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Vector Network Analyzers

SCPI Command Reference

VERSION 1.17 (Graphit R4M 2.6.28 or newer)

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Contents

SCPI Basics	1.
Introduction	1.1
Command Structure	1.2
Subsystems	1.3
Mnemonic Generation Rules	1.4
Letter Case	1.5
Parameters	1.6
Queries	1.7
Program Message Terminator	1.8
The Syntax Conventions	1.9
IEEE 488 Common Commands	2.
*CLS	2.1
*IDN?	2.2
*OPC	2.3
*RST	2.4
*STB?	2.5
ABORT	3.
CALCulate	4.
CALCulate:CORRection	4.1.
CALCulate:CORRection:TYPE	4.1.1.
CALCulate:DATA	4.2.
CALCulate:DATA:SNP	4.2.1.
CALCulate:DATA:SNP:PORTs?	4.2.1.1.
CALCulate:DATA:SNP:SAVE	4.2.1.2.
CALCulate:FILTer	4.3.
CALCulate:FILTer[:GATE]	4.3.1.
CALCulate:FILTer[:GATE]:TIME	4.3.1.1.
CALCulate:FILTer[:GATE]:TIME:CENTer	4.3.1.1.1.
CALCulate:FILTer[:GATE]:TIME:SHAPE	4.3.1.1.2.
CALCulate:FILTer[:GATE]:TIME:SHAPE:BKAIsEr	4.3.1.1.2.1.
CALCulate:FILTer[:GATE]:TIME:SPAN	4.3.1.1.3.
CALCulate:FILTer[:GATE]:TIME:STATe	4.3.1.1.4.
CALCulate:FILTer[:GATE]:TIME[:TYPE]	4.3.1.1.5.
CALCulate:FORMat	4.4.

CALCulate:FSIMulator	4.5.
CALCulate:FSIMulator:DEEMbed<port>	4.5.1.
CALCulate:FSIMulator:DEEMbed<port>:NETWork<network>	4.5.1.1.
CALCulate:FSIMulator:DEEMbed<port>:NETWork<network>[:ENABLE]	4.5.1.1.1.
CALCulate:FSIMulator:DEEMbed<port>:NETWork<network>:FILENAME	4.5.1.1.2.
CALCulate:FSIMulator:EMBed<port>	4.5.2.
CALCulate:FSIMulator:EMBed<port>:NETWork<network>	4.5.2.1.
CALCulate:FSIMulator:EMBed<port>:NETWork<network>[:ENABLE]	4.5.2.1.1.
CALCulate:FSIMulator:EMBed<port>:NETWork<network>:FILENAME	4.5.2.1.2.
CALCulate:MARKer	4.6.
CALCulate:MARKer:AOFF	4.6.1.
CALCulate:MARKer<n>	4.7.
CALCulate:MARKer<n>:DIScrete	4.7.1.
CALCulate:MARKer<n>:FUNction	4.7.2.
CALCulate:MARKer<n>:FUNction:DOMain	4.7.2.1.
CALCulate:MARKer<n>:FUNction:DOMain:USER	4.7.2.1.1.
CALCulate:MARKer<n>:FUNction:DOMain:USER[:RANGE]	4.7.2.1.1.1.
CALCulate:MARKer<n>:FUNction:DOMain:USER:START	4.7.2.1.1.2.
CALCulate:MARKer<n>:FUNction:DOMain:USER:STOP	4.7.2.1.1.3.
CALCulate:MARKer<n>:FUNction[:SElect]	4.7.2.2.
CALCulate:MARKer<n>:FUNction:TRACking	4.7.2.3.
CALCulate:MARKer<n>:FUNction:TRACking:SOURce	4.7.2.3.1.
CALCulate:MARKer<n>[:STATe]	4.7.3.
CALCulate:MARKer<n>:TARGet	4.7.4.
CALCulate:MARKer<n>:TYPE	4.7.5.
CALCulate:MARKer<n>:X	4.7.6.
CALCulate:MARKer<n>:Y?	4.7.7.
CALCulate:MATH	4.8.
CALCulate:MATH:CREate	4.8.1.
CALCulate:MATH:FUNction	4.8.2.
CALCulate:MATH:SOURce<num>	4.8.3.
CALCulate:PARAmeter	4.9.
CALCulate:PARAmeter:CATalog?	4.9.1.
CALCulate:PARAmeter[:DEFine]	4.9.2.
CALCulate:PARAmeter:DElete	4.9.3.
CALCulate:PARAmeter:DElete:ALL	4.9.3.1.
CALCulate:PARAmeter:DElete[:NAME]	4.9.3.2.

CALCulate:PARAmeter:SElect	4.9.4.
CALCulate:SMOothing	4.10.
CALCulate:SMOothing:APERture	4.10.1.
CALCulate:SMOothing[:STATE]	4.10.2.
CALCulate:TRANSform	4.11.
CALCulate:TRANSform:TIME	4.11.1.
CALCulate:TRANSform:TIME:CENTer	4.11.1.1.
CALCulate:TRANSform:TIME:LPASs	4.11.1.2.
CALCulate:TRANSform:TIME:LPASs:DCSParam	4.11.1.2.1.
CALCulate:TRANSform:TIME:LPASs:DCSParam:EXTRapolate	4.11.1.2.1.1.
CALCulate:TRANSform:TIME:LPFRequency	4.11.1.3.
CALCulate:TRANSform:TIME:SPAN	4.11.1.4.
CALCulate:TRANSform:TIME:START	4.11.1.5.
CALCulate:TRANSform:TIME:STATE	4.11.1.6.
CALCulate:TRANSform:TIME:STIMulus	4.11.1.7.
CALCulate:TRANSform:TIME:STOP	4.11.1.8.
CALCulate:TRANSform:TIME[:TYPE]	4.11.1.9.
CALCulate:TRANSform:TIME:UNIT	4.11.1.10.
CALCulate:TRANSform:TIME:WINDow	4.11.1.11.
CALCulate:X	4.12.
CALCulate:X[:VALues]?	4.12.1.
DISPlay	5.
DISPlay:CATalog?	5.1.
DISPlay:VISible	5.2.
DISPlay:WINDow<wnum>	5.3.
DISPlay:WINDow<wnum>:ACTivate	5.3.1.
DISPlay:WINDow<wnum>:CATalog?	5.3.2.
DISPlay:WINDow<wnum>[:STATE]	5.3.3.
DISPlay:WINDow<wnum>:TRACe<tnum>	5.3.4.
DISPlay:WINDow<wnum>:TRACe<tnum>[:STATE]	5.3.4.1.
DISPlay:WINDow<wnum>:TRACe<tnum>:Y	5.3.4.2.
DISPlay:WINDow<wnum>:TRACe<tnum>:Y[:SCALE]	5.3.4.2.1.
DISPlay:WINDow<wnum>:TRACe<tnum>:Y[:SCALE]:AUTO	5.3.4.2.1.1.
DISPlay:WINDow<wnum>:TRACe<tnum>:Y[:SCALE]:PDIVision	5.3.4.2.1.2.
DISPlay:WINDow<wnum>:TRACe<tnum>:Y[:SCALE]:RLEVel	5.3.4.2.1.3.
DISPlay:WINDow<wnum>:TRACe<tnum>:Y[:SCALE]:RPOStion	5.3.4.2.1.4.
FORMat	6.

FORMat[:DATA]	6.1.
INITiate	7.
INITiate:CONTinuous	7.1.
INITiate[:IMMediate]	7.2.
MMEMory	8.
MMEMory:CREate	8.1.
MMEMory:LOAD	8.2.
MMEMory:LOAD[:CORRection]	8.2.1.
MMEMory:LOAD[:STATe]	8.2.2.
MMEMory:STORe	8.3.
MMEMory:STORe[:CORRection]	8.3.1.
MMEMory:STORe:DATA	8.3.2.
MMEMory:STORe:TRACe	8.3.3.
MMEMory:STORe:TRACe:FORMat	8.3.3.1.
MMEMory:STORe:TRACe:FORMat:SNP	8.3.3.1.1.
MMEMory:STORe[:STATe]	8.3.4.
OUTPut	9.
OUTPut[:STATe]	9.1.
SENSe	10.
SENSe:AVERage	10.1.
SENSe:AVERage:CLEar	10.1.1.
SENSe:AVERage:COUNT	10.1.2.
SENSe:AVERage[:STATe]	10.1.3.
SENSe:BANDwidth	10.2.
SENSe:BANDwidth:TRACk	10.2.1.
SENSe:BANDwidth[:RESolution]	10.2.2.
SENSe:CORRection	10.3.
SENSe:CORRection:COLLect	10.3.1.
SENSe:CORRection:COLLect:CKIT	10.3.1.1.
SENSe:CORRection:COLLect:CKIT:CATalog?	10.3.1.1.1.
SENSe:CORRection:COLLect:CKIT:CLEar	10.3.1.1.2.
SENSe:CORRection:COLLect:CKIT:COUNT?	10.3.1.1.3.
SENSe:CORRection:COLLect:CKIT:IMPort	10.3.1.1.4.
SENSe:CORRection:COLLect:GUIDed	10.3.1.2.
SENSe:CORRection:COLLect:GUIDed:ABORt	10.3.1.2.1.
SENSe:CORRection:COLLect:GUIDed[:ACQuire]	10.3.1.2.2.
SENSe:CORRection:COLLect:GUIDed:CKIT	10.3.1.2.3.

