User Guide

FTB-5240/5240B

Optical Spectrum Analyzer for FTB-400

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Telecom Test and Measurement

EXFO
EXPERTISE REACHING OUT

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Trademarks

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Units of Measurement

Units of measurement in this publication conform to SI standards and practices.

Patents

The Optical Spectrum Analyzer is protected by US patent 6,636,306 and foreign equivalents; EXFO's Universal Interface is protected by US patent 6,612,750.

Version number 2.0.0

Contents

Certification Information

F.C.C. Information

Electronic test equipment is exempt from Part 15 compliance (FCC) in the United States. However, compliance verification tests are systematically performed on most EXFO equipment.

CE Information

Electronic test equipment is subject to the EMC Directive in the European Union. The EN61326 standard prescribes both emission and immunity requirements for laboratory, measurement, and control equipment. This unit has undergone extensive testing according to the European Union Directive and Standards.

DECLARATION OF CONFORMITY

Application of Council Directive(s):	73/23/EEC - The Low Voltage Directive 89/336/EEC - The EMC Directive And their amendments
Manufacturer's Name:	EXFO Electro-Optical Engineering Inc.
Manufacturer's Address:	400 Godin Avenue Quebec, Quebec Canada, G1M 2K2 (418) 683-0211
Equipment Type/Environment:	Test & Measurement / Industrial
Trade Name/Model No.:	FTB-5240/5240B Optical Spectrum Analyzer

Standard(s) to which Conformity is Declared:

EN 61010-1:2001	**Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements.**
EN 61326:1997 +A1: 1998 +A2: 2001	**Electrical Equipment for Measurement, Control and Laboratory Use - EMC Requirements**
EN 55022: 1998 +A1: 2000	**Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment.**

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive and Standards.

Manufacturer

Signature: Stephen Bull

Full Name: Stephen Bull, E. Eng

Position: Vice-President Research and Development

Address: 400 Godin Avenue, Quebec (Quebec), Canada, G1M 2K2

Date: November 15, 2001

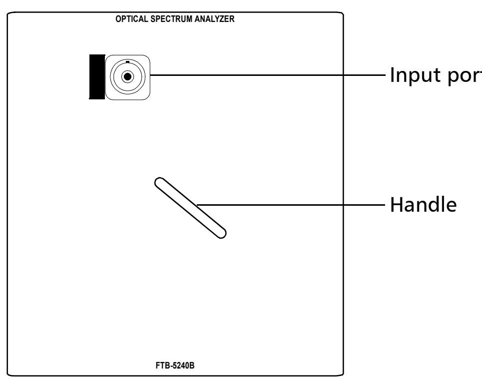
1 Introducing the FTB-5240/5240B Optical Spectrum Analyzer

The FTB-5240/5240B Optical Spectrum Analyzer is designed to measure optical power as a function of wavelength or frequency.

Your Optical Spectrum Analyzer can measure most parameters in a DWDM system. It can be used during installation, commissioning, maintenance and troubleshooting.

It is a double-pass monochromator-type OSA, optimized to obtain a large optical rejection ratio (ORR) and a high resolution bandwidth. Its unique design gives it better polarization-dependent loss (PDL) control over the entire wavelength range.

The FTB-5240/5240B Optical Spectrum Analyzer, housed in the FTB-400 Universal Test System, offers you narrow channel-spacing, larger spectral window, greater dynamic range, better power and wavelength accuracy, as well as a higher ORR.



The FTB-5240/5240B Optical Spectrum Analyzer supports local control (via the ToolBox software) and remote control (through GPIB, RS-232, or Ethernet TCP/IP using SCPI commands or the provided LabVIEW drivers). For more information, refer to the *FTB-400 Universal Test System* user guide.

Models

The Optical Spectrum Analyzer comes in two different models:

- FTB-5240 offers three test modes (Normal, In-Band and Drift) and several types of tests (DFB lasers, EDFA, Fabry-Perot lasers, Spectral Analysis, Spectral Transmittance and trace comparison).
- FTB-5240B offers the same test modes and types, but has a higher resolution and offers a better wavelength accuracy.

Typical Applications

You can use your Optical Spectrum Analyzer for the following tasks:

- characterizing channels in the O- to L-band spectra
- monitoring channel drift over time
- testing laser sources for spectral purity and power distribution
- testing the transmission characteristics of optical devices
- troubleshooting and monitoring key parameters on DWDM signals to check system stability
- troubleshooting and monitoring OSNR in ROADM-based DWDM networks.

Conventions

Before using the product described in this manual, you should understand the following conventions:

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 *minor or moderate 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.

IMPORTANT

Refers to information about this product you should not overlook.

2 Getting Started with Your Optical Spectrum Analyzer

IMPORTANT

For optimal performance, insert the module so that its ventilation holes are aligned with the FTB-400 Universal Test System fans. This provides better ventilation and stabilized temperature. Therefore, avoid using the last slot (slot 7 or G, depending on your FTB-400 receptacle configuration).

Inserting and Removing Test Modules

CAUTION

Never insert or remove a module while the FTB-400 Universal Test System is turned on. This will result in immediate and irreparable damage to both the module and unit.

WARNING

When the laser safety LED ( ) is flashing on the FTB-400, at least one of your modules is emitting an optical signal. Please check all modules, as it might not be the one you are currently using.

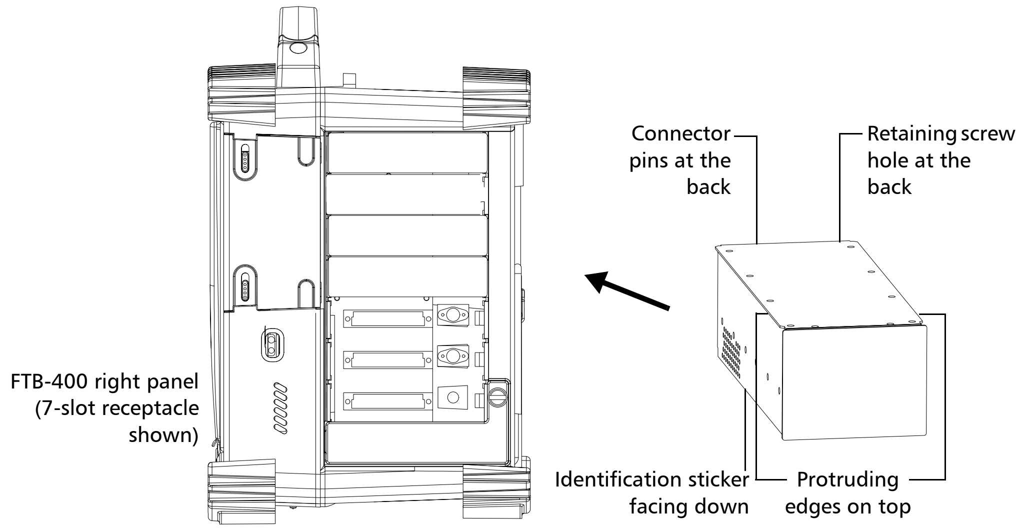
To insert a module into the FTB-400 Universal Test System:

1. Exit ToolBox and turn off your unit.
2. Position the FTB-400 so that its right panel is facing you.
3. Take the module and place it so that the connector pins are at the back, as explained and shown below.

   Identification sticker must be facing down and connector pins at the left of the retaining screw hole.

CAUTION

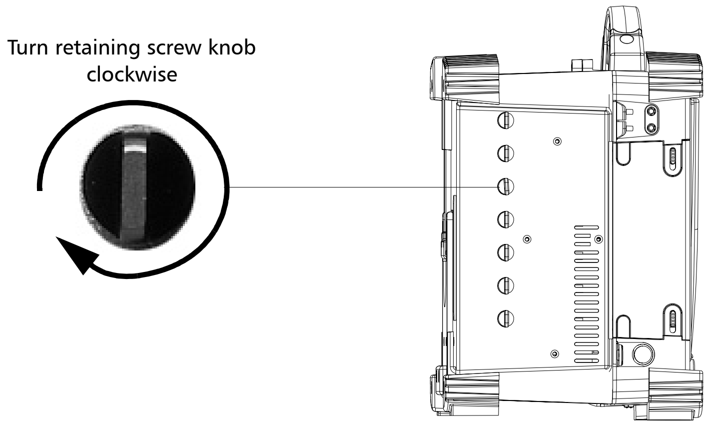
Inserting a module upside down could result in permanent damage to the module, as the connector pins might be bent.



4. Insert the protruding edges of the module into the grooves of the receptacle’s module slot.
5. Push the module all the way to the back of the slot, until the retaining screw makes contact with the receptacle casing.
6. Place the FTB-400 so that its left panel is facing you.

7. While applying slight pressure to the module, turn the retaining screw clockwise until it is tightened.

   This will secure the module into its “seated” position.



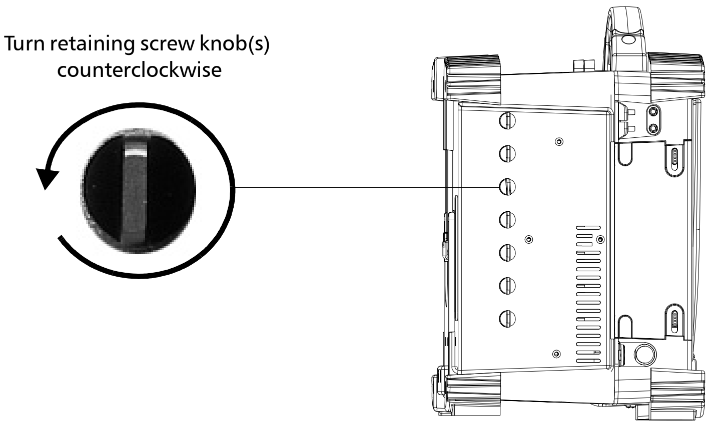
FTB-400 left panel
(7-slot unit shown)

When you turn on the unit, the startup sequence will automatically detect the module.

To remove a module from the FTB-400 Universal Test System:

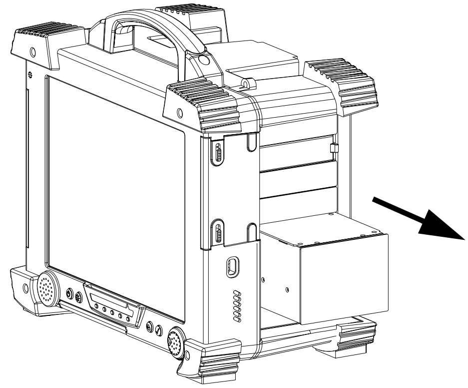
1. Exit ToolBox and turn off your unit.
2. Position the FTB-400 so that the left panel is facing you.
3. Turn the retaining screw counterclockwise until it stops.

   The module will be slowly released from the slot.



FTB-400 left panel
(7-slot unit shown)

4. Place the FTB-400 so that the right panel is facing you.
5. Hold the module by its sides or by the handle (*NOT by the connector*) and pull it out.



CAUTION

Pulling out a module by a connector could seriously damage both the module and connector. Always pull out a module by its casing.

6. Cover empty slots with the supplied protective covers.

CAUTION

Failure to reinstall protective covers over empty slots will result in ventilation problems.

Starting the Optical Spectrum Analyzer Application

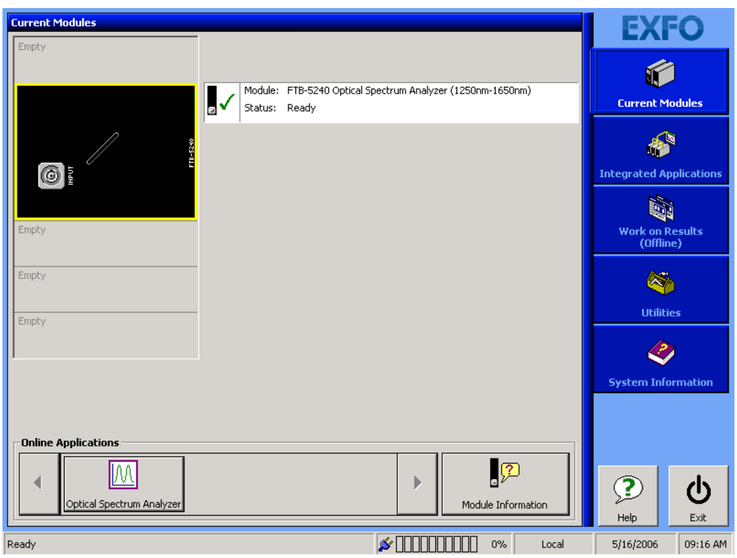
Your FTB-5240/5240B Optical Spectrum Analyzer module can be configured and controlled from its dedicated ToolBox application.

Note: *For details about ToolBox, refer to the* FTB-400 Universal Test System *user guide.*

To start the application:

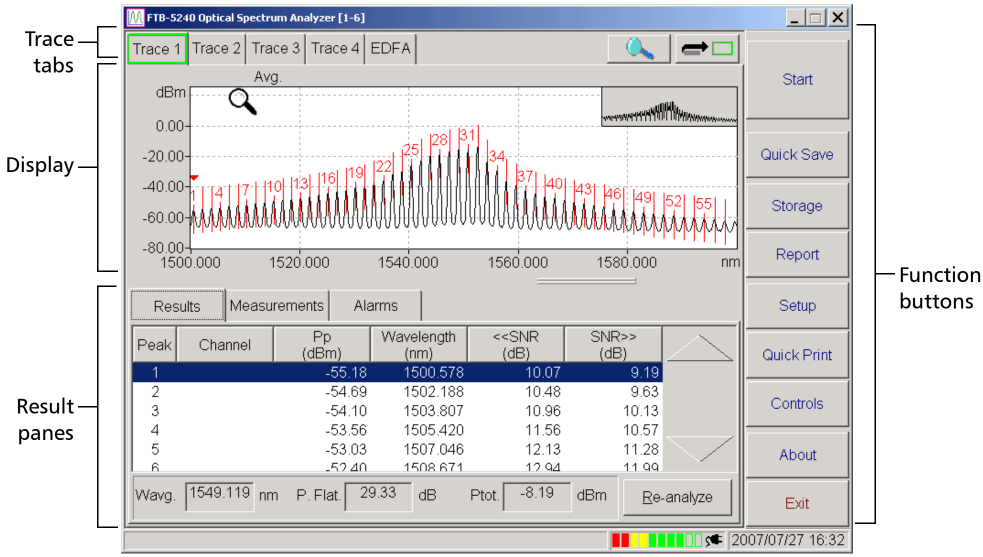
1. From the **Current Modules** function tab, select the module to use.

   It will turn white to indicate that it is highlighted.



2. Click the corresponding button in the **Online Applications** box.

The main window (shown below) contains all the commands required to control the Optical Spectrum Analyzer:



IMPORTANT

For optimal test results, you must allow a minimum warm up period of two hours for your Optical Spectrum Analyzer before starting your tests.

