OSA20

Optical Spectrum Analyzer

Programming Guide

About This Manual

Subject

This manual specifies the remote interfaces of the OSA20 Optical Spectrum Analyzer and the corresponding remote commands.

This document applies to OSA20 versions 1.10.x and above.

Intended Readers

Users of this manual must be familiar with:

- Fiber optic technology
- The Ethernet, USB and/or IEEE-488.1 interfaces used to operate the OSA20 in remote mode
- SCPI syntax and style
- The use of the OSA20 Optical Spectrum Analyzer (see *OSA20 User Manual*)

Date

7 May 2021

Manual Reference

OSA20_PG_2.0v1.0

Specifications

The OSA20 remote commands and interfaces comply with the following specifications:

- Standard Commands for Programmable Instruments (SCPI), 1999.
- IEEE Std 488:
  - IEEE std. 488.1-2003
  - IEEE std. 488.2-1992

Typographical Conventions

bold	Identifies graphical interface objects such as menu names, labels, buttons and icons.
italic	Identifies references to other sections or other guides.
`monospace`	Identifies portions of program codes, command lines, or messages displayed in command windows.

Command Syntax Notation Conventions

Notation	Meaning
/?	Indicates that a query is associated with the command.
[...]	The content between square brackets is optional.
<...>	The content between angled brackets indicates the type of information that you must enter as parameter (command) or that is received (response).
{...}	Indicates a table or array of values.
|	Indicates an alternative. Equivalent to "or".

Notation	Meaning
<wsp>	Indicates a white space.
;	Separates multiple commands in a single message.
,	Separates multiple parameters or results.
#	Represents a numeric suffix, for example a trace number.

Symbols

Important
Identifies important information to which you must pay particular attention.

Warning
Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. Do not proceed unless you understand and meet the required conditions.

Caution
Indicates a potentially hazardous situation which, if not avoided, may result in component damage. Do not proceed unless you understand and meet the required conditions.

Abbreviations Used

Abbreviation	Meaning
ASE	Amplified Spontaneous Emission
CR	Carriage Return
DUT	Device Under Test
EOI	End-Or-Identify
GPIB	General Purpose Interface Bus
LF	Line Feed
LSB	Least Significant Bit
MSK HI/LO	High/Low Mask
REF	Reference
SCPI	Standard Commands for Programmable Instruments
TRANS	Transfer function

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Table of Contents

1. Overview

1.1 Available Remote Interfaces

Subject

You can remotely control the OSA20 by GPIB, Ethernet and USB interfaces, as described in this section.

Maximum transfer rates for each interface are available in *OSA20 User Manual*.

LabVIEW Examples

Examples of remote control of the OSA20 via GPIB, Ethernet or USB-B are available:

- on the USB key provided with the instrument, in the **LabVIEW Examples** folder
- on the EXFO website (www.EXFO.com/en/exfo-apps)

OSA20_Ether_Example.vi; OSA20_GPIB_Example.vi and OSA20_USB_Example.vi

The example files *OSA20_Ether_Example.vi*; *OSA20_GPIB_Example.vi* and *OSA20_USB_Example.vi* are compatible with LabVIEW2010 (and later).

The OSA20_USB_Example.vi example must be launched using LabVIEW 32-bits.

These examples perform the following operations:

1. Initialize the OSA20.
2. Set up the scan and analysis parameters.
3. Perform a trace scan and analysis.
4. Gather the trace data and analysis results for display on the LabVIEW VI front panel.

OSA20_Ether_RollAvg_Example.vi (Ethernet only)

The example file *OSA20_Ether_RollAvg_Example.vi* is compatible with LabVIEW2010 (and later) and perform the following operations:

1. Initialize the OSA20.
2. Set up the scan and analysis parameters.
3. Perform a Roll Average trace scan and analysis.
4. Gather the entire history of the Roll Average trace data and the corresponding analysis results for display on the LabVIEW VI front panel.

1.1.1 GPIB Interface

Location on the Instrument

The GPIB port is located on the rear panel and is labeled **IEEE 488** (see *OSA20 User Manual*).

For more details on the standard compliance, see section *About This Manual, p. 3*.

Address

The GPIB default address is 10. You can set it between 1 and 30 using one of the following methods:

- Through the appropriate SYSTem command: see section *:SYSTem:COMMunicate:GPIB[:ADDRess]/?, p. 34*.
- Using the OSA20 **Remote** window (see *OSA20 User Manual*).

Capabilities

The following table lists the OSA20 GPIB capabilities.

Mnemonic	Function
SH1	Complete source handshake
AH1	Complete acceptor handshake
T6	Basic talker, serial poll, no talk only, not addressed to talk if addressed to listen
L4	Basic Listener, no listen only, not addressed to listen if addressed to talk
SR1	Service Request
RL1	Complete remote/local
PP0	No parallel poll
DC1	Complete device clear
DT0	No device trigger
C0	No controller
E2	Three state bus driver

Table 1: GPIB Interface Capabilities

1.1.2 Ethernet Interface

Location on the Instrument

The two Ethernet ports are located on the right-side panel (see *OSA20 User Manual*).
Two types of ports are available, as described below.

Ethernet Ports

Ethernet Port #1

This port enables you to directly control the OSA20 from a computer. It is associated with a DHCP server. You can use it to connect directly a computer that will be assigned automatically an IP address.

For more details on how to configure this port, see *OSA20 User Manual*.

Ethernet Port #2

This port enables you to remotely control the OSA20 from a computer through your company network, or to directly connect a computer to the OSA20 and manually configure the connection parameters.

You can configure this port manually or automatically:

- Automatically, the OSA20 IP configuration is setup by a remote DHCP server.
- Manually, you can configure the IP address, subnet mask and default gateway from the OSA20 **Remote** window.

For more details on how to configure this port, see *OSA20 User Manual*.

Communication Port

The OSA20 uses a TCP socket to communicate.

You can change the communication port from the OSA20 **Remote** window, as explained in *OSA20 User Manual*.

1.1.3 USB-B Interface

Location on the Instrument

The USB 2.0-B port is located on the right-side panel (see *OSA20 User Manual*).

USB Driver

The USB 2.0-B port enables you to directly control the OSA20 from a connected computer on which the appropriate USB driver is installed.

For more details on how to install the USB driver on the computer, see *OSA20 User Manual*.

USB DLL

EXFO provides a .dll file with functions allowing you to send commands via the USB port.

The .dll files used for USB-B control are only compatible with 32-bit versions of LabVIEW.

These files are available

- On the USB key provided with the OSA20, in the **USB Driver\OSA20 USB DLL** folder
- On the EXFO website (http://www.exfo.com/software/exfo-apps)

The USB interface speed is relatively slow to retrieve large amount of data.

1.2 Communication Principles

1.2.1 Buffer Mechanism

Input Buffer

The instrument input buffer is 1 MB large.

Any data beyond this limit size is discarded. In case of multiple commands, the last command after the separator is discarded.

When a byte is received, the output buffer is cleared.

The following modifications are applied on characters received (except on string and binary block):

- All characters are converted to upper-case.
- Characters from 0x00 to 0x09 and from 0x0B to 0x1F are converted to space character (0x20).
- Two or more spaces are converted to a single space.

If a character is received with a EOI (End Or Identify), a LF (Line Feed) is appended after the character.

If a EOI is send with a LF, only one LF is placed in the buffer.

Commands are parsed when a LF is received or the buffer is full.

Output Buffer

The instrument output buffer is 4 MB large.

When receiving a new command, the old data in the buffer is discarded and replaced by the new one.

- If no query is received or the query has an error, the buffer remains empty.
- When data is available, the MAV bit (message available, bit 4) is set.

Error Buffer

The instrument error buffer contains the last 30 errors that occurred.

1.2.2 Format of Messages

Message Endings

Command Message Ending

A command message must end with one of the following:

- LF (+ assertion of EOI signal for GPIB). Not available in Ethernet interface.
- CR + LF (+ assertion of EOI signal for GPIB).

Response Message Ending

A response message ends with CR + LF (+ assertion of EOI signal for GPIB)

Message Syntax Rules

Message syntax complies with the SCPI syntax and style.

Notation conventions used in this manual are listed in section *Command Syntax Notation Conventions, p. 3*.

This section describes the general syntax rules used in messages.

Case

You can type messages in upper-case or lower-case characters.

Short/Long Form

You can use short form and long form of commands. The short form part of a command is noted in upper-case letters in the command syntax specification.

Multiple Parameters and Commands

- If multiple parameters are required in a single command, each parameter is separated by a comma (,).
- If multiple commands are sent in a single message, each command is separated by a semicolon (;).

Numerical Values

- Numerical values are typed in decimal format.
- If a transmitted value has a higher precision than expected, the value is rounded off to the nearest accepted value.
- If a transmitted numerical value is not within the allowed range, it is coerced to the closest allowed value (i.e. minimum or maximum value).
- Result format for float value is +1.12345678E-123.

Units

- Unit multipliers are allowed to transmit numerical values. Applicable Mnemonics are listed in square brackets [...] for each command.
  Allowed mnemonics are:
  - P: pico
  - N: nano
  - U: micro
  - M: milli
  - G: giga
  - T: tera
- The unit of received numerical values is always the base unit (see section *UNIT Subsystem Commands and Queries, p. 35*).

1.2.3 Command Types

The OSA20 uses the following types of commands and queries:

- **Sequential**
  These commands are executed one after the other, in sequential order. A sequential command always finishes before the next command is implemented.
- **Overlapped**
  These commands allow execution of overlapping commands while execution of the overlapped commands is still in progress.
- **Overlapping**
  These commands can be executed during execution of an overlapped command.

1.2.4 Command Applicability

The OSA20 provides several application modes and one Home mode (see section *:OSA[:MODE]/?, p. 37*). For more details on application modes, see *OSA20 User Manual*.

Each mode has its own specific analysis calculation tools, adapted to the tested application, so all commands are not available in all application modes.

The applicability of each command is indicated in the command description.

2. General System and Status Control

This section describes all commands and queries enabling you to control the instrument general system:

- To control and query the standard IEEE status registers, see section *Standard Status Register Commands and Queries, p. 21*.
- To control and query the operational and questionable status registers, see section *Operational/Questionable Status Register Commands and Queries, p. 27*.
- To control the GPIB port and queries the SCPI version and error queue, see section *SYSTem Subsystem Commands and Queries, p. 33*.
- To control the measurement units, see section *UNIT Subsystem Commands and Queries, p. 35*.

2.1 Standard Status Register Commands and Queries

2.1.1 Standard Status Reporting Structure

The following figure shows the standard IEEE status reporting structure.

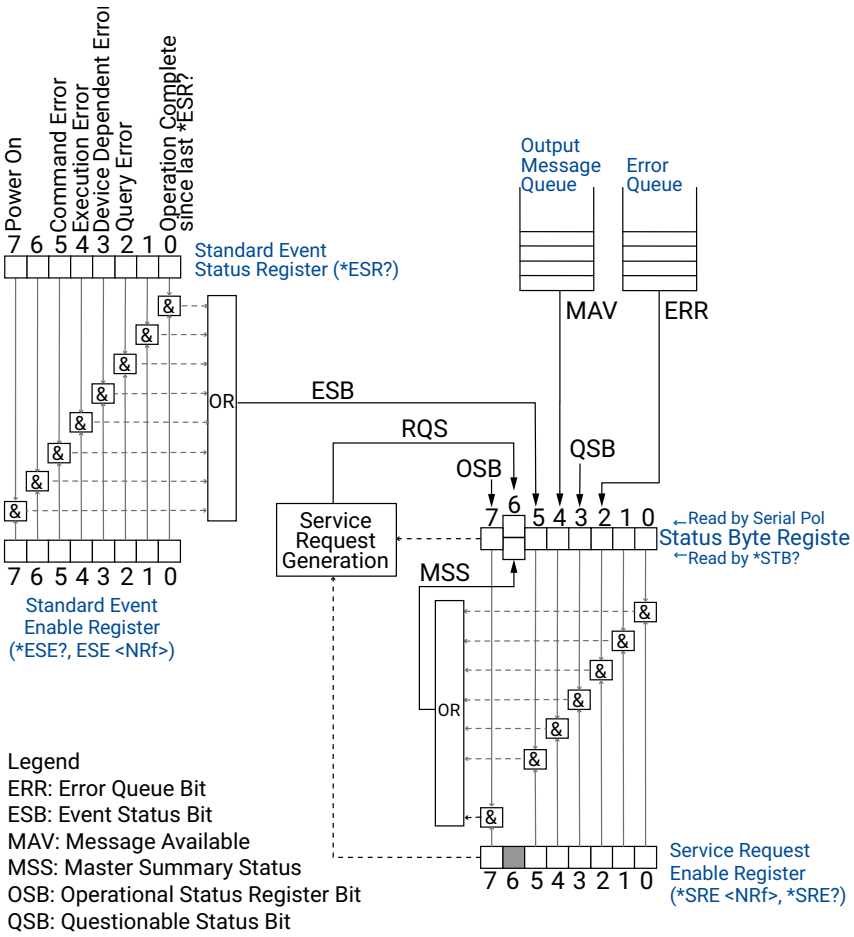


Figure 1: Standard Status Reporting Mechanism

2.1.2 Common IEEE Commands and Queries

The following table gives an overview of the IEEE standard commands and queries:

Command	Corresponding Section
`*CLS`	**CLS (Clear Status), p. 22*
`*ESE`	**ESE/? (Standard Event Status Enable), p. 22*
`*ESE?`	**ESE/? (Standard Event Status Enable), p. 22*
`*ESR?`	**ESR? (Event Status Register), p. 23*
`*IDN?`	**IDN? (Identification), p. 24*
`*OPC`	**OPC/? (Operation Complete), p. 24*
`*OPC?`	**OPC/? (Operation Complete), p. 24*
`*SRE`	**SRE/? (Service Request Enable), p. 24*
`*SRE?`	**SRE/? (Service Request Enable), p. 24*
`*RST?`	**RST (Reset), p. 25*
`*STB?`	**STB? (Status Byte), p. 26*
`*TST?`	**TST? (Self Test), p. 26*
`*WAI`	**WAI (Wait), p. 26*

Table 2: Common IEEE commands and queries

2.1.2.1 *CLS (Clear Status)

Syntax `*CLS`

Type Overlapping, no query.

Applicability All modes.

Description Clears the following:
- Error Queue.
- The Standard Event Status Register.
- The Status Byte Register.

Example `*CLS`

2.1.2.2 *ESE/? (Standard Event Status Enable)

Syntax
- Command `*ESE<wsp><value>`
- Query `*ESE?`

Type Overlapping.

Applicability All modes.

Description Sets/Queries the bits in the Standard Event Status Enable register.
- `<value>`: 0 (default) to 255.

Bit	Mnemonic
7	Power On
6	-
5	Command Error
4	Execution Error
3	Device Dependent Error
2	Query Error
1	-
0 (LSB)	Operation Complete

The register is cleared in the following cases:

- Power is on.
- Zero is set.

`*RST` and `*CLS` has no effect on this register.

Query Response 0 to 255

Example

```
*ESE 37
*ESE? → 37
```

2.1.2.3 *ESR? (Event Status Register)

Syntax `*ESR?`

Type Overlapping, query only.

Applicability All modes.

Description Queries the bits in the Standard Event Status Register.

Query Response 0 to 255 corresponding to the value of bits:

Bit	Mnemonic
7	Power On
6	-
5	Command Error
4	Execution Error
3	Device Dependent Error
2	Query Error
1	-
0 (LSB)	Operation Complete

Example

```
*ESR? → 1
```

2.1.2.4 *IDN? (Identification)

Syntax `*IDN?`

Type Overlapping, query only.

Applicability All modes.

Description Queries the instrument identification.

Query Response `<Manufacturer>,<Model>,<Serial>,<Firmware>`

- `<Manufacturer>`: manufacturer name
- `<Model>`: instrument name
- `<Serial>`: instrument serial number
- `<Firmware>`: instrument firmware version

Example `*IDN? → EXFO,OSA20,YO1405103XX,1.0.0`

2.1.2.5 *OPC/? (Operation Complete)

Syntax
```
*OPC
*OPC?
```

Type Overlapping.

Applicability All modes.

Description Sets/Queries the operation complete flag of the Standard Event Status Register that indicates that all pending operation has been completed. Sets the Operation Complete Status bit back to 1 after completion.

Query Response

- `1`: all operations are complete.

Example
```
*OPC
*OPC? → 1
```

2.1.2.6 *SRE/? (Service Request Enable)

Syntax
```
*SRE<wsp><value>
*SRE?
```

Type Overlapping.

Applicability All modes.

Description Sets/Queries the bits in the Service Request Enable Register.

- `<value>`: 0 (default) to 255

Bit	Mnemonic
7	Operation Status Bit (OSB)
6	-
5	Event Status Bit (ESB)

Bit	Mnemonic
4	Message Available (MAV)
3	Questionable Status Bit (QSB)
2	Error Message in Queue (ERR)
1	-
0 (LSB)	-

The register is cleared in the following cases:

- Power is on.
- Zero is set.

`*RST` and `*CLS` has no effect on this register.

Query Response 0 to 255

Example

```
*SRE 16
*SRE? → 16
```

2.1.2.7 *RST (Reset)

Syntax `*RST`

Type Overlapping, no query.

Applicability All modes.

Description Resets the instrument to a known state that is independent of the past-use history of the instrument.

This command does not affect the following:

- State of IEEE 488.1 interface.
- IEEE 488.1 address of the device.
- Output queue.
- Standard Status Register Enable Status.
- Standard Event Status Enable.
- Calibration data.
- The Ethernet port of the instrument

The command cancels any pending `*OPC?` queries and clears the Error queue.

Example

```
*RST
```

2.1.2.8 *STB? (Status Byte)

Syntax `*STB?`

Type Overlapping, query only.

Applicability All modes.

Description Queries the content of the status byte.

Query Response 0 to 255.

Bit	Mnemonic
7	Operation Status Bit (OSB)
6	Master Summary Status (MSS)
5	Event Status Bit (ESB)
4	Message Available (MAV)
3	Questionable Status Bit (QSB)
2	Error Message in Queue (ERR)
1	-
0 (LSB)	-

Example `*STB? → 128`

2.1.2.9 *TST? (Self Test)

Syntax `*TST?`

Type Sequential, query only.

Applicability All modes.

Description Performs an internal self-test and returns a response indicating whether the self-test completed without detected errors.

Query Response

- `0`: no error was found.
- `<error code>`: an error occurred (all error codes are explained in *OSA20 User Manual*).

Example `*TST? → 0`

2.1.2.10 *WAI (Wait)

Syntax `*WAI`

Type Overlapping, no query.

Applicability All modes.

Description Prevents the instrument from executing any other command until the end of the current command execution.

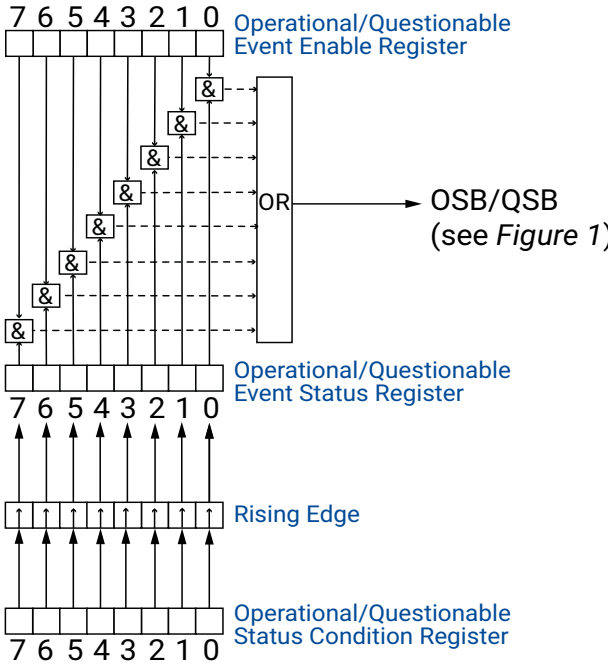
Example `*WAI`

2.2 Operational/Questionable Status Register Commands and Queries

2.2.1 Operational and Questionable Status Reporting Structure

Structure

The following figure shows the operational and questionable status reporting structure.



Legend
OSB: Operational Status Register Byte
QSB: Questionable Status Byte

Figure 2: Operational/Questionable Status Reporting Mechanism

- A rising bit in the Operational/Questionable Status Condition Register is copied to the Operational/Questionable Event Status Register.
- A falling bit in the Operational/Questionable Status Condition Register has no effect.
- Read effects:
  - Reading the Operational/Questionable Status Condition Register has no effect on the registers.
  - Reading the Operational/Questionable Event Status Register clears the register.
- The summary of Operational/Questionable Event Status Register is available in STB.

Operational Status Register

- Bit0: set if OSA is zeroing.
- Bit1: set if OSA is calibrating.
- Bit2: set if OSA is scanning.
- Bit3: set if OSA is analyzing.
- Bit4: set if OSA is aborting.
- Bit5: set if OSA is armed.
- Bit6: set if OSA is opening/closing a mode menu.

Questionable Status Register

- Bit0: set if zeroing is recommended.
- Bit1: set if calibrating is recommended.

2.2.2 STATus Subsystem Commands and Queries

The following table gives an overview of the status commands and queries:

Command	Corresponding Section
`:STATus`	-
`:OPERation`	-
`[:EVENt]?`	*:STATus:OPERation[:EVENt]?, p. 28*
`:CONDition?`	*:STATus:OPERation:CONDition?, p. 29*
`:ENABle/?`	*:STATus:OPERation:ENABle/?, p. 30*
`:QUEStionable`	-
`[:EVENt]?`	*:STATus:QUEStionable[:EVENt]?, p. 30*
`:CONDition?`	*:STATus:QUEStionable:CONDition?, p. 31*
`:ENABle/?`	*:STATus:QUEStionable:ENABle/?, p. 31*
`:PRESet`	*:STATus:PRESet, p. 32*

Table 3: STATus commands and queries

2.2.2.1 :STATus:OPERation[:EVENt]?

Syntax `:STATus:OPERation[:EVENt]?`

Type Sequential, query only.

Applicability All modes.

Description Queries the value of the Operational Status Event Register.

Query Response Integer within range 0 to 65535

Bit	Mnemonic
15	-
14	-
13	-
12	-
11	-
10	-
9	-
8	-
7	-
6	Opening or Closing Mode
5	Armed
4	Aborting
3	Analyzing
2	Scanning
1	Calibrating
0 (LSB)	Zeroing

Example `:STAT:OPER? → 4`

2.2.2.2 :STATus:OPERation:CONDition?

Syntax `:STATus:OPERation:CONDition?`

Type Sequential, query only.

Applicability All modes.

Description Queries the value of the Operational Status Condition Register.
Some remote commands can only be executed if the OSA20 is in idle state (`:STAT:OPER:COND? → 0`). Other commands will cause a change in the `:STAT:OPER:COND` byte.

Query Response Integer within range 0 to 65535

Bit	Mnemonic
15	-
14	-
13	-
12	-
11	-
10	-
9	-
8	-
7	-
6	Opening or Closing Mode
5	Armed
4	Aborting
3	Analyzing
2	Scanning
1	Calibrating
0 (LSB)	Zeroing

Example `:STAT:OPER:COND? → 4`

2.2.2.3 :STATus:OPERation:ENABle/?

Syntax
- Command `STATus:OPERation:ENABle<wsp><value>`
- Query `STATus:OPERation:ENABle?`

Type Sequential

Applicability All modes.

Description Sets/Queries the value of the Operational Status Enable Register bits.
- `<value>`: integer within range 0 to 65535.

Setting a bit in the register enable the corresponding bit in the Operational Status Event Register.

Query Response Integer within range 0 to 65535

Example
- Command `:STAT:OPER:ENAB 4`
- Query `:STAT:OPER:ENAB? → 4`

2.2.2.4 :STATus:QUEStionable[:EVENt]?

Syntax `:STATus:QUEStionable[:EVENt]?`

Type Sequential, query only

Applicability All modes.

Description Queries the value of the Questionable Status Event Register.

Query Response Integer within range 0 to 65535

Bit	Mnemonic
15	-
14	-
13	-
12	-
11	-
10	-
9	-
8	-
7	-
6	-
5	-
4	-
3	-
2	-
1	Calibration recommended
0 (LSB)	Zero recommended

Example `:STAT:QUES:OPER? → 1`

2.2.2.5 :STATus:QUEStionable:CONDition?

Syntax `:STATus:QUEStionable:CONDition?`

Type Sequential, query only.

Applicability All modes.

Description Queries the value of the Questionable Status Condition Register.

Query Response Integer within range 0 to 65535

Bit	Mnemonic
15	-
14	-
13	-
12	-
11	-
10	-
9	-
8	-
7	-
6	-
5	-
4	-
3	-
2	-
1	Calibration recommended
0 (LSB)	Zero recommended

Example `:STAT:QUES:COND? → 1`

2.2.2.6 :STATus:QUEStionable:ENABle/?

Syntax
- Command `:STATus:QUEStionable:ENABle<wsp><value>`
- Query `:STATus:QUEStionable:ENABle?`

Type Sequential.

Applicability All modes.

Description Sets/Queries the value of the Questionable Status Enable Register bits.
- `<value>`: integer within range 0 to 65535.

Setting a bit in the register enable the corresponding bit in the Questionable Status Event Register.

Query Response Integer within range 0 to 65535.

Example
- Command `:STAT:QUES:ENAB 1`
- Query `:STAT:QUES:ENAB? → 1`

2.2.2.7 :STATus:PRESet

Syntax `:STATus:PRESet`

Type Sequential, no query.

Applicability All modes.

Description Clears Event Register and sets all bits of the Enable register.

Example `:STAT:PRES`

2.3 SYSTem Subsystem Commands and Queries

The following table gives an overview of the general system commands and queries.

Command	Corresponding Section
`:SYSTem`	-
`:ERRor`	-
`[:NEXT]?`	*:SYSTem:ERRor[:NEXT]?, p. 33*
`:VERSion?`	*:SYSTem:VERSion?, p. 33*
`:COMMunicate`	-
`:GPIB`	-
`[:ADDRess/?]`	*:SYSTem:COMMunicate:GPIB[:ADDRess]/?, p. 34*

Table 4: SYSTem sub system commands and queries

2.3.1 :SYSTem:ERRor[:NEXT]?

Syntax `:SYSTem:ERRor[:NEXT]?`

Type Sequential, query only.

Applicability All modes.

Description Queries the next error in the error queue.

Query Response `<ErrorCode>,<ErrorShortDescription>`

- `<ErrorCode>`: -32768 to +32767
- `<ErrorShortDescription>`: String

Example `:SYST:ERR? → -100,"Command error"`

2.3.2 :SYSTem:VERSion?

Syntax `:SYSTem:VERSion?`

Type Sequential, query only.

Applicability All modes.

Description Queries the SCPI revision to which the instrument complies.

Query Response The revision year and number.

Example `SYST:VERS? → 1999.0`

2.3.3 :SYSTem:COMMunicate:GPIB[:ADDRess]/?

Syntax

- Command `:SYSTem:COMMunicate:GPIB[:ADDRess]<wsp><value>`
- Query `:SYSTem:COMMunicate:GPIB[:ADDRess]?`

Type Sequential.

Applicability Home mode.

Description Sets/Queries the address of the GPIB port.

- `<value>`: integer within range 1 to 30.

Query Response Integer corresponding to the GPIB address.

Example

- Command `SYST:COMM:GPIB 10`
- Query `SYST:COMM:GPIB? → 10`

2.4 UNIT Subsystem Commands and Queries

The following table gives an overview of the commands and queries enabling you to control the unit measurement settings.

Command	Corresponding Section
:UNIT	-
:X/?	*:UNIT:X/?, p. 35*
:Y/?	*:UNIT:Y/?, p. 35*

Table 5: SYSTem sub system commands and queries

2.4.1 :UNIT:X/?

Syntax
- Command `:UNIT:X<wsp>WAVelength|FREQuency|0|1`
- Query `:UNIT:X?`

Type Sequential.

Applicability All modes.

Description Sets/Queries the **Spectral Unit**.
- `0`: `WAVelength`, wavelength (nm).
- `1`: `FREQuency`, frequency (THz).

Query Response Integer corresponding to the spectral unit.

Example
- Command `:UNIT:X FREQ`
- Query `:UNIT:X? → 1`

2.4.2 :UNIT:Y/?

Syntax
- Command `:UNIT:Y<wsp>DBM|MW|0|1`
- Query `:UNIT:Y?`

Type Sequential.

Applicability All modes.

Description Sets/Queries the **Power Unit**.
- `0`: `DBM`, decibel-milliwatt (dBm).
- `1`: `MW`, milliwatt (mW).

Query Response Integer corresponding to the power unit.

Example
- Command `:UNIT:Y DBM`
- Query `:UNIT:Y? → 0`

3. Scan Measurements Control

This section describes all commands and queries enabling you to control scan measurement parameters:

- To set the wanted OSA mode and stop/abort the scanning process, see section *Root Level Commands and Queries, p. 37*.
- To set scanning parameters and perform a scan, see section *INITiate Subsystem Commands and Queries, p. 39*.
- To set scanning sensitivity, range and perform zeroing, see section *SENSe Subsystem Commands and Queries, p. 41*.
- To operate and handle scan traces, see section *TRACe Subsystem Commands and Queries, p. 50*.

3.1 Root Level Commands and Queries

The following table gives an overview of the Root layer commands and queries:

Command	Corresponding Section
`:OSA`	-
`[:MODE]/?`	*:OSA[:MODE]/?, p. 37*
`:STOP`	*:STOP, p. 38*
`:ABORt`	*:ABORt, p. 38*
`:CLEAR`	*:CLEar, p. 38*

Table 6: Root commands and queries

3.1.1 :OSA[:MODE]/?

Syntax

- Command `:OSA[:MODE]<wsp>HOME|OSA|WDM|OFA|PCT|SML|MML|BBS|RLT|0|1|2|3|4|5|6|7|8`
- Query `:OSA[:MODE]?`

Type Overlapped.

Applicability All modes.

Description Sets/Queries the testing mode of the OSA20.

- `0`: Home mode.
- `1`: OSA mode.
- `2`: WDM mode.
- `3`: OFA mode.
- `4`: PCT mode.
- `5`: SML mode.
- `6`: MML mode.
- `7`: BBS mode.
- `8`: RLT mode.

Query Response Integer corresponding to the testing mode.

Example
- Command `:OSA WDM`
- Query `:OSA? → 2`

3.1.2 :STOP

Syntax `:STOP`

Type Overlapping, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Stops a scan that is currently in progress. The scan stops when the wavelength stop is reached. This command is useful when scanning in continuous mode.

Example `:STOP`

3.1.3 :ABORt

Syntax `:ABORt`

Type Overlapping, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Immediately aborts a scan that is currently in progress.

Example `:ABOR`

3.1.4 :CLEar

Syntax `:CLEar`

Type Sequential, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Clears all traces content and analysis results.

Caution
This command cannot be undone.

Example `:CLE`

3.2 INITiate Subsystem Commands and Queries

The following table gives an overview of the initialization commands and queries:

Command	Corresponding Section
:INITiate	-
[:IMMediate]	*:INITiate[:IMMediate], p. 39*
:SMODe/?	*:INITiate:SMODe/?, p. 39*
:TMODe/?	*:INITiate:TMODe/?, p. 40*
:CURRent?	*:INITiate:CURRent?, p. 40*
:PROGress?	*:INITiate:PROGress?, p. 40*

Table 7: INITiate commands and queries

3.2.1 :INITiate[:IMMediate]

Syntax `:INITiate[:IMMediate]`

Type Overlapped, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Performs a scan with the current parameters.
- You can stop the scan with the `:STOP` command (see section *:STOP, p. 38*).
- You can abort the scan with the `:ABORt` command (see section *:ABORt, p. 38*).

Example
```
:INIT
```

3.2.2 :INITiate:SMODe/?

Syntax
- Command `:INITiate:SMODe<wsp>SINGle|CONTinuous|AUTO|0|1|2`
- Query `:INITiate:SMODe?`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the acquisition scanning mode.
- `0`: Single scan mode.
- `1`: Continuous scan mode.
- `2`: Auto set scan mode.

You must stop the scan before changing the mode.

Query Response Integer corresponding to the acquisition scanning mode.

Example
```
:INIT:SMOD SING
:INIT:SMOD? → 0
```

3.2.3 :INITiate:TMODe/?

Syntax
- Command :INITiate:TMODe<wsp>`MANual|TRIGgered|0|1`
- Query :INITiate:TMODe?

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Set/Queries the scan mode (manual or triggered):
- `0`: Manual.
- `1`: Triggered.

You must stop the scan before changing the mode.

Query Response Integer corresponding to the scan mode.

Example
- Command `:INIT:TMOD MAN`
- Query `:INIT:TMOD? → 0`

3.2.4 :INITiate:CURRent?

Syntax `:INITiate:CURRent?`

Type Overlapping, query only.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Gets the current scan count number.

Query Response Integer corresponding to the current scan count.

Example `:INIT:CURR? → 50`

3.2.5 :INITiate:PROGress?

Syntax `:INITiate:PROGress?`

Type Overlapping, query only.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Gets the current scan progress value in percent.

Query Response Integer corresponding to the progress in percent.

