Agilent X-Series Signal Analyzer

This manual provides documentation for the following X-Series Analyzers:
MXA Signal Analyzer N9020A
EXA Signal Analyzer N9010A

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

Agilent Technologies

Notices

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Manual Part Number

N9071-90012
Supersedes:N9071-90009

Print Date

March 2009

Printed in USA

Agilent Technologies, Inc.
1400 Fountaingrove Parkway
Santa Rosa, CA 95403

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Where to Find the Latest Information

Documentation is updated periodically. For the latest information about this analyzer, including firmware upgrades, application information, and product information, see the following URLs:

http://www.agilent.com/find/mxa
http://www.agilent.com/find/exa

To receive the latest updates by email, subscribe to Agilent Email Updates:

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

Information on preventing analyzer damage can be found at:

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

Contents

List of Commands

List of Commands

1 Using Help

Welcome to the X-Series Signal Analyzer Help system!

The online Help system is "context-sensitive". This means that the information displayed when you invoke the Help system depends on the selected Analyzer Mode, Measurement and key.

TIP	To view help for any Front-panel key or menu key, press that key with this Help Window open. To scroll any page vertically (to see the whole of a long topic), press the **Down Arrow** key on the Front Panel to scroll down (or the **Up Arrow** key to scroll up). To locate these keys, see “Front Panel Keys used by the Help System” on page 93.

See “Navigating the Help Window Without a Mouse” on page 98 for complete information about **Using Help without an attached Mouse and Keyboard**. For specific details of how to navigate to topics, see “Finding a Topic without a Mouse and Keyboard” on page 107.

See “Navigating the Help Window with a Mouse” on page 96 to learn about **Using Help with an attached Mouse and Keyboard**.

You can view Help on the Analyzer itself, or you can **View Help on Another Computer**, by copying the Help files and viewing Help there. For details, see the Section “Viewing Help on a separate Computer” on page 87.

To locate **Other Available Help Resources**, see “Locating Other Help Resources” on page 86.

Key Path	**Help**

Locating Other Help Resources

All available documentation is present on the Analyzer's hard disk, either as HTML Help or Acrobat PDF files.

In addition to the interactive Windows (HTML) Help system, the Analyzer's hard disk contains Application Notes, tutorial documents, etc.

This same documentation is also included on the Documentation CD shipped with your Analyzer.

Many of the supporting documents use the Adobe Acrobat (PDF) file format. You can view PDF files using the pre-installed Adobe Reader software.

The Adobe Reader user interface differs from the Windows Help interface. For full details on how to navigate within Acrobat documents using Adobe Reader, see "Navigating Acrobat (PDF) Files" on page 102.

Viewing Help on a separate Computer

You may want to view the help pages *without* having them appear on top of the Analyzer's screen.

There are two separate Help files for each Analyzer Mode, which contain all the same help pages in different formats:

1. A file in HTML Help (CHM) format,
2. A file in Acrobat (PDF) format.

You can copy any of the Help files to another computer, then open and view the help pages in the file on that computer.

Your choice of which file to copy and view may depend on what you want to do with the file (for example, whether you want to print it and read the paper copy, or view it on the computer). The table below compares the relative advantages of the two formats:

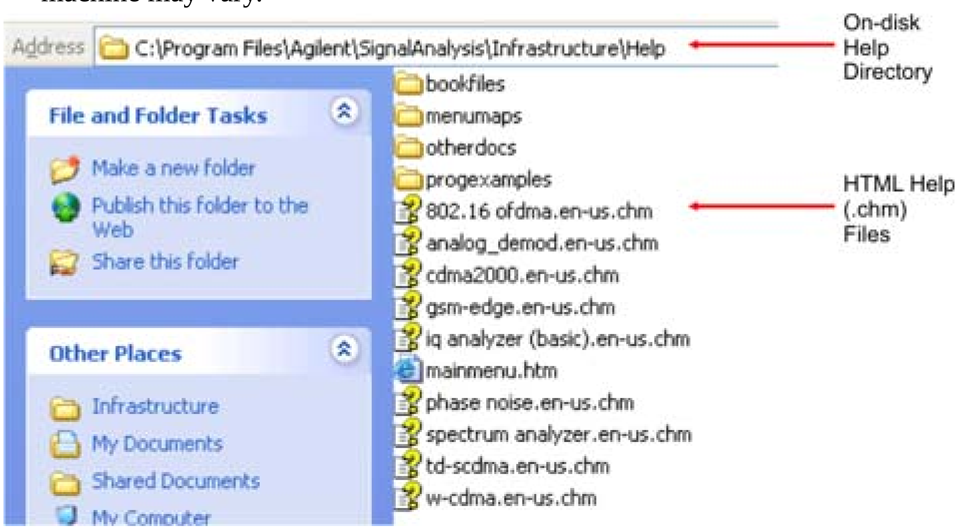
Format Type	**HTML Help** Format (**CHM** Files)	**Acrobat** Format (**PDF** Files)
File Extension	CHM	PDF
Software Required to view file	Microsoft Windows operating system only, with Microsoft Internet Explorer installed.	Free Adobe Reader software can be downloaded for many operating systems, including: Microsoft Windows, Macintosh, Linux, Solaris.
Full Text Search?	Yes	Yes
Printable?	Yes, but with limited control.	Yes. Full print control.
Printable Table of Contents?	No	Yes
Navigable without a Mouse and Keyboard?	Yes, but with some loss of functionality.	No
Has Page Numbers?	No	Yes
Context-Sensitive Display?	Yes, when viewed using the X-Series Analyzer application window.	No
Indexed?	Yes	No
Active Hyperlinks?	Yes	Yes

Copying the HTML Help (CHM) Files

You can copy the HTML Help file(s) you need to a separate computer running Microsoft Windows. Each HTML Help file has a `.chm` extension.

You can find the HTML Help (`.chm`) files:

- *Either*, on the documentation CD that came with the Analyzer,
- *Or*, in a special directory on the Analyzer's hard disk. The directory path is:
  `C:\Program Files\Agilent\SignalAnalysis\Infrastructure\Help`
  The illustration below shows an example listing of the HTML Help files in this directory, viewed using Windows Explorer.
  Depending on which Analyzer software licenses you purchased, the content of the directory on your machine may vary.



NOTE You can open and view the HTML Help files only on a PC that has Microsoft Windows and Microsoft Internet Explorer installed.

Copying the Acrobat (PDF) Files

You can copy the Acrobat file(s) you need to a separate computer running any of several different operating systems. Each Acrobat file has a `.pdf` extension.

You can find the Acrobat (`.pdf`) files:

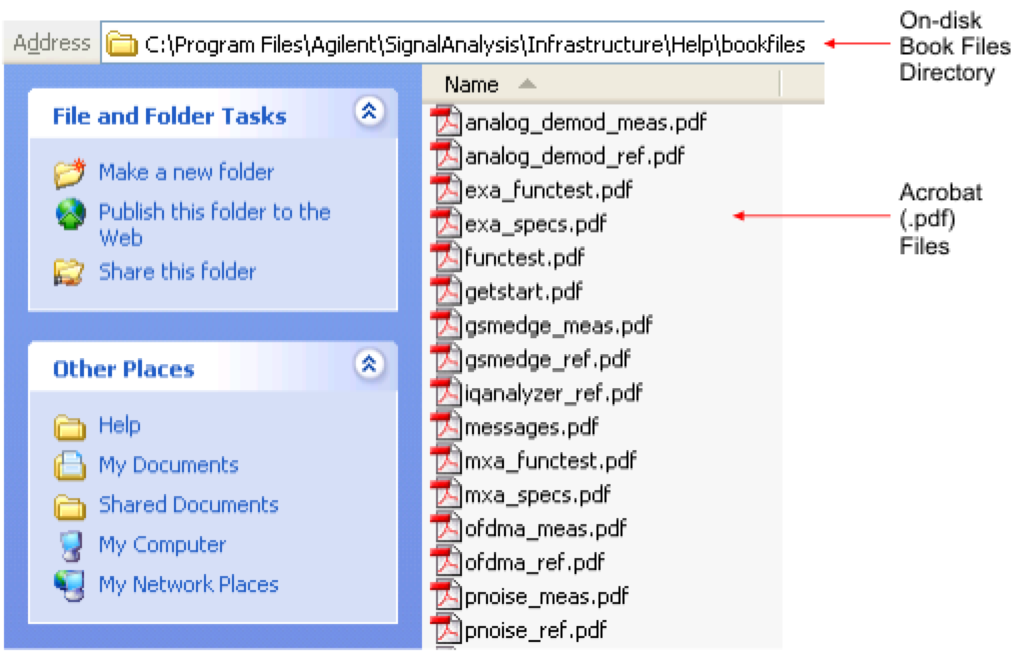
- *Either*, on the documentation CD that came with the Analyzer,
- *Or*, in a special directory on the Analyzer's hard disk. The directory path is:
  `C:\Program Files\Agilent\SignalAnalysis\Infrastructure\Help\bookfiles`

  — The illustration below shows an example listing of the Acrobat files in this directory, viewed using Windows Explorer.

  — The PDF versions of the help files are named `<mode>_ref.pdf`, where `<mode>` is the name of the Analyzer Mode. For example, the name of the PDF file for GSM/EDGE Mode is `gsmedge_ref.pdf`. (Note that the directory also contains other PDF documents.)

  — When you open any `<mode>_ref.pdf` document, the title page displays "`<Mode> User's` `and Programmer's Reference`", where `<Mode>` is the name of the Analyzer Mode described by the document.

— Depending on which Analyzer software licenses you purchased, the content of the directory on your machine may vary.



How Help is Organized

This topic contains the following sections:

"Help Contents Listing" on page 90

"System Functions" on page 91

"Key Descriptions for Each Measurement" on page 91

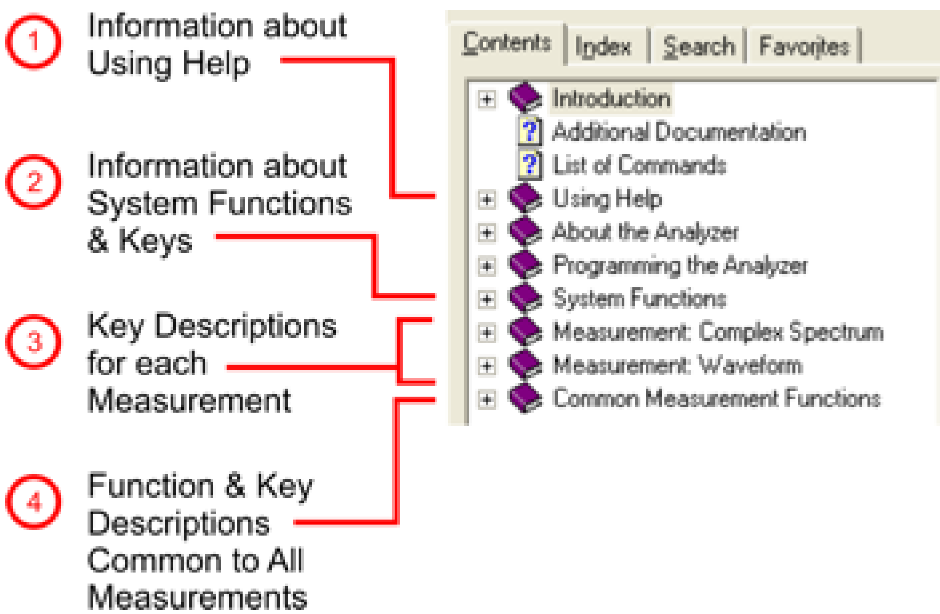
"Key Information for Softkeys" on page 92

"Common Measurement Functions" on page 92

Help Contents Listing

The listing under the Contents tab in the Help Window includes a topic for each Front-panel key and each softkey, for each available measurement.

The Contents listing is split into several major sections, as shown below for the HTML Help version of the document. The structure of the PDF version is similar.



Help information is split between these sections as follows:

1. Using Help: this section.
2. System Functions. See "System Functions" on page 91 below.
3. Measurement Functions. See "Key Descriptions for Each Measurement" on page 91 below.
4. Common Measurement Functions. See "Common Measurement Functions" on page 92 below.

System Functions

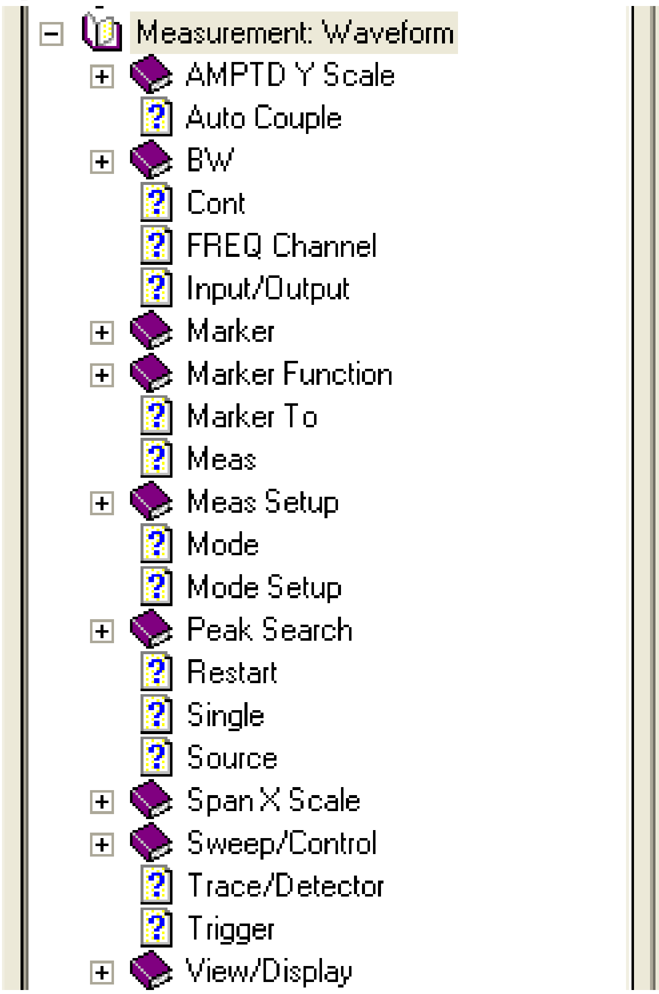
This section contains information for the following keys, which are listed in alphabetical order: **File**, **Preset**, **Print**, **Quick Save**, **Recall**, **Save**, **System**, **User Preset**.

The functions of these keys do not vary between measurements: they operate the same way, irrespective of which Analyzer measurement you have selected.

The sections for **Recall** and **Save** contain only cross-references to the respective sections in "Common Measurement Functions" on page 92, and are included here for convenience.

Key Descriptions for Each Measurement

The Contents section for each Measurement is sub-divided into topics for each Front-panel key, in alphabetical order, as shown below.

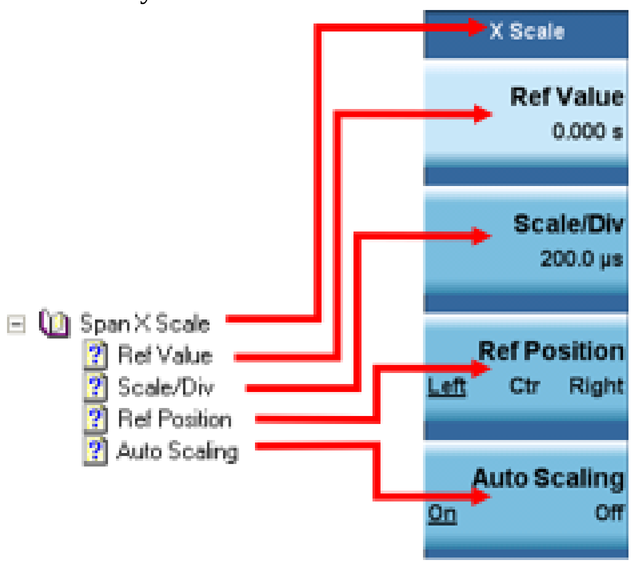


If you don't see a topic for a Front-panel key in the Measurement-specific section, then it is located in the section "System Functions" on page 91.

Using Help
How Help is Organized

Key Information for Softkeys

Information for each softkey that appears when you press a Front-panel key (or a softkey with a submenu) is listed under the entry for that key in the Help Contents. The example below shows the submenu under the **SPAN X Scale** Front-panel key in the "Waveform" Measurement, alongside the actual softkeys for that menu.



In these subsections, all softkeys are listed in the order they appear in their menu (that is, *not* in alphabetical order).

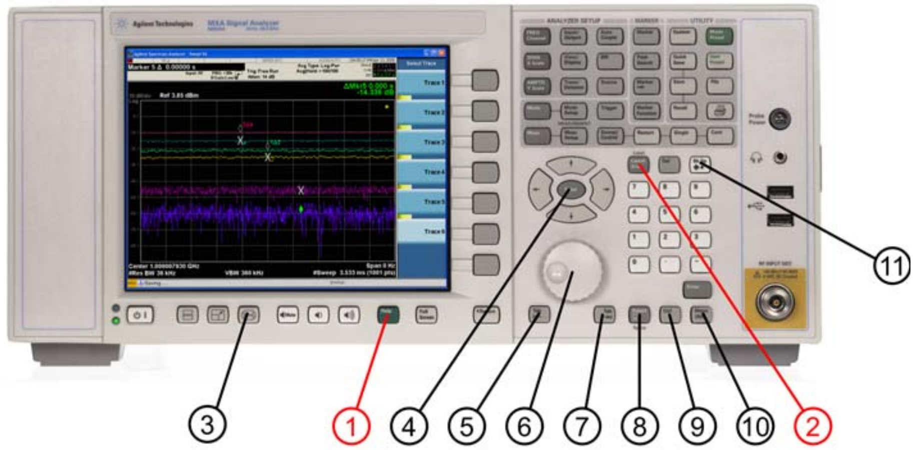
Common Measurement Functions

This section groups together function and key information that is shared between measurements. However, there is a listing for every Front-panel key and subkey in the section for each measurement, so you will generally not need to refer to this section.

The key subsections are listed alphabetically.

Front Panel Keys used by the Help System

The interactive Help system uses the Front-panel keys shown below.

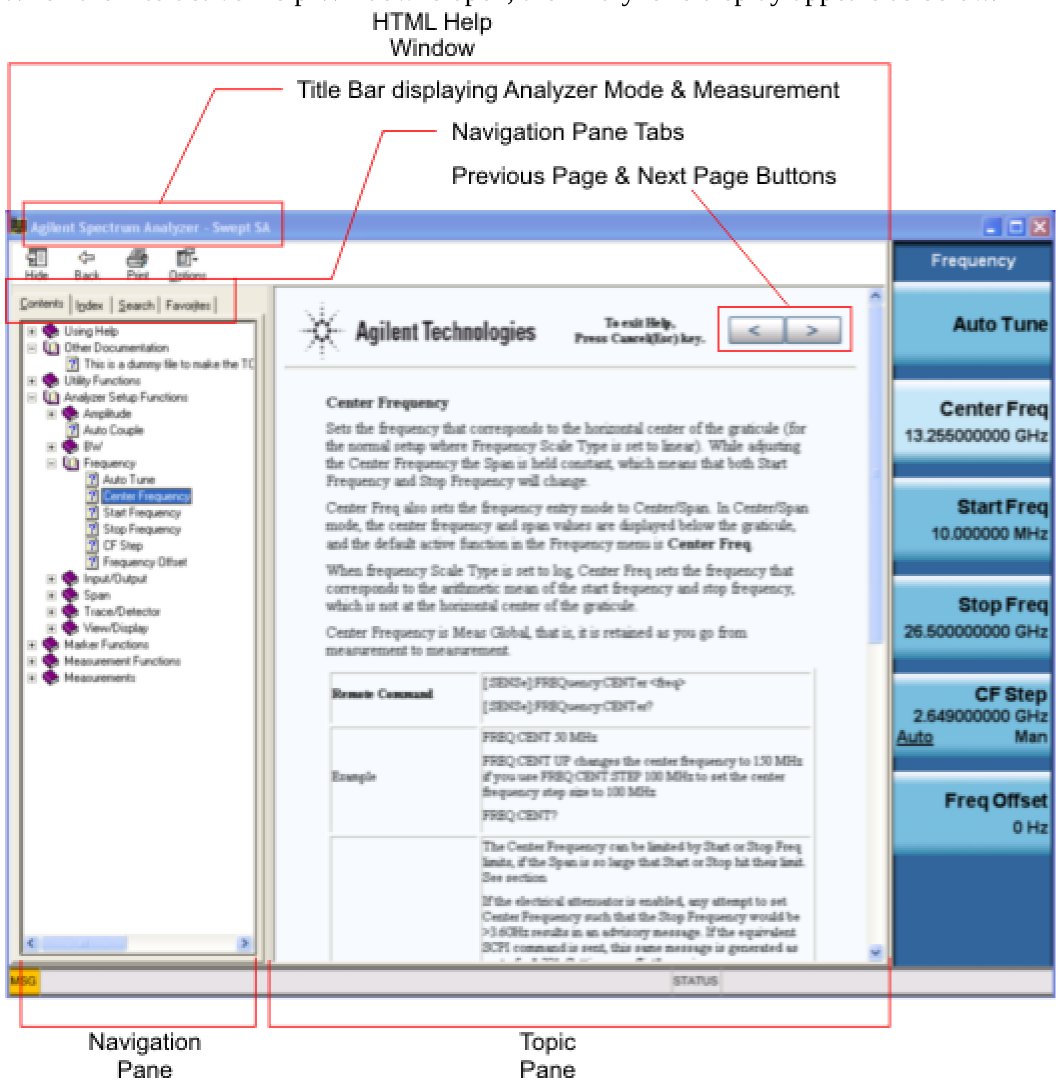


Item #	Item Name	Description
1	Help Key	Opens Help (displaying the topic for the last key pressed).
2	Cancel (Esc) Key	Exits Help.
3	Next Window Key	Changes the current window pane selection.
4	Arrow / Enter Keys	A central **Enter** key, surrounded by four directional arrow keys. Navigates within the Help system.
5	Backward Tab Key	Moves between controls in the Help display.
6	Knob	For future use.
7	Forward Tab Key	Moves between controls in the Help display.
8	Select / Space Key	Navigates within the Help system, in conjunction with other keys.
9	Ctrl Key	Navigates within the Help system, in conjunction with other keys. See “Navigating Windows HTML Help (CHM) Files” on page 94.
10	Alt Key	Navigates within the Help system, in conjunction with other keys. See “Navigating Windows HTML Help (CHM) Files” on page 94.
11	Bk Sp (Backspace) Key	Acts as a "Back" key when navigating the pages of the Help system.

Navigating Windows HTML Help (CHM) Files

HTML Help Window Components

When the interactive Help Window is open, the Analyzer’s display appears as below.



The HTML Help Window appears on top of, and to the left of, the measurement display. You can still see and use the current softkey menu when the HTML Help Window is open. However, pressing a softkey when the Help window is open displays Help for that softkey, but does *not* execute the softkey’s function.

When the Help Window is open, the Analyzer retains its current Mode and Measurement, as shown in the Title Bar.

The HTML Help Window itself consists of two panes, as shown in the diagram above.

On the left is the Navigation Pane, and on the right is the Topic Pane.

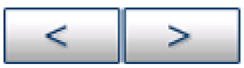
The Help Window Navigation Pane

The Navigation Pane is further divided into four tabs: Contents, Index, Search and Favorites, as shown below.

For details of how to switch between these tabs, if you don't have a mouse attached to the Analyzer, see the Section "To Switch the Active Tab within the Navigation Pane" on page 98.

The Help Window Topic Pane

This pane displays the text for the topic that you have selected. It also contains clickable **Previous Page** and **Next Page** buttons (as shown below), which can be used to move to the previous or next page in the Help file.



Basic Help Window Operations

This topic contains the following sections:

To locate the keys mentioned in this section, see "Front Panel Keys used by the Help System" on page 93.

Opening Help

To access the Help system, press the green **Help** key below the front panel display (shown below) while an Agilent application is running.

Note that the softkeys remain visible when the Help window is open.

Getting Help for a Specific Key

1. If the Help window *is* already open, press the desired key. The relevant Help topic appears.

   Note that the function normally invoked by the key is *not* executed when the key is pressed with the Help window open. If you want to execute the key's function, first close Help by pressing the **Cancel (Esc)** key (as described in "Closing the Help Window" on page 96), then press the key, before opening Help again (if required).

2. If the Help window is *not* already open, press the desired key (which executes the key's function), then press the **Help** key to display the relevant Help page. Help is available for all softkeys, and for

all the Front-panel keys listed under the "System Functions" and "Measurement" sections.

For details of how to navigate within the panes of the Help window, see “Navigating Windows HTML Help (CHM) Files” on page 94.

Closing the Help Window

To close the Help window, and return to the measurement application, press the **Cancel (Esc)** key (depicted below).

Viewing Help on How to Use Help

With the Help window open, press the green **Help** key again.

The "Using Help" page appears, as shown below.

Exiting Help on How to Use Help

See the Section “To Go Back or Forward: display the Previously-viewed or Next-viewed Topic in the Topic Pane” on page 100 for details of several methods to accomplish this.

Navigating the Help Window

The way you navigate around the HTML Help Window depends on whether you have a mouse and keyboard attached to your Analyzer:

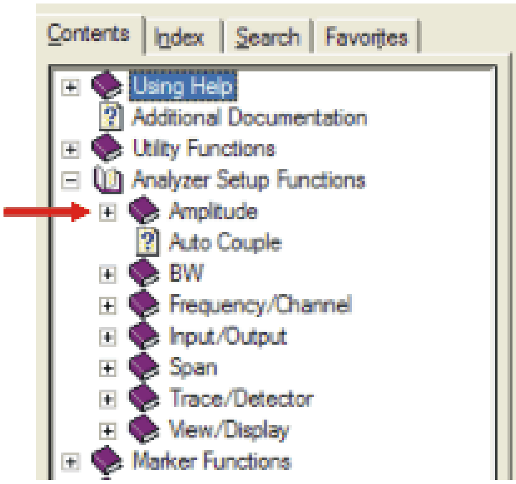
- If you have a mouse and keyboard attached, see the Section “Navigating the Help Window with a Mouse” on page 96.
- If you don’t have a mouse and keyboard attached, see the Section “Navigating the Help Window Without a Mouse” on page 98.

Navigating the Help Window with a Mouse

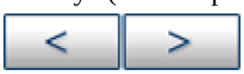
When the HTML Help window is open, you can point-and-click to navigate, as you would when using Help for any Microsoft Windows computer application. The basic navigational features the Help systems of all X-Series Analyzers are as follows:

- If necessary, press the green **Help** key on the Front Panel, as described in “Opening Help” on page 95, to open the HTML Help window.

- Choose the desired topic from the list under the Contents Tab of the HTML Help Window’s Navigation Pane, then click on the topic title to display the first page of the topic.
- To expand the listing of a topic, click on the + icon to the left of the topic’s book icon, as shown below. A list of subtopics and pages appears.

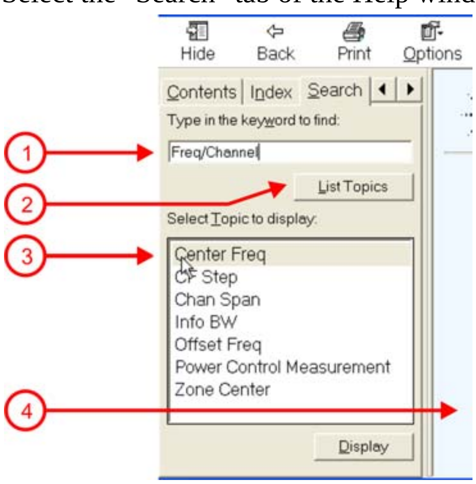


- To move to the Next or Previous Page within the Topic Pane, click the **Next Page** or **Previous Page** Keys (at the top right of the *Topic* Pane), as shown below.



Searching for a Help Topic If you also have a keyboard attached to the Analyzer, you can use the Help system’s full-text search feature to locate help for any topic, by typing in a key name, a topic name, or any other desired text.

Select the "Search" tab of the Help window’s Navigation Pane, then use the following procedure:



1. Type the desired topic name into the Search window as shown in the diagram above. Note that the text search is *not* case-sensitive.
2. Click on the **List Topics** button.
3. *Either*:

   Double-click on the desired topic in the list, *Or*:

Click on the desired topic to select it, then click the **Display** button beneath the list.

4. The topic is then displayed in the Topic Pane (right-hand side of display).

Navigating the Help Window Without a Mouse

Most features of the Help system can be accessed and navigated without the necessity to attach a mouse or keyboard to the Analyzer. There are, however, a few exceptions to this rule, which are noted in the Section “Functions that cannot be used without a Mouse and Keyboard” on page 101.

For information about how to perform common tasks in the Help system, click on one of the following links:

“To Toggle the Focus between the Navigation Pane and the Topic Pane” on page 98

“To Switch the Active Tab within the Navigation Pane” on page 98

“To Scroll up or down the list of Topics within the Contents or Index Tabs of the Navigation Pane” on page 99

“To Expand or Collapse a selected topic within the Contents Tab of the Navigation Pane” on page 99

“To Display a selected Help topic in the Topic Pane from the Contents Tab of the Navigation Pane” on page 99

“To Display a Help topic in the Topic Pane from the Index Tab of the Navigation Pane” on page 99

“To Scroll up or down within a topic in the Topic Pane” on page 100

“To Go to the Next or Previous Page in the Topic Pane” on page 100

“To Go Back or Forward: display the Previously-viewed or Next-viewed Topic in the Topic Pane” on page 100

“To Scroll horizontally or vertically within the Contents Tab of the Navigation Pane” on page 101

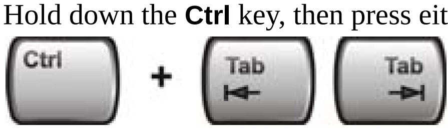
“To Print the topic currently displayed” on page 101

To locate all the keys mentioned in this section, see “Front Panel Keys used by the Help System” on page 93.

To Toggle the Focus between the Navigation Pane and the Topic Pane Press the **Next Window** key.

To Switch the Active Tab within the Navigation Pane Perform this procedure to display either the Contents, Index, Search or Favorites tab of the Help window’s Navigation Pane.

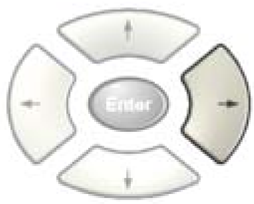
Hold down the **Ctrl** key, then press either the **Forward Tab** key, *or* the **Backward Tab** key.



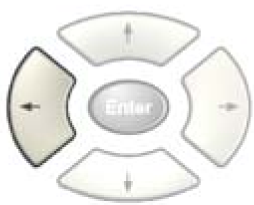
To Scroll up or down the list of Topics within the Contents or Index Tabs of the Navigation Pane

With the focus in the Navigation Pane, press the **Up Arrow** or **Down Arrow** keys.

To Expand or Collapse a selected topic within the Contents Tab of the Navigation Pane With the focus in the Navigation Pane, press the **Right Arrow** key to *expand* the selected topic:

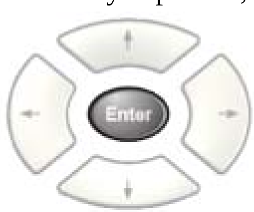


Or press the **Left Arrow** key to *collapse* the selected topic.

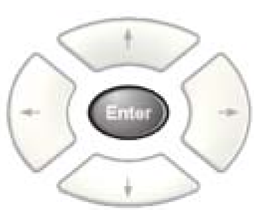


To Display a selected Help topic in the Topic Pane from the Contents Tab of the Navigation Pane

With the focus in the Contents Tab of the Navigation Pane, press the **Enter** key. If the selected topic was not already expanded, it expands in the Navigation Pane.

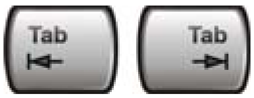


To Display a Help topic in the Topic Pane from the Index Tab of the Navigation Pane With the focus in the Index Tab of the Navigation Pane, press the **Enter** key.



To Scroll up or down within a topic in the Topic Pane With the focus in the Topic Pane, press either the **Up Arrow** key or **Down Arrow** key.

To Go to the Next or Previous Page in the Topic Pane With the focus in the Topic Pane, press either **Forward Tab** or **Backward Tab** keys



to select the **>** (**Next Page**) key at the top right of the Pane, if you want to go to the *next* page,

or select the **<** (**Previous Page**) key at the top right of the Pane, if you want to go to the *previous* page.

Press **Enter**.

To Go Back or Forward: display the Previously-viewed or Next-viewed Topic in the Topic Pane

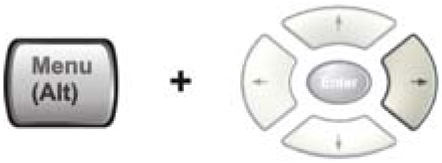
To go *back*, *either*:

Hold down the **Alt** key, then press the **Left Arrow** key.

Or:

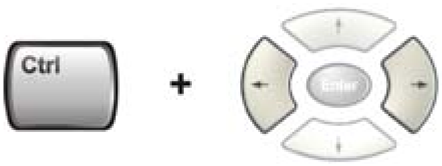
Press the **Bk Sp** key.

To go *forward*, hold down the **Alt** key, then press the **Right Arrow** key.

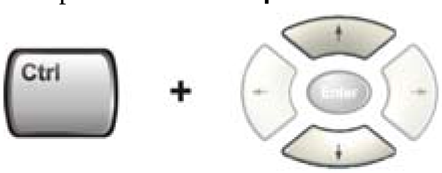


(The "Go Forward" operation has no effect unless there have been previous “Go Back” operations)

To Scroll horizontally or vertically within the Contents Tab of the Navigation Pane To scroll *horizontally*: with the focus in the Contents Tab of the Navigation Pane, hold down the **Ctrl** key, then press either the **Left Arrow** or **Right Arrow** keys.



To scroll *vertically*: with the focus in the Contents Tab of the Navigation Pane, hold down the **Ctrl** key, then press either the **Up Arrow** or **Down Arrow** keys.



To Print the topic currently displayed Press the Front-panel **Print** key

Functions that cannot be used without a Mouse and Keyboard The following parts of the HTML Help System *cannot* easily be used without attaching a mouse and keyboard to the Analyzer.

- The menu options at the top of the Help Window, consisting of: **Hide**, **Back**, **Print** and **Options**.
- The functionality of the Search Tab of the Navigation Pane.
- The functionality of the Favorites Tab of the Navigation Pane.

Navigating Acrobat (PDF) Files

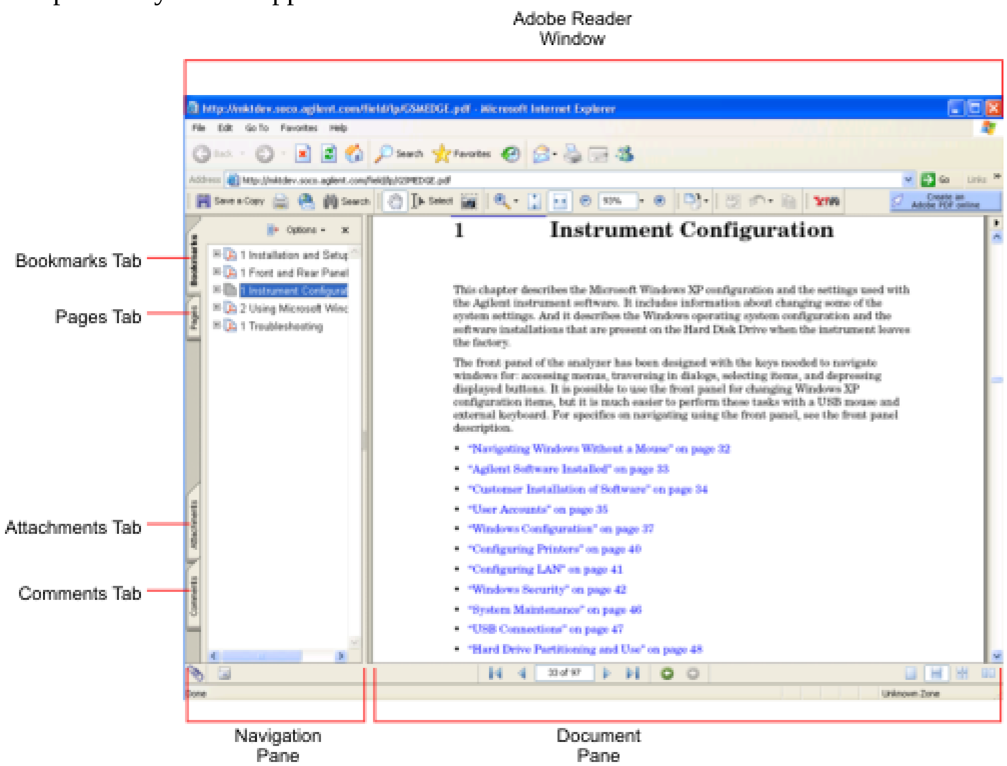
IMPORTANT To navigate PDF files effectively, you must attach a mouse and keyboard to the Analyzer.

If it is not possible to attach a mouse and keyboard to the Analyzer, you should copy the PDF file to a separate computer, then open it on that computer. Every PDF file that is present on the Analyzer's hard disk can also be found on the Documentation CD shipped with the Analyzer. For details, see "Copying the Acrobat (PDF) Files" on page 88.

Adobe Reader Window

When an Adobe Acrobat (PDF) file is open and being viewed, the Analyzer's display appears as below.

Note that, unlike the HTML Help Window, the Acrobat Reader Window is *not* embedded in the Analyzer's Application window. It is a separate window, which can be resized, moved and closed independently of the Application window.



The Adobe Reader Window itself consists of two panes, as shown in the diagram above.

On the left is the Navigation Pane (which may be hidden), and on the right is the Document Pane.

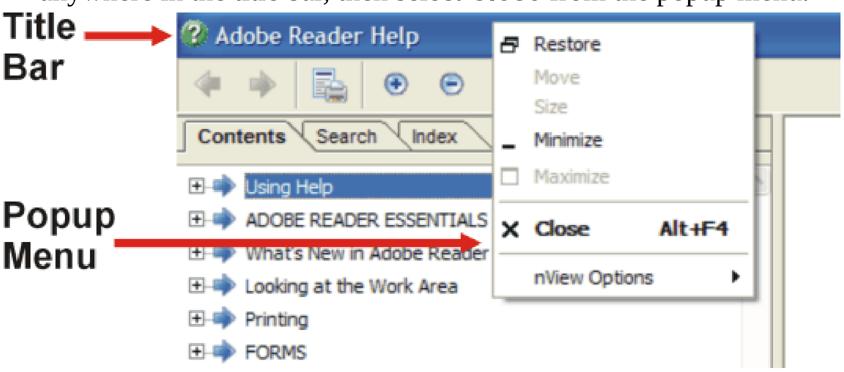
The Navigation Pane is further subdivided into four tabs: Bookmarks, Pages, Attachments and Comments. Typically, PDF files supplied with the Agilent X-Series Analyzers contain useful content only under the Bookmarks and Pages Tabs: the Attachments and Comments Tabs are not used.

Navigating the Acrobat Reader Window

The online Help for Adobe Reader provides detailed information on how to use the Reader. To access the online Help, do the following:

- With the Adobe Reader window open, click **Help**, **Adobe Reader Help** in the menu at the top of the screen. This opens the Help window on top of the document window.
- To close the Help window, *either* click the Red **X** at the top right of the window, *or* right-click

anywhere in the title bar, then select **Close** from the popup menu.



Printing Acrobat Files

NOTE The driver for the appropriate printer must be installed on the Analyzer's hard disk before any file can be printed.

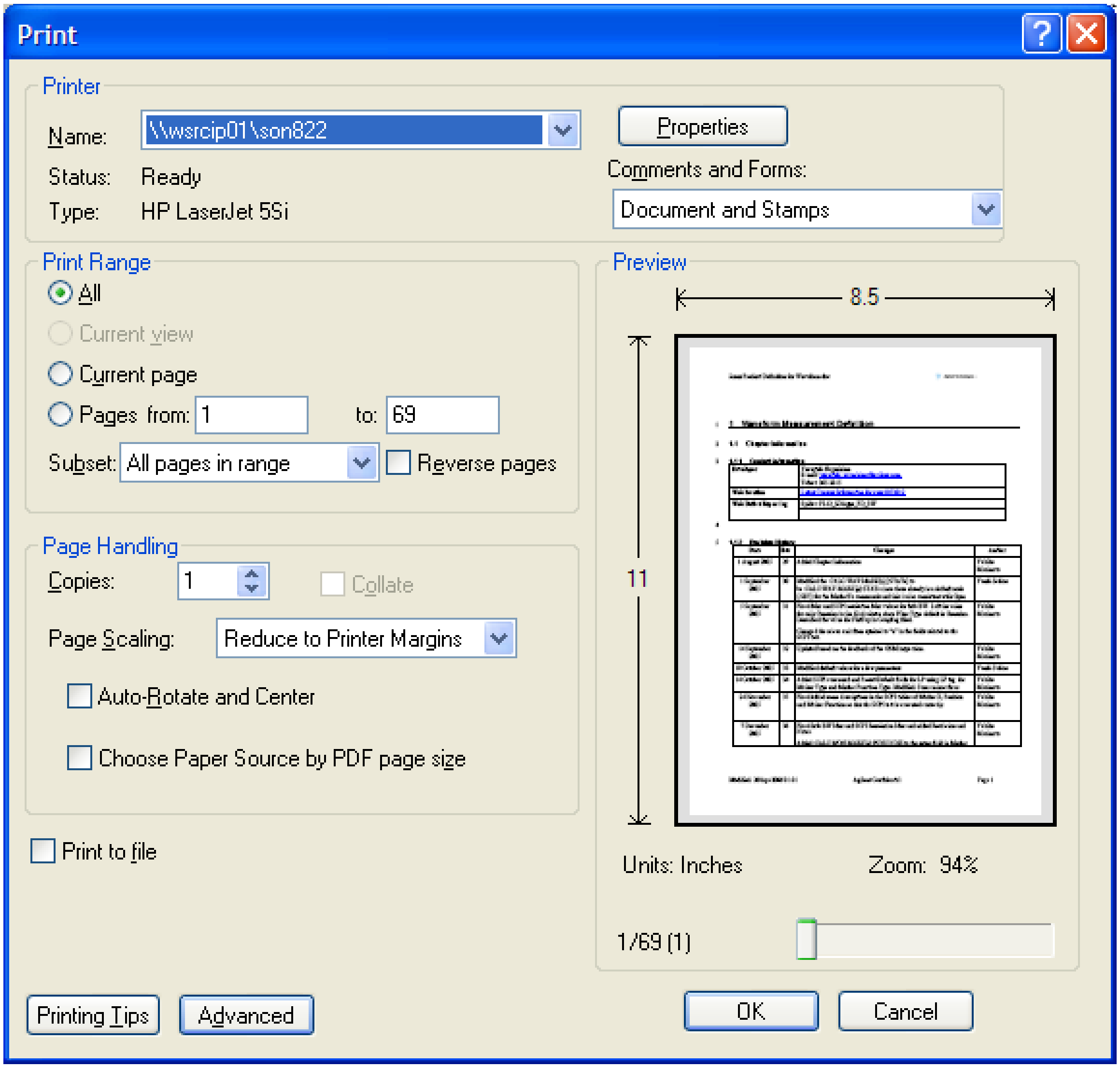
To print all or part of an open Acrobat file, do the following.

1. *Either*,

   a. click on the `Print` icon in the Acrobat Reader toolbar,

   b. *or*, select `File > Print` from the menu.

2. The Acrobat Reader Print dialog opens, as shown below.



3. Choose the desired options within the Print dialog, then click `OK` to print (or click `Cancel` to cancel the printing).

NOTE Clicking the `Properties` button within the Print dialog opens a window containing controls that are specific to the printer model installed. Check the printer manufacturer's documentation for details of these capabilities.

Terms Used in This Documentation

Many special terms are used throughout this documentation. Please refer to the "Getting Started Guide" for detailed explanations of all these terms.

The Section below provides a brief description of special terms used in the Key parameter tables.

Terms used in Key Parameter Tables

The following terms are used in the parameter tables for each Front-panel key or softkey. However, a particular key description may not use all the terms listed.

Term	Meaning
Default Unit	The default measurement unit of the setting.
Default Terminator	Indicates the units that will be attached to the numeric value that you have entered. This default will be used from the front panel, when you terminate your entry by pressing the **Enter** key, rather then selecting a units key. This default will be used remotely when you send the command without specifying any units after your value(s).
Dependencies/ Couplings	Some commands may be unavailable when other parameters are set in certain ways. If applicable, any such limitations are described here.
Example	Provides command examples using the indicated remote command syntax.
Factory Preset	Describes the function settings after a **Factory Preset**.
Key Path	The sequence of Front-panel keys that accesses the function or setting.
Knob Increment/Decrement	The numeric value of the minimum increment or decrement that is applied when turning the thumb wheel knob.
Max	The Maximum numerical value that the setting can take.
Min	The Minimum numerical value that the setting can take.
Meas Global	The functionality described is the same in all measurements.
Meas Local	The functionality described is only true for the measurement selected.
Mode Global	The functionality described is the same for all modes.
Preset	In some cases, a Preset operation changes the status of a parameter. If the operation of the key specified is modified by a Preset operation, the effect is described here.
Range	Describes the range of the smallest to largest values to which the function can be set. If you try to set a value below the minimum value, the analyzer defaults to the minimum value. If you try to set a value above the maximum value, the analyzer defaults to the maximum value.
Remote Command	Shows the syntax requirements for each SCPI command.

Term	Meaning
Remote Command Notes	Additional notes regarding Remote Commands.
Resolution	Specifies the smallest change that can be made to the numeric value of a parameter.
SCPI Status Bits/OPC Dependencies	Pressing certain keys may affect one or more status bits. If applicable, details are given here.
State Saved	Indicates what happens to a particular function when the Analyzer state is saved (either to an external memory device or the internal D: drive). It also indicates whether the current settings of the function are maintained if the Analyzer is powered on or preset using **Power On Last State** or **User Preset**.

Context Sensitive Help not Available

You have been directed to this page because interactive help for the key you selected is not available.

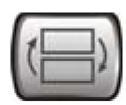
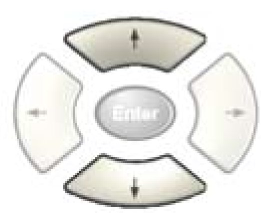
The following information may help you to find related topics of interest:

- If your Analyzer has an attached Mouse and Keyboard, see the Section "Searching for a Help Topic" on page 97.
- If your Analyzer does *not* have an attached Mouse and Keyboard, see the Section "Finding a Topic without a Mouse and Keyboard" on page 107 below.
- If you want to learn how to select on-page links *without* a Mouse attached to your Analyzer, see the Section "Selecting a Hyperlink without a Mouse" on page 108 below.

TIP If you want to understand the organization of Help, see the Section "How Help is Organized" on page 90.

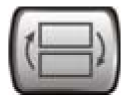
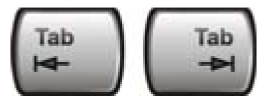
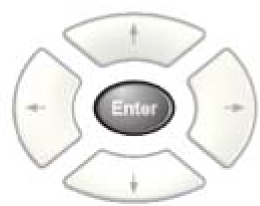
Finding a Topic without a Mouse and Keyboard

Follow this procedure when you want to display a different Help topic by selecting it from the Contents tab of the Help window's Navigation Pane, but you do not have a mouse attached to the Analyzer.

Perform this action:	**Using these keys:**
1. If necessary, toggle the focus between the Contents tab of the Navigation Pane (left side of display) and the Topic Pane (right side of display) by pressing the **Next Window** key. Ensure that the focus is in the *Contents tab of the Navigation* Pane.	
2. Move up or down the Contents list, by pressing the **Up Arrow** or **Down Arrow** keys. Topics become highlighted upon selection.	
3. Display the selected topic, by pressing the **Enter** key.	

Selecting a Hyperlink without a Mouse

Follow this procedure when you want to select and follow a hyperlink on a Help page, but you do not have a mouse attached to the Analyzer.

Perform this action:	Using these keys:
1. If necessary, toggle the focus between the Contents tab of the Navigation Pane (left side of display) and the Topic Pane (right side of display) by pressing the **Next Window** key. Ensure that the focus is in the *Topic Pane*.	
2. Move from link to link in the Topic Pane (right side of display) by pressing the **Forward Tab** and **Backward Tab** keys. Links become highlighted upon selection. NOTE: When a Help page is first displayed, no link is selected. Clicking the **Forward Tab** key once selects the **Previous Page** key. Clicking the **Forward Tab** key a second time selects the **Next Page** key. Clicking the **Forward Tab** key for a third time selects the first hyperlink on the page. It is sometimes difficult to see the highlighting of the **Previous** and **Next Page** keys.	Use the **Forward** and **Backward Tab** keys  to select the **Previous** and **Next Page** keys 
3. When you have selected the desired link, activate it by pressing the **Enter** key.	

2 About the Analyzer

The X-Series signal analyzer measures and monitors complex RF and microwave signals. Analog baseband analysis is available on MXA. The analyzer integrates traditional spectrum measurements with advanced vector signal analysis to optimize speed, accuracy, and dynamic range. The analyzer has Windows XP Pro® built in as an operating system, which expands the usability of the analyzer.

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

Installing Application Software

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

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

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

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

Viewing a License Key

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

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

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

C:\Programing Files\Agilent\Licensing

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

Obtaining and Installing a License Key

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

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

Installing a license key can also be done manually using the license management application in the instrument. It is found through the instrument front panel keys at **System**, **Licensing. . .** , or internally at C:\Programming Files\Agilent\Licensing.

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

Missing and Old Measurement Application Software

All the software applications were loaded at the time of original instrument manufacture. It is a good idea to regularly update your software with the latest available version. This assures that you get any improvements and expanded functionality that is available.

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

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

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

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

X-Series Options and Accessories

"MXA Instrument Options" on page 111

"MXA Accessories" on page 112

"EXA Instrument Options" on page 112

"EXA Accessories" on page 113

"Advanced Measurement Application Software" on page 113

MXA Instrument Options

Product	Description
N9020A	MXA Signal Analyzer
N9020A-503	Frequency range from 20 Hz to 3.6 GHz
N9020A-508	Frequency range from 20 Hz to 8.4 GHz
N9020A-513	Frequency range from 20 Hz to 13.6 GHz
N9020A-526	Frequency range from 20 Hz to 26.5 GHz
N9020A-B25	Analysis bandwidth, 25 MHz
N9020A-BBA	Analog baseband IQ inputs
N9020A-PFR	Precision frequency reference
N9020A-PRC	Portable configuration

Product	Description
N9020A-EA3	Electric attenuator, 3.6 GHz
N9020A-S40	Baseband analysis bandwidth, 40 MHz/channel
N9020A-P03	Preamplifier, 3.6 GHz
N9020A-P08	Preamplifier, 8.4 GHz
N9020A-P13	Preamplifier, 13.6 GHz
N9020A-P26	Preamplifier, 26.5 GHz

MXA Accessories

Product	Description
N9020A-MLP	75 ohm minimum loss pad
N9020A-EFM	USB flash drive
N9020A-DVR	DVD-ROM drive
N9020A-MSE	Mouse, USB interface
N9020A-KYB	Keyboard, USB interface
N9020A-HTC	Hard transit case
N9020A-1CP	Rackmount kit with handles
N9020A-1CN	Front handle kit
N9020A-1CM	Rackmount kit
N9020A-1CR	Rack slide kit
N9020A-CPU	Instrument security, additional CPU and HDD
N9020A-UK6	Commercial Calibration Certificate with Test Data
N9020A-1A7	ISO 17025 Compliant Calibration
N9020A-A6J	ANSI Z540 Compliant Calibration

EXA Instrument Options

Product	Description
N9010A	EXA Signal Analyzer (3.6, 7.0, 13.6, and 26.5 GHz)
N9010A-503	Frequency range from 9 kHz to 3.6 GHz
N9010A-507	Frequency range from 9 kHz to 7.0 GHz
N9010A-513	Frequency range from 9 kHz to 13.6 GHz
N9010A-526	Frequency range from 9 kHz to 26.5 GHz

Product	Description
N9010A-FSA	Fine step attenuator
N9010A-PFR	Precision frequency reference
N9010A-PRC	Portable configuration
N9010A-EA3	Electric attenuator, 3.6 GHz
N9010A-P03	Preamplifier, 3.6 GHz

EXA Accessories

Product	Description
N9010A-MLP	Minimum loss pad, 50 to 75 ohms
N9010A-EFM	USB flash drive
N9010A-DVR	DVD-ROM/CD-R/RW drive
N9010A-MSE	Mouse, USB interface
N9010A-KYB	Keyboard, USB interface
N9010A-HTC	Hard transit case
N9010A-1CP	Rackmount kit with handles
N9010A-1CN	Front handle kit
N9010A-1CM	Rackmount kit
N9010A-1CR	Rack slide kit
N9010A-CPU	Instrument security, additional CPU and HDD
N9010A-UK6	Commercial Calibration Certificate with Test Data
N9010A-1A7	ISO 17025 Compliant Calibration
N9010A-A6J	ANSI Z540 Compliant Calibration

Advanced Measurement Application Software

For a current list of application software, go to the following URLs.

For MXA,

http://www.agilent.com/find/mxa/options

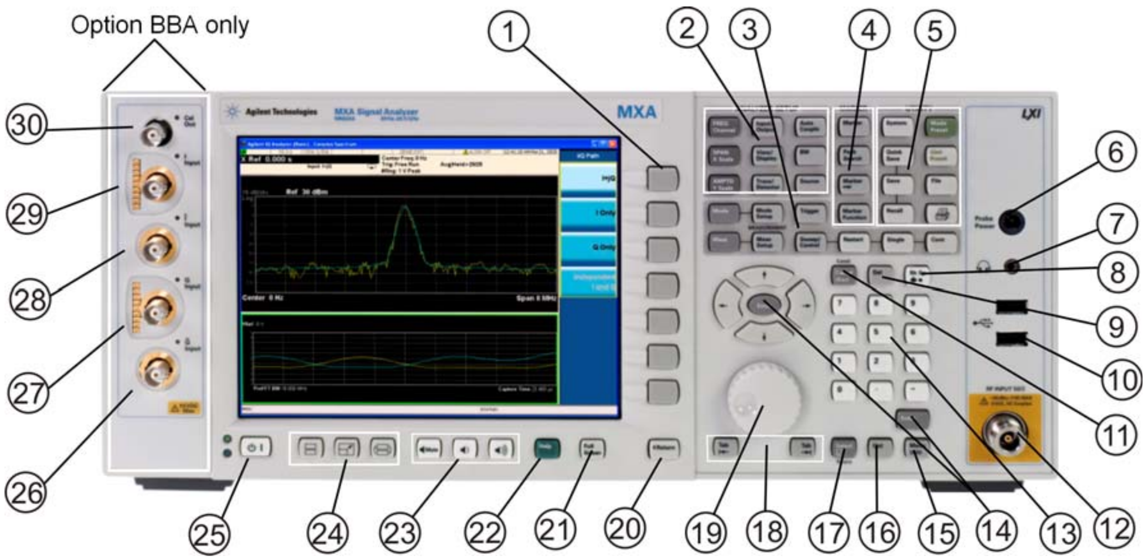
Select the *MXA N9020A, Options and Measurement Applications* link on the top of the page.

For EXA,

http://www.agilent.com/find/exa/options

Select the *EXA N9010A, Options and Measurement Applications* link on the top of the page.

Front-Panel Features



Item		Description
#	Name	
1	Menu Keys	Key labels appear to the left of the menu keys to identify the current function of each key. The displayed functions are dependent on the currently selected Mode and Measurement, and are directly related to the most recent key press.
2	Analyzer Setup Keys	These keys set the parameters used for making measurements in the current Mode and Measurement.
3	Measurement Keys	These keys select the Mode, and the Measurement within the mode. They also control the initiation and rate of recurrence of measurements.
4	Marker Keys	Markers are often available for a measurement, to measure a very specific point/segment of data within the range of the current measurement data.
5	Utility Keys	These keys control system-wide functionality such as: • instrument configuration information and I/O setup, • printer setup and printing, • file management, save and recall, • instrument presets.
6	Probe Power	Supplies power for external high frequency probes and accessories.
7	Headphones Output	Headphones can be used to hear any available audio output.
8	Back Space Key	Press this key to delete the previous character when entering alphanumeric information. It also works as the Back key in Help and Explorer windows.

Item #	Item Name	Description
9	Delete Key	Press this key to delete files, or to perform other deletion tasks.
10	USB Connectors	Standard USB 2.0 ports, Type A. Connect to external peripherals such as a mouse, keyboard, DVD drive, or hard drive.
11	Local/Cancel/(Esc) Key	If you are in remote operation, Local: • returns instrument control from remote back to local (the front panel). • turns the display on (if it was turned off for remote operation). • can be used to clear errors. (Press the key once to return to local control, and a second time to clear error message line.) If you have not already pressed the units or Enter key, Cancel exits the currently selected function without changing its value. Esc works the same as it does on a pc keyboard. It: • exits Windows dialogs • clears errors • aborts printing • cancels operations.
12	RF Input	Connector for inputting an external signal. Make sure that the total power of all signals at the analyzer input does *not* exceed +30 dBm (1 watt).
13	Numeric Keypad	Enters a specific numeric value for the current function. Entries appear on the upper left of the display, in the measurement information area.
14	Enter and Arrow Keys	The Enter key terminates data entry when either no unit of measure is needed, or you want to use the default unit. The arrow keys: • Increment and decrement the value of the current measurement selection. • Navigate help topics. • Navigate, or make selections, within Windows dialogs. • Navigate within forms used for setting up measurements. • Navigate within tables. **NOTE** The arrow keys cannot be used to move a mouse pointer around on the display.
15	Menu/ (Alt) Key	Alt works the same as a pc keyboard. Use it to change control focus in Windows pull-down menus.
16	Ctrl Key	Ctrl works the same as a pc keyboard. Use it to navigate in Windows applications, or to select multiple items in lists.
17	Select / Space Key	Select is also the Space key and it has typical pc functionality. For example, in Windows dialogs, it selects files, checks and unchecks check boxes, and picks radio button choices. It opens a highlighted Help topic.
18	Tab Keys	Use these keys to move between fields in Windows dialogs.
19	Knob	Increments and decrements the value of the current active function.
20	Return Key	Exits the current menu and returns to the previous menu. Has typical pc functionality.

Item		Description
#	**Name**	
21	Full Screen Key	Pressing this key turns off the softkeys to maximize the graticule display area. Press the key again to restore the normal display.
22	Help Key	Initiates a context-sensitive Help display for the current Mode. Once Help is accessed, pressing a front panel key brings up the help topic for that key function.
23	Speaker Control Keys	Enables you to increase or decrease the speaker volume, or mute it.
24	Window Control Keys	These keys select between single or multiple window displays. They zoom the current window to fill the data display, or change the currently selected window. They can be used to switch between the Help window navigation pane and the topic pane.
25	Power Standby/ On	Turns the analyzer on. A green light indicates power on. A yellow light indicates standby mode. **NOTE** The front-panel switch is a standby switch, *not* a LINE switch (disconnecting device). The analyzer continues to draw power even when the line switch is in standby. The main power cord can be used as the system disconnecting device. It disconnects the mains circuits from the mains supply.
26	$\overline{Q}$ Input	Input port for the Q channel when in differential mode.[a]
27	Q Input	Input port for the Q channel for either single or differential mode.[a]
28	$\overline{I}$ Input	Input port for the I channel when in differential mode.[a]
29	I Input	Input port for the I channel for either single or differential mode.[a]
30	Cal Out	Output port for calibrating the I, $\overline{I}$, Q and $\overline{Q}$ inputs and probes used with these inputs.[a]

a. Status of the LED indicates whether the current state of the port is active (green) or is not in use (dark).

Overview of key types

The keys labeled **FREQ Channel**, **System**, and **Marker Functions** are all examples of front-panel keys. Most of the dark or light gray keys access menus of functions that are displayed along the right side of the display. These displayed key labels are next to a column of keys called menu keys.

Menu keys list functions based on which front-panel key was pressed last. These functions are also dependant on the current selection of measurement application (**Mode**) and measurement (**Meas**).

If the numeric value of a menu key function can be changed, it is called an active function. The function label of the active function is highlighted after that key has been selected. For example, press **AMPTD Y Scale**. This calls up the menu of related amplitude functions. The function labeled **Ref Level** (the default selected key in the Amplitude menu) is highlighted. **Ref Level** also appears in the upper left of the display in the measurement information area. The displayed value indicates that the function is selected and its value can now be changed using any of the data entry controls.

Some menu keys have multiple choices on their label, such as **On**/**Off** or **Auto**/**Man**. The different choices are selected by pressing the key multiple times. For example, the Auto/Man type of key. To select the function, press the menu key and notice that Auto is underlined and the key becomes highlighted. To change the function to manual, press the key again so that Man is underlined. If there are more than two settings on the key, keep pressing it until the desired selection is underlined.

When a menu first appears, one key label is highlighted to show which key is the default selection. If you press **Marker Function**, the **Marker Function Off** key is the menu default key, and is highlighted.

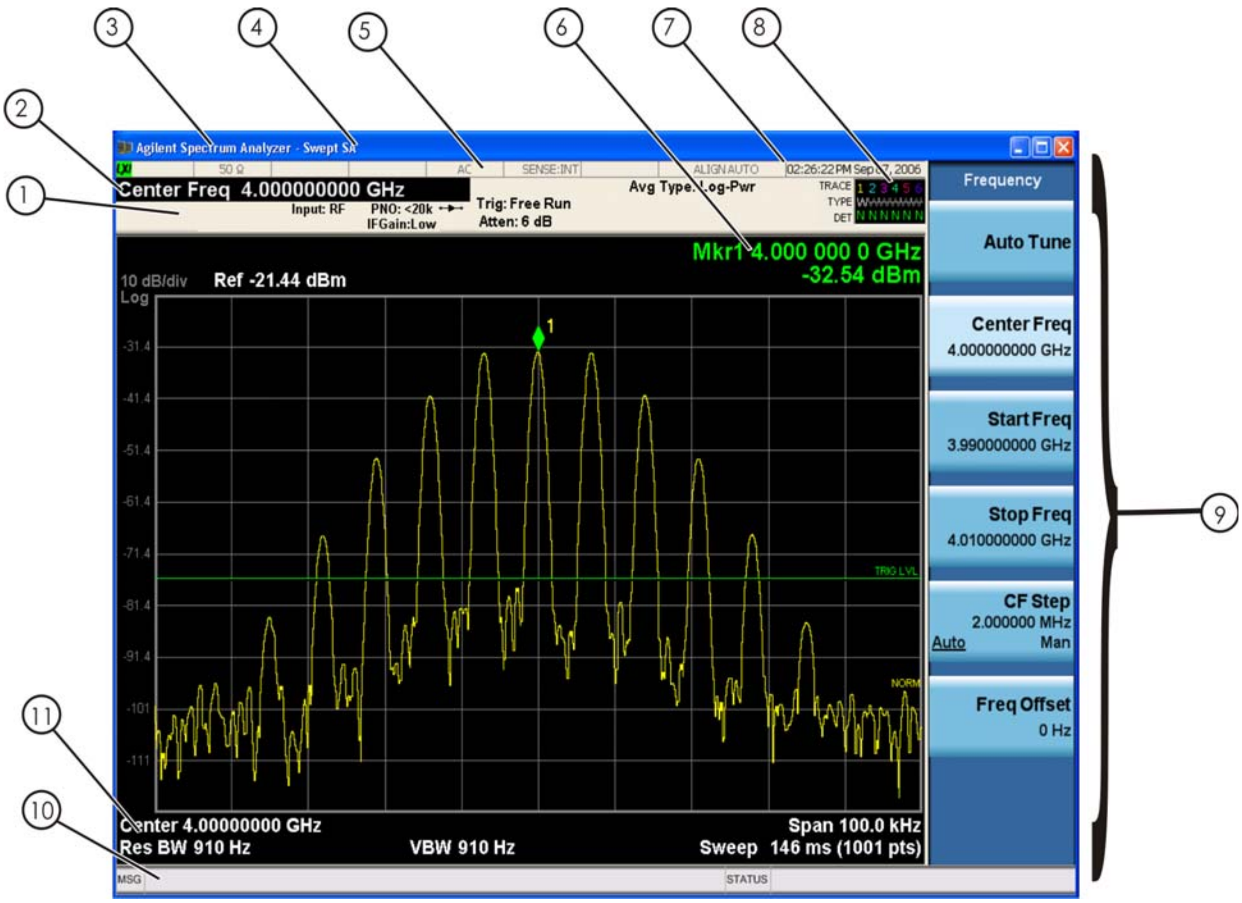
Some of the menu keys are grouped together by a yellow bar running behind the keys near the left side or by a yellow border around the group of keys. When you press a key within the yellow region, such as **Marker Noise**, the highlight moves to that key to show it has been selected. The keys that are linked are related functions, and only one of them can be selected at any one time. For example, a marker can only have one marker function active on it. So if you select a different function it turns off the previous selection. If the current menu is two pages long, the yellow bar or border could include keys on the second page of keys.

In some key menus, a key label is highlighted to show which key has been selected from multiple available choices. And the menu is immediately exited when you press one of the other keys. For example, when you press the **Select Trace** key (in the **Trace/Detector** menu), it brings up its own menu of keys. The **Trace 1** key is highlighted. When you press the **Trace 2** key, the highlight moves to that key and the screen returns to the **Trace/Detector** menu.

If a displayed key label shows a small solid-black arrow tip pointing to the right, it indicates that additional key menus are available. If the arrow tip is not filled in solid then pressing the key the first time selects that function. Now the arrow is solid and pressing it again brings up an additional menu of settings.

Display Annotations

This section describes the display annotation as it is on the Spectrum Analyzer Measurement Application display. Other measurement application modes have some annotation differences.

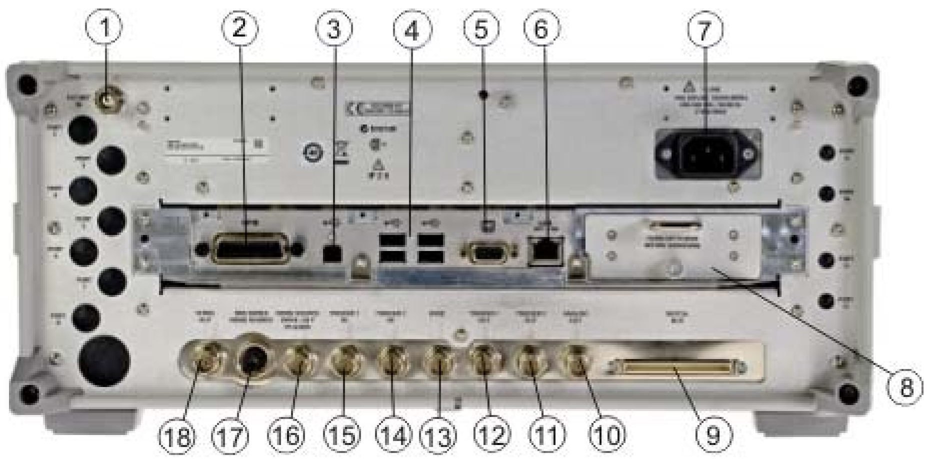


Item	Description	Function Keys
1	Measurement bar - Shows general measurement settings and information. Indicates single/continuous measurement. Some measurements include limits that the data is tested against. A Pass/Fail indication may be shown in the lower left of the measurement bar.	All the keys in the Analyzer Setup part of the front panel.
2	Active Function (measurement bar) - when the current active function has a settable numeric value, it is shown here.	Currently selected front panel key.
3	Banner - shows the name of the selected application that is currently running.	**Mode**
4	Measurement title - shows title information for the current measurement, or a title that you created for the measurement.	**Meas** **View/Display**, **Display**, **Title**

Item	Description	Function Keys
5	Settings panel - displays system information that is not specific to any one application. • Input/Output status - green LXI indicates the LAN is connected. RLTS indicate Remote, Listen, Talk, SRQ • Input impedance and coupling • Selection of external frequency reference • Setting of automatic internal alignment routine	**Local** and **System, I/O Config** **Input/Output**, **Amplitude**, **System** and others
6	Active marker frequency, amplitude or function value	**Marker**
7	Settings panel - time and date display.	**System**, **Control Panel**
8	Trace and detector information	**Trace/Detector**, **Clear Write (W) Trace Average (A) Max Hold (M) Min Hold (m)** **Trace/Detector**, **More, Detector, Average (A) Normal (N) Peak (P) Sample (S) Negative Peak (p)**
9	Key labels that change based on the most recent key press.	Softkeys
10	Displays information, warning and error messages. Message area - single events, Status area - conditions	
11	Measurement settings for the data currently being displayed in the graticule area. In the example above: center frequency, resolution bandwidth, video bandwidth, frequency span, sweep time and number of sweep points.	Keys in the Analyzer Setup part of the front panel.

Rear-Panel Features

MXA and EXA with Option PC2



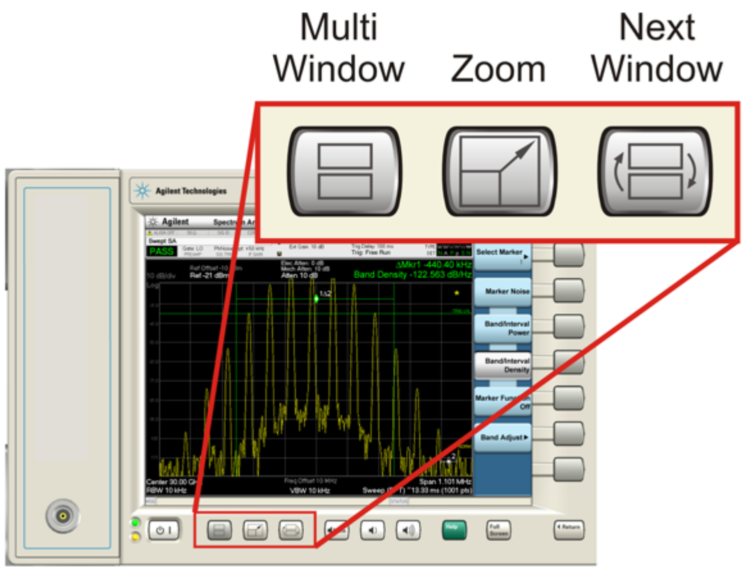
EXA

Item		Description
#	Name	
1	EXT REF IN	Input for an external frequency reference signal: For MXA – 1 to 50 MHz For EXA – 10 MHz.
2	GPIB	A General Purpose Interface Bus (GPIB, IEEE 488.1) connection that can be used for remote analyzer operation.

Item		Description
#	Name	
3	USB Connector	USB 2.0 port, Type B. USB TMC (test and measurement class) connects to an external pc controller to control the instrument and for data transfers over a 480 Mbps link.
4	USB Connectors	Standard USB 2.0 ports, Type A. Connect to external peripherals such as a mouse, keyboard, printer, DVD drive, or hard drive.
5	MONITOR	Allows connection of an external VGA monitor.
6	LAN	A TCP/IP Interface that is used for remote analyzer operation.
7	Line power input	The AC power connection. See the product specifications for more details.
8	Removable Disk Drive	Standard on MXA. Optional on EXA.
9	Digital Bus	Reserved for future use.
10	Analog Out	Reserved for future use.
11	TRIGGER 2 OUT	A trigger output used to synchronize other test equipment with the analyzer. Configurable from the Input/Output keys.
12	TRIGGER 1 OUT	A trigger output used to synchronize other test equipment with the analyzer. Configurable from the Input/Output keys.
13	Sync	Reserved for future use.
14	TRIGGER 2 IN	Allows external triggering of measurements.
15	TRIGGER 1 IN	Allows external triggering of measurements.
16	Noise Source Drive +28 V (Pulsed)	For use with Agilent 346A, 346B, and 346C Noise Sources
17	SNS Series Noise Source	For use with Agilent N4000A, N4001A, N4002A Smart Noise Sources (SNS).
18	10 MHz OUT	An output of the analyzer internal 10 MHz frequency reference signal. It is used to lock the frequency reference of other test equipment to the analyzer.

Window Control Keys

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



Multi-Window

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

Key Path	**Front-panel key**
Help Map ID	3496
Instrument S/W Revision	Prior to A.02.00

Zoom

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

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

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

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

Remote Command:	`:DISPlay:WINDow:FORMat:ZOOM`

Remote Command:	`:DISPlay:WINDow:FORMat:TILE`
Example:	:DISP:WIND:FORM:ZOOM sets zoomed
	:DISP:WIND:FORM:TILE sets un-zoomed
Preset:	TILE
Help Map ID:	3497
Instrument S/W Revision:	Prior to A.02.00

Next Window

This key selects the next window of the current view.

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

Remote Command:	`:DISPlay:WINDow[:SELect] <number>`
	`:DISPlay:WINDow[:SELect]?`
Example:	:DISP:WIND 1
Preset:	1
Min:	1
Max:	If <number> is greater than the number of windows, limit to <number of windows>
Help Map ID:	0
Instrument S/W Revision:	Prior to A.02.00

Selected Window

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

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

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

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

Navigating Windows

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

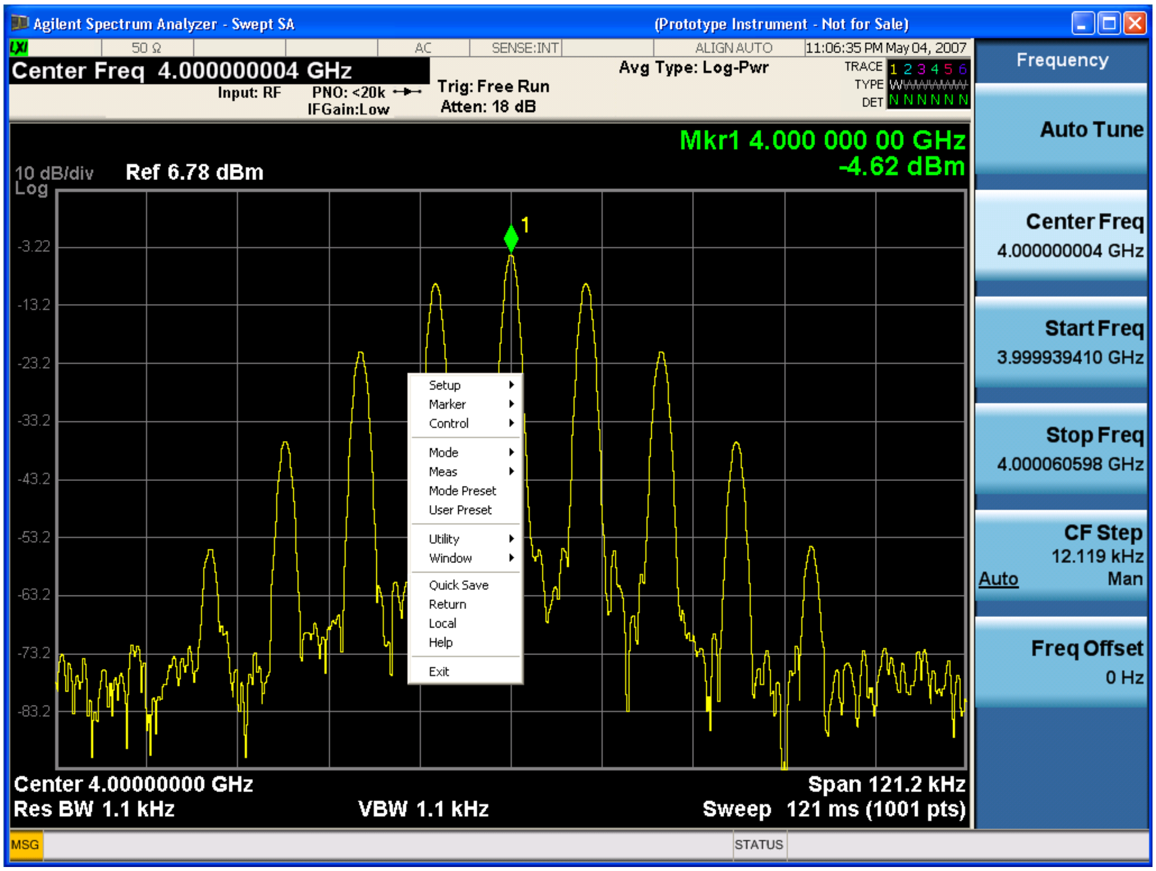
The window navigation does NOT use the arrow and select keys. Those are reserved for navigation within a window.

Mouse and Keyboard Control

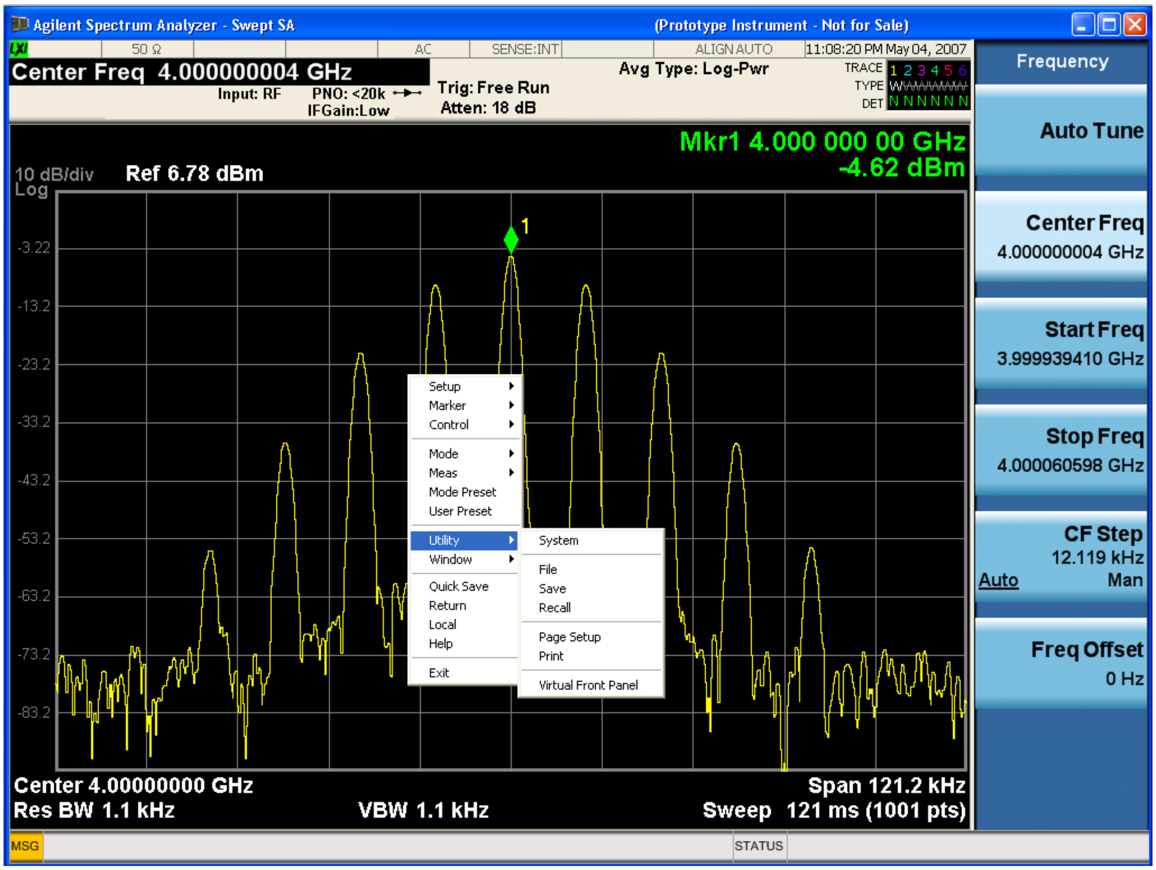
If you do not have access to the instrument front-panel, there are several ways that a mouse and PC Keyboard can give you access to functions normally accessed using the front-panel keys.

Right-Click

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

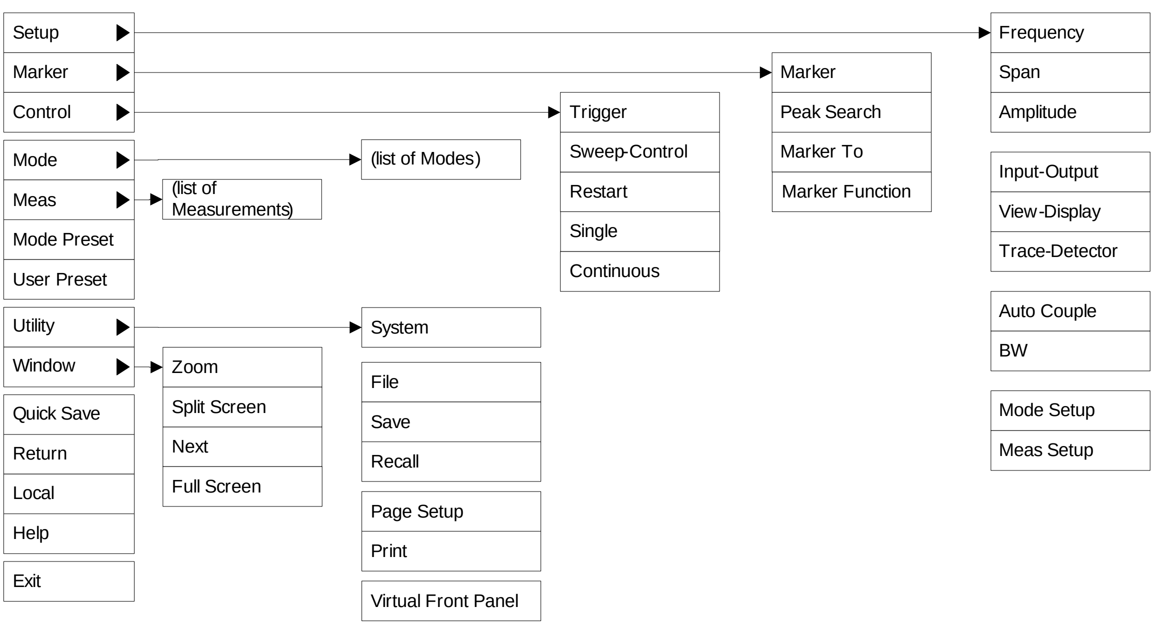


Placing the mouse on one of the rows marked with a right arrow symbol will cause that row to expand, as for example below where the mouse is hovered over the “Utility” row:



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

The array of keys thus available is shown below :



PC Keyboard

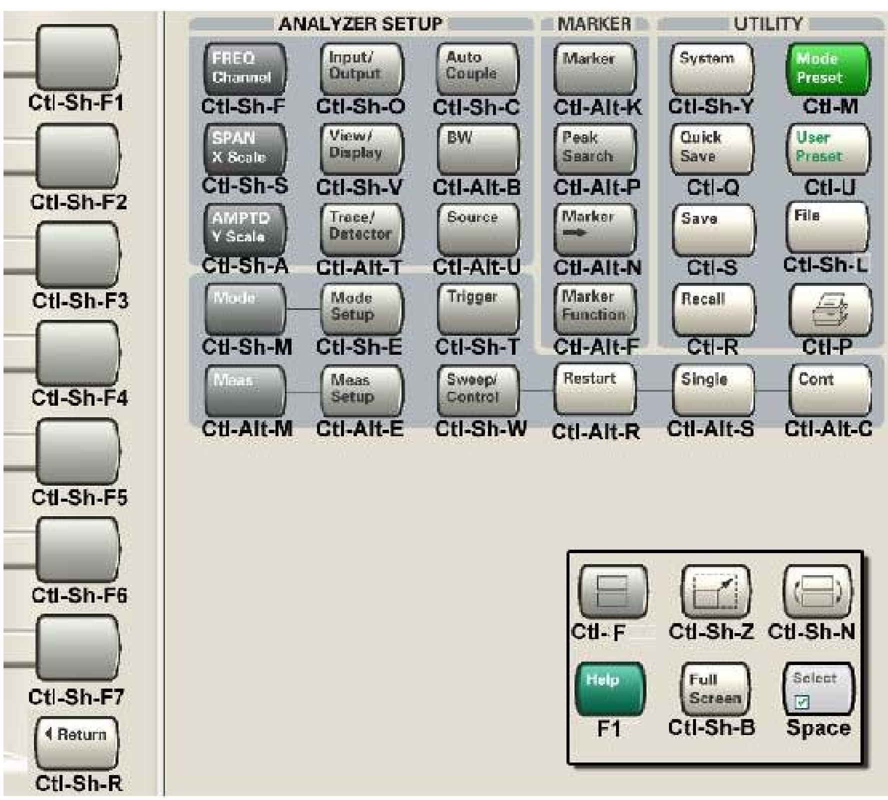
If you have a PC keyboard plugged in (or via Remote Desktop), certain key codes on the PC keyboard map to front-panel keys on the GPSA front panel. These key codes are shown below:

Key	Key Code
Frequency	CTRL+SHIFT+F
Span	CTRL+SHIFT+S
Amplitude	CTRL+SHIFT+A
Input/Output	CTRL+SHIFT+O
View/Display	CTRL+SHIFT+V
Trace/Detector	CTRL+ALT+T
Auto Couple	CTRL+SHIFT+C
Bandwidth	CTRL+ALT+B
Source	CTRL+SHIFT+E
Marker	CTRL+SHIFT+K
Peak Search	CTRL+SHIFT+P
Marker To	CTRL+ALT+N
Marker Function	CTRL+ALT+F
System	CTRL+SHIFT+Y
Quick Save	CTRL+SHIFT+Q
Save	CTRL+S
Recall	CTRL+R
Mode Preset	CTRL+M
User Preset	CTRL+U
Print	CTRL+P
File	CTRL+SHIFT+L
Mode	CTRL+SHIFT+M
Measure	CTRL+ALT+M
Mode Setup	CTRL+ALT+E
Meas Setup	CTRL+ALT+U
Trigger	CTRL+SHIFT+T
Sweep/Control	CTRL+SHIFT+W

Key	Key Code
Restart	CTRL+ALT+R
Single	CTRL+ALT+S
Cont	CTRL+ALT+C
Zoom	CTRL+SHIFT+Z
Next Window	CTRL+SHIFT+N
Split Screen	CTRL+L
Full Screen	CTRL+SHIFT+B
Return	CTRL+SHIFT+R
Mute	Mute
Inc Audio	Volume Up
Dec Audio	Volume Down
Help	F1
Control	CTRL
Alt	ALT
Enter	Return
Cancel	Esc
Del	Delete
Backspace	Backspace
Select	Space
Up Arrow	Up
Down Arrow	Down
Left Arrow	Left
Right Arrow	Right
Menu key 1	CTRL+SHIFT+F1
Menu key 2	CTRL+SHIFT+F2
Menu key 3	CTRL+SHIFT+F3
Menu key 4	CTRL+SHIFT+F4
Menu key 5	CTRL+SHIFT+F5
Menu key 6	CTRL+SHIFT+F6
Menu key 7	CTRL+SHIFT+F7

Key	Key Code
Backspace	BACKSPACE
Enter	ENTER
Tab	Tab
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
0	0

Here is a pictorial view of the table above:



3 About the GSM/EDGE Measurement Application

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

What Does GSM/EDGE Mode Do?

This Mode includes eleven measurements.

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

4 Programming the Analyzer

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

What Programming Information is Available?

The X-Series Documentation can be accessed through the Additional Documentation page in the instrument Help system and is included on the Documentation CD shipped with the instrument. It can also be found in the instrument at: `C:\ProgramsFiles\Agilent\SignalAnalysis\Infrastructure\Help\otherdocs`, or online at: http://www.agilent.com/find/mxa_manuals.

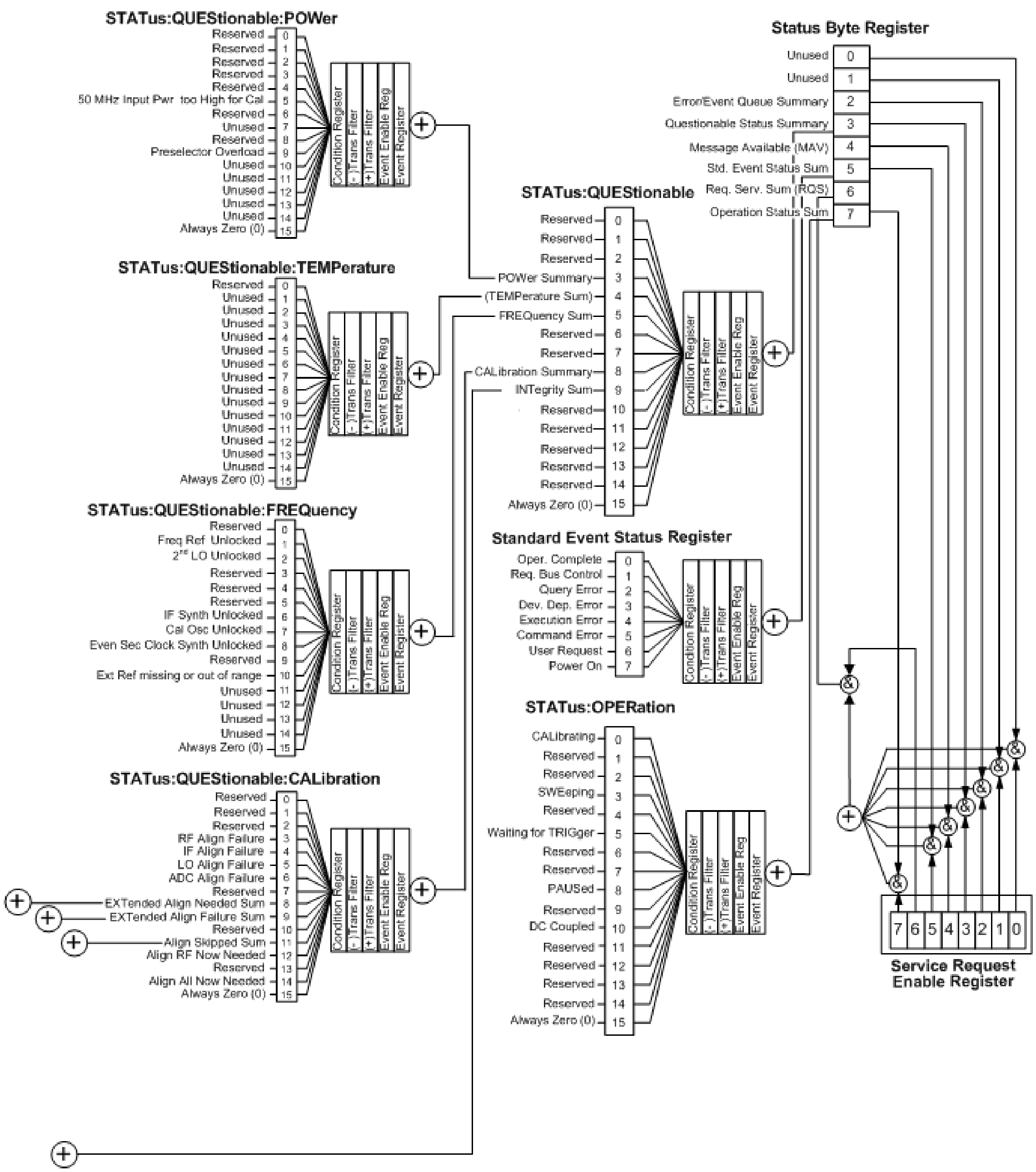
The following resources are available to help you create programs for automating your X-Series measurements:

Resource	Description
X-Series Programmer's Guide	Provides general SCPI programming information on the following topics: • Programming the X-Series Applications • Programming fundamentals • Programming examples Note that SCPI command descriptions for measurement applications are NOT in this book, but are in the User's and Programmer's Reference.
User's and Programmer's Reference manuals	Describes all front-panel keys and softkeys, including SCPI commands for a measurement application. Note that: • Each measurement application has its own User's and Programmer's Reference. • The content in this manual is duplicated in the analyzer's Help (the Help that you see for a key is identical to what you see in this manual).
Embedded Help in your instrument	Describes all front-panel keys and softkeys, including SCPI commands, for a measurement application. Note that the content that you see in Help when you press a key is identical to what you see in the User's and Programmer's Reference.
X-Series Getting Started Guide	Provides valuable sections related to programming including: • Licensing New Measurement Application Software - After Initial Purchase • Configuring instrument LAN Hostname, IP Address, and Gateway Address • Using the Windows XP Remote Desktop to connect to the instrument remotely • Using the Embedded Web Server Telnet connection to communicate SCPI This printed document is shipped with the instrument.
Agilent Application Notes	Printable PDF versions of pertinent application notes.
Agilent VISA User's Guide	Describes the Agilent Virtual Instrument Software Architecture (VISA) library and shows how to use it to develop I/O applications and instrument drivers on Windows PCs.

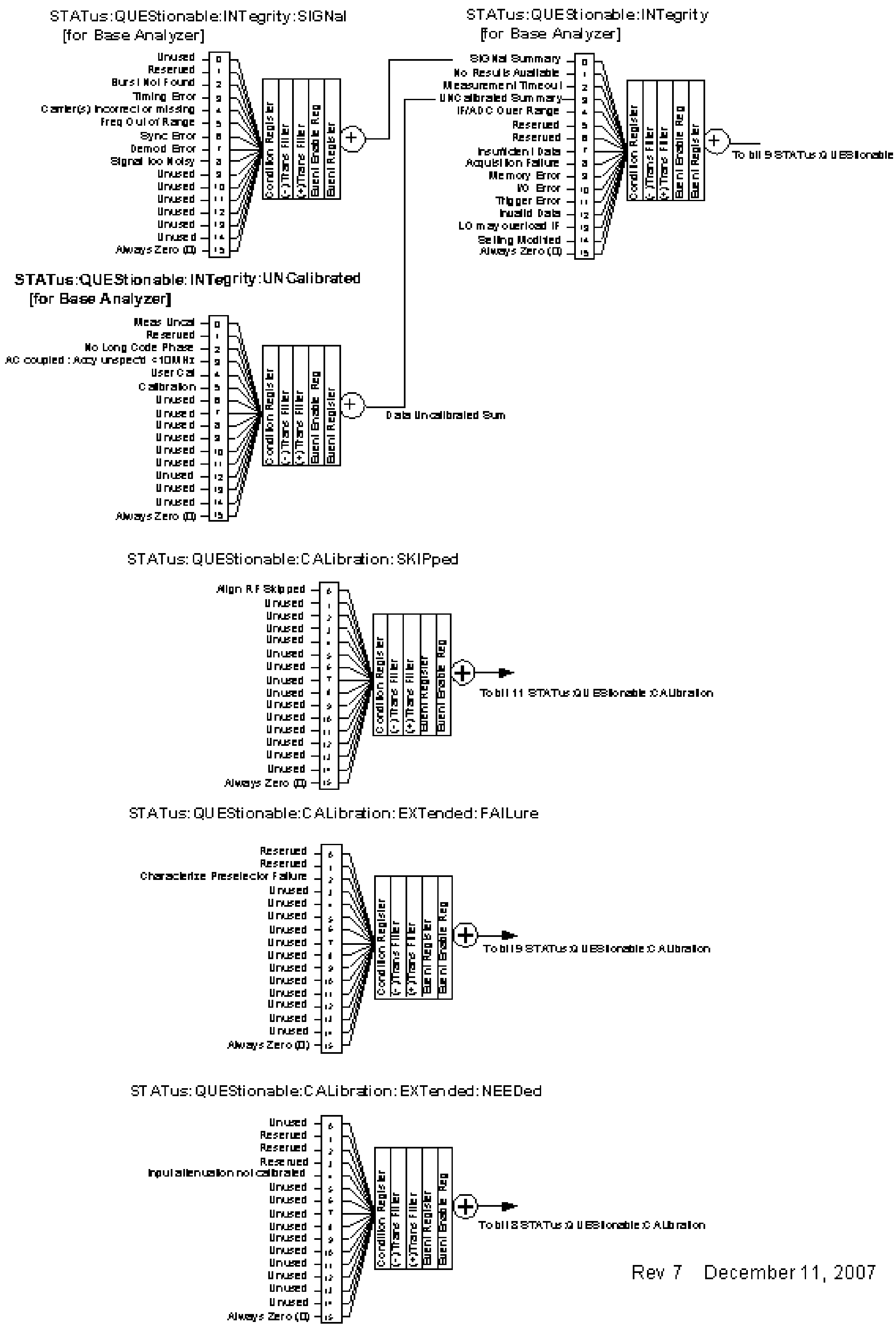
STATus Subsystem (No equivalent front-panel keys)

The following graphics show the current X-Series Status Register Subsystem implementation.

X-Series Status Byte Register System



Additional Registers:



Rev 7 December 11, 2007

Detailed Description

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

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

What Are Status Registers

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

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

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

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

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

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

What Are Status Register SCPI Commands

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

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

How to Use the Status Registers

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

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

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

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

Use the SRQ method when:

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

Use polling when:

- your programming language/development environment does not support SRQ interrupts
- you want to write a simple, single-purpose program and don't want the added complexity of setting up an SRQ handler
- To monitor a condition:

1. Determine which register contains the bit that reports the condition.
2. Send the unique SCPI query that reads that register.
3. Examine the bit to see if the condition has changed.

You can monitor conditions in different ways.

- Check the current instrument hardware and firmware status.

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

- Monitor a particular condition (bit).

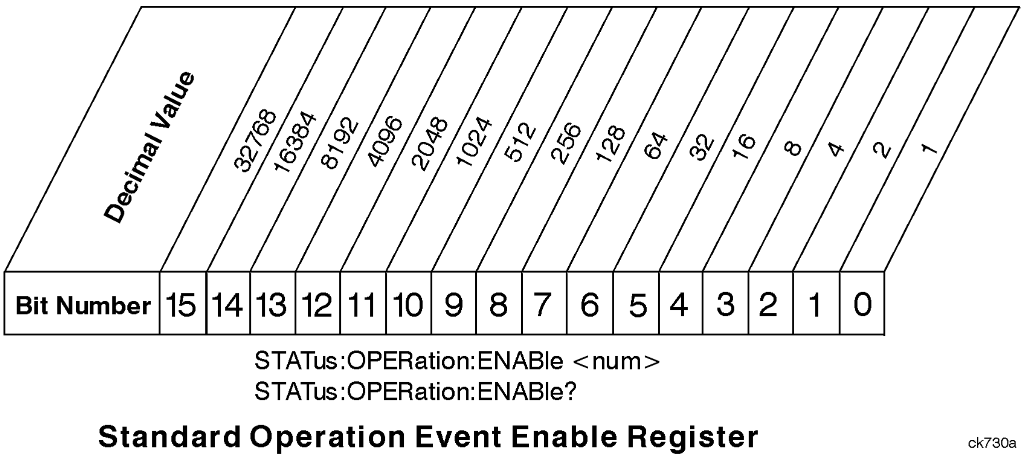
You can enable a particular bit(s), using the event enable register. The instrument will then monitor that particular condition(s). If the bit becomes true (0 to 1 transition) in the event register, it will stay set until the event register is cleared. Querying the event register allows you to detect that this condition occurred even if the condition no longer exists. The event register can only be cleared by querying it or sending the *CLS command.

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

Using a Status Register

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

Figure: Status Register Bit Values



Bit 15 is not used to report status.

Example 1:

1. To enable bit 0 and bit 6 of standard event status register, 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 care about that specific condition. For example, you want to know what was happening with bit 10 in the Status Questionable Integrity register, and do not care 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 enables you to 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 show when an auto-trigger timeout occurs. If you want to know when the Auto-trigger timeout condition is cleared, 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 look at only 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 can use the serial polling functionality available for the particular bus/software that you are using to monitor the Status Byte Register. (You can also use *STB? to poll the Status Byte Register.)

Using the Service Request (SRQ) Method

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

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

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

Generating a Service Request

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

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

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

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

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

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

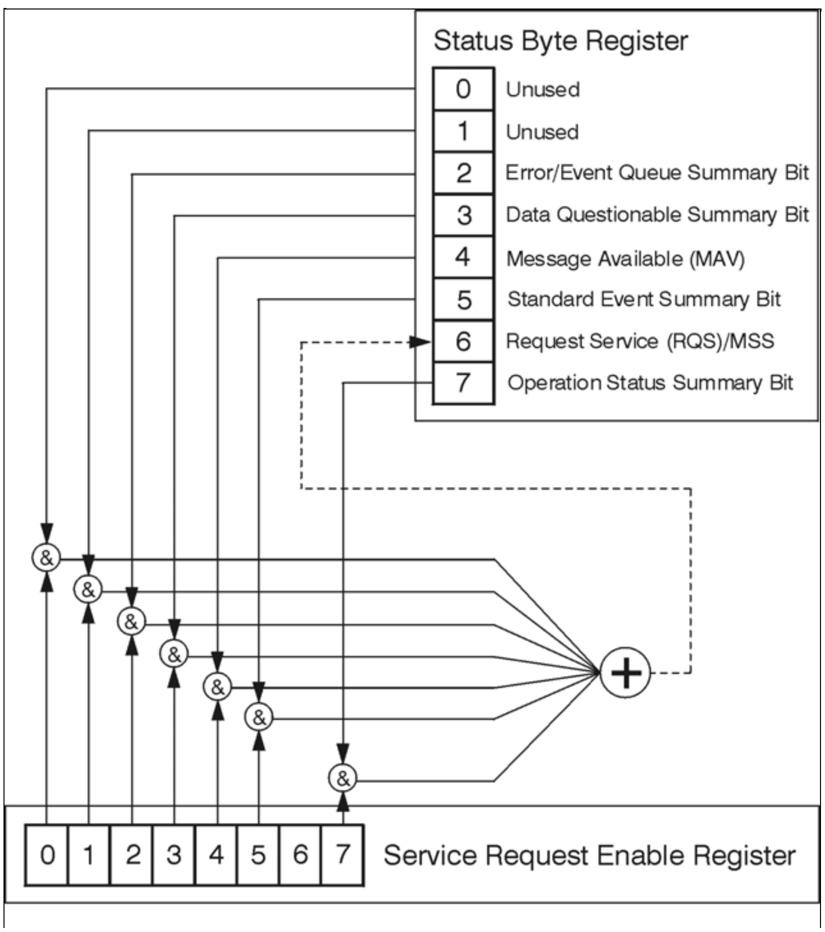
If the status register is configured to SRQ on end-of-measurement and the measurement is in continuous mode, then restarting a measurement (INIT command) can cause the measuring bit to pulse low. This causes an SRQ when you have not actually reached the "end-of-measurement" condition. To avoid this:

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

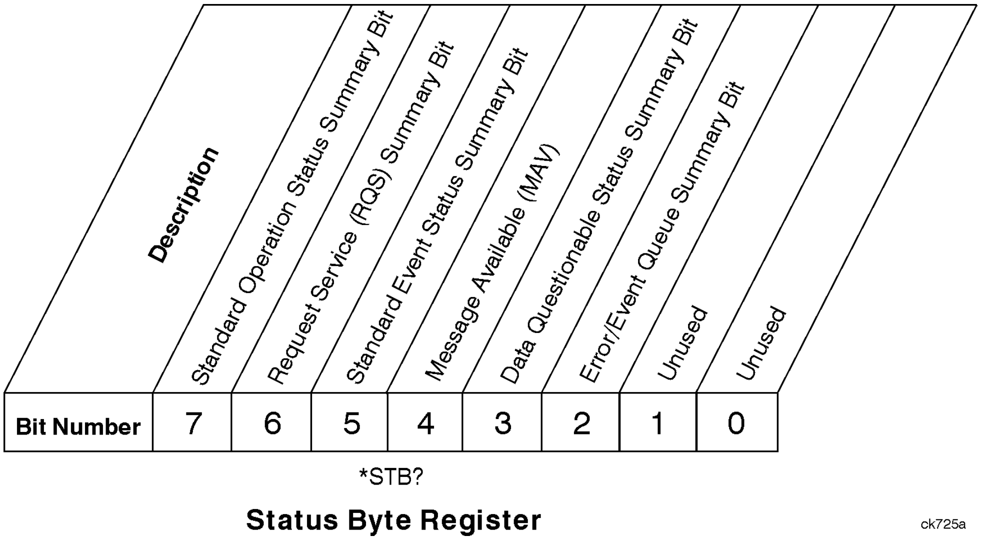
Status Register System

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

The Status Byte Register



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



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

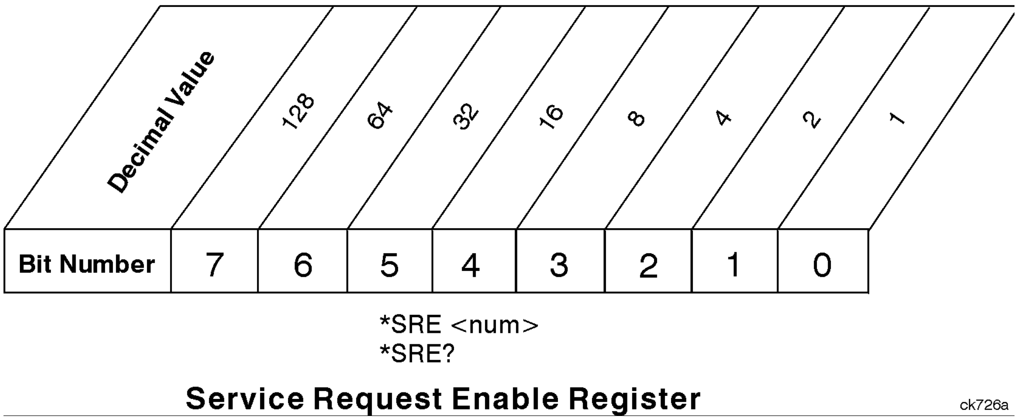
To query the status byte register, send the command *STB? The response will be the decimal sum of the bits which are set to 1. For example, if bit number 7 and bit number 3 are set to 1, the decimal sum of the 2 bits is 128 plus 8. So the decimal value 136 is returned. The *STB command does not clear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

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

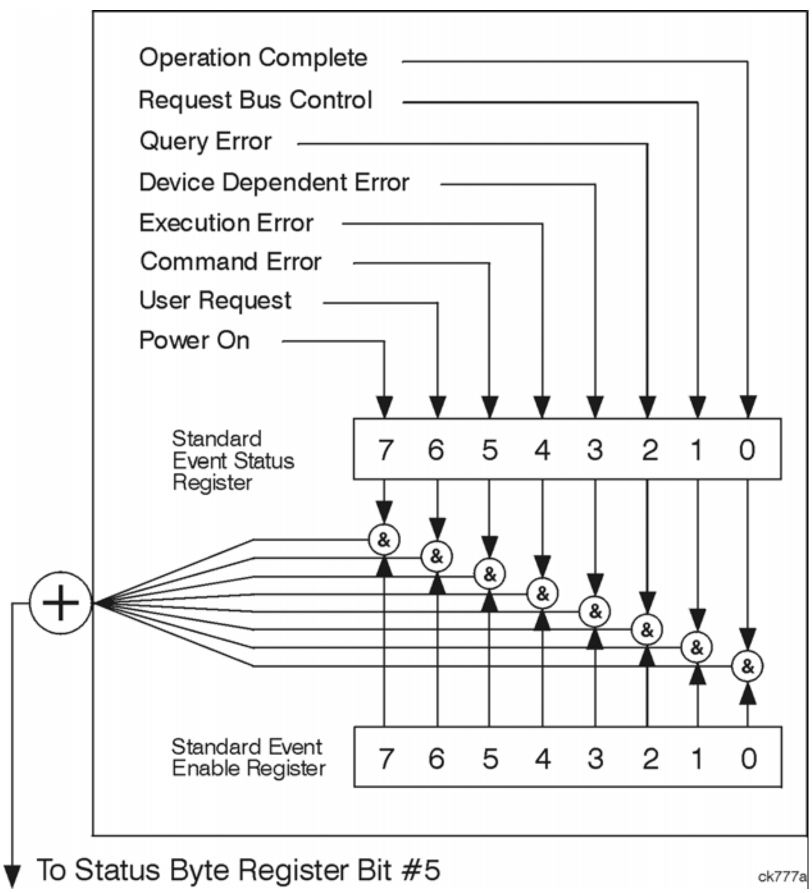
Send the *SRE <integer> command where <integer> is the sum of the decimal values of the bits you want to enable plus the decimal value of bit 6. For example, assume that you want to enable bit 7 so that whenever the standard operation status register summary bit is set to 1 it will trigger a service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

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

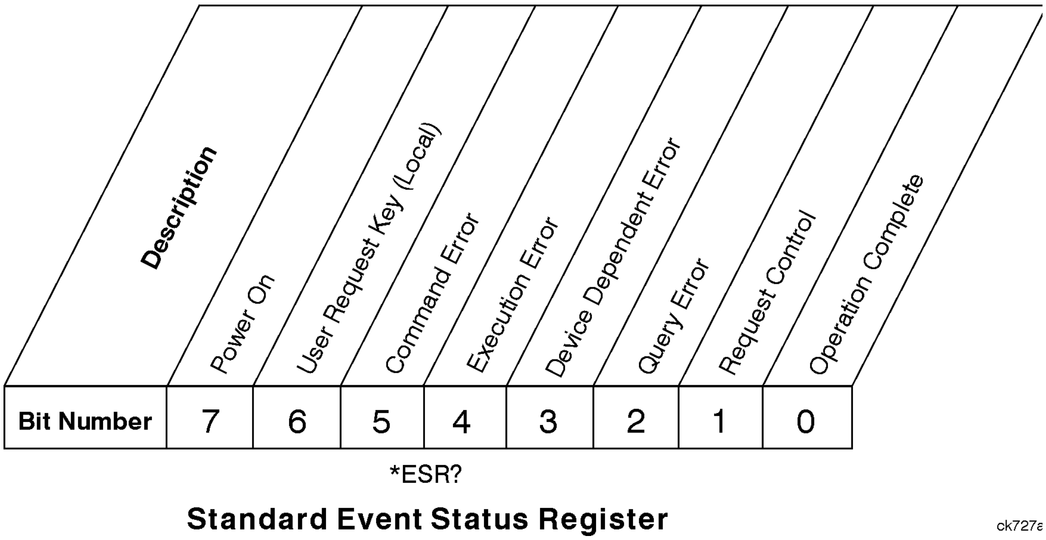
The service request enable register presets to zeros (0).



Standard Event Status Register



The standard event status register contains the following bits:

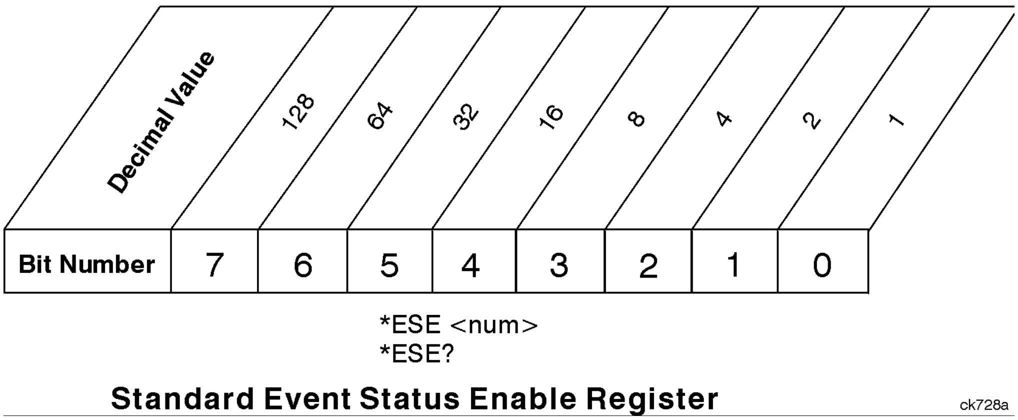


Bit	Description
0	A 1 in this bit position indicates that all pending operations were completed following execution of the *OPC command.
1	This bit is for GPIB handshaking to request control. Currently it is set to 0 because there are no implementations where the spectrum analyzer controls another instrument.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

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

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

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



Operation and Questionable Status Registers

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

Operation Status Register

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

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

Questionable Status Register

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

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

STATus Subsystem Command Descriptions

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

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

Operation Register

Operation Condition Query

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

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

Mode	All
Remote Command	`:STATus:OPERation:CONDition?`
Example	STAT:OPER:COND?
Preset	0
SCPI Status Bits/OPC Dependencies	Sequential command
Instrument S/W Revision	Prior to A.02.00

Operation Enable

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

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

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

Operation Event Query

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

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

Mode	All
Remote Command	`:STATus:OPERation[:EVENt]?`
Example	STAT:OPER?
Preset	0
SCPI Status Bits/OPC Dependencies	Sequential command
Instrument S/W Revision	Prior to A.02.00

Operation Negative Transition

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

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

Operation Positive Transition

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

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

Preset the Status Byte

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

Remote Command:	`:STATus:PRESet`
Example:	STAT:PRES
Instrument S/W Revision:	Prior to A.02.00

Questionable Register

Questionable Condition

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

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

Mode	All
Remote Command	`:STATus:QUEStionable:CONDition?`
Example	STAT:QUES:COND?
Preset	0
SCPI Status Bits/OPC Dependencies	Sequential command
Instrument S/W Revision	Prior to A.02.00

Questionable Enable

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

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

Mode	All

Remote Command	`:STATus:QUEStionable:ENABle 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
SCPI Status Bits/OPC Dependencies	Sequential command
Min	0
Max	32767
Instrument S/W Revision	Prior to A.02.00

Questionable Event Query

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

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

Mode	All
Remote Command	`:STATus:QUEStionable[:EVENt]?`
Example	STAT:QUES?
Preset	0
SCPI Status Bits/OPC Dependencies	Sequential command
Instrument S/W Revision	Prior to A.02.00

Questionable Negative Transition

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

Mode	All

Remote Command	`:STATus:QUEStionable:NTRansition 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
SCPI Status Bits/OPC Dependencies	Sequential command
Min	0
Max	32767
Instrument S/W Revision	Prior to A.02.00

Questionable Positive Transition

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

Mode	All
Remote Command	`:STATus:QUEStionable:PTRansition <integer>` `:STATus:QUEStionable:PTRansition?`
Example	STAT:QUES:PTR 16 Temperature summary ‘questionable asserted’ will be reported to the Status Byte Register.
Preset	32767
SCPI Status Bits/OPC Dependencies	Sequential command
Min	0
Max	32767
Instrument S/W Revision	Prior to A.02.00

Questionable Calibration Register

Questionable Calibration Condition

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

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

Mode	All
Remote Command	`:STATus:QUEStionable:CALibration:CONDition?`
Example	STAT:QUES:CAL:COND?

Preset	0
SCPI Status Bits/OPC Dependencies	Sequential command
Instrument S/W Revision	Prior to A.02.00

Questionable Calibration Enable

This command determines which bits in the Questionable Calibration Condition Register will set bits in the Questionable Calibration Event register, which also sets the Calibration Summary bit (bit 8) in the Questionable Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

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

Questionable Calibration Event Query

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

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

Mode	All
Remote Command	`:STATus:QUEStionable:CALibration[:EVENt]?`
Example	STAT:QUES:CAL?
Preset	0
SCPI Status Bits/OPC Dependencies	Sequential command
Instrument S/W Revision	Prior to A.02.00

Questionable Calibration Negative Transition

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

Mode	All
Remote Command	`:STATus:QUEStionable:CALibration:NTRansition <integer>`
	`:STATus:QUEStionable:CALibration:NTRansition?`
Example	STAT:QUES:CAL:NTR 16384 Alignment is not required.
Preset	0
SCPI Status Bits/OPC Dependencies	Sequential command
Min	0
Max	32767
Instrument S/W Revision	Prior to A.02.00

Questionable Calibration Positive Transition

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

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

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
Instrument S/W Revision	Prior to A.02.00

Questionable Calibration Skipped Enable

This command determines which bits in the Questionable Calibration Skipped Condition Register will set bits in the Questionable Calibration Skipped Event register, which also sets bit 11 of the Questionable Calibration Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

Mode	All
Remote Command	`:STATus:QUEStionable:CALibration:SKIPped:ENABle <integer>` `:STATus:QUEStionable:CALibration:SKIPped:ENABle?`
Example	STAT:QUES:CAL:SKIP:ENAB 1 Can be used to query if an EMI alignment skipped condition is detected
Preset	32767
SCPI Status Bits/OPC Dependencies	Sequential command
Min	0
Max	32767
Instrument S/W Revision	Prior to A.02.00

Questionable Calibration Skipped Event Query

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

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

Mode	All
Remote Command	`:STATus:QUEStionable:CALibration:SKIPped[:EVENt]?`
Example	STAT:QUES:CAL:SKIP?
Preset	0
SCPI Status Bits/OPC Dependencies	Sequential command
Instrument S/W Revision	Prior to A.02.00

Questionable Calibration Skipped Negative Transition

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

Mode	All
Remote Command	`:STATus:QUEStionable:CALibration:SKIPped:NTRansition <integer>` `:STATus:QUEStionable:CALibration:SKIPped:NTRansition?`
Example	STAT:QUES:CAL:SKIP:NTR 1 Align RF skipped is not required.
Preset	0
SCPI Status Bits/OPC Dependencies	Sequential command
Min	0
Max	32767
Instrument S/W Revision	Prior to A.02.00

Questionable Calibration Skipped Positive Transition

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

Mode	All
Remote Command	`:STATus:QUEStionable:CALibration:SKIPped:PTRansition <integer>` `:STATus:QUEStionable:CALibration:SKIPped:PTRansition?`
Example	STAT:QUES:CAL:SKIP:PTR 1 Align RF skipped is required.
Preset	32767
SCPI Status Bits/OPC Dependencies	Sequential command
Min	0
Max	32767
Instrument S/W Revision	Prior to A.02.00

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
Instrument S/W Revision	Prior to A.02.00

Questionable Calibration Extended Failure Enable

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

Mode	All
Remote Command	`:STATus:QUEStionable:CALibration:EXTended:FAILure:ENABle <integer>` `:STATus:QUEStionable:CALibration:EXTended:FAILure:ENABle?`
Example	STAT:QUES:CAL:EXT:FAIL:ENAB 1 Can be used to query if an EMI conducted alignment is needed.
Preset	32767
SCPI Status Bits/OPC Dependencies	Sequential command
Min	0
Max	32767
Instrument S/W Revision	Prior to A.02.00

Questionable Calibration Extended Failure Event Query

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

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

Mode	All
Remote Command	`:STATus:QUEStionable:CALibration:EXTended:FAILure[:EVENt]?`
Example	STAT:QUES:CAL:EXT:FAIL?
Preset	0
SCPI Status Bits/OPC Dependencies	Sequential command
Instrument S/W Revision	Prior to A.02.00

Questionable Calibration Extended Failure Negative Transition

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

Mode	All
Remote Command	`:STATus:QUEStionable:CALibration:EXTended:FAILure:NTRansition <integer>` `:STATus:QUEStionable:CALibration:EXTended:FAILure:NTRansition?`
Example	STAT:QUES:CAL:EXT:FAIL:NTR 1 EMI conducted align failure is not required.
Preset	0
SCPI Status Bits/OPC Dependencies	Sequential command
Min	0
Max	32767
Instrument S/W Revision	Prior to A.02.00

Questionable Calibration Extended Failure Positive Transition

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

Mode	All
Remote Command	`:STATus:QUEStionable:CALibration:EXTended:FAILure:PTRansition <integer>` `:STATus:QUEStionable:CALibration:EXTended:FAILure:PTRansition?`
Example	STAT:QUES:CAL:EXT:FAIL:PTR 1 EMI conducted align failure is required.
Preset	32767
SCPI Status Bits/OPC Dependencies	Sequential command
Min	0
Max	32767
Instrument S/W Revision	Prior to A.02.00

Questionable Calibration Extended Needed Register

Questionable Calibration Extended Needed Condition

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

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

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

Questionable Calibration Extended Needed Enable

This command determines which bits in the Questionable Calibration Extended Needed Condition Register will set bits in the Questionable Calibration Extended Needed Event register, which also sets bit 14 of the Questionable Calibration Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

Mode	All

Remote Command	`:STATus:QUEStionable:CALibration:EXTended:NEEDed:ENABle <integer>`
	
	`:STATus:QUEStionable:CALibration:EXTended:NEEDed:ENABle?`

Example	STAT:QUES:CAL:EXT:NEED:ENAB 2 Can be used to query if an EMI conducted alignment is needed.
Preset	32767
SCPI Status Bits/OPC Dependencies	Sequential command
Min	0
Max	32767
Instrument S/W Revision	Prior to A.02.00

Questionable Calibration Extended Needed Event Query

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

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

Mode	All
Remote Command	`:STATus:QUEStionable:CALibration:EXTended:NEEDed[:EVENt]?`
Example	STAT:QUES:CAL:EXT:NEED?
Preset	0
SCPI Status Bits/OPC Dependencies	Sequential command
Instrument S/W Revision	Prior to A.02.00

Questionable Calibration Extended Needed Negative Transition

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

Mode	All
Remote Command	`:STATus:QUEStionable:CALibration:EXTended:NEEDed:NTRansition <integer>` `:STATus:QUEStionable:CALibration:EXTended:NEEDed:NTRansition?`
Example	STAT:QUES:CAL:EXT:NEED:NTR 2 Align EMI conducted is not required.
Preset	0
SCPI Status Bits/OPC Dependencies	Sequential command
Min	0
Max	32767
Instrument S/W Revision	Prior to A.02.00

Questionable Calibration Extended Needed Positive Transition

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

Mode	All
Remote Command	`:STATus:QUEStionable:CALibration:EXTended:NEEDed:PTRansition <integer>` `:STATus:QUEStionable:CALibration:EXTended:NEEDed:PTRansition?`
Example	STAT:QUES:CAL:EXT:NEED:PTR 2 Align EMI conducted is required.
Preset	32767
SCPI Status Bits/OPC Dependencies	Sequential command
Min	0
Max	32767
Instrument S/W Revision	Prior to A.02.00

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
Instrument S/W Revision	Prior to A.02.00

Questionable Frequency Enable

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

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

Questionable Frequency Event Query

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

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

Mode	All
Remote Command	`:STATus:QUEStionable:FREQuency[:EVENt]?`
Example	STAT:QUES:FREQ?
Preset	0
SCPI Status Bits/OPC Dependencies	Sequential command
Instrument S/W Revision	Prior to A.02.00

Questionable Frequency Negative Transition

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

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

Questionable Frequency Positive Transition

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

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

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
Instrument S/W Revision	Prior to A.02.00

Questionable Integrity Enable

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

Mode	All
Remote Command	`:STATus:QUEStionable:INTegrity:ENABle <integer>` `:STATus:QUEStionable:INTegrity:ENABle?`
Example	STAT:QUES:INT:ENAB 8 Measurement Uncalibrated Summary will be reported to the Integrity Summary of the Status Questionable register.
Preset	32767
SCPI Status Bits/OPC Dependencies	Sequential command
Min	0
Max	32767
Instrument S/W Revision	Prior to A.02.00

Questionable Integrity Event Query

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

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

Mode	All
Remote Command	`:STATus:QUEStionable:INTegrity[:EVENt]?`
Example	STAT:QUES:INT?
Preset	0
SCPI Status Bits/OPC Dependencies	Sequential command
Instrument S/W Revision	Prior to A.02.00

Questionable Integrity Negative Transition

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

Mode	All
Remote Command	`:STATus:QUEStionable:INTegrity:NTRansition <integer>`
	`:STATus:QUEStionable:INTegrity:NTRansition?`
Example	STAT:QUES:INT:NTR 8 Measurement ‘regained calibration’ Summary will be reported to the Integrity Summary of the Status Questionable register.
Preset	0
SCPI Status Bits/OPC Dependencies	Sequential command
Min	0
Max	32767
Instrument S/W Revision	Prior to A.02.00

Questionable Integrity Positive Transition

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

Mode	All
Remote Command	`:STATus:QUEStionable:INTegrity:PTRansition <integer>`
	`:STATus:QUEStionable:INTegrity:PTRansition?`
Example	STAT:QUES:INT:PTR 8 Measurement ‘became uncalibrated’ Summary will be reported to the Integrity Summary of the Status Questionable register.
Preset	32767
SCPI Status Bits/OPC Dependencies	Sequential command
Min	0
Max	32767
Instrument S/W Revision	Prior to A.02.00

Questionable Integrity Signal Register

Questionable Integrity Signal Condition

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

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

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

Questionable Integrity Signal Enable

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

Mode	All
Remote Command	`:STATus:QUEStionable:INTegrity:SIGNal:ENABle <integer>` `:STATus:QUEStionable:INTegrity:SIGNal:ENABle?`
Example	STAT:QUES:INT:SIGN:ENAB 4 Burst Not Found will be reported to the Integrity Summary of the Status Questionable register.
Preset	32767
SCPI Status Bits/OPC Dependencies	Sequential command
Min	0
Max	32767
Instrument S/W Revision	Prior to A.02.00

Questionable Integrity Signal Event Query

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

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

Mode	All
Remote Command	`:STATus:QUEStionable:INTegrity:SIGNal[:EVENt]?`
Example	STAT:QUES:INT:SIGN?
Preset	0
SCPI Status Bits/OPC Dependencies	Sequential command
Instrument S/W Revision	Prior to A.02.00

Questionable Integrity Signal Negative Transition

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

Mode	All
Remote Command	`:STATus:QUEStionable:INTegrity:SIGNal:NTRansition <integer>` `:STATus:QUEStionable:INTegrity:SIGNal:NTRansition?`
Example	STAT:QUES:INT:SIGN:NTR 4 Burst found will be reported to the Integrity Summary of the Status Questionable register.
Preset	0
SCPI Status Bits/OPC Dependencies	Sequential command
Min	0
Max	32767
Instrument S/W Revision	Prior to A.02.00

Questionable Integrity Signal Positive Transition

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

Mode	All
Remote Command	`:STATus:QUEStionable:INTegrity:SIGNal:PTRansition <integer>` `:STATus:QUEStionable:INTegrity:SIGNal:PTRansition?`
Example	STAT:QUES:INT:SIGN:PTR 4 Burst not found will be reported to the Integrity Summary of the Status Questionable register.
Preset	32767
SCPI Status Bits/OPC Dependencies	Sequential command
Min	0
Max	32767
Instrument S/W Revision	Prior to A.02.00

Questionable Integrity Uncalibrated Register

Questionable Integrity Uncalibrated Condition

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

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

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

Questionable Integrity Uncalibrated Enable

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

Mode	All
Remote Command	`:STATus:QUEStionable:INTegrity:UNCalibrated:ENABle` `:STATus:QUEStionable:INTegrity:UNCalibrated:ENABle?`
Example	STAT:QUES:INT:UNC:ENAB 1 Oversweep (Meas Uncal) will be reported to the Integrity Summary of the Status Questionable register.
Preset	32767
SCPI Status Bits/OPC Dependencies	Sequential command
Min	0
Max	32767
Instrument S/W Revision	Prior to A.02.00

Questionable Integrity Uncalibrated Event Query

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

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

Mode	All
Remote Command	`:STATus:QUEStionable:INTegrity:UNCalibrated[:EVENt]?`
Example	STAT:QUES:INT:UNC?
Preset	0
SCPI Status Bits/OPC Dependencies	Sequential command
Instrument S/W Revision	Prior to A.02.00

Questionable Integrity Uncalibrated Negative Transition

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

Mode	All
Remote Command	`:STATus:QUEStionable:INTegrity:UNCalibrated:NTRansition <integer>` `:STATus:QUEStionable:INTegrity:UNCalibrated:NTRansition?`
Example	STAT:QUES:INT:UNC:NTR 1 Oversweep cleared will be reported to the Integrity Summary of the Status Questionable register.
Preset	0
SCPI Status Bits/OPC Dependencies	Sequential command
Min	0
Max	32767
Instrument S/W Revision	Prior to A.02.00

Questionable Integrity Uncalibrated Positive Transition

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

Mode	All
Remote Command	`:STATus:QUEStionable:INTegrity:UNCalibrated:PTRansition <integer>` `:STATus:QUEStionable:INTegrity:UNCalibrated:PTRansition?`
Example	STAT:QUES:INT:UNC:PTR 1 Oversweep (Meas Uncal) occurred will be reported to the Integrity Summary of the Status Questionable register.
Preset	32767
SCPI Status Bits/OPC Dependencies	Sequential command
Min	0
Max	32767
Instrument S/W Revision	Prior to A.02.00

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
Instrument S/W Revision	Prior to A.02.00

Questionable Power Enable

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

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

Questionable Power Event Query

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

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

Mode	All
Remote Command	`:STATus:QUEStionable:POWer[:EVENt]?`
Example	STAT:QUES:POW?
Preset	0
SCPI Status Bits/OPC Dependencies	Sequential command
Instrument S/W Revision	Prior to A.02.00

Questionable Power Negative Transition

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

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

Questionable Power Positive Transition

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

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

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
Instrument S/W Revision	Prior to A.02.00

Questionable Temperature Enable

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

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

Questionable Temperature Event Query

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

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

Mode	All
Remote Command	`:STATus:QUEStionable:TEMPerature[:EVENt]?`
Example	STAT:QUES:TEMP?
Preset	0
SCPI Status Bits/OPC Dependencies	Sequential command
Instrument S/W Revision	Prior to A.02.00

Questionable Temperature Negative Transition

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

Mode	All
Remote Command	`:STATus:QUEStionable:TEMPerature:NTRansition <integer>` `:STATus:QUEStionable:TEMPerature:NTRansition?`
Example	STAT:QUES:TEMP:NTR 1 Reference Oscillator Oven not cold will be reported to the Temperature Summary of the Status Questionable register.
Preset	0
SCPI Status Bits/OPC Dependencies	Sequential command
Min	0
Max	32767
Instrument S/W Revision	Prior to A.02.00

Questionable Temperature Positive Transition

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

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

IEEE Common GPIB Commands

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

Calibration Query

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

Clear Status

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

Key Path	**No equivalent key. Related key System, Show Errors, Clear Error Queue**
Remote Command	`*CLS`
Example	*CLS Clears the error queue and the Status Byte Register.
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.
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.
Instrument S/W Revision	Prior to A.02.00

Standard Event Status Enable

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

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

Key Path	**No equivalent key. Related key System, Show Errors, Clear Error Queue**
Remote Command	`*ESE <integer>` `*ESE?`
Example	*ESE 36 Enables the Standard Event Status Register to monitor query and command errors (bits 2 and 5). *ESE? Returns a 36 indicating that the query and command status bits are enabled.

Remote Command Notes	For related commands, see the STATus subsystem and SYSTem:ERRor[:NEXT]? commands.
Preset	255
SCPI Status Bits/OPC Dependencies	Event Enable Register of the Standard Event Status Register.
State Saved	Not saved in state.
Min	0
Max	255
Instrument S/W Revision	Prior to A.02.00

Standard Event Status Register Query

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

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

Identification Query

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

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

- Manufacturer
- Model
- Serial number
- Firmware version

Key Path	**No equivalent key. See related key System, Show System.**

Remote Command	`*IDN?`
Example	*IDN? Returns instrument identification information, such as:
	Agilent Technologies,N9020A,US01020004,A.01.02
Instrument S/W Revision	Prior to A.02.00

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.
Instrument S/W Revision:	Prior to A.02.00

Query Instrument Options

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

To be IEEE compliant, this command should return an arbitrary ascii variable that would not begin and end with quotes. But the quotes are needed to be backward compatible with previous Spectrum Analyzer 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?`
Instrument S/W Revision:	Prior to A.02.00

Recall Instrument State

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

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

Remote Command:	`*RCL <register #>`
Example:	*RCL 7 Recalls the instrument state that is currently stored in register 7.
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
Instrument S/W Revision:	Prior to A.02.00

Save Instrument State

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

Remote Command:	`*SAV <register #>`
Example:	*SAV 9 Saves the instrument state in register 9.
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
Instrument S/W Revision:	Prior to A.02.00

Service Request Enable

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

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

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

Status Byte Query

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

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

Trigger

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

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

Self Test Query

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

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

Wait-to-Continue

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

Remote Command:	`*WAI`
Example:	INIT:CONT OFF; INIT;*WAI Sets the instrument to single sweep. Starts a sweep and waits for its completion.
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.
Instrument S/W Revision:	Prior to A.02.00

5 System Functions

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.

Instrument S/W Revision	Prior to A.02.00

File Explorer

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

File Explorer opens up in My Documents.

Instrument S/W Revision	Prior to A.02.00

Page Setup

Refer to your Microsoft Windows Operating System manual.

Instrument S/W Revision	Prior to A.02.00

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.

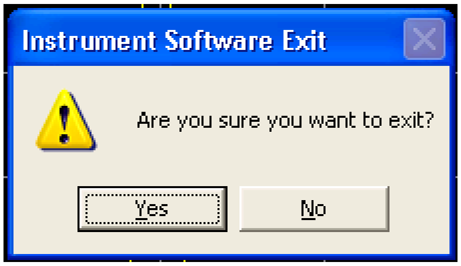
Mode	All
Remote Command	`:SYSTem:PRINt:THEMe TDColor|TDMonochrome|FCOLor|FMONochrome` `:SYSTem:PRINt:THEMe?`
Example	`:SYST:PRIN:THEM FCOL`
Preset	FCOL; not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes
State Saved	No
Instrument S/W Revision	Prior to A.02.00

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 you intended to exit the application:



Key Path	**File, Exit**
Mode	All
Remote Command Notes	The Instrument Application will be closed. No further SCPI commands can be sent after this command. Use with caution!
Instrument S/W Revision	Prior to A.02.00

Preset

Mode Preset

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

The **Mode Preset** does the following for the currently active mode:

- Aborts the currently running measurement.
- Brings up the default menu for the mode, with no active function.
- Sets Measurement settings to their preset values for the active mode only.
- Activates the default measurement.
- Brings up the default menu for the mode.
- Clears the input and output buffers.
- Sets Status Byte to 0.

Key Path	**Front-panel key**
Remote Command	`:SYSTem:PRESet`
Example	`:SYST:PRES`
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.
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.
Instrument S/W Revision	Prior to A.02.00

How-To Preset

The table below shows all possible presets, their corresponding SCPI commands and front panel access (Key Path). Instrument settings depend on the current measurement context. Some settings are local to the current measurement, some are global (common) across all the measurement in the current mode, and some are global to all the available modes. In a similar way, restoring the settings to their preset state can be done within the different contexts.

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

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

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

The Restore Mode Defaults key resets ALL the Mode variables (and all the Meas global and Meas local variables), including the persistent ones.

Type Of Preset	SCPI Command	Front Panel Access
Auto Couple	:COUPle ALL	Auto Couple front-panel key
Meas Preset	:CONFigure:<Measurement>	Meas Setup Menu
Mode Preset	:SYSTem:PRESet	Mode Preset (green key)
Restore Mode Defaults	:INSTrument:DEFault	Mode Setup Menu
Restore All Mode Defaults	:SYSTem:DEFault MODes	System Menu; Restore System Default Menu
*RST	*RST	not possible (Mode Preset with Single)
Restore Input/Output Defaults	:SYSTem:DEFault INPut	System Menu; Restore System Default Menu
Restore Power On Defaults	:SYSTem:DEFault PON	System Menu; Restore System Default Menu
Restore Alignment Defaults	:SYSTem:DEFault ALIGn	System Menu; Restore System Default Menu
Restore Miscellaneous Defaults	:SYSTem:DEFault MISC	System Menu; Restore System Default Menu
Restore All System Defaults	:SYSTem:DEFault [ALL] :SYSTem:PRESet:PERSistent	System Menu; Restore System Default Menu
User Preset	:SYSTem:PRESet:USER	User Preset Menu
User Preset All Modes	:SYSTem:PRESet:USER:ALL	User Preset Menu
Power On Mode Preset	:SYSTem:PON:TYPE MODE	System Menu
Power On User Preset	:SYSTem:PON:TYPE USER	System Menu
Power On Last State	:SYSTem:PON:TYPE LAST	System Menu

Restore Mode Defaults

Restore Mode Defaults resets the state for the currently active mode by resetting the mode persistent settings to their factory default values, clearing mode data and by performing a Mode Preset. This function will never cause a mode switch. This function performs a full preset for the currently active mode; whereas, Mode Preset performs a partial preset. Restore Mode Defaults does not affect any system settings. System settings are reset by Restore System Defaults. This function does reset mode data; as well as settings.

Key Path	**Mode Setup**
Remote Command	`:INSTrument:DEFault`
Example	:INST:DEF
Remote Command Notes	Clears all pending OPC bits. The Status Byte is set to 0.
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.
Instrument S/W Revision	Prior to A.02.00

*RST (Remote Command Only)

*RST is equivalent to :SYST:PRES:INIT:CONT OFF which is a Mode Preset in 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`
Remote Command Notes:	Sequential
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.
Instrument S/W Revision:	Prior to A.02.00

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**
Instrument S/W Revision	Prior to A.02.00

Quick Save

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

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

If the current measurement does not support the last non-register save that was performed, an informational message is generated, “File type not supported for this measurement”

Quick Save repeats the last type of qualified save (that is, a save qualified by the above criteria) in the last save directory by creating a unique filename using the Auto File Naming algorithm described below.

If Quick Save is pressed after startup and before any qualified Save has been performed, the Quick Save performs a Screen Image save using the current settings for Screen Image saves (current theme, current directory), which then becomes the “last save” for the purpose of subsequent Quick Saves.

The Auto File Naming feature automatically generates a file name for use when saving a file. The filename consists of a prefix and suffix separated by a dot, as is standard for the Windows® file system. For details on the suffix for each file type, see the documentation for the Save front-panel key. A default prefix exists for each of the available file types:

Type	Default Prefix	Menu
State	State_	(Save/Recall)
Trace + State	State_	(Save/Recall)
Screen	Screen_	(Save/Recall)
Amplitude Corrections	Ampcor_	(Import/Export)
Traces	Trace_	(Import/Export)
Limit Lines	LLine_	(Import/Export)
Measurement Result	MeasR_	(Import/Export)
Capture Buffer	CapBuf_	(Import/Export)

A four digit number is appended to the prefix to create a unique file name. The numbering sequence starts at 0000 within each Mode for each file type and works its way up to 9999, then wraps to 0000 again. It remembers where it was through a Mode Preset and when leaving and returning to the Mode. It is reset by Restore Misc Defaults and Restore System Defaults and subsequent running of the instrument application. So, for example, the first auto file name generated for State files is State_0000.state. The next is State_0001, and so forth.

One of the key features of Auto File Name is that we guarantee that the Auto File Name will never conflict with an existing file. This is because the whole point of Auto File Name is to relieve you from having to pick a file name. The algorithm looks for the next available number. If it gets to 9999, then it looks for holes. If it find no holes; i.e. no more numbers are available, it gives an error.

For example, if when we get to State_0010.state there is already a State_0010.state file in the current directory, we advance the counter to State_0011.state to ensure that no conflict will exist (and then we verify that State_0011.state also doesn't exist in the current directory and advance again if it does, et cetera).

If you enter a file name for a given file type, then the prefix becomes the filename you entered instead of the default prefix, followed by an underscore. The last four letters (the suffix) are the 4-digit number.

For example, if you save a Meas Results file as "fred.csv", then the next auto file name chosen for a Meas Results save will be fred_0000.csv.

NOTE Although 0000 is used in the example above, the number that is used is actually the current number in the Meas Results sequence, that is, the number that would have been used if you had not entered their own file name.

NOTE If the filename you entered ends with _dddd, where d=any number, making it look just like an auto file name, then the next auto file name picks up where you left off with the suffix being dddd + 1.

Key Path	**Quick Save**
Remote Command Notes	No remote command for this key specifically.
Instrument S/W Revision	Prior to A.02.00

Recall

Operation of this key is identical across several measurements. For details about this key, see "Recall" on page 1123.

Save

Operation of this key is identical across several measurements. For details about this key, see “Save” on page 1147.

System

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

Key Path	**Front-panel key**
Remote Command Notes	No remote command for this key specifically.
Instrument S/W Revision	Prior to A.02.00

Show

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

Key Path	**System**
Mode	All
Remote Command	`:SYSTem:SHOW OFF|ERRor|SYSTem|HARDware|LXI|HWSTatistics|ALIGNment|SOFTware` `:SYSTem:SHOW?`
Example	:SYST:SHOW SYST
Remote Command Notes	This command displays (or exits) the various System information screens.
Preset	OFF
State Saved	No
Range	OFF| ERRor | SYSTem | HARDware | LXI | HWSTatistics | ALIGNment | SOFTware
Instrument S/W Revision	Prior to A.02.00

Errors

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

The list of errors displayed in the Errors screen does not automatically refresh; you must press the Refresh 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 the time is displayed to the second.

The fields on the Errors display are:

Type (unlabeled) - Displays the icon identifying the event or condition as an error or warning.

ID - Displays the error number.

Message - Displays the message text.

Repeat (RPT) - This field shows the number of consecutive instances of the event, uninterrupted by other events. 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.

Key Path	**System, Show**
Mode	All
Remote Command	`:SYSTem:ERRor[:NEXT]?`
Example	:SYST:ERR?
Restriction and Notes	The return string has the format: "<Error Number>,<Error>" Where <Error Number> and <Error> are defined in the Master Error Messages document.
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Next Page

Next Page and Previous Page menu keys move you between pages of the log, if it fills more than one page. These keys are grayed out in some cases:

If on the last page of the log, the Next Page key is grayed out

If on the first page of the log, the Previous Page key is grayed out.

If there is only one page, both keys are grayed out.

Key Path	**System, Show, Errors**
Instrument S/W Revision	Prior to A.02.00

Previous Page

See “Next Page” on page 195.

Key Path	**System, Show, Errors**
Instrument S/W Revision	Prior to A.02.00

History

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

Key Path	**System, Show, Errors**
Instrument S/W Revision	Prior to A.02.00

Status

See “History” on page 196.

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.

Key Path	**System, Show, Errors**
Mode	All
Remote Command	`:SYSTem:ERRor:VERBose OFF|ON|0|1`
	`:SYSTem:ERRor:VERBose?`
Example	:SYST:ERR:VERB ON
Preset	This is unaffected by Preset but is set to OFF on a “Restore System Defaults->Misc”
State Saved	No
Range	On | Off
Instrument S/W Revision	Prior to A.02.00

Refresh

When pressed, refreshes the Show Errors display.

Key Path	**System, Show, Errors**
Instrument S/W Revision	Prior to A.02.00

Clear Error Queue This clears all errors in all error queues.

Clear Error Queue does not affect the current status conditions.

Mode Preset does not clear the error queue.

Restore System Defaults will clear all error queues.

*CLS only clears the queue if it is sent remotely and *RST does not affect any error queue.

Switching modes does not affect any error queues.

Key Path	**System, Show, Errors**
Instrument S/W Revision	Prior to A.02.00

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 unavailable if the first page of information is presently displayed. The Next Page menu key is unavailable if the last page is information is presently displayed.

Key Path	**System, Show**
Mode	All
Example	SYST:SHOW SYST
Instrument S/W Revision	Prior to A.02.00

Hardware

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

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

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

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

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

Key Path	**System, Show**
Mode	All
Example	SYST:SHOW HARD
Instrument S/W Revision	Prior to A.02.00

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.

Tip: For information about setting up measurements using LXI, refer to the "Programmer's Guide" located in your analyzer at: C:/Program Files/Agilent/Signal Analysis/Help/Bookfiles/x_series_prog.pdf. It is also available by selecting the "Additional Documentation" page of the Help.

Key Path	**System, Show**
Instrument S/W Revision	Prior to A.02.00

LXI Event Log

The event log records all of the LXI LAN event activity. As LXI LAN events are sent or received, the activity is noted in the Event Log with an IEEE 1588 timestamp. When the event log is selected, the current contents of the event log are displayed in the system information screen.

The fields recorded in the Event Log are:

- The date the event occurred (GMT)
- The time the event occurred (GMT)
- The type of event: LAN Input, LAN Output, Status, Alarm, Trigger Alarm, Trigger LAN
- The name of the event
- The edge associated with the event
- The event's identifier: This is the string that appears on the LAN.
- The source event: This is only valid for LAN Output, Trigger LAN, and Trigger Alarm event types.
- The source address: This is only valid for LAN Input event types. It is the address from which the message originated.
- The destination address: This is only valid for LAN Output event types. It is the address (or addresses) that the message will be sent to. For UDP messages, this field reads "ALL."

Key Path	**System, Show, LXI**
Instrument S/W Revision	Prior to A.02.00

Next Page

See "Next Page" on page 195

Key Path	**System, Show, Errors**
Instrument S/W Revision	Prior to A.02.00

Previous Page

See "Next Page" on page 195.

Key Path	**System, Show, Errors**
Instrument S/W Revision	Prior to A.02.00

Circular

Sets the behavior for entries that occur while the LXI Event Log is full.

- If Circular is set to 1, incoming events overwrite the oldest events in the log.
- If Circular is set to 0, incoming events are discarded.

Key Path	**System, Show, LXI, LXI Event Log**
Remote Command	`:LXI:EVENt:LOG:CIRCular[:ENABle] ON|OFF|1|0`
	`:LXI:EVENt:LOG:CIRCular[:ENABle]?`
Example	:LXI:EVEN:LOG:CIRC 1
Preset	Not affected by a Preset. The default value of "ON" can be restored by pressing **System, Restore Defaults, Misc.**
State Saved	Saved in instrument state.
Range	OFF|ON|0|1
Instrument S/W Revision	Prior to A.02.00

Clear

Clears the event log of all entries.

Key Path	**System, Show, LXI, LXI Event Log**
Remote Command	`:LXI:EVENt:LOG:CLEar`
Example	:LXI:EVEN:LOG:CLE
Instrument S/W Revision	Prior to A.02.00

Size

Sets the maximum number of entries the LXI Event Log can hold.

Key Path	**System, Show, LXI, LXI Event Log**
Remote Command	`:LXI:EVENt:LOG:SIZE <size>`
	`:LXI:EVENt:LOG:SIZE?`
Example	:LXI:EVEN:LOG:SIZE 256

Preset	Not affected by a Preset. The default value of "64" can be restored by pressing **System, Restore Defaults, Misc**.
State Saved	Saved in instrument state.
Range	>= 0
Instrument S/W Revision	Prior to A.02.00

Enabled

Enables and disables the logging of LXI Events.

Key Path	**System, Show, LXI, LXI Event Log**
Remote Command	`:LXI:EVENt:LOG:ENABle ON|OFF|1|0`
	`:LXI:EVENt:LOG:ENABle?`
Example	:LXI:EVEN:LOG:ENAB ON
Preset	Not affected by a Preset. The default value of "ON" can be restored by pressing **System, Restore Defaults, Misc.**
State Saved	Saved in instrument state.
Range	ON|OFF|0|1
Instrument S/W Revision	Prior to A.02.00

Count (Remote Command Only)

Returns the number of entries currently in the LXI Event Log.

Remote Command:	`:LXI:EVENt:LOG:COUNt?`
Example:	:LXI:EVEN:LOG:COUN?
Range:	0 – Size
Instrument S/W Revision:	Prior to A.02.00

Next Entry (Remote Command Only)

Returns the oldest entry from the LXI Event Log and removes it from the log. If the log is empty, an empty string is returned.

Remote Command:	`:LXI:EVENt:LOG[:NEXT]?`
Example:	:LXI:EVEN:LOG?
Instrument S/W Revision:	Prior to A.02.00

All (Remote Command Only)

Non-destructively retrieves the entire contents of the event log. Entries are returned as separate strings, surrounded by double quote marks, and separated by a comma. Fields within each entry are also comma delimited.

Remote Command:	`:LXI:EVENt:LOG:ALL?`
Example:	:LXI:EVEN:LOG:ALL? Returns the entire event log contents. An example may look like the following: "11/12/2007,18:14:10.770385,Error,LogOverwrite,Rise,,,,","11/12/2007,18:14:10.592105,Status,Measuring,Rise,,,,","11/12/2007,18:14:10.597758,Status,Measuring,Fall,,,,","11/12/2007,18:14:10.597786,Status,Sweeping,Fall,,,,","11/12/2007,18:14:10.599030,Status,WaitingForTrigger,Rise,,,," The contents of the Event Log vary, based on the operation of the instrument.
Instrument S/W Revision:	Prior to A.02.00

Specific Entry (Remote Command Only)

Non-destructively retrieves a specifically indexed entry from the event log. Fields within an entry are comma delimited.

Remote Command:	`:LXI:EVENt:LOG:ENTRy? <intIndex>`
Example:	:LXI:EVEN:LOG:ENTR? 0 Returns the first entry in the event log. An example may look like the following: "11/12/2007,18:14:10.770385,Error,LogOverwrite,Rise,,,," The contents of the Event Log vary, based on the operation of the instrument.
Instrument S/W Revision:	Prior to A.02.00

Beginning Entry (Remote Command Only)

Sets or freezes the beginning entry of the log when in circular mode to the most recently added entry at the time of the command. This is so that the :LXI:EVENt:LOG:ENTtry? command has a reference entry for indexing individual entries in the log.

Remote Command:	`:LXI:EVENt:LOG:CIRCular:FBENtry`
Example:	:LXI:EVEN:LOG:CIRC:FBEN
Instrument S/W Revision:	Prior to A.02.00

Power On

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

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

Mode and Input/Output Defaults

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

Key Path	**System, Power On**
Mode	All
Example	SYST:PON:TYPE MODE
Instrument S/W Revision	Prior to A.02.00

User Preset

Sets **Power On** to **User Preset**. When the analyzer is powered on in User Preset, it will User Preset each mode and switch to the power-on mode. Power On User Preset will not affect any settings beyond what a normal User Preset affects.

NOTE An instrument could never power up for the first time in User Preset.

Key Path	**System, Power On**
Mode	All
Example	SYST:PON:TYPE USER
Instrument S/W Revision	Prior to A.02.00

Last State

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

NOTE	An instrument 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.

Key Path	**System, Power On**
Mode	All
Example	SYST:PON:TYPE LAST
Restriction and Notes	Power on Last State only works if you have done a controlled shutdown prior to powering on in Last. If a controlled shutdown is not done when in Power On Last State, the instrument will power up in the last active mode, but it may not power up in the active mode's last state. If an invalid mode state is detected, a Mode Preset will occur. To control the shutdown under remote control use the :SYSTem:PDOWn command.
Instrument S/W Revision	Prior to A.02.00

Power On Application

This menu key brings up a Mode Menu that lists the available modes and lets you select which Mode is to be the power-on mode.

This application is used for Power On Type "Mode and Input/Output Defaults" and Restore System Defaults All.

Key Path	**System, Power On**
Mode	All

Remote Command	`:SYSTem:PON:MODE SA|BASIC|ADEMOD|NFIGURE|PNOISE|CDMA2K|TDSCDMA|VSA|VSA89601|WCDMA|WIMAXOFDMA`
	
	`:SYSTem:PON:MODE?`

Example	SYST:PON:MODE SA
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
Instrument S/W Revision	Prior to A.02.00

Configure Applications

The Configure Application utility allows you configure the bootup for fastest first mode switch time or faster boot time. In addition, there are more applications available for the X-Series than can fit into Windows® Virtual Memory. The Configure Application utility allows you to choose which licensed applications to load in-memory. There will be multiple opportunities for you to perform the configuration.

The Configure Applications utility will provide a graphical representation of the amount of Virtual Memory consumed. The indicator will be green when <90% of the memory limit is consumed, yellow for memory consumption is 90% to 100%, and red when consumption is >100% of the limit.

Key Path	**System, Power On**
Instrument S/W Revision	A.02.00

Configure Applications - Next application startup

Select All

Select All marks all applications in the selection list. This allows you to enable all applications licensed on the instrument for pre-loading, or is a convenience for selecting all applications in one operation and then letting you deselect individual applications.

Key Path	**System, Power On, Configure Applications**
Instrument S/W Revision	A.02.00

Deselect All

Deselect All removes marks from all applications in the selection list, with the exception of the Power On application (the Power On application cannot be eliminated from the pre-load list). This allows you to disable all applications licensed on the instrument for pre-loading (with the exception of the Power On application), or is a convenience for deselecting all applications in one operation and then select individual applications.

Key Path	**System, Power On, Configure Applications**
Instrument S/W Revision	A.02.00

Move Up

The application list is the order in which applications appear in the Mode Menu. Move Up shifts the selected application up in the list, thus moving the selected application earlier in the Mode Menu.

Key Path	**System, Power On, Configure Applications**
Instrument S/W Revision	A.02.00

Move Down

The application list is the order in which applications appear in the Mode Menu. Move Down shifts the selected application down in the list, thus moving the selected application later in the Mode Menu.

Key Path	**System, Power On, Configure Applications**
Instrument S/W Revision	A.02.00

Select/Deselect

Toggles the currently highlighted application in the list.

Key Path	**System, Power On, Configure Applications**
Instrument S/W Revision	A.02.00

Save Changes

Applies the configuration of applications list: marked application will be pre-loaded in memory the next time the instrument application is started, and the order of applications in the list will be the order of applications in the Mode Menu.

Key Path	**System, Power On, Configure Applications**
Notes	The menu key will be unavailable when the virtual memory of the selected applications exceeds 100% of the limit.
Instrument S/W Revision	A.02.00

System Restart

System Restart provides a means to restart the instrument application. Upon restart the applications in the pre-load list will be loaded in memory.

Key Path	**System, Power On, Configure Applications**
Remote Command	`:SYSTem:PUP:PROCess`
Example	:SYST:PUP:PROC Must Wait after this command for the instrument application to restart

Notes	You cannot use *WAI or *OPC? to synchronize operation; this command stops and restarts the instrument application, thus the SCPI operation is terminated and restarted. A remote program must use fixed wait time to resume sending commands to the instrument. The wait time will be dependent upon which applications are pre-loaded.
Instrument S/W Revision	A.02.00

Configure Applications - Remote commands

Configuration list (Remote Command Only)

This remote command is used to set or query the list of applications to be loaded in-memory.

Remote Command:	`:SYSTem:PON:APPLication:LLISt <string of INSTrument:SELect names>`
	
	`:SYSTem:PON:APPLication:LLISt?`

Example:	:SYST:PON:APPL:LLIS "SA,BASIC,WCDMA"
Notes:	<string of INSTrument:SELect names> are from the enums of the :INSTrument:SELect command in Meas Common section 13.3 The order of the <INSTrument:SELect names> is the order in which the applications are loaded into memory, and the order in which they appear in the Mode Menu. Error –225 "Out of Memory" is reported when more applications are listed than can reside in Virtual Memory. In such circumstance the existing applications load list is unchanged.
Preset:	Not affected by Preset
State Saved:	Not saved in state
Instrument S/W Revision:	A.02.00

Configuration Memory Available (Remote Command Only)

This remote command is used to query the amount of Virtual Memory remaining.

Remote Command:	`:SYSTem:PON:APPLication:VMEMory[:AVAilable]?`
Example:	:SYST:PON:APPL:VMEM?
Preset:	Not affected by Preset
Instrument S/W Revision:	A.02.00

Configuration Memory Total (Remote Command Only)

This remote command is used to query the limit of Virtual Memory allowed for applications.