<u>SENSe:CORRection:COLLect:GUIDed:CKIT:PORT<pnum></u>	10.3.1.2.3.1.
<u>SENSe:CORRection:COLLect:GUIDed:CKIT:PORT<pnum>:CATalog?</u>	10.3.1.2.3.1.1.
<u>SENSe:CORRection:COLLect:GUIDed:CKIT:PORT<pnum>[:SElect]</u>	10.3.1.2.3.1.2.
<u>SENSe:CORRection:COLLect:GUIDed:CONNector</u>	10.3.1.2.4.
<u>SENSe:CORRection:COLLect:GUIDed:CONNector:CATalog?</u>	10.3.1.2.4.1.
<u>SENSe:CORRection:COLLect:GUIDed:CONNector:PORT<pnum></u>	10.3.1.2.4.2.
<u>SENSe:CORRection:COLLect:GUIDed:CONNector:PORT<pnum>[:SElect]</u>	10.3.1.2.4.2.1.
<u>SENSe:CORRection:COLLect:GUIDed:DESCRiption?</u>	10.3.1.2.5.
<u>SENSe:CORRection:COLLect:GUIDed:INITiate</u>	10.3.1.2.6.
<u>SENSe:CORRection:COLLect:GUIDed:INITiate[:IMMediate]</u>	10.3.1.2.6.1.
<u>SENSe:CORRection:COLLect:GUIDed:ISOLation</u>	10.3.1.2.7.
<u>SENSe:CORRection:COLLect:GUIDed:PATH</u>	10.3.1.2.8.
<u>SENSe:CORRection:COLLect:GUIDed:PATH:CMETHOD</u>	10.3.1.2.8.1.
<u>SENSe:CORRection:COLLect:GUIDed:PATH:TMETHOD</u>	10.3.1.2.8.2.
<u>SENSe:CORRection:COLLect:GUIDed:SAVE</u>	10.3.1.2.9.
<u>SENSe:CORRection:COLLect:GUIDed:SAVE[:IMMediate]</u>	10.3.1.2.9.1.
<u>SENSe:CORRection:COLLect:GUIDed:STEPS?</u>	10.3.1.2.10.
<u>SENSe:CORRection:COLLect:GUIDed:VMC</u>	10.3.1.2.11.
<u>SENSe:CORRection:COLLect:GUIDed:VMC:MIXer</u>	10.3.1.2.11.1.
<u>SENSe:CORRection:COLLect:GUIDed:VMC:MIXer:GENDER</u>	10.3.1.2.11.1.1.
<u>SENSe:CORRection:DATA</u>	10.3.2.
<u>SENSe:CORRection[:STATe]</u>	10.3.3.
<u>SENSe:FREQUency</u>	10.4.
<u>SENSe:FREQUency:CENTer</u>	10.4.1.
<u>SENSe:FREQUency[:CW]</u>	10.4.2.
<u>SENSe:FREQUency:FIXed</u>	10.4.3.
<u>SENSe:FREQUency:MODE</u>	10.4.4.
<u>SENSe:FREQUency:SPAN</u>	10.4.5.
<u>SENSe:FREQUency:START</u>	10.4.6.
<u>SENSe:FREQUency:STOP</u>	10.4.7.
<u>SENSe:IF</u>	10.5.
<u>SENSe:IF:GATE</u>	10.5.1.
<u>SENSe:IF:GATE:DELay</u>	10.5.1.1.
<u>SENSe:IF:GATE:DINCrement</u>	10.5.1.2.
<u>SENSe:IF:GATE:POINTs</u>	10.5.1.3.
<u>SENSe:IF:GATE[:STATe]</u>	10.5.1.4.
<u>SENSe:IF:GATE:WIDTh</u>	10.5.1.5.

<u>SENSe:LIST</u>	10.6.
<u>SENSe:LIST:FREQuency</u>	10.6.1.
<u>SENSe:LIST:FREQuency:POINts?</u>	10.6.1.1.
<u>SENSe:MIXer</u>	10.7.
<u>SENSe:MIXer:IF</u>	10.7.1.
<u>SENSe:MIXer:IF:FREQuency</u>	10.7.1.1.
<u>SENSe:MIXer:IF:FREQuency:START?</u>	10.7.1.1.1.
<u>SENSe:MIXer:IF:FREQuency:STOP?</u>	10.7.1.1.2.
<u>SENSe:MIXer:LO</u>	10.7.2.
<u>SENSe:MIXer:LO:FREQuency</u>	10.7.2.1.
<u>SENSe:MIXer:LO:FREQuency:DENominator</u>	10.7.2.1.1.
<u>SENSe:MIXer:LO:FREQuency:NUMerator</u>	10.7.2.1.2.
<u>SENSe:MIXer:LO:FREQuency:START</u>	10.7.2.1.3.
<u>SENSe:MIXer:LO:FREQuency:STOP</u>	10.7.2.1.4.
<u>SENSe:MIXer:LO:NAME</u>	10.7.2.2.
<u>SENSe:MIXer:XAXis</u>	10.7.3.
<u>SENSe:OFFSet</u>	10.8.
<u>SENSe:OFFSet:DIVisor</u>	10.8.1.
<u>SENSe:OFFSet:MULTiplier</u>	10.8.2.
<u>SENSe:OFFSet:OFFSet</u>	10.8.3.
<u>SENSe:OFFSet:START?</u>	10.8.4.
<u>SENSe:OFFSet[:STATe]</u>	10.8.5.
<u>SENSe:OFFSet:STOP?</u>	10.8.6.
<u>SENSe:POWer</u>	10.9.
<u>SENSe:POWer:ATTenuator</u>	10.9.1.
<u>SENSe:PULSe</u>	10.10.
<u>SENSe:PULSe:PERiod</u>	10.10.1.
<u>SENSe:PULSe:WIDTh</u>	10.10.2.
<u>SENSe:SWEep</u>	10.11.
<u>SENSe:SWEep:POINts</u>	10.11.1.
<u>SENSe:SWEep:PULSe</u>	10.11.2.
<u>SENSe:SWEep:PULSe[:MODE]</u>	10.11.2.1.
<u>SENSe:SWEep:TRIGger</u>	10.11.3.
<u>SENSe:SWEep:TRIGger:MODE</u>	10.11.3.1.
<u>SENSe:SWEep:TYPE</u>	10.11.4.
<u>SOURce</u>	11.
<u>SOURce:POWer<port></u>	11.1.

SOURce:POWer<port>:ALC	11.1.1.
SOURce:POWer<port>:ALC:MODE	11.1.1.1.
SOURce:POWer<port>:ATTenuation	11.1.2.
SOURce:POWer<port>:CENTER	11.1.3.
SOURce:POWer<port>[:LEVEL]	11.1.4.
SOURce:POWer<port>[:LEVEL][:IMMEDIATE]	11.1.4.1.
SOURce:POWer<port>[:LEVEL][:IMMEDIATE][:AMPLITUDE]	11.1.4.1.1.
SOURce:POWer<port>:MODE	11.1.5.
SOURce:POWer<port>:SPAN	11.1.6.
SOURce:POWer<port>:START	11.1.7.
SOURce:POWer<port>:STOP	11.1.8.
SOURce:ROSCillator	11.2.
SOURce:ROSCillator:EXTERNAL	11.2.1.
SOURce:ROSCillator:EXTERNAL:FREQUENCY	11.2.1.1.
SOURce:ROSCillator:SOURCE	11.2.2.
SYSTEM	12.
SYSTem:ERROR?	12.1.
SYSTem:ERROR:COUNT?	12.1.1.
SYSTem:MCLASS	12.2.
SYSTem:MCLASS:CATALOG?	12.2.1.
SYSTem:SET	12.3.
TRIGGER	13.
TRIGger:AUXiliary	13.1.
TRIGger:AUXiliary:DURATION	13.1.1.
TRIGger:AUXiliary:INTERVAL	13.1.2.
TRIGger:AUXiliary:IPOlarity	13.1.3.
TRIGger:AUXiliary:OPOLarity	13.1.4.
TRIGger:AUXiliary[:OUTPUT]	13.1.5.
TRIGger:AUXiliary[:OUTPUT][:ENABLE]	13.1.5.1.
TRIGger:LXI<n>	13.2.
TRIGger:LXI<n>:DURATION	13.2.1.
TRIGger:LXI<n>:INTERVAL	13.2.2.
TRIGger:LXI<n>:IPOlarity	13.2.3.
TRIGger:LXI<n>:OPOLarity	13.2.4.
TRIGger:LXI<n>[:OUTPUT]	13.2.5.
TRIGger:LXI<n>[:OUTPUT][:ENABLE]	13.2.5.1.
TRIGger[:SEQUENCE]	13.3.

[TRIGger\[:SEQuence\]:**SOUR**ce](#)

[SCPI Errors Description](#)

Appendix 1

1. SCPI Basics

1.1 Introduction

The Standard Commands for Programmable Instruments (SCPI) defines a set of standard programming commands for use by all SCPI compatible instruments. This section describes the general use of the SCPI language for the Micran instruments.

For additional information refer to the SCPI Consortium or IEEE (IEEE Standard 488.2).

1.2 Command Structure

All SCPI commands, except the common commands, are organized in a hierarchical structure similar to the inverted tree file structure used in most computers. The command keywords that correspond to the major instrument control functions are located at the top of the command tree. All SCPI commands, except the ABORt command, have one or more subcommands (keywords) associated with them to further define the instrument function to be controlled. The subcommand keywords may in turn also have one or more associated subcommands (keywords). Each subcommand level adds another layer to the command tree. The command keyword and its associated subcommand keywords form a portion of the command tree called a command subsystem. The :INITiate command subsystem is shown below.

```

:INITiate
    :CONTinuous
        <bool>
    :[:IMMEDIATE]
  
```

1.3 Subsystems

Subsystem commands are distinguished by the colon (:). The colon is used at the beginning of a command statement and between keywords. For example:

```
:SYSTem:ERRor:COUNT?
```

"COUNT" is the query of the "ERRor" subsystem contained in the "SYSTem" top command tree.

1.4 Mnemonic Generation Rules

Each instrument-control header or keyword has both a long and a short form. A SCPI instrument shall accept only the exact short and the exact long forms. Sending a header that is not the short form, nor the complete long form to a SCPI instrument shall cause it to generate an error. For example:

```
:INPut:ATTenuation
```

command can be typed as:

```
:INP:ATT
```

Incorrect command notation listed below:

```
:INPU:ATTenuation
```

1.5 Letter case

Lowercase and uppercase letters are considered equivalent:

```
:INP:ATTenuation and :inP:AtT
```

1.6 Parameters

A typical command is made up of keywords prefixed with colons (:). The keywords are followed by parameters. There is a separating space (white space) between the command and its parameter. Few parameters should be separated using commas (','). Example:

```
:FREQ:LIST 1000 MHz, 2000 MHz, 3000 MHz, 4000 MHz
```

1.6.1 Numeric formats (<numeric>)

Numeric parameters are used in both common and subsystem commands. They accept all commonly used decimal representations of numbers including optional signs, decimal points, and scientific notation.