Example `:INIT:PROG? → 27`

3.3 SENSe Subsystem Commands and Queries

Overview

The following table gives an overview of commands and queries controlling scan range and sensitivity:

Command	Corresponding Section
:SENSe	-
[:SENSe]/?	*:SENSe[:SENSe]/?, p. 42*
:TBURst/?	*:SENSe:TBURst/?, p. 42*
:WAVelength	-
:STARt/?	*:SENSe:WAVelength:STARt/?, p. 43*
:STOP/?	*:SENSe:WAVelength:STOP/?, p. 43*
:SPAN/?	*:SENSe:WAVelength:SPAN/?, p. 44*
:CENTer/?	*:SENSe:WAVelength:CENTer/?, p. 44*
:BAND	*:SENSe:WAVelength:BAND, p. 44*
:LIMit/?	*:SENSe:WAVelength:BAND:LIMit/?, p. 45*
:SET	-
:ZOOM	*:SENSe:WAVelength:SET:ZOOM, p. 45*
:FULL	*:SENSe:WAVelength:SET:FULL, p. 45*
:MARKers	*:SENSe:WAVelength:SET:MARKers, p. 46*
:ZERO	-
[:IMMediate]	*:SENSe:ZERO[:IMMediate], p. 46*
:AUTO/?	*:SENSe:ZERO:AUTO/?, p. 46*
:BANDwidth	-
[:IMMediate]/?	*:SENSe:BANDwidth[:IMMediate]/?, p. 47*
:NATive/?	*:SENSe:BANDwidth:NATive/?, p. 47*
:CORRection	-
:LEVel	-
[:SHIFt]/?	*:SENSe:CORRection:LEVel[:SHIFt]/?, p. 48*
:GATE/?	*:SENSe:GATE/?, p. 48*
:TIME	-
:INTerval	-
[:VALue]/?	*:SENSe:TIME:INTerval[:VALue]/?, p. 49*
:ENABle/?	*:SENSe:TIME:INTerval:ENABle/?, p. 49*

Table 8: SENSe commands and queries

Rules

Wavelength start, stop, span and center are interdependent.

Important

You must make sure the OSA20 is in idle state (`:STAT:OPER:COND? → 0`) before running the SENSe subsystem commands (see section *:STATus:OPERation[:EVENt]?, p. 28*).

3.3.1 :SENSe[:SENSe]/?

Syntax
- Command `:SENSe[:SENSe]<wsp>1|2|3|4|5|6|7`
- Query `:SENSe[:SENSe]?`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the scan sensitivity.
You must stop the scan before changing the sensitivity.
- `1`: -55 dBm (2000 nm/s)
- `2`: -60 dBm (700 nm/s)
- `3`: -65 dBm (200 nm/s)
- `4`: -70 dBm (20 nm/s)
- `5`: -75 dBm (2 nm/s)
- `6`: High (0.5 nm/s)
- `7`: Burst

Query Response Integer corresponding to the current sensitivity.

Example
```
:SENS 2
:SENS? → 2
```

3.3.2 :SENSe:TBURst/?

Syntax
- Command `:SENSe:TBURst<wsp><value>[S|MS|US|NS]|MIN|MAX`
- Query `:SENSe:TBURst?[MIN|MAX]`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS modes.

Description Sets/Queries the period (**T**) of the burst, for the **Burst** scan sensitivity. This parameter automatically sets the *:SENSe[:SENSe]/?* parameter (*p. 42*) to `7` (Burst).
- `<value>`: period as float value
- `MIN`: minimum value is 10 µs
- `MAX`: maximum value is 2001 µs

Query Response Integer corresponding to the period in seconds.

Example
```
:SENS:TBUR 150US
:SENS:TBUR? → +1.50000000E-004
```

3.3.3 :SENSe:WAVelength:STARt/?

Syntax
- Command `:SENSe:WAVelength:STARt<wsp><value> [PM|NM|M|HZ|GHZ|THZ]|MIN|MAX`
- Query `:SENSe:WAVelength:STARt? [MIN|MAX]`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the scan start wavelength or frequency.
- `<value>`: wavelength or frequency as float value.
- `MIN`: minimum value is 1250 nm or 176.3485 THz.
- `MAX`: maximum value is the scan stop wavelength value minus 0.5 nm or the scan stop frequency value minus 0.060 THz (see section *:SENSe:WAVelength:STOP/?, p. 43*).

Query Response Wavelength in meters or frequency in Hertz, depending on the unit settings (see section *UNIT Subsystem Commands and Queries, p. 35*).

Example
- Command `:SENS:WAV:STAR 1500NM`
- Query `:SENS:WAV:STAR? → +1.50000000E-006`

3.3.4 :SENSe:WAVelength:STOP/?

Syntax
- Command `:SENSe:WAVelength:STOP<wsp><value>[PM|NM|M|HZ|GHZ|THZ]|MIN|MAX`
- Query `:SENSe:WAVelength:STOP? [MIN|MAX]`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the scan stop wavelength or frequency.
- `<value>`: wavelength or frequency as float value.
- `MIN`: minimum value is the scan start wavelength value plus 0.5 nm or the scan start frequency value plus 0.060 THz (see section *:SENSe:WAVelength:STARt/?, p. 43*).
- `MAX`: maximum value is 1700 nm or 239.8340 THz.

Query Response Wavelength in meters or frequency in Hertz, depending on the unit settings (see section *UNIT Subsystem Commands and Queries, p. 35*).

Example
- Command `:SENS:WAV:STOP 1650NM`
- Query `:SENS:WAV:STOP? → +1.65000000E-006`

3.3.5 :SENSe:WAVelength:SPAN/?

Syntax
- Command `:SENSe:WAVelength:SPAN<wsp><value>[PM|NM|M|HZ|GHZ|THZ]|MIN|MAX`
- Query `:SENSe:WAVelength:SPAN? [MIN|MAX]`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the scan span wavelength or frequency.
- `<value>`: wavelength or frequency span as float value.
- `MIN`: minimum value is 0.5 nm or 0.060 THz.
- `MAX`: maximum value is 450 nm or 54.384 THz.

Query Response Wavelength in meters or frequency in Hertz, depending on the unit settings (see section *UNIT Subsystem Commands and Queries, p. 35*).

Example
- Command `:SENS:WAV:SPAN 100NM`
- Query `:SENS:WAV:SPAN? → +1.00000000E-006`

3.3.6 :SENSe:WAVelength:CENTer/?

Syntax
- Command `:SENSe:WAVelength:CENTer<wsp><value>[PM|NM|M|HZ|GHZ|THZ]|MIN|MAX`
- Query `:SENSe:WAVelength:CENTer? [MIN|MAX]`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the scan center wavelength or frequency.
- `<value>`: wavelength or frequency as float value.
- `MIN`: minimum value is 1250.25 nm or 176.37445 THz.
- `MAX`: maximum value is 1699.75 nm or 239.80805 THz.

Query Response Wavelength in meters or frequency in Hertz, depending on the unit settings (see section *UNIT Subsystem Commands and Queries, p. 35*).

Example
- Command `:SENS:WAV:CENT 1550NM`
- Query `:SENS:WAV:CENT? → +1.55000000E-006`

3.3.7 :SENSe:WAVelength:BAND

Syntax `:SENSe:WAVelength:BAND<wsp><value>`

Type Sequential, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets the scan range by selecting the corresponding telecom band(s).
- `<value>`: string composed of the complete string "OESCLU", or part of it (e.g. "OE"), so that the corresponding band limits are used to define the scan span.

Example `:SENS:WAV:BAND SCL`

3.3.8 :SENSe:WAVelength:BAND:LIMit/?

Syntax

- Command `:SENSe:WAVelength:BAND:LIMit<wsp>LOO|OE|ES|SC|CL|LU|UUP|0|1|2|3|4|5|6,<value>[PM|NM|M|HZ|GHZ|THZ]|MIN|MAX`
- Query `:SENSe:WAVelength:BAND:LIMit?<wsp>LOO|OE|ES|SC|CL|LU|UUP|0|1|2|3|4|5|6,[MIN|MAX]`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the limits of each wavelength band.

- `0`: `LOO`, lower limit of O band, within range 1250 to 1270.
- `1`: OE, upper limit of O band and lower limit of E band, within range 1350 to 1370.
- `2`: ES, upper limit of E band and lower limit of S band, within range 1450 to 1470.
- `3`: SC, upper limit of S band and lower limit of C band, within range 1520 to 1540.
- `4`: CL, upper limit of C band and lower limit of L band, within range 1555 to 1575.
- `5`: LU, upper limit of L band and lower limit of U band, within range 1615 to 1635.
- `6`:UUP, upper limit of U band, within range 1665 to 1685.
- `<value>`: limit wavelength or frequency as float value.
- `MIN`: minimum value of the band limit.
- `MAX`: maximum value of the band limit.

Query Response Wavelength in meters or frequency in Hertz, depending on the unit settings (see section *UNIT Subsystem Commands and Queries, p. 35*).

Example

- Command `:SENS:WAV:BAND:LIM OE,1355NM`
- Query `:SENS:WAV:BAND:LIM? OE →+1.35500000E-006`

3.3.9 :SENSe:WAVelength:SET:ZOOM

Syntax `:SENSe:WAVelength:SET:ZOOM`

Type Sequential, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets the scan range to the zoom parameters displayed on the graph.

Example `:SENS:WAV:SET:ZOOM`

3.3.10 :SENSe:WAVelength:SET:FULL

Syntax `:SENSe:WAVelength:SET:FULL`

Type Sequential, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets the scan range to the maximum range.

Example `:SENS:WAV:SET:FULL`

3.3.11 :SENSe:WAVelength:SET:MARKers

Syntax `:SENSe:WAVelength:SET:MARKers`

Type Sequential, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets the scan range to the limits specified by the A and B markers on the graph.

Example `:SENS:WAV:SET:MARK`

3.3.12 :SENSe:ZERO[:IMMediate]

Syntax `:SENSe:ZERO[:IMMediate]`

Type Sequential, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Performs a zeroing of the dark current of the detection system.

Example `:SENS:ZERO`

3.3.13 :SENSe:ZERO:AUTO/?

Syntax
- Command `:SENSe:ZERO:AUTO<wsp>OFF|ON|0|1`
- Query `:SENSe:ZERO:AUTO?`

Type Sequential.

Applicability All modes.

Description Sets/Queries the state of the **Auto Zero** setting.
- `0`: `OFF`, the **Auto Zero** is disabled.
- `1`: `ON`, the **Auto Zero** is activated.

Query Response Integer corresponding to the activation state of the setting.

Example
- Command `:SENS:ZERO:AUTO OFF`
- Query `:SENS:ZERO:AUTO? → 0`

3.3.14 :SENSe:BANDwidth[:IMMediate]/?

Syntax
- Command `:SENSe:BANDwidth[:IMMediate]<wsp><value>[PM|NM|M|HZ|GHZ|THZ]|MIN|MAX`
- Query `:SENSe:BANDwidth[:IMMediate]?[MIN|MAX]`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the optical resolution.
- `<value>`: wavelength or frequency resolution as float value.
- `MIN`: minimum value is 50 pm or 6 GHz.
- `MAX`: maximum value is 2000 pm or 400 GHz.

Setting this parameter modifies the *:SENSe:BANDwidth:NATive/?* parameter (*p. 47*) to `OFF`.

Query Response Spectral resolution as float value in meters or hertz depending on the unit settings (see section *UNIT Subsystem Commands and Queries, p. 35*):
- If parameter *:SENSe:BANDwidth:NATive/?, p. 47* is set to `ON`: the instrument's monochromator optical resolution (FWHM) at the central wavelength of operation.
- If parameter *:SENSe:BANDwidth:NATive/?, p. 47* is set to `OFF`: the current calculated resolution to be used in following scans.

Example
- Command `:SENS:BAND 50pm`
- Query `:SENS:BAND? → +5.00000000E-011`

3.3.15 :SENSe:BANDwidth:NATive/?

Syntax
- Command `:SENSe:BANDwidth:NATive<wsp>OFF|ON|0|1`
- Query `:SENSe:BANDwidth:NATive?`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the **Resolution** setting:
- `0`: `OFF`, the resolution is set to **Calculated**.
- `1`: `ON`, the resolution is set to **Native**.

Query Response Integer corresponding to the activation state of the setting.

Example
- Command `:SENS:BAND:NAT ON`
- Query `:SENS:BAND:NAT? → 1`

3.3.16 :SENSe:CORRection:LEVel[:SHIFt]/?

Syntax
- Command `:SENSe:CORRection:LEVel[:SHIFt]<wsp><value>[DB]|MIN|MAX`
- Query `:SENSe:CORRection:LEVel[:SHIFt]? [MIN|MAX]`

Type Sequential.

Applicability All modes.

Description Sets/Queries the **Power Offset** setting.
- `<value>`: power correction in dB.
- `MIN`: minimum value is -2 dB
- `MAX`: maximum value is 2 dB

Query Response Power correction in dB.

Example
- Command `:SENS:CORR:LEV 1DB`
- Query `:SENS:CORR:LEV? → +1.00000000E+000`

3.3.17 :SENSe:GATE/?

Syntax
- Command `:SENSe:GATE<wsp>0|1`
- Query `:SENSe:GATE?`

Type Sequential.

Applicability RLT mode only. You must stop the scan before changing the polarity (see section *:STOP, p. 38*).

Description Sets/Queries the **Gate Acquisition** polarity setting.
- `0`: the polarity is set to **Low**.
- `1`: the polarity is set to **High**.

Query Response Integer corresponding to the polarity.

Example
- Command `:SENS:GATE HIGH`
- Query `:SENS:GATE? → 1`

3.3.18 :SENSe:TIME:INTerval[:VALue]/?

Syntax
- Command `:SENSe:TIME:INTerval[:VALue]<wsp><value> [S|MS|US|NS]|MIN|MAX`
- Query `:SENSe:TIME:INTerval[:VALue]?[MIN|MAX]`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the **Interval** value.
- `<value>`: period of time between two successive scans.
- `MIN`: minimum value is 0 s
- `MAX`: maximum value is 999 s

Query Response Interval as float value in seconds.

Example
- Command `:SENS:TIME:INT 1s`
- Query `:SENS:TIME:INT? → +1.00000000E+000`

3.3.19 :SENSe:TIME:INTerval:ENABle/?

Syntax
- Command `:SENSe:TIME:INTerval:ENABle<wsp>OFF|ON|0|1`
- Query `:SENSe:TIME:INTerval:ENABle?`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the **Interval** setting:
- `0`: `OFF`, the **Interval** parameter is not activated.
- `1`: `ON`, the **Interval** parameter is activated.

Query Response Integer corresponding to the activation state of the setting.

Example
- Command `:SENS:TIME:INT:ENAB ON`
- Query `:SENS:TIME:INT:ENAB? → 1`

3.4 TRACe Subsystem Commands and Queries

Overview

The following table gives an overview of commands and queries operating traces:

Command	Corresponding Section
:TRACe#	-
:TYPE/?	*:TRACe#:TYPE/?, p. 51*
:RAVG/?	*:TRACe#:RAVG/?, p. 51*
:DELete	*:TRACe#:DELete, p. 52*
:MATH	-
:TRA/?	*:TRACe#:MATH:TRA/?, p. 52*
:TRB/?	*:TRACe#:MATH:TRB/?, p. 52*
:OPERation/?	*:TRACe#:MATH:OPERation/?, p. 53*
:COPY	*:TRACe#:COPY, p. 53*
:PASTe	*:TRACe#:PASTe, p. 53*
:LOAD	*:TRACe#:LOAD, p. 54*
:SAVE	*:TRACe#:SAVE, p. 54*
:ACTive	*:TRACe#:ACTive, p. 54*
:STATe/?	*:TRACe#:STATe/?, p. 55*
:DATA	-
:STARt?	*:TRACe#:DATA:STARt?, p. 55*
:LENGth?	*:TRACe#:DATA:LENGth?, p. 55*
:SAMPling?	*:TRACe#:DATA:SAMPling?, p. 56*
:SENSitivity?	*:TRACe#:DATA:SENSitivity?, p. 56*
:TYPE?	*:TRACe#:DATA:TYPE?, p. 56*
:BANDwidth?	*:TRACe#:DATA:BANDwidth?, p. 57*
[:Y]	-
[:IMMediate]?	*:TRACe#:DATA[:Y][:IMMediate]?, p. 57*
:POINt?	*:TRACe#:DATA[:Y]:POINt?, p. 58*
:ALL?	*:TRACe#:DATA:ALL?, p. 58*

Table 9: TRACe commands and queries

Rules

- The **#** symbol represents the trace number to which the command is applied.
  - In OSA, WDM,SML, MML and BBS modes, eight traces are available, from 1 to 8.
  - In OFA mode, four traces are available:
    - 1: Trace IN
    - 2: Trace OUT
    - 3: Trace ASE in
    - 4: Trace ASE out
  - In PCT mode, five traces are available:
    - 1: Trace REF
    - 2: Trace DUT
    - 3: Trace TRANS
    - 4: Trace MSK HI
    - 5: Trace MSK LO
- If the trace number (#) is omitted, the command is executed on **Trace1**.

If the trace number (#) is specified, the specified trace does not become the active trace (except for the command *:TRACe#:ACTive, p. 54*).

Important

You must make sure the OSA20 is in idle state (`:STAT:OPER? → 0`) before running the TRACe subsystem commands (see section *:STATus:OPERation[:EVENt]?, p. 28*).

3.4.1 :TRACe#:TYPE/?

Syntax

- Command `:TRACe#:TYPE<wsp>STORe|LIVE|AVG|RAVG|HMIN|HMAX|CALC|NONE|0|1|2|3|4|5|6|7`
- Query `:TRACe#:TYPE?`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

- For OFA mode, this command is only applicable on trace #1 and trace #2 (see section *Rules, p. 50*).
- For PCT mode, this command is only applicable on trace#1, trace #2, trace #4 and trace #5 (see section *Rules, p. 50*).

Description Sets/Queries the trace type.

- `0`: Store.
- `1`: Live.
- `2`: Continuous average.
- `3`: Roll average.
- `4`: Hold Minimum.
- `5`: Hold Maximum.
- `6`: Calculation. This type is not available on trace #1 and trace #2.
- `7`: None.

Query Response Integer corresponding to the trace type.

Example

- Command `:TRAC1:TYPE LIVE`
- Query `:TRAC1:TYPE? → 1`

3.4.2 :TRACe#:RAVG/?

Syntax

- Command `:TRACe#:RAVG<wsp><value>|MIN|MAX`
- Query `:TRACe#:RAVG? [MIN|MAX]`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.
For OFA and PCT modes, this command is only applicable on trace #1 and trace #2.

Description Sets/Queries the number of rolling average to perform on a particular trace. The command sets the command `:TRACe:TYPe` to `RAVG`.

- `<value>`: integer within range 2 to 100.
- `MIN`: minimum value is 2.
- `MAX`: maximum value is 100.

Query Response Integer value corresponding to the rolling average number.

Example
- Command `:TRAC2:RAVG 16`
- Query `:TRAC2:RAVG? → 16`

3.4.3 :TRACe#:DELete

Syntax `:TRACe#:DELete`

Type Sequential, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Deletes the data contained in Trace #. This command is equivalent to `:TRACe#:TYPE<wsp>NONE`, without setting the type to NONE. The trace type is not modified.

Example `:TRAC2: DEL`

3.4.4 :TRACe#:MATH:TRA/?

Syntax
- Command `:TRACe#:MATH:TRA<wsp><value>|MIN|MAX`
- Query `:TRACe#:MATH:TRA? [MIN|MAX]`

Type Sequential.

Applicability OSA, WDM, SML, MML, BBS, RLT modes.

Description Sets/Queries the first source for Trace calculation.
- `<value>`: integer within range 1 to #-1.
  where # is the trace number.
- `MIN`: minimum value is 1.
- `MAX`: maximum value is the trace number minus 1.

Query Response Integer value corresponding to the rolling average number.

Example
- Command `:TRAC5:MATH:TRA 3`
- Query `:TRAC5:MATH:TRA? → 3`

3.4.5 :TRACe#:MATH:TRB/?

Syntax
- Command `:TRACe#:MATH:TRB<wsp><value>|MIN|MAX`
- Query `:TRACe#:MATH:TRB? [MIN|MAX]`

Type Sequential.

Applicability OSA, WDM, SML, MML, BBS, RLT modes.

Description Sets/Queries the second source for Trace calculation.
- `<value>`: integer within range 1 to #-1.
  where # is the trace number.
- `MIN`: minimum value is 1.
- `MAX`: maximum value is the trace number minus 1.

Query Response Integer value corresponding to the rolling average number.

Example
- Command `:TRAC5:MATH:TRB 4`
- Query `:TRAC5:MATH:TRB? → 4`

3.4.6 :TRACe#:MATH:OPERation/?

Syntax
- Command `:TRACe#:MATH:OPERation<wsp>1|2|3`
- Query `:TRACe#:MATH:OPERation?`

Type Sequential.

Applicability OSA, WDM, SML, MML, BBS, RLT modes.

Description Sets/Queries the Trace calculation operation.
- `1`: A + B (LIN).
- `2`: A - B (LIN).
- `3`: A - B (LOG).

Query Response Integer value corresponding to the Trace calculation operation.

Example
- Command `:TRAC5:MATH:OPER 1`
- Query `:TRAC5:MATH:OPER? → 1`

3.4.7 :TRACe#:COPY

Syntax `:TRACe#:COPY`

Type Sequential, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Copies trace data in memory.

Example `:TRAC2:COPY`

3.4.8 :TRACe#:PASTe

Syntax `:TRACe#:PASTe`

Type Sequential, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.
- For OFA mode, this command is only applicable on trace #1 and trace #2 (see section *Rules, p. 50*).
- For PCT mode, this command is only applicable on trace#1, trace #2, trace #4 and trace #5 (see section *Rules, p. 50*).

Description Pastes trace data from memory.

Example `:TRAC2:PAST`

3.4.9 :TRACe#:SAVE

Syntax `:TRACe#:SAVE<wsp><filename>`

Type Sequential, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Saves Trace data to the specified file into the current directory. For current directory control, see section *Configuration and File Handling Control, p. 149*.

- `<filename>`: name of the file in which you want to save trace data, with or without quotes.
  Possible extensions are .tra (binary file) and .csv (csv file).
  Default extension (if not specified): .tra

Example `:TRAC2:SAVE "trace.tra"`

3.4.10 :TRACe#:LOAD

Syntax `:TRACe#:LOAD<wsp><filename>`

Type Sequential, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

- For OFA mode, this command is only applicable on trace #1 and trace #2 (see section *Rules, p. 50*).
- For PCT mode, this command is only applicable on trace#1, trace #2, trace #4 and trace #5 (see section *Rules, p. 50*).

Description Loads Trace data from the specified file into the current directory. For current directory control, see section *Configuration and File Handling Control, p. 149*.

- `<filename>`: name of the file from which you want to load trace data.
  Possible extensions are .tra (binary file) and .csv (csv file).
  Default extension (if not specified): .tra

Example `:TRAC2:LOAD "trace.tra"`

3.4.11 :TRACe#:ACTive

Syntax `:TRACe#:ACT`

Type Overlapping, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets a Trace as activated.
The activated trace can be used for markers and auto-scale.

Example `:TRAC2:ACT`

3.4.12 :TRACe#:STATe/?

Syntax
- Command `:TRACe#:STATe<wsp>OFF|ON|0|1`
- Query `:TRACe#:STATe?`

Type Overlapping.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the trace visibility state.
- `0`: `OFF`, the trace is not displayed.
- `1`: `ON`, the trace is displayed.

Query Response Integer corresponding to the trace display state.

Example
- Command `:TRAC2:STAT ON`
- Query `:TRAC2:STAT? → 1`

3.4.13 :TRACe#:DATA:STARt?

Syntax `:TRACe#:DATA:STARt?`

Type Sequential, query only.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Queries the trace start wavelength.

Query Response Wavelength as float value in meters.

Example `:TRAC1:DATA:STAR? → +1.25000000E-006`

3.4.14 :TRACe#:DATA:LENGth?

Syntax `:TRACe#:DATA:LENGth?`

Type Sequential, query only.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Queries the number of points in the trace.

Query Response Integer corresponding to the number of points in the trace.

Example `:TRAC1:DATA:LENG? → 225001`

3.4.15 :TRACe#:DATA:SAMPling?

Syntax `:TRACe#:DATA:SAMPling?`

Type Sequential, query only.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Queries the trace sampling interval.

Query Response Interval as float value in meters.

Example `:TRAC1:DATA:SAMP? → +2.00000000E-012`

3.4.16 :TRACe#:DATA:SENSitivity?

Syntax `:TRACe#:DATA:SENSitivity?`

Type Sequential, query only.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Queries the sensitivity of the trace when it was acquired.

Query Response Text describing the sensitivity set when the trace was acquired.
The response "-" indicates that the trace sensitivity is unknown and cannot be retrieved. This can occur on the following type of traces:
- Traces of type ASE in/out (analyzed trace) in OFA mode
- Traces of type "TRANS" in PCT mode
- Traces of type "CALC"
- Traces acquired in version 1.4.0 (or earlier)

Example `:TRAC1:DATA:SENS? → HIGH`

3.4.17 :TRACe#:DATA:TYPE?

Syntax `:TRACe#:DATA:TYPE?`

Type Sequential, query only.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Queries the trace type.

Query Response <Type>,<Additional Info>
Where:
- <Type>: trace type when the trace was acquired.
- <Additional Info>:
  - if the trace type is `AVERAGE` or `ROLL AVERAGE`, indicates the number of samples taken when the trace was acquired.
  - If the trace type is `CALCULATE`, indicates the calculation performed when the trace was acquired.

Example `:TRAC1:DATA:TYPE? → Average,456`

3.4.18 :TRACe#:DATA:BANDwidth?

Syntax `:TRACe#:DATA:BANDwidth?`

Type Sequential, query only.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Queries the trace resolution at central wavelength or frequency.

Query Response <Bandwidth>,<Value>,<Unit>
Where:
- <Bandwidth>: NATIVE or CALC
- <Value>: bandwidth as float value
- <Unit>: M (meter) or H (Hertz) depending on the unit settings.

Example `:TRAC1:DATA:BAND? → CALC,+5.00000000E-011,M`

3.4.19 :TRACe#:DATA[:Y][:IMMediate]?

Syntax `:TRACe#:DATA[:Y][:IMMediate]?<wsp>ASCii|BINary|0|1,MW|DBM|0|1,<Reduction factor>`

Type Sequential, query only.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Queries the trace data:
- Format: `ASCii|BINary|0|1`
- Unit: `MW|DBM|0|1`
- `<Reduction factor>`: integer that decimates the number of data points for faster data retrieval. A reduction factor of 5 selects a point out of every 5 points available on the trace. The first point received is always the "start wavelength" data point.

Trace data for CALC traces can be queried:
- as a ratio by setting the unit to 0.
- in dB by setting the unit to 1.

Query Response
- Data as ASCII values:
  `<value1>,<value2>,...`
- Data formatted as binary blocks:
  `#<len><Nbofbytes><blocks>`

  Where:
  - `<len>`: length of `<Nbofbytes>`.
  - `<Nbofbytes>`: size of `<blocks>` in bytes.
  - `<blocks>`: floats data bytes (packet of 4 bytes).
    Bit order: big endian.

  For example, Data containing 10 data points will result in the header "#240<blocks>" as 40 bytes are needed to define the data and "40" length is 2.

Example
```
:TRAC1:DATA? ASC,DBM → -5.00000000E+000,-5.10000000E+000,...
:TRAC1:DATA? BIN,MW → #1821AÔ³Ë' ³ "¹2LÒ´2…
```

3.4.20 :TRACe#:DATA[:Y]:POINt?

Syntax `:TRACe#:DATA[:Y]:POINt?<wsp><value>[PM|NM|M|HZ|GHZ|THZ],MW|DBM|0|1`

Type Sequential, query only.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Queries the level of a specified wavelength, in a specified unit.

- `<value>`: wavelength or frequency as float value in meters.
  Minimum value is the start wavelength or frequency (see section *:SENSe:WAVelength:STARt/?, p. 43*) and maximum value is the stop wavelength or frequency (see section *:SENSe:WAVelength:STOP/?, p. 43*).

Trace data for CALC traces can be queried:

- as a ratio by setting the unit to 0.
- in dB by setting the unit to 1.

Query Response Data as ASCII float values in meters, Hertz, mW or dBm depending on the unit settings:
`<Wavelength>,<Power>,...`

Example `:TRAC1:DATA:POIN? 1550NM,DBM → +1.55000000E-006,-1.245000000E+001`

3.4.21 :TRACe#:DATA:ALL?

Syntax `:TRACe#:DATA:ALL?<wsp><Reduction factor>`

Type Sequential, query only.

Applicability

- Ethernet communication only.
- OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.
- **Roll Average** trace type only.
- OSA20 in idle state.

Description Queries the history of the selected trace (Roll Average type) data in binary format and in dBm. The number of traces retrieved corresponds to the number of rolling average performed (see section *:TRACe#:RAVG/?, p. 51*).

- **<**`Reduction factor`**>**: integer that decimates the number of data points for faster data retrieval. A reduction factor of 5 selects a point out of every 5 points available on the trace. The first point received is always the "start wavelength" data point.

Query Response Data formatted as binary blocks, in dBm:
`#<len><Nbofbytes><block1><block2>...<blockN>`
Where:

- `<len>`: length of `<Nbofbytes>`.
- `<Nbofbytes>`: size of `<block>` in bytes for one trace.
- `<blocks>`: floats data bytes (packet of 4 bytes) for each trace until the last trace.
- Bit order: big endian.

Example `:TRAC1:DATA:ALL? → #1821AÔ³Ë' ³ "¹2LÒ´2…`
A LabVIEW example using this command is available on the USB key provided with the instrument (see section *LabVIEW Examples, p. 15*).

4. Trace Analysis Control

This section describes all commands and queries enabling you to perform trace analysis.

- To control general analysis parameters, see section *CALCulate Subsystem – General Analysis Settings, p. 59*.
- To control trace analysis settings and get the results after having run the analysis, see section *CALCulate:PARameters and CALculate:DATA, p. 65*.

4.1 CALCulate Subsystem – General Analysis Settings

The following table gives an overview of commands and queries controlling trace analysis general parameters:

Command	Corresponding Section
`:CALCulate`	-
`[:IMMediate]`	*:CALCulate[:IMMediate], p. 60*
`:AUTO/?`	*:CALCulate[:IMMediate]:AUTO/?, p. 60*
`:SOURce/?`	*:CALCulate:SOURce/?, p. 60*
`:NFLOor`	-
`:[LVL]/?`	*:CALCulate:NFLOor[:LVL]/?, p. 61*
`:STATe/?`	*:CALCulate:NFLOor:STATe/?, p. 61*
`:MARKers`	-
`:ARANge`	*:CALCulate:MARKers:ARANge/?, p. 62*
`:A`	-
`:X/?`	*:CALCulate:MARKers:A:X/?, p. 62*
`:Y?`	*:CALCulate:MARKers:A:Y?, p. 62*
`:B`	-
`:X/?`	*:CALCulate:MARKers:B:X/?, p. 63*
`:Y?`	*:CALCulate:MARKers:B:Y?, p. 63*
`:C`	-
`:Y/?`	*:CALCulate:MARKers:C:Y/?, p. 63*
`:D`	-
`:Y/?`	*:CALCulate:MARKers:D:Y/?, p. 64*
`:PARameters`	*CALCulate:PARameters and CALculate:DATA, p. 65*
`:DATA?`	*CALCulate:PARameters and CALculate:DATA, p. 65*

Table 10: CALCulate commands and queries

Important
You must make sure the OSA20 is in idle state (`:STAT:OPER?` → `0`) before running the CALCulate subsystem commands (see section *:STATus:OPERation[:EVENt]?, p. 28*).

4.1.1 :CALCulate[:IMMediate]

Syntax `:CALCulate[:IMMediate]`

Type Overlapped, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Performs an analysis on the source trace.

Example `:CALC`

4.1.2 :CALCulate[:IMMediate]:AUTO/?

Syntax
- Command `:CALCulate[:IMMediate]:AUTO<wsp>OFF|ON|0|1`
- Query `:CALCulate[:IMMediate]:AUTO?`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the **Auto Analysis** activation state:
- `0`: `OFF`, the auto analysis is not activated.
- `1`: `ON`, the auto analysis is activated.

Query Response Integer corresponding to the activation state of the setting.

Example
- Command `:CALC:AUTO ON`
- Query `:CALC:AUTO? → 1`

4.1.3 :CALCulate:SOURce/?

Syntax
- Command `:CALCulate:SOURce<wsp><trace>`
- Query `:CALCulate:SOURce?`

Type Sequential.

Applicability OSA, WDM, SML, MML, BBS, RLT modes.

Description Sets/Queries the trace to analyze.
- `<trace>`: integer within range 1 to 8.

Query Response Integer corresponding to the trace number that is analyzed.

Example
- Command `:CALC:SOUR 1`
- Query `:CALC:SOUR? → 1`

4.1.4 :CALCulate:NFLOor[:LVL]/?

Syntax
- Command `:CALCulate:NFLOor[:LVL]<wsp><value>[DBM|PW|NW|UW|MW]|MIN|MAX`
- Query `:CALCulate:NFLOor[:LVL]? [MIN|MAX]`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the noise level for analysis.
Default unit is dBm.
- `<value>`:
  - if dBm, float value within range -90 to 20.
  - if mW, float value within range 0 to 100.
- `MIN`: minimum value is -90 dBm or 0 mW.
- `MAX`: maximum value is 0 dBm or 1 mW.

Query Response Integer value corresponding to the noise level in dBm.