Remote Command:	`:SYSTem:PON:APPLication:VMEMory:TOTal?`
Example:	:SYST:PON:APPL:VMEM:TOT?
Preset:	Not affected by Preset
Instrument S/W Revision:	A.02.00

Configuration Memory Used (Remote Command Only)

This remote command is a query of the amount of Virtual Memory used by all measurement applications.

Remote Command:	`:SYSTem:PON:APPLication:VMEMory:USED?`
Example:	:SYST:PON:APPL:VMEM:USED?
Preset:	Not affected by Preset
Instrument S/W Revision:	A.02.00

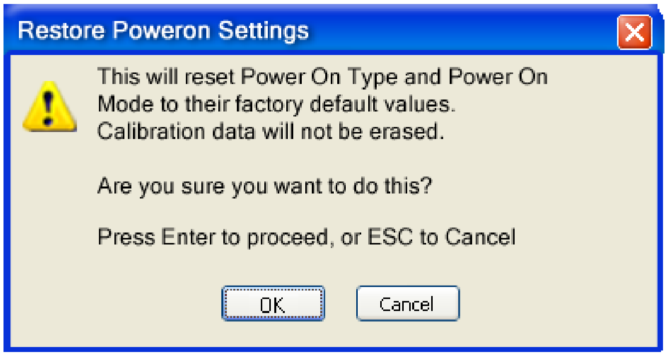
Configuration Application Memory (Remote Command Only)

This remote command is used to query the amount of Virtual Memory a particular application consumes.

Remote Command:	`:SYSTem:PON:APPLication:VMEMory:USED:NAME? <INSTrument:SELect name>`
Example:	:SYST:PON:APPL:VMEM:USED:NAME? CDMA2K
Notes:	<INSTrument:SELect name> is from the enums of the :INSTrument:SELect command in Meas Common section 13.3 Value returned will be 0 (zero) if the name provided is invalid.
Preset:	Not affected by Preset
Instrument S/W Revision:	A.01.70 or later

Restore Power On Defaults

This selection causes the Power On Type and Power On Application 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.

Key Path	**System, Power On**
Example	:SYST:DEF PON
Instrument S/W Revision	Prior to A.02.00

Alignments

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

The current setting of the alignment system is displayed in the system Settings Panel along the top of the display, including a warning icon for conditions that may cause specs to be impacted, for example:

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

Auto Align

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

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

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

Key Path	**System, Alignments**
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.
Preset	This is unaffected by Preset but is set to ON upon a "Restore System Defaults->Align".
SCPI Status Bits/OPC Dependencies	When Auto Align is executing, bit 0 in the Status Operational register is set.
Dependencies/Couplings	Auto Align is set to Off if Restore Align Data is invoked.
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Normal

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

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

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

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

Key Path	**System, Alignments, Auto Align**
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. After the interfering signal is removed, subsequent alignment of the RF will clear the condition, and clear bit 11 in the Status Questionable Calibration register.
SCPI Status Bits/OPC Dependencies	An interfering user signal may prevent automatic alignment of the RF subsystem. If this occurs, the Error Condition "Align skipped: 50 MHz interference" or "Align skipped: 4.8 GHz interference" is reported, the Status Questionable Calibration bit 11 is set, and the alignment proceeds. When a subsequent alignment of the RF subsystem succeeds, either by the next cycle of automatic alignment or from an **Align Now**, **RF**, the Error Condition and Status Questionable Calibration bit 11 are cleared.
Instrument S/W Revision	Prior to A.02.00

Partial

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

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

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

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

Key Path	**System, Alignments, Auto Align**
Mode	All
Example	:CAL:AUTO PART
Restriction and Notes	Auto Align Partial begins the elapsed time counter for Auto Align Off time.
Instrument S/W Revision	Prior to A.02.00

Off

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

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

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

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

Key Path	**System, Alignments, Auto Align**
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.
Instrument S/W Revision	Prior to A.02.00

All but RF

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

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

Key Path	**System, Alignments, Auto Align**
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
Instrument S/W Revision	Prior to A.02.00

Alert

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

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

Key Path	**System, Alignments, Auto Align**
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”.
SCPI Status Bits/OPC Dependencies	The alert is the Error Condition “Align Now, All required” and bit 14 is set in the Status Questionable Calibration register.
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Time & Temperature

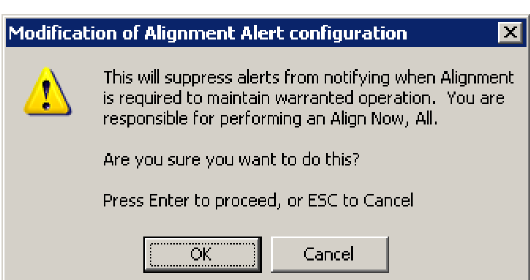
With Auto Align Alert set to **Time & Temperature** the instrument will signal an alert when alignments expire due to the combination of the passage of time and changes in temperature. The alert is the Error Condition “Align Now, All required”. If this choice for Alert is selected, the absence of an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

Key Path	**System, Alignments, Auto Align, Alert**
Mode	All
Example	:CAL:AUTO:ALER TTEM
SCPI Status Bits/OPC Dependencies	Bit 14 is set in the Status Questionable Calibration register.
Instrument S/W Revision	Prior to A.02.00

24 hours

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

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



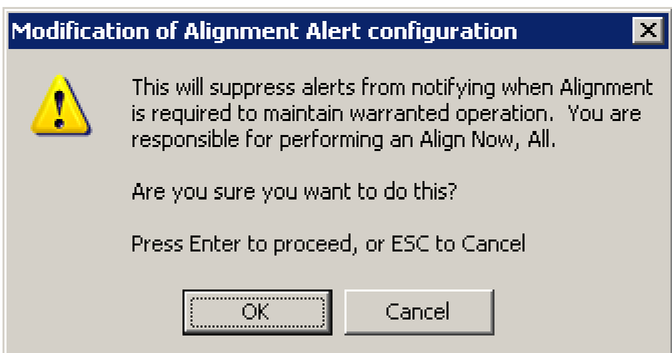
No confirmation is required when Alert is configured through a remote command.

Key Path	**System, Alignments, Auto Align, Alert**
Mode	All
Example	:CAL:AUTO:ALER DAY
SCPI Status Bits/OPC Dependencies	Bit 14 is set in the Status Questionable Calibration register.
Instrument S/W Revision	Prior to A.02.00

7 days

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

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



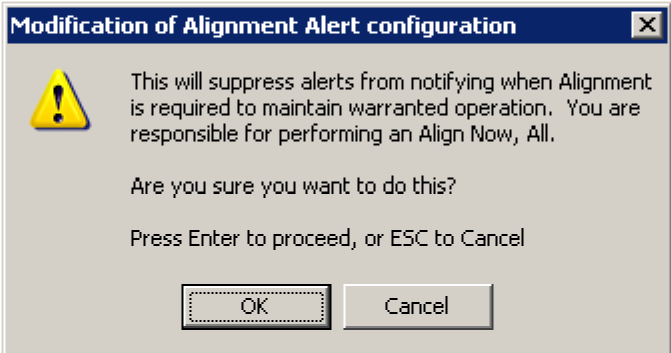
No confirmation is required when Alert is configured through a remote command.

Key Path	**System, Alignments, Auto Align, Alert**
Mode	All
Example	:CAL:AUTO:ALER WEEK
SCPI Status Bits/OPC Dependencies	Bit 14 is set in the Status Questionable Calibration register.
Instrument S/W Revision	Prior to A.02.00

None

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

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



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

Key Path	**System, Alignments, Auto Align, Alert**
Mode	All
Example	:CAL:AUTO:ALER NONE
Instrument S/W Revision	Prior to A.02.00

Align Now

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

Key Path	**System, Alignments**
Instrument S/W Revision	Prior to A.02.00

All

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

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

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

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

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

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

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

Key Path	**System, Alignments, Align Now**
Mode	All
Remote Command	`:CALibration[:ALL]` `:CALibration[:ALL]?`
Example	:CAL
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.
Restriction and Notes	An interfering user supplied signal will result in the instrument requiring an Align Now, RF with the interfering signal removed.
SCPI Status Bits/OPC Dependencies	Bits 11, 12, or 14 may be set in the Status Questionable Calibration register.

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.
Instrument S/W Revision	Prior to A.02.00
Mode	All
Remote Command	`*CAL?`
Example	*CAL?
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]?
Restriction and Notes	Everything about :CALibration[:ALL]? is synonymous with *CAL? including all conditions, status register bits, and couplings
Instrument S/W Revision	Prior to A.02.00

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, and then restart the measurement from the beginning (similar to pressing the **Restart** key). This can be used to align portions of the instrument that are not impacted by an interfering user input signal.

This operation might be chosen instead of **All** if you do not want the device under test to experience a large change in input impedance, such as a temporary open circuit at the analyzer input.

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

Successful completion of **Align Now**, **All but RF** will clear the “Align Now, All required” Error Condition, and clear bit 14 in the Status Questionable Calibration register. If “Align Now, All required” was in effect prior to executing the All but RF, the Error Condition “Align Now, RF required” is asserted and bit 12 in the Status Questionable Calibration register is set. It will also begin the elapsed time counter for Last Align Now, All Time, and capture the Last Align Now, All Temperature.

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

Key Path	**System, Alignments, Align Now**

Mode	All
Remote Command	`:CALibration:NRF` `:CALibration:NRF?`
Example	:CAL:NRF
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”.
SCPI Status Bits/OPC Dependencies	Bits 12 or 14 may be set in the Status Questionable Calibration register.
Dependencies/Couplings	Initializes the time for the Last Align Now, All Time. Records the temperature for the Last Align Now, All Temperature.
Instrument S/W Revision	Prior to A.02.00

RF

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

This operation might be desirable if the alignments had been set to not include RF alignments, or if previous RF alignments could not complete because of interference which has since been removed.

If an interfering user signal is present at the RF Input, the alignment will terminate and raise the Error Condition “Align skipped: 50 MHz interference” or “Align skipped: 4.8 GHz interference”, and Error Condition “Align Now, RF required”. In addition, bits 11 and 12 will be set in the Status Questionable Calibration register.

The query form of the remote commands (:CALibration:RF?) will invoke the alignment of the RF subsystem and return a success or failure value. An interfering user signal is grounds for failure.

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

Successful completion of **Align Now**, **RF** clears the Error Conditions “Align skipped: 50 MHz interference” and “Align skipped: 4800 MHz interference” and the Error Conditions “Align RF failed” and “Align Now, RF required”, and clears bits 3, 11, and 12 in the Status Questionable Calibration register. It will also begin the elapsed time counter for Last Align Now, RF Time, and capture the Last Align Now, RF Temperature.

Align Now, **RF** can be interrupted by pressing the Cancel (ESC) front-panel key or remotely with Device

Clear followed by the :ABORt SCPI command. When this occurs, the Error Condition “Align Now, RF required” is set, and bit 12 is set in the Status Questionable Condition register. None of the new alignment data is used.

Key Path	**System, Alignments, Align Now**
Mode	All
Remote Command	`:CALibration:RF` `:CALibration:RF?`
Example	:CAL:RF
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.
Restriction and Notes	An interfering user supplied signal will result in the instrument requiring an Align Now, RF with the interfering signal removed.
SCPI Status Bits/OPC Dependencies	Bits 11, 12, or 14 may be set in the Status Questionable Calibration register.
Dependencies/Couplings	Initializes the time for the Last Align Now, RF Time. Records the temperature for the Last Align Now, RF Temperature.
Instrument S/W Revision	Prior to A.02.00

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**
Instrument S/W Revision	Prior to A.02.00

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

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

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

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

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

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

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

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

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

Key Path	**System, Alignments, Align Now**
Mode	All
Remote Command	`:CALibration:YTF`
	`:CALibration:YTF?`
Example	:CAL:YTF

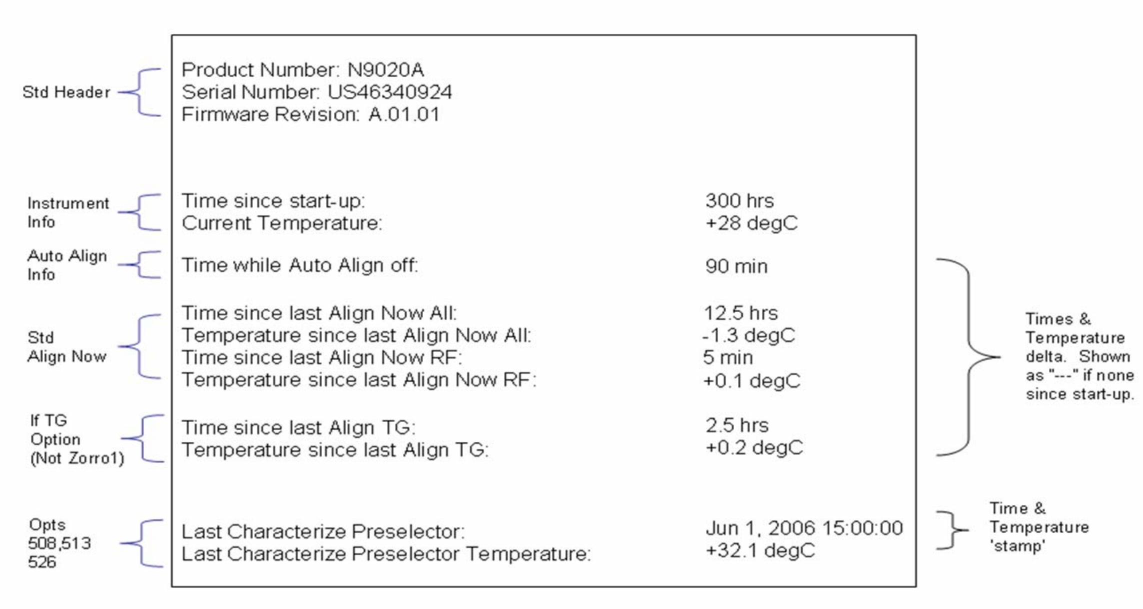
Remote Command Notes	:CALibration:YTF? returns 0 if successful
	:CALibration:YTF? returns 1 if failed (including interfering user signal)
	While Advanced, Characterize Preselector is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 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.
	For Option 507, 508, 513, and 526 only.
Dependencies/Couplings	Initializes the time for the Last Characterize Preselector Time.
	Records the temperature for the Last Characterize Preselector Temperature.
Instrument S/W Revision	Prior to A.02.00

Show Alignment Statistics

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

Values which are displayed are only updated when the Show Alignment Statistics screen is invoked, they are not updated while the Show Alignment Statistics screen is being displayed. The remote commands which access this information obtain current values.

An example of the Show Alignment Statistics screen would be similar to:



A successful Align Now, RF will set the Last Align RF temperature to the current temperature, and reset the Last Align RF time. A successful Align Now, All or Align Now, All but RF will set the Last Align Now All temperature to the current temperature, and reset the Last Align Now All time. A successful Align Now, All will also reset the Last Align RF items if the RF portion of the Align Now succeeded.

Key Path	**System, Alignments**
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.
Instrument S/W Revision	Prior to A.02.00

Key Path	**Visual annotation in the Show Alignment Statistics screen**
Mode	All
Remote Command	`:SYSTem:PON:TIME?`
Example	:SYST:PON:TIME?
Restriction and Notes	Value is the time since the most recent start-up in seconds.
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Key Path	**Visual annotation in the Show Alignment Statistics screen**
Mode	All
Remote Command	`:CALibration:TEMPerature:CURRent?`
Example	:CAL:TEMP:CURR?
Restriction and Notes	Value is in degrees Centigrade. Value is invalid if using default alignment data (Align Now, All required)
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Key Path	**Visual annotation in the Show Alignment Statistics screen**
Mode	All
Remote Command	`:CALibration:TIME:LALL?`
Example	:CAL:TIME:LALL?
Restriction and Notes	Value is the elapsed time, in seconds, since the last successful Align Now, All or Align Now, All but RF was executed.
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Key Path	**Visual annotation in the Show Alignment Statistics screen**
Mode	All
Remote Command	`:CALibration:TEMPerature:LALL?`
Example	:CAL:TEMP:LALL?
Restriction and Notes	Value is in degrees Centigrade at which the last successful Align Now, All or Align Now, All but RF was executed.
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Key Path	**Visual annotation in the Show Alignment Statistics screen**
Mode	All
Remote Command	`:CALibration:TIME:LRF?`
Example	:CAL:TIME:LRF?
Restriction and Notes	Value is the elapsed time, in seconds, since the last successful Align Now, RF was executed, either individually or as a component of Align Now, All.
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Key Path	**Visual annotation in the Show Alignment Statistics screen**
Mode	All
Remote Command	`:CALibration:TEMPerature:LRF?`
Example	:CAL:TEMP:LRF?
Restriction and Notes	Value is in degrees Centigrade at which the last successful Align Now, RF was executed, either individually or as a component of Align Now, All.
State Saved	No
Instrument S/W Revision	Prior to A.02.00

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

Instrument S/W Revision	Prior to A.02.00

Key Path	**Visual annotation in the Show Alignment Statistics screen**
Mode	All
Remote Command	`:CALibration:TEMPerature:LPReselector?`
Example	:CAL:TEMP:LPR?
Restriction and Notes	Value is in degrees Centigrade at which the last successful Characterize Preselector was executed.
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Key Path	**Visual annotation in the Show Alignment Statistics screen**
Mode	All
Remote Command	`:CALibration:AUTO:TIME:OFF?`
Example	:CAL:AUTO:TIME:OFF?
Restriction and Notes	Value is the elapsed time, in seconds, since Auto Align has been set to Off or Off with Alert. The value is 0 if Auto Align is ALL or NORF.
State Saved	No
Instrument S/W Revision	Prior to A.02.00

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.

Key Path	**System, Alignments**
Mode	All
Remote Command	`:CALibration:FREQuency:REFerence:MODE CALibrated|USER` `:CALibration:FREQuency:REFerence:MODE?`
Example	:CAL:FREQ:REF:MODE CAL
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.
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.

Preset	This is unaffected by Preset but is set to CALibrated on a “Restore System Defaults->Align”.
State Saved	No
Instrument S/W Revision	Prior to A.02.00

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.

Key Path	**System, Alignments, Timebase DAC**
Mode	All
Example	:CAL:FREQ:REF:MODE CAL
Instrument S/W Revision	Prior to A.02.00

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.

Key Path	**System, Alignments, Timebase DAC**
Mode	All
Example	:CAL:FREQ:REF:MODE USER
Instrument S/W Revision	Prior to A.02.00

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.
Preset	This is unaffected by Preset but is set to the factory setting on a “Restore System Defaults->Align”.
Dependencies/Couplings	Setting :CAL:FREQ:REF:FINE sets :CAL:FREQ:REF:MODE USER
State Saved	No
Min	0
Max	16383

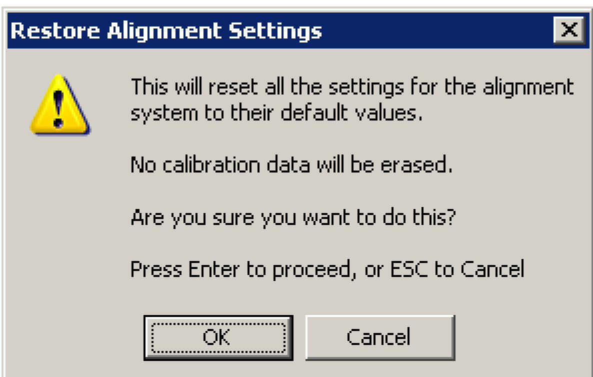
Instrument S/W Revision	Prior to A.02.00

Remote Command:	:CALibration:FREQuency:REFerence:COARse <integer> :CALibration:FREQuency:REFerence:COARse?
Example:	:CAL:FREQ:REF:COAR 8191
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.
Dependencies/Couplings:	Setting :CAL:FREQ:REF:COAR sets :CAL:FREQ:REF:MODE USER
Instrument S/W Revision:	Prior to A.02.00

Restore Align Defaults

Initializes the alignment user interface settings, not alignment data, to the factory default values. Align Now, All must be executed if the value of the Timebase DAC results in a change.

For front panel operation, you are prompted to confirm action before setting the alignment parameters to factory defaults:



The parameters affected are:

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

Key Path	**System, Alignments**
Mode	All

Example	:SYST:DEF ALIG
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.
Instrument S/W Revision	Prior to A.02.00

Backup and Restore Alignment Data

Alignment data for the instrument resides on the hard drive in a database. Agilent uses high quality hard drives; however it is highly recommended the alignment data be backed-up to storage outside of the instrument. Additionally, for customers who use multiple CPU Assemblies or multiple disk drives, the alignment that pertains to the instrument must be transferred to the resident hard drive after a CPU or hard drive is replaced. This utility facilitates backing-up and restoring the alignment data.

NOTE	This utility allows the operator to navigate to any location of the Windows file system. It is intended that the operator use an USB memory device or Mapped Network Drive to backup the alignment data to storage outside of the instrument.

Backup or Restore Align Data…

Opens the utility for backing-up or restoring the alignment data.

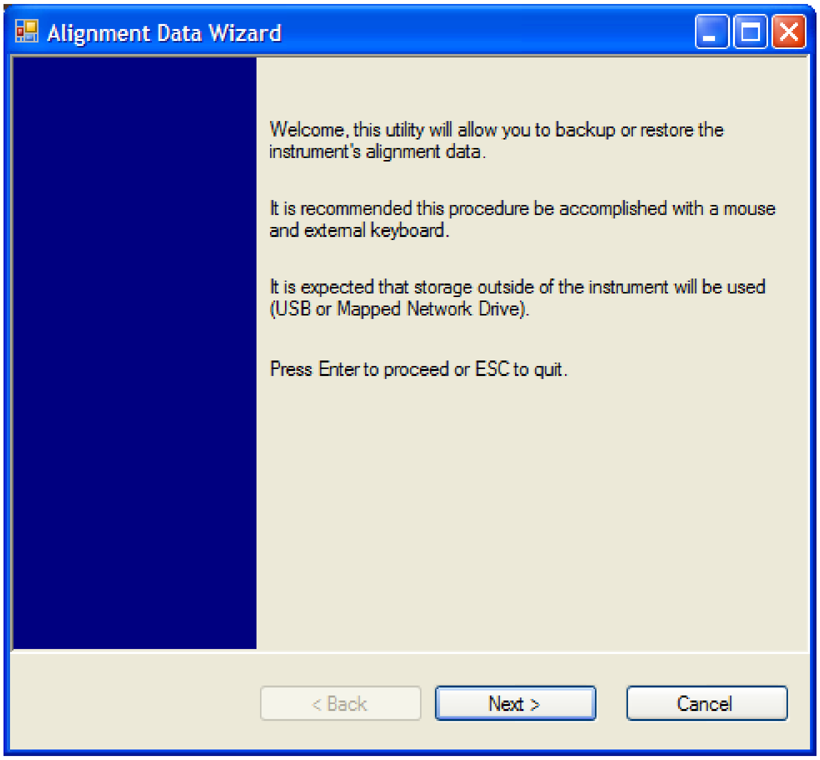
Key Path	**System, Alignments**
Instrument S/W Revision	A.02.00

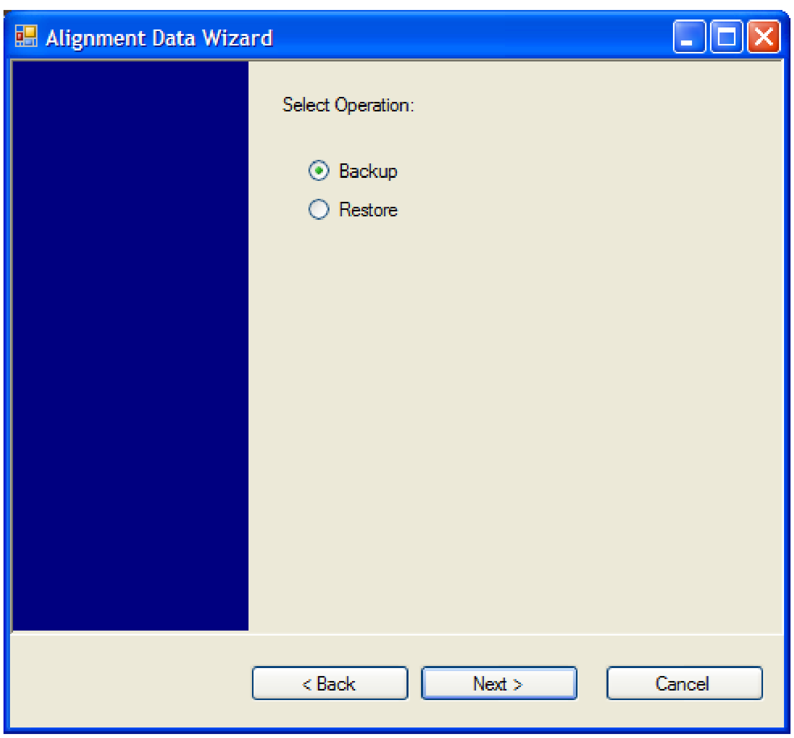
Key Path	**System, Alignments**
Mode	All
Remote Command	`:CALibration:DATA:DEFault`
Example	:CAL:DATA:DEF
Dependencies/Couplings	Sets Auto Align to Off. Sets bit 14 in the Status Questionable Calibration register. The Error Condition “Align Now, All required” is set.
Instrument S/W Revision	Prior to A.02.00

Alignment Data Wizard

The Backup or Restore Alignment Data wizard will guide the you through the operation of backing-up or restoring the alignment data.

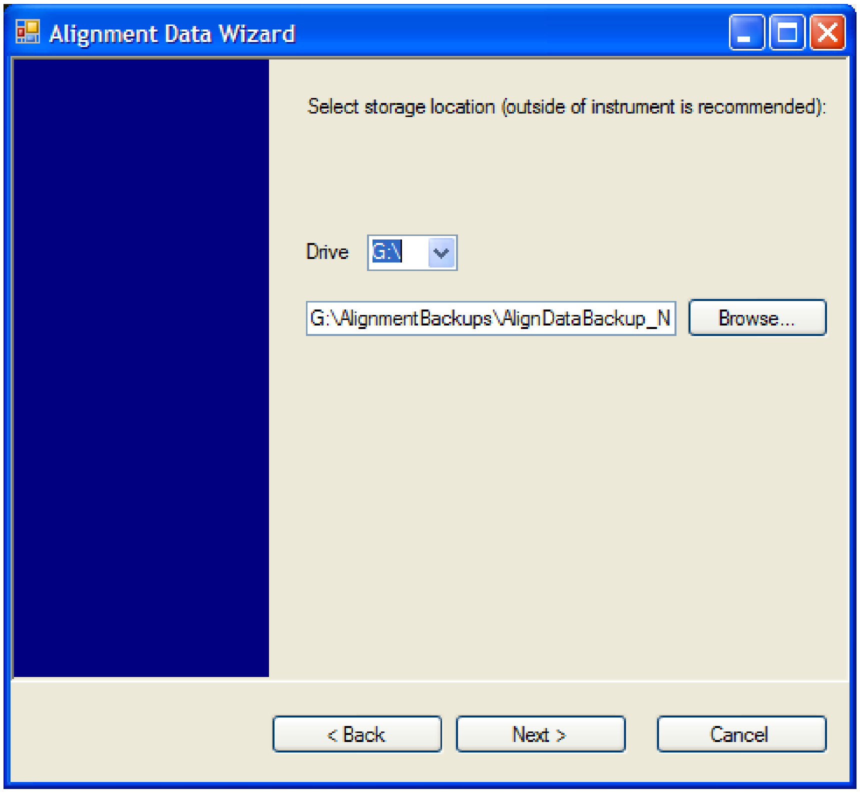
The following dialogue boxes operate without a mouse or external keyboard when you use the default file names.



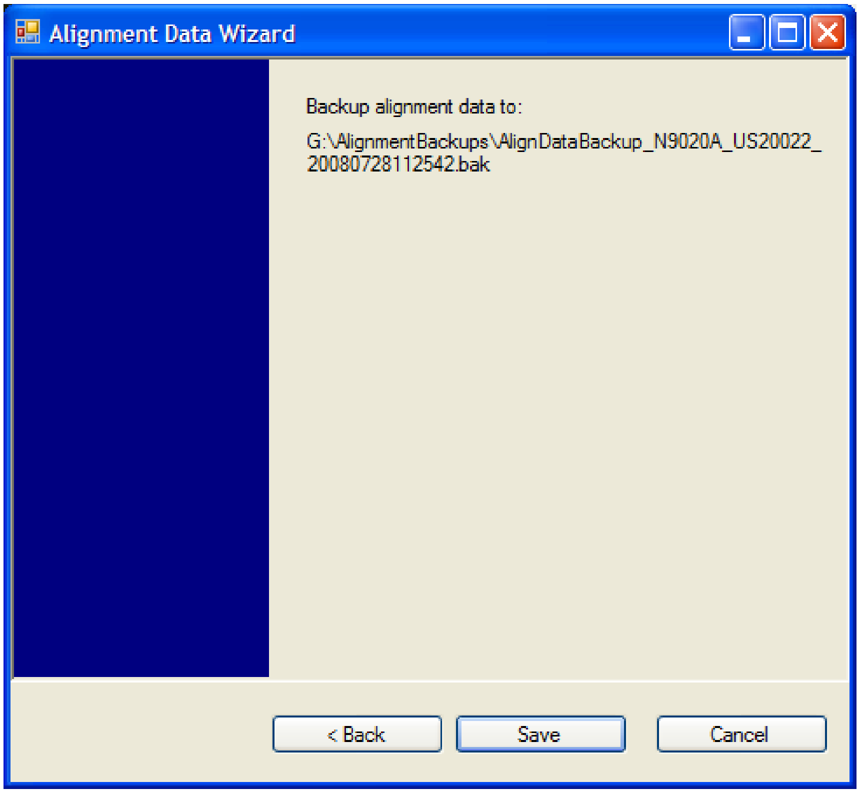


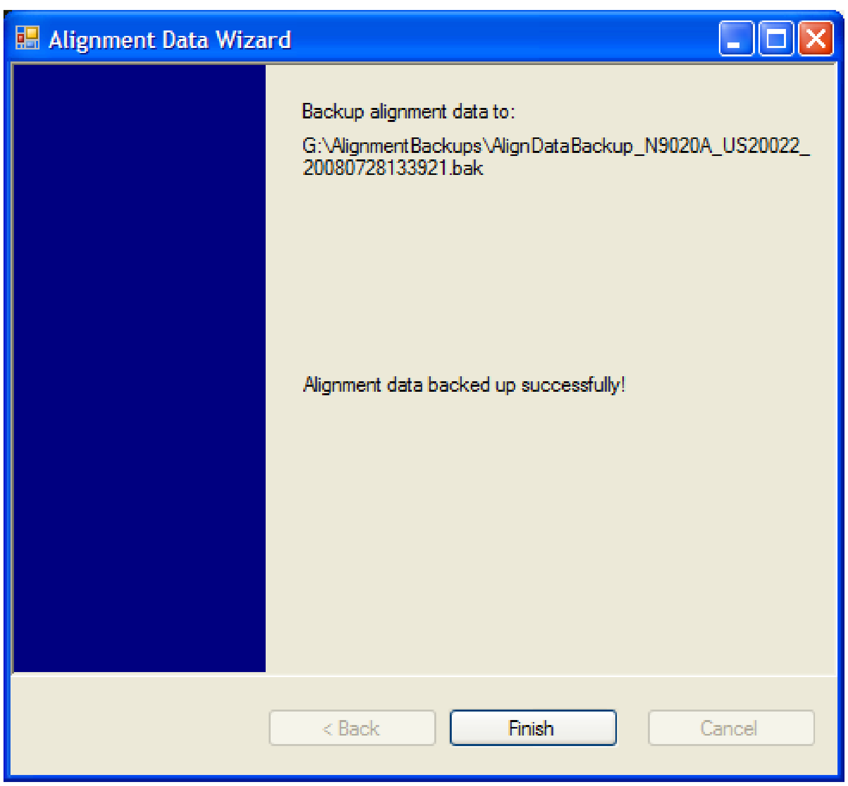
The backup screen will indicate the approximate amount of space required to contain the backup file.

The default file name will be AlignDataBackup_<model number>_<serial number>_<date in YYYYMMDDHHMMSS>.bak.

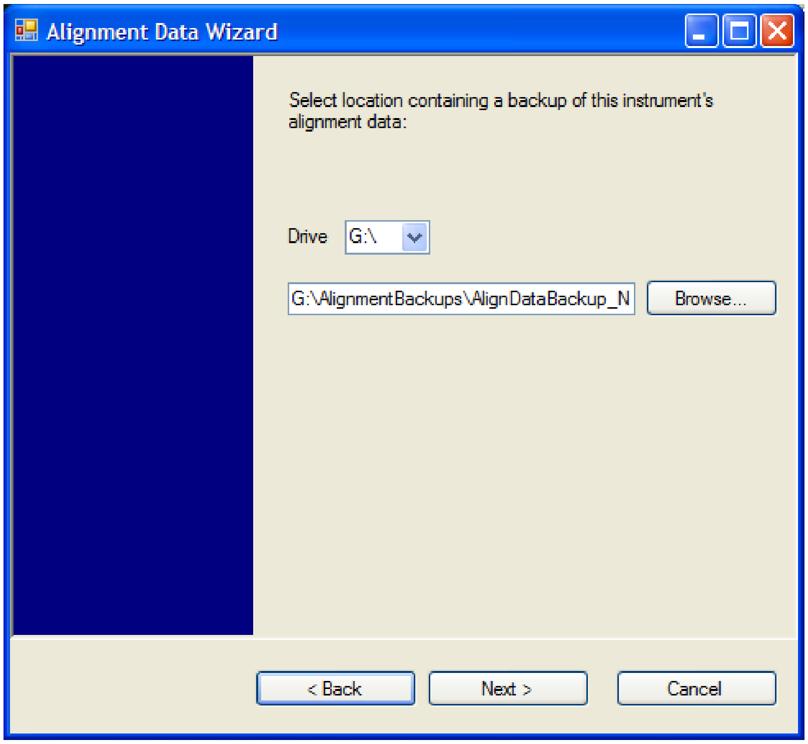


Changing the drive letter will also modify the path displayed in the box below. When this step is first loaded, the drive drop-down is populated with connected drives which provide s you with write access. If there are many unreachable network drives connected to the instrument, this step can take a few seconds. If a USB drive is present, it will be selected by default. The path defaults to the AlignmentBackups folder, and a filename will be automatically created in the form of AlignDataBackup_<model>_<serial number>_<date><time>. When the "Next >" button is pressed, you will be prompted to create a new folder if the chosen path does not yet exist.

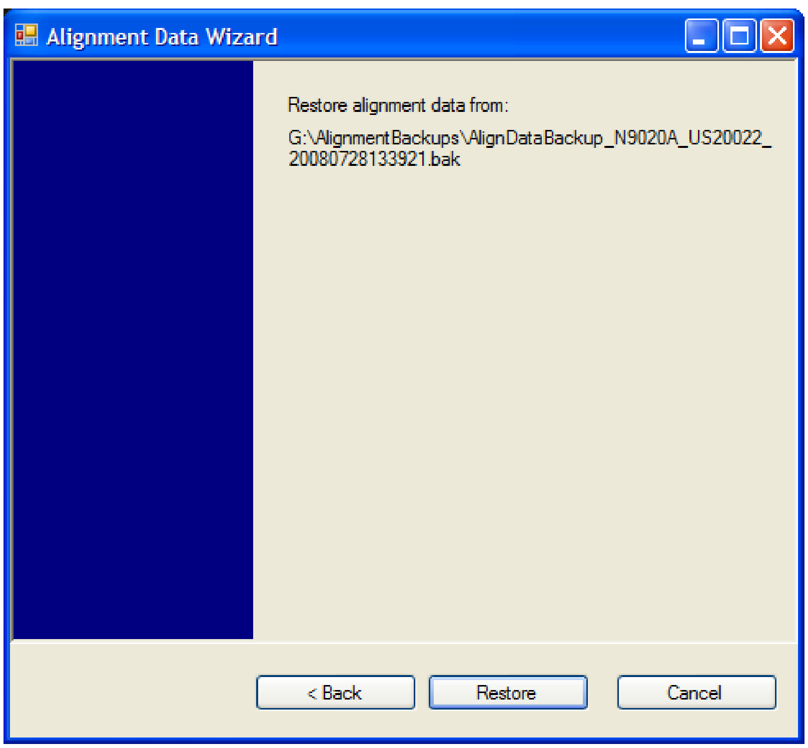


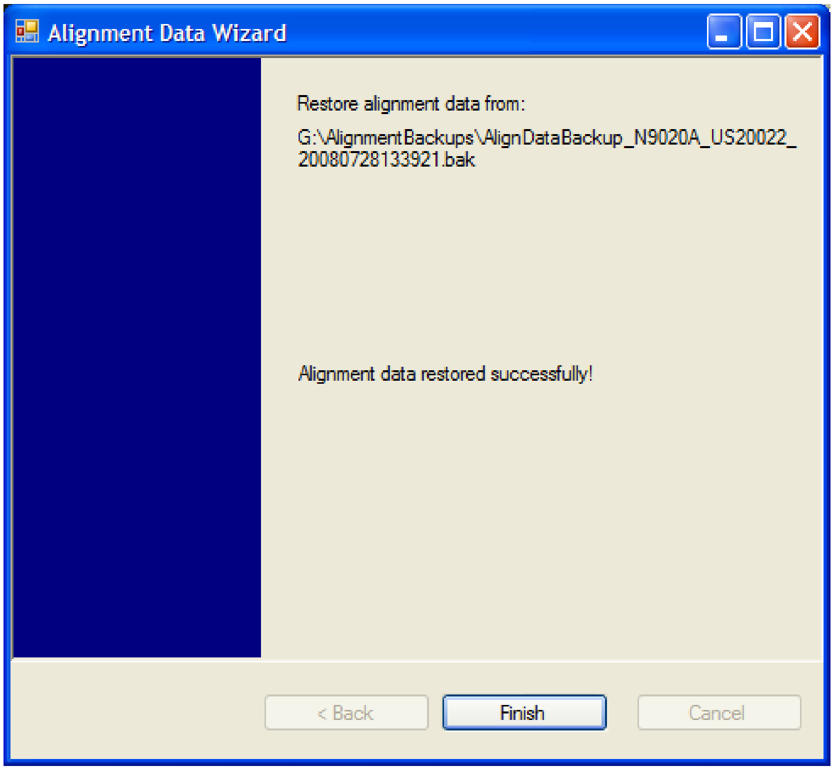


The restore operation will check the validity of the restore file using the database's built-in file validation. If the restore file is corrupt, the existing alignment data will remain in use.



Changing the drive letter will also modify the path displayed in the box below. When this step is first loaded, the drive drop-down is populated with connected drives which provide you with read access. The path defaults to the AlignBackups folder. The most recent *.bak file in the folder will also be selected by default.





Perform Backup (Remote Command Only)

Invokes an alignment data backup operation to the provided Folder.

NOTE	It is recommended that the Folder provided is outside of the instrument (USB or Mapped Network Drive).

Remote Command:	`:CALibration:DATA:BACKup <filename>`
Example:	:CAL:DATA:BACK "F:\AlignDataBackup_N9020A_US00000001_2008140100.bak"
Instrument S/W Revision:	A.02.00

Perform Restore (Remote Command Only)

Invokes an alignment data restore operation from the provided filename.

Remote Command:	`:CALibration:DATA:RESTore <filename>`
Example:	:CAL:DATA:REST "F:\AlignDataBackup_N9020A_US00000001_2008140100.bak "
Instrument S/W Revision:	A.02.00

I/O Config

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

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

GPIB

Activates a menu for configuring the GPIB I/O port.

Key Path	**System, I/O Config**
Instrument S/W Revision	A.02.00

GPIB Address

Select the GPIB remote address.

Key Path	**System, I/O Config, GPIB**
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
Instrument S/W Revision	Prior to A.02.00

GPIB Controller

Sets the GPIB port into controller or device mode. In the normal state, GPIB controller is disabled, which allows the analyzer to be controlled by a remote computer. When GPIB Controller is enabled, the instrument can run software applications that use the instrument's computer as a GPIB controller; controlling devices connected to the instrument's GPIB port.

NOTE	When GPIB Controller is enabled, the analyzer application itself cannot be controlled over GPIB; however, in this case it can easily be controlled via LAN or USB. The GPIB port cannot be a controller and device at the same time. Additionally, only one controller can be active on the GPIB bus at any given time; if the analyzer is the controller an external PC cannot be a controller.

To control the instrument from the software that is performing GPIB controller operation, you can use an internal TCP/IP connection to the analyzer application. Use the address TCPIP0::localhost::inst0::INSTR to send SCPI commands to the analyzer application.

Remote Command	`:SYSTem:COMMunicate:GPIB[1][:SELF]:CONTroller[:ENABle] ON|OFF|0|1`	
	`:SYSTem:COMMunicate:GPIB[1][:SELF]:CONTroller[:ENABle]?`	
Example	:SYST:COMM:GPIB:CONT ON	Will set GPIB port to Controller
Key Path	**System, I/O Config, GPIB**	
Mode	All	
Scope	Mode Global	
Notes	When the instrument becomes the Controller bit 0 in the Standard Event Status Register is set (and when the instrument relinquishes Controller capability bit 0 is cleared in the Standard Event Status Register).	
Preset	This is unaffected by Preset but is set to OFF on a “Restore System Defaults->Misc”	
State Saved	No	
Range	Disabled|Enabled	
Instrument S/W Revision	A.02.00	

Disabled

Selection for disabling the GPIB Controller capability, this is the default (or normal) setting.

Key Path	**System, I/O Config, GPIB, GPIB Controller**	
Example	:SYST:COMM:GPIB:CONT OFF	Will set GPIB port to Device
Instrument S/W Revision	A.02.00	

Enabled

Selection for enabling the GPIB Controller capability.

Key Path	**System, I/O Config, GPIB, GPIB Controller**	
Example	:SYST:COMM:GPIB:CONT ON	Will set GPIB port to Controller
Instrument S/W Revision	A.02.00	

SCPI LAN

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**
Instrument S/W Revision	Prior to A.02.00

SCPI Telnet

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

Key Path	**System, I/O Config, SCPI LAN**
Mode	All
Remote Command	`:SYSTem:COMMunicate:LAN:SCPI:TELNet:ENABle OFF|ON|0|1`
	`:SYSTem:COMMunicate:LAN:SCPI:TELNet:ENABle?`
Example	:SYST:COMM:LAN:SCPI:TELN:ENAB OFF
Preset	This is unaffected by Preset but is set to ON with a "Restore System Defaults->Misc"
State Saved	No
Range	On | Off
Instrument S/W Revision	Prior to A.02.00

SCPI Socket

Turns the capability of establishing Socket LAN sessions On or Off. This allows you to limit SCPI access over LAN through socket sessions.

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

Remote Command	:SYSTem:COMMunicate:LAN:SCPI:SOCKet:ENABle OFF|ON|0|1 :SYSTem:COMMunicate:LAN:SCPI:SOCKet:ENABle?
Example	:SYST:COMM:LAN:SCPI:SOCK:ENAB OFF
Preset	This is unaffected by Preset but is set to ON with a “Restore System Defaults->Misc”
State Saved	No
Range	On | Off
Instrument S/W Revision	Prior to A.02.00

SCPI Socket Control Port (Remote Command Only)

Returns the TCP/IP port number of the control socket associated with the SCPI socket session. This query enables you to obtain the unique port number to open when a device clear is to be sent to the instrument. Every time a connection is made to the SCPI socket, the instrument creates a peer control socket. The port number for this socket is random. You 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
Instrument S/W Revision	Prior to A.02.00

SICL Server

Turns the SICL server capability On or Off, enabling you to limit SCPI access over LAN through the SICL server. (SICL IEEE 488.2 protocol.)

Parameter	Description	Setting
Maximum Connections	The maximum number of connections that can be accessed simultaneously	5
Instrument Name	The name (same as the remote SICL address) of your analyzer	inst0
Instrument Logical Unit	The unique integer assigned to your analyzer when using SICL LAN	8

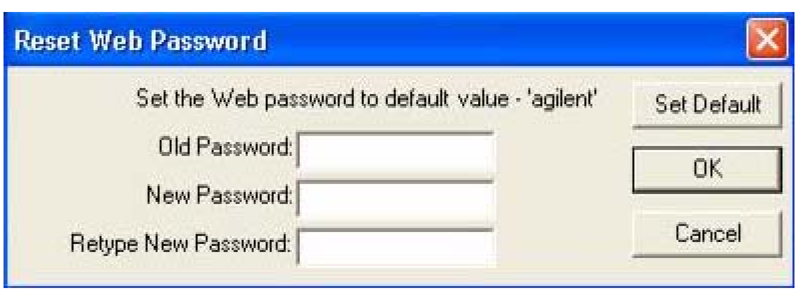
Emulated GPIB Name	The name (same as the remote SICL address) of the device used when communicating with your analyzer	gpib7
Emulated GPIB Logical Unit	The unique integer assigned to your device when it is being controlled using SICL LAN	8
Emulated GPIB Address	The emulated GPIB address assigned to your transmitter tester when it is a SICL server (the same as your GPIB address)	18

Key Path	**System, I/O Config, SCPI LAN**
Mode	All
Remote Command	`:SYSTem:COMMunicate:LAN:SCPI:SICL:ENABle OFF|ON|0|1` `:SYSTem:COMMunicate:LAN:SCPI:SICL:ENABle?`
Example	:SYST:COMM:LAN:SCPI:SICL:ENAB OFF
Preset	This is unaffected by Preset, but is set to ON with a “Restore System Defaults->Misc”
State Saved	No
Range	On | Off
Instrument S/W Revision	Prior to A.02.00

Reset Web Password

The embedded webserver contains certain capability which are password protected; modifying the LAN configuration of the instrument, and access to web pages that can change the settings of the instrument. The default password from the factory is `agilent' (without the quotes).

Selecting Reset web password brings up a control for resetting the password, 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) front panel key.

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

Instrument S/W Revision	Prior to A.02.00

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
Instrument S/W Revision	Prior to A.02.00

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

Instrument S/W Revision	Prior to A.02.00

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
Instrument S/W Revision	Prior to A.02.00

LXI

Pressing this key opens a menu that allows you to access the various LXI configuration properties.

Tip: For information about setting up measurements using LXI, refer to the "Programmer's Guide" located in your analyzer at: C:/Program Files/Agilent/Signal Analysis/Help/Bookfiles/x_series_prog.pdf. It is also available by selecting the "Additional Documentation" page of the Help.

Key Path	**System, I/O Config**
Instrument S/W Revision	Prior to A.02.00

LAN Reset

This key resets the LAN connection.

Key Path	**System, I/O Config, LXI**
Instrument S/W Revision	Prior to A.02.00

LXI Domain

The instrument only receives LXI LAN Events sent by members of the same LXI Domain. Conversely, LXI Output LAN Events sent by the instrument can only be received by members of the same LXI Domain. This is not the same as the IEEE 1588 domain (see “Domain (Remote Command Only)” on page 255“Domain (Remote Command Only)” on page 255).

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

Remote Command	`:LXI:EVENt:DOMain <intDomain>`
	`:LXI:EVENt:DOMain?`
Example	:LXI:EVEN:DOM 128
	:LXI:EVEN:DOM?
Preset	Not affected by a Preset. The default value of "0" can be restored by pressing Restore Defs, Input/Output Settings
State Saved	Saved in instrument state.
Range	0–255
Instrument S/W Revision	Prior to A.02.00

LXI Output LAN Events

The device can be configured to send LXI LAN Events as the instrument's state changes. Specifically, it can notify other devices as the status signals WaitingForTrigger, Sweeping, Measuring, OperationComplete, and Recalling transition. Additionally, Output LAN Events can be sent in response to the receipt of any of the Input LAN Events.

This is the entry point for the LXI Output LAN Event system. This key branches to a list of events that can be sent out on the LAN in response to instrument events.

Key Path	**System, I/O Config, LXI**
Instrument S/W Revision	Prior to A.02.00

Disable All

This command causes the Enable property of all members of the LXI Output LAN Event List to be set to OFF.

Key Path	**System, I/O Config, LXI, LXI Output LAN Events**
Remote Command	`:LXI:EVENt[:OUTPut]:LAN:DISable:ALL`
Example	:LXI:EVEN:LAN:DIS:ALL
Instrument S/W Revision	Prior to A.02.00

Output LAN Event List

This is the list of LXI Output LAN events that can be sent in response to an instrument event such as sweeping or waiting for a trigger. Each member of this list has a key in the LXI Output LAN Events panel. The list can grow and shrink in response to Add and Remove commands respectively. New pages must be added and removed automatically as the list size changes. Only the first 14 characters of an LXI Output LAN Event name are displayed on the key.

Key Path	**System, I/O Config, LXI, LXI Output LAN Events**
Remote Command	`:LXI:EVENt[:OUTPut]:LAN:LIST?`

Example	:LXI:EVEN:LAN:LIST?
	Returns the complete list of Output LAN Events which is, at minimum: "LAN0", "LAN1", "LAN2", "LAN3", "LAN4", "LAN5", "LAN6", "LAN7", "WaitingForTrigger", "Measuring", "Sweeping", OperationComplete", "Recalling"
Preset	Not affected by a Preset. The default values can be restored by pressing Restore Defs, Input/Output Settings.
	Preset/Default values: "LAN0", "LAN1", "LAN2", "LAN3", "LAN4", "LAN5", "LAN6", "LAN7", "WaitingForTrigger", Measuring", Sweeping", OperationComplete", "Recalling"
State Saved	Saved in instrument state.
Instrument S/W Revision	Prior to A.02.00

Add (Remote Command Only)

Adds the provided string to the list of possible LAN events to output as a response to instrument events. As new LAN events are added, keys are generated in the LXI Output LAN Events menu. New key panels are generated as the number of possible LAN events increases past a multiple of six, and the "More" keys are updated to reflect the new number of key panels in the LXI Output LAN Events menu.

Remote Command:	`:LXI:EVENt[:OUTPut]:LAN:ADD "LANEVENT"`
Example:	:LXI:EVEN:LAN:ADD "LANEVENT"
Restriction and Notes:	The maximum length of the string is 16 characters.
	Longer strings are concatenated and added to the LXI Output LAN Event list.
	No event is added if the LAN Event already exists.
State Saved:	No
Range:	Uppercase, Lowercase, Numeric, Symbol except for comma or semicolon
Instrument S/W Revision:	Prior to A.02.00

Remove (Remote Command Only)

Removes the provided string from the list of possible LAN events to output as a response to instrument events. As new LAN events are removed, keys are removed from the LXI Output LAN Events menu. Key panels are removed as the number of possible LAN events decreases past a multiple of six, and the "More" keys are updated to reflect the new number of key panels in the LXI Output LAN Events menu. Events from the default list cannot be removed.

Remote Command:	`:LXI:EVENt[:OUTPut]:LAN:REMove[:EVENt] "LANEVENT"`
Example:	:LXI:EVEN:LAN:REM "LANEVENT"

Restriction and Notes:	The maximum length of the string is 16 characters. Longer strings are concatenated and the resulting LAN Event is removed from the LXI Output LAN Event list. Nothing happens if the LAN event was not introduced using the Add command.
State Saved:	No
Range:	Uppercase, Lowercase, Numeric, Symbol
Instrument S/W Revision:	Prior to A.02.00

Remove All (Remote Command Only)

Clears the list of custom LAN events (those introduced using the Add command) that are available to output as a response to instrument events. As new LAN events are removed, keys are removed from the LXI Output LAN Events menu. Key panels are removed as the number of possible LAN events decreases past a multiple of six, and the “More” keys are updated to reflect the new number of key panels in the LXI Output LAN Events menu.

Remote Command:	`:LXI:EVENt[:OUTPut]:LAN:REMove:ALL`
Example:	:LXI:EVEN:LAN:REM:ALL
Restriction and Notes:	Only LAN Events added with the Add command are removed. Default events cannot be removed.
Instrument S/W Revision:	Prior to A.02.00

Source

Sets the instrument event that this LXI Output LAN event is tied to.

The possible instrument events are “WaitingForTrigger”, “Sweeping”, “Measuring”, “OperationComplete”, and “Recalling”.

The key is labeled with the value of the selected source.

For the instrument event specific LXI Output LAN Events “WaitingForTrigger,” “Sweeping,” “Measuring,” “OperationComplete,” and “Recalling,” this parameter is set to the corresponding source value and cannot be changed. For these events, the Source key does not appear.

WaitingForTrigger, Measuring, and Sweeping correspond to the standard trigger state machine activities for which they are named.

OperationComplete is low when a measurement operation is underway. For example, OperationComplete is low throughout a list sweep measurement, even though Sweeping, Measuring, and WaitingForTrigger will undergo a number of transitions. In this case, OperationComplete goes high when the entire list sweep is finished.

Recalling is high while the instrument is actively recalling a state.

Additionally, the Source parameter can be set to the name of any Input LAN Event. This causes the Output LAN Event to be sent upon receipt of the named Input LAN Event. There is no front panel support for these events.

The default list of available Input LAN Events is:

- "LAN0"
- "LAN1"
- "LAN2"
- "LAN3"
- "LAN4"
- "LAN5"
- "LAN6"
- "LAN7"

Key Path	**System, I/O Config, LXI, LXI Output LAN Events, LAN[n]**
Remote Command	`:LXI:EVENt[:OUTPut]:LAN[:SET]:SOURce "LANEVENT", "SourceEvent"` `:LXI:EVENt[:OUTPut]:LAN[:SET]:SOURce? "LANEVENT"`
Example	:LXI:EVEN:LAN:SOUR "LANEVENT","WaitingForTrigger"
Restriction and Notes	The maximum length of the string is 45 characters.
Preset	Not affected by a Preset. The default values can be restored by pressing Restore Defs, Input/Output Settings. Preset/Default values: **"**Sweeping" (The Output LAN Events "WaitingForTrigger", "Sweeping", "Measuring", "OperationComplete", and "Recalling" all have default source parameters that match their names)
State Saved	Saved in instrument state.
Range	"WaitingForTrigger"|"Sweeping"|"Measuring"|"OperationComplete"|"Recalling"|"LAN0"|"LAN1"| "LAN2"| "LAN3"| "LAN4"| "LAN5"| "LAN6"| "LAN7"| any user-added Input LAN Event
Instrument S/W Revision	Prior to A.02.00

Destination (Remote Command Only)

Outgoing LAN events are sent to the hosts enumerated in the destination expression. This expression takes the form of “host1:port1, host2:port2,....” where port numbers are optional, and default to the IANA assigned TCP port (5044). To designate a UDP broadcast at the default port, set the destination string to “” or “ALL”. To designate a UDP broadcast at a specific port, set the destination string to “:port” or “ALL:port”.

Examples:

- “192.168.0.1:23”
- “agilent.com, soco.agilent.com”
- “agilent.com:80, 192.168.0.1”

Remote Command:	`:LXI:EVENt[:OUTPut]:LAN[:SET]:DESTination "LANEVENT","destinationExpression"` `:LXI:EVENt[:OUTPut]:LAN[:SET]:DESTination? "LANEVENT"`
Example:	:LXI:EVEN:LAN:DEST “LANEVENT”,“host1, 192.168.0.1:80”
Restriction and Notes:	The maximum length of the string is 45 characters.
Preset:	Not affected by a Preset. The default value of "ALL" can be restored by using the command: :SYSTem:DEFault INPut
State Saved:	Saved in instrument state.
Range:	Uppercase, Lowercase, Numeric, Symbol
Instrument S/W Revision:	Prior to A.02.00

Drive

Determines the behavior of an output event.

- Normal designates typical operation, where both edges of the instrument event are transmitted,
- Off disables the LAN event.
- Wired-OR causes only one edge to be transmitted.

Key Path	**System, I/O Config, LXI, LXI Output LAN Events, LAN[n]**
Remote Command	`:LXI:EVENt[:OUTPut]:LAN[:SET]:DRIVe "LANEVENT", OFF|NORMal|WOR` `:LXI:EVENt[:OUTPut]:LAN[:SET]:DRIVe? "LANEVENT"`
Example	:LXI:EVEN:LAN:DRIV “LANEVENT”,WOR
Preset	Not affected by a Preset. The default value of "NORMal" can be restored by using the command: :SYSTem:DEFault INPut
State Saved	Saved in instrument state.

Range	OFF|NORMal|WOR
Instrument S/W Revision	Prior to A.02.00

Slope

Slope determines which instrument event transition results in a LAN packet being sent and whether or not that edge is inverted.

When the Drive parameter is set to Normal, a Slope of Negative causes both edges to be inverted before they are transmitted. A Positive Slope transmits the edges unaltered.

When the Drive parameter is set to WOR, only Positive edges are transmitted. When the Slope is Negative, a falling edge is inverted and sent as a rising edge. When the Slope is Positive, a rising edge is sent normally.

The following table illustrates the effects of the Slope and Drive parameters.

Instrument Event Edge	Slope Parameter	Drive Parameter	Action
0	Negative	Off	Not sent
0	Positive	Off	Not sent
1	Negative	Off	Not sent
1	Positive	Off	Not sent
0	Negative	Normal	1
0	Positive	Normal	0
1	Negative	Normal	0
1	Positive	Normal	1
0	Negative	Wired OR	1
0	Positive	Wired OR	Not sent
1	Negative	Wired OR	Not sent
1	Positive	Wired OR	0

Key Path	**System, I/O Config, LXI, LXI Output LAN Events, LAN[n]**
Remote Command	`:LXI:EVENt[:OUTPut]:LAN[:SET]:SLOPe "LANEVENT", POSitive|NEGative` `:LXI:EVENt[:OUTPut]:LAN[:SET]:SLOPe? "LANEVENT"`
Example	:LXI:EVEN:LAN:SLOP "LANEVENT",POS
Preset	Not affected by a Preset. The default value of "Positive" can be restored by using the command: :SYSTem:DEFault INPut
State Saved	Saved in instrument state.

Range	POSitive|NEGative
Instrument S/W Revision	Prior to A.02.00

Timestamp Delta

This parameter represents a time in seconds to add to the timestamp of the Output LAN Event. This timestamp delta allows the receiving instrument to delay its response until the time specified in the timestamp.

Key Path	**System, I/O Config, LXI, LXI Output LAN Events, LAN[n]**
Remote Command	`:LXI:EVENt[:OUTPut]:LAN[:SET]:TSDelta "LANEVENT", <seconds>`
	`:LXI:EVENt[:OUTPut]:LAN[:SET]:TSDelta? "LANEVENT"`
Example	:LXI:EVEN:LAN:TSD “LANEVENT”,10.5 s
Preset	Not affected by a Preset. The default value of "0.0 s" can be restored by using the command:
	:SYSTem:DEFault INPut
State Saved	Saved in instrument state.
Range	0.0 – 1.7976931348623157 x 10308 s (Max Double)
Instrument S/W Revision	Prior to A.02.00

Enabled

If this parameter is set to ON, this LAN Event is sent when the selected Source instrument event occurs.

Otherwise, this LAN Event is never output.

Key Path	**System, I/O Config, LXI, LXI Output LAN Events, LAN[n]**
Remote Command	`:LXI:EVENt[:OUTPut]:LAN[:SET]:ENABled "LANEVENT",ON|OFF|1|0`
	`:LXI:EVENt[:OUTPut]:LAN[:SET]:ENABled? "LANEVENT"`
Example	:LXI:EVEN:LAN:ENAB “LAN0”,ON
Preset	Not affected by a Preset. The default value of "OFF" can be restored by using the command:
	:SYSTem:DEFault INPut
State Saved	Saved in instrument state.
Range	OFF|ON|0|1
Instrument S/W Revision	Prior to A.02.00

Count (Remote Command Only)

Returns the number of items in the LXI Output LAN Event List.

Remote Command:	:LXI:EVENt[:OUTPut]:LAN:COUNt?
Example:	:LXI:EVEN:LAN:COUN?
Instrument S/W Revision:	Prior to A.02.00

Configure (Remote Command Only)

Allows the configuration of some of the above parameters from a single SCPI command.

Remote Command:	:LXI:EVENt[:OUTPut]:LAN[:SET]:CONFigure "lanEvent",<enabled>,<source>,<slope>,<drive>,<destination>
Example:	:LXI:EVEN:LAN:CONF "LAN0",1,"WaitingForTrigger",POS,NORM,"ALL"
Instrument S/W Revision:	Prior to A.02.00

Send (Remote Command Only)

Forces the instrument to send the requested LAN Event. The LAN Event must be enabled, otherwise this command is ignored.

Remote Command:	:LXI:EVENt[:OUTPut]:LAN:SEND "LANEVENT"", RISE|FALL
Example:	:LXI:EVEN:LAN:SEND "LANEVENT", FALL
Instrument S/W Revision:	Prior to A.02.00

Identifier (Remote Command Only)

Sets the string that will be placed in the peer-to-peer packet when the Output LAN Event is transmitted. The Identifier is variable to allow for easier system debugging. The Identifier must be unique, for example the "LAN0" and "LAN1" output events cannot have identical identifiers.

Remote Command:	:LXI:EVENt[:OUTPut]:LAN[:SET]:IDENtifier "LANEVENT", "identifier" :LXI:EVENt[:OUTPut]:LAN[:SET]:IDENtifier? "LANEVENT"
Example:	:LXI:EVEN:LAN:IDEN"LAN0","debugstring"
Restriction and Notes:	The maximum length of the string is 16 characters. Nothing happens if the LAN event does not exist. The default value is that the identifier is equivalent to the name of the LAN Event.
State Saved:	Saved in instrument state.
Range:	Uppercase, Lowercase, Numeric, Symbol

Instrument S/W Revision:	Prior to A.02.00

IEEE 1588 Time (Remote Command Only)

Time Epoch Time (Remote Command Only)

If the device is selected as the IEEE 1588 master clock, this sets the clock using the number of seconds elapsed since January, 1 1970 at 00:00:00 in International Atomic Time (TAI). Epoch time is time zone invariant. Otherwise, this allows you to query the epoch time.

Remote Command:	:LXI:CLOCk[:TIME][:VALue] <seconds>,<fractionalSeconds>
Example:	:LXI:CLOC 10020304.0 s,0.123456 s
Restriction and Notes:	The seconds argument must only contain values representing whole seconds. For example 1243.0 s is acceptable, but 1243.01 results in an error. Ignored when the device is not selected as the IEEE 1588 master clock. The fractional portion is only accurate to the microseconds position. Error generated if the seconds argument contains a fractional portion.
Preset:	Not affected by a Preset. The default value of "System Time" can be restored by using the command: :SYSTem:DEFault INPut
State Saved:	No
Range:	Seconds: 0.0 – 1.7976931348623157 x 10308 s (Max Double) Fraction: 0.0 s – 0.999999 s
Instrument S/W Revision:	Prior to A.02.00

Remote Command:	:LXI:CLOCk[:TIME][:VALue]?
Example:	:LXI:CLOC?
Restriction and Notes:	The seconds argument must only contain values representing whole seconds. For example 1243.0 s is acceptable, but 1243.01 results in an error. Ignored when the device is not selected as the IEEE 1588 master clock. The fractional portion is only accurate to the microseconds position. Error generated if the seconds argument contains a fractional portion.
Preset:	System time
State Saved:	No
Range:	Seconds: 0.0 – 1.7976931348623157 x 10308 s (Max Double) Fraction: 0.0 s – 0.999999 s
Instrument S/W Revision:	Prior to A.02.00

Seconds (Remote Command Only)

If the device is selected as the IEEE 1588 master clock, this sets the seconds portion of the clock. Otherwise, this allows you to query the seconds portion of the epoch time. Valid values are in discrete increments of whole seconds.

Remote Command:	:LXI:CLOCk[:TIME]:SEConds <seconds> :LXI:CLOCk[:TIME]:SEConds?
Example:	:LXI:CLOC:SEC 10020304.0
Restriction and Notes:	Ignored when the device is not selected as the IEEE 1588 master clock. Error generated if the argument contains a fractional portion. For example 1243.0 s is acceptable, but 1243.01 results in an error.
Preset:	Not affected by a Preset. The default value of "System Time" can be restored by using the command: :SYSTem:DEFault INPut
State Saved:	No
Range:	0.0 – 1.7976931348623157 x 10308 s (Max Double)
Instrument S/W Revision:	Prior to A.02.00

Fraction (Remote Command Only)

If the device is selected as the IEEE 1588 master clock, this sets the sub-second value of the clock. Otherwise, this allows you to query the sub-second value of the epoch time.

Remote Command:	:LXI:CLOCk[:TIME]:FRACtion <fraction> :LXI:CLOCk[:TIME]:FRACtion?
Example:	:LXI:CLOC:FRAC 10 ms
Restriction and Notes:	Ignored when the device is not selected as the IEEE 1588 master clock. Only accurate to the microseconds position.
Preset:	Sub-second value of system time
State Saved:	No
Range:	[0.0,1.0)
Instrument S/W Revision:	Prior to A.02.00

Local Time (Remote Command Only)

Returns the current local time formatted as a date time string.

Remote Command:	:LXI:CLOCk[:TIME]:LOCal?
Example:	:LXI:CLOC:LOC? Returns “5/15/2007 6:23:34.123456”

Notes:	LXI:CLOCk[:TIME]:LOCal? Returns Any string constituting a valid date and time
Instrument S/W Revision:	Prior to A.02.00

Leap Second Offset (Remote Command Only)

Enables you to set the leap second offset between the UTC and TAI time standards.

Remote Command:	`:LXI:CLOCk[:TIME]:LSOFfset <integer>` `:LXI:CLOCk[:TIME]:LSOFfset?`
Example:	:LXI:CLOC:LSOF 55
Range:	0 – 2147483647 (Max Integer)
Instrument S/W Revision:	Prior to A.02.00

International Atomic Time (Remote Command Only)

Retrieves the current time using the TAI format.

Remote Command:	`:LXI:CLOCk[:TIME]:TAI?`
Example:	:LXI:CLOC:TAI? “5/15/2007 6:23:34.123456”
Notes:	:LXI:CLOCk[:TIME]:TAI? Returns Any string constituting a valid date and time
Instrument S/W Revision:	Prior to A.02.00

Time Zone (Remote Command Only)

Retrieves the current local time zone as an offset in hours, minutes, and seconds from Greenwich Mean Time.

Remote Command:	`:LXI:CLOCk[:TIME]:TZONe?`
Example:	:LXI:CLOC:TZON?
Notes:	:LXI:CLOC:TZON? returns "01:00:00" if the current local time zone is 1 hour ahead from Greenwich Mean Time
Instrument S/W Revision:	Prior to A.02.00

Daylight Savings (Remote Command Only)

Retrieves the current status of the Windows System setting for Daylight Savings Time. Whether or not daylight savings time is in effect influences the time zone parameter.

Remote Command:	`:LXI:CLOCk[:TIME]:DLSavings?`
Example:	:LXI:CLOC:DLS?
Notes:	:LXI:CLOC:DLS? Returns 1 when Daylight Savings Time is On and 0 if the when Daylight Savings Time is Off

Instrument S/W Revision:	Prior to A.02.00

Coordinated Universal Time (Remote Command Only)

Retrieves the current time using the UTC format.

Remote Command:	`:LXI:CLOCk[:TIME]:UTC?`
Example:	:LXI:CLOC:UTC? "5/15/2007 6:23:34.123456"
Notes:	:LXI:CLOC:UTC? Returns Any string constituting a valid date and time
Instrument S/W Revision:	Prior to A.02.00

Time Marker (Remote Command Only)

Records the PTP time as a marker that can later be measured against the current PTP time. Typical use is to time the length of a sequence of instrument operations. There are 9 available markers with indices 1 – 9.

Remote Command:	`:LXI:CLOCk[:TIME]:MARKer[1]|2|3|4|5|6|7|8|9[:SET]`
Example:	:LXI:CLOC:MARK1 :LXI:CLOC:MARK2 :LXI:CLOC:MARK3 :LXI:CLOC:MARK4 :LXI:CLOC:MARK5 :LXI:CLOC:MARK6 :LXI:CLOC:MARK7 :LXI:CLOC:MARK8 :LXI:CLOC:MARK9 :LXI:CLOC:MARK
Instrument S/W Revision:	Prior to A.02.00

Time Marker Clear (Remote Command Only)

Clears the recorded PTP time marker used to measure against the current PTP time. There are 9 available markers with indices 1 – 9.

Remote Command:	`:LXI:CLOCk[:TIME]:MARKer[1]|2|3|4|5|6|7|8|9:CLEAr`

Example:	:LXI:CLOC:MARK1:CLEA
	:LXI:CLOC:MARK2:CLEA
	:LXI:CLOC:MARK3:CLEA
	:LXI:CLOC:MARK4:CLEA
	:LXI:CLOC:MARK5:CLEA
	:LXI:CLOC:MARK6:CLEA
	:LXI:CLOC:MARK7:CLEA
	:LXI:CLOC:MARK8:CLEA
	:LXI:CLOC:MARK9:CLEA
	:LXI:CLOC:MARK:CLEA
Instrument S/W Revision:	Prior to A.02.00

Time Marker Delta (Remote Command Only)

Calculates and returns the delta time from the marker to the present PTP time. Also returns the seconds and sub-seconds portions of the start and end times. There are 9 available markers with indices 1 – 9.

Remote Command:	`:LXI:CLOCk[:TIME]:MARKer[1]|2|3|4|5|6|7|8|9:DELTa?`
Example:	:LXI:CLOC:MARK1:DELT? returns <deltaTime>,<startSeconds>,<startFractionalSeconds>,<endSeconds>,<endFractionalSeconds>
	:LXI:CLOC:MARK2:DELT?
	:LXI:CLOC:MARK3:DELT?
	:LXI:CLOC:MARK4:DELT?
	:LXI:CLOC:MARK5:DELT?
	:LXI:CLOC:MARK6:DELT?
	:LXI:CLOC:MARK7:DELT?
	:LXI:CLOC:MARK8:DELT?
	:LXI:CLOC:MARK9:DELT?
	:LXI:CLOC:MARK:DELT?
Notes:	:LXI:CLOCk[:TIME]:MARKer[1]|2|3|4|5|6|7|8|9:DELTa? Returns a value between 0.0 – 1.7976931348623157 x 10308 s (Max Double)
Range:	0.0 – 1.7976931348623157 x 10308 s (Max Double)
Instrument S/W Revision:	Prior to A.02.00

Measurement Data Timestamp (Remote Command Only)

Returns the beginning and ending times of the last measurement cycle. This command also returns the duration of the measurement cycle. These values correspond to the last rising and falling transition of the Measuring instrument event.

Remote Command:	`:LXI:CLOCk[:TIME]:MEASure[:DELTa]?`
Example:	:LXI:CLOC:MEAS? Returns 2.0,1145902.0,0.123456, ,1145904.0,0.123456
Notes:	:LXI:CLOCk[:TIME]:MARKer[1]|2|3|4|5|6|7|8|9:DELTa? Returns a value between 0.0 – 1.7976931348623157 x 10308 s (Max Double)
Instrument S/W Revision:	Prior to A.02.00

Clear Measurement Data Timestamp (Remote Command Only)

Forces the return values of the Measurement Data Timestamp to zero until the next measurement cycle occurs. This command need not be issued for the Measurement Data Timestamp to be refreshed.

Remote Command:	`:LXI:CLOCk[:TIME]:MEASure:CLEar`
Example:	:LXI:CLOC:MEAS:CLE
Instrument S/W Revision:	Prior to A.02.00

Precision Time Protocol

Precision Time Protocol, as defined by IEEE 1588, is a method for synchronizing the time across a network. Instruments participating in the PTP network can coordinate activities using this common time base.

Accuracy (Remote Command Only)

Sets the typical offset from the correct time that a user can expect from the instrument PTP clock. This parameter is used when the instrument is selected as the Master clock. It should be set along with the time when configuring a master clock.

The value should be chosen by judging how precisely the clock can be set to the exact TAI time and the accuracy and drift of the clock’s underlying oscillator.

This is an input to the IEEE 1588 Best Master Clock algorithm.

Remote Command:	`:LXI:CLOCk:PTP:ACCuracy NS25|NS100|NS250|NS1000|NS2500|US10|US25|US100|US250|US1000|US2500|MS10|MS25|MS100|MS1000|S10|GT10S|UNKNown` `:LXI:CLOCk:PTP:ACCuracy?`
Example:	:LXI:CLOC:PTP:ACC US25
Preset:	Not affected by a Preset. The default value of "GT10S" can be restored by using the command: SYSTem:DEFault INPut

Range:	NS25|NS100|NS250|NS1000|NS2500|US10|US25|US100|US250|US1000|US2500|MS10|MS25|MS100|MS1000|S10|GT10S|UNKNown
Instrument S/W Revision:	Prior to A.02.00

Announce Interval (Remote Command Only)

Sets the time in seconds between PTP announce packets. A shorter interval makes the system more responsive to changes in the master clock at the cost of network bandwidth and packet processing time. The announce interval should be constant across all the instruments in the network. The announce interval will be rounded to the nearest non-negative integer power of two, with a maximum value of 16.

Remote Command:	`:LXI:CLOCk:PTP:ANNounce:INTerval <interval>` `:LXI:CLOCk:PTP:ANNounce:INTerval?`
Example:	:LXI:CLOC:PTP:ANN:INT 1
Preset:	Not affected by a Preset. The default value of "4" can be restored by using the command: SYSTem:DEFault INPut
Range:	1|2|4|8|16
Instrument S/W Revision:	Prior to A.02.00

Announce Receipt Time Out (Remote Command Only)

Sets the number of announce intervals that the instrument waits to receive an announce packet while in the Slave or Listening. After this number of announce intervals, the instrument will transition to the Master state.

Remote Command:	`:LXI:CLOCk:PTP:ANNounce:RTOut <numberOfIntervals>` `:LXI:CLOCk:PTP:ANNounce:RTOut?`
Example:	:LXI:CLOC:PTP:ANN:RTO 5
Preset:	Not affected by a Preset. The default value of "3" can be restored by using the command: SYSTem:DEFault INPut
Min:	2
Max:	10
Instrument S/W Revision:	Prior to A.02.00

Clock Class (Remote Command Only)

Returns a ranking of master clock suitability relative to other clocks on the network. A lower value represents a more suitable clock.

Suitability is defined by the IEEE 1588 standard section 7.6.2.4

Remote Command:	`:LXI:CLOCk:PTP:CCLass?`

Example:	:LXI:CLOC:PTP:CCL?
Preset:	Not affected by a Preset. The default value of "248" can be restored by using the command: SYSTem:DEFault INPut
Min:	6
Max:	248
Instrument S/W Revision:	Prior to A.02.00

Deviation (Remote Command Only)

Returns the standard deviation of the instrument's PTP time from the Grandmaster's PTP time.

Remote Command:	`:LXI:CLOCk:PTP:DEViation?`
Example:	:LXI:CLOC:PTP:DEV?
Instrument S/W Revision:	Prior to A.02.00

Domain (Remote Command Only)

The instrument synchronizes its clock only with other clocks in the same domain.

Remote Command:	`:LXI:CLOCk:PTP:DOMain <domainNumber>` `:LXI:CLOCk:PTP:DOMain?`
Example:	:LXI:CLOC:PTP:DOM 0
Preset:	Not affected by a Preset. The default value of "0" can be restored by using the command: SYSTem:DEFault INPut
Min:	0
Max:	127
Instrument S/W Revision:	Prior to A.02.00

Offset (Remote Command Only)

Returns the difference between the instrument clock PTP time and the Master clock PTP time.

Remote Command:	`:LXI:CLOCk:PTP:OFFSet?`
Example:	:LXI:CLOC:PTP:OFFS?
Range:	0.0 to – 1.7976931348623157 x 10308 s (Min Double)
Instrument S/W Revision:	Prior to A.02.00

First Priority (Remote Command Only)

Setting this parameter overrides the IEEE 1588 Best Master Clock algorithm. If an instrument’s First Priority parameter is smaller than all other clocks in its domain, it is chosen as the Master clock.

Remote Command:	`:LXI:CLOCk:PTP:PRIority:FIRSt <priority>`
	`:LXI:CLOCk:PTP:PRIority:FIRSt?`
Example:	:LXI:CLOC:PTP:PRI:FIRS 50
Preset:	Not affected by a Preset. The default value of "128" can be restored by using the command:
	SYSTem:DEFault INPut
Min:	0
Max:	255
Instrument S/W Revision:	Prior to A.02.00

Second Priority (Remote Command Only)

When two or more clocks are determined to be equally good by the Best Master Clock algorithm, the clock with the lowest Second Priority value is chosen to be the Master Clock.

Remote Command:	`:LXI:CLOCk:PTP:PRIority:SECond <priority>`
	`:LXI:CLOCk:PTP:PRIority:SECond?`
Example:	:LXI:CLOC:PTP:PRI:SEC 50
Preset:	Not affected by a Preset. The default value of "128" can be restored by using the command:
	SYSTem:DEFault INPut
Min:	0
Max:	255
Instrument S/W Revision:	Prior to A.02.00

State (Remote Command Only)

Returns the current state of the instrument’s PTP clock as defined in the IEEE 1588 standard.

Remote Command:	`:LXI:CLOCk:PTP:STATe?`
Example:	:LXI:CLOC:PTP:STAT?
Range:	INITializing|FAULty|DISabled|LISTening|PREMaster| MASTer|PASSive|UNCalibrated|SLAVe
Instrument S/W Revision:	Prior to A.02.00

Traceability (Remote Command Only)

Returns the quality of the instrument’s PTP clock source of time when chosen as the Grand Master clock.

This parameter is used by the Best Master Clock algorithm.

Remote Command:	:LXI:CLOCk:PTP:TRACeability?
Example:	:LXI:CLOC:PTP:TRAC?
Range:	ATOMic|GPS|RADio|PTP|NTP|HANDset|OTHer|OSCillator
Instrument S/W Revision:	Prior to A.02.00

Variance (Remote Command Only)

Returns the variance of the instrument’s PTP clock time relative to the Master’s PTP clock time.

Remote Command:	:LXI:CLOCk:PTP:VARiance?
Example:	:LXI:CLOC:PTP:VAR?
Range:	0.0 – 1.7976931348623157 x 10308 (Max Double)
Instrument S/W Revision:	Prior to A.02.00

Sync Interval (Remote Command Only)

Sets the rate at which PTP sync packets are transmitted when this instrument is acting as a Master PTP clock. The values must be integer powers of 2.

Remote Command:	:LXI:CLOCk:PTP:SINTerval <seconds>
Example:	:LXI:CLOC:PTP:SINT 0.25s
Preset:	Not affected by a Preset. The default value of "1" can be restored by using the command: SYSTem:DEFault INPut
Range:	0.0625s|0.125s|0.25s|0.5s|1s|2s
Instrument S/W Revision:	Prior to A.02.00

Remote Command:	:LXI:CLOCk:PTP:SINTerval?
Example:	:LXI:CLOC:PTP:SINT?
Preset:	1
Range:	0.0625s|0.125s|0.25s|0.5s|1s|2s
Instrument S/W Revision:	Prior to A.02.00

Delay Request Interval (Remote Command Only)

This property is used by the master clock to specify the interval between delay request packets sent from the slave to the master clock. Slaves use a randomly-chosen interval, with mean equal to this property.

The value for this parameter must be an integer power of two.

Remote Command:	`:LXI:CLOCk:PTP:DRINterval <seconds>`
Example:	:LXI:CLOC:PTP:DRIN 15 ms
Preset:	Not affected by a Preset. The default value of "8 s" can be restored by using the command: SYSTem:DEFault INPut
Range:	1 s | 2 s | 4 s | 8 s | 16 s | 32 s
Instrument S/W Revision:	Prior to A.02.00

Remote Command:	`:LXI:CLOCk:PTP:DRINterval?`
Example:	:LXI:CLOC:PTP:DRIN 15 ms
Preset:	8 s
Min:	0.0 s
Max:	2^32 = 4294967296 s
Instrument S/W Revision:	Prior to A.02.00

Grand Master   Accuracy (Remote Command Only)

Returns the relative accuracy of the Grand Master clock.

Remote Command:	`:LXI:CLOCk:PTP:GMASter:ACCuracy?`
Example:	:LXI:CLOC:PTP:GMAS:ACC? For example, this might return GT10S.
Range:	25NS|100NS|250NS|1US|2.5US|10US|25US|100US|250US|1MS|2.5MS|10MS|25MS|100MS|1S|10S|GT10S|UNKNown
Instrument S/W Revision:	Prior to A.02.00

MAC Address (Remote Command Only)

Returns the Grand Master’s MAC Address.

Remote Command:	`:LXI:CLOCk:PTP:GMASter:MADDress?`
Example:	:LXI:CLOC:PTP:GMAS:MADD? For example, this might return "00–00–50–1e-ca-ad".
Range:	Uppercase, Lowercase, Numeric, Symbol
Instrument S/W Revision:	Prior to A.02.00

Traceability (Remote Command Only)

Describes the quality of the Grand Master PTP clock's source of time.

Remote Command:	`:LXI:CLOCk:PTP:GMASter:TRACeability?`
Example:	:LXI:CLOC:PTP:GMAS:TRAC? For example, this might return OSC.
Range:	ATOMic|GPS|RADio|PTP|NTP|HANDset|OTHer|OSCillator
Instrument S/W Revision:	Prior to A.02.00

Master MAC Address (Remote Command Only)

Returns the Master's MAC Address.

Remote Command:	`:LXI:CLOCk:PTP:MASTer:MADDress?`
Example:	:LXI:CLOC:PTP:MAST:MADD?
Range:	Uppercase, Lowercase, Numeric, Symbol
Instrument S/W Revision:	Prior to A.02.00

Servo Algorithm (Remote Command Only)

The Servo Algorithm parameters are considered advanced settings for tweaking IEEE 1588 performance.

Log (Remote Command Only)

The Servo Log records measurements of the offset between the instrument's PTP clock and the Master's PTP clock. It also records the packet travel time for Master-to-Slave and Slave-to-Master transactions.

Next (Remote Command Only)

Retrieves and removes the oldest entry from the Servo Log. The format for a servo log entry is as follows

Sample Index:	integer representing entry order
Time Seconds:	seconds portion of the entry timestamp
Time Fraction:	sub-second portion of the entry timestamp
Offset Seconds:	offset between the instrument's PTP clock and the Master's PTP clock
Average Delay Seconds:	the average measured transmission delay
Master Delay Seconds:	Master-to-Slave packet travel time
Slave Delay Seconds:	Slave-to-Master packet travel time

Remote Command:	`:LXI:CLOCk:SALGorithm:LOG[:NEXT]?`
Example:	:LXI:CLOC:SALG:LOG?
Range:	Uppercase, Lowercase, Numeric, Symbol

Instrument S/W Revision:	Prior to A.02.00

Circular (Remote Command Only)

Sets the behavior for entries occurring while the Servo Log is full.

- If Circular is set to 1, incoming events overwrite the oldest events in the log.
- If Circular is set to 0, incoming events are discarded.

Remote Command:	`:LXI:CLOCk:SALGorithm:LOG:CIRCular[:ENABled] ON|OFF|0|1` `:LXI:CLOCk:SALGorithm:LOG:CIRCular[:ENABled]?`
Example:	:LXI:CLOC:SALG:LOG:CIRC 1
Preset:	Not affected by a Preset. The default value of "1" can be restored by using the command: SYSTem:DEFault INPut
Range:	ON|OFF|0|1
Instrument S/W Revision:	Prior to A.02.00

Beginning Entry (Remote Command Only)

Sets or freezes the eginning entry of the log when in circular mode to the most recently added entry at the time of the command. This is so that the :LXI:EVENt:LOG:ENTRy? command has a reference entry for indexing individual entries in the log.

Remote Command:	`:LXI:CLOCk:SALGorithm:LOG:CIRCular:FBENtry`
Example:	LXI:CLOCk:SALG:LOG:CIRC:FBEN
Instrument S/W Revision:	Prior to A.02.00

Clear (Remote Command Only)

Clears all entries from the Servo Log.

Remote Command:	`:LXI:CLOCk:SALGorithm:LOG:CLEar`
Example:	:LXI:CLOC:SALG:LOG:CLE
Instrument S/W Revision:	Prior to A.02.00

Count (Remote Command Only)

Returns the number of unread entries in the Servo Log.

Remote Command:	`:LXI:CLOCk:SALGorithm:LOG:COUNt?`
Example:	:LXI:CLOC:SALG:LOG:COUN?
Range:	0 - IEEE 1588 Servo Log Size

Instrument S/W Revision:	Prior to A.02.00

Enabled (Remote Command Only) •

- When the Servo Log is disabled, no events are recorded.
- When it is enabled, the Servo Log is active.

Remote Command:	`:LXI:CLOCk:SALGorithm:LOG:ENABled ON|OFF|0|1`
	`:LXI:CLOCk:SALGorithm:LOG:ENABled?`
Example:	:LXI:CLOC:SALG:LOG:ENAB 1
Preset:	Not affected by a Preset. The default value of "0" can be restored by using the command:
	SYSTem:DEFault INPut
Range:	ON|OFF|0|1
Instrument S/W Revision:	Prior to A.02.00

Size (Remote Command Only)

Sets the maximum number of entries to store in the Servo Log.

Remote Command:	`:LXI:CLOCk:SALGorithm:LOG:SIZE <maxLogEntries>`
	`:LXI:CLOCk:SALGorithm:LOG:SIZE?`
Example:	:LXI:CLOC:SALG:LOG:SIZE 100
Preset:	Not affected by a Preset. The default value of "256" can be restored by using the command:
	SYSTem:DEFault INPut
Min:	0
Max:	1024
Instrument S/W Revision:	Prior to A.02.00

All (Remote Command Only)

Non-destructively returns the entire contents of the Servo Log.

Remote Command:	`:LXI:CLOCk:SALGorithm:LOG:ALL?`
Example:	:LXI:CLOC:SALG:LOG?
Range:	Uppercase, Lowercase, Numeric, Symbol
Instrument S/W Revision:	Prior to A.02.00

Specific Entry (Remote Command Only)

Non-destructively returns a specifically indexed entry from within the Servo Log.

Remote Command:	`:LXI:CLOCk:SALGorithm:LOG:ENTRy? <intIndex>`
Example:	:LXI:CLOC:SALG:LOG? 0 Returns the oldest entry in the Servo Log. Example of result : "1,1208978798,139644871,0.000000000,3.393600e+038,0.000000000,0.000000000,0.000000000"
Range:	Uppercase, Lowercase, Numeric, Symbol
Instrument S/W Revision:	Prior to A.02.00

Statistics (Remote Command Only)

Returns the long-term statistics of the servo log that characterizes the performance of the instrument PTP clock's offset from the master PTP clock. The statistics include the following values:

- Number of samples (an integer)
- Mean offset (a double)
- Standard deviation of the offset (a double)
- Maximum offset (a double)
- Minimum offset (a double)

Remote Command:	`:LXI:CLOCk:SALGorithm:LOG:STATistics[:DATA]?`
Example:	:LXI:CLOC:SALG:LOG:STAT? Example of result : "3643,0.000000000,0.000000000,0.000000000,0.000000000"
Instrument S/W Revision:	Prior to A.02.00

Clear Statistics (Remote Command Only)

Resets the long-term servo performance statistics.

Remote Command:	`:LXI:CLOCk:SALGorithm:LOG:STATistics:CLEar`
Example:	:LXI:CLOC:SALG:LOG:STAT? Example of result : "3643,0.000000000,0.000000000,0.000000000,0.000000000"
Instrument S/W Revision:	Prior to A.02.00

Asymmetry (Remote Command Only)

Sets the difference in seconds between the Master-to-Slave packet travel time and the Slave-to-Master packet travel time.

Remote Command:	`:LXI:CLOCk:SALGorithm[:SET]:ASYMmetry <seconds>` `:LXI:CLOCk:SALGorithm[:SET]:ASYMmetry?`

Example:	:LXI:CLOC:SALG:ASYM 15 ns
Preset:	Not affected by a Preset. The default value of "0.0 s " can be restored by using the command: SYSTem:DEFault INPut
Min:	–1
Max:	1
Instrument S/W Revision:	Prior to A.02.00

Coarse/Fine Threshold (Remote Command Only)

Determines when the PTP clock Servo algorithm uses the ‘Fine’ or ‘Coarse’ parameters for adjusting the instrument’s PTP clock time. The threshold is measured against a running estimate of the servo variance.

Coarse mode causes a slave clock to converge with the master clock more quickly, but it is more sensitive to noise, while Fine mode filters out noise more effectively, but takes longer to converge.

Remote Command:	`:LXI:CLOCk:SALGorithm[:SET]:CFTHreshold <secondsSquared>` `:LXI:CLOCk:SALGorithm[:SET]:CFTHreshold?`
Example:	:LXI:CLOC:SALG:CFTH 0.25
Preset:	Not affected by a Preset. The default value of "1.0e–11 " can be restored by using the command: SYSTem:DEFault INPut
Min:	0
Max:	1
Instrument S/W Revision:	Prior to A.02.00

Coarse Proportional Constant (Remote Command Only)

This constant is used by the servo when above the Coarse/Fine Threshold variance. Decreasing this constant causes the servo to become less responsive to both noise in the system and changes in the Master Clock’s rate. Conversely, increasing this constant causes the servo to respond more energetically to both system noise and changes in the Master Clock’s rate.

The ratio between the Proportional and Integral constants should remain roughly constant.

Remote Command:	`:LXI:CLOCk:SALGorithm[:SET]:CPConstant <servoConstant>` `:LXI:CLOCk:SALGorithm[:SET]:CPConstant?`
Example:	:LXI:CLOC:SALG:CPC 0.5
Preset:	Not affected by a Preset. The default value of "0.4 " can be restored by using the command: SYSTem:DEFault INPut

Min:	0
Max:	1
Instrument S/W Revision:	Prior to A.02.00

Coarse Integral Constant (Remote Command Only)

This constant is used by the servo when above the Coarse/Fine Threshold variance. Decreasing this constant causes the servo to become less responsive to both noise in the system and changes in the Master Clock's rate. Conversely, increasing this constant causes the servo to respond more energetically to both system noise and changes in the Master Clock's rate.

The ratio between the Proportional and Integral constants should remain roughly constant.

Remote Command:	`:LXI:CLOCk:SALGorithm[:SET]:CIConstant <servoConstant>`
	`:LXI:CLOCk:SALGorithm[:SET]:CIConstant?`
Example:	:LXI:CLOC:SALG:CIC 0.5
Preset:	Not affected by a Preset. The default value of "0.2 " can be restored by using the command:
	SYSTem:DEFault INPut
Min:	0
Max:	1
Instrument S/W Revision:	Prior to A.02.00

Fine Proportional Constant (Remote Command Only)

This constant is used by the servo when below the Coarse/Fine Threshold variance. Decreasing this constant causes the servo to become less responsive to both noise in the system and changes in the Master Clock's rate. Conversely, increasing this constant causes the servo to respond more energetically to both system noise and changes in the Master Clock's rate.

The ratio between the Proportional and Integral constants should remain roughly constant.

Remote Command:	`:LXI:CLOCk:SALGorithm[:SET]:FPConstant <servoConstant>`
	`:LXI:CLOCk:SALGorithm[:SET]:FPConstant?`
Example:	:LXI:CLOC:SALG:FPC 1
Preset:	Not affected by a Preset. The default value of "0.35 " can be restored by using the command:
	SYSTem:DEFault INPut
Min:	0
Max:	1
Instrument S/W Revision:	Prior to A.02.00

Fine Integral Constant (Remote Command Only)

This constant is used by the servo when below the Coarse/Fine Threshold variance. Decreasing this constant causes the servo to become less responsive to both noise in the system and changes in the Master Clock’s rate. Conversely, increasing this constant causes the servo to respond more energetically to both system noise and changes in the Master Clock’s rate.

The ratio between the Proportional and Integral constants should remain roughly constant.

Remote Command:	`:LXI:CLOCk:SALGorithm[:SET]:FIConstant <servoConstant>` `:LXI:CLOCk:SALGorithm[:SET]:FIConstant?`
Example:	:LXI:CLOC:SALG:FIC 0.6
Preset:	Not affected by a Preset. The default value of "0.05" can be restored by using the command: SYSTem:DEFault INPut
Min:	0
Max:	1
Instrument S/W Revision:	Prior to A.02.00

Maximum Outlier Discard Count (Remote Command Only)

Sets the maximum number of outlier packets to ignore. After this maximum is exceeded, the next packet is accepted, regardless of whether or not it is flagged as an outlier.

Remote Command:	`:LXI:CLOCk:SALGorithm[:SET]:OMAXimum <consecutiveSamples>` `:LXI:CLOCk:SALGorithm[:SET]:OMAXimum?`
Example:	:LXI:CLOC:SALG:OMAX 3
Preset:	Not affected by a Preset. The default value of "5" can be restored by using the command: SYSTem:DEFault INPut
Min:	0
Max:	25
Instrument S/W Revision:	Prior to A.02.00

Outlier Threshold (Remote Command Only)

Defines the threshold for determining whether a packet is considered a statistical outlier. If a sync or delay request is held up in a switch for a significant amount of time, the quality of synchronization will be perturbed. The servo ignores anything outside the outlier threshold. This parameter is expressed as a number of standard deviations from the currently measured average packet latency. Note that the value can be set to fractional standard deviations.

Remote Command:	`:LXI:CLOCk:SALGorithm[:SET]:OTHReshold <standardDeviations>` `:LXI:CLOCk:SALGorithm[:SET]:OTHReshold?`
Example:	:LXI:CLOC:SALG:OTHR 1.0
Preset:	Not affected by a Preset. The default value of "5.0" can be restored by using the command: SYSTem:DEFault INPut
Min:	0.25
Max:	6.0
Instrument S/W Revision:	Prior to A.02.00

Outlier Threshold Enable (Remote Command Only)

Enables the outlier threshold to determine whether or not outliers are discarded.

Remote Command:	`:LXI:CLOCk:SALGorithm[:SET]:OTENable ON|OFF|1|0` `:LXI:CLOCk:SALGorithm[:SET]:OTENable?`
Example:	:LXI:CLOC:SALG:OTEN OFF
Preset:	Not affected by a Preset. The default value of "OFF" can be restored by using the command: SYSTem:DEFault INPut
Instrument S/W Revision:	Prior to A.02.00

Set/Steer Threshold (Remote Command Only) I

f the instrument’s clock deviates from the master by an amount equal to or greater than this threshold, it is reset to match the master rather than being gradually steered toward it.

Remote Command:	`:LXI:CLOCk:SALGorithm[:SET]:STHReshold <seconds>` `:LXI:CLOCk:SALGorithm[:SET]:STHReshold?`
Example:	:LXI:CLOC:SALG:STHR 15 ms
Preset:	Not affected by a Preset. The default value of "0.1 s " can be restored by using the command: SYSTem:DEFault INPut
Min:	0.0001

Max:	10.0
Instrument S/W Revision:	Prior to A.02.00

Configure (Remote Command Only)

Allows the configuration of some of the above parameters from a single SCPI command.

Remote Command:	`:LXI:CLOCk:SALGorithm[:SET]:CONFigure <asymmetry>, <coarse fine threshold>, <cpc>, <cic>, <fpc>, <fic>, <maximum outlier discard>, <outlier threshold>, <set/steer threshold>`
Example:	:LXI:CLOC:SALG:CONF 0.0, 2.0E–13, 0.4, 0.2, 0.35, 0.05, 5, 2.0E–4, 0.1s
Instrument S/W Revision:	Prior to A.02.00

Synchronization (Remote Command Only)

Master (Remote Command Only)

Reports whether or not the device has been selected as the PTP master clock.

Remote Command:	`:LXI:CLOCk:SYNC:MASTer?`
Example:	:LXI:CLOC:SYNC:MAST?
Range:	ON|OFF|0|1
Instrument S/W Revision:	Prior to A.02.00

Local Enabled (Remote Command Only)

Enable steering of the local clock with the PTP IEEE 1588 clock.

Remote Command:	`:LXI:CLOCk:SYNC:LOCal:ENABled ON|OFF|0|1` `:LXI:CLOCk:SYNC:LOCal:ENABled?`
Example:	:LXI:CLOC:SYNC:LOC:ENAB ON
Preset:	Not affected by a Preset. The default value of "ON" can be restored by using the command: SYSTem:DEFault INPut
Range:	ON|OFF|0|1
Instrument S/W Revision:	Prior to A.02.00

Local Interval (Remote Command Only)

The local clock is updated after the time set in the Local Interval elapses.

Remote Command:	`:LXI:CLOCk:SYNC:LOCal:INTerval` `:LXI:CLOCk:SYNC:LOCal:INTerval?`
Example:	:LXI:CLOC:SYNC:LOC:INT 60
Preset:	Not affected by a Preset. The default value of "60 " can be restored by using the command: SYSTem:DEFault INPut
Min:	0
Max:	3600
Instrument S/W Revision:	Prior to A.02.00

Instrument Status Events

Enable (Remote Command Only)

Setting the enabled parameter to ON enables the selected instrument event to be used as a source for Output LAN Events. Enabling an Instrument Status Event also causes the event to appear in the Event Log.

Remote Command:	`:LXI:EVENt:STATus[:ENABled] "STATUSEVENT",ON|OFF|1|0`
Example:	:LXI:EVEN:STAT “WaitingForTrigger”,1
Preset:	Not affected by a Preset. The default value of "1" can be restored by using the command, :SYSTem:DEFault INPut.
State Saved:	Saved in instrument state.
Range:	1|0|ON|OFF
Instrument S/W Revision:	Prior to A.02.00

Remote Command:	`:LXI:EVENt:STATus[:ENABled]? "STATUSEVENT"`
Example:	:LXI:EVEN:STAT? “WaitingForTrigger” Returns 1 if previously enabled. Otherwise, returns 0.
Preset:	ON
State Saved:	Saved in instrument state.
Range:	1|0|ON|OFF
Instrument S/W Revision:	Prior to A.02.00

LXI State Recall

Location (Remote Command Only)

This parameter is used to store the file paths of the state files to be recalled when each Input LAN Event is received. Since each LAN Event has its own Location entry, a given state is capable of branching to at least 8 different states. If custom Input events are added, an even greater branching factor is possible.

When setting up state transitions, it is important to set the location of the next state before saving. This way, when the saved state is recalled, the n

ext state locations are also automatically recalled.

Remote Command:	`:LXI:EVENt:INPut:LAN:LOCation "LANEVENT","path"`
Example:	:LXI:EVEN:INP:LAN:LOC "LANEVENT","c:\states\state01.state"
Restriction and Notes:	The maximum length of the string is 512 characters.
State Saved:	Saved in instrument state.
Range:	Uppercase, Lowercase, Numeric, Symbol
Instrument S/W Revision:	Prior to A.02.00

Remote Command:	`:LXI:EVENt:INPut:LAN:LOCation? "LANEVENT"`
Example:	:LXI:EVEN:INP:LAN:LOC? "LANEVENT"
	Returns "c:\states\state01.state" if that value was previously entered
Restriction and Notes:	The maximum length of the string is 512 characters.
State Saved:	Saved in instrument state.
Range:	Uppercase, Lowercase, Numeric, Symbol
Instrument S/W Revision:	Prior to A.02.00

Disable All (Remote Command Only)

Causes all LXI Input LAN Events to go into the disabled state (Enabled = OFF).

Remote Command:	`:LXI:EVENt:INPut:LAN:DISable:ALL`
Example:	:LXI:EVEN:INP:LAN:DIS:ALL
Instrument S/W Revision:	Prior to A.02.00

Add (Remote Command Only)

Adds the provided string to the list of possible LAN events to Input as a response to instrument events. As new LAN events are added, keys are generated in the LXI Input LAN Events menu. New key panels are generated as the number of possible LAN events increases past a multiple of six, and the “More” keys are updated to reflect the new number of key panels in the LXI Input LAN Events menu.

Remote Command:	`:LXI:EVENt:INPut:LAN:ADD "LANEVENT"`
Example:	:LXI:EVEN:INP:LAN:ADD “LANEVENT”
Restriction and Notes:	The maximum length of the string is 16 characters. Longer strings are concatenated and added to the LXI Input LAN Event list. No event is added if the LAN Event already exists.
State Saved:	No
Range:	Uppercase, Lowercase, Numeric, Symbol except for comma or semicolon
Instrument S/W Revision:	Prior to A.02.00

Remove (Remote Command Only)

Removes the provided string from the list of LXI Input LAN Events. As new LAN events are removed, keys are removed from the LXI Input LAN Events menu. Key panels are removed as the number of possible LAN events decreases past a multiple of six, and the “More” keys are updated to reflect the new number of key panels in the LXI Input LAN Events menu. Events from the default list cannot be removed.

Remote Command:	`:LXI:EVENt:INPut:LAN:REMove[:EVENt] "LANEVENT"`
Example:	:LXI:EVEN:INP:LAN:REM “LANEVENT”
Restriction and Notes:	The maximum length of the string is 16 characters. Longer strings are concatenated and the resulting LAN Event is removed from the LXI Input LAN Event list. Nothing happens if the LAN event was not introduced using the Add command.
State Saved:	No
Range:	Uppercase, Lowercase, Numeric, Symbol
Instrument S/W Revision:	Prior to A.02.00

Remove All (Remote Command Only)

Clears the list of custom LAN events (those introduced using the Add command). As new LAN events are removed, keys are removed from the LXI Input LAN Events menu. Key panels are removed as the number of possible LAN events decreases past a multiple of six, and the “More” keys are updated to reflect the new number of key panels in the LXI Input LAN Events menu.

Remote Command:	`:LXI:EVENt:INPut:LAN:REMove:ALL`
Example:	:LXI:EVEN:INP:LAN:REM:ALL
Restriction and Notes:	Only LAN Events added with the Add command are removed. Default events cannot be removed.
Instrument S/W Revision:	Prior to A.02.00

Filter (Remote Command Only)

Only LXI Input LAN Events coming from hosts matching the filter string are processed. There is no Key Path to this command

The syntax for specifying a filter is as follows:

Filter == ([host[:port]] | [ALL[:port]]) [,Filter]

Specifying an empty string means that LXI trigger packets are accepted as an Input from any port on any host on the network via either TCP or UDP.

Specifying only the port means that any host communicating over that port can send events.

Specifying ALL indicates that UDP multicast packets are accepted if they are directed to the IANA assigned multicast address on the IANA assigned default port, or the designated port if specified.

Examples:

- “192.168.0.1:23”
- “agilent.com, soco.agilent.com”
- “agilent.com:80, 192.168.0.1”

Remote Command:	`:LXI:EVENt:INPut:LAN:FILTer “LANEVENT”,“filterString”`
	`:LXI:EVENt:INPut:LAN:FILTer?`
Example:	:LXI:EVEN:INP:LAN:FILT “LAN0”,“agilent.com”
	:LXI:EVEN:INP:LAN:FILT?
Restriction and Notes:	The maximum length of the string is 45 characters. Nothing happens if the LAN event does not exist.
State Saved:	Saved in instrument state.
Range:	Uppercase, Lowercase, Numeric, Symbol
Instrument S/W Revision:	Prior to A.02.00

Identifier (Remote Command Only)

Sets the string that is expected to arrive over the LAN for a given Input LAN Event to occur. The Identifier is variable to allow for easier system debugging.

Remote Command:	`:LXI:EVENt:INPut:LAN:IDENtifier "LANEVENT","identifier"` `:LXI:EVENt:INPut:LAN:IDENtifier? "LANEVENT"`
Example:	:LXI:EVEN:INP:LAN:IDEN "LAN0","debugstring"
Restriction and Notes:	The maximum length of the string is 16 characters. Nothing happens if the LAN event does not exist. The default value is that the identifier is equivalent to the name of the LAN Event.
State Saved:	Saved in instrument state.
Range:	Uppercase, Lowercase, Numeric, Symbol
Instrument S/W Revision:	Prior to A.02.00

Detection (Remote Command Only)

Pressing this button brings up the Detection menu.

- Selecting "Rise" causes the instrument to trigger on the receipt of a signal low LAN Event followed by a signal high LAN Event.
- Selecting "Fall" causes the instrument to trigger on the receipt of a signal high LAN Event followed by a signal low LAN Event.
- Selecting "High" causes the instrument to trigger on every signal high LAN Event.
- Selecting "Low" causes the instrument to trigger on every signal low LAN Event.

Remote Command:	`:LXI:EVENt:INPut:LAN[:SET]:DETection "LANEVENT", HIGH|LOW|RISE|FALL`
Example:	:LXI:EVENt:INP:LAN:DET "LANEVENT",HIGH
Restriction and Notes:	If a non existent LAN event is passed in the lanEvent argument, the command is ignored
Preset:	Not affected by a Preset. The default value of "HIGH" can be restored by using the remote command: :SYSTem:DEFault INPut
State Saved:	Saved in instrument state.
Range:	HIGH | LOW | RISE | FALL
Instrument S/W Revision:	Prior to A.02.00

Remote Command:	`:LXI:EVENt:INPut:LAN[:SET]:DETection? "LANEVENT"`

Example:	:LXI:EVEN:INP:LAN:DET? “LANEVENT”
Restriction and Notes:	If a non existent LAN event is passed in the lanEvent argument, the command is ignored
Preset:	HIGH
State Saved:	Saved in instrument state.
Range:	HIGH | LOW | RISE | FALL
Instrument S/W Revision:	Prior to A.02.00

Enabled (Remote Command Only)

When the Enabled parameter is set to ON, receiving the given LAN Event causes the instrument to transition to the state held in the Next State Slot.

When the Enabled parameter is OFF, the Input LAN Event is ignored.

Remote Command:	`:LXI:EVENt:INPut:LAN[:SET]:ENABled “LANEVENT”,ON|OFF|1|0`
Example:	:LXI:EVEN:INP:LAN:ENAB “LAN0”,1
Preset:	Not affected by a Preset. The default value of "OFF" can be restored by using the remote command: :SYSTem:DEFault INPut
State Saved:	Saved in instrument state.
Range:	1|0
Instrument S/W Revision:	Prior to A.02.00

Remote Command:	`:LXI:EVENt:INPut:LAN[:SET]:ENABled? “LANEVENT”`
Example:	:LXI:EVEN:INP:LAN:ENAB? “LAN0”
Preset:	OFF
State Saved:	Saved in instrument state.
Range:	1|0
Instrument S/W Revision:	Prior to A.02.00

Count (Remote Command Only)

Returns the number of items in the LXI Input LAN Event List.

Remote Command:	`:LXI:EVENt:INPut:LAN:COUNt?`
Example:	:LXI:EVEN:INP:LAN:COUN?
Instrument S/W Revision:	Prior to A.02.00

List (Remote Command Only)

Returns a list of all of the valid LXI Input LAN Event names.

Remote Command:	:LXI:EVENt:INPut:LAN:LIST?
Example:	:LXI:EVEN:INP:LAN:LIST? Returns “LAN0”, “LAN1”, “LAN2”, “LAN3”, “LAN4”, “LAN5”, “LAN6”, “LAN7”
Preset:	“LAN0”, “LAN1”, “LAN2”, “LAN3”, “LAN4”, “LAN5”, “LAN6”, “LAN7”
State Saved:	Saved in instrument state.
Instrument S/W Revision:	Prior to A.02.00

Configure (Remote Command Only)

Allows the configuration of some of the above parameters from a single SCPI command.

Remote Command:	:LXI:EVENt:INPut:LAN[:SET]:CONFigure “lanEvent”, <enab>, <detection>, <filter>, <identifier>
Example:	:LXI:EVEN:INP:LAN:CONF "LAN0",1,FALL,"FILTER","DEBUG"
Instrument S/W Revision:	Prior to A.02.00

Restore Defaults

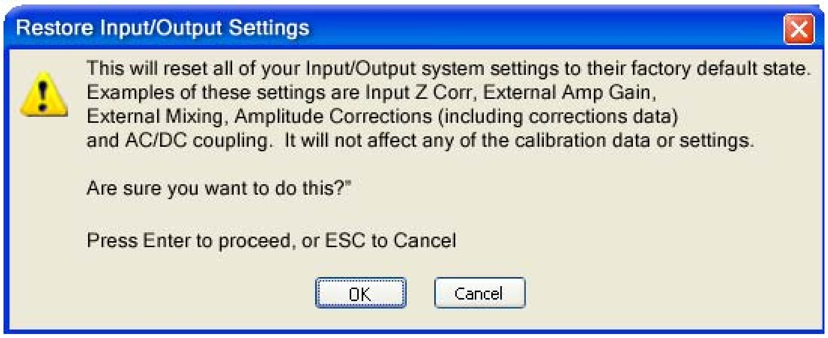
Provides incremental initialization of the system setting groups along with supporting a comprehensive reset of the entire instrument back to a factory default state. The menu selections are the groups of system settings and when one is selected, that particular group of system settings is reset back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

Key Path	**System**
Mode	All
Remote Command	:SYSTem:DEFault [ALL]|ALIGn|INPut|MISC|MODes|PON
Example	SYST:DEF
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Restore Input/Output Defaults

Causes the group of settings and data associated with Input/Output front-panel key to be a reset to their default values. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode switch.

Confirmation is required to restore the Input/Output setting. The confirmation dialog is:

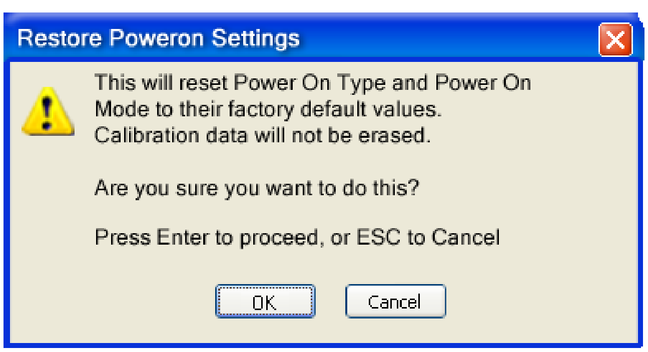


Key Path	**System, Restore System Defaults**
Example	:SYST:DEF INP
Instrument S/W Revision	Prior to A.02.00

Restore Power On Defaults

This selection causes the Power On settings to be a reset to their default value. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode switch. The Power On settings and their default values are Power On Type reset to Mode and Input/Output Defaults and Power On Application reset to whatever the factory set as its default value.

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



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

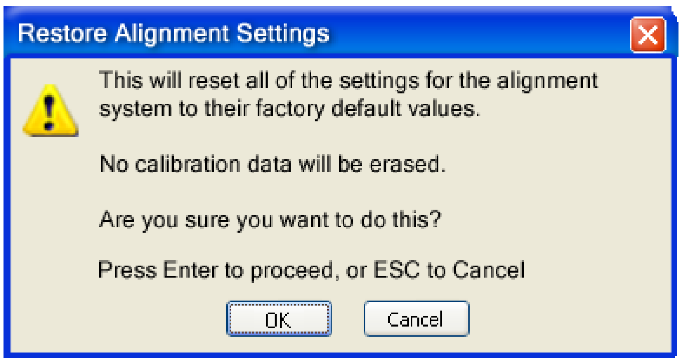
Instrument S/W Revision	Prior to A.02.00

Restore Align Defaults

This selection causes the Alignment system settings to be a reset to their default values. This does not affect any Alignment data stored in the system. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode switch.

After performing this function, it may impact the auto-alignment time of the instrument until a new alignment baseline has been established.

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



Key Path	**System, Restore System Defaults**
Example	:SYST:DEF ALIG
Instrument S/W Revision	Prior to A.02.00

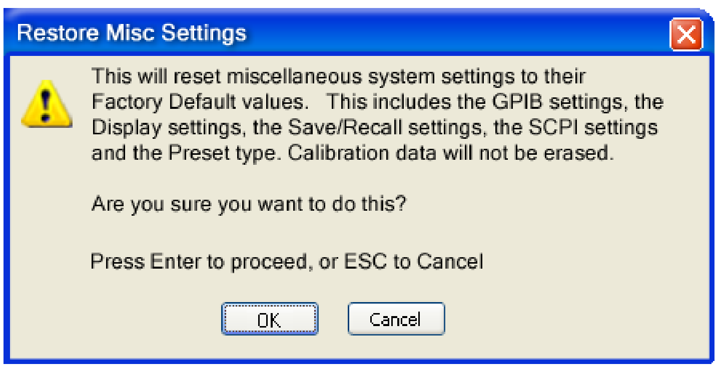
Restore Misc Defaults

This selection causes miscellaneous system settings to be reset to their default values. With this reset, you lose the GPIB address and it is reset to 18, so this should be used with caution. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode switch. This miscellaneous group contains the rest of the settings that have not been part of the other Restore System Defaults groups. The following table is a complete list of settings associated with this group:

Miscellaneous Setting	Default Value
Verbose SCPI	Off
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
SICL 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:

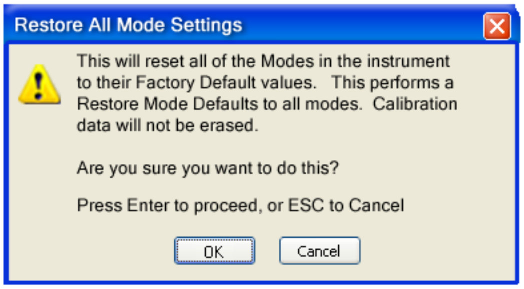


Key Path	**System, Restore System Defaults**
Example	:SYST:DEF MISC
Instrument S/W Revision	Prior to A.02.00

Restore Mode Defaults (All Modes)

This selection resets all of the modes in the instrument back to their default state just as a Restore Mode Defaults does and it switches the instrument to the power-on mode and causes the default measurement for the power-on mode to be active. This level of Restore System Defaults does not affect any system settings, but it does affect the state of all modes and does cause a mode switch unless the instrument was already in the power-on mode.

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

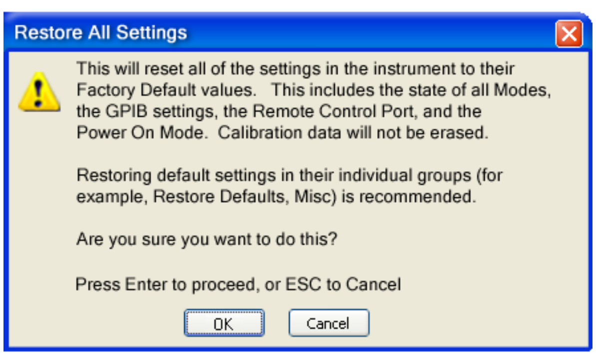


Key Path	**System, Restore System Defaults**
Example	:SYST:DEF MOD
Dependencies/Couplings	An All Mode will cause the currently running measurement to be aborted, mode switch to the power-on mode and activate the default measurement for the power-on mode. It gets the mode to a consistent state with all of the default couplings set.
Instrument S/W Revision	Prior to A.02.00

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:



Key Path	**System, Restore System Defaults**
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.
Instrument S/W Revision	Prior to A.02.00

Control Panel…

Opens the Windows Control Panel.

Pressing any key will cause the Control Panel to exit.

Key Path	**System**
Remote Command Notes	No remote command for this key.
Instrument S/W Revision	Prior to A.02.00

Licensing…

Opens the license explorer.

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

Key Path	**System**
Remote Command Notes	No equivalent remote command for this key.
Instrument S/W Revision	Prior to A.02.00

There are five remote commands available for licensing.

Remote Command:	`:SYSTem:LKEY <”OptionInfo”>, <”LicenseInfo”>`
Example:	SYST:LKEY “N9073A–1FP”,”027253AD27F83CDA5673A9BA5F427FDA5E4F25AEB1 017638211AC9F60D9C639FE539735909C551DE0A91”
Remote Command Notes:	The <”OptionInfo”> contains the feature and the version. You must specify the feature but can omit the version. If you omit the version, the system regards it as the latest one, since the system knows which version is supported for each feature. The <”LicenseInfo”> contains the signature, the expiration date, and serial number for transport if transportable. You must specify the signature, but you can omit the other information. If you omit the expiration date, the system regards it as permanent. If you omit the serial number, the system regards it as non-transportable. As a result, this supports backward compatibility.
Instrument S/W Revision:	Prior to A.02.00

Remote Command:	`:SYSTem:LKEY:DELete <”OptionInfo”>,<”LicenseInfo”>`
Example:	`SYST:LKEY:DEL` “N9073A–1FP”,”027253AD27F83CDA5673A9BA5F427FDA5E4F25AEB1 017638211AC9F60D9C639FE539735909C551DE0A91”

Remote Command Notes:	The <"OptionInfo"> contains the feature and the version. You must specify the feature but can omit the version. If you omit the version, the system regards it as the latest one, if more than one version is installed. The <"LicenseInfo"> contains the signature, the expiration date, and whether or not be transportable. You must specify the signature, but you can omit the other information. If you omit the expiration date, the system regards it as permanent. If you omit the transportability, the system regards it as non-transportable. As a result, this supports backward compatibility.
Instrument S/W Revision:	Prior to A.02.00

Remote Command:	`:SYSTem:LKEY:LIST?`
Remote Command Notes:	Return Value: An <arbitrary block data> of all the installed instrument licenses. The format of each license is as follows. <Feature>,<Version>,<Signature>,<Expiration Date>,<Serial Number for Transport> Return Value Example: #3136 N9073A–1FP,1.000,B043920A51CA N9060A–2FP,1.000,4D1D1164BE64 N9020A–508,1.000,389BC042F920 N9073A–1F1,1.000,5D71E9BA814C,13-aug–2005 <arbitrary block data> is: #NMMM<data> Where: N is the number of digits that describes the number of MMM characters. For example if the data was 55 bytes, N would be 2. MMM would be the ASCII representation of the number of bytes. In the previous example, N would be 55. <data> ASCII contents of the data
Instrument S/W Revision:	Prior to A.02.00

Remote Command:	`:SYSTem:LKEY? <"OptionInfo">`
Example:	SYST:LKEY? "N9073A–1FP"

Remote Command Notes:	The <"OptionInfo"> contains the feature and the version. You must specify the feature but can omit the version. If you omit the version, the system regards it as the latest one. Return Value: <"LicenseInfo"> if the license is valid, null otherwise. <"LicenseInfo"> contains the signature, the expiration date, and serial number if transportable. Return Value Example: "B043920A51CA"
Instrument S/W Revision:	Prior to A.02.00

Remote Command:	`:SYSTem:HID?`
Remote Command Notes:	Return value is the host ID as a string
Instrument S/W Revision:	Prior to A.02.00

Agilent Upgrade Service

The Agilent Upgrade Service entitles an instrument to software enhancements, if and when they occur, for the duration of the service period. Beginning in September, 2008, all new X-Series instruments will contain 2 years of upgrade service included with the purchase of the instrument. The Agilent Upgrade Service will be option AUS on the N9010A or N9020A. For new instrument purchases the two year entitlement will be from date of manufacture (plus one month for transit and receiving).

The Agilent Upgrade Service is administered via a license which carries the end date of the upgrade entitlement. The license can be viewed in Agilent License Manager, or via the Show System screen.

The Agilent Upgrade Service is for an individual instrument, it cannot be transferred from one instrument to another.

For existing instruments that do not have the Agilent Upgrade Service, or for extending the upgrade service after it has expired, the Agilent Upgrade Service is available as a standalone upgrade product. The two year entitlement will be from the date of redemption of the license.

Agilent Upgrade Service - software update installation

When a software update is being performed on an instrument, the installer will determine if the instrument has a valid Agilent Upgrade Service for the revision of software that is being installed. If the Agilent Upgrade Service is valid, the installation proceeds unencumbered. If the service is not valid, the operator is provided a prompt to contact Agilent for purchasing an Agilent Upgrade Service and the software update is not performed.

Agilent Upgrade Service - software removal

When a software update is being removed from instrument via Add/Remove Programs, the uninstall will check if there is an AUS license with date remaining on the service. If the AUS is expired, the operator will be given a prompt warning that an AUS Renewal may be required to install newer software and how to contact Agilent to obtain the renewal. The operator can choose to proceed with uninstall or terminate at which no software will be removed or altered.

Agilent Upgrade Service - viewing end-of-service date

There are two methods for viewing the end-of-service date of the Agilent Upgrade Service. The first is to use the Show System screen in the instrument application System -> Show -> System. The second is the use the Agilent License Manager. The Agilent License Manager can be invoked from the System menu of the instrument application or by right-mouse clicking on the License Notifier icon in the Windows® task tray.

Agilent Upgrade Service - Listing end-of-service date (Remote Command Only)

The end-of-service date for the Agilent Upgrade Service can be queried via SCPI.

Remote Command:	`:SYSTem:AUService:DATE?`
Example:	:SYST:AUS:DATE?
Notes:	If there is no Agilent Upgrade Service license installed the date will return "01-sep–2008"
Instrument S/W Revision:	A.02.00

Service

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

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

Diagnostics

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

Key Path	**System, More**
Instrument S/W Revision	Prior to A.02.00

Show Hardware Statistics

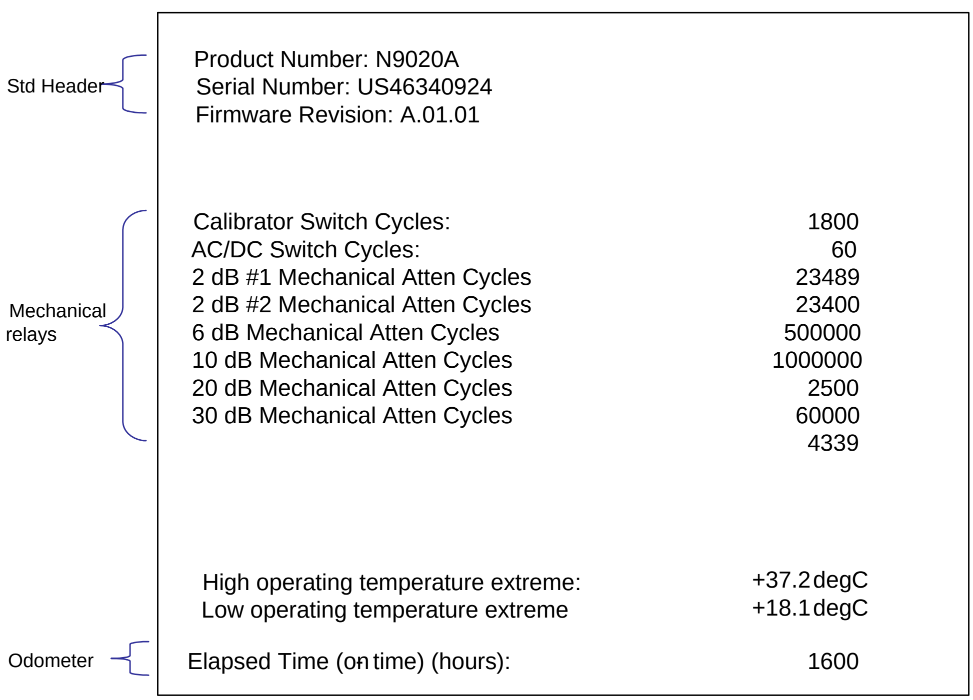
Provides a display of various hardware statistics. The statistics include the following:

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.

Key Path	**System, Diagnostics**
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.
Instrument S/W Revision	Prior to A.02.00

Query the Mechanical Relay Cycle Count

Returns the count of mechanical relay cycles.

Remote Command:	`:SYSTem:MRELay:COUNt?`
Example:	:SYST:MREL:COUN?
Remote Command Notes:	Query Only
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>"
Instrument S/W Revision:	Prior to A.02.00

Query the Operating Temperature Extremes

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

Mode	All
Remote Command	`:SYSTem:TEMPerature:LEXTreme?`
Example	:SYST:TEMP:LEXT?
Restriction and Notes	Value is in degrees Celsius at which the lowest operating temperature has been recorded since 1st power-up.
State Saved	No
Instrument S/W Revision	Prior to A.02.00

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

Mode	All

Remote Command	`:SYSTem:TEMPerature:HEXTreme?`
Example	:SYST:TEMP:HEXT?
Restriction and Notes	Value is in degrees Celsius at which the highest operating temperature has been recorded since 1st power-up.
State Saved	No
Instrument S/W Revision	Prior to A.02.00

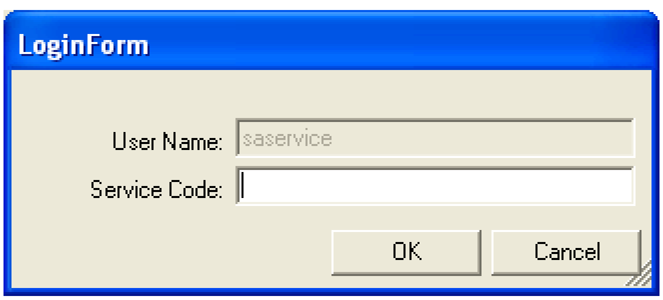
Query the Elapsed Time since 1st power on

Returns the elapsed on-time in minutes since 1st power-on.

Remote Command:	`:SYSTem:PON:ETIMe?`
Example:	:SYST:PON:ETIM?
Remote Command Notes:	Query Only
Instrument S/W Revision:	Prior to A.02.00

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 you are provided the following dialog:

Key Path	**System, Diagnostics**

Restriction and Notes	**Password is required to access this menu.**
Instrument S/W Revision	Prior to A.02.00

List installed Options (Remote Command Only)

Lists the installed options that pertain to the instrument (signal analyzer).

Mode	All
Remote Command	`:SYSTem:OPTions?`
Example	:SYST:OPT?
Restriction and Notes	The return string is a comma separated list of the installed options. For example: “503,P03,PFR” :SYSTem:OPTions? and *OPT? are the same.
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Lock the Front-panel keys (Remote Command Only)

Disables the instrument keyboard to prevent local input when the instrument is controlled remotely. Annunciation showing a “K” for ‘Klock” (keyboard lock) alerts the local user that the keyboard is locked. Klock is similar to the GPIB Local Lockout function; namely that no front-panel keys are active with the exception of the Power Standby key. (The instrument is allowed to be turned-off if Klock is ON.) The Klock command is used in remote control situations where Local Lockout cannot be used.

Although primary intent of Klock is to lock-out the front panel, it will lock-out externally connected keyboards through USB. Klock has no effect on externally connected pointing devices (mice).

The front panel ‘Local’ key (Cancel/Esc) has no effect if Klock is ON.

Mode	All
Remote Command	`:SYSTem:KLOCk OFF|ON|0|1` `:SYSTem:KLOCk?`
Example	:SYST:KLOC ON
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
Instrument S/W Revision	Prior to A.02.00

List SCPI Commands (Remote Command Only)

Outputs a list of the valid SCPI commands for the currently selected Mode.

Remote Command:	`:SYSTem:HELP:HEADers?`
Example:	:SYST:HELP:HEAD?
Remote Command Notes:	The output is an IEEE Block format with each command separated with the New-Line character (hex 0x0A)
Instrument S/W Revision:	Prior to A.02.00

SCPI Version Query (Remote Command Only)

Returns the SCPI version number with which the instrument complies. The SCPI industry standard changes regularly. This command indicates the version used when the instrument SCPI commands were defined.

Remote Command:	`:SYSTem:VERSion?`
Example:	:SYST:VERS?
Instrument S/W Revision:	Prior to A.02.00

Date (Remote Command Only)

The recommended access to the Date, Time, and Time zone of the instrument is through the Windows native control (Control Panel or accessing the Task Bar). You may also access this information remotely, as shown in this command and Time (below).

Sets or queries the date in the instrument.

Mode	All
Remote Command	`:SYSTem:DATE "<year>,<month>,<day>"` `:SYSTem:DATE?`
Example	:SYST:DATE “2006,05,26”
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
Instrument S/W Revision	Prior to A.02.00

Time (Remote Command Only)

Sets or queries the time in the instrument.

Mode	All
Remote Command	`:SYSTem:TIME "<hour>,<minute>,<second>"` `:SYSTem:TIME?`
Example	:SYST:TIME "13,05,26"
Remote Command Notes	<hour> is the two digit representation of the hour in 24 hour format <minute> is the two digit representation of minute <second> is the two digit representation of second
Instrument S/W Revision	Prior to A.02.00

User Preset

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

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

User Preset

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

The User Preset file is a Save State file. **User Preset** sets the state of the currently active mode back to the state that was previously saved for this mode using the **Save User Preset** menu key or the SCPI command, `SYST:PRES:USER:SAV`. So for any given Mode, the only way to perform a User Preset is from that Mode, not from any other Mode. The user has no control over the user preset filename and has no direct access to the user preset file.

User Preset recalls a mode's state which includes all of the variables affected by doing a Mode Preset. It not only recalls Mode Preset settings, but it also recalls all of the mode persistent settings. User Preset also recalls all of the Input/Output system settings that existed at the time **Save User Preset** was executed.

If a **Save User Preset** has not been done at any time, **User Preset** recalls the default user preset file for the currently active mode. The default user preset files are created if, at power-on, a mode detects there is no user preset file, so there will never be a scenario when there is no user preset file to restore. For each mode, the default user preset state is the same state that would be saved if a **Save User Preset** is performed in each mode right after doing a Restore Mode Default and after a Restore Input/Output Defaults.

User Preset does the following:

- Aborts the currently running measurement.
- Sets the mode state to the values defined by **Save User Preset**.
- Makes the saved measurement for the currently running mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

Key Path	**User Preset**
Remote Command	`:SYSTem:PRESet:USER`

Example	`:SYST:PRES:USER:SAVE` `:SYST:PRES:USER`
Remote Command Notes	`:SYST:PRES:USER:SAVE` is used to save the current state as the user preset state.
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.
Instrument S/W Revision	Prior to A.02.00

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.

Key Path	**User Preset**
Remote Command	`:SYSTem:PRESet:USER:ALL`
Example	`:SYST:PRES:USER:SAVE` `:SYST:PRES:USER:ALL`
Remote Command Notes	`:SYST:PRES:USER:SAVE` is used to save the current state as the user preset state.
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.
Instrument S/W Revision	Prior to A.02.00

Save User Preset

Save User Preset saves the currently active mode and its state. The way you recall 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.

Key Path	**User Preset**
Remote Command	`:SYSTem:PRESet:USER:SAVE`
Example	`:SYST:PRES:USER:SAVE`
Restriction and Notes	:SYST:PRES:SAVE creates the same file as if you requested a *SAV or a MMEM: STOR:STAT, except User Preset Save does not allow you to specify the filename or the location of the file.
Instrument S/W Revision	Prior to A.02.00

6 Burst Power (Transmit Power)

The Burst Power (Transmit Power) measurement (at the base transceiver station) is used to determine the power delivered to the antenna system on the radio-frequency channel under test. The Burst Power measurement verifies the accuracy of the mean transmitted RF carrier power. This can be done across the frequency range and at each power step. For more information, see "Transmit Power (Burst Power) Measurement Description" on page 295. For measurement results and views, see "View/Display" on page 341.

This topic contains the following sections.

Measurement Commands for Burst Power (Transmit Power)

The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSe:TXPower|BPOWer commands for more measurement related commands.

NOTE	The BPOWer form of the commands is included for backward compatibility only. They are not recommended for use in new designs. Use the TXPower keyword.

The following commands are used to retrieve the measurement results:

```
:CONFigure:TXPower|BPOWer
```

```
:CONFigure:TXPower|BPOWer:NDEFault
```

```
:INITiate:TXPower|BPOWer
```

```
:FETCh:TXPower|BPOWer[n]?
```

```
:READ:TXPower|BPOWer[n]?
```

```
:MEASure:TXPower|BPOWer[n]?
```

For more remote command information, see the section, "Remote Measurement Functions" on page 1069.

Remote Command Results for Burst Power (Transmit Power)

n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.
not specified or n = 1	Returns the following comma-separated scalar results: 1. Sample time is a floating point number representing the time between samples when using the trace queries (n=0, 2, etc.). 2. Power is the mean power (in dBm) of the power value that calculated by specified method: above the threshold or measured burst width. If averaging is on, the power is for the latest acquisition. 3. Power averaged is the power (in dBm) for N averages, if averaging is on. An average consists of N acquisitions of data which represents the current trace. If averaging is off, the value of Power averaged is the same as the Power value. 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. Threshold value is the absolute threshold level (in dBm) above which the power is calculated when Meas Method is set to Above Threshold. 6. Threshold points is the number of points that were above the threshold and were used to calculate Mean Transmit Power when “Meas Method” on page 319 is set to Above Threshold. If “Meas Method” on page 319 is set to Measured Burst Width, Measured Pts is returned. 7. Maximum value is the maximum peak level of the most recently acquired trace data (in dBm). 8. Minimum value is the minimum peak level of the most recently acquired trace data (in dBm). 9. Full Burst width is the burst width of this signal regardless of the parameter value set for the current Measured width. The Burst width is determined by the Threshold Lvl when Meas Method is set to Measured Burst Width. If Meas Method is set to Above Threshold Lvl, this value is 0. Full Burst width is the burst width of this signal regardless of the parameter value set for the current Measured width. The Burst width is determined by the Threshold Lvl when Meas Method is set to Measured Burst Width. If Meas Method is set to Above Threshold Lvl, this value is zero. 10. Measured width is the time length that is used to calculate Mean Transmit Power when “Meas Method” on page 319 is set to Measured Burst Width. If “Meas Method” on page 319 is set to Above Threshold, this value is zero. 11. Measured points is the number of points used to calculate Mean Transmit Power when Meas Method is set to Measured Burst Width. If Meas Method is set to Above Threshold, this value is 0.
2	Returns comma-separated trace points of the Measure Trace data. These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the number of samples. The period between the samples is defined by the sample time.

3	Returns comma-separated trace points of the Max Hold Trace data. These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the number of samples. The period between the samples is defined by the sample time. * This is not available in TD-SCDMA.
4	Returns comma-separated trace points of the Min Hold Trace data. These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the number of samples. The period between the samples is defined by the sample time. * This is not available in TD-SCDMA.

Transmit Power (Burst Power) Measurement Description

Mobile stations and base transceiver stations must transmit enough power, with sufficient modulation accuracy, to maintain a call of acceptable quality without leaking power into frequency channels or timeslots allocated for others. The Burst Power measurement determines the average power for an RF signal burst at or above a specified threshold value or during the detected burst width. The threshold value may be absolute, or relative to the peak value of the signal. Burst width can be set automatically or manually.

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

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. Many of the parameter values are measurement dependent. Attenuation values, and the Internal Preamp selection are measurement global, so they are common across all measurements. Functions with operation unique to this measurement are described below. See "Amplitude Y Scale (AMPTD Y Scale)" on page 969 for more information.

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

Y Ref Value

Sets the absolute power reference.

Key Path	**AMPTD Y Scale**
Mode	SA, GSM, TD-SCDMA
Remote Command	`:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:TXP:VIEW:WIND:TRAC:Y:RLEV 5dbm DISP:TXP:VIEW:WIND:TRAC:Y:RLEV?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Dependencies/Couplings	When "Auto Scaling" on page 298 is On, this value is automatically determined by the measurement result. When the user sets this value manually, Auto Scaling automatically changes to Off.
Preset	10.00
State Saved	Saved in instrument state.
Min	–250.0
Max	250.0
Instrument S/W Revision	Prior to A.02.00

Attenuation

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

See "Attenuation" on page 969 for more information.

Key Path	**AMPTD Y Scale**
Instrument S/W Revision	Prior to A.02.00

Scale/Division

Enables you to enter a numeric value to change the vertical display sensitivity.

Key Path	**AMPTD Y Scale**
Mode	SA, GSM, TD-SCDMA
Remote Command	`:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:TXP:VIEW:WIND:TRAC:Y:PDIV 10dB DISP:TXP:VIEW:WIND:TRAC:Y:PDIV?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Dependencies/Couplings	When the "Auto Scaling" on page 298 is On, this value is automatically determined by the measurement result. When the user sets a value manually, Auto Scaling automatically changes to Off.
Preset	10.00 dB
State Saved	Saved in instrument state.
Min	0.1 dB
Max	20.00 dB
Instrument S/W Revision	Prior to A.02.00

Presel Center (Measurement Global)

Operation of this key is identical across several measurements. For details about this key, see "Presel Center" on page 981.

Presel Adjust (Measurement Global)

Operation of this key is identical across several measurements. For details about this key, see "Preselector Adjust" on page 982.

Internal Preamp

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

See "Internal Preamp" on page 984 for more information.

Key Path	**AMPTD Y Scale**
Instrument S/W Revision	Prior to A.02.00

Ref Position

Enables you to set the display reference position to either, Top, Center or Bottom.

Key Path	**AMPTD Y Scale, More**
Mode	SA, GSM, TD-SCDMA
Remote Command	`:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:TXP:VIEW:WIND:TRAC:Y:RPOS CENT DISP:TXP:VIEW:WIND:TRAC:Y:RPOS?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	TOP
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Instrument S/W Revision	Prior to A.02.00

Auto Scaling

Allows you to toggle the Y axis auto scaling function between On and Off.

Key Path	**AMPTD Y Scale, More**
Mode	SA, GSM, TD-SCDMA
Remote Command	`:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`

Example	DISP:TXP:VIEW:WIND:TRAC:Y:COUP 0 DISP:TXP:VIEW:WIND:TRAC:Y:COUP?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Dependencies/Couplings	When Auto Scaling is On, upon pressing the Restart front-panel key, this function automatically determines the scale per division and reference values based on the measurement results. When the user sets a value either "Y Ref Value" on page 296 or "Scale/Division" on page 297, this parameter is automatically set to 'Off'.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Auto Couple

Operation of this key is identical across several measurements. For details about this key, see “AUTO COUPLE” on page 987.

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.

NOTE If the mode is TD-SCDMA, this function will NOT be available.

Key Path	**Front-panel key**
Mode	SA, GSM
Instrument S/W Revision	Prior to A.02.00

Res BW

Sets the resolution bandwidth. This is the bandwidth used for the power measurement. The bandwidth is ideally wide enough to pass all the power of the bursted signal, while not being so wide that it passes noise that reduces dynamic range and the accuracy of low level measurements.

Key Path	**BW**
Mode	SA, GSM
Remote Command	`[:SENSe]:TXPower:BANDwidth[:RESolution] <bandwidth>`
	`[:SENSe]:TXPower:BANDwidth[:RESolution]?`
Example	TXP:BAND 1000
	TXP:BAND?
Notes	You must be in the Spectrum Analyzer mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	GSM: 510 kHz
	SA: 3 MHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	Hardware Dependent:
	No Option = 10 MHz
	Option B25 = 25 MHz
Instrument S/W Revision	Prior to A.02.00

RBW Control

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

Filter Type

Besides the familiar Gaussian filter shape, there are certain special filter types, such as Flat Top, that are desirable under certain conditions.

Key Path	**BW**
Mode	SA, GSM
Remote Command	`[:SENSe]:TXPower:BANDwidth:TYPE GAUSsian|FLATtop`
	`[:SENSe]:TXPower:BANDwidth:TYPE?`
Example	TXP:BAND:TYPE GAUS
	TXP:BAND:TYPE?
Notes	This chooses the type of filter, either Gaussian or Flat (Flattop). Gaussian is the best choice when looking at the overall burst or the rising and falling edges, as it has excellent pulse response. We are not interested in trading off time domain accuracy vs. noise, just total power accuracy vs. noise level in this measurement. If you want to precisely examine just the useful part of the burst, choose Flat. This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default, may cause invalid measurement results.
	FLATtop – a filter with a flat amplitude response, which provides the best amplitude accuracy.
	GAUSsian – a filter with Gaussian characteristics, which provides the best pulse response.
	You must be in the Spectrum Analyzer mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	GAUSsian
State Saved	Saved in instrument state.
Range	Gaussian (Normal)|Flattop
Instrument S/W Revision	Prior to A.02.00

Cont (Continuous)

Operation of this key is identical across several measurements. For details about this key, see "Cont (Continuous Measurement/Sweep)" on page 991.

FREQ/Channel (Frequency or Channel)

Operation of this key is identical across several measurements. For details about this key, see “FREQ/Channel” on page 993.

Input/Output

Operation of this key is identical across several measurements. For details about this key, see "Input/Output" on page 1003.

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

For more information, see "Marker" on page 1063.

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

Select Marker

Displays 12 markers available for selection.

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

Marker Type

Sets the marker control mode as described under **Normal**, **Delta**, **Fixed** and **Off**, below. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Key Path	**Marker**
Mode	GSM, SA, TD-SCDMA
Remote Command	`:CALCulate:TXPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF` `:CALCulate:TXPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	CALC:TXP:MARK:MODE OFF CALC:TXP:MARK:MODE?
Notes	If the selected marker is Off, pressing **Marker** sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area. Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X axis value entered in the active function area will display the marker value to its full entered precision. You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.

Range	Normal|Delta|Off
Instrument S/W Revision	Prior to A.02.00

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**.

Key Path	**Marker, Normal**
Mode	GSM, SA, TD-SCDMA

Remote Command	`:CALCulate:TXPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <real>`
	
	`:CALCulate:TXPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`

Example	CALC:TXP:MARK3:X 0 CALC:TXP:MARK3:X?
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. You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Dependencies/Couplings	Max value would be changed by Sweep/Meas Time parameter value.
Preset	Markers are turned OFF, so Marker X Axis Value query will return a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37
Instrument S/W Revision	Prior to A.02.00

Marker X Axis Position (Remote Command Only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering a value if the control mode is **Normal** or **Delta** except in trace points rather than X Axis Scale units. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Mode	GSM, SA, TD-SCDMA
Remote Command	`:CALCulate:TXPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <real>` `:CALCulate:TXPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`
Example	CALC:TXP:MARK10:X:POS 500 CALC:TXP:MARK10:X:POS?
Notes	The query returns the marker's absolute X Axis value in trace points if the control mode is **Normal**, or the offset from the marker's reference marker in trace points if the control mode is **Delta**. If the marker is **Off** the response is not a number. You must be in the Spectrum Analyzer mode, TDSCMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Dependencies/Couplings	Max value would be changed by Sweep/Meas Time parameter value.
Preset	Markers are turned OFF, so Marker X Axis Value query will return a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37
Instrument S/W Revision	Prior to A.02.00

Marker Y Axis Value (Remote Command Only)

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

The "result" of a marker is the value which is displayed on the second line of the Marker Result block. To properly interpret the returned value the remote programmer must also know what the analyzer's Y-Axis Unit is set to as described below.

A marker can have up to two results, only one of which is displayed or returned on a query, as follows:

Absolute result: every marker has an absolute result and it is simply:

For Normal and Delta markers, the Y Axis value of the trace point the marker is currently on.

The absolute result is displayed in the result block or returned on a query unless the marker control mode is **Delta**.

Relative result: if a marker's control mode is **Delta**, the relative result is displayed in the result block or returned on a query. This is the ratio of the Absolute Result of a delta marker to the Absolute Result of its reference marker. The ratio is expressed in dB.

Mode	GSM, SA, TD-SCDMA
Remote Command	`:CALCulate:TXPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	CALC:TXP:MARK11:Y?
Notes	The query returns the marker Y Axis result. If the marker is **Off** the response is not a number. You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Properties

Accesses a menu that enables you to set marker properties and to access the marker trace menu.

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

Select Marker

Displays 12 markers available for selection.

Key Path	**Marker, Properties**
Mode	GSM, SA, TD-SCDMA
Instrument S/W Revision	Prior to A.02.00

Relative To

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

Key Path	**Marker, Properties**
Mode	GSM, SA, TD-SCDMA
Remote Command	`:CALCulate:TXPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>` `:CALCulate:TXPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`

Example	CALC:TXP:MARK:REF 10 CALC:TXP:MARK:REF?
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.” You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode. When queried a single value will be returned (the specified marker numbers relative marker).
Preset	2|3|4|5|6|7|8|9|10|11|12|1
State Saved	Saved in instrument state.
Min	1
Max	12
Instrument S/W Revision	Prior to A.02.00

Marker Trace

Assigns the specified marker to the designated trace.

Key Path	**Marker, Properties**
Mode	GSM, SA, TD-SCDMA
Remote Command	`:CALCulate:TXPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe RFENvelope|MAXHold|MINHold` `:CALCulate:TXPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?`
Example	CALC:TXP:MARK:TRAC MAXH CALC:TXP:MARK:TRAC?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Dependencies/Couplings	If Detector/Max Hold Trace is Off, Max Hold is grayed out and MAXHold parameter is not available. If Detector/Min Hold Trace is Off, Min Hold is grayed out and MINHold parameter is not available.
Preset	RFENvelope
State Saved	Saved in instrument state.
Range	RF Envelope|Max Hold RF Envelope|Min Hold RF Envelope
Instrument S/W Revision	Prior to A.02.00

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).

This may result in markers going off screen.

Key Path	**Marker, More**
Mode	GSM, SA, TD-SCDMA
Remote Command	`:CALCulate:TXPower:MARKer:COUPle[:STATe] ON|OFF|1|0`
	`:CALCulate:TXPower:MARKer:COUPle[:STATe]?`
Example	CALC:TXP:MARK:COUP ON
	CALC:TXP:MARK:COUP?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

All Markers Off

Turns off all markers.

Key Path	**Marker, More**
Mode	GSM, SA, TD-SCDMA
Remote Command	`:CALCulate:TXPower:MARKer:AOFF`
Example	CALC:TXP:MARK:AOFF
Notes	You must be in the Spectrum Analyzer mode, TDSDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Instrument S/W Revision	Prior to A.02.00

Marker Function

There is no ‘Marker Function’ supported in Burst (Tx) Power so this front-panel key will display a blank menu key when pressed.

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

Marker To

There is no ‘Marker To’ functionality supported in Burst (Tx) Power so this front-panel key will display a blank menu key when pressed.

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

Meas

Operation of this key is identical across several measurements. For details about this key, see "Meas" on page 1069.

Meas Setup

Displays the setup menu for the currently selected measurement. Many of the lower-level menu keys operate the same in all measurements. Unique functions are described below. For more information, refer to Analyzer Setup.

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

Avg/Hold Num

Specifies the number of data acquisition that will be averaged. After the specified number of average counts, the averaging mode (terminal control) setting determines the averaging action.

On - Sets measurement averaging on.

Off - Sets measurement averaging off.

Key Path	**Meas Setup**
Mode	SA, GSM, TD-SCDMA
Remote Command	`[:SENSe]:TXPower:AVERage:COUNt <integer>`
	`[:SENSe]:TXPower:AVERage:COUNt?`
	`[:SENSe]:TXPower:AVERage[:STATe] OFF|ON|0|1`
	`[:SENSe]:TXPower:AVERage[:STATe]?`
Example	TXP:AVER:COUN 100
	TXP:AVER:COUN?
	TXP:AVER:0
	TXP:AVER?
Notes	You must be in the Spectrum Analyzer mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	50
	ON
State Saved	Saved in instrument state.
Min	1
Max	10000
Instrument S/W Revision	Prior to A.02.00

Avg Mode

Selects the type of termination control used for the averaging function. This determines the averaging action after the specified number of data acquisitions (average count) is reached.

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.

Key Path	**Meas Setup**
Mode	SA, GSM, TD-SCDMA
Remote Command	`[:SENSe]:TXPower:AVERage:TCONtrol EXPonential|REPeat` `[:SENSe]:TXPower:AVERage:TCONtrol?`
Example	TXP:AVER:TCON REP TXP:AVER:TCON?
Notes	You must be in the Spectrum Analyzer mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	EXPonential
State Saved	Saved in instrument state.
Range	Exp|Repeat
Instrument S/W Revision	Prior to A.02.00

Avg Type

Specifies the type of trace and result averaging to use.

KEY:Pwr Avg (RMS) SCPI:RMS	True power averaging that is equivalent to taking the RMS value of the voltage. It is the most accurate type of averaging.
KEY:Log-Pwr Avg (Video) SCPI:LOG	Simulates the traditional spectrum analyzer type of averaging by averaging the log of the power.
KEY:None SCPI:MAXimum	The maximum values are retained during the averaging cycle.
KEY:None SCPI:MINimum	The minimum values are retained during the averaging cycle.

SA, GSM Mode

Key Path	**Meas Setup**
Mode	SA, GSM
Remote Command	`[:SENSe]:TXPower:AVERage:TYPE LOG|MAXimum|MINimum|RMS` `[:SENSe]:TXPower:AVERage:TYPE?`
Example	TXP:AVER:TYPE LOG TXP:AVER:TYPE?
Notes	Maximum|Minimum are selected only via SCPI. You must be in the Spectrum Analyzer or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Dependencies/Couplings	Selecting MAXimum|MINimum force to visible “Max Hold Trace” on page 338 or|and “Min Hold Trace” on page 338. Measure Trace stays in RMS or Video average state.
Preset	RMS
State Saved	Saved in instrument state.
Range	Pwr Avg (RMS)|Log-Pwr Avg(Video)|Maximum|Minimum
Instrument S/W Revision	Prior to A.02.00

TD-SCDMA Mode

Key Path	**Meas Setup**
Mode	TD-SCDMA
Remote Command	`[:SENSe]:TXPower:AVERage:TYPE LOG|RMS` `[:SENSe]:TXPower:AVERage:TYPE?`
Example	TXP:AVER:TYPE LOG TXP:AVER:TYPE?
Notes	You must be in the TD-SCDMA mode. Use INSTrument:SELect to set the mode.
Preset	RMS
State Saved	Saved in instrument state.
Range	Pwr Avg (RMS)|Log-Pwr Avg(Video)
Instrument S/W Revision	Prior to A.02.00

Threshold Lvl

When Meas Method is set to Above Threshold Lvl, the mean carrier power is calculated based on the trace above the threshold level. The threshold level is displayed in dB (relative to the measured carrier) or dBm (absolute).

A green line in the grid is displayed at the y-position associated with the current threshold level value. Its state is controlled by the On/Off state of the 'Display Line' under the View/Display menu.

Key Path	**Meas Setup**
Mode	SA, GSM, TD-SCDMA

Remote Command	`[:SENSe]:TXPower:THReshold <real>`
	`[:SENSe]:TXPower:THReshold?`
	`[:SENSe]:TXPower:THReshold:TYPE ABSolute|RELative`
	`[:SENSe]:TXPower:THReshold:TYPE?`

Example	TXP:THR 0 TXP:THR?
Example	TXP:THR:TYPE ABS TXP:THR:TYPE?
Notes	You must be in the TD-SCDMA mode, Spectrum Analyzer mode or GSM mode to use this command. Use INSTrument:SELect to set the mode. BAF SCPI Command determines whether this command is setting an absolute or a relative power level. Suffix dB and dBm are allowed, but it does not change the state of Threshold Type. Suffix may not be send. If Threshold Type is set to Relative, the positive value of Threshold level was allowed to +100dB and it treated as a negative value. Now max value of Threshold level is changed to 0dB. To keep the backward compatibility, the input from SCPI command allows to +100dB.
Preset	GSM: –20.0 SA: –30.0 TD-SCDMA : –60.0 RELative
State Saved	Saved in instrument state.
Min	–100

Max	GSM, SA: Relative : 0dB Absolute : 100dBm TD-SCDMA: Relative : 0dB Absolute : 60dBm
Instrument S/W Revision	Prior to A.02.00

Meas Method

There are two selections for this parameter; Above Threshold Level, and Measured Burst Width.

Above Threshold Level measurement algorithm is used to capture a time record, and average only those points in the time record that exceed the user-specified threshold level. No attempt is made to position the burst, or to calculate/display burst widths. This can be used to measure continuous signals, or bursted signals where the Measured Burst Width algorithm is too restrictive.

Measured Burst Width measurement algorithm uses the threshold level to calculate the burst center, and average those points that lie within a user-specified burst width that is centered upon the burst. The burst width parameter is described in more detail below.

If the mode is TD-SCDMA, there is a third selection.

Single Time Slot measurement algorithm is to capture a single time slot record, and calculate the start and stop position of the time slot in terms of the trigger position theoretically. No attempt is made to position the burst, or to calculate/display burst widths. The burst width drawn in the screen is considered to be the theoretical width of the slot. This method is recommended to measure the mean transmit power in a single slot when trigger source is External Front/Rear while the Measured Burst Width algorithm is too restrictive.

SA, GSM mode

Key Path	**Meas Setup**
Mode	SA, GSM
Remote Command	`[:SENSe]:TXPower:METHod THReshold|BWIDth` `[:SENSe]:TXPower:METHod?`
Example	TXP:METH BWID TXP:METH?
Preset	THReshold
State Saved	Saved in instrument state.
Range	Above Threshold Lvl|Measured Burst Width
Instrument S/W Revision	Prior to A.02.00

TD-SCDMA mode

Key Path	**Meas Setup**

Mode	TD-SCDMA
Remote Command	`[:SENSe]:TXPower:METHod THReshold|BWIDth|SINGle`
	`[:SENSe]:TXPower:METHod?`
Example	TXP:METH BWID
	TXP:METH?
Preset	SINGle
State Saved	Saved in instrument state.
Range	Threshold Lvl|Measured Burst Width|Single TimeSlot
Instrument S/W Revision	Prior to A.02.00

Burst Width

When Burst Width Mode is set to manual, the user may enter a fixed-time value in seconds, or alternatively specify the burst width as a percentage of the last measured burst width (result in bottom-left corner of second window).

Key Path	**Meas Setup**
Mode	SA, GSM, TD-SCDMA
Remote Command	`[:SENSe]:TXPower:BURSt:WIDTh <time>`
	`[:SENSe]:TXPower:BURSt:WIDTh?`
	`[:SENSe]:TXPower:BURSt:AUTO ON|OFF|1|0`
	`[:SENSe]:TXPower:BURSt:AUTO?`
Example	TXP:BURS:WIDT 10
	TXP:BURS:WIDT?
	TXP:BURS:AUTO 1
	TXP:BURS:AUTO?
Example	TXP:BURS:AUTO 0
	TXP:BURS:AUTO?
	TXP:BURS:AUTO 1
	TXP:BURS:AUTO?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.

Dependencies/Couplings	Burst Width will be grayed out if Meas Method is set to 'Above Threshold Lvl'. SA, GSM Max value depends on Sweep Time, Res BW and RBW filter type. TD-SCDMA: If the measure method is not "Measured Burst Width", this key will be grayed out. The default value is depending on the Burst type: If Burst Type = Traffic, Burst Width = 662.5us If Burst Type = Downlink Pilot, Burst Width = 50us If Burst Type = Uplink Pilot, Burst Width = 100us
Preset	SA, GSM: 255.6 us TD-SCDMA: 662.5us ON
State Saved	Saved in instrument state.
Min	100.0 ns
Max	50 s
Instrument S/W Revision	Prior to A.02.00

IF Gain

The **IF Gain** key can be used to set the IF Gain function to Auto, or to On (the extra 10 dB) or Off. These settings affect sensitivity and IF overloads.

If the mode is TD-SCDMA, this function will NOT be available.

The front-panel key will display a blank menu key when pressed.

Key Path	**Meas Setup**
Mode	SA
Instrument S/W Revision	Prior to A.02.00

IF Gain Auto

Activates the auto rules for IF Gain.

