COPPER MOUNTAIN
TECHNOLOGIES

1-Port VNA Series

R60

R140

R180

RNVNA Network Analyzer

Programming Manual SCPI

Revision 21.1

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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 commands. The commands sent to the analyzer and the responses from it are text messages conforming to the **SCPI** (Standard Commands for Programmable Instruments) specification. The text messages are delivered over computer networks using TCP/IP Socket network protocols.

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.

1.1 Programming Manual Scope

This Manual directly applies to the R54, R140, R60, R180 models VNA and N-port mode of VNA (RNVNA).

This Manual corresponds to software version:

- RVNA, 21.3.1
- RVNVNA - 21.3.1.

1.2 Related Documents

It is recommended to be familiar with 1-Port VNA Series Operating Manual before reading this 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.

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

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

2 ANALYZER INTERFACES

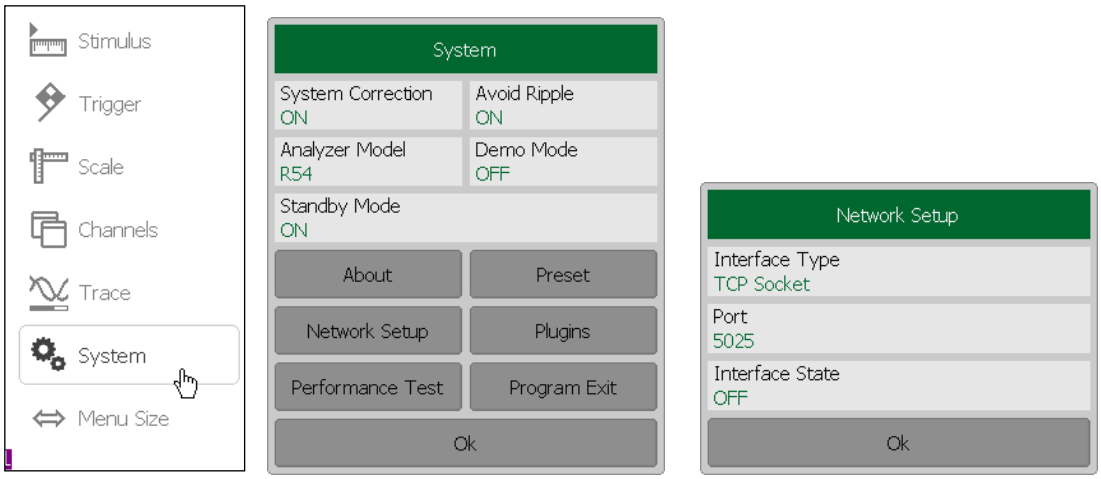
2.1 Ethernet Interface

Ethernet interface is part of the equipment of a personal computer that connects to the device “R54”, “R140”, “R60” or “R180”.

Data transfer between the PC user and the computer that is connected to the device, is performed via Socket protocol (TCP, port 5025).

Connect the device to a PC in the local Ethernet network of your company.

Activate the function of remote control via Socket protocol on your Analyzer as described below.



To enable/disable remote control via Socket protocol use the following softkeys: **System > Network Setup > Interface State > ON/OFF.**

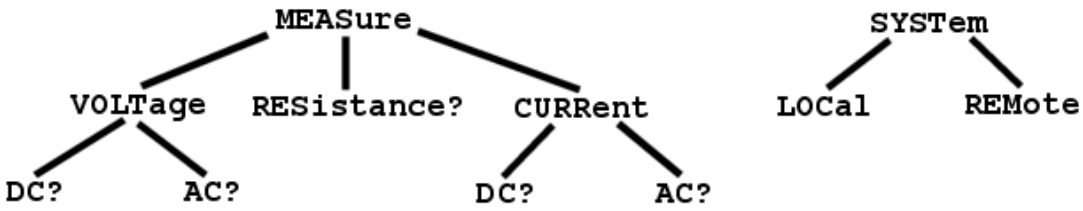
3 SCPI OVERVIEW

The Ethernet interface implement the set of commands based on 1999 SCPI standard (Standard Commands for Programmable Instruments). This command set allows the exchange of character messages.

SCPI is developed by SCPI Consortium (http:\\www.scpiconsortium.org).The main features of SCPI standard are described below. For a more detailed information on SCPI standard, see the website of SCPI Consortium.

3.1 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 the 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
```

3.2 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
```

3.3 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
```

3.4 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
```

3.5 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
```

3.6 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 (',').

3.6.1 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
```

3.6.1.1 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.

3.6.1.2 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}

3.6.2 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
```

3.6.3 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 3.4.

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
```

3.6.4 String Parameters

In some cases, the instrument 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"
```

3.6.5 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
```

3.7 Query Commands

The query commands read out the parameter values from the instrument. 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 1 MHz
SENSe:FREQuency:STARt?
```

3.8 Numeric Suffixes

The instrument contains several items of the same type, such as 9 channels, each of which in turn contains 8 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
```

3.9 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
```

3.10 IEEE488.2 Common Commands Overview

A SCPI compatible instrument 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.

3.11 String Terminator

The <new line> character (ASCII 10) in the last data byte of the command string is used as a command terminator. The string of instructions sent to the instrument is executed after the instruction terminator is received.

4 REMOTE CONTROL 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 indicate 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
…	ellipsis indicates that parameters in that part are omitted

4.1.2 Identifiers

Identifier	Parameter	Description
<numeric>	Number	{<integer>|<real>}
<frequency>	Frequency	<numeric>{[HZ]|KHZ|MHZ|GHZ}
<power>	Power	<numeric>{[DBM]|DBMW|DBW|KW|W|MW|UW|NW}
<time>	Time	<numeric>{[S]|MS|US|NS|PS|FS}
<logmag>	Log Amplitude	<numeric>[DB]
<phase>	Phase	<numeric>{[DEG]|MADEG|KDEG|MDEG|UDEG}
<stimulus>	Stimulus	{<frequency>|<power>|<time>}
<response>	Response	{<logmag>|<phase>|<time>}
<numeric list>	Numeric List	<numeric 1>,<numeric 2>,...<numeric N>

4.2 IEEE488.2 Common Commands

*CLS

```
*CLS
```

Description	Clears the following (no query) • 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
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
Out of Range	Bitwise AND with 255 number
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 instrument information string. The string format: <manufacturer>, <model>, <serial number>, <software version/firmware version> (query only). For example: Copper Mountain Technologies, Planar – TR1300/1, 00000101, 0.8.12/1.0
Target	Instrument
Query Response	String up to 40 characters
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 (no query).
Target	Status Reporting System
Equivalent Softkeys	**None**

*OPC?

```
*OPC?
```

Description	1 is read out at the completion of all pending operations (query only).
Target	Status Reporting System
Query Response	`1`
Equivalent Softkeys	**None**

*RST

```
*RST
```

Description	Restores the default settings of the instrument (no query). There is difference from presetting the instrument with `:SYST:PRES` command – in this case the trigger mode is set to Hold.
Target	Instrument
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.
Out of Range	Bitwise AND with 255 number
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	If the trigger source is set to LAN (set to BUS with the `:TRIG:SOUR` command), triggers a sweep. If the trigger source is not set to the bus or the instrument is not waiting for a trigger, the command is ignored. The command is completed before the end of the sweep. (no query)
Target	Instrument
Related Commands	`TRIG:SOUR`
Equivalent Softkeys	**None**

*WAI

```
*WAI
```

Description	Waits for the execution of all commands sent before this command. (no query)
Target	Instrument
Equivalent Softkeys	**None**

4.3 Vector Analyzer Commands

ABOR

```
ABORt
```

Description	Aborts the sweep and switches the triggers of all the channels to *Hold*. The channels in *Continuous* trigger mode switch to waiting for a trigger. If the trigger source is set to Internal, the channel from waiting for a trigger turns to a new sweep. (no query)
Equivalent Softkeys	**None**

CALC:CONV

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

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

Description	Sets or reads out the ON/OFF state of S–parameter conversion function (command/query).
Target	The active trace of channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1] … |16} (in N-port mode only)
Parameter	{ON|1} S–parameter conversion function ON {OFF|0} S–parameter conversion function 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|3|4} <Ch>={[1] … |16} (in N-port mode only)
Parameter	<char> specifies parameter: IMPedance : Equivalent transmission or reflection impedance, depending on the parameter S11 or S21 ADMittance : Equivalent transmission or reflection conductance, depending on the parameter S11 or S21 INVersion : Inverse S–parameter CONJugation : S–parameter conjugate
Out of Range	Error occurs. The command is ignored. Error code: 217
Query Response	{IMP|ADM|INV|CONJ}
Preset Value	IMP
Equivalent Softkeys	**Analysis > Conversion > Function { Impedance Z | Admittance Y | Inverse 1/S | 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|3|4} <Ch>={[1] … |16} (in N-port mode only)
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|3|4} <Ch>={[1] … |16} (in N-port mode only)
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:DATA:FDAT?

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

Description	Reads out the formatted data array (query only). 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.
Target	The active trace of channel <Ch>, `<Ch>={[1]|2|3|4}` `<Ch>={[1] … |16}` (in N-port mode only)
Query Response	`<numeric 1>,<numeric 2>,…<numeric 2N>` The data transfer format depends on the `FORM:DATA` command setting.
Related Commands	`CALC:FORM` `FORM:DATA`
Equivalent Softkeys	**None**

CALC:DATA:FMEM?

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

Description	Reads out the formatted memory array (query only). 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
Target	The active trace of channel <Ch>, `<Ch>={[1]|2|3|4}` `<Ch>={[1] … |16}` (in N-port mode only)
Query Response	`<numeric 1>,<numeric 2>,…<numeric 2N>` The data transfer format depends on the `FORM:DATA` command setting.
Notes	If the memory is empty, an error occurs and the command is ignored.

Related Commands	`CALC:MATH:MEM`
	`CALC:FORM`
	`FORM:DATA`

Equivalent Softkeys	**None**

CALC:DATA:SDAT?

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

Description	Reads out the corrected data array (query only). 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
Target	The active trace of channel <Ch>, `<Ch>={[1]|2|3|4}` `<Ch>={[1] … |16}` (in N-port mode only)
Query Response	`<numeric 1>,<numeric 2>,…<numeric 2N>` The data transfer format depends on the `FORM:DATA` command setting.
Related Commands	`FORM:DATA`
Equivalent Softkeys	**None**

CALC:DATA:SMEM?

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

Description	Reads out the corrected memory array (query only). 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.
Target	The active trace of channel <Ch>, `<Ch>={[1]|2|3|4}` `<Ch>={[1] … |16}` (in N-port mode only)
Query Response	`<numeric 1>,<numeric 2>,…<numeric 2N>` The data transfer format depends on the `FORM:DATA` command setting.
Notes	If the memory is empty, an error occurs and the command is ignored.
Related Commands	`CALC:MATH:MEM` `FORM:DATA`
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 <Ch>,
	`CALCulate<Ch>:TRACe<Tr>:DATA:XAXis?` - the trace <Tr> of channel <Ch>,
	`<Ch>={[1]|2|3|4}`
	`<Ch>={[1] … |16}` (in N-port mode only)
	`<Tr>={[1]|2|3|4}`
	`<Tr>={[1] … |16}` (in N-port mode only)

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|3|4} <Ch>={[1] … |16} (in N-port mode only)
Parameter	<char> specifies the gate type: BPASs : Bandpass type NOTCh : Notch type
Out of Range	Error occurs. The command is ignored. Error code: 219
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|3|4} <Ch>={[1] … |16} (in N-port mode only)
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	**None**

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|3|4} <Ch>={[1] … |16} (in N-port mode only)
Parameter	<char> specifies the gate shape: MAXimum : Maximum shape WIDE : Wide shape NORMal : Normal shape MINimum : Minimum shape
Out of Range	Error occurs. The command is ignored. Error code: 218
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|3|4} <Ch>={[1] … |16} (in N-port mode only)
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	**None**

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|3|4} <Ch>={[1] … |16} (in N-port mode only)
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 {ON|OFF|1|0}

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

Description	Sets or reads out the ON/OFF state of the gating function (command/query).
Target	The active trace of channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1] … |16} (in N-port mode only)
Parameter	{ON|1} Gating function ON {OFF|0} Gating function 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|3|4} <Ch>={[1] … |16} (in N-port mode only)
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|3|4} <Ch>={[1] … |16} (in N-port mode only)
Parameter	<char> specifies the trace format: MLOGarithmic : Logarithmic magnitude PHASe : Phase UPHase : Expanded phase GDELay : Group delay time SWR : Voltage standing wave ratio REAL : Real part IMAGinary : Imaginary part MLINear : Linear magnitude 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) CLOS : Cable Loss - Logarithmic magnitude RLOSs : Retutn Loss (obsolete, write only) use MLOG[1] DSWR : DFT in SWR chart format (obsolete, write only) use SWR+Time Domain[1] DRLOSs : DFT Logarithmic magnitude (obsolete, write only) useMLOG+Time Domain[1]
Out of Range	Error occurs. The command is ignored.
Query Response	{MLOG|PHAS|UPH|GDEL|SWR|REAL|IMAG|MLIN|SLIN|SLOG|SCOM|SMITh|SADM|PLIN|PLOG|POL|CLOS}
Preset Value	MLOG
Equivalent Softkeys	**Trace > Format> Log Magnitude | Phase | Expand Phase | Group Delay | SWR | Real | Imag | Lin Magnitude | Smith (Lin) | Smith (Log) | Smith (Re/Im) | Smith (R+jX) | Smith (G+jB) | Polar (Lin) | Polar (Log) | Polar (Re/Im) Cable Loss**

[1]To switch on Time Domain mode – Analysis > Time Domain > Time Domain

CALC:FSIM:SEND:DEEM:PORT:STAT

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

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

Description	Sets or reads out the ON/OFF state of the de–embedding function (command/query).
Target	Port <Pt> of channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1] … |16} (in N-port mode only) <Pt>=1 <Pt>={[1] … |16}
Parameter	{ON|1} De–embedding function ON {OFF|0} De–embedding function OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Analysis > Fixture Simulator > De–Embedding**

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 de−embedding function (command/query). The file contains the circuit S−parameters in Touchstone format.
Target	Port <Pt> of channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1] … |16} (in N-port mode only) <Pt>=1 <Pt>={[1] … |16}
Parameter	<srting>, up to 256 characters (quoted string)
Preset Value	""
Notes	If the full path of the file is not specified, the \FixtireSim subdirectory of the main directory will be searched for the file.
Equivalent Softkeys	**Analysis > Fixture Simulator > De−Embedding > S−parameters File**

CALC:FSIM:SEND:PMC:PORT:STAT

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

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

Description	Sets or reads out the ON/OFF state of the embedding function (command/query).
Target	Port <Pt> of channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1] … |16} (in N-port mode only) <Pt>=1 <Pt>={[1] … |16}
Parameter	{ON|1} Embedding function ON {OFF|0} Embedding function OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Analysis > Fixture Simulator > Embedding**

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 embedding function (command/query). The file contains the circuit S−parameters in Touchstone format.
Target	Port <Pt> of channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1] … |16} (in N-port mode only) <Pt>=1 <Pt>={[1] … |16}
Parameter	<string>, up to 256 characters (quoted string)
Preset Value	""
Notes	If the full path of the file is not specified, the \FixtireSim subdirectory of the main directory will be searched for the file.
Equivalent Softkeys	**Analysis > Fixture Simulator > S−parameters File (Embedding)**

CALC:FSIM:SEND:ZCON:PORT:Z0

```
CALCulate<Ch>:FSIMulator:SENDed:ZCONversion:PORT<Pt>:Z0[:R]
<impedance>

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|3|4} <Ch>={[1] … |16} (in N-port mode only) <Pt>=1 <Pt>={[1] … |16}
Parameter	<impedance> 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 Z0**

CALC:FSIM:SEND:ZCON:STAT

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

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

Description	Sets or reads out the ON/OFF state of the port impedance conversion function (command/query).
Target	Channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1] … |16} (in N-port mode only)
Parameter	{ON|1} Port Z conversion function ON {OFF|0} Port Z conversion function OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Analysis > Fixture Simulator > Port Z Conversion**

CALC:FUNC:DATA?

