

# **SSA3000X Plus Spectrum Analyzer**

## **Programming Guide**

PG0703P\_E01A

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# 1. Programming Overview

The Siglent spectrum analyzers features LAN, USB Device, and SIGLENT GPIB\_USB module interfaces. By using a computer with these interfaces, and a suitable programming language (and/or NI-VISA software), users can remotely control the analyzer based on SCPI (Standard Commands for Programmable Instruments) command set, Labview and IVI (Interchangeable Virtual Instrument), to interoperate with other programmable instruments.

This chapter introduces how to build communication between the spectrum analyzer and a controller computer with these interfaces.

## 1.1 Remotely Operating the Analyzer

The analyzer provides both the USB and LAN connection which allows you to set up a remote operation environment with a controller computer. A controller computer could be a personal computer (PC) or a minicomputer. Some intelligent instruments also function as controllers.

### 1.1.1 USB: Connecting the Analyzer via the USB Device port

Refer to the following steps to finish the connection via USB-Device:

1. Install NI-VISA on your PC for USB-TMC driver.
2. Connect the analyzer USB Device port to a PC with a USB A-B cable.



Figure 1-1 USB Device

3. Switch on the analyzer

The analyzer will be detected automatically as a new USB hardware.

### 1.1.2 LAN: Connecting the Analyzer via the LAN port

Refer to the following steps to finish the connection via LAN:

1. Install NI-VISA on your PC for VXI driver. Or without NI-VISA, using socket or telnet in your PC's Operating System.
2. Connect the analyzer to PC or the local area network with a LAN cable



Figure 1-2 LAN

3. Switch on the analyzer
4. Press button on the front panel **System** → Interface → LAN to enter the LAN Config function menu.
5. Select the IP Config between Static and DHCP
  - ◆ DHCP: the DHCP server in the current network will assign the network parameters automatically (IP address, subnet mask, gate way) for the analyzer.
  - ◆ Static: you can set the IP address, subnet mask, gate way manually. Press Apply.

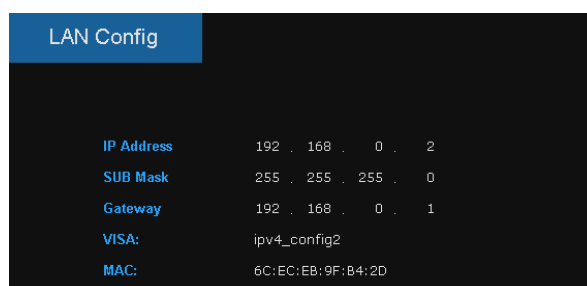


Figure 1-3 LAN Config

The analyzer will be detected automatically or manually as a new LAN point.

### 1.1.3 GPIB: Connecting the Analyzer via the USB Host port

Refer to the following steps to finish the connection via USB:

1. Install NI-VISA on your PC for GPIB driver.
2. Connect the analyzer USB Host port to a PC's GPIB card port, with SIGLENT USB-GPIB adaptor.



Figure 1-4 SIGLENT USB-GPIB Adaptor

3. Switch on the analyzer
4. Press button on the front panel **System** → Interface → GPIB to enter the GPIB number.

The analyzer will be detected automatically as a new GPIB point.

## 1.2 Build Communication

### 1.2.1 Build Communication Using VISA

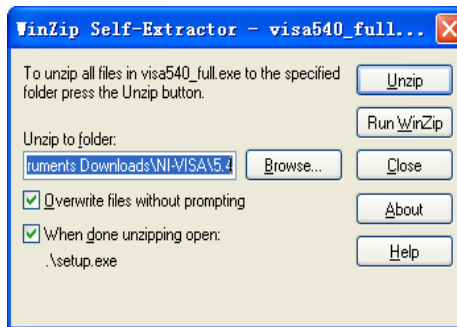
NI-VISA includes a Run-Time Engine version and a Full version. The Run-Time Engine version provides NI device drivers such as USB-TMC, VXI, GPIB, etc. The full version includes the Run-Time Engine and a software tool named NI MAX that provides a user interface to control the device.

You can get NI-VISA full version from:

<http://www.ni.com/download/>.

After download you can follow the steps below to install it:

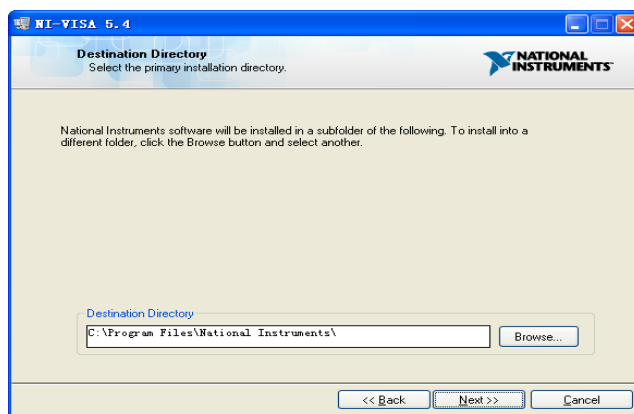
a. Double click the visa\_full.exe, dialog shown as below:



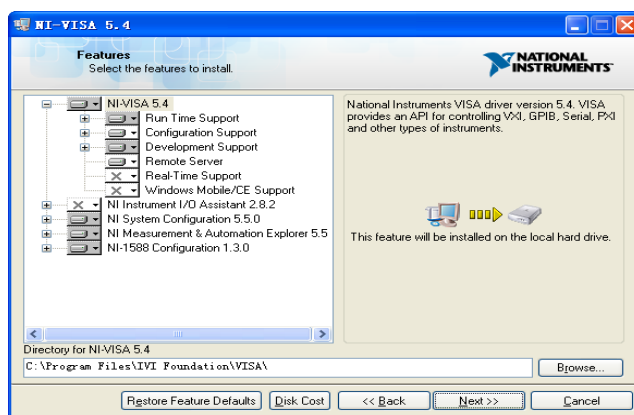
b. Click Unzip, the installation process will automatically launch after unzipping files. If your computer needs to install .NET Framework 4, its setup process will auto start.



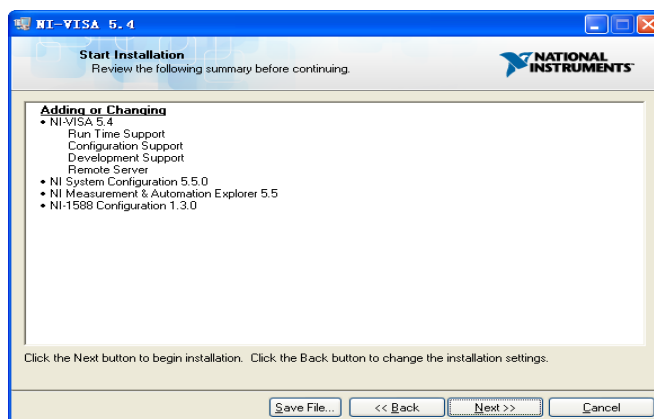
c. The NI-VISA installing dialog is shown above. Click Next to start the installation process.



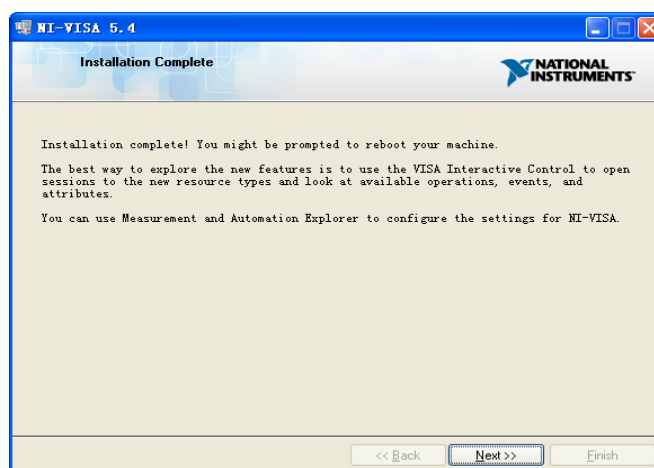
Set the install path, default path is “C:\Program Files\National Instruments\”, you can change it. Click Next, dialog shown as above.



d. Click Next twice, in the License Agreement dialog, select the “ I accept the above 2 License Agreement(s).” , and click Next, dialog shown as below:



e. Click Next to run installation.



Now the installation is complete, reboot your PC.

## 1.2.2 Build Communication Using Sockets/Telnet

Through the LAN interface, VXI-11, Sockets and Telnet protocols can be used to communicate with the spectrum analyzer. VXI-11 is provided in NI-VISA, while Sockets and Telnet are commonly included in PC's OS initially.

Socket LAN is a method used to communicate with the spectrum analyzer over the LAN interface using the Transmission Control Protocol/Internet Protocol (TCP/IP). A socket is a fundamental technology used for computer networking and allows applications to communicate using standard mechanisms built into network hardware and operating systems. The method accesses a port on the spectrum analyzer from which bidirectional communication with a network computer can be established.

Before you can use sockets LAN, you must select the analyzer's sockets port number to use:

- ◆ Standard mode. Available on port 5025. Use this port for programming.
- ◆ Telnet mode. The telnet SCPI service is available on port 5024.



## 1.3 Remote Control Capabilities

### 1.3.1 User-defined Programming

Users can use SCPI commands to program and control the spectrum analyzer. For details, refer to the introductions in “Programming Examples”.

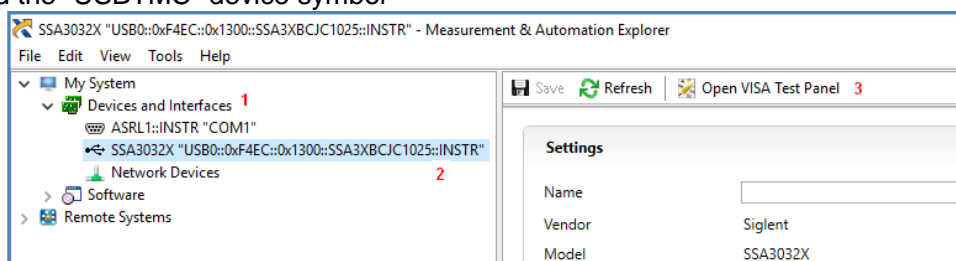
### 1.3.2 Send SCPI Commands via NI MAX

Users can control the spectrum analyzer remotely by sending SCPI commands via NI-MAX software. NI\_MAX is National Instruments Measurement and Automation Explorer. It is an executable program that enables easy communication to troubleshoot issues with instrumentation.

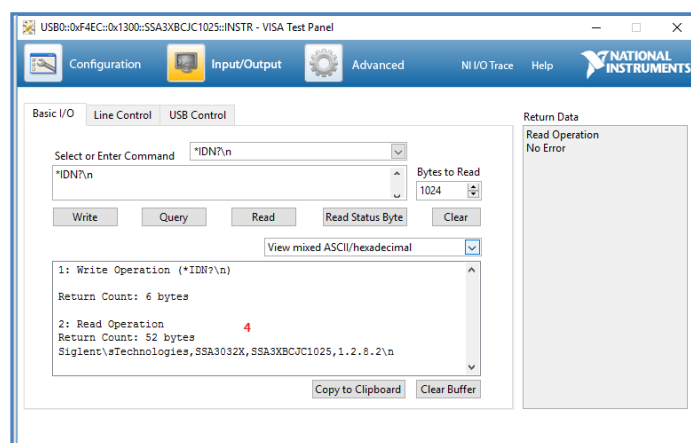
#### 1.3.2.1 Using USB

Run NI MAX software.

1. Click “Device and interface” at the upper left corner of the software;
2. Find the “USBTMC” device symbol



3. Click “Open VISA Test Panel” option button, then the following interface will appear.
4. Click the “Input/Output” option button and click the “Query” option button in order to view the operation information.



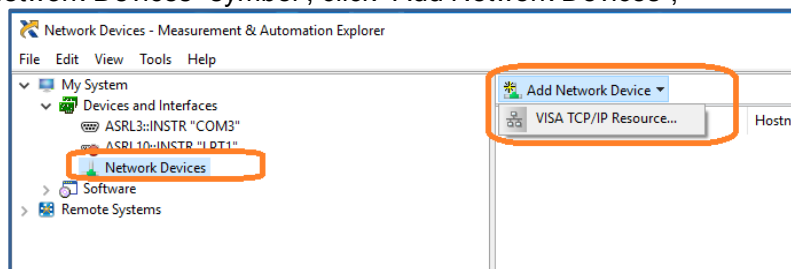
**NOTE:** The \*IDN? command (known as the Identification Query) returns the instrument manufacturer, instrument model, serial number, and other identification information.

#### 1.3.2.2 Using LAN

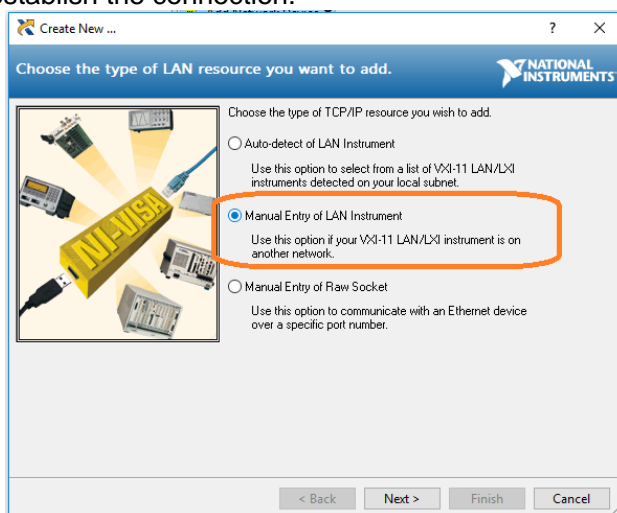
Select, Add Network Device, and select VISA TCP/IP Resource as shown:

Run NI MAX software.

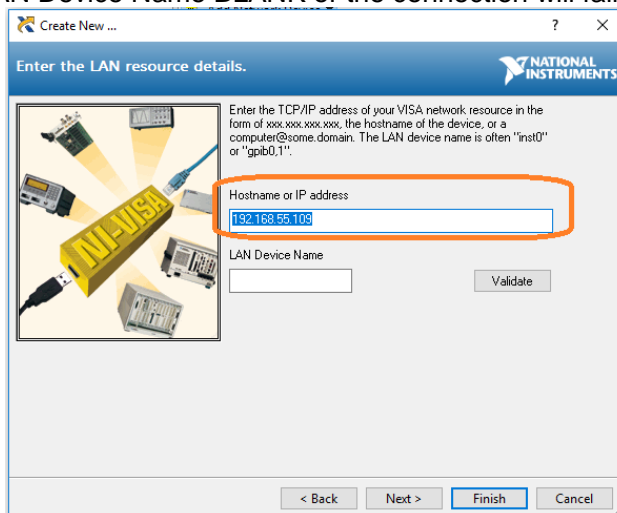
1. Click “Device and interface” at the upper left corner of the software;
2. Find the “Network Devices” symbol, click “Add Network Devices”;



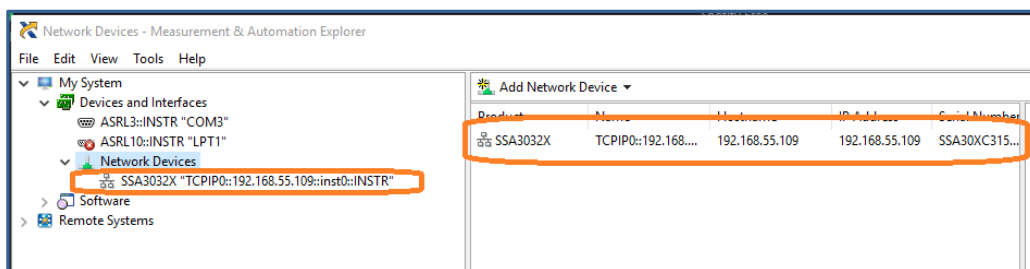
3. Select Manual Entry of LAN instrument, select Next, and enter the IP address as shown. Click Finish to establish the connection:



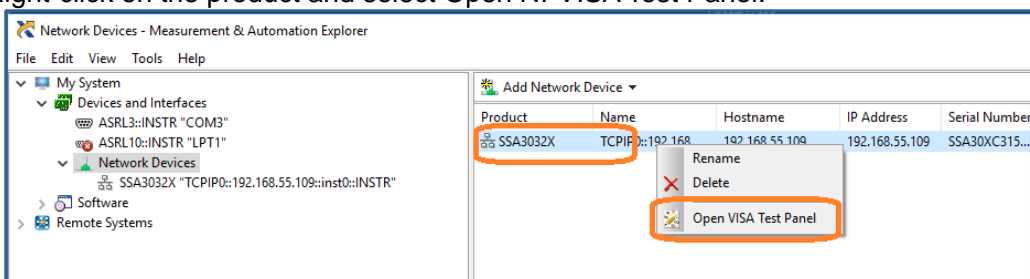
**NOTE:** Leave the LAN Device Name BLANK or the connection will fail.



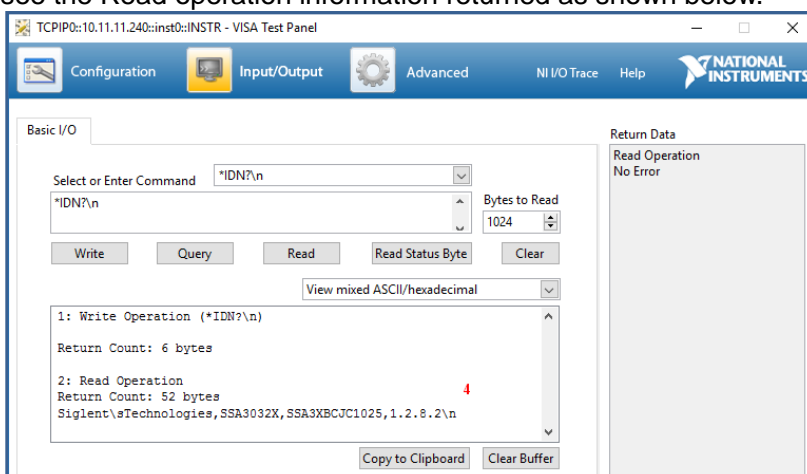
4. After a brief scan, the connection should be shown under Network Devices:



5. Right-click on the product and select Open NI-VISA Test Panel:



6. Click "Input/Output" option button and click "Query" option button. If everything is OK, you will see the Read operation information returned as shown below.



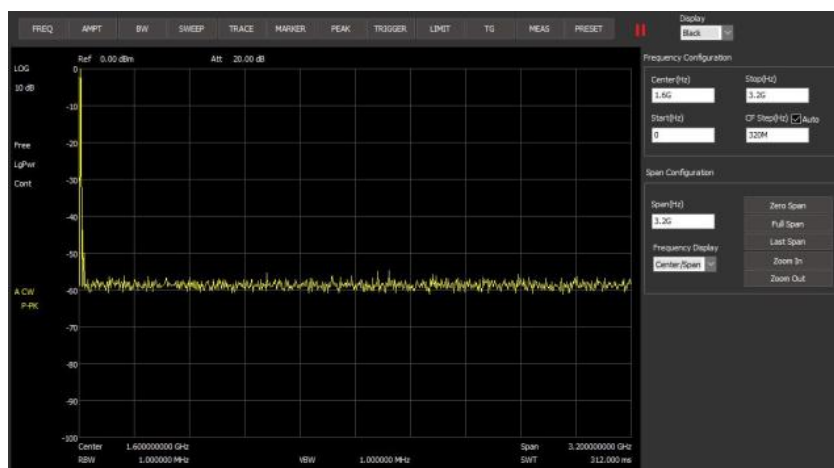
### 1.3.3 EasySpectrum Software

Users can control the spectrum analyzer remotely by EasySpectrum. PC software EasySpectrum is an easy-to-use, PC-Windows-based remote control tool for Siglent's spectrum analyzer. You can download it from Siglent's website. To connect the analyzer via the USB/LAN port to a PC, you need install the NI VISA first.

It is able to be used as:

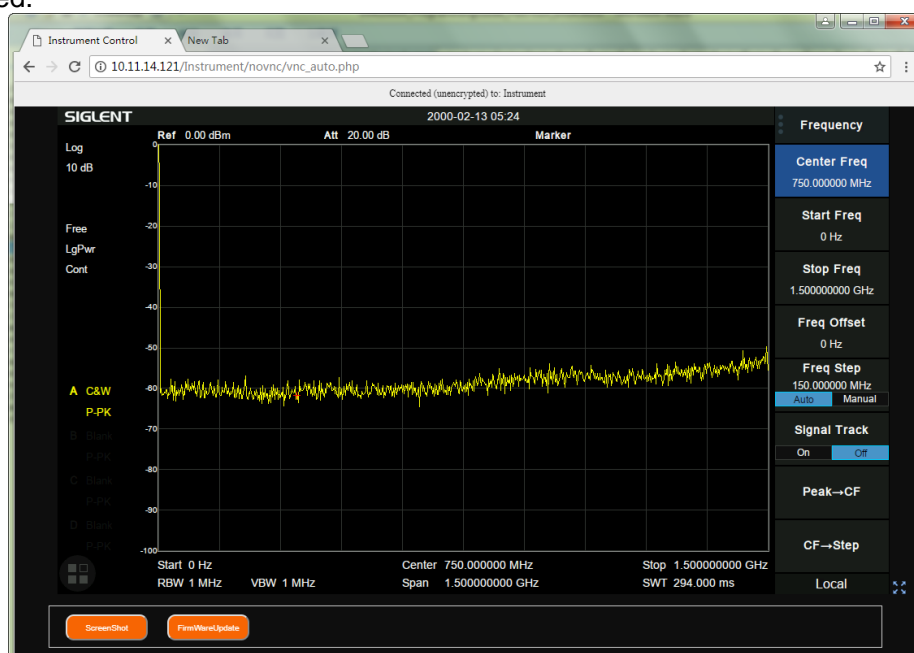
- ◆ A monitor to display and control the trace scans simultaneously with the analyzer;
- ◆ A file maker to get user defined Limit/Correction files, and load them to the analyzer;
- ◆ An EMI receiver to perform EMI Pre-compliance test including prescan, peak search, finalscan and report generating.

For the further description of the software, please refer to the online help embedded in this software.



### 1.3.4 Web Control

With the embedded web server, the analyzer can be controlled through LAN from a web browser\* on PC and mobile terminals, without any extra driver be installed. This provides remote controlling and monitoring capabilities. Screenshot and firmware update are also supported.



\*Web browser with HTML5 supported like Google Chrome or Firefox are recommended.

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## 2.SCPi Overview

### 2.1 Command Format

SCPI commands present a hierarchical tree structure containing multiple subsystems, each of the subsystems is made up of a root keyword and several subkeywords. The command string usually starts with “:”, the keywords are separated by “:” and the followed parameter settings are separated by space. Query commands add “?” at the end of the string.

For example:

```
:SENSe:FREQuency:CENTer <freq>
```

```
:SENSe:FREQuency:CENTer?
```

SENSe is the root key of the command, FREQuency and CENTer are second and third keywords. The command begins with “:”, and separates the keywords at the same time, <freq> separated by space and represents the parameter available for setting; “?” represents a query.

### 2.2 Symbol Instruction

The following four symbols are not the content of SCPI commands and cannot be sent with the commands, but are usually used in the commands.

#### 1.Triangle Brackets < >

The parameter in the triangle brackets must be replaced by an effective value. For example:

Send the “:DEMod:VOLume <value>” command in “:DEMod:VOLume 5”.

#### 2.Square Brackets [ ]

The content in the square brackets can be ignored. When the parameter is ignored, the instrument will set the parameter to its default. For example,

In the “[:SENSe]:POWer[:RF]:ATTenuation?” command, sending any of the four commands below can generate the same effect:

```
:POWer:ATTenuation?
```

```
:POWer:RF:ATTenuation?
```

```
:SENSe:POWer:ATTenuation?
```

```
:SENSe:POWer:RF:ATTenuation?
```

#### 3.Vertical Bar |

The vertical bar is used to separate multiple parameters and when sending the command, you can choose one of the parameters. For example,

In the “[:SENSe]:FREQuency:CENTer:STEP:AUTO OFF|ON|0|1” command, the parameters available are “OFF”, “ON”, “0” or “1”.

### 4.Braces { }

The parameters in the braces are optional which can be ignored or set for one or more times. For example:

:CALCulate:LLINe[1]|2:DATA <x-axis>,<ampl>{,<x-axis>, <ampl>}, in the command, the {,<x-axis>, <ampl>} parameters can be ignored or set for one or more times.

## 2.3 Parameter Type

The parameters in the commands introduced in this manual include 6 types: boolean, enumeration, integer, float, discrete and string.

### 1. Boolean

The parameters in the commands could be “OFF”, “ON”, “0” or “1”. For example:

```
[:SENSe]:FREQuency:CENTer:STEP:AUTO OFF|ON|0|1
```

### 2.Enumeration

The parameter could be any of the values listed. For example:

```
[:SENSe]:AVERAge:TYPE LOGPower|POWER|VOLTage
```

The parameter is “OGPower”, “POWER” or “VOLTage”.

### 3.String

The parameter should be the combinations of ASCII characters. For example:

```
:SYSTem:COMMunicate:LAN:IPADdress <“xxx.xxx.xxx.xxx”>
```

The parameter can be set as “192.168.1.12” string.