Key Path	**Meas Setup, More, IF Gain**
Mode	SA, GSM
Remote Command	`[:SENSe]:TXPower:IF:GAIN:AUTO[:STATe] OFF|ON|0|1` `[:SENSe]:TXPower:IF:GAIN:AUTO[:STATe]?`

Example	`TXP:IF:GAIN:AUTO ON`
	`TXP:IF:GAIN:AUTO?`
Notes	You must be in the Spectrum Analyzer mode, GSM mode to use this command. Use INSTrument:SELect to set the mode.
Dependencies/Couplings	IF Gain is not available when IQ Input is selected (the menu key is blank).
	When either the auto attenuation works (for example, with electrical attenuator), or the optimize mechanical attenuator range is requested, the IF Gain setting is changed according to the following rule.
	'auto' sets IF Gain High under any of the following conditions: the input attenuator is set to 0 dB, the preamp is turned on, or the Max Mixer Level is 20 dBm or lower. For other settings, auto sets IF Gain to Low.
Preset	ON
State Saved	Saved in instrument state.
Range	Auto|Man
Instrument S/W Revision	Prior to A.02.00

IF Gain State

Selects the range of the IF Gain.

Key Path	**Meas Setup, More, IF Gain**
Mode	SA, GSM
Remote Command	`[:SENSe]:TXPower:IF:GAIN[:STATe] ON|OFF|1|0`
	`[:SENSe]:TXPower:IF:GAIN[:STATe]?`
Example	`TXP:IF:GAIN ON`
	`TXP:IF:GAIN?`
Notes	You must be in the Spectrum Analyzer mode, GSM mode to use this command. Use INSTrument:SELect to set the mode.
	where ON = high gain
	OFF = low gain
Dependencies/Couplings	IF Gain is not available when IQ Input is selected (the menu key is blank)
	Sending this command forces "IF Gain Auto" on page 321 to OFF (Man).
Preset	OFF
State Saved	Saved in instrument state.
Range	Low Gain (Best for Large Signals)|High Gain (Best Noise Level)
Instrument S/W Revision	Prior to A.02.00

Meas Interval (for TD-SCDMA mode)

Sets the number of slots to be captured for each measurement. Uplink and downlink pilots each count as one slot, so setting the Meas Interval parameter to 9 will display one full subframe.

Key Path	**Meas Setup, More**
Mode	TD-SCDMA
Remote Command	`[:SENSe]:TXPower:SWEep:TIME <integer>` `[:SENSe]:TXPower:SWEep:TIME?`
Example	TXP:SWE:TIME 4 TXP:SWE:TIME?
Notes	In Single Time Slot method, Meas Interval is set to 1 and the key is disabled automatically. You must be in the TDSCDMA mode to use this command. Use INSTrument:SELect to set the mode.
Dependencies/Couplings	When device in Radio menu changes: If device is BTS, Trigger Source: External Front, Method: Single Time Slot, Measure: Continuous, Measure Time: disabled (=1); If device is MS, Trigger Source: RF Burst, Method: Measured Burst Width, Measure: Single, Measure Time: enabled.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	18
Instrument S/W Revision	Prior to A.02.00

Meas Preset

Returns parameters for this measurement to those set by the factory.

Key Path	**Meas Setup, More**

Mode	SA, GSM, TD-SCDMA
Remote Command	`:CONFigure:TXPower`
Example	CONF:TXP
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Instrument S/W Revision	Prior to A.02.00

Mode

Operation of this key is identical across several measurements. For details about this key, see “Mode” on page 1087.

Mode Setup

Operation of this key is identical across several measurements. For details about this key, see "Mode Setup" on page 1101.

Peak Search

Places the selected marker on the trace point with the maximum y-axis value for that marker's trace. Pressing Peak Search with the selected marker off causes the selected marker to be set to Normal, then a peak search is immediately performed.

Key Path	**Front-panel key**
Mode	GSM, SA, TD-SCDMA
Remote Command	`:CALCulate:TXPower:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	CALC:TXP:MARK2:MAX
Instrument S/W Revision	Prior to A.02.00

Recall

Operation of this key is identical across several measurements. For details about this key, see “Recall” on page 1123.

Restart

Operation of this key is identical across several measurements. For details about this key, see "Restart" on page 1145.

Save

Operation of this key is identical across several measurements. For details about this key, see “Save” on page 1147.

Single

Operation of this key is identical across several measurements. For details about this key, see "Single (Single Measurement/Sweep)" on page 1173.

Source

Operation of this key is identical across several measurements. For details about this key, see “Source” on page 1175.

SPAN X Scale

Accesses a menu of functions that enable you set the horizontal scale parameters.

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

Ref Value

Enables you to set the display X reference value.

Key Path	**SPAN X Scale**
Mode	SA, GSM, TD-SCDMA
Remote Command	`:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel <time>` `:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:TXP:VIEW:WIND:TRAC:X:RLEV 1s DISP:TXP:VIEW:WIND:TRAC:X:RLEV?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Dependencies/Couplings	If the “Auto Scaling” on page 335 is On, this value is automatically determined by the measurement result. When you set a value manually, “Auto Scaling” on page 335 automatically changes to Off.
Preset	0 s
State Saved	Saved in instrument state.
Min	–10.0 s
Max	10.00 s
Instrument S/W Revision	Prior to A.02.00

Scale/Div

Enables you to set the display X scale/division value.

Key Path	**SPAN X Scale**
Mode	SA, GSM, TD-SCDMA

Remote Command	`:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision <time>` `:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:TXP:VIEW:WIND:TRAC:X:PDIV 1ms DISP:TXP:VIEW:WIND:TRAC:X:PDIV?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Dependencies/Couplings	If the “Auto Scaling” on page 335 is on, this value is automatically determined by the measurement result. When you set a value manually, “Auto Scaling” on page 335 automatically changes to Off.
Preset	64.0 us
State Saved	Saved in instrument state.
Min	1.00 ns
Max	1.00 s
Instrument S/W Revision	Prior to A.02.00

Ref Position

Enables you to set the display X reference position to Left, Center or Right.

Key Path	**SPAN X Scale**
Mode	SA, GSM, TD-SCDMA
Remote Command	`:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:TXP:VIEW:WIND:TRAC:X:RPOS LEFT DISP:TXP:VIEW:WIND:TRAC:X:RPOS?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left|Ctr|Right
Instrument S/W Revision	Prior to A.02.00

Auto Scaling

Enables you to toggle the X auto scaling function between On and Off.

Key Path	**SPAN X Scale**
Mode	SA, GSM, TD-SCDMA
Remote Command	`:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUPle?`
Example	DISP:TXP:VIEW:WIND:TRAC:X:COUP OFF DISP:TXP:VIEW:WIND:TRAC:X:COUP?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Dependencies/Couplings	Upon pressing the Restart front-panel key, the scale coupling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either X Rel Value or X Scale/Div manually, X Auto Scaling automatically changes to Off.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Sweep/Control

Accesses a menu of functions that enable you to set up and control the sweep for the current measurement. For details about this key, see “Sweep / Control” on page 1179.

Key Path	**Front-panel key**
Mode	SA, GSM, TD-SCDMA
Instrument S/W Revision	Prior to A.02.00

Sweep Time (for SAmode)

Sets the sweep time to capture and show on screen.

Key Path	**Sweep/Control**
Mode	SA
Remote Command	`[:SENSe]:TXPower:SWEep:TIME <time>`
	`[:SENSe]:TXPower:SWEep:TIME?`
Example	TXP:SWE:TIME 10
	TXP:SWE:TIME?
Notes	You must be in the Spectrum Analyzer mode to use this command. Use INSTrument:SELect to set the mode.
Preset	640 us
State Saved	Saved in instrument state.
Min	1.0e–6
Max	50
Instrument S/W Revision	Prior to A.02.00

Sweep Time (for GSM mode)

Sets the number of slots which are used in each data acquisition. Each slot is approximately to 600 s.

Key Path	**Sweep/Control**
Mode	GSM
Remote Command	`[:SENSe]:TXPower:SWEep:TIME <integer>`
	`[:SENSe]:TXPower:SWEep:TIME?`
Example	TXP:SWE:TIME 4
	TXP:SWE:TIME?

Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	50
Instrument S/W Revision	Prior to A.02.00

Pause/Resume

Pauses a measurement after the current data acquisition is complete.

When Paused, the label on the key changes to Resume. Pressing Resume un-pauses the measurement.

Since this functionality is mode global, see Mode functionality section or other section for details.

Key Path	**Sweep/Control**
Mode	SA, GSM, TD-SCDMA
Instrument S/W Revision	Prior to A.02.00

Trace/Detector

Accesses a menu of functions that enable you to control the detectors for the current measurement.

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

Max Hold Trace

This key enables you to select visible/invisible Max Hold Trace.

Key Path	**Trace/Detector**
Mode	SA, GSM, TD-SCDMA
Remote Command	`:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATe] ON|OFF|1|0` `:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATe]?`
Example	:DISP:TXP:VIEW:WIND:TRAC:MAXH ON :DISP:TXP:VIEW:WIND:TRAC:MAXH?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Dependencies/Couplings	Selecting [:SENSe]:TXPower:AVERage:TYPE MAXimum forces this parameter to ON.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Min Hold Trace

This key enables you to select visible/invisible Min Hold Trace.

Key Path	**Trace/Detector**
Mode	SA, GSM, TD-SCDMA
Remote Command	`:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATe] ON|OFF|1|0` `:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATe]?`

Example	:DISP:TXP:VIEW:WIND:TRAC:MINH ON :DISP:TXP:VIEW:WIND:TRAC:MINH?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTrument:SELect to set the mode.
Dependencies/Couplings	Selecting [:SENSe]:TXPower:AVERage:TYPE MINimum forces this parameter to ON.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Trigger

Operation of this key is identical across several measurements. For details about this key, see "Trigger" on page 1197.

View/Display

The View/Display key opens up the View menu for the current measurement. The views that are available are specific to the current measurement selected under the **Meas** key. Many of the lower-level menu keys are also the same across all measurements. Unique functions are described below.

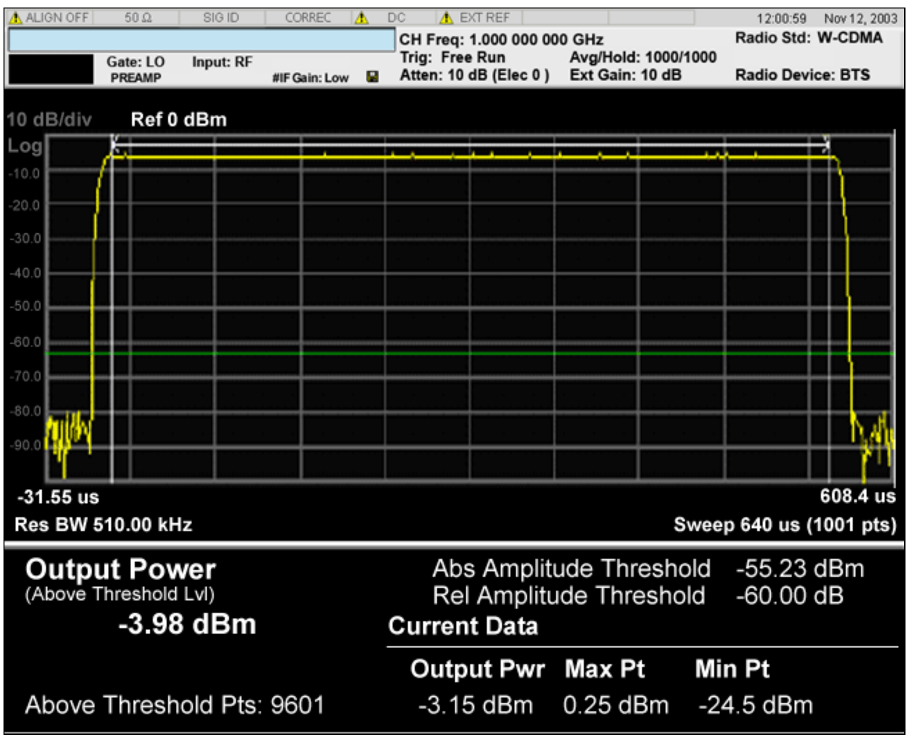
This measurement consists of one view, which consists of two windows.

"RF Envelope view for TX Power Measurement(Above Threshold)" on page 341

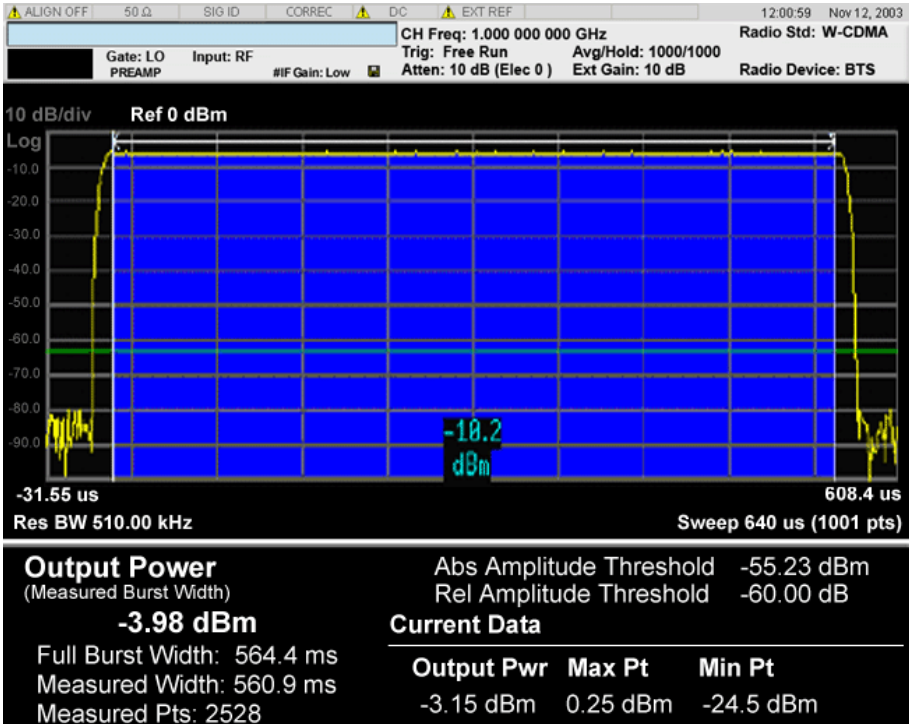
"RF Envelope view with Bar Graph for TX Power Measurement (Measured Burst Width)" on page 342

"RF Envelope view with Bar Graph for TX Power Measurement (Single TimeSlot)" on page 342

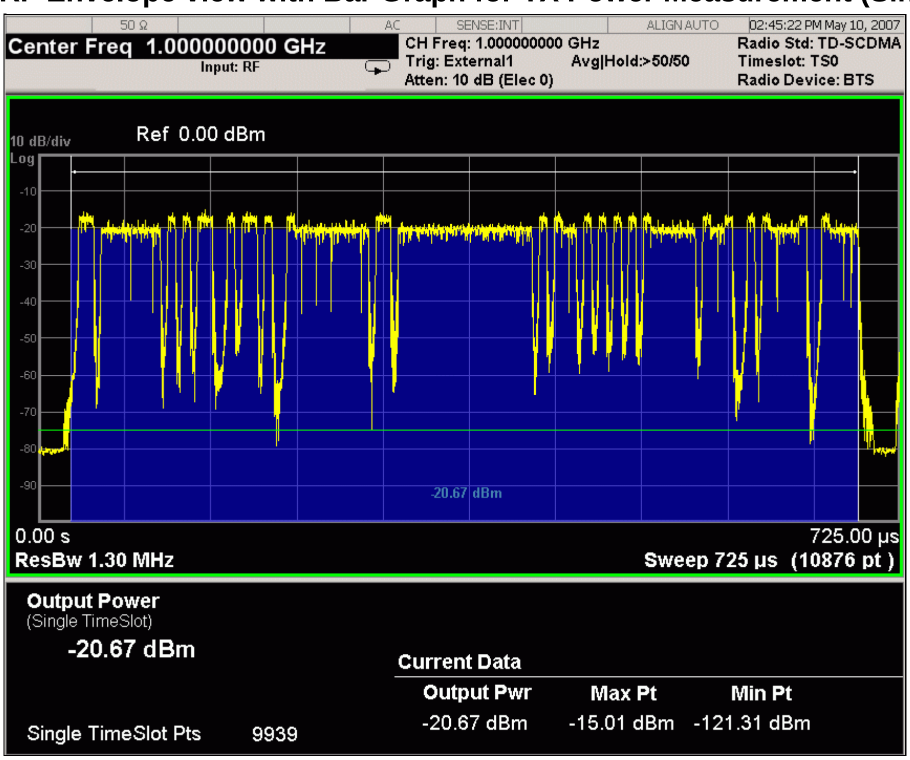
RF Envelope view for TX Power Measurement(Above Threshold)



RF Envelope view with Bar Graph for TX Power Measurement (Measured Burst Width)



RF Envelope view with Bar Graph for TX Power Measurement (Single TimeSlot)



The bar graph represents the measured portion of the trace. It is the blue bar in the second figure. Its state (On/Off) is controlled by “Bar Graph” on page 344 under the View/Display key.

RF Envelope window

Marker Operation	Yes
Corresponding Trace	Corrected measured trace (n=2,3,4)

Metrics window

Name	Corresponding Results	Display Format
Mean Transmit Power	n=1 3rd	99.99 dBm
Above Threshold or Measured Burst Width	Power Value above the threshold or measured burst width for N averages, if averaging is on. An average consists of N acquisitions of data which represents the current trace. If averaging is off, the value of power averaged is the same as the Mean Transmit Power of Current Data.	
Full Burst Width	n=1 9th Burst width that is determined by the "Threshold Lvl" on page 318.	999.9 us
Measured Width	n=1 10th Time length that is used to calculate Mean Transmit Power when "Meas Method" on page 319 is Measured Burst Width. If "Meas Method" on page 319 is set to Above Threshold, disappear from the window.	999.9 us
Above Thresh Pts	n=1 6th Number of points that were above the threshold level and were used for the power calculation when "Meas Method" on page 319 is Above Threshold Level.	9999
Thresh Pts	N=1 6th Number of points that were used for the power calculation when Meas Method is Measured Burst Width.	9999
Abs Amplitude Threshold	n=1 5th Threshold value is the threshold (in dBm) above which the power is calculated.	99.99 dBm
Rel Amplitude Threshold	Threshold (in dB) relative to the peak carrier level above which the power is calculated	99.99 dB
Mean Transmit power (Current data)	n=1 2nd Power value above the threshold or measured burst width. If averaging is on, the power is for the latest acquisition.	99.99 dBm
Max Pt	n=1 7th Maximum peak level of the most recently acquired trace data.	99.99 dBm

Min Pt	n=1 8th Minimum peak level of the most recently acquired trace data.	99.99 dBm

Key Path	**Front panel key**
Mode	SA, GSM, TD-SCDMA
Instrument S/W Revision	Prior to A.02.00

Display

Invokes Display menu. All measurements have same Display menu and same functionality for each key under Display menu. For details about this key, see "Display" on page 1253.

Key Path	**View/Display**
Mode	SA, GSM, TD-SCDMA
Instrument S/W Revision	Prior to A.02.00

Bar Graph

Enables you to select visible/invisible Bar Graph.

Key Path	**View/Display**
Mode	SA, GSM, TD-SCDMA
Remote Command	`:DISPlay:TXPower:BARGraph[:STATe] ON|OFF|1|0` `:DISPlay:TXPower:BARGraph[:STATe]?`
Example	DISP:TXP:BARG ON DISP:TXP:BARG?
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

7 GMSK Power vs. Time Measurement

Power vs. Time measures the mean transmit power during the “useful part” of GSM bursts and verifies that the power ramp fits within the defined mask. Power vs. Time also lets you view the rise, fall, and “useful part” of the GSM bursts. Using the “Multi-Slot” function, up to eight slots in a frame can be viewed at one time.

This topic contains the following sections:

“Measurement Commands for GMSK Power vs Time” on page 345

“Remote Command Results for GMSK Power vs Time” on page 345

Measurement Commands for GMSK Power vs Time

The following commands are used to retrieve the measurement results:

```
:CONFigure:PVTime
```

```
:CONFigure:PVTime:NDEFault
```

```
:INITiate:PVTime
```

```
:FETCh:PVTime[n]?
```

```
:READ:PVTime[n]?
```

```
:MEASure:PVTime[n]?
```

For more measurement related commands, see the section “Remote Measurement Functions” on page 1069.

See Also: “Custom Limit Mask Remote Only Commands ” on page 380.

Remote Command Results for GMSK Power vs Time

n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.

n	Results Returned
not specified or n = 1	Returns the following comma-separated scalar results: Sample time is a floating point number that represents the time between samples when using the trace queries (n=0,2,etc.). Power of single burst is the mean power (in dBm) across the useful part of the selected burst in the most recently acquired data, or in the last data acquired at the end of a set of averages. If averaging is on, the power is for the last burst. Power averaged is the power (in dBm) of N averaged bursts, if averaging is on. The power is averaged across the useful part of the burst. Average m is a single burst from the acquired trace. If there are multiple bursts in the acquired trace, only one burst is used for average m. This means that N traces are acquired to make the complete average. If averaging is off, the value of power averaged is the same as the power single burst value. Number of samples is the number of data points in the captured signal. This number is useful when performing a query on the signal (i.e. when n=0,2,etc.). Start point of the useful part of the burst is the index of the data point at the start of the useful part of the burst Stop point of the useful part of the burst is the index of the data point at the end of the useful part of the burst Index of the data point where T0 occurred. Burst width of the useful part of the burst is the width of the burst measured at .3dB below the mean power in the useful part of the burst. Maximum value is the maximum value of the most recently acquired data (in dBm). Minimum value is the minimum value of the most recently acquired data (in dBm). Burst search threshold is the value (in dBm) of the threshold where a valid burst is identified, after the data has been acquired. IQ point delta is the number of data points offset that are internally applied to the useful data in traces n=2,3,4. You must apply this correction value to find the actual location of the Start, Stop, or T0 values.
2	Returns comma-separated trace points of the entire captured I/Q trace data. These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the number of samples. The period between the samples is defined by the sample time.
3	Returns comma-separated points representing the upper mask (in dBm).
4	Returns comma-separated points representing the lower mask (in dBm).
7	Returns power level values for the 8 slots in the current frame (in dBm).
8	Returns comma-separated trace points of the Max Hold Trace data. These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the number of samples. The period between the samples is defined by the sample time.

n	Results Returned
9	Returns comma-separated trace points of the Min Hold Trace data. These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the number of samples. The period between the samples is defined by the sample time.
10	Returns the following comma-separated scalar results: 1. Sample time is a floating point number that represents the time between samples when using the trace queries (n=0,2,etc.). 2. Power of single burst is the mean power (in dBm) across the useful part of the selected burst in the most recently acquired data, or in the last data acquired at the end of a set of averages. If averaging is on, the power is for the last burst. 3. Power averaged is the power (in dBm) of N averaged bursts, if averaging is on. The power is averaged across the useful part of the burst. Average m is a single burst from the acquired trace. If there are multiple bursts in the acquired trace, only one burst is used for average m. This means that N traces are acquired to make the complete average. If averaging is off, the value of power averaged is the same as the power single burst value. 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 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 7. Index of the data point where T0 occurred. 8. Burst width of the useful part of the burst is the width of the burst measured at 3dB below the mean power in the useful part of the burst. 9. Maximum value is the maximum value of the most recently acquired data (in dBm). 10. Minimum value is the minimum value of the most recently acquired 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. 12. IQ point delta is the number of data points offset that are internally applied to the useful data in traces n=2,3,4. You must apply this correction value to find the actual location of the Start, Stop, or T0 values. 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, returned data has no meaning.

n	Results Returned
10 (Cont.)	14. Detected TSC is the most recently detected TSC. The returned value is 0~7 (Burst Type : Normal) if TSC detected. If TSC not detected, the returned value is –999.0. If Amptd or NONE (Power vs Time only) is specified in Sync Type, the returned value is –999.0. In multi slot condition, the returned value is the detected TSC of the specified slot (Time Slot ON) or the first evaluated slot (Time Slot OFF). Note: The returned value in Sync (Synchronization Burst) is. 10 if (BN42, BN43..BN105) = (1,0,1,1,1,0,0,1,0,1,1,0,0,0,1,0,0,0,0,0,0,1,0,0,0,0,0,0,1, 1,1,1,0,0,1,0,1,1,0,1,0,1,0,0,0,1,0,1,0,1,1,1,0,1,1,0,0,0,0,1,1,0,1,1) 11 if (BN42, BN43..BN105) = (1,1,1,0,1,1,1,0,0,1,1,0,1,0,1,1,0,0,1,0,1,0,0,0,0,0,1,1,1,1,1,0,1, 1,1,1,0,1,0,0,0,1,1,1,1,1,1,0,1,1,0,0,1,0,1,1,0,0,0,1,0,1,0,1) 12 if (BN42, BN43..BN105) = (1,1,1,0,1,1,0,0,0,0,1,1,0,1,1,1,0,1,0,1,0,0,0,1,0,1,0,1,1,0, 1,0,0,1,1,1,1,0,0,0,0,0,0,1,0,0,0,0,0,0,1,0,0,0,1,1,0,1,0,0,1,1,1,0) The returned value in Access (Access Burst) is 20 if (BN8, BN9..BN48) = (0,1,0,0,1,0,1,1,0,1,1,1,1,1,1,1,1,0,0,1,1,0,0,1,1,0,1,0,1,0,1,0,0,0,1,1,1,1,0,0,0) 21 if (BN8, BN9..BN48) = (0,1,0,1,0,1,0,0,1,1,1,1,1,0,0,0,1,0,0,0,0,1,1,0,0,0,1,0,1,1,1,1,0,0,1,0,0,1,1,0,1) 22 if (BN8, BN9..BN48) = (1,1,1,0,1,1,1,1,0,0,1,0,0,1,1,1,0,1,0,1,0,1,1,0,0,0,0,0,1,1,0,1,1,0,1,1,1,0,1,1,1) 15. Reserved for future use – the value returned is –999.0 (floating point). 16. Reserved for future use – the value returned is –999.0 (floating point). 17. Reserved for future use – the value returned is –999.0 (floating point). 18. Reserved for future use – the value returned is –999.0 (floating point). 19. Reserved for future use – the value returned is –999.0 (floating point).

Key Path	**Meas**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. 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**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Ref Value

Allows you to set the absolute power reference by Burst, Multi-slot and Rise & Fall views.

Key Path	**AMPTD Y Scale**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Ref Value (Burst view and Multi-slot view)

Allows you to set the absolute power reference.

Remote Command	`:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:PVT:VIEW:WIND:TRAC:Y:SCAL:RLEV 5 DISP:PVT:VIEW:WIND:TRAC:Y:SCAL:RLEV?
Dependencies/Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets this value manually, Y Auto Scaling automatically changes to Off.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Subopcode: VIEW[1]:WINDow[1]:Burst view RF Envelope window VIEW3:WINDow[1]:Multi-slot view RF Envelope window

Preset	10 dBm|0.00 dBm
State Saved	Saved in instrument state.
Min	–250.0
Max	250.0
Instrument S/W Revision	Prior to A.02.00

Ref Value (Rise & Fall view)

Allows you to set the absolute power reference.

Remote Command	`:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:PVT:VIEW:WIND:TRAC:Y:SCAL:RLEV 5 DISP:PVT:VIEW:WIND:TRAC:Y:SCAL:RLEV?
Dependencies/Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets this value manually, Y Auto Scaling automatically changes to Off.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Subopcode: VIEW2:WINDow[1]:Rising RF Envelope window VIEW2:WINDow2:Falling RF Envelope window
Preset	0.00 dBm
State Saved	Saved in instrument state.
Min	–250.0
Max	250.0
Instrument S/W Revision	Prior to A.02.00

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" on page 969 under the AMPTD Y Scale section for more information.

Key Path	**AMPTD/Y Scale**
Instrument S/W Revision	Prior to A.02.00

Scale/Div

Allows you to enter a numeric value to change the vertical display sensitivity by Burst, Multi-slot and Rise & Fall views.

Key Path	**AMPTD Y Scale**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Scale/Div (Burst view and Multi-slot view)

Allows you to enter a numeric value to change the vertical display sensitivity.

Remote Command	`:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:PVT:VIEW:WIND:TRAC:Y:PDIV 10 DISP:PVT:VIEW:WIND:TRAC:Y:PDIV?
Dependencies/Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets this value manually, Y Auto Scaling automatically changes to Off.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Subopcode: VIEW[1]:WINDow[1]:Burst view RF Envelope window VIEW3:WINDow[1]:Multi-slot view RF Envelope window
Preset	10.00

State Saved	Saved in instrument state.
Min	0.1
Max	20.0
Instrument S/W Revision	Prior to A.02.00

Scale/Div (Rise & Fall view)

Allows you to enter a numeric value to change the vertical display sensitivity.

Remote Command	`:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:PVT:VIEW:WIND:TRAC:Y:PDIV 10 DISP:PVT:VIEW:WIND:TRAC:Y:PDIV?
Dependencies/Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets this value manually, Y Auto Scaling automatically changes to Off.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Subopcode: VIEW2:WINDow[1]:Rising RF Envelope window VIEW2:WINDow2:Falling RF Envelope window
Preset	10.00
State Saved	Saved in instrument state.
Min	0.1
Max	20.0
Instrument S/W Revision	Prior to A.02.00

Presel Center

When this key is pressed, the centering of the preselector filter is adjusted to optimize the amplitude accuracy at the frequency of the selected marker.

See “Presel Center” on page 981 under AMPTD Y Scale for more information.

Key Path	**AMPTD/Y Scale**

Instrument S/W Revision	Prior to A.02.00

Presel Adjust

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

See "Preselector Adjust" on page 982 under AMPTD Y Scale for more information.

Key Path	**AMPTD/Y Scale**
Instrument S/W Revision	Prior to A.02.00

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" on page 984 under the AMPTD Y Scale section for more information.

Key Path	**AMPTD Y Scale**
Instrument S/W Revision	Prior to A.02.00

Ref Position

Allows you to set the display reference position to Top, Center, or Bottom, by Burst, Multi-slot and Rise & Fall views.

Key Path	**AMPTD Y Scale**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Ref Position (Burst view and Multi-slot view)

Allows you to set the display reference position to Top, Center, or Bottom.

Remote Command	`:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:PVT:VIEW:WIND:TRAC:Y:RPOS CENT DISP:PVT:VIEW:WIND:TRAC:Y:RPOS?
Key Path	**AMPTD Y Scale**
Mode	GSM

Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Subopcode: VIEW[1]:WINDow[1]:Burst view RF Envelope window VIEW3:WINDow[1]:Multi-slot view RF Envelope window
Preset	TOP
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Instrument S/W Revision	Prior to A.02.00

Ref Position (Rise & Fall view)

Allows you to set the display reference position to Top, Center, or Bottom.

Remote Command	`:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:PVT:VIEW:WIND:TRAC:Y:RPOS CENT DISP:PVT:VIEW:WIND:TRAC:Y:RPOS?
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Subopcode: VIEW2:WINDow[1]:Rising RF Envelope window VIEW2:WINDow2:Falling RF Envelope window
Preset	TOP
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Instrument S/W Revision	Prior to A.02.00

Auto Scaling

Allows you to toggle the Y-axis auto scaling function between On and Off by Burst, Multi-slot and Rise & Fall views.

Key Path	**AMPTD Y Scale**

Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Auto Scaling (Burst view and Multi-slot view)

Allows you to toggle the Y-axis auto scaling function between On and Off.

Remote Command	`:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:PVT:VIEW:WIND:TRAC:Y:COUP 0 DISP:PVT:VIEW:WIND:TRAC:Y:COUP?
Dependencies/Couplings	When Auto Scaling is On, upon pressing the Restart front-panel key, this function automatically determines the scale per division and reference values based on the measurement results. When user sets a value either "Ref Value" on page 349 or "Ref Position" on page 353 manually, this parameter is set to 'Off' automatically.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Subopcode: VIEW[1]:WINDow[1]:Burst view RF Envelope window VIEW3:WINDow[1]:Multi-slot view RF Envelope window
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Auto Scaling (Rise & Fall view)

Allows you to toggle the Y-axis auto scaling function between On and Off.

Remote Command	`:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:PVT:VIEW:WIND:TRAC:Y:COUP 0 DISP:PVT:VIEW:WIND:TRAC:Y:COUP?

Dependencies/Couplings	When Auto Scaling is On, upon pressing the Restart front-panel key, this function automatically determines the scale per division and reference values based on the measurement results. When user sets a value either “Ref Value” on page 349 or “Ref Position” on page 353 manually, this parameter is set to ‘Off’ automatically.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Subopcode: VIEW2:WINDow[1]:Rising RF Envelope window VIEW2:WINDow2:Falling RF Envelope window
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Auto Couple

Operation of this key is identical across several measurements. For details about this key, see "AUTO COUPLE" on page 987.

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**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Info BW

Sets the information bandwidth. This is the bandwidth used for the power measurement. The bandwidth is ideally wide enough to pass all the power of the bursted signal, while not being so wide that it passes noise, which reduces dynamic range and the accuracy of low level measurements.

This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default may cause invalid measurement results.

Remote Command	`[:SENSe]:PVTime:BANDwidth[:RESolution] <bandwidth>`
	`[:SENSe]:PVTime:BANDwidth[:RESolution]?`
Example	PVT:BAND 1000
	PVT:BAND?
Key Path	**BW**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	510 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	Hardware Dependent:
	No Option = 10 MHz
	Option B25 = 25 MHz
Instrument S/W Revision	Prior to A.02.00

Filter Type

Allows you to select the type of resolution bandwidth filter. Besides the familiar Gaussian filter shape, Flat Top, desirable under certain conditions, is available.

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.

Remote Command	`[:SENSe]:PVTime:BANDwidth[:RESolution]:TYPE FLATtop|GAUSsian` `[:SENSe]:PVTime:BANDwidth[:RESolution]:TYPE?`
Example	PVT:BAND:TYPE GAUS PVT:BAND:TYPE?
Key Path	**BW**
Mode	GSM
Notes	This chooses the type of filter, either Gaussian or Flat (Flattop). Gaussian is the best choice when looking at the overall burst or the rising and falling edges, as it has excellent pulse response. Even though they have a 5.5% wider noise bandwidth for the same –3 dB bandwidth as a flat top filter, that is only 0.23 dB more noise, and their step response is much cleaner and free of overshooting and ringing. If you want to precisely examine just the useful part of the burst, choose Flat. This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default, may cause invalid measurement results. FLATtop – a filter with a flat amplitude response, which provides the best amplitude accuracy. GAUSsian – a filter with Gaussian characteristics, which provides the best pulse response.
Preset	GAUSsian
State Saved	Saved in instrument state.
Range	Gaussian|Flat
Instrument S/W Revision	Prior to A.02.00

Cont (Continuous Measurement/Sweep)

Operation of this key is identical across all measurements. For details about this key, see "Cont (Continuous Measurement/Sweep)" on page 991.

FREQ Channel

Operation of this key is identical across all measurements. For details about this key, see “FREQ/Channel” on page 993.

Input/Output

Operation of this key is identical across all measurements. For details about this key, see “Input/Output” on page 1003.

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Some Marker operations are common across multiple Modes and Measurements. See the section “Marker” on page 1063 for information on common features.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

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

Marker Type

Sets the marker control mode to Normal, Delta or Off. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Remote Command	`:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF` `:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	CALC:PVT:MARK:MODE OFF CALC:PVT:MARK:MODE?
Key Path	**Marker**
Mode	GSM
Notes	If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area. Default Active Function: the active function for the selected marker’s current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X axis value entered in the active function area displays the marker value to its full entered precision. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.

Preset	OFF
State Saved	Saved in instrument state.
Range	Normal|Delta|Off
Instrument S/W Revision	Prior to A.02.00

Marker X Axis Value (Remote Command Only)

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is **Off,** however, it is the SCPI equivalent of entering an X value if the control mode is **Normal** or **Delta**.

Remote Command	`:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <real>` `:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`
Example	CALC:PVT:MARK3:X 0 CALC:PVT:MARK3:X?
Dependencies/Couplings	Max value will be changed by Meas Time parameter value.
Mode	GSM
Notes	If no suffix is sent, uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error “Invalid suffix” is generated. The query returns the marker’s absolute X Axis value if the control mode is **Normal**, or the offset from the marker’s reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: seconds for **Period** and **Time**. If the marker is **Off** the response is not a number. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	After a preset, all markers are turned OFF, so Marker X-Axis Value query returns a not a number (NAN).
State Saved	No
Min	–9.9E37
Max	9.9E37
Instrument S/W Revision	Prior to A.02.00

Marker X Axis Position (Remote Command Only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off,** however, it 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.

Remote Command	`:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <integer>` `:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`
Example	CALC:PVT:MARK10:X:POS 0 CALC:PVT:MARK10:X:POS?
Dependencies/Couplings	Max value will be changed by Sweep/Meas Time parameter value.
Mode	GSM
Notes	The query returns the marker's absolute -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. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	–9.9E37
Max	9.9E37
Instrument S/W Revision	Prior to A.02.00

Marker Y Axis Value (Remote Command Only)

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

The "result" of a marker is the value which is displayed on the second line of the Marker Result block. To properly interpret the returned value, the remote programmer must also know to which 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 on a query, as follows:

Absolute result: every marker has an absolute result and it is simply:

For Normal and Delta markers, the Y-axis value of the trace point the marker is currently on.

The absolute result is displayed in the result block or returned on a query unless the marker control mode is **Delta**.

Relative result: if a marker's control mode is **Delta**, the relative result is displayed in the result block or returned on a query. This is the ratio of the Absolute Result of a delta marker to the Absolute Result of its reference marker. The ratio is expressed in dB.

Remote Command	`:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	CALC:PVT:MARK11:Y?
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Query only command
Preset	0
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Properties

Accesses a menu that allows you to set marker properties and to access the marker trace menu.

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

Select Marker

Displays 12 markers available for selection.

Key Path	**Marker, Properties**
Instrument S/W Revision	Prior to A.02.00

Relative To

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

Remote Command	`:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>` `:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	CALC:PVT:MARK:REF 3 CALC:PVT:MARK:REF?
Key Path	**Marker, Properties**
Mode	GSM

Notes	A marker cannot be relative to itself so that choice is unavilable, and if sent from SCPI generates error –221: “Settings conflict; marker cannot be relative to itself.” You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. When queried, a single value is returned (the specified marker numbers relative marker).
Preset	2|3|4|5|6|7|8|9|10|11|12|1
State Saved	Saved in instrument state.
Min	1
Max	12
Instrument S/W Revision	Prior to A.02.00

Marker Trace

Assigns the specified marker to the designated trace.

Remote Command	`:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe RFENvelope|UMASk|LMASk|MAXRfenvelop|MINRfenvelop` `:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?`
Example	CALC:PVT:MARK:TRAC LMAS CALC:PVT:MARK:TRAC?
Dependencies/Couplings	Max Hold RF Envelop is only available when Max Trace is set to On. Min Hold RF Envelop is only available when Min Hold Trace is set to On. Otherwise, the menu keys are unavailable and the commands are unavailable.
Key Path	**Marker, Properties**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	RFENvelope
State Saved	Saved in instrument state.
Range	RF Envelope|Upper Mask|Lower Mask|Max Hold RF Envelope|Min Hold RF Envelope
Instrument S/W Revision	Prior to A.02.00

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).

This may result in markers going off screen.

Remote Command	`:CALCulate:PVTime:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:PVTime:MARKer:COUPle[:STATe]?`
Example	CALC:PVT:MARK:COUP ON CALC:PVT:MARK:COUP?
Key Path	**Marker**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

All Markers Off

Turns off all markers.

Remote Command	`:CALCulate:PVTime:MARKer:AOFF`
Example	CALC:PVT:MARK:AOFF
Key Path	**Marker**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Instrument S/W Revision	Prior to A.02.00

Marker Function

There is no functionality for this Front-panel key in this measurement. When pressed, this key displays a blank menu.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Marker > (Marker To)

There is no functionality for this Front-panel key in this measurement. When pressed, this key displays a blank menu.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Meas

Operation of this key is identical across all measurements. For details about this key, see "Meas" on page 1069.

Meas Setup

Displays the measurement setup menu for the currently selected measurement.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Avg/Hold Num

Sets the number of bursts that are averaged. After the specified number of bursts (average counts), the averaging mode (termination control) setting determines the averaging action.

Remote Command	`[:SENSe]:PVTime:AVERage:COUNt <integer>`
	`[:SENSe]:PVTime:AVERage:COUNt?`
	`[:SENSe]:PVTime:AVERage[:STATe] OFF|ON|0|1`
	`[:SENSe]:PVTime:AVERage[:STATe]?`
Example	PVT:AVER:COUN 3
	PVT:AVER:COUN?
	PVT:AVER 1
	PVT:AVER?
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10
	OFF
State Saved	Saved in instrument state.
Min	1
Max	10000
Instrument S/W Revision	Prior to A.02.00

Avg Mode

Selects the type of termination control used for the averaging function. This selection only affects the averaging after the number of N averages is reached (set using the Averages, Avg Bursts, or Avg Number key).

Exponential averaging SCPI:EXPonential	When Measure is set at Cont, data acquisitions continue indefinitely. After N averages, exponential averaging is used with a weighting factor of N (the displayed average count stops at N). Exponential averaging weights new data more than old data, which allows tracking of slow-changing signals. The weighting factor N is set using the Averages, Avg Bursts key.
Repeat averaging SCPI:REPeat	When Measure is set at Cont, data acquisitions continue indefinitely. After N averages is reached, all previous result data is cleared and the average count is set back to 1. This is equivalent to being in Measure Single and pressing the Restart key when the Single measurement finishes.

Remote Command	`[:SENSe]:PVTime:AVERage:TCONtrol EXPonential|REPeat` `[:SENSe]:PVTime:AVERage:TCONtrol?`
Example	PVT:AVER:TCON REP PVT:AVER:TCON?
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	EXPonential
State Saved	Saved in instrument state.
Range	Exp|Repeat
Instrument S/W Revision	Prior to A.02.00

Avg Type

Selects the averaging type from the following:

KEY:Pwr Avg (RMS) SCPI:RMS	True power averaging that is equivalent to taking the RMS value of the voltage. It is the most accurate type of averaging.
KEY:Log-Pwr Avg (Video) SCPI:LOG	Simulates the traditional spectrum analyzer type of averaging by averaging the log of the power.
KEY:None SCPI:MAXimum	Keeps track of the maximum values.

KEY:None SCPI:MINimum	Keeps track of the minimum values.
KEY:None SCPI:MXMinimum	Keeps track of the maximum and minimum values.

Remote Command	`[:SENSe]:PVTime:AVERage:TYPE LOG|RMS|MAXimum|MINimum|MXMinimum` `[:SENSe]:PVTime:AVERage:TYPE?`
Example	PVT:AVER:TYPE RMS PVT:AVER:TYPE?
Dependencies/Couplings	Selecting MAXimum|MINimum|MXMinimum forces to visible "Max Hold Trace" on page 400 or|and "Min Hold Trace" on page 400. Measure Trace stays in RMS or Video average state.
Key Path	**Meas Setup**
Mode	GSM
Notes	Maximum|Minimum|Max&Min can be selected only via SCPI. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	RMS
State Saved	Saved in instrument state.
Range	Pwr Avg(RMS)|Log-Pwr Avg(Video)
Instrument S/W Revision	Prior to A.02.00

Meas Time

Allows you to measure more than one timeslot. Enter a value in integer increments of "slots" with a range of 1 to 8. The actual measure time in μs is set somewhat longer than the specified number of slots, in order to view the complete burst.

Remote Command	`[:SENSe]:PVTime:SWEep:TIME <integer>` `[:SENSe]:PVTime:SWEep:TIME?`
Example	PVT:SWE:TIME 4 PVT:SWE:TIME?
Dependencies/Couplings	Scale/Div of X scale of Multi Slot View varies according to this value. Scale/Div should be adjusted to show set meas time.
Key Path	**Meas Setup**
Mode	GSM

Notes	The actual sweep time may be slightly larger than required SweepTime due to limited trace point resolution, this is a hardware dependency. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	1 Slot
State Saved	Saved in instrument state.
Min	1
Max	8
Instrument S/W Revision	Prior to A.02.00

Burst Sync

Pressing the Burst Sync key allows you to choose the source used to synchronize the measurement to the "T0" point of the GSM burst. The "T0" point is defined as the time point of the transition from bit 13 to bit 14 of the midamble training sequence for a given time slot. The Burst Search Threshold setting (in the Mode Setup keys under the Demod menu) applies to both Training Seq and RF Amptd. Pressing the Burst Sync key brings up a menu with some or all of the following choices:

Training Seq (SCPI: TSEQuence)

RF Amptd (SCPI: RFBurst)

None (SCPI: NONE)

Remote Command	`[:SENSe]:PVTime:BSYNc:SOURce TSEQuence|RFBurst|NONE` `[:SENSe]:PVTime:BSYNc:SOURce?`
Example	PVT:BSYN:SOUR NONE PVT:BSYN:SOUR?
Dependencies/Couplings	If the selected Burst Sync is "NONE", the key "Timeslot Length" on page 379 becomes active. Otherwise the key is unavailable.
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	TSEQuence
State Saved	Saved in instrument state.
Range	Training Seq|RF Amptd|None
Instrument S/W Revision	Prior to A.02.00

IF Gain

To take full advantage of the RF dynamic range of the analyzer, a switched IF amplifier with approximately 10 dB of gain is available. When it can be turned on without an overload, the dynamic range is always better with it on than off. The **IF Gain** key can be used to set the IF Gain function to Auto, or to On (the extra 10 dB) or Off. These settings affect sensitivity and IF overloads.

Key Path	**Meas Setup, Advanced,**
Instrument S/W Revision	Prior to A.02.00

IF Gain Auto

Activates the auto rules for IF Gain

Remote Command	`[:SENSe]:PVTime:IF:GAIN:AUTO[:STATe] ON|OFF|1|0` `[:SENSe]:PVTime:IF:GAIN:AUTO[:STATe]?`
Example	PVT:IF:GAIN:AUTO ON PVT:IF:GAIN:AUTO?
Dependencies/Couplings	When either the auto attenuation works (for example, with electrical attenuator), or the optimize mechanical attenuator range is requested, the IF Gain setting is changed as following rule. ‘auto’ sets IF Gain High under any of the following conditions: the input attenuator is set to 0 dB, the preamp is turned on, or the Max Mixer Level is 20 dBm or lower. For other settings, auto sets IF Gain to Low.
Key Path	**Meas Setup, IF Gain**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	Auto|Man
Instrument S/W Revision	Prior to A.02.00

IF Gain State

Selects the range of IF gain.

Remote Command	`[:SENSe]:PVTime:IF:GAIN[:STATe] ON|OFF|1|0` `[:SENSe]:PVTime:IF:GAIN[:STATe]?`
Example	PVT:IF:GAIN ON PVT:IF:GAIN?

Dependencies/Couplings	Couple to “IF Gain Auto” on page 376 force it to Man.
Key Path	**Meas Setup, IF Gain**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. where ON = high gain OFF = low gain
Preset	OFF
State Saved	Saved in instrument state.
Range	Low Gain (Best for Large Signals)|High Gain (Best Noise Level)
Instrument S/W Revision	Prior to A.02.00

Limit Test

Turns on or off limit pass/fail testing that does not affect the limit line display.

Remote Command	`:CALCulate:PVTime:LIMit:TEST[:STATe] OFF|ON|0|1` `:CALCulate:PVTime:LIMit:TEST[:STATe]?`
Example	CALC:PVT:LIM:TEST ON CALC:PVT:LIM:TEST?
Dependencies/Couplings	See Notes
Key Path	**Meas Setup**
Mode	GSM
Notes	This is not the same as the “Limit Mask” on page 410 – the measurement results are checked against the PVT Limit parameter to see if they meet the limit requirements if set to On. If set to Off, PASS/FAIL indicator on the Meas Bar goes blank. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Limit Mask

Allows you to set the Limit Mask type to Standard or Custom.

For custom, see also:

"Lower Mask Absolute Amplitude Levels" on page 380

"Lower Mask Points" on page 380

"Lower Mask Relative Amplitude Levels" on page 381

"Lower Mask Time Points" on page 381

"Upper Mask Absolute Amplitude Levels" on page 382

"Upper Mask Points" on page 383

"Upper Mask Relative Amplitude Levels" on page 383

"Upper Mask Time Points" on page 384

KEYStandard SCPISTANdard	The measurement algorithm uses standard-defined limit mask.
KEYCustom SCPICUSTom	The measurement algorithm uses user-defined custom limit mask.

Remote Command	`[:SENSe]:PVTime:MASK:SELect STANdard|CUSTom` `[:SENSe]:PVTime:MASK:SELect?`
Example	PVT:MASK:SEL STAN PVT:MASK:SEL?
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	STANdard
State Saved	Saved in instrument state.
Range	Std|Custm
Instrument S/W Revision	Prior to A.02.00

Timeslot Length

Allows you to change how the limit mask applies for each slot when in a multi-slot measurement.

KEYAll 156.25 symb SCPIEVEN	The measurement algorithm generates limit mask with the same slot length. All slots have 156.25 symbol
KEY157/156 symb SCPIINTeger	The measurement algorithm generates limit mask for slot 0 and 4 with slot length 157 symbol. And, the algorithm generates limit mask for slot 1, 2, 3, 5, 6, 7 with slot length 156 symbol. Slot 0 here is simply the first slot in the captured data, not the absolute slot determined by training sequence number.

Remote Command	`[:SENSe]:PVTime:BSYNc:SLENgth EVEN|INTeger` `[:SENSe]:PVTime:BSYNc:SLENgth?`
Example	PVT:BSYN:SLEN INT PVT:BSYN:SLEN?
Dependencies/Couplings	This parameter is available only if the "Limit Test" on page 377 type is None. Otherwise grayed out.
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	INTeger
State Saved	Saved in instrument state.
Range	All 156.25 symb | 157/156 symb
Instrument S/W Revision	Prior to A.02.00

Meas Preset

Restores all the measurement parameters to their default values.

Remote Command	`:CONFigure:PVTime`
Example	CONF:PVT
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.

Instrument S/W Revision	Prior to A.02.00

Custom Limit Mask Remote Only Commands

Lower Mask Absolute Amplitude Levels

Allows you to enter a power level for any mask line segment that requires an absolute minimum power limit in addition to its relative limit. Each time a measurement is made, the Ref Level is determined. As the power of the Ref Level changes, all of the relative mask power levels change by the same amount.

Each relative limit is then compared to the Ref Level and an equivalent absolute power level is calculated. This power level is compared to the specified absolute limit for each line segment. If this calculated relative limit is lower than the specified absolute limit, then the value of the absolute limit is used for this segment. Therefore, if the absolute reference limit is set to a very low value, the calculated value of the reference limit will never be lower, and the specified relative limit is always used for the segment.

Every time point you define with PVT:MASK:LOW:TIME must have a power value defined in the same order.

Remote Command:	`[:SENSe]:PVTime:MASK:LIST:LOWer:ABSolute <real>, …` `[:SENSe]:PVTime:MASK:LIST:LOWer:ABSolute?`
Example:	PVT:MASK:LIST:LOW:ABS 0,–10,–60 PVT:MASK:LIST:LOW:ABS?
Notes:	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Dependencies/Couplings:	Relative Amplitude Levels are also changed when this value has been set.
Preset:	–200,–200
State Saved:	Saved in instrument state.
Min:	–200 dBm
Max:	100 dBm
Instrument S/W Revision:	Prior to A.02.00

Lower Mask Points

Queries the number of elements in the lower mask. This value is determined by the number of time points entered by :PVT:MASK:LIST:LOW:TIME.

Remote Command:	`[:SENSe]:PVTime:MASK:LIST:LOWer:POINts?`
Example:	PVT:MASK:LIST:LOW:POIN?
Notes:	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Query only.

Instrument S/W Revision:	Prior to A.02.00

Lower Mask Relative Amplitude Levels

Allows you to enter the relative power level for each horizontal line segment in the lower limit mask. There should be a power level for each time point entered using [:SENSe]:PVTime:MASK:LIST:LOWer:TIME, and they must be entered in the same order. These power levels are all relative to the defined Reference Power Level (the average power in the useful part of the data). When an upper and lower limit mask have been defined, the Reference Power Level is the mid-point between these two limits at time T0.

Any portion of the signal that has no limit line segment defined for it defaults to a very low limit (–100dB relative to the reference power). This prevents the measurement from indicating a failure for that portion of the data.

Remote Command:	`[:SENSe]:PVTime:MASK:LIST:LOWer:RELative <rel_ampl>, …`
	`[:SENSe]:PVTime:MASK:LIST:LOWer:RELative?`
Example:	PVT:MASK:LIST:LOW:REL –200,–200
	PVT:MASK:LIST:LOW:REL?
Notes:	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Dependencies/Couplings:	Absolute Amplitude Levels are also changed when this value has been set.
Preset:	–200,–200
State Saved:	Saved in instrument state.
Min:	–200
Max:	200
Instrument S/W Revision:	Prior to A.02.00

Lower Mask Time Points

Allows you to enter the time points that define the horizontal line segments for the lower limit. A reference point designated “t0” is at the center of the useful data (usually the center of the burst). Each line segment to the right of the t0 reference point is designated as a positive time value, and each segment to the left of t0 reference point is a negative time value.

First enter positive values in sequence starting from t0, then negative values in sequence starting from t0.

Remote Command:	`[:SENSe]:PVTime:MASK:LIST:LOWer:TIME <seconds>, …`
	`[:SENSe]:PVTime:MASK:LIST:LOWer:TIME?`
Example:	PVT:MASK:LIST:LOW:TIME 1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1
	PVT:MASK:LIST:LOW:TIME?

Notes:	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset:	1,–1
State Saved:	Saved in instrument state.
Min:	–1 s
Max:	1 s
Instrument S/W Revision:	Prior to A.02.00

Upper Mask Absolute Amplitude Levels

Allows you to enter a power level for any mask line segment that requires an absolute minimum power limit in addition to its relative limit. Each time a measurement is made, the Ref Level is determined (This is the power level of the useful part of the burst, or midway between the upper/lower masks). Remember, as the power of the Ref Level changes, all of the relative mask power levels change by the same amount.

Each relative limit is then compared to the Ref Level and an equivalent absolute power level is calculated. This power level is compared to the specified absolute limit for each line segment. If this calculated relative limit is higher than the specified absolute limit, then the value of the absolute limit is used for this segment. Therefore, if the absolute reference limit is set to a very low value (–200 dBm), the calculated value of the reference limit will never be lower, and the specified relative limit is always used for the segment.

Every time point you define with PVT:MASK:UPP:TIME must have a power value defined in the same order.

Remote Command:	`[:SENSe]:PVTime:MASK:LIST:UPPer:ABSolute <real>, …`
	`[:SENSe]:PVTime:MASK:LIST:UPPer:ABSolute?`
Example:	PVT:MASK:LIST:UPP:ABS –200,–200,–58,–200,–200,–200,–200,–58,–200
	PVT:MASK:LIST:UPP:ABS?
Notes:	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Dependencies/Couplings:	Relative Amplitude Levels are also changed when this value has been set.
Preset:	–200,–200
State Saved:	Saved in instrument state.
Min:	–200 dBm
Max:	100 dBm
Instrument S/W Revision:	Prior to A.02.00

Upper Mask Points

Queries the number of elements in the upper mask. This value is determined by the number of time points entered by :PVT:MASK:LIST:UPP:TIME.

Remote Command:	`[:SENSe]:PVTime:MASK:LIST:UPPer:POINts?`
Example:	PVT:MASK:LIST:UPP:POIN?
Notes:	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	Query only.
Instrument S/W Revision:	Prior to A.02.00

Upper Mask Relative Amplitude Levels

Allows you to enter the relative power level for each horizontal line segment in the upper limit mask. There should be a power level for each time point entered using [:SENSe]:PVTime:MASK:LIST:UPPer:TIME, and they must be entered in the same order. These power levels are all relative to the defined Reference Power Level (the average power in the useful part of the data). When an upper and lower limit mask have been defined, the Reference Power Level is the mid-point between these two limits.

Remote Command:	`[:SENSe]:PVTime:MASK:LIST:UPPer:RELative <rel_ampl>, …`
	`[:SENSe]:PVTime:MASK:LIST:UPPer:RELative?`
Example:	PVT:MASK:LIST:UPP:REL 4,–32,–48,100,4,7,–25,–43,100
	PVT:MASK:LIST:UPP:REL?
Notes:	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Dependencies/Couplings:	Absolute Amplitude Levels are also changed when this value has been set.
Preset:	100,100
State Saved:	Saved in instrument state.
Min:	–200 dB
Max:	200 dB
Instrument S/W Revision:	Prior to A.02.00

Upper Mask Time Points

Allows you to enter the time points that define the horizontal line segments for the upper limit. A reference point designated “t0” is at the center of the useful data (usually the center of the burst). Each line segment to the right of the t0 reference point is designated as a positive time value and each segment to the left of t0 is a negative time value.

First enter positive values in sequence starting from t0, then the negative values in sequence starting from t0.

We recommend that you select a large time value for your first and last mask points (e.g. –1 and +1 second). This guarantees that you’ve defined a limit for all the measured data.

Remote Command:	`[:SENSe]:PVTime:MASK:LIST:UPPer:TIME <seconds>, …`
	`[:SENSe]:PVTime:MASK:LIST:UPPer:TIME?`
Example:	PVT:MASK:LIST:UPP:TIME 1,–1
	PVT:MASK:LIST:UPP:TIME?
Notes:	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset:	1,–1
State Saved:	Saved in instrument state.
Min:	–1 s
Max:	1 s
Instrument S/W Revision:	Prior to A.02.00

Mode

Operation of this key is identical across all measurements. For details about this key, see “Mode” on page 1087.

Mode Setup

Operation of this key is identical across all measurements. For details about this key, see "Mode Setup" on page 1101.

Peak Search

There is no functionality for this Front-panel key in this measurement. When pressed, this key displays a blank menu.

Remote Command	`:CALCulate:PVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	CALC:TXP:MARK2:MAX
Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Recall

Operation of this key is identical across several measurements. For details of this key, see “Recall” on page 1123

Restart

Operation of this key is identical across all measurements. For details about this key, see “Restart” on page 1145.

Save

Operation of this key is identical across several measurements. For details of this key, see "Save" on page 1147

Single

Operation of this key is identical across several measurements. For details about this key, see "Single (Single Measurement/Sweep)" on page 1173.

Source

Operation of this key is identical across several measurements. For details about this key, see "Source" on page 1175.

SPAN X Scale

Accesses a menu of functions that enable you to set the horizontal scale parameters

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Ref Value

Allows you to set the display X reference value in the Burst, Multi-slot, and Rise & Fall views.

Key Path	**SPAN X Scale**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Ref Value (Burst view and Multi-slot view)

Allows you to set the display X reference value.

Remote Command	`:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:RLEVel <time>` `:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:PVT:VIEW:WIND:TRAC:X:RLEV 1 DISP:PVT:VIEW:WIND:TRAC:X:RLEV?
Dependencies/Couplings	If the “Auto Scaling” on page 397 is On, this value is automatically determined by the measurement result. When you set a value manually, “Auto Scaling” on page 397 automatically changes to Off.
Key Path	**SPAN X Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	–65 us |–67 us
State Saved	Saved in instrument state.
Min	–1.00 s
Max	1.00 s
Instrument S/W Revision	Prior to A.02.00

Ref Value (Rise & Fall view)

Allows you to set the display X reference value.

Remote Command	`:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:RLEVel <time>` `:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:PVT:VIEW2:WIND2:TRAC:X:RLEV 1 DISP:PVT:VIEW2:WIND2:TRAC:X:RLEV?
Dependencies/Couplings	If the "Auto Scaling" on page 397 is On, this value is automatically determined by the measurement result. When you set a value manually, "Auto Scaling" on page 397 automatically changes to Off.
Key Path	**SPAN X Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0 s |542.8 us
State Saved	Saved in instrument state.
Min	–1.00 s
Max	1.00 s
Instrument S/W Revision	Prior to A.02.00

Scale/Div

Allows you to set the display X scale/division value in the Burst, Multi-slot, and Rise & Fall views.

Key Path	**SPAN X Scale**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Scale/Div (Burst view and Multi-slot view)

Allows you to set the display X scale/division value.

Remote Command	`:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:PDIVision <time>` `:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:PVT:VIEW:WIND:TRAC:X:PDIV 1ms DISP:PVT:VIEW:WIND:TRAC:X:PDIV?

Dependencies/Couplings	If the "Auto Scaling" on page 397 is On, this value is automatically determined by the measurement result. When you set a value manually, "Auto Scaling" on page 397 automatically changes to Off.
Key Path	**Span X Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	70.00us|84.00us
State Saved	Saved in instrument state.
Min	1.00 ns
Max	1.00 s
Instrument S/W Revision	Prior to A.02.00

Scale/Div (Rise & Fall view)

Allows you to set the display X scale/division value.

Remote Command	`:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:PDIVision <time>` `:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:PVT:VIEW2:WIND2:TRAC:X:PDIV 1ms DISP:PVT:VIEW2:WIND2:TRAC:X:PDIV?
Dependencies/Couplings	If the "Auto Scaling" on page 397 is On, this value is automatically determined by the measurement result. When you set a value manually, "Auto Scaling" on page 397 automatically changes to Off.
Key Path	**Span X Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10.00us|10.00 us
State Saved	Saved in instrument state.
Min	1.00 ns
Max	1.00 s
Instrument S/W Revision	Prior to A.02.00

Ref Position

Allows you to set the display reference position to Left, Center or Right for Burst, Multi-slot, and Rise & Fall views.

Key Path	**SPAN X Scale**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Ref Position (Burst view and Multi-slot view)

Allows you to set the display reference position to Left, Center or Right.

Remote Command	`:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:PVT:VIEW:WIND:TRAC:X:RPOS LEFT DISP:PVT:VIEW:WIND:TRAC:X:RPOS?
Key Path	**SPAN X Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	LEFT|LEFT
State Saved	Saved in instrument state.
Range	Left|Ctr|Right
Instrument S/W Revision	Prior to A.02.00

Ref Position (Rise & Fall view)

Allows you to set the display reference position to Left, Center or Right.

Remote Command	`:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:PVT:VIEW2:WIND2:TRAC:X:RPOS LEFT DISP:PVT:VIEW2:WIND2:TRAC:X:RPOS?
Key Path	**SPAN X Scale**
Mode	GSM

Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	CENTer|CENTer
State Saved	Saved in instrument state.
Range	Left|Ctr|Right
Instrument S/W Revision	Prior to A.02.00

Auto Scaling

Allows you to toggle the scale coupling function between On and Off in Burst, Multi-slot and Rise & Fall views.

Key Path	**SPAN X Scale**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Auto Scaling (Burst view and Multi-slot view)

Allows you to toggle the scale coupling function between On and Off.

Remote Command	`:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:PVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:COUPle?`
Example	DISP:PVT:VIEW:WIND:TRAC:X:COUP OFF DISP:PVT:VIEW:WIND:TRAC:X:COUP?
Dependencies/Couplings	See Notes
Key Path	**Span X Scale**
Mode	GSM
Notes	Upon pressing the Restart front-panel key the scale coupling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either “Ref Value” on page 393 or “Scale/Div” on page 394 manually, X Auto Scaling automatically changes to Off. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off

Instrument S/W Revision	Prior to A.02.00

Auto Scaling (Rise & Fall view)

Allows you to toggle the scale coupling function between On and Off.

Remote Command	`:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:PVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:COUPle?`
Example	DISP:PVT:VIEW2:WIND2:TRAC:X:COUP OFF DISP:PVT:VIEW2:WIND2:TRAC:X:COUP?
Dependencies/Couplings	See Notes
Key Path	**Span X Scale**
Mode	GSM
Notes	Upon pressing the Restart front-panel key, the scale coupling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either “Ref Value” on page 393 or “Scale/Div” on page 394 manually, X Auto Scaling automatically changes to Off. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Sweep/Control

Operation of this key is identical across several measurements. For details about this key, see "Sweep / Control" on page 1179.

Trace/Detector

Accesses a menu that enables you to hide or show Max Hold Trace and Min Hold Trace.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Max Hold Trace

This key allows the user to hide or show Max Hold Trace.

Remote Command	`:DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATe] ON|OFF|1|0` `:DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATe]?`
Example	DISP:PVT:VIEW:WIND:TRAC:MAXH ON DISP:PVT:VIEW:WIND:TRAC:MAXH?
Dependencies/Couplings	Selecting [:SENSe]:PVTime:AVERage:TYPE MAXimum|MXMinimum forces this parameter to ON.
Key Path	**Trace/Detector**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Min Hold Trace

This key allows the user to hide or show Min Hold Trace.

Remote Command	`:DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATe] ON|OFF|1|0` `:DISPlay:PVTime:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATe]?`

Example	DISP:PVT:VIEW:WIND:TRAC:MINH ON DISP:PVT:VIEW:WIND:TRAC:MINH?
Dependencies/Couplings	Selecting [:SENSe]:PVTime:AVERage:TYPE MINimum|MXMinimum forces this parameter to ON.
Key Path	**Trace/Detector**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Trigger

Accesses a menu functions that enable you to select and control the trigger source for the current measurement. See “Trigger” on page 1197 for more information.

View/Display

Accesses a menu of functions that enable you to:

- Set the display parameters for the current measurement
- Select the View
- Set the Limit Mask On or Off

See the section "View/Display" on page 1253 for general information about this menu.

View Selections

For details of Remote Commands associated with the measurement's views, see the following sections:

"View Selection by name" on page 404

"View Selection by number (Remote Command Only)" on page 404

Key Path	View/Display
Mode	GSM
Preset	ALL
State Saved	Saved in instrument state.
Range	Burst|Rise & Fall|Multi-Slot
Instrument S/W Revision	Prior to A.02.00

The **View/Display** menu includes three View Selection keys as shown below, which allow you to select the desired view of the measurement.

View	Name	Description
1	Burst (SCPI: ALL)	Views the entire burst of interest as determined by the current trigger source, burst sync, training sequence, and timeslot settings. To view a different burst of interest you must set these parameters for the selected timeslot. To view multiple slots, use the **Multi-Slot** view described below. For full details, see the section "Burst View" on page 405.
2	Rise & Fall (SCPI: BOTH)	Zooms in on the rising and falling portions of the burst being tested. For full details, see the section "Rise & Fall View" on page 408.
3	Multi-Slot (SCPI: MSLot)	Views the entire sweep as specified by the current Meas Time setting. Power levels for each active slot are listed in a table below the timeslot display. Also shown in the table, under 1st Error Pt, is the point in time at which the signal level first exceeds the limit; to help identify the slot where a failure first occurs. For full details, see the section "Multi-Slot View" on page 409.

View Selection by name

Remote Command	`:DISPlay:PVTime:VIEW[:SELect] ALL|BOTH|MSLot`
	`:DISPlay:PVTime:VIEW[:SELect]?`
Example	DISP:PVT:VIEW:SEL ALL
	DISP:PVT:VIEW:SEL?
Key Path	**View/Display**
Mode	GSM
Preset	ALL
State Saved	Saved in instrument state.
Range	Burst|Rise & Fall|Multi-Slot
Instrument S/W Revision	Prior to A.02.00

View Selection by number (Remote Command Only)

Remote Command	`:DISPlay:PVTime:VIEW:NSELect <integer>`
	`:DISPlay:PVTime:VIEW:NSELect?`
Example	DISP:PVT:VIEW:NSEL 3
	DISP:PVT:VIEW:NSEL?
Mode	GSM
Notes	1: Burst
	2: Rise & Fall
	3: Multi-Slot
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	3
Instrument S/W Revision	Prior to A.02.00

Display

Accesses a menu of functions that enable you to set the display parameters for the current measurement.

See the section “Display” on page 1253 for more information.

Key Path	**View/Display**

Instrument S/W Revision	Prior to A.02.00

Burst View

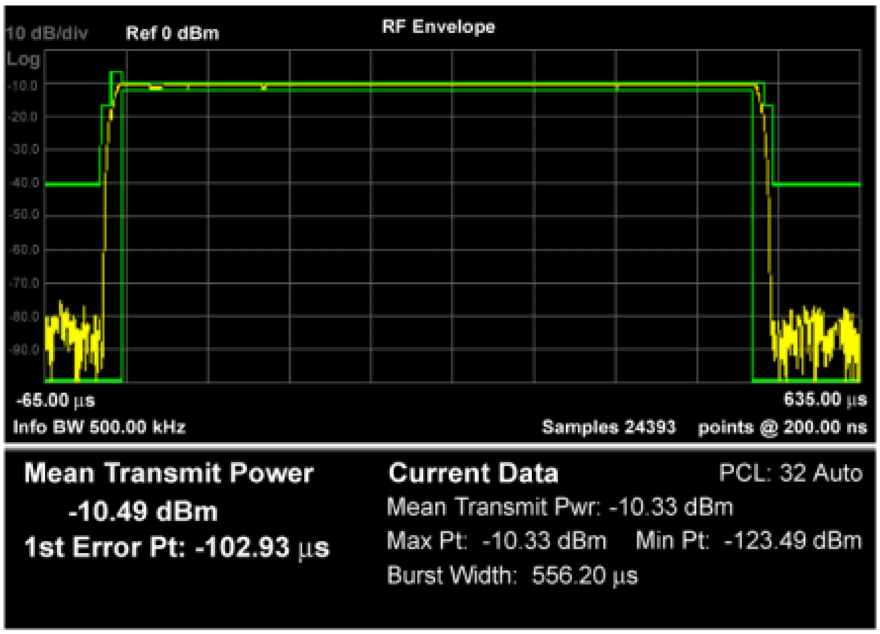
This view shows power vs. time and mask result for a GMSK-modulated burst. The view has two windows:

“RF Envelope Window” on page 405

“Numeric Results Window” on page 407

For the associated Remote Commands, see the subtopics under “View/Display” on page 403.

The figure below shows an example of the Burst View.



RF Envelope Window

Shows the trace and mask lines.

The following tables provide details of the traces and masks.

Measured Trace

Marker Trace	Yes
Corresponding Trace	n=7
Color	Yellow

Max Hold Trace

Marker Trace	Yes

Corresponding Trace	n=8
Color	Water Blue

Min Hold Trace

Marker Trace	Yes
Corresponding Trace	n=9
Color	Magenta

Upper Mask

Marker Trace	Yes
Corresponding Trace	n=3
Color	Green

Lower Mask

Marker Trace	Yes
Corresponding Trace	n=4
Color	Green

Numeric Results Window

Name	Corresponding Trace	Description	Display Format
Mean Transmit Power	n=1, 3rd	The power of N averaged bursts, if averaging is on. The power is averaged across the useful part of the burst. If there are multiple bursts in the acquired trace, only one burst is used for average. This means that N traces are acquired to make the complete average. If “Avg/Hold Num” on page 372 is off or the number is 1, this number is the power averaged across the useful part of the most recently acquired data.	##.## dBm
Mean Transmit Power (Current Data)	n=1, 2nd	The power averaged across the useful part of the most recently acquired data. If “Avg/Hold Num” on page 372 is off or the number is 1, disappear from the window since the number is identical to the Mean Transmit Power above.	##.## dBm
Max Pt (Current Data)	n=1, 9th	The maximum value of the most recently acquired data.	##.## dBm
Min Pt (Current Data)	n=1, 10th	The minimum value of the most recently acquired data.	##.## dBm
Burst Width	n=1, 8th	The width of the burst measured at –3dB below the mean power in the useful part of the burst.	###.## µs
1st Error Pt	n=1, 13th	The time 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, disappear from the window.	##.## µs
PCL	None	Power Control Level determined by the Mean Transmit Power and used to determine the limit mask. Auto disappears when [:SENSe]:RADio:PCL:STATe is set to 0|Off.	PCL: ## Auto

Key Path	**View/Display**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

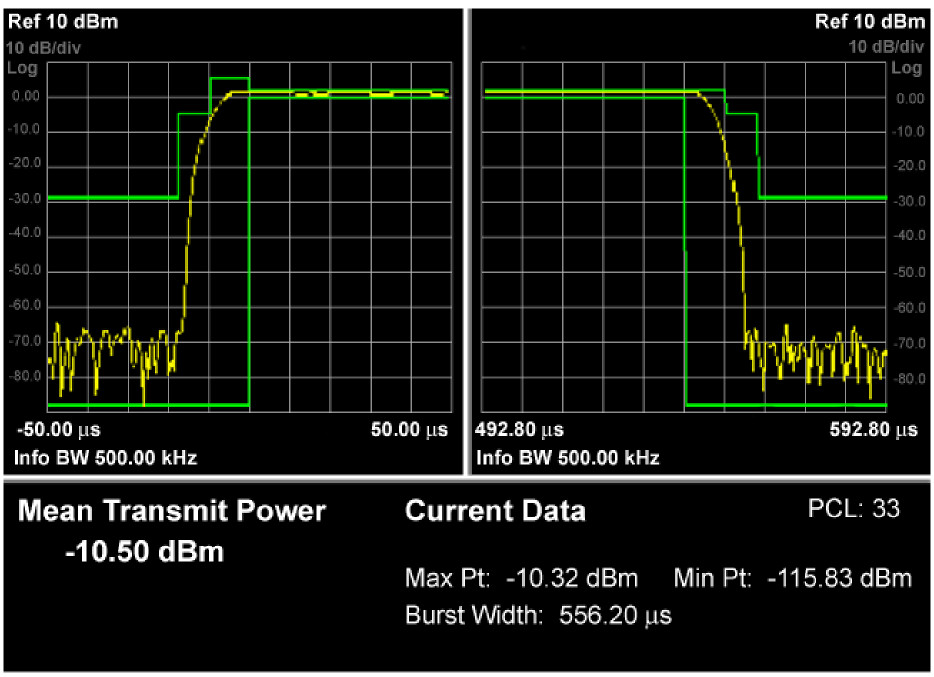
Rise & Fall View

This view has three windows:

Rising RF Envelope Window.	The parameters of this window are identical to those of the RF Window in the "Burst View" on page 405.
Falling RF Envelope Window.	The parameters of this window are identical to those of the RF Window in the "Burst View" on page 405.
Numeric Results Window.	The parameters of this window are identical to those of the Numeric Results Window in the "Burst View" on page 405.

For the associated Remote Commands, see the subtopics under "View/Display" on page 403.

The figure below shows an example of the Rise & Fall View.



Key Path	**View/Display**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Multi-Slot View

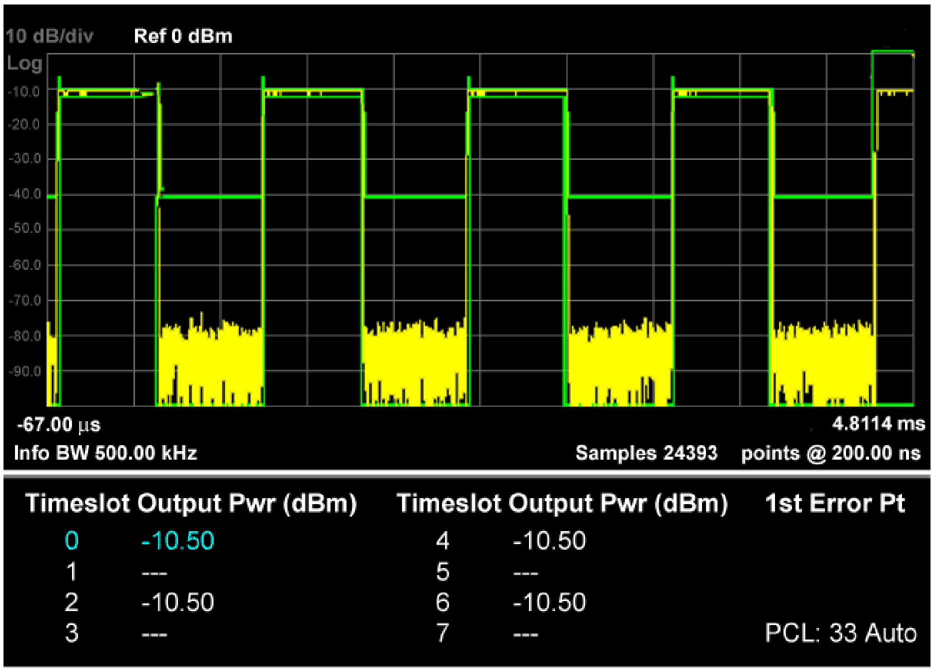
This view has two windows:

"RF Envelope Window" on page 409

"Numeric Results Window" on page 409

For the associated Remote Commands, see the subtopics under "View/Display" on page 403.

The figure below shows an example of the Multi-Slot View.



RF Envelope Window

The parameters of this window are identical to those of the RF Window in the "Burst View" on page 405.

Numeric Results Window

The output power of multi slots whose number is defined by Meas Time.

Name	Corresponding Trace	Description	Display Format
1st Error Pt	None	The time 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, disappear from the window.	##.## µs
Timeslot Output Pwr	n=7	Power level values for each slot in the current frame	##.## dBm

PCL	None	Power Control Level that determined by the Mean Transmit Power and used to determine the limit mask. Auto disappears when [:SENSe]:RADio:PCL:STATe is set to 0|Off.	PCL: ## Auto

Key Path	**View/Display**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Limit Mask

This setting is used to show (On) or hide (off) the limit mask that is displayed on the graticule.

NOTE	This does not affect any calculation taking place.

Remote Command	`:DISPlay:PVTime:LIMit:MASK OFF|ON|0|1` `:DISPlay:PVTime:LIMit:MASK?`
Example	DISP:PVT:LIM:MASK 1 DISP:PVT:LIM:MASK?
Key Path	**View/Display**
Mode	GSM
Notes	This parameter only hides or shows the limit mask line on the display. PASS/FAIL limit check will be done if “Limit Test” on page 377 is set to On whether Limit Mask state is set to On or Off. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

8 GMSK Phase and Frequency Measurement

Phase and frequency error are the measures of modulation quality for GSM systems. Since GSM systems use relative phase to transmit information, the phase and frequency accuracy of the transmitter are critical to the systems' performance and ultimately affect range.

This topic contains the following sections:

Measurement Commands for GMSK Phase & Frequency

The following commands are used to retrieve the measurement results:

`:CONFigure:PFERror`

`:CONFigure:PFERror:NDEFault`

`:INITiate:PFERror`

`:FETCh:PFERror[n]?`

`:READ:PFERror[n]?`

`:MEASure:PFERror[n]?`

For more measurement related commands, see the section "Remote Measurement Functions" on page 1069.

Remote Command Results for GMSK Phase & Frequency

n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.

n	Results Returned
not specified or n = 1	Returns the following scalar results: The result depends on the Average Type setting (Maximum or Mean) if the average state is ON. The average type is a remote command only parameter. Average type is: Maximum (default setting) : Detected Maximum value in average cycle Mean : Averaged value in average cycle 1. RMS Phase Error is a floating point number (in degrees) of the rms phase error between the measured phase and the ideal phase. The calculation is based on symbol decision points and points halfway between symbol decision points (i.e. 2 points/symbol). 2. Peak Phase Error is a floating point number (in degrees) of the peak phase error of all the individual symbol decision points (prior to the rms averaging process). 3. Peak Phase Error Symbol Position is a floating point number (in symbols) representing the symbol number at which the peak phase error occurred. 4. Frequency Error is a floating point number (in Hz) of the frequency error in the measured signal. This is the difference between the measured phase trajectory and the reference phase trajectory. 5. I/Q Origin Offset is a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin. 6. Trace Phase Sample is a floating point number (in units of bits) representing the time between samples. It is used in querying phase error vector traces. 7. Trace bit 0 Decision Offset is an integer number in units of sample pairs for the sample points in an I/Q vector trace that represents the bit 0 (zero) decision point. The sample pairs in the trace are numbered 0 to N. 8. Trace Sync Start is an integer number in units of bits for the bit number, within the data bits trace, that represents the start of the sync word. 9. Trace Time Sample is a floating point number (in second) of the time between samples. It is used in querying time domain traces. For the n=0 trace, of acquired I/Q pairs, this is the time between pairs. 10. T0 Offset is a floating-point number of the time interval between the trigger point to T0. T0 means the transition time from symbol 13 to symbol 14 of the midamble training sequence for each time slot. Unit is sec.
2	Returns a series of floating point numbers (in degrees) that represent each sample in the phase error trace. The first number is the symbol 0 decision point and there are 10 points per symbol. Therefore, decision points are at 0, 10, 20, etc.

n	Results Returned
3	Returns a series of floating point numbers (in degrees) that represent each sample in the phase error with frequency trace. Phase error with frequency is the error vector between the measured phase (that has not had frequency compensation) and the ideal reference phase. The calculation is based on symbol decision points and points halfway between symbol decision points (i.e. 2 points/symbol). The first number is the symbol 0 decision point and there are 10 points per symbol. Therefore, decision points are at 0, 10, 20, etc.
4	Returns a series of floating point numbers that represent each sample in the log magnitude trace of the original time record. Each number represents a value (in dBm) of the time record.
5	Returns a series of floating point numbers that alternately represent I and Q pairs of the corrected measured trace. The magnitude of each I and Q pair are normalized to 1.0. The first number is the in-phase (I) sample of symbol 0 decision point and the second is the quadrature-phase (Q) sample of symbol 0 decision point. As in the rms phase error, there are ten points per symbol, so that: 1st number = I of the symbol 0 decision point 2nd number = Q of the symbol 0 decision point … 10th number = Q of the symbol 0 decision point 11th number = I of the symbol 1 decision point 12th number = Q of the symbol 1 decision point … Nth number = Q of the symbol N decision point
6	Returns a series of logical values (0 or 1) that represent the demodulated bit value of the measured waveform. The first number is the symbol 0 decision point and there are 1 point per symbol. Therefore, decision points are at 0, 1, 2, etc.
7	Returns comma-separated scalar values of pass/fail (0.0 = passed, 1.0 = failed) results determined by testing Phase and Frequency Error. The tested results are changed between Maximum and Average. It depends on the Average Type (:PFER:AVER:TYPE) setting. 1. Test results of RMS Phase Error 2. Test results of Peak Phase Error 3. Test results of Frequency Error

n **Results Returned**

8 Returns the following scalar results:

1. Average RMS Phase Error is a floating point number (in degrees) of the rms phase error between the measured phase and the ideal phase. The calculation is based on symbol decision points and points halfway between symbol decision points (i.e. 2 points/symbol). If averaging is ON, this is the average of the individual rms phase error.
2. Maximum RMS Phase Error is a floating point number (in degrees) of the rms phase error between the measured phase and the ideal phase. The calculation is based on symbol decision points and points halfway between symbol decision points (i.e. 2 points/symbol). If averaging is ON, this is the max hold number of the individual rms phase error.
3. Average Peak Phase Error is a floating point number (in degrees) of the peak phase error of all the individual symbol decision points (prior to the rms averaging process). If averaging is ON, this is the average of the individual peak phase error.
4. Maximum Peak Phase Error is a floating point number (in degrees) of the peak phase error of all the individual symbol decision points (prior to the rms averaging process). If averaging is ON, this is the max hold number of the individual peak phase error.
5. Average Peak Phase Error Symbol Position is a floating point number (in symbols) representing the symbol number at which the peak phase error occurred. If averaging is ON, keeps the position that has the worst phase error.
6. Maximum Peak Phase Error Symbol Position is a floating point number (in symbols) representing the symbol number at which the peak phase error occurred. If averaging is ON, keeps the position that has the worst maximum peak phase error.
7. Average Frequency Error is a floating point number (in Hz) of the frequency error in the measured signal. This is the difference between the measured phase trajectory and the reference phase trajectory. If averaging is ON, this is the average of the individual frequency error.
8. Maximum Frequency Error is a floating point number (in Hz) of the frequency error in the measured signal. This is the difference between the measured phase trajectory and the reference phase trajectory. If averaging is ON, this is the max hold number of the individual frequency error.
9. Average I/Q Origin Offset is a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin. If averaging is ON, this is the average of the individual IQ Offset.
10. Maximum I/Q Origin Offset is a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin. If averaging is ON, this is the max hold number of the individual IQ Offset
11. Average T0 Offset is a floating-point number of the time interval between the trigger point to T0. T0 means the transition time from symbol 13 to symbol 14 of the midamble training sequence for each time slot. Unit is sec. If averaging is ON, this is the average of the T0 offset.

n	Results Returned
n=8 (Cont.)	12. Maximum T0 Offset is a floating-point number of the time interval between the trigger point to T0. T0 means the transition time from symbol 13 to symbol 14 of the midamble training sequence for each time slot. Unit is sec. If averaging is ON, this is the max hold number of the T0 offset. 13. Trace Phase Sample is a floating point number (in units of bits) representing the time between samples. It is used in querying phase error vector traces. 14. Trace bit 0 Decision Offset is an integer number in units of sample pairs for the sample points in an I/Q vector trace that represents the bit 0 (zero) decision point. The sample pairs in the trace are numbered 0 to N. 15. Trace Sync Start is an integer number in units of bits for the bit number, within the data bits trace, that represents the start of the sync word. 16. Trace Time Sample is a floating point number (in second) of the time between samples. It is used in querying time domain traces. For the n=0 trace, of acquired I/Q pairs, this is the time between pairs. 17. Detected TSC is the most recently detected TSC. The returned value is 0~7 (Burst Type : Normal), 10 (Burst Type : Sync), 20 (Burst Type : Access) if TSC detected. If TSC (Normal), Extended Training Sequence Bits (Sync) or Synch. Sequence Bits (Access) not detected, the returned value is –999.0. If Amptd or NONE (Power vs Time only) specified in Sync Type, the returned value is –999.0. In multi slot condition, the returned value is the detected TSC of the specified slot (Time Slot ON) or the first evaluated slot (Time Slot OFF). 18. Reserved for future use – the value returned is –999.0 (floating point). 19. Reserved for future use – the value returned is –999.0 (floating point). 20. Reserved for future use – the value returned is –999.0 (floating point). 21. Reserved for future use – the value returned is –999.0 (floating point). 22. Reserved for future use – the value returned is –999.0 (floating point).

Key Path	**Meas**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. 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**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Ref Value

Allows you to set the reference value, using absolute degree (Phase Error and Phase Error w/Freq) or absolute power (RF Envelope).

See also:

"Ref Value (Phase Error and Phase Error w/Freq window)" on page 416

"Ref Value (RF Envelope window)" on page 417

Key Path	**AMPTD Y Scale**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Ref Value (Phase Error and Phase Error w/Freq window)

Allows you to set the absolute degree reference.

Remote Command	`:DISPlay:PFERror:VIEW[1]:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:PFERror:VIEW[1]:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:PFER:VIEW:WIND:TRAC:Y:RLEV 5 DISP:PFER:VIEW:WIND:TRAC:Y:RLEV?
Dependencies/Couplings	When "Auto Scaling" on page 421 is On, this value is automatically determined by the measurement result. When the user sets this value manually, Auto Scaling automatically changes to Off.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.

Preset	0.00
State Saved	Saved in instrument state.
Min	–36000.0
Max	36000.0
Instrument S/W Revision	Prior to A.02.00

Ref Value (RF Envelope window)

Allows you to set the absolute power reference.

Remote Command	`:DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:Y[:SCALe]:RLEVel ?`
Example	DISP:PFER:VIEW:WIND3:TRAC:Y:RLEV 4 DISP:PFER:VIEW:WIND3:TRAC:Y:RLEV?
Dependencies/Couplings	When "Auto Scaling" on page 421 is On, this value is automatically determined by the measurement result. When the user sets this value manually, Auto Scaling automatically changes to Off.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.00
State Saved	Saved in instrument state.
Min	–250.0
Max	250.0
Instrument S/W Revision	Prior to A.02.00

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" on page 969 under AMPTD Y Scale for more information.

This key is only available when the selected input is RF.

Key Path	**AMPTD/Y Scale**

Instrument S/W Revision	Prior to A.02.00

Range

Accesses the Range menu to change baseband I/Q gain settings. This key has a readback text that describes gain range value. For details, see "Range" on page 976.

This key is only available when the selected input is IQ.

Key Path	**AMPTD/Y Scale**
Instrument S/W Revision	Prior to A.02.00

Scale/Div

Sets the Y scale per division on the display, using absolute degree (Phase Error and Phase Error w/Freq) or absolute power (RF Envelope).

See also:

"Scale/Div (Phase Error and Phase Error w/Freq window)" on page 418

"Scale/Division (RF Envelope window)" on page 419

Key Path	**AMPTD Y Scale**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Scale/Div (Phase Error and Phase Error w/Freq window)

Allows you to enter a numeric value to change the vertical display sensitivity.

Remote Command	`:DISPlay:PFERror:VIEW[1]:WINDow[1]|2:TRACe:Y[:SCALe]:PDIVision <real>` `:DISPlay:PFERror:VIEW[1]:WINDow[1]|2:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:PFER:VIEW:WIND:TRAC:Y:PDIV 10 DISP:PFER:VIEW:WIND:TRAC:Y:PDIV?
Dependencies/Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets this value manually, Y Auto Scaling automatically changes to Off.
Key Path	**AMPTD Y Scale**
Mode	GSM

Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	5.00
State Saved	Saved in instrument state.
Min	0.01
Max	360
Instrument S/W Revision	Prior to A.02.00

Scale/Division (RF Envelope window)

Allows you to enter a numeric value to change the vertical display sensitivity.

Remote Command	`:DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:PFER:VIEW:WIND3:TRAC:Y:SCAL:PDIV 10 DISP:PFER:VIEW:WIND3:TRAC:Y:SCAL:PDIV?
Dependencies/Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets this value manually, Y Auto Scaling automatically changes to Off.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10.00
State Saved	Saved in instrument state.
Min	0.1
Max	20.0
Instrument S/W Revision	Prior to A.02.00

Presel Center

When this key is pressed, the centering of the preselector filter is adjusted to optimize the amplitude accuracy at the frequency of the selected marker.

See “Presel Center” on page 981 under the AMPTD Y Scale section for more information.

This key is only available when the selected input is RF.

Key Path	**AMPTD/Y Scale**
Instrument S/W Revision	Prior to A.02.00

Presel Adjust

Allows you to manually adjust the preselector filter frequency to optimize its response to the signal of interest. This function is only available when Presel Center is available and the selected input is RF. See “Preselector Adjust” on page 982 under the AMPTD Y Scale section for more information.

Key Path	**AMPTD/Y Scale**
Instrument S/W Revision	Prior to A.02.00

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” on page 984 under AMPTD Y Scale for more information.

This is only available when the selected input is RF.

Key Path	**AMPTD/Y Scale**
Instrument S/W Revision	Prior to A.02.00

Ref Position

Allows you to set the reference position.

Remote Command	`:DISPlay:PFERror:VIEW[1]:WINDow[1]|2|3:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom`
	`:DISPlay:PFERror:VIEW[1]:WINDow[1]|2:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:PFER:VIEW:WIND:TRAC:Y:RPOS TOP
	DISP:PFER:VIEW:WIND:TRAC:Y:RPOS?
Key Path	**AMPTD Y Scale**
Mode	GSM

Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	CENT|CENT|TOP
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Instrument S/W Revision	Prior to A.02.00

Auto Scaling

Allows you to toggle the auto scaling function between On and Off.

Remote Command	`:DISPlay:PFERror:VIEW[1]:WINDow[1]2|3:TRACe:Y[:SCALe]:COUPle ON|OFF|1|0` `:DISPlay:PFERror:VIEW[1]:WINDow[1]2|3:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:PFER:VIEW:WIND:TRAC:Y:COUP ON DISP:PFER:VIEW:WIND:TRAC:Y:COUP?
Dependencies/Couplings	When Auto Scaling is On, upon pressing the Restart front-panel key, this function automatically determines the scale per division and reference values based on the measurement results. When you set either "Ref Value" on page 416 or "Presel Center" on page 420 manually, this parameter is set to 'Off' automatically.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Auto Couple

Operation of this key is identical across several measurements. For details about this key, see "AUTO COUPLE" on page 987.

BW

There is no functionality for this front-panel key in this measurement. When pressed, this key displays a blank menu.

Key Path	**Front-panel key**
Mode	GSM

Cont (Continuous Measurement/Sweep)

Operation of this key is identical across all measurements. For details about this key, see "Input/Output" on page 1003.

FREQ Channel

Operation of this key is identical across all measurements. For details about this key, see "FREQ/Channel" on page 993.

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Some Marker operation is common across multiple Modes and Measurements. See the section “Marker” on page 1063 for information on features that are common.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

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

Marker Type

Sets the marker control mode **Normal**, **Delta** and **Off**. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

See also:

- “Marker X Axis Value (Remote Command Only)” on page 427
- “Marker X Axis Position (Remote Command Only)” on page 428
- “Marker Y Axis Value (Remote Command Only)” on page 428)

Remote Command	`:CALCulate:PFERror:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF` `:CALCulate:PFERror:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	CALC:PFER:MARK:MODE OFF CALC:PFER:MARK:MODE?
Key Path	**Marker**
Mode	GSM

Notes	If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area. Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X-axis value entered in the active function area displays the marker value to its full entered precision. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal|Delta|Off
Instrument S/W Revision	Prior to A.02.00

Marker X Axis Value (Remote Command Only)

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering an X-value if the control mode is **Normal** or **Delta**.

Remote Command	`:CALCulate:PFERror:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <real>`
	
	`:CALCulate:PFERror:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X ?`

Example	CALC:PFER:MARK3:X 0 CALC:PFER:MARK3:X?
Dependencies/Couplings	Max value would be changed.
Mode	GSM
Notes	If no suffix is sent, uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error “Invalid suffix” is generated. The query returns the marker's absolute X Axis value if the control mode is **Normal**, or the offset from the marker's reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency** and **Inverse Time**, seconds for **Period** and **Time**. If the marker is **Off** , the response is not a number. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	After a preset, all markers are turned OFF, so the Marker X Axis Value query returns a not a number (NAN).

State Saved	No
Min	–9.9E37
Max	9.9E37
Instrument S/W Revision	Prior to A.02.00

Marker X Axis Position (Remote Command Only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering a value if the control mode is **Normal** or **Delta** or **Fixed -** except in trace points rather than X Axis Scale units. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Remote Command	`:CALCulate:PFERror:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X :POSition <integer>` `:CALCulate:PFERror:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X :POSition?`
Example	CALC:PFER:MARK10:X:POS 0 CALC:PFER:MARK10:X:POS?
Mode	GSM
Notes	The query returns the marker's absolute X Axis value in trace points if the control mode is **Normal**, or the offset from the marker's reference marker in trace points if the control mode is **Delta**. If the marker is **Off** the response is not a number. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	After a preset, all markers are turned OFF, so the Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	–9.9E37
Max	9.9E37
Instrument S/W Revision	Prior to A.02.00

Marker Y Axis Value (Remote Command Only)

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

The "result" of a marker is the value which is displayed on the second line of the Marker Result block. To properly interpret the returned value, the remote programmer must also know what the analyzer's Y Axis Unit is set to as described below.

A marker can have up to two results, only one of which is displayed or returned on a query, as follows:

Absolute result: every marker has an absolute result:

For Normal and Delta markers, the Y-axis value of the trace point the marker is currently on.

The absolute result is displayed in the result block or returned on a query unless the marker control mode is **Delta**.

Relative result: if a marker's control mode is **Delta**, the relative result is displayed in the result block or returned on a query. This is the ratio of the Absolute Result of a delta marker to the Absolute Result of its reference marker.

Remote Command	`:CALCulate:PFERror:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	CALC:PFERror:MARK11:Y?
Mode	GSM
Notes	The query returns the marker Y-axis result. If the marker is **Off** the response is not a number. If 'Polar' is selected for the Marker Trace, it returns the values of 'I' and 'Q' at the same time. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Properties

Accesses a menu that allows you to set marker properties and to access the marker trace menu.

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

Relative To

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

Remote Command	`:CALCulate:PFERror:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>` `:CALCulate:PFERror:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	CALC:PFER:MARK:REF 10 CALC:PFER:MARK:REF?
Key Path	**Marker, Properties**
Mode	GSM

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.” You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. When queried, a single value is returned (the specified marker number’s relative marker).
Preset	2|3|4|5|6|7|8|9|10|11|12|1
State Saved	Saved in instrument state.
Min	1
Max	12
Instrument S/W Revision	Prior to A.02.00

Marker Trace

Assigns the specified marker to the designated trace.

Remote Command	`:CALCulate:PFERror:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe PERRor|PFERror|RFENvelope|POLar` `:CALCulate:PFERror:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?`
Example	CALC:PFER:MARK:TRAC POL CALC:PFER:MARK:TRAC?
Dependencies/Couplings	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Key Path	**Marker, Properties**
Mode	GSM
Preset	PERRor
State Saved	Saved in instrument state.
Range	IQ Polar|Phase Error|Phase Error w/Freq|RF Envelope
Instrument S/W Revision	Prior to A.02.00

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).

This may result in markers going off screen.

Remote Command	`:CALCulate:PFERror:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:PFERror:MARKer:COUPle[:STATe]?`
Example	CALC:PFER:MARK:COUP ON CALC:PFER:MARK:COUP?
Key Path	**Marker**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

All Markers Off

Turns off all markers.

Remote Command	`:CALCulate:PFERror:MARKer:AOFF`
Example	CALC:PFER:MARK:AOFF
Key Path	**Marker**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Instrument S/W Revision	Prior to A.02.00

Marker Function

There is no functionality for this front-panel key in this measurement. When pressed, this key displays a blank menu.

Key Path	**Front-panel key**
Mode	GSM

Marker To

There is no functionality for this front-panel key in this measurement. When pressed, this key displays a blank menu.

Key Path	**Front-panel key**
Mode	GSM

Meas

Operation of this key is identical across all measurements. For details about this key, see “Meas” on page 1069.

Meas Setup

Displays the measurement setup menu for the currently selected measurement.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Avg/Hold Num

Specifies the number of data acquisitions that are averaged. After the specified number of average counts, the averaging mode (terminal control) setting determines the averaging action.

- On – Sets measurement averaging on.
- Off – Sets measurement averaging off.

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

Example	PFER:AVER:COUN 4 PFER:AVER:COUN? PFER:AVER OFF PFER:AVER?
Dependencies/Couplings	When this value is changed, Avg State is set to On.
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10 OFF
State Saved	Saved in instrument state.
Min	1
Max	10000
Instrument S/W Revision	Prior to A.02.00

Avg Mode

Allows you to choose either exponential or repeat averaging. This selection only effects the averaging after the number of N averages is reached (set using the Averages, Avg Bursts, or Avg Number key).

- Exponential averaging – When Measure is set at Cont, data acquisitions continue indefinitely. After N averages, exponential averaging is used with a weighting factor of N (the displayed average count stops at N). Exponential averaging weights new data more than old data, which allows tracking of slow-changing signals. The weighting factor N is set using the Averages, Avg Bursts key.
- Repeat averaging – When Measure is set at Cont, data acquisitions continue indefinitely. After N averages is reached, all previous result data is cleared and the average count is set back to 1. This is equivalent to being in Measure Single and pressing the Restart key when the Single measurement finishes.
-

Remote Command	`[:SENSe]:PFERror:AVERage:TCONtrol EXPonential|REPeat` `[:SENSe]:PFERror:AVERage:TCONtrol?`
Example	PFER:AVER:TCON REP PFER:AVER:TCON?
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	REPeat
State Saved	Saved in instrument state.
Range	Exp|Repeat
Instrument S/W Revision	Prior to A.02.00

Burst Sync

Allows you to select the method of synchronizing the measurement to the bursts.

RFBurst – The burst synchronization approximates the start and stop of the useful part of the burst without demodulation of the burst.

Training Sequence (TSEQuence) – The burst synchronization performs a demodulation of the burst and determines the start and stop of the useful part of the burst based on the midamble training sync sequence.

Remote Command	`[:SENSe]:PFERror:BSYNc:SOURce RFBurst|TSEQuence` `[:SENSe]:PFERror:BSYNc:SOURce?`

Example	PFER:BSYN:SOUR RFB PFER:BSYN:SOUR?
Dependencies/Couplings	See Notes
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	TSEQuence
State Saved	Saved in instrument state.
Range	Training Seq|RF Amptd
Instrument S/W Revision	Prior to A.02.00

IF Gain

Accesses a menu that controls the setting of the IF Gain function.

This function is an IF amplifier with approximately 10 dB of gain and enables you to take full advantage of the RF dynamic range of the analyzer. When it is turned on without an overload, the dynamic range is always better than when this function is off. The **IF Gain** key can be used to set the IF Gain function to Auto, On (the extra 10 dB), or Off. These settings affect sensitivity and IF overloads.

This only applies to the RF input. It does not apply to baseband I/Q input.

Key Path	**Meas Setup, Advanced,**
Instrument S/W Revision	Prior to A.02.00

IF Gain Auto

Activates the auto rules for IF Gain

Remote Command	`[:SENSe]:PFERror:IF:GAIN:AUTO[:STATe] ON|OFF|1|0` `[:SENSe]:PFERror:IF:GAIN:AUTO[:STATe]?`
Example	PFERror:IF:GAIN:AUTO ON PFERror:IF:GAIN:AUTO?
Dependencies/Couplings	When either the auto attenuation works (for example, with electrical attenuator), or the Optimize Mechanical Attenuator range is requested, the IF Gain setting is changed. ‘auto’ sets IF Gain High under any of the following conditions: the input attenuator is set to 0 dB, the preamp is turned on, or the Max Mixer Level is 20 dBm or lower. For other settings, auto sets IF Gain to Low.
Key Path	**Meas Setup**

Mode	GSM
Notes	IF Gain only applies to the RF input. It does not apply to baseband I/Q input. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	Auto|Man
Instrument S/W Revision	Prior to A.02.00

IF Gain State

Selects the range of IF gain.

Remote Command	`[:SENSe]:PFERror:IF:GAIN[:STATe] ON|OFF|1|0` `[:SENSe]:PFERror:IF:GAIN[:STATe]?`
Example	PFER:IF:GAIN ON PFER:IF:GAIN?
Dependencies/Couplings	Coupled to "IF Gain Auto" on page 437. Setting IF Gain Auto forces IF Gain State to Man.
Key Path	**Meas Setup, IF Gain**
Mode	GSM
Notes	IF Gain only applies to the RF input. It does not apply to baseband I/Q input. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. where ON = high gain OFF = low gain
Preset	OFF
State Saved	Saved in instrument state.
Range	Low Gain (Best for Large Signals)|High Gain (Best Noise Level)
Instrument S/W Revision	Prior to A.02.00

Limits

Accesses a menu that enables you to set the Limit Test.

Key Path	**Meas Setup, Mode, Limits**
Mode	GSM

Instrument S/W Revision	Prior to A.02.00

Limit Test

Turns on or off limit pass/fail testing.

Remote Command	`:CALCulate:PFERror:LIMit:TEST[:STATe] OFF|ON|0|1` `:CALCulate:PFERror:LIMit:TEST[:STATe]?`
Example	CALC:PFER:LIM:TEST ON CALC:PFER:LIM:TEST?
Key Path	**Meas Setup, Limits**
Mode	GSM
Notes	If set to Off, PASS/FAIL indicator on the Meas Bar goes blank. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

RMS Phase Error

Set the limit value for RMS Phase limit in degree by MS and BTS.

See also:

"RMS Phase Error Limit for BTS." on page 439.

"RMS Phase Error Limit for MS." on page 440.

Key Path	**Meas Setup, Limits**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

RMS Phase Error Limit for BTS.

Remote Command	`:CALCulate:PFERror:LIMit:BTS:RPHase <real>` `:CALCulate:PFERror:LIMit:BTS:RPHase?`
Example	CALC:PFER:LIM:BTS:RPH 10 CALC:PFER:LIM:BTS:RPH?
Key Path	**Meas Setup, Limits**

Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	5
State Saved	Saved in instrument state.
Min	0.0
Max	180.0
Instrument S/W Revision	Prior to A.02.00

RMS Phase Error Limit for MS.

Remote Command	`:CALCulate:PFERror:LIMit:MS:RPHase <real>` `:CALCulate:PFERror:LIMit:MS:RPHase?`
Example	CALC:PFER:LIM:MS:RPH 10 CALC:PFER:LIM:MS:RPH?
Key Path	**Meas Setup, Limits**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	5
State Saved	Saved in instrument state.
Min	0.0
Max	180.0
Instrument S/W Revision	Prior to A.02.00

Peak Phase Error

Set the limit value for Peak Phase limit in degree by MS and BTS.

See also:

"Peak Phase Error Limit for BTS" on page 441

"Peak Phase Error Limit for MS" on page 441

Key Path	**Meas Setup, Limits**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Peak Phase Error Limit for BTS

Remote Command	`:CALCulate:PFERror:LIMit:BTS:PPHase <real>`
	`:CALCulate:PFERror:LIMit:BTS:PPHase?`
Example	CALC:PFER:LIM:BTS:PPH 10
	CALC:PFER:LIM:BTS:PPH?
Key Path	**Meas Setup, Limits**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	Unit is Degree(s).
Preset	20
State Saved	Saved in instrument state.
Min	0.0
Max	180.0
Instrument S/W Revision	Prior to A.02.00

Peak Phase Error Limit for MS

Remote Command	`:CALCulate:PFERror:LIMit:MS:PPHase <real>`
	`:CALCulate:PFERror:LIMit:MS:PPHase?`
Example	CALC:PFER:LIM:MS:PPH 10
	CALC:PFER:LIM:MS:PPH?
Key Path	**Meas Setup, Limits**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	20
State Saved	Saved in instrument state.
Min	0.0
Max	180.0
Instrument S/W Revision	Prior to A.02.00

Frequency Error

Sets the limit value for frequency limit in ppm by MS and BTS.

See also:

- "Freq Error Limit for BTS" on page 442
- "Freq Error Limit for mBTS" on page 442
- "Freq Error Limit for pBTS" on page 443
- "Freq Error Limit for MS" on page 443

Key Path	**Meas Setup, Limits**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Freq Error Limit for BTS

Remote Command	`:CALCulate:PFERror:LIMit:BTS:FERRor <real>`
	`:CALCulate:PFERror:LIMit:BTS:FERRor?`
Example	CALC:PFER:LIM:BTS:FERR 10
	CALC:PFER:LIM:BTS:FERR?
Key Path	**Meas Setup, Limits**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.05
State Saved	Saved in instrument state.
Min	0
Max	100
Instrument S/W Revision	Prior to A.02.00

Freq Error Limit for mBTS

Remote Command	`:CALCulate:PFERror:LIMit:MBTS:FERRor <real>`
	`:CALCulate:PFERror:LIMit:MBTS:FERRor?`
Example	CALC:PFER:LIM:MBTS:FERR 10
	CALC:PFER:LIM:MBTS:FERR?
Key Path	**Meas Setup, Limits**

Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.05
State Saved	Saved in instrument state.
Min	0
Max	100
Instrument S/W Revision	Prior to A.02.00

Freq Error Limit for pBTS

Remote Command	`:CALCulate:PFERror:LIMit:PBTS:FERRor <real>` `:CALCulate:PFERror:LIMit:PBTS:FERRor?`
Example	CALC:PFER:LIM:PBTS:FERR 10 CALC:PFER:LIM:PBTS:FERR?
Key Path	**Meas Setup, Limits**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Unit is ppm.
Preset	0.1
State Saved	Saved in instrument state.
Min	0
Max	100
Instrument S/W Revision	Prior to A.02.00

Freq Error Limit for MS

Remote Command	`:CALCulate:PFERror:LIMit:MS:FERRor <real>` `:CALCulate:PFERror:LIMit:MS:FERRor?`
Example	CALC:PFER:LIM:MS:FERR 10 CALC:PFER:LIM:MS:FERR?
Key Path	**Meas Setup, Limits**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.

Preset	0.1
State Saved	Saved in instrument state.
Min	0
Max	100
Instrument S/W Revision	Prior to A.02.00

Meas Preset

Restores all the measurement parameters to their default values.

Remote Command	`:CONFigure:PFERror`
Example	CONF:PFER
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Instrument S/W Revision	Prior to A.02.00

Mode

Operation of this key is identical across all measurements. For details about this key, see "Mode" on page 1087.

Mode Setup

Operation of this key is identical across all measurements. For details about this key, see “Mode Setup” on page 1101.

Peak Search

There is no functionality for this front-panel key in this measurement. When pressed, this key displays a blank menu.

Remote Command	`:CALCulate:PFERror:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	CALC:PFER:MARK2:MAX
Key Path	**Peak Search**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Recall

Operation of this key is identical across several measurements. For details of this key, see "Recall" on page 1123

Restart

Operation of this key is identical across all measurements. For details about this key, see "Restart" on page 1145.

Save

Operation of this key is identical across several measurements. For details of this key, see “Save” on page 1147

Single (Single Measurement/Sweep)

Operation of this key is identical across several measurements. For details about this key, see "Single (Single Measurement/Sweep)" on page 1173.

Source

Operation of this key is identical across several measurements. For details about this key, see "Source" on page 1175.

SPAN X Scale

Accesses a menu of functions that enable you set the horizontal scale parameters

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Ref Value

Allows you to set reference value by Phase Error and Phase Error w/Freq, and RF Envelope.

See also:

- "Ref Value (Phase Error and Phase Error w/Freq window)" on page 453
- "Ref Value (RF Envelope window)" on page 454

Key Path	**SPAN X Scale**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Ref Value (Phase Error and Phase Error w/Freq window)

Allows you to set the display X reference value for time axis 'bit'.

Remote Command	`:DISPlay:PFERror:VIEW[1]:WINDow[1]|2:TRACe:X[:SCALe]:RLEVel <real>` `:DISPlay:PFERror:VIEW[1]:WINDow[1]|2:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:PFER:VIEW:WIND:TRAC:X:RLEV 1.5 DISP:PFER:VIEW:WIND:TRAC:X:RLEV?
Dependencies/Couplings	If the "Auto Scaling" on page 456 is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.
Key Path	**SPAN / X Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.5
State Saved	Saved in instrument state.

Min	0.000
Max	5000000.000
Instrument S/W Revision	Prior to A.02.00

Ref Value (RF Envelope window)

Allow you to set the display X reference value for time axis ‘sec’.

Remote Command	`:DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:X[:SCALe]:RLEVel <time>` `:DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:X[:SCALe]:RLEVel ?`
Example	DISP:PFER:VIEW:WIND3:TRAC:X:RLEV 1.5 DISP:PFER:VIEW:WIND3:TRAC:X:RLEV?
Dependencies/Couplings	If the “Auto Scaling” on page 421 is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.
Key Path	**SPAN / X Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	–64.4 us
State Saved	Saved in instrument state.
Min	–1.0 s
Max	10.0 s
Instrument S/W Revision	Prior to A.02.00

Scale/Div

Allows you to set the display X scale/division value using bits (Phase Error and Phase Error w/Freq) or time (RF Envelope)

See also:

- “Scale/Div (Phase Error and Phase Error w/Freq window)” on page 455
- “Scale/Div (RF Envelope window)” on page 455

Key Path	**SPAN X Scale**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Scale/Div (Phase Error and Phase Error w/Freq window)

Allows you to set the display X scale/division value.

Remote Command	`:DISPlay:PFERror:VIEW[1]:WINDow[1]|2:TRACe:X[:SCALe]:PDIVision <real>` `:DISPlay:PFERror:VIEW[1]:WINDow[1]|2:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:PFER:VIEW:WINDOW:TRAC:X:PDIV 15 DISP:PFER:VIEW:WINDOW:TRAC:X:PDIV?
Dependencies/Couplings	If the “Auto Scaling” on page 421 is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.
Key Path	**SPAN / X Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	14.7
State Saved	Saved in instrument state.
Min	1.000
Max	500000.0
Instrument S/W Revision	Prior to A.02.00

Scale/Div (RF Envelope window)

Allows you to set the display X scale/division value.

Remote Command	`:DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:X[:SCALe]:PDIVision <time>` `:DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:PFER:VIEW:WINDOW3:TRAC:X:PDIV 1 DISP:PFER:VIEW:WINDOW3:TRAC:X:PDIV?
Dependencies/Couplings	If the “Auto Scaling” on page 421 is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.
Key Path	**SPAN / X Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.

Preset	532.0 us
State Saved	Saved in instrument state.
Min	1.00 ns
Max	1.00 s
Instrument S/W Revision	Prior to A.02.00

Ref Position

Allows you to set the display reference position to Left, Center or Right.

Remote Command	`:DISPlay:PFERror:VIEW[1]:WINDow[1]|2|3:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:PFERror:VIEW[1]:WINDow[1]|2|3:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:PFER:VIEW:WIND2:TRAC:X:RPOS LEFT DISP:PFER:VIEW:WIND2:TRAC:X:RPOS?
Key Path	**SPAN / X Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left|Ctr|Right
Instrument S/W Revision	Prior to A.02.00

Auto Scaling

Allows you to toggle the scale coupling function between On and Off.

Remote Command	`:DISPlay:PFERror:VIEW[1]:WINDow[1]|2|3:TRACe:X[:SCALe]:COUPle ON|OFF|1|0` `:DISPlay:PFERror:VIEW[1]:WINDow[1]|2|3:TRACe:X[:SCALe]:COUPle?`
Example	DISP:PFER:VIEW:WIND:TRAC:X:COUP ON DISP:PFER:VIEW:WIND:TRAC:X:COUP?

Dependencies/Couplings	Upon pressing the Restart front-panel key, the scale coupling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either “Ref Value” on page 453 or “Scale/Div” on page 454 manually, Auto Scaling automatically changes to Off.
Key Path	**SPAN / X Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Sweep/Control

Operation of this key is identical across several measurements. For details about this key, see "Sweep / Control" on page 1179.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Trace/Detector

There is no functionality for this Front-panel key in this measurement. When pressed, this key displays a blank menu.

Key Path	**Front-panel key**
Mode	GSM

View/Display

Accesses a menu of functions that enable you to set the display parameters for the current measurement and select the View.

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

Display

Accesses a menu of functions that enable you to set the display parameters for the current measurement.

See the "Display" on page 1253section for more information.

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

View

Accesses a menu that allows you to select the desired view of the measurement.

For remote commands associated with view selection, see "View Selection by name (SCPI only)" on page 461 and "View Selection by number (SCPI only)" on page 461.

The 3 following view selections are available:

1) I/Q Measured Polar Graph (SCPI: POLar) or (SCPI: 1)

Provides a view of numeric results and a polar vector graph. This view has 2 windows:

- Window 1: Numeric Results
- Window 2: I/Q Polar Graph

For full details, see "I/Q Measured Polar Graph View" on page 462.

2) I/Q Error (SCPI: ERRor|QUAD) or (SCPI: 2)

Provides a combination view, with 4 windows:

- Window 1: Phase Error
- Window 2: Phase Error with Freq
- Window 3: RF Envelope
- Window 4: Numeric Results

You can select each window using the **Next Window** key, and make the selected window full size using the **Zoom** key.

For full details, see "I/Q Error " on page 463

3) Data Bits (SCPI: DBITs) or (SCPI: 3)

Provides a view of the numeric results and data bits with the sync word (TSC) highlighted.

"Burst Sync" on page 436

If a result fails, 'F' is displayed beside the result.

For full details of this view, see "Data Bits" on page 466

View Selection by name (SCPI only)

Remote Command	`:DISPlay:PFERror:VIEW[:SELect] POLar|ERRor|DBITs`
	`:DISPlay:PFERror:VIEW[:SELect]?`
Example	DISP:PFER:VIEW ERR
	DISP:PFER:VIEW?
Dependencies/Couplings	View Selection by number must be coupled with this parameter value.
Key Path	**View/Display**
Mode	GSM
Notes	- POLar : I/Q Measured Polar Graph
	- ERRor : I/Q Error
	- DBITs : Data Bits
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ERRor
State Saved	Saved in instrument state.
Range	I/Q Error|I/Q Measurerd Polar Graph|Data Bits
Instrument S/W Revision	Prior to A.02.00

View Selection by number (SCPI only)

Remote Command	`:DISPlay:PFERror:VIEW:NSELect <integer>`
	`:DISPlay:PFERror:VIEW:NSELect?`
Example	DISP:PFER:VIEW:NSEL 3
Dependencies/Couplings	View Selection must be coupled with this parameter value.
Mode	GSM

Notes	1: I/Q Measured Polar Graph 2: IQ Error 3: Data Bits You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	2
State Saved	Saved in instrument state.
Min	1
Max	3
Instrument S/W Revision	Prior to A.02.00

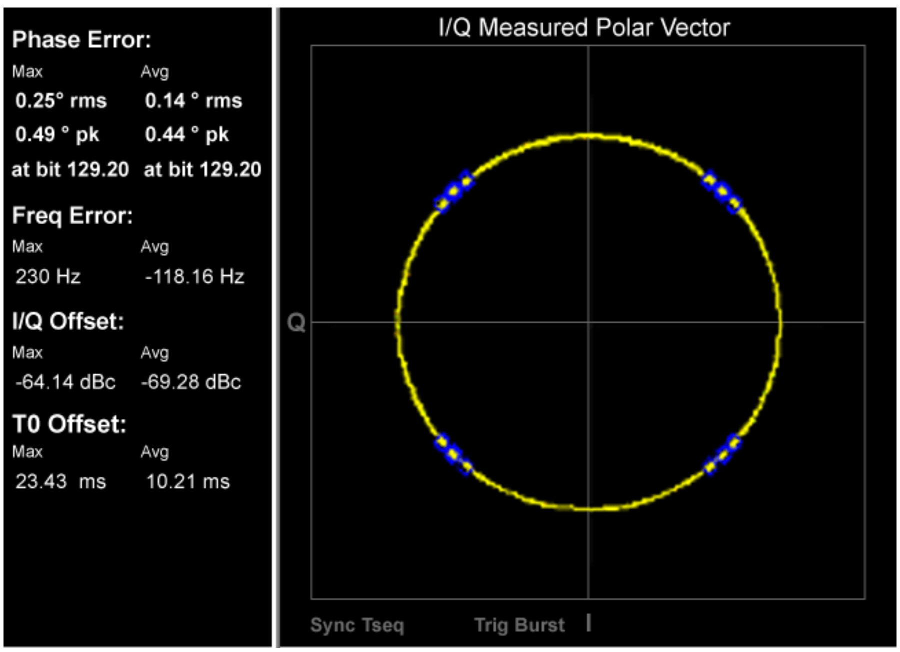
I/Q Measured Polar Graph View

This view has 2 windows, as detailed in the sections below:

"Graph Window" on page 462

"Metrics Window" on page 463

The figure below shows an example of this view.



Graph Window

Marker Operation	No
Corresponding Trace	Series of floating point numbers that alternately represent I and Q pairs of the corrected measured trace. (n=5)

Metrics Window

The Metrics Window is identical to that of the I/Q Error view. Refer to the section “I/Q Error ” on page 463.

Key Path	**View/Display**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

I/Q Polar Vect/Constln

I/Q Polar Vector/Constellation allows you to change the format of the polar vector graph. The following display options are available:

- Vector and Constellation (SCPI: VC)
- Vector Only (SCPI: VECTor)
- Constellation Only (SCPI: CONStln)

Remote Command	`:DISPlay:PFERror:VIEW[1]:WINDow2:TRACe:POLar VC|VECTor|CONStln` `:DISPlay:PFERror:VIEW[1]:WINDow2:TRACe:POLar?`
Example	DISP:PFER:VIEW:WIND2:TRAC:POL VC DISP:PFER:VIEW:WIND2:TRAC:POL?
Key Path	**View/Display**
Mode	GSM
Notes	VC : Vect & Constln VECTor: Vector CONStln : Constellation You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	VC
State Saved	Saved in instrument state.
Range	Vect & Constln|Vector|Constellation
Instrument S/W Revision	Prior to A.02.00

I/Q Error

This view has 4 windows, as detailed in the sections below:

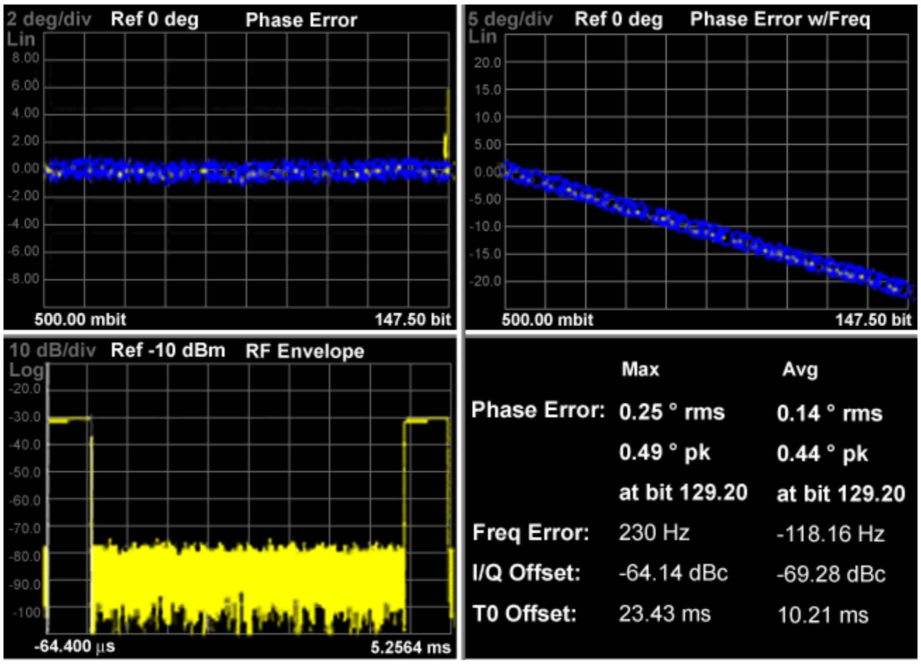
“Phase Err Window” on page 464

“Phase Err w/Freq Window” on page 464

"RF Envelope Window" on page 464

"Metrics Window" on page 464

The figure below shows an example of this view.



Phase Err Window

Marker Operation	Yes
Corresponding Trace	Series of floating point numbers (in degrees) that represent each sample in the phase error trace. (n=2)

Phase Err w/Freq Window

Marker Operation	Yes
Corresponding Trace	Series of floating point numbers (in degrees) that represent each sample in the phase error with frequency trace. (n=3)

RF Envelope Window

Marker Operation	Yes
Corresponding Trace	Series of floating point numbers that represent each sample in the log magnitude trace of the original time record. (n=4)

Metrics Window

Name	Corresponding Results	Display Format

Phase Error [rms] (Avg)	n=8 1st Average RMS Phase Error	9.99 − rms
Phase Error [rms] (Max Hold)	n=8 2nd Maximum RMS Phase Error	9.99 − rms
Phase Error [pk] (Avg)	n=8 3rd Average Peak Phase Error	9.99 − pk
Phase Error [pk] (Max Hold)	n=8 4th Maximum Peak Phase Error	9.99 − pk
Phase Error at bit (Avg)	n=8 5th Average Peak Phase Error Symbol Position	at bit 99.99
Phase Error at bit (Max Hold)	n=8 6th Maximum Peak Phase Error Symbol Position	at bit 99.99
Freq Error (Avg)	n=8 7th Average Frequency Error	–999.99 Hz
Freq Error (Max Hold)	n=8 8th Maximum Frequency Error	–999.99 Hz
I/Q Offset (Avg)	n=8 9th Average I/Q Origin Offset	–99.99 dBc
I/Q Offset (Max Hold)	n=8 10th Maximum I/Q Origin Offset	–99.99 dBc
T0 Offset (Avg)	n=8 11th Average T0 Offset	999.999 µs
T0 Offset (Max Hold)	n=8 12th Maximum T0 Offset	999.999 µs

Key Path	**View/Display**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Bit Dots

Allows you to toggle the bit dots between On and Off.

- On: turns on blue bit dots on the trace in ‘Phase Error’ & ‘Phase Error with Freq’ window.

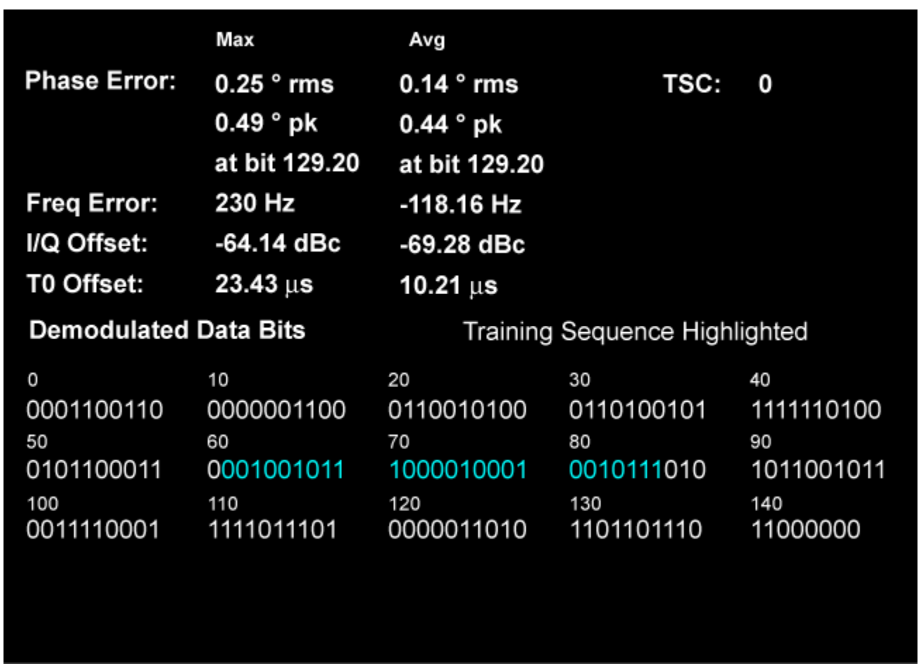
- Off: turns off blue bit dots on the trace in ‘Phase Error’ & ‘Phase Error with Freq’ window.

Remote Command	`:DISPlay:PFERror:BDOTs[:STATe] ON|OFF|1|0` `:DISPlay:PFERror:BDOTs[:STATe]?`
Example	DISP:PFER:BDOT ON DISP:PFER:BDOT?
Key Path	**View/Display**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. This SCPI command is included for completeness. But only affects the traces displayed on the screen.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Data Bits

This view has only one window, as detailed in the section “Metrics Window” on page 467.

The figure below shows an example of this view.



Metrics Window

Name	Corresponding Results	Display Format
Phase Error [rms] (Avg)	n=8 1st Average RMS Phase Error	9.99 − rms
Phase Error [rms] (Max Hold)	n=8 2nd Maximum RMS Phase Error	9.99 − rms
Phase Error [pk] (Avg)	n=8 3rd Average Peak Phase Error	9.99 − pk
Phase Error [pk] (Max Hold)	n=8 4th Maximum Peak Phase Error	9.99 − pk
Phase Error at bit (Avg)	n=8 5th Average Peak Phase Error Symbol Position	at bit 99.99
Phase Error at bit (Max Hold)	n=8 6th Maximum Peak Phase Error Symbol Position	at bit 99.99
Freq Error (Avg)	n=8 7th Average Frequency Error	–999.99 Hz
Freq Error (Max Hold)	n=8 8th Maximum Frequency Error	–999.99 Hz
I/Q Offset (Avg)	n=8 9th Average I/Q Origin Offset	–99.99 dBc
I/Q Offset (Max Hold)	n=8 10th Maximum I/Q Origin Offset	–99.99 dBc
T0 Offset (Avg)	n=8 11th Average T0 Offset	999.999 µs
T0 Offset (Max Hold)	n=8 12th Maximum T0 Offset	999.999 µs
Demodulated Data Bits	n=6	

Key Path	**View/Display**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

9 GMSK Output RF Spectrum Measurement

The Output RF Spectrum measurement is the GSM version of the adjacent channel power (ACP) measurement. For more details, see the "GMSK Output RF Spectrum Description" on page 472 below.

This topic contains the following sections:

Measurement Commands for GMSK Output RF Spectrum

```
:CONFigure:ORFSpectrum
```

```
:CONFigure:ORFSpectrum:NDEFault
```

```
:FETCh:ORFSpectrum[n]?
```

```
:INITiate:ORFSpectrum
```

```
:MEASure:ORFSpectrum[n]?
```

```
:READ:ORFSpectrum[n]?
```

Remote Command Results for GMSK Output RF Spectrum

Measurement Method	n	Results Returned
	0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.
Single offset	not specified or n = 1	Returns 4 comma-separated results for the specified offset: 1. Modulation spectrum power, dB 2. Modulation spectrum power, dBm 3. Switching transient power, dB 4. Switching transient power, dBm

Measurement Method	n	Results Returned
Multi-Offset	not specified or n = 1	Returns a list of comma-separated values for the modulation spectrum at all the offsets (lower and upper.). This is followed by the switching transient results at all the offsets (lower and upper). The carrier is considered offset zero (0) and is the first set of results sent. Four values are provided for each of the offsets (including the carrier), in this order: 1. Negative offset(a) - power relative to carrier (dB) 2. Negative offset(a) - absolute average power (dBm) 3. Positive offset(a) - power relative to carrier (dB) 4. Positive offset(a) - absolute average power (dBm) Values for all possible offsets are sent. Zeros are sent for offsets that have not been defined. The total number of values sent (120) = (4 results/offset) * (15 offsets) * (2 measurement types - modulation & switching) Carrier – modulation measurement values Offset 1 – modulation measurement values and so on ~ Offset 14 – modulation measurement values Carrier – switching transients measurement values Offset 1 – switching transients measurement values ~ Offset 14 – switching transients measurement values and so on This measurement defaults to modulation measurements and not switching measurements. If you want to return the switching measurement values, you must change that default condition and use FETCh or READ to return values, rather than MEASure.
Swept	not specified or n = 1	Returns 5 comma-separated results of the closest point to the limit line: 1. Frequency 2. Offset frequency from carrier frequency 3. Power in dBm 4. delta from limit (dB) 5. delta from reference (dB)
Single offset	2	Returns floating point numbers (in dBm) of the captured trace data. It contains N data points of the “spectrum due to modulation” signal, where N is the specified number of samples.

Measurement Method	n	Results Returned
Multi-Offset or Swept	2	Nothing returns.
Single offset	3	Returns floating point numbers (in dBm) of the captured trace data. It contains N data points of the “spectrum due to switching transients” signal, where N is the specified number of samples.
Multi-Offset or Swept	3	Returns NULL.
Swept	4	Returns floating point numbers (in dBm) of the sweep spectrum trace.
Multi-Offset or Single Offset	4	Returns NULL.
Swept	5	Returns floating point numbers (in dBm) of the swept limit trace.
Multi-Offset or Single Offset	5	Returns NULL.
Multi-Offset	6	Relative level to the test limit, and test limit itself for both modulation and switching transient measurements. Returns a list of relative level to the test limit, the relative test limit and the absolute test limit for all the offset frequencies. The relative level to the test limit is returned for both lower and upper offsets. Four values are returned for each offset in the following order: 1. Relative level to the test limit (dB) at the negative offset frequency 2. Relative level to the test limit (dB) at the positive offset frequency 3. Relative test limit used (dB) 4. Absolute test limit used (dBm)

Measurement Method	n	Results Returned
Multi-Offset (Cont.)	6	Values for all possible offsets are returned. The carrier frequency is considered offset zero (0.0 Hz) and is the first set of values returned. Zeros are returned for offsets that have not been defined. Zeros are returned for the measurement that was not performed. For example, if Meas Type is Modulation, all switching transient measurement results are 0.0. The total number of values returned is: 120 = (4 results / offset) * (15 offset frequencies) * (2 measurement types) Carrier (Offset A) – modulation measurement results Offset 1 (Offset B) - modulation measurement results . . . . . . Offset 14 (Offset O) - modulation measurement results Carrier (Offset A)– switching transients measurement results Offset 1 (Offset B) – switching transients measurement results . . . . . . Offset 14 (Offset O) – switching transients measurement results
Single Offset or Swept	6	Returns NULL.
All	7	Returns floating point number (in dBm) of Measured Carrier Power Level that determines the PCL.

GMSK Output RF Spectrum Description

Since GSM is a TDMA format, RF power is switched on and off depending on whether the actual burst is being transmitted. The switching of power causes spectral splatter at frequencies other than that being transmitted by the carrier. Fast transitions in the time domain cause switching transients that have high frequency content associated with them. Excessive amount of energy spilling into an adjacent frequency channel could interfere with signals being transmitted to other MS or BTS.

Key Path	**Meas**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Amplitude (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**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Ref Value

Allows you to set the absolute power reference.

Remote Command	`:DISPlay:ORFSpectrum:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:ORFSpectrum:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:ORFS:VIEW:WIND:TRAC:Y:RLEV –10 DISP:ORFS:VIEW:WIND:TRAC:Y:RLEV?
Dependencies/Couplings	Blanked when Meas Method is Multi Offset. When “Auto Scaling” on page 476 is On, this value is automatically determined by the measurement result. When this value is set manually, “Auto Scaling” on page 476 automatically changes to Off.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. SubOpCode: VIEW[1]:WINDow[1]:RF Envelope window VIEW2:WINDow[1]:Spectrum window
Preset	0.00|0.00
State Saved	Saved in instrument state.
Min	–250.0
Max	250.0
Instrument S/W Revision	Prior to A.02.00

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" on page 969 under AMPTD Y Scale for more information.

Key Path	**AMPTD Y Scale**
Instrument S/W Revision	Prior to A.02.00

Scale/Div

Allows you to enter a numeric value to change the vertical display sensitivity.

Remote Command	`:DISPlay:ORFSpectrum:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:ORFSpectrum:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:ORFS:VIEW:WIND:TRAC:Y:PDIV 2db DISP:ORFS:VIEW:WIND:TRAC:Y:PDIV?
Dependencies/Couplings	Blanked when Meas Method is Multi Offset. When "Auto Scaling" on page 476 is On, this value is automatically determined by the measurement result. When this value is set manually, Auto Scaling automatically changes to Off.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. SubOpCode: VIEW[1]:WINDow[1]:RF Envelope window VIEW2:WINDow[1]:Spectrum window
Preset	10.00|10.00
State Saved	Saved in instrument state.
Min	0.1
Max	20.0
Instrument S/W Revision	Prior to A.02.00

Presel Center

When this key is pressed, the centering of the preselector filter is adjusted to optimize the amplitude accuracy at the frequency of the selected marker.

See "Presel Center" on page 981 under AMPTD Y Scale for more information.

Key Path	**AMPTD Y Scale**
Instrument S/W Revision	Prior to A.02.00

Presel Adjust

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

See "Preselector Adjust" on page 982 under AMPTD Y Scale for more information.

Key Path	**AMPTD Y Scale**
Instrument S/W Revision	Prior to A.02.00

Internal Preamp

This menu controls the internal preamplifier. 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" on page 984 under AMPTD Y Scale for more information.

Key Path	**AMPTD Y Scale**
Instrument S/W Revision	Prior to A.02.00

Ref Position

Allows you to set the display reference position to 0(Top), 5(Center), or 10(Bottom).

Remote Command	`:DISPlay:ORFSpectrum:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:ORFSpectrum:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:ORFS:VIEW:WIND:TRAC:Y:RPOS TOP DISP:ORFS:VIEW:WIND:TRAC:Y:RPOS?
Dependencies/Couplings	Blanked when Meas Method is Multi Offset.
Key Path	**AMPTD Y Scale**
Mode	GSM

Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. SubOpCode: VIEW[1]:WINDow[1]:RF Envelope window VIEW2:WINDow[1]:Spectrum window
Preset	TOP|TOP
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Instrument S/W Revision	Prior to A.02.00

Auto Scaling

Allows you to toggle the Auto Scaling function between On and Off.

Remote Command	`:DISPlay:ORFSpectrum:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:ORFSpectrum:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:ORFS:VIEW:WIND:TRAC:Y:COUP ON DISP:ORFS:VIEW:WIND:TRAC:Y:COUP?
Dependencies/Couplings	Blanked when Meas Method is Multi Offset. 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 “Ref Value” on page 473 or “Scale/Div” on page 474 is set manually, this parameter is set to ‘Off’ automatically.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. SubOpCode: VIEW[1]:WINDow[1]:RF Envelope window VIEW2:WINDow[1]:Spectrum window
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Auto Couple

Operation of this key is identical across several measurements. For details about this key, see “AUTO COUPLE” on page 987.

BW

There is no ‘BW’ functionality supported in GMSK Output RF Spectrum so this front-panel key displays a blank menu when pressed.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Cont (Continuous Measurement/Sweep)

Operation of this key is identical across all measurements. For details about this key, see "Cont (Continuous Measurement/Sweep)" on page 991.

FREQ Channel

Operation of this key is identical across all measurements. For details about this key, see "FREQ/Channel" on page 993.

Input/Output

Operation of this key is identical across all measurements. For details about this key, see "Input/Output" on page 1003.

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Some Marker operations are common across multiple Modes and Measurements. See the section “Marker” on page 1063 for information on features that are common.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Select Marker

Displays 12 marker available for selection.

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

Marker Type

Sets the marker control mode **Normal**, **Delta**, and **Off**. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Remote Command	`:CALCulate:ORFSpectrum:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF` `:CALCulate:ORFSpectrum:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	CALC:ORFS:MARK:MODE OFF CALC:ORFS:MARK:MODE?
Key Path	**Marker**
Mode	GSM
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. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal|Delta|Off
Instrument S/W Revision	Prior to A.02.00

Marker X Axis Value (Remote Command Only)

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is **Off,** but it is the SCPI equivalent of entering an X value if the control mode is **Normal, Delta** or **Fixed**.

Remote Command	`:CALCulate:ORFSpectrum:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <real>` `:CALCulate:ORFSpectrum:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`
Example	CALC:ORFS:MARK3:X 0 CALC:ORFS:MARK3:X?
Dependencies/Couplings	Max/Min value may be changed by Sweep Time or Frequency Span.
Mode	GSM
Notes	If no suffix is sent it, uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error “Invalid suffix” is generated. The query returns the marker’s absolute X Axis value if the control mode is **Normal**, or the offset from the marker’s reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency** and **Inverse Time**, seconds for **Period** and **Time**. If the marker is **Off** the response is not a number. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	–9.9E37.
Max	9.9E37
Instrument S/W Revision	Prior to A.02.00

Marker X Axis Position (Remote Command Only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off,** but it 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.

Remote Command	`:CALCulate:ORFSpectrum:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <integer>` `:CALCulate:ORFSpectrum:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`

Example	CALC:ORFS:MARK10:X:POS 0 CALC:ORFS:MARK10:X:POS?
Dependencies/Couplings	Max/Min value may be changed by Sweep Time or Frequency Span.
Mode	GSM
Notes	The query returns the marker's absolute X Axis value in trace points if the control mode is **Normal**, or the offset from the marker's reference marker in trace points if the control mode is **Delta**. If the marker is **Off** the response is not a number. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	–9.9E37
Max	9.9E37
Instrument S/W Revision	Prior to A.02.00

Marker Y Axis Value (Remote Command Only)

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

The "result" of a marker is the value which is displayed on the second line of the Marker Result block. To properly interpret the returned value the remote programmer must also know what the analyzer's Y-Axis Unit is set to as described below.

A marker can have up to two results, only one of which is displayed or returned on a query, as follows:

Absolute result: every marker has an absolute result and it is simply:

For Normal and Delta markers, the Y-axis value of the trace point the marker is currently on.

The absolute result is displayed in the result block or returned on a query unless the marker control mode is **Delta**.

Relative result: if a marker's control mode is **Delta**, the relative result is displayed in the result block or returned on a query. This is the ratio of the Absolute Result of a delta marker to the Absolute Result of its reference marker.

Remote Command	`:CALCulate:ORFSpectrum:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	CALC:ORFS:MARK11:Y?
Mode	GSM

Notes	The query returns the marker Y-axis result. If the marker is **Off,** the response is not a number. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Properties

Accesses a menu that allows you to set marker properties and to access the marker trace menu.

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

Relative To

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

Remote Command	`:CALCulate:ORFSpectrum:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>` `:CALCulate:ORFSpectrum:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	CALC:ORFS:MARK:REF 5 CALC:ORFS:MARK:REF?
Key Path	**Marker, Properties**
Mode	GSM
Notes	A marker cannot be relative to itself so that choice is unavailable. If the equivalent SCPI command is sent, an error message is generated as part of a "–221, Settings conflict" . You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. When queried, a single value is returned (the specified marker number's relative marker).
Preset	2|3|4|5|6|7|8|9|10|11|12|1
State Saved	Saved in instrument state.
Min	1
Max	12
Instrument S/W Revision	Prior to A.02.00

Marker Trace

Assigns the specified marker to the designated trace.

Remote Command	`:CALCulate:ORFSpectrum:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe RFEMod|RFESwitching|SPEMod|LIMMod`
	`:CALCulate:ORFSpectrum:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?`
Example	CALC:ORFS:MARK:TRACE RFES
	CALC:ORFS:MARK:TRACE?
Dependencies/Couplings	RF Envelope Modulation and RF Envelop Switching are available only when Meas Method is Single.
	Swp Spectrum Modulation and Limit Modulation are available when the Meas Method is Swept. Otherwise they are unavailable.
Key Path	**Marker, Properties**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	RFEMod
State Saved	Saved in instrument state.
Range	RF Envelope Modulation|RF Envelope Switching|Swp Spectrum Modulation|Limit Modulation
Instrument S/W Revision	Prior to A.02.00

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).

This may result in markers going off screen.

Remote Command	`:CALCulate:ORFSpectrum:MARKer:COUPle[:STATe] ON|OFF|1|0`
	`:CALCulate:ORFSpectrum:MARKer:COUPle[:STATe]?`
Example	CALC:ORFS:MARK:COUP ON
	CALC:ORFS:MARK:COUP?
Key Path	**Marker**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.

Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

All Markers Off

Turns off all markers.

Remote Command	`:CALCulate:ORFSpectrum:MARKer:AOFF`
Example	CALC:ORFS:MARK:AOFF
Key Path	**Marker**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Instrument S/W Revision	Prior to A.02.00

Marker Function

There is no functionality for this front-panel key in this measurement. When pressed, this key displays a blank menu.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Marker To

There is no functionality for this front-panel key in this measurement. When pressed, this key displays a blank menu.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Meas

See “Meas” on page 1069 in the section "Common Measurement Functions" for more information.

Meas Setup

Displays the measurement setup menu for the currently selected measurement.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Avg/Hold Num

Specifies the number of data acquisitions that are averaged. After the specified number of average counts, the averaging mode (terminal control) setting determines the averaging action.

On – Sets measurement averaging on.

Off – Sets measurement averaging off.

Remote Command	`[:SENSe]:ORFSpectrum:AVERage:COUNt <integer>`
	`[:SENSe]:ORFSpectrum:AVERage:COUNt?`
	`[:SENSe]:ORFSpectrum:AVERage[:STATe] OFF|ON|0|1`
	`[:SENSe]:ORFSpectrum:AVERage[:STATe]?`
Example	ORFS:AVER:COUN 3
	ORFS:AVER:COUN?
	ORFS:AVER ON
	ORFS:AVER?
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	20
	ON
State Saved	Saved in instrument state.
Min	1
Max	10000
Instrument S/W Revision	Prior to A.02.00

Meas Type

Selects the measurement type.

The Meas Type that you select affects the displayed view. For details, see "View/Display" on page 530.

KEYMod & Switch SCPIMSWitching	Performs both Modulation and Switching measurements.
KEYModulation SCPIMODulation	Measures the spectrum due to the 0.3 GMSK modulation and noise.
KEYSwitching SCPISWITching	Measures the spectrum due to switching transients (burst ramping).
KEYFull Frame Modulation (FAST) SCPIFFModulation	Improves measurement speed by acquiring a full frame of data prior to performing the FFT calculation. This feature can only be used when all slots in the transmitted frame are active.

Remote Command	`[:SENSe]:ORFSpectrum:TYPE MODulation|MSWitching|SWITching|FFModulation` `[:SENSe]:ORFSpectrum:TYPE?`
Example	ORFS:TYPE MOD ORFS:TYPE?
Dependencies/Couplings	When Meas Method is set to SWEpt, the "Mod & Switch" and "Full Frame Mod(FAST)" selection keys are grayed out. When Meas Method is set to Single Offset, the Full Frame Mod selection key is grayed out.
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. If a grayed out selection is chosen via SCPI command, it is ignored (no error).
Preset	MODulation
State Saved	Saved in instrument state.
Range	Mod & Switch|Modulation|Switching|Full Frame Mod (FAST)
Instrument S/W Revision	Prior to A.02.00

Meas Method

Selects the measurement method.

The Meas Method that you select affects the displayed view. For details, see "View/Display" on page 530.

KEYMulti-Offset SCPIMULTiple	The measurement is done at all offsets in the offset frequency list.
KEYSingle Offset (Examine) SCPISINGle	The measurement is done at only one offset as determined by the offset frequency setting. This allows detailed examination of the time-domain waveform at the specified offset frequency.
KEYSwept SCPISWEPt	The measurement is done in the frequency domain. For output RF spectrum due to modulation it is done using time-gated spectrum analysis to sweep the analyzer with the gate turned on for the desired portion of the burst only.

Remote Command	`[:SENSe]:ORFSpectrum:MEASure MULTiple|SINGle|SWEPt` `[:SENSe]:ORFSpectrum:MEASure?`
Example	ORFS:MEAS SING ORFS:MEAS?
Dependencies/Couplings	The Swept key is unavailable when Meas Type is set to Mod & Switch. The Single Offset and Swept keys are unavailable when Meas Type is set to Full Frame Mod.
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. If an unavilable selection is chosen via a SCPI command, it is ignored (no error).
Preset	MULTiple
State Saved	Saved in instrument state.
Range	Multi Offset|Single Offset (Examine)|Swept
Instrument S/W Revision	Prior to A.02.00

Multi-Offset Freq List

Accesses a menu to choose the offset frequency list. Select a Standard, Short, or Custom list as shown in the table below.

List	Modulation Offsets (kHz)	Switching Transients Offsets (kHz)
Standard	100, 200, 250, 400, 600, 800, 1000, 1200, 1400, 1600, 1800, 3000, 6000	400, 600, 1200, 1800
Short	200, 250, 400, 600, 1200, 1800	400, 600, 1200, 1800
Custom	User-defined list that specifies: Offset Freq, RES BW, Limit Offsets, Meas Type, Initialized to be the same as the standard list Mod RBW, SW Trans RBW	400, 600, 1200, 1800

Select the list of settings that are used to make the ORFS measurement. This specifies standard or customized lists and short lists. The lists contain the offset frequencies (and bandwidths) that are used for the modulation spectrum and transient spectrum parts of the ORFS measurement.

- CUSTom – uses the four user-defined lists that specify:
- - Offset frequencies for modulation spectrum measurement
- - Corresponding resolution bandwidths for each of the modulation offset frequencies
- - Offset frequencies for switching transient spectrum measurement
- - Corresponding resolution bandwidths for each of the switching transient offset frequencies

SHORt - a shortened list of the offset frequencies specified in the GSM Standards. It uses two internal offset frequency lists, one for modulation spectrum and the other for switching transient spectrum. These offset frequencies cannot be changed, but the resolution bandwidths can be changed by other commands in the :SENSe:ORFSpectrum subsystem.

STANdard - the complete list of the offset frequencies specified in the GSM Standards, except for those offsets greater than 6 MHz. It uses two internal offset frequency lists, one for modulation spectrum and the other for switching transient spectrum. These offset frequencies cannot be changed, but the resolution bandwidths can be changed by other commands in the :SENSe:ORFSpectrum subsystem.

Remote Command	`[:SENSe]:ORFSpectrum:LIST:SELect CUSTom|SHORt|STANdard` `[:SENSe]:ORFSpectrum:LIST:SELect?`
Example	ORFS:LIST:SEL CUST ORFS:LIST:SEL?

Dependencies/Couplings	Unavailable when the Meas Method is not Multi-Offset.
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	SHORt
State Saved	Saved in instrument state.
Range	Standard|Short|Custom
Instrument S/W Revision	Prior to A.02.00

Single Offset Freq

Selects a frequency offset from the carrier, at which a single offset Output RF Spectrum measurement is performed.

Remote Command	`[:SENSe]:ORFSpectrum:OFRequency <freq>` `[:SENSe]:ORFSpectrum:OFRequency?`
Example	ORFS:OFR 250kHz ORFS:OFR?
Dependencies/Couplings	Unavailable when the Meas Method is not Single Offset.
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	250 kHz
State Saved	Saved in instrument state.
Min	–12.0 MHz
Max	+12.0 MHz
Instrument S/W Revision	Prior to A.02.00

Wideband Noise

Sets the wideband noise function to ON or OFF. When set to Off, the analyzer is turned to the carrier and –1800 kHz to +1800 kHz on either side of the center frequency is swept. When set to On, the whole of the relevant band +2 MHz on either side is swept.

Remote Command	`[:SENSe]:ORFSpectrum:WBNoise ON|OFF|1|0` `[:SENSe]:ORFSpectrum:WBNoise?`
Example	ORFS:WBN ON ORFS:WBN?
Dependencies/Couplings	Unavailable when the Meas Method is not Swept
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Fast Avg

Allows you to change the On/Off state of fast averaging.

Fast Average is active only when averaging is on, and when only the modulation results are being measured. If both modulation and switching transient results are being measured, the measurement uses the default averaging.

Remote Command	`[:SENSe]:ORFSpectrum:AVERage:FAST[:STATe] OFF|ON|0|1` `[:SENSe]:ORFSpectrum:AVERage:FAST[:STATe]?`
Example	ORFS:AVER:FAST ON ORFS:AVER:FAST?
Dependencies/Couplings	This key is available when 'Modulation' is selected on Meas Type and Meas Method is not SWEPt. Otherwise it is unavailable.
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON

State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Advanced

Accesses advanced features. These features are recommended for use only by advanced users.

Dependencies/Couplings	The Advanced menu is not available when Meas Method is Swept.
Key Path	**Meas Setup**
Instrument S/W Revision	Prior to A.02.00

Modulation Meas BWs

Accesses a menu with the following sections:

- Carrier RBW (for Modulation Meas BWs)
- <1800 kHz Offset RBW (for Modulation Meas BWs)
- >= 1800 kHz Offset RBW (for Modulation Meas BWs)

This menu key is unavailable when "Meas Type" on page 492 is Switching or "Multi-Offset Freq List" on page 494 is Custom.

Key Path	**Meas Setup, Advanced**
Instrument S/W Revision	Prior to A.02.00

Carrier RBW (for Modulation Meas BWs)

Sets the resolution bandwidth for measuring the carrier when measuring spectrum due to modulation and wideband noise.

Remote Command	`[:SENSe]:ORFSpectrum:BANDwidth[:RESolution]:MODulation:CARRier <freq>` `[:SENSe]:ORFSpectrum:BANDwidth[:RESolution]:MODulation:CARRier?`
Example	ORFS:BAND:MOD:CARR 30e3 ORFS:BAND:MOD:CARR?
Dependencies/Couplings	This parameter is only used with the "Multi-Offset Freq List" on page 494 Freq List Standard or Short lists, and not with the Custom list. No
Key Path	**Meas Setup, Advanced, Modulation Meas BWs**
Mode	GSM

Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	30 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Instrument S/W Revision	Prior to A.02.00

< 1800 kHz Offset RBW (for Modulation Meas BWs)

Sets the resolution bandwidth used for the spectrum due to modulation part of the ORFS measurement for offset frequencies less than 1800 kHz.

Remote Command	`[:SENSe]:ORFSpectrum:BANDwidth[:RESolution]:MODulation:OFFSet:CLOSe <freq>` `[:SENSe]:ORFSpectrum:BANDwidth[:RESolution]:MODulation:OFFSet:CLOSe?`
Example	ORFS:BAND:MOD:OFFS:CLOS 30kHz ORFS:BAND:MOD:OFFS:CLOS?
Dependencies/Couplings	This parameter is only used with the “Multi-Offset Freq List” on page 494 Freq List Standard or Short lists, and not with the Custom list.
Key Path	**Meas Setup, Advanced, Modulation Meas BWs**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	30 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Instrument S/W Revision	Prior to A.02.00

>= 1800 kHz Offset RBW (for Modulation Meas BWs)

Sets the resolution bandwidth used for the spectrum due to modulation part of the ORFS measurement for offset frequencies greater than or equal to 1800 kHz.

Remote Command	`[:SENSe]:ORFSpectrum:BANDwidth[:RESolution]:MODulation:OFFSet:FAR <freq>` `[:SENSe]:ORFSpectrum:BANDwidth[:RESolution]:MODulation:OFFSet:FAR?`

Example	ORFS:BAND:RES:MOD:OFFS:FAR 30kHz ORFS:BAND:RES:MOD:OFFS:FAR?
Dependencies/Couplings	This parameter is only used with the “Multi-Offset Freq List” on page 494 Freq List Standard or Short lists, and not with the Custom list.
Key Path	**Meas Setup, Advanced, Modulation Meas BWs**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	100 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Instrument S/W Revision	Prior to A.02.00

Switching Meas BWs

Accesses a menu with the following sections:

- Carrier RBW (for Modulation Meas BWs)
- <1800 kHz Offset RBW (for Modulation Meas BWs)
- >= 1800 kHz Offset RBW (for Modulation Meas BWs)
- VBW:3dB RBW (for Switching Meas BWs) – information only. Bandwidth ratio is fixed at 3.

This menu key is unavailable when “Meas Type” on page 492 is Modulation or Full Frame Mod, or when “Multi-Offset Freq List” on page 494 is Custom.

Key Path	**Meas Setup, Advanced**
Instrument S/W Revision	Prior to A.02.00

Carrier RBW (for Switching Meas BWs)

Sets the resolution bandwidth for the carrier when measuring spectrum due to switching transients.

Remote Command	`[:SENSe]:ORFSpectrum:BANDwidth[:RESolution]:SWITching:CARRier <freq>` `[:SENSe]:ORFSpectrum:BANDwidth[:RESolution]:SWITching:CARRier?`
Example	ORFS:BAND:SWIT:CARR 30e3 ORFS:BAND:SWIT:CARR?
Dependencies/Couplings	This parameter is only used with the “Multi-Offset Freq List” on page 494 Freq List Standard or Short lists, and not with the Custom list.

Key Path	**Meas Setup, Advanced, Switching Meas BWs**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	300 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Instrument S/W Revision	Prior to A.02.00

< 1800 kHz Offset RBW (for Switching Meas BWs)

Sets the resolution bandwidth used for the spectrum due to switching transients part of the ORFS measurement for offset frequencies less than 1800 kHz.

Remote Command	`[:SENSe]:ORFSpectrum:BANDwidth[:RESolution]:SWITching:OFFSet:CLOSe <freq>` `[:SENSe]:ORFSpectrum:BANDwidth[:RESolution]:SWITching:OFFSet:CLOSe?`
Example	ORFS:BAND:RES:SWIT:OFFS:CLOS 30kHz ORFS:BAND:RES:SWIT:OFFS:CLOS?
Dependencies/Couplings	This parameter is only used with the “Multi-Offset Freq List” on page 494 Freq List Standard or Short lists, and not with the Custom list.
Key Path	**Meas Setup, Advanced, Switching Meas BWs**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	30 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Instrument S/W Revision	Prior to A.02.00

>= 1800 kHz Offset RBW (for Switching Meas BWs)

Sets the resolution bandwidth used for the spectrum due to switching transient part of the ORFS measurement for offset frequencies greater than or equal to 1800 kHz.

