



# Remote Interface Reference Manual

## Anritsu MS271xB

Document #10580-00182  
Rev. E

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# 1 Introduction

## ***Scope of this Manual***

This manual contains descriptions of the remote commands available for Anritsu's line of Master™ products.

While it does reference the equivalent front-panel interface for each command, it does not provide a complete front panel reference. Please see the appropriate product's User's Guide for that information.

## **References**

IEEE Standard 488.2-1992, *IEEE Standard Codes, Formats, Protocols and Common Commands for Use with ANSI/IEEE Std 488.1-1987*. IEEE, New York, NY, 1992.

SCPI Standard-1999, *Standard Commands for Programmable Instruments Volume 1: Syntax and Style*. SCPI Consortium, San Diego, CA, 1999.

*MS271xB User's Guide* (document #10580-00181). Anritsu Company, Morgan Hill, CA, 2004.

*NI-VISA User Manual* (document #370423A-01). National Instruments Corporation, Austin, TX, 2001.

## ***Trademark Acknowledgments***

NI-VISA and Lab VIEW are trademarks of National Instruments Corporation.  
MS271xB is a trademark of Anritsu Company.

## ***Firmware Revisions***

To check your current firmware revision, press Shift-8 (System), Status.

Remote commands are available in the applications beginning with the following firmware revisions:

<b>Application</b>	<b>Firmware Revision</b>
MS2717B	1.00
MS2718B/MS2719B	0.01

## 2 Programming Overview

### **Controller Interface**

The physical interface is the RJ-45 connection on the instrument for 10BASE-T.

Data transfer takes place over Ethernet using TCP/IP and the VXI-11 protocol. In order to communicate with the instrument the PC must have a VXI-11 client implementation either as part of the controller program or using a third party software package on the controlling PC. The examples in Appendix A of this manual are written using National Instruments' NI-VISA™ product.

### **Command Structure**

#### **Format**

The Master™ product line implements a remote interface based on the 1999 SCPI Standard. This is an ASCII-based command set.

Some basic details are described below. For a more detailed description see the SCPI Standard, available for download on the SCPI Consortium website.

#### **Command Tree**

SCPI commands are organized in a “tree” structure. The base of the tree is called the “root”. The “branches” are the functional subsystems. Each “branch” can have sub-branches. The final node is called the “leaf”. The entire sequence of branches, plus the leaf, makes up the command. For example, part of the “CALCulate” branch looks like this:

```
:CALCulate
  :LIMit
    :ALARm
    :CLEAr
    :STATe
    :TYPE
    :VALue
    :POINT
      :FREQuency
      :VALue
```

Although they are at different levels in the tree, “FREQuency” and “VALue” are both leaves on the tree.

There can be branches and leaves in the tree with the same name as long as they appear at different levels. For example, there is a “VALue” leaf at the tip of both of these branches:

```
:CALCulate          :CALCulate
  :LIMit             :LIMit
    :VALue           :POINT
                    :VALue
```

## Subsystems

A colon (':') separates each subsystem. For example, the command `:SENSe:FREQuency:STARt <freq>` sets the start frequency. The start frequency is part of the :FREQuency subsystem which is part of the :SENSe subsystem. Stop frequency is also part of the :SENSe:FREQuency subsystem. It is specified by `:SENSe:FREQuency:STOP`.

## Optional Subsystems

One subsystem at each “tree” level can be specified as optional. That is, the optional subsystem does not need to be specified to create a valid command. For example, if the specification is written as `[ :SENSe ] :FREQuency:STARt`, the :SENSe subsystem is optional. So, both `:SENS:FREQ:STAR` and `:FREQ:STARt` are valid commands and will have the same result.

## Long Format vs. Short Format

Each keyword has a long format and a short format. The start frequency can be specified by `:SENSe:FREQuency:STARt` or `:SENS:FREQ:STAR`. The capital letters in the command specification indicate the short form of the command.

Only the short form and the long form are acceptable. For example, `:SENS:FREQuen:STA` is not an acceptable form of the command.

## Case Sensitivity

Commands are not case sensitive. For example, `:SENS:FREQ:STAR 1 MHZ` and `:sens:freq:star 1 mhz` will have the same result.

## Parameters

The command and its parameters are separated by a space. Parameters may be specified with optional units, depending on the command.

For example, `:SENS:FREQ:STAR 1 MHZ` sets the start frequency to 1 MHz.

Multiple parameters are separated by a comma (“,”).

Note that there is no parameter validity check in the instrument. Please double check the parameters before sending them to the instrument.

## Query Format

Many commands have a query format that will return a parameter value or other data.

For example, `:SENS:FREQ:STAR?` will return the current value of the start frequency.

## Combining Multiple Commands

Multiple commands can be sent together if separated by a semi-colon (;). For example, `:SENSe:FREQ:STAR 1MHZ;:SENSe:FREQ:STOP 2 MHZ` would set the start frequency to 1 MHz and then set the stop frequency to 2 MHz.

## Creating Valid Commands

Command Specification	Valid Forms
<code>[ :SENSE ] :FREQUENCY :START &lt;freq&gt;</code>	<p>The following all produce equivalent results:</p> <pre>:SENSE:FREQUENCY:START 1 MHZ :SENS:FREQ:STAR 1 MHZ :sense:frequency:start 1000000 :FREQ:STAR 1000 KHZ</pre>
<code>:CALCulate:MARKer[1] 2 3 4 5 6:X &lt;x-parameter&gt;</code>	<p>The first 2 commands set the location of marker 1. The third command sets the location of marker 2.</p> <pre>:CALC:MARK:X 1 GHZ :CALC:MARK1:X 1 GHZ :CALC:MARK2:X 2 GHZ</pre>
<code>:UNIT:POWER DBM DBV DBMV DBUV V W</code>	<p>The following commands are identical:</p> <pre>:UNIT:POWER DBM :unit:pow dbm</pre>
<code>:INITiate:CONTinuous OFF ON 0 1</code>	<p>The following commands are identical:</p> <pre>:INITiate:CONTinuous OFF :init:cont 0</pre>

## Command Terminators

The <new line> character (ASCII 10) in the last data byte of a command string is used as a command terminator. Use of a command terminator will reset the command path to the root of the tree.

## Conventions

The following conventions have been used throughout the document.

### Notational Conventions

This document uses several notational conventions. They are listed below.

<code>:COMMANds:WILL:LOOK:LIKE:THIS</code>	Commands will be formatted to differentiate them from text descriptions.
<code>:COMMANd:QUERies:LOOK:LIKE:THIS?</code>	The query form of the command will be followed by a “?”
Front-panel key sequences use this formatting	Front-panel key presses will be formatted to differentiate them from text descriptions.  Key presses are separated by a comma (“,”).
<code>&lt;identifier&gt;</code>	Identifiers will be enclosed in “<>”. They indicate that some type of data must be provided.
	The “ ” indicates that a choice must be made.
<code>[optional input]</code>	Optional input will be enclosed in “[ ]”.

## Identifiers

The following identifiers have been used throughout the remote command definitions. Descriptions are provided here. In most cases, units will be specified with the individual command.

Identifier	Description
<amplitude>	Amplitude value. Units specified with the command.
<current>	Current. Units specified with the command.
<distance>	Distance. Units specified with the command.
<file name>	The name should be enclosed in either single quotes ( ' ') or double quotes ( " "). The need for an extension will be documented with applicable commands.
<freq>	Frequency. Units specified with the command.
<integer>	Integer value, no units. Range specified with the command.
<number>	Numeric value, integer or real.
<percentage>	Percentage value from 0-100. Units are always "%".
<rel ampl>	Relative amplitude. Units are always dB.
<string>	The string should be enclosed in either single quotes ( ' ') or double quotes ( " ").
<value>	Parameter value in units of y-axis. Units specified with the command.
<voltage>	Voltage. Units specified with the command.
<x-parameter>	Parameter value in the units of the x-axis. Units are specified with the command.

## 3 Remote Commands

### 3.1 IEEE Common Commands

These commands are specified in IEEE Standard 488.2-1992, *IEEE Standard Codes, Formats, Protocols and Common Commands for Use with ANSI/IEEE Std 488.1-1987*. IEEE, New York, NY, 1992.

#### Identity Query

##### **\*IDN?**

This command returns the following information in `<string>` format separated by commas: manufacturer name (“Anritsu”), model number/options, serial number, firmware package number.

Note that the model number and options will be separated by a “/” and each option will be separated by a “/”.

For example, the return string might look like:

```
"Anritsu,MS2721A,1234567890,1.00"
```

#### Reset

##### **\*RST**

This command restores parameters in the current application as well as system settings to their factory default values.

System settings affected by this command are Ethernet configuration, language, volume and brightness.

Note that the unit will power-cycle after this command is executed.

Front Panel Access:	Shift-8 (System), System Options, Reset, Factory Defaults
See Also:	:SYSTem:PRESet

## 3.2 GSM

This section contains the GSM remote commands. These commands are available in the MS2717B, MS2718B, and MS2719B.

### ***Abort Subsystem***

The abort subsystem includes commands that allow the user to stop current measurement activities on the instrument.

#### **Abort**

##### **:ABORt**

Restarts the current sweep and/or measurement. Resets the trigger system.

If :INITiate:CONTinuous is OFF (i.e. the instrument is in single sweep mode), send the command :INITiate[:IMMediate] to trigger the next sweep.

If :INITiate:CONTinuous is ON (i.e. the instrument is in continuous sweep mode) a new sweep will start immediately.

See Also:	:INITiate:CONTinuous :INITiate[:IMMediate]
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### ***CALCulate Subsystem***

The commands in this subsystem process data that has been collected via the SENSE subsystem.

#### ***:CALCulate:MARKer Subsystem***

This subsystem contains commands to manipulate data markers.

#### **Multi-Channel Spectrum Channel Cursor**

**:CALCulate:MARKer:CHANnel <number>**

**:CALCulate:MARKer:CHANnel?**

Sets the channel cursor for Multi-Channel Spectrum markers.

A signal standard must be selected or the instrument will display "--". The signal standard can be set through "Freq, Signal Standard" on the front panel or [:SENSe]:FREQuency:SIGStandard through SCPI.

The query form returns the current channel cursor number.

Note that this command is valid only in Multi-Spectrum view. Use CONFIGure:SPECTrum:MULTi to set the instrument to Multi-Channel Spectrum view.

Front Panel Access:	Marker, Channel Cursor
See Also:	CALCulate:MARKer:FREQuency CALCulate:MARKer:FREQuency? [:SENSe]:FREQuency:SIGStandard CONFIgure:SPECTrum:MULTi

## Multi-Channel Spectrum Frequency Cursor

**:CALCulate:MARKer:FREQuency <number>**

**:CALCulate:MARKer:FREQuency?**

Sets the frequency cursor for Multi-Channel Spectrum markers.

The query form returns the current frequency cursor number in Hz.

Note that this command is valid only in Multi-Spectrum view. Use `CONFIgure:SPECTrum:MULTi` to set the instrument to Multi-Channel Spectrum view.

Factory Preset / *RST:	1 GHz
Default Unit:	Hz
Front Panel Access:	Marker, Channel Cursor
See Also:	CALCulate:MARKer:CHANnel CALCulate:MARKer:CHANnel? [:SENSe]:FREQuency:SIGStandard CONFIgure:SPECTrum:MULTi

## Display Subsystem

This subsystem provides commands that modify the display of data for the user. They do not modify the way in which data are returned to the controller.

### Power Offset

**:DISPlay:WINDow:TRACe:Y[:SCALE]:OFFSet <rel ampl>**

**:DISPlay:WINDow:TRACe:Y[:SCALE]:OFFSet?**

Sets the power offset value for the y-axis.

Factory Preset / *RST:	0 dB
Range:	-100 dB to 100 dB
Default Unit:	dB
Front Panel Access:	Amplitude, Power Offset

## **Format Subsystem**

This subsystem contains commands that determine the formatting of numeric data when it is transferred.

The format setting affects data in specific commands only. If a command is affected, it will be noted in the command description.

### **Numeric Data Format**

**:FORMat[:READings][:DATA] ASCii|INTEger,32|REAL,32**

**:FORMat[:READings][:DATA]?**

This command specifies the format in which data is returned in certain commands.

ASCii format returns the data in comma-separated ASCII format. The units are the current instrument units. This format requires many more bytes so it will be the slowest format.

INTEger,32 values are signed 32-bit integers in little-endian byte order. This format returns the data in 4-byte blocks.

REAL,32 values are 32-bit floating point numbers conforming to the IEEE 754 standard in little-endian byte order. This format returns the data in 4-byte binary format. The units are the current instrument units.

Both INTEger,32 and REAL,32 formats return a definite block length. Each transfer begins with an ASCII header such as #42204. The first digit represents the number of following digits in the header (in this example, 4). The remainder of the header indicates the number of bytes that follow the header (in this example, 2204). You then divide the number of following bytes by the number of bytes in the data format you've chosen (4 for both INTEger,32 and REAL,32...so 2204/4) to get the number of data points (in this example, 551).

Factory Preset / *RST:	ASCii
See Also:	:TRACe[:DATA]?

## **INITiate Subsystem**

This subsystem controls the triggering of measurements.

### **Continuous/Single Sweep**

**:INITiate:CONTinuous OFF|ON|0|1**

**:INITiate:CONTinuous?**

Specifies whether the sweep/measurement is triggered continuously.

If the value is set to ON or 1, another sweep/measurement is triggered as soon as the current one completes.

If continuous is set to OFF or 0, the instrument enters the “idle” state and waits for the **:INITiate[:IMMediate]** command or for **:INITiate:CONTinuous ON**.

The default value is ON. That is, sending **:INIT:CONT** is equivalent to sending **:INIT:CONT ON**

The query version of the command returns a 1 if the instrument is continuously sweeping/measuring and returns a 0 if the instrument is in single sweep/measurement mode.

Note that rapid toggling between ON and OFF is not allowed. The instrument must be allowed to make a full sweep before toggling can be done.

Factory Preset / *RST:	ON
Front Panel Access:	Shift-3 (Sweep), Sweep (Single/Continuous)
See Also:	<b>:INITiate[:IMMediate]</b>

### **Trigger Sweep/Measurement**

**:INITiate[:IMMediate]**

Initiates a sweep/measurement.

If **:INITiate:CONTinuous** is set to ON, this command is ignored.

Use this command in combination with **:STATus:OPERation?** to synchronize the capture of one complete set of data. When this command is sent, the “sweep complete” bit of **:STATus:OPERation?** is set to 0, indicating that the measurement has not completed. The data collection is then triggered. The controlling program can poll **:STATus:OPERation?** to determine the status. When the “sweep complete” bit is set to 1, data is ready to be retrieved.

Front Panel Access:	SPA: Shift-3 (Sweep), Manual Trigger WCDMA: Shift-3 (Sweep), Trigger Sweep Fixed WiMAX: Shift 3(Sweep), Trigger Sweep
See Also:	<b>:INITiate:CONTinuous</b> <b>:STATus:OPERation?</b>

## ***INSTRUMENT Subsystem***

One instrument may contain many logical instruments (“modes”). This subsystem controls the selection of the current instrument mode.

### **Query Available Modes**

**:INSTRUMENT:CATALOG:FULL?**

Returns a comma-separated list of available modes. Mode names are enclosed in double quotes (“”). Immediately following the string name is the application number.

For example: “SPA”1, “WCDMA”5, “VNA”2, “WIMAX\_D”18, “SCOPE”17

Front Panel Access:	Shift-9 (Mode)
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### **Select Mode by Number**

**:INSTRUMENT:NSELECT <integer>**

**:INSTRUMENT:NSELECT?**

Sets the instrument mode based on the value of <integer>.

The query version returns the number associated with the current mode.

Use :INSTRUMENT:CATALOG:FULL? to get a list of available mode names and their integer representations.

Factory Preset / *RST:	MS2721A: 1 MS2717A: 1 MT8220A: 1 MS2012A: 2 MS2024A: 2 MS2026A: 2 MS2034A: 2 MS2036A: 2 MS2717B: 1 MS2718B: 1 MS2719B: 1
Front Panel Access:	Shift-9 (Mode)
See Also:	:INSTRUMENT:CATALOG:FULL? :INSTRUMENT[:SELECT]

## Select Mode by Name

**:INSTrument[:SElect] <string>**

**:INSTrument[:SElect]?**

Sets the instrument mode based on the mode name specified by <string>.

The query version returns the name of the current mode.

Use `:INSTrument:CATalog:FULL?` to get a list of available modes.

Factory Preset / *RST:	MS2721A: "SPA" MS2717A: "SPA" MT8220A: "SPA" MS2012A: "VNA" MS2024A: "VNA" MS2026A: "VNA" MS2034A: "VNA" MS2036A: "VNA" MS2717B: "SPA" MS2718B: "SPA" MS2719B: "SPA"
Front Panel Access:	Shift-9 (Mode)
See Also:	:INSTrument:CATalog:FULL? :INSTrument:NSElect

## MMEMory Subsystem

The Mass MEMory subsystem contains functions that provide access to the instrument's setup and data storage.

### Delete Setup/Measurement

**:MMEMory:DElete <file name>**

Removes the measurement or setup file specified by <file name> from the current mass storage device.

<file name> should be enclosed in either single quotes (') or double quotes (") and should contain a file extension ".stp" for setup and ".edg" for measurement.

Use the command `MMEMory:MSIS` to set the current mass storage location.

Front Panel Access:	Shift-7 (File), Delete, Delete Selected File
See Also:	:MMEMory:STORE:STATe, :MMEMory:STORE:TRACe, :MMEMory:MSIS INTernal   USB   CFLash

## Format Storage Device

**:MMEMory:INITialize [CFLash]**

Formats the compact flash. Issuing this command will erase all files on an installed Compact Flash module and create the /usr directory for storage of measurements, setups and jpg files.

Front Panel Access:	Shift-7 (File), Directory Management, Format Compact Flash
---------------------	--

## Recall Setup

**:MMEMory:LOAD:STATE <integer>,<file name>**

Recalls a previously stored instrument setup in the current storage location. The setup file to be loaded is specified by <file name>.

<file name> should be enclosed in either single quotes (') or double quotes (") and should contain a file extension ".stp".

Use the command **MMEMory:MSIS** to set the current storage location.

The <integer> parameter is not currently used, but it must be sent. Send a 0.

Front Panel Access:	Shift-7 (File), Recall, Recall Setup
See Also:	:MMEMory:STORE:STATE, :MMEMory:MSIS INTERNAL USB CFLash

## Recall Measurement

**:MMEMory:LOAD:TRACe <integer>,<file name>**

Recalls a previously stored measurement trace from the current storage location. The saved measurement trace to be loaded is specified by <file name>.

<file name> should be enclosed in either single quotes (') or double quotes (") and should contain a file extension ".edg". Note that the trace specified by <file name> should be available at the current mass storage location.

Use the command **MMEMory:MSIS** to set the current mass storage location.

The <integer> parameter is not currently used, but it must be sent. Send a 0.

File Extensions:	".edg"
Front Panel Access:	Shift-7 (File), Recall, Recall Measurement
See Also:	:MMEMory:STORE:TRACe

## Storage Location

**MMEMory:MSIS INTernal | USB | CFLash**

**MMEMory:MSIS?**

Sets the storage location.

Setting the storage location to INTernal will set the current storage location to be the internal memory.

Setting the storage location to USB will set the current storage location to be the USB Flash drive.

Setting the storage location to CFLash will set the current storage location to be the Compact Flash memory.

Note that changing the current location to save files causes the “Copy to Destination” on the front panel to be automatically changed if the selected current location is the same as the destination. When the change occurs, the instrument will cycle through each of the available storage locations. For example, if “Copy to Destination” is on CFLash and the “Current Location” is changed to CFLash, “Copy to Destination” will cycle to INTernal.

Note that the storage location must be available in order for it to be set.

Front Panel Access:	Shift-7 (File), Directory Management, Current Location
See Also:	:MMEMory:MSIS:DESTination

## Copy From Current Location To Destination

**:MMEMory:MSIS:COPY**

Copies all measurements, setups and jpg files stored in the current storage location to the “copy to destination” location.

Front Panel Access:	Shift-7 (File), Directory Management, Copy From Current Location To Destination
See Also:	:MMEMory:MSIS :MMEMory:MSIS:DESTination

## Copy to Destination

**:MMEMory:MSIS:DESTination INTERNAL|USB|CFLash**

**:MMEMory:MSIS:DESTination?**

Sets the destination to where measurements and setups in the current storage location will be copied.

Setting the location to INTERNAL will result in copying the files that are stored at the current storage location to the internal memory when the command **:MMEMory:MSIS:COPY** is sent.

Setting the location to USB will result in copying the files that are stored at the current storage location to the USB Flash drive when the command **:MMEMory:MSIS:COPY** is sent..

Setting the location to CFLash will result in copying the files that are stored at the current storage location to the Compact Flash memory when the command **:MMEMory:MSIS:COPY** is sent.

Note that changing the destination to which the instrument will save files to causes the “Current Location” on the front panel to be automatically changed if the selected destination is the same as the current location. When the change occurs, the instrument will cycle through each of the available storage locations. For example, if “Current Location” is on CFLash and the “Copy to Destination” is changed to CFLash, “Current Location” will cycle to INTERNAL.

Front Panel Access:	Shift-7 (File), Directory Management, Copy To Destination
See Also:	<b>:MMEMory:MSIS</b> <b>:MMEMory:MSIS:COPY</b>

## Save Setup

**:MMEMory:STORe:STATe <integer>,<file name>**

Stores the current setup into the file specified by <file name>.

<file name> should be enclosed in either single quotes (‘’) or double quotes (‘‘’) and should not contain a file extension.

Use the command **MMEMory:MSIS** to set the current storage location.

The <integer> parameter is not currently used, but it must be sent. Send a value of 0.

Front Panel Access:	Shift-7 (File), Save, Save Setup
See Also:	<b>:MMEMory:LOAD:STATe</b> <b>:MMEMory:MSIS INTERNAL USB CFLash</b>

## Save Measurement

**:MMEMory:STORe:TRACe <integer>,<file name>**

Stores the trace into the file specified by <file name>.

<file name> should be enclosed in either single quotes (') or double quotes (") and should not contain a file extension.

Use the command **MMEMory:MSIS** to set the current storage location.

The <integer> parameter is not currently used, but it must be sent. Send a 0.

Front Panel Access:	Shift-7 (File), Save, Save Measurement
See Also:	:MMEMory:LOAD:TRACe :MMEMory:MSIS INTernal   USB   CFLash

## ***SENSe Subsystem***

The commands in this subsystem relate to device-specific parameters, not signal-oriented parameters.

### ***[:SENSe]:FREQuency Subsystem***

Commands in this subsystem pertain to the frequency settings of the instrument.

#### **GSM/EDGE Measurement Selection**

**[ :SENSe ] :FREQuency: BAND AUTO | GSM | EDGE**

**[ :SENSe ] :FREQuency: BAND?**

This command toggles the type of signal that will be measured.

AUTO allows the instrument to search for a GSM or EDGE signal automatically.

GSM sets the instrument to measure only GSM signals.

EDGE sets the instrument to measure only EDGE signals.

The query form of the command returns the measurement mode that the instrument is currently in.

Factory Preset / *RST:	AUTO
Front Panel Access:	Setup, GSM/EDGE Select

## Center Frequency

**[ :SENSe ] :FREQuency:CENTer <freq>**

**[ :SENSe ] :FREQuency:CENTer?**

Sets the center frequency.

Factory Preset / *RST:	1 GHz
Range:	0 Hz – 7.1 GHz
Default Unit:	Hz
Front Panel Access:	Freq, Center Freq

## External Reference Frequency

**[ :SENSe ] :FREQuency:EXTernal <freq value>**

**[ :SENSe ] :FREQuency:EXTernal?**

Sets the desired external reference frequency. The <freq value> in MHz must be one of the following 12 values:

1 , 1.2288 , 1.544 , 2.048 , 2.4576 , 4.8 , 4.9152 , 5 , 9.8304 , 10 , 13 , 19.6608

The query form of this command will return the external reference frequency in Hz.

Front Panel Access:	Setup, Ext. Reference Frequency
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## Signal Standard

**[ :SENSe ] :FREQuency:SIGStandard <index>**

**[ :SENSe ] :FREQuency:SIGStandard?**

Selects the desired signal standard from the list.

The <index> argument is a 1-based index of the position of the desired signal standard in the instrument's current signal standard list. The list can be seen on the instrument by choosing the "Signal Standard" soft-key button in the "Frequency" menu. The list can also be downloaded remotely and viewed using Anritsu Master Software Tools. For example, if the desired Signal Standard is the 3<sup>rd</sup> item on the list then the value of the <index> argument would be 3.

The query form of this command will return the index of the currently-selected Signal Standard on the list.

Front Panel Access:	Frequency, Signal Standard
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## Channel Selection

**[ :SENSe ] :FREQuency:SIGStandard:CHANnel <number>**

**[ :SENSe ] :FREQuency:SIGStandard:CHANnel?**

Sets the channel number for the selected signal standard.

Front Panel Access:	Frequency, Channel
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## Start Frequency

**[ :SENSe ] :FREQuency :START?**

Queries the start frequency of the Multi-Channel Spectrum.

Note that this command is valid only if the current view is set to Multi-Channel Spectrum.

Default Unit:	Hz
See Also:	[ :SENSe ] :FREQuency :STOP?

## Stop Frequency

**[ :SENSe ] :FREQuency :STOP?**

Queries the stop frequency of the Multi-Channel Spectrum.

Note that this command is valid only if the current view is set to Multi-Channel Spectrum.

Default Unit:	Hz
See Also:	[ :SENSe ] :FREQuency :STOP?

## **[ :SENSe ] :POWer Subsystem**

This subsection relates to the power amplitude parameters of the instrument.

### Automatic Amplitude Range

**[ :SENSe ] :POWer [ :RF ] :RANGe :AUTO OFF | ON | 0 | 1**

**[ :SENSe ] :POWer [ :RF ] :RANGe :AUTO?**

Sets the automatic amplitude range.

Setting the value to ON or 1 will result in the amplitude range being coupled to the detected input signal level.

Setting the value to OFF or 0 will result in the input attenuation being un-coupled from the input signal level. That is, changing the input signal level will not change the amplitude range. When this command is issued, the amplitude range itself will not change.

The default value is ON. That is, sending `:SENS:POW:RANG:AUTO` is equivalent to sending `:SENS:POW:RANG:AUTO ON`.

Factory Preset / *RST:	ON
Front Panel Access:	Amplitude, Auto Range
See Also:	[ :SENSe ] :POWer [ :RF ] :RANGe

## Amplitude Range

[ :SENSE ] :POWER [ :RF ] :RANGE [ :IMMEDIATE ]

Re-calculates amplitude range.

Note that issuing this command will set the automatic dynamic range OFF.

Front Panel Access:	Amplitude, Adjust Range
See Also:	[ :SENSE ] :POWER [ :RF ] :RANGE :AUTO

## STATUS Subsystem

The commands in this subsystem relate to the current operating state of the instrument.

### Query Operation Status

:STATUS:OPERATION?

This command requests information about the current status of the instrument. Each bit of the return value represents some operation. Only a subset of the bits will be implemented for each application.

The number returned will be the decimal representation of the bit-wise OR of the enabled bits.

Bit	Decimal Value	Description
0	1	Not implemented
1	2	Not implemented
2	4	Not implemented
3	8	Not implemented
4	16	Not implemented
5	32	Not implemented
6	64	Not implemented
7	128	Not implemented
8	256	Sweep Complete – This bit will be set to 0 when the command :INITiate[:IMMEDIATE] is sent to trigger a sweep. It will have a value of 1 when the sweep has completed.
9	512	Not implemented
10	1024	Not implemented
11	2048	Not implemented
12	4096	Not implemented
13	8192	Not implemented
14	16384	Not implemented
15	0	Will always be 0

## **SYSTEM Subsystem**

This subsystem contains commands that affect instrument functionality that does not directly relate to data collection, display or transfer.

### **Query Installed Options**

**:SYSTEM:OPTIONS?**

Returns a string of the installed options. Options will be separated by a “/”.

The string will return “NONE” if no options are installed.

See Also:	*IDN?
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### **Preset**

**:SYSTEM:PRESet**

This command restores all application parameters to their factory preset values. This does not modify system parameters such as Ethernet configuration, language, volume or brightness.

Front Panel Access:	Shift-1 (Preset), Preset
See Also:	*RST

## **SYSTEM:FILE Subsystem**

This subsystem provides commands that modify how file lists should be displayed on the instrument. They do not modify the way in which data is returned to the controller.

### **File Lists Sort Method**

**:SYSTEM:FILE:SORT:METHod NAME | TYPE | DATE**

**:SYSTEM:FILE:SORT:METHod?**

Sets the file lists sort method.

Setting the sort method to NAME will result in file lists sorted by the name of the file.

Setting the sort method to TYPE will result in the file lists sorted by the type of file.

Setting the sort method to DATE will result in the file lists sorted by the date that the file was saved.

Factory Preset / *RST:	NAME
Front Panel Access:	Shift-7 (File), Directory Management, Sort Method
See Also:	:SYSTEM:FILE:SORT:ORDER

## File Lists Sort Order

**:SYSTem:FILE:SORT:ORDER ASCend | DESCend**

**:SYSTem:FILE:SORT:ORDER?**

Sets the file lists sort order.

Setting the sort order to ASCend will result in file lists sorted from lowest to highest.

Setting the sort order to DESCend will result in the file lists sorted from highest to lowest.

When sorting by name, the sort will place file names that start with numbers before file names that start with letters.

Factory Preset / *RST:	ASCend
Front Panel Access:	Shift-7 (File), Directory Management, Sort Order
See Also:	:SYSTem:FILE:SORT:METHOD

## Trace Subsystem

This subsystem contains commands related to the transfer of trace data to and from the instrument.

### Trace Data Transfer

**:TRACe[:DATA]? <trace type>**

This command transfers trace data from the instrument to the controller. The <trace type> must be one of the following: SINGLE | MULTI | PVTFrame | PVTSlot | DEMod. The format of the block data in the query form is specified by :FORMAt:DATA. The block data in the command form is always sent in ASCII format.

The response begins with an ASCII header that specifies the number of data bytes. It looks like #AX, where A is the number of digits in X and X is the number of bytes that follow the header. Each data point is separated by a comma delimiter.

Trace setup information can be acquired using :TRACe[:DATA]:PREamble?.

Use the commands in the MMEMory subsystem to store and recall traces from the instrument memory.

Except for DEMod, there is only one value per data point. For DEMod, each data point is represented by 2 values, 4 bytes each: IData (no units), and QData (no units).

For SINGLE, MULTI, PVTFrame, and PVTSlot, the unit is in dBm.

Note that the instrument must be set in the selected view. Use the CONFIgure commands to set the unit to the selected view.

See Also:	:FORMAt[:DATA] :TRACe[:DATA]:PREamble?
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## Trace Header Transfer

**:TRACe:PREamble? <trace type>**

Returns trace header information for the specified trace. The <trace type> must be one of the following: SINGle | MULTi | PVTFrame | PVTSlot | DEMod

Data can be transferred to and from the 5 available display trace types. Use the commands in the MMEMory subsystem to store and recall traces from the instrument memory.

The response begins with an ASCII header. The header specifies the number of following bytes. It looks like #AX, where A is the number of digits in X and X is the number of bytes that follow the header.

Note that the instrument must be set in the selected view. Use the CONFigure commands to set the unit to the selected view.

Parameters are returned in comma-delimited ASCII format. Each parameter will be returned as "NAME=VALUE[ UNITS],"

Valid parameter names are:

Parameter Name	Description
SN	Instrument serial #
UNIT_NAME	Instrument name
TYPE	The data type (Setup or Data)
DESCR	Trace name
DATE	Trace date/time
BASE_VER	Base FW version
APP_NAME	Application name
APP_VER	Application FW version
APP_MODE	Application Mode

Parameter Name	Description
REFERENCE_LEVEL	Reference Level
CENTER_FREQ	Center freq
SIGNAL_STANDARD	Current signal standard(the value is the index of the signal standard list, where a value of 1 is the first index in the list)
CHANNEL	Current channel
POWER_OFFSET	Applied power offset
REFERENCE_FREQUENCY	Selected external reference frequency

UNITS	Amplitude units
CURRENT_VIEW	Current view
CURRENT_MEASUREMENTS	Current measurements
DYNAMIC_ATTENUATION	Dynamic range on/off
SPAN	Frequency span
MANUAL_SYSTEM_SELECT	GSM/EDGE select
CURRENT_SPECTRUM_VIEW	Current spectrum view (single or multiple channel spectrum)
I_Q_VIEW	IQ view
RUN_HOLD	Run/Hold on/off
MC_SPECTRUM_START_FREQ	Multi-channel spectrum start frequency
MC_SPECTRUM_STOP_FREQ	Multi-channel spectrum stop frequency
MC_CHANNEL_CURSOR	Multi-channel spectrum channel cursor (used for markers)
MC_FREQ_CURSOR	Multi-channel spectrum frequency cursor (used for markers)
TEST_MODEL	Current pass fail model being tested

See Also:	:TRACe:DATA?
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## 3.3 Spectrum Analyzer

This section contains the SPA remote commands. These commands are available in the MS2717B, MS2718B, and MS2719B.

### ***Abort Subsystem***

The abort subsystem includes commands that allow the user to stop current measurement activities on the instrument.

#### **Abort**

**:ABORT**

Restarts the current sweep and/or measurement. Resets the trigger system.

If `:INITiate:CONTinuous` is OFF (i.e. the instrument is in single sweep mode), send the command `:INITiate[:IMMediate]` to trigger the next sweep.

If `:INITiate:CONTinuous` is ON (i.e. the instrument is in continuous sweep mode) a new sweep will start immediately.

See Also:	<code>:INITiate:CONTinuous</code> <code>:INITiate[:IMMediate]</code>
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### ***CALCulate Subsystem***

The commands in this subsystem process data that has been collected via the `SENSe` subsystem.

#### ***:CALCulate:LIMit Subsystem***

This subsystem defines the limit lines and controls the limit check.

## Limit Alarm

**:CALCulate:LIMit:ALARm OFF|ON|0|1**

**:CALCulate:LIMit:ALARm?**

Enables/disables the currently active limit line alarm.

Setting the value to ON or 1 will turn on the limit alarm.

Setting the value to OFF or 0 will turn off the limit alarm.

The query version of the command returns a 1 if the currently selected limit line alarm is set to ON and returns 0 if OFF.

Use **:CALCulate:LIMit:TYPE** to set the currently active limit line.

Factory Preset / *RST:	OFF
Front Panel Access:	Shift-6 (Limit), Limit Alarm
See Also:	:CALCulate:LIMit:TYPE
Example:	To turn off limit alarm :CALCulate:LIMit:ALARm OFF OR :CALCulate:LIMit:ALARm 0
	To turn on limit alarm :CALCulate:LIMit:ALARm ON OR :CALCulate:LIMit:ALARm 1

## Move Limit to Current Center Frequency

**:CALCulate:LIMit:CENTer**

Moves the center of the current active limit line to the center frequency.

If no limit line is turned on, a new flat default limit line is turned on.

Front Panel Access:	Shift-6 (Limit), Limit Advanced, Move Limit to Current Center Freq
Example:	To move the limit to the current center :CALCulate:LIMit:CENTer

## Create Limit Envelope

**:CALCulate:LIMit:ENVELOpe:CREate**

Creates a limit envelope. This generates a limit line that formed a mask just above or below the existing signals.

Note that this command will turn on the currently selected limit line if it is not already on.

Use **:CALCulate:LIMit:TYPE** to set the currently active limit line.

Front Panel Access:	Shift-6 (Limit), Limit Envelope, Create Envelope
Example:	To create a limit envelope :CALCulate:LIMit:ENVELOpe:CREate

## Limit Envelope Offset

**:CALCulate:LIMit:ENVELOpe:OFFSet <amplitude>**  
**:CALCulate:LIMit:ENVELOpe:OFFSet?**

Sets limit envelope offset. This defines how far away from the measured signal the active limit envelope will be placed.

Use **:CALCulate:LIMit:TYPE** to set the currently active limit line.

Factory Preset:	3dB for upper limit, -3dB for lower limit
Range:	-100dB - 100dB
Default Unit:	dB
Front Panel Access:	Shift-6(Limit), Limit Envelope, Upper Offset (If limit is toggled to Upper) or Lower Offset (If limit is toggled to Lower)
Example:	To set the limit envelope offset to 5dB <b>:CALCulate:LIMit:ENVELOpe:OFFSet 5</b>

## Number of Limit Envelope Points

**:CALCulate:LIMit:ENVELOpe:POINT <number>**  
**:CALCulate:LIMit:ENVELOpe:POINT?**

Sets the number of inflection point for the currently active limit envelope.

Use **:CALCulate:LIMit:TYPE** to set the currently active limit line.

Factory Preset:	21
Range:	2-41
Front Panel Access:	Shift-6(Limit), Limit Envelope, Upper Point (If limit is toggled to Upper) or Lower Point (If limit is toggled to Lower)
Example:	To set the number of inflection point to 31 <b>:CALCulate:LIMit:ENVELOpe:POINT 31</b>

## Limit Envelope Shape

**:CALCulate:LIMit:ENVELOpe:SHAPE SQUARE | SLOPE**

**:CALCulate:LIMit:ENVELOpe:SHAPE?**

Sets the currently active limit envelope shape.

Front Panel Access:	Shift-6(Limit), Limit Envelope, Upper Shape (If limit is toggled to Upper) or Lower Shape (If limit is toggled to Lower)
Example	To set the limit envelope to a square :CALCulate:LIMit:ENVELOpe:SHAPE SQUARE

## Update Limit Envelope Frequency

**:CALCulate:LIMit:ENVELOpe:UPDATE:X**

Updates limit envelope frequency.

Note that this command is valid only if the limit envelope shape is set to a square.

Use :CALCulate:LIMit:TYPE to set the currently active limit line.

Front Panel Access:	Shift-6 (Limit), Limit Envelope, Update Square Envelope Frequency
Example:	To adjust the envelope frequency :CALCulate:LIMit:ENVELOpe:UPDATE:X

## Update Limit Envelope Amplitude

**:CALCulate:LIMit:ENVELOpe:UPDATE:Y**

Updates the amplitude of the current limit without changing the frequencies of the inflection point.

Use :CALCulate:LIMit:TYPE to set the currently active limit line.

Front Panel Access:	Shift-6 (Limit), Limit Envelope, Update Envelope Amplitude
Example:	To adjust the limit envelope amplitude :CALCulate:LIMit:ENVELOpe:UPDATE:Y

## Limit Fail State

**:CALCulate:LIMit:FAIL?**

Query whether the currently active limit line (upper or lower) has failed or not.

The command returns a 0 on success, 1 on fail, and 2 if the current active limit is OFF or the alarm is OFF.

Use :CALCulate:LIMit:TYPE to set the currently active limit line.

## Lower Limit Alarm

**:CALCulate:LIMit:LOWer:ALARm OFF|ON|0|1**

**:CALCulate:LIMit:LOWer:ALARm?**

Enables/disables the lower limit alarm.

It is a combination of the commands **:CALCulate:LIMit:TYPE 1;**

**:CALCulate:LIMit:ALARm ON|OFF.**

Setting the value to ON or 1 will turn on the lower limit alarm.

Setting the value to OFF or 0 will turn off the lower limit alarm.

The query version of the command returns a 1 if the lower limit line alarm is ON and returns 0 if OFF.

Note that using this command set the lower limit line active for editing.

Factory Preset / *RST:	OFF
Front Panel Access:	Shift-6 (Limit), Limit Alarm
See Also:	:CALCulate:LIMit:ALARm

## Lower Limit Fail State

**:CALCulate:LIMit:LOWer:FAIL?**

Query whether the lower limit line has failed or not.

The command returns a 0 on success, 1 on fail, and 2 if the lower limit line is OFF or the alarm is OFF.

## Number of Lower Limit Points

**:CALCulate:LIMit:LOWer:POINT?**

Returns the number of points currently in the lower limit line.

Factory Preset / *RST:	2
See Also:	:CALCulate:LIMit:POINT?

## Lower Limit State

**:CALCulate:LIMit:LOWer[:STATE] OFF|ON|0|1**

**:CALCulate:LIMit:LOWer[:STATE]?**

Turns the lower limit line ON or OFF.

It is a combination of the commands **:CALCulate:LIMit:TYPE 1;**

**:CALCulate:LIMit:STATE ON|OFF.**

The query version of the command returns a 1 if the lower limit line is ON and returns a 0 if OFF.

Factory Preset / *RST:	OFF
Front Panel Access:	Shift-6 (Limit), On/Off
See Also:	:CALCulate:LIMit[:STATE]
Example:	To turn on lower limit :CALCulate:LIMit:LOWer ON OR :CALCulate:LIMit:LOWer 1 OR :CALCulate:LIMit:LOWer:STATE ON
	To turn off lower limit :CALCulate:LIMit:LOWer OFF OR :CALCulate:LIMit:LOWer 0 OR :CALCulate:LIMit:LOWer:STATE 0

## Limit Line Type

**:CALCulate:LIMit:LTYPE ABSolute|RELative**

**:CALCulate:LIMit:LTYPE?**

Sets the currently active limit line type.

Absolute limit lines set the limit inflection points based upon the entered frequencies for each point.

Relative limit lines set the limit inflection points relative to the current center frequency.

Factory Preset/ *RST:	ABSolute
Front Panel Access:	Shift-6(Limit), Limit Advanced, Limit Line Type
Example:	To set the limit line type to relative :CALCulate:LIMit:LTYPE RELative

## Limit Mirror

**:CALCulate:LIMit:MIRRor**

Creates a limit mirror.

Use :CALCulate:LIMit:TYPE to set the currently active limit line.

Front Panel Access:	Shift-6 (Limit), Limit Advanced, Mirror Limit
See Also:	:CALCulate:LIMit:TYPE

## Number of Limit Points

**:CALCulate:LIMit:POINT?**

Returns the number of points currently in the selected limit line.

Use :CALCulate:LIMit:TYPE to set the currently active limit line.

See Also:	:CALCulate:LIMit:TYPE
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## Add Limit Point

**:CALCulate:LIMit:POINT:ADD**

Adds a new limit point to the currently active limit line.

Use :CALCulate:LIMit:TYPE to set the currently active limit line.