Example
- Command `:CALC:NFLO -55.0 DBM`
- Query `:CALC:NFLO? → -5.500000000E+001`

4.1.5 :CALCulate:NFLOor:STATe/?

Syntax
- Command `:CALCulate:NFLOor:STATe<wsp>OFF|ON|0|1`
- Query `:CALCulate:NFLOor:STATe?`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the activation state of the **Noise Level Visible** setting.
- `0`: `OFF`, the noise level is not displayed on the graph.
- `1`: `ON`, the noise level is displayed on the graph.

Query Response Integer corresponding to the activation state of the setting.

Example
- Command `:CALC:NFLO:STAT ON`
- Query `:CALC:NFLO:STAT? → 1`

4.1.6 :CALCulate:MARKers:ARANge/?

Syntax
- Command `:CALCulate:MARKers:ARANge<wsp>OFF|ON|0|1`
- Query `:CALCulate:MARKers:ARANge?`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the activation of the fact that markers A and B specify the analysis range (**Between Markers Only** setting):
- `0`: `OFF`, the analysis range is not set to the limits specified by markers A and B positions.
- `1`: `ON`, the analysis range is set to the limits specified by markers A and B positions.

Query Response Integer corresponding to the activation state of the setting.

Example
- Command `:CALC:MARK:ARAN ON`
- Query `:CALC:MARK:ARAN? → 1`

4.1.7 :CALCulate:MARKers:A:X/?

Syntax
- Command `:CALCulate:MARKers:A:X<wsp><value> [PM|NM|M|HZ|GHZ|THZ]|MIN|MAX`
- Query `:CALCulate:MARKers:A:X?[MIN|MAX]`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the position of the "A" marker.
- `<value>`: wavelength or frequency as float value.
- `MIN`: minimum value is 1250 nm or 176.349 THz.
- `MAX`: maximum value is 1700 nm or 239.8340 THz.

Query Response Wavelength or frequency as float value in meters or Hertz depending on the unit settings.

Example
- Command `:CALC:MARK:A:X 1300NM`
- Query `:CALC:MARK:A:X? → +1.30000000E-006`

4.1.8 :CALCulate:MARKers:A:Y?

Syntax `:CALCulate:MARKers:A:Y?`

Type Sequential, query only.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Queries the power or ratio value of the "A" marker of the current selected trace (see section *:TRACe#:ACTive, p. 54*).

Query Response Float value indicating the power level or ratio of the current selected trace at the position of marker A. Unit depends on the unit settings (see section *:UNIT:Y/?, p. 35*).

Example `:CALC:MARK:A:Y? → -7.350000000E+001`

4.1.9 :CALCulate:MARKers:B:X/?

Syntax
- Command `:CALCulate:MARKers:B:X<wsp><value>[PM|NM|M|HZ|GHZ|THZ]|MIN|MAX`
- Query `:CALCulate:MARKers:B:X?[MIN|MAX]`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the position of the "B" marker.
- `<value>`: wavelength or frequency as float value.
- `MIN`: minimum value is 1250 nm or 176.349 THz.
- `MAX`: maximum value is 1700 nm or 239.8340 THz.

Query Response Wavelength or frequency as float value in meters or Hertz depending on the unit settings (see section *:UNIT:X/?, p. 35*).

Example
- Command `:CALC:MARK:B:X 1400.520NM`
- Query `:CALC:MARK:B:X? → +1.40052000E-006`

4.1.10 :CALCulate:MARKers:B:Y?

Syntax `:CALCulate:MARKers:B:Y?`

Type Sequential, query only.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Queries the power or ratio value of the "B" marker of the current selected trace (see section *:TRACe#:ACTive, p. 54*).

Query Response Float value indicating the power level or ratio of the current selected trace at the position of marker B. Unit depends on the unit settings (see section *:UNIT:Y/?, p. 35*).

Example `:CALC:MARK:B:Y? → -7.350000000E+001`

4.1.11 :CALCulate:MARKers:C:Y/?

Syntax
- Command `:CALCulate:MARKers:C:Y<wsp><value>[DBM|PW|NW|UW|MW]|MIN|MAX`
- Query `:CALCulate:MARKers:C:Y?[MIN|MAX]`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the position of the "C" marker.
- `<value>`: power corresponding to the position of the "C" marker as float value.
- `MIN`: minimum value is -90 dBm
- `MAX`: maximum value is 20 dBm

Query Response Power as float value in dBm or mW depending on the unit settings.

Example
- Command `:CALC:MARK:C:Y -35DBM`
- Query `:CALC:MARK:C:Y? → -3.50000000E+001`

4.1.12 :CALCulate:MARKers:D:Y/?

Syntax
- Command `:CALCulate:MARKers:D:Y<wsp><value>[DBM|PW|NW|UW|MW]|MIN|MAX`
- Query `:CALCulate:MARKers:D:Y?[MIN|MAX]`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the position of the "D" marker.
- `<value>`: power corresponding to the position of the "D" marker as float value.
- `MIN`: minimum value is -90 dBm
- `MAX`: maximum value is 20 dBm

Query Response Power as float value in dBm or mW depending on the unit settings (see section *:UNIT:Y/?, p. 35*).

Example
- Command `:CALC:MARK:C:Y 3.5DBM`
- Query `:CALC:MARK:C:Y? → +3.50000000E+000`

4.2 CALCulate:PARameters and CALculate:DATA

Overview

The OSA20 uses several tools to analyze the trace. Depending on the test mode used, a tool may be available or not. If you try to send a command for a tool that is not available to the activated mode, this results in an error.

The following table gives an overview of the tools available for each analysis mode.

This icon means that the analysis tool is available for the analysis mode and can be modified: you can modify the analysis parameters, and query the corresponding results.

This icon means that the analysis tool is available for the analysis mode and cannot be modified: the analysis is performed automatically according to preset parameters, and you can query the results.

Analysis Tool / Analysis Mode	OSA	BBS	MML	SML	WDM	OFA	PCT	RLT	Related Section
Peak Trough Search	⚙	ⓘ	ⓘ	⚙	⚙	⚙	⚙	⚙	*PT Search Tool, p. 73*
Component Selector							⚙		*Component Selector Tool, p. 77*
Channel Detection					⚙	⚙		⚙	*WDM Channel Detection Tool, p. 78*
Spectral Width	⚙		⚙	⚙					*Spectral Width Tool, p. 86*
Spectral Width 1 **Spectral Width 2** **Spectral Width 3**							⚙		*Spectral Width 1, Spectral Width 2 and Spectral Width 3 Tools, p. 90*
XXdB Width		⚙							*XXdB Width Tool, p. 94*
λ_{mean}		⚙	ⓘ						*Mean Wavelength/Frequency Tool, p. 97*
λ_{peak}			ⓘ						*Peak Wavelength Tool (:CALCulate:DATA:PWAVelength?), p. 99*
λ_{center} and σ				ⓘ					*Central Wavelength Tool (:CALCulate:DATA:CWAVelength?), p. 99*
FWHM		ⓘ	ⓘ						*FWHM Tool (:CALCulate:DATA:FWHM?), p. 99*
Side Modes Spacing				ⓘ					*Side Mode Spacing Tool (:CALCulate:DATA:SMSPacing?), p. 100*
Notch Width	⚙								*Notch Width Tool, p. 100*
Notch Width 1 **Notch Width 2** **Notch Width 3**							⚙		*Notch Width 1, Notch Width 2 and Notch Width 3 Tools, p. 104*
Level Check	⚙								*Level Check Tool, p. 107*
SMSR	⚙			⚙					*SMSR Tool, p. 109*

Analysis Tool \ Analysis Mode	OSA	BBS	MML	SML	WDM	OFA	PCT	RLT	Related Section
OSNR	⚙			⚙	⚙	⚙		⚙	*OSNR Tool, p. 112*
Ripple	⚙	⚙							*Ripple Tool, p. 120*
Optical Power	⚙	⚙	⚙	⚙	ℹ	ℹ		ℹ	*Optical Power Tool, p. 122*
Power Density		⚙							*Power Density Tool, p. 125*
Loss Measurement							ℹ		*Loss Measurement (:CALCulate:DATA:LOSS?), p. 126*
Gain & NF						⚙			*Gain and Noise Figure Tool, p. 127*
Pass Band Test							⚙		*Pass Band Test Tool, p. 134*
Stop Band Test							⚙		*Stop Band Test Tool, p. 140*
Mask Test							ℹ		*Mask Test Tool (:CALCulate:DATA:MASK?), p. 146*

PARameters The following table gives an overview of commands and queries controlling analysis parameters:

Command	Corresponding Section
`:CALCulate`	*CALCulate Subsystem – General Analysis Settings, p. 59*
`:PARameters`	*CALCulate:PARameters and CALculate:DATA, p. 65*
`:PTSearch`	*PT Search Tool, p. 73*
`:DISPlay`	-
`[:STATe]/?`	*:CALCulate:PARameters:PTSearch:DISPlay[:STATe]/?, p. 73*
`:SHOW/?`	*:CALCulate:PARameters:PTSearch:DISPlay:SHOW/?, p. 74*
`:PTTHreshold/?`	*:CALCulate:PARameters:PTSearch:PTTHreshold/?, p. 74*
`:ANTHreshold/?`	*:CALCulate:PARameters:PTSearch:ANTHreshold/?, p. 75*
`:MTHReshold/?`	*:CALCulate:PARameters:PTSearch:MTHReshold/?, p. 76*
`:CSELector`	*Component Selector Tool, p. 77*
`:TYPE/?`	*Component Selector Tool, p. 77*
`:SWIDth`	*Spectral Width Tool, p. 86*
`[:ACTivate]/?`	*:CALCulate:PARameters:SWIDth[:ACTivate]/?, p. 86*
`:DISPlay/?`	*:CALCulate:PARameters:SWIDth:DISPlay/?, p. 86*
`:ALGorithm/?`	*:CALCulate:PARameters:SWIDth:ALGorithm/?, p. 86*
`:WTHReshold /?`	*:CALCulate:PARameters:SWIDth:WTHReshold/?, p. 87*
`:MTHReshold/?`	*:CALCulate:PARameters:SWIDth:MTHReshold/?, p. 87*
`:MULTiplier/?`	*:CALCulate:PARameters:SWIDth:MULTiplier/?, p. 88*
`:FMODe/?`	*:CALCulate:PARameters:SWIDth:FMODe/?, p. 88*
`:MANalysis/?`	*:CALCulate:PARameters:SWIDth:MANalysis/?, p. 88*
`:SW1`	*Spectral Width 1, Spectral Width 2 and Spectral Width 3 Tools, p. 90*

Command	Corresponding Section
:DISPlay/?	*:CALCulate:PARameters:SW~:DISPlay/?, p. 90*
:ALGorithm/?	*:CALCulate:PARameters:SW~:ALGorithm/?, p. 90*
:WTHReshold /?	*:CALCulate:PARameters:SW~:WTHReshold/?, p. 91*
:MTHReshold/?	*:CALCulate:PARameters:SW~:MTHReshold/?, p. 91*
:MULTiplier/?	*:CALCulate:PARameters:SW~:MULTiplier/?, p. 92*
:FMODe/?	*:CALCulate:PARameters:SW~:FMODe/?, p. 92*
:MANalysis/?	*:CALCulate:PARameters:SW~:MANalysis/?, p. 93*
:SW2	*Spectral Width 1, Spectral Width 2 and Spectral Width 3 Tools, p. 90*
:DISPlay/?	*:CALCulate:PARameters:SW~:DISPlay/?, p. 90*
:ALGorithm/?	*:CALCulate:PARameters:SW~:ALGorithm/?, p. 90*
:WTHReshold /?	*:CALCulate:PARameters:SW~:WTHReshold/?, p. 91*
:MTHReshold/?	*:CALCulate:PARameters:SW~:MTHReshold/?, p. 91*
:MULTiplier/?	*:CALCulate:PARameters:SW~:MULTiplier/?, p. 92*
:FMODe/?	*:CALCulate:PARameters:SW~:FMODe/?, p. 92*
:MANalysis/?	*:CALCulate:PARameters:SW~:MANalysis/?, p. 93*
:SW3	*Spectral Width 1, Spectral Width 2 and Spectral Width 3 Tools, p. 90*
:DISPlay/?	*:CALCulate:PARameters:SW~:DISPlay/?, p. 90*
:ALGorithm/?	*:CALCulate:PARameters:SW~:ALGorithm/?, p. 90*
:WTHReshold /?	*:CALCulate:PARameters:SW~:WTHReshold/?, p. 91*
:MTHReshold/?	*:CALCulate:PARameters:SW~:MTHReshold/?, p. 91*
:MULTiplier/?	*:CALCulate:PARameters:SW~:MULTiplier/?, p. 92*
:FMODe/?	*:CALCulate:PARameters:SW~:FMODe/?, p. 92*
:MANalysis/?	*:CALCulate:PARameters:SW~:MANalysis/?, p. 93*
:MWAVelength	*Mean Wavelength/Frequency Tool, p. 97*
[:ACTivate]/?	*:CALCulate:PARameters:MWAVelength[:ACTivate]/?, p. 97*
:DISPlay/?	*:CALCulate:PARameters:MWAVelength:DISPlay/?, p. 97*
:WTHReshold /?	*:CALCulate:PARameters:MWAVelength:WTHReshold/?, p. 98*
:XXDB	*XXdB Width Tool, p. 94*
[:ACTivate]/?	*:CALCulate:PARameters:XXDB[:ACTivate]/?, p. 94*
:DISPlay/?	*:CALCulate:PARameters:XXDB:DISPlay/?, p. 94*
:ALGorithm/?	*:CALCulate:PARameters:XXDB:ALGorithm/?, p. 94*
:WTHReshold /?	*:CALCulate:PARameters:XXDB:WTHReshold/?, p. 95*
:MTHReshold/?	*:CALCulate:PARameters:XXDB:MTHReshold/?, p. 95*
:MULTiplier/?	*:CALCulate:PARameters:XXDB:MULTiplier/?, p. 96*
:NWIDth	*Notch Width Tool, p. 100*
[:ACTivate]/?	*:CALCulate:PARameters:NWIDth[:ACTivate]/?, p. 100*
:DISPlay/?	*:CALCulate:PARameters:NWIDth:DISPlay/?, p. 100*
:NSELection/?	*:CALCulate:PARameters:NWIDth:NSELection/?, p. 101*
:WREFerence /?	*:CALCulate:PARameters:NWIDth:WREFerence/?, p. 101*
:ALGorithm/?	*:CALCulate:PARameters:NWIDth:ALGorithm/?, p. 101*
:WTHReshold/?	*:CALCulate:PARameters:NWIDth:WTHReshold/?, p. 102*
:MULTiplier/?	*:CALCulate:PARameters:NWIDth:MULTiplier/?, p. 102*
:NW1	*Notch Width 1, Notch Width 2 and Notch Width 3 Tools, p. 104*

Command	Corresponding Section
:DISPlay/?	*:CALCulate:PARameters:SW~:DISPlay/?, p. 90*
:ALGorithm/?	*:CALCulate:PARameters:SW~:ALGorithm/?, p. 90*
:WTHReshold /?	*:CALCulate:PARameters:SW~:WTHReshold/?, p. 91*
:MTHReshold/?	*:CALCulate:PARameters:SW~:MTHReshold/?, p. 91*
:MULTiplier/?	*:CALCulate:PARameters:SW~:MULTiplier/?, p. 92*
:FMODe/?	*:CALCulate:PARameters:SW~:FMODe/?, p. 92*
:MANalysis/?	*:CALCulate:PARameters:SW~:MANalysis/?, p. 93*
:SW2	*Spectral Width 1, Spectral Width 2 and Spectral Width 3 Tools, p. 90*
:DISPlay/?	*:CALCulate:PARameters:SW~:DISPlay/?, p. 90*
:ALGorithm/?	*:CALCulate:PARameters:SW~:ALGorithm/?, p. 90*
:WTHReshold /?	*:CALCulate:PARameters:SW~:WTHReshold/?, p. 91*
:MTHReshold/?	*:CALCulate:PARameters:SW~:MTHReshold/?, p. 91*
:MULTiplier/?	*:CALCulate:PARameters:SW~:MULTiplier/?, p. 92*
:FMODe/?	*:CALCulate:PARameters:SW~:FMODe/?, p. 92*
:MANalysis/?	*:CALCulate:PARameters:SW~:MANalysis/?, p. 93*
:SW3	*Spectral Width 1, Spectral Width 2 and Spectral Width 3 Tools, p. 90*
:DISPlay/?	*:CALCulate:PARameters:SW~:DISPlay/?, p. 90*
:ALGorithm/?	*:CALCulate:PARameters:SW~:ALGorithm/?, p. 90*
:WTHReshold /?	*:CALCulate:PARameters:SW~:WTHReshold/?, p. 91*
:MTHReshold/?	*:CALCulate:PARameters:SW~:MTHReshold/?, p. 91*
:MULTiplier/?	*:CALCulate:PARameters:SW~:MULTiplier/?, p. 92*
:FMODe/?	*:CALCulate:PARameters:SW~:FMODe/?, p. 92*
:MANalysis/?	*:CALCulate:PARameters:SW~:MANalysis/?, p. 93*
:MWAVelength	*Mean Wavelength/Frequency Tool, p. 97*
[:ACTivate]/?	*:CALCulate:PARameters:MWAVelength[:ACTivate]/?, p. 97*
:DISPlay/?	*:CALCulate:PARameters:MWAVelength:DISPlay/?, p. 97*
:WTHReshold /?	*:CALCulate:PARameters:MWAVelength:WTHReshold/?, p. 98*
:XXDB	*XXdB Width Tool, p. 94*
[:ACTivate]/?	*:CALCulate:PARameters:XXDB[:ACTivate]/?, p. 94*
:DISPlay/?	*:CALCulate:PARameters:XXDB:DISPlay/?, p. 94*
:ALGorithm/?	*:CALCulate:PARameters:XXDB:ALGorithm/?, p. 94*
:WTHReshold /?	*:CALCulate:PARameters:XXDB:WTHReshold/?, p. 95*
:MTHReshold/?	*:CALCulate:PARameters:XXDB:MTHReshold/?, p. 95*
:MULTiplier/?	*:CALCulate:PARameters:XXDB:MULTiplier/?, p. 96*
:NWIDth	*Notch Width Tool, p. 100*
[:ACTivate]/?	*:CALCulate:PARameters:NWIDth[:ACTivate]/?, p. 100*
:DISPlay/?	*:CALCulate:PARameters:NWIDth:DISPlay/?, p. 100*
:NSELection/?	*:CALCulate:PARameters:NWIDth:NSELection/?, p. 101*
:WREFerence /?	*:CALCulate:PARameters:NWIDth:WREFerence/?, p. 101*
:ALGorithm/?	*:CALCulate:PARameters:NWIDth:ALGorithm/?, p. 101*
:WTHReshold/?	*:CALCulate:PARameters:NWIDth:WTHReshold/?, p. 102*
:MULTiplier/?	*:CALCulate:PARameters:NWIDth:MULTiplier/?, p. 102*
:NW1	*Notch Width 1, Notch Width 2 and Notch Width 3 Tools, p. 104*

Command	Corresponding Section
:DISPlay/?	*:CALCulate:PARameters:NW~:DISPlay/?, p. 104*
:NSELection/?	*:CALCulate:PARameters:NW~:NSELection/?, p. 104*
:WREFerence /?	*:CALCulate:PARameters:NW~:WREFerence/?, p. 105*
:ALGorithm/?	*:CALCulate:PARameters:NW~:ALGorithm/?, p. 105*
:WTHReshold/?	*:CALCulate:PARameters:NW~:WTHReshold/?, p. 105*
:MULTiplier/?	*:CALCulate:PARameters:NW~:MULTiplier/?, p. 106*
:NW2	*Notch Width 1, Notch Width 2 and Notch Width 3 Tools, p. 104*
:DISPlay/?	*:CALCulate:PARameters:NW~:DISPlay/?, p. 104*
:NSELection/?	*:CALCulate:PARameters:NW~:NSELection/?, p. 104*
:WREFerence /?	*:CALCulate:PARameters:NW~:WREFerence/?, p. 105*
:ALGorithm/?	*:CALCulate:PARameters:NW~:ALGorithm/?, p. 105*
:WTHReshold/?	*:CALCulate:PARameters:NW~:WTHReshold/?, p. 105*
:MULTiplier/?	*:CALCulate:PARameters:NW~:MULTiplier/?, p. 106*
:NW3	*Notch Width 1, Notch Width 2 and Notch Width 3 Tools, p. 104*
:DISPlay/?	*:CALCulate:PARameters:NW~:DISPlay/?, p. 104*
:NSELection/?	*:CALCulate:PARameters:NW~:NSELection/?, p. 104*
:WREFerence /?	*:CALCulate:PARameters:NW~:WREFerence/?, p. 105*
:ALGorithm/?	*:CALCulate:PARameters:NW~:ALGorithm/?, p. 105*
:WTHReshold/?	*:CALCulate:PARameters:NW~:WTHReshold/?, p. 105*
:MULTiplier/?	*:CALCulate:PARameters:NW~:MULTiplier/?, p. 106*
:LVLCheck	*Level Check Tool, p. 107*
[:ACTivate]/?	*:CALCulate:PARameters:LVLCheck[:ACTivate]/?, p. 107*
:DISPlay/?	*:CALCulate:PARameters:LVLCheck:DISPlay/?, p. 107*
:REFPoint1/?	*:CALCulate:PARameters:LVLCheck:REFPoint~/?, p. 108*
:REFPoint2/?	*:CALCulate:PARameters:LVLCheck:REFPoint~/?, p. 108*
:REFPoint3/?	*:CALCulate:PARameters:LVLCheck:REFPoint~/?, p. 108*
:SMSR	*SMSR Tool, p. 109*
[:ACTivate]/?	*:CALCulate:PARameters:SMSR[:ACTivate]/?, p. 109*
:DISPlay/?	*:CALCulate:PARameters:SMSR:DISPlay/?, p. 109*
:ALGorithm/?	*:CALCulate:PARameters:SMSR:ALGorithm/?, p. 109*
:SMCalc /?	*:CALCulate:PARameters:SMSR:SMCalc/?, p. 110*
:MASK/?	*:CALCulate:PARameters:SMSR:MASK/?, p. 110*
:RIPPle	*Ripple Tool, p. 120*
[:ACTivate]/?	*:CALCulate:PARameters:RIPPle[:ACTivate]/?, p. 120*
:DTHReshold/?	*:CALCulate:PARameters:RIPPle:DTHReshold/?, p. 120*
:SPAN /?	*:CALCulate:PARameters:RIPPle:SPAN /?, p. 121*
:RINDex/?	*:CALCulate:PARameters:RIPPle:RINDex/?, p. 121*
:TPOWer	*Optical Power Tool, p. 122*
[:ACTivate]/?	*:CALCulate:PARameters:TPOWer[:ACTivate]/?, p. 122*
:OFFSet/?	*:CALCulate:PARameters:TPOWer:OFFSet/?, p. 122*
:FSPan/?	*:CALCulate:PARameters:TPOWer:FSPan/?, p. 123*
:SPAN/?	*:CALCulate:PARameters:TPOWer:SPAN/?, p. 123*
:NSUPpression/?	*:CALCulate:PARameters:TPOWer:NSUPpression/?, p. 124*
:PDENsity	*Power Density Tool, p. 125*
[:ACTivate]/?	*:CALCulate:PARameters:PDENsity[:ACTivate]/?, p. 125*

Command	Corresponding Section
:OFFSet/?	*:CALCulate:PARameters:PDENsity:OFFSet/?, p. 125*
:NSUPpression/?	*:CALCulate:PARameters:PDENsity:NSUPpression/?, p. 126*
:WDMChannel	*WDM Channel Detection Tool, p. 78*
:DISPlay/?	*:CALCulate:PARameters:WDMChannel:DISPlay/?, p. 78*
:MODe/?	*:CALCulate:PARameters:WDMChannel:MODe/?, p. 78*
:BTHReshold/?	*:CALCulate:PARameters:WDMChannel:BTHReshold/?, p. 78*
:FCHannel	*:CALCulate:PARameters:WDMChannel:FCHannel/?, p. 79*
:CDMode/?	*:CALCulate:PARameters:WDMChannel:CDMode/?, p. 79*
:CREFerence/?	*:CALCulate:PARameters:WDMChannel:CREFerence/?, p. 80*
:CNUMber/?	*:CALCulate:PARameters:WDMChannel:CNUMber/?, p. 80*
:GSPacing/?	*:CALCulate:PARameters:WDMChannel:GSPacing/?, p. 80*
:RFRequency/?	*:CALCulate:PARameters:WDMChannel:RFRequency/?, p. 81*
:ECHannels/?	*:CALCulate:PARameters:WDMChannel:ECHannels/?, p. 81*
:STARt/?	*:CALCulate:PARameters:WDMChannel:STARt/?, p. 82*
:STOP/?	*:CALCulate:PARameters:WDMChannel:STOP/?, p. 82*
:OSNR	*OSNR Tool, p. 112*
[:ACTivate]/?	*:CALCulate:PARameters:OSNR[:ACTivate]/?, p. 112*
:DISPlay/?	*:CALCulate:PARameters:OSNR:DISPlay/?, p. 112*
:NSELection/?	*:CALCulate:PARameters:OSNR:NSELection/?, p. 112*
:SDIStance/?	*:CALCulate:PARameters:OSNR:SDIStance/?, p. 113*
:NRANge/?	*:CALCulate:PARameters:OSNR:NRANge/?, p. 113*
:IRANge/?	*:CALCulate:PARameters:OSNR:IRANge/?, p. 114*
:FIT/?	*:CALCulate:PARameters:OSNR:FIT/?, p. 114*
:ROWidth/?	*:CALCulate:PARameters:OSNR:ROWidth/?, p. 114*
:BWCDisplay/?	*:CALCulate:PARameters:OSNR:BWCDisplay/?, p. 115*
:PINTegration/?	*:CALCulate:PARameters:OSNR:PINTegration/?, p. 115*
:PRANge/?	*:CALCulate:PARameters:OSNR:PRANge/?, p. 116*
:PMETer/?	*:CALCulate:PARameters:OSNR:PMETer/?, p. 116*
:GAINnf	*Gain and Noise Figure Tool, p. 127*
:DISPlay/?	*:CALCulate:PARameters:GAINnf:DISPlay/?, p. 127*
:ESETup/?	*:CALCulate:PARameters:GAINnf:ESETup/?, p. 127*
:IATTenuation/?	*:CALCulate:PARameters:GAINnf:IATTenuation/?, p. 128*
:OATTenuation/?	*:CALCulate:PARameters:GAINnf:OATTenuation/?, p. 128*
:NFSelection?	*:CALCulate:PARameters:GAINnf:NFSelection/?, p. 129*
:RESolution/?	*:CALCulate:PARameters:GAINnf:RESolution/?, p. 129*
:FWIDth/?	*:CALCulate:PARameters:GAINnf:FWIDth/?, p. 129*
:PBANd	*Pass Band Test Tool, p. 134*
:DISPlay/?	*:CALCulate:PARameters:PBANd:DISPlay/?, p. 134*
:REFerence/?	*:CALCulate:PARameters:PBANd:REFerence/?, p. 134*
:BMEThod/?	*:CALCulate:PARameters:PBANd:BMEThod/?, p. 135*
:BDIStance/?	*:CALCulate:PARameters:PBANd:BDIStance/?, p. 135*
:ARANge/?	*:CALCulate:PARameters:PBANd:ARANge/?, p. 136*
:SPAN/?	*:CALCulate:PARameters:PBANd:SPAN/?, p. 136*
:PERCentage/?	*:CALCulate:PARameters:PBANd:PERCentage/?, p. 137*
:THReshold/?	*:CALCulate:PARameters:PBANd:THReshold/?, p. 137*

Command	Corresponding Section
:TRANsition/?	*:CALCulate:PARameters:PBANd:TRANsition/?, p. 138*
:EXCLusion	-
:MINimum/?	*:CALCulate:PARameters:PBANd:EXCLusion:MINimum/?, p. 138*
:MAXimum/?	*:CALCulate:PARameters:PBANd:EXCLusion:MAXimum/?, p. 139*
:SBANd	*Stop Band Test Tool, p. 140*
:DISPlay/?	*:CALCulate:PARameters:SBANd:DISPlay/?, p. 140*
:REFerence/?	*:CALCulate:PARameters:SBANd:REFerence/?, p. 140*
:BMEThod/?	*:CALCulate:PARameters:SBANd:BMEThod/?, p. 141*
:BDIStance/?	*:CALCulate:PARameters:SBANd:BDIStance/?, p. 141*
:ARANge/?	*:CALCulate:PARameters:SBANd:ARANge/?, p. 142*
:SPAN/?	*:CALCulate:PARameters:SBANd:SPAN/?, p. 142*
:PERCentage/?	*:CALCulate:PARameters:SBANd:PERCentage/?, p. 143*
:THReshold/?	*:CALCulate:PARameters:SBANd:THReshold/?, p. 143*
:TRANsition/?	*:CALCulate:PARameters:SBANd:TRANsition/?, p. 144*
:EXCLusion	-
:MINimum/?	*:CALCulate:PARameters:SBANd:EXCLusion:MINimum/?, p. 144*
:MAXimum/?	*:CALCulate:PARameters:SBANd:EXCLusion:MAXimum/?, p. 145*
:DATA?	See *Table 12, p. 73*

Table 11: CALCulate:PARameters commands and queries

DATA

The following table gives an overview of queries enabling you to get analysis results:

Command	Corresponding Section
:CALCulate	*CALCulate Subsystem – General Analysis Settings, p. 59*
:PARameters	See *Table 11, p. 71*
:DATA?	-
[:ALL]?	*:CALCulate:DATA[:ALL]?, p. 146*
:PTSearch	-
[:LIST]?	*:CALCulate:DATA:PTSearch[:LIST]?, p. 76*
:MAIN	-
:PEAK?	*:CALCulate:DATA:PTSearch:MAIN:PEAK?, p. 77*
:TRO?	*:CALCulate:DATA:PTSearch:MAIN:TROugh?, p. 77*
:SWIDth?	*:CALCulate:DATA:SWIDth?, p. 89*
:SW1?	*:CALCulate:DATA:SW~?, p. 93*
:SW2?	*:CALCulate:DATA:SW~?, p. 93*
:SW3?	*:CALCulate:DATA:SW~?, p. 93*
:MWAVelength?	*:CALCulate:DATA:MWAVelength?, p. 98*
:PWAVelength?	*Peak Wavelength Tool (:CALCulate:DATA:PWAVelength?), p. 99*
:CWAVelength?	*Central Wavelength Tool (:CALCulate:DATA:CWAVelength?), p. 99*
:XXDB?	*:CALCulate:DATA:XXDB?, p. 96*
:FWHM?	*FWHM Tool (:CALCulate:DATA:FWHM?), p. 99*
:SMSPacing?	*Side Mode Spacing Tool (:CALCulate:DATA:SMSPacing?), p. 100*

Command	Corresponding Section
:NWIDth?	*:CALCulate:DATA:NWIDth?, p. 103*
:NW1?	*:CALCulate:DATA:NW~?, p. 106*
:NW2?	*:CALCulate:DATA:NW~?, p. 106*
:NW3?	*:CALCulate:DATA:NW~?, p. 106*
:LVLCheck?	*:CALCulate:DATA:LVLCheck?, p. 108*
:SMSR?	*:CALCulate:DATA:SMSR?, p. 111*
:RIPPle?	*:CALCulate:DATA:RIPPle?, p. 121*
:TPOWer?	*:CALCulate:DATA:TPOWer?, p. 124*
:PDENsity?	*:CALCulate:DATA:PDENsity?, p. 126*
:LOSS?	*Loss Measurement (:CALCulate:DATA:LOSS?), p. 126*
:OSNR?	*:CALCulate:DATA:OSNR?, p. 116*
:IN?	*:CALCulate:DATA:OSNR:IN?, p. 117*
:OUT?	*:CALCulate:DATA:OSNR:OUT?, p. 117*
:GAINnf?	*:CALCulate:DATA:GAINnf?, p. 130*
:WDM	-
:NCHannels?	*:CALCulate:DATA:WDM:NCHannels?, p. 83*
:SLOPe?	*:CALCulate:DATA:WDM:SLOPe?, p. 83*
:UNIFormity?	*:CALCulate:DATA:WDM:UNIFormity?, p. 83*
:TPOWer?	*:CALCulate:DATA:WDM:TPOWer?, p. 83*
[:ALL]	-
:CHANnel?	*:CALCulate:DATA:WDM[:ALL]:CHANnel?, p. 84*
:OSNR?	*:CALCulate:DATA:WDM[:ALL]:OSNR?, p. 117*
:CH	-
:CHANnel?	*:CALCulate:DATA:WDM:CH:CHANnel?, p. 85*
:OSNR?	*:CALCulate:DATA:WDM:CH:OSNR?, p. 118*
:OFA	-
:TASE?	*:CALCulate:DATA:OFA:TASE?, p. 130*
:GFLatness?	*:CALCulate:DATA:OFA:GFLatness?, p. 130*
:GSLope?	*:CALCulate:DATA:OFA:GSLope?, p. 131*
:GAVerage?	*:CALCulate:DATA:OFA:GAVerage?, p. 131*
:TPOWer:IN?	*:CALCulate:DATA:OFA:TPOWer:IN?, p. 131*
:TPOWer:OUT?	*:CALCulate:DATA:OFA:TPOWer:OUT?, p. 132*
[:ALL]	-
:CHANnel?	*:CALCulate:DATA:OFA[:ALL]:CHANnel?, p. 84*
:OSNR:IN?	*:CALCulate:DATA:OFA[:ALL]:OSNR:IN?, p. 118*
:OSNR:OUT?	*:CALCulate:DATA:OFA[:ALL]:OSNR:OUT?, p. 119*
:GAINnf?	*:CALCulate:DATA:OFA[:ALL]:GAINnf?, p. 132*
:CH	-
:CHANnel?	*:CALCulate:DATA:OFA:CH:CHANnel?, p. 85*

Command	Corresponding Section
:OSNR:IN?	*:CALCulate:DATA:OFA:CH:OSNR:IN?, p. 119*
:OSNR:OUT?	*:CALCulate:DATA:OFA:CH:OSNR:OUT?, p. 119*
:GAINnf?	*:CALCulate:DATA:OFA:CH:GAINnf?, p. 133*
:SBANd?	*:CALCulate:DATA:PBANd?, p. 139*
:SBANd?	*:CALCulate:DATA:SBANd?, p. 145*
:MASK?	*Mask Test Tool (:CALCulate:DATA:MASK?), p. 146*
:HIST?	*:CALCulate:DATA:HIST?, p. 147*

Table 12: CALCulate:DATA commands and queries

Rules

- The unit returned depends on unit settings (see section *UNIT Subsystem Commands and Queries, p. 35*).
  Results headers are noted `WL` if the unit is set to wavelength, and `FREQ` if the unit is set to Frequency.
- Results are always expressed in base unit (e.g. M|HZ).