Title Bar

The title bar is located at the top of the main window. It displays the module name and its position in the FTB-400 Universal Test System. The module position is identified as follows:

Unit housing the module
(1 identifies FTB-400)

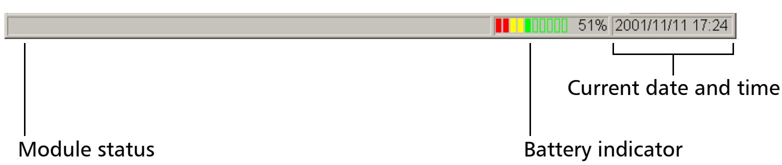
Slot number in which module is inserted
(0 identifies first slot)

[1 – 1]

Note: *On some 7-slot backplanes, slots are marked with a letter from A to G.*

Status Bar

The status bar, located at the bottom of the main window, identifies the current operational status of the FTB-5240/5240B Optical Spectrum Analyzer.



For more information about automating or remotely controlling the FTB-5240/5240B Optical Spectrum Analyzer, refer to the *FTB-400 Universal Test System* user guide.

Adjusting the Trace Display

You may need to enlarge or reduce the size of your trace to have a better view of your results.

Zooming

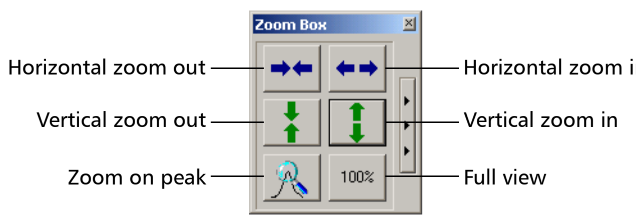
The zooming tools are located in the floating **Zoom Box**. To open this box, click . You can move this box by clicking on its title bar, and then dragging it around.

To select the center of the area you want to zoom:

Position the icon on that area. All zoom actions reflect the zoom type selected in the **Zoom Box**.

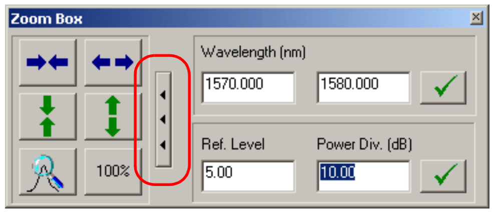
To zoom in or out of a trace:

Use the buttons as follows:



- Zoom in on a trace increases its size in the corresponding axis.
- Zooming out on a trace decreases its size in the corresponding axis.
- Full view reverts to the trace original size.
- Zoom on peak automatically enlarges the area where the selected peak is located. Clicking this button while on the **Measurement** tab positions marker B on the selected peak (of the **Results** tab). Markers A and C are placed where the signal is 3 dB under the peak, respectively before and after the peak.

If you click the arrow button on the right side of the zoom box, you can access advanced zoom features.

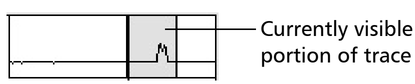


- In the **Wavelength** or **Frequency** boxes (depending on your current display), enter a range to center on in the horizontal axis.
- In the **Ref. Level** and **Power Div.** boxes, enter precise values to center on in the vertical axis.

In both cases, click ✓ to apply your changes.

Moving a Trace from the Zoom Preview Area

The zoom preview area in the upper right-hand corner of the display helps you see where you are on the trace.



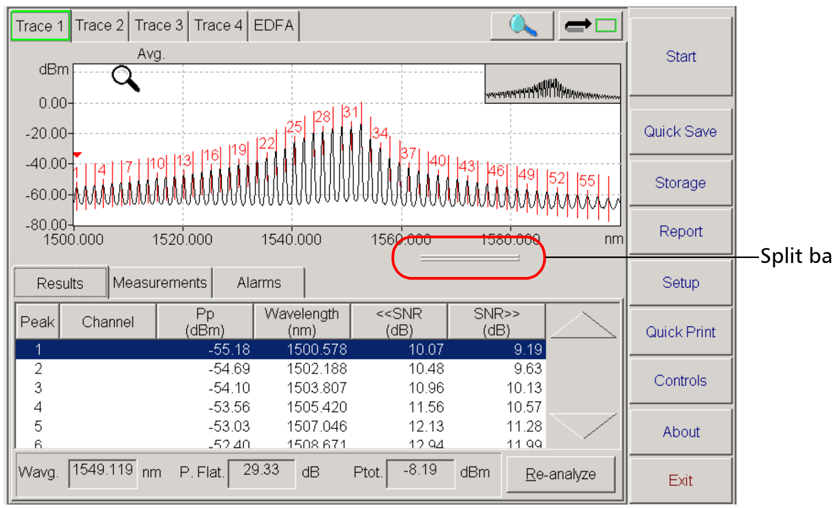
To move the currently visible portion:

Click the gray area and drag it to the location you want to view.

Note: *For drift results (two traces), before using the zoom tools, click anywhere on a trace to ensure that the icon appears (see* Customizing and Viewing Drift Mode Results *on page 79).*

Adjusting the Main Window Panes

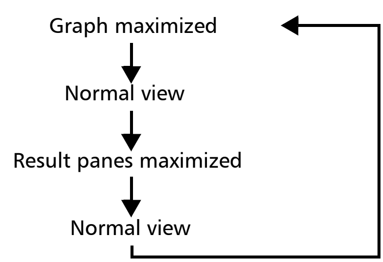
Using the split bar, you can increase or reduce the graph or results panes of the main window.



To adjust the size of the graph or result panes:

Click the split bar until the display suits you.

The following diagram shows the various displays:



Exiting the Application

Closing any application that is not currently being used is a good way to free system memory.

To close the application from the main window:

Click  in the top right corner of the main window.

OR

Click the **Exit** button located at the bottom of the function bar.

3 Preparing Your Optical Spectrum Analyzer for a Test

IMPORTANT

For optimal test results, you must allow a minimum warm up period of two hours for your Optical Spectrum Analyzer before starting your tests.

Cleaning and Connecting Optical Fibers

IMPORTANT

To ensure maximum power and to avoid erroneous readings:

- **Always clean fiber ends as explained below before inserting them into the port. EXFO is not responsible for damage or errors caused by bad fiber cleaning or handling.**
- **Ensure that your patchcord has appropriate connectors. Joining mismatched connectors will damage the ferrules.**

To connect the fiber-optic cable to the port:

1. Clean the fiber ends as follows:

   1a. Gently wipe the fiber end with a lint-free swab dipped in isopropyl alcohol.

   1b. Use compressed air to dry completely.

   1c. Visually inspect the fiber end to ensure its cleanliness.

2. Carefully align the connector and port to prevent the fiber end from touching the outside of the port or rubbing against other surfaces.

   If your connector features a key, ensure that it is fully fitted into the port's corresponding notch.

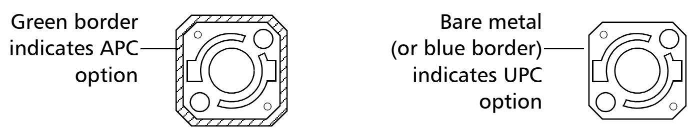
3. Push the connector in so that the fiber-optic cable is firmly in place, thus ensuring adequate contact.

If your connector features a screwsleeve, tighten the connector enough to firmly maintain the fiber in place. Do not overtighten, as this will damage the fiber and the port.

Note: *If your fiber-optic cable is not properly aligned and/or connected, you will notice heavy loss and reflection.*

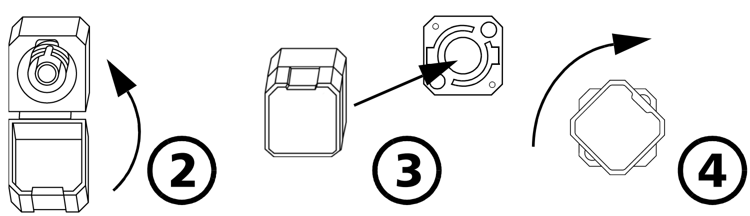
Installing the EXFO Universal Interface (EUI)

The EUI fixed baseplate is available for connectors with angled (APC) or non-angled (UPC) polishing. A green border around the baseplate indicates that it is for APC-type connectors.



To install an EUI connector adapter onto the EUI baseplate:

1. Hold the EUI connector adapter so the dust cap opens downwards.



2. Close the dust cap in order to hold the connector adapter more firmly.
3. Insert the connector adapter into the baseplate.
4. While pushing firmly, turn the connector adapter clockwise on the baseplate to lock it in place.

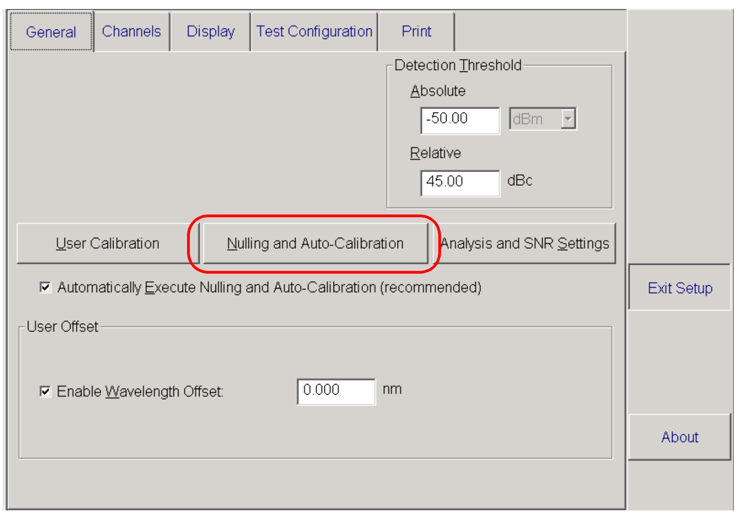
Performing an Automatic Calibration (FTB-5240B Only)

Calibrating your module can help you achieve better results. It is particularly important when the measurement accuracy is critical or when your OSA has experienced shock or vibrations.

The automatic calibration is performed with your OSA's internal reference source. You do not need an external source to perform it.

To perform an automatic calibration:

1. From the main window, click **Setup**.
2. Click the **General** tab, and then click **Nulling and Auto-Calibration**.



3. Follow the on-screen instructions.
4. Click **Exit Setup** to return to the main window.

Performing a Wavelength Calibration

To reach the highest possible accuracy, you can perform a wavelength calibration to create a reference spectrum containing up to 100 peaks and dips. Such a calibration will use these peaks and dips and "shape" the whole spectrum accordingly.

This type of calibration is designed to define a complete reference in one scan, not a series of steps.

The calibration result will automatically appear on the lower left-hand corner of the window as the current correction. It is permanent until you perform a new calibration or revert to the factory calibration.

IMPORTANT

To perform the calibration, you need:

- **a source (either tunable or DFB)**
- **a notch filter or a wavelength-reference absorption cell combined with a white broadband source**

Ensure that your source is stabilized according to the manufacturer's specifications, and that the current test conditions comply with the specified environmental conditions.

To be considered valid, the user calibration requires that all reference signals meet the following conditions:

- Dips must be at least 1 dB in depth relative to both of their sides.
- Peaks must be at least 3 dB higher than the neighboring noise.

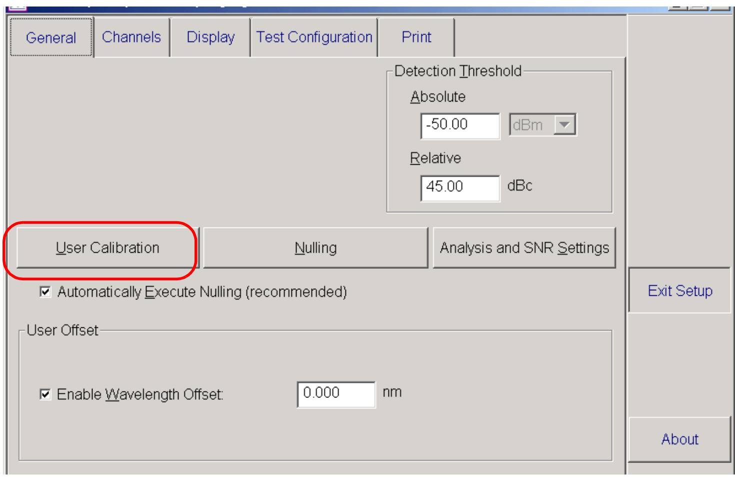
Several signals close to the user-defined calibration points can result in ambiguities. The recalibrating algorithms will always resolve them by associating the defined reference to the most powerful local peak or the lowest dip.

The very first reference signal on the list will be given a greater wavelength tolerance in the fitting process that the other defined reference signals. Therefore, the most obvious reference signal (highest peak or lowest dip) should be put at the top of the list, to avoid ambiguities.

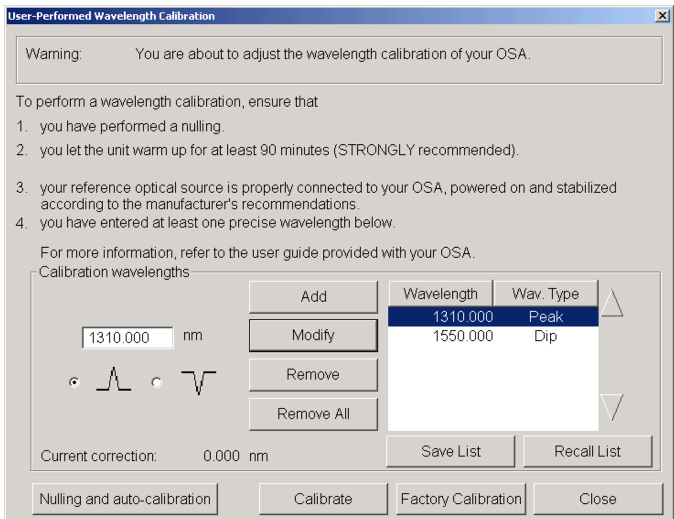
Note: *Before starting the calibration, you must specify which wavelengths to use (see Defining the Calibration Wavelength List* on page 23*).*

To perform a wavelength calibration:

1. From the main window, click **Setup**.
2. Click the **General** tab, and then click **User Calibration**.



3. In the **User-Performed Wavelength Calibration** dialog box, define the list of wavelengths (see *Defining the Calibration Wavelength List* on page 23).



IMPORTANT

Before performing a wavelength calibration, ensure that all of the conditions you see on screen are met. They will help you achieve a trouble-free and reliable calibration.

4. Connect the source to the input port of the Optical Spectrum Analyzer.

5. Click **Calibrate**.

   The process should take around 15 minutes.

To revert to factory calibration:

In the **User-Performed Wavelength Calibration** dialog box, click **Factory Calibration**.

