S2 and S4 series

Network Analyzer

Programming Manual.

SCPI Commands.

Software version 19.1

2019

TABLE OF CONTENTS

1 Introduction

This Manual contains information about the CMT Network Analyzer remote control and its data communication, carried out by means of user program through a computer network.

This manual describes the analyzer command system and the network protocols used to deliver the commands. The commands sent to and the responses read from the analyzer are text messages conforming to the **SCPI** (Standard Commands for Programmable Instruments) specification. The text messages are delivered over computer networks using HiSLIP or TCP/IP Socket network protocols.

HiSLIP (High-Speed LAN Instrument Protocol) – a network protocol intended for remote control of measuring and testing equipment, is based on the TCP/IP network protocol. HiSLIP is developed by the consortium IVI Foundation as the successor to GPIB[1] and VXI-11[2] protocols. The user program, as a rule, relies on the implementation of the HiSLIP protocol in the VISA library.

TCP/IP Socket is a general-purpose network protocol. The user program can connect to the analyzer using the TCP/IP Socket protocol both directly and through the VISA library.

VISA (Virtual Instrument Software Architecture) is a widely used software input-output interface in the field of testing and measurement for controlling devices from a personal computer. It is a library of functions for C / C ++, C #, Visual Basic, MATLAB, LabVIEW and others. The VISA library unifies access to all measuring instruments, regardless of the protocol and equipment used. The VISA library is installed on the client side, that is, on the computer where the user program is executed. The VISA library is available on the websites of many companies for free download. There are versions for Linux, Mac OS, Windows.

Section 2 of the manual describes how to establish a network connection between the user program and the analyzer using the HiSLIP or TCP/IP Socket protocol. It shows the differences between the HiSLIP and TCP/IP Socket protocols in terms of writing user programs.

Sections 3 and 4 of the manual describe general information about SCPI and the analyzer command system, respectively.

Section 5 of the manual focuses on recommendations about programming in some specific situations.

Appendixies 1 through 3 contain information about the IEE488.2 Status Reporting System, Error Codes, and Sample Programs.

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[1] GPIB is a bus interface that connects measurement and test equipmet to a computer.
[2] VXI-11 is a network protocol for remote control of measurement and test equipmet.

Note. Analyzers support an alternative remote control technology based on COM. Its description is contained in a separate manual.

1.1 Programming Manual Scope

This programmer's manual covers the 2-port and 4-port models of the CMT network analyzers listed below.

The 2-port network analyzers controlled by the S2VNA softwar are:

- Planar 304/1
- Planar 804/1
- Planar 814/1
- S5048
- S5065
- S5085
- S7530
- S5180
- C1209
- C1220
- C2220
- C2209
- C4209
- C4220

The 4-port network analyzers controlled by the S4VNA software are:

- Planar 808/1
- C1409
- C1420
- C2409
- C4409

1.2 Related Documents

Before reading this Manual, familiarize yourself with Analyzer Operating Manual.

1.3 References

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

Standard Commands for Programmable Instruments (SCPI), *http://www.ivifoundation.org/specifications*

High-Speed LAN Instrument Protocol (HiSLIP), *http://www.ivifoundation.org/specifications*

VISA specifications, *http://www.ivifoundation.org/specifications*

2 Connection Setup

2.1 Overview

To enable remote control of the analyzer, the user must enable the HiSLIP server or Socket server in the settings of the analyzer's program. After that the analyzer's program waits for connection from the user program (client).

HiSLIP server and Socket server use various network protocols based on TCP/IP protocol. HiSLIP is a specialized protocol developed for measuring and test equipment. TCP/IP Socket is a general-purpose protocol.

It is possible to simultaneously enable both HiSLIP and Socket servers in the analyzer program. In this case, the client determines the connection protocol. When using the VISA library, the client selects the protocol by specifying it in the address string of the analyzer.

After a connection has been established on the initiative of the client, the latter can send text commands and read the results of the measurements. The command set is the same for both protocols and is described in sections 3 and 4.

The VISA library hides the details of protocol implementation from the user and provides an uniform I/O interface. Nevertheless, there are some minor differences in programming methods using the HiSLIP and TCP/IP Socket protocols, which are described later in Section 2.7.

Usually the user program and the analyzer program run on different computers connected by the local network. However, it is possible that the user and analyzer program runs on the same computer. In the latter case, the client specifies the IP address of the analyzer's computer – 127.0.0.1 or the network name of the analyzer's computer – *localhost*.

Multiple analyzer programs can be executed on the same computer (when several USB analyzer blocks are connected). In this case, remote control of each analyzer is possible. For this purpose, the user must specify a unique TCP/IP port number in the settings of each analyzer program.

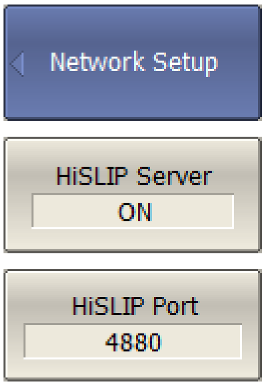
One analyzer program does not limit the number of simultaneously connected clients. Clients themselves are responsible for the absence of conflicts in the remote control of the analyzer. The HiSLIP protocol supports the exclusive or shared lock of the analyzer by the client. For more details about locks, see the VISA manual.

2.2 Analyzer Setting

For remote access to the analyzer it is necessary to make the following settings in its program:

- Enable HiSLIP server and/or Socket server;
- Configure the TCP/IP port number (optional).

Configuring the TCP/IP port number is necessary in the only case where several analyzer programs are simultaneously executed on the same computer, and these programs require remote remote control. In other cases, you should leave the default TCP/IP port number: for the HiSLIP server - 4880, and for the Socket server – 5025.

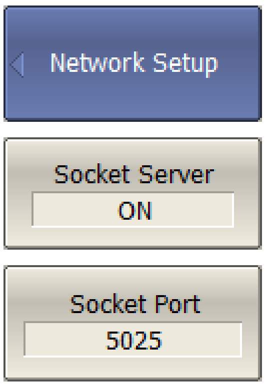


To enable remote control of the analyzer using the HiSLIP protocol, press the following softkeys:

System > Misc Setup > Network Setup > HiSLIP Server [ON/OFF].

To change the TCP/IP port number of the HiSLIP server, use the following softkeys:

System > Misc Setup > Network Setup > HiSLIP Port.



To enable remote control of the analyzer using the Socket protocol, press the following softkeys:

System > Misc Setup > Network Setup > Socket Server [ON/OFF].

To change the TCP/IP port number of the Socket server, use the following softkeys:

System > Misc Setup > Network Setup > Socket Port.

2.3 Client Setting

If the client is a user program that works through the VISA library, the easiest way to configure the network connection with the Analyzer is using a special graphical utility from VISA package (for example, NI-MAX, Keysight Connection Expert).

According to the manual for the above utilities, add a new network device, specifying the network name or IP address of the Analyzer's computer, and the protocol. As a result of successful connection to the Analyzer, the VISA address of the analyzer will be automatically generated and displayed. The VISA address of the Analyzer is used later in the user program in order to open the connection.

The format of the VISA address for the HiSLIP and Socket protocols:

HiSLIP	TCPIP[board]::*host address*[::*HiSLIP device name*[,*HiSLIP port*]][::INSTR]
Socket	TCPIP[*board*]::*host address*::*port*::SOCKET

Examples of VISA address for HiSLIP and Socket protocols:

HiSLIP	TCPIP0::192.168.0.1::hislip0::INSTR TCPIP0::localhost::hislip0::INSTR
Socket	TCPIP0::192.168.0.1::5025::SOCKET TCPIP0::localhost::5025::SOCKET

If the client is a user program that does not use the VISA library, then only the TCP/IP Socket protocol is available to it. In this case, the user program establishes a connection using the IP address of the analyzer's Socket server.

The format of the IP address of the analyzer's Socket server:

Socket	*host address*:*port*

Examples of the IP address of the analyzer's Socket server:

Socket	192.168.0.1:5025 localhost:5025

2.4 VISA Library

Using the VISA (Virtual Instrument Software Architecture) library is most common approach. The VISA library is a widely used software input-output interface in the field of testing and measurement for controlling devices from a personal computer. It is a library of functions for C/C ++, C #, Visual Basic, MATLAB, LabVIEW and others.

The VISA Library unifies access to all measuring instruments, regardless of the protocol and equipment used.

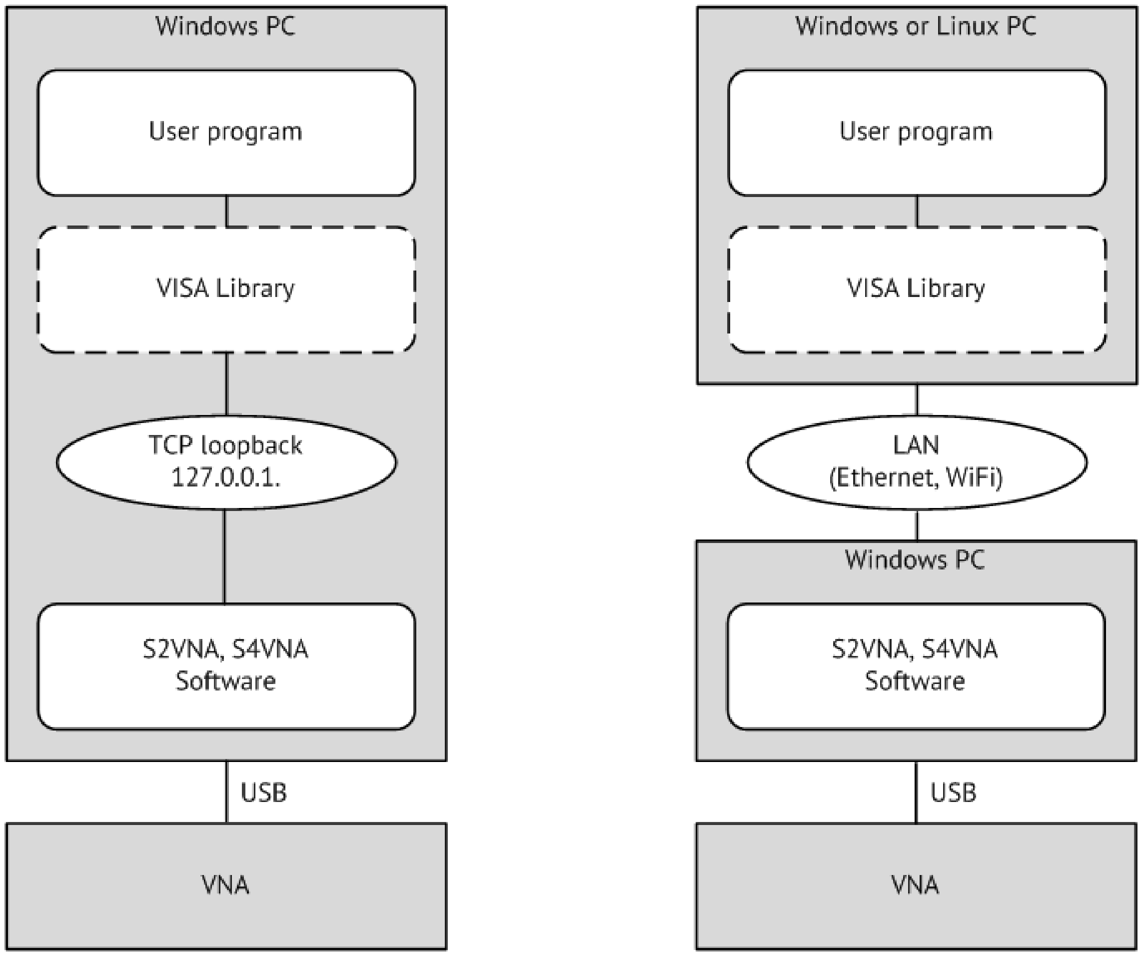
The VISA library is installed on the client side, that is, on the computer where the user program is executed. The VISA library is available on the websites of many companies for free download. There are versions for Linux, Mac OS, Windows

2.5 Network and Local Configuration

A network configuration involves executing a user program and analyzer program on different computers connected by a local area network.

The local configuration involves executing the user program and the analyzer program on the single computer.

The figure shows the local configuration on the left and the network configuration on the right.



The local configuration is possible due to to the standard TCP/IP stack function – TCP loopback. The TCP loopback function allows network applications to communicate in a standard way within a single computer. The most widely used IP address in the TCP loopback mechanism is 127.0.0.1. Instead of the numeric address 127.0.0.1, it is possible to use the symbolic name *localhost*.

Note: The network configuration does not restrict the client in choosing the OS. The local configuration limits the client in choosing the OS – only Windows.

2.6 Connecting Multiple Analyzers to Single Computer

This section describes in detail how to configure the remote control of the multiple analyzer programs executed simultaneously on a single computer (provided several USB analyzer hardware units connected to the single computer).

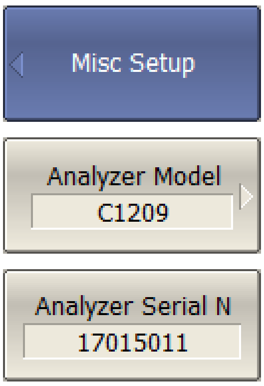
- It is recommended that you create a separate folder for each analyzer with the software. This allows you to save individual settings for each analyzer.
- It is recommended that each copy of the software be linked to a specific hardware unit by its serial number or model (see at the end of this section).
- Assign a unique TCP/IP port number for each copy of the software for the HiSLIP or Socket protocol used. For example, if HiSLIP is used, assign port 4880 to the first analyzer, 4881 to the second, and so on. When assigning a port number, the user must ensure that the port number is not used by other programs.
- Use the analyzer's address in the user program with the mandatory indication of the TCP/IP port number assigned to the analyzer, as in the examples given.

Examples of the VISA address for the HiSLIP and Socket protocols with the indication of the TCP/IP port:

HiSLIP	TCPIP0::192.168.0.1::hislip0,4880::INSTR TCPIP0::192.168.0.1::hislip0,4881::INSTR
Socket	TCPIP0::192.168.0.1::5025::SOCKET TCPIP0::192.168.0.1::5026::SOCKET

Examples of the TCP/IP address of the analyzer's Socket server with the indication of the port:

Socket	192.168.0.1:5025 192.168.0.1:5026



To link the analyzer program to the analyzer model, press the softkeys:

System > Misc Setup > Analyzer Model

To link the analyzer program to the analyzer serial number, press the softkeys:

System > Misc Setup > Analyzer Serial N

2.7 Differences in Use of HiSLIP and Socket Protocols

This section describes the differences in the methods of writing user programs due to the use of different HiSLIP and TCP/IP Socket protocols. It is assumed that the user program works through the VISA library.

The list of differences in a brief form is given below. Then a detailed description of each item is given.

1. The terminal character <*newline*> in the commands sent to the analyzer.

2. The terminal character <*newline*> in the analyzer's responses.

3. Determine the *interrupted* violation of the messages exchange protocol of IEEE488.2.

4. Support for the IEEE488.2 *Status Reporting System*.

5. Support the transfer of binary data.

2.7.1 Terminal Character in Messages to Analyzer

The user program sends variable-length text messages to the analyzer. The end of the message, according to IEEE488.2, is transmitted either by protocol means (not by a symbol), or by the symbol <*newline*> ('\n', 0x0A, 10), or both methods together.

The HiSLIP has a mechanism for transmitting the end of the message by protocol means, while the Socket protocol does not. This makes the following requirements for programs sending commands to analyzer:

- Programs using the Socket protocol **shall** send a <*newline*> character at the end of the message;

- Programs using the HiSLIP protocol **may** send the <*newline*> symbol at the end of the message.

Note for the graphical language LabVIEW when using the Socket protocol: to be able to enter the symbol <*newline*> at the end of the message, you need to right-click on the string constant and enable **'\'** ***Codes Display***. The <*newline*> character is entered as **'\n'**.

Note for the textual languages: it is recommended to use to the symbol <*newline*> at the end of the message regarless of the protocol used.

2.7.2 Terminal Character in Analyzer Responses

When using the HiSLIP protocol, the analyzer terminates messages with the symbol <*newline*> + the protocol defined end of message (not symbolic).

When using the Socket protocol, the analyzer terminates messages only with the <*newline*> symbol, since the Socket protocol does not have the protocol defined end of message.

Depending on the protocol used, you need to make the following settings for the VISA library so that it correctly determines the end of the message from the analyzer:

- When using the HiSLIP protocol – no settings are required, the VISA library functions normally with default settings;
- When using the Socket protocol, the user program must set the attribute VI_ATTR_TERMCHAR_EN to TRUE (completion of the read operation when the <*newline*> character is received).

Examples of setting up the VISA library using the Socket protocol:

C/C++	viSetAttribute(instr, VI_ATTR_TERMCHAR_EN, VI_TRUE);
LabVIEW	

2.7.3 Interrupted Error

The HiSLIP protocol meets the requirements of the IEEE Std 488.2 message exchange protocol to detect an interrupted error[3]. The interrupted error indicates that the Analyzer received an incoming message (command or query) before the client accepted a response from the previous request. In other words, the client is required to read the result of each query before sending the next query or command. If the client fails to do so, the protocol generates an error message and the response from the previous query is cleared by the protocol.

The Socket protocol does not detect the interrupted error. Multiple queries can be sent to the analyzer without a read operation between them. Answers from

[3] The analyzer implements the synchronized mode of the HiSLIP protocol.

queries will be returned in the order in which they were sent. The client himself determines from which request a specific answer has been received.

2.7.4 IEEE488.2 Status Reporting System

The HiSLIP protocol fully supports the analyzer's IEEE488.2 Status Reporting System described in the appendix, while the Socket protocol supports it only partially. The Socket protocol does not support the following functions:

- The MAV (message available) bit in the Status Byte;
- SRQ (service request) generation - request from the analyzer, implemented by callback functions in the VISA library;
- Read the Status Byte using the dedicated function – viReadSTB.

2.7.5 Transfer of Binary Data

By default, data from the analyzer is sent in text form. To increase the speed of the exchange, the user has the option to enable binary data transfer. The transfer of binary data is enabled by the FORMat:DATA command and is effective for commands that transfer large data ammounts. A list of such commands is given in the description of the FORMat:DATA command.

The HiSLIP protocol supports the transfer of binary data, since it provides the protocol defined end of message (not symbolic).

The Socket protocol does not support the transfer of binary data, since it use the <*newline*> byte as the end of the message, which can occur in binary data.

3 SCPI Overview

The analyzer implements a set of commands based on the standard SCPI-1999 (Standard Commands for Programmable Instruments). This is a set of instructions oriented to the exchange of symbolic messages.

SCPI was developed by the SCPI Consortium (currently supported by the IVI Foundation). The main details of the SCPI standard are described below. More information about the SCPI standard can be downloaded from the IVI Foundation website.

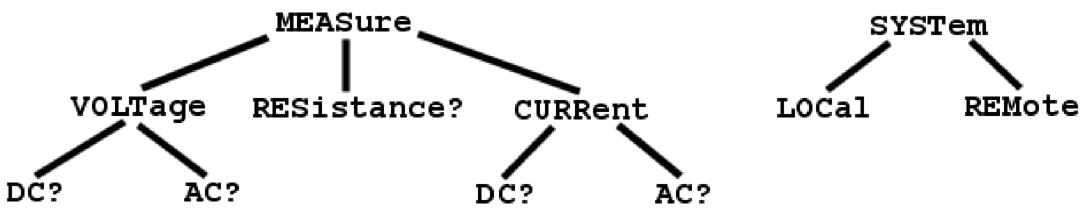
3.1 Messages

The SCPI is text message oriented protocol. The commands are sent as character messages. One message can contain one or several commands. The answer from instrument is read out as a text message by default. Optionaly an instrument can be programmed to output a binary data.

Note	The Analyzer supports the binary data output when using HiSLIP protocol. The Analyzer does not support the binary data output when using TCP/IP Socket protocol.

3.2 Command Tree

The SCPI commands are organized in a tree structure. For example:



Each tree structure forms a functional system. The base of the tree is called root, e.g. MEASure and SYSTem. Each functional system can have subsystems of lower level. The final nodes are called leaves. The entire sequence from root to the leaf makes up the command. For example, part of SOURCe functional system looks as follows:

```
:SOURce
     :POWer
          :CENTer
          :STARt
          :SPAN
          :STOP
          [:LEVel]
               :SLOPe
                    [:DATA]
                    :STATe
```

This SOURce branch has several levels, where CENTer, STARt, SPAN, STOP, DATA, STATe are the leaves, which represent the following six commands:

```
:SOURce:POWer:CENTer
:SOURce:POWer:STARt
:SOURce:POWer:SPAN
:SOURce:POWer:STOP
:SOURce:POWer[:LEVel]:SLOPe[:DATA]
:SOURce:POWer[:LEVel]:SLOPe:STATe
```

The tree can contain subsystems and leaves with the same names if they belong to different branches, e.g. CENTer leaf is on the tips of different branches:

```
:SOURce                            :SENSe
     :POWer                             :FREQuency
          :CENTer                            :CENTer
```

3.3 Subsystems

A colon (':') separates the subsystems. The subsystems, which follow the colon are of a lower level. For example, in command:

```
:SOURce:POWer:STARt
```

the start power STARt is a part of POWer subsystem, which is a part of SOURce subsystem. The stop power is also a part of :SOURce:POWer subsystem. It is specified by:

```
:SOURce:POWer:STOP
```

The first colon in the line can be omitted, for example:

```
SOURce:POWer:STOP
```

3.4 Optional Subsystems

Some subsystems can be specified as optional, if omission of such a subsystem will not lead to ambiguity. This means that the subsystem can be omitted in command line. The optional subsystems are bracketed ("[]"). For example, if full command specification is written as:

```
SOURce:POWer[:LEVel]:SLOPe[:DATA]
```

subsystems LEVel and DATA are optional. Therefore the both commands are valid:

```
SOURce:POWer:LEVel:SLOPe:DATA
SOURce:POWer:SLOPe
```

3.5 Long and Short Formats

Each keyword in a command specification has a long format and a short format. The short format of a command is indicated by capital letters. For example, a command specification:

```
SENSe:FREQuency:CENTer
```

can be written as:

```
SENS:FREQ:CENT
SENS:FREQ:CENTer
```

Only long or short form of each keyword is acceptable. For example, the following specification is incorrect:

```
:SENS:FREQuen:CEN
```

3.6 Case Sensitivity

The commands are not case sensitive. Upper case and lower case letters are only used to indicate the long and short formats of a command specification. For example, the following commands are equivalent:

```
SENS:FREQ:STAR
sens:freq:star
```

3.7 Parameters

The commands can have parameters. The parameters are separated from the command by a space. If a command has several parameters, they are separated by commas (',').

3.7.1 Numeric Values

The numeric values are integer or real numbers. These parameters can have measurement units. For example:

```
SENS:FREQ 1000000000
SENS:FREQ 1000 MHz
SENS:FREQ 1 GHz
SENS:FREQ 1E9
```

3.7.1.1 Multiplier Prefixes

The SCPI standard allows specification of the numeric values with multiplier prefix to the measurement units.

Prefix	Multiplier
A	1e−18
F	1e−15
P	1e−12
N	1e−9
U	18−6
M	1e−3
K	1e3
MA	1e6
G	1e9
T	1e12
PE	1e15
EX	1e18

There are two exceptions to the above designation: prefix M in combination with HZ or OHM means 1e6 (Mega), and not 1e−3 (milli), i.e. MHZ means Megahertz, same as MAHZ.

3.7.1.2 Notations

The SCPI standard allows numeric value specification in different notations. Decimal notation is used by default. To use other notations, specify the numeric values in the following way:

Notation	**Prefix**	**Example**
Binary	**#B**	#B11001010 = 202_{10}
Octal	**#Q**	#Q107 = 71_{10}
Hexadecimal	**#H**	#H10FF = 4351_{10}

3.7.2 Booleans

The booleans can assume two values: logical *yes* and logical *no* (ON and OFF), and specified in command as:

`ON` or `1` – logical yes
`OFF` or `0` – logical no

For example:

```
DISPlay:ENABle OFF
DISPlay:ENABle 0
```

3.7.3 Character Data

The SCPI standard allows specification of parameters as character data, as in the following command:

```
TRIGger:SOURce {BUS|IMMediate|EXTernal}
```

the possible values of the character data – "BUS", "IMMediate", "EXTernal".

The character data have long and short format, and the formats are specified in accordance with the same rules as described in Section 3.5.

Apart from that, the character data can be combined with numerical parameters. For example:

```
SENSe:FREQuency:STARt {MINimum|MAXimum|<value>}
```

The following specifications are acceptable:

```
SENSe:FREQuency:STARt MIN
SENSe:FREQuency:STARt maximum
SENSe:FREQuency:STARt 1000000
```

3.7.4 String Parameters

In some cases, the Analyzer can accept parameters made of character strings. Such strings are enclosed with single quotes (') or double quotes ("). For example, the file name in the state saving command:

```
MMEMory:STORe "state01.sta"
```

3.7.5 Numeric Lists

The numeric lists (*<numeric list>*) are used to specify a variable number of numerical parameters, for example:

```
CALC:LIMit:DATA 2,1,1E9,3E9,0,0,2,1E9,3E9,-3,-3
```

3.8 Query Commands

The query commands read out the parameter values from the Analyzer. After a query command has been sent, the response should return via remote control interface.

The query commands has a question mark ('?') in the end of the command. Many of the commands have two forms. The form with a question mark writes the parameter, the form without a question mark reads out the parameter. For expample:

```
SENSe:FREQuency:STARt 1MHz
SENSe:FREQuency:STARt?
```

3.9 Numeric Suffixes

The Analyzer contains several items of the same type, such as 16 channels, each of which in turn contains 16 traces, etc. A numeric suffix is used to denote the item number in a command. The suffix is added to the keyword of the item (channel, trace, etc). For expample, in the following specification the channel number *<Ch>* and trace number *<Tr>* indicate the channel and trace, to which this command is addressed:

```
CALCulate<Ch>:PARameter<Tr>:DEFine
```

According to this specification, the command referred to the trace 2 of the channel 1 will be written as follows:

```
CALC1:PAR2:DEF
```

The numeric suffix can be omitted. In this case, it is 1 by default. For example, the following commands are equivalent:

```
CALC:PAR:DEF
CALC1:PAR1:DEF
```

3.10 Compound Commands

It is possible to enter more than one command in the same command line. The commands in the line are separated by a semicolon (';'). The specification of the first command is valid for the following command, except for the last leaf before the semicolon. For expample:

```
SENS:FREQ:STAR 1 MHZ;STOP 2MHZ
```

If you need to start the next command from the highest level of the structure, this command should start from a colon (':'):

```
SENS:FREQ:STAR 1 MHZ;:CALC:PAR:DEF S21
```

3.11 IEEE488.2 Common Commands Overview

A SCPI compatible Analyzer must support a set of common commands of IEEE488.2 standard. These commands start with an asterix ('*'). The list of such commands see below:

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

These commands are used for resetting, state queries, etc.

4 Remote Commands

4.1 Conventions

The following conventions are used throughout the Manual.

4.1.1 Syntax

The following symbols are used in command syntax:

<>	identifiers enclosed in angular brackets indicated that a particular type of data must be specified
[]	part enclosed in square brackets can be omitted
{}	part enclosed in curly brackets indicates that you must select one of the items in this part. Individual items are separated by a vertical bar "|"
Space	space separates commands from parameters
,	comma separates adjacent parameters
...	ellipses indicates that parameters in that part are omitted

4.1.2 Identifiers

<table>
<tr><th>Identifier</th><th>Parameter</th><th>Description</th></tr>
<tr><td><numeric></td><td>Number</td><td>{<integer>|<real>}</td></tr>
<tr><td><frequency></td><td>Frequency</td><td><numeric>{[HZ]|KHZ|MHZ|GHZ}</td></tr>
<tr><td><power></td><td>Power</td><td><numeric>{[DBM]|DBMW|DBW|KW|W|MW|UW|NW}</td></tr>
<tr><td><time></td><td>Time</td><td><numeric>{[S]|MS|US|NS|PS|FS}</td></tr>
<tr><td><phase></td><td>Phase</td><td><numeric>{[DEG]|MADEG|KDEG|MDEG|UDEG}</td></tr>
<tr><td><stimulus></td><td>Stimulus</td><td>{<frequency>|<power>|<time>}</td></tr>
<tr><td><numeric list></td><td>Numeric List</td><td><numeric 1>,<numeric 2>,...<numeric N></td></tr>
<tr><td><bool></td><td>Boolean parameter</td><td>{0|1|ON|OFF}</td></tr>
<tr><td><char></td><td>Character parameter</td><td>Predefined set of character strings without quotes</td></tr>
<tr><td><port></td><td>Port Number</td><td><integer></td></tr>
<tr><td><string></td><td>String parameter</td><td>Quoted string</td></tr>
</table>

4.2 IEEE488.2 Common Commands

*CLS

*CLS

Description	Clears the following: • Error Queue • Status Byte Register • Standard Event Status Register • Operation Status Event Register • Questionable Status Event Register • Questionable Limit Status Event Register • Questionable Limit Channel Status Event Register (no query)
Target	Status Reporting System
Equivalent Softkeys	**None**

*ESE

*ESE *<numeric>*

*ESE?

Description	Sets or reads out the value of the Standard Event Status Enable Register. (command/query)
Target	Status Reporting System
Parameter	*<**numeric**>* 0 to 255
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**None**

*ESR?

*ESR?

Description	Reads out the value of the Standard Event Status Register. Executing this command clears the register value. (query only)
Target	Status Reporting System
Query Response	*<numeric>*
Equivalent Softkeys	**None**

*IDN?

*IDN?

Description	Reads out the Analyzer identification string. (query only)
Target	Analyzer
Query Response	The identification string in format: <manufacturer>, <model>, <serial number>, <software version>/<hardware version>. For example: CMT, C1209, 08080188, 16.2/01
Equivalent Softkeys	**None**

*OPC

*OPC

Description	Sets the OPC bit (bit 0) of the Standard Event Status Register at the completion of all pending operations. The pending operation caused by the command TRIG:SING only. (no query)
Target	Status Reporting System
Equivalent Softkeys	**None**

*OPC?

*OPC?

Description	Reads out the "1" at the completion of all pending operations. The query blocks the execution of the user program until execution of all previous instructions. The query *OPC? can be used for waiting for the end of a sweep initiated by the command TRIG:SING. (query only)
Target	Analyzer
Query Response	1
Related Commands	TRIG:SING
Equivalent Softkeys	**None**

*RST

*RST

Description	Restores the default settings of the Analyzer. There is difference from presetting the Analyzer with SYST:PRES command – in this case all channels are set to *Hold*. (no query)
Target	Analyzer
Related Commands	SYSTem:PRESet
Equivalent Softkeys	**None**

*SRE

*SRE *<numeric>*

*SRE?

Description	Sets or reads out the value of the Service Request Enable Register (command/query)
Target	Status Reporting System
Parameter	***<numeric>*** 0 to 255
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**None**

*STB?

*STB?

Description	Reads out the value of the Status Byte Register (query only)
Target	Status Reporting System
Query Response	*<numeric>*
Equivalent Softkeys	**None**

*TRG

*TRG

Description	Generates a trigger signal and initiates a sweep under the following conditions. 6. Trigger source is set to the *BUS* (set by the command TRIG:SOUR BUS), otherwise an error occurs and the command is ignored. 7. Analyzer must be in the *trigger waiting* state, otherwise (the analyzer is in the *measurement* state or *hold* state) an error occurs and the command is ignored. The command is completed immediately after the generation of the trigger signal. (no query)
Target	Analyzer
Related Commands	TRIG:SOUR
Equivalent Softkeys	**None**

*WAI

*WAI

Description	Delays the execution by the **analyzer** of the next command till the completion of the command TRIG:SING. In absence of a pending command TRIG:SING the command *WAI is equivalent to an empty operation. A query that follows the command *WAI blocks the execution of the user program till the completion of the command TRIG:SING, similarly to the query *OPC?. (no query)
Target	Analyzer
Related Commands	TRIG:SING
Equivalent Softkeys	**None**

4.3 Network Analyzer Commands

ABOR

ABORt

Description	Aborts the sweep. The channels in the *Single* trigger initiation mode transit to the *Hold* state. The channels in the *Continuous* trigger initiation mode transit to the *trigger waiting* state, if the trigger source is set to *Internal*, the channel immediately starts a new sweep. (no query)
Related Commands	INIT:CONT
Equivalent Softkeys	**Stimulus > Trigger > Restart**

CALC:FSIM:BAL:CZC:BPOR:Z0

CALCulate<*Ch*>:FSIMulator:BALun:CZConversion:BPORt<*Bpt*>:Z0[:R] <*numeric*>

CALCulate<*Ch*>:FSIMulator:BALun:CZConversion:BPORt<*Bpt*>:Z0[:R]?

Description	Sets or reads out the impedance value for the common impedance conversion function of the balanced port. The impedance is real. The default impedance value equals to 25 Ω. (command/query)
Target	Balanced Port <*Bpt*> of channel <*Ch*>, <*Ch*>={[1]|2|...16} <*Bpt*>={[1]|2}, 1 or 2 for the Bal-Bal topology, always 1 for the SE-Bal, SE-SE-Bal and Bal topology.
Parameter	<***numeric***> the new value of the common impedance of the balanced port from 1 mΩ to 10 MΩ.
Unit	Ω (Ohm)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<*numeric*>
Preset Value	25 Ω
Equivalent Softkeys	**Analysis > Fixture Simulator > Cmn ZConversion > Bal Port n**

CALC:FSIM:BAL:CZC:STAT

CALCulate*<Ch>*:FSIMulator:BALun:CZConversion:STATe {OFF|ON|0|1}

CALCulate*<Ch>*:FSIMulator:BALun:CZConversion:STATe?

<table>
<tr><td>Description</td><td>Turns ON/OFF the common impedance conversion function of the balanced port.
(command/query)</td></tr>
<tr><td>Target</td><td>The channel <Ch>={[1]|2|...16}</td></tr>
<tr><td>Parameter</td><td>{ON|1} : ON
{OFF|0} : OFF</td></tr>
<tr><td>Query Response</td><td>{0|1}</td></tr>
<tr><td>Preset Value</td><td>0</td></tr>
<tr><td>Equivalent Softkeys</td><td>Analysis > Fixture Simulator > Cmn ZConversion > Cmn ZConversion [On/Off]</td></tr>
</table>

CALC:FSIM:BAL:DEV

CALCulate*<Ch>*:FSIMulator:BALun:DEVice *<char>*

CALCulate*<Ch>*:FSIMulator:BALun:DEVice?

Description	Selects the type of balanced device of the balance-unbalance fixture simulation function (command/query, S4 only).
Target	The channel *<Ch>*={[1]|2|...16}
Parameter	*<char>* Specifies type of the balanced device: **SBALanced** : Unbalance-Balance (3 ports) **BBALanced** : Balance-Balance (4 ports) **SSBalanced** : Unbalance-Unbalance-Balance (4 ports) **BALanced** : Balance (2 ports)
Query Response	{SBAL|BBAL|SSB|BAL}
Preset Value	BBAL
Equivalent Softkeys	**Analysis > Fixture Simulator > Topology > Device > {SE-Bal | Bal-Bal | SE-SE-Bal | Bal }**

CALC:FSIM:BAL:DMC:BPOR:PAR:C

CALCulate<*Ch*>:FSIMulator:BALun:DMCircuit:BPORt<*Bpt*>:PARameters:C <*numeric*>

CALCulate<*Ch*>:FSIMulator:BALun:DMCircuit:BPORt<*Bpt*>:PARameters:C?

Description	Sets or reads out the capacitance value of the C element of the differential matching circuit. (command/query)
Target	Balanced Port <*Bpt*> of channel <*Ch*>, <*Ch*>={[1]|2|...16} <*Bpt*>={[1]|2}, 1 or 2 for the Bal-Bal topology, always 1 for the SE-Bal, SE-SE-Bal and Bal topology.
Parameter	***<numeric>*** the capacitance value of the C element of the differential matching circuit from 1e−18 to 1e18.
Unit	F (Farad)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<*numeric*>
Preset Value	0
Equivalent Softkeys	**Analysis > Fixture Simulator > Diff Matching > Bal Port n > C**

CALC:FSIM:BAL:DMC:BPOR:PAR:G

CALCulate<*Ch*>:FSIMulator:BALun:DMCircuit:BPORt<*Bpt*>:PARameters:G <*numeric*>

CALCulate<*Ch*>:FSIMulator:BALun:DMCircuit:BPORt<*Bpt*>:PARameters:G?

Description	Sets or reads out the conductance value of the G element of the differential matching circuit. (command/query)
Target	Balanced Port <*Bpt*> of channel <*Ch*>, <*Ch*>={[1]|2|...16} <*Bpt*>={[1]|2}, 1 or 2 for the Bal-Bal topology, always 1 for the SE-Bal, SE-SE-Bal and Bal topology.
Parameter	***<numeric>*** the conducitance value of the G element of the differential matching circuit from 1e−18 to 1e18.
Unit	S (Siemens)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**Analysis > Fixture Simulator > Diff Matching > Bal Port n > G**

CALC:FSIM:BAL:DMC:BPOR:PAR:L

CALCulate<*Ch*>:FSIMulator:BALun:DMCircuit:BPORt<*Bpt*>:PARameters:L <*numeric*>

CALCulate<*Ch*>:FSIMulator:BALun:DMCircuit:BPORt<*Bpt*>:PARameters:L?

Description	Sets or reads out the inductance value of the L element of the differential matching circuit. (command/query)
Target	Balanced Port <*Bpt*> of channel <*Ch*>, <*Ch*>={[1]|2|...16} <*Bpt*>={[1]|2}, 1 or 2 for the Bal-Bal topology, always 1 for the SE-Bal, SE-SE-Bal and Bal topology.
Parameter	<***numeric***> the inducitance value of the L element of the differential matching circuit from 1e−18 to 1e18.
Unit	S (Henry)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<*numeric*>
Preset Value	0
Note	If both elements L and R are equal to zero, then L and R elements are omited in the sheme. If any element L or R is not zero, then zero value of the rest element means short circuit.
Equivalent Softkeys	**Analysis > Fixture Simulator > Diff Matching > Bal Port n > L**

CALC:FSIM:BAL:DMC:BPOR:PAR:R

CALCulate<*Ch*>:FSIMulator:BALun:DMCircuit:BPORt<*Bpt*>:PARameters:R <*numeric*>

CALCulate<*Ch*>:FSIMulator:BALun:DMCircuit:BPORt<*Bpt*>:PARameters:R?

Description	Sets or reads out the resistance value of the R element of the differential matching circuit. (command/query)
Target	Balanced Port *<Bpt>* of channel *<Ch>*, *<Ch>*={[1]|2|...16} *<Bpt>*={[1]|2}, 1 or 2 for the Bal-Bal topology, always 1 for the SE-Bal, SE-SE-Bal and Bal topology.
Parameter	***<numeric>*** the resistance value of the R element of the differential matching circuit from 1e−18 to 1e18.
Unit	Ω (Ohm)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	0
Note	If both elements L and R are equal to zero, then L and R elements are omited in the sheme. If any element L or R is not zero, then zero value of the rest element means short circuit.
Equivalent Softkeys	**Analysis > Fixture Simulator > Diff Matching > Bal Port n > R**

CALC:FSIM:BAL:DMC:BPOR:TYPE

CALCulate<*Ch*>:FSIMulator:BALun:DMCircuit:BPORt<*Bpt*>:TYPE <*char*>

CALCulate<*Ch*>:FSIMulator:BALun:DMCircuit:BPORt<*Bpt*>:TYPE?

Description	Selects the type of the differential matching circuit for the specified balanced port number *Bpt* of the channel *Ch*. (command/query)
Target	Balanced Port <*Bpt*> of channel <*Ch*>, <*Ch*>={[1]|2|...16} <*Bpt*>={[1]|2}, 1 or 2 for the Bal-Bal topology, always 1 for the SE-Bal, SE-SE-Bal and Bal topology
Parameter	<*char*> Specifies the differential matching circuit: **NONE** : No-circuit **PLPC** : Shunt L – Shunt C **USER** : User defined circuit by touchstone file
Query Response	{NONE|PLPC|USER}
Preset Value	NONE
Related Commands	CALC:FSIM:BAL:DEV
Equivalent Softkeys	**Analysis > Fixture Simulator > > Diff Matching > Bal Port n > {None | Shunt L - Shunt C | User }**

CALC:FSIM:BAL:DMC:BPOR:USER:FIL

CALCulate<*Ch*>:FSIMulator:BALun:DMCircuit:BPORt<*Bpt*>:USER:FILename <*string*>

CALCulate<*Ch*>:FSIMulator:BALun:DMCircuit:BPORt<*Bpt*>:USER:FILename?

Description	Specifies a file defining the 2-port network which is used in the differential matching circuit, for the specified balanced port number *Bpt* of the channel *Ch*. The *.s2p file contains the circuit S–parameters in Touchstone format. (command/query)
Target	Balanced Port <*Bpt*> of channel <*Ch*>, <*Ch*>={[1]|2|...16} <*Bpt*>={[1]|2}, 1 or 2 for the Bal-Bal topology, always 1 for the SE-Bal, SE-SE-Bal and Bal topology
Parameter	***<srting>***, up to 256 characters
Notes	If the full path of the file is not specified, the \FixtireSim subdirectory of the application directory will be searched for the file.
Related Commands	CALC:FSIM:BAL:DMC:BPOR:TYPE
Equivalent Softkeys	**Analysis > Fixture Simulator > > Diff Matching > Bal Port n > User File**

CALC:FSIM:BAL:DMC:STAT

CALCulate<*Ch*>:FSIMulator:BALun:DMCircuit:STATe {OFF|ON|0|1}

CALCulate<*Ch*>:FSIMulator:BALun:DMCircuit:STATe?

Description	Turns ON/OFF the differential matching circuit function. (command/query)
Target	The channel <*Ch*>={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Analysis > Fixture Simulator > Diff Matching > Diff Matching**

CALC:FSIM:BAL:DZC:BPOR:Z0

CALCulate<*Ch*>:FSIMulator:BALun:DZConversion:BPORt<*Bpt*>:Z0[:R] <*numeric*>

CALCulate<*Ch*>:FSIMulator:BALun:DZConversion:BPORt<*Bpt*>:Z0[:R]?

Description	Sets or reads out the impedance value for the differential impedance conversion function of the balanced port. The impedance is real. The default impedance value equals to 100 Ω. (command/query)
Target	Balanced Port *<Bpt>* of channel *<Ch>*, *<Ch>*={[1]|2|...16} *<Bpt>*={[1]|2}, 1 or 2 for the Bal-Bal topology, always 1 for the SE-Bal, SE-SE-Bal and Bal topology.
Parameter	***<numeric>*** the new value of the differential impedance of the balanced port from 1 mΩ to 10 MΩ.
Unit	Ω (Ohm)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	100 Ω
Equivalent Softkeys	**Analysis > Fixture Simulator > Diff ZConversion > Bal Port n**

CALC:FSIM:BAL:DZC:STAT

CALCulate<*Ch*>:FSIMulator:BALun:DZConversion:STATe {OFF|ON|0|1}

CALCulate<*Ch*>:FSIMulator:BALun:DZConversion:STATe?

Description	Turns ON/OFF the differential impedance conversion function of the balanced port. (command/query)
Target	The channel <*Ch*>={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Analysis > Fixture Simulator > Diff ZConversion > Diff ZConversion [On/Off]**

CALC:FSIM:BAL:PAR:BAL

CALCulate*<Ch>*:FSIMulator:BALun:PARameter*<Tr>*:BALanced[:DEFine] *<char>*

CALCulate*<Ch>*:FSIMulator:BALun:PARameter*<Tr>*:BALanced[:DEFine]?

Description	Selects the measurement parameter of the fixture simulation function when the device type is BALanced. (command/query)
Target	Trace *<Tr>* of channel *<Ch>*, *<Tr>*={[1]|2|...16} *<Ch>*={[1]|2|...16}
Parameter	*<char>* Specifies the measurement parameter: **SDD11** **SCD11** **SDC11** **SCC11**
Query Response	{SDD11|SCD11|SDC11|SCC11}
Preset Value	SDD11
Related Commands	CALC:FSIM:BAL:DEV
Equivalent Softkeys	**Analysis > Fixture Simulator > Measurement > {Sdd11|Scd11|Sdc11| Scc11 }**

CALC:FSIM:BAL:PAR:BBAL

CALCulate*<Ch>*:FSIMulator:BALun:PARameter*<Tr>*:BBALanced[:DEFine] *<char>*

CALCulate*<Ch>*:FSIMulator:BALun:PARameter*<Tr>*:BBALanced[:DEFine]?

Description	Selects the measurement parameter of the fixture simulation function when the device type is BBALanced. (command/query)
Target	Trace *<Tr>* of channel *<Ch>*, *<Tr>*={[1]|2|...16} *<Ch>*={[1]|2|...16}
Parameter	*<char>* Specifies the measurement parameter: **SDD11** **SDD21** **SDD12** **SDD22** **SCD11** **SCD21** **SCD12** **SCD22** **SDC11** **SDC21** **SDC12** **SDC22** **SCC11** **SCC21** **SCC12** **SCC22** **IMB1** : Imbalance1 **IMB2** : Imbalance1 **CMRR** : Sdd21/Scc21
Query Response	{SDD11|SDD21|SDD12|SDD22|SCD11|SCD21|SCD12|SCD22|SDC11|SDC21|SDC12|SDC22|SCC11|SCC21|SCC12|SCC22|IMB1|IMB2|CMRR}
Preset Value	SDD11
Related Commands	CALC:FSIM:BAL:DEV
Equivalent Softkeys	**Analysis > Fixture Simulator > Measurement > {Sdd11|... CMRR }**

CALC:FSIM:BAL:PAR:SBAL

CALCulate*<Ch>*:FSIMulator:BALun:PARameter*<Tr>*:SBALanced[:DEFine] *<char>*

CALCulate*<Ch>*:FSIMulator:BALun:PARameter*<Tr>*:SBALanced[:DEFine]?

Description	Selects the measurement parameter of the fixture simulation function when the device type is SBALanced. (command/query)
Target	Trace *<Tr>* of channel *<Ch>*, *<Tr>*={[1]|2|...16} *<Ch>*={[1]|2|...16}
Parameter	*<char>* Specifies the measurement parameter: **SSS11** **SDS21** **SSD12** **SCS21** **SSC12** **SDD22** **SCD22** **SDC22** **SCC22** **IMB** : Imbalance **CMRR1** : Sds21/Scs21 **CMRR2** : Ssd12/Ssc12
Query Response	{SSS11|SDS21|SSD12|SCS21|SSC12|SDD22|SCD22|SDC22|SCC22| IMB|CMRR1|CMRR2}
Preset Value	SSS11
Related Commands	CALC:FSIM:BAL:DEV
Equivalent Softkeys	**Analysis > Fixture Simulator > Measurement > {Sss11|... CMRR2 }**

CALC:FSIM:BAL:PAR:SSB

CALCulate*<Ch>*:FSIMulator:BALun:PARameter*<Tr>*:SSBalanced[:DEFine] *<char>*

CALCulate*<Ch>*:FSIMulator:BALun:PARameter*<Tr>*:SSBalanced[:DEFine]?

Description	Selects the measurement parameter of the fixture simulation function when the device type is SSBalanced. (command/query)
Target	Trace *<Tr>* of channel *<Ch>*, *<Tr>*={[1]|2|...16} *<Ch>*={[1]|2|...16}
Parameter	*<char>* Specifies the measurement parameter: **SSS11** **SSS21** **SSS12** **SSS22** **SDS31** **SDS32** **SSD13** **SSD23** **SCS31** **SCS32** **SSC13** **SSC23** **SDD33** **SCD33** **SDC33** **SCC33** **IMB1** : Imbalance1 **IMB2** : Imbalance2 **IMB3** : Imbalance3 **IMB4** : Imbalance4 **CMRR1** : Sds31/Scs31 **CMRR2** : Sds32/Scs32
Query Response	{SSS11|SSS21|SSS12|SSS22|SDS31|SDS32|SSD13|SSD23|SCS31|SCS32|SSC13|SSC23|SDD33|SCD33|SDC33|SCC33|IMB1|IMB2|IMB3|IMB4|CMRR1|CMRR2}
Preset Value	SSS11
Equivalent Softkeys	**Analysis > Fixture Simulator > Measurement > {Sss11|... CMRR2 }**

CALC:FSIM:BAL:PAR:STAT

CALCulate*<Ch>*:FSIMulator:BALun:PARameter*<Tr>*:STATe {OFF|ON|0|1}

CALCulate*<Ch>*:FSIMulator:BALun:PARameter*<Tr>*:STATe?