### 4.Integer

Except other notes, the parameter can be any integer within the effective value range. For example:

```
[:SENSe]:DEMod:VOLume <value>
```

The parameter < value > can be set to any integer between 0 and 10.

### 5.Float

The parameter could be any value within the effective value range according to the accuracy requirement (the default accuracy contains up to 9 digits after the decimal points). For example:

```
:CALCulate:BANDwidth:NDB <value>
```

The parameter < value > can be set to any real number between -100 and 100.

## 6. Discrete

The parameter could only be one of the specified values and these values are discontinuous. For example:

`[:SENSe]:BWIDth:VIDeo:RATio <number>`

The parameter <number> could only be one of 0.001, 0.003, 0.01, 0.03, 0.1, 0.3, 1.0, 3.0, 10.0, 30.0, 100.0, 300.0, 1000.0.

## 2.4 Command Abbreviation

All of the commands are not case sensitive, so you can use any of them. But if abbreviation is used, all the capital letters in the command must be written completely. For example:

`:DISPlay:WINDow:TRACe:Y:DLINe:STATe?`

Can be abbreviated to:

`:DISP:WIND:TRAC:Y:DLIN:STAT?`

# 3. Commands that are Common to All Modes

- [3.1 IEEE Common Commands](#) ..... 错误！未定义书签。
- [3.2 System Subsystem](#) ..... 错误！未定义书签。
- [3.3 Memory Subsystem](#) ..... 错误！未定义书签。
- [3.4 Display Subsection](#) ..... 错误！未定义书签。
- [3.5 Mode Subsection](#)..... 错误！未定义书签。

## 3.1 IEEE Common Commands

- \*IDN
- \*RST
- \*CLS
- \*ESE
- \*ESR?
- \*OPC
- \*SRE
- \*STB
- \*WAI
- \*TRG
- \*TST?

Command Format	*IDN?
<b>Instruction</b>	Returns an instrument identification information string. The string will contain the manufacturer, model number, serial number and firmware number
<b>Menu</b>	None
<b>Example</b>	*IDN?

Command Format	*RST
<b>Instruction</b>	This command presets the instrument to a factory defined condition that is appropriate for remote programming operation.



---

<b>Menu</b>	None
<b>Example</b>	*RST

---

<b>Command Format</b>	<b>*CLS</b>
<b>Instruction</b>	Clears the status byte register. It does this by emptying the error queue and clearing all bits in all of the event registers. The status byte register summarizes the states of the other registers. It is also responsible for generating service requests.
<b>Menu</b>	None
<b>Example</b>	*CLS

---

<b>Command Format</b>	<b>*ESE &lt;number&gt;</b> <b>*ESE?</b>
<b>Instruction</b>	Set the bits in the standard event status enable register. This register monitors I/O errors and synchronization conditions such as operation complete, request control, query error, device dependent error, execution error, command error and power on. A summary bit is generated on execution of the command. The query returns the state of the standard event status enable register.
<b>Menu</b>	None
<b>Example</b>	*ESE 16

---

<b>Command Format</b>	<b>*ESR?</b>
<b>Instruction</b>	Queries and clears the standard event status event register. (This is a destructive read.) The value returned reflects the current state (0/1) of all the bits in the register.
<b>Menu</b>	None
<b>Example</b>	*ESR?

---

<b>Command Format</b>	<b>*OPC</b> <b>*OPC?</b>
<b>Instruction</b>	Set bit 0 in the standard event status register to "1" when all pending operations have finished. The query stops any new commands from being processed until the current processing is complete. Then it returns a "1", and the program continues. This query can be used to synchronize events of other instruments on the external bus. Returns a "1" if the last processing is complete. Use this query when there's a need to monitor the command execution status, such as a sweep execution.
<b>Menu</b>	None

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## SIGLENT

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<b>Example</b>	*OPC?
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<b>Command Format</b>	<b>*SRE &lt;integer&gt; *SRE?</b>
-----------------------	---------------------------------------

<b>Instruction</b>	This command enables the desired bits of the service request enable register. The query returns the value of the register, indicating which bits are currently enabled. The default value is 255.
--------------------	--

<b>Menu</b>	None
-------------	------

<b>Example</b>	*SRE 1
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---

<b>Command Format</b>	<b>*STB</b>
-----------------------	-------------

<b>Instruction</b>	This query is used by some instruments for a self test.
--------------------	---

<b>Menu</b>	None
-------------	------

<b>Example</b>	*STB
----------------	------

---

<b>Command Format</b>	<b>*WAI</b>
-----------------------	-------------

<b>Instruction</b>	This command causes the instrument to wait until all pending commands are completed before executing any additional commands. There is no query form to the command.
--------------------	---

<b>Menu</b>	None
-------------	------

<b>Example</b>	*WAI
----------------	------

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<b>Command Format</b>	<b>*TRG</b>
-----------------------	-------------

<b>Instruction</b>	Restart the current sweep.
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<b>Menu</b>	None
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<b>Example</b>	*TRG
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---

<b>Command Format</b>	<b>*TST?</b>
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<b>Instruction</b>	This query is used by some instruments for a self test.
--------------------	---

<b>Menu</b>	None
-------------	------

<b>Example</b>	*TST?
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## 3.2 System Subsystem

**:SYSTem:TIME**  
**:SYSTem:DATE**  
**:SYSTem:COMMunicate:LAN:IPADdress**  
**:SYSTem:COMMunicate:LAN:GATeway**  
**:SYSTem:COMMunicate:LAN:SMASk**  
**:SYSTem:COMMunicate:LAN:TYPE**  
**:SYSTem:LANGuage**  
**:SYSTem:PON:TYPE**  
**:SYSTem:REStart**  
**:SYSTem:PRESet**  
**:SYSTem:PRESet:TYPE**  
**:SYSTem:PRESet:USER[1]|2|3|4|5|6|7:SAVE**  
**:SYSTem:PRESet:USER[1]|2|3|4|5|6|7:LOAD**  
**:SYSTem:FDEFault**  
**:SYSTem:LKEY**  
**:SYSTem:OPTions?**  
**:SYSTem:POWer:OFF**  
**:SYSTem:CONFigure:SYSTem?**

<b>Command</b>	<b>:SYSTem:TIME &lt;hhmmss&gt;</b>
<b>Format</b>	<b>:SYSTem:TIME?</b>
<b>Instruction</b>	Sets System time. Gets System time.
<b>Parameter Type</b>	String
<b>Parameter Range</b>	hour(0~23), minute(0~59), second(0~59)
<b>Return</b>	String
<b>Default</b>	None
<b>Menu</b>	System > date & time
<b>Example</b>	Sets System time: :SYSTem:TIME 182559 Gets System time: :SYSTem:TIME?

<b>Command</b>	<b>:SYSTem:DATE &lt;yyyymmdd&gt;</b>
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## SIGLENT

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<b>Format</b>	<b>:SYSTem:DATE?</b>
<b>Instruction</b>	Sets system date. Gets system date.
<b>Parameter Type</b>	String
<b>Parameter Range</b>	year(four digits), month(1~12), date(1~31)
<b>Return</b>	String
<b>Default</b>	None
<b>Menu</b>	System > date&time
<b>Example</b>	Sets System date: :SYSTem:DATE 20050101 Gets System date: :SYSTem:DATE?

---

<b>Command Format</b>	<b>:SYSTem:COMMunicate:LAN:IPADdress &lt;"xxx.xxx.xxx.xxx"&gt; :SYSTem:COMMunicate:LAN:IPADdress?</b>
<b>Instruction</b>	Sets a host name for the analyzer in network. IP Address command will be effective after using this "APPLY" command. Gets IP address.
<b>Parameter Type</b>	String
<b>Parameter Range</b>	Conform to the IP Sets standard(0-255:0-255:0-255:0-255)
<b>Return</b>	IP address String
<b>Default</b>	None
<b>Menu</b>	System > Interface > LAN > IP Address
<b>Example</b>	:SYSTem:COMMunicate:LAN:IPADdress "192.168.1.12" :SYSTem:COMMunicate:LAN:IPADdress?

---

<b>Command Format</b>	<b>:SYSTem:COMMunicate:LAN:GATeway &lt;"xxx.xxx.xxx.xxx"&gt; :SYSTem:COMMunicate:LAN:GATeway?</b>
<b>Instruction</b>	Sets the gateway for the analyzer in the network. The gateway will be fetched automatically if the IP assignment is set to DHCP. Gateway command will be effective after using this "APPLY" command. Gets gateway.
<b>Parameter Type</b>	String
<b>Parameter Range</b>	Conform to the IP standard (0-255:0-255:0-255:0-255)
<b>Return</b>	Gateway string.
<b>Default</b>	None
<b>Menu</b>	System > Interface > LAN > Gateway
<b>Example</b>	:SYSTem:COMMunicate:LAN:GATeway "192.168.1.1" :SYSTem:COMMunicate:LAN:GATeway?

---

---

<b>Command Format</b>	<b>:SYSTem:COMMunicate:LAN:SMASK &lt;“xxx.xxx.xxx.xxx”&gt; :SYSTem:COMMunicate:LAN:SMASK?</b>
<b>Instruction</b>	Sets the subnet mask according to the PC network Settings. The subnet mask will be set automatically if the IP assignment is set to DHCP. Subnet Mask commands will be effective after using this “APPLY” command. Gets Subnet Mask.
<b>Parameter Type</b>	String
<b>Parameter Range</b>	Conform to the IP standard (0-255:0-255:0-255:0-255)
<b>Return</b>	Subnet mask string
<b>Default</b>	None
<b>Menu</b>	System > Interface > LAN > Subnet Mask
<b>Example</b>	:SYSTem:COMMunicate:LAN:SMASK?

---

<b>Command Format</b>	<b>:SYSTem:COMMunicate:LAN:TYPE STATIC DHCP :SYSTem:COMMunicate:LAN:TYPE?</b>
<b>Instruction</b>	Toggles the IP assignment Setting between static (manual) and DHCP (dynamic assignment) mode. Gets IP config.
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	STATIC DHCP
<b>Return</b>	Enumeration
<b>Default</b>	None
<b>Menu</b>	System > Interface > LAN > IP Config
<b>Example</b>	:SYSTem:COMMunicate:LAN:TYPE DHCP :SYSTem:COMMunicate:LAN:TYPE?

---

<b>Command Format</b>	<b>:SYSTem:LANGUage SCHINESE ENGLISH :SYSTem:LANGUage?</b>
<b>Instruction</b>	Sets language. Gets language.
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	SCHINESE: Chinese ENGLISH: English
<b>Return</b>	Enumeration
<b>Default</b>	None
<b>Menu</b>	System > Language
<b>Example</b>	Sets language :SYSTem:LANGUage SCHINESE Gets language

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## SIGLENT

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:SYSTem:LANGuage?

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<b>Command Format</b>	<b>:SYSTem:PON:TYPE DFT LAST USER</b> <b>:SYSTem:PON:TYPE?</b>
<b>Instruction</b>	Uses command to set analyzer to power on in default, user, or last state. Gets power on type.
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	DFT: Default LAST: Last USER: Custom Configuration
<b>Return</b>	Enumeration
<b>Default</b>	DFT
<b>Menu</b>	System > Pwr/Preset > Power On
<b>Example</b>	SYSTem:PON:TYPE DFT

---

<b>Command Format</b>	<b>:SYSTem:PRESet</b>
<b>Instruction</b>	Use this command to preset the instrument. The preset type is based on the Setting of Preset Type: DFT, User or Last.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	None
<b>Example</b>	:SYSTem:PRESet

---

<b>Command Format</b>	<b>:SYSTem:REStart</b>
<b>Instruction</b>	Use this command to restart the instrument (part of machine may not support).
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	None
<b>Example</b>	:SYSTem:REStart

---

<b>Command Format</b>	<b>:SYSTem:PRESet:TYPE DFT LAST USER :SYSTem:PRESet:TYPE?</b>
<b>Instruction</b>	Uses this command to preset the analyzer to default, user, or last state. Gets preset type.
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	DFT: Default LAST: Last USER: Custom Configuration
<b>Return</b>	Enumeration
<b>Default</b>	DFT
<b>Menu</b>	System > Pwr/Preset > Preset
<b>Example</b>	:SYSTem:PRESet:TYPE DFT

<b>Command Format</b>	<b>:SYSTem:PRESet:USER[1] 2 3 4 5 6 7:SAVE</b>
<b>Instruction</b>	Save current setting to user config
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	System > Pwr/Preset > User Config
<b>Example</b>	:SYSTem:PRESet:USER7:SAVE

<b>Command Format</b>	<b>:SYSTem:PRESet:USER[1] 2 3 4 5 6 7:LOAD</b>
<b>Instruction</b>	load user config
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	System > Pwr/Preset > User Config
<b>Example</b>	:SYSTem:PRESet:USER6:LOAD

<b>Command Format</b>	<b>:SYSTem:FDEFault</b>
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## SIGLENT

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<b>Instruction</b>	Sets both the measure and setting parameters to factory preset parameters.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	System > Pwr/Preset > Factory Reset
<b>Example</b>	:SYSTem:FDEFault

---

**Command Format** :SYSTem:LKEY <“option”>,<“license key”>

<b>Instruction</b>	Use this command to enable the specified option with the license key, please restart the instrument to make license active.
<b>Parameter Type</b>	“option”: Enumeration
<b>Parameter Range</b>	“license key”: String
<b>Return</b>	“option”: Meas EMI TG DMA “license key”: provided by Siglent Technologies, 16 bits String.
<b>Default</b>	None
<b>Menu</b>	System > System Info > Load Option
<b>Example</b>	:SYSTem:LKEY EMI,fjbdajffnklmgwno

---

**Command Format** :SYSTem:OPTions?

<b>Instruction</b>	This command returns a list of the options that are installed.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	Meas EMI TG DMA
<b>Default</b>	None
<b>Menu</b>	System > System Info
<b>Example</b>	:SYSTem:OPTions?

---

**Command Format** :SYSTem:POWER:OFF

<b>Instruction</b>	Use this command to turn off the instrument.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None

---



---

<b>Range</b>	
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	None
<b>Example</b>	:SYSTem:POWer:OFF

---

<b>Command Format</b>	:SYSTem:CONFigure:SYSTem?
<b>Instruction</b>	Use this command to query the system message of the instrument.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	String
<b>Default</b>	None
<b>Menu</b>	System > System Info
<b>Example</b>	:SYSTem:CONFigure:SYSTem?

---

## 3.3 Memory Subsystem

**:MMEMory:STORe**

**:MMEMory:LOAD**

**:MMEMory:DELeTe**

<b>Command Format</b>	:MMEMory:STORe STA TRC COR CSV LIM JPG BMP PNG, "<file>"
<b>Instruction</b>	Store file
<b>Parameter Type</b>	String
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	File > Save
<b>Example</b>	:MMEMory:STORe STA,"ABC.sta"

---

<b>Command Format</b>	:MMEMory:LOAD STA TRC COR LIM, "<file>"
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## SIGLENT

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<b>Instruction</b>	Load file
<b>Parameter Type</b>	String
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	File > Open/Load
<b>Example</b>	:MMEMory:LOAD STA, "ABC.sta"

---

<b>Command Format</b>	:MMEMory:DELeTe "<file>"
-----------------------	--------------------------

<b>Instruction</b>	Delete file or folder
<b>Parameter Type</b>	String
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	File > Operate > Delete
<b>Example</b>	:MMEMory:DELeTe "ABC.sta"

---

## 3.4 Display Subsection

**:DISPlay:WINDow:TRACe:GRATicule:GRID:BRIGhtness**

**:DISPlay:WINDow:TRACe:Y:DLINe:STATe**

**:DISPlay:WINDow:TRACe:Y:DLINe**

<b>Command Format</b>	:DISPlay:WINDow:TRACe:GRATicule:GRID:BRIGhtness <value> :DISPlay:WINDow:TRACe:GRATicule:GRID:BRIGhtness?
-----------------------	---

<b>Instruction</b>	Sets grid brightness. Gets grid brightness.
<b>Parameter Type</b>	Integer
<b>Parameter Range</b>	0 ~ 100
<b>Return</b>	Integer
<b>Default</b>	30%
<b>Menu</b>	Display > Grid Brightness
<b>Example</b>	:DISPlay:WINDow:TRACe:GRATicule:GRID:BRIGhtness 50

---

<b>Command Format</b>	<b>:DISPlay:WINDow:TRACe:Y:DLINe:STATe OFF ON 0 1</b> <b>:DISPlay:WINDow:TRACe:Y:DLINe:STATe?</b>
<b>Instruction</b>	Toggles the display line between on and off. Gets the display line state.
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	OFF ON 0 1
<b>Return</b>	0 1
<b>Default</b>	OFF
<b>Menu</b>	Display > Display Line
<b>Example</b>	:DISPlay:WINDow:TRACe:Y:DLINe:STATe ON

<b>Command Format</b>	<b>:DISPlay:WINDow:TRACe:Y:DLINe &lt;value&gt;</b> <b>:DISPlay:WINDow:TRACe:Y:DLINe?</b>
<b>Instruction</b>	Sets the amplitude value for the display line. Gets the amplitude value for the display line.
<b>Parameter Type</b>	Float, unit: dBm
<b>Parameter Range</b>	Ref Level ~ Ref Level - 100 dBm
<b>Return</b>	Float, unit: dBm
<b>Default</b>	0 dBm
<b>Menu</b>	Display > Display Line
<b>Example</b>	:DISPlay:WINDow:TRACe:Y:DLINe -10

## 3.5 Mode Subsection

### **:INSTrument[:SElect]**

<b>Command Format</b>	<b>:INSTrument[:SElect] SA MA</b> <b>:INSTrument[:SElect]?</b>
<b>Instruction</b>	Sets instrument mode.
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	SA: Spec Analyzer MA: Modulation Analysis
<b>Return</b>	Enumeration
<b>Default</b>	SA
<b>Menu</b>	mode
<b>Example</b>	:INSTrument DTF

# 4. Spectrum Analyzer

- [4.1 Frequency Subsection](#)..... 错误！未定义书签。
- [4.2 Amplitude Subsection](#) ..... 错误！未定义书签。
- [4.3 Sweep Subsection](#)..... 错误！未定义书签。
- [4.4 Trigger Subsystem](#) ..... 错误！未定义书签。
- [4.5 Bandwidth Subsection](#)..... 错误！未定义书签。
- [4.6 Trace Subsection](#)..... 错误！未定义书签。
- [4.7 Marker Subsection](#) ..... 错误！未定义书签。
- [4.8 Limit Subsection](#) ..... 错误！未定义书签。
- [4.9 Measurement Subsystem](#) ..... 错误！未定义书签。
- [4.10 TG Subsystem](#) ..... 错误！未定义书签。
- [4.11 Demod Subsystem](#)..... 错误！未定义书签。

## 4.1 Frequency Subsection

- `[[:SENSe]:FREQuency:CENTer`
- `[[:SENSe]:FREQuency:STARt`
- `[[:SENSe]:FREQuency:STOP`
- `[[:SENSe]:FREQuency:CENTer:STEP[:INCRement]`
- `[[:SENSe]:FREQuency:CENTer:STEP:AUTO`
- `[[:SENSe]:FREQuency:CENTer:SET:STEP`
- `[[:SENSe]:FREQuency:OFFSet`
- `[[:SENSe]:FREQuency:SPAN`
- `[[:SENSe]:FREQuency:SPAN:FULL`
- `[[:SENSe]:FREQuency:SPAN:ZERO`
- `[[:SENSe]:FREQuency:SPAN:PREVious`
- `[[:SENSe]:FREQuency:SPAN:HALF`
- `[[:SENSe]:FREQuency:SPAN:DOUBL`

<b>Command</b>	<code>[[:SENSe]:FREQuency:CENTer &lt;freq&gt;</code>
<b>Format</b>	<code>[[:SENSe]:FREQuency:CENTer?</code>
<b>Instruction</b>	Sets the center frequency of the spectrum analyzer. Gets the center frequency.

---

<b>Parameter Type</b>	Float, unit: Hz, kHz, MHz, GHz
<b>Parameter Range</b>	50 Hz~3.199999950 GHz Zero Span: 0~3.2 GHz
<b>Return</b>	Float, unit: Hz
<b>Default</b>	1.6 GHz
<b>Menu</b>	Frequency > Center Freq
<b>Example</b>	:FREQUENCY:CENTer 0.2 GHz

---

<b>Command Format</b>	<b>[[:SENSe]:FREQUENCY:STARt &lt;freq&gt;[:SENSe]:FREQUENCY:STARt?]</b>
<b>Instruction</b>	Sets the start frequency of the spectrum analyzer. Gets the start Frequency.
<b>Parameter Type</b>	Float, unit: Hz, kHz, MHz, GHz
<b>Parameter Range</b>	50 Hz~3.199999950 GHz Zero Span: 0~3.2 GHz
<b>Return</b>	Float, unit: Hz
<b>Default</b>	0 Hz
<b>Menu</b>	Frequency > Start Freq
<b>Example</b>	:FREQUENCY:STARt 100 Hz

---

<b>Command Format</b>	<b>[[:SENSe]:FREQUENCY:STOP &lt;freq&gt;[:SENSe]:FREQUENCY:STOP?]</b>
<b>Instruction</b>	Sets the stop frequency of the spectrum analyzer. Gets the stop frequency.
<b>Parameter Type</b>	Float, unit: Hz, kHz, MHz, GHz
<b>Parameter Range</b>	50 Hz~3.199999950 GHz Zero Span: 0~3.2 GHz
<b>Return</b>	Float, unit: Hz
<b>Default</b>	1.5 GHz
<b>Menu</b>	Frequency > Stop Freq
<b>Example</b>	:FREQUENCY:STOP 1.0 GHz

---

<b>Command Format</b>	<b>[[:SENSe]:FREQUENCY:CENTer:STEP[:INCRement] &lt;freq&gt;[:SENSe]:FREQUENCY:CENTer:STEP[:INCRement]?]</b>
<b>Instruction</b>	Specifies the center frequency step size. Gets the center frequency step.
<b>Parameter Type</b>	Float, unit: Hz, kHz, MHz, GHz
<b>Parameter Range</b>	1 Hz~3.2 GHz

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<b>Return</b>	Float, unit: Hz
<b>Default</b>	320 MHz
<b>Menu</b>	Frequency > Freq Step
<b>Example</b>	:FREQUENCY:CENTER:STEP 2 MHz

---

<b>Command Format</b>	<b>[[:SENSe]:FREQUENCY:CENTER:STEP:AUTO OFF ON 0 1 [:SENSe]:FREQUENCY:CENTER:STEP:AUTO?</b>
<b>Instruction</b>	Specifies whether the step size is set automatically based on the span. Gets center frequency step mode.
<b>Parameter Type</b>	Boolean
<b>Parameter Range</b>	OFF ON 0 1
<b>Return</b>	0 1
<b>Default</b>	ON
<b>Menu</b>	Frequency > Freq Step
<b>Example</b>	:FREQUENCY:CENTER:STEP:AUTO OFF

---

<b>Command Format</b>	<b>[[:SENSe]:FREQUENCY:CENTER:SET:STEP</b>
<b>Instruction</b>	Sets step value equal to center frequency.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	Frequency > CF→Step
<b>Example</b>	:FREQUENCY:CENTER:SET:STEP

---

<b>Command Format</b>	<b>[[:SENSe]:FREQUENCY:OFFSet &lt;freq&gt; [:SENSe]:FREQUENCY:OFFSet?</b>
<b>Instruction</b>	Sets the frequency offset of the spectrum analyzer. Gets the frequency offset.
<b>Parameter Type</b>	Float, unit: Hz, kHz, MHz, GHz
<b>Parameter Range</b>	-100 GHz ~ 100 GHz
<b>Return</b>	Float, unit: Hz
<b>Default</b>	0 Hz
<b>Menu</b>	Frequency > Freq Offset

---

---

**Example**           :FREQUency:OFFSet 1 GHz

---

<b>Command Format</b>	<b>[[:SENSe]:FREQUency:SPAN &lt;freq&gt;]</b> <b>[[:SENSe]:FREQUency:SPAN?]</b>
<b>Instruction</b>	Sets the frequency span. Setting the span to 0 Hz puts the analyzer into zero span. Gets span value.
<b>Parameter Type</b>	Float, unit: Hz, kHz, MHz, GHz
<b>Parameter Range</b>	0 Hz, 100 Hz ~ 3.2GHz
<b>Return</b>	Float, unit: Hz
<b>Default</b>	1.5 GHz
<b>Menu</b>	Span > Span
<b>Example</b>	:FREQUency:SPAN 1 GHz

---

<b>Command Format</b>	<b>[[:SENSe]:FREQUency:SPAN:FULL]</b>
<b>Instruction</b>	Sets the frequency span to full scale.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	Span > Full Span
<b>Example</b>	:FREQUency:SPAN:FULL

---

<b>Command Format</b>	<b>[[:SENSe]:FREQUency:SPAN:ZERO]</b>
<b>Instruction</b>	Sets the frequency span to zero span.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	Span > Zero Span
<b>Example</b>	:FREQUency:SPAN:ZERO

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## SIGLENT

---

<b>Command Format</b>	<b>[[:SENSe]:FREQuency:SPAN:PREVious</b>
<b>Instruction</b>	Sets the frequency span to the previous span setting.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	Span > Last Span
<b>Example</b>	:FREQuency:SPAN:PREVious

---

<b>Command Format</b>	<b>[[:SENSe]:FREQuency:SPAN:HALF</b>
<b>Instruction</b>	Sets the frequency span to half of the previous span setting.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	Span> Zoom In
<b>Example</b>	:FREQuency:SPAN:HALF

---

<b>Command Format</b>	<b>[[:SENSe]:FREQuency:SPAN:DOUBle</b>
<b>Instruction</b>	Sets the frequency span to double the previous span setting.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	Span> Zoom Out
<b>Example</b>	:FREQuency:SPAN:DOUBle

---

## 4.2 Amplitude Subsection

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

**[[:SENSe]:POWER[:RF]:ATTenuation**



```
[:SENSe]:POWer[:RF]:ATTenuation:AUTO
[:SENSe]:POWer[:RF]:GAIN[:STATe]
:DISPlay:WINDow:TRACe:Y:SCALE:RLEVel:OFFSet
:UNIT:POWer
:DISPlay:WINDow:TRACe:Y[:SCALE]:SPACing
:DISPlay:WINDow:TRACe:Y[:SCALE]:PDIVision
[:SENSe]:CORRection:OFF
[:SENSe]:CORRection:CSET:ALL[:STATe]
[:SENSe]:CORRection:CSET[1]|2|3|4[:STATe]
[:SENSe]:CORRection:CSET[1]|2|3|4:ADD
[:SENSe]:CORRection:CSET[1]|2|3|4:DELeTe
[:SENSe]:CORRection:CSET[1]|2|3|4:ALL:DELeTe
[:SENSe]:CORRection:CSET[1]|2|3|4:DATA
[:SENSe]:CORRection:IMPedance[:INPut][:MAGNitude]
```

<b>Command Format</b>	<b>:DISPlay:WINDow:TRACe:Y[:SCALE]:RLEVel &lt;value&gt;</b> <b>:DISPlay:WINDow:TRACe:Y[:SCALE]:RLEVel?</b>
<b>Instruction</b>	This command sets the reference level for the Y-axis. Gets reference level.
<b>Parameter Type</b>	Float, unit: dBm, dBmV, dBuV, V, W
<b>Parameter Range</b>	Unit is dBm: -100 dBm ~ 30 dBm Unit is dBmV: -53.01 dBmV ~ 76.99 dBmV, Unit is dBuV: 6.99 dBuV ~ 136.99 dBuV, Unit is Volts: 2.24 uV ~ 7.07 V Unit is Watts: 100 fW ~ 1 W
<b>Return</b>	Float, unit: dBm
<b>Default</b>	0 dBm
<b>Menu</b>	Amplitude > Ref Level
<b>Example</b>	:DISPlay:WINDow:TRACe:Y:RLEVel 20 DBM

<b>Command Format</b>	<b>[:SENSe]:POWer[:RF]:ATTenuation &lt;value&gt;</b> <b>[:SENSe]:POWer[:RF]:ATTenuation?</b>
<b>Instruction</b>	Sets the input attenuator of the spectrum analyzer. Gets the input attenuator.
<b>Parameter Type</b>	Integer
<b>Parameter Range</b>	0 dB ~ 51 dB
<b>Return</b>	Integer, unit: dB

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<b>Default</b>	20 dB
<b>Menu</b>	Amplitude > Attenuator
<b>Example</b>	:POWER:ATTenuation 10

---

<b>Command Format</b>	<b>[[:SENSe]:POWER[:RF]:ATTenuation:AUTO OFF ON 0 1 [:SENSe]:POWER[:RF]:ATTenuation:AUTO?</b>
<b>Instruction</b>	This command turns on/off auto input port attenuator state. Gets input port attenuator state.
<b>Parameter Type</b>	Boolean
<b>Parameter Range</b>	OFF ON 0 1
<b>Return</b>	0 1
<b>Default</b>	ON
<b>Menu</b>	Amplitude > Attenuator
<b>Example</b>	:POWER:ATTenuation:AUTO?