The following syntax conventions are used for numeric data parameters:

- <NR1> - a signed integer without a decimal point (implied radix point), e.g.: 12, +23, -656;
- <NR2> - a signed number with an explicit radix point, e.g.: 12.571;
- <NR3> - a scaled explicit decimal point numeric value with radix and exponent

(e.g., floating point number), such as 12.451E4 (equals 124510).

Extended numeric parameters also include the following special parameters:

- DEFault - resets the parameter to its default value;
- UP - increments the parameter;
- DOWN - decrements the parameter;
- MINimum - sets the parameter to the smallest possible value;
- MAXimum - sets the parameter to the largest possible value.

1.6.2 Unit Suffixes

Numeric parameters may be followed by an optional suffix:

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

* - suffix M relates to 1e6 instead of 1e-3 when using MHZ or OHM units.

If the suffix is omitted, default units are used. Various frequency parameters may contain following suffixes:

Suffix	Multiplier
Hz	1e
KHz	1e3
MHz	1e6

GHz	1e9
-----	-----

1.6.3 Boolean Parameters (<boolean>)

Boolean parameters represent a single binary condition that is either true or false. The two-state boolean parameter has four arguments. The following list shows the arguments for the two-state boolean parameter:

- ON or 1 – boolean true;
- OFF or 0 – boolean false.

Boolean parameters are always returned as 1 or 0 by query commands, e.g.:

```
[SENSE]:AVERage[:STATe] ON|1|OFF|0
```

will respond with 0 or 1.

1.6.4 Discrete Parameters (<character_data>)

Discrete parameters use mnemonics to represent each valid setting. They have a long and a short form, just like command mnemonics. You can mix upper and lower case letters for discrete parameters:

```
TRIGger:SOURce {BUS|INTernal|IMMEDIATE|EXTernal}
```

"BUS", "INTernal", "IMMEDIATE", "EXTernal" are allowed values.

Discrete parameters are always returned in short upper case form.

1.6.5 String Parameters (<string>)

String parameters allow ASCII strings to be sent as parameters. Single or double quotes are used as delimiters, e.g.:

```
MEMory:ADC:SElect "table_1"
```

1.7 Queries

All commands, unless otherwise noted, have an additional query form. As defined in IEEE 488.2, a query is a command header with a question mark symbol appended. When a query form of a command is received, the current setting associated with the command is placed in the output buffer. The command and associated query are listed below:

:INP:ATT 20
:INP:ATT?

1.8 Program Message Terminator

LF (0x0A, new line, «\n») symbol (ASCII) is using as program message terminator. «\r\n» (0x0D, 0x0A - new line + carriage return) may be used too, but LF is always returned in query commands.

1.9 The Syntax Conventions

The syntax conventions that are used for all SCPI command keywords and data parameter descriptions in this manual are described below:

- Angle brackets (< >) around a word (or words) indicate they are not to be used literally in the command. They represent the needed item.
- A vertical stroke (|) between keywords or parameters indicates alternative choices. For parameters, the effect of the command varies depending on the choice.
- Square brackets ([]) indicate that the enclosed keywords or parameters are optional when composing the command. These implied keywords or parameters will be executed even if they are omitted.
- Braces ({ }) indicate that parameters can optionally be used in the command once, several times, or not at all.

2. IEEE 488 Common Commands

2.1. Команда *CLS

(Write-only) Clears the instrument status byte by emptying the error queue and clearing all event registers. Also cancels any preceding *OPC command or query.

2.2. Команда *IDN?

(Read-only) Returns a string that uniquely identifies the analyzer. The string is of the form *Micran,<model number>,<serial number>,<software version>*.

2.3. Команда *OPC

(Write or Read) Returns an ASCII "+1" when all pending overlapped operations have been completed.

2.4. Команда *RST

(Write-only) Executes a device reset and cancels any pending [*OPC](#) command or query, exactly the same as a [SYSTem:PRESet](#).

2.5. Команда *STB?

(Read-only) Reads the value of the instrument status byte. The register is cleared only when the registers feeding it are cleared.

3. ABORt commands

(Write-only) Stops all sweeps - then resume per current trigger settings. This command is the same as [INITiate:IMMediate](#) (restart) except if a channel is performing a single sweep, ABORt will stop the sweep, but not initiate another sweep.

4. CALCulate commands

4.1. Команда CALCulate:CORRection

Controls error correction functions.

4.1.1. Команда CALCulate:CORRection:TYPE <string>

(Write or Read) Sets the correction type for the calibration on the specified channel.

Parameters

<string> Correction Type. For Full Calibrations use "Full n Port(x,y)", where n - the number of ports to correct (1 or 2), x and y - port indices. Allows exclude unnecessary sweep directions.

Examples

Full 2-port correction (default):

```
:CALCulate:CORRection:TYPE "Full 2 Port(1,2)"
```

Port 2 one-way correction:

```
:CALCulate:CORRection:TYPE "Full 1 Port(2)"
```

4.2. Команда CALCulate:DATA <char> ,<data>

(Write or Read) Reads Measurement data, read or writes memory data. Data format (text / binary) is defined by [FORMat\[:DATA\]](#).

Parameters

<char> Data format.

Allowed values:

- **FDATA** - formatted measurement data (query only)
- **SDATA** - complex measurement data (query only)
- **FMEM** - formatted measurement data for memory trace import (write only)

<data> Data block.

Examples

Read measured complex data:

```
CALCulate:PARAmeter:SElect "Trc1"
CALCulate:DATA? SDATA
```

Write ASCII data to a memory trace:

```
CALCulate:PARAmeter:SElect "Mem1"
CALCulate:DATA FMEM,y1,y2,y3,y4
```

4.2.1.1. Команда CALCulate:DATA:SNP:PORTs? <char>

(Read-only) Reads SNP data for the specified source ports. This command returns SNP data in columns, not in rows as Touchstone files. The query contains all frequency data, then S11, S21, S12, S22 (when ports 1 and 2 data requested) in complex format. Data format (text / binary) is defined by [FORMat\[:DATA\]](#), values format depends on [MMEMory:STORe:TRACe:FORMat:SNP](#).

Parameters

<char> Comma-separated port list, enclosed in quotes.

Examples

Read data of ports 1 and 2:

```
CALCulate:DATA:SNP:PORTs? "1,2"
```

4.2.1.2. Команда CALCulate:DATA:SNP:SAVE <filename> ,<comment>

(Write-only) Save measured S-parameters from active window to SnP file. Values format depends on [MMEMory:STORe:TRACe:FORMat:SNP](#).

Parameters

<filename> An absolute path and filename

Parameters

<comment> Comments to the saved data (optional)

4.3.1.1. Команда CALCulate:FILTer[:GATE]:TIME

Gating function settings.

4.3.1.1.1. Команда CALCulate:FILTer[:GATE]:TIME:CENTer <time>

(Write or Read) Sets the gating center time.

Parameters

<time> Supported units: S(default), MS, US, NS, PS

4.3.1.1.2.1. Команда CALCulate:FILTER[:GATE]:TIME:SHAPE:BKAIsEr

<num>

(Write or Read) Sets the gate filter window parameter.

Parameters

<num> Kaiser Beta value.

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

Value range: **1 ÷ 13**

Default value: **6**

4.3.1.1.3. Команда CALCulate:FILTER[:GATE]:TIME:SPAN

(Write or Read) Sets the gating span time.

Parameters

 Supported units: S(default), MS, US, NS, PS

4.3.1.1.4. Команда CALCulate:FILTER[:GATE]:TIME:STATE <bool>

(Write or Read) Turns gating state ON or OFF.

Parameters

<bool> Allowed values:

- **ON**
- **OFF**

4.3.1.1.5. Команда CALCulate:FILTER[:GATE]:TIME[:TYPE] <char>

(Write or Read) Sets the type of gate filter used.

Parameters

<char> Gate type.

Allowed values:

- **BPASs** - includes (passes) the range between the start and stop times
- **NOTCh** - excludes (attenuates) the range between the start and stop times

4.4. Команда CALCulate:FORMat <format>

(Write or Read) Sets the display format for the selected trace.

Parameters

<format> Display format.

Allowed values:

- **MLINear** - linear magnitude
- **MLOGarithmic** - logarithmic magnitude
- **PHASe** - phase
- **IMAGinary** - imaginary part
- **REAL** - real part
- **SMITH** - Smith diagram
- **SWR** - VSWR
- **GDELay** - group delay
- **UPHase** - unwrapped phase
- **TEMPerature** - noise temperature

4.5. Команда CALCulate:FSIMulator

Specifies settings for fixturing circuits.

4.5.1. Команда CALCulate:FSIMulator:DEEMbed<port>

Specifies settings for de-embedding fixturing circuits.

Suffix

<port> Port number (1 or 2)

4.5.1.1. Команда

CALCulate:FSIMulator:DEEMbed<port>:NETWork<network>

Suffix

<network> De-embedded network number

4.5.1.1.1. Команда

**CALCulate:FSIMulator:DEEMbed<port>:NETWork<network>[:ENABLE]
<bool>**

(Write or Read) Turns de-embedding ON or OFF for the port on the specified channel.

Parameters

<bool> Function state.

Allowed values:

- ON
- OFF

4.5.1.1.2. Команда

**CALCulate:FSIMulator:DEEMbed<port>:NETWork<network>:FILEName
<char>**

(Write-only) Specifies the filename of the circuit model to be used for de-embedding.

Parameters

<char> Filename

4.5.2. Команда CALCulate:FSIMulator:EMBed<port>

Specifies settings for embedding fixturing circuits.

Suffix

<port> Port number (1 or 2)

4.5.2.1. Команда

CALCulate:FSIMulator:EMBed<port>:NETWork<network>

Suffix

<network> Embedded network number

4.5.2.1.1. Команда

CALCulate:FSIMulator:EMBed<port>:NETWork<network>[:ENABLE] <bool>

(Write or Read) Turns embedding ON or OFF for the port on the specified channel.

Parameters

<bool> Function state.

Allowed values:

- **ON**
- **OFF**

4.5.2.1.2. Команда

CALCulate:FSIMulator:EMBed<port>:NETWork<network>:FILEName <char>

(Write-only) Specifies the filename of the circuit model to be used for embedding.