Description	Turns ON/OFF the BalUn function for the specified trace. (command/query)
Target	Trace *<Tr>* of channel *<Ch>*, *<Tr>*={[1]|2|...16} *<Ch>*={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Analysis > Fixture Simulator > BalUn**

CALC:FSIM:BAL:TOP:BAL

CALCulate*<Ch>*:FSIMulator:BALun:TOPology:BALanced[:PPORts] *<port1>*,*<port2>*

CALCulate*<Ch>*:FSIMulator:BALun:TOPology:BALanced[:PPORts]?

Description	Sets or reads out the ports assigned to the balanced device when its type is "BALance". (command/query)
Target	The channel *<Ch>*={[1]|2|...16}
Parameters	***<port1>*** First port number ***<port2>*** Second port number
Query Response	*<port1>, <port2>*
Preset Value	1,2
Related Commands	CALC:FSIM:BAL:DEV
Equivalent Softkeys	**Analysis > Fixture Simulator > Topology > Port 1 (bal)**

CALC:FSIM:BAL:TOP:BBAL

CALCulate*<Ch>*:FSIMulator:BALun:TOPology:BBALanced[:PPORts] *<port1>*, *<port2>*, *<port3>*, *<port4>*

CALCulate*<Ch>*:FSIMulator:BALun:TOPology:BBALanced[:PPORts]?

Description	Sets or reads out the ports assigned to the balanced device when its type is "BBALance". (command/query)
Target	The channel *<Ch>*={[1]|2|...16}
Parameters	***<port1>*** First port number ***<port2>*** Second port number ***<port3>*** Third port number ***<port4>*** Fourth port number
Query Response	*<port1>*, *<port2>*, *<port3>*, *<port4>*
Preset Value	1,2,3,4
Related Commands	CALC:FSIM:BAL:DEV
Equivalent Softkeys	**Analysis > Fixture Simulator > Topology > Port 1 (bal), Port 2 (bal)**

CALC:FSIM:BAL:TOP:SBAL

CALCulate*<Ch>*:FSIMulator:BALun:TOPology:SBALanced[:PPORts] *<port1>*, *<port2>*, *<port3>*

CALCulate*<Ch>*:FSIMulator:BALun:TOPology:SBALanced[:PPORts]?

Description	Sets or reads out the ports assigned to the balanced device when its type is "SBALance". (command/query)
Target	The channel *<Ch>*={[1]|2|...16}
Parameters	***<port1>*** First port number ***<port2>*** Second port number ***<port3>*** Third port number
Query Response	*<port1>*, *<port2>*, *<port3>*
Preset Value	1,2,3
Related Commands	CALC:FSIM:BAL:DEV
Equivalent Softkeys	**Analysis > Fixture Simulator > Topology > Port 1 (se) , Port 2 (bal)**

CALC:FSIM:BAL:TOP:SSB

CALCulate*<Ch>*:FSIMulator:BALun:TOPology:SSBalanced[:PPORts] *<port1>*, *<port2>*, *<port3>*,*<port4>*

CALCulate*<Ch>*:FSIMulator:BALun:TOPology:SSBalanced[:PPORts]?

Description	Sets or reads out the ports assigned to the balanced device when its type is "SSBalance". (command/query)
Target	The channel *<Ch>*={[1]|2|...16}
Parameters	***<port1>*** First port number ***<port2>*** Second port number ***<port3>*** Third port number ***<port4>*** Fourth port number
Query Response	*<port1>*, *<port2>*, *<port3>*, *<port4>*
Preset Value	1,2,3,4
Related Commands	CALC:FSIM:BAL:DEV
Equivalent Softkeys	**Analysis > Fixture Simulator > Topology > Port 1 (se), Port 2 (se), Port 3 (bal)**

CALC:FSIM:BAL:TOP:PROP:STAT

CALCulate*<Ch>*:FSIMulator:BALun:TOPology:PROPerty:STATe {OFF|ON|0|1}

CALCulate*<Ch>*:FSIMulator:BALun:TOPology:PROPerty:STATe?

Description	Turns ON/OFF the BalUn property indication on the screen. (command/query)
Target	The channel *<Ch>*={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Analysis > Fixture Simulator > Topology > Property**

CALC:FSIM:EMB:NETW:FIL

CALCulate*<Ch>*:FSIMulator:EMBed:NETWork*<Nk>*:FILename *<string>*

CALCulate*<Ch>*:FSIMulator:EMBed:NETWork*<Nk>*:FILename?

Description	Sets or reads out the name of 4-port touchstone file (*.s4p) of the 4-port network embedding/de-embedding feature. The file contains the circuit S−parameters in Touchstone format. (command/query)
Target	The channel *<Ch>*={[1]|2|...16}, The Network *<Nk>*={[1]|2}
Parameter	<***srting***>, up to 256 characters
Notes	If the full path of the file is not specified, the \FixtireSim subdirectory of the application directory will be searched for the file.
Equivalent Softkeys	**Analysis > Fixture Simulator > De−Embedding S4P > File (ntwk1), File (ntwk2)**

CALC:FSIM:EMB:NETW:TYPE

CALCulate*<Ch>*:FSIMulator:EMBed:NETWork*<Nk>*:TYPE *<char>*

CALCulate*<Ch>*:FSIMulator:EMBed:NETWork*<Nk>*:TYPE?

Description	Selects the processing type of the 4-port network embedding/de-embedding feature. (command/query, S4 only)
Target	The channel *<Ch>*={[1]|2|...16}, The Network *<Nk>*={[1]|2}
Parameter	*<char>* Specifies processing type: **NONE** : No processing **EMBed** : Embedding **DEEMbed** : De-Embedding
Query Response	{NONE|EMB|DEEM}
Preset Value	NONE
Equivalent Softkeys	**Analysis > Fixture Simulator > De−Embedding S4P > Type (ntwk1), Type (ntwk2) > {None| Embed| De-Embed}**

CALC:FSIM:EMB:STAT

CALCulate*<Ch>*:FSIMulator:EMBed:STATe {OFF|ON|0|1}

CALCulate*<Ch>*:FSIMulator:EMBed:STATe?

Description	Turns ON/OFF the 4-port network embedding/de-embedding feature (command/query, S4 only).
Target	The channel *<Ch>*={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Analysis > Fixture Simulator > De−Embedding S4P > De−Embedding S4P**

CALC:FSIM:EMB:TOP:A:PORT

CALCulate*<Ch>*:FSIMulator:EMBed:TOPology:A:PORTs *<port1>*, *<port2>*

CALCulate*<Ch>*:FSIMulator:EMBed:TOPology:A:PORTs?

Description	Sets or reads out the test port assignment when the Topology is set to A, for the 4-port network embedding/de-embedding feature. (command/query)
Target	The channel *<Ch>*={[1]|2|...16}
Parameters	***<port1>*** First port number ***<port2>*** Second port number
Query Response	*<port1>*, *<port2>*
Preset Value	1,2
Related Commands	CALC:FSIM:EMB:TYPE
Equivalent Softkeys	**Analysis > Fixture Simulator > De–Embedding S4P > Ports**

CALC:FSIM:EMB:TOP:B:PORT

CALCulate*<Ch>*:FSIMulator:EMBed:TOPology:B:PORTs *<port1>*, *<port2>*, *<port3>*

CALCulate*<Ch>*:FSIMulator:EMBed:TOPology:B:PORTs?

Description	Sets or reads out the test port assignment when the Topology is set to B, for the 4-port network embedding/de-embedding feature. (command/query)
Target	The channel *<Ch>*={[1]|2|...16}
Parameters	***<port1>*** First port number ***<port2>*** Second port number ***<port3>*** Third port number
Query Response	*<port1>*, *<port2>*, *<port3>*
Preset Value	1,2,3
Related Commands	CALC:FSIM:EMB:TYPE
Equivalent Softkeys	**Analysis > Fixture Simulator > De–Embedding S4P > Ports**

CALC:FSIM:EMB:TOP:C:PORT

CALCulate*<Ch>*:FSIMulator:EMBed:TOPology:C:PORTs *<port1>*, *<port2>*, *<port3>*, *<port4>*

CALCulate*<Ch>*:FSIMulator:EMBed:TOPology:C:PORTs?

Description	Sets or reads out the test port assignment when the Topology is set to B, for the 4-port network embedding/de-embedding feature. (command/query)
Target	The channel *<Ch>*={[1]|2|...16}
Parameters	***<port1>*** First port number ***<port2>*** Second port number ***<port3>*** Third port number ***<port4>*** Fourth port number
Query Response	*<port1>*, *<port2>*, *<port3>*, *<port4>*
Preset Value	1,2,3,4
Related Commands	CALC:FSIM:EMB:TYPE
Equivalent Softkeys	**Analysis > Fixture Simulator > De–Embedding S4P > Ports**

CALC:FSIM:EMB:TYPE

CALCulate*<Ch>*:FSIMulator:EMBed:TYPE *<char>*

CALCulate*<Ch>*:FSIMulator:EMBed:TYPE?

Description	Selects the Topology for the 4-port network embedding/de-embedding feature. (command/query, S4 only)
Target	The channel *<Ch>*={[1]|2|...16}
Parameter	*<char>* Specifies Topology: **A** : Topology A **B** : Topology B **C** : Topology C
Query Response	{A|B|C}
Preset Value	A
Equivalent Softkeys	**Analysis > Fixture Simulator > De−Embedding S4P > Topology > {A| B| C}**

CALC:FSIM:SEND:DEEM:STAT

CALCulate*<Ch>*:FSIMulator:SENDed:DEEMbed:STATe {OFF|ON|0|1}

CALCulate*<Ch>*:FSIMulator:SENDed:DEEMbed:STATe?

Description	Turns ON/OFF the 2-port network de−embedding function. (command/query)
Target	The channel *<Ch>*={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Analysis > Fixture Simulator > De−Embedding > De−Embedding**

CALC:FSIM:SEND:DEEM:PORT:STAT

CALCulate*<Ch>*:FSIMulator:SENDed:DEEMbed:PORT*<Pt>*:STATe {OFF|ON|0|1}

CALCulate*<Ch>*:FSIMulator:SENDed:DEEMbed:PORT*<Pt>*:STATe?

Description	Turns ON/OFF the 2-port network de–embedding function for specified port. (command/query)

Target	Port *<Pt>* of channel *<Ch>*,
	`<Ch>={[1]|2|...16}`
	`<Pt>={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA`

Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Analysis > Fixture Simulator > De–Embedding > Port n**

CALC:FSIM:SEND:DEEM:PORT:USER:FIL

CALCulate*<Ch>*:FSIMulator:SENDed:DEEMbed:PORT*<Pt>*:USER:FILename *<string>*

CALCulate*<Ch>*:FSIMulator:SENDed:DEEMbed:PORT*<Pt>*:USER:FILename?

Description	Sets or reads out the name of *.s2p file of the de–embedded circuit of the 2-port network de–embedding function. The file contains the circuit S–parameters in Touchstone format. (command/query)

Target	Port *<Pt>* of channel *<Ch>*,
	`<Ch>={[1]|2|...16}`
	`<Pt>={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA`

Parameter	***<srting>***, up to 256 characters
Notes	If the full path of the file is not specified, the \FixtireSim subdirectory of the application directory will be searched for the file.
Equivalent Softkeys	**Analysis > Fixture Simulator > De–Embedding > S–parameters File**

CALC:FSIM:SEND:PMC:STAT

CALCulate*<Ch>*:FSIMulator:SENDed:PMCircuit:STATe {OFF|ON|0|1}

CALCulate*<Ch>*:FSIMulator:SENDed:PMCircuit:STATe?

Description	Turns ON/OFF the 2-port network embedding function. (command/query)
Target	The channel *<Ch>*={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Analysis > Fixture Simulator > Embedding > Embedding**

CALC:FSIM:SEND:PMC:PORT:STAT

CALCulate*<Ch>*:FSIMulator:SENDed:PMCircuit:PORT*<Pt>*:STATe {OFF|ON|0|1}

CALCulate*<Ch>*:FSIMulator:SENDed:PMCircuit:PORT*<Pt>*:STATe?

Description	Turns ON/OFF the 2-port network embedding function for each port. (command/query)
Target	Port *<Pt>* of channel *<Ch>*, *<Ch>*={[1]|2|...16} *<Pt>*={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Analysis > Fixture Simulator > Embedding > Port n**

CALC:FSIM:SEND:PMC:PORT:USER:FIL

CALCulate*<Ch>*:FSIMulator:SENDed:PMCircuit:PORT*<Pt>*:USER:FILename *<string>*

CALCulate*<Ch>*:FSIMulator:SENDed:PMCircuit:PORT*<Pt>*:USER:FILename?

Description	Sets or reads out the name of *.s2p file of the embedded circuit of the 2-port network embedding function. The file contains the circuit S−parameters in Touchstone format. (command/query)

Target	Port *<Pt>* of channel *<Ch>*,
	`<Ch>={[1]|2|...16}`
	`<Pt>={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA`

Parameter	***<string>***, up to 256 characters
Notes	If the full path of the file is not specified, the \FixtireSim subdirectory of the application directory will be searched for the file.
Equivalent Softkeys	**Analysis > Fixture Simulator > Embedding > S−parameters File**

CALC:FSIM:SEND:ZCON:PORT:Z0

CALCulate*<Ch>*:FSIMulator:SENDed:ZCONversion:PORT*<Pt>*:Z0[:R] *<numeric>*

CALCulate*<Ch>*:FSIMulator:SENDed:ZCONversion:PORT*<Pt>*:Z0[:R]?

Description	Sets or reads out the value of the impedance for port impedance conversion function. (command/query)

Target	Port *<Pt>* of channel *<Ch>*,
	`<Ch>={[1]|2|...16}`
	`<Pt>={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA`

Parameter	***<numeric>*** the impedance value from 1e−6 to 1e6
Unit	Ω (Ohm)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	50
Equivalent Softkeys	**Analysis > Fixture Simulator > Port Z Conversion > Port n Z0**

CALC:FSIM:SEND:ZCON:STAT

CALCulate*<Ch>*:FSIMulator:SENDed:ZCONversion:STATe {OFF|ON|0|1}

CALCulate*<Ch>*:FSIMulator:SENDed:ZCONversion:STATe?

Description	Turns ON/OFF the port impedance conversion function. (command/query)
Target	The channel *<Ch>*={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Analysis > Fixture Simulator > Port Z Conversion > Port Z Conversion**

CALC:FSIM:STAT

CALCulate*<Ch>*:FSIMulator:STATe {OFF|ON|0|1}

CALCulate*<Ch>*:FSIMulator:STATe?

Description	Turns ON/OFF the fixture simulation function. (command/query)
Target	The channel *<Ch>*={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Analysis > Fixture Simulator > Fixture Simulator**

CALC:PAR:COUN

CALCulate<*Ch*>:PARameter:COUNt <*numeric*>

CALCulate<*Ch*>:PARameter:COUNt?

Description	Sets or reads out the number of traces in the channel. (command/query)
Target	The channel <*Ch*>={[1]|2|...16}
Parameter	<***numeric***> The number of the traces in the channel from 1 to 16
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<*numeric*>
Preset Value	1
Equivalent Softkeys	**Display > Num of Traces**

CALC:PAR:DEF

CALCulate*<Ch>*:PARameter*<Tr>*:DEFine *<char>*

CALCulate*<Ch>*:PARameter*<Tr>*:DEFine?

Description	Selects the measurement parameter of the trace. (command/query)	
Target	Trace *<Tr>* of channel *<Ch>*, *<Tr>*={[1]|2|...16} *<Ch>*={[1]|2|...16}	
Parameter	*<char>* Specifies parameter:	
	S11, S12, S13, S14, **S21, S22, S23, S24,** **S31, S32, S33, S34,** **S41, S42, S43, S44**	: S – parameter
	A, B, C, D or **T1, T2, T3, T4**	: Test receiver
	R1, R2, R3, R4	: Reference receiver
	AUX1, AUX2 or **V1, V2**	: DC Voltage
Query Response	{S11|S12|S13|S14|S21|S22|S23|S24|S31|S32|S33|S34|S41|S42|S43|S44|R1(n)|R2(n)|R3(n)|R4(n)|A(n)|B(n)|C(n)|D(n)|V1(n)|V2(n)}, Where n is the stimulus port number;	
Preset Value	Depends on the trace number.	
Equivalent Softkeys	**Measurement > S11 | S21 | S12 | S22 ...** **Measurement > Absolute**	

CALC:PAR:SEL

CALCulate<Ch>:PARameter<Tr>:SELect

Description	Selects the active trace in channel. (no query)
Target	Trace <Tr> of channel <Ch>, <Tr>={[1]|2|...16} <Ch>={[1]|2|...16}
Notes	If the trace number is greater than the number of the traces displayed in the channel, an error occurs and the command is ignored.
Related Commands	CALC:PAR:COUN
Equivalent Softkeys	**Display > Active Trace/Channel > Active Trace**

CALC:PAR:SPOR

CALCulate<Ch>:PARameter<Tr>:SPORt <port>

CALCulate<Ch>:PARameter<Tr>:SPORt?

Description	Sets or reads out the number of the stimulus port, when performing absolute measurements. (command/query)
Target	Trace <Tr> of channel <Ch>, <Tr>={[1]|2|...16} <Ch>={[1]|2|...16}
Parameter	***<port>*** the number of the stimulus port
Out of Range	Error occurs. The command is ignored.
Query Response	*<port>*
Preset Value	1
Equivalent Softkeys	**Measurement > Absolute > { A(1) | B(1) | R1(1) | A(2) | B(2) | R2(2) }**

CALC:CONV

CALCulate<*Ch*>[:SELected]:CONVersion[:STATe] {OFF|ON|0|1}

CALCulate<*Ch*>[:SELected]:CONVersion[:STATe]?

Description	Turns ON/OFF the S−parameter conversion function. (command/query)
Target	The active trace of channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Analysis > Conversion > Conversion**

CALC:CONV:FUNC

CALCulate<*Ch*>[:SELected]:CONVersion:FUNCtion <*char*>

CALCulate<*Ch*>[:SELected]:CONVersion:FUNCtion?

Description	Sets or reads out the S−parameter conversion function type. (command/query)
Target	The active trace of channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	<*char*> Specifies parameter: **ZREFlection** : Reflection equivalent impedance **ZTRansmit** : Transmission equivalent impedance **YREFlection** : Reflection equivalent admittance **YTRansmit** : Transmission equivalent admittance **INVersion** : Inverse S−parameter **ZTSHunt** : Shunt equivalent impedance **YTSHunt** : Shunt equivalent admittance **CONJugation** : S−parameter conjugate
Query Response	{ZREF|ZTR|YREF|YTR|INV|ZTSH|YTSH|CONJ}
Preset Value	ZREF
Equivalent Softkeys	**Analysis > Conversion > { Zr | Zt | Yr | Yt | 1/S | Z Trans−Shunt | Y Trans−Shunt | Conjugation }**

CALC:CORR:EDEL:TIME

CALCulate<*Ch*>[:SELected]:CORRection:EDELay:TIME <*time*>

CALCulate<*Ch*>[:SELected]:CORRection:EDELay:TIME?

Description	Sets or reads out the value of the electrical delay. (command/query)
Target	The active trace of channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	***<time>*** the electrical delay value from −10 to 10
Unit	s (second)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**Scale > Electrical Delay**

CALC:CORR:OFFS:PHAS

CALCulate*<Ch>*[:SELected]:CORRection:OFFSet:PHASe *<phase>*

CALCulate*<Ch>*[:SELected]:CORRection:OFFSet:PHASe?

Description	Sets or reads out the value of the phase offset. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<phase>*** the phase offset value from −360 to 360
Unit	° (degree)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**Scale > Phase Offset**

CALC:CORR:STAT?

CALCulate*<Ch>*[:SELected]:CORRection:STATus?

Description	Reads out the interpolation/extrapolation status of the error correction. (query only)
Target	The active trace of channel *<Ch>*, `<Ch>={[1]|2|...16}`
Query Response	Trace represents S-parameter: NONE : Correction not applied COR : Correction applied exactly C? : Correction interpolated C! : Correction extrarpolated Trace represents absolute parameter: NONE : Correction not applied RC : Correction applied exactly RC? : Correction interpolated RC! : Correction extrarpolated
Equivalent Softkeys	**None**

CALC:DATA:FDAT

CALCulate*<Ch>*[:SELected]:DATA:FDATa *<numeric list>*

CALCulate*<Ch>*[:SELected]:DATA:FDATa?

CALC:TRAC:DATA:FDAT

CALCulate*<Ch>*:TRACe*<Tr>*:DATA:FDATa *<numeric list>*

CALCulate*<Ch>*:TRACe*<Tr>*:DATA:FDATa?

Description	Reads out or writes the formatted data array. The formatted data array is the data, whose processing is completed including the formatting as the last step. Such data represent the data trace values as they are shown on the screen. The array size is 2N, where N is the number of measurement points. For the n–th point, where n from 1 to N: *<numeric 2n–1>* real number in rectangular format, real part in polar and Smith chart formats; *<numeric 2n>* 0 in rectangular format, imaginary part in polar and Smith chart formats. (Command/Query)
Target	CALCulate<*Ch*>[:SELected]:DATA:FDATa - the active trace of channel, CALCulate<*Ch*>:TRACe<*Tr*>:DATA:FDATa - the trace <*Tr*> of channel, <*Ch*>={[1]|2|...16} <*Tr*>={[1]|2|...16}
Query Response	*<numeric 1>*, *<numeric 2>*, …*<numeric 2N>*
Notes	When data is being written it is recommended to hold the sweep before and update the screen after write.
Related Commands	CALC:FORM
Equivalent Softkeys	**None**

CALC:DATA:FMEM

CALCulate*<Ch>*[:SELected]:DATA:FMEMory *<numeric list>*

CALCulate*<Ch>*[:SELected]:DATA:FMEMory?

CALC:TRAC:DATA:FMEM

CALCulate*<Ch>*:TRACe*<Tr>*:DATA:FMEMory *<numeric list>*

CALCulate*<Ch>*:TRACe*<Tr>*:DATA:FMEMory?

Description	Reads out or writes the formatted memory array. The formatted memory array is the data, whose processing is completed including the formatting as the last step. Such data represent the memory trace values as they are shown on the screen. The array size is 2N, where N is the number of measurement points. For the n−th point, where n from 1 to N: *<numeric 2n−1>* real number in rectangular format, real part in polar and Smith chart formats; *<numeric 2n>* 0 in rectangular format, imaginary part in polar and Smith chart formats. (Command/Query)
Target	CALCulate<*Ch*>[:SELected]:DATA:FMEMory - the active trace of channel, CALCulate<*Ch*>:TRACe<*Tr*>:DATA:FMEMory - the trace <*Tr*> of channel, <*Ch*>={[1]|2|...16} <Tr>={[1]|2|...16}
Query Response	*<numeric 1>*, *<numeric 2>*, …*<numeric 2N>*
Related Commands	CALC:MATH:MEM CALC:FORM
Equivalent Softkeys	**None**

CALC:DATA:SDAT

CALCulate*<Ch>*[:SELected]:DATA:SDATa *<numeric list>*

CALCulate*<Ch>*[:SELected]:DATA:SDATa?

CALC:TRAC:DATA:SDAT

CALCulate*<Ch>*:TRACe*<Tr>*:DATA:SDATa *<numeric list>*

CALCulate*<Ch>*:TRACe*<Tr>*:DATA:SDATa?

Description	Reads out or writes the corrected data array. The corrected data array is the data, whose processing is completed excluding the formatting as the last step. Such data represent S-parameter complex values. The array size is 2N, where N is the number of measurement points. For the n-th point, where n from 1 to N: *<numeric 2n-1>* the real part of corrected measurement; *<numeric 2n>* the imaginary part of corrected measurement. (Command/Query)
Target	CALCulate<*Ch*>[:SELected]:DATA:SDATa - the active trace of channel, CALCulate<*Ch*>:TRACe<*Tr*>:DATA:SDATa - the trace <*Tr*> of channel, <*Ch*>={[1]|2|...16} <*Tr*>={[1]|2|...16}
Query Response	*<numeric 1>*, *<numeric 2>*, …*<numeric 2N>*
Notes	When data is being written it is recommended to hold the sweep before and update the screen after write.
Equivalent Softkeys	**None**

CALC:DATA:SMEM

CALCulate<*Ch*>[:SELected]:DATA:SMEMory <*numeric list*>

CALCulate<*Ch*>[:SELected]:DATA:SMEMory?

CALC:TRAC:DATA:SMEM

CALCulate<*Ch*>:TRACe<*Tr*>:DATA:SMEMory <*numeric list*>

CALCulate<*Ch*>:TRACe<*Tr*>:DATA:SMEMory?

Description	Reads out or writes the corrected memory array. The corrected memory array is the data, whose processing is completed excluding the formatting as the last step. Such data represent S−parameter complex values. The array size is 2N, where N is the number of measurement points. For the n−th point, where n from 1 to N: *<numeric 2n−1>* the real part of corrected measurement memory; *<numeric 2n>* the imaginary part of corrected measurement memory. (Command/Query)
Target	CALCulate<*Ch*>[:SELected]:DATA:SMEMory - the active trace of channel, CALCulate<*Ch*>:TRACe<*Tr*>:DATA:SMEMory - the trace <*Tr*> of channel, <*Ch*>={[1]|2|...16} <*Tr*>={[1]|2|...16}
Query Response	*<numeric 1>*, *<numeric 2>*, …*<numeric 2N>*
Related Commands	CALC:MATH:MEM
Equivalent Softkeys	**None**

CALC:DATA:XAX?

CALCulate*<Ch>*[:SELected]:DATA:XAXis?

CALC:TRAC:DATA:XAX?

CALCulate*<Ch>*:TRACe*<Tr>*:DATA:XAXis?

Description	Reads out the X-axis values array. The X-axis values array is the frequency, power or time values array depending on the trace setup. The array contains real values. The array size is N, where N is the number of measurement points. For the n−th point, where n from 1 to N: *<numeric n>* the X-axis value; (Query only)
Target	CALCulate<*Ch*>[:SELected]:DATA:XAXis? - the active trace of channel, CALCulate<*Ch*>:TRACe<*Tr*>:DATA:XAXis? - the trace <*Tr*> of channel, <*Ch*>={[1]|2|...16} <*Tr*>={[1]|2|...16}
Query Response	*<numeric 1>*, *<numeric 2>*, …*<numeric N>*
Related Commands	SENS:SWE:TYPE CALC:TRAN:TIME:STAT
Equivalent Softkeys	**None**

CALC:FILT:TIME

CALCulate*<Ch>*[:SELected]:FILTer[:GATE]:TIME[:TYPE] *<char>*

CALCulate*<Ch>*[:SELected]:FILTer[:GATE]:TIME[:TYPE]?

Description	Sets or reads out the gate type of the gating function. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	*<char>* Specifies the gate type: **BPASs** : Bandpass type **NOTCh** : Notch type
Query Response	{BPAS|NOTC}
Preset Value	BPAS
Equivalent Softkeys	**Analysis > Gating > Type**

CALC:FILT:TIME:CENT

CALCulate*<Ch>*[:SELected]:FILTer[:GATE]:TIME:CENTer *<time>*

CALCulate*<Ch>*[:SELected]:FILTer[:GATE]:TIME:CENTer?

Description	Sets or reads out the gate center value of the gating function. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<time>*** the center value of the gate, the range varies depending on the frequency span and the number of points
Unit	s (second)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**Analysis > Gating > Center**

CALC:FILT:TIME:SHAP

CALCulate*<Ch>*[:SELected]:FILTer[:GATE]:TIME:SHAPe *<char>*

CALCulate*<Ch>*[:SELected]:FILTer[:GATE]:TIME:SHAPe?

Description	Sets or reads out the gate shape of the gating function. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	*<char>* Specifies the gate shape: **MAXimum** : Maximum shape **WIDE** : Wide shape **NORMal** : Normal shape **MINimum** : Minimum shape
Query Response	{MAX|WIDE|NORM|MIN}
Preset Value	NORM
Equivalent Softkeys	**Analysis > Gating > Shape > { Maximum | Wide | Normal | Minimum }**

CALC:FILT:TIME:SPAN

CALCulate*<Ch>*[:SELected]:FILTer[:GATE]:TIME:SPAN *<time>*

CALCulate*<Ch>*[:SELected]:FILTer[:GATE]:TIME:SPAN?

Description	Sets or reads out the gate span value of the gating function. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<time>*** the span value of the gate, the range varies depending on the frequency span and the number of points
Unit	s (second)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	2e−8
Equivalent Softkeys	**Analysis > Gating > Span**

CALC:FILT:TIME:STAR

CALCulate *<Ch>*[:SELected]:FILTer[:GATE]:TIME:STARt *<time>*

CALCulate *<Ch>*[:SELected]:FILTer[:GATE]:TIME:STARt?

Description	Sets or reads out the gate start value of the gating function. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<time>*** the start value of the gate, the range varies depending on the frequency span and the number of points
Unit	s (second)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	-1e-8
Equivalent Softkeys	**Analysis > Gating > Start**

CALC:FILT:TIME:STAT

CALCulate*<Ch>*[:SELected]:FILTer[:GATE]:TIME:STATe {OFF|ON|0|1}

CALCulate*<Ch>*[:SELected]:FILTer[:GATE]:TIME:STATe?

Description	Turns ON/OFF the gating function. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Analysis > Gating > Gating**

CALC:FILT:TIME:STOP

CALCulate*<Ch>*[:SELected]:FILTer[:GATE]:TIME:STOP *<time>*

CALCulate*<Ch>*[:SELected]:FILTer[:GATE]:TIME:STOP?

Description	Sets or reads out the gate stop value of the gating function. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<time>*** the stop value of the gate, the range varies depending on the frequency span and the number of points
Unit	s (second)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	+1e−8
Equivalent Softkeys	**Analysis > Gating > Stop**

CALC:FORM

CALCulate*<Ch>*[:SELected]:FORMat *<char>*

CALCulate*<Ch>*[:SELected]:FORMat?

Description	Sets or reads out the trace format. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	*<char>* Specifies the trace format: **MLOGarithmic** : Logarithmic magnitude **PHASe** : Phase **GDELay** : Group delay time **SLINear** : Smith chart format (Lin) **SLOGarithmic** : Smith chart format (Log) **SCOMplex** : Smith chart format (Real/Imag) **SMITh** : Smith chart format (R + jX) **SADMittance** : Smith chart format (G + jB) **PLINear** : Polar format (Lin) **PLOGarithmic** : Polar format (Log) **POLar** : Polar format (Real/Imag) **MLINear** : Linear magnitude **SWR** : Voltage standing wave ratio **REAL** : Real part **IMAGinary** : Imaginary part **UPHase** : Expanded phase
Query Response	{MLOG|PHAS|GDEL|SLIN|SLOG|SCOM|SMIT|SADM|PLIN|PLOG| POL|MLIN|SWR|REAL|IMAG|UPH}
Preset Value	MLOG
Equivalent Softkeys	**Format > { Log Mag | Phase | Group Delay | Lin Mag | SWR | Real | Imag | Phase > 180 }** **Format > Smith > { Log/Phase | Lin/Phase | Real/Imag | R+jX | G+jB }** **Format > Polar > { Log/Phase | Ling/Phase | Real/Imag }**

CALC:FUNC:DATA?

CALCulate<*Ch*>[:SELected]:FUNCtion:DATA?

Description	Reads out the data array, which is the CALC:FUNC:EXEC command analysis result. The array size is 2N, where N is the number of points. For the n–th point, where n from 1 to N: <*numeric 2n–1*> the response value in n–th measurement point; <*numeric 2n*> the stimulus value in n–th measurement point. Always set to 0 for the analysis of mean value, standard deviation, and peak–to–peak value. (query only)
Target	The active trace of channel <*Ch*>, <*Ch*>={[1]|2|...16}
Query Response	*<numeric 1>*, *<numeric 2>*, …*<numeric 2N>*
Related Commands	CALC:FUNC:EXEC CALC:FUNC:POIN?
Equivalent Softkeys	**None**

CALC:FUNC:DOM

CALCulate<Ch>[:SELected]:FUNCtion:DOMain[:STATe] {OFF|ON|0|1}

CALCulate<Ch>[:SELected]:FUNCtion:DOMain[:STATe]?

Description	Specify whether an arbitrary range or the entire sweep range is used when the CALC:FUNC:EXEC command is executed. (command/query)
Target	All traces of channel *<Ch>* (if the coupling is set to ON by the CALC:FUNC:DOM:COUP command), the active trace of channel *<Ch>* (if otherwise), *<Ch>*={[1]|2|...16}
Parameter	Select the following : **{ON|1}** : Arbitrary range **{OFF|0}** : Entire sweep range
Query Response	{0|1}
Preset Value	0
Related Commands	CALC:FUNC:EXEC CALC:FUNC:DOM:COUP
Equivalent Softkeys	**None**

CALC:FUNC:DOM:COUP

CALCulate<Ch>[:SELected]:FUNCtion:DOMain:COUPle {OFF|ON|0|1}

CALCulate<Ch>[:SELected]:FUNCtion:DOMain:COUPle?

Description	If the arbitrary range turned ON by the CALC:FUNC:DOM:STAT command, specifies whether all traces of channel use the same range (coupling) or each trace uses individual range when the CALC:FUNC:EXEC command is executed. (command/query)
Target	All traces of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	1
Related Commands	CALC:FUNC:EXEC
Equivalent Softkeys	**None**

CALC:FUNC:DOM:STAR

CALCulate*<Ch>*[:SELected]:FUNCtion:DOMain:STARt *<stimulus>*

CALCulate*<Ch>*[:SELected]:FUNCtion:DOMain:STARt?

Description	Sets the start value of the analysis range of the CALC:FUNC:EXEC command. (command/query)
Target	All traces of channel *<Ch>* (if the coupling is set to ON by the CALC:FUNC:DOM:COUP command), the active trace of channel *<Ch>* (if otherwise), *<Ch>*={[1]|2|...16}
Parameter	***<stimulus>*** the start value of analysis range
Unit	{ Hz |s |dBm }
Query Response	*<numeric>*
Preset Value	0
Related Commands	CALC:FUNC:DOM
Equivalent Softkeys	**None**

CALC:FUNC:DOM:STOP

CALCulate<*Ch*>[:SELected]:FUNCtion:DOMain:STOP <*stimulus*>

CALCulate<*Ch*>[:SELected]:FUNCtion:DOMain:STOP?

Description	Sets the stop value of the analysis range of the CALC:FUNC:EXEC command. (command/query)
Target	All traces of channel <*Ch*> (if the coupling is set to ON by the CALC:FUNC:DOM:COUP command), the active trace of channel <*Ch*> (if otherwise), <*Ch*>={[1]|2|...16}
Parameter	<***stimulus***> the stop value of analysis range
Unit	{ Hz |s |dBm }
Query Response	<*numeric*>
Preset Value	0
Related Commands	CALC:FUNC:DOM
Equivalent Softkeys	**None**

CALC:FUNC:EXEC

CALCulate<*Ch*>[:SELected]:FUNCtion:EXECute

Description	Executes the analysis specified by the CALC:FUNC:TYPE command. The analysis result can be read out by the CALC:FUNC:DATA? command. (no query)
Target	The active trace of channel <*Ch*>, <*Ch*>={[1]|2|...16}
Related Commands	CALC:FUNC:TYPE CALC:FUNC:DATA?
Equivalent Softkeys	**None**

CALC:FUNC:PEXC

CALCulate*<Ch>*[:SELected]:FUNCtion:PEXCursion *<numeric>*

CALCulate*<Ch>*[:SELected]:FUNCtion:PEXCursion?

Description	Sets the lower limit for the peak excursion value when executing the peak search with the CALC:FUNC:EXEC command. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<numeric>*** the lower limit of the peak excursion value, varies depending on the data format
Unit	{ dB |° |s }
Query Response	*<numeric>*
Preset Value	3.0
Related Commands	CALC:FUNC:EXEC
Equivalent Softkeys	**None**

CALC:FUNC:POIN?

CALCulate<Ch>[:SELected]:FUNCtion:POINts?

Description	Reads out the number of points (data pairs) of the analysis result by the CALC:FUNC:EXEC command. Always reads out 1, when the search is executed for the maximum, minimum, mean, standard deviation, peak, and peak–to–peak values. The actual number of points is read out, when the search is executed for all peak or all targets. (query only)
Target	The active trace of channel *<Ch>*, `<Ch>={[1]|2|...16}`
Query Response	*<numeric>*
Related Commands	CALC:FUNC:EXEC
Equivalent Softkeys	**None**

CALC:FUNC:PPOL

CALCulate<*Ch*>[:SELected]:FUNCtion:PPOLarity <*char*>

CALCulate<*Ch*>[:SELected]:FUNCtion:PPOLarity?

Description	Selects the polarity when performing the peak search with the CALC:FUNC:EXEC command. (command/query)
Target	The active trace of channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	<*char*> Specifies the polarity: **POSitive** : Positive peaks **NEGative** : Negative peaks **BOTH** : Both positive peaks and negative peaks
Query Response	{POS|NEG|BOTH}
Preset Value	POS
Related Commands	CALC:FUNC:EXEC
Equivalent Softkeys	**None**

CALC:FUNC:TARG

CALCulate*<Ch>*[:SELected]:FUNCtion:TARGet *<numeric>*

CALCulate*<Ch>*[:SELected]:FUNCtion:TARGet?

Description	Selects the target level when performing the search for the trace and the target level crosspoints with the CALC:FUNC:EXEC command. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<numeric>*** the target value, varies depending on the data format
Unit	{ dB |° |s }
Query Response	*<numeric>*
Preset Value	0
Related Commands	CALC:FUNC:EXEC
Equivalent Softkeys	**None**

CALC:FUNC:TTR

CALCulate*<Ch>*[:SELected]:FUNCtion:TTRansition *<char>*

CALCulate*<Ch>*[:SELected]:FUNCtion:TTRansition?

Description	Selects the transition type when performing the search for the trace and the target level crosspoints with the CALC:FUNC:EXEC command. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	*<char>* Specifies the transition: **POSitive** : Positive peaks **NEGative** : Negative peaks **BOTH** : Both positive peaks and negative peaks
Query Response	{POS|NEG|BOTH}
Preset Value	POS
Related Commands	CALC:FUNC:EXEC
Equivalent Softkeys	**None**

CALC:FUNC:TYPE

CALCulate*<Ch>*[:SELected]:FUNCtion:TYPE *<char>*

CALCulate*<Ch>*[:SELected]:FUNCtion:TYPE?

Description	Selects the type of analysis executed with the CALC:FUNC:EXEC command. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	*<char>* Specifies the transition: **PTPeak** : Peak–to–peak (difference between the maximum value and the minimum value) **STDEV** : Standard deviation **MEAN** : Mean value **MAXimum** : Maximum value **MINimum** : Minimum value **PEAK** : Search for peak **APEak** : Search for all the peaks **ATARget** : Search for all targets
Query Response	{PTP|STDEV|MEAN|MAX|MIN|PEAK|APE|ATAR}
Preset Value	PTP
Related Commands	CALC:FUNC:EXEC
Equivalent Softkeys	**None**

CALC:LIM

CALCulate*<Ch>*[:SELected]:LIMit[:STATe] {OFF|ON|0|1}

CALCulate*<Ch>*[:SELected]:LIMit[:STATe]?

Description	Turns ON/OFF the limit test. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Analysis > Limit Test > Limit Test**

CALC:LIM:DATA

CALCulate<*Ch*>[:SELected]:LIMit:DATA <*numeric list*>

CALCulate<*Ch*>[:SELected]:LIMit:DATA?

Description	Sets the data array, which is the limit line in the limit test function. The array size is 1 + 5N, where N is the number of limit line segments. For the n−th point, where n from 1 to N: *<numeric 1>* the number of limit line segments N is from 0 to 100. Setting 0 clears the limit line. *<numeric 5n−3>* type of the n−th limit line segment 0: Off. 1: Upper limit 2: Lower limit 3: Single Point limit *<numeric 5n−2>* the stimulus value in the start point of the n−th segment *<numeric 5n−1>* the stimulus value in the end point of the n−th segment *<numeric 5n−0>* the response value in the start point of the n−th segment *<numeric 5n+1>* the response value in the end point of the n−th segment (command/query)
Target	The active trace of channel <*Ch*>, <*Ch*>={[1]|2|...16}
Query Response	*<numeric 1>*, *<numeric 2>*, …*<numeric 5N+1>*
Notes	If the array size is not 1 + 5N, where N is *<numeric 1>*, an error occurs. If *<numeric 5n−3>* is less than 0 or more than 2, an error occurs. When *<numeric 5n−2>, <numeric 5n−1>, <numeric 5n−0>,* and *<numeric 5n+1>* elements are out of allowable range, the value is set to the limit, which is closer to the specified value.
Equivalent Softkeys	**Analysis > Limit Test > Edit Limit Line**

CALC:LIM:DISP

CALCulate*<Ch>*[:SELected]:LIMit:DISPlay[:STATe] {OFF|ON|0|1}

CALCulate*<Ch>*[:SELected]:LIMit:DISPlay[:STATe]?

Description	Turns ON/OFF the limit line display of the limit test function. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Analysis > Limit Test > Limit Line**

CALC:LIM:FAIL?

CALCulate*<Ch>*[:SELected]:LIMit:FAIL?

Description	Reads out the limit test result. (query only)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Query Response	1 : Fail 0 : Pass
Equivalent Softkeys	**None**

CALC:LIM:OFFS:AMPL

CALCulate*<Ch>*[:SELected]:LIMit:OFFSet:AMPLitude *<numeric>*

CALCulate*<Ch>*[:SELected]:LIMit:OFFSet:AMPLitude?

Description	Sets the value of the limit line offset along Y–axis. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<numeric>*** the value of the limit line offset along Y–axis, varies depending on the data format
Unit	{ dB | ° | s}
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**Analysis > Limit Test > Limit Line Offsets > Response Offset**

CALC:LIM:OFFS:MARK

CALCulate*<Ch>*[:SELected]:LIMit:OFFSet:MARKer

Description	Sets the value of the limit line offset along Y–axis to the active marker value. (no query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Equivalent Softkeys	**Analysis > Limit Test > Limit Line Offsets > Marker > Response Ofs**

CALC:LIM:OFFS:STIM

CALCulate*<Ch>*[:SELected]:LIMit:OFFSet:STIMulus *<stimulus>*

CALCulate*<Ch>*[:SELected]:LIMit:OFFSet:STIMulus?

Description	Sets the value of the limit line offset along X–axis. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<stimulus>*** the value of the limit line offset along X–axis
Unit	{ Hz | s | dBm }
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**Analysis > Limit Test > Limit Lines Offsets > Stimulus Offset**

CALC:LIM:REP:ALL?

CALCulate<*Ch*>[:SELected]:LIMit:REPort:ALL?

Description	Reads out the data array, which is the limit test result. The array size is 4N, where N is the number of measurement points. For the n–th point, where n from 1 to N: <*numeric 4n–3*> the stimulus value in the n–th point; <*numeric 4n–2*> the limit test result in the n–th point; –1: No limit 0: Fail 1: Pass <*numeric 4n–1*> the upper limit value in the n–th point (0 – if there is no limit) <*numeric 4n–0*> the lower limit value in the n–th point (0 – if there is no limit) (query only)
Target	The active trace of channel <*Ch*>, `<Ch>={[1]|2|...16}`
Query Response	*<numeric 1>*, *<numeric 2>*, …*<numeric 4N>*
Equivalent Softkeys	**None**

CALC:LIM:REP:POIN?

CALCulate*<Ch>*[:SELected]:LIMit:REPort:POINts?

Description	Reads out the number of the measurement points that failed the limit test. The stimulus data array of these points can be read out by the CALC:LIM:REP? command. (query only)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Query Response	*<numeric>*
Related Commands	CALC:LIM:REP?
Equivalent Softkeys	**None**

CALC:LIM:REP?

CALCulate*<Ch>*[:SELected]:LIMit:REPort[:DATA]?

Description	Reads out the data array, which is the stimulus values of the measurement points that failed the limit test. The array size is set by the CALC:LIM:REP:POIN? command. (query only)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Query Response	*<numeric 1>*, *<numeric 2>*,…*<numeric N>*
Related Commands	CALC:LIM:REP:POIN?
Equivalent Softkeys	**None**

CALC:MARK

CALCulate<*Ch*>[:SELected]:MARKer<*Mk*>[:STATe] {OFF|ON|0|1}

CALCulate<*Ch*>[:SELected]:MARKer<*Mk*>[:STATe]?

Description	Turns ON/OFF the marker. Turning ON a marker with the number from 1 to 15 will turn ON all the markers of smaller numbers. Turning OFF a marker with the number from 1 to 15 will turn OFF all the markers of greater numbers (except of the reference marker with number 16). Turning ON/OFF the reference marker with number 16 does not turn ON/OFF the markers with the numbers from 1 to 15, but switchs these markers between relative and absolute measurement mode. (command/query)
Target	Marker <*Mk*> of the active trace of channel <*Ch*>, <*Ch*>={[1]|2|...16} <*Mk*>={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Markers > Add Marker | Remove Marker** **Markers > Reference Marker**

CALC:MARK:ACT

CALCulate<Ch>:SELected]:MARKer<Mk>:ACTivate

Description	Sets the active marker. If the marker is not ON, this function will turn the marker ON. Turning ON a marker with the number from 1 to 15 will turn ON all the markers of smaller numbers. Turning ON the reference marker with number 16 does not turn ON the markers with the numbers from 1 to 15, but switchs these markers to the relative measurement mode. (no query)

Target	Marker *<Mk>* of the active trace of channel *<Ch>*,
	`<Ch>={[1]|2|...16}`
	`<Mk>={[1]|2|...16}`

Equivalent Softkeys	**Markers > Select > Marker n** **Markers > Reference Marker**

CALC:MARK:BWID

CALCulate<Ch>[:SELected]:MARKer:BWIDth[:STATe] {OFF|ON|0|1}

CALCulate<Ch>[:SELected]:MARKer:BWIDth[:STATe]?

Description	Turns ON/OFF the bandwidth search function. (command/query)
Target	The active trace of channel *<Ch>*, `<Ch>={[1]|2|...16}`
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Markers > Marker Math > Bandwidth Search > Bandwidth Search**

CALC:MARK:BWID:DATA?

CALCulate*<Ch>*[:SELected]:MARKer*<Mk>*:BWIDth:DATA?

Description	Reads out the bandwidth search result. The bandwidth search can performed relatively to the marker *<Mk>*, or relatively to the absolute maximum value of the trace (in this case the number of the marker is ignored), what is set by the CALC:MARK:BWID:REF command. The data include 4 elements: *<numeric 1>* Bandwidth; *<numeric 2>* Center frequency; *<numeric 3>* Q value; *<numeric 4>* Loss; (query only)
Target	Marker *<Mk>* of the active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16} *<Mk>*={[1]|2|...16}
Query Response	*<numeric 1>*, *<numeric 2>*, ...*<numeric 4>*
Related Commands	CALC:MARK:BWID:REF
Notes	If the bandwidth search is impossible, all the read out values are 0. If the search is performed relatively to a maker, which is OFF, an error occurs.
Equivalent Softkeys	**None**

CALC:MARK:BWID:REF

CALCulate<*Ch*>[:SELected]:MARKer:BWIDth:REFerence <*char*>

CALCulate<*Ch*>[:SELected]:MARKer:BWIDth:REFerence?