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

Description	Reads out the data array, which is the `CALC:FUNC:EXEC` command analysis result (query only). The array size is 2N, where N is the number of points set by `CALC:FUNC:POIN?` command. 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.
Target	Channel <Ch>, `<Ch>={[1]|2|3|4}` `<Ch>={[1] … |16}` (in N-port mode only)
Query Response	`<numeric 1>,<numeric 2>,…<numeric 2N>` The data transfer format depends on the FORM:DATA command setting.

Related Commands	`CALC:FUNC:EXEC`
	`CALC:FUNC:POIN?`
	`FORM:DATA`

Equivalent Softkeys	**None**

CALC:FUNC:DOM

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

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

Description	Sets or reads out the ON/OFF state of an arbitrary range use in `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|3|4}` `<Ch>={[1] … |16}` (in N-port mode only)
Parameter	`{ON|1}` Arbitrary range ON `{OFF|0}` Arbitrary range OFF (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 {ON|OFF|1|0}

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

Description	Sets or reads out the ON/OFF state of trace coupling for analysis range of the `CALC:FUNC:EXEC` command (command/query).
Target	All traces of channel <Ch>, `<Ch>={[1]|2|3|4}` `<Ch>={[1] … |16}` (in N-port mode only)
Parameter	`{ON|1}` Coupling ON `{OFF|0}` Coupling 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|3|4}` `<Ch>={[1] … |16}` (in N-port mode only)
Parameter	`<stimulus>` the start value of analysis range
Unit	{ Hz (Hertz) | s (second) | dBm (decibels above 1 milliwatt) }
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|3|4}` `<Ch>={[1] … |16}` (in N-port mode only)
Parameter	`<stimulus>` the stop value of analysis range
Unit	{ Hz (Hertz) | s (second) | dBm (decibels above 1 milliwatt) }
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|3|4}` `<Ch>={[1] … |16}` (in N-port mode only)
Related Commands	`CALC:FUNC:TYPE` `CALC:FUNC:DATA?`
Equivalent Softkeys	**None**

CALC:FUNC:PEXC

```
CALCulate<Ch>[:SELected]:FUNCtion:PEXCursion <response>

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|3|4}` `<Ch>={[1] … |16}` (in N-port mode only)
Parameter	`<response>` the lower limit of the peak excursion value, varies depending on the data format
Unit	{ dB (decibel) | ° (degree) | s (second) }
Query Response	`<numeric>`
Preset Value	`3`
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 (query only). 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.
Target	The active trace of channel <Ch>, `<Ch>={[1]|2|3|4}` `<Ch>={[1] … |16}` (in N-port mode only)
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|3|4}` `<Ch>={[1] … |16}` (in N-port mode only)
Parameter	`<char>` specifies the polarity: POSitive : Positive peaks NEGative : Negative peaks BOTH : Both positive peaks and negative peaks
Out of Range	The command is ignored.
Query Response	`{POS|NEG|BOTH}`
Preset Value	`POS`
Related Commands	`CALC:FUNC:EXEC`
Equivalent Softkeys	**None**

CALC:FUNC:TARG

```
CALCulate<Ch>[:SELected]:FUNCtion:TARGet <response>

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|3|4}` `<Ch>={[1] … |16}` (in N-port mode only)
Parameter	`<response>` the target value, varies depending on the data format
Unit	{ dB (decibel) | ° (degree) | s (second) }
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|3|4}` `<Ch>={[1] … |16}` (in N-port mode only)
Parameter	`<char>` specifies the type of transition: POSitive : Positive peaks NEGative : Negative peaks BOTH : Both positive peaks and negative peaks
Out of Range	The command is ignored.
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|3|4}` `<Ch>={[1] … |16}` (in N-port mode only)
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
Out of Range	The command is ignored.
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] {ON|OFF|1|0}

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

Description	Sets or reads out the ON/OFF state of the limit test function (command/query).
Target	The active trace of channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1] … |16} (in N-port mode only)
Parameter	{ON|1} Limit test function ON {OFF|0} Limit test function 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 (command/query). 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
Target	The active trace of channel <Ch>, `<Ch>={[1]|2|3|4}` `<Ch>={[1] … |16}` (in N-port mode only)
Query Response	`<numeric 1>,<numeric 2>,…<numeric 5N+1>` The data transfer format depends on the FORM:DATA command setting.
Notes	If the array size is not 1 + 5N, where N is `<numeric 1>`, an error occurs (error code 214). If `<numeric 5n–3>` is less than 0 or more than 2, an error occurs (error code 214). 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.
Related Commands	`FORM:DATA`
Equivalent Softkeys	**Analysis > Limit Test > Edit Limit Line**

CALC:LIM:DISP

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

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

Description	Sets or reads out the ON/OFF state of the limit line display of the limit test function (command/query).
Target	The active trace of channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1] … |16} (in N-port mode only)
Parameter	{ON|1} Limit line display ON {OFF|0} Limit line display 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|3|4} <Ch>={[1] … |16} (in N-port mode only)
Query Response	1 Fail 0 Pass
Equivalent Softkeys	**None**

CALC:LIM:OFFS:AMPL

```
CALCulate<Ch>[:SELected]:LIMit:OFFSet:AMPLitude <response>

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|3|4} <Ch>={[1] … |16} (in N-port mode only)
Parameter	<response> the value of the limit line offset along Y–axis, varies depending on the data format
Unit	{ dB (decibel) | ° (degree) | s (second) }
Query Response	<numeric>
Preset Value	0
Equivalent Softkeys	**Analysis > Limit Test > Response Offset**

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|3|4} <Ch>={[1] … |16} (in N-port mode only)
Parameter	<stimulus> the value of the limit line offset along X–axis
Unit	{ Hz (Hertz) | s (second) | dBm (decibels above 1 milliwatt) }
Query Response	<numeric>
Preset Value	0
Equivalent Softkeys	**Analysis > Limit Test > Stimulus Offset**

CALC:LIM:REP:ALL?

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

Description	Reads out the data array, which is the limit test results (query only). 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)
Target	The active trace of channel <Ch>, `<Ch>={[1]|2|3|4}` `<Ch>={[1] … |16}` (in N-port mode only)
Query Response	`<numeric 1>,<numeric 2>,…<numeric 4N>` The data transfer format depends on the FORM:DATA command setting.
Related Commands	`FORM:DATA`
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 (query only). The stimulus data array of these points can be read out by the `CALC:LIM:REP?` command.
Target	The active trace of channel <Ch>, `<Ch>={[1]|2|3|4}` `<Ch>={[1] … |16}` (in N-port mode only)
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 (query only). The array size is set by the `CALC:LIM:REP:POIN?` command.
Target	The active trace of channel <Ch>, `<Ch>={[1]|2|3|4}` `<Ch>={[1] … |16}` (in N-port mode only)
Query Response	`<numeric 1>,<numeric 2>,…<numeric N>` The data transfer format depends on the `FORM:DATA` command setting.
Related Commands	`CALC:LIM:REP:POIN?` `FORM:DATA`
Equivalent Softkeys	**None**

CALC:MARK

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

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

Description	Sets or reads out the ON/OFF state of a marker (command/query). 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). 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 to the relative measurement mode.

Target	Marker <Mk> of the active trace of channel <Ch>,
	`<Ch>={[1]|2|3|4}`
	`<Ch>={[1] … |16}` (in N-port mode only)
	`<Mk>={[1] … |16}`

Parameter	`{ON|1}` Marker ON `{OFF|0}` Marker OFF
Query Response	`{0|1}`
Preset Value	`0`
Equivalent Softkeys	**Marker > Add Marker | Remove Marker** **Marker > Reference Marker**

CALC:MARK:ACT

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

Description	Sets the active marker (no query). 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.

Target	Marker <Mk> of the active trace of channel <Ch>,
	`<Ch>={[1]|2|3|4}`
	`<Ch>={[1] … |16}` (in N-port mode only)
	`<Mk>={[1] … |16}`

Equivalent Softkeys	**None**

CALC:MARK:BWID

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

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

Description	Sets or reads out the ON/OFF state of the bandwidth search function (command/query).
Target	The active trace of channel <Ch>, `<Ch>={[1]|2|3|4}` `<Ch>={[1] … |16}` (in N-port mode only)
Parameter	`{ON|1}` Bandwidth search function ON `{OFF|0}` Bandwidth search function OFF
Query Response	`{0|1}`
Preset Value	`0`
Equivalent Softkeys	**Marker > Math > Bandwidth Search > Bandwidth Search**

CALC:MARK:BWID:DATA?

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

Description	Reads out the bandwidth search result (query only). 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;

Target	Marker <Mk> of the active trace of channel <Ch>,
	`<Ch>={[1]|2|3|4}`
	`<Ch>={[1] … |16}` (in N-port mode only)
	`<Mk>={[1] … |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 (error code 204).
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|3|4} <Ch>={[1] … |16} (in N-port mode only)
Parameter	<char> choose from: MARKer : Bandwidth search relative to the reference marker MAXimum : Bandwidth search relative to the absolute maximum of the trace MINimum" : Bandwidth search relative to the absolute minimum of the trace
Out of Range	The command is ignored.
Query Response	{MAX|MARK|MIN}
Preset Value	MAX
Equivalent Softkeys	**Marker > Math > Bandwidth Search > Search Ref To**

CALC:MARK:BWID:THR

```
CALCulate<Ch>[:SELected]:MARKer<Mk>:BWIDth:THReshold
<response>

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|3|4} <Ch>={[1] … |16} (in N-port mode only) <Mk>={[1] … |16}
Parameter	<response> the bandwidth definition value, the range varies depending on the data format
Unit	{ dB (decibel) | ° (degree) | s (second) }
Query Response	<numeric>
Preset Value	-3
Equivalent Softkeys	**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|3|4} <Ch>={[1] … |16} (in N-port mode only)
Parameter	<char> specifies the type of the bandwidth: BPASs : Bandpass NOTCh : Notch
Out of Range	The command is ignored.
Query Response	{BPAS|NOTC}
Preset Value	BPAS
Equivalent Softkeys	**Marker > Math > Bandwidth Search > Type Search**

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|3|4} <Ch>={[1] … |16} (in N-port mode only)
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
Equivalent Softkeys	**None**

CALC:MARK:COUP

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

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

Description	Sets or reads out the ON/OFF state of the marker coupling function (command/query).
Target	All the traces of channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1] … |16} (in N-port mode only)
Parameter	{ON|1} Marker coupling ON {OFF|0} Marker coupling OFF
Query Response	{0|1}
Preset Value	1
Equivalent Softkeys	**Marker > Properties > Marker Couple**

CALC:MARK:FUNC:DOM

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

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

Description	Sets or reads out the ON/OFF state 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|3|4}` `<Ch>={[1] … |16}` (in N-port mode only)
Parameter	`{ON|1}` Marker search range ON `{OFF|0}` Marker search range OFF
Query Response	`{0|1}`
Preset Value	`0`
Equivalent Softkeys	**Marker > Search > Search Range**

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|3|4}` `<Ch>={[1] … |16}` (in N-port mode only)
Parameter	`<stimulus>` the start value of the marker search
Unit	{ Hz (Hertz) | s (second) | dBm (decibels above 1 milliwatt) }
Query Response	`<numeric>`
Equivalent Softkeys	**Markers > 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|3|4}` `<Ch>={[1] … |16}` (in N-port mode only)
Parameter	`<stimulus>` the stop value of the marker search
Unit	{ Hz (Hertz) | s (second) | dBm (decibels above 1 milliwatt) }
Query Response	`<numeric>`
Equivalent Softkeys	**Markers > 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|3|4}`
	`<Ch>={[1] … |16}` (in N-port mode only)
	`<Mk>={[1] … |16}`

Related Commands	`CALC:MARK:FUNC:TYPE` `CALC:MARK:FUNC:DOM`
Equivalent Softkeys	**Marker > Search > { Maximum | Minimum }** **Marker > Search > Search Peak > { Search Peak | Search Max Peak | Search Peak Left | Search Peak Right }** **Marker > Search > Search Target > { Search Target | Search Target Left | Search Target Right }**

CALC:MARK:FUNC:PEXC

```
CALCulate<Ch>[:SELected]:MARKer<Mk>:FUNCtion:PEXCursion
<response>

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|3|4}`
	`<Ch>={[1] … |16}` (in N-port mode only)
	`<Mk>={[1] … |16}`

Parameter	`<response>` the peak excursion value, the range varies depending on the data format
Unit	{ dB (decibel) | ° (degree) | s (second) }
Query Response	`<numeric>`
Preset Value	`1`
Equivalent Softkeys	**Marker > Search > 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|3|4}`
	`<Ch>={[1] … |16}` (in N-port mode only)
	`<Mk>={[1] … |16}}`

Parameter	`<char>` specifies the peak polarity: POSitive : Positive polarity NEGative : Negative polarity BOTH : Both positive polarity and negative polarity
Out of Range	The command is ignored.
Query Response	`{POS|NEG|BOTH}`
Preset Value	`POS`
Related Commands	`CALC:MARK:FUNC:EXEC`
Equivalent Softkeys	**Marker > Search > Search Peak > Peak Polarity > { Positive | Negative | Both }**

CALC:MARK:FUNC:TARG

```
CALCulate<Ch>[:SELected]:MARKer<Mk>:FUNCtion:TARGet <response>

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|3|4}`
	`<Ch>={[1] … |16}` (in N-port mode only)
	`<Mk>={[1] … |16}`

Parameter	`<response>` the target value, the range varies depending on the data format
Unit	{ dB (decibel) | ° (degree) | s (second) }
Query Response	`<numeric>`
Preset Value	`0`
Equivalent Softkeys	**Marker > Search > Search Target > Target Value**

CALC:MARK:FUNC:TRAC

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

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

Description	Sets or reads out the ON/OFF state of the marker search tracking function (command/query).
Target	Marker <Mk> of the active trace of channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1] … |16} (in N-port mode only) <Mk>={[1] … |16}
Parameter	{ON|1} Marker search tracking ON {OFF|0} Marker search tracking OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**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|3|4}`
	`<Ch>={[1] … |16}` (in N-port mode only)
	`<Mk>={[1] … |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
Out of Range	The command is ignored.
Query Response	`{POS|NEG|BOTH}`
Preset Value	`POS`
Related Commands	`CALC:MARK:FUNC:EXEC`
Equivalent Softkeys	**Marker > Search > 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|3|4}`
	`<Ch>={[1] … |16}` (in N-port mode only)
	`<Mk>={[1] … |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
Out of Range	The command is ignored.
Query Response	`{MAX|MIN|PEAK|LPE|RPE|TARG|LTAR|RTAR}`
Preset Value	`MAX`
Related Commands	`CALC:MARK:FUNC:EXEC`
Equivalent Softkeys	**Marker > Search > { Maximum | Minimum }** **Marker > Search > Peak > { Search Peak | Search Max Peak | Search Peak Left | Search Peak Right }** **Marker > Search > Target > { Search Target | Search Target Left | Search Target Right }**

CALC:MARK:REF

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

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

Description	Sets or reads out the ON/OFF state of the reference marker (command/query). When the reference marker is turned ON, all the values of the other markers turn to relative values.
Target	The active trace of channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1] … |16} (in N-port mode only)
Parameter	{ON|1} Reference marker ON {OFF|0} Reference marker OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Marker > 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|3|4} <Ch>={[1] … |16} (in N-port mode only) <Mk>={[1] … |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.
Out of Range	The command is ignored.
Equivalent Softkeys	**None**

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|3|4} <Ch>={[1] … |16} (in N-port mode only) <Mk>={[1] … |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 (Hertz) | s (second) | dBm (decibels above 1 milliwatt) }
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	**None**

CALC:MARK:Y?

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

Description	Reads out the response value of the marker (query only). 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.