---

<b>Command Format</b>	<b>[[:SENSe]:POWER[:RF]:GAIN[:STATe] OFF ON 0 1 [:SENSe]:POWER[:RF]:GAIN[:STATe]?</b>
<b>Instruction</b>	Turns the internal preamp on/off. Gets preamp on-off state.
<b>Parameter Type</b>	Boolean
<b>Parameter Range</b>	OFF ON 0 1
<b>Return</b>	0 1
<b>Default</b>	OFF
<b>Menu</b>	Amplitude > Preamp
<b>Example</b>	:POWER:GAIN ON

---

<b>Command Format</b>	<b>:DISPlay:WINDow:TRACe:Y:SCALE:RLEVel:OFFSet &lt;value&gt; :DISPlay:WINDow:TRACe:Y:SCALE:RLEVel:OFFSet?</b>
<b>Instruction</b>	Sets reference offsets. Gets reference offsets.
<b>Parameter Type</b>	Float
<b>Parameter Range</b>	-100dB~100dB
<b>Return</b>	Float, unit: dB
<b>Default</b>	0dB
<b>Menu</b>	Amplitude > Ref OffSets

---

---

**Example** :DISPlay:WINDow:TRACe:Y:SCALe:RLEVel:OFFSet 2

---

**Command Format** :UNIT:POWer DBM|DBMV|DBUV|V|W  
:UNIT:POWer?

**Instruction** Specifies amplitude units for the input, output and display.  
Gets amplitude units.

**Parameter Type** Enumeration

**Parameter Range** DBM|DBMV|DBUV|DBUA|V|W,

**Return** Enumeration

**Default** DBM

**Menu** Amplitude > Units

**Example** :UNIT:POWer DBMV

---

**Command Format** :DISPlay:WINDow:TRACe:Y[:SCALe]:SPACing LINear|LOGarithmic  
:DISPlay:WINDow:TRACe:Y[:SCALe]:SPACing?

**Instruction** Toggles the vertical graticule divisions between logarithmic unit and linear unit. The default logarithmic unit is dBm, and the linear unit is V.  
Gets scale type.

**Parameter Type** Enumeration

**Parameter Range** LINear|LOGarithmic

**Return** Enumeration

**Default** LOGarithmic

**Menu** Amplitude > Scale Type

**Example** :DISPlay:WINDow:TRACe:Y:SPACing LINear

---

**Command Format** :DISPlay:WINDow:TRACe:Y[:SCALe]:PDIVision <integer>  
:DISPlay:WINDow:TRACe:Y[:SCALe]:PDIVision?

**Instruction** This command sets the per-division display scaling for the y-axis when scale type of Y axis is set to Log.  
Gets Scale/Div when scale type of Y axis is set to Log.

**Parameter Type** Float

**Parameter Range** 1 dB ~ 10 dB

**Return** Float, unit: dB

**Default** 10 dB

**Menu** Amplitude > Scale/Div

**Example** :DISPlay:WINDow:TRACe:Y:PDIVision 10 dB

---

## SIGLENT

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<b>Command Format</b>	<b>[:SENSe]:CORRection:OFF</b>
<b>Instruction</b>	Turn off the amplitude correction function off and all of the correction sets are off.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	None
<b>Example</b>	:SENSe:CORRection:OFF

---

<b>Command Format</b>	<b>[:SENSe]:CORRection:CSET:ALL[:STATe] OFF ON 0 1</b> <b>[:SENSe]:CORRection:CSET:ALL[:STATe]?</b>
<b>Instruction</b>	Turns on or off the amplitude corrections. When turned on, only the correction sets that were turned on are enabled. When turned off, all of the correction Sets are disabled. If there is no correction enabled, state cannot be set to on.
<b>Parameter Type</b>	Boolean
<b>Parameter Range</b>	OFF ON 0 1
<b>Return</b>	0 1
<b>Default</b>	OFF
<b>Menu</b>	Amplitude > Corrections > Apply Corrections
<b>Example</b>	:SENSe:CORRection:CSET:ALL:STATe OFF

---

<b>Command Format</b>	<b>[:SENSe]:CORRection:CSET[1] 2 3 4[:STATe]</b> <b>[:SENSe]:CORRection:CSET[1] 2 3 4[:STATe]?</b>
<b>Instruction</b>	Turns the amplitude correction function on/off. Gets the amplitude correction function state.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	0 1
<b>Default</b>	OFF
<b>Menu</b>	Amplitude > Corrections > Correction1 2 3 4
<b>Example</b>	:CORRection:CSET2:OFF

---

---

<b>Command Format</b>	<b>[:SENSe]:CORRection:CSET[1] 2 3 4:ADD &lt;x1,y1,x2,y2;...&gt;</b>
<b>Instruction</b>	Add Correction Points
<b>Parameter Type</b>	String<freq, ampl,freq, ampl,freq, ampl,.....>
<b>Parameter Range</b>	None
<b>Return</b>	
<b>Default</b>	None
<b>Menu</b>	Amplitude > Corrections > CorrectionX > Add Point
<b>Example</b>	:CORRection:CSET2:ADD 10000000,-10,15000000,-12

---

<b>Command Format</b>	<b>[:SENSe]:CORRection:CSET[1] 2 3 4:DELeTe &lt;index&gt;</b>
<b>Instruction</b>	Delete Correction Points
<b>Parameter Type</b>	Serial number of Correction Points
<b>Parameter Range</b>	None
<b>Return</b>	
<b>Default</b>	None
<b>Menu</b>	Amplitude > Corrections > CorrectionX > Del Point
<b>Example</b>	:CORRection:CSET2: DELeTe 2

---

<b>Command Format</b>	<b>[:SENSe]:CORRection:CSET[1] 2 3 4:ALL:DELeTe</b>
<b>Instruction</b>	Add All Correction Points
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	Amplitude > Corrections > CorrectionX > Del All
<b>Example</b>	:CORRection:CSET2: ALL:DELeTe

---

<b>Command Format</b>	<b>[:SENSe]:CORRection:CSET[1] 2 3 4:DATA &lt;x1,y1,x2,y2;...&gt; [:SENSe]:CORRection:CSET[1] 2 3 4:DATA?</b>
-----------------------	---

---

## SIGLENT

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<b>Instruction</b>	Set correction X data 1 2 3 4 Read correction X data.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	String
<b>Default</b>	None
<b>Menu</b>	None
<b>Example</b>	:CORRection:CSET2:DATA?

---

<b>Command Format</b>	<b>[[:SENSE]:CORRection:IMPedance[:INPut][:MAGNitude]  OHM75 [:SENSE]:CORRection:IMPedance[:INPut][:MAGNitude]?</b>	<b>OHM50</b>
<b>Instruction</b>	Set the input impedance for voltage-to-power conversions. Get the input impedance.	
<b>Parameter Type</b>	Enumeration	
<b>Parameter Range</b>	OHM50  OHM75	
<b>Return</b>	OHM50  OHM75	
<b>Default</b>	OHM50	
<b>Menu</b>	Amplitude > Corrections	
<b>Example</b>	CORRection:IMPedance?	

---

## 4.3 Sweep Subsection

**[[:SENSE]:SWEep:MODE**

**[[:SENSE]:SWEep:TIME**

**[[:SENSE]:SWEep:TIME:AUTO**

**[[:SENSE]:SWEep:SPEed**

**[[:SENSE]:SWEep:COUNT**

**[[:SENSE]:QPD:DWELI:TIME**

**:INITiate[:IMMediate]**

**:INITiate:REStart**

**:INITiate:CONTinuous**

**ABORt**

<b>Command Format</b>	<b>[[:SENSE]:SWEep:MODE AUTO FFT SWEep [:SENSE]:SWEep:MODE?</b>
-----------------------	---

---

---

<b>Instruction</b>	Sets sweep mode. Gets sweep mode.
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	AUTO FFT SWEep
<b>Return</b>	Enumeration
<b>Default</b>	SWEep
<b>Menu</b>	Sweep
<b>Example</b>	:SWEep:MODE SWEep

---

<b>Command Format</b>	<b>[[:SENSe]:SWEep:TIME &lt;time&gt; [:SENSe]:SWEep:TIME?</b>
<b>Instruction</b>	Specifies the time in which the instrument sweeps the display. A span value of 0 Hz causes the analyzer to enter zero span mode. In zero span the X-axis represents time rather than frequency.
<b>Parameter Type</b>	Float, unit: ks, s, ms, us
<b>Parameter Range</b>	450us ~ 1500 s
<b>Return</b>	Float, unit: s
<b>Default</b>	312.416ms(216.288ms, 192.256ms, 168.224ms, 120.160ms)
<b>Menu</b>	Sweep > Sweep Time
<b>Example</b>	:SWEep:TIME 5s

---

<b>Command Format</b>	<b>[[:SENSe]:SWEep:TIME:AUTO OFF ON 0 1 [:SENSe]:SWEep:TIME:AUTO?</b>
<b>Instruction</b>	This command turns on/off auto sweep time state.
<b>Parameter Type</b>	Boolean
<b>Parameter Range</b>	OFF ON 0 1
<b>Return</b>	0 1
<b>Default</b>	ON
<b>Menu</b>	Sweep > Sweep Time
<b>Example</b>	:SWEep:TIME:AUTO ON

---

<b>Command Format</b>	<b>[[:SENSe]:SWEep:SPEed NORMAL ACCuracy [:SENSe]:SWEep:SPEed?</b>
<b>Instruction</b>	Toggles the sweep speed between normal and accuracy.
<b>Parameter Type</b>	Enumeration

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## SIGLENT

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<b>Parameter Range</b>	ACCURacy NORMal
<b>Return</b>	Enumeration
<b>Default</b>	NORMal
<b>Menu</b>	Sweep > Sweep Rule
<b>Example</b>	:SWEep: SPEed NORMal

---

<b>Command Format</b>	<b>[[:SENSe]:SWEep:COUNT &lt;integer&gt;]</b> <b>[[:SENSe]:SWEep:COUNT?]</b>
<b>Instruction</b>	Sets sweep numbers, when single sweep on. Gets sweep numbers, when single sweep on.
<b>Parameter Type</b>	Integer
<b>Parameter Range</b>	1 ~ 99999
<b>Return</b>	Integer
<b>Default</b>	1
<b>Menu</b>	Sweep > Numbers
<b>Example</b>	:SWEep:COUNT 10

---

<b>Command Format</b>	<b>[[:SENSe]:QPD:DWELI:TIME &lt;time &gt;]</b> <b>[[:SENSe]:QPD:DWELI:TIME?]</b>
<b>Instruction</b>	Sets QPD Time Gets QPD Time
<b>Parameter Type</b>	Float, unit: s, ms, us
<b>Parameter Range</b>	0us ~ 10s(qusai-peak: 900us ~ 30ks)
<b>Return</b>	Float, unit: s
<b>Default</b>	50ms
<b>Menu</b>	Sweep > QPD Time
<b>Example</b>	:QPD:DWELI:TIME 10s

---

<b>Command Format</b>	<b>:INITiate[:IMMEDIATE]</b>
<b>Instruction</b>	Restart the current sweep.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None

---



---

<b>Default</b>	None
<b>Menu</b>	
<b>Example</b>	:INITiate:IMMEDIATE

---

<b>Command Format</b>	<b>:INITiate:REStart</b>
<b>Instruction</b>	Restart the current sweep. :INITiate:REStart and :INITiate:IMMEDIATE perform exactly the same function.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	
<b>Example</b>	:INITiate:REStart

---

<b>Command Format</b>	<b>:INITiate:CONTInuous OFF ON 0 1</b> <b>:INITiate:CONTInuous?</b>
<b>Instruction</b>	Sets continuous sweep mode on-off. Gets continuous sweep mode state.
<b>Parameter Type</b>	Boolean
<b>Parameter Range</b>	OFF ON 0 1
<b>Return</b>	0 1
<b>Default</b>	ON
<b>Menu</b>	Sweep > Sweep
<b>Example</b>	:INITiate:CONTInuous OFF

---

<b>Command Format</b>	<b>ABORt</b>
<b>Instruction</b>	<p>This command is used to stop the current measurement. It aborts the current measurement as quickly as possible, resets the sweep and trigger systems, and puts the measurement into an "idle" state.</p> <p>If the analyzer is set for Continuous measurement, it sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.</p> <p>If the analyzer is set for Single measurement, it remains in the "idle" state until an :INIT:IMM command is received.</p>

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## SIGLENT

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<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	None
<b>Default</b>	ABORT

---

## 4.4 Trigger Subsystem

**:TRIGger[:SEQuence]:SOURce**

**:TRIGger[:SEQuence]:VIDeo:LEVel**

**:TRIGger[:SEQuence]:RFBurst:SLOPe**

<b>Command Format</b>	<b>:TRIGger[:SEQuence]:SOURce IMMEDIATE VIDeo EXTernal</b> <b>:TRIGger[:SEQuence]:SOURce?</b>
<b>Instruction</b>	Specifies the source (or type) of triggering used to start a measurement. Gets trigger type.
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	IMMEDIATE: free-run triggering. VIDeo: triggers on the video signal level. EXTernal: allows you to connect an external trigger source.
<b>Return</b>	Enumeration
<b>Default</b>	IMMEDIATE
<b>Menu</b>	Trigger
<b>Example</b>	:TRIGger:SOURce IMMEDIATE

---

<b>Command Format</b>	<b>:TRIGger[:SEQuence]:VIDeo:LEVel &lt;value&gt;</b> <b>:TRIGger[:SEQuence]:VIDeo:LEVel?</b>
<b>Instruction</b>	Specifies the level at which a video trigger will occur. Video is adjusted using this command, but must also be selected using the command. Gets video Trigger Level.
<b>Parameter Type</b>	Float, unit: dBm, dBmV, dBuV, V, W
<b>Parameter Range</b>	Unit is dBm: -300 dBm ~ 50 dBm unit is dBmV: -253.01 dBmV ~ 96.99 dBmV unit is dBuV: -193.01 dBuV ~ 156.99 dBuV unit is Volts: 223E-16V ~ 70.71 V unit is Watts: 1.00E-33 W ~ 100 W
<b>Return</b>	Float, unit: dBm, dBmV, dBuV, V, W
<b>Default</b>	0 dBm
<b>Menu</b>	Trigger > Video Level

---

---

**Example** :TRIGger:VIDeo:LEVel 0.5 dBm

---

<b>Command Format</b>	:TRIGger[:SEquence]:RFBurst:SLOPe POSitive NEGative :TRIGger[:SEquence]:RFBurst:SLOPe?
<b>Instruction</b>	This command activates the trigger condition that allows the next sweep to start when the external voltage (connected to EXT TRIG IN connector) passes through approximately 1.5 volts. The external trigger signal must be a 0V to +5V TTL signal. This function only controls the trigger polarity (for positive or negative-going signals). Gets Trigger edge.
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	POSitive: positive edge. NEGative: negative edge.
<b>Return</b>	Enumeration
<b>Default</b>	POSitive
<b>Menu</b>	Trigger > External Trigger
<b>Example</b>	:TRIGger:RFBurst:SLOPe POSitive

---

## 4.5 Bandwidth Subsection

[\[:SENSe\]:BWIDth\[:RESolution\]](#)

[\[:SENSe\]:BWIDth\[:RESolution\]:AUTO](#)

[\[:SENSe\]:BWIDth:VIDeo](#)

[\[:SENSe\]:BWIDth:VIDeo:AUTO](#)

[\[:SENSe\]:BWIDth:VIDeo:RATio](#)

[\[:SENSe\]:BWIDth:VIDeo:RATio:CONfig?](#)

[\[:SENSe\]:FILTEr:TYPE](#)

<b>Command Format</b>	<a href="#">[:SENSe]:BWIDth[:RESolution]</a> <freq> <a href="#">[:SENSe]:BWIDth[:RESolution]?</a>
<b>Instruction</b>	Specifies the resolution bandwidth. For numeric entries, all RBW types choose the nearest (arithmetically, on a linear scale, rounding up) available RBW to the value entered.
<b>Parameter Type</b>	Discrete
<b>Parameter Range</b>	1 Hz, 3 Hz, 10 Hz, 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz, 300 kHz, 1 MHz
<b>Return</b>	Float, unit: Hz
<b>Default</b>	1 MHz
<b>Menu</b>	BW > RBW
<b>Example</b>	:BWIDth 1 kHz

---

## SIGLENT

---

<b>Command Format</b>	<b>[[:SENSe]:BWIDth[:RESolution]:AUTO OFF ON 0 1 [:SENSe]:BWIDth[:RESolution]:AUTO?</b>
<b>Instruction</b>	Turns on/off auto resolution bandwidth state.
<b>Parameter Type</b>	Boolean
<b>Parameter Range</b>	OFF ON 0 1
<b>Return</b>	0 1
<b>Default</b>	ON
<b>Menu</b>	BW > RBW
<b>Example</b>	:BWID:AUTO On

---

<b>Command Format</b>	<b>[[:SENSe]:BWIDth:VIDeo &lt;freq&gt; [:SENSe]:BWIDth:VIDeo?</b>
<b>Instruction</b>	Specifies the video bandwidth.
<b>Parameter Type</b>	Discrete
<b>Parameter Range</b>	1 Hz, 3 Hz, 10 Hz, 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz, 300 kHz, 1 MHz
<b>Return</b>	Float, unit: Hz
<b>Default</b>	1 MHz
<b>Menu</b>	BW > VBW
<b>Example</b>	:BWIDth:VIDeo 10 KHZ

---

<b>Command Format</b>	<b>[[:SENSe]:BWIDth:VIDeo:AUTO OFF ON 0 1 [:SENSe]:BWIDth:VIDeo:AUTO?</b>
<b>Instruction</b>	This command turns on/off auto video bandwidth state.
<b>Parameter Type</b>	Boolean
<b>Parameter Range</b>	OFF ON 0 1
<b>Return</b>	0 1
<b>Default</b>	ON
<b>Menu</b>	BW > VBW
<b>Example</b>	BWIDth:VIDeo:AUTO OFF

---

<b>Command Format</b>	<b>[[:SENSe]:BWIDth:VIDeo:RATio &lt;number&gt; [:SENSe]:BWIDth:VIDeo:RATio?</b>
-----------------------	---

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---

<b>Instruction</b>	Specifies the ratio of the video bandwidth to the resolution bandwidth.
<b>Parameter Type</b>	Discrete, Float
<b>Parameter Range</b>	0.001, 0.003, 0.01, 0.03, 0.1, 0.3, 1.0, 3.0, 10.0, 30.0, 100.0, 300.0, 1000.0
<b>Return</b>	Float
<b>Default</b>	1.0
<b>Menu</b>	BW > VBW/RBW
<b>Example</b>	:BWIDth:VIDeo:RATio 30

---

<b>Command Format</b>	<b>[[:SENSe]:BWIDth:VIDeo:RATio:CONfig?</b>
<b>Instruction</b>	This command turns on/off auto video to resolution bandwidth ratio.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	0 1
<b>Default</b>	1
<b>Menu</b>	None
<b>Example</b>	:BWIDth:VIDeo:RATio:CONfig?

---

<b>Command Format</b>	<b>[[:SENSe]:FILTer:TYPE EMI GAUSS [:SENSe]:FILTer:TYPE?</b>
<b>Instruction</b>	Sets filter type Gets filter type
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	EMI GAUSS
<b>Return</b>	Enumeration
<b>Default</b>	GAUSS
<b>Menu</b>	BW > Filter Type
<b>Example</b>	:FILTer:TYPE EMI

---

## 4.6 Trace Subsection

**:TRACe[1]|2|3|4:MODE**

**:TRACe[:DATA]?**

**:FORMat[:TRACe][:DATA]**

## SIGLENT

---

**:CALCulate[:SElected]:MATH:FUNction**

**:TRACe:MATH:X**

**:TRACe:MATH:Y**

**:TRACe:MATH:Z**

**:TRACe:MATH:OFFSet**

**[:SENSe]:FREQuency:TUNE:IMMEdiate**

**[:SENSe]:DETector:TRACe[1]|2|3|4[:FUNction]**

**[:SENSe]:AVERAge:TYPE**

**[:SENSe]:AVERAge:TRACe[1]|2|3|4:COUNT**

**[:SENSe]:AVERAge:TRACe[1]|2|3|4:CLEAr**

<b>Command Format</b>	<b>:TRACe[1] 2 3 4:MODE WRITe MAXHold MINHold VIEW BLANk AVERAge :TRACe[1] 2 3 4:MODE?</b>
<b>Instruction</b>	Selects the display mode for the selected trace.
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	WRITe: puts the trace in the normal mode, updating the data. MAXHold: displays the highest measured trace value for all the data that has been measured since the function was turned on. MINHold: displays the lowest measured trace value for all the data that has been measured since the function was turned on. VIEW: turns on the trace data so that it can be viewed on the display. BLANk: turns off the trace data so that it is not viewed on the display. AVERAge: averages the trace for test period.
<b>Return</b>	Enumeration
<b>Default</b>	Trace1: WRITe, Trace2 3 4: BLANk
<b>Menu</b>	Trace
<b>Example</b>	:TRAC1:MODE VIEW

<b>Command Format</b>	<b>:TRACe[:DATA]? 1 2 3 4</b>
<b>Instruction</b>	This query command returns the current displayed data. You can also add trace parameters directly after trace as :TRACe[1] 2 3 4[:DATA]?
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	1 2 3 4 or A B C D or TRACE1  TRACE2  TRACE3  TRACE4
<b>Return</b>	String
<b>Default</b>	1
<b>Menu</b>	None

---

**Example** :TRACe:DATA? 1

---

<b>Command Format</b>	<b>:FORMat[:TRACe][:DATA] ASCii REAL :FORMat[:TRACe][:DATA]?</b>
<b>Instruction</b>	Sets trace data type. Gets trace data type.
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	ASCii REAL: single precision floating-point (float)
<b>Return</b>	String
<b>Default</b>	ASCii
<b>Menu</b>	None
<b>Example</b>	:FORMat ASCii

---

<b>Command Format</b>	<b>:CALCulate[:SElected]:MATH:FUNcTion :CALCulate[:SElected]:MATH:FUNcTion?</b>
<b>Instruction</b>	Sets trace math function Gets trace data function
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	OFF: Trace Math Off PDIF : Power Diff PSUM : Power Sum LOFF : Log Offset LDIF : Log Diff
<b>Return</b>	Enumeration
<b>Default</b>	OFF
<b>Menu</b>	Trace > Math
<b>Example</b>	:CALCulate[:SElected]:MATH:FUNcTion?