Parameters

<char> Filename

4.6. Команда CALCulate:MARKer

Markers operations.

4.6.1. Команда CALCulate:MARKer:AOff

(Write-only) Reset all markers.

4.7. Команда CALCulate:MARKer<n>

Marker's settings.

Suffix

<n> Marker's number.

4.7.1. Команда CALCulate:MARKer<n>:DISCcrete <bool>

(Write or Read) Turns ON / OFF marker's discrete mode.

Parameters

<bool> Discrete mode.

Allowed values:

- ON
- OFF

4.7.2. Команда CALCulate:MARKer<n>:FUNCtion

Configure marker's function.

4.7.2.1. Команда CALCulate:MARKer<n>:FUNCtion:DOMain

Configures search range of the marker's function.

4.7.2.1.1. Команда CALCulate:MARKer<n>:FUNCtion:DOMain:USER

Configures custom search range of the marker's function.

4.7.2.1.1.1. Команда

CALCulate:MARKer<n>:FUNCtion:DOMain:USER[:RANGe] <num>

(Write or Read) Search range selection.

Parameters

<num> Range number.

Allowed values:

- **0** - search entire range of the trace
- **1** - user search range defined by START and STOP values

4.7.2.1.1.2. Команда

CALCulate:MARKer<n>:FUNction:DOMain:USER:START <num>

(Write or Read) Start frequency of the search range.

Parameters

<num> Range start.

Supported units: HZ(default), KHZ, MHZ, GHZ, THZ

4.7.2.1.1.3. Команда**CALCulate:MARKer<n>:FUNction:DOMain:USER:STOP <num>**

(Write or Read) Stop frequency of the search range.

Parameters

<num> Range stop.

Supported units: HZ(default), KHZ, MHZ, GHZ, THZ

4.7.2.2. Команда CALCulate:MARKer<n>:FUNction[:SElect] <char>

(Write or Read) Select marker's search function.

Parameters

<char> Markers's function.

Allowed values:

- **OFF** - search function inactive
- **MAXimum** - maximum search
- **MINimum** - minimum search
- **TARGET** - search value specified with [CALCulate:MARKer:TARGet](#)

4.7.2.3. Команда CALCulate:MARKer<n>:FUNction:TRACKing <bool>

(Write or Read) Turns ON / OFF tracking. Marker's function is not active if tracking is turned off.

Parameters

<bool> Tracking state.

Allowed values:

- **ON**
- **OFF**

4.7.2.3.1. Команда **CALCulate:MARKer<n>:FUNCTion:TRACking:SOURce <Tname>**

(Write or Read) Links the marker to a trace to operate with search/tracking functions.

Parameters

<Tname> Trace name.

4.7.3. Команда **CALCulate:MARKer<n>[:STATe] <bool>**

(Write or Read) Enable / disable marker. It's not possible to retrieve data or process function when marker is disabled.

Parameters

<bool> Marker's state.

Allowed values:

- **ON**
- **OFF**

4.7.4. Команда **CALCulate:MARKer<n>:TARGet <num>**

(Write or Read) Target value for a search function.

Parameters

<num> Target value to search.

4.7.5. Команда **CALCulate:MARKer<n>:TYPE <char>**

(Write or Read) Selects marker type - normal / fixed. Fixed marker stores last values of stimulus and traces data.

Parameters

<char> Marker's type.

Allowed values:

- **NORMal**
- **FIXed**

4.7.6. Команда CALCulate:MARKer<n>:X <num>

(Write or Read) Sets the marker's X-axis value (frequency, power, or time).

Parameters

<num> Marker's position.

Supported units: HZ(default), KHZ, MHZ, GHZ, THZ

4.7.7. Команда CALCulate:MARKer<n>:Y? <char>

(Read-only) Query marker's value by the trace name.

Parameters

<char> Trace name.

4.8. Команда CALCulate:MATH

Creates and configures math traces.

4.8.1. Команда CALCulate:MATH:CREate <name>

(Write-only) Creates math trace.

Parameters

<name> Memory trace name.

Examples

Adding *Math1* math trace:

```
CALCulate:MATH:CREate "Math1"
```

4.8.2. Команда CALCulate:MATH:FUNction <char>

(Write or Read) Sets math expression to the selected math trace. Data source traces (A

and B operands) must be specified using [CALCulate:MATH:SOURce](#) commands before setting the expression. Refer to available math expressions for complex measurements in the list below.

Parameters

<char> Mathematical expression.

The list of available math expressions for complex measurements:

Expression
$ A - B $
$ A + B $
$(A + B)/2$
$ A / B $
$ A * B $
$\text{abs}(A - B)$
$A - B$
$A + B$
$(A + B)/2$
A / B
$A * B$

Examples

Setting absolute subtraction as expression for *Math1* math trace:

```
CALCulate:MATH:FUNCTION "|A|-|B|"
```

4.8.3. Команда CALCulate:MATH:SOURce<num> <name>

(Write or Read) Assigns data source traces for the selected math trace.

Suffix

<num> The number of a source trace (1, 2 are A, B operands in expression respectively)

Parameters

<name> Source trace name.

Examples

Assigning sources for *Math1* math trace :

```
CALCulate:PARAmeter:SElect "Math1"
CALCulate:MATH:SOURce1 "Trc1"
CALCulate:MATH:SOURce2 "Trc2"
```

4.9. Команда CALCulate:PARAmeter

Lists, creates, selects and deletes traces.

4.9.1. Команда CALCulate:PARAmeter:CATalog?

(Read-only) Returns the names and measurements of all traces.

Examples

Query result:

```
"Trc1,S11,Trc2,a1_1,Trc3,b2_2,Trc4,NF"
```

4.9.2. Команда CALCulate:PARAmeter[:DEFine] <name> ,<param> ,<port>

(Write-only) Create data trace.

Parameters

<name> Trace name.
<param> Trace measurement.

Allowed values:

- **S11**
- **S12**
- **S21**
- **S22**
- **A1** - reference receiver of the port 1
- **B1** - test receiver of the port 1
- **A2** - reference receiver of the port 2
- **B2** - test receiver of the port 2
- **NF** - noise measurement
- **SC21** - scalar conversion measurement
- **A1C** - reference receiver of the port 1 with frequency conversion

enabled (source port definition is not required)

- **B1C** - test receiver of the port 1 with frequency conversion enabled (source port definition is not required)
- **A2C** - reference receiver of the port 2 with frequency conversion enabled (source port definition is not required)
- **B2C** - test receiver of the port 2 with frequency conversion enabled (source port definition is not required)

<port> Defines source port (1 or 2) for receiver measurements A1,B1,A2,B2. (optional)

Examples

S11 trace creation:

```
:CALCulate:PARAmeter:DEFine "Trc1",S11
```

b1(2->1) trace creation:

```
:CALCulate:PARAmeter:DEFine "Power",B1,2
```

4.9.3.1. Команда **CALCulate:PARAmeter:DElete:ALL**

(Write-only) Deletes all traces.

4.9.3.2. Команда **CALCulate:PARAmeter:DElete[:NAME] <name>**

(Write-only) Deletes the specified trace.

Parameters

<name> Trace name.

4.9.4. Команда **CALCulate:PARAmeter:SElect <Mname>**

(Write or Read) Sets the selected trace. Most CALC: commands require that this command be sent before a setting change is made. One trace on each channel can be selected at the same time. To obtain a list of currently named traces, use [CALCulate:PARAmeter:CATalog?](#).

Parameters

<Mname> Trace name.

4.10. Команда **CALCulate:SMOothing**

Trace smoothing function.

4.10.1. Команда **CALCulate:SMOothing:APERture** <num>

(Write or Read) Sets size of the smoothing window in percents of span.

Parameters

<num> Window size.

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

Value range: **1 ÷ 30**

Default value: **5**

4.10.2. Команда **CALCulate:SMOothing[:STATe]** <bool>

(Write or Read) Enable / disable trace smoothing.

Parameters

<bool> Function state.

Allowed values:

- **ON**
- **OFF**

4.11. Команда **CALCulate:TRANSform**

Specifies the settings for time domain transform.

4.11.1.1. Команда **CALCulate:TRANSform:TIME:CENTer** <time>

(Write or Read) Sets the stop time for time domain measurements.

Parameters

<time> Domain center time.

Supported units: S(default), MS, US, NS, PS

4.11.1.2.1. Команда CALCulate:TRANSform:TIME:LPASs:DCSParam <num>

(Write or Read) Disables auto DC mode and defines the response DC value.

Parameters

<num> Manual DC value.

4.11.1.2.1.1. Команда

CALCulate:TRANSform:TIME:LPASs:DCSParam:EXTRapolate

(Write-only) Executes auto DC mode.

4.11.1.3. Команда CALCulate:TRANSform:TIME:LPFRequency

(Write-only) Set start and step frequencies to be harmonics of the start frequency for the Low Pass mode.

4.11.1.4. Команда CALCulate:TRANSform:TIME:SPAN

(Write or Read) Sets the span time for time domain measurements.

Parameters

 Domain width.

Supported units: S(default), MS, US, NS, PS

4.11.1.5. Команда CALCulate:TRANSform:TIME:START <time>

(Write or Read) Sets the start time for time domain measurements.

Parameters

<time> Domain start. Maximum absolute value is limited by 1/(frequency step).

Supported units: S(default), MS, US, NS, PS

4.11.1.6. Команда CALCulate:TRANSform:TIME:STATE <bool>

(Write or Read) Turns the time domain transform state ON or OFF.

Parameters

<bool> Function state.

Allowed values:

- **ON**
- **OFF**

4.11.1.7. Команда CALCulate:TRANSform:TIME:STIMulus <char>

(Write or Read) Sets the type of simulated stimulus.

Parameters

<char> Response type.

Allowed values:

- **IMPulse** - simulates a pulse DUT stimulus
- **STEP** - simulates a step DUT stimulus (requires LPASs transform)

4.11.1.8. Команда CALCulate:TRANSform:TIME:STOP <time>

(Write or Read) Sets the stop time for time domain measurements.

Parameters

<time> Domain stop. Maximum absolute value is limited by 1/(frequency step).