Important
You must make sure the OSA20 is in idle state (`:STAT:OPER? → 0`) before running the CALCulate subsystem commands (see section *:STATus:OPERation[:EVENt]?, p. 28*).

4.2.1 PT Search Tool

4.2.1.1 :CALCulate:PARameters:PTSearch:DISPlay[:STATe]/?

Syntax

- Command `:CALCulate:PARameters:PTSearch:DISPlay[:STATe]<wsp>OFF|ON|0|1`
- Query `:CALCulate:PARameters:PTSearch:DISPlay[:STATe]?`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, RLT modes.

Description Sets/Queries the **Display on Graph** setting:

- `0`: `OFF`, the tool results are not displayed on graph.
- `1`: `ON`, the tool results are displayed on graph.

Query Response Integer corresponding to the state of the setting.

Example

- Command `:CALC:PAR:PTS:DISP[:STAT] ON`
- `:CALC:PAR:PTS:DISP[:STAT]? → 1`

4.2.1.2 :CALCulate:PARameters:PTSearch:DISPlay:SHOW/?

Syntax
- Command `:CALCulate:PARameters:PTSearch:DISPlay:SHOW<wsp>PEAKs|TROughs|BOTH|0|1|2`
- Query `:CALCulate:PARameters:PTSearch:DISPlay:SHOW?`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, RLT modes. This parameter is only settable if the *:CALCulate:PARameters:PTSearch:DISPlay[:STATe]/?* parameter (*p. 73*), is set to `ON`.

Description Sets/Queries the **Show** setting.
- `0`: graphical items are displayed on peaks.
- `1`: graphical items are displayed on troughs.
- `2`: graphical items are displayed on peaks and troughs.

Query Response Integer corresponding to the type of display selected.

Example
- Command `:CALC:PAR:PTS:DISP:SHOW TRO`
- Query `:CALC:PAR:PTS:DISP:SHOW? → 1`

4.2.1.3 :CALCulate:PARameters:PTSearch:PTTHreshold/?

Syntax
- Command `:CALCulate:PARameters:PTSearch:PTTHreshold<wsp><value>|MIN|MAX`
- Query `:CALCulate:PARameters:PTSearch:PTTHreshold?[MIN|MAX]`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, RLT modes.

Description Sets/Queries the **PT Threshold** value for the discrimination of peaks and troughs in the spectrum.
- `<value>`: threshold as float value in dB.
- `MIN`: minimum value is:
  - OSA mode: 0.01
  - WDM mode: 0.5
- `MAX`: maximum value is:
  - OSA mode: 50
  - WDM mode: **Mode Threshold** value minus 0.01 (see section *:CALCulate:PARameters:PTSearch:MTHReshold/?, p. 76*).

Query Response Threshold as float value in dB.

Example
- Command `:CALC:PAR:PTS:PTTH 3`
- Query `:CALC:PAR:PTS:PTTH? → +3.00000000E+000`

4.2.1.4 :CALCulate:PARameters:PTSearch:ANTHreshold/?

Syntax

- Command `:CALCulate:PARameters:PTSearch:ANTHreshold <wsp>OFF|ON|0|1`
- Query `:CALCulate:PARameters:PTSearch:ANTHreshold?`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, RLT modes.

Description Sets/Queries the **Auto Noise Threshold** activation state:

- `0`: `OFF`, the Auto Noise Threshold is not activated.
- `1`: `ON`, the Auto Noise Threshold is activated.

Query Response Integer corresponding to the activation state of the setting.

Example

- Command `:CALC:PAR:PTS:ANTH ON`
- Query `:CALC:PAR:PTS:ANTH? → 1`

4.2.1.5 :CALCulate:PARameters:PTSearch:MTHReshold/?

Syntax
- Command `:CALCulate:PARameters:PTSearch:MTHReshold <wsp><value>|MIN|MAX`
- Query `:CALCulate:PARameters:PTSearch:MTHReshold? [MIN|MAX]`

Type Sequential.

Applicability WDM, OFA, PCT, SML, RLT mode.

Description Sets/Queries the **Mode Threshold**.
- `<value>`: threshold value in dB.
- `MIN`: minimum value is **PT Threshold** value plus 0.01 (see section *:CALCulate:PARameters:PTSearch:PTTHreshold/?, p. 74*).
- `MAX`: maximum value is 100.

Query Response Threshold as float value in dB.

Example
- Command `:CALC:PAR:PTS:MTHR 20`
- Query `:CALC:PAR:PTS:MTHR? → +2.00000000E+001`

4.2.1.6 :CALCulate:DATA:PTSearch[:LIST]?

Syntax `:CALCulate:DATA:PTSearch[:LIST]?`

Type Sequential, query only.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Queries the list of wavelength and power level for all found peaks and troughs, according to the unit settings (see section *UNIT Subsystem Commands and Queries, p. 35*).

Query Response <Number of Peaks>, <Number of Troughs>, PEAKWAVELENGTH,<unit>,PEAKPOWER,<unit>,TROUGHWAVELENGTH, <unit>,TROUGHPOWER,<unit>,{<Peak wavelength>},{<Peak power level>}, {<Trough wavelength>},{<Trough power level>}

Example
```
:CALC:DATA:PTS? →
2,3,PEAKWAVELENGTH,M,PEAKPOWER,DBM,TROUGHWAVELENGTH,M,TROUGHPOWER
,DBM,+1.53033000E-006,+1.52950600E-006,-1.14000000E+001,-
1.15200000E+001,+1.53386800E-006,+1.53007200E-006,+1.52774400E-
006,-6.40100000E+001,-6.42600000E+001,-6.45200000E+001
```

4.2.1.7 :CALCulate:DATA:PTSearch:MAIN:PEAK?

Syntax `:CALCulate:DATA:PTSearch:MAIN:PEAK?`

Type Sequential, query only.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Queries the list of wavelength (in meters) or frequency (in Hertz) and power level of the peak with the highest power.

Query Response <Peak wavelength or frequency>, <Peak power level>

Example
```
:CALC:DATA:PTS:MAIN:PEAK? →
+1.52950600E-006,-1.15200000E+001
```

4.2.1.8 :CALCulate:DATA:PTSearch:MAIN:TROugh?

Syntax `:CALCulate:DATA:PTSearch:MAIN:TROugh?`

Type Sequential, query only.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Queries the list of wavelength (in meters) or frequency (in Hertz) and power level of the trough with the lowest power.

Query Response <Trough wavelength or frequency>, <Trough power level>

Example
```
:CALC:DATA:PTS:MAIN:TRO? →
+1.52774400E-006,-6.45200000E+001
```

4.2.2 Component Selector Tool

Syntax
- Command `:CALCulate:PARameters:CSELector:TYPE<wsp>PASS|STOP|ISOLator|FIBer|0|1|2|3`
- Query `:CALCulate:PARameters:CSELector:TYPE?`

Type Sequential.

Applicability PCT mode.

Description Sets/Queries the type of device under test.
- `0`: `PASS`, pass band filter.
- `1`: `STOP`, stop band filter
- `2`: `ISOLator`, isolator or circulator
- `3`: `FIBer`, fiber component

Query Response Integer corresponding to the device under test.

Example
- Command `:CALC:PAR:CSEL:TYPE ISOL`
- Query `:CALC:PAR:CSEL:TYPE? → 2`

4.2.3 WDM Channel Detection Tool

4.2.3.1 :CALCulate:PARameters:WDMChannel:DISPlay/?

Syntax

- Command `:CALCulate:PARameters:WDMChannel:DISPlay <wsp>OFF|ON|0|1`
- Query `:CALCulate:PARameters:WDMChannel:DISPlay?`

Type Sequential.

Applicability WDM, OFA, RLT modes.

Description Sets/Queries the **Display on Graph** setting:

- `0`: `OFF`, the tool results are not displayed on graph.
- `1`: `ON`, the tool results are displayed on graph.

Query Response Integer corresponding to the state of the setting.

Example

- Command `:CALC:PAR:WDMC:DISP ON`
- Query `:CALC:PAR:WDMC:DISP? → 1`

4.2.3.2 :CALCulate:PARameters:WDMChannel:MODe/?

Syntax

- Command `:CALCulate:PARameters:WDMChannel:MODe<wsp> GRID|PCHannel|CWDM|0|1|2`
- Query `:CALCulate:PARameters:WDMChannel:MODe?`

Type Sequential.

Applicability WDM, OFA, RLT modes.

Description Sets/Queries the **WDM Display Mode**.

- `0`: `GRID`, Grid mode.
- `1`: `PCHannel`, Per Channel mode.
- `2`: `CWDM`, CWDM spacing.

Query Response Integer corresponding to the channel detection method selected.

Example

- Command `:CALC:PAR:WDMC:MOD GRID`
- Query `:CALC:PAR:WDMC:MOD? → 0`

4.2.3.3 :CALCulate:PARameters:WDMChannel:BTHReshold/?

Syntax

- Command `:CALCulate:PARameters:WDMChannel: BTHReshold<wsp><value>|MIN|MAX`
- Query `:CALCulate:PARameters:WDMChannel: BTHReshold? [MIN|MAX]`

Type Sequential.

Applicability WDM, OFA, RLT modes.

Description Sets/Queries the **Bandwidth Threshold** for the calculation of the central wavelength of the channel's signal.
- `<value>`: threshold value in dB.
- `MIN`: minimum value is 0.01.
- `MAX`: maximum value is 50.

Query Response Bandwidth threshold as float value in dB.

Example
- Command `:CALC:PAR:WDMC:BTHR 3`
- Query `:CALC:PAR:WDMC:BTHR? → +3.00000000E+000`

4.2.3.4 :CALCulate:PARameters:WDMChannel:FCHannel/?

Syntax
- Command `:CALCulate:PARameters:WDMChannel:FCHannel<wsp> 1270nm|1271nm|0|1`
- Query `:CALCulate:PARameters:WDMChannel:FCHannel?`

Type Sequential.

Applicability WDM, RLT and OFA modes.

Description Sets/Queries the center wavelength of the **First Channel** of the CWDM grid.
- `0`: `1270nm`, the first channel is centered on 1270 nm.
- `1`: `1271nm`, the first channel is centered on 1271 nm.

Query Response Integer corresponding to the first channel of the grid.

Example
- Command `:CALC:PAR:WDMC:FCH 1270nm`
- Query `:CALC:PAR:WDMC:FCH? → 1`

4.2.3.5 :CALCulate:PARameters:WDMChannel:CDMode/?

Syntax
- Command `:CALCulate:PARameters:WDMChannel:CDMode <wsp>OFFSet|SPACing|0|1`
- Query `:CALCulate:PARameters:WDMChannel:CDMode?`

Type Sequential.

Applicability WDM, RLT modes.

Description Sets/Queries the **Channel Display Mode**.
- `0`: `OFFSet` mode, results are based on a **Reference Channel**.
- `1`: `SPACing` mode, results based on adjacent channels.

Query Response Integer corresponding to the Channel detection method selected.

Example
- Command `:CALC:PAR:WDMC:CDM SPAC`
- Query `:CALC:PAR:WDMC:CDM? → 1`

4.2.3.6 :CALCulate:PARameters:WDMChannel:CREFerence/?

Syntax
- Command `:CALCulate:PARameters:WDMChannel:CREFerence <wsp>MAXimum|CNUMber|0|1`
- Query `:CALCulate:PARameters:WDMChannel:CREFerence?`

Type Sequential.

Applicability WDM, RLT modes.

Description Sets/Queries the **Reference Channel**.
- `0`: `MAXimum`, reference channel is the channel with maximum power.
- `1`: `CNUMber`, reference channel is a specified channel number.

Query Response Integer corresponding to the channel reference used.

Example
- Command `:CALC:PAR:WDMC:CREF CNUM`
- Query `:CALC:PAR:WDMC:CREF? → 1`

4.2.3.7 :CALCulate:PARameters:WDMChannel:CNUMber/?

Syntax
- Command `:CALCulate:PARameters:WDMChannel:CNUMber <wsp><value>`
- Query `:CALCulate:PARameters:WDMChannel:CNUMber?`

Type Sequential.

Applicability WDM, RLT modes.

Description Sets/Queries the **Channel Number**.
- `<value>`: integer corresponding to the channel number used as reference for the offset mode calculation, within range 1 to 10000.

Query Response Integer corresponding to the channel number that is taken as reference for the offset mode calculation.

Example
- Command `:CALC:PAR:WDMC:CNUM 20`
- Query `:CALC:PAR:WDMC:CNUM? → 20`

4.2.3.8 :CALCulate:PARameters:WDMChannel:GSPacing/?

Syntax
- Command `:CALCulate:PARameters:WDMChannel:GSPacing <wsp><value>|MIN|MAX`
- Query `:CALCulate:PARameters:WDMChannel:GSPacing? [MIN|MAX]`

Type Sequential.

Applicability WDM, OFA, RLT modes.

Description Sets/Queries the **Grid Spacing** value (in `GRID` mode).
- `<value>`: grid spacing value in GHz.
- `MIN`: minimum value is 1.
- `MAX`: maximum value is 200.

Query Response Grid Spacing as float value in GHz.

Example
- Command `:CALC:PAR:WDMC:GSP 12.5`
- Query `:CALC:PAR:WDMC:GSP? → +1.25000000E+001`

4.2.3.9 :CALCulate:PARameters:WDMChannel:RFRequency/?

Syntax
- Command `:CALCulate:PARameters:WDMChannel:RFRequency <wsp><value>|MIN|MAX`
- Query `:CALCulate:PARameters:WDMChannel:RFRequency? [MIN|MAX]`

Type Sequential.

Applicability WDM, OFA, RLT modes.

Description Sets/Queries the **Reference Frequency** used for the calculation of the Grid channels (in `GRID` mode).
- `<value>`: reference frequency as float value in THz. Commands sent in nm are not allowed.
- `MIN`: minimum value is 176.349 THz.
- `MAX`: maximum value is 239.834 THz.

Query Response Reference frequency as float value in Hz.

Example
- Command `:CALC:PAR:WDMC:RFR 193.1`
- Query `:CALC:PAR:WDMC:RFR? → +1.93100000E+014`

4.2.3.10 :CALCulate:PARameters:WDMChannel:ECHannels/?

Syntax
- Command `:CALCulate:PARameters:WDMChannel:ECHannels <wsp>HIDE|SHOW|0|1`
- Query `:CALCulate:PARameters:WDMChannel:ECHannels?`

Type Sequential.

Applicability WDM, OFA, RLT modes.

Description Sets/Queries the **Empty Channels** setting (in `GRID` mode).
- `0`: `HIDE`, empty channels are hidden in the result table.
- `1`: `SHOW`, empty channels are displayed in the result table.

Query Response Integer corresponding to the display of empty channels.

Example
- Command `:CALC:PAR:WDMC:ECH HIDE`
- Query `:CALC:PAR:WDMC:ECH? → 0`

4.2.3.11 :CALCulate:PARameters:WDMChannel:STARt/?

Syntax
- Command `:CALCulate:PARameters:WDMChannel:STARt<wsp><value>[PM|NM|M|HZ|GHZ|THZ]|MIN|MAX`
- Query `:CALCulate:PARameters:WDMChannel:STARt? [MIN|MAX]`

Type Sequential.

Applicability WDM, OFA, RLT modes.

Description Sets/Queries the **Start Wavelength/Frequency** setting for the generation of the grid (in `GRID` mode).
- `<value>`: wavelength or frequency as float value.
- `MIN`: minimum value is 1250 nm or 176.349 THz.
- `MAX`: maximum value is the stop wavelength setting minus 0.01 nm or the stop frequency setting minus 0.001 THz (see section *:CALCulate:PARameters:WDMChannel:STOP/?, p. 82*).

Query Response Wavelength or frequency as float value in meters or Hertz depending on the unit settings.

Example
- Command `:CALC:PAR:WDMC:STAR 1525NM`
- Query `:CALC:PAR:WDMC:STAR? → +1.52500000E-006`

4.2.3.12 :CALCulate:PARameters:WDMChannel:STOP/?

Syntax
- Command `:CALCulate:PARameters:WDMChannel:STOP<wsp><value>[PM|NM|M|HZ|GHZ|THZ]|MIN|MAX`
- Query `:CALCulate:PARameters:WDMChannel:STOP? [MIN|MAX]`

Type Sequential.

Applicability WDM, OFA, RLT modes.

Description Sets/Queries the **Stop Wavelength/Frequency** setting for the generation of the grid (in `GRID` mode).
- `<value>`: wavelength or frequency as float value.
- `MIN`: minimum value is the start wavelength setting plus 0.01 nm or the start frequency setting minus 0.001 THz (see section *:CALCulate:PARameters:WDMChannel:STARt/?, p. 82*).
- `MAX`: maximum value is 1700 nm or 239.8340 THz.

Query Response Wavelength or frequency as float value in meters or Hertz depending on the unit settings.

Example
- Command `:CALC:PAR:WDMC:STOP 1625NM`
- Query `:CALC:PAR:WDMC:STOP? → +1.62500000E-006`

4.2.3.13 :CALCulate:DATA:WDM:NCHannels?

Syntax `:CALCulate:DATA:WDM:NCHannels?`

Type Sequential, query only.

Applicability WDM, RLT modes.

Description Queries the number of channel detected.

Query Response NBROFCHANNELS,<value>,

Example
```
:CALC:DATA:WDM:NCH? →
NBROFCHANNELS,6,
```

4.2.3.14 :CALCulate:DATA:WDM:SLOPe?

Syntax `:CALCulate:DATA:WDM:SLOPe?`

Type Sequential, query only.

Applicability WDM, RLT modes.

Description Queries the slope of the WDM channel output levels.

Query Response `SLOPE`,<value>,<unit>

Example
```
:CALC:DATA:WDM:SLOP? →
SLOPE,+3.95000000E+008,DB/M
```

4.2.3.15 :CALCulate:DATA:WDM:UNIFormity?

Syntax `:CALCulate:DATA:WDM:UNIFormity?`

Type Sequential, query only.

Applicability WDM, RLT modes.

Description Queries the uniformity of the WDM channel output levels.

Query Response UNIFORMITY,<value>,<unit>

Example `:CALC:DATA:WDM:UNIF? → UNIFORMITY,+2.17000000E+000,DB`

4.2.3.16 :CALCulate:DATA:WDM:TPOWer?

Syntax `:CALCulate:DATA:WDM:TPOWer?`

Type Sequential, query only.

Applicability WDM, RLT modes.

Description Queries the result of the **Optical Power** tool.

Query Response TOTALPOWER,<value>,<unit>

Example `:CALC:DATA:WDM:TPOW? → TOTALPOWER,-1.22800000E+001,DBM`

4.2.3.17 :CALCulate:DATA:WDM[:ALL]:CHANnel?

Syntax `:CALCulate:DATA:WDM[:ALL]:CHANnel?`

Type Sequential, query only.

Applicability WDM, RLT modes.

Description Queries the channel detection results for all displayed channels.

Query Response

- If parameter *:CALCulate:PARameters:WDMChannel:MODe/?, p. 78* is set to `GRID`:

  CH,NBR,WL_GRID,<unit>,WL_MEAS,<unit>,LVL_MEAS,<unit>,DWLTOGRID,<unit>, {<Channel Number value>},{<Wavelength Grid value>},{<Wavelength Measured value>},{<Distance to Grid value>}
- If parameter *:CALCulate:PARameters:WDMChannel:MODe/?, p. 78* is set to `PCHannel`:
  - If parameter *:CALCulate:PARameters:WDMChannel:CDMode/?, p. 79* is set to `OFFSet`:

    CH,NBR,WL_CTR,<unit>,LVL_CTR,<unit>,WLOFFSET,<unit>,LVLOFFSET,<unit> {<Channel Number value>},{<Center Wavelength value>},{<Power at Center Wavelength value>},{<Wavelength Offset value>},{<Power Offset value>}
  - If parameter *:CALCulate:PARameters:WDMChannel:CDMode/?, p. 79* is set to `SPACing`:

    CH,NBR,WL_CTR,<unit>,LVL_CTR,<unit>,DWL,<unit>,DLVL,<unit>, {<Channel Number value>},{<Center Wavelength value>},{<Power at center Wavelength value>},{<Delta Wavelength value>},{<Delta Power value>}

Example

```
:CALC:DATA:WDM:CHAN? →
CH,NBR,WL_GRID,M,WL_MEAS,M,LVL_MEAS,DBM,DWLTOGRID,M,190,191,194,1
95,196,197,+1.53465060E-006,+1.53386540E-006,+1.53151460E-
006,+1.53073260E-006,+1.52995150E-006,+1.52917110E-
006,+1.53502880E-006,+1.53347690E-006,+1.53189100E-
006,+1.53111330E-006,+1.53033000E-006,+1.52950620E-006,-
1.00200000E+001,-9.77000000E+000,-1.16300000E+001,-
1.19200000E+001,-1.13900000E+001,-1.15200000E+001,+3.78200000E-
010,-3.88500000E-010,+3.76400000E-010,+3.80700000E-
010,+3.78500000E-010,+3.35100000E-010
```

4.2.3.18 :CALCulate:DATA:OFA[:ALL]:CHANnel?

Syntax `:CALCulate:DATA:OFA[:ALL]:CHANnel?`

Type Sequential, query only.

Applicability OFA mode, with parameter *:CALCulate:PARameters:GAINnf:ESETup/?, p. 127* set to `MULTi`.

Description Queries the channel detection results for all displayed channels.

Query Response
- If parameter *:CALCulate:PARameters:WDMChannel:MODe/?, p. 78* is set to `GRID`: CH,NBR,WL_MEAS,<Unit>,{<ChannelNumberValue>,<WLmeasValue>}
- If parameter *:CALCulate:PARameters:WDMChannel:MODe/?, p. 78* is set to `PCHannel`: CH,NBR,WL_CTR,<Unit>,{<ChannelNumberValue>,<WLctrValue>}

Example
```
:CALC:DATA:OFA:CHAN? →
CH,NBR,WL_MEAS,M,140,148,156,164,+1.53858630E-006,+1.53780020E-006,+1.53701460E-006,+1.53621530E-006
```

4.2.3.19 :CALCulate:DATA:OFA:CH:CHANnel?

Syntax `:CALCulate:DATA:OFA:CH:CHANnel? <channel>`

Type Sequential, query only.

Applicability OFA mode, with parameter *:CALCulate:PARameters:GAINnf:ESETup/?, p. 127* set to `MULTi`.

Description Queries the channel detection results for a specified channel.
`<channel>`: integer corresponding to the channel number.

Query Response
- If parameter *:CALCulate:PARameters:WDMChannel:MODe/?, p. 78* is set to `GRID`: CH,NBR,WL_MEAS,<unit>,<ChannelNumberValue>,<WLmeasValue>
- If parameter *:CALCulate:PARameters:WDMChannel:MODe/?, p. 78* is set to `PCHannel`: CH,NBR,WL_CTR,<unit>,<ChannelNumberValue>,<WLcenterValue>

Example
```
:CALC:DATA:OFA:CH:CHAN? 148 →
CH,NBR,WL_MEAS,M,148,+1.53780020E-006
```

4.2.3.20 :CALCulate:DATA:WDM:CH:CHANnel?

Syntax `:CALCulate:DATA:WDM:CH:CHANnel? <channel>`

Type Sequential, query only.

Description Queries the channel detection results for a specified channel.
`<channel>`: integer corresponding to the channel number.

Applicability WDM, RLT modes.

Query Response CH,NBR,WL_GRID,<unit>,WL_MEAS,<unit>,LVL_MEAS,<unit>,DWLTOGRID,<unit>, <Channel Number value>,<Grid Wavelength value>,<Measured Wavelength value>,<Distance to Grid value>

Example
```
:CALC:DATA:WDM:CH:CHAN? 194 →
CH,NBR,WL_GRID,M,WL_MEAS,M,LVL_MEAS,DBM,DWLTOGRID,M,194,+1.53151460E-006,+1.53189100E-006,-11.63,+3.76400000E-010
```

4.2.4 Spectral Width Tool

4.2.4.1 :CALCulate:PARameters:SWIDth[:ACTivate]/?

Syntax
- Command `:CALCulate:PARameters:SWIDth[:ACTivate] <wsp>OFF|ON|0|1`
- Query `:CALCulate:PARameters:SWIDth[:ACTivate]?`

Type Sequential.

Applicability OSA, SML, MML modes.

Description Sets/Queries the activation of the **Spectral Width** tool:
- `0`: `OFF`, the tool is not activated.
- `1`: `ON`, the tool is activated.

Query Response Integer corresponding to the activation state of the tool.

Example
- Command `:CALC:PAR:SWID ON`
- Query `:CALC:PAR:SWID? → 1`

4.2.4.2 :CALCulate:PARameters:SWIDth:DISPlay/?

Syntax
- Command `:CALCulate:PARameters:SWIDth:DISPlay<wsp> OFF|ON|0|1`
- Query `:CALCulate:PARameters:SWIDth:DISPlay?`

Type Sequential.

Applicability OSA, SML, MML modes.

Description Sets/Queries the **Display on Graph** setting:
- `0`: `OFF`, the tool results are not displayed on graph.
- `1`: `ON`, the tool results are displayed on graph.

Query Response Integer corresponding to the state of the setting.

Example
- Command `:CALC:PAR:SWID:DISP ON`
- Query `:CALC:PAR:SWID:DISP? → 1`

4.2.4.3 :CALCulate:PARameters:SWIDth:ALGorithm/?

Syntax
- Command `:CALCulate:PARameters:SWIDth:ALGorithm<wsp> THReshold|ENVelope|RMS|RMSPeak|GFIT|LFIT|0|1|2|3|4|5`
- Query `:CALCulate:PARameters:SWIDth:ALGorithm?`

Type Sequential.

Applicability OSA, SML, MML modes.

Description Sets/Queries the **Algorithm** used for the calculation:

- 0: THReshold, Threshold algorithm.
- 1: ENVelope, Envelope algorithm.
- 2: RMS, RMS algorithm.
- 3: RMSPeak, RMS Peak algorithm.
- 4: GFIT, Gaussian Fit algorithm.
- 5: LFIT, Lorentzian Fit algorithm.

Query Response Integer corresponding to the type of algorithm used.

Example
- Command `:CALC:PAR:SWID:ALG GFIT`
- Query `:CALC:PAR:SWID:ALG? → 4`

4.2.4.4 :CALCulate:PARameters:SWIDth:WTHReshold/?

Syntax
- Command `:CALCulate:PARameters:SWIDth:WTHReshold <wsp><value>|MIN|MAX`
- Query `:CALCulate:PARameters:SWIDth:WTHReshold? [MIN|MAX]`

Type Sequential.

Applicability OSA, SML, MML modes.

Description Sets/Queries the **Width Threshold** for measurement of width:
- <value>: threshold value in dB.
- MIN: minimum value is 0.01.
- MAX: maximum value is 50.

Query Response Threshold as float value in dB.

Example
- Command `:CALC:PAR:SWID:WTHR 10`
- Query `:CALC:PAR:SWID:WTHR? → +1.00000000E+001`

4.2.4.5 :CALCulate:PARameters:SWIDth:MTHReshold/?

Syntax
- Command `:CALCulate:PARameters:SWIDth:MTHReshold <wsp><value>|MIN|MAX`
- Query `:CALCulate:PARameters:SWIDth:MTHReshold? [MIN|MAX]`

Type Sequential.

Applicability OSA, SML, MML modes.

Description Sets/Queries the **Mode Threshold**:
- <value>: threshold value in dB.
- MIN: minimum value is 0.01.
- MAX: maximum value is 50.

Query Response Threshold as float value in dB.

Example
- Command `:CALC:PAR:SWID:MTHR 40`
- Query `:CALC:PAR:SWID:MTHR? → +4.00000000E+001`

4.2.4.6 :CALCulate:PARameters:SWIDth:MULTiplier/?

Syntax
- Command `:CALCulate:PARameters:SWIDth:MULTiplier <wsp><value>|MIN|MAX`
- Query `:CALCulate:PARameters:SWIDth:MULTiplier? [MIN|MAX]`

Type Sequential.

Applicability OSA, SML, MML modes.

Description Sets/Queries the **Multiplier** for the measured spectral width:
- `<value>`: multiplying factor as float value.
- `MIN`: minimum value is 1.
- `MAX`: maximum value is 10.

Query Response Multiplier as float value.

Example
- Command `:CALC:PAR:SWID:MULT 2.45`
- Query `:CALC:PAR:SWID:MULT? → +2.45000000E+000`

4.2.4.7 :CALCulate:PARameters:SWIDth:FMODe/?

Syntax
- Command `:CALCulate:PARameters:SWIDth:FMODe<wsp> OFF|ON|0|1`
- Query `:CALCulate:PARameters:SWIDth:FMODe?`

Type Sequential.

Applicability OSA, SML, MML modes.

Description Sets/Queries the **Fit to Mode** activation:
- `0`: `OFF`, the function is not activated.
- `1`: `ON`, the function is activated.

Query Response Integer corresponding to the activation state of the setting.

Example
- Command `:CALC:PAR:SWID:FMOD ON`
- Query `:CALC:PAR:SWID:FMOD? → 1`

4.2.4.8 :CALCulate:PARameters:SWIDth:MANalysis/?

Syntax
- Command `:CALCulate:PARameters:SWIDth:MANalysis<wsp> OFF|ON|0|1`
- Query `:CALCulate:PARameters:SWIDth:MANalysis?`

Type Sequential.

Applicability OSA, SML, MML modes.

Description Sets/Queries the **Modal Analysis** activation:
- `0`: `OFF`, the function is not activated.
- `1`: `ON`, the function is activated.

Query Response Integer corresponding to the activation state of the setting

Example
- Command `:CALC:PAR:SWID:MAN OFF`
- Query `:CALC:PAR:SWID:MAN? → 0`

4.2.4.9 :CALCulate:DATA:SWIDth?

Syntax `:CALCulate:DATA:SWIDth?`

Type Sequential, query only.

Applicability OSA, SML, MML modes.

Description Queries the results of the **Spectral Width** tool.

Query Response
- For Threshold, Envelope, Gaussian Fit and Lorentzian Fit Algorithm:
  SPECTRAL WIDTH RESULTS,WL_MEAN,<value>,<unit>,
  LEVEL_MEAN,<value>,<unit>,DWL,<value>,<unit>,
  NUMBEROFMODES,<value>
- For RMS and RMSPeak Algorithm:
  SPECTRAL WIDTH RESULTS,WL_MEAN,<value>,<unit>,
  LEVEL_mean,<value>,<unit>,SIGMA,<value>,<unit>,
  NUMBEROFMODES,<value>,<unit>

Example
```
:CALC:DATA:SWID? →
SPECTRAL WIDTH RESULTS,WL_MEAN,+1.54547100E-006,M,LEVEL_MEAN,-
9.10000000E-001,DBM,DWL@10.00DB,+1.02800000E-
010,M,NUMBEROFMODES,1,
```

4.2.5 Spectral Width 1, Spectral Width 2 and Spectral Width 3 Tools

In this section, the symbol ~ represents the tool number to which the command is applied:

- `SW1` for Spectral Width 1 tool
- `SW2` for Spectral Width 2 tool
- `SW3` for Spectral Width 3 tool

4.2.5.1 :CALCulate:PARameters:SW~:DISPlay/?

Syntax

- Command `:CALCulate:PARameters:SW~:DISPlay<wsp>OFF|ON|0|1`
- Query `:CALCulate:PARameters:SW~:DISPlay?`

Type Sequential.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `PASS`.

Description Sets/Queries the **Display on Graph** setting:

- `0`: `OFF`, the tool results are not displayed on graph.
- `1`: `ON`, the tool results are displayed on graph.

Query Response Integer corresponding to the state of the setting.

Example

- Command `:CALC:PAR:SW1:DISP ON`
- Query `:CALC:PAR:SW1:DISP? → 1`

4.2.5.2 :CALCulate:PARameters:SW~:ALGorithm/?

Syntax

- Command `:CALCulate:PARameters:SW~:ALGorithm<wsp>THReshold|ENVelope|RMS|RMSPeak|GFIT|LFIT|0|1|2|3|4|5`
- Query `:CALCulate:PARameters:SW~:ALGorithm?`

Type Sequential.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `PASS`.