Remote Command	`[:SENSe]:ORFSpectrum:BANDwidth[:RESolution]:SWITching:OFFSet:FAR <freq>` `[:SENSe]:ORFSpectrum:BANDwidth[:RESolution]:SWITching:OFFSet:FAR?`
Example	ORFS:BAND:RES:SWIT:OFFS:FAR 30e3 ORFS:BAND:RES:SWIT:OFFS:FAR?
Dependencies/Couplings	This parameter is only used with the "Multi-Offset Freq List" on page 494 Freq List Standard or Short lists, and not with the Custom list.
Key Path	**Meas Setup, Advanced, Switching Meas BWs**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	30 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Instrument S/W Revision	Prior to A.02.00

Modulation Custom Offs & Lim

This menu key is available only when the parameters below are set to the following values at the same time. Otherwise it is unavailable.

- Meas Type: Mod & Switch|Modulation|Full Frame Mod
- Meas Method: Multi Offset
- Multi-Offset Freq List: Custom

Key Path	**Meas Setup, Advanced**
Instrument S/W Revision	Prior to A.02.00

Offset

Selects the offset pairs (upper and lower) that affect the menu keys and displays the memory selection menu from A to O. The memory selection menu allows you to store up to 5 sets of parameter values for the offset pairs, such as Offset Freq, Res BW, Rel Limit Level Offset, Abs Limit Level Offset and Apply Level Offset. Press Offset until the letter selection at a time is shown on this menu key label.

Key Path	**Meas Setup, Advanced**
Instrument S/W Revision	Prior to A.02.00

Offset Freq

This parameter defines a custom set of states that defines whether or not the measurement is made on each defined offset frequency.

KEYOn SCPION | 1	The measurement is made on the corresponding frequency in Custom Modulation Offset Freq list.
KEYOff SCPIOFF | 0	The measurement is skipped for the corresponding frequency in Custom Modulation Offset Freq list.

Its default value is ON (1) in order to keep background compatibility. Previously, without this parameter, measurement was done on all the specified frequencies by Custom Modulation Offset Freq.

Remote Command	`[:SENSe]:ORFSpectrum:LIST:MODulation[:FREQuency] <freq>, <freq>, <freq>, <freq>,<freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>`
	`[:SENSe]:ORFSpectrum:LIST:MODulation[:FREQuency]?`
	`[:SENSe]:ORFSpectrum:LIST:MODulation:STATe OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1`
	`[:SENSe]:ORFSpectrum:LIST:MODulation:STATe?`

Example	ORFS:LIST:MOD:FREQ 0.0, 1.0e5, 2.0e5 ORFS:LIST:MOD:FREQ? ORFS:LIST:MOD:STAT ON, ON, ON ORFS:LIST:MOD:STAT?
Dependencies/Couplings	Unavailable when Offset is A.
Key Path	**Meas Setup, Advanced, Modulation Custom Offset & Limits**
Mode	GSM

Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.0, 1.0e5, 2.0e5, 2.5e5, 4.0e5, 6.0e5, 8.0e5, 1.0e6, 1.2e6, 1.4e6, 1.6e6, 1.8e6, 3.0e6, 6.0e6, 0.0 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1
State Saved	Saved in instrument state.
Min	0.0 Hz
Max	12.0 MHz
Instrument S/W Revision	Prior to A.02.00

Res BW

Defines the custom set of resolution bandwidths for the modulation spectrum part of the ORFS measurement. The first bandwidth specified is for the carrier. Each resolution bandwidth in this list corresponds to an offset frequency in the modulation offset frequency list. The number of items in each of these lists must be the same.

Remote Command	`[:SENSe]:ORFSpectrum:LIST:MODulation:BANDwidth <freq>, <freq>, <freq>, <freq>,<freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>` `[:SENSe]:ORFSpectrum:LIST:MODulation:BANDwidth?`
Example	ORFS:LIST:MOD:BAND 10e3,10e3,10e3 ORFS:LIST:MOD:BAND?
Key Path	**Meas Setup, Advanced, Modulation Custom Offset & Limits**
Notes	You must be in the GSM, EDGE mode to use this command. Use INSTrument:SELect to set the mode. This command is only valid if SENS:ORFS:MEAS is set to multiple and the custom list type is selected with :SENS:ORFS:LISE:SEL CUST.
Preset	3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,1.000000000E+05,1.000000000E+05,1.000000000E+05,1.000000000E+05
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Instrument S/W Revision	Prior to A.02.00

Rel Limit Level Offset

Defines the custom set of level offsets for the modulation spectrum part of the ORFS measurement. This allows you to modify the standard limits by adding a delta amplitude value to them. The first level offset specified must be 0 dB for the carrier. Each level offset in this list corresponds to an offset frequency in the modulation offset frequency list. The number of items in each of these lists must be the same.

Remote Command	`[:SENSe]:ORFSpectrum:LIST:MODulation:LOFFset[:RCARrier] <rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>` `[:SENSe]:ORFSpectrum:LIST:MODulation:LOFFset[:RCARrier]?`
Example	ORFS:LIST:MOD:LOFF:RCAR 0.0, –2.0, –5.0 ORFS:LIST:MOD:LOFF:RCAR?
Dependencies/Couplings	Unavailable when Offset is A.
Key Path	**Meas Setup, Advanced, Modulation Custom Offset & Limits**
Mode	GSM
Notes	The first element of the parameters must be zero. Otherwise, the Custom freq list is not used, but Standard freq list is used instead. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	Saved in instrument state.
Min	–200.0
Max	200.0
Instrument S/W Revision	Prior to A.02.00

Abs Limit Level Offset

This parameter defines a custom set of absolute limit level offsets for the modulation spectrum part of the ORFS measurement. It allows you to modify the standard-defined test limits by adding/subtracting a delta amplitude value to/from them. The single set of the offsets applies all the cases in terms of all the DUT types and power level classes. It takes an array of float64 numbers. Each element represents absolute level offsets at corresponding Custom Modulation Offset Freq.

Remote Command	`[:SENSe]:ORFSpectrum:LIST:MODulation:LOFFset:ABSolute <rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>` `[:SENSe]:ORFSpectrum:LIST:MODulation:LOFFset:ABSolute?`

Example	ORFS:LIST:MOD:LOFF:ABS 0.0, –2.0, –5.0 ORFS:LIST:MOD:LOFF:ABS?
Dependencies/Couplings	Unavailable when Offset is A.
Key Path	**Meas Setup, Advanced, Modulation Custom Offset & Limits**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	Saved in instrument state.
Min	–200.0
Max	200.0
Instrument S/W Revision	Prior to A.02.00

Apply Level Offset

KEYRel SCPIRELative	Only Custom Modulation Relative Limit Level Offsets are applied to standard-defined modulation relative test limit. Standard-defined modulation relative test limit does not change. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.
KEYBoth SCPIBOTH	Custom Modulation Relative Limit Level Offsets are applied to standard-defined modulation relative test limit. And, Custom Modulation Absolute Limit Level Offsets are applied to standard-defined modulation absolute test limit. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.
KEYAbs SCPIABSolute	Only Custom Modulation Absolute Limit Level Offsets are applied to standard-defined modulation absolute test limit. Standard-defined modulation absolute test limit does not change. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.

Remote Command	`[:SENSe]:ORFSpectrum:LIST:MODulation:APPLy RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute` `[:SENSe]:ORFSpectrum:LIST:MODulation:APPLy?`
Example	ORFS:LIST:MOD:APPL REL, REL, REL ORFS:LIST:MOD:APPL?
Dependencies/Couplings	Unavailable when Offset is A.
Key Path	**Meas Setup, Advanced, Modulation Custom Offset & Limits**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH
State Saved	Saved in instrument state.
Range	Rel|Both|Abs
Instrument S/W Revision	Prior to A.02.00

Switching Custom Offs & Lim

This menu key is available only when the parameters below are set to the following values at the same time. Otherwise it is unavailable.

- Meas Type: Mod & Switch | Switching
- Meas Method: Multi Offset
- Multi-Offset Freq List: Custom

Key Path	**Meas Setup, Advanced**
Instrument S/W Revision	Prior to A.02.00

Offset Freq

KEYOn SCPION | 1	The measurement is made on the corresponding frequency in Custom Switching Offset Freq list.
KEYOff SCPIOFF | 0	The measurement is skipped for the corresponding frequency in Custom Switching Offset Freq list.

Its default value is ON (1), to maintain background compatibility.

Remote Command	`[:SENSe]:ORFSpectrum:LIST:SWITching[:FREQuency] <freq>, <freq>, <freq>, <freq>,<freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>`
	`[:SENSe]:ORFSpectrum:LIST:SWITching[:FREQuency]?`
	`[:SENSe]:ORFSpectrum:LIST:SWITching:STATe OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1`
	`[:SENSe]:ORFSpectrum:LIST:SWITching:STATe?`
Example	ORFS:LIST:SWIT:FREQ 0.0, 1.0e5, 2.0e5
	ORFS:LIST:SWIT:FREQ?
	ORFS:LIST:SWIT:STAT ON, ON, ON
	ORFS:LIST:SWIT:STAT?
Dependencies/Couplings	Unavailable when Offset is A.
Key Path	**Meas Setup, Advanced, Switching Custom Offsets & Limits**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.0, 4.0e5, 6.0e5, 1.2e6, 1.8e6, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
	1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1
State Saved	Saved in instrument state.
Min	0.0 Hz
Max	12.0 MHz
Instrument S/W Revision	Prior to A.02.00

Res BW

Defines the custom set of resolution bandwidths for the switching transient spectrum part of the ORFS measurement. The first bandwidth specified is for the carrier. Each resolution bandwidth in this list corresponds to an offset frequency in the switching offset frequency list. The number of items in each of these lists must be the same.

Remote Command	`[:SENSe]:ORFSpectrum:LIST:SWITching:BANDwidth <freq>, <freq>, <freq>, <freq>,<freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>`
	`[:SENSe]:ORFSpectrum:LIST:SWITching:BANDwidth?`

Example	ORFS:LIST:SWIT:BAND 1e3,1e3,1e3,1e3 ORFS:LIST:SWIT:BAND?
Key Path	**Meas Setup, Advanced, Switching Custom Offsets & Limits**
Notes	You must be in the GSM, EDGE mode to use this command. Use INSTrument:SELect to set the mode. This command is only valid if :SENS:ORFS:MEAS is set to multiple and the custom list type is selected with :SENS:ORFS:LISE:SEL CUST.
Preset	3.000000000E+05,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Instrument S/W Revision	Prior to A.02.00

Rel Limit Level Offset

Defines the custom set of level offsets for the switching transient spectrum part of the ORFS measurement. This allows you to modify the standard limits by adding a delta amplitude value to them. The first level offset specified must be 0 dB for the carrier. Each level offset in this list corresponds to an offset frequency in the modulation offset frequency list. The number of items in each of these lists must be the same.

Remote Command	`[:SENSe]:ORFSpectrum:LIST:SWITching:LOFFset[:RCARrier] <rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>` `[:SENSe]:ORFSpectrum:LIST:SWITching:LOFFset[:RCARrier]?`
Example	ORFS:LIST:SWIT:LOFF:RCAR 0.0, –2.0, –5.0 ORFS:LIST:SWIT:LOFF:RCAR?
Dependencies/Couplings	Unavailable when Offset is A.
Key Path	**Meas Setup, Advanced, Switching Custom Offsets & Limits**
Mode	GSM
Notes	The first element of the parameters must be zero. Otherwise, the Custom freq list is not used, but Standard freq list is used instead. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0

State Saved	Saved in instrument state.
Min	–200.0
Max	200.0
Instrument S/W Revision	Prior to A.02.00

Abs Limit Level Offset

This parameter defines a custom set of absolute limit level offsets for the Switching spectrum part of the ORFS measurement. It allows you to modify the standard-defined test limits by adding/subtracting a delta amplitude value to/from them. The single set of the offsets applies all the cases in terms of all the DUT types and power level classes. It takes an array of float64 numbers. Each element represents absolute level offsets at corresponding Custom Switching Offset Freq.

Remote Command	`[:SENSe]:ORFSpectrum:LIST:SWITching:LOFFset:ABSolute <rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>` `[:SENSe]:ORFSpectrum:LIST:SWITching:LOFFset:ABSolute?`
Example	ORFS:LIST:SWIT:LOFF:ABS 0.0, –2.0, –5.0 ORFS:LIST:SWIT:LOFF:ABS?
Dependencies/Couplings	Grayed out when Offset is A.
Key Path	**Meas Setup, Advanced, Switching Custom Offsets & Limits**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	Saved in instrument state.
Min	–200.0
Max	200.0
Instrument S/W Revision	Prior to A.02.00

Apply Level Offset

KEYRel SCPIRELative	Only Custom Switching Relative Limit Level Offsets are applied to standard-defined switching relative test limit. Standard-defined switching relative test limit does not change. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.

KEYBoth SCPIBOTH	Custom Switching Relative Limit Level Offsets are applied to standard-defined switching relative test limit. And, Custom Switching Absolute Limit Level Offsets are applied to standard-defined switching absolute test limit. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.
KEYAbs SCPIABSolute	Only Custom Switching Absolute Limit Level Offsets are applied to standard-defined switching absolute test limit. Standard-defined switching absolute test limit does not change. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.

Remote Command	`[:SENSe]:ORFSpectrum:LIST:SWITching:APPLy RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute` `[:SENSe]:ORFSpectrum:LIST:SWITching:APPLy?`
Example	ORFS:LIST:SWIT:APPL REL, REL, REL ORFS:LIST:SWIT:APPL?
Dependencies/Couplings	Unavailable when Offset is A.
Key Path	**Meas Setup, Advanced, Switching Custom Offsets & Limits**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH
State Saved	Saved in instrument state.
Range	Rel | Both | Abs
Instrument S/W Revision	Prior to A.02.00

Min Freq Using Direct Time

Selects the transition frequency (the first offset frequency) where the Direct Time Domain method is used instead of the FFT method. The Direct Time Domain offers a high dynamic range and the measurement speed is faster at a few offset frequencies. The FFT method has a moderate dynamic range (generally sufficient when the RBW = 30 kHz) and the measurement speed is much faster at many offset frequencies. The FFT method uses 5-pole sync-tuned filters, as required by the standards, while the

Direct Time method does not. The use of 5-pole sync-tuned filters is critical at close-in offsets, such as 250 kHz and lower, because the measurement standards as written usually test the analyzer filter shape instead of the device under test. At 600 kHz offsets and above, the shape of the filters is unimportant, only their noise bandwidth and impulse bandwidth matter. At 400 kHz offset, the shape matters somewhat; therefore, the best agreement between different pieces of measurement equipment requires that the 400 kHz offset be measured with the FFT method.

Remote Command	`[:SENSe]:ORFSpectrum:BFRequency <freq>` `[:SENSe]:ORFSpectrum:BFRequency?`
Example	ORFS:BFR 600e3 ORFS:BFR?
Dependencies/Couplings	Unavailable unless Meas Method is set to MULTiple and Meas Type is set to MSWitching or MODulation.
Key Path	**Meas Setup, Advanced**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	600 kHz
State Saved	Saved in instrument state.
Min	0 kHz
Max	2MHz
Instrument S/W Revision	Prior to A.02.00

Fast Peak Det

Sets the detection mode to “fast peak”.

Remote Command	`[:SENSe]:ORFSpectrum:DETector:SWITching:FAST[:STATe] ON|OFF|1|0` `[:SENSe]:ORFSpectrum:DETector:SWITching:FAST[:STATe]?`
Example	ORFS:DET:SWIT:FAST ON ORFS:DET:SWIT:FAST?
Dependencies/Couplings	This key is active when the “Meas Type” on page 492 is ‘Switching’ and the “Meas Method” on page 493 is ‘Multi-Offset’. Otherwise it is unavailable.
Key Path	**Meas Setup, Advanced**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON

State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Ref Pwr Avg

Specifies how many averages you want to use when measuring the reference power.

Set it to ON to use the same number of averages as specified in the number of bursts averaged command.

Set it to OFF to use the number specified in the reference power averages command.

Remote Command	`[:SENSe]:ORFSpectrum:REFerence:AVERage:COUNt <integer>`
	`[:SENSe]:ORFSpectrum:REFerence:AVERage:COUNt?`
	`[:SENSe]:ORFSpectrum:REFerence:AVERage[:AUTO] ON|OFF|1|0`
	`[:SENSe]:ORFSpectrum:REFerence:AVERage[:AUTO]?`

Example	ORFS:REF:AVER:COUN 10 ORFS:REF:AVER:COUN? ORFS:REF:AVER OFF ORFS:REF:AVER?
Dependencies/Couplings	This key is only available when the “Meas Method” on page 493 is set to Single Offset.
Key Path	**Meas Setup, Advanced**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10 ON
State Saved	Saved in instrument state.
Range	1 to 1000
Instrument S/W Revision	Prior to A.02.00

Mod Avg

Selects the type of averaging for measuring the modulation spectrum. This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default may cause invalid measurement results.

KEYLog-Pwr Avg (Video) SCPILOG	The log of the power is averaged. (This is also known as video averaging.)

KEYPwr Avg (RMS) SCPIRMS	The power is averaged, providing the rms of the voltage.

Remote Command	`[:SENSe]:ORFSpectrum:AVERage:MODulation:TYPE LOG|RMS` `[:SENSe]:ORFSpectrum:AVERage:MODulation:TYPE?`
Example	ORFS:AVER:MOD:TYPE LOG ORFS:AVER:MOD:TYPE?
Dependencies/Couplings	Unavailable when “Meas Type” on page 492 is set to Switching.
Key Path	**Meas Setup, Advanced**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	LOG
State Saved	Saved in instrument state.
Range	Pwr Avg (RMS)|Log-Pwr Avg (Video)
Instrument S/W Revision	Prior to A.02.00

Modulation Reference Power

Allows you to manually set the modulation reference power for each Meas Method.

Remote Command	`[:SENSe]:ORFSpectrum:MODulation:RPOWer <ampl>`
	`[:SENSe]:ORFSpectrum:MODulation:RPOWer?`
	`[:SENSe]:ORFSpectrum:MODulation:RPOWer:AUTO[:STATe] OFF|ON|0|1`
	`[:SENSe]:ORFSpectrum:MODulation:RPOWer:AUTO[:STATe]?`

Example	ORFS:MOD:RPOW –20 ORFS:MOD:RPOW? ORFS:MOD:RPOW:AUTO 0 ORFS:MOD:RPOW:AUTO?
Key Path	**Meas Setup, Advanced**
Mode	GSM
Preset	–250 ON
State Saved	Saved in instrument state.
Min	–250

Max	250
Instrument S/W Revision	A.02.00

Switching Reference Power

Allows you to manually set the switching reference power for each Meas Method.

Remote Command	`[:SENSe]:ORFSpectrum:SWITching:RPOWer <ampl>`
	`[:SENSe]:ORFSpectrum:SWITching:RPOWer?`
	`[:SENSe]:ORFSpectrum:SWITching:RPOWer:AUTO[:STATe] OFF|ON|0|1`
	`[:SENSe]:ORFSpectrum:SWITching:RPOWer:AUTO[:STATe]?`
Example	ORFS:SWIT:RPOW –20
	ORFS:SWIT:RPOW?
	ORFS:SWIT:RPOW:AUTO 0
	ORFS:SWIT:RPOW:AUTO?
Key Path	**Meas Setup, Advanced**
Mode	GSM
Preset	–250
	ON
State Saved	Saved in instrument state.
Min	–250
Max	250
Instrument S/W Revision	A.02.00

Meas Preset

Restores all the measurement parameters to their default values.

Remote Command	`:CONFigure:ORFSpectrum`
Example	CONF:ORFS
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Instrument S/W Revision	Prior to A.02.00

Mode

Operation of this key is identical across all measurements. For details about this key, see “Mode” on page 1087.

Mode Setup

Operation of this key is identical across all measurements. For details about this key, see “Mode Setup” on page 1101.

Peak Search

There is no functionality for this front-panel key in this measurement. When pressed, this key displays a blank menu.

Remote Command	`:CALCulate:ORFSpectrum:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	`CALC:ORFS:MARK2:MAX`
Key Path	**Front-panel key**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Instrument S/W Revision	Prior to A.02.00

Recall

Operation of this key is identical across several measurements. For details of this key, see “Recall” on page 1123

Restart

Operation of this key is identical across all measurements. For details about this key, see “Restart” on page 1145.

Save

Operation of this key is identical across several measurements. For details of this key, see “Save” on page 1147

Single (Single Measurement/Sweep)

Operation of this key is identical across several measurements. For details about this key, see "Single (Single Measurement/Sweep)" on page 1173.

Source

Operation of this key is identical across several measurements. For details about this key, see “Source” on page 1175.

SPAN X Scale

Accesses a menu of functions that enable you to set the horizontal scale parameters.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Ref Value

Allows you to set the display X reference value.

Key Path	**Span X Scale**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Ref Value (RF Envelope window)

Allows you to set the display X reference value in the RF Envelope window.

Remote Command	`:DISPlay:ORFSpectrum:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel <time>` `:DISPlay:ORFSpectrum:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:ORFS:VIEW:WIND:TRAC:X:RLEV 1 DISP:ORFS:VIEW:WIND:TRAC:X:RLEV?
Dependencies/Couplings	Blanked when Meas Method is Multi Offset. If the "Auto Scaling" on page 526 is On, this value is automatically determined by the measurement result. When you set a value manually, "Auto Scaling" on page 476 automatically changes to Off.
Key Path	**Span X Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.000
State Saved	Saved in instrument state.
Min	–1.00 s
Max	10.00 s

Instrument S/W Revision	Prior to A.02.00

Ref Value (Spectrum window)

Allows you to set the display X reference value.

Remote Command	`:DISPlay:ORFSpectrum:VIEW2:WINDow[1]:TRACe:X[:SCALe]:RLEVel <freq>` `:DISPlay:ORFSpectrum:VIEW2:WINDow[1]:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:ORFS:VIEW2:WIND:TRAC:X:RLEV 0 DISP:ORFS:VIEW2:WIND:TRAC:X:RLEV?
Dependencies/Couplings	Blanked when Meas Method is Multi Offset. If the “Auto Scaling” on page 476 is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.
Key Path	**Span X Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	935.2 MHz
State Saved	Saved in instrument state.
Min	Depends on instrument minimum frequency.
Max	Depends on hardware options and instrument maximum frequency
Instrument S/W Revision	Prior to A.02.00

Scale/Div

Allows you to set the display X scale/division value.

Key Path	**Span X Scale**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Scale/Div (RF Envelope window)

Allows you to set the display X scale/division value in the RF Envelope window.

Remote Command	`:DISPlay:ORFSpectrum:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision <time>` `:DISPlay:ORFSpectrum:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:ORFS:VIEW:WIND:TRAC:X:PDIV 1ms DISP:ORFS:VIEW:WIND:TRAC:X:PDIV?
Dependencies/Couplings	Blanked when Meas Method is Multi Offset. If the “Auto Scaling” on page 476 is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.
Key Path	**Span X Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	57.600 us
State Saved	Saved in instrument state.
Min	1.00 ns
Max	1.00 s
Instrument S/W Revision	Prior to A.02.00

Scale/Div (Spectrum window)

Allows you to set the display X scale/division value in the Spectrum window.

Remote Command	`:DISPlay:ORFSpectrum:VIEW2:WINDow[1]:TRACe:X[:SCALe]:PDIVision <freq>` `:DISPlay:ORFSpectrum:VIEW2:WINDow[1]:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:ORFS:VIEW2:WIND:TRAC:X:PDIV 1MHz DISP:ORFS:VIEW2:WIND:TRAC:X:PDIV?
Dependencies/Couplings	Blanked when Meas Method is Multi Offset. If the “Auto Scaling” on page 476 is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.
Key Path	**Span X Scale**
Mode	GSM

Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	360.000 kHz
State Saved	Saved in instrument state.
Min	100.000 kHz
Max	1.000 MHz
Instrument S/W Revision	Prior to A.02.00

Ref Position

Allows you to set the display reference position to Left, Center or Right.

Remote Command	`:DISPlay:ORFSpectrum:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:ORFSpectrum:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:ORFS:VIEW:WIND:TRAC:X:RPOS CENT DISP:ORFS:VIEW:WIND:TRAC:X:RPOS?
Dependencies/Couplings	Blanked when Meas Method is Multi Offset.
Key Path	**Span X Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	LEFT|CENTer
State Saved	Saved in instrument state.
Range	Left|Ctr|Right
Instrument S/W Revision	Prior to A.02.00

Auto Scaling

Allows you to toggle the Auto Scaling function between On and Off.

Remote Command	`:DISPlay:ORFSpectrum:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:ORFSpectrum:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:COUPle?`
Example	DISP:ORFS:VIEW:WIND:TRAC:X:COUP 1 DISP:ORFS:VIEW:WIND:TRAC:X:COUP?

Dependencies/Couplings	Blanked when Meas Method is Multi Offset. See Notes
Key Path	**Span X Scale**
Mode	GSM
Notes	Upon pressing the Restart front-panel key or Restart softkey under the Meas Control menu, the scale coupling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either “Ref Value” on page 523 or “Scale/Div” on page 524 manually, Auto Scaling automatically changes to Off. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Automatically changes to Off
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Sweep/Control

Operation of this key is identical across several measurements. For details about this key, see “Sweep / Control” on page 1179.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Trace/Detector

There is no ‘Trace/Detector’ functionality supported in GMSK Output RF Spectrum so this Front-panel key displays a blank menu when the key is pressed.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

View/Display

For the GMSK Output RF Spectrum measurement, the View/Display menu includes only a Display key, which accesses a menu of functions that enable you to set the display parameters. See "Display" on page 1253 for more information about the Display menu.

The measurement has 7 available view types, as detailed in the table below. The view that is displayed depends on the settings of **Meas Type** (see "Meas Type" on page 492) and **Meas Method** (see "Meas Method" on page 493), which are keys in the **Meas Setup** menu.

For full details of each view, click on the link in the View column.

View	Meas Type Setting	Meas Method Setting
Modulation Power, Multi Offset (See "Modulation Power" on page 531)	Modulation *or* Full Frame Mod (FAST)	Multi Offset
Switching Power, Multi Offset (See "Switching Power" on page 533)	Switching	Multi Offset
Modulation and Switching, Multi Offset (See "Modulation and Switching" on page 535)	Mod & Switch	Multi Offset
Modulation and Switching, Single Offset (See "Modulation & Switching" on page 537)	Mod & Switch	Single Offset
Modulation, Single Offset (See "Modulation Power" on page 538)	Modulation	Single Offset
Switching, Single Offset (See "Switching Power" on page 539)	Switching	Single Offset
Swept Spectrum (See "Swept spectrum View" on page 541)	Modulation *or* Switching	Swept

For any view, if a result fails, 'F' is displayed beside the result.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Multi-Offset views

These views are displayed when **Meas Method** is set to **Multi Offset**. For details, see "Meas Method" on page 493.

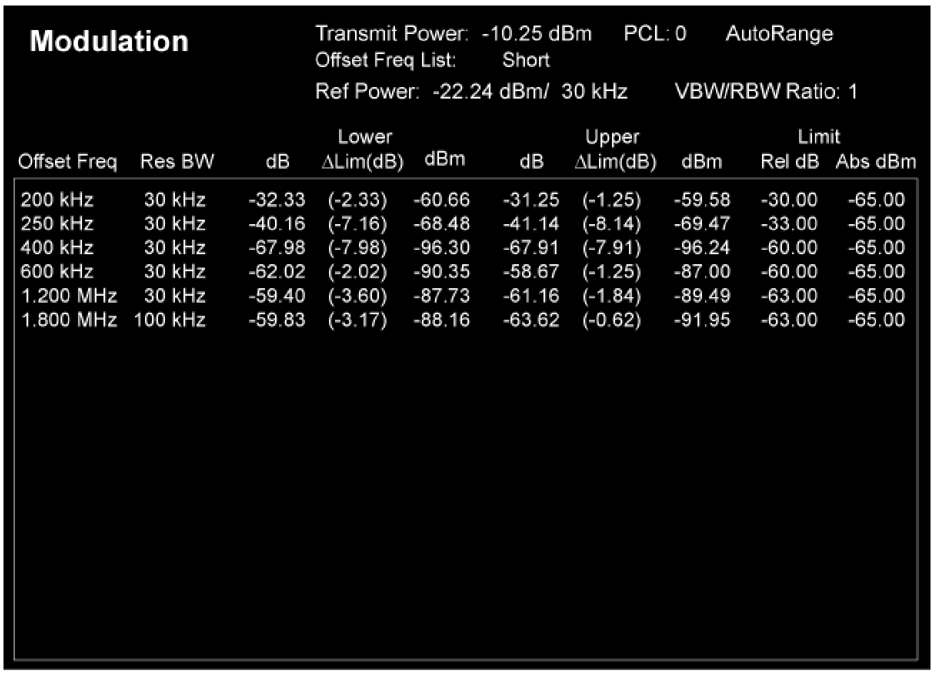
Modulation Power

This view is displayed when:

- Meas Type: Modulation, Full Frame Mod (FAST)
- Meas Method: Multi-Offset

The view has only one window: the Metrics Window. For details of each element of this window, see "Metrics Window" on page 532.

The figure below shows an example of this view.



Modulation

Transmit Power: -10.25 dBm PCL: 0 AutoRange
Offset Freq List: Short
Ref Power: -22.24 dBm/ 30 kHz VBW/RBW Ratio: 1

		Lower			Upper			Limit	
Offset Freq	Res BW	dB	ΔLim(dB)	dBm	dB	ΔLim(dB)	dBm	Rel dB	Abs dBm
200 kHz	30 kHz	-32.33	(-2.33)	-60.66	-31.25	(-1.25)	-59.58	-30.00	-65.00
250 kHz	30 kHz	-40.16	(-7.16)	-68.48	-41.14	(-8.14)	-69.47	-33.00	-65.00
400 kHz	30 kHz	-67.98	(-7.98)	-96.30	-67.91	(-7.91)	-96.24	-60.00	-65.00
600 kHz	30 kHz	-62.02	(-2.02)	-90.35	-58.67	(-1.25)	-87.00	-60.00	-65.00
1.200 MHz	30 kHz	-59.40	(-3.60)	-87.73	-61.16	(-1.84)	-89.49	-63.00	-65.00
1.800 MHz	100 kHz	-59.83	(-3.17)	-88.16	-63.62	(-0.62)	-91.95	-63.00	-65.00

Metrics Window

Name	Corresponding Results	Display Format
Transmit Power	n=7 Transmit Power [dBm]	–99.99 dBm
PCL	None. Power Control Level that determined by the Transmit Power and used to determine the limits. Since PCL is a Measurement Global parameter, [:SENSe]:RADio:PCL, refer to the section Mode Functionality. Auto disappears when [:SENSe]:RADio:PCL:STATe is set to 0|Off.	PCL: ## AutoRange
Offset Freq List	None Offset Frequency list parameter value (Standard|Short|Custom)	Short
Ref Power	n=1 2 Reference Power for all offsets [dBm] Resolution Bandwidth for reference power measurement [Hz]	–99.99/99
VBW/RBW Ratio	None VBW/RBW Ratio (1|3) [1 = Modulation, 3 = Switching]	1
Offset Freq	None Offset Frequency to be measured [Hz]	–99.99
Res BW	None Resolution Bandwidth for each offset [Hz]	–99.99
Lower dB	n=1 (N–1)*4+1 Negative offset(N) – power relative to carrier [dB]	–99.99
Delta from Limit dB Lower	n=6 (N–1)*4+1 Relative level to the test limit [dB] at the negative offset(N)	–99.99
Lower dBm	n=1 (N–1)*4+2 Negative offset(N) – absolute average power [dBm]	–99.99

Name	Corresponding Results	Display Format
Upper dB	n=1 (N–1)*4+3 Positive offset(N) – power relative to carrier [dB]	–99.99
Delta from Limit dB Upper	n=6 (N–1)*4+2 Relative level to the test limit [dB] at the positive offset(N)	–99.99
Upper dBm	n=1 (N–1)*4+4 Positive offset(N) – absolute average power [dBm]	–99.99
Limit Rel dB	n=6 (N–1)*4+3 Relative test limit used [dB]	–99.99
Limit Abs dBm	n=6 (N–1)*4+4 Absolute test limit used [dBm]	–99.99

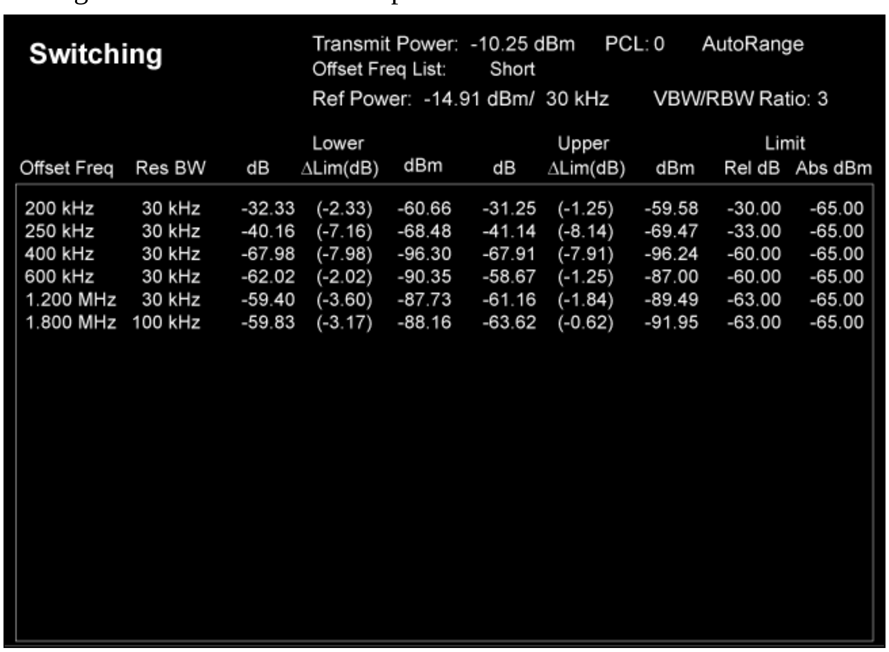
Switching Power

This view is displayed when:

- Meas Type: Switching
- Meas Method: Multi-Offset

The view has only one window: the Metrics Window. For details of each element of this window, see "Metrics Window" on page 534.

The figure below shows an example of this view.



Metrics Window

Name	Corresponding Results	Display Format
Transmit Power	n=7 Transmit Power	–99.99 dBm
PCL	None. Power Control Level that determined by the Transmit Power and used to determine the limits. Since PCL is a Measurement Global parameter, [:SENSe]:RADio:PCL, refer to the section Mode Functionality. Auto disappears when [:SENSe]:RADio:PCL:STATe is set to 0|Off.	PCL: ## AutoRange
Offset Freq List	None Offset Frequency list parameter value (Standard|Short|Custom)	Short
Ref Power	n=1 62 Reference Power for all offsets [dBm] Resolution Bandwidth for reference power measurement [Hz]	–99.99
VBW/RBW Ratio	None VBW/RBW Ratio (1|3) [1 = Modulation, 3 = Switching]	1
Offset Freq	None Offset Frequency to be measured [Hz]	–99.99
Res BW	None Resolution Bandwidth for each offset [Hz]	–99.99
Lower dB	n=1 (N–1)*4+1 Negative offset(N) – power relative to carrier [dB]	–99.99
Delta from Limit dB Lower	n=6 (N–1)*4+1 Relative level to the test limit [dB] at the negative offset(N)	–99.99
Lower dBm	n=1 (N–1)*4+2 Negative offset(N) – absolute average power [dBm]	–99.99

Name	Corresponding Results	Display Format
Upper dB	n=1 (N–1)*4+3 Positive offset(N) – power relative to carrier [dB]	–99.99
Delta from Limit dB Upper	n=6 (N–1)*4+2 Relative level to the test limit [dB] at the positive offset(N)	–99.99
Upper dBm	n=1 (N–1)*4+4 Positive offset(N) – absolute average power [dBm]	–99.99
Limit Rel dB	n=6 (N–1)*4+3 Relative test limit used [dB]	–99.99
Limit Abs dBm	n=6 (N–1)*4+4 Absolute test limit used [dBm]	–99.99

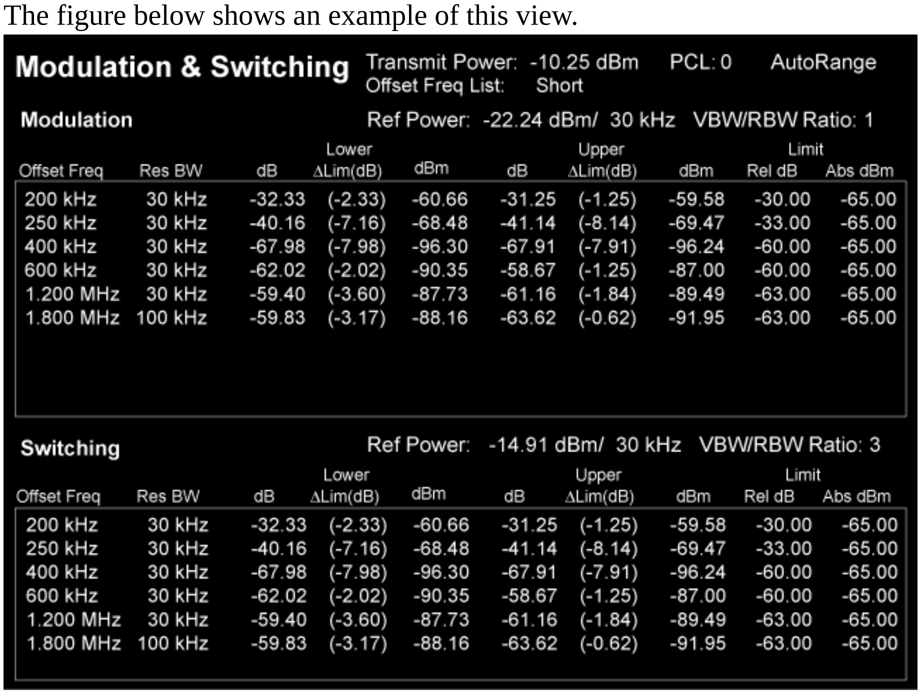
Modulation and Switching

This view is displayed when:

- Meas Type: Mod & Switch
- Meas Method: Multi-Offset

The view has only one window: the Metrics Window. For details of each element of this window, see “Metrics Window” on page 536.

The figure below shows an example of this view.



Modulation & Switching   Transmit Power: -10.25 dBm   PCL: 0   AutoRange
Offset Freq List: Short

Modulation   Ref Power: -22.24 dBm/ 30 kHz   VBW/RBW Ratio: 1

Offset Freq	Res BW	Lower dB	Lower ΔLim(dB)	Lower dBm	Upper dB	Upper ΔLim(dB)	Upper dBm	Limit Rel dB	Limit Abs dBm
200 kHz	30 kHz	-32.33	(-2.33)	-60.66	-31.25	(-1.25)	-59.58	-30.00	-65.00
250 kHz	30 kHz	-40.16	(-7.16)	-68.48	-41.14	(-8.14)	-69.47	-33.00	-65.00
400 kHz	30 kHz	-67.98	(-7.98)	-96.30	-67.91	(-7.91)	-96.24	-60.00	-65.00
600 kHz	30 kHz	-62.02	(-2.02)	-90.35	-58.67	(-1.25)	-87.00	-60.00	-65.00
1.200 MHz	30 kHz	-59.40	(-3.60)	-87.73	-61.16	(-1.84)	-89.49	-63.00	-65.00
1.800 MHz	100 kHz	-59.83	(-3.17)	-88.16	-63.62	(-0.62)	-91.95	-63.00	-65.00

Switching   Ref Power: -14.91 dBm/ 30 kHz   VBW/RBW Ratio: 3

Offset Freq	Res BW	Lower dB	Lower ΔLim(dB)	Lower dBm	Upper dB	Upper ΔLim(dB)	Upper dBm	Limit Rel dB	Limit Abs dBm
200 kHz	30 kHz	-32.33	(-2.33)	-60.66	-31.25	(-1.25)	-59.58	-30.00	-65.00
250 kHz	30 kHz	-40.16	(-7.16)	-68.48	-41.14	(-8.14)	-69.47	-33.00	-65.00
400 kHz	30 kHz	-67.98	(-7.98)	-96.30	-67.91	(-7.91)	-96.24	-60.00	-65.00
600 kHz	30 kHz	-62.02	(-2.02)	-90.35	-58.67	(-1.25)	-87.00	-60.00	-65.00
1.200 MHz	30 kHz	-59.40	(-3.60)	-87.73	-61.16	(-1.84)	-89.49	-63.00	-65.00
1.800 MHz	100 kHz	-59.83	(-3.17)	-88.16	-63.62	(-0.62)	-91.95	-63.00	-65.00

Metrics Window

Name	Corresponding Results	Display Format
Transmit Power	n=7 Transmit Power	–99.99 dBm
PCL	None. Power Control Level that determined by the Transmit Power and used to determine the limits. Since PCL is a Measurement Global parameter, [:SENSe]:RADio:PCL, refer to the section Mode Functionality. Auto disappears when [:SENSe]:RADio:PCL:STATe is set to 0|Off.	PCL: ## AutoRange
Offset Freq List	None Offset Frequency list parameter value (Standard|Short|Custom)	Short
Ref Power (Modulation)	n=1 2 Modulation Reference Power for all offsets [dBm] Resolution Bandwidth for reference power measurement [Hz]	–99.99/99
Ref Power (Switching)	n=1 62 Switching Reference Power for all offsets [dBm] Resolution Bandwidth for reference power measurement [Hz]	–99.99/99
VBW/RBW Ratio	None VBW/RBW Ratio (1|3) [1 = Modulation, 3 = Switching]	1
Offset Freq	None Offset Frequency to be measured [Hz]	–99.99
Res BW	None Resolution Bandwidth for each offset [Hz]	–99.99
Lower dB	n=1 (N–1)*4+1 Negative offset(N) – power relative to carrier [dB]	–99.99
Delta from Limit dB Lower	n=6 (N–1)*4+1 Relative level to the test limit [dB] at the negative offset(N)	–99.99

Name	Corresponding Results	Display Format
Lower dBm	n=1 (N–1)*4+2 Negative offset(N) – absolute average power [dBm]	–99.99
Upper dB	n=1 (N–1)*4+3 Positive offset(N) – power relative to carrier [dB]	–99.99
Delta from Limit dB Upper	n=6 (N–1)*4+2 Relative level to the test limit [dB] at the positive offset(N)	–99.99
Limit Rel dB	n=6 (N–1)*4+3 Relative test limit used [dB]	–99.99
Limit Abs dBm	n=6 (N–1)*4+4 Absolute test limit used [dBm]	–99.99

Single Offset Views

These views are displayed when **Meas Method** is set to **Single Offset**. For details, see "Meas Method" on page 493.

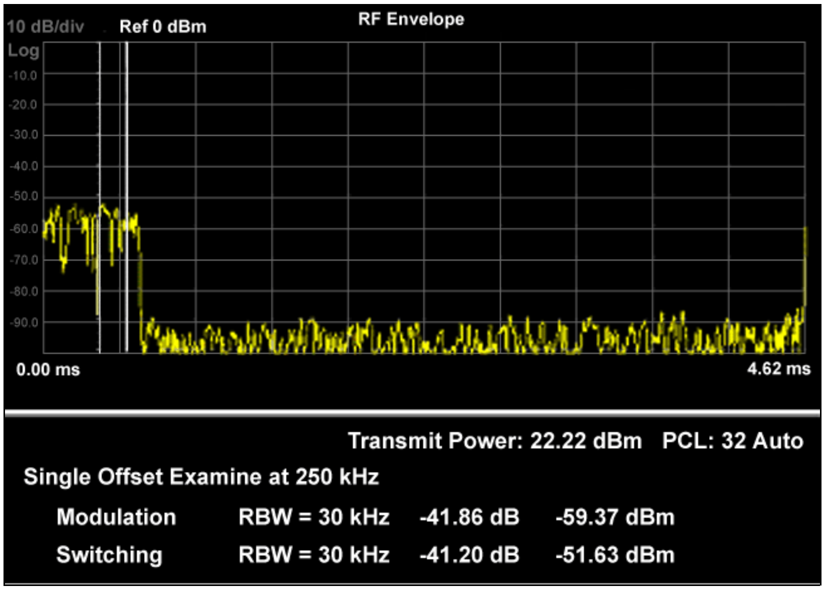
Modulation & Switching

This view is displayed when:

- Meas Type: Mod & Switch
- Meas Method: Single Offset

"Fast Avg" on page 496 is not available for this measurement.

The figure below shows an example of this view. In the figure, the blue trace is the Switching data and the yellow trace is the Modulation data, with the measurement gates shown as the vertical white lines.



Modulation Power

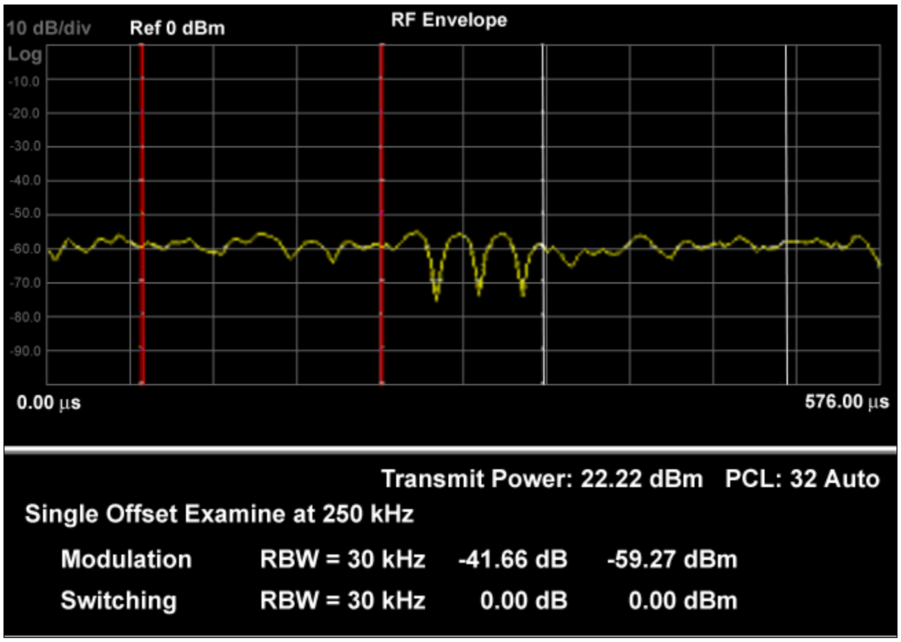
Available when

- Meas Type: Modulation
- Meas Method: Single Offset

The view has two windows: the Graph Window and the Metrics Window. Details of each element of these windows may be found under the description of the view “Switching Power” on page 539, under “Graph Window” on page 540 and “Metrics Window” on page 540 respectively.

The figure below shows an example of this view. In the figure:

- The white vertical lines represent the modulation section to be measured for modulation measurement.
- The red vertical lines represent the added section to be measured when Fast Avg is set to ‘On’ (improve measurement speed).



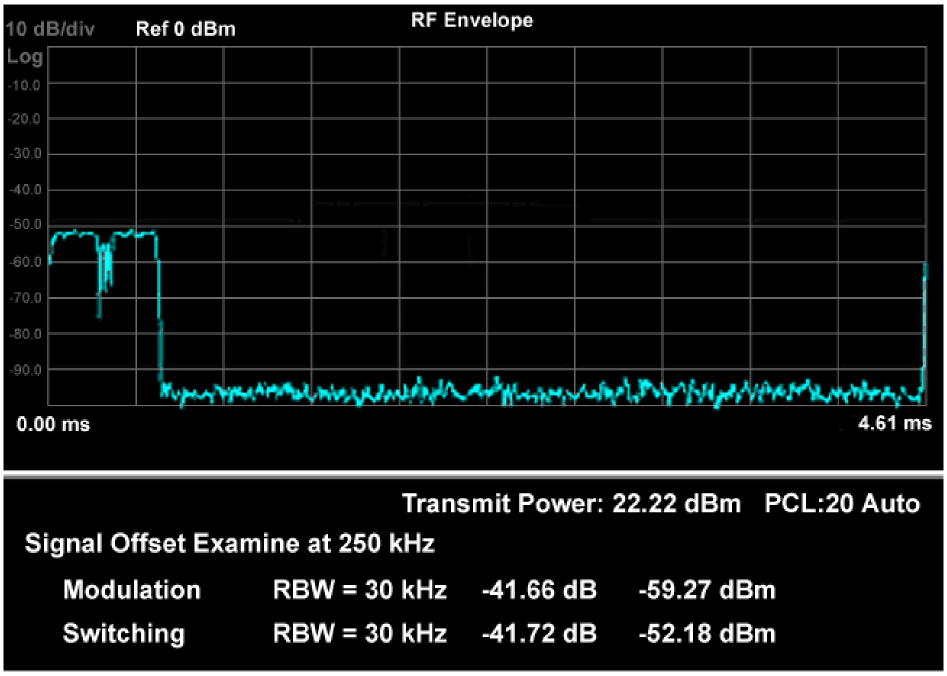
Switching Power

This view is displayed when:

- Meas Type: Switching
- Meas Method: Single Offset

The view has two windows: the Graph Window and the Metrics Window. For details of each element of these windows, see “Graph Window” on page 542 and “Metrics Window” on page 542 respectively.

The figure below shows an example of this view.



Graph Window

Marker Operation	Yes
Corresponding Trace	Yellow: Series of floating point numbers that represent the “spectrum due to modulation” signal. (n=2) Blue: Series of floating point numbers that represent the “spectrum due to switching transients” signal. (n=3)

Metrics Window

Name	Corresponding Results	Display Format
Modulation [dB]	n=1 1st Modulation spectrum power	–99.99 dB
Modulation [dBm]	n=1 2nd Modulation spectrum power	–99.99 dBm
Switching [dB]	n=1 3rd Switching transient power	–99.99 dB

Name	Corresponding Results	Display Format
Switching [dBm]	n=1 4th Switching transient power	–99.99 dBm
Transmit Power	n=7 Transmit Power	–99.99 dBm
PCL	None. Power Control Level that determined by the Transmit Power and used to determine the limits. Since PCL is a Measurement Global parameter, [:SENSe]:RADio:PCL, refer to the section Mode Functionality. Auto disappears when [:SENSe]:RADio:PCL:STATe is set to 0|Off.	PCL: ## Auto

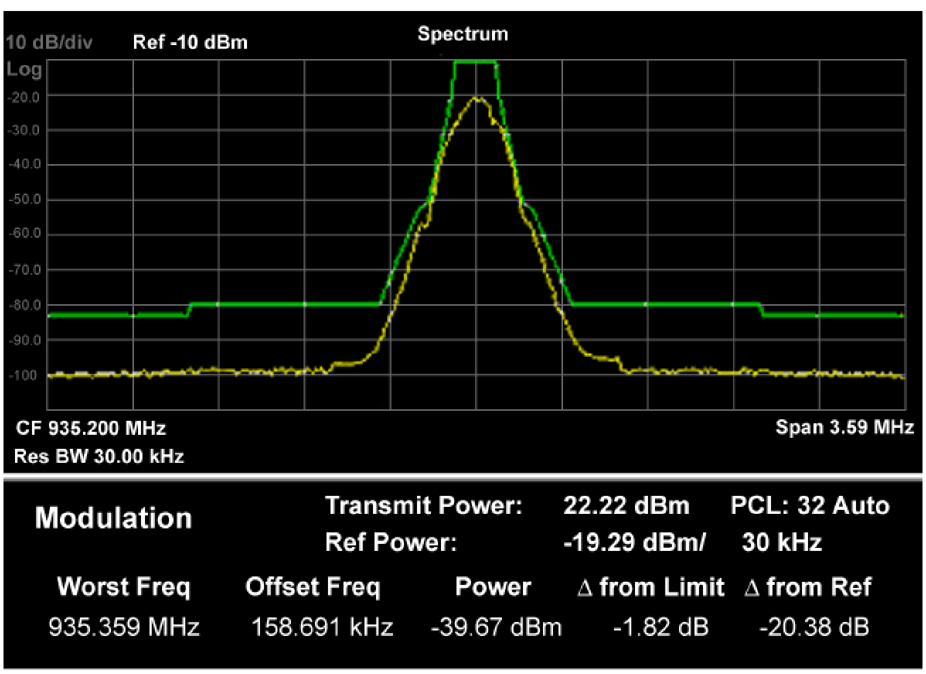
Swept spectrum View

This view is displayed when:

- Meas Type: Modulation, Switching
- Meas Method: Swept

The view has two windows: the Graph Window and the Metrics Window. For details of each element of these windows, see “Graph Window” on page 542 and “Metrics Window” on page 542 respectively.

The figure below shows an example of this view.



Graph Window

Marker Operation	Yes
Corresponding Trace	Series of floating point numbers that represent the “spectrum due to modulation” signal. (n=2)

Metrics Window

Name	Corresponding Results	Display Format
Worst Freq	n=1 1st Frequency	999.999 MHz
Offset Freq	n=1 2nd Offset frequency from carrier frequency	999.999 kHz
Power	n=1 3rd Power in dBm	–99.99 dBm
from Limit	n=1 4th delta from limit	–9.99 dB
from Ref	n=1 5th delta from reference	–99.99 dB
Transmit Power	n=7 Transmit Power	–99.99 dBm
PCL	None. Power Control Level that determined by the Transmit Power and used to determine the limits. Since PCL is a Measurement Global parameter, [:SENSe]:RADio:PCL, refer to the section Mode Functionality. Auto disappears when [:SENSe]:RADio:PCL:STATe is set to 0|Off.	PCL: ## Auto

Display

Operation of this key is identical across several measurements. For details about this key, see “Display” on page 1253.

10 GMSK TX Band Spur Measurement

This measurement checks that the transmitter does not transmit undesirable energy into the transmit band. This energy may cause interference for other users of the GSM system. For more details, see the section "GMSK TX Band Spur Measurement Description" on page 544 below.

This topic contains the following sections:

Measurement Commands for GMSK TX Band Spur

The following commands are used to retrieve the measurement results:

```
:CONFigure:TSPur
```

```
:CONFigure:TSPur:NDEFault
```

```
:INITiate:TSPur
```

```
:FETCh:TSPur[n]?
```

```
:READ:TSPur[n]?
```

```
:MEASure:TSPur[n]?
```

For more measurement related commands, see the section "Remote Measurement Functions" on page 1069.

Remote Command Results for GMSK TX Band Spur

n	Results Returned
not specified or n = 1	Returns 3 comma-separated scalar results: 1. The worst spur's frequency difference from channel center frequency (in MHz) 2. The worst spur's amplitude difference from the limit (in dB) 3. The worst spur's amplitude difference from the mean transmit power (in dB)
2	Returns trace of the current segment spectrum.
3	Returns trace of the current segment Upper Limit.
4	Returns trace of Lowest segment Spectrum.
5	Returns trace of Lowest segment Upper Limit.
6	Returns trace of Lower Adj segment Spectrum.
7	Returns trace of Lower Adj segment Upper Limit.
8	Returns trace of Upper Adj segment Spectrum.
9	Returns trace of Upper Adj segment Upper Limit.
10	Returns trace of Highest segment Spectrum.

n	Results Returned
11	Returns trace of Highest segment Upper Limit.
12	Returns 18 comma-separated scalar results:

1. The mean transmit power.
2. The spur's frequency offset from channel center frequency (in MHz) on Lowest region.
3. The spur's amplitude difference from the limit (in dB) on Lowest region.
4. The spur's amplitude difference from the mean transmit power (in dBc) on Lowest region.
5. The spur's frequency offset from channel center frequency (in MHz) on Lower region.
6. The spur's amplitude difference from the limit (in dB) on Lower region.
7. The spur's amplitude difference from the mean transmit power (in dBc) on Lower region.
8. The spur's frequency offset from channel center frequency (in MHz) on Upper region.
9. The spur's amplitude difference from the limit (in dB) on Upper region.
10. The spur's amplitude difference from the mean transmit power (in dBc) on Upper region.
11. The spur's frequency offset from channel center frequency (in MHz) on Highest region.
12. The spur's amplitude difference from the limit (in dB) on Highest region.
13. The spur's amplitude difference from the mean transmit power (in dBc) on Highest region.
14. Reserved
15. Reserved
16. Reserved
17. Reserved
18. Reserved

Note: –999.0 is retuned if the region can not be specified due to the band limit.

GMSK TX Band Spur Measurement Description

This measurement is only available for the base station. The transmitter should be set at its maximum output power on all time slots.

Key Path	**Meas**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

AMPTD (Amplitude) 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**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Ref Value

Allows you to set the absolute power reference.

Remote Command	`:DISPlay:TSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:TSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel ?`
Example	DISP:TSP:VIEW:WIND:TRAC:Y:RLEV –10 DISP:TSP:VIEW:WIND:TRAC:Y:RLEV?
Dependencies/Couplings	When “Auto Scaling” on page 548 is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	Saved in instrument state.
Min	–250.0
Max	250.0
Instrument S/W Revision	Prior to A.02.00

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” on page 969 under the AMPTD Y Scale section for more information.

Key Path	**AMPTD Y Scale**
Instrument S/W Revision	Prior to A.02.00

Scale/Div

Allows you to enter a numeric value to change the vertical display sensitivity.

Remote Command	`:DISPlay:TSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:TSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:TSP:VIEW:WIND:TRAC:Y:PDIV 10 DISP:TSP:VIEW:WIND:TRAC:Y:PDIV?
Dependencies/Couplings	When “Auto Scaling” on page 548 is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10.00
State Saved	Saved in instrument state.
Min	0.1
Max	20.0
Instrument S/W Revision	Prior to A.02.00

Presel Center

When this key is pressed, the centering of the preselector filter is adjusted to optimize the amplitude accuracy at the frequency of the selected marker.

See “Presel Center” on page 981 under the AMPTD Y Scale section for more information.

Key Path	**AMPTD Y Scale**

Instrument S/W Revision	Prior to A.02.00

Presel Adjust

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

See "Preselector Adjust" on page 982 under the AMPTD Y Scale section for more information.

Key Path	**AMPTD Y Scale**
Instrument S/W Revision	Prior to A.02.00

Internal Preamp

This menu controls the internal preamplifier. 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" on page 984 under AMPTD Y Scale for more information.

Key Path	**AMPTD Y Scale**
Instrument S/W Revision	Prior to A.02.00

Ref Position

Allows you to set the display reference position to Top, Center or Bottom.

Remote Command	`:DISPlay:TSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:TSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:TSP:VIEW:WIND:TRAC:Y:RPOS CENT DISP:TSP:VIEW:WIND:TRAC:Y:RPOS?
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	TOP
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Instrument S/W Revision	Prior to A.02.00

Auto Scaling

Allows you to toggle the scale coupling function between On and Off.

Remote Command	`:DISPlay:TSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:TSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle ?`
Example	DISP:TSP:VIEW:WIND:TRAC:Y:COUP 1 DISP:TSP:VIEW:WIND:TRAC:Y:COUP?
Dependencies/Couplings	When Auto Scaling is On, upon pressing the Restart front-panel key, this function automatically determines the scale per division and reference values based on the measurement results. When you set a value either “Ref Value” on page 545 or “Scale/Div” on page 546 manually, this parameter is set to ‘Off’ automatically.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Auto Couple

Operation of this key is identical across several measurements. For details about this key, see "AUTO COUPLE" on page 987.

BW

There is no functionality for this Front-panel key in this measurement. When pressed, this key displays a blank menu.

Key Path	**Front-panel key**
Mode	GSM

Cont (Continuous Measurement/Sweep)

Operation of this key is identical across all measurements. For details about this key, see "Cont (Continuous Measurement/Sweep)" on page 991.

FREQ Channel

Operation of this key is identical across all measurements. For details about this key, see "FREQ/Channel" on page 993.

Input/Output

Operation of this key is identical across all measurements. For details about this key, see "Input/Output" on page 1003.

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Some Marker operation is common across multiple Modes and Measurements. See the section "Marker" on page 1063 for information on features that are common.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

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

Marker Type

Sets the marker control mode Normal, Delta and Off. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Remote Command	`:CALCulate:TSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF` `:CALCulate:TSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	CALC:TSP:MARK:MODE OFF CALC:TSP:MARK:MODE?
Key Path	**Marker**
Mode	GSM
Notes	If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area. Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X axis value entered in the active function area displays the marker value to its full entered precision. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.

Preset	OFF
State Saved	Saved in instrument state.
Range	Normal|Delta|Off
Instrument S/W Revision	Prior to A.02.00

Marker X Axis Value (Remote Command Only)

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering an X value if the control mode is **Normal** or **Delta**.

Remote Command	`:CALCulate:TSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <real>`
	
	`:CALCulate:TSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`

Example	CALC:TSP:MARK3:X 0 CALC:TSP:MARK3:X?
Dependencies/Couplings	Max value will be changed.
Mode	GSM
Notes	If no suffix is sent, uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error “Invalid suffix” is generated. The query returns the marker’s absolute X Axis value if the control mode is **Normal**, or the offset from the marker’s reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency** and **Inverse Time**, seconds for **Period** and **Time**. If the marker is **Off** the response is not a number. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	–9.9E37
Max	9.9E37
Instrument S/W Revision	Prior to A.02.00

Marker X Axis Position (Remote Command Only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering a value if the control mode is **Normal** or **Delta** except in trace points rather than X Axis Scale units. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Remote Command	`:CALCulate:TSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <integer>` `:CALCulate:TSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`
Example	CALC:TSP:MARK10:X:POS 0 CALC:TSP:MARK10:X:POS?
Dependencies/Couplings	Max value will be changed.
Mode	GSM
Notes	The query returns the marker's absolute X Axis value in trace points if the control mode is **Normal**, or the offset from the marker's reference marker in trace points if the control mode is **Delta**. If the marker is **Off** the response is not a number. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	–9.9E37
Max	9.9E37
Instrument S/W Revision	Prior to A.02.00

Marker Y Axis Value (Remote Command Only)

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

The "result" of a marker is the value which is displayed on the second line of the Marker Result block. To properly interpret the returned value the remote programmer must also know what the analyzer's Y-Axis Unit is set to as described below.

A marker can have up to two results, only one of which is displayed or returned on a query, as follows:

Absolute result: every marker has an absolute result and it is simply:

For Normal and Delta markers, the Y-axis value of the trace point the marker is currently on.

The absolute result is displayed in the result block or returned on a query unless the marker control mode is **Delta**.

Relative result: if a marker's control mode is **Delta**, the relative result is displayed in the result block or returned on a query. This is the ratio of the Absolute Result of a delta marker to the Absolute Result of its reference marker.

Remote Command	`:CALCulate:TSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	CALC:TSP:MARK11:Y?
Mode	GSM
Notes	The query returns the marker Y-axis result. If the marker is **Off** the response is not a number. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Query only command
Preset	0
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Properties

Accesses a menu that allows you to set marker properties and to access the marker trace menu.

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

Relative To

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

Remote Command	`:CALCulate:TSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>` `:CALCulate:TSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	CALC:TSP:MARK:REF 5 CALC:TSP:MARK:REF?
Key Path	**Marker, Properties**
Mode	GSM

Notes	A marker cannot be relative to itself so that choice is unavailable, and if sent from SCPI generates error –221: “Settings conflict; marker cannot be relative to itself.” When queried, a single value is returned (the specified marker numbers relative marker). You must be in the GSM 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
Instrument S/W Revision	Prior to A.02.00

Marker Trace

Assigns the specified marker to the designated trace.

Remote Command	`:CALCulate:TSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe SPECtrum|ULIMit` `:CALCulate:TSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?`
Example	CALC:TSP:MARK:TRAC SPEC CALC:TSP:MARK:TRAC?
Key Path	**Marker, Properties**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	SPECtrum
State Saved	Saved in instrument state.
Range	Spectrum|Upper Limit
Instrument S/W Revision	Prior to A.02.00

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).

This may result in markers going off screen.

Remote Command	`:CALCulate:TSPur:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:TSPur:MARKer:COUPle[:STATe]?`
Example	CALC:TSP:MARK:COUP ON CALC:TSP:MARK:COUP?
Key Path	**Marker**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

All Markers Off

Turns off all markers.

Remote Command	`:CALCulate:TSPur:MARKer:AOFF`
Example	CALC:TSP:MARK:AOFF
Key Path	**Marker**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Instrument S/W Revision	Prior to A.02.00

Marker Function

There is no functionality for this Front-panel key in this measurement. When pressed, this key displays a blank menu.

Key Path	**Front-panel key**
Mode	GSM

Marker > (Marker To)

There is no functionality for this Front-panel key in this measurement. When pressed, this key displays a blank menu.

Key Path	**Front-panel key**
Mode	GSM

Meas

Operation of this key is identical across all measurements. For details about this key, see “Meas” on page 1069.

Meas Setup

Displays the measurement setup menu for the currently selected measurement.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Avg/Hold Num

Allows you to specify the number of data acquisitions that are averaged. After the specified number of average counts, the averaging mode (terminal control) setting determines the averaging action.

OnSets measurement averaging on.

OffSets measurement averaging off.

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

Example	TSP:AVER:COUN 100 TSP:AVER:COUN? TSP:AVER 0 TSP:AVER?
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	30 ON
State Saved	Saved in instrument state.
Min	1
Max	10000
Instrument S/W Revision	Prior to A.02.00

Avg Mode

Selects the type of termination control used for the averaging function. This determines the averaging action after the specified number of data acquisitions (average count) is reached.

KEYExponential SCPIEXPonential	Each successive data acquisition after the average count is reached, is exponentially weighted and combined with the existing average.
KEYRepeat SCPIREPeat	After reaching the average count, the averaging is reset and a new average is started.

Remote Command	`[:SENSe]:TSPur:AVERage:TCONtrol EXPonential|REPeat` `[:SENSe]:TSPur:AVERage:TCONtrol?`
Example	TSP:AVER:TCON EXP TSP:AVER:TCON?
Key Path	**Meas Setup**
Mode	GSM
Notes	Valid only when “Avg/Hold Num” on page 563 is set to On. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	REPeat
State Saved	Saved in instrument state.
Range	Exp|Repeat
Instrument S/W Revision	Prior to A.02.00

Avg Type

Selects the type of averaging.

LOG – The log of the power is averaged. (This is also known as video averaging.)

MAXimum – The maximum values are retained. Remove from MUI.

RMS – The power is averaged, providing the rms of the voltage.

Remote Command	`[:SENSe]:TSPur:AVERage:TYPE LOG|MAXimum|RMS` `[:SENSe]:TSPur:AVERage:TYPE?`
Example	TSP:AVER:TYPE LOG TSP:AVER:TYPE?
Dependencies/Couplings	This key is unavailable when Trace is set to Max Hold. Selecting ‘MAXimum’ via SCPI force to change state of Trace to ‘MAXHold’. Selecting ‘LOG’ or ‘RMS’ force to change state of Trace to ‘AVERage’.

Key Path	**Meas Setup**
Mode	GSM
Notes	MAXimum is SCPI only, no MUI. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	MAXimum
State Saved	Saved in instrument state.
Range	Pwr Avg (RMS)|Log-Pwr Avg (Video)
Instrument S/W Revision	Prior to A.02.00

Meas Type

Selects the measurement type from the following selections:

KEYFull SCPIFULL	In Continuous Measure, it repeatedly does full search of all segments.
KEYExamine SCPIEXAMine	In Continuous Measure, after doing one full search across all segments, it parks on the worst segment and continuously updates that segment.

Remote Command	`[:SENSe]:TSPur:TYPE EXAMine|FULL` `[:SENSe]:TSPur:TYPE?`
Example	TSP:TYPE EXAM TSP:TYPE?
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	FULL
State Saved	Saved in instrument state.
Range	Examine|Full
Instrument S/W Revision	Prior to A.02.00

IF Gain

To take full advantage of the RF dynamic range of the analyzer, a switched IF amplifier with approximately 10 dB of gain is available. When it can be turned on without an overload, the dynamic range is always better with it on than off. The **IF Gain** key can be used to set the IF Gain function to Auto, or to On (the extra 10 dB) or Off. These settings affect sensitivity and IF overloads.

Key Path	**Meas Setup, Advanced**
Instrument S/W Revision	Prior to A.02.00

IF Gain Auto

Activates the auto rules for IF Gain. Auto rules will be set IF Gain to Low Gain.

Remote Command	`[:SENSe]:TSPur:IF:GAIN:AUTO[:STATe] ON|OFF|1|0`
	`[:SENSe]:TSPur:IF:GAIN:AUTO[:STATe]?`
Example	`TSP:IF:GAIN:AUTO ON`
	`TSP:IF:GAIN:AUTO?`
Dependencies/Couplings	Couple to IF Gain State.
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	Auto|Man
Instrument S/W Revision	Prior to A.02.00

IF Gain State

Selects the range of IF gain.

Remote Command	`[:SENSe]:TSPur:IF:GAIN[:STATe] ON|OFF|1|0`
	`[:SENSe]:TSPur:IF:GAIN[:STATe]?`
Example	`TSP:IF:GAIN ON`
	`TSP:IF:GAIN?`
Dependencies/Couplings	Coupled to “IF Gain Auto” on page 566 forces it to Manual mode.
Key Path	**Meas Setup**
Mode	GSM

Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. where ON = high gain OFF = low gain
Preset	OFF
State Saved	Saved in instrument state.
Range	Low Gain (Best for Large Signals)|High Gain (Best Noise Level)
Instrument S/W Revision	Prior to A.02.00

Limit

Sets the value for the test limit. This command does not accept units. Use :CALCulate:TSPur:LIMit:TEST to select the units dBm (absolute) or dB (relative).

dBm – Absolute limit

dBc – Relative to Mean Transmit Power.

Remote Command	`:CALCulate:TSPur:LIMit[:UPPer][:DATA] <real>`
	`:CALCulate:TSPur:LIMit[:UPPer][:DATA]?`
	`:CALCulate:TSPur:LIMit:TEST ABSolute|RELative`
	`:CALCulate:TSPur:LIMit:TEST?`

Example	CALC:TSP:LIM 100 CALC:TSP:LIM? CALC:TSP:LIM:TEST ABS CALC:TSP:LIM:TEST?
Dependencies/Couplings	Selection of Front-panel key Unit/Terminator Key will change this BAF parameter, absolute or relative. If you select dBm for terminator, BAF parameter should be changed to ABSolute(dBm).
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	–36.00 ABSolute
State Saved	Saved in instrument state.
Min	–200
Max	100

Instrument S/W Revision	Prior to A.02.00

Meas Preset

Restores all the measurement parameters to their default values.

Remote Command	`:CONFigure:TSPur`
Example	CONF:TSP
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Instrument S/W Revision	Prior to A.02.00

Mode

Operation of this key is identical across all measurements. For details about this key, see "Mode" on page 1087.

Mode Setup

Operation of this key is identical across all measurements. For details about this key, see “Mode Setup” on page 1101.

Peak Search

There is no functionality for this Front-panel key in this measurement. When pressed, this key displays a blank menu.

Remote Command	`:CALCulate:TSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	`:CALC:TSP:MARK2:MAX`
Key Path	**Front-panel key**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Instrument S/W Revision	Prior to A.02.00

Recall

Operation of this key is identical across several measurements. For details of this key, see “Recall” on page 1123

Restart

Operation of this key is identical across all measurements. For details about this key, see “Restart” on page 1145.

Save

Operation of this key is identical across several measurements. For details of this key, see “Save” on page 1147

Single

Operation of this key is identical across several measurements. For details about this key, see “Single (Single Measurement/Sweep)” on page 1173.

Source

Operation of this key is identical across several measurements. For details about this key, see “Source” on page 1175.

SPAN X Scale

There is no functionality for this Front-panel key in this measurement. When pressed, this key displays a blank menu.

Key Path	**Front-panel key**
Mode	GSM

Sweep/Control

Operation of this key is identical across several measurements. For details about this key, see "Sweep / Control" on page 1179.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Trace/Detector

Accesses a menu that allows you to control trace settings.

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

Trace

Selects the trace mode from the following selections:

KEYAvg	Trace will be averaged.
SCPIAVERage	
KEYMax Hold	Trace will hold maximum value.
SCPIMAXHold	

Remote Command	`[:SENSe]:TSPur:TRACe AVERage|MAXHold` `[:SENSe]:TSPur:TRACe?`
Example	TSP:TRAC AVER TSP:TRAC?
Dependencies/Couplings	Coupled with "Avg Type" on page 564.
Key Path	**Trace/Detector**
Mode	GSM
Notes	Valid only when "Avg/Hold Num" on page 563 is set to On. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	`MAXHold`
State Saved	Saved in instrument state.
Range	Avgerage|Max Hold
Instrument S/W Revision	Prior to A.02.00

Trigger

There is no functionality for this front-panel key in this measurement. When pressed, this key displays a blank menu.

Key Path	**Front-panel key**
Mode	GSM

View/Display

Display

Accesses a menu of functions that enable you to set up and control the display parameters for the current measurement. See the section "Display" on page 1253 for more information.

View

Changes the content of the Spectrum Window. The measurement splits the transmit band into four segments (or less if the currently selected ARFCN is at the edge of the band). Two of these segments are on each side of the ETSI specified transmit band. View selection allows you to select each segment in sequence after the measurement completes (if Meas Type Full), to automatically home in on the worst performing segment (if Meas Type Examine) or to manually select which segment to view (if Meas Type Examine).

	Lower Tx band edge to –6 MHz offset from the channel frequency
"Lower Adj Segment" on page 583	–6 MHz to –1.8 MHz offset from the channel frequency
"Upper Adj Segment" on page 583	+1.8 MHz to +6 MHz offset from the channel frequency
"Highest Segment" on page 584	+6 MHz offset from the channel frequency to the upper Tx band edge

For details of each view, click on the links above.

Key Path	**View/Display**
Mode	GSM
Notes	Dynamically changed in sequence after the measurement completes (if Meas Type Full), to automatically home in on the worst performing segment (if Meas Type Examine) or to manually select which segment to view (if Meas Type Examine).
Preset	Lower Segment
Range	Lowest Segment|Lower Adj Segment|Upper Adj Segment|Highest Segment
Instrument S/W Revision	Prior to A.02.00

Display

Accesses a menu of functions that enable you to set the display parameters. See the section "Display" on page 1253 for more information.

Key Path	**View/Display**

Instrument S/W Revision	Prior to A.02.00

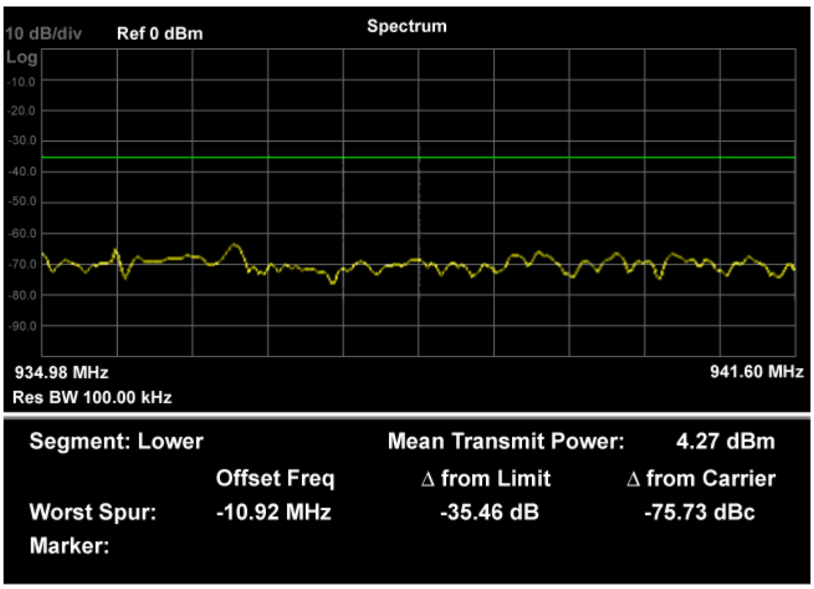
Lowest Segment

This view has 2 windows:

- Top window - Spectrum Window: shows spectrum of each segment. For details, see “Spectrum window” on page 582.
- Bottom window – Results Metrics Window: shows each metric result. For details, see “Metrics window” on page 582.

If a result fails, ‘F’ is displayed beside the result.

The figure below shows an example of the two windows of this view.



Spectrum window

Marker Operation	Yes
Corresponding Trace	Corrected measured trace (n=2,4,6,8,10)

Metrics window

Name	Corresponding Results	Display Format
Worst Spur: Offset	n=1 1st The worst spur’s frequency difference from channel center frequency.	99.99 MHz

Name	Corresponding Results	Display Format
Worst Spur: Δ from Limit	n=1 2nd The worst spur's amplitude difference from the limit	99.99 dB
Worst Spur: Δ from Carrier	n=1 3rd The worst spur's amplitude difference from the mean transmit power	99.99 dBc
Marker: Δ from Limit	Marker frequency difference from channel center frequency.	99.99 dB
Marker: Δ from Carrier	Marker amplitude difference from the limit.	99.99 dBc

Key Path	**View/Display**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Lower Adj Segment

This view has 2 windows:

- Top window - Spectrum Window: shows spectrum of each segment. For details, see the Spectrum Window topic in the description of the view "Lowest Segment" on page 582.
- Bottom window – Results Metrics Window: shows each metric result. This window is as shown in the example below.

Key Path	**View/Display**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Upper Adj Segment

This view has 2 windows:

- Top window - Spectrum Window: shows spectrum of each segment. For details, see the Spectrum Window topic in the description of the view "Lowest Segment" on page 582.
- Bottom window – Results Metrics Window: shows each metric result. This window is as shown in the example below.

Key Path	**View/Display**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Highest Segment

This view has 2 windows:

- Top window - Spectrum Window: shows spectrum of each segment. For details, see the Spectrum Window topic in the description of the view “Lowest Segment” on page 582.
- Bottom window – Results Metrics Window: shows each metric result. This window is as shown in the example below.

Key Path	**View/Display**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

11 EDGE EVM Measurement

Since EDGE uses PSK/QAM modulations, the transmitter's phase, frequency, and amplitude accuracy are critical to the communications system's performance.

This topic contains the following sections:

Measurement Commands for EDGE EVM

The following commands can be used to retrieve the measurement results:

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

For more measurement related commands, see the section "Remote Measurement Functions" on page 1069.

Remote Command Results for EDGE EVM

n	Results Returned
0	Returns unprocessed I/Q trace data, as a data array of comma-separated trace points, in volts.
1 (default)	Returns the following scalar results: 1. RMS 95th %ile EVM – a floating point number (in percent) of EVM over 95% of the entire measurement area. 2. Average RMS EVM – a floating point number (in percent) of EVM over the entire measurement area. 3. Maximum RMS EVM – a floating point number (in percent) of highest EVM over the entire measurement area. 4. Average Peak EVM – a floating point number (in percent) of the average of the peak EVMs. Take the peak EVMs from each burst and average them together. 5. Maximum Peak EVM – a floating point number (in percent) of the maximum peak EVM. Take the peak EVMs from each burst and identify the highest peak.

n	Results Returned
1 (Cont.)	6. Symbol position of the peak EVM – an integer number of the symbol position where the peak EVM error is detected. 7. Average Magnitude error – a floating point number (in percent) of average magnitude error over the entire measurement area. 8. Maximum Magnitude error – a floating point number (in percent) of maximum magnitude error over the entire measurement area. 9. Average Phase error – a floating point number (in degree) of average phase error over the entire measurement area. 10. Maximum Phase error – a floating point number (in degree) of maximum phase error over the entire measurement area. 11. Average Frequency error – a floating point number (in Hz) of the frequency error in the measured signal. 12. Maximum Frequency error – a floating point number (in Hz) of the highest frequency error in the measured signal. 13. I/Q origin offset – a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin. 14. Amplitude Droop Error – a floating point number (in dB) of the amplitude droop measured across the 142 symbol burst. 15. Trigger to T0 - a floating-point number (in sec) of the time interval between the trigger point to T0. T0 means the transition time from symbol 13 to symbol 14 of the midamble training sequence for each time slot.
2	Returns series of floating point numbers (in percent) that represent each sample in the EVM vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol.
3	Returns series of floating point numbers (in percent) that represent each sample in the magnitude error vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol.
4	Returns series of floating point numbers (in degree) that represent each sample in the phase error vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol.

n	Results Returned
5	Returns series of floating point numbers that alternately represent I and Q pairs of the final corrected measured data for the last slot. The magnitude of each I and Q pair are normalized to 1.0. The first number is the in-phase (I) sample of symbol 0 decision point and the second is the quadrature-phase (Q) sample of symbol 0 decision point. As in the EVM, there is 1 point per symbol, so the series of numbers is: 1st number = I of the symbol 0 decision point 2nd number = Q of the symbol 0 decision point . . . (2) + 1 (or 3rd) number = I of the symbol 1 decision point (2) + 2 (or 4th) number = Q of the symbol 1 decision point . . . (2) x N + 1 number = I of the symbol N decision point (2) x N + 2 number = Q of the symbol N decision point
6	Returns comma-separated scalar values of pass/fail (0.0 = passed, 1.0 = failed) results determined by testing EVM. Test results of RMS EVM Test results of Peak EVM Test results of 95%ile EVM Test results of I/Q Origin Offset Test results of Frequency Error
7	Returns series of integer values that represent the demoded symbols of the final corrected measured data for the last slot. bit/symbol is represented as a value between 0 – 7 (octal) : 8PSK 142 symbols 0 – 3 (octal) : QPSK 169 symbols 0 – 15 (decimal) : 16QAM 169 symbols 0 – 31 (decimal) : 32QAM 169 symbols

n	Results Returned
8	Returns the following scalar results:

1. RMS 95th %ile EVM – a floating point number (in percent) of EVM over 95% of the entire measurement area.
2. Average RMS EVM – a floating point number (in percent) of EVM over the entire measurement area.
3. Maximum RMS EVM – a floating point number (in percent) of highest EVM over the entire measurement area.
4. Average Peak EVM – a floating point number (in percent) of the average of the peak EVMs. Take the peak EVMs from each burst and average them together.
5. Maximum Peak EVM – a floating point number (in percent) of the maximum peak EVM. Take the peak EVMs from each burst and identify the highest peak.
6. Symbol position of the peak EVM – an integer number of the symbol position where the peak EVM error is detected.
7. Average Magnitude error – a floating point number (in percent) of average magnitude error over the entire measurement area.
8. Maximum Magnitude error – a floating point number (in percent) of maximum magnitude error over the entire measurement area.
9. Average Phase error – a floating point number (in degree) of average phase error over the entire measurement area.
10. Maximum Phase error – a floating point number (in degree) of maximum phase error over the entire measurement area.
11. Average Frequency error – a floating point number (in Hz) of the frequency error in the measured signal.
12. Maximum Frequency error – a floating point number (in Hz) of the highest frequency error in the measured signal.
13. I/Q origin offset – a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin.
14. Amplitude Droop Error – a floating point number (in dB) of the amplitude droop measured across the 142 symbol burst.
15. Trigger to T0 - a floating-point number (in sec) of the time interval between the trigger point to T0. T0 means the transition time from symbol 13 to symbol 14 of the midamble training sequence for each time slot.
16. Timing Offset of AM/PM path - a floating number (in sec) of the time interval between Amplitude Modulation path and Phase Modulation path.
17. Detected TSC is the most recently detected TSC. The returned value is 0~7 (Burst Type : Normal) if TSC detected. If TSC not detected, the returned value is –999.0. If Amptd or NONEPower vs Time only) specified in Sync Type, the returned value is –999.0. In multi slot condition, the returned value is the detected TSC of the specified slot(Time Slot ON) or the first evaluated slot(Time Slot OFF).

n	Results Returned
8 (Cont.)	18. Detected Mod Scheme (0:GMSK, 1:NB 8PSK, 2:NB 16QAM, 3:NB 32QAM, 11:HB QPAK, 12:HB 16QAM, 13:HB 32QAM) Note that value except for GMSK and 8PSK return only when N9071A–3FP (EDGE Evo license) is installed. 19. Reserved for future use (floating point) – the value returned is –999.0. 20. Reserved for future use (floating point) – the value returned is –999.0. 21. Reserved for future use (floating point) – the value returned is –999.0. 22. Reserved for future use (floating point) – the value returned is –999.0.
9	Returns series of floating point numbers that alternately represent I and Q pairs of the final corrected derotated measured data for the last slot. The magnitude of each I and Q pair are normalized to 1.0. The first number is the in-phase (I) sample of symbol 0 decision point and the second is the quadrature-phase (Q) sample of symbol 0 decision point. As in the EVM, there is 1 point per symbol, so the series of numbers is: 1st number = I of the symbol 0 decision point 2nd number = Q of the symbol 0 decision point . . . (2) +1 (or 3rd) number = I of the symbol 1 decision point (2) +2 (or 4th) number = Q of the symbol 1 decision point . . . (2) * N + 1 number = I of the symbol N decision point (2) * N + 2 number = Q of the symbol N decision point
10	Returns series of floating point numbers (in percent) that represent each sample in Max Hold of the EVM vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol. This command is available only when the Max Hold Trace State is ON.
11	Returns series of floating point numbers (in percent) that represent each sample in Min Hold of the EVM vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol. This command is available only when the Min Hold Trace State is ON.
12	Returns series of floating point numbers (in percent) that represent each sample in Max Hold of the magnitude error vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol. This command is available only when the Max Hold Trace State is ON.
13	Returns series of floating point numbers (in percent) that represent each sample in Min Hold of the magnitude error vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol. This command is available only when the Min Hold Trace State is ON.
14	Returns series of floating point numbers (in degree) that represent each sample in Max Hold of the phase error vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol. This command is available only when the Max Hold Trace State is ON.

n	Results Returned
15	Returns series of floating point numbers (in degree) that represent each sample in Min Hold of the phase error vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol. This command is available only when the Min Hold Trace State is ON.

EDGE EVM Measurement Description

The most widely used modulation quality metric in digital communications systems is error vector magnitude (EVM). The error vector is the vector difference at a given time between the ideal reference signal and the measured signal. The error vector is a complex quantity that contains a magnitude and phase component.

The EDGE EVM measurement calculates EVM as defined in Annex G of 3GPP TS 45.005 Release 8 143, V8.3.0 (2008-11).

Key Path	**Meas**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. 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**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Ref Value

Allows you to set reference value by error vector magnitude or phase error.

Key Path	**AMPTD Y Scale**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Ref Value (Mag Error or EVM)

Allows you to set reference value using Error Vector Magnitude.

Remote Command	`:DISPlay:EEVM:VIEW2:WINDow[1]|3:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:EEVM:VIEW2:WINDow[1]|3:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:EEVM:VIEW2:WIND:TRAC:Y:RLEV 10 DISP:EEVM:VIEW2:WIND:TRAC:Y:RLEV?
Dependencies/Couplings	When “Auto Scaling” on page 596 is On, this value is automatically determined by the measurement result. When the user sets this value manually, Auto Scaling automatically changes to Off.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	No
Min	–500
Max	500

Instrument S/W Revision	Prior to A.02.00

Ref Value (Phase Error)

Allows you to set reference value using Phase Error.

Remote Command	`:DISPlay:EEVM:VIEW2:WINDow2:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:EEVM:VIEW2:WINDow2:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:EEVM:VIEW2:WIND2:TRAC:Y:RLEV 2 DISP:EEVM:VIEW2:WIND2:TRAC:Y:RLEV?
Dependencies/Couplings	When "Auto Scaling" on page 596 is On, this value is automatically determined by the measurement result. When the user sets this value manually, Auto Scaling automatically changes to Off.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	No
Min	–36000
Max	36000
Instrument S/W Revision	Prior to A.02.00

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" on page 969 under AMPTD Y Scale for more information.

This is only available when the selected input is RF.

Key Path	**AMPTD/Y Scale**
Instrument S/W Revision	Prior to A.02.00

Range

Accesses the Range menu to change baseband I/Q gain settings. This key has a readback text that describes gain range value.

This is only available when the selected input is IQ. For more details, see "Range" on page 976.

Key Path	**AMPTD/Y Scale**
Instrument S/W Revision	Prior to A.02.00

Scale/Div

Sets the Y scale per division on the display, using percent (EVM) or degrees (Phase Error).

Key Path	**AMPTD Y Scale**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Scale/Div (Max Error or EVM)

Sets the vertical scale per division in percent.

Remote Command	`:DISPlay:EEVM:VIEW2:WINDow[1]|3:TRACe:Y[:SCALe]:PDIVision <real>` `:DISPlay:EEVM:VIEW2:WINDow[1]|3:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:EEVM:VIEW2:WIND:TRAC:Y:PDIV 2 DISP:EEVM:VIEW2:WIND:TRAC:Y:PDIV?
Dependencies/Couplings	When Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets this value manually, Auto Scaling automatically changes to Off.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	1
State Saved	No
Min	0.1
Max	50.0
Instrument S/W Revision	Prior to A.02.00

Scale/Div (Phase Error)

Sets the vertical scale per division in degrees.

Remote Command	`:DISPlay:EEVM:VIEW2:WINDow2:TRACe:Y[:SCALe]:PDIVision <real>`
	`:DISPlay:EEVM:VIEW2:WINDow2:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:EEVM:VIEW2:WIND2:TRAC:Y:PDIV 2
	DISP:EEVM:VIEW2:WIND2:TRAC:Y:PDIV?
Dependencies/Couplings	When "Auto Scaling" on page 596 is On, this value is automatically determined by the measurement result.
	When the user sets this value manually, Auto Scaling automatically changes to Off.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	1.0
State Saved	No
Min	0.01
Max	3600
Instrument S/W Revision	Prior to A.02.00

Presel Center

When this key is pressed, the centering of the preselector filter is adjusted to optimize the amplitude accuracy at the frequency of the selected marker.

See "Presel Center" on page 981 under AMPTD Y Scale for more information.

This is only available when the selected input is RF.

Key Path	**AMPTD Y Scale**
Instrument S/W Revision	Prior to A.02.00

Presel Adjust

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

See "Preselector Adjust" on page 982 under AMPTD Y Scale for more information.

This is only available when the selected input is RF.

Key Path	**AMPTD Y Scale**
Instrument S/W Revision	Prior to A.02.00

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" on page 984 under AMPTD Y Scale for more information.

This is only available when the selected input is RF.

Key Path	**AMPTD Y Scale**
Instrument S/W Revision	Prior to A.02.00

Ref Position

Allows you to set the reference position.

Remote Command	`:DISPlay:EEVM:VIEW2:WINDow[1]|2|3:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:EEVM:VIEW2:WINDow[1]|2|3:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:EEVM:VIEW2:WIND3:TRAC:Y:RPOS TOP DISP:EEVM:VIEW2:WIND3:TRAC:Y:RPOS?
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	Preset\Default is window dependent as follows: View – I/Q Error, Window – Mag Error: Ctr View – I/Q Error, Window – Phase Error: Ctr View – I/Q Error, Window – EVM: Bot You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	CENT|CENT|BOTT
State Saved	No
Range	Top|Ctr|Bot
Instrument S/W Revision	Prior to A.02.00

Auto Scaling

Allows you to toggle the Auto Scaling function between On and Off.

Remote Command	`:DISPlay:EEVM:VIEW2:WINDow[1]|2|3:TRACe:Y[:SCALe]:COUPle ON|OFF|1|0` `:DISPlay:EEVM:VIEW2:WINDow[1]|2|3:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:EEVM:VIEW2:WIND3:TRAC:Y:COUP ON DISP:EEVM:VIEW2:WIND3:TRAC:Y:COUP?
Dependencies/Couplings	When Auto Scaling is On, upon pressing the Restart front-panel key, this function automatically determines the scale per division and reference values based on the measurement results. When user sets a value either "Ref Value" on page 591 or "Ref Position" on page 595 manually, this parameter is set to 'Off' automatically.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	No
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Auto Couple

Operation of this key is identical across several measurements. For details about this key, see “AUTO COUPLE” on page 987.

BW

There is no functionality for this front-panel key in this measurement. Pressing this key displays a blank menu.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Cont (Continuous Measurement/Sweep)

Operation of this key is identical across all measurements. For details about this key, see "Cont (Continuous Measurement/Sweep)" on page 991.

FREQ Channel

Operation of this key is identical across all measurements. For details about this key, see "FREQ/Channel" on page 993.

Input/Output

Operation of this key is identical across all measurements. For details about this key, see "Input/Output" on page 1003.

Marker

Accesses the Marker menus.

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

Select Marker

Displays 12 markers available for selection.

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

Marker Type

Sets the marker control mode **Normal**, **Delta** and **Off**. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Remote Command	`:CALCulate:EEVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF` `:CALCulate:EEVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE ?`
Example	CALC:EEVM:MARK:MODE OFF CALC:EEVM:MARK:MODE?
Key Path	**Marker**
Mode	GSM
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 displays the marker value to its full entered precision. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal|Delta|Off

Instrument S/W Revision	Prior to A.02.00

Marker X Axis Value (Remote Command Only)

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering an X value if the control mode is **Normal** or **Delta**.

Remote Command	`:CALCulate:EEVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <real>` `:CALCulate:EEVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`
Example	CALC:EEVM:MARK3:X 0 CALC:EEVM:MARK3:X?
Dependencies/Couplings	Max value will be changed.
Mode	GSM
Notes	If no suffix is sent, uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error “Invalid suffix” is generated. The query returns the marker’s absolute X Axis value if the control mode is **Normal**, or the offset from the marker’s reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency** and **Inverse Time**, seconds for **Period** and **Time**. If the marker is **Off** the response is not a number. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a Not A Number (NAN).
State Saved	No
Min	–9.9E37
Max	9.9E37
Instrument S/W Revision	Prior to A.02.00

Marker X Axis Position (Remote Command Only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering a value if the control mode is **Normal** or **Delta** except in trace points rather than X Axis Scale units. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Remote Command	`:CALCulate:EEVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <integer>` `:CALCulate:EEVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`

Example	CALC:EEVM:MARK10:X:POS 0 CALC:EEVM:MARK10:X:POS?
Mode	GSM
Notes	The query returns the marker's absolute X Axis value in trace points if the control mode is **Normal**, or the offset from the marker's reference marker in trace points if the control mode is **Delta**. If the marker is **Off** the response is not a number. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a Not A Number (NAN).
State Saved	No
Min	–9.9E37
Max	9.9E37
Instrument S/W Revision	Prior to A.02.00

Marker Y Axis Value (Remote Command Only)

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

The "result" of a marker is the value which is displayed on the second line of the Marker Result block. To properly interpret the returned value the remote programmer must also know what the analyzer's Y-Axis Unit is set to as described below.

A marker can have up to two results, only one of which is displayed or returned on a query, as follows:

Absolute result: every marker has an absolute result and it is simply:

For Normal and Delta markers, the Y-axis value of the trace point the marker is currently on.

The absolute result is displayed in the result block or returned on a query unless the marker control mode is **Delta**.

Relative result: if a marker's control mode is **Delta**, the relative result is displayed in the result block or returned on a query. This is the ratio of the Absolute Result of a delta marker to the Absolute Result of its reference marker.

Remote Command	`:CALCulate:EEVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	CALC:EEVM:MARK11:Y?
Mode	GSM

Notes	The query returns the marker Y-axis result. If the marker is **Off** the response is not a number. If ‘Polar’ is selected for Marker Trace, it returns the values of ‘I’ and ‘Q’ at the same time. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Properties

Accesses a menu that allows you to set marker properties and to access the marker trace menu.

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

Select Marker

Displays 12 markers available for selection.

Key Path	**Marker, Properties**
Instrument S/W Revision	Prior to A.02.00

Relative To

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

Remote Command	`:CALCulate:EEVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>` `:CALCulate:EEVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	CALC:EEVM:MARK:REF 2 CALC:EEVM:MARK:REF?
Key Path	**Marker, Properties**
Mode	GSM

Notes	A marker cannot be relative to itself so that choice is unavailable, and if sent from SCPI generates error –221: “Settings conflict; marker cannot be relative to itself.” You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. When queried a single value is returned (the specified marker number’s relative marker).
Preset	2|3|4|5|6|7|8|9|10|11|12|1
State Saved	Saved in instrument state.
Min	1
Max	12
Instrument S/W Revision	Prior to A.02.00

Marker Trace

Assigns the specified marker to the designated trace.

Remote Command	`:CALCulate:EEVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe POLar|MERRor|PERRor|EVM|MAXMerror|MINMerror|MAXPerror|MINPerror|MAXEvm|MINEvm` `:CALCulate:EEVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?`
Example	CALC:EEVM:MARK:TRAC PERR CALC:EEVM:MARK:TRAC?
Key Path	**Marker, Properties**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	EVM
State Saved	Saved in instrument state.
Range	IQ Polar|Mag Error|Phase Error|EVM|Max Hold Mag Error|Min Hold Mag Error|Max Hold Phase Error|Min Hold Phase Error|Max Hold EVM|Min Hold EVM
Instrument S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00
History	MAXMerror|MINMerror|MAXPerror|MINPerror|MAXEvn|MINEvm selections were added at A.02.00.

Couple Markers

When this function is **On**, moving any marker causes an equal X Axis movement of every other marker which is not **Off**. By “equal X Axis movement” we mean that we preserve the difference between each marker’s X Axis value (in the fundamental x-axis units of the trace that marker is on) and the X Axis value of the marker being moved (in the same fundamental x-axis units). This may result in markers going off screen.

Remote Command	`:CALCulate:EEVM:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:EEVM:MARKer:COUPle[:STATe]?`
Example	CALC:EEVM:MARK:COUP ON CALC:EEVM:MARK:COUP?
Key Path	**Marker**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

All Markers Off

Turns off all markers.

Remote Command	`:CALCulate:EEVM:MARKer:AOFF`
Example	CALC:EEVM:MARK:AOFF
Key Path	**Marker**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Instrument S/W Revision	Prior to A.02.00

Marker Function

There is no functionality for this front-panel key in this measurement. Pressing this key displays a blank menu.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Marker To

There is no functionality for this front-panel key in this measurement. Pressing this key displays a blank menu.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Meas

Operation of this key is identical across all measurements. For details about this key, see “Meas” on page 1069.

Meas Setup

Displays the measurement setup menu for the currently selected measurement.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Avg /Hold Num

Sets the number of data acquisitions that will be averaged. After the specified number of average counts, the average mode (termination control) setting determines the average action.

Remote Command	`[:SENSe]:EEVM:AVERage:COUNt <integer>`
	`[:SENSe]:EEVM:AVERage:COUNt?`
	`[:SENSe]:EEVM:AVERage[:STATe] OFF|ON|0|1`
	`[:SENSe]:EEVM:AVERage[:STATe]?`
Example	EEVM:AVER:COUN 3
	EEVM:AVER:COUN?
	EEVM:AVER ON
	EEVM:AVER?
Dependencies/Couplings	When this value is changed, Avg State is set to On.
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10
	OFF
State Saved	Saved in instrument state.
Min	1
Max	10000
Instrument S/W Revision	Prior to A.02.00

Avg Mode

Selects the type of termination control used to averaging. This determines the averaging action after the specified number of data acquisitions (average count) is reached.

- Exponential averaging – When Measure is set at Cont, data acquisitions continue indefinitely. After N averages, exponential averaging is used with a weighting factor of N (the displayed average count stops at N). Exponential averaging weights new data more than old data, which allows tracking of slow-changing signals. The weighting factor N is set using the Averages, Avg Bursts key.
- Repeat averaging – When Measure is set at Cont, data acquisitions continue indefinitely. After N averages is reached, all previous result data is cleared and the average count is set back to 1. This is equivalent to being in Measure Single and pressing the Restart key when the Single measurement finishes.

Remote Command	`[:SENSe]:EEVM:AVERage:TCONtrol EXPonential|REPeat` `[:SENSe]:EEVM:AVERage:TCONtrol?`
Example	EEVM:AVER:TCON REP EEVM:AVER:TCON?
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	REPeat
State Saved	Saved in instrument state.
Range	Exp|Repeat
Instrument S/W Revision	Prior to A.02.00

Burst Sync

Select the method of synchronizing the measurement to the bursts.

Training Sequence (TSEQuence) – The burst synchronization performs a demodulation of the burst and determines the start and stop of the useful part of the burst based on the midamble training sync sequence.

RFBurst – The burst synchronization approximates the start and stop of the useful part of the burst without demodulation of the burst.

Polar Modulation -The burst synchronization performs a demodulation of the burst and determines the start and stop of the useful part of the burst based on the midamble training sync sequence. (It's same as "Training Seq") The measurement start searching training sequence both on amplitude path and phase path to make synchronization

None – The measurement is performed without searching burst.

Remote Command	`[:SENSe]:EEVM:BSYNc:SOURce TSEQuence|RFBurst|PMODulation|NONE` `[:SENSe]:EEVM:BSYNc:SOURce?`
Example	EEVM:BSYNC:SOUR RFB EEVM:BSYNC:SOUR?
Dependencies/Couplings	None When Burst Type in the Mode Setup menu is set to Mixed, this menu key is unavailable and Training Sequence (TSC) is used for synchronization. ”Training Seq” is shown on Meas Bar. The sync algorithm always runs in Training Sequence (TSC) synchronization mode in case of “Mixed” because Burst Type can be determined by looking at TSC in the signal. Original selection of Burst Sync becomes effective again when Burst Type selection is changed from “Mixed” to another one. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Key Path	**Meas Setup**
Mode	GSM
Preset	TSEQuence
State Saved	Saved in instrument state.
Range	Training Seq|RF Amptd|Polar Modulation|None
Instrument S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

IF Gain

To take full advantage of the RF dynamic range of the analyzer, a switched IF amplifier with approximately 10 dB of gain is available. When it can be turned on without an overload, the dynamic range is always better with it on than off. The **IF Gain** key can be used to set the IF Gain function to Auto, or to On (the extra 10 dB) or Off. These settings affect sensitivity and IF overloads.

Key Path	**Meas Setup, Advanced,**
Instrument S/W Revision	Prior to A.02.00

IF Gain Auto

Activates the auto rules for IF Gain

Remote Command	`[:SENSe]:EEVM:IF:GAIN:AUTO[:STATe] ON|OFF|1|0` `[:SENSe]:EEVM:IF:GAIN:AUTO[:STATe]?`

Example	`EEVM:IF:GAIN:AUTO ON` `EEVM:IF:GAIN:AUTO?`
Dependencies/Couplings	When either the auto attenuation works (for example, with electrical attenuator), or the Optimize Mechanical Attenuator range is requested, the IF Gain setting is changed according to the following rule. 'auto' sets IF Gain High under any of the following conditions: • the input attenuator is set to 0 dB, • the preamp is turned on, • the Max Mixer Level is 20 dBm or lower. For other settings, auto sets IF Gain to Low.
Key Path	**Meas Setup, IF Gain**
Mode	GSM
Notes	IF Gain only applies to the RF input. It does not apply to baseband I/Q input. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	Auto|Man
Instrument S/W Revision	Prior to A.02.00

IF Gain State

Turns the IF Gain state on or off.

Remote Command	`[:SENSe]:EEVM:IF:GAIN[:STATe] ON|OFF|1|0` `[:SENSe]:EEVM:IF:GAIN[:STATe]?`
Example	`EEVM:IF:GAIN ON` `EEVM:IF:GAIN?`
Dependencies/Couplings	Couple to "IF Gain Auto" on page 613.
Key Path	**Meas Setup, IF Gain**
Mode	GSM
Notes	IF Gain only applies to the RF input. It does not apply to baseband I/Q input. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. where ON = high gain OFF = low gain
Preset	OFF

State Saved	Saved in instrument state.
Range	Low Gain (Best for Large Signals)|High Gain (Best Noise Level)
Instrument S/W Revision	Prior to A.02.00

Limits

Accesses a menu that enables you to set the Limit Test to on or off and the Test Condition to a normal or extreme limit table.

Key Path	**Meas Setup**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Limit Test

Turns on or off limit pass/fail testing.

Remote Command	`:CALCulate:EEVM:LIMit:TEST[:STATe] OFF|ON|0|1`
	`:CALCulate:EEVM:LIMit:TEST[:STATe]?`
Example	CALC:EEVM:LIM:TEST ON
	CALC:EEVM:LIM:TEST?
Key Path	**Meas Setup, Limits**
Mode	GSM
Notes	If set to Off, PASS/FAIL indicator on the Meas Bar goes blank.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Test Condition

This measurement could have different limit table for different test environment, Normal and Extreme. This parameter allows user to select which limit table to be modified and used for the judgement.

Remote Command	`:CALCulate:EEVM:LIMit:TYPE NORMal|EXTReme`
	`:CALCulate:EEVM:LIMit:TYPE?`

Example	CALC:EEVM:LIM:TYPE NORM CALC:EEVM:LIM:TYPE?
Key Path	**Meas Setup, Limits**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	NORMal
State Saved	Saved in instrument state.
Range	Norm|Extreme
Instrument S/W Revision	Prior to A.02.00

RMS EVM

Accesses the menu to set the limit for the RMS EVM measurement pass/fail test per burst.

Key Path	**Meas Setup, Mode, Limits**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

NB 8PSK

Sets the limit of the 8PSK burst for the RMS EVM measurement pass/fail test.

Radio Type is BTS, Test Condition is Normal

Remote Command	`:CALCulate:EEVM:LIMit:BTS:NORMal:REVM <real>` `:CALCulate:EEVM:LIMit:BTS:NORMal:REVM?`
Example	CALC:EEVM:LIM:BTS:NORM:REVM 12 CALC:EEVM:LIM:BTS:NORM:REVM?
Key Path	**Meas Setup, Limits, RMS EVM**
Mode	GSM
Notes	This parameter can only be set using the front-panel Limits key if the device selected is BTS and Test Condition is Extreme. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	7.0
State Saved	Saved in instrument state.

Min	0.0
Max	100.0
Instrument S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

Radio Type is BTS, Test Condition is Extreme

Remote Command	`:CALCulate:EEVM:LIMit:BTS:EXTReme:REVM <real>`
	`:CALCulate:EEVM:LIMit:BTS:EXTReme:REVM?`
Example	CALC:EEVM:LIM:BTS:EXTR:REVM 15
	CALC:EEVM:LIM:BTS:EXTR:REVM?
Key Path	**Meas Setup, Limits, RMS EVM**
Mode	GSM
Notes	This parameter can only be set using the front-panel Limits key if the device selected is BTS and Test Condition is Extreme.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	8.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

Radio Type is MS, Test Condition is Normal

Remote Command	`:CALCulate:EEVM:LIMit:MS:NORMal:REVM <real>`
	`:CALCulate:EEVM:LIMit:MS:NORMal:REVM?`
Example	CALC:EEVM:LIM:MS:NORM:REVM 20
	CALC:EEVM:LIM:MS:NORM:REVM?
Key Path	**Meas Setup, Limits, RMS EVM**
Mode	GSM
Notes	This parameter can only be set using the front-panel Limits key if the device selected is MS and Test Condition is Extreme.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.

Preset	9.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

Radio Type is MS, Test Condition is Extreme

Remote Command	`:CALCulate:EEVM:LIMit:MS:EXTReme:REVM <real>`
	`:CALCulate:EEVM:LIMit:MS:EXTReme:REVM?`
Example	CALC:EEVM:LIM:MS:EXTR:REVM 15
	CALC:EEVM:LIM:MS:EXTR:REVM?
Key Path	**Meas Setup, Limits, RMS EVM**
Mode	GSM
Notes	This parameter can only be set using the front-panel Limits key if the device selected is MS and Test Condition is Extreme.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

NB 16QAM

Sets the limit of the normal symbol rate 16QAM burst for the RMS EVM Measurement pass/fail test.

Radio Type is BTS, Test Condition is Normal

Remote Command	`:CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate QAM16, <real>`
	`:CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate? QAM16`
Example	CALC:EEVM:LIM:BTS:NORM:REVM:NSR QAM16, 12
	CALC:EEVM:LIM:BTS:NORM:REVM:NSR? QAM16
Dependencies/Couplings	Blanked when the EDGE Evolution N9071A–3FP license is not installed.

Key Path	**Meas Setup, Limits, RMS EVM**
Mode	GSM
Notes	This parameter can only be set using the front-panel Limits key if the device selected is BTS and Test Condition is Normal. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	7.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	A.02.00

Radio Type is BTS, Test Condition is Extreme

Remote Command	`:CALCulate:EEVM:LIMit:BTS:EXTReme:REVM:NSRate QAM16, <real>` `:CALCulate:EEVM:LIMit:BTS:EXTReme:REVM:NSRate? QAM16`
Example	CALC:EEVM:LIM:BTS:EXTR:REVM:NSR QAM16, 15 CALC:EEVM:LIM:BTS:EXTR:REVM:NSR? QAM16
Dependencies/Couplings	Blanked when the EDGE Evolution N9071A–3FP license is not installed.
Key Path	**Meas Setup, Limits, RMS EVM**
Mode	GSM
Notes	This parameter can only be set using the front-panel Limits key if the device selected is BTS and Test Condition is Extreme. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	8.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	A.02.00

Radio Type is MS, Test Condition is Normal

Remote Command	`:CALCulate:EEVM:LIMit:MS:NORMal:REVM:NSRate QAM16, <real>` `:CALCulate:EEVM:LIMit:MS:NORMal:REVM:NSRate? QAM16`

Example	CALC:EEVM:LIM:MS:NORM:REVM:NSR QAM16, 20 CALC:EEVM:LIM:MS:NORM:REVM:NSR? QAM16
Dependencies/Couplings	Blanked when the EDGE Evolution N9071A–3FP license is not installed.
Key Path	**Meas Setup, Limits, RMS EVM**
Mode	GSM
Notes	This parameter can only be set using the front-panel Limits key if the device selected is MS and Test Condition is Normal. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	9.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	A.02.00

Radio Type is MS, Test Condition is Extreme

Remote Command	`:CALCulate:EEVM:LIMit:MS:EXTReme:REVM:NSRate QAM16, <real>` `:CALCulate:EEVM:LIMit:MS:EXTReme:REVM:NSRate? QAM16`
Example	CALC:EEVM:LIM:MS:EXTR:REVM:NSR QAM16, 15 CALC:EEVM:LIM:MS:EXTR:REVM:NSR? QAM16
Dependencies/Couplings	Blanked when the EDGE Evolution N9071A–3FP license is not installed.
Key Path	**Meas Setup, Limits, RMS EVM**
Mode	GSM
Notes	This parameter can only be set using the front-panel Limits key if the device selected is MS and Test Condition is Extreme. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	A.02.00

NB 32QAM

Sets the limit of the normal symbol rate 32QAM burst for the RMS EVM Measurement pass/fail test.

Radio Type is BTS, Test Condition is Normal

Remote Command	`:CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate QAM32, <real>` `:CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate? QAM32`
Example	CALC:EEVM:LIM:BTS:NORM:REVM:NSR QAM32, 12 CALC:EEVM:LIM:BTS:NORM:REVM:NSR? QAM32
Dependencies/Couplings	Blanked when the EDGE Evolution N9071A–3FP license is not installed.
Key Path	**Meas Setup, Limits, RMS EVM**
Mode	GSM
Notes	This parameter can only be set using the front-panel Limits key if the device selected is BTS and Test Condition is Normal. But SCPI command can set each test limit without setting the radio device and test condition because it contains the information of radio device and test condition. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	7.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	A.02.00

Radio Type is BTS, Test Condition is Extreme

Remote Command	`:CALCulate:EEVM:LIMit:BTS:EXTReme:REVM:NSRate QAM32, <real>` `:CALCulate:EEVM:LIMit:BTS:EXTReme:REVM:NSRate? QAM32`
Example	CALC:EEVM:LIM:BTS:EXTR:REVM:NSR QAM32, 15 CALC:EEVM:LIM:BTS:EXTR:REVM:NSR? QAM32
Dependencies/Couplings	Blanked when the EDGE Evolution N9071A–3FP license is not installed.
Key Path	**Meas Setup, Limits, RMS EVM**
Mode	GSM

Notes	This parameter can only be set using the front-panel Limits key if the device selected is BTS and Test Condition is Extreme. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	8.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	A.02.00

Radio Type is MS, Test Condition is Normal

Remote Command	`:CALCulate:EEVM:LIMit:MS:NORMal:REVM:NSRate QAM32, <real>` `:CALCulate:EEVM:LIMit:MS:NORMal:REVM:NSRate? QAM32`
Example	CALC:EEVM:LIM:MS:NORM:REVM:NSR QAM32, 20 CALC:EEVM:LIM:MS:NORM:REVM:NSR? QAM32
Dependencies/Couplings	Blanked when the EDGE Evolution N9071A–3FP license is not installed.
Key Path	**Meas Setup, Limits, RMS EVM**
Mode	GSM
Notes	This parameter can only be set using the front-panel Limits key if the device selected is MS and Test Condition is Normal. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	9.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	A.02.00

Radio Type is MS, Test Condition is Extreme

Remote Command	`:CALCulate:EEVM:LIMit:MS:EXTReme:REVM:NSRate QAM32, <real>` `:CALCulate:EEVM:LIMit:MS:EXTReme:REVM:NSRate? QAM32`
Example	CALC:EEVM:LIM:MS:EXTR:REVM:NSR QAM32, 15 CALC:EEVM:LIM:MS:EXTR:REVM:NSR? QAM32

Dependencies/Couplings	Blanked when the EDGE Evolution N9071A–3FP license is not installed.
Key Path	**Meas Setup, Limits, RMS EVM**
Mode	GSM
Notes	This parameter can only be set using the front-panel Limits key if the device selected is MS and Test Condition is Extreme. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	A.02.00

HB QPSK

Sets the limit of the QPSK burst for the RMS EVM Measurement pass/fail test.

Radio Type is BTS, Test Condition is Normal

Remote Command	`:CALCulate:EEVM:LIMit:BTS:NORMal:REVM:HSRate QPSK, <real>` `:CALCulate:EEVM:LIMit:BTS:NORMal:REVM:HSRate? QPSK`
Example	CALC:EEVM:LIM:BTS:NORM:REVM:HSR QPSK, 12 CALC:EEVM:LIM:BTS:NORM:REVM:HSR? QPSK
Dependencies/Couplings	Blanked when the EDGE Evolution N9071A–3FP license is not installed.
Key Path	**Meas Setup, Limits, RMS EVM**
Mode	GSM
Notes	This parameter can only be set using the front-panel Limits key if the device selected is BTS and Test Condition is Normal. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	7.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	A.02.00

Radio Type is BTS, Test Condition is Extreme

Remote Command	`:CALCulate:EEVM:LIMit:BTS:EXTReme:REVM:HSRate QPSK, <real>`
	`:CALCulate:EEVM:LIMit:BTS:EXTReme:REVM:HSRate? QPSK`
Example	CALC:EEVM:LIM:BTS:EXTR:REVM:HSR QPSK, 15
	CALC:EEVM:LIM:BTS:EXTR:REVM:HSR? QPSK
Dependencies/Couplings	Blanked when the EDGE Evolution N9071A–3FP license is not installed.
Key Path	**Meas Setup, Limits, RMS EVM**
Mode	GSM
Notes	This parameter can only be set using the front-panel Limits key if the device selected is BTS and Test Condition is Extreme.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	8.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	A.02.00

Radio Type is MS, Test Condition is Normal

Remote Command	`:CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate QPSK, <real>`
	`:CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate? QPSK`
Example	CALC:EEVM:LIM:MS:NORM:REVM:HSR QPSK, 20
	CALC:EEVM:LIM:MS:NORM:REVM:HSR? QPSK
Dependencies/Couplings	Blanked when the EDGE Evolution N9071A–3FP license is not installed.
Key Path	**Meas Setup, Limits, RMS EVM**
Mode	GSM
Notes	This parameter can only be set using the front-panel Limits key if the device selected is MS and Test Condition is Normal.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	9.0
State Saved	Saved in instrument state.
Min	0.0

Max	100.0
Instrument S/W Revision	A.02.00

Radio Type is MS, Test Condition is Extreme

Remote Command	`:CALCulate:EEVM:LIMit:MS:EXTReme:REVM:HSRate QPSK, <real>`
	`:CALCulate:EEVM:LIMit:MS:EXTReme:REVM:HSRate? QPSK`
Example	CALC:EEVM:LIM:MS:EXTR:REVM:HSR QPSK, 15
	CALC:EEVM:LIM:MS:EXTR:REVM:HSR? QPSK
Dependencies/Couplings	Blanked when the EDGE Evolution N9071A–3FP license is not installed.
Key Path	**Meas Setup, Limits, RMS EVM**
Mode	GSM
Notes	This parameter can only be set using the front-panel Limits key if the device selected is MS and Test Condition is Extreme.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	A.02.00

HB 16QAM

Sets the limit of the higher symbol rate 16QAM burst for the RMS EVM Measurement pass/fail test.

Radio Type is BTS, Test Condition is Normal

Remote Command	`:CALCulate:EEVM:LIMit:BTS:NORMal:REVM:HSRate QAM16, <real>`
	`:CALCulate:EEVM:LIMit:BTS:NORMal:REVM:HSRate? QAM16`
Example	CALC:EEVM:LIM:BTS:NORM:REVM:HSR QAM16, 12
	CALC:EEVM:LIM:BTS:NORM:REVM:HSR? QAM16
Dependencies/Couplings	Blanked when the EDGE Evolution N9071A–3FP license is not installed.
Key Path	**Meas Setup, Limits, RMS EVM**
Mode	GSM

Notes	This parameter can only be set using the front-panel Limits key if the device selected is BTS and Test Condition is Normal. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	7.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	A.02.00

Radio Type is BTS, Test Condition is Extreme

Remote Command	`:CALCulate:EEVM:LIMit:BTS:EXTReme:REVM:HSRate QAM16, <real>` `:CALCulate:EEVM:LIMit:BTS:EXTReme:REVM:HSRate? QAM16`
Example	CALC:EEVM:LIM:BTS:EXTR:REVM:HSR QAM16, 15 CALC:EEVM:LIM:BTS:EXTR:REVM:HSR? QAM16
Dependencies/Couplings	Blanked when the EDGE Evolution N9071A–3FP license is not installed.
Key Path	**Meas Setup, Limits, RMS EVM**
Mode	GSM
Notes	This parameter can only be set using the front-panel Limits key if the device selected is BTS and Test Condition is Extreme. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	8.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	A.02.00

Radio Type is MS, Test Condition is Normal

Remote Command	`:CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate QAM16, <real>` `:CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate? QAM16`
Example	CALC:EEVM:LIM:MS:NORM:REVM:HSR QAM16, 20 CALC:EEVM:LIM:MS:NORM:REVM:HSR? QAM16

Dependencies/Couplings	Blanked when the EDGE Evolution N9071A–3FP license is not installed.
Key Path	**Meas Setup, Limits, RMS EVM**
Mode	GSM
Notes	This parameter can only be set using the front-panel Limits key if the device selected is MS and Test Condition is Normal. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	9.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	A.02.00

Radio Type is MS, Test Condition is Extreme

Remote Command	`:CALCulate:EEVM:LIMit:MS:EXTReme:REVM:HSRate QAM16, <real>` `:CALCulate:EEVM:LIMit:MS:EXTReme:REVM:HSRate? QAM16`
Example	CALC:EEVM:LIM:MS:EXTR:REVM:HSR QAM16, 15 CALC:EEVM:LIM:MS:EXTR:REVM:HSR? QAM16
Dependencies/Couplings	Blanked when the EDGE Evolution N9071A–3FP license is not installed.
Key Path	**Meas Setup, Limits, RMS EVM**
Mode	GSM
Notes	This parameter can only be set using the front-panel Limits key if the device selected is MS and Test Condition is Extreme. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	A.02.00

HB 32QAM

Sets the limit of the higher symbol rate 32QAM burst for the RMS EVM Measurement pass/fail test.

Radio Type is BTS, Test Condition is Normal

Remote Command	`:CALCulate:EEVM:LIMit:BTS:NORMal:REVM:HSRate QAM32, <real>`
	`:CALCulate:EEVM:LIMit:BTS:NORMal:REVM:HSRate? QAM32`
Example	CALC:EEVM:LIM:BTS:NORM:REVM:HSR QAM32, 12
	CALC:EEVM:LIM:BTS:NORM:REVM:HSR? QAM32
Dependencies/Couplings	Blanked when the EDGE Evolution N9071A–3FP license is not installed.
Key Path	**Meas Setup, Limits, RMS EVM**
Mode	GSM
Notes	This parameter can only be set using the front-panel Limits key if the device selected is BTS and Test Condition is Normal.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	7.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	A.02.00

Radio Type is BTS, Test Condition is Extreme

Remote Command	`:CALCulate:EEVM:LIMit:BTS:EXTReme:REVM:HSRate QAM32, <real>`
	`:CALCulate:EEVM:LIMit:BTS:EXTReme:REVM:HSRate? QAM32`
Example	CALC:EEVM:LIM:BTS:EXTR:REVM:HSR QAM32, 15
	CALC:EEVM:LIM:BTS:EXTR:REVM:HSR? QAM32
Dependencies/Couplings	Blanked when the EDGE Evolution N9071A–3FP license is not installed.
Key Path	**Meas Setup, Limits, RMS EVM**
Mode	GSM
Notes	This parameter can only be set using the front-panel Limits key if the device selected is BTS and Test Condition is Extreme.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.

Preset	8.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	A.02.00

Radio Type is MS, Test Condition is Normal

Remote Command	`:CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate QAM32, <real>` `:CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate? QAM32`
Example	CALC:EEVM:LIM:MS:NORM:REVM:HSR QAM32, 20 CALC:EEVM:LIM:MS:NORM:REVM:HSR? QAM32
Dependencies/Couplings	Blanked when the EDGE Evolution N9071A–3FP license is not installed.
Key Path	**Meas Setup, Limits, RMS EVM**
Mode	GSM
Notes	This parameter can only be set using the front-panel Limits key if the device selected is MS and Test Condition is Normal. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	9.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	A.02.00

Radio Type is MS, Test Condition is Extreme

Remote Command	`:CALCulate:EEVM:LIMit:MS:EXTReme:REVM:HSRate QAM32, <real>` `:CALCulate:EEVM:LIMit:MS:EXTReme:REVM:HSRate? QAM32`
Example	CALC:EEVM:LIM:MS:EXTR:REVM:HSR QAM32, 15 CALC:EEVM:LIM:MS:EXTR:REVM:HSR? QAM32
Dependencies/Couplings	Blanked when the EDGE Evolution N9071A–3FP license is not installed.
Key Path	**Meas Setup, Limits, RMS EVM**
Mode	GSM

Notes	This parameter can only be set using the front-panel Limits key if the device selected is MS and Test Condition is Extreme. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	A.02.00

Peak EVM

Sets the limit for the Peak EVM result. The value can be set for each Radio Device and Test Condition.

Key Path	**Meas Setup, Mode, Limits**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Peak EVM (Radio Type is BTS, Test Condition is Normal)

Remote Command	`:CALCulate:EEVM:LIMit:BTS:NORMal:PEVM <real>` `:CALCulate:EEVM:LIMit:BTS:NORMal:PEVM?`
Example	CALC:EEVM:LIM:BTS:NORM:PEVM 12 CALC:EEVM:LIM:BTS:NORM:PEVM?
Key Path	**Meas Setup, Limits**
Mode	GSM
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is BTS and the “Test Condition” is Normal. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	22.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	Prior to A.02.00

Peak EVM (Radio Type is BTS, Test Condition is Extreme)

Remote Command	`:CALCulate:EEVM:LIMit:BTS:EXTReme:PEVM <real>`
	`:CALCulate:EEVM:LIMit:BTS:EXTReme:PEVM?`
Example	CALC:EEVM:LIM:BTS:EXTR:PEVM 15
	CALC:EEVM:LIM:BTS:EXTR:PEVM?
Key Path	**Meas Setup, Limits**
Mode	GSM
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is BTS and the “Test Condition” is Extreme.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	22.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	Prior to A.02.00

Peak EVM (Radio Type is MS, Test Condition is Normal)

Remote Command	`:CALCulate:EEVM:LIMit:MS:NORMal:PEVM <real>`
	`:CALCulate:EEVM:LIMit:MS:NORMal:PEVM?`
Example	CALC:EEVM:LIM:MS:NORM:PEVM 20
	CALC:EEVM:LIM:MS:NORM:PEVM?
Key Path	**Meas Setup, Limits**
Mode	GSM
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Normal.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	30.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	Prior to A.02.00

Peak EVM (Radio Type is MS, Test Condition is Extreme)

Remote Command	`:CALCulate:EEVM:LIMit:MS:EXTReme:PEVM <real>`
	`:CALCulate:EEVM:LIMit:MS:EXTReme:PEVM?`
Example	CALC:EEVM:LIM:MS:EXTR:PEVM 15
	CALC:EEVM:LIM:MS:EXTR:PEVM?
Key Path	**Meas Setup, Limits**
Mode	GSM
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Extreme.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	30.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	Prior to A.02.00

95%ile EVM

Sets the limit value for the 95%ile EVM result. The value can be set for each Radio Device and Test Condition.

Key Path	**Meas Setup, Mode, Limits**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

95%ile EVM (Radio Type is BTS, Test Condition is Normal)

Remote Command	`:CALCulate:EEVM:LIMit:BTS:NORMal:EVMP95 <real>`
	`:CALCulate:EEVM:LIMit:BTS:NORMal:EVMP95?`
Example	CALC:EEVM:LIM:BTS:NORM:EVMP95 12
	CALC:EEVM:LIM:BTS:NORM:EVMP95?
Key Path	**Meas Setup, Limits**
Mode	GSM

Notes	This parameter can only be set using the front-panel "Limits" key if the device selected by the "Device" key is BTS and the "Test Condition" is Normal. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	11.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	Prior to A.02.00

95%ile EVM (Radio Type is BTS, Test Condition is Extreme)

Remote Command	`:CALCulate:EEVM:LIMit:BTS:EXTReme:EVMP95 <real>` `:CALCulate:EEVM:LIMit:BTS:EXTReme:EVMP95?`
Example	CALC:EEVM:LIM:BTS:EXTR:EVMP95 15 CALC:EEVM:LIM:BTS:EXTR:EVMP95?
Key Path	**Meas Setup, Limits**
Mode	GSM
Notes	This parameter can only be set using the front-panel "Limits" key if the device selected by the "Device" key is BTS and the "Test Condition" is Extreme. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	11.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	Prior to A.02.00

95%ile EVM (Radio Type is MS, Test Condition is Normal)

Remote Command	`:CALCulate:EEVM:LIMit:MS:NORMal:EVMP95 <real>` `:CALCulate:EEVM:LIMit:MS:NORMal:EVMP95?`
Example	CALC:EEVM:LIM:MS:NORM:EVMP95 20 CALC:EEVM:LIM:MS:NORM:EVMP95?
Key Path	**Meas Setup, Limits**
Mode	GSM

Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Normal. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	15.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	Prior to A.02.00

95%ile EVM (Radio Type is MS, Test Condition is Extreme)

Remote Command	`:CALCulate:EEVM:LIMit:MS:EXTReme:EVMP95 <real>` `:CALCulate:EEVM:LIMit:MS:EXTReme:EVMP95?`
Example	CALC:EEVM:LIM:MS:EXTR:EVMP95 15 CALC:EEVM:LIM:MS:EXTR:EVMP95?
Key Path	**Meas Setup, Limits**
Mode	GSM
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Extreme. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	15.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Instrument S/W Revision	Prior to A.02.00

I/Q Origin Offset

Sets the limit value for the I/Q Origin Offset result. The value can be set for each Radio Device and Test Condition.

Key Path	**Meas Setup, Mode, Limits**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

I/Q Origin Offset (Radio Type is BTS, Test Condition is Normal)

Remote Command	`:CALCulate:EEVM:LIMit:BTS:NORMal:IQOOffset <real>`
	`:CALCulate:EEVM:LIMit:BTS:NORMal:IQOOffset?`
Example	CALC:EEVM:LIM:BTS:NORM:IQOO –12
	CALC:EEVM:LIM:BTS:NORM:IQOO?
Key Path	**Meas Setup, Limits**
Mode	GSM
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is BTS and the “Test Condition” is Normal.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	–35
State Saved	Saved in instrument state.
Min	–100.0
Max	0.0
Instrument S/W Revision	Prior to A.02.00

I/Q Origin Offset (Radio Type is BTS, Test Condition is Extreme)

Remote Command	`:CALCulate:EEVM:LIMit:BTS:EXTReme:IQOOffset <real>`
	`:CALCulate:EEVM:LIMit:BTS:EXTReme:IQOOffset?`
Example	CALC:EEVM:LIM:BTS:EXTR:IQOO –15
	CALC:EEVM:LIM:BTS:EXTR:IQOO?
Key Path	**Meas Setup, Limits**
Mode	GSM
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is BTS and the “Test Condition” is Extreme.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	–35.0
State Saved	Saved in instrument state.
Min	–100.0
Max	0.0
Instrument S/W Revision	Prior to A.02.00

I/Q Origin Offset (Radio Type is MS, Test Condition is Normal)

Remote Command	`:CALCulate:EEVM:LIMit:MS:NORMal:IQOOffset <real>`
	`:CALCulate:EEVM:LIMit:MS:NORMal:IQOOffset?`
Example	CALC:EEVM:LIM:MS:NORM:IQOO –20
	CALC:EEVM:LIM:MS:NORM:IQOO?
Key Path	**Meas Setup, Limits**
Mode	GSM
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Normal.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	–30.0
State Saved	Saved in instrument state.
Min	–100.0
Max	0.0
Instrument S/W Revision	Prior to A.02.00

I/Q Origin Offset (Radio Type is MS, Test Condition is Extreme)

Remote Command	`:CALCulate:EEVM:LIMit:MS:EXTReme:IQOOffset <real>`
	`:CALCulate:EEVM:LIMit:MS:EXTReme:IQOOffset?`
Example	CALC:EEVM:LIM:MS:EXTR:IQOO –15
	CALC:EEVM:LIM:MS:EXTR:IQOO?
Key Path	**Meas Setup, Limits**
Mode	GSM
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Extreme.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	–30.0
State Saved	Saved in instrument state.
Min	–100.0
Max	0.0
Instrument S/W Revision	Prior to A.02.00

Freq Error

Sets the limit alue for the Frequency Error result. The value can be set for each Radio Device and Test Condition.

Key Path	**Meas Setup, Limits**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Freq Error (Radio Type is BTS, BTS Type is Normal, Test Condition is Normal)

Remote Command	`:CALCulate:EEVM:LIMit:BTS:NORMal:FERRor <real>` `:CALCulate:EEVM:LIMit:BTS:NORMal:FERRor?`
Example	CALC:EEVM:LIM:BTS:NORM:FERR 0.1 CALC:EEVM:LIM:BTS:NORM:FERR?
Key Path	**Meas Setup, Limit**
Mode	GSM
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is BTS and the “BTS Type” is Normal or Micro and the “Test Condition” is Normal. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.05
State Saved	Saved in instrument state.
Min	0.0
Max	50.0
Instrument S/W Revision	Prior to A.02.00

Freq Error (Radio Type is BTS, BTS Type is Normal, Test Condition is Extreme)

Remote Command	`:CALCulate:EEVM:LIMit:BTS:EXTReme:FERRor <real>` `:CALCulate:EEVM:LIMit:BTS:EXTReme:FERRor?`
Example	CALC:EEVM:LIM:BTS:EXTR:FERR 0.1 CALC:EEVM:LIM:BTS:EXTR:FERR?
Key Path	**Meas Setup, Limit**
Mode	GSM

Notes	This parameter can only be set using the front-panel "Limits" key if the device selected by the "Device" key is BTS and the "BTS Type" is Normal or Micro and the "Test Condition" is Extreme. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.05
State Saved	Saved in instrument state.
Min	0.0
Max	50.0
Instrument S/W Revision	Prior to A.02.00

Freq Error (Radio Type is BTS, BTS Type is Micro, Test Condition is Normal)

Remote Command	`:CALCulate:EEVM:LIMit:MBTS:NORMal:FERRor <real>` `:CALCulate:EEVM:LIMit:MBTS:NORMal:FERRor?`
Example	CALC:EEVM:LIM:MBTS:NORM:FERR 0.1 CALC:EEVM:LIM:MBTS:NORM:FERR?
Key Path	**Meas Setup, Limit**
Mode	GSM
Notes	This parameter can only be set using the front-panel "Limits" key if the device selected by the "Device" key is BTS and the "BTS Type" is Normal or Micro and the "Test Condition" is Normal. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.05
State Saved	Saved in instrument state.
Min	0.0
Max	50.0
Instrument S/W Revision	Prior to A.02.00

Freq Error (Radio Type is BTS, BTS Type is Micro, Test Condition is Extreme)

Remote Command	`:CALCulate:EEVM:LIMit:MBTS:EXTReme:FERRor <real>` `:CALCulate:EEVM:LIMit:MBTS:EXTReme:FERRor?`
Example	CALC:EEVM:LIM:MBTS:EXTR:FERR 0.1 CALC:EEVM:LIM:MBTS:EXTR:FERR?
Key Path	**Meas Setup, Limit**

Mode	GSM
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is BTS and the “BTS Type” is Normal or Micro and the “Test Condition” is Extreme. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.05
State Saved	Saved in instrument state.
Min	0.0
Max	50.0
Instrument S/W Revision	Prior to A.02.00

Freq Error (Radio Type is BTS, BTS Type is Pico, Test Condition is Normal)

Remote Command	`:CALCulate:EEVM:LIMit:PBTS:NORMal:FERRor <real>` `:CALCulate:EEVM:LIMit:PBTS:NORMal:FERRor?`
Example	CALC:EEVM:LIM:PBTS:NORM:FERR 0.1 CALC:EEVM:LIM:PBTS:NORM:FERR?
Key Path	**Meas Setup, Limit**
Mode	GSM
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is BTS and the “BTS Type” is Pico and the “Test Condition” is Normal. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.1
State Saved	Saved in instrument state.
Min	0.0
Max	50.0
Instrument S/W Revision	Prior to A.02.00

Freq Error (Radio Type is BTS, BTS Type is Pico, Test Condition is Extreme)

Remote Command	`:CALCulate:EEVM:LIMit:PBTS:EXTReme:FERRor <real>` `:CALCulate:EEVM:LIMit:PBTS:EXTReme:FERRor?`
Example	CALC:EEVM:LIM:PBTS:EXTR:FERR 0.2 CALC:EEVM:LIM:PBTS:EXTR:FERR?

Key Path	**Meas Setup, Limit**
Mode	GSM
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the“Device” key is BTS and the “BTS Type” is Pico and the “Test Condition” is Extreme. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.1
State Saved	Saved in instrument state.
Min	0.0
Max	50.0
Instrument S/W Revision	Prior to A.02.00

Freq Error (Radio Type is MS, Test Condition is Normal)

Remote Command	`:CALCulate:EEVM:LIMit:MS:NORMal:FERRor <real>` `:CALCulate:EEVM:LIMit:MS:NORMal:FERRor?`
Example	CALC:EEVM:LIM:MS:NORM:FERR 0.1 CALC:EEVM:LIM:MS:NORM:FERR?
Key Path	**Meas Setup, Limit**
Mode	GSM
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Normal. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.1
State Saved	Saved in instrument state.
Min	0.0
Max	50.0
Instrument S/W Revision	Prior to A.02.00

Freq Error (Radio Type is MS, Test Condition is Extreme)

Remote Command	`:CALCulate:EEVM:LIMit:MS:EXTReme:FERRor <real>` `:CALCulate:EEVM:LIMit:MS:EXTReme:FERRor?`
Example	CALC:EEVM:LIM:MS:EXTR:FERR 0.2 CALC:EEVM:LIM:MS:EXTR:FERR?

Key Path	**Meas Setup, Limit**
Mode	GSM
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Extreme. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.1
State Saved	Saved in instrument state.
Min	0.0
Max	50.0
Instrument S/W Revision	Prior to A.02.00

Droop Compensation

Turns Droop Compensation on or off. Droop Compensation corrects amplitude variations across a burst. You may want to turn off this compensation so you can see the changes in the measured magnitude error. Droop can result from signal impairments like a power amplifier problem.

Remote Command	`[:SENSe]:EEVM:DROop OFF|ON|0|1` `[:SENSe]:EEVM:DROop?`
Example	EEVM:DRO ON EEVM:DRO?
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Freq Error Tolerance Rng

Toggles between Wide and Normal settings for Frequency Error tolerance. To accurately demodulate complex signals which require more stringent tolerance for frequency error, Normal can be selected. For use with signals that are simpler with greater frequency error tolerance, Wide can be selected.

Remote Command	`[:SENSe]:EEVM:FERRor:TRANge WIDE|NORMal`
	`[:SENSe]:EEVM:FERRor:TRANge?`
Example	EEVM:FERR:TRAN NORM
	EEVM:FERR:TRAN?
Key Path	**Meas Setup**
Mode	GSM
Preset	WIDE
State Saved	Saved in instrument state.
Range	Wide|Normal
Instrument S/W Revision	A.02.00

Polar Mod Align

Turns On/Off polar modulation alignment.

Remote Command	`[:SENSe]:EEVM:BSYNc:PMODulation:ALIGnment OFF|ON|0|1`
	`[:SENSe]:EEVM:BSYNc:PMODulation:ALIGnment?`
Example	EEVM:BSYNC:PMOD:ALIG OFF
	EEVM:BSYNC:PMOD:ALIG?
Key Path	**Meas Setup**
Mode	GSM
Notes	Unavailable unless the "Burst Sync" on page 612 is set to Polar Modulation.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Meas Preset

Restores all the measurement parameters to their default values.

Remote Command	`:CONFigure:EEVM`
Example	CONF:EEVM
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Instrument S/W Revision	Prior to A.02.00

Mode

Operation of this key is identical across all measurements. For details about this key, see "Mode" on page 1087.

Mode Setup

Operation of this key is identical across all measurements. For details about this key, see "Mode Setup" on page 1101.

Peak Search

There is no functionality for this front-panel key in this measurement. Pressing this key displays a blank menu.

Remote Command	`:CALCulate:EEVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	CALC:EEVM:MARK2:MAX
Key Path	**Peak Search**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Min Peak Search (Backward Compatibility/Remote Command Only)

Remote Command	`:CALCulate:EEVM:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MINimum`
Example	CALC:EEVM:MARK:MIN
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Instrument S/W Revision	Prior to A.02.00

Recall

Operation of this key is identical across several measurements. For details of this key, see “Recall” on page 1123

Restart

Operation of this key is identical across all measurements. For details about this key, see “Restart” on page 1145.

Save

Operation of this key is identical across several measurements. For details of this key, see "Save" on page 1147

Single (Single Measurement/Sweep)

Operation of this key is identical across several measurements. For details about this key, see "Single (Single Measurement/Sweep)" on page 1173.

Source

Operation of this key is identical across several measurements. For details about this key, see "Source" on page 1175.

SPAN X Scale

Accesses a menu of functions that enable you set the horizontal scale parameters.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Ref Value

Allows you to set X reference value.

Remote Command	`:DISPlay:EEVM:VIEW2:WINDow[1]|2|3:TRACe:X[:SCALe]:RLEVel <real>` `:DISPlay:EEVM:VIEW2:WINDow[1]|2|3:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:EEVM:VIEW2:WIND3:TRAC:X:RLEV 1 DISP:EEVM:VIEW2:WIND3:TRAC:X:RLEV?
Dependencies/Couplings	If the "Auto Scaling" on page 654 is On, this value is automatically determined by the measurement result. When you set a value manually, X Auto Scaling automatically changes to Off.
Key Path	**SPAN / X Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Unit is Symbol(s).
Preset	0.0
State Saved	Saved in instrument state.
Min	0.0
Max	5000000.0
Instrument S/W Revision	Prior to A.02.00

Scale/Div

Allows you to change the horizontal scale.

Remote Command	`:DISPlay:EEVM:VIEW2:WINDow[1]|2|3:TRACe:X[:SCALe]:PDIVision <real>` `:DISPlay:EEVM:VIEW2:WINDow[1]|2|3:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:EEVM:VIEW2:WIND:TRAC:X:PDIV 1.2 DISP:EEVM:VIEW2:WIND:TRAC:X:PDIV?
Dependencies/Couplings	If the X Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, X Auto Scaling automatically changes to Off.
Key Path	**SPAN / X Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Unit is Symbol(s).
Preset	14.10
State Saved	Saved in instrument state.
Range	1.0 to 500000.0
Instrument S/W Revision	Prior to A.02.00

Ref Position

Allows you to set the reference position.

Remote Command	`:DISPlay:EEVM:VIEW2:WINDow[1]|2|3:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:EEVM:VIEW2:WINDow[1]|2|3:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:EEVM:VIEW2:WIND3:TRAC:X:RPOS CENT DISP:EEVM:VIEW2:WIND3:TRAC:X:RPOS?
Key Path	**SPAN / X Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	LEFT
State Saved	Saved in instrument state.

Range	Left|Ctr|Right
Instrument S/W Revision	Prior to A.02.00

Auto Scaling

Allows you to toggle the Auto Scaling function between On and Off.

Remote Command	`:DISPlay:EEVM:VIEW2:WINDow[1]|2|3:TRACe:X[:SCALe]:COUPle ON|OFF|1|0` `:DISPlay:EEVM:VIEW2:WINDow[1]|2|3:TRACe:X[:SCALe]:COUPle?`
Example	DISP:EEVM:VIEW2:WIND:TRAC:X:COUP ON DISP:EEVM:VIEW2:WIND:TRAC:X:COUP?
Dependencies/Couplings	Upon pressing the Restart front-panel key, the scale coupling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either "Ref Value" on page 652 or "Scale/Div" on page 653 manually, X Auto Scaling automatically changes to Off..
Key Path	**SPAN / X Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Sweep/Control

Operation of this key is identical across all measurements. For details about this key, see "Sweep / Control" on page 1179.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Trace/Detector

Accesses a menu that enables you to visible/invisible Max Hold Trace and Min Hold Trace.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Max Hold Trace

This key allows you to show or hide the Max Hold Trace on the Mag Error, Phase Error, or EVM window in the I/Q Error view. Max Hold Traces are held during the averaging cycle.

Remote Command	`:DISPlay:EEVM:VIEW2:WINDow[1]:TRACe:MAXHold[:STATe] ON|OFF|1|0`
	`:DISPlay:EEVM:VIEW2:WINDow[1]:TRACe:MAXHold[:STATe]?`
Example	DISP:EEVM:VIEW2:WIND:TRAC:MAXH ON
	DISP:EEVM:VIEW2:WIND:TRAC:MAXH?
Key Path	**Trace/Detector**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	A.02.00

Min Hold Trace

This key allows you to show or hide the Min Hold Trace on the Mag Error, Phase Error, or EVM window in the I/Q Error view. Min Hold Traces are held during the averaging cycle.

Remote Command	`:DISPlay:EEVM:VIEW2:WINDow[1]:TRACe:MINHold[:STATe] ON|OFF|1|0`
	`:DISPlay:EEVM:VIEW2:WINDow[1]:TRACe:MINHold[:STATe]?`
Example	DISP:EEVM:VIEW2:WIND:TRAC:MINH ON
	DISP:EEVM:VIEW2:WIND:TRAC:MINH?
Key Path	**Trace/Detector**

Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	A.02.00

Trigger

Accesses a menu of functions that enable you to select and control the trigger source for the current measurement. Operation of this key is identical across all measurements. See “Trigger” on page 1197 for more information.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

View/Display

Accesses a menu of functions that enable you to set the display parameters. See "Display" on page 1253 for more information.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Display

Operation of this key is identical across all measurements. For details about this key, see "Display" on page 1253.

View Selection

You can select desired view of the measurement from the following:

- I/Q Measured Polar Graph (SCPI: POLar) – Provides a view of numeric results and a polar vector graph. For more details of each window, see "I/Q Measured Polar Graph" on page 661.
  - Window 1: Numeric Results
  - Window 2: I/Q Polar Graph
- I/Q Error (SCPI: ERRor) – Provides a combination view including
  - Window 1: Magnitude Error
  - Window 2: Phase Error
  - Window 3: EVM
  - Window 4: Numeric Results
  - For more details of each window, see "I/Q Error" on page 666. Any of these windows can be selected (using the **Next Window** key) and made full size (using the **Zoom** key).
- Data Bits (SCPI: DBITs) – Provides a view of the numeric results and data bits with the sync word (TSC) highlighted.

Remote Command	`:DISPlay:EEVM:VIEW[:SELect] POLar|ERRor|DBITs`
	`:DISPlay:EEVM:VIEW[:SELect]?`
Example	DISP:EEVM:VIEW:SEL QUAD
	DISP:EEVM:VIEW:SEL?
Dependencies/Couplings	View Selection by number must be coupled with this parameter value.
	Selecting POLar changed DISP:EEVM:VIEW:WIND2:TRAC:POL to VC.

Key Path	**View/Display**
Mode	GSM
Notes	- POLar: I/Q Measured Polar Graph - ERRor : I/Q Error - DBITs : Data Bits You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	POLar
State Saved	Saved in instrument state.
Range	I/Q Measured Polar Graph|I/Q Error|Data Bits
Instrument S/W Revision	Prior to A.02.00

View Selection by number (SCPI only)

You can select desired view with view number.

- 1 : I/Q Measured Polar Graph (SCPI: 1) – Provides a view of numeric results and a polar vector graph.
- Window 1: Numeric Results
- Window 2: I/Q Polar Graph
- 2 : I/Q Error (SCPI: 2) – Provides a combination view including:
- Window 1: Magnitude Error
- Window 2: Phase Error
- Window 3: EVM
- Window 4: Numeric Results

Any of these windows can be selected (using the **Next Window** key) and made full size (using the **Zoom** key).

- 3 : Data Bits (SCPI: 3) – Provides a view of the numeric results and data bits with the sync word (TSC) highlighted.

Remote Command	`:DISPlay:EEVM:VIEW:NSELect <integer>` `:DISPlay:EEVM:VIEW:NSELect?`
Example	DISP:EEVM:VIEW:NSEL 3 DISP:EEVM:VIEW:NSEL?
Dependencies/Couplings	View Selection must be coupled with this parameter value.
Mode	GSM

Notes	1: I/Q Measured Polar Graph 2: IQ Error 3: Data Bits You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	3
Instrument S/W Revision	Prior to A.02.00

I/Q Measured Polar Graph

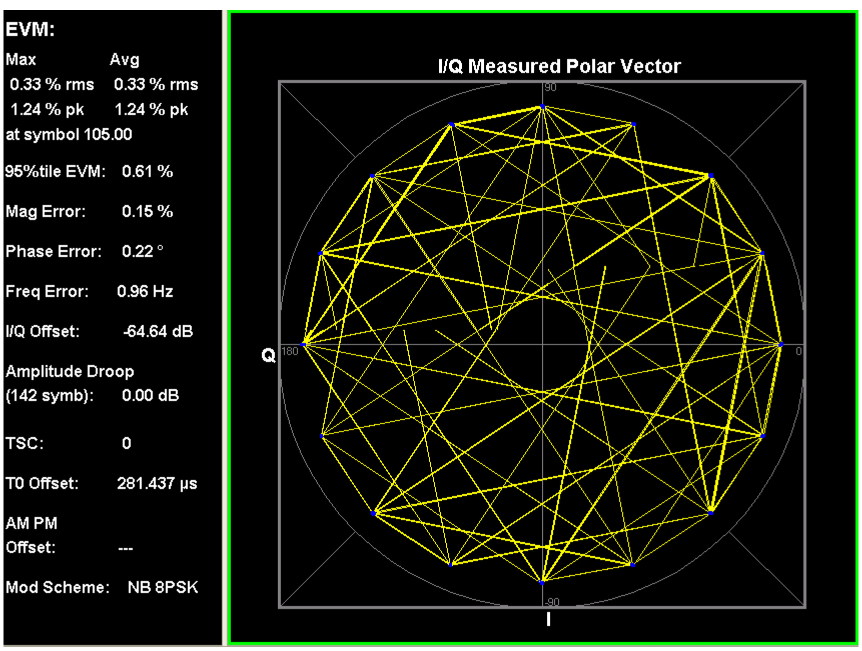
For the Remote Commands, see "View Selection" on page 659 and "View Selection by number (SCPI only)" on page 660.

This topic includes the following sections, which provide details of this view's windows, as shown in the examples below:

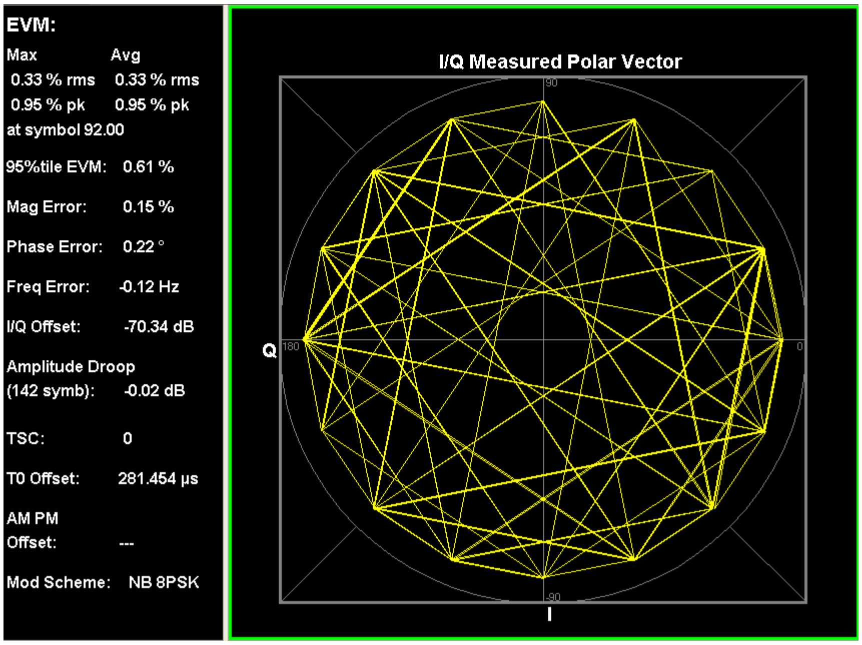
"Graph window" on page 663

"Metric window" on page 663

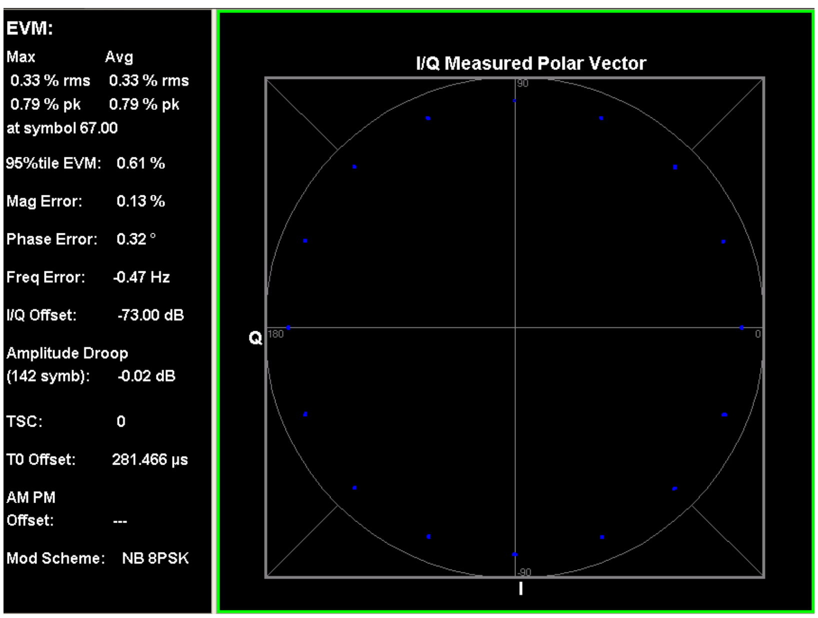
Example View with Vector and Constellation Traces



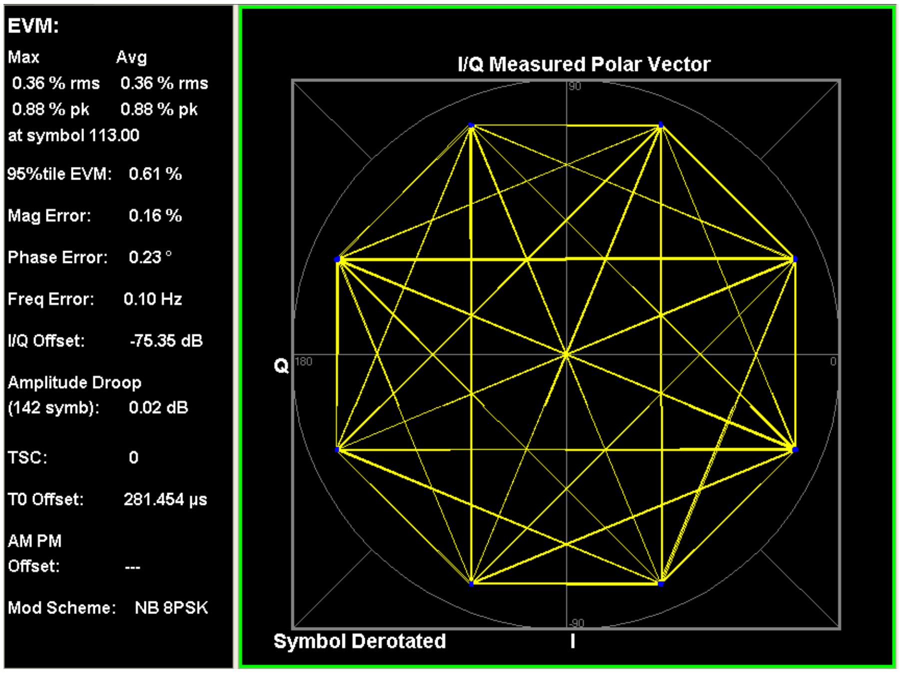
Example View with Vector Trace Only



Example View with Constellation Trace Only



Example View with Vector and Constellation Traces (Symbol Derotated)



Key Path	**View/Display**
Instrument S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

Graph window

Marker Operation	No
Corresponding Trace	Series of float point numbers that alternately represent I and Q pairs of the final corrected measured data for the last slot. (n=5)

Metric window

Name	Corresponding Results	Display Format
EVM rms (Max)	n=1 3rd Maximum RMS EVM	9.99 % rms
EVM rms (Avg)	n=1 2nd RMS EVM	9.99 % rms
EVM Pk (Max)	n=1 5th Maximum peak EVM	9.99 % pk

Name	Corresponding Results	Display Format
EVM Pk (Avg)	n=1 4th Peak EVM	9.99 % pk
Symbol position of the peak EVM	n=1 6th Symbol position of Peak EVM.	99
95%ile EVM	n=1 1st RMS 95th %ile EVM	9.99 %
Mag Error	n=1 7th Magnitude error	9.99 %
Phase Error	n=1 9th Phase error	9.99 °
Freq Error	n=1 11th Frequency error	–999.99 Hz
I/Q Offset	n=1 13th I/Q origin offset	–99.99 dB
Amplitude Droop	n=1 14th Amplitude droop error	–99.99 dB
T0 Offset	n=1 15th Trigger to T0	0.000 us 0.000 symbols
AMPM Offset	n=1 16th AMPM Offset	0.000 us 0.0000 symbols
Mod Scheme	n=8 18th Modulation Scheme	NB 8PSK

NOTE The value of ‘T0 Offset’ and ‘AM PM Offset’ is displayed by ‘sec’ and both ‘Symbol’ unit. (The figure above does not show this. See the Data Bits figure.)