Supported units: S(default), MS, US, NS, PS

4.11.1.9. Команда CALCulate:TRANSform:TIME[:TYPE] <char>

(Write or Read) Sets the type of time domain measurement.

Parameters

<char> Transform mode.

Allowed values:

- **LPASs** - lowpass
- **BPASs** - bandpass

4.11.1.10. Команда CALCulate:TRANSform:TIME:UNIT <char>

(Write or Read) Sets the stimulus units for the time domain.

Parameters

<char> Stimulus quantity.

Allowed values:

- **TIME** - time
- **DISTance** - distance (in metres)

4.11.1.11. Команда CALCulate:TRANSform:TIME:WINDow <char>

(Write or Read) Sets the window type for the frequency domain.

Parameters

<char> Window type.

Allowed values:

- **RECT** - no parametric window
- **NUTTall** - Nuttall window
- **HAMMING** - Hamming window

4.12. Команда CALCulate:X

X-axis parameters.

4.12.1. Команда CALCulate:X[:VALues]?

(Read-only) Returns the stimulus values of the specified channel measurements. Data format (text / binary) is defined by [FORMat\[:DATA\]](#).

5. DISPLAY commands

Configures display settings.

5.1. Команда DISPLAY:CATalog?

(Read-only) Returns the existing window numbers.

5.2. Команда DISPLAY:VISible <bool>

(Write or Read) Makes the Graphit application visible or not. In the invisible state, the analyzer cycle time for making measurements, and especially data transfer, can be significantly faster because the display does not process data.

Parameters

<bool> Graphit visibility.

Allowed values:

- ON
- OFF

5.3. Команда DISPLAY:WINDow<wnum>

Controls diagram window.

Suffix

<wnum> The number of a diagram window

5.3.1. Команда DISPLAY:WINDow<wnum>:ACTivate

(Write-only) Activates specified window.

5.3.2. Команда DISPLAY:WINDow<wnum>:CATalog?

(Read-only) Returns the trace numbers for the specified window.

5.3.3. Команда DISPLAY:WINDow<wnum>[:STATe] <bool>

(Write or Read) Write to create or delete a window or read whether a window is present.

Parameters

<bool> The state of a diagram window.

Allowed values:

- ON
- OFF

5.3.4. Команда DISPLAY:WINDOW<wnum>:TRACE<tnum>

Trace display parameters.

Suffix

<tnum> Trace number on the specified diagram window.

5.3.4.1. Команда DISPLAY:WINDOW<wnum>:TRACE<tnum>[:STATE] <bool>

(Write or Read)

Parameters

<bool> Trace visibility

Allowed values:

- ON
- OFF

5.3.4.2.1.1. Команда**DISPLAY:WINDOW<wnum>:TRACE<tnum>:Y[:SCALE]:AUTO**

(Write-only) Performs automatic trace scaling.

5.3.4.2.1.2. Команда**DISPLAY:WINDOW<wnum>:TRACE<tnum>:Y[:SCALE]:PDIVISION <div>**

(Write or Read) Specifies trace scale division.

Parameters

<div> Scale division

5.3.4.2.1.3. Команда

DISPlay:WINDow<wnum>:TRACe<tnum>:Y[:SCALe]:RLEVel <ref>

(Write or Read) Specifies trace reference level.

Parameters

<ref> Reference level.

5.3.4.2.1.4. Команда

DISPlay:WINDow<wnum>:TRACe<tnum>:Y[:SCALe]:RPOSition <pos>

(Write or Read) Specifies trace reference position.

Parameters

<pos> Reference position

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

Value range: **1 ÷ 10**

6. FORMat commands

6.1. Команда FORMat[:DATA] <format> ,<width>

(Write or Read) Sets the data format for data transfers.

Parameters

<format> Data format.

Allowed values:

- **AScii** - data transfers in ASCII text format (writing data is not supported)
- **REAL** - data transfers in binary 32-bit or 64-bit floating point numbers

<width> Memory size in bits for a floating point number. Must be defined only for REAL format, 32 and 64 values are allowed. (optional)

7. INITiate commands

7.1. Команда INITiate:CONTinuous <bool>

(Write or Read) Specifies whether the R4 trigger source is set to Internal (continuous) or Manual.

Parameters

<bool> Continuous trigger state.

Allowed values:

- ON
- OFF

7.2. Команда INITiate[:IMMediate]

(Write-only) Stops the current sweeps and immediately sends a trigger.

8. MMEMory commands

The memory commands control saving and loading instrument states and measurement trace data to the hard drive.

8.1. Команда MMEMory:CREate <name> ,<param> ,<port>

(Write-only) Creates empty memory trace for a following data import (see [CALCulate:DATA](#)).

Parameters

<name> Memory trace name.
 <param> Measurement name. Must be specified to define supported data formats.

Allowed values:

- **S11**
- **S12**
- **S21**
- **S22**
- **A1** - reference receiver of the port 1
- **B1** - test receiver of the port 1
- **A2** - reference receiver of the port 2
- **B2** - test receiver of the port 2
- **NF** - noise measurement
- **SC21** - scalar conversion measurement
- **A1C** - reference receiver of the port 1 with frequency conversion enabled (source port definition is not required)
- **B1C** - test receiver of the port 1 with frequency conversion enabled (source port definition is not required)
- **A2C** - reference receiver of the port 2 with frequency conversion enabled (source port definition is not required)
- **B2C** - test receiver of the port 2 with frequency conversion enabled (source port definition is not required)

<port> Defines source port (1 or 2) for receiver measurements A1,B1,A2,B2. (optional)

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

Examples

Memory trace *Mem1* for S11 measurement data:

```
MMEMory:CREate "Mem1",S11
```

Memory trace *Mem2* for b1(2->1) measurement:

```
MMEMory:CREate "Mem2",B1,2
```

8.2. Команда MMEMory:LOAD

Loads user profile or calibration data from file. Data type will be selected by the file extension if type is not specified.

8.2.1. Команда MMEMory:LOAD[:CORRection] <filename> ,<bool>

(Write-only) Loads calibration data from file.

Parameters

<filename> Filename.
<bool> Apply sweep parameters from file. (optional)

Allowed values:

- **ON**
- **OFF**

Default value: **FALSE**

8.2.2. Команда MMEMory:LOAD[:STATe] <filename>

(Write-only) Loads user profile from file.

Parameters

<filename> Filename.

8.3. Команда MMEMory:STORe

Saves user profile or calibration data to file. Data type will be selected by the file

extension if type is not specified.

8.3.1. Команда **MMEMory:STORe[:CORRection] <filename>**

(Write-only) Saves calibration data to file.

Parameters

<filename> Filename.

8.3.2. Команда **MMEMory:STORe:DATA <filename> ,<type> ,<scope> ,<format> ,<comment>**

(Write-only) Trace data export to CSV-file.

Parameters

<filename> Filename.

<type> Type of the file, should be equal to "CSV Formatted Data".

<scope> Data to save: "Trace" - only the selected trace; "Displayed" - all displayed traces of the active diagram.

<format> The format of the saved data: "Displayed" (displayed formatted data); "Source" (initial corrected source data, e.g. complex S-parameter).

<comment> File commentary. (optional)

Examples

The data export of the selected trace:

```
MMEMory:STORe:DATA "E:\\DUT_12345678.csv","CSV Formatted
data","Trace","Displayed","DUT #12345678"
```

8.3.3.1.1. Команда **MMEMory:STORe:TRACe:FORMat:SNP <char>**

(Write or Read) Specifies the format s1p, s2p save statements.

Parameters

<char> Value format.

Allowed values:

- **MA** - Linear Magnitude / degrees
- **DB** - Log Magnitude / degrees

RI - Real / Imaginary**Examples**

```
MMEMory:STORe:TRACe:FORMat:SNP DB
```

8.3.4. Команда MMEMory:STORe[:STATe] <filename>

(Write-only) Saves user profile to file.

Parameters

<filename> Filename.

9. OUTPut commands

Controls RF output parameters.

9.1. Команда OUTPut[:STATe] <bool>

(Write or Read) Turns RF power from the source ON or OFF. The command exists for compability only and will be ignored if called. Power control is performed in accordance with [SOURce:POWer:MODE](#). The query returns actual RF output state.

Parameters

<bool> RF output state.

Allowed values:

- ON
- OFF

10. SENSE commands

Parameters of the measurement instrument.

10.1. Команда SENSE:AVERage

Sets sweep-to-sweep averaging parameters.

10.1.1. Команда SENSE:AVERage:CLEar

(Write-only) Clears and restarts averaging of the measurement data.

10.1.2. Команда SENSE:AVERage:COUNt <num>

(Write or Read) Sets the number of measurements to combine for an average.

Parameters

<num> Number of measurements to average.

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

Value range: **1 ÷ 1024**

Default value: **1**

10.1.3. Команда SENSE:AVERage[:STATe] <bool>

(Write or Read) Turns trace averaging ON or OFF. 1 measurement to average is equal to OFF.

Parameters

<bool> Averaging state.

Allowed values:

- **ON**
- **OFF**

10.2. Команда SENSE:BANDwidth

Digital filter parameters.

10.2.1. Команда SENSE:BANDwidth:TRACK <bool>

(Write or Read) Controls IF Bandwidth reduction at low frequencies.

Parameters

<bool> Function state.

Allowed values:

- **ON**
- **OFF**

Default value: **TRUE**

10.2.2. Команда SENSE:BANDwidth[:RESolution] <band>

(Write or Read) Sets the bandwidth of the digital IF filter to be used in the measure.

Parameters

<band> IF Bandwidth in Hz.

Supported units: HZ(default), KHZ, MHZ, GHZ, THZ

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

Default value: **10 kHz**

10.3. Команда SENSE:CORRection

Performs and applies calibration and other error correction features.

10.3.1. Команда SENSE:CORRection:COLLect

Controls calibration process and manages calibration kits.

10.3.1.1. Команда **SENSe:CORRection:COLLect:CKIT**

Manages the list of cal kits that are installed in the Graphit.

10.3.1.1.1. Команда **SENSe:CORRection:COLLect:CKIT:CATalog?**

(Read-only) Returns a comma-separated list of valid kits for each port.