Description Sets/Queries the **Algorithm** used for the calculation:

- `0`: `THReshold`, Threshold algorithm.
- `1`: `ENVelope`, Envelope algorithm.
- `2`: `RMS`, RMS algorithm.
- `3`: `RMSPeak`, RMS Peak algorithm.
- `4`: `GFIT`, Gaussian Fit algorithm.
- `5`: `LFIT`, Lorentzian Fit algorithm.

Query Response Integer representing the type of algorithm used.

Example

- Command `:CALC:PAR:SW1:ALG GFIT`
- Query `:CALC:PAR:SW1:ALG? → 4`

4.2.5.3 :CALCulate:PARameters:SW~:WTHReshold/?

Syntax
- Command `:CALCulate:PARameters:SW~:WTHReshold <wsp><value>|MIN|MAX`
- Query `:CALCulate:PARameters:SW~:WTHReshold? [MIN|MAX]`

Type Sequential.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `PASS`.

Description Sets/Queries the **Width Threshold** for measurement of width:
- `<value>`: threshold value in dB.
- `MIN`: minimum value is 0.01.
- `MAX`: maximum value is 50.

Query Response Threshold as float value in dB.

Example
- Command `:CALC:PAR:SW1:WTHR 10`
- Query `:CALC:PAR:SW1:WTHR? → +1.00000000E+001`

4.2.5.4 :CALCulate:PARameters:SW~:MTHReshold/?

Syntax
- Command `:CALCulate:PARameters:SW~:MTHReshold <wsp><value>|MIN|MAX`
- Query `:CALCulate:PARameters:SW~:MTHReshold? [MIN|MAX]`

Type Sequential.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `PASS`.

Description Sets/Queries the **Mode Threshold**:
- `<value>`: threshold value in dB.
- `MIN`: minimum value is 0.01.
- `MAX`: maximum value is 50.

Query Response Threshold as float value in dB.

Example
- Command `:CALC:PAR:SW1:MTHR 40`
- Query `:CALC:PAR:SW1:MTHR? → +4.00000000E+001`

4.2.5.5 :CALCulate:PARameters:SW~:MULTiplier/?

Syntax
- Command `:CALCulate:PARameters:SW~:MULTiplier <wsp><value>|MIN|MAX`
- Query `:CALCulate:PARameters:SW~:MULTiplier? [MIN|MAX]`

Type Sequential.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `PASS`.

Description Sets/Queries the **Multiplier** for the measured spectral width:
- `<value>`: multiplying factor as float value.
- `MIN`: minimum value is 1.
- `MAX`: maximum value is 10.

Query Response Multiplier as float value.

Example
- Command `:CALC:PAR:SW1:MULT 2.45`
- Query `:CALC:PAR:SW1:MULT? → +2.45000000E+000`

4.2.5.6 :CALCulate:PARameters:SW~:FMODe/?

Syntax
- Command `:CALCulate:PARameters:SW~:FMODe<wsp> OFF|ON|0|1`
- Query `:CALCulate:PARameters:SW~:FMODe?`

Type Sequential.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `PASS`.

Description Sets/Queries the **Fit to Mode** activation:
- `0`: `OFF`, the function is not activated.
- `1`: `ON`, the function is activated.

Query Response Integer corresponding to the activation state of the setting.

Example
- Command `:CALC:PAR:SW1:FMOD ON`
- Query `:CALC:PAR:SW1:FMOD? → 1`

4.2.5.7 :CALCulate:PARameters:SW~:MANalysis/?

Syntax
- Command `:CALCulate:PARameters:SW~:MANalysis<wsp>OFF|ON|0|1`
- Query `:CALCulate:PARameters:SW~:MANalysis?`

Type Sequential.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `PASS`.

Description Sets/Queries the **Modal Analysis** activation:
- `0`: `OFF`, the function is not activated.
- `1`: `ON`, the function is activated.

Query Response Integer corresponding to the activation state of the setting

Example
- Command `:CALC:PAR:SW1:MAN OFF`
- Query `:CALC:PAR:SW1:MAN? → 0`

4.2.5.8 :CALCulate:DATA:SW~?

Syntax `:CALCulate:DATA:SW~?`

Type Sequential, query only.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `PASS`.

Description Queries the results of the **Spectral Width 1** (`SW1`) or **Spectral Width 2** (`SW2`) or **Spectral Width 3** (`SW3`) tool.

Query Response
- For Threshold, Envelope, Gaussian Fit and Lorentzian Fit Algorithm:
  SPECTRAL WIDTH ~ RESULTS,WL_PEAK,<value>,<unit>,
  LEVEL_PEAK,<value>,<unit>,WL_MEAN,<value>,<unit>,LEVEL_MEAN,<value>,
  <unit>,DWL,<value>,<unit>
- For RMS and RMSPeak Algorithm:
  SPECTRAL WIDTH ~ RESULTS,WL_PEAK,<value>,<unit>,
  LEVEL_PEAK,<value>,<unit>,WL_MEAN,<value>,<unit>,
  LEVEL_MEAN,<value>,<unit>SIGMA,<value>,<unit>

Example
```
:CALC:DATA:SW1? →
SPECTRAL WIDTH 1 RESULTS, WL_PEAK,+1.54547800E-006,M,LEVEL_PEAK,-
9.12000000E-001,DBM ,WL_MEAN,+1.54547100E-006,M,LEVEL_MEAN,-
9.10000000E-001,DBM,DWL@3.00DB,+1.02800000E-010,M
```

4.2.6 XXdB Width Tool

4.2.6.1 :CALCulate:PARameters:XXDB[:ACTivate]/?

Syntax
- Command `:CALCulate:PARameters:XXDB[:ACTivate]<wsp>OFF|ON|0|1`
- Query `:CALCulate:PARameters:XXDB[:ACTivate]?`

Type Sequential.

Applicability BBS mode.

Description Sets/Queries the activation of the **XXdB Width** tool:
- `0`: `OFF`, the tool is not activated.
- `1`: `ON`, the tool is activated.

Query Response Integer corresponding to the activation state of the tool.

Example
- Command `:CALC:PAR:XXDB ON`
- Query `:CALC:PAR:XXDB? → 1`

4.2.6.2 :CALCulate:PARameters:XXDB:DISPlay/?

Syntax
- Command `:CALCulate:PARameters:XXDB:DISPlay<wsp>OFF|ON|0|1`
- Query `:CALCulate:PARameters:XXDB:DISPlay?`

Type Sequential.

Applicability BBS mode.

Description Sets/Queries the **Display on Graph** setting:
- `0`: `OFF`, the tool results are not displayed on graph.
- `1`: `ON`, the tool results are displayed on graph.

Query Response Integer corresponding to the state of the setting.

Example
- Command `:CALC:PAR:XXDB:DISP ON`
- Query `:CALC:PAR:XXDB:DISP? → 1`

4.2.6.3 :CALCulate:PARameters:XXDB:ALGorithm/?

Syntax
- Command `:CALCulate:PARameters:XXDB:ALGorithm<wsp>THReshold|RMS|GFIT|LFIT|0|1|2|3`
- Query `:CALCulate:PARameters:XXDB:ALGorithm?`

Type Sequential.

Applicability BBS mode.

Description Sets/Queries the **Algorithm** used for the calculation.
- `0`: `THReshold`, Threshold algorithm.
- `1`: `RMS`, RMS algorithm.
- `2`: `GFIT`, Gaussian Fit algorithm.
- `3`: `LFIT`, Lorentzian Fit algorithm.

Query Response Integer corresponding to the type of algorithm used.

Example
- Command `:CALC:PAR:XXDB:ALG GFIT`
- Query `:CALC:PAR:XXDB:ALG? → 4`

4.2.6.4 :CALCulate:PARameters:XXDB:WTHReshold/?

Syntax
- Command `:CALCulate:PARameters:XXDB:WTHReshold<wsp><value>|MIN|MAX`
- Query `:CALCulate:PARameters:XXDB:WTHReshold? [MIN|MAX]`

Type Sequential.

Applicability BBS mode.

Description Sets/Queries the **Width Threshold** for measurement of width:
- `<value>`: threshold value in dB.
- `MIN`: minimum value is 0.01.
- `MAX`: maximum value is 50.

Query Response Threshold as float value in dB.

Example
- Command `:CALC:PAR:XXDB:WTHR 10`
- Query `:CALC:PAR:XXDB:WTHR? → +1.00000000E+001`

4.2.6.5 :CALCulate:PARameters:XXDB:MTHReshold/?

Syntax
- Command `:CALCulate:PARameters:XXDB:MTHReshold<wsp><value>|MIN|MAX`
- Query `:CALCulate:PARameters:XXDB:MTHReshold? [MIN|MAX]`

Type Sequential.

Applicability BBS mode.

Description Sets/Queries the **Mode Threshold**:
- `<value>`: threshold value in dB.
- `MIN`: minimum value is 0.01.
- `MAX`: maximum value is 50.

Query Response Threshold as float value in dB.

Example
- Command `:CALC:PAR:XXDB:MTHR 40`
- Query `:CALC:PAR:XXDB:MTHR? → +4.00000000E+001`

4.2.6.6 :CALCulate:PARameters:XXDB:MULTiplier/?

Syntax
- Command `:CALCulate:PARameters:XXDB:MULTiplier<wsp><value>|MIN|MAX`
- Query `:CALCulate:PARameters:XXDB:MULTiplier? [MIN|MAX]`

Type Sequential.

Applicability BBS mode.

Description Sets/Queries the **Multiplier** for the measured spectral width:
- `<value>`: multiplying factor as float value.
- `MIN`: minimum value is 1.
- `MAX`: maximum value is 10.

Query Response Multiplier as float value.

Example
- Command `:CALC:PAR:XXDB:MULT 2.45`
- Query `:CALC:PAR:XXDB:MULT? → +2.45000000E+000`

4.2.6.7 :CALCulate:DATA:XXDB?

Syntax `:CALCulate:DATA:XXDB?`

Type Sequential, query only.

Applicability BBS mode.

Description Queries the results of the **XXDB Width** tool.

Query Response
- In MML mode:
  XXDB WIDTH RESULTS,DWL,<value>,<unit>
- In BBS and SML modes:
  XXDB WIDTH RESULTS,DWL,<value>,<unit>

Example
```
:CALC:DATA:XXDB? →
XXDB WIDTH RESULTS,DWL@10.00DB,+9.80000000E-011,M
```

4.2.7 Mean Wavelength/Frequency Tool

4.2.7.1 :CALCulate:PARameters:MWAVelength[:ACTivate]/?

Syntax

- Command `:CALCulate:PARameters:MWAVelength [:ACTivate]<wsp>OFF|ON|0|1`
- Query `:CALCulate:PARameters:MWAVelength [:ACTivate]?`

Type Sequential.

Applicability BBS mode.

Description Sets/Queries the activation of the **λmean** tool:

- `0`: `OFF`, the tool is not activated.
- `1`: `ON`, the tool is activated.

Query Response Integer corresponding to the activation state of the tool.

Example

- Command `:CALC:PAR:MWAV ON`
- Query `:CALC:PAR:MWAV? → 1`

4.2.7.2 :CALCulate:PARameters:MWAVelength:DISPlay/?

Syntax

- Command `:CALCulate:PARameters:MWAVelength:DISPlay <wsp>OFF|ON|0|1`
- Query `:CALCulate:PARameters:MWAVelength:DISPlay?`

Type Sequential.

Applicability BBS mode.

Description Sets/Queries the **Display on Graph** setting:

- `0`: `OFF`, the tool results are not displayed on graph.
- `1`: `ON`, the tool results are displayed on graph.

Query Response Integer corresponding to the state of the setting.

Example

- Command `:CALC:PAR:MWAV:DISP ON`
- Query `:CALC:PAR:MWAV:DISP? → 1`

4.2.7.3 :CALCulate:PARameters:MWAVelength:WTHReshold/?

Syntax

- Command `:CALCulate:PARameters:MWAVelength:WTHReshold<wsp><value>|MIN|MAX`
- Query `:CALCulate:PARameters:MWAVelength:WTHReshold? [MIN|MAX]`

Type Sequential.

Applicability BBS mode.

Description Sets/Queries the **Width Threshold** for measurement of width:

- `<value>`: threshold value in dB.
- `MIN`: minimum value is 0.01.
- `MAX`: maximum value is 50.

Query Response Threshold as float value in dB.

Example

- Command `:CALC:PAR:MWAV:WTHR 3`
- Query `:CALC:PAR:MWAV:WTHR? → +3.00000000E+000`

4.2.7.4 :CALCulate:DATA:MWAVelength?

Syntax `:CALCulate:DATA:MWAVelength?`

Type Sequential, query only.

Applicability BBS, MML modes.

Description Queries the results of the **Mean Wavelength/Frequency** tool.

Query Response WL/FREQ_MEAN_ RESULTS,WL/FREQ_MEAN,<value>,<unit>, LEVEL_MEAN,<value>,<unit>,SIGMA,<value>,<unit>

Example

```
:CALC:DATA:MWAV? →
WL_MEAN_RESULTS,WL_MEAN,+1.54548600E-006,M,LEVEL_MEAN,
-8.70000000E-001,DBM,SIGMA,+4.00000000E-012,M
```

4.2.8 Peak Wavelength Tool (:CALCulate:DATA:PWAVelength?)

Syntax `:CALCulate:DATA:PWAVelength?`

Type Sequential, query only.

Applicability MML mode.

Description Queries the results of the **Peak Wavelength/Frequency** tool.

Query Response WL/FREQ_PEAK_ RESULTS,WL/FREQ_PEAK,<value>,<unit>, LEVEL_PEAK,<value>,<unit>

Example
```
:CALC:DATA:PWAV? →
WL_PEAK_ RESULTS,WL_PEAK,+1.54547620E-006,M,LEVEL_PEAK,-
7.90000000E-001,DBM
```

4.2.9 Central Wavelength Tool (:CALCulate:DATA:CWAVelength?)

Syntax `:CALCulate:DATA:CWAVelength?`

Type Sequential, query only.

Applicability SML mode.

Description Queries the results of the **Central Wavelength/Frequency and sigma** tool.

Query Response WL/FREQ_CENTER_ AND SIGMA RESULTS, WL/FREQ_CENTER,<value>,<unit>, SIGMA,<value>,<unit>

Example
```
:CALC:DATA:CWAV? →
WL_CENTER_ AND SIGMA RESULTS,WL_CENTER,+1.54546590E-
006,M,SIGMA,+4.00000000E-012,M
```

4.2.10 FWHM Tool (:CALCulate:DATA:FWHM?)

Syntax `:CALCulate:DATA:FWHM?`

Type Sequential, query only.

Applicability BBS, MML modes.

Description Queries the results of the **FWHM** tool.

Query Response FWHM RESULTS,FWHM, <value>, <unit>

Example
```
:CALC:DATA:FWHM? →
FWHM RESULTS,FWHM,+1.80000000E-011,M
```

4.2.11 Side Mode Spacing Tool (:CALCulate:DATA:SMSPacing?)

Syntax `:CALCulate:DATA:SMSPacing?`

Type Sequential, query only.

Applicability SML mode.

Description Queries the results of the **Side Mode Spacing** tool.

Query Response SIDE MODES SPACING RESULTS,SIDEMODESPACING,<value>,<unit>

Example
```
:CALC:DATA:SMSP? →
SIDE MODES SPACING RESULTS,SIDEMODESSPACING,+1.4804000E-009,M
```

4.2.12 Notch Width Tool

4.2.12.1 :CALCulate:PARameters:NWIDth[:ACTivate]/?

Syntax
- Command `:CALCulate:PARameters:NWIDth[:ACTivate] <wsp>OFF|ON|0|1`
- Query `:CALCulate:PARameters:NWIDth[:ACTivate]?`

Type Sequential.

Applicability OSA mode.

Description Sets/Queries the activation of the **Notch Width** tool:
- `0`: `OFF`, the tool is not activated.
- `1`: `ON`, the tool is activated.

Query Response Integer corresponding to the activation state of the tool.

Example
- Command :CALC:PAR:NWID ON
- Query :CALC:PAR:NWID? → 1

4.2.12.2 :CALCulate:PARameters:NWIDth:DISPlay/?

Syntax
- Command `:CALCulate:PARameters:NWIDth:DISPlay<wsp> OFF|ON|0|1`
- Query `:CALCulate:PARameters:NWIDth:DISPlay?`

Type Sequential.

Applicability OSA mode.

Description Sets/Queries the **Display on Graph** setting:
- `0`: `OFF`, the tool results are not displayed on graph.
- `1`: `ON`, the tool results are displayed on graph.

Query Response Integer corresponding to the state of the setting.

Example
- Command `:CALC:PAR:NWID:DISP ON`
- Query `:CALC:PAR:NWID:DISP? → 1`

4.2.12.3 :CALCulate:PARameters:NWIDth:NSELection/?

Syntax
- Command `:CALCulate:PARameters:NWIDth:NSELection <wsp>MTRough|DNOTch|0|1`
- Query `:CALCulate:PARameters:NWIDth:NSELection?`

Type Sequential.

Applicability OSA mode.

Description Sets/Queries the **Notch Selection** type.
- `0`: `MTRough`, the notch is defined as the **Minimum Trough**.
- `1`: `DNOTch`, the notch is defined as the **Deepest Notch**.

Query Response Integer corresponding to the type detection to perform.

Example
- Command `:CALC:PAR:NWID:NSEL DNOT`
- Query `:CALC:PAR:NWID:NSEL? → 1`

4.2.12.4 :CALCulate:PARameters:NWIDth:WREFerence/?

Syntax
- Command `:CALCulate:PARameters:NWIDth:WREFerence <wsp>BOTTom|TOP|0|1`
- Query `:CALCulate:PARameters:NWIDth:WREFerence?`

Type Sequential.

Applicability OSA mode.

Description Sets/Queries the **Width Reference** to which the notch is measured.
- `0`: `BOTTom`, the notch is measured from the **Bottom**.
- `1`: `TOP`, the notch is measured from the **Top**.

Query Response Integer corresponding to the width reference.

Example
- Command `:CALC:PAR:NWID:WREF TOP`
- Query `:CALC:PAR:NWID:WREF? → 1`

4.2.12.5 :CALCulate:PARameters:NWIDth:ALGorithm/?

Syntax
- Command `:CALCulate:PARameters:NWIDth:ALGorithm<wsp> THReshold|GFIT|LFIT|0|1|2`
- Query `:CALCulate:PARameters:NWIDth:ALGorithm?`

Type Sequential.

Applicability OSA mode.

Description Sets/Queries the **Algorithm** used in the calculation.
- `0`: `THReshold`, Threshold algorithm.
- `1`: `GFIT`, Gaussian fit algorithm.
- `2`: `LFIT`, Lorentzian fit algorithm.

Query Response Integer corresponding to the fitting algorithm selected.

Example
- Command `:CALC:PAR:NWID:ALG LFIT`
- Query `:CALC:PAR:NWID:ALG? → 2`

4.2.12.6 :CALCulate:PARameters:NWIDth:WTHReshold/?

Syntax
- Command `:CALCulate:PARameters:NWIDth:WTHReshold <wsp><value>|MIN|MAX`
- Query `:CALCulate:PARameters:NWIDth:WTHReshold? [MIN|MAX]`

Type Sequential.

Applicability OSA mode.

Description Sets/Queries the **Width Threshold** for measurement of width:
- `<value>`: threshold value in dB.
- `MIN`: minimum value is 0.01.
- `MAX`: maximum value is 50.

Query Response Threshold as float value in dB.

Example
- Command `:CALC:PAR:NWID:WTHR 3`
- Query `:CALC:PAR:NWID:WTHR? → +3.00000000E+000`

4.2.12.7 :CALCulate:PARameters:NWIDth:MULTiplier/?

Syntax
- Command `:CALCulate:PARameters:NWIDth:MULTiplier <wsp><value>|MIN|MAX`
- Query `:CALCulate:PARameters:NWIDth:MULTiplier? [MIN|MAX]`

Type Sequential.

Applicability OSA mode.

Description Sets/Queries the **Multiplier** for the measured spectral width:
- `<value>`: multiplying factor as float value.
- `MIN`: minimum value is 1.
- `MAX`: maximum value is 10.

Query Response Multiplier as float value.

Example
- Command `:CALC:PAR:NWID:MULT 3`
- Query `:CALC:PAR:NWID:MULT? → +3.00000000E+000`

4.2.12.8 :CALCulate:DATA:NWIDth?

Syntax `:CALCulate:DATA:NWIDth?`

Type Sequential, query only.

Applicability OSA mode.

Description Queries the results of the **Notch Width** tool.

Query Response NOTCH WIDTH RESULTS, WL_NOTCH,<value>,<unit>, LEVEL_NOTCH,<value>,<unit>,DWL_NOTCH,<value>,<unit>

Example
```
:CALC:DATA:NWID? →
NOTCH WIDTH RESULTS,WL_NOTCH,+1.54669440E-006,M,LEVEL_NOTCH,-
3.65600000E+001,DBM,DWL_NOTCH_3dB,+5.93161000E-008,M
```

4.2.13 Notch Width 1, Notch Width 2 and Notch Width 3 Tools

In this section, the symbol ~ represents the tool number to which the command is applied:

- `NW1` for Notch Width 1 tool
- `NW2` for Notch Width 2 tool
- `NW3` for Notch Width 3 tool

4.2.13.1 :CALCulate:PARameters:NW~:DISPlay/?

Syntax

- Command `:CALCulate:PARameters:NW~:DISPlay<wsp> OFF|ON|0|1`
- Query `:CALCulate:PARameters:NW~:DISPlay?`

Type Sequential.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `STOP` or `ISOLator`.

Description Sets/Queries the **Display on Graph** setting:

- `0`: `OFF`, the tool results are not displayed on graph.
- `1`: `ON`, the tool results are displayed on graph.

Query Response Integer corresponding to the state of the setting.

Example

- Command `:CALC:PAR:NW1:DISP ON`
- Query `:CALC:PAR:NW1:DISP? → 1`

4.2.13.2 :CALCulate:PARameters:NW~:NSELection/?

Syntax

- Command `:CALCulate:PARameters:NW~:NSELection <wsp>MTRough|DNOTch|0|1`
- Query `:CALCulate:PARameters:NW~:NSELection?`

Type Sequential.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `STOP` or `ISOLator`.

Description Sets/Queries the **Notch Selection** type.

- `0`: `MTRough`, the notch is defined as the **Minimum Trough**.
- `1`: `DNOTch`, the notch is defined as the **Deepest Notch**.

Query Response Integer corresponding to the type detection to perform.

Example

- Command `:CALC:PAR:NW1:NSEL DNOT`
- Query `:CALC:PAR:NW1:NSEL? → 1`

4.2.13.3 :CALCulate:PARameters:NW~:WREFerence/?

Syntax
- Command `:CALCulate:PARameters:NW~:WREFerence <wsp>BOTTom|TOP|0|1`
- Query `:CALCulate:PARameters:NW~:WREFerence?`

Type Sequential.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `STOP` or `ISOLator`.

Description Sets/Queries the **Width Reference** to which the notch is measured.
- `0`: `BOTTom`, the notch is measured from the **Bottom**.
- `1`: `TOP`, the notch is measured from the **Top**.

Query Response Integer corresponding to the width reference.

Example
- Command `:CALC:PAR:NW1:WREF TOP`
- Query `:CALC:PAR:NW1:WREF? → 1`

4.2.13.4 :CALCulate:PARameters:NW~:ALGorithm/?

Syntax
- Command `:CALCulate:PARameters:NW~:ALGorithm<wsp>THReshold|GFIT|LFIT|0|1|2`
- Query `:CALCulate:PARameters:NW~:ALGorithm?`

Type Sequential.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `STOP` or `ISOLator`.

Description Sets/Queries the **Algorithm** used in the calculation.
- `0`: `THReshold`, Threshold algorithm.
- `1`: `GFIT`, Gaussian fit algorithm.
- `2`: `LFIT`, Lorentzian fit algorithm.

Query Response Integer corresponding to the selected algorithm.

Example
- Command `:CALC:PAR:NW1:ALG LFIT`
- Query `:CALC:PAR:NW1:ALG? → 2`

4.2.13.5 :CALCulate:PARameters:NW~:WTHReshold/?

Syntax
- Command `:CALCulate:PARameters:NW~:WTHReshold <wsp><value>|MIN|MAX`
- Query `:CALCulate:PARameters:NW~:WTHReshold? [MIN|MAX]`

Type Sequential.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `STOP` or `ISOLator`.

Description Sets/Queries the **Width Threshold** for measurement of width:
- `<value>`: threshold value in dB.
- `MIN`: minimum value is 0.01.
- `MAX`: maximum value is 50.

Query Response Threshold as float value in dB.

Example
- Command `:CALC:PAR:NW1:WTHR 3`
- Query `:CALC:PAR:NW1:WTHR? → +3.00000000E+000`

4.2.13.6 :CALCulate:PARameters:NW~:MULTiplier/?

Syntax
- Command `:CALCulate:PARameters:NW~:MULTiplier <wsp><value>|MIN|MAX`
- Query `:CALCulate:PARameters:NW~:MULTiplier? [MIN|MAX]`

Type Sequential.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `STOP` or `ISOLator`.

Description Sets/Queries the **Multiplier** for the measured spectral width:
- `<value>`: multiplying factor as float value.
- `MIN`: minimum value is 1.
- `MAX`: maximum value is 10.

Query Response Multiplier as float value.

Example
- Command `:CALC:PAR:NW1:MULT 3`
- Query `:CALC:PAR:NW1:MULT? → +3.00000000E+000`

4.2.13.7 :CALCulate:DATA:NW~?

Syntax `:CALCulate:DATA:NW~?`

Type Sequential, query only.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `STOP` or `ISOLator`.

Description Queries the results of the **Notch Width 1** (`NW1`) or **Notch Width 2** (`NW2`) or **Notch Width 3** (`NW3`) tool.

Query Response NOTCH WIDTH ~ RESULTS, WL_TROUGH,<value>,<unit>,LEVEL_THOUGH,<value>,<unit>,WL_NOTCH,<value>,<unit>,LEVEL_NOTCH,<value>,<unit>DWL_NOTCH,<value>,<unit>

Example
```
:CALC:DATA:NW1? →
NOTCH WIDTH 1 RESULTS, WL_TROUGH,+1.54667800E-
006,M,LEVEL_TROUGH,-3.65700000E+001,DBM,WL_NOTCH,+1.54669440E-
006,M,LEVEL_NOTCH,-
3.65600000E+001,DBM,DWL_NOTCH_3dB,+5.93161000E-008,M
```

4.2.14 Level Check Tool

4.2.14.1 :CALCulate:PARameters:LVLCheck[:ACTivate]/?

Syntax
- Command `:CALCulate:PARameters:LVLCheck[:ACTivate]<wsp>OFF|ON|0|1`
- Query `:CALCulate:PARameters:LVLCheck[:ACTivate]?`

Type Sequential.

Applicability OSA mode.

Description Sets/Queries the activation of the **Level Check** tool:
- `0`: `OFF`, the tool is not activated.
- `1`: `ON`, the tool is activated.

Query Response Integer corresponding to the activation state of the tool.

Example
- Command `:CALC:PAR:LVLC ON`
- Query `:CALC:PAR:LVLC? → 1`

4.2.14.2 :CALCulate:PARameters:LVLCheck:DISPlay/?

Syntax
- Command `:CALCulate:PARameters:LVLCheck:DISPlay<wsp>OFF|ON|0|1`
- Query `:CALCulate:PARameters:LVLCheck:DISPlay?`

Type Sequential.

Applicability OSA mode.

Description Sets/Queries the **Display on Graph** setting:
- `0`: `OFF`, the tool results are not displayed on graph.
- `1`: `ON`, the tool results are displayed on graph.

Query Response Integer corresponding to the state of the setting.

Example
- Command `:CALC:PAR:LVLC:DISP ON`
- Query `:CALC:PAR:LVLC:DISP? -> 1`

4.2.14.3 :CALCulate:PARameters:LVLCheck:REFPoint~/?

Syntax

- Command `:CALCulate:PARameters:LVLCheck:REFPoint~<wsp> <value> [PM|NM|M|HZ|GHZ|THZ]|MIN|MAX`
- Query `:CALCulate:PARameters:LVLCheck:REFPoint~? [MIN|MAX]`

Type Sequential.

Applicability OSA mode.

Description Sets/Queries the **Reference Point** position used for the calculation of the power level:

- `~`: the reference point number to which the command applies.
  Valid reference point number values: 1, 2 or 3
- `<value>`: wavelength or frequency as float value.
- `MIN`: minimum value is 1250 nm or 176.349 THz
- `MAX`: maximum value is 1700 nm or 239.834 THz

Query response Wavelength or frequency as float value in meters or Hertz depending on the unit settings.

Example

- Command `:CALC:PAR:LVLC:REFP2 1530NM`
- Query `:CALC:PAR:LVLC:REFP2? -> +1.53000000E-006`

4.2.14.4 :CALCulate:DATA:LVLCheck?

Syntax `:CALCulate:DATA:LVLCheck?`

Type Sequential.

Applicability OSA mode.

Description Queries the results of the Level Check tool.

Query response LEVEL CHECK RESULTS,
LEVEL@WL1,<value>,<unit>,LEVEL@WL2,<value>,<unit>,LEVEL@WL3,-<value>,<unit>,DLVL2-1,<value>,<unit>,DLVL3-1,<value>,<unit>

Example

```
:CALC:DATA:LVLC? →
LEVELCHECKRESULTS,LEVEL@WL1,-5.52500000E+001,DBM,LEVEL@WL2,-2.47800000E+001,DBM,LEVEL@WL3,-3.51900000E+001,DBM,DLVL2-1,+3.04700000E+001,DB,DLVL3-1,+2.00600000E+001,DB
```

4.2.15 SMSR Tool

4.2.15.1 :CALCulate:PARameters:SMSR[:ACTivate]/?

Syntax
- Command `:CALCulate:PARameters:SMSR[:ACTivate]<wsp>OFF|ON|0|1`
- Query `:CALCulate:PARameters:SMSR[:ACTivate]?`

Type Sequential.

Applicability OSA, SML modes.

Description Sets/Queries the activation of the **SMSR** tool:
- `0`: `OFF`, the tool is not activated.
- `1`: `ON`, the tool is activated.

Query Response Integer corresponding to the activation state of the tool.

Example
- Command `:CALC:PAR:SMSR ON`
- Query `:CALC:PAR:SMSR? → 1`

4.2.15.2 :CALCulate:PARameters:SMSR:DISPlay/?

Syntax
- Command `:CALCulate:PARameters:SMSR:DISPlay<wsp>OFF|ON|0|1`
- Query `:CALCulate:PARameters:SMSR:DISPlay?`

Type Sequential.

Applicability OSA, SML modes.

Description Sets/Queries the **Display on Graph** setting:
- `0`: `OFF`, the tool results are not displayed on graph.
- `1`: `ON`, the tool results are displayed on graph.

Query Response Integer corresponding to the state of the setting.

Example
- Command `:CALC:PAR:SMSR:DISP ON`
- Query `:CALC:PAR:SMSR:DISP? -> 1`

4.2.15.3 :CALCulate:PARameters:SMSR:ALGorithm/?

Syntax
- Command `:CALCulate:PARameters:SMSR:ALGorithm<wsp>NEXT|LR|0|1`
- Query `:CALCulate:PARameters:SMSR:ALGorithm?`

Type Sequential.

Applicability OSA, SML modes.

Description Sets/Queries the **Algorithm** used for the calculation of SMSR.

- 0: NEXT, next side mode (nearest) is used for the calculation.
- 1: LR, left-hand side (short wavelength) and right-hand side (long wavelength) side modes are used for the calculation.

Query Response Integer corresponding to the type of algorithm used.

Example
- Command :CALC:PAR:SMSR:ALG LR
- Query :CALC:PAR:SMSR:ALG? -> 1

4.2.15.4 :CALCulate:PARameters:SMSR:SMCalc/?

Syntax
- Command :CALCulate:PARameters:SMSR:SMCalc<wsp> HIGHest|NEARest|0|1
- Query :CALCulate:PARameters:SMSR:SMCalc?

Type Sequential.

Applicability OSA, SML modes.

Description Sets/Queries the **Side Mode Calculation** setting.
- 0: HIGHest, side mode(s) with highest power.
- 1: NEARest, side mode(s) nearest to the main peak (outside the masked spectral range).

Query Response Integer representing the side mode to select for the calculation.

Example
- Command :CALC:PAR:SMSR:SMC HIGH
- Query :CALC:PAR:SMSR:SMC? → 0

4.2.15.5 :CALCulate:PARameters:SMSR:MASK/?

Syntax
- Command :CALCulate:PARameters:SMSR:MASK<wsp><value> [PM|NM|M|HZ|GHZ|THZ]|MIN|MAX
- Query :CALCulate:PARameters:SMSR:MASK? [MIN|MAX]

Type Sequential.

Applicability OSA, SML modes.

Description Sets/Queries the signal **Mask** value.
- <value>: wavelength or frequency as float value.
- MIN: minimum value is 0 (nm or THz).
- MAX: maximum value is:
  - OSA mode: 50 nm or 6.043 THz.
  - SML mode: 450 nm or 54.384 THz.

Query Response Wavelength or frequency as float value in meters or Hertz depending on the unit settings.