---

<b>Command Format</b>	<b>:TRACe:MATH:X A B C D :TRACe:MATH:X?</b>
<b>Instruction</b>	Sets trace math input X Gets trace math input X
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	A B C D 或 TRACE1 TRACE2 TRACE3 TRACE4
<b>Return</b>	Enumeration
<b>Default</b>	A
<b>Menu</b>	Trace > Math > Input X

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## SIGLENT

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<b>Example</b>	:TRACe:MATH:X A
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<b>Command Format</b>	:TRACe:MATH:Y A B C D :TRACe:MATH:Y?
<b>Instruction</b>	Sets trace math input Y Gets trace math input Y
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	A B C D 或 TRACE1 TRACE2 TRACE3 TRACE4
<b>Return</b>	Enumeration
<b>Default</b>	A
<b>Menu</b>	Trace > Math > Input Y
<b>Example</b>	:TRACe:MATH:Y A

---

<b>Command Format</b>	:TRACe:MATH:Z A B C D :TRACe:MATH:Z?
<b>Instruction</b>	Sets trace math Output Z Gets trace math Output Z
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	A B C D 或 TRACE1 TRACE2 TRACE3 TRACE4
<b>Return</b>	Enumeration
<b>Default</b>	A
<b>Menu</b>	Trace > Math > Output Z
<b>Example</b>	:TRACe:MATH:Z A

---

<b>Command Format</b>	:TRACe:MATH:OFFSet <const> :TRACe:MATH:OFFSet?
<b>Instruction</b>	Sets trace math OFFSet Gets trace math OFFSet
<b>Parameter Type</b>	Float
<b>Parameter Range</b>	-100 dB ~100 dB
<b>Return</b>	Float
<b>Default</b>	0.00 dB
<b>Menu</b>	Trace > Math > Offset
<b>Example</b>	:TRACe:MATH:OFFSet 7

---



<b>Command Format</b>	<b>[:SENSe]:FREQuency:TUNE:IMMediate</b>
<b>Instruction</b>	Auto tune the spectrum analyzer parameter to display the main signal.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	Auto Tune
<b>Example</b>	:FREQuency:TUNE:IMMediate

<b>Command Format</b>	<b>[:SENSe]:DETEctor:TRACe[1] 2 3 4[:FUNction] NEGative POSitive SAMPlE AVERAge NORMAl QUASi [:SENSe]:DETEctor:TRACe[1] 2 3 4[:FUNction]?</b>
<b>Instruction</b>	Specifies the detection mode. For each trace interval (bucket), average detection displays the average of all the samples within the interval.
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	<p>NEGative: Negative peak detection displays the lowest sample taken during the interval being displayed.</p> <p>POSitive: Positive peak detection displays the highest sample taken during the interval being displayed.</p> <p>SAMPlE: Sample detection displays the sample taken during the interval being displayed, and is used primarily to display noise or noise-like signals. In sample mode, the instantaneous signal value at the present display point is placed into memory. This detection should not be used to make the most accurate amplitude measurement of non noise-like signals.</p> <p>AVERAge: Average detection is used when measuring the average value of the amplitude across each trace interval (bucket). The averaging method used by the average detector is set to either video or power as appropriate when the average type is auto coupled.</p> <p>NORMAl: Normal detection selects the maximum and minimum video signal values alternately. When selecting Normal detection, "Norm" appears in the upper-left corner.</p> <p>QUASi: Quasipeak detection is a form of detection where a signal level is weighted based on the repetition frequency of the spectral components making up the signal. That is to say, the result of a quasi-peak measurement depends on the repetition rate of the signal.</p>
<b>Return</b>	Enumeration
<b>Default</b>	POSitive
<b>Menu</b>	Detect

<b>Command Format</b>	<b>[:SENSe]:AVERAge:TYPE LOGPower POWer VOLTage [:SENSe]:AVERAge:TYPE?</b>
<b>Instruction</b>	Toggle the average type between Log power, power and voltage.

## SIGLENT

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<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	LOGPower POWER VOLTage
<b>Return</b>	Enumeration
<b>Default</b>	LOGPower
<b>Menu</b>	BW > Avg Type
<b>Example</b>	AVERage:TYPE VOLTage

---

<b>Command Format</b>	<b>[[:SENSe]:AVERage:TRACe[1] 2 3 4:COUNT &lt;integer&gt;[:SENSe]:AVERage:TRACe[1] 2 3 4:COUNT?</b>
<b>Instruction</b>	Specifies the number of measurements that are combined.
<b>Parameter Type</b>	Integer
<b>Parameter Range</b>	1 ~ 999
<b>Return</b>	Integer
<b>Default</b>	1
<b>Menu</b>	Trace > Avg Times
<b>Example</b>	:AVERage:TRACe1:COUNT 10

---

<b>Command Format</b>	<b>[[:SENSe]:AVERage:TRACe[1] 2 3 4:CLEar</b>
<b>Instruction</b>	Restarts the trace average. This command is only available when average is on.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	None
<b>Example</b>	:AVERage:TRAC1:CLEar

---

## 4.7 Marker Subsection

**:CALCulate:MARKer[1]|2|3|4|5|6|7|8:STATE**  
**:CALCulate:MARKer:AOff**  
**:CALCulate:MARKer[1]|2|3|4|5|6|7|8:MODE**  
**:CALCulate:MARKer[1]|2|3|4|5|6|7|8:TRACe**

:CALCulate:MARKer[1]|2|3|4|5|6|7|8:RELative:TO:MARKer  
 :CALCulate:MARKer[1]|2|3|4|5|6|7|8:X  
 :CALCulate:MARKer[1]|2|3|4|5|6|7|8:Y?  
 :CALCulate:MARKer:TABLE  
 :CALCulate:MARKer[1]|2|3|4|5|6|7|8[:SET]:START  
 :CALCulate:MARKer[1]|2|3|4|5|6|7|8[:SET]:STOP  
 :CALCulate:MARKer[1]|2|3|4|5|6|7|8[:SET]:CENTER  
 :CALCulate:MARKer[1]|2|3|4|5|6|7|8[:SET]:STEP  
 :CALCulate:MARKer[1]|2|3|4|5|6|7|8[:SET]:RLEVEL  
 :CALCulate:MARKer[1]|2|3|4|5|6|7|8:DELTA[:SET]:SPAN  
 :CALCulate:MARKer[1]|2|3|4|5|6|7|8:DELTA[:SET]:CENTER  
 :CALCulate:MARKer:PEAK:SEARch:MODE  
 :CALCulate:MARKer:PEAK:SORT  
 :CALCulate:MARKer:PEAK:THReshold  
 :CALCulate:MARKer:PEAK:EXCursion  
 :CALCulate:MARKer:PEAK:TABLE  
 :CALCulate:PEAK:TABLE?  
 :CALCulate:MARKer[1]|2|3|4|5|6|7|8:CPEak[:STATe]  
 :CALCulate:MARKer[1]|2|3|4|5|6|7|8:MAXimum  
 :CALCulate:MARKer[1]|2|3|4|5|6|7|8:MAXimum:NEXT  
 :CALCulate:MARKer[1]|2|3|4|5|6|7|8:MAXimum:LEFT  
 :CALCulate:MARKer[1]|2|3|4|5|6|7|8:MAXimum:RIGHT  
 :CALCulate:MARKer[1]|2|3|4|5|6|7|8:CPSearch  
 :CALCulate:MARKer[1]|2|3|4|5|6|7|8:FUNCTION  
 :CALCulate:MARKer:FCOunt[:STATe]  
 :CALCulate:MARKer:FCOunt:X?  
 :CALCulate:MARKer[1]|2|3|4|5|6|7|8:BANDwidth:RESult?  
 :CALCulate:MARKer[1]|2|3|4|5|6|7|8:BANDwidth:NDB  
 :CALCulate:MARKer[1]|2|3|4|5|6|7|8:X:READout  
 :CALCulate:MARKer:TRCKing[:STATe]

<b>Command</b>	:CALCulate:MARKer[1] 2 3 4 5 6 7 8:STATe OFF ON 0 1
<b>Format</b>	:CALCulate:MARKer[1] 2 3 4 5 6 7 8:STATe?
<b>Instruction</b>	This command toggles the selected marker status between on and off. Gets marker state.

## SIGLENT

---

<b>Parameter Type</b>	Boolean
<b>Parameter Range</b>	OFF ON 0 1
<b>Return</b>	0 1
<b>Default</b>	OFF
<b>Menu</b>	Marker
<b>Example</b>	:CALCulate:MARK1:STATE ON

---

<b>Command Format</b>	<b>:CALCulate:MARKer:AOFF</b>
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<b>Instruction</b>	Turn all the markers off.
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<b>Parameter Type</b>	None
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<b>Parameter Range</b>	None
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<b>Return</b>	None
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<b>Default</b>	None
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<b>Menu</b>	None
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<b>Example</b>	:CALCulate:MARKer:AOFF
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<b>Command Format</b>	<b>:CALCulate:MARKer[1] 2 3 4 5 6 7 8:MODE POSition DELTA BAND OFF :CALCulate:MARKer[1] 2 3 4 5 6 7 8:MODE?</b>
-----------------------	---

<b>Instruction</b>	Selects the type of markers that you want to activate. Gets the type of markers.
--------------------	---

<b>Parameter Type</b>	Enumeration
-----------------------	-------------

<b>Parameter Range</b>	POSITION: selects a normal marker that can be positioned on a trace and from which trace information will be generated. DELTA: activates a pair of markers, one of which is fixed at the current marker location. The other marker can then be moved around on the trace. The marker readout shows the marker value which moves. BAND: activates a pair of markers, one of which is fixed at the current marker location. The two marker can then be moved around on the trace. The marker readout shows the difference between the two markers. OFF: turns the designated marker off. If a marker is not active when the mode is queried, "off" will be returned.
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<b>Return</b>	Enumeration
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<b>Default</b>	OFF
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<b>Menu</b>	Marker
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<b>Example</b>	:CALCulate:MARK1:MODE POSition
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<b>Command Format</b>	<b>:CALCulate:MARKer[1] 2 3 4 5 6 7 8:TRACe 1 2 3 4</b> <b>:CALCulate:MARKer[1] 2 3 4 5 6 7 8:TRACe?</b>
<b>Instruction</b>	This command assigns the specified marker to the designated trace 1, 2, 3 or 4. Gets the specified marker to which trace.
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	MARKer:1 2 3 4 5 6 7 8 TRACe:1 2 3 4
<b>Return</b>	Enumeration
<b>Default</b>	1
<b>Menu</b>	Marker > Select Trace
<b>Example</b>	CALCulate:MARK1:TRAC 1

<b>Command Format</b>	<b>:CALCulate:MARKer[1] 2 3 4 5 6 7 8:RELative:TO:MARKer 1 2 3 4 5 6 7 8</b> <b>:CALCulate:MARKer[1] 2 3 4 5 6 7 8:RELative:TO:MARKer?</b>
<b>Instruction</b>	Sets marker relative to. Gets marker relative to.
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	1 2 3 4 5 6 7 8
<b>Return</b>	Enumeration
<b>Default</b>	1
<b>Menu</b>	Marker > Relative To
<b>Example</b>	:CALCulate:MARKer1:RELative:TO:MARK 3

<b>Command Format</b>	<b>:CALCulate:MARKer[1] 2 3 4 5 6 7 8:X &lt;para&gt;</b> <b>:CALCulate:MARKer[1] 2 3 4 5 6 7 8:X?</b>
<b>Instruction</b>	This command positions the designated marker on its assigned trace at the specified trace X value. The value is in the X-axis units, which can be a frequency or time. The query returns the current X value of the designated marker. When the readout mode is frequency, the query returns the X value of the span of the marker in integer and the unit is "Hz". When the readout mode is time or period, the query returns the X value of the span of the marker in scientific notation and the unit is "s". Reference Command: :CALCulate:MARKer[1] 2 3 4 5 6 7 8:X:READout
<b>Parameter Type</b>	Frequency: Float, unit: Hz, kHz, MHz, GHz, Default "Hz" Time: Float, unit: us, ms, s, ks, Default "s"
<b>Parameter Range</b>	0 Hz ~ 1.5 GHz or 10 ms ~ 1000 s
<b>Return</b>	Float
<b>Default</b>	750 MHz or 312.64 ms

## SIGLENT

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<b>Menu</b>	Marker > Normal
<b>Example</b>	:CALCulate:MARKer4:X 0.4 GHz :CALCulate:MARKer4:X 200 ms :CALCulate:MARKer4:X?

---

<b>Command Format</b>	:CALCulate:MARKer[1] 2 3 4 5 6 7 8:Y?
<b>Instruction</b>	This command reads the current Y value for the designated marker. This command can be used to read the results of noise marker. Make sure that Marker is on, Reference Command: :CALCulate:MARKer[1] 2 3 4 5 6 7 8:STATe :CALCulate:MARKer[1] 2 3 4 5 6 7 8:MODE
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	Float, unit: dBm
<b>Default</b>	None
<b>Menu</b>	Marker > Normal
<b>Example</b>	:CALCulate:MARKer1:Y? Return: -25

---

<b>Command Format</b>	:CALCulate:MARKer:TABLE ON OFF 0 1 :CALCulate:MARKer: TABLE?
<b>Instruction</b>	Toggles the marker table between on and off. Gets the status of the marker table.
<b>Parameter Type</b>	Boolean
<b>Parameter Range</b>	ON OFF 0 1
<b>Return</b>	0 1
<b>Default</b>	0
<b>Menu</b>	Marker > Marker Table
<b>Example</b>	:CALCulate:MARKer:TABLE ON

---

<b>Command Format</b>	:CALCulate:MARKer[1] 2 3 4 5 6 7 8[:SET]:START
<b>Instruction</b>	Sets the start frequency to the value of the specified marker frequency. This command is not available in zero span. If the Marker is OFF, it will set the marker on center.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None

---

---

<b>Default</b>	None
<b>Menu</b>	Marker > M→Start Freq
<b>Example</b>	:CALCulate:MARKer1:START

---

<b>Command Format</b>	<b>:CALCulate:MARKer[1] 2 3 4 5 6 7 8[:SET]:STOP</b>
<b>Instruction</b>	Sets the stop frequency to the value of the specified marker frequency. This command is not available in zero span . This command is valid when the Marker is on.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	Marker > Marker→Stop Freq
<b>Example</b>	:CALCulate:MARKer1:STOP

---

<b>Command Format</b>	<b>:CALCulate:MARKer[1] 2 3 4 5 6 7 8[:SET]:CENTER</b>
<b>Instruction</b>	This command sets the center frequency equal to the specified marker frequency, which moves the marker to the center of the screen. This command is not available in zero span. This command is valid when the Marker is on.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	Marker > M→CF
<b>Example</b>	:CALCulate:MARKer1:CENTER

---

<b>Command Format</b>	<b>:CALCulate:MARKer[1] 2 3 4 5 6 7 8[:SET]:STEP</b>
<b>Instruction</b>	This command sets the center frequency step equal to the specified marker frequency. This command is not available in zero span. This command is valid when the Marker is on.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None

---

## SIGLENT

---

<b>Default</b>	None
<b>Menu</b>	Marker > M→CF Step
<b>Example</b>	:CALCulate:MARKer1:STEP

---

<b>Command Format</b>	<b>:CALCulate:MARKer[1] 2 3 4 5 6 7 8[:SET]:RLEVel</b>
<b>Instruction</b>	This command sets the reference level equal to the specified marker frequency. This command is valid when the Marker is on.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	Marker > M→Ref Level
<b>Example</b>	:CALCulate:MARKer2:RLEVel

---

<b>Command Format</b>	<b>:CALCulate:MARKer[1] 2 3 4 5 6 7 8:DELTA[:SET]:SPAN</b>
<b>Instruction</b>	This command sets the span equal to the specified delta marker frequency. This command can be only used in DELTA BAND marker mode, Reference Command:CALCulate:MARKer[1] 2 3 4 5 6 7 8:MODE
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	Marker > Δ M→Span
<b>Example</b>	:CALCulate:MARKer2:DELTA:SPAN

---

<b>Command Format</b>	<b>:CALCulate:MARKer[1] 2 3 4 5 6 7 8:DELTA[:SET]:CENTer</b>
<b>Instruction</b>	This command sets the center frequency equal to the specified delta marker frequency. This command can be only used in DELTA BAND marker mode, Reference Command:CALCulate:MARKer[1] 2 3 4 5 6 7 8:MODE
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None

---



---

<b>Default</b>	None
<b>Menu</b>	Marker > Δ M→CF
<b>Example</b>	:CALCulate:MARKer3:DELTA:CENTer

---

<b>Command Format</b>	<b>:CALCulate:MARKer:PEAK:SEARch:MODE MAXimum MINimum</b> <b>:CALCulate:MARKer:PEAK:SEARch:MODE?</b>
<b>Instruction</b>	This is for the analyzer's internal peak identification routine to recognize a signal as a peak.
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	MAXimum MINimum
<b>Return</b>	Enumeration
<b>Default</b>	MAXimum
<b>Menu</b>	Peak > Search Config > Peak Type
<b>Example</b>	:CALCulate:MARKer:PEAK:SEARch:MODE MINimum

---

<b>Command Format</b>	<b>:CALCulate:MARKer:PEAK:SORT FREQUency  AMPLitude</b> <b>:CALCulate:MARKer:PEAK:SORT?</b>
<b>Instruction</b>	Set the type of peak sort by Get the type of peak sort by
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	FREQUency: Frequency AMPLitude: Amplitude
<b>Return</b>	Enumeration: FREQ AMPL
<b>Default</b>	AMPL
<b>Menu</b>	Peak > Search Config > Sort By
<b>Example</b>	:CALCulate:MARKer:PEAK:SORT FREQ

---

<b>Command Format</b>	<b>:CALCulate:MARKer:PEAK:THReshold &lt;value&gt;</b> <b>:CALCulate:MARKer:PEAK:THReshold?</b>
<b>Instruction</b>	Specifies the minimum signal level for the analyzers internal peak identification routine to recognize a signal as a peak. This applies to all traces and all windows. Gets the minimum signal level for the analyzers internal peak identification routine to recognize a signal as a peak.
<b>Parameter Type</b>	Float, unit: dBm
<b>Parameter Range</b>	-200.0 dBm~ 200.0 dBm
<b>Return</b>	Float, unit: dBm

---

## SIGLENT

---

<b>Default</b>	-160.0 dBm
<b>Menu</b>	Peak > Search Config > Peak Threshold
<b>Example</b>	:CALCulate:MARKer:PEAK:THReshold -50

---

<b>Command Format</b>	:CALCulate:MARKer:PEAK:EXCursion <value> :CALCulate:MARKer:PEAK:EXCursion?
<b>Instruction</b>	Specifies the minimum signal excursion above the threshold for the internal peak identification routine to recognize a signal as a peak.
<b>Parameter Type</b>	Float, unit: dB
<b>Parameter Range</b>	0 ~ 200.0dB
<b>Return</b>	Float, unit: dB
<b>Default</b>	0 dB
<b>Menu</b>	Peak > Search Config > Peak Excursion
<b>Example</b>	:CALCulate:MARKer:PEAK:EXCursion 10

---

<b>Command Format</b>	:CALCulate:MARKer:PEAK:TABLE ON OFF 0 1 :CALCulate:MARKer:PEAK:TABLE?
<b>Instruction</b>	Toggles the peak table between on and off. Gets the status of the peak table.
<b>Parameter Type</b>	Boolean
<b>Parameter Range</b>	ON OFF 0 1
<b>Return</b>	0 1
<b>Default</b>	0
<b>Menu</b>	Peak > Peak Table

---

<b>Command Format</b>	:CALCulate:PEAK:TABLE?
<b>Instruction</b>	Get peak table data.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	String
<b>Default</b>	None
<b>Menu</b>	Peak > Peak Table
<b>Example</b>	:CALCulate:PEAK:TABLE?

---

<b>Command Format</b>	<b>:CALCulate:MARKer[1] 2 3 4 5 6 7 8:CPEak[:STATE] OFF ON 0 1</b> <b>:CALCulate:MARKer[1] 2 3 4 5 6 7 8:CPEak[:STATE]?</b>
<b>Instruction</b>	Toggles the continuous peak search function between on and off. Gets the continuous peak search function state.
<b>Parameter Type</b>	Boolean
<b>Parameter Range</b>	OFF ON 0 1
<b>Return</b>	0 1
<b>Default</b>	None
<b>Menu</b>	Peak > Cont Peak
<b>Example</b>	:CALCulate:MARKer1:CPEak ON

<b>Command Format</b>	<b>:CALCulate:MARKer[1] 2 3 4 5 6 7 8:MAXimum</b>
<b>Instruction</b>	Performs a peak search based on the search mode settings. (based on the search mode settings, include: peak search mode, peak threshold and peak excursion, Reference Commands: :CALCulate:MARKer:PEAK:SEARch:MODE :CALCulate:MARKer:PEAK:THReshold :CALCulate:MARKer:PEAK: EXCursion)
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	Peak
<b>Example</b>	:CALCulate:MARKer4:MAXimum

<b>Command Format</b>	<b>:CALCulate:MARKer[1] 2 3 4 5 6 7 8:MAXimum:NEXT</b>
<b>Instruction</b>	Places the selected marker on the next highest signal peak of the current marked peak. (based on the search mode settings, include: peak search mode, peak threshold and peak excursion, Reference Commands: :CALCulate:MARKer:PEAK:SEARch:MODE :CALCulate:MARKer:PEAK:THReshold :CALCulate:MARKer:PEAK: EXCursion)
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None

## SIGLENT

---

<b>Default</b>	None
<b>Menu</b>	Peak > Next Peak
<b>Example</b>	:CALCulate:MARKer1:MAXimum:NEXT

---

<b>Command Format</b>	<b>:CALCulate:MARKer[1] 2 3 4 5 6 7 8:MAXimum:LEFT</b>
-----------------------	--

<b>Instruction</b>	Places the selected marker on the next highest signal peak to the left of the current marked peak. (based on the search mode settings, include: peak search mode, peak threshold and peak excursion, Reference Commands: :CALCulate:MARKer:PEAK:SEARch:MODE :CALCulate:MARKer:PEAK:THReshold :CALCulate:MARKer:PEAK: EXCursion)
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	Peak > Next Left Peak
<b>Example</b>	:CALCulate:MARKer1:MAXimum:LEFT

---

<b>Command Format</b>	<b>:CALCulate:MARKer[1] 2 3 4 5 6 7 8:MAXimum:RIGHT</b>
-----------------------	---

<b>Instruction</b>	Places the selected marker on the next highest signal peak to the right of the current marked peak. (based on the search mode settings, include: peak search mode, peak threshold and peak excursion, Reference Commands: :CALCulate:MARKer:PEAK:SEARch:MODE :CALCulate:MARKer:PEAK:THReshold :CALCulate:MARKer:PEAK: EXCursion)
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	Peak > Next Right Peak
<b>Example</b>	:CALCulate:MARKer1:MAXimum:RIGHT

---

<b>Command Format</b>	<b>:CALCulate:MARKer[1] 2 3 4 5 6 7 8:CPSearch</b>
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<b>Instruction</b>	Positions a pair of delta markers on the highest and lowest points on the trace.
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<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	Peak > Peak Peak
<b>Example</b>	:CALCulate:MARKer1:CPSearch

---

<b>Command Format</b>	:CALCulate:MARKer[1] 2 3 4 5 6 7 8:FUNCTion OFF FCOunt NOISe NDB :CALCulate:MARKer[1] 2 3 4 5 6 7 8:FUNCTion?
<b>Instruction</b>	This command selects the marker function for the designated marker. Gets the selected marker function for the designated marker.
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	OFF: refers to the normal function. FCOunt: refers to the frequency counter function. NOISe: refers to the noise measurement function. NDB: refers to the N dB bandwidth function.
<b>Return</b>	Enumeration
<b>Default</b>	OFF
<b>Menu</b>	Marker Fn
<b>Example</b>	:CALCulate:MARK1:FUNCTion FCOunt

---

<b>Command Format</b>	:CALCulate:MARKer:FCOunt[:STATe] ON OFF 0 1
<b>Instruction</b>	To set the frequency counter status
<b>Parameter Type</b>	Boolean
<b>Parameter Range</b>	ON OFF 0 1
<b>Return</b>	0 1
<b>Default</b>	0
<b>Menu</b>	Marker Fn > Freq Counter
<b>Example</b>	:CALCulate:MARK:FCOunt 1

---

<b>Command Format</b>	:CALCulate:MARKer:FCOunt:X?
<b>Instruction</b>	To query the frequency counter
<b>Parameter Type</b>	None

---

## SIGLENT

---

<b>Parameter Range Return</b>	None
<b>Default</b>	None
<b>Menu</b>	Marker Fn > Freq Counter
<b>Example</b>	:CALCulate:MARK:FCOut:X?