I/Q Polar Vect/Constln

I/Q Polar Vector/Constellation provides options that allow you to change the format of the polar vector graph. The following display options are available:

- Vector and Constellation (SCPI: VC)
- Vector Only (SCPI: VECTor)
- Constellation Only (SCPI: CONStln)

Remote Command	`:DISPlay:EEVM:VIEW[1]:WINDow2:TRACe:POLar VC|VECTor|CONStln` `:DISPlay:EEVM:VIEW[1]:WINDow2:TRACe:POLar?`
Example	DISP:EEVM:VIEW:WIND2:TRAC:POL VC DISP:EEVM:VIEW:WIND2:TRAC:POL?
Dependencies/Couplings	DISP:EEVM:VIEW POL changes this parameter to POL. DISP:EEVM:VIEW CONS changes this parameter to CONS.
Key Path	**View/Display, I/Q Measured Polar Graph**
Mode	GSM
Notes	VC : Vect & Constln VECTor: Vector CONStln : Constellation You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	VC
State Saved	Saved in instrument state.
Range	Vect & Constln|Vector|Constellation
Instrument S/W Revision	Prior to A.02.00

Time Offset Unit

See "Time Offset Unit" on page 669.

I/Q Symbol Derotation

Allows you to derotate I/Q symbols.

- On: Derotate I/Q Symbols.
- Off: No I/Q Symbol derotation.

Remote Command	`:DISPlay:EEVM:SDERotation[:STATe] OFF|ON|0|1` `:DISPlay:EEVM:SDERotation[:STATe]?`

Example	DISP:EEVM:SDER ON DISP:EEVM:SDER?
Key Path	**View/Display, I/Q Measured Polar Graph**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

I/Q Error

For the Remote Commands, see "View Selection" on page 659 and "View Selection by number (SCPI only)" on page 660.

This topic includes the following sections, which provide details of this view's windows, as shown in the examples below:

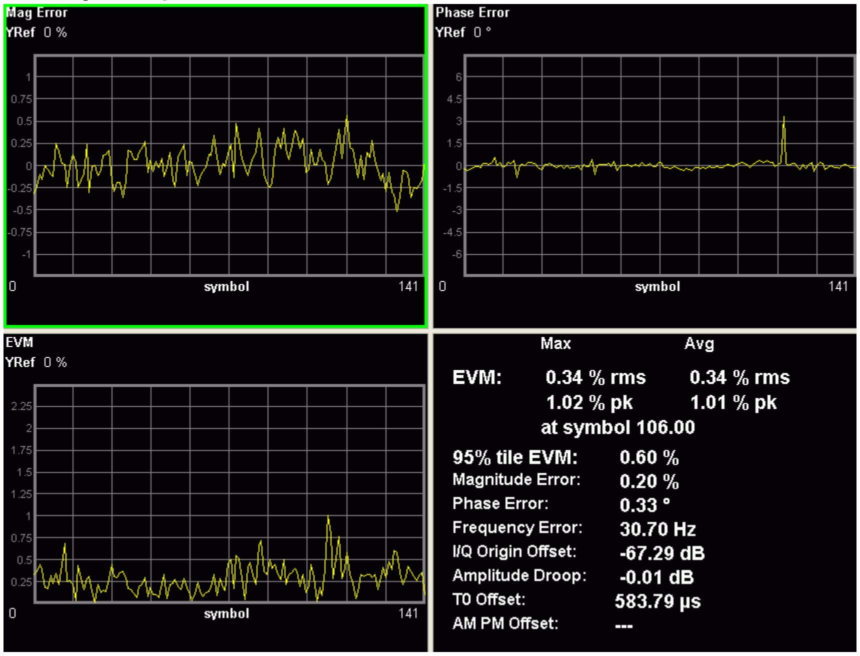
"Mag Error window" on page 667

"Phase Error window" on page 667

"EVM window" on page 667

"Metric window" on page 668

Example I/Q Error View



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

Mag Error window

Marker Operation	Yes
Corresponding Trace	Series of floating point numbers (in percent) that represent each sample in the magnitude error vector trace for the last slot. (n=3)

Phase Error window

Marker Operation	Yes
Corresponding Trace	Series of floating point numbers (in degree) that represent each sample in the phase error vector trace for the last slot. (n=4)

EVM window

Marker Operation	Yes
Corresponding Trace	Series of floating point numbers (in percent) that represent each sample in the EVM vector trace for the last slot. (n=2)

Metric window

Name	Corresponding Results	Display Format
EVM [rms] (Max)	n=1 3rd Maximum RMS EVM	9.99 % rms
EVM [rms] (Avg)	n=1 2nd RMS EVM	9.99 % rms
EVM [pk] (Max)	n=1 5th Maximum peak EVM	9.99 % pk
EVM [pk] (Avg)	n=1 4th Peak EVM	9.99 % pk
Symbol position of the peak EVM	n=1 6th Symbol position of Peak EVM.	99
95%ile EVM	n=1 1st RMS 95th %ile EVM	9.99 %
Magnitude Error	n=1 7th Magnitude error	9.99 %
Phase Error	n=1 9th Phase error	9.99 °
Frequency Error	n=1 11th Frequency error	–999.99 Hz
I/Q Origin Offset	n=1 13th I/Q origin offset	–99.99 dB
Amplitude Droop	n=1 14th Amplitude droop error	–99.99 dB
T0 Offset	n=1 15th Trigger to T0	0.000 us 0.000 symbols
AMPM Offset	n=1 16th AMPM Offset	0.000 us 0.0000 symbols

NOTE The value of ‘T0 Offset’ and ‘AM PM Offset’ is displayed by ‘sec’ and both ‘Symbol’ unit. (The figure above does not show this. See the Data Bits figure.)

Symbol Dots

Allows you to toggle the symbol dots between On and Off.

On: turns on blue symbol dots on the trace in ‘Mag Error’, ‘Phase Error’ & ‘EVM’ window.

Off: turns off blue symbol dots on the trace in ‘Mag Error’, ‘Phase Error’ & ‘EVM’ window.

Remote Command	`:DISPlay:EEVM:SDOTs[:STATe] OFF|ON|0|1` `:DISPlay:EEVM:SDOTs[:STATe]?`
Example	DISP:EEVM:SDOT ON DISP:EEVM:SDOT?
Key Path	**View/Display**
Mode	GSM
Notes	This parameter does not control constellation visible/invisible state on I/Q Measured Polar Graph. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Time Offset Unit

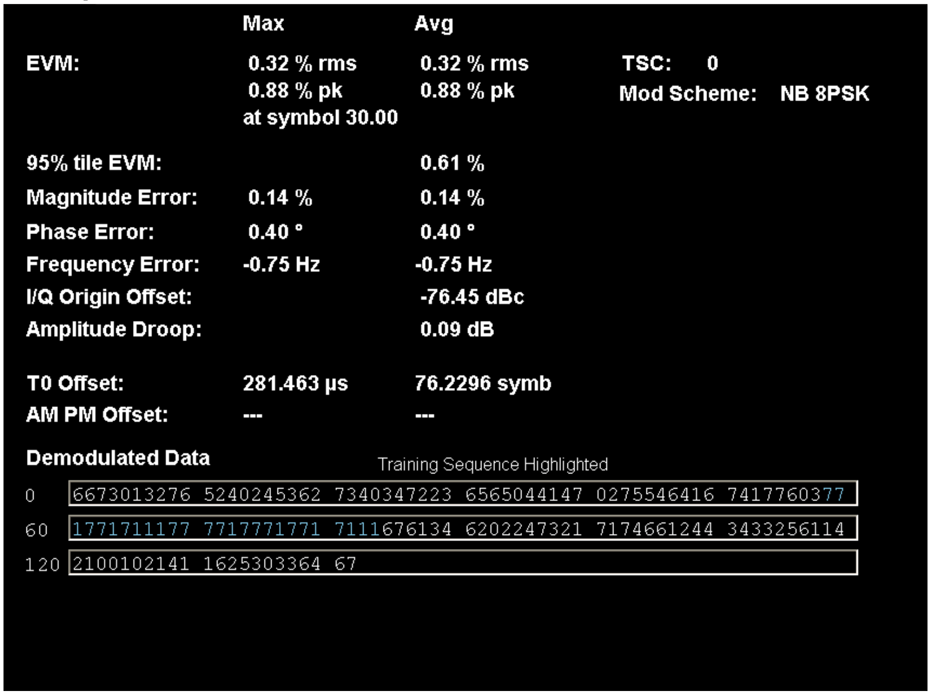
Toggles the unit of Time Offset result between Symbol and Second.

Remote Command	`:DISPlay:EEVM:TEXT:TFUNit SECond|SYMBol` `:DISPlay:EEVM:TEXT:TFUNit?`
Example	DISP:EEVM:TEXT:TFUN SEC DISP:EEVM:TEXT:TFUN?
Key Path	**View/Display, Display**
Mode	GSM
Notes	This command only affects the display result. Results returned by remote commands are always expressed in units of "SYMBol".
Preset	SEC
State Saved	Saved in instrument state.
Range	sec|symbols
Instrument S/W Revision	Prior to A.02.00

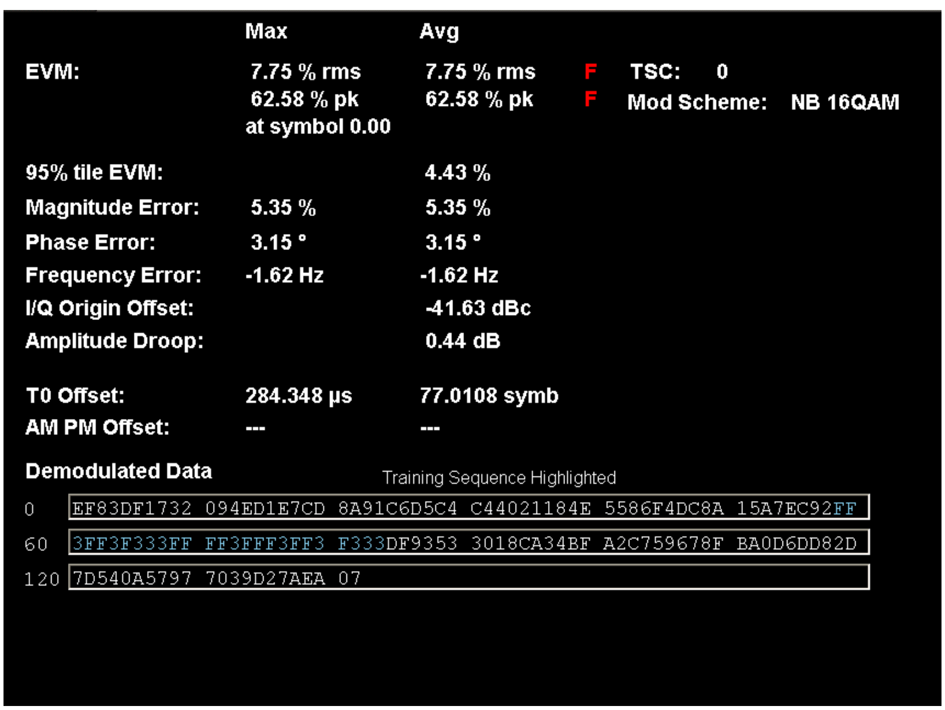
Data Bits

For the Remote Command, see “View Selection” on page 659 and “View Selection by number (SCPI only)” on page 660.

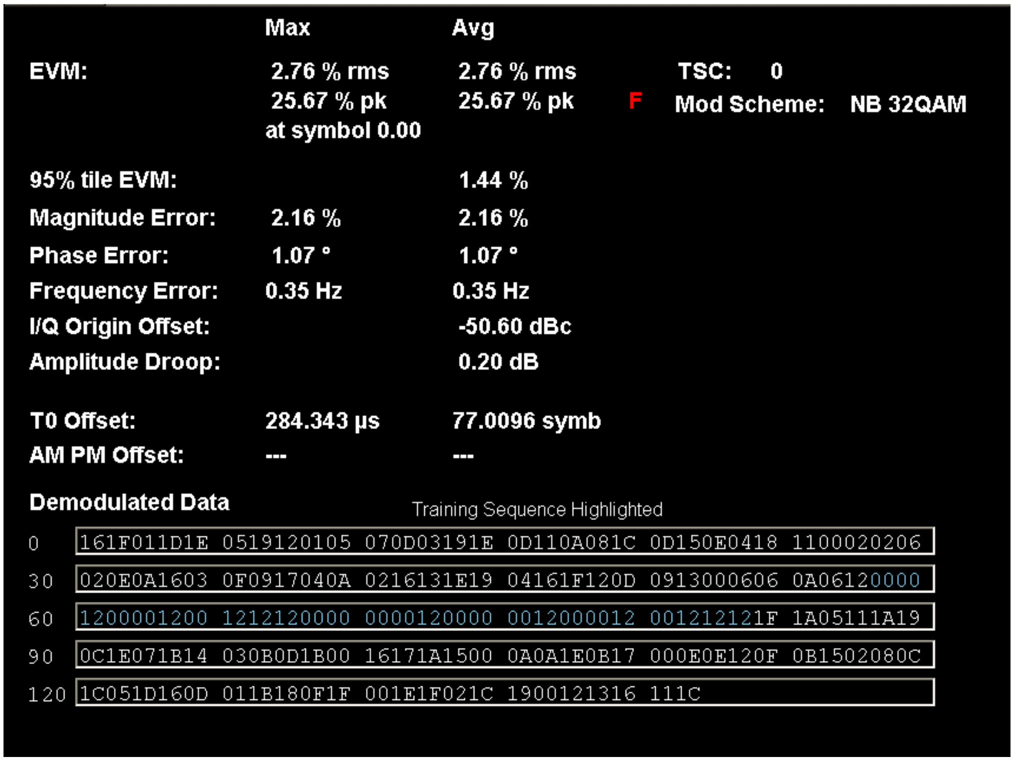
Example Data Bits View for EDGE Normal 8PSK Burst



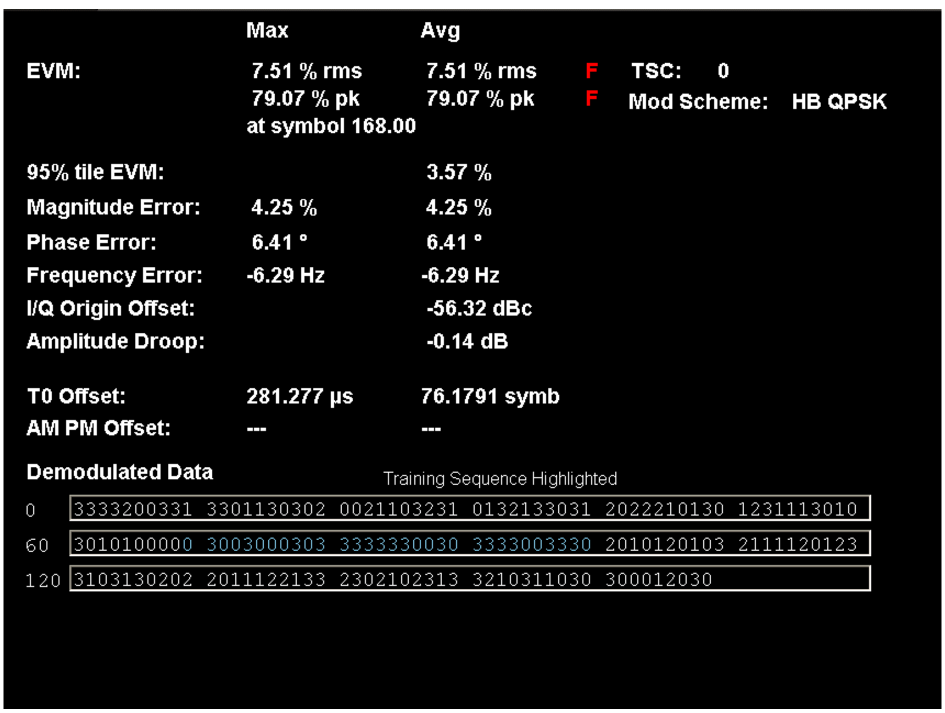
Example Data Bits View for EDGE Normal 16QAM Burst



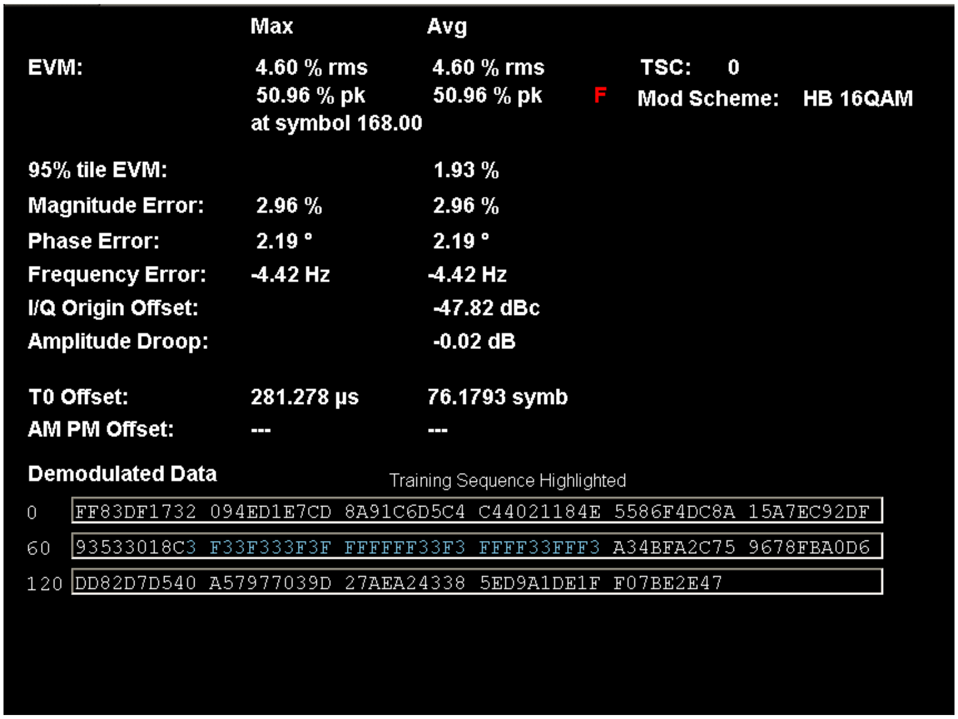
Example Data Bits View for EDGE Normal 32QAM Burst



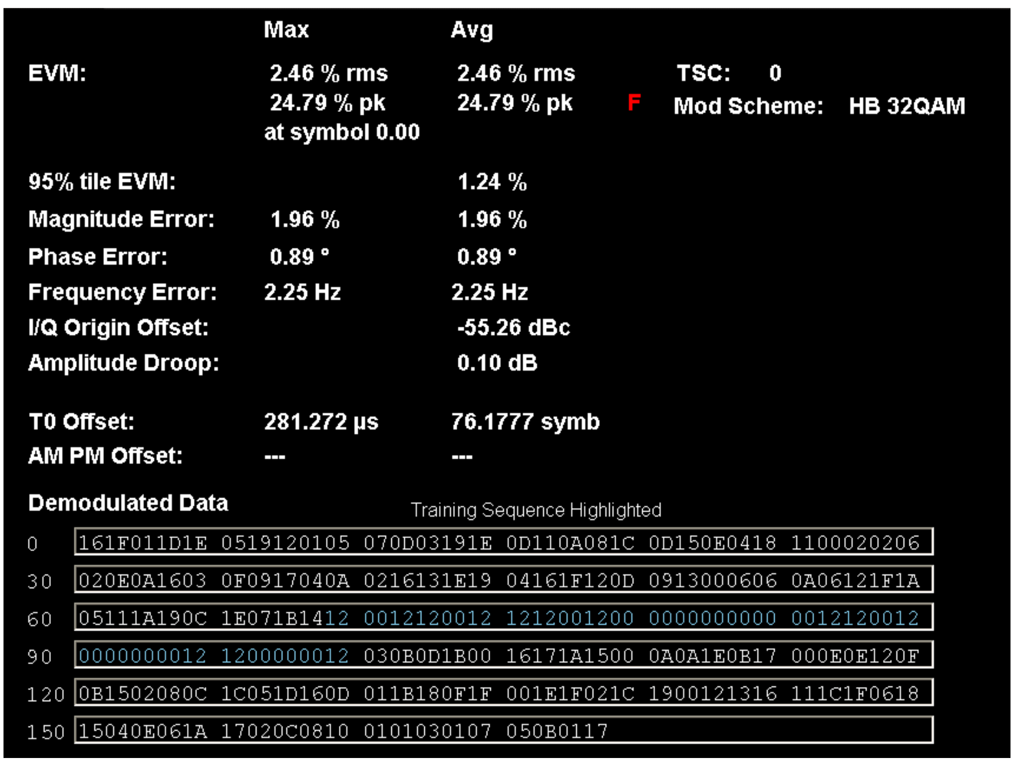
Example Data Bits View for EDGE HSR QPSK Burst



Example Data Bits View for EDGE HSR 16QAM Burst



Example Data Bits View for EDGE HSR 32QAM Burst



Metric window

Name	Corresponding Results	Display Format
EVM rms (Max)	n=1 3rd Maximum RMS EVM	9.99 %rms
EVM rms (Avg)	n=1 2nd RMS EVM	9.99 %rms
EVM Pk (Max)	n=1 5th Maximum peak EVM	9.99 %pk
EVM Pk (Avg)	n=1 4th Peak EVM	9.99 %pk
Symbol position of the peak EVM	n=1 6th Symbol position of Peak EVM.	99
95%ile EVM	n=1 1st RMS 95th %ile EVM	9.99 %
Magnitude Error	n=1 7th Magnitude error	9.99 %
Phase Error	n=1 9th Phase error	9.99 °
Frequency Error	n=1 11th Frequency error	–999.99 Hz
I/Q Origin Offset	n=1 13th I/Q origin offset	–99.99 dB
Amplitude Droop	n=1 14th Amplitude droop error	–99.99 dB
T0 Offset	n=1 15th Trigger to T0	0.000 us 0.000 symbols
AMPM Offset	n=1 16th AMPM Offset	0.000 us 0.0000 symbols
Mod Scheme	n=8 18th Modulation Scheme	NB 8PSK

Key Path	**View/Display**
Instrument S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

12 EDGE Power vs Time Measurement

Power vs. Time measures the mean transmit power during the “useful” part of bursts, and verifies that the power ramp fits within the defined mask. The “useful “ part of the normal burst is defined as, the 147 bits centered on the transition from bit 13 to bit 14 (the “TO” time point) of the 26 bit training sequence. The Power vs. Time measurant also lets you view the rise, fall, and “useful” part of the bursts. Using the “Multi-Slot” function, up to eight slots in a frame can be viewed at one time.

This topic contains the following sections:

“Measurement Commands for EDGE Power vs Time” on page 675

“Remote Command Results for EDGE Power vs Time” on page 675

See also: Section “Custom Limit Mask (Remote Commands Only)” on page 712

Measurement Commands for EDGE Power vs Time

The following commands are used to retrieve the measurement results:

```
:CONFigure:EPVTime

:CONFigure:EPVTime:NDEFault

:INITiate:EPVTime

:FETCh:EPVTime[n]?

:READ:EPVTime[n]?

:MEASure:EPVTime[n]?
```

For more measurement related commands, see the section “Remote Measurement Functions” on page 1069.

Remote Command Results for EDGE Power vs Time

n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.
not specified or n = 1	Returns the following comma-separated scalar results: 1. Sample time is a floating point number that represents the time between samples when using the trace queries (n=0,2,etc.). 2. Power single burst is the mean power (in dBm) across the useful part of the selected burst in the most recently acquired data, or in the last data acquired at the end of a set of averages. If averaging is on, the power is for the last burst. 3. Power averaged is the power (in dBm) of N averaged bursts, if averaging is on. The power is averaged across the useful part of the burst. Average m is a single burst from the acquired trace. If there are multiple bursts in the acquired trace, only one burst is used for average m. This means that N traces are acquired to make the complete average. If averaging is off, the value of power averaged is the same as the power single burst value.

n	Results Returned
n = 1 (Cont.)	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 is the index of the data point at the start of the useful part of the burst 6. Stop is the index of the data point at the end of the useful part of the burst 7. T0 is the index of the data point where t0 occurred 8. Burst width is the width of the burst measured at .3dB below the mean power in the useful part of the burst. 9. Maximum value is the maximum value of the most recently acquired data (in dBm). 10. Minimum value is the minimum value of the most recently acquired 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. 12. IQ point delta is the number of data points offset that are internally applied to the useful data in traces n=2,3,4. You must apply this correction value to find the actual location of the Start, Stop, or T0 values. (e.g. for n=2, Start (for the IQ trace data) = Start + IQ_point_delta)
2	Returns comma-separated trace points of the Measure Trace data. These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the number of samples. The period between the samples is defined by the sample time.
3	Returns comma-separated points of the upper mask (in dBm) of the measured slots configured by Meas Time. The measured slots can be seen in Multi Slot view in View/Display.
4	Returns comma-separated points of the lower mask (in dBm) of the measured slots configured by Meas Time. The measured slots can be seen in Multi Slot view in View/Display.
7	Returns power level values for the 8 slots in the current frame (in dBm).
8	Returns comma-separated trace points of the Max Hold Trace data (in dBm) of the measured slots configured by Meas Time. The measured slots can be seen in Multi Slot view in View/Display. There are N data points, where N is the number of samples. The period between the samples is defined by the sample time. This command is available only when the Max Hold Trace State is ON.
9	Returns comma-separated trace points of the Min Hold Trace data (in dBm) of the measured slots configured by Meas Time. The measured slots can be seen in Multi Slot view in View/Display. There are N data points, where N is the number of samples. The period between the samples is defined by the sample time. This command is available only when the Min Hold Trace State is ON.

n	Results Returned
10	Returns the following comma-separated scalar results: 1. Sample time is a floating point number that represents the time between samples when using the trace queries (n=0,2,etc.). 2. Power single burst is the mean power (in dBm) across the useful part of the selected burst in the most recently acquired data, or in the last data acquired at the end of a set of averages. If averaging is on, the power is for the last burst. 3. Power averaged is the power (in dBm) of N averaged bursts, if averaging is on. The power is averaged across the useful part of the burst. Average m is a single burst from the acquired trace. If there are multiple bursts in the acquired trace, only one burst is used for average m. This means that N traces are acquired to make the complete average. If averaging is off, the value of power averaged is the same as the power single burst value. 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 is the index of the data point at the start of the useful part of the burst 6. Stop is the index of the data point at the end of the useful part of the burst 7. T0 is the index of the data point where t0 occurred 8. Burst width is the width of the burst measured at .3dB below the mean power in the useful part of the burst. 9. Maximum value is the maximum value of the most recently acquired data (in dBm). 10. Minimum value is the minimum value of the most recently acquired 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. 12. IQ point delta is the number of data points offset that are internally applied to the useful data in traces n=2,3,4. You must apply this correction value to find the actual location of the Start, Stop, or T0 values. (e.g. for n=2, Start (for the IQ trace data) = Start + IQ_point_delta) 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, returned data has no meaning.

n	Results Returned
10 (Cont.)	14. Detected TSC is the most recently detected TSC. The returned value is 0~7 (Burst Type : Normal/Higher Symbol Rate (HSR)) if TSC detected. If TSC not detected, the returned value is –999.0. If Amptd or NONEPower vs Time only) specified in Sync Type, the returned value is –999.0. In multi slot condition, the returned value is the detected TSC of the specified slot(Time Slot ON) or the first evaluated slot(Time Slot OFF). Note: The returned value in Sync (Synchronization Burst) is. 10 if (BN42, BN43..BN105) = (1,0,1,1,1,0,0,1,0,1,1,0,0,0,1,0,0,0,0,0,0,1,0,0,0,0,0,0,1, 1,1,1,0,0,1,0,1,1,0,1,0,1,0,0,0,1,0,1,0,1,1,1,0,1,1,0,0,0,0,1,1,0,1,1) 11 if (BN42, BN43..BN105) = (1,1,1,0,1,1,1,0,0,1,1,0,1,0,1,1,0,0,1,0,1,0,0,0,0,0,1,1,1,1,1,0,1, 1,1,1,0,1,0,0,0,1,1,1,1,1,1,0,1,1,0,0,1,0,1,1,0,0,0,1,0,1,0,1) 12 if (BN42, BN43..BN105) = (1,1,1,0,1,1,0,0,0,0,1,1,0,1,1,1,0,1,0,1,0,0,0,1,0,1,0,1,1,0, 1,0,0,1,1,1,1,0,0,0,0,0,0,1,0,0,0,0,0,0,1,0,0,0,1,1,0,1,0,0,1,1,1,0) The returned value in Access (Access Burst) is 20 if (BN8, BN9..BN48) = (0,1,0,0,1,0,1,1,0,1,1,1,1,1,1,1,1,0,0,1,1,0,0,1,1,0,1,0,1,0,1,0,0,0,1,1,1,1,0,0,0) 21 if (BN8, BN9..BN48) = (0,1,0,1,0,1,0,0,1,1,1,1,1,0,0,0,1,0,0,0,0,1,1,0,0,0,1,0,1,1,1,1,0,0,1,0,0,1,1,0,1) 22 if (BN8, BN9..BN48) = (1,1,1,0,1,1,1,1,0,0,1,0,0,1,1,1,0,1,0,1,0,1,1,0,0,0,0,0,1,1,0,1,1,0,1,1,1,0,1,1,1) 15. Detected Mod scheme is the most recently detected modulation scheme. The returned value is as follows. 0 for GMSK, 1 for Normal Burst (NB) 8PSK, 2 for NB 16QAM, 3 for NB 32QAM, 11 for Higher symbol rate Burst (HB) QPSK, 12 for HB 16QAM, 13 for HB 32QAM 16. Estimated Carrier Power **(ECP) in dBm** 17. Reserved for future use – the value returned is –999.0 (floating point) 18. Reserved for future use – the value returned is –999.0 (floating point) 19. Reserved for future use – the value returned is –999.0 (floating point)
12	Returns comma-separated trace points of the Measure Trace data. These data points are floating point numbers representing the power of the signal (in dBm). The slot is identified by Time Slot if its state is on, or it is the first measured slot if Time Slot state is off. this single slot can be seen in the Burst view in View/Display.
13	Returns comma-separated points of the upper mask (in dBm) of the single slot. The slot is identified by Time Slot if its state is on, or it is the first measured slot if Time Slot state is off. This single slot can be seen in the Burst view in View/Display.
14	Returns comma-separated points of the lower mask (in dBm) of the single slot. The slot is identified by Time Slot if its state is on, or it is the first measured slot if Time Slot state is off. This single slot can be seen in the Burst view in View/Display.
17	Returns Estimated Carrier Power (ECP) level values for the eight slots in the current frame (in dBm)

n	Results Returned
18	Returns comma-separated trace points of the Max Hold Trace data (in dBm) of the single slot. The slot is identified by Time Slot if its state is on, or it is the first measured slot if Time Slot state is off. This single slot can be seen in the Burst view in View/Display. There are N data points, where N is the number of samples. The period between the samples is defined by the sample time. This command is available only when the Max Hold Trace State is ON.
19	Returns comma-separated trace points of the Min Hold Trace data (in dBm) of the single slot. The slot is identified by Time Slot if its state is on, or it is the first measured slot if Time Slot state is off. This single slot can be seen in the Burst view in View/Display. There are N data points, where N is the number of samples. The period between the samples is defined by the sample time. This command is available only when the Min Hold Trace State is ON.

Key Path	**Meas**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. 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**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Ref Value

Allows you to set the absolute power reference by Burst, Multi-slot and Rise & Fall views.

Key Path	**AMPTD Y Scale**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Ref Value (Burst view and Multi-slot view)

Allows you to set the absolute power reference.

Remote Command	`:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>`
	`:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:EPVT:VIEW:WIND:TRAC:Y:RLEV 5
	DISP:EPVT:VIEW:WIND:TRAC:Y:RLEV?
Dependencies/Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result.
	When the user sets this value manually, Y Auto Scaling automatically changes to Off.
Default Unit	dBm
Key Path	**AMPTD Y Scale**
Key Path	**AMPTD Y Scale**
Mode	GSM

Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. SubOpCode: EPVTime:VIEW[1]:WINDow[1]:Burst view RF Envelope window EPVTime:VIEW3:WINDow[1]:Multi-slot view RF Envelope window
Preset	10 dBm|0.00 dBm
State Saved	Saved in instrument state.
Min	–250.0
Max	250.0
Instrument S/W Revision	Prior to A.02.00

Ref Value (Rise & Fall view)

Allows you to set the absolute power reference.

Remote Command	`:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:EPVT:VIEW:WIND:TRAC:Y:RLEV 5 DISP:EPVT:VIEW:WIND:TRAC:Y:RLEV?
Dependencies/Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets this value manually, Y Auto Scaling automatically changes to Off.
Default Unit	dBm
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. SubOpCode: EPVTime:VIEW2:WINDow[1]:Rising RF Envelope window EPVTime:VIEW2:WINDow2:Falling RF Envelope window
Preset	0.00 dBm
State Saved	Saved in instrument state.
Min	–250.0
Max	250.0
Instrument S/W Revision	Prior to A.02.00

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" on page 969 under AMPTD Y Scale for more information.

Key Path	**AMPTD Y Scale**
Instrument S/W Revision	Prior to A.02.00

Scale/Div

Allows you to enter a numeric value to change the vertical display sensitivity by Burst, Multi-slot and Rise & Fall views.

Key Path	**AMPTD Y Scale**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Scale/Div (Burst view and Multi-slot view)

Allows you to enter a numeric value to change the vertical display sensitivity.

Remote Command	`:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:EPVT:VIEW:WIND:TRAC:Y:PDIV 10 DISP:EPVT:VIEW:WIND:TRAC:Y:PDIV?
Dependencies/Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result. When you set this value manually, Y Auto Scaling automatically changes to Off.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Subopcode: VIEW[1]:WINDow[1]:Burst view RF Envelope window VIEW3:WINDow[1]:Multi-slot view RF Envelope window
Preset	10.00

State Saved	Saved in instrument state.
Min	0.1
Max	20.0
Instrument S/W Revision	Prior to A.02.00

Scale/Div (Rise & Fall view)

Allows you to enter a numeric value to change the vertical display sensitivity.

Remote Command	`:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:EPVT:VIEW:WIND:TRAC:Y:PDIV 10 DISP:EPVT:VIEW:WIND:TRAC:Y:PDIV?
Dependencies/Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result. When you set this value manually, Y Auto Scaling automatically changes to Off.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Subopcode: VIEW2:WINDow[1]:Rising RF Envelope window VIEW2:WINDow2:Falling RF Envelope window
Preset	10.00
State Saved	Saved in instrument state.
Min	0.1
Max	20.0
Instrument S/W Revision	Prior to A.02.00

Presel Center

When this key is pressed, the centering of the preselector filter is adjusted to optimize the amplitude accuracy at the frequency of the selected marker.

See “Presel Center” on page 981 under the AMPTD Y Scale section for more information.

Key Path	**AMPTD Y Scale**

Instrument S/W Revision	Prior to A.02.00

Presel Adjust

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

See “Preselector Adjust” on page 982 under the AMPTD Y Scale section for more information.

Key Path	**AMPTD Y Scale**
Instrument S/W Revision	Prior to A.02.00

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” on page 984 under the AMPTD Y Scale section for more information.

Key Path	**AMPTD Y Scale**
Instrument S/W Revision	Prior to A.02.00

Ref Position

Allows you to set the display reference position to Top, Center, or Bottom by Burst, Multi-slot and Rise & Fall views.

Key Path	**AMPTD Y Scale**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Ref Position (Burst view and Multi-slot view)

Allows you to set the display reference position to Top, Center, or Bottom.

Remote Command	`:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:EPVT:VIEW:WIND:TRAC:Y:RPOS CENT DISP:EPVT:VIEW:WIND:TRAC:Y:RPOS?
Key Path	**AMPTD Y Scale**
Mode	GSM

Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Subopcode: VIEW[1]:WINDow[1]:Burst view RF Envelope window VIEW3:WINDow[1]:Multi-slot view RF Envelope window
Preset	TOP
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Instrument S/W Revision	Prior to A.02.00

Ref Position (Rise & Fall view)

Allows you to set the display reference position to Top, Center, or Bottom.

Remote Command	`:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:EPVT:VIEW:WIND:TRAC:Y:RPOS CENT DISP:EPVT:VIEW:WIND:TRAC:Y:RPOS?
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Subopcode: VIEW2:WINDow[1]:Rising RF Envelope window VIEW2:WINDow2:Falling RF Envelope window
Preset	TOP
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Instrument S/W Revision	Prior to A.02.00

Auto Scaling

Allows you to toggle Y axis auto scaling function between On and Off by Burst, Multi-slot and Rise & Fall views.

Key Path	**AMPTD Y Scale**

Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Auto Scaling (Burst view and Multi-slot view)

Allows you to toggle Y axis auto scaling function between On and Off.

Remote Command	`:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:EPVT:VIEW:WIND:TRAC:Y:COUP 0 DISP:EPVT:VIEW:WIND:TRAC:Y:COUP?
Dependencies/Couplings	When Auto Scaling is On, upon pressing the Restart front-panel key, this function automatically determines the scale per division and reference values based on the measurement results. When you set a value either "Ref Value" on page 680 or "Ref Position" on page 684 manually, this parameter is set to 'Off' automatically.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Subopcode: VIEW[1]:WINDow[1]:Burst view RF Envelope window VIEW3:WINDow[1]:Multi-slot view RF Envelope window
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Auto Scaling (Rise & Fall view)

Allows you to toggle Y axis auto scaling function between On and Off.

Remote Command	`:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:EPVT:VIEW:WIND:TRAC:Y:COUP 0 DISP:EPVT:VIEW:WIND:TRAC:Y:COUP?

Dependencies/Couplings	When Auto Scaling is On, upon pressing the Restart front-panel key, this function automatically determines the scale per division and reference values based on the measurement results. When you set a value either "Ref Value" on page 727 or "Ref Position" on page 684 manually, this parameter is set to 'Off' automatically.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Subopcode: VIEW2:WINDow[1]:Rising RF Envelope window VIEW2:WINDow2:Falling RF Envelope window
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Auto Couple

Operation of this key is identical across several measurements. For details about this key, see “AUTO COUPLE” on page 987.

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**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Info BW

Sets the information bandwidth. This is the bandwidth used for the power measurement. The bandwidth is ideally wide enough to pass all the power of the bursted signal, while not being so wide that it passes noise that reduces the dynamic range and the accuracy of low level measurements.

This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default may cause invalid measurement results.

Remote Command	`[:SENSe]:EPVTime:BANDwidth[:RESolution] <bandwidth>`
	`[:SENSe]:EPVTime:BANDwidth[:RESolution]?`
Example	EPVT:BAND 1000
	EPVT:BAND?
Key Path	**BW**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	510 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	Hardware Dependent:
	No Option = 10 MHz
	Option B25 = 25 MHz
Instrument S/W Revision	Prior to A.02.00

Filter Type

Allows you to select the type of resolution bandwidth filter. Besides the familiar Gaussian filter shape, Flat Top, desirable under certain conditions, is available.

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.

Remote Command	`[:SENSe]:EPVTime:BANDwidth[:RESolution]:TYPE FLATtop|GAUSsian` `[:SENSe]:EPVTime:BANDwidth[:RESolution]:TYPE?`
Example	EPVT:BAND:TYPE GAUS EPVT:BAND:TYPE?
Key Path	**BW**
Mode	GSM
Notes	This chooses the type of filter, either Gaussian or Flat (Flatop). Gaussian is the best choice when looking at the overall burst or the rising and falling edges, as it has excellent pulse response. Even though they have a 5.5% wider noise bandwidth for the same –3 dB bandwidth as a flat top filter, that is only 0.23 dB more noise, and their step response is much cleaner and free of overshooting and ringing. If you want to precisely examine just the useful part of the burst, choose Flat. This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default, may cause invalid measurement results. FLATtop – a filter with a flat amplitude response, which provides the best amplitude accuracy. GAUSsian – a filter with Gaussian characteristics, which provides the best pulse response.
Preset	GAUSsian
State Saved	Saved in instrument state.
Range	Gaussian|Flattop
Instrument S/W Revision	Prior to A.02.00

Cont (Continuous Measurement/Sweep)

Operation of this key is identical across all measurements. For details about this key, see "Cont (Continuous Measurement/Sweep)" on page 991.

FREQ Channel

Operation of this key is identical across all measurements. For details about this key, see "FREQ/Channel" on page 993.

Input/Output

Operation of this key is identical across all measurements. For details about this key, see "Input/Output" on page 1003.

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Some Marker operation is common across multiple Modes and Measurements. See the section "Marker" on page 1063 for information on features that are common.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

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

Marker Type

Sets the marker control mode as described under **Normal**, **Delta** and **Off**, below. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Remote Command	`:CALCulate:EPVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF`
	
	`:CALCulate:EPVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`

Example	CALC:EPVT:MARK:MODE OFF CALC:EPVT:MARK:MODE?
Key Path	**Marker**
Mode	GSM
Notes	If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area. Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X axis value entered in the active function area displays the marker value to its full entered precision. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.

Preset	OFF
State Saved	Saved in instrument state.
Range	Normal|Delta|Off
Instrument S/W Revision	Prior to A.02.00

Marker X Axis Value (Remote Command Only)

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering an X value if the control mode is **Normal** or **Delta**.

Remote Command	`:CALCulate:EPVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <real>`
	
	`:CALCulate:EPVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`

Example	CALC:EPVT:MARK3:X 0 CALC:EPVT:MARK3:X?
Dependencies/Couplings	Max value will be changed by Meas Time parameter value.
Mode	GSM
Notes	If no suffix is sent, uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error “Invalid suffix” is generated. The query returns the marker’s absolute X Axis value if the control mode is **Normal**, or the offset from the marker’s reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency** and **Inverse Time**, seconds for **Period** and **Time**. If the marker is **Off** the response is not a number. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	–9.9E37
Max	9.9E37
Instrument S/W Revision	Prior to A.02.00

Marker X Axis Position (Remote Command Only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering a value if the control mode is **Normal** or **Delta** except in trace points rather than X Axis Scale units. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Remote Command	`:CALCulate:EPVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <integer>` `:CALCulate:EPVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`
Example	CALC:EPVT:MARK10:X:POS 0 CALC:EPVT:MARK10:X:POS?
Dependencies/Couplings	Max value would be changed by Sweep/Meas Time parameter value.
Mode	GSM
Notes	The query returns the marker’s absolute X Axis value in trace points if the control mode is **Normal**, or the offset from the marker’s reference marker in trace points if the control mode is **Delta**. If the marker is **Off** the response is not a number. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	–9.9E37
Max	9.9E37
Instrument S/W Revision	Prior to A.02.00

Marker Y Axis Value (Remote Command Only)

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

The “result” of a marker is the value which is displayed on the second line of the Marker Result block. To properly interpret the returned value the remote programmer must also know what the analyzer’s Y-Axis Unit is set to as described below.

A marker can have up to two results, only one of which is displayed or returned on a query, as follows:

Absolute result: every marker has an absolute result and it is simply:

For Normal and Delta markers, the Y-axis value of the trace point the marker is currently on.

The absolute result is displayed in the result block or returned on a query unless the marker control mode is **Delta**.

Relative result: if a marker’s control mode is **Delta**, the relative result is displayed in the result block or returned on a query. This is the ratio of the Absolute Result of a delta marker to the Absolute Result of its reference marker.

Remote Command	:CALCulate:EPVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?
Example	CALC:EPVT:MARK11:Y?
Mode	GSM
Notes	The query returns the marker Y-axis result. If the marker is **Off** the response is not a number. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Properties

Accesses a menu that allows you to set marker properties and to access the marker trace menu.

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

Relative To

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

Remote Command	:CALCulate:EPVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer> :CALCulate:EPVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?
Example	CALC:EPVT:MARK:REF 2 CALC:EPVT:MARK:REF?
Key Path	**Marker, Properties**
Mode	GSM
Notes	A marker cannot be relative to itself so that choice is unavailable, and if sent from SCPI generates error –221: “Settings conflict; marker cannot be relative to itself.” You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. When queried a single value is returned (the specified marker numbers relative marker).

Preset	2|3|4|5|6|7|8|9|10|11|12|1
State Saved	Saved in instrument state.
Min	1
Max	12
Instrument S/W Revision	Prior to A.02.00

Marker Trace

Assigns the specified marker to the designated trace.

Remote Command	`:CALCulate:EPVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe RFENvelope|UMASk|LMASk|MAXRfenvelop|MINRfenvelop` `:CALCulate:EPVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?`
Example	CALC:EPVT:MARK:TRAC LMAS CALC:EPVT:MARK:TRAC?
Dependencies/Couplings	Max Hold RF Envelop is only available when Max Trace is set to On. Min Hold RF Envelop is only available when Min Hold Trace is set to On. Otherwise, the menu keys are unavailable and the commands are unavailable.
Key Path	**Marker, Properties**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	RFENvelope
State Saved	Saved in instrument state.
Range	RF Envelope|Upper Mask|Lower Mask|Max Hold RF Envelope|Min Hold RF Envelope
Instrument S/W Revision	Prior to A.02.00

Couple Markers

When this function is **On**, moving any marker causes an equal X Axis movement of every other marker which is not **Off**. By "equal X Axis movement" we mean that we preserve the difference between each marker's X Axis value (in the fundamental x-axis units of the trace that marker is on) and the X Axis value of the marker being moved (in the same fundamental x-axis units).

This may result in markers going off screen.

Remote Command	`:CALCulate:EPVTime:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:EPVTime:MARKer:COUPle[:STATe]?`

Example	CALC:EPVT:MARK:COUP ON CALC:EPVT:MARK:COUP?
Key Path	**Marker**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

All Markers Off

Turns off all markers.

Remote Command	`:CALCulate:EPVTime:MARKer:AOFF`
Example	CALC:EPVT:MARK:AOFF
Key Path	**Marker**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Instrument S/W Revision	Prior to A.02.00

Marker Function

There is no functionality for this Front-panel key in this measurement. When pressed, this key displays a blank menu.

Key Path	**Front-panel key**
Mode	GSM

Marker To

There is no functionality for this Front-panel key in this measurement. When pressed, this key displays a blank menu.

Key Path	**Front-panel key**
Mode	GSM

Meas

Operation of this key is identical across all measurements. For details about this key, see “Meas” on page 1069.

Meas Setup

Displays the measurement setup menu for the currently selected measurement.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Avg/Hold Num

Sets the number of bursts that are averaged. After the specified number of bursts (average counts), the averaging mode (termination control) setting determines the averaging action.

Remote Command	`[:SENSe]:EPVTime:AVERage:COUNt <integer>`
	`[:SENSe]:EPVTime:AVERage:COUNt?`
	`[:SENSe]:EPVTime:AVERage[:STATe] OFF|ON|0|1`
	`[:SENSe]:EPVTime:AVERage[:STATe]?`
Example	EPVT:AVER:COUN 3
	EPVT:AVER:COUN?
	EPVT:AVER 1
	EPVT:AVER?
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10
	OFF
State Saved	Saved in instrument state.
Min	1
Max	10000
Instrument S/W Revision	Prior to A.02.00

Avg Mode

Selects the type of termination control used for the averaging function. This selection only affects the averaging after the number of N averages is reached (set using the Averages, Avg Bursts, or Avg Number key).

Exponential averaging SCPI:EXPonential	When Measure is set at Cont, data acquisitions continue indefinitely. After N averages, exponential averaging is used with a weighting factor of N (the displayed average count stops at N). Exponential averaging weights new data more than old data, which allows tracking of slow-changing signals. The weighting factor N is set using the Averages, Avg Bursts key.
Repeat averaging SCPI:REPeat	When Measure is set at Cont, data acquisitions continue indefinitely. After N averages is reached, all previous result data is cleared and the average count is set back to 1. This is equivalent to being in Measure Single and pressing the Restart key when the Single measurement finishes.

Remote Command	`[:SENSe]:EPVTime:AVERage:TCONtrol EXPonential|REPeat` `[:SENSe]:EPVTime:AVERage:TCONtrol?`
Example	EPVT:AVER:TCON REP EPVT:AVER:TCON?
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	EXPonential
State Saved	Saved in instrument state.
Range	Exp|Repeat
Instrument S/W Revision	Prior to A.02.00

Avg Type

Selects the averaging type, according to the following alternatives:

KEY:Pwr Avg (RMS) SCPI:RMS	True power averaging that is equivalent to taking the RMS value of the voltage. It is the most accurate type of averaging.
KEY:Log-Pwr Avg (Video) SCPI:LOG	Simulates the traditional spectrum analyzer type of averaging by averaging the log of the power.
KEY:None SCPI:MAXimum	Keeps track of the maximum values.

KEY:None SCPI:MINimum	Keeps track of the minimum values.
KEY:None SCPI:MXMinimum	Keeps track of the maximum and minimum values.

Remote Command	`[:SENSe]:EPVTime:AVERage:TYPE LOG|RMS|MAXimum|MINimum|MXMinimum` `[:SENSe]:EPVTime:AVERage:TYPE?`
Example	EPVT:AVER:TYPE RMS EPVT:AVER:TYPE?
Dependencies/Couplings	Selecting MAXimum|MINimum|MXMinimum shows "Max Hold Trace" on page 734 or|and "Min Hold Trace" on page 734. Measure Trace stays in RMS or Video average state.
Key Path	**Meas Setup**
Mode	GSM
Notes	Maximum|Minimum|Max&Min can be selected only via SCPI. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	RMS
State Saved	Saved in instrument state.
Range	Pwr Avg(RMS)|Log-Pwr Avg(Video)
Instrument S/W Revision	Prior to A.02.00

Meas Time

Allows you to measure more than one timeslot. Enter a value in integer increments of “slots” with a range of 1 to 8. The actual measure time, in µs, is set somewhat longer than the specified number of slots, to view the complete burst.

Remote Command	`[:SENSe]:EPVTime:SWEep:TIME <integer>` `[:SENSe]:EPVTime:SWEep:TIME?`
Example	EPVT:SWE:TIME 8 EPVT:SWE:TIME?
Dependencies/Couplings	Scale/Div of X scale of Multi Slot View varies according to this value. Scale/Div should be adjusted to show set meas time.
Key Path	**Meas Setup**
Mode	GSM

Notes	The actual sweep time may be slightly larger than required SweepTime due to limited trace point resolution, this is a hardware dependency. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	1 slot
State Saved	Saved in instrument state.
Min	1
Max	8
Instrument S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

Burst Sync

Allows you to choose the source used to synchronize the measurement to the “T0” point of the EDGE burst. The “T0” point is defined as the time point of the transition from bit 13 to bit 14 of the midamble training sequence for a given time slot. The Burst Search Threshold setting (in the Mode Setup keys under Demod menu) applies to both Training Seq and RF Amptd. Pressing the Burst Sync key brings up a menu with some or all of the following choices:

Training Seq (SCPI: TSEQuence)

RF Amptd (SCPI: RFBurst)

None (SCPI: NONE)

Remote Command	`[:SENSe]:EPVTime:BSYNc:SOURce TSEQuence|RFBurst|NONE` `[:SENSe]:EPVTime:BSYNc:SOURce?`
Example	EPVT:BSYN:SOUR NONE EPVT:BSYN:SOUR?
Dependencies/Couplings	When Burst Type in the Mode Setup menu is set to Mixed, this menu key is unavailable and Training Sequence (TSC) is used for synchronization. The ”Training Seq” is shown on Meas Bar. The sync algorithm always runs in Training Sequence (TSC) synchronization mode in case of “Mixed” because Burst Type can be determined by looking at TSC in the signal. Original selection of Burst Sync becomes effective again when Burst Type selection is changed from “Mixed” to another one. If the selected Burst Sync is “NONE”, the key “Timeslot Length” on page 711 becomes active. Otherwise the key is unavailable.
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.

Preset	TSEQuence
State Saved	Saved in instrument state.
Range	Training Seq|RF Amptd|None
Instrument S/W Revision	Prior to A.02.00

IF Gain

To take full advantage of the RF dynamic range of the analyzer, a switched IF amplifier with approximately 10 dB of gain is available. When it can be turned on without an overload, the dynamic range is always better with it on than off. The **IF Gain** key can be used to set the IF Gain function to Auto, or to On (the extra 10 dB) or Off. These settings affect sensitivity and IF overloads.

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

IF Gain Auto

Activates the auto rules for IF Gain

Remote Command	`[:SENSe]:EPVTime:IF:GAIN:AUTO[:STATe] ON|OFF|1|0`
	`[:SENSe]:EPVTime:IF:GAIN:AUTO[:STATe]?`
Example	EPVT:IF:GAIN:AUTO ON
	EPVT:IF:GAIN:AUTO?
Dependencies/Couplings	When either the auto attenuation works (for example, with electrical attenuator), or the optimize mechanical attenuator range is requested, the IF Gain setting is changed as following rule.
	‘auto’ sets IF Gain High under any of the following conditions: the input attenuator is set to 0 dB, the preamp is turned on, or the Max Mixer Level is 20 dBm or lower. For other settings, auto sets IF Gain to Low.
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	Auto|Man
Instrument S/W Revision	Prior to A.02.00

IF Gain State

Selects the range of IF gain.

Remote Command	`[:SENSe]:EPVTime:IF:GAIN[:STATe] ON|OFF|1|0`
	`[:SENSe]:EPVTime:IF:GAIN[:STATe]?`
Example	EPVT:IF:GAIN ON
	EPVT:IF:GAIN?
Dependencies/Couplings	Couple to “IF Gain Auto” on page 707 force it to Man.
Key Path	**Meas Setup, IF Gain**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	where ON = high gain
	OFF = low gain
Preset	OFF
State Saved	Saved in instrument state.
Range	Low Gain (Best for Large Signals)|High Gain (Best Noise Level)
Instrument S/W Revision	Prior to A.02.00

Limit Test

Turns on or off limit pass/fail testing. Does not affect the limit line display.

Remote Command	`:CALCulate:EPVTime:LIMit:TEST[:STATe] OFF|ON|0|1`
	`:CALCulate:EPVTime:LIMit:TEST[:STATe]?`
Example	CALC:EPVT:LIM:TEST ON
	CALC:EPVT:LIM:TEST?
Key Path	**Meas Setup**
Mode	GSM
Notes	If set to On, the measurement results are checked against the PVT Limit parameter to see if they meet the limit requirements.
	If set to Off, the PASS/FAIL indicator on the Meas Bar goes blank.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.

Range	On|Off
Instrument S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

Limit Mask

Allows you to select Limit Mask type, against which the measured data is compared.

For custom, see also:

"Lower Mask Absolute Amplitude Levels" on page 712
"Lower Mask Points" on page 713
"Lower Mask Relative Amplitude Levels" on page 713
"Lower Mask Time Points" on page 714
"Upper Mask Absolute Amplitude Levels" on page 715
"Upper Mask Points" on page 715
"Upper Mask Relative Amplitude Levels" on page 716
"Upper Mask Time Points" on page 716

KEYStandard SCPISTANdard	The measurement algorithm uses standard-defined limit mask.
KEYCustom SCPICUSTom	The measurement algorithm uses user-defined custom limit mask.

Remote Command	`[:SENSe]:EPVTime:MASK:SELect STANdard|CUSTom` `[:SENSe]:EPVTime:MASK:SELect?`
Example	EPVT:MASK:SEL STAN EPVT:MASK:SEL?
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	STANdard
State Saved	Saved in instrument state.
Range	Std|Custm
Instrument S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

Advanced

Accesses advanced features. These features are recommended for use only by advanced users.

Key Path	**Meas Setup**
Instrument S/W Revision	A.02.00

Ref Pwr Type

Pressing the Ref Pwr Type key allows you to choose the type of a reference power used for a limit mask. Pressing the Ref Pwr Type key brings up a menu with some or all of the following choices:

Useful Part (SCPI: UPARt)

Midamble (SCPI: MAMBle)

Estimated (SCPI: ESTimated)

Remote Command	`[:SENSe]:EPVTime:MASK:RPOWer:TYPE UPARt|MAMBle|ESTimated` `[:SENSe]:EPVTime:MASK:RPOWer:TYPE?`
Example	EPVT:MASK:RPOW:TYPE UPAR EPVT:MASK:RPOW:TYPE?
Dependencies/Couplings	If the Burst Sync is set to “TSEQuence”, the soft key “Estimated” becomes enabled. Otherwise the key is unavailable.
Key Path	**Meas Setup, Advanced**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	UPARt
State Saved	Saved in instrument state.
Range	Useful Part|Midamble|Estimated
Instrument S/W Revision	A.02.00

Ref Power

Allows you to manually set the reference power for time mask.

Remote Command	`[:SENSe]:EPVTime:MASK:RPOWer <ampl>`
	`[:SENSe]:EPVTime:MASK:RPOWer?`
	`[:SENSe]:EPVTime:MASK:RPOWer:AUTO[:STATe] OFF|ON|0|1`
	`[:SENSe]:EPVTime:MASK:RPOWer:AUTO[:STATe]?`

Example	EPVT:MASK:RPOW –20 EPVT:MASK:RPOW? EPVT:MASK:RPOW:AUTO 0 EPVT:MASK:RPOW:AUTO?
Key Path	**Meas Setup, Advanced**
Mode	GSM
Preset	–10 ON
State Saved	Saved in instrument state.
Min	–200
Max	200
Instrument S/W Revision	A.02.00

Timeslot Length

Allows you to change how the limit mask applies for each slot, when in a multi-slot measurement.

KEYEven SCPIEVEN	The measurement algorithm generates limit mask with the same slot length. For the normal and the higher symbol rate case, all slots have 156.25 and 187.5 symbols respectively.
KEYNot Even SCPIINTeger	For the normal and the higher symbol rate case, the measurement algorithm generates limit mask for 0 and 4 with slot length 157 and 188.4 symbols respectively. For the normal and higher symbol rate case, the measurement algorithm generates limit mask for slot 1, 2, 3, 5, 6, 7 with slot length 156 and 187.2 symbols respectively. Slot 0 here is simply the first slot in the captured data, not the absolute slot determined by training sequence number.

Remote Command	`[:SENSe]:EPVTime:BSYNc:SLENgth EVEN|INTeger` `[:SENSe]:EPVTime:BSYNc:SLENgth?`
Example	EPVT:BSYN:SLEN INT EPVT:BSYN:SLEN?
Dependencies/Couplings	This parameter is available only if the Burst Sync type is None. Otherwise it is unavailable.
Key Path	**Meas Setup, Advanced**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.

Preset	INTeger
State Saved	Saved in instrument state.
Range	Even | Not Even
Instrument S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

Meas Preset

Restores all the measurement parameters to their default values.

Remote Command	`:CONFigure:EPVTime`
Example	CONF:EPVT
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode
Instrument S/W Revision	Prior to A.02.00

Custom Limit Mask (Remote Commands Only)

The following Remote Only commands in this section define the custom limit mask:

"Lower Mask Absolute Amplitude Levels" on page 712

"Lower Mask Points" on page 713

"Lower Mask Relative Amplitude Levels" on page 713

"Lower Mask Time Points" on page 714

"Upper Mask Absolute Amplitude Levels" on page 715

"Upper Mask Points" on page 715

"Upper Mask Relative Amplitude Levels" on page 716

"Upper Mask Time Points" on page 716

Lower Mask Absolute Amplitude Levels

Allows you to enter a power level for any of your mask line segments that require an absolute minimum power limit in addition to its relative limit. Each time a measurement is made, the Ref Level is determined. As the power of the Ref Level changes, all of the relative mask power levels change by the same amount.

Each relative limit is then compared to the Ref Level and an equivalent absolute power level is calculated. This power level is compared to the specified absolute limit for each line segment. If this calculated relative limit is lower than the specified absolute limit, then the value of the absolute limit is used for this segment. Therefore, if the absolute reference limit is set to a very low value, the calculated value of the reference limit is never lower, and the specified relative limit is always used for the segment.

Every time point you defined with EPVT:MASK:LOW:TIME must have a power value defined in the same order.

Remote Command:	`[:SENSe]:EPVTime:MASK:LIST:LOWer:ABSolute <real>, …`
	`[:SENSe]:EPVTime:MASK:LIST:LOWer:ABSolute?`
Example:	EPVT:MASK:LIST:LOW:ABS 0,–10,–60
	EPVT:MASK:LIST:LOW:ABS?
Notes:	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Dependencies/Couplings:	Relative Amplitude Levels are also changed when this value has been set.
Preset:	–200,–200
State Saved:	Saved in instrument state.
Min:	–200 dBm
Max:	100 dBm
Instrument S/W Revision:	Prior to A.02.00

Lower Mask Points

Queries the number of elements in the lower mask. This value is determined by the number of time points entered by EPVT:MASK:LIST:LOW:TIME.

Remote Command:	`[:SENSe]:EPVTime:MASK:LIST:LOWer:POINts?`
Example:	EPVT:MASK:LIST:LOW:POIN?
Notes:	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
	Query only.
Instrument S/W Revision:	Prior to A.02.00

Lower Mask Relative Amplitude Levels

Allows you to enter the relative power level for each horizontal line segment in the lower limit mask. There should be a power level for each time point entered using [:SENSe]:EPVTime:MASK:LIST:LOWer:TIME, and they must be entered in the same order. These power levels are all relative to the defined Reference Power Level (the average power in the useful part of the data). When an upper and lower limit mask have been defined, the Reference Power Level is the mid-point between these two limits at time T0.

Any portion of the signal that has no limit line segment defined for it defaults to a very low limit (–100dB relative to the reference power). This keeps the measurement from indicating a failure for that portion of the data.

Remote Command:	`[:SENSe]:EPVTime:MASK:LIST:LOWer:RELative <rel_ampl>, …`
	`[:SENSe]:EPVTime:MASK:LIST:LOWer:RELative?`
Example:	EPVT:MASK:LIST:LOW:REL –200,–200
	EPVT:MASK:LIST:LOW:REL?
Notes:	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Dependencies/Couplings:	Absolute Amplitude Levels are also changed when this value has been set.
Preset:	–200,–200
State Saved:	Saved in instrument state.
Min:	–200
Max:	200
Instrument S/W Revision:	Prior to A.02.00

Lower Mask Time Points

Allows you to enter the time points that define the horizontal line segments for the lower limit. A reference point designated “t0” is at the center of the useful data (usually the center of the burst). Each line segment to the right of the t0 reference point is designated as a positive time value and each segment to the left of t0 reference point is a negative time value.

First enter positive values in sequence starting from t0, then negative values in sequence starting from t0.

Remote Command:	`[:SENSe]:EPVTime:MASK:LIST:LOWer:TIME <seconds>, …`
	`[:SENSe]:EPVTime:MASK:LIST:LOWer:TIME?`
Example:	EPVT:MASK:LIST:LOW:TIME 1,1
	EPVT:MASK:LIST:LOW:TIME?
Notes:	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset:	1,–1
State Saved:	Saved in instrument state.
Min:	–1 s
Max:	1 s
Instrument S/W Revision:	Prior to A.02.00

Upper Mask Absolute Amplitude Levels

Allows you to enter a power level for any of your mask line segments that require an absolute minimum power limit in addition to its relative limit. Each time a measurement is made, the Ref Level is determined (This is the power level of the useful part of the burst, or midway between the upper/lower masks). Remember that, as the power of the Ref Level changes, all of the relative mask power levels changes by the same amount.

Each relative limit is then compared to the Ref Level and an equivalent absolute power level is calculated. This power level is compared to the specified absolute limit for each line segment. If this calculated relative limit is higher than the specified absolute limit, then the value of the absolute limit is used for this segment. Therefore, if the absolute reference limit is set to a very low value (–200 dBm), the calculated value of the reference limit is never lower, and the specified relative limit is always used for the segment.

Every time point you defined with EPVT:MASK:UPP:TIME must have a power value defined in the same order.

Remote Command:	`[:SENSe]:EPVTime:MASK:LIST:UPPer:ABSolute <real>, …` `[:SENSe]:EPVTime:MASK:LIST:UPPer:ABSolute?`
Example:	EPVT:MASK:LIST:UPP:ABS –200,–200,–58,–200,–200,–200,–200,–58,–200 EPVT:MASK:LIST:UPP:ABS?
Notes:	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Dependencies/Couplings:	Relative Amplitude Levels are also changed when this value has been set.
Preset:	–200,–200
State Saved:	Saved in instrument state.
Min:	–200
Max:	100
Instrument S/W Revision:	Prior to A.02.00

Upper Mask Points

Queries the number of elements in the upper mask. This value is determined by the number of time points entered by EPVT:MASK:LIST:UPP:TIME.

Remote Command:	`[:SENSe]:EPVTime:MASK:LIST:UPPer:POINts?`
Example:	EPVT:MASK:LIST:UPP:POIN?
Notes:	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. Query only.
Instrument S/W Revision:	Prior to A.02.00

Upper Mask Relative Amplitude Levels

Allows you to enter the relative power level for each horizontal line segment in the upper limit mask. There should be a power level for each time point entered using [:SENSe]:EPVTime:MASK:LIST:UPPer:TIME, and they must be entered in the same order. These power levels are all relative to the defined Reference Power Level (the average power in the useful part of the data). When an upper and lower limit mask have been defined, the Reference Power Level is the mid-point between these two limits.

Remote Command:	`[:SENSe]:EPVTime:MASK:LIST:UPPer:RELative <rel_ampl>, …`
	`[:SENSe]:EPVTime:MASK:LIST:UPPer:RELative?`
Example:	EPVT:MASK:LIST:UPP:REL 4,–32,–48,100,4,7,–25,–43,100
	EPVT:MASK:LIST:UPP:REL?
Notes:	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Dependencies/Couplings:	Absolute Amplitude Levels are also changed when this value has been set.
Preset:	100,100
State Saved:	Saved in instrument state.
Min:	–200
Max:	200
Instrument S/W Revision:	Prior to A.02.00

Upper Mask Time Points

Allows you to enter the time points that define the horizontal line segments for the upper limit. A reference point designated “t0” is at the center of the useful data (usually the center of the burst). Each line segment to the right of the t0 reference point is designated as a positive time value and each segment to the left of t0 is a negative time value.

First enter positive values in sequence starting from t0, then the negative values in sequence starting from t0.

We recommend that you select a large time value for your first and last mask points (for example,. –1 and +1 second). This guarantees that you have defined a limit for all the measured data.

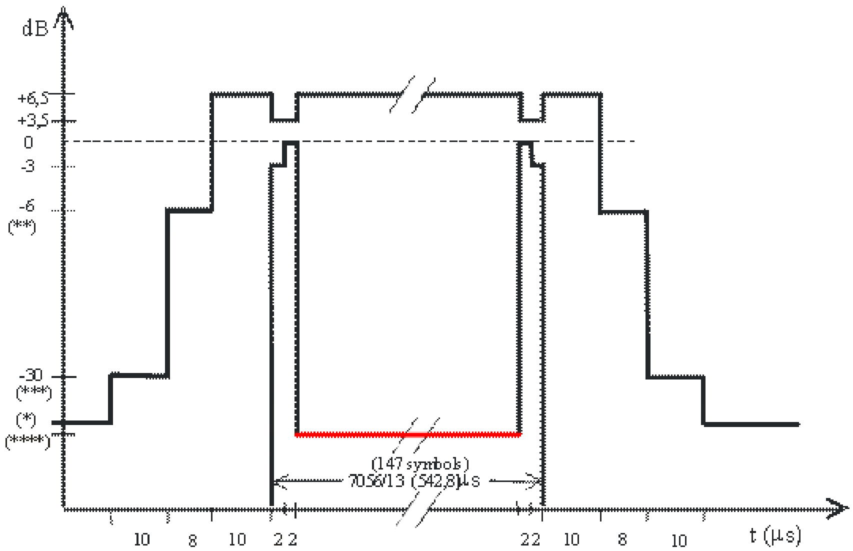
Remote Command:	`[:SENSe]:EPVTime:MASK:LIST:UPPer:TIME <seconds>, …`
	`[:SENSe]:EPVTime:MASK:LIST:UPPer:TIME?`
Example:	EPVT:MASK:LIST:UPP:TIME 1,–1
	EPVT:MASK:LIST:UPP:TIME?
Notes:	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset:	1,–1

State Saved:	Saved in instrument state.
Min:	–1 s
Max:	1 s
Instrument S/W Revision:	Prior to A.02.00

Lower Limit within Useful Part (Remote Commands Only)

Limit Mask Useful Part Lower Normal

According to the Standards, the lower limit within the useful part of normal duration bursts (NB) is seen as undefined for 16-QAM and 32-QAM. The lower limit (red in the Figure 1) is set to –200 by default. This command allows you to set the lower limit as you like. Only SCPI remote command is supported. Note that the lower limit is shared in the BTS and MS modes.

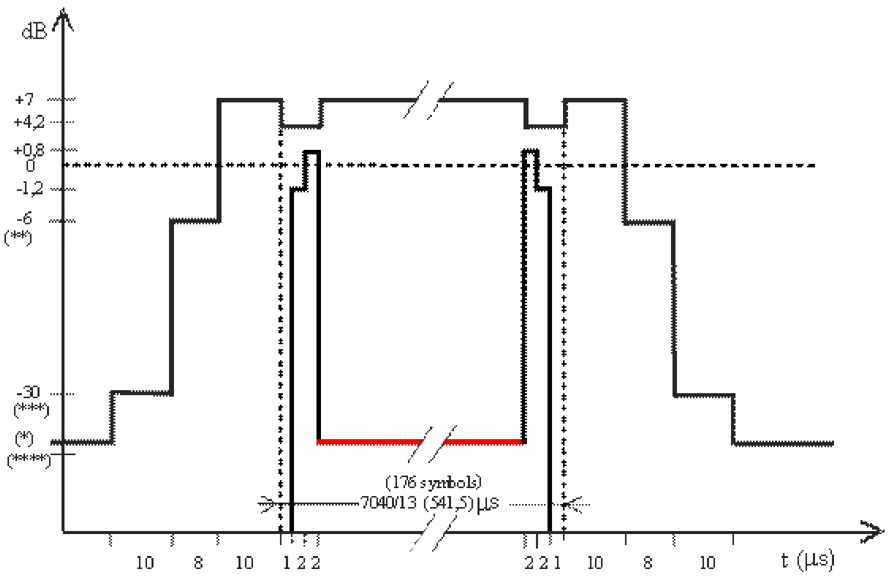


Remote Command	`[:SENSe]:EPVTime:MASK[:UPARt]:LOWer:NORMal QAM16|QAM32, <rel_ampl>` `[:SENSe]:EPVTime:MASK[:UPARt]:LOWer:NORMal? QAM16|QAM32`
Example	EPVT:MASK:LOW:NORM QAM16, –40 EPVT:MASK:LOW:NORM? QAM16
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	–200
State Saved	Saved in instrument state.
Min	–200

Max	200
Instrument S/W Revision	A.02.00

Limit Mask Useful Part Lower Higher Symbol Rate

According to the Standards, the lower limit within the useful part for higher symbol rate bursts (HB) is seen as undefined for 16-QAM and 32-QAM. The lower limit (red in the Figure 2) is set to –200 by default. This command allows you to set the lower limit as you like. Only SCPI remote command is supported. Note that the lower limit is shared in the BTS and MS modes and in the narrow and wide pulse shaping filter modes.



Remote Command	`[:SENSe]:EPVTime:MASK[:UPARt]:LOWer:HSRate QAM16|QAM32, <rel_ampl>`
	`[:SENSe]:EPVTime:MASK[:UPARt]:LOWer:HSRate? QAM16|QAM32`
Example	EPVT:MASK:LOW:HSR QAM16, –40
	EPVT:MASK:LOW:HSR? QAM16
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	–200
State Saved	Saved in instrument state.
Min	–200
Max	200
Instrument S/W Revision	A.02.00

Mode

Operation of this key is identical across all measurements. For details about this key, see “Mode” on page 1087.

Mode Setup

Operation of this key is identical across all measurements. For details about this key, see "Mode Setup" on page 1101.

Peak Search

There is no functionality for this Front-panel key in this measurement. When pressed, this key displays a blank menu.

Remote Command	`:CALCulate:EPVTime:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	CALC:EPVT:MARK2:MAX
Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Recall

Operation of this key is identical across several measurements. For details of this key, see “Recall” on page 1123

Restart

Operation of this key is identical across all measurements. For details about this key, see “Restart” on page 1145.

Save

Operation of this key is identical across several measurements. For details of this key, see "Save" on page 1147

Single

Operation of this key is identical across several measurements. For details about this key, see "Single (Single Measurement/Sweep)" on page 1173.

Source

Operation of this key is identical across several measurements. For details about this key, see "Source" on page 1175.

SPAN X Scale

Accesses a menu of functions that enable you to set the horizontal scale parameters

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Ref Value

Allows you to set the display X reference value by Burst, Multi-slot and Rise & Fall views.

Key Path	**Span X Scale**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Ref Value (Burst view and Multi-slot view)

Allows you to set the display X reference value.

Remote Command	`:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:RLEVel <time>` `:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:EPVT:VIEW:WIND:TRAC:X:RLEV 1 DISP:EPVT:VIEW:WIND:TRAC:X:RLEV?
Dependencies/Couplings	If the “Auto Scaling” on page 731 is On, this value is automatically determined by the measurement result. When you set a value manually, “Auto Scaling” on page 731 automatically changes to Off.
Key Path	**SPAN X Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	–65.0 us|–67 us
State Saved	Saved in instrument state.
Min	–1.00 s
Max	1.00 s
Instrument S/W Revision	Prior to A.02.00

Ref Value (Rise & Fall view)

Allows you to set the display X reference value.

Remote Command	`:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:RLEVel <time>`
	`:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:EPVT:VIEW2:WIND2:TRAC:X:RLEV 1
	DISP:EPVT:VIEW2:WIND2:TRAC:X:RLEV?
Dependencies/Couplings	If the “Auto Scaling” on page 731 is On, this value is automatically determined by the measurement result. When you set a value manually, “Auto Scaling” on page 731 automatically changes to Off.
Key Path	**SPAN X Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0 s|542.8 us
State Saved	Saved in instrument state.
Min	–1.00 s
Max	1.00 s
Instrument S/W Revision	Prior to A.02.00

Scale/Div

Allows you to set the display X scale/division value by Burst, Multi-slot and Rise & Fall views.

Key Path	**Span X Scale**
Mode	**GSM**
Instrument S/W Revision	**Prior to A.02.00**

Scale/Div (Burst view and Multi-slot view)

Allows you to set the display X scale/division value.

Remote Command	`:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:PDIVision <time>`
	`:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:EPVT:VIEW:WIND:TRAC:X:PDIV 1ms
	DISP:EPVT:VIEW:WIND:TRAC:X:PDIV?

Dependencies/Couplings	If the "Auto Scaling" on page 731 is On, this value is automatically determined by the measurement result. When you set a value manually, "Auto Scaling" on page 731 automatically changes to Off.
Key Path	**Span X Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	70.00 us|84.00 us
State Saved	Saved in instrument state.
Min	1.00 ns
Max	1.00 s
Instrument S/W Revision	Prior to A.02.00

Scale/Div (Rise & Fall view)

Allows you to set the display X scale/division value.

Remote Command	`:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:PDIVision <time>` `:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:EPVT:VIEW2:WIND2:TRAC:X:PDIV 1ms DISP:EPVT:VIEW2:WIND2:TRAC:X:PDIV?
Dependencies/Couplings	If the "Auto Scaling" on page 731 is On, this value is automatically determined by the measurement result. When you set a value manually, "Auto Scaling" on page 731 automatically changes to Off.
Key Path	**Span X Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10.00 us
State Saved	Saved in instrument state.
Min	1.00 ns
Max	1.00 s
Instrument S/W Revision	Prior to A.02.00

Ref Position

Allows you to set the display reference position to Left, Center or Right by Burst, Multi-slot and Rise & Fall views.

Key Path	**Span X Scale**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Ref Position (Burst view and Multi-slot view)

Allows you to set the display reference position to Left, Center or Right.

Remote Command	`:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:EPVT:VIEW:WIND:TRAC:X:RPOS LEFT DISP:EPVT:VIEW:WIND:TRAC:X:RPOS?
Key Path	**SPAN X Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left|Ctr|Right
Instrument S/W Revision	Prior to A.02.00

Ref Position (Rise & Fall view)

Allows you to set the display reference position to Left, Center or Right.

Remote Command	`:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:EPVT:VIEW2:WIND2:TRAC:X:RPOS LEFT DISP:EPVT:VIEW2:WIND2:TRAC:X:RPOS?
Key Path	**SPAN X Scale**
Mode	GSM

Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	CENTer
State Saved	Saved in instrument state.
Range	Left|Ctr|Right
Instrument S/W Revision	Prior to A.02.00

Auto Scaling

Allows you to toggle the scale coupling function between On and Off by Burst, Multi-slot and Rise & Fall views.

Key Path	**Span X Scale**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Auto Scaling (Burst view and Multi-slot view)

Allows you to toggle the scale coupling function between On and Off.

Remote Command	`:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALe]:COUPle?`
Example	DISP:EPVT:VIEW:WIND:TRAC:X:COUP OFF DISP:EPVT:VIEW:WIND:TRAC:X:COUP?
Dependencies/Couplings	See Notes
Key Path	**Span X Scale**
Mode	GSM
Notes	Upon pressing the Restart front-panel key,the scale coupling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either “Ref Value” on page 727 or “Scale/Div” on page 728 manually, X Auto Scaling automatically changes to Off. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off

Instrument S/W Revision	Prior to A.02.00

Auto Scaling (Rise & Fall view)

Allows you to toggle the scale coupling function between On and Off.

Remote Command	`:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:COUPle?`
Example	DISP:EPVT:VIEW:WIND:TRAC:X:COUP OFF DISP:EPVT:VIEW:WIND:TRAC:X:COUP?
Dependencies/Couplings	See Notes
Key Path	**Span X Scale**
Mode	GSM
Notes	Upon pressing the Restart front-panel key, the scale coupling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either "Ref Value" on page 727 or "Scale/Div" on page 728 manually, X Auto Scaling automatically changes to Off. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Sweep/Control

Operation of this key is identical across several measurements. For details about this key, see "Sweep / Control" on page 1179.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Trace/Detector

Accesses a menu that enables you to show (On) or hide (Off) the Max Hold Trace and Min Hold Trace. Max/Min Hold Traces will be hold during the averaging cycle.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Max Hold Trace

This key enables you to show (On) or hide (Off) the Max Hold Trace.

Remote Command	`:DISPlay:EPVTime:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATe] ON|OFF|1|0` `:DISPlay:EPVTime:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATe]?`
Example	DISP:EPVT:VIEW:WIND:TRAC:MAXH ON DISP:EPVT:VIEW:WIND:TRAC:MAXH?
Dependencies/Couplings	Selecting [:SENSe]:EPVTime:AVERage:TYPE MAXimum|MXMinimum forces this parameter to ON.
Key Path	**Trace/Detector**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Min Hold Trace

This key enables you to show (On) or hide (Off) the Min Hold Trace.

Remote Command	`:DISPlay:EPVTime:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATe] ON|OFF|1|0` `:DISPlay:EPVTime:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATe]?`

Example	DISP:EPVT:VIEW:WIND:TRAC:MINH ON DISP:EPVT:VIEW:WIND:TRAC:MINH?
Dependencies/Couplings	Selecting [:SENSe]:EPVTime:AVERage:TYPE MINimum|MXMinimum forces this parameter to ON.
Key Path	**Trace/Detector**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Trigger

Accesses a menu functions that enable you to select and control the trigger source for the current measurement. See “Trigger” on page 1197 for more information.

View/Display

Accesses a menu of functions that enable you to:

- Set the display parameters for the current measurement
- Select the View

See the section “View/Display” on page 1253 for more information.

Key Path	**View/Display**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Display

Accesses a menu of functions that enable you to set the display parameters for the current measurement.

See the section “Display” on page 1253for more information.

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

View Selection

Accesses a menu that allows you to select the desired view of the measurement.

For details of Remote Commands associated with the measurement’s views, see the following sections:

“View Selection by name (Remote Command Only).” on page 738

“View Selection by number (Remote Command Only)” on page 738

The following view selections are available:

- Burst (SCPI: ALL) – views the entire burst of interest as determined by the current trigger source, burst sync, training sequence, and timeslot settings. To view a different burst of interest you must set these parameters for the selected timeslot. To view multiple slots, use the Multi-Slot key described below. For full details, see “Burst View” on page 738.
- Rise & Fall (SCPI: BOTH) – zooms in on the rising and falling portions of the burst being tested. For full details, see “Rise & Fall View” on page 742.
- Multi-Slot (SCPI: MSLot) – views the entire sweep as specified by the current Meas Time setting. Power levels for each active slot are listed in a table below the timeslot display. For full details, see “Multi-Slot View” on page 743.

View Selection by name (Remote Command Only).

Remote Command	`:DISPlay:EPVTime:VIEW[:SELect] ALL|BOTH|MSLot`
	`:DISPlay:EPVTime:VIEW[:SELect]?`
Example	DISP:EPVT:VIEW:SEL ALL
	DISP:EPVT:VIEW:SEL?
Key Path	**View/Display**
Mode	GSM
Preset	ALL
State Saved	Saved in instrument state.
Range	Burst|Rise & Fall|Multi-Slot
Instrument S/W Revision	Prior to A.02.00

View Selection by number (Remote Command Only)

Remote Command	`:DISPlay:EPVTime:VIEW:NSELect <integer>`
	`:DISPlay:EPVTime:VIEW:NSELect?`
Example	DISP:EPVT:VIEW:NSEL 3
	DISP:EPVT:VIEW:NSEL?
Mode	GSM
Notes	1: Burst 2: Rise & Fall 3: Multi-Slot
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	3
Instrument S/W Revision	Prior to A.02.00

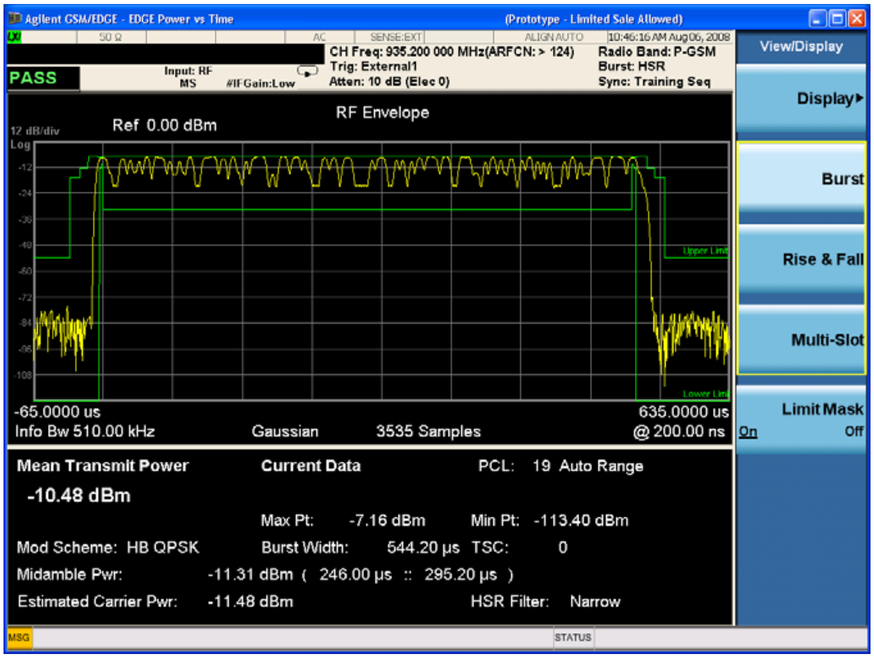
Burst View

Shows power vs. time and mask result for the EDGE burst. This view has two windows:

- “RF Envelope Window” on page 739
- “Numeric Results Window ” on page 740

For details of the associated Remote Commands, see Section “View Selection” on page 737.

The figure below shows an example of the Burst View.



RF Envelope Window

Shows the trace and mask lines. Max Hold Trace and Min Hold Trace are not displayed in this figure.

The following tables provide details of the traces and masks.

Measured Trace

Marker Trace	Yes
Corresponding Trace	n=7
Color	Yellow

Max Hold Trace

Marker Trace	Yes
Corresponding Trace	n=8
Color	Water Blue

Min Hold Trace

Marker Trace	Yes
Corresponding Trace	n=9
Color	Magenta

Upper Mask

Marker Trace	Yes
Corresponding Trace	n=3
Color	Green

Lower Mask

Marker Trace	Yes
Corresponding Trace	n=4
Color	Green

Numeric Results Window

Name	Corresponding Trace	Description	Display Format
Mean Transmit Power	n=1, 3rd	The power of N averaged bursts, if averaging is on. The power is averaged across the useful part of the burst. If there are multiple bursts in the acquired trace, only one burst is used for average. This means that N traces are acquired to make the complete average. If "Avg/Hold Num" on page 703 is off or the number is 1, this number is the power averaged across the useful part of the most recently acquired data	##.## dBm
Mean Transmit Power (Current Data)	n=1, 2nd	The power averaged across the useful part of the most recently acquired data. If "Avg/Hold Num" on page 703 is off or the number is 1, the trace disappears from the window since the number is identical to the Mean Transmit Power above.	##.## dBm
Max Pt (Current Data)	n=1, 9th	The maximum value of the most recently acquired data.	##.## dBm
Min Pt (Current data)	n=1, 10th	The minimum value of the most recently acquired data.	##.## dBm

Name	Corresponding Trace	Description	Display Format
Mod Scheme	N=10,15th	The modulation scheme used for a burst signal of a specified time slot.	"NB GMSK", "NB 8PSK", "NB 16QAM", "NB 32QAM", "HB QPSK", "HB 16QAM", "HB 32QAM", "ACCESS", or "SYNC"
Burst Width	n=1, 8th	The width of the burst measured at –3 dB below the mean power in the useful part of the burst.	###.## μs
Midamble Pwr	None	The (Mask Reference) Power is the average power in dBm of the middle 16 symbols in the midamble. The times displayed are the corresponding start and stop times of the middle 16 symbols.	###.## dBm (###.# μs:: ###.# μs)
1st Error Pt	n=1, 13th	The time 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, disappear from the window.	##.## μs
PCL	None	Power Control Level that determined by the Mean Transmit Power and used to determine the limit mask. Since PCL is a Measurement Global parameter, [:SENSe]:RADio:PCL, refer to the section Mode Functionality. Auto disappears when [:SENSe]:RADio:PCL:STATe is set to 0|Off.	PCL: ## Auto

Name	Corresponding Trace	Description	Display Format
Detected TSC	None	The most recently detected TSC. The returned value is 0~7 (Burst Type : Normal/Higher Symbol Rate (HSR)) if TSC detected. If TSC not detected, the returned value is –999.0. In multi slot condition, the returned value is the detected TSC of the specified slot (Time Slot ON) or the first evaluated slot (Time Slot OFF). The returned value is 10~12 if Synchronization burst. The returned value is 20~22 if Access burst.	TSC: ##
Estimated Carrier Pwr	N=10, 16th	Estimated Carrier Power calculated from the specified time slot.	###.##dBm
HSR Filter	None	The specified pulse shaping filter used for higher symbol rate modulation	"Narrow" or "Wide"

Key Path	**View/Display**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Rise & Fall View

This view has three windows:

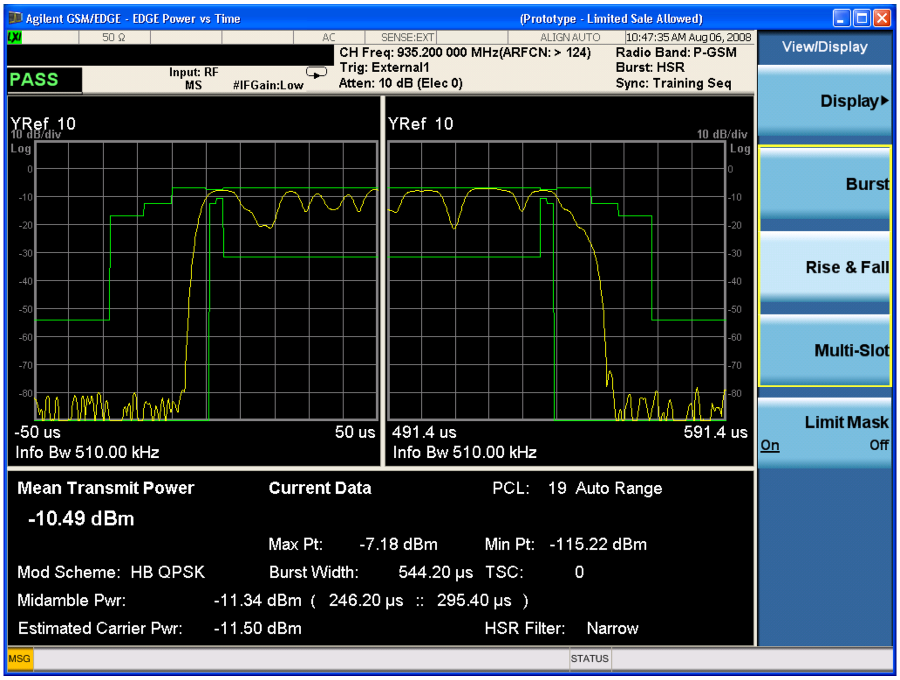
Rising RF Envelope Window. The parameters of this window are identical to those of the RF Window in the "Burst View" on page 738.

Falling RF Envelope Window. The parameters of this window are identical to those of the RF Window in the "Burst View" on page 738.

Numeric Results Window. The parameters of this window are identical to those of the Numeric Results Window in the "Burst View" on page 738.

For details of the associated Remote Command, see Section "View Selection" on page 737.

The figure below shows an example of the Rise & Fall View.



Key Path	**View/Display**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

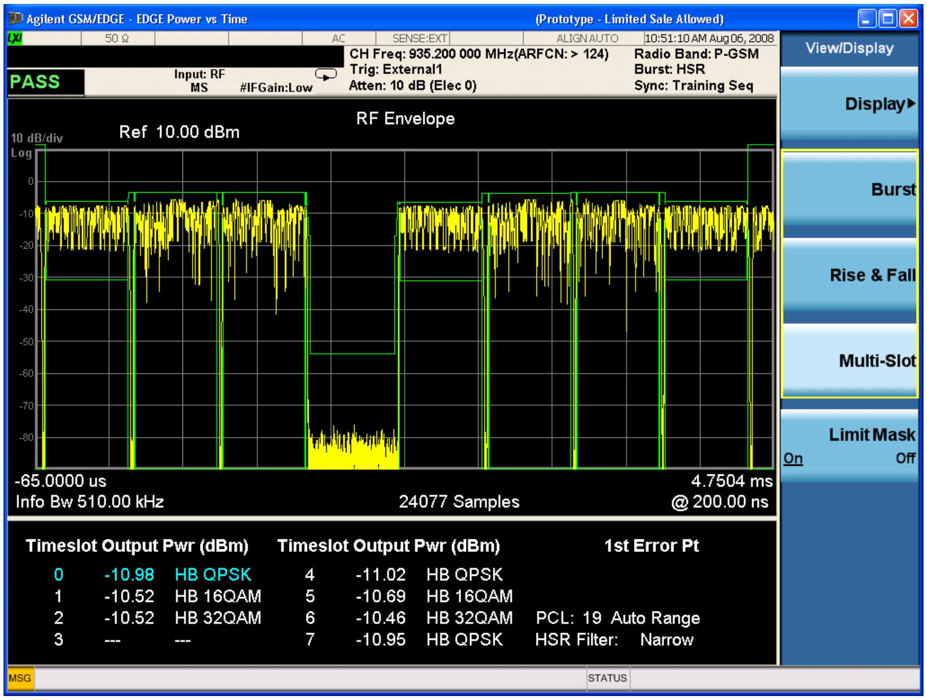
Multi-Slot View

This view has two windows.

- "RF Envelope Window" on page 744
- "Numeric Results Window" on page 744

For details of the associated Remote Command, see Section "View Selection" on page 737.

The figure below shows an example of the Multi Slot View.



RF Envelope Window

The parameters of this window are identical to those of the RF Window in the “Burst View” on page 738.

Numeric Results Window

The output power of multi slots whose number is defined by Meas Time.

Name	Corresponding Trace	Description	Display Format
1st Error Pt	None	The time 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.	##.## µs
Timeslot Output Pwr	n=7	Power level values for each slot in the current frame	##.## dBm

Name	Corresponding Trace	Description	Display Format
Mod Scheme	None	The modulation scheme used for a burst signal of each time slot. If burst isn't found at a time slot, the word "---" is displayed.	"NB GMSK", "NB 8PSK", "NB 16QAM", "NB 32QAM", "HB QPSK", "HB 16QAM", "HB 32QAM", "ACCESS", "SYNC", or "---"
PCL	None	Power Control Level that determined by the Mean Transmit Power and used to determine the limit mask. Since PCL is a Measurement Global parameter, [:SENSe]:RADio:PCL, refer to the section Mode Functionality. Auto disappears when [:SENSe]:RADio:PCL:STATe is set to 0|Off.	PCL: ## Auto
HSR Filter	None	The specified pulse shaping filter used for higher symbol rate modulation	"Narrow" or "Wide"

Key Path	**View/Display**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Limit Mask

This setting is used to show (On) or hide (Off) the limit mask that is displayed on the graticule. It also disables limit checking.

NOTE This does not affect any calculation taking place.

Remote Command	`:DISPlay:EPVTime:LIMit:MASK OFF|ON|0|1` `:DISPlay:EPVTime:LIMit:MASK?`
Example	DISP:EPVT:LIM:MASK 1 DISP:EPVT:LIM:MASK?

Key Path	**View/Display**
Mode	GSM
Notes	This parameter only hides or shows the limit mask line on the display. The PASS/FAIL limit check will be done if “Limit Test” on page 708 is set to On whether the Limit Mask state is set to On or Off. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

13 EDGE Output RF Spectrum Measurement

The Output RF Spectrum measurement is the GSM version of the adjacent channel power (ACP) measurement.

This topic contains the following sections:

Measurement Commands for EDGE Output RF Spectrum

The following commands can be used to retrieve the measurement results:

```
:CONFigure:EORFspectr
```

```
:CONFigure:EORFspectr:NDEFault
```

```
:INITiate:EORFspectr
```

```
:FETCh:EORFspectr[n]?
```

```
:READ:EORFspectr[n]?
```

```
:MEASure:EORFspectr[n]?
```

For more measurement related commands, see the section "Remote Measurement Functions" on page 1069.

Remote Command Results for EDGE Output RF Spectrum

Measurement Method	n	Results Returned
	0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.
Single offset	not specified or n = 1	Returns 4 comma-separated results for the specified offset: 1. Modulation spectrum power, dB 2. Modulation spectrum power, dBm 3. Switching transient power, dB 4. Switching transient power, dBm

Measurement Method	n	Results Returned
Multi-Offset	not specified or n = 1	Returns a list of comma-separated values for the modulation spectrum at all the offsets (lower and upper.). This is followed by the switching transient results at all the offsets (lower and upper). The carrier is considered offset zero (0) and is the first set of results sent. Four values are provided for each of the offsets (including the carrier), in this order: 1. Negative offset(a) - power relative to carrier (dB) 2. Negative offset(a) - absolute average power (dBm) 3. Positive offset(a) - power relative to carrier (dB) 4. Positive offset(a) - absolute average power (dBm) Values for all possible offsets are sent. Zeros are sent for offsets that have not been defined. The total number of values sent (120) = (4 results/offset) * (15 offsets) * (2 measurement types - modulation & switching) Carrier – modulation measurement values Offset 1 – modulation measurement values and so on ~ Offset 14 – modulation measurement values Carrier – switching transients measurement values Offset 1 – switching transients measurement values ~ Offset 14 – switching transients measurement values and so on This measurement defaults to modulation measurements and not switching measurements. If you want to return the switching measurement values, you must change that default condition and use FETCh or READ to return values, rather than MEASure.
Swept	not specified or n = 1	Returns 5 comma-separated results of the closest point to the limit line: 1. Frequency 2. Offset frequency from carrier frequency 3. Power in dBm 4. delta from limit (dB) 5. delta from reference (dB)
Single offset	2	Returns floating point numbers (in dBm) of the captured trace data. It contains N data points of the “spectrum due to modulation” signal, where N is the specified number of samples.

Measurement Method	n	Results Returned
Multi-Offset or Swept	2	Nothing returns.
Single offset	3	Returns floating point numbers (in dBm) of the captured trace data. It contains N data points of the “spectrum due to switching transients” signal, where N is the specified number of samples.
Multi-Offset or Swept	3	Nothing returns.
Swept	4	Returns floating point numbers (in dBm) of the sweep spectrum trace.
Multi-Offset or Single Offset	4	Nothing returns.
Swept	5	Returns floating point numbers (in dBm) of the swept limit trace.
Multi-Offset or Single Offset	5	Nothing returns.
Multi-Offset	6	Relative level to the test limit, and test limit itself for both modulation and switching transient measurements. Returns a list of relative level to the test limit, the relative test limit and the absolute test limit for all the offset frequencies. The relative level to the test limit is returned for both lower and upper offsets. Four values are returned for each offset in the following order: 1. Relative level to the test limit (dB) at the negative offset frequency 2. Relative level to the test limit (dB) at the positive offset frequency 3. Relative test limit used (dB) 4. Absolute test limit used (dBm) Values for all possible offsets are returned. The carrier frequency is considered offset zero (0.0 Hz) and is the first set of values returned. Zeros are returned for offsets that have not been defined. Zeros are returned for the measurement that was not performed. For example, if Meas Type is Modulation, all switching transient measurement results are 0.0.

Measurement Method	n	Results Returned
Multi-Offset (Cont.)	6	The total number of values returned is: 120 = (4 results / offset) * (15 offset frequencies) * (2 measurement types) Carrier (Offset A) – modulation measurement results Offset 1 (Offset B) - modulation measurement results . . . . . . Offset 14 (Offset O) - modulation measurement results Carrier (Offset A) – switching transients measurement results Offset 1 (Offset B) – switching transient measurement results . . . . . . Offset 14 (Offset O) – switching transients measurement results
Single Offset or Swept	6	Nothing returns.
All	7	Returns floating point number (in dBm) of Measured Carrier Power Level that determines the PCL.

Key Path	**Meas**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. 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**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Ref Value

Allows you to set the absolute power reference.

Remote Command	`:DISPlay:EORFspectr:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:EORFspectr:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:EORF:VIEW:WIND:TRAC:Y:RLEV –10 DISP:EORF:VIEW:WIND:TRAC:Y:RLEV?
Dependencies/Couplings	Blanked when Meas Method is Multi Offset. When the Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets this value manually, Auto Scaling automatically changes to Off.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. SubOpCode: VIEW[1]:WINDow[1]:RF Envelope window VIEW2:WINDow[1]:Spectrum window
Preset	0.00|0.00
State Saved	Saved in instrument state.
Min	–250.0
Max	250.0
Instrument S/W Revision	Prior to A.02.00

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” on page 969 under AMPTD Y Scale for more information.

Key Path	**AMPTD Y Scale**
Instrument S/W Revision	Prior to A.02.00

Scale/Div

Allows you to enter a numeric value to change the vertical display sensitivity.

Remote Command	`:DISPlay:EORFspectr:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:EORFspectr:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:EORF:VIEW:WIND:TRAC:Y:PDIV 2 DISP:EORF:VIEW:WIND:TRAC:Y:PDIV?
Dependencies/Couplings	Blanked when Meas Method is Multi Offset. When the Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets this value manually, Auto Scaling automatically changes to Off.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. SubOpCode: VIEW[1]:WINDow[1]:RF Envelope window VIEW2:WINDow[1]:Spectrum window
Preset	10.00|10.00
State Saved	Saved in instrument state.
Min	0.1
Max	20.0
Instrument S/W Revision	Prior to A.02.00

Presel Center

When this key is pressed, the centering of the preselector filter is adjusted to optimize the amplitude accuracy at the frequency of the selected marker.

See “Presel Center” on page 981 under AMPTD Y Scale for more information.

Key Path	**AMPTD Y Scale**
Instrument S/W Revision	Prior to A.02.00

Presel Adjust

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

See “Preselector Adjust” on page 982 under AMPTD Y Scale for more information.

Key Path	**AMPTD Y Scale**
Instrument S/W Revision	Prior to A.02.00

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” on page 984 under AMPTD Y Scale for more information, and for details of the keys in this menu.

Key Path	**AMPTD Y Scale**
Instrument S/W Revision	Prior to A.02.00

Ref Position

Allows you to set the display reference position to either 0(Top), 5(Center), or 10(Bottom).

Remote Command	`:DISPlay:EORFspectr:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:EORFspectr:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:EORF:VIEW:WIND:TRAC:Y:RPOS TOP DISP:EORF:VIEW:WIND:TRAC:Y:RPOS?
Dependencies/Couplings	Blanked when Meas Method is Multi Offset.
Key Path	**AMPTD Y Scale**
Mode	GSM

Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. SubOpCode: VIEW[1]:WINDow[1]:RF Envelope window VIEW2:WINDow[1]:Spectrum window
Preset	TOP|TOP
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Instrument S/W Revision	Prior to A.02.00

Auto Scaling

Allows you to toggle the Auto Scaling function between On and Off.

Remote Command	`:DISPlay:EORFspectr:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:EORFspectr:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:EORF:VIEW:WIND:TRAC:Y:COUP ON DISP:EORF:VIEW:WIND:TRAC:Y:COUP?
Dependencies/Couplings	Blanked when Meas Method is Multi Offset. When Auto Scaling is On, upon pressing the Restart front-panel key, this function automatically determines the scale per division and reference values based on the measurement results. When user sets a value either Ref Value or Scale/Div manually, this parameter is set to ‘Off’ automatically.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. SubOpCode: VIEW[1]:WINDow[1]:RF Envelope window VIEW2:WINDow[1]:Spectrum window
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Auto Couple

Operation of this key is identical across several measurements. For details about this key, see "AUTO COUPLE" on page 987.

BW

There is no ‘BW’ functionality supported in EDGE Output RF Spectrum, so this front-panel key displays a blank menu when pressed.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Cont (Continuous Measurement/Sweep)

Operation of this key is identical across all measurements. For details about this key, see "Cont (Continuous Measurement/Sweep)" on page 991.

FREQ Channel

Operation of this key is identical across all measurements. For details about this key, see “FREQ/Channel” on page 993.

Input/Output

Operation of this key is identical across all measurements. For details about this key, see "Input/Output" on page 1003.

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Some Marker operations are common across multiple Modes and Measurements. See “Marker” on page 1063 for information on features that are common.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

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

Marker Type

Sets the marker control mode to **Normal**, **Delta** or **Off**. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Remote Command	`:CALCulate:EORFspectr:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF` `:CALCulate:EORFspectr:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	CALC:EORF:MARK:MODE OFF CALC:EORF:MARK:MODE?
Key Path	**Marker**
Mode	GSM
Notes	If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area. Default Active Function: the active function for the selected marker’s current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X axis value entered in the active function area displays the marker value to its full entered precision. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.

Preset	OFF
State Saved	Saved in instrument state.
Range	Normal|Delta|Off
Instrument S/W Revision	Prior to A.02.00

Marker X Axis Value (Remote Command Only)

Sets the marker X Axis value, using the current marker X Axis Scale unit. It has no effect if the control mode is **Off**, but is the SCPI equivalent of entering an X value if the control mode is **Normal, Delta** or **Fixed**.

Remote Command	`:CALCulate:EORFspectr:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <real>` `:CALCulate:EORFspectr:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`
Example	CALC:EORF:MARK3:X 0 CALC:EORF:MARK3:X?
Dependencies/Couplings	Max/Min value is changed by Sweep Time or Frequency Span.
Mode	GSM
Notes	If no suffix is sent , uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error “Invalid suffix” is generated. The query returns the marker’s absolute X Axis value if the control mode is **Normal**, or the offset from the marker’s reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency** and **Inverse Time**, seconds for **Period** and **Time**. If the marker is **Off** the response is not a number. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	–9.9E37.
Max	9.9E37
Instrument S/W Revision	Prior to A.02.00

Marker X Axis Position (Remote Command Only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering a value if the control mode is **Normal** or **Delta** except in trace points rather than X Axis Scale units. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Remote Command	`:CALCulate:EORFspectr:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <integer>` `:CALCulate:EORFspectr:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`
Example	CALC:EORFspectr:MARK10:X:POS 0 CALC:EORFspectr:MARK10:X:POS?
Dependencies/Couplings	Max/Min value is changed by Sweep Time or Frequency Span.
Mode	GSM
Notes	The query returns the marker’s absolute X Axis value in trace points if the control mode is **Normal**, or the offset from the marker’s reference marker in trace points if the control mode is **Delta**. If the marker is **Off** the response is not a number. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	–9.9E37
Max	9.9E37
Instrument S/W Revision	Prior to A.02.00

Marker Y Axis Value (Remote Command Only)

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

The “result” of a marker is the value which is displayed on the second line of the Marker Result block. To properly interpret the returned value, the remote programmer must also know what the analyzer’s Y-Axis Unit is set to as described below.

A marker can have up to two results, only one of which is displayed or returned on a query, as follows:

Absolute result: every marker has an absolute result and it is simply:

For Normal and Delta markers, the Y-axis value of the trace point the marker is currently on.

The absolute result is displayed in the result block or returned on a query unless the marker control mode is **Delta**.

Relative result: if a marker's control mode is **Delta**, the relative result is displayed in the result block or returned on a query. This is the ratio of the Absolute Result of a delta marker.

Remote Command	`:CALCulate:EORFspectr:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	CALC:EORFspectr:MARK11:Y?
Mode	GSM
Notes	The query returns the marker Y-axis result. If the marker is **Off** the response is not a number. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Properties

Accesses a menu that allow you to set marker properties and to access the marker trace menu.

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

Select Marker

Displays 12 markers available for selection.

Key Path	**Marker, Properties**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Relative To

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

Remote Command	`:CALCulate:EORFspectr:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>` `:CALCulate:EORFspectr:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	CALC:EORF:MARK:REF 10 CALC:EORF:MARK:REF?

Dependencies/Couplings	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."
Key Path	**Marker, Properties**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. When queried a single value is returned (the specified marker numbers relative marker). A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error –221: "Settings conflict; marker cannot be relative to itself."
Preset	2|3|4|5|6|7|8|9|10|11|12|1
State Saved	Saved in instrument state.
Min	1
Max	12
Instrument S/W Revision	Prior to A.02.00

Marker Trace

Assigns the specified marker to the designated trace.

Remote Command	`:CALCulate:EORFspectr:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe RFEMod|RFESwitching|SPEMod|LIMMod` `:CALCulate:EORFspectr:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?`
Example	CALC:EORF:MARK:TRACE RFES CALC:EORF:MARK:TRACE?
Key Path	**Marker, Properties**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	RFEMod
State Saved	Saved in instrument state.
Range	RF Envelope Modulation|RF Envelope Switching|Swp Spectrum Modulation|Limit Modulation
Instrument S/W Revision	Prior to A.02.00

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).

This may result in markers going off screen.

Remote Command	`:CALCulate:EORFspectr:MARKer:COUPle[:STATe] ON|OFF|1|0`
	`:CALCulate:EORFspectr:MARKer:COUPle[:STATe]?`
Example	CALC:EORF:MARK:COUP ON
	CALC:EORF:MARK:COUP?
Key Path	**Marker**
Mode	GSM
Notes	You must be in the GSM mode to use this command.
	Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

All Markers Off

Turns off all markers.

Remote Command	`:CALCulate:EORFspectr:MARKer:AOFF`
Example	CALC:EORFspectr:MARK:AOFF
Key Path	**Marker**
Mode	GSM
Notes	You must be in the GSM mode to use this command.
	Use INSTrument:SELect to set the mode.
Instrument S/W Revision	Prior to A.02.00

Marker Function

There is no functionality for this Front-panel key in this measurement. Pressing this key displays a blank menu.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Marker To

There is no functionality for this Front-panel key in this measurement. Pressing this key displays a blank menu.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Meas

Operation of this key is identical across all measurements. For details about this key, see “Meas” on page 1069.

Meas Setup

Displays the measurement setup menu for the currently selected measurement.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Avg/Hold Num

Specifies the number of data acquisitions that are averaged. After the specified number of average counts, the averaging mode (terminal control) setting determines the averaging action.

On – Sets measurement averaging on.

Off – Sets measurement averaging off.

Remote Command	`[:SENSe]:EORFspectr:AVERage:COUNt <integer>`
	`[:SENSe]:EORFspectr:AVERage:COUNt?`
	`[:SENSe]:EORFspectr:AVERage[:STATe] OFF|ON|0|1`
	`[:SENSe]:EORFspectr:AVERage[:STATe]?`
Example	EORF:AVER:COUN 3
	EORF:AVER:COUN?
	EORF:AVER ON
	EORF:AVER?
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	20
	ON
State Saved	Saved in instrument state.
Range	1 to 10000
Instrument S/W Revision	Prior to A.02.00

Meas Type

Selects the measurement type.

KEYMod & Switch SCPIMSWitching	Performs both Modulation and Switching measurements.
KEYModulation SCPIMODulation	Measures the spectrum due to the 3/8pi shift 8PSK modulation and noise.
KEYSwitching SCPISWITching	Measures the spectrum due to switching transients (burst ramping).
KEYFull Frame Modulation (FAST) SCPIFFModulation	Improves measurement speed by acquiring a full frame of data prior to performing the FFT calculation. This feature can only be used when all slots in the transmitted frame are active.

Remote Command	`[:SENSe]:EORFspectr:TYPE MODulation|MSWitching|SWITching|FFModulation` `[:SENSe]:EORFspectr:TYPE?`
Example	EORF:TYPE MOD EORF:TYPE?
Dependencies/Couplings	When Meas Method is set to SWEpt, the Mod & Switch and Full Frame Mod(FAST) selection keys are grayed out. When Meas_Method is set to Single Offset, the Full Frame Mod selection key is grayed out.
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. If a grayed out selection is chosen via SCPI command, it is ignored (no error)
Preset	MODulation
State Saved	Saved in instrument state.
Range	Mod & Switch|Modulation|Switching|Full Frame Mod (FAST)
Instrument S/W Revision	Prior to A.02.00

Meas Method

Selects the measurement method.

KEYMulti-Offset SCPIMULTiple	The measurement is done at all offsets in the offset frequency list.
KEYSingle Offset (Examine) SCPISINGle	The measurement is done at only one offset as determined by the offset frequency setting. This allows detailed examination of the time-domain waveform at the specified offset frequency.
KEYSwept SCPISWEPt	The measurement is done in the frequency domain. For output RF spectrum due to modulation it is done using time-gated spectrum analysis to sweep the analyzer with the gate turned on for the desired portion of the burst only.

Remote Command	`[:SENSe]:EORFspectr:MEASure MULTiple|SINGle|SWEPt` `[:SENSe]:EORFspectr:MEASure?`
Example	EORF:MEAS SING EORF:MEAS?
Dependencies/Couplings	The Swept key is grayed out when Meas Type is set to Mod & Switch. The Single Offset and Swept keys are grayed out when Meas Type is set to Full Frame Mod.
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. If a grayed out selection is chosen via SCPI command, it is ignored (no error).
Preset	MULTiple
State Saved	Saved in instrument state.
Range	Multi Offset|Single Offset (Examine)|Swept
Instrument S/W Revision	Prior to A.02.00

Multi-Offset Freq List

Accesses a menu to choose the offset frequency list. You can select a Standard, Short, or Custom list as shown in the table below.

List	Modulation Offsets (kHz)	Switching Transients Offsets (kHz)
Standard	100, 200, 250, 400, 600, 800, 1000, 1200, 1400, 1600, 1800, 3000, 6000	400, 600, 1200, 1800

List	Modulation Offsets (kHz)	Switching Transients Offsets (kHz)
Short	200, 250, 400, 600, 1200, 1800	400, 600, 1200, 1800
Custom	User-defined list that specifies: Offset Freq, RES BW, Limit Offsets, Meas Type, Initialized to be the same as the standard list Mod RBW, SW Trans RBW	400, 600, 1200, 1800

Select the list of settings that are used to make the EORFspectr measurement. This specifies standard or customized lists and short lists. The lists contain the offset frequencies (and bandwidths) that are used for the modulation spectrum and transient spectrum parts of the EORFspectr measurement.

- CUSTom – uses the four user-defined lists that specify:
- - Offset frequencies for modulation spectrum measurement
- - Corresponding resolution bandwidths for each of the modulation offset frequencies
- - Offset frequencies for switching transient spectrum measurement
- - Corresponding resolution bandwidths for each of the switching transient offset frequencies
- SHORt - a shortened list of the offset frequencies specified in the GSM Standards. It uses two internal offset frequency lists, one for modulation spectrum and the other for switching transient spectrum. These offset frequencies cannot be changed, but the resolution bandwidths can be changed by other commands in the SENSe:EORFspectr subsystem.
- STANdard - the complete list of the offset frequencies specified in the GSM Standards, except for those offsets greater than 6 MHz. It uses two internal offset frequency lists, one for modulation spectrum and the other for switching transient spectrum. These offset frequencies cannot be changed, but the resolution bandwidths can be changed by other commands in the SENSe:EORFspectr subsystem.

Remote Command	`[:SENSe]:EORFspectr:LIST:SELect CUSTom|SHORt|STANdard` `[:SENSe]:EORFspectr:LIST:SELect?`
Example	EORF:LIST:SEL CUST EORF:LIST:SEL?
Dependencies/Couplings	Grayed out when “Meas Method” on page 771 is not Multi-Offset.
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	SHORt
State Saved	Saved in instrument state.

Range	Standard|Short|Custom
Instrument S/W Revision	Prior to A.02.00

Single Offset Freq

Selects a frequency offset from the carrier at which to perform a single offset Output RF Spectrum measurement.

Remote Command	`[:SENSe]:EORFspectr:OFRequency <freq>`
	`[:SENSe]:EORFspectr:OFRequency?`
Example	EORF:OFR 250kHz
	EORF:OFR?
Dependencies/Couplings	Grayed out when "Meas Method" on page 771 is not Single Offset.
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	250 kHz
State Saved	Saved in instrument state.
Min	–12.0 MHz
Max	+12.0 MHz
Instrument S/W Revision	Prior to A.02.00

Wideband Noise

Sets wideband noise function to ON or OFF. When set to OFF, the analyzer is tuned to the carrier, and –1800 kHz to +1800 kHz either side of the center frequency is swept. When set to ON, the whole of the relevant band, plus 2 MHz on either side, is swept.

Remote Command	`[:SENSe]:EORFspectr:WBNoise ON|OFF|1|0`
	`[:SENSe]:EORFspectr:WBNoise?`
Example	EORF:WBN ON
	EORF:WBN?
Dependencies/Couplings	Grayed out when Meas Method is not Swept
Key Path	**Meas Setup**
Mode	GSM

Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Fast Avg

Changes On and Off of Fast Avg.

The fast averaging is active only when averaging is on, and only when the modulation results are being measured. If both modulation and switching transient results are being measured, then the measurement uses the default averaging.

Remote Command	`[:SENSe]:EORFspectr:AVERage:FAST[:STATe] OFF|ON|0|1` `[:SENSe]:EORFspectr:AVERage:FAST[:STATe]?`
Example	EORF:AVER:FAST ON EORF:AVER:FAST?
Dependencies/Couplings	This key is available when 'Modulation' is selected on Meas Type and Meas Method is not SWEPt. Otherwise grayed out.
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Advanced

Accesses advanced features. These features are recommended for use only by advanced users.

Dependencies/Couplings	The advanced menu is not available when Meas Method is Swept and the Advanced key is grayed out.
Key Path	**Meas Setup**
Instrument S/W Revision	Prior to A.02.00

Modulation Meas BWs

Accesses a menu with the following sections:

- Carrier RBW (For Modulation Meas BWs)
- < 1800 kHz Offset RBW (for Modulation Meas BWs)
- >=1800 kHz Offset RBW (for Modulation Meas BWs)

This menu key is grayed out when “Meas Type” on page 770 is Switching or “Multi-Offset Freq List” on page 771 is Custom.

Key Path	**Meas Setup, Advanced**
Instrument S/W Revision	Prior to A.02.00

Carrier RBW (for Modulation Meas BWs)

Sets the resolution bandwidth for measuring the carrier when measuring spectrum due to modulation and wideband noise.

Remote Command	`[:SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:CARRier <freq>` `[:SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:CARRier?`
Example	EORF:BAND:MOD:CARR 30e3 EORF:BAND:MOD:CARR?
Dependencies/Couplings	This parameter is only used with the “Multi-Offset Freq List” on page 771 Standard or Short lists, and not with the Custom list. No
Key Path	**Meas Setup, Advanced, Modulation Meas BWs**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	30 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Instrument S/W Revision	Prior to A.02.00

< 1800 kHz Offset RBW (for Modulation Meas BWs)

Sets the resolution bandwidth used for the spectrum due to modulation part of the EORFspectr measurement for offset frequencies less than 1800 kHz.

Remote Command	`[:SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:OFFSet:CLOSe <freq>` `[:SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:OFFSet:CLOSe?`
Example	EORF:BAND:MOD:OFFS:CLOS 30 kHz EORF:BAND:MOD:OFFS:CLOS?
Dependencies/Couplings	This parameter is only used with the "Multi-Offset Freq List" on page 771 Standard or Short lists, and not with the Custom list.
Key Path	**Meas Setup, Advanced, Modulation Meas BWs**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	30 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Instrument S/W Revision	Prior to A.02.00

>= 1800 kHz Offset RBW (for Modulation Meas BWs)

Sets the resolution bandwidth used for the spectrum due to modulation part of the EORFspectr measurement for offset frequencies greater than or equal to 1800 kHz.

Remote Command	`[:SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:OFFSet:FAR <freq>` `[:SENSe]:EORFspectr:BANDwidth[:RESolution]:MODulation:OFFSet:FAR?`
Example	EORF:BAND:RES:MOD:OFFS:FAR 30 kHz EORF:BAND:RES:MOD:OFFS:FAR?
Dependencies/Couplings	This parameter is only used with the "Multi-Offset Freq List" on page 771 Standard or Short lists, and not with the Custom list.
Key Path	**Meas Setup, Advanced, Modulation Meas BWs**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.

Preset	100 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Instrument S/W Revision	Prior to A.02.00

Switching Meas BWs

Accesses a menu with the following sections:

- Carrier RBW (For Modulation Meas BWs)
- < 1800 kHz Offset RBW (for Modulation Meas BWs)
- >=1800 kHz Offset RBW (for Modulation Meas BWs)

This menu key is grayed out when "Meas Type" on page 770 is Modulation or Full Frame Mod, or when "Multi-Offset Freq List" on page 771 is Custom.

Key Path	**Meas Setup, Advanced**
Instrument S/W Revision	Prior to A.02.00

Carrier RBW (for Switching Meas BWs)

Sets the resolution bandwidth for the carrier when measuring spectrum due to switching transients.

Remote Command	`[:SENSe]:EORFspectr:BANDwidth[:RESolution]:SWITching:CARRier <freq>` `[:SENSe]:EORFspectr:BANDwidth[:RESolution]:SWITching:CARRier?`
Example	EORF:BAND:SWIT:CARR 30e3 EORF:BAND:SWIT:CARR?
Dependencies/Couplings	This parameter is only used with the "Multi-Offset Freq List" on page 771 Standard or Short lists, and not with the Custom list.
Key Path	**Meas Setup, Advanced, Switching Meas BWs**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	300 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz

Instrument S/W Revision	Prior to A.02.00

< 1800 kHz Offset RBW (for Switching Meas BWs)

Sets the resolution bandwidth used for the spectrum due to switching transients part of the EORFspectr measurement for offset frequencies less than 1800 kHz.

Remote Command	`[:SENSe]:EORFspectr:BANDwidth[:RESolution]:SWITching:OFFSet:CLOSe <freq>` `[:SENSe]:EORFspectr:BANDwidth[:RESolution]:SWITching:OFFSet:CLOSe?`
Example	EORF:BAND:RES:SWIT:OFFS:CLOS 30 kHz EORF:BAND:RES:SWIT:OFFS:CLOS?
Dependencies/Couplings	This parameter is only used with the "Multi-Offset Freq List" on page 771 Standard or Short lists, and not with the Custom list.
Key Path	**Meas Setup, Advanced, Switching Meas BWs**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	30 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Instrument S/W Revision	Prior to A.02.00

>= 1800 kHz Offset RBW (for Switching Meas BWs)

Sets the resolution bandwidth used for the spectrum due to switching transients part of the EORFspectr measurement for offset frequencies greater than or equal to 1800 kHz.

Remote Command	`[:SENSe]:EORFspectr:BANDwidth[:RESolution]:SWITching:OFFSet:FAR <freq>` `[:SENSe]:EORFspectr:BANDwidth[:RESolution]:SWITching:OFFSet:FAR?`
Example	EORF:BAND:RES:SWIT:OFFS:FAR 30e3 EORF:BAND:RES:SWIT:OFFS:FAR?
Dependencies/Couplings	This parameter is only used with the "Multi-Offset Freq List" on page 771 Standard or Short lists, and not with the Custom list.
Key Path	**Meas Setup, Advanced, Switching Meas BWs**
Mode	GSM

Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	30 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Instrument S/W Revision	Prior to A.02.00

Modulation Custom Offs & Lim

This menu key is available only when these parameters below are set to the following values at the same time. Otherwise it is grayed out.

- Meas Type: Mod & Switch|Modulation|Full Frame Mod
- Meas Method: Multi Offset
- Multi-Offset Freq List: Custom

Key Path	**Meas Setup, Advanced**
Instrument S/W Revision	Prior to A.02.00

Offset

Selects the offset pairs (upper and lower) that affect the menu keys and displays the memory selection menu from A to O. The memory selection menu allows you to store up to 5 sets of parameter values for the offset pairs, such as Offset Freq, Res BW, Rel Limit Level Offset, Abs Limit Level Offset and Apply Level Offset. Press Offset until the letter selection at a time is shown on this menu key label.

Key Path	**Meas Setup, Advanced**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Offset Freq

This parameter defines a custom set of states that defines whether or not the measurement is made on each defined offset frequency.

KEYOn SCPION | 1	The measurement is made on the corresponding frequency in Custom Modulation Offset Freq list.
KEYOff SCPIOFF | 0	The measurement is skipped for the corresponding frequency in Custom Modulation Offset Freq list.

Remote Command	`[:SENSe]:EORFspectr:LIST:MODulation[:FREQuency] <freq>, <freq>, <freq>, <freq>,<freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>`
	`[:SENSe]:EORFspectr:LIST:MODulation[:FREQuency]?`
	`[:SENSe]:EORFspectr:LIST:MODulation:STATe OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1`
	`[:SENSe]:EORFspectr:LIST:MODulation:STATe?`

Example	EORF:LIST:MOD:FREQ 0.0, 1.0e5, 2.0e5 EORF:LIST:MOD:FREQ? EORF:LIST:MOD:STAT ON, ON, ON EORF:LIST:MOD:STAT?
Dependencies/Couplings	Grayed out when Offset is A.
Key Path	**Meas Setup, Advanced, Modulation Custom Offset & Limits**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.0, 1.0e5, 2.0e5, 2.5e5, 4.0e5, 6.0e5, 8.0e5, 1.0e6, 1.2e6, 1.4e6, 1.6e6, 1.8e6, 3.0e6, 6.0e6, 0.0 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1
State Saved	Saved in instrument state.
Min	0.0 Hz
Max	12.0 MHz
Instrument S/W Revision	Prior to A.02.00

Res BW

Defines the custom set of resolution bandwidths for the modulation spectrum part of the EORFspectr measurement. The first bandwidth specified is for the carrier. Each resolution bandwidth in this list corresponds to an offset frequency in the modulation offset frequency list. The number of items in each list must be the same.

Remote Command	`[:SENSe]:EORFspectr:LIST:MODulation:BANDwidth <freq>, <freq>, <freq>, <freq>,<freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>` `[:SENSe]:EORFspectr:LIST:MODulation:BANDwidth?`
Example	EORF:LIST:MOD:BAND 10e3, 20e3, 10e3 EORF:LIST:MOD:BAND?

Dependencies/Couplings	This command is only valid if SENS:EORFspectr:MEAS is set to multiple and the custom list type is selected with SENS:EORFspectr:LISE:SEL CUST.
Key Path	**Meas Setup, Advanced, Modulation Custom Offset & Limits**
Notes	You must be in the GSM, EDGE mode to use this command. Use INSTrument:SELect to set the mode.
Preset	3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,1.000000000E+05,1.000000000E+05,1.000000000E+05,1.000000000E+05
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Instrument S/W Revision	Prior to A.02.00

Rel Limit Level Offset

Defines the custom set of level offsets for the modulation spectrum part of the EORF measurement. This allows you to modify the standard limits by adding a delta amplitude value to them. The first level offset specified must be 0 dB for the carrier. Each level offset in this list corresponds to an offset frequency in the modulation offset frequency list. The number of items in each of these lists must be the same.

Remote Command	`[:SENSe]:EORFspectr:LIST:MODulation:LOFFset[:RCARrier] <rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>` `[:SENSe]:EORFspectr:LIST:MODulation:LOFFset[:RCARrier]?`
Example	EORF:LIST:MOD:LOFF:RCAR 0.0, –2.0, –5.0 EORF:LIST:MOD:LOFF:RCAR?
Dependencies/Couplings	Grayed out when Offset is A.
Key Path	**Meas Setup, Advanced, Modulation Custom Offset & Limits**
Mode	GSM
Notes	The first element of the parameters must be zero. Otherwise, the Custom freq list is not used, but Standard freq list is used instead. This command is only valid if SENS:EORF:MEAS is set to multiple, and the custom list type is selected with SENS:EORF:LIST:SEL CUST. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	Saved in instrument state.

Min	–200.0
Max	200.0
Instrument S/W Revision	Prior to A.02.00

Abs Limit Level Offset

This parameter defines a custom set of absolute limit level offsets for the modulation spectrum part of the EORFspectr measurement. It allows you to modify the standard-defined test limits by adding/subtracting a delta amplitude value to/from them. The single set of the offsets applies to all the cases in terms of all the DUT types and power level classes. It takes an array of float64 numbers. Each element represents absolute level offsets at corresponding Custom Modulation Offset Freq.

Remote Command	`[:SENSe]:EORFspectr:LIST:MODulation:LOFFset:ABSolute <rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>` `[:SENSe]:EORFspectr:LIST:MODulation:LOFFset:ABSolute?`
Example	EORF:LIST:MOD:LOFF:ABS 0.0, –2.0, –5.0 EORF:LIST:MOD:LOFF:ABS?
Dependencies/Couplings	Grayed out when Offset is A.
Key Path	**Meas Setup, Advanced, Modulation Custom Offset & Limits**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	Saved in instrument state.
Min	–200.0
Max	200.0
Instrument S/W Revision	Prior to A.02.00

Apply Level Offset

KEYRel SCPIRELative	Only Custom Modulation Relative Limit Level Offsets are applied to standard-defined modulation relative test limit. Standard-defined modulation relative test limit does not change. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.

KEYBoth SCPIBOTH	Custom Modulation Relative Limit Level Offsets are applied to standard-defined modulation relative test limit. And, Custom Modulation Absolute Limit Level Offsets are applied to standard-defined modulation absolute test limit. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.
KEYAbs SCPIABSolute	Only Custom Modulation Absolute Limit Level Offsets are applied to standard-defined modulation absolute test limit. Standard-defined modulation absolute test limit does not change. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.

Remote Command	`[:SENSe]:EORFspectr:LIST:MODulation:APPLy RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute` `[:SENSe]:EORFspectr:LIST:MODulation:APPLy?`
Example	EORF:LIST:MOD:APPL REL, REL, REL EORF:LIST:MOD:APPL?
Dependencies/Couplings	Grayed out when Offset is A.
Key Path	**Meas Setup, Advanced, Modulation Custom Offset & Limits**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH
State Saved	Saved in instrument state.
Range	Rel|Both|Abs
Instrument S/W Revision	Prior to A.02.00

Switching Custom Offs & Lim

This menu key is available only when these parameters below are set to the following values at the same time. Otherwise it is grayed out.

- Meas Type: Mod & Switch | Switching
- Meas Method: Multi Offset
- Multi-Offset Freq List: Custom

Key Path	**Meas Setup, Advanced**
Instrument S/W Revision	Prior to A.02.00

Offset Freq

Defines the custom set of offset frequencies at which the switching transient spectrum part of the EORFspectr measurement is made.

The first offset specified must be 0 Hz, for the carrier. For each offset frequency specified, the power is measured at both the lower and upper offsets. Up to 14 offset frequencies, plus the 0 Hz carrier frequency, may be defined.

For the BAF SCPI command:

KEYOn SCPION | 1	The measurement is made on the corresponding frequency in Custom Switching Offset Freq list.
KEYOff SCPIOFF | 0	The measurement is skipped for the corresponding frequency in Custom Switching Offset Freq list.

Remote Command	`[:SENSe]:EORFspectr:LIST:SWITching[:FREQuency] <freq>, <freq>, <freq>, <freq>,<freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>`
	`[:SENSe]:EORFspectr:LIST:SWITching[:FREQuency]?`
	`[:SENSe]:EORFspectr:LIST:SWITching:STATe OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1, OFF|ON|0|1`
	`[:SENSe]:EORFspectr:LIST:SWITching:STATe?`

Example	EORF:LIST:SWIT:FREQ 0.0, 1.0e5, 2.0e5 EORF:LIST:SWIT:FREQ? EORF:LIST:SWIT:STAT ON, ON, ON EORF:LIST:SWIT:STAT?
Dependencies/Couplings	Grayed out when Offset is A.

Key Path	**Meas Setup, Advanced, Switching Custom Offsets & Limits**
Mode	GSM
Notes	This command is only valid if SENS:EORF:MEAS is set to multiple, and the custom list type is selected with SENS:EORF:LIST:SEL CUST. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.0, 4.0e5, 6.0e5, 1.2e6, 1.8e6, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1
State Saved	Saved in instrument state.
Min	0.0 Hz
Max	12.0 MHz
Instrument S/W Revision	Prior to A.02.00

Res BW

Defines the custom set of resolution bandwidths for the switching transient spectrum part of the EORFspectr measurement. The first bandwidth specified is for the carrier. Each resolution bandwidth in this list corresponds to an offset frequency in the switching offset frequency list. The number of items in each list must be the same.

Remote Command	`[:SENSe]:EORFspectr:LIST:SWITching:BANDwidth <freq>, <freq>, <freq>, <freq>,<freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>` `[:SENSe]:EORFspectr:LIST:SWITching:BANDwidth?`
Example	EORF:LIST:SWIT:BAND 1e3, 1e3,1e3 EORF:LIST:SWIT:BAND?
Key Path	**Meas Setup, Advanced, Switching Custom Offsets & Limits**
Notes	This command is only valid if SENS:EORFspectr:MEAS is set to multiple and the custom list type is selected with SENS:EORFspectr:LISE:SEL CUST. You must be in the GSM, EDGE mode to use this command. Use INSTrument:SELect to set the mode.
Preset	3.000000000E+05,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04,3.000000000E+04
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Instrument S/W Revision	Prior to A.02.00

Rel Limit Level Offset

Defines the custom set of level offsets for the switching transient spectrum part of the EORF measurement. This allows you to modify the standard limits by adding a delta amplitude value to them. The first level offset specified must be 0 dB for the carrier. Each level offset in this list corresponds to an offset frequency in the modulation offset frequency list. The number of items in each of these lists must be the same.

Remote Command	`[:SENSe]:EORFspectr:LIST:SWITching:LOFFset[:RCARrier] <rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>` `[:SENSe]:EORFspectr:LIST:SWITching:LOFFset[:RCARrier]?`
Example	EORF:LIST:SWIT:LOFF:RCAR 0.0, –2.0, –5.0 EORF:LIST:SWIT:LOFF:RCAR?
Dependencies/Couplings	Grayed out when Offset is A.
Key Path	**Meas Setup, Advanced, Switching Custom Offsets & Limits**
Mode	GSM
Notes	The first element of the parameters must be zero. Otherwise, the Custom freq list is not used, but Standard freq list is used instead. This command is only valid if SENS:EORF:MEAS is set to multiple, and the custom list type is selected with SENS:EORF:LIST:SEL CUST. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	Saved in instrument state.
Min	–200.0
Max	200.0
Instrument S/W Revision	Prior to A.02.00

Abs Limit Level Offset

This parameter defines a custom set of absolute limit level offsets for the Switching spectrum part of the EORFspectr measurement. It allows you to modify the standard-defined test limits by adding/subtracting a delta amplitude value to/from them. The single set of the offsets applies all the cases in terms of all the DUT types and power level classes. It takes an array of float64 numbers. Each element represents absolute level offsets at corresponding Custom Switching Offset Freq.

Remote Command	`[:SENSe]:EORFspectr:LIST:SWITching:LOFFset:ABSolute <rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>, <rel_ampl>` `[:SENSe]:EORFspectr:LIST:SWITching:LOFFset:ABSolute?`
Example	EORF:LIST:SWIT:LOFF:ABS 0.0, –2.0, –5.0 EORF:LIST:SWIT:LOFF:ABS?
Dependencies/Couplings	Grayed out when Offset is A.
Key Path	**Meas Setup, Advanced, Switching Custom Offsets & Limits**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	Saved in instrument state.
Min	–200.0
Max	200.0
Instrument S/W Revision	Prior to A.02.00

Apply Level Offset

KEYRel SCPIRELative	Only Custom Switching Relative Limit Level Offsets are applied to standard-defined switching relative test limit. Standard-defined switching relative test limit does not change. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.
KEYBoth SCPIBOTH	Custom Switching Relative Limit Level Offsets are applied to standard-defined switching relative test limit. And, Custom Switching Absolute Limit Level Offsets are applied to standard-defined switching absolute test limit. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.

KEYAbs SCPIABSolute	Only Custom Switching Absolute Limit Level Offsets are applied to standard-defined switching absolute test limit. Standard-defined switching absolute test limit does not change. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.

Remote Command	`[:SENSe]:EORFspectr:LIST:SWITching:APPLy RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute, RELative|BOTH|ABSolute` `[:SENSe]:EORFspectr:LIST:SWITching:APPLy?`
Example	EORF:LIST:SWIT:APPL REL, REL, REL EORF:LIST:SWIT:APPL?
Dependencies/Couplings	Grayed out when Offset is A.
Key Path	**Meas Setup, Advanced, Switching Custom Offsets & Limits**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH
State Saved	Saved in instrument state.
Range	Rel|Both|Abs
Instrument S/W Revision	Prior to A.02.00

Min Freq Using Direct Time

Selects the transition frequency (the first offset frequency) where the Direct Time Domain method is used instead of the FFT method. The Direct Time Domain offers a high dynamic range and the measurement speed is faster at a few offset frequencies. The FFT method has a moderate dynamic range (generally sufficient when the RBW = 30 kHz) and the measurement speed is much faster at many offset frequencies. The FFT method uses 5-pole sync-tuned filters, as required by the standards, while the Direct Time method does not. The use of 5-pole sync-tuned filters is critical at close-in offsets, such as 250 kHz and lower, because the measurement standards as written usually test the analyzer filter shape instead of the device under test. At 600 kHz offsets and above, the shape of the filters is unimportant, only their noise bandwidth and impulse bandwidth matter. At 400 kHz offset, the shape matters somewhat; therefore, the best agreement between different pieces of measurement equipment requires that the 400 kHz offset be measured with the FFT method.

Remote Command	`[:SENSe]:EORFspectr:BFRequency <freq>` `[:SENSe]:EORFspectr:BFRequency?`
Example	EORF:BFR 600e3
Dependencies/Couplings	Grayed out unless Meas Method is set to MULTiple and Meas Type is set to MSWitching or MODulation.
Key Path	**Meas Setup, Advanced**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	600 kHz
State Saved	Saved in instrument state.
Min	0 kHz
Max	2MHz
Instrument S/W Revision	Prior to A.02.00

Fast Peak Det

Sets the detection mode to “fast peak”.

Remote Command	`[:SENSe]:EORFspectr:DETector:SWITching:FAST[:STATe] ON|OFF|1|0` `[:SENSe]:EORFspectr:DETector:SWITching:FAST[:STATe]?`
Example	EORF:DET:SWIT:FAST ON
Dependencies/Couplings	This key is active when “Meas Type” on page 770 is ‘Switching’ and “Meas Method” on page 771 is ‘Multi-Offset’. Otherwise, grayed out.
Key Path	**Meas Setup, Advanced**
Mode	GSM

Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Ref Pwr Avg

Specifies how many averages you want to use when measuring the reference power.

Set to ON to use the same number of averages as specified in the number of bursts averaged command.

Set to OFF to use the number specified in the reference power averages command.

Remote Command	`[:SENSe]:EORFspectr:REFerence:AVERage:COUNt <integer>`
	`[:SENSe]:EORFspectr:REFerence:AVERage:COUNt?`
	`[:SENSe]:EORFspectr:REFerence:AVERage[:AUTO] ON|OFF|1|0`
	`[:SENSe]:EORFspectr:REFerence:AVERage[:AUTO]?`
Example	EORF:REF:AVER:COUN 10
	EORF:REF:AVER:COUN?
	EORF:REF:AVER OFF
	EORF:REF:AVER?
Dependencies/Couplings	Grayed out when "Meas Method" on page 771 is not Single Offset.
Key Path	**Meas Setup, Advanced**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10
	ON
State Saved	Saved in instrument state.
Min	1
Max	1000
Instrument S/W Revision	Prior to A.02.00

Mod Avg

Selects the type of averaging for measuring the modulation spectrum. This is an advanced control that normally does not need to be changed.

Setting this to a value other than the factory default may cause invalid measurement results.

KEYLog-Pwr Avg (Video) SCPILOG	The log of the power is averaged. (This is also known as video averaging.)
KEYPwr Avg (RMS) SCPIRMS	The power is averaged, providing the rms of the voltage.

Remote Command	`[:SENSe]:EORFspectr:AVERage:MODulation:TYPE LOG|RMS` `[:SENSe]:EORFspectr:AVERage:MODulation:TYPE?`
Example	EORF:AVER:MOD:TYPE LOG EORF:AVER:MOD:TYPE?
Dependencies/Couplings	Grayed out when “Meas Type” on page 770 is set to Switching.
Key Path	**Meas Setup, Advanced**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	LOG
State Saved	Saved in instrument state.
Range	Pwr Avg (RMS)|Log-Pwr Avg (Video)
Instrument S/W Revision	Prior to A.02.00

Modulation Reference Power

Allows you to manually set the modulation reference power for each Meas Method.

Remote Command	`[:SENSe]:EORFspectr:MODulation:RPOWer <ampl>`
	`[:SENSe]:EORFspectr:MODulation:RPOWer?`
	`[:SENSe]:EORFspectr:MODulation:RPOWer:AUTO[:STATe] OFF|ON|0|1`
	`[:SENSe]:EORFspectr:MODulation:RPOWer:AUTO[:STATe]?`

Example	EORF:MOD:RPOW –20 EORF:MOD:RPOW? EORF:MOD:RPOW:AUTO 0 EORF:MOD:RPOW:AUTO?
Key Path	**Meas Setup, Advanced**
Mode	GSM

Preset	–250
	ON
State Saved	Saved in instrument state.
Min	–250
Max	250
Instrument S/W Revision	A.02.00

Switching Reference Power

Allows you to manually set the switching reference power for each Meas Method.

Remote Command	`[:SENSe]:EORFspectr:SWITching:RPOWer <ampl>`
	`[:SENSe]:EORFspectr:SWITching:RPOWer?`
	`[:SENSe]:EORFspectr:SWITching:RPOWer:AUTO[:STATe] OFF|ON|0|1`
	`[:SENSe]:EORFspectr:SWITching:RPOWer:AUTO[:STATe]?`
Example	EORF:SWIT:RPOW –20
	EORF:SWIT:RPOW?
	EORF:SWIT:RPOW:AUTO 0
	EORF:SWIT:RPOW:AUTO?
Key Path	**Meas Setup, Advanced**
Mode	GSM
Preset	–250
	ON
State Saved	Saved in instrument state.
Min	–250
Max	250
Instrument S/W Revision	A.02.00

Meas Preset

Restores all the measurement parameters to their default values.

Remote Command	`:CONFigure:EORFspectr`
Example	CONF:EORF
Key Path	**Meas Setup**
Mode	GSM

Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Instrument S/W Revision	Prior to A.02.00

Mode

Operation of this key is identical across all measurements. For details about this key, see “Mode” on page 1087.

Mode Setup

Operation of this key is identical across all measurements. For details about this key, see “Mode Setup” on page 1101.

Peak Search

There is no functionality for this Front-panel key in this measurement. Pressing this key displays a blank menu.

Remote Command	`:CALCulate:EORFspectr:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	`CALC:EORF:MARK2:MAX`
Key Path	**Front-panel key**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Instrument S/W Revision	Prior to A.02.00

Recall

Operation of this key is identical across several measurements. For details of this key, see “Recall” on page 1123

Restart

Operation of this key is identical across all measurements. For details about this key, see "Restart" on page 1145.

Save

Operation of this key is identical across several measurements. For details of this key, see “Save” on page 1147

Single (Single Measurement/Sweep)

Operation of this key is identical across several measurements. For details about this key, see “Single (Single Measurement/Sweep)” on page 1173.

Source

Operation of this key is identical across several measurements. For details about this key, see “Source” on page 1175.

SPAN X Scale

Accesses a menu of functions that enable you to set the horizontal scale parameters

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Ref Value

Allows you to set the display X reference value.

Key Path	**Span X Scale**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Ref Value (RF Envelope window)

Allows you to set the display X reference value in the RF Envelope window..

Remote Command	`:DISPlay:EORFspectr:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel <time>` `:DISPlay:EORFspectr:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:EORF:VIEW:WIND:TRAC:X:RLEV 1 DISP:EORF:VIEW:WIND:TRAC:X:RLEV?
Dependencies/Couplings	Blanked when Meas Method is Multi Offset. If the Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually Auto Scaling automatically changes to Off.
Key Path	**SPAN X Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0.000
State Saved	Saved in instrument state.
Min	–1.00 s
Max	10.00 s

Instrument S/W Revision	Prior to A.02.00

Ref Value (Spectrum window)

Allows you to set the display X reference value in the Spectrum window.

Remote Command	`:DISPlay:EORFspectr:VIEW2:WINDow[1]:TRACe:X[:SCALe]:RLEVel <freq>` `:DISPlay:EORFspectr:VIEW2:WINDow[1]:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:EORF:VIEW2:WIND:TRAC:X:RLEV 0 DISP:EORF:VIEW2:WIND:TRAC:X:RLEV?
Dependencies/Couplings	Blanked when Meas Method is Multi Offset. If the 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.
Key Path	**SPAN X Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	935.2 MHz
State Saved	Saved in instrument state.
Min	Depends on instrument minimum frequency.
Max	Depends on hardware options and instrument maximum frequency.
Instrument S/W Revision	Prior to A.02.00

Scale/Div

Allows you to set the display X scale/division value.

Key Path	**SPAN X Scale**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Scale/Div (RF Envelope window)

Allows you to set the display X scale/division value in the RF Envelope window.

Remote Command	`:DISPlay:EORFspectr:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision <time>` `:DISPlay:EORFspectr:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:EORF:VIEW:WIND:TRAC:X:PDIV 1ms DISP:EORF:VIEW:WIND:TRAC:X:PDIV?
Dependencies/Couplings	Blanked when Meas Method is Multi Offset. If the Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.
Key Path	**SPAN X Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	57.600 us
State Saved	Saved in instrument state.
Min	1.00 ns
Max	1.00 s
Instrument S/W Revision	Prior to A.02.00

Scale/Div (Spectrum window)

Allows you to set the display X scale/division value in the Spectrum window.

Remote Command	`:DISPlay:EORFspectr:VIEW2:WINDow[1]:TRACe:X[:SCALe]:PDIVision <freq>` `:DISPlay:EORFspectr:VIEW2:WINDow[1]:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:EORF:VIEW2:WIND:TRAC:X:PDIV 1MHz DISP:EORF:VIEW2:WIND:TRAC:X:PDIV?
Dependencies/Couplings	Blanked when Meas Method is not Swept If the Auto Scaling is On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.
Key Path	**SPAN X Scale**
Mode	GSM

Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	360.000 kHz
State Saved	Saved in instrument state.
Min	100.000 kHz
Max	1.000 MHz
Instrument S/W Revision	Prior to A.02.00

Ref Position

Allows you to set the display reference position to Left, Center or Right.

Remote Command	`:DISPlay:EORFspectr:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:EORFspectr:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:EORF:VIEW:WIND:TRAC:X:RPOS CENT DISP:EORF:VIEW:WIND:TRAC:X:RPOS?
Dependencies/Couplings	Blanked when Meas Method is Multi Offset.
Key Path	**SPAN X Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	LEFT|CENTer
State Saved	No
Range	Left|Ctr|Right
Instrument S/W Revision	Prior to A.02.00

Auto Scaling

Allows you to toggle the Auto Scaling function between On and Off.

Remote Command	`:DISPlay:EORFspectr:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:EORFspectr:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:COUPle?`
Example	DISP:EORF:VIEW:WIND:TRAC:X:COUP 1 DISP:EORF:VIEW:WIND:TRAC:X:COUP?

Dependencies/Couplings	Blanked when Meas Method is Multi Offset. See Notes
Key Path	**SPAN X Scale**
Mode	GSM
Notes	Upon pressing the Restart front-panel key or Restart softkey under the Meas Control menu, the scale coupling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either “Ref Value (RF Envelope window)” on page 802 or “Scale/Div (RF Envelope window)” on page 804 manually, X Auto Scaling automatically changes to Off You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Sweep/Control

Operation of this key is identical across several measurements. For details about this key, see "Sweep / Control" on page 1179.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Trace/Detector

There is no 'Trace/Detector' functionality supported in EDGE Output RF Spectrum, so this front-panel key displays a blank menu when pressed.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

View/Display

For the EDGE Output RF Spectrum measurement, the View/Display menu includes only a Display key, which accesses a menu of functions that enable you to set the display parameters. See "Display" on page 1253 for more information about the Display menu.

The measurement has 7 available view types, as detailed in the table below. The view that is displayed depends on the settings of **Meas Type** (see "Meas Type" on page 770) and **Meas Method** (see "Meas Method" on page 771), which are keys in the **Meas Setup** menu.

For full details of each view, click the link in the View column.

View	Meas Type Setting	Meas Method Setting
Modulation Power, Multi Offset (See "Modulation Power" on page 810)	Modulation *or* Full Frame Mod (FAST)	Multi Offset
Switching Power, Multi Offset (See "Switching Power" on page 812)	Switching	Multi Offset
Modulation and Switching, Multi Offset (See "Modulation & Switching" on page 814)	Mod & Switch	Multi Offset
Modulation and Switching, Single Offset (See "Modulation & Switching" on page 816)	Mod & Switch	Single Offset
Modulation, Single Offset (See "Modulation Power" on page 817)	Modulation	Single Offset
Switching, Single Offset (See "Switching Power" on page 818)	Switching	Single Offset
Swept Spectrum (See "Swept Spectrum View" on page 819)	Modulation *or* Switching	Swept

For any view, if a result fails, 'F' is displayed beside the result.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Multi Offset Views

These views are displayed when **Meas Method** is set to **Multi Offset**. For details, see "Meas Method" on page 771.

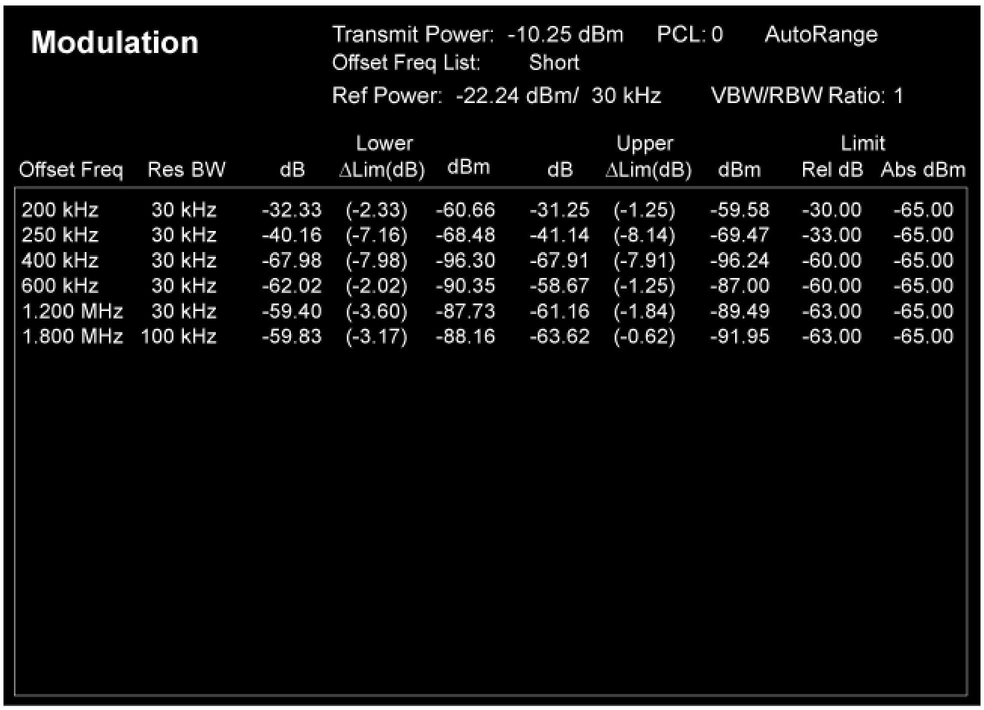
Modulation Power

This view is displayed when:

- Meas Type: Modulation *or* Full Frame Mod (FAST)
- Meas Method: Multi-Offset

The view has only one window: the Metrics Window. Details of each element of this window may be found in "Metrics Window" on page 810 Window.

The figure below shows an example of this view.



Metrics Window

Name	Corresponding Results	Display Format
Transmit Power	n=7 Transmit Power [dBm]	–99.99 dBm

Name	Corresponding Results	Display Format
PCL	None. Power Control Level that determined by the Transmit Power and used to determine the limits. Since PCL is a Measurement Global parameter, [:SENSe]:RADio:PCL, refer to the section Mode Functionality. Auto disappears when [:SENSe]:RADio:PCL:STATe is set to 0|Off.	PCL: ## AutoRange
Offset Freq List	None Offset Frequency list parameter value (Standard|Short|Custom)	Short
Ref Power	n=1 2 Reference Power for all offsets [dBm] Resolution Bandwidth for reference power measurement [Hz]	–99.99/99
VBW/RBW Ratio	None VBW/RBW Ratio (1|3) [1 = Modulation, 3 = Switching]	1
Offset Freq	None Offset Frequency to be measured [Hz]	–99.99
Res BW	None Resolution Bandwidth for each offset [Hz]	–99.99
Lower dB	n=1 (N–1)*4+1 Negative offset(N) – power relative to carrier [dB]	–99.99
Delta from Limit dB Lower	n=6 (N–1)*4+1 Relative level to the test limit [dB] at the negative offset(N)	–99.99
Lower dBm	n=1 (N–1)*4+2 Negative offset(N) – absolute average power [dBm]	–99.99
Upper dB	n=1 (N–1)*4+3 Positive offset(N) – power relative to carrier [dB]	–99.99
Delta from Limit dB Upper	n=6 (N–1)*4+2 Relative level to the test limit [dB] at the positive offset(N)	–99.99
Upper dBm	n=1 (N–1)*4+4 Positive offset(N) – absolute average power [dBm]	–99.99

Name	Corresponding Results	Display Format
Limit Rel dB	n=6 (N–1)*4+3 Relative test limit used [dB]	–99.99
Limit Abs dBm	n=6 (N–1)*4+4 Absolute test limit used [dBm]	–99.99

Switching Power

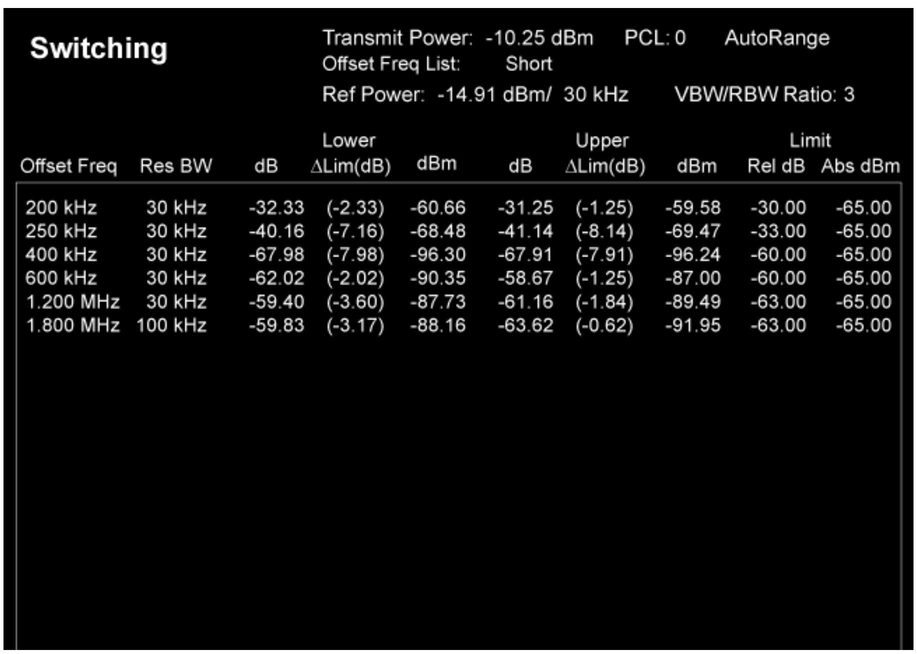
This view is displayed when:

Meas Type: Switching

Meas Method: Multi-Offset

The view has only one window: the Metrics Window. For details of each element of this window, see "Metrics Window" on page 812.

The figure below shows an example of this view.