Target	Marker <Mk> of the active trace of channel <Ch>,
	`<Ch>={[1]|2|3|4}`
	`<Ch>={[1] … |16}` (in N-port mode only)`<Mk>={[1] … |16}`

Query Response	`<numeric 1>,<numeric 2>`
Related Commands	`CALC:MARK:REF`
Equivalent Softkeys	**None**

CALC:MATH:DEL

```
CALCulate<Ch>[:SELected]:MATH:DELete
```

Description	Removes the data from the memory trace.
Target	The active trace of channel <Ch>, `<Ch>={[1]|2|3|4}` `<Ch>={[1] … |16}` (in N-port mode only)
Equivalent Softkeys	**Trace > Clear Memory**

CALC:MATH:FUNC

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

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

Description	Selects the math operation between the measurement data and the memory trace data. The math result replaces the data trace. If the data trace is not saved, the command is ignored (command/query).
Target	The active trace of channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1] … |16} (in N-port mode only)
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
Out of Range	Error occurs. The command is ignored. Error code: 210.
Query Response	{NORM|SUBT|DIV|ADD|MULT}
Preset Value	NORM
Related Commands	CALC:MATH:MEM
Equivalent Softkeys	**Trace > Data Math > { Data/Mem | Data*Mem | Data+Mem | Data–Mem | OFF }**

CALC:MATH:MEM

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

Description	Saves 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|3|4} <Ch>={[1] … |16} (in N-port mode only)
Equivalent Softkeys	**Trace > Memory Trace**

CALC:MST

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

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

Description	Sets or reads out the ON/OFF state of the math statistics display (command/query).
Target	The active trace of channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1] … |16} (in N-port mode only)
Parameter	{ON|1} Statistics display ON {OFF|0} Statistics display OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Marker > Math > Statistics > Statistics**

CALC:MST:DATA?

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

Description	Reads out the math statistics values (query only). The statistics function is applied either over the whole range (for all the trace), 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).
Target	The active trace of channel <Ch>, `<Ch>={[1]|2|3|4}` `<Ch>={[1] … |16}` (in N-port mode only)
Query Response	`<numeric 1>,<numeric 2>,<numeric 3>`
Related Commands	`CALC:MST:DOM`
Equivalent Softkeys	**None**

CALC:MST:DOM

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

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

Description	Sets or reads out the ON/OFF state of the math statistics range (command/query).
Target	The active trace of channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1] … |16} (in N-port mode only)
Parameter	{ON|1} Statistics range ON {OFF|0} Statistics range OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**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|3|4} <Ch>={[1] … |16} (in N-port mode only)
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	**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|3|4} <Ch>={[1] … |16} (in N-port mode only)
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	**Marker > Math > Statistics > Statistics Stop**

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	Channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1] … |16} (in N-port mode only)
Parameter	<numeric> the number of the trace 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	**None**

CALC:PAR:DEF

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

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

Description	Sets the measurement parameter of the trace (command/query) (in N-port mode only).

Target	`Trace <Tr> of channel <Ch>,`
	`<Tr>={[1]|2|3|4}`
	`<Ch>={[1]|2|3|4}`
	`<Tr>={[1]…|16}` (in N-port mode only)
	`<Ch>={[1]…|16}` (in N-port mode only)

Parameter	{ S11|S21|...|S16.1|...|S1.16|... |S16.16 }
Out of Range	Error occurs. The command is ignored.
Query Response	`{ S11|S21|...|S16.1|... |S16.16}`
Equivalent Softkeys	**Trace > Measurement** (in N-port mode only)

CALC:PAR:SEL

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

Description	Sets the active trace in channel <Ch> (no query).
Target	Trace <Tr> of channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only) <Tr>={[1]|2|3|4} <Tr>={[1]…|16} (in N-port mode only)
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	**Trace > Active Trace**

CALC:RLIM

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

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

Description	Sets or reads out the ON/OFF state of the ripple limit test (command/query).
Target	The active trace of channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	{ON|1} Ripple limit test ON {OFF|0} Ripple limit test OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Analysis > Ripple Test > 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 (command/query). 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
Target	The active trace of channel <Ch>, `<Ch>={[1]|2|3|4}` `<Ch>={[1]…|16}` (in N-port mode only)
Query Response	`<numeric 1>,<numeric 2>,…<numeric 4N+1>` The data transfer format depends on the FORM:DATA command setting.
Notes	If the array size is not 1 + 4N, where N is `<numeric 1>`, an error occurs (error code 214). If `<numeric 4n−2>` is less than 0 or more than 1, an error occurs (error code 214). 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.
Related Commands	`FORM:DATA`
Equivalent Softkeys	**Analysis > Ripple Test > Edit Ripple Limit**

CALC:RLIM:DISP:LINE

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

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

Description	Sets or reads out the ON/OFF state of the ripple limit line display (command/query).
Target	The active trace of channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	{ON|1} Ripple limit line ON {OFF|0} Ripple limit line OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Analysis > Ripple Test > Limit Line**

CALC:RLIM:FAIL?

```
CALCulate#[:SELected]:RLIMit:FAIL?
```

Description	Reads out the ripple limit test result (query only).
Target	The active trace of channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
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 results (query only). 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
Target	The active trace of channel <Ch>, `<Ch>={[1]|2|3|4}` `<Ch>={[1]…|16}` (in N-port mode only)
Query Response	`<numeric 1>,<numeric 2>,…<numeric 3N+1>` The data transfer format depends on the `FORM:DATA` command setting.
Related Commands	`FORM:DATA`
Equivalent Softkeys	**None**

CALC:SMO

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

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

Description	Sets or reads out the ON/OFF state of the trace smoothing function (command/query).
Target	The active trace of channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	{ON|1} Trace smoothing ON {OFF|0} Trace smoothing 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	The active trace of channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
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 > Smoothing Aperture**

CALC:TRAC:DATA:FDAT?

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

Description	Reads out the formatted data array (query only). 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.

Target	The specified trace <Tr> of channel <Ch>,
	`<Tr>={[1]|2|3|4}`
	`<Ch>={[1]|2|3|4}`
	`<Tr>={[1]…|16}` (in N-port mode only)
	`<Ch>={[1]…|16}` (in N-port mode only)

Query Response	`<numeric 1>,<numeric 2>,…<numeric 2N>` The data transfer format depends on the `FORM:DATA` command setting.
Related Commands	`CALC:DATA:FDAT`
Equivalent Softkeys	**None**

CALC:TRAC:DATA:FMEM?

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

Description	Reads out the formatted memory array (query only). 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.

Target	The specified trace <Tr> of channel <Ch>,
	`<Tr>={[1]|2|3|4}`
	`<Ch>={[1]|2|3|4}`
	`<Tr>={[1]…|16}` (in N-port mode only)
	`<Ch>={[1]…|16}` (in N-port mode only)

Query Response	`<numeric 1>,<numeric 2>,…<numeric 2N>` The data transfer format depends on the FORM:DATA command setting.
Notes	If the memory is empty, an error occurs and the command is ignored.
Related Commands	`CALC:DATA:FMEM`
Equivalent Softkeys	**None**

CALC:TRAC:DATA:SDAT?

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

Description	Reads out the corrected data array (query only). 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.

Target	The specified trace <Tr> of channel <Ch>,
	`<Tr>={[1]|2|3|4}`
	`<Ch>={[1]|2|3|4}`
	`<Tr>={[1]…|16}` (in N-port mode only)
	`<Ch>={[1]…|16}` (in N-port mode only)

Query Response	`<numeric 1>,<numeric 2>,…<numeric 2N>` The data transfer format depends on the `FORM:DATA` command setting.
Related Commands	`CALC:DATA:SDAT`
Equivalent Softkeys	**None**

CALC:TRAC:DATA:SMEM?

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

Description	Reads out the corrected memory array (query only). 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.

Target	The specified trace <Tr> of channel <Ch>,
	`<Tr>={[1]|2|3|4}`
	`<Ch>={[1]|2|3|4}`
	`<Tr>={[1]…|16}` (in N-port mode only)
	`<Ch>={[1]…|16}` (in N-port mode only)

Query Response	`<numeric 1>,<numeric 2>,…<numeric 2N>` The data transfer format depends on the `FORM:DATA` command setting.
Notes	If the memory is empty, an error occurs and the command is ignored.
Related Commands	`CALC:DATA:SMEM`
Equivalent Softkeys	**None**

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: bandpass response or direct current circuit (command/query).
Target	The active trace of channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	<char> specifies the transformation type: BPASs : Bandpass LPASs : Lowpass
Out of Range	The command is ignored.
Query Response	{BPAS|LPAS}
Preset Value	BPAS
Equivalent Softkeys	**Analysis > Time Domain > Response 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|3|4} <Ch>={[1]…|16} (in N-port mode only)
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|3|4} <Ch>={[1]…|16} (in N-port mode only)
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	**None**

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|3|4} <Ch>={[1]…|16} (in N-port mode only)
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	**None**

CALC:TRAN:TIME:LPFR

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

Description	Changes the frequency range to match with the lowpass type of the time domain transformation function (no query).
Target	The active trace of channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
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|3|4} <Ch>={[1]…|16} (in N-port mode only)
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|3|4} <Ch>={[1]…|16} (in N-port mode only)
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:STAT

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

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

Description	Sets or reads out the ON/OFF state of the time domain transformation function (command/query).
Target	The active trace of channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	{ON|1} Time domain transformation ON {OFF|0} Time domain transformation 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|3|4} <Ch>={[1]…|16} (in N-port mode only)
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	**None**

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|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	<char> specifies the stimulus type: IMPulse : Impulse STEP : Step
Out of Range	The command is ignored.
Query Response	{IMP|STEP}
Preset Value	IMP
Equivalent Softkeys	**Analysis > Time Domain > Response Type > { Bandpass | Lowpass Step | Lowpass Impulse }**

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|3|4} <Ch>={[1]…|16} (in N-port mode only)
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: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|3|4} <Ch>={[1]…|16} (in N-port mode only).
Parameter	<char> choose from: SEC : Seconds MET : Meters FEET : Feet
Query Response	{SEC|MET|FEET}
Preset Value	SEC
Equivalent Softkeys	**Analysis > Time Domain > Unit > Time, ns | Metric, m | Imperial, ft**

DEV:ADDN

```
DEVices:ADDNext
```

Description	Additing one more device to configuration (in N-port mode only)
Equivalent Softkeys	**Devices > Add Next**

DEV:COUN?

```
DEVices:COUNt
```

Description	Number of connected devices in the configuration (query only) (in N-port mode only)
Equivalent Softkeys	**None**

DEV:MOVD

```
DEVices:MOVDown <numeric>
```

Description	Moving the device from the position *Port* into position *Port+1* (in N-port mode only)
Parameter	`<numeric> Port Number {[1]|2|3|4... 16}`
Equivalent Softkeys	**Devices > Move Down**

DEV:MOVU

```
DEVices:MOVUp <numeric>
```

Description	Moving the device from the position *Port* into position *Port-1* (in N-port mode only)
Parameter	`<numeric> Port Number {[1]|2|3|4... 16}`
Equivalent Softkeys	**Devices > Move Up**

DEV:READ?

```
DEVices:READy? <numeric>
```

Description	Readiness of the device associated with port *Port* (query only) (in N-port mode only)
Parameter	`<numeric> Port Number {[1]|2|3|4... 16}`
Equivalent Softkeys	**None**

DEV:ADJ:EXEC

```
DEVices[:REFerence]:ADJust:Execute
```

Description	Adjustment of the reference frequency of all devices relative to the first in the list (in N-port mode only)
Equivalent Softkeys	**Devices > Adjust Immediate**

DEV:ADJ:PER

```
DEVices[:REFerence]:ADJust:PERiod <numeric>
```

Description	Frequency automatic adjustment period (command/query) (in N-port mode only)
Parameter	`<numeric>` Value of Frequency automatic adjustment period
Unit	sec
Equivalent Softkeys	**Devices > Frequency Adjust Period { OFF | 3 | 10 | 30 | 100 | 300 }**

DEV:PORT:OFF

```
DEVices[:REFerence]:PORT<Pt>:OFFset <numeric>

DEVices[:REFerence]:PORT<Pt>:OFFset?
```

Description	Reference frequency correction value (command/query) (in N-port mode only)
Target	`Port <Pt>,` `<Pt>={[1]|2|3|4... 16}`
Parameter	`<numeric>` Offset of Reference Frequency
Unit	Hz
Equivalent Softkeys	**None**

DEV:REML

```
DEVices:REMLast
```

Description	Removing one more device to configuration (in N-port mode only)
Equivalent Softkeys	**Devices > Remove Last**

DEV:SER?

```
DEVices:SERial? <numeric>
```

Description	Serial number of the device associated with *Port* (query only) (in N-port mode only)
Parameter	`<numeric> Port Number {[1]|2|3|4... 16}`
Equivalent Softkeys	**None**

DEV:METH?

```
DEVices[:SYNChronization]:METHod <char>

DEVices[:SYNChronization]:METHod?
```

Description	Device synchronization method (command/query) (in N-port mode only)
Parameter	<char> choose from: FREE : Independent operation of devices. No synchronization. USB : Device Synchronization via USB Bus TRIG : Device Synchronization via Trigger Bus
Out of Range	The command is ignored.
Query Response	{FREE|USB|TRIG}
Preset Value	USB
Equivalent Softkeys	**Devices > Synchronization { Free Run | USB Bus | Trig Bus }**

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 > Interface Elements Color > Background**

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 > Interface Elements Color > Grid**

DISP:COL:RES

```
DISPlay:COLor:RESet
```

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

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|3|4} <Tr>={[1]…|16} (in N-port mode only)
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 > Interface Elements Color > Data Trace**

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|3|4} <Tr>={[1]…|16} (in N-port mode only)
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 > Interface Elements Color > Memory Trace**

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 {ON|OFF|1|0}

DISPlay:FSIGn?
```

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

DISP:IMAG

```
DISPlay:IMAGe <char>

DISPlay:IMAGe?
```

Description	Sets or reads out the inverted color display of the data traces (command/query).
Parameter	<char> choose from: NORMal : Normal display INVert : Inverted color display
Out of Range	The command is ignored.
Query Response	{NORM|INV}
Preset Value	NORM
Equivalent Softkeys	**Display > Inverse Color**

DISP:MAX

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

DISPlay:MAXimize?
```

Description	Sets or reads out the ON/OFF state of the window maximization of the active channel (command/query).
Parameter	{ON|1} Maximization ON {OFF|0} Maximization OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Channels > Maximize Channel**

DISP:SPL

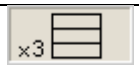
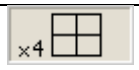
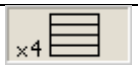
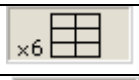
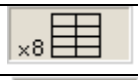
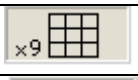
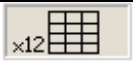
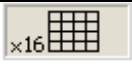
```
DISPlay:SPLit <numeric>

DISPlay:SPLit?
```

Description	Sets or reads out the layout of the channel windows on the screen (command/query). The channel window layout on the screen see below.
Parameter	`<numeric>` the number of the channel window layout from 1 to 10
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	`<numeric>`
Preset Value	`1`
Equivalent Softkeys	**Channels**

Channel window layout on the screen

1:	2:	3:
4:	5:	6:

Channel window layout on the screen (in N-port mode only)

1:	2:	3:
4: 	5: 	6: 
7: 	8: 	9: 
10:	11: 	12: 

DISP:WIND:ACT

```
DISPlay:WINDow<Ch>:ACTivate
```

Description	Sets the active channel (no query).
Target	Channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
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	**Channels > 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|3|4}` `<Ch>={[1]…|16}` (in N-port mode only)
Parameter	`<char>` choose from VERTical : Vertical alignment HORizontal : Horizontal alignment NONE : No alignment
Out of Range	The command is ignored.
Query Response	`{NONE|VERT|HOR}`
Preset Value	`NONE`
Related Commands	`DISP:WIND:ANN:MARK:SING`
Equivalent Softkeys	**Marker > Properties > Align > { Vertical | Horizontal | OFF }**

DISP:WIND:ANN:MARK:SING

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

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

Description	Sets or reads out the ON/OFF state of the marker display for the active trace only (command/query).
Target	Channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	{ON|1} Only active trace markers display ON {OFF|0} Only active trace markers display OFF
Query Response	{0|1}
Preset Value	1
Equivalent Softkeys	**Marker > Properties > Active Only**

DISP:WIND:MAX

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

DISPlay:WINDow<Ch>:MAXimize?
```

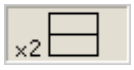
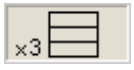
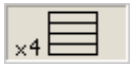
Description	Sets or reads out the ON/OFF state of the active trace maximization of the specified channel (command/query).
Parameter	{ON|1} Maximization ON {OFF|0} Maximization OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Trace > Trace Allocation > Maximize Trace**

DISP:WIND:SPL

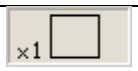
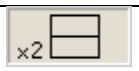
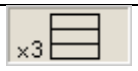
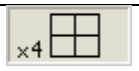
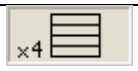
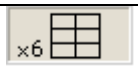
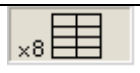
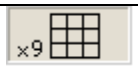
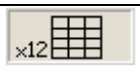
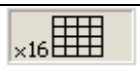
```
DISPlay:WINDow<Ch>:SPLit <numeric>