A message is displayed, asking you to confirm your action and the module reverts to its original calibration.

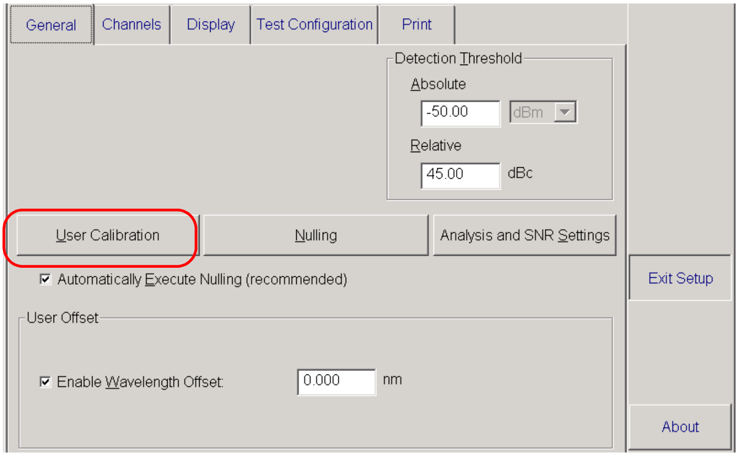
Defining the Calibration Wavelength List

You can add a list of up to 100 calibration wavelengths. The following procedure shows you how to add, modify, and delete wavelengths.

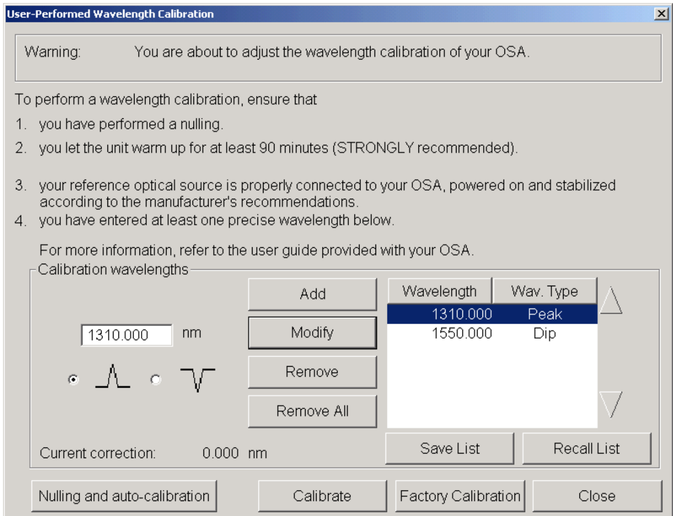
To add a calibration wavelength:

1. From the main window, click **Setup**.

2. Click the **General** tab, and then click **User Calibration**.



3. In the **User-Performed Wavelength Calibration** dialog box, under **Calibration wavelengths**, enter a wavelength value in the box.



4. Specify if it is a peak  or a dip .

5. Click **Add** to add the new wavelength in the list on the right.

To modify a calibration wavelength:

1. From the list on the right, select the value you want to modify.

2. Under **Calibration wavelengths**, enter a wavelength value in the box.

3. Specify if it is a peak  or a dip .

4. Click the **Modify** button to apply the new value to the selected wavelength.

To delete a calibration wavelengths:

➤ From the list on the right, select the value you want to delete, and then click **Remove**.

OR

➤ To remove all values at the same time, click the **Remove All** button.

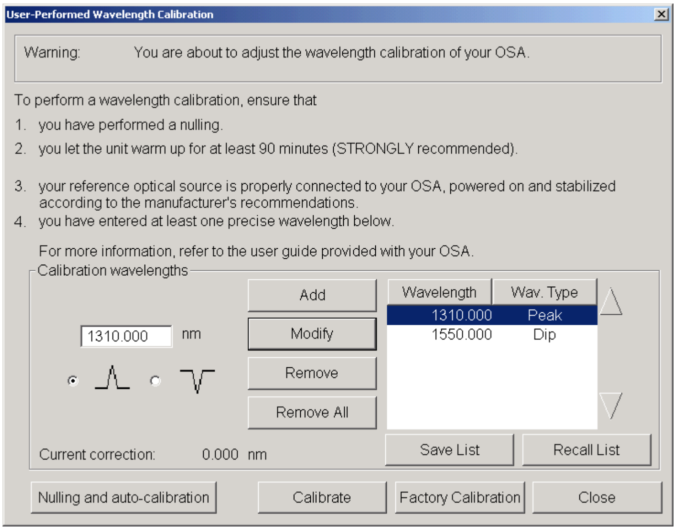
You do not have to select the items in the list to delete them.

Managing Calibration Wavelength Lists

Wavelength lists can be saved so you can reuse them if required. This is particularly useful if you need to use the same reference wavelengths often or for more than one module.

To save a list:

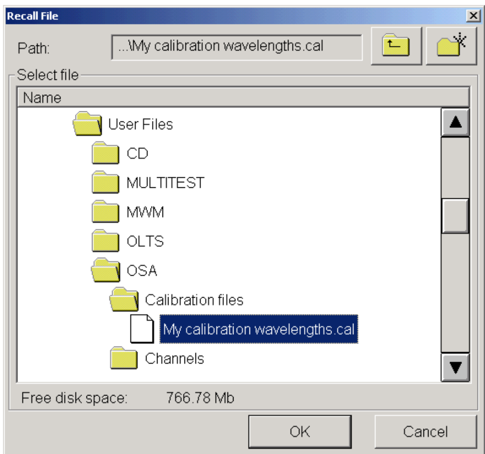
1. In the **User-Performed Wavelength Calibration** dialog box, after entering all the wavelengths you want, click **Save List**.



2. In the **Save List** dialog box, enter a name for this list, and click **OK**.

To recall a list:

1. In the **User-Performed Wavelength Calibration** dialog box, click **Recall List**.
2. In the **Recall File** dialog box, select the list file, and then click **OK**.



Nulling Electrical Offsets

Temperature and humidity variations affect the performance of electronic circuits and optical detectors, which can offset measurement results. To compensate for this offset, the FTB-5240/5240B is equipped with an offset nulling function.

EXFO recommends performing a nulling of the electrical offsets whenever environmental conditions change.

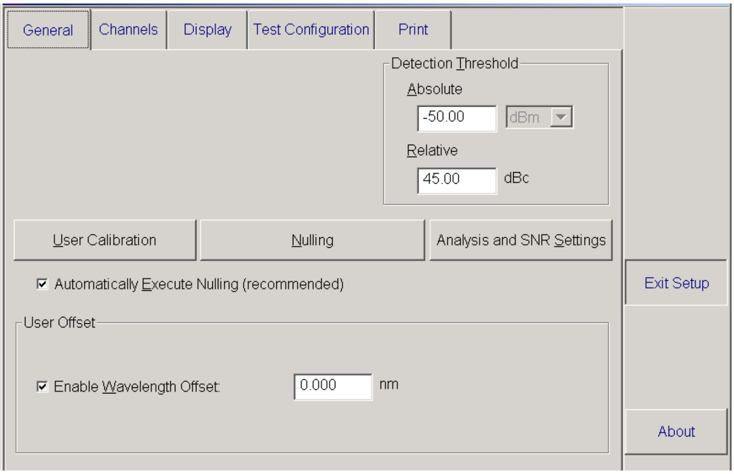
IMPORTANT

Light must not reach the detector when nulling offsets.

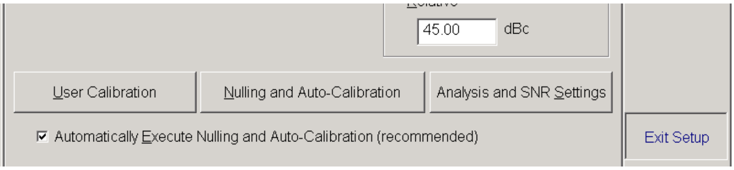
In addition, nulling offsets is performed automatically each time you start the OSA application and at regular intervals afterwards.

To null the offsets:

1. From the main window, click **Setup**.
2. Click the **General** tab.



3. Disconnect any incoming signal to obtain an optimal accuracy.
4. Click **Nulling** (FTB-5240) or **Nulling and Auto-Calibration** (FTB-5240B).



Nulling is completed in a few seconds and you are ready to perform measurements.

You can disable the automatic nulling and calibration by clearing the **Automatically Execute Nulling (Recommended)** check box.

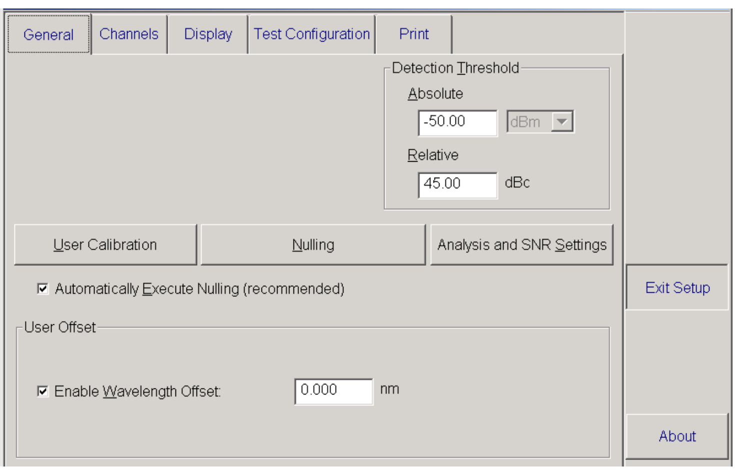
Enabling the Wavelength Offset

You can use an offset to adjust your unit. This does not replace a calibration performed at EXFO, but it can help you achieve the specifications if you feel that, for example, external conditions have affected your module.

Note: *Any change or calibration done in the **Setup** window will only take effect with the next acquisition and will be applied to all four trace tabs. The change or calibration will also take effect if you click **Re-analyze** on the trace result tab.*

To enable the wavelength offset:

1. From the main window, click **Setup**.
2. Click the **General** tab.



3. Under **User Offset**, select the **Enable Wavelength Offset** check box.

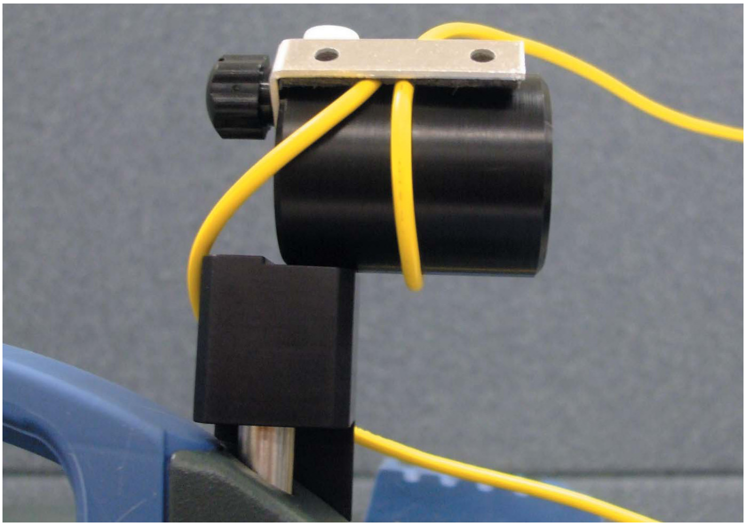
   Enabling the wavelength offset makes available the wavelength value box.

4. In the wavelength value box, enter the desired wavelength offset value.

Moving the Fiber for In-Band Mode Testing

Although moving the fiber randomly between scans can provide a sufficient coverage of polarization input conditions to achieve a reliable OSNR reading, a systematic change of the polarization conditions allows this desired coverage to be achieved in less scans (especially if the system under test has a high number of channels). Therefore, EXFO strongly recommends that more systematic fiber movements be applied in order for the analysis to converge faster. The manual procedure below provides such a systematic series of movements.

Note: *This procedure is made easier by the use of a convenient tool, the* State of Polarization Generation Tool*, available for Optical Spectrum Analyzers equipped with the In-Band analysis option. (Included with* FTB-5240/5240B Optical Spectrum Analyzers.)



IMPORTANT

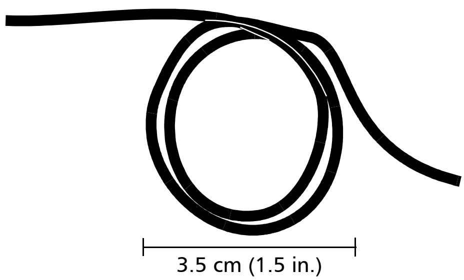
The fiber must remain stable during the scan.

To move the fiber between sweeps:

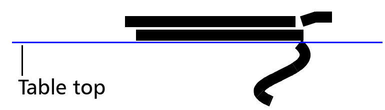
1. When you are prompted to move the fiber for the first time, coil the fiber twice to form a loop of 3.5 cm (1.5 in.) in diameter, holding the fiber flat on a surface.

You can use a mandrel of that size if one is available.

Note: *A smaller diameter may induce loss.*

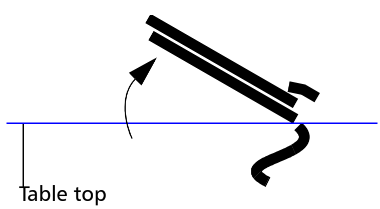


Top view



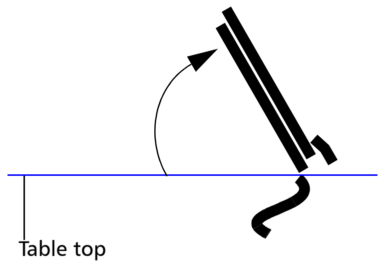
Side view

2. When asked to move the fiber for a second time, still keeping the loops together, rotate them around the fiber axis at an angle of about 30 degrees (high enough so that your thumb fits under the coil).



Side view

3. When asked to move the fiber for a third time, still keeping the loops together, rotate them around the fiber axis at an additional angle of about 30 degrees.



Side view

4. If you are asked to move the fiber again, continue to move it at different angles to obtain an increased coverage of the polarization conditions.

   OR

   Let the fiber uncoil and move the fiber in various random positions.

4 Setting Up Your Optical Spectrum Analyzer

Before performing any spectral analysis, you must set up your OSA module and test application.

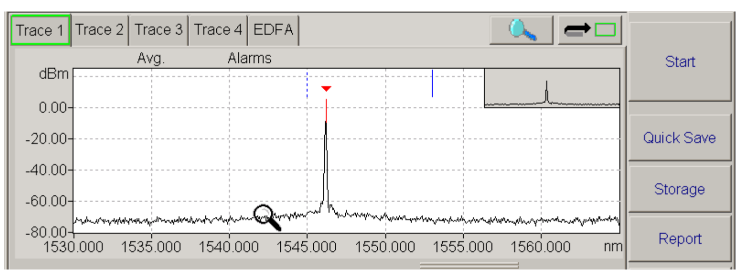
Note: *Existing traces must be re-analyzed to apply the new detection threshold, analysis method, or SNR measurement parameter settings.*

Selecting the Active Trace

In the main window, the active trace selection button , to the right-hand side of the trace tabs and next to the **Start** button, allows you to view traces 1 through 4 without changing the current display.