Metrics Window

Name	Corresponding Results	Display Format
Transmit Power	n=7 Transmit Power	–99.99 dBm

Name	Corresponding Results	Display Format
PCL	None. Power Control Level that determined by the Transmit Power and used to determine the limits. Since PCL is a Measurement Global parameter, [:SENSe]:RADio:PCL, refer to the section Mode Functionality. Auto disappears when [:SENSe]:RADio:PCL:STATe is set to 0|Off.	PCL: ## AutoRange
Offset Freq List	None Offset Frequency list parameter value (Standard|Short|Custom)	Short
Ref Power	n=1 62 Reference Power for all offsets [dBm] Resolution Bandwidth for reference power measurement [Hz]	–99.99
VBW/RBW Ratio	None VBW/RBW Ratio (1|3) [1 = Modulation, 3 = Switching]	1
Offset Freq	None Offset Frequency to be measured [Hz]	–99.99
Res BW	None Resolution Bandwidth for each offset [Hz]	–99.99
Lower dB	n=1 (N–1)*4+1 Negative offset(N) – power relative to carrier [dB]	–99.99
Delta from Limit dB Lower	n=6 (N–1)*4+1 Relative level to the test limit [dB] at the negative offset(N)	–99.99
Lower dBm	n=1 (N–1)*4+2 Negative offset(N) – absolute average power [dBm]	–99.99
Upper dB	n=1 (N–1)*4+3 Positive offset(N) – power relative to carrier [dB]	–99.99
Delta from Limit dB Upper	n=6 (N–1)*4+2 Relative level to the test limit [dB] at the positive offset(N)	–99.99

Name	Corresponding Results	Display Format
Upper dBm	n=1 (N–1)*4+4 Positive offset(N) – absolute average power [dBm]	–99.99
Limit Rel dB	n=6 (N–1)*4+3 Relative test limit used [dB]	–99.99
Limit Abs dBm	n=6 (N–1)*4+4 Absolute test limit used [dBm]	–99.99

Modulation & Switching

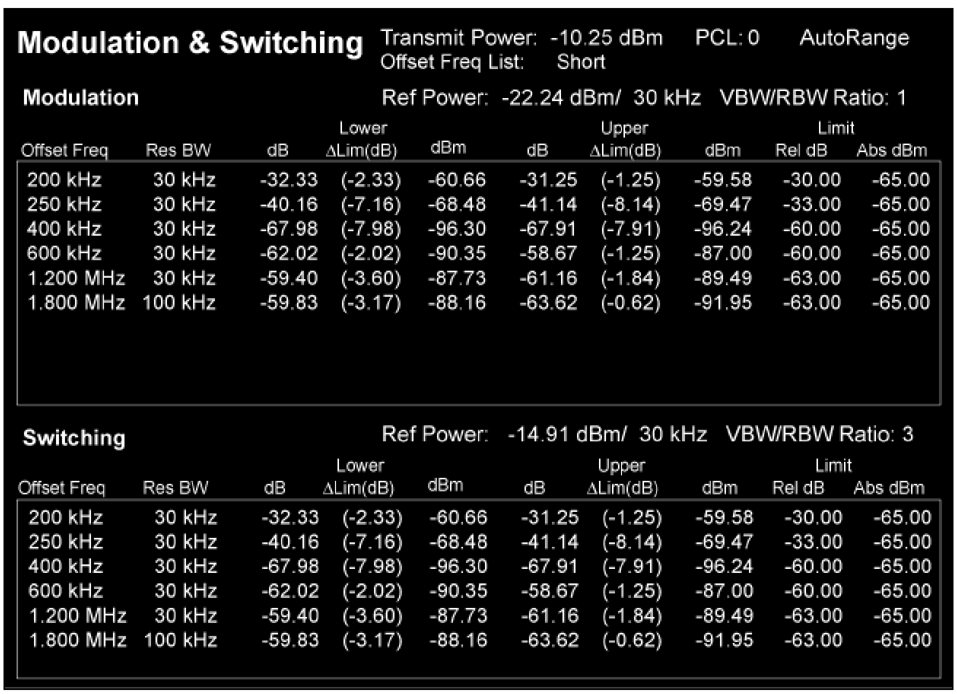
This view is displayed when:

Meas Type: Mod & Switch

Meas Method: Multi-Offset

The view has only one window: the Metrics Window. For details of each element of this window, see “Metrics Window” on page 815.

The figure below shows an example of this view.



Modulation & Switching Transmit Power: -10.25 dBm PCL: 0 AutoRange
Offset Freq List: Short

Modulation Ref Power: -22.24 dBm/ 30 kHz VBW/RBW Ratio: 1

		Lower			Upper			Limit	
Offset Freq	Res BW	dB	ΔLim(dB)	dBm	dB	ΔLim(dB)	dBm	Rel dB	Abs dBm
200 kHz	30 kHz	-32.33	(-2.33)	-60.66	-31.25	(-1.25)	-59.58	-30.00	-65.00
250 kHz	30 kHz	-40.16	(-7.16)	-68.48	-41.14	(-8.14)	-69.47	-33.00	-65.00
400 kHz	30 kHz	-67.98	(-7.98)	-96.30	-67.91	(-7.91)	-96.24	-60.00	-65.00
600 kHz	30 kHz	-62.02	(-2.02)	-90.35	-58.67	(-1.25)	-87.00	-60.00	-65.00
1.200 MHz	30 kHz	-59.40	(-3.60)	-87.73	-61.16	(-1.84)	-89.49	-63.00	-65.00
1.800 MHz	100 kHz	-59.83	(-3.17)	-88.16	-63.62	(-0.62)	-91.95	-63.00	-65.00

Switching Ref Power: -14.91 dBm/ 30 kHz VBW/RBW Ratio: 3

		Lower			Upper			Limit	
Offset Freq	Res BW	dB	ΔLim(dB)	dBm	dB	ΔLim(dB)	dBm	Rel dB	Abs dBm
200 kHz	30 kHz	-32.33	(-2.33)	-60.66	-31.25	(-1.25)	-59.58	-30.00	-65.00
250 kHz	30 kHz	-40.16	(-7.16)	-68.48	-41.14	(-8.14)	-69.47	-33.00	-65.00
400 kHz	30 kHz	-67.98	(-7.98)	-96.30	-67.91	(-7.91)	-96.24	-60.00	-65.00
600 kHz	30 kHz	-62.02	(-2.02)	-90.35	-58.67	(-1.25)	-87.00	-60.00	-65.00
1.200 MHz	30 kHz	-59.40	(-3.60)	-87.73	-61.16	(-1.84)	-89.49	-63.00	-65.00
1.800 MHz	100 kHz	-59.83	(-3.17)	-88.16	-63.62	(-0.62)	-91.95	-63.00	-65.00

Metrics Window

Name	Corresponding Results	Display Format
Transmit Power	n=7 Transmit Power	–99.99 dBm
PCL	None. Power Control Level that determined by the Transmit Power and used to determine the limits. Since PCL is a Measurement Global parameter, [:SENSe]:RADio:PCL, refer to the section Mode Functionality. Auto disappears when [:SENSe]:RADio:PCL:STATe is set to 0|Off.	PCL: ## AutoRange
Offset Freq List	Offset Frequency list parameter value (Standard|Short|Custom)	Short
Ref Power (Modulation)	n=1 2 Modulation Reference Power for all offsets [dBm] Resolution Bandwidth for reference power measurement [Hz]	–99.99/99
Ref Power (Switching)	n=1 62 Switching Reference Power for all offsets [dBm] Resolution Bandwidth for reference power measurement [Hz]	–99.99/99
VBW/RBW Ratio	None VBW/RBW Ratio (1|3) [1 = Modulation, 3 = Switching]	1
Offset Freq	Offset Frequency to be measured [Hz]	–99.99
Res BW	Resolution Bandwidth for each offset [Hz]	–99.99
Lower dB	n=1 (N–1)*4+1 Negative offset(N) – power relative to carrier [dB]	–99.99
Delta from Limit dB Lower	n=6 (N–1)*4+1 Relative level to the test limit [dB] at the negative offset(N)	–99.99
Lower dBm	n=1 (N–1)*4+2 Negative offset(N) – absolute average power [dBm]	–99.99

Name	Corresponding Results	Display Format
Upper dB	n=1 (N–1)*4+3 Positive offset(N) – power relative to carrier [dB]	–99.99
Delta from Limit dB Upper	n=6 (N–1)*4+2 Relative level to the test limit [dB] at the positive offset(N)	–99.99
Limit Rel dB	n=6 (N–1)*4+3 Relative test limit used [dB]	–99.99
Limit Abs dBm	n=6 (N–1)*4+4 Absolute test limit used [dBm]	–99.99

Single Offset Views

These views are displayed when **Meas Method** is set to **Single Offset**. For details, see “Meas Method” on page 771.

Modulation & Switching

This view is displayed when:

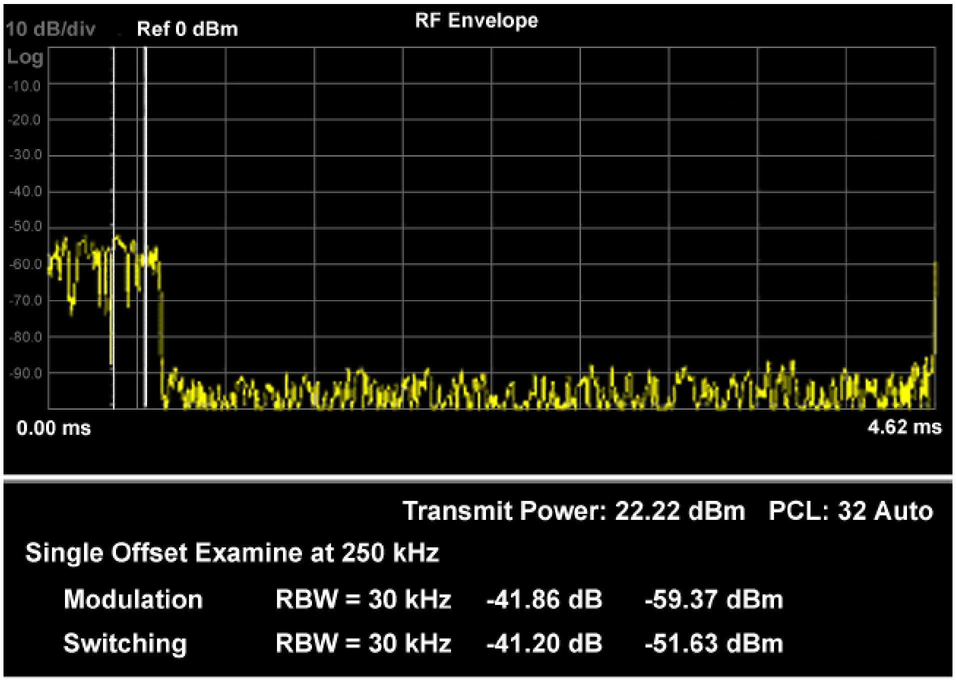
Meas Type: Mod & Switch

Meas Method: Single Offset

The figure below shows an example of this view, in which:

- The blue trace is the Switching data
- The yellow trace is the Modulation data
- The measurement gates are shown as vertical white lines

“Fast Avg” on page 774 is not available for this measurement.



Modulation Power

This view is displayed when:

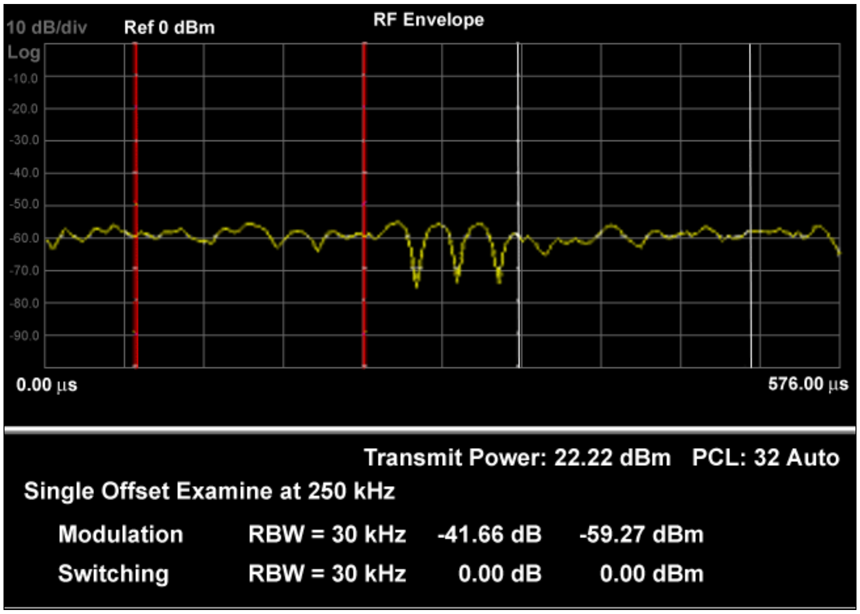
Meas Type: Modulation

Meas Method: Single Offset

The figure below shows an example of this view, in which:

- The white vertical lines represent the modulation section to be measured for modulation measurement.
- The red vertical lines represent the added section to be measured when "Fast Avg" on page 774 is set to 'On' (improve measurement speed).

The view has two windows: the Graph Window and the Metrics Window. Details of each element of these windows may be found under the description of the view "Switching Power" on page 818, under "Graph Window" on page 819 and "Metrics Window" on page 819 respectively.



Switching Power

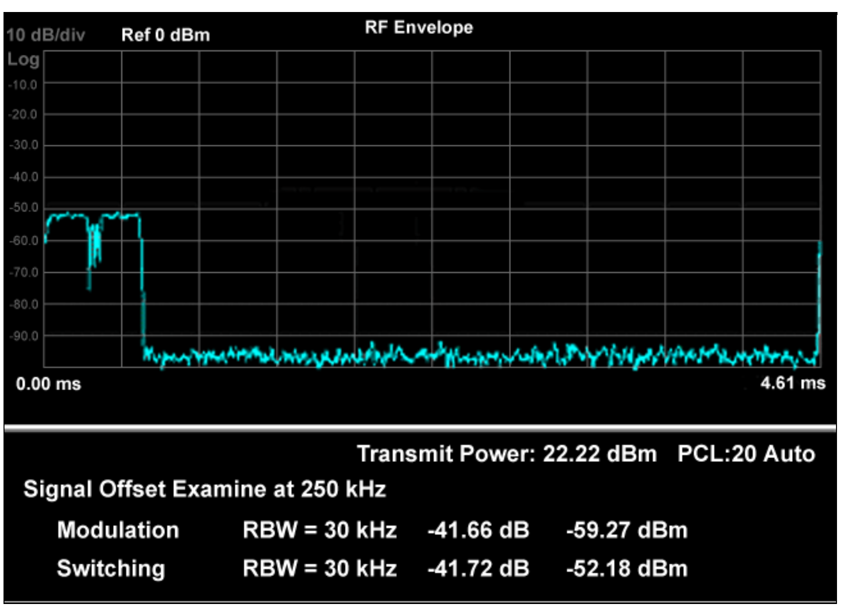
This view is displayed when:

Meas Type: Switching

Meas Method: Single Offset

The view has two windows: the Graph Window and the Metrics Window. For details of each element of these windows, see "Graph Window" on page 819 and "Metrics Window" on page 819 respectively.

The figure below shows an example of this view.



Graph Window

Marker Operation	Yes
Corresponding Trace	Yellow: Series of floating point numbers that represent the “spectrum due to modulation” signal. (n=2) Blue: Series of floating point numbers that represent the “spectrum due to switching transients” signal. (n=3)

Metrics Window

Name	Corresponding Results	Display Format
Modulation [dB]	n=1 1st Modulation spectrum power	–99.99 dB
Modulation [dBm]	n=1 2nd Modulation spectrum power	–99.99 dBm
Switching [dB]	n=1 3rd Switching transient power	–99.99 dB
Switching [dBm]	n=1 4th Switching transient power	–99.99 dBm
Transmit Power	n=7 Transmit Power	–99.99 dBm
PCL	None. Power Control Level that determined by the Transmit Power and used to determine the limits. Since PCL is a Measurement Global parameter, [:SENSe]:RADio:PCL, refer to the section Mode Functionality. Auto disappears when [:SENSe]:RADio:PCL:STATe is set to 0|Off.	PCL: ## Auto

Swept Spectrum View

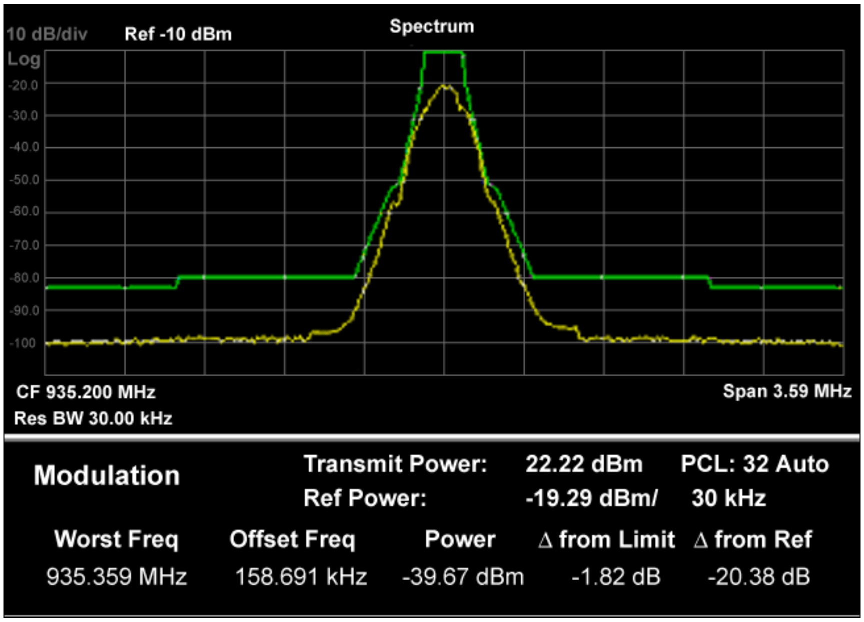
This view is displayed when:

Meas Type: Modulation, Switching

Meas Method: Swept

The view has two windows: the Graph Window and the Metrics Window. For details of each element of these windows, see “Graph Window” on page 820 and “Metrics Window” on page 820 respectively.

The figure below shows an example of this view.



Graph Window

Marker Operation	Yes
Corresponding Trace	Series of floating point numbers that represent the “spectrum due to modulation” signal. (n=2)

Metrics Window

Name	Corresponding Results	Display Format
Worst Freq	n=1 1st Frequency	999.999 MHz
Offset Freq	n=1 2nd Offset frequency from carrier frequency	999.999 kHz
Power	n=1 3rd Power in dBm	–99.99 dBm
from Limit	n=1 4th delta from limit	–9.99 dB
from Ref	n=1 5th delta from reference	–99.99 dB

Name	Corresponding Results	Display Format
Transmit Power	n=7 Transmit Power	–99.99 dBm
PCL	None. Power Control Level that is determined by the Transmit Power and used to determine the limits. Since PCL is a Measurement Global parameter, [:SENSe]:RADio:PCL, refer to the section Mode Functionality. Auto disappears when [:SENSe]:RADio:PCL:STATe is set to 0|Off.	PCL: ## Auto

14 EDGE Tx Band Spur Measurement

This measurement checks that the transmitter does not transmit undesirable energy into the transmit band. This energy may cause interference for other users of the GSM system. For more details, see "EDGE Tx Band Spur Description" on page 824 below.

This topic contains the following sections:

Measurement Commands for EDGE Tx Band Spur

The following commands are used to retrieve the measurement results:

```
:CONFigure:ETSPur
```

```
:CONFigure:ETSPur:NDEFault
```

```
:INITiate:ETSPur
```

```
:FETCh:ETSPur[n]?
```

```
:READ:ETSPur[n]?
```

```
:MEASure:ETSPur[n]?
```

For more measurement related commands, see the section "Remote Measurement Functions" on page 1069.

Remote Command Results for EDGE Tx Band Spur

n	Results Returned
not specified or n = 1	Returns 3 comma-separated scalar results: The worst spur's frequency difference from channel center frequency (in MHz) The worst spur's amplitude difference from the limit (in dB) The worst spur's amplitude difference from the mean transmit power (in dB)
2	Returns trace of the current segment spectrum.
3	Returns trace of the current segment Upper Limit.
4	Returns trace of Lowest segment Spectrum.
5	Returns trace of Lowest segment Upper Limit.
6	Returns trace of Lower Adj segment Spectrum.
7	Returns trace of Lower Adj segment Upper Limit.
8	Returns trace of Upper Adj segment Spectrum.
9	Returns trace of Upper Adj segment Upper Limit.
10	Returns trace of Highest segment Spectrum.

n	Results Returned
11	Returns trace of Highest segment Upper Limit.
12	1. The mean transmit power. 2. The spur's frequency offset from channel center frequency (in MHz) on Lowest region. 3. The spur's amplitude difference from the limit (in dB) on Lowest region. 4. The spur's amplitude difference from the mean transmit power (in dBc) on Lowest region. 5. The spur's frequency offset from channel center frequency (in MHz) on Lower region. 6. The spur's amplitude difference from the limit (in dB) on Lower region. 7. The spur's amplitude difference from the mean transmit power (in dBc) on Lower region. 8. The spur's frequency offset from channel center frequency (in MHz) on Upper region. 9. The spur's amplitude difference from the limit (in dB) on Upper region. 10. The spur's amplitude difference from the mean transmit power (in dBc) on Upper region. 11. The spur's frequency offset from channel center frequency (in MHz) on Highest region. 12. The spur's amplitude difference from the limit (in dB) on Highest region. 13. The spur's amplitude difference from the mean transmit power (in dBc) on Highest region. 14. Reserved 15. Reserved 16. Reserved 17. Reserved 18. Reserved Note: –999.0 is retuned if the region can not be specified due to the band limit.

EDGE Tx Band Spur Description

This measurement is only available for the base station. The transmitter should be set at its maximum output power on all time slots.

Key Path	**Meas**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

AMPTD (Amplitude) 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**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Ref Value

Allows you to set the absolute power reference.

Remote Command	`:DISPlay:ETSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>` `:DISPlay:ETSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:ETSP:VIEW:WIND:TRAC:Y:RLEV –10 DISP:ETSP:VIEW:WIND:TRAC:Y:RLEV?
Dependencies/Couplings	When “Auto Scaling” on page 828 is On, this value is automatically determined by the measurement result. When you set a value manually, “Auto Scaling” on page 828 automatically changes to Off.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	Saved in instrument state.
Min	–250.0
Max	250.0
Instrument S/W Revision	Prior to A.02.00

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" on page 969 under AMPTD Y Scale for more information.

Key Path	**AMPTD Y Scale**
Instrument S/W Revision	Prior to A.02.00

Scale/Div

Allows you to enter a numeric value to change the vertical display sensitivity.

Remote Command	`:DISPlay:ETSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:ETSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:ETSP:VIEW:WIND:TRAC:Y:PDIV 10 DISP:ETSP:VIEW:WIND:TRAC:Y:PDIV?
Dependencies/Couplings	When "Auto Scaling" on page 828 is On, this value is automatically determined by the measurement result. When you set a value manually, "Auto Scaling" on page 828 automatically changes to Off.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	10.00
State Saved	Saved in instrument state.
Min	0.1
Max	20.0
Instrument S/W Revision	Prior to A.02.00

Presel Center

When this key is pressed, the centering of the preselector filter is adjusted to optimize the amplitude accuracy at the frequency of the selected marker.

See "Presel Center" on page 981 under the AMPTD Y Scale section for more information.

Key Path	**AMPTD Y Scale**

Instrument S/W Revision	Prior to A.02.00

Presel Adjust

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

See "Preselector Adjust" on page 982 under the AMPTD Y Scale section for more information.

Key Path	**AMPTD Y Scale**
Instrument S/W Revision	Prior to A.02.00

Internal Preamp

This menu controls the internal preamplifier. 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" on page 984 under the AMPTD Y Scale section for more information.

Key Path	**AMPTD Y Scale**
Instrument S/W Revision	Prior to A.02.00

Ref Position

Allows you to set the display reference position to Top, Center or Bottom.

Remote Command	`:DISPlay:ETSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:ETSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:ETSP:VIEW:WIND:TRAC:Y:RPOS CENT DISP:ETSP:VIEW:WIND:TRAC:Y:RPOS?
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	TOP
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Instrument S/W Revision	Prior to A.02.00

Auto Scaling

Allows you to toggle the scale coupling function between On and Off.

Remote Command	`:DISPlay:ETSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:ETSPur:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:ETSP:VIEW:WIND:TRAC:Y:COUP 1 DISP:ETSP:VIEW:WIND:TRAC:Y:COUP?
Dependencies/Couplings	When Auto Scaling is On, upon pressing the Restart front-panel key, this function automatically determines the scale per division and reference values based on the measurement results. When you set a value either “Ref Value” on page 825 or “Scale/Div” on page 826 manually, this parameter is set to ‘Off’ automatically.
Key Path	**AMPTD Y Scale**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Auto Couple

Operation of this key is identical across several measurements. For details about this key, see "AUTO COUPLE" on page 987.

BW

There is no functionality for this function in this measurement. When pressed, this key displays a blank menu.

Key Path	**Front-panel key**
Mode	GSM

Cont (Continuous Measurement/Sweep)

Operation of this key is identical across all measurements. For details about this key, see "Cont (Continuous Measurement/Sweep)" on page 991.

FREQ Channel

Operation of this key is identical across all measurements. For details about this key, see "FREQ/Channel" on page 993.

Input/Output

Operation of this key is identical across all measurements. For details about this key, see “Input/Output” on page 1003.

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Some Marker operation is common across multiple Modes and Measurements. See the section "Marker" on page 1063 for information on features that are common.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Select Marker

Displays 12 marker available for selection.

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

Marker Type

Sets the marker control mode Normal, Delta and Off. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Remote Command	`:CALCulate:ETSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF`
	
	`:CALCulate:ETSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`

Example	CALC:ETSP:MARK:MODE OFF CALC:ETSP:MARK:MODE?
Key Path	**Marker**
Mode	GSM
Notes	If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area. Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X axis value entered in the active function area displays the marker value to its full entered precision. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.

Preset	OFF
State Saved	Saved in instrument state.
Range	Normal|Delta|Off
Instrument S/W Revision	Prior to A.02.00

Marker X Axis Value (Remote Command Only)

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering an X value if the control mode is **Normal** or **Delta**.

Remote Command	`:CALCulate:ETSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <real>` `:CALCulate:ETSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X?`
Example	CALC:ETSP:MARK3:X 0 CALC:ETSP:MARK3:X?
Dependencies/Couplings	Max value is changed.
Mode	GSM
Notes	If no suffix is sent, uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error “Invalid suffix” is generated. The query returns the marker’s absolute X Axis value if the control mode is **Normal**, or the offset from the marker’s reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency** and **Inverse Time**, seconds for **Period** and **Time**. If the marker is **Off** the response is Not A Number (NAN). You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	–9.9E37
Max	9.9E37
Instrument S/W Revision	Prior to A.02.00

Marker X Axis Position (Remote Command Only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering a value if the control mode is **Normal** or **Delta** except in trace points rather than X Axis Scale units. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Remote Command	`:CALCulate:ETSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <integer>` `:CALCulate:ETSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`
Example	CALC:ETSP:MARK10:X:POS 10 CALC:ETSP:MARK10:X:POS?
Dependencies/Couplings	Max value is changed.
Mode	GSM
Notes	The query returns the marker’s absolute X Axis value in trace points if the control mode is **Normal**, or the offset from the marker’s reference marker in trace points if the control mode is **Delta**. If the marker is **Off** the response is not a number. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	–9.9E37
Max	9.9E37
Instrument S/W Revision	Prior to A.02.00

Marker Y Axis Value (Remote Command Only)

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

The “result” of a marker is the value which is displayed on the second line of the Marker Result block. To properly interpret the returned value the remote programmer must also know what the analyzer’s Y-Axis Unit is set to as described below.

A marker can have up to two results, only one of which is displayed or returned on a query, as follows:

Absolute result: every marker has an absolute result and it is simply:

For Normal and Delta markers, the Y-axis value of the trace point the marker is currently on.

The absolute result is displayed in the result block or returned on a query unless the marker control mode is **Delta**.

Relative result: if a marker's control mode is **Delta**, the relative result is displayed in the result block or returned on a query. This is the ratio of the Absolute Result of a delta marker to the Absolute Result of its reference marker.

Remote Command	`:CALCulate:ETSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	CALC:ETSPur:MARK11:Y?
Mode	GSM
Notes	The query returns the marker Y-axis result. If the marker is **Off** the response is not a number. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Properties

Accesses a menu that allows you to set marker properties and to access the marker trace menu.

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

Select Marker

Displays 12 markers available for selection.

Key Path	**Marker, Properties**
Instrument S/W Revision	Prior to A.02.00

Relative To

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

Remote Command	`:CALCulate:ETSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>` `:CALCulate:ETSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	CALC:ETSP:MARK:REF 5 CALC:ETSP:MARK:REF?
Key Path	**Marker, Properties**
Mode	GSM

Notes	A marker cannot be relative to itself so that choice is unavailable, and if sent from SCPI generates error –221: “Settings conflict; marker cannot be relative to itself.” You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. When queried a single value is returned (the specified marker numbers relative marker).
Preset	2|3|4|5|6|7|8|9|10|11|12|1
State Saved	Saved in instrument state.
Min	1
Max	12
Instrument S/W Revision	Prior to A.02.00

Marker Trace

Assigns the specified marker to the designated trace.

Remote Command	`:CALCulate:ETSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe SPECtrum|ULIMit` `:CALCulate:ETSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?`
Example	CALC:ETSP:MARK:TRACE ULIM CALC:ETSP:MARK:TRACE?
Key Path	**Marker, Properties**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	SPECtrum
State Saved	Saved in instrument state.
Range	Spectrum|Upper Limit
Instrument S/W Revision	Prior to A.02.00

Couple Markers

When toggled 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).

This may result in markers going off screen.

Remote Command	`:CALCulate:ETSPur:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:ETSPur:MARKer:COUPle[:STATe]?`
Example	CALC:ETSP:MARK:COUP ON CALC:ETSP:MARK:COUP?
Key Path	**Marker**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

All Markers Off

Turns off all markers.

Remote Command	`:CALCulate:ETSPur:MARKer:AOFF`
Example	CALC:ETSPur:MARK:AOFF
Key Path	**Marker**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Instrument S/W Revision	Prior to A.02.00

Marker Fctn (Function)

There is no functionality for this front-panel key in this measurement. When pressed, this key displays a blank menu.

Key Path	**Front-panel key**
Mode	GSM

Marker > (Marker To)

There is no functionality for this front-panel key in this measurement. When pressed, this key displays a blank menu.

Key Path	**Front-panel key**
Mode	GSM

Meas (Measure)

Operation of this key is identical across all measurements. For details about this key, see “Meas” on page 1069.

Meas (Measure) Setup

Displays the measurement setup menu for the currently selected measurement.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Avg/Hold Num

Used to specify the number of data acquisitions that are averaged. After the specified number of average counts, the averaging mode (terminal control) setting determines the averaging action.

OnSets measurement averaging on.

OffSets measurement averaging off.

Remote Command	`[:SENSe]:ETSPur:AVERage:COUNt <integer>`
	`[:SENSe]:ETSPur:AVERage:COUNt?`
	`[:SENSe]:ETSPur:AVERage[:STATe] OFF|ON|0|1`
	`[:SENSe]:ETSPur:AVERage[:STATe]?`
Example	ETSP:AVER:COUN 3
	ETSP:AVER:COUN?
	ETSP:AVER ON
	ETSP:AVER?
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	30
	ON
State Saved	Saved in instrument state.
Min	1
Max	10000
Instrument S/W Revision	Prior to A.02.00

Avg Mode

Select the type of termination control used for the averaging function. This determines the averaging action after the specified number of data acquisitions (average count) is reached.

KEYExponential SCPIEXPonential	Each successive data acquisition after the average count is reached, is exponentially weighted and combined with the existing average.
KEYRepeat SCPIREPeat	After reaching the average count, the averaging is reset and a new average is started.

Remote Command	`[:SENSe]:ETSPur:AVERage:TCONtrol EXPonential|REPeat` `[:SENSe]:ETSPur:AVERage:TCONtrol?`
Example	ETSP:AVER:TCON REP ETSP:AVER:TCON?
Key Path	**Meas Setup**
Mode	GSM
Notes	Valid only when “Avg/Hold Num” on page 843 is set to On. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	REPeat
State Saved	Saved in instrument state.
Range	Exp|Repeat
Instrument S/W Revision	Prior to A.02.00

Avg Type

Select the type of averaging.

LOG – The log of the power is averaged. (This is also known as video averaging.)

MAXimum – The maximum values are retained. Remove from MUI.

RMS – The power is averaged, providing the rms of the voltage.

Remote Command	`[:SENSe]:ETSPur:AVERage:TYPE LOG|MAXimum|RMS` `[:SENSe]:ETSPur:AVERage:TYPE?`
Example	ETSP:AVER:TYPE RMS ETSP:AVER:TYPE?

Dependencies/Couplings	This key is unavailable then Trace is set to Max Hold. Selecting ‘MAXimum’ via SCPI force to change state of Trace to ‘MAXHold’. Selecting ‘LOG’ or ‘RMS’ force to change state of Trace to ‘AVERage’.
Key Path	**Meas Setup**
Mode	GSM
Notes	MAXimum is SCPI only, no MUI. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	MAXimum
State Saved	Saved in instrument state.
Range	Pwr Avg (RMS)|Log-Pwr Avg (Video)
Instrument S/W Revision	Prior to A.02.00

Meas Type

Select the measurement type from the following selections:

KEYFull SCPIFULL	In Continuous Measure, it repeatedly does full search of all segments.
KEYExamine SCPIEXAMine	In Continuous Measure, after doing one full search across all segments, it parks on the worst segment and continuously updates that segment.

Remote Command	`[:SENSe]:ETSPur:TYPE EXAMine|FULL` `[:SENSe]:ETSPur:TYPE?`
Example	ETSP:TYPE FULL ETSP:TYPE?
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	FULL
State Saved	Saved in instrument state.
Range	Examine|Full
Instrument S/W Revision	Prior to A.02.00

IF Gain

To take full advantage of the RF dynamic range of the analyzer,a switched IF amplifier with approximately 10 dB of gain is available. When it can be turned on without an overload, the dynamic range is always better with it on than off.The **IF Gain** key can be used to set the IF Gain function to Auto, or to On (the extra 10 dB) or Off. These settings affect sensitivity and IF overloads.

Key Path	**Meas Setup, Advanced**
Instrument S/W Revision	Prior to A.02.00

IF Gain Auto

Activates the auto rules for IF Gain. Auto rules set IF Gain to Low Gain.

Remote Command	`[:SENSe]:ETSPur:IF:GAIN:AUTO[:STATe] ON|OFF|1|0` `[:SENSe]:ETSPur:IF:GAIN:AUTO[:STATe]?`
Example	ETSPur:IF:GAIN:AUTO ON ETSPur:IF:GAIN:AUTO?
Dependencies/Couplings	Couple to IF Gain State.
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	Auto|Man
Instrument S/W Revision	Prior to A.02.00

IF Gain State

Selects the range of IF gain.

Remote Command	`[:SENSe]:ETSPur:IF:GAIN[:STATe] ON|OFF|1|0` `[:SENSe]:ETSPur:IF:GAIN[:STATe]?`
Example	ETSPur:IF:GAIN ON ETSPur:IF:GAIN?
Dependencies/Couplings	Couple to “IF Gain Auto” on page 846.
Key Path	**Meas Setup**
Mode	GSM

Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode. where ON = high gain OFF = low gain
Preset	OFF
State Saved	Saved in instrument state.
Range	Low Gain (Best for Large Signals)|High Gain (Best Noise Level)
Instrument S/W Revision	Prior to A.02.00

Limit

Sets the value for the test limit. This command does not accept units. Use :CALCulate:ETSPur:LIMit:TEST to select the units dBm (absolute) or dB (relative).

dBm – Absolute limit

dBc – Relative to Mean Transmit Power.

Remote Command	`:CALCulate:ETSPur:LIMit[:UPPer][:DATA] <real>`
	`:CALCulate:ETSPur:LIMit[:UPPer][:DATA]?`
	`:CALCulate:ETSPur:LIMit:TEST ABSolute|RELative`
	`:CALCulate:ETSPur:LIMit:TEST?`

Example	CALC:ETSP:LIM –10 CALC:ETSP:LIM? CALC:ETSP:LIM:TEST ABS CALC:ETSP:LIM:TEST?
Dependencies/Couplings	Selection of Front Panel Unit/Terminator Key changes this BAF parameter, absolute or relative. If you select dBm for terminator, BAF parameter should be changed to ABSolute(dBm).
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	–36.00 ABSolute
State Saved	Saved in instrument state.
Min	–200
Max	100

Instrument S/W Revision	Prior to A.02.00

Meas Preset

Restores all the measurement parameters to their default values.

Remote Command	`:CONFigure:ETSPur`
Example	CONF:ETSP
Key Path	**Meas Setup**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Instrument S/W Revision	Prior to A.02.00

Mode

Operation of this key is identical across all measurements. For details about this key, see “Mode” on page 1087.

Mode Setup

Operation of this key is identical across all measurements. For details about this key, see "Mode Setup" on page 1101.

Peak Search

Places the selected marker on the trace point with the maximum y-axis value for that marker's trace.

Remote Command	`:CALCulate:ETSPur:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	`CALC:ETSP:MARK2:MAX`
Key Path	**Front-panel key**
Mode	GSM
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Instrument S/W Revision	Prior to A.02.00

Recall

Operation of this key is identical across several measurements. For details of this key, see “Recall” on page 1123

Restart

Operation of this key is identical across all measurements. For details about this key, see “Restart” on page 1145.

Save

Operation of this key is identical across several measurements. For details of this key, see "Save" on page 1147

Single (Single Measurement/Sweep)

Operation of this key is identical across several measurements. For details about this key, see "Single (Single Measurement/Sweep)" on page 1173.

Source

Operation of this key is identical across several measurements. For details about this key, see "Source" on page 1175.

SPAN X Scale

There is no functionality for this Front-panel key in this measurement. When pressed, this key displays a blank menu.

Key Path	**Front-panel key**
Mode	GSM

Sweep/Control

Operation of this key is identical across several measurements. For details about this key, see “Sweep / Control” on page 1179.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Trace/Detector

Accesses a menu that allows you to control trace settings.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Trace

Selects the trace mode from the following selections:

KEYAverage	Trace is averaged.
SCPIAVERage	
KEYMax Hold	Trace holds maximum value.
SCPIMAXHold	

Remote Command	`[:SENSe]:ETSPur:TRACe AVERage|MAXHold` `[:SENSe]:ETSPur:TRACe?`
Example	ETSP:TRAC MAXH ETSP:TRAC?
Dependencies/Couplings	Coupled with “Avg Type” on page 844.
Key Path	**Trace/Detector**
Mode	GSM
Notes	Valid only when “Avg/Hold Num” on page 843 is set to On. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	`MAXHold`
State Saved	Saved in instrument state.
Range	Average|Max Hold
Instrument S/W Revision	Prior to A.02.00

Trigger

There is no functionality for this front-panel key in this measurement. When pressed, this key displays a blank menu.

Key Path	**Front-panel key**
Mode	GSM

View/Display

Display

Accesses a menu of functions that enable you to set up and control the display parameters for the current measurement. See the section “Display” on page 1253 for more information.

View

Changes the content of the view’s windows. The measurement splits the transmit band into four segments (or less if the currently selected ARFCN is at the edge of the band). Two of these segments are on each side of the ETSI specified transmit band. View selection allows you to select each segment in sequence after the measurement completes (if Meas Type Full), to automatically home in on the worst performing segment (if Meas Type Examine) or to manually select which segment to view (if Meas Type Examine).

- “Lowest Segment ” on page 862 – lower Tx band edge to –6 MHz offset from the channel frequency
- “Lower Adj Segment ” on page 863 – –6 MHz to –1.8 MHz offset from the channel frequency
- “Upper Adj Segment ” on page 863 – +1.8 MHz to +6 MHz offset from the channel frequency
- “Highest Segment ” on page 864 – +6 MHz offset from the channel frequency to the upper Tx band edge

For details of each view, click the links above.

Key Path	**View/Display**
Mode	GSM
Notes	Dynamically changed in sequence after the measurement completes (if Meas Type Full), to automatically home in on the worst performing segment (if Meas Type Examine) or to manually select which segment to view (if Meas Type Examine).
Preset	Lowest Segment
Range	Lowest Segment|Lower Adj Segment|Upper Adj Segment|Highest Segment
Instrument S/W Revision	Prior to A.02.00

Display

Accesses a menu of functions that enable you to set the display parameters. See the section “Display” on page 1253 for more information.

Key Path	**Front-panel key**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Lowest Segment

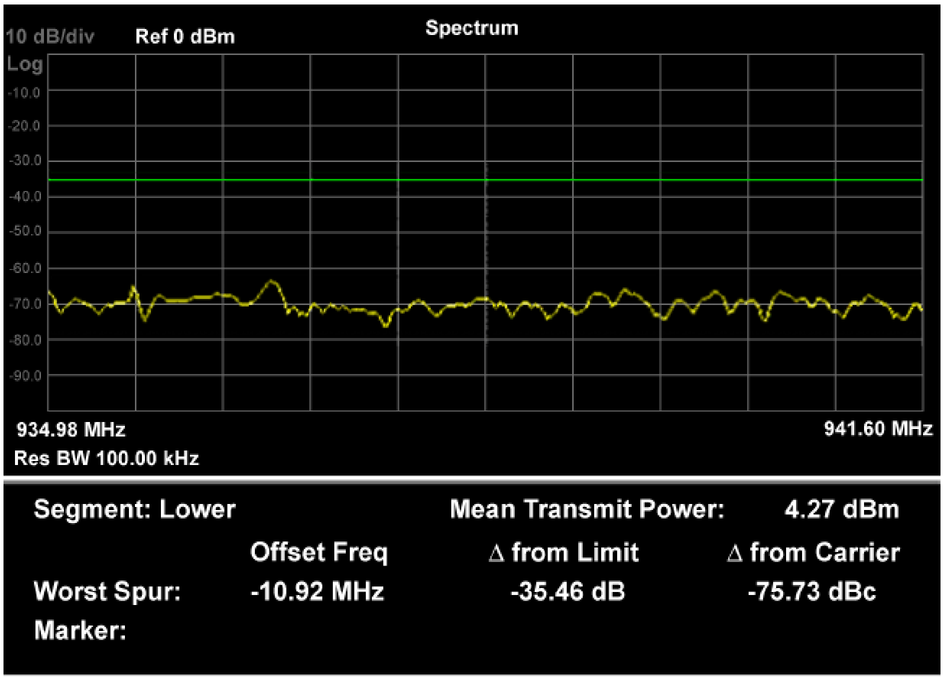
This view has two windows, as follows:

Top window - Spectrum Window: shows spectrum of each segment

Bottom window – Metrics Window: shows each metric result.

If a result failed, ‘F’ is displayed beside the result.

The figure below shows an example of the two windows of this view.



Spectrum Window

Marker Operation	Yes
Corresponding Trace	Corrected measured trace (n=2,4,6,8,10)

Metrics Window

Name	**Corresponding Results**	**Display Format**
Worst Spur: Offset	n=1 1st The worst spur’s frequency difference from channel center frequency.	99.99 MHz
Worst Spur: Δ from Limit	n=1 2nd The worst spur’s amplitude difference from the limit	99.99 dB

Name	Corresponding Results	Display Format
Worst Spur: Δ from Carrier	n=1 3rd The worst spur’s amplitude difference from the mean transmit power	99.99 dBc
Marker: Δ from Limit	Marker frequency difference from channel center frequency.	99.99 dB
Marker: Δ from Carrier	Marker amplitude difference from the limit.	99.99 dBc

Key Path	**View/Display**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Lower Adj Segment

This view has two windows: the Spectrum Window and the Metrics Windows. For details of both windows, see the section “Lowest Segment ” on page 862.

The figure above shows only the Metrics Window for this view.

Key Path	**View/Display**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Upper Adj Segment

This view has two windows: the Spectrum Window and the Metrics Windows. For details of both windows, see the section “Lowest Segment ” on page 862.

The figure above shows only the Metrics Window for this view.

Key Path	**View/Display**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

Highest Segment

This view has two windows: the Spectrum Window and the Metrics Windows. For details of both windows, see the section "Lowest Segment " on page 862.

The figure above shows only the Metrics Window for this view.

Key Path	**View/Display**
Mode	GSM
Instrument S/W Revision	Prior to A.02.00

15 Monitor Spectrum Measurement

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. For measurement results and views, see "View/Display" on page 907.

This topic contains the following sections:

Measurement Commands for Monitor Spectrum

The following commands can be used to retrieve the measurement results:

```
:CONFigure:MONitor

:CONFigure:MONitor:NDEFault

:INITiate:MONitor

:FETCh:MONitor[n]?

:READ:MONitor[n]?

:MEASure:MONitor[n]?
```

For more measurement related commands, see the SENSe subsystem, and the section "Remote Measurement Functions" on page 1069.

Remote Command Results for Monitor Spectrum Measurement

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

Key Path	**Meas**
Instrument S/W Revision	Prior to A.02.00

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. 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**
Instrument S/W Revision	Prior to A.02.00

Ref Value

Sets the absolute power reference value. However, since the Auto Scaling is defaulted to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

Key Path	**AMPTD Y Scale**
Mode	All except SA and BASIC
Remote Command	`:DISPlay:MONitor:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>`
	`:DISPlay:MONitor:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:MON:VIEW:WIND:TRAC:Y:RLEV 2.0
	DISP:MON:VIEW:WIND:TRAC:Y:RLEV?
Dependencies/Couplings	When the Auto Scaling is On, this value is automatically determined by the measurement result.
	When you set a value manually, Auto Scaling automatically changes to Off.
Preset	10.00 dBm
State Saved	Saved in instrument state.
Min	–250.00 dBm
Max	250.00 dBm
Instrument S/W Revision	Prior to A.02.00

Attenuation

Accesses a menu of functions that enable you to change the attenuation settings.

See AMPTD Y Scale, “Attenuation” on page 969 in the “Common Measurement Functions” section for more information.

Key Path	**AMPTD Y Scale**

Instrument S/W Revision	Prior to A.02.00

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.

Key Path	**AMPTD Y Scale**
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.
Min	0.10 dB
Max	20.00 dB
Instrument S/W Revision	Prior to A.02.00

Presel Center

See AMPTD Y Scale, "Presel Center" on page 981 in the "Common Measurement Functions" section for more information.

Presel Adjust

See AMPTD Y Scale, "Preselector Adjust" on page 982 in the "Common Measurement Functions" section for more information.

Internal Preamp

Accesses a menu of functions that enable you to control the internal preamplifiers.

See AMPTD Y Scale, "Internal Preamp" on page 984 in the "Common Measurement Functions" section for more information.

Key Path	**AMPTD Y Scale**
Instrument S/W Revision	Prior to A.02.00

Ref Position

Positions the reference level at the top, center or bottom of the Y Scale display. Changing the reference position does not change the reference level value.

Key Path	**AMPTD Y Scale**
Mode	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
Instrument S/W Revision	Prior to A.02.00

Auto Scaling

Toggles the Auto Scaling function between On and Off.

Key Path	**AMPTD Y Scale**
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
Instrument S/W Revision	Prior to A.02.00

Auto Couple

See "AUTO COUPLE" on page 987 in the section "Common Measurement Functions" for more information.

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**
Instrument S/W Revision	Prior to A.02.00

Res BW

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

Key Path	**BW**
Mode	All except SA and BASIC

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

Example	MON:BAND 2.4 MHz MON:BAND? MON:BAND:AUTO ON MON:BAND:AUTO?
Preset	WCDMA: Automatically calculated WIMAX OFDMA: 100kHz C2K: Automatically calculated PN: Automatically calculated GSM/EDGE: Automatically calculated TD-SCDMA: Automatically calculated 1xEVDO: 30kHz DVB-T/H: 3.9kHz DTMB: 3.9kHz
State Saved	Saved in instrument state.
Min	1.0 Hz
Max	8.0 MHz
Instrument S/W Revision	Prior to A.02.00

Video BW

Changes the analyzer post–detection filter.

Key Path	**BW**
Mode	All except SA and BASIC
Remote Command	`[:SENSe]:MONitor:BANDwidth:VIDeo <bandwidth>`
	`[:SENSe]:MONitor:BANDwidth:VIDeo?`
	`[:SENSe]:MONitor:BANDwidth:VIDeo:AUTO ON|OFF|1|0`
	`[:SENSe]:MONitor:BANDwidth:VIDeo:AUTO?`
Example	MON:BAND:VID 10 MHz
	MON:BAND:VID?
	MON:BAND:VID:AUTO OFF
	MON:BAND:VID:AUTO?
Preset	WCDMA: Automatically calculated
	WIMAX OFDMA: 1MHz
	C2K: Automatically calculated
	PN: Automatically calculated
	GSM/EDGE: Automatically calculated
	TD-SCDMA: Automatically calculated
	1xEVDO: 300kHz
	DVB-T/H: 39kHz
	DTMB: 39kHz
State Saved	Saved in instrument state.
Min	1 Hz
Max	50 MHz
Instrument S/W Revision	Prior to A.02.00

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.

Key Path	**BW**
Mode	All except SA and BASIC

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

Example	MON:BAND:VID:RAT 2 MON:BAND:VID:RAT? MON:BAND:VID:RAT:AUTO 0 MON:BAND:VID:RAT:AUTO?
Preset	1 ON
State Saved	Saved in instrument state.
Min	0.00001
Max	3000000
Instrument S/W Revision	Prior to A.02.00

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.

Key Path	**BW**
Mode	All except SA and BASIC

Remote Command	`[:SENSe]:MONitor:FREQuency:SPAN:BANDwidth[:RESolution]:RATio <integer>`
	`[:SENSe]:MONitor:FREQuency:SPAN:BANDwidth[:RESolution]:RATio?`
	`[:SENSe]:MONitor:FREQuency:SPAN:BANDwidth[:RESolution]:RATio:AUTO OFF|ON|0|1`
	`[:SENSe]:MONitor:FREQuency:SPAN:BANDwidth[:RESolution]:RATio:AUTO?`

Example	MON:FREQ:SPAN:BAND:RAT 200 MON:FREQ:SPAN:BAND:RAT? MON:FREQ:SPAN:BAND:RAT:AUTO ON MON:FREQ:SPAN:BAND:RAT:AUTO?
Preset	106 ON

State Saved	Saved in instrument state.
Min	2
Max	10000
Instrument S/W Revision	Prior to A.02.00

Cont

See “Cont (Continuous Measurement/Sweep)” on page 991 in the section "Common Measurement Functions" for more information.

FREQ Channel

See “FREQ/Channel” on page 993 in the section "Common Measurement Functions" for more information.

Input/Output

See “Input/Output” on page 1003 in the section "Common Measurement Functions" 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**
Instrument S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

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

Marker Type

Sets the marker control mode to **Normal**, **Delta** or **Off**. If the selected marker is Off, pressing Marker sets it to Normal and places a single marker at the center of the display. At the same time, **Marker X Axis Value** appears on the Active Function area.

Key Path	**Marker**
Mode	All except SA and BASIC
Remote Command	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE POSition|DELTa|OFF` `:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MODE?`
Example	CALC:MON:MARK:MODE POS CALC:MON:MARK:MODE?
Notes	If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area. Default Active Function: the active function for the selected marker’s current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X axis value entered in the active function area displays the marker value to its full entered precision.
Preset	OFF
State Saved	Saved in instrument state.

Range	Normal|Delta|Off
Instrument S/W Revision	Prior to A.02.00

Marker X Axis Value (Remote Command only)

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering an X value if the control mode is **Normal** or **Delta**.

Mode	All except SA and BASIC
Remote Command	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X <freq>` `:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X ?`
Example	CALC:MON:MARK3:X 0 CALC:MON:MARK3:X?
Notes	If no suffix is sent, uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error “Invalid suffix” is generated. The query returns the marker’s absolute X Axis value if the control mode is **Normal**, or the offset from the marker’s reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency** and **Inverse Time**, seconds for **Period** and **Time**. If the marker is **Off** the response is not a number.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37
Instrument S/W Revision	Prior to A.02.00

Marker X Axis Position (Remote Command only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering a value if the control mode is **Normal** or **Delta** – except in trace points rather than X Axis Scale units. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Mode	All except SA and BASIC
Remote Command	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X :POSition <real>` `:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X :POSition?`

Example	CALC:MON:MARK:X:POS 0 CALC:MON:MARK:X:POS?
Notes	The query returns the marker's absolute X Axis value in trace points if the control mode is **Normal**, or the offset from the marker's reference marker in trace points if the control mode is **Delta**. The value is returned as a real number, not an integer, corresponding to the translation from X Axis Scale units to trace points. If the marker is **Off** the response is not a number.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37
Instrument S/W Revision	Prior to A.02.00

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
Instrument S/W Revision	Prior to A.02.00

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**
Instrument S/W Revision	Prior to A.02.00

Select Marker

Displays 12 markers available for selection.

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

Relative To

Selects the desired marker. The selected marker is relative to its reference marker

Key Path	**Marker, Properties**
Mode	All except SA and BASIC
Remote Command	`:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>` `:CALCulate:MONitor:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	CALC:MON:MARK:REF 1 CALC:MON:MARK:REF?
Notes	A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error –221: “Settings conflict; marker cannot be relative to itself.” When queried a single value is returned (the specified marker number’s relative marker).
Preset	2|3|4|5|6|7|8|9|10|11|12|1
State Saved	Saved in instrument state.
Min	1
Max	12
Instrument S/W Revision	Prior to A.02.00

Marker Trace

Assigns the specified marker to the designated trace.

Key Path	**Marker, Properties**
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

Instrument S/W Revision	Prior to A.02.00

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).

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

All Markers Off

Turns off all markers on the current measurement.

Key Path	**Marker**
Mode	All except SA and BASIC
Remote Command	`:CALCulate:MONitor:MARKer:AOFF`
Example	CALC:MON:MARK:AOFF
Instrument S/W Revision	Prior to A.02.00

Marker Function

Accesses special marker functions such as marker noise, and power in a specified bandwidth or time interval.

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

Select Marker

Selects one of the 12 available markers.

Key Path	**Marker Function**
Instrument S/W Revision	Prior to A.02.00

Marker Function Type

Sets the marker control function type to, Marker Noise, Band/Interval Power, Band Interval Density, or Marker Function Off.

Key Path	**Marker Function**
Mode	All except SA and 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
Instrument S/W Revision	Prior to A.02.00

Band Adjust

Accesses a menu that enables you to set the frequency span width and the left and right edge, or time values, for the band or interval of the selected marker.

Key Path	**Marker Function**

Instrument S/W Revision	Prior to A.02.00

Band/Interval Span for Frequency Domain

Sets the width of the frequency span for the selected marker.

Key Path	**Marker Function**
Mode	All except SA and 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
Instrument S/W Revision	Prior to A.02.00

Band/Interval Left for Frequency Domain

Sets the left edge frequency or time value for the band of the selected marker.

Key Path	**Marker Function**
Mode	All except SA and 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
Instrument S/W Revision	Prior to A.02.00

Band/Interval Right for Frequency Domain

Sets the right edge frequency or time value for the band of the selected marker.

Key Path	**Marker Function**
Mode	All except SA and 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
Instrument S/W Revision	Prior to A.02.00

Marker To

There is no ‘Marker To’ functionality supported in Monitor Spectrum. The front-panel key displays a blank menu key when pressed.

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

Meas

See “Meas” on page 1069 in the section "Common Measurement Functions" for more information.

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**
Instrument S/W Revision	Prior to A.02.00

Avg/Hold Num

Specifies the number of measurement averages used when calculating the measurement result. The average is displayed at the end of each sweep.

After the specified number of average counts, the averaging mode (terminal control) setting determines the averaging action.

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

Avg Mode

Toggles the average mode between exponential (Exp) and Repeat.

Exp- continues measurement averaging, using the specified number of averages to compute each averaged value. The average is displayed at the end of each sweep.

Repeat- causes the measurement to reset the average counter each time the specified number of averages is reached.

Key Path	**Meas Setup**
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	ExpRepeat
Instrument S/W Revision	Prior to A.02.00

Meas Preset

Restores all the measurement parameters to their default values.

Key Path	**Meas Setup**
Mode	All except SA and BASIC
Remote Command	`:CONFigure:MONitor`
Example	CONF:MON
Instrument S/W Revision	Prior to A.02.00

Mode

See “Mode” on page 1087 in the section "Common Measurement Functions" for more information.

Mode Setup

See “Mode Setup” on page 1101 in the section "Common Measurement Functions" for more information.

Peak Search

There is no ‘Peak Search’ functionality supported in Monitor Spectrum. The front-panel key displays a blank menu key when pressed.

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

Recall

See “Recall” on page 1123 in the section "Common Measurement Functions" for more information.

Restart

See “Restart” on page 1145 in the section "Common Measurement Functions" for more information.

Save

See “Save” on page 1147 in the section "Common Measurement Functions" for more information.

Single

See “Single (Single Measurement/Sweep)” on page 1173 in the section "Common Measurement Functions" for more information.

Source

See “Source” on page 1175 in the section "Common Measurement Functions" for more information.

Span X Scale

Accesses a menu of functions that enable you to set the horizontal scale parameters.

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

Span

Changes the frequency range symmetrically about the center frequency.

Key Path	**Span X Scale**
Mode	All except SA, BASIC
Remote Command	`[:SENSe]:MONitor:FREQuency:SPAN <freq>` `[:SENSe]:MONitor:FREQuency:SPAN?`
Example	MON:FREQ:SPAN 1 MHz MON:FREQ:SPAN?
Dependencies/Couplings	Changing the span causes the resolution bandwidth to change automatically, and affects data acquisition time.
Preset	WCDMA: 10.0 MHz WIMAX OFDMA: 50.0 MHz C2K: 2.5MHz PN: 1.0 MHz GSM/EDGE: 1.0 MHz TD-SCDMA: 3.2 MHz 1xEVDO: 2.0MHz DVB-T/H: 10.0MHz DTMB: 10.0MHz
State Saved	Saved in instrument state.
Min	10 Hz
Max	Hardware Dependent: Option 503 = 3.7 GHz Option 507 = 7.1GHz Option 508 = 8.5 GHz Option 513 = 13.8 GHz Option 526 = 27.0 GHz

Instrument S/W Revision	Prior to A.02.00

Full Span

Changes the Span to show the full frequency range of the analyzer.

Key Path	**Span X Scale**
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.
Instrument S/W Revision	Prior to A.02.00

Last Span

Changes the measurement span to the span setting of the previous measurement. If there is no existing previous span value, then the span remains unchanged.

Key Path	**Span X Scale**
Mode	All except SA and BASIC
Remote Command	`[:SENSe]:MONitor:FREQuency:SPAN:PREVious`
Example	MON:FREQ:SPAN:PREV
Dependencies/Couplings	Selecting last span changes the measurement span value.
Instrument S/W Revision	Prior to A.02.00

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**
Instrument S/W Revision	Prior to A.02.00

Sweep Time

Selects the length of time in which the spectrum analyzer sweeps the displayed frequency span. Additional overhead time 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.

Key Path	**Sweep/Control**
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?
Dependencies/Couplings	When the user manually changes the Sweep Time, this set automatically goes to ‘Man’.
Preset	Automatically Calculated
State Saved	Saved in instrument state.
MIN/MAX/DEF Support	Yes
Min	1 ms
Max	4000 s
Instrument S/W Revision	Prior to A.02.00

Pause

Pauses a measurement after the current data acquisition is complete.
When Paused, the label on the key changes to Resume. Pressing Resume continues the measurement at the point where it had been paused.

See “Pause/Resume” on page 1180 under Sweep/Control in the "Common Measurement Functions" section for more information.

Key Path	**Sweep/Control**
Instrument S/W Revision	Prior to A.02.00

Gate

Accesses a menu that enables you to control the gating function .

The Gate functionality is used to view signals best viewed by qualifying them with other events.

See “Gate ” on page 1180 in “common Measurement Functions” for more details.

Key Path	**Sweep/Control**
Instrument S/W Revision	Prior to A.02.00

Points

Sets the number of points per sweep. The resolution of setting the sweep time depends on the number of points selected. If Preset is selected, the number of points per sweep defaults to 1001. The current value of points is displayed parenthetically, next to the sweep time in the lower right corner of the display.

Key Path	**Sweep/Control**
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
Instrument S/W Revision	Prior to A.02.00

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**
Instrument S/W Revision	Prior to A.02.00

Select Trace

Allows you to select which trace you want to use for the current measurement. You can select one of three traces. Monitor Spectrum supports 3 traces, numbered 1 through 3.

Key Path	**Trace/Detector**
Mode	All except SA and BASIC
Preset	Trace 1
State Saved	The number of the selected trace is saved in Instrument State
Instrument S/W Revision	Prior to A.02.00

Trace Type

Allows you to select the type of trace you want to you use for the current measurement. You can assign a trace type to one of the three available traces.

The first page of this menu contains a 1–of–N selection of the trace type (**Clear Write, Average, Max Hold, Min Hold**) for the selected trace.

Key Path	**Trace/Detector**
Mode	All except SA and BASIC
Remote Command	`:TRACe[1]|2|3:MONitor:TYPE WRITe|AVERage|MAXHold|MINHold` `:TRACe[1]|2|3:MONitor:TYPE?`
Example	TRAC:MON:TYPE WRIT TRAC:MON:TYPE?
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`
Instrument S/W Revision	Prior to A.02.00

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.

Key Path	**Trace/Detector**
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(View)`
Instrument S/W Revision	Prior to A.02.00

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

Key Path	**Trace/Detector**
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	`Show|Blank`
Instrument S/W Revision	Prior to A.02.00

Detector

Accesses a menu of functions that enable you to control the detectors for the current measurement. The following choices are available:

Auto — the detector selected depends on marker functions, trace functions, average type, and the trace averaging function.

- Normal — the detector determines the peak of the CW-like signals, and it yields alternating maximums and minimums of noise-like signals. This is also referred to as Rosenfell detection.
- Average — the detector determines the average of the signal within the sweep points. The averaging method depends upon the Average Type selection (voltage, power or log scales).
- Peak — the detector determines the maximum of the signal within the sweep points.
- Sample — the detector indicates the instantaneous level of the signal at the center of the sweep points represented by each display point.
- Negative Peak — the detector determines the minimum of the signal within the sweep points.

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.

Key Path	**Trace/Detector**
Mode	All except SA and BASIC
Remote Command	`[:SENSe]:MONitor:DETector:TRACe AVERage|NEGative|NORMal|POSitive|SAMPle` `[:SENSe]:MONitor:DETector:TRACe?`
Example	MON:DET:TRAC NORM MON:DET:TRAC?

Notes	The query returns a name that corresponds to the detector type as shown below. String Returned Definition NORM Normal AVER Average POS Peak SAMP Sample NEG Negative Peak
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(RMS)|Peak|Sample|Negative Peak
Instrument S/W Revision	Prior to A.02.00

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.

Key Path	**Trace/Detector** **Trace/Detector, Detector**
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	Auto|Man
Instrument S/W Revision	Prior to A.02.00

Clear Trace

Clears the selected trace from the display.

Key Path	**Trace/Detector**
Mode	All except SA and BASIC
Remote Command	`:TRACe:MONitor:CLEar [TRACE1]|TRACE2|TRACE3`
Example	TRAC:MON:CLE
Instrument S/W Revision	Prior to A.02.00

Mode	All except SA and BASIC
Remote Command	`:DISPlay:MONitor:VIEW:WINDow:TRACe[1]|2|3:CLEar`
Example	DISP:MON:VIEW:WIND:TRAC:CLE
Instrument S/W Revision	Prior to A.02.00

Clear All Traces

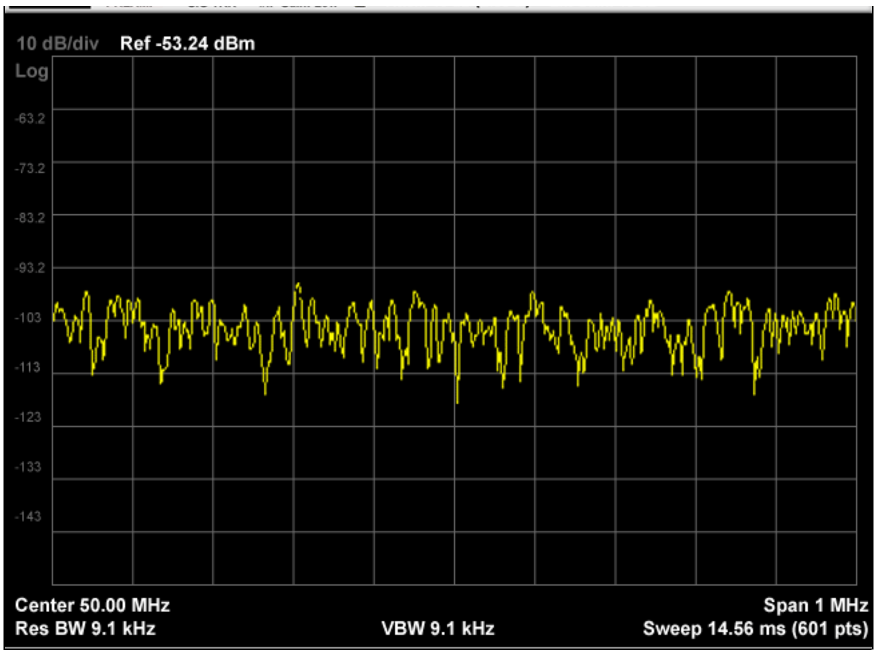
Clears all traces from the display.

Key Path	**Trace/Detector**
Mode	All except SA and BASIC
Remote Command	`:TRACe:MONitor:CLEar:ALL`
Example	TRAC:MON:CLE:ALL
Instrument S/W Revision	Prior to A.02.00

View/Display

Accesses a menu of functions that enable you to control certain functions related to the display of the analyzer.

There is a single trace view for this measurement.



The measurement has no results, but has a number of features that make it flexible and simple to use.

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

Display

Accesses a menu of functions that enable you to set the display parameters.

See “Display” on page 1253 in the "Common Measurement Functions" section for more information.

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

16 Waveform Measurement

The waveform measurement is a generic measurement for viewing the input signal waveforms in the time domain. This measurement represents how the instrument performs the zero span functionality found in traditional spectrum analyzers. For more details, see ""Waveform Measurement Description" on page 910" below.

This topic contains the following sections:

"Measurement Commands for Waveform" on page 909

"Remote Command Results for Waveform Measurement" on page 909

Measurement Commands for Waveform

The general functionality of CONFigure, INITiate, FETCh, MEASure, and READ are described at this section.

```
:CONFigure:WAVeform
```

```
:CONFigure:WAVeform:NDEFault
```

```
:INITiate:WAVeform
```

```
:FETCh:WAVeform[n]
```

```
:MEASure:WAVeform[n]
```

```
:READ:WAVeform[n]
```

For more measurement related commands, see the SENSe subsystem, and the section "Remote Measurement Functions" on page 1069.

Remote Command Results for Waveform Measurement

The following table denotes the returned results from the FETCh|MEASure|READ commands:

n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of trace point values, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.

n	Results Returned
1	Returns the following scalar results: 1. Sample Time is a floating point number representing the time between samples when using the trace queries (n=0, 2, and so forth). 2. Mean Power is the mean power (in dBm). This is the power across the entire trace. If averaging is on, the power is for the latest acquisition. 3. Mean Power Averaged is the power (in dBm) for N averages, if averaging is on. This is the power across the entire trace. If averaging is on, the power is for the latest acquisition. If averaging is off, the value of the mean power averaged is the same as the value of the mean power. 4. Number of samples is the number of data points in the captured signal. This number is useful when performing a query on the signal (i.e. when n=0,2,etc.). 5. Peak-to-mean ratio has units of dB. This is the ratio of the maximum signal level to the mean power. Valid values are only obtained with averaging turned off. If averaging is on, the peak-to-mean ratio is calculated using the highest peak value, rather than the displayed average peak value. 6. Maximum value is the maximum of the most recently acquired data (in dBm). 7. Minimum value is the minimum of the most recently acquired data (in dBm).
2	Returns trace point values of the entire captured signal envelope trace data. These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the number of samples. The period between the samples is defined by the sample time.

Waveform Measurement Description

Also available under basic Waveform measurement is an I/Q window, which shows the I and Q signal waveforms in parameters of voltage versus time to disclose the voltages which comprise the complex modulated waveform of a digital signal.

The waveform measurement can also be used to perform general purpose power measurements to a high degree of accuracy.

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

AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters.

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

Ref Value

Sets the absolute power reference value. However, since the Auto Scaling is defaulted to On, this value is automatically determined by the measurement result. When you set a value manually, Auto Scaling automatically changes to Off.

Ref Value (RF Envelope View)

Sets the Y Scale reference value (in dBm) when the RF Envelope View is active. By default, the measurement determines the reference value with Auto Scaling. Entering a reference value manually turns Auto Scaling off.

Key Path	**AMPTD Y Scale**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`:DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <ampl>` `:DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:WAV:VIEW:WIND:TRAC:Y:RLEV –50 dBm DISP:WAV:VIEW:WIND:TRAC:Y:RLEV?
Notes	You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
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.
Range	–250.00 dBm to 250.00 dBm
Instrument S/W Revision	Prior to A.02.00

Ref Value (I/Q Waveform View)

Sets the Y Scale reference value (in volts) when the I/Q Waveform View is active. By default, the measurement determines the reference value with Auto Scaling. Entering a reference value manually turns Auto Scaling off.

Key Path	**AMPTD Y Scale**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`:DISPlay:WAVeform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <voltage>` `:DISPlay:WAVeform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?`
Example	DISP:WAV:VIEW2:WIND:TRAC:Y:RLEV 25 V DISP:WAV:VIEW2:WIND:TRAC:Y:RLEV?
Notes	You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
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	0 V
State Saved	Saved in instrument state.
Min	–250 V
Max	250 V
Instrument S/W Revision	Prior to A.02.00

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

This is only available when the selected input is RF.

See AMPTD Y Scale, “Attenuation” on page 969 in the section “Common Measurement Functions” for more information.

Key Path	**AMPTD Y Scale**
Instrument S/W Revision	Prior to A.02.00

Range

Accesses the Range menu to change baseband I/Q gain settings. This key has a readback text that describes gain range value. Refer to "Amplitude Y Scale (AMPTD Y Scale)" on page 969 in the section "Common Measurement Functions" for more information.

Key Path	**AMPTD Y Scale**
Instrument S/W Revision	Prior to A.02.00

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.

Key Path	**AMPTD Y Scale**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`:DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>` `:DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:WAV:VIEW:WIND:TRAC:Y:PDIV 5 DISP:WAV:VIEW:WIND:TRAC:Y:PDIV?
Notes	You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
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
Instrument S/W Revision	Prior to A.02.00

Scale/Div (I/Q Waveform View)

Sets the scale per division for the I/ Q signal waveform graph.

Key Path	**AMPTD Y Scale**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`:DISPlay:WAVeform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <voltage>`
	`:DISPlay:WAVeform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?`
Example	DISP:WAV:VIEW2:WIND:TRAC:Y:PDIV 25mV
	DISP:WAV:VIEW2:WIND:TRAC:Y:PDIV?
Notes	You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
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	100.0 mV
State Saved	Saved in instrument state.
Min	1.0 nV
Max	20 V
Instrument S/W Revision	Prior to A.02.00

Presel Center

When this key is pressed, the centering of the preselector filter is adjusted to optimize the amplitude accuracy at the frequency of the selected marker.

See “Presel Center” on page 981 under AMPTD Y Scale in the section "Common Measurement Functions" for more information.

This key is only available when the selected input is RF.

Key Path	**AMPTD/Y Scale**
Instrument S/W Revision	Prior to A.02.00

Presel Adjust

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

See "Preselector Adjust" on page 982 under AMPTD Y Scale in the section "Common Measurement Functions" for more information.

This key is only available when the selected input is RF.

Key Path	**AMPTD/Y Scale**
Instrument S/W Revision	Prior to A.02.00

Internal Preamp

Accesses a menu of functions that enable you to control the internal preamplifiers.

See AMPTD Y Scale, "Internal Preamp" on page 984 in the section "Common Measurement Functions" for more information.

This key is only available when the selected input is RF.

Key Path	**AMPTD Y Scale**
Instrument S/W Revision	Prior to A.02.00

Ref Position

Positions the reference level at the top, center or bottom of the Y Scale display. Changing the reference position does not change the reference level value.

Ref Position (RF Envelope View)

Positions the reference level at the top, center or bottom of the Y Scale display. Changing the reference position does not change the reference level value.

Key Path	**AMPTD Y Scale**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`:DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:WAVeform:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:WAV:VIEW:WIND:TRAC:Y:RPOS CENT DISP:WAV:VIEW:WIND:TRAC:Y:RPOS?
Notes	You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	TOP
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot

Instrument S/W Revision	Prior to A.02.00

Ref Position (I/Q Waveform View)

Positions the reference level at the top, center or bottom of the Y Scale display. Changing the reference position does not change the reference level value.

Key Path	**AMPTD Y Scale**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`:DISPlay:WAVeform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP|CENTer|BOTTom` `:DISPlay:WAVeform:VIEW2:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?`
Example	DISP:WAV:VIEW2:WIND:TRAC:Y:RPOS CENT DISP:WAV:VIEW2:WIND:TRAC:Y:RPOS?
Notes	You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	CENT
State Saved	Saved in instrument state.
Range	Top|Ctr|Bot
Instrument S/W Revision	Prior to A.02.00

Auto Scaling

Toggles the Auto Scaling function between On and Off. When the **Restart** front panel key is pressed, this function automatically determines the scale per division and reference values based on the measurement results.

Key Path	**AMPTD Y Scale**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:Y[:SCALe]:COUPle?`
Example	DISP:WAV:VIEW:WIND:TRAC:Y:COUP OFF DISP:WAV:VIEW:WIND:TRAC:Y:COUP?
Notes	You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.

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.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Auto Couple

See “AUTO COUPLE” on page 987 in the section "Common Measurement Functions" for more information.

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**
Instrument S/W Revision	Prior to A.02.00

Info BW

Enables you to set the information bandwidth (Info BW) of the analyzer.

Key Path	**BW**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`[:SENSe]:WAVeform:BANDwidth[:RESolution] <freq>` `[:SENSe]:WAVeform:BANDwidth[:RESolution]?`
Example	WAV:BAND 1kHz WAV:BAND?
Notes	You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	All except GSM/EDGE: 100 kHz GSM/EDGE: 510kHz TDSCDMA: 1.3MHZ 1xEVDO: 1.3MHz DVB-T/H: 8.0MHz DTMB: 8.0MHz
State Saved	Saved in instrument state.
Min	10 Hz

Max	Hardware Dependent: RF Input: No Option = 10 MHz Option B25 = 25 MHz I/Q Input: No Option = 10 MHz per channel (20 MHz for I+jQ) Option B25 = 25 MHz per channel (50 MHz for I+jQ) Option S40 = 40 MHz per channel (80 MHz for I+jQ)
Instrument S/W Revision	Prior to A.02.00

IBW Control

Accesses the Filter Type key

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

Filter Type

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

Key Path	**BW, RBW Control**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`[:SENSe]:WAVeform:BANDwidth:SHAPe GAUSsian|FLATtop` `[:SENSe]:WAVeform:BANDwidth:SHAPe?`
Example	WAV:BAND:SHAP GAUS WAV:BAND:SHAP?
Notes	You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	GAUSsian
State Saved	Saved in instrument state.
Range	Gaussian|FlatTop
Instrument S/W Revision	Prior to A.02.00

Gaussian

The table in the section “Gaussian filters” on page 921 lists all 160 Gaussian filter types.

Gaussian filters

Normal (–3 dB)	–6 dB	Noise	Impulse
1.0 Hz	1.41 Hz	1.06 Hz	1.49 Hz
1.1 Hz	1.55 Hz	1.16 Hz	1.63 Hz
1.2 Hz	1.69 Hz	1.27 Hz	1.77 Hz
1.3 Hz	1.83 Hz	1.37 Hz	1.92 Hz
1.5 Hz	2.11 Hz	1.59 Hz	2.22 Hz
1.6 Hz	2.25 Hz	1.69 Hz	2.37 Hz
1.8 Hz	2.53 Hz	1.90 Hz	2.66 Hz
2.0 Hz	2.81 Hz	2.12 Hz	2.96 Hz
2.2 Hz	3.09 Hz	2.33 Hz	3.25 Hz
2.4 Hz	3.38 Hz	2.54 Hz	3.55 Hz
2.7 Hz	3.80 Hz	2.86 Hz	3.99 Hz
3.0 Hz	4.22 Hz	3.17 Hz	4.44 Hz
3.3 Hz	4.64 Hz	3.49 Hz	4.88 Hz
3.6 Hz	5.06 Hz	3.81 Hz	5.32 Hz
3.9 Hz	5.49 Hz	4.12 Hz	5.77 Hz
4.3 Hz	6.05 Hz	4.55 Hz	6.36 Hz
4.7 Hz	6.61 Hz	4.97 Hz	6.95 Hz
5.1 Hz	7.17 Hz	5.39 Hz	7.54 Hz
5.6 Hz	7.87 Hz	5.92 Hz	8.27 Hz
6.2 Hz	8.72 Hz	6.56 Hz	9.17 Hz
6.8 Hz	9.55 Hz	7.18 Hz	10.0 Hz
7.5 Hz	10.5 Hz	7.93 Hz	11.1 Hz
8.2 Hz	11.5 Hz	8.66 Hz	12.1 Hz
9.1 Hz	12.8 Hz	9.64 Hz	13.5 Hz
10 Hz	14.0 Hz	10.6 Hz	14.8 Hz
11 Hz	15.4 Hz	11.6 Hz	16.2 Hz
12 Hz	16.9 Hz	12.7 Hz	17.7 Hz
13 Hz	18.3 Hz	13.7 Hz	19.2 Hz
15 Hz	21.1 Hz	15.9 Hz	22.2 Hz

Normal (–3 dB)	**–6 dB**	**Noise**	**Impulse**
16 Hz	22.5 Hz	16.9 Hz	23.7 Hz
18 Hz	25.3 Hz	19.1 Hz	26.6 Hz
20 Hz	28.1 Hz	21.1 Hz	29.5 Hz
22 Hz	30.9 Hz	23.2 Hz	32.5 Hz
24 Hz	33.8 Hz	25.4 Hz	35.5 Hz
27 Hz	38.0 Hz	28.6 Hz	40.0 Hz
30 Hz	42.3 Hz	31.8 Hz	44.5 Hz
33 Hz	46.3 Hz	34.8 Hz	48.7 Hz
36 Hz	50.7 Hz	38.1 Hz	53.3 Hz
39 Hz	54.9 Hz	41.3 Hz	57.7 Hz
43 Hz	60.5 Hz	45.5 Hz	63.6 Hz
47 Hz	66.1 Hz	49.7 Hz	69.5 Hz
51 Hz	71.7 Hz	53.9 Hz	75.3 Hz
56 Hz	78.9 Hz	59.3 Hz	83.0 Hz
62 Hz	87.3 Hz	65.6 Hz	91.7 Hz
68 Hz	95.5 Hz	71.8 Hz	100 Hz
75 Hz	106 Hz	79.4 Hz	111 Hz
82 Hz	115 Hz	86.8 Hz	121 Hz
91 Hz	128 Hz	96.4 Hz	135 Hz
100 Hz	141 Hz	106 Hz	148 Hz
110 Hz	154 Hz	116 Hz	162 Hz
120 Hz	169 Hz	127 Hz	178 Hz
130 Hz	183 Hz	137 Hz	192 Hz
150 Hz	211 Hz	159 Hz	222 Hz
160 Hz	225 Hz	169 Hz	237 Hz
180 Hz	253 Hz	190 Hz	266 Hz
200 Hz	281 Hz	211 Hz	295 Hz
220 Hz	309 Hz	232 Hz	325 Hz
240 Hz	337 Hz	254 Hz	355 Hz
270 Hz	380 Hz	286 Hz	400 Hz

Normal (–3 dB)	**–6 dB**	**Noise**	**Impulse**
300 Hz	422 Hz	317 Hz	444 Hz
330 Hz	463 Hz	348 Hz	487 Hz
360 Hz	507 Hz	381 Hz	533 Hz
390 Hz	550 Hz	413 Hz	578 Hz
430 Hz	605 Hz	455 Hz	636 Hz
470 Hz	662 Hz	498 Hz	696 Hz
510 Hz	718 Hz	540 Hz	755 Hz
560 Hz	789 Hz	593 Hz	829 Hz
620 Hz	872 Hz	655 Hz	916 Hz
680 Hz	958 Hz	720 Hz	1.01 kHz
750 Hz	1.06 kHz	794 Hz	1.11 kHz
820 Hz	1.15 kHz	866 Hz	1.21 kHz
910 Hz	1.28 kHz	964 Hz	1.35 kHz
1.0 kHz	1.41 kHz	1.06 kHz	1.48 kHz
1.1 kHz	1.55 kHz	1.17 kHz	1.63 kHz
1.2 kHz	1.69 kHz	1.27 kHz	1.78 kHz
1.3 kHz	1.83 kHz	1.38 kHz	1.93 kHz
1.5 kHz	2.11 kHz	1.59 kHz	2.22 kHz
1.6 kHz	2.26 kHz	1.70 kHz	2.37 kHz
1.8 kHz	2.54 kHz	1.91 kHz	2.67 kHz
2.0 kHz	2.82 kHz	2.12 kHz	2.96 kHz
2.2 kHz	3.10 kHz	2.33 kHz	3.26 kHz
2.4 kHz	3.38 kHz	2.54 kHz	3.56 kHz
2.7 kHz	3.80 kHz	2.86 kHz	4.00 kHz
3.0 kHz	4.23 kHz	3.18 kHz	4.44 kHz
3.3 kHz	4.65 kHz	3.49 kHz	4.89 kHz
3.6 kHz	5.06 kHz	3.81 kHz	5.32 kHz
3.9 kHz	5.48 kHz	4.12 kHz	5.76 kHz
4.3 kHz	6.07 kHz	4.56 kHz	6.38 kHz
4.7 kHz	6.62 kHz	4.98 kHz	6.96 kHz

Normal (–3 dB)	–6 dB	Noise	Impulse
5.1 kHz	7.16 kHz	5.38 kHz	7.53 kHz
5.6 kHz	7.87 kHz	5.92 kHz	8.27 kHz
6.2 kHz	8.74 kHz	6.57 kHz	9.18 kHz
6.8 kHz	9.58 kHz	7.20 kHz	10.1 kHz
7.5 kHz	10.5 kHz	7.92 kHz	11.1 kHz
8.2 kHz	11.5 kHz	8.66 kHz	12.1 kHz
9.1 kHz	12.8 kHz	9.64 kHz	13.5 kHz
10 kHz	14.1 kHz	10.6 kHz	14.8 kHz
11 kHz	15.4 kHz	11.6 kHz	16.2 kHz
12 kHz	16.9 kHz	12.7 kHz	17.8 kHz
13 kHz	18.3 kHz	13.7 kHz	19.2 kHz
15 kHz	21.2 kHz	15.9 kHz	22.3 kHz
16 kHz	22.4 kHz	16.8 kHz	23.5 kHz
18 kHz	25.2 kHz	19.0 kHz	26.5 kHz
20 kHz	28.4 kHz	21.3 kHz	29.8 kHz
22 kHz	31.2 kHz	23.4 kHz	32.8 kHz
24 kHz	33.8 kHz	25.4 kHz	35.6 kHz
27 kHz	38.1 kHz	28.7 kHz	40.1 kHz
30 kHz	42.1 kHz	31.7 kHz	44.3 kHz
33 kHz	46.8 kHz	35.2 kHz	49.2 kHz
36 kHz	50.1 kHz	37.7 kHz	52.7 kHz
39 kHz	54.8 kHz	41.2 kHz	57.6 kHz
43 kHz	61.1 kHz	46.0 kHz	64.3 kHz
47 kHz	66.2 kHz	49.8 kHz	69.6 kHz
51 kHz	72.3 kHz	54.3 kHz	76.0 kHz
56 kHz	79.5 kHz	59.8 kHz	83.6 kHz
62 kHz	86.3 kHz	64.9 kHz	90.8 kHz
68 kHz	96.5 kHz	72.6 kHz	101 kHz
75 kHz	106 kHz	79.7 kHz	111 kHz
82 kHz	114 kHz	86.0 kHz	120 kHz

Normal (–3 dB)	–6 dB	Noise	Impulse
91 kHz	129 kHz	97.3 kHz	136 kHz
100 kHz	140 kHz	105 kHz	147 kHz
110 kHz	154 kHz	116 kHz	162 kHz
120 kHz	169 kHz	127 kHz	178 kHz
130 kHz	182 kHz	137 kHz	192 kHz
150 kHz	210 kHz	158 kHz	221 kHz
160 kHz	223 kHz	168 kHz	235 kHz
180 kHz	253 kHz	190 kHz	266 kHz
200 kHz	280 kHz	211 kHz	295 kHz
220 kHz	308 kHz	232 kHz	324 kHz
240 kHz	336 kHz	253 kHz	353 kHz
270 kHz	380 kHz	286 kHz	400 kHz
300 kHz	420 kHz	316 kHz	441 kHz
330 kHz	467 kHz	352 kHz	491 kHz
360 kHz	506 kHz	380 kHz	532 kHz
390 kHz	550 kHz	414 kHz	578 kHz
430 kHz	599 kHz	451 kHz	629 kHz
470 kHz	660 kHz	497 kHz	693 kHz
510 kHz	715 kHz	538 kHz	750 kHz
560 kHz	786 kHz	592 kHz	826 kHz
620 kHz	867 kHz	653 kHz	912 kHz
680 kHz	952 kHz	717 kHz	1.00 MHz
750 kHz	1.05 MHz	791 kHz	1.10 MHz
820 kHz	1.14 MHz	859 kHz	1.19 MHz
910 kHz	1.27 MHz	960 kHz	1.34 MHz
1.0 MHz	1.40 MHz	1.06 MHz	1.47 MHz
1.1 MHz	1.53 MHz	1.15 MHz	1.61 MHz
1.2 MHz	1.66 MHz	1.26 MHz	1.75 MHz
1.3 MHz	1.80 MHz	1.36 MHz	1.89 MHz
1.5 MHz	2.06 MHz	1.56 MHz	2.17 MHz

Normal (–3 dB)	–6 dB	Noise	Impulse
1.6 MHz	2.19 MHz	1.66 MHz	2.29 MHz
1.8 MHz	2.51 MHz	1.91 MHz	2.63 MHz
2.0 MHz	2.75 MHz	2.10 MHz	2.88 MHz
2.2 MHz	3.00 MHz	2.30 MHz	3.14 MHz
2.4 MHz	3.30 MHz	2.54 MHz	3.45 MHz
2.7 MHz	3.63 MHz	2.81 MHz	3.78 MHz
3.0 MHz	4.09 MHz	3.18 MHz	4.22 MHz
4 MHz	5.30 MHz	4.23 MHz	5.30 MHz
5 MHz	5.78 MHz	4.81 MHz	5.41 MHz
6 MHz	6.31 MHz	5.50 MHz	5.82 MHz
8 MHz	8.07 MHz	7.21 MHz	6.90 MHz

Flattop

The table in the section “Flottop Filters” on page 926 lists all 134 Flattop filter types.

Flottop Filters

3.0 Hz	3.3 Hz	3.6 Hz	3.9 Hz
4.3 Hz	4.7 Hz	5.1 Hz	5.6 Hz
6.2 Hz	6.8 Hz	7.5 Hz	8.2 Hz
9.1 Hz	10 Hz	11 Hz	12 Hz
13 Hz	15 Hz	16 Hz	18 Hz
20 Hz	22 Hz	24 Hz	27 Hz
30 Hz	33 Hz	36 Hz	39 Hz
43 Hz	47 Hz	51 Hz	56 Hz
62 Hz	68 Hz	75 Hz	82 Hz
91 Hz	100 Hz	110 Hz	120 Hz
130 Hz	150 Hz	160 Hz	180 Hz
200 Hz	220 Hz	240 Hz	270 Hz
300 Hz	330 Hz	360 Hz	390 Hz
430 Hz	470 Hz	510 Hz	560 Hz
620 Hz	680 Hz	750 Hz	820 Hz

910 Hz	1.0 kHz	1.1 kHz	1.2 kHz
1.3 kHz	1.5 kHz	1.6 kHz	1.8 kHz
2.0 kHz	2.2 kHz	2.4 kHz	2.7 kHz
3.0 kHz	3.3 kHz	3.6 kHz	3.9 kHz
4.3 kHz	4.7 kHz	5.1 kHz	5.6 kHz
6.2 kHz	6.8 kHz	7.5 kHz	8.2 kHz
9.1 kHz	10 kHz	11 kHz	12 kHz
13 kHz	15 kHz	16 kHz	18 kHz
20 kHz	22 kHz	24 kHz	27 kHz
30 kHz	33 kHz	36 kHz	39 kHz
43 kHz	47 kHz	51 kHz	56 kHz
62 kHz	68 kHz	75 kHz	82 kHz
91 kHz	100 kHz	110 kHz	120 kHz
130 kHz	150 kHz	160 kHz	180 kHz
200 kHz	220 kHz	240 kHz	270 kHz
300 kHz	330 kHz	390 kHz	430 kHz
510 kHz	620 kHz	750 kHz	1.0 MHz
1.5 MHz	3.0 MHz	4 MHz	5 MHz
6 MHz	8 MHz		

Cont

See “Cont (Continuous Measurement/Sweep)” on page 991 in the section "Common Measurement Functions" for more information.

FREQ Channel

See “FREQ/Channel” on page 993 in the section "Common Measurement Functions" for more information.

Input/Output

See “Input/Output” on page 1003 in the section "Common Measurement Functions" for more information.

Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

See “Marker” on page 1063in the section "Common Measurement Functions" for more information

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

Select Marker

Displays 12 markers available for selection.

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

Marker Type

Sets the marker control mode to **Normal**, **Delta**, **Fixed** or **Off**. All interactions and dependencies detailed under the key description are enforced when the remote command is sent. If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area.

The default active function is the active function for the currently selected marker control mode. If the current control mode is Off, there is no active function and the active function is turned off.

Key Path	**Marker**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
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?

Notes	If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the **Marker Trace** rules. At the same time, **Marker X Axis Value** appears on the Active Function area. Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X axis value entered in the active function area displays the marker value to its full entered precision. You must be in the mode that Waveform measurement is included to use this command. Use INSTrument:SELect to set the mode.
Preset	=OFF
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal|Delta|Off
Instrument S/W Revision	Prior to A.02.00

Marker X Axis Value (Remote Command only)

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering an X value if the control mode is **Normal** or **Delta**.

Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB

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

Example	CALC:WAV:MARK:X 50 ms CALC:WAV:MARK:X?
Notes	If no suffix is sent, uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error “Invalid suffix” is generated. If the specified marker is Fixed and a Marker Function is on, error –221 “Settings conflict; cannot adjust Fixed marker while Marker Function is on” is generated. The query returns the marker's absolute X Axis value if the control mode is **Normal**, or the offset from the marker's reference marker if the control mode is **Delta**. The query is returned in the fundamental units for the current marker X Axis scale: Hz for **Frequency** and **Inverse Time**, seconds for **Period** and **Time**. If the marker is **Off** the response is not a number. You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	0

Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37
Instrument S/W Revision	Prior to A.02.00

Marker X Axis Position (Remote Command only)

Sets the marker X position in trace points. It has no effect if the control mode is **Off,** but is the SCPI equivalent of entering a value if the control mode is **Normal** or **Delta**. 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, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition <real>` `:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:X:POSition?`
Example	CALC:WAV:MARK:X:POS 500 CALC:WAV:MARK:X:POS?
Notes	The query returns the marker's absolute X Axis value in trace points if the control mode is **Normal** or the offset from the marker's reference marker in trace points if the control mode is **Delta**. The value is returned as a real number, not an integer, corresponding to the translation from X Axis Scale units to trace points. You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	0
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	–9.9E+37
Max	9.9E+37
Instrument S/W Revision	Prior to A.02.00

Marker Y Axis Value (Remote Command only)

Queries the marker Y Axis value in the current marker Y Axis unit.

Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:Y?`
Example	CALC:WAV:MARK11:Y?
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 a double array of two values, the first is X, and the second is Y. >:CALC:WAV:MARK1:Y? –3.006944493834E–003,+9.9870666467354E–004 You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	Result dependant on markers setup and signal source
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Properties

Accesses the marker properties menu.

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

Select Marker

Displays 12 markers available for selection.

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

Relative To

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

Key Path	**Marker, Properties**

Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence <integer>` `:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:REFerence?`
Example	CALC:WAV:MARK:REF 8 CALC:WAV:MARK:REF?
Notes	A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error –221: “Settings conflict; marker cannot be relative to itself.” When queried a single value is returned (the specified marker numbers relative marker). You must be in the 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
Instrument S/W Revision	Prior to A.02.00

Marker Trace

Assigns the specified marker to the designated trace.

Key Path	**Marker**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe RFENvelope|IQ` `:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:TRACe?`
Example	CALC:WAV:MARK:TRAC RFEN CALC:WAV:MARK:TRAC?
Notes	Assigns the specified marker to the designated trace. You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	RFEN
State Saved	Saved in instrument state.

Range	RF Envelope|IQ Waveform
Instrument S/W Revision	Prior to A.02.00

Couple Markers

Toggles the state of the markers to be coupled On or Off. When this function is true (On), moving any marker causes an equal X axis movement of every other marker which is not **Off**. "Equal X axis movement" refers to the difference between each marker's X Axis value (in the fundamental x-axis units of the trace that marker is on) and the X Axis value of the marker being moved (in the same fundamental x-axis units) are preserved.

Key Path	**Marker**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`:CALCulate:WAVeform:MARKer:COUPle[:STATe] ON|OFF|1|0` `:CALCulate:WAVeform:MARKer:COUPle[:STATe]?`
Example	CALC:WAV:MARK:COUP ON CALC:WAV:MARK:COUP ON
Notes	You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

All Markers Off

Turns off all markers.

Key Path	**Marker**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`:CALCulate:WAVeform:MARKer:AOFF`
Example	CALC:WAV:MARK:AOFF
Notes	You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Instrument S/W Revision	Prior to A.02.00

Marker Function

Accesses a menu of marker functions that perform post-processing operations on markers based on the measurement specifications. Marker functions are distinct from Measurement functions, which automatically perform complex sequences of setup, data acquisition, and display operations in order to measure specified signal characteristics. Marker Functions are specified for each individual marker and may be turned on individually for each marker.

The **Marker Function** menu controls which marker functions are turned on and allows you to adjust the setup parameters for each function. These parameters include the following, but only one parameter can be assigned to a given marker:

- **Marker Noise**
- **Band/Interval Power**
- **Band/Interval Density**
- **Marker Function Off**

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

Select Marker

Displays 12 markers available for selection.

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

Marker Function Type

Sets the marker control function type to, Marker Noise, Band/Interval Power, Band Interval Density, or Marker Function Off

Key Path	**Marker Function**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion BPOWer|BDENsity|OFF` `:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion?`
Example	`CALC:WAV:MARK:FUNC BPOW` CALC:WAV:MARK:FUNC?

Notes	You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	Band/Interval Power|Band Interval Density|Marker Function Off
Instrument S/W Revision	Prior to A.02.00

Band Adjust

Accesses a menu that enables you to set the frequency span width and the left and right edge, or time values, for the band or interval of the selected marker.

Key Path	**Marker Function**
Instrument S/W Revision	Prior to A.02.00

Band/Interval Span for Time Domain

Sets the width of the frequency span for the selected marker.

Key Path	**Marker Function**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:SPAN <time>` `:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:SPAN?`
Example	CALC:WAV:MARK:FUNC:BAND:SPAN 20 ms CALC:WAV:MARK:FUNC:BAND:SPAN?
Notes	You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Dependencies/Couplings	
	Changing the Band/Interval Span necessarily changes the Band/Interval Left and Band/Interval Right values
Preset	0
Preset	10% of Meas Time
State Saved	Saved in instrument state.
Min	0
Max	100s
Instrument S/W Revision	`Prior to A.02.00`

Band/Interval Left for Time Domain

Sets the left edge frequency or time value for the band of the selected marker.

Key Path	**Marker Function**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:LEFT <time>`
	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:LEFT?`
Example	CALC:WAV:MARK12:FUNC:BAND:LEFT 1 s
	CALC:WAV:MARK12:FUNC:BAND:LEFT?
Notes	You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Dependencies/Couplings	Changing the Band/Interval Left necessarily changes the Band/Interval Span and Band/Interval Right values
Preset	0
Preset	5% of Meas Time
State Saved	Saved in instrument state.
Min	0
Max	100s
Instrument S/W Revision	Prior to A.02.00

Band/Interval Right for Time Domain

Sets the right edge frequency or time value for the band of the selected marker.

Key Path	**Marker Function**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:RIGHt <time>`
	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:FUNCtion:BAND:RIGHt?`
Example	CALC:WAV:MARK12:FUNC:BAND:RIGH 1 s
	CALC:WAV:MARK12:FUNC:BAND:RIGH?
Notes	You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.

Dependencies/Couplings	Changing the Band/Interval Left necessarily changes the Band/Interval Span and Band/Interval Right values
Preset	0
Preset	5% of Meas Time
State Saved	Saved in instrument state.
Min	0
Max	100s
Instrument S/W Revision	Prior to A.02.00

Marker To

There is no ‘Marker To’ functionality supported in Waveform measurements. The front-panel key displays a blank menu key when pressed.

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

Meas

See “Meas” on page 1069 in the section "Common Measurement Functions" for more information.

Meas Setup

Displays the setup menu keys that enable you to control the parameters for the current measurement.

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

Average/Hold Number

Sets the number of sweeps (average counts) that are averaged. After the specified number of sweeps, the averaging mode (terminal control) setting determines the averaging action.

Key Path	**Meas Setup**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB

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

Example	WAV:AVER:COUN 1001 WAV:AVER:COUN? WAV:AVER ON WAV:AVER?
Notes	You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	10 OFF
State Saved	Saved in instrument state.
Min	1
Max	20001
Instrument S/W Revision	Prior to A.02.00

Avg Mode

Enables you to set the averaging mode.

When set to Exponential (Exp) the measurement averaging continues using the specified number of averages to compute each averaged value. The average is displayed at the end of each sweep.

When set to Repeat, the measurement resets the average counter each time the specified number of averages is reached.

Key Path	**Meas Setup**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`[:SENSe]:WAVeform:AVERage:TCONtrol EXPonential|REPeat` `[:SENSe]:WAVeform:AVERage:TCONtrol?`
Example	WAV:AVER:TCON REP WAV:AVER:TCON?
Notes	You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	EXPonential
State Saved	Saved in instrument state.
Range	Exp|Repeat
Instrument S/W Revision	Prior to A.02.00

Avg Type

Selects the type of averaging.

Key Path	**Meas Setup**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`[:SENSe]:WAVeform:AVERage:TYPE LOG|MAXimum|MINimum|RMS|SCALar` `[:SENSe]:WAVeform:AVERage:TYPE?`
Example	WAV:AVER:TYPE MAX WAV:AVER:TYPE?
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. You must be in the mode that includes Waveform measurement 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
Instrument S/W Revision	Prior to A.02.00

Meas Time

Sets how long the measurement is performed. X Scale only changes the representation of the display.

Key Path	**Meas Setup**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`[:SENSe]:WAVeform:SWEep:TIME <time>` `[:SENSe]:WAVeform:SWEep:TIME?`
Example	WAV:SWE:TIME 50 ms WAV:SWE:TIME?
Notes	Specifies and returns how long the measurement is performed. It is the time record length of the measurement waveform. The Max time may be reduced when the sample frequency is high due to the memory limitation. You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	2.000000 ms
State Saved	Saved in instrument state.
Range	1.000 µs to 100.00 s
Instrument S/W Revision	Prior to A.02.00

Meas Preset

Restores all the measurement parameters to their default values.

Key Path	**Meas Setup**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`:CONFigure:WAVeform`
Example	CONF:WAV
Notes	Restore default values of all parameters. You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Instrument S/W Revision	Prior to A.02.00

Advanced

Accesses a menu of “advanced” functions that are used for specific applications. These settings should not be changed for most measurements.

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

ADC Dither

Accesses the ADC Dither control menu.

Key Path	**Meas Setup, Advanced**
Instrument S/W Revision	Prior to A.02.00

ADC Dither Auto

Sets ADC dithering to automatically select whether dithering is needed.

Key Path	**Meas Setup, Advanced, ADC Dither**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
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?
Notes	The dither function improves linearity for low level signals, at the expense of a higher noise floor. This table is for SCPI definition purpose only. You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

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.

The reduced clipping-to-noise ratio results in higher noise, because the clipping level of the ADC relative to the front terminals remains unchanged with the introduction of dither. The enhanced linearity is mostly improved scale fidelity.

With dither on, the third-order distortions are usually invisible for mixer levels below –35 dBm. With dither off, these distortions can be visible, with typical power levels of –110 dBm referred to the mixer. Detection nonlinearity can reach 1 dB for dither off at mixer levels around –70 dBm and lower, while the specified nonlinearity is many times smaller with dither on.

Key Path	**Meas Setup, Advanced, ADC Dither**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`[:SENSe]:WAVeform:ADC:DITHer[:STATe] OFF|ON|0|1` `[:SENSe]:WAVeform:ADC:DITHer[:STATe]?`
Example	WAV:ADC:DITH ON WAV:ADC:DITH?
Notes	The dither function improves linearity for low level signals, at the expense of a higher noise floor. . You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	Auto|Man
Instrument S/W Revision	Prior to A.02.00

IF Gain

Sets the IF Gain function to Auto, Low Gain or High Gain. These settings affect sensitivity and IF overloads.

This only applies to the RF input. It does not apply to baseband I/Q input.

Key Path	**Meas Setup, Advanced**
Instrument S/W Revision	Prior to A.02.00

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.

Key Path	**Meas Setup, Advanced, IF Gain**

Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
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?
Notes	This only applies to the RF input. It does not apply to baseband I/Q input.
	You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

IF Gain State

Selects the range of IF gain.

Key Path	**Meas Setup, Advanced, IF Gain**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`[:SENSe]:WAVeform:IF:GAIN[:STATe] AUTOrange|LOW|HIGH`
	`[:SENSe]:WAVeform:IF:GAIN[:STATe]?`
Example	WAV:IF:GAIN HIGH
	WAV:IF:GAIN?
Notes	This only applies to the RF input and does not apply to baseband I/Q input.
	You must be in the mode that includes Waveform measurement 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)
Instrument S/W Revision	Prior to A.02.00

Mode

See “Mode” on page 1087 in the section "Common Measurement Functions" for more information.

Mode Setup

See “Mode Setup” on page 1101 in the section "Common Measurement Functions" for more information.

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.

Key Path	**Front-panel key**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum`
Example	`CALC:WAV:MARK2:MAX`
Notes	You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Instrument S/W Revision	Prior to A.02.00

Next Peak

Moves the selected marker to the next highest local maximum with a value less than the current marker's.

Key Path	**Peak Search**
Mode	BASIC
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MAXimum:NEXT`
Example	CALC:WAV:MARK:MAX:NEXT
Notes	You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Instrument S/W Revision	Prior to A.02.00

Min Search

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

Key Path	**Peak Search**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`:CALCulate:WAVeform:MARKer[1]|2|3|4|5|6|7|8|9|10|11|12:MINimum`
Example	CALC:WAV:MARK:MIN
Notes	You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Instrument S/W Revision	Prior to A.02.00

Recall

See “Recall” on page 1123 in the section "Common Measurement Functions" for more information.

Restart

See “Restart” on page 1145 in the section "Common Measurement Functions" for more information.

Save

See “Save” on page 1147 in the section "Common Measurement Functions" for more information.

Single

See “Single (Single Measurement/Sweep)” on page 1173 in the section "Common Measurement Functions" for more information.

Source

See “Source” on page 1175 in the section "Common Measurement Functions" for more information.

Span X Scale

Accesses a menu of functions that enable you to set the horizontal scale parameters.

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

Ref Value

Sets the reference value for time on the horizontal axis. When Auto Scaling is set to On, the displayed plots use a Scale/Div value determined by the analyzer, based on the measurement result.

Key Path	**SPAN X Scale**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:RLEVel <time>` `:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:RLEVel?`
Example	DISP:WAV:VIEW:WIND:TRAC:X:RLEV 10 ms DISP:WAV:VIEW:WIND:TRAC:X:RLEV?
Notes	You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Dependencies/Couplings	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.
Preset	0.00 s
State Saved	Saved in instrument state.
Min	–1.000 s
Max	10.00 s
Instrument S/W Revision	Prior to A.02.00

Scale/Div

Sets the horizontal scale by changing a time value per division.

Key Path	**SPAN X Scale**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB

Remote Command	`:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:PDIVision <time>` `:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:PDIVision?`
Example	DISP:WAV:VIEW:WIND:TRAC:X:PDIV 500 us DISP:WAV:VIEW:WIND:TRAC:X:PDIV?
Notes	You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Dependencies/Couplings	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.
Preset	200.0 us
State Saved	Saved in instrument state.
Min	1.000 ns
Max	1.000 s
Instrument S/W Revision	Prior to A.02.00

Ref Position

Sets the reference position for the X axis to Left, Center or Right.

Key Path	**SPAN X Scale**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT|CENTer|RIGHt` `:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:RPOSition?`
Example	DISP:WAV:VIEW:WIND:TRAC:X:RPOS LEFT DISP:WAV:VIEW:WIND:TRAC:X:RPOS?
Notes	Allows you to set the reference position to Left, Ctr (center) or Right. You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left|Ctr|Right
Instrument S/W Revision	Prior to A.02.00

Auto Scaling

Toggles the scale coupling function between On and Off.

Key Path	**SPAN X Scale**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:COUPle 0|1|OFF|ON` `:DISPlay:WAVeform:VIEW[1]|2:WINDow[1]:TRACe:X[:SCALe]:COUPle?`
Example	DISP:WAV:VIEW:WIND:TRAC:X:COUP ON DISP:WAV:VIEW:WIND:TRAC:X:COUP?
Notes	You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
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	1
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Sweep/Control

Accesses the Sweep menu that allows you to pause and restart the measurement.

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

Pause and Resume

Pauses a measurement after the current data acquisition is complete. When Paused, the label on the key changes to Resume. Pressing the Resume key resumes the measurement at the point it was at when paused.

See "Sweep / Control" on page 1179 in the section "Common Measurement Functions" for more information.

Key Path	**Sweep/Control**
Instrument S/W Revision	Prior to A.02.00

Trace/Detector

There is no ‘Trace/Detector’ functionality supported in the Waveform measurement. The front-panel key displays a blank menu key when pressed.

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

Trigger

Accesses a menu of functions that enable you to select and control the trigger source for the current measurement

See "Trigger" on page 1197 in the section "Common Measurement Functions" for information about all keys in this menu.

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

View/Display

Accesses a menu of functions that enable you to set up and control the display parameters for the current measurement.

This topic contains the following sections:

"View Selection by name (SCPI only)" on page 964

"View Selection by number (SCPI only)" on page 964

View Selection by name (SCPI only)

Selects the results view.

Key Path	**View/Display**
Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`:DISPlay:WAVeform:VIEW[:SELect] RFENvelope|IQ`
	`:DISPlay:WAVeform:VIEW[:SELect]?`
Example	DISP:WAV:VIEW RFEN
	DISP:WAV:VIEW?
Notes	You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.
Preset	RFENveloper
State Saved	Saved in instrument state.
Range	RF Envelope|IQ Waveform
Instrument S/W Revision	Prior to A.02.00

View Selection by number (SCPI only)

Displays the numeric values of the measurement results.

Mode	BASIC, PN, WCDMA, C2K, GSM, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB
Remote Command	`:DISPlay:WAVeform:VIEW:NSELect <integer>`
	`:DISPlay:WAVeform:VIEW:NSELect?`
Example	DISP:WAV:VIEW:NSEL 1
	DISP:WAV:VIEW:NSEL?
Notes	You must be in the mode that includes Waveform measurement to use this command. Use INSTrument:SELect to set the mode.

Preset	1
State Saved	Saved in instrument state.
Min	1
Max	2
Instrument S/W Revision	Prior to A.02.00

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

Display

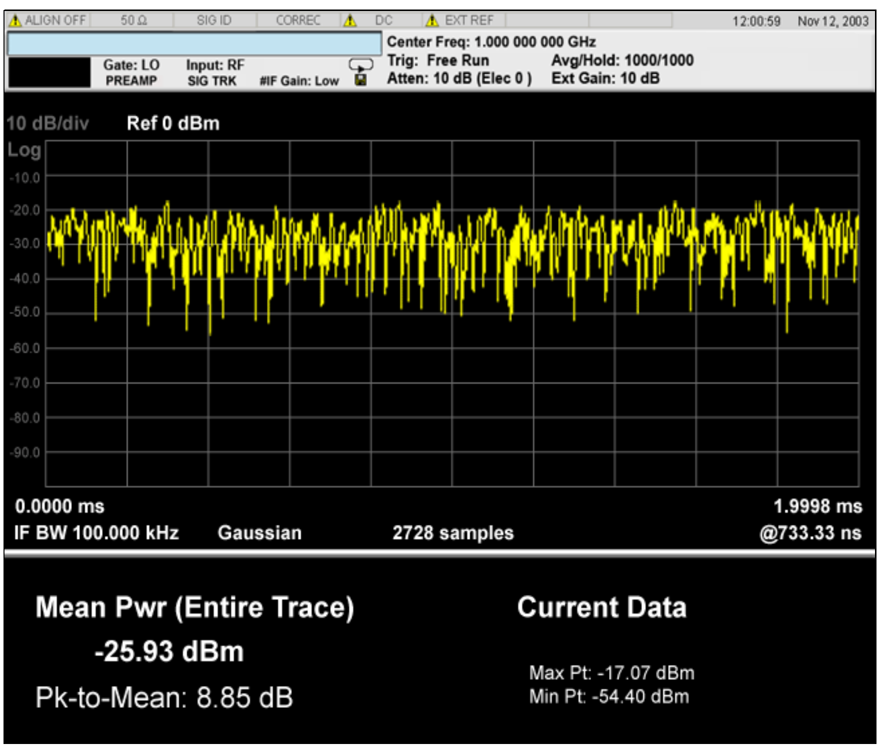
Accesses a menu of functions that enable you to set the display parameters.

See “Display” on page 1253 in the section "Common Measurement Functions” for more information.

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

RF Envelope

The view below shows an example of the RF Envelope result for the waveform (time domain) measurements in the graph window. The measured values for the mean power and peak-to-mean power are shown in the text window.



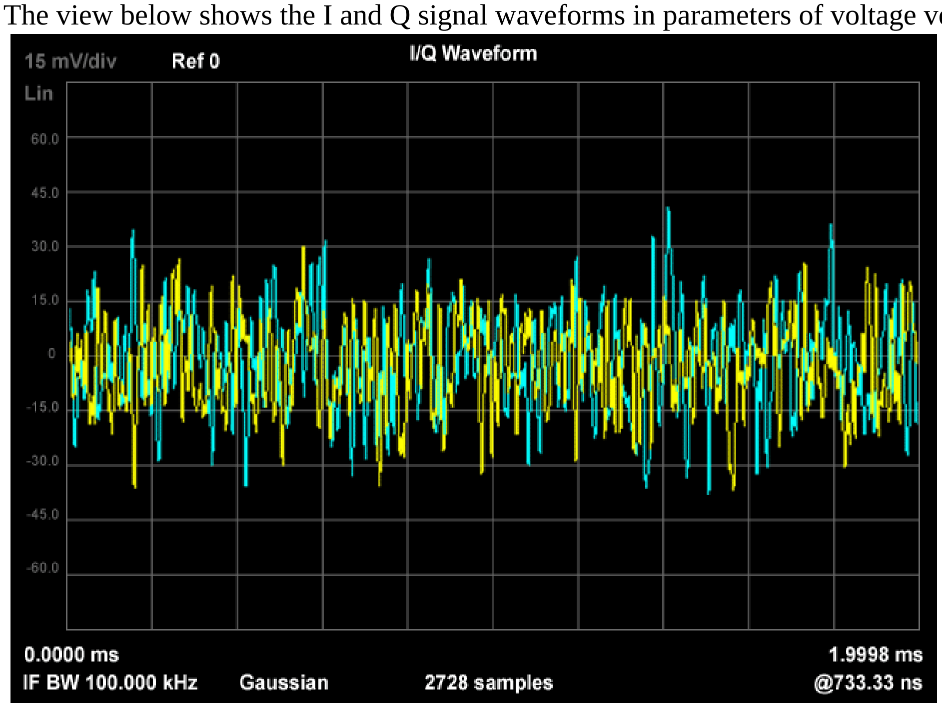
Numeric Results

Name	Type	Description	Unit	Format
Mean Pwr	Float64	The mean power (dBm). This is either the power across the entire trace, or the power between markers if the markers are enabled.	dBm	XX.XX dBm
Pk-to-Mean	Float64	This is the ratio of the maximum signal level to the mean power.	dB	XX.XX dB
Max Pt	Float64	The maximum of the most recently acquired data.	dBm	XX.XX dBm
Min Pt	Float64	The minimum of the most recently acquired data.	dBm	XX.XX dBm

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

I/Q Waveform

The view below shows the I and Q signal waveforms in parameters of voltage versus time.



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

17 Common Measurement Functions

The key and command descriptions in this section describe functions that operate the same in multiple measurements and/or modes. This section is a library of functions that is referenced by many measurements and modes

To find the exact description and parameters for functions in a specific measurement, always look in the measurement section of this documentation. Pressing the front-panel key or softkey and then pressing the green Help key also provides the correct information.

NOTE	If you want to print the documentation, be sure to select this section and the measurement of interest to ensure having all the information you need. See "Printing Acrobat Files" on page 103 for further instructions about printing.

Amplitude Y Scale (AMPTD Y Scale)

Some Amplitude features are common across multiple Modes and Measurements. These common features are described in this section. See the Measurement description for information on features that are specific to that measurement.

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

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

Attenuation

This menu controls both the electrical and mechanical attenuators and their interactions. All parameters in the Attenuation menus are Meas Global, meaning they are common to all the measurements and are unaffected by Meas Preset.

Dependencies/Couplings	In measurements which support the I/Q inputs, this key is unavailable when I/Q is the selected input, and is replaced by the Range key in that case.
Key Path	**AMPTD Y Scale**
Readback Line	Contains a summary in [ ] brackets of the total attenuation from the menu below, which 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.
Instrument S/W Revision	Prior to A.02.00

Mech Atten Auto/Man

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

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

Remote Command:	`[:SENSe]:POWer[:RF]:ATTenuation <rel_ampl>`
	`[:SENSe]:POWer[:RF]:ATTenuation?`
	`[:SENSe]:POWer[:RF]:ATTenuation:AUTO OFF|ON|0|1`
	`[:SENSe]:POWer[:RF]:ATTenuation:AUTO?`

Example:	POW:ATT 20 Sets the attenuator to manual mode, and sets the value to 20 dB.
Dependencies/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, below. When the Input Attenuator is in ‘auto’, it uses the following algorithm to determine a value: Atten = ReferenceLevel + PreAmpGain + ExternalGain – RefLevelOffset - MaxMixerLevel + IF Gain. Limit this value to be between 6 and 70 dB for MXA (or 60 dB for EXA). No value below 6 dB can ever be chosen by Auto. The resulting value should be rounded up to the largest value possible given the attenuation step setting. That is, 50.01 dB would change to 60 dB (for a 10 dB attenuation step). The “IF Gain” term in the equation above is either 0 dB or +10 dB, depending in a fairly complex fashion on the settings of FFT IF Gain, Swept IF Gain, max Ref Level and the Auto/Man setting of Mech Atten.
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:	EXA: 60 dB MXA: 70 dB
Key Path:	**AMPTD Y Scale, Attenuation**
Instrument S/W Revision:	Prior to A.02.00

Enable Elec Atten

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

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

Remote Command:	`[:SENSe]:POWer[:RF]:EATTenuation:STATe OFF|ON|0|1` `[:SENSe]:POWer[:RF]:EATTenuation:STATe?`
Example:	POW:EATT:STAT 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 Internal Preamp is on, meaning it is set to Low Band or Full, the electronic attenuator is unavailable. In this case the Enable Elec Atten key will be OFF and grayed out. If either of the above is true, if the SCPI command is sent, a generic error indicating that the electronic attenuator is unavailable will be sent. If the Electronic Attenuator is enabled, then the Stop Freq of the analyzer is limited to 3.6 GHz and the Internal Preamp is unavailable.
Preset:	OFF
State Saved:	Saved in instrument state.
Key Path:	**AMPTD Y Scale, Attenuation**
Instrument S/W Revision:	Prior to A.02.00

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

When the Electrical Attenuator is disabled:

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

Elec Atten

You can modify the electrical attenuation using this function

Remote Command:	`[:SENSe]:POWer[:RF]:EATTenuation <rel_ampl>` `[:SENSe]:POWer[:RF]:EATTenuation?`
Restriction and Notes:	Electrical Attenuation's spec is defined only when Mechanical Attenuation is 6 dB.
Dependencies/Couplings:	When Enable Elec Atten is off, Elec Atten key is grayed out.
Preset:	0 dB
State Saved:	Saved in instrument state.
Min:	0 dB
Max:	24 dB
Key Path:	**AMPTD Y Scale, Attenuation**
Instrument S/W Revision:	Prior to A.02.00

Adjust Atten for Min Clip

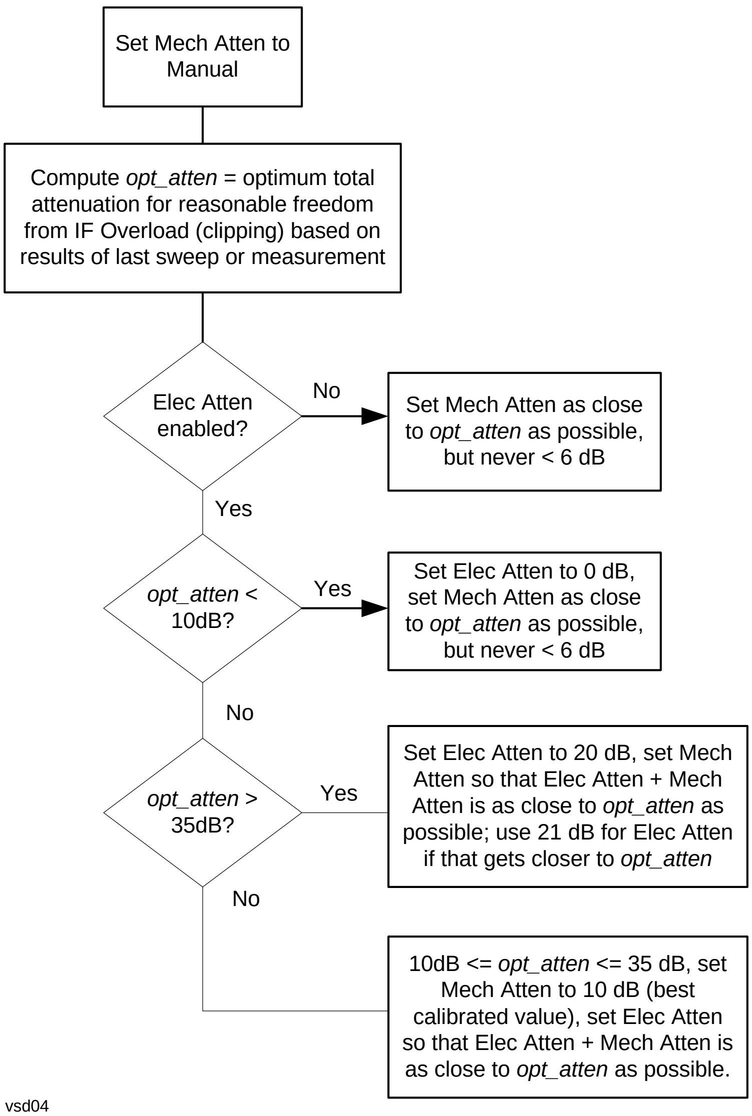
This function is similar to the "Optimize Ref Level" function in some measurements in the Agilent PSA and ESA analyzers. Its purpose is to set the combination of mechanical and electrical attenuation based on the current measured signal level so that clipping will be at a minimum.

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.

Remote Command:	`[:SENSe]:POWer[:RF]:RANGe:OPTimize IMMediate`
Key Path:	**AMPTD Y Scale, Attenuation**
Instrument S/W Revision:	Prior to A.02.00

The algorithm to be used is as follows:



Pre-Adjust for Min Clip

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

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

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 Y Scale, Attenuation**
Instrument S/W Revision:	Prior to A.02.00

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"
Instrument S/W Revision:	Prior to A.02.00

Off

Example:	:POW:RANGe:OPT:ATT OFF
Key Path:	**AMPTD Y Scale, Attenuation, Pre-Adjust for Min Clip**
Instrument S/W Revision:	Prior to A.02.00

Elec Atten Only

Example:	:POW:RANGe:OPT:ATT ELEC
Key Path:	**AMPTD Y Scale, Attenuation, Pre-Adjust for Min Clip**
Instrument S/W Revision:	Prior to A.02.00

Mech + Elec Atten

Example:	:POW:RANGe:OPT:ATT COMB
Key Path:	**AMPTD Y Scale, Attenuation, Pre-Adjust for Min Clip**
Instrument S/W Revision:	Prior to A.02.00

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] 10 dB | 2 dB` `[:SENSe]:POWer[:RF]:ATTenuation:STEP[:INCRement]?`
Example:	POW:ATT:STEP 2
Dependencies/Couplings:	Blanked in EXA if option FSA (2 dB steps) is not present. Attempts to set it via SCPI will yield the "Option not present" error. When the attenuation step size changes, the current mechanical attenuation value is adjusted (if necessary) to be quantized to the new step size. That is, if step is set to 10 dB, mech atten is increased if necessary so it is a multiple of 10 dB
Remote Command Notes:	Note this feature works like a 1-N choice from the front panel, but it takes a specific value (in dB) when used remotely. The only valid values are 2 and 10.
Preset:	MXA: 2 dB EXA: 10 dB (2 dB with option FSA)
State Saved:	Saved in State
Key Path:	**AMPTD Y Scale, Attenuation**
Instrument S/W Revision:	Prior to A.02.00

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 Y Scale, Attenuation**
Default Unit:	Depends on the current selected Y axis unit, see Swept SA discussion of Y Axis Unit
Instrument S/W Revision:	Prior to A.02.00

Range

This key is only available when I/Q is the selected input. It replaces the Attenuation key in that case.

Each input channel (I and Q) has four internal gain ranges. The maximum allowed voltage in each gain range is slightly more than the nominal value, so the break point between ranges is a couple millivolts higher that the nominal (setting a peak voltage of 0.502 mV will still map to the 0.5 V Peak range).

Gain Setting	Volts RMS	Volts Peak	Volts Peak - Peak	dBm (50Ω)	Break Point
0 dB	0.7071	1.0	2.0	10	n/a
6 dB	0.3536	0.5	1.0	4	0.502 V Peak
12 dB	0.1768	0.25	0.5	–2	0.252 V Peak
18 dB	0.0884	0.125	0.25	–8	0.127 V Peak

Restriction and Notes	Visible only when the selected input is I/Q.
Key Path	**AMPTD Y Scale**
State Saved	No
Readback Text	When Range is Auto, "[Auto]"
	When Range is Man and I & Q are the same, "[<range value>]"
	When Range is Man and I & Q are different:
	"[I: <I range value>
	Q: <Q range value>]"
	See I Range and Q Range for the <range value> enumeration definition.
Instrument S/W Revision	Prior to A.02.00

Range Auto/Man

The Auto setting for Range will cause the range to be set based on the Y Scale settings. When Range is “Auto”, the I & Q Range are set based on the top of the Y Scale when the Y scale is in dB units (for example, power), or to the max(abs(top), abs(bottom)) when the Y scale reference is not at top of screen.

Not all measurements support Range Auto/Man. If Auto is not supported in the current measurement, this key is grayed out and shows “Man” and MAN is returned to a SCPI query; but this does NOT change the Meas Global Auto/Man for Range, so when you go to a measurement that supports Auto, it goes back to Auto if it was previously in Auto.

Remote Command	`[:SENSe]:VOLTage:IQ:RANGe:AUTO OFF|ON|0|1`
	`[:SENSe]:VOLTage:IQ:RANGe:AUTO?`

Dependencies/Couplings	When in Auto, both I Range and Q Range are set to the same value, computed as follows: Maximum absolute value is computed for the Y Scale. The top and bottom of the graph are computed based on Ref Value, Scale/Div, and Ref Position. Formula: YMax = max(abs(top), abs(bottom)). The I Range and Q Range are then set to YMax. If Auto is not supported, sending the SCPI command will generate an error.
Example	Put the I Range and Q Range in manual. VOLT:IQ:RANG:AUTO OFF
Key Path	**AMPTD Y Scale, Range**
Preset	ON
State Saved	Saved in instrument state.
Range	Auto | Man
Instrument S/W Revision	Prior to A.02.00

This is an alternate form of the SCPI command to match the POWer form of the I Range and Q Range SCPI.

Remote Command:	`[:SENSe]:POWer:IQ:RANGe:AUTO OFF|ON|0|1` `[:SENSe]:POWer:IQ:RANGe:AUTO?`
Preset:	ON
Range:	Auto | Man
Remote Command Notes:	The POW:IQ:RANG:AUTO is an alternate form of the VOLT:IQ:RANG:AUTO command. This is to maintain consistency with I Range and Q Range, which support both the POWer and VOLTage forms of the command.
Example:	Put the I Range and Q Range in manual. POW:IQ:RANG:AUTO OFF
Instrument S/W Revision:	Prior to A.02.00

I Range

This is the internal gain range for the I channel when Input Path is I Only or Ind I/Q, and it is used for both the I and Q channels when Input Path is I+jQ. See “I/Q Gain Ranges” on page 981.

Remote Command	`[:SENSe]:VOLTage:IQ[:I]:RANGe[:UPPer] <voltage>` `[:SENSe]:VOLTage:IQ[:I]:RANGe[:UPPer]?`
Dependencies/Couplings	When Q Same as I is On, the I Range value will be copied to the Q Range. Changing the value will also set Range = Man.

Remote Command Notes	The numeric entries are mapped to the smallest gain range whose break point is greater than or equal to the value, or 1 V Peak if the value is greater than 1 V.
Example	Set the I Range to 0.5 V Peak VOLT:IQ:RANG 0.5 V
Key Path	**AMPTD Y Scale, Range**
Preset	1 V Peak
State Saved	Saved in instrument state.
Range	1 V Peak | 0.5 V Peak | 0.25 V Peak | 0.125 V Peak
Instrument S/W Revision	Prior to A.02.00

This is an alternate form of the SCPI command to allow entry as a power.

Remote Command:	`[:SENSe]:POWer:IQ[:I]:RANGe[:UPPer] <ampl>` `[:SENSe]:POWer:IQ[:I]:RANGe[:UPPer]?`
Preset:	10.0 dBm
Range:	–20 dBm to 10 dBm
Min:	–20 dBm
Max:	10 dBm
Remote Command Notes:	The POWer form of the command is provided for convenience. It maps to the same underlying gain range parameter as the VOLTage form of the command. The Reference Z (not the I channel Input Z) is used to convert the power to peak voltage, which is then used to set the I Range as with the VOLTage form of the command. The power values of the 4 range states (1V Peak, 0.5V Peak, 0.25V Peak, and 0.125V Peak) will vary with Reference Z. Here are some examples: 50Ω: 10, 4, –2, –8 75Ω: 8.2, 2.2, –3.8, –9.8 600Ω: –0.8, –6.8, –12.8, –18.9
Example:	Set the I Range to 0.5 V Peak when Reference Z is 50Ω, and to 1.0 V Peak when Reference Z is 75Ω. POW:IQ:RANG 4 dBm
Instrument S/W Revision:	Prior to A.02.00

Q Range

Bring up the Q Range menu.

Key Path	**AMPTD Y Scale, Range**
Readback Text	Q Same as I | 1 V Peak | 0.5 V Peak | 0.25 V Peak | 0.125 V Peak When Q Same as I is On, the readback is "Q Same as I", otherwise it is the Q Range value.
Instrument S/W Revision	Prior to A.02.00

Q Same as I

Many, but not all, usages require the I and Q channels have an identical setup. To simplify channel setup, the Q Same as I will cause the Q channel range to be mirrored from the I channel. That way you only need to set up one channel (the I channel). The I channel values are copied to the Q channel, so at the time Q Same as I is "Off" the I and Q channel setups will be identical.

Remote Command	`[:SENSe]:VOLTage|POWer:IQ:MIRRored OFF|ON|0|1` `[:SENSe]:VOLTage|POWer:IQ:MIRRored?`
Dependencies/Couplings	When On, the I Range value is mirrored (copied) to the Q Range.
Example	Turn off the mirroring of I Range to Q Range. VOLT:IQ:MIRR OFF POW:IQ:MIRR OFF
Key Path	**AMPTD Y Scale, Range, Q Range**
Preset	On
State Saved	Saved in instrument state.
Range	On | Off
Readback Text	"Q Same as I" when On, otherwise none.
Instrument S/W Revision	Prior to A.02.00

Q Range Value

This is the internal gain range for the Q channel. See "I/Q Gain Ranges" on page 981. The Q Range only applies to Input Path Q Only and Ind I/Q. For input I+jQ the I Range determines both I and Q channel range settings.

Remote Command	`[:SENSe]:VOLTage:IQ:Q:RANGE[:UPPer] <voltage>` `[:SENSe]:VOLTage:IQ:Q:RANGE[:UPPer]?`
Dependencies/Couplings	When Q Same as I is On, the I Range value will be copied to the Q Range and the range value keys are disabled. Changing the value will also set Range = Man.

Remote Command Notes	The numeric entries are mapped to the smallest gain range whose break point is greater than or equal to the value, or 1 V Peak if the value is greater than 1 V. The Q Range is only used for Input Path Q Only and Ind I/Q. For input I+jQ the I Range determines both I and Q channel range settings.
Example	Set the Q Range to 0.5 V Peak VOLT:IQ:Q:RANG 0.5 V
Key Path	**AMPTD Y Scale, Range**
Preset	1 V Peak
State Saved	Saved in instrument state.
Range	1 V Peak | 0.5 V Peak | 0.25 V Peak | 0.125 V Peak
Instrument S/W Revision	Prior to A.02.00

This is an alternate form of the SCPI command to allow entry as a power.

Remote Command:	`[:SENSe]:POWer:IQ:Q:RANGe[:UPPer] <ampl>` `[:SENSe]:POWer:IQ:Q:RANGe[:UPPer]?`
Preset:	10.0 dBm
Range:	–20 dBm to 10 dBm
Min:	–20 dBm
Max:	10 dBm
Remote Command Notes:	The POWer form of the command is provided for convenience. It maps to the same underlying gain range parameter as the VOLTage form of the command. The Reference Z (not the Q channel Input Z) is used to convert the power to peak voltage, which is then used to set the Q Range as with the VOLTage form of the command. The power values of the 4 range states (1V Peak, 0.5V Peak, 0.25V Peak, and 0.125V Peak) will vary with Reference Z. Here are some examples: 50Ω: 10, 4, –2, –8 75Ω: 8.2, 2.2, –3.8, –9.8 600Ω: –0.8, –6.8, –12.8, –18.9
Example:	Will set the Q Range to 0.5 V Peak when Reference Z is 50Ω, and to 1.0 V Peak when Reference Z is 75Ω. POW:IQ:Q:RANG 4 dBm
Instrument S/W Revision:	Prior to A.02.00

I/Q Gain Ranges

1 V Peak

Set the channel gain state to 1 Volt Peak.

Key Path	**AMPTD Y Scale, I Range | Q Range**
Instrument S/W Revision	Prior to A.02.00

0.5 V Peak

Set the channel gain state to 1 Volt Peak.

Key Path	**AMPTD Y Scale, I Range | Q Range**
Instrument S/W Revision	Prior to A.02.00

0.25 V Peak

Set the channel gain state to 1 Volt Peak.

Key Path	**AMPTD Y Scale, I Range | Q Range**
Instrument S/W Revision	Prior to A.02.00

0.125 V Peak

Set the channel gain state to 1 Volt Peak.

Key Path	**AMPTD Y Scale, I Range | Q Range**
Instrument S/W Revision	Prior to A.02.00

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, and 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.

The value displayed on the **Presel Adjust** key will change to reflect the new preselector tuning (see **Presel Adjust**, below).

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

If the selected marker is off, the analyzer will turn on a marker, perform a peak search, and adjust the preselector using the selected marker’s frequency. It uses the "highest peak" peak search method unqualified by threshold or excursion, so that there is no chance of a ‘no peak found’ error. It continues with that peak, even if it is the peak of just noise. Therefore, for this operation to work properly, there should be a signal on screen in a preselected range for the peak search to find.

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 about 3.6 GHz, therefore if the marker is on a signal below 3.6 GHz, no centering will be attempted and an advisory message generated

When centering the preselector, *OPC will not return true until the process is complete and a subsequent measurement has completed, nor will results be returned to a READ or MEASure command. Note further that if the analyzer 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:	Note that the rules outlined above under the key description apply for the remote command as well as the key. Hence, the result of the command is dependent on marker position, etc. Any message shown by the key press is also shown in response to the remote command.
Key Path:	**AMPTD Y Scale**
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.
Instrument S/W Revision:	Prior to A.02.00

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 (see **Presel Center**, above), that is, the same gray-out rules apply.

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 these instruments, it generates an error.
Preset:	0 MHz
State Saved:	The **Presel Adjust** value set by **Presel Center**, or by manually adjusting **Presel Adjust**, is not saved in Instrument State, and does not survive Preset or power cycle.
Min:	–500 MHz
Max:	500 MHz
Key Path:	**AMPTD Y Scale**
Default Unit:	Hz
Instrument S/W Revision:	Prior to A.02.00

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 Preselector Selection - PSA had multiple preselectors, and you could select which preselector to center. Since MXA will have only one preselector, the preselector selection key will no longer be available. However, in order to provide backward compatibility, we will support the remote command. The command form is a NOP The query will return MWAVe
Instrument S/W Revision:	Prior to A.02.00

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. The preamp is not available when the electronic attenuator is enabled.
Preset:	OFF
State Saved:	Saved in state
Key Path:	**AMPTD Y Scale**
Instrument S/W Revision:	Prior to A.02.00

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. If a POW:GAIN:BAND FULL command is sent when a low band preamp is available, the preamp band parameter is to LOW instead of FULL, and an "Option not installed" message is generated.
Preset:	LOW
State Saved:	Saved in state
Key Path:	**AMPTD Y Scale, Internal Preamp**
Instrument S/W Revision:	Prior to A.02.00

Off

Turns the internal preamp off

Example:	:POW:GAIN OFF
Key Path:	**AMPTD Y Scale, Internal Preamp**
Readback:	Off
Instrument S/W Revision:	Prior to A.02.00

Low Band

Sets the internal preamp to use only the low band (0–3.6 GHz)

Example:	:POW:GAIN ON
	:POW:GAIN:BAND LOW
Key Path:	**AMPTD Y Scale, Internal Preamp**
Readback:	Low Band
Instrument S/W Revision:	Prior to A.02.00

Full Range

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

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

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

Example:	:POW:GAIN ON
	:POW:GAIN:BAND FULL
Key Path:	**AMPTD Y Scale, Internal Preamp**
Readback:	Full Range
Instrument S/W Revision:	Prior to A.02.00

AUTO COUPLE

The Auto Couple feature provides a quick and convenient way to automatically couple multiple instrument settings. This helps ensure accurate measurements and optimum dynamic range. When the Auto Couple feature is activated, either from the front panel or remotely, all parameters of the current measurement which have an Auto/Manual mode are set to Auto mode and all measurement settings dependent on (or coupled to) the Auto/Man parameters are automatically adjusted for optimal performance.

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

Remote Command:	`:COUPle ALL|NONE`
Example:	:COUP ALL
Remote Command Notes:	:COUPle ALL puts all Auto/Man parameters in Auto mode (equivalent to pressing the **Auto Couple** key). :COUPLE NONE puts all Auto/Man parameters in manual mode. It decouples all the coupled instrument parameters and is not recommended for making measurements.
Key Path:	**Front-panel key**
Instrument S/W Revision:	Prior to A.02.00

BW

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

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

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

Cont (Continuous Measurement/Sweep)

Cont Sets the analyzer for Continuous measurement operation. The single/continuous state is Meas Global so the setting will affect all measurements. If you are Paused, pressing Cont does a Resume.

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**
Instrument S/W Revision:	Prior to A.02.00

In Swept SA Measurement (Spectrum Analysis Mode):

The analyzer takes repetitive sweeps, averages, measurements, etc. when in Continuous mode. When the average count reaches the **Average/Hold Number** the count stops incrementing but the analyzer keeps sweeping. See the Trace/Detector section for the averaging formula used both before and after the **Average/Hold Number** is reached. The trigger condition must be met prior to each sweep. The type of trace processing for multiple sweeps, is set under the Trace/Detector key, with choices of **Trace Average**, **Max Hold**, or **Min Hold**.

In Other Measurements/Modes:

With **Avg Number** (in **Meas Setup** menu) set to **Off** or set to **On** with a value of 1, a sweep is taken after the trigger condition is met; and the analyzer continues to take new sweeps after the current sweep has completed and the trigger condition is again met. However, with **Avg Number** set to On with a value >1, multiple sweeps (data acquisitions) are taken for the measurement. The trigger condition must be met prior to each sweep. The sweep is not stopped when the average count k equals the number N set for Avg Number is reached, but the number k stops incrementing. A measurement average usually applies to all traces, marker results, and numeric results. But sometimes it only applies to the numeric results.

If the analyzer is in Single measurement, pressing the **Continuous** key does not change k and does not cause the sweep to be reset; the only action is to put the analyzer into Continuous measurement operation.

If it 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.

FREQ/Channel

Accesses a menu of softkeys that allow you to control the Frequency parameters of the instrument.

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

ARFCN

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

Remote Command	`[:SENSe]:CHANnel:ARFCn|RFCHannel <integer>` `[:SENSe]:CHANnel:ARFCn|RFCHannel?`
Example	CHAN:ARFC 3 CHAN:ARFC?
Dependencies/Couplings	1. When I/Q Input is selected, this key is not available (blank). Coupled with "Center Frequency" on page 994. Setting ARFCN sets Center Freq to the value corresponding to that ARFCN. 1. BMT Freq choice changes this parameter.
Key Path	**FREQ Channel**
Mode	GSM
Scope	Meas Global
Notes	1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. 2. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	1
State Saved	Saved in instrument state.

Range	Different for each BAND as follows:
	E-GSM: 0 to 124, and 975 to 1023
	P-GSM: 1 to 124
	R-GSM: 0 to 124(MS), and 955 to 1023(BTS)
	DCS1800: 512 to 885
	PCS1900: 512 to 810
	GSM450: 259 to 293
	GSM480: 306 to 340
	GSM700: 438 to 516
	GSM850: 128 to 251
Instrument S/W Revision	Prior to A.02.00

Center Frequency

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

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

The **Center Frequency** setting is the same for all measurements within a **Mode**. Some modes are also able to share a global **Center Frequency** value; if this is the case, the **Mode** will have a **Global Settings** key in its **Mode Setup** menu.

If your analyzer has multiple inputs, the Center Freq function sets (and queries) the Center Frequency for the currently selected input. If you select another input, the Center Freq changes to the value for that input. SCPI commands are available to directly set the Center Freq for a specific input.

See "RF Center Freq" on page 996

See "I/Q Center Freq" on page 997

See "Center Frequency Presets" on page 996

Remote Command	`[:SENSe]:FREQuency:CENTer <freq>`
	`[:SENSe]:FREQuency:CENTer?`
Default Unit	Hz

Dependencies/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 The Center Frequency can be limited by Start or Stop Freq limits, if the Span is so large that Start or Stop hit their limit.
Example	FREQ:CENT 50 MHz FREQ:CENT UP changes the center frequency to 150 MHz if you use FREQ:CENT:STEP 100 MHz to set the center frequency step size to 100 MHz `FREQ:CENT?`
Key Path	**FREQ Channel**
Mode	BASIC, GSM, WIMAXOFDMA, WCDMA
Scope	Meas Global
Notes	This command sets either the RF or I/Q Center Frequency depending on the selected input. For RF input it is equivalent to FREQ:RF:CENT For I/Q input it is equivalent to FREQ:IQ:CENT Preset and Max values are dependant on Hardware Options (503, 508, 513, 526)
Preset	Depends on instrument maximum frequency, mode, measurement, and selected input. See REF T_CF_CFPresets \h * MERGEFORMAT - and REF T_RFCF_MoreInformation \h * MERGEFORMAT - and REF T_IQCF_MoreInformation \h * MERGEFORMAT -
State Saved	Saved in State
Min	Depends on instrument maximum frequency, mode, measurement, and selected input. See REF T_CF_CFPresets \h * MERGEFORMAT - and REF T_RFCF_MoreInformation \h * MERGEFORMAT - and REF T_IQCF_MoreInformation \h * MERGEFORMAT -
Max	Depends on instrument maximum frequency, mode, measurement, and selected input. See REF T_CF_CFPresets \h * MERGEFORMAT - and REF T_RFCF_MoreInformation \h * MERGEFORMAT - and REF T_IQCF_MoreInformation \h * MERGEFORMAT -
Status Bits/OPC Dependencies	non-overlapped
Instrument S/W Revision	Prior to A.02.00

Center Frequency Presets

The following table provides the Center Frequency Presets for the various modes.

Freq Option	CF after Mode Preset	Stop Freq after Mode Preset	Max Freq (can't tune above)
503	1.805 GHz	3.6 GHz	3.7 GHz
507	3.505 GHz	7.0 GHz	7.1 GHz
508	4.205 GHz	8.4 GHz	8.5 GHz
513	6.805 GHz	13.6 GHz	13.8 GHz
526	13.255 GHz	26.5 GHz	27.0 GHz

RF Center Freq

SCPI command for specifying the RF Center Frequency. This will always access the RF value, even when the selected input is not RF. The front panel always uses the Freq Center (Selected Input).

Remote Command	`[:SENSe]:FREQuency:RF:CENTer <freq>` `[:SENSe]:FREQuency:RF:CENTer?`
Dependencies/Couplings	If the electrical attenuator is enabled, any attempt to set Center Frequency such that the Stop Frequency would be >3.6 GHz results in an advisory message. If the equivalent SCPI command is sent, this same message is generated as part of a “–221, Settings conflict” warning.
Example	FREQ:RF:CENT 30 MHz
Mode	All
Scope	Meas Global
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Preset	See table above
State Saved	Saved in instrument state.
Min	–79.999995 MHz
Max	See table above. Basically instrument maximum frequency – 10 Hz minimum span. If the knob or step keys are being used, depends on the value of the other three interdependent parameters
Instrument S/W Revision	Prior to A.02.00

I/Q Center Freq

SCPI command for specifying the I/Q Center Frequency. This will always access the I/Q value, even when the selected input is not I/Q. The front panel always uses the Freq Center (Selected Input).

Remote Command	`[:SENSe]:FREQuency:IQ:CENTer <freq>` `[:SENSe]:FREQuency:IQ:CENTer?`
Example	FREQ:IQ:CENT 30 MHz
Mode	BASIC, GSM, WIMAX OFDMA, WCDMA
Scope	Meas Global
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Preset	0 Hz
State Saved	Saved in instrument state.
Min	–39.999995 MHz
Max	39.999995 MHz
Instrument S/W Revision	Prior to A.02.00

BMT Freq

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

Dependencies/Coupling	When I/Q Input is selected, this key is not available (blank). BMT choice changes ARFCN and Center Freq. Chosen ARFCN will be displayed on each menu key.
Key Path	**FREQ Channel**
Mode	GSM
Scope	Meas Global
Notes	This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this.
Range	Top|Middle|Bottom
Instrument S/W Revision	Prior to A.02.00

BMT Freq Top

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

Remote Command	`[:SENSe]:CHANnel:ARFCn|RFCHannel:TOP`
Example	CHAN:ARFC:TOP
Dependencies/Couplings	When I/Q Input is selected, this key is not displayed. Change [:SENSe]:CHANnel:ARFCn|RFCHannel as follows: E-GSM: 124 P-GSM: 124 R-GSM: 124 DCS1800: 885 PCS1900: 810 GSM450: 293 GSM480: 340 GSM700: 516 GSM850: 251 Change B M T ARFCN to BMTFreqTOP. Change [:SENSe]:FREQuency:CENTer as follows: E-GSM: 959.800 MHz P-GSM: 959.800 MHz R-GSM: 959.800 MHz DCS1800: 1879.80 MHz PCS1900: 1989.80 MHz GSM450: 467.400 MHz GSM480: 495.800 MHz GSM700: 762.800 MHz GSM850: 893.800 MHz
Key Path	**FREQ Channel, BMT Freq**
Mode	GSM
Scope	Meas Global
Notes	1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. 2. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.

State Saved	No
Instrument S/W Revision	Prior to A.02.00

BMT Freq Middle

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

Remote Command	`[:SENSe]:CHANnel:ARFCn|RFCHannel:MIDDle`
Example	CHAN:ARFC:MIDD
Dependencies/Couplings	When I/Q Input is selected, this key is not displayed. Change [:SENSe]:CHANnel:ARFCn|RFCHannel as follows: E-GSM: 38 P-GSM: 63 R-GSM: 28 DSC1800: 699 PCS1900: 661 GSM450: 276 GSM480: 323 GSM700: 477 GSM850: 190 Change B M T ARFCN to BMTFreqMIDDLE. Change [:SENSe]:FREQuency:CENTer as follows: E-GSM: 942.600 MHz P-GSM: 947.600 MHz R-GSM: 940.600 MHz DCS1800: 1842.60 MHz PCS1900: 1960.00 MHz GSM450: 464.000 MHz GSM480: 492.400 MHz GSM700: 755.000 MHz GSM850: 881.600 MHz
Key Path	**FREQ Channel, BMT Freq**
Mode	GSM
Scope	Meas Global

Notes	1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. 2. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
State Saved	No
Instrument S/W Revision	Prior to A.02.00

BMT Freq Bottom

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

Remote Command	`[:SENSe]:CHANnel:ARFCn|RFCHannel:BOTTom`
Example	CHAN:ARFC:BOTT
Dependencies/Couplings	When I/Q Input is selected, this key is not displayed. Change [:SENSe]:CHANnel:ARFCn|RFCHannel as follows: E-GSM: 975 P-GSM: 1 R-GSM: 955 DCS1800: 512 PCS1900: 512 GSM450: 259 GSM480: 306 GSM700: 438 GSM850: 128 Change B M T ARFCN to BMTFreqBOTTOM. Change [:SENSe]:FREQuency:CENTer as follows: E-GSM: 925.200 MHz P-GSM: 935.200 MHz R-GSM: 921.200 MHz DCS1800: 1805.20 MHz PCS1900: 1930.20 MHz GSM450: 460.600 MHz GSM480: 489.000 MHz GSM700: 747.2 MHz GSM850: 869.2 MHz
Key Path	**FREQ Channel, BMT Freq**

Mode	GSM
Scope	Meas Global
Notes	1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. 2. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Timeslot

This functionality is the same as that of the corresponding key in the Demod menu. See "Time Slot" on page 1108 for details.

Burst Type

This functionality is the same as that of the corresponding key in the Demod menu. See "Burst Type" on page 1109 for details.

TSC (Std)

This functionality is the same as that of the corresponding key in the Demod menu. See "TSC (Std)" on page 1111 for details.

Input/Output

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

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

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

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

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

Remote Command:	`[:SENSe]:FEED RF|AIQ|IQ|IONLy|QONLy|AREFerence` `[:SENSe]:FEED?`
Remote Command Notes:	The parameter EXTMixer is for future use and is not supported at this time; sending it generates an error.
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
Key Path:	**Front-panel key**
Instrument S/W Revision:	Prior to A.02.00

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**
Readback:	The current input impedance settings are Readback to this key i.e. "XX, ZZ" where XX is AC or DC and ZZ is 50 or 75
Instrument S/W Revision:	Prior to A.02.00

Input Z Correction

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

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

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 ohms on a "Restore Input/Output Defaults" or "Restore System Defaults->All" Some instruments/options may have 75 ohms available.
State Saved:	Saved in State
Key Path:	**Input/Output, RF Input**
Readback:	50 or 75. Current setting reads back to the RF key.
Instrument S/W Revision:	Prior to A.02.00

RF Coupling

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

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

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

When operating in DC coupled mode, ensure protection of the analyzer input circuitry 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

X-Series Option	AC Frequency Range	N9010A DC Frequency Range	N9020A DC Frequency Range
Option 503	10 MHz to 3.6 GHz	9 kHz to 3.6 GHz	3 Hz to 3.6 GHz
Option 507	10 MHz to 7.0 GHz	9 kHz to 7.0 GHz	
Option 508	10 MHz to 8.4 GHz		3 Hz to 8.4 GHz
Option 513	10 MHz to 13.6 GHz	9 kHz to 13.6 GHz	3 Hz to 13.6 GHz
Option 526	10 MHz to 26.5 GHz	9 kHz to 26.5 GHz	3 Hz to 26.5 GHz

Remote Command:	`:INPut:COUPling AC|DC`
	`:INPut:COUPling?`
Example:	INP:COUP DC
Preset:	AC
State Saved:	Saved in State
Key Path:	**Input/Output, RF Input**
Instrument S/W Revision:	Prior to A.02.00

I/Q

This feature is not available unless the Baseband I/Q option (BBA) is installed.

Selects the front panel I/Q input ports to be the analyzer signal input. If I/Q is already selected, pressing this key accesses the I/Q setup menu.

Restriction and Notes	Not all measurements support the use of the I/Q signal input. When I/Q is selected in a measurement that does not support it, the "Meas invalid with I/Q inputs" error condition occurs.

Remote Command Notes	The parameters IQ|IONLy|QONLy are only supported for backwards compatibility The E44406 SCPI has the following that corresponds to FEED:IQ:TYPE for MXA. [:SENSe]:FEED IQ|IONLy|QONLy [:SENSe]:FEED? [:SENSe]:FEED IQ will set the I/Q path to IQ [:SENSe]:FEED IONLy will set the I/Q path to I Only [:SENSe]:FEED QONLy will set the I/Q path to QOnly Note [:SENSe]:FEED? will not be backward compatible. The query [:SENSe]:FEED? will always returns AIQ whatever the type of legacy parameters IQ|IONLy|QONLy has been used.
Example	FEED AIQ
Key Path	**Input/Output**
Mode	BASIC, CDMA2K, EDGEGSM, TDSCDMA, VSA89601, WIMAXOFDMA
Instrument S/W Revision	Prior to A.02.00

The Baseband I/Q functionality is a hardware option. It is option BBA. If the option is not installed, none of the I/Q functionality is enabled.

The Baseband I/Q has four input ports and one output port. The input ports are I, I-bar, Q, and Q-bar. The I and I-bar together compose the I channel and the Q and Q-bar together compose the Q channel. Each channel has two modes of operation, Single-Ended (also called "unbalanced") and Differential Input (also called "balanced"). When in Single-Ended operation, only the main port (I or Q) is used and the complementary port (I-bar or Q-bar) is ignored. When in Differential Input mode, both main and complementary ports are used.

The input settings (range, attenuation, skew, impedance, external gain) apply to the channels, not the individual ports.

The system supports a variety of 1 MΩ input passive probes as well as the Agilent 113x Series active differential probes using the Infinimax probe interface.

The Agilent 113x Series active probes can be used for both single ended and differential measurements. In either case a single connection is made for each channel (on either the I or Q input). The input is automatically configured to 50 Ω single ended and the probe power is supplied through the Infinimax interface. The probe can be configured for a variety of input coupling and low frequency rejection modes. In addition, a wide range of offset voltages and probe attenuation accessories are supported at the probe interface. The active probe has the advantage that it does not significantly load the circuit under test, even with unity gain probing.

With passive 1 MΩ probes, the probe will introduce a capacitive load on the circuit, unless higher attenuation is used at the probe interface. Higher attenuation reduces the signal level and degrades the signal-to-noise-ratio of the measurement. Passive probes are available with a variety of attenuation values for a moderate cost. Most Agilent passive probes can be automatically identified by the system, setting the input impedance setting required as well as the nominal attenuation. For single ended measurements a single probe is used for each channel. Other passive probes can by used, with the attenuation and impedance settings configured manually.

For full differential measurements, the system supports probes on each of the four inputs. The attenuation of the probes should be the same for good common mode rejection and channel match.

Both active and passive probes in single ended and differential configurations can be calibrated. This calibration uses the Cal Out BNC connection and a probe connection accessory. The calibration achieves excellent absolute gain flatness in a probed measurement. It matches both the gain and frequency response of the I and Q channels as well as any delay skew, resulting in high accuracy in derived measurements such as Error Vector Magnitude (EVM).

When a probe is connected a status message will be displayed. The message will indicate if calibration data is available or not. Calibration data is saved for each type of probe (including "none") for each port and will be reapplied whenever that type of probe is re-connected to the same port. For probes with EEPROM identification, the calibration data will be stored based on the unique probe identifier and will reapply data for that particular probe if it is available. The data will not follow a probe from one port to another. For probes without EEPROM identification, the instrument cannot distinguish between different probes of the same type and it will use the data from the last calibration for that probe type on that port.

When in differential mode, both the main and complementary probes are expected to be of the same type.

In some situations, the I and Q channels should be configured identically. In other situations it is convenient to control them independently. Some menus have a "Q Same as I" setting that will cause the Q channel configuration to mirror the I channel configuration, avoiding the overhead of double data entry when the channels should be the same.

The output port is for calibrating the I/Q input ports, although it can also be manually controlled.

There are two types of calibrations available: cable calibration and probe calibration. The cable calibration will guide you through connecting each input port in turn. All ports must be calibrated together. The probe calibration is done for a specific channel (I or Q). If in Single-Ended mode, only the main port is calibrated. When in Differential Input mode, you are guided through calibrating both main and complementary ports.

The front panel I/Q port LEDs indicate the current state of that port. On (green) indicates it is active, and off (dark) indicates it is not in use. For example, the Cal Out port LED is on if and only if there is signal coming out of that port.