DISPlay:WINDow<Ch>:SPLit?
```

Description	Sets or reads out the layout of the graph in the channel window (command/query). The graph layout in the channel window see below.
Target	Channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	<numeric> the number of the graph layout from 1 to 9
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<numeric>
Preset Value	1
Equivalent Softkeys	**Trace > Trace Allocation**

Graph layout in the channel window

1:	2: 	3:
4: 	5:	6: 

Graph layout in the channel window (in N-port mode only)

1: 	2: 	3:
4: 	5: 	6: 
7: 	8: 	9: 
10:	11: 	12: 

DISP:WIND:TITL

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

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

Description	Sets or reads out the ON/OFF state of the channel title display (command/query).
Target	Channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	{ON|1} Channel title display ON {OFF|0} Channel title display OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Display > Caption**

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|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	<string>, up to 256 characters (quoted string)
Query Response	<string>
Preset Value	""
Equivalent Softkeys	**None**

DISP:WIND:TRAC:ANN:MARK:MEM

```
DISPlay:WINDow<Ch>:TRACe<Tr>:ANNotation:MARKer:MEMory <bool>

DISPlay:WINDow<Ch>:TRACe<Tr>:ANNotation:MARKer:MEMory?
```

Description	Turns ON/OFF the state of the memory value display on the marker.
Target	Trace <Tr> of channel <Ch>, <Tr>={[1]|2|3|4} <Ch>={[1]|2|3|4} <Tr>={[1]…|16} (in N-port mode only) <Ch>={[1]…|16} (in N-port mode only)
Parameter	<bool> Specifies the memory value display: {ON|1} ON {OFF|0} OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Markers > Properties > Memory Value**

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 value on the X–axis by a percentage of the display width (command/query).
Target	Trace <Tr> of channel <Ch>, <Tr>={[1]|2|3|4} <Ch>={[1]|2|3|4} <Tr>={[1]…|16} (in N-port mode only) <Ch>={[1]…|16} (in N-port mode only)
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	**None**

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 value on the Y–axis by a percentage of the display height (command/query).
Target	Trace <Tr> of channel <Ch>, <Tr>={[1]|2|3|4} <Ch>={[1]|2|3|4} <Tr>={[1]…|16} (in N-port mode only) <Ch>={[1]…|16} (in N-port mode only)
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	**None**

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|3|4} <Ch>={[1]|2|3|4} <Tr>={[1]…|16} (in N-port mode only) <Ch>={[1]…|16} (in N-port mode only)
Equivalent Softkeys	**Scale > Auto Scale**

DISP:WIND:TRAC:Y:PDIV

```
DISPlay:WINDow<Ch>:TRACe<Tr>:Y[:SCALe]:PDIVision <response>

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|3|4} <Ch>={[1]|2|3|4} <Tr>={[1]…|16} (in N-port mode only) <Ch>={[1]…|16} (in N-port mode only)
Parameter	<response> the scale value from 10E−18 to 1E18
Out of Range	Sets the value of the limit, which is closer to the specified value.
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 <response>

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|3|4} <Ch>={[1]|2|3|4} <Tr>={[1]…|16} (in N-port mode only) <Ch>={[1]…|16} (in N-port mode only)
Parameter	<response> the reference value from 10E−18 to 1E18
Unit	{ dB (decibel) | ° (degree) | s (second) }
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|3|4} <Ch>={[1]|2|3|4} <Tr>={[1]…|16} (in N-port mode only) <Ch>={[1]…|16} (in N-port mode only)
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: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|3|4} <Ch>={[1]…|16} (in N-port mode only)
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 (from the most significant byte) SWAPped : Swapped (from the least significant byte)
Out of Range	The command is ignored.
Query Response	`{NORM|SWAP}`
Preset Value	`NORM`
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)
Out of Range	The command is ignored.
Query Response	{ASC|REAL|REAL32}
Preset Value	ASC
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	**None**

HCOP:DATE:STAM

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

HCOPy:DATE:STAMp?
```

Description	Sets or reads out the ON/OFF state of the current date and time printout in the upper right corner (command/query).
Parameter	`{ON|1}` Date & time printout ON `{OFF|0}` Date & time printout OFF
Query Response	`{0|1}`
Preset Value	`1`
Equivalent Softkeys	**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
Out of Range	The command is ignored.
Query Response	{NORM|INV}
Preset Value	NORM
Equivalent Softkeys	**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
Out of Range	The command is ignored.
Query Response	{COL|GRAY|BW}
Preset Value	BW
Equivalent Softkeys	**Print > Print Color**

HCOP:RECT

```
HCOPy:RECTangle <width>,<height>

HCOPy:RECTangle?
```

Description	Sets or reads out size of the image printout (command/query).
Parameter	<width> width of the printout <height> height of the printout
Out of Range	The command is ignored.
Query Response	<numeric 1>,<numeric 2>
Equivalent Softkeys	**None**

INIT

```
INITiate<Ch>[:IMMediate]
```

Description	Sets the channel to the single trigger mode. Before this command is sent, the channel must be in hold state, otherwise an error occurs (error code 213) and the command is ignored. On completion of the sweep, the channel goes back into the hold state. The command is completed before the end of the sweep. (no query)
Target	Channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
Notes	The sweep start in single trigger mode depends on the trigger source. If the trigger is set to internal, the sweep will start immediately upon the single mode activation. If the trigger is set otherwise, the sweep will start when the trigger signal is received.
Related Commands	TRIG:SOUR
Equivalent Softkeys	**Trigger >Trigger Mode > Single**

INIT:CONT

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

INITiate<Ch>:CONTinuous?
```

Description	Sets or reads out the ON/OFF state of the continuous trigger initiation mode. If the continuous trigger initiation mode is set to OFF, the channel tuns to the hold state (command /query).
Target	Channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	{ON|1} Continuous trigger initiation mode ON {OFF|0} Continuous trigger initiation mode OFF
Query Response	{0|1}
Preset Value	1
Notes	The sweep start in continuous trigger initiation mode depends on the trigger source. If the trigger is set to internal, the sweeps will go immediately one after another. If the trigger is set otherwise, the sweep will start when the trigger signal is received.
Related Commands	TRIG:SOUR
Equivalent Softkeys	**Trigger > Trigger Mode > Continuous** **Trigger > Trigger Mode > Hold**

MMEM:COPY

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

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

MMEM:DEL

```
MMEMory:DELete <string>
```

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

MMEM:LOAD

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

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

MMEM:LOAD:CHAN

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

Description	Recalls the instrument 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
Out of Range	The command is ignored.
Equivalent Softkeys	**Chanels > Recall Channel > { State A | B | C | D }**

MMEM:LOAD:CHAN:CAL

```
MMEMory:LOAD:CHANnel<Ch>:CALibration <string>
```

Description	Recalls the calibration for the specified channel from the file. The file must be saved by the `MMEM:STOR:CHAN:CAL` command (no query).
Target	Channel <Ch>, `<Ch>={[1]|2|3|4}` `<Ch>={[1]…|16}` (in N-port mode only)
Parameter	`<string>` File name
Notes	If the full path to the file is not specified, the \State subdirectory of the main directory will be searched for the file. The calibration files have **.cal* extension by default.
Equivalent Softkeys	**Files > Recall Calibration**

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|...J}`, where J – the number of the calibration kit (up to 50)
Parameter	`<string>` File name (quoted string)
Notes	If the full path of the file is not specified, the \CalKit subdirectory of the main 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 (quoted string)
Notes	If the full path of the file is not specified, the \Limit subdirectory of the main 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:RLIM

```
MMEMory:LOAD:RLIMit <string>
```

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

MMEM:MDIR

```
MMEMory:MDIRectory <string>
```

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

MMEM:STOR

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

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

MMEM:STOR:CHAN

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

Description	Saves the instrument 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
Out of Range	The command is ignored.
Equivalent Softkeys	**Channels > Save Channel > { State A | B | C | D }**

MMEM:STOR:CHAN:CAL

```
MMEMory:STORe:CHANnel<Ch>:CALibration <string>
```

Description	Save the specified calibration file. The file must be recaled by the MMEM:LOAD:CHAN:CAL command (no query).
Target	Channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	<string> File name
Notes	If the full path to the file is not specified, the \State subdirectory of the main directory will be searched for the file. The calibration files have **.cal* extension by default.
Equivalent Softkeys	**Files > Save Calibration**

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	**Channels > 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|...J}, where J – the number of the calibration kit (up to 50)
Parameter	<string> File name (quoted string)
Notes	If the full path of the file is not specified, the \CalKit subdirectory of the main 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 (quoted string)
Notes	If the full path of the file is not specified, the \CSV subdirectory of the main directory will be searched for the file. The file has *.csv extension by default.
Equivalent Softkeys	**Files > 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 (quoted string)
Notes	If the full path of the file is not specified, the \Image subdirectory of the main 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	**Print > Print with MS Windows**

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 (quoted string)
Notes	If the full path of the file is not specified, the \Limit subdirectory of the main 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: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 (quoted string)
Notes	If the full path of the file is not specified, the \Limit subdirectory of the main directory will be searched for the file. The ripple limit file has *.rlm extension by default.
Equivalent Softkeys	**Analysis > Ripple Test > Edit Ripple Limit > Save Ripple 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 (quoted string)
Notes	If the full path of the file is not specified, the \Segment subdirectory of the main 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 or 2–port) is set by the MMEM:STOR:SNP:TYPE:S1P and MMEM:STOR:SNP:TYPE:S2P commands. 1–port type file saves one reflection parameter: S11 or S22. 2–port type file saves all the four parameters: S11, S21, S12, S22. (no query)
Target	Active channel, set by the DISP:WIND:ACT command
Parameter	<string> File name (quoted string)
Notes	If the full path of the file is not specified, the \FixtureSim subdirectory of the main directory will be searched for the file. The 1–port measurement file has *.slp extension; the 2–port measurement file has *.s2p extension.
Equivalent Softkeys	**Files > Save Touchstone > Save Touchstone**

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).
Target	Active channel, set by the `DISP:WIND:ACT` command
Parameter	`<char>` choose from: MA : Logarithmic Magnitude / Angle format DB : Linear Magnitude / Angle format RI : Real part /Imaginary part format
Out of Range	The command is ignored.
Query Response	`{RI|DB|MA}`
Preset Value	`RI`
Equivalent Softkeys	**Files > Save Touchstone > Touchstone 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
Query Response	`<numeric>`
Preset Value	`1`
Equivalent Softkeys	**Files > Save Touchstone > Type > S1P**

MMEM:STOR:SNP:TYPE:S2P

```
MMEMory:STORe:SNP:TYPE:S2P <rcvport>, <srcport>

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	`<rcvport>` the number of the receiver port from 1 to 2 `<srcport>` the number of the source port 1
Query Response	`<numeric1>, <numeric2>`
Equivalent Softkeys	**Files > Save Touchstone > Type > S2P**

MMEM:STOR:STYP

```
MMEMory:STORe:STYPe <char>

MMEMory:STORe:STYPe?
```

Description	Selects the type of the instrument or channel state saving by the `MMEM:STOR:CHAN` command (command/query).
Parameter	`<char>` choose from: STATe : Measurement conditions CSTate : Measurement conditions and calibration tables DSTate : Measurement conditions and data traces CDSTate : Measurement conditions, calibration tables and data traces
Out of Range	An error occurs. Error code: 205.
Query Response	`{STAT|CST|DST|CDST}`
Preset Value	`CST`
Equivalent Softkeys	**Files > State > Save Type**

MMEM:TRAN?

```
MMEMory:TRANsfer? <string>
```

Description	Transfers the contents of a specified file from the instrument to the external computer (command/query).
Parameter	`<string>` the file name with the full path (quoted string)
Query Response	Block data transfer format. For example: #6001000 <binary block with length of 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 file must be 20 Mbytes or less.
Equivalent Softkeys	**None**

OUTP

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

OUTPut[:STATe]?
```

Description	Sets or reads out the ON/OFF state of the stimulus signal output. Measurements cannot be performed when the stimulus signal output is set to OFF (command/query).
Parameter	`{ON|1}` Stimulus signal output ON `{OFF|0}` Stimulus signal output OFF
Query Response	`{0|1}`
Preset Value	`1`
Equivalent Softkeys	**Stimulus > Power > RF out Off**

SENS:AVER

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

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

Description	Sets or reads out the ON/OFF state of the averaging function (command/query).
Target	Channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	{ON|1} Averaging ON {OFF|0} Averaging OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Average > Averaging**

SENS:AVER:CLE

```
SENSe<Ch>:AVERage:CLEar
```

Description	Restarts the averaging process, when averaging function is set to ON (no query).
Target	Channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
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 is set to ON (command/query).
Target	Channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
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 > Averaging 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|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	<frequency> the IF bandwidth value from 1 to 30000
Unit	Hz (Hertz)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<numeric>
Preset Value	10000
Resolution	In steps of 10, 30, 100, 300, 1000, 3000, 10000, 30000
Equivalent Softkeys	**Average > IFBW**

SENS:CABL:SEL

```
SENSe<Ch>:CABLe:SELect <numeric>
```

Description	Selection of the cable and setting its parameters in the channel (no query).
Target	Channel <Ch>, <Ch>={[1]|2|3|4}
Parameter	<numeric> the cable number in cable list
Related Command	MMEM:LOAD:CBL SENS:CABL:COUN
Equivalent Softkeys	**Analysis > Time Domain > Cable Loss Correction Cable Type > Select**

SENS:CABL:COUN

```
SENSe:CABLe:COUNt?
```

Description	Returns the number of cables in the cable list (query only).
Target	Cable list
Related Command	MMEM:LOAD:CBL
Equivalent Softkeys	**None**

SENS:CORR:CLE

```
SENSe<Ch>:CORRection:CLEar
```

Description	Clears the calibration coefficient table (no query).
Target	Channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
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 (command/query). 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
Target	Channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	<char> specifies the Error term:. ER : Reflection tracking ED : Directivity ES : Source match <rcvport>, the number of the receiver port = 1 <srcport>, the number of the source port = 1 <numeric list> the calibration coefficient array
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 Command	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|3|4}` `<Ch>={[1]…|16}` (in N-port mode only)
Parameter	`<port>` the number of the port = 1
Out of Range	An error occurs. Error code: 222.
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|3|4}` `<Ch>={[1]…|16}` (in N-port mode only)
Parameter	`<port>` the number of the port = 1
Out of Range	An error occurs. Error code: 222.
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|3|4}` `<Ch>={[1]…|16}` (in N-port mode only)
Parameter	`<port>` the number of the port = 1
Out of Range	An error occurs. Error code: 222.
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|3|4}` `<Ch>={[1]…|16}` (in N-port mode only)

Related Commands	Calibration type selection:
	`SENS:CORR:COEF:METH:SOLT1`
	`SENS:CORR:COEF:METH:OPEN`
	`SENS:CORR:COEF:METH:SHOR`
	Calibration coefficient writing:
	`SENS:CORR:COEF`

Equivalent Softkeys	**None**

SENS:CORR:COLL:CKIT

```
SENSe<Ch>:CORRection:COLLect:CKIT[:SELect] <numeric>

SENSe<Ch>:CORRection:COLLect:CKIT[:SELect]?
```

Description	Sets or reads out the number of the selected calibration kit (command/query).
Target	Channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	<numeric> the number of the calibration kit from 1 to 11
Out of Range	Error occurs. The command is ignored. Error code: 222.
Query Response	<numeric>
Preset Value	1
Equivalent Softkeys	**Calibration > Calibration Kit > Cal Kit n**

SENS:CORR:COLL:CKIT:LAB

```
SENSe<Ch>:CORRection:COLLect:CKIT:LABel <string>

SENSe<Ch>:CORRection:COLLect:CKIT:LABel?
```

Description	Sets or reads out the calibration kit label (command/query).
Target	Channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	<string>, up to 254 characters (quoted string)
Query Response	<string>
Preset Value	Varies depending on the number of the calibration kit.
Equivalent Softkeys	**Calibration > Calibration Kit > Edit Cal Kit > Label**

SENS:CORR:COLL:CKIT:RES

```
SENSe<Ch>:CORRection:COLLect:CKIT:RESet
```

Description	Resets the calibration kit to the factory settings (no query).
Target	Channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
Equivalent Softkeys	**Calibration > Calibration Kit > Edit Cal Kit > Restore**