10.3.1.1.2. Команда **SENSe:CORRection:COLLect:CKIT:CLEar <name>**

(Write-only) Deletes installed cal kits. Full cal kits list can be obtained by [SENSe:CORRection:COLLect:CKIT:CATalog?](#). If name not specified, all cal kits are deleted, including custom kits.

Parameters

<name> Kit name and serial string (in accordance with
SENSe:CORRection:COLLect:CKIT:CATalog? format).

10.3.1.1.3. Команда **SENSe:CORRection:COLLect:CKIT:COUNT?**

(Read-only) Returns the number of installed cal kits.

10.3.1.1.4. Команда **SENSe:CORRection:COLLect:CKIT:IMPort <filename>**

(Write-only) Imports the specified cal kit (.ckm file) and appends the imported kit to the end of the list of kits.

Parameters

<filename> Cal kit filename.

10.3.1.2.1. Команда **SENSe:CORRection:COLLect:GUIDed:ABORT**

(Write-only) Aborts the acquiring of a guided calibration that has been INITIALIZED but has not yet been concluded using the SAVE command.

10.3.1.2.2. Команда **SENSe:CORRection:COLLect:GUIDed[:ACQuire]**

(Write-only) Initiates the measurement of the next calibration step. Calibration should be initialized before by using command [SENSe:CORRection:COLLect:GUIDed:INITiate](#). It's allowed to prepare next step measurement after current measurement completes. Standard connection instructions can be extracted by command

[SENSe:CORRection:COLLect:GUIDed:DESCription?](#); use [SENSe:CORRection:COLLect:GUIDed:STEPS?](#) to obtain total amount of calibration steps. Check [*OPC?](#) to determine whether step measurements are finished.

10.3.1.2.3. Команда **SENSe:CORRection:COLLect:GUIDed:CKIT**

Specifies calibration kit for GUIDED calibration.

10.3.1.2.3.1. Команда

SENSe:CORRection:COLLect:GUIDed:CKIT:PORT<pnum>

Manage calibration kits for the specified port.

Suffix

<pnum> Port number

10.3.1.2.3.1.1. Команда

SENSe:CORRection:COLLect:GUIDed:CKIT:PORT<pnum>:CATalog?

(Read-only) Returns a comma-separated list of valid kits for the specified port.

10.3.1.2.3.1.2. Команда

SENSe:CORRection:COLLect:GUIDed:CKIT:PORT<pnum>[:SElect] <kit>

(Write or Read) Specifies the calibration kit for the selected port to be used during a guided calibration. An unused port does NOT need to have a specified Cal Kit.

Parameters

<kit> Cal kit name for the specified port.

Examples

Set cal kit for the port 1:

```
:SENSe:CORRection:COLLect:GUIDed:CKIT:PORT1:SElect "NKMM-13-13R №2196080008"
```

10.3.1.2.4.1. Команда

SENSe:CORRection:COLLect:GUIDed:CONNector:CATalog?

(Read-only) Returns a list of valid connectors based on the connector descriptions of the

available cal kits.

10.3.1.2.4.2. Команда

SENSe:CORRection:COLLect:GUIDed:CONNector:PORT<pnum>

Manage connector for the specified port.

Suffix

<pnum> Port number

10.3.1.2.4.2.1. Команда

SENSe:CORRection:COLLect:GUIDed:CONNector:PORT<pnum>[:SElect] <conn>

(Write or Read) Specifies a connector type for the specified port during the GUIDED calibration.

Parameters

<conn> Connector type string

Examples

Set connector for the port 1:

```
:SENSe:CORRection:COLLect:GUIDed:CONNector:PORT1:SElect "3,5/SMA female"
```

10.3.1.2.5. Команда **SENSe:CORRection:COLLect:GUIDed:DESCription?**

(Read-only) Returns the connection description for the current calibration step.

10.3.1.2.6.1. Команда

SENSe:CORRection:COLLect:GUIDed:INITiate[:IMMediate]

(Write-only) Initiates a guided calibration, which must be configured before. Use [SENSe:CORRection:COLLect:GUIDed:STEPS?](#) to obtain total amount of calibration steps.

10.3.1.2.7. Команда **SENSe:CORRection:COLLect:GUIDed:ISOLation <bool>**

(Write or Read) Measure isolation on ports 1-2.

Parameters

<bool> Isolation measurement. (optional)

Allowed values:

- **ON**
- **OFF**

Default value: **OFF**

10.3.1.2.8.1. Команда

SENSe:CORRection:COLLect:GUIDed:PATH:CMETHod <type>

(Write or Read) Specifies the calibration method for each port pair.

Parameters

<type> Calibration type

Allowed values:

- **SOLT** - full 2-port calibration (SOLT)
- **EnhResp1** - enhanced response calibration for port 1
- **EnhResp2** - enhanced response calibration for port 2
- **THRU1** - transmission response calibration for port 1
- **THRU2** - transmission response calibration for port 2
- **QSOLT1** - reflection vector calibration for port 1
- **QSOLT2** - reflection vector calibration for port 2
- **RESP1** - reflection response calibration for port 1
- **RESP2** - reflection response calibration for port 2
- **TRL** - full 2-port calibration (TRL)

Examples

Perform full 2-port calibration:

```
:SENSe:CORRection:COLLect:GUIDed:PATH:CMETHod "SOLT"
```

10.3.1.2.8.2. Команда

SENSe:CORRection:COLLect:GUIDed:PATH:TMETHod <method>

(Write or Read) Specifies the calibration THRU method.

Parameters

<method> THRU method.

Allowed values:

- **DEFined** - use defined THRU as described in cal kit
- **UNKnown** - use unknown THRU (parameters are not defined)

Default value: **DEFined**

10.3.1.2.9.1. Команда**SENSe:CORRection:COLLect:GUIDed:SAVE[:IMMediate]**

(Write-only) Completes the guided cal by computing the error correction terms, turning Correction ON, and saving the calibration to a Cal Set.

10.3.1.2.10. Команда SENSE:CORRection:COLLect:GUIDed:STEPS?

(Read-only) Returns the number of measurement steps required to complete the current guided calibration.

10.3.1.2.11. Команда SENSE:CORRection:COLLect:GUIDed:VMC

Vector mixer calibration settings.

10.3.1.2.11.1. Команда SENSE:CORRection:COLLect:GUIDed:VMC:MIXer

Parameters of the calibration mixer.

10.3.1.2.11.1.1. Команда**SENSe:CORRection:COLLect:GUIDed:VMC:MIXer:GENDER <char>**

(Write or Read) Gender of the mixer's IF connector.

Parameters

<char> Connector gender.

Allowed values:

- **FEMALE** - female
- **MALE** - male

- **NONE** - universal

10.3.2. Команда **SENSe:CORRection:DATA <char> ,<data>**

(Write or Read) Writes or reads error correction data acquired from calibration procedure or file. Data format (text / binary) is defined by [FORMat\[:DATA\]](#).

Parameters

<char> Error term notation.

Allowed values:

- **SCORR1** - directivity (Ed), port 1
- **SCORR2** - source match (Es), port 1
- **SCORR3** - reflection tracking(Er), port 1
- **SCORR4** - isolation (Ex), port 1
- **SCORR5** - load match (El), port 1
- **SCORR6** - forward transmission tracking (Et), port 1
- **SCORR7** - directivity (Ed), port 2
- **SCORR8** - source match (Es), port 2
- **SCORR9** - reflection tracking(Er), port 2
- **SCORR10** - isolation (Ex), port 2
- **SCORR11** - load match (El), port 2
- **SCORR12** - forward transmission tracking (Et), port 2

<data> Data block. Each term contains one complex value (real and imaginary part) for each calibration frequency point.

Examples

Read directivity error term at port 1:

```
SENSe:CORRection:DATA? SCORR1
```

Write corrected ASCII data to load match (El) error term at port 2:

```
SENSe:CORRection:DATA SCORR11,r1,i1,r2,i2,...
```

10.3.3. Команда **SENSe:CORRection[:STATe] <bool>**

(Write or Read) Turns error correction ON and OFF for the specified channel.

Parameters

<bool> Correction state.

Allowed values:

- **ON**
- **OFF**

10.4.1. Команда SENSE:FREQUENCY:CENTer <freq>

(Write or Read) Sets the center frequency of the analyzer.

Parameters

<freq> Center frequency.

Supported units: HZ(default), KHZ, MHZ, GHZ, THZ

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

10.4.2. Команда SENSE:FREQUENCY[:CW] <freq>

(Write or Read) Sets the Continuous Wave (or Fixed) frequency. Must also send [SENSE:SWEep:TYPE CW](#) to put the analyzer into CW sweep mode.

Parameters

<freq> Fixed frequency.

Supported units: HZ(default), KHZ, MHZ, GHZ, THZ

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

10.4.3. Команда SENSE:FREQUENCY:FIXed <freq>

(Write or Read) Sets the Continuous Wave (or Fixed) frequency. Must also send

[SENSe:SWEEp:TYPE CW](#) to put the analyzer into CW sweep mode.

Parameters

<freq> Fixed frequency

Supported units: HZ(default), KHZ, MHZ, GHZ, THZ

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

10.4.4. Команда **SENSe:FREQuency:MODE <mode>**

(Write or Read) This command sets the frequency mode of the signal generator to list or swept.

Parameters

<mode> The frequency mode of the signal generator.

Allowed values:

- **SWEEp** - stepped frequency sweep
- **LIST** - frequency list sweep

10.4.5. Команда **SENSe:FREQuency:SPAN <band>**

(Write or Read) Sets the frequency span of the analyzer.

Parameters

<band> Frequency span in Hz.

Supported units: HZ(default), KHZ, MHZ, GHZ, THZ

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

10.4.6. Команда **SENSe:FREQuency:STARt <freq>**

(Write or Read) Sets the start frequency of the analyzer.

Parameters

<freq> Start frequency.

Supported units: HZ(default), KHZ, MHZ, GHZ, THZ

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

10.4.7. Команда **SENSe:FREQuency:STOP <freq>**

(Write or Read) Sets the stop frequency of the analyzer.

Parameters

<freq> Stop frequency.

Supported units: HZ(default), KHZ, MHZ, GHZ, THZ

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

10.5. Команда **SENSe:IF**

Controls the IF filter for pulse applications.