Example
- Command :CALC:PAR:SMSR:MASK 10NM
- Query :CALC:PAR:SMSR:MASK? → +1.00000000E-008

4.2.15.6 :CALCulate:DATA:SMSR?

Syntax `:CALCulate:DATA:SMSR?`

Type Sequential, query only.

Applicability OSA, SML modes.

Description Queries the results of the **SMSR Width** tool.

Query Response

- If *:CALCulate:PARameters:SMSR:ALGorithm/?, p. 109* is set to `NEXT`:
  SMSRRESULTS,MAINMODERESULTS,,,WL_PEAK,<value>,<unit>,LEVEL_PEAK,<value>,<unit>,SIDEBANDRESULTS,,,WL_SIDEMODE,<value>,<unit>,LEVEL_SIDEMODE,<value>,<unit>,DWL_SMSR,<value>,<unit>,SMSR, <value>,<unit>
- If *:CALCulate:PARameters:SMSR:ALGorithm/?, p. 109* is set to `LR`:
  SMSRRESULTS,MAINMODERESULTS,,,WL_PEAK,<value>,<unit>,LEVEL_PEAK,<value>,<unit>,SIDEBAND1RESULTS,,,WL_SIDEMODE_1,<value>,<unit>,LEVEL_SIDEMODE_1,<value>,<unit>,DWL_SMSR_1,<value>,SMSR1,<value>,<unit>,SIDEBAND2RESULTS,,,WL_SIDEMODE_2,<value>,<unit>,LEVEL_SIDEMODE_2,<value>,<unit>,<unit>,DWL_SMSR_2,<value>,<unit>,SMSR2,<value>,<unit>,STOPBAND,<value>,<unit>,CENTEROFFSET,<value>,<unit>

Example

```
:CALC:DATA:SMSR? →
SMSR RESULTS,MAINMODERESULTS,,,WL_PEAK,+1.54669440E-
006,M,LEVEL_PEAK,-3.65600000E+001,DBM,SIDEBAND1RESULTS,,,
WL_SIDEMODE_1,+1.54560000E-006,M,LEVEL_SIDEMODE_1,
-4.67600000E+001,DBM,DWL_SMSR_1,-1.09440000E-009,
M,SMSR1,+1.02000000E+001,DB,SIDEBAND2RESULTS,,,
WL_SIDEMODE_2,+1.55769440E-006,M,LEVEL_SIDEMODE_2,
-5.68000000E+001,DBM,DWL_SMSR_2,+1.10000000E-008
,M,SMSR2,+2.02400000E+001,DB,STOPBAND,
+1.20944000E-008,M,CENTEROFFSET,-4.95280000E-009,M
```

4.2.16 OSNR Tool

4.2.16.1 :CALCulate:PARameters:OSNR[:ACTivate]/?

Syntax
- Command `:CALCulate:PARameters:OSNR[:ACTivate]<wsp>OFF|ON|0|1`
- Query `:CALCulate:PARameters:OSNR[:ACTivate]?`

Type Sequential.

Applicability OSA, SML, WDM, RLT modes.

Description Sets/Queries the activation of the **OSNR** tool:
- `0`: `OFF`, the tool is not activated.
- `1`: `ON`, the tool is activated.

Query Response Integer corresponding to the activation state of the tool.

Example
- Command `:CALC:PAR:OSNR ON`
- Query `:CALC:PAR:OSNR? → 1`

4.2.16.2 :CALCulate:PARameters:OSNR:DISPlay/?

Syntax
- Command `:CALCulate:PARameters:OSNR:DISPlay<wsp>OFF|ON|0|1`
- Query `:CALCulate:PARameters:OSNR:DISPlay?`

Type Sequential.

Applicability OSA, SML, WDM, OFA, RLT modes.

Description Sets/Queries the **Display on Graph** setting:
- `0`: `OFF`, the tool results are not displayed on graph.
- `1`: `ON`, the tool results are displayed on graph.

Query Response Integer corresponding to the state of the setting.

Example
- Command `:CALC:PAR:OSNR:DISP ON`
- Query `:CALC:PAR:OSNR:DISP? → 1`

4.2.16.3 :CALCulate:PARameters:OSNR:NSELection/?

Syntax
- Command `:CALCulate:PARameters:OSNR:NSELection<wsp>FIXed|NPEaks|NTRoughs|ONOFf|0|1|2|3`
- Query `:CALCulate:PARameters:OSNR:NSELection?`

Type Sequential.

Applicability OSA, SML, WDM, OFA, RLT modes.

Description Sets/Queries the **Noise Point Selection** setting:

- 0: FIXed, **Fixed** method.
- 1: NPEaks, **Nearest Peaks** method.
- 2: NTRoughs, **Nearest Troughs** method.
- 3: ONOFf, **On-Off Method** (WDM and RLT modes only).

Query Response Integer corresponding to the method for determining the noise area.

Example
- Command :CALC:PAR:OSNR:NSEL NTR
- Query :CALC:PAR:OSNR:NSEL? → 2

4.2.16.4 :CALCulate:PARameters:OSNR:SDIStance/?

Syntax
- Command :CALCulate:PARameters:OSNR:SDIStance<wsp> <value>[PM|NM|M|HZ|GHZ|THZ]|MIN|MAX
- Query :CALCulate:PARameters:OSNR:SDIStance? [MIN|MAX]

Type Sequential.

Applicability OSA, SML, WDM, OFA, RLT modes.

Description Sets/Queries the **SN Spectral Distance** setting.
- <value>: wavelength or frequency distance as float value.
- MIN: minimum value is 0.01 nm or 0.001 THz.
- MAX: maximum value is 50 nm or 6.043 THz.

Query Response Wavelength or frequency distance as float value in meters or Hertz depending on the unit settings.

Example
- Command :CALC:PAR:OSNR:SDIS 500PM
- Query :CALC:PAR:OSNR:SDIS? → +5.00000000E-010

4.2.16.5 :CALCulate:PARameters:OSNR:NRANge/?

Syntax
- Command :CALCulate:PARameters:OSNR:NRANge<wsp> <value>[PM|NM|M|HZ|GHZ|THZ]|MIN|MAX
- Query :CALCulate:PARameters:OSNR:NRANge? [MIN|MAX]

Type Sequential.

Applicability OSA, SML, WDM, OFA, RLT modes.

Description Sets/Queries the **Noise Range** setting.
- <value>: wavelength or frequency width as float value.
- MIN: minimum value is 0.01 nm or 0.001 THz.
- MAX: maximum value is 50 nm or 6.043 THz.

Query Response Wavelength or frequency width as float value in meters or hertz depending on the unit settings.

Example
- Command :CALC:PAR:OSNR:NRAN 200PM
- Query :CALC:PAR:OSNR:NRAN? → +2.00000000E-010

4.2.16.6 :CALCulate:PARameters:OSNR:IRANge/?

Syntax
- Command `:CALCulate:PARameters:OSNR:IRANge<wsp><value>|MIN|MAX`
- Query `:CALCulate:PARameters:OSNR:IRANge? [MIN|MAX]`

Type Sequential.

Applicability WDM and RLT modes.

Description Sets/Queries the **On-Off Integration Range** setting value:
- `<value>`: range in GHz as float value.
- `MIN`: minimum value is 2
- `MAX`: maximum value is 10000

Query Response Range value in GHz.

Example
- Command `:CALC:PAR:OSNR:IRAN 50`
- Query `:CALC:PAR:OSNR:IRAN? → +5.00000000E+001`

4.2.16.7 :CALCulate:PARameters:OSNR:FIT/?

Syntax
- Command `:CALCulate:PARameters:OSNR:FIT<wsp>LINear|THIRd|FOURth|FIFTh|GAUSsian|0|1|2|3|4`
- Query `:CALCulate:PARameters:OSNR:FIT?`

Type Sequential.

Applicability OSA, SML, WDM, OFA, RLT modes.

Description Sets/Queries the **Fit** algorithm performed for the calculation of the noise level.
- `0`: `LINear`, Linear fit.
- `1`: `THIRd`, 3rd order polynomial fit.
- `2`: `FOURth`, 4th order polynomial fit.
- `3`: `FIFTh`, 5th order polynomial fit.
- `4`: `GAUSsian`, Gaussian fit.

Query Response Integer corresponding to the method for determining the noise area.

Example
- Command `:CALC:PAR:OSNR:FIT GAUS`
- Query `:CALC:PAR:OSNR:FIT? → 4`

4.2.16.8 :CALCulate:PARameters:OSNR:ROWidth/?

Syntax
- Command `:CALCulate:PARameters:OSNR:ROWidth<wsp><value>[PM|NM|M|HZ|GHZ|THZ]|MIN|MAX`
- Query `:CALCulate:PARameters:OSNR:ROWidth? [MIN|MAX]`

Type Sequential.

Applicability OSA, SML, WDM, OFA, RLT modes.

Description Sets/Queries **Reference Optical Bandwidth** setting used in the resolution correction part of the OSNR equation.
- `<value>`: wavelength or frequency bandwidth as float value.
- `MIN`: minimum value is 0.01 nm or 0.001 THz.
- `MAX`: maximum value is 50 nm or 6.043 THz.

Query Response Wavelength or frequency bandwidth as float value in meters or Hertz depending on the unit settings.

Example
- Command `:CALC:PAR:OSNR:ROW 100PM`
- Query `:CALC:PAR:OSNR:ROW? → +1.00000000E-010`

4.2.16.9 :CALCulate:PARameters:OSNR:BWCDisplay/?

Syntax
- Command `:CALCulate:PARameters:OSNR:BWCDisplay<wsp> OFF|ON|0|1`
- Query `:CALCulate:PARameters:OSNR:BWCDisplay?`

Type Sequential.

Applicability OSA, SML, WDM, OFA, RLT modes.

Description Sets/Queries **BW Corrected Display** activation:
- `0`: `OFF`, the function is not activated.
- `1`: `ON`, the function is activated.

Query Response Integer corresponding to the activation state of the setting.

Example
- Command `:CALC:PAR:OSNR:BWCD ON`
- Query `:CALC:PAR:OSNR:BWCD? → 1`

4.2.16.10 :CALCulate:PARameters:OSNR:PINTegration/?

Syntax
- Command `:CALCulate:PARameters:OSNR:PINTegration <wsp>OFF|ON|0|1`
- Query `:CALCulate:PARameters:OSNR:PINTegration?`

Type Sequential.

Applicability OSA, SML, WDM, OFA, RLT modes.

Description Sets/Queries the **Power Integration** activation:
- `0`: `OFF`, the power is not integrated.
- `1`: `ON`, the power is integrated.

Query Response Integer corresponding to the activation state of the setting.

Example
- Command `:CALC:PAR:OSNR:PINT ON`
- Query `:CALC:PAR:OSNR:PINT? → 1`

4.2.16.11 :CALCulate:PARameters:OSNR:PRANge/?

Syntax
- Command `:CALCulate:PARameters:OSNR:PRANge<wsp><value>|MIN|MAX`
- Query `:CALCulate:PARameters:OSNR:PRANge? [MIN|MAX]`

Type Sequential.

Applicability OSA, SML, WDM, OFA, RLT modes.

Description Sets/Queries the **Power Integral Range** setting, over which the power is integrated.
- `<value>`: range value in GHz.
- `MIN`: minimum value is 2.
- `MAX`: maximum value is 10000.

Query Response Range as float value in GHz.

Example
- Command `:CALC:PAR:OSNR:PRAN 10`
- Query `:CALC:PAR:OSNR:PRAN? → +1.00000000E+001`

4.2.16.12 :CALCulate:PARameters:OSNR:PMETer/?

Syntax
- Command `:CALCulate:PARameters:OSNR:PMETer<wsp>OFF|ON|0|1`
- Query `:CALCulate:PARameters:OSNR:PMETer?`

Type Sequential.

Applicability WDM, RLT mode.

Description Sets/Queries the **Power Meter Display** activation:
- `0`: `OFF`, the power meter display is activated.
- `1`: `ON`, the power meter display is activated.

Query Response Integer corresponding to the activation state of the setting.

Example
- Command `:CALC:PAR:OSNR:PMET ON`
- Query `:CALC:PAR:OSNR:PMET? → 1`

4.2.16.13 :CALCulate:DATA:OSNR?

Syntax `:CALCulate:DATA:OSNR?`

Type Sequential, query only.

Applicability OSA, SML modes.

Description Queries the results of the **OSNR** tool.

Query Response OSNR RESULTS,NOISELEVEL,<value>,<unit>, OSNR,<value>,<unit>

Example

```
:CALC:DATA:OSNR? →
OSNR RESULTS,NOISELEVEL,+8.10000000E-001,DBM,
OSNR,-1.07650000E+002,DB
```

4.2.16.14 :CALCulate:DATA:OSNR:IN?

Syntax

```
:CALCulate:DATA:OSNR:IN?
```

Type Sequential, query only.

Applicability OFA mode, with parameter *:CALCulate:PARameters:GAINnf:ESETup/?, p. 127* set to `SINGle`.

Description Queries the results of the **OSNR** tool for trace IN.

Query Response OSNRINRESULTS,P_IN,<Value>,<Unit>,NOISE_IN,<Value>,<Unit>,OSNR_IN,<Value>,<Unit>

Example

```
:CALC:DATA:OSNR:IN? →
OSNRINRESULTS,P_IN,-8.44000000E+000,DBM,NOISE_IN,-
1.00000000E+002,DBM,OSNR_IN,+8.41900000E+001,DB
```

4.2.16.15 :CALCulate:DATA:OSNR:OUT?

Syntax

```
:CALCulate:DATA:OSNR:OUT?
```

Type Sequential, query only.

Applicability OFA mode, with parameter *:CALCulate:PARameters:GAINnf:ESETup/?, p. 127* set to `SINGle`.

Description Queries the results of the **OSNR** tool for trace OUT.

Query Response OSNROUTRESULTS,P_OUT,<Value>,<Unit>,NOISE_OUT,<Value>,<Unit>,OSNR_OUT,<Value>,<Unit>

Example

```
:CALC:DATA:OSNR:OUT? →
OSNROUTRESULTS,P_OUT,+3.92000000E+000,DBM,NOISE_OUT,-
5.40500000E+001,DBM,OSNR_OUT,+5.05900000E+001,DB
```

4.2.16.16 :CALCulate:DATA:WDM[:ALL]:OSNR?

Syntax

```
:CALCulate:DATA:WDM[:ALL]:OSNR?
```

Type Sequential, query only.

Applicability WDM, RLT modes.

Description Queries the OSNR results for all displayed channels.

Query Response

- If parameter *:CALCulate:PARameters:OSNR:PINTegration/?, p. 115* is set to `ON`:

  CH,NBR,P_INT,<unit>,NOISE,<unit>,OSNR,<unit>,{<Integrated Power value>},{<Noise value>},{<OSNR value>}

- If parameter *:CALCulate:PARameters:OSNR:PINTegration/?, p. 115* is set to `OFF`:

  CH,NBR,NOISE,<unit>,OSNR,<unit>,{<Channel Number value>},{<Noise value>},{<OSNR value>}

If parameter *:CALCulate:PARameters:OSNR:BWCDisplay/?, p. 115* is set to `ON`, "NOISE" becomes "CORR_NOISE".

Example

```
:CALC:DATA:WDM:OSNR? →
CH,NBR,NOISE,DBM,OSNR,DB,190,191,194,195,196,197,-
6.69800000E+001,-6.44100000E+001,-6.64700000E+001,-
6.75800000E+001,-6.54100000E+001,-
6.57900000E+001,+4.94800000E+001,+4.70300000E+001,+4.85700000E+00
1,+4.99600000E+001,+4.96500000E+001,+4.97900000E+001
```

4.2.16.17 :CALCulate:DATA:WDM:CH:OSNR?

Syntax

```
:CALCulate:DATA:WDM:CH:OSNR? <channel>
```

Type Sequential, query only.

Applicability WDM, RLT modes.

Description Queries the OSNR results for a specified channel.

Query Response

- If parameter *:CALCulate:PARameters:OSNR:PINTegration/?, p. 115* is set to `ON`:

  P_INT,<unit>,NOISE,<unit>,OSNR,<unit>,<Integrated Power value>, <Noise value>,<OSNR value>

- If parameter *:CALCulate:PARameters:OSNR:PINTegration/?, p. 115* is set to `OFF`:

  NOISE,<unit>,OSNR,<unit>,<value>,<value>

If parameter :CALCulate:PARameters:OSNR:BWCDisplay/?, p. 93 is set to ON, "NOISE" becomes "CORR_NOISE".

Example

```
:CALC:DATA:WDM:CH:OSNR? 194 →
NOISE,DBM,OSNR,DB,-66.47,48.57
```

4.2.16.18 :CALCulate:DATA:OFA[:ALL]:OSNR:IN?

Syntax

```
:CALCulate:DATA:OFA[:ALL]:OSNR:IN?
```

Type Sequential, query only.

Applicability OFA mode, with parameter *:CALCulate:PARameters:GAINnf:ESETup/?, p. 127* set to `MULTi`.

Description Queries the OSNR results from trace IN for all displayed channels.

Query Response CH,NBR,P_IN,<unit>,NOISE_IN,<unit>,OSNR_IN,<unit>,{<ChannelNumberValue>, <PinValue>,<NoiseValue>,<OSNRValue>}

Example

```
:CALC:DATA:OFA:OSNR:IN? →
CH,NBR,P_IN,DBM,NOISE_IN,DBM,OSNR_IN,DB,140,148,156,164,-
8.73000000E+000,-9.02000000E+000,-8.44000000E+000,
-8.95000000E+000,-1.00000000E+002,-8.00100000E+001,
-1.00000000E+002,-1.00000000E+002,+8.39000000E+001,
+6.36200000E+001,+8.41900000E+001,+8.36700000E+001
```

4.2.16.19 :CALCulate:DATA:OFA[:ALL]:OSNR:OUT?

Syntax `:CALCulate:DATA:OFA[:ALL]:OSNR:OUT?`

Type Sequential, query only.

Applicability OFA mode, with parameter *:CALCulate:PARameters:GAINnf:ESETup/?, p. 127* set to `MULTi`.

Description Queries the OSNR results from trace OUT for all displayed channels.

Query Response CH,NBR,P_OUT,<unit>,NOISE_OUT,<unit>,OSNR_OUT,<unit>,{<ChannelNumberValue>,<PinValue>,<NoiseValue>,<OSNRValue>}

Example
```
:CALC:DATA:OFA:OSNR:OUT? →
CH,NBR,P_OUT,DBM,NOISE_OUT,DBM,OSNR_OUT,DB,140,148,156,164,+4.11000000E+000,+3.81000000E+000,+3.92000000E+000,+3.77000000E+000,-5.50700000E+001,-5.41900000E+001,-5.40500000E+001,-5.52500000E+001,+5.18200000E+001,+5.06400000E+001,+5.05900000E+001,+5.16400000E+001
```

4.2.16.20 :CALCulate:DATA:OFA:CH:OSNR:IN?

Syntax `:CALCulate:DATA:OFA:CH:OSNR:IN? <channel>`

Type Sequential, query only.

Applicability OFA mode, with parameter *:CALCulate:PARameters:GAINnf:ESETup/?, p. 127* set to `MULTi`.

Description Queries the results of the **OSNR** tool from trace IN for a specified channel.ë `<channel>`: integer corresponding to the channel number.

Query Response P_IN,<unit>,NOISE_IN, <unit>,OSNR_IN,<unit>,<PinValue>,<NoiseinValue>, <OSNRinValue>

Example
```
:CALC:DATA:OFA:CH:OSNR:IN? 194 →
P_IN,DBM,NOISE_IN,DBM,OSNR_IN,DB,-9.02000000E+000,-8.00100000E+001,+6.36200000E+001
```

4.2.16.21 :CALCulate:DATA:OFA:CH:OSNR:OUT?

Syntax `:CALCulate:DATA:OFA:CH:OSNR:OUT? <channel>`

Type Sequential, query only.

Applicability OFA mode, with parameter *:CALCulate:PARameters:GAINnf:ESETup/?, p. 127* set to `MULTi`.

Description Queries the results of the **OSNR** tool from trace OUT for a specified channel. `<channel>`: integer corresponding to the channel number.

Query Response P_OUT,<unit>,NOISE_OUT,<unit>,OSNR_OUT,<unit>,<PoutValue>,<NoiseoutValue>, <OSNRoutValue>

Example `:CALC:DATA:OFA:CH:OSNR:OUT? 194 →`
`P_OUT,DBM,NOISE_OUT,DBM,OSNR_OUT,DB,+3.81000000E+000,-5.41900000E+001,+5.06400000E+001`

4.2.17 Ripple Tool

4.2.17.1 :CALCulate:PARameters:RIPPle[:ACTivate]/?

Syntax
- Command `:CALCulate:PARameters:RIPPle[:ACTivate] <wsp>OFF|ON|0|1`
- Query `:CALCulate:PARameters:RIPPle[:ACTivate]?`

Type Sequential.

Applicability OSA, BBS modes.

Description Sets/Queries the activation of the **Ripple** tool:
- `0`: `OFF`, the tool is not activated.
- `1`: `ON`, the tool is activated.

Query Response Integer corresponding to the activation state of the tool.

Example
- Command `:CALC:PAR:RIPP ON`
- Query `:CALC:PAR:RIPP? → 1`

4.2.17.2 :CALCulate:PARameters:RIPPle:DTHReshold/?

Syntax
- Command `:CALCulate:PARameters:RIPPle:DTHReshold <wsp><value>|MIN|MAX`
- Query `:CALCulate:PARameters:RIPPle:DTHReshold? [MIN|MAX]`

Type Sequential.

Applicability OSA, BBS modes.

Description Sets/Queries the **Detection Threshold** setting:
- `<value>`: threshold value in dB.
- `MIN`: minimum value is 0.01.
- `MAX`: maximum value is 50.

Query Response Threshold as float value in dB.

Example
- Command `:CALC:PAR:RIPP:DTHR 0.01`
- Query `:CALC:PAR:RIPP:DTHR? → +1.00000000E-002`

4.2.17.3 :CALCulate:PARameters:RIPPle:SPAN /?

Syntax
- Command `:CALCulate:PARameters:RIPPle:SPAN<wsp><value>[PM|NM|M|HZ|GHZ|THZ]|MIN|MAX`
- Query `:CALCulate:PARameters:RIPPle:SPAN? [MIN|MAX]`

Type Sequential.

Applicability OSA, BBS modes.

Description Sets/Queries the **Span** setting:
- `<value>`: threshold value.
- `MIN`: minimum value is 0.01 nm or 0.001 THz.
- `MAX`: maximum value is 450 nm or 54.384 THz.

Query Response Wavelength or frequency as float value in meters or Hertz depending on the unit settings.

Example
- Command `:CALC:PAR:RIPP:SPAN 40NM`
- Query `:CALC:PAR:RIPP:SPAN? → +4.00000000E-008`

4.2.17.4 :CALCulate:PARameters:RIPPle:RINDex/?

Syntax
- Command `:CALCulate:PARameters:RIPPle:RINDex<wsp><value>|MIN|MAX`
- Query `:CALCulate:PARameters:RIPPle:RINDex? [MIN|MAX]`

Type Sequential.

Applicability OSA, BBS modes.

Description Sets/Queries the **Refractive index** setting.
- `<value>`: refractive index value.
- `MIN`: minimum value is 0.5.
- `MAX`: maximum value is 10.

Query Response Refractive Index as float value.

Example
- Command `:CALC:PAR:RIPP:RIND 1.55`
- Query `:CALC:PAR:RIPP:RIND? → +1.55000000E+000`

4.2.17.5 :CALCulate:DATA:RIPPle?

Syntax `:CALCulate:DATA:RIPPle?`

Type Sequential, query only.

Applicability OSA, BBS modes.

Description Queries the results of the **Ripple** tool.

Query Response RIPPLE RESULTS,AMPLITUDE,<value>,<unit>,SPACING,<value>,<unit>, EQUIVALENTFPLENGTH,<value>,<unit>

Example

```
:CALC:DATA:RIPP? →
RIPPLE RESULTS,AMPLITUDE,+7.00000000E-002,DB,SPACING,
+1.65120000E-009,M,EQUIVALENTFPLENGTH, +7.30000000E-004,M
```

4.2.18 Optical Power Tool

4.2.18.1 :CALCulate:PARameters:TPOWer[:ACTivate]/?

Syntax

- Command `:CALCulate:PARameters:TPOWer[:ACTivate] <wsp>OFF|ON|0|1`
- Query `:CALCulate:PARameters:TPOWer[:ACTivate]?`

Type Sequential.

Applicability OSA, BBS, MML, SML modes.

Description Sets/Queries the activation of the **Optical Power** tool:

- `0`: `OFF`, the tool is not activated.
- `1`: `ON`, the tool is activated.

Query Response Integer corresponding to the activation state of the tool.

Example

- Command `:CALC:PAR:TPOW ON`
- Query `:CALC:PAR:TPOW? → 1`

4.2.18.2 :CALCulate:PARameters:TPOWer:OFFSet/?

Syntax

- Command `:CALCulate:PARameters:TPOWer:OFFSet<wsp> <value>|MIN|MAX`
- Query `:CALCulate:PARameters:TPOWer:OFFSet? [MIN|MAX]`

Type Sequential.

Applicability OSA, BBS, MML, SML modes.

Description Sets/Queries the **Offset** value added to the power measurement.

- `<value>`: offset value in dB.
- `MIN`: minimum value is -120.
- `MAX`: maximum value is +120.

Query Response Offset as float value in dB.

Example

- Command `:CALC:PAR:TPOW:OFFS 0.65`
- Query `:CALC:PAR:TPOW:OFFS? → +6.50000000E-001`

4.2.18.3 :CALCulate:PARameters:TPOWer:FSPan/?

Syntax
- Command `:CALCulate:PARameters:TPOWer:FSPan<wsp> OFF|ON|0|1`
- Query `:CALCulate:PARameters:TPOWer:FSPan?`

Type Sequential.

Applicability OSA, BBS, MML, SML modes.

Description Sets/Queries the **Full Span** activation:
- `0`: `OFF`, the Full Span is not activated.
- `1`: `ON`, the Full Span is activated.

Query Response Integer corresponding to the activation state of the setting.

Example
- Command `:CALC:PAR:TPOW:FSP OFF`
- Query `:CALC:PAR:TPOW:FSP? → 0`

4.2.18.4 :CALCulate:PARameters:TPOWer:SPAN/?

Syntax
- Command `:CALCulate:PARameters:TPOWer:SPAN<wsp> <value>[PM|NM|M|HZ|GHZ|THZ]|MIN|MAX`
- Query `:CALCulate:PARameters:TPOWer:SPAN? [MIN|MAX]`

Type Sequential.

Applicability OSA, BBS, MML, SML modes.

Description Sets/Queries the **Span** setting over which the power integration is done.
- `<value>`: span value in nm or THz.
- `MIN`: minimum value is 0.02 nm or 0.002 THz.
- `MAX`: maximum value is 450 nm or 54.384 THz.

Query Response Wavelength or frequency span as float value in meters or Hertz depending on the unit settings.

Example
- Command `:CALC:PAR:TPOW:SPAN 10NM`
- Query `:CALC:PAR:TPOW:SPAN? → +1.00000000E-008`

4.2.18.5 :CALCulate:PARameters:TPOWer:NSUPpression/?

Syntax
- Command `:CALCulate:PARameters:TPOWer:NSUPpression<wsp>OFF|ON|0|1`
- Query `:CALCulate:PARameters:TPOWer:NSUPpression?`

Type Sequential.

Applicability OSA, BBS, MML, SML modes.

Description Sets/Queries the **Noise Suppression** activation:
- `0`: `OFF`, the Noise Suppression is not activated.
- `1`: `ON`, the Noise Suppression is activated.

Query Response Integer corresponding to the activation state of the setting.

Example
- Command `:CALC:PAR:TPOW:NSUP ON`
- Query `:CALC:PAR:TPOW:NSUP? → 1`

4.2.18.6 :CALCulate:DATA:TPOWer?

Syntax `:CALCulate:DATA:TPOWer?`

Type Sequential, query only.

Applicability OSA, BBS, SML, MML modes.

Description Queries the results of the **Optical Power** tool.

Query Response OPTICAL POWER RESULTS,TOTALPOWER,<value>,<unit>,TOTALPOWER,<value>,<unit>

Example
```
:CALC:DATA:TPOW? →
OPTICAL POWER RESULTS,TOTALPOWER,-7.00000000E-001,DBM,
TOTALPOWER,+8.50750000E+002,uW
```

4.2.19 Power Density Tool

4.2.19.1 :CALCulate:PARameters:PDENsity[:ACTivate]/?

Syntax
- Command `:CALCulate:PARameters:PDENsity[:ACTivate] <wsp>OFF|ON|0|1`
- Query `:CALCulate:PARameters:PDENsity[:ACTivate]?`

Type Sequential.

Applicability BBS mode.

Description Sets/Queries the activation of the **Power Density** tool:
- `0`: `OFF`, the tool is not activated.
- `1`: `ON`, the tool is activated.

Query Response Integer corresponding to the activation state of the tool.

Example
- Command `:CALC:PAR:PDEN ON`
- Query `:CALC:PAR:PDEN? → 1`

4.2.19.2 :CALCulate:PARameters:PDENsity:OFFSet/?

Syntax
- Command `:CALCulate:PARameters:PDENsity:OFFSet<wsp> <value>|MIN|MAX`
- Query `:CALCulate:PARameters:PDENsity:OFFSet? [MIN|MAX]`

Type Sequential.

Applicability BBS mode.

Description Sets/Queries the **Offset** value added to the power measurement.
- `<value>`: offset value in dB.
- `MIN`: minimum value is -120.
- `MAX`: maximum value is +120.

Query Response Offset as float value in dB.

Example
- Command `:CALC:PAR:PDEN:OFFS 0.65`
- Query `:CALC:PAR:PDEN:OFFS? → +6.50000000E-001`

4.2.19.3 :CALCulate:PARameters:PDENsity:NSUPpression/?

Syntax
- Command `:CALCulate:PARameters:PDENsity:NSUPpression<wsp>OFF|ON|0|1`
- Query `:CALCulate:PARameters:PDENsity:NSUPpression?`

Type Sequential.

Applicability BBS mode.

Description Sets/Queries the **Noise Suppression** activation:
- `0`: `OFF`, the Noise Suppression is not activated.
- `1`: `ON`, the Noise Suppression is activated.

Query Response Integer corresponding to the activation state of the setting.

Example
- Command `:CALC:PAR:PDEN:NSUP ON`
- Query `:CALC:PAR:PDEN:NSUP? → 1`

4.2.19.4 :CALCulate:DATA:PDENsity?

Syntax `:CALCulate:DATA:PDENsity?`

Type Sequential, query only.

Applicability BBS mode.

Description Queries the results of the **Peak Power Density** tool.

Query Response PEAK POWER DENSITY RESULTS,POWERDENSITY,<value>,<unit>, POWERDENSITY,<value>,<unit>

Example
```
:CALC:DATA:PDEN? →
PEAK POWER DENSITY RESULTS,POWERDENSITY,
-7.60000000E+008,DBM/M,POWERDENSITY,+8.39520000E+002,uW/NM
```

4.2.20 Loss Measurement (:CALCulate:DATA:LOSS?)

Syntax `:CALCulate:DATA:LOSS?`

Type Sequential, query only.

Applicability PCT mode. These results are only available if the *Component Selector Tool, p. 77* is set to `FIBer`.

Description Queries the results of the **Loss Measurement** tool.

Query Response AVERAGELOSSDB<Value>,<Unit>, UNIFORMITY,<Value>,<Unit>

Example
```
:CALC:DATA:LOSS? →
LOSS MEASUREMENT RESULTS,AVERAGELOSSDB,-7.00000000E-
001,DBM,UNIFORMITY,+1.10000000E-001,DB
```

4.2.21 Gain and Noise Figure Tool

4.2.21.1 :CALCulate:PARameters:GAINnf:DISPlay/?

Syntax
- Command `:CALCulate:PARameters:GAINnf:DISPlay<wsp>OFF|ON|0|1`
- Query `:CALCulate:PARameters:GAINnf:DISPlay?`

Type Sequential.

Applicability OFA mode.

Description Sets/Queries the **Display on Graph** setting:
- `0`: `OFF`, the tool results are not displayed on graph.
- `1`: `ON`, the tool results are displayed on graph.

Query Response Integer corresponding to the state of the setting.

Example
- Command `:CALC:PAR:GAIN:DISP ON`
- Query `:CALC:PAR:GAIN:DISP? → 1`

4.2.21.2 :CALCulate:PARameters:GAINnf:ESETup/?

Syntax
- Command `:CALCulate:PARameters:GAINnf:ESETup<wsp>SINGle|MULTi|0|1`
- Query `:CALCulate:PARameters:GAINnf:ESETup?`

Type Sequential.

Applicability OFA mode.

Description Sets/Queries the **Experimental Setup**.
- `0`: `SINGle`, **Single Source** setup.
- `1`: `MULTi`, **Multichannel** setup, the results are retrieved per channel.

Query Response Integer corresponding to the setup used for the measurement.

Example
- Command `:CALC:PAR:GAIN:ESET SING`
- Query `:CALC:PAR:GAIN:ESET? → 0`

4.2.21.3 :CALCulate:PARameters:GAINnf:IATTenuation/?

Syntax
- Command `:CALCulate:PARameters:GAINnf:IATTenuation<wsp><value>|MIN|MAX`
- Query `:CALCulate:PARameters:GAINnf:IATTenuation?[MIN|MAX]`

Type Sequential.

Applicability OFA mode.