SENS:CORR:COLL:CKIT:STAN:C0

```
SENSe<Ch>:CORRection:COLLect:CKIT:STAN<Std>:C0 <numeric>

SENSe<Ch>: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 calibration kit specified for channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only) <Std>={[1]|2|...K}, where K – 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 > Calibration Kit > Edit Cal Kit > C0 10–15 F**

SENS:CORR:COLL:CKIT:STAN:C1

```
SENSe<Ch>:CORRection:COLLect:CKIT:STAN<Std>:C1 <numeric>

SENSe<Ch>: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 calibration kit specified for channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only) <Std>={[1]|2|...K}, where K – 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 > Calibration Kit > Edit Cal Kit > C1 10–27 F/Hz**

SENS:CORR:COLL:CKIT:STAN:C2

```
SENSe<Ch>:CORRection:COLLect:CKIT:STAN<Std>:C2 <numeric>

SENSe<Ch>: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 calibration kit specified for channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only) <Std>={[1]|2|...K}, where K – the number of the standards in the calibration kit
Parameter	<numeric> the C2 value from –1E18 to 1E18
Unit	1E–36 F/Hz2 (Farad/Hertz2)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<numeric>
Equivalent Softkeys	**Calibration > Calibration Kit > Edit Cal Kit > C2 10–36 F/Hz2**

SENS:CORR:COLL:CKIT:STAN:C3

```
SENSe<Ch>:CORRection:COLLect:CKIT:STAN<Std>:C3 <numeric>

SENSe<Ch>: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 calibration kit specified for channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only) <Std>={[1]|2|...K}, where K – the number of the standards in the calibration kit
Parameter	<numeric> the C3 value from –1E18 to 1E18
Unit	1E–45 F/Hz3 (Farad/Hertz3)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<numeric>
Equivalent Softkeys	**Calibration > Calibration Kit > Edit Cal Kit > C3 10–45 F/Hz3**

SENS:CORR:COLL:CKIT:STAN:DEL

```
SENSe<Ch>:CORRection:COLLect:CKIT:STAN<Std>:DELay <numeric>

SENSe<Ch>: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 calibration kit specified for channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only) <Std>={[1]|2|...K}, where K – 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 > Calibration Kit > Edit Cal Kit > Offset Delay**

SENS:CORR:COLL:CKIT:STAN:L0

```
SENSe<Ch>:CORRection:COLLect:CKIT:STAN<Std>:L0 <numeric>

SENSe<Ch>: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 calibration kit specified for channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only) <Std>={[1]|2|...K}, where K – 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 > Calibration Kit > Edit Cal Kit > L0 10–12 H**

SENS:CORR:COLL:CKIT:STAN:L1

```
SENSe<Ch>:CORRection:COLLect:CKIT:STAN<Std>:L1 <numeric>

SENSe<Ch>: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 calibration kit specified for channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only) <Std>={[1]|2|...K}, where K – 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 > Calibration Kit > Edit Cal Kit > L1 10–24 H/Hz**

SENS:CORR:COLL:CKIT:STAN:L2

```
SENSe<Ch>:CORRection:COLLect:CKIT:STAN<Std>:L2 <numeric>

SENSe<Ch>: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 calibration kit specified for channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only) <Std>={[1]|2|...K}, where K – the number of the standards in the calibration kit
Parameter	<numeric> the L2 value from –1E18 to 1E18
Unit	1E–33 H/Hz2 (Henry/Hertz2)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<numeric>
Equivalent Softkeys	**Calibration > Calibration Kit > Edit Cal Kit > L2 10–33 H/Hz2**

SENS:CORR:COLL:CKIT:STAN:L3

```
SENSe<Ch>:CORRection:COLLect:CKIT:STAN<Std>:L3 <numeric>

SENSe<Ch>: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 calibration kit specified for channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only) <Std>={[1]|2|...K}, where K – the number of the standards in the calibration kit
Parameter	<numeric> the L3 value from –1E18 to 1E18
Unit	1E–42 H/Hz3 (Henry/Hertz3)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<numeric>
Equivalent Softkeys	**Calibration > Calibration Kit > Edit Cal Kit > L3 10–42 H/Hz3**

SENS:CORR:COLL:CKIT:STAN:LAB?

`SENSe<Ch>:CORRection:COLLect:CKIT:STAN<Std>:LABel?`

Description	Sets or reads out the label for the calibration standard (command/query).
Target	Standard <Std> of the calibration kit specified for channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only) <Std>={[1]|2|...K}, where K – the number of the standards in the calibration kit
Parameter	<string>, up to 254 characters (quoted string)
Query Response	<string>
Equivalent Softkeys	**Calibration > Calibration Kit > Edit Cal Kit > Label**

SENS:CORR:COLL:CKIT:STAN:LOSS

```
SENSe<Ch>:CORRection:COLLect:CKIT:STAN<Std>:LOSS <loss>

SENSe<Ch>: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 calibration kit specified for channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only) <Std>={[1]|2|...K}, where K – the number of the standards in the calibration kit
Parameter	<loss> 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 > Calibration Kit > Edit Cal Kit > Offset Loss**

SENS:CORR:COLL:CKIT:STAN:TYPE?

`SENSe<Ch>:CORRection:COLLect:CKIT:STAN<Std>:TYPE?`

Description	Sets or reads out the type of calibration standard (command/query).
Target	Standard <Std> of the calibration kit specified for channel <Ch>, `<Ch>={[1]|2|3|4}` `<Ch>={[1]…|16}` (in N-port mode only) `<Std>={[1]|2|...K}`, where K – the number of the standards in the calibration kit
Parameter	OPEN : Open SHORt : Short LOAD : Load THRU : Thru
Out of Range	Error occurs. The command is ignored. Error code: 216.
Query Response	`{OPEN|SHOR|LOAD|THRU}`
Equivalent Softkeys	**Calibration > Calibration Kit > Edit Cal Kit > Standard Type**

SENS:CORR:COLL:CKIT:STAN:Z0

```
SENSe<Ch>:CORRection:COLLect:CKIT:STAN<Std>:Z0 <impedance>

SENSe<Ch>: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 calibration kit specified for channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only) <Std>={[1]|2|...K}, where K – the number of the standards in the calibration kit
Parameter	<impedance> 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 > Calibration Kit > Edit Cal Kit > Offset Z0**

SENS:CORR:COLL:CLE

```
SENSe<Ch>:CORRection:COLLect:CLEar
```

Description	Clears the measurement values of the calibration standards (no query).
Target	Channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
Equivalent Softkeys	**Calibration > { Open | Short | Load } > Cancel**

SENS:CORR:COLL:ECAL:CHECK:EXEC

```
SENSe<Ch>:CORRection:COLLect:ECAL:CHECK:EXECute
```

Description	Executing confidence check
Target	AutoCal module (*Ch* – arbitrary number 1 to 4)
Equivalent Softkeys	**Calibration > Autocalibration > Confidence Check**

SENS:CORR:COLL:ECAL:ORI:EXEC

```
SENSe:CORRection:COLLect:ECAL:ORIentation:EXECute
```

Description	Executing AutoCal orientation
Target	AutoCal module
Equivalent Softkeys	**Calibration > Autocalibration > Perform Auto-Orientation**

SENS:CORR:COLL:ECAL:ORI:STAT

```
SENSe:CORRection:COLLect:ECAL:ORIentation:STATe {ON|OFF|1|0}

SENSe:CORRection:COLLect:ECAL:ORIentation:STATe?
```

Description	Sets or reads out the ON/OFF state of the Auto-Orientation function used when executing Autocalibration (command/query).
Target	Autocalibration
Parameter	`{ON|1}` Auto-Orientation function ON `{OFF|0}` Auto-Orientation function OFF
Query Response	`{0|1}`
Preset Value	`0`
Equivalent Softkeys	**Calibration > Autocalibration > Orientation > Auto-Orientation**

SENS:CORR:COLL:ECAL:SOLT1

```
SENSe<Ch>:CORRection:COLLect:ECAL:SOLT1 <numeric>
```

Description	Executes 1-port calibration of the specified port of specified channel (Ch) using the Autocalibration module (command only).
Target	Channel <Ch>, `<Ch>={[1]|2|3|4}` `<Ch>={[1]…|16}` (in N-port mode only)
Parameter	`<numeric>` : Port Number = 1
Equivalent Softkeys	**Calibration > Autocalibration > Calibrate**

SENS:CORR:COLL:ECAL:SOLT2

`SENSe<Ch>:CORRection:COLLect:ECAL:SOLT2 <numeric1>,<numeric2>`

Description	Executes the one path 2–port calibration in both directions of the specified ports of selected channel (Ch) using the AutoCal module. (in N-port mode only) Data(0) the number of the receiver port; Data(1) the number of the source port
Target	Channel <Ch>, `<Ch>={[1]…|16}` (in N-port mode only).
Parameter	Port number from 1 to 16. The array elements can not contain the same port numbers.
Equivalent Softkeys	**Calibration > Autocalibration > Calibrate**

SENS:CORR:COLL:ECAL:UCH

```
SENSe:CORRection:COLLect:ECAL:UCHar <char>

SENSe:CORRection:COLLect:ECAL:UCHar?
```

Description	Sets or reads out the Characteristic used when executing Autocalibration (factory or user characterization). (command/query).
Target	Autocalibration
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 > Autocalibration > Characterization**

SENS:CORR:COLL:LOAD

```
SENSe<Ch>:CORRection:COLLect[:ACQuire]:LOAD <numeric>
```

Description	Measures the calibration data of the load standard for the specified port (no query).
Target	Channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only).
Parameter	Port number is 1, 1-16 (in N-port mode only).
Out of Range	Error occurs. The command is ignored..
Notes	The command start the measurement for the channel independently of the trigger and trigger source settings. The command waits for the completion of the measurement.
Equivalent Softkeys	**Calibration > Load**

SENS:CORR:COLL:METH:ERES

```
SENSe<Ch>:CORRection:COLLect:METHod:ERESponse <numeric1>,
<numeric2>
```

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(Ch):CORR:COLL:SAVE` command. (in N-port mode only)
Target	Channel <Ch>, `<Ch>={[1]…|16}`(in N-port mode only).
Parameter	Port number from 1 to 16. The array elements can not contain the same port numbers.
Out of Range	Error occurs.
Related commands	`SENS:CORR:COLL:SAVE`
Equivalent Softkeys	**Calibration > Calibration Type**

SENS:CORR:COLL:METH:OPEN

`SENSe<Ch>:CORRection:COLLect:METHod[:RESPonse]:OPEN <numeric>`

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|3|4}` `<Ch>={[1]…|16}` (in N-port mode only).
Parameter	Port number is 1, 1-16 (in N-port mode only).
Out of Range	Error occurs. The command is ignored.
Related Commands	`SENS:CORR:COLL:SAVE`
Equivalent Softkeys	**None**

SENS:CORR:COLL:METH: SHOR

`SENSe<Ch>:CORRection:COLLect:METHod[:RESPonse]:SHORt <numeric>`

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|3|4}` `<Ch>={[1]…|16}` (in N-port mode only).
Parameter	Port number is 1, 1-16 (in N-port mode only).
Out of Range	Error occurs. The command is ignored.
Related Commands	`SENS:CORR:COLL:SAVE`
Equivalent Softkeys	**None**

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|3|4}` `<Ch>={[1]…|16}` (in N-port mode only)
Parameter	`<port>` the number of the port = 1
Out of Range	Error occurs. The command is ignored.
Related Commands	`SENS:CORR:COLL:SAVE`
Equivalent Softkeys	**None**

SENS:CORR:COLL:METH:SOLT2

```
SENSe<Ch>:CORRection:COLLect:METHod:SOLT2 <numeric 1>,
<numeric 2>
```

Description	Selects the port 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]...|16} (in N-port mode only)
Parameter	Port number is 1, 1-16 (in N-port mode only)
Out of Range	Error occurs. The command is ignored.
Related Commands	SENS:CORR:COLL:SAVE
Equivalent Softkeys	**None**

SENS:CORR:COLL:METH: THRU

```
SENSe<Ch>:CORRection:COLLect:METHod[:RESPonse]:THRU
<numeric1>, <numeric2>
```

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|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	Port number is 1, 1-16 (in N-port mode only).
Out of Range	Error occurs. The command is ignored.
Related Commands	`SENS:CORR:COLL:SAVE`
Equivalent Softkeys	**None**

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|3|4}` `<Ch>={[1]…|16}` (in N-port mode only)
Query Response	ST : Scalar Thru (in N-port mode only) RO : Response (Open) RS : Response (Short) F1 : Full 1–port calibration F1ST : Full 1–port calibration + Scalar Thru (in N-port mode only) F2ST : Full 2-port calibration + Scalar Thru (in N-port mode only) MATH : Calculated Full 2-port calibration + Scalar Thru (in N-port mode only) NONE : Not defined
Equivalent Softkeys	**None**

SENS:CORR:COLL:OPEN

```
SENSe<Ch>:CORRection:COLLect[:ACQuire]:OPEN <numeric>
```

Description	Measures the calibration data of the open standard for the specified port (no query).
Target	Channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	Port number is 1, 1-16 (in N-port mode only).
Out of Range	Error occurs. The command is ignored.
Notes	The command start the measurement for the channel independently of the trigger and trigger source settings. The command waits for the completion of the measurement.
Equivalent Softkeys	**Calibration > Open**

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. On completion of the command, all the calibration standards measurements are cleared and the error correction automatically turns ON. Before executing this command it is neccessery to select calibration type by one of commands `SENS:CORR:COLL:METH:XXXX`. 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|3|4}` `<Ch>={[1]…|16}` (in N-port mode only)

Related Commands	Calibration type selection:
	`SENS:CORR:COLL:METH:OPEN`
	`SENS:CORR:COLL:METH:SHOR`
	`SENS:CORR:COLL:METH:SOLT1`
	`SENS:CORR:COLL:METH:SOLT2` (in N-port mode only)
	Calibration standards measurement:
	`SENS:CORR:COLL:LOAD`
	`SENS:CORR:COLL:OPEN`
	`SENS:CORR:COLL:SHOR`

Equivalent Softkeys	**Calibration > { Open | Short | Load } > Apply**

SENS:CORR:COLL:SHOR

```
SENSe<Ch>:CORRection:COLLect[:ACQuire]:SHORt <numeric>
```

Description	Measures the calibration data of the short standard for the specified port (no query).
Target	Channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only).
Parameter	Port number is 1, 1-16 (in N-port mode only).
Out of Range	Error occurs. The command is ignored..
Notes	The command start the measurement for the channel independently of the trigger and trigger source settings. The command waits for the completion of the measurement.
Equivalent Softkeys	**Calibration > Short**

SENS:CORR:COLL:THRU

```
SENSe<Ch>:CORRection:COLLect[:ACQuire]:THRU <numeric1>,
<numeric2>
```

Description	Measures the calibration data of the thru standard between the source port and the receiver port. (in N-port mode only)
Target	Channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
Range	Port number is 1-16
Notes	The property writing starts the measurement for the channel independently of the trigger initiation and trigger source settings. The function of the property writing waits for the completion of the measurement.
Equivalent Softkeys	**Calibration > Thru**

SENS:CORR:EXT

```
SENSe<Ch>:CORRection:EXTension[:STATe] {ON|OFF|1|0}

SENSe<Ch>:CORRection:EXTension[:STATe]?
```

Description	Sets or reads out the ON/OFF state of the port extension function (command/query).
Target	Channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	{ON|1} Port extension function ON {OFF|0} Port extension function OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Calibration > Port Extension >Port 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|3|4} <Ch>={[1]…|16} (in N-port mode only) <Pt>=1 <Pt>={[1]…|16} (in N-port mode only)
Parameter	<frequency> the frequency value from 85E6 to 5.4E9 (R54), from 85E6 to 14E9 (R140), from 1e6 to 6e9 (R60), from 1e6 to 18e9 (R180)
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 Extension > { Freq1 | Freq2 }**

SENS:CORR:EXT:PORT:INCL