Description	Selects the reference point for the bandwidth search function: reference marker or absolute maximum value of the trace. (command/query)
Target	The active trace of channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	<*char*> Choose from: **MARKer** : Bandwidth search relative to the reference marker **MAXimum** : Bandwidth search relative to the absolute maximum of the trace
Query Response	{MAX|MARK}
Preset Value	MAX
Equivalent Softkeys	**Markers > Marker Math > Bandwidth Search > Search Ref To**

CALC:MARK:BWID:THR

CALCulate*<Ch>*[:SELected]:MARKer*<Mk>*:BWIDth:THReshold *<numeric>*

CALCulate*<Ch>*[:SELected]:MARKer*<Mk>*:BWIDth:THReshold?

Description	Sets the bandwidth definition value.. (command/query)
Target	Marker *<Mk>* of the active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16} *<Mk>*={[1]|2|...16}
Parameter	***<numeric>*** the bandwidth definition value, the range varies depending on the data format
Unit	{ dB | ° | s }
Query Response	*<numeric>*
Preset Value	−3.0
Equivalent Softkeys	**Markers > Marker Math > Bandwidth Search > Bandwidth Value**

CALC:MARK:BWID:TYPE

CALCulate*<Ch>*[:SELected]:MARKer:BWIDth:TYPE *<char>*

CALCulate*<Ch>*[:SELected]:MARKer:BWIDth:TYPE?

Description	Sets the type of the bandwidth search function. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	*<char>* Specifies the type of the bandwidth: **BPASs** : Bandpass **NOTCh** : Notch
Query Response	{BPAS|NOTC}
Preset Value	BPAS
Equivalent Softkeys	**Markers > Marker Math > Bandwidth Search > Type**

CALC:MARK:COUN

CALCulate*<Ch>*[:SELected]:MARKer:COUNt *<numeric>*

CALCulate*<Ch>*[:SELected]:MARKer:COUNt?

Description	Sets the number of the turned ON markers. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<numeric>***, range from 0 to 16
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	0
Notes	Choosing 16 turns on the reference marker and sets the markers 1 to 15 to the relative values.
Equivalent Softkeys	**None**

CALC:MARK:COUP

CALCulate<*Ch*>[:SELected]:MARKer:COUPle {OFF|ON|0|1}

CALCulate<*Ch*>[:SELected]:MARKer:COUPle?

Description	Turns ON/OFF the marker coupling between traces. When coupled the markers of different traces with same number track the X-axis position. (command/query)
Target	All the traces of channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	1
Equivalent Softkeys	**Marker > Properties > Marker Couple**

CALC:MARK:DATA?

CALCulate*<Ch>*[:SELected]:MARKer:DATA?

<table>
<tr><td>Description</td><td>
Reads out the data array of all turned ON markers.
The array size is 3N + 1, where N is the number of turned ON markers including the reference marker. If the reference marker is turned ON the last three elements of array contain the reference marker data and the rest elements of array contain the relative values.
For the n−th marker, where n from 1 to N:
<numeric 1> the number of turned ON markers including the reference marker (N);
<numeric 3n-1> the stimulus value of the n−th marker;
<numeric 3n> the real data in rectangular format, real part in polar and Smith chart formats of the n−th marker;
<numeric 3n+1> 0 in rectangular format, imaginary part in polar and Smith chart formats of the n−th marker;
(query only)
</td></tr>
<tr><td>Target</td><td>All markers of the active trace of channel <Ch>,
<Ch>={[1]|2|...16}</td></tr>
<tr><td>Query Response</td><td><numeric 1>, <numeric 2>, …<numeric 3N+1></td></tr>
<tr><td>Related Commands</td><td>CALC:MARK:COUN</td></tr>
<tr><td>Equivalent Softkeys</td><td>None</td></tr>
</table>

CALC:MARK:DISC

CALCulate<*Ch*>[:SELected]:MARKer:DISCrete {OFF|ON|0|1}

CALCulate<*Ch*>[:SELected]:MARKer:DISCrete?

Description	Turns ON/OFF the marker discrete mode. (command/query)
Target	All traces of channel <*Ch*> (if the marker coupling is set to ON by the CALC:MARK:COUP command), the active trace of channel <*Ch*> (if otherwise), <*Ch*>={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	1
Equivalent Softkeys	**Marker > Properties > Discrete**

CALC:MARK:FUNC:DOM

CALCulate<*Ch*>[:SELected]:MARKer:FUNCtion:DOMain[:STATe] {OFF|ON|0|1}

CALCulate<*Ch*>[:SELected]:MARKer:FUNCtion:DOMain[:STATe]?

Description	Specify whether an arbitrary range or the entire sweep range is used when the marker search is performed. (command/query)
Target	All traces of channel <*Ch*> (if the marker search range coupling is set to ON by the CALC:MARK:FUNC:DOM:COUP command), the active trace of channel <*Ch*> (if otherwise), <*Ch*>={[1]|2|...16}
Parameter	**{ON|1}** : Arbitrary range **{OFF|0}** : Entire sweep range
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Markers > Marker Search > Search Range**

CALC:MARK:FUNC:DOM:COUP

CALCulate<*Ch*>[:SELected]:MARKer:FUNCtion:DOMain:COUPle {OFF|ON|0|1}

CALCulate<*Ch*>[:SELected]:MARKer:FUNCtion:DOMain:COUPle?

Description	If the arbitrary search range turned ON by the CALC:MARK:FUNC:DOM command, specifies whether all traces of channel use the same range (coupling) or each trace uses individual range when the marker search is performed. (command/query)
Target	All the traces of channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	Specifies the search range coupling: **{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	1
Equivalent Softkeys	**Markers > Marker Search > Couple**

CALC:MARK:FUNC:DOM:STAR

CALCulate*<Ch>*[:SELected]:MARKer:FUNCtion:DOMain:STARt *<stimulus>*

CALCulate*<Ch>*[:SELected]:MARKer:FUNCtion:DOMain:STARt?

Description	Sets or reads out the start value of the marker search range. (command/query)
Target	All traces of channel *<Ch>* (if the marker search range coupling is set to ON by the CALC:MARK:FUNC:DOM:COUP command), the active trace of channel *<Ch>* (if otherwise), *<Ch>*={[1]|2|...16}
Parameter	***<stimulus>*** the start value of the marker search
Unit	{ Hz | s | dBm }
Query Response	*<numeric>*
Preset Value	Lower limit of the analyzer frequency range
Equivalent Softkeys	**Markers > Marker Search > Search Start**

CALC:MARK:FUNC:DOM:STOP

CALCulate<*Ch*>[:SELected]:MARKer:FUNCtion:DOMain:STOP <*stimulus*>

CALCulate<*Ch*>[:SELected]:MARKer:FUNCtion:DOMain:STOP?

Description	Sets or reads out the stop value of the marker search range. (command/query)
Target	All traces of channel <*Ch*> (if the marker search range coupling is set to ON by the CALC:MARK:FUNC:DOM:COUP command), the active trace of channel <*Ch*> (if otherwise), <*Ch*>={[1]|2|...16}
Parameter	<***stimulus***> the stop value of the marker search
Unit	{ Hz | s | dBm }
Query Response	<*numeric*>
Preset Value	Upper limit of the analyzer frequency range
Equivalent Softkeys	**Markers > Marker Search > Search Stop**

CALC:MARK:FUNC:EXEC

CALCulate*<Ch>*[:SELected]:MARKer*<Mk>*:FUNCtion:EXECute

Description	Executes the marker search according to the specified criterion. The type of the marker search is set by the CALC:MARK:FUNC:TYPE command. (no query)
Target	Marker *<Mk>* of the active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16} *<Mk>*={[1]|2|...16}
Related Commands	CALC:MARK:FUNC:TYPE CALC:MARK:FUNC:DOM
Equivalent Softkeys	**Markers > Marker Search > { Maximum | Minimum }** **Markers > Marker Search > Peak > { Search Peak | Search Max Peak | Search Peak Left | Search Peak Right }** **Markers > Marker Search > Target > { Search Target | Search Target Left | Search Target Right }**

CALC:MARK:FUNC:PEXC

CALCulate*<Ch>*[:SELected]:MARKer*<Mk>*:FUNCtion:PEXCursion *<numeric>*

CALCulate*<Ch>*[:SELected]:MARKer*<Mk>*:FUNCtion:PEXCursion?

Description	Sets or reads out the peak excursion value, when the marker search for peak is performed by the CALC:MARK:FUNC:EXEC command. (command/query)
Target	Marker *<Mk>* of the active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16} *<Mk>*={[1]|2|...16}
Parameter	***<numeric>*** the peak excursion value, the range varies depending on the data format
Unit	{ dB | ° | s }
Query Response	*<numeric>*
Preset Value	1
Equivalent Softkeys	**Markers > Marker Search > Peak > Peak Excursion**

CALC:MARK:FUNC:PPOL

CALCulate<*Ch*>[:SELected]:MARKer<*Mk*>:FUNCtion:PPOLarity <*char*>

CALCulate<*Ch*>[:SELected]:MARKer<*Mk*>:FUNCtion:PPOLarity?

Description	Selects the peak polarity, when the marker search for peak is performed by the CALC:MARK:FUNC:EXEC command. (command/query)
Target	Marker <*Mk*> of the active trace of channel <*Ch*>, <*Ch*>={[1]|2|...16} <*Mk*>={[1]|2|...16}
Parameter	<*char*> Specifies the peak polarity: **POSitive** : Positive polarity **NEGative** : Negative polarity **BOTH** : Both positive polarity and negative polarity
Query Response	{POS|NEG|BOTH}
Preset Value	POS
Related Commands	CALC:MARK:FUNC:EXEC
Equivalent Softkeys	**Markers > Marker Search > Peak > Peak Polarity > { Positive | Negative | Both }**

CALC:MARK:FUNC:TARG

CALCulate*<Ch>*[:SELected]:MARKer*<Mk>*:FUNCtion:TARGet *<numeric>*

CALCulate*<Ch>*[:SELected]:MARKer*<Mk>*:FUNCtion:TARGet?

Description	Sets or reads out the target value, when the marker search for target is performed by the CALC:MARK:FUNC:EXEC command. (command/query)
Target	Marker *<Mk>* of the active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16} *<Mk>*={[1]|2|...16}
Parameter	***<numeric>*** the target value, the range varies depending on the data format
Unit	{ dB | ° | s }
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**Markers > Marker Search > Target > Target Value**

CALC:MARK:FUNC:TRAC

CALCulate<*Ch*>[:SELected]:MARKer<*Mk*>:FUNCtion:TRACking {OFF|ON|0|1}

CALCulate<*Ch*>[:SELected]:MARKer<*Mk*>:FUNCtion:TRACking?

Description	Turns ON/OFF the marker search tracking. (command/query)
Target	Marker <*Mk*> of the active trace of channel <*Ch*>, <*Ch*>={[1]|2|...16} <*Mk*>={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Markers > Marker Search > Tracking**

CALC:MARK:FUNC:TTR

CALCulate*<Ch>*[:SELected]:MARKer*<Mk>*:FUNCtion:TTRansition *<char>*

CALCulate*<Ch>*[:SELected]:MARKer*<Mk>*:FUNCtion:TTRansition?

Description	Selects the type of the target transition, when the marker search for transition is performed by the CALC:MARK:FUNC:EXEC command. (command/query)
Target	Marker *<Mk>* of the active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16} *<Mk>*={[1]|2|...16}
Parameter	*<char>* Specifies the type of the target transition: **POSitive** : Positive target transition **NEGative** : Negative target transition **BOTH** : Both positive target transition and negative target transition
Query Response	{POS|NEG|BOTH}
Preset Value	POS
Related Commands	CALC:MARK:FUNC:EXEC
Equivalent Softkeys	**Marker > Marker Search > Target > Target Transition > { Positive | Negative | Both }**

CALC:MARK:FUNC:TYPE

CALCulate*<Ch>*[:SELected]:MARKer*<Mk>*:FUNCtion:TYPE *<char>*

CALCulate*<Ch>*[:SELected]:MARKer*<Mk>*:FUNCtion:TYPE?

Description	Selects the type of the marker search, which is performed by the CALC:MARK:FUNC:EXEC command. (command/query)
Target	Marker *<Mk>* the active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16} *<Mk>*={[1]|2|...16}
Parameter	*<char>* Specifies the type of the marker search: **MAXimum** : Maximum value search **MINimum** : Minimum value search **PEAK** : Peak search **LPEak** : Peak search to the left from the marker **RPEak** : Peak search to the right from the marker **TARGet** : Target search **LTARget** : Target search to the left from the marker **RTARget** : Target search to the right from the marker
Query Response	{MAX|MIN|PEAK|LPE|RPE|TARG|LTAR|RTAR}
Preset Value	MAX
Related Commands	CALC:MARK:FUNC:EXEC
Equivalent Softkeys	**Markers > Marker Search > { Maximum | Minimum }** **Markers > Marker Search > Peak > { Search Peak | Search Max Peak | Search Peak Left | Search Peak Right }** **Markers > Marker Search > Target > { Search Target | Search Target Left | Search Target Right }**

CALC:MARK:MATH:FLAT:DATA?

CALCulate<*Ch*>[:SELected]:MARKer:MATH:FLATness:DATA?

Description	Reads out FLATNESS function data array. The FLATNESS function is applied within the range determined by two markers. The array includes 4 elements: *<numeric 1>* Span; *<numeric 2>* Gain; *<numeric 3>* Slope; *<numeric 4>* Flatness. (query only)
Target	The active trace of channel <*Ch*>, <*Ch*>={[1]|2|...16}
Query Response	*<numeric 1>*, *<numeric 2>,...<numeric 4>*
Related Commands	CALC:MARK:MATH:FLAT:DOM:STAR CALC:MARK:MATH:FLAT:DOM:STOP
Equivalent Softkeys	**None**

CALC:MARK:MATH:FLAT:STAT

CALCulate<*Ch*>[:SELected]:MARKer:MATH:FLATness:STATe {OFF|ON|0|1}

CALCulate<*Ch*>[:SELected]:MARKer:MATH:FLATness:STATe?

Description	Turns ON/OFF the marker FLATNESS function. (command/query)
Target	The active trace of channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Markers > Marker Math > Flatness > Flatness**

CALC:MARK:MATH:FLAT:DOM:STAR

CALCulate<*Ch*>[:SELected]:MARKer:MATH:FLATness:STARt <*numeric*>

CALCulate<*Ch*>[:SELected]:MARKer:MATH:FLATness:STARt?

Description	Sets or reads out the number of the marker, which specifies the start frequency of the FLATNESS function domain. (command/query)
Target	The active trace of channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	<***numeric***> marker number from 1 to 16
Query Response	<*numeric*>
Preset Value	1
Equivalent Softkeys	**Markers > Marker Math > Flatness > Flatness Start**

CALC:MARK:MATH:FLAT:DOM:STOP

CALCulate<*Ch*>[:SELected]:MARKer:MATH:FLATness:STOP <*numeric*>

CALCulate<*Ch*>[:SELected]:MARKer:MATH:FLATness:STOP?

Description	Sets or reads out the number of the marker, which specifies the stop frequency of the FLATNESS function domain. (command/query)
Target	The active trace of channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	<***numeric***> marker number from 1 to 16
Query Response	<*numeric*>
Preset Value	2
Equivalent Softkeys	**Markers > Marker Math > Flatness > Flatness Stop**

CALC:MARK:REF

CALCulate<*Ch*>[:SELected]:MARKer:REFerence[:STATe] {OFF|ON|0|1}

CALCulate<*Ch*>[:SELected]:MARKer:REFerence[:STATe]?

Description	Turns ON/OFF the reference marker. When the reference marker is turned ON, all the values of the other markers turn to relative values. (command/query)
Target	The active trace of channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	**{ON|1}** : Reference marker ON **{OFF|0}** : Reference marker OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Markers > Reference Marker**

CALC:MARK:SET

CALCulate*<Ch>*[:SELected]:MARKer*<Mk>*:SET *<char>*

Description	Sets the value of the specified item to the value of the position of the marker. (no query)

Target	Marker *<Mk>* of the active trace of channel *<Ch>*,
	`<Ch>={[1]|2|...16}`
	`<Mk>={[1]|2|...16}`

Parameter	*<char>* Specifies the type of the marker search: **STARt** : Sweep start value set to the stimulus value of the marker position. **STOP** : Sweep stop value set to the stimulus value of the marker position. **CENTer** : Sweep center value set to the stimulus value of the marker position. **RLEVel** : Reference value set to the response value of the marker position. **DELay** : Delay value set to the response value of the marker position.
Equivalent Softkeys	**Markers > Marker Functions > { Marker–>Start | Marker–>Stop | Marker –>Center | Marker–>Ref Value | Marker–>Delay }**

CALC:MARK:X

CALCulate*<Ch>*[:SELected]:MARKer*<Mk>*:X *<stimulus>*

CALCulate*<Ch>*[:SELected]:MARKer*<Mk>*:X?

Description	Sets or reads out the stimulus value of the marker. (command/query)
Target	Marker *<Mk>* of the active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16} *<Mk>*={[1]|2|...16}
Parameter	***<stimulus>*** the stimulus value of the marker, the range is from the stimulus start value to the stimulus stop value currently set
Unit	{ Hz | s | dBm }
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	Stimulus center value
Equivalent Softkeys	**Markers > Edit Stimulus**

CALC:MARK:Y?

CALCulate*<Ch>*[:SELected]:MARKer*<Mk>*:Y?

Description	Reads out the response value of the marker. If the reference marker is turned ON, the values of the markers from 1 to 15 are read out as relative values to the reference marker. The data include 2 elements: *<numeric 1>* real number in rectangular format, real part in polar and Smith chart formats; *<numeric 2>* 0 in rectangular format, imaginary part in polar and Smith chart formats. (query only)
Target	Marker *<Mk>* of the active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16} *<Mk>*={[1]|2|...16}
Query Response	*<numeric 1>*, *<numeric 2>*
Related Commands	CALC:MARK:REF
Equivalent Softkeys	**None**

CALC:MATH:FUNC

CALCulate*<Ch>*[:SELected]:MATH:FUNCtion *<char>*

CALCulate*<Ch>*[:SELected]:MATH:FUNCtion?

Description	Selects the math operation between the data trace and the memory trace. The math result replaces the data trace. If the memory trace does not exist, the command is ignored. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	*<char>* Specifies the math operation: **DIVide** : Division *Data / Mem.* **MULTiply** : Multiplication *Data x Mem.* **ADD** : Addition *Data + Mem.* **SUBTract** : Subtraction *Data – Mem.* **NORMal** : No math
Query Response	{NORM|SUBT|DIV|ADD|MULT}
Preset Value	NORM
Related Commands	CALC:MATH:MEM
Equivalent Softkeys	**Display > Data Math > { Data/Mem | Data*Mem | Data+Mem | Data–Mem | OFF }**

CALC:MATH:MEM

CALCulate*<Ch>*[:SELected]:MATH:MEMorize

Description	Copies the measurement data to the memory trace. Automatically turns on the display the memory trace. (no query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Equivalent Softkeys	**Display > Data–>Memory**

CALC:MST

CALCulate<*Ch*>[:SELected]:MSTatistics[:STATe] {OFF|ON|0|1}

CALCulate<*Ch*>[:SELected]:MSTatistics[:STATe]?

Description	Turns ON/OFF the math statistics display. (command/query)
Target	The active trace of channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Markers > Marker Math > Statistics > Statistics**

CALC:MST:DATA?

CALCulate<Ch>[:SELected]:MSTatistics:DATA?

Description	Reads out the math statistics values. The statistics function is applied either over the whole range, or within the range specified by CALC:MST:DOM command (the range limits are determined by two markers). The data include 3 elements: *<numeric 1>* Mean value; *<numeric 2>* Standard deviation; *<numeric 3>* Peak–to–peak (difference between the maximum value and the minimum value). (query only)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Query Response	*<numeric 1>*, *<numeric 2>*, *<numeric 3>*
Related Commands	CALC:MST
Equivalent Softkeys	**None**

CALC:MST:DOM

CALCulate*<Ch>*[:SELected]:MSTatistics:DOMain[:STATe] {OFF|ON|0|1}

CALCulate*<Ch>*[:SELected]:MSTatistics:DOMain[:STATe]?

Description	Selects either partial frequency range or entire frequency range is used for math statistic calculation. The partial frequency range is limited by two markers. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	Choose from: **{ON|1}** : partial frequency range **{OFF|0}** : entire frequency range
Query Response	{0|1}
Preset Value	0
Related Commands	CALC:MST:DOM:STAR CALC:MST:DOM:STOP
Equivalent Softkeys	**Markers > Marker Math > Statistics > Statistics Range**

CALC:MST:DOM:STAR

CALCulate*<Ch>*[:SELected]:MSTatistics:DOMain[:MARKer]:STARt *<numeric>*

CALCulate*<Ch>*[:SELected]:MSTatistics:DOMain[:MARKer]:STARt?

Description	Sets or reads out the number of the marker, which specifies the start frequency of the math statistics range. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<numeric>*** marker number from 1 to 16
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	1
Equivalent Softkeys	**Markers > Marker Math > Statistics > Statistics Start**

CALC:MST:DOM:STOP

CALCulate*<Ch>*[:SELected]:MSTatistics:DOMain[:MARKer]:STOP *<numeric>*

CALCulate*<Ch>*[:SELected]:MSTatistics:DOMain[:MARKer]:STOP?

Description	Sets or reads out the number of the marker, which specifies the stop frequency of the math statistics range. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	**<numeric>** marker number from 1 to 16
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<numeric>
Preset Value	2
Equivalent Softkeys	**Markers > Marker Math > Statistics > Statistics Stop**

CALC:RLIM

CALCulate*<Ch>*[:SELected]:RLIMit[:STATe] {OFF|ON|0|1}

CALCulate*<Ch>*[:SELected]:RLIMit[:STATe]?

Description	Turns ON/OFF the ripple limit test. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Analysis > Ripple Limit > Ripple Test**

CALC:RLIM:DATA

CALCulate<*Ch*>[:SELected]:RLIMit:DATA *<numeric list>*

CALCulate<*Ch*>[:SELected]:RLIMit:DATA?

Description	Sets the data array, which is the limit line for the ripple limit function. The array size is 1 + 4N, where N is the number of limit line segments. For the n−th point, where n from 1 to N: *<numeric 1>* the number of limit line segments N is the integer from 0 to 12. Setting 0 clears the limit line. *<numeric 4n−2>* type of the n−th limit line segment 0: Off. 1: On *<numeric 4n−1>* the stimulus value in the beginning point of the n−th segment *<numeric 4n−0>* the stimulus value in the end point of the n−th segment *<numeric 4n+1>* the ripple limit value of the n−th segment (command/query)
Target	The active trace of channel <*Ch*>, <*Ch*>={[1]|2|...16}
Query Response	*<numeric 1>*, *<numeric 2>*, …*<numeric 4N+1>*
Notes	If the array size is not 1 + 4N, where N is *<numeric 1>*, an error occurs. If *<numeric 4n−2>* is less than 0 or more than 1, an error occurs. When *<numeric 4n−1>, <numeric 4n−0>,* and *<numeric 4n+1>* elements are out of allowable range, the value is set to the limit, which is closer to the specified value.
Equivalent Softkeys	**Analysis > Ripple Limit > Edit Ripple Limit**

CALC:RLIM:DISP:LINE

CALCulate*<Ch>*[:SELected]:RLIMit:DISPlay:LINE {OFF|ON|0|1}

CALCulate*<Ch>*[:SELected]:RLIMit:DISPlay:LINE?

Description	Turns ON/OFF the ripple limit line display. (command/query)
Target	Active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Analysis > Ripple Limit > Ripple Limit**

CALC:RLIM:DISP:SEL

CALCulate*<Ch>*[:SELected]:RLIMit:DISPlay:SELect *<numeric>*

CALCulate*<Ch>*[:SELected]:RLIMit:DISPlay:SELect?

Description	Sets or reads out the number of the ripple limit test band selected for the ripple value display. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<numeric>***, range from 1 to 12
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	1
Equivalent Softkeys	**Analysis > Ripple Limit > Ripple Value Band**

CALC:RLIM:DISP:VAL

CALCulate*<Ch>*[:SELected]:RLIMit:DISPlay:VALue *<char>*

CALCulate*<Ch>*[:SELected]:RLIMit:DISPlay:VALue?

Description	Selects the display type of the ripple value in the specified band. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	*<char>* Specifies the math operation: **OFF** : Ripple value display OFF **ABSolute** : Absolute value **MARgin** : Margin (difference between the ripple limit and the absolute value)
Query Response	{OFF|ABS|MAR}
Preset Value	OFF
Equivalent Softkeys	**Analysis > Ripple Limit > Ripple Value**

CALC:RLIM:FAIL?

CALCulate*<Ch>*[:SELected]:RLIMit:FAIL?

Description	Reads out the ripple limit test result. (query only)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Query Response	1 : Fail 0 : Pass
Equivalent Softkeys	**None**

CALC:RLIM:REP?

CALCulate<Ch>[:SELected]:RLIMit:REPort[:DATA]?

Description	Reads out the data array, which is the ripple limit test result. The array size is 1+3N, where N is the number of ripple limit bands. For the n−th point, where n from 1 to N: *<numeric 1>* N total number of the bands *<numeric 3n−1>* n number of the band *<numeric 3n−0>* Ripple value in the n−th band *<numeric 3n+1>* Ripple limit test result in the n−th band: 0- Pass 1- Fail (query only)
Target	The active trace of channel *<Ch>*, <Ch>={[1]|2|...16}
Query Response	*<numeric 1>*, *<numeric 2>*, …*<numeric 3N+1>*
Equivalent Softkeys	**None**

CALC:SMO

CALCulate<Ch>[:SELected]:SMOothing[:STATe] {OFF|ON|0|1}

CALCulate<Ch>[:SELected]:SMOothing[:STATe]?

Description	Turns ON/OFF the trace smoothing. (command/query)
Target	Active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Average > Smoothing**

CALC:SMO:APER

CALCulate<*Ch*>[:SELected]:SMOothing:APERture <*numeric*>

CALCulate<*Ch*>[:SELected]:SMOothing:APERture?

Description	Sets or reads out the smoothing aperture, when performing smoothing function. (command/query)
Target	Active trace of channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	<***numeric***> the smoothing aperture from 0.01 to 20
Unit	% (percent)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<*numeric*>
Preset Value	1
Equivalent Softkeys	**Average > Smo Aperture**

CALC:TRAN:TIME

CALCulate*<Ch>*[:SELected]:TRANsform:TIME[:TYPE] *<char>*

CALCulate*<Ch>*[:SELected]:TRANsform:TIME[:TYPE]?

Description	Selects the transformation type for the time domain transformation function: band-pass or low-pass. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	*<char>* Specifies the transformation type: **BPASs** Ban-dpass **LPASs** Low-pass
Query Response	{BPAS|LPAS}
Preset Value	BPAS
Equivalent Softkeys	**Analysis > Time Domain > Type > { Bandpass | Lowpass Step | Lowpass Impulse }**

CALC:TRAN:TIME:CENT

CALCulate<*Ch*>[:SELected]:TRANsform:TIME:CENTer <*time*>

CALCulate<*Ch*>[:SELected]:TRANsform:TIME:CENTer?

Description	Sets or reads out the time domain center value, when the time domain transformation function is turned ON. (command/query)
Target	The active trace of channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	<***time***> the time domain center value, the range varies depending on the specified frequency range and the number of points
Unit	s (second)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<*numeric*>
Preset Value	1
Equivalent Softkeys	**Analysis > Time Domain > Center**

CALC:TRAN:TIME:IMP:WIDT

CALCulate*<Ch>*[:SELected]:TRANsform:TIME:IMPulse:WIDTh *<time>*

CALCulate*<Ch>*[:SELected]:TRANsform:TIME:IMPulse:WIDTh?

Description	Sets or reads out the impulse width (time domain transformation resolution), coupled with the Kaiser–Bessel window shape β parameter. The impulse width setting changes the β parameter, and setting of β parameter changes the impulse width. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<time>*** the impulse width, the range varies depending on the specified frequency range and the number of points
Unit	s (second)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Equivalent Softkeys	**Analysis > Time Domain > Window > Impulse Width** (when the transformation type is set to Bandpass or Lowpass Impulse)

CALC:TRAN:TIME:KBES

CALCulate*<Ch>*[:SELected]:TRANsform:TIME:KBESsel *<numeric>*

CALCulate*<Ch>*[:SELected]:TRANsform:TIME:KBESsel?

Description	Sets or reads out the β parameter, which controls the Kaiser–Bessel window shape, when performing time domain transformation. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<numeric>*** β parameter from 0 to 13
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	6
Equivalent Softkeys	**Analysis > Time Domain > Window > Kaiser Beta**

CALC:TRAN:TIME:LPFR

CALCulate*<Ch>*[:SELected]:TRANsform:TIME:LPFRequency

Description	Changes the frequency range to match with the low-pass type of the time domain transformation function. (no query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Equivalent Softkeys	**Analysis > Time Domain > Set Frequency Low Pass**

CALC:TRAN:TIME:SPAN

CALCulate*<Ch>*[:SELected]:TRANsform:TIME:SPAN *<time>*

CALCulate*<Ch>*[:SELected]:TRANsform:TIME:SPAN?

Description	Sets or reads out the time domain span value, when the time domain transformation function is turned ON. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<time>*** the time domain span value, the range varies depending on the specified frequency range and the number of points
Unit	s (second)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	2e−8
Equivalent Softkeys	**Analysis > Time Domain > Span**

CALC:TRAN:TIME:STAR

CALCulate<*Ch*>[:SELected]:TRANsform:TIME:STARt <*time*>

CALCulate<*Ch*>[:SELected]:TRANsform:TIME:STARt?

Description	Sets or reads out the time domain start value, when the time domain transformation function is turned ON. (command/query)
Target	The active trace of channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	<***time***> the time domain start value, the range varies depending on the specified frequency range and the number of points
Unit	s (second)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<*numeric*>
Preset Value	−1e−8
Equivalent Softkeys	**Analysis > Time Domain > Start**

CALC:TRAN:TIME:STOP

CALCulate*<Ch>*[:SELected]:TRANsform:TIME:STOP *<time>*

CALCulate*<Ch>*[:SELected]:TRANsform:TIME:STOP?

Description	Sets or reads out the time domain stop value, when the time domain transformation function is turned ON. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<time>*** the time domain stop value, the range varies depending on the specified frequency range and the number of points
Unit	s (second)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	+1e-8
Equivalent Softkeys	**Analysis > Time Domain > Stop**

CALC:TRAN:TIME:STAT

CALCulate<Ch>[:SELected]:TRANsform:TIME:STATe {OFF|ON|0|1}

CALCulate<Ch>[:SELected]:TRANsform:TIME:STATe?

Description	Turns ON/OFF the time domain transformation function. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Analysis > Time Domain > Time Domain**

CALC:TRAN:TIME:STEP:RTIM

CALCulate*<Ch>*[:SELected]:TRANsform:TIME:STEP:RTIMe *<time>*

CALCulate*<Ch>*[:SELected]:TRANsform:TIME:STEP:RTIMe?

Description	Sets or reads out the rise time of the step signal (time domain transformation resolution), coupled with the Kaiser–Bessel window shape β parameter. The impulse width setting changes the β parameter, and setting of β parameter changes the impulse width. (command/query)
Target	The active trace of channel *<Ch>*, `<Ch>={[1]|2|...16}`
Parameter	***<time>*** the impulse width, the range varies depending on the specified frequency range and the number of points
Unit	s (second)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Equivalent Softkeys	**Analysis > Time Domain > Window > Impulse Width** (when the transformation type is set to Lowpass Step)

CALC:TRAN:TIME:STIM

CALCulate*<Ch>*[:SELected]:TRANsform:TIME:STIMulus *<char>*

CALCulate*<Ch>*[:SELected]:TRANsform:TIME:STIMulus?

Description	Selects the stimulus type for the time domain transformation function: impulse or step. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	*<char>* Specifies the stimulus type: **IMPulse** : Impulse **STEP** : Step
Query Response	{IMP|STEP}
Preset Value	IMP
Equivalent Softkeys	**Analysis > Time Domain > Type > { Bandpass | Lowpass Step | Lowpass Impulse }**

CALC:TRAN:TIME:REFL:TYPE

CALCulate*<Ch>*[:SELected]:TRANsform:TIME:REFLection:TYPE *<char>*

CALCulate*<Ch>*[:SELected]:TRANsform:TIME:REFLection:TYPE?

Description	Selects the reflection distance either one way or round trip for the time domain transformation function. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	*<char>* Choose from: **RTRip** : Round Trip **OWAY** : One Way
Query Response	{RTR|OWAY}
Preset Value	RTR
Equivalent Softkeys	**Analysis > Time Domain >Reflection Type > Round Trip | One Way**

CALC:TRAN:TIME:UNIT

CALCulate*<Ch>*[:SELected]:TRANsform:TIME:UNIT *<char>*

CALCulate*<Ch>*[:SELected]:TRANsform:TIME:UNIT?

Description	Selects the the transformation unit for the time domain transformation function: seconds, meters, feet. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	*<char>* Choose from: **SEConds** : Seconds **METers** : Meters **FEET** : Feet
Query Response	{SEC|MET|FEET}
Preset Value	SEC
Equivalent Softkeys	**Analysis > Time Domain > Unit > Seconds | Meters | Feet**

DISP:COL:BACK

DISPlay:COLor:BACK *<numeric 1>*,*<numeric 2>*,*<numeric 3>*

DISPlay:COLor:BACK?

Description	Sets or reads out the background color for trace display. (command/query)
Parameter	*<numeric 1>* Red value R from 0 to 255; *<numeric 2>* Green value G from 0 to 255; *<numeric 3>* Blue value B from 0 to 255.
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric 1>*, *<numeric 2>*, *<numeric 3>*
Preset Value	0, 0, 0
Equivalent Softkeys	**Display > Properties > Color > Background > { Red | Green | Blue }**

DISP:COL:GRAT

DISPlay:COLor:GRATicule *<numeric 1>*,*<numeric 2>*,*<numeric 3>*

DISPlay:COLor:GRATicule?

Description	Sets or reads out the grid and the graticule label color for trace display. (command/query)
Parameter	*<numeric 1>* Red value R from 0 to 255; *<numeric 2>* Green value G from 0 to 255; *<numeric 3>* Blue value B from 0 to 255.
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric 1>*,*<numeric 2>*,*<numeric 3>*
Preset Value	160, 160, 164
Equivalent Softkeys	**Display > Properties > Color > Grid > { Red | Green | Blue }**

DISP:COL:RES

DISPlay:COLor:RESet

Description	Restores the display settings to the default values. (no query)
Equivalent Softkeys	**Display > Properties > Set Defaults**

DISP:COL:TRAC:DATA

DISPlay:COLor:TRACe<*Tr*>:DATA *<numeric 1>*,*<numeric 2>*,*<numeric 3>*

DISPlay:COLor:TRACe<*Tr*>:DATA?

Description	Sets or reads out the data trace color. (command/query)
Target	Trace <*Tr*>, <*Tr*>={[1]|2|...16}
Parameter	*<numeric 1>* Red value R from 0 to 255; *<numeric 2>* Green value G from 0 to 255; *<numeric 3>* Blue value B from 0 to 255.
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric 1>*, *<numeric 2>*, *<numeric 3>*
Preset Value	Varies depending on the trace number.
Equivalent Softkeys	**Display > Properties > Color > Data Trace > { Red | Green | Blue }**

DISP:COL:TRAC:MEM

DISPlay:COLor:TRACe<*Tr*>:MEMory <*numeric 1*>,<*numeric 2*>,<*numeric 3*>

DISPlay:COLor:TRACe<*Tr*>:MEMory?

Description	Sets or reads out the memory trace color. (command/query)
Target	Trace <*Tr*>, <*Tr*>={[1]|2|...16}
Parameter	<*numeric 1*> Red value R from 0 to 255; <*numeric 2*> Green value G from 0 to 255; <*numeric 3*> Blue value B from 0 to 255.
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<*numeric 1*>,<*numeric 2*>,<*numeric 3*>
Preset Value	Varies depending on the trace number.
Equivalent Softkeys	**Display > Properties > Color > Memory Trace > { Red | Green | Blue }**

DISP:ENAB

DISPlay:ENABle {OFF|ON|0|1}

DISPlay:ENABle?

Description	Turns ON/OFF the display update. (command/query)
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	1
Equivalent Softkeys	**Display > Update**

DISP:FSIG

DISPlay:FSIGn {OFF|ON|0|1}

DISPlay:FSIGn?

Description	Turns ON/OFF the "*Fail*" sign display, when performing limit test or ripple limit test. (command/query)
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Analysis > Limit Test > Fail Sign** **Analysis > Ripple Limit > Fail Sign**

DISP:IMAG

DISPlay:IMAGe *<char>*

DISPlay:IMAGe?

Description	Turns ON/OFF the invertion of display colors of the traces area. (command/query)
Parameter	*<char>* Choose from: **NORMal** : Normal display **INVert** : Inverted color display
Query Response	{NORM|INV}
Preset Value	NORM
Equivalent Softkeys	**Display > Properties > Invert Color**

DISP:HIDE

DISPlay:HIDE

Description	Hides the Analyzer GUI. (no query)
Related Commands	DISP:SHOW
Equivalent Softkeys	**None**

DISP:MAX

DISPlay:MAXimize {OFF|ON|0|1}

DISPlay:MAXimize?

Description	Turns ON/OFF of the maximization of the active channel window. (command/query)
Target	The active channel set by the command DISP:WIND:ACT
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Display > Active Trace/Channel > Maximize channel**

DISP:SHOW

DISPlay:SHOW

Description	Shows the Analyzer GUI hidden by the DISP:HIDE command. (no query)
Related Commands	DISP:HIDE
Equivalent Softkeys	**None**

DISP:SPL

DISPlay:SPLit *<numeric>*

DISPlay:SPLit?

Description	Sets or reads out the layout of the channel windows on the screen. The channel window layout on the screen see below. (command/query)
Parameter	<**numeric**> the number of the channel window layout from 1 to 16
Query Response	<numeric>
Preset Value	1
Equivalent Softkeys	**Display > Allocate channels**

Channel window layout on the screen

1:	×1	2:	×2	3:	×2	4:	×3
5:	×3	6:	×3	7:	×4	8:	×4
9:	×6	10:	×6	11:	×8	12:	×8
13:	×9	14:	×12	15:	×12	16:	×16

DISP:UPD

DISPlay:UPDate[:IMMediate]

Description	Updates the display once, when the display update is set to OFF by the DISP:ENAB command. (no query)
Related Commands	DISP:ENAB
Equivalent Softkeys	**None**

DISP:WIND:ACT

DISPlay:WINDow*<Ch>*:ACTivate

Description	Sets the active channel. (no query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Notes	At attempt to set to the active channel the channel, which is not displayed by the DISP:SPL command, an error occurs.
Related Commands	DISP:SPL
Equivalent Softkeys	**Display > Active Trace / Channel > Active Channel**

DISP:WIND:ANN:MARK:ALIG

DISPlay:WINDow*<Ch>*:ANNotation:MARKer:ALIGn[:TYPE] *<char>*

DISPlay:WINDow*<Ch>*:ANNotation:MARKer:ALIGn[:TYPE]?

Description	Sets or reads out the alignment mode of the marker display position of each trace, when the only active trace display feature is turned OFF by the DISP:WIND:ANN:MARK:SING command. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	*<char>* Choose from: **VERTical** : Vertical alignment **HORizontal** : Horizontal alignment **NONE** : No alignment
Query Response	{NONE|VERT|HOR}
Preset Value	NONE
Related Commands	DISP:WIND:ANN:MARK:SING
Equivalent Softkeys	**Markers > Properties > Align > { Vertical | Horizontal | OFF }**

DISP:WIND:ANN:MARK:SING

DISPlay:WINDow<*Ch*>:ANNotation:MARKer:SINGle[:STATe] {OFF|ON|0|1}

DISPlay:WINDow<*Ch*>:ANNotation:MARKer:SINGle[:STATe]?

Description	Selects display either the active trace markers or the all trace markers. (command/query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	Choose from: **{ON|1}** : Active trace markers **{OFF|0}** : All trace markers
Query Response	{0|1}
Preset Value	1
Equivalent Softkeys	**Markers > Properties > Active Only**

DISP:WIND:MAX

DISPlay:WINDow<*Ch*>:MAXimize {OFF|ON|0|1}

DISPlay:WINDow<*Ch*>:MAXimize?

Description	Turn ON/OFF the active trace maximization inside the specified channel. (command/query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Display > Active Trace/Channel > Maximize Trace**

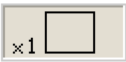
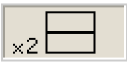
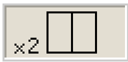
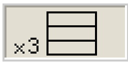
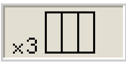
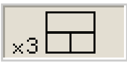
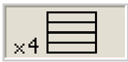
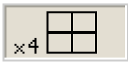
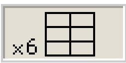
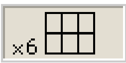
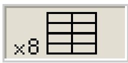
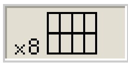
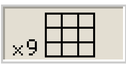
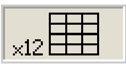
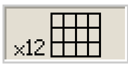
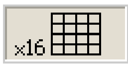
DISP:WIND:SPL

DISPlay:WINDow*<Ch>*:SPLit *<numeric>*

DISPlay:WINDow*<Ch>*:SPLit?

Description	Sets or reads out the layout of the graph in the channel window. The graph layout in the channel window see below. (command/query)
Target	Channel *<Ch>*, `<Ch>={[1]|2|...16}`
Parameter	***<numeric>*** the number of the graph layout from 1 to 16
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	1
Equivalent Softkeys	**Display > Allocate Traces**

Graph layout in the channel window

1:		2:		3:		4:	
5:		6:		7:		8:	
9:		10:		11:		12:	
13:		14:		15:		16:	

DISP:WIND:TITL

DISPlay:WINDow*<Ch>*:TITLe[:STATe] {OFF|ON|0|1}

DISPlay:WINDow*<Ch>*:TITLe[:STATe]?

Description	Turns ON/OFF the channel title display. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Display > Title Label**

DISP:WIND:TITL:DATA

DISPlay:WINDow*<Ch>*:TITLe:DATA *<string>*

DISPlay:WINDow*<Ch>*:TITLe:DATA?

Description	Sets or reads out the channel title label. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	<***string***>, up to 256 characters
Query Response	*<string>*
Preset Value	Empty string
Equivalent Softkeys	**Display > Edit Title Label**

DISP:WIND:TRAC:ANN:MARK:POS:X

DISPlay:WINDow<Ch>:TRACe<Tr>:ANNotation:MARKer:POSition:X <numeric>

DISPlay:WINDow<Ch>:TRACe<Tr>:ANNotation:MARKer:POSition:X?

Description	Sets or reads out the display position of the marker annotation on the X−axis by a percentage of the display width. (command/query)
Target	Trace *<Tr>* of channel *<Ch>*, <Tr>={[1]|2|...16} <Ch>={[1]|2|...16}
Parameter	***<numeric>*** the display position of the marker value on the X−axis from 0 to 100
Unit	% (percent)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**Markers > Properties > Data X Position**

DISP:WIND:TRAC:ANN:MARK:POS:Y

DISPlay:WINDow*<Ch>*:TRACe*<Tr>*:ANNotation:MARKer:POSition:Y *<numeric>*

DISPlay:WINDow*<Ch>*:TRACe*<Tr>*:ANNotation:MARKer:POSition:Y?

Description	Sets or reads out the display position of the marker annotation on the Y−axis by a percentage of the display height. (command/query)

Target	Trace *<Tr>* of channel *<Ch>*,
	`<Tr>={[1]|2|...16}`
	`<Ch>={[1]|2|...16}`

Parameter	***<numeric>*** the display position of the marker value on the Y−axis from 0 to 100
Unit	% (percent)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**Markers > Properties > Data Y Position**

DISP:WIND:TRAC:MEM

DISPlay:WINDow*<Ch>*:TRACe*<Tr>*:MEMory[:STATe] {OFF|ON|0|1}

DISPlay:WINDow*<Ch>*:TRACe*<Tr>*:MEMory[:STATe]?

Description	Turns ON/OFF the memory trace display. (command/query)
Target	Trace *<Tr>* of channel *<Ch>*, *<Tr>*={[1]|2|...16} *<Ch>*={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Notes	If the memory trace does not exist, an error occurs and the command is ignored.
Equivalent Softkeys	**Display > Display > Memory | Data & Memory** (ON) **Display > Display > { Data | OFF }** (OFF)

DISP:WIND:TRAC:STAT

DISPlay:WINDow*<Ch>*:TRACe*<Tr>*:STATe {OFF|ON|0|1}

DISPlay:WINDow*<Ch>*:TRACe*<Tr>*:STATe?

Description	Turns ON/OFF the data trace display. (command/query)
Target	Trace *<Tr>* of channel *<Ch>*, *<Tr>*={[1]|2|...16} *<Ch>*={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	1
Equivalent Softkeys	**Display > Display > Data | Data & Memory** (ON) **Display > Display > { Memory | OFF }** (OFF)

DISP:WIND:TRAC:Y:AUTO

DISPlay:WINDow*<Ch>*:TRACe*<Tr>*:Y[:SCALe]:AUTO

Description	Executes the auto scale function for the trace. (no query)
Target	Trace *<Tr>* of channel *<Ch>*, *<Tr>*={[1]|2|...16} *<Ch>*={[1]|2|...16}
Equivalent Softkeys	**Scale > Auto Scale**

DISP:WIND:TRAC:Y:PDIV

DISPlay:WINDow*<Ch>*:TRACe*<Tr>*:Y[:SCALe]:PDIVision *<numeric>*

DISPlay:WINDow*<Ch>*:TRACe*<Tr>*:Y[:SCALe]:PDIVision?

Description	Sets or reads out the trace scale. Sets the scale per division, when the data format is the rectangular format. Sets the full scale value, when the data format is the Smith chart format or the polar format.
Target	Trace *<Tr>* of channel *<Ch>*, *<Tr>*={[1]|2|...16} *<Ch>*={[1]|2|...16}
Parameter	***<numeric>*** the scale value from 10E−18 to 1E18
Out of Range	Sets the value of the limit, which is closer to the specified value.
Unit	{ dB |° |s }
Query Response	*<numeric>*
Preset Value	Varies depending on the format. Logarithmic Magnitude: 10 dB/Div Phase: 40 °/Div Expand Phase: 100 °/Div Group Delay: 10e−9 s/Div Smith Chart, Polar, SWR: 1 /Div Linear Magnitude: 0.1 /Div Real part, Imaginary part: 0.2 /Div
Equivalent Softkeys	**Scale > Scale**

DISP:WIND:TRAC:Y:RLEV

DISPlay:WINDow*<Ch>*:TRACe*<Tr>*:Y[:SCALe]:RLEVel *<numeric>*

DISPlay:WINDow*<Ch>*:TRACe*<Tr>*:Y[:SCALe]:RLEVel?

Description	Sets the value of the reference line (response value on the reference line). For the rectangular format only. (command/query)
Target	Trace *<Tr>* of channel *<Ch>*, *<Tr>*={[1]|2|...16} *<Ch>*={[1]|2|...16}
Parameter	***<numeric>*** the reference value from 10E−18 to 1E18
Unit	{ dB | ° | s }
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	0 (except for SWR: 1)
Equivalent Softkeys	**Scale > Ref Value**

DISP:WIND:TRAC:Y:RPOS

DISPlay:WINDow*<Ch>*:TRACe*<Tr>*:Y[:SCALe]:RPOSition *<numeric>*

DISPlay:WINDow*<Ch>*:TRACe*<Tr>*:Y[:SCALe]:RPOSition?

Description	Sets the position of the reference line. For the rectangular format only. (command/query)
Target	Trace *<Tr>* of channel *<Ch>*, *<Tr>*={[1]|2|...16} *<Ch>*={[1]|2|...16}
Parameter	***<numeric>*** the reference line position from 0 to the number of the scale divisions (set by the DISP:WIND:Y:DIV command, 10 by default)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	5 (except for SWR: 0)
Equivalent Softkeys	**Scale > Ref Position**

DISP:WIND:X:SPAC

DISPlay:WINDow*<Ch>*:X:SPACing *<char>*

DISPlay:WINDow*<Ch>*:X:SPACing?