Front Panel Access:	Shift-6 (Limit), Limit Edit, Add Point
See Also:	:CALCulate:LIMit:TYPE

## Delete Limit Point

**:CALCulate:LIMit:POINT:DELeTe**

Deletes the currently active limit point. The active point becomes the point that is immediately to the left of the point that was deleted.

Note that deletion is only valid if there are more than 2 limit points.

Use :CALCulate:LIMit:TYPE to set the currently active limit line.

Front Panel Access:	Shift-6 (Limit), Limit Edit, Delete Point
Example:	To delete the currently active limit point :CALCulate:LIMit:POINT:DELeTe

## Next Point Left

**:CALCulate:LIMit:POINT:LEFT**

Selects the limit point immediately to the left of the active point, making it active for editing or deleting.

Use :CALCulate:LIMit:TYPE to set the currently active limit line.

Front Panel Access:	Shift-6 (Limit), Limit Edit, Next Point Left
Example:	To select the point to the left of the active point :CALCulate:LIMit:POINT:LEFT

## Next Point Right

**:CALCulate:LIMit:POINT:RIGHT**

Selects the limit point immediately to the right of the active point, making it active for editing or deleting.

Use `:CALCulate:LIMit:TYPE` to set the currently active limit line.

Front Panel Access:	Shift-6 (Limit), Limit Edit, Next Point Right
Example:	To select the point to the right of the active point :CALCulate:LIMit:POINT:RIGHT

## Limit Point X Value

**:CALCulate:LIMit:POINT:X <x-parameter>**

**:CALCulate:LIMit:POINT:X?**

Sets the location of the active limit point on the x-axis at the specified location. `<x-parameter>` is defined in the current x-axis.

Note that this will change the Move Limit on the front panel to Point if it is currently set to Limit.

The query version of the command returns the location of the active limit point on the x-axis.

Use `:CALCulate:LIMit:TYPE` to set the currently active limit line.

Default Unit:	Hz or for zero span in seconds
Front Panel Access:	Shift-6 (Limit), Limit Edit, Frequency
Example:	To set the active point to 5 Hertz :CALCulate:LIMit:POINT:X 5 OR :CALCulate:LIMit:POINT:X 5Hz
	To set the active point to 500 MHz :CALCulate:LIMit:POINT:X 500MHz
	To set the active point to 2.5 seconds (In zero span) :CALCulate:LIMit:POINT:X 2.5 OR :CALCulate:LIMit:POINT:X 2.5s
	To set the active point to 25 <i>us</i> (In zero span) :CALCulate:LIMit:POINT:X 25us

## Limit Point Y Value

**:CALCulate:LIMit:POINT:Y <y-parameter>**

**:CALCulate:LIMit:POINT:Y?**

Sets the location of the active limit point on the y-axis at the specified location.

<y-parameter> is defined in the current y-axis.

Note that this will change the Move Limit on the front panel to Point if it is currently set to Limit.

The query version of the command returns the location of the active limit point on the y-axis.

Use :CALCulate:LIMit:TYPe to set the currently active limit line.

Default Unit:	Current y-axis unit.
Front Panel Access:	Shift-6 (Limit), Limit Edit, Amplitude
Example:	To set the active point to 5dBm :CALCulate:LIMit:POINT:Y 5 (If y-axis unit is dBm) OR :CALCulate:LIMit:POINT:Y 5dBm

## Set Default Limit

**:CALCulate:LIMit[:SET]:DEFault**

Deletes all limit points for the currently active limit line and sets the default limit line value.

Note that this command will turn on the currently selected limit line if it is not already on.

The current selected limit line can be modified by using the command

:CALCulate:LIMit:TYPe.

Front Panel Access:	Shift-6 (Limit), Set Default Limit
Example:	To set the default limit line :CALCulate:LIMit:DEFault

## Limit State

**:CALCulate:LIMit[:STATe] OFF|ON|0|1**

**:CALCulate:LIMit[:STATe]?**

Turns the currently selected limit line (upper or lower) ON or OFF.

If the value is set to ON or 1, the currently selected limit line is ON.

If the value is set to OFF or 0, the currently selected limit line is OFF.

The query version of the command returns a 1 if the currently selected limit line is ON and returns a 0 if OFF.

Use **:CALCulate:LIMit:TYPE** to set the currently active limit line.

Factory Preset/ *RST:	OFF
Front Panel Access:	Shift-6 (Limit), On/Off
Example:	To turn on the currently selected limit line :CALCulate:LIMit ON OR :CALCulate:LIMit:STATe ON OR :CALCulate:LIMit:STATe 1
	To turn off the currently selected limit line :CALCulate:LIMit OFF OR :CALCulate:LIMit:STATe 0 OR :CALCulate:LIMit 0

## Limit Type

**:CALCulate:LIMit:TYPE 0|1**

**:CALCulate:LIMit:TYPE?**

Sets the limit line segment type (upper or lower) to be edited.

Set the value to 1 for Lower limit segment and 0 for Upper limit line segment.

The query version of the command returns a 1 if the lower limit line is currently active for editing and returns 0 if the upper limit line is currently active for editing.

Factory Preset/ *RST:	0
Front Panel Access:	Shift-6(Limit), Limit
Example:	To set upper limit line active for editing :CALCulate:LIMit:TYPE 0
	To set lower limit line active for editing :CALCulate:LIMit:TYPE 1

## Upper Limit Alarm

**:CALCulate:LIMit:UPPer:ALARm OFF|ON|0|1**

**:CALCulate:LIMit:UPPer:ALARm?**

Enables/disables the alarm for the upper limit.

It is a combination of the commands **:CALCulate:LIMit:TYPE 0;**

**:CALCulate:LIMit:ALARm ON|OFF.**

Setting the value to ON or 1 will turn on the upper limit alarm.

Setting the value to OFF or 0 will turn off the upper limit alarm.

The query version of the command returns a 1 if the upper limit line alarm is ON and returns 0 if OFF.

Factory Preset / *RST:	OFF
Front Panel Access:	Shift-6 (Limit), Limit Alarm
See Also:	:CALCulate:LIMit:ALARm

## Upper Limit Fail State

**:CALCulate:LIMit:UPPer:FAIL?**

Query whether the upper limit line has failed or not.

The command returns a 0 on success, 1 on fail, and 2 if the upper limit line is OFF or the alarm is OFF.

## Number of Upper Limit Points

**:CALCulate:LIMit:UPPer:POINT?**

Returns the number of points currently in the upper limit line.

Factory Preset / *RST:	2
See Also:	:CALCulate:LIMit:POINT?

## Upper Limit State

**:CALCulate:LIMit:UPPer[:STATe] OFF|ON|0|1**

**:CALCulate:LIMit:UPPer[:STATe]?**

Turns the upper limit line ON or OFF.

It is a combination of the commands `:CALCulate:LIMit:TYPE 0;`

`:CALCulate:LIMit:STATe ON|OFF.`

The query version of the command returns a 1 if the upper limit line is ON and returns a 0 if OFF.

Factory Preset / *RST:	OFF
Front Panel Access:	Shift-6 (Limit), On/Off
See Also:	:CALCulate:LIMit[:STATe]
Example:	To turn on upper limit :CALCulate:LIMit:UPPer ON OR :CALCulate:LIMit:UPPer 1 OR :CALCulate:LIMit:UPPer:STATe ON
	To turn off upper limit :CALCulate:LIMit:UPPer OFF OR :CALCulate:LIMit:UPPer 0 OR :CALCulate:LIMit:UPPer:STATe 0

## Move Limit

**:CALCulate:LIMit:VALue <value>**

Sets the currently active limit line value. This command moves an entire single or multi-segment limit line up or down by the given <value>.

Note that this will change the Move Limit on the front panel to Limit if it is currently set to Point.

This command is equivalent to the command `:CALCulate:LIMit:Y.`

Use `:CALCulate:LIMit:TYPE` to set the currently active limit line.

Front Panel Access:	Shift-6 (Limit), Limit Edit, Amplitude
Default Unit:	Current y-axis unit.
See Also:	:CALCulate:LIMit:Y

## Add Vertical

**:CALCulate:LIMit:VERTical:ADD**

Adds vertical. This will add two inflection points that share the same frequency and are centered midpoint between adjacent points.

Use `:CALCulate:LIMit:TYPE` to set the currently active limit line.

Front Panel Access:	Shift-6 (Limit), Limit Edit, Add Vertical
See Also:	<code>:CALCulate:LIMit:TYPE</code>

## Limit X Value

**:CALCulate:LIMit:X <x-parameter>**

Sets the location of the active limit line on the x-axis at the specified location. This moves the entire limit and moves the active limit point to the given value.

<x-parameter> is defined in the current x-axis.

Note that this will change the Move Limit on the front panel to Limit if it is currently set to Point.

Use `:CALCulate:LIMit:TYPE` to set the currently active limit line.

Default Unit:	Hz or for zero span in seconds
Front Panel Access:	Shift-6 (Limit), Limit Edit, Frequency
Example:	To move the limit and set active point to 5Hz <code>:CALCulate:LIMit:X 5</code>
	OR <code>:CALCulate:LIMit:X 5Hz</code>
	To move the limit and set active point to 500 MHz <code>:CALCulate:LIMit:X 500MHz</code>
	To move the limit and set active point to 2.5 seconds (In zero span) <code>:CALCulate:LIMit:X 2.5</code> OR <code>:CALCulate:LIMit:X 2.5s</code>
To move the limit and set active point to 25us (In zero span) <code>:CALCulate:LIMit:X 25us</code>	

## Limit Line Y Value

**:CALCulate:LIMit:Y <y-parameter>**

Sets the location of the active limit line on the y-axis at the specified location. This moves the entire limit and moves the current active limit point by the given value.

<y-parameter> is defined in the current y-axis.

Note that this will change the Move Limit on the front panel to Limit if it is currently set to Point.

Use **:CALCulate:LIMit:TYPE** to set the currently active limit line.

Default Unit:	Current y-axis unit.
Front Panel Access::	Shift-6 (Limit), Limit Edit, Amplitude
Example:	To move limit and set the active point to 5dbm :CALCulate:LIMit:Y 5 (If y-axis unit is dBm) OR :CALCulate:LIMit:Y 5dBm

## **:CALCulate:MARKer Subsystem**

This subsystem contains commands to manipulate data markers.

### Turn All Markers Off

**:CALCulate:MARKer:AOff**

Turns off all markers.

Front Panel Access:	Marker, More, All Markers Off
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## Marker Noise

**:CALCulate:MARKer[1]|2|3|4|5|6:DELTA:NOISE[:STATE]**

**OFF|ON|0|1**

**:CALCulate:MARKer[1]|2|3|4|5|6:DELTA:NOISE[:STATE]?**

Turns the delta marker noise on or off.

Note that if counter marker is set to on when setting marker noise to on, then counter marker will be set to off.

This command is not valid in zero span.

The query version of this command returns a 1 if the specified delta marker is noise marker and returns a 0 if not.

Factory Preset / *RST:	OFF
Front Panel Access:	Marker, More, Marker Noise
Example:	To turn on marker noise for delta marker #1 :CALCulate:MARKer1:DELTA:NOISE ON OR :CALCulate:MARKer1:DELTA:NOISE 1 OR :CALCulate:MARKer:DELTA:NOISE 1 OR :CALCulate:MARKer:DELTA:NOISE:STATE ON
	To turn on marker noise for delta marker #2 :CALCulate:MARKer2:DELTA:NOISE ON OR :CALCulate:MARKer2:DELTA:NOISE 1 OR :CALCulate:MARKer2:DELTA:NOISE:STATE ON
	To turn off marker noise #5 :CALCulate:MARKer5:DELTA:NOISE OFF OR :CALCulate:MARKer5:DELTA:NOISE 0 OR :CALCulate:MARKer5:DELTA:NOISE:STATE OFF

## Delta Marker to Span

**:CALCulate:MARKer[1]|2|3|4|5|6:DELTA[:SET]:SPAN**

Sets the total span width to the value of the specified delta marker.

Note that this command is valid only if delta marker is on.

Front Panel Access:	Marker, More Peak Options, Delta Marker to Span
Example:	To set the span to the value of delta marker #4 :CALCulate:MARKer4:DELTA:SPAN

## Delta Marker State

**:CALCulate:MARKer[1]|2|3|4|5|6:DELTA[:STATE] OFF|ON|0|1**

**:CALCulate:MARKer[1]|2|3|4|5|6:DELTA[:STATE]?**

Sets the specified delta marker on or off.

Factory Preset / *RST:	OFF
Front Panel Access:	Marker, Delta
Example:	<p>To turn on delta marker #3</p> <pre>:CALCulate:MARKer3:DELTA ON</pre> <p>OR</p> <pre>:CALCulate:MARKer3:DELTA 1</pre> <p>OR</p> <pre>:CALCulate:MARKer3:DELTA:STATE ON</pre> <p>OR</p> <pre>:CALCulate:MARKer3:DELTA:STATE 1</pre> <hr/> <p>To turn off delta marker #6</p> <pre>:CALCulate:MARKer6:DELTA OFF</pre> <p>OR</p> <pre>:CALCulate:MARKer6:DELTA:STATE OFF</pre> <p>OR</p> <pre>:CALCulate:MARKer6:DELTA:STATE 0</pre>

## Delta Marker X Value

**:CALCulate:MARKer[1]|2|3|4|5|6:DELTA:X <x-parameter>**

**:CALCulate:MARKer[1]|2|3|4|5|6:DELTA:X?**

Sets the location of the delta marker on the x-axis at the specified location

<x-parameter> + the reference marker x-axis. <x-parameter> is defined in the current x-axis units.

The query version of the command returns the location of the delta marker on the x-axis.

Default Unit:	Hz or seconds if in zero span
Front Panel Access:	Marker, Delta
See Also:	<b>:CALCulate:MARKer[1] 2 3 4 5 6:X</b>
Example:	<p>If both the reference and delta marker #1 is currently at 1 GHz on the x-axis, send the command below to set the delta marker #1 to 2 GHz on the x-axis</p> <pre>:CALCulate:MARKer1:DELTA:X 1GHz</pre> <hr/> <p>(In zero span) If both the reference and delta marker #1 is currently at 25 us on the x-axis, send the command below to set the delta marker to 50us on the x-axis:</p> <pre>:CALCulate:MARKer1:DELTA:X 25us</pre>

## Delta Marker Read Y Value

**:CALCulate:MARKer[1]|2|3|4|5|6:DELTA:Y?**

Reads the current Y value for the specified delta marker. The units are the units of the y-axis.

Default Unit:	Current y-axis unit
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## Marker Counter

**:CALCulate:MARKer[1]|2|3|4|5|6:FCOunt[:STATE] OFF|ON|0|1**

**:CALCulate:MARKer[1]|2|3|4|5|6:FCOunt[:STATE]?**

Turns the marker frequency counter on or off.

The marker counter is turned off when the selected marker is turned off.

If delta marker is on when setting marker counter to on, then delta marker will be turned off.

If noise marker is set to on when setting marker counter to on, then noise marker will be set to off.

This command is not valid in zero span.

Factory Preset / *RST:	OFF
Front Panel Access:	Marker, More, Counter Marker
Example:	To turn on frequency counter for reference marker # 2 :CALCulate:MARKer2:FCOunt ON OR :CALCulate:MARKer2:FCOunt 1

## Marker Fixed State

**:CALCulate:MARKer[1]|2|3|4|5|6:FIXed[:STATE] OFF|ON|0|1**

**:CALCulate:MARKer[1]|2|3|4|5|6:FIXed[:STATE]?**

Sets the specified reference marker fixed state on or off. If Fixed is set to on, then the selected reference markers stay at the amplitude they were at when the marker is set to Fixed.

Factory Preset / *RST:	OFF
Front Panel Access:	Marker, More, Fixed Marker
Example:	To set reference marker #1 to fixed :CALCulate:MARKer:FIXed ON OR :CALCulate:MARKer:FIXed 1

## Marker (Maximum) Peak Search

**:CALCulate:MARKer[1]|2|3|4|5|6:MAXimum**

Puts the specified marker at the maximum amplitude in the trace.

Front Panel Access:	Marker, [Marker 1/2/3/4/5/6,] Peak Search Marker, More Peak Options, Peak Search
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## Marker (Maximum) Peak Search Left

**:CALCulate:MARKer[1]|2|3|4|5|6:MAXimum:LEFT**

Puts the specified marker on the next highest peak to the left of the current peak.

The next highest peak must be above the peak threshold. If no point meets that criterion, the marker is set to the first point on the trace.

Front Panel Access:	Marker, More Peak Options, Next Peak Left
See Also:	:CALCulate:MARKer:PEAK:THReshold

## Marker (Maximum) Peak Search Right

**:CALCulate:MARKer[1]|2|3|4|5|6:MAXimum:RIGHT**

Puts the specified marker on the next highest peak to the right of the current peak.

The next highest peak must be above the peak threshold. If no point meets that criterion, the marker is set to the last point on the trace.

Front Panel Access:	Marker, More Peak Options, Next Peak Right
See Also:	:CALCulate:MARKer:PEAK:THReshold

## Marker Noise

**:CALCulate:MARKer[1]|2|3|4|5|6:NOISE[:STATE] OFF|ON|0|1**

**:CALCulate:MARKer[1]|2|3|4|5|6:NOISE[:STATE]?**

Turns the marker noise on or off for the specified reference marker.

Note that if counter marker is set to on when setting marker noise to on, then counter marker will be set to off.

This command is not valid in zero span.

Factory Preset / *RST:	OFF
Front Panel Access:	Marker, More, Marker Noise
Example:	To set reference marker #3 as noise marker :CALCulate:MARKer3:NOISE ON OR :CALCulate:MARKer3:NOISE 1

## Peak Threshold

**:CALCulate:MARKer:PEAK:THREshold <percentage>**

**:CALCulate:MARKer:PEAK:THREshold?**

Sets the peak/valley threshold as a percentage of the display.

**:CALCulate:MARKer:MAXimum:LEFT** and

**:CALCulate:MARKer:MAXimum:RIGHT** use this value to determine whether a particular display point qualifies as a peak.

Factory Preset / *RST:	10%
Range:	0% to 100%
Default Unit:	%
Front Panel Access:	Marker, More Peak Options, Peak Threshold

## Marker Frequency to Center

**:CALCulate:MARKer[1]|2|3|4|5|6[:SET]:CENTer**

Sets the center frequency equal to the frequency of the specified marker.

Note that this will result in a change to the start and stop frequencies and may also result in a change to the span.

Note that this command is not valid in zero span.

Front Panel Access:	Marker, Marker Freq to Center
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## Marker to Reference Level

**:CALCulate:MARKer[1]|2|3|4|5|6[:SET]:RLEVEL**

Sets the reference level equal to the measured amplitude of the specified marker.

Note that this may result in a change to the input attenuation.

Front Panel Access:	Marker, Marker to Ref Lvl
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## Marker State

**:CALCulate:MARKer[1]|2|3|4|5|6[:STATE] OFF|ON|0|1**

**:CALCulate:MARKer[1]|2|3|4|5|6[:STATE]?**

Sets the specified marker on/off.

Factory Preset / *RST:	OFF
Front Panel Access:	Marker, On/Off
Example:	To turn off reference marker #1 :CALCulate:MARKer1:STATE OFF

## Marker Table State

**:CALCulate:MARKer:TABLE[:STATE] OFF|ON|0|1**

**:CALCulate:MARKer:TABLE[:STATE]?**

Turns the Marker Table on or off.

Setting the value to ON or 1 will turn on the marker table.

Setting the value to OFF or 0 will turn off the marker table.

Factory Preset / *RST:	OFF
Front Panel Access:	Marker, More, Marker Table
Example:	To turn on marker table :CALCulate:MARKer:TABLE ON OR :CALCulate:MARKer:TABLE 1

## Marker X Value

**:CALCulate:MARKer[1]|2|3|4|5|6:X <x-parameter>**

**:CALCulate:MARKer[1]|2|3|4|5|6:X?**

Sets the location of the marker on the x-axis at the specified location. <x-parameter> is defined in the current x-axis units.

The query version of the command returns the location of the marker on the x-axis.

Note that the marker is snapped to the data point closest to the specified value.

If the specified marker is not on it will be set to on.

Default Unit:	Hz or seconds if in zero span
Front Panel Access:	Marker, [Marker 1/2/3/4/5/6]
Example:	To set reference marker #2 to 5 hertz on the x-axis :CALCulate:MARKer2:X 5 OR :CALCulate:MARKer2:X 5Hz
	To set reference marker #1 to 1.5 GHz on the x-axis :CALCulate:MARKer:X 1.5GHz OR :CALCulate:MARKer1:X 1.5GHz
	(In zero span) To set reference marker #3 to 1.5 seconds on the x-axis :CALCulate:MARKer3:X 1.5 OR :CALCulate:MARKer3:X 1.5s
	(In zero span) To set reference marker #1 to 25 us :CALCulate:MARKer:X 25us OR :CALCulate:MARKer1:X 25us

## Marker Read Y Value

**:CALCulate:MARKer[1]|2|3|4|5|6:Y?**

Reads the current Y value for the specified marker. The units are the units of the y-axis.

Default Unit:	Current y-axis unit
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## Display Subsystem

This subsystem provides commands that modify the display of data for the user. They do not modify the way in which data are returned to the controller.

### Scale

**:DISPlay:WINDow:TRACe:Y[:SCALE]:PDIVision <rel ampl>**

**:DISPlay:WINDow:TRACe:Y[:SCALE]:PDIVision?**

Sets the scale (dB/division) for the y-axis.

Factory Preset / *RST:	10 dB/div
Range:	1 dB to 15 dB
Default Unit:	dB
Front Panel Access:	Amplitude, Scale

### Reference Level

**:DISPlay:WINDow:TRACe:Y[:SCALE]:RLEVel <amplitude>**

**:DISPlay:WINDow:TRACe:Y[:SCALE]:RLEVel?**

Sets the reference level amplitude value for the y-axis.

Note that this may cause a change in attenuation if the automatic input attenuation coupling is enabled.

Factory Preset / *RST:	10 dBm
Range:	With reference level offset = 0 dB: 30 dBm to -130 dBm
Default Unit:	Current active amplitude unit
Front Panel Access:	Amplitude, Reference Level
See Also:	<b>:DISPlay:WINDow:TRACe:Y[:SCALE]:RLEVel:OFFset &lt;rel ampl&gt;</b>
Example:	To set the reference level to 15dBm (If y-axis is dBm) <b>:DISPlay:WINDow:TRACe:Y:SCALE:RLEVel 15</b> OR <b>:DISPlay:WINDow:TRACe:Y:SCALE:RLEVel 15dBm</b>

## Reference Level Offset

**:DISPlay:WINDow:TRACe:Y[:SCALE]:RLEVEL:OFFSet <rel ampl>**  
**:DISPlay:WINDow:TRACe:Y[:SCALE]:RLEVEL:OFFSet?**

Sets the reference level offset value for the y-axis.

Factory Preset / *RST:	0 dB
Range:	-100 dB to 100 dB
Default Unit:	dB
Front Panel Access:	Amplitude, RL Offset

## Format Subsystem

This subsystem contains commands that determine the formatting of numeric data when it is transferred.

The format setting affects data in specific commands only. If a command is affected, it will be noted in the command description.

### Numeric Data Format

**:FORMat[:READings][:DATA] ASCii|INTeger,32|REAL,[<length>]**  
**:FORMat[:READings][:DATA]?**

This command specifies the format in which data is returned in certain commands.

The optional <length> parameter is needed for REAL format only. It defines the length of the floating point number in bits. Valid values are 32 and 64. If no length is specified, the default length of REAL data is set to 64 bits.

ASCii format returns the data in comma-separated ASCII format. The units are the current instrument units. This format requires many more bytes so it will be the slowest format.

INTeger, 32 values are signed 32-bit integers in little-endian byte order. This format returns the data in 4-byte blocks. The units are always mdBm. For example, if the measured result was -12.345 dBm, that value would be sent as -12345.

REAL,32 values are 32-bit floating point numbers conforming to the IEEE 754 standard in little-endian byte order. This format returns the data in 4-byte binary format. The units are the current instrument units.

REAL,64 values are 64-bit floating point numbers conforming to the IEEE 754 standard in little-endian byte order. This format returns the data in 8-byte binary format. The units are the current instrument units. For a more precise reading, REAL,64 should be used instead of REAL,32 when the current instrument unit is set to Volt or Watt.

Both INTeger and REAL formats return a definite block length. Each transfer begins with an ASCII header such as #42204 for INTeger,32 and REAL,32 and #44408 for REAL,64. The first digit represents the number of following digits in the header (in this example, 4). The remainder of the header indicates the number of bytes that follow the header (in this example, 2204 for INT,32 and REAL,32 and 4408 for REAL,64). You

then divide the number of following bytes by the number of bytes in the data format you've chosen (4 for both INTeger,32 and REAL,32...so 2204/4, and 8 for REAL,64) to get the number of data points (in this example, 551).

Factory Preset / *RST:	AScii
See Also:	:TRACe[ :DATA ]

## ***INITiate Subsystem***

This subsystem works with the ABORt and TRIGger subsystems to control the triggering of measurements.

### **Continuous/Single Sweep**

**:INITiate:CONTinuous OFF|ON|0|1**

**:INITiate:CONTinuous?**

Specifies whether the sweep/measurement is triggered continuously.

If the value is set to ON or 1, another sweep/measurement is triggered as soon as the current one completes.

If continuous is set to OFF or 0, the instrument enters the "idle" state and waits for the :INITiate[:IMMediate] command or for :INITiate:CONTinuous ON.

The default value is ON. That is, sending :INIT:CONT is equivalent to sending :INIT:CONT ON

The query version of the command returns a 1 if the instrument is continuously sweeping/measuring and returns a 0 if the instrument is in single sweep/measurement mode.

Factory Preset / *RST:	ON
Front Panel Access:	Shift-3 (Sweep), Sweep (Single/Continuous)
See Also:	:INITiate[:IMMediate]

### **Data Broadcast**

**:INITiate:DBROadcast OFF|ON|0|1**

**:INITiate:DBROadcast?**

Turns data broadcast on/off.

The query version of the command returns a 1 if broadcast data is ON, and returns 0 if OFF.

Front Panel Access:	Shift-8(System), Application Options, Broadcast Data
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## Trigger Sweep/Measurement

**:INITiate[:IMMEDIATE]**

Initiates a sweep/measurement.

If **:INITiate:CONTinuous** is set to ON, this command is ignored.

Use this command in combination with **:STATus:OPERation?** to synchronize the capture of one complete set of data. When this command is sent, the “sweep complete” bit of **:STATus:OPERation?** is set to 0, indicating that the measurement has not completed. The data collection is then triggered. The controlling program can poll **:STATus:OPERation?** to determine the status. When the “sweep complete” bit is set to 1, data is ready to be retrieved.

Note that when averaging is on, the sweep complete bit will be set to complete if all the specified number of averages has completed.

Front Panel Access:	Shift-3 (Sweep), Manual Trigger
See Also:	<b>:INITiate:CONTinuous</b> <b>:STATus:OPERation?</b>

## Tracking Generator On/Off

**:INITiate:TGENERator OFF|ON|0|1**

**:INITiate:TGENERator?**

Specifies whether the tracking generator is on or off.

If the value is set to ON or 1, the tracking generator is turned on.

If the value is set to OFF or 0, the tracking generator is turned off.

The default value is OFF. That is, sending **:INIT:TGEN** is equivalent to sending **:INIT:TGEN OFF**

The query version of the command returns a 1 if the tracking generator is on and returns a 0 if the tracking generator is off.

Factory Preset / *RST:	OFF
Front Panel Access:	Shift-4 (Measurements), Tracking Generator (Off/On)
Example:	To turn on tracking generator <b>:INITiate:TGENERator 1</b>

## ***INSTRUMENT Subsystem***

One instrument may contain many logical instruments (“modes”). This subsystem controls the selection of the current instrument mode.

### **Query Available Modes**

**:INSTRUMENT:CATALOG:FULL?**

Returns a comma-separated list of available modes. Mode names are enclosed in double quotes (“”). Immediately following the string name is the application number.

For example: “SPA”1, “WCDMA”5, “VNA”2, “WIMAX\_D”18, “SCOPE”17

Front Panel Access:	Shift-9 (Mode)
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### **Select Mode by Number**

**:INSTRUMENT:NSELECT <integer>**

**:INSTRUMENT:NSELECT?**

Sets the instrument mode based on the value of <integer>.

The query version returns the number associated with the current mode.

Use :INSTRUMENT:CATALOG:FULL? to get a list of available mode names and their integer representations.

Factory Preset / *RST:	MS2721A: 1 MS2717A: 1 MT8220A: 1 MS2012A: 2 MS2024A: 2 MS2026A: 2 MS2034A: 2 MS2036A: 2 MS2717B: 1 MS2718B: 1 MS2719B: 1
Front Panel Access:	Shift-9 (Mode)
See Also:	:INSTRUMENT:CATALOG:FULL? :INSTRUMENT[:SELECT]

## Select Mode by Name

**:INSTRument[:SElect] <string>**

**:INSTRument[:SElect]?**

Sets the instrument mode based on the mode name specified by <string>.

The query version returns the name of the current mode.

Use **:INSTRument:CATalog:FULL?** to get a list of available modes.

Factory Preset / *RST:	MS2721A: "SPA" MS2717A: "SPA" MT8220A: "SPA" MS2012A: "VNA" MS2024A: "VNA" MS2026A: "VNA" MS2034A: "VNA" MS2036A: "VNA" MS2717B: "SPA" MS2718B: "SPA" MS2719B: "SPA"
Front Panel Access:	Shift-9 (Mode)
See Also:	:INSTRument:CATalog:FULL? :INSTRument:NSElect

## MMEMory Subsystem

The Mass MEMory subsystem contains functions that provide access to the instrument's setup and data storage.

### Transfer Data

**:MMEMory:DATA? <file name>**

Transfers the data stored in the given file from the instrument to the controlling program.

Data is transferred in the form of <header><block>. The ASCII <header> specifies the number of data bytes. It looks like #AX, where A is the number of digits in X and X is the number of bytes in <block>.

<file name> should be enclosed in either single quotes (') or double quotes ("") and should contain a file extension (ei. .stp, .jpg) and the file must not be larger than 262136 bytes.

Use the command **MMEMory:MSIS** to set the current storage location.

## Delete Setup/Measurement

**:MMEMory:DELEte <file name>**

Deletes the measurement or setup file specified by <file name>.

<file name> should be enclosed in either single quotes (') or double quotes (") and should contain a file extension ".stp" for setup and ".spa" for measurement.

Front Panel Access:	Shift-7 (File), Delete, Delete Selected File
See Also:	:MMEMory:STORE:STATe, :MMEMory:STORE:TRACe

## Format Storage Device

**:MMEMory:INITialize [CFLash]**

Formats the compact flash. Issuing this command will erase all files on an installed Compact Flash module and create the /usr directory for storage of measurements, setups and jpg files.

Front Panel Access:	Shift-7 (File), Directory Management, Format Compact Flash
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## Recall Limit

**:MMEMory:LOAD:LIMit <file name>**

Recalls a previously stored limit from the current storage location. The saved limit setting to be loaded is specified by <file name>.

<file name> should be enclosed in either single quotes (') or double quotes (") and should contain a file extension ".lim". Note that the trace specified by <file name> should be available at the current mass storage location.

Use the command `MMEMory:MSIS` to set the current mass storage location.

File Extensions:	".lim"
Front Panel Access:	Shift-7 (File), Recall, Recall Limit Line
See Also:	:MMEMory:STORE:LIMit
Example:	To recall trace with file name "limit" :MMEMory:LOAD:LIMit "limit.lim"

## Recall Setup

**:MMEMory:LOAD:STATe <integer>,<file name>**

Loads the current setup from the file specified by <file name>.

<file name> should be enclosed in either single quotes (') or double quotes (") and should include the extension ".stp".

The <integer> parameter is not currently used, but it must be sent. Send a value of 1.

Front Panel Access:	Shift-7 (File), Recall, Recall Setup
See Also:	:MMEMory:STORE:STATe

## Recall Measurement

**:MMEMory:LOAD:TRACe <integer>,<file name>**

Recalls a previously stored measurement trace from the current storage location. The saved measurement trace to be loaded is specified by <file name>.

<file name> should be enclosed in either single quotes (') or double quotes (") and should contain a file extension ".spa". Note that the trace specified by <file name> should be available at the current mass storage location.

Use the command **MMEMory:MSIS** to set the current mass storage location.

Use the command **:TRACe[1] | 2 | 3:LOAD:DISPlay[:STATe]** to turn on or off the recalled trace view.

The <integer> parameter is not currently in used, but it must be sent. Send a 1.

File Extensions:	".spa"
Front Panel Access:	Shift-7 (File), Recall, Recall Measurement
See Also:	:MMEMory:STORE:TRACe
Example:	To recall trace with file name "trace" :MMEMory:LOAD:TRACe 1, "trace.spa"

## Storage Location

**MMEMory:MSIS INTernal | USB | CFLash**

**MMEMory:MSIS?**

Sets the storage location.

Setting the storage location to **INTernal** will set the current storage location to be the internal memory.

Setting the storage location to **USB** will set the current storage location to be the USB Flash drive.

Setting the storage location to **CFLash** will set the current storage location to be the Compact Flash memory.

Note that changing the current location to save files causes the “Copy to Destination” on the front panel to be automatically changed if the selected current location is the same as the destination. When the change occurs, the instrument will cycle through each of the available storage locations. For example, if “Copy to Destination” is on CFLash and the “Current Location” is changed to CFLash, “Copy to Destination” will cycle to INTernal.

Note that the storage location must be available in order for it to be set.

Front Panel Access:	Shift-7 (File), Directory Management, Current Location
See Also:	:MMEMory:MSIS:DESTination

## Copy From Current Location To Destination

**:MMEMory:MSIS:COPY**

Copies all measurements, setups and jpg files stored in the current storage location to the “copy to destination” location.

Front Panel Access:	Shift-7 (File), Directory Management, Copy From Current Location To Destination
See Also:	:MMEMory:MSIS :MMEMory:MSIS:DESTination

## Copy to Destination

**:MMEMory:MSIS:DESTination INTERNAL | USB | CFLash**

**:MMEMory:MSIS:DESTination?**

Sets the destination to where measurements and setups in the current storage location will be copied.

Setting the location to INTernal will result in copying the files that are stored at the current storage location to the internal memory when the command :MMEMory:MSIS:COPY is sent.

Setting the location to USB will result in copying the files that are stored at the current storage location to the USB Flash drive when the command :MMEMory:MSIS:COPY is send..

Setting the location to CFLash will result in copying the files that are stored at the current storage location to the Compact Flash memory when the command :MMEMory:MSIS:COPY is send.

Note that changing the destination to which the instrument will save files to causes the “Current Location” on the front panel to be automatically changed if the selected destination is the same as the current location. When the change occurs, the instrument will cycle through each of the available storage locations. For example, if “Current Location” is on CFLash and the “Copy to Destination” is changed to CFLash, “Current Location” will cycle to INTernal.

Front Panel Access:	Shift-7 (File), Directory Management, Copy To Destination
See Also:	:MMEMory:MSIS :MMEMory:MSIS:COPY

## Save Screen as JPEG

**:MMEMory:STORe:JPEG <file name>**

Saves the current screen measurement as a jpeg file. This will save the screen as a jpeg file specified by <file name> with the extension .jpg to the current storage location.

<file name> should be enclosed in either single quotes (') or double quotes (") and should not contain a file extension.

Use the command `MMEMory:MSIS` to set the current storage location.

Front Panel Access:	Shift-7 (File), Save, Save Screen as JPEG
See Also:	:MMEMory:DATA? :MMEMory:MSIS INTernal   USB   CFLash
Example:	To save the screen into the file name "trace" :MMEMory:STORe:JPEG "trace"

## Save Limit

**:MMEMory:STORe:LIMit <file name>**

Stores the current limit setup into the file specified by <file name>.

<file name> should be enclosed in either single quotes (') or double quotes (") and should not contain a file extension.

Use the command `MMEMory:MSIS` to set the current storage location.

Front Panel Access:	Shift-7 (File), Save, Save Limit Line
See Also:	:MMEMory:MSIS INTernal   USB   CFLash

## Save Setup

**:MMEMory:STORe:STATe <integer>,<file name>**

Stores the current setup into the file specified by <file name>.

<file name> should be enclosed in either single quotes (') or double quotes (") and should not contain a file extension.

Use the command `MMEMory:MSIS` to set the current storage location.

The <integer> parameter is not currently used, but it must be sent. Send a value of 0.

Front Panel Access:	Shift-7 (File), Save, Save Setup
See Also:	:MMEMory:LOAD:STATe :MMEMory:MSIS INTernal   USB   CFLash

## Save Measurement

**:MMEMory:STORe:TRACe <integer>,<file name>**

Stores the trace into the file specified by <file name>.

<file name> should be enclosed in either single quotes (') or double quotes (") and should not contain a file extension.

Use the command **MMEMory:MSIS** to set the current storage location.

The <integer> parameter is not currently used, but it must be sent. Send a 0.

Front Panel Access:	Shift-7 (File), Save, Save Measurement
See Also:	:MMEMory:LOAD:TRACe :MMEMory:MSIS INTERNAL USB CFLash
Example:	To save the trace into the file name "trace" :MMEMory:STORe:TRACe 1,"trace"

## SENSe Subsystem

The commands in this subsystem relate to device-specific parameters, not signal-oriented parameters.

### [[:SENSe]:AVERage Subsystem

This subsystem contains commands related to the combination of the data from consecutive sweeps. Use commands in this subsystem to control sweep-to-sweep averaging and max hold functionality.

### Number of Traces to Average

**[[:SENSe]:AVERage:COUNT <integer>**

**[[:SENSe]:AVERage:COUNT?**

Sets the number of traces to average.

Factory Preset / *RST:	10
Range:	2-65535
Front Panel Access:	Shift-5 (Trace), Trace A Operations, # of Averages

### Trace Mode (Normal/Average/Max Hold/Min Hold)

**[[:SENSe]:AVERage:TYPE NONE|SCALAR|MAXimum|MINimum**

**[[:SENSe]:AVERage:TYPE?**

Specifies how successive traces are combined to produce the resulting display value.

Setting the TYPE to NONE is the equivalent of setting the trace mode to "Normal->A" on the front panel. The displayed value for a point will be the current measured value for that point.

Setting the TYPE to SCALAr is the equivalent of setting the trace mode to “Average->A” on the front panel. The displayed value for a point will be the average of the last <integer> measured values where <integer> is set by

[ :SENSE ] :AVERAge :COUNT.

Setting the TYPE to MAXimum is the equivalent of setting the trace mode to “Max Hold->A” on the front panel. The displayed value for a point will be the maximum measured value for that point over sweeps.

Setting the TYPE to MINimum is the equivalent of setting the trace mode to “Min Hold->A” on the front panel. The displayed value for a point will be the minimum measured value for that point over sweeps.

Factory Preset / *RST:	NONE
Front Panel Access:	Shift-5 (Trace), Trace A Operations
See Also:	[ :SENSE ] :AVERAge :COUNT
Example:	To set the TYPE to SCALAr :SENSE :AVERAge :TYPE SCALAr
	To set the TYPE to MAXimum :SENSE :AVERAge :TYPE MAXimum

## ***[ :SENSE ] :BANDwidth | BWIDth Subsystem***

This subsystem contains commands related to the filter bandwidth of the instrument.

### **Resolution Bandwidth**

[ :SENSE ] :BANDwidth | BWIDth [ :RESolution ] <freq>

[ :SENSE ] :BANDwidth | BWIDth [ :RESolution ] ?

Sets the resolution bandwidth.

Note that using this command turns the automatic resolution bandwidth setting OFF.

Factory Preset / *RST:	3 MHz
Range:	10 Hz to 3 MHz in a 1:3 sequence
Default Unit:	Hz
Front Panel Access:	BW, RBW
See Also:	[ :SENSE ] :BANDwidth   BWIDth [ :RESolution ] :AUTO

### **Resolution Bandwidth Coupling**

[ :SENSE ] :BANDwidth | BWIDth [ :RESolution ] :AUTO OFF | ON | 0 | 1

[ :SENSE ] :BANDwidth | BWIDth [ :RESolution ] :AUTO ?

Sets the state of the coupling of the resolution bandwidth to the frequency span.

Setting the value to ON or 1 will result in the resolution bandwidth being coupled to the span. That is, when the span changes, the resolution bandwidth changes.

Setting the value to OFF or 0 will result in the resolution bandwidth being un-coupled from the span. That is, changing the span will not change the resolution bandwidth. When this command is issued, the resolution bandwidth setting itself will not change.

The default value is ON. That is, sending `:SENS:BAND:RES:AUTO` is equivalent to sending `:SENS:BAND:RES:AUTO ON`.

Factory Preset / *RST:	ON
Front Panel Access:	BW, Auto RBW
See Also:	<code>[ :SENSE ] :BANDwidth   BWIDth [ :RESolution ] :RATio</code>

### Resolution Bandwidth to Span Ratio

`[ :SENSE ] :BANDwidth | BWIDth [ :RESolution ] :RATio <number>`  
`[ :SENSE ] :BANDwidth | BWIDth [ :RESolution ] :RATio?`

Sets the ratio of the resolution bandwidth to the span for use when the resolution bandwidth to span coupling is enabled.

Note that the front panel interface sets the inverse ratio: the span to the resolution bandwidth.

Factory Preset / *RST:	0.00333
Range:	0.00001 to 1
Front Panel Access:	BW, Span/RBW (note that this is the inverse ratio)
See Also:	<code>[ :SENSE ] :BANDwidth   BWIDth [ :RESolution ] :AUTO</code>

### Video Bandwidth

`[ :SENSE ] :BANDwidth | BWIDth :VIDeo <freq>`  
`[ :SENSE ] :BANDwidth | BWIDth :VIDeo?`

Sets the video bandwidth.

Note that using this command turns the automatic video bandwidth setting OFF.

Factory Preset / *RST:	1 MHz
Range:	1 Hz to 3 MHz in a 1:3 sequence
Default Unit:	Hz
Front Panel Access:	BW, VBW
See Also:	<code>[ :SENSE ] :BANDwidth   BWIDth :VIDeo :AUTO</code>

## Video Bandwidth Coupling

`[ :SENSE ] :BANDwidth | BWIDth :VIDeo :AUTO OFF | ON | 0 | 1`

`[ :SENSE ] :BANDwidth | BWIDth :VIDeo :AUTO?`

Sets the state of the coupling of the video bandwidth to the resolution bandwidth.