```
SENSe<Ch>:CORRection:EXTension:PORT<Pt>:INCLude{[1]|2}[:STATe]
{ON|OFF|1|0}

SENSe<Ch>:CORRection:EXTension:PORT<Pt>:INCLude{[1]|2}[:STATe]
?
```

Description	Sets or reads out the ON/OFF state of the compensation of the loss 1 and loss 2 for the port extension function (command/query).
Target	Channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only) <Pt>=1 <Pt>={[1]…|16} (in N-port mode only)
Parameter	{ON|1} Loss compensation ON {OFF|0} Loss compensation OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Calibration > Port Extension > { Loss1 | Loss2 }**

SENS:CORR:EXT:PORT:LDC

```
SENSe<Ch>:CORRection:EXTension:PORT<Pt>:LDC <loss>

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|3|4} <Ch>={[1]…|16} (in N-port mode only) <Pt>=1 <Pt>={[1]…|16} (in N-port mode only)
Parameter	<loss> 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 Extension > Loss at DC**

SENS:CORR:EXT:PORT:LOSS

```
SENSe<Ch>:CORRection:EXTension:PORT<Pt>:LOSS{[1]|2} <loss>

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|3|4} <Ch>={[1]…|16} (in N-port mode only) <Pt>=1 <Pt>={[1]…|16} (in N-port mode only)
Parameter	<loss> 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 Extension > { 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|3|4} <Ch>={[1]…|16} (in N-port mode only) <Pt>=1 <Pt>={[1]…|16} (in N-port mode only)
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 Extension > Port Extension**

SENS:CORR:IMP

```
SENSe:CORRection:IMPedance[:INPut][:MAGNitude] <impedance>

SENSe:CORRection:IMPedance[:INPut][:MAGNitude]?
```

Description	Sets or reads out the system impedance Z0 (command/query)
Parameter	`<impedance>` 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	**None**

SENS:CORR:STAT

```
SENSe<Ch>:CORRection:STATe {ON|OFF|1|0}

SENSe<Ch>:CORRection:STATe?
```

Description	Sets or reads out the ON/OFF state of the error correction (command/query).
Target	Channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	{ON|1} : Error correction ON {OFF|0} : Error correction 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|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	<frequency> the frequency value.
Unit	Hz (Hertz)
Query Response	<numeric>
Preset Value	1 GHz
Equivalent Softkeys	**Analysis > Time Domain > Cable Loss 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|3|4} <Ch>={[1]…|16} (in N-port mode only)
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 Loss Correction > 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|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	<numeric> the cable velocity factor.
Query Response	<numeric>
Preset Value	1.0
Equivalent Softkeys	**Analysis > Time Domain > Cable Loss Correction > Velocity Factor**

SENS:CORR:TRAN:TIME:STAT

```
SENSe<Ch>:CORRection:TRANsform:TIME:STATe <bool>

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|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	Specifies state of the cable correction: {ON|1} : ON {OFF|0} : OFF
Query Response	{0|1}
Preset Value	0
Equivalent Softkeys	**Analysis > Time Domain > Cable Loss Correction > Cable Loss Correction**

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|3|4} <Ch>={[1]|2|3|4} <Tr>={[1]…|16} (in N-port mode only) <Ch>={[1]…|16} (in N-port mode only)
Query Response	{ST|RO|RS||F1|F1ST|F2ST|MATH|NONE},<srcport>,<rcvport> Where: ST : Scalar Thru (in N-port mode only) RO : Response (Open) RS : Response (Short) F1 : Full 1–port calibration F1ST : Full 1–port calibration + Scalar Thru (in N-port mode only) F2ST : Full 2-port calibration + Scalar Thru (in N-port mode only) MATH : Calculated Full 2-port calibration + Scalar Thru (in N-port mode only) NONE : Not defined <rcvport>, the number of the receiver port = 1 <srcport>, the number of the source port = 1
Equivalent Softkeys	**None**

SENS:FREQ:DATA?

```
SENSe<Ch>:FREQuency:DATA?
```

Description	Reads out the array of the measurement points frequency (query only). 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
Target	Channel <Ch>, `<Ch>={[1]|2|3|4}` `<Ch>={[1]…|16}` (in N-port mode only)
Query Response	`<numeric 1>,<numeric 2>,…<numeric N>` The data transfer format depends on the `FORM:DATA` command setting.
Related Commands	`FORM:DATA`
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|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	<frequency> the stimulus center value from 85E6 to 5.4E9 (R54), from 85E6 to 14E9 (R140), from 1e6 to 6e9 (R60), from 1e6 to 18e9 (R180)
Unit	Hz (Hertz)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<numeric>
Equivalent Softkeys	**None**

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|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	<frequency> the stimulus span value from 0 to 5.315E9 (R54), from 0 to 13.915E9 (R140), from 0 to 5.999e9 (R60), from 0 to 17.999e9 (R180).
Unit	Hz (Hertz)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<numeric>
Equivalent Softkeys	**None**

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|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	<frequency> the stimulus start value from 85E6 to 5.4E9 (R54), from 85E6 to 14E9 (R140), from 1e6 to 6e9 (R60), from 1e6 to 18e9 (R180).
Unit	Hz (Hertz)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<numeric>
Equivalent Softkeys	**Stimulus > Start Frequency**

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|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	<frequency> the stimulus start value from 85E6 to 5.4E9 (R54), from 85E6 to 14E9 (R140), from 1e6 to 6e9 (R60), from 1e6 to 18e9 (R180).
Unit	Hz (Hertz)
Out of Range	Sets the value of the limit, which is closer to the specified value.
Query Response	<numeric>
Equivalent Softkeys	**Stimulus > Stop Frequency**

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|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	<char> choose from: INTernal : Internal source of the reference frequency EXTernal : External source of the reference frequency
Out of Range	Error occurs. The command is ignored. Error code: 224.
Query Response	{INT|EXT}
Preset Value	INT
Equivalent Softkeys	**System > Reference 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 (command/query).
	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)

Target	Channel <Ch>, `<Ch>={[1]|2|3|4}` `<Ch>={[1]…|16}` (in N-port mode only)

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	**None**

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|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	<numeric> the number of measurement points from 2 to 100001 from 2 to 16001 (in N-port mode only)
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|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	<time> the measurement delay value from 0 to 0.3
Resolution	5E-6
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	**None**

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|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	<char> specifies the sweep type: LINear : Linear frequency sweep LOGarithmic : Logarithmic frequency sweep SEGMent : Segment frequency sweep
Out of Range	Error occurs. The command is ignored. Error code: 206.
Query Response	{LIN|LOG|SEGM}
Preset Value	LIN
Equivalent Softkeys	**Stimulus > Sweep Type**

SERV:CHAN:ACT?

```
SERVice:CHANnel:ACTive?
```

Description	Reads out the active channel number (query only).
Query Response	<numeric> from 1 to 4
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|3|4}` `<Ch>={[1]…|16}` (in N-port mode only)
Query Response	`<numeric>` from 1 to 4
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:POW

```
SOURce<Ch>:POWer[:LEVel][:IMMediate][:AMPLitude]
{MIN|MAX|<power>}

SOURce<Ch>:POWer[:LEVel][:IMMediate][:AMPLitude]?
```

Description	Sets or reads out the power level for the frequency sweep (command/query). (only for R60, R180)
Target	Channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	<power> level power
Resolution	0.05
Unit	dBm (decibels above 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	**Stimulus > Power > Output Power**

SOUR:POW:STAT

```
SOURce<Ch>:POWer[:LEVel]:STATe <char>
```

Description	Sets or reads out the power level for the frequency sweep. (only for R54/R140).
Target	Channel <Ch>, <Ch>={[1]|2|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	<char> specifies the power level for the frequency sweep: HIGH : high output power; LOW : low output power: ROFF : RF Out is Off.
Out of Range	Error occurs. The command is ignored..
Query Response	{HIGH|LOW|ROFF}
Preset Value	"HIGH"
Equivalent Softkeys	**Stimulus > Power**

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
Out of Range	Bit–to–bit AND with numeric 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
Out of Range	Bit–to–bit AND with numeric 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
Out of Range	Bit–to–bit AND with numeric 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
Out of Range	Bit–to–bit AND with numeric 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|3|4} <Ch>={[1]…|16} (in N-port mode only)
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|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	<numeric> from 0 to 65535
Out of Range	Bit–to–bit AND with numeric 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|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	<numeric> from 0 to 65535
Out of Range	Bit–to–bit AND with numeric 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|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	<numeric> from 0 to 65535
Out of Range	Bit–to–bit AND with numeric 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|3|4} <Ch>={[1]…|16} (in N-port mode only)
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
Out of Range	Bit–to–bit AND with numeric 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
Out of Range	Bit–to–bit AND with numeric 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
Out of Range	Bit–to–bit AND with numeric 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
Out of Range	Bit–to–bit AND with numeric 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
Out of Range	Bit–to–bit AND with numeric 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|3|4}` `<Ch>={[1]…|16}` (in N-port mode only)
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|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	<numeric> from 0 to 65535
Out of Range	Bit–to–bit AND with numeric 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|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	<numeric> from 0 to 65535
Out of Range	Bit–to–bit AND with numeric 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|3|4} <Ch>={[1]…|16} (in N-port mode only)
Parameter	<numeric> from 0 to 65535
Out of Range	Bit–to–bit AND with numeric 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|3|4} <Ch>={[1]…|16} (in N-port mode only)
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
Out of Range	Bit–to–bit AND with numeric 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
Out of Range	Bit–to–bit AND with numeric 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
Out of Range	Bit–to–bit AND with numeric 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: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:CONN:SER

```
SYSTem:CONNection:SERial[:NUMBer] <numeric>

SYSTem:CONNection:SERial[:NUMBer]?
```

Description	Sets or reads out serial number of the analyzer to which the software is connected (command/query).
Parameter	<numeric> serial number Where: "0" is autodetect (software connect to any Analyzer).
Query Response	<numeric>
Equivalent Softkeys	**System->Analyzer Model->Analyzer Serial**

SYST:CORR

```
SYSTem:CORRection[:STATe] {ON|OFF|1|0}

SYSTem:CORRection[:STATe]?
```

Description	Sets or reads out the ON/OFF state of the system error correction (command/query).
Parameter	{ON|1} : System error correction ON {OFF|0}: System error correction OFF
Query Response	{0|1}
Preset Value	1
Equivalent Softkeys	**System > System Correction**

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 instrument. 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:HIDE

```
SYSTem:HIDE
```

Description	Hides the instrument GUI (no query).
Related Commands	`SYST:SHOW`
Equivalent Softkeys	**None**

SYST:LOC

```
SYSTem:LOCal
```

Description	Sets the instrument 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:PRES

```
SYSTem:PRESet
```

Description	Resets the instrument 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 instrument 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 instrument to the local operation mode (no query).
Related Commands	`SYST:LOC` `SYST:RWL`
Equivalent Softkeys	**None**

SYST:RWL

```
SYSTem:RWLock
```

Description	Sets the instrument 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:SHOW

```
SYSTem:SHOW
```

Description	Shows the instrument GUI hidden by the `SYST: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
Parameter	`<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**

TRIG

```
TRIGger[:SEQuence][:IMMediate]
```

Description	Generates a trigger, independently of the trigger source setting (except for the External). If the trigger source is set to External, an error occurs (error code 221) and the command is ignored. If the instrument is not in the waiting for a trigger state (sweep is in progress or all the channels are set to Hold), an error occurs (error code 211) and the command is ignored. The command is completed before the end of the sweep. (no query)
Related Commands	TRIG:SOUR INIT:CONT INIT:IMM
Equivalent Softkeys	**None**

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	**Trigger > Trigger Input > Delay**

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	**Trigger > Trigger Input > Position > Before Sampling | Before Setup**

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	**Trigger > Trigger Input> Polarity > Negative Edge | Positive Edge**

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	**Trigger > Trigger Output > Position > Before Setup | Before Sampling | After Sampling | Ready for Trig | 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 : Positive edge
Query Response	{POS|NEG}
Preset value	NEG
Related Commands	TRIG:OUTP:FUNC
Equivalent Softkeys	**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	**Trigger > Trigger Output > Enable Out> 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	**Trigger > Trigger Input > Event > On Sweep | On Point**

TRIG:SING

```
TRIGger[:SEQuence]:SINGle
```

Description	Generates a trigger, independently of the trigger source setting (except for the External). If the trigger source is set to External, an error occurs (error code 221) and the command is ignored. If the instrument is not in the waiting for a trigger state (sweep is in progress or all the channels are set to Hold), an error occurs (error code 211) and the command is ignored. The command is not completed before the end of the sweep (waiting for the completion of the sweep of all the channels). (no query)

Related Commands	`TRIG:SOUR`
	`INIT:CONT`
	`INIT:IMM`

Equivalent Softkeys	**None**

TRIG:SOUR

```
TRIGger[:SEQuence]:SOURce <char>

TRIGger[:SEQuence]:SOURce?
```

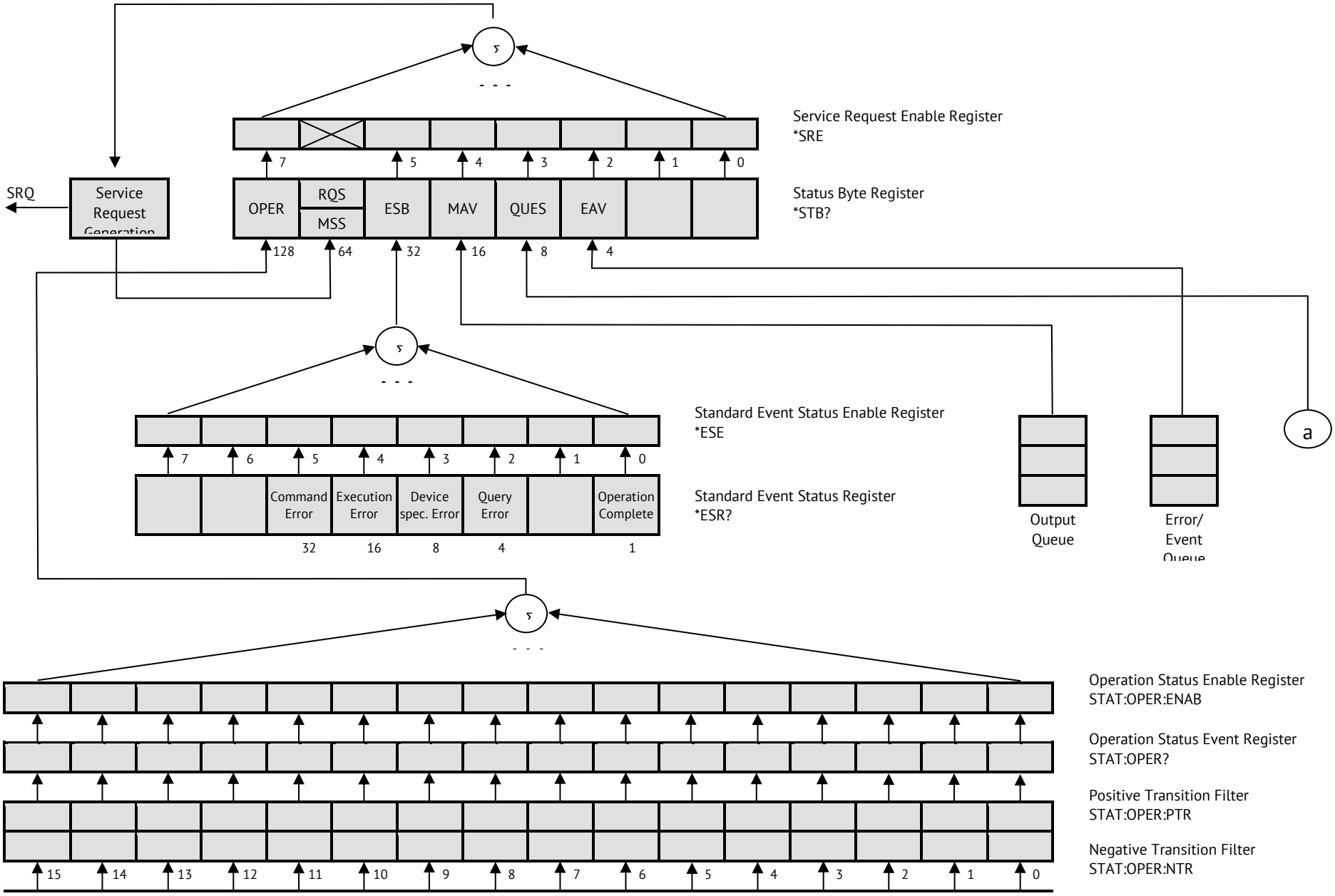
Description	Sets or reads out the sweep trigger source (command/query).
Parameter	<char> choose from: INTernal : Internal EXTernal : External BUS : Bus
Out of Range	Error occurs. The command is ignored. Error code: 205
Query Response	{INT|EXT|MAN|BUS}
Preset Value	INT
Related Commands	TRIG TRIG:SING *TRG
Equivalent Softkeys	**Trigger> Trigger Source > { Internal | External | Bus }**