Description	Sets or reads out the display method of the graph horizontal axis for the segment sweep. (command/query)
Target	Channel *<Ch>*, `<Ch>={[1]|2|...16}`
Parameter	*<char>* Choose from: **LINear** : Frequency base (linear frequency axis) **OBASe** : Order base (linear axis of the point numbers)
Out of Range	The command is ignored.
Query Response	`{LIN|OBAS}`
Preset Value	`LIN`
Related Commands	SENS:SWE:TYPE
Equivalent Softkeys	**Stimulus > Segment Table > Segment Display**

DISP:WIND:Y:DIV

DISPlay:WINDow<*Ch*>:Y[:SCALe]:DIVisions <*numeric*>

DISPlay:WINDow<*Ch*>:Y[:SCALe]:DIVisions?

Description	Sets the number of the vertical scale divisions. For the rectangular format only. (command/query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	***<numeric>*** the number of the vertical scale divisions from 4 to 30
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	10
Resolution	2
Equivalent Softkeys	**Scale > Divisions**

FORM:BORD

FORMat:BORDer *<char>*

FORMat:BORDer?

Description	Sets or reads out the transfer order of each byte in data, when the binary data transfer format is set by the FORM:DATA command. (command/query)
Parameter	*<char>* Choose from: **NORMal** : Normal (big-endian format) **SWAPped** : Swapped (little-endian format)
Query Response	{NORM|SWAP}
Preset Value	NORM
Notes	The Intel x86 and also AMD64 / x86-64 series of processors use the little-endian format.
Related Commands	FORM:DATA
Equivalent Softkeys	**None**

FORM:DATA

FORMat:DATA *<char>*

FORMat:DATA?

Description	Sets or reads out the data transfer format, when responding to the following queries: CALC:DATA:FDAT? CALC:DATA:FMEM? CALC:DATA:SDAT? CALC:DATA:SMEM? CALC:FUNC:DATA? CALC:LIM:DATA? CALC:LIM:REP? CALC:LIM:REP:ALL? CALC:RLIM:DATA? CALC:RLIM:REP? SENS:FREQ:DATA? SENS:SEGM:DATA? (command/query)
Parameter	*<char>* Choose from: **ASCii** : Character format **REAL** : Binary format (IEEE−64 floating point) **REAL32** : Binary format (IEEE−32 floating point)
Query Response	{ASC|REAL|REAL32}
Preset Value	ASC
Notes	The command is not applicable with the TCP/IP Socket protocol.
Related Commands	FORM:BORD
Equivalent Softkeys	**None**

HCOP

HCOPy[:IMMediate]

Description	Prints out the image displayed on the screen without previewing. (no query)
Equivalent Softkeys	**System > Print > Print Embedded**

HCOP:ABOR

HCOPy:ABORt

Description	Aborts the printout. (no query)
Equivalent Softkeys	**None**

HCOP:DATE:STAM

HCOPy:DATE:STAMp {OFF|ON|0|1}

HCOPy:DATE:STAMp?

Description	Turns ON/OFF the date and time printout in the upper right corner of the image. (command/query)
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	1
Equivalent Softkeys	**System > Print > Print Date & Time**

HCOP:IMAG

HCOPy:IMAGe *<char>*

HCOPy:IMAGe?

Description	Sets or reads out the inverted color image printout. (command/query)
Parameter	*<char>* Choose from: **NORMal** : Normal printout **INVert** : Inverted color printout
Query Response	{NORM|INV}
Preset Value	NORM
Equivalent Softkeys	**System > Print > Invert Image**

HCOP:PAIN

HCOPy:PAINt *<char>*

HCOPy:PAINt?

Description	Sets or reads out the color chart for the image printout. (command/query)
Parameter	*<char>* Choose from: **COLor** : Color printout **GRAY** : Grayscale printout **BW** : Black&white printout
Query Response	{COL|GRAY|BW}
Preset Value	BW
Equivalent Softkeys	**System > Print > Print Color**

INIT

INITiate<*Ch*>[:IMMediate]

Description	Puts the channel to the *Trigger Waiting* state for the one trigger event. The channel should be in the *hold* state, otherwise an error occurs and the command is ignored. The channel goes into the *Hold* as a result of the command INIT: CONT OFF. If the *Internal* trigger source is selected by the command TRIG:SOUR INT, then the command initiates a sweep in the single channel, otherwise the channel goes to the *Waiting for a Single Trigger* mode. Upon receipt of a trigger from the selected source, the sweep starts for the channels awaiting trigger. On completion of the sweep the channel goes to the *Hold* state. (no query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Related Commands	TRIG:SOUR INIT:CONT
Equivalent Softkeys	**Stimulus > Trigger > Single**

INIT:CONT

INITiate<*Ch*>:CONTinuous {OFF|ON|0|1}

INITiate<*Ch*>:CONTinuous?

Description	Turns ON/OFF the *continuous trigger initiation* mode. When the *continuous initiation* mode turned **ON**: • If the *Internal* trigger source is selected by the command TRIG:SOUR INT, then the channel continuously sweeps; • If the trigger source other than the internal is selected, then the channel goes to the *trigger waiting* state. Upon receipt of a trigger from the selected source, the sweep starts for the channels awaiting trigger. On completion of the sweep the channel goes to the *trigger waiting* state. When the *continuous trigger initiation* mode turned **OFF** the channel is in the *Hold* state, to initiate a sweep one should use the INIT command. (command /query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	Specifies the continuous trigger initiation mode: **{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	1
Related Commands	TRIG:SOUR INIT
Equivalent Softkeys	**Stimulus > Trigger > Continuous** **Stimulus > Trigger > Hold**

MMEM:CAT?

MMEMory:CATalog? *<string>*

Description	This command reads out the following information on the hard drive: • Space in use • Available space • Name and size of all files (including directories) in the specified directory (query only)
Parameter	***<string>*** Directory name
Query Response	Format: ("{A},{B},{Name 1},,{Size 1},{Name 2},,{Size 2}, … ,{Name N},,{Size N}") Where N is the number of all files in the specified directory and n is an integer between 1 and N. {A}: Space in use of the hard drive (byte). {B}: Available space of the hard drive (byte). {Name n}: Name of the n-th file (directory). {Size n}: Size (byte) of the n-th file (directory). Always 0 for directories.
Equivalent Softkeys	**None**

MMEM:COPY

MMEMory:COPY *<string1>*, *<string2>*

Description	Copies a file. (no query)
Parameter	***<string1>*** Source file name ***<string2>*** Destination file name
Equivalent Softkeys	**None**

MMEM:DEL

MMEMory:DELete *<string>*

Description	Deletes a file. (no query)
Parameter	***<string>*** File name
Equivalent Softkeys	**None**

MMEM:LOAD

MMEMory:LOAD[:STATe] *<string>*

Description	Recalls the specified Analyzer state file. The file must be saved by the MMEM:STOR command. (no query)
Parameter	***<string>*** File name
Notes	If the full path of the file is not specified, the *State* subdirectory of the application directory will be searched for the file. The Analyzer state file has **.sta* extension by default.
Equivalent Softkeys	**Save/Recall > Recall State > State...**

MMEM:LOAD:CHAN

MMEMory:LOAD:CHANnel[:STATe] *<char>*

Description	Recalls the Analyzer state for the active channel. The file must be saved in one of the four memory registers by the MMEM:STOR:CHAN command. (no query)
Target	Active channel set by the DISP:WIND:ACT command
Parameter	*<char>* Choose from: **A** : Recall from register A **B** : Recall from register B **C** : Recall from register C **D** : Recall from register D
Equivalent Softkeys	**Save/Recall > Recall Channel > { State A | B | C | D }**

MMEM:LOAD:CKIT

MMEMory:LOAD:CKIT*<Ck>* *<string>*

Description	Recalls the definition file for the calibration kit. The file must be saved by the MMEM:STOR:CKIT command. (no query)
Target	Calibration kit *<Ck>*, `<Ck>={[1]|2|...50}`
Parameter	***<string>*** Fine name
Notes	If the full path of the file is not specified, the *CalKit* subdirectory of the application directory will be searched for the file. The calibration kit definition file has *.*ckd* extension by default.
Equivalent Softkeys	**None**

MMEM:LOAD:LIM

MMEMory:LOAD:LIMit *<string>*

Description	Recalls the limit table file. The file must be saved by the MMEM:STOR:LIM command. (no query)
Target	Active trace of the active channel, set by the CALC:PAR:SEL command
Parameter	***<string>*** File name
Notes	If the full path of the file is not specified, the *Limit* subdirectory of the application directory will be searched for the file. The limit table file has **.lim* extension by default.
Equivalent Softkeys	**Analysis > Limit Test > Edit Limit Line > Restore Limit Table**

MMEM:LOAD:PLOS

MMEMory:LOAD:PLOSs*<Pt>* *<string>*

Description	Recalls the loss compensation file. The file must be saved by the MMEM:STOR:PLOS command. (no query)
Target	Port *<Pt>* of the active channel, set by the DISP:WIND:ACT command *<Pt>*={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA
Parameter	***<string>*** File name
Notes	If the full path of the file is not specified, the *CalKit* subdirectory of the application directory will be searched for the file. The loss compensation file has **.lct* extension by default.
Equivalent Softkeys	**Calibration > Power Calibration > Loss Compen > Import Loss Table**

MMEM:LOAD:RLIM

MMEMory:LOAD:RLIMit *<string>*

Description	Recalls the ripple limit table file. The file must be saved by the MMEM:STOR:RLIM command. (no query)
Target	Active trace of the active channel, set by the CALC:PAR:SEL command
Parameter	***<string>*** File name
Notes	If the full path of the file is not specified, the *Limit* subdirectory of the application directory will be searched for the file. The ripple limit file has **.rlm* extension by default.
Equivalent Softkeys	**Analysis > Ripple Limit > Edit Ripple Limit > Restore Ripple Limit Table**

MMEM:LOAD:SEGM

MMEMory:LOAD:SEGMent *<string>*

Description	Recalls the segment table file. The file must be saved by the MMEM:STOR:SEGM command. (no query)
Target	Active channel, set by the DISP:WIND:ACT command
Parameter	***<string>*** File name
Notes	If the full path of the file is not specified, the *Segment* subdirectory of the application directory will be searched for the file. The segment file has **.seg* extension by default.
Equivalent Softkeys	**Stimulus > Segment Table > Recall...**

MMEM:LOAD:SNP

MMEMory:LOAD:SNP[:DATA] *<string>*

Description	Loads the Touchstone file with the specified name to the measured S–parameters of the active channel. The Touchstone file types 1, 2, 3 or 4 port (file extensions s1p, s2p, s3p or s4p) are supported. On completion of the command, the channel goes to the hold state. (no query)
Target	The active channel set by the command SCPI.DISPlay.WINDow(Ch).ACTivate.
Parameter	***<string>*** File name
Equivalent Softkeys	**Save/Recall > Load Data From Touchstone File > To S-parameters...**

MMEM:LOAD:SNP:TRAC:MEM

MMEMory:LOAD:SNP:TRACe*<Tr>*:MEMory *<string>*

Description	Loads the Touchstone file with the specified name to the memory trace. The Touchstone file types 1, 2, 3 or 4 port (file extensions s1p, s2p, s3p or s4p) are supported. The current measured S-parameter of data trace selects the appropriate S-parameter from the Touchstone file. After successful load the display of memory trace is automatically switched on. (no query)
Target	The specified memory trace *<Tr>* of active channel, *<Tr>*={[1]|2|...16} Active channel set by the command SCPI.DISPlay.WINDow(Ch).ACTivate.
Parameter	***<string>*** File name
Equivalent Softkeys	**Save/Recall > Load Data From Touchstone File > To Active Trace Memory...**

MMEM:MDIR

MMEMory:MDIRectory *<string>*

Description	Creates a new directory. (no query)
Parameter	***<string>*** Directory full name
Equivalent Softkeys	**None**

MMEM:STOR

MMEMory:STORe[:STATe] *<string>*

Description	Saves the Analyzer state into a file. (no query)
Parameter	***<string>*** File name
Notes	If the full path of the file is not specified, the *State* subdirectory of the application directory will be searched for the file. The state file has **.sta* extension by default.
Equivalent Softkeys	**Save/Recall > Save State > State...**

MMEM:STOR:CHAN

MMEMory:STORe:CHANnel[:STATe] *<char>*

Description	Saves the Analyzer state of the items set for the active channel into one of the four memory registers. (no query)
Target	Active channel set by the DISP:WIND:ACT command
Parameter	*<char>* Choose from: **A** : Save to register A **B** : Save to register B **C** : Save to register C **D** : Save to register D
Equivalent Softkeys	**Save/Recall > Save Channel > { State A | B | C | D }**

MMEM:STOR:CHAN:CLE

MMEMory:STORe:CHANnel:CLEar

Description	Clears the memory of the channel state saved by the MMEM:STOR:CHAN command. (no query)
Equivalent Softkeys	**Save/Recall > Save Channel > Clear States**

MMEM:STOR:CKIT

MMEMory:STORe:CKIT *<Ck>* *<string>*

Description	Saves the definition file for the calibration kit. (no query)
Target	Calibration kit *<Ck>*, `<Ck>={[1]|2|...50}`
Parameter	***<string>*** File name
Notes	If the full path of the file is not specified, the *CalKit* subdirectory of the application directory will be searched for the file. The calibration kit definition file has **.ckd* extension by default.
Equivalent Softkeys	**None**

MMEM:STOR:FDAT

MMEMory:STORe:FDATa *<string>*

Description	Saves the CSV formatted data into a file. (no query)
Target	Active trace of the active channel, set by the CALC:PAR:SEL command
Parameter	***<string>*** File name
Notes	If the full path of the file is not specified, the *CSV* subdirectory of the application directory will be searched for the file. The file has **.csv* extension by default.
Equivalent Softkeys	**Save/Recall > Save Trace Data**

MMEM:STOR:IMAG

MMEMory:STORe:IMAGe *<string>*

Description	Saves the display image in BMP or PNG format into a file. (no query)
Parameter	***<string>*** File name
Notes	If the full path of the file is not specified, the *Image* subdirectory of the application directory will be searched for the file. If the file has **.png* extension, the file had PNG format, in all the other cases the file has BMP format.
Equivalent Softkeys	**System > Print > Print Windows > Save as...**

MMEM:STOR:LIM

MMEMory:STORe:LIMit *<string>*

Description	Saves the limit table into a file. (no query)
Target	Active trace of the active channel, set by the CALC:PAR:SEL command
Parameter	***<string>*** File name
Notes	If the full path of the file is not specified, the *Limit* subdirectory of the application directory will be searched for the file. The file has **.lim* extension by default.
Equivalent Softkeys	**Analysis > Limit Test > Edit Limit Line > Save Limit Table**

MMEM:STOR:PLOS

MMEMory:STORe:PLOSs *<Pt>* *<string>*

Description	Saves the loss compensation table into a file. (no query)
Target	Port *<Pt>* of the active channel, set by the DISP:WIND:ACT command `<Pt>={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA`
Parameter	***<string>*** File name
Notes	If the full path of the file is not specified, the *CalKit* subdirectory of the application directory will be searched for the file. The loss compensation file has **.lct* extension by default.
Equivalent Softkeys	**Calibration > Power Calibration > Loss Compen > Export Loss Table**

MMEM:STOR:RLIM

MMEMory:STORe:RLIMit *<string>*

Description	Saves the ripple limit table into a file. (no query)
Target	Active trace of the active channel, set by the CALC:PAR:SEL command
Parameter	***<string>*** File name
Notes	If the full path of the file is not specified, the *Limit* subdirectory of the application directory will be searched for the file. The ripple limit file has *.*rlm* extension by default.
Equivalent Softkeys	**Analysis > Ripple Limit > Edit Ripple Limit > Save Ripple Limit Table**

MMEM:STOR:SEGM

MMEMory:STORe:SEGMent *<string>*

Description	Save the segment table in a file. (no query)
Target	Active channel, set by the DISP:WIND:ACT command
Parameter	***<string>*** File name
Notes	If the full path of the file is not specified, the *Segment* subdirectory of the application directory will be searched for the file. The segment file has *.*seg* extension by default.
Equivalent Softkeys	**Stimulus > Segment Table > Save...**

MMEM:STOR:SNP

MMEMory:STORe:SNP[:DATA] *<string>*

Description	Saves the measured S–parameters of the active channel into a Touchstone file. The file type (1–port to 4–port) is set by the MMEM:STOR:SNP:TYPE:SxP command. (no query)
Target	Active channel, set by the DISP:WIND:ACT command
Parameter	***<string>*** File name
Notes	If the full path of the file is not specified, the *FixtureSim* subdirectory of the application directory will be searched for the file. The file has **.sNp* extension by default.
Equivalent Softkeys	**Save/Recall > Save Data to Touchstone File > Save File...**

MMEM:STOR:SNP:FORM

MMEMory:STORe:SNP:FORMat *<char>*

MMEMory:STORe:SNP:FORMat?

Description	Sets the data format for the S–parameter saving by the MMEM:STOR:SNP command. (command/query)
Parameter	*<char>* Choose from: **MA** : Logarithmic Magnitude / Angle format **DB** : Linear Magnitude / Angle format **RI** : Real part /Imaginary part format
Query Response	{RI|DB|MA}
Preset Value	RI
Equivalent Softkeys	**Save/Recall > Save Data to Touchstone File > Format**

MMEM:STOR:SNP:TYPE:S1P

MMEMory:STORe:SNP:TYPE:S1P *<port>*

MMEMory:STORe:SNP:TYPE:S1P?

Description	Sets the 1-port Touchstone file type (*.s1p) and the port number, when saving S–parameters by the MMEM:STOR:SNP command. (command/query)
Parameter	*<port>* port number from 1 to 2 (or 4 for S4 software)
Query Response	***<numeric>***
Preset Value	1
Equivalent Softkeys	**Save/Recall > Save Data to Touchstone File > Type > 1–Port (s1p)** **Save/Recall > Save Data to Touchstone File > Select Port**

MMEM:STOR:SNP:TYPE:S2P

MMEMory:STORe:SNP:TYPE:S2P *<port1>*, *<port2>*

MMEMory:STORe:SNP:TYPE:S2P?

Description	Sets the 2-port Touchstone file type (*.s2p) and the port numbers, when saving S–parameters by the MMEM:STOR:SNP command. (command/query)
Parameter	***<port1>*** First port number ***<port2>*** Second port number port number must be from 1 to 2 (or 4 for S4 software)
Query Response	*<numeric1>*,*<numeric2>*
Equivalent Softkeys	**Save/Recall > Save Data to Touchstone File > Type > 2–Port (s2p)**

MMEM:STOR:SNP:TYPE:S3P

MMEMory:STORe:SNP:TYPE:S3P *<port1>*, *<port2>*, *<port3>*

MMEMory:STORe:SNP:TYPE:S3P?

Description	Sets the 3-port Touchstone file type (*.s3p) and the port numbers, when saving S–parameters by the MMEM:STOR:SNP command. (command/query)
Parameter	***<port1>*** First port number ***<port2>*** Second port number ***<port3>*** Third port number port number must be from 1 to 4 (S4 software only)
Query Response	*<numeric1>*,*<numeric2>*,*<numeric3>*
Equivalent Softkeys	**Save/Recall > Save Data to Touchstone File > Type > 3–Port (s3p)**

MMEM:STOR:SNP:TYPE:S4P

MMEMory:STORe:SNP:TYPE:S4P *<port1>*, *<port2>*, *<port3>*, *<port4>*

MMEMory:STORe:SNP:TYPE:S4P?

Description	Sets the 4-port Touchstone file type (*.s4p) and the port numbers, when saving S–parameters by the MMEM:STOR:SNP command. (command/query)
Parameter	***<port1>*** First port number ***<port2>*** Second port number ***<port3>*** Third port number ***<port4>*** Fourth port number port number must be from 1 to 4 (S4 software only)
Query Response	*<numeric1>*,*<numeric2>*,*<numeric3>*,*<numeric4>*
Equivalent Softkeys	**Save/Recall > Save Data to Touchstone File > Type > 4–Port (s4p)**

MMEM:STOR:STYP

MMEMory:STORe:STYPe *<char>*

MMEMory:STORe:STYPe?

Description	Selects the type of the Analyzer or channel state saving by the MMEM:STOR:CHAN command. (command/query)
Parameter	*<char>* Choose from: **STATe** : Measurement conditions **CSTate** : Measurement conditions and calibration **DSTate** : Measurement conditions and data **CDSTate** : Measurement conditions, calibration, data and memory **CMSTate** : Measurement conditions, calibration and memory
Query Response	{STAT|CST|DST|CDST|CMST}
Preset Value	CST
Equivalent Softkeys	**Save/Recall > Save Type**

MMEM:TRAN?

MMEMory:TRANsfer? *<string>*

Description	Transfers the contents of a specified file from the Analyzer to the external computer. (command/query)
Parameter	***<string>*** the file name with the full path
Query Response	Block data transfer format. For example: #6001000<binary block 1000 bytes> #6 Symbol # introduces the data block. The next number indicates how many of the following digits describe the length of the data block; 001000 Length of the data block;
Notes	The command is not applicable with the TCP/IP Socket protocol. The file must be 20 Mbytes or less.
Equivalent Softkeys	**None**

OUTP

OUTPut[:STATe] {OFF|ON|0|1}

OUTPut[:STATe]?

Description	Turns ON/OFF the RF signal output. Measurements cannot be performed when the RF signal output is turned OFF. (command/query)
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	1
Equivalent Softkeys	**Stimulus > Power > RF Out**

SENS:AVER

SENSe<*Ch*>:AVERage[:STATe] {OFF|ON|0|1}

SENSe<*Ch*>:AVERage[:STATe]?

Description	Turns ON/OFF the measurement averaging function. (command/query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Related Commands	SENS:AVER:COUN
Equivalent Softkeys	**Average > Averaging**

SENS:AVER:CLE

SENSe<*Ch*>:AVERage:CLEar

Description	Restarts the averaging process, when the averaging function turned on. (no query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Related Commands	SENS:AVER
Equivalent Softkeys	**None**

SENS:AVER:COUN

SENSe<*Ch*>:AVERage:COUNt <*numeric*>

SENSe<*Ch*>:AVERage:COUNt?

Description	Sets or reads out the averaging factor, when the averaging function turned on. (command/query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	***<numeric>*** the averaging factor from 1 to 999
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	10
Related Commands	SENS:AVER
Equivalent Softkeys	**Average > Avg Factor**

SENS:BAND

SENSe<*Ch*>:BANDwidth[:RESolution] *<frequency>*

SENSe<*Ch*>:BANDwidth[:RESolution]?

SENS:BWID

SENSe<*Ch*>:BWIDth[:RESolution] *<frequency>*

SENSe<*Ch*>:BWIDth[:RESolution]?

Description	Sets or reads out the IF bandwidth. (command/query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	***<frequency>*** the IF bandwidth value
Unit	Hz (Hertz)
Out of Range	Sets the value of the analyzer limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	10 kHz
Resolution	In steps of 1, 1.5, 2, 3, 5, 7
Equivalent Softkeys	**Average > IF Bandwidth**

SENS:CORR:CLE

SENSe<*Ch*>:CORRection:CLEar

Description	Clears the calibration coefficient table. (no query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Equivalent Softkeys	**None**

SENS:CORR:COEF

SENSe<*Ch*>:CORRection:COEFficient[:DATA] <*char*>, <*rcvport*>, <*srcport*>, <*numeric list*>

SENSe<*Ch*>:CORRection:COEFficient[:DATA]? <*char*>, <*rcvport*>, <*srcport*>

Description	Writes or reads out the calibration coefficient data array. The array size is 2N, where N is the number of measurement points. For the n–th point, where n from 1 to N: *<numeric 2n–1>* real part of the calibration coefficients *<numeric 2n>* imaginary part of the calibration coefficients (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	*<char>* Specifies the Error term: **ER** : Reflection tracking **ED** : Directivity **ES** : Source match **ET** : Transmission tracking **EX** : Isolation **EL** : Load match *<rcvport>* the number of the receiver port from 1 to 2 (or 4) *<srcport>* the number of the source port from 1 to 2 (or 4) *<numeric list>* the calibration coefficient array When ES, ER, or ED is used, the numbers of the ports *<rcvport>* and *<srcport>* must be the same. When EL, ET, or EX is used, the numbers of the ports *<rcvport>* and *<srcport>* must be different.
Query Response	*<numeric 1>*, *<numeric 2>*, …*<numeric 2N>*
Notes	The written calibration coefficients become effective only after the SENS:CORR:COEF:SAVE command is executed.
Related Commands	SENS:CORR:COEF:SAVE
Equivalent Softkeys	**None**

SENS:CORR:COEF:METH:ERES

SENSe*<Ch>*:CORRection:COEFficient:METHod:ERESponse *<rcvport>*, *<srcport>*

Description	Selects the ports and sets the *1–path 2–port calibration* type, when the written calibration coefficients are made effective by the SENS:CORR:COEF:SAVE command. (no query)
Target	Channel *<Ch>*, `<Ch>={[1]|2|...16}`
Parameter	***<rcvport>*** the number of the receiver port from 1 to 2 (or 4) ***<srcport>*** the number of the source port from 1 to 2 (or 4)
Out of Range	If the same port numbers are specified, an error occurs.
Related Commands	SENS:CORR:COEF:SAVE
Equivalent Softkeys	**None**

SENS:CORR:COEF:METH:OPEN

SENSe*<Ch>*:CORRection:COEFficient:METHod[:RESPonse]:OPEN *<port>*

Description	Selects the port and sets the *response calibration (Open)* type, when the written calibration coefficients are made effective by the SENS:CORR:COEF:SAVE command. (no query)
Target	Channel *<Ch>*, `<Ch>={[1]|2|...16}`
Parameter	***<port>*** the number of the port from 1 to 2 (or 4)
Related Commands	SENS:CORR:COEF:SAVE
Equivalent Softkeys	**None**

SENS:CORR:COEF:METH:SHOR

SENSe<*Ch*>:CORRection:COEFficient:METHod[:RESPonse]:SHORt <*port*>

Description	Selects the port and sets the *response calibration (Short)* type, when the written calibration coefficients are made effective by the SENS:CORR:COEF:SAVE command. (no query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	<***port***> the number of the port from 1 to 2 (or 4)
Related Commands	SENS:CORR:COEF:SAVE
Equivalent Softkeys	**None**

SENS:CORR:COEF:METH:SOLT1

SENSe<*Ch*>:CORRection:COEFficient:METHod:SOLT1 <*port*>

Description	Selects the port and sets the *full 1–port calibration* type, when the written calibration coefficients are made effective by the SENS:CORR:COEF:SAVE command. (no query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	<***port***> the number of the port from 1 to 2 (or 4)
Related Commands	SENS:CORR:COEF:SAVE
Equivalent Softkeys	**None**

SENS:CORR:COEF:METH:SOLT2

SENSe<*Ch*>:CORRection:COEFficient:METHod:SOLT2 <*port1*>,<*port2*>

Description	Selects the ports and sets the *full 2–port calibration* type, when the written calibration coefficients are made effective by the SENS:CORR:COEF:SAVE command. (no query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	**<*port1*>** the first port number from 1 to 2 (or 4) **<*port2*>** the second port number from 1 to 2 (or 4)
Out of Range	If the same port numbers are specified, an error occurs.
Related Commands	SENS:CORR:COEF:SAVE
Equivalent Softkeys	**None**

SENS:CORR:COEF:METH:SOLT3

SENSe<*Ch*>:CORRection:COEFficient:METHod:SOLT3 <*port1*>,<*port2*>,<*port3*>

Description	Selects the ports and sets the *full 3–port calibration* type, when the written calibration coefficients are made effective by the SENS:CORR:COEF:SAVE command. (no query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	**<*port1*>** the first port number from 1 to 4 **<*port2*>** the second port number from 1 to 4 **<*port3*>** the third port number from 1 to 4
Out of Range	If the same port numbers are specified, an error occurs.
Related Commands	SENS:CORR:COEF:SAVE
Equivalent Softkeys	**None**

SENS:CORR:COEF:METH:SOLT4

SENSe<Ch>:CORRection:COEFficient:METHod:SOLT4 *<port1>*, *<port2>*, *<port3>*, *<port4>*

Description	Selects the ports and sets the *full 4–port calibration* type, when the written calibration coefficients are made effective by the SENS:CORR:COEF:SAVE command. (no query)
Target	Channel *<Ch>*, <Ch>={[1]|2|...16}
Parameter	***<port1>*** the first port number from 1 to 4 ***<port2>*** the second port number from 1 to 4 ***<port3>*** the third port number from 1 to 4 ***<port4>*** the fourth port number from 1 to 4
Out of Range	If the same port numbers are specified, an error occurs.
Related Commands	SENS:CORR:COEF:SAVE
Equivalent Softkeys	**None**

SENS:CORR:COEF:METH:THRU

SENSe<Ch>:CORRection:COEFficient:METHod[:RESPonse]:THRU *<rcvport>*, *<srcport>*

Description	Selects the ports and sets the *response calibration (Thru)* type, when the written calibration coefficients are made effective by the SENS:CORR:COEF:SAVE command. (no query)
Target	Channel *<Ch>*, <Ch>={[1]|2|...16}
Parameter	***<rcvport>***, the number of the receiver port from 1 to 2 (or 4) ***<srcport>***, the number of the source port from 1 to 2 (or 4)
Out of Range	If the same port numbers are specified, an error occurs.
Related Commands	SENS:CORR:COEF:SAVE
Equivalent Softkeys	**None**

SENS:CORR:COEF:SAVE

SENSe*<Ch>*:CORRection:COEFficient:SAVE

Description	Enables the written calibration coefficients depending on the selected calibration type. On completion of the command the error correction automatically turns ON. At the attempt to execute this command before all the needed calibration coefficients are written, an error occurs and the command is ignored. (no query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Related Commands	Calibration type selection: SENS:CORR:COEF:METH:ERES SENS:CORR:COEF:METH:OPEN SENS:CORR:COEF:METH:SHOR SENS:CORR:COEF:METH:THRU SENS:CORR:COEF:METH:SOLT1 SENS:CORR:COEF:METH:SOLT2 Calibration coefficient writing: SENS:CORR:COEF
Equivalent Softkeys	**None**

SENS:CORR:COLL:ADAP:DEL

SENSe*<Ch>*:CORRection:COLLect:ADAPter:DELay *<numeric>*

SENSe*<Ch>*:CORRection:COLLect:ADAPter:DELay?

Description	Sets or reads out the approximate delay value of an adapter in the adapter removal/insertion function. This value is used to eliminate the uncertainty of ± 180 ° when calculating the phase response of the adapter. The sign of the value depends on the type of the removal / insertion function. The value must be **negative** for the adapter removal function and must be **positive** for the adapter insertion function. If this value is set to zero, the analyzer uses an algorithm to automatically determine the delay of the adapter. In most cases setting this value to zero is enough. Setting this value to non zero is required when: $$Frequency\ Step > \frac{1}{2Delay}$$ (command/query)
Target	Channel *<Ch>*, `<Ch>={[1]|2|...16}`
Parameter	***<numeric>*** the approximate delay value of the adapter (with minus sign when adapter is removed).
Unit	Seconds
Query Response	*<numeric>*
Preset Value	0
Note	The delay and the length of the adapter can be set mutually. $$Delay = \frac{Length\sqrt{Permittivity}}{C}$$
Equivalent Softkeys	**Calibration > Calibrate > Adapter Removal / Insertion > Adapter Delay**

SENS:CORR:COLL:ADAP:LENG

SENSe<*Ch*>:CORRection:COLLect:ADAPter:LENGth <*numeric*>

SENSe<*Ch*>:CORRection:COLLect:ADAPter:LENGth?

Description	Sets or reads out the approximate value of the mechanical length of the adapter in the adapter removal/insertion function. This value is used to eliminate the uncertainty of ± 180 ° when calculating the phase response of the adapter. The sign of the value depends on the type of the removal / insertion function. The value must be **negative** for the adapter removal function and must be **positive** for the adapter insertion function. If this value is set to zero, the analyzer uses an algorithm to automatically determine the delay of the adapter. In most cases setting this value to zero is enough. Setting this value to non zero is required when: $$Frequency\ Step > \frac{1}{2Delay}$$ (command/query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	<***numeric***> the approximate length of the adapter (with minus sign when adapter is removed).
Unit	Meters
Query Response	<*numeric*>
Preset Value	0
Note	The delay and the length of the adapter can be set mutually. $$Delay = \frac{Length\sqrt{Permittivity}}{C}$$
Equivalent Softkeys	**Calibration > Calibrate > Adapter Removal / Insertion > Adapter Delay**

SENS:CORR:COLL:ADAP:UNIT

SENSe<*Ch*>:CORRection:COLLect:ADAPter:UNIT {SEConds|METers}

SENSe<*Ch*>:CORRection:COLLect:ADAPter:UNIT?

Description	Selects the display units of the adapter delay (length) in the adapter removal/insertion function. (command/query)
Target	The active trace of channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	**SEConds** : Selects the seconds **METers** : Selects the meters
Query Response	{SEC|MET}
Preset Value	SEConds
Equivalent Softkeys	**Calibration > Calibrate > Adapter Removal / Insertion > Delay Unit**

SENS:CORR:COLL:ADAP:MED

SENSe<Ch>:CORRection:COLLect:ADAPter:MEDia {COAXial|WAVeguide}

SENSe<Ch>:CORRection:COLLect:ADAPter:MEDia?

Description	Specifies the adapter media in the adapter removal/insertion function. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	**COAXial** : Specifies the coaxial adapter **WAVeguide** : Specifies the waveguide adapter
Query Response	{COAX|WAV}
Preset Value	COAXial
Note	When the waveguide adapter is used it is recommended to specify the adapter length instead of delay.
Equivalent Softkeys	**Calibration > Calibrate > Adapter Removal / Insertion > Adapter Media**

SENS:CORR:COLL:ADAP:PERM

SENSe*<Ch>*:CORRection:COLLect:ADAPter:PERMittivity *<numeric>*

SENSe*<Ch>*:CORRection:COLLect:ADAPter:PERMittivity?

Description	Sets or reads out the value of the permittivity of an adapter media in the adapter removal/insertion function. When setting the adapter length, this parameter is used to calculate the adapter delay; therefore this parameter must be set before setting of the adapter length. When setting the adapter delay, this parameter is not used. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<numeric>*** the value of the permittivity of an adapter
Query Response	*<numeric>*
Preset Value	1.000649 (air)
Equivalent Softkeys	**Calibration > Calibrate > Adapter Removal / Insertion > Permittivity**

SENS:CORR:COLL:ADAP:WAV:CUT

SENSe*<Ch>*:CORRection:COLLect:ADAPter:WAVeguide:CUToff *<numeric>*

SENSe*<Ch>*:CORRection:COLLect:ADAPter:WAVeguide:CUToff?

Description	Sets or reads out the value of the cutoff frequency of the waveguide adapter. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	*<**numeric**>* the value of the cutoff frequency of the waveguide adapter.
Query Response	*<numeric>*
Preset Value	1.0 GHz
Equivalent Softkeys	**Calibration > Calibrate > Adapter Removal / Insertion> Cutoff Frequency**

SENS:CORR:COLL:METH:ADAP:REM

SENSe*<Ch>*:CORRection:COLLect:METHod:ADAPter:REMoval *<port>*

Description	Selects the port number and sets the *adapter removal/insertion function* for the calculation of the calibration coefficients when the SENS:CORR:COLL:SAVE command has been executed . (no query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	*<**port**>* the number of the port from 1 to 2 (4 for S4VNA)
Related Commands	SENS:CORR:COLL:SAVE
Equivalent Softkeys	**Calibration > Calibrate > Adapter Removal / Insertion> Select Port**

SENS:CORR:COLL:CKIT

SENSe:CORRection:COLLect:CKIT[:SELect] *<numeric>*

SENSe:CORRection:COLLect:CKIT[:SELect]?

Description	Sets or reads out the number of the selected calibration kit in the table of calibration kits. The selected calibration kit is used in the subsequent calibration and is used for editing by the commands SENS:CORR:COLL:CKIT:XXXX. (command/query)
Parameter	*<**numeric**>* the number of the calibration kit from 1 to 64
Query Response	*<numeric>*
Preset Value	1
Equivalent Softkeys	**Calibration > Cal Kit > Cal Kit n > Select**

SENS:CORR:COLL:CKIT:DESC

SENSe:CORRection:COLLect:CKIT:DESCription *<string>*

SENSe:CORRection:COLLect:CKIT:DESCription ?

Description	Sets or reads out the calibration kit description string. (command/query)
Target	Selected calibration kit
Parameter	*<**string**>*, up to 254 characters
Query Response	*<string>*
Equivalent Softkeys	**Calibration > Cal Kit > Cal Kit n > Description**

SENS:CORR:COLL:CKIT:LAB

SENSe:CORRection:COLLect:CKIT:LABel *<string>*

SENSe:CORRection:COLLect:CKIT:LABel?

Description	Sets or reads out the calibration kit label. (command/query)
Target	Selected calibration kit
Parameter	*<**string**>*, up to 254 characters
Query Response	*<string>*
Equivalent Softkeys	**Calibration > Cal Kit > Cal Kit n > Label**

SENS:CORR:COLL:CKIT:ORD:LOAD

SENSe:CORRection:COLLect:CKIT:ORDer:LOAD *<port>*, *<numeric>*

SENSe:CORRection:COLLect:CKIT:ORDer:LOAD? *<port>*

Description	Sets or reads out the number of the calibration standard of the load type, used for the measurement of the specified port. (command/query)
Target	Selected calibration kit
Parameter	*<**port**>* the number of the port from 1 to 2 (or 4) *<**numeric**>* the number of the calibration standard
Out of Range	If the specified standard number is greater than the number of standards in the kit, an error occurs. If the specified standard number is not the load standard number, an error occurs.
Query Response	*<numeric>*
Equivalent Softkeys	**Calibration > Cal Kit > Specify CLSs > Load Port x (Row)**

SENS:CORR:COLL:CKIT:ORD:OPEN

SENSe:CORRection:COLLect:CKIT:ORDer:OPEN *<port>*, *<numeric>*

SENSe:CORRection:COLLect:CKIT:ORDer:OPEN? *<port>*

Description	Sets or reads out the number of the calibration standard of the open type, used for the measurement of the specified port. (command/query)
Target	Selected calibration kit
Parameter	<***port***> the number of the port from 1 to 2 (or 4) <***numeric***> the number of the calibration standard
Out of Range	If the specified standard number is greater than the number of standards in the kit, an error occurs. If the specified standard number is not the open standard number, an error occurs.
Query Response	*<numeric>*
Equivalent Softkeys	**Calibration > Cal Kit > Specify CLSs > Open Port x (Row)**

SENS:CORR:COLL:CKIT:ORD:SEL

SENSe:CORRection:COLLect:CKIT:ORDer:SELect *<numeric>*

SENSe:CORRection:COLLect:CKIT:ORDer:SELect?

Description	The subclass used to specify classes of calbration standards by the commands SENSe<*Ch*>:CORRection:COLLect:CKIT:ORDer:XXXX.
Target	Selected calibration kit
Parameter	<***numeric***> the subclass number from 1 to 8
Query Response	*<numeric>*
Equivalent Softkeys	**Calibration > Cal Kit > Specify CLSs > Subclass n (Column)**

SENS:CORR:COLL:CKIT:ORD:SHOR

SENSe:CORRection:COLLect:CKIT:ORDer:SHORt *<port>*, *<numeric>*

SENSe:CORRection:COLLect:CKIT:ORDer:SHORt? *<port>*

Description	Sets or reads out the number of the calibration standard of the short type, used for the measurement of the specified port. (command/query)
Target	Selected calibration kit
Parameter	***<port>*** the number of the port from 1 to 2 (or 4) ***<numeric>*** the number of the calibration standard
Out of Range	If the specified standard number is greater than the number of standards in the kit, an error occurs. If the specified standard number is not the short standard number, an error occurs.
Query Response	*<numeric>*
Equivalent Softkeys	**Calibration > Cal Kit > Specify CLSs > Short Port x (Row)**

SENS:CORR:COLL:CKIT:ORD:THRU

SENSe:CORRection:COLLect:CKIT:ORDer:THRU *<port1>*, *<port2>*, *<numeric>*

SENSe:CORRection:COLLect:CKIT:ORDer:THRU? *<port1>*, *<port2>*

Description	Sets or reads out the number of the calibration standard of the thru type, used for the measurement between the *<port1>* and *<port2>* ports. (command/query)
Target	Selected calibration kit
Parameter	***<port1>*** the number of the receiver port from 1 to 2 (or 4) ***<port2>*** the number of the source port from 1 to 2 (or 4) ***<numeric>*** the number of the calibration standard
Out of Range	If the specified standard number is greater than the number of standards in the kit, an error occurs. If the specified standard number is not the thru standard number, an error occurs.
Equivalent Softkeys	**Calibration > Cal Kit > Specify CLSs > Thru Port x-y (Row)**

SENS:CORR:COLL:CKIT:ORD:TRLL

SENSe:CORRection:COLLect:CKIT:ORDer:TRLLine *<port1>*, *<port2>*, *<numeric>*

SENSe:CORRection:COLLect:CKIT:ORDer:TRLLine? *<port1>*, *<port2>*

Description	Sets or reads out the number of the calibration standard of the TRL line type, used for the measurement between the *<port1>* and *<port2>* ports. (command/query)
Target	Selected calibration kit
Parameter	***<port1>*** the number of the receiver port from 1 to 2 (or 4) ***<port2>*** the number of the source port from 1 to 2 (or 4) ***<numeric>*** the number of the calibration standard
Out of Range	If the specified standard number is greater than the number of standards in the kit, an error occurs. If the specified standard number is not the thru standard number, an error occurs.
Equivalent Softkeys	**Calibration > Cal Kit > Specify CLSs > TRL Line Port x-y (Row)**

SENS:CORR:COLL:CKIT:ORD:TRLT

SENSe:CORRection:COLLect:CKIT:ORDer:TRLThru *<port1>*, *<port2>*, *<numeric>*

SENSe:CORRection:COLLect:CKIT:ORDer:TRLThru? *<port1>*, *<port2>*

Description	Sets or reads out the number of the calibration standard of the TRL thru type, used for the measurement between the *<port1>* and *<port2>* ports. (command/query)
Target	Selected calibration kit
Parameter	***<port1>*** the number of the receiver port from 1 to 2 (or 4) ***<port2>*** the number of the source port from 1 to 2 (or 4) ***<numeric>*** the number of the calibration standard
Out of Range	If the specified standard number is greater than the number of standards in the kit, an error occurs. If the specified standard number is not the thru standard number, an error occurs.
Equivalent Softkeys	**Calibration > Cal Kit > Specify CLSs > TRL Thru Port x-y (Row)**

SENS:CORR:COLL:CKIT:ORD:TRLR

SENSe:CORRection:COLLect:CKIT:ORDer:TRLReflect *<port>*, *<numeric>*

SENSe:CORRection:COLLect:CKIT:ORDer:TRLReflect? *<port>*

Description	Sets or reads out the number of the calibration standard of the TRL Reflect type, used for the measurement of the specified port. (command/query)
Target	Selected calibration kit
Parameter	***<port>*** the number of the port from 1 to 2 (or 4) ***<numeric>*** the number of the calibration standard
Out of Range	If the specified standard number is greater than the number of standards in the kit, an error occurs. If the specified standard number is not the open or short standard number, an error occurs.
Query Response	*<numeric>*
Equivalent Softkeys	**Calibration > Cal Kit > Specify CLSs > TRL Reflect Port x (Row)**

SENS:CORR:COLL:CKIT:RES

SENSe:CORRection:COLLect:CKIT:RESet

Description	Resets the calibration kit to the factory settings. Restores the predefined calibration kit. Removes the user defined calibration kit. (no query)
Target	Selected calibration kit
Equivalent Softkeys	**Calibration > Restore Cal Kit**

SENS:CORR:COLL:CKIT:STAN:ARB

SENSe:CORRection:COLLect:CKIT:STAN<*Std*>:ARBitrary <*numeric*>

SENSe:CORRection:COLLect:CKIT:STAN<*Std*>:ARBitrary?

Description	Sets or reads out the value of the arbitrary impedance for the load standard. (command/query)
Target	Standard <*Std*> of the selected calibration kit, <*Std*>={[1]|2|...N}, where N – the number of the standards in the calibration kit
Parameter	<***numeric***> the arbitrary impedance value from −1E18 to 1E18
Unit	Ω (Ohm)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<*numeric*>
Preset Value	50 or 75, depending on the selected calibration kit
Equivalent Softkeys	**Calibration > Cal Kit > Define STDs > Terminal Impedance**

SENS:CORR:COLL:CKIT:STAN:C0

SENSe:CORRection:COLLect:CKIT:STAN*<Std>*:C0 *<numeric>*

SENSe:CORRection:COLLect:CKIT:STAN*<Std>*:C0?

Description	Sets or reads out the C0 value for the open calibration standard. (command/query)
Target	Standard *<Std>* of the selected calibration kit, *<Std>*={[1]|2|...N}, where N – the number of the standards in the calibration kit
Parameter	***<numeric>*** the C0 value from −1E18 to 1E18
Unit	1E−15 F (Farad)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Equivalent Softkeys	**Calibration > Cal Kit > Define STDs > C0 10^{-15} F**

SENS:CORR:COLL:CKIT:STAN:C1

SENSe:CORRection:COLLect:CKIT:STAN*<Std>*:C1 *<numeric>*

SENSe:CORRection:COLLect:CKIT:STAN*<Std>*:C1?

Description	Sets or reads out the C1 value for the open calibration standard. (command/query)
Target	Standard *<Std>* of the selected calibration kit, *<Std>*={[1]|2|...N}, where N – the number of the standards in the calibration kit
Parameter	***<numeric>*** the C1 value from −1E18 to 1E18
Unit	1E−27 F/Hz (Farad/Hertz)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Equivalent Softkeys	**Calibration > Cal Kit > Define STDs > C1 10^{-27} F/Hz**

SENS:CORR:COLL:CKIT:STAN:C2

SENSe:CORRection:COLLect:CKIT:STAN*<Std>*:C2 *<numeric>*

SENSe:CORRection:COLLect:CKIT:STAN*<Std>*:C2?

Description	Sets or reads out the C2 value for the open calibration standard. (command/query)
Target	Standard *<Std>* of the selected calibration kit, *<Std>*={[1]|2|...N}, where N – the number of the standards in the calibration kit
Parameter	***<numeric>*** the C2 value from −1E18 to 1E18
Unit	1E−36 F/Hz^2 (Farad/Hertz^2)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Equivalent Softkeys	**Calibration > Cal Kit > Define STDs > C2 10^{-36} F/Hz^2**

SENS:CORR:COLL:CKIT:STAN:C3

SENSe:CORRection:COLLect:CKIT:STAN*<Std>*:C3 *<numeric>*

SENSe:CORRection:COLLect:CKIT:STAN*<Std>*:C3?

Description	Sets or reads out the C3 value for the open calibration standard. (command/query)
Target	Standard *<Std>* of the selected calibration kit, *<Std>*={[1]|2|...N}, where N – the number of the standards in the calibration kit
Parameter	***<numeric>*** the C3 value from −1E18 to 1E18
Unit	1E−45 F/Hz^3 (Farad/Hertz^3)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Equivalent Softkeys	**Calibration > Cal Kit > Define STDs > C3 10^{-45} F/Hz^3**

SENS:CORR:COLL:CKIT:STAN:DEL

SENSe:CORRection:COLLect:CKIT:STAN*<Std>*:DELay *<numeric>*

SENSe:CORRection:COLLect:CKIT:STAN*<Std>*:Delay?