Note: *The **Start** function button is displayed in the main window only when an FTB-5240/5240B module is inserted in your FTB-400 Universal Test System.*

A green outline indicates the currently selected tab. Any change, such as saving, loading, performing acquisitions, or tests affect this tab.



Note: *The **Quick Save** and **Quick Print** function buttons are displayed in the main window only when a trace is displayed in the selected tab. If a trace's channel-based analysis becomes invalid, the **Quick Save** and **Quick Print** function buttons become inactive. For more information, see* Reanalyzing the Current Trace *on page 88.*

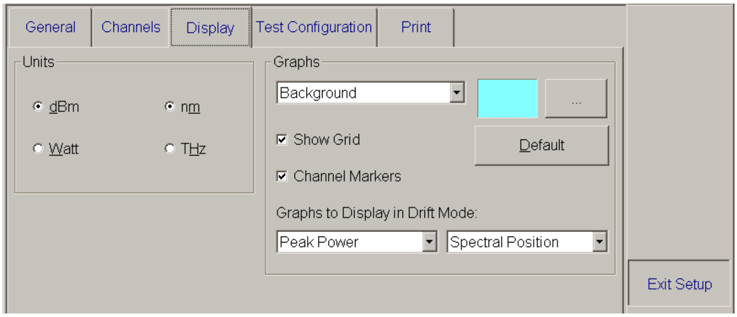
Selecting Power and Spectral Units

Your tests can require different power and spectral units. Tests will be performed using selected units. If you have already acquired traces or performed tests, results will also change according to these units.

Note: *If you choose watts as power units, you can select which units suit you best on the* ***General*** *tab, under* ***Detection Threshold****. This is also true when creating or modifying channels. If you are working with dBm as units, the list next to the detection threshold is disabled. For more information, see* Setting the Detection Thresholds *on page 35**.*

To select the power and spectral units:

1. From the main window, click **Setup**.
2. Click the **Display** tab.



3. Under **Units**, select **dBm** or **Watt** (power units), and select **nm** or **THz** (spectral units).
4. Click **Exit Setup**.

Setting the Detection Thresholds

Detection thresholds are the minimum power that a peak must have to be detected by the OSA analysis function. Two threshold values must be set:

➤ **Absolute**: You explicitly set the minimum power required for detection. Any signal detected below this threshold will be ignored.

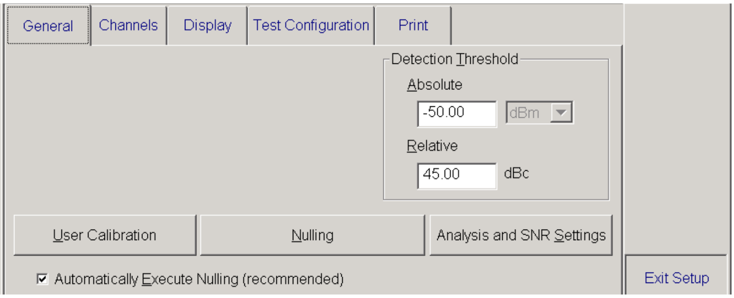
➤ **Relative**: You specify a value (dBc) below the maximum signal found on the trace; the difference between the maximum signal value detected and the relative threshold value will determine the minimum power required for detection.

Both the absolute and relative thresholds are used for acquiring traces.

To set the detection threshold:

1. From the main window, click **Setup**.

2. Click the **General** tab.



3. Under **Detection threshold**, enter the thresholds at which you want to start detecting peaks according to the power unit you have chosen (see *Selecting Power and Spectral Units* on page 34).

Note: *For In-band measurements, the relative threshold is limited to 30 dBc.*

4. Click **Exit Setup**.

   When performing tests, peaks below the set values will not be detected.

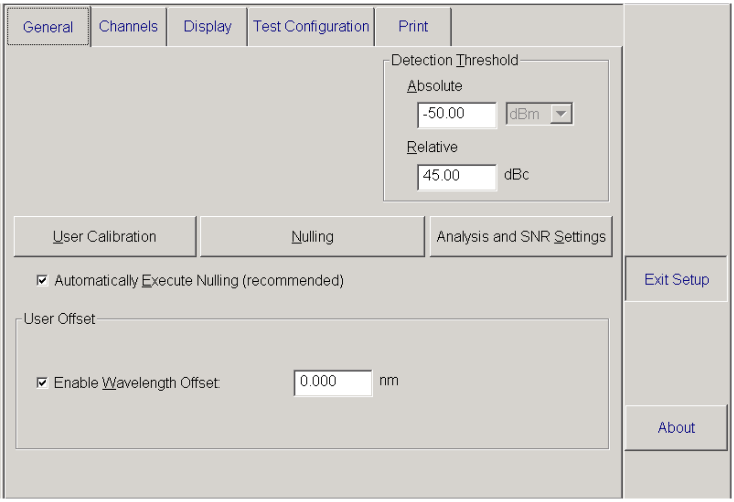
Setting the Analysis Method

Two methods are available for analyzing your test results:

- The standard method, which uses the measured signal to identify peaks, as well as associate channels.
- The channel-based method, which uses a list of predefined channels to determine peaks from the measured signal.

To set the analysis method:

1. From the main window, click **Setup**.
2. Click the **General** tab, and then click **Analysis and SNR Settings**.



3. In the **Analysis and SNR Settings** dialog box, under **Analysis**, select the method of analysis you want to use:

➤ **Standard**: With the Standard method, which is the analysis method selected by default, the analysis includes the following steps: 1. the measured spectrum is analyzed to identify peaks, 2. a table of results is generated, and 3. the detected peaks are associated with the channels defined in the channel list.

As a result, at times several peaks may be associated to a single channel, or a channel defined in the channel list may not be included in the results table because no peak can be associated to it.

➤ **Channel-Based**: With the Channel-Based method, the analysis includes the following steps: 1. the measured spectrum is analyzed to identify peaks, 2. a table of results is generated, 3. all the detected peaks are associated with channels defined in the channel list, and 4. any group of peaks that has been associated to a single channel is merged.

As a result, only one result can be associated to a given channel. There is always the possibility that a channel defined in the channel list may not be included in the results table because no peak can be associated to it.

The Channel-Based analysis method is very useful, especially with the many modulation codes now available, as it has become somehow difficult to determine if groups of neighboring peaks originate from a single source or from multiple sources.

Selecting the Standard or the Channel-Based analysis method also has an effect on the power characterization of the channels.

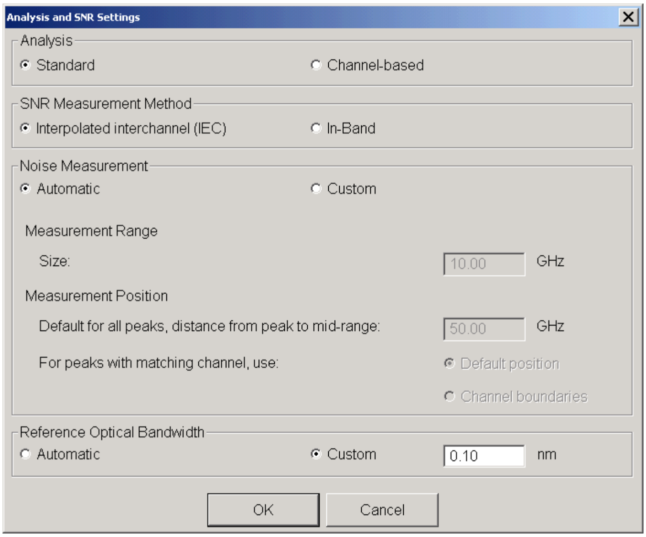
With the Standard method, the power of the signal in a peak is determined by an algorithm that automatically determines peaks boundaries, which in turn affects the total power of a peak and its SNR.

When the Channel-Based method is selected, the corresponding channel's user-defined boundaries will be used as the peak's boundaries, thus affecting the characterization (total power and SNR) of the channel-based results.

Using channel-based Analysis has the following effects:

➤ SNR distance: When channel-based analysis is selected, any peak that is detected within a defined channel will have its noise estimation (IEC method) made at a position centered at the matching channel's boundaries. This overrides the noise distance setting.

➤ Peak Analysis: For some modulation codes, it is difficult to determine how many distinct signals exist. When channel-based analysis is selected, the peak analysis function considers that everything found within a channel originates from a unique signal source.



4. You can also set noise measurement, as well as a reference optical bandwidth. For more information, see the following sections:

   ➤ *Setting the Signal-to-Noise Ratio Measurement Parameters* on page 40.

   ➤ *Setting the Reference Optical Bandwidth* on page 44.

5. Click **OK**.

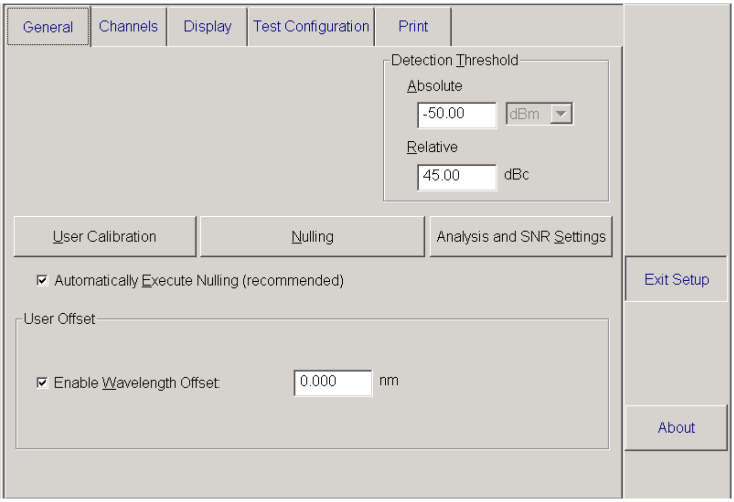
   Clicking **Cancel** closes the dialog box without applying the changes to the settings.

Setting the Signal-to-Noise Ratio Measurement Parameters

The signal-to-noise ratio (SNR) allows you to measure the difference between the noise floor and the top of a signal peak.

To set the SNR calculation parameters:

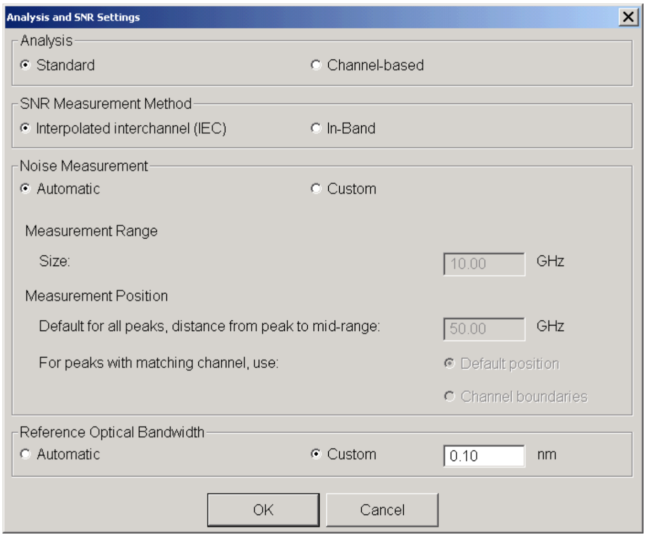
1. From the main window, click **Setup**.
2. Click the **General** tab, and then click **Analysis and SNR Settings**.



3. Under **SNR Measurement Method**, select the signal-to-noise measurement method you want to use:

➤ The IEC method uses interpolation of noise measured on both sides of the signal to estimate the noise level

➤ The in-band method uses a series of scans having different polarization states to estimate the noise level in band.



By default, the IEC method is selected in the Normal and Drift scan modes, whereas the in-band settings are selected when using the In-Band SNR measurement mode. However you can override these settings, which can be especially useful for comparison purposes, when reanalyzing data.

IMPORTANT

If you have old files created using an older version of the OSA software that did not feature the in-band option, you cannot reanalyze them using the in-band SNR mode.

4. Under **Noise Measurement**, select **Automatic** to use default values for noise measurements.

   Default values for IEC are 50 GHz for distance and 10 GHz for range.

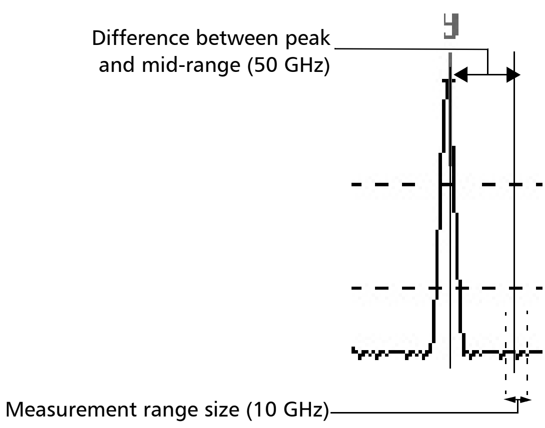
   OR

   Select **Custom** to specify a measurement range and position.

Note: *Even when you are using the In-Band SNR measurement mode, you should carefully define the noise measurement settings because the are used to determine the upper limit for the SNR measurement. The noise measurement settings that apply to the in-band mode are optimized for typical 10-gigabit modulated signals.*

To set the **Custom** settings:

➤ In the **Measurement Range Size** box, enter the range on which the noise will be measured. For example, if you are using the **Default Position** option, the range is set on both sides of the external limit of the distance-from-peak value.



- Under **Measurement Position,** in the **Default for all peaks, distance from peak and mid-range** box, enter the distance between the peak wavelength and the center of the noise measurement range.
- For **For peaks with matching channel, use** select either **Default position** or **Channel boundaries** to determine the position from where the center of the noise measurement range is to be located.

  When you select the **Default position** option, noise measurement will be made at the distance from the peak that has been set in the **Default for all peaks, distance from peak and mid-range** box.

  When you select the **Channel boundaries** option, for all peaks associated to channels from the selected channel list, noise measurement will be made at the boundaries of the channels. For more information, see *Managing Channels and Channel Lists* on page 47.

The settings from the **Custom** signal-to-noise measurement configuration will be applied in both the IEC mode and the in-band mode.

5. You can also set a reference optical bandwidth. For more information, see *Setting the Reference Optical Bandwidth* on page 44.
6. Click **OK**.