Setting the value to ON or 1 will result in the video bandwidth being coupled to the resolution bandwidth. That is, when the resolution bandwidth changes, the video bandwidth changes.

Setting the value to OFF or 0 will result in the video bandwidth being un-coupled from the resolution bandwidth. That is, changing the resolution bandwidth will not change the video bandwidth. When this command is issued, the video bandwidth setting itself will not change.

The default value is ON. That is, sending `:SENS:BAND:VID:AUTO` is equivalent to sending `:SENS:BAND:VID:AUTO ON`.

Factory Preset / *RST:	ON
Front Panel Access:	BW, Auto VBW
See Also:	<code>[ :SENSE ] :BANDwidth   BWIDth :VIDeo :RATio</code>

## Video Bandwidth to Resolution Bandwidth Ratio

`[ :SENSE ] :BANDwidth | BWIDth :VIDeo :RATio <number>`

`[ :SENSE ] :BANDwidth | BWIDth :VIDeo :RATio?`

Sets the ratio of the video bandwidth to the resolution bandwidth for use when the video to resolution bandwidth coupling is enabled.

Note that the front panel interface sets the inverse ratio: the resolution bandwidth to the video bandwidth.

Factory Preset / *RST:	0.33
Range:	0.00001 to 1
Front Panel Access:	BW, RBW/VBW (note that this is the inverse ratio)
See Also:	<code>[ :SENSE ] :BANDwidth   BWIDth :VIDeo :AUTO</code>

## ***CORREction Subsystem***

This subsystem provides commands for losses or gains external to the instrument.

### **Input Impedance**

`[ :SENSE ] :CORREction :IMPedance [ :INPut ] [ :MAGNitude ] <integer>`

`[ :SENSE ] :CORREction :IMPedance [ :INPut ] [ :MAGNitude ]?`

Sets the input impedance that will be used for amplitude correction and conversion between units (dBm vs. dBV vs. Volts, etc.).

If the value of <integer> is 50 no correction will be performed.

If the value of <integer> is 75 correction will be done based on Anritsu adapter 12N50-75B.

If the value of <integer> is anything else it will look to the value set by `[ :SENSE ] :CORREction:IMPedance [ :INPut ] :OFFSet` for the amplitude correction value. Unit conversion will be done as if the impedance is 75Ω.

If a value other than 50 or 75 is set, it will be returned as 2 by the query form of this command.

Factory Preset / *RST:	50
Range:	50, 75 all other values will be treated as described above
Front Panel Access:	Shift-8 (System), Application Options, Impedance
See Also:	<code>[ :SENSE ] :CORREction:IMPedance [ :INPut ] :OFFSet</code>

### “Other” Input Impedance Loss

`[ :SENSE ] :CORREction:IMPedance [ :INPut ] :OFFSet <rel ampl>`  
`[ :SENSE ] :CORREction:IMPedance [ :INPut ] :OFFSet?`

Sets the value that will be used for amplitude correction when the value set by `[ :SENSE ] :CORREction:IMPedance [ :INPut ] [ :MAGNitude ]` is something other than 50 or 75. This value is not applied if the impedance is set to either 50 or 75.

Factory Preset / *RST:	0
Range:	0 dB to 100 dB
Default Unit:	dB
Front Panel Access:	Shift-8 (System), Application Options, Impedance
See Also:	<code>[ :SENSE ] :CORREction:IMPedance [ :INPut ] [ :MAGNitude ]</code>

### ***[ :SENSE ] :DETector Subsystem***

This subsystem includes commands that affect acquisition data points on the instrument.

#### **Detection Type**

`[ :SENSE ] :DETector [ :FUNCTION ] POSitive | RMS | NEGative | SAMPlE`  
`[ :SENSE ] :DETector [ :FUNCTION ]?`

Sets the detection method for calculating each display point.

Each display point represents several measurements. The detection type determines how the display point is derived from its associated measurements.

POSitive Peak detection displays the maximum value of the associated measurements.

RMS detection displays the average power of the associated measurements.

NEGative Peak detection displays the minimum value of the associated measurements.

SAMPlE detection displays the “middle” point of those measurements associated with a display point. For example, if there are 3 measurement frequencies associated with a given display point, sample detection will display the value at the frequency of the second measurement point.

Factory Preset / *RST:	(Positive) Peak
Front Panel Access:	Shift-3(Sweep), Detection, Peak RMS Negative Sample

## ***[[:SENSE]:FREQUENCY Subsystem***

Commands in this subsystem pertain to the frequency settings of the instrument.

### **Center Frequency**

**[[:SENSE]:FREQUENCY:CENTER <freq>**

**[[:SENSE]:FREQUENCY:CENTER?**

Sets the center frequency.

Note that changing the value of the center frequency will change the value of the coupled parameters Start Frequency and Stop Frequency. It may also change the value of the span.

Factory Preset / *RST:	MS2718B, MS2723B: 6.50 GHz
	MS2719B, MS2724B: 10 GHz
	All others: 3.55 GHz
Range:	MS2718B, MS2723B: 10 Hz – 12.99999999 GHz
	MS2719B, MS2724B: 10 Hz – 19.99999999 GHz
	All others: 10 Hz – 7.099999995 GHz
Default Unit:	Hz
Front Panel Access:	Freq, Center Freq

### **External Reference Frequency**

**[[:SENSE]:FREQUENCY:EXTERNAL <freq value>**

**[[:SENSE]:FREQUENCY:EXTERNAL?**

Sets the desired external reference frequency. The <freq value> in MHz must be one of the following 12 values:

1 , 1.2288 , 1.544 , 2.048 , 2.4576 , 4.8 , 4.9152 , 5 , 9.8304 , 10 , 13 , 19.6608

The query form of this command will return the external reference frequency in Hz.

Front Panel Access:	Shift-8 (System), Application Options, Ext. Ref Freq
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## Signal Standard

**[ :SENSe ] :FREQUency :SIGStandard <index>**

**[ :SENSe ] :FREQUency :SIGStandard?**

Selects the desired signal standard from the list.

The **<index>** argument is a 1-based index of the position of the desired signal standard in the instrument's current signal standard list. The list can be seen on the instrument by choosing the "Signal Standard" soft-key button in the "Frequency" menu. The list can also be downloaded remotely and viewed using Anritsu Master Software Tools. For example, if the desired Signal Standard is the 3<sup>rd</sup> item on the list then the value of the **<index>** argument would be 3.

The query form of this command will return the index of the currently-selected Signal Standard on the list.

Front Panel Access:	Frequency, Signal Standard
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## Channel Selection

**[ :SENSe ] :FREQUency :SIGStandard :CHANnel <number>**

**[ :SENSe ] :FREQUency :SIGStandard :CHANnel?**

Sets the channel number for the selected signal standard.

Front Panel Access:	Frequency, Channel
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## Frequency Span

**[ :SENSe ] :FREQUency :SPAN <freq>**

**[ :SENSe ] :FREQUency :SPAN?**

Sets the frequency span. Setting the value of **<freq>** to 0 Hz is the equivalent of setting the span mode to zero span.

Note that changing the value of the frequency span will change the value of the coupled parameters Start Frequency and Stop Frequency and may change the Center Frequency.

Factory Preset / *RST:	MS2718B, MS2723B: 13 GHz
	MS2719B, MS2724B: 20 GHz
	All others: 7.1 GHz
Range:	MS2718B, MS2723B: 0 Hz, 10 Hz -13 GHz
	MS2719B, MS2724B: 0 Hz, 10 Hz -20 GHz
	All others: 0 Hz, 10 Hz – 7.1 GHz
Default Unit:	Hz
Front Panel Access:	Freq, Span Span

## Frequency Span - Full

[ :SENSE ] :FREQUENCY:SPAN:FULL

Sets the frequency span to full span.

Note that changing the value of the frequency span will change the value of the coupled parameters, Start Frequency and Stop Frequency and may change the Center Frequency.

Factory Preset / *RST:	MS2718B, MS2723B: 13 GHz
	MS2719B, MS2724B: 20 GHz
	All others: 7.1 GHz
Front Panel Access:	Span, Full Span

## Frequency Span - Last

[ :SENSE ] :FREQUENCY:SPAN:PREVIOUS

Sets the frequency span to the previous span value.

Note that changing the value of the frequency span will change the value of the coupled parameters, Start Frequency and Stop Frequency and may change the Center Frequency.

Front Panel Access:	Freq, Span, Last Span
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## Start Frequency

[ :SENSE ] :FREQUENCY:START <freq>

[ :SENSE ] :FREQUENCY:START?

Sets the start frequency.

Note that in the spectrum analyzer, changing the value of the start frequency will change the value of the coupled parameters, Center Frequency and Span.

Note that in the VNA, changing the value of the start frequency may affect the DTF distance range.

Factory Preset / *RST:	0 Hz
Range:	MS2718B, MS2723B: 0 Hz – 12.99999999 GHz
	MS2719B, MS2724B: 0 Hz - 19.99999999 GHz
	All others: 0 Hz – 7.099999990 GHz
Default Unit:	Hz
Front Panel Access:	Freq, Start Freq

## Frequency Step

`[ :SENSe ] :FREQuency:STEP [ :INCRement ] <freq>`

`[ :SENSe ] :FREQuency:STEP [ :INCRement ] ?`

Sets the frequency step to the given frequency value.

Factory Preset / *RST:	1 MHz
Range:	1 Hz – 20 GHz
Default Unit:	Hz
Front Panel Access:	Freq, Freq Step

## Stop Frequency

`[ :SENSe ] :FREQuency:STOP <freq>`

`[ :SENSe ] :FREQuency:STOP ?`

Sets the stop frequency.

Note that in the spectrum analyzer, changing the value of the stop frequency will change the value of the coupled parameters, Center Frequency and Span.

Note that in the VNA, changing the value of the start frequency may affect the DTF distance range.

Factory Preset / *RST:	MS2718B, MS2723B: 13 GHz
	MS2719B, MS2724B: 20 GHz
	All others: 7.1 GHz
Range:	MS2718B, MS2723B: 10 Hz -13 GHz
	MS2719B, MS2724B: 10 Hz -20 GHz
	All others: 10 Hz – 7.1 GHz
Default Unit:	Hz
Front Panel Access:	Freq, Stop Freq

## ***:SENSe:OPTion Subsystem***

Commands in this subsystem are related to the setup of parameters that are available only with specific option installed.

### **IF Bandwidth State**

`:SENSe:OPTion:IF:BWStAte 1 | 2 | 3 | 4`

`:SENSe:OPTion:IF:BWStAte ?`

Sets the IF Bandwidth.

Setting a value of 1 is equivalent of setting the IF Bandwidth to Normal on the front panel.

Setting a value of 2 is equivalent of setting the IF Bandwidth to 7 MHz BW on the front panel.

Setting a value of 3 is equivalent of setting the IF Bandwidth to 10 MHz BW on the front panel.

Setting the value of 4 is equivalent of setting the IF Bandwidth to 16 MHz BW on the front panel.

Note that option 89 must be available and in Zero span for the command to be valid. The query version of this command will return a 0 if not in zero span.

## **[[:SENSE]:POWER Subsystem**

This subsection relates to the power amplitude parameters of the instrument.

### **Input Attenuation**

**[[:SENSE]:POWER[:RF]:ATTenuation <rel ampl>**

**[[:SENSE]:POWER[:RF]:ATTenuation?**

Sets the input attenuation.

Note that issuing this command will set the automatic input attenuation OFF.

Factory Preset / *RST:	30 dB
Range:	0 dB to 65 dB
Default Unit:	dB
Front Panel Access:	Amplitude, Atten Lvl
See Also:	[[:SENSE]:POWER[:RF]:ATTenuation:AUTO

### **Input Attenuation Coupling**

**[[:SENSE]:POWER[:RF]:ATTenuation:AUTO OFF|ON|0|1**

**[[:SENSE]:POWER[:RF]:ATTenuation:AUTO?**

Sets the input attenuation coupling.

Setting the value to ON or 1 will result in the input attenuation being coupled to the reference level.

Setting the value to OFF or 0 will result in the input attenuation being un-coupled from the reference level. That is, changing the reference level will not change the input attenuation. When this command is issued, the input attenuator setting itself will not change.

The default value is ON. That is, sending :SENS:POW:ATT:AUTO is equivalent to sending :SENS:POW:ATT:AUTO ON.

Factory Preset / *RST:	ON
Front Panel Access:	Amplitude, Auto Atten
See Also:	[[:SENSE]:POWER[:RF]:ATTenuation

## Preamp State

`[ :SENSe ] :POWER [ :RF ] :GAIN [ :STATE ] OFF | ON | 0 | 1`  
`[ :SENSe ] :POWER [ :RF ] :GAIN [ :STATE ] ?`

Sets the state of the preamp.

Note that this may cause a change in the reference level and/or attenuation.

Factory Preset / *RST:	OFF
Front Panel Access:	Amplitude, Pre Amp

## ***[ :SENSe ] :SWEEp Subsystem***

This subsystem includes commands that affect the sweep generator of the instrument.

### Minimum Sweep Time

`[ :SENSe ] :SWEEp :TIME`  
`[ :SENSe ] :SWEEp :TIME ?`

Sets the value of the minimum sweep time parameter. The sweep will complete in the shortest time possible greater than the specified time.

To sweep as fast as possible, enter the minimum value allowed for the sweep time.

Factory Preset / *RST:	50 $\mu$ s
Range:	10 $\mu$ s to 600000000 $\mu$ s
Default Unit:	Seconds
Front Panel Access:	Shift-3 (Sweep), Min Sweep Time
Example:	To set sweep time to 12 $\mu$ s <code>:SENSe :SWEEp :TIME 12us</code> OR <code>:SENSe :SWEEp :TIME 0.000012</code>
	To set sweep time to 10 secs <code>:SENSe :SWEEp :TIME 10</code> OR <code>:SENSe :SWEEp :TIME 10s</code>
	To set sweep time to 1 ms <code>:SENSe :SWEEp :TIME 1ms</code>

## ***STATus Subsystem***

The commands in this subsystem relate to the current operating state of the instrument.

### Query Operation Status

`:STATus :OPERation ?`

This command requests information about the current status of the instrument. Each bit of the return value represents some operation. Only a subset of the bits will be implemented for each application.

The number returned will be the decimal representation of the bit-wise OR of the enabled bits.

Bit	Decimal Value	Description
0	1	Not implemented
1	2	Not implemented
2	4	Not implemented
3	8	Not implemented
4	16	Not implemented
5	32	Not implemented
6	64	Not implemented
7	128	Not implemented
8	256	Sweep Complete – This bit will be set to 0 when the command :INITiate[:IMMediate] is sent to trigger a sweep. It will have a value of 1 when the sweep has completed. Note that with averaging ON, the sweep complete bit is set when all the specified number of averages has completed.
9	512	Not implemented
10	1024	Not implemented
11	2048	Not implemented
12	4096	Not implemented
13	8192	Not implemented
14	16384	Not implemented
15	0	Will always be 0

## ***SYSTEM Subsystem***

This subsystem contains commands that affect instrument functionality that does not directly relate to data collection, display or transfer.

### **Query Installed Options**

**:SYSTEM:OPTIONS?**

Returns a string of the installed options. Options will be separated by a “/”.

The string will return “NONE” if no options are installed.

See Also:	*IDN?
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## Preset

**:SYSTem:PRESet**

This command restores all application parameters to their factory preset values. This does not modify system parameters such as Ethernet configuration, language, volume or brightness.

Front Panel Access:	Shift-1 (Preset), Preset
See Also:	*RST

## **SYSTem:FILE Subsystem**

This subsystem provides commands that modify how file lists should be displayed on the instrument. They do not modify the way in which data is returned to the controller.

### File Lists Sort Method

**:SYSTem:FILE:SORT:METHod NAME | TYPE | DATE**

**:SYSTem:FILE:SORT:METHod?**

Sets the file lists sort method.

Setting the sort method to NAME will result in file lists sorted by the name of the file.

Setting the sort method to TYPE will result in the file lists sorted by the type of file.

Setting the sort method to DATE will result in the file lists sorted by the date that the file was saved.

Front Panel Access:	Shift-7 (File), Directory Management, Sort Method
See Also:	:SYSTem:FILE:SORT:ORDer

### File Lists Sort Order

**:SYSTem:FILE:SORT:ORDer ASCend | DESCend**

**:SYSTem:FILE:SORT:ORDer?**

Sets the file lists sort order.

Setting the sort order to ASCend will result in file lists sorted from lowest to highest.

Setting the sort order to DESCend will result in the file lists sorted from highest to lowest.

When sorting by name, the sort will place file names that start with numbers before file names that start with letters.

Front Panel Access:	Shift-7 (File), Directory Management, Sort Order
See Also:	:SYSTem:FILE:SORT:METHod

## ***TGENERator Subsystem***

This subsystem contains commands related to the tracking generator.

### **Tracking Generator Output Power**

**:TGENERator:OUTput:POWER <amplitude>**

**:TGENERator:OUTput:POWER?**

Sets the output power for the Tracking Generator.

Factory Preset / *RST:	-40 dBm
Range:	0 dBm to -40 dBm
Default Unit:	Current active amplitude unit
Front Panel Access:	Shift-4 (Measurements), Tracking Generator, Output Power
See Also:	:INITiate[:TGENERator]
Required Options:	20

## ***Trace Subsystem***

This subsystem contains commands related to the transfer of trace data to and from the instrument.

### **Trace Copy**

**:TRACe:COPIY TRACE1,TRACE2|TRACE3**

Copies Trace A to either Trace B or Trace C.

Copying Trace A to Trace B is equivalent to pressing the shift-5(Trace), Trace B Operations, A->B on the front panel. This store Trace A into Trace B and turns on Trace B if it was off.

Copying Trace A to Trace C is equivalent to pressing the shift-5(Trace), Trace C Operations, A->C on the front panel. This store Trace A into Trace C and turns on Trace C if it was off.

Example:	To copy Trace A to Trace B :TRACe:COPIY TRACE1,TRACE2
	To copy Trace A to Trace C :TRACe:COPIY TRACE1,Trace3

## Trace Data Transfer

**:TRACe[:DATA] 1|2|3, (<header><block>)**

**:TRACe[:DATA]? [1]|2|3**

This command transfers data from the controlling program to the instrument. The query form transfers trace data from the instrument to the controller. Data is transferred to the instrument enclosed in parentheses as (<header><block>) and from the instrument as <header><block>.

The ASCII header specifies the number of data bytes. It looks like #AX, where A is the number of digits in X and X is the number of bytes in the <block>.

The format of the block data in the query form is specified by :FORMat:DATA. The block data in the command form is always sent in ASCII format.

Data can be transferred to and from the 3 available display traces. Use the commands in the MMEMory subsystem to store and recall traces from the instrument memory.

The command form does not support setting all trace points to a single value. To do this, send the same value to each point.

Trace setup information can be acquired using :TRACe[:DATA]:PREamble?.

To acquire the data from trace A in the instrument send :TRACe[:DATA]? 1. A 551 point trace will be returned as #42204<block data>. <block> data could be in either INTeger,32 or REAL,32 format. In both cases, there will be 4 bytes per data point. So, 4 bytes per point \* 551 data points gives 2204 bytes in <block> data. This example assumes that :FORMat:DATA INTeger, 32 or :FORMat:DATA REAL, 32 has been sent to the instrument before the query command is sent.

The query command will return a #0 if data is invalid for the active trace.

See Also:	:FORMat:DATA :TRACe[:DATA]:PREamble?
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## Trace View State

**:TRACe[1]|2|3:DISPlay[:STATE] OFF|ON|0|1**

**:TRACe[1]|2|3:DISPlay[:STATE]?**

Specifies whether the specified trace should be displayable (visible) or hidden. TRACe1 corresponds to Trace A, TRACe2 corresponds to Trace B, and TRACe3 corresponds to Trace C.

Setting the value to ON or 1 will set the specified trace visible.

Setting the value to OFF or 0 will set the specified trace hidden.

Note that issuing this command will also set the specified trace as active trace.

Factory Preset/ *RST:	ON for Trace A OFF for Trace B OFF for Trace C
Front Panel Access:	Shift-5 (Trace), View/Blank
Example:	To set Trace A to Blank :TRACe:DISPlay OFF OR :TRACe1:DISPlay 0
	To set Trace B to View :TRACe2:DISPlay ON OR :TRACe2:DISPlay:STATE ON OR :TRACe2:DISPlay 1

## Trace Exchange

**:TRACe:EXCHange TRACE2,TRACE3**

Swaps Trace B and Trace C.

Front Panel Access:	Shift-5 (Trace), Trace B Operations, B<->C OR Shift-5 (Trace), Trace C Operations, B<->C
Example:	To swap Trace B to Trace C :TRACe:EXCHange TRACE2,TRACE3

## Trace View State

**:TRACe[1]|2|3:LOAD:DISPlay[:STATE] OFF|ON|0|1**

**:TRACe[1]|2|3:LOAD:DISPlay[:STATE]?**

Specifies whether the specified recall trace should be displayable (visible) or hidden. TRACe1 corresponds to Trace A, TRACe2 corresponds to Trace B, and TRACe3 corresponds to Trace C.

Setting the value to ON or 1 will set the specified trace visible.

Setting the value to OFF or 0 will set the specified trace hidden.

Note that this command is valid only if there is a trace recalled.

Factory Preset/ *RST:	OFF
Front Panel Access:	Trace A: Shift-5 (Trace), Recalled Traces, Recalled A Trace B: Shift-5 (Trace), Recalled Traces, Recalled B Trace C: Shift-5 (Trace), Recalled Traces, Recalled C
Example:	To set Trace A to Blank :TRACe:LOAD:DISPlay OFF OR :TRACe1:LOAD:DISPlay 0
	To set Trace B to View :TRACe2:LOAD:DISPlay ON OR :TRACe2:LOAD:DISPlay:STATE ON OR :TRACe2:LOAD:DISPlay 1

## Trace Load Operation

**:TRACe:LOAD:OPERation <operation>**

This command specifies the operation to be performed on the recalled traces. The <operation> must be one of the following values:

SETup | ATOB | BTOB | CTOB | ATOC | BTOC | CTOC | CLear

Setting the operation to SETup is equivalent to pressing the shift-5(Trace), Recalled Traces, Use Recalled Setup on the front panel.

Setting the operation to ATOB is equivalent to pressing the shift-5(Trace), Recalled Trace, Recalled Operations, Recalled A->B on the front panel. This copies the recalled trace A to trace B.

Setting the operation to BTOB is equivalent to pressing the shift-5(Trace), Recalled Traces, Recalled Operations, Recalled B->B. This copies the recalled Trace B to Trace B.

Setting the operation to CTOB is equivalent to pressing the shift-5(Trace), Recalled Traces, Recalled Operations, Recalled C->B. This copies the recalled Trace C to Trace B.

Setting the operation to ATOC is equivalent to pressing the shift-5(Trace), Recalled Traces, Recalled Operations, Recalled A->C. This copies the recalled Trace A to Trace C.

Setting the operation to BTOC is equivalent to pressing the shift-5(Trace), Recalled Traces, Recalled Operations, Recalled B->C. This copies the recalled Trace B to Trace C.

Setting the operation to CTOC is equivalent to pressing the shift-5(Trace), Recalled Traces, Recalled Operations, Recalled C->C. This copies the recalled Trace C to Trace C.

Setting the operation to CLEAr is equivalent to pressing the shift-5(Trace), Recalled Traces, Clear Recall. This clears all the recalled traces.

Note that this command is valid only if there is a trace recalled.

Example:	To use the recalled setup :TRACe:LOAD:OPERation SETup
	To clear the recalled traces :TRACe:LOAD:OPERation CLEAr
	To copy the recalled Trace A to Trace B :TRACe:LOAD:OPERation ATOB
	To copy the recalled Trace B to Trace B :TRACe:LOAD:OPERation BTOB

## Trace A Operation

**:TRACe1:OPERation NORMAL | MAXHold | MINHold | AVERage**  
**:TRACe1:OPERation?**

This command specifies how successive traces are combined to produce the resulting display values.

Setting the operation to NORMAl is equivalent to pressing the shift-5(Trace), Trace A Operations, Normal->A on the front panel. This displays a trace based on the detection method selected.

Setting the operation to MAXHold is equivalent to pressing the shift-5(Trace), Trace A Operations, Max Hold->A on the front panel. This displays the largest signal for each display point over multiple sweeps.

Setting the operation to MINHold is equivalent to pressing the shift-5(Trace), Trace A Operations, Min Hold->A on the front panel. This displays the smallest signal for each display point over multiple sweeps.

Setting the operation to AVERage is equivalent to pressing the shift-5(Trace), Trace A Operations, Average->A on the front panel. This displays the average value of multiple sweeps for each display point.

The query version of the command returns the current operation mode or “NONE” if no operation is set.

Factory Preset/ *RST:	NORMAL
See Also:	[ :SENSE ] :AVERAge :TYPE

## Trace B Operation

**:TRACe2:OPERation MAXHold|MINHold**

**:TRACe2:OPERation?**

This command specifies how successive traces are combined to produce the resulting display values.

Setting the operation to MAXHold is equivalent to pressing the shift-5(Trace), Trace B Operations, Max Hold->B on the front panel. This displays the largest signal for each display point over multiple sweeps.

Setting the operation to MINHold is equivalent to pressing the shift-5(Trace), Trace B Operations, Min Hold->B on the front panel. This displays the smallest signal for each display point over multiple sweeps.

The query version of the command returns the current operation mode or “NONE” if no operation is set.

Factory Preset/ *RST:	NONE
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## Trace C Operation

**:TRACe3:OPERation MAXHold|MINHold|A-B|B-A**

**:TRACe3:OPERation?**

This command specifies how successive traces are combined to produce the resulting display values.

Setting the operation to MAXHold is equivalent to pressing the shift-5(Trace), Trace C Operations, Max Hold->C on the front panel. This displays the largest signal for each display point over multiple sweeps.

Setting the operation to MINHold is equivalent to pressing the shift-5(Trace), Trace C Operations, Min Hold->C on the front panel. This displays the smallest signal for each display point over multiple sweeps.

Setting the operation to A-B is equivalent to pressing the shift-5(Trace), Trace C Operations, A-B->C. This displays the difference between trace A and trace B values in trace C.

Setting the operation to B-A is equivalent to pressing the shift-5(Trace), Trace C Operations, B-A->C. This displays the difference between trace B and trace A values in trace C.

The query version of the command returns the current operation mode or “NONE” if no operation is set.

Factory Preset/ *RST:	NONE
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### Trace Header Transfer

**:TRACe:PREamble? [1] | 2 | 3**

Returns trace header information for the specified trace.

Data can be transferred to and from the 3 available display traces. Use the commands in the MMEMory subsystem to store and recall traces from the instrument memory.

The response begins with an ASCII header. The header specifies the number of following bytes. It looks like #AX, where A is the number of digits in X and X is the number of bytes that follow the header.

Parameters are returned in comma-delimited ASCII format. Each parameter will be returned as “NAME=VALUE[ UNITS],”

Note that the parameters returns depend on the firmware version and that this document does not cover all parameter values returned by the command.

Valid parameter names are:

Parameter Name	Description
SN	Instrument serial #
UNIT_NAME	Instrument name
DESCR	Trace name
DATE	Trace date/time
BASE_VER	Base FW version
APP_NAME	Application name
APP_VER	Application FW version

Parameter Name	Description
UNITS	Amplitude units
CENTER_FREQ	Center freq
SPAN	Frequency span
FREQ_STEP	Frequency step size
RBW	Resolution bw
RBW_TYPE	RBW coupling auto/manual
VBW	Video bw
VBW_TYPE	VBW coupling auto/manual
RBW_VBW_RATIO	RBW/VBW ratio
SPAN_RBW_RATIO	Span/RBW ratio
INPUT_ATTEN	Input attenuation
ATTEN_TYPE	Attenuation coupling auto/manual
REFERENCE_LEVEL	Reference level
SCALE	Y-axis scale
PREAMP_SET	Preamp state
REF_LEVEL_OFFSET	Reference level offset
DETECTION	Detection type
TRACE_AVERAGE	Number of traces to average
SWEEP_TYPE	Single/continuous
CURRENT_SIGNAL	Current signal index
CURRENT_CHANNEL	Current signal channel
TRACE_MODE	Normal/Avg/Max
TRACE_STATUS	TRACE_A_VIEW_NOT_BLANK 0x0000000000000001 TRACE_A_WRITE_NOT_HOLD 0x0000000000000002 TRACE_A_DATA_VALID 0x0000000000000004 TRACE_B_VIEW_NOT_BLANK 0x0000000000010000 TRACE_B_WRITE_NOT_HOLD 0x0000000000020000 TRACE_B_DATA_VALID 0x0000000000040000 TRACE_C_VIEW_NOT_BLANK 0x0000000100000000 TRACE_C_WRITE_NOT_HOLD 0x0000000200000000 TRACE_C_DATA_VALID 0x0000000400000000 TRACE_C_IS_B_MINUS_A_ON 0x0000001000000000 TRACE_C_IS_A_MINUS_B_ON 0x0000002000000000

TRACE_COUNT	Number of traces averaged
UI_DATA_POINTS	Number of display points
IMPEDANCE	Input impedance
REFERENCE_ FREQUENCY	Reference freq
SET_SWEEP_TIME	Minimum sweep time setting
TRIGGER_TYPE	Trigger type
VIDEO_TRIGGER_ LEVEL	Video trigger level
TRIGGER_POSITION	Trigger position as a percent of the display
PEAK_THRESHOLD	Marker peak search threshold
MARKER_TABLE	Marker table status

<b>Parameter Name</b>	<b>Description</b>
ACTIVE_ MEASUREMENT	Current measurement
ANTENNA	Antenna index
OCC_BW_METHOD	Occupied bandwidth method
OCC_BW_PERCENT	Occupied bandwidth % of power setting
OCC_BW_DBC	Occupied bandwidth dBc setting
OCC_BW_MEASURED_ DB	Occupied bandwidth measured dBc value
OCC_BW_MEASURED_ PERCENT	Occupied bandwidth measured % value
OCC_BW_VALUE	Measured occupied bandwidth
OCC_BW_LINE_ MARKER_INFO	Mask off 16 bits at a time to get the display point location of the 3 OBW display indicators
CH_PWR_WIDTH	Channel power integration bandwidth
CH_PWR_VALUE	Measured channel power
CH_PWR_DENSITY	Measured channel power density
CH_PWR_LINE_ MARKER_INFO	Mask off 16 bits at a time to get the display point location of the 2 channel power display indicators
ACPR_MAIN_CH_BW	ACPR main channel bw

ACPR_ADJC_CH_BW	ACPR adjacent channel bw
ACPR_CHANNEL_SPACING	ACPR channel spacing
ACPR_MAIN_CH_PWR	ACPR measured main channel power
ACPR_UPPER_CH_PWR	ACPR measured upper channel power
ACPR_LOWER_CH_PWR	ACPR measured lower channel power
ACPR_LOWER_CH_LINE_MARKER_INFO	Mask off 16 bits at a time to get the display point location of the 2 ACPR lower channel display indicators
ACPR_MAIN_CH_LINE_MARKER_INFO	Mask off 16 bits at a time to get the display point location of the 2 ACPR main channel display indicators
ACPR_UPPER_CH_LINE_MARKER_INFO	Mask off 16 bits at a time to get the display point location of the 2 ACPR upper channel display indicators
AM_FM_DEMOD_VOL	AM/FM demod volume
AM_FM_DEMOD_FREQUENCY	AM/FM demod freq
AM_FM_DEMOD_TYPE	AM/FM demod type
AM_FM_DEMOD_TIME	AM/FM demod time
AM_FM_LINE_MARKER	Display point location of the demodulation frequency
BEAT_FREQUENCY_OSC_FREQUENCY	BFO oscillator freq
CI_C_TYPE	C/I measurement carrier type
CI_C_VALUE	C/I measurement measured carrier power
CI_I_BB_VALUE	C/I measurement measured broadband interference power
CI_I_NB_VALUE	C/I measurement measured narrowband interference power
CI_I_WB_VALUE	C/I measurement measured wideband interference power
CI_BB_VALUE	C/I measurement with broadband interference
CI_NB_VALUE	C/I measurement with narrowband interference
CI_WB_VALUE	C/I measurement with wideband interference

Parameter Name	Description
MKR_SPA_FREQNx	Marker x frequency (where x is the marker number 0-11, 0 represent the reference marker #1 and 1 represent delta marker #1, 2 represent reference marker #2, and 3 represent delta marker #2, and so on)
MKR_SPA_POINTx	Reference marker x display point
MKR_SPA_MAGNTx	Reference marker x magnitude
MKR_SPA_PRCNTx	Reference marker x display percentage
MKR_SPA_FLAGSx	Reference marker x flags: SPA_MKR_FLAG_ON_OFF                   0x00000001 SPA_MKR_FLAG_DELTA_MKR               0x00000002 SPA_MKR_FLAG_SELECTED                0x00000004 SPA_MKR_FLAG_DATA_INVALID           0x00000008 SPA_MKR_FLAG_DATA_STALE             0x00000010 SPA_MKR_FLAG_FIXED                    0x00000020 SPA_MKR_FLAG_MASK                     0x000000FF SPA_MKR_FLAG_DISPL_AMPL_HZ         0x00000100 SPA_MKR_FLAG_DISPL_AMPL_PER_HZ    0x00000200 SPA_MKR_FLAG_DISP_FLAG              0x00000F00 SPA_MKR_FLAG_RELATIVE                0x00001000 SPA_MKR_STANDARD                     0x10000000 SPA_MKR_FIELD_STRENGTH              0x20000000 SPA_MKR_NOISE                         0x30000000 SPA_MKR_COUNTER                      0x40000000 SPA_MKR_TIME                          0x50000000
MKR_SPA_REF_TOx	Specifies which marker is the marker x reference to
MKR_SPA_TRACEx	Specifies which trace the marker x is for.

Parameter Name	Description
LIM_LFLAGS_UP	Upper limit flags: LIMIT_FLAG_ON                         0x00000004 LIMIT_FLAG_ALARM_ON                 0x00000002
LIM_FREQNC_UPx	Upper limit point x freq (where x is the limit point number starting with 0)
LIM_MAGNTD_UPx	Upper limit point x amplitude
LIM_LFLAGS_LO	Lower limit flags: LIMIT_FLAG_ON                         0x00000004 LIMIT_FLAG_ALARM_ON                 0x00000002

LIM_FREQNC_LOx	Lower limit point x freq (where x is the limit point number starting with 0)
LIM_MAGNTD_LOx	Lower limit point x amplitude

<b>Tracking Generator Option Only:</b>	
<b>Parameter Name</b>	<b>Description</b>
TG_SET_ON_OFF	Set tracking generator power; On/Off
TG_SET_OUTPUT_POWER	Set tracking generator output power; 0dBm to -40dBm
TG_REFERENCE_LEVEL	Tracking generator S21 normalized reference level; On/Off
TG_SCALE	Tracking generator specific scale for S21 normalized display only; +100 to -120 dBm
TG_UNITS	Tracking generator log / linear scale units. Currently defaulted to Log scale only; 0x00
TG_TRACE_STATUS	Tracking generator S21 normalized trace status; S21 OFF:           0x00 Normalizing Sweep: 0x11 Valid Sweep:       0x12
TG_REF_LEVEL_OFFSET	Tracking Generator S21 Normalized reference level offset; +100 to -100dBm
See Also:	: TRACe : DATA

## Trace Write State

**:TRACe[1]|2|3:WRITe[:STATe] OFF|ON|0|1**

**:TRACe[1]|2|3:WRITe[:STATe]?**

Specifies whether the specified trace state should be set to write or hold. TRACe1 corresponds to Trace A, TRACe2 corresponds to Trace B, and TRACe3 corresponds to Trace C.

Setting the state to ON or 1 will set the specified trace to write.

Setting the state to OFF or 0 will set the specified trace to hold.

Factory Preset/ *RST:	ON for Trace A OFF for Trace B OFF for Trace C
Front Panel Access:	Shift-5 (Trace), Write/Hold
Example:	To set Trace A to Hold :TRACe:WRITe:STATe OFF OR :TRACe:WRITe OFF OR :TRACe:WRITe 0
	To set Trace C to Write :TRACe3:WRITe ON OR :TRACe3:WRITe:STATe ON OR: :TRACe3:WRITe 1

## Trigger Subsystem

This subsystem contains commands related to the triggering of instrument functions for the purposes of synchronization. Related commands appear in the ABORt and INITiate subsystems.

### Trigger Source

**:TRIGger[:SEQuence]:SOURce IMMEDIATE|EXTernal|VIDeo**

**:TRIGger[:SEQuence]:SOURce?**

This command defines the trigger source.

IMMEDIATE triggering is the equivalent of free-run triggering.

EXTernal triggering is triggered when a TTL signal is applied to the External Trigger input connector. EXTernal triggering is always done on the rising edge of the signal. It is available only in zero span mode.

VIDeo triggering is triggered based on the measured signal level. It is available only in zero span mode.

Factory Preset / *RST:	Immediate
Front Panel Access:	Shift-3 (Sweep), Trigger Type, Free Run External Video
See Also:	:TRIGger[:SEquence]:VIDeo:LEVel :TRIGger[:SEquence]:VIDeo:POSition

### Video Trigger Level

**:TRIGger[:SEquence]:VIDeo:LEVel <amplitude>**

**:TRIGger[:SEquence]:VIDeo:LEVel?**

This command sets the video triggering level.

Factory Preset / *RST:	-65.0 dBm
Range:	30 dBm to -130 dBm
Default Unit:	Current amplitude unit
Front Panel Access:	Shift-3 (Sweep), Trigger Type, Video

### Video Trigger Position

**:TRIGger[:SEquence]:VIDeo:POSition <percentage>**

**:TRIGger[:SEquence]:VIDeo:POSition?**

This command sets the video triggering position as a percentage of the display.

When the sweep is triggered, the trigger point will be drawn at the location defined by the position. The graph appearing to the left of the trigger position is data acquired before the trigger. The graph appearing to the right of the trigger position is data acquired after the trigger.

Factory Preset / *RST:	1.00%
Range:	0% to 100%
Default Unit:	%
Front Panel Access:	Shift-3 (Sweep), Trigger Type, Change Trigger Position

## ***Unit Subsystem***

The unit subsystem is used to modify the default units used for related parameters. These changes affect parameters in both commands and responses.

### **Measurement Units**

**:UNIT:POWER** DBM|DBV|DBMV|DBUV|V|W

**:UNIT:POWER?**

Sets the default amplitude units for input, output and display.

Note that linear units are not operational with SPA V3.06. The set command is non-operational with SPA V3.06 as well.

Factory Preset / *RST:	dBm
Front Panel Access:	Amplitude, Units, dBm dBV dBmV dBuV Volt Watt

## 3.4 WCDMA

This section contains the WCDMA remote commands. These commands are available in the MS2717B, MS2718B, and MS2719B.

### ***Abort Subsystem***

The abort subsystem includes commands that allow the user to stop current measurement activities on the instrument.

#### **Abort**

**:ABORT**

Restarts the current sweep and/or measurement. Resets the trigger system.

If `:INITiate:CONTinuous` is OFF (i.e. the instrument is in single sweep mode), send the command `:INITiate[:IMMediate]` to trigger the next sweep.

If `:INITiate:CONTinuous` is ON (i.e. the instrument is in continuous sweep mode) a new sweep will start immediately.

Front Panel Access:	Shift-3 (Sweep), Reset Sweep
See Also:	<code>:INITiate:CONTinuous</code> <code>:INITiate[:IMMediate]</code>

### ***CALCulate Subsystem***

The commands in this subsystem process data that has been collected via the `SENSe` subsystem.

#### ***:CALCulate:MARKer Subsystem***

This subsystem contains commands to manipulate data markers.

#### **Turn All Markers Off**

**:CALCulate:MARKer:AOFF**

Turns off all markers.

Front Panel Access:	VNA: Marker, All Markers Off SPA: Marker, More, All Markers Off WCDMA: Marker, All Markers Off
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## Marker State

**:CALCulate:MARKer[1]|2|3|4|5|6[:STATE] OFF|ON|0|1**

**:CALCulate:MARKer[1]|2|3|4|5|6[:STATE]?**

Sets the specified marker on/off.

Factory Preset / *RST:	OFF
Front Panel Access:	Marker, On/Off
Example:	To turn off reference marker #1 :CALCulate:MARKer1:STATE OFF

## Marker X Value

**:CALCulate:MARKer[1]|2|3|4|5|6:X <x-parameter>**

**:CALCulate:MARKer[1]|2|3|4|5|6:X?**

Sets the location of the marker on the x-axis at the specified location. <x-parameter> is defined in the current x-axis units.

The query version of the command returns the location of the marker on the x-axis.

Default Unit:	Current x-axis unit
Front Panel Access:	Marker, [Marker 1/2/3/4/5/6]

## Marker Read Y Value

**:CALCulate:MARKer[1]|2|3|4|5|6:Y?**

Reads the current Y value for the specified marker. The units are the units of the y-axis.

Default Unit:	Current y-axis unit
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## Display Subsystem

This subsystem provides commands that modify the display of data for the user. They do not modify the way in which data are returned to the controller.

### Power Offset

**:DISPlay:WINDow:TRACe:Y[:SCALE]:OFFSet <rel ampl>**

**:DISPlay:WINDow:TRACe:Y[:SCALE]:OFFSet?**

Sets the power offset value for the y-axis.

Factory Preset / *RST:	0 dB
Range:	0 dB to 100 dB
Default Unit:	dB
Front Panel Access:	Amplitude, Power Offset

## Scale

**:DISPlay:WINDow:TRACe:Y[:SCALE]:PDIVision <rel ampl>**  
**:DISPlay:WINDow:TRACe:Y[:SCALE]:PDIVision?**

Sets the scale (dB/division) for the y-axis.

Factory Preset / *RST:	10 dB/div
Range:	1 dB to 15 dB
Default Unit:	dB
Front Panel Access:	Amplitude, Scale

## Format Subsystem

This subsystem contains commands that determine the formatting of numeric data when it is transferred.