---

<b>Command Format</b>	:CALCulate:MARKer[1] 2 3 4 5 6 7 8:BANDwidth:RESult?
-----------------------	--

<b>Instruction</b>	Gets the result of N dB bandwidth measurement.
--------------------	--

<b>Parameter Type</b>	None
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<b>Parameter Range</b>	None
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<b>Return</b>	Float
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<b>Default</b>	None
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<b>Menu</b>	Marker Fn > N dB BW
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<b>Example</b>	:CALCulate:MARK1:BANDwidth:RESult?
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<b>Command Format</b>	:CALCulate:MARKer[1] 2 3 4 5 6 7 8:BANDwidth:NDB <value> :CALCulate:MARKer[1] 2 3 4 5 6 7 8:BANDwidth:NDB?
-----------------------	---

<b>Instruction</b>	Sets the reference value of N dB bandwidth measurement. Gets the reference value of N dB bandwidth measurement.
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<b>Parameter Type</b>	Float
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<b>Parameter Range</b>	-100dB ~ 100dB
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<b>Return</b>	Float
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<b>Default</b>	-3 dB
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<b>Menu</b>	Marker Fn > N dB BW
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<b>Example</b>	:CALCulate:MARK1:BANDwidth:NDB 10
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<b>Command Format</b>	:CALCulate:MARKer[1] 2 3 4 5 6 7 8:X:READout FREQuency TIME PERiod :CALCulate:MARKer[1] 2 3 4 5 6 7 8:X:READout?
-----------------------	--

<b>Instruction</b>	Toggles the marker X-Axis readout between frequency, time and period. Gets the marker X-Axis readout type.
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<b>Parameter Type</b>	Enumeration
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<b>Parameter Range</b>	FREQuency TIME PERiod
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<b>Return</b>	Enumeration
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<b>Default</b>	FREQuency
<b>Menu</b>	Marker Fn > Read Out
<b>Example</b>	:CALCulate:MARKer1:X:READout FREQuency

---

<b>Command Format</b>	:CALCulate:MARKer:TRCKing[:STATe] OFF ON 0 1
<b>Instruction</b>	This command turns on/off signal track state. Gets signal track state.
<b>Parameter Type</b>	Boolean
<b>Parameter Range</b>	OFF ON 0 1
<b>Return</b>	0 1
<b>Default</b>	ON
<b>Menu</b>	Frequency > Signal Track
<b>Example</b>	:CALCulate:MARKer:TRCKing on

---

## 4.8 Limit Subsection

:CALCulate:LLINE:TEST:START  
 :CALCulate:LLINE:TEST:STOP  
 :CALCulate:LLINE:TEST:STATe?  
 :CALCulate:LLINE[1]|2:STATe  
 :CALCulate:LLINE[1]|2:TYPE  
 :CALCulate:LLINE[1]|2:MODE  
 :CALCulate:LLINE[1]|2:Y  
 :CALCulate:LLINE[1]|2:DATA  
 :CALCulate:LLINE[1]|2:ADD  
 :CALCulate:LLINE[1]|2:DELeTe  
 :CALCulate:LLINE[1]|2:ALL:DELeTe  
 :CALCulate:LLINE:CONTrol:DOMain  
 :CALCulate:LLINE:CONTrol:BEEP  
 :CALCulate:LLINE:FAIL?  
 :CALCulate:LLINE:FAIL:STOP

<b>Command Format</b>	:CALCulate:LLINE:TEST:START
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## SIGLENT

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<b>Instruction</b>	Sets limit test start.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	Limit > Test
<b>Example</b>	:CALCulate:LLINe:TEST:START

---

<b>Command Format</b>	<b>:CALCulate:LLINe:TEST:STOP</b>
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<b>Instruction</b>	Sets limit test stop.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	Limit > Test
<b>Example</b>	:CALCulate:LLINe:TEST:STOP

---

<b>Command Format</b>	<b>:CALCulate:LLINe:TEST:STATe?</b>
-----------------------	-------------------------------------

<b>Instruction</b>	Gets limit test state.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	0 1
<b>Default</b>	OFF
<b>Menu</b>	Limit > Test
<b>Example</b>	:CALCulate:LLINe:TEST:STAT?

---

<b>Command Format</b>	<b>:CALCulate:LLINe[1]2:STATe OFF ON 0 1</b> <b>:CALCulate:LLINe[1]2:STATe?</b>
-----------------------	--

<b>Instruction</b>	Sets limit line state. Gets limit line state.
<b>Parameter Type</b>	Boolean
<b>Parameter</b>	OFF ON 0 1

---



---

<b>Range</b>	
<b>Return</b>	0 1
<b>Default</b>	OFF
<b>Menu</b>	Limit > Limit1 2
<b>Example</b>	:CALCulate:LLINe1:STATe OFF

---

<b>Command Format</b>	:CALCulate:LLINe[1] 2:TYPE UPPer LOWer :CALCulate:LLINe[1] 2:TYPE?
<b>Instruction</b>	Mode sets a limit line to be either an upper or lower type limit line. An upper line will be used as the maximum allowable value when comparing with the data. Gets limit type.
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	UPPer LOWer
<b>Return</b>	Enumeration
<b>Default</b>	The default setting of LINe1 is UPPer, the default setting of LINe2 is LOWer
<b>Menu</b>	Limit > Limit1 2 Edit > Type
<b>Example</b>	:CALCulate:LLINe1: TYPE LOWer

---

<b>Command Format</b>	:CALCulate:LLINe[1] 2:MODE LINE POINT :CALCulate:LLINe[1] 2:MODE?
<b>Instruction</b>	Sets limit mode Gets limit mode
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	LINE POINT
<b>Return</b>	Enumeration
<b>Default</b>	LINE
<b>Menu</b>	Limit > Limit1 2 Edit > Mode
<b>Example</b>	:CALCulate:LLINe1: MODE POINT

---

<b>Command Format</b>	:CALCulate:LLINe[1] 2:Y <value> :CALCulate:LLINe[1] 2:Y?
<b>Instruction</b>	Sets the Y-axis value of a limit line. Limit line Y-axis value is set independently and is not affected by the X-axis units. Gets the Y-axis value of a limit line.
<b>Parameter Type</b>	Float
<b>Parameter Range</b>	-400 dBm~330 dBm

---

## SIGLENT

---

### Range

<b>Return</b>	Float
<b>Default</b>	0dBm
<b>Menu</b>	Limit > Limit1 2 Edit > Amplitude
<b>Example</b>	:CALCulate:LLINe1:Y 5dBm

---

<b>Command Format</b>	:CALCulate:LLINe[1] 2:DATA <x-axis>,<ampl>{,<x-axis>, <ampl>} :CALCulate:LLINe[1] 2:DATA?
-----------------------	--

<b>Instruction</b>	Use this command to define the limit points. Gets the defined limit points.
--------------------	--

<b>Parameter Type</b>	X-axis: Float Amplitude: Float
<b>Parameter Range</b>	X-axis: 0~1.5GHz Amplitude: -400 dBm~330 dBm
<b>Return</b>	X-axis: Float Amplitude: Float
<b>Default</b>	X-axis: -1Hz Amplitude: 0 dBm
<b>Menu</b>	Limit > Limit1 2 Edit
<b>Example</b>	:CALC:LLINe1:DATA 10000000,-20,20000000,-30

---

<b>Command Format</b>	:CALCulate:LLINe[1] 2:ADD <x-axis>,<ampl>
-----------------------	---

<b>Instruction</b>	Add limit point data
--------------------	----------------------

<b>Parameter Type</b>	X-axis: Float Amplitude: Float
<b>Parameter Range</b>	X-axis: 0~1.5GHz Amplitude: None
<b>Return</b>	X-axis: Float Amplitude: Float
<b>Default</b>	X-axis: -1Hz Amplitude: 0 dBm
<b>Menu</b>	Limit > Limit1 2 Edit
<b>Example</b>	:CALCulate:LLINe1:ADD 10000000,-20

---

<b>Command Format</b>	:CALCulate:LLINe[1] 2:DELeTE <number>
-----------------------	---------------------------------------

<b>Instruction</b>	Use this command to delete the assigned limit point.
--------------------	--

<b>Parameter Type</b>	Integer
<b>Parameter Range</b>	None
<b>Return</b>	None

---

---

<b>Default</b>	None
<b>Menu</b>	Limit > Limit1 2 Edit > Del Point
<b>Example</b>	:CALCulate:LLINe1:DELeTe 2

---

<b>Command Format</b>	<b>:CALCulate:LLINe[1] 2:ALL:DELeTe</b>
<b>Instruction</b>	Use this command to define all the limits points.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	Limit > Limit1 2 Edit > Del All
<b>Example</b>	:CALCulate:LLINe2:ALL:DELeTe

---

<b>Command Format</b>	<b>:CALCulate:LLINe:CONTRol:DOMain FREQUency TIME :CALCulate:LLINe:CONTRol:DOMain?</b>
<b>Instruction</b>	Toggles the limit X-axis value between frequency and time. Gets the limit X-axis unit.
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	FREQUency TIME
<b>Return</b>	Enumeration
<b>Default</b>	FREQUency
<b>Menu</b>	Limit > Setup > X Axis
<b>Example</b>	:CALCulate:LLINe:CONTRol:DOMain FREQUency

---

<b>Command Format</b>	<b>:CALCulate:LLINe:CONTRol:BEEP OFF ON 0 1 :CALCulate:LLINe:CONTRol:BEEP?</b>
<b>Instruction</b>	Use this command to turn on/off the limit beep status. Gets limit beep state.
<b>Parameter Type</b>	Boolean
<b>Parameter Range</b>	OFF ON 0 1
<b>Return</b>	0 1
<b>Default</b>	ON
<b>Menu</b>	Limit > Setup > Buzzer
<b>Example</b>	:CALCulate:LLINe:CONTRol:BEEP OFF

---

<b>Command Format</b>	<b>:CALCulate:LLINe:FAIL?</b>
<b>Instruction</b>	This query returns the limits pass/failed result. If the test result fails, this command will get result FAIL. If the test result passes, it will get result PASS.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	PASS FAIL
<b>Default</b>	None
<b>Menu</b>	None
<b>Example</b>	:CALCulate:LLINe:FAIL?

---

<b>Command Format</b>	<b>:CALCulate:LLINe:FAIL:STOP OFF ON 0 1</b> <b>:CALCulate:LLINe:FAIL:STOP?</b>
<b>Instruction</b>	Sets whether to stop the test if the test fails. Gets whether to stop the test if the test fails.
<b>Parameter Type</b>	Boolean
<b>Parameter Range</b>	OFF ON 0 1
<b>Return</b>	0 1
<b>Default</b>	OFF
<b>Menu</b>	Limit > Setup > Fail to stop
<b>Example</b>	:CALCulate:LLINe:FAIL:STOP OFF

---

## 4.9 Measurement Subsystem

ACPR

CHP

OBW

T-Power

SPECTrogram

TOI

CNR

Harmonics

:INSTrument:MEASure

<b>Command Format</b>	<b>:INSTrument:MEASure OFF ACPR CHPower OBW TPOWer  SPECtrogram TOI :INSTrument:MEASure?</b>
<b>Instruction</b>	Sets measure mode. Gets measure mode.
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	OFF: measure off ACPR: ACPR CHPower: Channel Power OBW: Occupied BW TPOWer: T-POWer SPECtrogram: Spectrogram Monitor TOI: Third-order Intercept Point HARMonics: Harmonic analysis CNR: Carrier Noise Ratio
<b>Return</b>	Enumeration
<b>Default</b>	OFF
<b>Menu</b>	Measure
<b>Example</b>	:INSTrument:MEASure ACPR

#### 4.9.1 ACPR Subsection

[\[:SENSe\]:ACPRatio:BWIDth:INTegration](#)

[\[:SENSe\]:ACPRatio:OFFSet:BWIDth\[:INTegration\]](#)

[\[:SENSe\]:ACPRatio:OFFSet\[:FREQuency\]](#)

[:MEASure:ACPRatio:MAIN?](#)

[:MEASure:ACPRatio:LOWer:POWer?](#)

[:MEASure:ACPRatio:LOWer?](#)

[:MEASure:ACPRatio:UPPer:POWer?](#)

[:MEASure:ACPRatio:UPPer?](#)

<b>Command Format</b>	<b>[:SENSe]:ACPRatio:BWIDth:INTegration &lt;freq&gt; [:SENSe]:ACPRatio:BWIDth:INTegration?</b>
<b>Instruction</b>	Specifies the range of integration used in calculating the power in the main channel. Gets the range of integration used in calculating the power in the main channel.
<b>Parameter Type</b>	Float, unit: Hz, kHz, MHz, GHz
<b>Parameter Range</b>	100 Hz~1.5 GHz
<b>Return</b>	Float, unit: Hz
<b>Default</b>	1MHz
<b>Menu</b>	Meas > ACPR > Meas Setup > Main Channel

## SIGLENT

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<b>Example</b>	INSTrument:MEASure ACPR :ACPRatio:BWIDth:INTegration 20 MHz
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<b>Command Format</b>	<b>[[:SENSE]:ACPRatio:OFFSet:BWIDth[:INTegration] &lt;freq&gt;[:SENSE]:ACPRatio:OFFSet:BWIDth[:INTegration]?</b>
<b>Instruction</b>	Specifies the bandwidth used in calculating the power in the adjacent channel. Gets the bandwidth used in calculating the power in the adjacent channel.
<b>Parameter Type</b>	Float, unit: Hz, kHz, MHz, GHz
<b>Parameter Range</b>	100 Hz~1.5 GHz
<b>Return</b>	Float, unit: Hz
<b>Default</b>	1MHz
<b>Menu</b>	Meas > ACPR > Meas Setup > Adjacent Chn
<b>Example</b>	:ACPRatio:OFFSet:BWIDth 20 MHz

---

<b>Command Format</b>	<b>[[:SENSE]:ACPRatio:OFFSet[:FREQUENCY] &lt;freq&gt;[:SENSE]:ACPRatio:OFFSet[:FREQUENCY]?</b>
<b>Instruction</b>	Sets the space value between the center frequency of main channel power and that of the adjacent channel power. Gets adjacent channel space
<b>Parameter Type</b>	Float, unit: Hz, kHz, MHz, GHz
<b>Parameter Range</b>	100 Hz~700 MHz
<b>Return</b>	Float, unit: Hz
<b>Default</b>	3MHz
<b>Menu</b>	Meas > ACPR > Meas Setup > Adj Chn Space
<b>Example</b>	:ACPRatio:OFFSets 20 MHz

---

<b>Command Format</b>	<b>:MEASure:ACPRatio:MAIN?</b>
<b>Instruction</b>	Return the main channel power of ACPR measurement.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	Float, unit: dBm
<b>Default</b>	None
<b>Menu</b>	Meas > ACPR
<b>Example</b>	:MEASure:ACPRatio:MAIN?

---

---

<b>Command Format</b>	<b>:MEASure:ACPRatio:LOWer:POWer?</b>
<b>Instruction</b>	Return the lower adjacent channel power of ACPR measurement.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	Float, unit: dBm
<b>Default</b>	None
<b>Menu</b>	Meas > ACPR
<b>Example</b>	:MEASure:ACPRatio:LOWer:POWer?

---

<b>Command Format</b>	<b>:MEASure:ACPRatio:LOWer?</b>
<b>Instruction</b>	Return the lower adjacent channel power to main channel power ratio.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	Float, unit: dBm
<b>Default</b>	None
<b>Menu</b>	Meas > ACPR
<b>Example</b>	:MEASure:ACPRatio:LOWer?

---

<b>Command Format</b>	<b>:MEASure:ACPRatio:UPPer:POWer?</b>
<b>Instruction</b>	Return the upper adjacent channel power of ACPR measurement.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	Float, unit: dBm
<b>Default</b>	None
<b>Menu</b>	Meas > ACPR
<b>Example</b>	:MEASure:ACPRatio:UPPer:POWer?

---

<b>Command Format</b>	<b>:MEASure:ACPRatio:UPPer?</b>
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## SIGLENT

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<b>Instruction</b>	Return the upper adjacent channel power to main channel power ratio.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	Float
<b>Default</b>	None
<b>Menu</b>	Meas > ACPR
<b>Example</b>	:MEASure:ACPRatio:UPPer?

---

### 4.9.2 CHP Subsection

**[[:SENSe]:CHPower:BWIDth:INTEgration**

**[[:SENSe]:CHPower:FREQuency:SPAN:POWer**

**:MEASure:CHPower?**

**:MEASure:CHPower:CHPower?**

**:MEASure:CHPower:DENSity?**

<b>Command Format</b>	<b>[[:SENSe]:CHPower:BWIDth:INTEgration &lt;freq&gt;</b> <b>[[:SENSe]:CHPower:BWIDth:INTEgration?</b>
<b>Instruction</b>	Specifies the integration bandwidth to calculate the power. Gets the integration bandwidth.
<b>Parameter Type</b>	Float, unit: Hz, kHz, MHz, GHz
<b>Parameter Range</b>	100 Hz~1.5 GHz Zero Span: 0~1.5 GHz
<b>Return</b>	Float, unit: Hz
<b>Default</b>	2 MHz
<b>Menu</b>	Meas > Ch Power > Meas Setup > Integration BW
<b>Example</b>	:CHPower:BWIDth:INTEgration 1.0 GHz

---

<b>Command Format</b>	<b>[[:SENSe]:CHPower:FREQuency:SPAN:POWer</b>
<b>Instruction</b>	Sets the analyzer span for the channel power measurement. Be sure the span is set larger than the integration bandwidth.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	Meas > Ch Power > Meas Setup > Span

---



---

**Example** :CHPower:FREQuency:SPAN:POWer

---

**Command Format** :MEASure:CHPower?

**Instruction** This command returns scalar results of main channel power, and power density.

**Parameter Type** None

**Parameter Range** None

**Return** Float, Channel Power unit: dBm

Float, Density unit: dBm/Hz

**Default** None

**Menu** Meas > Ch Power

**Example** :MEASure:CHPower?

---

**Command Format** :MEASure:CHPower:CHPower?

**Instruction** This command returns the value of the channel power in dBm units.

**Parameter Type** None

**Parameter Range** None

**Return** Float

**Default** None

**Menu** Meas > Ch Power

**Example** :MEASure:CHPower:CHPower?

---

**Command Format** :MEASure:CHPower:DENSity?

**Instruction** This command returns the value of the channel power density in dBm/Hz.

**Parameter Type** None

**Parameter Range** None

**Return** Float

**Default** None

**Menu** Meas > Ch Power

**Example** :MEASure:CHPower:DENSity?

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### 4.9.3 OBW Subsection

**[[:SENSe]:OBWidth:METHOD**

**[[:SENSe]:OBWidth:PERCent**

**[[:SENSe]:OBWidth:XDB**

**:MEASure:OBWidth?**

**:MEASure:OBWidth:OBWidth?**

**:MEASure:OBWidth:CENTroid?**

**:MEASure:OBWidth:OBWidth:FERRor?**

<b>Command Format</b>	<b>[[:SENSe]:OBWidth:METHOD PERCent DBC [:SENSe]:OBWidth:METHOD?</b>
<b>Instruction</b>	This command toggles the method of OBW measurement between percent and dBc. Gets the method of OBW measurement.
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	PERCent DBC
<b>Return</b>	Enumeration
<b>Default</b>	PERCent
<b>Menu</b>	Meas > Occupied BW > Meas Setup > Method
<b>Example</b>	:OBW:METHOD PERCent

<b>Command Format</b>	<b>[[:SENSe]:OBWidth:PERCent &lt;para&gt; [:SENSe]:OBWidth:PERCent?</b>
<b>Instruction</b>	Edit the percentage of signal power used when determining the occupied bandwidth. Press {%} to set the percentage ranging from 10.00% to 99.99%. Gets the percentage of signal power.
<b>Parameter Type</b>	Float
<b>Parameter Range</b>	10~99.99
<b>Return</b>	Float
<b>Default</b>	99
<b>Menu</b>	Meas > Occupied BW > Meas Setup > %
<b>Example</b>	:OBW:PERCent 50

<b>Command Format</b>	<b>[[:SENSe]:OBWidth:XDB &lt;value&gt; [:SENSe]:OBWidth:XDB?</b>
<b>Instruction</b>	Specify the power level used to determine the emission bandwidth as the number of dB down from the highest signal point, within the occupied

---

	bandwidth span. Gets dBc value.
<b>Parameter Type</b>	Float
<b>Parameter Range</b>	0.1~100
<b>Return</b>	Float
<b>Default</b>	26
<b>Menu</b>	Meas > Occupied BW > Meas Setup > dBc
<b>Example</b>	:OBWidth:XDB 3

---

<b>Command Format</b>	<b>:MEASure:OBWidth?</b>
<b>Instruction</b>	Use this command to query the occupied bandwidth and bandwidth centroid according to the method you set.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	Float, unit: Hz
<b>Default</b>	None
<b>Menu</b>	Meas > Occupied BW
<b>Example</b>	:MEASure:OBW?

---

<b>Command Format</b>	<b>:MEASure:OBWidth:OBWidth?</b>
<b>Instruction</b>	Use this command to query the occupied bandwidth according to the method you set. Query Centroid Result.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	Float, unit: Hz
<b>Default</b>	None
<b>Menu</b>	Meas > Occupied BW
<b>Example</b>	:MEASure:OBW:OBW?

---

<b>Command Format</b>	<b>:MEASure:OBWidth:CENTRoid?</b>
<b>Instruction</b>	Use this command to query the occupied bandwidth according to the method you set.

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<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	Float, unit: Hz
<b>Default</b>	None
<b>Menu</b>	Meas > Occupied BW
<b>Example</b>	:MEASure:OBW:CENTroid?

---

<b>Command Format</b>	<b>:MEASure:OBWidth:OBWidth:FERRor?</b>
<b>Instruction</b>	Uses this command to query transmit frequency error.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	Float, unit: Hz
<b>Default</b>	None
<b>Menu</b>	Meas > Occupied BW
<b>Example</b>	:MEASure:OBWidth:OBWidth:FERRor?

---

### 4.9.4 Subsection T-power(T-Power)

[\[:SENSe\]:TPOWer:FREQuency:CENTer](#)

[\[:SENSe\]:TPOWer:LLIMit](#)

[\[:SENSe\]:TPOWer:RLIMit](#)

[:MEASure:TPOWer?](#)

<b>Command Format</b>	<b>[:SENSe]:TPOWer:FREQuency:CENTer &lt;freq&gt;</b> <b>[:SENSe]:TPOWer:FREQuency:CENTer?</b>
<b>Instruction</b>	Sets T-power center frequency. Gets T-power center frequency.
<b>Parameter Type</b>	Float, unit: Hz, kHz, MHz, GHz
<b>Parameter Range</b>	50 Hz~1.499999950 GHz
<b>Return</b>	Zero Span: 0~1.5 GHz Float, unit: Hz
<b>Default</b>	750MHz
<b>Menu</b>	Meas > T-power > Meas Setup > Center Freq
<b>Example</b>	:TPOWer:FREQuency:CENTer 15kHz

---

<b>Command Format</b>	<b>[[:SENSe]:TPOWer:LLIMit &lt;time&gt;[:SENSe]:TPOWer:LLIMit?</b>
<b>Instruction</b>	Sets T-power start line. Gets T-power start line.
<b>Parameter Type</b>	Float, unit: s
<b>Parameter Range</b>	0 ~ 1000 s
<b>Return</b>	Float, time unit: s
<b>Default</b>	0
<b>Menu</b>	Meas > T-power > Meas Setup > Start Line
<b>Example</b>	:TPOWer:LLIMit 0.01

<b>Command Format</b>	<b>[[:SENSe]:TPOWer:RLIMit &lt;time&gt;[:SENSe]:TPOWer:RLIMit?</b>
<b>Instruction</b>	Sets T-power stop line. Gets T-power stop line.
<b>Parameter Type</b>	Float, unit: s
<b>Parameter Range</b>	0 ~ 1000 s
<b>Return</b>	Float, time unit: s
<b>Default</b>	20ms
<b>Menu</b>	Meas > T-power > Meas Setup > Stop Line
<b>Example</b>	:TPOWer:RLIMit 0.02

<b>Command Format</b>	<b>:MEASure:TPOWer?</b>
<b>Instruction</b>	Query the result of T-power measurement.
<b>Parameter Type</b>	Float, unit: dBm
<b>Parameter Range</b>	None
<b>Return</b>	Float, unit: dBm
<b>Default</b>	None
<b>Menu</b>	Meas > T-power
<b>Example</b>	:MEASure:TPOWer?