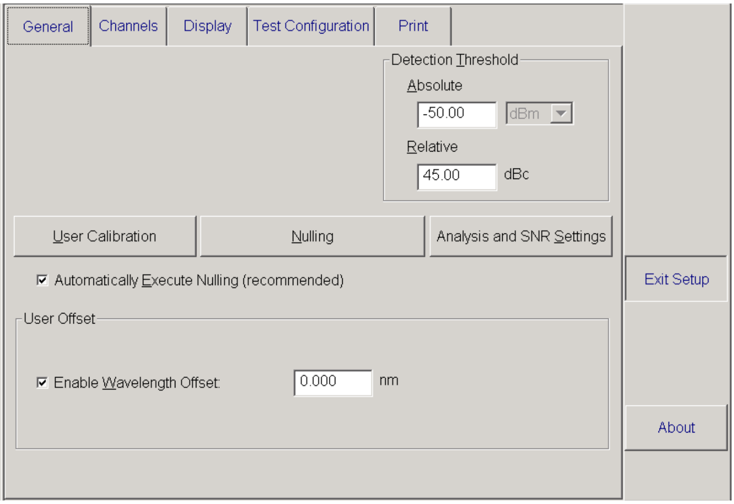
   Clicking **Cancel** closes the dialog box without applying the changes to the settings.

Setting the Reference Optical Bandwidth

You can choose to apply a reference optical bandwidth if your test procedure requires it. This feature is particularly useful if you intend to compare SNR figures from different OSAs, which may have different resolutions and noise-equivalent bandwidths.

To set the reference optical bandwidth:

1. From the main window, click **Setup**.
2. Click the **General** tab, and then click **Analysis and SNR Settings**.



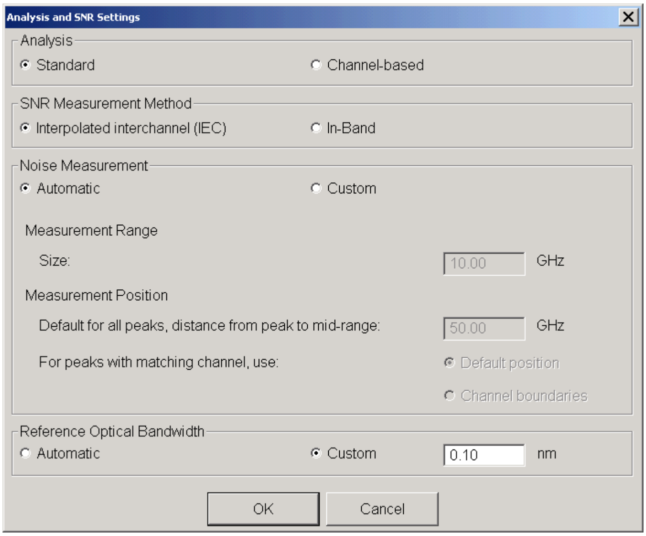
3. In the **Analysis and SNR Settings** dialog box, under **Reference Optical Bandwidth**, select **Custom**, to make SNR calculations based on the value you specify as your OSA noise-equivalent bandwidth, and specify the reference optical bandwidth value.

By default, the **Custom** option is selected with a value of 0.10 nm.

OR

Select **Automatic** to make SNR measurements using the OSA's true noise-equivalent bandwidth.

This value is calibrated for each OSA and will vary from one unit to another.



4. Click **OK**.

Clicking **Cancel** closes the dialog box without applying the changes to the settings.

Clearing the Trace Display

If you just acquired a trace with the wrong test control mode, bad settings, etc., you can clear the display and start over.

Note: *This operation affects only the selected trace (the one for which the tab is outlined green). Ensure that you select the right trace before proceeding.*

To clear the trace display:

1. Click the tab of the trace you want to clear.
2. From the main window, click **Storage**.

3. Click **New file**.

   If a there is currently a file in the application, you are offered to clear it. You are asked to confirm the operation.

   If the acquisition data of the file you are clearing needs to be saved, you are offered to save it:

   ➤ Click **Yes** to save the displayed acquisition data.

   OR

   ➤ Click **No** to discard the unsaved acquisition data and return to the main window.

4. Click **Exit Storage**.

The trace display is cleared.

5 Managing Channels and Channel Lists

Testing DWDM systems involves testing many channels on the same fiber. The application allows you to define channels one at a time or quickly generate them from current data. You can also rapidly create a list of equally spaced channels. Once a channel list is created, you can modify it as needed.

These channels are mostly related to the standard ITU wavelength table, for which standard ITU channel files are provided with your application. Channel definitions are necessary to allow drift and alarm tracking.

IMPORTANT

When you create, modify, recall or clear a channel list, the analyses of traces already opened in the application that are channel-based or that use channel boundaries for noise measurement become invalid.

For a trace with an invalid analysis, the data displayed in the Results tab, as well as the Quick Save and Quick Print function buttons are disabled.

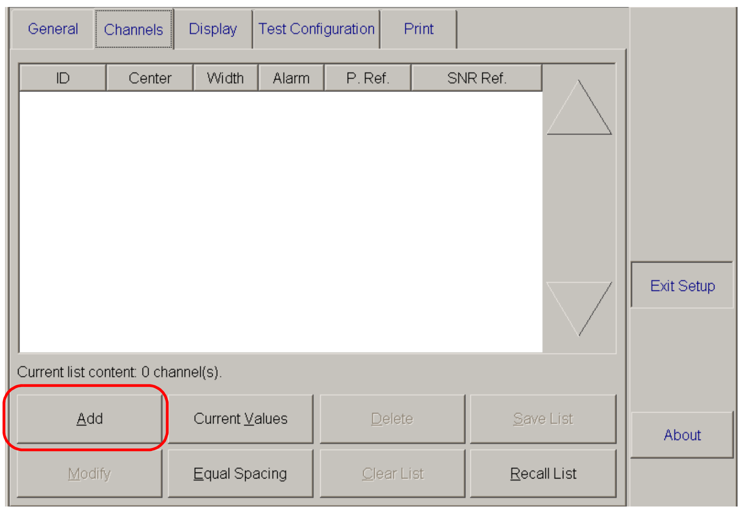
You may want to reanalyze such traces. For more information, see *Reanalyzing the Current Trace* on page 88.

Defining a Single Channel

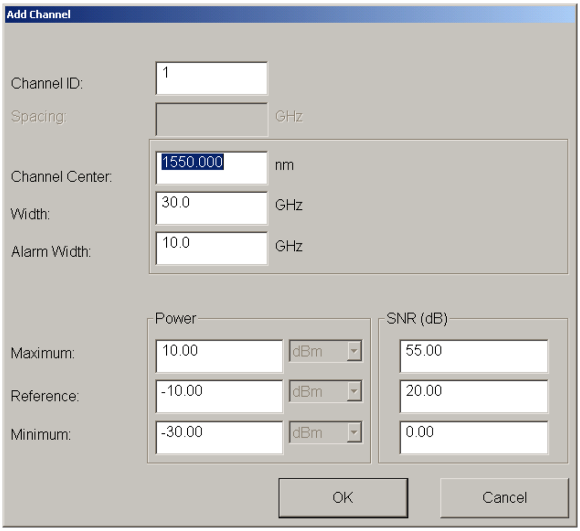
A channel can be defined according to your specifications.

To create only one channel:

1. From the main window, click **Setup**.
2. Click the **Channels** tab, and then click **Add**.



3. In the **Add Channel** dialog box, enter your channel parameters.



- **Channel ID**: Using alphanumeric values, enter the channel name.
- **Channel center**: Enter the central wavelength or frequency of the channel (wavelength: between 1250 nm and 1650 nm).
- **Width**: Enter the channel width. A typical WDM value could be 10 % of the channel spacing (for example, 10 GHz for a channel spacing of 100 GHz).
- **Alarm width**: Enter the range in which the central wavelength or frequency is allowed to move. The smaller the alarm width, the stricter the control on channel movement. In WDM, this value generally represents 90 % of the channel width (for example, 9 GHz for a channel width of 10 GHz).

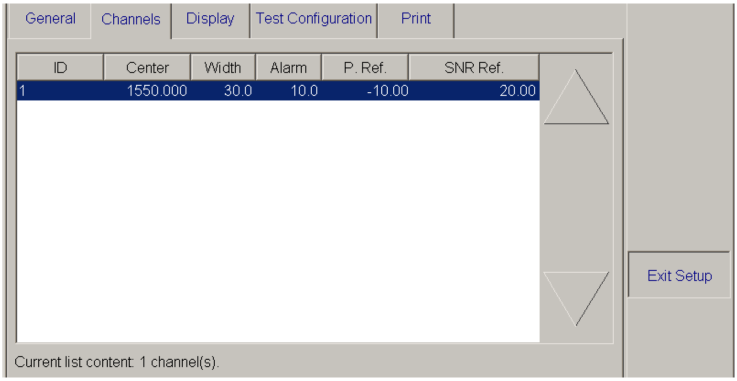
- **Maximum** (Power column): Enter the maximum power allowed without you being notified.
- **Reference** (Power column): Enter the power used as a reference for the Drift mode graph display.
- **Minimum** (Power column): Enter the maximum and minimum power allowed without you being notified.

Note: *If you are working with dBm units, the unit lists under **Power** are unavailable. If you are working with watts, the lists offer you the choice between W, mW, nW and pW (see* Selecting Power and Spectral Units *on page 34).*

- **Maximum** (SNR (W/W) column): Enter the maximum SNR allowed without you being notified.
- **Reference** (SNR (W/W) column): Enter the SNR used as a reference for the Drift mode graph display.
- **Minimum** (SNR (W/W) column): Enter the minimum SNR allowed without you being notified.

4. Click **OK**.

Your channel is displayed in the list of the **Channels** tab.



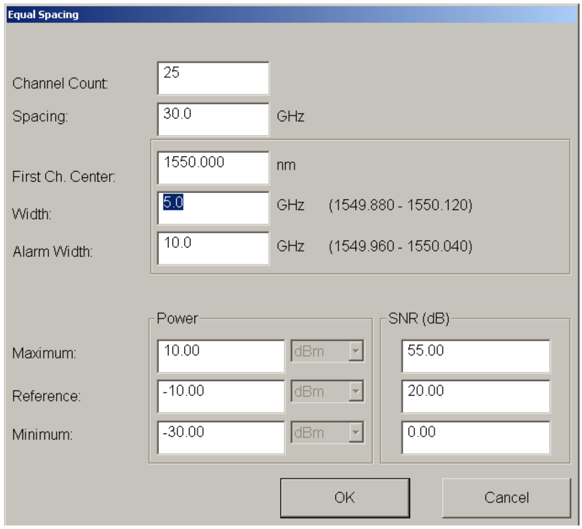
Creating a List of Equally Spaced Channels

You can make a list of equally spaced channels which, for example, can be used to comply with a standardized wavelength table.

To create a list of equally spaced channels:

1. From the main window, click **Setup**.
2. Click the **Channels** tab, and then click **Equal Spacing**.

3. In the **Equal Spacing** dialog box, enter your channel parameters.



- **Channel count**: Enter the number of channels (1 to 100) you want in your list.
- **Spacing**: Enter the space between channels (frequency between 20 GHz and 10000 GHz).
- **First ch. center**: Enter the central wavelength or frequency of the first channel (wavelength: between 1250 nm and 1650 nm).
- **Width**: Enter the width of all channels in your list. A typical WDM value could be 10 % of the channel spacing (for example, 10 GHz for a channel spacing of 100 GHz).
- **Alarm width**: Enter the range in which the central wavelength or frequency is allowed to move. The smaller the alarm width, the stricter the control on channel movement. In WDM, this value generally represents 90 % of the channel width (for example, 9 GHz for a channel width of 10 GHz).

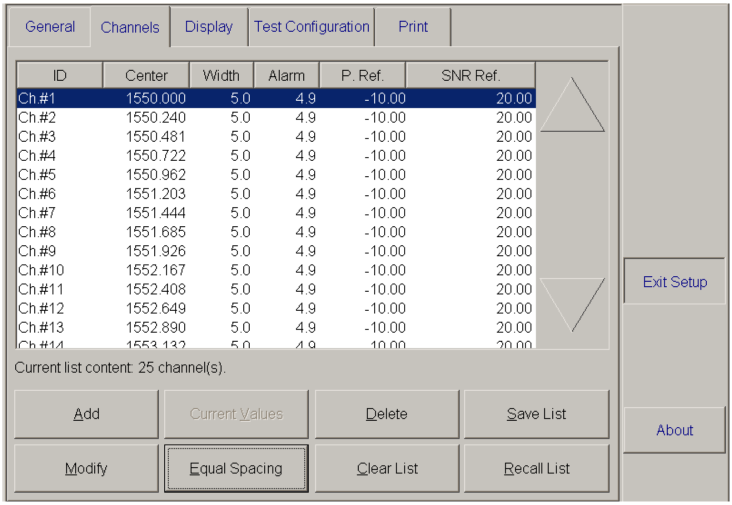
- **Maximum** (Power column): Enter the maximum power allowed for each new channel without you being notified.
- **Reference** (Power column): Enter the power used as a reference for the Drift mode graph display.
- **Minimum** (Power column): Enter the minimum power allowed for each new channel without you being notified.

Note: *If you are working with dBm units, the unit lists under **Power** are unavailable. If you are working with watts, the lists offer you the choice between W, mW, nW and pW (see* Selecting Power and Spectral Units *on page 34**).*

- **Maximum** (SNR (W/W) column): Enter the maximum SNR allowed for each new channel without you being notified.
- **Reference** (SNR (W/W) column): Enter the SNR used as a reference for the Drift mode graph display.
- **Minimum** (SNR (W/W) column): Enter the minimum SNR allowed for each new channel without you being notified.

4. Click **OK**.

All channels of the list are displayed in the list of the **Channels** tab.



Creating a Channel List with Current Acquisition Values

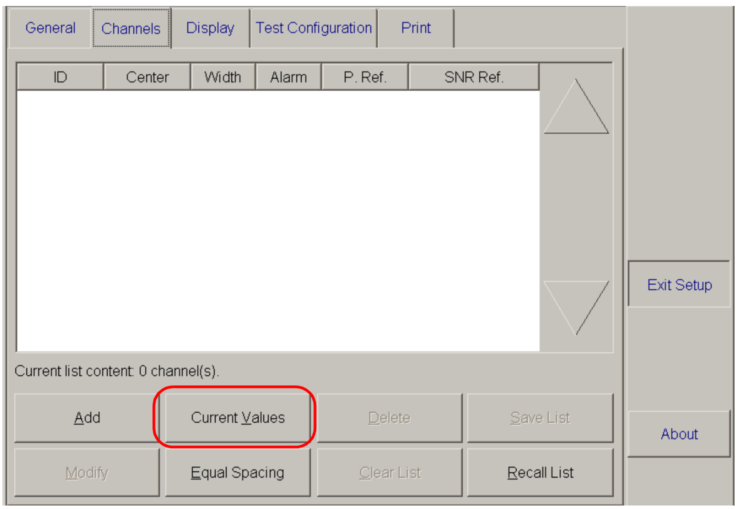
You can create a channel list based on a trace you have just acquired. For details about trace acquisition, refer to *Testing DWDM Systems in Normal, In-Band, or Drift Mode* on page 65.