The format setting affects data in specific commands only. If a command is affected, it will be noted in the command description.

### Numeric Data Format

**:FORMat[:READings][:DATA] ASCii|INTEger,32|REAL,32**  
**:FORMat[:READings][:DATA]?**

This command specifies the format in which data is returned in certain commands.

ASCii format returns the data in comma-separated ASCII format. The units are the current instrument units. This format requires many more bytes so it will be the slowest format.

INTEger 32 values are signed 32-bit integers in little-endian byte order. This format returns the data in 4-byte blocks. The units are always mdBm. For example, if the measured result was -12.345 dBm, that value would be sent as -12345.

REAL,32 values are 32-bit floating point numbers conforming to the IEEE 754 standard in little-endian byte order. This format returns the data in 4-byte binary format. The units are the current instrument units.

Both INTEger,32 and REAL,32 formats return a definite block length. Each transfer begins with an ASCII header such as #42204. The first digit represents the number of following digits in the header (in this example, 4). The remainder of the header indicates the number of bytes that follow the header (in this example, 2204). You then divide the number of following bytes by the number of bytes in the data format you've chosen (4 for both INTEger,32 and REAL,32...so 2204/4) to get the number of data points (in this example, 551).

Factory Preset / *RST:	ASCii
See Also:	:TRACe[:DATA]

## **INITiate Subsystem**

This subsystem works with the ABORt subsystem to control the triggering of measurements.

### **Continuous/Single Sweep**

**:INITiate:CONTInuous OFF|ON|0|1**

**:INITiate:CONTInuous?**

Specifies whether the sweep/measurement is triggered continuously.

If the value is set to ON or 1, another sweep/measurement is triggered as soon as the current one completes.

If continuous is set to OFF or 0, the instrument enters the “idle” state and waits for the **:INITiate[:IMMediate]** command or for **:INITiate:CONTInuous ON**.

The default value is ON. That is, sending **:INIT:CONT** is equivalent to sending **:INIT:CONT ON**

The query version of the command returns a 1 if the instrument is continuously sweeping/measuring and returns a 0 if the instrument is in single sweep/measurement mode.

Factory Preset / *RST:	ON
Front Panel Access:	Shift-3 (Sweep), Sweep (Single/Continuous)
See Also:	<b>:INITiate[:IMMediate]</b>

### **Trigger Sweep/Measurement**

**:INITiate[:IMMediate]**

Initiates a sweep/measurement.

If **:INITiate:CONTInuous** is set to ON, this command is ignored.

Use this command in combination with **:STATus:OPERation?** to synchronize the capture of one complete set of data. When this command is sent, the “sweep complete” bit of **:STATus:OPERation?** is set to 0, indicating that the measurement has not completed. The data collection is then triggered. The controlling program can poll **:STATus:OPERation?** to determine the status. When the “sweep complete” bit is set to 1, data is ready to be retrieved.

Front Panel Access:	SPA: Shift-3 (Sweep), Manual Trigger WCDMA: Shift-3 (Sweep), Trigger Sweep Fixed WiMAX: Shift 3(Sweep), Trigger Sweep
See Also:	<b>:INITiate:CONTInuous</b> <b>:STATus:OPERation?</b>

## ***INSTRUMENT Subsystem***

One instrument may contain many logical instruments (“modes”). This subsystem controls the selection of the current instrument mode.

### **Query Available Modes**

**:INSTRUMENT:CATALOG:FULL?**

Returns a comma-separated list of available modes. Mode names are enclosed in double quotes (“”). Immediately following the string name is the application number.

For example: “SPA”1, “WCDMA”5, “VNA”2, “WIMAX\_D”18, “SCOPE”17

Front Panel Access:	Shift-9 (Mode)
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### **Select Mode by Number**

**:INSTRUMENT:NSELECT <integer>**

**:INSTRUMENT:NSELECT?**

Sets the instrument mode based on the value of <integer>.

The query version returns the number associated with the current mode.

Use **:INSTRUMENT:CATALOG:FULL?** to get a list of available mode names and their integer representations.

Factory Preset / *RST:	MS2721A: 1 MS2717A: 1 MT8220A: 1 MS2012A: 2 MS2024A: 2 MS2026A: 2 MS2034A: 2 MS2036A: 2 MS2717B: 1 MS2718B: 1 MS2719B: 1
Front Panel Access:	Shift-9 (Mode)
See Also:	:INSTRUMENT:CATALOG:FULL? :INSTRUMENT[:SELECT]

## Select Mode by Name

**:INSTRument[:SElect] <string>**

**:INSTRument[:SElect]?**

Sets the instrument mode based on the mode name specified by <string>.

The query version returns the name of the current mode.

Use **:INSTRument:CATalog:FULL?** to get a list of available modes.

Factory Preset / *RST:	MS2721A: "SPA" MS2717A: "SPA" MT8220A: "SPA" MS2012A: "VNA" MS2024A: "VNA" MS2026A: "VNA" MS2034A: "VNA" MS2036A: "VNA" MS2717B: "SPA" MS2718B: "SPA" MS2719B: "SPA"
Front Panel Access:	Shift-9 (Mode)
See Also:	:INSTRument:CATalog:FULL? :INSTRument:NSElect

## MMEMory Subsystem

The Mass MEMory subsystem contains functions that provide access to the instrument's setup and data storage.

### Delete Setup/Measurement

**:MMEMory:DElete <file name>**

Deletes the measurement or setup file specified by <file name>.

<file name> should be enclosed in either single quotes (') or double quotes (") and should contain a file extension ".stp" for setup and ".wcd" for measurement.

Front Panel Access:	Shift-7 (File), Delete, Delete Selected File
See Also:	:MMEMory:STORE:STATe, :MMEMory:STORE:TRACe

## Format Storage Device

**:MMEMory:INITialize [CFLash]**

Formats the compact flash. Issuing this command will erase all files on an installed Compact Flash module and create the /usr directory for storage of measurements, setups and jpg files.

Front Panel Access:	Shift-7 (File), Directory Management, Format Compact Flash
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## Recall Setup

**:MMEMory:LOAD:STATE <integer>,<file name>**

Loads the current setup from the file specified by <file name>.

<file name> should be enclosed in either single quotes (') or double quotes (") and should include the extension ".stp".

The <integer> parameter is not currently used, but it must be sent. Send a value of 1.

Front Panel Access:	Shift-7 (File), Recall, Recall Setup
See Also:	:MMEMory:STORE:STATE

## Recall Measurement

**:MMEMory:LOAD:TRACe <integer>,<file name>**

Recalls the trace specified by <file name> into the trace specified by <integer>.

The instrument must be in the mode of the saved trace in order to recall that trace. Use :INSTrument:SElect or :INSTrument:NSElect to set the mode.

<file name> should be enclosed in either single quotes (') or double quotes (") and should include a file extension.

The <integer> parameter is not currently used, but it must be sent. Send a 0.

File Extensions:	".wcd"
Front Panel Access:	Shift-7 (File), Recall, Recall Measurement
See Also:	:MMEMory:STORE:TRACe

## Storage Location

**MMEMory:MSIS INTernal | USB | CFLash**

**MMEMory:MSIS?**

Sets the storage location.

Setting the storage location to INTernal will set the current storage location to be the internal memory.

Setting the storage location to USB will set the current storage location to be the USB Flash drive.

Setting the storage location to CFLash will set the current storage location to be the Compact Flash memory.

Note that changing the current location to save files causes the “Copy To Destination” on the front panel to be automatically changed if the selected storage location is the same as the selected current location.

Note that the storage location must be available in order for it to be set.

Front Panel Access:	Shift-7 (File), Directory Management, Current Location
See Also:	:MMEMory:MSIS:DESTination

### Copy From Current Location To Destination

**:MMEMory:MSIS:COPY**

Copies all measurements, setups and jpg files stored in the current storage location to the “copy to destination” location.

Front Panel Access:	Shift-7 (File), Directory Management, Copy From Current Location To Destination
See Also:	:MMEMory:MSIS :MMEMory:MSIS:DESTination

### Copy to Destination

**:MMEMory:MSIS:DESTination INTERNAL|USB|CFLash**

**:MMEMory:MSIS:DESTination?**

Sets the destination to where measurements and setups in the current storage location will be copied.

Setting the location to INTERNAL will result in copying the files that are stored at the current storage location to the internal memory when the command :MMEMory:MSIS:COPY is send.

Setting the location to USB will result in copying the files that are stored at the current storage location to the USB Flash drive when the command :MMEMory:MSIS:COPY is send..

Setting the location to CFLash will result in copying the files that are stored at the current storage location to the Compact Flash memory when the command :MMEMory:MSIS:COPY is send.

Note that changing the destination to which the instrument will copy files, will automatically changed the “Current Location” on the front panel if the current location is the same as the selected copy to destination.

Front Panel Access:	Shift-7 (File), Directory Management, Copy To Destination
See Also:	:MMEMory:MSIS :MMEMory:MSIS:COPY

## Store PASS/FAIL Test Definitions

**:MMEMory:STORe:PFail <header><block>**

Stores a new PASS/FAIL test definition file in the internal file space for future use.

The ASCII header specifies the number of data bytes. It looks like #AX, where A is the number of digits in X and X is the number of bytes in the <block>.

The format of the block data is always ASCII text. The contents of the block data is the contents of a Pass/Fail test definition file. These files can be generated using the Pass/Fail Test Editor that is included with the Anritsu Master Software Tools Measurement Editor. For the latest Master Software Tools, visit the Anritsu web site at <http://www.us.anritsu.com>.

Front Panel Access:	None
See Also:	:CONFigure PFail :FETCh:PFail? :MEASure:PFail? :READ:PFail?

## Save Setup

**:MMEMory:STORe:STATe <integer>,<file name>**

Stores the current setup into the file specified by <file name>.

<file name> should be enclosed in either single quotes (') or double quotes (") and should not contain a file extension.

The <integer> parameter is not currently used, but it must be sent. Send a value of 0.

Front Panel Access:	Shift-7 (File), Save, Save Setup
See Also:	:MMEMory:LOAD:STATe

## Save Measurement

**:MMEMory:STORe:TRACe <integer>,<file name>**

Stores the trace in trace A into the file specified by <file name>.

<file name> should be enclosed in either single quotes (') or double quotes (") and should not contain a file extension.

The <integer> parameter is not currently used, but it must be sent. Send a 0.

Front Panel Access:	Shift-7 (File), Save, Save Measurement
See Also:	:MMEMory:LOAD:TRACe

## **SENSe Subsystem**

The commands in this subsystem relate to device-specific parameters, not signal-oriented parameters.

### **[[:SENSe]:AVERage Subsystem**

This subsystem contains commands related to the combination of the data from consecutive sweeps. Use commands in this subsystem to control sweep-to-sweep averaging and max hold functionality.

#### **Frequency Error Averaging State**

**[[:SENSe]:AVERage:FERRor OFF|ON|0|1**

**[[:SENSe]:AVERage:FERRor?**

Turns averaging for Frequency Error ON or OFF.

Setting the value to ON or 1 will result in turning frequency error averaging ON.

The Query form of this command returns either “1” or “0”. “1” corresponds to frequency error averaging being ON and “0” corresponds to frequency error averaging being OFF.

Factory Preset / *RST:	OFF
Front Panel Access:	Setup, More, Freq Err Avg
See Also:	[[:SENSe]:AVERage:FERRor:COUNT [[:SENSe]:AVERage:FERRor:COUNT?

#### **Average Frequency Error Count**

**[[:SENSe]:AVERage:FERRor:COUNT <integer>**

**[[:SENSe]:AVERage:FERRor:COUNT?**

Sets the number that is used for averaging the frequency error.

Factory Preset / *RST:	2
Range:	2-15
Front Panel Access:	Setup, More, Freq Err Avg Cnt
See Also:	[[:SENSe]:AVERage:FERRor [[:SENSe]:AVERage:FERRor?

## ***[[:SENSE]:FREQUENCY Subsystem***

Commands in this subsystem pertain to the frequency settings of the instrument.

### **Center Frequency**

**[[:SENSE]:FREQUENCY:CENTER <freq>**

**[[:SENSE]:FREQUENCY:CENTER?**

Sets the center frequency.

Factory Preset / *RST:	1 GHz
Range:	824 MHz – 2.7 GHz
Default Unit:	Hz
Front Panel Access:	Freq, Center Freq

### **Start Frequency**

**[[:SENSE]:FREQUENCY:START?**

Queries the start frequency of the RF Band Spectrum.

Note that this command is valid only if the current view is set to RF Band Spectrum.

Default Unit:	Hz
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### **Stop Frequency**

**[[:SENSE]:FREQUENCY:STOP?**

Queries the stop frequency of the RF Band Spectrum.

Note that this command is valid only if the current view is set to RF Band Spectrum.

Default Unit:	Hz
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## ***[ :SENSe ] :POWer Subsystem***

This subsection relates to the power amplitude parameters of the instrument.

### **Automatic Amplitude Range**

**[ :SENSe ] :POWer [ :RF ] :RANGe :AUTO OFF | ON | 0 | 1**

**[ :SENSe ] :POWer [ :RF ] :RANGe :AUTO?**

Sets the automatic amplitude range.

Setting the value to ON or 1 will result in the amplitude range being coupled to the detected input signal level.

Setting the value to OFF or 0 will result in the input attenuation being un-coupled from the input signal level. That is, changing the input signal level will not change the amplitude range. When this command is issued, the amplitude range itself will not change.

The default value is ON. That is, sending :SENS:POW:RANG:AUTO is equivalent to sending :SENS:POW:RANG:AUTO ON.

Factory Preset / *RST:	ON
Front Panel Access:	Amplitude, Auto Range
See Also:	[ :SENSe ] :POWer [ :RF ] :RANGe

### **Amplitude Range**

**[ :SENSe ] :POWer [ :RF ] :RANGe [ :IMMediate ]**

Re-calculates amplitude range.

Note that issuing this command will set the automatic dynamic range OFF.

Front Panel Access:	Amplitude, Adjust Range
See Also:	[ :SENSe ] :POWer [ :RF ] :RANGe :AUTO

## **STATus Subsystem**

The commands in this subsystem relate to the current operating state of the instrument.

### **Query Operation Status**

#### **:STATus:OPERation?**

This command requests information about the current status of the instrument. Each bit of the return value represents some operation. Only a subset of the bits will be implemented for each application.

The number returned will be the decimal representation of the bit-wise OR of the enabled bits.

Bit	Decimal Value	Description
0	1	Not implemented
1	2	Not implemented
2	4	Not implemented
3	8	Not implemented
4	16	Not implemented
5	32	Not implemented
6	64	Not implemented
7	128	Not implemented
8	256	Sweep Complete – This bit will be set to 0 when the command :INITiate[:IMMediate] is sent to trigger a sweep. It will have a value of 1 when the sweep has completed.
9	512	Not implemented
10	1024	Not implemented
11	2048	Not implemented
12	4096	Not implemented
13	8192	Not implemented
14	16384	Not implemented
15	0	Will always be 0

## ***SYSTEM Subsystem***

This subsystem contains commands that affect instrument functionality that does not directly relate to data collection, display or transfer.

### **Query Installed Options**

**:SYSTEM:OPTIONS?**

Returns a string of the installed options. Options will be separated by a “/”.

The string will return “NONE” if no options are installed.

See Also:	*IDN?
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### **Preset**

**:SYSTEM:PRESet**

This command restores all application parameters to their factory preset values. This does not modify system parameters such as Ethernet configuration, language, volume or brightness.

Front Panel Access:	Shift-1 (Preset), Preset
See Also:	*RST

## ***SYSTEM:FILE Subsystem***

This subsystem provides commands that modify how file lists should be displayed on the instrument. They do not modify the way in which data is returned to the controller.

### **File Lists Sort Method**

**:SYSTEM:FILE:SORT:METHod NAME | TYPE | DATE**

**:SYSTEM:FILE:SORT:METHod?**

Sets the file lists sort method.

Setting the sort method to NAME will result in file lists sorted by the name of the file.

Setting the sort method to TYPE will result in the file lists sorted by the type of file.

Setting the sort method to DATE will result in the file lists sorted by the date that the file was saved.

Front Panel Access:	Shift-7 (File), Directory Management, Sort Method
See Also:	:SYSTEM:FILE:SORT:ORDER

## File Lists Sort Order

**:SYSTem:FILE:SORT:ORDER ASCend | DESCend**

**:SYSTem:FILE:SORT:ORDER?**

Sets the file lists sort order.

Setting the sort order to ASCend will result in file lists sorted from lowest to highest.

Setting the sort order to DESCend will result in the file lists sorted from highest to lowest.

When sorting by name, the sort will place file names that start with numbers before file names that start with letters.

Front Panel Access:	Shift-7 (File), Directory Management, Sort Order
See Also:	:SYSTem:FILE:SORT:METHOD

## Trace Subsystem

This subsystem contains commands related to the transfer of trace data to and from the instrument.

### Trace Data Transfer

**:TRACe[:DATA] ACLR | SPECTrum | EMISsion | DEMod,  
( <header><block> )**

**:TRACe[:DATA]? ACLR | SPECTrum | EMISsion | DEMod**

This command transfers data from the controlling program to the instrument. The query form transfers trace data from the instrument to the controller.

The ASCII header specifies the number of data bytes. It looks like #AX, where A is the number of digits in X and X is the number of bytes in the <block>. The number of bytes in the block is calculated by multiplying the number of data points by the number of bytes used to transfer each data point. Also note that the second argument must be enclosed in parentheses.

The format of the block data in the query form is specified by :FORMat:DATA. The block data in the command form is always sent in ASCII format.

Trace setup information can be acquired using :TRACe[:DATA]:PREamble?.

Data can be transferred to and from the 4 available display types. Use the commands in the MMEMory subsystem to store and recall traces from the instrument memory.

This command does not support setting all trace points to a single value. To do this, send the same value to each point.

For RF traces (ACLR, Spectrum and EMISsion), there is only one value per data point.

For example, to transfer a 501 point trace from the controlling program to the ACLR trace in the instrument the command :TRACe:DATA ACLR, (#42004<block>) would be sent. <block> data could be in either INTeger,32 or REAL,32 format. In

both cases, there would be 4 bytes per data point. So, 4 bytes per point \* 501 data points gives 2004 bytes in <block> data.

For the demodulated code domain power trace, each data point is represented by 6 values of 4 bytes each: code number (no units), absolute power (dBm), relative power (dB), spreading factor (no units), symbol EVM (%), code state( 0 = Inactive, 1 = Active). If Option 65 is installed code state will indicate the modulation type (0 = Noise, 1 = QPSK, 2 = 16\_QAM).

Note that the instrument must be set in the selected view. Use the CONFIGure command to set the unit to the selected view.

See Also:	:FORMat:DATA :TRACe[:DATA]:PREamble?
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### Trace Header Transfer

**:TRACe:PREamble? ACLR|SPECTrum|EMISSion|DEMod**

Returns trace header information for the specified trace.

Data can be transferred to and from the 4 available display trace types. Use the commands in the MMEMory subsystem to store and recall traces from the instrument memory.

The response begins with an ASCII header. The header specifies the number of following bytes. It looks like #AX, where A is the number of digits in X and X is the number of bytes that follow the header.

Parameters are returned in comma-delimited ASCII format. Each parameter will be returned as "NAME=VALUE[ UNITS],"

Valid parameter names are:

Parameter Name	Description
SN	Instrument serial #
UNIT_NAME	Instrument name
TYPE	The data type (Setup or Data)
DESCR	Trace name
DATE	Trace date/time
BASE_VER	Base FW version
APP_NAME	Application name
APP_VER	Application FW version
APP_MODE	Application Mode

<b>Parameter Name</b>	<b>Description</b>
CENTER_FREQ	Center frequency
AUTO_SCRAMBLING_CODE	Auto scrambling code detection on/off
SCRAMBLING_CODE	Selected manual scrambling code
MAX_SPREADING_FACTOR	Maximum spreading factor
REFERENCE_LEVEL	Reference Level
THRESHOLD	Active channel threshold
CURRENT_MEASUREMENTS	Currently active measurements
SCALE	Display scale (dB/division)
POWER_OFFSET	Applied power offset
SCCPCH_CODE	Selected S-CCPCH channelization code
PICH_CODE	Selected PICH channelization code
CURRENT_VIEW	Current view
CDP_ZOOM	Zoom range for code domain power
CDP_ZOOM_START	Start code for zoom window
REFERENCE_FREQUENCY	Reference Frequency
SCCPCH_SPREAD_FCT	Selected S-CCPCH spreading factor
RUN_HOLD	Run/hold state
EXT_REF_FREQ	Selected external reference frequency
DYNAMIC_ATTENUATION	Dynamic range on/off
ACLR_DISPLAY_GRAPH	Display ACLR trace on/off
MARKER_TABLE	Marker table on/off
OTA_AUTO_SC	OTA auto scrambling code on/off
OTA_CODE_LOCK	OTA code lock on/off
OTA_DISPLAY_VALUE	Selected OTA display value
OTA_SORT_PARAM	Selected OTA sort parameter
OTA_MANUAL_SC_1	Selected manual scrambling code 1
OTA_MANUAL_SC_2	Selected manual scrambling code 2
OTA_MANUAL_SC_3	Selected manual scrambling code 3
OTA_MANUAL_SC_4	Selected manual scrambling code 4
OTA_MANUAL_SC_5	Selected manual scrambling code 5

OTA_MANUAL_SC_6	Selected manual scrambling code 6
CODOGRAM_SINGLE_SWEEP_TIME	Single sweep time for codogram
TEST_MODEL	Current pass fail model being tested
CONSTELLATION_CODE	Code number for which IQ data is being displayed
CONSTELLATION_SPREAD	Spreading factor of code for which IQ data is being displayed
NUM_OF_ACLR_MAIN_CHANNELS	Number of main channels
NUM_OF_ACLR_MAIN_CHANNELS	Number of adjacent channels
BAND_SPECTRUM_START_FREQ	Band spectrum start frequency
BAND_SPECTRUM_STOP_FREQ	Band spectrum stop frequency
DL_CHANNEL_NUMBER	Currently selected band spectrum channel
AUTO_THRESHOLD	Auto threshold value
HSDPA_DEMOD_SINGLE_SWEEP_TIME	Single sweep time for hsdpa
BAND_SPECTRUM_REFERENCE_LEVEL	Reference level for band spectrum
CONSTELLATION_PERSISTENCE	Persistence level for IQ data
SIGNAL_STANDARD	Current Signal standard
CHANNEL	Current channel
CONSTELLATION_MARKER	Display location of the IQ marker

Parameter Name	Description
RF_MKR_POINT_[1] 2 3 4 5 6	RF marker point number
RF_MKR_STATE_[1] 2 3 4 5 6	RF marker on/off

Parameter Name	Description
DEMOD_MKR_POINT_[1] 2 3 4 5 6	Code domain marker point number
DEMOD_MKR_STATE_[1] 2 3 4 5 6	Code domain marker on/off

Parameter Name	Description
CODOGRAM_MKR_POINT_1	Codogram marker point number
CODOGRAM_MKR_STATE_1	Codogram marker on/off
CODOGRAM_MKR_TIME_1	Codogram marker time offset

See Also:	:TRACe:DATA
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## 3.5 Fixed WiMAX

This section contains the Fixed WiMax remote commands. These commands are available in the MS2717B, MS2718B, and MS2719B.

### **Abort Subsystem**

The abort subsystem includes commands that allow the user to stop current measurement activities on the instrument.

#### **Abort**

##### **:ABORt**

Restarts the current sweep and/or measurement. Resets the trigger system.

If `:INITiate:CONTinuous` is OFF (i.e. the instrument is in single sweep mode), send the command `:INITiate[:IMMediate]` to trigger the next sweep.

If `:INITiate:CONTinuous` is ON (i.e. the instrument is in continuous sweep mode) a new sweep will start immediately.

See Also:	<code>:INITiate:CONTinuous</code> <code>:INITiate[:IMMediate]</code>
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### **Display Subsystem**

This subsystem provides commands that modify the display of data for the user. They do not modify the way in which data are returned to the controller.

#### **Max Hold State**

**:DISPlay:WINDow:TRACe:MAXHold OFF|ON|0|1**

**:DISPlay:WINDow:TRACe:MAXHold?**

Specifies whether the Max Hold is ON or OFF.

The default value is ON. That is, sending `:DISP:WIND:TRAC:MAXH` is equivalent to sending `:DISP:WIND:TRAC:MAXH ON`

The query version of the command returns a 1 if Max Hold is set to ON and returns a 0 if the Max Hold is set to OFF.

Note that this command is available only in the Spectrum and EVM vs. Sub-carrier views.

Factory Preset / *RST:	OFF
Front Panel Access:	Shift-5 (Trace), Max Hold

## Power Offset

**:DISPlay:WINDow:TRACe:Y[:SCALE]:OFFSet <rel ampl>**  
**:DISPlay:WINDow:TRACe:Y[:SCALE]:OFFSet?**

Sets the power offset value for the y-axis.

Factory Preset / *RST:	0 dB
Range:	0 dB to 100 dB
Default Unit:	dB
Front Panel Access:	Amplitude, Power Offset

## Scale

**:DISPlay:WINDow:TRACe:Y[:SCALE]:PDIVision <value>**  
**:DISPlay:WINDow:TRACe:Y[:SCALE]:PDIVision?**

Sets the scale per division for the y-axis. The units change from dB/div to % when EVM is the y-axis value.

The resolution per division value is maintained separately for each measurement.

Factory Preset / *RST:	Spectral Flatness : 1dB/div EVM vs. SubCarrier: 0.50% EVM vs. Symbol : 0.50% All others : 10dB/div
Range:	EVM vs. SubCarrier: 0.1% to 10% EVM vs. Symbol : 0.1% to 10% All others : 1dB to 15dB
Default Unit:	Current active amplitude unit
Front Panel Access:	Amplitude, Scale

## Y Axis Max

**:DISPlay:WINDow:TRACe:Y[:SCALE]:TOP <amplitude>**  
**:DISPlay:WINDow:TRACe:Y[:SCALE]:TOP?**

Sets the maximum value of the Y axis.

Note that this command is available only in the Spectral Flatness and EVM vs. Symbol/Sub-carrier views.

Factory Preset / *RST:	Spectral Flatness : 5dB EVM vs. Symbol : 5% EVM vs. Sub-carrier : 5%
Range:	Spectral Flatness : -5dB to 5dB EVM vs. Symbol : 1% to 100% EVM vs. Sub-carrier : 1% to 100%
Default Unit:	Current active amplitude unit
Front Panel Access:	Amplitude, Y Axis Max

## ***Format Subsystem***

This subsystem contains commands that determine the formatting of numeric data when it is transferred.

The format setting affects data in specific commands only. If a command is affected, it will be noted in the command description.

### **Numeric Data Format**

**:FORMat[:READings][:DATA] ASCii|INTEger,32|REAL,32**

**:FORMat[:READings][:DATA]?**

This command specifies the format in which data is returned in certain commands.

ASCii format returns the data in comma-separated ASCII format. The units are the current instrument units. This format requires many more bytes so it will be the slowest format.

INTEger 32 values are signed 32-bit integers in little-endian byte order. This format returns the data in 4-byte blocks.

REAL,32 values are 32-bit floating point numbers conforming to the IEEE 754 standard in little-endian byte order. This format returns the data in 4-byte binary format. The units are the current instrument units.

Both INTEger,32 and REAL,32 formats return a definite block length. Each transfer begins with an ASCII header such as #42204. The first digit represents the number of following digits in the header (in this example, 4). The remainder of the header indicates the number of bytes that follow the header (in this example, 2204). You then divide the number of following bytes by the number of bytes in the data format you've chosen (4 for both INTEger,32 and REAL,32...so 2204/4) to get the number of data points (in this example, 551).

Factory Preset / *RST:	ASCii
See Also:	:TRACe[:DATA]

## ***INITiate Subsystem***

This subsystem controls the triggering of measurements.

### **Continuous/Single Sweep**

**:INITiate:CONTInuous OFF|ON|0|1**

**:INITiate:CONTInuous?**

Specifies whether the sweep/measurement is triggered continuously.

If the value is set to ON or 1, another sweep/measurement is triggered as soon as the current one completes.

If continuous is set to OFF or 0, the instrument enters the "idle" state and waits for the :INITiate[:IMMediate] command or for :INITiate:CONTInuous ON.

The default value is ON. That is, sending `:INIT:CONT` is equivalent to sending `:INIT:CONT ON`

The query version of the command returns a 1 if the instrument is continuously sweeping/measuring and returns a 0 if the instrument is in single sweep/measurement mode.

Factory Preset / *RST:	ON
Front Panel Access:	Shift-3 (Sweep), Sweep (Single/Continuous)
See Also:	<code>:INITiate[:IMMediate]</code>

### Trigger Sweep/Measurement

**`:INITiate[:IMMediate]`**

Initiates a sweep/measurement.

If `:INITiate:CONTinuous` is set to ON, this command is ignored.

Use this command in combination with `:STATus:OPERation?` to synchronize the capture of one complete set of data. When this command is sent, the “sweep complete” bit of `:STATus:OPERation?` is set to 0, indicating that the measurement has not completed. The data collection is then triggered. The controlling program can poll `:STATus:OPERation?` to determine the status. When the “sweep complete” bit is set to 1, data is ready to be retrieved.

Front Panel Access:	SPA: Shift-3 (Sweep), Manual Trigger WCDMA: Shift-3 (Sweep), Trigger Sweep Fixed WiMAX: Shift 3(Sweep), Trigger Sweep
See Also:	<code>:INITiate:CONTinuous</code> <code>:STATus:OPERation?</code>

### *INSTrument Subsystem*

One instrument may contain many logical instruments (“modes”). This subsystem controls the selection of the current instrument mode.

#### Query Available Modes

**`:INSTrument:CATalog:FULL?`**

Returns a comma-separated list of available modes. Mode names are enclosed in double quotes (“”). Immediately following the string name is the application number.

For example: `"SPA"1, "WCDMA"5, "VNA"2, "WIMAX_D"18, "SCOPE"17`

Front Panel Access:	Shift-9 (Mode)
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## Select Mode by Number

**:INSTRument:NSElect <integer>**  
**:INSTRument:NSElect?**

Sets the instrument mode based on the value of <integer>.

The query version returns the number associated with the current mode.

Use **:INSTRument:CATalog:FULL?** to get a list of available mode names and their integer representations.

Factory Preset / *RST:	MS2721A: 1 MS2717A: 1 MT8220A: 1 MS2012A: 2 MS2024A: 2 MS2026A: 2 MS2034A: 2 MS2036A: 2 MS2717B: 1 MS2718B: 1 MS2719B: 1
Front Panel Access:	Shift-9 (Mode)
See Also:	:INSTRument:CATalog:FULL? :INSTRument[:SElect]

## Select Mode by Name

**:INSTRument[:SElect] <string>**  
**:INSTRument[:SElect]?**

Sets the instrument mode based on the mode name specified by <string>.

The query version returns the name of the current mode.

Use **:INSTRument:CATalog:FULL?** to get a list of available modes.

Factory Preset / *RST:	MS2721A: "SPA" MS2717A: "SPA" MT8220A: "SPA" MS2012A: "VNA" MS2024A: "VNA" MS2026A: "VNA" MS2034A: "VNA" MS2036A: "VNA" MS2717B: "SPA" MS2718B: "SPA" MS2719B: "SPA"
Front Panel Access:	Shift-9 (Mode)
See Also:	:INSTRument:CATalog:FULL? :INSTRument:NSElect

## **MMEMory Subsystem**

The Mass MEMory subsystem contains functions that provide access to the instrument's setup and data storage.

### **Delete Setup/Measurement**

**:MMEMory:DELEte <file name>**

Removes the measurement or setup file specified by <file name> from the current mass storage device.

<file name> should be enclosed in either single quotes (') or double quotes (") and should contain a file extension ".stp" for setup and ".wmx" for measurement.

Use the command **MMEMory:MSIS** to set the current mass storage location.

Front Panel Access:	Shift-7 (File), Delete, Delete Selected File
See Also:	:MMEMory:STORE:STATE, :MMEMory:STORE:TRACe, :MMEMory:MSIS INTernal   USB   CFLash

### **Format Storage Device**

**:MMEMory:INITialize [CFLash]**

Formats the compact flash. Issuing this command will erase all files on an installed Compact Flash module and create the /usr directory for storage of measurements, setups and jpg files.

Front Panel Access:	Shift-7 (File), Directory Management, Format Compact Flash
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### **Recall Setup**

**:MMEMory:LOAD:STATE <integer>,<file name>**

Recalls a previously stored instrument setup in the current storage location. The setup file to be loaded is specified by <file name>.

<file name> should be enclosed in either single quotes (') or double quotes (") and should contain a file extension ".stp".

Use the command **MMEMory:MSIS** to set the current storage location.

The <integer> parameter is not currently used, but it must be sent. Send a 1.

Front Panel Access:	Shift-7 (File), Recall, Recall Setup
See Also:	:MMEMory:STORE:STATE, :MMEMory:MSIS INTernal   USB   CFLash

## Recall Measurement

**:MMEMory:LOAD:TRACe <integer>,<file name>**

Recalls a previously stored measurement trace from the current storage location. The saved measurement trace to be loaded is specified by <file name>.

<file name> should be enclosed in either single quotes (‘’) or double quotes (‘‘’) and should contain a file extension “.wmx”. Note that the trace specified by <file name> should be available at the current mass storage location.

Use the command **MMEMory:MSIS** to set the current mass storage location.

The <integer> parameter is not currently in used, but it must be sent. Send a 1.

Front Panel Access:	Shift-7 (File), Recall, Recall Measurement
See Also:	:MMEMory:STORe:TRACe , :MMEMory:MSIS INTernal   USB   CFLash

## Storage Location

**MMEMory:MSIS INTernal | USB | CFLash**

**MMEMory:MSIS?**

Sets the storage location.

Setting the storage location to **INTernal** will set the current storage location to be the internal memory.

Setting the storage location to **USB** will set the current storage location to be the USB Flash drive.

Setting the storage location to **CFLash** will set the current storage location to be the Compact Flash memory.

Note that changing the current location to save files causes the “Copy To Destination” on the front panel to be automatically changed if the selected storage location is the same as the selected current location.

Note that the storage location must be available in order for it to be set.

Front Panel Access:	Shift-7 (File), Directory Management, Current Location
See Also:	:MMEMory:MSIS:DESTination

## Copy From Current Location To Destination

**:MMEMory:MSIS:COpy**

Copies all measurements, setups and jpg files stored in the current storage location to the “copy to destination” location.

Front Panel Access:	Shift-7 (File), Directory Management, Copy From Current Location To Destination
See Also:	:MMEMory:MSIS :MMEMory:MSIS:DESTination

## Copy to Destination

**:MMEMory:MSIS:DESTination INTernal | USB | CFLash**

**:MMEMory:MSIS:DESTination?**

Sets the destination to where measurements and setups in the current storage location will be copied.

Setting the location to INTernal will result in copying the files that are stored at the current storage location to the internal memory when the command

:MMEMory:MSIS:COpy is send.

Setting the location to USB will result in copying the files that are stored at the current storage location to the USB Flash drive when the command :MMEMory:MSIS:COpy is send..

Setting the location to CFLash will result in copying the files that are stored at the current storage location to the Compact Flash memory when the command

:MMEMory:MSIS:COpy is send.

Note that changing the destination to which the instrument will copy files, will automatically changed the “Current Location” on the front panel if the current location is the same as the selected copy to destination.

Front Panel Access:	Shift-7 (File), Directory Management, Copy To Destination
See Also:	:MMEMory:MSIS :MMEMory:MSIS:COpy

## Save Setup

**:MMEMory:STORe:STAtE <integer>,<file name>**

Stores the current setup into the file specified by <file name>.

<file name> should be enclosed in either single quotes (') or double quotes (") and should not contain a file extension.

The <integer> parameter is not currently used, but it must be sent. Send a value of 0.

Front Panel Access:	Shift-7 (File), Save, Save Setup
See Also:	:MMEMory:LOAD:STAtE

## Save Measurement

**:MMEMory:STORe:TRACe <integer>,<file name>**

Stores the trace into the file specified by <file name>.

<file name> should be enclosed in either single quotes (') or double quotes (") and should not contain a file extension.

The <integer> parameter is not currently used, but it must be sent. Send a 0.

Front Panel Access:	Shift-7 (File), Save, Save Measurement
See Also:	:MMEMory:LOAD:TRACe

## SENSe Subsystem

The commands in this subsystem relate to device-specific parameters, not signal-oriented parameters.

### **[[:SENSe]:BANDwidth|BWIDth] Subsystem**

This subsystem contains commands related to the filter bandwidth of the instrument.

#### **Resolution Bandwidth**

**[[:SENSe]:BANDwidth|BWIDth[:RESolution] <index>**

**[[:SENSe]:BANDwidth|BWIDth[:RESolution]?**

Sets the resolution bandwidth.

The <index> argument is a 1-based index of the position of the desired bandwidth in the instrument's current bandwidth list. The list can be seen on the instrument by choosing the "BW" soft-key button in the "Setup" menu. For example, if the desired bandwidth is the 3<sup>rd</sup> item on the list then the value of the <index> argument would be 3.

The query form of this command will return the index of the currently-selected bandwidth on the list.

Factory Preset / *RST:	The default bandwidth is 1.25MHz which is the 1 <sup>st</sup> index in the bandwidth list.
Front Panel Access:	Setup, BW

## Cyclic Prefix Ratio (G)

**[ :SENSe ]:CPRatio <index>**

**[ :SENSe ]:CPRatio?**

Selects the desired Cyclic Prefix Ratio from the list.

The **<index>** argument is a 1-based index of the position of the desired CP Ratio in the instrument's current CP Ratio list. The list can be seen on the instrument by choosing the "CP Ratio (G)" soft-key button in the "Setup" menu. For example, if the desired CP Ratio is the 3<sup>rd</sup> item on the list then the value of the **<index>** argument would be 3.

The query form of this command will return the index of the currently-selected CP Ratio on the list.

Factory Preset / *RST:	The default CP Ratio is 1/4 which is the 1 <sup>st</sup> index in the CP Ratio list.
Front Panel Access:	Setup, CP Ratio (G)

## Down Link Frame Length

**[ :SENSe ]:DLFLength 2.5 | 5 | 10**

**[ :SENSe ]:DLFLength?**

Set the Down Link Frame Length.

Setting the length to 2.5 will result in setting the Frame Length to 2.5 ms.

Setting the length to 5 will result in setting the Frame Length to 5 ms.

Setting the length to 10 will result in setting the Frame Length to 10 ms.

The query form of this command will return the Down Link Frame Length in unit of seconds.

Factory Preset / *RST:	2500 $\mu$ s
Default Unit:	seconds
Front Panel Access:	Setup, DL Frame Length

## **[[:SENSE]:FREQUENCY Subsystem**

Commands in this subsystem pertain to the frequency settings of the instrument.

### **Center Frequency**

**[[:SENSE]:FREQUENCY:CENTER <freq>**

**[[:SENSE]:FREQUENCY:CENTER?**

Sets the receiver center frequency.

Factory Preset / *RST:	2.5 GHz
Range:	0Hz – 7.1 GHz
Default Unit:	Hz
Front Panel Access:	Freq, Center Freq

### **External Reference Frequency**

**[[:SENSE]:FREQUENCY:EXTERNAL <freq value>**

**[[:SENSE]:FREQUENCY:EXTERNAL?**

Sets the desired external reference frequency. The <freq value> in MHz must be one of the following values:

1|1.2288|1.544|2.048|2.4576|4.8|4.9152|5|9.8304|10|13|19.6608

The query form of this command will return the external reference frequency in Hz.

Front Panel Access:	Setup, Ext. Reference Frequency
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### **Signal Standard**

**[[:SENSE]:FREQUENCY:SIGSTANDARD <index>**

**[[:SENSE]:FREQUENCY:SIGSTANDARD?**

Selects the desired signal standard from the list.

The <index> argument is a 1-based index of the position of the desired signal standard in the instrument's current signal standard list. The list can be seen on the instrument by choosing the "Signal Standard" soft-key button in the "Frequency" menu. For example, if the desired Signal Standard is the 3<sup>rd</sup> item on the list then the value of the <index> argument would be 3.

The query form of this command will return the index of the currently-selected Signal Standard on the list.

Front Panel Access:	Frequency, Signal Standard
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## Channel Selection

**[ :SENSe ] :FREQuency :SIGStandard :CHANnel <number>**

**[ :SENSe ] :FREQuency :SIGStandard :CHANnel ?**

Sets the channel number for the selected signal standard.

Front Panel Access:	Frequency, Channel
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## **[ :SENSe ] :POWER Subsystem**

This subsection relates to the power amplitude parameters of the instrument.

### Automatic Amplitude Range

**[ :SENSe ] :POWER [ :RF ] :RANGe :AUTO OFF | ON | 0 | 1**

**[ :SENSe ] :POWER [ :RF ] :RANGe :AUTO ?**

Sets the automatic amplitude range.

Setting the value to ON or 1 will result in the amplitude range being coupled to the detected input signal level.

Setting the value to OFF or 0 will result in the input attenuation being un-coupled from the input signal level. That is, changing the input signal level will not change the amplitude range. When this command is issued, the amplitude range itself will not change.

The default value is ON. That is, sending `:SENS:POW:RANG:AUTO` is equivalent to sending `:SENS:POW:RANG:AUTO ON`.

Factory Preset / *RST:	ON
Front Panel Access:	Amplitude, Auto Range
See Also:	<code>[ :SENSe ] :POWER [ :RF ] :RANGe</code>

### Amplitude Range

**[ :SENSe ] :POWER [ :RF ] :RANGe [ :IMMediate ]**

Re-calculates amplitude range.

Note that issuing this command will set the automatic dynamic range OFF.

Front Panel Access:	Amplitude, Adjust Range
See Also:	<code>[ :SENSe ] :POWER [ :RF ] :RANGe :AUTO</code>

## **STATus Subsystem**

The commands in this subsystem relate to the current operating state of the instrument.

### **Query Operation Status**

**:STATus:OPERation?**

This command requests information about the current status of the instrument. Each bit of the return value represents some operation. Only a subset of the bits will be implemented for each application.

The number returned will be the decimal representation of the bit-wise OR of the enabled bits.