TRIG:WAIT

```
TRIGger[:SEQuence]:WAIT <char>
```

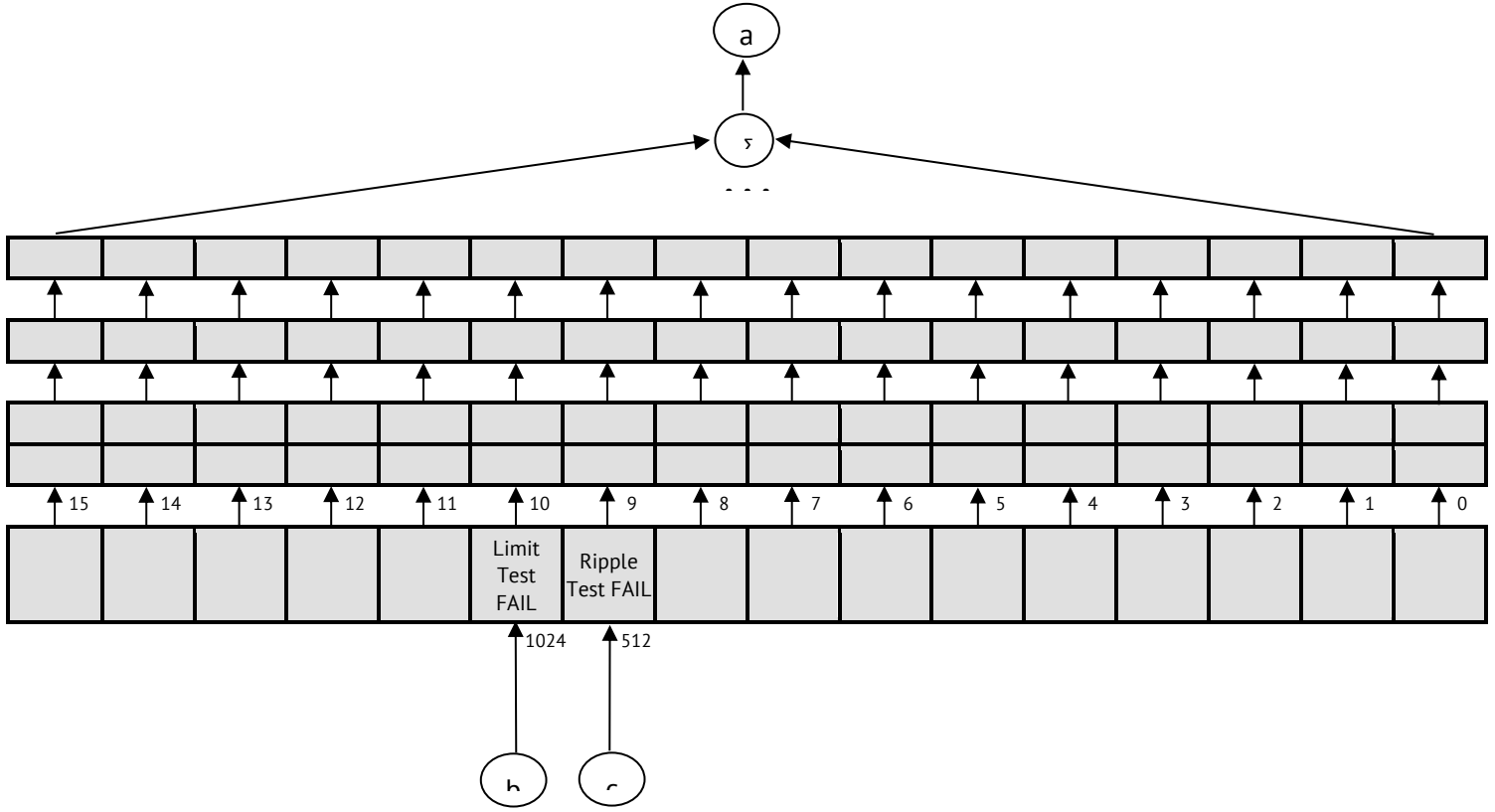
Description	Delays the execution by the analyzer of the next command till the specified state of the analyzer has been reached (see options below). A query that follows the `TRIG:WAIT` command blocks the execution of the user program till the specified state of the analyzer has been reached. The command 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**

APPENDIX 1. IEE488.2 STATUS REPORTING SYSTEM



Operation Status Condition Register
STAT:OPER:COND?

Appendix 1. IEE488.2 Status Reporting System



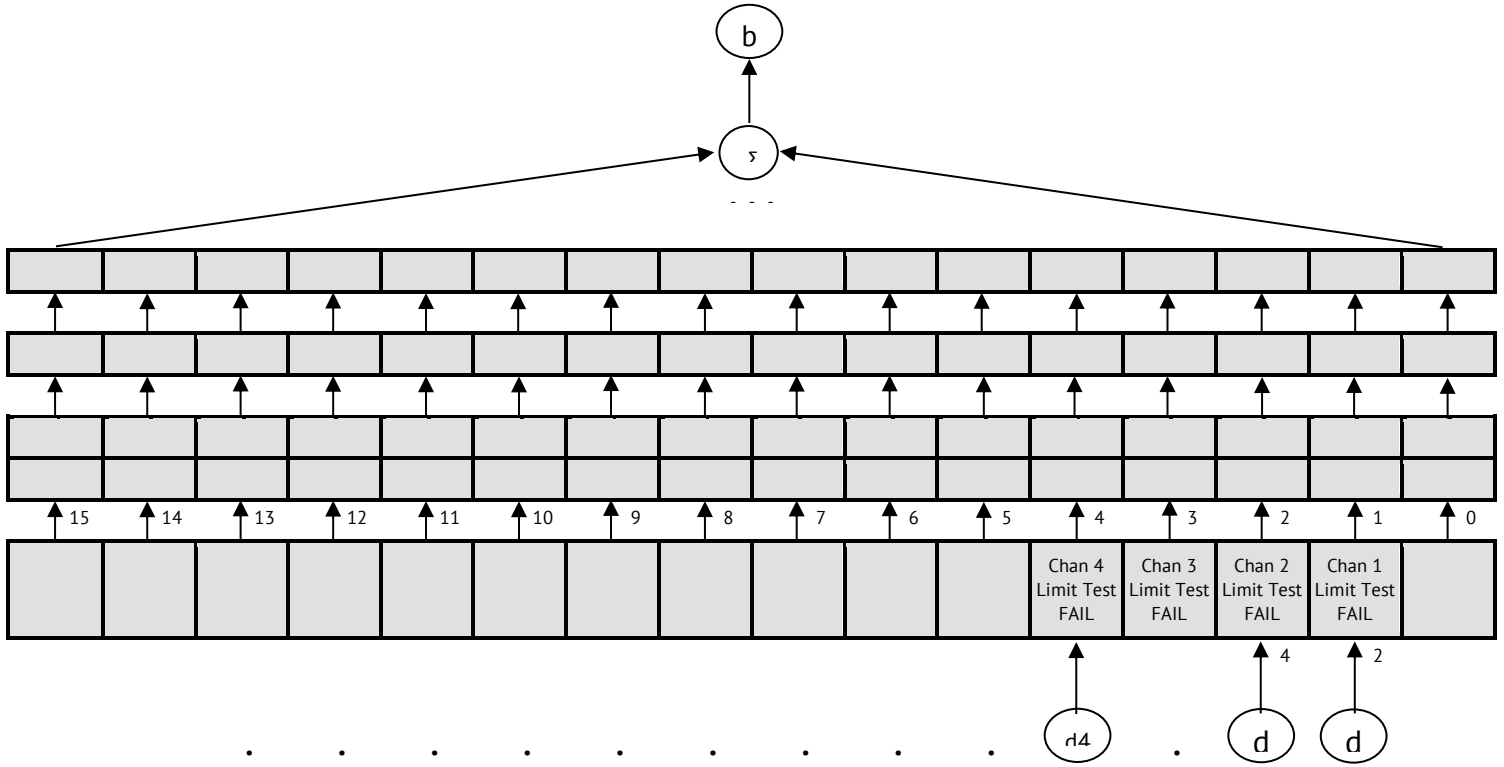
Questionable Status Enable Register
STAT:QUES:ENAB

Questionable Status Event Register
STAT:QUES?

Positive Transition Filter
STAT:QUES:PTR

Negative Transition Filter
STAT:QUES:NTR

Questionable Status Condition Register
STAT:QUES:COND?



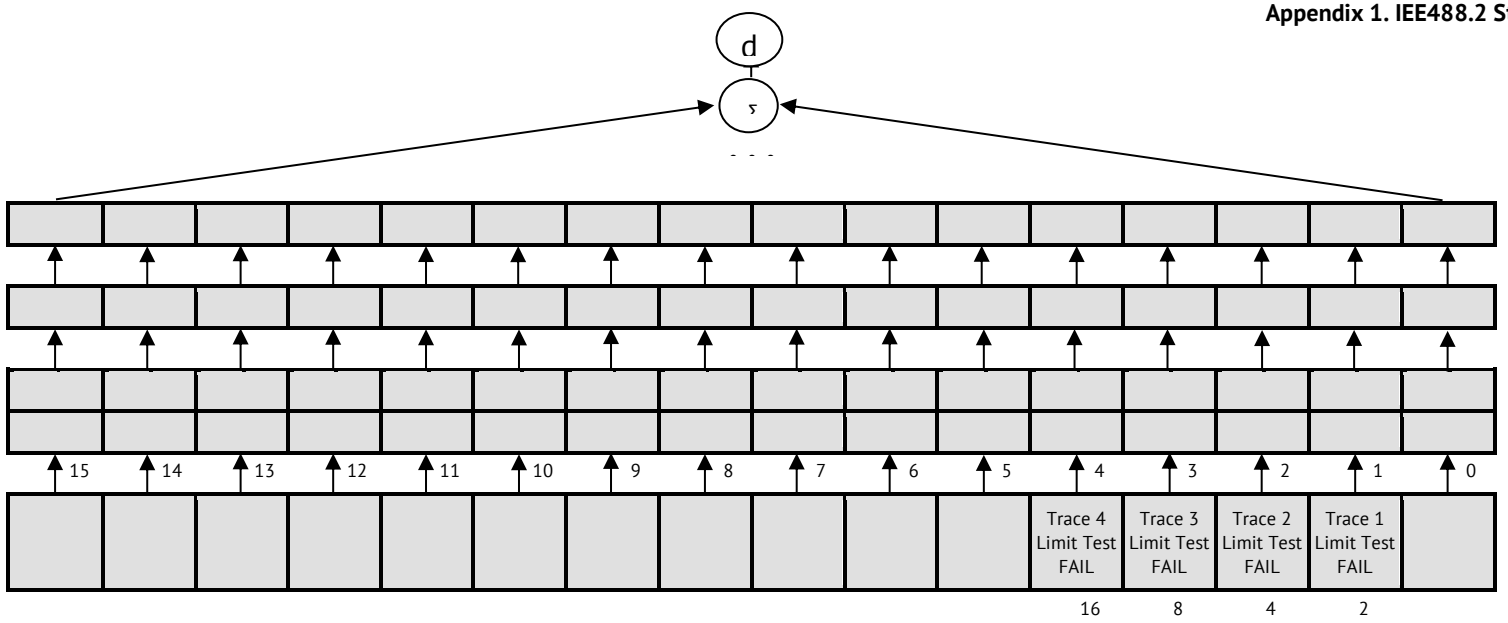
Questionable Limit Status Enable Register
STAT:QUES:LIM:ENAB

Questionable Limit Status Event Register
STAT:QUES:LIM?

Positive Transition Filter
STAT:QUES:LIM:PTR

Negative Transition Filter
STAT:QUES:LIM:NTR

Questionable Limit Status Condition Register
STAT:QUES:LIM:COND?



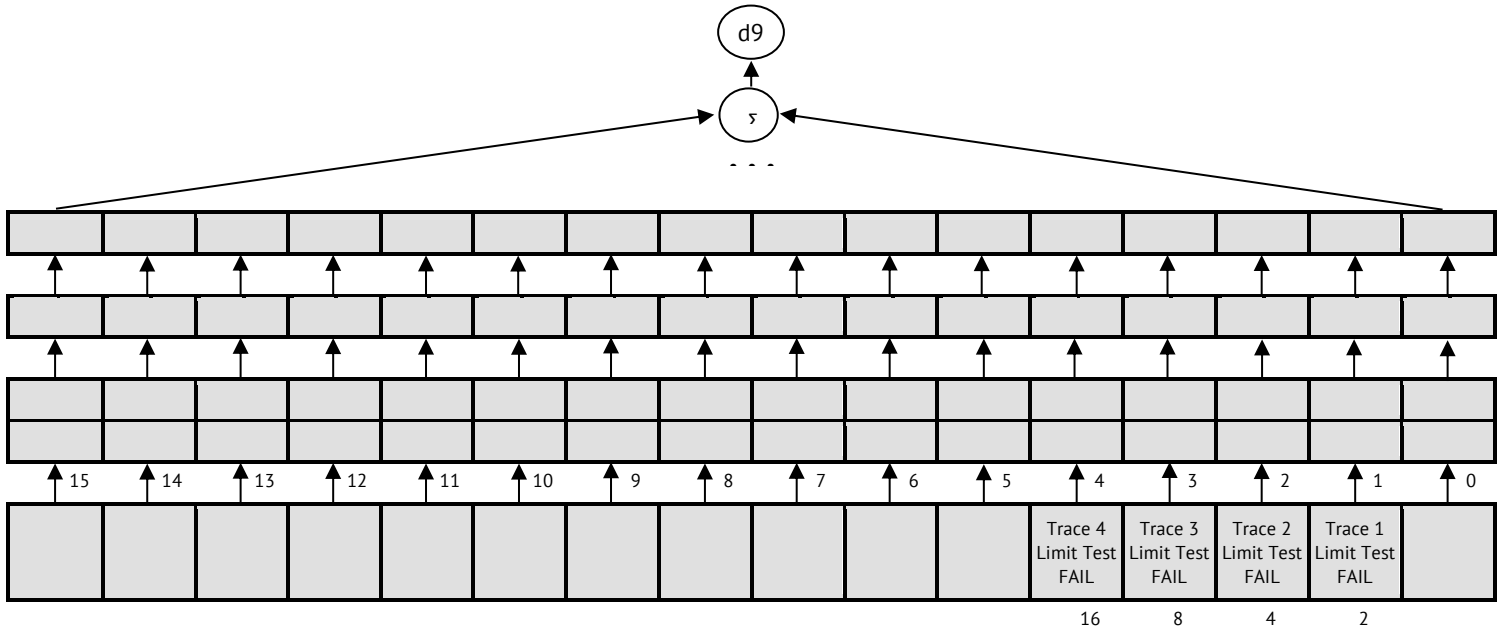
Questionable Limit Channel 1 Status Enable Register
STAT:QUES:LIM:CHAN1:ENAB

Questionable Limit Channel 1 Status Event Register
STAT:QUES:CHAN1:LIM2

Positive Transition Filter
STAT:QUES:LIM:CHAN1:PTR

Negative Transition Filter
STAT:QUES:LIM:CHAN1:NTR

Questionable Limit Channel 1 Status Condition Register
STAT:QUES:LIM:CHAN1:COND?