10.5.1.1. Команда **SENSe:IF:GATE:DELaY <value>**

(Write or Read) Sets the gate delay. The amount of time before a new pulse begins, corresponds to "Gate Start" parameter.

Parameters

<value> Gate delay.

Supported units: S, MS, US(default)

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

Default value: **0**

10.5.1.2. Команда **SENSe:IF:GATE:DINCrement <value>**

(Write or Read) Sets the pulse delay increment. The delay increments with each pulse by this value amount in pulse profile mode.

Parameters

<value> Delay increment value in milliseconds.

Supported units: S, MS, US(default)

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

Default value: **0.01us**

10.5.1.3. Команда **SENSe:IF:GATE:POINts <num>**

(Write or Read) Defines points number in pulse profile mode.

Parameters

<num> Points number.

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

Default value: **51**

10.5.1.4. Команда **SENSe:IF:GATE[:STATe] <bool>**

(Write or Read) Sets or returns the IF gate state.

Parameters

<bool> IF gate

Allowed values:

- **ON**
- **OFF**

Default value: **ON**

10.5.1.5. Команда **SENSe:IF:GATE:WIDTh** <value>

(Write or Read) Sets the gate width. The amount of time that the pulse is ON, corresponds to "Gate Length" parameter.

Parameters

<value> Gate width.

Supported units: S, MS, US(default)

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

Default value: **0.04us**

10.6.1. Команда **SENSe:LIST:FREQuency** <value>

(Write or Read) This command sets the frequency values for the current list sweep points.

Parameters

<value> The frequency values for the current list sweep points.

Supported units: THZ, GHZ, MHZ, KHZ, HZ(default)

Examples

Set frequency list:

```
:SENSe:LIST:FREQuency 10000kHz,200MHz,3GHz
```

10.6.1.1. Команда **SENSe:LIST:FREQuency:POINts?**

(Read-only) This command queries the current list sweep size.

10.7. Команда SENSE:MIXer

Frequency conversion settings for a mixer measurements. Frequency conversion can be enabled by [SENSE:OFFSET\[:STATE\]](#) command.

10.7.1. Команда SENSE:MIXer:IF

IF parameters.

10.7.1.1. Команда SENSE:MIXer:IF:FREQuency

IF values.

10.7.1.1.1. Команда SENSE:MIXer:IF:FREQuency:START? <minmax>

(Read-only) Returns the IF start frequency value of the mixer. Duplicates [\[:SENSE\]:OFFSET:START?](#) command.

Parameters

<minmax> (optional)

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

10.7.1.1.2. Команда SENSE:MIXer:IF:FREQuency:STOP? <minmax>

(Read-only) Returns the IF stop frequency value of the mixer. Duplicates [\[:SENSE\]:OFFSET:STOP?](#) command.

Parameters

<minmax> (optional)

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

10.7.2. Команда SENSE:MIXer:LO

Defines LO settings.

10.7.2.1. Команда **SENSe:MIXer:LO:FREQuency**

LO frequency configuration.

10.7.2.1.1. Команда **SENSe:MIXer:LO:FREQuency:DENominator <num>**

(Write or Read) Sets or returns the denominator value of the LO Fractional Multiplier.

Parameters

<num> Divisor value.

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

Value range: **1 ÷ 10**

Default value: **1**

10.7.2.1.2. Команда **SENSe:MIXer:LO:FREQuency:NUMerator <num>**

(Write or Read) Sets or returns the numerator value of the LO Fractional Multiplier.

Parameters

<num> Multiplier value.

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

Value range: **-10 ÷ 10**

Default value: **0**

10.7.2.1.3. Команда **SENSe:MIXer:LO:FREQuency:STARt <freq>**

(Write or Read) Sets the LO start frequency.

Parameters

<freq> Start frequency.

Supported units: HZ(default), KHZ, MHZ, GHZ, THZ

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

Value range: **-100 GHz ÷ 100 GHz**

Default value: **1 GHz**

10.7.2.1.4. Команда SENSE:MIXer:LO:FREQuency:STOP <freq>

(Write or Read) Sets the LO stop frequency.

Parameters

<freq> Stop frequency.

Supported units: HZ(default), KHZ, MHZ, GHZ, THZ

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

Value range: **-100 GHz ÷ 100 GHz**

Default value: **1 GHz**

10.7.2.2. Команда SENSE:MIXer:LO:NAME <value>

(Write or Read) Defines LO name or address. Set empty value when using external non-controlled synthesizer, or specify VISA-formatted address for G7M/R2M/PLG device.

Parameters

<value> Signal source name or address.

Examples

```
SENSe:MIXer:LO:NAME ""
```

SENSe:MIXer:LO:NAME "TCPIP::172.18.102.13::8888::SOCKET::GEN"

10.7.3. Команда SENSe:MIXer:XAXis <mode>

(Write or Read) Sets or returns the swept frequency range to display on the X-axis.

Parameters

<mode> Displayed stimulus.

Allowed values:

- **INPUT** - source frequencies
- **OUTPUT** - receiver frequencies

Default value: **INPUT**

10.8. Команда SENSe:OFFSet

Sets the offset frequency functions, causing the stimulus and response frequencies to be different.

10.8.1. Команда SENSe:OFFSet:DIVisor <num>

(Write or Read) Specifies (along with the multiplier) the value to multiply by the stimulus.

Parameters

<num> Divisor value.

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

Value range: **1 ÷ 10**

Default value: **1**

10.8.2. Команда SENSe:OFFSet:MULTIplier <num>

(Write or Read) Specifies (along with the divisor) the value to multiply by the stimulus.

Parameters

<num> Multiplier value.

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

Value range: **-10 ÷ 10**

Default value: **0**

10.8.3. Команда **SENSe:OFFSet:OFFSet <freq>**

(Write or Read) Specifies an absolute offset frequency in Hz. For mixer measurements, this would be the LO frequency.

Parameters

<freq> Offset frequency. Offsets can be positive or negative.

Supported units: HZ(default), KHZ, MHZ, GHZ, THZ

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

Default value: **0**

10.8.4. Команда **SENSe:OFFSet:START? <minmax>**

(Read-only) Returns the response start frequency.

Parameters

<minmax> (optional)

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

10.8.5. Команда **SENSe:OFFSet[:STATe] <bool>**

(Write or Read) Enables Frequency Offset Mode on ALL measurements that are present on the active channel. This immediately causes the source and receiver to tune to separate frequencies. The receiver frequencies are specified with the other [SENSe:OFFSet](#) commands. To make the stimulus settings use the [SENSe:FREQuency](#) commands. LO frequencies for mixer measurements are configured by [SENSe:MIXer:LO](#) commands.

Parameters

<bool> Frequency conversion.

Allowed values:

- **ON**
- **OFF**

10.8.6. Команда **SENSe:OFFSet:STOP? <minmax>**

(Read-only) Returns the response stop frequency.

Parameters

<minmax> (optional)

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

10.9. Команда **SENSe:POWer**

Configure power settings on receivers input.

10.9.1. Команда **SENSe:POWer:ATTenuator <char> ,<num>**

(Write or Read) Sets the input attenuation level for the specified receiver.

Parameters

<char> Receiver.

Allowed values:

- **ARECeiver** - port 1
- **BRECeiver** - port 2

<num> Attenuator value.

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

10.10. Команда SENSE:PULSE

Configures the pulse generator.

10.10.1. Команда SENSE:PULSE:PERiod <value>

(Write or Read) Sets the pulse-period (high + low level widths) for the pulse generator. Modifies low level width only if possible.

Parameters

<value> Pulse period in seconds.

Supported units: S(default), MS, US

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

10.10.2. Команда SENSE:PULSE:WIDTH <value>

(Write or Read) Sets the pulse width (high level width).

Parameters

<value> Pulse width in seconds.

Supported units: S(default), MS, US

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

10.11. Команда SENSE:SWEEP

Specifies the sweep functions of the analyzer.

10.11.1. Команда SENSE:SWEEP:POINTS <num>

(Write or Read) Sets the number of data points for the measurement.

Parameters

<num> Points number.

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

Value range: **1 ÷ 10001**

Default value: **501**

10.11.2.1. Команда SENSE:SWEEP:PULSE[:MODE] <char>

(Write or Read) Sets the pulse measurement state for the channel.

Parameters

<char> Pulse measurement mode.

Allowed values:

- **OFF** - pulse measurements are OFF
- **STD** - pulse measurements are ON
- **PROFile** - pulse profile measurements

10.11.3.1. Команда SENSE:SWEEP:TRIGGER:MODE <char>

(Write or Read) Sets and reads the trigger mode for the specified channel. Specifies "Trigger IN" parameter.

Parameters

<char> Trigger IN mode.

Allowed values:

- **POINT** - measure start
- **SWEEP** - sweep start
- **NPOINT** - switch to next point

10.11.4. Команда **SENSe:SWEEP:TYPE <char>**

(Write or Read) Sets sweep mode of the analyzer.

Parameters

<char> Sweep mode.

Allowed values:

- **LINear** - frequency sweep
- **CW** - fixed frequency mode
- **POWER** - power sweep

11. SOURce commands

Controls the power delivered to the DUT and controls parameters of reference generator.

11.1. Команда SOURce:POWer<port>

Controls the power delivered to the DUT.

Suffix

<port> Source port number.

11.1.1. Команда SOURce:POWer<port>:ALC

Manages the automatic level control (ALC) system.

11.1.1.1. Команда SOURce:POWer<port>:ALC:MODE <state>

(Write or Read) Sets and returns ALC mode for the specified port.

Parameters

<state> ALC system mode.

Allowed values:

- **INTernal** - ALC system is used by default
- **OPENloop** - "External A1/A2 Reference" option is enabled for the specified port, ALC system is disabled

Default value: **INTernal**

11.1.2. Команда SOURce:POWer<port>:ATTenuation <num>

(Write or Read) Sets attenuator state for the channel's output.

Parameters

<num> Attenuation value. The range of settable values depends on the analyzer model

Allowed values:

- **MINimum** - minimum value of the parameter

MAXimum - maximum value of the parameter

11.1.3. Команда **SOURce:POWer<port>:CENTer <pow>**

(Write or Read) Sets the power sweep center power.

Parameters

<pow> Center power.