Bit	Decimal Value	Description
0	1	Not implemented
1	2	Not implemented
2	4	Not implemented
3	8	Not implemented
4	16	Not implemented
5	32	Not implemented
6	64	Not implemented
7	128	Not implemented
8	256	Sweep Complete – This bit will be set to 0 when the command :INITiate[:IMMediate] is sent to trigger a sweep. It will have a value of 1 when the sweep has completed.
9	512	Not implemented
10	1024	Not implemented
11	2048	Not implemented
12	4096	Not implemented
13	8192	Not implemented
14	16384	Not implemented
15	0	Will always be 0

## **SYSTEM Subsystem**

This subsystem contains commands that affect instrument functionality that does not directly relate to data collection, display or transfer.

### **Query Installed Options**

**:SYSTEM:OPTions?**

Returns a string of the installed options. Options will be separated by a “/”.

The string will return “NONE” if no options are installed.

See Also:	*IDN?
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## Preset

**:SYSTEM:PRESet**

This command restores all application parameters to their factory preset values. This does not modify system parameters such as Ethernet configuration, language, volume or brightness.

Front Panel Access:	Shift-1 (Preset), Preset
See Also:	*RST

## **SYSTEM:FILE Subsystem**

This subsystem provides commands that modify how file lists should be displayed on the instrument. They do not modify the way in which data is returned to the controller.

### File Lists Sort Method

**:SYSTEM:FILE:SORT:METHod NAME | TYPE | DATE**

**:SYSTEM:FILE:SORT:METHod?**

Sets the file lists sort method.

Setting the sort method to NAME will result in file lists sorted by the name of the file.

Setting the sort method to TYPE will result in the file lists sorted by the type of file.

Setting the sort method to DATE will result in the file lists sorted by the date that the file was saved.

Front Panel Access:	Shift-7 (File), Directory Management, Sort Method
See Also:	:SYSTEM:FILE:SORT:ORDER

### File Lists Sort Order

**:SYSTEM:FILE:SORT:ORDER ASCend | DESCend**

**:SYSTEM:FILE:SORT:ORDER?**

Sets the file lists sort order.

Setting the sort order to ASCend will result in file lists sorted from lowest to highest.

Setting the sort order to DESCend will result in the file lists sorted from highest to lowest.

When sorting by name, the sort will place file names that start with numbers before file names that start with letters.

Front Panel Access:	Shift-7 (File), Directory Management, Sort Order
See Also:	:SYSTEM:FILE:SORT:METHod

## Trace Subsystem

This subsystem contains commands related to the transfer of trace data to and from the instrument.

### Trace Data Transfer

**:TRACe[:DATA]? <trace type>**

This command transfers trace data from the instrument to the controller. The <trace type> must be one of the following:

SPECTrum | PVTime | CONSTln | SFLatness | EVSCarrier | EVSYmbol

The format of the block data in the query form is specified by :FORMat:DATA. The block data in the command form is always sent in ASCII format.

The response begins with an ASCII header that specifies the number of data bytes. It looks like #AX, where A is the number of digits in X and X is the number of bytes that follow the header. Each data point is separated by a comma delimiter.

Trace setup information can be acquired using :TRACe[:DATA]:PREamble?.

Use the commands in the MMEMory subsystem to store and recall traces from the instrument memory.

Except for CONSTln there is only one value per data point. If max hold is set to ON for SPECTrum and EVM vs. Sub Carrier then the max hold value is returned. For CONSTln, each data point is represented by 3 values 4 bytes each: IData (no units), QData (no units), and the constellation type (no units).

For SPECTrum and PVTime unit is in dBm. For Spectral Flatness unit is in dB. For EVM vs Sub Carrier and EVM vs Symbol unit is in percent.

Note that the instrument must be set in the selected view. Use the CONFigure command to set the unit to the selected view.

See Also:	:FORMat:DATA :TRACe[:DATA]:PREamble?
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### Trace Header Transfer

**:TRACe:PREamble? <trace type>**

Returns trace header information for the specified trace. The <trace type> must be one of the following: SPECTrum|PVTime|ACPR|CONSTln|SFLatness|EVSCarrier|EVSYmbol

Data can be transferred to and from the 7 available display trace types. Use the commands in the MMEMory subsystem to store and recall traces from the instrument memory.

The response begins with an ASCII header. The header specifies the number of following bytes. It looks like #AX, where A is the number of digits in X and X is the number of bytes that follow the header.

Parameters are returned in comma-delimited ASCII format. Each parameter will be returned as “NAME=VALUE[ UNITS],”

Valid parameter names are:

<b>Parameter Name</b>	<b>Description</b>
SN	Instrument serial #
UNIT_NAME	Instrument name
TYPE	The data type (Setup or Data)
DESCR	Trace name
DATE	Trace date/time
BASE_VER	Base FW version
APP_NAME	Application name
APP_VER	Application FW version
APP_MODE	Application Mode

<b>Parameter Name</b>	<b>Description</b>
REFERENCE_LEVEL	Reference Level
UNITS	Amplitude units
SCALE	Y axis scale
CENTER_FREQ	Center freq
SIGNAL_STANDARD	Current signal standard(the value is the index of the signal standard list, where a value of 0 is the first index in the list)
CHANNEL	Current channel
POWER_OFFSET	Applied power offset
REFERENCE_FREQUENCY	Selected external reference frequency
UNITS	Amplitude units
CURRENT_VIEW	Current view
CURRENT_MEASUREMENTS	Current measurements
DYNAMIC_ATTENUATION	Dynamic range on/off
SPAN	Frequency span
PVT_FRAME_START_TIME	Power vs. Time start time
PVT_FRAME_STOP_TIME	Power vs. Time stop time

BW_SELECT	Current Bandwidth (MHz)
CURRENT_SPECTRUM_VIEW	Current spectrum view (single or multiple channel spectrum)
I_Q_VIEW	IQ view
RUN_HOLD	Run/Hold on/off
TEST_MODEL	Current pass fail model being tested
CP_RATIO	Cyclic Prefix Ratio (the value is the index of the CP Ratio list, where a value of 0 is the first index in the list)
SPECTRUM_SPAN	Spectrum frequency span(the value is the index of the span list, where a value of 0 is the first index in the list)
AUTO_SPAN	Auto span on/off
MAX_HOLD	Max hold on/off
EVM_SUB_CARRIER_TOP	Y Axis Max for EVM vs. Symbol/Sub-Carrier
EVM_SUB_CARRIER_SCALE	EVM vs. Symbol/Sub-Carrier scale
SPECTRAL_FLATNESS_SCALE	Spectral Flatness scale
ACPR_DISPLAY_GRAPH	Display ACPR trace on/off
NUM_OF_ACPR_MAIN_CHANNELS	Number of main channels
NUM_OF_ACPR_ADJC_CHANNELS	Number of adjacent channels
CONSTELLATION_REFERENCE_POINTS	Constellation reference points on/off
SPECTRAL_FLATNESS_TOP	Y Axis Max for Spectral Flatness
SPECTRAL_FLATNESS_EVM_SUB_START	Spectral Flatness/EVM vs. sub-carrier start
SPECTRAL_FLATNESS_EVM_SUB_STOP	Spectral Flatness/EVM vs. sub-carrier stop
EVM_SYM_START	EVM vs. Symbol start
EVM_SYM_STOP	EVM vs. Symbol stop

See Also:	:TRACe:DATA?
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## 4 Measurement Commands

### Measurement Command Overview

The measurement commands provide a high-level set of commands to access instrument specific measurements. While the group of measure instructions is defined in the SCPI standard, the implementation of many specific measurements is not. The five measurement instructions are defined below. The behavior of each command will be defined with each measurement.

#### ***MEASure***

This command is the most high-level command. It combines the commands **CONFigure** and **READ** commands.

#### ***CONFigure***

This command takes the instrument from its current state, enables the measurement and puts the instrument into single sweep mode, awaiting an **:INITiate** command. It corrects any parameters that are invalid given the new measurement state such that a valid measurement can take place. Other settings may be changed, see the documentation of **CONFigure** for each measurement.

#### ***READ***

This command combines the **ABORt**, **INITiate** and **FETCh** commands. It makes the measurement based on the current configuration of the instrument. It will not return until data collection is complete.

#### ***INITiate***

This command begins the collection of data.

#### ***FETCh***

This command calculates and returns the acquired data. It will not return until data collection is complete.

### 4.1 GSM

This section contains the GSM measurement remote commands

#### ***CONFigure Commands***

This set of commands prepares the instrument for the selected measurement. It disables any currently-enabled measurements and activates the specified measurement. It sets the instrument to single sweep mode, waiting for an **:INITiate** command. It will not initiate the taking of a measurement.

Current instrument settings may be changed to default values. These changes will be identified with their respective measurement commands.

## Configure Query

### CONFigure?

CONFigure? query returns the name of the measurement previously set up using a CONFigure command or a MEASure? query. The following table shows the possible return values and the actual names of each configuration.

Returns Value	Actual Name
SPEC, SING	Single Channel Spectrum
SPEC, MULT	Multi-Channel Spectrum
PVTF	Power vs. Time (Frame)
PVTS	Power vs. Time (Slot)
DEM	Demodulator
PF	Pass/Fail
SUMM	Summary

## Configure Demodulator Measurement

### CONFigure:DEMod

This command configures the Demodulator measurement. It disables any other active measurements.

None of the instrument parameters are changed by the execution of this command.

Sets the instrument to single sweep mode (:INITiate:CONTinuous OFF).

Measurement settings can be modified by using the [:SENSE] commands before initiating a measurement.

Required Options:	41
Front Panel Access:	Shift-4(Measurement), Demodulator
See Also:	MEASure:DEMod? READ:DEMod? FETCh:DEMod?

## Configure PASS/FAIL Measurement

### CONFigure:PFail

This command configures the PASS/FAIL measurement. It disables any other active measurements.

None of the instrument parameters are changed by the execution of this command.

Sets the instrument to single sweep mode ( :INITiate:CONTinuous OFF).

Measurement settings can be modified by using the [ :SENSe ] commands before initiating a measurement.

Front Panel Access:	Shift-4(Measurement), PASS/FAIL
See Also:	FETCh:PFail? MEASure:PFail? READ:PFail?

## Configure Power vs. Time (Frame) Measurement

### CONFigure:PVTFrame

This command configures the Power vs. Time (Frame) measurement. It disables any other active measurements.

None of the instrument parameters are changed by the execution of this command.

Sets the instrument to single sweep mode ( :INITiate:CONTinuous OFF).

Measurement settings can be modified by using the [ :SENSe ] commands before initiating a measurement.

Required Options:	40
Front Panel Access:	Shift-4(Measurement), Power vs. Time (Frame)
See Also:	MEASure:PVTFrame? READ:PVTFrame? FETCh:PVTFrame?

## Configure Power vs. Time (Slot) Measurement

### CONFigure:PVTSlot

This command configures the Power vs. Time (Slot) measurement. It disables any other active measurements.

None of the instrument parameters are changed by the execution of this command.

Sets the instrument to single sweep mode ( :INITiate:CONTinuous OFF).

Measurement settings can be modified by using the [ :SENSe ] commands before initiating a measurement.

Required Options:	40
Front Panel Access:	Shift-4(Measurement), Power vs. Time (Slot)
See Also:	MEASure:PVTSlot? READ:PVTSlot? FETCh:PVTSlot?

## Configure Multi-Channel Spectrum Measurement

### **CONFigure:SPECTrum:MULTi**

This command configures the Multi-Channel Spectrum measurement. It disables any other active measurements.

None of the instrument parameters are changed by the execution of this command.

Sets the instrument to single sweep mode ( :INITiate:CONTinuous OFF).

Measurement settings can be modified by using the [ :SENSe ] :RF commands before initiating a measurement.

Required Options:	40
Front Panel Access:	Shift-4(Measurement), Spectrum, Multi-Channel Spectrum
See Also:	MEASure:SPECTrum:MULTi? READ:SPECTrum:MULTi? FETCh:SPECTrum:MULTi?

## Configure Single Channel Spectrum Measurement

### **CONFigure:SPECTrum:SINGLE**

This command configures the Single Channel Spectrum measurement. It disables any other active measurements.

None of the instrument parameters are changed by the execution of this command.

Sets the instrument to single sweep mode ( :INITiate:CONTinuous OFF).

Measurement settings can be modified by using the [ :SENSe ] :RF commands before initiating a measurement.

Required Options:	40
Front Panel Access:	Shift-4(Measurement), Spectrum, Single Channel Spectrum
See Also:	MEASure:SPECTrum:SINGLE? READ:SPECTrum:SINGLE? FETCh:SPECTrum:SINGLE?

## Configure Summary Measurement

### CONFigure:SUMMARY

This command configures the summary of all the GSM related numerical measurement results. It disables any other active measurements.

None of the instrument parameters are changed by the execution of this command.

Sets the instrument to single sweep mode ( :INITiate:CONTinuous OFF).

Measurement settings can be modified by using the [ :SENSe ] commands before initiating a measurement.

Front Panel Access:	Shift-4(Measurement) , GSM/EDGE Summary
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## FETCh Commands

This set of commands returns the most recent measurement data of the active measurement. They will not switch to another measurement.

To make a new measurement, use the INITiate command. To get new measurement data, use the READ or MEASure query commands.

## Fetch Demodulator

### FETCh:DEMod?

Returns the most recent Demodulator measurement results.

The Demodulator measurement must be the active measurement. The current measurement can be queried using CONFigure?. Use the CONFigure:DEMod command to set Demodulator as the active measurement.

Data is returned as 9 comma-delimited values: Phase Error (rms), Phase Error (peak), EVM (rms) in %, EVM (peak) in %, Origin Offset in dB, C/I in dB, Magnitude Error (rms) in %, Modulation Type, and TSC.

“--“ is returned for data that is not valid at that instance.

Required Options:	41
See Also:	MEASure:DEMod? CONFigure:DEMod READ:DEMod?

## Fetch PASS/FAIL

### FETCh:PFail?

Returns the most recent PASS/FAIL measurement results.

Measurement results are returned in a block of ASCII text in the format of <header><block>. The ASCII header specifies the number of data bytes. It looks like #AX, where A is the number of digits in X and X is the number of bytes in the <block>.

The block consists of a set of records which indicate individual test results. Records are comma-separated. Each record follows the format <test ID>: <input1> <input2> <min> <max> <value1> <value2> <PASS/FAIL/OPTION NOT INSTALLED>. The <test ID> field indicates which test was performed to retrieve these results. The < input1> and < input2> fields indicate the test setup. The <min> and <max> fields indicate the minimum and maximum values against which <value1> and <value2> were compared to arrive at the final PASS/FAIL result.

If the specified test is not available in the instrument, the <PASS/FAIL> field will indicate “option not available” instead of “pass” or “fail”.

All unused fields for a given test will be represented by a double dash (“--”).

The Pass/Fail measurement must be the active measurement. The current measurement can be queried using CONFigure?. Use the CONFigure:PFail Pass/Fail as the active measurement.

See Also:	MEASure:PFail? CONFigure:PFail READ:PFail?
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## Fetch Power vs. Time (Frame)

### **FETCh:PVTFrame?**

Returns the most recent Power vs. Time (Frame) measurement results.

The Power vs. Time (Frame) measurement must be the active measurement. The current measurement can be queried using CONFigure?. Use the CONFigure:PVTFrame command to set Power vs. Time (Frame) as the active measurement.

Data is returned as 9 comma-delimited values: Channel Power in dBm, Burst Power in dBm, Average Burst Power in dBm, Span in MHz, Occupied Bandwidth in MHz, Frequency Error in MHz, Frequency Error (ppm), Modulation Type, and TSC.

“--“ is returned for each data that is not valid at that instance.

Required Options:	40
See Also:	MEASure:PVTFrame? CONFigure:PVTFrame READ:PVTFrame?

## Fetch Power vs. Time (Slot)

### **FETCh:PVTSlot?**

Returns the most recent Power vs. Time (Slot) measurement results.

The Power vs. Time (Slot) measurement must be the active measurement. The current measurement can be queried using CONFigure?. Use the CONFigure:PVTSlot command to set Power vs. Time (Slot) as the active measurement.

Data is returned as 9 comma-delimited values: Channel Power in dBm, Burst Power in dBm, Average Burst Power in dBm, Span in MHz, Occupied Bandwidth in MHz, Frequency Error in MHz, Frequency Error (ppm), Modulation Type, and TSC.

--“ is returned for each data that is not valid at that instance.

Required Options:	40
See Also:	MEASure:PVTSlot? CONFigure:PVTSlot READ:PVTSlot?

## Fetch Multi-Channel Spectrum

### **FETCh:SPECTrum:MULTi?**

Returns the most recent Multi-Channel Spectrum measurement results.

The Multi-Channel Spectrum measurement must be the active measurement. The current measurement can be queried using CONFigure?. Use the CONFigure:SPECTrum:MULTi command to set Multi-Channel Spectrum as the active measurement.

Data is returned as 1 value: Span in MHz.

Required Options:	40
See Also:	MEASure:SPECTrum:MULTi? CONFigure:SPECTrum:MULTi READ:SPECTrum:MULTi?

## Fetch Single Channel Spectrum

### **FETCh:SPECTrum:SINGLE?**

Returns the most recent Single Channel Spectrum measurement results.

The Single Channel Spectrum measurement must be the active measurement. The current measurement can be queried using CONFigure?. Use the CONFigure:SPECTrum:SINGLE command to set Single Channel Spectrum as the active measurement.

Data is returned as 9 comma-delimited values: Channel Power in dBm, Burst Power in dBm, Average Burst Power in dBm, Span in MHz, Occupied Bandwidth in MHz, Frequency Error in MHz, Frequency Error (ppm), Modulation Type, and TSC.

--“ is returned for each data that is not valid at that instance.

Required Options:	40
See Also:	MEASure:SPECTrum:SINGLE? CONFigure:SPECTrum:SINGLE READ:SPECTrum:SINGLE?

## MEASure Commands

These commands take the instrument from its current state, enable the specified measurement and put the instrument into single sweep mode. Any invalid parameters in the new measurement state are corrected such that a valid measurement can take place. A new measurement is then initiated and the results are returned when the measurement is complete.

To make a measurement with settings other than the “default” settings applied by CONFigure, do the following:

- Send the appropriate CONFigure command to set the desired measurement.
- Modify the settings as required.
- Send the appropriate READ command to measure and return the result.

To get the measurement data without making a new measurement, use the appropriate FETCh? command.

### Measure Demodulator

#### MEASure:DEMod?

Sets the active measurement to Demodulator, sets the default measurement parameters, triggers a new measurement and returns the Phase Error (rms), Phase Error (peak), EVM (rms), EVM (peak), Origin Offset, C/I, Magnitude Error (rms), Modulation Type, and TSC measurement.

It is a combination of the following commands:

CONFigure:DEMod; READ:DEMod?

To make a Demodulator measurement with settings other than the default values send

- CONFigure:DEMod
- Commands to set desired settings
- READ:DEMod?

Data is returned as 9 comma-delimited values: Phase Error (rms), Phase Error (peak), EVM (rms) in %, EVM (peak) in %, Origin Offset in dB, C/I in dB, Magnitude Error (rms) in %, Modulation Type, and TSC.

“--“ is returned for each data that is not valid at that instance.

Required Options:	41
Front Panel Access:	Shift-4(Measurement), Demodulator
See Also:	CONFigure:DEMod READ:DEMod? FETCh:DEMod?

### Measure PASS/FAIL

#### MEASure:PFail?

Sets the active measurement to PASS/FAIL, sets the default measurement parameters, triggers a new measurement and returns the PASS/FAIL results.

It is a combination of the commands:  
 CONFigure:PFail; READ:PFail?

To make a channel power measurement with settings other than the default values send

- CONFigure:PFail
- Commands to set desired settings
- READ:PFail?

Front Panel Access:	Shift-4(Measurement), PASS/FAIL
See Also:	CONFigure:PFail READ:PFail? FETCh:PFail?

### Measure Power vs. Time (Frame)

#### MEASure:PVTFramE?

Sets the active measurement to Power vs. Time (Frame), sets the default measurement parameters, triggers a new measurement and returns the Channel Power, Burst Power, Average Burst Power, Span, Occupied Bandwidth, Frequency Error, Frequency Error (ppm), Modulation Type, and TSC measurement.

It is a combination of the following commands:  
 CONFigure:PVTFramE; READ:PVTFramE?

To make a Power vs. Time (Frame) measurement with settings other than the default values send

- CONFigure:PVTFramE
- Commands to set desired settings
- READ:PVTFramE?

Data is returned as 9 comma-delimited values: Channel Power in dBm, Burst Power in dBm, Average Burst Power in dBm, Span in MHz, Occupied Bandwidth in MHz, Frequency Error in MHz, Frequency Error (ppm), Modulation Type, and TSC.

-- is returned for each data that is not valid at that instance.

Required Options:	40
Front Panel Access:	Shift-4(Measurement), Power vs. Time (Frame)
See Also:	CONFigure:PVTFramE READ:PVTFramE? FETCh:PVTFramE?

### Measure Power vs. Time (Slot)

#### MEASure:PVTSlot?

Sets the active measurement to Power vs. Time (Slot), sets the default measurement parameters, triggers a new measurement and returns the Channel Power, Burst Power, Average Burst Power, Span, Occupied Bandwidth, Frequency Error, Frequency Error (ppm), Modulation Type, and TSC measurement.

It is a combination of the following commands:  
 CONFigure:PVTSlot; READ:PVTSlot?

To make a Power vs. Time (Slot) measurement with settings other than the default values send

- CONFigure:PVTSlot
- Commands to set desired settings
- READ:PVTSlot?

Data is returned as 9 comma-delimited values: Channel Power in dBm, Burst Power in dBm, Average Burst Power in dBm, Span in MHz, Occupied Bandwidth in MHz, Frequency Error in MHz, Frequency Error (ppm), Modulation Type, and TSC.

-- is returned for each data that is not valid at that instance.

Required Options:	40
Front Panel Access:	Shift-4(Measurement), Power vs. Time (Slot)
See Also:	CONFigure:PVTSlot READ:PVTSlot? FETCh:PVTSlot?

## Measure Multi-Channel Spectrum

### MEASure:SPECTrum:MULTi?

Sets the active measurement to Multi-Channel Spectrum, sets the default measurement parameters, triggers a new measurement and returns the Span.

It is a combination of the following commands:

CONFigure:SPECTrum:MULTi; READ:SPECTrum:MULTi?

To make a Multi-Channel Spectrum measurement with settings other than the default values send

- CONFigure:SPECTrum:MULTi
- Commands to set desired settings
- READ:SPECTrum:MULTi?

Data is returned as 1 value: Span in MHz.

Required Options:	40
Front Panel Access:	Shift-4(Measurement), Spectrum, Multi-Channel Spectrum
See Also:	CONFigure:SPECTrum:MULTi READ:SPECTrum:MULTi? FETCh:SPECTrum:MULTi?

## Measure Single Channel Spectrum

### **MEASure:SPECTrum:SINGLE?**

Sets the active measurement to Single Channel Spectrum, sets the default measurement parameters, triggers a new measurement and returns the Channel Power, Burst Power, Average Burst Power, Span, Occupied Bandwidth, Frequency Error, Frequency Error (ppm), Modulation Type, and TSC measurement.

It is a combination of the following commands:

`CONFigure:SPECTrum:SINGLE; READ:SPECTrum:SINGLE?`

To make a Single Channel Spectrum measurement with settings other than the default values send

- `CONFigure:SPECTrum:SINGLE`
- Commands to set desired settings
- `READ:SPECTrum:SINGLE?`

Data is returned as 9 comma-delimited values: Channel Power in dBm, Burst Power in dBm, Average Burst Power in dBm, Span in MHz, Occupied Bandwidth in MHz, Frequency Error in MHz, Frequency Error (ppm), Modulation Type, and TSC.

-- is returned for each data that is not valid at that instance.

Required Options:	40
Front Panel Access:	Shift-4(Measurement), Spectrum, Single Channel Spectrum
See Also:	<code>CONFigure:SPECTrum:SINGLE</code> <code>READ:SPECTrum:SINGLE?</code> <code>FETCH:SPECTrum:SINGLE?</code>

## **READ Commands**

This set of commands combines the `ABORT`, `INITiate` and `FETCH` commands. It aborts any current triggering sequence and sets the trigger state to idle. It then initiates a new active measurement (i.e. begins the collection of new data). When the measurement is complete, it returns the result. These commands will not switch to another measurement.

To get the current measurement data, use the `FETCH` command.

## **Read Demodulator**

### **READ:DEMod?**

Triggers a new Demodulator measurement and returns the results: Phase Error (rms), Phase Error (peak), EVM (rms), EVM (peak), Origin Offset, C/I, Magnitude Error (rms), Modulation Type, and TSC measurement.

It is a combination of the commands `:ABORT;` `:INITiate;` `FETCH:DEMod?`

The Demodulator measurement must be the active measurement (specified by `CONFigure:DEMod`). The current measurement can be queried using `CONFigure?`

Data is returned as 9 comma-delimited values: Phase Error (rms), Phase Error (peak), EVM (rms) in %, EVM (peak) in %, Origin Offset in dB, C/I in dB, Magnitude Error (rms) in %, Modulation Type, and TSC.

--“ is returned for each data that is not valid at that instance.

Required Options:	41
Front Panel Access:	Shift-4(Measurement), Demodulator
See Also:	MEASure:DEMod? CONFIgure:DEMod FETCh:DEMod?

## Read PASS/FAIL

### READ:PFail?

Triggers a new PASS/FAIL measurement and returns the results. It is a combination of the commands :ABORT; :INITiate; FETCh:PFail?

The PASS/FAIL measurement must be active. The current measurement can be queried using :CONFIgure?

Front Panel Access:	Shift-4(Measurement), PASS/FAIL
See Also:	MEASure:PFail? CONFIgure:PFail FETCh:PFail?
Result Format	See FETCh:PFail?

## Read Power vs. Time (Frame)

### READ:PVTFframe?

Triggers a new Power vs. Time (Frame) measurement and returns the results: Channel Power, Burst Power, Average Burst Power, Span, Occupied Bandwidth, Frequency Error, Frequency Error (ppm), Modulation Type, and TSC measurement.

It is a combination of the commands :ABORT; :INITiate; FETCh:PVTFframe?

The Power vs. Time (Frame) measurement must be the active measurement (specified by CONFIgure:PVTFframe. The current measurement can be queried using CONFIgure?

Data is returned as 9 comma-delimited values: Channel Power in dBm, Burst Power in dBm, Average Burst Power in dBm, Span in MHz, Occupied Bandwidth in MHz, Frequency Error in MHz, Frequency Error (ppm), Modulation Type, and TSC.

--“ is returned for each data that is not valid at that instance.

Required Options:	40
Front Panel Access:	Shift-4(Measurement), Power vs. Time (Frame)
See Also:	MEASure:PVTFframe? CONFIgure:PVTFframe FETCh:PVTFframe?

## Read Power vs. Time (Slot)

### **READ:PVTSlot?**

Triggers a new Power vs. Time (Slot) measurement and returns the results: Channel Power, Burst Power, Average Burst Power, Span, Occupied Bandwidth, Frequency Error, Frequency Error (ppm), Modulation Type, and TSC measurement.

It is a combination of the commands :ABORT; :INITiate; FETCh:PVTSlot?

The Power vs. Time (Slot) measurement must be the active measurement (specified by CONFigure:PVTSlot. The current measurement can be queried using CONFigure?

Data is returned as 9 comma-delimited values: Channel Power in dBm, Burst Power in dBm, Average Burst Power in dBm, Span in MHz, Occupied Bandwidth in MHz, Frequency Error in MHz, Frequency Error (ppm), Modulation Type, and TSC.

“--“ is returned for each data that is not valid at that instance.

Required Options:	40
Front Panel Access:	Shift-4(Measurement), Power vs. Time (Slot)
See Also:	MEASure:PVTSlot? CONFigure:PVTSlot FETCh:PVTSlot?

## Read Multi-Channel Spectrum

### **READ:SPECTrum:MULTi?**

Triggers a new Multi-Channel Spectrum measurement and returns the results: Span.

It is a combination of the commands :ABORT; :INITiate;  
FETCh:SPECTrum:MULTi?

The Multi-Channel Spectrum measurement must be the active measurement (specified by CONFigure:SPECTrum:MULTi. The current measurement can be queried using CONFigure?

Data is returned as 1 value: Span in MHz.

Required Options:	40
Front Panel Access:	Shift-4(Measurement), Spectrum, Multi-Channel Spectrum
See Also:	MEASure:SPECTrum:MULTi? CONFigure:SPECTrum:MULTi FETCh:SPECTrum:MULTi?

## Read Single Channel Spectrum

### **READ:SPECTrum:SINGLE?**

Triggers a new Single Channel Spectrum measurement and returns the results: Channel Power, Burst Power, Average Burst Power, Span, Occupied Bandwidth, Frequency Error, Frequency Error (ppm), Modulation Type, and TSC measurement.

It is a combination of the commands :ABORT; :INITiate;  
FETCh:SPECTrum:SINGLE?

The Single Channel Spectrum measurement must be the active measurement (specified by CONFigure:SPECTrum:SINGLE. The current measurement can be queried using :CONFigure?

Data is returned as 9 comma-delimited values: Channel Power in dBm, Burst Power in dBm, Average Burst Power in dBm, Span in MHz, Occupied Bandwidth in MHz, Frequency Error in MHz, Frequency Error (ppm), Modulation Type, and TSC.

--“ is returned for each data that is not valid at that instance.

Required Options:	40
Front Panel Access:	Shift-4(Measurement), Spectrum, Single Channel Spectrum
See Also:	MEASure:SPECTrum:SINGLE? CONFigure:SPECTrum:SINGLE FETCh:SPECTrum:SINGLE?

## ***SENSe (Measurement Command) Subsystem***

This subsystem contains commands related to preparing the instrument to make a particular measurement. These measurements are not defined in the SCPI standard so they are maintained separately here.

### **PASS/FAIL Test Selection**

**[ :SENSe ]:PFail <test set>**

**[ :SENSe ]:PFail?**

Selects the active test set to be used in subsequent PASS/FAIL measurements. The <test set> value must correspond to a test set that is defined in the test set list. To view the list on the instrument, go into the “Measurement” menu, press the “Pass/Fail Mode” key, and then press the “Select Pass/Fail Test” soft key. Alternatively, the list can be retrieved remotely and viewed using the Anritsu Master Software Tools. The <test set> argument is a 1-based index of the position of the desired Pass/Fail test set in the instrument’s current Pass/Fail test set list. For example, if the desired Pass/Fail test is the 3<sup>rd</sup> item on the list then the value of the <test set> argument would be 3.

When using the query form of the command, the return value will be the currently selected test set number. If there is not a valid test set selected, the return value will be “-1” (negative 1).

Front Panel Access:	Measurement, Pass Fail Mode, Select Pass/Fail Test
See Also:	:CONFigure:PFail

### ***[[:SENSE]:PVTFrame Subsystem***

This subsystem includes commands related to querying the Power vs. Time (Frame) measurement.

#### **Power vs. Time (Frame) Start Time**

**[[:SENSE]:PVTFrame:START?**

Queries the Power vs. Time (Frame) start time.

Default Unit:	seconds
See Also:	[[:SENSE]:PVTFrame:STOP?

#### **Power vs. Time (Frame) Stop Time**

**[[:SENSE]:PVTFrame:STOP?**

Queries the Power vs. Time frame stop time.

Default Unit:	seconds
See Also:	[[:SENSE]:PVTFrame:START?

### ***[[:SENSE]:PVTSlot Subsystem***

This subsystem includes commands related to querying the Power vs. Time (Slot) measurement.

#### **Power vs. Time (Slot) Start Time**

**[[:SENSE]:PVTSlot:START?**

Queries the Power vs. Time (Slot) start time.

Default Unit:	seconds
See Also:	[[:SENSE]:PVTSlot:STOP?

#### **Power vs. Time (Slot) Stop Time**

**[[:SENSE]:PVTSlot:STOP?**

Queries the Power vs. Time (Slot) stop time.

Default Unit:	seconds
See Also:	[[:SENSE]:PVTSlot:START?

## 4.2 Spectrum Analyzer

This section contains the SPA remote commands. These commands are available in the MS2717B, MS2718B, and MS2719B.

### **CONFigure Commands**

This set of commands prepares the instrument for the selected measurement. It disables any currently-enabled measurements and activates the specified measurement. It sets the instrument to single sweep mode, waiting for an :INITiate command. It will not initiate the taking of a measurement.

Current instrument settings may be changed to default values. These changes will be identified with their respective measurement commands.

The CONFigure? query returns the name of the current measurement.

### **Configure Adjacent Channel Power Ratio**

#### **:CONFigure:ACPower**

Configures the default adjacent channel power ratio measurement.

Disables any other active one-button measurements, including channel power, occupied bandwidth, AM/FM demodulation and C/I.

Sets the main channel bandwidth equal to the span.

Sets the adjacent channel bandwidth and channel spacing equal to the main channel bandwidth.

Sets the detection method to RMS.

Sets the instrument to single sweep mode ( :INITiate:CONTinuous OFF).

Measurement settings can be modified by using the [ :SENSe ] :ACPower commands before initiating a sweep.

See Also:	[ :SENSe ] :ACPower :STATe [ :SENSe ] :ACPower :BANDwidth   BWIDth:MAIN [ :SENSe ] :ACPower :BANDwidth   BWIDth:ADJacent [ :SENSe ] :ACPower :BANDwidth   BWIDth:SPACing
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## Configure Channel Power

### **:CONFigure:CHPower**

Configures the default channel power measurement.

Disables any other active one-button measurements, including ACPR, occupied bandwidth, AM/FM demodulation and C/I.

Sets the integration bandwidth equal to the span.

Sets the detection method to RMS.

Sets the instrument to single sweep mode ( :INITiate:CONTinuous OFF).

Measurement settings can be modified by using the [ :SENSe ] :CHPower commands before initiating a sweep.

Note that this measurement is not valid in zero span.

See Also:	:SENSe:CHPower:STATE :SENSe:CHPower:BANDwidth   BWIDth:INTEgration
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## Configure Field Strength

### **:CONFigure:FSTrength**

Configures the default field strength measurement.

Disables any other active one-button measurements, including channel power, adjacent channel power, occupied bandwidth, AM/FM demodulation and C/I.

Sets the antenna to the first antenna in the instrument's antenna list.

Sets the instrument to single sweep mode ( :INITiate:CONTinuous OFF).

Measurement settings can be modified by using the [ :SENSe ] :FSTrength commands before initiating a sweep.

Note that this measurement is not valid in zero span.

See Also:	[ :SENSe ] :FSTrength:ANTenna
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## Configure Occupied Bandwidth

### **:CONFigure:OBwidth**

Configures the default occupied bandwidth measurement.

Disables any other active one-button measurements, including channel power, ACPR, AM/FM demodulation and C/I.

Sets the method to %.

Sets the % of power to 99%.

Sets the instrument to single sweep mode (`:INITiate:CONTinuous OFF`).

Measurement settings can be modified by using the `[ :SENSe ]:OBwidth` commands before initiating a sweep.

Note that this measurement is not valid in zero span.

See Also:	<code>[ :SENSe ]:OBwidth:STATE</code> <code>[ :SENSe ]:OBwidth:METHOD</code> <code>[ :SENSe ]:OBwidth:PERCent</code> <code>[ :SENSe ]:OBwidth:XDB</code>
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## Configure Tracking Generator Measurement

### **:CONFigure:TGENerator ABSStats|RELStats**

This command configures the selected tracking generator statistic measurement. It disables any other active one-button measurements, including channel power, occupied bandwidth, AM/FM demodulation and C/I.

Sets the tracking generator measurement state to ON.

When the ABSStats option is selected, the instrument is set to a single sweep mode (`:INITiate:CONTinuous OFF`) and the measurement results are equivalent to the results that are displayed by choosing Shift-4(Measure), then Tracking Generator, then Abs Max, Min, Avg from the front panel.

When the RELStats option is selected, the Normalize state is set to ON and the measurement results are equivalent to the results that are displayed by choosing Shift-4(Measure), then Tracking Generator, then S21 Insertion Loss, then S21 Max, Min, Avg from the front panel. Note that when this option is selected, the instrument will trigger the normalization sweep and will not be set to single sweep mode.

Measurement settings can be modified by using the `[ :SENSe ]:TGENerator` commands before initiating a sweep.

Note that this measurement is not valid in zero span.

Required Options:	20
See Also:	<code>TGENerator:OUTput:POWer</code> <code>[ SENSE: ]TGENerator:S21[ :SCALE ]:RLEVEL</code> <code>[ SENSE: ]TGENerator:S21[ :SCALE ]:RLEVEL:OFFSet</code> <code>[ SENSE: ]TGENerator:S21[ :SCALE ]:PDIVision</code>

## ***FETCh Commands***

This set of commands returns the most recent measurement data of the active measurement. They will not switch to another measurement.

To make a new measurement, use the INITiate command. To get new measurement data, use the READ or MEASure query commands.

### **Fetch Adjacent Channel Power Ratio**

**:FETCh:ACPower?**

Returns the most recent adjacent channel power ratio measurement results.

If the instrument is sweeping, it will not return until the sweep is complete. If the instrument is not sweeping and the current data is not valid it will return error -230. This could occur if there was a \*RST immediately before the :FETCh? or if a measurement parameter was changed without an :INITiate.

Data is returned as 3 comma-separated values: main channel power, lower adjacent channel power, upper adjacent channel power.

Default Units:	Current amplitude units
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### **Fetch Channel Power/Density**

**:FETCh:CHPower?**

This command returns the most recent channel power measurement results: channel power and channel power density.

If the instrument is sweeping, it will not return until the sweep is complete. If the instrument is not sweeping and the current data is not valid it will return error -230. This could occur if there was a \*RST immediately before the :FETCh? or if a measurement parameter was changed without an :INITiate.

Data is returned as 2 comma-separated values: channel power, channel power density.

Default Units:	Current amplitude units
See Also:	:FETCh:CHPower:CHPower? :FETCh:CHPower:DENSity?

## Fetch Channel Power

**:FETCh:CHPower:CHPower?**

Returns the most recent channel power measurement result. It returns only the channel power, not the channel power density. Use `:FETCh:CHPower?` to get both channel power and channel power density.

Default Units:	Current amplitude units
See Also:	<code>:FETCh:CHPower?</code> <code>:FETCh:CHPower:DENSity?</code>

## Fetch Channel Power Density

**:FETCh:CHPower:DENSity?**

Returns the most recent channel power density measurement result. It returns only the channel power density, not the channel power. Use `:FETCh:CHPower?` to get both channel power and channel power density.

If the instrument is sweeping, it will not return until the sweep is complete. If the instrument is not sweeping and the current data is not valid it will return error -230. This could occur if there was a `*RST` immediately before the `:FETCh?` or if a measurement parameter was changed without an `:INITiate`.

Default Units:	Current amplitude units
See Also:	<code>:FETCh:CHPower?</code> <code>:FETCh:CHPower:CHPower?</code>

## Fetch Occupied Bandwidth

**:FETCh:OBWidth?**

Returns the most recent occupied bandwidth measurement results: occupied bandwidth, percent of power and dB down.

One of either percent of power or dB down will be measured and the other will be set. That will be determined by the value set using `[ :SENSE ] :OBWidth:METHOD`.

If the instrument is sweeping, it will not return until the sweep is complete. If the instrument is not sweeping and the current data is not valid it will return error -230. This could occur if there was a `*RST` immediately before the `:FETCh?` or if a measurement parameter was changed without an `:INITiate`.

Data is returned as 3 comma-separated values: occupied bandwidth, percent of power, dB down.

Default Units:	For OBW: Hz For Percent of Power: % For dB Down: dB
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## Fetch Occupied Bandwidth Frequency

**:FETCh:OBWidth:FREQuency?**

Returns the most recent occupied bandwidth lower frequency and upper frequency.

Data is returned as 2 comma-separated values: lower frequency and upper frequency in Hz

Default Units:	Hz
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## Fetch Tracking Generator Absolute Statistics

**:FETCh:TGENERator:ABSStats?**

Returns the most recent tracking generator absolute statistic measurement results.

Data is returned as 3 comma-separated values: Absolute Max Power, Absolute Min Power, and Absolute Average Power. “---“ is returned for each data that is not valid at that instance.

Default Units:	Current amplitude units
Required Options:	20

## Fetch Tracking Generator Relative Statistics

**:FETCh:TGENERator:RELStats?**

Returns the most recent tracking generator relative statistic measurement results.

Data is returned as 3 comma-separated values: Insertion Loss Relative Max Power, Insertion Loss Relative Min Power, and Insertion Loss Relative Average Power. “---“ is returned for each data that is not valid at that instance.

Default Units:	Current amplitude units
Required Options:	20

## ***MEASure Commands***

These commands take the instrument from its current state, enable the specified measurement and put the instrument into single sweep mode. Any invalid parameters in the new measurement state are corrected such that a valid measurement can take place. A new measurement is then initiated and the results are returned when the measurement is complete.

To make a measurement with settings other than the “default” settings applied by CONFigure, do the following:

- Send the appropriate CONFigure command to set the desired measurement.
- Modify the settings as required.
- Send the appropriate READ command to measure and return the result.

To get the measurement data without making a new measurement, use the appropriate FETCh? command.

## Measure Adjacent Channel Power Ratio

### **:MEASure:ACPower?**

Sets the active measurement to adjacent channel power ratio, sets the default measurement parameters, triggers a new measurement and returns the main channel power lower adjacent and upper adjacent channel power results.

It is a combination of the commands `:CONFigure:ACPower;:READ:ACPower?`

For a description of the default adjacent channel power ratio measurement parameters see `:CONFigure:ACPower`.

To make an adjacent channel power ratio measurement with settings other than the default values send

- `:CONFigure:ACPower`
- Commands to set desired settings
- `:READ:ACPower?`

Data is returned as 3 comma-separated values: main channel power, lower adjacent channel power, upper adjacent channel power.

Default Units:	Current amplitude units
See Also:	<code>:CONFigure:ACPower</code>

## Measure Channel Power/Density

### **:MEASure:CHPower?**

Sets the active measurement to channel power, sets the default measurement parameters, triggers a new measurement and returns the channel power and channel power density results.

It is a combination of the commands `:CONFigure:CHPower;:READ:CHPower?`

For a description of the default channel power measurement parameters see `:CONFigure:CHPower`.