IMPORTANT

The new list based on current acquisition values will replace any previous list without you being notified. Before using this function, ensure that you want to replace the list that is currently displayed on the Channel tab or that the list is empty (to empty a list, refer to Deleting Channels or Clearing the List *on page 60*).

To create a channel list based on current acquisition values:

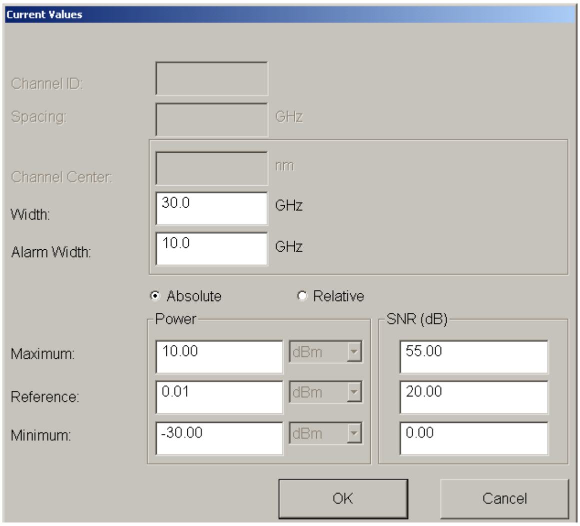
1. From the main window, click **Setup**.
2. Click the **Channels** tab, and then click **Current Values**.



3. In the **Current Values** dialog box, you can change some parameters (for details about parameters not describe here, refer to *Defining a Single Channel* on page 48).

4. Select **Absolute** or **Relative** for power and SNR thresholds. These are the limits within which the peak can move without causing an alarm.

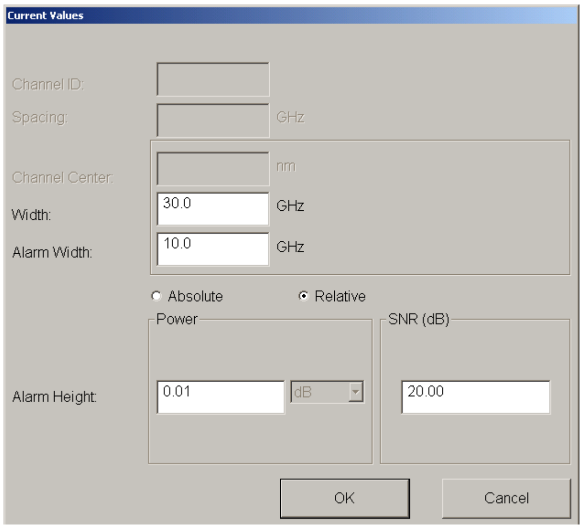
   ➤ **Absolute**: Enter the minimum and maximum values for power and SNR that will apply to every channel in the list.



Note: *Reference power and Reference SNR parameters are not configurable; they are based on the peak's values.*

➤ **Relative**: Enter the alarm height (range within which peaks can vary without causing an alarm) for power and SNR.

This value initially corresponds to the difference between absolute maximum and minimum values, but it is totally independent (you may change one without affecting the other).



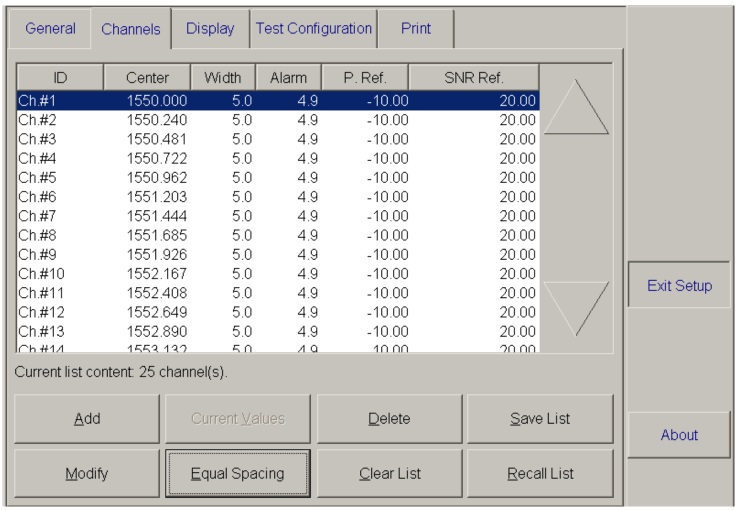
5. Click **OK**.

Modifying Channels

When your DWDM system is modified to accept more channels or a different ITU table, you cam modify existing channels to reflect the changes.

To modify a channel:

1. From the main window, click **Setup**, and then click the **Channels** tab.



2. In the list, select the channel to modify.

3. Click **Modify**.

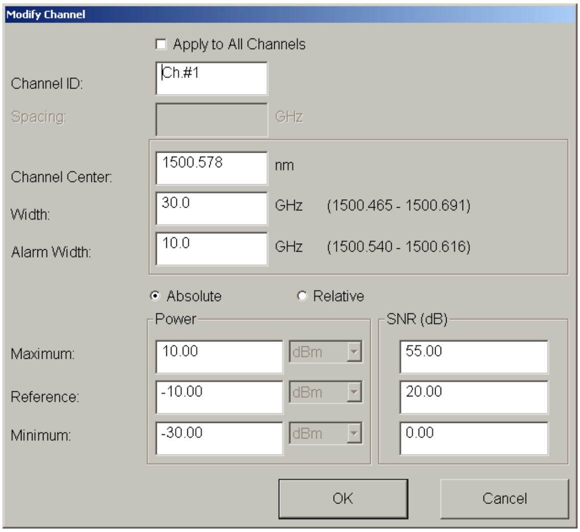
   The **Modify Channel** dialog box, in which you make the required parameter changes, opens.

IMPORTANT

Before making any changes, if you want the changes to apply to all channels, select the Apply to all Channels check box. If you do not select the box before making changes, they will not be applied to all of the channels.

For a detailed description of parameters available in the **Modify Channel** dialog box, see *Defining a Single Channel* on page 48 and *Creating a Channel List with Current Acquisition Values* on page 55.

If you leave a box empty, it will return as it was before your changes.



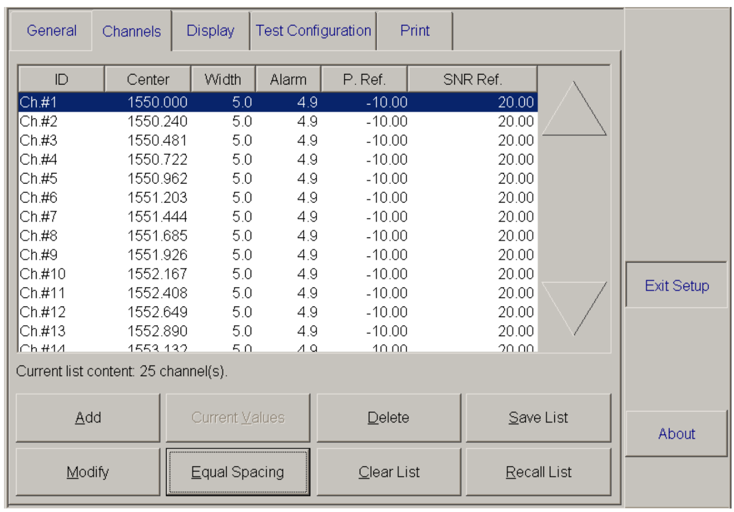
4. Click **OK**.

Deleting Channels or Clearing the List

When your DWDM system is modified to reduce the number of channels or to accept a different ITU table, you can delete existing channels to reflect the changes. You can also clear the entire list and make a new one.

To delete a single channel or clear the entire channel list:

1. From the main window, click **Setup**.
2. Click the **Channels** tab.



3. In the list, select the channel to remove, and then click **Delete**.

   OR

   Click **Clear List**.

4. In the message box asking you to confirm deletion, click **Yes**.

Saving a Channel List

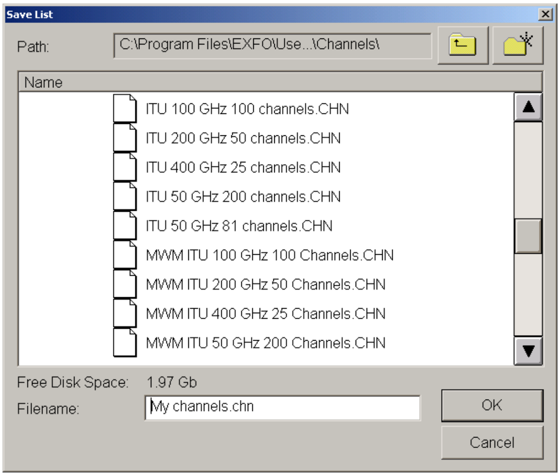
Lists can be saved to be reused next time you test the same fiber.

To save a channel list:

1. Ensure that the channel list you want to save is displayed on the **Channels** tab, and then click **Save List**.
2. In the **Save List** dialog box, in Filename, enter the channel list name.

   OR

   Scroll up and down the list to select the file to overwrite.



3. Click **OK**.

Note: *If the name already exists, a message asking you if you want to overwrite the file appears. To overwrite the file, click **Yes**; to rename the file, click **No**.*

Recalling a Channel List

When you retest a fiber for which you have already configured a channel list, you can recall the list instead of configuring it again.

Note: *If an unsaved list is already displayed on the* ***Channels*** *tab, you will receive a message asking if you want to save it before recalling another channel list.*

IMPORTANT

When you recall a channel list, the analyses of traces already opened in the application that are channel-based or that use channel boundaries for noise measurement become invalid.

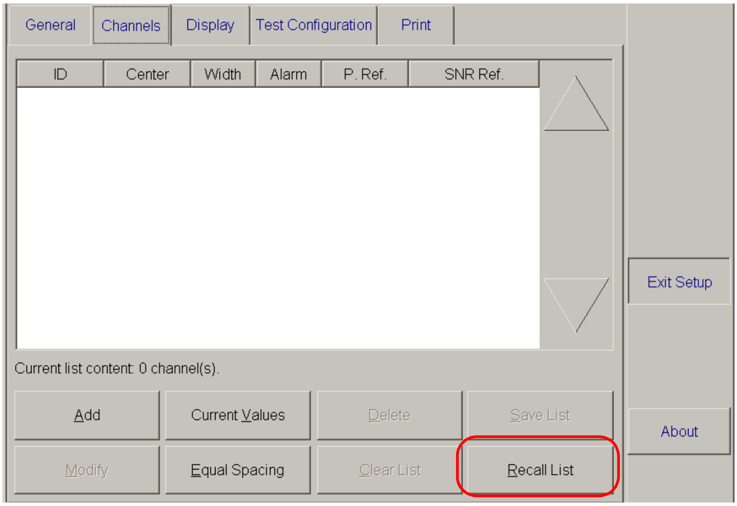
For a trace with an invalid analysis, the data displayed in the Results tab, as well as the Quick Save and Quick Print function buttons are disabled.

You may want to reanalyze such traces. For more information, see *Reanalyzing the Current Trace* on page 88.

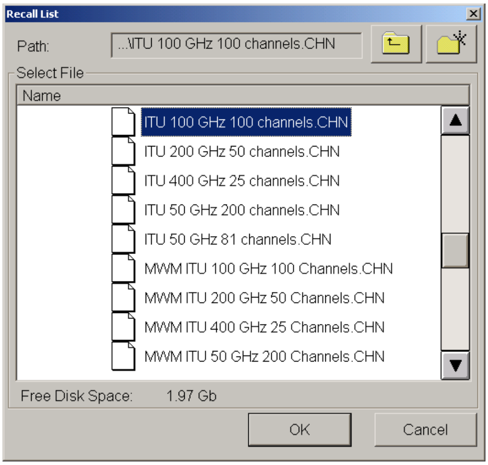
To recall a channel list:

1. From the main window, click **Setup**.

2. Click the **Channels** tab, and then click the **Recall List** button.



3. In the **Recall List** dialog box, scroll up and down to select the channel list file required.



4. Click **OK**.

6 Testing DWDM Systems in Normal, In-Band, or Drift Mode

Optical spectrum analysis is the measurement of optical power as a function of wavelength or frequency. Applications include testing laser light sources for spectral purity and power distribution, as well as testing transmission characteristics of optical devices.

Passive components, the heart of a dense WDM network, include filters, multiplexers, demultiplexers, channel add/drop devices, and phased arrays. As dense WDM technology attains increasingly tighter wavelength spacing, the requirements and performance specifications for wavelength-selective components become more demanding.

IMPORTANT

For optimal test results, you must allow a minimum warm up period of two hours for your Optical Spectrum Analyzer before starting your tests.

Selecting and Configuring a Test Mode

Your Optical Spectrum Analyzer gives you different ways to test your DWDM systems.

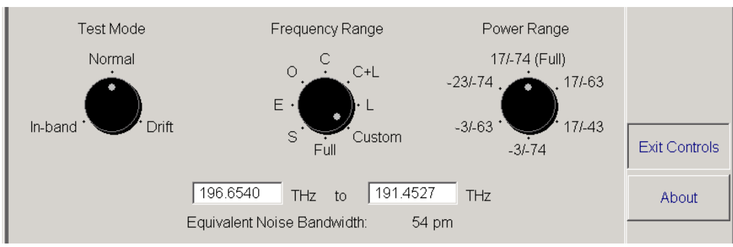
You start with the selection of a test mode:

- Normal (default): sweeps across the channel spectrum.
- In-band: sweeps across the channel spectrum as for the normal mode, and performs a series of scans in different polarization states until it can accurately estimate each signal in-band SNR measurements.
- Drift: measures variations over time for every channel on a fiber.

To select a test mode:

1. From the main window, click **Controls**.
2. In the controls window, using the **Test Mode** dial, select a test mode.

Note: *Changes made in the controls window will only take effect with subsequent acquisitions.*



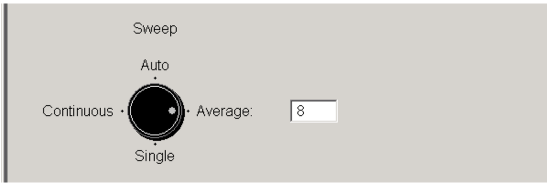
Note: *If the mention **User-Calibrated Module** is displayed in the upper right-hand corner, it indicates that you have previously performed a wavelength calibration as explained in* Performing a Wavelength Calibration *on page 20.*

3. Configure the mode according to the instructions in *Configuring the Normal Mode* on page 67, *Configuring the In-Band Mode* on page 68, or *Configuring the Drift Mode* on page 69.