The input is a context and some parameters have separate values for each context. The SCPI for these parameters has an optional "[:RF|IQ]" node. If the specific context is omitted, the command acts on the current input context's value. Here are the parameters that are input context sensitive:

- Center Frequency
- Trigger Source

It is important to distinguish between the I and Q input ports and the displayed I and Q data values. The I and Q input ports feed into a digital receiver that does digital tuning and filtering. The I and Q data seen by you (either on the display or through SCPI) corresponds to the real ("I") and the imaginary ("Q") output from the digital receiver. When the input path is I+jQ or I Only and the center frequency is 0 Hz the I input ends up in as the real output from the receiver and appears as "I" data. Likewise, when the input path is I+jQ and the center frequency is 0 Hz, the Q input ends up as the imaginary output from the receiver and appears as "Q" data. However, when the input path is Q Only, the Q input is sent to the receiver as Q+j0, so the receiver output has the Q input coming out on the real output, and so in Q Only, the signal from the Q input port appears as the "I" data. Another situation where the I and Q data do not necessarily correspond directly to the I and Q inputs is when the center frequency is non-zero. The digital processing involved in the tuning is a complex operation. This will result in I Only data appearing as both "I" and "Q" data, the same as that signal would appear if seen through the RF input port.

I/Q Path

Selects which I/Q input channels are active. The LED next to each I/Q input port will be on when that port is active.

The analysis bandwidth for each channel is the same as that of the instrument. So, for example, the base N9020A has a bandwidth of 10 MHz. With I/Q input the I and Q channels would each have an analysis bandwidth of 10 MHz, giving 20 MHz of bandwidth when the I/Q Path is I+jQ. With option B25, the available bandwidth becomes 25 MHz, giving 25 MHz each to I and Q and 50 MHz to I+jQ. With option S40, the available bandwidth becomes 40 MHz, giving 40 MHz each to I and Q, that is 80 MHz to I+jQ.

I/Q voltage to power conversion processing is dependent on the I/Q Path selected.

- With I+jQ input we know that the input signal may not be symmetrical about 0 Hz, because it has a complex component. Therefore, above 0 Hz only the positive frequency information is displayed, and below 0 Hz only the negative frequency information is displayed.
- With all other Input Path selections, the input signal has no complex component and therefore is always symmetrical about 0 Hz. In this case, by convention, the power conversion shows the combined voltage for both the positive and negative frequencies. The information displayed below 0 Hz is the mirror of the information displayed above 0 Hz. This results in a power reading 6.02 dB higher (for both) than would be seen with only the positive frequency voltage. Note also that, in this case the real signal may have complex modulation embedded in it, but that must be recovered by further signal processing.

Remote Command	`[:SENSe]:FEED:IQ:TYPE IQ|IONLy|QONLy`
	`[:SENSe]:FEED:IQ:TYPE?`
Example	Set the input to be both the I and Q channels, combined as I + j * Q.
	FEED:IQ:TYPE IQ
Key Path	**Input/Output, I/Q**
Preset	IQ
State Saved	Yes
	This is unaffected by Preset but is set to the default value on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
Range	I+jQ | I Only | Q Only
Readback Text	I+jQ | I Only | Q Only
Instrument S/W Revision	Prior to A.02.00

Remote Command:	`:INPut[1]:IQ:TYPE IQ|I|Q`
	`:INPut[1]:IQ:TYPE?`
Preset:	IQ
Instrument S/W Revision:	Prior to A.02.00

I+jQ

Sets the signal input to be both the I and Q channels. The I and Q channel data will be combined as I + j * Q.

Example	Set the input to be both the I and Q channels, combined as I + j * Q.
	FEED:IQ:TYPE IQ
Key Path	**Input/Output, I/Q, I/Q Path**
Instrument S/W Revision	Prior to A.02.00

I Only

Sets the signal input to be only the I channel. The Q channel will be ignored. The data collected is still complex. When the center frequency is 0 the imaginary part will always be zero, but for any other center frequency both the real and imaginary parts will be significant.

Example	Set the input to be only the I channel.
	FEED:IQ:TYPE IONL
Key Path	**Input/Output, I/Q, I/Q Path**
Instrument S/W Revision	Prior to A.02.00

Q Only

Sets the signal input to be only the Q channel. The I channel will be ignored. The Q channel will be sent to the digital receiver block as Q+j0. The receiver's output is still complex. When the center frequency is 0 the imaginary part will always be zero, but for any other center frequency both the real and imaginary parts will be significant. Note that since the receiver's real output is displayed as the "I" data, when the center frequency is 0, the Q Only input appears as the "I" data.

Example	Set the input to be only the Q channel.
	FEED:IQ:TYPE QONL
Key Path	**Input/Output, I/Q, I/Q Path**
Instrument S/W Revision	Prior to A.02.00

I Setup

Accesses the channel setup parameters for the I channel.

Key Path	**Input/Output, I/Q**
Instrument S/W Revision	Prior to A.02.00

I Differential Input

Selects differential input on or off for the I channel. For differential input (also called balanced input), the analyzer uses both main and complementary ports. When differential input is off (also called single-ended or unbalanced input), the analyzer uses only the main port.

Remote Command	`:INPut:IQ[:I]:DIFFerential OFF|ON|0|1` `:INPut:IQ[:I]:DIFFerential?`
Dependencies/Couplings	Some active probes include built-in differential capability. When one of these probes is sensed, this key is disabled. Since the differential capability is handled in the probe, the Analyzer will use only the main port and the key will show that the Analyzer's Differential Input mode is Off (indicating that the complementary port not in use). When Q Same as I is On, the value set for I will also be copied to Q.
Restriction and Notes	When Differential Input = On, the analyzer will check for attenuation mismatches between the I and I-bar ports. If the difference in attenuation values exceeds 0.5 dB an error condition will be set.
Example	Put the I channel in Differential Input mode INP:IQ:DIFF ON
Key Path	**Input/Output, I/Q, I Setup**
Preset	Off
State Saved	Yes This is unaffected by Preset but is set to the default value on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
Range	Off | On
Instrument S/W Revision	Prior to A.02.00

Remote Command:	`:INPut[1]:IQ:BALanced[:STATe] OFF|ON|0|1` `:INPut[1]:IQ:BALanced[:STATe]?`
Preset:	OFF
Remote Command Notes:	This backwards compatibility SCPI command was for an instrument without independent settings for the I and Q channels. Therefore, it is tied only to the I channel and does not provide an equivalent for the Q channel. For proper operation of the backwards compatibility command Q Same as I should be set to On.

Instrument S/W Revision:	Prior to A.02.00

I Input Z

Selects the input impedance for the I channel. The impedance applies to both the I and I-bar ports.

The input impedance controls the hardware signal path impedance match. It is not used for converting voltage to power. The voltage to power conversion always uses the Reference Z parameter. The Reference Z parameter applies to both I and Q channels.

Remote Command	`:INPut[1]:IQ[:I]:IMPedance LOW|HIGH` `:INPut[1]:IQ[:I]:IMPedance?`
Dependencies/Couplings	Input impedance is a built-in characteristic of a probe. Therefore, whenever a probe is sensed, this key is disabled and the value is set to match the probe. When no probe is sensed on Q and Q Same as I is On, the value set for I will also be copied to Q.
Remote Command Notes	LOW = 50 Ω, HIGH = 1 MΩ
Example	Set the I channel input impedance to 1 MΩ INP:IQ:IMP HIGH
Key Path	**Input/Output, I/Q, I Setup**
Preset	LOW
State Saved	Yes This is unaffected by Preset but is set to the default value on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
Range	50 Ω | 1 MΩ
Instrument S/W Revision	Prior to A.02.00

I Skew

This command sets the skew factor for the I channel. The skew will shift the channel's data in time. Use this to compensate for differences in the electrical lengths of the input paths due to cabling.

Remote Command	`[:SENSe]:CORRection:IQ[:I]:SKEW <seconds>` `[:SENSe]:CORRection:IQ[:I]:SKEW?`
Example	Delay the data for the I channel by 10 ns. CORR:IQ:SKEW 10 ns
Key Path	**Input/Output, I/Q, I Setup**
Preset	0

State Saved	Yes
	This is unaffected by Preset but is set to the default value on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
Range	0 s to 100 ns
Instrument S/W Revision	Prior to A.02.00

I Probe

Acceses the probe setup parameters for the I channel. See "I/Q Probe Setup" on page 1016.

Key Path	**Input/Output, I/Q, I Setup**
State Saved	No
Readback Text	[<I port probe id>]
	This is reporting the type of probe sensed on the I port. There is no parameter for overriding what is sensed.
Instrument S/W Revision	Prior to A.02.00

Combined Differential/Input Z

This is SCPI only (no front panel) and is for backwards compatibility only. It combines the Differential Input and Input Z selections into a single SCPI command.

Remote Command:	`:INPut:IMPedance:IQ U50|B50|U1M|B1M`
	`:INPut:IMPedance:IQ?`
Preset:	U50
Remote Command Notes:	The enum values translate as follows:
	U50: Differential Input = Off, Input Z = 50Ω
	B50: Differential Input = On, Input Z = 50Ω
	U1M: Differential Input = Off, Input Z = 1 MΩ
	B1M: Differential Input = On, Input Z = 1 MΩ
	This command is for backwards compatibility. It combines the Input Z (50Ω or 1 MΩ) parameter with the Differential Input (Off = "Unbalanced", On = "Balanced") parameter into a single enumeration.
	This backwards compatibility SCPI command was for an instrument without independent settings for the I and Q channels. Therefore, it is tied only to the I channel and does not provide an equivalent for the Q channel. For proper operation of the backwards compatibility command Q Same as I should be set to On.
	Also, note the subtle difference between this SCPI command and the backwards compatibility command for Input Z. The Input Z SCPI has "IQ" before "IMP" while this command has that order reversed.

Dependencies/Couplings:	This command does not have an independent parameter, but instead is tied to the Differential Input and Input Z parameters. The coupling for those parameters apply to this command too.
Example:	:INPut:IMPedance:IQ U50 This is equivalent to the following two SCPI commands: :INP:IQ:DIFF OFF :INP:IQ:IMP 50
Instrument S/W Revision:	Prior to A.02.00

Q Setup

Accesses the channel setup parameters for the Q channel.

Key Path	**Input/Output, I/Q**
Readback Text	When Q Same as I is On the readback is "Q Same as I".
Instrument S/W Revision	Prior to A.02.00

Q Same as I

Many, but not all, usages require the I and Q channels have an identical setup. To simplify channel setup, the Q Same as I will cause the Q channel parameters to be mirrored from the I channel. That way you only need to set up one channel (the I channel). The I channel values are copied to the Q channel, so at the time Q Same as I is turned off the I and Q channel setups will be identical. This does not apply to Probe settings or to parameters that determined by the probe.

Remote Command	`:INPut:IQ:MIRRored OFF|ON|0|1` `:INPut:IQ:MIRRored?`
Dependencies/Couplings	Only displayed for the Q channel. When Yes, the I channel values for some parameters are mirrored (copied) to the Q channel. However, when a parameter is determined by the type of probe and a probe is sensed, the probe setting is always used and the I channel setting is ignored. The following parameters are mirrored: Differential Input (when not determined by probe) Input Z (when not determined by probe)
Example	Turn off the mirroring of parameters from I to Q. INP:IQ:MIRR OFF
Key Path	**Input/Output, I/Q, Q Setup**
Preset	This is unaffected by Preset but is set to the default value (Q Same as I set to "On") on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
State Saved	Saved in instrument state.

Range	On | Off
Readback Text	"Q Same as I" when On, otherwise none.
Instrument S/W Revision	Prior to A.02.00

Q Differential Input

Selects differential input on or off for the Q channel. For differential input (also called balanced input), the analyzer uses both the Q and Q-bar ports. When differential input is off (also called single-ended or unbalanced input), the analyzer uses only the Q port.

Remote Command	`:INPut:IQ:Q:DIFFerential OFF|ON|0|1` `:INPut:IQ:Q:DIFFerential?`
Dependencies/Couplings	Some active probes include built-in differential capability. When one of these probes is sensed, this key is disabled. Since the differential capability is handled in the probe, the Analyzer will use only the main port and the key will show that the Analyzer's Differential Input mode is Off (indicating that the complementary port not in use). When a differential probe is not sensed and Q Same as I is On, the value set for I will be copied to Q. This key is disabled when Q Same as I is On.
Restriction and Notes	When Differential Input = On, the analyzer will check for attenuation mismatches between the Q and Q-bar ports. If the difference in attenuation values exceeds 0.5 dB an error condition will be set.
Example	Put the Q channel in Differential Input mode INP:IQ:Q:DIFF ON
Key Path	**Input/Output, I/Q, Q Setup**
Preset	Off
State Saved	On This is unaffected by Preset but is set to the default value on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
Range	Off | On
Instrument S/W Revision	Prior to A.02.00

Q Input Z

Selects the input impedance for the Q channel. The impedance applies to both the Q and Q-bar ports.

The input impedance controls the hardware signal path impedance match. It is not used for converting voltage to power. The voltage to power conversion always uses the Reference Z parameter. The Reference Z parameter applies to both I and Q channels.

Remote Command	`:INPut[1]:IQ:Q:IMPedance LOW|HIGH` `:INPut[1]:IQ:Q:IMPedance?`

Dependencies/Couplings	Input impedance is a built-in characteristic of a probe. Therefore, whenever a probe is sensed, this key is disabled and the value is set to match the probe. When no probe is sensed and Q Same as I is On, the value set for I will also be copied to Q. This key is disabled when Q Same as I is On.
Remote Command Notes	LOW = 50 Ω, HIGH = 1 MΩ
Example	Set the Q channel input impedance to 1 MΩ INP:IQ:Q:IMP HIGH
Key Path	**Input/Output, I/Q, Q Setup**
Preset	LOW
State Saved	On This is unaffected by Preset but is set to the default value on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
Range	50 Ω | 1 MΩ
Instrument S/W Revision	Prior to A.02.00

Q Skew

This command sets the skew factor for the Q channel. The skew will shift the channel's data in time. Use this to compensate for differences in the electrical lengths of the input paths due to cabling and probes.

Remote Command	`[:SENSe]:CORRection:IQ:Q:SKEW <seconds>` `[:SENSe]:CORRection:IQ:Q:SKEW?`
Example	Delay the data for the Q channel by 10 ns. CORR:IQ:Q:SKEW 10 ns
Key Path	**Input/Output, I/Q, Q Setup**
Preset	0
State Saved	Yes This is unaffected by Preset but is set to the default value on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
Range	0 s to 100 ns
Instrument S/W Revision	Prior to A.02.00

Q Probe

Accesses the probe setup parameters for the Q channel. See "I/Q Probe Setup" on page 1016.

Key Path	**Input/Output, I/Q, Q Setup**
State Saved	No

Readback Text	[<Q port probe id>] This is reporting the type of probe sensed on the Q port. There is no parameter for overriding what is sensed.
Instrument S/W Revision	Prior to A.02.00

I/Q Probe Setup

The set of I/Q probe setup parameters change based on the type of probe that is sensed. All probe types have the Attenuation parameter, and all probe types can be calibrated. The remaining parameters are only available for some probe types and will not be shown when not available. The probe type is determined by and reported for only for the I and Q ports, never the I-bar or Q-bar ports. The menu title will be "<ch>: <probe id>", where "<ch>" is either "I" or "Q" and "<probe id>" is the type of probe. For example, for the I Probe setup with an Agilent 1130A probe connected to the I port, the title will be "I: 1130A".

Probe calibration data is stored for each probe type for each channel. When no probe is sensed, the probe type "Unknown" is used, and this is also is treated like a probe type with its own calibration data. When a probe is changed, the calibration data for that probe type for that port is restored. An advisory message will be displayed showing the new probe type and the calibration status. The calibration data is stored permanently (survives power cycle) and is not affected by Preset or any of the Restore commands. When the probe has EEPROM identification (most newer Agilent probes have this), the calibration data is stored by probe serial number and port, so if you have two probes of the same type, the correct calibration data will be used for each. For probes that do not have EEPROM identification, the calibration data is stored by probe type and port and the instrument cannot distinguish between different probes of the same type. In all cases (with or without EEPROM identification), the calibration data is port specific, so it will not follow a specific probe from port to port if the probe is moved.

The "Unknown" probe type is used whenever no probe is sensed. When no calibration data exists for "Unknown" the latest cable calibration data is used (see "I/Q Guided Calibration" on page 1048).

Attenuation

The attenuation is part of the calibration data stored with the probe type and is initially the value that was returned by the last calibration. You are able to modify this value and any changes will be stored with the calibration data and will survive power cycles and presets. When a probe calibration is performed the attenuation value will be overwritten by the calibration.

Remote Command	`[:SENSe]:CORRection:IQ:I|Q:ATTenuation:RATio <real>` `[:SENSe]:CORRection:IQ:I|Q:ATTenuation:RATio?`
Restriction and Notes	Each probe type has its own attenuation setting. As probes are changed the attenuation value will reflect the new probe's setting. Changing the attenuation affects only the current probe type's setting and leaves all others unchanged.
Example	Set the attenuation for the current I probe to 100.00:1. CORR:IQ:I:ATT:RAT 100
Key Path	**Input/Output, I/Q, I Setup | Q Setup, I Probe | Q Probe**
Preset	Each probe type has its own default. The default for the "Unknown" probe type is 1:1.

State Saved	Saved with probe calibration data. It survives power cycle and is not affected by Preset or Restore.
Range	0.001 to 10000
Instrument S/W Revision	Prior to A.02.00

This is an alternate form of the SCPI that allows input as a power instead of a ratio.

Remote Command:	`[:SENSe]:CORRection:IQ:I|Q:ATTenuation <rel_ampl>` `[:SENSe]:CORRection:IQ:I|Q:ATTenuation?`
Range:	–60 dB to +80 dB
Example:	Set the attenuation for the current I probe type to 100.00:1. CORR:IQ:I:ATT 20 dB
Instrument S/W Revision:	Prior to A.02.00

Offset

Some active probes have DC offset capability. When one of these probes is connected this control will be visible. The signal is will be adjusted for the DC offset before entering the analyzer's port. This allows for removal of a DC offset before hitting the analyzer's input port voltage limits. For example, a signal that varies 1 V peak-to-peak with a DC offset equal to the analyzer's max input voltage would exceed the input limits of the analyzer for half its cycle. Removing the DC offset allows the analyzer to correctly process the entire signal.

Remote Command	`:INPut:OFFSet:I|Q <voltage>` `:INPut:OFFSet:I|Q?`
Restriction and Notes	Only some probe types support Offset. For those that do, each probe type has its own Offset setting. As probes are changed the Offset value will reflect the new probe's setting. Changing the Offset affects only the current probe type's setting and leaves all others unchanged.
Example	Remove a DC offset of –0.5 V from the I channel input. INP:OFFS:I –0.5
Key Path	**Input/Output, I/Q, I Setup | Q Setup, I Probe | Q Probe**
Preset	0 V
State Saved	Saved with probe calibration data. It survives power cycle and is not affected by Preset or Restore.
Range	–18 V to +18 V
Instrument S/W Revision	Prior to A.02.00

Coupling

Some probe types allow coupling to reject low frequencies. This will filter out the DC component of a signal that is composed of a DC bias plus some AC signal. This control is visible only for probe types that have this capability.

Remote Command	`:INPut:COUPling:I|Q DC|LFR1|LFR2` `:INPut:COUPling:I|Q?`
Restriction and Notes	Only some probe types support Coupling. For those that do, each probe type has its own Coupling setting. As probes are changed the Coupling value will reflect the new probe's setting. Changing the Coupling affects only the current probe type's setting and leaves all others unchanged.
Example	Set the probe to low frequency rejection below 1.7 Hz. INP:COUP:I LFR1
Key Path	**Input/Output, I/Q, I Setup | Q Setup, I Probe | Q Probe**
Preset	DC
State Saved	Saved with probe calibration data. It survives power cycle and is not affected by Preset or Restore.
Range	DC | AC 1.7 Hz LFR1 | AC 0.14 Hz LFR2
Readback Text	DC | LFR1 | LFR2
Instrument S/W Revision	Prior to A.02.00

DC

Turns off low frequency rejection, allowing signals down to DC.

Example	Turn off low frequency rejection on the I channel INP:COUP:I DC
Key Path	**Input/Output, I/Q, I Setup | Q Setup, I Probe | Q Probe, Coupling**
Instrument S/W Revision	Prior to A.02.00

LFR1

Turns on low frequency rejection, rejecting signal component lower than 1.7 Hz.

Example	Turn on low frequency rejection on the I channel for frequencies lower than 1.7 Hz INP:COUP:I LFR1
Key Path	**Input/Output, I/Q, I Setup | Q Setup, I Probe | Q Probe, Coupling**
Instrument S/W Revision	Prior to A.02.00

LFR2

Turns on low frequency rejection, rejecting signal component lower than 0.14 Hz.

Example	Turn on low frequency rejection on the I channel for frequencies lower than 0.14 Hz INP:COUP:I LFR2
Key Path	**Input/Output, I/Q, I Setup | Q Setup, I Probe | Q Probe, Coupling**
Instrument S/W Revision	Prior to A.02.00

Calibrate

Starts the guided probe calibration. The guided probe calibration is context sensitive and depends on the channel (I or Q) and the Differential Input state. The calibration is only performed on the selected channel. When Differential Input is on, both the probe attached to the main port and the probe attached to the complementary port are calibrated. When Differential Input is off, only the probe attached to the main port is calibrated. See "I/Q Guided Calibration" on page 1048.

Key Path	**Input/Output, I/Q, I Setup | Q Setup, I Probe | Q Probe, Coupling**
Readback Text	The last calibration date, or if no calibration exists, "(empty)". Last: <cal date> <cal time> Example: Last: 8/22/2007 1:02:49 PM
Instrument S/W Revision	Prior to A.02.00

Clear Calibration

Clears the calibration data for the current port and probe. It does not clear the data for other probe types or other ports. If the sensed probe has EEPROM identification, only the data for that specific probe is cleared. After this command has completed, the probe calibration state will be the same as if no probe calibration had ever been performed for the specified channel and probe; the probe attenuation will be the default value for that probe type and the Cable Calibration frequency response corrections will be used. This command is dependent on the Differential Input state. When Differential Input is on, both the data for the probe attached to the main port and the data for the probe attached to the complementary port are cleared. When Differential Input is off, only data for the probe attached to the main port is cleared.

Remote Command	`:CALibration:IQ:PROBe:I|Q:CLEar`
Example	Clear the calibration data for the I channel and the current probe (with EEPROM identification) or probe type (without EEPROM identification). :CAL:IQ:PROBe:I:CLE
Key Path	**Input/Output, I/Q, I Setup | Q Setup, I Probe | Q Probe**

Instrument S/W Revision	Prior to A.02.00

Reference Z

Sets the value of the impedance to be used in converting voltage to power for the I and Q channels. This does not change the hardware's path impedance (see “I Input Z” on page 1011).

Remote Command	`:INPut:IMPedance:REFerence <integer>`
	`:INPut:IMPedance:REFerence?`
Example	Set the I/Q reference impedance to 50 Ω
	INP:IMP:REF 50
Key Path	**Input/Output, I/Q**
Preset	50 Ω
State Saved	Yes
	This is unaffected by Preset but is set to the default value on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
Range	1 Ω to 1 MΩ
Instrument S/W Revision	Prior to A.02.00

RF Calibrator

Lets you choose a calibrator signal to look at or turns the calibrator "off" (meaning switches back to the selected input). When one of the calibrator signals is selected, the analyzer routes that signal (an internal amplitude reference) to the analyzer, while leaving the main input selection menu (RF or I/Q) unchanged.

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 switches back to the selected input – RF, ExtMix 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 keys or with the [:SENSe]:FEED command. The 4.8 GHz internal reference is only available in some models, and only with options 507, 508, 513, and 526.
Preset:	OFF
State Saved:	Saved in State
Key Path:	**Input/Output**
Readback:	Off, 50 MHz, 4.8 GHz or Comb
Instrument S/W Revision:	Prior to A.02.00

50 MHz

Selects the 50 MHz internal reference as the input signal.

Key Path	**Input/Output, RF Calibrator**
Readback	50 MHz
Instrument S/W Revision	Prior to A.02.00

4.8 GHz

Selects the 4.8 GHz internal reference as the input signal.

Dependencies/Couplings:	This key is blank (unavailable) in MXA with frequency option 503, and in EXA
Key Path:	**Input/Output, RF Calibrator**
Readback:	4.8 GHz
Instrument S/W Revision:	Prior to A.02.00

Comb

Selects the 300 MHz comb modulated signal as the input signal.

Key Path	**Input/Output, RF Calibrator**
Readback	Comb
Instrument S/W Revision	Prior to A.02.00

Off

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

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

Readback	Off
Instrument S/W Revision	Prior to A.02.00

External Gain

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

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

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

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

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**
Readback:	1-of-N selection | [variable]
Instrument S/W Revision:	Prior to A.02.00

Ext Preamp

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

Please note that the Ref Lvl Offset and Maximum Mixer Level are described in the Amplitude section. They are reset by the instrument Preset. The External Preamp Gain is reset by the "Restore Input/Output

Defaults" or "Restore System Defaults->All functions. The External Gain is subtracted from the amplitude readout so that the displayed signal level represents the signal level at the output of the device-under-test, which is the input of the external device that is providing gain/loss.

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, and 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, External Gain**
Readback:	Preamp Gain, <Ext Gain value> dB
Instrument S/W Revision:	Prior to A.02.00

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 (that is, 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:	–100 dB

Max:	100 dB
Key Path:	**Input/Output, External Gain**
Readback:	MS, <Ext Gain value> dB
Instrument S/W Revision:	Prior to A.02.00

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 (that is, 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:	–100 dB
Max:	100 dB
Key Path:	**Input/Output, External Gain**
Readback:	BTS, <Ext Gain value> dB
Instrument S/W Revision:	Prior to A.02.00

I Ext Gain

This function affects only the I channel input, except when the Input Path is I+jQ. In I+jQ this setting is applied to both I and Q channel inputs. It is not available unless the Baseband I/Q option (BBA) is installed.

Remote Command	`[:SENSe]:CORRection:IQ:I:GAIN <rel_ampl>` `[:SENSe]:CORRection:IQ:I:GAIN?`
Restriction and Notes	Not available unless option BBA is installed
Example	Set the I Ext Gain to 10 dB CORR:IQ:I:GAIN 10 Set the I Ext Gain to –10 dB (that is, a loss of 10 dB.) CORR:IQ:I:GAIN –10

Key Path	**Input/Output, External Gain**
Preset	0 dB This is unaffected by Preset but is set to 0 dB on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
State Saved	Saved in instrument state.
Min	–100 dB
Max	100 dB
Readback Text	I Gain, <I Ext Gain> dB
Instrument S/W Revision	Prior to A.02.00

Q Ext Gain

This function affects only the Q channel input and only when the Input Path is not I+jQ. It is not available unless the Baseband I/Q option (BBA) is installed.

Remote Command	`[:SENSe]:CORRection:IQ:Q:GAIN <rel_ampl>` `[:SENSe]:CORRection:IQ:Q:GAIN?`
Restriction and Notes	Not available unless option BBA is installed
Example	Set the Q Ext Gain to 10 dB CORR:IQ:Q:GAIN 10 Set the Q Ext Gain to –10 dB (that is, a loss of 10 dB.) CORR:IQ:Q:GAIN –10
Key Path	**Input/Output, External Gain**
Preset	0 dB This is unaffected by Preset but is set to 0 dB on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
State Saved	Saved in instrument state.
Min	–100 dB
Max	100 dB
Readback Text	Q Gain, <I Ext Gain> dB
Instrument S/W Revision	Prior to A.02.00

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, including Input Corrections and Data (described in the Corrections section).

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

Data Source

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

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

Remote Command:	`[:SENSe]:FEED:DATA INPut|STORed|RECorded` `[:SENSe]:FEED:DATA?`
Example:	FEED:DATA REC FEED:DATA?
Dependencies/Couplings:	Not all inputs are available in all modes. Unavailable keys are grayed out.
Remote Command Notes:	INPuts = Inputs STORed = Capture Buffer RECorded = Record Data Buffer
Preset:	This is unaffected by Preset but is set to INPut on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
State Saved:	Saved in state

Key Path:	**Input/Output**
Readback:	Variable
Instrument S/W Revision:	Prior to A.02.00

Inputs

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

Example:	FEED:DATA INP causes the measurement to look at the input selection
Key Path:	**Input/Output, Data Source**
Readback:	Inputs
Instrument S/W Revision:	Prior to A.02.00

Capture Buffer

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

If you switch to a measurement that does not support this feature, then the instrument switches to use "Inputs" and grays out this key. If the grayed out key is pressed, it generates a message.

Example:	FEED:DATA STOR causes stored measurement data to be used with a different measurement that supports this.
Dependencies/Couplings:	Grayed out in the SA measurement.
Key Path:	**Input/Output, Data Source**
Readback:	Stored Data
Instrument S/W Revision:	Prior to A.02.00

Recorded Data

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

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

Instrument S/W Revision:	Prior to A.02.00

Current Meas -> Capture Buffer

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

Remote Command:	`[:SENSe]:FEED:DATA:STORe`
Example:	FEED:DATA:STOR stores recorded data
Dependencies/Couplings:	Grayed out in the SA measurement.
Remote Command Notes:	This is command only, there is no query
Key Path:	**Input/Output, Data Source**
Instrument S/W Revision:	Prior to A.02.00

Record Data Now

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

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

The following dialogs show the progress of the recording:

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

Remote Command	`[:SENSe]:RECording:INITiate[:IMMediate]`
Example	REC:INIT
Dependencies/Couplings	Changes Data source to Recorded Data. Grayed out in the SA measurement.
Remote Command Notes	This is command only, there is no query. See the Recall functionality to access previously saved data.
Key Path	**Input/Output, Data Source**
Mode	VSA
Instrument S/W Revision	Prior to A.02.00

Remote Command:	`[:SENSe]:RECording:ABORt`
Example:	REC:ABOR

Key Path:	**Input/Output, Data Source**
Remote Command Notes:	This is command only, there is no query. The command does nothing if it is sent when there is no recording in progress.
Instrument S/W Revision:	Prior to A.02.00

Record Length

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

Remote Command	`[:SENSe]:RECording:LENGth <real>,SECOnds|RECords|POINts`
	`[:SENSe]:RECording:LENGth:STATe MAX|MANual`
	`[:SENSe]:RECording:LENGth:STATe?`

Example	REC:LENG 20,REC REC:LENG 4.1E–4,SEC REC:LENG:STAT MAX REC:LENG:STAT?
Remote Command Notes	There is no default unit. The unit must be specified. The length command does not have a query form. Length information is queried using the two commands following this table. If set to MAX, all of the available "recording memory" us used.
Key Path	**Input/Output, Data Source**
Mode	VSA
Preset	50 Records, Manual
State Saved	No
Min	0
Max	Depends on memory available
Readback	<value><Seconds|Points|Records>
Instrument S/W Revision	Prior to A.02.00

Remote Command	`[:SENSe]:RECording:LENGth:VALue?`
Example	REC:LENG:VAL?
Remote Command Notes	Query Only Returns the first (numeric) parameter of the most recent [:SENSe]:RECording:LENGth command.

Mode	VSA
Preset	50 Records
Instrument S/W Revision	Prior to A.02.00

Remote Command	`[:SENSe]:RECording:LENGth:UNIT?`
Example	REC:LENG:UNIT?
Remote Command Notes	Query Only Returns the second parameter of the most recent [:SENSe]:RECording:LENGth command. Possible values are SEC|REC|POIN. If no second parameter was sent, then the return value is SEC.
Mode	VSA
Preset	RECords
Instrument S/W Revision	Prior to A.02.00

Corrections

This key accesses the Amplitude Corrections menu.

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

Trace data is in absolute units and corrections data is in relative units, but we want to be able to display trace data at the same time as corrections data. Therefore we establish a reference line to be used while building or editing a Corrections table. The reference line is halfway up the display and represents 0 dB of correction. It is labeled “0 dB CORREC”. It is drawn in blue (0,0,255) and is three pixels high.

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

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

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

Key Path	**Input/Output, Corrections**
Mode	SA, DVB-T/H, DTMB
Measurement	Swept SA

Preset	Corrections arrays are reset (deleted) by Restore Input/Output Defaults. They survive shutdown and restarting of the analyzer application, which means they will survive a power cycle.
Dependencies/Couplings	Amplitude correction may not be available in all modes; if a mode does not support amplitude correction, the Corrections key should be blanked while in that mode. If an application supports corrections but the current measurement does not, then the key should be grayed out in that measurement
Instrument S/W Revision	A.02.00

Select Correction

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

Key Path	**Input/Output, Corrections**
Mode	SA
Preset	Set to Correction 1 by Restore Input/Output Defaults
Readback	Correction 1|Correction 2|Correction 3|Correction 4
Instrument S/W Revision	A.02.00

Correction On/Off

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

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

Remote Command:	`[:SENSe]:CORRection:CSET[1]|2|3|4[:STATe] ON|OFF|1|0`
	`[:SENSe]:CORRection:CSET[1]|2|3|4[:STATe]?`
Example:	SENS:CORR:CSET1 ON
Dependencies/Couplings:	Turning this on automatically turns on "Apply Corrections"
	Only the first correction array (Correction 1) supports antenna units. When this array is turned on, and it contains an Antenna Unit other than “None”, the Y Axis Unit of the analyzer is forced to that Antenna Unit. All other Y Axis Unit choices are grayed out.
	Note that this means that a correction file with an Antenna Unit can only be loaded into the Corrections 1 register. Consequently only for Correction 1 does the dropdown in the Recall dialog include.ant, and if an attempt is made to load a correction file into any other Correction register which DOES contain an antenna unit, a Mass Storage error is generated.

Preset:	Not affected by Preset. Set to OFF by **Restore Input/Output Defaults**
State Saved:	Saved in State
Key Path:	**Input/Output, Corrections**
Instrument S/W Revision:	A.02.00

Properties

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

Key Path	**Input/Output, Corrections**
Instrument S/W Revision	A.02.00

Select Correction

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

Key Path	**Input/Output, Corrections, Properties**
Preset	Set to Correction 1 by Restore Input/Output Defaults
Readback	Correction 1|Correction 2|Correction 3|Correction 4
Instrument S/W Revision	A.02.00

Antenna Unit

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

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

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

Remote Command	`[:SENSe]:CORRection:CSET[1]|2|3|4:ANTenna[:UNIT] GAUSs|PTESla|UVM|UAM|NOConversion` `[:SENSe]:CORRection:CSET[1]|2|3|4:ANTenna[:UNIT]?`
Example	CORR:CSET:ANT GAUS

Dependencies/Couplings	Only the first correction array (Correction 1) supports antenna units. Note that this means that a correction file with an Antenna Unit can only be loaded into the Corrections 1 register. Consequently only for Correction 1 does the dropdown in the Recall dialog include.ant, and if an attempt is made to load a correction file into any other Correction register which DOES contain an antenna unit, a Mass Storage error is generated.
Key Path	**Input/Output, Corrections, Properties**
Mode	SA
Preset	Unaffected by Preset. Set to NOC by Restore Input/Output Defaults
State Saved	Saved in State
Instrument S/W Revision	A.02.00

dBµV/m

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

Example:	:CORR:CSET2:ANT UVM
Key Path:	**Input/Output, Corrections, Properties, Antenna Unit**
Readback:	"dBµV/m"
Instrument S/W Revision:	A.02.00

dBµA/m

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

Example:	:CORR:CSET2:ANT UVA
Key Path:	**Input/Output, Corrections, Properties, Antenna Unit**
Readback:	" dBµA/m"
Instrument S/W Revision:	A.02.00

dBpT

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

Example:	:CORR:CSET3:ANT PTES
Key Path:	**Input/Output, Corrections, Properties, Antenna Unit**
Readback:	"dBpT"
Instrument S/W Revision:	A.02.00

dBG

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

Example:	:CORR:CSET:ANT GAUS
Key Path:	**Input/Output, Corrections, Properties, Antenna Unit**
Readback:	" dBG"
Instrument S/W Revision:	A.02.00

None

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

Example:	:CORR:CSET4:ANT NOC
Key Path:	**Input/Output, Corrections, Properties, Antenna Unit**
Readback:	"None"
Instrument S/W Revision:	A.02.00

Frequency Interpolation

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

This setting is handled and stored individually per correction set.

Remote Command:	`[:SENSe]:CORRection:CSET[1]|2|3|4:X:SPACing LINear|LOGarithmic`
	`[:SENSe]:CORRection:CSET[1]|2|3|4:X:SPACing?`
Example:	CORR:CSET:X:SPAC LIN
Preset:	Unaffected by Preset. Set to Linear by Restore Input/Output Defaults
State Saved:	Saved in State
Key Path:	**Input/Output, Corrections, Properties**
Instrument S/W Revision:	A.02.00

Description

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

Remote Command:	`[:SENSe]:CORRection:CSET[1]|2|3|4:DESCription "text"`
	`[:SENSe]:CORRection:CSET[1]|2|3|4:DESCription?`
Example:	:CORR:CSET1:DESC "11941A Antenna correction"

Remote Command Notes:	45 chars max; may not fit on display if max chars used
Preset:	Unaffected by Preset. Set to empty by **Restore Input/Output Defaults**
State Saved:	Saved in State
Key Path:	**Input/Output, Corrections, Properties**
Instrument S/W Revision:	A.02.00

Comment

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

Remote Command:	`[:SENSe]:CORRection:CSET[1]|2|3|4:COMMent "text"`
	`[:SENSe]:CORRection:CSET[1]|2|3|4:COMMent?`
Example:	:CORR:CSET1:COMM "this is a comment"
Remote Command Notes:	45 chars max; may not fit on display if max chars used
Preset:	Unaffected by Preset. Set to empty by **Restore Input/Output Defaults**
State Saved:	Saved in State
Key Path:	**Input/Output, Corrections, Properties**
Instrument S/W Revision:	A.02.00

Edit

Invokes the integrated editing facility for this correction set.

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

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

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

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

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

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

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

Key Path	**Input/Output, Corrections**
Instrument S/W Revision	A.02.00

Navigate

Lets you move through the table to edit the desired point

Key Path	**Input/Output, Corrections, Edit**
Notes	There is no value readback on the key
Instrument S/W Revision	A.02.00

Frequency

Lets you edit the frequency of the current row.

Key Path	**Input/Output, Corrections, Edit**
Notes	There is no value readback on the key
Instrument S/W Revision	A.02.00

Amplitude

Lets you edit the Amplitude of the current row.

Key Path	**Input/Output, Corrections, Edit**
Notes	There is no value readback on the key

Instrument S/W Revision	A.02.00

Insert Point Below

Pressing this key inserts a point below the current point. The new point is a copy of the current point. And becomes the current point. The new point is not yet entered into the underlying table, and the data in the row is displayed in Light Gray.

Key Path	**Input/Output, Corrections, Edit**
Instrument S/W Revision	A.02.00

Delete Point

This is an immediate action key. It will immediately delete the currently-selected point, whether or not that point is being edited, and select Navigate. The point following the currently-selected point (or the point preceding if there is none) will be selected.

Key Path	**Input/Output, Corrections, Edit**
Instrument S/W Revision	A.02.00

Scale X Axis

Matches the X Axis to the selected Correction, as well as possible. Sets the Start and Stop Frequency to contain the minimum and maximum Frequency of the selected Correction. The range between Start Frequency and Stop Frequency is 12.5% above the range between the minimum and maximum Frequency so that span exceeds this range by one graticule division on either side. If in zero-span, or there is no data in the Ampcor table, or the frequency range represented by the table is zero, no action is taken. Standard clipping rules apply, if the value in the table is outside the allowable range for the X axis.

Key Path	**Input/Output, Corrections, Edit**
Instrument S/W Revision	A.02.00

Delete Correction

Deletes the correction values for this set. When this key is pressed a prompt is placed on the screen that says “Please press Enter or OK key to delete correction. Press ESC or Cancel to close this dialog.” The deletion is only performed if you press OK or Enter; if so, after the deletion, the informational message “Correction deleted” appears in the MSG line.

Remote Command:	`[:SENSe]:CORRection:CSET[1]|2|3|4:DELete`
Example:	CORR:CSET:DEL
	CORR:CSET1:DEL
	CORR:CSET4:DEL
Key Path:	**Input/Output, Corrections**

Instrument S/W Revision:	A.02.00

Apply Corrections

Applies amplitude corrections which are marked as ON to the measured data. If this is set to NO, then no amplitude correction sets will be used, regardless of their individual on/off settings. If set to YES, then the corrections that are marked as ON (see “Correction On/Off” on page 1031) will be used.

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

Delete All Corrections

Erases all correction values for all 4 Amplitude Correction sets.

When this key is pressed a prompt is placed on the screen that says “Please press Enter or OK key to delete all corrections. Press ESC or Cancel to close this dialog.” The deletion is only performed if you press OK or Enter; if so, after the deletion, the informational message “All Corrections deleted” appears in the MSG line.

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

Remote Correction Data Set Commands

Set (Replace) Data (Remote Command Only)

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

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

An Ampcor array can contain 2000 points maximum.

Remote Command:	`[:SENSe]:CORRection:CSET[1]|2|3|4:DATA <freq>, <ampl>, . . .`
	`[:SENSe]:CORRection:CSET[1]|2|3|4:DATA?`
Example:	CORR:CSET1:DATA 10000000,–1.0,20000000,1.0
	This defines two correction points at (10 MHz, –1.0 dB) and (20 MHz, 1.0 dB) for correction set 1.
Preset:	Empty after Restore Input/Output Defaults. Survives shutdown/restart of analyzer application (including power cycle)
State Saved:	Saved in state
Min:	Freq: 0 Hz
	Amptd: –1000 dBm
Max:	Freq: 1 THz
	Amptd: +1000 dBm
Instrument S/W Revision:	A.02.00

Merge Correction Data (Remote Command Only)

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

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

An Ampcor array can contain 2000 total points, maximum.

Remote Command:	`[:SENSe]:CORRection:CSET[1]|2|3|4:DATA:MERGe <freq>, <ampl>,...`
Example:	CORR:CSET1:DATA:MERGE 15000000,–5.0,25000000,5.0
	This adds two correction points at (15 MHz, –5.0 dB) and (25 MHz, 5.0 dB) to whatever values already exist in correction set 1.
Preset:	Empty after Restore Input/Output Defaults. Survives shutdown/restart of analyzer application (including power cycle)

Min:	Freq: 0 Hz Amptd: –1000 dBm
Max:	Freq: 1 THz Amptd: +1000 dBm
Instrument S/W Revision:	A.02.00

Freq Ref In

Specifies the frequency reference as being the internal reference, external reference or sensing the presence of an external reference.

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

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

If Sense is selected, the instrument checks whether a signal is present at the external reference connector and will automatically switch to the external reference when a signal is detected. When no signal is present, it automatically switches to the internal reference. No message is generated as the reference switches between external and internal. The monitoring of the external reference occurs approximately on 1 millisecond intervals, and never occurs in the middle of a measurement acquisition, only at the end of the measurement (end of the request).

If for any reason the instrument's frequency reference is not able to obtain lock, Status bit 2 in the Questionable Frequency register will be true and an error condition detected message is generated. When lock is regained, Status bit 2 in the Questionable Frequency register will be cleared and an error message is cleared will be sent.

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

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.
Instrument S/W Revision:	Prior to A.02.00

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

Remote Command Notes:	The query [SENSe]:ROSCillator:SOURce? returns the current switch setting. This means: 1. If it was set to SENSe but there is no external reference so the instrument is actually using the internal reference, then this query returns INTernal and not SENSe. 2. If it was set to SENSe and there is an external reference present, the query returns EXTernal and not SENSe. 3. If it was set to EXTernal, then the query returns "EXTernal" 4. If it was set to INTernal, then the query returns INTernal
Preset:	SENSe
Instrument S/W Revision:	Prior to A.02.00

Remote Command:	`[:SENSe]:ROSCillator:SOURce INTernal|EXTernal`
Instrument S/W Revision:	Prior to A.02.00

Sense

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

Example:	:ROSC:SOUR:TYPE SENS
Key Path:	**Input/Output, Freq Ref In**
Readback:	Sense
Instrument S/W Revision:	Prior to A.02.00

Internal

The internal reference is used.

Example:	:ROSC:SOUR:TYPE INT
Key Path:	**Input/Output, Freq Ref In**
Readback:	Internal
Instrument S/W Revision:	Prior to A.02.00

External

The external reference is used.

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

Instrument S/W Revision:	Prior to A.02.00

Ext Ref Freq

This key tells the analyzer the frequency of the external reference. When the external reference is in use (either because the reference has been switched to External or because the Reference has been switched to Sense and there is a valid external reference present) this information is used by the analyzer to determine the internal settings needed to lock to that particular external reference signal.

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

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

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:	EXA: 10 MHz MXA: 1 MHz
Max:	EXA: 10 MHz MXA: 50 MHz
Key Path:	**Input/Output, Freq Ref In**
Default Unit:	Hz
Instrument S/W Revision:	Prior to A.02.00

External Ref Coupling

Only appears with option ERC installed and licensed.

This function lets you couple the sweep system of the analyzer to the state of the External Reference. If **Normal** is selected, data acquisition proceeds regardless of the state of the External Reference. When you select **Ext Ref Out Of Range Stops Acquisition**, the data acquisition (sweep or measurement) stops when either the "521, External ref out of range" or the "503, Frequency Reference unlocked" error is asserted. Note that this will only take place if the **Freq Ref In** selection is **External**.

With the acquisition stopped, the data display will stop updating (even if this occurs in the middle of a sweep or measurement) and no data will be returned to a READ? or MEASure? query; that is to say, these queries will not complete because the analyzer will not respond to them. Furthermore, no response will be generated to a *WAI? or *OPC? query.

Proper SCPI sequences are shown below, which will always fail to return if the acquisition stops during the requested sweep or measurement. Note that, for predictable operation of this function, it is best to operate the analyzer in single measurement mode (INIT:CONT OFF), because if operating in continuous mode, the analyzer may respond to the above queries even after the acquisition stops, with data left over from the previous acquisition.

:INIT:CONT OFF

:INIT:IMM;*OPC?

--

:INIT:CONT OFF

:INIT:IMM;*WAI?

--

:INIT:CONT OFF

:READ?

--

:INIT:CONT OFF

:MEASure?

When the acquisition ceases, in addition to the error condition(s) described above, an error message will be generated informing you that the acquisition has ceased due to an invalid external reference. This message will stay on the screen while the acquisition is suspended.

External reference problem.
Data acquisition suspended.
To resume data acquisition, fix the
problem and press the Restart key
OR
Press the following keys:
Input/Output, More 1 of 2, Freq Ref In,
External Ref Coupling, Normal
OR
Input/Output, More 1 of 2,
Freq Ref In, Internal

If you press the Restart key this message will be taken off the screen and a new acquisition will be attempted; if the External Reference problem persists the message will go right back up. You can also take the message down by changing back to the **Normal** setting of Sweep/Ext Ref Coupling, or by pressing **Freq Ref In, Internal**, or **Freq Ref In, Sense**, or **Restore Input/Output Defaults.**

The setting of **External Ref Coupling** is persistent across power-cycling and is not reset with **Preset**. It is reset to the default state (**Normal**) when **Restore Input/Output Defaults** is invoked, which will also restart normal data acquisition.

The detection of invalid external reference is under interrupt processing. If the external reference becomes invalid then returns to valid in too short a time, no error condition will be detected or reported and therefore the acquisition will not be stopped.

Remote Command	`[:SENSe]:ROSCillator:COUPling NORMal|NACQuisition` `[:SENSe]:ROSCillator:COUPling?`
Mode	All
Preset	This setting is persistent: it survives power-cycling or Preset and is reset with Restore Input/Output defaults.
State Saved	Not saved in State
Readback	Normal|Stop Acq
Key Path:	**Input/Output, Freq Ref In**
Instrument S/W Revision	A.02.00

Output Config

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

Key Path	**Input/Output**
Instrument S/W Revision	Prior to A.02.00

Trig Out (1 and 2)

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

Remote Command:	`:TRIGger|TRIGger1|TRIGger2[:SEQuence]:OUTPut HSWP|MEASuring|MAIN|GATE|GTRigger|OEVen` `:TRIGger|TRIGger1|TRIGger2[:SEQuence]:OUTPut?`
Example:	TRIG:OUTP HSWP
Preset:	Trigger 1: Sweeping (HSWP) Trigger 2: Gate This is unaffected by Preset but is preset to the above values on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
State Saved:	Saved in instrument state
Key Path:	**Input/Output, Output Config**
Instrument S/W Revision:	Prior to A.02.00

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**
Instrument S/W Revision:	Prior to A.02.00

Sweeping (HSWP)

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

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

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**
Readback:	Measuring
Instrument S/W Revision:	Prior to A.02.00

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**
Readback:	Main Trigger

Instrument S/W Revision:	Prior to A.02.00

Gate Trigger

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

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

Gate

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

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

Odd/Even Trace Point

Selects either the odd or even trace points as the signal to be output to the Trig 1 Out 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**
Readback:	Odd/Even
Instrument S/W Revision:	Prior to A.02.00

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**
Readback:	Off

Instrument S/W Revision:	Prior to A.02.00

Digital Bus

Opens a menu that allows you to select options for configuring the digital bus output(s) of the analyzer.

Key Path	**Input/Output, Output Config**
Instrument S/W Revision	Prior to A.02.00

Bus Out

The Digital Bus is a connector located on the rear panel of the instrument. It is a unidirectional link of real time raw ADC data at a 90 MHz rate. No corrections are applied. The ADC is sampling a 22.5 MHz IF. When Bus Out is on, all acquisitions are streamed to the output port including acquisitions for internal purposes such as Alignment; internal processing and routing of acquisitions continues as usual and is unaffected by the state of Bus Out. This port is intended for use with the Agilent N5105 and N5106 products only. It is not available for general purpose use.

Remote Command	`:OUTPut:DBUS[1][:STATe] ON|OFF|1|0` `:OUTPut:DBUS[1][:STATe]?`
Example	OUTP:DBUS ON
Key Path	**Input/Output, Output Config, Digital Bus**
Scope	Mode Global
Preset	This is unaffected by Preset but is set to Off on a "Restore Input/Output Defaults" or "Restore System Defaults -> All"
State Saved	Saved in instrument state.
Instrument S/W Revision	Prior to A.02.00

I/Q Cal Out

The Baseband I/Q "Cal Out" port can be turned on with either a 1 kHz or a 250 kHz square wave. This can be turned on independent of the input selection. A Preset will reset this to Off.

Remote Command	`:OUTPut:IQ:OUTPut IQ1|IQ250|OFF` `:OUTPut:IQ:OUTPut?`
Dependencies/Couplings	An I/Q Cable Calibration or an I/Q Probe Calibration will change the state of the Cal Out port as needed by the calibration routine. When the calibration is finished the I/Q Cal Out is restored to the pre-calibration state.
Example	OUTP:IQ:OUTP IQ1
Key Path	**Input/Output, Output Config**
Preset	Off
State Saved	Saved in instrument state.

Range	1 kHz Square Wave|250 kHz Square Wave|Off
Readback Text	1 kHz|250 kHz|Off
Instrument S/W Revision	Prior to A.02.00

1 kHz Square Wave

Turn on the 1 kHz square wave signal at the Cal Out port. This choice is only available with option BBA.

Key Path	**Input/Output, Output Config, I/Q Cal Out**
Readback	I/Q 1kHz
Instrument S/W Revision	Prior to A.02.00

250 kHz Square Wave

Turn on the 250 kHz square wave signal at the Cal Out port. This choice is only available with option BBA.

Key Path	**Input/Output, Output Config, I/Q Cal Out**
Readback	I/Q 250kHz
Instrument S/W Revision	Prior to A.02.00

Off

Turn off the signal at the Cal Out port. This choice is only available with option BBA.

Key Path	**Input/Output, Output Config, I/Q Cal Out**
Readback	Off
Instrument S/W Revision	Prior to A.02.00

I/Q Guided Calibration

Calibrating the Baseband I/Q ports requires several steps and manual connections. The Guided Calibration will interactively step a user through the required steps, displaying diagrams to help with the connections. The steps will vary depending on the setup.

In the Guided Calibration windows, the date and time of the last calibration are displayed. If any of the items listed are displayed in yellow, this indicates that the calibration for that item is inconsistent with the latest calibration, and you should complete the entire calibration process before you exit the calibration.

I/Q Isolation Calibration

The I/Q Isolation Calibration must be run before calibrating any port with either the I/Q Cable Calibration or I/Q Probe Calibration. This calibration is performed with nothing connected to any of the front panel I/Q ports. This is the first step in both the I/Q Cable Calibration and the I/Q Probe Calibration.

Next

Perform the I/Q Isolation calibration.

Remote Command	`:CALibration:IQ:ISOLation`
Restriction and Notes	All front panel I/Q ports must not be connected to anything.
Remote Command Notes	All cables and probes should be disconnected from the I/Q ports before issuing the SCPI command.
Example	CAL:IQ:ISOL
Key Path	**Input/Output, I/Q, I/Q Cable Calibration**
State Saved	No.
Instrument S/W Revision	Prior to A.02.00

Exit

Exit the calibration procedure. All ports calibrated before pressing Exit will use the newly acquired calibration data.

Notes	Using the Exit button will not restore the calibration data to the state prior to entering the guided calibration. Once a port is calibrated the data is stored immediately and the only way to change it is to redo the calibration step. When the calibration may be left in an inconsistent state, a confirmation dialog will be displayed (see “Exit Confirmation” on page 1061).
Key Path	**Input/Output, I/Q, I/Q Cable Calibration**
Instrument S/W Revision	Prior to A.02.00

I/Q Isolation Calibration Time (Remote Only)

Return the last date and time that the I/Q Isolation Calibration was performed. This is a remote query command only.

Remote Command:	`:CALibration:IQ:ISOLation:TIME?`
Example:	:CAL:IQ:ISOL:TIME?
Restriction and Notes:	This returns 6 integer values: year, month, day, hour, minute, second. When no calibration has been performed, all values will be 0.
Instrument S/W Revision:	A.02.00

I/Q Cable Calibration

The I/Q cable calibration creates correction data for each of the front panel I/Q ports. This calibration data is used whenever no probe specific calibration data is available. It is important that all ports are calibrated using the same short BNC cable so that the data is comparable from port to port.

The guided calibration (front panel only) will show connection diagrams and guide you through the isolation calibration and calibrating each port. The calibration data for each port is stored separately, so as soon as a port is calibrated that data is saved and will be used. If a user presses "Exit" to exit the calibration process, the data for the ports already completed will still be used. It is recommended that a calibration be completed once started, or if exited, that it be properly done before the next use of the I/Q ports. The "Next" button will perform the calibration for the current port and then proceed to the next step in the calibration procedure. The "Back" button will return to the prior port in the procedure. Both keys and dialog buttons are supplied for ease of use. The dialog buttons are for mouse use and the keys for front panel use.

The calibration can also be done via SCPI, but no connection diagrams will be shown. You will have to make the correct connections before issuing each port calibration command. Again, it is recommended that all ports be calibrated at the same time.

The instrument state remains as it was prior to entering the calibration procedure except while a port is actually being calibrated. Once a port is calibrated it returns to the prior state. A port calibration is in process only from the time the "Next" button is pressed until the next screen is shown. For SCPI, this corresponds to the time from issuing the CAL:IQ:FLAT:I|IB|Q|QB command until the operation is complete.

For example, if the prior instrument state is Cal Out = Off, Input = I+jQ, and Differential = Off, then up until the time the "Next" button is pressed the I Input and Q Input LEDs are on and the Cal Out, I-bar Input and Q-bar Input LEDs are off. Once the "Next" button is pressed for the I port calibration, only the Cal Out and I Input LEDs will be on and the others will be off. When the screen progresses to the next step ("Next" button again enabled), the prior state is restored and only the I Input and Q Input LEDs are on (Cal Out is off again).

The last calibration date and time for each port will be displayed. Any calibrations that are more than a day older than the most recent calibration will be displayed with the color amber.

Key Path	**Input/Output, I/Q, I/Q**
Instrument S/W Revision	Prior to A.02.00

I Port

The I port calibration is performed with the front panel's I port connected via a short BNC cable to the Cal Out port. The guided calibration will show a diagram of the required connections.

Back

Return to the prior step in the calibration procedure.

Key Path	**Input/Output, I/Q, Q Setup, Q Probe, Calibrate**
Instrument S/W Revision	Prior to A.02.00

Next

Perform the I port calibration.

Remote Command	`:CALibration:IQ:FLATness:I`
Restriction and Notes	The recommended procedure is to use the same BNC cable to calibrate all I/Q ports. All I/Q ports should be calibrated sequentially during the procedure. The calibration data is saved as soon as the port is calibrated and will survive power cycles. It is not reset by any preset or restore data commands.
Remote Command Notes	The I port must be connected to the Cal Out port before issuing the SCPI command.
Example	CAL:IQ:FLAT:I
Key Path	**Input/Output, I/Q, I/Q Cable Calibration**
State Saved	No.
Instrument S/W Revision	Prior to A.02.00

Exit

Exit the calibration procedure. All ports calibrated before pressing Exit will use the newly acquired calibration data.

Notes	Using the Exit button will not restore the calibration data to the state prior to entering the guided calibration. Once a port is calibrated the data is stored immediately and the only way to change it is to redo the calibration step. When the calibration may be left in an inconsistent state, a confirmation dialog will be displayed (see “Exit Confirmation” on page 1061).
Key Path	**Input/Output, I/Q, I/Q Cable Calibration**
Instrument S/W Revision	Prior to A.02.00

I-bar Port

The I-bar port calibration is performed with the front panel's I-bar port connected via a short BNC cable to the Cal Out port. The guided calibration will show a diagram of the required connections.

Back

Return to the prior step in the calibration procedure.

Restriction and Notes	Using the Back button will not restore the calibration data to a prior state. Once a port is calibrated the data is stored immediately and the only way to change it is to redo the calibration step. The Back button allows you to go back to a prior step to redo that calibration step.
Key Path	**Input/Output, I/Q, I/Q Cable Calibration**
Instrument S/W Revision	Prior to A.02.00

Next

Perform the I-bar port calibration.

Remote Command	`:CALibration:IQ:FLATness:IBAR`
Restriction and Notes	The recommended procedure is to use the same BNC cable to calibrate all I/Q ports. All I/Q ports should be calibrated sequentially during the procedure. The calibration data is saved as soon as the port is calibrated and will survive power cycles. It is not reset by any preset or restore data commands.
Remote Command Notes	The I-bar port must be connected to the Cal Out port before issuing the SCPI command.
Example	CAL:IQ:FLAT:IBAR
Key Path	**Input/Output, I/Q, I/Q Cable Calibration**
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Exit

Exit the calibration procedure. All ports calibrated before pressing Exit will use the newly acquired calibration data.

Restriction and Notes	Using the Exit button will not restore the calibration data to the state prior to entering the guided calibration. Once a port is calibrated the data is stored immediately and the only way to change it is to redo the calibration step. When the calibration may be left in an inconsistent state, a confirmation dialog will be displayed (see “Exit Confirmation” on page 1061).
Key Path	**Input/Output, I/Q, I/Q Cable Calibration**
Instrument S/W Revision	Prior to A.02.00

Q Port

The Q port calibration is performed with the front panel's Q port connected via a short BNC cable to the Cal Out port. The guided calibration will show a diagram of the required connections.

Back

Return to the prior step in the calibration procedure.

Restriction and Notes	Using the Back button will not restore the calibration data to a prior state. Once a port is calibrated the data is stored immediately and the only way to change it is to redo the calibration step. The Back button allows you to go back to a prior step to redo that calibration step.
Key Path	**Input/Output, I/Q, I/Q Cable Calibration**
Instrument S/W Revision	Prior to A.02.00

Next

Perform the Q port calibration.

Remote Command	`:CALibration:IQ:FLATness:Q`
Restriction and Notes	The recommended procedure is to use the same BNC cable to calibrate all I/Q ports. All I/Q ports should be calibrated sequentially during the procedure. The calibration data is saved as soon as the port is calibrated and will survive power cycles. It is not reset by any preset or restore data commands.
Remote Command Notes	The Q port must be connected to the Cal Out port before issuing the SCPI command.
Example	CAL:IQ:FLAT:Q
Key Path	**Input/Output, I/Q, I/Q Cable Calibration**
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Exit

Exit the calibration procedure. All ports calibrated before pressing Exit will use the newly acquired calibration data.

Restriction and Notes	Using the Exit button will not restore the calibration data to the state prior to entering the guided calibration. Once a port is calibrated the data is stored immediately and the only way to change it is to redo the calibration step. When the calibration may be left in an inconsistent state, a confirmation dialog will be displayed (see “Exit Confirmation” on page 1061).
Key Path	**Input/Output, I/Q, I/Q Cable Calibration**
Instrument S/W Revision	Prior to A.02.00

Q-bar Port

The Q-bar port calibration is performed with the front panel's Q-bar port connected via a short BNC cable to the Cal Out port. The guided calibration will show a diagram of the required connections.

Back

Return to the prior step in the calibration procedure.

Restriction and Notes	Using the Back button will not restore the calibration data to a prior state. Once a port is calibrated the data is stored immediately and the only way to change it is to redo the calibration step. The Back button allows you to go back to a prior step to redo that calibration step.
Key Path	**Input/Output, I/Q, I/Q Cable Calibration**
Instrument S/W Revision	Prior to A.02.00

Next

Perform the Q-bar port calibration.

Remote Command	`:CALibration:IQ:FLATness:QBAR`
Notes	The recommended procedure is to use the same BNC cable to calibrate all I/Q ports. All I/Q ports should be calibrated sequentially during the procedure. The calibration data is saved as soon as the port is calibrated and will survive power cycles. It is not reset by any preset or restore data commands.
Remote Command Notes	The Q-bar port must be connected to the Cal Out port before issuing the SCPI command.
Example	CAL:IQ:FLAT:QBAR
Key Path	**Input/Output, I/Q, I/Q Cable Calibration**
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Exit

Exit the calibration procedure. All ports calibrated before pressing Exit will use the newly acquired calibration data.

Restriction and Notes	Using the Exit button will not restore the calibration data to the state prior to entering the guided calibration. Once a port is calibrated the data is stored immediately and the only way to change it is to redo the calibration step. When the calibration may be left in an inconsistent state, a confirmation dialog will be displayed (see "Exit Confirmation" on page 1061).
Key Path	**Input/Output, I/Q, I/Q Cable Calibration**
Instrument S/W Revision	Prior to A.02.00

I/Q Cable Calibration Time (Remote Command Only)

Return the last date and time that the I/Q Cable Calibration was performed for a specific port. This is a remote query command only.

Remote Command:	`:CALibration:IQ:FLATness:I|IBAR|Q|QBAR:TIME?`
Example:	:CAL:IQ:FLAT:I:TIME?
Restriction and Notes:	This returns 6 integer values: year, month, day, hour, minute, second. When no calibration has been performed, all values will be 0.
Instrument S/W Revision:	A.02.00

I/Q Probe Calibration

The I/Q probe calibration creates correction data for one of the front panel I/Q channels. When the probe has EEPROM identification, the data is unique to that specific probe. When the probe does not have EEPROM identification, the data will be used for all probes of the same type. The data is also unique to the channel, so calibration data for the I channel will not be used for the Q channel and vice versa.

The guided calibration (front panel only) will show connection diagrams and guide you through the I/Q Isolation Calibration and through calibrating each port. The calibration data for each port is stored separately, so as soon as a port is calibrated that data is saved and will be used. If a user presses "Exit" to exit the calibration process, the data for the port already completed will still be used. It is recommended that a calibration be completed once started, or if exited, that it be properly done before the next use of the probe. The "Next" button will perform the calibration for the current port and then proceed to the next step in the calibration procedure. The "Back" button will return to the prior port in the procedure. Both keys and dialog buttons are supplied for ease of use. The dialog buttons are for mouse use and the keys for front panel use.

The calibration can also be done via SCPI, but no connection diagrams will be shown. You will have to make the correct connections before issuing each port calibration command. Again, it is recommended that all ports be calibrated at the same time.

For Active probes or when Differential is Off, only the main port is calibrated, otherwise both the main and complementary ports are calibrated.

The instrument state remains as it was prior to entering the calibration procedure except while a port is actually being calibrated. Once a port is calibrated it returns to the prior state. A port calibration is in process only from the time the "Next" button is pressed until the next screen is shown. For SCPI, this corresponds to the time from issuing the CAL:IQ:PROB:I|IB|Q|QB command until the operation is complete.

For example, if the prior instrument state is Cal Out = Off, Input = I+jQ, and Differential = Off, then up until the time the "Next" button is pressed the I Input and Q Input LEDs are on and the Cal Out, I-bar Input and Q-bar Input LEDs are off. Once the "Next" button is pressed for the I port calibration, only the Cal Out and I Input LEDs will be on and the others will be off. When the screen progresses to the next step ("Next" button again enabled), the prior state is restored and only the I Input and Q Input LEDs are on (Cal Out is off again).

The last calibration date and time for each relevant port will be displayed. For passive probes with Differential On, any calibration that is more than a day older than the most recent calibration will be displayed with the color amber.

I Port

The I port calibration is performed with the probe body attached to the front panel's I port and the probe tip connected via an adapter to the Cal Out port. The guided calibration will show a diagram of the required connections.

Show Adapter

Show a connection diagram and instructions for the probe and adapter. See "Show Adapter Screen" on page 1060.

Restriction and Notes	Either a passive or an active probe adapter diagram will be shown, depending on the type of probe attached.
Key Path	**Input/Output, I/Q, I Setup, I Probe, Calibrate**
Instrument S/W Revision	Prior to A.02.00

Back

Return to the prior step in the calibration procedure.

Key Path	**Input/Output, I/Q, Q Setup, Q Probe, Calibrate**
Instrument S/W Revision	Prior to A.02.00

Next

Perform the I port calibration.

Remote Command	`:CALibration:IQ:PROBe:I`
Remote Command Notes	The I port must be connected to the Cal Out port before issuing the SCPI command. The calibration data is saved as soon as the port is calibrated and will survive power cycles. It is not reset by any preset or restore data commands.
Example	CAL:IQ:PROB:I
Key Path	**Input/Output, I/Q, I Setup, I Probe, Calibrate**
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Exit

Exit the calibration procedure. All ports calibrated before pressing Exit will use the newly acquired calibration data.

Restriction and Notes	Using the Exit button will not restore the calibration data to the state prior to entering the guided calibration. Once a port is calibrated the data is stored immediately and the only way to change it is to redo the calibration step. When the calibration may be left in an inconsistent state, a confirmation dialog will be displayed (see “Exit Confirmation” on page 1061).
Key Path	**Input/Output, I/Q, I Setup, I Probe, Calibrate**
Instrument S/W Revision	Prior to A.02.00

I-bar Port

The I-bar port calibration is performed with the probe body attached to the front panel's I-bar port and the probe tip connected via an adapter to the Cal Out port. The I-bar probe calibration is only available for passive probes with Differential On. The guided calibration will show a diagram of the required connections.

Show Adapter

Show a connection diagram and instructions for the probe and adapter. See "Show Adapter Screen" on page 1060.

Restriction and Notes	Either a passive or an active probe adapter diagram will be shown, depending on the type of probe attached.
Key Path	**Input/Output, I/Q, I Setup, I Probe, Calibrate**
Instrument S/W Revision	Prior to A.02.00

Back

Return to the prior step in the calibration procedure.

Restriction and Notes	Using the Back button will not restore the calibration data to a prior state. Once a port is calibrated the data is stored immediately and the only way to change it is to redo the calibration step. The Back button allows you to go back to a prior step to redo that calibration step.
Key Path	**Input/Output, I/Q, I Setup, I Probe, Calibrate**
Instrument S/W Revision	Prior to A.02.00

Next

Perform the I-bar port calibration.

Remote Command	`:CALibration:IQ:PROBe:IBar`
Remote Command Notes	The I-bar port must be connected to the Cal Out port before issuing the SCPI command. The calibration data is saved as soon as the port is calibrated and will survive power cycles. It is not reset by any preset or restore data commands.
Example	CAL:IQ:PROB:IB
Key Path	**Input/Output, I/Q, I Setup, I Probe, Calibrate**
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Exit

Exit the calibration procedure. All ports calibrated before pressing Exit will use the newly acquired calibration data.

Restriction and Notes	Using the Exit button will not restore the calibration data to the state prior to entering the guided calibration. Once a port is calibrated the data is stored immediately and the only way to change it is to redo the calibration step. When the calibration may be left in an inconsistent state, a confirmation dialog will be displayed (see "Exit Confirmation" on page 1061).

Key Path	**Input/Output, I/Q, I Setup, I Probe, Calibrate**
Instrument S/W Revision	Prior to A.02.00

Q Port

The Q port calibration is performed with the probe body attached to the front panel's Q port and the probe tip connected via an adapter to the Cal Out port. The guided calibration will show a diagram of the required connections.

Show Adapter

Show a connection diagram and instructions for the probe and adapter. See "Show Adapter Screen" on page 1060.

Restriction and Notes	Either a passive or an active probe adapter diagram will be shown, depending on the type of probe attached.
Key Path	**Input/Output, I/Q, Q Setup, Q Probe, Calibrate**
Instrument S/W Revision	Prior to A.02.00

Back

Return to the prior step in the calibration procedure.

Key Path	**Input/Output, I/Q, Q Setup, Q Probe, Calibrate**
Instrument S/W Revision	Prior to A.02.00

Next

Perform the Q port calibration.

Remote Command	`:CALibration:IQ:PROBe:Q`
Remote Command Notes	The Q port must be connected to the Cal Out port before issuing the SCPI command. The calibration data is saved as soon as the port is calibrated and will survive power cycles. It is not reset by any preset or restore data commands.
Example	CAL:IQ:PROB:Q
Key Path	**Input/Output, I/Q, Q Setup, Q Probe, Calibrate**
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Exit

Exit the calibration procedure. All ports calibrated before pressing Exit will use the newly acquired calibration data.

Restriction and Notes	Using the Exit button will not restore the calibration data to the state prior to entering the guided calibration. Once a port is calibrated the data is stored immediately and the only way to change it is to redo the calibration step. When the calibration may be left in an inconsistent state, a confirmation dialog will be displayed (see "Exit Confirmation" on page 1061).
Key Path	**Input/Output, I/Q, Q Setup, Q Probe, Calibrate**
Instrument S/W Revision	Prior to A.02.00

Q-bar Port

The Q-bar port calibration is performed with the probe body attached to the front panel's Q-bar port and the probe tip connected via an adapter to the Cal Out port. The Q-bar probe calibration is only available for passive probes with Differential On. The guided calibration will show a diagram of the required connections.

Show Adapter

Show a connection diagram and instructions for the probe and adapter. See "Show Adapter Screen" on page 1060.

Restriction and Notes	Either a passive or an active probe adapter diagram will be shown, depending on the type of probe attached.
Key Path	**Input/Output, I/Q, Q Setup, Q Probe, Calibrate**
Instrument S/W Revision	Prior to A.02.00

Back

Return to the prior step in the calibration procedure.

Restriction and Notes	Using the Back button will not restore the calibration data to a prior state. Once a port is calibrated the data is stored immediately and the only way to change it is to redo the calibration step. The Back button allows you to go back to a prior step to redo that calibration step.
Key Path	**Input/Output, I/Q, Q Setup, Q Probe, Calibrate**
Instrument S/W Revision	Prior to A.02.00

Next

Perform the Q-bar port calibration.

Remote Command	`:CALibration:IQ:PROBe:QBar`
Remote Command Notes	The Q-bar port must be connected to the Cal Out port before issuing the SCPI command. The calibration data is saved as soon as the port is calibrated and will survive power cycles. It is not reset by any preset or restore data commands.
Example	CAL:IQ:PROB:QB
Key Path	**Input/Output, I/Q, Q Setup, Q Probe, Calibrate**
State Saved	No
Instrument S/W Revision	Prior to A.02.00

Exit

Exit the calibration procedure. All ports calibrated before pressing Exit will use the newly acquired calibration data.

Restriction and Notes	Using the Exit button will not restore the calibration data to the state prior to entering the guided calibration. Once a port is calibrated the data is stored immediately and the only way to change it is to redo the calibration step. When the calibration may be left in an inconsistent state, a confirmation dialog will be displayed (see “Exit Confirmation” on page 1061).
Key Path	**Input/Output, I/Q, Q Setup, Q Probe, Calibrate**
Instrument S/W Revision	Prior to A.02.00

Show Adapter Screen

When one of the Probe Calibration Show Adapter buttons is pressed, a diagram of the probe with its adapter will be shown. Depending on the type of probe attached, either the Passive Probe Adapter or the Active Probe Adapter diagram will be shown.

I/Q Probe Calibration Time (Remote Command Only)

Return the last date and time that the I/Q Probe Calibration was performed for a specific port. This is a remote query command only.

Remote Command:	`:CALibration:IQ:PROBe:I|IBAR|Q|QBAR:TIME?`
Example:	:CAL:IQ:PROB:I:TIME?
Restriction and Notes:	This returns 6 integer values: year, month, day, hour, minute, second. When no calibration has been performed, all values will be 0. The value is specific to both the port and probe, so the value will change as probes are connected or disconnected.

Instrument S/W Revision: A.02.00

Exit Confirmation

When Exit is pressed during one of the calibration routines, the calibration may be in an inconsistent state with some of the ports having newly measured calibration data and others with old data. If this is the case, a dialog box will appear to confirm that you really want to exit. A "Yes" answer will exit the calibration procedure, leaving potentially inconsistent calibration data in place. A "No" answer will return to the calibration procedure.

Marker

Some Marker operation is common across multiple Modes and Measurements. These common features are described in this section. See the Measurement description for information on features that are unique.

The Marker key accesses the Marker menu. A marker can be placed on a trace to allow the value of the trace at the marker point to be determined precisely. The functions in this menu include a 1-of-N selection of the control mode Normal, Delta, Fixed, or Off for the selected marker. If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the Marker Trace rules.

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

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

Marker Function

Some Marker Functions are common across multiple Modes and Measurements. These common features are described in this section. See the Measurement description for information on features that are unique.

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

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

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

Marker To

Some Marker To operation is common across multiple Modes and Measurements. These common features are described in this section. See the Measurement description for information on features that are unique.

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

Meas

The information in this section is common to all measurements. For key and remote command information 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 Operation for some keys differs between measurements. The information displayed in Help pertains to the current measurement. To see how a key operates in a different measurement, exit Help (press the Cancel Esc key), select the measurement, then reenter Help (press the Help key) and press that key.

Key Path	**Front-panel key**
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Remote Measurement Functions

This section contains the following topics:

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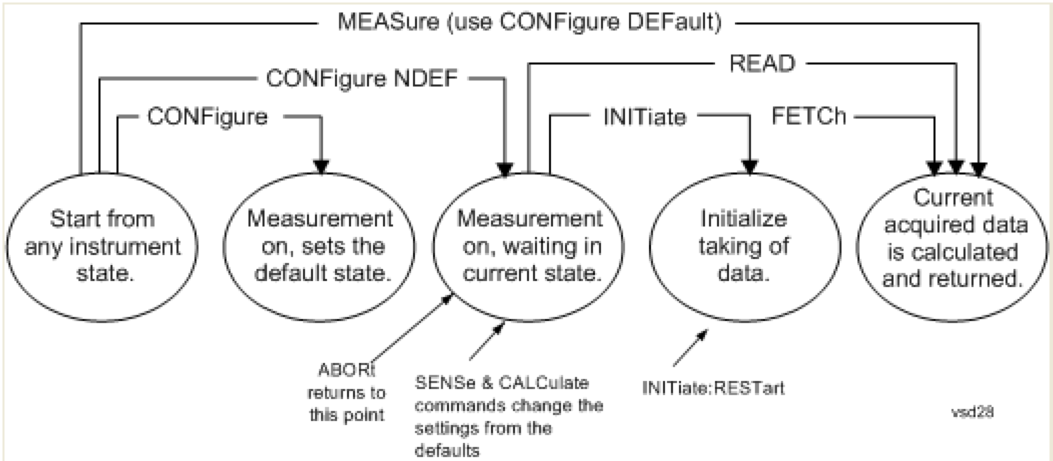
Measurement Group of Commands



Measure Commands:

:MEASure:<measurement>[n]?

This is a fast single-command way to make a measurement using the factory default instrument settings. These are the settings and units that conform to the Mode Setup settings (e.g. radio standard) that you have currently selected.

- Stops the current measurement (if any) and sets up the instrument for the specified measurement using the factory defaults
- Initiates the data acquisition for the measurement
- Blocks other SCPI communication, waiting until the measurement is complete before returning results.
- If the function does averaging, it is turned on and the number of averages is set to 10.
- After the data is valid it returns the scalar results, or the trace data, for the specified measurement. The type of data returned may be defined by an [n] value that is sent with the command.

  The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available.

  ASCII is the default format for the data output. (Older versions of Spectrum Analysis and Phase Noise mode measurements only use ASCII.) The binary data formats should be used for handling large blocks of data since they are smaller and faster than the ASCII format. Refer to the FORMat:DATA command for more information.

If you need to change some of the measurement parameters from the factory default settings you can set up the measurement with the CONFigure command. Use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to change the settings. Then you can use the READ? command to initiate the measurement and query the results.

If you need to repeatedly make a given measurement with settings other than the factory defaults, you can use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to set up the measurement. Then use the READ? command to initiate the measurement and query results.

Measurement settings persist if you initiate a different measurement and then return to a previous one. Use READ:<measurement>? if you want to use those persistent settings. If you want to go back to the default settings, use MEASure:<measurement>?.

Configure Commands:

:CONFigure:<measurement>

This command stops the current measurement (if any) and sets up the instrument for the specified measurement using the factory default instrument settings. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON. If you change any measurement settings after using the CONFigure command, the READ command can be used to initiate a measurement without changing the settings back to their defaults.

In the Swept SA measurement in Spectrum Analyzer mode the CONFigure command also turns the averaging function on and sets the number of averages to 10 for all measurements.

:CONFigure:NDEFault<measurement> stops the current measurement and changes to the specified measurement. It does not change the settings to the defaults. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON.

The **CONFigure?** query returns the current measurement name.

The **CONFigure:CATalog?** query returns a quoted string of all measurement names in the current mode. For example, "SAN, CHP, OBW, ACP, PST, TXP, SPUR, SEM, LIST".

Fetch Commands:

:FETCh:<measurement>[n]?

This command puts selected data from the most recent measurement into the output buffer. Use FETCh if you have already made a good measurement and you want to return several types of data (different [n] values, for example, both scalars and trace data) from a single measurement. FETCh saves you the time of re-making the measurement. You can only FETCh results from the measurement that is currently active, it will not change to a different measurement. An error is reported if a measurement other than the current one, is specified.

If you need to get new measurement data, use the READ command, which is equivalent to an INITiate followed by a FETCh.

The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used for handling large blocks of data since they are smaller and transfer faster then the ASCII format. (FORMat:DATA)

FETCh may be used to return results other than those specified with the original READ or MEASure command that you sent.

INITiate Commands:

:INITiate:<measurement>

This command is not available for measurements in all the instrument modes:

- Initiates a trigger cycle for the specified measurement, but does not output any data. You must then use the FETCh<meas> command to return data. If a measurement other than the current one is specified, the instrument will switch to that measurement and then initiate it.
- For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. If you send INIT:ACP? it will change from channel power to ACP and will initiate an ACP measurement.
- Does not change any of the measurement settings. For example, if you have previously started the ACP measurement and you send INIT:ACP? it will initiate a new ACP measurement using the same instrument settings as the last time ACP was run.
- If your selected measurement is currently active (in the idle state) it triggers the measurement, assuming the trigger conditions are met. Then it completes one trigger cycle. Depending upon the measurement and the number of averages, there may be multiple data acquisitions, with multiple trigger events, for one full trigger cycle. It also holds off additional commands on GPIB until the acquisition is complete.

READ Commands:

:READ:<measurement>[n]?

- Does not preset the measurement to the factory default settings. For example, if you have previously initiated the ACP measurement and you send READ:ACP? it will initiate a new measurement using the same instrument settings.
- Initiates the measurement and puts valid data into the output buffer. If a measurement other than the current one is specified, the instrument will switch to that measurement before it initiates the measurement and returns results.

  For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. Then you send READ:ACP? It will change from channel power back to ACP and, using the previous ACP settings, will initiate the measurement and return results.
- Blocks other SCPI communication, waiting until the measurement is complete before returning the results

  If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used when handling large blocks of data since they are smaller and faster then the ASCII format. (FORMat:DATA)

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Current Measurement Query (Remote Command Only)

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

Remote Command:	`:CONFigure?`
Example:	CONF?
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Limit Test Current Results (Remote Command Only)

Queries the status of the current measurement limit testing. It returns a 0 if the measured results pass when compared with the current limits. It returns a 1 if the measured results fail any limit tests.

Remote Command:	`:CALCulate:CLIMits:FAIL?`
Example:	CALC:CLIM:FAIL? queries the current measurement to see if it fails the defined limits. Returns a 0 or 1: 0 it passes, 1 it fails.
Instrument S/W Revision:	Prior to A.02.00

Data Query (Remote Command Only)

Returns the designated measurement data for the currently selected measurement and subopcode.

n = any valid subopcode for the current measurement. See the measurement command results table for your current measurement, for information about what data is returned for the subopcodes.

This command uses the data setting specified by the FORMat:BORDer and FORMat:DATA commands and can return real or ASCII data. (See the format command descriptions under Input/Output in the Analyzer Setup section.)

Remote Command:	`:CALCulate:DATA[n]?`
Notes:	The return trace depends on the measurement. In CALCulate:<meas>:DATA[n], n is any valid subopcode for the current measurement. It returns the same data as the FETCh:<measurement>? query where <measurement> is the current measurement.
Instrument S/W Revision:	Prior to A.02.00

Calculate/Compress Trace Data Query (Remote Command Only)

Returns compressed data for the currently selected measurement and sub-opcode [n].

n = any valid sub-opcode for that measurement. See the MEASure:<measurement>? command description of your specific measurement for information on the data that can be returned.

The data is returned in the current Y Axis Unit of the analyzer. The command is used with a sub-opcode <n> (default=1) to specify the trace. With trace queries, it is best if the analyzer is not sweeping during the query. Therefore, it is generally advisable to be in Single Sweep, or Update=Off.

This command is used to compress or decimate a long trace to extract and return only the desired data. A typical example would be to acquire N frames of GSM data and return the mean power of the first burst in each frame. The command can also be used to identify the best curve fit for the data.

Remote Command:	`:CALCulate:DATA<n>:COMPress? BLOCk|CFIT|MAXimum|MINimum|MEAN|DMEan|RMS|RMSCubed|SAMPle|SDEViation|PPHase [,<soffset>[,<length>[,<roffset>[,<rlimit>]]]]`
Remote Command Notes:	The command supports 5 parameters. Note that the last 4 (<soffset>,<length>,<roffset>,<rlimit>) are optional. But these optional parameters must be entered in the specified order. For example, if you want to specify <length>, then you must also specify <soffset>. See details below for a definition of each of these parameters. This command uses the data in the format specified by FORMat:DATA, returning either binary or ASCII data.
Example:	To query the mean power of a set of GSM bursts: Supply a signal that is a set of GSM bursts. Select the IQ Waveform measurement (in IQ Analyzer Mode). Set the sweep time to acquire at least one burst. Set the triggers such that acquisition happens at a known position relative to a burst. Then query the mean burst levels using, CALC:DATA2:COMP? MEAN,24e–6,526e–6 (These parameter values correspond to GSM signals, where 526e–6 is the length of the burst in the slot and you just want 1 burst.)
Instrument S/W Revision:	Prior to A.02.00

- BLOCk or block data - returns all the data points from the region of the trace data that you specify. For example, it could be used to return the data points of an input signal over several timeslots, excluding the portions of the trace data that you do not want. (This is x,y pairs for trace data and I,Q pairs for complex data.)
- CFIT or curve fit - applies curve fitting routines to the data. <soffset> and <length> are required to define the data that you want. <roffset> is an optional parameter for the desired order of the curve equation. The query will return the following values: the x-offset (in seconds) and the curve coefficients ((order + 1) values).

MIN, MAX, MEAN, DME, RMS, RMSC, SAMP, SDEV and PPH return one data value for each specified region (or <length>) of trace data, for as many regions as possible until you run out of trace data (using <roffset> to specify regions). Or they return the number of regions you specify (using <rlimit>) ignoring any data beyond that.

- MINimum - returns the minimum data point (x,y pair) for the specified region(s) of trace data. For I/Q trace data, the minimum magnitude of the I/Q pairs is returned.
- MAXimum - returns the maximum data point (x,y pair) for the specified region(s) of trace data. For I/Q trace data, the maximum magnitude of the I/Q pairs is returned.

MEAN - returns a single value that is the arithmetic mean of the data point values (in dB/ dBm) for the specified region(s) of trace data. For I/Q trace data, the mean of the magnitudes of the I/Q pairs is returned. See the following equations.

NOTE If the original trace data is in dB, this function returns the arithmetic mean of those log values, not log of the mean power which is a more useful value. The mean of the log is the better measurement technique when measuring CW signals in the presence of noise. The mean of the power, expressed in dB, is useful in power measurements such as Channel Power. To achieve the mean of the power, use the RMS option.

Equation 1
Mean Value of Data Points for Specified Region(s)

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

vsd27-1

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

Equation 2
Mean Value of I/Q Data Pairs for Specified Region(s)

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

vsd27-2

where |Xi| is the magnitude of an I/Q pair, and n is the number of I/Q pairs in the specified region(s).

- DMEan - returns a single value that is the mean power (in dB/ dBm) of the data point values for the specified region(s) of trace data. See the following equation:

Equation 3
DMEan Value of Data Points for Specified Region(s)

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

vsd27-3

- RMS - returns a single value that is the average power on a root-mean-squared voltage scale (arithmetic rms) of the data point values for the specified region(s) of trace data. See the following equation.

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

NOTE	This function is very useful for I/Q trace data. However, if the original trace data is in dB, this function returns the rms of the log values which is not usually needed.

Equation 4
RMS Value of Data Points for Specified Region(s)

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

vsd27-4

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

Equation 5
RMS Value of I/Q Data Pairs for Specified Region(s)

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

vsd27-5

where Xi is the complex value representation of an I/Q pair, Xi* its conjugate complex number, and n is the number of I/Q pairs in the specified region(s).

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

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

- SAMPle - returns the first data value (x,y pair) for the specified region(s) of trace data. For I/Q trace data, the first I/Q pair is returned.
- SDEViation - returns a single value that is the arithmetic standard deviation for the data point values for the specified region(s) of trace data. See the following equation.

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

Equation 6
Standard Deviation of Data Point Values for Specified Region(s)

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

vsd27-7

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

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

vsd27-8

where |Xi| is the magnitude of an I/Q pair, X is the mean of the magnitudes for the specified region(s), and n is the number of data points in the specified region(s).

- PPHase - returns the x,y pairs of both rms power (dBm) and arithmetic mean phase (radian) for every specified region and frequency offset (Hz). The number of pairs is defined by the specified number of regions. This parameter can be used for I/Q vector (n=0) in Waveform (time domain) measurement and all parameters are specified by data point in PPHase.

  The rms power of the specified region may be expressed as:

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

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

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

vsd27-9

where Xi is the complex value representation of an I/Q pair, Xi* its conjugate complex number, and n is the number of I/Q pairs in the specified region.

The arithmetic mean phase of the specified region may be expressed as:

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

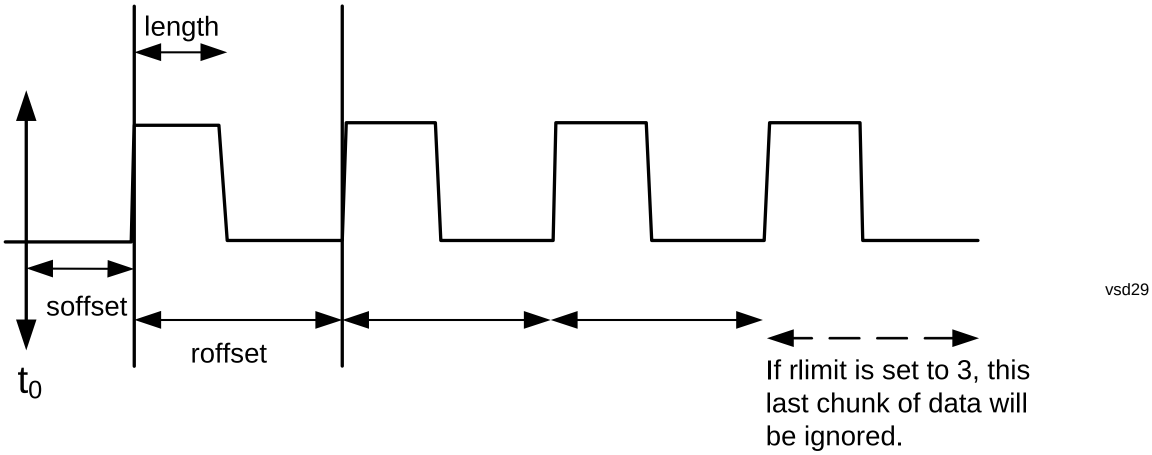
vsd27-10

where Yi is the unwrapped phase of I/Q pair with applying frequency correction and n is the number of I/Q pairs in the specified region.

The frequency correction is made by the frequency offset calculated by the arithmetic mean of every specified region’s frequency offset. Each frequency offset is calculated by the least square method against the unwrapped phase of I/Q pair.

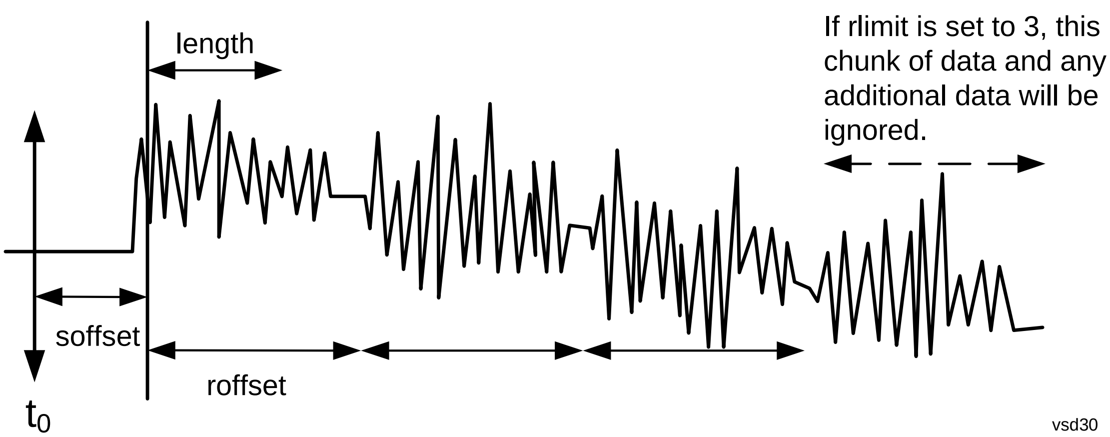
Sample Trace Data - Constant Envelope

(See below for explanation of variables.)



Sample Trace Data - Not Constant Envelope

(See below for explanation of variables.)



<soffset> - start offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints – 1, for frequency-domain traces). It specifies the amount of data at the beginning of the trace that will be ignored before the decimation process starts. It is the time or frequency change from the start of the trace to the point where you want to start using the data. The default value is zero.

<length> - is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints – 1, for frequency-domain traces). It defines how much data will be compressed into one value. This parameter has a default value equal to the current trace length.

<roffset> - repeat offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints – 1, for frequency-domain traces). It defines the beginning of the next field of trace elements to be compressed. This is relative to the beginning of the previous field. This parameter has a default value equal to the <length> variable. Note that this parameter is used for a completely different purpose when curve fitting (see CFIT above).

<rlimit> - repeat limit is an optional integer. It specifies the number of data items that you want returned. It will ignore any additional items beyond that number. You can use the Start offset and the Repeat limit to pick out exactly what part of the data you want to use. The default value is all the data.

Calculate Peaks of Trace Data (Remote Command Only)

Returns a list of all the peaks for the currently selected measurement and sub-opcode [n]. The peaks must meet the requirements of the peak threshold and excursion values.

n = any valid sub-opcode for the current measurement. See the MEASure:<measurement> command description of your specific measurement for information on the data that can be returned.

The command can only be used with specific sub-opcodes with measurement results that are trace data. Both real and complex traces can be searched, but complex traces are converted to magnitude in dBm. In many measurements the sub-opcode n=0, is the raw trace data which cannot be searched for peaks. And Sub-opcode n=1, is often calculated results values which also cannot be searched for peaks.

This command uses the data setting specified by the FORMat:BORDer and FORMat:DATA commands and can return real or ASCII data. If the format is set to INT,32, it returns REAL,32 data.

The command has four types of parameters:

- Threshold (in dBm)
- Excursion (in dB)
- Sorting order (amplitude, frequency, time)
- Optional in some measurements: Display line use (all, > display line, < display line)

Remote Command:

For Swept SA measurement:

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

For most other measurements:

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

Example:

Example for Swept SA measurement in Spectrum Analyzer Mode:

CALC:DATA4:PEAK? –40,10,FREQ,GTDL This will identify the peaks of trace 4 that are above –40 dBm, with excursions of at least 10 dB. The peaks are returned in order of increasing frequency, starting with the lowest frequency. Only the peaks that are above the display line are returned.

Query Results 1:

With FORMat:DATA REAL,32 selected, it returns a list of floating-point numbers. The first value in the list is the number of peak points that are in the following list. A peak point consists of two values: a peak amplitude followed by its corresponding frequency (or time).

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

Dependencies/Couplings:	Values must be provided for threshold and excursion. The sorting and display line parameters are optional (defaults are AMPLitude and ALL). Note that there is always a Y-axis value for the display line, regardless of whether the display line state is on or off. It is the current Y-axis value of the display line which is used by this command to determine whether a peak should be reported.
Notes:	<n> - is the trace that will be used <threshold> - is the level below which trace data peaks are ignored. Note that the threshold value is required and is always used as a peak criterion. To effectively disable the threshold criterion for this command, provide a substantially low threshold value such as –200 dBm. Also note that the threshold value used in this command is independent of and has no effect on the threshold value stored under the Peak Criteria menu. <excursion> - is the minimum amplitude variation (rise and fall) required for a signal to be identified as peak. Note that the excursion value is required and is always used as a peak criterion. To effectively disable the excursion criterion for this command, provide the minimum value of 0.0 dB. Also note that the excursion value used in this command is independent of and has no effect on the excursion value stored under the Peak Criteria menu. 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.
Instrument S/W Revision:	Prior to A.02.00

Format Data: Numeric Data (Remote Command Only)

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

Remote Command:	`:FORMat[:TRACe][:DATA] ASCii|INTeger,32|REAL,32 |REAL,64`
	
	`:FORMat[:TRACe][:DATA]?`

Remote Command Notes:	The query response is: ASCii: ASC,8 REAL,32: REAL,32 REAL,64: REAL,64 INTeger,32: INT,32 When the numeric data format is REAL or ASCii, data is output in the current Y Axis unit. When the data format is INTeger, data is output in units of m dBm (.001 dBm). Note that the INT,32 format is only applicable to the command, TRACe:DATA. This preserves backwards compatibility for the Swept SA measurement. For all other commands/queries which honor FORMat:DATA, if INT,32 is sent the analyzer will behave as though it were set to REAL,32. The INT,32 format returns binary 32-bit integer values in internal units (m dBm), in a definite length block.
Dependencies/Couplings:	Sending a data format spec with an invalid number (for example, INT,48) generates no error. The analyzer simply uses the default (8 for ASCii, 32 for INTeger, 32 for REAL). Sending data to the analyzer which does not conform to the current FORMat specified, results in an error.
Preset:	ASCii
Instrument S/W Revision:	Prior to A.02.00

The specs for each output type follow:

ASCii - Amplitude values are in ASCII, in the current Y Axis Unit, one ASCII character per digit, values separated by commas, each value in the form:

SX.YYYYYEsZZ

Where:

S = sign (+ or -)

X = one digit to left of decimal point

Y = 5 digits to right of decimal point

E = E, exponent header

s = sign of exponent (+ or -)

ZZ = two digit exponent

REAL,32 - Binary 32-bit real values in the current Y Axis Unit, in a definite length block.

REAL,64 - Binary 64-bit real values in the current Y Axis Unit, in a definite length block.

Format Data: Byte Order (Remote Command Only)

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

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

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

Remote Command:	`:FORMat:BORDer NORMal|SWAPped`
	`:FORMat:BORDer?`
Preset:	NORMal
Instrument S/W Revision:	Prior to A.02.00

Meas Setup

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

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

Mode

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

NOTE	Key operation can be different between modes. The information displayed in Help is about the current mode. To access Help for a different Mode you must first exit Help (by pressing the Cancel (Esc) key). Then select the desired mode and re-access Help.

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

It is possible to specify the order in which the Modes appear in the Mode menu, using the Configure Applications utility (**System, Power On, Configure Applications**). It is also possible, using the same utility, to specify a subset of the available applications to load at startup time, which can significantly decrease the startup time of the analyzer. If this is done, then during runtime, if an application which is not loaded into memory is selected by you using the Mode menu or by sending SCPI commands, there will be a significant pause while the Application is loaded. During this pause a message box which says "Loading application …" is displayed.

Remote Command	`:INSTrument[:SELect] SA|BASIC|ADEMOD|NFIGURE|PNOISE|CDMA2K|TDSCDMA|VSA|VSA89601|WCDMA|WIMAXOFDMA|EDGEGSM|CDMA1XEV|RLC`
	
	`:INSTrument[:SELect]?`

Example	:INST SA
Remote Command Notes	The available parameters are dependent upon installed and licensed applications resident in the instrument. Parameters given here are an example, specific parameters are in the individual Application. Once an instrument mode is selected, only the commands that are valid for that mode can be executed.
Key Path	**Front-panel key**
Preset	Not affected by Preset. Set to SA following Restore System Defaults, if SA is the default mode.
State Saved	Saved in state
Instrument S/W Revision	Prior to A.02.00

Application Mode Number Selection (Remote Command only)

Select the measurement mode by its mode number. The actual available choices depend upon which applications are installed in your instrument. The modes appear in this table by NSEL number, which is not the same as their order in the Mode menu (see "Detailed List of Modes" on page 1092 for the mode order).

Mode	:INSTrument:NSELect <integer>	:INSTrument[:SELect] <parameter>
Spectrum Analyzer	1	SA
I/Q Analyzer (Basic)	8	BASIC
WCDMA with HSDPA/HSUPA	9	WCDMA
cdma2000	10	CDMA2K
GSM/EDGE/EDGE Evo	13	EDGEGSM
Phase Noise	14	PNOISE
1xEV-DO	15	CDMA1XEV
Combined WLAN	19	CWLAN
802.16 OFDMA (WiMAX/WiBro)	75	WIMAXOFDMA
Combined Fixed WiMAX	81	CWIMAXOFDM
Vector Signal Analyzer (VXA)	100	VSA
89601 VSA	101	VSA89601
LTE	102	LTE
iDEN/WiDEN/MotoTalk	103	IDEN
802.16 OFDM (Fixed WiMAX)	104	WIMAXFIXED
TD-SCDMA with HSPA/8PSK	211	TDSCDMA
Noise Figure	219	NFIGURE
Analog Demod	234	ADEMOD
DVB-T/H	235	DVB
DTMB	236	DTMB
Remote Language Compatibility	266	RLC

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 SA mode) following Restore System Defaults.
State Saved:	Saved in state
Instrument S/W Revision:	Prior to A.02.00

Application Mode Catalog Query (Remote Command only)

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

Remote Command:	`:INSTrument:CATalog?`
Example:	:INST:CAT?
Remote Command Notes:	Query returns a quoted string of the installed and licensed modes separated with a comma. Example: "SA,PNOISE,WCDMA"
Instrument S/W Revision:	Prior to A.02.00

Application Identification (Remote Commands only)

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

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

Current Application Model

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

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, the value will be the selected application when Save is done.
Instrument S/W Revision:	Prior to A.02.00

Current Application Revision

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

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)
Preset:	Not affected by Preset
State Saved:	Not saved in state, the value will be the selected application when Save is done.
Instrument S/W Revision:	Prior to A.02.00

Current Application Options

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

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

Application Identification Catalog (Remote Commands only)

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

Application Catalog number of entries

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

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

Application Catalog Model Numbers

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

Remote Command:	`:SYSTem:APPLication:CATalog[:NAME]?`
Example:	:SYST:APPL:CAT?
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.
Instrument S/W Revision:	Prior to A.02.00

Application Catalog Revision

Returns the Revision of the provided Model Number.

Remote Command:	`:SYSTem:APPLication:CATalog:REVision? <model>`
Example:	:SYST:APPL:CAT:REV? ‘N9060A’
Remote Command Notes:	Returned value is a quoted string of revision for the provided Model Number. The revision will be a null-string ("") if the provided Model Number is not installed and licensed. Example, if SAMS is installed and licensed: "1.0.0.0"
Preset:	Not affected by Preset
State Saved:	Not saved in state.

Instrument S/W Revision:	Prior to A.02.00

Application Catalog Options

Returns a list of Options for the provided Model Number

Remote Command:	`:SYSTem:APPLication:CATalog:OPTion? <model>`
Example:	:SYST:APPL:CAT:OPT? 'N9060A'
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.
Instrument S/W Revision:	Prior to A.02.00

Detailed List of Modes

Spectrum Analyzer

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

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

Example	INST:SEL SA INST:NSEL 1
Key Path	**Mode**
Instrument S/W Revision	Prior to A.02.00

IQ Analyzer (Basic)

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

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

Example	INST:SEL BASIC INST:NSEL 8
Key Path	**Mode**
Instrument S/W Revision	Prior to A.02.00

W-CDMA with HSDPA/HSUPA

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

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

Example	INST:SEL WCDMA INST:NSEL 9
Key Path	**Mode**
Instrument S/W Revision	Prior to A.02.00

GSM/EDGE/EDGE Evo

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

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

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

802.16 OFDMA (WiMAX/WiBro)

Selects the OFDMA mode for general purpose measurements of WiMAX signals. There are several measurements available in this mode.

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

Example	INST:SEL WIMAXOFDMA
	INST:NSEL 75
Key Path	**Mode**
Instrument S/W Revision	Prior to A.02.00

Vector Signal Analyzer (VXA)

The 89601X Vector Signal Analyzer provides vector-signal analysis measurement capability. It provides 3 main measurements that allow you to measure the signal quality of all varieties of RF modulation:

- Digital Demodulation
- Analog Demodulation
- Vector Signal Analysis

There are advanced modulation analysis and troubleshooting capabilities including the following communications formats: AM, FM, PM, WiMAX, W-CDMA, 2G, 3G, 3.5G, WLAN, digital video, and more. It also provides standard-specific measurements for analysis of iDEN, WiDEN, and MotoTalk signals with Option H09.

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

Example	INST:SEL VSA
	INST:NSEL 100
Key Path	**Mode**
Instrument S/W Revision	Prior to A.02.00

Phase Noise

The Phase Noise mode provides pre-configured measurements for making general purpose measurements of device phase noise.

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

Example	INST:SEL PNOISE
	or
	INST:NSEL 14

Key Path	**Mode**
Instrument S/W Revision	Prior to A.02.00

Noise Figure

The Noise Figure mode provides pre-configured measurements for making general purpose measurements of device noise figure.

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

Example	INST:SEL NFIGURE
	Or
	INST:NSEL 219
Key Path	**Mode**
Instrument S/W Revision	Prior to A.02.00

Analog Demod

Selects the Analog Demod mode for making measurements of AM, FM and phase modulated signals.

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

Example	INST:SEL ADEMOD
	INST:NSEL 234
Key Path	**Mode**
Instrument S/W Revision	Prior to A.02.00

TD-SCDMA with HSPA/8PSK

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

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

Example	INST:SEL TDSCDMA
	INST:NSEL 211
Key Path	**Mode**
Instrument S/W Revision	Prior to A.02.00

cdma2000

Selects the cdma2000 mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

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

Example	INST:SEL CDMA2K INST:NSEL 10
Key Path	**Mode**
Instrument S/W Revision	Prior to A.02.00

1xEV-DO

Selects the 1xEV-DO mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

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

Example	INST:SEL CDMA1XEV INST:NSEL 15
Key Path	**Mode**
Instrument S/W Revision	Prior to A.02.00

LTE

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

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

Example	INST:SEL LTE INST:NSEL 102
Key Path	**Mode**
Instrument S/W Revision	Prior to A.02.00

DVB-T/H

Selects the DVB-T/H mode for measurements of digital video signals using this format. There are several power and demod measurements available in this mode.

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

Example	INST:SEL DVB
	INST:NSEL 235
Key Path	**Mode**
Instrument S/W Revision	A.02.00

DTMB

Selects the DTMB mode for measurements of digital video signals using this format. There are several power and demod measurements available in this mode.

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

Example	INST:SEL DTMB
	INST:NSEL 236
Key Path	**Mode**
Instrument S/W Revision	A.02.00

Combined WLAN

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

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

Example	INST:SEL CWLAN
	INST:NSEL 19
Key Path	**Mode**
Instrument S/W Revision	A.02.00

Combined Fixed WiMAX

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

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

Example	INST:SEL CWIMAXOFDM
	INST:NSEL 81
Key Path	**Mode**

Instrument S/W Revision	A.02.00

802.16 OFDM (Fixed WiMAX)

Selects the 802.16 OFDM (Fixed WiMAX) mode. This mode allows modulation quality measurements of signals that comply with IEEE 802.16a–2003 and IEEE 802.16–2004 standards, with flexibility to measure nonstandard OFDM formats. Along with the typical digital demodulation measurement results, several additional 802.16 OFDM unique trace data formats and numeric error data results provide enhanced data analysis.

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

Key Path	**Mode**
Example	INST:SEL WIMAXFIXED
	INST:NSEL 104
Instrument S/W Revision	A.02.00

iDEN/WiDEN/MOTOTalk

Selects the iDEN/WiDEN/MOTOTalk mode for general purpose measurements of iDEN and iDEN-related signals. There are several measurements available in this mode.

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

Example	INST:SEL IDEN
	INST:NSEL 103
Key Path	**Mode**
Instrument S/W Revision	A.02.00

Remote Language Compatibility

The Remote Language Compatibility (RLC) mode provides remote command backwards compatibility for the 8560 series of spectrum analyzers, known as legacy spectrum analyzers.

NOTE	After changing into or out of RLC mode, allow a 1 second delay before sending any subsequent commands.

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

Example	INST:SEL RLC
	Or
	INST:NSEL 266

Key Path	**Mode**
Instrument S/W Revision	Prior to A.02.00

89601 VSA

Selecting the 89601 VSA mode will start the 89600-Series VSA software application. The 89600 VSA software is powerful, PC-based software, offering the industry's most sophisticated general purpose and standards specific signal evaluation and troubleshooting tools for the R&D engineer. Reach deeper into signals, gather more data on signal problems, and gain greater insight.

- Over 30 general-purpose analog and digital demodulators ranging from 2FSK to 1024QAM
- Standards specific modulation analysis including:
- Cell: GSM, cdma2000, WCDMA, TD-SCDMA and more
- Wireless networking: 802.11a/b/g, 802.11n, 802.16 WiMAX (fixed/mobile), UWB
- RFID
- Digital satellite video and other satellite signals, radar, LMDS
- Up to 400K bin FFT, for the highest resolution spectrum analysis
- A full suite of time domain analysis tools, including signal capture and playback, time gating, and CCDF measurements
- Six simultaneous trace displays and the industry's most complete set of marker functions
- Easy-to-use Microsoft ® Windows ® graphical user interface

For more information see the Agilent 89600 Series VSA web site at www.agilent.com/find/89600

To learn more about how to use the 89600 VSA running in the MXA, after the 89600 VSA application is running, open the 89600 VSA Help and open the "About Agilent X-Series Signal Analyzers (MXA/EXA) with 89600-Series Software" help topic.

Example	INST:SEL VSA89601
	INST:NSEL 101
Key Path	**Mode**
Instrument S/W Revision	Prior to A.02.00

Mode Setup

Mode Setup opens a menu of keys that allows you to specify parameters of the mode.

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

Radio

Accesses the Radio setup menu.

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

Band

Selects the standard variant that applies to the radio to be tested.

KEY:P-GSM SCPI:PGSM	Primary GSM in the 900 MHz band
KEY:E-GSM SCPI:EGSM	Extended GSM in the 900 MHz band
KEY:R-GSM SCPI:RGSM	Railway GSM in the 900 MHz band
KEY:DCS 1800 SCPI:DCS1800	DSC1800 band; also known as GSM–1800
KEY:PCS 1900 SCPI:PCS1900	PCS1900 band; also known as GSM–1900
KEY:GSM 450 SCPI:GSM450	GSM450 band
KEY:GSM 480 SCPI:GSM480	GSM480 band
KEY:GSM 700 SCPI:GSM700	GSM700 band
KEY:GSM 850 SCPI:GSM850	GSM850 band, for IS–136HS

Remote Command	`[:SENSe]:RADio:STANdard:BAND PGSM|EGSM|RGSM|DCS1800|PCS1900|GSM450|GSM480|GSM700|GSM 850` `[:SENSe]:RADio:STANdard:BAND?`

Example	RAD:STAN:BAND PGSM RAD:STAN:BAND?
Key Path	**Mode Setup, Radio**
Mode	GSM
Scope	Meas Global
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	PGSM
State Saved	Saved in instrument state.
Range	P-GSM|E-GSM|R-GSM|DCS 1800|PCS 1900|GSM 450|GSM 480|GSM 700|GSM 850
Instrument S/W Revision	Prior to A.02.00

Device

Selects the type of radio device to be tested.

BTS - Base station transmitter test

MS - Mobile station transmitter test

Remote Command	`[:SENSe]:RADio:DEVice BTS|MS` `[:SENSe]:RADio:DEVice?`
Example	RAD:DEV BTS RAD:DEV?
Key Path	**Mode Setup, Radio**
Mode	GSM
Scope	Meas Global
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	BTS
State Saved	Saved in instrument state.
Range	BTS|MS
Instrument S/W Revision	Prior to A.02.00

BTS Type

Selects the type of base station to be tested.

KEY:Normal SCPI:NORMal	Normal BTS.
KEY:Micro1 SCPI:MICR1|MICRo	Micro 1 BTS. Note: SCPI enumeration 'MICRo' is kept for backward compatibility. It is equivalent to 'MICR1'.
KEY:Micro2 SCPI:MICR2	Micro 2 BTS.
KEY:Micro3 SCPI:MICR3	Micro 3 BTS.
KEY:Pico1 SCPI:PICO1|PICO	Pico 1 BTS. Note: SCPI enumeration 'PICO' is kept for backward compatibility. It's equivalent to 'PICO1'.

Remote Command	`[:SENSe]:RADio:DEVice:BASE[:TYPE] NORMal|MICRo|MICR1|MICR2|MICR3|PICO|PICO1` `[:SENSe]:RADio:DEVice:BASE[:TYPE]?`
Example	RAD:DEV:BASE PICO1 RAD:DEV:BASE?
Key Path	**Mode Setup, Radio**
Mode	GSM
Scope	Meas Global
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	NORMal
State Saved	Saved in instrument state.
Range	Normal|Micro1|Micro2|Micro3|Pico1
Instrument S/W Revision	Prior to A.02.00

Freq Hopping

Turns the carrier hopping mode on and off. If frequency hopping is turned on, the instrument ignores the bursts when the frequency is hopped off the selected channel frequency. Thus only valid data is included in the results.

This parameter applies only to the following measurements:

- GMSK/EDGE Transmit Power measurement
- GMSK/EDGE Power vs. Time measurement
- GMSK/EDGE Output RF Spectrum measurement
- GMSK Phase & Frequency Error measurement
- EDGE EVM measurement

Remote Command	`[:SENSe]:RADio:CARRier:HOP OFF|ON|0|1` `[:SENSe]:RADio:CARRier:HOP?`
Example	RAD:CARR:HOP ON RAD:CARR:HOP?
Key Path	**Mode Setup, Radio**
Mode	GSM
Scope	Meas Global
Notes	This functionality does not affect Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

Carrier

Selects the type of RF carrier on the device to be tested. You need to select ‘Cont’ if all 8 slots are active in the frame and the carrier has no gaps between the slots.

KEY:Burst SCPI:BURSt	For single or multi slotted burst carrier signal.
KEY:Cont SCPI:CONTinuous	For continuous multi slot carrier signal.

This parameter applies only to the following measurements:

- GMSK/EDGE Power vs. Time measurement
- GMSK Phase & Frequency Error measurement
- EDGE EVM measurement

The GMSK/EDGE Power vs. Time measurement does not support full continuous multi-slot signals (no gap between two adjacent slots).

EDGE EVM will skip burst search for Multi-Slot signals.

Remote Command	`[:SENSe]:RADio:CARRier[:TYPE] BURSt|CONTinuous` `[:SENSe]:RADio:CARRier[:TYPE] ?`
Example	RAD:CARR BURS RAD:CARR?
Key Path	**Mode Setup, Radio**
Mode	GSM
Scope	Meas Global
Notes	This functionality does not affect Combined GSM/EDGE measurement. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	BURSt
State Saved	Saved in instrument state.
Range	Burst|Cont
Instrument S/W Revision	Prior to A.02.00

Pwr Ctrl Lvl(PCL)

Allows you to choose the power control level (PCL) of the transmitter.

Selection:AutoRange SCPI:ON|1	PCL is determined by the measured carrier power level, and is used to determine the test limits. Since PCL is an integer number, the value is determined by the nearest Target Carrier Power level. For example, if the measured carrier power level is +35.9 dBm in a GSM 400 system, the nearest Target Carrier Power is 35 dBm, so the PCL would be set to 4. If the measured carrier power level is just the center between Target Carrier Power like 34.0 dBm, the PCL would be determined by the higher Target Carrier Power (in this case, 35 dBm, PCL:4).
Selection:Man SCPI:OFF|0	User defined PCL is used to determine the test limits.

This parameter applies only to the following measurements:

- GMSK/EDGE Power vs. Time measurement
- GMSK/EDGE Output RF Spectrum measurement

This parameter applies only when the selected "Device" on page 1102Device is MS.

Target Carrier Power [dBm]	Power Control Level
39	2
37	3
35	4
33	5
31	6
29	7
27	8
25	9
23	10
21	11
19	12
17	13
15	14
13	15
11	16
9	17
7	18
5	19

Table 6-1: Power Control Level for GSM 400, GSM 900, GSM 850 and GSM 700

Target Carrier Power [dBm]	Power Control Level
36	29
34	30
32	31
30	0
28	1
26	2
24	3
22	4
20	5
18	6
16	7
14	8
12	9
10	10
8	11
6	12
4	13
2	14
0	15

Table 6-2: Power Control Level for DCS 1800

Target Carrier Power [dBm]	Power Control Level
33	30
32	31
30	0
28	1
26	2
24	3
22	4
20	5
18	6
16	7
14	8
12	9
10	10
8	11
6	12
4	13
2	14
0	15

Table 6-3: Power Control Level for PCS 1900

Remote Command	`[:SENSe]:RADio:PCLevel <integer>`
	`[:SENSe]:RADio:PCLevel?`
	`[:SENSe]:RADio:PCLevel:AUTO 0|1|OFF|ON`
	`[:SENSe]:RADio:PCLevel:AUTO?`

Example	RAD:PCL 3 RAD:PCL? RAD:PCL:AUTO ON RAD:PCL:AUTO?
Dependencies/Couplings	Applicable only for Power vs. Time and Output RF Spectrum measurements. Unavailable unless selected “Device” on page 1102Device is MS.
Key Path	**Mode Setup, Demod**
Mode	GSM
Scope	Meas Global
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	1 ON

State Saved	Saved in instrument state.
Min	0
Max	40
Instrument S/W Revision	Prior to A.02.00

Demod

Accesses the Demod setup menu.

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

Time Slot

Selects On or Off for slot searching. Generally, this feature is only valid in external and periodic timer trigger source modes that triggers every frame since another trigger source does not have the information where is the head of the frame. When Timeslot is set to On, the demodulation measurement is made on the nth timeslot specified by the trigger point + n timeslots, where n is the selected timeslot value 0 to 7.

Remote Command	`[:SENSe]:CHANnel:SLOT <integer>`
	`[:SENSe]:CHANnel:SLOT?`
	`[:SENSe]:CHANnel:SLOT:AUTO OFF|ON|0|1`
	`[:SENSe]:CHANnel:SLOT:AUTO?`

Example	CHAN:SLOT 0 CHAN:SLOT? CHAN:SLOT:AUTO OFF CHAN:SLOT:AUTO?
Key Path	**Mode Setup, Demod** **FREQ Channel**
Mode	GSM
Scope	Meas Global
Notes	This functionality does not affect Combined GSM/EDGE measurement. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0 OFF
State Saved	Saved in instrument state.
Min	0

Max	7
Instrument S/W Revision	Prior to A.02.00

Burst Type

Sets the burst type that the analyzer will search for and to which it will syncronize.

KEYSync (SCH)	Burst length = 142 symbols
SCPISYNC	Extended training sequences for CTS and COMPACT synchronization bursts are not supported.
KEYAccess (RACH)	Burst length = 88 symbols
SCPIACCess	Alternative training (synchronization) sequence “TS1” and “TS2” are supported only in GSMK Power vs. Time.
KEYNormal - NB (TCH & CCH)	Burst length = 142 symbols
SCPINORMal	Softkey label will be changed to ‘Normal – NB’ form ‘Normal’
KEYHigher Symbol Rate - HB (TCH & CCH)	Burst length = 169 symbols
SCPIHSRate	This selection key is only shown when the EDGE Evolution N9071A–3FP license is installed.
KEY Mixed (NB/HB for TSC sync)	Enables auto detection between Normal (NB) and HSR (HB) TCH & CCH EDGE Burst.
SCPI MIXed	This selection key is only shown when the EDGE Evolution N9071A–3FP license is installed.

Measurement synchronization capability (Burst Sync = Training Seq)

	Sync	Access	Normal		HSR	Mixed
			GMSK	8PSK 16QAM 32QAM		
GMSK Phase & Freq Error measurement	Yes	Yes	Yes	No	N/A (measures as Normal GMSK when selected)	
GMSK Power vs. Time measurement	Yes	Yes	Yes	No		
GMSK Output RF Spectrum measurement (when Trigger Source is Periodic Timer and Sync Source is Off)	No	No	Yes	No		
EDGE EVM measurement	Yes	Yes	Yes	Yes	Yes	Yes
EDGE Power vs. Time measurement	Yes	Yes	Yes	Yes	Yes	Yes
EDGE Output RF Spectrum measurement (when Trigger Source is Periodic Timer and Sync Source is Off.)	No	No	Yes	Yes	Yes	Yes

Remote Command	`[:SENSe]:CHANnel:BURSt NORMal|SYNC|ACCess|HSRate|MIXed`
	`[:SENSe]:CHANnel:BURSt?`
Example	CHAN:BURS NORM
	CHAN:BURS?
Dependencies/Couplings	Higher Symbol Rate and Mixed selection keys are not shown unless N9071A–3FP is installed. When unlicensed and SCPI is sent, an undefined header error is returned.
	When “Mixed” is selected, the Burst Sync menu key under Meas Setup menu will be unavailable and Training Sequence (TSC) will be used for synchronization. The sync algorithm always runs in Training Sequence (TSC) synchronization because Burst Type can be determined by looking at TSC in the signal. Original selection of Burst Sync will become effective again when the Burst Type selection is changed from “Mixed” to another one.
Key Path	**Mode Setup, Demod**
	FREQ Channel
Mode	GSM
Scope	Meas Global
Notes	This functionality does not affect the Combined GSM/EDGE measurement.
	Higher Symbol Rate and Mixed selections are only available when the N9071A–3FP license is installed. Otherwise these menu keys are blank.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	NORMal
State Saved	Saved in instrument state.
Range	Sync (SCH) | Access (RACH)|Normal - NB (TCH & CCH)|Higher Symbol Rate - HB (TCH & CCH)|Mixed (NB/HB for TSC sync)
Instrument S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

TSC (Std)

Allows you to select the Training Sequence Code that determines which burst is to be measured. Applicable only when Burst Sync is set to Training Sequence in the measurement.

This parameter applies only to the following measurements:

- GMSK/EDGE Power vs. Time measurement
- GMSK Phase & Frequency Error measurement
- EDGE EVM measurement

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

Remote Command	`[:SENSe]:CHANnel:TSCode <integer>`
	`[:SENSe]:CHANnel:TSCode?`
	`[:SENSe]:CHANnel:TSCode:AUTO OFF|ON|0|1`
	`[:SENSe]:CHANnel:TSCode:AUTO?`

Example	CHAN:TSC 3 CHAN:TSC? CHAN:TSC:AUTO 1 CHAN:TSC:AUTO?
Key Path	**Mode Setup, Demod** **FREQ Channel**
Mode	GSM
Scope	Meas Global
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0 ON
State Saved	Saved in instrument state.
Min	0
Max	7
Instrument S/W Revision	Prior to A.02.00

Mod Scheme

This functionality applies only to the following measurements.

- EDGE EVM measurement
- EDGE Power vs. Time measurement
- GMSK/EDGE Output RF Spectrum measurement

When Mod Scheme is “Auto”, the measurements automatically determines which Modulation Scheme the input signal is using.

Key Path	**Mode Setup, Demod**
Instrument S/W Revision	A.02.00

Normal - NB

Selects the Modulation Scheme (modulation type) for Normal Burst that the analyzer will search for when Auto mode is selected. In manual mode, you may select the desired modulation type from the list.

Remote Command	`[:SENSe]:SYNC:NORMal:MODulation:AUTO ON|OFF|1|0`
	`[:SENSe]:SYNC:NORMal:MODulation:AUTO?`
Example	SYNC:NORM:MOD:AUTO 1
	SYNC:NORM:MOD:AUTO?
Dependencies/Couplings	ON automatically changes to OFF when GMSK, 8PSK, 16QAM or 32QAM is selected.
Key Path	**Mode Setup, Demod, Mod Scheme**
Mode	GSM
Scope	Meas Global
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Readback Text	EDGE NB: AutoDet
Instrument S/W Revision	A.02.00

Remote Command	`[:SENSe]:SYNC:NORMal:MODulation GMSK|EPSK|QAM16|QAM32`
	`[:SENSe]:SYNC:NORMal:MODulation?`
Example	SYNC:NORM:MOD QAM32
	SYNC:NORM:MOD?

Dependencies/Couplings	16QAM and 32QAM are available only when the N9071A–3FP license is installed. When it is unlicensed and SCPI is sent, illegal parameter value error is returned.
Key Path	**Mode Setup, Demod, Mod Scheme, Normal - NB**
Mode	GSM
Scope	Meas Global
Notes	You must be in the GSM mode to use this command. Use :INSTrument:SELect to set the mode.
Preset	EPSK
State Saved	Saved in instrument state.
Range	GMSK|8PSK|16QAM|32QAM
Instrument S/W Revision	A.02.00

HSR - HB

Selects the Modulation Scheme (modulation type) for HSR Burst that the analyzer will search for when Auto mode is selected. In manual mode, you may select the desired modulation type from the list.

Remote Command	`[:SENSe]:SYNC:HSRate:MODulation:AUTO ON|OFF|1|0` `[:SENSe]:SYNC:HSRate:MODulation:AUTO?`
Example	SYNC:HSR:MOD:AUTO 1 SYNC:HSR:MOD:AUTO?
Dependencies/Couplings	This key is only shown when the N9071A–3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error is returned. ON automatically changes to OFF when QPSK, 16QAM or 32QAM is selected.
Key Path	**Mode Setup, Demod, Mod Scheme**
Mode	GSM
Scope	Meas Global
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On|Off
Readback Text	EDGE HB: AutoDet
Instrument S/W Revision	A.02.00

Remote Command	`[:SENSe]:SYNC:HSRate:MODulation QPSK|QAM16|QAM32`
	`[:SENSe]:SYNC:HSRate:MODulation?`
Example	SYNC:HSR:MOD QAM32
	SYNC:HSR:MOD?
Dependencies/Couplings	This key is only shown when the N9071A–3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error is returned.
Key Path	**Mode Setup, Demod, Mod Scheme, HSR - HB**
Mode	GSM
Scope	Meas Global
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	QAM16
State Saved	Saved in instrument state.
Range	QPSK|16QAM|32QAM
Instrument S/W Revision	A.02.00

Config Manual Sync Method

Selects the behavior type of synchronization and measurement for the Mod Scheme selected in NB or HB. This method is applicable in EDGE EVM and EDGE Power vs Time when Burst Sync is set to Training Sequence (by default)

Force Selected Method on All Slots: In EDGE Power vs Time, the selected Mod Scheme is forced to use the synchronization method regardless of the input signal format. In EDGE EVM, the Mod Scheme is forced to use the demodulation method in addition to (as well as) the synchronization method. When the selected Mod Scheme does not match the input signal format (for example, if the selected Mode Scheme is 8PSK and the input signal format is 16QAM), a large EVM number or sync error may be observed.

Discard Non-Matching Slots: Performs auto synchronization and picks up the value when the detected Mod Scheme matches the manually selected Mod Scheme. For example, if a signal which contains 8PSK, 16QAM and 32QAM formats is fed and the selected Mod Scheme is 16QAM, the analyzer will report measurement results of 16QAM only.

Remote Command	`[:SENSe]:SYNC:CONFigure:METHod FORCe|DISCard`
	`[:SENSe]:SYNC:CONFigure:METHod?`
Example	SYNC:CONF:METH FORC
	SYNC:CONF:METH?
Dependencies/Couplings	Unavailable when both of Mod Scheme Normal and HSR are set to AutoDet.
Key Path	**Mode Setup, Demod, Mod Scheme**
Mode	GSM

Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	DISC
State Saved	Saved in instrument state.
Range	Force Selected Method on All Slots|Discard Non-Matching Slots
Readback Text	Force Method|Discard Mismatch
Instrument S/W Revision	A.02.00

Burst Search Threshold

Sets the relative power threshold from the peak power, which is used by the burst alignment algorithm to determine the burst rising edge and falling edge.

Remote Command	`[:SENSe]:SYNC:BURSt:STHReshold <rel_ampl>`
	`[:SENSe]:SYNC:BURSt:STHReshold?`
Example	SYNC:BURS:STHR –20
	SYNC:BURS:STHR?
Key Path	**Mode Setup, Demod**
Mode	GSM
Scope	Meas Global
Notes	This functionality does not affect Combined GSM/EDGE measurement.
	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	–30
State Saved	Saved in instrument state.
Min	–200
Max	–0.01
Instrument S/W Revision	Prior to A.02.00

HSR Pulse Shaping Filter

Selects the pulse shaping filter for higher symbol rate (HSR) signals. This menu key is available only when the N9071A–3FP license is installed.

This functionality applies only to the following measurements:

- EDGE EVM measurement
- EDGE Power vs. Time measurement
- GMSK/EDGE Output RF Spectrum measurement

KEY: Narrow	Use the Spectrally Narrow Pulse Shaping Filter.
SCPI: NARRow	
KEY: Wide	Use the Spectrally Wide Pulse Shaping Filter.
SCPI: WIDE	

Remote Command	`[:SENSe]:RADio:PSHape NARRow|WIDE` `[:SENSe]:RADio:PSHape?`
Example	RAD:PSH WIDE RAD:PSH?
Dependencies/Couplings	This key is only shown when the N9071A–3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error is returned.
Key Path	**Mode Setup, Demod**
Mode	GSM
Scope	Meas Global
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	NARRow
State Saved	Saved in instrument state.
Range	Narrow|Wide
Instrument S/W Revision	A.02.00

Burst Align

Selects the sync alignment to be ether to the GSM standard or the standard offset by 1/2 bit behind.

KEYGSM	Uses the burst alignment as defined in the GSM specifications.
SCPIGSM	

KEY1/2 Bit Offset SCPIHBIT	Shifts the burst alignment by 1/2 bit, which corresponds to an earlier interpretation of the GSM standard. This selection applies to the Power vs. Time and the Phase and Frequency Error measurements.

Remote Command	`[:SENSe]:SYNC:ALIGnment GSM|HBIT` `[:SENSe]:SYNC:ALIGnment?`
Example	SYNC:ALIG HBIT SYNC:ALIG?
Key Path	**Mode Setup, Demod**
Mode	GSM
Scope	Meas Global
Notes	You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	GSM
State Saved	Saved in instrument state.
Range	GSM | 1/2 Bit Offset
Instrument S/W Revision	Prior to A.02.00

Carrier Bandpass Filter

Toggles the band-limited filter between Single (off) and Multi (on). When carriers other than the signal of interest are present, especially if they are strong, they can interfere with the measurement, making it difficult to sync and producing artificially high EVM results. When this condition exists, toggle from Single to Multi. A band-limited filter 600 kHz wide will help reduce the measurement interference.

KEY:On SCPI:MULTiple	Enable multi carrier tolerance filter.
KEY:Off SCPI:SINGle	Disable multi carrier tolerance filter.

This parameter applies only to the following measurements:

- GMSK Phase & Frequency Error measurement
- EDGE EVM measurement

Remote Command	`[:SENSe]:RADio:CARRier:NUMBer SINGle|MULTiple` `[:SENSe]:RADio:CARRier:NUMBer?`
Example	RAD:CARR:NUMB SING RAD:CARR:NUMB?

Key Path	**Mode Setup, Demod**
Mode	GSM
Scope	Meas Global
Notes	The “Carrier Bandpass Filter” key is in the Mode Setup menu, but only EDGE EVM and GSM PFER measurements support this feature. In other measurements, this setting is not applicable. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	SINGle
State Saved	Saved in instrument state.
Range	Single|Multi
Instrument S/W Revision	Prior to A.02.00

RF Sync Delay

Adjusts the “T0” point that position is settled in each measurement. This adjustment does not apply if the Burst Sync key (in each measurement’s Meas Setup menu) is set to None.

This parameter applies only to the following measurements:

- GMSK Phase & Frequency Error measurement
- GMSK/EDGE Power vs. Time measurement
- GMSK/EDGE Output RF Spectrum measurement
- EDGE EVM measurement

Remote Command	`[:SENSe]:SYNC:BURSt:RFAMplitude:DELay <time>` `[:SENSe]:SYNC:BURSt:RFAMplitude:DELay?`
Example	SYNC:BURS:RFAM:DEL –10us SYNC:BURS:RFAM:DEL?
Default Unit	ms
Key Path	**Mode Setup, Demod**
Mode	GSM
Scope	Meas Global
Notes	This functionality does not affect Combined GSM/EDGE measurement. You must be in the GSM mode to use this command. Use INSTrument:SELect to set the mode.
Preset	0
State Saved	Saved in instrument state.

Min	–5 ms
Max	5 ms
Instrument S/W Revision	Prior to A.02.00

Restore Mode Defaults

Restore Mode Defaults resets the state for the currently active mode by resetting the mode persistent settings to their factory default values, clearing mode data and by performing a Mode Preset

For more information, see the section under the key "Restore Mode Defaults" on page 188 in the System Functions section.

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

Peak Search

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

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

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

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

Recall

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

The Recall feature prompts you to answer the questions: What do you want to recall? And to where do you want to recall it? Once these questions are answered the recall can occur. The options in this menu answer the question "What do you want to Recall?"

The options are State, Trace and Data. (Screen Image can be saved, but not recalled.) The default paths for Recall are data type dependent and are the same as for Save.

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	**Front-panel key**
Instrument S/W Revision	Prior to A.02.00

State

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

When this key is pressed, you have 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 you with the option of where to retrieve the state. For quick recalls, the State menu lists 6 registers to recall from or you can select a file to recall from.

Example	MMEM:LOAD:STAT "MyStateFile.state" This loads the state file data (on the default file directory path) into the instrument state.
Remote Command Notes	See “Open” on page 1126.
Key Path	**Recall**
Mode	All
Instrument S/W Revision	Prior to A.02.00

In measurements that support saving Traces, for example, Swept SA, the Trace data is saved along with the State in the State file. When recalling the State, the Trace data is recalled as well. Traces are recalled exactly as they were stored, including the writing mode and update and display modes; so if a Trace was updating and visible when the State was saved, it will come back updating and visible; hence its data will be rewritten right away. So if using State to save and recall traces, any trace whose data must be preserved should be placed in View or Blank before saving.

This creates the following table describing the Trace Save/Recall possibilities:

You want to recall state and one trace's data, leaving other traces unaffected.	Save Trace+State from 1 trace. Make sure that no other traces are updating (they should all be in View or Blank) when the save is performed.	On Recall, specify the trace you want to load the one trace's data into. This trace will load in View. All other traces' data will be unaffected, although their trace mode will be as it was when the state save was performed.
You want to recall all traces	Save Trace+State from ALL traces.	On Recall, all traces will come back in View (or Blank if they were in Blank or Background when saved)
You want all traces to load exactly as they were when saved.	Save State	On recall, all traces' mode and data will be exactly as they were when saved. Any traces that were updating will, of course, have their data immediately overwritten.

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. 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 you do 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.

Example	*RCL 1
Key Path	**Recall, State**
Readback	Date and time with seconds resolution of the last Save is displayed on the key, or "(empty)" if no prior save operation performed to this register.
Instrument S/W Revision	Prior to A.02.00

Example	*RCL 2
Key Path	**Recall, State**
Readback	Date and time with seconds resolution of the last Save is displayed on the key, or "(empty)" if no prior save operation performed to this register.
Instrument S/W Revision	Prior to A.02.00

Example	*RCL 3
Key Path	**Recall, State**
Readback	Date and time with seconds resolution of the last Save is displayed on the key, or "(empty)" if no prior save operation performed to this register.
Instrument S/W Revision	Prior to A.02.00

Example	*RCL 4
Key Path	**Recall, State**
Readback	Date and time with seconds resolution of the last Save is displayed on the key, or "(empty)" if no prior save operation performed to this register.
Instrument S/W Revision	Prior to A.02.00

Example	*RCL 5
Key Path	**Recall, State**
Readback	Date and time with seconds resolution of the last Save is displayed on the key, or "(empty)" if no prior save operation performed to this register.
Instrument S/W Revision	Prior to A.02.00

Example	*RCL 6
Key Path	**Recall, State**
Readback	Date and time with seconds resolution of the last Save is displayed on the key, or "(empty)" if no prior save operation performed to this register.
Instrument S/W Revision	Prior to A.02.00

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. For more details, refer to "File Open Dialog and Menu" on page 1140.

Restriction and Notes	Brings up Open dialog for recalling a State Save Type
Key Path	**Recall, State**
Instrument S/W Revision	Prior to A.02.00

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.

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. Errors are generated if the specified file is empty or does not exist, or there is a file type mismatch.
Key Path:	**Recall, State, From File…**
Instrument S/W Revision:	Prior to A.02.00

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

The Recall State function does the following:

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

Aborts the currently running measurement.

Clears any pending operations.

Switches to the mode of the selected Save State file.

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

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

Makes the saved measurement for the mode the active measurement.

Clears the input and output buffers.

Status Byte is set to 0.

Executes a *CLS

Trace (+State)

When this key is pressed, you have determined what you 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 you were 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 key 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 you with the option of where to retrieve the trace.

For quick recalls, the Trace menu lists 5 registers to recall from or you can select a file to recall from.

Example	MMEM:LOAD:TRAC TRACE2,"MyTraceFile.trace" !This loads the trace file data (on the default file directory path) into the specified trace. :MMEM:LOAD:TRAC:REG TRACE1,2 ! restores the trace data in register 2 to Trace 1
Key Path	**Recall**
Mode	SA

Instrument S/W Revision	Prior to A.02.00

Register 1 thru Register 5

Selecting any one of these register keys causes the Traces and State from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last modified.

Trace registers are shared by all modes, so recalling from any one of the 5 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 “Trace 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** causes the traces and state of the mode from the specified Register to be recalled. The registers are provided for easy saving and recalling, since you do not have to specify a filename or navigate to a specific file. The date will follow the format specified in the Date Format setting under the **Control Panel**. The time will show hours, minutes and seconds.

Key Path	**Recall, Trace**
Readback	Date and time with seconds resolution of the last Save is displayed on the key, or "(empty)" if no prior save operation performed to this register.
Instrument S/W Revision	Prior to A.02.00

Key Path	**Recall, Trace**
Readback	Date and time with seconds resolution of the last Save is displayed on the key, or "(empty)" if no prior save operation performed to this register.
Instrument S/W Revision	Prior to A.02.00

Key Path	**Recall, Trace**
Readback	Date and time with seconds resolution of the last Save is displayed on the key, or "(empty)" if no prior save operation performed to this register.
Instrument S/W Revision	Prior to A.02.00

Key Path	**Recall, Trace**
Readback	Date and time with seconds resolution of the last Save is displayed on the key, or "(empty)" if no prior save operation performed to this register.
Instrument S/W Revision	Prior to A.02.00

Key Path	**Recall, Trace**
Readback	Date and time with seconds resolution of the last Save is displayed on the key, or "(empty)" if no prior save operation performed to this register.

Instrument S/W Revision	Prior to A.02.00

To Trace

These key selections let you pick which Trace to recall the saved trace into; either 1, 2, 3, 4, 5, or 6. Not all modes have the full 6 traces available. The default is the currently selected trace, selected in this menu or in the Trace/Det, Export Data, Import Data, or Save Trace menus, except if you have chosen All then it remains chosen until you specifically change it to a single trace.

If the .trace file is an "all trace" file, "**To Trace**" is ignored and the traces each go back to the trace 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.

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

Open…

Pressing **Open** brings up the File Open standard Windows dialog and its corresponding File Open key menu. When you navigate 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 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 *.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 “File Open Dialog and Menu” on page 1140.

Restriction and Notes	Brings up Open dialog for recalling a Trace Save Type
Key Path	**Recall, Trace**
Mode	SA
Instrument S/W Revision	Prior to A.02.00

Open

Recalling Trace first must verify the file is recallable in this instrument by checking instrument software version and model number, since it includes State. If everything matches, a full recall proceeds by aborting the currently running measurement, loads the state from the saved state file to as close as possible to the context in which the save occurred. Users can open .trace files from any mode that supports them, so recalling a Trace File switches to the mode that was active when the save occurred. After switching to the mode of the saved state file, mode settings and data (if any for the mode) are loaded with values from the saved file and the saved measurement of the mode becomes the newly active measurement and the data relevant to the measurement (if there is any) is recalled.

Once the state is loaded the trace data must be loaded. The internal flags are consulted to see which trace to load and the "To Trace" setting to see where to load it. Trace data is always loaded with the specified trace set to View, so that the data is visible and not updating (so as not to wipe out the recalled data). If the file is an "all trace" file, all traces are loaded with the saved data (to the original trace the data was saved from) and set to View. Traces whose data is not loaded are restored to the update state that existed when they were saved.

In every other way a Trace load is identical to a State load. See section “Open” on page 1126 for details.

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	`:MMEMory:LOAD:TRACe TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6,<filename>` `:MMEMory:LOAD:TRACe:REGister TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6,<integer>`
Remote Command Notes	Some modes and measurements do not have available all 6 traces. Phase Noise mode command, for example, is: MMEMory:LOAD:TRACe TRACE1|TRACE2|TRACE3,<filename> The load trace command actually performs a load state, which in the Swept SA measurement includes the trace data. However it looks in the recalled state file to see how it was flagged at save time. The possibilities are: If the trace file was saved using one of the TRACE# enums, it is flagged as a single trace save file. The trace that 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. If the trace file was saved using one the ALL enum, it is flagged as an "all traces" file. And all traces will be 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".
Example	:MMEM:LOAD:TRAC TRACE2,"myState.trace" recalls the file myState.trace on the default path; if it is a "single trace" save file, that trace is loaded to trace 2, and will is set to be not updating. :MMEM:LOAD:TRAC:REG TRACE1,2 restores the trace data in register 2 to Trace 1
Key Path	**Recall, Trace, Open…**
Instrument S/W Revision	Prior to A.02.00

Data (Mode Specific)

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

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

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

Importing Data loads measurement data from the specified file into the specified or default destination, depending on the data type selected. Selecting an Import Data menu key will not actually cause the importing to occur, since the analyzer still needs to know from where to get the data. Pressing the Open key in this menu brings up the Open dialog and Open menu that provides you with the options from where to recall the data. Once a filename has been selected or entered in the Open menu, the recall will occur as soon as the Open key is pressed. See section "File Open Dialog and Menu" on page 1140 for more details.

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.
Key Path	**Recall**
Mode	SA|VSA
Preset	<mode specific>; Is not affected by Preset, but is reset during Restore Mode Defaults and survives subsequent running of the mode
Readback	SA: Trace 1|Trace 2|Trace 3|Trace 4|Trace 5|Trace 6 VSA: Trace to Data 1|Trace to Data 2|Trace to Data 3|Trace to Data 4|Trace to Data 5|Trace to Data 6
Instrument S/W Revision	Prior to A.02.00

Trace

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

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

For Vector Signal Analyzer Mode:

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

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

The following trace data formats may be imported:

Text and comma-separated variable (CSV)

Text

SDF.

Option 200 also allows import of these additional formats:

Matlab 4

Matlab 5

Matlab HDF5

N5110A compatible binary

Example	MMEM:LOAD:TRAC:DATA TRACE2,"MyTraceFile.csv"
	This loads the trace file data (on the default file directory path) into the specified trace.
Dependencies/Couplings	Trace data is not available from all Measurements. In that case, the key will be grayed out. The key will not show if no measurements in the Mode support it.
	For SA measurements, traces cannot be recalled from a trace file that was saved with ALL traces selected.
Key Path	**Recall, Data**
Mode	SA|Analog Demod|VSA
Preset	1; not part of Preset, but is reset by Restore Mode Defaults and survives power cycles
State Saved	Saved in State
Readback	selected Trace table
Readback	SA: 1|2|3|4|5|6
	VSA: Data 1|Data 2|Data 3|Data 4|Data 5|Data 6
Instrument S/W Revision	Prior to A.02.00

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 the currently selected trace, selected in this menu or in the Trace/Det, Export Data, Recall Trace, or Save Trace menus, except if you have chosen All then it remains chosen until you specifically change it to a single trace.

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.

Key Path	**Recall, Data, Trace**
Mode	SA|VSA
Instrument S/W Revision	Prior to A.02.00

Display in Selected Trace

In Vector Signal Analyzer Mode, data registers are used as temporary storage places for trace data.

A register may be displayed in any trace. If "Display in Selected Trace" key is set to "Yes" then the data register into which the file is recalled is then assigned to the currently selected trace.

Example	!Related command: MMEM:LOAD:TRAC:DATA D1,"TRC1.TXT",TXT !This command explicitly puts the data in the specified trace.
Key Path	**Recall, Data (Import), Trace (to)**
Mode	VSA
Instrument S/W Revision	Prior to A.02.00

Amplitude Correction

Pressing this key selects the Amplitude Corrections as the data type to be imported with this recall request. This key brings up the Amplitude Correction Menu that allows you to select which Amplitude Correction to recall.

A set of preloaded Corrections files can be found in the directory

/My Documents/ EMC Limits and Ampcor.

Under this directory, the directory called Ampcor (Legacy Naming) contains a set of legacy corrections files, generally the same files that were supplied with older Agilent EMI analyzers, that use the legacy suffixes .ant, .oth, .usr, and .cbl, and the old 8-character file names. In the directory called Ampcor, the same files can be found, with the same suffixes, but with longer, more descriptive filenames.

Example	MMEM:LOAD:CORR 2,"MyCorrectionsData.csv" This loads the file of corrections data (on the default file directory path) into the specified correction table of date (2).

Dependencies/Couplings	Correction data is not available from all Measurements. In that case, the key will be grayed out. The key will not show if no measurements in the Mode support it. When a correction is loaded from mass storage, it is automatically turned on. This also turns on the global "Apply Corrections" function. Only the first correction array (Correction 1) supports antenna units. Note that this means that a correction file with an Antenna Unit can only be loaded into the Corrections 1 register. Consequently only for Correction 1 does the dropdown in the Recall dialog include.ant, and if an attempt is made to load a correction file into any other Correction register which DOES contain an antenna unit, a Mass Storage error is generated.
Key Path	**Recall, Data**
Mode	SA|EDGEGSM
Preset	1 It is not part of Preset, but is reset by Restore Input/Output Defaults and survives subsequent running of the mode.
State Saved	Saved in instrument state.
Readback	1 | 2 | 3 | 4
Instrument S/W Revision	A.02.00

Amplitude Correction 1, 2, 3, 4

These menu key selections let you pick which Amplitude Correction to recall; either 1, 2, 3, or 4. The default is 1. Once selected, the key returns back to the Import Data menu and the selected Amplitude Correction number is annotated on the key. Now exactly what needs to be recalled has been selected. To trigger a recall of the selected Amplitude Correction, you must select the File Open key in the Import Data menu.

An example of using this menu is: if you select 4 and then continues on to the File Open menu, the amplitude correction table 4 will be recalled from the file selected or entered in File Name option in the File Open dialog. See "File Open Dialog and Menu" on page 1140 for more details.

Antenna corrections are a particular kind of Amplitude Corrections – they are distinguished by having the Antenna Unit set to a value other than None. See the Input/Output chapter discussion of Amplitude Corrections for details on Antenna Units.

Key Path	**Recall, Data, Amplitude Correction**
Mode	SA|EDGEGSM
Readback	1
Instrument S/W Revision	A.02.00

Key Path	**Recall, Data, Amplitude Correction**
Mode	SA|EDGEGSM

Readback	2
Instrument S/W Revision	A.02.00

Key Path	**Recall, Data, Amplitude Correction**
Mode	SA|EDGEGSM
Readback	3
Instrument S/W Revision	A.02.00

Key Path	**Recall, Data, Amplitude Correction**
Mode	SA|EDGEGSM
Readback	4
Instrument S/W Revision	A.02.00

Limit Line

This key selects the Limit Lines as the data type to be imported with this recall request. It brings up the Limit Line Menu that lets you select which Limit Line to import the data into. This key is grayed out when SA measurements are running that do not support limit line importing.

A set of preloaded Corrections files can be found in the directory

/My Documents/ EMC Limits and Ampcor.

Under this directory, the directory called Limits (Legacy Naming) contains a set of legacy limits, generally the same files that were supplied with older Agilent EMI analyzers, that use the legacy suffix .lim, and the old 8-character file names. In the directory called Limits, the same files can be found, with the same suffix, but with longer, more descriptive filenames.

Example	MMEM:LOAD:LIM LLINE1,"MyLimitsFile.csv" This loads the limit line file data (on the default file directory path) into the specified limit line.
Dependencies/Couplings	Some Measurements do not allow the use of limit lines, so the key will be grayed out. The key will not show if no measurements in the Mode support it. When a limit line is loaded from mass storage, it is automatically turned on. This allows you to see it, thus confirming the load.
Key Path	**Recall, Data**
Mode	SA
Preset	1; not part of Preset, but is reset by Restore Mode Defaults and survives power cycles
State Saved	Saved in State
Readback	selected Limit Line

Readback	1 | 2 | 3 | 4 | 5 | 6
Instrument S/W Revision	A.02.00

Limit Line 1, 2, 3, 4, 5, 6

These keys let you pick which Limit Line to import the data into; either 1 or 2. The default is 1. Once selected, the key returns back to the Import Data menu and the selected Limit Line number is annotated on the key. Now you have selected exactly what needs to be imported. In order to trigger an import of the selected Limit Line, you must select the Open key in the Import Data menu.

An example of using this menu is: If you select 2 and continue to the File Open menu, the Limit Line 2 will be imported from the file selected or entered in File Name option in the File Open dialog.

Key Path	**Recall, Data, Limit Line**
Mode	SA
Instrument S/W Revision	A.02.00

Capture Buffer

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

Example	MMEM:LOAD:CAPT "MyCaptureData.bin" This loads the file of capture data (on the default file directory path) into the instrument.
Dependencies/Couplings	Capture buffer data is not available from all Measurements. In that case, the key will be grayed out. The key will not show if no measurements in the Mode support it.
Key Path	**Recall, Data**
Mode	WCDMA
Instrument S/W Revision	Prior to A.02.00

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.

Example	MMEM:LOAD:ZMAP "MyZonemapFile.omf" This loads the file of zone map data (on the default file directory path) into the custom map.

Dependencies/Couplings	Zone map data is not available from all Measurements. In that case, the key will be grayed out. The key will not show if no measurements in the Mode support it.
Key Path	**Recall, Data**
Mode	OFDMA WIMAX
Instrument S/W Revision	Prior to A.02.00

Recorded Data

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

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

Example	MMEM:LOAD:REC "MyRecording.sdf"
Key Path	**Recall, Data (Import)**
Mode	VSA
Notes	Available file types are: • CSV (Comma delimited) (*.csv) • MAT-File (*.mat) • MAT-File (Version 4) (*.mat) • MAT-File (HDF5) (*.mat;*.hdf;*.h5) • N5110A Waveform (*.bin) • SDF (Fast) (*.sdf;*.dat) • SDF (Export) (*.sdf;*.dat) • Text (Tab delimited) (*.txt)
Instrument S/W Revision	Prior to A.02.00

Open…

Pressing **File Open** brings up the File Open standard Windows dialog and the File Open key menu. When you navigate 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.

Restriction and Notes	Brings up Open dialog for recalling a <mode specific> Save Type
Key Path	**Recall, Data**
Instrument S/W Revision	Prior to A.02.00

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

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

Limit Line Import: The instrument cannot mix Limits domains (X Axis Unit must be Frequency or Time for both Limits). So when a Limits file is loaded, the analyzer will go to the Limits domain (X Axis Unit) of that file. If this changes the Limits domain from what it was before the file was loaded, all Limits data in both Limits sets will be erased before the data loads. There will be no warning if this occurs, so care should be taken to know the domain of the file you are loading.

When a Limit is loaded it will be turned ON. The Margin settings will match those when the limit was saved.

Amplitude Correction Import: When an amplitude correction data file is imported, the selected amplitude correction table is loaded with the data in the imported file. Also, the x axis interpolation value for that corrections table is recalled from the file and the correction table is interpolated across the entire span. Then the selected amplitude correction table is turned on (**Amplitude Correction** ON and **Amplitude Corrections Apply** set to Yes).

When the Amplitude Correction is an Antenna correction and the Antenna Unit in the file is not None, the Y Axis Unit setting will change to match that of the file.

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	Traces cannot be recalled from a trace data file that was saved with ALL traces selected. Errors are reported if the file is empty or missing, or if the file type does not match.
Mode	SA
Instrument S/W Revision	Prior to A.02.00

Remote Command	`:MMEMory:LOAD:TRACe:DATA D1|D2|D3|D4|D5|D6,<filename>[,CSV|TXT|SDF]`
Example	:MMEM:LOAD:TRAC:DATA D1,"TRC1.TXT",TXT

Restriction and Notes	If you are not licensed to recall a particular file type, then an error –203.9010 will be returned. If the file format cannot be determined or the file cannot be recalled successfully, then an error –250.5290 is returned. If the recall is successful, then advisory 0.1600 is shown.
Remote Command Notes	If the file format parameter is not included in the SCPI command, the file format is determined by the file name extension. If this is not sufficient, the file is scanned to determine the format.
Key Path	**Recall, Data (Import), Trace (to), Open . . .**
Mode	VSA
Instrument S/W Revision	Prior to A.02.00

Remote Command	`:MMEMory:LOAD:CORRection 1|2|3|4, <filename>`
Example	:MMEM:LOAD:CORR 2 "myAmpcor.csv" recalls the Amplitude Correction data from the file myAmpcor.csv on the default directory to the 2nd Amplitude Correction table, and turns on table 2.
Dependencies/Couplings	Amplitude Correction <number> is ON, Amplitude Corrections Apply is set to Yes, Amplitude Correction <number> interpolation is recalled from the file and the interpolation occurs for that table.
Remote Command Notes	Errors are generated if the specified file is empty or missing, or if there is a file type mismatch.
Mode	SA|EDGEGSM
Instrument S/W Revision	Prior to A.02.00

Remote Command	`:MMEMory:LOAD:LIMit LLINE1|LLINE2,<filename>`
Example	:MMEM:LOAD:LIM LLINE2,"myLimitLine2.csv" imports the 2nd Limit Line from the file myLimitLine2.csv in the default path.
Remote Command Notes	Errors are reported if the file is empty or missing, or if the file type does not match.
SCPI Status Bits/OPC Dependencies	Sequential - aborts the current measurement
Key Path	**Recall, Data, File Open**
Mode	SA
Readback	floppy icon in the settings bar
Instrument S/W Revision	Prior to A.02.00

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

Remote Command	`:MMEMory:LOAD:CAPTured <filename>`

Restriction and Notes	Errors are reported if the file is empty or missing, or if the file type does not match.
Example	:MMEM:LOAD:CAPT "My Documents\WCDMA\data\IQ\captureBuffer\myCaptureBuffer.bin"
Key Path	**Recall, Data, File Open**
Mode	WCDMA
Instrument S/W Revision	Prior to A.02.00

Remote Command	`:MMEMory:LOAD:RECording <filename>`
Example	:MMEM:LOAD:REC "MyRecording.sdf"
Remote Command Notes	SCPI reflects the action performed when this key is selected and File Open is pressed.
Key Path	**Recall, Data (Import), Recorded Data, Open . . .**
Mode	VSA
Instrument S/W Revision	Prior to A.02.00

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**
Mode	WIMAXOFDMA
Instrument S/W Revision	Prior to A.02.00

File Open Dialog and Menu

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

Instrument S/W Revision	Prior to A.02.00

Open

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

Restriction and Notes:	Advisory Event "File <file name> recalled" after recall is complete.
Instrument S/W Revision:	Prior to A.02.00

File/Folder List

This menu key navigates to the center of the dialog that contains the list of files and folders. Once here you can get information about the file.

Restriction and Notes	Pressing this key navigates you to the files and folders list in the center of the dialog.
Key Path	**Recall, <various>, Open…**
Instrument S/W Revision	Prior to A.02.00

Sort

Pressing this key brings up the Sort menu that allows you 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.

Remote Command Notes	No SCPI command directly controls the sorting.
Key Path	**Recall, <various>, Open…**
Instrument S/W Revision	Prior to A.02.00

By Date This allows you 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.

Restriction and Notes	Files in File Open dialog are sorted immediately in the selected order
Key Path	**Recall, <various>, Open…, Sort**
Instrument S/W Revision	Prior to A.02.00

By Name

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

Restriction and Notes	Files in File Open dialog are sorted immediately in the selected order.
Key Path	**Recall, <various>, Open…, Sort**
Instrument S/W Revision	Prior to A.02.00

By Extension

This allows you 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.

Restriction and Notes	Files in File Open dialog are sorted immediately in the selected order.
Key Path	**Recall, <various>, Open…, Sort**
Instrument S/W Revision	Prior to A.02.00

By Size

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

Restriction and Notes	Files in File Open dialog are sorted immediately in the selected order.
Key Path	**Recall, <various>, Open…, Sort**
Instrument S/W Revision	Prior to A.02.00

Ascending

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

Restriction and Notes	Files in File Open dialog are sorted immediately in the selected order.
Key Path	**Recall, <various>, Open…, Sort**
Instrument S/W Revision	Prior to A.02.00

Descending

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

Restriction and Notes	Files in File Open dialog are sorted immediately in the selected order.
Key Path	**Recall, <various>, Open…, Sort**
Instrument S/W Revision	Prior to A.02.00

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 you have selected to save. If you 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 you 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 you navigated here from importing a data file, the data types available will be dependent on the current measurement and the selection you made under “Import Data”. For example:

Amplitude Corrections: pull down menu shows

Amplitude Corrections (*.csv)
Legacy Cable Corrections (*.cbl)
Legacy User Corrections (*.amp)
Legacy Other Corrections (*.oth)
Legacy Antenna Corrections (*.ant)

Limit: pull down menu shows

Limit Data (*.csv)
Legacy Limit Data (*.lim)

Trace: pull down menu shows "Trace Data (*.csv)"

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…**
Instrument S/W Revision	Prior to A.02.00

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.