## 4.9.5 Spectrum Monitor (SPECTrogram)

[\[:SENSe\]:SPECTrogram:STATe](#)

[\[:SENSe\]:SPECTrogram:REStart](#)

<b>Command Format</b>	<b>[[:SENSe]:SPECtrogram:STATe RUN PAUSE [:SENSe]:SPECtrogram:STATe?</b>
<b>Instruction</b>	Sets spectrogram state. Gets spectrogram state.
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	RUN: Start PAUSE: Pause
<b>Return</b>	RUN PAUSE
<b>Default</b>	RUN
<b>Menu</b>	Meas > Spectrum Monitor > Meas Setup > Spectrogram
<b>Example</b>	:SPECtrogram:STATe PAUSE

---

<b>Command Format</b>	<b>[[:SENSe]:SPECtrogram:REStart</b>
<b>Instruction</b>	Restart spectrogram.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	Meas > Spectrum Monitor > Meas Setup > Restart
<b>Example</b>	:SPECtrogram:REStart

---

## 4.9.6 Third-order Intercept Point (TOI)

**:MEASure:TOI?**

**:MEASure:TOI:IP3?**

<b>Command Format</b>	<b>:MEASure:TOI?</b>
<b>Instruction</b>	Gets the result of Third-order Intercept Point.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	Float
<b>Default</b>	None
<b>Menu</b>	Meas > TOI
<b>Example</b>	:MEASure:TOI?

---

<b>Command Format</b>	<b>:MEASure:TOI:IP3?</b>
<b>Instruction</b>	Gets the min intercept of the Lower TOI(Lower 3rd) and the Upper TOI(Upper 3rd).
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	Float
<b>Default</b>	None
<b>Menu</b>	Meas > TOI
<b>Example</b>	:MEASure:TOI:IP3?

## 4.9.7 Carrier Noise Ratio(CNR)

**[[:SENSE]:CNRatio:BANDwidth:INTEgration**

**[[:SENSE]:CNRatio:BANDwidth:NOISe**

**[[:SENSE]:CNRatio:OFFSet**

**:MEASure:CNRatio?**

**:MEASure:CNRatio:CARRier?**

**:MEASure:CNRatio:NOISe?**

<b>Command Format</b>	<b>[[:SENSE]:CNRatio:BANDwidth:INTEgration &lt;freq&gt; [[:SENSE]:CNRatio:BANDwidth:INTEgration?</b>
<b>Instruction</b>	Sets Carrier BW Gets Carrier BW
<b>Parameter Type</b>	Float, Unit: Hz, kHz, MHz, GHz
<b>Parameter Range</b>	100 Hz ~ 6.3999999 GHz
<b>Return</b>	Float, Unit: Hz
<b>Default</b>	3 MHz
<b>Menu</b>	Meas > CNR > Carrier BW
<b>Example</b>	:CNRatio:BANDwidth:INTEgration 1.0 GHz

<b>Command Format</b>	<b>[[:SENSE]:CNRatio:BANDwidth:NOISe &lt;freq&gt; [[:SENSE]:CNRatio:BANDwidth:NOISe?</b>
<b>Instruction</b>	Sets Noise BW Gets Noise BW
<b>Parameter Type</b>	Float, Unit: Hz, kHz, MHz, GHz
<b>Parameter Range</b>	100 Hz ~ 6.3999999 GHz

## SIGLENT

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<b>Return</b>	Float, Unit: Hz
<b>Default</b>	3 MHz
<b>Menu</b>	Meas > CNR > Noise BW
<b>Example</b>	:CNRatio:BANDwidth:NOISe 1 MHz

---

<b>Command Format</b>	<b>[[:SENSE]:CNRatio:OFFSet &lt;freq&gt;[:SENSE]:CNRatio:OFFSet?</b>
<b>Instruction</b>	Sets Freq Offset Gets Freq Offset
<b>Parameter Type</b>	Float, Unit: Hz, kHz, MHz, GHz
<b>Parameter Range</b>	-3.1999999 GHz ~ 3.1999999 GHz
<b>Return</b>	Float, Unit: Hz
<b>Default</b>	3 MHz
<b>Menu</b>	Meas > CNR > Freq Offset
<b>Example</b>	:CNRatio:OFFSet 1 MHz

---

<b>Command Format</b>	<b>:MEASure:CNRatio?</b>
<b>Instruction</b>	Query CNR
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	Float
<b>Default</b>	None
<b>Menu</b>	Meas > CNR
<b>Example</b>	:MEASure:TOI?

---

<b>Command Format</b>	<b>:MEASure:CNRatio:CARRier?</b>
<b>Instruction</b>	Query Carrier Power
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	Float
<b>Default</b>	None

---



---

<b>Menu</b>	Meas > CNR
<b>Example</b>	:MEASure:CNRatio:CARRier?

---

<b>Command Format</b>	<b>:MEASure:CNRatio:NOISe?</b>
<b>Instruction</b>	Query Noise Power
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	Float
<b>Default</b>	None
<b>Menu</b>	Meas > CNR
<b>Example</b>	:MEASure:CNRatio:NOISe?

---

## 4.9.8 Harmonics(Harmonics)

[:SENSe]:HARMonics:FREQuency:FUNDamental  
[:SENSe]:HARMonics:FREQuency:STEP[:INCRement]  
[:SENSe]:HARMonics:FREQuency:FUNDamental:AUTO  
[:SENSe]:HARMonics:FREQuency:STEP[:INCRement]:AUTO  
[:SENSe]:HARMonics:NUMBER  
[:SENSe]:HARMonics:SElect

<b>Command Format</b>	<b>[:SENSe]:HARMonics:FREQuency:FUNDamental &lt;freq&gt;</b> <b>[:SENSe]:HARMonics:FREQuency:FUNDamental?</b>
<b>Instruction</b>	Sets Fundamental Freq Gets Fundamental Freq
<b>Parameter Type</b>	Float, Unit: Hz, kHz, MHz, GHz
<b>Parameter Range</b>	10M Hz ~ 1.6 GHz
<b>Return</b>	Float, Unit: Hz
<b>Default</b>	
<b>Menu</b>	Meas > Harmonics > Fundamental
<b>Example</b>	:HARMonics:FREQuency:FUNDamental 1.0 GHz

---

<b>Command Format</b>	<b>[:SENSe]:HARMonics:FREQuency:STEP[:INCRement] &lt;freq&gt;</b> <b>[:SENSe]:HARMonics:FREQuency:STEP[:INCRement]?</b>
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## SIGLENT

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<b>Instruction</b>	Set Frequency Step Get Frequency Step
<b>Parameter Type</b>	Float, Unit: Hz, kHz, MHz, GHz
<b>Parameter Range</b>	10M Hz ~ 3.19 GHz
<b>Return</b>	Float, Unit:Hz
<b>Default</b>	
<b>Menu</b>	Meas > Harmoniscs > Freq Step
<b>Example</b>	:HARMonics:FREQuency:STEP 1 MHz

---

<b>Command Format</b>	<b>[:SENSe]:HARMonics:FREQuency:FUNDamental:AUTO</b> <b>[:SENSe]:HARMonics:FREQuency:FUNDamental:AUTO?</b>
<b>Instruction</b>	Sets Fundamental Freq State Gets Fundamental Freq State
<b>Parameter Type</b>	Boolean
<b>Parameter Range</b>	OFF ON 0 1
<b>Return</b>	Boolean
<b>Default</b>	1
<b>Menu</b>	Meas > Harmonics > Fundamental
<b>Example</b>	:HARMonics:FREQuency:FUNDamental:AUTO on

---

<b>Command Format</b>	<b>[:SENSe]:HARMonics:FREQuency:STEP[:INCRement]:AUTO</b> <b>[:SENSe]:HARMonics:FREQuency:STEP[:INCRement]:AUTO?</b>
<b>Instruction</b>	Sets Freq step State Gets Freq step State
<b>Parameter Type</b>	Boolean
<b>Parameter Range</b>	OFF ON 0 1
<b>Return</b>	Boolean
<b>Default</b>	1
<b>Menu</b>	Meas > Harmonics > Freq Step
<b>Example</b>	:HARMonics:FREQuency:STEP:AUTO on

---

<b>Command Format</b>	<b>[:SENSe]:HARMonics:NUMBer</b> <b>[:SENSe]:HARMonics:NUMBer?</b>
<b>Instruction</b>	Sets Harmonic Num Gets Harmonic Num
<b>Parameter Type</b>	Integer

---

---

<b>Parameter Range</b>	2 ~ 10
<b>Return</b>	Integer
<b>Default</b>	10
<b>Menu</b>	Meas > Harmonics > Harmonic Num
<b>Example</b>	:HARMonics:NUMBer 2

---

<b>Command Format</b>	<b>[:SENSe]:HARMonics:SElect</b> <b>[:SENSe]:HARMonics:SElect?</b>
<b>Instruction</b>	Sets the Harmonic to be selected. Gets the Harmonic which is selected.
<b>Parameter Type</b>	Integer
<b>Parameter Range</b>	It will set select all Harmonics when the parameter is 0 0 ~ 10
<b>Return</b>	Integer
<b>Default</b>	0
<b>Menu</b>	Meas > Harmonics > Select Harmonic
<b>Example</b>	:HARMonics:SElect 4

---

## 4.10TG Subsystem

**:OUTPut[:STATe]**

**:SOURce:POWer[:LEVel][:IMMEDIATE][:AMPLitude]**

**:SOURce:CORRection:OFFSet**

**:CALCulate:NTData[:STATe]**

**:DISPlay:WINDow:TRACe:Y[:SCALe]:NRLevel**

**:DISPlay:WINDow:TRACe:Y[:SCALe]:NRPosition**

**:DISPlay:WINDow:NTTRace[:STATe]**

<b>Command Format</b>	<b>:OUTPut[:STATe] OFF ON 0 1</b> <b>:OUTPut[:STATe]?</b>
<b>Instruction</b>	Sets TG on-off. Gets TG state.
<b>Parameter Type</b>	Boolean
<b>Parameter Range</b>	OFF ON 0 1
<b>Return</b>	0 1
<b>Default</b>	0
<b>Menu</b>	TG > TG

---

## SIGLENT

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**Example** :OUTPut ON

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<b>Command Format</b>	<b>:SOURce:POWer[:LEVel][:IMMediate][:AMPLitude] &lt;value&gt;</b> <b>:SOURce:POWer[:LEVel][:IMMediate][:AMPLitude]?</b>
<b>Instruction</b>	Sets TG level. Gets TG level.
<b>Parameter Type</b>	Float, unit: dBm
<b>Parameter Range</b>	0 dBm ~ -20 dBm
<b>Return</b>	Float
<b>Default</b>	0 dBm
<b>Menu</b>	TG > TG Level
<b>Example</b>	:SOURce:POWer -20

---

<b>Command Format</b>	<b>:SOURce:CORRection:OFFSet &lt;value&gt;</b> <b>:SOURce:CORRection:OFFSet?</b>
<b>Instruction</b>	Sets TG level offsets. Gets TG level offsets.
<b>Parameter Type</b>	Float, unit: dBm
<b>Parameter Range</b>	200 dBm ~ -200 dBm
<b>Return</b>	Float
<b>Default</b>	0 dBm
<b>Menu</b>	TG > LeI OffSets
<b>Example</b>	:SOURce:CORRection:OFFSet 1

---

<b>Command Format</b>	<b>:CALCulate:NTData[:STATe] OFF ON 0 1</b> <b>:CALCulate:NTData[:STATe]?</b>
<b>Instruction</b>	Sets TG normalize on-off. Gets TG normalize state.
<b>Parameter Type</b>	Boolean
<b>Parameter Range</b>	OFF ON 0 1
<b>Return</b>	0 1
<b>Default</b>	0
<b>Menu</b>	TG > Normalize > Normalize
<b>Example</b>	:CALCulate:NTData ON

---

---

<b>Command Format</b>	<b>:DISPlay:WINDow:TRACe:Y[:SCALe]:NRLevel &lt;value&gt;</b> <b>:DISPlay:WINDow:TRACe:Y[:SCALe]:NRLevel?</b>
<b>Instruction</b>	Sets TG normalize reference level. Gets TG normalize reference level.
<b>Parameter Type</b>	Float, unit: dB
<b>Parameter Range</b>	-200 dB ~ 200 dB
<b>Return</b>	Float, unit: dB
<b>Default</b>	0 dB
<b>Menu</b>	TG > Normalize > Ref Lvl
<b>Example</b>	:DISPlay:WINDow:TRACe:Y:NRLevel 10

---

<b>Command Format</b>	<b>:DISPlay:WINDow:TRACe:Y[:SCALe]:NRPosition &lt;integer&gt;</b> <b>:DISPlay:WINDow:TRACe:Y[:SCALe]:NRPosition?</b>
<b>Instruction</b>	Sets TG normalize reference position. Gets TG normalize reference position.
<b>Parameter Type</b>	Integer
<b>Parameter Range</b>	0 ~ 100%
<b>Return</b>	Float
<b>Default</b>	100%
<b>Menu</b>	TG > Normalize > Position
<b>Example</b>	:DISPlay:WINDow:TRACe:Y:NRPosition 10

---

<b>Command Format</b>	<b>:DISPlay:WINDow:NTTRace[:STATe] OFF ON 0 1</b> <b>:DISPlay:WINDow:NTTRace[:STATe]?</b>
<b>Instruction</b>	Sets TG normalize reference trace on-off.
<b>Parameter Type</b>	Boolean
<b>Parameter Range</b>	OFF ON 0 1
<b>Return</b>	0 1
<b>Default</b>	0
<b>Menu</b>	TG > Normalize > Ref Trace
<b>Example</b>	:DISPlay:WINDow:NTTRace ON

---

## 4.11 Demod Subsystem

**[[:SENSe]:DEMod**

## SIGLENT

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**[[:SENSE]:DEMod:TIME**

**[[:SENSE]:DEMod:EPHone**

**[[:SENSE]:DEMod:VOLume**

<b>Command Format</b>	<b>[[:SENSE]:DEMod AM FM OFF [:SENSE]:DEMod?</b>
<b>Instruction</b>	Sets demod mode. Gets demod mode.
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	AM FM OFF
<b>Return</b>	Enumeration
<b>Default</b>	OFF
<b>Menu</b>	Demod
<b>Example</b>	:DEMod AM

---

<b>Command Format</b>	<b>[[:SENSE]:DEMod:TIME &lt;time&gt; [:SENSE]:DEMod:TIME?</b>
<b>Instruction</b>	Sets demod time. Gets demod time.
<b>Parameter Type</b>	Float, unit: ms, us, s
<b>Parameter Range</b>	5 ms ~1000 s
<b>Return</b>	Float, unit: s
<b>Default</b>	5 ms
<b>Menu</b>	Demod
<b>Example</b>	DEMod:TIME 5 ms

---

<b>Command Format</b>	<b>[[:SENSE]:DEMod:EPHone OFF ON 0 1 [:SENSE]:DEMod:EPHone?</b>
<b>Instruction</b>	Sets earphone on-off. Gets earphone on-off.
<b>Parameter Type</b>	Boolean
<b>Parameter Range</b>	OFF ON 0 1
<b>Return</b>	0 1
<b>Default</b>	OFF
<b>Menu</b>	Demod > Earphone
<b>Example</b>	:DEMod:EPHone ON

---

---

<b>Command Format</b>	<b>[[:SENSe]:DEMod:VOLume &lt;value&gt;[:SENSe]:DEMod:VOLume?</b>
<b>Instruction</b>	Sets volume value. Gets volume value.
<b>Parameter Type</b>	Integer
<b>Parameter Range</b>	0 ~ 10
<b>Return</b>	Integer
<b>Default</b>	6
<b>Menu</b>	Demod > Volume
<b>Example</b>	:DEMod:EPHone ON

---

# 5.Modulation Analyzer

- [7.1 Frequency Subsection](#)..... 错误！未定义书签。
- [7.2 Amplitude Subsection](#) ..... 错误！未定义书签。
- [7.3 BW Subsection](#)..... 错误！未定义书签。
- [7.4 Sweep Subsection](#)..... 错误！未定义书签。
- [7.5 Trace Subsection](#)..... 错误！未定义书签。
- [7.6 Marker Subsection](#) ..... 错误！未定义书签。
- [7.7 Measurement Subsystem](#) ..... 错误！未定义书签。
- [7.8 Trigger Subsection](#)..... 错误！未定义书签。

## 5.1 Frequency Subsection

`[:SENSe]:FREQUency:CENTer`

`[:SENSe]:FREQUency:CENTer:STEP[:INCRement]`

`[:SENSe]:FREQUency:SPAN?`

<b>Command Format</b>	<code>[:SENSe]:FREQUency:CENTer &lt;freq&gt;</code> <code>[:SENSe]:FREQUency:CENTer?</code>
<b>Instruction</b>	Sets the center frequency Gets the center frequency.
<b>Parameter Type</b>	Float, unit: Hz, kHz, MHz, GHz
<b>Parameter Range</b>	0 Hz ~ 3.2 GHz
<b>Return</b>	Float, unit: Hz
<b>Default</b>	100 MHz
<b>Menu</b>	Frequency > Center Freq
<b>Example</b>	<code>[:SENSe]:FREQUency:CENTer 300 MHz</code>

<b>Command Format</b>	<code>[:SENSe]:FREQUency:CENTer:STEP[:INCRement] &lt;freq&gt;</code> <code>[:SENSe]:FREQUency:CENTer:STEP[:INCRement]?</code>
<b>Instruction</b>	Sets frequency step Gets frequency step
<b>Parameter Type</b>	Float, unit: Hz, kHz, MHz, GHz
<b>Parameter Range</b>	1 Hz ~ 100 MHz



---

<b>Range</b>	
<b>Return</b>	Float, unit: Hz
<b>Default</b>	10 kHz
<b>Menu</b>	Frequency > Freq Step
<b>Example</b>	<code>[:SENSe]:FREQUency:CENTer:STEP[:INCRement] 20 MHz</code>

---

<b>Command Format</b>	<code>[:SENSe]:FREQUency:SPAN?</code>
<b>Instruction</b>	Query span The span of modulation analyzer mode is determined by multiple measurement parameters, and can not be set directly.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	Float, unit: Hz
<b>Default</b>	31.25 kHz
<b>Menu</b>	Span > Span
<b>Example</b>	<code>[:SENSe]:FREQUency:SPAN?</code>

---

## 5.2 Amplitude Subsection

`[:SENSe]:POWER[:RF]:ATTenuation`

`[:SENSe]:POWER[:RF]:ATTenuation:AUTO`

`:TRACe1|2|3|4:Y[:SCALE]:RLEVEL`

`:TRACe1|2|3|4:Y[:SCALE]:PDIVision`

`:TRACe1|2|3|4[:Y]:AUToscale`

<b>Command Format</b>	<code>[:SENSe]:POWER[:RF]:ATTenuation &lt;value&gt;</code> <code>[:SENSe]:POWER[:RF]:ATTenuation?</code>
<b>Instruction</b>	Sets the input attenuator Gets the input attenuator
<b>Parameter Type</b>	Integer, Unit: dB
<b>Parameter Range</b>	0 dB ~ 51 dB
<b>Return</b>	Integer, unit: dB
<b>Default</b>	20 dB
<b>Menu</b>	Amplitude > Attenuator
<b>Example</b>	<code>[:SENSe]:POWER[:RF]:ATTenuation 30 dB</code>

---

<b>Command Format</b>	<b>[:SENSe]:POWer[:RF]:ATTenuation:AUTO OFF ON 0 1</b> <b>[:SENSe]:POWer[:RF]:ATTenuation:AUTO?</b>
<b>Instruction</b>	Sets the input attenuator Gets the input attenuator
<b>Parameter Type</b>	Boolean
<b>Parameter Range</b>	OFF ON 0 1
<b>Return</b>	0 1
<b>Default</b>	0
<b>Menu</b>	Amplitude > Attenuator
<b>Example</b>	[:SENSe]:POWer[:RF]:ATTenuation:AUTO ON

---

<b>Command Format</b>	<b>:TRACe1 2 3 4:Y[:SCALe]:RLEVel &lt;value&gt;</b> <b>:TRACe1 2 3 4:Y[:SCALe]:RLEVel?</b>
<b>Instruction</b>	This command sets the reference level for the Y-axis. Gets reference level. The command is valid if the measurement mode is ASK, FSK, MSK, PSK, QAM and the data format is not Syms/Errs.
<b>Parameter Type</b>	Float
<b>Parameter Range</b>	If the display type is Log Mag: -1000 ~ 1000 If the display type is Lin Mag: -1000 ~ 1000 If the display type is Real: -1000 ~ 1000 If the display type is Imag: -1000 ~ 1000 If the display type is I-Q: -1000 ~ 1000 If the display type is Constellation: -1000 ~ 1000 If the display type is I-Eye: -1000 ~ 1000 If the display type is Q-Eye: -1000 ~ 1000 If the display type is Wrap Phase: -1000 ~ 1000 If the display type is Unwrap Phase: -1000 ~ 1000 If the display type is Trellis-Eye: -1e5 ~ 1e9
<b>Return</b>	Float
<b>Default</b>	
<b>Menu</b>	Amplitude > Ref Level
<b>Example</b>	:TRACe4:Y:RLEVel 2

---

<b>Command Format</b>	<b>:TRACe1 2 3 4:Y[:SCALe]:PDIVision &lt;value&gt;</b> <b>:TRACe1 2 3 4:Y[:SCALe]:PDIVision?</b>
<b>Instruction</b>	This command sets the per-division display scaling for the y-axis . Gets Scale/Div when scale type. The command is valid if the measurement mode is ASK, FSK, MSK, PSK, QAM and the data format is not Syms/Errs.
<b>Parameter Type</b>	Float

---

---

<b>Parameter Range</b>	
<b>Return</b>	Float
<b>Default</b>	
<b>Menu</b>	Amplitude > Scale/Div
<b>Example</b>	:TRACe4:Y:PDIVision 2

---

<b>Command Format</b>	:TRACe1 2 3 4[:Y]:AUToscale
<b>Instruction</b>	Sets auto scale
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	Amplitude > Auto Scale
<b>Example</b>	:TRACe2:AUToscale

---

## 5.3 BW Subsection

**[[:SENSe]:BWIDth[:RESolution]?**

**[[:SENSe]:DDEMod:FFT:WINDow:TYPE**

<b>Command Format</b>	[[:SENSe]:BWIDth[:RESolution]?
<b>Instruction</b>	Query equalization BW
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	Float, Unit: Hz
<b>Default</b>	100 kHz
<b>Menu</b>	BW > EQBW
<b>Example</b>	:BWIDth?

---

<b>Command Format</b>	[[:SENSe]:DDEMod:FFT:WINDow:TYPE [:SENSe]:DDEMod:FFT:WINDow:TYPE?
<b>Instruction</b>	Sets FFT window function. Gets FFT window function.

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## SIGLENT

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<b>Parameter Type</b>	Enumeration RECTangular HAMMING : HANNing FLATtop BLACKman
<b>Parameter Range</b>	None
<b>Return</b>	Enumeration RECT HAMM HANN FLAT BLAC
<b>Default</b>	100 kHz
<b>Menu</b>	BW > Window
<b>Example</b>	:DDEMod:FFT:WINDow:TYPE BLAC

---

## 5.4 Sweep Subsection

**:INITiat[:IMMediate]**

**:INITiate:CONTInuous**

**ABORt**

<b>Command Format</b>	<b>:INITiat[:IMMediate]</b>
<b>Instruction</b>	Restart the current sweep. :INITiate:REStart and :INITiate:IMMediate perform exactly the same function.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	
<b>Example</b>	:INITiate:IMMediate

---

<b>Command Format</b>	<b>:INITiate:CONTInuous OFF ON 0 1</b> <b>:INITiate:CONTInuous?</b>
<b>Instruction</b>	Sets continuous sweep mode on-off. Gets continuous sweep mode state.
<b>Parameter Type</b>	Boolean
<b>Parameter Range</b>	OFF ON 0 1
<b>Return</b>	0 1

---

<b>Default</b>	ON
<b>Menu</b>	Sweep > Sweep
<b>Example</b>	:INITiate:CONTInuous OFF

<b>Command Format</b>	<b>ABORt</b>
<b>Instruction</b>	This command is used to stop the current measurement. It aborts the current measurement as quickly as possible, resets the sweep and trigger systems, and puts the measurement into an "idle" state.  If the analyzer is set for Continuous measurement, it sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.  If the analyzer is set for Single measurement, it remains in the "idle" state until an :INIT:IMM command is received.
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	None
<b>Example</b>	INIT;ABORt

## 5.5 Trace Subsection

**:CALCulate:PARAmeter:COUNT**

**:DISPlay:LAYout**

**:TRACe[1]|2|3|4:DATA:NAME**

**:TRACe[1]|2|3|4:FORMat[:Y]**

**:TRACe:COPI**

**:TRACe:DEMod:EYE:LENGth**

**:TRACe:DEMod:TABLE:FORMat**

<b>Command Format</b>	<b>:CALCulate:PARAmeter:COUNT &lt;integer&gt;</b>
<b>Instruction</b>	<b>:CALCulate:PARAmeter:COUNT?</b> Sets trace number.
<b>Parameter Type</b>	Integer
<b>Parameter Range</b>	1 ~ 4

## SIGLENT

---

### Return

**Default** 1

**Menu** Trace > Num of Traces

**Example** :CALCulate:PARAmeter:COUNt 4

---

**Command Format** :DISPlay:LAYout <integer,integer>

**Instruction** Sets trace layout on screen  
Currently, one row, two columns are not supported (1, 2)

**Parameter Type** Integer (rows, columns)

**Parameter Range** rows 1 ~ 2

columns 1 ~ 2

**Return**

**Default** two rows, two columns

**Menu** Trace > Layout

**Example** :DISPlay:LAYout 2,2

---

**Command Format** :TRACe[1]|2|3|4:DATA:NAME  
:TRACe[1]|2|3|4:DATA:NAME?

**Instruction** Sets trace format.  
Gets trace format.

**Parameter Type** Enumeration

**Parameter Range** TIME: time

SPECTrum: spectrum

MTIME: IQ meas time

MSPECTrum: IQ meas spectrum (FFT of IQ Meas Time.)