Configuring the Normal Mode

When you select **Normal** as test mode, the **Sweep** dial appears on the top part of the controls window.

Select a sweep type according to the measurements you want to perform.



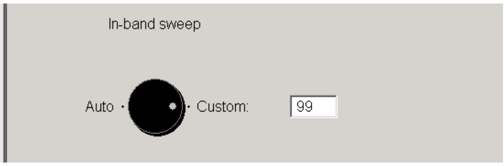
- **Auto**: Performs spectrum measurements with eight sweeps, on which the average is based.
- **Average**: Spectrum measurements are performed based on the number of sweeps you have entered in the text box. The trace will be displayed after each acquisition and averaged with the previous traces.
- **Single**: Spectrum measurements are performed once, according to the selected power range. If you select the full power range, the module will perform three subacquisitions before the acquisition is complete.
- **Continuous**: Spectrum measurements are performed continuously until you click **Stop**. They will be averaged by the number of required acquisitions needed to cover the selected range. Results are refreshed after each acquisition.

The unit is ready to perform measurements; click **Exit Controls** to return to the main window. For more information on performing measurements, see *Measuring DWDM Systems Performance* on page 72.

Configuring the In-Band Mode

When you select **in-band** as test mode, the **In-band sweep** dial appears on the top part of the controls window.

Select a sweep type according to the measurements you want to perform.



- Auto: Performs spectrum measurements with a minimum of four sweeps.
- Custom: The minimum number of sweeps is set manually in the corresponding box.

Note: *If an in-band SNR estimation is not found for each peak within the minimum number of sweeps, the system will ask you to perform more sweeps as required.*

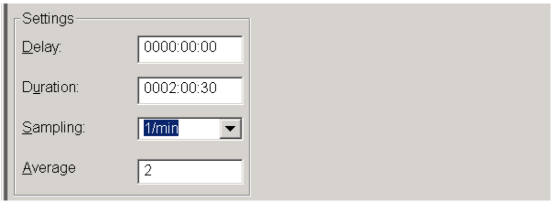
The unit is ready to perform measurements; click **Exit Controls** to return to the main window. For more information on performing measurements, see *Measuring DWDM Systems Performance* on page 72.

Configuring the Drift Mode

When you select **Drift** as test mode, the **Settings** parameters appear on the top part of the controls window.

Note: *In order to perform drift measurements, you previously have to define a list of channels. For more information, see* Managing Channels and Channel Lists *on page 47.*

Configure the parameters according to the measurements you want to perform.



- **Delay**: Enter the duration of the delay you want to use. This could be useful when you must wait for sources to stabilize.
- **Duration**: Enter the duration of the acquisition.
- **Sampling**: Select the sampling rate, which is the frequency of the sweeps.

Note: *A large amount of stored data affects the loading and saving performances of the unit. Since stored data depends on the **Duration** and **Sampling** settings, EXFO recommends using high sampling rates for short durations only.*

- **Average**: Enter the number of sweeps (between 1 and 99) you want the unit to use to average the results.

The unit is ready to perform measurements; click **Exit Controls** to return to the main window. For more information on performing measurements, see *Measuring DWDM Systems Performance* on page 72.

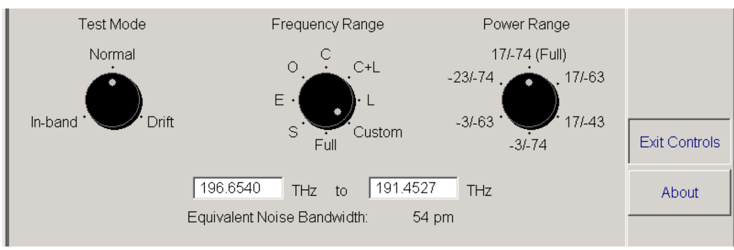
Selecting the Wavelength or Frequency Range

Before performing measurements on an optical spectrum, you must select a range of wavelengths (or frequencies, depending on selected spectral units, see *Selecting Power and Spectral Units* on page 34).

To select the wavelength or frequency range:

1. From the main window, click **Controls**.
2. In the controls window, using the **Wavelength Range** (or **Frequency Range**) dial, select a spectral range.

   Refer to the table below for a description of each setting.



Setting	Wavelength Range (nm)	Frequency Range (THz)
Full (OSA's entire range)	1250 to 1625	239.8340 to 181.6924
S (short band)	1460 to 1530	205.3373 to 195.9428
E (extended band)	1360 to 1460	220.4356 to 205.3373
O (original band)	1260 to 1360	237.9305 to 220.4356
C (conventional band)	1530 to 1565	195.9428 to 191.5607
C+L (conventional and long bands combined)	1530 to 1625	195.9428 to 184.4877
L (long band)	1565 to 1625	191.5607 to 184.4877
Custom	User-defined range	

Note: *With some selections, namely the **Full** range, the accuracy obtained may be compromised. If this happens, you will be notified by a message appearing on the lower part of the screen.*

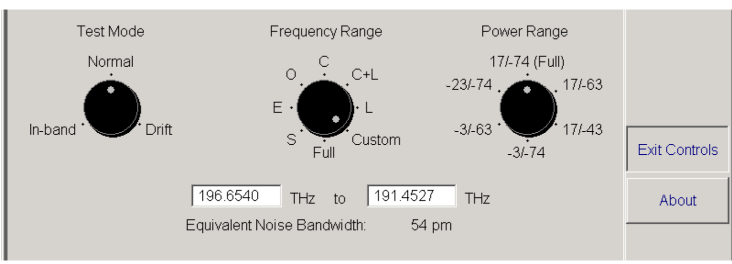
3. Click **Exit Controls** to return to the main window.

Selecting the Power Range

Before performing measurements on an optical spectrum, you must select the power range you want the OSA to use.

To select the power range:

1. From the main window, click **Controls**.
2. In the controls window, using the **Power Range** dial, select the allowable power input range.



3. Click **Exit Controls** to return to the main window.

Measuring DWDM Systems Performance

When measuring DWDM systems performance, you acquire and store data on the following system characteristics:

➤ number of channels in the fiber

➤ channels' frequency/central wavelength

➤ comparison between what your channels' central wavelength, power, and signal-to-noise ratio should be and what they are in reality.

Once you have selected and configured the test mode (*Selecting and Configuring a Test Mode* on page 65), entered test parameters (*Selecting the Wavelength or Frequency Range* on page 70 and *Selecting the Power Range* on page 71), and selected a trace display (*Selecting the Active Trace* on page 33) you are ready to perform measurements.

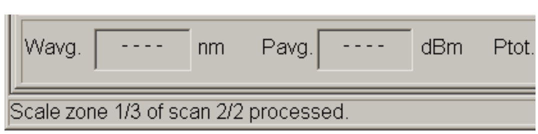
To measure a DWDM system performance:

1. Connect a system's fiber to the OSA input port.

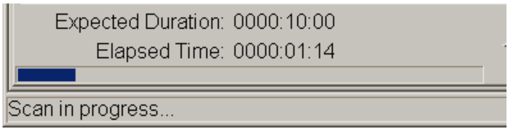
2. From the main window, click **Start**.

   The button changes to **Stop** and the measurements start. The trace display is updated at every sweep. Once the test is complete, the final trace is displayed and detailed results appear on the **Results** tab.

   ➤ If you are using the Normal or In-band test mode, a progress indicator appears on the lower left part of the window.

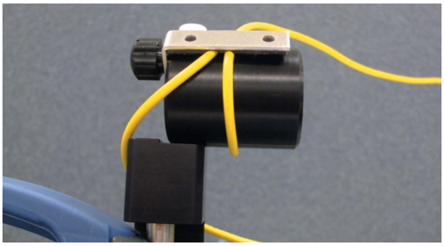


➤ If you are using the Drift test mode, a progress bar appears in the lower left part of the window. This bar gives an indication of how long the drift has been running and how much time is left before the test is complete.

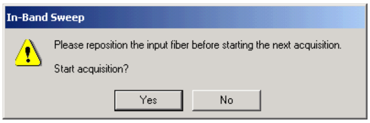


➤ During an In-band test, after each sweep, the results are analyzed and, if required, the system prompts to move the fiber and start another sweep in order to be able to combine traces to make the in-band SNR measurement estimation.

When you purchased your FTB-5240/5240B Optical Spectrum Analyzer, *the* State of Polarization Generation Tool was included for this purpose.



However, if you do not have the tool, follow the instructions in *Moving the Fiber for In-Band Mode Testing* on page 29 to properly move the fiber prior to a sweep.



3. At the end of the measurement, you can save the trace if you need to (refer to *Saving a Trace File* on page 129).

Customizing and Viewing Results from Tests Done in Normal and In-Band Modes

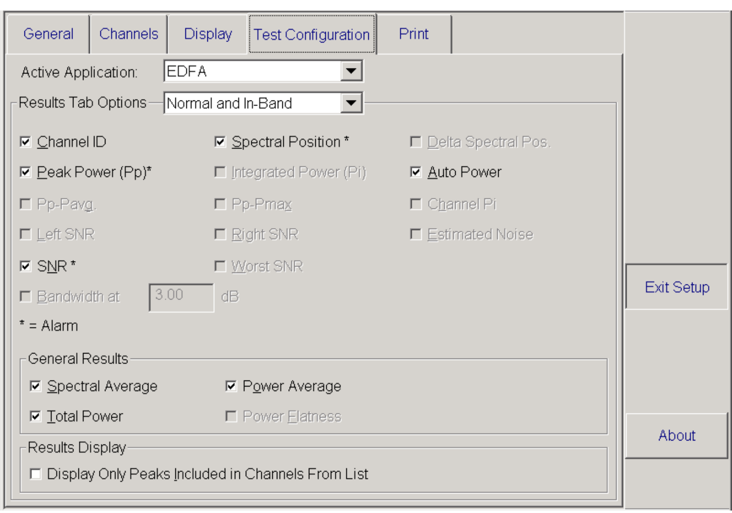
It is possible to select which results you would like displayed on the **Results** tab when you make measurements using Normal and In-Band modes.

The results you choose are displayed in the Results table as column titles, as well as below the table.

Note: *You can customize the result display before or after performing measurements.*

To customize the results display:

1. From the main window, click **Setup**.
2. Select the **Test Configuration** tab.



3. In the **Result Tab Options** list, select **Normal and In-Band**.

4. Select the information to be displayed in the columns to the right-hand side of the Peak column. You can select up to five options according to the information you need.

- **Channel ID**: is the name you have given to the channel.
- **Spectral position**: is the wavelength or frequency position.
- **Delta spectral pos.**: indicates the spectral position delta for each channel.
- **Auto power**: is the automatic signal power (the software chooses the best value between Pp and Pi).
- **Integrated power (Pi)**: represents the sum of the power values included between the automatically detected boundaries of this peak, minus the estimated noise contribution between the same boundaries.

  In some cases, for instance CATV signals, signals with high-frequency modulation, or signals with an inherent line width greater than one tenth of the OSA's resolution bandwidth, this calculation becomes a better estimation of the true peak power.
- **Peak power (Pp)**: is the peak signal power. This may differ a little bit from the peak measurement on the spectrum due to the fact that estimated noise had to be subtracted to yield peak signal power.
- **P–Pavg**: indicates the current channel's peak signal power (Pp) minus the average of peak signal powers (Pavg) of all the detected channels.
- **P–Pmax**: indicates the current channel's peak signal power (Pp) minus the most powerful detected channel’s peak signal power.

- **Channel Pi**: is the sum of the power values included inside the channel's alarm width.

  This value appears in the **Results** table only when the peak is in a defined channel. Also, if two peaks are in the same channel, the value will be the same for the two peaks.

- **Left SNR**: in IEC mode, SNR to the left of the signal. In In-Band mode, the SNR value is displayed.
- **Right SNR**: in IEC mode, SNR to the right of the signal. In in-band mode, the SNR value is displayed.
- **Estimated Noise**: is the power level of the noise as estimated with he current estimation method (in-band or IEC).
- **SNR**: average SNR calculated using the left and right SNR for IEC mode; for in-band mode, SNR is calculated based on an estimation of the noise under the peak.
- **Worst SNR**: in IEC mode, indicates the worst SNR of the signal to the left and right of the channel. In in-band mode, the SNR value is displayed.
- **Bandwidth at *.****: is the bandwidth of the channel at a dB value that you can adjust in the corresponding box.

Note: *You can change the Analysis and SNR settings as instructed in* Setting the Analysis Method *on page 36.*

Note: *If you see an asterisk (*) or a greater than symbol (>) in the **Results** tab next to the SNR results, it means that this measurement is not optimized. This could be for any of the following reasons: saturated signal due to an improper selection of the power scale, insufficient variation of polarization conditions between scans of the in-band SNR measurement session, signal changing the polarization condition in the middle of a scan or that sees its power change significantly due to a faulty manipulation during the in-band SNR measurement session.*

Once you have selected five items, the remaining items become unavailable. You must clear an item to choose another.

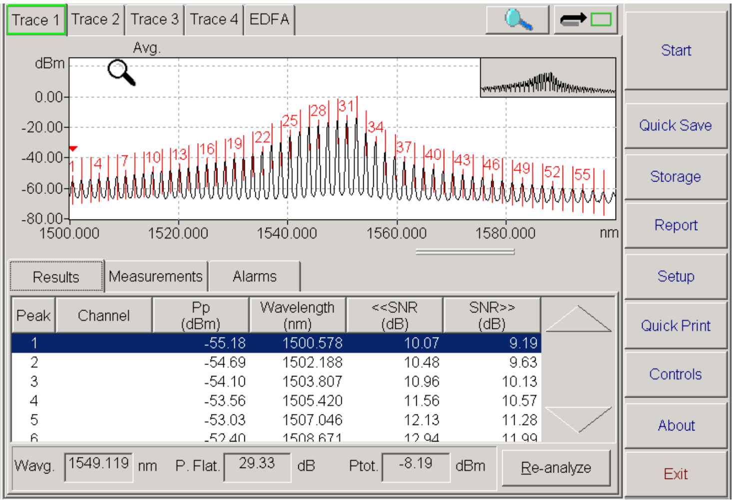
5. Under **General Results**, you can also select up to three out of the four global result types in order to display them below the Results table in the **Results** tab.

   - **Spectral average**: indicates the average wavelength value from all of the peaks detected in the current acquisition. The peak power of each peak is used as the weighting factor.
   - **Power average**: indicates the sum of all of the peak powers of the peaks detected in the current acquisition, divided by the total number of peaks.
   - **Total power**: indicates the sum of each peak power value detected in the current acquisition.
   - **Power flatness**: indicates the difference between the maximum and minimum peak power values of the detected peaks, in dB.