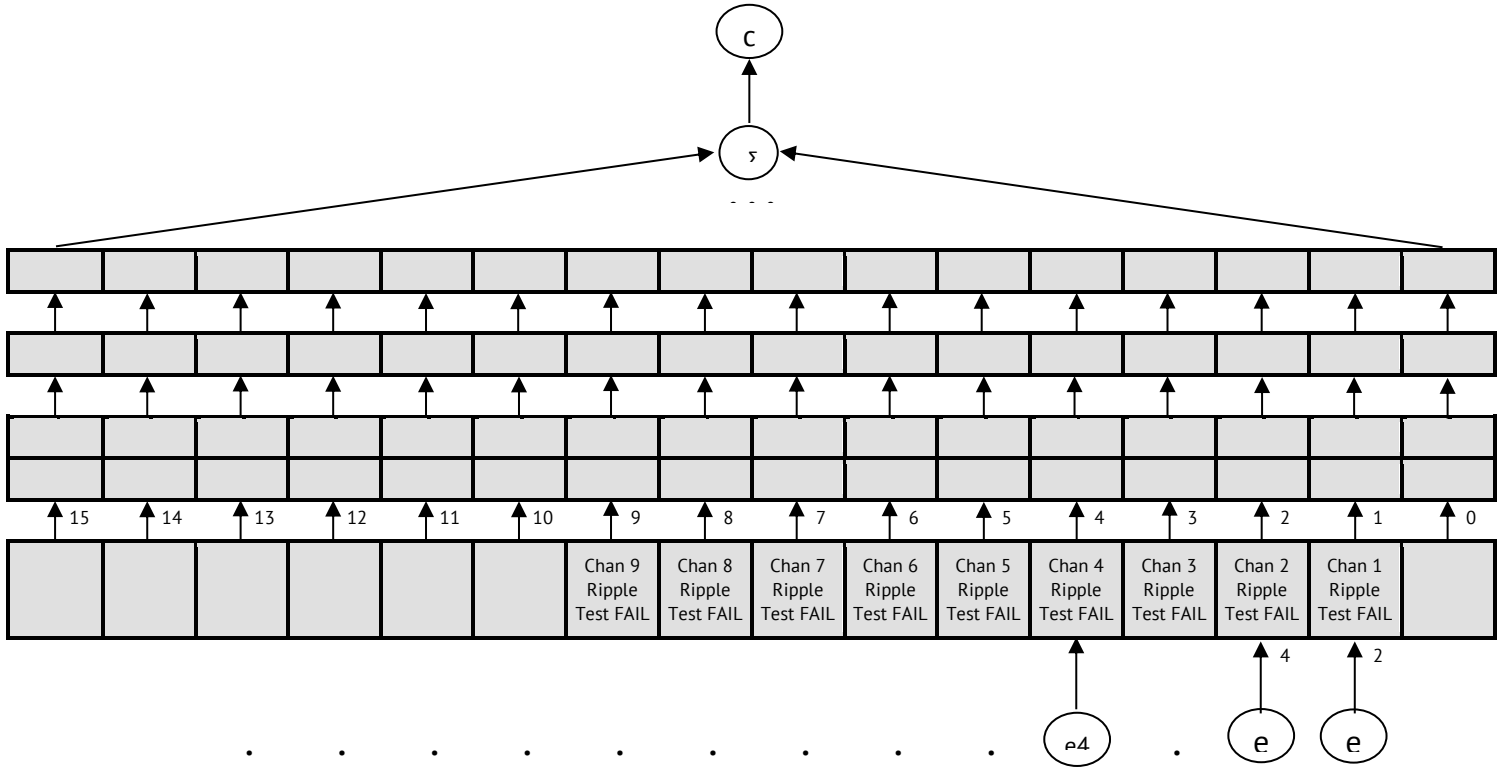
Questionable Limit Channel 14 Status Enable Register
STAT:QUES:LIM:CHAN14:ENAB

Questionable Limit Channel 9 Status Event Register
STAT:QUES:CHAN9:LIM2

Positive Transition Filter
STAT:QUES:LIM:CHAN9:PTR

Negative Transition Filter
STAT:QUES:LIM:CHAN9:NTR

Questionable Limit Channel 9 Status Condition Register
STAT:QUES:LIM:CHAN9:COND?



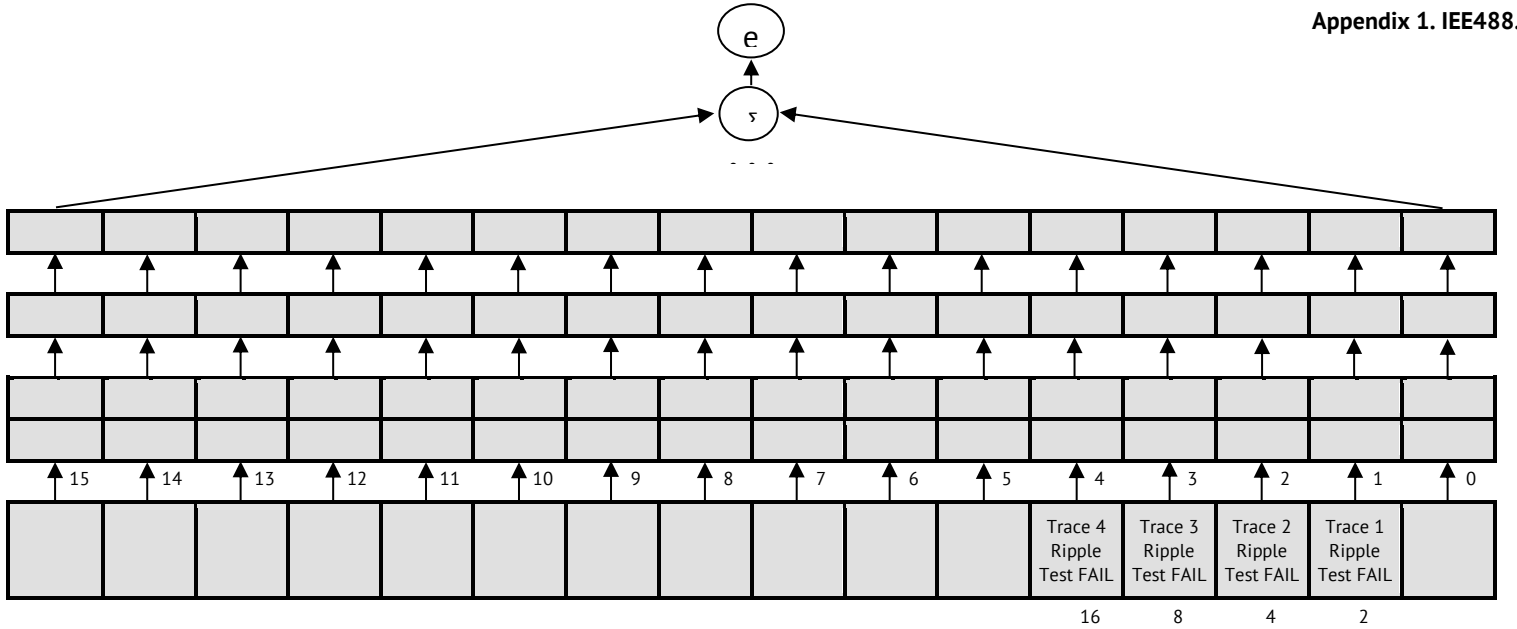
Questionable Ripple Limit Status Enable Register
STAT:QUES:RLIM:ENAB

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?



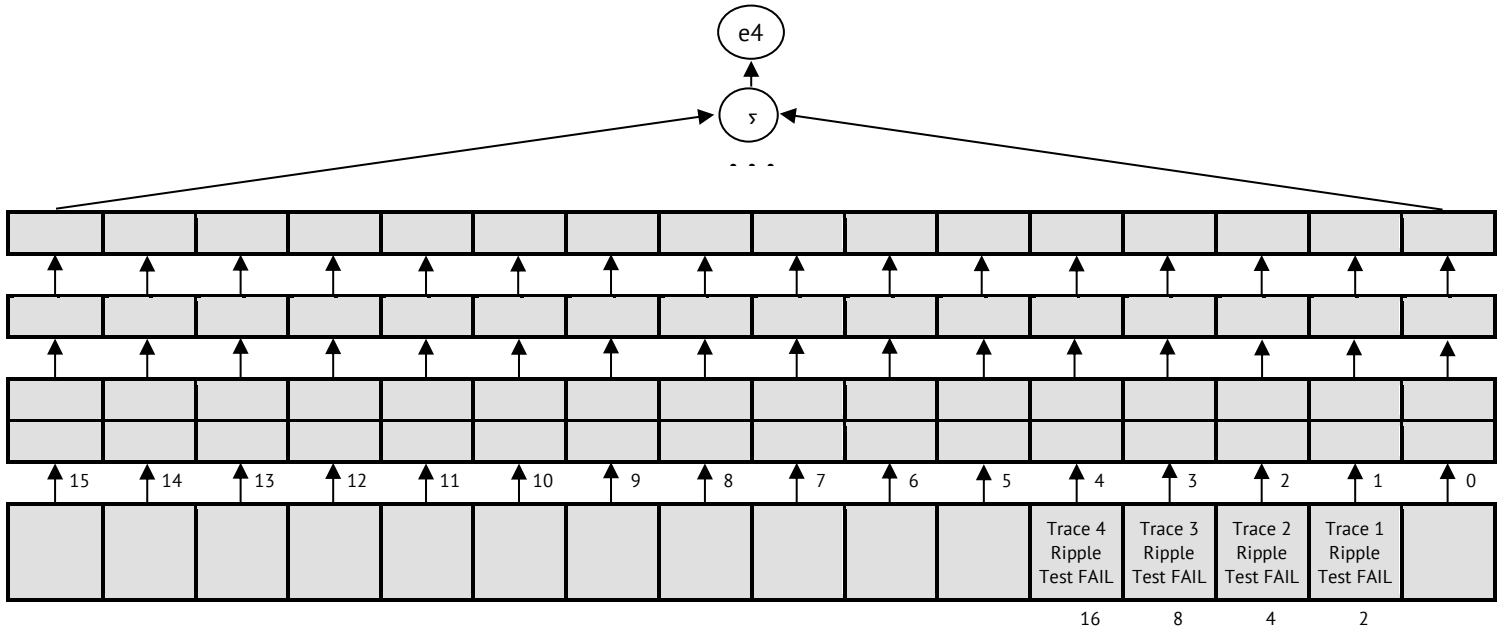
Questionable Ripple Limit Channel 1 Status Enable Register
STAT:QUES:RLIM:CHAN1:ENAB

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

Questionable Ripple Limit Channel 1 Status Condition Register
STAT:QUES:RLIM:CHAN1:COND?



Questionable Ripple Limit Channel 9 Status Enable Register
STAT:QUES:RLIM:CHAN9:ENAB

Questionable Ripple Limit Channel 9 Status Event Register
STAT:QUES:CHAN9:RLIM?

Positive Transition Filter
STAT:QUES:RLIM:CHAN9:PTR

Negative Transition Filter
STAT:QUES:RLIM:CHAN9:NTR

Questionable Ripple Limit Channel 9 Status Condition Register
STAT:QUES:RLIM:CHAN9:COND?

APPENDIX 2. ERROR CODES

114	"Header suffix out of range"
200	"Execution error"
211	"Trigger ignored"
213	"Init ignored"
220	"Parameter Error"
222	"Data out of range"
224	"Illegal parameter value"
201	"Invalid channel index"
202	"Invalid trace index"
203	"Invalid marker index"
204	"Marker is not active"
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"
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"
300	"Device-specific error"
302	"Status reporting system error"

APPENDIX 3. PROGRAMMING EXAMPLES

Example 1. Program Written in C

The following program shows the control over the instrument using the C language with the VISA library.

The instrument address is assigned in VISA Resource Name format 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 instrument.
2. Reads out and displays the instrument information string.
3. Sets some parameters of the instrument.
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

```
// Example1.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
    int 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: Example4 <VISA address>\n\n");
        printf("VISA address examples:\n");
        printf("       TCPIP::nnn.nnn.nnn.nnn::INSTR\n");
        printf("       TCPIP::devicename::INSTR\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 timeout for message-based communication
    //
    viSetAttribute(instr, VI_ATTR_TMO_VALUE, 5000);
    //
    // 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:FORM SWR\n");
    viPrintf(instr, "SENS:BAND  1000\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 2. Program Written in LabView

The following program shows the control over the instrument using the LabView language with the VISA library.

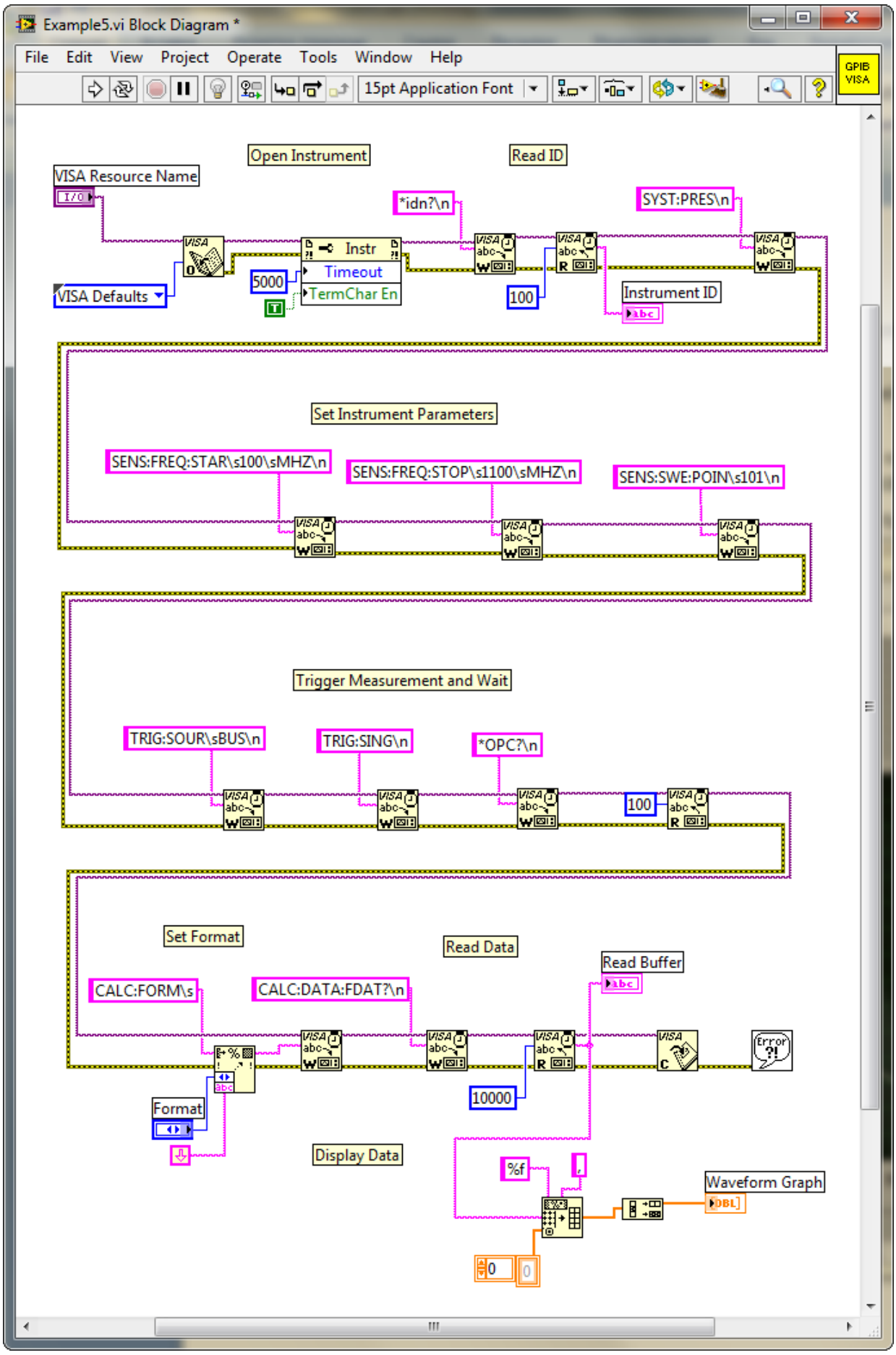
Below see the block diagram of the program and front panel of the program with the program execution result.

The front panel contains the entry field for the instrument name “VISA Resource Name”. For more detail on VISA Resource Name see the VISA library documentation.

The user must enter the instrument address, select the trace format in the “Format” field, and click the “Run” button. As the result of the program, the instrument information string will be displayed and the measurement trace will be plotted.

Program description:

1. Sets up the communication with the instrument.
2. Reads out and displays the instrument information string.
3. Sets some parameters of the instrument.
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
VISA Resource Name
VISA Defaults
Instr
Timeout
TermChar En
5000
Read ID
*idn?\n
100
SYST:PRES\n
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
CALC:FORM\s
Format
Read Data
CALC:DATA:FDAT?\n
10000
Read Buffer
Error
Display Data
%f
Waveform Graph
DBL
0