RTIME: IQ Reference time (Reconstructed ideal time waveform to compare IQ Meas Time against)

RSPECTrum: IQ Reference spectrum(FFT of IQ Reference time.)

MERRor: IQ Mag Err (Difference in length of the IQ Meas Time vector and IQ Ref Time vectorat each point in time.)

PERRor: IQ Phase Err (Difference in phase of the IQ Meas Time vector and IQ Ref Time vector at each point in time.)

EVTIME: Error Time (Vector difference between IQ Meas Time and IQ Ref Time at each pointin time.)

EVSPpectrum: Error Vector Spec

---

---

	SYMSerrs: Syms/Errs
<b>Return</b>	Enumeration
<b>Default</b>	
<b>Menu</b>	Trace > Format
<b>Example</b>	:TRACe:DATA:NAME SYMS

---

<b>Command Format</b>	:TRACe[1] 2 3 4:FORMat[:Y] :TRACe[1] 2 3 4:FORMat[:Y]?
<b>Instruction</b>	Sets trace format Gets trace format
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	MLOG: Log Mag MLINear: Lin Mag REAL: Real IMAGinary: Imag IQ: I-Q CONSTln: Constellation IEYE: I-Eye QEYE: Q-Eye WPHase: Wrap Phase UWPHase: Unwrap Phase TRELlis: Trellis-Eye
<b>Return</b>	MLOG MLIN REAL IMAG IQ CONS IEYE QEYE WPHA UWPH TREL
<b>Default</b>	
<b>Menu</b>	Trace > Format
<b>Example</b>	:TRACe:FORMat MLIN

---

<b>Command Format</b>	:TRACe:COpy <from,to>
<b>Instruction</b>	Copy trace data to another trace
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	A B C D orTRACE1  TRACE2  TRACE2  TRACE4
<b>Return</b>	None

---

## SIGLENT

---

<b>Default</b>	None
<b>Menu</b>	Trace > Copy To
<b>Example</b>	:TRACe:COPIY A,B :TRACe:COPIY TRACE1,TRACE2

---

<b>Command</b>	:TRACe:DEMod:EYE:LENGth <integer>
<b>Format</b>	:TRACe:DEMod:EYE:LENGth?
<b>Instruction</b>	Sets eye length Gets eye length
<b>Parameter</b>	Integer
<b>Type</b>	
<b>Parameter</b>	2 ~ 40
<b>Range</b>	
<b>Return</b>	Integer
<b>Default</b>	2
<b>Menu</b>	Trace > Properties
<b>Example</b>	:TRACe:DEMod:EYE:LENGth 4

---

<b>Command</b>	:TRACe:DEMod:TABLE:FORMat
<b>Format</b>	:TRACe:DEMod:TABLE:FORMat?
<b>Instruction</b>	Display format of Symbol Table data
<b>Parameter</b>	Enumeration
<b>Type</b>	
<b>Parameter</b>	BINary  HEXadecimal
<b>Range</b>	
<b>Return</b>	Enumeration BIN HEX
<b>Default</b>	HEX
<b>Menu</b>	Trace > Properties
<b>Example</b>	:TRACe:DEMod:TABLE:FORMat HEX

---

## 5.6 Marker Subsection

**:TRACe[1]|2|3|4:MARKer[1]|2|3|4:ENABLE**

**:TRACe[1]|2|3|4:MARKer[1]|2|3|4:TYPE**

**:TRACe[1]|2|3|4:MARKer[1]|2|3|4:X**

**:TRACe[1]|2|3|4:MARKer[1]|2|3|4:Y?**

**:TRACe[1]|2|3|4:MARKer[1]|2|3|4:REFerence**

**:CALCulate[:SElected]:MARKer:COUPle**

**:CALCulate:MARKer:AOFF**



<b>Command Format</b>	<b>:TRACe[1] 2 3 4:MARKer[1] 2 3 4:ENABLE OFF ON 0 1</b> <b>:TRACe[1] 2 3 4:MARKer[1] 2 3 4:ENABLE?</b>
<b>Instruction</b>	Sets marker state Gets marker state
<b>Parameter Type</b>	Boolean
<b>Parameter Range</b>	OFF ON 0 1
<b>Return</b>	0 1
<b>Default</b>	OFF
<b>Menu</b>	Marker
<b>Example</b>	:TRACe1:MARKer1:ENABLE ON

<b>Command Format</b>	<b>:TRACe[1] 2 3 4:MARKer[1] 2 3 4:TYPE POSition DELTA OFF</b> <b>:TRACe[1] 2 3 4:MARKer[1] 2 3 4:TYPE?</b>
<b>Instruction</b>	Sets marker mode. Gets marker mode
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	POSition DELTA OFF
<b>Return</b>	Enumeration: POS DELTA OFF
<b>Default</b>	OFF
<b>Menu</b>	Marker
<b>Example</b>	:TRACe:MARKer:TYPE POSition

<b>Command Format</b>	<b>:TRACe[1] 2 3 4:MARKer[1] 2 3 4:X &lt;para&gt;</b> <b>:TRACe[1] 2 3 4:MARKer[1] 2 3 4:X?</b>
<b>Instruction</b>	Sets marker X value Gets marker X value This command only works when marker is not off
<b>Parameter Type</b>	Float
<b>Parameter Range</b>	
<b>Return</b>	
<b>Default</b>	
<b>Menu</b>	Marker > Normal
<b>Example</b>	:TRACe:MARKer:X 200 :TRACe:MARKer:X?

<b>Command Format</b>	<b>:TRACe[1] 2 3 4:MARKer[1] 2 3 4:Y?</b>
-----------------------	---

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---

<b>Instruction</b>	Gets marker Y value
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	Float
<b>Default</b>	None
<b>Menu</b>	None
<b>Example</b>	:TRACe:MARKer:Y?

---

<b>Command Format</b>	:TRACe[1] 2 3 4:MARKer[1] 2 3 4:REFerence <integer> :TRACe[1] 2 3 4:MARKer[1] 2 3 4:REFerence?
<b>Instruction</b>	Sets reference marker . Gets reference marker Cannot set the current marker to the reference marker.
<b>Parameter Type</b>	Integer
<b>Parameter Range</b>	1 ~ 4
<b>Return</b>	1 ~ 4
<b>Default</b>	2
<b>Menu</b>	Marker > Relative
<b>Example</b>	:TRACe:MARKer:REFerence 3

---

<b>Command Format</b>	:CALCulate[:SElected]:MARKer:COUPle OFF ON 0 1 :CALCulate[:SElected]:MARKer:COUPle?
<b>Instruction</b>	Sets marker couple state Gets marker couple state
<b>Parameter Type</b>	Boolean
<b>Parameter Range</b>	OFF ON 0 1
<b>Return</b>	0 1
<b>Default</b>	None
<b>Menu</b>	Marker > Couple
<b>Example</b>	:CALCulate:MARKer:COUPle ON

---

<b>Command Format</b>	:CALCulate:MARKer:AOFF
<b>Instruction</b>	Close All Markers
<b>Parameter Type</b>	None

---

---

<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	Marker > All Off
<b>Example</b>	:CALCulate:MARKer:AOff

---

## 5.7 Measurement Subsystem

[:SENSe]:DDEMod:MODulation  
 [:SENSe]:ADEMod:STYLE  
 :DDEMod[:FORMat]:SRATe  
 [:SENSe]:DDEMod[:FORMat]:SYMBol:POINTs  
 [:SENSe]:DDEMod[:FORMat]:RLENgth  
 [:SENSe]:DDEMod:FILTer[:MEASurement]  
 [:SENSe]:DDEMod:FILTer:REFerence  
 [:SENSe]:STATistic:STATe  
 [:SENSe]:AVERage[:STATe]  
 [:SENSe]:AVERage:COUNT  
 :CALCulate:REStart  
 :READ:DDEMod?

<b>Command</b>	<b>[:SENSe]:DDEMod:MODulation</b>
<b>Format</b>	<b>[:SENSe]:DDEMod:MODulation?</b>
<b>Instruction</b>	Sets Digital Demodulation Mode Gets Digital Demodulation Mode
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	ASK2 MSK BPSK QPSK PSK8 DBPSK DQPSK DPSK8 OQPSK PI4DQ PI8D8 QAM16 QAM32 QAM64 QAM12 QAM25

---

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	QAM51 QAM10 FSK2 FSK4 FSK8 FSK16
<b>Return</b>	Enumeration
<b>Default</b>	QAM16
<b>Menu</b>	Meas
<b>Example</b>	:DDEMod:MODulation FSK8

---

<b>Command Format</b>	<b>[:SENSe]:ADEMod:STyLe</b> <b>[:SENSe]:ADEMod:STyLe?</b>
<b>Instruction</b>	Sets Analog Modulation Type Gets Analog Modulation Type
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	AM FM
<b>Return</b>	Enumeration: AM FM
<b>Default</b>	AM
<b>Menu</b>	Meas
<b>Example</b>	:ADEMod:STyLe AM

---

<b>Command Format</b>	<b>:DDEMod[:FORMat]:SRATe &lt;integer&gt;</b> <b>:DDEMod[:FORMat]:SRATe?</b>
<b>Instruction</b>	Sets Symbol Rate Gets Symbol Rate
<b>Parameter Type</b>	Integer
<b>Parameter Range</b>	1000 ~ 2500000
<b>Return</b>	Integer
<b>Default</b>	10000
<b>Menu</b>	Meas > Symbol Rate
<b>Example</b>	:DDEMod:SRATe 2000

---

<b>Command Format</b>	<b>[:SENSe]:DDEMod[:FORMat]:SYMBol:POINts &lt;integer&gt;</b> <b>[:SENSe]:DDEMod[:FORMat]:SYMBol:POINts?</b>
<b>Instruction</b>	Sets Points per Symbol Gets Points per Symbol
<b>Parameter Type</b>	Discrete

---

---

<b>Parameter Range</b>	4, 6, 8, 10, 12, 14, 16
<b>Return</b>	Discrete
<b>Default</b>	4
<b>Menu</b>	Meas > Points/Symbol
<b>Example</b>	DDEMod:SYMBol:POINts 14

---

<b>Command Format</b>	<b>[[:SENSe]:DDEMod[:FORMat]:RLENgth &lt;integer&gt;[:SENSe]:DDEMod[:FORMat]:RLENgth?</b>
<b>Instruction</b>	Sets meas length Gets meas length
<b>Parameter Type</b>	Integer
<b>Parameter Range</b>	16 ~ 4096
<b>Return</b>	Integer
<b>Default</b>	128
<b>Menu</b>	Meas > Meas Length
<b>Example</b>	:DDEMod:RLENgth 200

---

<b>Command Format</b>	<b>[[:SENSe]:DDEMod:FILTer[:MEASurement]:SENSe]:DDEMod:FILTer[:MEASurement]?</b>
<b>Instruction</b>	Sets meas filter Gets meas filter
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	OFF RRCosine RCOSine GAUSSian HSIN
<b>Return</b>	0 1
<b>Default</b>	ASK, FSK, PSK, QAM Default is RCOSine MSK Default is OFF
<b>Menu</b>	Meas > Filter Setup > Meas Filter
<b>Example</b>	:DDEMod:FILTer HSIN

---

<b>Command Format</b>	<b>[[:SENSe]:DDEMod:FILTer:REFErence[:SENSe]:DDEMod:FILTer:REFErence?</b>
<b>Instruction</b>	Sets reference filter Gets reference filter
<b>Parameter Type</b>	Enumeration

---

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---

<b>Parameter Range</b>	OFF RRCosine: Root Raised Cosine RCOSine : Raised Cosine GAUSSian HSIN: Half Sine
<b>Return</b>	Enumeration
<b>Default</b>	ASK, FSK, PSK, QAM Default is RRC MSK Default is GAUS
<b>Menu</b>	Meas > Ref Filter
<b>Example</b>	:DDEMod:FILTer:REFerence OFF

---

<b>Command Format</b>	<b>[[:SENSe]:STATistic:STATe [:SENSe]:STATistic:STATe?</b>
<b>Instruction</b>	Sets Meas Statistic State Gets Meas Statistic State
<b>Parameter Type</b>	Boolean
<b>Parameter Range</b>	OFF ON 0 1
<b>Return</b>	Enumeration
<b>Default</b>	OFF
<b>Menu</b>	Meas > Statistic > Statistic
<b>Example</b>	:STATistic:STATe ON

---

<b>Command Format</b>	<b>[[:SENSe]:AVERage[:STATe] [:SENSe]:AVERage[:STATe]?</b>
<b>Instruction</b>	Sets meas average state Gets meas average state
<b>Parameter Type</b>	Boolean
<b>Parameter Range</b>	OFF ON 0 1
<b>Return</b>	Boolean
<b>Default</b>	OFF
<b>Menu</b>	Meas> Statistic > Avg
<b>Example</b>	:AVERage ON

---

<b>Command Format</b>	<b>[[:SENSe]:AVERage:COUNt [:SENSe]:AVERage:COUNt?</b>
<b>Instruction</b>	Sets meas average count Gets meas average count
<b>Parameter Type</b>	Integer

---

---

<b>Parameter Range</b>	1 ~ 1000
<b>Return</b>	Integer
<b>Default</b>	10
<b>Menu</b>	Meas> Statistic > Avg
<b>Example</b>	:AVERage:COUNT 20

---

<b>Command Format</b>	:CALCulate:REStart
<b>Instruction</b>	Restart measurements
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	None
<b>Default</b>	None
<b>Menu</b>	Meas > Statistic > Restart Meas
<b>Example</b>	:CALCulate:REStart

---

<b>Command Format</b>	:READ:DDEMod?
<b>Instruction</b>	<p>Read digital demod result</p> <p>If demod type is ASK it will return:</p> <ol style="list-style-type: none"> <li>1.ASK err rms (% rms)</li> <li>2.ASK err peak (% pk)</li> <li>3. symbol position of ASK err peak</li> <li>4.carrier power</li> <li>5.carrier offset</li> <li>6.ASK depth</li> </ol> <p>If demod type is FSK it will return:</p> <ol style="list-style-type: none"> <li>1.FSK err rms (% rms)</li> <li>2.FSK err peak (% pk)</li> <li>3.symbol position of FSK err peak</li> <li>4. carrier power</li> <li>5.carrier offset</li> <li>6.FSK deviation</li> </ol> <p>If demod type is MSK,PSK,QAM it will return:</p> <ol style="list-style-type: none"> <li>1. EVM rms (% rms)</li> <li>2. EVM peak (% pk)</li> <li>3. symbol position of EVM peak</li> <li>4. magnitude error rms (% rms).</li> <li>5. magnitude error peak (% pk)</li> <li>6.symbol position of magnitude error peak</li> <li>7.phase error rms (deg)</li> <li>8.phase error peak (deg pk)</li> <li>9.symbol position of phase error peak</li> </ol>

---

	10. frequency error (Hz)
	11. IQ offset
	12. SNR(MER) (dB)
	13. quadrature error (deg)
	14. gain imbalance (dB)
<b>Parameter Type</b>	None
<b>Parameter Range</b>	None
<b>Return</b>	String
<b>Default</b>	None
<b>Menu</b>	
<b>Example</b>	:READ:DDEMod?

---

## 5.8 Trigger Subsection

**:TRIGger[:SEQuence]:SOURce**

**:TRIGger[:SEQuence]:RF:LEVel**

**:TRIGger[:SEQuence]:RFBurst:SLOPe**

<b>Command Format</b>	<b>:TRIGger[:SEQuence]:SOURce IMMEDIATE  RFBurst  EXTernal</b> <b>:TRIGger[:SEQuence]:SOURce?</b>
<b>Instruction</b>	Specifies the source (or type) of triggering used to start a measurement. Gets trigger type. RFBurst is not supported if demod type is MSK, PSK, QAM
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	IMMEDIATE: free-run triggering. RFBurst: triggers on the RF signal level. EXTernal: allows you to connect an external trigger source.
<b>Return</b>	Enumeration: IMM EXT RFB
<b>Default</b>	IMMEDIATE
<b>Menu</b>	Trigger
<b>Example</b>	:TRIGger:SOURce IMMEDIATE

---

<b>Command Format</b>	<b>:TRIGger[:SEQuence]:RF:LEVel &lt;value&gt;</b> <b>:TRIGger[:SEQuence]:RF:LEVel?</b>
<b>Instruction</b>	Sets RF Trigger Level Gets RF Trigger Level
<b>Parameter Type</b>	Float, Unit: dBm
<b>Parameter Range</b>	-300 dBm ~ 50 dBm
<b>Return</b>	Float, Unit: dBm

---



---

<b>Default</b>	0 dBm
<b>Menu</b>	Trigger > RF Trigger
<b>Example</b>	:TRIGger:RF:LEVel 0.5 dBm

---

<b>Command Format</b>	:TRIGger[:SEquence]:RFBurst:SLOPe POSitive NEGative :TRIGger[:SEquence]:RFBurst:SLOPe?
-----------------------	---

<b>Instruction</b>	Sets trigger edge Gets trigger edge
<b>Parameter Type</b>	Enumeration
<b>Parameter Range</b>	POSitive NEGative
<b>Return</b>	Enumeration: POS NEG
<b>Default</b>	POSitive
<b>Menu</b>	Trigger > External
<b>Example</b>	:TRIGger:RFBurst:SLOPe POSitive

---

# 6. Programming Examples

This chapter gives some examples for the programmer. In these examples you can see how to use the VISA or sockets, in combination with the commands have been described above to control the spectrum analyzer. By following these examples, you can develop many more applications.

## 6.1 Examples of Using VISA

### 6.1.1 Example of VC++

**Environment:** Win7 32bit system, Visual Studio

**The functions of this example:** use the NI-VISA, to control the device with USBTMC or TCP/IP access to do a write and read.

Follow the steps to finish the example:

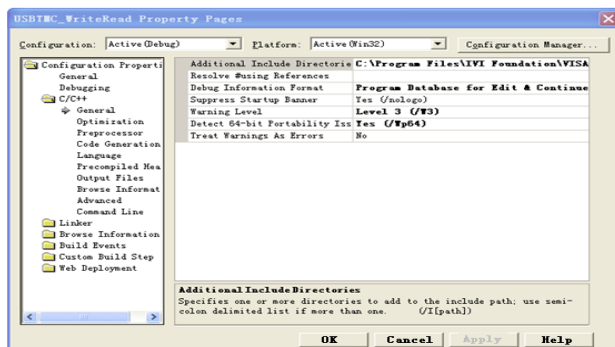
- 1、 Open Visual Studio, create a new VC++ win32 console project.
- 2、 Set the project environment to use the NI-VISA lib, there are two ways to use NI-VISA, static or automatic:
  - 1)Static: find files: visa.h, visatype.h, visa32.lib in NI-VISA install path. Copy them to your project, and add them into project. In the projectname.cpp file, add the follow two lines:

```
#include "visa.h"
```

```
#pragma comment(lib,"visa32.lib")
```

- 2)Automatic:

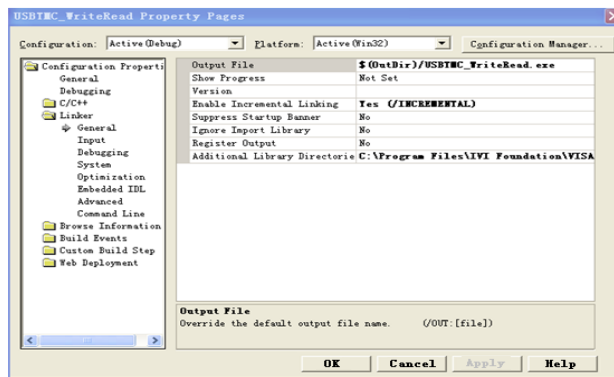
Set the .h file include directory, the NI-VISA install path, in our computer we set the path is: C:\Program Files\IVI Foundation\VISAWinNT\include. Set this path to project---properties---c/c+---General---Additional Include Directories: See the picture.



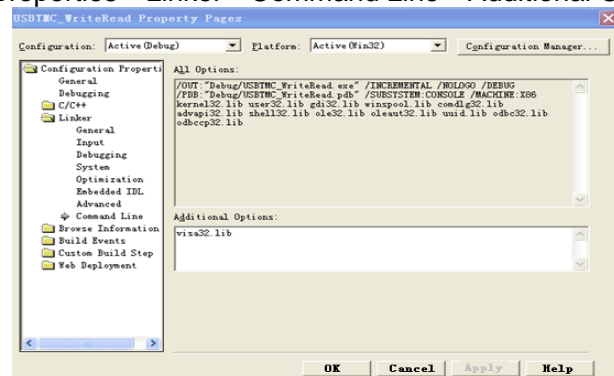
Set lib path set lib file:

Set lib path: the NI-VISA install path, in our computer we set the path is: C:\Program Files\IVI Foundation\VISAWinNT

lib\msc. Set this path to project---properties---Linker---General---Additional Library Directories: as seen in the pictures below.



Set lib file:project---properties---Linker---Command Line---Additional Options: visa32.lib



Include visa.h file: In the projectname.cpp file:

```
#include <visa.h>
```

3、 Add codes:

1)USBTMC access code:

Write a function Usbtmc\_test:

```
int Usbtmc_test()
{
    /* This code demonstrates sending synchronous read & write commands */
    /* to an USB Test & Measurement Class (USBTMC) instrument using */
    /* NI-VISA */
    /* The example writes the "*IDN?\n" string to all the USBTMC */
    /* devices connected to the system and attempts to read back */
    /* results using the write and read functions. */
    /* The general flow of the code is */
    /* Open Resource Manager */
    /* Open VISA Session to an Instrument */
    /* Write the Identification Query Using viPrintf */
    /* Try to Read a Response With viScanf */
    /* Close the VISA Session */
    /*******/
    ViSessiondefaultRM;
    ViSessioninstr;
    ViUInt32numInstrs;
    ViFindListfindList;
    ViStatus status;
    char instrResourceString[VI_FIND_BUFLLEN];
    unsignedchar buffer[100];
    int i;
    /** First we must call viOpenDefaultRM to get the manager
    * handle. We will store this handle in defaultRM.*/
    status=viOpenDefaultRM (&defaultRM);
    if (status<VI_SUCCESS)
    {
        printf ("Could not open a session to the VISA Resource Manager!\n");
        returnstatus;
    }
}
```

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---

```
/* Find all the USB TMC VISA resources in our system and store the number of resources in the system in
numInstrs.*/
status = viFindRsrc (defaultRM, "USB?*INSTR", &findList, &numInstrs, instrResourceString);
if (status<VI_SUCCESS)
{
printf ("An error occurred while finding resources.\nPress 'Enter' to continue.");
fflush(stdin);
getchar();
viClose (defaultRM);
returnstatus;
}
/** Now we will open VISA sessions to all USB TMC instruments.
* We must use the handle from viOpenDefaultRM and we must
* also use a string that indicates which instrument to open. This
* is called the instrument descriptor. The format for this string
* can be found in the function panel by right clicking on the
* descriptor parameter. After opening a session to the
* device, we will get a handle to the instrument which we
* will use in later VISA functions. The AccessMode and Timeout
* parameters in this function are reserved for future
* functionality. These two parameters are given the value VI_NULL.*/
for (i=0; i<int(numInstrs); i++)
{
if (i> 0)
{ viFindNext (findList, instrResourceString);
}status = viOpen (defaultRM, instrResourceString, VI_NULL, VI_NULL, &instr);
if (status<VI_SUCCESS)
{
printf ("Cannot open a session to the device %d.\n", i+1);
continue;
}
/* * At this point we now have a session open to the USB TMC instrument.
* We will now use the viPrintf function to send the device the string "**IDN?\n",
* asking for the device's identification. */
char * cmmand ="**IDN?\n";
status = viPrintf (instr, cmmand);
if (status<VI_SUCCESS)
{
printf ("Error writing to the device %d.\n", i+1);
status = viClose (instr);
continue;
}
/** Now we will attempt to read back a response from the device to
* the identification query that was sent. We will use the viScanf
* function to acquire the data.
* After the data has been read the response is displayed.*/
status = viScanf(instr, "%t", buffer);
if (status<VI_SUCCESS)
{ printf ("Error reading a response from the device %d.\n", i+1);
} else
{ printf ("\nDevice %d: %s\n", i+1, buffer);
}status = viClose (instr);
}
/** Now we will close the session to the instrument using
* viClose. This operation frees all system resources. */
status = viClose (defaultRM);
printf("Press 'Enter' to exit.");
fflush(stdin);
getchar();return 0;
}

int _tmain(int argc, _TCHAR* argv[])
{
Usbtmc_test();
return 0;
}
```

## 2) TCP/IP access code:

```

Write a function TCP_IP_Test:
int TCP_IP_Test(char *pIP)
{
char outputBuffer[VI_FIND_BUFLLEN];
ViSession defaultRM, instr;
ViStatus status;

/* First we will need to open the default resource manager. */
status = viOpenDefaultRM (&defaultRM);
if (status<VI_SUCCESS)
{
printf("Could not open a session to the VISA Resource Manager!\n");
}
/* Now we will open a session via TCP/IP device */
char head[256] ="TCP0::";
char tail[] = "::INSTR";

strcat(head,pIP);
strcat(head,tail);
status = viOpen (defaultRM, head, VI_LOAD_CONFIG, VI_NULL, &instr);
if (status<VI_SUCCESS)
{
printf ("An error occurred opening the session\n");
viClose(defaultRM);
}
status = viPrintf(instr, "%i\n", status);
status = viScanf(instr, "%t", outputBuffer);
if (status<VI_SUCCESS)
{
printf("viRead failed with error code: %x \n",status);
viClose(defaultRM);
}
else
{
printf ("\nMessage read from device: %s\n", outputBuffer);
}
status = viClose (instr);
status = viClose (defaultRM);
printf("Press 'Enter' to exit.");
fflush(stdin);
getchar();return 0;
}

int _tmain(int argc, _TCHAR* argv[])
{
printf("Please input IP address:");
char ip[256];
fflush(stdin);
gets(ip);
TCP_IP_Test(ip);
return 0;
}

```

## 6.1.2 Example of VB

**Environment:** Win7 32bit system, Microsoft Visual Basic 6.0

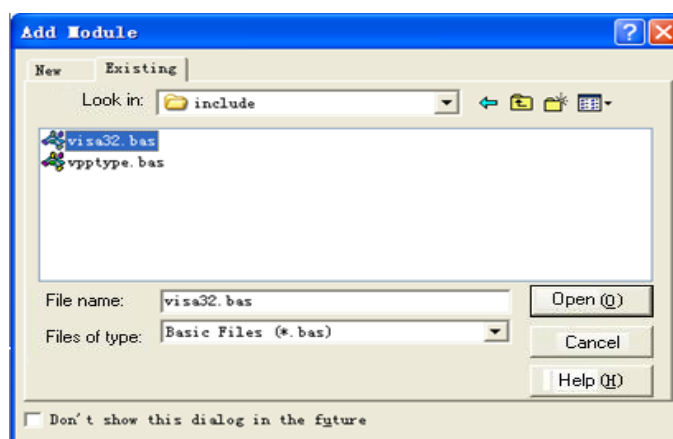
**The function of this example:** Use the NI-VISA, to control the device with USBTMC and TCP/IP access to do a write and read.