Description	Sets or reads out the offset delay value for the calibration standard. (command/query)
Target	Standard *<Std>* of the selected calibration kit, *<Std>*={[1]|2|...N}, where N – the number of the standards in the calibration kit
Parameter	***<numeric>*** the offset delay value form −1E18 to 1E18
Unit	s (second)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Equivalent Softkeys	**Calibration > Cal Kit > Define STDs > Offset Delay**

SENS:CORR:COLL:CKIT:STAN:FMAX

SENSe:CORRection:COLLect:CKIT:STAN<*Std*>:FMAXimum <*numeric*>

SENSe:CORRection:COLLect:CKIT:STAN<*Std*>:FMAXimum?

Description	Sets or reads out the maximum frequency limit of the calibration standard. (command/query)
Target	Standard <*Std*> of the selected calibration kit, <*Std*>={[1]|2|...N}, where N – the number of the standards in the calibration kit
Parameter	<***numeric***> the maximum frequency limit form 0 to 1E14
Unit	Hz
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<*numeric*>
Equivalent Softkeys	**Calibration > Cal Kit > Define STDs > F max**

SENS:CORR:COLL:CKIT:STAN:FMIN

SENSe:CORRection:COLLect:CKIT:STAN*<Std>*:FMINimum *<numeric>*

SENSe:CORRection:COLLect:CKIT:STAN*<Std>*:FMINimum?

Description	Sets or reads out the minimum frequency limit of the calibration standard. (command/query)
Target	Standard *<Std>* of the selected calibration kit, <Std>={[1]|2|...N}, where N – the number of the standards in the calibration kit
Parameter	***<numeric>*** the minimum frequency limit form 0 to 1E14
Unit	Hz
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Equivalent Softkeys	**Calibration > Cal Kit > Define STDs > F min**

SENS:CORR:COLL:CKIT:STAN:L0

SENSe:CORRection:COLLect:CKIT:STAN*<Std>*:L0 *<numeric>*

SENSe:CORRection:COLLect:CKIT:STAN*<Std>*:L0?

Description	Sets or reads out the L0 value for the short calibration standard. (command/query)
Target	Standard *<Std>* of the selected calibration kit, *<Std>*={[1]|2|...N}, where N – the number of the standards in the calibration kit
Parameter	***<numeric>*** the L0 value from −1E18 to 1E18
Unit	1E−12 H (Henry)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Equivalent Softkeys	**Calibration > Cal Kit > Define STDs > L0 10^{-12} H**

SENS:CORR:COLL:CKIT:STAN:L1

SENSe:CORRection:COLLect:CKIT:STAN<*Std*>:L1 <*numeric*>

SENSe:CORRection:COLLect:CKIT:STAN<*Std*>:L1?

Description	Sets or reads out the L1 value for the short calibration standard. (command/query)
Target	Standard <*Std*> of the selected calibration kit, <*Std*>={[1]|2|...N}, where N – the number of the standards in the calibration kit
Parameter	<***numeric***> the L1 value from −1E18 to 1E18
Unit	1E−24 H/Hz (Henry/Hertz)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<*numeric*>
Equivalent Softkeys	**Calibration > Cal Kit > Define STDs > L1 10^{-24} H/Hz**

SENS:CORR:COLL:CKIT:STAN:L2

SENSe:CORRection:COLLect:CKIT:STAN*<Std>*:L2 *<numeric>*

SENSe:CORRection:COLLect:CKIT:STAN*<Std>*:L2?

Description	Sets or reads out the L2 value for the short calibration standard. (command/query)
Target	Standard *<Std>* of the selected calibration kit, *<Std>*={[1]|2|...N}, where N – the number of the standards in the calibration kit
Parameter	***<numeric>*** the L2 value from −1E18 to 1E18
Unit	1E−33 H/Hz^2 (Henry/Hertz^2)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Equivalent Softkeys	**Calibration > Cal Kit > Define STDs > L2 10^{-33} H/Hz^2**

SENS:CORR:COLL:CKIT:STAN:L3

SENSe:CORRection:COLLect:CKIT:STAN*<Std>*:L3 *<numeric>*

SENSe:CORRection:COLLect:CKIT:STAN*<Std>*:L3?

Description	Sets or reads out the L3 value for the short calibration standard. (command/query)
Target	Standard *<Std>* of the selected calibration kit, *<Std>*={[1]|2|...N}, where N – the number of the standards in the calibration kit
Parameter	***<numeric>*** the L3 value from −1E18 to 1E18
Unit	1E−42 H/Hz^3 (Henry/Hertz^3)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Equivalent Softkeys	**Calibration > Cal Kit > Define STDs > L3 10^{-42} H/Hz^3**

SENS:CORR:COLL:CKIT:STAN:LAB

SENSe:CORRection:COLLect:CKIT:STAN*<Std>*:LABel *<string>*

SENSe:CORRection:COLLect:CKIT:STAN*<Std>*:LABel?

Description	Sets or reads out the label for the calibration standard. (command/query)
Target	Standard *<Std>* of the selected calibration kit, *<Std>*={[1]|2|...N}, where N – the number of the standards in the calibration kit
Parameter	***<string>***, up to 254 characters
Query Response	*<string>*
Equivalent Softkeys	**Calibration > Cal Kit > Define STDs > Label**

SENS:CORR:COLL:CKIT:STAN:LOSS

SENSe:CORRection:COLLect:CKIT:STAN*<Std>*:LOSS *<numeric>*

SENSe:CORRection:COLLect:CKIT:STAN*<Std>*:LOSS?

Description	Sets or reads out the offset loss value for the calibration standard. (command/query)
Target	Standard *<Std>* of the selected calibration kit, *<Std>*={[1]|2|...N}, where N – the number of the standards in the calibration kit
Parameter	***<numeric>*** the offset loss value from −1E18 to 1E18
Unit	Ω/s (Ohm/second)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Equivalent Softkeys	**Calibration > Cal Kit > Define STDs > Offset Loss**

SENS:CORR:COLL:CKIT:STAN:TYPE

SENSe:CORRection:COLLect:CKIT:STAN<*Std*>:TYPE <*char*>

SENSe:CORRection:COLLect:CKIT:STAN<*Std*>:TYPE?

Description	Sets or reads out the type of calibration standard. (command/query)
Target	Standard <*Std*> of the selected calibration kit, <*Std*>={[1]|2|...N}, where N – the number of the standards in the calibration kit
Parameter	<*char*> Specifies the type of calibration standard: **OPEN** : Open **SHORt** : Short **LOAD** : Load **THRU** : Thru **NONE** : Not defined
Query Response	{OPEN|SHOR|LOAD|THRU|NONE}
Equivalent Softkeys	**Calibration > Cal Kit > Define STDs > STD Type**

SENS:CORR:COLL:CKIT:STAN:Z0

SENSe:CORRection:COLLect:CKIT:STAN*<Std>*:Z0 *<numeric>*

SENSe:CORRection:COLLect:CKIT:STAN*<Std>*:Z0?

Description	Sets or reads out the offset Z0 value for the calibration standard. (command/query)
Target	Standard *<Std>* of the selected calibration kit, *<Std>*={[1]|2|...N}, where N – the number of the standards in the calibration kit
Parameter	***<numeric>*** the offset Z0 value from −1E18 to 1E18
Unit	Ω (Ohm)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	50 or 75, depending on the selected calibration kit
Equivalent Softkeys	**Calibration > Cal Kit > Define STDs > Offset Z0**

SENS:CORR:COLL:CLE

SENSe*<Ch>*:CORRection:COLLect:CLEar

Description	Clears the measurement data of the calibration standards. (no query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Equivalent Softkeys	**Calibration > Calibrate >** **Response (Open) |** **Response (Short) |** **Response (Thru) |** **One Path 2–Port Cal |** **Full 1–Port Cal |** **Full 2–Port Cal > Cancel > OK**

SENS:CORR:COLL:ECAL:INF?

SENSe:CORRection:COLLect:ECAL:INFormation?

Description	Gets information of the AutoCal Module connected to the Network Analyzer. (query only)
Target	AutoCal Module
Query Response	The query returns information in a string with comma separated fields. Autocal Module Information: Model Name, Serial Number, Current Temperature of AutoCal Module, Selected Characterization Information: Characterization Name, Characterization Date and Time, Min Frequency, Max Frequency, Number of Points, Characterization Temperature, PortA Connector, PortB Connector, PortA Adapter, PortB Adapter, Analyzer, Location, Operator.
Equivalent Softkeys	**Calibration > AutoCal > Characterization Info...**

SENS:CORR:COLL:ECAL:ORI:EXEC

SENSe:CORRection:COLLect:ECAL:ORIentation:EXECute

Description	Executes the Auto-Orientation procedure of the AutoCal Module. The AutoCal Module must be connected to the ports of Analyzer. (command)
Target	AutoCal Module
Equivalent Softkeys	**Calibration > AutoCal > Orientation > Execute Auto-Orientation**

SENS:CORR:COLL:ECAL:ORI:STAT

SENSe:CORRection:COLLect:ECAL:ORIentation:STATe {OFF|ON|0|1}

SENSe:CORRection:COLLect:ECAL:ORIentation:STATe?

Description	Turns ON/OFF the Auto-Orientation function when the AutoCal Module calibration is executed. (command/query)
Target	AutoCal Module
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Calibration > AutoCal > Orientation > Auto-Orientation**

SENS:CORR:COLL:ECAL:PATH

SENSe:CORRection:COLLect:ECAL:PATH *<numeric1>*, *<numeric2>*

SENSe:CORRection:COLLect:ECAL:PATH? *<numeric1>*

Description	Sets or reads out the AutoCal module port number which is connected to a specified port of Network Analyzer. (command/query)
Target	AutoCal
Parameter	<***numeric1***> Network Analyzer Port Number, <***numeric2***> AutoCal Module Port Number: 1- Port A of AutoCal Module 2- Port B of AutoCal Module
Query Response	*<numeric>*
Equivalent Softkeys	**Calibration > AutoCal > Orientation > Port 1 | Port 2**

SENS:CORR:COLL:ECAL:SOLT1

SENSe*<Ch>*:CORRection:COLLect:ECAL:SOLT1 *<port>*

Description	Executes 1-port calibration of the specified port of specified channel using the AutoCal module (command only).
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<port>*** : Port Number
Equivalent Softkeys	**Calibration > AutoCal > 1-Port AutoCal > Port n**

SENS:CORR:COLL:ECAL:SOLT2

SENSe*<Ch>*:CORRection:COLLect:ECAL:SOLT2 *<port1>*, *<port2>*

Description	Executes full 2-port calibration between the specified 2 ports of specified channel using the AutoCal module (command only).
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<port1>*** : Port Number ***<port2>*** : Port Number
Equivalent Softkeys	**Calibration > AutoCal > 2-Port AutoCal**

SENS:CORR:COLL:ECAL:SOLT3

SENSe *<Ch>*:CORRection:COLLect:ECAL:SOLT3 *<port1>*, *<port2>*, *<port3>*

Description	Executes full 3-port calibration between the specified 3 ports of specified channel using the AutoCal module (command only).
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<port1>*** : Port Number ***<port2>*** : Port Number ***<port3>*** : Port Number
Equivalent Softkeys	**Calibration > AutoCal > 3-Port AutoCal**

SENS:CORR:COLL:ECAL:SOLT4

SENSe *<Ch>*:CORRection:COLLect:ECAL:SOLT3 *<port1>*, *<port2>*, *<port3>*, *<port4>*

Description	Executes full 4-port calibration between the specified 3 ports of specified channel using the AutoCal module (command only).
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<port1>*** : Port Number ***<port2>*** : Port Number ***<port3>*** : Port Number ***<port4>*** : Port Number
Equivalent Softkeys	**Calibration > AutoCal > 4-Port AutoCal**

SENS:CORR:COLL:ECAL:UCH

SENSe:CORRection:COLLect:ECAL:UCHar *<char>*

SENSe:CORRection:COLLect:ECAL:UCHar?

Description	Sets or reads out the characterization number used when executing AutoCal (factory or user characterizations). (command/query)
Target	AutoCal
Parameter	*<char>* Specifies the stimulus type: **CHAR0** : factory characterization **CHAR1** : user characterization 1 **CHAR2** : user characterization 2 **CHAR3** : user characterization 3
Query Response	{CHAR0|CHAR1|CHAR2|CHAR3}
Preset Value	CHAR0
Equivalent Softkeys	**Calibration > AutoCal > Characterization**

SENS:CORR:COLL:ECAL:UTHR:STAT

SENSe:CORRection:COLLect:ECAL:UTHRu:STATe {OFF|ON|0|1}

SENSe:CORRection:COLLect:ECAL:UTHRu:STATe?

Description	Turns ON/OFF the Unknown Thru feature when the AutoCal Module calibration is executed. (command/query)
Target	AutoCal
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Calibration > AutoCal > Unkn Thru**

SENS:CORR:COLL:DATA:ISOL

SENSe *<Ch>*:CORRection:COLLect:DATA:ISOLation *<rcvport>*, *<srcport>*, *<numeric list>*

SENSe *<Ch>*:CORRection:COLLect:DATA:ISOLation? *<rcvport>*, *<srcport>*

Description	Writes or reads out the array of the isolation calibration measurement performed between the receiver port *<rcvport>* and the source port *<srcport>*. The array size is 2N, where N is the number of measurement points. For the n–th point, where n from 1 to N: *<numeric 2n–1>* real part of the measurement *<numeric 2n>* imaginary part of the measurement (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	*<**rcvport**>* the number of the receiver port from 1 to 2 (or 4) *<**srcport**>* the number of the source port from 1 to 2 (or 4) *<**numeric** list>* the isolation measurement data array
Query Response	*<numeric 1>*, *<numeric 2>*, …*<numeric 2N>*
Related Commands	SENS:CORR:COLL:ISOL
Equivalent Softkeys	**None**

SENS:CORR:COLL:DATA:LOAD

SENSe<*Ch*>:CORRection:COLLect:DATA:LOAD <*port*>,<*numeric list*>

SENSe<*Ch*>:CORRection:COLLect:DATA:LOAD? <*port*>

Description	Writes or reads out the array of the *load* calibration standard measurement for the port <*port*>. The array size is 2N, where N is the number of measurement points. For the n–th point, where n from 1 to N: <*numeric 2n–1*> real part of the measurement <*numeric 2n*> imaginary part of the measurement (command/query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	**<*port*>** the number of the port from 1 to 2 (or 4) **<*numeric list*>** the data array of the *load* standard measurement
Query Response	<*numeric 1*>,<*numeric 2*>,...<*numeric 2N*>
Related Commands	SENS:CORR:COLL:LOAD
Equivalent Softkeys	**None**

SENS:CORR:COLL:DATA:OPEN

SENSe*<Ch>*:CORRection:COLLect:DATA:OPEN *<port>*,*<numeric list>*

SENSe*<Ch>*:CORRection:COLLect:DATA:OPEN? *<port>*

Description	Writes or reads out the array of the *open* calibration standard measurement for the port *<port>*. The array size is 2N, where N is the number of measurement points. For the n–th point, where n from 1 to N: *<numeric 2n–1>* real part of the measurement *<numeric 2n>* imaginary part of the measurement (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<port>*** the number of the port from 1 to 2 (or 4) ***<numeric list>*** the data array of the *open* standard measurement
Query Response	*<numeric 1>*, *<numeric 2>*, ...*<numeric 2N>*
Related Commands	SENS:CORR:COLL:OPEN
Equivalent Softkeys	**None**

SENS:CORR:COLL:DATA: SHOR

SENSe*<Ch>*:CORRection:COLLect:DATA:SHORt *<port>*, *<numeric list>*

SENSe*<Ch>*:CORRection:COLLect:DATA:SHORt? *<port>*

Description	Writes or reads out the array of the *short* calibration standard measurements for the port *<port>*. The array size is 2N, where N is the number of measurement points. For the n−th point, where n from 1 to N: *<numeric 2n−1>* real part of the measurement *<numeric 2n>* imaginary part of the measurement (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<port>*** the number of the port from 1 to 2 (or 4) ***<numeric list>*** the data array of the *short* standard measurement
Query Response	*<numeric 1>*, *<numeric 2>*, …*<numeric 2N>*
Related Commands	SENS:CORR:COLL:SHOR
Equivalent Softkeys	**None**

SENS:CORR:COLL:DATA:THRU:MATC

SENSe*<Ch>*:CORRection:COLLect:DATA:THRU:MATCh *<rcvport>*, *<srcport>*, *<numeric list>*

SENSe*<Ch>*:CORRection:COLLect:DATA:THRU:MATCh? *<rcvport>*, *<srcport>*

Description	Writes or reads out the array of the reflection measurement of the *thru* standard connected between the receiver port *<rcvport>* and the source port *<srcport>*. The array size is 2N, where N is the number of measurement points. For the n−th point, where n from 1 to N: *<numeric 2n−1>* real part of the measurement *<numeric 2n>* imaginary part of the measurement (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<rcvport>*** the number of the receiver port from 1 to 2 (or 4) ***<srcport>*** the number of the source port from 1 to 2 (or 4) ***<numeric list>*** the data array of the reflection measurements using the *thru* standard
Query Response	*<numeric 1>*, *<numeric 2>*, …*<numeric 2N>*
Related Commands	SENS:CORR:COLL:THRU
Equivalent Softkeys	**None**

SENS:CORR:COLL:DATA:THRU:TRAN

SENSe*<Ch>*:CORRection:COLLect:DATA:THRU:TRANsmission *<rcvport>*, *<srcport>*, *<numeric list>*

SENSe*<Ch>*:CORRection:COLLect:DATA:THRU:TRANsmission? *<rcvport>*, *<srcport>*

Description	Writes or reads out the array of the transmission measurement performed between the receiver port *<rcvport>* and the source port *<srcport>* using the *thru* standard. The array size is 2N, where N is the number of measurement points. For the n−th point, where n from 1 to N: *<numeric 2n–1>* real part of the measurement *<numeric 2n>* imaginary part of the measurement (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<rcvport>*** the number of the receiver port from 1 to 2 (or 4) ***<srcport>*** the number of the source port from 1 to 2 (or 4) ***<numeric list>*** the data array of the transmission measurements using the *thru* standard
Query Response	*<numeric 1>*, *<numeric 2>*, ...*<numeric 2N>*
Related Commands	SENS:CORR:COLL:THRU
Equivalent Softkeys	**None**

SENS:CORR:COLL:ISOL

SENSe*<Ch>*:CORRection:COLLect[:ACQuire]:ISOLation *<rcvport>*, *<srcport>*

Description	Measures the isolation calibration data between the receiver port *<rcvport>* and the source port *<srcport>*. (no query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<rcvport>*** the number of the receiver port from 1 to 2 (or 4) ***<srcport>*** the number of the source port from 1 to 2 (or 4)
Out of Range	If the same port numbers are specified, an error occurs.
Notes	The command starts the measurement immediately if the trigger source for calibration set to the "Internal" by the command SENS:CORR:TRIG:FREE, otherwise waits for the trigger signal. The command blocks the execution of the subsequent commands until the completion of the measurement.
Equivalent Softkeys	**Calibration > Calibrate > Response (Thru) > Isolation (Optional)** **Calibration > Calibrate > One Path 2–Port Cal > Isolation (Optional)** **Calibration > Calibrate > Full 2–Port Cal > Isolation (Optional)**

SENS:CORR:COLL:LOAD

SENSe<Ch>:CORRection:COLLect[:ACQuire]:LOAD <port>

Description	Measures the calibration data of the *load* standard for the specified port. (no query)
Target	Channel <Ch>, <Ch>={[1]|2|...16}
Parameter	***<port>*** the number of the port from 1 to 2 (or 4)
Notes	The command starts the measurement immediately if the trigger source for calibration set to the "Internal" by the command SENS:CORR:TRIG:FREE, otherwise waits for the trigger signal. The command blocks the execution of the subsequent commands until the completion of the measurement.
Equivalent Softkeys	**Calibration > Calibrate > Response (Open) > Load (Optional)** **Calibration > Calibrate > Response (Short) > Load (Optional)** **Calibration > Calibrate > Full 1–Port Cal > Load** **Calibration > Calibrate > One Path 2–Port Cal > Load** **Calibration > Calibrate > Full 2–Port Cal > Port n Load**

SENS:CORR:COLL:OPEN

SENSe<Ch>:CORRection:COLLect[:ACQuire]:OPEN <port>

Description	Measures the calibration data of the *open* standard for the specified port. (no query)
Target	Channel <Ch>, <Ch>={[1]|2|...16}
Parameter	***<port>*** the number of the port from 1 to 2 (or 4)
Notes	The command starts the measurement immediately if the trigger source for calibration set to the "Internal" by the command SENS:CORR:TRIG:FREE, otherwise waits for the trigger signal. The command blocks the execution of the subsequent commands until the completion of the measurement.
Equivalent Softkeys	**Calibration > Calibrate > Response (Open) > Open** **Calibration > Calibrate > Full 1–Port Cal > Open** **Calibration > Calibrate > One Path 2–Port Cal > Open** **Calibration > Calibrate > Full 2–Port Cal > Port n Open**

SENS:CORR:COLL:SHOR

SENSe*<Ch>*:CORRection:COLLect[:ACQuire]:SHORt *<port>*

Description	Measures the calibration data of the *short* standard for the specified port. (no query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<port>*** the number of the port from 1 to 2 (or 4)
Notes	The command starts the measurement immediately if the trigger source for calibration set to the "Internal" by the command SENS:CORR:TRIG:FREE, otherwise waits for the trigger signal. The command blocks the execution of the subsequent commands until the completion of the measurement.
Equivalent Softkeys	**Calibration > Calibrate > Response (Short) > Short** **Calibration > Calibrate > Full 1–Port Cal > Short** **Calibration > Calibrate > One Path 2–Port Cal > Short** **Calibration > Calibrate > Full 2–Port Cal > Port n Short**

SENS:CORR:COLL:THRU

SENSe<*Ch*>:CORRection:COLLect[:ACQuire]:THRU <*rcvport*>,<*srcport*>

Description	Measures the calibration data of the *thru* standard between the receiver port <*rcvport*> and the source port <*srcport*>. (no query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	<***rcvport***> the number of the receiver port from 1 to 2 (or 4) <***srcport***> the number of the source port from 1 to 2 (or 4)
Out of Range	If the same port numbers are specified, an error occurs.
Notes	The command starts the measurement immediately if the trigger source for calibration set to the "Internal" by the command SENS:CORR:TRIG:FREE, otherwise waits for the trigger signal. The command blocks the execution of the subsequent commands until the completion of the measurement.
Equivalent Softkeys	**Calibration > Calibrate > Response (Thru) > Thru** **Calibration > Calibrate > One Path 2–Port Cal > Thru** **Calibration > Calibrate > Full 2–Port Cal > Port 1–2 Thru**

SENS:CORR:COLL:TRLL

SENSe*<Ch>*:CORRection:COLLect[:ACQuire]:TRLLine *<port1>*,*<port2>*

Description	Measures the calibration data of the TRL line standard between the *<port1>* and the *<port2>*. (no query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<port1>*** the number of the port from 1 to 2 (or 4) ***<port2>*** the number of the port from 1 to 2 (or 4)
Out of Range	If the same port numbers are specified, an error occurs.
Notes	The command starts the measurement immediately if the trigger source for calibration set to the "Internal" by the command SENS:CORR:TRIG:FREE, otherwise waits for the trigger signal. The command blocks the execution of the subsequent commands until the completion of the measurement.
Equivalent Softkeys	**Calibration > Calibrate > n–Port TRL Cal > Line/Match**

SENS:CORR:COLL:TRLT

SENSe*<Ch>*:CORRection:COLLect[:ACQuire]:TRLThru *<port1>*, *<port2>*

Description	Measures the calibration data of the TRL thru standard between the *<port1>* and the *<port2>*. (no query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<port1>*** the number of the port from 1 to 2 (or 4) ***<port2>*** the number of the port from 1 to 2 (or 4)
Out of Range	If the same port numbers are specified, an error occurs.
Notes	The command starts the measurement immediately if the trigger source for calibration set to the "Internal" by the command SENS:CORR:TRIG:FREE, otherwise waits for the trigger signal. The command blocks the execution of the subsequent commands until the completion of the measurement.
Equivalent Softkeys	**Calibration > Calibrate > n–Port TRL Cal > Thru/Line**

SENS:CORR:COLL:TRLR

SENSe*<Ch>*:CORRection:COLLect[:ACQuire]:TRLReflect *<port>*

Description	Measures the calibration data of the *TRL reflect* standard for the specified port. (no query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<port>*** the number of the port from 1 to 2 (or 4)
Notes	The command starts the measurement immediately if the trigger source for calibration set to the "Internal" by the command SENS:CORR:TRIG:FREE, otherwise waits for the trigger signal. The command blocks the execution of the subsequent commands until the completion of the measurement.
Equivalent Softkeys	**Calibration > Calibrate > n–Port TRL Cal > Reflect**

SENS:CORR:COLL:SUBC

SENSe<*Ch*>:CORRection:COLLect[:ACQuire]:SUBClass *<numeric>*

SENSe<*Ch*>:CORRection:COLLect[:ACQuire]:SUBClass?

Description	Selects the subclass number of calibration standard used for measurement by the subsequent command SENS:CORR:COLL:XXXX. If the calibration kit contains several calibration standards of the same type, say SHORTs, this allows select the particular SHORT. The subclasses must be set in advance by the commands SENS:CORR:COLL:CKIT:ORD:XXXX or in the user interface "Specify Classes".
Target	Calibration kit, selected for channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	***<numeric>*** the subclass number from 1 to 8
Query Response	*<numeric>*
Preset Value	1
Equivalent Softkeys	**None**

SENS:CORR:COLL:METH:ERES

SENSe<*Ch*>:CORRection:COLLect:METHod:ERESponse *<rcvport>*, *<srcport>*

Description	Selects the ports and sets the *one path 2-port calibration* type for the calculation of the calibration coefficients on completion of the calibration executed by the SENS:CORR:COLL:SAVE command. (no query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	***<rcvport>*** the number of the receiver port from 1 to 2 (or 4) ***<srcport>*** the number of the source port from 1 to 2 (or 4)
Out of Range	f the same port numbers are specified, an error occurs.
Related Commands	SENS:CORR:COLL:SAVE
Equivalent Softkeys	**Calibration > Calibrate > One Path 2-Port Cal > Select Port**

SENS:CORR:COLL:METH:OPEN

SENSe<*Ch*>:CORRection:COLLect:METHod[:RESPonse]:OPEN <*port*>

Description	Selects the port and sets the *response calibration (Open)* type for the calculation of the calibration coefficients on completion of the calibration executed by the SENS:CORR:COLL:SAVE command. (no query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	**<*port*>** the number of the port from 1 to 2 (or 4)
Related Commands	SENS:CORR:COLL:SAVE
Equivalent Softkeys	**Calibration > Calibrate > Response (Open) > Select Port**

SENS:CORR:COLL:METH: SHOR

SENSe<*Ch*>:CORRection:COLLect:METHod[:RESPonse]:SHORt <*port*>

Description	Selects the port and sets the *response calibration (Short)* type for the calculation of the calibration coefficients on completion of the calibration executed by the SENS:CORR:COLL:SAVE command. (no query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	**<*port*>** the number of the port from 1 to 2 (or 4)
Related Commands	SENS:CORR:COLL:SAVE
Equivalent Softkeys	**Calibration > Calibrate > Response (Short) > Select Port**

SENS:CORR:COLL:METH:SOLT1

SENSe<*Ch*>:CORRection:COLLect:METHod:SOLT1 <*port*>

Description	Selects the port and sets the *full 1–port calibration* type for the calculation of the calibration coefficients on completion of the calibration executed by the SENS:CORR:COLL:SAVE command. (no query)
Target	Channel <*Ch*>, `<Ch>={[1]|2|...16}`
Parameter	<***port***> the number of the port from 1 to 2 (or 4)
Related Commands	SENS:CORR:COLL:SAVE
Equivalent Softkeys	**Calibration > Calibrate > Full 1–Port Cal > Select Port**

SENS:CORR:COLL:METH:SOLT2

SENSe<*Ch*>:CORRection:COLLect:METHod:SOLT2 <*port1*>,<*port2*>

Description	Selects the ports and sets the *full 2–port calibration* type for the calculation of the calibration coefficients on completion of the calibration executed by the SENS:CORR:COLL:SAVE command. (no query)
Target	Channel <*Ch*>, `<Ch>={[1]|2|...16}`
Parameter	<***port1***> the first port number from 1 to 2 (or 4) <***port2***> the second port number from 1 to 2 (or 4)
Out of Range	If the same port numbers are specified, an error occurs.
Related Commands	SENS:CORR:COLL:SAVE
Equivalent Softkeys	**Calibration > Calibrate > Full 2–Port Cal**

SENS:CORR:COLL:METH:SOLT3

SENSe*<Ch>*:CORRection:COLLect:METHod:SOLT3 *<port1>*, *<port2>*, *<port3>*

Description	Selects the ports and sets the *full 3-port calibration* type for the calculation of the calibration coefficients on completion of the calibration executed by the SENS:CORR:COLL:SAVE command. (no query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<port1>*** the first port number from 1 to 4 ***<port2>*** the second port number from 1 to 4 ***<port3>*** the third port number from 1 to 4
Out of Range	If the same port numbers are specified, an error occurs.
Related Commands	SENS:CORR:COLL:SAVE
Equivalent Softkeys	**Calibration > Calibrate > Full 3-Port Cal**

SENS:CORR:COLL:METH:SOLT4

SENSe*<Ch>*:CORRection:COLLect:METHod:SOLT4 *<port1>*, *<port2>*, *<port3>*, *<port4>*

Description	Selects the ports and sets the *full 4-port calibration* type for the calculation of the calibration coefficients on completion of the calibration executed by the SENS:CORR:COLL:SAVE command. (no query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<port1>*** the first port number from 1 to 4 ***<port2>*** the second port number from 1 to 4 ***<port3>*** the third port number from 1 to 4 ***<port4>*** the fourth port number from 1 to 4
Out of Range	If the same port numbers are specified, an error occurs.
Related Commands	SENS:CORR:COLL:SAVE
Equivalent Softkeys	**Calibration > Calibrate > Full 4-Port Cal**

SENS:CORR:COLL:METH:THRU

SENSe*<Ch>*:CORRection:COLLect:METHod[:RESPonse]:THRU *<rcvport>*, *<srcport>*

Description	Selects the ports and sets the *response calibration (Thru)* type for the calculation of the calibration coefficients on completion of the calibration executed by the SENS:CORR:COLL:SAVE command. (no query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<rcvport>*** the number of the receiver port from 1 to 2 (or 4) ***<srcport>*** the number of the source port from 1 to 2 (or 4)
Out of Range	If the same port numbers are specified, an error occurs.
Related Commands	SENS:CORR:COLL:SAVE
Equivalent Softkeys	**Calibration > Calibrate > Response (Thru) > Select Port**

SENS:CORR:COLL:METH:TRL2

SENSe*<Ch>*:CORRection:COLLect:METHod:TRL2 *<port1>*, *<port2>*

Description	Selects the ports and sets the *2–port TRL calibration* type for the calculation of the calibration coefficients on completion of the calibration executed by the SENS:CORR:COLL:SAVE command. (no query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<port1>*** the first port number from 1 to 2 (or 4) ***<port2>*** the second port number from 1 to 2 (or 4)
Out of Range	If the same port numbers are specified, an error occurs.
Related Commands	SENS:CORR:COLL:SAVE
Equivalent Softkeys	**Calibration > Calibrate > 2–Port TRL Cal**

SENS:CORR:COLL:METH:TRL3

SENSe*<Ch>*:CORRection:COLLect:METHod:TRL3 *<port1>*,*<port2>*,*<port3>*

Description	Selects the ports and sets the *3–port TRL calibration* type for the calculation of the calibration coefficients on completion of the calibration executed by the SENS:CORR:COLL:SAVE command. (no query)
Target	Channel *<Ch>*, `<Ch>={[1]|2|...16}`
Parameter	***<port1>*** the first port number from 1 to 4 ***<port2>*** the second port number from 1 to 4 ***<port3>*** the third port number from 1 to 4
Out of Range	If the same port numbers are specified, an error occurs.
Related Commands	SENS:CORR:COLL:SAVE
Equivalent Softkeys	**Calibration > Calibrate > 3–Port TRL Cal**

SENS:CORR:COLL:METH:TRL4

SENSe*<Ch>*:CORRection:COLLect:METHod:TRL4 *<port1>*,*<port2>*,*<port3>*,*<port4>*

Description	Selects the ports and sets the *4–port TRL calibration* type for the calculation of the calibration coefficients on completion of the calibration executed by the SENS:CORR:COLL:SAVE command. (no query)
Target	Channel *<Ch>*, `<Ch>={[1]|2|...16}`
Parameter	***<port1>*** the first port number from 1 to 4 ***<port2>*** the second port number from 1 to 4 ***<port3>*** the third port number from 1 to 4 ***<port4>*** the fourth port number from 1 to 4
Out of Range	If the same port numbers are specified, an error occurs.
Related Commands	SENS:CORR:COLL:SAVE
Equivalent Softkeys	**Calibration > Calibrate > 4–Port TRL Cal**

SENS:CORR:COLL:METH:TYPE?

SENSe<Ch>:CORRection:COLLect:METHod:TYPE?

Description	Reads out the calibration type selected for the calculation of the calibration coefficients on completion of the calibration executed by the SENS:CORR:COLL:SAVE command. (query only)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Query Response	**RESPO** : Response (Open) **RESPS** : Response (Short) **RESPT** : Response (Thru) **SOLT1** : Full 1−port calibration **SOLT2** : Full 2−port calibration **1PATH** : One path 2−port calibration **NONE** : Not defined
Equivalent Softkeys	**None**

SENS:CORR:COLL:SAVE

SENSe*<Ch>*:CORRection:COLLect:SAVE

Description	Calculates the calibration coefficients from the calibration standards measurements depending on the selected calibration type. The calibration type is selected by one of commands SENS:CORR:COLL:METH:XXXX. On completion of the command, all the calibration standards measurements are cleared and the error correction automatically turns ON. At the attempt to execute this command before all the needed standards are measured, an error occurs and the command is ignored. (no query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Related Commands	Calibration type selection: Calibration standards measurement: SENS:CORR:COLL:ISOL SENS:CORR:COLL:LOAD SENS:CORR:COLL:OPEN SENS:CORR:COLL:SHOR SENS:CORR:COLL:THRU SENS:CORR:COLL:TRLT SENS:CORR:COLL:TRLL SENS:CORR:COLL:TRLR
Equivalent Softkeys	**Calibration > Calibrate > ... > Apply**

SENS:CORR:COLL:SIMP:SAVE

SENSe*<Ch>*:CORRection:COLLect:SIMPlified:SAVE

Description	Calculates the calibration coefficients for the simplified 3 or 4 port calibration from the calibration standards measurements when the 3 or 4 port calibration is selected as the calibration type. The calibration type is selected by one of commands SENS:CORR:COLL:METH:SOLT3/SOLT4/TRL3/TRL4. The simplified 3 port calibration allows omit one THRU measurement. The simplified 4 port calibration allows omit up to three THRU measurements. If full set of calibration standard measurement is made this command behaves like the SENS:CORR:COLL:SAVE command. (no query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Related Commands	Calibration type selection: SENS:CORR:COLL:METH:SOLT3 SENS:CORR:COLL:METH:SOLT4 SENS:CORR:COLL:METH:TRL3 SENS:CORR:COLL:METH:TRL4 Calibration standards measurement: SENS:CORR:COLL:ISOL SENS:CORR:COLL:LOAD SENS:CORR:COLL:OPEN SENS:CORR:COLL:SHOR SENS:CORR:COLL:THRU SENS:CORR:COLL:TRLT SENS:CORR:COLL:TRLL SENS:CORR:COLL:TRLR
Equivalent Softkeys	**Calibration > Calibrate > ... > Apply**

SENS:CORR:COLL:THRU:ADD:DEL

SENSe*<Ch>*:CORRection:COLLect:THRU:ADDition:DELay *<numeric>*

SENSe*<Ch>*:CORRection:COLLect:THRU:ADDition:DELay?

Description	Sets or reads out the approximate delay value of an unknown thru in the thru addition function. This value is used to eliminate the uncertainty of ± 180 ° when calculating the phase response of the thru. If this value is set to zero, the analyzer uses an algorithm to automatically determine the delay of the thru. In most cases setting this value to zero is enough. Setting this value to non zero is required when: $Frequency\ Step > \frac{1}{2Delay}$ (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<numeric>*** the approximate delay value of the thru.
Unit	Seconds
Query Response	*<numeric>*
Preset Value	0
Note	The delay and the length of the thru can be set mutually. $Delay = \frac{Length\sqrt{Permittivity}}{C}$
Equivalent Softkeys	**Calibration > Calibrate > Thru Addition > Delay**

SENS:CORR:COLL:THRU:ADD:LENG

SENSe*<Ch>*:CORRection:COLLect:THRU:ADDition:LENGth *<numeric>*

SENSe*<Ch>*:CORRection:COLLect:THRU:ADDition:LENGth?

Description	Sets or reads out the approximate value of the mechanical length of an unknown thru in the thru addition function. This value is used to eliminate the uncertainty of ± 180 ° when calculating the phase response of the thru. If this value is set to zero, the analyzer uses an algorithm to automatically determine the delay of the thru. In most cases setting this value to zero is enough. Setting this value to non zero is required when: $$Frequency\ Step > \frac{1}{2Delay}$$ (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<numeric>*** the approximate value of the thru length .
Unit	Meters
Query Response	*<numeric>*
Preset Value	0
Note	The delay and the length of the thru can be set mutually. $$Delay = \frac{Length\ \sqrt{Permittivity}}{C}$$
Equivalent Softkeys	**Calibration > Calibrate > Thru Addition > Delay**

SENS:CORR:COLL:THRU:ADD:UNIT

SENSe*<Ch>*:CORRection:COLLect:THRU:ADDition:UNIT {SEConds | METers}

SENSe*<Ch>*:CORRection:COLLect:THRU:ADDition:UNIT?

Description	Selects the display units of the thru delay (length) in the thru addition function. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	**SEConds** : Selects the seconds **METers** : Selects the meters
Query Response	{SEC|MET}
Preset Value	SEConds
Equivalent Softkeys	**Calibration > Calibrate > Thru Addition > Delay Unit**

SENS:CORR:COLL:THRU:ADD:MED

SENSe<*Ch*>:CORRection:COLLect:THRU:ADDition:MEDia {COAXial|WAVeguide}

SENSe<*Ch*>:CORRection:COLLect:THRU:ADDition:MEDia?

Description	Specifies the media of the thru in the thru addition function. (command/query)
Target	The active trace of channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	**COAXial** : Specifies the coaxial **WAVeguide** : Specifies the waveguide
Query Response	{COAX|WAV}
Preset Value	COAXial
Note	When the waveguide adapter is used it is recommended to specify the thru length instead of its delay.
Equivalent Softkeys	**Calibration > Calibrate > Thru Addition > Thru Media**

SENS:CORR:COLL:THRU:ADD:PERM

SENSe*<Ch>*:CORRection:COLLect:THRU:ADDition:PERMittivity *<numeric>*

SENSe*<Ch>*:CORRection:COLLect:THRU:ADDition:PERMittivity?

Description	Sets or reads out the value of the permittivity of the thru media in the thru addition function. This parameter is used to calculate the adapter delay when the thru length is setting; therefore this parameter must be set before setting of the thru length. (command/query)
Target	Channel *<Ch>*, `<Ch>={[1]|2|...16}`
Parameter	***<numeric>*** the value of the permittivity of the thru
Query Response	*<numeric>*
Preset Value	1.000649 (air)
Equivalent Softkeys	**Calibration > Calibrate > Thru Addition > Permittivity**

SENS:CORR:COLL:THRU:ADD:WAV:CUT

SENSe*<Ch>*:CORRection:COLLect:THRU:ADDition:WAVeguide:CUToff *<numeric>*

SENSe*<Ch>*:CORRection:COLLect:THRU:ADDition:WAVeguide:CUToff?

Description	Sets or reads out the value of the cutoff frequency of the waveguide thru in the thru addition function. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<numeric>*** the value of the cutoff frequency of the waveguide thru.
Query Response	*<numeric>*
Preset Value	1.0 GHz
Equivalent Softkeys	**Calibration > Calibrate > Thru Addition > Cutoff Frequency**

SENS:CORR:COLL:THRU:ADD:FULL2:COMP

SENSe*<Ch>*:CORRection:COLLect:THRU:ADDition:FULL2:COMPlete *<port1>,<port2>*

Description	Completes the full 2-port calibration between the specified ports provided that each port was calibrated using full 1-port calibration: • Measures an arbitrary thru between the ports; • Calculates the error terms Et and El using the unknown thru algorithm; • Saves the Et and El error terms to the existing calibration getting the full 2-port calibration from the two 1-port calbrations. If the full 2-port calibration already existed between the specified ports, updates the Et and El error terms. (no query)
Target	Channel *<Ch>*, `<Ch>={[1]|2|...16}`
Parameter	***<port1>*** the first port number from 1 to 4 ***<port2>*** the second port number from 1 to 4
Equivalent Softkeys	**Calibration > Calibrate > Thru Addition > Comlete 2-Port Calibration**

SENS:CORR:COLL:THRU:ADD:FULL3:PORT

SENSe*<Ch>*:CORRection:COLLect:THRU:ADDition:FULL3:PORTs *<port1>*, *<port2>*, *<port3>*

SENSe*<Ch>*:CORRection:COLLect:THRU:ADDition:FULL3:PORTs?

Description	Selects the pors to comlete the 3–port calibration in the thru addition function. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<port1>*** the first port number from 1 to 4 ***<port2>*** the second port number from 1 to 4 ***<port3>*** the third port number from 1 to 4
Related Commands	SENS:CORR:COLL:THRU:ADD:FULL3:COMP
Equivalent Softkeys	**Calibration > Calibrate > Thru Addition > Comlete 3-Port Calibration > Select Ports**

SENS:CORR:COLL:THRU:ADD:FULL3:ACQ

SENSe*<Ch>*:CORRection:COLLect:THRU:ADDition:FULL3:ACQuire *<port1>*, *<port2>*

Description	Measures an arbitrary thru between the specified ports. The measurements are used to complete the 3-port calibration in the thru addition function by the command SENS:CORR:COLL:THRU:ADD:FULL3:COMP. (no query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<port1>*** the first port number from 1 to 4 ***<port2>*** the second port number from 1 to 4
Equivalent Softkeys	**Calibration > Calibrate > Thru Addition > Comlete 3-Port Calibration > Thru m-n**

SENS:CORR:COLL:THRU:ADD:FULL3:COMP

SENSe<*Ch*>:CORRection:COLLect:THRU:ADDition:FULL3:COMPlete

Description	Completes the full 3-port calibration between the ports specified by the command SENS:CORR:COLL:THRU:ADD:FULL3:PORT. The ports must be calibrated using the full 1-port calibration in advance. The necessary number of the thru measurement must be accomplished by the command SENS:CORR:COLL:THRU:ADD:FULL3:ACQ. This command calculates the error terms Et and El using the unknown thru algorithm. Then it saves the Et and El error terms to the existing calibration getting the full 3-port calibration from the three 1-port calbrations. If the full 3-port calibration already existed, updates the Et and El error terms. (no query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Equivalent Softkeys	**Calibration > Calibrate > Thru Addition > Comlete 3-Port Calibration > Apply**

SENS:CORR:COLL:THRU:ADD:FULL4:ACQ

SENSe<*Ch*>:CORRection:COLLect:THRU:ADDition:FULL4:ACQuire <*port1*>,<*port2*>

Description	Measures an arbitrary thru between the specified ports. The measurements are used to complete the 4-port thru addition function by the command SENS:CORR:COLL:THRU:ADD:FULL4:COMP. (no query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	<***port1***> the first port number from 1 to 4 <***port2***> the second port number from 1 to 4
Equivalent Softkeys	**Calibration > Calibrate > Thru Addition > Comlete 4-Port Calibration > Thru m-n**

SENS:CORR:COLL:THRU:ADD:FULL4:COMP

SENSe*<Ch>*:CORRection:COLLect:THRU:ADDition:FULL4:COMPlete

Description	Completes the full 4-port calibration. The ports must be calibrated using the full 1-port calibration in advance. The necessary number of the thru measurement must be accomplished by the command SENS:CORR:COLL:THRU:ADD:FULL4:ACQ. This command calculates the error terms Et and El using the unknown thru algorithm. Then it saves the Et and El error terms to the existing calibration getting the full 4-port calibration from the four 1-port calbrations. If the full 4-port calibration already existed, updates the Et and El error terms. (no query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Equivalent Softkeys	**Calibration > Calibrate > Thru Addition > Comlete 4-Port Calibration > Apply**

SENS:CORR:EXT:AUTO:CONF

SENSe<Ch>:CORRection:EXTension:AUTO:CONFig {CSPN|AMKR|USPN}

SENSe<Ch>:CORRection:EXTension:AUTO:CONFig?

Description	Specifies the frequency range used for calculation of the results of the Auto Port Extension function. (command/query)
Target	The active trace of channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	**CSPN** : Uses current frequency span **AMKR** : Uses the frequency of the active marker. This is applied to Loss 1 and Loss 2 is ignored. **USPN** : Uses arbitrary frequency range set by user
Query Response	{CSPN|AMKR|USPN}
Preset Value	CSPN
Equivalent Softkeys	**Calibration > Port Extension > Auto Port Extension > Method {Current span | Acive Marker | User Span}**

SENS:CORR:EXT:AUTO:DCOF

SENSe*<Ch>*:CORRection:EXTension:AUTO:DCOFfset {OFF|ON|0|1}

SENSe*<Ch>*:CORRection:EXTension:AUTO:DCOFfset?

Description	Turns ON/OFF the usage of "Loss at DC" value for the results of the auto port extension function. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Calibration > Port Extension > Auto Port Extension > Adjust Mismatch {OFF | ON }**

SENS:CORR:EXT:AUTO:LOSS

SENSe*<Ch>*:CORRection:EXTension:AUTO:LOSS {OFF|ON|0|1}

SENSe*<Ch>*:CORRection:EXTension:AUTO:LOSS?

Description	Turns ON/OFF the usage of "Loss1"and "Loss2" values for the results of the auto port extension function. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Calibration > Port Extension > Auto Port Extension > Adjust Mismatch {OFF | ON }**

SENS:CORR:EXT:AUTO:MEAS

SENSe<*Ch*>:CORRection:EXTension:AUTO:MEASure {SHORt|OPEN}

Description	Performs measurement of the standard "SHORT" or "OPEN", automatically calculates and sets the parameters of the Port Extension. The set of ports for which this command is executed is determined by the SENS:CORR:EXT:AUTO:PORTcommand. When two consecutive measurements of "SHORT" and "OPEN" are performed the results of these measurements are averaged. (command)
Target	The active trace of channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	**SHORt** : Measures "SHORT" standard **OPEN** : Measures "OPEN" standard
Equivalent Softkeys	**Calibration > Port Extension > Auto Port Extension > Measure Short or Open**

SENS:CORR:EXT:AUTO:PORT

SENSe*<Ch>*:CORRection:EXTension:AUTO:PORT*<Pt>* {OFF|ON|0|1}

SENSe*<Ch>*:CORRection:EXTension:AUTO:PORT*<Pt>*?

Description	Turns ON/OFF the status of the auto port extension for the Port number <Pt>. (command/query)

Target	Port *<Pt>* of channel *<Ch>*,
	`<Ch>={[1]|2|...16}`
	`<Pt>={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA`

Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	1
Equivalent Softkeys	**Calibration > Port Extension > Auto Port Extension > Select Port(s)**

SENS:CORR:EXT:AUTO:RES

SENSe*<Ch>*:CORRection:EXTension:AUTO:RESet

Description	Deletes the finished measurement data of OPEN and SHORT standards of the auto port extension function. Allows to start averaging again between the SHORT and OPEN standards. (command/query)
Target	Channel *<Ch>*, `<Ch>={[1]|2|...16}`
Equivalent Softkeys	**Enter to the Auto Port Extension menu**

SENS:CORR:EXT:AUTO:STAR

SENSe*<Ch>*:CORRection:EXTension:AUTO:STARt *<frequency>*

SENSe*<Ch>*:CORRection:EXTension:AUTO:STARt?