To make a channel power measurement with settings other than the default values send

- `:CONFigure:CHPower`
- Commands to set desired settings
- `:READ:CHPower?`

Data is returned as 2 comma-separated values: channel power, channel power density.

Default Units:	Current amplitude units
See Also:	<code>:MEASure:CHPower:CHPower?</code> <code>:MEASure:CHPower:DENSity?</code> <code>:CONFigure:CHPower</code>

## Measure Channel Power

**:MEASure:CHPower:CHPower?**

Sets the active measurement to channel power, sets the default measurement parameters, triggers a new measurement and returns the channel power result. To measure both channel power and channel power density use :MEASure:CHPower?

It is a combination of the commands

:CONFigure:CHPower;:READ:CHPower:CHPower?

For a description of the default channel power measurement parameters see

:CONFigure:CHPower.

To make a channel power measurement with settings other than the default values send

- :CONFigure:CHPower
- Commands to set desired settings
- :READ:CHPower:CHPower?

Default Units:	Current amplitude units
See Also:	:MEASure:CHPower? :MEASure:CHPower:DENSity? :CONFigure:CHPower

## Measure Channel Power Density

**:MEASure:CHPower:DENSity?**

Sets the active measurement to channel power, sets the default measurement parameters, triggers a new measurement and returns the channel power density result. To measure both channel power and channel power density use :MEASure:CHPower?

It is a combination of the commands

:CONFigure:CHPower;:READ:CHPower:DENSity?

For a description of the default channel power measurement parameters see

:CONFigure:CHPower.

To make a channel power measurement with settings other than the default values send

- :CONFigure:CHPower
- Commands to set desired settings
- :READ:CHPower:DENSity?

Default Units:	Current amplitude units
See Also:	:MEASure:CHPower? :MEASure:CHPower:CHPower? :CONFigure:CHPower

## Measure Occupied Bandwidth

### **:MEASure:OBWidth?**

Sets the active measurement to occupied bandwidth, sets the default measurement parameters, triggers a new measurement and returns the occupied bandwidth, percent of power and dB down results.

It is a combination of the commands `:CONFigure:OBWidth;:READ:OBWidth?`

For a description of the default occupied bandwidth measurement parameters see `:CONFigure:OBWidth`.

To make an occupied bandwidth measurement with settings other than the default values send

- `:CONFigure:OBWidth`
- Commands to set desired settings
- `:READ:OBWidth?`

Data is returned as 3 comma-separated values: occupied bandwidth, percent of power, dB down.

Default Units:	For OBW: Hz For Percent of Power: % For dB Down: dB
See Also:	<code>:CONFigure:OBWidth</code>

## Measure Tracking Generator Absolute Statistics

### **:MEASure:TGENerator:ABSStats?**

Sets the active measurement to tracking generator with absolute statistics on, sets the default measurement parameters, triggers a new measurement and returns the results.

It is a combination of the commands `:CONFigure:TGENerator ABSStats;:READ:TGENerator:ABSStats?`

For a description of the default tracking generator absolute statistics measurement parameters see `:CONFigure:TGENerator ABSStats`.

To make an tracking generator absolute statistics measurement with settings other than the default values send

- `:CONFigure:TGENerator ABSStats`
- Commands to set desired settings
- `:READ:TGENerator:ABSStats?`

Data is returned as 3 comma-separated values: absolute max power, absolute min power, absolute average power.

Default Units:	Current amplitude units
See Also:	<code>:CONFigure:TGENerator</code>
Required Options:	20

## **READ Commands**

This set of commands combines the ABORT, INITiate and FETCh commands. It aborts any current triggering sequence and sets the trigger state to idle. It then initiates a new active measurement (i.e. begins the collection of new data). When the measurement is complete, it returns the result. These commands will not switch to another measurement.

To get the current measurement data, use the FETCh command.

### **Read Adjacent Channel Power Ratio**

#### **:READ:ACPower?**

Triggers a new adjacent channel power ratio measurement and returns the results: main channel power, lower adjacent and upper adjacent channel power. It is a combination of the commands :ABORT; :INITiate; :FETCh:ACPower?

The channel power measurement must be the active measurement (specified by the command :CONFigure:ACPower). The current measurement can be queried using the command :CONFigure?

Data is returned as 3 comma-separated values: main channel power, lower adjacent channel power, upper adjacent channel power.

See Also:	:READ:ACPower? :CONFigure
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### **Read Channel Power/Density**

#### **:READ:CHPower?**

Triggers a new channel power measurement and returns the results: channel power and channel power density. It is a combination of the commands :ABORT; :INITiate; :FETCh:CHPower?

The channel power measurement must be the active measurement (specified by the command :CONFigure:CHPower). The current measurement can be queried using the command :CONFigure?

Data is returned as 2 comma-separated values: channel power, channel power density.

See Also:	:READ:CHPower:CHPower? :READ:CHPower:DENSITY? :CONFigure
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### **Read Channel Power**

#### **:READ:CHPower:CHPower?**

Triggers a new channel power measurement and returns the channel power result.

It is a combination of the commands

:ABORT; :INITiate; :FETCh:CHPower:CHPower?

It returns only the channel power, not the channel power density. Use the command `:READ:CHPower?` to get both channel power and channel power density.

The channel power measurement must be the active measurement (specified by `:CONFigure:CHPower`). The current measurement can be queried using the `:CONFigure?` command.

Default Units:	Current amplitude units
See Also:	<code>:READ:CHPower?</code> <code>:READ:CHPower:DENSity?</code> <code>:CONFigure</code>

## Read Channel Power Density

**`:READ:CHPower:DENSity?`**

Triggers a new channel power measurement and returns the channel power density result.

It is a combination of the commands

`:ABORT;:INITiate;:FETCh:CHPower:DENSity?`

It returns only the channel power density, not the channel power. Use the command `:READ:CHPower?` to get both channel power and channel power density.

The channel power measurement must be the active measurement (specified by `:CONFigure:CHPower`). The current measurement can be queried using `:CONFigure?` command.

Default Units:	Current amplitude units
See Also:	<code>:READ:CHPower?</code> <code>:READ:CHPower:CHPower?</code> <code>:CONFigure</code>

## Read Occupied Bandwidth

**`:READ:OBWidth?`**

Triggers a new occupied bandwidth measurement and returns the results: occupied bandwidth, percent of power and dB down. It is a combination of the commands `:ABORT;:INITiate;:FETCh:OBWidth?`

The occupied bandwidth measurement must be the active measurement (specified by `:CONFigure:OBWidth`). The current measurement can be queried using the `:CONFigure?` command.

Data is returned as 3 comma-separated values: occupied bandwidth, percent of power, dB down.

Default Units:	For OBW: Hz For Percent of Power: % For dB Down: dB
See Also:	<code>:CONFigure</code>

## Read Tracking Generator Absolute Statistics

**:READ:TGENerator:ABSStats?**

Triggers a new tracking generator absolute statistic measurement and returns the results.

It is a combination of the commands

**:ABORT;:INITiate;:FETCh:TGENerator:ABSStats?**

The tracking generator absolute statistic measurement must be the active measurement (specified by **:CONFigure:TGENerator ABSStats**). The current measurement can be queried using **:CONFigure?**

Data is returned as 3 comma-separated values: absolute max power, absolute min power, absolute average power.

Required Options:	20
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## Read Tracking Generator Relative Statistics

**:READ:TGENerator:RELStats?**

Triggers a new tracking generator relative statistics measurement and returns the results.

It is a combination of the commands

**:ABORT;:INITiate;:FETCh:TGENerator:RELStats?**

The tracking generator S21 Insertion Loss relative statistic measurement must be the active measurement (specified by **:CONFigure:TGENerator RELStats**). The current measurement can be queried using **:CONFigure?**

Data is returned as 3 comma-separated values: relative max power, relative min power, relative average power.

Required Options:	20
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## ***SENSe (Measurement Command) Subsystem***

This subsystem contains commands related to preparing the instrument to make a particular measurement. These measurements are not defined in the SCPI standard so they are maintained separately here.

### ***[:SENSe]:ACPower Subsystem***

This subsystem includes commands related to configuring the adjacent channel power ratio measurement.

#### **ACPR Adjacent Channel Bandwidth**

**[:SENSe]:ACPower:BANDwidth|BWIDth:ADJacent <freq>**

**[:SENSe]:ACPower:BANDwidth|BWIDth:ADJacent?**

Sets the adjacent channel bandwidth for the ACPR measurement.

Factory Preset / *RST:	10.35 MHz
Range:	MS2718B, MS2723B: 10 Hz – 13 GHz
	MS2719B, MS2724B: 10 Hz - 20 GHz
	All others: 10 Hz - 7.1 GHz
Default Unit:	Hz
Front Panel Access:	Shift-4 (Measure), ACPR, Adj Ch BW

### ACPR Main Channel Bandwidth

[ :SENSE ] :ACPower :BANDwidth | BWIDth :MAIN <freq>

[ :SENSE ] :ACPower :BANDwidth | BWIDth :MAIN?

Sets the main channel bandwidth for the ACPR measurement.

Factory Preset / *RST:	10.35 MHz
Range:	MS2718B, MS2723B: 10 Hz – 13 GHz
	MS2719B, MS2724B: 10 Hz - 20 GHz
	All others: 10 Hz - 7.1 GHz
Default Unit:	Hz
Front Panel Access:	Shift-4 (Measure), ACPR, Main Ch BW

### ACPR Channel Spacing

[ :SENSE ] :ACPower :BANDwidth | BWIDth :SPACing <freq>

[ :SENSE ] :ACPower :BANDwidth | BWIDth :SPACing?

Sets the channel spacing for the ACPR measurement.

Factory Preset / *RST:	10.35 MHz
Range:	MS2718B, MS2723B: 10 Hz – 13 GHz
	MS2719B, MS2724B: 10 Hz - 20 GHz
	All others: 10 Hz - 7.1 GHz
Default Unit:	Hz
Front Panel Access:	Shift-4 (Measure), ACPR, Ch Spacing

### ACPR Measurement State

[ :SENSE ] :ACPower :STATE OFF | ON | 0 | 1

[ :SENSE ] :ACPower :STATE?

Sets the state of the adjacent channel power ratio measurement, ON or OFF.

When using :CONFigure :ACPower, the state is automatically set to ON.

Factory Preset / *RST:	OFF
Front Panel Access:	Shift-4 (Measure), ACPR, On/Off
See Also:	:CONFigure :ACPower

## ***[[:SENSE]:CHPower Subsystem***

This subsystem includes commands related to configuring the channel power measurement.

### **Channel Power Integration Bandwidth**

**[[:SENSE]:CHPower:BANDwidth|BWIDth:INTEgration <freq>**

**[[:SENSE]:CHPower:BANDwidth|BWIDth:INTEgration?**

Sets the integration bandwidth for the channel power measurement.

Integration bandwidth must be less than or equal to the frequency span.

Factory Preset / *RST:	10.35 MHz
Range:	MS2718B, MS2723B: 10 Hz – 13 GHz
	MS2719B, MS2724B: 10 Hz - 20 GHz
	All others: 10 Hz - 7.1 GHz
Default Unit:	Hz
Front Panel Access:	Shift-4 (Measure), Channel Power, Ch Pwr Width
See Also:	[[:SENSE]:FREQuency:SPAN

### **Channel Power Measurement State**

**[[:SENSE]:CHPower:STATe OFF|ON|0|1**

**[[:SENSE]:CHPower:STATe?**

Sets the state of the channel power measurement, ON or OFF.

When using :CONFIgure:CHPower, the state is automatically set to ON.

Factory Preset / *RST:	OFF
Front Panel Access:	Shift-4 (Measure), Channel Power, On/Off
See Also:	:CONFIgure:CHPower

## ***[[:SENSE]:FSTRength Subsystem***

This subsystem includes commands related to configuring the field strength measurement.

### **Field Strength Antenna**

**[[:SENSE]:FSTRength:ANTenna <antenna>**

**[[:SENSE]:FSTRength:ANTenna?**

Selects an antenna from the antenna list to use for field strength measurement result calculations.

The <antenna> argument is a 1-based index of the position of the desired antenna in the instrument's current antenna list. The list can be seen on the instrument by choosing the "Antenna" soft-key button in the "F Strength" menu. For example, if the desired antenna were the 3<sup>rd</sup> item on the antenna listing then the value of the <antenna> argument would be 3.

The query form of this command will return the index of the currently-selected antenna.

Factory Preset / *RST:	1
Front Panel Access:	Shift-4(Measure), Field Strength, Antenna
See Also:	:CONFIgure:FSTRength

### Field Strength Measurement State

[ :SENSE ]:FSTRength:STATE OFF | ON | 0 | 1

[ :SENSE ]:FSTRength:STATE?

Sets the state of the field strength measurement, ON or OFF.

When using :CONFIgure:FSTRength, the state is automatically set to ON.

Factory Preset / *RST:	OFF
Front Panel Access:	Shift-4 (Measure), Field Strength, On/Off
See Also:	:CONFIgure:FSTRength

### [ :SENSE ]:OBWidth Subsystem

This subsystem includes commands related to configuring the occupied bandwidth measurement.

### Occupied Bandwidth Measurement Method

[ :SENSE ]:OBWidth:METHOD XDB | PERCent

[ :SENSE ]:OBWidth:METHOD?

Sets the method for calculating occupied bandwidth.

XDB calculates the occupied bandwidth based on points a specified number of dB below the carrier. Issue command [ :SENSE ]:OBWidth:XDB to set the number of dB to be used.

PERCent calculates the occupied bandwidth based on points a specified percentage of the carrier power below the carrier. Issue command [ :SENSE ]:OBWidth:PERCent to set the percentage to be used.

Factory Preset / *RST:	PERCent
Front Panel Access:	Shift-4(Measure), OCC BW, % Down dBc Down
See Also:	[ :SENSE ]:OBWidth:XDB [ :SENSE ]:OBWidth:PERCent

### Occupied Bandwidth Percent of Power

[ :SENSE ]:OBWidth:PERCent <percentage>

[ :SENSE ]:OBWidth:PERCent?

This command sets the percentage of carrier power used to measure the occupied bandwidth.

This value is used in the measurement if `:SENSe:OBWidth:METHOD` is set to `PERCent`.

Factory Preset / *RST:	99.00%
Range:	0% to 100%
Default Unit:	%
Front Panel Access:	Shift-4 (Measure), OCC BW, %
See Also:	<code>:SENSe:OBWidth:METHOD</code>

### Occupied Bandwidth Measurement State

`[ :SENSe ]:OBWidth:STATe OFF | ON | 0 | 1`  
`[ :SENSe ]:OBWidth:STATe?`

Sets the state of the occupied bandwidth measurement, ON or OFF.

When using `:CONFIgure:OBWidth`, the state is automatically set to ON.

Factory Preset / *RST:	OFF
Front Panel Access:	Shift-4 (Measure), OCC BW, On/Off
See Also:	<code>:CONFIgure:OBWidth</code>

### Occupied Bandwidth dB Down

`[ :SENSe ]:OBWidth:XDB <rel ampl>`  
`[ :SENSe ]:OBWidth:XDB?`

This command sets the number of dB below the carrier used to measure the occupied bandwidth.

This value is used in the measurement if `:SENSe:OBWidth:METHOD` is set to `XDB`.

Factory Preset / *RST:	3 dBc
Range:	0 to 100 dBc
Default Unit:	dBc
Front Panel Access:	Shift-4 (Measure), OCC BW, dBc
See Also:	<code>:SENSe:OBWidth:METHOD</code>

### *[ :SENSe ]:TGENerator Subsystem*

This subsystem includes commands used to set up parameters associated with the tracking generator measurement.

### Tracking Generator Absolute Statistic State

`[ :SENSe ]:TGENerator:ABSStats [ :STATe ] OFF | ON | 0 | 1`  
`[ :SENSe ]:TGENerator:ABSStats [ :STATe ]?`

Specifies whether the tracking generator absolute statistic is ON or OFF.

If the value is set to ON or 1, the tracking generator absolute statistic is turned on.

If the value is set to OFF or 0, the tracking generator absolute statistic is turned off.

The query version of the command returns a 1 if the tracking generator absolute statistic is on and returns a 0 if the tracking generator is off.

Note that this command is ignored if the tracking generator state is off.

Factory Preset / *RST:	OFF
Front Panel Access:	Shift-4 (Measure), Tracking Generator, Abs Max, Min,Avg(On/Off)
Required Option:	20

### Tracking Generator Normalize State

**[ :SENSE ] :TGENERATOR :S21 :NORMALIZE [ :STATE ] OFF | ON | 0 | 1**

**[ :SENSE ] :TGENERATOR :S21 :NORMALIZE [ :STATE ] ?**

Specifies whether the tracking generator normalization is ON or OFF.

If the value is set to ON or 1, the tracking generator normalization is turned on.

If the value is set to OFF or 0, the tracking generator normalization is turned off.

The query version of the command returns a 1 if the tracking generator normalization is on and returns a 0 if the tracking generator normalization is off.

Note that this command is ignored if the tracking generator state is off.

Factory Preset / *RST:	OFF
Front Panel Access:	Shift-4 (Measure), Tracking Generator, S21 Insertion Loss, Normalize(On/Off)
Required Option:	20

### Tracking Generator Relative Statistic State

**[ :SENSE ] :TGENERATOR :S21 :RELSTATS [ :STATE ] OFF | ON | 0 | 1**

**[ :SENSE ] :TGENERATOR :S21 :RELSTATS [ :STATE ] ?**

Specifies whether the tracking generator relative statistic is ON or OFF.

If the value is set to ON or 1, the tracking generator relative statistic is turned on.

If the value is set to OFF or 0, the tracking generator relative statistic is turned off.

The query version of the command returns a 1 if the tracking generator relative statistic is on and returns a 0 if the tracking generator is off.

Note that this command is ignored if the tracking generator normalization is off.

Factory Preset / *RST:	OFF
Front Panel Access:	Shift-4 (Measure), Tracking Generator, S21 Insertion Loss, S21 Max,Min,Avg (On/Off)
Required Option:	20
See Also:	INITiate:TGENERATOR [ :SENSE ] :TGENERATOR :S21 :NORMALIZE [ :STATE ]

## Tracking Generator Scale

`[ :SENSE ] : TGENerator : S21 [ :SCALE ] : PDIVision <rel ampl>`

`[ :SENSE ] : TGENerator : S21 [ :SCALE ] : PDIVision?`

Sets the tracking generator scale (dB/division).

Factory Preset / *RST:	10 dB/div
Range:	1 dB to 15 dB
Default Unit:	dB
Front Panel Access:	Shift-4(Measure), Tracking Generator, S21 Insertion Loss, S21 Scale.
Required Options:	20
See Also:	:INITiate:TGENerator

## Tracking Generator Reference Level

`[ :SENSE ] : TGENerator : S21 [ :SCALE ] : RLEVEL <amplitude>`

`[ :SENSE ] : TGENerator : S21 [ :SCALE ] : RLEVEL?`

Sets the tracking generator reference level amplitude value for the y-axis.

Factory Preset / *RST:	0 dB
Range:	With reference level offset = 0 dB: -200 dB to 20 dB
Default Unit:	Current active amplitude unit
Front Panel Access:	Shift-4(Measure), Tracking Generator, S21 Insertion Loss, S21 Ref Level
Required Options:	20
See Also:	[ :SENSE ] : TGENerator : S21 [ :SCALE ] : RLEVEL : OFF Set <rel ampl> :UNIT:POWER

## Tracking Generator Reference Level Offset

`[ :SENSE ] : TGENerator : S21 [ :SCALE ] : RLEVEL : OFFSET <rel ampl>`

`[ :SENSE ] : TGENerator : S21 [ :SCALE ] : RLEVEL : OFFSET?`

Sets the tracking generator reference level offset value for the y-axis.

Factory Preset / *RST:	0 dB
Range:	-100 dB to 100 dB
Default Unit:	dB
Front Panel Access:	Shift-4(Measure), Tracking Generator, S21 Insertion Loss, S21 RL Offset
Required Options:	20
See Also:	INITiate:TGENerator [ :SENSE ] : TGENerator : S21 [ :SCALE ] : RLEVEL <amplitude>

## 4.3 WCDMA

This section contains the WCDMA remote commands. These commands are available in the MS2717B, MS2718B, and MS2719B.

### **CONFigure Commands**

This set of commands prepares the instrument for the selected measurement. It disables any currently-enabled measurements and activates the specified measurement. All measurement activity is stopped pending an INITiate command.

Current instrument settings may be changed to default values. These changes will be identified with their respective measurement commands.

The :CONFigure? query returns the name of the current measurement.

### **Configure Demodulation Measurement**

**:CONFigure:DEMod SUMMARY | CDPower | CODogram | HSDPa**

The HSDPa measurement is only available if option 65 is installed.

This command configures the selected demodulation measurement. It disables any other active measurements.

None of the instrument parameters are changed by the execution of this command.

Sets the instrument to single sweep mode ( :INITiate:CONTinuous OFF).

Measurement settings can be modified by using the [ :SENSe ] :DEMod commands before initiating a measurement.

When the SUMMARY option is selected, the measurement results are equivalent to the results that are displayed by choosing Measurements, then Demod, then Summary from the front panel.

When the CDP option is selected, the measurement results are equivalent to the results that are displayed by choosing Measurements, then Demod, then CDP from the front panel.

When the CODOGRAM option is selected, the measurement results are equivalent to the results that are displayed by choosing Measurements, then Demod, then Codogram from the front panel.

When the HSDPa option is selected, the measurement results are equivalent to the results that are displayed by choosing Measurements, then Demod, then Hsdpa from the front panel.

See Also:	[ :SENSe ] :DEMod :SCODE [ :SENSe ] :DEMod :SFACTOR [ :SENSe ] :DEMod :THRShold [ :SENSe ] :DEMod :PICH :CODE [ :SENSe ] :DEMod :SCCPch :CODE
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## Configure Over-The-Air Measurement

### **:CONFigure:OTA**

This command configures the over-the-air measurement. It disables any other active measurements.

None of the instrument parameters are changed by the execution of this command.

Sets the instrument to single sweep mode (`:INITiate:CONTinuous OFF`).

Measurement settings can be modified by using the `[ :SENSe ] :OTA` commands before initiating a measurement.

The measurement results are equivalent to the results that are displayed by choosing Measurements, then OTA from the front panel.

See Also:	<code>[ :SENSe ] :OTA:RESet</code> <code>[ :SENSe ] :OTA:SCODE</code> <code>[ :SENSe ] :OTA:SORT</code>
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## Configure PASS/FAIL Measurement

### **:CONFigure PFail**

This command configures the PASS/FAIL measurement. It disables any other active measurements.

None of the instrument parameters are changed by the execution of this command.

Sets the instrument to single sweep mode (`:INITiate:CONTinuous OFF`).

Measurement settings can be modified by using the `[ :SENSe ]` commands before initiating a measurement.

The measurement results are equivalent to the results that are displayed by choosing Measurements, then PASS/FAIL from the front panel.

See Also:	<code>:FETCh:PFail?</code> <code>:MEASure:PFail?</code> <code>:READ:PFail?</code>
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## Configure RF Measurement

### **:CONFigure:RF SUMMARY | SPECTrum | ACLR | EMISSION | BANDSpectrum**

This command configures the selected RF measurement. It disables any other active measurements.

None of the instrument parameters are changed by the execution of this command.

Sets the instrument to single sweep mode (`:INITiate:CONTinuous OFF`).

Measurement settings can be modified by using the `[ :SENSe ] :RF` commands before initiating a measurement.

When the **SUMM**ary option is selected, the measurement results are equivalent to the results that are displayed by choosing Measurements, then RF, then Summary from the front panel.

When the **SPECT**rum option is selected, the measurement results are equivalent to the results that are displayed by choosing Measurements, then RF, then Channel Spectrum from the front panel.

When the **ACLR** option is selected, the measurement results are equivalent to the results that are displayed by choosing Measurements, then RF, then ACLR from the front panel.

When the **EMISS**ion option is selected, the measurement results are equivalent to the results that are displayed by choosing Measurements, then RF, then Spectral Emission Mask from the front panel.

When the **BANDS**pectrum option is selected, the measurement results are equivalent to the results that are displayed by choosing Measurements, then RF, then Band Spectrum from the front panel.

See Also:	[ :SENSE ] : FREQUency [ :SENSE ] : RF : ACLR : MAINchannelcount [ :SENSE ] : RF : ACLR : ADJCchannelcount
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## Configure Summary Measurement

### **:CONF**igure **SUMMARY** | **PF**ail

This command configures the UMTS Summary or PASS/FAIL measurement. It disables any other active measurements.

None of the instrument parameters are changed by the execution of this command.

Sets the instrument to single sweep mode ( :INITiate:CONTinuous OFF).

Measurement settings can be modified by using the [ :SENSE ] commands before initiating a measurement.

In **SUMMARY** mode, the measurement results are equivalent to the results that are displayed by choosing Measurements, then WCDMA Summary from the front panel. In **PF**ail mode, the results are equivalent to those that are displayed by choosing Measurements, then Pass Fail Mode from the front panel.

## **FETCH** Commands

This set of commands returns the most recent measurement data of the active measurement. They will not switch to another measurement.

To get new measurement data, use the **READ** command.

## Fetch Adjacent Channel Leakage Ratio

**:FETCh:ACLR?**

Returns the most recent adjacent channel leakage ratio measurement results.

If the instrument is sweeping, it will not return until the sweep is complete. If the instrument is not sweeping and the current data is not valid it will return error -230. This could occur if there was a \*RST immediately before the :FETCh? or if a measurement parameter was changed without an :INITiate.

Data is returned as 12 comma-separated values: -20 MHz channel power, -15 MHz channel power, -10 MHz channel power, -5 MHz channel power, Main channel power 1, Main channel power 2, Main channel power 3, Main channel power 4, +5 MHz channel power, +10 MHz channel power, +15 MHz channel power, +20 MHz channel power.

Default Units:	dBm
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## Fetch Channel Power

**:FETCh:CHPower?**

Returns the most recent channel power measurement results.

If the instrument is sweeping, it will not return until the sweep is complete. If the instrument is not sweeping and the current data is not valid it will return error -230. This could occur if there was a \*RST immediately before the :FETCh? or if a measurement parameter was changed without an :INITiate.

Default Units:	dBm
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## Fetch Active Channel Count

**:FETCh:DEMod:ACTChannels?**

Returns the active channel count from the most recent measurement results.

If the instrument is sweeping, it will not return until the sweep is complete. If the instrument is not sweeping and the current data is not valid it will return error -230. This could occur if there was a \*RST immediately before the :FETCh? or if a measurement parameter was changed without an :INITiate.

Data is returned as a single value representing the total number of active channels.

Default Units:	No units
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## Fetch Demodulated Channel Power

**:FETCh:DEMod:CDPower?**

Returns the most recent absolute power measurement results for the requested logical channel.

If the instrument is sweeping, it will not return until the sweep is complete. If the instrument is not sweeping and the current data is not valid it will return error -230. This

could occur if there was a \*RST immediately before the :FETCh? or if a measurement parameter was changed without an :INITiate.

Data is returned as 4 comma-delimited values: CPICH power, PCCPCH power, PICH power, SCCPCH power.

Default Units:	dBm
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## Fetch Carrier Feed Through

**:FETCh:DEMod:CFThrougH?**

Returns the most recent carrier feed through measurement results.

If the instrument is sweeping, it will not return until the sweep is complete. If the instrument is not sweeping and the current data is not valid it will return error -230. This could occur if there was a \*RST immediately before the :FETCh? or if a measurement parameter was changed without an :INITiate.

Data is returned as a single value representing the carrier feed through.

Default Units:	dB
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## Fetch Error Vector Magnitude (EVM)

**:FETCh:DEMod:EVM?**

Returns the most recent EVM measurement result.

If the instrument is sweeping, it will not return until the sweep is complete. If the instrument is not sweeping and the current data is not valid it will return error -230. This could occur if there was a \*RST immediately before the :FETCh? or if a measurement parameter was changed without an :INITiate.

Data is returned as a single value representing the RMS error vector magnitude.

Default Units:	Percent
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## Fetch Frequency Error

**:FETCh:DEMod:FERRor?**

Returns the most recent frequency error measurement result.

If the instrument is sweeping, it will not return until the sweep is complete. If the instrument is not sweeping and the current data is not valid it will return error -230. This could occur if there was a \*RST immediately before the :FETCh? or if a measurement parameter was changed without an :INITiate.

Data is returned as a single value representing the frequency error.

Default Units:	Hertz
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## Fetch Frequency Error PPM

**:FETCh:DEMod:FERRor:PPM?**

Returns the most recent frequency error PPM measurement result.

If the instrument is sweeping, it will not return until the sweep is complete. If the instrument is not sweeping and the current data is not valid it will return error -230. This could occur if there was a \*RST immediately before the :FETCh? or if a measurement parameter was changed without an :INITiate.

Data is returned as a single value representing the frequency error PPM.

Default Units:	No Unit
See Also:	MEASure:DEMod:FERRor:PPM? READ:DEMod:FERRor:PPM?

## Fetch Frequency Error

**:FETCh:DEMod:FERRor:PRECIse?**

Returns the most recent frequency error measurement result.

If the instrument is sweeping, it will not return until the sweep is complete. If the instrument is not sweeping and the current data is not valid it will return error -230. This could occur if there was a \*RST immediately before the :FETCh? or if a measurement parameter was changed without an :INITiate.

Data is returned as a single value representing the frequency error.

Note that this command is the same as :FETCh:DEMod:FERRor?, but returns the result with a precision of one-tenth Hertz.

Default Units:	Hertz
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## Fetch HSDPA Frequency Error

**:FETCh:DEMod:HSDPa:FERRor?**

Returns the most recent HSDPA frequency error measurement result.

If the instrument is sweeping, it will not return until the sweep is complete. If the instrument is not sweeping and the current data is not valid it will return error -230. This could occur if there was a \*RST immediately before the :FETCh? or if a measurement parameter was changed without an :INITiate.

Data is returned as a single value representing the HSDPA frequency error.

Default Units:	Hertz
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## Fetch HSDPA Frequency Error PPM

**:FETCh:DEMod:HSDPa:FERRor:PPM?**

Returns the most recent HSDPA frequency error PPM measurement result.

If the instrument is sweeping, it will not return until the sweep is complete. If the instrument is not sweeping and the current data is not valid it will return error -230. This could occur if there was a \*RST immediately before the :FETCh? or if a measurement parameter was changed without an :INITiate.

Data is returned as a single value representing the HSDPA frequency error PPM.

Default Units:	No Unit
See Also:	MEASure:DEMod:HSDPa:FERRor:PPM? READ:DEMod:HSDPa:FERRor:PPM?

## Fetch HSDPA Transmitter Frequency

**:FETCh:DEMod:HSDPa:TXFRequency?**

Returns the most recent HSDPA transmitter frequency measurement results.

If the instrument is sweeping, it will not return until the sweep is complete. If the instrument is not sweeping and the current data is not valid it will return error -230. This could occur if there was a \*RST immediately before the :FETCh? or if a measurement parameter was changed without an :INITiate.

Data is returned as a single value representing the HSDPA carrier frequency.

Default Units:	Hertz
See Also:	:MEASure:DEMod:HSDPa:TXFRequency? :READ:DEMod:HSDPa:TXFRequency?

## Fetch Code Domain Noise Floor

**:FETCh:DEMod:NFLoor?**

Returns the most recent code domain noise floor measurement result.

If the instrument is sweeping, it will not return until the sweep is complete. If the instrument is not sweeping and the current data is not valid it will return error -230. This could occur if there was a \*RST immediately before the :FETCh? or if a measurement parameter was changed without an :INITiate.

Data is returned as a single value representing the noise floor power level.

Default Units:	dB
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## Fetch Total Channel Count

**:FETCh:DEMod:NUMChannels?**

Returns the total channel count from the most recent measurement results.

If the instrument is sweeping, it will not return until the sweep is complete. If the instrument is not sweeping and the current data is not valid it will return error -230. This could occur if there was a \*RST immediately before the :FETCh? or if a measurement parameter was changed without an :INITiate.

Data is returned as a single value representing the total number of channels.

Default Units:	No units
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## Fetch Synch Channel Power

**:FETCh:DEMod:SPOWer?**

Returns the most recent absolute power measurement results for the requested synch channel.

If the instrument is sweeping, it will not return until the sweep is complete. If the instrument is not sweeping and the current data is not valid it will return error -230. This could occur if there was a \*RST immediately before the :FETCh? or if a measurement parameter was changed without an :INITiate.

Data is returned as 3 comma-delimited values: SCH power, PSCH power, SSCH power.

Default Units:	dBm
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## Fetch Transmitter Frequency

**:FETCh:DEMod:TXFRequency?**

Returns the most recent transmitter frequency measurement results.

If the instrument is sweeping, it will not return until the sweep is complete. If the instrument is not sweeping and the current data is not valid it will return error -230. This could occur if there was a \*RST immediately before the :FETCh? or if a measurement parameter was changed without an :INITiate.

Data is returned as a single value representing the carrier frequency.

Default Units:	Hertz
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## Fetch Transmitter Frequency

**:FETCh:DEMod:TXFRequency:PRECIse?**

Returns the most recent transmitter frequency measurement results.

If the instrument is sweeping, it will not return until the sweep is complete. If the instrument is not sweeping and the current data is not valid it will return error -230. This

could occur if there was a \*RST immediately before the :FETCh? or if a measurement parameter was changed without an :INITiate.

Data is returned as a single value representing the carrier frequency.

Note that this command is the same as :FETCh:DEMod:TXFrequency?, but returns the result with a precision of one-tenth Hertz.

Default Units:	Hertz
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## Fetch Spectral Emission Mask Results

### :FETCh:EMISSion?

Returns the most recent spectral emission mask pass/fail and template measurement results.

Any violation of the spectral emission mask template will cause a FAIL result.

If the instrument is sweeping, it will not return until the sweep is complete. If the instrument is not sweeping and the current data is not valid it will return error -230. This could occur if there was a \*RST immediately before the :FETCh? or if a measurement parameter was changed without an :INITiate.

Data is returned as 2 comma-delimited values: PASS/FAIL status (PASS = 0, FAIL = 1), template number. See :FETCh:EMISSion:TEMPlate command for valid template numbers.

Default Units:	No units
See Also	:FETCh:EMISSion:FAIL? :FETCh:EMISSion:TEMPlate?

## Fetch Spectral Emission Mask Pass/Fail

### :FETCh:EMISSion:FAIL?

Returns the most recent spectral emission mask pass/fail measurement result.

Any violation of the spectral emission mask template will cause a FAIL result.

If the instrument is sweeping, it will not return until the sweep is complete. If the instrument is not sweeping and the current data is not valid it will return error -230. This could occur if there was a \*RST immediately before the :FETCh? or if a measurement parameter was changed without an :INITiate.

Data is returned as a single value indicating the PASS/FAIL status of the spectral emission mask measurement (PASS = 0, FAIL = 1).

Default Units:	No units
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## Fetch Spectral Emission Mask Template

**:FETCh:EMISSion:TEMPlate?**

Returns the spectral emission mask template used for the most recent spectral emission mask measurement.

Any violation of the spectral emission mask template will cause a FAIL result.

If the instrument is sweeping, it will not return until the sweep is complete. If the instrument is not sweeping and the current data is not valid it will return error -230. This could occur if there was a \*RST immediately before the :FETCh? or if a measurement parameter was changed without an :INITiate.

Data is returned as a single value representing the template used for the current spectral emission mask measurement results.

Default Units:	No units	
Templates	0	Power >= 43 dBm
	1	43 dBm > Power >= 39 dBm
	2	39 dBm > Power >= 31 dBm
	3	Power < 31 dBm

## Fetch Spectral Emission Mask Template Data

**:FETCh:EMISSion:TEMPlate:DATA?**

Returns the spectral emission mask template power level, frequency, and PASS/FAIL data for all ten frequency ranges shown in the Spectral Emission Summary.

If the instrument is sweeping, it will not return until the sweep is complete. If the instrument is not sweeping and the current data is not valid it will return error -230. This could occur if there was a \*RST immediately before the :FETCh? or if a measurement parameter was changed without an :INITiate.

Any violation of the spectral emission mask template will cause a FAIL result.

For each frequency range, the data is returned as 3 comma delimited values: Power Level in dBm, Frequency in Hz, and PASS/FAIL. The order in which the data is returned is shown below (from top to bottom).

Frequency Ranges:	-12.5 MHz to -8 MHz
	-8 MHz to -4 MHz
	-4 MHz to -3.515 MHz
	-3.515 MHz to -2.715 MHz
	-2.715 MHz to -2.515 MHz
	2.515 MHz to 2.715 MHz
	2.715 MHz to 3.515 MHz
	3.515 MHz to 4 MHz
	4 MHz to 8 MHz
	8 MHz to 12.5 MHz
See Also:	MEASure:EMISSion:TEMPlate:DATA? READ:EMISSion:TEMPlate:DATA?

## Fetch Occupied Bandwidth

**:FETCh:OBWidth?**

Returns the most recent occupied bandwidth measurement results.

If the instrument is sweeping, it will not return until the sweep is complete. If the instrument is not sweeping and the current data is not valid it will return error -230. This could occur if there was a \*RST immediately before the :FETCh? or if a measurement parameter was changed without an :INITiate.

Default Units:	Hz
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## Fetch Over The Air

**:FETCh:OTA[1] | 2 | 3 | 4 | 5 | 6?**

Returns the most recent over-the-air measurement results.

If the instrument is sweeping, it will not return until the sweep is complete. If the instrument is not sweeping and the current data is not valid it will return error -230. This could occur if there was a \*RST immediately before the :FETCh? or if a measurement parameter was changed without an :INITiate.

The measurement results are returned as 5 comma delimited values: scrambling code, CPICH power, chip energy, Ec/I0 ratio, pilot dominance.

If valid results are not available in the requested position (1-6), the returned string will contain a series of 3 dashes “---“ instead of the numeric results.

Default Units:	Scrambling Code: No units CPICH power: dBm Chip Energy: dBm EC/I0: dB Pilot dominance: No units
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## Fetch PASS/FAIL

**:FETCh:PFail?**

Returns the most recent PASS/FAIL measurement results.

If the instrument is actively measuring, it will not return until the measurement is complete. If the instrument is not actively measuring and the current data is not valid it will return error -230. This could occur if there was a \*RST immediately before the :FETCh? or if a measurement parameter was changed without an :INITiate.

Measurement results are returned in a block of ASCII text in the format of <header><block>. The ASCII header specifies the number of data bytes. It looks like #AX, where A is the number of digits in X and X is the number of bytes in the <block>.

The block consists of a set of records which indicate individual test results. Records are comma-separated. Each record follows the format <test ID>: <input1> <input2> <min> <max> <value1> <value2> <PASS/FAIL/OPTION NOT INSTALLED>. The <test ID> field indicates which test was performed to retrieve these results. The < input1> and < input2> fields indicate the test setup. The <min> and <max> fields indicate the minimum and maximum values against which <value1> and <value2> were compared to arrive at the final PASS/FAIL result.

If the specified test is not available in the instrument, the <PASS/FAIL> field will indicate “option not available” instead of “pass” or “fail”.

All unused fields for a given test will be represented by a double dash (“--”).

## Fetch Peak to Average Power Ratio

### **:FETCh:PTAPower?**

Returns the most recent peak to average power ratio measurement result.

If the instrument is sweeping, it will not return until the sweep is complete. If the instrument is not sweeping and the current data is not valid it will return error -230. This could occur if there was a \*RST immediately before the :FETCh? or if a measurement parameter was changed without an :INITiate.

Default Units:	dB
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## **MEASure Commands**

These commands take the instrument from its current state, enable the specified measurement and put the instrument into single sweep mode. They correct any parameters that are invalid given the new measurement state such that a valid measurement can take place. Other settings may be changed; see the documentation of CONFigure for each measurement. They then initiate the measurement. When the measurement is complete, they return the result.

To make a measurement with settings other than the “default” measurement settings applied by CONFigure, do the following:

- Send the appropriate CONFigure command to set the desired measurement.
- Modify the settings as required.
- Send the appropriate READ command to measure and return the result.

To get the current measurement data, use the appropriate FETCh command.

## Measure Adjacent Channel Leakage Ratio

### **:MEASure:ACLR?**

Sets the active measurement to adjacent channel power ratio, sets the default measurement parameters, triggers a new measurement and returns the main channel(s) power, and adjacent channel(s) power.

It is a combination of the commands `:CONFigure:RF ACLR;` `:READ:ACLR?`

For a description of the default adjacent channel power ratio measurement parameters see `:CONFigure:RF ACLR`.

To make an adjacent channel power ratio measurement with settings other than the default values send

- `:CONFigure:RF ACLR`
- Commands to set desired settings
- `:READ:ACLR?`

Data is returned as 12 comma-separated values: -20 MHz channel power, -15 MHz channel power, -10 MHz channel power, -5 MHz channel power, Main channel power 1, Main channel power 2, Main channel power 3, Main channel power 4, +5 MHz channel power, +10 MHz channel power, +15 MHz channel power, +20 MHz channel power.

Default Units:	dBm
See Also:	<code>:CONFigure:RF ACLR</code>

## Measure Channel Power

### **:MEASure:CHPower?**

Sets the active measurement to channel power, sets the default measurement parameters, triggers a new measurement and returns the channel power results.

It is a combination of the commands `:CONFigure:DEMod CDPower;` `:READ:CHPower?`

For a description of the default channel power measurement parameters see `:CONFigure:DEMod CDPower`.

To make a channel power measurement with settings other than the default values send

- `:CONFigure:DEMod CDPower`
- Commands to set desired settings
- `:READ:CHPower?`

Default Units:	dBm
See Also:	<code>:CONFigure:DEMod CDPower</code>

## Measure Active Code Domain Channels

### **:MEASure:DEMod:ACTChannels?**

Sets the active measurement to code domain power, sets the default measurement parameters, triggers a new measurement and returns the number of active traffic channels.

It is a combination of the commands:

`:CONFigure:DEMod CDP;:READ:DEMod:ACTChannels?`

For a description of the default code domain power measurement parameters see

`:CONFigure:DEMod CDP`.