Follow the steps to complete the example:

- 1、 Open Visual Basic, build a standard application program project (Standard EXE)
- 2、 Set the project environment to use the NI-VISA lib, Click the Existing tab of Project>>Add

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Existing Item. Search for the visa32.bas file in the include folder under the NI-VISA installation path and add the file.



This allows the VISA functions and VISA data types to be used in a program.

### 3. Add codes:

1)USBTMC access code:

Write a function Usbtmc\_test:

Private Function Usbtmc\_test() As Long

```
' This code demonstrates sending synchronous read & write commands  
' to an USB Test & Measurement Class (USBTMC) instrument using  
' NI-VISA  
' The example writes the "*IDN?\n" string to all the USBTMC  
' devices connected to the system and attempts to read back  
' results using the write and read functions.  
' The general flow of the code is  
' Open Resource Manager  
' Open VISA Session to an Instrument  
' Write the Identification Query Using viWrite  
' Try to Read a Response With viRead  
' Close the VISA Session
```

```
Const MAX_CNT = 200
```

```
Dim defaultRM As Long
```

```
Dim instrsesn As Long
```

```
Dim numInstrs As Long
```

```
Dim findList As Long
```

```
Dim retCount As Long
```

```
Dim status As Long
```

```
Dim instrResourceString As String * VI_FIND_BUFLLEN
```

```
Dim Buffer As String * MAX_CNT
```

```
Dim i As Integer
```

```
' First we must call viOpenDefaultRM to get the manager  
' handle. We will store this handle in defaultRM.
```

```
status = viOpenDefaultRM(defaultRM)
```

```
If (status < VI_SUCCESS) Then
```

```
    resultTxt.Text = "Could not open a session to the VISA Resource Manager!"
```

```
    Usbtmc_test = status
```

```
    Exit Function
```

```
End If
```

```
' Find all the USB TMC VISA resources in our system and store the  
' number of resources in the system in numInstrs.
```

```

status = viFindRsrc(defaultRM, "USB?*INSTR", findList, numInstrs, instrResourceString)
If (status < VI_SUCCESS) Then
    resultTxt.Text = "An error occurred while finding resources."
    viClose (defaultRM)
    Usbtmc_test = status

```

```
Exit Function
```

```
End If
```

```

' Now we will open VISA sessions to all USB TMC instruments.
' We must use the handle from viOpenDefaultRM and we must
' also use a string that indicates which instrument to open. This
' is called the instrument descriptor. The format for this string
' can be found in the function panel by right clicking on the
' descriptor parameter. After opening a session to the
' device, we will get a handle to the instrument which we
' will use in later VISA functions. The AccessMode and Timeout
' parameters in this function are reserved for future
' functionality. These two parameters are given the value VI_NULL.

```

```
For i = 0 To numInstrs
```

```
  If (i > 0) Then
```

```
    status = viFindNext(findList, instrResourceString)
```

```
  End If
```

```
    status = viOpen(defaultRM, instrResourceString, VI_NULL, VI_NULL, instrsesn)
```

```
  If (status < VI_SUCCESS) Then
```

```
    resultTxt.Text = "Cannot open a session to the device " + CStr(i + 1)
```

```
    GoTo NextFind
```

```
  End If
```

```

' At this point we now have a session open to the USB TMC instrument.
' We will now use the viWrite function to send the device the string "**IDN?",
' asking for the device's identification.

```

```
status = viWrite(instrsesn, "**IDN?", 5, retCount)
```

```
If (status < VI_SUCCESS) Then
```

```
  resultTxt.Text = "Error writing to the device."
```

```
  status = viClose(instrsesn)
```

```
  GoTo NextFind
```

```
End If
```

```

' Now we will attempt to read back a response from the device to
' the identification query that was sent. We will use the viRead
' function to acquire the data.

```

```
' After the data has been read the response is displayed.
```

```
status = viRead(instrsesn, Buffer, MAX_CNT, retCount)
```

```
If (status < VI_SUCCESS) Then
```

```
  resultTxt.Text = "Error reading a response from the device." + CStr(i + 1)
```

```
Else
```

```
  resultTxt.Text = "Read from device: " + CStr(i + 1) + " " + Buffer
```

```
End If
```

```
  status = viClose(instrsesn)
```

```
Next i
```

```

' Now we will close the session to the instrument using
' viClose. This operation frees all system resources.

```

```
status = viClose(defaultRM)
```

```
Usbtmc_test = 0
```

```
End Function
```

2)TCP/IP access code:

Write a function TCP\_IP\_Test:

```
Private Function TCP_IP_Test(ByVal ip As String) As Long
```

```
Dim outputBuffer As String * VI_FIND_BUFLEN
```

```
Dim defaultRM As Long
```

```
Dim instrsesn As Long
```

```
Dim status As Long
```

Dim count As Long

' First we will need to open the default resource manager.

status = viOpenDefaultRM (defaultRM)

If (status < VI\_SUCCESS) Then

    resultTxt.Text = "Could not open a session to the VISA Resource Manager!"

    TCP\_IP\_Test = status

    Exit Function

End If

' Now we will open a session via TCP/IP device

status = viOpen(defaultRM, "TCPIP0::" + ip + "::INSTR", VI\_LOAD\_CONFIG, VI\_NULL, instrsesn)

If (status < VI\_SUCCESS) Then

    resultTxt.Text = "An error occurred opening the session"

    viClose (defaultRM)

    TCP\_IP\_Test = status

Exit Function

End If

status = viWrite(instrsesn, "\*\*IDN?", 5, count)

If (status < VI\_SUCCESS) Then

    resultTxt.Text = "Error writing to the device."

End If

status = viRead(instrsesn, outputBuffer, VI\_FIND\_BUFLEN, count)

If (status < VI\_SUCCESS) Then

    resultTxt.Text = "Error reading a response from the device." + CStr(i + 1)

Else

    resultTxt.Text = "read from device:" + outputBuffer

End If

status = viClose(instrsesn)

status = viClose(defaultRM)

TCP\_IP\_Test = 0

End Function

3) Button control code:

```
Private Sub exitBtn_Click()
```

```
    End
```

```
End Sub
```

```
Private Sub tcpipBtn_Click()
```

```
    Dim stat As Long
```

```
    stat = TCP_IP_Test(ipTxt.Text)
```

```
    If (stat < VI_SUCCESS) Then
```

```
        resultTxt.Text = Hex(stat)
```

```
    End If
```

```
End Sub
```

```
Private Sub usbBtn_Click()
```

```
    Dim stat As Long
```

```
    stat = Usbtmc_test
```

```
    If (stat < VI_SUCCESS) Then
```

```
        resultTxt.Text = Hex(stat)
```

```
    End If
```

```
End Sub
```

## 6.1.3 Example of MATLAB

**Environment:** Win7 32bit system, MATLAB R2013a

**The function of this example:** Use the NI-VISA, to control the device with USBTMC or TCP/IP access to do a write and read.

Follow the steps to complete the example:

1、 Open MATLAB, modify the **current directory**. In this demo, the current directory is



modified to D:\USBTMC\_TCPIP\_Demo.

2、 Click **File>>New>>Script** in the Matlab interface to create an empty M file

3、 Add codes:

1)USBTMC access code :

Write a function Usbtmc\_test.

```
function USBTMC_test()
% This code demonstrates sending synchronous read & write commands
% to an USB Test & Measurement Class (USBTMC) instrument using
% NI-VISA

%Create a VISA-USB object connected to a USB instrument
vu = visa('ni','USB0::0xF4ED::0xEE3A::sdg2000x::INSTR');

%Open the VISA object created
fopen(vu);

%Send the string "**IDN?",asking for the device's identification.
fprintf(vu,"*IDN?");

%Request the data
outputbuffer = fscanf(vu);
disp(outputbuffer);

%Close the VISA object
fclose(vu);
delete(vu);
clear vu;

end
```

2)TCP/IP access code:

Write a function TCP\_IP\_Test:

```
function TCP_IP_test()
% This code demonstrates sending synchronous read & write commands
% to an TCP/IP instrument using NI-VISA

%Create a VISA-TCPIP object connected to an instrument
%configured with IP address.
vt = visa('ni',['TCPIP0::','10.11.13.32','::INSTR']);

%Open the VISA object created
fopen(vt);

%Send the string "**IDN?",asking for the device's identification.
fprintf(vt,"*IDN?");

%Request the data
outputbuffer = fscanf(vt);
disp(outputbuffer);

%Close the VISA object
fclose(vt);
delete(vt);
clear vt;

end
```

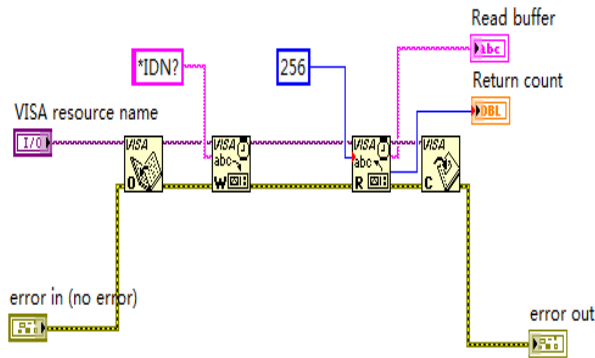
## 6.1.4 Example of LabVIEW

**Environment:** Win7 32bit system, LabVIEW 2011

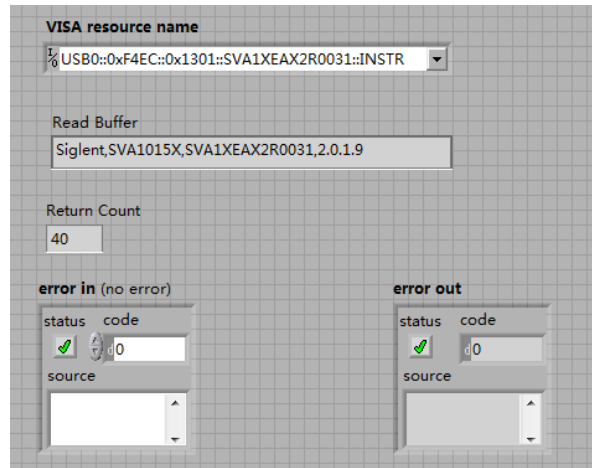
**The functions of this example:** use the NI-VISA, to control the device with USBTMC and TCP/IP access to do a write and read.

Follow the steps to complete the example:

- 1、 Open LabVIEW, create a VI file.
- 2、 Add controls. Right-click in the **Front Panel** interface, select and add **VISA resource name**, error in, error out and some indicators from the Controls column.
- 3、 Open the **Block Diagram** interface. Right-click on the **VISA resource name** and you can select and add the following functions from VISA Palette from the pop-up menu: **VISA Write**, **VISA Read**, **VISA Open** and **VISA Close**.
- 4、 Connect them as shown in the figure below



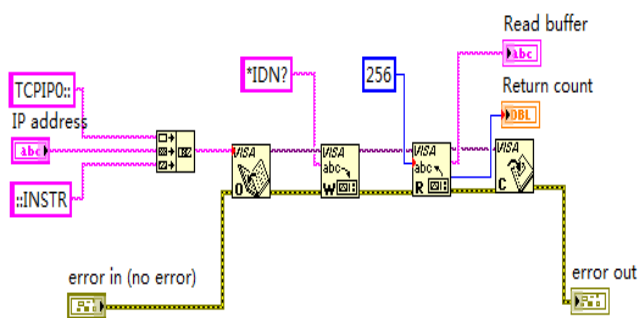
- 5、 Select the device resource from the VISA Resource Name list box and run the program.



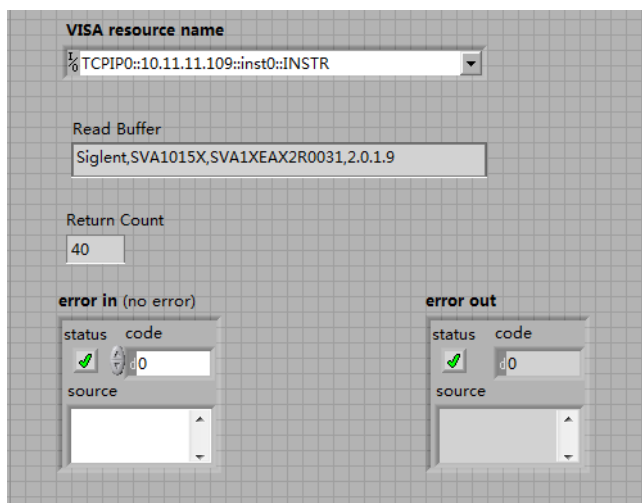
In this example, the VI opens a VISA session to a USBTMC device, writes a command to the device, and reads back the response. In this example, the specific command being sent is the device ID query. Check with your device manufacturer for the device command set. After all communication is complete, the VI closes the VISA session.

- 6、 Communicating with the device via TCP/IP is similar to USBTMC. But you need to change VISA Write and VISA Read Function to Synchronous I/O. The LabVIEW default is asynchronous I/O. Right-click the node and select Synchronous I/O Mod>>Synchronous from the shortcut menu to write or read data synchronously.

7、 Connect them as shown in the figure below



8、 Input the IP address and run the program.



## 6.2 Examples of Using Sockets/Telnet

### 6.2.1 Example of Python

Python is an interpreted programming language that lets you work quickly and is very portable. Python has a low-level networking module that provides access to the socket interface. Python scripts can be written for sockets to do a variety of test and measurements tasks.

**Environment:** Win7 32bit system, Python v2.7.5

**The functions of this example:** Open a socket, sends a query, and closes the socket. It does this loop 10 times.

Below is the code of the script:

```
#!/usr/bin/env python
#-*- coding:utf-8 -*-
#-----
# The short script is a example that open a socket, sends a query,
# print the return message and closes the socket.
#-----
import socket # for sockets
import sys # for exit
import time # for sleep
#-----
remote_ip = "10.11.13.32" # should match the instrument's IP address
port = 5025 # the port number of the instrument service
count = 0

def SocketConnect():
    try:
        #create an AF_INET, STREAM socket (TCP)
        s = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
    except socket.error:
        print ('Failed to create socket.')
        sys.exit();
    try:
        #Connect to remote server
        s.connect((remote_ip , port))
        info = s.recv(4096)
        print (info)
    except socket.error:
        print ('failed to connect to ip ' + remote_ip)
    return s

def SocketQuery(Sock, cmd):
    try :
        #Send cmd string
        Sock.sendall(cmd)
        Sock.sendall(b'\n')
        time.sleep(1)
    except socket.error:
        #Send failed
        print ('Send failed')
        sys.exit()
    reply = Sock.recv(4096)
    return reply

def SocketClose(Sock):
    #close the socket
    Sock.close()
```

```

time.sleep(.300)

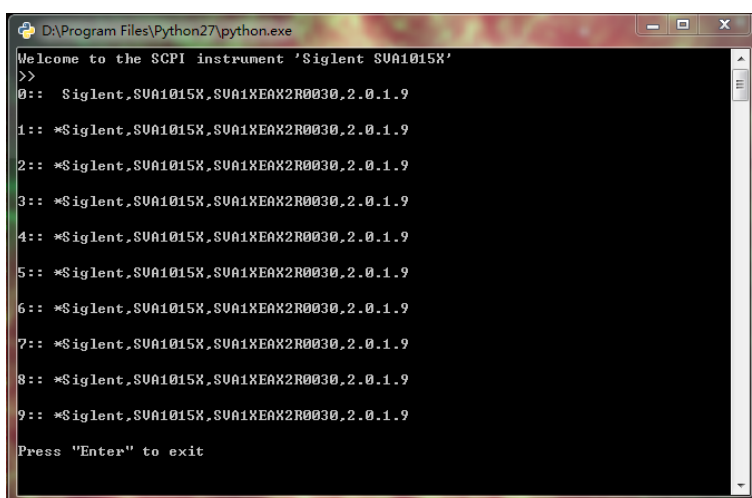
def main():
    global remote_ip
    global port
    global count

    # Body: send the SCPI commands *IDN? 10 times and print the return message
    s = SocketConnect()
    for i in range(10):
        qStr = SocketQuery(s, b'*IDN?')
        print (str(count) + ":: " + str(qStr))
        count = count + 1
        SocketClose(s)
    input('Press "Enter" to exit')

if __name__ == '__main__':
    proc = main()

```

### Run result:



```

D:\Program Files\Python27\python.exe
Welcome to the SCPI instrument 'Siglent SUA1015X'
>>
0:: Siglent,SUA1015X,SUA1XEAX2R0030,2.0.1.9
1:: *Siglent,SUA1015X,SUA1XEAX2R0030,2.0.1.9
2:: *Siglent,SUA1015X,SUA1XEAX2R0030,2.0.1.9
3:: *Siglent,SUA1015X,SUA1XEAX2R0030,2.0.1.9
4:: *Siglent,SUA1015X,SUA1XEAX2R0030,2.0.1.9
5:: *Siglent,SUA1015X,SUA1XEAX2R0030,2.0.1.9
6:: *Siglent,SUA1015X,SUA1XEAX2R0030,2.0.1.9
7:: *Siglent,SUA1015X,SUA1XEAX2R0030,2.0.1.9
8:: *Siglent,SUA1015X,SUA1XEAX2R0030,2.0.1.9
9:: *Siglent,SUA1015X,SUA1XEAX2R0030,2.0.1.9
Press "Enter" to exit

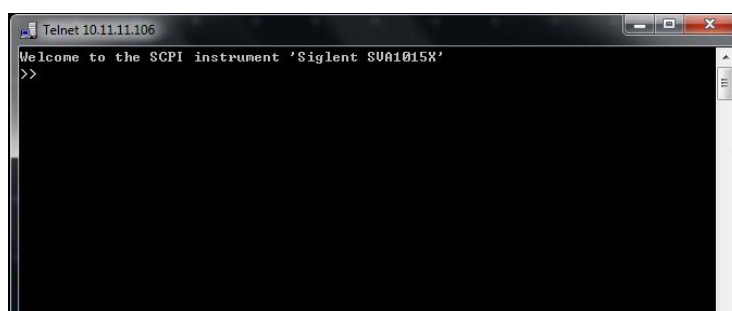
```

## 6.2.2 Example of Telnet

**Telnet SCPI:** Provides the ability to send single SCPI commands from a remote PC to the analyzer using LAN port number 5024.

How to send single SCPI commands using Telnet:

1. On the remote PC, click Start, then Run
2. Type: **telnet <ip address> 5024**
3. A Telnet window with a >> prompt should appear on the remote PC screen.



```

Telnet 10.11.11.106
Welcome to the SCPI instrument 'Siglent SUA1015X'
>>

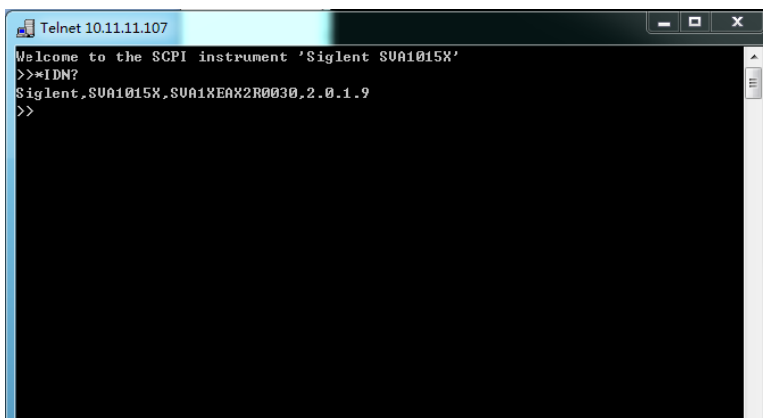
```

4. From the SCPI prompt:

## SIGLENT

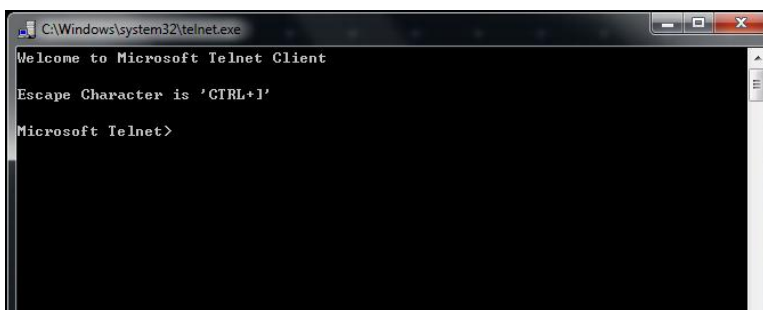
---

- Type single SCPI commands. Press Enter to send the command.



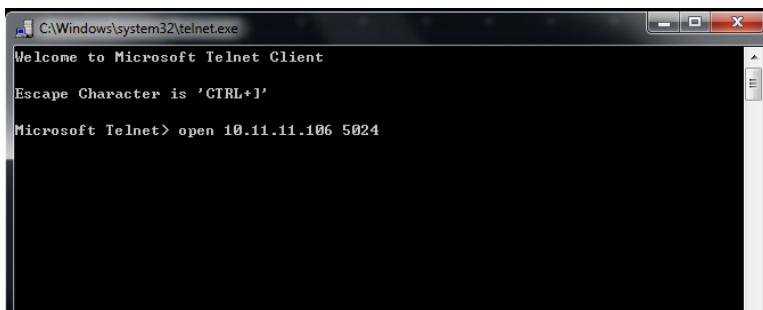
```
Telnet 10.11.11.107
Welcome to the SCPI instrument 'Siglent SUA1015X'
>>*IDN?
Siglent,SUA1015X,SUA1XEXX2R0030,2.0.1.9
>>
```

- To exit the telnet window click X in the upper-right corner.
- To get a normal telnet prompt, press Ctrl ] (closing bracket).



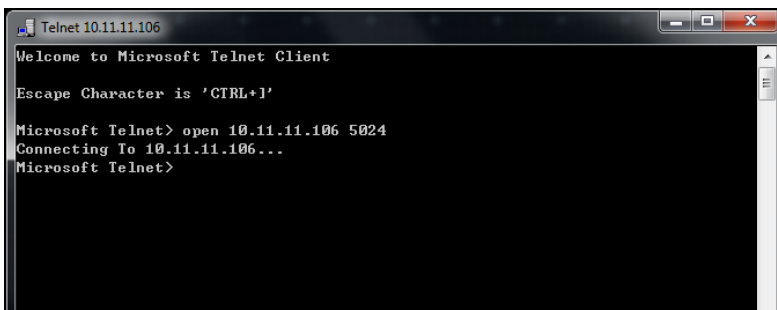
```
C:\Windows\system32\telnet.exe
Welcome to Microsoft Telnet Client
Escape Character is 'CTRL+]'
Microsoft Telnet>
```

- To get SCPI prompt again, type open <ip Address> 5024.



```
C:\Windows\system32\telnet.exe
Welcome to Microsoft Telnet Client
Escape Character is 'CTRL+]'
Microsoft Telnet> open 10.11.11.106 5024
```

Press Enter:



```
Telnet 10.11.11.106
Welcome to Microsoft Telnet Client
Escape Character is 'CTRL+]'
Microsoft Telnet> open 10.11.11.106 5024
Connecting To 10.11.11.106...
Microsoft Telnet>
```

- To close the normal telnet window, type **Quit** and press **Enter**.