Description	Sets or reads out the start value of the user span of the auto port extension function. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<frequency>*** the user span start
Unit	Hz (Hertz)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	The analyzer's lowest frequency
Equivalent Softkeys	**Calibration > Port Extension > Auto Port Extension > User Span Start**

SENS:CORR:EXT:AUTO:STOP

SENSe<*Ch*>:CORRection:EXTension:AUTO:STOP <*frequency*>

SENSe<*Ch*>:CORRection:EXTension:AUTO:STOP?

Description	Sets or reads out the stop value of the user span of the auto port extension function. (command/query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	***<frequency>*** the user span stop
Unit	Hz (Hertz)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	The analyzer's highest frequency
Equivalent Softkeys	**Calibration > Port Extension > Auto Port Extension > User Span Stop**

SENS:CORR:EXT

SENSe<*Ch*>:CORRection:EXTension[:STATe] {OFF|ON|0|1}

SENSe<*Ch*>:CORRection:EXTension[:STATe]?

Description	Turns ON/OFF the port extension function. (command/query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Calibration > Port Extensions > Extension**

SENS:CORR:EXT:PORT:FREQ

SENSe*<Ch>*:CORRection:EXTension:PORT*<Pt>*:FREQuency{[1]|2} *<frequency>*

SENSe*<Ch>*:CORRection:EXTension:PORT*<Pt>*:FREQuency{[1]|2}?

Description	Sets or reads out the values of the frequency 1 and frequency 2 to calculate the loss for the port extension function. (command/query)

Target	Port *<Pt>* of channel *<Ch>*,
	`<Ch>={[1]|2|...16}`
	`<Pt>={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA`

Parameter	***<frequency>*** the frequency value within the frequency limits of the analyzer.
Unit	Hz (Hertz)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	1E9
Equivalent Softkeys	**Calibration > Port Extensions > Loss > { Freq1 | Freq2 }**

SENS:CORR:EXT:PORT:INCL

SENSe<*Ch*>:CORRection:EXTension:PORT<*Pt*>:INCLude{[1]|2}[:STATe] {OFF|ON|0|1}

SENSe<*Ch*>:CORRection:EXTension:PORT<*Pt*>:INCLude{[1]|2}[:STATe]?

Description	Turns ON/OFF the loss compensation of the loss 1 and loss 2 for the port extension function. (command/query)
Target	Port <*Pt*> of channel <*Ch*>, <*Ch*>={[1]|2|...16} <*Pt*>={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Calibration > Port Extensions > Loss > { Loss1 | Loss2 }**

SENS:CORR:EXT:PORT:LDC

SENSe *<Ch>*:CORRection:EXTension:PORT *<Pt>*:LDC *<numeric>*

SENSe *<Ch>*:CORRection:EXTension:PORT *<Pt>*:LDC?

Description	Sets or reads out the loss value at DC for the port extension function. (command/query)
Target	Port *<Pt>* of channel *<Ch>*, *<Ch>*={[1]|2|...16} *<Pt>*={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA
Parameter	***<numeric>*** the loss value from −200 to 200
Unit	dB (decibel)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**Calibration > Port Extensions > Loss > Loss at DC**

SENS:CORR:EXT:PORT:LOSS

SENSe*<Ch>*:CORRection:EXTension:PORT*<Pt>*:LOSS{[1]|2} *<numeric>*

SENSe*<Ch>*:CORRection:EXTension:PORT*<Pt>*:LOSS{[1]|2}?

Description	Sets or reads out the values of the loss 1 and loss 2 for the port extension function. (command/query)
Target	Port *<Pt>* of channel *<Ch>*, *<Ch>*={[1]|2|...16} *<Pt>*={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA
Parameter	***<numeric>*** the loss value from −200 to 200
Unit	dB (decibel)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**Calibration > Port Extensions > Loss > { Loss1 | Loss2 }**

SENS:CORR:EXT:PORT:TIME

SENSe<*Ch*>:CORRection:EXTension:PORT<*Pt*>:TIME <*time*>

SENSe<*Ch*>:CORRection:EXTension:PORT<*Pt*>:TIME?

Description	Sets or reads out the electrical delay value for the port extension function. (command/query)

Target	Port <*Pt*> of channel <*Ch*>,
	`<Ch>={[1]|2|...16}`
	`<Pt>={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA`

Parameter	<***time***> the electrical delay value from −10 to 10
Unit	s (second)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<*numeric*>
Preset Value	0
Equivalent Softkeys	**Calibration > Port Extensions > { Extension Port1 | Extension Port2 }**

SENS:CORR:INF?

SENSe<*Ch*>:CORRection:INFormation? <*rcvport*>,<*srcport*>

Description	Reads out the information string of the calibration acting between the <*rcvport*> and <*srcport*>. (query only)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	<***rcvport***> the receiver port number from 1 to 2 (or 4) <***srcport***> the source port number from 1 to 2 (or 4)
Query Response	<*YYYY/MM/DD*> <*HH:MM:SS*>, <*Type*>, <*TypeEx*>, <*IFBW*>, <*Power*>, <*Temperature*>, <*CalKit*> <*Type*>: {RT|RO|RS|F1|OP|F2|F3|F4} <*TypeEx*>: {SOLT|SOLR|TRL|COPY} <*CalKit*>: Calibration Kit Label and Description
Equivalent Softkeys	**None**

SENS:CORR:IMP

SENSe:CORRection:IMPedance[:INPut][:MAGNitude] <*numeric*>

SENSe:CORRection:IMPedance[:INPut][:MAGNitude]?

Description	Sets or reads out the system impedance Z0 (command/query)
Parameter	<***numeric***> the Z0 value from 0.001 to 1000
Unit	Ω (Ohm)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<*numeric*>
Preset Value	50
Equivalent Softkeys	**Calibration > System Z0**

SENS:CORR:OFFS:CLE

SENSe*<Ch>*:CORRection:OFFSet:CLEar

Description	Clears the scalar mixer calibration coefficient table. (no query)
Target	Channel *<Ch>*, `<Ch>={[1]|2|...16}`
Equivalent Softkeys	**None**

SENS:CORR:OFFS:COLL:CLE

SENSe*<Ch>*:CORRection:OFFSet:COLLect:CLEar

Description	Clears the calibration measurement data of scalar mixer calibration when the frequency offset feature is ON. (no query)
Target	Channel *<Ch>*, `<Ch>={[1]|2|...16}`
Equivalent Softkeys	**Calibration > Mixer/Converter Calibration > Scalar Mixer Calibration > Cancel**

SENS:CORR:OFFS:COLL:LOAD

SENSe*<Ch>*:CORRection:OFFSet:COLLect[:ACQuire]:LOAD *<numeric1>*, *<numeric2>*

Description	Measures the calibration data of the *load* standard of the specified port when the frequency offset feature is on for scalar mixer calibration. (no query)
Target	Channel *<Ch>*, `<Ch>={[1]|2|...16}`
Parameter	<***numeric1***> Measurement port number <***numeric2***> Frequency port number.
Out of Range	If an incorrect port number is specified, an error occurs.
Notes	The command starts the measurement immediately if the trigger source for calibration set to the "Internal" by the command SENS:CORR:TRIG:FREE, otherwise waits for the trigger signal. The command blocks the execution of the subsequent commands until the completion of the measurement.
Equivalent Softkeys	**Calibration > Mixer/Converter Calibration > Scalar Mixer Calibration > Reflection Port n > Port n @Freq m Load**

SENS:CORR:OFFS:COLL:METH:SMIX2

SENSe*<Ch>*:CORRection:OFFSet:COLLect:METHod:SMIX2 *<numeric1>*, *<numeric2>*

Description	Selects the ports and sets the *scalar mixer calibration* type when the frequency offset feature is on for the calculation of the calibration coefficients on completion of the calibration executed by the SENS:CORR:OFFS:COLL:SAVE command. (no query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	<***numeric1***> first port; <***numeric2***> second port.
Out of Range	If the same port numbers are specified, an error occurs.
Equivalent Softkeys	**Calibration > Mixer/Converter Calibration > Scalar Mixer Calibration**

SENS:CORR:OFFS:COLL:OPEN

SENSe*<Ch>*:CORRection:OFFSet:COLLect[:ACQuire]:OPEN *<numeric1>*, *<numeric2>*

Description	Measures the calibration data of the *open* standard of the specified port when the frequency offset feature is on for scalar mixer calibration. (no query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	<***numeric1***> Measurement port number <***numeric2***> Frequency port number.
Notes	The command starts the measurement immediately if the trigger source for calibration set to the "Internal" by the command SENS:CORR:TRIG:FREE, otherwise waits for the trigger signal. The command blocks the execution of the subsequent commands until the completion of the measurement.
Equivalent Softkeys	**Calibration > Mixer/Converter Calibration > Scalar Mixer Calibration > Reflection Port n > Port n @Freq m Open**

SENS:CORR:OFFS:COLL:PMETer

SENSe*<Ch>*:CORRection:OFFSet:COLLect[:ACQuire]:PMETer *<numeric1>*, *<numeric2>*, *<numeric3>*

Description	Measures the scalar-mixer calibration data using the power meter when the frequency offset feature is ON. (no query)
Target	Channel *<Ch>*, `<Ch>={[1]|2|...16}`
Parameter	<***numeric1***> Measurement port number <***numeric2***> Frequency port number. <***numeric3***> Always 0 (reserved).
Notes	The command starts the measurement of the calibration data immediately regardless the trigger settings. The command blocks the execution of the subsequent commands until the completion of the measurement.
Equivalent Softkeys	**Calibration > Mixer/Converter Calibration > Scalar Mixer Calibration > Power > Port n @Freq m**

SENS:CORR:OFFS:COLL:SHOR

SENSe*<Ch>*:CORRection:OFFSet:COLLect[:ACQuire]:SHORt *<numeric1>*, *<numeric2>*

Description	Measures the calibration data of the *short* standard of the specified port when the frequency offset feature is on for scalar mixer calibration. (no query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	<***numeric1***> Measurement port number <***numeric2***> Frequency port number.
Notes	The command starts the measurement immediately if the trigger source for calibration set to the "Internal" by the command SENS:CORR:TRIG:FREE, otherwise waits for the trigger signal. The command blocks the execution of the subsequent commands until the completion of the measurement.
Equivalent Softkeys	**Calibration > Mixer/Converter Calibration > Scalar Mixer Calibration > Reflection Port n > Port n @Freq m Short**

SENS:CORR:OFFS:COLL:THRU

SENSe<*Ch*>:CORRection:OFFSet:COLLect[:ACQuire]:THRU <*numeric1*>,<*numeric2*>

Description	Measures the calibration data of the *thru* standard of the specified port when the frequency offset feature is on for scalar mixer calibration. (no query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	<***numeric1***> Response port number; <***numeric2***> Stimulus port number.
Out of Range	If the same port numbers are specified, an error occurs.
Notes	The command starts the measurement immediately if the trigger source for calibration set to the "Internal" by the command SENS:CORR:TRIG:FREE, otherwise waits for the trigger signal. The command blocks the execution of the subsequent commands until the completion of the measurement.
Equivalent Softkeys	**Calibration > Mixer/Converter Calibration > Scalar Mixer Calibration > Reflection Port n > Port n @Freq m Thru**

SENS:CORR:OFFS:COLL:SAVE

SENSe*<Ch>*:CORRection:OFFSet:COLLect:SAVE

Description	Calculates the calibration coefficient for the selected calibration type (scalar mixer calibration only) from the calibration data measured with the frequency offset feature is ON. If this command is executed before all necessary calibration data for calculating the calibration coefficient is measured, an error occurs when executed. (no query)
Target	Channel *<Ch>*, `<Ch>={[1]|2|...16}`
Related Commands	SCPI.SENSe(*Ch*).CORRection.OFFSet.COLLect.METHod.SMIX2 SCPI.SENSe(*Ch*).CORRection.OFFSet.COLLect.ACQuire.LOAD SCPI.SENSe(*Ch*).CORRection.OFFSet.COLLect.ACQuire.OPEN SCPI.SENSe(*Ch*).CORRection.OFFSet.COLLect.ACQuire.SHORt SCPI.SENSe(*Ch*).CORRection.OFFSet.COLLect.ACQuire.THRU SCPI.SENSe(*Ch*).CORRection.OFFSet.COLLect.ACQuire.PMETer
Equivalent Softkeys	**Calibration > Mixer/Converter Calibration > Scalar Mixer Calibration > Apply**

SENS:CORR:REC

SENSe*<Ch>*:CORRection:RECeiver*<Pt>*[:STATe] {OFF|ON|0|1}

SENSe*<Ch>*:CORRection:RECeiver*<Pt>*[:STATe]?

Description	Turns ON/OFF the receiver correction of the specified port. (command/query)
Target	Port *<Pt>* of channel *<Ch>*, *<Ch>*={[1]|2|...16} *<Pt>*={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Calibration > Receiver Calibration > Correction**

SENS:CORR:REC:COLL:ACQ

SENSe*<Ch>*:CORRection:RECeiver*<Pt>*:COLLect:ACQuire *<srcport>*

Description	Executes receiver calibration of both the test receiver and the reference receiver of the specified port *<Pt>*.The test receiver calibration uses port number *<srcport>* as the source port. The reference receiver calibration uses its own port *<Pt>* as the source port. (no query)
Target	Port *<Pt>* of channel *<Ch>*, *<Ch>*={[1]|2|...16} *<Pt>*={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA
Parameter	***<srcport>*** the number of the source port from 1 to 2 (or 4)
Notes	The command starts the measurement of the calibration data immediately regardless the trigger settings. The command blocks the execution of the subsequent commands until the completion of the measurement.
Equivalent Softkeys	**Calibration > Receiver Calibration > Calibrate Both**

SENS:CORR:REC:COLL:RCH:ACQ

SENSe*<Ch>*:CORRection:RECeiver*<Pt>*:COLLect:RCHannel:ACQuire

Description	Executes receiver calibration of the reference receiver of the specified port *<Pt>*. The reference receiver calibration uses its own port *<Pt>* as the source port. (no query)

Target	Port *<Pt>* of channel *<Ch>*,
	`<Ch>={[1]|2|...16}`
	`<Pt>={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA`

Notes	The command starts the measurement of the calibration data immediately regardless the trigger settings. The command blocks the execution of the subsequent commands until the completion of the measurement.
Equivalent Softkeys	**Calibration > Receiver Calibration > Take Cal Sweep**

SENS:CORR:REC:COLL:TCH:ACQ

SENSe*<Ch>*:CORRection:RECeiver*<Pt>*:COLLect:TCHannel:ACQuire *<srcport>*

Description	Executes receiver calibration of the test receiver of the specified port *<Pt>*. The test receiver calibration uses port number *<srcport>* as the source port. (no query)

Target	Port *<Pt>* of channel *<Ch>*,
	`<Ch>={[1]|2|...16}`
	`<Pt>={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA`

Parameter	***<srcport>*** the number of the source port from 1 to 2 (or 4)
Notes	The command starts the measurement of the calibration data immediately regardless the trigger settings. The command blocks the execution of the subsequent commands until the completion of the measurement.
Equivalent Softkeys	**Calibration > Receiver Calibration > Calibrate Both**

SENS:CORR:REC:OFFS:AMPL

SENSe*<Ch>*:CORRection:RECeiver*<Pt>*:OFFSET:AMPLitude *<numeric>*

SENSe*<Ch>*:CORRection:RECeiver*<Pt>*:OFFSET:AMPLitude*?*

Description	Sets or reads out the power offset value when the Receiver Calibration is performed. Receiver calibration is done at the condition of <source power> + < power offset>. (command/query)

Target	Port *<Pt>* of channel *<Ch>*,
	`<Ch>={[1]|2|...16}`
	`<Pt>={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA`

Parameter	<***numeric***> the power offset value when the Receiver Calibration is performed from -100 to 100.
Unit	dBm
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	0.0
Equivalent Softkeys	**Calibration > Receiver Calibration > Power Offset**

SENS:CORR:STAT

SENSe*<Ch>*:CORRection:STATe {OFF|ON|0|1}

SENSe*<Ch>*:CORRection:STATe?

Description	Turns ON/OFF the S-parameter error correction. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Calibration > Correction**

SENS:CORR:TRAN:TIME:FREQ

SENSe*<Ch>*:CORRection:TRANsform:TIME:FREQuency *<frequency>*

SENSe*<Ch>*:CORRection:TRANsform:TIME:FREQuency?

Description	Sets or reads out the frequency value at which the cable loss specified for the cable correction function, when the time domain transformation function is turned ON. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<frequency>*** the frequency value.
Unit	Hz (Hertz)
Query Response	*<numeric>*
Preset Value	1 GHz
Equivalent Softkeys	**Analysis > Time Domain > Cable Correction > Frequency**

SENS:CORR:TRAN:TIME:LOSS

SENSe<*Ch*>:CORRection:TRANsform:TIME:LOSS <*numeric*>

SENSe<*Ch*>:CORRection:TRANsform:TIME:LOSS?

Description	Sets or reads out the cable loss value for the cable correction function, when the time domain transformation function is turned ON. (command/query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	<***numeric***> the cable loss value.
Unit	dB/m (decibell / meter)
Query Response	<*numeric*>
Preset Value	0 dB/m
Equivalent Softkeys	**Analysis > Time Domain > Cable Correction > Cable Loss**

SENS:CORR:TRAN:TIME:RVEL

SENSe<*Ch*>:CORRection:TRANsform:TIME:RVELocity <*numeric*>

SENSe<*Ch*>:CORRection:TRANsform:TIME:RVELocity?

Description	Sets or reads out the cable relative wave speed velocity for the cable correction function, when the time domain transformation function is turned ON. (command/query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	<***numeric***> the cable velocity factor.
Query Response	<*numeric*>
Preset Value	1.0
Equivalent Softkeys	**Analysis > Time Domain > Cable Correction > Velocity Factor**

SENS:CORR:TRAN:TIME:STAT

SENSe<*Ch*>:CORRection:TRANsform:TIME:STATe {OFF|ON|0|1}

SENSe<*Ch*>:CORRection:TRANsform:TIME:STATe?

Description	Turns ON/OFF the cable correction when the time domain transformation function is turned ON. (command/query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Analysis > Time Domain > Cable Correction > Cable Correction**

SENS:CORR:TRIG:FREE

SENSe*<Ch>*:CORRection:TRIGger:FREE[:STATe] {OFF|ON|0|1}

SENSe*<Ch>*:CORRection:TRIGger:FREE[:STATe]?

Description	Enables/disables the *internal* trigger source for calibration. If the *internal* trigger source for calibration is enabled then a command of the calibration standard measurement starts the measurement immediately. If the internal trigger source for calibration is disabled then the *system* trigger source is used (which is set for regular measurement with the command TRIG:SOUR) to start the calibration standard measurement. The *system* trigger source also enables the averaging trigger function (TRIG:AVER) and the point trigger function (TRIG:POIN) for calibration. Note: When the *system* trigger source is selected you should avoid the program trigger source (BUS), otherwise the program deadlock is possible. Note: The command does not apply to the electronic calibration, the power calibration and the receiver calibration. The internal trigger always used in these cases. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	Specifies the trigger source for calibration: **{ON|1}** : Internal **{OFF|0}** : System
Query Response	{0|1}
Preset Value	1
Equivalent Softkeys	**Calibration > Cal Trig Source { Internal | System }**

SENS:CORR:TYPE?

SENSe*<Ch>*:CORRection:TYPE*<Tr>*?

Description	Reads out the applied calibration type and the port numbers for the specified trace. (query only)
Target	Trace *<Tr>* of channel *<Ch>*, *<Tr>*={[1]|2|...16} *<Ch>*={[1]|2|...16}
Query Response	{RESPO|RESPS|RESPT|SOLT1|SOLT2|1PATH|NONE},*<srcport>*, *<rcvport>* Where: **RESPO** : Response (Open) **RESPS** : Response (Short) **RESPT** : Response (Thru) **SOLT1** : Full 1–port calibration **SOLT2** : Full 2–port calibration **1PATH** : One path 2–port calibration **NONE** : Not defined ***<rcvport>***, the number of the receiver port from 1 to 2 (or 4) ***<srcport>***, the number of the source port from 1 to 2 (or 4)
Equivalent Softkeys	**None**

SENS:DATA:CORR?

SENSe*<Ch>*:DATA:CORRdata? *<char>*

Description	Reads out the corrected S-parameter data array or the corrected receiver data array. The type of the array entries is a complex number. The array size is 2N, where N is the number of measurement points. For the n–th point, where n from 1 to N: *<numeric 2n–1>* the real part of corrected measurement; *<numeric 2n>* the imaginary part of corrected measurement. (query only)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	*<char>* Specifies the S-parameter: **S11, S12, S13, S14, S21, ... S44**
	<char> Specifies the Test Receiver: **T11, T12, T13, T14, T21, ... T44** Where the first index is the receiver port number, and the second index is the source port number; The following notations are also available: **T1(1), T1(2), T1(3), T1(4), T2(1), ... T4(4)** or **A(1), A(2), A(3), A(4), B(1), ... D(4)**
	<char> Specifies the Test Receiver: **R11, R12, R13, R14, R21, ... R44** Where the first index is the receiver port number, and the second index is the source port number; The following notations are also available: **R1(1), R1(2), R1(3), R1(3), R2(1), ... R4(4)**
Query Response	*<numeric 1>*, *<numeric 2>*, ...*<numeric 2N>*
Note	To ensure the update of the data, the corresponding stimulus port must be active. For example, when reading the S12 parameter at least one trace with the stimulus port 2 must present or SOLT2 calibration must be active.
Equivalent Softkeys	**None**

SENS:DATA:RAWD?

SENSe<*Ch*>:DATA:RAWData? <*char*>

Description	Reads out the raw S-parameter data array or the raw receiver data array. The type of the array entries is a complex number. The array size is 2N, where N is the number of measurement points. For the n−th point, where n from 1 to N: *<numeric 2n−1>* the real part of raw measurement; *<numeric 2n>* the imaginary part of raw measurement. (query only)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	*<char>* Specifies the S-parameter: **S11, S12, S13, S14, S21, ... S44**
	<char> Specifies the Test Receiver: **T11, T12, T13, T14, T21, ... T44** Where the first index is the receiver port number, and the second index is the source port number; The following notations are also available: **T1(1), T1(2), T1(3), T1(4), T2(1), ... T4(4)** or **A(1), A(2), A(3), A(4), B(1), ... D(4)**
	<char> Specifies the Test Receiver: **R11, R12, R13, R14, R21, ... R44** Where the first index is the receiver port number, and the second index is the source port number; The following notations are also available: **R1(1), R1(2), R1(3), R1(3), R2(1), ... R4(4)**
Query Response	*<numeric 1>*, *<numeric 2>*, …*<numeric 2N>*
Note	To ensure the update of the data, the corresponding stimulus port must be active. For example, when reading the S12 parameter at least one trace with the stimulus port 2 must present or SOLT2 calibration must be active.
Equivalent Softkeys	**None**

SENS:FREQ

SENSe<*Ch*>:FREQuency[:CW] <*frequency*>

SENSe<*Ch*>:FREQuency[:FIXed] <*frequency*>

SENSe<*Ch*>:FREQuency[:CW]?

SENSe<*Ch*>:FREQuency[:FIXed]?

Description	Sets or reads out the fixed frequency value when the power sweep type selected. (command/query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	<***frequency***> the frequency value within the frequency limits of the analyzer.
Unit	Hz (Hertz)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<*numeric*>
Preset Value	The minimum frequency limit of the analyzer.
Equivalent Softkeys	**Stimulus > Power > CW Freq**

SENS:FREQ:DATA?

SENSe*<Ch>*:FREQuency:DATA?

Description	Reads out the frequency array of the measurement points. The array size is N, where N is the number of measurement points. For the n–th point, where n from 1 to N: *<numeric n>* the frequency value at the n–th measurement point (query only)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Query Response	*<numeric 1>*, *<numeric 2>*, …*<numeric N>*
Equivalent Softkeys	**None**

SENS:FREQ:CENT

SENSe<*Ch*>:FREQuency:CENTer <*frequency*>

SENSe<*Ch*>:FREQuency:CENTer?

Description	Sets or reads out the stimulus center value of the sweep range for linear or logarithmic sweep type. (command/query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	***<frequency>*** the stimulus center value within the frequency limits of the analyzer.
Unit	Hz (Hertz)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	the center frequency of the analyzer
Equivalent Softkeys	**Stimulus > Center**

SENS:FREQ:SPAN

SENSe*<Ch>*:FREQuency:SPAN *<frequency>*

SENSe*<Ch>*:FREQuency:SPAN?

Description	Sets or reads out the stimulus span value of the sweep range for linear or logarithmic sweep type. (command/query)
Target	Channel *<Ch>*, `<Ch>={[1]|2|...16}`
Parameter	***<frequency>*** the stimulus span value from 0 to the maximum frequency span of the analyzer.
Unit	Hz (Hertz)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	the maximum frequency span of the analyzer
Equivalent Softkeys	**Stimulus > Span**

SENS:FREQ:STAR

SENSe<*Ch*>:FREQuency:STARt <*frequency*>

SENSe<*Ch*>:FREQuency:STARt?

Description	Sets or reads out the stimulus start value of the sweep range for linear or logarithmic sweep type. (command/query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	<***frequency***> the stimulus start value within the frequency limits of the analyzer.
Unit	Hz (Hertz)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<*numeric*>
Preset Value	The minimum frequency limit of the analyzer.
Equivalent Softkeys	**Stimulus > Start**

SENS:FREQ: STOP

SENSe<*Ch*>:FREQuency:STOP <*frequency*>

SENSe<*Ch*>:FREQuency:STOP?

Description	Sets or reads out the stimulus stop value of the sweep range for linear or logarithmic sweep type. (command/query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	<***frequency***> the stimulus stop value within the frequency limits of the analyzer..
Unit	Hz (Hertz)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<*numeric*>
Preset Value	The maximum frequency limit of the analyzer.
Equivalent Softkeys	**Stimulus > Stop**

SENS:OFFS

SENSe<Ch>:OFFSet[:STATe] {OFF|ON|0|1}

SENSe<Ch>:OFFSet[:STATe]?

Description	Turns ON/OFF the frequency offset feature. (command/query)
Target	Channel *<Ch>*, `<Ch>={[1]|2|...16}`
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Stimulus > Frequency Offset > Frequency Offset**

SENS:OFFS:PORT:DATA?

SENSe<Ch>:OFFSet:PORT<Pt>[:FREQuency]:DATA?

Description	Reads out the array of the frequency points of port *<Pt>* when the frequency offset feature is ON and offset type is "PORT". The array size is N, where N is the number of measurement points. For the n–th point, where n from 1 to N: *<numeric n>* the frequency value at the n–th point (query only)

Target	Port *<Pt>* of channel *<Ch>*,
	`<Ch>={[1]|2|...16}`
	`<Pt>={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA`

Query Response	*<numeric 1>*, *<numeric 2>*, …*<numeric N>*
Related Commands	SENS:OFFS:STAT SENS:OFFS:TYPE
Equivalent Softkeys	**None**

SENS:OFFS:PORT:DIV

SENSe<*Ch*>:OFFSet:PORT<*Pt*>[:FREQuency]:DIVisor <*numeric*>

SENSe<*Ch*>:OFFSet:PORT<*Pt*>[:FREQuency]:DIVisor?

Description	Sets or reads out the basic frequency range divisor of port *<Pt>* when the frequency offset feature is ON and offset type is "PORT". (command/query)
Target	Port *<Pt>* of channel *<Ch>*, *<Ch>*={[1]|2|...16} *<Pt>*={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA
Parameter	***<numeric>*** divisor from 1 to 1000;
Unit	n/a
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	1
Related Commands	SENS:OFFS:STAT SENS:OFFS:TYPE
Equivalent Softkeys	**Stimulus > Frequency Offset > Port n > Divider**

SENS:OFFS:PORT:MULT

SENSe<Ch>:OFFSet:PORT<Pt>[:FREQuency]:MULTiplier <numeric>

SENSe<Ch>:OFFSet:PORT<Pt>[:FREQuency]:MULTiplier?

Description	Sets or reads out the basic frequency range multiplier of port *<Pt>* when the frequency offset feature is ON and offset type is "PORT". (command/query)

Target	Port *<Pt>* of channel *<Ch>*,
	`<Ch>={[1]|2|...16}`
	`<Pt>={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA`

Parameter	***<numeric>*** `multiplier` from −1000 to 1000;
Unit	n/a
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	1
Related Commands	SENS:OFFS:STAT SENS:OFFS:TYPE
Equivalent Softkeys	**Stimulus > Frequency Offset > Port n > Multiplier**

SENS:OFFS:PORT:OFFS

SENSe*<Ch>*:OFFSet:PORT*<Pt>*[:FREQuency]:OFFSet *<frequency>*

SENSe*<Ch>*:OFFSet:PORT*<Pt>*[:FREQuency]:OFFSet?

Description	Sets or reads out the basic frequency range offset of port *<Pt>* when the frequency offset feature is ON and offset type is "PORT". (command/query)

Target	Port *<Pt>* of channel *<Ch>*,
	`<Ch>={[1]|2|...16}`
	`<Pt>={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA`

Parameter	***<frequency>*** offset from −1e12 to 1e12;
Unit	Hz
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	0
Related Commands	SENS:OFFS:STAT SENS:OFFS:TYPE
Equivalent Softkeys	**Stimulus > Frequency Offset > Port n > Offset**

SENS:OFFS:PORT:STAR

SENSe<*Ch*>:OFFSet:PORT<*Pt*>[:FREQuency]:STARt <*frequency*>

SENSe<*Ch*>:OFFSet:PORT<*Pt*>[:FREQuency]:STARt?

Description	Sets or reads out the frequency sweep start of port <*Pt*> when the frequency offset feature is ON and offset type is "PORT". (command/query)
Target	Port <*Pt*> of channel <*Ch*>, <*Ch*>={[1]|2|...16} <*Pt*>={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA
Parameter	<***frequency***> frequency sweep start of port <*Pt*>;
Unit	Hz
Query Response	<*numeric*>
Related Commands	SENS:OFFS:STAT SENS:OFFS:TYPE
Equivalent Softkeys	**Stimulus > Frequency Offset > Port n > Start**

SENS:OFFS:PORT:STOP

SENSe*<Ch>*:OFFSet:PORT*<Pt>*[:FREQuency]:STOP *<frequency>*

SENSe*<Ch>*:OFFSet:PORT*<Pt>*[:FREQuency]:STOP?

Description	Sets or reads out the frequency sweep stop of port *<Pt>* when the frequency offset feature is ON and offset type is "PORT". (command/query)
Target	Port *<Pt>* of channel *<Ch>*, *<Ch>*={[1]|2|...16} *<Pt>*={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA
Parameter	***<frequency>*** frequency sweep stop of port *<Pt>*;
Unit	Hz
Query Response	*<numeric>*
Related Commands	SENS:OFFS:STAT SENS:OFFS:TYPE
Equivalent Softkeys	**Stimulus > Frequency Offset > Port n > Stop**

SENS:OFFS:REC:DATA?

SENSe<*Ch*>:OFFSet:RECeiver[:FREQuency]:DATA?

Description	Reads out the array of the receiver frequency points when the frequency offset feature is ON and offset type is "SRCRcv". The array size is N, where N is the number of measurement points. For the n−th point, where n from 1 to N: <*numeric n*> the frequency value at the n−th point (query only)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Query Response	<*numeric 1*>, <*numeric 2*>, …<*numeric N*>
Related Commands	SENS:OFFS:STAT SENS:OFFS:TYPE
Equivalent Softkeys	**None**

SENS:OFFS:REC:DIV

SENSe<Ch>:OFFSet:RECeiver[:FREQuency]:DIVisor <numeric>

SENSe<Ch>:OFFSet:RECeiver[:FREQuency]:DIVisor?

Description	Sets or reads out the basic frequency range divisor to get the receiver frequency when the frequency offset feature is ON and offset type is "SRCRcv". (command/query)
Target	Channel <Ch>, <Ch>={[1]|2|...16}
Parameter	***<numeric>*** divisor from 1 to 1000;
Unit	n/a
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	1
Related Commands	SENS:OFFS:STAT SENS:OFFS:TYPE
Equivalent Softkeys	**Stimulus > Frequency Offset > Receivers > Divider**

SENS:OFFS:REC:MULT

SENSe*<Ch>*:OFFSet:RECeiver[:FREQuency]:MULTiplier *<numeric>*

SENSe*<Ch>*:OFFSet:RECeiver[:FREQuency]:MULTiplier?

Description	Sets or reads out the basic frequency range multiplier to get the receiver frequency when the frequency offset feature is ON and offset type is "SRCRcv". (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<numeric>*** multiplier from −1000 to 1000;
Unit	n/a
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	1
Related Commands	SENS:OFFS:STAT SENS:OFFS:TYPE
Equivalent Softkeys	**Stimulus > Frequency Offset > Receivers > Multiplier**

SENS:OFFS:REC:OFFS

SENSe<*Ch*>:OFFSet:RECeiver[:FREQuency]:OFFSet <*frequency*>

SENSe<*Ch*>:OFFSet:RECeiver[:FREQuency]:OFFSet?

Description	Sets or reads out the basic frequency range offset to get the receiver frequency when the frequency offset feature is ON and offset type is "SRCRcv". (command/query)
Target	Channel <*Ch*>, `<Ch>={[1]|2|...16}`
Parameter	***<frequency>*** offset from −1e12 to 1e12;
Unit	Hz
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	0
Related Commands	SENS:OFFS:STAT SENS:OFFS:TYPE
Equivalent Softkeys	**Stimulus > Frequency Offset > Receivers > Offset**

SENS:OFFS:REC:STAR

SENSe<*Ch*>:OFFSet:RECeiver[:FREQuency]:STARt <*frequency*>

SENSe<*Ch*>:OFFSet:RECeiver[:FREQuency]:STARt?

Description	Sets or reads out the frequency sweep start of the receivers when the frequency offset feature is ON and offset type is "SRCRcv". (command/query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	<***frequency***> frequency sweep start of receivers
Unit	Hz
Query Response	<*numeric*>
Related Commands	SENS:OFFS:STAT SENS:OFFS:TYPE
Equivalent Softkeys	**Stimulus > Frequency Offset > Receivers > Start**

SENS:OFFS:REC:STOP

SENSe*<Ch>*:OFFSet:RECeiver[:FREQuency]:STOP *<frequency>*

SENSe*<Ch>*:OFFSet:RECeiver[:FREQuency]:STOP?

Description	Sets or reads out the frequency sweep stop of the receivers when the frequency offset feature is ON and offset type is "SRCRcv". (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<frequency>*** frequency sweep stop of receivers
Unit	Hz
Query Response	*<numeric>*
Related Commands	SENS:OFFS:STAT SENS:OFFS:TYPE
Equivalent Softkeys	**Stimulus > Frequency Offset > Receivers > Stop**

SENS:OFFS:SOUR:DATA?

SENSe<*Ch*>:OFFSet:SOURce[:FREQuency]:DATA?

Description	Reads out the array of the frequency points of the source when the frequency offset feature is ON and offset type is "SRCRcv". The array size is N, where N is the number of measurement points. For the n–th point, where n from 1 to N: <*numeric n*> the frequency value at the n–th point (query only)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Query Response	*<numeric 1>*, *<numeric 2>*, …*<numeric N>*
Related Commands	SENS:OFFS:STAT SENS:OFFS:TYPE
Equivalent Softkeys	**None**

SENS:OFFS:SOUR:DIV

SENSe<*Ch*>:OFFSet:SOURce[:FREQuency]:DIVisor <*numeric*>

SENSe<*Ch*>:OFFSet:SOURce[:FREQuency]:DIVisor?

Description	Sets or reads out the basic frequency range divisor to get the source frequency when the frequency offset feature is ON and offset type is "SRCRcv". (command/query)
Target	Channel <*Ch*>, `<Ch>={[1]|2|...16}`
Parameter	***<numeric>*** divisor from 1 to 1000;
Unit	n/a
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	1
Related Commands	SENS:OFFS:STAT SENS:OFFS:TYPE
Equivalent Softkeys	**Stimulus > Frequency Offset > Source > Divider**

SENS:OFFS:SOUR:MULT

SENSe<*Ch*>:OFFSet:SOURce[:FREQuency]:MULTiplier <*numeric*>

SENSe<*Ch*>:OFFSet:SOURce[:FREQuency]:MULTiplier?

Description	Sets or reads out the basic frequency range multiplier to get the source frequency when the frequency offset feature is ON and offset type is "SRCRcv". (command/query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	***<numeric>*** multiplier from −1000 to 1000;
Unit	n/a
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	1
Related Commands	SENS:OFFS:STAT SENS:OFFS:TYPE
Equivalent Softkeys	**Stimulus > Frequency Offset > Source > Multiplier**

SENS:OFFS:SOUR:OFFS

SENSe*<Ch>*:OFFSet:SOURce[:FREQuency]:OFFSet *<frequency>*

SENSe*<Ch>*:OFFSet:SOURce[:FREQuency]:OFFSet?

Description	Sets or reads out the basic frequency range offset to get the source frequency when the frequency offset feature is ON and offset type is "SRCRcv". (command/query)
Target	Channel *<Ch>*, `<Ch>={[1]|2|...16}`
Parameter	***<frequency>*** offset from −1e12 to 1e12;
Unit	Hz
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	0
Related Commands	SENS:OFFS:STAT SENS:OFFS:TYPE
Equivalent Softkeys	**Stimulus > Frequency Offset > Source > Offset**

SENS:OFFS:SOUR:STAR

SENSe<*Ch*>:OFFSet:SOURce[:FREQuency]:STARt <*frequency*>

SENSe<*Ch*>:OFFSet:SOURce[:FREQuency]:STARt?

Description	Sets or reads out the frequency sweep start of the source when the frequency offset feature is ON and offset type is "SRCRcv". (command/query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	<***frequency***> frequency sweep start of the source
Unit	Hz
Query Response	<*numeric*>
Related Commands	SENS:OFFS:STAT SENS:OFFS:TYPE
Equivalent Softkeys	**Stimulus > Frequency Offset > Source > Start**

SENS:OFFS:SOUR:STOP

SENSe*<Ch>*:OFFSet:SOURce[:FREQuency]:STOP *<frequency>*

SENSe*<Ch>*:OFFSet:SOURce[:FREQuency]:STOP?

Description	Sets or reads out the frequency sweep stop of the source when the frequency offset feature is ON and offset type is "SRCRcv". (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<frequency>*** frequency sweep stop of the source
Unit	Hz
Query Response	*<numeric>*
Related Commands	SENS:OFFS:STAT SENS:OFFS:TYPE
Equivalent Softkeys	**Stimulus > Frequency Offset > Source > Stop**

SENS:OFFS:TYPE

SENSe*<Ch>*:OFFSet:TYPE *<char>*

SENSe*<Ch>*:OFFSet:TYPE?

Description	Sets or reads out the frequency offset type when the frequency offset feature is ON. There are two frequency offset types: "Port1/Port2" and "Source/Receivers". First offset type offsets ports against each other. Second offset type offsets source against receivers. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	*<char>* Specifies the offset type: **PORT** : Port1/Port2 offset **SRCRcv** : Source/Receivers offset
Query Response	{PORT|SRCR}
Preset Value	PORT
Equivalent Softkeys	**Stimulus > Frequency Offset > Offset Type**

SENS:ROSC:SOUR

SENSe<*Ch*>:ROSCillator:SOURce <*char*>

SENSe<*Ch*>:ROSCillator:SOURce?

Description	Sets or reads out the internal or external source of the reference frequency of 10 MHz. (command/query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	<*char*> Choose from: **INTernal** : Internal source of the reference frequency **EXTernal** : External source of the reference frequency
Query Response	{INT|EXT}
Preset Value	INT
Equivalent Softkeys	**System > Misc Setup > Ref Source**

SENS:SEGM:DATA

SENSe*<Ch>*:SEGMent:DATA *<numeric list>*

SENSe*<Ch>*:SEGMent:DATA?

Description	Sets or reads out the array of the segment sweep table. The array has the following format: *{ <Buf>, <Flag1>, <Flag2>, <Flag3>, <Flag4>, <Flag5>, <N>,* *<Start 1>, <Stop 1>, <NOP 1> [,<IFBW 1>] [,<Pow 1>] [,<Del 1>] [,<Time 1>],* *<Start 2>, <Stop 2>, <NOP 2> [,<IFBW 2>] [,<Pow 2>] [,<Del 2>] [,<Time 2>],* **...** *<StartN>, <StopN>, <NOP N> [,<IFBW N>] [,<Pow N>] [,<Del N>] [,<TimeN>] }* *<Buf>* : Always 5, *<Flag1>* : Stimulus start setting (0 – start/stop, 1 – center/span), *<Flag2>* : Setting of the *<IFBW>* field (0 – disabled, 1 – enabled), *<Flag3>* : Setting of the *<Pow>* field (0 – disabled, 1 – enabled), *<Flag4>* : Setting of the *<Del>* field (0 – disabled, 1 – enabled), *<Flag5>* : Setting of the *<Time>* field (0 – disabled, 1 – enabled), *<N>* : Number of segments, *<Start n>* : Start value of the n–th segment, *<Stop n>* : Stop value of the n–th segment, *<NOP n>* : Number of points of the n–th segment, *<IFBW n>* : IF bandwidth of the n–th segment (if enabled), *<Pow n>* : Power of the n–th segment (if enabled), *<Del n>* : Measurement delay of the n–th segment (if enabled), *<Time n>* : Reserved for future use (if enabled) (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Query Response	*<numeric 1>,<numeric 2>,...<numeric 7+M×N>* Where, N – the number of the segments, M – depends on the values of the flags: M = 3 + *<Flag2>* + *<Flag3>* + *<Flag4>* + *<Flag5>*
Equivalent Softkeys	**Stimulus / Segment Table**

SENS:SWE:POIN

SENSe*<Ch>*:SWEep:POINts *<numeric>*

SENSe*<Ch>*:SWEep:POINts?

Description	Sets or reads out the number of measurement points. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<numeric>*** the number of measurement points from 2 to maximum limit of the analyzer.
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	201
Equivalent Softkeys	**Stimulus > Points**

SENS:SWE:POIN:TIME

SENSe<*Ch*>:SWEep:POINt:TIME <*time*>

SENSe<*Ch*>:SWEep:POINt:TIME?

Description	Sets or reads out the delay before measurement in each measurement point. (command/query)
Target	Channel <*Ch*>, `<Ch>={[1]|2|...16}`
Parameter	***<time>*** the measurement delay value from 0 to 0.3 sec.
Unit	s (second)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**Stimulus > Meas Delay**

SENS:SWE:TYPE

SENSe*<Ch>*:SWEep:TYPE *<char>*

SENSe*<Ch>*:SWEep:TYPE?

Description	Sets or reads out the sweep type. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	*<char>* Specifies the sweep type: **LINear** : Linear frequency sweep **LOGarithmic** : Logarithmic frequency sweep **SEGMent** : Segment frequency sweep **POWer** : Power sweep
Query Response	{LIN|LOG|SEGM|POW}
Preset Value	LIN
Equivalent Softkeys	**Stimulus > Sweep Type**

SENS:VOLT:DC:RANG:UPP

SENSe<*Ch*>:VOLTage{[1]|2}:DC:RANGe:UPPer <*numeric*>

SENSe<*Ch*>:VOLTage{[1]|2}:DC:RANGe:UPPer?

Description	Sets or reads out the DC voltage range at the connector AUX1 or AUX2. (command/query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	<***numeric***> the DC voltage range 10V or 1V
Unit	V (Volt)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<*numeric*>
Preset Value	10
Equivalent Softkeys	**Measurement > DC Voltage > Range**

SERV:CHAN:ACT?

SERVice:CHANnel:ACTive?

Description	Reads out the active channel number. (query only)
Query Response	<***numeric***> from 1 to 16
Equivalent Softkeys	**None**

SERV:CHAN:COUN?

SERVice:CHANnel:COUNt?

Description	Reads out the maximum number of the channels. (query only)
Query Response	*<numeric>*
Equivalent Softkeys	**None**

SERV:CHAN:TRAC:ACT?

SERVice:CHANnel*<Ch>*:TRACe:ACTive?

Description	Read out the active trace number of the channel. (query only)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Query Response	*<numeric>* from 1 to 16
Equivalent Softkeys	**None**

SERV:CHAN:TRAC:COUN?

SERVice:CHANnel:TRACe:COUNt?

Description	Reads out the maximum number of the traces in the channel. (query only)
Query Response	*<numeric>*
Equivalent Softkeys	**None**

SERV:PORT:COUN?

SERVice:PORT:COUNt?

Description	Reads out the number of the ports. (query only)
Query Response	*<numeric>*
Equivalent Softkeys	**None**

SERV:SWE:FREQ:MAX?

SERVice:SWEep:FREQuency:MAXimum?

Description	Reads out the upper limit of the measurement frequency. (query only)
Query Response	*<numeric>*
Unit	Hz (Hertz)
Equivalent Softkeys	**None**

SERV:SWE:FREQ:MIN?

SERVice:SWEep:FREQuency:MINimum?

Description	Reads out the lower frequency of the measurement frequency. (query only)
Query Response	*<numeric>*
Unit	Hz (Hertz)
Equivalent Softkeys	**None**

SERV:SWE:POIN?

SERVice:SWEep:POINts?

Description	Reads out the maximum number of the measurement points. (query only)
Query Response	*<numeric>*
Equivalent Softkeys	**None**

SOUR:AUX

SOURce*<Ch>*:AUXiliary[:STATe] {OFF|ON|0|1}

SOURce*<Ch>*:AUXiliary[:STATe]?

Description	Turns ON/OFF an auxiliary RF source. The auxiliary RF source takes one port of the 4 port VNA to output the second RF source with programmable frequency and power (4-port VNA only). The second RF source can be used, for example, as a LO in mixer measurements. The auxiliary port can not be used for measurements. Ports are divided into two groups: 1, 2 and 3, 4. The second port of the group that comprises the auxiliary port can not be used as a stimulus. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Stimulus > Auxiliary Source > Auxiliary Source [ON| OFF]**

SOUR:AUX:FREQ:DIV

SOURce*<Ch>*:AUXiliary:FREQuency:DIVisor *<numeric>*

SOURce*<Ch>*:AUXiliary:FREQuency:DIVisor?

Description	Sets or reads out the basic frequency range divisor to derive the frequency of the auxiliary RF source (4-port VNA only). (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<numeric>*** the integer divisor from 1 to 1000;
Unit	n/a
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	1
Related Commands	SOUR:AUX:FREQ:MULT SOUR:AUX:FREQ:OFFS
Equivalent Softkeys	**Stimulus > Auxiliary Source > Divider**

SOUR:AUX:FREQ:MULT

SOURce*<Ch>*:AUXiliary:FREQuency:MULTiplier *<numeric>*

SOURce*<Ch>*:AUXiliary:FREQuency:MULTiplier?

Description	Sets or reads out the basic frequency range multiplier to derive the frequency of the auxiliary RF source (4-port VNA only). (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<numeric>*** the floating point multiplier from −1000 to 1000;
Unit	n/a
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	0
Related Commands	SOUR:AUX:FREQ:DIV SOUR:AUX:FREQ:OFFS
Equivalent Softkeys	**Stimulus > Auxiliary Source > Multiplier**

SOUR:AUX:FREQ:OFFS

SOURce*<Ch>*:AUXiliary:FREQuency:MULTiplier *<numeric>*

SOURce*<Ch>*:AUXiliary:FREQuency:MULTiplier?

Description	Sets or reads out the basic frequency range offset to derive the frequency of the auxiliary RF source (4-port VNA only). (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<numeric>*** the frequency offset from −1e12 to 1e12;
Unit	Hz
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	1 GHz
Related Commands	SOUR:AUX:FREQ:DIV SOUR:AUX:FREQ:MULT
Equivalent Softkeys	**Stimulus > Auxiliary Source > Offset**

SOUR:AUX:FREQ:STAR

SOURce*<Ch>*:AUXiliary:FREQuency:STARt *<numeric>*

SOURce*<Ch>*:AUXiliary:FREQuency:STARt?