Supported units: DBM(default)

11.1.4.1.1. Команда **SOURce:POWer<port>[:LEVel] [:IMMediate][:AMPLitude] <pow>**

(Write or Read) Sets the RF power output level.

Parameters

<pow> Source power.

Supported units: DBM(default)

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

11.1.5. Команда **SOURce:POWer<port>:MODE <state>**

(Write or Read) Sets the RF output mode for the specified port.

Parameters

<state> RF output mode.

Allowed values:

- **AUTO** - source power is turned ON when required for a measurement
- **ON** - source power is always ON
- **OFF** - source power is always OFF

Default value: **AUTO**

11.1.6. Команда **SOURce:POWer<port>:SPAN <pow>**

(Write or Read) Sets the power sweep span power.

Parameters

<pow> Span power. Actual achievable leveled power depends on frequency.

Supported units: DB(default)

11.1.7. Команда **SOURce:POWer<port>:STARt <pow>**

(Write or Read) Sets the power sweep start power for ALL ports being used by the specified channel.

Parameters

<pow> Start power.

Supported units: DBM(default)

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

11.1.8. Команда **SOURce:POWer<port>:STOP <pow>**

(Write or Read) Sets the power sweep stop power for ALL ports being used by the specified channel.

Parameters

<pow> Stop power.

Supported units: DBM(default)

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

11.2. Команда **SOURce:ROSCillator**

Reference oscillator settings.

11.2.1.1. Команда **SOURce:ROSCillator:EXTernal:FREQuency <num>**

(Write or Read) Tells the analyzer the frequency of the external reference.

Parameters

<num> External reference frequency.

Supported units: HZ(default), KHZ, MHZ

Allowed values:

- **MINimum** - minimum value of the parameter
- **MAXimum** - maximum value of the parameter

11.2.2. Команда **SOURce:ROSCillator:SOURce <char>**

(Write or Read) Defines source of the reference frequency.

Parameters

<char> Reference oscillator's type.

Allowed values:

- **INTernal** - internal
- **EXTernal** - external
- **AUTO** - automatic selection (R42 only)

12. SYSTem commands

Controls and queries settings that affect the R4 system.

12.1. Команда SYSTem:ERRor?

(Read-only) Returns the next error in the error queue. Each time the analyzer detects an error, it places a message in the error queue.

12.1.1. Команда SYSTem:ERRor:COUnT?

(Read-only) Returns the number of errors in the error queue.

12.2.1. Команда SYSTem:MCLass:CATalog?

(Read-only) Returns list of available optional measurements.

12.3. Команда SYSTem:SET

(Write-only) Sets instrument state from a file, equals to profile's loading [MMEMory:LOAD\[:STATe\]](#).

13. TRIGger commands

Controls the starts or ends of data acquisition.

13.1. Команда TRIGger:AUXiliary

Parameters of AUX trigger input / output connector pair on the rear panel.

13.1.1. Команда TRIGger:AUXiliary:DURation <num>

(Write or Read) Specifies the width of the output pulse, which is the time that the aux trigger output will be asserted. Defines "Pulse Width" parameter.

Parameters

<num> Duration value in seconds.

Supported units: S(default), MS, US

13.1.2. Команда TRIGger:AUXiliary:INTerval <char>

(Write or Read) Specifies how often a trigger output signal is sent. Defines "Trigger OUT" parameter.

Parameters

<char> Trigger OUT mode.

Allowed values:

- **POINT** - next point
- **SWEep** - sweep start
- **AUXiliary** - relay trigger IN
- **PULSe** - pulse gen (for the pulse measurements)
- **LOCKpII** - lock PLL
- **PORT** - sweep direction

13.1.3. Команда TRIGger:AUXiliary:IPOLarity <char>

(Write or Read) Specifies the polarity of the trigger IN signal to which the analyzer will respond. Defines "Trigger IN Inversion" parameter.

Parameters

<char> Signal polarity.

Allowed values:

- **POSitive** - positive polarity of trigger pulse
- **NEGative** - negative polarity of trigger pulse (inversion enabled)

Default value: **POSitive**

13.1.4. Команда TRIGger:AUXiliary:OPOLarity <char>

(Write or Read) Specifies the polarity of the aux output signal. Defines "Trigger OUT Inversion" parameter.

Parameters

<char> Signal polarity.

Allowed values:

- **POSitive** - positive polarity of trigger pulse
- **NEGative** - negative polarity of trigger pulse (inversion enabled)

Default value: **POSitive**

13.1.5.1. Команда TRIGger:AUXiliary[:OUTPut][:ENABLE] <bool>

(Write or Read) Turns ON / OFF the trigger output. Trigger interval is configured by [TRIGger:AUXiliary:INTerval](#).

Parameters

<bool> Trigger output state.

Allowed values:

- **ON**
- **OFF**

13.2. Команда TRIGger:LXI<n>

Controls custom input / output signal lines on the rear panel.

Suffix

<n> Custom signal line number (0-7). Please contact software support to get additional information.

13.2.1. Команда TRIGger:LXI<n>:DURation <num>

(Write or Read) Specifies the width of the output pulse, which is the time that the custom trigger output will be asserted.

Parameters

<num> Duration value in seconds.

Supported units: S(default), MS, US

13.2.2. Команда TRIGger:LXI<n>:INTerval <char>

(Write or Read) Specifies how often a custom trigger output signal is sent.

Parameters

<char> Trigger output mode.

Allowed values:

- **POINT** - next point
- **SWEep** - sweep start
- **AUXiliary** - relay trigger IN
- **PULSe** - pulse gen (for the pulse measurements)
- **LOCKpll** - lock PLL
- **PORT** - sweep direction

13.2.3. Команда TRIGger:LXI<n>:IPOLarity <char>

(Write or Read) Specifies the polarity of the custom trigger IN signal to which the analyzer will respond.

Parameters

<char> Signal polarity.

Allowed values:

- **POSitive** - positive polarity of trigger pulse

- **NEGative** - negative polarity of trigger pulse (inversion enabled)

Default value: **POSitive**

13.2.4. Команда TRIGger:LXI<n>:OPOLarity <char>

(Write or Read) Specifies the polarity of the custom output signal.

Parameters

<char> Signal polarity.

Allowed values:

- **POSitive** - positive polarity of trigger pulse
- **NEGative** - negative polarity of trigger pulse (inversion enabled)

Default value: **POSitive**

13.2.5.1. Команда TRIGger:LXI<n>[:OUTPut][:ENABle] <bool>

(Write or Read) Turns ON / OFF the trigger output. Trigger interval is configured by [TRIGger:LXI<n>:INTerval](#).

Parameters

<bool> Custom trigger output state.

Allowed values:

- **ON**
- **OFF**

13.3.1. Команда TRIGger[:SEQuence]:SOURce <char>

(Write or Read) Sets the source of the sweep trigger signal.

Parameters

<char> Trigger source.

Allowed values:

- **IMMediate** - internal source sends continuous trigger signals (trigger IN disabled)

- **EXternal** - auxiliary trigger IN
- **LXI0..LXI7** - custom signal line (0..7)

SCPI Errors Description

Error Code	Error String	Description
(+)0	"No error"	No error
-108	"Parameter not allowed"	More parameters were received than expected for the command. You may have entered an extra parameter, or added a parameter to a command that does not accept a parameter
-109	"Missing parameter"	Fewer parameters were received than expected for the command. You may have omitted one or more parameters that are required for this command
-113	"Undefined header"	A command was received that is not valid for the instrument. You may have misspelled the command, it may not be a valid command, or you may have the wrong interface selected. If you are using the short form of the command, remember that it may contain up to four letters
-114	"Header suffix out of range"	Indicates the value of a header suffix attached to a program mnemonic makes the header invalid.
-121	"Invalid character in number"	Indicates an invalid character for the data type being parsed was encountered. For example, an alpha in a decimal numeric or a "9" in octal data.
-123	"Exponent too large"	Indicates the magnitude of an exponent was greater than 32000, see IEEE 488.2, 7.7.2.4.1.
-128	"Numeric data not allowed"	Indicates that a legal numeric data element was received, but the device does not accept one in this position for the header.
-131	"Invalid suffix"	A suffix was incorrectly specified for a numeric parameter. You may have misspelled the suffix. For example, SENS:FREQ 200KZ
-138	"Suffix not allowed"	A suffix was received following a numeric parameter which does not accept a suffix. For example, INIT:CONT 0Hz
-160	"Block data error"	This error, as well as errors -161 through -169, are generated when parsing a block data element. This particular error message is used if the device cannot detect a more specific error.
-161	"Invalid block data"	Indicates a block data element was expected, but was invalid, see IEEE 488.2, 7.7.6.2. For example, and END message was received before the end length was satisfied.

-168	"Block data not allowed"	Indicates a legal block data element was encountered, but not allowed by the device at this point in parsing.
-211	"Trigger ignored"	Indicates that GET, *TRG or TRIG:IMM was received but was ignored because the device was not in the wait-for-trigger state
-213	"Initiation ignored"	Init ignored.
-221	"Settings conflict"	This message means that command has been received and processed successfully, but will be ignored due to conflicting settings
-222	"Data out of range"	A numeric parameter value is outside the valid range for the command
-224	"Illegal parameter value"	Illegal parameter value. A discrete parameter was received which was not a valid choice for the command. You may have used an invalid parameter choice. For example, TRIG:SOUR EX
-226	"List not same length"	This occurs when frequency and dwell time lists do not correspond in length, for example
-227	"CALC measurement selection set to none"	No trace is selected. Use CALCulate:PARAmeter:SElect to define selected trace.
-240	"Hardware error"	Indicates that a legal program command or query could not be executed because of a hardware problem in the device.
-300	"Device-specific error"	This event bit (Bit 3) indicates that a device operation did not properly complete due to some condition, such as overrange see IEEE 488.2, 11.5.1.1.6.
-310	"System error"	System error
-320	"Storage fault"	Indicates that the firmware detected a fault when using data storage. This is not an indication of physical damage or failure of any mass storage element.
-350	"Queue overflow"	The error queue is full and another error has occurred which could not be recorded
-360	"Communication error"	This is the generic communication error for devices that cannot detect the more specific errors described for error -361 through -363.
-365	"Time out error"	Operation timeout.