Description Sets/Queries the **Input Attenuation**.
- `<value>`: attenuation of input signal in dB.
- `MIN`: minimum value is 0 dB
- `MAX`: maximum value is 50 dB

Query Response Input signal attenuation value in dB.

Example
- Command `:CALC:PAR:GAIN:IATT 1.5`
- Query `:CALC:PAR:GAIN:IATT? → +1.50000000E+000`

4.2.21.4 :CALCulate:PARameters:GAINnf:OATTenuation/?

Syntax
- Command `:CALCulate:PARameters:GAINnf:OATTenuation<wsp><value>|MIN|MAX`
- Query `:CALCulate:PARameters:GAINnf:OATTenuation?[MIN|MAX]`

Type Sequential.

Applicability OFA mode.

Description Sets/Queries the **Output Attenuation**.
- `<value>`: attenuation of output signal in dB.
- `MIN`: minimum value is 0 dB
- `MAX`: maximum value is 50 dB

Query Response Output signal attenuation value in dB.

Example
- Command `:CALC:PAR:GAIN:OATT 0.2`
- Query `:CALC:PAR:GAIN:OATT? → +2.00000000E-001`

4.2.21.5 :CALCulate:PARameters:GAINnf:NFSelection/?

Syntax
- Command :CALCulate:PARameters:GAINnf:NFSelection<wsp> FULL|SIMPlified|0|1
- Query `:CALCulate:PARameters:GAINnf:NFSelection?`

Type Sequential.

Applicability OFA mode.

Description Sets/Queries the **Noise Figure Selection**.
- `0`: `FULL` formula is used in NF calculation.
- `1`: `SIMPlified` formula is used in NF calculation.

Query Response Integer corresponding to the selection

Example
- Command `:CALC:PAR:GAIN:NFS SIMP`
- Query `:CALC:PAR:GAIN:NFS → 1`

4.2.21.6 :CALCulate:PARameters:GAINnf:RESolution/?

Syntax
- Command :CALCulate:PARameters:GAINnf:RESolution<wsp> MEASured|CALibrated|0|1
- Query `:CALCulate:PARameters:GAINnf:RESolution?`

Type Sequential.

Applicability OFA mode.

Description Sets/Queries the **Resolution** used in the noise figure calculation.
- `0`: `MEASured`, the resolution is measured from Trace OUT.
- `1`: `CALibrated`, the resolution is calculated from calibration.

Query Response Integer corresponding to the type of resolution used.

Example
- Command `:CALC:PAR:GAIN:RES MEAS`
- Query `:CALC:PAR:GAIN:RES? → 0`

4.2.21.7 :CALCulate:PARameters:GAINnf:FWIDth/?

Syntax
- Command :CALCulate:PARameters:GAINnf:FWIDth <wsp> <value>|MIN|MAX
- Query `:CALCulate:PARameters:GAINnf:FWIDth?[MIN|MAX]`

Type Sequential.

Applicability OFA mode.

Description Sets/Queries the **Filtering Width** used in the noise figure calculation.
- `<value>`: width value in GHz.
- `MIN`: minimum value is 0 GHz
- `MAX`: maximum value is 10000 GHz

Query Response Width as float value in Hz.

Example
- Command `:CALC:PAR:GAIN:FWID 10`
- Query `:CALC:PAR:GAIN:FWID? → +1.00000000E+010`

4.2.21.8 :CALCulate:DATA:GAINnf?

Syntax `:CALCulate:DATA:GAINnf?`

Type Sequential, query only.

Applicability OFA mode, with parameter *:CALCulate:PARameters:GAINnf:ESETup/?, p. 127* set to `SINGle`.

Description Queries the results of the **Gain & Noise Figure** tool results for all displayed channels.

Query Response GAIN&NFRESULTS,RES,<Value>,<Unit>,NOISE_AMP ,<Value>,<Unit>,GAIN,<Value>,<Unit>,NF,<Value>,<Unit>,OSNR_AMP, <Value>,<Unit>,S,<Value>,<Unit>

Example
```
:CALC:DATA:GAIN? →
GAIN&NFRESULTS,RES,+1.60000000E-011,M,NOISE_AMP,-
5.40500000E+001,DBM,GAIN,+1.23600000E+001,DB,NF,+1.20000000E+000,
DB,OSNR_AMP,+4.85500000E+001,DBM,S,+1.00000000E+002,%
```

4.2.21.9 :CALCulate:DATA:OFA:TASE?

Syntax `:CALCulate:DATA:OFA:TASE?`

Type Sequential, query only.

Applicability OFA mode, with parameter *:CALCulate:PARameters:GAINnf:ESETup/?, p. 127* set to `MULTi`.

Description Queries the integrated ASE power (from trace ASE out).

Query Response INT.ASE_AMP,<Value>,<Unit>

Example
```
:CALC:DATA:OFA:TASE? →
INT.ASE_AMP,-3.05600000E+001,DBM
```

4.2.21.10 :CALCulate:DATA:OFA:GFLatness?

Syntax `:CALCulate:DATA:OFA:GFLatness?`

Type Sequential, query only.

Applicability OFA mode, with parameter *:CALCulate:PARameters:GAINnf:ESETup/?, p. 127* set to `MULTi`.

Description Queries the flatness of the measured Gain.

Query Response GFLAT,<Value>,<Unit>

Example `:CALC:DATA:OFA:GFLatness? → GFLAT.,+4.80000000E-001,DB`

4.2.21.11 :CALCulate:DATA:OFA:GSLope?

Syntax `:CALCulate:DATA:OFA:GSLope?`

Type Sequential, query only.

Applicability OFA mode, with parameter *:CALCulate:PARameters:GAINnf:ESETup/?, p. 127* set to `MULTi`.

Description Queries the slope of the measured Gain.

Query Response GSLOPE,<Value>,<Unit>

Example `:CALC:DATA:OFA:GSL? → GSLOPE,+1.05600000E+008,DB/M`

4.2.21.12 :CALCulate:DATA:OFA:GAVerage?

Syntax `:CALCulate:DATA:OFA:GAVerage?`

Type Sequential, query only.

Applicability OFA mode, with parameter *:CALCulate:PARameters:GAINnf:ESETup/?, p. 127* set to `MULTi`.

Description Queries the average Gain.

Query Response G_AVG,<Value>,<Unit>

Example `:CALC:DATA:OFA:GAV? → G_AVG,+1.26900000E+001,DB`

4.2.21.13 :CALCulate:DATA:OFA:TPOWer:IN?

Syntax `:CALCulate:DATA:OFA:TPOWer:IN?`

Type Sequential, query only.

Applicability OFA mode.

Description Queries the total power from trace IN.

Query Response TOTALP_IN,<Value>,<Unit>

Example `:CALC:DATA:OFA:TPOW:IN? → TOTALP_IN,-1.47300000E+001,DBM`

4.2.21.14 :CALCulate:DATA:OFA:TPOWer:OUT?

Syntax `:CALCulate:DATA:OFA:TPOWer:OUT?`

Type Sequential, query only.

Applicability OFA mode.

Description Queries the total power from trace OUT.

Query Response TOTALP_OUT,<Value>,<Unit>

Example `:CALC:DATA:OFA:TPOW:OUT? → TOTALP_OUT,+1.46900000E+001,DBM`

4.2.21.15 :CALCulate:DATA:OFA[:ALL]:GAINnf?

Syntax `:CALCulate:DATA:OFA[:ALL]:GAINnf?`

Type Sequential, query only.

Applicability OFA mode, with parameter *:CALCulate:PARameters:GAINnf:ESETup/?, p. 127* set to `MULTi`.

Description Queries the Gain & Noise Figure results for all displayed channels.

Query Response CH,NBR,RES,<unit>,NOISE_AMP,<unit>,GAIN,<unit>,NF,<unit>,OSNR_AMP,<unit>,S,<unit>,{<ChannelNumberValue>,<ResValue>,<NoiseAmpValue>,<GainValue>,<NFValue>,<OSNRAmpValue>}

Example
```
:CALC:DATA:OFA:GAINnf? →
CH,NBR,RES,M,NOISE_AMP,DBM,GAIN,DB,NF,DB,OSNR_AMP,DBM,S,%,140,148
,156,164,+1.81000000E-011,+1.59000000E-011,+1.60000000E-
011,+1.60000000E-011,-5.50800000E+001,-5.44200000E+001,-
5.40500000E+001,-5.52500000E+001,+1.28400000E+001,
+1.28300000E+001,+1.23600000E+001,+1.27200000E+001,-
1.13000000E+000,+3.20000000E-001,+1.20000000E+000,-5.50000000E-
001,+5.02200000E+001,+4.88600000E+001,+4.85500000E+001,+4.9670000
0E+001,+1.00000000E+002,+1.00000000E+002,+1.00000000E+002,+1.0000
0000E+002
```

4.2.21.16 :CALCulate:DATA:OFA:CH:GAINnf?

Syntax `:CALCulate:DATA:OFA:CH:GAINnf? <channel>`

Type Sequential, query only.

Applicability OFA mode, with parameter *:CALCulate:PARameters:GAINnf:ESETup/?, p. 127* set to `MULTi`.

Description Queries the Gain and Noise Figure results for a specified channel.
`<channel>`: integer corresponding to the channel number.

Query Response RES,<unit>,NOISE_AMP, <unit>,GAIN, <unit>,NF, <unit>,OSNR_AMP, <unit>,S, <unit>, <ResValue>,<NoiseAmpValue>,<GainValue>,<NFValue>,<OSNRAmpValue>,<SValue>

Example
```
:CALC:DATA:OFA:OSNR:OUT? 194 →
RES,M,NOISE_AMP,DBM,GAIN,DB,NF,DB,OSNR_AMP,DBM,S,NBR,+1.59000000E
-011,-5.44200000E+001,+1.28300000E+001,+3.20000000E-
001,+4.88600000E+001,100.00
```

4.2.22 Pass Band Test Tool

4.2.22.1 :CALCulate:PARameters:PBANd:DISPlay/?

Syntax
- Command `:CALCulate:PARameters:PBANd:DISPlay<wsp>OFF|ON|0|1`
- Query `:CALCulate:PARameters:PBANd:DISPlay?`

Type Sequential.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `PASS`.

Description Sets/Queries the **Display on Graph** setting:
- `0`: `OFF`, the tool results are not displayed on graph.
- `1`: `ON`, the tool results are displayed on graph.

Query Response Integer corresponding to the state of the setting.

Example
- Command `:CALC:PAR:PBAN:DISP ON`
- Query `:CALC:PAR:PBAN:DISP? → 1`

4.2.22.2 :CALCulate:PARameters:PBANd:REFerence/?

Syntax
- Command `:CALCulate:PARameters:PBANd:REFerence<wsp>PEAK|CENTer|0|1`
- Query `:CALCulate:PARameters:PBANd:REFerence?`

Type Sequential.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `PASS`.

Description Sets/Queries the **Reference** setting, calculated from the **Spectral Width 1** tool results (see *:CALCulate:DATA:SW~?, p. 93*).
- `0`: `PEAK`, peak wavelength is used as reference point.
- `1`: `CENTer`: center wavelength is used as reference point.

Query Response Integer corresponding to the point used as reference.

Example
- Command `:CALC:PAR:PBAN:REF CENT`
- Query `:CALC:PAR:PBAN:REF? → 1`

4.2.22.3 :CALCulate:PARameters:PBANd:BMEThod/?

Syntax
- Command `:CALCulate:PARameters:PBANd:BMEThod<wsp>BWIDth|SET|0|1`
- Query `:CALCulate:PARameters:PBANd:BMEThod?`

Type Sequential.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `PASS`.

Description Sets/Queries the **IN/OUT Band Method** setting.
- `0`: `BWIDth`, corresponds to the **Bandwidth 1** method. The out-band reference points are calculated using the **Spectral Width 1** tool results (see *:CALCulate:DATA:SW~?, p. 93*).
- `1`: `SET`, corresponds to the **Set Distance** method. The spacing value is the value specified in the *:CALCulate:PARameters:PBANd:BDIStance/?* section, *p 135*.

Query Response Integer corresponding to the algorithm to use to determine the out-band reference points.

Example
- Command `:CALC:PAR:PBAN:BMET BWID`
- Query `:CALC:PAR:PBAN:BMET? → 0`

4.2.22.4 :CALCulate:PARameters:PBANd:BDIStance/?

Syntax
- Command :CALCulate:PARameters:PBANd:BDIStance<wsp><value>[PM|NM|M|HZ|GHZ|THZ]|MIN|MAX
- Query `:CALCulate:PARameters:PBANd:BDIStance?[MIN|MAX]`

Type Sequential.

Applicability PCT mode, with the following settings:
- *Component Selector Tool, p. 77* set to `PASS`.
- *:CALCulate:PARameters:PBANd:BMEThod/?* parameter (*p. 135*) set to `SET`.

Description Sets/Queries the **IN/OUT Band Distance**.
- `<value>`: wavelength or frequency distance as float value.
- `MIN`: minimum value is 0.05 nm or 0.006 THz
- `MAX`: maximum value is 450 nm or 54.384 THz

Query Response Wavelength or frequency distance as float value in meters or hertz depending on the unit settings (see section *:UNIT:X/?, p. 35*).

Example
- Command `:CALC:PAR:PBAN:BDIS 5NM`
- Query `:CALC:PAR:PBAN:BDIS? → +5.00000000E-009`

4.2.22.5 :CALCulate:PARameters:PBANd:ARANge/?

Syntax
- Command `:CALCulate:PARameters:PBANd:ARANge<wsp>FIXed|PBWidth|PTDetection|0|1|2`
- Query `:CALCulate:PARameters:PBANd:ARANge?`

Type Sequential.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `PASS`.

Description Sets/Queries the **Averaging Range** setting, spectral range over which the average loss and ripple are calculated.
- `0`: `FIXed`, fixed span set in the *:CALCulate:PARameters:PBANd:SPAN/?* setting (*p. 136*).
- `1`: `PBWidth`, percentage of bandwidth calculated using **Spectral Width 1** tool results and set by the *:CALCulate:PARameters:PBANd:PERCentage/?* setting (*p. 137*).
- `2`: `PTDetection`, span calculated as distance between extreme peaks using a PTSearch type tool with the *:CALCulate:PARameters:PBANd:THReshold/?* setting (*p. 137*).

Query Response Integer corresponding to the method used to calculate the spectral range for average loss and ripple.

Example
- Command `:CALC:PAR:PBAN:ARAN PBW`
- Query `:CALC:PAR:PBAN:ARAN? → 1`

4.2.22.6 :CALCulate:PARameters:PBANd:SPAN/?

Syntax
- Command :CALCulate:PARameters:PBANd:SPAN<wsp><value>[PM|NM|M|HZ|GHZ|THZ]|MIN|MAX
- Query `:CALCulate:PARameters:PBANd:SPAN?[MIN|MAX]`

Type Sequential.

Applicability PCT mode, with the following settings:
- *Component Selector Tool, p. 77* set to `PASS`.
- *:CALCulate:PARameters:PBANd:ARANge/?* parameter (*p. 136*) set to `FIXed`

Description Sets/Queries the **Calculation Span** setting, the span over which average loss and ripple are calculated.
- `<value>`: wavelength or frequency distance as float value.
- `MIN`: minimum value is 0 nm or 0 THz
- `MAX`: maximum value is 100 nm or 12.085 THz

Query Response Wavelength or frequency distance as float value in meters or hertz depending on the unit settings (see section *:UNIT:X/?, p. 35*).

Example
- Command `:CALC:PAR:PBAN:SPAN 200PM`
- Query `:CALC:PAR:PBAN:SPAN? → +2.00000000E-010`

4.2.22.7 :CALCulate:PARameters:PBANd:PERCentage/?

Syntax
- Command :CALCulate:PARameters:PBANd:PERCentage<wsp><value>|MIN|MAX
- Query `:CALCulate:PARameters:PBANd:PERCentage?[MIN|MAX]`

Type Sequential.

Applicability PCT mode, with the following settings:
- *Component Selector Tool, p. 77* set to `PASS`.
- *:CALCulate:PARameters:PBANd:ARANge/?* parameter (*p. 136*) set to `PBWidth`.

Description Sets/Queries the **% Bandwidth** setting, the percentage of **Bandwidth 1** to be used as a range for average loss and ripple calculation.
- `<value>`: percentage of bandwidth calculated from **Spectral Width 1** tool as float value.
- `MIN`: minimum value is 0 %
- `MAX`: maximum value is 100 %

Query Response Percentage of bandwidth.

Example
- Command `:CALC:PAR:PBAN:PERC 25.5`
- Query `:CALC:PAR:PBAN:PERC? → +2.55000000E+001`

4.2.22.8 :CALCulate:PARameters:PBANd:THReshold/?

Syntax
- Command :CALCulate:PARameters:PBANd:THReshold<wsp><value>|MIN|MAX
- Query `:CALCulate:PARameters:PBANd:THReshold?[MIN|MAX]`

Type Sequential.

Applicability PCT mode, with the following settings:
- *Component Selector Tool, p. 77* set to `PASS`.
- *:CALCulate:PARameters:PBANd:ARANge/?* parameter (*p. 136*) set to `PTDetection`.

Description Sets/Queries the **Detection Threshold** parameter, setting an averaging range for loss and ripple calculation.
- `<value>`: detection threshold in dB.
- `MIN`: minimum value is 0.001 dB
- `MAX`: maximum value is 50 dB

Query Response Detection threshold value in dB.

Example
- Command `:CALC:PAR:PBAN:THR 0.2`
- Query `:CALC:PAR:PBAN:THR? → +2.00000000E-001`

4.2.22.9 :CALCulate:PARameters:PBANd:TRANsition/?

Syntax
- Command `:CALCulate:PARameters:PBANd:TRANsition<wsp>INBand|OUTBand|0|1`
- Query `:CALCulate:PARameters:PBANd:TRANsition?`

Type Sequential.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `PASS`.

Description Sets/Queries the **Transition Reference** setting, the reference point used to determine the spectral range over which the roll-off is calculated.
- `0`: `INBand`, the in-band reference point is used to determine the spectral range for roll-off calculation.
- `1`: `OUTBand`, out-band reference points are used to determine the spectral range for roll-off calculation.

Query Response Integer corresponding to the selected reference point.

Example
- Command `:CALC:PAR:PBAN:TRAN INB`
- Query `:CALC:PAR:PBAN:TRAN? → 0`

4.2.22.10 :CALCulate:PARameters:PBANd:EXCLusion:MINimum/?

Syntax
- Command :CALCulate:PARameters:PBANd:EXCLusion:MINimum<wsp><value>|MIN|MAX
- Query `:CALCulate:PARameters:PBANd:EXCLusion:MINimum?[MIN|MAX]`

Type Sequential.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `PASS`.

Description Sets/Queries the **Min Exclusion Thresh.** setting, the minimum threshold above which the roll-off is calculated.
- `<value>`: minimum threshold in dB.
- `MIN`: minimum value is 0 dB
- `MAX`: maximum value is the **Max Exclusion Thresh.** setting minus 0.01 dB (see section *:CALCulate:PARameters:PBANd:EXCLusion:MAXimum/?, p. 139*)

Query Response Minimum threshold value in dB.

Example
- Command `:CALC:PAR:PBAN:EXCL:MIN 3`
- Query `:CALC:PAR:PBAN:EXCL:MIN? → +3.00000000E+000`

4.2.22.11 :CALCulate:PARameters:PBANd:EXCLusion:MAXimum/?

Syntax

- Command :CALCulate:PARameters:PBANd:EXCLusion:MAXimum<wsp><value>|MIN|MAX
- Query `:CALCulate:PARameters:PBANd:EXCLusion:MAXimum? [MIN|MAX]`

Type Sequential.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `PASS`.

Description Sets/Queries the **Max Exclusion Thresh.** setting, the maximum threshold above which the roll-off is calculated.

- `<value>`: maximum threshold in dB.
- `MIN`: minimum value is is the **Min Exclusion Thresh.** setting plus 0.01 dB (see section *:CALCulate:PARameters:PBANd:EXCLusion:MINimum/?, p. 138*)
- `MAX`: maximum value is 100 dB

Query Response Maximum threshold value in dB.

Example

- Command `:CALC:PAR:PBAN:EXCL:MAX 20`
- Query `:CALC:PAR:PBAN:EXCL:MAX? → +2.00000000E+001`

4.2.22.12 :CALCulate:DATA:PBANd?

Syntax `:CALCulate:DATA:PBAND?`

Type Sequential, query only.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `PASS`.

Description Queries the results of the **Pass Band Test** tool.

Query Response PASSBANDTESTRESULTS(NOISELIMITED),IN-BANDRESULTS,,,AVGLOSS,<Value>,<Unit>,RIPPLE,<Value>,<Unit>,SLOPE,<Value>,<Unit>,OUT-BANDSIDE1RESULTS,,,AVGLOSS,<Value>,<Unit>,RIPPLE,<Value>,<Unit>,CROSSTALK,<Value>,<Unit>,ROLLOFF@X.XDB<Value>,<Unit>,ROLLOFF_MAX,<Value>,<Unit>,WL@ROLLOFF_MAX,<Value>,<Unit>,TRANSITIONBAND,<Value>,<Unit>,OUT-BANDSIDE2RESULTS,,,AVGLOSS,<Value>,<Unit>,RIPPLE,<Value>,<Unit>,CROSSTALK,<Value>,<Unit>,ROLLOFF@X.XDB,<Value>,<Unit>,ROLLOFF_MAX,<Value>,<Unit>,WL@ROLLOFF_MAX,<Value>,<Unit>,TRANSITIONBAND,<Value>,<Unit>

Example

```
:CALC:DATA:PBAN? →
PASSBANDTESTRESULTS(NOISELIMITED),IN-
BANDRESULTS,,,AVGLOSS,+3.00000000E-002,DB,RIPPLE,+1.40000000E-
001,DB,SLOPE,+3.80000000E-003,DB/NM,OUT-BANDSIDE1RESULTS,,,
AVGLOSS,+4.46200000E+001,DB,RIPPLE,+2.69600000E+001,DB,CROSSTALK,
+5.45300000E+001,DB,ROLLOFF@3.0DB,+2.10613000E+001,DB/NM,
ROLLOFF_MAX,+2.30871000E+001,DB/NM,WL@ROLLOFF_MAX,
+1.31265840E-006,M,TRANSITIONBAND,+1.45400000E-009,M,OUT-
BANDSIDE2RESULTS,,,AVGLOSS,+4.21100000E+001,DB,RIPPLE,+1.21600000
E+001,DB,CROSSTALK,+4.30400000E+001,DB,ROLLOFF@3.0DB,-
2.06429000E+001,DB/NM,ROLLOFF_MAX,-2.43933000E+001,DB/NM,
WL@ROLLOFF_MAX,+1.31945640E-006,M,TRANSITIONBAND,+1.85800000E-
009,M
```

4.2.23 Stop Band Test Tool

4.2.23.1 :CALCulate:PARameters:SBANd:DISPlay/?

Syntax
- Command `:CALCulate:PARameters:SBANd:DISPlay<wsp>OFF|ON|0|1`
- Query `:CALCulate:PARameters:SBANd:DISPlay?`

Type Sequential.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `STOP`.

Description Sets/Queries the **Display on Graph** setting:
- `0`: `OFF`, the tool results are not displayed on graph.
- `1`: `ON`, the tool results are displayed on graph.

Query Response Integer corresponding to the state of the setting.

Example
- Command `:CALC:PAR:SBAN:DISP ON`
- Query `:CALC:PAR:SBAN:DISP? → 1`

4.2.23.2 :CALCulate:PARameters:SBANd:REFerence/?

Syntax
- Command `:CALCulate:PARameters:SBANd:REFerence<wsp>TROUgh|CENTer|0|1`
- Query `:CALCulate:PARameters:SBANd:REFerence?`

Type Sequential.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `STOP`.

Description Sets/Queries the **Reference** setting, calculated from the **Notch Width 1** tool results (see *:CALCulate:DATA:NW~?, p. 106*).
- `0`: `TROUgh`, trough wavelength is used as reference point.
- `1`: `CENTer`: center wavelength is used as reference point.

Query Response Integer corresponding to the point used as reference.

Example
- Command `:CALC:PAR:SBAN:REF TROU`
- Query `:CALC:PAR:SBAN:REF? → 0`

4.2.23.3 :CALCulate:PARameters:SBANd:BMEThod/?

Syntax
- Command `:CALCulate:PARameters:SBANd:BMEThod<wsp>BWIDth|SET|0|1`
- Query `:CALCulate:PARameters:SBANd:BMEThod?`

Type Sequential.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `STOP`.

Description Sets/Queries the **IN/OUT Band Method** setting.
- `0`: `BWIDth`, corresponds to the **Bandwidth 1** method. The out-band reference points are calculated using the **Notch Width 1** tool results (see *:CALCulate:DATA:NW~?, p. 106*).
- `1`: `SET`, corresponds to the **Set Distance** method. The spacing value is the value specified in the *:CALCulate:PARameters:SBANd:BDIStance/?* section, *p 141*.

Query Response Integer corresponding to the algorithm to use to determine the out-band reference points.

Example
- Command `:CALC:PAR:SBAN:BMET BWID`
- Query `:CALC:PAR:SBAN:BMET? → 0`

4.2.23.4 :CALCulate:PARameters:SBANd:BDIStance/?

Syntax
- Command :CALCulate:PARameters:SBANd:BDIStance<wsp><value>[PM|NM|M|HZ|GHZ|THZ]|MIN|MAX
- Query `:CALCulate:PARameters:SBANd:BDIStance?[MIN|MAX]`

Type Sequential.

Applicability PCT mode, with the following settings:
- *Component Selector Tool, p. 77* set to `STOP`
- *:CALCulate:PARameters:SBANd:BMEThod/?* parameter (*p. 141*) set to `SET`.

Description Sets/Queries the **IN/OUT Band Distance**.
- `<value>`: wavelength or frequency distance as float value.
- `MIN`: minimum value is 0.05 nm or 0.006 THz
- `MAX`: maximum value is 450 nm or 54.384 THz

Query Response Wavelength or frequency distance as float value in meters or hertz depending on the unit settings (see section *:UNIT:X/?, p. 35*).

Example
- Command `:CALC:PAR:SBAN:BDIS 5NM`
- Query `:CALC:PAR:SBAN:BDIS? → +5.00000000E-009`

4.2.23.5 :CALCulate:PARameters:SBANd:ARANge/?

Syntax
- Command `:CALCulate:PARameters:SBANd:ARANge<wsp>FIXed|PBWidth|PTDetection|0|1|2`
- Query `:CALCulate:PARameters:SBANd:ARANge?`

Type Sequential.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `STOP`.

Description Sets/Queries the **Averaging Range** setting, spectral range over which the average loss and ripple are calculated.
- `0`: `FIXed`, fixed span set in the *:CALCulate:PARameters:SBANd:SPAN/?* setting (*p. 142*).
- `1`: `PBWidth`, percentage of bandwidth calculated using **Notch Width 1** tool results and set by the *:CALCulate:PARameters:SBANd:PERCentage/?* setting (*p. 143*).
- `2`: `PTDetection`, span calculated as distance between extreme troughs using a PTSearch type tool with the *:CALCulate:PARameters:SBANd:THReshold/?* setting (*p. 143*).

Query Response Integer corresponding to the method used to calculate the spectral range for average loss and ripple.

Example
- Command `:CALC:PAR:SBAN:ARAN PBW`
- Query `:CALC:PAR:SBAN:ARAN? → 1`

4.2.23.6 :CALCulate:PARameters:SBANd:SPAN/?

Syntax
- Command :CALCulate:PARameters:SBANd:SPAN<wsp><value>[PM|NM|M|HZ|GHZ|THZ]|MIN|MAX
- Query `:CALCulate:PARameters:SBANd:SPAN?[MIN|MAX]`

Type Sequential.

Applicability PCT mode, with the following settings:
- *Component Selector Tool, p. 77* set to `STOP`
- *:CALCulate:PARameters:SBANd:ARANge/?* parameter (*p. 142*) set to `FIXed`

Description Sets/Queries the **Calculation Span** setting, the span over which average loss and ripple are calculated.
- `<value>`: wavelength or frequency distance as float value.
- `MIN`: minimum value is 0 nm or 0 THz
- `MAX`: maximum value is 100 nm or 12.085 THz

Query Response Wavelength or frequency distance as float value in meters or hertz depending on the unit settings (see section *:UNIT:X/?, p. 35*).

Example
- Command `:CALC:PAR:SBAN:SPAN 200PM`
- Query `:CALC:PAR:SBAN:SPAN? → +2.00000000E-010`

4.2.23.7 :CALCulate:PARameters:SBANd:PERCentage/?

Syntax
- Command `:CALCulate:PARameters:SBANd:PERCentage<wsp><value>|MIN|MAX`
- Query `:CALCulate:PARameters:SBANd:PERCentage?[MIN|MAX]`

Type Sequential.

Applicability PCT mode, with the following settings:
- *Component Selector Tool, p. 77* set to `STOP`
- *:CALCulate:PARameters:SBANd:ARANge/?* parameter (*p. 142*) set to `PBWidth`

Description Sets/Queries the **% Bandwidth** setting, the percentage of **Bandwidth 1** to be used as a range for average loss and ripple calculation.
- `<value>`: percentage of bandwidth calculated from **Notch Width 1** tool as float value.
- `MIN`: minimum value is 0 %
- `MAX`: maximum value is 100 %

Query Response Percentage of bandwidth.

Example
- Command `:CALC:PAR:SBAN:PERC 25.5`
- Query `:CALC:PAR:SBAN:PERC? → +2.55000000E+001`

4.2.23.8 :CALCulate:PARameters:SBANd:THReshold/?

Syntax
- Command `:CALCulate:PARameters:SBANd:THReshold<wsp><value>|MIN|MAX`
- Query `:CALCulate:PARameters:SBANd:THReshold?[MIN|MAX]`

Type Sequential.

Applicability PCT mode, with the following settings:
- *Component Selector Tool, p. 77* set to `STOP`
- *:CALCulate:PARameters:SBANd:ARANge/?* parameter (*p. 142*) set to `PTDetection`

Description Sets/Queries the **Detection Threshold** parameter, setting an averaging range for loss and ripple calculation.
- `<value>`: detection threshold in dB.
- `MIN`: minimum value is 0.001 dB
- `MAX`: maximum value is 50 dB

Query Response Detection threshold value in dB.

Example
- Command `:CALC:PAR:SBAN:THR 0.2`
- Query `:CALC:PAR:SBAN:THR? → +2.00000000E-001`

4.2.23.9 :CALCulate:PARameters:SBANd:TRANsition/?

Syntax
- Command `:CALCulate:PARameters:SBANd:TRANsition<wsp>INBand|OUTBand|0|1`
- Query `:CALCulate:PARameters:SBANd:TRANsition?`

Type Sequential.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `STOP`.

Description Sets/Queries the **Transition Reference** setting, the reference point used to determine the spectral range over which the roll-off is calculated.
- `0`: `INBand`, the in-band reference point is used to determine the spectral range for roll-off calculation.
- `1`: `OUTBand`, out-band reference points are used to determine the spectral range for roll-off calculation.

Query Response Integer corresponding to the selected reference point.

Example
- Command `:CALC:PAR:SBAN:TRAN INB`
- Query `:CALC:PAR:SBAN:TRAN? → 0`

4.2.23.10 :CALCulate:PARameters:SBANd:EXCLusion:MINimum/?

Syntax
- Command :CALCulate:PARameters:SBANd:EXCLusion:MINimum<wsp><value>|MIN|MAX
- Query `:CALCulate:PARameters:SBANd:EXCLusion:MINimum?[MIN|MAX]`

Type Sequential.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `STOP`.

Description Sets/Queries the **Min Exclusion Thresh.** setting, the minimum threshold above which the roll-off is calculated.
- `<value>`: minimum threshold in dB.
- `MIN`: minimum value is 0 dB
- `MAX`: maximum value is the **Max Exclusion Thresh.** setting minus 0.01 dB (see section *:CALCulate:PARameters:PBANd:EXCLusion:MAXimum/?, p. 139*)

Query Response Minimum threshold value in dB.

Example
- Command `:CALC:PAR:SBAN:EXCL:MIN 3`
- Query `:CALC:PAR:SBAN:EXCL:MIN? → +3.00000000E+000`

4.2.23.11 :CALCulate:PARameters:SBANd:EXCLusion:MAXimum/?

Syntax
- Command :CALCulate:PARameters:SBANd:EXCLusion:MAXimum<wsp><value>|MIN|MAX
- Query `:CALCulate:PARameters:SBANd:EXCLusion:MAXimum? [MIN|MAX]`

Type Sequential.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `STOP`.

Description Sets/Queries the **Max Exclusion Thresh.** setting, the maximum threshold above which the roll-off is calculated.
- `<value>`: maximum threshold in dB.
- `MIN`: minimum value is the **Min Exclusion Thresh.** setting plus 0.01 dB (see section *:CALCulate:PARameters:PBANd:EXCLusion:MINimum/?, p. 138*)
- `MAX`: maximum value is 100 dB

Query Response Maximum threshold value in dB.

Example
- Command `:CALC:PAR:SBAN:EXCL:MAX 20`
- Query `:CALC:PAR:SBAN:EXCL:MAX? → +2.00000000E+001`

4.2.23.12 :CALCulate:DATA:SBANd?

Syntax `:CALCulate:DATA:SBAND?`

Type Sequential, query only.

Applicability PCT mode, with the *Component Selector Tool, p. 77* set to `STOP`.

Description Queries the results of the **Stop Band Test** tool.