Description	Sets or reads out the start of the frequency range of the auxiliary RF source (4-port VNA only). When set the multiplier and offset values are automatically corrected. (command/query)
Target	Channel *<Ch>*, `<Ch>={[1]|2|...16}`
Parameter	***<numeric>*** start of the frequency range of the auxiliary RF source within the VNA frequency range;
Unit	Hz
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	1 GHz
Related Commands	SOUR:AUX:FREQ:STOP
Equivalent Softkeys	**Stimulus > Auxiliary Source > Start**

SOUR:AUX:FREQ:STOP

SOURce*<Ch>*:AUXiliary:FREQuency:STOP *<numeric>*

SOURce*<Ch>*:AUXiliary:FREQuency:STOP?

Description	Sets or reads out the stop of the frequency range of the auxiliary RF source (4-port VNA only). When set the multiplier and offset values are automatically corrected. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<numeric>*** stop of the frequency range of the auxiliary RF source within the VNA frequency range;
Unit	Hz
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	1 GHz
Related Commands	SOUR:AUX:FREQ:STAR
Equivalent Softkeys	**Stimulus > Auxiliary Source > Start**

SOUR:AUX:PORT

SOURce*<Ch>*:AUXiliary:PORT *<numeric>*

SOURce*<Ch>*:AUXiliary:PORT?

Description	Sets or reads out the port number assigned to the auxiliary RF source when it is turned on (4-port VNA only). The auxiliary port can not be used for measurements. Ports are divided into two groups: 1, 2 and 3, 4 ports. The second port of the group that comprises the auxiliary port can not be used as a stimulus. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<numeric>*** port number assigned to the auxiliary RF source from 1 to 4;
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	4
Equivalent Softkeys	**Stimulus > Auxiliary Source > Select Port**

SOUR:AUX:POW

SOURce*<Ch>*:AUXiliary:POWer[:AMPLitude] *<numeric>*

SOURce*<Ch>*:AUXiliary:POWer[:AMPLitude]?

Description	Sets or reads out the power of the auxiliary RF source (4-port VNA only). (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<numeric>*** the power level of the auxiliary RF source within the power limits of the analyzer;
Unit	dBm (decibels above 1 milliwatt)
Resolution	0.05 dBm
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	0 dBm
Equivalent Softkeys	**Stimulus > Auxiliary Source > Power**

SOUR:POW

SOURce*<Ch>*:POWer[:LEVel][:IMMediate][:AMPLitude] *<power>*

SOURce*<Ch>*:POWer[:LEVel][:IMMediate][:AMPLitude]?

Description	Sets or reads out the power level for the frequency sweep type. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<power>*** the power level within the power limits of the analyzer.
Unit	dBm (decibels above 1 milliwatt)
Resolution	0.05 dBm
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	0 dBm
Equivalent Softkeys	**Stimulus > Power > Power**

SOUR:POW:CENT

SOURce<*Ch*>:POWer:CENTer <*power*>

SOURce<*Ch*>:POWer:CENTer?

Description	Sets or reads out the center value of the power sweep type. (command/query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	***<power>*** the power level within the power limits of the analyzer.
Unit	dBm (decibels above 1 milliwatt)
Resolution	0.05 dBm
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	Depends on the analyzer
Equivalent Softkeys	**Stimulus > Center**

SOUR:POW:PORT

SOURce<*Ch*>:POWer:PORT<*Pt*>[:LEVel][:IMMediate][:AMPLitude] <*power*>

SOURce<*Ch*>:POWer:PORT<*Pt*>[:LEVel][:IMMediate][:AMPLitude]?

Description	Sets or reads out the power level of each port for the frequency sweep type when the port couple feature is set to OFF by the SOUR:POW:PORT:COUP command. (command/query)

Target	Port <*Pt*> of channel <*Ch*>,
	`<Ch>={[1]|2|...16}`
	`<Pt>={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA`

Parameter	<***power***> the power level within the power limits of the analyzer.
Unit	dBm (decibels above 1 milliwatt)
Resolution	0.05 dBm
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<*numeric*>
Preset Value	0
Equivalent Softkeys	**Stimulus > Power > Port Power > Port n**

SOUR:POW:PORT:CORR

SOURce*<Ch>*:POWer:PORT*<Pt>*:CORRection[:STATe] {OFF|ON|0|1}

SOURce*<Ch>*:POWer:PORT*<Pt>*:CORRection[:STATe]?

Description	Turns ON/OFF the power correction. (command/query)

Target	Port *<Pt>* of channel *<Ch>*,
	`<Ch>={[1]|2|...16}`
	`<Pt>={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA`

Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Calibration > Power Calibration > Correction**

SOUR:POW:PORT:CORR:COLL

SOURce*<Ch>*:POWer:PORT*<Pt>*:CORRection:COLLect[:ACQuire]

Description	Measures the power calibration data for the port *<Pt>* using the power meter controlled via USB or USB/GPIB. Calculates calibration coefficients on completion of the measurement, and turns ON the power correction for the port. (no query)

Target	Port *<Pt>* of channel *<Ch>*,
	`<Ch>={[1]|2|...16}`
	`<Pt>={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA`

Equivalent Softkeys	**Calibration > Power Calibration > Calibrate**

SOUR:POW:PORT:CORR:COLL:TABL:LOSS:DATA

SOURce*<Ch>*:POWer:PORT*<Pt>*:CORRection:COLLect:TABLe:LOSS:DATA *<numeric list>*

SOURce*<Ch>*:POWer:PORT*<Pt>*:CORRection:COLLect:TABLe:LOSS:DATA?

Description	Sets/gets the loss compensation table used when the power calibration is executed by the SOUR:POW:PORT:CORR:COLL command. (command/query)
Parameter	The array size is 1+2N, where N is the number of measurement points. For the n−th point, where n from 1 to N: *<numeric 1>* the number of the table rows N integer from 0 to 10001; *<numeric 2n>* the frequency of the n−th row of the table; *<numeric 2n+1>* the loss compensation value of the n−th row of the table from −100 to +100 dB;
Target	Port *<Pt>* of channel *<Ch>*, *<Ch>*={[1]|2|...16} *<Pt>*={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA
Query Response	*<numeric 1>*, *<numeric 2>*, …*<numeric 2N+1>*
Notes	If the array size is not 1 + 2N, where N is equal to *<numeric 1>*, an error occurs. If the *<numeric 2n>* and *<numeric 2n+1>* values are out of the allowable range, the value of the limit, which is closer to the specified value will be set.
Related Commands	SOUR:POW:PORT:CORR:COLL
Equivalent Softkeys	**Calibration > Power Calibration > Loss Compen**

SOUR:POW:PORT:CORR:COLL:TABL:LOSS

SOURce<*Ch*>:POWer:PORT<*Pt*>:CORRection:COLLect:TABLe:LOSS[:STATe] {OFF|ON|0|1}

SOURce<*Ch*>:POWer:PORT<*Pt*>:CORRection:COLLect:TABLe:LOSS[:STATe]?

Description	Turns ON/OFF the state of the loss compensation used when the power calibration is executed by the SOUR:POW:PORT:CORR:COLL command. (command/query)
Target	Port <*Pt*> of channel <*Ch*>, <*Ch*>={[1]|2|...16} <*Pt*>={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Calibration > Power Calibration > Loss Compen > Compensation**

SOUR:POW:PORT:CORR:DATA

SOURce*<Ch>*:POWer:PORT*<Pt>*:CORRection:DATA *<numeric list>*

SOURce*<Ch>*:POWer:PORT*<Pt>*:CORRection:DATA?

Description	Sets or reads out the power correction array (result of power calibration executed by the SOUR:POW:PORT:CORR:COLL command). (command/query)
Parameter	The array size is NOP, where NOP is the number of measurement points. For the n−th point, where n from 1 to NOP: *<numeric n>* power correction value of the n−th point;
Target	Port *<Pt>* of channel *<Ch>*, *<Ch>*={[1]|2|...16} *<Pt>*={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA
Query Response	*<numeric 1>*, *<numeric 2>*, ...*<numeric 4N+1>*
Notes	If the array size is not 1 + 2N, where N is equal to *<numeric 1>*, an error occurs. If the *<numeric 2n>* and *<numeric 2n+1>* values are out of the allowable range, the value of the limit, which is closer to the specified value will be set.
Related Commands	SOUR:POW:PORT:CORR:COLL
Equivalent Softkeys	**None**

SOUR:POW:PORT:COUP

SOURce<*Ch*>:POWer:PORT:COUPle {OFF|ON|0|1}

SOURce<*Ch*>:POWer:PORT:COUPle?

Description	Turns ON/OFF the port power couple. Setting the port power couple to OFF allows independent power level setting for each port. (command/query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	1
Equivalent Softkeys	**Stimulus > Power > Port Couple [ON| OFF]**

SOUR:POW:SLOP

SOURce*<Ch>*:POWer[:LEVel]:SLOPe[:DATA] *<numeric>*

SOURce*<Ch>*:POWer[:LEVel]:SLOPe[:DATA]?

Description	Sets or reads out the power slope value for the frequency sweep type. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<numeric>*** the power slope value from −2 to +2
Unit	dB/GHz (decibel/gigahertz)
Resolution	0.1
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**Stimulus > Power > Slope**

SOUR:POW:SLOP:STAT

SOURce<*Ch*>:POWer[:LEVel]:SLOPe:STATe {OFF|ON|0|1}

SOURce<*Ch*>:POWer[:LEVel]:SLOPe:STATe?

Description	Turns ON/OFF the power slope. The power slope is valid for the frequency sweep type: Linear, Logarithimic, Segment. (command/query)
Target	Channel <*Ch*>, <*Ch*>={[1]|2|...16}
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Stimulus > Power > Slope [ON| OFF]**

SOUR:POW:SPAN

SOURce*<Ch>*:POWer:SPAN *<power>*

SOURce*<Ch>*:POWer:SPAN?

Description	Sets or reads out the power span when the power sweep type is active. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<power>*** the power sweep span value from 0 to maximum limit of the analyzer
Unit	dBm (decibels above 1 milliwatt)
Resolution	0.05 dBm
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	Depends on the analyzer
Equivalent Softkeys	**Stimulus > Span**

SOUR:POW:STAR

SOURce*<Ch>*:POWer:STARt *<power>*

SOURce*<Ch>*:POWer:STARt?

Description	Sets or reads out the power sweep start value when the power sweep type is active. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<power>*** the power sweep start value within the power limits of the analyzer
Unit	dBm (decibels above 1 milliwatt)
Resolution	0.05 dBm
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	Depends on the analyzer
Equivalent Softkeys	**Stimulus > Start**

SOUR:POW:STOP

SOURce*<Ch>*:POWer:STOP *<power>*

SOURce*<Ch>*:POWer:STOP?

Description	Sets or reads out the power sweep stop value when the power sweep type is active. (command/query)
Target	Channel *<Ch>*, `<Ch>={[1]|2|...16}`
Parameter	***<power>*** the power sweep stop value within the power limits of the analyzer
Unit	dBm (decibels above 1 milliwatt)
Resolution	0.05 dBm
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	Depends on the analyzer
Equivalent Softkeys	**Stimulus > Stop**

STAT:OPER?

STATus:OPERation[:EVENt]?

Description	Reads out the value of the Operation Status Event Register. (query only)
Target	Status Reporting System
Query Response	*<numeric>*
Equivalent Softkeys	**None**

STAT:OPER:COND?

STATus:OPERation:CONDition?

Description	Reads out the value of the Operation Status Condition Register. (query only)
Target	Status Reporting System
Query Response	*<numeric>*
Equivalent Softkeys	**None**

STAT:OPER:ENAB

STATus:OPERation:ENABle *<numeric>*

STATus:OPERation:ENABle?

Description	Sets or reads out the value of the Operation Status Enable Register. (command/query)
Target	Status Reporting System
Parameter	***<numeric>*** from 0 to 65535
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**None**

STAT:OPER:NTR

STATus:OPERation:NTRansition *<numeric>*

STATus:OPERation:NTRansition?

Description	Sets or reads out the value of the Negative transition filter of the Operation Status Register. (command/query)
Target	Status Reporting System
Parameter	*<numeric>* from 0 to 65535
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**None**

STAT:OPER:PTR

STATus:OPERation:PTRansition *<numeric>*

STATus:OPERation:PTRansition?

Description	Sets or reads out the value of the Positive transition filter of the Operation Status Register. (command/query)
Target	Status Reporting System
Parameter	*<numeric>* from 0 to 65535
Query Response	*<numeric>*
Preset Value	65535
Equivalent Softkeys	**None**

STAT:PRES

STATus:PRESet

Description	Resets all the status registers to the factory settings. (no query)
Target	Status Reporting System
Query Response	*<numeric>*
Equivalent Softkeys	**None**

STAT:QUES:COND?

STATus:QUEStionable:CONDition?

Description	Reads out the value of the Questionable Status Condition Register. (query only)
Target	Status Reporting System
Query Response	*<numeric>*
Equivalent Softkeys	**None**

STAT:QUES:ENAB

STATus:QUEStionable:ENABle *<numeric>*

STATus:QUEStionable:ENABle?

Description	Sets or reads out the value of the Questionable Status Enable Register. (command/query)
Target	Status Reporting System
Parameter	***<numeric>*** from 0 to 65535
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**None**

STAT:QUES:LIM:CHAN:COND?

STATus:QUEStionable:LIMit:CHANnel*<Ch>*:CONDition?

Description	Reads out the value of the Questionable Limit Channel Status Condition Register. (query only)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Query Response	*<numeric>*
Equivalent Softkeys	**None**

STAT:QUES:LIM:CHAN:ENAB

STATus:QUEStionable:LIMit:CHANnel*<Ch>*:ENABle *<numeric>*

STATus:QUEStionable:LIMit:CHANnel*<Ch>*:ENABle?

Description	Sets or reads out the value of the Questionable Limit Channel Status Enable Register. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	*<**numeric**>* from 0 to 65535
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**None**

STAT:QUES:LIM:CHAN:NTR

STATus:QUEStionable:LIMit:CHANnel*<Ch>*:NTRansition *<numeric>*

STATus:QUEStionable:LIMit:CHANnel*<Ch>*:NTRansition?

Description	Sets or reads out the value of the Negative transition filter of the Questionable Limit Channel Status Register. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	*<**numeric**>* from 0 to 65535
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**None**

STAT:QUES:LIM:CHAN:PTR

STATus:QUEStionable:LIMit:CHANnel*<Ch>*:PTRansition *<numeric>*

STATus:QUEStionable:LIMit:CHANnel*<Ch>*:PTRansition?

Description	Sets or reads out the value of the Positive transition filter of the Questionable Limit Channel Status Register. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<numeric>*** from 0 to 65535
Query Response	*<numeric>*
Preset Value	65535
Equivalent Softkeys	**None**

STAT:QUES:LIM:CHAN?

STATus:QUEStionable:LIMit:CHANnel*<Ch>*[:EVENt]?

Description	Reads out the value of the Questionable Limit Channel Status Event Register. (query only)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Query Response	*<numeric>*
Equivalent Softkeys	**None**

STAT:QUES:LIM:COND?

STATus:QUEStionable:LIMit:CONDition?

Description	Reads out the value of the Questionable Limit Status Condition Register. (query only)
Target	Status Reporting System
Query Response	*<numeric>*
Equivalent Softkeys	**None**

STAT:QUES:LIM:ENAB

STATus:QUEStionable:LIMit:ENABle *<numeric>*

STATus:QUEStionable:LIMit:ENABle?

Description	Sets or reads out the value of the Questionable Limit Status Enable Register. (command/query)
Target	Status Reporting System
Parameter	***<numeric>*** from 0 to 65535
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**None**

STAT:QUES:LIM:NTR

STATus:QUEStionable:LIMit:NTRansition *<numeric>*

STATus:QUEStionable:LIMit:NTRansition?

Description	Sets or reads out the value of the Negative transition filter of the Questionable Limit Status Register. (command/query)
Target	Status Reporting System
Parameter	<**numeric**> from 0 to 65535
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**None**

STAT:QUES:LIM:PTR

STATus:QUEStionable:LIMit:PTRansition *<numeric>*

STATus:QUEStionable:LIMit:PTRansition?

Description	Sets or reads out the value of the Positive transition filter of the Questionable Limit Status Register. (command/query)
Target	Status Reporting System
Parameter	<**numeric**> from 0 to 65535
Query Response	*<numeric>*
Preset Value	65535
Equivalent Softkeys	**None**

STAT:QUES:LIM?

STATus:QUEStionable:LIMit[:EVENt]?

Description	Reads out the value of the Questionable Limit Status Event Register. (query only)
Target	Status Reporting System
Query Response	*<numeric>*
Equivalent Softkeys	**None**

STAT:QUES:NTR

STATus:QUEStionable:NTRansition *<numeric>*

STATus:QUEStionable:NTRansition?

Description	Sets or reads out the value of the Negative transition filter of the Questionable Status Register. (command/query)
Target	Status Reporting System
Parameter	<**numeric**> from 0 to 65535
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**None**

STAT:QUES:PTR

STATus:QUEStionable:PTRansition *<numeric>*

STATus:QUEStionable:PTRansition?

Description	Sets or reads out the value of the Positive transition filter of the Questionable Status Register. (command/query)
Target	Status Reporting System
Parameter	***<numeric>*** from 0 to 65535
Query Response	*<numeric>*
Preset Value	65535
Equivalent Softkeys	**None**

STAT:QUES:RLIM:CHAN:COND?

STATus:QUEStionable:RLIMit:CHANnel*<Ch>*:CONDition?

Description	Reads out the value of the Questionable Ripple Limit Channel Status Condition Register. (query only)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Query Response	*<numeric>*
Equivalent Softkeys	**None**

STAT:QUES:RLIM:CHAN:ENAB

STATus:QUEStionable:RLIMit:CHANnel*<Ch>*:ENABle *<numeric>*

STATus:QUEStionable:RLIMit:CHANnel*<Ch>*:ENABle?

Description	Sets or reads out the value of the Questionable Ripple Limit Channel Status Enable Register. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<numeric>*** from 0 to 65535
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**None**

STAT:QUES:RLIM:CHAN:NTR

STATus:QUEStionable:RLIMit:CHANnel*<Ch>*:NTRansition *<numeric>*

STATus:QUEStionable:RLIMit:CHANnel*<Ch>*:NTRansition?

Description	Sets or reads out the value of the Negative transition filter of the Questionable Ripple Limit Channel Status Register. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<numeric>*** from 0 to 65535
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**None**

STAT:QUES:RLIM:CHAN:PTR

STATus:QUEStionable:RLIMit:CHANnel*<Ch>*:PTRansition *<numeric>*

STATus:QUEStionable:RLIMit:CHANnel*<Ch>*:PTRansition?

Description	Sets or reads out the value of the Positive transition filter of the Questionable Ripple Limit Channel Status Register. (command/query)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Parameter	***<numeric>*** from 0 to 65535
Query Response	*<numeric>*
Preset Value	65535
Equivalent Softkeys	**None**

STAT:QUES:RLIM:CHAN?

STATus:QUEStionable:RLIMit:CHANnel*<Ch>*[:EVENt]?

Description	Reads out the value of the Questionable Ripple Limit Channel Status Event Register. (query only)
Target	Channel *<Ch>*, *<Ch>*={[1]|2|...16}
Query Response	*<numeric>*
Equivalent Softkeys	**None**

STAT:QUES:RLIM:COND?

STATus:QUEStionable:RLIMit:CONDition?

Description	Reads out the value of the Questionable Ripple Limit Status Condition Register. (query only)
Target	Status Reporting System
Query Response	*<numeric>*
Equivalent Softkeys	**None**

STAT:QUES:RLIM:ENAB

STATus:QUEStionable:RLIMit:ENABle *<numeric>*

STATus:QUEStionable:RLIMit:ENABle?

Description	Sets or reads out the value of the Questionable Ripple Limit Status Enable Register. (command/query)
Target	Status Reporting System
Parameter	***<numeric>*** from 0 to 65535
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**None**

STAT:QUES:RLIM:NTR

STATus:QUEStionable:RLIMit:NTRansition *<numeric>*

STATus:QUEStionable:RLIMit:NTRansition?

Description	Sets or reads out the value of the Negative transition filter of the Questionable Ripple Limit Status Register. (command/query)
Target	Status Reporting System
Parameter	<***numeric***> from 0 to 65535
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**None**

STAT:QUES:RLIM:PTR

STATus:QUEStionable:RLIMit:PTRansition *<numeric>*

STATus:QUEStionable:RLIMit:PTRansition?

Description	Sets or reads out the value of the Positive transition filter of the Questionable Ripple Limit Status Register. (command/query)
Target	Status Reporting System
Parameter	<***numeric***> from 0 to 65535
Query Response	*<numeric>*
Preset Value	65535
Equivalent Softkeys	**None**

STAT:QUES:RLIM?

STATus:QUEStionable:RLIMit[:EVENt]?

Description	Reads out the value of the Questionable Ripple Limit Status Event Register. (query only)
Target	Status Reporting System
Query Response	*<numeric>*
Equivalent Softkeys	**None**

STAT:QUES?

STATus:QUEStionable[:EVENt]?

Description	Reads out the value of the Questionable Status Event Register. (query only)
Target	Status Reporting System
Query Response	*<numeric>*
Equivalent Softkeys	**None**

SYST:BEEP:COMP:IMM

SYSTem:BEEPer:COMPlete:IMMediate

Description	Generates a beep to notify of the completion of the operation. (no query)
Equivalent Softkeys	**System > Misc Setup > Beeper > Test Beep Complete**

SYST:BEEP:COMP:STAT

SYSTem:BEEPer:COMPlete:STATe {OFF|ON|0|1}

SYSTem:BEEPer:COMPlete:STATe?

Description	Turns ON/OFF the beeper notifying of the completion of the operation. (command/query)
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	1
Equivalent Softkeys	**System > Misc Setup > Beeper > Beep complete**

SYST:BEEP:WARN:IMM

SYSTem:BEEPer:WARNing:IMMediate

Description	Generates a beep to notify of warning. (no query)
Equivalent Softkeys	**System > Misc Setup > Beeper > Test Beep Warning**

SYST:BEEP:WARN:STAT

SYSTem:BEEPer:WARNing:STATe {OFF|ON|0|1}

SYSTem:BEEPer:WARNing:STATe?

Description	Turns ON/OFF the beeper notifying of warning. (command/query)
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	1
Equivalent Softkeys	**System > Misc Setup > Beeper > Beep Warning**

SYST:COMM:ECAL:TEMP:SENS?

SYSTem:COMMunicate:ECAL:TEMPerature:SENSor?

Description	Reads out the temperature of the AutoCal module connected to the Analyzer. (query only)
Target	AutoCal module
Unit	°C
Query Response	*<numeric>*
Equivalent Softkeys	**None**

SYST:COMM:ECAL:IMP

SYSTem:COMMunicate:ECAL:IMPedance *<port>*, *<char>*

SYSTem:COMMunicate:ECAL:IMPedance? *<port>*

Description	Sets or reads out the impedance state of the specified port of AutoCal module. (command/query)
Parameters	*<port>* : Port number of the AutoCal module *<char>* Specifies the math operation: **OPEN** : OPEN impedance state **SHORt** : SHORT impedance state **LOAD** : LOAD impedance state **LOAD2** : LOAD2 impedance state **OPEN2** : OPEN2 impedance state
Query Response	{OPEN|SHOR|LOAD|THRU|LOAD2|OPEN2 }
Preset Value	LOAD
Equivalent Softkeys	**None**

SYST:COMM:ECAL:THRU

SYSTem:COMMunicate:ECAL:THRU *<port1>*, *<port2>*

Description	Sets the THRU state between the specified 2 ports of AutoCal module (command only).
Parameters	***<port1>*** : the first port number of the AutoCal module ***<port2>*** : the second port number of the AutoCal module
Equivalent Softkeys	**None**

SYST:COMM:ECAL:CHEC

SYSTem:COMMunicate:ECAL:CHECk

Description	Sets the CHECK state of AutoCal module (command only).
Equivalent Softkeys	**None**

SYST:CORR

SYSTem:CORRection[:STATe] {OFF|ON|0|1}

SYSTem:CORRection[:STATe]?

Description	Turns ON/OFF the system correction. The system correction is the factory full 1-port calibration performed at the port connectors. (command/query)
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	1
Equivalent Softkeys	**System > Misc Setup > System Correction**

SYST:CYCL:TIME:MEAS?

SYSTem:CYCLe:TIME:MEASurement?

Description	Reads out the measured cycle time. The cycle time is the interval between the start of two adjacent sweeps. The cycle time is averaged by an exponential window with a time constant of about 0.5 sec. If the cycle time is changed more than 100 usec in comparison with the averaged time, the averaging starts anew. (query only)
Target	Analyzer
Unit	second
Query Response	*<numeric>*
Equivalent Softkeys	**Display > Properies > Cycle Time**

SYST:DATE

SYSTem:DATE *<numeric 1>*, *<numeric 2>*, *<numeric 3>*

SYSTem:DATE?

Description	Sets or reads out the current date. (command/query)
Parameter	<**numeric** 1> year from 1900 to 2100; <**numeric** 2> month from 1 to 12; <**numeric** 3> day from 1 to 31.
Query Response	*<numeric 1>*, *<numeric 2>*, *<numeric 3>*
Equivalent Softkeys	**None**

SYST:ERR?

SYSTem:ERRor[:NEXT]?

Description	Reads out the error message of the error occurred when executing the SCPI commands, from the FIFO (First In First Out) error queue stored in the Analyzer. The read out error is deleted from the error queue. The *CLS command clears the error queue. The maximum size of the queue is 100 messages. (query only)
Query Response	*<numeric>*, *<string>* Where: *<numeric>* error code *<string>* error message If there is no error in the queue, "0, No error" is read out.
Equivalent Softkeys	**None**

SYST:FREQ:EXT:RFP:POW

SYSTem:FREQuency:EXTender:RFPort:POWer *<numeric>*

SYSTem:FREQuency:EXTender:RFPort:POWer?

Description	Sets or reads out the RF Port Power when analyzer is configured to work with a frequency extender. (command/query)
Parameter	<***numeric***> the power value.
Unit	dBm (decibel relative to 1 milliwatt)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**System > Misc Setup > Frequency Extender > RF Port Power**

SYST:FREQ:EXT:RFP:PSL

SYSTem:FREQuency:EXTender:RFPort:PSLope *<numeric>*

SYSTem:FREQuency:EXTender:RFPort:PSLope?

Description	Sets or reads out the RF Port Power Slope when analyzer is configured to work with a frequency extender. (command/query)
Parameter	*<**numeric**>* the slope value.
Unit	dB/GHz (decibel / gigahertz)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**System > Misc Setup > Frequency Extender > RF Power Slope**

SYST:FREQ:EXT:LOP:POW

SYSTem:FREQuency:EXTender:LOPort:POWer *<numeric>*

SYSTem:FREQuency:EXTender:LOPort:POWer?

Description	Sets or reads out the LO Port Power when analyzer is configured to work with a frequency extender. (command/query)
Parameter	***<numeric>*** the power value.
Unit	dBm (decibel relative to 1 milliwatt)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**System > Misc Setup > Frequency Extender > LO Port Power**

SYST:FREQ:EXT:LOP:PSL

SYSTem:FREQuency:EXTender:LOPort:PSLope *<numeric>*

SYSTem:FREQuency:EXTender:LOPort:PSLope?

Description	Sets or reads out the LO Port Power Slope when analyzer is configured to work with a frequency extender. (command/query)
Parameter	*<**numeric**>* the slope value.
Unit	dB/GHz (decibel / gigahertz)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	0
Equivalent Softkeys	**System > Misc Setup > Frequency Extender > LO Power Slope**

SYST:FREQ:EXT:TYPE

SYSTem:FREQuency:EXTender:TYPE *<char>*

SYSTem:FREQuency:EXTender:TYPE?

Description	Selects or reads the frequency extender type. When the new type is selected the connection has been closed because of the program restart. (command/query)
Parameter	*<char>* Choose from: **NONE** : None **FEV15** : FEV-15 50 – 75 GHz **FEV12** : FEV-15 60 – 90 GHz **FEV10** : FEV-15 75 – 110 GHz **FET1854** : FET-1854 18 – 54 GHz **CUSTom** : Custom
Query Response	{NONE|FEV15|FEV12|FEV10|FET1854|CUST}
Preset Value	NONE
Equivalent Softkeys	**System > Misc Setup > Frequency Extender > { None | FEV15 | FEV12 | FEV10 | FET1854 | Custom }**

SYST:FREQ:EXT:PORT:CONN?

SYSTem:FREQuency:EXTender:PORT<*Pt*>:CONNect?

Description	Reads out whether the frequency extender is connected to the port number <Pt>. The actual state is read out when the FET-1854 is configured. Always reads 1 when other type of frequency extender is configured. (query only)
Target	Port <*Pt*>, `<Pt>={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA`
Query Response	**1** : Connected **0** : Not connected
Equivalent Softkeys	**None**

SYST:FREQ:EXT:PORT:SER?

SYSTem:FREQuency:EXTender:PORT<*Pt*>:SERial?

Description	Reads out whether the serial number of the frequency extender connected to the port number <Pt>. The actual serial number is read out when the FET-1854 is configured. Always reads "00000000" when other type of frequency extender is configured. (query only)
Target	Port <*Pt*>, `<Pt>={[1]|2} for S2VNA or {[1]|2|3|4} for S4VNA`
Query Response	<*String*> of 8 symbols
Equivalent Softkeys	**None**

SYST:LOC

SYSTem:LOCal

Description	Sets the Analyzer to the local operation mode, when all the keys on the front panel, mouse and the touch screen are active. (no query)
Related Commands	SYST:REM SYST:RWL
Equivalent Softkeys	**None**

SYST:PORT:SWIT:DEL

SYSTem:PORT:SWITchover:DELay[:STATe] {OFF|ON|0|1}

SYSTem:PORT:SWITchover:DELay[:STATe]?

Description	Turns ON/OFF the port switchover delay. The port switchover delay from 0 to 10 ms (depending on the analyzer model) occurs when the stimulus port number is changing. (command/query)
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	1
Equivalent Softkeys	**System > Misc Setup > Port Switchover Delay { On | OFF }**

SYST:PRES

SYSTem:PRESet

Description	Resets the Analyzer to the factory settings. (no query)
Notes	The difference from the*RST: command is that the trigger is set to the *Continuous* trigger mode.
Related Commands	*RST
Equivalent Softkeys	**System > Preset > OK**

SYST:READy?

SYSTem:READy[:STATe]?

Description	Reads out the ready state of the Analyzer. The state is *True* when analyzer hardware is connected, powered and the boot process is completed (about 10 sec). (query only)
Query Response	{0|1}
Equivalent Softkeys	**None**

SYST:REM

SYSTem:REMote

Description	Sets the Analyzer to the remote operation mode, when all the keys on the front panel, mouse and the touch screen are not active, except for one key labeled **Return to Local**. Pushing this button will reset the Analyzer to the local operation mode. (no query)
Related Commands	SYST:LOC SYST:RWL
Equivalent Softkeys	**None**

SYST:RWL

SYSTem:RWLock

Description	Sets the Analyzer to the remote operation mode, when all the keys on the front panel, mouse and the touch screen are not active. Only SYST:LOC or SYST:REM command can release this remote operation mode. (no query)
Related Commands	SYST:LOC SYST:REM
Equivalent Softkeys	**None**

SYST:HIDE

SYSTem:SHOW

Description	Minimizes the analyzer main window removing it from desktop. (no query)
Related Commands	SYST:SHOW
Equivalent Softkeys	**None**

SYST:SHOW

SYSTem:SHOW

Description	Restores the analyzer main window hidden by the SCPI.SYSTem.HIDE command. (no query)
Related Commands	SYST:HIDE
Equivalent Softkeys	**None**

SYST:TEMP:SENS?

SYSTem:TEMPerature:SENSor? *<numeric>*

Description	Reads out the specified sensor temperature inside the Analyzer. (query only)
Target	Analyzer
Parameters	***<numeric>*** : Sensor number
Unit	°C
Query Response	*<numeric>*
Equivalent Softkeys	**None**

SYST:TIME

SYSTem:TIME *<numeric 1>*,*<numeric 2>*,*<numeric 3>*

SYSTem:TIME?

Description	Sets or reads out the current time. (command/query)
Parameter	***<numeric 1>*** hours from 0 to 23; ***<numeric 2>*** minutes from 0 to 59; ***<numeric 3>*** seconds from 0 to 59.
Query Response	*<numeric 1>*, *<numeric 2>*, *<numeric 3>*
Equivalent Softkeys	**None**

SYST:TERM

SYSTem:TERMinate

Description	Terminates the analyzer software. (no query)
Equivalent Softkeys	**None**

TRIG

TRIGger[:SEQuence][:IMMediate]

Description	Generates a trigger signal and initiates a sweep under the following conditions. 8. Trigger source is set to the *BUS* (set by the command TRIG:SOUR BUS), otherwise an error occurs and the command is ignored. 9. Analyzer must be in the *trigger waiting* state, otherwise (the analyzer is in the *measurement* state or in the *hold* state) an error occurs and the command is ignored. The command is completed immediately after the generation of the trigger signal (does not wait the end of a sweep). (no query)
Related Commands	TRIG:SOUR BUS
Equivalent Softkeys	**None**

TRIG:AVER

TRIGger[:SEQuence]:AVERage {OFF|ON|0|1}

TRIGger[:SEQuence]:AVERage?

Description	Turns ON/OFF the averaging trigger function. The function executes a sweep the number of times specified by the averaging factor with a single trigger for the channels with the averaging enabled. The averaging process begins again with each trigger. Note: The point trigger function has priority against this command. When the point trigger is enabled the number of pulses equal to (number of points) x (averaging factor) is needed to complete the averaging. (command/query)
Parameter	Specifies the averaging trigger function state: **{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Related Commands	SENS:AVER
Equivalent Softkeys	**Average > Avg Trigger { ON | OFF }**

TRIG:EXT:DEL

TRIGger[:SEQuence]:EXTernal:DELay *<time>*

TRIGger[:SEQuence]:EXTernal:DELay?

Description	Sets or reads out the response delay with respect to the external trigger signal. (command/query)
Parameter	***<time>*** the delay value from 0 to 100 sec.
Unit	s (second)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	*<numeric>*
Preset Value	0
Related Commands	TRIG:SOUR EXT
Equivalent Softkeys	**Stimulus > Trigger > Ext Trig > Delay**

TRIG:EXT:SLOP

TRIGger[:SEQuence]:EXTernal:SLOPe *<char>*

TRIGger[:SEQuence]:EXTernal:SLOPe?

Description	Sets or reads out the polarity of the external trigger. (command/query)
Parameter	*<char>* Choose from: **POSitive** : Positive edge **NEGative** : Negative edge
Query Response	{POS|NEG}
Preset Value	NEG
Related Commands	TRIG:SOUR
Equivalent Softkeys	**Stimulus > Trigger > Ext Trig Polarity > { Negative edge | Positive edge }**

TRIG:EXT:POS

TRIGger[:SEQuence]:EXTernal:POSition *<char>*

TRIGger[:SEQuence]:EXTernal:POSition?

Description	Selects the position of the external trigger. The Analyzer waits for external trigger: • Before sampling, when the frequency of the stimulus port have been set. • Before the frequency setup and subsequent measurement. The frequency change of the stimulus port begins when the external trigger arrives. Depending on the command TRIG:SEQ:POIN the external trigger wait occurs before each point or before the first point of the full sweep cycle. (command/query)
Parameter	*<char>* Choose from: **BSAM** : Before sampling **BSET** : Before frequency setup
Query Response	{BSAM|BSET}
Preset Value	BSAM
Related Commands	TRIG:SOUR
Equivalent Softkeys	**Stimulus > Trigger > Ext Trig > Position > { Before sampling | Before setup }**

TRIG:OUTP:FUNC

TRIGger:OUTPut:FUNCtion *<char>*

TRIGger:OUTPut:FUNCtion?

Description	Selects the trigger output function. The trigger output outputs various waveforms depending on the setting of the Output Trigger Function (see the operating manual). (command/query)
Parameter	*<char>* Choose from: **BSET** : Before frequency setup pulse **BSAM** : Before sampling pulse **ASAM** : After sampling pulse **RTRG** : Ready for trigger signal **ESWP** : End of sweep pulse **MEAS** : Measurement sweep signal
Query Response	{BSET|BSAM|ASAM|RTGR|ESWP|MEAS}
Preset Value	RTRG
Related Commands	TRIG:OUTP:STAT
Equivalent Softkeys	**Stimulus > Trigger > Trigger Output > Function > { Before setup | Before sampling | After sampling | Ready for trigger | Sweep End | Measurement }**

TRIG:OUTP:POL

TRIGger:OUTPut:POLarity *<char>*

TRIGger:OUTPut:POLarity?

Description	Sets or reads out the polarity of the trigger output. (command/query)
Parameter	*<char>* Choose from: **POSitive** : Positive edge **NEGative** : Negative edge
Query Response	{POS|NEG}
Preset Value	NEG
Related Commands	TRIG:OUTP:FUNC
Equivalent Softkeys	**Stimulus > Trigger > Trigger Output > Polarity > { Negative edge | Positive edge }**

TRIG:OUTP:STAT

TRIGger:OUTPut:STATe {OFF|ON|0|1}

TRIGger:OUTPut:STATe?

Description	Turns ON/OFF the trigger output. (command/query)
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Related Commands	TRIG:OUTP:FUNC
Equivalent Softkeys	**Stimulus > Trigger > Trigger Output > Trigger Output { ON | OFF }**

TRIG:POIN

TRIGger[:SEQuence]:POINt {OFF|ON|0|1}

TRIGger[:SEQuence]:POINt?

Description	Turns ON/OFF the point trigger feature. When the point trigger is turned ON, the external trigger response is the single point. When the point trigger feature is turned OFF, the external trigger response is the entire sweep. (command/query)
Parameter	**{ON|1}** : ON **{OFF|0}** : OFF
Query Response	{0|1}
Preset Value	0
Related Commands	TRIG:SOUR
Equivalent Softkeys	**Stimulus > Trigger > Ext Trig Event > { On Sweep | On Point }**

TRIG:SING

TRIGger[:SEQuence]:SINGle

Description	Generates a trigger signal and initiates a sweep under the following conditions. 10. Trigger source is set to the *BUS* (set by the command TRIG:SOUR BUS), otherwise an error occurs and the command is ignored. 11. Analyzer must be in the *trigger waiting* state, otherwise (the analyzer is in the *measurement* state or in the *hold* state) an error occurs and the command is ignored. As opposed to the TRIG command this command is pending till the end of the sweep. The end of the sweep initiated by the TRIG:SING command can be waited using the *OPC? query. (no query)
Related Commands	TRIG:SOUR *OPC?
Equivalent Softkeys	**None**

TRIG:SCOP

TRIGger[:SEQuence]:SCOPe *<char>*

TRIGger[:SEQuence]:SCOPe?

Description	Sets or reads out the trigger scope. The trigger scope determines the response on the trigger signal arrival: either starts a sweep of all waiting channels in turn or starts a sweep in the active channel only. (command/query)
Parameter	*<char>* Choose from: **ALL** : All channels **ACTive** : Active channel
Query Response	{ALL|ACT}
Preset Value	ALL
Related Commands	TRIG TRIG:SING *TRG
Equivalent Softkeys	**Stimulus > Trigger > Trigger Scope > { All Channels | Active Channel }**

TRIG:SOUR

TRIGger[:SEQuence]:SOURce *<char>*

TRIGger[:SEQuence]:SOURce?

Description	Selects the trigger source (see options below). If the the *continuous trigger initiation* mode is enabled with the command INIT:CONT ON, the **INTernal** choice leads to continuous sweep. The choice of **another** option switches the analyzer to the *trigger waiting state* from the corresponding source. If the the *continuous trigger initiation* mode is disabled with the command INIT:CONT OFF, the reaction to INIT command is different. Selecting **INTernal** leads to a single sweep in response to the command INIT, selection **another** option puts the analyzer in a *single trigger waiting* state in response to the INIT command. (command/query)
Parameter	*<char>* Choose from: **INTernal** : Internal **EXTernal** : External (hardware trigger input) **MANual** : Manual (user interface) **BUS** : Bus (program)
Query Response	{INT|EXT|MAN|BUS}
Preset Value	INT
Related Commands	INIT:CONT
Equivalent Softkeys	**Stimulus > Trigger > Trigger Source > { Internal | External | Manual | Bus }**

TRIG:STAT?

TRIGger[:SEQuence]:STATus?

Description	Reads out the the current state of the analyzer. (query only)
Query Response	**HOLD** : Hold **MEAS** : Measure (sweep in progress) **WAIT** : Waiting for trigger
Equivalent Softkeys	**None**

TRIG:WAIT

TRIGger[:SEQuence]:WAIT *<char>*

Description	Delays the execution by the **analyzer** of the next command till the specified state of the analyzer has been reached (see options below). A query that follows the TRIG:WAIT command blocks the execution of the user program till the specified state of the analyzer has been reached. The command can be used to wait for the end of the sweep initianed by the commands TRIG, *TRG or initiated by the external trigger signal. If the *continuous initiation mode* is turned ON by the command INIT:CONT ON, then the parameter of the command must be WAIT, otherwise HOLD. (no query)
Parameter	*<char>* Choose from: **HOLD** : Waits for the *Hold* state **MEASure** : Waits for the *Measure* state **WAIT** : Waits for the *Trigger Waiting* state
Related Commands	TRIG, *TRG TRIG:SOUR EXT
Equivalent Softkeys	**None**

5 Programming Tips

This section gives recommendations for programming in certain specific situations.

5.1 Program Sweep Initiation and Waiting

The program sweep initiation and waiting for its completion the most simple method can be implemented by using commands TRIG:SING and *OPC?.

The command TRIG:SING gerates a trigger signal and starts sweeping under the following conditions:

- The program trigger source is selected by command TRIG:SOUR BUS;
- The analyzer should be in the *trigger waiting* state, otherwise (the analyzer is sweeping or analyzer is in the *Hold* state) an error occurs and the command is ignored.

The transition of the analyzer to the *trigger waiting* state depends on the state of the *continuous initiation mode*, which is set by command INIT:CONT. Provided that the *continuous initiation mode* is ON, the analyzer automatically transits to the *trigger waiting* state when the program trigger source have been selected, and then each time at the end of a sweep. Provided that the *continuous initiation mode* is OFF, the analyzer transits to the *trigger waiting* state for **single** time upon receiving the command INIT.

The command TRIG:SING remains pending until the end of sweep. This allows use the *OPC? query for the waiting the end of sweep.

Example 1. Start sweeping in all channels and waits for its completion. The channels sweep one by one in turn. The *continuous initiation mode* is enabled by default.

TRIG:SOUR BUS	Selects the program trigger source and puts the analyzer to the *trigger waiting* state
<loop>:	
TRIG:SING	Starts sweep
*OPC?	Waits for the end of the sweep
…	

After the sweep completion the analyser returns to the *trigger waiting* state, and then the next sweep initiation command can be sended.

Example 2. Start sweeping in one channel and waits for its completion, then start sweeping in another channel and waits for its completion. The channel number must be set to 2.

TRIG:SOUR BUS	Selects the program trigger source
INIT1:CONT OFF	Puts channel 1 to the hold state
INIT2:CONT OFF	Puts channel 2 to the hold state
<loop>:	
INIT1	Puts channel 1 to the *trigger waiting* state
TRIG:SING	Starts sweep in channel 1
*OPC?	Waits for the end of the sweep
…	
INIT2	Puts channel 2 to the *trigger waiting* state
TRIG:SING	Starts sweep in channel 2
*OPC?	Waits for the end of the sweep
…	

After completion of the sweep on one channel the analyser returns to the *hold* state, then the sweep initiation for another channel is available.

5.2 External Trigger

If trigger source is set to the *External* by the command TRIG:SOUR EXT, the sweep starts at signal arrival on the external trigger input.

At the moment of a trigger signal arrival the Analyzer must be in the *trigger waiting* state, otherwise the signal is ignored but no error is detected.

As a rule the hardware trigger output is used to determine the end of the sweep. If there is a need to determine programmatically the end of the sweep, the TRIG:WAIT command can be used. Using program way to determine the end of the sweep requires the *continuous initiation mode* turned OFF.

Example 3. Starts sweep at the signal on the external trigger input. Programmatically waits for its completion. The *continuous initiation mode* must be turned OFF.

TRIG:SOUR EXT	Selects the external trigger source
INIT:CONT OFF	Puts channel 1 to the hold state
<loop>:	
INIT	Puts channel 1 to the *trigger waiting* state. The sweep starts at external trigger signal
TRIG:WAIT HOLD	Waits for the end of the sweep
*OPC?	Any query is required
…	

After completion of the sweep the analyser returns to the *hold* state, then the next sweep initiation is available.

5.3 Waiting for Calibration Commands

Depending on the sweep settings the calibration commands may have long execution time, as they start sweep and wait it completion. These commands are:

```
SENS:CORR:COLL:XXXX
SENS:CORR:OFFS:COLL:XXXX
SENS:CORR:REC:COLL:XXXX
SENS:CORR:COLL:ECAL:XXXX
SENS:CORR:COLL:ECAL:ORI:EXEC
```

The user program can determine the end of these command using any query, the *OPC? for example.

5.4 VISA Timeout Considerations

When using the query *OPC? for waiting an operation the VISA timeout value must be set to the value no less than the expected sweep time. For example in C/C++:

```
viSetAttribute(instr, VI_ATTR_TMO_VALUE, 5000);
```

5.5 Receiving Data Arrays in Text Form

By default the data from the analyzer is transmitted in a text form. The VISA library has built-in facilities for receiving an array of data from the analyzer. The example assumes that the size of the array is sufficient to receive a number of elements equal to twice the number of points.

An example of receiving a data array in C/C++:

```
double DataArray[1000];
ViUInt32 retCount;
...
retCount = sizeof(DataArray) / sizeof(double);
viQueryf(instr, "CALC:DATA:SDAT?\n", "%,#lf", &retCount, Data);
// retCount now contains the actual number of elements read
```

5.6 Receiving Data Arrays in Binary Form

The transfer of data from the analyzer in binary form reduces the amount of data transferred and the transmission time. The transfer of binary data is supported only by the HiSLIP protocol. To enable binary data transfer, use the FORM: DATA command. The list of commands that support the transfer of binary data is given in the description of the FORM: DATA command.