To make an active channel measurement with settings other than the default values send

- `:CONFigure:DEMod CDP`
- Commands to set desired settings
- `:READ:DEMod:ACTChannels?`

Default Units:	dB
See Also:	<code>:CONFigure:DEMod CDP</code>

## Measure Code Domain Power

### **:MEASure:DEMod:CDPower?**

Sets the active measurement to code domain power, sets the default measurement parameters, triggers a new measurement and returns the channel power results.

It is a combination of the commands:

`:CONFigure:DEMod CDPower;:READ:DEMod:CDPower?`

For a description of the default channel power measurement parameters see

`:CONFigure:DEMod CDPower`.

To make a code domain power measurement with settings other than the default values send

- `:CONFigure:DEMod CDP`
- Commands to set desired settings
- `:READ:DEMod:CDPower?`

Results are returned as 4 comma-delimited values: CPICH power, PCCPCH power, PICH power, SCCPCH power.

Default Units:	dBm
See Also:	<code>:CONFigure:DEMod CDPower</code>

## Measure Carrier Feed Through

### **:MEASure:DEMod:CFTHrough?**

Sets the active measurement to code domain power, sets the default measurement parameters, triggers a new measurement and returns the carrier feed through results.

It is a combination of the commands:

`:CONFigure:DEMod CDP; :READ:DEMod:CFTHrough?`

For a description of the default code domain power measurement parameters see

`:CONFigure:DEMod CDP`.

To make a carrier feed through measurement with settings other than the default values send

- `:CONFigure:DEMod CDP`
- Commands to set desired settings
- `:READ:DEMod:CFTHrough?`

Default Units:	dB
See Also:	<code>:CONFigure:DEMod CDP</code>

## Measure Error Vector Magnitude

### **:MEASure:DEMod:EVM?**

Sets the active measurement to code domain power, sets the default measurement parameters, triggers a new measurement and returns the EVM results.

It is a combination of the commands:

`:CONFigure:DEMod CDP; :READ:DEMod:EVM?`

For a description of the default code domain power measurement parameters see

`:CONFigure:DEMod CDP`.

To make a carrier feed through measurement with settings other than the default values send

- `:CONFigure:DEMod CDP`
- Commands to set desired settings
- `:READ:DEMod:EVM?`

Default Units:	Percent
See Also:	<code>:CONFigure:DEMod CDP</code>

## Measure Frequency Error

### **:MEASure:DEMod:FERRor?**

Sets the active measurement to code domain power, sets the default measurement parameters, triggers a new measurement and returns the frequency error results.

It is a combination of the commands:

`:CONFigure:DEMod CDP; :READ:DEMod:FERRor?`

For a description of the default code domain power measurement parameters see  
:CONFigure:DEMod CDP.

To make a frequency error measurement with settings other than the default values send

- :CONFigure:DEMod CDP
- Commands to set desired settings
- :READ:DEMod:FERRor?

Default Units:	Hertz
See Also:	:CONFigure:DEMod CDP

## Measure Frequency Error PPM

### :MEASure:DEMod:FERRor:PPM?

Sets the active measurement to code domain power, sets the default measurement parameters, triggers a new measurement and returns the frequency error PPM results.

It is a combination of the commands :

:CONFigure:DEMod CDP; :READ:DEMod:FERRor:PPM?

For a description of the default code domain power measurement parameters, see  
:CONFigure:DEMod CDP.

To make a frequency error measurement with settings other than the default values send

- :CONFigure:DEMod CDP
- Commands to set desired settings
- :READ:DEMod:FERRor:PPM?

Default Units:	No Unit
See Also:	:READ:DEMod:FERRor:PPM? :FETCh:DEMod:FERRor:PPM? :CONFigure:DEMod CDP

## Measure Frequency Error

### :MEASure:DEMod:FERRor:PRECise?

Sets the active measurement to code domain power, sets the default measurement parameters, triggers a new measurement and returns the frequency error results.

It is a combination of the commands :

:CONFigure:DEMod CDP; :READ:DEMod:FERRor:PRECise?

For a description of the default code domain power measurement parameters see  
:CONFigure:DEMod CDP.

To make a frequency error measurement with settings other than the default values send

- :CONFigure:DEMod CDP
- Commands to set desired settings
- :READ:DEMod:FERRor:PRECise?

Note that this command is the same as `:MEASure:DEMod:FERRor?`, but returns the result with a precision of one-tenth Hertz.

Default Units:	Hertz
See Also:	<code>:CONFIgure:DEMod CDP</code> <code>:MEASure:DEMod:FERRor?</code>

## Measure HSDPA Frequency Error

### **:MEASure:DEMod:HSDPa:FERRor?**

Sets the active measurement to HSDPA, sets the default measurement parameters, triggers a new measurement and returns the HSDPA frequency error results.

It is a combination of the commands:

`:CONFIgure:DEMod HSDPa; :READ:DEMod:HSDPa:FERRor?`

For a description of the default HSDPA measurement parameters, see

`:CONFIgure:DEMod HSDPa.`

To make a frequency error measurement with settings other than the default values send

- `:CONFIgure:DEMod HSDPa`
- Commands to set desired settings
- `:READ:DEMod:HSDPa:FERRor?`

Default Units:	Hertz
See Also:	<code>:READ:DEMod:HSDPa:FERRor?</code> <code>:FETCh:DEMod:HSDPa:FERRor?</code> <code>:CONFIgure:DEMod HSDPa</code>

## Measure HSDPA Frequency Error PPM

### **:MEASure:DEMod:HSDPa:FERRor:PPM?**

Sets the active measurement to HSDPA sets the default measurement parameters, triggers a new measurement and returns the HSDPA frequency error PPM results.

It is a combination of the commands:

`:CONFIgure:DEMod HSDPa; :READ:DEMod:HSDPa:FERRor:PPM?`

For a description of the default HSDPA measurement parameters, see

`:CONFIgure:DEMod HSDPa.`

To make a frequency error measurement with settings other than the default values send

- `:CONFIgure:DEMod HSDPa`
- Commands to set desired settings
- `:READ:DEMod:HSDPa:FERRor:PPM?`

Default Units:	No Unit
See Also:	<code>:READ:DEMod:HSDPa:FERRor:PPM?</code> <code>:FETCh:DEMod:HSDPa:FERRor:PPM?</code> <code>:CONFIgure:DEMod HSDPa</code>

## Measure HSDPA Transmitter Frequency

### **:MEASure:DEMod:HSDPa:TXFrequency?**

Sets the active measurement to HSDPA, sets the default measurement parameters, triggers a new measurement and returns the HSDPA transmitter frequency results.

It is a combination of the commands:

`:CONFigure:DEMod HSDPa; :READ:DEMod:HSDPa:TXFrequency?`

For a description of the default HSDPA measurement parameters, see

`:CONFigure:DEMod HSDPa.`

To make a transmitter frequency measurement with settings other than the default values send

- `:CONFigure:DEMod HSDPa`
- Commands to set desired settings
- `:READ:DEMod:HSDPa:TXFrequency?`

Default Units:	Hertz
See Also:	<code>:READ:DEMod:HSDPa:TXFrequency?</code> <code>:FETCh:DEMod:HSDPa:TXFrequency?</code> <code>:CONFigure:DEMod HSDPa</code>

## Measure Code Domain Noise Floor

### **:MEASure:DEMod:NFLoor?**

Sets the active measurement to code domain power, sets the default measurement parameters, triggers a new measurement and returns the noise floor results.

It is a combination of the commands:

`:CONFigure:DEMod CDP; :READ:DEMod:NFLoor?`

For a description of the default code domain power measurement parameters see

`:CONFigure:DEMod CDP.`

To make a noise floor measurement with settings other than the default values send

- `:CONFigure:DEMod CDP`
- Commands to set desired settings
- `:READ:DEMod:NFLoor?`

Default Units:	dB
See Also:	<code>:CONFigure:DEMod CDP</code>

## Measure Code Domain Channel Count

### **:MEASure:DEMod:NUMChannels?**

Sets the active measurement to code domain power, sets the default measurement parameters, triggers a new measurement and returns the number of channels.

It is a combination of the commands :

`:CONFigure:DEMod CDP;:READ:DEMod:NUMChannels?`

For a description of the default code domain power measurement parameters see

`:CONFigure:DEMod CDP`.

To make an channel count measurement with settings other than the default values send

- `:CONFigure:DEMod CDP`
- Commands to set desired settings
- `:READ:DEMod:NUMChannels?`

Default Units:	dB
See Also:	<code>:CONFigure:DEMod CDP</code>

## Measure Synch Channel Power

**`:MEASure:DEMod:SPOWer?`**

Sets the active measurement to code domain power, sets the default measurement parameters, triggers a new measurement and returns the synch channel power results.

It is a combination of the commands :

`:CONFigure:DEMod CDP;:READ:DEMod:SPOWer?`

For a description of the default code domain power measurement parameters see

`:CONFigure:DEMod CDP`.

To make a synch channel power measurement with settings other than the default values send

- `:CONFigure:DEMod CDP`
- Commands to set desired settings
- `:READ:DEMod:SPOWer?`

Results are returned as 3 comma-delimited values: SCH power, PSCH power, SSCH power.

Default Units:	dBm
See Also:	<code>:CONFigure:DEMod CDP</code>

## Measure Transmitter Frequency

**`:MEASure:DEMod:TXFrequency?`**

Sets the active measurement to code domain power, sets the default measurement parameters, triggers a new measurement and returns the transmitter frequency results.

It is a combination of the commands :

`:CONFigure:DEMod CDP;:READ:DEMod:TXFrequency?`

For a description of the default code domain power measurement parameters see

`:CONFigure:DEMod CDP`.

To make a transmitter frequency measurement with settings other than the default values send

- :CONFigure:DEMod CDP
- Commands to set desired settings
- :READ:DEMod:TXFRequency?

Default Units:	Hertz
See Also:	:CONFigure:DEMod CDP

## Measure Transmitter Frequency

### :MEASure:DEMod:TXFRequency:PRECise?

Sets the active measurement to code domain power, sets the default measurement parameters, triggers a new measurement and returns the transmitter frequency results.

It is a combination of the commands :

:CONFigure:DEMod CDP; :READ:DEMod:TXFRequency:PRECise?

For a description of the default code domain power measurement parameters see

:CONFigure:DEMod CDP.

To make a transmitter frequency measurement with settings other than the default values send

- :CONFigure:DEMod CDP
- Commands to set desired settings
- :READ:DEMod:TXFRequency:PRECise?

Note that this command is the same as :MEASure:DEMod:TXFRequency?, but returns the result with a precision of one-tenth Hertz.

Default Units:	Hertz
See Also:	:CONFigure:DEMod CDP :MEASure:DEMod:TXFRequency?

## Measure Spectral Emission Mask

### :MEASure:EMISSion?

Sets the active measurement to spectral emission mask, sets the default measurement parameters, triggers a new measurement and returns the spectral emission mask measurement results.

It is a combination of the commands :

:CONFigure:RF EMISSion; :READ:EMISSion?

For a description of the default spectral emission mask measurement parameters see

:CONFigure:RF EMISSion.

To make a spectral emission mask measurement with settings other than the default values send

- :CONFigure:RF EMISsion
- Commands to set desired settings
- :READ:EMISsion?

Results are returned as 2 comma-delimited values: pass/fail status, and template number.

See Also:	:MEASure:EMISsion:FAIL? :MEASure:EMISsion:TEMPlate?
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## Measure Spectral Emission Mask Pass/Fail status

### **:MEASure:EMISsion:FAIL?**

Sets the active measurement to spectral emission mask, sets the default measurement parameters, triggers a new measurement and returns the spectral emission mask pass/fail results.

It is a combination of the commands:

CONFigure:RF EMISsion;:READ:EMISsion:FAIL?

For a description of the default spectral emission mask measurement parameters see

:CONFigure:RF EMISsion.

To make a spectral emission mask pass/fail status measurement with settings other than the default values send

- :CONFigure:RF EMISsion
- Commands to set desired settings
- :READ:EMISsion:FAIL?

See Also:	:MEASure:EMISsion :MEASure:EMISsion:TEMPlate? :CONFigure:RF EMISsion
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## Measure Spectral Emission Mask Template

### **:MEASure:EMISsion:TEMPlate?**

Sets the active measurement to spectral emission mask, sets the default measurement parameters, triggers a new measurement and returns the spectral emission mask template results.

It is a combination of the commands:

:CONFigure:RF EMISsion;:READ:EMISsion:TEMPlate?

For a description of the default spectral emission mask measurement parameters see

:CONFigure:RF EMISsion.

To make a spectral emission mask template measurement with settings other than the default values send

- :CONFigure:RF EMISSion
- Commands to set desired settings
- :READ:EMISSion:TEMPlate?

See Also:	:MEASure:EMISSion? :MEASure:EMISSion:FAIL? :CONFigure:RF EMISSion
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## Measure Spectral Emission Mask Template Data

### :MEASure:EMISSion:TEMPlate:DATA?

Sets the active measurement to spectral emission mask, sets the default measurement parameters, triggers a new measurement and returns the spectral emission mask template power level, frequency, and PASS/FAIL data for all ten frequency ranges shown in the Spectral Emission Summary.

It is a combination of the commands:

:CONFigure:RF EMISSion; :READ:EMISSion:TEMPlate:DATA?

For a description of the default spectral emission mask measurement parameters, see

:CONFigure:RF EMISSion.

To make a spectral emission mask template measurement with settings other than the default values send

- :CONFigure:RF EMISSion
- Commands to set desired settings
- :READ:EMISSion:TEMPlate:DATA?

For each frequency range, the data is returned as 3 comma delimited values: Power Level in dBm, Frequency in Hz, and PASS/FAIL.

See Also:	:READ:EMISSion:TEMPlate:DATA? :FETCh:EMISSion:TEMPlate:DATA? :CONFigure:RF EMISSion
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## Measure Occupied Bandwidth

### :MEASure:OBWidth?

Sets the active measurement to RF spectrum, sets the default measurement parameters, triggers a new measurement and returns the occupied bandwidth results.

It is a combination of the commands:

:CONFigure:RF SPECTrum; :READ:OBWidth?

For a description of the default occupied bandwidth measurement parameters see

:CONFigure:RF SPECTrum.

To make an occupied bandwidth measurement with settings other than the default values send

- :CONFigure:RF SPECTrum
- Commands to set desired settings
- :READ:OBWidth?

Default Units:	Hz
See Also:	:CONFigure:RF SPECTrum

## Measure Over The Air

**:MEASure:OTA[1] | 2 | 3 | 4 | 5 | 6?**

Sets the active measurement to over-the-air, sets the default measurement parameters, triggers a new measurement and returns the OTA measurement results.

It is a combination of the commands :CONFigure:OTA; :READ:OBWidth?

For a description of the default occupied bandwidth measurement parameters see :CONFigure:RF SPECTRUM.

To make an OTA measurement with settings other than the default values send

- :CONFigure:OTA
- Commands to set desired settings
- :READ:OTA?

The measurement results are returned as 5 comma delimited values: scrambling code, CPICH power, chip energy, Ec/I0 ratio, pilot dominance.

Default Units:	Scrambling Code: No units CPICH power: dBm Chip Energy: dBm EC/I0: dB Pilot dominance: No units
See Also:	:CONFigure:OTA

## Measure PASS/FAIL

**:MEASure:PFail?**

Sets the active measurement to PASS/FAIL, sets the default measurement parameters, triggers a new measurement and returns the PASS/FAIL results.

It is a combination of the commands :

:CONFigure PFail;:READ:PFail?

To make a channel power measurement with settings other than the default values send

- :CONFigure PFail
- Commands to set desired settings
- :READ:PFail?

See Also:	:CONFigure PFail
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## Measure Peak to Average Power

### **:MEASure:PTAPower?**

Sets the active measurement to RF spectrum, sets the default measurement parameters, triggers a new measurement and returns the PTAP measurement results.

It is a combination of the commands :CONFigure:RF SPECTrum;  
:READ:PTAPower?

For a description of the default occupied bandwidth measurement parameters see  
:CONFigure:RF SPECTrum.

To make a peak to average power measurement with settings other than the default values send

- :CONFigure:RF SPECTrum
- Commands to set desired settings
- :READ:PTAPower?

Default Units	dB
See Also:	:CONFigure:RF SPECTrum

## **READ Commands**

This set of commands combines the ABORt, INITiate and FETCh commands. It aborts any current triggering sequence and sets the trigger state to idle. It then initiates a new active measurement (i.e. begins the collection of new data). When the measurement is complete, it returns the result. These commands will not switch to another measurement.

To get the current measurement data, use the FETCh command.

## **Read Adjacent Channel Leakage Ratio (ACLR)**

### **:READ:ACLR?**

Triggers a new adjacent channel power ratio measurement and returns the results: main channel power, lower adjacent and upper adjacent channel power, and lower alternate and upper alternate channel power. It is a combination of the commands

:ABORt; :INITiate; :FETCh:ACLR?

The ACLR measurement must be the active measurement (specified by :CONFigure:RF ACLR). The current measurement can be queried using :CONFigure?

Data is returned as 12 comma-separated values: -20 MHz channel power, -15 MHz channel power, -10 MHz channel power, -5 MHz channel power, Main channel power 1, Main channel power 2, Main channel power 3, Main channel power 4, +5 MHz channel power, +10 MHz channel power, +15 MHz channel power, +20 MHz channel power.

See Also:	:CONFigure:RF ACLR
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## Read Channel Power

### **:READ:CHPower?**

Triggers a new channel power measurement and returns the results. It is a combination of the commands :ABORT; :INITiate; :FETCh:CHPower?

The channel power measurement must be active. The current measurement can be queried using :CONFigure?

See Also:	:CONFigure:RF ACLR
Default Units	dBm

## Read Active Code Domain Channel Count

### **:READ:DEMod:ACTChannels?**

Triggers a new measurement and returns the active channel count. It is a combination of the commands :ABORT; :INITiate; :FETCh:DEMod:ACTChannels?

A demodulation measurement must be active. The current measurement can be queried using :CONFigure?

Default Units	dB
See Also:	:CONFigure:DEMod

## Read Code Domain Power

### **:READ:DEMod:CDPower?**

Triggers a new code domain power measurement and returns the results. It is a combination of the commands :ABORT; :INITiate; :FETCh:DEMod:CDPower?

The code domain power measurement must be active. The current measurement can be queried using :CONFigure?

Results are returned as 4 comma-delimited values: CPICH power, PCCPCH power, PICH power, SCCPCH power.

Default Units	dBm
See Also:	:CONFigure:DEMod CDP

## Read Carrier Feed Through

### **:READ:DEMod:CFThrough?**

Triggers a new measurement and returns the carrier feed through results. It is a combination of the commands

:ABORT; :INITiate; :FETCh:DEMod:CFThrough?

The carrier feed through measurement must be active. The current measurement can be queried using :CONFigure?

Default Units	dB
See Also:	:CONFigure:DEMod

## Read Error Vector Magnitude (EVM)

**:READ:DEMod:EVM?**

Triggers a new measurement and returns the EVM results. It is a combination of the commands `:ABORT;` `:INITiate;` `:FETCh:DEMod:EVM?`

The EVM measurement must be active. The current measurement can be queried using `:CONFigure?`

Default Units	Percent
See Also:	<code>:CONFigure:DEMod</code>

## Read Frequency Error

**:READ:DEMod:FERRor?**

Triggers a new measurement and returns the frequency error results. It is a combination of the commands `:ABORT;` `:INITiate;` `:FETCh:DEMod:FERRor?`

The frequency error measurement must be active. The current measurement can be queried using `:CONFigure?`

Default Units	Hertz
See Also:	<code>:CONFigure:DEMod</code>

## Read Frequency Error PPM

**:READ:DEMod:FERRor:PPM?**

Triggers a new measurement and returns the frequency error results. It is a combination of the commands:

`:ABORT;` `:INITiate;` `:FETCh:DEMod:FERRor:PPM?`

The frequency error PPM measurement must be active. The current measurement can be queried using `:CONFigure?`

Default Units	No Unit
See Also:	<code>:MEASure:DEMod:FERRor:PPM?</code> <code>:FETCh:DEMod:FERRor:PPM?</code> <code>:CONFigure:DEMod CDP</code>

## Read Frequency Error

**:READ:DEMod:FERRor:PRECise?**

Triggers a new measurement and returns the frequency error results. It is a combination of the commands `:ABORT;` `:INITiate;` `:FETCh:DEMod:FERRor:PRECise?`

The frequency error measurement must be active. The current measurement can be queried using `:CONFigure?`

Note that this command is the same as `:READ:DEMod:FERRor?`, but returns the result with a precision of one-tenth Hertz.

Default Units	Hertz
See Also:	<code>:CONFIgure:DEMod</code> <code>:READ:DEMod:FERRor?</code>

### Read HSDPA Frequency Error

**`:READ:DEMod:HSDPa:FERRor?`**

Triggers a new measurement and returns the frequency error results. It is a combination of the commands:

`:ABORT;` `:INITiate;` `:FETCh:DEMod:HSDPa:FERRor?`

The HSDPA frequency error measurement must be active. The current measurement can be queried using `:CONFIgure?`

Default Units	Hertz
See Also:	<code>:MEASure:DEMod:HSDPa:FERRor?</code> <code>:FETCh:DEMod:HSDPa:FERRor?</code> <code>:CONFIgure:DEMod HSDPa</code>

### Read HSDPA Frequency Error PPM

**`:READ:DEMod::HSDPa:FERRor:PPM?`**

Triggers a new measurement and returns the frequency error results. It is a combination of the commands:

`:ABORT;` `:INITiate;` `:FETCh:DEMod:HSDPa:FERRor:PPM?`

The HSDPA frequency error PPM measurement must be active. The current measurement can be queried using `:CONFIgure?`

Default Units	No Unit
See Also:	<code>:MEASure:DEMod:HSDPa:FERRor:PPM?</code> <code>:FETCh:DEMod:HSDPa:FERRor:PPM?</code> <code>:CONFIgure:DEMod HSDPa</code>

## Read HSDPA Transmitter Frequency

**:READ:DEMod:HSDPa:TXFrequency?**

Triggers a new measurement and returns the HSDPA transmitter frequency results. It is a combination of the commands:

:ABORT; :INITiate; :FETCh:DEMod:HSDPa:TXFrequency?

The HSDPA transmitter frequency measurement must be active. The current measurement can be queried using :CONFigure?

Default Units	Hertz
See Also:	:MEASure:DEMod:HSDPa:TXFrequency? :FETCh:DEMod:HSDPa:TXFREquency? :CONFigure:DEMod HSDPa

## Read Noise Floor

**:READ:DEMod:NFLoor?**

Triggers a new measurement and returns the noise floor results. It is a combination of the commands :ABORT; :INITiate; :FETCh:DEMod:NFLoor?

The noise floor measurement must be active. The current measurement can be queried using :CONFigure?

Default Units	dB
See Also:	:CONFigure:DEMod

## Read Code Domain Channel Count

**:READ:DEMod:NUMChannels?**

Triggers a new measurement and returns the channel count. It is a combination of the commands :ABORT; :INITiate; :FETCh:DEMod:NUMChannels?

A demodulation measurement must be active. The current measurement can be queried using :CONFigure?

Default Units	dB
See Also:	:CONFigure:DEMod

## Read Synch Channel Power

**:READ:DEMod:SPOWer?**

Triggers a new measurement and returns the synch channel power results. It is a combination of the commands :ABORT::INITiate::FETCh:DEMod:SPOWer?

The synch channel power measurement must be active. The current measurement can be queried using :CONFIgure?

Results are returned as 3 comma-delimited values: SCH power, PSCH power, SSCH power.

Default Units	dBm
See Also:	:CONFIgure:DEMod

## Read Transmitter Frequency

**:READ:DEMod:TXFrequency?**

Triggers a new measurement and returns transmitter frequency results. It is a combination of the commands

:ABORT::INITiate::FETCh:DEMod:TXFrequency?

The carrier frequency measurement must be active. The current measurement can be queried using :CONFIgure?

Default Units	Hertz
See Also:	:CONFIgure:DEMod

## Read Transmitter Frequency

**:READ:DEMod:TXFrequency:PRECise?**

Triggers a new measurement and returns transmitter frequency results. It is a combination of the commands

:ABORT::INITiate::FETCh:DEMod:TXFrequency:PRECise?

The carrier frequency measurement must be active. The current measurement can be queried using :CONFIgure?

Note that this command is the same as :READ:DEMod:TXFrequency?, but returns the result with a precision of one-tenth Hertz.

Default Units	Hertz
See Also:	:CONFIgure:DEMod :READ:DEMod:TXFrequency?

## Read Spectral Emission Mask

**:READ:EMISSION?**

Triggers a new spectral emission mask measurement and returns the results: pass/fail status and template number. It is a combination of the commands

**:ABORT;:INITiate;:FETCh:EMISSION?**

The spectral emission mask measurement must be active. The current measurement can be queried using **:CONFigure?**

Results are returned as 2 comma-delimited values: pass/fail status, and template number.

Default Units	No units
See Also:	<b>:CONFigure:RF EMISSION</b>

## Read Spectral Emission Mask Pass/Fail Status

**:READ:EMISSION:FAIL?**

Triggers a new spectral emission mask measurement and returns the pass/fail results. It is a combination of the commands **:ABORT;:INITiate;**

**:FETCh:EMISSION:FAIL?**

The spectral emission mask measurement must be active. The current measurement can be queried using **:CONFigure?**

Default Units	No units
See Also:	<b>:CONFigure:RF EMISSION</b>

## Read Spectral Emission Mask Template

**:READ:EMISSION:TEMPLATE?**

Triggers a new spectral emission mask measurement and returns the template number result. It is a combination of the commands **:ABORT;:INITiate;**

**:FETCh:EMISSION:TEMPLATE?**

The spectral emission mask measurement must be active. The current measurement can be queried using **:CONFigure?**

Default Units	No units
See Also:	<b>:CONFigure:RF EMISSION</b>

## Read Spectral Emission Mask Template Data

**:READ:EMISSION:TEMPLATE:DATA?**

Triggers a new spectral emission mask measurement and returns the spectral emission mask template power level, frequency, and PASS/FAIL data for all ten frequency ranges shown in the Spectral Emission Summary.

It is a combination of the commands:

`:ABORT; :INITiate; :FETCh:EMISSion:TEMPLate:DATA?`

The spectral emission mask measurement must be active. The current measurement can be queried using `:CONFigure?`

For each frequency range, the data is returned as 3 comma delimited values: Power Level in dBm, Frequency in Hz, and PASS/FAIL.

Default Units	No units
See Also:	<code>:MEASure:EMISSion:TEMPLate:DATA?</code> <code>:FETCh:EMISSion:TEMPLate:DATA?</code> <code>:CONFigure:RF EMISSion</code>

### Read Occupied Bandwidth

`:READ:OBwidth?`

Triggers a new occupied bandwidth measurement and returns the result. It is a combination of the commands `:ABORT; :INITiate; :FETCh:OBwidth?`

The occupied bandwidth measurement must be active. The current measurement can be queried using `:CONFigure?`

Default Units:	Hz
See Also:	<code>:CONFigure:RF</code>

### Read Over The Air

`:READ:OTA[1] | 2 | 3 | 5 | 6?`

Triggers a new over-the-air measurement and returns the result. It is a combination of the commands `:ABORT; :INITiate; :FETCh:OTA?`

The over-the-air measurement must be active. The current measurement can be queried using `:CONFigure?`

The measurement results are returned as 5 comma delimited values: scrambling code, CPICH power, chip energy, Ec/I0 ratio, pilot dominance.

Default Units:	Scrambling Code: No units CPICH power: dBm Chip Energy: dBm EC/I0: dB Pilot dominance: No units
See Also:	<code>:CONFigure:OTA</code>

## Read PASS/FAIL

**:READ:PFail?**

Triggers a new PASS/FAIL measurement and returns the results. It is a combination of the commands :ABORT; :INITiate; :FETCh:PFail?

The PASS/FAIL measurement must be active. The current measurement can be queried using :CONFigure?

See Also:	:CONFigure PFail
Result Format	See :FETCh:PFail?

## Read Peak to Average Power Ratio

**:READ:PTAPower?**

Triggers a new measurement and returns the peak to average power ratio result. It is a combination of the commands :ABORT; :INITiate; :FETCh:PTAPower?

The peak to average power measurement must be active. The current measurement can be queried using :CONFigure?

Default Units:	dB
See Also:	:CONFigure:RF

## ***SENSe (Measurement Command) Subsystem***

This subsystem contains commands related to preparing the instrument to make a particular measurement. These measurements are not defined in the SCPI standard so they are maintained separately here.

### ***[:SENSe]:DEMod Subsystem***

This subsystem includes commands used to set up and query parameters associated with measurements that are performed on modulated signals.

### **Codogram Measurement Time**

**[ :SENSe ] :DEMod :CODogram :TIME <seconds>**

**[ :SENSe ] :DEMod :CODogram :TIME?**

This command refers to the minimum elapsed time between successive codogram measurements.

Factory Preset / *RST:	5 seconds
Range:	5 seconds - 6000 seconds
Front Panel Access:	Measurements, Demodulator, Codogram, Single Sweep Time

## Absolute Common Pilot Channel (CPICH) Level

**[ :SENSE ] :DEMod:CPICH:ABSolute?**

Queries the absolute Common Pilot Channel level.

Default Unit:	dB
See Also:	MEASure:DEMod:CDPower? READ:DEMod:CDPower? FETCh:DEMod:CDPower?

## Relative Common Pilot Channel (CPICH) Level

**[ :SENSE ] :DEMod:CPICH:RELative?**

Queries the relative Common Pilot Channel level.

Default Unit:	dB
See Also:	MEASure:DEMod:CDPower? READ:DEMod:CDPower? FETCh:DEMod:CDPower?

## Control Channels Display Units

**[ :SENSE ] :DEMod:CTRLchannels:UNIT RELative | ABSolute | DELTa**

**[ :SENSE ] :DEMod:CTRLchannels:UNIT?**

This command refers to the display units for the control channels in the HSDPA and CDP view.

Setting the value to RELative will result in displaying P-CCPCH, S-CCPCH, PICH, P-SCH and S-SCH in relative powers.

Setting the value to ABSolute will result in displaying P-CCPCH, S-CCPCH, PICH, P-SCH and S-SCH in absolute powers.

Setting the value to DELTa will result in displaying P-CCPCH, S-CCPCH, PICH, P-SCH and S-SCH in delta powers.

Factory Preset / *RST:	RELative
Front Panel Access:	Shift-4(Measure),Demodulator, HSDPA,Control Channels; Shift-4(Measure),Demodulator,CDP, Control Channels

## HSDPA IQ Persistence

[ :SENSE ] :DEMod:HSDPa:IQPersistence <integer>

[ :SENSE ] :DEMod:HSDPa:IQPersistence?

Sets the number of samples before displaying the screen.

Factory Preset / *RST:	1
Range:	1-48
Front Panel Access:	Measurements, Demodulator, HSDPA, IQ Persistence
Required Options:	65

## HSDPA Measurement Time

[ :SENSE ] :DEMod:HSDPa:TIME <seconds>

[ :SENSE ] :DEMod:HSDPa:TIME?

This command refers to the minimum elapsed time between successive codogram measurements.

Factory Preset / *RST:	5 seconds
Range:	5 - 6000 seconds
Front Panel Access:	Measurements, Demodulator, HSDPA, Single Sweep Time
Required Options:	65

## Relative Primary Common Control Physical Channel (P-CCPCH) Level

[ :SENSE ] :DEMod:PCCPch:RELative?

Queries the relative Primary Common Control Physical Channel level.

Default Unit:	dB
See Also:	MEASure:DEMod:CDPower? READ:DEMod:CDPower? FETCh:DEMod:CDPower?

## Peak Code Domain Error

[ :SENSE ] :DEMod:PCDerror?

Queries the Peak Code Domain Error.

Default Unit:	dB
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## PICH Code Number

[ :SENSE ] :DEMod:PICH:CODE <code number>

[ :SENSE ] :DEMod:PICH:CODE?

This command refers to the channelization code number of the PICH channel for W-CDMA code domain demodulation measurements.

Factory Preset / *RST:	MT8220A: 16 MS2717A: 16
Range:	MT8220A: 0 – 255 MS2717A: 0 – 255
Front Panel Access:	Setup, PICH Code

## S-CCPCH Code Number

[ :SENSE ] :DEMod:SCCPch:CODE <code number>

[ :SENSE ] :DEMod:SCCPch:CODE?

This command refers to the channelization code number of the S-CCPCH channel for W-CDMA code domain demodulation measurements.

Factory Preset / *RST:	MT8220A: 3 MS2717A: 3
Range:	MT8220A: 0 – 255 MS2717A: 0 – 255
Front Panel Access:	Setup, S-CCPCH Code

## S-CCPCH Spreading Factor

[ :SENSE ] :DEMod:SCCPch:SFACTOR 4 | 8 | 16 | 32 | 64 | 128 | 256

[ :SENSE ] :DEMod:SCCPch:SFACTOR?

This command refers to the spreading factor of the S-CCPCH channel for W-CDMA code domain demodulation measurements.

Factory Preset / *RST:	MT8220A: 256 MS2717A: 256
Front Panel Access:	Setup, S-CCPCH Spread

## Scrambling Code

**[ :SENSe ] :DEMod :SCODE <scrambling code>**

**[ :SENSe ] :DEMod :SCODE?**

This command refers to the primary scrambling code used for W-CDMA code domain demodulation measurements. When the auto scrambling code feature is turned on, setting this value has no direct effect on measurement results.

Factory Preset / *RST:	MT8220A: 0 MS2717A: 0
Valid Values:	MT8220A: 0 to 262143 MS2717A: 0 to 262143
Front Panel Access:	Setup, Scrambling Code

## Automatic Scrambling Code Detection

**[ :SENSe ] :DEMod :SCODE :AUTO OFF | ON | 0 | 1**

**[ :SENSe ] :DEMod :SCODE :AUTO?**

Sets the state of the automatic scrambling code detection feature.

Setting the value to ON or 1 will result in the scrambling code being set to the code of the strongest detected signal. That is, the instrument will detect the strongest signal present and use the scrambling code of that signal for demodulation.

Setting the value to OFF or 0 will force the instrument to base all demodulation on the user-selected scrambling code value.

The default value is ON. That is, sending **:SENS:DEM:SCOD:AUTO** is equivalent to sending **:SENS:DEM:SCOD:AUTO ON**.

Factory Preset / *RST:	MT8220A: ON MS2717A: ON
Front Panel Access:	Setup, Scrambling Code
See Also:	[ :SENSe ] :DEMod :SCODE

## Maximum Spreading Factor

**[ :SENSe ] :DEMod :SFACTOR 256 | 512**

**[ :SENSe ] :DEMod :SFACTOR?**

This command refers to the maximum spreading factor used when demodulating a UMTS/W-CDMA signal.

Factory Preset / *RST:	MT8220A: 512 MS2717A: 512
Front Panel Access:	Setup, Max Spreading

## Active Code Threshold

**[ :SENSE ] :DEMod:THRShold <rel ampl>**

**[ :SENSE ] :DEMod:THRShold?**

This command refers to the threshold used for detecting active vs. inactive traffic channels in W-CDMA code domain demodulation measurements.

Factory Preset / *RST:	MT8220A: -30 dB MS2717A: -30 dB
Valid Values:	MT8220A: -50 to -10 dB MS2717A: -50 to -10 dB

## Automatic Threshold

**[ :SENSE ] :DEMod:THRShold:AUTO OFF | ON | 0 | 1**

**[ :SENSE ] :DEMod:THRShold:AUTO?**

Sets the state of the automatic threshold feature.

Setting the value to ON or 1 will enable the automatic threshold feature.

Setting the value to OFF or 0 will disable the automatic threshold feature.

The default value is ON. That is, sending `:SENS:DEM:THRS:AUTO` is equivalent to sending `:SENS:DEM:THRS:AUTO ON`.

Factory Preset / *RST:	ON
Front Panel Access:	Setup, Threshold
See Also:	[ :SENSE ] :DEMod:THRShold

## **[ :SENSE ] :OTA Subsystem**

This subsystem includes commands used to set up parameters associated with Over the Air measurements.

### OTA Reset

**[ :SENSE ] :OTA:RESet**

This command forces the instrument to reset the over-the-air measurement and start fresh without any history.

When the auto scrambling code feature is ON the RESet command will clear the list of scrambling codes and attempt to detect new codes.

When the auto scrambling code feature is OFF the RESet command will force the instrument to take new measurements for all of the user-selected scrambling codes.

Front Panel Access:	Measurements, OTA, Reset
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## OTA Scrambling Code

[ :SENSe ] : OTA : SCODE [ 1 ] | 2 | 3 | 4 | 5 | 6 <scrambling code>  
[ :SENSe ] : OTA : SCODE [ 1 ] | 2 | 3 | 4 | 5 | 6 ?

This command refers to the primary scrambling codes used for W-CDMA over-the-air measurements. To disable the specified code use a scrambling code value of '-1'.

When the auto scrambling code feature is turned on, setting this value has no direct effect on measurement results.

Factory Preset / *RST:	MT8220A: -1
Valid Values:	MT8220A: -1 to 511
Front Panel Access:	Measurements, OTA, Manual Scrambling Code

## Automatic OTA Scrambling Code Detection

[ :SENSe ] : OTA : SCODE : AUTO OFF | ON | 0 | 1  
[ :SENSe ] : OTA : SCODE : AUTO ?

Sets the state of the automatic scrambling code detection feature.

Setting the value to ON or 1 will result in the scrambling codes being set to the codes of the strongest detected signals. That is, the instrument will detect the strongest signals present.

Setting the value to OFF or 0 will force the instrument to base all over-the-air measurements on the user-selected scrambling code values.

The default value is ON. That is, sending :SENS:DEM:OTA:SCOD:AUTO is equivalent to sending :SENS:DEM:OTA:SCOD:AUTO ON.

Factory Preset / *RST:	MT8220A: ON
Front Panel Access:	Measurements, OTA, Auto Scrambling
See Also:	[ :SENSe ] : DEMod : OTA : SCODE

## OTA Scrambling Code Lock

[ :SENSe ] : OTA : SCODE : LOCK OFF | ON | 0 | 1  
[ :SENSe ] : OTA : SCODE : LOCK ?

This command refers to the primary scrambling codes used for W-CDMA over-the-air measurements.

When scrambling code lock is ON, the instrument will not search for any new scrambling codes and will only measure the codes that have already been detected.

When scrambling code lock is OFF, the instrument will dynamically update the list of scrambling codes that are to be included in the current measurements.

This feature has no effect when scrambling code auto detection is OFF for over-the-air measurements.

The default value for this command is ON. That is, sending `SENS:DEM:OTA:LOCK` is equivalent to `SENS:DEM:OTA:LOCK ON`.

Factory Preset / *RST:	MT8220A: OFF
Front Panel Access:	Measurements, OTA, Code Lock

### OTA Sort Parameter

`[ :SENSe ]:OTA:SORT CODE | PwEr`

`[ :SENSe ]:OTA:SORT?`

This command refers to the parameter that is used to sort the over-the-air measurement results.

Factory Preset / *RST:	MT8220A: CODE
Front Panel Access:	Measurements, OTA, Sort By

### PASS/FAIL Test Selection

`[ :SENSe ]:PFail <test set>`

`[ :SENSe ]:PFail?`

Selects the active test set to be used in subsequent PASS/FAIL measurements. The `<test set>` value must correspond to a test set that is defined in the test set list. For more information on loading test sets to the instrument, see the `:MMEMory:STORE:PFail` command. NOTE: The first test set in the list would be test set 0, the next test set would be 1, etc.

When using the query form of the command, the return value will be the currently selected test set number. If there is not a valid test set selected, the return value will be “-1” (negative 1).

Front Panel Access:	Measurement, Pass Fail Mode, Select Pass/Fail Test
See Also:	:CONFigure PFail

### ***[ :SENSe ]:RF Subsystem***

This subsystem includes commands used to set up and query parameters associated with RF measurements.

## **[[:SENSe]:ACLR Subsystem**

This subsystem includes commands related to configuring the ACLR measurement.

### **ACLR ADJC Channel Count**

**[[:SENSe]:RF:ACLR:ADJCchannelcount <num of Adjacent channels>**

**[[:SENSe]:RF:ACLR:ADJCchannelcount?**

This command refers to the number of Adjacent channels in the ACLR view.

Factory Preset / *RST:	MT8220A: 2 Adjacent Channel MS2717A: 2 Adjacent Channel
Range:	MT8220A: 1 Adjacent Channel – 4 Adjacent Channels MS2717A: 1 Adjacent Channel – 4 Adjacent Channels
Front Panel Access:	Measurements, RF Measurement, ACLR, Select # of Adjacent Channels

### **ACLR MAIN Channel Count**

**[[:SENSe]:RF:ACLR:MAINchannelcount <num of main channels>**

**[[:SENSe]:RF:ACLR:MAINchannelcount?**

This command refers to the number of main channels in the ACLR view.

Factory Preset / *RST:	MT8220A: 1 Main Channel MS2717A: 1 Main Channel
Range:	MT8220A: 1 Main Channel – 4 Main Channels MS2717A: 1 Main Channel – 4 Main Channels
Front Panel Access:	Measurements, RF Measurement, ACLR, Select # of Main Channels

## 4.4 Fixed WiMAX

This section contains the Fixed WiMAX remote commands. These commands are available in the MS2717B, MS2718B, and MS2719B.

### **CONFigure Commands**

This set of commands prepares the instrument for the selected measurement. It disables any currently-enabled measurements and activates the specified measurement. It sets the instrument to single sweep mode, waiting for an :INITiate command. It will not initiate the taking of a measurement.

Current instrument settings may be changed to default values. These changes will be identified with their respective measurement commands.

The CONFigure? query returns the name of the current measurement.

Returns Value	Actual Name
SUMM	WiMAX Summary
RF,SPEC	RF Spectrum
RF,ACPR	RF Adjacent Channel Power Ratio
RF,PVT	RF Power vs. Time
RF,SUMM	RF Summary
DEM,CONS	Demodulator Constellation
DEM,SFL	Demodulator Spectral Flatness
DEM,SUMM	Demodulator Summary
DEM,EVSC	Demodulator EVM vs. Sub Carrier
DEM,EVSY	Demodulator EVM vs. Symbol
PF	Pass/Fail

### **Configure Demodulation Measurement**

**:CONFigure:DEMod <measurement>**

This command configures the selected demodulation measurement. It disables any other active measurements. Valid <measurement> can be any of the following:

SUMMARY | CONSTln | SFLatness | EVSCarrier | EVSYmbol.