Query Response STOPBANDTESTRESULTS(NOISELIMITED),IN-BANDRESULTS,,,AVGLOSS,<Value>,<Unit>,RIPPLE,<Value>,<Unit>,SLOPE,<Value>,<Unit>,OUT-BANDSIDE1RESULTS,,,AVGLOSS,<Value>,<Unit>,RIPPLE,<Value>,<Unit>,ISOLATIONDEPTH,<Value>,<Unit>,ROLLOFF@X.XDB<Value>,<Unit>,ROLLOFF_MAX,<Value>,<Unit>,WL@ROLLOFF_MAX,<Value>,<Unit>,TRANSITIONBAND,<Value>,<Unit>,OUT-BANDSIDE2RESULTS,,,AVGLOSS,<Value>,<Unit>,RIPPLE,<Value>,<Unit>,ISOLATIONDEPTH,<Value>,<Unit>,ROLLOFF@X.XDB,<Value>,<Unit>,ROLLOFF_MAX,<Value>,<Unit>,WL@ROLLOFF_MAX,<Value>,<Unit>,TRANSITIONBAND,<Value>,<Unit>
NOISELIMITED only appears if the measurement is limited by noise.

Example
```
:CALC:DATA:SBAN? →
STOPBANDTESTRESULTS(NOISELIMITED),IN-
BANDRESULTS,,,AVGLOSS,+4.95200000E+001,DB,RIPPLE,+3.79000000E+001
,DB,SLOPE,+1.76917000E+002,DB/NM,OUT-BANDSIDE1RESULTS,
,,AVGLOSS,+3.17000000E+000,DB,RIPPLE,+0.00000000E+000,DB,
ISOLATIONDEPTH,+5.60500000E+001,DB,ROLLOFF@3.0DB,-
6.91883000E+002,DB/NM,ROLLOFF_MAX,-9.16580000E+002,DB/NM,
WL@ROLLOFF_MAX,+1.53281490E-006,M,TRANSITIONBAND,
+3.10000000E-010,M,OUT-BANDSIDE2RESULTS,,,AVGLOSS,
+6.92000000E+000,DB,RIPPLE,+1.68600000E+001,DB,ISOLATIONDEPTH,
+6.02200000E+001,DB,ROLLOFF@3.0DB,+6.48852000E+002,DB/NM,
ROLLOFF_MAX,+4.46449000E+002,DB/NM,WL@ROLLOFF_MAX,+1.53470870E-
006,M,TRANSITIONBAND,+6.14100000E-010,M
```

4.2.24 Mask Test Tool (:CALCulate:DATA:MASK?)

Syntax `:CALCulate:DATA:MASK?`

Type Sequential, query only.

Applicability PCT mode.

Description Queries the results of the **Mask** tool.

Query Response String corresponding to the result of the mask test:
MASKTESTRESULTS,TRANSBETWEENMASKS,<result of the test>

Example
```
:CALC:DATA:MASK? →
MASKTESTRESULTS,TRANSBETWEENMASKS,PASS
```

4.2.25 :CALCulate:DATA[:ALL]?

Syntax `:CALCulate:DATA[:ALL]?`

Type Sequential, query only.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Collects all available analysis results, grouped by tools.

Query Response <Number of Peaks>, <Number of Troughs>, PEAKWAVELENGTH,<unit>,PEAKPOWER,<unit>,TROUGHWAVELENGTH, <unit>,TROUGHPOWER,<unit>,{<Peak wavelength>},{<Peak power level>}, {<Trough wavelength>},{<Trough power level>},<Results from each activated tools in List>,<Results from each activated tools in Grid (WDM, RLT and OFA mode (only if parameter *:CALCulate:PARameters:GAINnf:ESETup/?, p. 127* is set to `MULTi`))>

Example
```
:CALC:DATA? →
2,3,PEAKWAVELENGTH,M,PEAKPOWER,DBM,TROUGHWAVELENGTH,M,TROUGHPOWER
,DBM,+1.53033000E-006,+1.52950600E-006,-1.14000000E+001,-
1.15200000E+001,+1.53386800E-006,+1.53007200E-006,+1.52774400E-
006,-6.40100000E+001,-6.42600000E+001,-
6.45200000E+001,NBROFCHANNELS,2,,SLOPE,+1.55800000E+008,DB/
M,UNIFORMITY,+1.30000000E-
001,DB,CH,NBR,WL_GRID,M,WL_MEAS,M,LVL_MEAS,DBM,DWLTOGRID,M,
NOISE,DBM,OSNR,DB,196,197,+1.52995150E-006,+1.52917110E-
006,+1.53033120E-006,+1.52950700E-006,-1.14200000E+001,-
1.15500000E+001,+3.79700000E-010,+3.35900000E-010,-
7.00700000E+001,-
6.97500000E+001,+5.25400000E+001,+5.23400000E+001
```

4.2.26 :CALCulate:DATA:HIST?

Syntax `:CALCulate:DATA:HIST?`

Type Sequential, query only.

Applicability
- OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.
- **Roll Average** trace type only.
- OSA20 in idle state (recommended).

Description Collects the analysis data of all traces in the roll average trace history.

Query Response OSA20 MEASUREMENT;<Date and Time 1>;<DATA LIST1>;<DATA GRID1>; OSA20 MEASUREMENT;<Date and Time 2>;<DATA LIST2>;<DATA GRID2>;...; OSA20 MEASUREMENT;<Date and Time N>;<DATA LIST100>;<DATA GRID N>

Example A LabVIEW example using this command is available on the USB key provided with the instrument (see section *LabVIEW Examples, p. 15*).

The following example illustrates the response for the history of 5 scans in Roll Average and with OSNR and Total Power as analysis results:

```
:CALC:DATA:HIST? →
OSA20 MEASUREMENT;FEB 03, 2017 -
14:32:42:.7;OSNRRESULTS,NOISELEVEL,-
6.50500000E+001,DBM,OSNR,+4.85600000E+001,DB,OPTICALPOWERRESULTS,
TOTALPOWER,+2.59000000E+000,DBM,TOTALPOWER,+1.81000000E-
003,W;OSA20 MEASUREMENT;FEB 03, 2017 -
14:32:44:.0;OSNRRESULTS,NOISELEVEL,-
6.50700000E+001,DBM,OSNR,+4.85700000E+001,DB,OPTICALPOWERRESULTS,
TOTALPOWER,+2.58000000E+000,DBM,TOTALPOWER,+1.81000000E-
003,W;OSA20 MEASUREMENT;FEB 03, 2017 -
14:32:45:.2;OSNRRESULTS,NOISELEVEL,-
6.51100000E+001,DBM,OSNR,+4.86200000E+001,DB,OPTICALPOWERRESULTS,
TOTALPOWER,+2.58000000E+000,DBM,TOTALPOWER,+1.81000000E-
003,W;OSA20 MEASUREMENT;FEB 03, 2017 -
14:32:46:.4;OSNRRESULTS,NOISELEVEL,-
6.50900000E+001,DBM,OSNR,+4.85900000E+001,DB,OPTICALPOWERRESULTS,
TOTALPOWER,+2.58000000E+000,DBM,TOTALPOWER,+1.81000000E-
003,W;OSA20 MEASUREMENT;FEB 03, 2017 -
14:32:47:.6;OSNRRESULTS,NOISELEVEL,-
6.50600000E+001,DBM,OSNR,+4.85500000E+001,DB,OPTICALPOWERRESULTS,
TOTALPOWER,+2.58000000E+000,DBM,TOTALPOWER,+1.81000000E-003,W
```

5. Configuration and File Handling Control

List of Commands and Queries

The following table gives an overview of the commands and queries enabling you to handle file and configuration settings (copy, save, delete, load trace files and settings):

Command	Corresponding Section
:MMEMory	-
:CATalog	-
[:IMMediate]?	*:MMEMory:CATalog[:IMMediate]?, p. 150*
:DRIVe?	*:MMEMory:CATalog:DRIVe?, p. 150*
:CDRive/?	*:MMEMory:CDRive/?, p. 151*
:CDIRectory/?	*:MMEMory:CDIRectory/?, p. 151*
:MDIRectory	*:MMEMory:MDIRectory, p. 151*
:COPY	*:MMEMory:COPY, p. 152*
:DELete	*:MMEMory:DELete, p. 152*
:LOAD	-
:TRACe	*:MMEMory:LOAD:TRACe, p. 152*
:SETTings	*:MMEMory:LOAD:SETTings, p. 153*
:DEFault	*:MMEMory:LOAD:DEFault, p. 153*
:STORe	-
:TRACe	*:MMEMory:STORe:TRACe, p. 153*
:ARESults	*:MMEMory:STORe:ARESults, p. 154*
:SETTings	*:MMEMory:STORe:SETTings, p. 154*
:GRAPhics	*:MMEMory:STORe:GRAPhics, p. 154*

Table 13: MMEMory commands and queries

Rules

- You must specify paths as follows:
  "<drive>:\<directory>\...\<filename>.<extension>"
  - Double quotes are optional.
  - If <drive> is not specified, the current drive is used.
  - If the <directory>\...\ is not specified, the current directory is used.
- When loading a file, the file extension is optional.
  If the file extension is omitted in a command to store a file, the default extension is applied.

Important
You must make sure the OSA20 is in idle state (:STAT:OPER? → 0) before running the CALCulate subsystem commands (see section *:STATus:OPERation[:EVENt]?, p. 28*).

5.1 :MMEMory:CATalog[:IMMediate]?

Syntax `:MMEMory:CATalog[:IMMediate]?`

Type Sequential, query only.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Queries the state of the current directory or drive and returns the list of files and folders that it contains.

Query Response <Directory memory size available on the drive>,<Memory size occupied by files under directory>,<number of folders>,<number of files>,{<FolderName>,DIR,-},{<FileName>,<FileType>,<FileSize>}

- <Directory memory size available on the drive> and <Memory size occupied by files under directory> are expressed in Mo (1 048 576 octets).
- File Size is expressed in Ko (1024 octets).

Example

```
:MMEM:CAT? →
E:\SPECTRUM
+2.535152E+003,+1.302739E+001,12,46,TRACE1,csv,+2.14015000E+002,…
```

5.2 :MMEMory:CATalog:DRIVe?

Syntax `:MMEMory:CATalog:DRIVe?`

Type Sequential, query only.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Queries the list of mass storage devices connected to the OSA20, with their name, type and memory space available on them.

Query Response <Number of drives>{<DriveLetter>,<DriveSize>,<DriveFreeSpace>,<DriveName>,<DriveType>}

<DriveSize> and <DriveFreeSpace> are expressed in Mo (1 048 576 octets).

Example

```
:MMEM:CAT:DRIV? →
2,D:\,+2.59401452E+003,+2.25351452E+003,USER,FIXED,E:\,+1.90804500E+003,+5.31145148E+002,UNTITLED,FIXED
```

5.3 :MMEMory:CDRive/?

Syntax
- Command `:MMEMory:CDRive<wsp>"<drive>"`
- Query `:MMEMory:CDRive?`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the current drive.
- `<drive>`: letter of the current drive.

Query Response String containing the drive letter.

Example
- Command `:MMEM:CDR "E:"`
- Query `:MMEM:CDR? → E:`

5.4 :MMEMory:CDIRectory/?

Syntax
- Command `:MMEMory:CDIRectory<wsp>"<directory>"`
- Query `:MMEMory:CDIRectory?`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the current directory.
- `<directory>`: current directory name in the current drive (with or without outer backslashes).

Query Response String containing the current directory name.

Example
- Command `:MMEM:CDIR "SPECTRUM\SAMPLES"`
- Query `:MMEM:CDIR? → \SPECTRUM\SAMPLES\`

5.5 :MMEMory:MDIRectory

Syntax `:MMEMory:MDIRectory<wsp>"<directory>"`

Type Sequential, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Creates a new directory in the current directory/drive.
- `<directory>`: current directory name (with or without outer backslashes).

Example `:MMEM:MDIR "\SAMPLE1\"`

5.6 :MMEMory:COPY

Syntax `:MMEMory:COPY<wsp>"<path1>","<path2>"`

Type Sequential, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Copies the specified file/folder and pastes it in another directory.

- `<path1>`: source file/folder path (absolute or relative to current directory/drive).
- `<path2>`: destination file/folder path (absolute or relative to current directory/drive).

The current drive or directory is not modified after command execution, even if you specify the full path.

Important
If you copy the entire mode configuration settings, make sure to copy the corresponding traces folder in the same location as the copied settings file.

Example
```
:MMEM:COPY
"D:\TRACE1.csv","E:\SPECTRUM\SAMPLES\SAMPLE1\TRACE1.csv"
```

5.7 :MMEMory:DELete

Syntax `:MMEMory:DELete<wsp>"<path>"`

Type Sequential, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Deletes the specified file/folder.

- `<path>`: file/folder name in current directory

Example
```
:MMEM:DEL "TRACE1.csv"
```

5.8 :MMEMory:LOAD:TRACe

Syntax `:MMEMory:LOAD:TRACe<wsp>"<filename>"`

Type Sequential, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

- For OFA mode, this command is only applicable on trace #1 and trace #2 (see section *Rules, p. 50*).
- For PCT mode, this command is only applicable on trace#1, trace #2, trace #4 and trace #5 (see section *Rules, p. 50*).

Description Loads a trace file located in the current directory into the active trace.

- `<filename>`: name of the trace file to load.
  Default extension (if not specified): .tra

Example
```
:MMEM:LOAD:TRAC "SLED.csv"
```

5.9 :MMEMory:LOAD:SETTings

Syntax `:MMEMory:LOAD:SETTings<wsp><filename>`

Type Sequential, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Loads complete mode settings from the selected file located in the current directory.

- `<filename>`: file name. The extension of the file must be the same as the current mode (e.g. .wdm in WDM mode)

Example

```
:MMEM:LOAD:SETT "WDM Settings.wdm"
```

5.10 :MMEMory:LOAD:DEFault

Syntax `:MMEMory:LOAD:DEFault`

Type Sequential, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Loads default mode settings.

Example

```
:MMEM:LOAD:DEF
```

5.11 :MMEMory:STORe:TRACe

Syntax `:MMEMory:STORe:TRACe<wsp>"<filename>"`

Type Sequential, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Stores the active trace into the specified trace file in the current directory.

- `<filename>`: name of the trace file in which you want to store the active trace.

  Possible extensions are .tra (binary file) and .csv (csv file).
  Default extension (if not specified): .tra

Example

```
:MMEM:STOR:TRAC "TRACE1.csv"
```

5.12 :MMEMory:STORe:ARESults

Syntax `:MMEMory:STORe:ARESults<wsp>"<filename>"`

Type Sequential, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Saves the analysis results to the specified file (csv format) in the current directory.

- `<filename>`: name of the file in which you want to save the analysis results.
  Default extension: .csv

Example `:MMEM:STOR:ARES "RESULTS.csv"`

5.13 :MMEMory:STORe:SETTings

Syntax `:MMEMory:STORe:SETTings<wsp>"<filename>"`

Type Sequential, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Saves complete mode settings in the specified file in the current directory, and all the traces in their current state in a separate folder with the same name as the settings file.

- `<filename>`: name of the file in which you want to save the complete mode settings.

Example `:MMEM:STOR:SETT "WDM Settings.wdm"`

5.14 :MMEMory:STORe:GRAPhics

Syntax `:MMEMory:STORe:GRAPhics<wsp>"<filename>"`

Type Sequential, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Saves the displayed window as a jpg or png file, in the directory defined by the `:MMEMory:CDIRectory/?` command (see page 151).

- `<filename>`: name of the file in which you want to store the screenshot.

  Possible extensions are .jpg and .png.
  Default extension (if not specified): .jpg

Example `:MMEM:STOR:GRAP "picture.png"`

6. Graph Display Control

List of Commands and Queries

The following table gives an overview of the commands and queries enabling you to control the display settings:

Command	Corresponding Section
:DISPlay/?	*:DISPlay/?, p. 155*
:ZOOM	-
[:AUTO]	*:DISPlay:ZOOM[:AUTO], p. 156*
:FULL	*:DISPlay:ZOOM:FULL, p. 156*
:X	-
:STARt/?	*:DISPlay:ZOOM:X:STARt/?, p. 156*
:STOP/?	*:DISPlay:ZOOM:X:STOP/?, p. 157*
:SPAN/?	*:DISPlay:ZOOM:X:SPAN/?, p. 157*
:CENTer/?	*:DISPlay:ZOOM:X:CENTer/?, p. 157*
:FIT	*:DISPlay:ZOOM:X:FIT, p. 158*
:Y	-
[:PRIMary]	-
:MINimum/?	*:DISPlay:ZOOM:Y:[PRIMary]:MINimum/?, p. 158*
:MAXimum/?	*:DISPlay:ZOOM:Y:[PRIMary]:MAXimum/?, p. 159*
:SECondary	-
:STATe/?	*:DISPlay:ZOOM:Y:SECondary:STATe/?, p. 159*
:REFerence/?	*:DISPlay:ZOOM:Y:SECondary:REFerence/?, p. 159*
:FACTor/?	*:DISPlay:ZOOM:Y:SECondary:FACTor/?, p. 160*
:FIT	*:DISPlay:ZOOM:Y:FIT, p. 160*

Table 14: DISPay commands and queries

6.1 :DISPlay/?

Syntax

- Command `:DISPlay<wsp><value>OFF|ON|0|1`
- Query `:DISPlay?`

Type

Sequential.

Applicability

All modes.

Description

Sets/Queries the state of the OSA20 display.

- `0: OFF`, the OSA20 display is disabled, the GUI is not visible on screen.
- `1: ON`, the OSA20 display is enabled (in remote mode).

Query Response

Integer corresponding to the state of the display.

Example

- Command `:DISP: OFF`
- Query `:DISP? → 0`

6.2 :DISPlay:ZOOM[:AUTO]

Syntax `:DISPlay:ZOOM[:AUTO]`

Type Sequential, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Zooms on the interesting area of the active trace: twice the spectral width detected at 20 dB of the main peak.

Equivalent command button on the GUI: 

Example `:DISP:ZOOM`

6.3 :DISPlay:ZOOM:FULL

Syntax `:DISPlay:ZOOM:FULL`

Type Overlapping, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets the display to the maximum wavelength and power range.

Equivalent command button on the GUI: 

Example `:DISP:ZOOM:FULL`

6.4 :DISPlay:ZOOM:X:STARt/?

Syntax

- Command `:DISPlay:ZOOM:X:STARt<wsp><value> [PM|NM|M|HZ|GHZ|THZ]|MIN|MAX`
- Query `:DISPlay:ZOOM:X:STARt? [MIN|MAX]`

Type Overlapping.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the start wavelength/frequency on the horizontal scale.

- `<value>`: start wavelength or frequency as float value.
- `MIN`: minimum value is 1250 nm or 176.359 THz.
- `MAX`: maximum value is 1699.9 nm or 239.834 THz.

Query Response Wavelength in meters or frequency in Hertz, depending on the unit settings.

Example

- Command `:DISP:ZOOM:X:STAR 1500NM`
- Query `:DISP:ZOOM:X:STAR? → +1.50000000E-006`

6.5 :DISPlay:ZOOM:X:STOP/?

Syntax
- Command `:DISPlay:ZOOM:X:STOP<wsp><value> [PM|NM|M|HZ|GHZ|THZ]|MIN|MAX`
- Query `:DISPlay:ZOOM:X:STOP? [MIN|MAX]`

Type Overlapping.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the stop wavelength/frequency on the horizontal scale.
- `<value>`: stop wavelength or frequency as float value.
- `MIN`: minimum value is 1250.1 nm or 176.349 THz.
- `MAX`: maximum value is 1700 nm or 239.815 THz.

Query Response Wavelength in meters or frequency in Hertz, depending on the unit settings.

Example
- Command `:DISP:ZOOM:X:STOP 1650NM`
- Query `:DISP:ZOOM:X:STOP? → +1.65000000E-006`

6.6 :DISPlay:ZOOM:X:SPAN/?

Syntax
- Command `:DISPlay:ZOOM:X:SPAN<wsp><value> [PM|NM|M|HZ|GHZ|THZ]|MIN|MAX`
- Query `:DISPlay:ZOOM:X:SPAN? [MIN|MAX]`

Type Overlapping.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the wavelength/frequency span on the horizontal scale.
- `<value>`: wavelength or frequency span as float value.
- `MIN`: minimum value is 0.1 nm or 0.01 THz.
- `MAX`: maximum value is 450 nm or 63.48 THz.

Query Response Wavelength in meters or frequency in Hertz, depending on the unit settings.

Example
- Command `:DISP:ZOOM:X:SPAN 100NM`
- Query `:DISP:ZOOM:X:SPAN? → +1.00000000E-006`

6.7 :DISPlay:ZOOM:X:CENTer/?

Syntax
- Command `:DISPlay:ZOOM:X:CENTer<wsp><value> [PM|NM|M|HZ|GHZ|THZ]|MIN|MAX`
- Query `:DISPlay:ZOOM:X:CENTer? [MIN|MAX]`

Type Overlapping.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the wavelength/frequency center on the horizontal scale.
- `<value>`: wavelength or frequency span as float value.

- `MIN`: minimum value is 1250.05 nm or 176.354 THz.
- `MAX`: maximum value is 1699.95 nm or 239.824 THz.

Query Response Wavelength in meters or frequency in Hertz, depending on the unit settings.

Example
- Command `:DISP:ZOOM:X:CENT 1550NM`
- Query `:DISP:ZOOM:X:CENT? → +1.55000000E-006`

6.8 :DISPlay:ZOOM:X:FIT

Syntax `:DISPlay:ZOOM:X:FIT`

Type Overlapping, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Modify the wavelength/frequency axis to fit all visible traces.

Equivalent command button on the GUI: 

Example `:DISP:ZOOM:X:FIT`

6.9 :DISPlay:ZOOM:Y:[PRIMary]:MINimum/?

Syntax
- Command `:DISPlay:ZOOM:Y:[PRIMary]:MINimum<wsp><value> [DBM|PW|NW|UW|MW]|MIN|MAX`
- Query `:DISPlay:ZOOM:Y:[PRIMary]:MINimum? [MIN|MAX]`

Type Overlapping.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

This command is only available if the power unit setting is set to **dBm** (see section *:UNIT:Y/?, p. 35*). If the power unit is set to mW, the minimum power level is set to 0 and cannot be modified.

Description Sets/Queries the minimum power level on the vertical primary scale.
- `<value>`: power as float value in dBm or mW. Default unit is dBm.
- `MIN`: minimum value is -90 dBm.
- `MAX`: maximum value is 19 dBm.

Query Response Power as float value in dBm or mW depending on the unit settings.

Example
- Command `:DISP:ZOOM:Y:MIN -90dBm`
- Query `:DISP:ZOOM:Y:MIN? → -9.00000000E+001`

6.10 :DISPlay:ZOOM:Y:[PRIMary]:MAXimum/?

Syntax
- Command `:DISPlay:ZOOM:Y:[PRIMary]:MAXimum<wsp><value> [DBM|PW|NW|UW|MW]|MIN|MAX`
- Query `:DISPlay:ZOOM:Y:[PRIMary]:MAXimum? [MIN|MAX]`

Type Overlapping.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the maximum power level on the vertical primary scale.
- `<value>`: power as float value in dBm or mW. Default unit is dBm.
- `MIN`: minimum value is -89 dBm or $2x10^{-7}$ mW.
- `MAX`: maximum value is 20 dBm or 100 mW.

Query Response Power as float value in dBm or mW depending on the unit settings.

Example
- Command `:DISP:ZOOM:Y:MAX 20dBm`
- Query `:DISP:ZOOM:Y:MIN? → +2.00000000E+001`

6.11 :DISPlay:ZOOM:Y:SECondary:STATe/?

Syntax
- Command `:DISPlay:ZOOM:Y:SECondary:STATe<wsp><state>`
- Query `:DISPlay:ZOOM:Y:SECondary:STATe?`

Type Overlapping.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the visibility state of the vertical secondary scale (**Scale Visible** parameter):
- `0`: `OFF`, the secondary scale is not visible.
- `1`: `ON`, the secondary scale is visible.

Query Response Integer corresponding to the scale visibility state.

Example
- Command `:DISP:ZOOM:Y:SEC:STAT ON`
- Query `:DISP:ZOOM:Y:SEC:STAT? → 1`

6.12 :DISPlay:ZOOM:Y:SECondary:REFerence/?

Syntax
- Command `:DISPlay:ZOOM:Y:SECondary:REFerence<wsp><value> [DBM|PW|NW|UW|MW]|MIN|MAX`
- Query `:DISPlay:ZOOM:Y:SECondary:REFerence? [MIN|MAX]`

Type Overlapping.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

This command/query is only available if the power unit is set to **dBm** (see section *:UNIT:Y/?, p. 35*). If the power unit is set to mW, the minimum power level is set to 0 and cannot be modified.

Description Sets/Queries the **Ref. Level** value for the vertical secondary scale:
- `<value>`: power value of the primary scale that you want to match to the 0 level on the secondary scale, as float value in dBm or mW. Default value is dBm.
- `MIN`: minimum value is -100 dBm.
- `MAX`: maximum value is 100 dBm.

Query Response Power as float value in dBm or mW depending on the unit settings.

Example
- Command `:DISP:ZOOM:Y:SEC:REF 20dBm`
- Query `:DISP:ZOOM:Y:SEC:REF? → 2.00000000E+001`

6.13 :DISPlay:ZOOM:Y:SECondary:FACTor/?

Syntax
- Command `:DISPlay:ZOOM:Y:SECondary:FACTor<wsp><value> |MIN|MAX`
- Query `:DISPlay:ZOOM:Y:SECondary:FACTor? [MIN|MAX]`

Type Overlapping.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the **Zoom Fact.** value for the vertical secondary scale:
- `<value>`: zoom factor compared to the one used on the primary scale, as float value.
- `MIN`: minimum value is 0.1 dBm.
- `MAX`: maximum value is 100 dBm.

Query Response Power as float value in dBm or mW depending on the unit settings.

Example
- Command `:DISP:ZOOM:Y:SEC:FACT 0.2`
- Query `:DISP:ZOOM:Y:SEC:FACT? → +2.00000000E-001`

6.14 :DISPlay:ZOOM:Y:FIT

Syntax `:DISPlay:ZOOM:Y:FIT`

Type Overlapping, no query.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Modify the power axis to fit all visible traces.

Equivalent command button on the GUI: 

Example `:DISP:ZOOM:Y:FIT`

7. Calibration Control

Before Starting Before performing a remote calibration:

- Make sure the requirements described in *OSA20 User Manual* are met.
- Make sure a jumper is connected between the Calibration Output and the Optical Input.

7.1 :CALibration:WAVelength:INTernal

Syntax `:CALibration:WAVelength:INTernal`

Type Overlapped, no query.

Applicability Home mode.

Description Performs a user calibration of the instrument.

Example `:CAL:WAV:INT`

7.2 :CALibration:WAVelength:RESult?

Syntax `:CALibration:WAVelength:RESult?`

Type Sequential, query only.

Applicability All modes.

Description Queries the results of the last user calibration performed.

Query Response

- `0`: no error was found.
- `<error code>`: an error occurred (all error codes are explained in *OSA20 User Manual*).

Example `:CAL:WAV:RES? → 0`

8. Trigger Control

The following table gives an overview of the commands and queries enabling you to handle file and configuration settings (copy, save, delete, load trace files and settings):

Command	Corresponding Section
:TRIGger	-
:IN	-
[:AUTO/]?	*:TRIGger:IN[:AUTO]/?, p. 163*
:SLOPe/?	*:TRIGger:IN:SLOPe/?, p. 164*
:OUT	-
:ONSPan/?	*:TRIGger:OUT:ONSPan/?, p. 164*
:STARt/?	*:TRIGger:OUT:STARt/?, p. 165*
:STOP/?	*:TRIGger:OUT:STOP/?, p. 165*
:INVerted/	*:TRIGger:OUT:INVerted/?, p. 166*

Table 15: TRIGger commands and queries

8.1 :TRIGger:IN[:AUTO]/?

Syntax
- Command `:TRIGger:IN[:AUTO]<wsp>OFF|ON|0|1`
- Query `:TRIGger:IN[:AUTO]?`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the **Auto Rearm** activation after each triggered scan:
- `0`: `OFF`, the Auto Rearm function is not activated.
- `1`: `ON`, the Auto Rearm function is activated.

Query Response Integer corresponding to the activation state of the setting.

Example
- Command `:TRIG:IN OFF`
- Query `:TRIG:IN? → 0`

8.2 :TRIGger:IN:SLOPe/?

Syntax
- Command `:TRIGger:IN:SLOPe<wsp>POSitive|NEGative|EITHer|0|1|2`
- Query `:TRIGger:IN[:AUTO]?`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the slope of the received signal that triggers the scan.
- `0`: positive slope.
- `1`: negative slope.
- `2`: either.

Query Response Integer corresponding to the slope type to use.

Example
- Command `:TRIG:IN:SLOP EITH`
- Query `:TRIG:IN:SLOP? → 2`

8.3 :TRIGger:OUT:ONSPan/?

Syntax
- Command `:TRIGger:OUT:ONSPan<wsp>OFF|ON|0|1`
- Query `:TRIGger:OUT:ONSPan?`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the Trigger OUT activation on the current span's start and stop wavelength or frequency values (**On Span** parameter):
- `0`: `OFF`, the **On Span** is not activated.
- `1`: `ON`, the **On Span** is activated (see section *:TRIGger:OUT:STARt/?, p. 165* and section *:TRIGger:OUT:STOP/?, p. 165* for start/stop values).

Query Response Integer corresponding to the activation state of the setting.

Example
- Command `:TRIG:OUT:ONSP OFF`
- Query `:TRIG:OUT:ONSP? → 0`

8.4 :TRIGger:OUT:STARt/?

Syntax
- Command `:TRIGger:OUT:STARt<wsp><value>[PM|NM|M|HZ|GHZ|THZ]|MIN|MAX`
- Query `:TRIGger:OUT:STARt? [MIN|MAX]`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the start wavelength or frequency of the Trigger OUT.
This value is only settable if the *:TRIGger:OUT:ONSPan/?* is set to `OFF`.
- `<value>`: wavelength or frequency as float value.
- `MIN`: minimum value is the scan start wavelength or frequency value (see section *:SENSe:WAVelength:STARt/?, p. 43*).
- `MAX`: maximum value is the stop wavelength of the Trigger OUT value minus 0.1 nm or the stop frequency of the Trigger OUT value minus 0.01 THz (see section *:TRIGger:OUT:STOP/?, p. 165*).

Query Response Wavelength or frequency as float value in meters or Hertz depending on the unit settings (see section *UNIT Subsystem Commands and Queries, p. 35*).

Example
- Command `:TRIG:OUT:STAR 1425NM`
- Query `:TRIG;OUT:STAR? → +1.42500000E-006`

8.5 :TRIGger:OUT:STOP/?

Syntax
- Command `:TRIGger:OUT:STOP<wsp><value>[PM|NM|M|HZ|GHZ|THZ]|MIN|MAX`
- Query `:TRIGger:OUT:STOP? [MIN|MAX]`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the stop wavelength or frequency of the Trigger OUT.
This value is only settable if *:TRIGger:OUT:ONSPan/?* is set to `OFF`.
- `<value>`: wavelength or frequency as float value.
- `MIN`: minimum value is the start wavelength of the Trigger OUT value plus 0.1 nm or the start frequency of the Trigger OUT value plus 0.01 THz (see section *:TRIGger:OUT:STARt/?, p. 165*).
- `MAX`: maximum value is the scan stop wavelength or frequency value (see section *:SENSe:WAVelength:STOP/?, p. 43*).

Query Response Wavelength or frequency as float value in meters or Hertz depending on the unit settings (see section *UNIT Subsystem Commands and Queries, p. 35*).

Example
- Command `:TRIG:OUT:STOP 1625NM`
- Query `:TRIG;OUT:STOP? → +1.62500000E-006`

8.6 :TRIGger:OUT:INVerted/?

Syntax
- Command `:TRIGger:OUT:INVerted<wsp>OFF|ON|0|1`
- Query `:TRIGger:OUT:INVerted?`

Type Sequential.

Applicability OSA, WDM, OFA, PCT, SML, MML, BBS, RLT modes.

Description Sets/Queries the **Inverted Logic** activation:
- `0`: `OFF`, the trigger OUT logic is non inverted.
- `1`: `ON`, the trigger OUT logic is inverted.

Query Response Integer corresponding to the activation state of the setting.

Example
- Command `:TRIG:OUT:INV ON`
- Query `:TRIG:OUT:INV? → 0`

9. Error Codes

Subject

This section describes the instrument specific errors (-399 to -300).

All other command errors (range -199 to -100) and execution errors (range -299 to -200) are described in the *Standard Commands for Programmable Instruments (SCPI)* document available at the following URL http://www.ivifoundation.org/docs/scpi-99.pdf (URL valid in November 2017).

Instrument Specific Errors

Error Code	Error Description
-300	**OSA20-Specific Error** Generic instrument-dependent error for instruments that cannot detect more specific errors. This code indicates only that a device-dependent error as defined in IEEE 488.2, 11.5.1.1.6 has occurred.
-301	**OSA20 Scan State Busy** The OSA is still scanning, analyzing, stopping or aborting and is not in an idle state.
-302	**OSA20 Calibration State Busy** The OSA is still calibrating and is not in an idle state.
-303	**OSA20 Mode State Busy** The OSA is still opening or closing a mode and is not in an idle state.

List of Commands

List of Tables