Binary data is transmitted as a block having a header followed by data. Block format:

#	**8**	**<Data Size>**	**<Binary Data>**

Where:

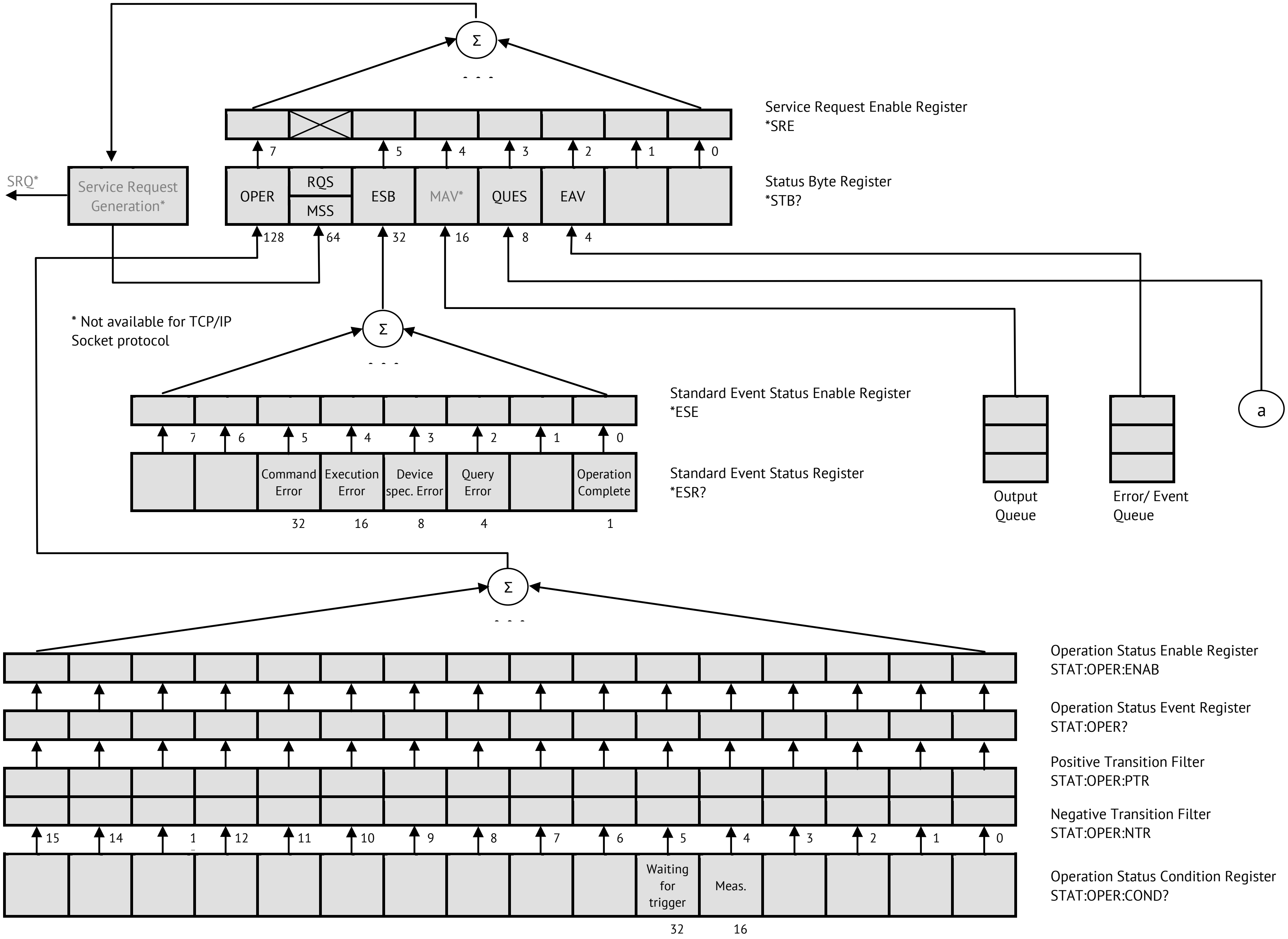
\# – the character '#';
8 – the character '8';
<Data Size> – 8 bytes, the symbolic representation of the number of bytes of binary data.

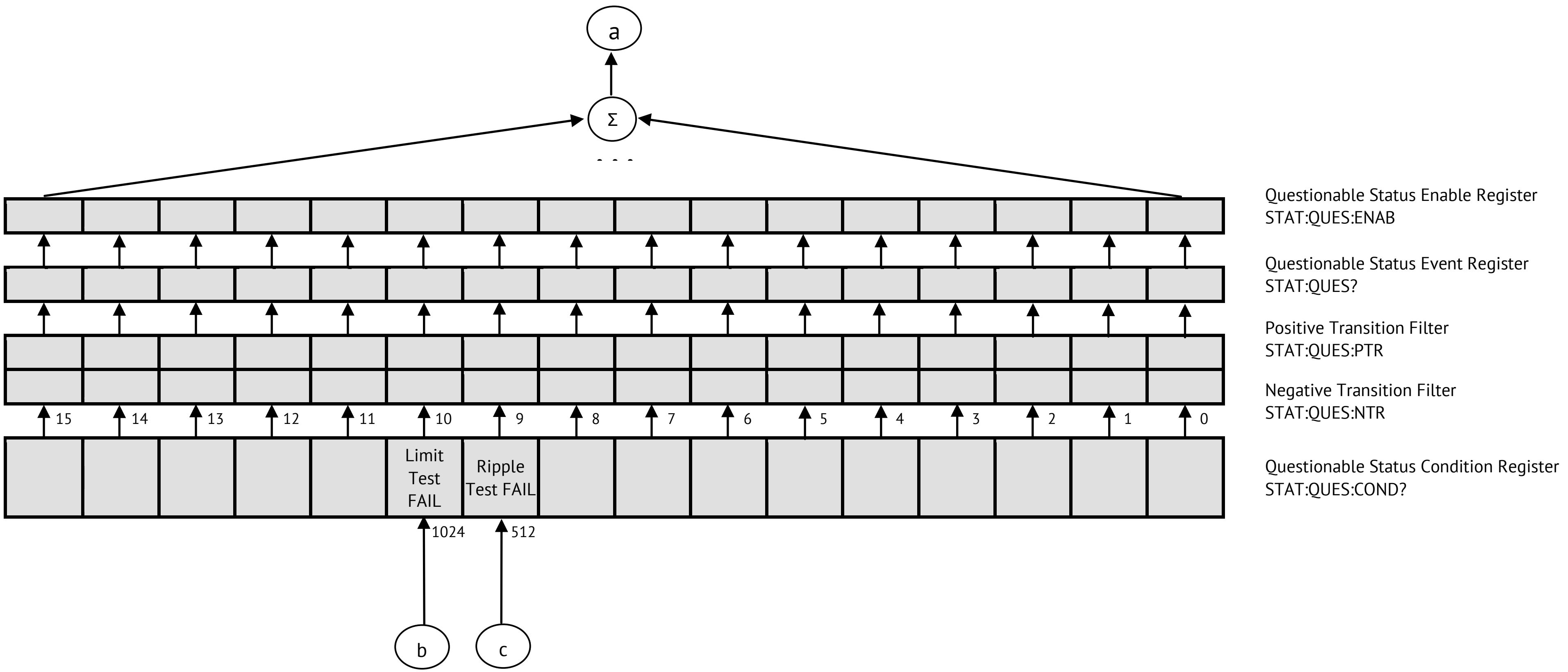
For example:
#800003216<Binary Data>

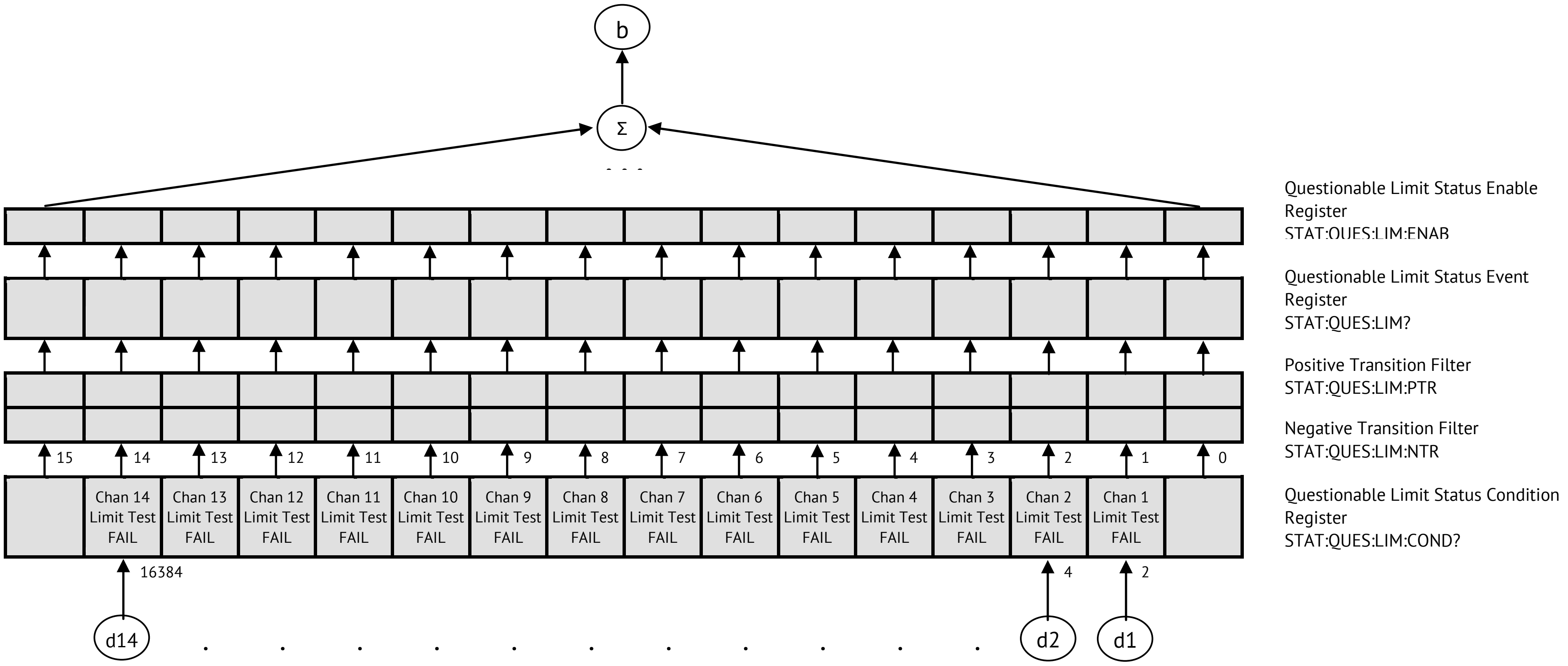
The VISA library has built-in tools for receiving binary data from the analyzer. The example assumes that the size of the array is sufficient to receive a number of elements equal to twice the number of points.

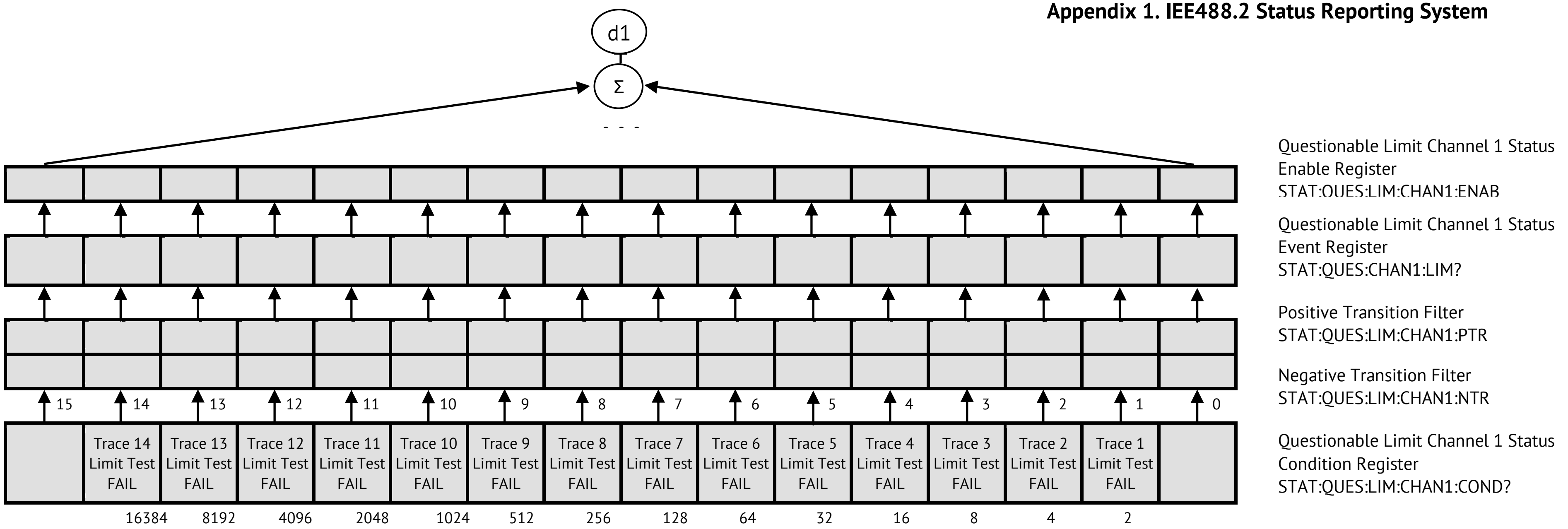
Example of receiving binary data array in C/C ++:

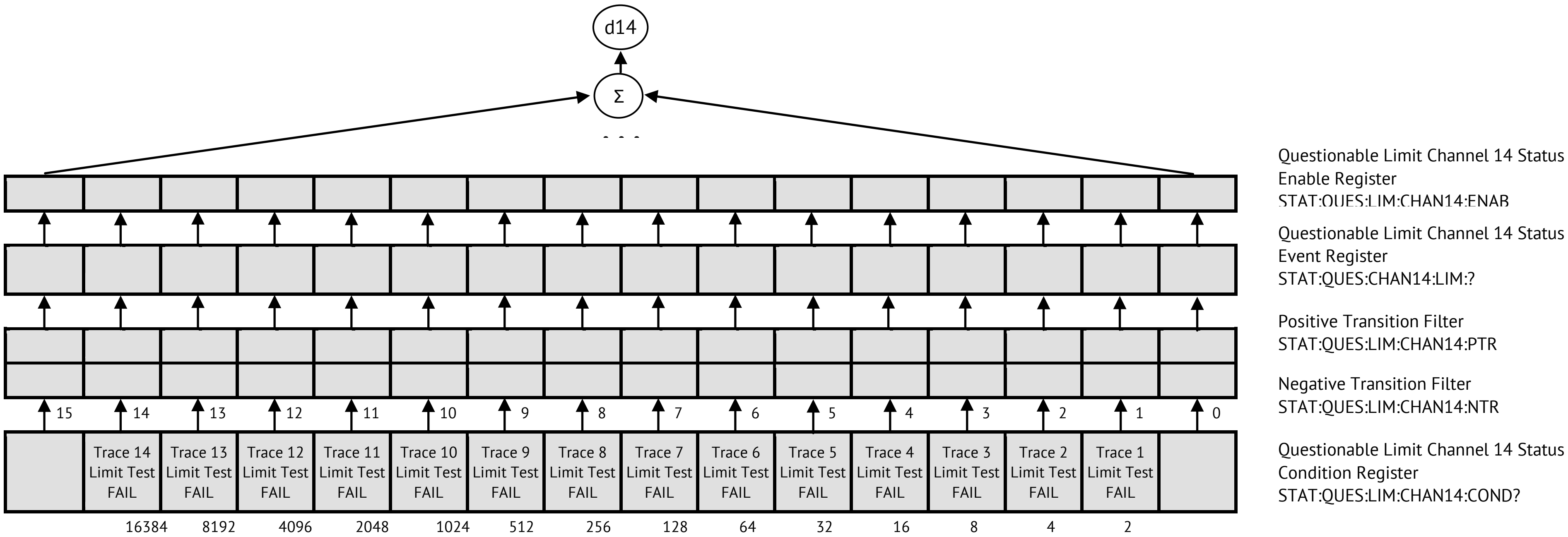
```
double DataArray[1000];
ViUInt32 retCount;
...
viPrintf(instr, "FORM:DATA REAL\n");
retCount = sizeof(DataArray) / sizeof(double);
viQueryf(instr, "CALC:DATA:FDAT?\n", "%#Zb", &retCount, DataArray);
// retCount now contains the actual number of elements read
```

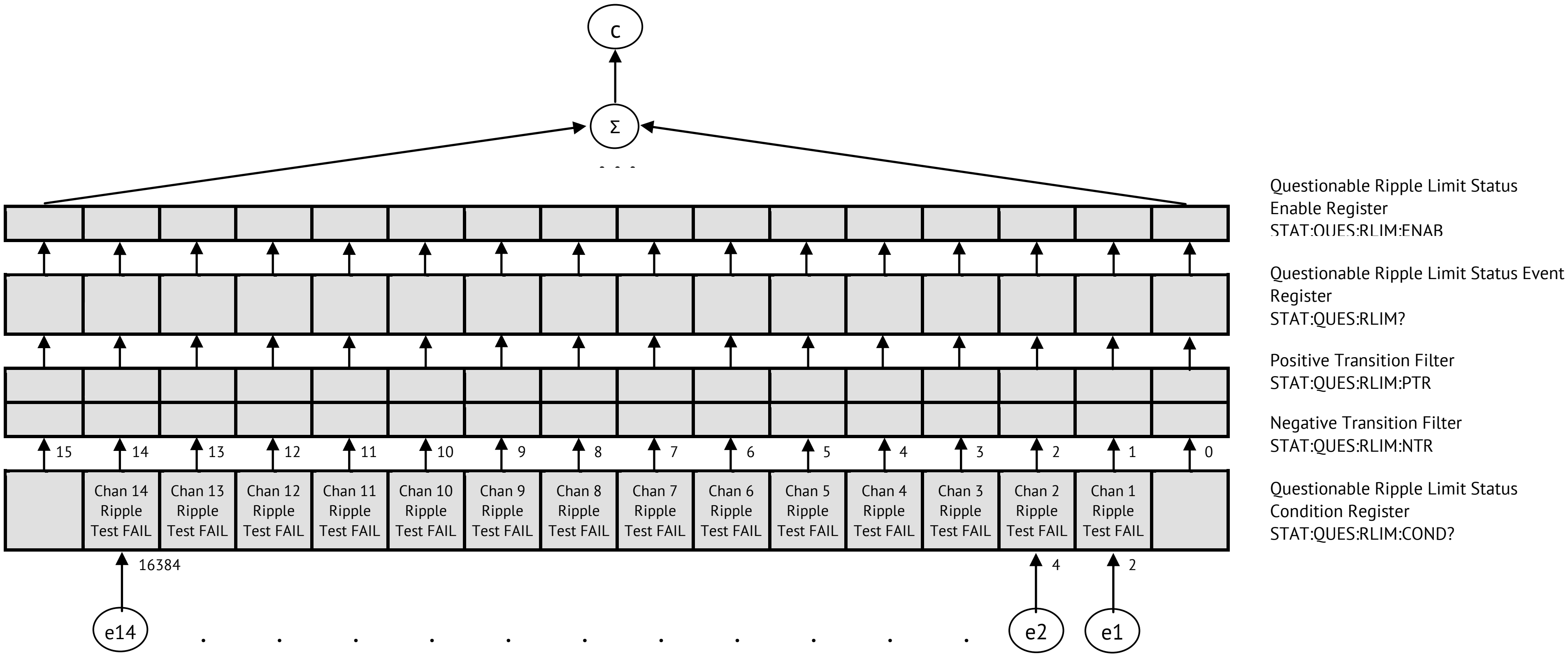

Σ
Service Request Enable Register
*SRE
7
5
4
3
2
1
0
SRQ*
Service Request
Generation*
OPER
RQS
MSS
ESB
MAV*
QUES
EAV
Status Byte Register
*STB?
128
64
32
16
8
4
* Not available for TCP/IP
Socket protocol
Σ
Standard Event Status Enable Register
*ESE
7
6
5
4
3
2
1
0
Command
Error
Execution
Error
Device
spec. Error
Query
Error
Operation
Complete
Standard Event Status Register
*ESR?
32
16
8
4
1
a
Output
Queue
Error/ Event
Queue
Σ
Operation Status Enable Register
STAT:OPER:ENAB
Operation Status Event Register
STAT:OPER?
Positive Transition Filter
STAT:OPER:PTR
Negative Transition Filter
STAT:OPER:NTR
15
14
1
12
11
10
9
8
7
6
5
4
3
2
1
0
Waiting
for
trigger
Meas.
Operation Status Condition Register
STAT:OPER:COND?
32
16

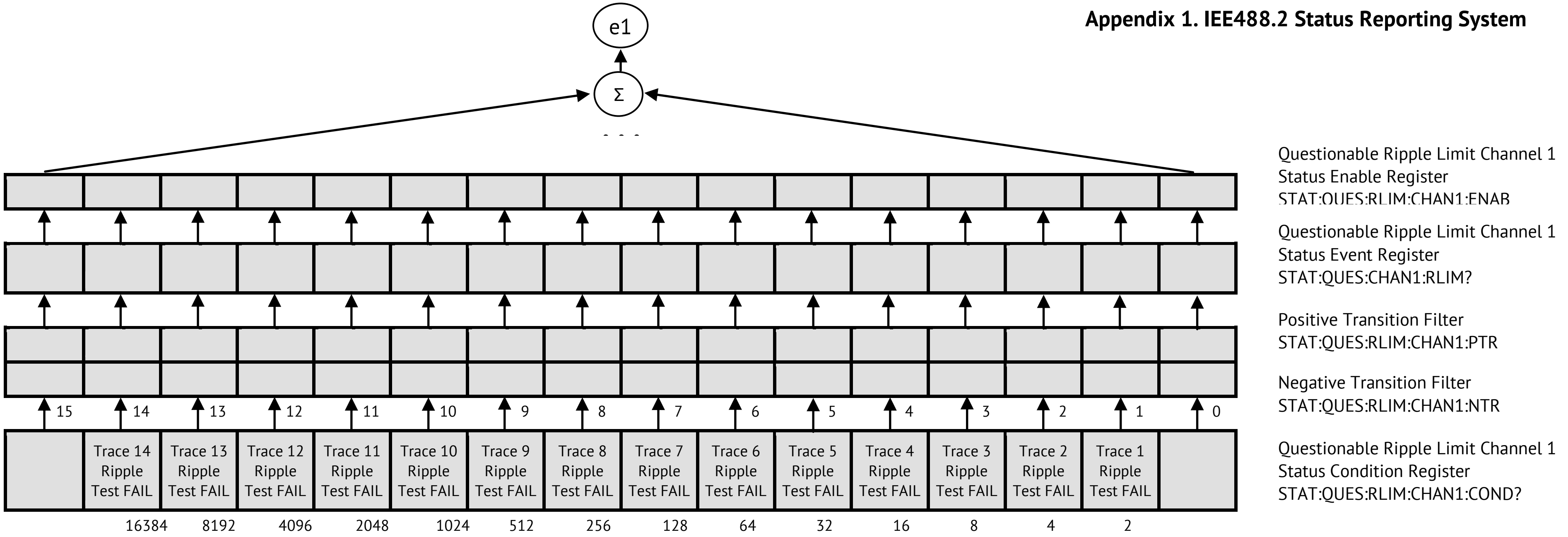

a
Σ
Questionable Status Enable Register
STAT:QUES:ENAB
Questionable Status Event Register
STAT:QUES?
Positive Transition Filter
STAT:QUES:PTR
Negative Transition Filter
STAT:QUES:NTR
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
Limit Test FAIL
Ripple Test FAIL
Questionable Status Condition Register
STAT:QUES:COND?
1024
512
b
c

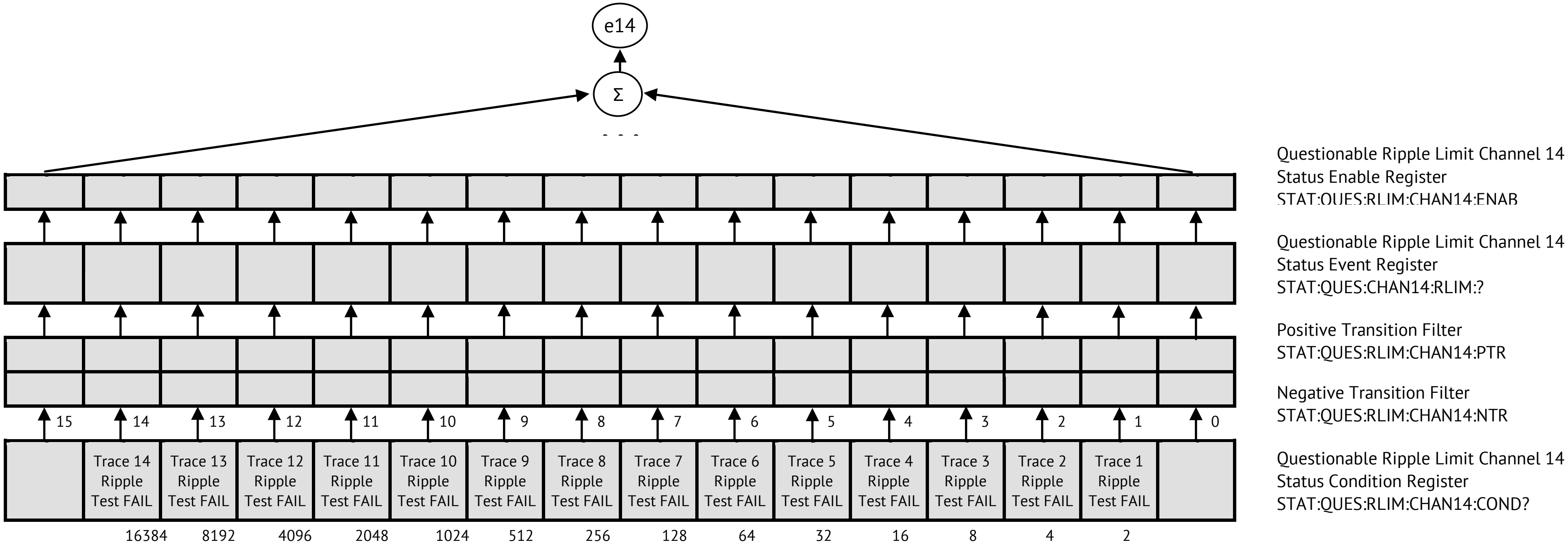

b
Σ
Questionable Limit Status Enable Register
STAT:QUES:LIM:ENAB
Questionable Limit Status Event Register
STAT:QUES:LIM?
Positive Transition Filter
STAT:QUES:LIM:PTR
Negative Transition Filter
STAT:QUES:LIM:NTR
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
Chan 14 Limit Test FAIL
Chan 13 Limit Test FAIL
Chan 12 Limit Test FAIL
Chan 11 Limit Test FAIL
Chan 10 Limit Test FAIL
Chan 9 Limit Test FAIL
Chan 8 Limit Test FAIL
Chan 7 Limit Test FAIL
Chan 6 Limit Test FAIL
Chan 5 Limit Test FAIL
Chan 4 Limit Test FAIL
Chan 3 Limit Test FAIL
Chan 2 Limit Test FAIL
Chan 1 Limit Test FAIL
Questionable Limit Status Condition Register
STAT:QUES:LIM:COND?
16384
4
2
d14
d2
d1


d1
Σ
Questionable Limit Channel 1 Status Enable Register STAT:QUES:LIM:CHAN1:ENAB
Questionable Limit Channel 1 Status Event Register STAT:QUES:CHAN1:LIM?
Positive Transition Filter STAT:QUES:LIM:CHAN1:PTR
Negative Transition Filter STAT:QUES:LIM:CHAN1:NTR
15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
Trace 14 Limit Test FAIL
Trace 13 Limit Test FAIL
Trace 12 Limit Test FAIL
Trace 11 Limit Test FAIL
Trace 10 Limit Test FAIL
Trace 9 Limit Test FAIL
Trace 8 Limit Test FAIL
Trace 7 Limit Test FAIL
Trace 6 Limit Test FAIL
Trace 5 Limit Test FAIL
Trace 4 Limit Test FAIL
Trace 3 Limit Test FAIL
Trace 2 Limit Test FAIL
Trace 1 Limit Test FAIL
Questionable Limit Channel 1 Status Condition Register STAT:QUES:LIM:CHAN1:COND?
16384 8192 4096 2048 1024 512 256 128 64 32 16 8 4 2


d14
Σ
Questionable Limit Channel 14 Status Enable Register STAT:QUES:LIM:CHAN14:ENAB
Questionable Limit Channel 14 Status Event Register STAT:QUES:CHAN14:LIM:?
Positive Transition Filter STAT:QUES:LIM:CHAN14:PTR
Negative Transition Filter STAT:QUES:LIM:CHAN14:NTR
15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
Trace 14 Limit Test FAIL
Trace 13 Limit Test FAIL
Trace 12 Limit Test FAIL
Trace 11 Limit Test FAIL
Trace 10 Limit Test FAIL
Trace 9 Limit Test FAIL
Trace 8 Limit Test FAIL
Trace 7 Limit Test FAIL
Trace 6 Limit Test FAIL
Trace 5 Limit Test FAIL
Trace 4 Limit Test FAIL
Trace 3 Limit Test FAIL
Trace 2 Limit Test FAIL
Trace 1 Limit Test FAIL
Questionable Limit Channel 14 Status Condition Register STAT:QUES:LIM:CHAN14:COND?
16384 8192 4096 2048 1024 512 256 128 64 32 16 8 4 2


c
Σ
Questionable Ripple Limit Status Enable Register STAT:QUES:RLIM:ENAB
Questionable Ripple Limit Status Event Register STAT:QUES:RLIM?
Positive Transition Filter STAT:QUES:RLIM:PTR
Negative Transition Filter STAT:QUES:RLIM:NTR
Questionable Ripple Limit Status Condition Register STAT:QUES:RLIM:COND?
15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
Chan 14 Ripple Test FAIL
Chan 13 Ripple Test FAIL
Chan 12 Ripple Test FAIL
Chan 11 Ripple Test FAIL
Chan 10 Ripple Test FAIL
Chan 9 Ripple Test FAIL
Chan 8 Ripple Test FAIL
Chan 7 Ripple Test FAIL
Chan 6 Ripple Test FAIL
Chan 5 Ripple Test FAIL
Chan 4 Ripple Test FAIL
Chan 3 Ripple Test FAIL
Chan 2 Ripple Test FAIL
Chan 1 Ripple Test FAIL
16384
4
2
e14
e2
e1


e1
Σ
Questionable Ripple Limit Channel 1
Status Enable Register
STAT:QUES:RLIM:CHAN1:ENAB
Questionable Ripple Limit Channel 1
Status Event Register
STAT:QUES:CHAN1:RLIM?
Positive Transition Filter
STAT:QUES:RLIM:CHAN1:PTR
Negative Transition Filter
STAT:QUES:RLIM:CHAN1:NTR
15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
Trace 14 Ripple Test FAIL
Trace 13 Ripple Test FAIL
Trace 12 Ripple Test FAIL
Trace 11 Ripple Test FAIL
Trace 10 Ripple Test FAIL
Trace 9 Ripple Test FAIL
Trace 8 Ripple Test FAIL
Trace 7 Ripple Test FAIL
Trace 6 Ripple Test FAIL
Trace 5 Ripple Test FAIL
Trace 4 Ripple Test FAIL
Trace 3 Ripple Test FAIL
Trace 2 Ripple Test FAIL
Trace 1 Ripple Test FAIL
Questionable Ripple Limit Channel 1
Status Condition Register
STAT:QUES:RLIM:CHAN1:COND?
16384 8192 4096 2048 1024 512 256 128 64 32 16 8 4 2


e14
Σ
Questionable Ripple Limit Channel 14
Status Enable Register
STAT:QUES:RLIM:CHAN14:ENAB
Questionable Ripple Limit Channel 14
Status Event Register
STAT:QUES:CHAN14:RLIM:?
Positive Transition Filter
STAT:QUES:RLIM:CHAN14:PTR
Negative Transition Filter
STAT:QUES:RLIM:CHAN14:NTR
15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
Trace 14 Ripple Test FAIL
Trace 13 Ripple Test FAIL
Trace 12 Ripple Test FAIL
Trace 11 Ripple Test FAIL
Trace 10 Ripple Test FAIL
Trace 9 Ripple Test FAIL
Trace 8 Ripple Test FAIL
Trace 7 Ripple Test FAIL
Trace 6 Ripple Test FAIL
Trace 5 Ripple Test FAIL
Trace 4 Ripple Test FAIL
Trace 3 Ripple Test FAIL
Trace 2 Ripple Test FAIL
Trace 1 Ripple Test FAIL
Questionable Ripple Limit Channel 14
Status Condition Register
STAT:QUES:RLIM:CHAN14:COND?
16384 8192 4096 2048 1024 512 256 128 64 32 16 8 4 2

100	"Command error"
101	"Unmatched quote"
102	"Unmatched bracket"
103	"Invalid value in numeric list"
104	"Data type error"
106	"Numeric parameter overflow"
107	"Wrong units in numeric data"
108	"Parameter not allowed"
109	"Missing parameter"
110	"Command header error"
114	"Header suffix out of range"
115	"Input buffer is full"
130	"Suffix eror"
200	"Execution error"
201	"Invalid channel index"
202	"Invalid trace index"
203	"Invalid marker index"
204	"Marker is not enabled"
205	"Invalid save type specifier"
206	"Invalid sweep type specifier"
207	"Invalid trigger source specifier"
208	"Invalid measurement parameter specifier"
209	"Invalid format specifier"
210	"Invalid data math specifier"
211	"Trigger ignored"
212	"Invalid trigger source"

213	"Init ignored"
214	"Invalid limit data"
215	"Invalid segment data"
216	"Invalid standard type specifier"
217	"Invalid conversion specifier"
218	"Invalid gating shape specifier"
219	"Invalid gating type specifier"
220	"Parameter Error"
221	"Invalid port index"
222	"Data out of range"
223	"No Calibration Measurement Data"
224	"Illegal parameter value"
225	"Cal Kit Definition Error"
226	"Differ Forward and Reverse Thru"
227	"Differ Forward and Reverse TRL Thru"
228	"Differ Forward and Reverse Line"
229	"TRL Match Standard is not Load Type Standard"
230	"ACM Auto-Orientation Error"
231	"ACM Orientation Settings Error"
232	"AutoCal Execution Error"
233	"ACM Frequncy Settings Error"
234	"ACM Characterization Error"
235	"Frequency Range Exceeds ACM Characterization Frequency Range"
236	"AutoCal Module Reading Error"
237	"Incorrect set of measured parameters"
238	"Calibration Execution Error"
239	"TRIG:SING interrupted"

240	"Analyzer not ready"
241	"AutoCal Module not ready"
251	"Invalid trigger scope specifier"
252	"Invalid trigger polarity specifier"
253	"Invalid trigger position specifier"
256	"File not found"
300	"Device-specific error"
302	"Status reporting system error"
400	"Query error"
403	"Query error: no data"
404	"Query truncated"
410	"Query Interrupted"

Example. Program Written in C

The following program shows the control over the Analyzer using the C language with the VISA library.

The Analyzer address is passed as parameter in the command line at the start of the program. For more detail on VISA Resource Name see the VISA library documentation.

Program description:

1. Sets up the communication with the Analyzer.
2. Reads out and displays the Analyzer information string.
3. Sets some parameters of the Analyzer.
4. Triggers the measurement and waits for the sweep completion.
5. Reads out the measurement data and the frequency values at the measurement points.
6. Displays the measurement data

```
// Example.cpp
//
// VISA Header: visa.h (must be included)
// VISA Library: visa32.lib (must be linked with)
#include "stdafx.h"
#include "visa.h"

int main(int argc, char* argv[])
{
  ViStatus status;               // Error checking
  ViSession defaultRM, instr;    // Communication channels
  ViUInt32 retCount;             // Return count from string I/O
  ViByte buffer[255];            // Buffer for string I/O
  ViUInt32 temp;
  int NOP = 21;                  // Number of measurement points
  const int maxCnt = 100;        // Maximum reading count
  double Data[maxCnt*2];         // Measurement data array
  double Freq[maxCnt];           // Frequency array

  if (argc < 2)
  {
    printf("\nUsage: Example <VISA address>\n\n");
    printf("VISA address examples:\n");
    printf("       TCPIP::nnn.nnn.nnn.nnn::5025::SOCKET\n");
    printf("       TCPIP::hostname::5025::SOCKET\n");
    return -1;
```

```
    }

    status = viOpenDefaultRM(&defaultRM);

    if (status < VI_SUCCESS)
    {
      printf("Can't initialize VISA\n");
      return -1;
    }

    status = viOpen(defaultRM, argv[1], VI_NULL, VI_NULL, &instr);

    if (status < VI_SUCCESS)
    {
      printf("Can't open VISA address: %s\n", argv[1]);
      return -1;
    }
    //
    // Set the answer timeout
    //
    viSetAttribute(instr, VI_ATTR_TMO_VALUE, 5000);
    //
    // Enable the terminal character
    //
    viSetAttribute(instr, VI_ATTR_TERMCHAR_EN, VI_TRUE);
    viSetAttribute(instr, VI_ATTR_TERMCHAR, '\n');
    //
   // Read ID string from Analyzer
    //
    viPrintf(instr, "*IDN?\n");
    viRead(instr, buffer, sizeof(buffer), &retCount);
    printf("*IDN? Returned %d bytes: %.*s\n\n", retCount, retCount, buffer);
    //
   // Set up the Analyzer
    //
    viPrintf(instr, "SYST:PRES\n");
    viPrintf(instr, "SENS:SWE:POIN %d\n", NOP);
    viPrintf(instr, "CALC:PAR1:DEF S21\n");
    viPrintf(instr, "CALC:PAR1:SEL\n");
    viPrintf(instr, "CALC:FORM MLOG\n");
    viPrintf(instr, "SENS:BAND 10\n");
    //
    // Trigger measurement and wait for completion
    //
    viPrintf(instr, ":TRIG:SOUR BUS\n");
    viPrintf(instr, ":TRIG:SING\n");
    viQueryf(instr, "*OPC?\n", "%d", &temp);
    //
    // Read out measurement data
    //
    retCount = maxCnt * 2;
    viQueryf(instr, "CALC:DATA:FDAT?\n", "%,#lf", &retCount, Data);
    retCount = maxCnt;
    viQueryf(instr, "SENS:FREQ:DATA?\n", "%,#lf", &retCount, Freq);
    //
    // Display measurement data
    //
```

```
    printf("%20s %20s %20s\n", "Frequency", "Data1", "Data2");
    for (int i = 0; i < NOP; i++)
    {
        printf("%20f %20f %20f\n", Freq[i], Data[i*2], Data[i*2+1]);
    }

    status = viClose(instr);
    status = viClose(defaultRM);
    return 0;
}
```

Example 5. Program Written in LabView

The following program shows the control over the Analyzer using the LabView language with the VISA library.

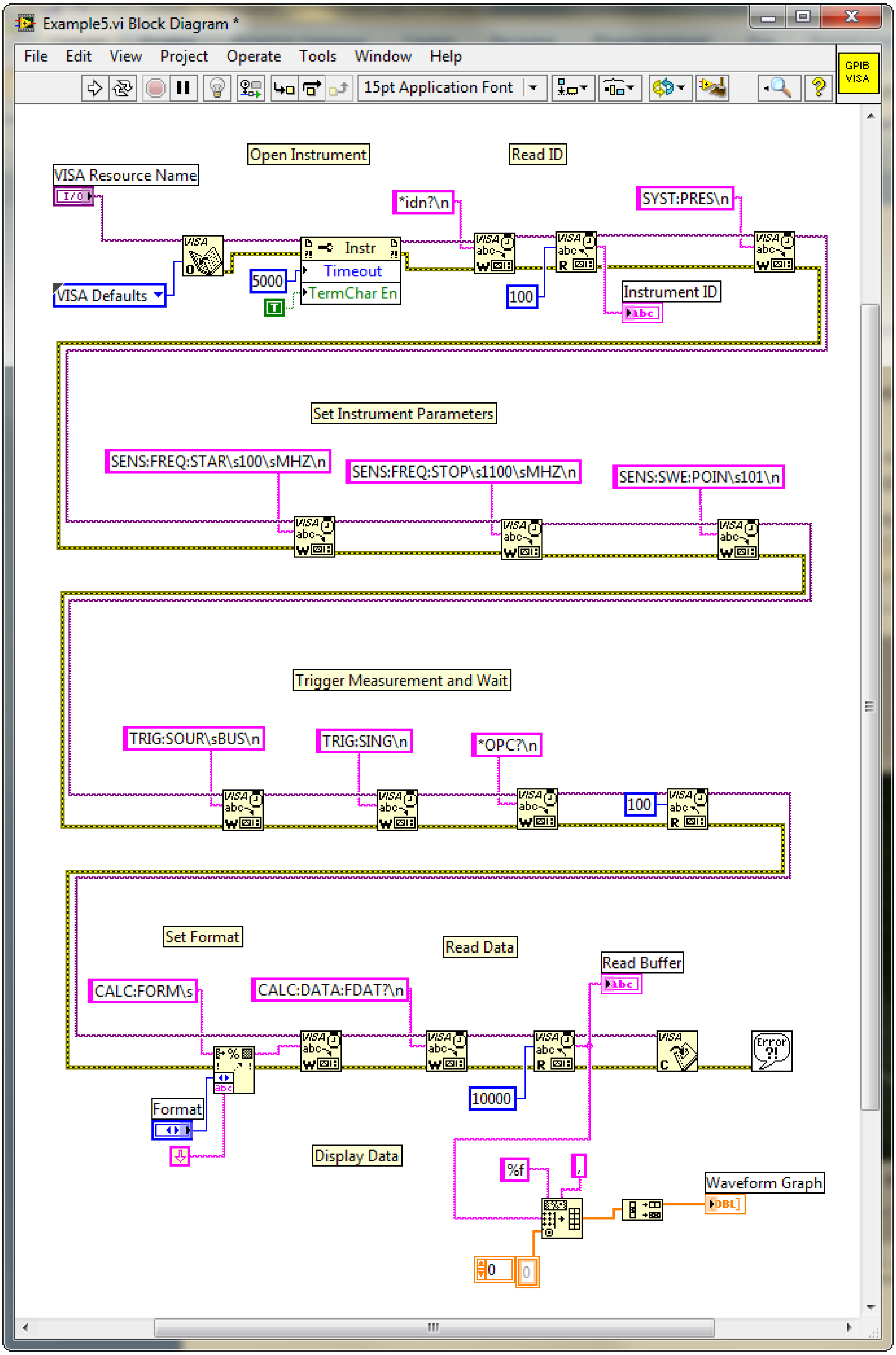
Below see the block diagram of the program and front panel of the program with the program execution result.

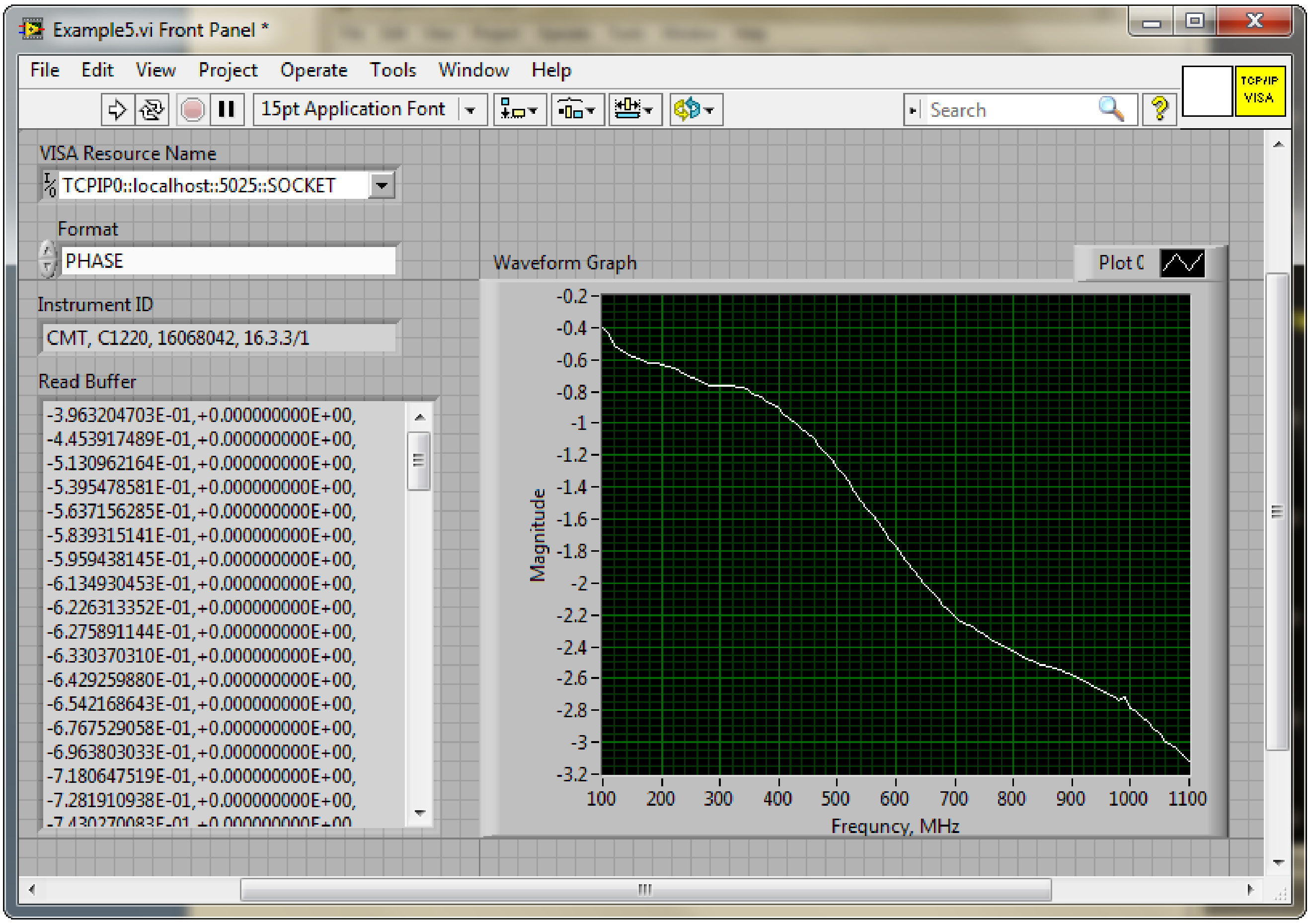
The front panel contains the entry field for the Analyzer name “VISA Resource Name”. For more detail on VISA Resource Name see the VISA library documentation.

The user must enter the Analyzer address, select the trace format in the “Format” field, and click the “Run” button. As the result of the program, the Analyzer information string will be displayed and the measurement trace will be plotted.

Program description:

1. Sets up the communication with the Analyzer.
2. Reads out and displays the Analyzer information string.
3. Sets some parameters of the Analyzer.
4. Generates the trigger and waits for the sweep completion.
5. Sets the trace format to the format entered by the user in the “Format” field.
6. Reads out the measurement data.
7. Displays the measurement data.


Example5.vi Block Diagram *
File Edit View Project Operate Tools Window Help
15pt Application Font
GPIB VISA
Open Instrument
Read ID
VISA Resource Name
*idn?\n
SYST:PRES\n
Instr
Timeout
TermChar En
5000
100
VISA Defaults
Instrument ID
Set Instrument Parameters
SENS:FREQ:STAR\s100\sMHZ\n
SENS:FREQ:STOP\s1100\sMHZ\n
SENS:SWE:POIN\s101\n
Trigger Measurement and Wait
TRIG:SOUR\sBUS\n
TRIG:SING\n
*OPC?\n
100
Set Format
Read Data
Read Buffer
CALC:FORM\s
CALC:DATA:FDAT?\n
10000
Format
Display Data
%f
,
Waveform Graph
0
0


Example5.vi Front Panel *
File Edit View Project Operate Tools Window Help
15pt Application Font
Search
TCP/IP VISA
VISA Resource Name
TCPIP0::localhost::5025::SOCKET
Format
PHASE
Instrument ID
CMT, C1220, 16068042, 16.3.3/1
Read Buffer
-3.963204703E-01,+0.000000000E+00,
-4.453917489E-01,+0.000000000E+00,
-5.130962164E-01,+0.000000000E+00,
-5.395478581E-01,+0.000000000E+00,
-5.637156285E-01,+0.000000000E+00,
-5.839315141E-01,+0.000000000E+00,
-5.959438145E-01,+0.000000000E+00,
-6.134930453E-01,+0.000000000E+00,
-6.226313352E-01,+0.000000000E+00,
-6.275891144E-01,+0.000000000E+00,
-6.330370310E-01,+0.000000000E+00,
-6.429259880E-01,+0.000000000E+00,
-6.542168643E-01,+0.000000000E+00,
-6.767529058E-01,+0.000000000E+00,
-6.963803033E-01,+0.000000000E+00,
-7.180647519E-01,+0.000000000E+00,
-7.281910938E-01,+0.000000000E+00,
Waveform Graph
Plot 0
Magnitude
-0.2 -0.4 -0.6 -0.8 -1 -1.2 -1.4 -1.6 -1.8 -2 -2.2 -2.4 -2.6 -2.8 -3 -3.2
100 200 300 400 500 600 700 800 900 1000 1100
Frequncy, MHz