None of the instrument parameters are changed by the execution of this command.

Sets the instrument to single sweep mode ( :INITiate:CONTinuous OFF).

Measurement settings can be modified by using the [ :SENSE ] :DEMod commands before initiating a measurement.

When the SUMMARY option is selected, the measurement results are equivalent to the results that are displayed by choosing Measurements, then Demodulator, then Modulation Summary from the front panel.

When the CONSTln option is selected, the measurement results are equivalent to the results that are displayed by choosing Measurements, then Demodulator, then Constellation from the front panel.

When the SFLatness option is selected, the measurement results are equivalent to the results that are displayed by choosing Measurements, then Demodulator, then Spectral Flatness from the front panel.

When the EVSCarrier option is selected, the measurement results are equivalent to the results that are displayed by choosing Measurements, then Demodulator then EVM vs Sub Carrier from the front panel.

When the EVSYMBOL option is selected, the measurement results are equivalent to the results that are displayed by choosing Measurements, then Demodulator then EVM vs Symbol from the front panel.

Required Options:	47
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## Configure PASS/FAIL Measurement

### **:CONFigure PFail**

This command configures the PASS/FAIL measurement. It disables any other active measurements.

None of the instrument parameters are changed by the execution of this command.

Sets the instrument to single sweep mode ( :INITiate:CONTinuous OFF).

Measurement settings can be modified by using the [ :SENSE ] commands before initiating a measurement.

The measurement results are equivalent to the results that are displayed by choosing Measurements, then PASS/FAIL from the front panel.

See Also:	:FETCh:PFail? :MEASure:PFail? :READ:PFail?
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## Configure RF Measurement

**:CONFigure:RF SUMMary|SPECTrum|PVTTime|ACPR**

This command configures the selected RF measurement. It disables any other active measurements.

None of the instrument parameters are changed by the execution of this command.

Sets the instrument to single sweep mode ( :INITiate:CONTinuous OFF).

Measurement settings can be modified by using the [ :SENSe ] :RF commands before initiating a measurement.

When the SUMMary option is selected, the measurement results are equivalent to the results that are displayed by choosing Measurements, then RF, then RF Summary from the front panel.

When the SPECTrum option is selected, the measurement results are equivalent to the results that are displayed by choosing Measurements, then RF, then Spectrum from the front panel.

When the PVTTime option is selected, the measurement results are equivalent to the results that are displayed by choosing Measurements, then RF, then Power vs Time from the front panel.

When the ACPR option is selected, the measurement results are equivalent to the results that are displayed by choosing Measurements, then RF, then ACPR from the front panel.

Required Options:	46
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## Configure Summary Measurement

**:CONFigure SUMMARY**

This command configures the summary of all the WiMAX related numerical measurement results. It disables any other active measurements.

None of the instrument parameters are changed by the execution of this command.

Sets the instrument to single sweep mode ( :INITiate:CONTinuous OFF).

Measurement settings can be modified by using the [ :SENSe ] commands before initiating a measurement.

Front Panel Access:	Shift 4(Measurement) , WiMAX Summary
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## ***FETCh Commands***

This set of commands returns the most recent measurement data of the active measurement. They will not switch to another measurement.

To get new measurement data, use the READ command.

### **Fetch Constellation**

**:FETCh:DEMod:CONStLn?**

Returns the constellation of the demodulated data symbol over one frame measurement results.

Data is returned as 8 comma-delimited values: EVM (rms) in %, EVM (pk) in %, RCE (rms) in dB, RCE (pk) in dB, Carrier Frequency in MHz, Freq Error in MHz, Freq Error in ppm, and the Base Station ID. "--" is returned for each data that is not valid at that instance.

### **Fetch EVM vs. Sub Carrier**

**:FETCh:DEMod:EVSCarrier?**

Returns the EVM vs. Sub Carrier measurement results.

Data is returned as 8 comma-delimited values: EVM (rms) in %, EVM (pk) in %, RCE (rms) in dB, RCE (pk) in dB, Carrier Frequency in MHz, Freq Error in MHz, Freq Error in ppm, and the Base Station ID. "--" is returned for each data that is not valid at that instance.

### **Fetch EVM vs. Symbol**

**:FETCh:DEMod:EVSYmbol?**

Returns the EVM vs. Symbol measurement results.

Data is returned as 8 comma-delimited values: EVM (rms) in %, EVM (pk) in %, RCE (rms) in dB, RCE (pk) in dB, Carrier Frequency in MHz, Freq Error in MHz, Freq Error in ppm, and the Base Station ID. "--" is returned for each data that is not valid at that instance.

### **Fetch Spectral Flatness**

**:FETCh:DEMod:SFLatness?**

Returns the absolute delta of the power between adjacent sub carriers in dB. "--" is returned for each data that is not valid at that instance.

## Fetch PASS/FAIL

**:FETCh:PFail?**

Returns the most recent PASS/FAIL measurement results.

Measurement results are returned in a block of ASCII text in the format of <header><block>. The ASCII header specifies the number of data bytes. It looks like #AX, where A is the number of digits in X and X is the number of bytes in the <block>.

The block consists of a set of records which indicate individual test results. Records are comma-separated. Each record follows the format <test ID>: <input1> <input2> <min> <max> <value1> <value2> <PASS/FAIL/OPTION NOT INSTALLED>. The <test ID> field indicates which test was performed to retrieve these results. The <input1> and <input2> fields indicate the test setup. The <min> and <max> fields indicate the minimum and maximum values against which <value1> and <value2> were compared to arrive at the final PASS/FAIL result.

If the specified test is not available in the instrument, the <PASS/FAIL> field will indicate “option not available” instead of “pass” or “fail”.

All unused fields for a given test will be represented by a double dash (“--”).

## Fetch Adjacent Channel Power Ratio

**:FETCh:RF:ACPR?**

Returns the most recent adjacent channel power ratio measurement results.

Data is returned as 11 comma-delimited values: The Channel Power in dBm, relative adjacent channel 1 power level, absolute adjacent channel 1 power level, relative adjacent channel 2 power level, absolute adjacent channel 2 power level, relative adjacent channel 3 power level, absolute adjacent channel 3 power level, relative adjacent channel 4 power level, absolute adjacent channel 4 power level, relative adjacent channel 5 power level, absolute adjacent channel 5 power level. The relative adjacent channel power level is in dB and the absolute adjacent channel power level is in dBm. “--” is returned for each data that is not valid at that instance.

## Fetch Power vs. Time

**:FETCh:RF:PVTime?**

Returns the most recent WiMAX 802.16-2004 OFDM signal over approximately one frame time domain measurement results.

Data is returned as 4 comma-delimited values: The Channel Power in dBm, Preamble power in dBm, burst power of data bursts in dBm, and the Crest Factor in dB. “--” is returned for each data that is not valid at that instance.

## Fetch RF Spectrum

**:FETCh:RF:SPECTrum?**

Returns the most recent RF Spectrum measurement results.

Data is returned as 2 comma-delimited values: Channel Power(RSSI) in dBm and Occupied bandwidth measurement in MHz. "--" is returned for each data that is not valid at that instance.

## MEASure Commands

These commands take the instrument from its current state, enable the specified measurement and put the instrument into single sweep mode. They correct any parameters that are invalid given the new measurement state such that a valid measurement can take place. Other settings may be changed; see the documentation of CONFigure for each measurement. They then initiate the measurement. When the measurement is complete, they return the result.

To make a measurement with settings other than the "default" measurement settings applied by CONFigure, do the following:

- Send the appropriate CONFigure command to set the desired measurement.
- Modify the settings as required.
- Send the appropriate READ command to measure and return the result.

To get the current measurement data, use the appropriate FETCh command.

## Measure Constellation

**:MEASure:DEMod:CONStln?**

Sets the active measurement to Constellation, sets the default measurement parameters, triggers a new measurement, and returns the EVM (rms), EVM (pk), RCE (rms), RCE (pk), Carrier Frequency, Freq Error, Freq Error, and the Base Station ID

It is a combination of the commands:

**:CONFigure:DEMod CONStln; :READ:DEMod:CONStln?**

To make a Demodulated Constellation measurement with settings other than the default values send

- **:CONFigure:DEMod CONStln**
- Commands to set desired settings
- **:READ:DEMod:CONStln?**

Data is returned as 8 comma-delimited values: EVM (rms) in %, EVM (pk) in %, RCE (rms) in dB, RCE (pk) in dB, Carrier Frequency in MHz, Freq Error in MHz, Freq Error in ppm, and the Base Station ID.

See Also:	<code>:READ:DEMod:CONStln?</code> <code>:CONFigure:DEMod CONStln</code>
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## Measure EVM vs. Sub Carrier

### **:MEASure:DEMod:EVSCarrier?**

Sets the active measurement to EVM vs. Sub Carrier, sets the default measurement parameters, triggers a new measurement, and returns the EVM (rms), EVM (pk), RCE (rms), RCE (pk), Carrier Frequency, Freq Error, Freq Error, and the Base Station ID

It is a combination of the commands:

`:CONFigure:DEMod EVSCarrier; :READ:DEMod:EVSCarrier?`

To make a EVM vs. Symbol measurement with settings other than the default values send

- `:CONFigure:DEMod EVSCarrier`
- Commands to set the desired settings
- `:READ:DEMod:EVSCarrier?`

Data is returned as 8 comma-delimited values: EVM (rms) in %, EVM (pk) in %, RCE (rms) in dB, RCE (pk) in dB, Carrier Frequency in MHz, Freq Error in MHz, Freq Error in ppm, and the Base Station ID.

See Also:	<code>:READ:DEMod:EVSCarrier?</code> <code>:CONFigure:DEMod EVSCarrier</code>
-----------	--

## Measure EVM vs. Symbol

### **:MEASure:DEMod:EVSYmbol?**

Sets the active measurement to EVM vs. Symbol, sets the default measurement parameters, triggers a new measurement, and returns the EVM (rms), EVM (pk), RCE (rms), RCE (pk), Carrier Frequency, Freq Error, Freq Error, and the Base Station ID

It is a combination of the commands:

`:CONFigure:DEMod EVSYmbol; :READ:DEMod:EVSYmbol?`

To make a EVM vs. Symbol measurement with settings other than the default values send

- `:CONFigure:DEMod EVSYmbol`
- Commands to set the desired settings
- `:READ:DEMod:EVSYmbol?`

Data is returned as 8 comma-delimited values: EVM (rms) in %, EVM (pk) in %, RCE (rms) in dB, RCE (pk) in dB, Carrier Frequency in MHz, Freq Error in MHz, Freq Error in ppm, and the Base Station ID.

See Also:	:READ:DEMod:EVSYmbol? :CONFigure:DEMod EVSYmbol
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## Measure Spectral Flatness

### **:MEASure:DEMod:SFLatness?**

Sets the active measurement to Spectral Flatness, sets the default measurement parameters, triggers a new measurement, and returns the absolute delta of the power between adjacent sub carriers in dB.

It is a combination of the commands:

:CONFigure:DEMod SFLatness; :READ:DEMod:SFLatness?

To make a Spectral Flatness measurement with settings other than the default values send

- :CONFigure:DEMod SFLatness
- Commands to set desired settings
- :READ:DEMod:SFLatness?

See Also:	:READ:DEMod:SFLatness? :CONFigure:DEMod SFLatness
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## Measure PASS/FAIL

### **:MEASure:PFail?**

Sets the active measurement to PASS/FAIL, sets the default measurement parameters, triggers a new measurement and returns the PASS/FAIL results.

It is a combination of the commands:

:CONFigure PFail;:READ:PFail?

To make a channel power measurement with settings other than the default values send

- :CONFigure PFail
- Commands to set desired settings
- :READ:PFail?

See Also:	:CONFigure PFail
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## Measure Adjacent Channel Power Ratio

### **:MEASure:RF:ACPR?**

Sets the active measurement to ACPR, sets the default measurement parameters, triggers a new measurement, and returns the power levels for each channel (both absolute and relative).

It is a combination of the commands:

`:CONFigure:RF ACPR; :READ:RF:SPECTrum?`

To make an RF ACPR measurement with settings other than the default values send

- `:CONFigure:RF ACPR`
- Commands to set desired settings
- `:READ:RF:ACPR?`

Data is returned as 11 comma-delimited values: The Channel Power in dBm, relative adjacent channel 1 power level, absolute adjacent channel 1 power level, relative adjacent channel 2 power level, absolute adjacent channel 2 power level, relative adjacent channel 3 power level, absolute adjacent channel 3 power level, relative adjacent channel 4 power level, absolute adjacent channel 4 power level, relative adjacent channel 5 power level, absolute adjacent channel 5 power level. The relative adjacent channel power level is in dB and the absolute adjacent channel power level is in dBm.

See Also:	<code>:READ:RF:ACPR?</code> <code>:CONFigure:RF ACPR</code>
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## Measure Power vs. Time

### **:MEASure:RF:PVTime?**

Sets the active measurement to Power vs. Time, sets the default measurement parameters, triggers a new measurement and returns the Channel Power, Preamble power, burst power of data bursts, and the Crest Factor.

It is a combination of the following commands:

`CONFigure:RF PVTime; :READ:RF:PVTime?`

To make an RF ACPR measurement with settings other than the default values send

- `:CONFigure:RF PVTime`
- Commands to set desired settings
- `:READ:RF:PVTime?`
- 

Data is returned as 4 comma-delimited values: The Channel Power in dBm, Preamble power in dBm, burst power of data bursts in dBm, and the Crest Factor in dB.

See Also:	<code>:READ:RF:PVTime?</code> <code>:CONFigure:RF PVTime</code>
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## Measure RF Spectrum

### **:MEASure:RF:SPECTrum?**

Sets the active measurement to Spectrum, sets the default measurement parameters, triggers a new measurement and returns the Channel Power (RSSI) and Occupied bandwidth measurement.

It is a combination of the following commands:

`:CONFigure:RF SPECTrum;`  
`:READ:RF:SPECTrum?`

To make an RF Spectrum measurement with settings other than the default values send

- `:CONFigure:RF SPECTrum`
- Commands to set desired settings
- `:READ:RF:SPECTrum?`

Data is returned as 2 comma-delimited values: Channel Power(RSSI) in dBm Occupied bandwidth measurement in MHz.

See Also:	<code>:CONFigure:RF SPECTrum</code> <code>:READ:RF:SPECTrum?</code>
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## READ Commands

This set of commands combines the ABORt, INITiate and FETCh commands. It aborts any current triggering sequence and sets the trigger state to idle. It then initiates a new active measurement (i.e. begins the collection of new data). When the measurement is complete, it returns the result. These commands will not switch to another measurement.

To get the current measurement data, use the FETCh command.

## Read Constellation

### **:READ:DEMod:CONStln?**

Triggers a new Constellation measurement and returns the results: EVM (rms), EVM (pk), RCE (rms), RCE (pk), Carrier Frequency, Freq Error, Freq Error, and the Base Station ID

The Constellation measurement must be the active measurement (specified by `:CONFigure:DEMod CONSTln`). The current measurement can be queried using the command `:CONFigure?`

Data is returned as 8 comma-delimited values: EVM (rms) in %, EVM (pk) in %, RCE (rms) in dB, RCE (pk) in dB, Carrier Frequency in MHz, Freq Error in MHz, Freq Error in ppm, and the Base Station ID.

See Also:	<code>:FETCh:DEMod:CONStln?</code> <code>:CONFigure:DEMod CONSTln</code>
-----------	---

## Read EVM vs. Sub Carrier

### **:READ:DEMod:EVSCarrier?**

Triggers a new EVM vs. Sub Carrier measurement and returns the results: EVM (rms), EVM (pk), RCE (rms), RCE (pk), Carrier Frequency, Freq Error, Freq Error, and the Base Station ID

The EVM vs. Sub Carrier measurement must be the active measurement (specified by :CONFigure:DEMod EVSCarrier). The current measurement can be queried using the command :CONFigure?

Data is returned as 8 comma-delimited values: EVM (rms) in %, EVM (pk) in %, RCE (rms) in dB, RCE (pk) in dB, Carrier Frequency in MHz, Freq Error in MHz, Freq Error in ppm, and the Base Station ID.

See Also:	:FETCh:DEMod:EVSCarrier? :CONFigure:DEMod EVSCarrier
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## Read EVM vs. Symbol

### **:READ:DEMod:EVSYmbol?**

Triggers a new EVM vs. Symbol measurement and returns the results: EVM (rms), EVM (pk), RCE (rms), RCE (pk), Carrier Frequency, Freq Error, Freq Error, and the Base Station ID

The EVM vs. Symbol measurement must be the active measurement (specified by :CONFigure:DEMod EVSYmbol). The current measurement can be queried using the command :CONFigure?

Data is returned as 8 comma-delimited values: EVM (rms) in %, EVM (pk) in %, RCE (rms) in dB, RCE (pk) in dB, Carrier Frequency in MHz, Freq Error in MHz, Freq Error in ppm, and the Base Station ID.

See Also:	:FETCh:DEMod:EVSYmbol? :CONFigure:DEMod EVSYmbol
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## Read Spectral Flatness

**:READ:DEMod:SFLatness?**

Triggers a new Spectral Flatness measurement and returns the absolute delta of the power between adjacent sub carriers in dB.

The Spectral Flatness measurement must be the active measurement (specified by :CONFigure:DEMod SFLatness). The current measurement can be queried using the command :CONFigure?

See Also:	:FETCh:DEMod:SFLatness? :CONFigure:DEMod SFLatness
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## Read PASS/FAIL

**:READ:PFail?**

Triggers a new PASS/FAIL measurement and returns the results. It is a combination of the commands :ABORT;:INITiate;:FETCh:PFail?

The PASS/FAIL measurement must be active. The current measurement can be queried using :CONFigure?

See Also:	:CONFigure PFail
Result Format	See :FETCh:PFail?

## Read Adjacent Channel Power Ratio

**:READ:RF:ACPR?**

Triggers a new Adjacent Channel Power Ratio measurement and returns the results: Power levels for each channel (both absolute and relative).

It is a combination of the commands :ABORT;:INITiate;:FETCh:RF:ACPR?

The ACPR measurement must be the active measurement (specified by :CONFigure:RF ACPR). The current measurement can be queried using :CONFigure?

Data is returned as 11 comma-delimited values: The Channel Power in dBm, relative adjacent channel 1 power level, absolute adjacent channel 1 power level, relative adjacent channel 2 power level, absolute adjacent channel 2 power level, relative adjacent channel 3 power level, absolute adjacent channel 3 power level, relative adjacent channel 4 power level, absolute adjacent channel 4 power level, relative adjacent channel 5 power level, absolute adjacent channel 5 power level. The relative adjacent channel power level is in dB and the absolute adjacent channel power level is in dBm.

See Also:	:FETCh:RF:ACPR? :CONFigure:RF ACPR
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## Read Power vs. Time

### **:READ:RF:PVTime?**

Triggers a new Power vs. Time measurement and returns the results: Channel Power, Preamble power, burst power of data bursts, and the Crest Factor. It is a combination of the commands :ABORT;:INITiate;:FETCh:RF:PVTime?

The Power vs. Time measurement must be the active measurement (specified by :CONFigure:RF PVTime. The current measurement can be queried using :CONFigure?

Data is returned as 4 comma-delimited values: The Channel Power in dBm, Preamble power in dBm, burst power of data bursts in dBm, and the Crest Factor in dB.

See Also:	:FETCh:RF:PVTime? :CONFigure:RF PVTime
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## Read RF Spectrum

### **:READ:RF:SPECTrum?**

Triggers a new RF Spectrum measurement and returns the results: Channel Power(RSSI) and Occupied bandwidth measurement.

It is a combination of the commands  
:ABORT;:INITiate;:FETCh:RF:SPECTrum?

The Spectrum measurement must be the active measurement (specified by :CONFigure:RF SPECTrum. The current measurement can be queried using :CONFigure?

Data is returned as 2 comma-delimited values: Channel Power(RSSI) in dBm and Occupied bandwidth measurement in MHz.

See Also:	:FETCh:RF:SPECTrum? :CONFigure:RF SPECTrum
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## ***SENSe (Measurement Command) Subsystem***

This subsystem contains commands related to preparing the instrument to make a particular measurement. These measurements are not defined in the SCPI standard so they are maintained separately here.

### ***[:SENSe]:DEMod Subsystem***

This subsystem includes commands used to set up and query parameters associated with measurements that are performed on modulated signals.

## Number of Constellation Point

**[ :SENSE ] : DEMOD : CONSTLN : POINTS ?**

Queries the number of Constellation points.

Required Options:	47
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## Constellation Reference Points

**[ :SENSE ] : DEMOD : CONSTLN : REFPOINTS [ :STATE ] OFF | ON | 0 | 1**

**[ :SENSE ] : DEMOD : CONSTLN : REFPOINTS [ :STATE ] ?**

Sets the display of the reference points for the various constellations on/off.

Required Options:	47
Factory Preset / *RST:	ON
Front Panel Access:	Shift 4(Measurement),Demodulator,Constellation,Reference Points

## EVM vs. Sub Carrier Start Value

**[ :SENSE ] : DEMOD : EVSCARRIER : START : X ?**

Queries the EVM vs. Sub Carrier start value.

See Also:	<b>[ :SENSE ] : DEMOD : EVSCARRIER : STOP : X ?</b>
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## EVM vs. Sub Carrier Stop Value

**[ :SENSE ] : DEMOD : EVSCARRIER : STOP : X ?**

Queries the EVM vs. Sub Carrier stop value.

See Also:	<b>[ :SENSE ] : DEMOD : EVSCARRIER : START : X ?</b>
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## EVM vs. Symbol Start Value

**[ :SENSE ] : DEMOD : EVSYMBOL : START : X ?**

Queries the EVM vs. Symbol start value.

See Also:	<b>[ :SENSE ] : DEMOD : EVSYMBOL : STOP : X ?</b>
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## EVM vs. Symbol Stop Value

**[ :SENSE ] : DEMOD : EVSYMBOL : STOP : X ?**

Queries the EVM vs. Symbol stop value.

See Also:	<b>[ :SENSE ] : DEMOD : EVSYMBOL : START : X ?</b>
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## Spectral Flatness Start Value

**[ :SENSe ] :DEMod :SFLatness :START :X?**

Queries the Spectral Flatness start value.

See Also:	[ :SENSe ] :DEMod :SFLatness :STOP :X?
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## Spectral Flatness Stop Value

**[ :SENSe ] :DEMod :SFLatness :STOP :X?**

Queries the Spectral Flatness stop value.

See Also:	[ :SENSe ] :DEMod :SFLatness :START :X?
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## PASS/FAIL Test Selection

**[ :SENSe ] :PFail <test set>**

**[ :SENSe ] :PFail?**

Selects the active test set to be used in subsequent PASS/FAIL measurements. The <test set> value must correspond to a test set that is defined in the test set list. The <test set> argument is a 1-based index of the position of the desired Pass/Fail test set in the instrument's current Pass/Fail test set list. For example, if the desired Pass/Fail test is the 3<sup>rd</sup> item on the list then the value of the <index> argument would be 3.

When using the query form of the command, the return value will be the currently selected test set number. If there is not a valid test set selected, the return value will be “-1” (negative 1).

Front Panel Access:	Measurement, Pass Fail Mode, Select Pass/Fail Test
See Also:	:CONFigure PFail

## **[ :SENSe ] :RF Subsystem**

This subsystem includes commands used to set up and query parameters associated with RF measurements.

## ***[[:SENSE]:RF:ACPR Subsystem***

This subsystem includes commands related to configuring the ACPR measurement.

### **ACPR ADJC Channel Count**

**[[:SENSE]:RF:ACPR:ADJCchannelcount?**

Returns the number of Adjacent channels in the ACPR view.

Range:	1 Adjacent Channel – 4 Adjacent Channels
--------	--

### **ACPR MAIN Channel Count**

**[[:SENSE]:RF:ACPR:MAINchannelcount?**

Returns the number of main channels in the ACPR view.

Range:	1 Main Channel – 4 Main Channels
--------	----------------------------------

## ***[[:SENSE]:RF:PVTime Subsystem***

This subsystem includes commands related to configuring and querying the Power vs. Time measurement.

### **Power vs. Time Frame Start Time**

**[[:SENSE]:RF:PVTime:FRAME:START?**

Queries the Power vs. Time Frame start time.

Default Unit:	seconds
See Also:	[[:SENSE]:RF:PVTime:FRAME:STOP? , [[:SENSE]:DLFLength?

### **Power vs. Time Frame Stop Time**

**[[:SENSE]:RF:PVTime:FRAME:STOP?**

Queries the Power vs. Time frame stop time.

Default Unit:	seconds
See Also:	[[:SENSE]:RF:PVTime:FRAME:START? , [[:SENSE]:DLFLength?

## ***[[:SENSe]:SPECTrum Subsystem***

This subsystem includes commands related to configuring the SPECTrum measurement.

### **Spectrum View Span**

**[[:SENSe]:RF:SPECTrum:SPAN 5|10|20|30**

**[[:SENSe]:RF:SPECTrum:SPAN?**

Sets the span for the Spectrum view.

Setting the value to 5 will set the span for the Spectrum view to 5MHz

Setting the value to 10 will set the span for the Spectrum view to 10MHz.

Setting the value to 20 will set the span for the Spectrum view to 20MHz.

Setting the value to 30 will set the span for the Spectrum view to 30MHz.

Factory Preset / *RST:	5 MHz
Default Unit:	MHz
Front Panel Access:	Measurement, RF, Spectrum, Span

## A Example

### C/C++

This example is run on the command line. It sends the \*IDN? query to the instrument and prints the response to the console.

```
// IdnExample.cpp : Microsoft Visual Studio-Generated Example
//      Based on Example 2-1 in the NI-VISA User Manual
//      Usage : IdnExample "TCPIP::xxx.xxx.xxx.xxx::inst0::INSTR"
//      where xxx.xxx.xxx.xxx is the IP address of the
//      instrument.
//      Output : The string identity string returned from the
//      instrument.
//      VISA Header : visa.h (must be included)
//      VISA Library : visa32.lib (must be linked with)

#include "stdafx.h"
#include "stdio.h"
#include "string.h"
#include "visa.h"

#define BUFFER_SIZE 255

int main(int argc, char* argv[])
{
    ViStatus status; /* For checking errors */
    ViSession defaultRM, instr; /* Communication channels */
    ViUInt32 retCount; /* Return count from string I/O */
    ViChar buffer[BUFFER_SIZE]; /* Buffer for string I/O */
    char tempDisplay[BUFFER_SIZE]; /* Display buffer for example */
    char *pAddress;

    /* Make sure we got our address. */
    if ( argc < 2 )
    {
        printf("Usage: IdnExample
\\TCPIP::xxx.xxx.xxx.xxx::inst0::INSTR\\\"\\n");
        printf("\\t where xxx.xxx.xxx.xxx is the IP address of your
instrument.\\n");
        return -1;
    }

    /* Store the address. */
    pAddress = argv[1];

    /* Begin by initializing the system*/
    status = viOpenDefaultRM(&defaultRM);

    if (status < VI_SUCCESS)
    {
        /* Error Initializing VISA...exiting*/
        printf("Can't initialize VISA\\n");
    }
}
```

```

        return -1;
    }

    /* Open communication with TCP/IP device at xxx.xxx.xxx.xxx*/
    /* NOTE: For simplicity, we will not show error checking*/
    /* TODO: Add error handling. */
    status = viOpen(defaultRM, pAddress, VI_NULL, VI_NULL, &instr);

    /* Set the timeout for message-based communication*/
    /* TODO: Add error handling. */
    status = viSetAttribute(instr, VI_ATTR_TMO_VALUE, 5000);

    /* Ask the device for identification */
    sprintf(buffer, "*IDN?\n");
    status = viWrite(instr, (unsigned char *)&buffer[0], 6,
&retCount);
    status = viRead(instr, (unsigned char *)buffer, BUFFER_SIZE,
&retCount);

    /* TODO: Add code to process data. */
    strncpy(tempDisplay, buffer, retCount);
    tempDisplay[retCount] = 0; /* Null-terminate display string. */
    printf("*IDN? Returned %d bytes: %s\n", retCount, tempDisplay);

    /* Close down the system */
    /* TODO: Add error handling. */
    status = viClose(instr);
    status = viClose(defaultRM);

    return 0;
}

```

## Visual Basic

This function can be called in a Visual Basic program. It sends the \*IDN? query to the instrument and returns the byte count and ASCII response string.

Rem This example is based on Example 2-1 from the NI-VISA User Manual.

```
Public Sub IdnMain(ByVal address As String, ByRef byteCount As String,
ByRef returnBytes As String)
    Const BUFFER_SIZE = 200
    Dim stat As ViStatus
    Dim dfltRM As ViSession
    Dim sesn As ViSession
    Dim retCount As Long
    Dim buffer As String * BUFFER_SIZE

    Rem ***Include visa32.dll as a reference in your project.***

    Rem Begin by initializing the system
    stat = viOpenDefaultRM(dfltRM)
    If (stat < VI_SUCCESS) Then
        Rem Error initializing VISA...exiting
        MsgBox "Can't initialize VISA"
        Exit Sub
    End If

    Rem Open communication with Device
    Rem NOTE: For simplicity, we will not show error checking
    Rem TODO: Add error handling.
    stat = viOpen(dfltRM, address, VI_NULL, VI_NULL, sesn)

    Rem Set the timeout for message-based communication
    Rem TODO: Add error handling.
    stat = viSetAttribute(sesn, VI_ATTR_TMO_VALUE, 5000)

    Rem Ask the device for identification
    Rem TODO: Add error handling.
    stat = viWrite(sesn, "*IDN?", 5, retCount)
    stat = viRead(sesn, buffer, BUFFER_SIZE, retCount)

    Rem TODO: Add code to process the data.
    byteCount = retCount
    returnBytes = Left(buffer, retCount)

    Rem Close down the system
    Rem TODO: Add error handling.
    stat = viClose(sesn)
    stat = viClose(dfltRM)
End Sub
```

## LabVIEW™

This example shows how to read the trace data from the instrument in 32-bit integer format. The output is an array of data point magnitudes. Figure 1 shows the data capture and conversion to 32-bit integers in the format used by LabVIEW. Figure 2 shows the details of the conversion.

Note that your instrument must first be defined to the VISA resource manager using NI-MAX. The VISA resource for your instrument serves as the VISA resource input to the vi.

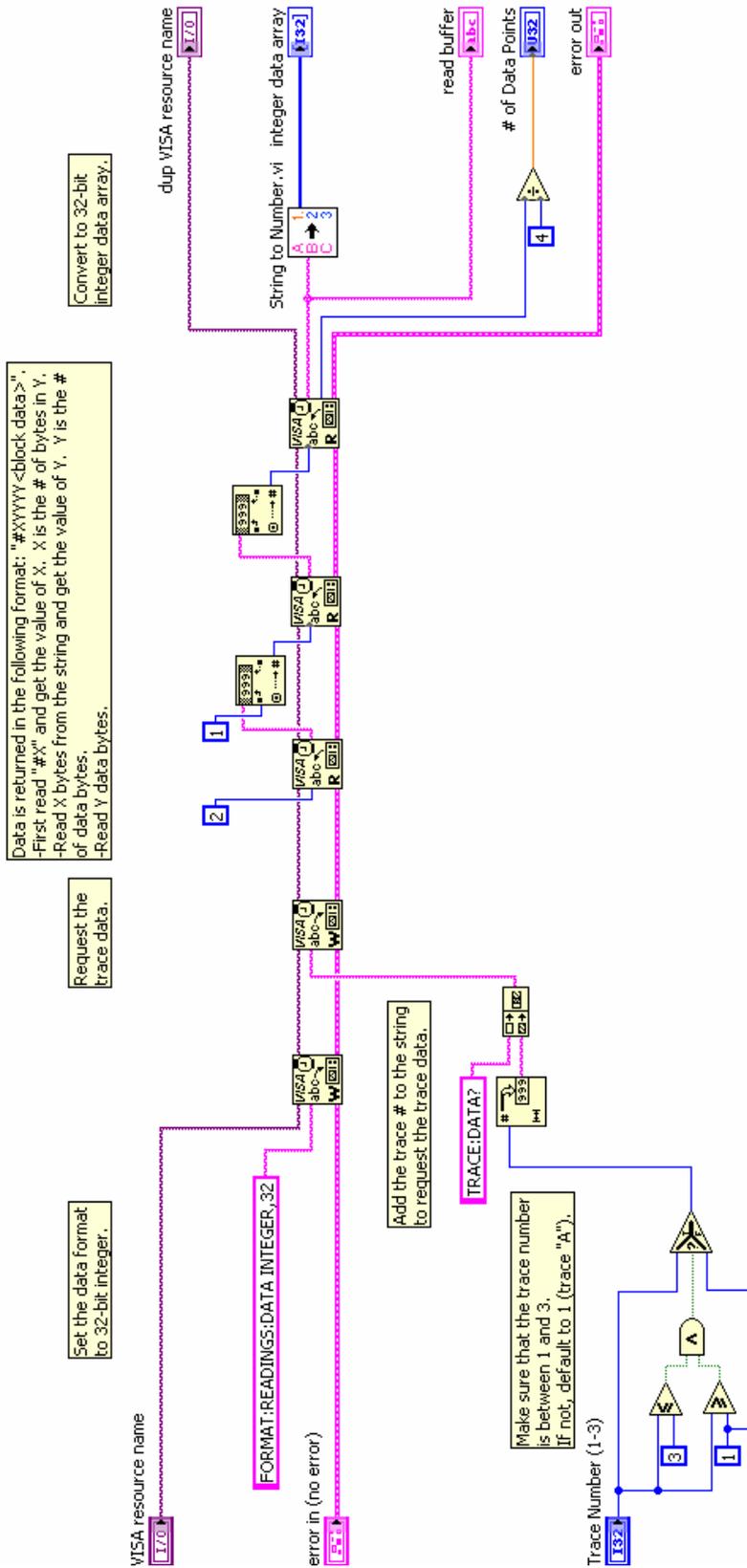


Figure 1: Data Capture

String To Number.vi

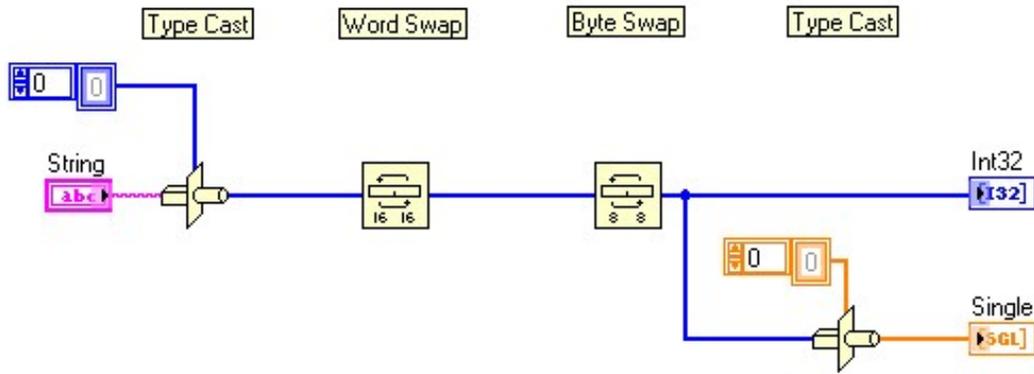


Figure 2: Data Conversion

## Master Programming Manual Revision History

Date	Manual Section Name /Command Name	Change Description
03/28/07	Manual Revision A(MS271xA.pdf) Released	Initial release
<b>Manual Revision B (MS271xB.pdf) Released</b>		
5/10/07	[SENSe:]DEMod:EVSYmbol:START:X?; [SENSe:]DEMod:EVSYmbol:STOP:X?; [SENSe:]DEMod:EVSCarrier:START:X?; [SENSe:]DEMod:EVSCarrier:STOP:X?; [SENSe:]DEMod:EVSCarrier:START:X?; [SENSe:]DEMod:EVSCarrier:STOP:X?; [SENSe:]DEMod:CONStln:POINts?; [SENSe:]DLFLength?; [SENSe:]RF:PVTime:FRAMe:STARt?; [SENSe:]RF:PVTime:FRAMe:STOP?; [SENSe:]RF:ACPR:ADJCchannelcount?; [SENSe:]RF:ACPR:MAINchannelcount?	Added
<b>Manual Revision C (MS271xB.pdf) Released</b>		
11/27/07	:SENSe:DLFLength	Added for Fixed WiMAX
11/27/07	CALCulate:MARKer:TABLE[:STATe], CALCulate:MARKer:TABLE[:STATe]?, CALCulate:MARKer#:FCOunt[:STATe], CALCulate:MARKer#:FCOunt[:STATe]?, CALCulate:MARKer#:NOISe[:STATe], CALCulate:MARKer#:NOISe[:STATe]?, CALCulate:MARKer#:DELTA:NOISe[:STATe], CALCulate:MARKer#:DELTA:NOISe[:STATe]?, CALC:MARK#:DELT:NOIS[:STAT]?, CALC:MARK#:FIX[:STAT], CALC:MARK#:FIX[:STAT]?, CALC:MARK#:DELT[:SET]:SPAN, [SENS:]FREq:EXT, [SENSe:]FREQuency:EXTernal?, [SENSe:]FREQuency:STEP[:INCRement], [SENSe:]FREQuency:STEP[:INCRement]?, [SENSe:]FREQuency:SIGStandard, [SENSe:]FREQuency:SIGStandard?, [SENS:]FREq:SIGs:CHAN, [SENS:]FREq:SIGs:CHAN?, CALCulate:LIMit:POINt:DELeTe, CALCulate:LIMit:POINt:LEFT, CALCulate:LIMit:POINt:RIGHT, CALCulate:LIMit:ENVelope:CREate, CALCulate:LIMit:ENVelope:UPDate:Y, CALCulate:LIMit:ENVelope:UPDate:X, CALCulate:LIMit:ENVelope:SHAPE, CALCulate:LIMit:ENVelope:SHAPE?	New commands added for SPA

	CALCulate:LIMit:ENVELOpe:POINt, CALCulate:LIMit:ENVELOpe:POINt?, CALCulate:LIMit:ENVELOpe:OFFSet, CALCulate:LIMit:ENVELOpe:OFFSet?, CALCulate:LIMit[:SET]:DEFault, CALCulate:LIMit:X, CALCulate:LIMit:Y, CALCulate:LIMit:LTYPe, CALCulate:LIMit:LTYPe?, CALCulate:LIMit:CENTer, TRACe#:DISPlay[:STATe], TRACe#:DISPlay[:STATe]?, TRACe#:WRITe[:STATe], TRACe#:WRITe[:STATe]?, TRACe:LOAD:OPERation, TRACe#:LOAD:DISPlay[:STATe], TRACe#:LOAD:DISPlay[:STATe]?, TRACe#:OPERation, TRACe#:OPERation?, TRACe:COpy, TRACe:EXCHange, FETCh:OBWidth:FREQuency?	
11/27/07	:SENSe:AVERage:TYPe	Update Front Panel Access section for SPA.
11/27/07	TRACe:COpy, TRACe:EXCHange, FETCh:OBWidth:FREQuency?	Note that with this revision, some SPA commands are updated to reflect the added Zero-span markers and limit.
11/27/07	:STATus:OPERation?, :INITiate:IMMediate	Update in SPA mode when averaging is ON, the sweep complete bit is set when all the specified number of averages has completed.
11/27/07	:UNIT:POWer	Linear units are not operational in SPA V3.06. The set command :UNIT:POWer is non-operational as well.
11/27/07		Added GSM remote commands.
<b>Manual Revision D (MS271xB.pdf) Released</b>		
02/19/08	:INITiate:DBROadcast, :INITiate:DBROadcast?, :CALCulate:LIMit:MIRRor,: :CALCulate:LIMit:VERTical:ADD, :MMEMory:LOAD:LIMit,  :MMEMory:STORe:LIMit	SPA: Added new commands.
02/19/08	:FORMat, :TRACe:DATA?, :TRACe:PREAmble?	SPA: Command updated, added new format type REAL,64. :TRACe:DATA? now returns #0 if data is invalid.

02/19/08	:TRIGger:VIDeo:LEVel <amplitude>	SPA: Update range
02/19/08	:UNIT:POWEr	SPA: Linear units are now available in SPA V3.08
02/19/08	[SENSe:]DEMod:PCDError?, [SENSe:]DEMod:CPICh:RELative?, [SENSe:]DEMod:CPICh:ABSolute?, [SENSe:]DEMod:PCCPch:RELative?, [SENSe:]AVERAge:FERRor, [SENSe:]AVERAge:FERRor?, [SENSe:]AVERAge:FERRor:COUNT, [SENSe:]AVERAge:FERRor:COUNT?, MEASure:EMISsion:TEMPlate:DATA?, READ:EMISsion:TEMPlate:DATA?, FETCh:EMISsion:TEMPlate:DATA?, MEASure:DEMod:HSDPa:FERRor?, READ:DEMod:HSDPa:FERRor?, FETCh:DEMod:HSDPa:FERRor?, MEASure:DEMod:HSDPa:FERRor:PPM?", READ:DEMod:HSDPa:FERRor:PPM?, FETCh:DEMod:HSDPa:FERRor:PPM?, MEASure:DEMod:FERRor:PPM? READ:DEMod:FERRor:PPM?, FETCh:DEMod:FERRor:PPM?", MEASure:DEMod:FERRor:PRECise?, READ:DEMod:FERRor:PRECise?, FETCh:DEMod:FERRor:PRECise?, MEAS:DEM:TXFR:PREC?, READ:DEMod:TXFRequency:PRECise?, FETCh:DEMod:TXFRequency:PRECise?, MEASure:DEMod:HSDPa:TXFRequency?, READ:DEMod:HSDPa:TXFRequency?, FETCh:DEMod:HSDPa:TXFRequency?,	WCDMA – New command added.
<b>Manual Revision E (MS271xB.pdf) Released</b>		
08/20/08	MMEMory:STORe:JPEG <filename> :MMEMory:DATA? <filename> :SENSe:OPTion:IF:BWSTate 1 2 3 4 :SENSe:OPTion:IF:BWSTate? :CALCulate:LIMit:FAIL? :CALCulate:LIMit:UPPEr:FAIL? :CALCulate:LIMit:LOWEr:FAIL?	SPA – New command added.