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…**
Instrument S/W Revision	Prior to A.02.00

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.

Restriction and Notes	Pressing this key causes the Open dialog to go away and auto return.
Key Path	**Recall, <various>, Open…**
Instrument S/W Revision	Prior to A.02.00

Restart

The Restart function restarts the current sweep, or measurement, or set of averaged/held sweeps or measurements. If you are Paused, pressing Restart does a Resume.

The Restart function is accessed in several ways:

- Pressing the Restart key
- Sending the remote command INIT:IMMediate
- Sending the remote command INIT:RESTart

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.
Instrument S/W Revision:	Prior to A.02.00

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.
Instrument S/W Revision:	Prior to A.02.00

The **Restart** function first aborts the current sweep/measurement as quickly as possible. It then resets the sweep and trigger systems, sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is in the process of aligning when **Restart** is executed, the alignment finishes before the restart function is performed.

Even when set for Single operation, multiple sweeps may be taken when Restart is pressed (for example, when averaging/holding is on). Thus when we say that **Restart** "restarts a measurement," we may mean:

- It restarts the current sweep
- It restarts the current measurement
- It restarts the current set of sweeps if any trace is in Trace Average, Max Hold or Min Hold
- It restarts the current set of measurements if Averaging, or Max Hold, or Min Hold is on for the measurement
- depending on the current settings.

With **Average/Hold Number** (in **Meas Setup** menu) set to 1, or Averaging off, or no trace in Trace Average or Hold, a single sweep is equivalent to a single measurement. A single sweep is taken after the trigger condition is met; and the analyzer stops sweeping once that sweep has completed. However, with **Average/Hold Number** >1 and at least one trace set to **Trace Average**, **Max Hold**, or **Min Hold (SA Measurement)** or **Averaging on (most other measurements)**, multiple sweeps/data acquisitions are taken for a single measurement. The trigger condition must be met prior to each sweep. The sweep is stopped when the average count k equals the number N set for **Average/Hold Number**. A measurement average usually applies to all traces, marker results, and numeric results; but sometimes it only applies to the numeric results.

Once the full set of sweeps has been taken, the analyzer will go to idle state. To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command CALC:AVER:TCON UP.

Save

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

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

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

Remote Command Notes	No remote command for this key specifically.
Key Path	**Save**
Mode	All
Instrument S/W Revision	Prior to A.02.00

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 key 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 you with these options.

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

Example	MMEM:STOR:STATe "MyStateFile.state" This stores the current instrument state data in the file MyStateFile.state in the default directory.
Remote Command Notes	See “Save” on page 1153.
Key Path	**Save**
Mode	All
Instrument S/W Revision	Prior to A.02.00

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. 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 you in the My Documents\System folder.

Example	*SAV 1
Key Path	**Save, State**
Mode	All
Readback	Date and time with seconds resolution are displayed on the key, or "(empty)" if no prior save operation performed to this register.
Instrument S/W Revision	Prior to A.02.00

Example	*SAV 2
Key Path	**Save, State**
Mode	All
Readback	Date and time with seconds resolution are displayed on the key, or "(empty)" if no prior save operation performed to this register.
Instrument S/W Revision	Prior to A.02.00

Example	*SAV 3
Key Path	**Save, State**
Mode	All
Readback	Date and time with seconds resolution are displayed on the key, or "(empty)" if no prior save operation performed to this register.
Instrument S/W Revision	Prior to A.02.00

Example	*SAV 4
Key Path	**Save, State**
Mode	All
Readback	Date and time with seconds resolution are displayed on the key, or "(empty)" if no prior save operation performed to this register.
Instrument S/W Revision	Prior to A.02.00

Example	*SAV 5
Key Path	**Save, State**
Mode	All
Readback	Date and time with seconds resolution are displayed on the key, or "(empty)" if no prior save operation performed to this register.
Instrument S/W Revision	Prior to A.02.00

Example	*SAV 6
Key Path	**Save, State**
Mode	All
Readback	Date and time with seconds resolution are displayed on the key, or "(empty)" if no prior save operation performed to this register.
Instrument S/W Revision	Prior to A.02.00

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.

Key Path	**Save, State**
Mode	All
Instrument S/W Revision	Prior to A.02.00

Save As . . .

This menu lets you select the location where you can save the State. This menu is a standard Windows® dialog with Save As menu keys. The "File Name" field in the Save As dialog is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name key. See the Quick Save key documentation for more on the automatic file naming algorithm.

The default path for all State Files is:

My Documents\<mode name>\state

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

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

Key Path	**Save, State**
Mode	All
Instrument S/W Revision	Prior to A.02.00

Save

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

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

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…**
Mode	All
Instrument S/W Revision	Prior to A.02.00

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.   You can save to either a register or a file. 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 key 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 you with these options.

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

Example	MMEM:STOR:STATe TRACE2,"MyTraceFile.trace" This stores trace 2 data in the file MyTraceFile.trace in the default directory. :MMEM:STOR:TRAC:REG TRACE1,2 stores trace 1 data in trace register 2 :MMEM:STOR:TRAC:REG ALL,3 saves the data for all 6 traces in trace register 3
Remote Command Notes	See "Save" on page 1153.
Key Path	**Save**
Mode	SA
Instrument S/W Revision	Prior to A.02.00

Register 1 thru Register 5

Selecting any one of these register menu keys causes the Trace(s) specified under From Trace, along with the state of the currently active mode, to be saved to the specified Trace Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified.

These 5 trace registers are all that is available for all modes in the instrument. At present, only the Swept SA measurement of the Spectrum Analyzer mode supports saving to Trace+State files. Registers are files that are visible to you in the My Documents\System folder.

Key Path	**Save, Trace**
Mode	SA
Readback	Date and time with seconds resolution are displayed on the key, or "(empty)" if no prior save operation performed to this register.
Instrument S/W Revision	Prior to A.02.00

Key Path	**Save, Trace**
Mode	SA
Readback	Date and time with seconds resolution are displayed on the key, or "(empty)" if no prior save operation performed to this register.
Instrument S/W Revision	Prior to A.02.00

Key Path	**Save, Trace**
Mode	SA

Readback	Date and time with seconds resolution are displayed on the key, or "(empty)" if no prior save operation performed to this register.
Instrument S/W Revision	Prior to A.02.00

Key Path	**Save, Trace**
Mode	SA
Readback	Date and time with seconds resolution are displayed on the key, or "(empty)" if no prior save operation performed to this register.
Instrument S/W Revision	Prior to A.02.00

Key Path	**Save, Trace**
Mode	SA
Readback	Date and time with seconds resolution are displayed on the key, or "(empty)" if no prior save operation performed to this register.
Instrument S/W Revision	Prior to A.02.00

From Trace

Accesses a menu that enables you to select the trace to be saved. You can choose either 1, 2, 3, 4, 5, 6 or All. Not all modes have the full six traces. 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 the currently selected trace, selected in this menu or in the Trace/Det, Export Data, Import Data or Recall Trace menus, except if you have chosen All then it remains chosen until you specifically change it to a single trace. To save the Trace you must select **Save As**.

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

Key Path	**Save, Trace + State**
Mode	SA
Instrument S/W Revision	Prior to A.02.00

Save As . . .

This menu lets you select the location where you can save the Trace. It is a standard Windows® dialog with Save As menu keys.

The "File Name" field in the Save As dialog is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name key. See the Quick Save key documentation for more on the automatic file naming algorithm.

The default path for all State Files including .trace files is:

My Documents\<mode name>\state

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

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

Restriction and Notes	Brings up Save As dialog for saving a Trace Save Type
Key Path	**Save, Trace (+State)**
Mode	SA
Instrument S/W Revision	Prior to A.02.00

Save

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

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

Remote Command	`:MMEMory:STORe:TRACe TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6|ALL, <filename>`
	
	`:MMEMory:STORe:TRACe:REGister TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6|ALL, <integer>`

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 :MMEM:STOR:TRAC:REG TRACE1,2 stores trace 1 data in trace register 2

Remote Command Notes	Some modes and measurements do not have available all 6 traces. The Phase Noise mode command, for example, is: MMEMory:STORe:TRACe TRACE1|TRACE2|TRACE3|ALL,<filename> This command actually performs a save state, which in the Swept SA measurement includes the trace data. However it flags it (in the file) as a "save trace" file of the specified trace (or all traces). The range for the register parameter is 1–5
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, Trace, Save As…**
Mode	SA
Instrument S/W Revision	Prior to A.02.00

Data (Mode Specific)

Exporting a data file stores data from the current measurement to mass storage files. The Export Menu only contains data types that are supported by the current measurement.

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

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

Selecting an Export Data menu key will not actually cause the exporting to occur, since the analyzer still needs to know where you wish to save the data. Pressing the Save As key in this menu brings up the Save As dialog and Save As menu that allows you to specify the destination file and directory. Once a filename has been selected or entered in the Open menu, the export will occur as soon as the Save key is pressed. See section "Save As . . ." on page 1168 for more details.

Remote Command Notes	No SCPI command directly controls the Data Type that this key controls. The Data Type is included in the MMEM:STORe commands.
Dependencies/Couplings	If a file type is not used by a certain measurement, that type is grayed out for that measurement. The key for a file type will not show if there are no measurements in Mode that supports it.
Key Path	**Save**
Mode	All

Preset	<mode specific>; Is not affected by Preset, but is reset during Restore Mode Defaults and survives subsequent running of the mode.
Readback	1-of-N selection
Instrument S/W Revision	Prior to A.02.00

Trace

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

Example	MMEM:STOR:TRAC:DATA TRACE3,"MyTraceFile.csv" This stores the specified trace data in the file MyTraceFile.csv in the default directory. VSA Example: MMEM:STOR:TRAC:DATA TRACE1,"Trc1.txt",TXT,ON
Remote Command Notes	See “Save” on page 1161
Dependencies/Couplings	Trace data is not available from all Measurements. In that case, the key will be grayed out. The key will not show if no measurements in the Mode support it. For SA measurements, traces cannot be recalled from a trace file that was saved with ALL traces selected.
Key Path	**Save, Data**
Mode	SA|Analog Demod|VSA
Preset	Not part of Preset, but is reset by Restore Mode Defaults and survives power cycles.
State Saved	Saved in State
Readback	selected Trace table
Readback	Swept SA: 1|2|3|4|5|6|ALL Analog Demod Mode: RF Spectrum|Demod|Demod Ave|Demod Max|Demod Min|AF Spectrum Vector Signal Analyzer: Trace 1|Trace 2 with header|Trace 2|Trace 2 with header|Trace 3|Trace 3 with header|Trace 4|Trace 4 with header|Trace 5|Trace 5 with header|Trace 6|Trace 6 with header|
Instrument S/W Revision	Prior to A.02.00

Trace selection

These keys let you pick which Trace to save. The traces may have names, or they may be labeled 1, 2, 3, 4, 5, or 6, depending on the current mode. Once selected, the key returns back to the Export Data menu and the selected trace name/number is annotated on the key. The default is the currently selected trace, selected in this menu or in the Trace/Det, Import Data, Recall Trace or Save Trace menus, except if you have chosen All then it remains chosen until you specifically change it to a single trace.

In order to trigger a save of the selected trace, you must select the Save As key in the Export Data menu.

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

Key Path	**Save, Data, Trace**
Mode	SA|Analog Demod|VSA
Preset	The first trace key shown.
Instrument S/W Revision	Prior to A.02.00

Include Header

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

Example	MMEM:STOR:TRAC:DATA TRACE1,"Trc1.txt",TXT,ON The On/Off setting is the last variable passed in the MMEMory:STORe:TRACe:DATA command.
Key Path	**Save, Data, Trace**
Mode	VSA
Preset	On
Instrument S/W Revision	Prior to A.02.00

Measurement Results

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

Measurement results may not be available for all measurements.

Example	MMEM:STOR:RES "MyResultsFile.xml" This stores the measurement results data in the file MyResultsFile.xml in the default directory.

Remote Command Notes	See “Save” on page 1161
Dependencies/Couplings	The key will not show if no measurements in the Mode support it.
Key Path	**Save, Data**
Mode	SA|ADEMOD|BASIC(IQ Analyzer)|CDMA2K|EDGEGSM|PNOISE|WCDMA|WIMAXOFDMA|TDS CDMA
Instrument S/W Revision	Prior to A.02.00

Amplitude Correction

Pressing this key selects the **Amplitude Corrections** as the data type to be exported with this save request. This key brings up the Amplitude Correction Menu that allows you to select which **Amplitude Correction** to save.

Example:	MMEM:STOR:CORR 3,"MyCorrectionsFile.csv" This stores the specified corrections data (3) in the file MyCorrectionsFile.csv in the default directory.
Remote Command Notes:	See “Save” on page 1161
Key Path:	**Save, Data**
Preset:	1; Is not part of Preset, but is reset by Restore Input/Output Defaults and survives subsequent running of the mode
State Saved:	Saved in instrument state.
Readback:	1 | 2 | 3 | 4
Dependencies/Couplings:	The key will not show if no measurements in the Mode support it.
Instrument S/W Revision:	A.02.00

Amplitude Correction 1, 2, 3, 4

These menu key selections let you pick which Amplitude Correction to save; either 1, 2, 3, or 4. The default is **1**. Once selected, the key returns back to the **Export Data** menu and the selected Amplitude Correction number is annotated on the key. Now exactly what needs to be saved has been selected. In order to trigger a save of the selected **Amplitude Correction**, you must select the **Save As** key in the **Export Data** menu.

An example of using this menu is: if you select 4, the Amplitude Correction table 4 will be saved to the file selected or entered in File Name option in the Save As dialog. See “Save As . . .” on page 1168 for more details.

Key Path	**Save, Data, Amplitude Correction**
Readback	1
Instrument S/W Revision	A.02.00

Key Path	**Save, Data, Amplitude Correction**
Readback	2
Instrument S/W Revision	A.02.00

Key Path	**Save, Data, Amplitude Correction**
Readback	3
Instrument S/W Revision	A.02.00

Key Path	**Save, Data, Amplitude Correction**
Readback	4
Instrument S/W Revision	A.02.00

Limit Line

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

Example:	MMEM:STOR:LIM LLINE1,"MyLimitsFile.csv" This stores the specified limit line data in the file MyLimitsFile.csv in the default directory.
Remote Command Notes:	See "Save" on page 1161
Dependencies/Couplings:	Some Measurements do not allow the use of limit lines, so the key will be grayed out. The key will not show if no measurements in the Mode support it.
Preset:	1; not part of Preset, but is reset by Restore Mode Defaults and survives power cycles
State Saved:	Saved in State
Key Path:	**Save, Data**
Readback:	selected Limit Line
Readback:	1|2|3|4|5|6
Instrument S/W Revision:	A.02.00

Limit Line 1, 2, 3, 4, 5, 6

These keys let you pick which Limit Line to save. The default is **1**. Once selected, the key returns back to the **Export Data** menu and the selected Limit Line number is annotated on the key. Now you have selected exactly what needs to be saved. To trigger a save of the selected Limit Line, you must select the Save As key in the Export Data menu.

An example of using this menu is: If you select 2, the Limit Line 2 will be saved in the format described in Section Limit Line Data File to the file selected or entered in **File Name** option in the **Save As** dialog.

Key Path	**Save, Data, Limit Line**
Instrument S/W Revision	A.02.00

Capture Buffer

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

Example	MMEM:STOR:CAPT "MyCaptureData.bin" This stores the capture data in the file MyCaptureData.bin in the default directory.
Remote Command Notes	See "Save" on page 1161
Dependencies/Couplings	The key will not show if no measurements in the Mode support it.
Key Path	**Save, Data**
Mode	WCDMA
Instrument S/W Revision	Prior to A.02.00

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.

Example	MMEM:STOR:ZMAP "MyZonemapFile.omf" This stores the zone map data in the file MyZonemapFile.omf in the default directory.
Remote Command Notes	See "Save" on page 1161
Dependencies/Couplings	The key will not show if no measurements in the Mode support it.
Key Path	**Save, Data**
Mode	OFDMA WiMAX
Instrument S/W Revision	Prior to A.02.00

Recorded Data

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

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

Example	MMEM:STOR:REC "MyRecording.sdf",SDF,ON,ON,OFF
Restriction and Notes	Grayed out unless there is recorded data in the buffer.
Key Path	**Save, Data (Export)**
Mode	VSA
Instrument S/W Revision	Prior to A.02.00

Save As . . .

This menu lets you select the location where you can save Data Type files. It is a standard Windows® dialog with Save As menu keys. The "File Name" field in the Save As dialog is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name key. See the Quick Save key documentation for more on the automatic file naming algorithm.

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

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

The default path for saving files is:

For all of the Trace Data Files:

My Documents\<mode name>\data\traces

For all of the Limit Data Files:

My Documents\<mode name>\data\limits

For all of the Measurement Results Data Files:

My Documents\<mode name>\data\<measurement name>\results

For all of the Capture Buffer Data Files:

My Documents\<mode name>\data\captureBuffer

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

Mode	All
Instrument S/W Revision	Prior to A.02.00

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

Restriction and Notes	If the file already exists, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during a instrument software upgrade. Both single and double quotes are supported for any filename parameter over remote.
Key Path	**Save, Data, Save As…**
Instrument S/W Revision	Prior to A.02.00

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. This command form is not supported for the Swept SA measurement; see below.
Mode	SA|ADEMOD|BASIC(IQ Analyzer)|CDMA2K|EDGEGSM|PNOISE|WCDMA|WIMAXOFDMA| TDSCDMA
Instrument S/W Revision	Prior to A.02.00

Remote Command	`:MMEMory:STORe:RESults:MTABle|PTABle <filename>`

Example	:MMEM:STOR:RES:MTAB “myResults.csv” saves the results from the current marker table to the file myResults.csv in the default path. :MMEM:STOR:RES:PTAB “myResults.csv” saves the results from the current peak table to the file myResults.csv in the default path. This command form is only supported for the Swept SA measurement; see above.
Dependencies/Couplings	If a save of Marker Table results is requested and the Marker Table is not on, no file is saved an error is generated: Mass Storage error; Mkr Table must be on to save Mkr Table as Meas Results If a save of Peak Table results is requested and the Peak Table is not on, no file is saved an error is generated: Mass Storage error; Pk Table must be on to save Pk Table as Meas Results
Mode	SA
Preset	Peak Table
State Saved	Saved in State
Range	Peak Table|Marker Table
Instrument S/W Revision	Prior to A.02.00

Remote Command	`:MMEMory:STORe:CORRection 1|2|3|4, <filename>`
Example	:MMEM:STOR:CORR 2 "myAmpcor.csv" saves just the 2nd Amplitude Correction table to the file myAmpcor.csv on the default path.
Mode	SA
Instrument S/W Revision	A.02.00

Remote Command	`:MMEMory:STORe:TRACe:DATA TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6|ALL,<filename>`
Example	:MMEM:STOR:TRAC:DATA TRACE2,"myTrace2.csv" exports the 2nd trace to the file myTrace2.csv in the default path.
Remote Command Notes	Not all measurements have the ALL selection. Traces cannot be recalled from files that were saved using the ALL selection. If the save is initiated via SCPI, and the file already exists, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade. Both single and double quotes are supported for any filename parameter over remote.
Mode	SA|Analog Demod

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Trace Number	Analog Demod Mode: Trace Names
TRACE1	RF Spectrum
TRACE2	Demod
TRACE3	Demod Ave
TRACE4	Demod Max
TRACE5	Demod Min
TRACE6	AF Spectrum

Remote Command	`:MMEMory:STORe:TRACe:DATA TRACE1|TRACE2|TRACE3|TRACE4|TRACE5|TRACE6,"<filename>"[,CSV|TXT|SDF[,OFF|ON|0|1]]`
Example	MMEM:STOR:TRAC:DATA TRACE1,"Trc1.txt",TXT,ON
Restriction and Notes	If you are not licensed to save a particular file type, then an error will be returned. If an invalid file format is specified or the file cannot be saved successfully, then an error is returned. 8901X Option 205 allows export in TXT, CSV, and SDF formats. 8901X Option 200 allows the Option 205 formats and additionally: Matlab 4, 5 and HDF5, and an N5110A compatible binary format.
Remote Command Notes	File format is selected by the second parameter, but no default extension is appended to the filename. If the second parameter is not supplied, then the filename extension is used to determine the format. *.mat selects Matlab 5 format. *.sdf, or an unrecognized extension chooses the SDF fast format. The optional Boolean determines if the file is saved with headers. By default the headers are saved.
Mode	VSA
Instrument S/W Revision	Prior to A.02.00

Remote Command	`:MMEMory:STORe:LIMit LLINE1|LLINE2,<filename>`
Example	:MMEM:STOR:LIM LLINE2,"myLimitLine2.csv" saves the 2nd Limit Line to the file myLimitLine2.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.

SCPI Status Bits/OPC Dependencies	Sequential - waits for previous measurement to complete
Key Path	**Save, Data, To File, Save As**
Mode	NFIGURE
Instrument S/W Revision	A.02.00

Remote Command	`:MMEMory:STORe:CAPTured <filename>`
Example	:MMEM:STOR:CAPT "MyDocuments\WCDMA\data\captureBuffer\myCaptureBuffer.bin" saves the capture buffer data from the current measurement to the file myCaptureBuffer.bin in the default path.
Restriction and Notes	If the file already exists, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during a instrument software upgrade. Both single and double quotes are supported for any filename parameter over remote.
Key Path	**Save, Data, Save As**
Mode	WCDMA
Instrument S/W Revision	Prior to A.02.00

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**
Mode	WIMAXOFDMA
Instrument S/W Revision	Prior to A.02.00

Remote Command	`:MMEMory:STORe:RECording <filename>[,SDF|SDFX|CSV|TXT|MAT4|MAT|HDF5|BIN[,OFF|ON|0|1[,OFF|ON|0|1[,OFF|ON|0|1]]]`
Example	MMEM:STOR:REC "MyRecording.sdf",SDF,ON,ON,OFF

Remote Command Notes	Recorded data must be available in the buffer. File format is selected by the second parameter, but no default extension is appended to the filename. If the second parameter is not supplied, then the filename extension is used to determine the format. *.mat selects Matlab 5 format. *.sdf, or an unrecognized extension chooses the SDF fast format. The three optional Booleans determine if: 1. file is saved with headers 2. data is resampled to the current span before saving 3. player position settings limit the data saved
Mode	VSA
Instrument S/W Revision	Prior to A.02.00

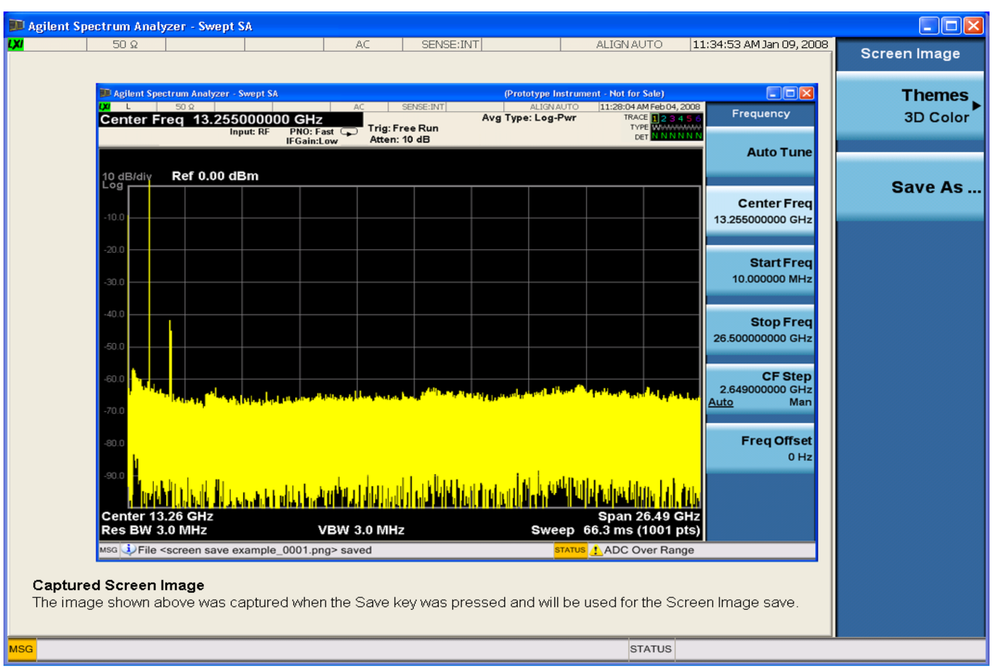
Screen Image

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

Pressing Screen Image brings up a menu which allows you to specify the color scheme of the Screen Image (Themes) or navigate to the Save As dialog to perform the actual save.

Screen Image files contain an exact representation of the analyzer display. They cannot be loaded back onto the analyzer, but they can be loaded into your PC for use in many popular applications.

The image to be saved is actually captured when the **Save** front-panel key is pressed, and kept in temporary storage to be used if you ask for a Screen Image save. When the Screen Image key is pressed, a "thumbnail" of the captured image is displayed, as shown below:



When you continue on into the **Save As** menu and complete the Screen Image save, the image depicted in the thumbnail is the one that gets saved, showing the menus that were on the screen before going into the **Save** menus.

After you have completed the save, the **Quick Save** front-panel key lets you quickly repeat the last save performed, using an auto-named file, with the current screen data.

NOTE	For versions previous to A.01.55, if you initiate a screen image save by navigating through the Save menus, the image that is saved will contain the Save menu keys, not the menus and the active function that were on the screen when you first pressed the Save front-panel key.

Example	MMEM:STOR:SCR "MyScreenFile.png" This stores the current screen image in the file MyScreenFile.png in the default directory.
Remote Command Notes	See "Save" on page 1161
Key Path	**Save**
Mode	All
Instrument S/W Revision	Prior to A.02.00

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 you to pick between themes to be used when saving the screen image.

Remote Command	`:MMEMory:STORe:SCReen:THEMe TDColor|TDMonochrome|FCOLor|FMONochrome` `:MMEMory:STORe:SCReen:THEMe?`
Example	:MMEM:STOR:SCR:THEM TDM
Key Path	**Save, Screen Image**
Preset	3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes
Readback	3D Color | 3D Mono | Flat Color | Flat Mono
Instrument S/W Revision	Prior to A.02.00

3D Color

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

Example	MMEM:STOR:SCR:THEM TDC
Key Path	**Save, Screen Image, Themes**
Readback	3D Color
Instrument S/W Revision	Prior to A.02.00

3D Monochrome

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

Example	MMEM:STOR:SCR:THEM TDM
Key Path	**Save, Screen Image, Themes**
Readback	3D Mono
Instrument S/W Revision	Prior to A.02.00

Flat Color

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

Example	MMEM:STOR:SCR:THEM FCOL
Key Path	**Save, Screen Image, Themes**
Readback	Flat Color
Instrument S/W Revision	Prior to A.02.00

Flat Monochrome

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

Example	MMEM:STOR:SCR:THEM FMON
Key Path	**Save, Screen Image, Themes**
Readback	Flat Mono
Instrument S/W Revision	Prior to A.02.00

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 you first enter this dialog.

Restriction and Notes	Brings up Save As dialog for saving a Screen Image Save Type
Key Path	**Save, Screen Image**
Instrument S/W Revision	Prior to A.02.00

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.

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…**
Instrument S/W Revision:	Prior to A.02.00

Save As . . .

The **Save As** is a standard Windows dialog and with the **Save As** key menu. The "File Name" field in the Save As dialog is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name key. See the Quick Save key documentation for more on the automatic file naming algorithm.

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

Instrument S/W Revision	Prior to A.02.00

Save

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

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

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

Restriction and Notes:	If the file already exists, the File Exist dialog pops up and allows you 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.
Instrument S/W Revision:	Prior to A.02.00

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.

Restriction and Notes	Pressing this key navigates you to the files and folders list in the center of the dialog.
Key Path	**Save, <various>, Save As…**
Instrument S/W Revision	Prior to A.02.00

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.

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

Instrument S/W Revision	Prior to A.02.00

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.

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…**
Instrument S/W Revision	Prior to A.02.00

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.

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…**
Instrument S/W Revision	Prior to A.02.00

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.

Restriction and Notes	Creates a new folder in the current folder and lets you fill in the folder name using the Alpha Editor.
Key Path	**Save, <various>, Save As…**
Instrument S/W Revision	Prior to A.02.00

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.

Restriction and Notes	Pressing this key causes the Save As dialog to go away and auto return.
Key Path	**Save, <various>, Save As…**
Instrument S/W Revision	Prior to A.02.00

Single (Single Measurement/Sweep)

Single sets the analyzer for Single measurement operation. The single/continuous state is Meas Global, so the setting will affect all the measurements. If you are Paused, pressing **Single** does a Resume.

Example:	:INIT:CONT OFF
Remote Command Notes:	See **Cont** key description.
Key Path:	**Front-panel key**
Instrument S/W Revision:	Prior to A.02.00

Source

This mode does not have any Source control functionality.

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

SPAN X Scale

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

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

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

Sweep / Control

This section describes the keys in the Sweep, Control and Capture menu that are common to multiple Modes and Measurements. See the Measurement descriptions for information on features that are unique.

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 too fast to give accurate measurements with the current setting of Res BW. When this happens, increase the Sweep Time or the Res BW.

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

Abort (Remote Command Only)

This command is used to stop the current measurement. It aborts the current measurement as quickly as possible, resets the sweep and trigger systems, and puts the measurement into an "idle" state. If the analyzer is in the process of aligning when ABORt is sent, the alignment finishes before the abort function is performed. So ABORt does not abort an alignment.

If the analyzer is set for Continuous measurement, it sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is set for Single measurement, it remains in the "idle" state until an :INIT:IMM command is received.

Remote Command:	`:ABORt`
Example:	:ABOR
Dependencies/Couplings:	For continuous measurement, ABORt is equivalent to the Restart key. Not all measurements support the abort command.
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.
Instrument S/W Revision:	Prior to A.02.00

Pause/Resume

Pauses a measurement after the current data acquisition is complete.

When Paused, the label on the key changes to Resume. Pressing Resume un-pauses the measurement. When you are Paused, pressing **Restart**, **Single** or **Cont** does a Resume.

Remote Command:	`:INITiate:PAUSe`
Dependencies/Couplings:	Grayed out in Measurements that don’t support Pausing. Blanked in Modes that don’t support Pausing.
Key Path:	**Sweep/Control**
Instrument S/W Revision:	Prior to A.02.00

Remote Command:	`:INITiate:RESume`
Dependencies/Couplings:	Grayed out in Measurements that don’t support Pausing. Blanked in Modes that don’t support Pausing.
Key Path:	**Sweep/Control**
Instrument S/W Revision:	Prior to A.02.00

Gate

The Gate key in the Sweep/Control menu accesses a menu that enables you to control the gating function.

The Gate functionality is used to view signals best viewed by qualifying them with other events. Gate setup parameters are meas global, so the settings will be the same in all the measurements.

Sweep Time autocoupling rules and annotation are changed by Gate being on.

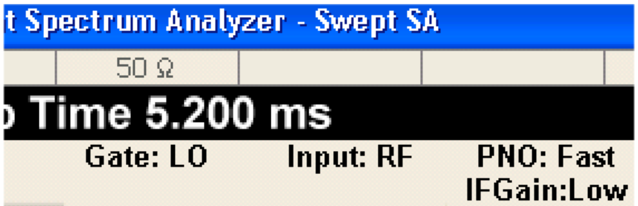
Key Path	**Sweep/Control**
Readback	The state and method of Gate, as [Off, LO] or [On, Video]. Note that for measurements that only support gated LO, the method is nonetheless read back, but always as LO.
Instrument S/W Revision	Prior to A.02.00

Gate On/Off

Turns the gate function on and off.

When the Gate Function is on, the selected Gate Method is used along with the gate settings and the signal at the gate source to control the sweep and video system with the gate signal. Not all measurements allow every type of Gate Methods.

When Gate is on, the annunciation in the Meas Bar reflects that it is on and what method is used, as seen in the "Gate: LO" annunciator below.



Remote Command: `[:SENSe]:SWEep:EGATe[:STATe] OFF|ON|0|1`

`[:SENSe]:SWEep:EGATe[:STATe]?`

Example: SWE:EGAT ON

SWE:EGAT?

Dependencies/Couplings: The function is unavailable (grayed out) and Off when:

Gate Method is LO or Video and FFT Sweep Type is manually selected.

Gate Method is FFT and Swept Sweep Type is manually selected.

Marker Count is ON.

When Meas Method is RBW or FAST, this function is unavailable and the key is grayed out.

Whenever Gate is on, Meas Method, RBW or FAST is unavailable and keys for those are grayed out.

When Gate is on, Offset Res BW and Offset Video BW is ignored (if user sets these values) and measurement works like as all Offset Res BW and all Offset Video BW are coupled with Res BW and Video BW under BW menu. When Gate is on, Offset BW key in Offset/Limit menu is grayed out.

Preset: Off

Range: On|Off

State Saved: Saved in State

Key Path: **Sweep/Control, Gate**

Instrument S/W Revision: Prior to A.02.00

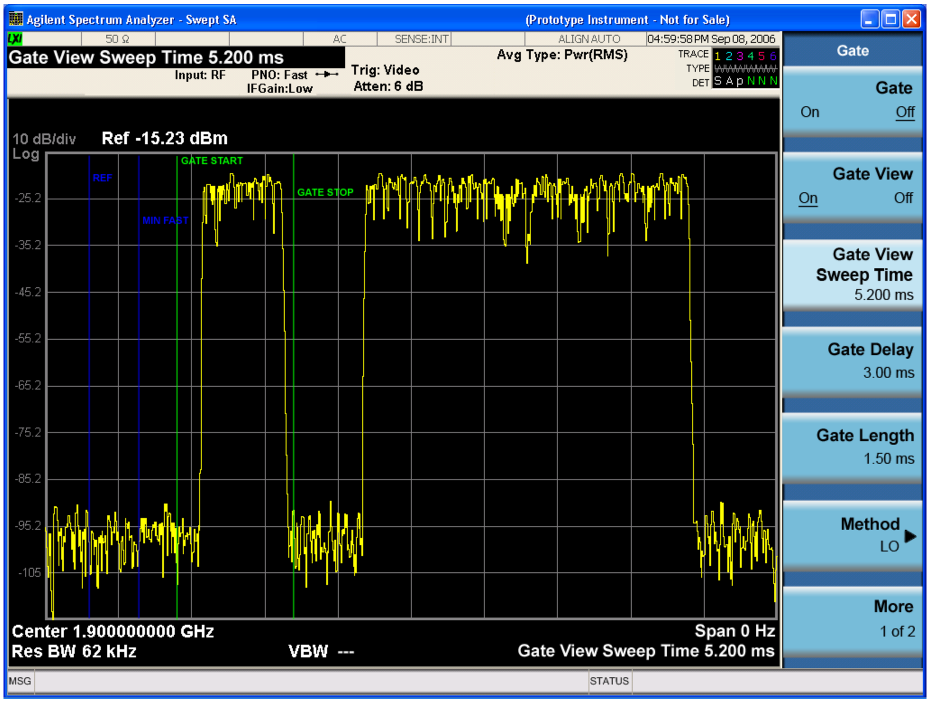
Gate View On/Off

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

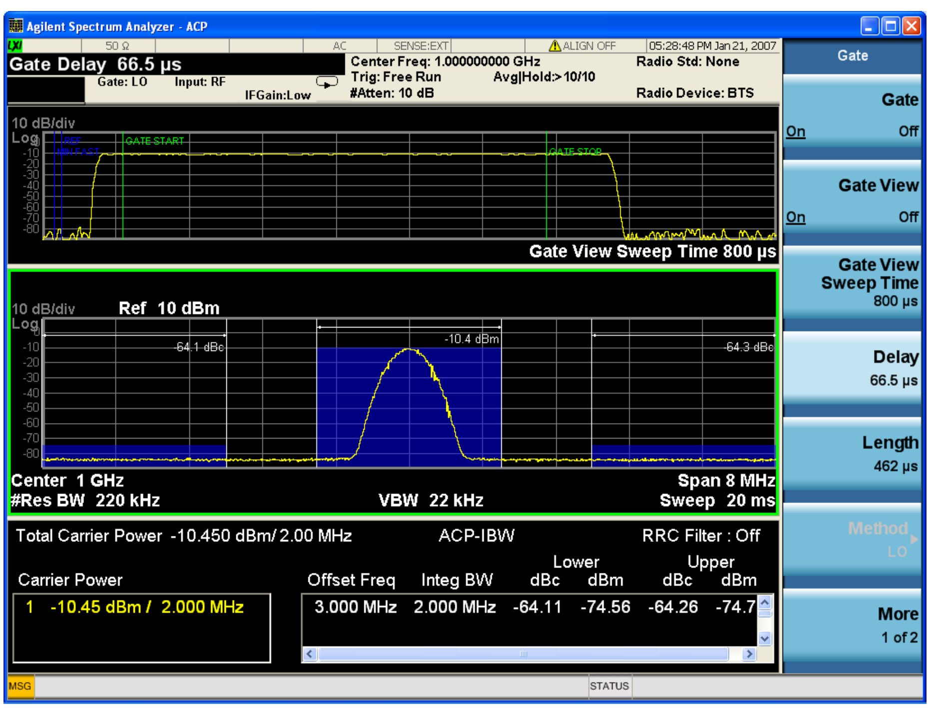
Turning on Gate View in other measurements shows the split-screen Gate View. In these measurements, when the Gate View is on, the regular view of the current measurement traces and results are reduced vertically to about 70% of the regular height. The Zero Span window showing the positions of the Gate is shown between the Measurement Bar and the reduced measurement window. By reducing the height of the measurement window, some of the annotation on the Data Display may not fit and is not shown.

Remote Command	`[:SENSe]:SWEep:EGATe:VIEW ON|OFF|1|0` `[:SENSe]:SWEep:EGATe:VIEW?`
Example	SWE:EGAT:VIEW ON turns on the gate view.
Dependencies/Couplings	These couplings apply to the Swept SA measurement: • When Gate View is turned on, the instrument is set to Zero Span. • Gate View automatically turns off whenever a Span other than Zero is selected. • Gate View automatically turns off if you press Last Span while in Gate View, and the instrument returns to the Span it was in before entering Gate View (even if that is Zero Span). When Gate View is turned on, the sweep time used is the gate view sweep time. This is set according to the rules in "Gate View Sweep Time" on page 1184. • When Gate View is turned off, Sweep Time is set to the normal Swept SA measurement sweep time. • If Gate View is on and Gate is off, then turning on Gate turns off Gate View. In the Swept SA measurement: In Gate View, the regular Sweep Time key is grayed out, to avoid confusing you when you want to set Gate View Sweep Time. In the other measurements: When you turn Gate View on, the lower window takes on the current state of the instrument. Upon leaving Gate View, the instrument takes on the state of the lower window. • When you turn Gate View on, the upper window Sweep Time is set to the gate view sweep time.
Key Path	**Sweep/Control, Gate**
Preset	OFF
State Saved	Saved in state
Range	On|Off
Instrument S/W Revision	Prior to A.02.00

A sample of the Gate View screen in the Swept SA measurement is shown below:



A sample of the Gate View screen in other measurements is shown below. This example is for the ACP measurement:



Turning Gate View off returns the analyzer to the Normal measurement view.

In the Swept SA, the normal measurement view is the single-window Swept SA view. When returning to this view, the Swept SA measurement returns to the Span it was in before entering **Gate View** (even if that is Zero Span).

The **Gate View** window is triggered from the Gate Source, with zero trigger delay. Also, when updating the **Gate View** window, the Gate itself must not operate. So it is internally shut off while the gate view window is being updated. For the Swept SA measurement, this means that the Gate is internally shut off whenever the gate view window is displayed. The Meas Bar and keys continue to show the Trigger source for the main sweep window and give no indication that the Gate is shut off or that the Gate View window is triggered from the Gate Source.

When in **Gate View**, vertical lines are displayed in the Gate View window as follows:

- Green lines are displayed at the gate edges as follows: in Edge Gate, a line is shown for Delay and one for the end of the Gate period (defined by Length, even in FFT. In Level Gate a line is shown only for Delay. You can adjust the position of the green lines by adjusting the gate length and the gate delay. These lines update in the Gate View window as the active function changes, even if the window is not being updated. In Gated LO and Gated Video, these lines are positioned relative to the delay reference line (not relative to 0 time). In Gated FFT, their location is relative to the left edge of the screen.
- A blue line is displayed showing the delay reference, that is, the reference point for the Gate Delay within the Zero Span window. The blue line represents where (in time) the effective location of the gate start would be if the gate were programmed to zero delay.
- The second blue line is labeled "MIN FAST" as shown in the figure above because it represents the minimum Gate Delay for fast Gated LO operation. This line is only displayed in Gated LO. You cannot scroll (knob) or decrement (down key) the Gate Delay to less than that represented by the position of this line, it can only be set below this position manually, although once there it can be moved freely with the knob while below the line.
- A yellow line in the Gated Video case only, is displayed at Blength, where Blength is the bucket length for the swept trace, which is given by the sweep time for that trace divided by number of Points – 1. So it is referenced to 0 time, not to the delay reference. This line is labeled NEXT PT (it is not shown in the figure above because the figure above is for Gated LO). The yellow line represents the edge of a display point (bucket). Normally in Gated Video, the bucket length must be selected so that it exceeds the off time of the burst. There is another way to use the analyzer in Gated Video measurements, and that is to set the bucket width much shorter than the off time of the burst. Then use the Max Hold trace function to fill in "missing" buckets more slowly. This allows you to see some of the patterns of the Gated Video results earlier, though seeing a completely filled-in spectrum later.

Gate View Sweep Time

Controls the sweep time in the Gate View window. In order to provide an optimal view of the gate signal, the analyzer initializes Gate View Sweep Time based on the current settings of Gate Delay and Gate Length.

Remote Command:	`[:SENSe]:SWEep:EGATe:TIME <time>`
	`[:SENSe]:SWEep:EGATe:TIME?`
Example:	SWE:EGAT:TIME 500 ms

Dependencies/Couplings:	Gate View Sweep Time is initialized: on Preset (after initializing delay and length). every time the Gate Method is set/changed. Additionally, in the Swept SA measurement, whenever you do a Preset, or leave Gate View, the analyzer remembers the Gate Delay and Gate Length settings. Then, when returning to Gate View, if the current Gate Delay and/or Gate Length do not match the remembered values Gate View Sweep Time is re-initialized. 1. Compute the location of the "gate stop" line, which you know is at time t = tmin + GateDelay + GateLength.
Preset:	519.3 µs WiMAX OFDMA: 5 ms GSM/EDGE: 1 ms
State Saved:	Saved in state
Min:	1 µs
Max:	6000 s
Key Path:	**Sweep/Control, Gate**
Instrument S/W Revision:	Prior to A.02.00

Gate Delay

Controls the length of time from the time the gate condition goes True until the gate is turned on.

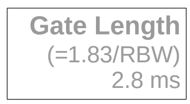
Remote Command:	`[:SENSe]:SWEep:EGATe:DELay <time>` `[:SENSe]:SWEep:EGATe:DELay?`
Example:	SWE:EGAT:DELay 500ms SWE:EGAT:DELay?
Remote Command Notes:	Units of time are required or no units; otherwise an invalid suffix error will be generated. See error –131.
Preset:	57.7 us WiMAX OFDMA: 71 us GSM/EDGE: 600 us
State Saved:	Saved in state
Min:	0.0 us
Max:	100 s
Key Path:	**Sweep/Control, Gate**

Instrument S/W Revision: Prior to A.02.00

Gate Length

Controls the length of time that the gate is on after it opens.

Remote Command:	`[:SENSe]:SWEep:EGATe:LENGth <time>` `[:SENSe]:SWEep:EGATe:LENGth?`
Example:	SWE:EGAT:LENG 1 SWE:EGAT:LENG?
Dependencies/Couplings:	Grayed out when Gate Method is set to FFT in which case the label changes to that shown below.



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The key is also grayed out if Gate Control = Level.

Remote Command Notes:	Units of time are required or no units; otherwise an invalid suffix will be generated.
Preset:	461.6 us WiMAX OFDMA: 50 us GSM/EDGE: 200 us
State Saved:	Saved in state
Min:	100 ns
Max:	5 s
Key Path:	**Sweep/Control, Gate**
Instrument S/W Revision:	Prior to A.02.00

Method

This lets you choose one of the three different types of gating.

Not all types of gating are available for all measurements.

Remote Command:	`[:SENSe]:SWEep:EGATe:METHod LO|VIDeo|FFT` `[:SENSe]:SWEep:EGATe:METHod?`
Example:	SWE:EGAT:METH FFT
Preset:	LO

State Saved:	Saved in state
Key Path:	**Sweep/Control, Gate**
Instrument S/W Revision:	Prior to A.02.00

LO

When set to Gate (On), the LO sweeps whenever the gate conditions as specified in the Gate menu are satisfied by the signal at the Gate Source.

This form of gating is more sophisticated, and results in faster measurements. With Gated LO, the analyzer only sweeps while the gate conditions are satisfied. This means that a sweep could take place over several gate events. It would start when the gate signal goes true and stop when it goes false, then continue when it goes true again. But since the LO is sweeping as long as the gate conditions are satisfied, the sweep typically finishes much more quickly than with Gated Video.

When in zero span, there is no actual sweep performed. But data is only taken while the gate conditions are satisfied. So even though there is no sweep, the gate settings will impact when data is acquired.

Dependencies/Couplings:	Key is unavailable when Gate is On and FFT Sweep Type manually selected. When selected, Sweep Type is forced to Swept and the FFT key in Sweep Type is grayed out.
Key Path:	**Sweep/Control, Gate, Method**
Readback:	LO
Instrument S/W Revision:	Prior to A.02.00

Video

When set to Gate (On), the video signal is allowed to pass through whenever the gate conditions as specified in the Gate menu are satisfied by the signal at the Gate Source.

This form of gating may be thought of as a simple switch, which connects the signal to the input of the spectrum analyzer. When the gate conditions are satisfied, the switch is closed, and when the gate conditions are not satisfied, the switch is open. So we only look at the signal while the gate conditions are satisfied.

With this type of gating, you usually set the analyzer to sweep very slowly. In fact, a general rule is to sweep slowly enough that the gate is guaranteed to be closed at least once per bucket (data measurement interval). Then if the peak detector is used, each bucket will represent the peak signal as it looks with the gate closed.

Dependencies/Couplings:	Key is unavailable when Gate is On and FFT Sweep Type manually selected. When selected, Sweep Type is forced to Swept and the FFT key in Sweep Type is grayed out
Key Path:	**Sweep/Control, Gate, Method**

Readback:	Video
Instrument S/W Revision:	Prior to A.02.00

FFT

When set to Gate (On), the an FFT is performed whenever the gate conditions as specified in the Gate menu are satisfied by the signal at the Gate Source. This is an FFT measurement which begins when the gate conditions are satisfied. Since the time period of an FFT is approximately 1.83/RBW, you get a measurement which starts under predefined conditions and takes place over a predefined period. So, in essence, this is a gated measurement. You have limited control over the gate length but it works in FFT sweeps, which the other two methods do not.

Gated FFT cannot be done in zero span since the instrument is not sweeping. So in zero span the Gated LO method is used. Data is still only taken while the gate conditions are satisfied, so the gate settings do impact when data is acquired.

The Gate Length will be 1.83/RBW.

This is a convenient way to make a triggered FFT measurement under control of an external gating signal.

Dependencies/Couplings:	Key is unavailable when Gate is On and Swept Sweep Type manually selected. Key is unavailable when gate Control is set to Level. When selected, Sweep Type is forced to FFT and the Swept key in Sweep Type is grayed out Forces Gate Length to 1.83/RBW (see Length key description above)
Key Path:	**Sweep/Control, Gate**
Readback:	FFT
Instrument S/W Revision:	Prior to A.02.00

Gate Source

The menus under the **Gate Source** key follow the same pattern as those under **Trigger**, with the exception that neither **Free Run** nor **Video** are available as Gate Source selections. Any changes to the settings in the setup menus under each Gate Source selection key (for example: **Trigger Level**) also affect the settings under the Trigger menu keys. Note that the selected Trigger Source does not have to match the Gate Source.

Remote Command:	`[:SENSe]:SWEep:EGATe:SOURce EXTernal1|EXTernal2 |LINE|FRAMe|RFBurst|TV` `[:SENSe]:SWEep:EGATe:SOURce?`
Preset:	EXTernal 1 GSM/EDGE: FRAMe

Key Path:	**Sweep/Control, Gate**
Dependencies/Couplings:	TV triggering is not available yet.
Instrument S/W Revision:	Prior to A.02.00

Control Edge/Level

Sets the method of controlling the gating function from the gating signal.

Edge

In Edge triggering, the gate opens (after the Delay) on the selected edge (for example, positive) of the gate signal and closes on the alternate edge (for example, negative).

Level

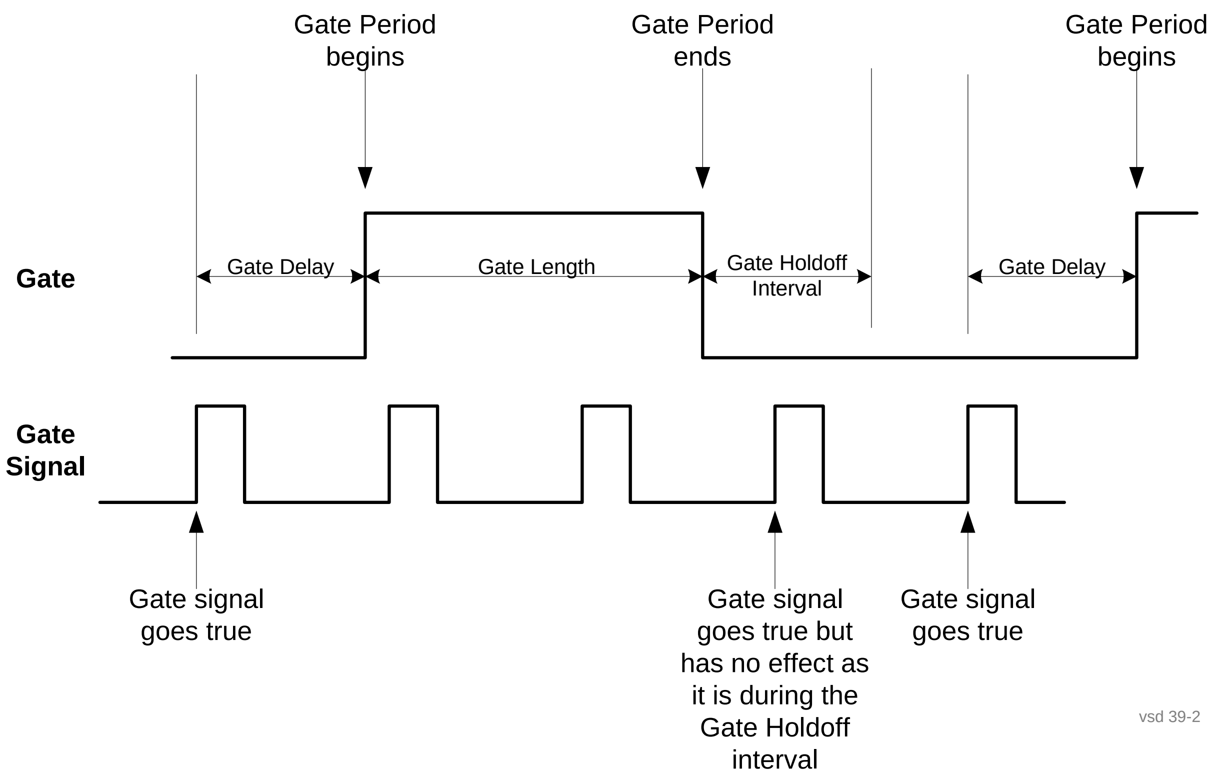
In Level triggering, the gate opens (after the Delay) when the gate signal has achieved a certain level and stays open as long as that level is maintained.

Remote Command:	`[:SENSe]:SWEep:EGATe:CONTrol EDGE|LEVel`
	`[:SENSe]:SWEep:EGATe:CONTrol?`
Example:	SWE:EGAT:CONT EDGE
Dependencies/Couplings:	If the Gate Method is FFT the Control key is grayed out and Edge is selected.
	If the Gate Source is TV, Frame or Line, the Control key is grayed out and Edge is selected.
Preset:	EDGE
State Saved:	Saved in stat
Key Path:	**Sweep/Control, Gate**
Instrument S/W Revision:	Prior to A.02.00

Gate Holdoff

Lets you increase or decrease the wait time after a gate event ends before the analyzer will respond to the next gate signal.

After any Gate event finishes, the analyzer must wait for the sweep system to settle before it can respond to another Gate signal. The analyzer calculates a "wait time," taking into account a number of factors, including RBW and Phase Noise Optimization setting. The goal is to achieve the same accuracy when gated as in ungated operation. The figure below illustrates this concept:



When Gate Holdoff is in Auto, the wait time calculated by the analyzer is used. When Gate Time is in Manual, you may adjust the wait time, usually decreasing it in order to achieve greater speed, but at the risk of decreasing accuracy.

When **Method** is set to **Video** or **FFT**, the **Gate Holdoff** function has no effect.

In measurements that do not support Auto, the value shown when Auto is selected is "---" and the manually set holdoff is returned to a query.

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

Dependencies/Couplings	When **Gate Holdoff** is **Auto**, the **Gate Holdoff** key shows the value calculated by the analyzer for the wait time. Pressing the **Gate Holdoff** key while it is in **Auto** and not selected, causes the key to become selected and allows you to adjust the value. If the value is adjusted, the setting changes to **Man**. Pressing the **Gate Holdoff** key, while it is in **Auto** and selected, does not change the value of **Gate Holdoff**, but causes the setting to change to **Man.** Now you can adjust the value. Pressing the key while it is in **Man** and selected, cause the value to change back to **Auto**. Pressing the key while it is in **Man** and not selected, causes the key to become selected and allows you to adjust the value. When **Method** is set to **Video** or **FFT**, the **Gate Holdoff** function has no effect. See Coupling, above
Example	SWE:EGAT:HOLD 0.0002 SWE:EGAT:HOLD? SWE:EGAT:HOLD:AUTO ON SWE:EGAT:HOLD:AUTO?
Key Path	**Sweep/Control, Gate**
Mode	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO
Preset	Auto Auto/On
State Saved	Saved in instrument state.
Min	1 µsec
Max	1 sec
Instrument S/W Revision	Prior to A.02.00

Gate Delay Compensation

This function allows you to select an RBW-dependent value by which to adjust the gate delay, to compensate for changes in the delay caused by RBW effects. The intent is to make it unnecessary for you to worry about the effects that RBW will have on the gate circuitry, by automatically compensating for them.

You can select between uncompensated operation and two types of compensation, **Delay Until RBW Settled** and **Compensate for RBW Group Delay**.

See "More Information" on page 1192

Remote Command:	`[:SENSe]:SWEep:EGATe:DELay:COMPensation:TYPE OFF|SETTled|GDELay` `[:SENSe]:SWEep:EGATe:DELay:COMPensation:TYPE?`
Example:	SWE:EGAT:DEL:COMP:TYPE SETT SWE:EGAT:DEL:COMP:TYPE?
Scope:	Meas Global
Range:	Uncompensated|Delay Until RBW Settled|Compensate for RBW Group Delay
Readback text:	Uncompensated|Settled|Group Delay
Preset:	TD-SCDMA mode: Compensate for RBW Group Delay All other modes: Delay Until RBW Settled
State Saved:	Saved in state
Key Path:	**Sweep/Control, Gate**
Notes:	Although this function is Meas Global, there are some measurements that do not support this function. In those measurements the operation will be Uncompensated. Going into one of those measurements will not change the Meas Global selection; it will simply display the grayed-out menu key with "Uncompensated" showing as the selection. This is a non-forceful grayout, so the SCPI command is still accepted. If Gate Delay Compensation is not supported at all within a particular mode, the key is not displayed, and if the SCPI command is sent while in a measurement within that mode, an "Undefined Header" error is generated. Measurements that do not support this function include: Swept SA
Instrument S/W Revision:	Prior to A.02.00

More Information

Selecting **Uncompensated** means that the actual gate delay is as you set it.

Selecting **Delay Until RBW Settled** causes the gate delay to be increased above the user setting by an amount equal to 3.06/RBW. This compensated delay causes the GATE START and GATE STOP lines on the display to move by the compensation amount, and the actual hardware gate delay to be increased by the same amount. All the other gate lines (for example, MIN FAST) are unaffected. If the RBW subsequently changes, the compensation is readjusted for the new RBW. The value shown on the **Gate Delay** key does NOT change.

Delay Until RBW Settled allows excellent measurements of gated signals, by allowing the IF to settle following any transient that affects the burst.   Excellent measurements also require that the analysis region not extend into the region affected by the falling edge of the burst. Thus, excellent measurements can only be made over a width that declines with narrowing RBWs. Therefore, for general purpose compensation, you will still want to change the gate length with changes in RBW even if the gate delay is compensated.

Selecting **Compensate for RBW Group Delay** causes the gate delay to be increased above the user setting by an amount equal to 1.81/RBW. This compensated delay causes the GATE START, GATE STOP lines on the display to move by the compensation amount, and the actual hardware gate delay to be increased by the same amount. All the other gate lines (for example, MIN FAST) are unaffected. If the RBW subsequently changes, the compensation is readjusted for the new RBW. The value shown on the **Gate Delay** key does NOT change. **Compensate for RBW Group Delay** also includes gate length compensation; the gate length itself is adjusted as necessary to attempt to compensate for delay effects imposed by the RBW.

Compensate for RBW Group Delay is similar to **Delay Until RBW Settled**, but compensates for the group delay of the RBW filter, rather than the filter settling time. As the RBW gets narrow, this can allow the settling tail of the RBW to affect the beginning part of the gated measurement, and allow the beginning of the RBW settling transient to affect the end of the gated measurement. These two effects are symmetric because the RBW response is symmetric. Because the gate length is not automatically compensated, some users might find this compensation to be more intuitive than compensation for RBW settling.

Min Fast Position Query (Remote Command Only)

This command queries the position of the MIN FAST line, relative to the delay reference (REF) line. See section "Gate View On/Off" on page 1182. If this query is sent while not in gate view, the MinFast calculation is performed based on the current values of the appropriate parameters and the result is returned. Knowing this value lets you to set an optimal gate delay value for the current measurement setup.

Remote Command:	`[:SENSe]:SWEep:EGATe:MINFast?`
Example:	SWE:EGAT:MIN?
Instrument S/W Revision:	Prior to A.02.00

Trace / Detector

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

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

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

Trigger

The Trig front-panel key accesses a menu of keys to control the selection of the trigger source and the setup of each of the trigger sources. The analyzer is designed to allow triggering from a number of different sources, for example, Free Run, Video, External, RF Burst, etc.

The `TRIG:SOURCe` command (below) will specify the trigger source for the currently selected input (RF or I/Q). If you change inputs, the new input remembers the trigger source it was last programmed to for the current measurement, and uses that trigger source. You can directly set the trigger source for each input using the `TRIGger:RF:SOURce` and `TRIGger:IQ:SOURce` commands (later in this section).

Note the inclusion of the `<measurement>` parameter in the command below. Because each measurement remembers its own Trigger Source, the command must be qualified with the measurement name. Note that for the Swept SA measurement this is not the case; for backwards compatibility, no <measurement> parameter is used when setting the Trigger Source for the Swept SA measurement.

See "Trigger Source Presets" on page 1198

See "RF Trigger Source" on page 1201

See "I/Q Trigger Source" on page 1202

See "More Information" on page 1203

Remote Command	`:TRIGger:<measurement>[:SEQuence]:SOURce EXTernal1|EXTernal2|IMMediate|LINE|FRAMe|RFBurst|VIDeo|IF|ALARm|LAN|IQMag|IDEMod|QDEMod|IINPut|QINPut|AIQMag` `:TRIGger:<measurement>[:SEQuence]:SOURce?`
Example	TRIG:ACP:SOUR EXT1 Selects the external 1 trigger input for the ACP measurement and the selected input TRIG:SOUR VID Selects video triggering for the SANalyzer measurement in the Spectrum Analyzer mode. For SAN, do not use the <measurement> keyword.

Remote Command Notes	Not all measurements have all the trigger sources available to them. Check the trigger source documentation for your specific measurement to see what sources are available. Not all trigger sources are available for each input. See the "RF Trigger Source" on page 1201 and "I/Q Trigger Source" on page 1202 commands (below) for detailed information on which trigger sources are available for each input. Other trigger-related commands are found in the INITiate and ABORt SCPI command subsystems. *OPC should be used after requesting data. This will hold off any subsequent changes to the selected trigger source, until after the sweep is completed and the data is returned. Available ranges and presets can vary from mode to mode.
SCPI Status Bits/OPC Dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Key Path	**Front-panel key**
Preset	`See table below`
Instrument S/W Revision	Prior to A.02.00

Trigger Source Presets

Here are the Trigger Source Presets for the various measurements:

Meas	Mode	Preset for RF	Preset for IQ	Notes
Swept SA	SA	IMM	IQ not supported	
CHP	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB	IMM	IQ not supported	

Meas	Mode	Preset for RF	Preset for IQ	Notes
OBW	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO	1xEVDO: EXT1 others: IMM	IQ not supported	For 1xEVDO mode, the trigger source is coupled with the gate state, as well as the gate source. When the trigger source changes to RFBurst, External1 or External2, the gate state is set to on, and the gate source is set identically with the trigger source. When the trigger source changes to IMMediate, VIDeo, LINE, FRAMe or IF, the gate state is set to off.
CCDF	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB-T/H, DTMB	SA, WCDMA, C2K: IMMediate WIMAX OFDMA: RFBurst TD-SCDMA: BTS: External 1 MS: RFBurst	TD-SCDMA: BTS: External 1 MS: IQMag Others: IMM	For TD-SCDMA: Trigger source is coupled with radio device. When radio device changes to BTS, trigger source will be changed to EXTernal1. When radio device changes to MS, trigger source will be set as RFBurst for RF or IQ Mag for BBIQ. When TriggerSource is RFBurst or IQ Mag, Measure Interval is grayed out.
ACP	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB	IMM	IQ not supported	
Tx Power	SA, GSM, TD-SCDMA	SA, GSM: RFBurst TD-SCDMA: EXTernal	IMM	TD-SCDMA doesn't support the Line and Periodic Timer parameters. When the mode is TD-SCDMA, if the Radio Device is switched to BTS, the value will be changed to External 1 and if the Radio device is switched to MS, the value will be changed to RFBurst
SPUR	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA,1xEV-DO, DVB-T/H	IMM	IQ not supported	

Meas	Mode	Preset for RF	Preset for IQ	Notes
SEM	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-T/H, DTMB	SA, WCDMA, C2K, TD-SCDMA, WIMAX OFDMA: IMMediate 1xEVDO(BTS): EXTernal1	IQ not supported	
CDP	WCDMA	IMM	IMM	
RHO	WCDMA	IMM	IMM	
PCON	WCDMA	IMM	IMM	
QPSK	WCDMA, C2K, 1xEVDO	All except CDMA1xEVDO: IMMediate CDMA1xEVDO: EXT1	IMM	
MON	All except SA and BASIC	IMM	IQ not supported	
WAV		All except GSM/EDGE: IMMediate GSM/EDGE: RFBurst	All except GSM/EDGE: IMMediate GSM/EDGE: IQMag	
PVT	WIMAX OFDMA	RFB	IMM	
EVM	WIMAX OFDMA, DVB-T/H, DTMB	IMM	IMM	
SPEC	BASIC	IMM	IMM	
LOG Plot	PN	IMM	IQ not supported	
Spot Freq	PN	IMM	IQ not supported	
GMSK PVT	EDGE/GSM	RFB	IMM	
GMSK PFER	EDGE/GSM	RFB	IQMag	
GMSK ORFS	EDGE/GSM	RFB	IQ not supported	
EDGE PVT	EDGE/GSM	RFB	IMM	

Meas	Mode	Preset for RF	Preset for IQ	Notes
EDGE EVM	EDGE/GSM	RFB	IQMag	
EDGE ORFS	EDGE/GSM	RFB	IQ not supported	
Combined WCDMA	WCDMA	IMM	IQ not supported	
Combined GSM	EDGE/GSM	RFB	IQ not supported	
List Power Step	WCDMA, EDGE/GSM	IMM	IQ not supported	

RF Trigger Source

The **RF Trigger Source** command (below) selects the trigger to be used for the specified measurement when RF is the selected input. The RF trigger source can be queried and changed even while another input is selected, but it is inactive until RF becomes the selected input.

Note the inclusion of the `<measurement>` parameter in the command below. Because each measurement remembers its own Trigger Source, the command must be qualified with the measurement name. Note that for the Swept SA measurement this is not the case; for backwards compatibility, no <measurement> parameter is used when setting the Trigger Source for the Swept SA measurement.

Remote Command:	`:TRIGger:<measurement>[:SEQuence]:RF:SOURce EXTernal1|EXTernal2|IMMediate|LINE|FRAMe|RFBurst|VIDeo|IF|ALARm|LAN` `:TRIGger:<measurement>[:SEQuence]:RF:SOURce?`
Example:	TRIG:ACP:RF:SOUR EXT1 Selects the external 1 trigger input for the ACP measurement and the RF input TRIG:RF:SOUR VID Selects video triggering for the SANalyzer measurement and the RF input. For SAN, do not use the <measurement> keyword.

Remote Command Notes:	Not all measurements have all the trigger sources available to them. Check the trigger source documentation for your specific measurement to see what sources are available. Not all trigger sources are available for each input. For the **RF Trigger Source,** the following trigger sources are available: — IMMediate - free run triggering — VIDeo - triggers on the video signal level — LINE - triggers on the power line signal — EXTernal1 - triggers on an externally connected trigger source on the rear panel — EXTernal2 - triggers on an externally connected trigger source on the front panel — RFBurst - triggers on the bursted frame — FRAMe - triggers on the periodic timer — IF (video) - same as video, for backwards compatibility only — ALARm – LXI Alarm — LAN – LXI LAN event *OPC should be used after requesting data. This will hold off any subsequent changes to the selected trigger source, until after the sweep is completed and the data is returned. Available ranges, and presets can vary from mode to mode.
SCPI Status Bits/OPC Dependencies:	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Instrument S/W Revision:	Prior to A.02.00

I/Q Trigger Source

The **I/Q Trigger Source** command (below) selects the trigger to be used for the specified measurement when I/Q (which requires option BBA) is the selected input. The I/Q trigger source can be queried and changed even while another input is selected, but it is inactive until I/Q becomes the selected input.

Remote Command:	`:TRIGger:<measurement>[:SEQuence]:IQ:SOURce EXTernal1|EXTernal2|IMMediate|IQMag|IDEMod|QDEMod|IINPut|QINPut|AIQMag`
	
	`:TRIGger:<measurement>[:SEQuence]:IQ:SOURce?`

Example:	TRIG:WAVeform:SOUR IQM Selects I/Q magnitude triggering for the IQ Waveform measurement and the I/Q input

Remote Command Notes:	Not all measurements have all the trigger sources available to them. Check the trigger source documentation for your specific measurement to see what sources are available. Not all trigger sources are available for each input. For the **I/Q Trigger Source,** the following trigger sources are available: — IMMediate - free run triggering — EXTernal1 - triggers on an externally connected trigger source on the rear panel — EXTernal2 - triggers on an externally connected trigger source on the front panel — IQMag - triggers on the magnitude of the I/Q signal — IDEMod - triggers on the I/Q signal's demodulated I voltage — QDEMod - triggers on the I/Q signal's demodulated Q voltage — IINPut - triggers on the I channel's ADC voltage — QINPut - triggers on the Q channel's ADC voltage — AIQMag - triggers on the magnitude of the auxiliary receiver channel I/Q signal *OPC should be used after requesting data. This will hold off any subsequent changes to the selected trigger source, until after the sweep is completed and the data is returned. Available ranges, and presets can vary from mode to mode.
SCPI Status Bits/OPC Dependencies:	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Instrument S/W Revision:	Prior to A.02.00

More Information

The trigger menus let you select the trigger source and trigger settings for a sweep or measurement. In triggered operation (basically, any trigger source other than Free Run), the analyzer will begin a sweep or measurement only with the selected trigger conditions are met, generally when your trigger source signal meets the specified trigger level and polarity requirements. (In FFT measurements, the trigger controls when the data acquisition begins for FFT conversion.)

For each of the trigger sources, you may define a set of operational parameters or settings which will be applied when that source is selected as the current trigger source. Examples of these settings are Trigger Level, Trigger Delay, and Trigger Slope. You may apply different settings for each source; so, for example, you could have a Trigger Level of 1v for External 1 trigger and –10 dBm for Video trigger.

Once you have established the settings for a given trigger source, they generally will remain unchanged for that trigger source as you go from measurement to measurement within a Mode (although the settings do change as you go from Mode to Mode). Furthermore, the trigger settings within a Mode are the same for the **Trigger** menu, the **Gate Source** menu, and the **Sync Source** menu that is part of the **Periodic Timer Trigger Setup** menu. That is, if **Ext1** trigger level is set to 1v in the **Trigger** menu, it will appear as 1v in both the **Gate Source** and the **Sync Source** menus. For these reasons the trigger settings commands are not qualified with the measurement name, the way the trigger source commands are.

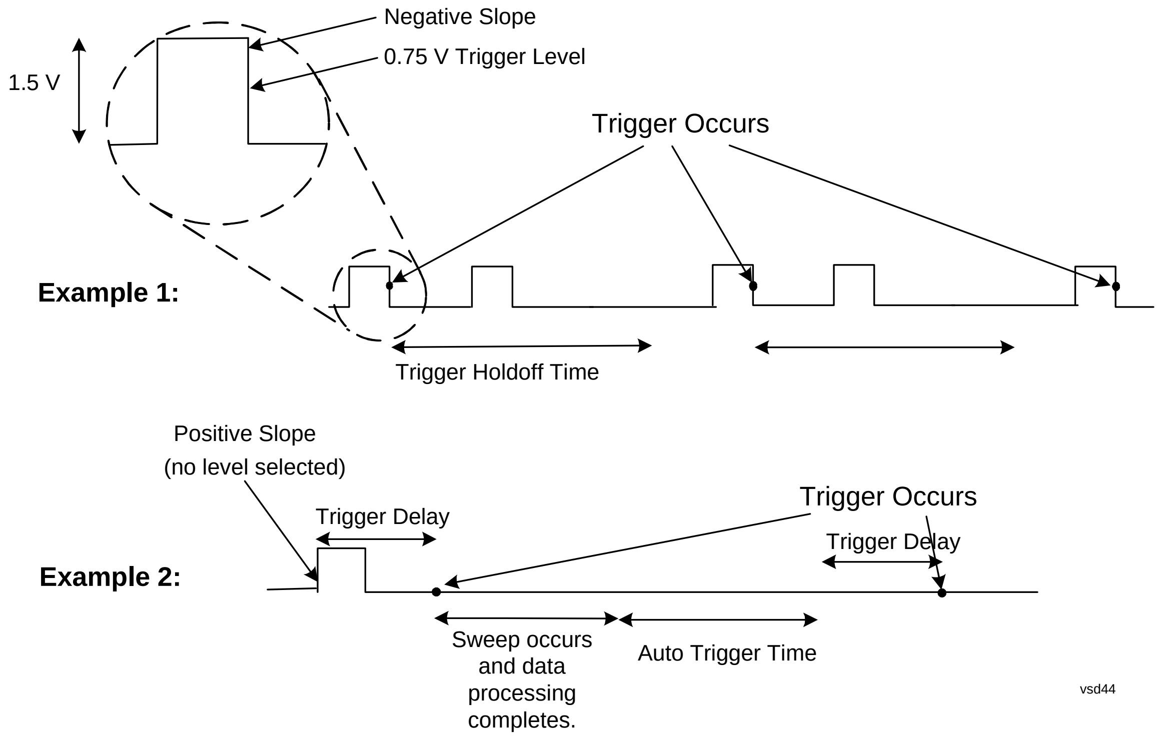
The settings setup menu can be accessed by pressing the key for the current trigger source a second time. For example, one press of Video selects the Video trigger as the source. The Video key becomes highlighted and the hollow arrow on the key turns black. Now a second press of the key takes you into the Video Trigger Setup menu.

Trigger Setup Parameters:

The following examples show trigger setup parameters using an external trigger source.

Example 1 illustrates the trigger conditions with negative slope and no trigger occurs during trigger Holdoff time.

Example 2 illustrates the trigger conditions with positive slope, trigger delay, and auto trigger time.



Free Run

Pressing this key, when it is not selected, selects free-run triggering. Free run triggering occurs immediately after the sweep/measurement is initiated.

Example:	TRIG:SOUR IMM	Swept SA measurement
	TRIG:<meas>:SOUR IMM Measurements other than Swept SA	
State Saved:	Saved in instrument state.	

Key Path:	**Trigger**
SCPI Status Bits/OPC Dependencies:	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Instrument S/W Revision:	Prior to A.02.00

Video (IF Envelope)

Pressing this key, when it is not selected, selects the video signal as the trigger. The Video trigger condition is met when the video signal (the filtered and detected version of the input signal, including both RBW and VBW filtering) crosses the video trigger level.

NOTE	When the detector selected for all active traces is the average detector, the video signal for triggering does not include any VBW filtering.

The video trigger level is shown as a labeled line on the display. The line is displayed as long as video is the selected trigger source.

Pressing this key, when it is already selected, accesses the video trigger setup functions.

Example:	TRIG:SOUR VID	Swept SA measurement
	TRIG:<meas>:SOUR VID	Measurements other than Swept SA
Dependencies/Couplings:	Video trigger is allowed in average detector mode.	
State Saved:	Saved in instrument state.	
Key Path:	**Trigger**	
Notes:	Log Plot and Spot Frequency measurements do not support Video Trigger	
SCPI Status Bits/OPC Dependencies:	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.	
Instrument S/W Revision:	Prior to A.02.00	

Trigger Level

Sets a level for the video signal trigger. When the video signal crosses this level, with the chosen slope, the trigger occurs. This level is displayed with a horizontal line only if **Video** is the selected trigger source.

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 and for the Video selection in the Gate Source 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 reference level
Max:	Same as reference level
Key Path:	**Trigger, Video**
Default Unit:	depends on the current selected Y axis unit
Instrument S/W Revision:	Prior to A.02.00

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

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:	**Trigger, Video**
Instrument S/W Revision:	Prior to A.02.00

Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT, but not in swept spans.

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:	Off, 1 us
State Saved:	Saved in instrument state.
Min:	–150 ms
Max:	+500 ms
Key Path:	**Trigger, Video**
Default Unit:	s
Instrument S/W Revision:	Prior to A.02.00

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 Swept SA measurement TRIG:<meas>:SOUR LINE Measurements other than Swept SA
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:	**Trigger**
SCPI Status Bits/OPC Dependencies:	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Instrument S/W Revision:	Prior to A.02.00

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

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:	**Trigger, Line**
Instrument S/W Revision:	Prior to A.02.00

Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT, but not in swept spans.

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:	Off, 1.000 us
State Saved:	Saved in instrument state.
Min:	–150 ms
Max:	500 ms
Key Path:	**Trigger, Line**
Default Unit:	S
Instrument S/W Revision:	Prior to A.02.00

External 1

Pressing this key, when it is not selected, selects an external input signal as the trigger. A new sweep/measurement will start when the external trigger condition is met using the external 1 input connector on the rear panel.

Pressing this key, when it is already selected, accesses the external 1 trigger setup menu.

Example:	TRIG:SOUR EXT1	Swept SA measurement
	TRIG:<meas>:SOUR EXT1	Measurements other than Swept SA
State Saved:	Saved in instrument state.	
Key Path:	**Trigger**	
SCPI Status Bits/OPC Dependencies:	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.	
Instrument S/W Revision:	Prior to A.02.00	

Trigger Level

Sets the value where the external 1 trigger input will trigger a new sweep/measurement.

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 and in the Gate Source menu), and also for the Ext1 selection in the Gate Source menu.
Preset:	1.2 V
State Saved:	Saved in instrument state.
Min:	–5 V
Max:	5 V
Key Path:	**Trigger, External 1**
Default Unit:	V
Instrument S/W Revision:	Prior to A.02.00

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

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 and in the Gate Source menu).
Preset:	POSitive
State Saved:	Saved in instrument state.
Key Path:	**Trigger, External 1**
Instrument S/W Revision:	Prior to A.02.00

Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT, but not in swept spans.

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:	Off, 1.000 us
State Saved:	Saved in instrument state.
Min:	–150 ms
Max:	+500 ms
Key Path:	**Trigger, External 1**
Default Unit:	s
Instrument S/W Revision:	Prior to A.02.00

External 2

Pressing this key, when it is not selected, selects an external input signal as the trigger. A new sweep/measurement will start when the external trigger condition is met using the external 2 input connector. The external trigger 2 input connector is on the rear panel.

Pressing this key, when it is already selected, accesses the external 2 trigger setup menu.

Example:	TRIG:SOUR EXT2	Swept SA measurement
	TRIG:<meas>:SOUR EXT2	Measurements other than Swept SA
State Saved:	Saved in instrument state.	

Key Path:	**Trigger**
SCPI Status Bits/OPC Dependencies:	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Instrument S/W Revision:	Prior to A.02.00

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 and in the Gate Source menu), and also for the Ext2 selection in the Gate Source menu.
Preset:	1.2 V
State Saved:	Saved in instrument state.
Min:	–5 V
Max:	5 V
Key Path:	**Trigger, External 2**
Default Unit:	V
Instrument S/W Revision:	Prior to A.02.00

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

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 and in the Gate Source menu).
Preset:	POSitive

State Saved:	Saved in instrument state.
Key Path:	**Trigger, External 2**
Instrument S/W Revision:	Prior to A.02.00

Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT, but not in swept spans.

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:	Off, 1.000 us
State Saved:	Saved in instrument state.
Min:	–150 ms
Max:	500 ms
Key Path:	**Trigger, External 2**
Default Unit:	s
Instrument S/W Revision:	Prior to A.02.00

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 Swept SA measurement
	TRIG:<meas>:SOUR RFB Measurements other than Swept SA
Key Path:	**Trigger**
State Saved:	Saved in instrument state.

SCPI Status Bits/OPC Dependencies:	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Instrument S/W Revision:	Prior to A.02.00

Trigger Level

Sets the trigger level for the RF burst envelope.

In some measurements, both absolute and relative burst trigger functions are available. When Relative is available, this key will display a toggle between **Abs** and **Rel** on the third line. When **Abs** is selected, the value on the key is the absolute trigger level; when **Rel** is selected, the value is the relative trigger level.

If no toggle appears on the key, the measurement only supports absolute trigger level.

The relative RF Burst trigger is implemented as follows:

The measurement starts with the absolute RF Burst trigger setting. If it can not get a trigger with that level, auto trigger fires and the acquisition starts anyway. After the acquisition, the measurement searches for the peak in the acquired waveform and saves it.

Now, in the next cycle of the measurement, the measurement determines a new absolute RF Burst level based on the peak value from the first measurement and the Relative RF Burst Trigger Level (always 0 or negative dB) set by you. The following formula is used:

absolute RF Burst level = peak level of the previous acquisition + relative RF Burst level

If the new absolute RF Burst level differs from the previous by more than 0.5 dB, the new level is sent to the hardware; otherwise it is not updated (to avoid slowing down the acquisition)

Steps 2 and 3 repeat for subsequent measurements.

Remote Command:	`:TRIGger[:SEQuence]:RFBurst:LEVel:ABSolute <ampl>`
	`:TRIGger[:SEQuence]:RFBurst:LEVel:RELative <ampl>`
	`:TRIGger[:SEQuence]:RFBurst:LEVel:ABSolute?`
	`:TRIGger[:SEQuence]:RFBurst:LEVel:RELative?`
	`:TRIGger[:SEQuence]:RFBurst:LEVel:TYPE ABSolute|RELative`
	`:TRIGger[:SEQuence]:RFBurst:LEVel:TYPE?`

Example:	TRIG:RFB:LEV:ABS 10 dBm sets the trigger level of the RF burst envelope signal to the absolute level of 10 dBm.
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 and in the Gate Source menu), and also for the RF Burst selection in the Gate Source menu.

Preset:	Absolute: –20 dBm Relative: –6 dB GSM: –25 dB ABSolute
State Saved:	Saved in instrument state.
Min:	Absolute: –200 dBm Relative: –45 dB
Max:	Absolute: 100 dBm Relative: 0 dB
Key Path:	**Trigger, RF Burst**
Default Unit:	Absolute: depends on the current selected Y-Axis unit Relative: dB or dBc
Instrument S/W Revision:	Prior to A.02.00

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 and in the Gate Source menu).
Preset:	POSitive
State Saved:	Saved in instrument state.
Key Path:	**Trigger, RF Burst**
Instrument S/W Revision:	Prior to A.02.00

Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT, but not in swept spans.

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:	Off, 1.000 us
State Saved:	Saved in instrument state.
Min:	–150 ms
Max:	500 ms
Key Path:	**Trigger, RF Burst**
Default Unit:	s
Instrument S/W Revision:	Prior to A.02.00

Periodic Timer (Frame Trigger)

Pressing this key, when it is not selected, selects the internal periodic timer signal as the trigger. Triggering occurrences are set by the **Period** parameter, which is modified by the **Sync Source** and **Offset**. Pressing this key, when it is already selected, accesses the periodic timer trigger setup functions.

If you do not have a sync source selected (it is Off), then the internal timer will not be synchronized with any external timing events.

Example:	TRIG:SOUR FRAM	Swept SA measurement
	TRIG:<meas>:SOUR FRAM	Measurements other than Swept SA
State Saved:	Saved in instrument state.	
Key Path:	**Trigger**	
Readback:	[Sync: <value of Sync Source>], for example, [Sync: External 1]	
SCPI Status Bits/OPC Dependencies:	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.	

Instrument S/W Revision:	Prior to A.02.00

Periodic Timer Triggering:

This feature selects the internal periodic timer signal as the trigger. Trigger occurrences are set by the **Periodic Timer** parameter, which is modified by the **Sync Source** and **Offset**.

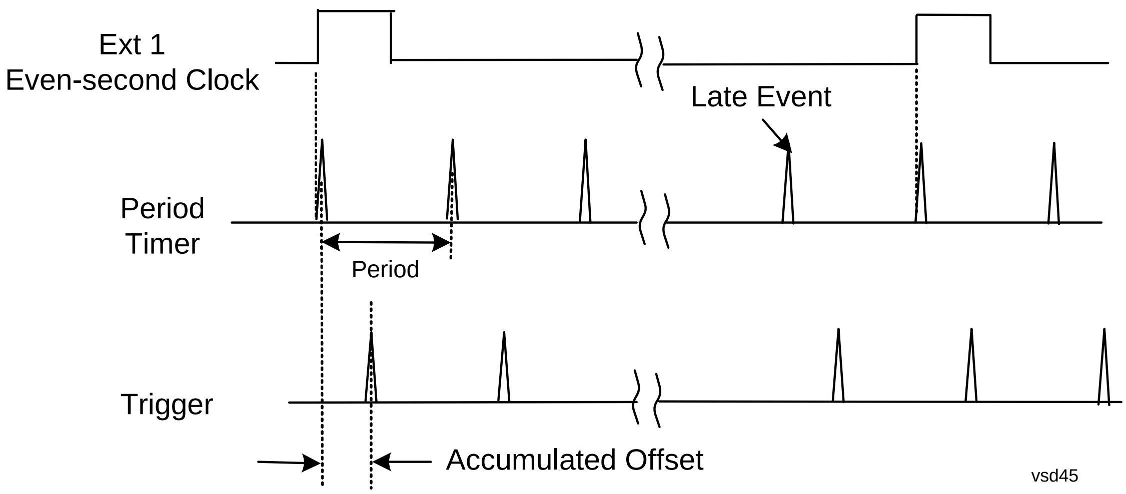
The figure below shows the action of the periodic timer trigger. Before reviewing the figure, we'll explain some uses for the periodic trigger.

A common application is measuring periodic burst RF signals for which a trigger signal is not easily available. For example, we might be measuring a TDMA radio which bursts every 20 ms. Let's assume that the 20 ms period is very consistent. Let's also assume that we do not have an external trigger source available that is synchronized with the period, and that the signal-to-noise ratio of the signal is not high enough to provide a clean RF burst trigger at all of the analysis frequencies. For example, we might want to measure spurious transmissions at an offset from the carrier that is larger than the bandwidth of the RF burst trigger. In this application, we can set the Periodic Timer to a 20.00 ms period and adjust the offset from that timer to position our trigger just where we want it. If we find that the 20.00 ms is not exactly right, we can adjust the period slightly to minimize the drift between the period timer and the signal to be measured.

A second way to use this feature would be to use **Sync Source** temporarily, instead of **Offset**. In this case, we might tune to the signal in a narrow span and use the RF Burst trigger to synchronize the periodic timer. Then we would turn the sync source off so that it would not mis-trigger. Mis-triggering can occur when we are tuned so far away from the RF burst trigger that it is no longer reliable.

A third example would be to synchronize to a signal that has a reference time element of much longer period than the period of interest. In some CDMA applications, it is useful to look at signals with a short periodicity, by synchronizing that periodicity to the "even-second clock" edge that happens every two seconds. Thus, we could connect the even-second clock trigger to Ext1 and use then Ext1 as the sync source for the periodic timer.

The figure below illustrates this third example. The top trace represents the even-second clock. It causes the periodic timer to synchronize with the leading edge shown. The analyzer trigger occurs at a time delayed by the accumulated offset from the period trigger event. The periodic timer continues to run, and triggers continue to occur, with a periodicity determined by the analyzer time base. The timer output (labeled "late event") will drift away from its ideal time due to imperfect matching between the time base of the signal being measured and the time base of the analyzer, and also because of imperfect setting of the period parameter. But the synchronization is restored on the next even-second clock event. ("Accumulated offset" is described in the in the **Offset** function section.)



Period

Sets the period of the internal periodic timer clock. For digital communications signals, this is usually set to the frame period of your current input signal. In the case that sync source is not set to OFF, and the external sync source rate is changed for some reason, the periodic timer is synchronized at the every external synchronization pulse by resetting the internal state of the timer circuit.

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.
	The same period is used in the Gate Source selection of the period timer.
Preset:	20 ms
	GSM: 4.615383
State Saved:	Saved in instrument state.
Min:	100.000 ns
Max:	559.0000 ms
Key Path:	**Trigger, Periodic Timer**
Default Unit:	S
Instrument S/W Revision:	Prior to A.02.00

Offset

Adjusts the accumulated offset between the periodic timer events and the trigger event. Adjusting the accumulated offset is different than setting an offset, and requires explanation.

The periodic timer is usually not synchronized with any external events, so the timing of its output events has no absolute meaning. Since the timing relative to external events (RF signals) is important, you need to be able to adjust (offset) it. However, you have no direct way to see when the periodic timer events occur. All that you can see is the trigger timing. When you want to adjust the trigger timing, you will be changing the internal offset between the periodic timer events and the trigger event. Because the absolute value of that internal offset is unknown, we will just call that the accumulated offset. Whenever the Offset parameter is changed, you are changing that accumulated offset. You can reset the displayed offset using Reset Offset Display. Changing the display does not change the value of the accumulated offset, and you can still make additional changes to accumulated offset.

To avoid ambiguity, we define that an increase in the "offset" parameter, either from the knob or the SCPI adjust command, serves to delay the timing of the trigger event.

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. The same offset is used in the Gate Source selection of the period timer.
Remote Command Notes:	When the SCPI command is sent the value shown on the key (and the Active Function, if this happens to be the active function) is updated with the new value. However, the actual amount sent to the hardware is the delta value, that is, the current accumulated offset value minus the previous accumulated offset value. The SCPI query simply returns the value currently showing on the key.
Preset:	0 s
State Saved:	Saved in instrument state.
Min:	–10.000 s
Max:	10.000 s
Key Path:	**Trigger, Periodic Timer**
Default Unit:	S
Instrument S/W Revision:	Prior to A.02.00

Offset Adjust (Remote Command only) This remote command does not work at all like the related front-panel keys. This command lets you advance the phase of the frame trigger by the amount you specify.

It does not change the period of the trigger waveform. If the command is sent multiple times, it advances the phase of the frame trigger an additional amount each time it is sent. Negative numbers are permitted.

Remote Command:	`:TRIGger[:SEQuence]:FRAMe:ADJust <time>`
Example:	TRIG:FRAM:ADJ 1.2 ms

Dependencies/Couplings:	The invalid data indicator turns on when the offset is changed, until the next sweep/measurement completes. The same offset is used in the Gate Source selection of the period timer.
Remote Command Notes:	The front panel interface (for example, the knob) and the :TRIG:FRAM:OFFS command adjust the accumulated offset, which is shown on the active function display. However, the actual amount sent to the hardware is the delta value, that is, the current offset value minus the previous offset value. When the SCPI command is sent the value shown on the key (and the Active Function, if this happens to be the active function) is updated by increasing it (or decreasing it if the value sent is negative) by the amount specified in the SCPI command. This is a "command only" SCPI command, with no query.
Preset:	0 s
State Saved:	Saved in instrument state.
Min:	–10.000 s
Max:	10.000 s
Default Unit:	S
Instrument S/W Revision:	Prior to A.02.00

Reset Offset Display

Resets the value of the periodic trigger offset display setting to 0.0 seconds. The current displayed trigger location may include an offset value defined with the **Offset** key. Pressing this key redefines the currently displayed trigger location as the new trigger point that is 0.0 s offset. The **Offset** key can then be used to add offset relative to this new timing.

Remote Command:	`:TRIGger[:SEQuence]:FRAMe:OFFSet:DISPlay:RESet`
Example:	TRIG:FRAM:OFFS:DISP:RES
Key Path:	**Trigger, Periodic Timer**
Instrument S/W Revision:	Prior to A.02.00

Sync Source

Selects a signal source for you to synchronize your periodic timer trigger to, otherwise you are triggering at some arbitrary location in the frame. Synchronization reduces the precision requirements on the setting of the period.

For convenience you may adjust the level and slope of the selected sync source in a conditional branch setup menu accessed from the Sync Source menu. Note that these settings match those in the **Trigger** and **Gate Source** menus; that is, each trigger source has only one value of level and slope, regardless of which menu it is accessed from.

Remote Command:	`:TRIGger[:SEQuence]:FRAMe:SYNC EXTernal1|EXTernal2|RFBurst|OFF` `:TRIGger[:SEQuence]:FRAMe:SYNC?`
Example:	TRIG:FRAM:SYNC EXT2
Preset:	Off GSM/EDGE: RFBurst
State Saved:	Saved in instrument state.
Key Path:	**Trigger, Periodic Timer**
Readback:	The current setting is read back to this key and it is also Readback to the previous **Periodic Timer** trigger key.
Instrument S/W Revision:	Prior to A.02.00

Off

Turns off the sync source for your periodic trigger. With the sync source off, the timing will drift unless the signal source frequency is locked to the analyzer frequency reference.

Example:	TRIG:FRAM:SYNC OFF
Key Path:	**Trigger, Periodic Timer, Sync Source**
Readback:	Off
Instrument S/W Revision:	Prior to A.02.00

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.
Key Path:	**Trigger, Periodic Timer, Sync Source**
Readback:	External 1
Instrument S/W Revision:	Prior to A.02.00

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.
Key Path:	**Trigger, Periodic Timer, Sync Source**
Readback:	External 2
Instrument S/W Revision:	Prior to A.02.00

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.
Key Path:	**Trigger, Periodic Timer, Sync Source**
Readback:	RF Burst
Instrument S/W Revision:	Prior to A.02.00

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:	Off, 1.000 us
State Saved:	Saved in instrument state.
Min:	–150 ms
Max:	+500 ms
Key Path:	**Trigger, Periodic Timer**
Default Unit:	s
Instrument S/W Revision:	Prior to A.02.00

Sync Holdoff

Sync Holdoff specifies the duration that the sync source signal must be kept false before the transition to true to be recognized as the sync timing. The periodic timer phase is aligned when the sync source signal becomes true, after the Holdoff time is satisfied.

A holdoff of 2 ms will work with most WiMAX signals, but there may be cases where the burst off duration is less than 1 ms and this value will need to be changed.

Remote Command:	`:TRIGger[:SEQuence]:FRAMe:SYNC:HOLDoff <time>`
	`:TRIGger[:SEQuence]:FRAMe:SYNC:HOLDoff?`
	`:TRIGger[:SEQuence]:FRAMe:SYNC:HOLDoff:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:FRAMe:SYNC:HOLDoff:STATe?`
Preset:	On, 1.000 ms
State Saved:	Saved in instrument state.
Min:	0 ms
Max:	+500 ms
Key Path:	**Trigger, Periodic Timer**
Default Unit:	s
Instrument S/W Revision:	Prior to A.02.00

LXI Trigger

Pressing this key when it is not selected selects the LXI system as the trigger. Pressing the key when it is already selected accesses the LXI trigger type selection menu, where either LAN Event or Alarm can be chosen. The key is annotated to display which of the two is currently selected.

NOTE	For information about setting up measurements using LXI, refer to the Programmer's Guide located in your analyzer at: C:/Program Files/Agilent/Signal Analysis/Help/Bookfiles/x_series_prog.pdf. It is also available by selecting the "Additional Documentation" page of the Help.

Key Path	**Trigger**
Mode	SA, IQ(Basic)
Preset	ON
State Saved	Saved in instrument state.
Readback	The LXI trigger source that becomes active when this key is selected is displayed. The possible values are "LAN Event" and "Alarm"
Instrument S/W Revision	Prior to A.02.00

LAN Event

Pressing this key when it is not selected selects the LAN event system as the LXI trigger. A new sweep/measurement starts when the pre-configured LAN message arrives if the LXI trigger is selected (see “LXI Trigger” on page 1222). Pressing this key when it is already selected accesses the LAN trigger setup menu.

NOTE	Pressing this button causes Enabled LXI Alarm Triggers to be ignored, since the Trigger source is changed to LXI LAN Event.

Example	TRIG:SOUR LAN	Swept SA measurement
	TRIG:<meas>:SOUR LAN	Measurements other than Swept SA
SCPI Status Bits/OPC Dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.	
Key Path	**Trigger, LXI Trigger**	
Mode	SA, IQ(Basic)	
Preset	ON	
State Saved	Saved in instrument state.	
State Saved	Saved in instrument state.	
Instrument S/W Revision	Prior to A.02.00	

Disable All

Sets the Enable parameter of every member of the LXI LAN Event list to OFF.

Remote Command	`:TRIGger[:SEQuence]:LXI:LAN:DISable:ALL`
Example	:TRIG:LXI:LAN:DIS:ALL
Key Path	**Trigger LXI Trigger, LAN Event**
Mode	SA, IQ(Basic)
Instrument S/W Revision	Prior to A.02.00

LAN Event List

After selecting LAN as the trigger source, you are presented with a list of LXI Trigger LAN Events to be configured. By default, LAN0-LAN7 are available. Using the TRIG:LXI:LAN:ADD and TRIG:LXI:LAN:REM commands, the size of this list can be changed arbitrarily. Pressing a LAN event branches to that event's setup menu.

Remote Command	`:TRIGger[:SEQuence]:LXI:LAN:LIST?`
Example	:TRIG:LXI:LAN:LIST? Returns the complete list of Trigger LAN Events which is, at minimum: "LAN0", "LAN1", "LAN2", "LAN3", "LAN4", "LAN5", "LAN6", "LAN7"
Key Path	**Trigger LXI Trigger, LAN Event**
Mode	SA, IQ(Basic)
Preset	"LAN0", "LAN1", "LAN2", "LAN3", "LAN4", "LAN5", "LAN6", "LAN7"
State Saved	Saved in instrument state.
Readback	Displays the value of the LXI Trigger LAN Event parameter (Enabled|Disabled).
Instrument S/W Revision	Prior to A.02.00

Detection

Pressing this button brings up the Trigger Detection menu.

Selecting "Rise" causes the instrument to trigger on the receipt of a signal low LAN Event followed by a signal high LAN Event.

Selecting "Fall" caused the instrument to trigger on the receipt of a signal high LAN Event followed by a signal low LAN Event.

Selecting "High" causes the instrument to trigger on every signal high LAN Event.

Selecting "Low" causes the instrument to trigger on every signal low LAN Event.

Remote Command	`:TRIGger[:SEQuence]:LXI:LAN[:SET]:DETection "LANEVENT", HIGH|LOW|RISE|FALL`
Example	:TRIG:LXI:LAN:DET "LAN0",HIGH
Restriction and Notes	If a non existent LAN event is passed in the lanEvent argument, the command is ignored
Key Path	**Trigger LXI Trigger, LAN Event, <lanEvent>**
Mode	SA, IQ(Basic)
Preset	HIGH
State Saved	Saved in instrument state.
Range	HIGH | LOW | RISE | FALL
Readback	Currently selected detection type

Instrument S/W Revision	Prior to A.02.00

Remote Command	`:TRIGger[:SEQuence]:LXI:LAN[:SET]:DETection? "LANEVENT"`
Example	:TRIG:LXI:LAN:DET? "LAN0"?
Restriction and Notes	If a non existent LAN event is passed in the lanEvent argument, the command is ignored
Key Path	**Trigger LXI Trigger, LAN Event, <lanEvent>**
Mode	SA, IQ(Basic)
Preset	HIGH
State Saved	Saved in instrument state.
Range	HIGH | LOW | RISE | FALL
Readback	Currently selected detection type
Instrument S/W Revision	Prior to A.02.00

Delay

Sets the amount of delay that should pass between receiving a LXI Trigger LAN Event Trigger and the trigger action. A Delay of 0.0 s indicates that the instrument will trigger as soon as possible after receiving the proper LXI LAN Event.

Remote Command	`:TRIGger[:SEQuence]:LXI:LAN[:SET]:DELay "LANEVENT",<time>`
Example	:TRIG:LXI:LAN:DEL "LAN0",5S
Key Path	**Trigger, LXI Trigger, LAN Event, <lanEvent>**
Mode	SA, IQ(Basic)
Preset	0.0 s
State Saved	Saved in instrument state.
Range	0.0 – 1.7976931348623157 x 10308 (Max Double)
Instrument S/W Revision	Prior to A.02.00

Remote Command	`:TRIGger[:SEQuence]:LXI:LAN[:SET]:DELay? "lanEvent"`
Example	:TRIG:LXI:LAN:DEL? "LAN0"
Key Path	**Trigger, LXI Trigger, LAN Event, <lanEvent>**
Mode	SA, IQ(Basic)
Preset	0.0 s
State Saved	Saved in instrument state.

Range	0.0 – 1.7976931348623157 x 10308 (Max Double)
Instrument S/W Revision	Prior to A.02.00

Enabled/Disabled

When the Trigger Source is set to LXI Trigger LAN Event, the instrument triggers upon receiving any event from the LXI Trigger LAN Event List whose Enabled parameter is set to ON.

If the Enabled parameter is set to OFF, the event is ignored.

Remote Command	`:TRIGger[:SEQuence]:LXI:LAN[:SET]:ENABled "LANEVENT",ON|OFF|1|0`
Example	:TRIG:LXI:LAN:ENAB "LAN0",ON
Key Path	**Trigger, LXI Trigger, LAN Event, <lanEvent>**
Mode	SA, IQ(Basic)
Preset	OFF
State Saved	Saved in instrument state.
Range	OFF|ON|0|1
Instrument S/W Revision	Prior to A.02.00

Remote Command	`:TRIGger[:SEQuence]:LXI:LAN[:SET]:ENABled? "LANEVENT"`
Example	:TRIG:LXI:LAN:ENAB? "LAN0"
Key Path	**Trigger, LXI Trigger, LAN Event, <lanEvent>**
Mode	SA, IQ(Basic)
Preset	OFF
State Saved	Saved in instrument state.
Range	OFF|ON|0|1
Instrument S/W Revision	Prior to A.02.00

Add (Remote Command Only)

Adds the provided string to the list of possible LAN events to trigger on. As new LAN events are added, keys are generated in the LAN source menu. New key panels are generated as the number of possible LAN events increases past a multiple of six, and the "More" keys are updated to reflect the new number of key panels in the LAN source menu.

Remote Command	`:TRIGger[:SEQuence]:LXI:LAN:ADD "LANEVENT"`
Example	:TRIG:LXI:LAN:ADD "LANEVENT"

Restriction and Notes	The maximum length of the string is 16 characters. Longer strings are concatenated to 16 characters and added. No event is added if the LAN Event already exists. This command modifies the LXI Trigger LAN Event List Parameter.
Mode	SA, IQ(Basic)
State Saved	No
Range	Uppercase, Lowercase, Numeric, Symbol except for comma or semicolon
Instrument S/W Revision	Prior to A.02.00

Remove (Remote Command Only)

Removes the provided string from the list of possible LAN events to trigger on. As LAN events are removed, keys are removed from the LAN source menu. Key panels are removed as the number of possible LAN events decreases past a multiple of six, and the "More" keys are updated to reflect the new number of key panels in the LAN source menu. It is not possible to remove the "LAN0" – "LAN7" events.

Remote Command	`:TRIGger[:SEQuence]:LXI:LAN:REMove[:EVENt] "LANEVENT"`
Example	:TRIG:LXI:LAN:REM "LANEVENT"
Restriction and Notes	The maximum length of the string is 16 characters. Longer strings are concatenated and the corresponding LAN Event is removed. Nothing happens if the LAN event does not exist. This command modifies the LXI Trigger LAN Event List Parameter.
Mode	SA, IQ(Basic)
State Saved	No
Range	Uppercase, Lowercase, Numeric, Symbol except for comma or semicolon
Instrument S/W Revision	Prior to A.02.00

Remove All (Remote Command Only)

Clears the list of customer added LAN events that can cause the instrument to trigger. Events LAN0-LAN7 are not affected. As LAN events are removed, keys are removed from the LAN source menu. Key panels are removed as the number of possible LAN events decreases past a multiple of six, and the "More" keys are updated to reflect the new number of key panels in the LAN source menu.

It is not possible to remove the "LAN0" – "LAN7" events.

Remote Command	`:TRIGger[:SEQuence]:LXI:LAN:REMove:ALL`
Example	:TRIG:LXI:LAN:REM:ALL

Restriction and Notes	This command modifies the LXI Trigger LAN Event List Parameter.
Mode	SA, IQ(Basic)
Instrument S/W Revision	Prior to A.02.00

Event Filter (Remote Command Only)

Only LXI Trigger LAN Events coming from hosts matching the filter string are processed. There is no front panel access to this command

The syntax for specifying a filter is as follows:

Filter == ([host[:port]] | [ALL[:port]]) [,Filter]

Specifying an empty string means that LXI trigger packets are accepted as a Trigger from any port on any host on the network via either TCP or UDP.

Specifying only the port means that any host communicating over that port can send events.

Specifying ALL indicates that UDP multicast packets are accepted if they are directed to the Internet Assigned Numbers Authority (IANA) assigned multicast address on the IANA assigned default port, or the designated port if specified.

Examples:

"192.168.0.1:23"

"agilent.com, soco.agilent.com"

"agilent.com:80, 192.168.0.1"

Remote Command	`:TRIGger[:SEQuence]:LXI:LAN[:SET]:FILTer "LANEVENT","filterString"` `:TRIGger[:SEQuence]:LXI:LAN[:SET]:FILTer?`
Example	:TRIG:LXI:LAN:FILT "LAN0","agilent.com" :TRIG:LXI:LAN:FILT?
Restriction and Notes	The maximum length of the string is 45 characters. Nothing happens if the LAN event does not exist.
Mode	SA, IQ(Basic)
Preset	“” (empty string)
State Saved	Saved in instrument state.
Range	Uppercase, Lowercase, Numeric, Symbol
Instrument S/W Revision	Prior to A.02.00

Count (Remote Command Only)

Returns the number of items in the LXI Trigger LAN Event List.

Remote Command	`:TRIGger[:SEQuence]:LXI:LAN:COUNt?`

Example	:TRIG:LXI:LAN:COUN?
Mode	SA, IQ(Basic)
Instrument S/W Revision	Prior to A.02.00

Identifier (Remote Command Only)

Sets the string that is expected to arrive over the LAN for a given Trigger LAN Event to occur. The Identifier is variable to allow for easier system debugging.

Remote Command	`:TRIGger[:SEQuence]:LXI:LAN[:SET]:IDENtifier "LANEVENT","identifier"` `:TRIGger[:SEQuence]:LXI:LAN[:SET]:IDENtifier? "LANEVENT"`
Example	:TRIG:LXI:LAN:IDEN "LAN0","debugstring"
Restriction and Notes	The maximum length of the string is 16 characters. Nothing happens if the LAN event does not exist. The default value is that the identifier is equivalent to the name of the LAN Event.
Mode	SA, IQ(Basic)
State Saved	Saved in instrument state.
Range	Uppercase, Lowercase, Numeric, Symbol
Instrument S/W Revision	Prior to A.02.00

Configure (Remote Command Only)

Allows the configuration of some of the above parameters from a single SCPI command.

Remote Command	`:TRIGger[:SEQuence]:LXI:LAN[:SET]:CONFigure "lanEvent", <enable>, <detection>, <delay>,<filter>,<identifier>`
Example	:TRIG:LXI:LAN:CONF "LAN0",1,FALL,0.0,"ALL","debugIdentifier"
Mode	SA, IQ(Basic)
Instrument S/W Revision	Prior to A.02.00

Alarm

Pressing this key when it is not selected selects the alarm system as the LXI trigger. A new sweep/measurement starts when the configured IEEE 1588 time occurs if the LXI trigger is selected as the active trigger (see "LXI Trigger" on page 1222). Pressing this key when it is already selected accesses the alarm source selection menu.

Example	TRIG:ACP:SOUR ALAR

SCPI Status Bits/OPC Dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Key Path	**Trigger LXI Trigger**
Mode	SA, IQ(Basic)
Preset	ON
State Saved	Saved in instrument state.
Instrument S/W Revision	Prior to A.02.00

Disable All

This key causes all Alarms in the trigger alarm list to go into the disabled state.

(Enabled = OFF)

Remote Command	`:TRIGger[:SEQuence]:LXI:ALARm:DISable:ALL`
Example	:TRIG:LXI:ALAR:DIS:ALL
Key Path	**Trigger, LXI Trigger, Alarm**
Mode	SA, IQ(Basic)
Instrument S/W Revision	Prior to A.02.00

Alarm List

After selecting Alarm as the trigger source, you are presented with a list of possible alarms. Pressing an alarm (e.g. "ALARM0") branches to the alarm setup menu.

Remote Command	`:TRIGger[:SEQuence]:LXI:ALARm:LIST?`
Example	:TRIG:LXI:ALAR:LIST?
	Returns the complete list of Alarm events which is: "ALARM0"
Key Path	**Trigger, LXI Trigger, Alarm**
Mode	SA, IQ(Basic)
Preset	"ALARM0"
State Saved	Saved in instrument state.
Readback	Displays the value of the LXI Trigger Alarm Enabled parameter (Enabled|Disabled).
Instrument S/W Revision	Prior to A.02.00

Date/Time

Absolute alarm time sets an alarm for one specific time using the date and time of day (e.g. 12/14/2007 at 11:45:15.3456). The Date and Time are represented in the instrument's local time. This is the only way to set an alarm from the front panel.

Epoch time is another type of absolute alarm time. A specific time is identified by the number of seconds it occurs after January 1, 1970 00:00:00 in International Atomic Time (TAI). Epoch Time is time zone invariant. Epoch time is only set via remote; see "Epoch Time Value (Remote Command Only)" on page 1234.

The date and time the alarm is scheduled to go off is noted on the branch key.

NOTE The Epoch Time Second and Epoch Time Fraction are the ultimate source of alarm information. The Absolute Time and Date may be changed from the front panel without being applied. When querying the Absolute Time and Date parameters from SCPI, if the Absolute Time and Date have not been applied (and therefore do not match the Epoch Time Second and Epoch Time Fraction), the string "(epoch time not set)" is added to the return value.

Key Path	**Trigger, LXI Trigger, Alarm, <alarmEvent>**
Mode	SA, IQ(Basic)
Readback	Annotated with the date and time the alarm is scheduled to go off.
Instrument S/W Revision	Prior to A.02.00

Remote Command	`:TRIGger[:SEQuence]:LXI:ALARm[:SET]:TIME[:VALue]:ABSolute "alarmEvent","date","time"`
Example	:TRIG:LXI:ALAR:TIME:ABS "ALARM0","2007/4/6", "15:45:02.123456"
Remote Command Notes	"date" is a representation of the date the alarm should occur in the form of "YYYY/MM/DD" where: YYYY is the four digit representation of year. (for example, 2007) MM is the two digit representation of month. (for example. 01 to 12) DD is the two digit representation of day. (for example, 01 to 28, 29, 30, or 31 depending on the month and year) "time" is a representation of the time of day the alarm should occur in the form of "HH:MM:SS.SSSSSS" where: HH is the two digit representation of the hour in 24 hour format MM is the two digit representation of minute SS.SSSSSS is a real representing seconds (for example 02.123456)
Key Path	**Trigger, LXI Trigger, Alarm, <alarmEvent>,Time**
Mode	SA, IQ(Basic)
Preset	Current date at initialization at 00:00:00.000000

State Saved	Saved in instrument state.
Instrument S/W Revision	Prior to A.02.00

Remote Command	`:TRIGger[:SEQuence]:LXI:ALARm[:SET]:TIME[:VALue]:ABSolute? "alarmEvent"`
Example	:TRIG:LXI:ALAR:TIME:ABS? "ALARM0" This query returns data using the following format "YYYY/MM/DD HH:MM:SS.SSSSSS" If the Absolute time has been changed from the front panel, but has not been applied, the return value is of the form "YYYY/MM/DD HH:MM:SS.SSSSSS (epoch time not set)".
Remote Command Notes	<date> is a representation of the date the alarm should occur in the form of YYYY/MM/DD where: YYYY is the four digit representation of year. (for example, 2007) MM is the two digit representation of month. (for example. 01 to 12) DD is the two digit representation of day. (for example, 01 to 28, 29, 30, or 31 depending on the month and year) <time> is a representation of the time of day the alarm should occur in the form of HH:MM:SS.SSSSSS where: HH is the two digit representation of the hour in 24 hour format MM is the two digit representation of minute SS.SSSSSS is a real representing seconds (for example 02.123456)
Key Path	**Trigger, LXI Trigger, Alarm, <alarmEvent>,Time**
Mode	SA, IQ(Basic)
Preset	Current date at initialization at 00:00:00.000000
State Saved	Saved in instrument state.
Instrument S/W Revision	Prior to A.02.00

Date

The date the alarm should occur. All absolute alarm time parameters are set using the same SCPI command; however they each have their own front panel control.

When setting alarm values from the front panel, the new alarm time is not registered with the alarm system until the "Set" key is pressed.

Key Path	**Trigger, LXI Trigger, Alarm, <alarmEvent>,Time**
Mode	SA, IQ(Basic)
Preset	Current date
State Saved	Saved in instrument state.

Range	current date – 214748/12/31. Values representing a time in the past result in an error.
Instrument S/W Revision	Prior to A.02.00

Time

The time of the day, in the instrument's local time (this takes into account time zones and daylight savings time), the alarm should occur. This parameter is based on a 24 hour clock.

All absolute alarm time parameters are set using the same SCPI command; however they each have their own front panel control.

When setting alarm values from the front panel, the new alarm time is not registered with the alarm system until the "Set" key is pressed.

Restriction and Notes	Uses a 24 hour clock. Values representing a time in the past result in an error. Only valid time values are accepted. The <second> field accepts a decimal number, and is valid to the microsecond position. The <year>, <month>, <hour>, and <minute> fields all accept integers.
Key Path	**Trigger, LXI Trigger, Alarm, <alarmEvent>,Time**
Mode	SA, IQ(Basic)
Preset	00:00:00.000000
State Saved	Saved in instrument state.
Range	00:00:00.000000 – 23:59:59.999999
Instrument S/W Revision	Prior to A.02.00

Apply (Front Panel Only)

Causes the Absolute Alarm Time values to be converted into an Epoch time (see "Epoch Time Value (Remote Command Only)" on page 1234), compared to the current time, and sent to the Alarm Trigger subsystem. This key can only be pressed when the epoch time and the absolute time are out of synch.

Restriction and Notes	Alarm times are settable to microsecond resolution.
Key Path	**Trigger, LXI Trigger, Alarm, <alarmEvent>,Time**
Mode	SA, IQ(Basic)
Instrument S/W Revision	Prior to A.02.00

Epoch Time Value (Remote Command Only)

Sets the LXI Alarm Time. This represents the number of seconds after January 1, 1970 00:00:00, in TAI time, that the alarm should go off.

Remote Command	`:TRIGger[:SEQuence]:LXI:ALARm[:SET]:TIME[:VALue] "alarmEvent",<seconds>, <fractionalSeconds>`
Example	:TRIG:LXI:ALAR:TIME "ALARM0",123456.0 S, 0.123456
Restriction and Notes	Values representing a time in the past result in an error.
Mode	SA, IQ(Basic)
Preset	Seconds: The number of whole seconds between Jan 1, 1970 at 00:00:00 (in TAI time) and the current date at initialization at 00:00:00 (in TAI time) FractionalSeconds: 0
State Saved	Saved in instrument state.
Range	Seconds: Epoch time of current date at 00:00:00 (in TAI time) – 253402300800 + number of seconds local time zone offset from UTC FractionalSeconds: 0.0 – 0.999999
Instrument S/W Revision	Prior to A.02.00

Remote Command	`:TRIGger[:SEQuence]:LXI:ALARm[:SET]:TIME[:VALue]?`
Example	:TRIG:LXI:ALAR:TIME?
Restriction and Notes	Values representing a time in the past result in an error.
Mode	SA, IQ(Basic)
Preset	Seconds: The number of whole seconds between Jan 1, 1970 at 00:00:00 (in TAI time) and the current date at initialization at 00:00:00 (in TAI time) FractionalSeconds: 0
State Saved	Saved in instrument state.
Range	Seconds: Epoch time of current date at 00:00:00 (in TAI time) – 253402300800 + number of seconds local time zone offset from UTC FractionalSeconds: 0.0 – 0.999999
Instrument S/W Revision	Prior to A.02.00

Epoch Time Seconds (Remote Command Only)

Sets the seconds portion of the LXI Alarm time. This represents the number of seconds after January 1, 1970 00:00:00 (in TAI time) that the alarm should go off.

Values must be in the form of whole seconds; decimal values result in an error.

Remote Command	`:TRIGger[:SEQuence]:LXI:ALARm[:SET]:TIME:SEConds "alarmEvent",<seconds>`

Example	:TRIG:LXI:ALAR:TIME:SEC "ALARM0",123456.0 S
Restriction and Notes	Values representing a time in the past result in an error. Values containing a decimal portion result in an error.
Mode	SA, IQ(Basic)
Preset	The number of whole seconds between Jan 1, 1970 at 00:00:00 (in TAI time) and the current date at initialization at 00:00:00 (in TAI time)
State Saved	Saved in instrument state.
Range	Epoch time of current date at 00:00:00 (in TAI time) – 253402300800 + number of seconds local time zone offset from UTC
Instrument S/W Revision	Prior to A.02.00

Remote Command	`:TRIGger[:SEQuence]:LXI:ALARm[:SET]:TIME:SEConds? "alarmEvent"`
Example	:TRIG:LXI:ALAR:TIME:SEC "ALARM0"?
Restriction and Notes	Values representing a time in the past result in an error. Values containing a decimal portion result in an error.
Mode	SA, IQ(Basic)
Preset	The number of seconds between Jan 1, 1970 at 00:00:00 (in TAI time) and the current date at initialization at 00:00:00 (in TAI time)
State Saved	Saved in instrument state.
Range	Epoch time of current date at 00:00:00 (in TAI time) – 253402300800 + number of seconds local time zone offset from UTC
Instrument S/W Revision	Prior to A.02.00

Epoch Time Fraction (Remote Command Only)

Sets the sub-second value of the Epoch time.

Remote Command	`:TRIGger[:SEQuence]:LXI:ALARm[:SET]:TIME[:VALue]:FRACtion "alarmEvent",<fractionalSeconds>`
Example	:TRIG:LXI:ALAR:TIME:FRAC "ALARM0",0.123456 S
Restriction and Notes	Values representing a time in the past result in an error.
Mode	SA, IQ(Basic)
Preset	0
State Saved	Saved in instrument state.
Range	0.0 – 0.999999
Instrument S/W Revision	Prior to A.02.00

Remote Command	:TRIGger[:SEQuence]:LXI:ALARm[:SET]:TIME[:VALue]:FRACtion? "alarmEvent"
Example	:TRIG:LXI:ALAR:TIME:FRAC "ALARM0"?
Restriction and Notes	Values representing a time in the past result in an error.
Mode	SA, IQ(Basic)
Preset	0
State Saved	Saved in instrument state.
Min	0.0
Max	0.999999
Instrument S/W Revision	Prior to A.02.00

Relative Time (Remote Command Only)

Sets the values of Epoch Time Seconds and Epoch Time Fraction by adding an offset to the time when the command is issued. For example, if the Relative Time command is issued with an argument of 60s, the alarm will occur 1 minute in the future.

Remote Command	:TRIGger[:SEQuence]:LXI:ALARm[:SET]:TIME[:VALue]:RELative "alarmEvent",<seconds>
Example	:TRIG:LXI:ALAR:TIME:REL "ALARM0",60.0s
Mode	SA, IQ(Basic)
Range	0.0 – 1.7976931348623157 x 10308 (Max Double)
Instrument S/W Revision	Prior to A.02.00

Remote Command	:TRIGger[:SEQuence]:LXI:ALARm[:SET]:TIME[:VALue]:RELative? "alarmEvent"
Example	:TRIG:LXI:ALAR:TIME:REL "ALARM0"?
Mode	SA, IQ(Basic)
Range	0.0 – 1.7976931348623157 x 10308 (Max Double)
Instrument S/W Revision	Prior to A.02.00

Period

Sets the amount of time that should elapse between alarms in a repeating alarm trigger.

Remote Command	:TRIGger[:SEQuence]:LXI:ALARm[:SET]:PERiod "alarmEvent",<seconds>
Example	:TRIG:LXI:ALAR:PER "ALARM0",1.2345 s

Restriction and Notes	A period of 0.0s effectively causes the trigger to occur only once, since all repetitions are fired simultaneously
Key Path	**Trigger, LXI Trigger, Alarm, <alarmEvent>**
Mode	SA, IQ(Basic)
Preset	0.0 s
State Saved	Saved in instrument state.
Range	0.0 – 1.7976931348623157 x 10308 (Max Double)
Instrument S/W Revision	Prior to A.02.00

Remote Command	:TRIGger[:SEQuence]:LXI:ALARm[:SET]:PERiod? "alarmEvent"
Example	:TRIG:LXI:ALAR:PER "ALARM0"?
Restriction and Notes	A period of 0.0s effectively causes the trigger to occur only once, since all repetitions are fired simultaneously
Key Path	**Trigger, LXI Trigger, Alarm, <alarmEvent>**
Mode	SA, IQ(Basic)
Preset	0.0 s
State Saved	Saved in instrument state.
Range	0.0 – 1.7976931348623157 x 10308 (Max Double)
Instrument S/W Revision	Prior to A.02.00

Repetitions

Sets the number of times a repeating alarm should fire once the initial alarm time has occurred.

Remote Command	:TRIGger[:SEQuence]:LXI:ALARm[:SET]:REPeat "alarmEvent",<repetitions>
Example	:TRIG:LXI:ALAR:REP "ALARM0",10
Key Path	**Trigger, LXI Trigger, Alarm, <alarmEvent>**
Mode	SA, IQ(Basic)
Preset	1
State Saved	Saved in instrument state.
Range	1 – 2,147,483,647
Instrument S/W Revision	Prior to A.02.00

Remote Command	:TRIGger[:SEQuence]:LXI:ALARm[:SET]:REPeat? "alarmEvent"

Example	:TRIG:LXI:ALAR:REP "ALARM0",10
Key Path	**Trigger, LXI Trigger, Alarm, <alarmEvent>**
Mode	SA, IQ(Basic)
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	2,147,483,647
Instrument S/W Revision	Prior to A.02.00

Enabled

If Enabled is set to ON and the trigger source is set to ALARm, this alarm causes the instrument to trigger.

If Enabled is set to OFF, this alarm is ignored

Remote Command	`:TRIGger[:SEQuence]:LXI:ALARm[:SET]:ENABled "alarmEvent",ON|OFF|1|0`
Example	:TRIG:LXI:ALAR:ENAB "ALARM0",ON
Key Path	**Trigger, LXI Trigger, Alarm, <alarmEvent>**
Mode	SA, IQ(Basic)
Preset	OFF
State Saved	Saved in instrument state.
Range	1|0
Instrument S/W Revision	Prior to A.02.00

Remote Command	`:TRIGger[:SEQuence]:LXI:ALARm[:SET]:ENABled? "alarmEvent"`
Example	:TRIG:LXI:ALAR:ENAB "ALARM0"?
Key Path	**Trigger, LXI Trigger, Alarm, <alarmEvent>**
Mode	SA, IQ(Basic)
Preset	OFF
State Saved	Saved in instrument state.
Range	1|0
Instrument S/W Revision	Prior to A.02.00

Configure (Remote Command Only)

Allows the configuration of some of the above parameters from a single SCPI command.

Remote Command	`:TRIGger[:SEQuence]:LXI:ALARm[:SET]:CONFigure "alarmEvent", <enable>, <epochSeconds>, <epochFraction>, <period>, <repeat>`
Example	:TRIG:LXI:ALAR:CONF "ALARM0",1,1000000.0,0.123456,1.2,3
Mode	SA, IQ(Basic)
Instrument S/W Revision	Prior to A.02.00

Count (Remote Command Only)

Returns the number of alarms in the LXI Trigger Alarm List.

Remote Command:	`:TRIGger1|TRIGger[:SEQuence]:LXI:ALARm:COUNt?`
Example:	:TRIG:LXI:ALAR:COUN?
Instrument S/W Revision:	Prior to A.02.00

Baseband I/Q

Pressing this key when it is not selected selects Baseband I/Q as the trigger. Pressing the key when it is already selected accesses the Baseband I/Q trigger type selection menu. The key is annotated to display which of the Baseband I/Q trigger types is currently selected.

Key Path	**Trigger**
Mode	SA, IQ(Basic)
State Saved	No
Readback	The Baseband I/Q trigger source that becomes active when this key is selected is displayed. The possible values are "I/Q Mag", "I", "Q", "Input I", "Input Q", and "Aux I/Q Mag".
Instrument S/W Revision	Prior to A.02.00

I/Q Mag

Pressing this key, when it is not selected, selects the I/Q magnitude signal as the trigger. The I/Q Magnitude trigger condition is met when the I/Q magnitude crosses the I/Q magnitude trigger level. The magnitude is measured at the output of the main I/Q digital receiver.

Example	TRIG:<meas>:SOUR IQM
Key Path	**Trigger, Baseband I/Q**
Readback Text	I/Q Mag
Instrument S/W Revision	Prior to A.02.00

Trigger Level

Sets a level for the I/Q magnitude trigger. When the signal crosses this level, with the chosen slope, the trigger occurs. If the specific Measurement displays the signal from the chosen sampling point a green line will be displayed to indicate the trigger level.

Remote Command	`:TRIGger[:SEQuence]:IQMag:LEVel <ampl >`
	`:TRIGger[:SEQuence]:IQMag:LEVel?`
Remote Command Notes	The I/Q reference impedance is used for converting between power and voltage.
Example	TRIG:IQM:LEV –30 dBm
Key Path	**Trigger, Baseband I/Q, I/Q Mag**
Preset	–25 dBm
State Saved	Saved in instrument state.
Range	–200 dBm to 100 dBm
Readback Text	<level> dBm
Instrument S/W Revision	Prior to A.02.00

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Remote Command	`:TRIGger[:SEQuence]:IQMag:SLOPe POSitive | NEGative`
	`:TRIGger[:SEQuence]:IQMag:SLOPe?`
Example	TRIG:IQM:SLOP POS
Key Path	**Trigger, Baseband I/Q, I/Q Mag**
Preset	POSitive
State Saved	Saved in instrument state.
Instrument S/W Revision	Prior to A.02.00

Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT.

Remote Command	`:TRIGger[:SEQuence]:IQMag:DELay <time>`
	`:TRIGger[:SEQuence]:IQMag:DELay?`
	`:TRIGger[:SEQuence]:IQMag:DELay:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:IQMag:DELay:STATe?`

Example	TRIG:IQM:DEL 10 ms TRIG:IQM:DEL:STAT ON
Key Path	**Trigger, Baseband I/Q, I/Q Mag**
Preset	1 us OFF
State Saved	Saved in instrument state.
Range	–2.5 s to +10 s
Instrument S/W Revision	Prior to A.02.00

I (Demodulated)

Pressing this key, when it is not selected, selects the main receiver's output I voltage as the trigger. The I (Demodulated) trigger condition is met when the I voltage crosses the I voltage trigger level.

Example	TRIG:<meas>:SOUR IDEM
Key Path	**Trigger, Baseband I/Q**
Readback Text	I
Instrument S/W Revision	Prior to A.02.00

Trigger Level

Sets a level for the I (Demodulated) trigger. When the signal crosses this level, with the chosen slope, the trigger occurs. If the specific Measurement displays the signal from the chosen sampling point a green line will be displayed to indicate the trigger level.

Remote Command	`:TRIGger[:SEQuence]:IDEMod:LEVel <voltage>` `:TRIGger[:SEQuence]:IDEMod:LEVel?`
Example	TRIG:IDEM:LEV 0.5 V
Key Path	**Trigger, Baseband I/Q, I (Demodulated)**
Preset	0.25 V
State Saved	Saved in instrument state.
Range	–1 to 1 V
Readback Text	0.1 of displayed unit (V, mV, etc.)
Instrument S/W Revision	Prior to A.02.00

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Remote Command	:TRIGger[:SEQuence]:IDEMod:SLOPe POSitive | NEGative
	:TRIGger[:SEQuence]:IDEMod:SLOPe?
Example	TRIG:IDEM:SLOP POS
Key Path	**Trigger, Baseband I/Q, I (Demodulated)**
Preset	POSitive
State Saved	Saved in instrument state.
Instrument S/W Revision	Prior to A.02.00

Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT.

Remote Command	:TRIGger[:SEQuence]:IDEMod:DELay <time>
	:TRIGger[:SEQuence]:IDEMod:DELay?
	:TRIGger[:SEQuence]:IDEMod:DELay:STATe OFF|ON|0|1
	:TRIGger[:SEQuence]:IDEMod:DELay:STATe?
Example	TRIG:IDEM:DEL 10 ms
	TRIG:IDEM:DEL:STAT ON
Key Path	**Trigger, Baseband I/Q, I (Demodulated)**
Preset	1 us
	OFF
State Saved	Saved in instrument state.
Range	–2.5 s to +10 s
Instrument S/W Revision	Prior to A.02.00

Q (Demodulated)

Pressing this key, when it is not selected, selects the main receiver's output Q voltage as the trigger. The Q (Demodulated) trigger condition is met when the Q voltage crosses the Q voltage trigger level.

Example	TRIG:<meas>:SOUR QDEM
Key Path	**Trigger, Baseband I/Q**
Readback Text	Q

Instrument S/W Revision	Prior to A.02.00

Trigger Level

Sets a level for the Q (Demodulated) trigger. When the signal crosses this level, with the chosen slope, the trigger occurs. If the specific Measurement displays the signal from the chosen sampling point a green line will be displayed to indicate the trigger level.

Remote Command	`:TRIGger[:SEQuence]:QDEMod:LEVel <voltage>`
	`:TRIGger[:SEQuence]:QDEMod:LEVel?`
Example	TRIG:QDEM:LEV 0.5 V
Key Path	**Trigger, Baseband I/Q, Q (Demodulated)**
Preset	0.25 V
State Saved	Saved in instrument state.
Range	–1 to 1 V
Readback Text	0.1 of displayed unit (V, mV, etc.)
Instrument S/W Revision	Prior to A.02.00

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Remote Command	`:TRIGger[:SEQuence]:QDEMod:SLOPe POSitive | NEGative`
	`:TRIGger[:SEQuence]:QDEMod:SLOPe?`
Example	TRIG:QDEM:SLOP POS
Key Path	**Trigger, Baseband I/Q, Q (Demodulated)**
Preset	POSitive
State Saved	Saved in instrument state.
Instrument S/W Revision	Prior to A.02.00

Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT.

Remote Command	`:TRIGger[:SEQuence]:QDEMod:DELay <time>`
	`:TRIGger[:SEQuence]:QDEMod:DELay?`
	`:TRIGger[:SEQuence]:QDEMod:DELay:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:QDEMod:DELay:STATe?`

Example	TRIG:QDEM:DEL 10 ms TRIG:QDEM:DEL:STAT ON
Key Path	**Trigger, Baseband I/Q, Q (Demodulated)**
Preset	1 us OFF
State Saved	Saved in instrument state.
Range	–2.5 s to +10 s
Instrument S/W Revision	Prior to A.02.00

Input I

Pressing this key, when it is not selected, selects the I channel's ADC voltage as the trigger. The Input I trigger condition is met when the voltage crosses the trigger level.

Example	TRIG:<meas>:SOUR IINP
Key Path	**Trigger, Baseband I/Q**
Readback Text	Input I
Instrument S/W Revision	Prior to A.02.00

Trigger Level

Sets a level for the Input I trigger. When the signal crosses this level, with the chosen slope, the trigger occurs.

Remote Command	`:TRIGger[:SEQuence]:IINPut:LEVel <voltage>` `:TRIGger[:SEQuence]:IINPut:LEVel?`
Example	TRIG:IINP:LEV 0.5 V
Key Path	**Trigger, Baseband I/Q, Input I**
Preset	0.25 V
State Saved	Saved in instrument state.
Range	–1 to 1 V
Readback Text	0.1 of displayed unit (V, mV, etc.)
Instrument S/W Revision	Prior to A.02.00

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Remote Command	`:TRIGger[:SEQuence]:IINPut:SLOPe POSitive	NEGative`
	`:TRIGger[:SEQuence]:IINPut:SLOPe?`
Example	TRIG:IINP:SLOP POS
Key Path	**Trigger, Baseband I/Q, Input I**
Preset	POSitive
State Saved	Saved in instrument state.
Instrument S/W Revision	Prior to A.02.00

Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT.

Remote Command	`:TRIGger[:SEQuence]:IINPut:DELay <time>`
	`:TRIGger[:SEQuence]:IINPut:DELay?`
	`:TRIGger[:SEQuence]:IINPut:DELay:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:IINPut:DELay:STATe?`
Example	TRIG:IINP:DEL 10 ms
	TRIG:IINP:DEL:STAT ON
Key Path	**Trigger, Baseband I/Q, Input I**
Preset	1 us
	OFF
State Saved	Saved in instrument state.
Range	–2.5 s to +10 s
Instrument S/W Revision	Prior to A.02.00

Input Q

Pressing this key, when it is not selected, selects the Q channel's ADC voltage as the trigger. The Input Q trigger condition is met when the voltage crosses the trigger level.

Example	TRIG:<meas>:SOUR QINP
Key Path	**Trigger, Baseband I/Q**
Readback Text	Input Q

Instrument S/W Revision	Prior to A.02.00

Trigger Level

Sets a level for the Input Q trigger. When the signal crosses this level, with the chosen slope, the trigger occurs.

Remote Command	`:TRIGger[:SEQuence]:QINPut:LEVel <voltage>`
	`:TRIGger[:SEQuence]:QINPut:LEVel?`
Example	TRIG:QINP:LEV 0.5 V
Key Path	**Trigger, Baseband I/Q, Input Q**
Preset	0.25 V
State Saved	Saved in instrument state.
Range	–1 to 1 V
Readback Text	0.1 of displayed unit (V, mV, etc.)
Instrument S/W Revision	Prior to A.02.00

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Remote Command	`:TRIGger[:SEQuence]:QINPut:SLOPe POSitive | NEGative`
	`:TRIGger[:SEQuence]:QINPut:SLOPe?`
Example	TRIG:QINP:SLOP POS
Key Path	**Trigger, Baseband I/Q, Input Q**
Preset	POSitive
State Saved	Saved in instrument state.
Instrument S/W Revision	Prior to A.02.00

Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT.

Remote Command	`:TRIGger[:SEQuence]:QINPut:DELay <time>`
	`:TRIGger[:SEQuence]:QINPut:DELay?`
	`:TRIGger[:SEQuence]:QINPut:DELay:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:QINPut:DELay:STATe?`

Example	TRIG:QINP:DEL 10 ms TRIG:QINP:DEL:STAT ON
Key Path	**Trigger, Baseband I/Q, Input Q**
Preset	1 us OFF
State Saved	Saved in instrument state.
Range	–2.5 s to +10 s
Instrument S/W Revision	Prior to A.02.00

Auxiliary Channel I/Q Mag

Pressing this key, when it is not selected, selects the Auxiliary Channel I/Q magnitude signal as the trigger. The Auxiliary Channel I/Q Magnitude trigger condition is met when the auxiliary receiver's I/Q magnitude output crosses the Auxiliary I/Q magnitude trigger level.

Example	TRIG:<meas>:SOUR AIQM
Key Path	**Trigger, Baseband I/Q**
Readback Text	Aux I/Q Mag
Instrument S/W Revision	Prior to A.02.00

Trigger Level

Sets a level for the I/Q magnitude trigger. When the signal crosses this level, with the chosen slope, the trigger occurs.

Remote Command	`:TRIGger[:SEQuence]:AIQMag:LEVel <ampl >` `:TRIGger[:SEQuence]:AIQMag:LEVel?`
Remote Command Notes	The I/Q reference impedance is used for converting between power and voltage.
Example	TRIG:AIQM:LEV –30 dBm
Key Path	**Trigger, Baseband I/Q, Aux Channel I/Q Mag**
Preset	–25 dBm
State Saved	Saved in instrument state.
Range	–200 dBm to 100 dBm
Readback Text	<level> dBm
Instrument S/W Revision	Prior to A.02.00

Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Remote Command	`:TRIGger[:SEQuence]:AIQMag:SLOPe POSitive	NEGative`
	`:TRIGger[:SEQuence]:AIQMag:SLOPe?`
Example	TRIG:AIQM:SLOP POS
Key Path	**Trigger, Baseband I/Q, Aux Channel I/Q Mag**
Preset	POSitive
State Saved	Saved in instrument state.
Instrument S/W Revision	Prior to A.02.00

Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT.

Remote Command	`:TRIGger[:SEQuence]:AIQMag:DELay <time>`
	`:TRIGger[:SEQuence]:AIQMag:DELay?`
	`:TRIGger[:SEQuence]:AIQMag:DELay:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:AIQMag:DELay:STATe?`
Example	TRIG:AIQM:DEL 10 ms
	TRIG:AIQM:DEL:STAT ON
Key Path	**Trigger, Baseband I/Q, Aux Channel I/Q Mag**
Preset	1 us
	OFF
State Saved	Saved in instrument state.
Range	–2.5 s to +10 s
Instrument S/W Revision	Prior to A.02.00

Trigger Center Frequency

This key sets the center frequency to be used by the auxiliary receiver.

Remote Command	`:TRIGger[:SEQuence]:AIQMag:CENTer <freq>`
	`:TRIGger[:SEQuence]:AIQMag:CENTer?`
Restriction and Notes	Trigger CF + 1/2 Trigger BW < Max
	Trigger CF – 1/2 Trigger BW > Min

Example	:TRIG:AIQM:CENT 10 MHz
Key Path	**Trigger, Baseband I/Q, Aux Channel I/Q Mag**
Preset	0 Hz
State Saved	Saved in instrument state.
Range	–40 MHz to 40 MHz
Instrument S/W Revision	Prior to A.02.00

Trigger Bandwidth

This key sets the information bandwidth used by the auxiliary receiver for the Auxiliary Channel I/Q Magnitude trigger.

Remote Command	`:TRIGger[:SEQuence]:AIQMag:BANDwidth <freq>` `:TRIGger[:SEQuence]:AIQMag:BANDwidth?`
Restriction and Notes	The combined sample rate for the main and auxiliary receivers cannot exceed 100 MSa/sec. The bandwidth available to the Trigger BW is limited to what is available after the main receiver's bandwidth (Info BW, sometimes pre-FFT BW) is set. Because of this limitation, the Max is not always achievable. The combination of Trigger Center Freq and Trigger BW is also limited: Trigger CF + 1/2 Trigger BW < Max Trigger CF – 1/2 Trigger BW > Min
Example	:TRIG:AIQM:BAND 8 MHz
Key Path	**Trigger, Baseband I/Q, Aux Channel I/Q Mag**
Preset	Bandwidth option dependent: No Opt: 10 MHz Opt B25: 25 MHz Opt S40: 40 MHz
State Saved	Saved in instrument state.
Range	10 Hz to Maximum
Instrument S/W Revision	Prior to A.02.00

Auto/Holdoff

Opens up a menu that lets you adjust Auto Trigger and Trigger Holdoff parameters

Key Path	**Trigger**

Readback line	Displays a summary of the Auto Trig and Holdoff settings, in square brackets First line: Auto Off or Auto On Second Line: “Hldf” followed by: • If Holdoff is Off, readback Off • If Holdoff On and Type = Normal, readback value • If Holdoff On and Type = Above, readback value followed by AL • If Holdoff On and Type = Below, readback value followed by BL • If Holdoff Type selection is not supported by the current measurement, Holdoff Type is always Normal
Instrument S/W Revision	A.02.00

Auto Trig

Sets the time that the analyzer will wait for the trigger conditions to be met. If they are not met after that much time, then the analyzer is triggered anyway.

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:	Off, 100 ms
State Saved:	Saved in instrument state.
Min:	1 ms
Max:	100 s
Key Path:	**Trigger, Auto/Holdoff**
Default Unit:	s
Instrument S/W Revision:	Prior to A.02.00

Trig Holdoff

Sets the holdoff time between triggers. When the trigger condition is satisfied, the trigger occurs, the delay begins, and the holdoff time begins. New trigger conditions will be ignored until the holdoff time expires. For a free-running trigger, the holdoff value is the minimum time between triggers.

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:	Off, 100 ms
State Saved:	Saved in instrument state.
Min:	0 s
Max:	0.5 s
Key Path:	**Trigger, Auto/Holdoff**
Default Unit:	s
Instrument S/W Revision:	Prior to A.02.00

Holdoff Type

Lets you set the Trigger Holdoff Type.

NOTE	Holdoff Type is not supported by all measurements. If the current measurement does not support it, this key will be blank and the Holdoff Type will be Normal. If the Holdoff Type SCPI is sent while in such a measurement, the SCPI will be accepted and the setting remembered, but it will have no effect until a measurement is in force that supports Holdoff Type.

Trigger Holdoff Type functionality:

NORMal

This is the “oscilloscope” type of trigger holdoff, and is the setting when the Holdoff Type key does not appear. In this type of holdoff, no new trigger will be accepted until the holdoff interval has expired after the previous trigger.

ABOVe
If the trigger slope is positive, a trigger event is generated only if the signal characteristic of interest crosses the trigger threshold (with positive slope) and then remains above the threshold for at least the holdoff time. For negative slope, the trigger event is generated if the signal characteristic crosses the threshold (with negative slope) after having been above the threshold for at least the holdoff time. In either case, the trigger event is associated with the time the level was crossed.

BELow

If the trigger slope is positive, a trigger event is generated only if the signal characteristic of interest crosses the trigger threshold (with positive slope) after having been below the threshold for at least the holdoff time. For negative slope, the trigger event is generated if the signal characteristic crosses the threshold (with negative slope) and then remains below the threshold for at least the holdoff time. In either case, the trigger event is associated with the time the level was crossed.

Remote Command:	`:TRIGger[:SEQuence]:HOLDoff:TYPE NORMal|ABOVe|BELow`
	`:TRIGger[:SEQuence]:HOLDoff:TYPE?`
Example:	TRIG:HOLD:TYPE NORM
Mode:	GSM/EDGE
Preset:	All modes but GSM/EDGE: Normal
	GSM/EDGE: Below
State Saved:	Saved in instrument state.
Key Path:	**Trigger, Auto/Holdoff**
Instrument S/W Revision:	A.02.00

Trigger Offset (Remote Command Only)

ESA Backwards Compatibility command

Remote Command:	`:TRIGger[:SEQuence]:OFFSet <time>`
	`:TRIGger[:SEQuence]:OFFSet?`
	`:TRIGger[:SEQuence]:OFFSet:STATe OFF|ON|0|1`
	`:TRIGger[:SEQuence]:OFFSet:STATe?`
Example:	TRIG:OFFS ON
	TRIG:OFFS –100 ms
Remote Command Notes:	These are ESA commands for trigger offset that allowed you to use a positive or negative delay when in zero span and in a Res BW >= 1 kHz. For ESA compatibility, X-series analyzers keep track of this offset and add it to the Trigger Delay for line, video or external whenever the value is sent to the hardware, if in Zero Span and RBW >= 1 kHz.
Preset:	Off, 0 s
State Saved:	Saved in instrument state.
Min:	–11 s
Max:	+11 s
Instrument S/W Revision:	Prior to A.02.00

View/Display

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

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

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

Display

The **Display** menu is common to most measurements, and is used for configuring items on the display. Some **Display** menu settings apply to all the measurements in a mode, and some only to the current measurement. Those under the **System Display Settings** key apply to all measurements in all modes.

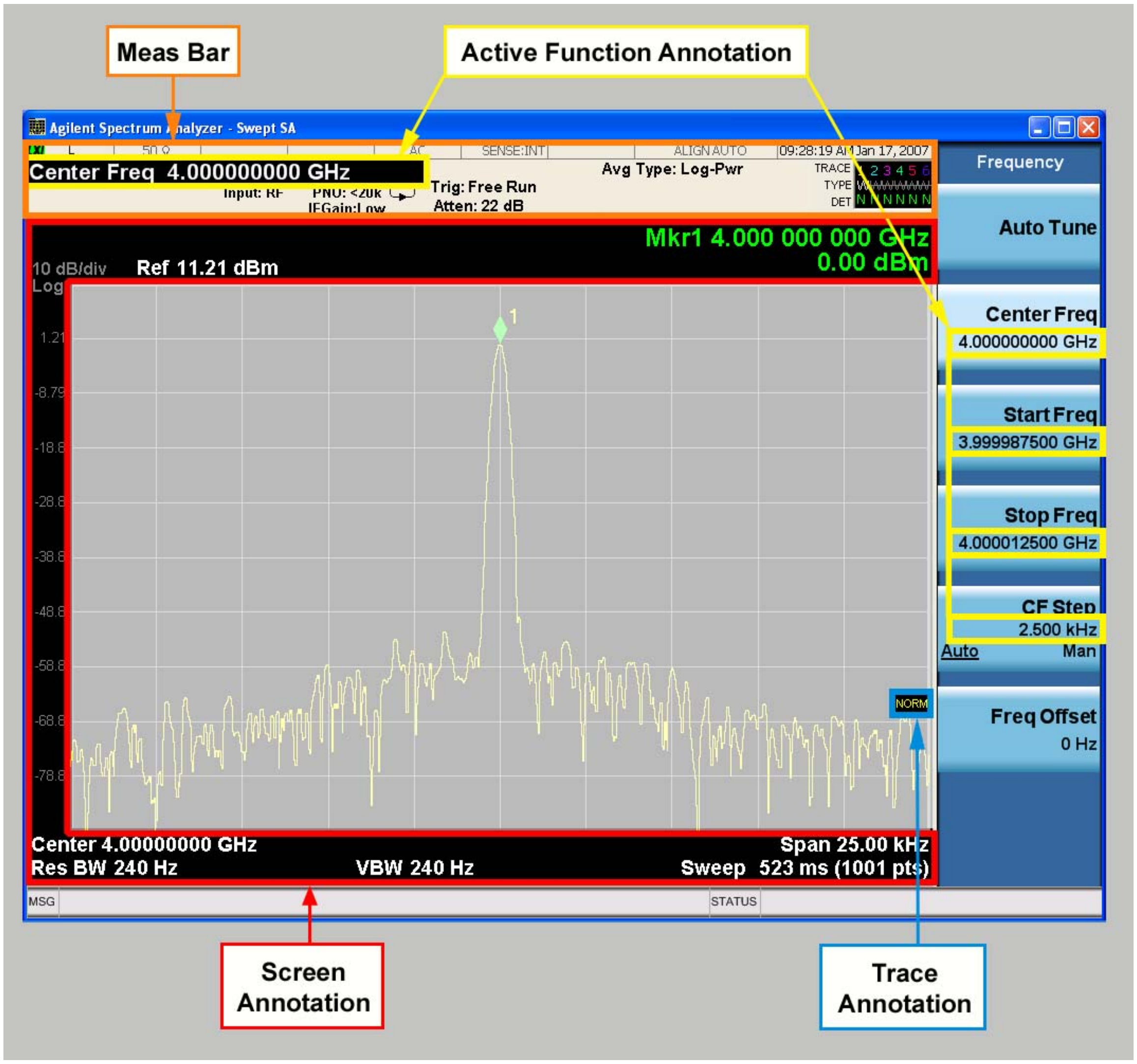
Key Path	**View/Display**
Instrument S/W Revision	Prior to A.02.00

Annotation

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

1. Meas Bar: This is the measurement bar at the top of the screen. It does not include the settings panel or the Active Function. Turning off the Meas Bar turns off the settings panel and the Active Function. When the Meas Bar is off, the graticule area expands to fill the area formerly occupied by the Meas Bar.
2. Screen Annotation: this is the annotation and annunciation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) This does NOT include the marker number or the N dB result. When off, the graticule expands to fill the entire graticule area.
3. Trace annotation: these are the labels on the traces, showing their detector (or their math mode).
4. Active Function annotation: this is the active function display in the meas bar, and all of the active function values displayed on keys.

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



Key Path	**View/Display, Display**
Instrument S/W Revision	Prior to A.02.00

Meas Bar On/Off

This function turns the Measurement Bar on and off, including the settings panel. When off, the graticule area expands to fill the area formerly occupied by the Measurement Bar.

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:	On This should remain Off through a Preset when **System Display Settings**, **Annotation** is set to Off.
State Saved:	Saved in instrument state.
Key Path:	**View/Display, Display, Annotation**
Instrument S/W Revision:	Prior to A.02.00

Screen

This controls the display of the annunciation and annotation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) and the y-axis annotation. This does NOT include marker annotation (or the N dB result). When off, the graticule expands to fill the entire graticule area, leaving only the 1.5% gap above the graticule as described in the Trace/Detector chapter.

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:	On This should remain Off through a Preset when **System Display Settings**, **Annotation** is set to Off
State Saved:	Saved in instrument state.
Key Path:	**View/Display, Display, Annotation**
Instrument S/W Revision:	Prior to A.02.00

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.

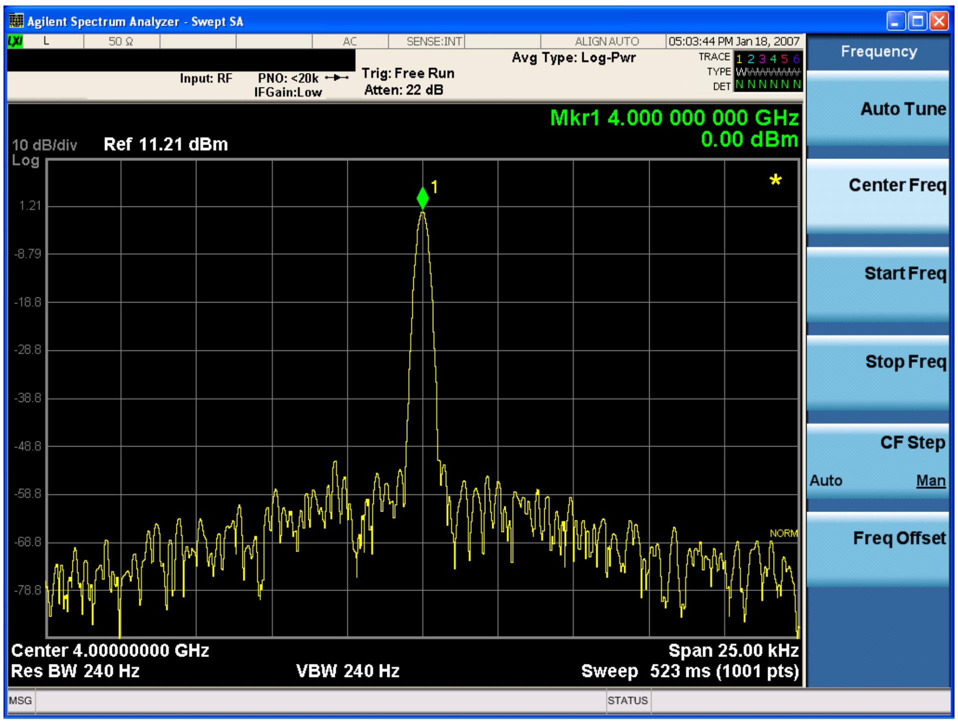
Key Path: **View/Display, Display, Annotation**

Instrument S/W Revision: Prior to A.02.00

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 keys.

Note that all of the keys 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:	On
	This should remain Off through a Preset when **System Display Settings**, **Annotation** is set to Off
State Saved:	Saved in instrument state.
Key Path:	**View/Display, Display, Annotation**
Instrument S/W Revision:	Prior to A.02.00

Title

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

Key Path	**View/Display, Display**
Instrument S/W Revision	Prior to A.02.00

Change Title Writes a title into the "measurement name" field in the banner, for example, "Swept SA".

Press Change Title to enter a new title through the alpha editor. Press Enter or Return to complete the entry. Press ESC to cancel the entry and preserve your existing title.

The display title will replace the measurement name. It remains for this measurement until you press **Change Title** again, or you recall a state, or a Preset is performed. A title can also be cleared by pressing **Title**, **Clear Title**.

NOTE Notice the inclusion of the `<measurement>` parameter in the command below. Because each measurement remembers the Display Title, the command must be qualified with the measurement name. For the Swept SA measurement this is not the case; for backwards compatibility, no <measurement> parameter is used when changing the Display Title for the Swept SA measurement.

Remote Command	`:DISPlay:<measurement>:ANNotation:TITLe:DATA <string>` `:DISPlay:<measurement>:ANNotation:TITLe:DATA?`
Example	DISP:ANN:TITL:DATA "This Is My Title" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "This Is My Title" This example is for Measurements other than Swept SA. Both set the title to: This Is My Title
Key Path	**View/Display, Display, Title**
Mode	All
Preset	No title (measurement name instead)
State Saved	Saved in instrument state.
Instrument S/W Revision	Prior to A.02.00

Clear Title

Clears a title from the front-panel display. Once cleared, the title cannot be retrieved. After the title is cleared, the current Measurement Name replaces it in the title bar.

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**
Instrument S/W Revision:	Prior to A.02.00

Graticule

Pressing Graticule turns the display graticule On or Off. It also turns the graticule y-axis annotation on and off.

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**
Instrument S/W Revision:	Prior to A.02.00

Display Line

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

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

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

The display line is unaffected by Auto Couple.

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 Off and –25 dBm on Preset. When the Display Line goes from Off to On, if it is off screen, set it to either the top or bottom of screen, depending on which direction off screen it was. The Display Line's value does not change when it is turned off.
State Saved:	Saved in instrument state.
Min:	– (minus infinity) in current units
Max:	+ (plus infinity) in current units
Key Path:	**View/Display, Display**
Default Unit:	Depends on the current selected Y axis unit
Instrument S/W Revision:	Prior to A.02.00

System Display Settings

These settings are "Mode Global" – they affect all modes and measurements and are reset only by **Restore Misc Defaults** or **Restore System Defaults** under System.

Key Path	**View/Display, Display, System Display Settings**
Instrument S/W Revision	Prior to A.02.00

Annotation Local Settings/All Off This is a Mode Global override of the meas local annotation settings. When it is **All 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 **All Off, Screen, Meas Bar, Trace, and Active Function Values** keys under the **Display, Annotation** menu are grayed out and forced to **Off**. When **Local Settings** has been selected, you are able to set the local annotation settings on a measurement by measurement basis.

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**
Instrument S/W Revision:	Prior to A.02.00

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?`
Preset:	TDColor (Set by Restore Misc Defaults)
State Saved:	Not saved in instrument state.
Key Path:	**View/Display, Display, System Display Settings**
Remote Command Notes:	TDColor – 3D is the standard color theme with filling and shading TDMonochrome – is similar to 3D color, but only black is used FCOLor – flat color is intended for inkjet printers to conserve ink. It uses a white background instead of black. FMONochrome – is like flat color, but only black is used
Example:	DISP:THEM TDM sets the display theme to 3D Monochrome.
Instrument S/W Revision:	Prior to A.02.00

Backlight

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

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

Remote Command:	`:DISPlay:BACKlight ON|OFF` `:DISPlay:BACKlight?`
Preset:	ON (Set by Restore Misc Defaults)
Key Path:	**View/Display, Display, System Display Settings**
Instrument S/W Revision:	Prior to A.02.00

On

Turns the display backlight on.

Example:	DISP:BACK ON
Key Path:	**View/Display, Display, System Display Settings, Backlight**
Readback:	On
Instrument S/W Revision:	Prior to A.02.00

Off

Turns the display backlight off.

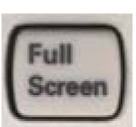
Example:	DISP:BACK OFF
Key Path:	**View/Display, Display, System Display Settings, Backlight**
Readback:	Off
Instrument S/W Revision:	Prior to A.02.00

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**
Instrument S/W Revision:	Prior to A.02.00

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

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

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

Remote Command:	`:DISPlay:FSCReen[:STATe] OFF|ON|0|1`
	`:DISPlay:FSCReen[:STATe]?`
Preset:	Off
State Saved:	Not saved in state.
Key Path:	**Display**
Instrument S/W Revision:	Prior to A.02.00

Display Enable (Remote Command Only)

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

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

If you have turned off the display:

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

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

Remote Command:	`:DISPlay:ENABle OFF|ON|0|1`
	`:DISPlay:ENABle?`
Example:	DISP:ENAB OFF
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:	On Set by SYST:DEF MISC, but Not affected by *RST or SYSTem:PRESet.
State Saved:	Not saved in instrument state.
Instrument S/W Revision:	Prior to A.02.00