6. Under **Results Display**, you can also select the **Display Only Peaks Included in Channels From List** check box to display only the peaks included in channels defined in a recalled channel list in the **Results** tab.

7. Click **Exit Setup**.

If you click the **Results** tab in the main window, you will see the data you have selected on the **Test Configuration** tab.



To scroll the peak list, you can use the up and down arrow buttons. You can also press the up and down keyboard arrow keys.

To perform manual analysis on your results, use the markers as explained in *Analyzing Results Manually* on page 86.

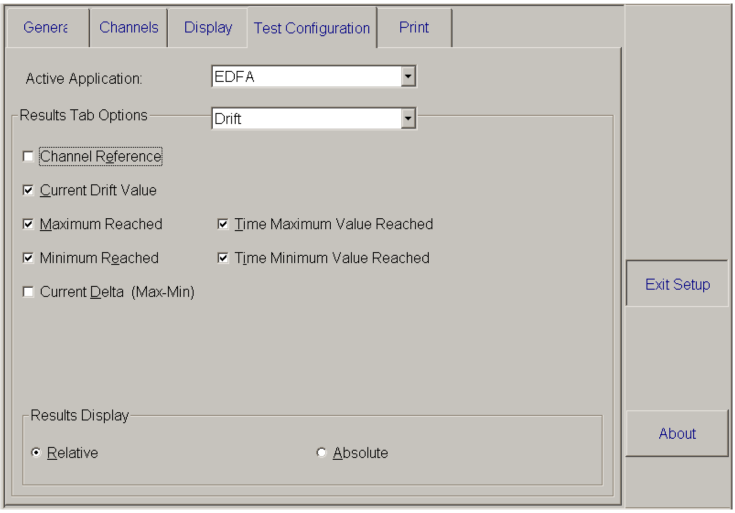
Customizing and Viewing Drift Mode Results

It is possible to select which results you would like displayed in the **Results** tab when testing in Drift mode.

Note: *You can customize the result display before or after performing your test. The display changes accordingly.*

To customize Drift test results:

1. From the main window, click **Setup**.
2. Click the **Test Configuration** tab.



3. From the **Result tab options** list, select **Drift**.

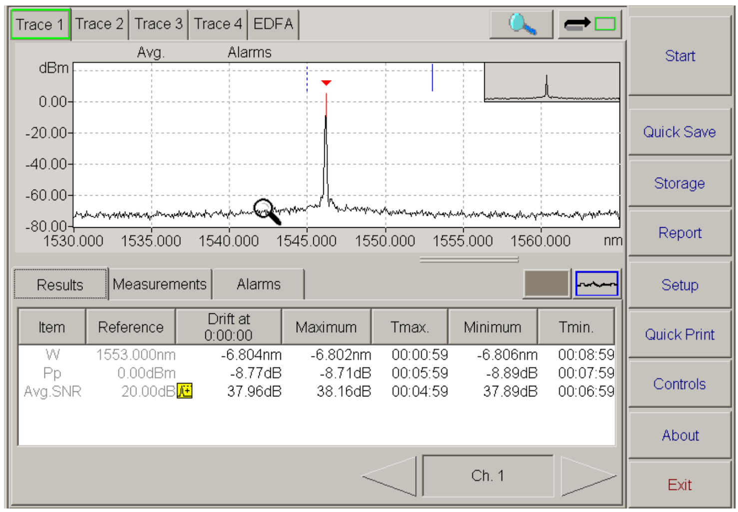
4. Select up to six items according to the information you need.
   - **Channel reference**: channel reference value for your drift.
   - **Current drift value**: current drift value (you will see **Drift at [time]** in the **Results** tab).
   - **Maximum reached**: maximum wavelength or frequency value reached during the drift according to your choice of units.
   - **Minimum reached**: minimum wavelength or frequency value reached during the drift according to your choice of units.
   - **Current delta (Max. - Min.)**: current delta (maximum value minus minimum value) for the channel.
   - **Time maximum value**: time of the drift at which the channel was at its highest value.
   - **Time minimum value**: time of the drift at which the channel was at its lowest value.

   Once you have selected six items, the remaining items become unavailable. You must clear an item to choose another.

5. Under **Results Display**, select if you want the results to be absolute or relative to the reference.
   - Absolute results will always give you the result value (for example, the reference value 1514.684 nm becomes 1514.693 after five minutes of drifting).
   - Relative results will always give you the variation value (for example, the reference 1514.684 nm had a variation of 0.009 nm after five minutes of drifting).

6. Click **Exit Setup** to return to the main window.

From the main window, click the **Results** tab to see the data you have selected on the **Test Configuration** tab.

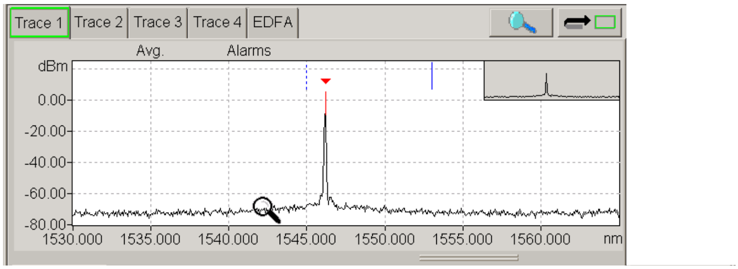


To scroll the channel list, you can use the right and left arrow buttons.

To perform manual measurements on your results, use the markers as explained in *Adjusting the Trace Display* on page 13.

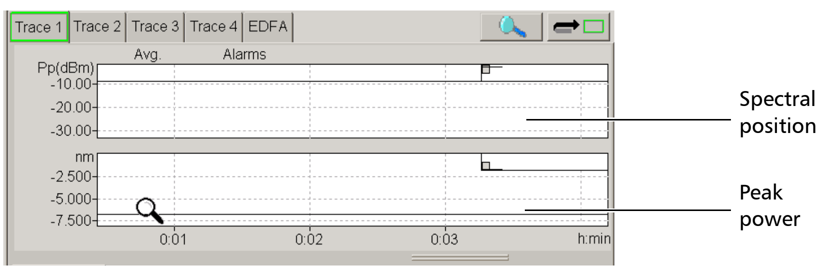
Once channel drift (wavelength and power) has been measured over a certain period of time, you can view test results on the **Results** tab, but you can also see them in the trace display.

You can display either the last acquired trace or the spectral position, power, and/or SNR drift traces. The last acquired trace is shown by default.



In this case, the **Trace Toggle** buttons look like this:

To display the wavelength, power, and/or drift traces, click the button to the right. The trace display now looks like this:

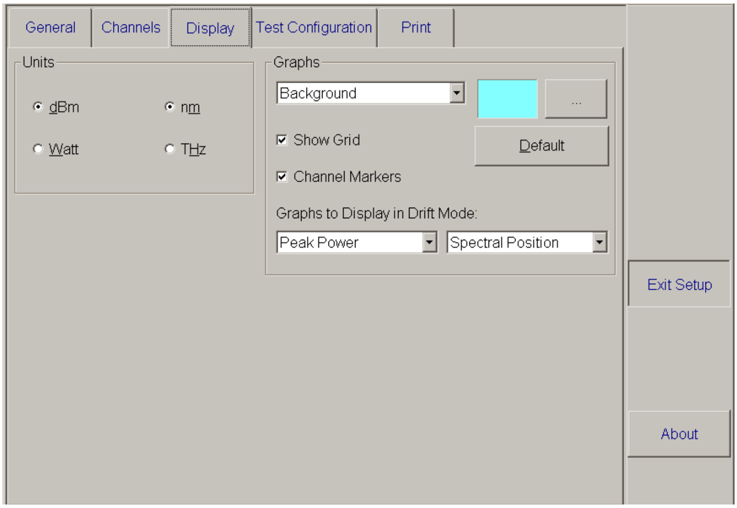


In this case, the **Trace Toggle** buttons look like this:

In Drift mode, you can always view either the spectral position or the power drift results.

To select which traces to view:

1. From the main window, click **Setup**.
2. Click the **Display** tab.

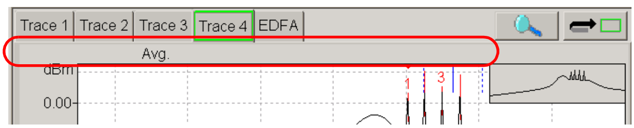


3. Under **Graphs**, in the **Graphs to display in Drift mode** lists, select the graphs to display.

   The item you select on the left will be the upper graph on the trace display and the item you select on the right will be the lower graph on the trace display.

Viewing Alarms

If alarms occurred during the acquisition, if there is a wavelength or user-induced offset, or if the trace is averaged, you will notice the **Alarms**, **Avg.**, **User Cal.**, **Uncal. Res.** or **Offset** mentions (depending on the situation) appear over the trace display.

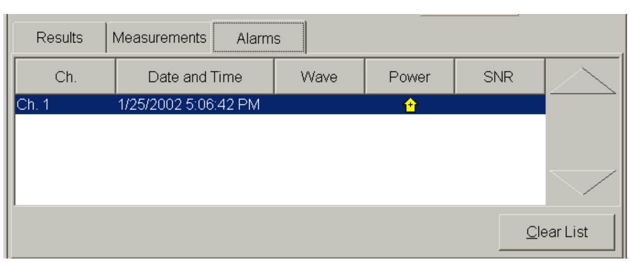


Note: *If an alarm occurs during the acquisition, a symbol will appear next to the bad value, allowing you to quickly pinpoint the alarms.*

When you click the **Alarms** tab on the main window, you can view where alarms were detected during your acquisition.

The first column gives you the channel number (ID), while the second gives you the date and time the alarm occurred. The last three columns give you the status of wavelength, power, and average or In-Band SNR for this alarm.

You can navigate up or down the list using the arrow buttons on the side of the alarm display.



The following table illustrates the various symbols shown in the Alarms view.

Symbol	Definition
	The SNR exceeds the upper SNR threshold.
	The SNR is below the lower SNR threshold.
	The signal in this channel has been lost, then recovered.
	The peak is not detected or is out of the defined channel.
	The peak position is below the left threshold.
	The peak position exceeds the right threshold.
	The peak power exceeds the upper threshold (maximum power).
	The peak power is below the lower threshold (minimum power).

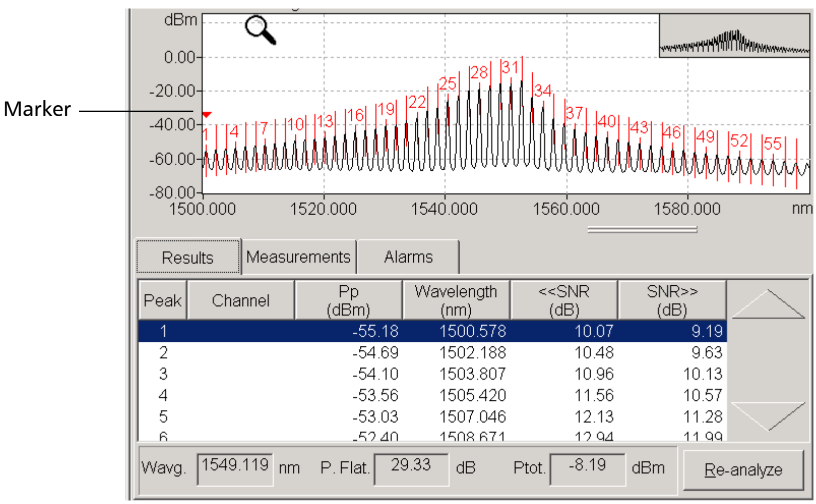
If you want to clear the list of alarms, click **Clear List**. The list of alarms will be deleted until you make a new acquisition.

Analyzing Results Manually

Once you have performed a test, you can manually analyze parts of the results.

Selecting Individual Channel Results

To locate a peak on the graph, you can either select result lines or select the corresponding peak on the graph. A small red marker will point down at the peak, and the corresponding row on the **Results** table will be highlighted.



When you select a peak, the red marker moves accordingly to indicate the corresponding peak.

To zoom in on a peak, see *Adjusting the Trace Display* on page 13.

Selecting and Moving Markers

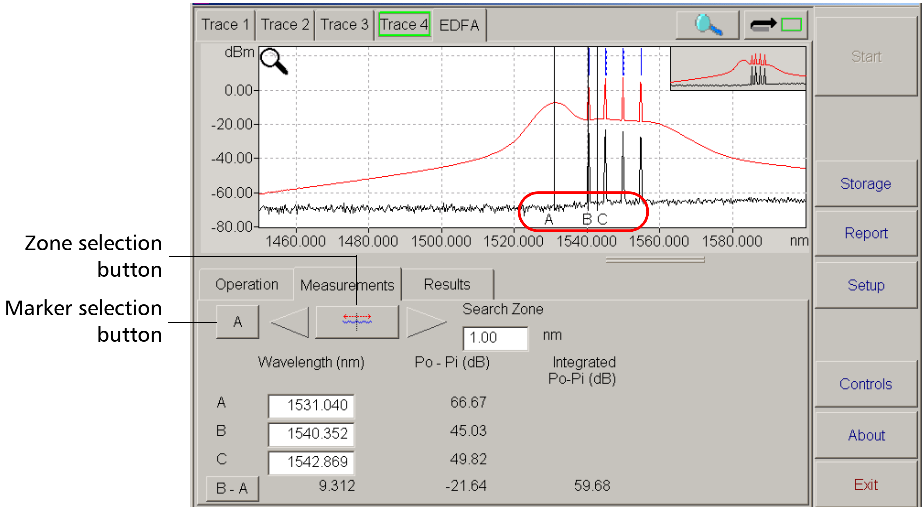
On the **Measurements** tab, there are three markers: A, B, and C. These markers also appear in the graph and table displays.

To move a marker to the trace portion you want to view:

1. On the **Measurements** tab, click the marker selection button until it displays the letter of the marker you want to move.

   OR

   Select the marker directly in the trace display.



2. Click and drag the marker to the desired area.

   Under **Wavelength**, the value displayed in the box next to the selected marker changes according to the marker's position. If you want to set a precise value for the marker, enter it in the box.

In the lower left-hand corner, a button indicates a subtraction of two markers. To change the marker order, click this subtraction button. The result appears at the bottom of the wavelength values and in the table display.

You can also move the markers with the left and right arrow buttons according to the selection on the button between the arrows. To change the selection, click the zone selection button until the desired one appears.

- : to move the marker over the whole trace.
- : to move the marker over dips. Set the zone size in the **Search Zone** box.
- : to move the marker over peaks. Set the zone size in the **Search Zone** box.

Reanalyzing the Current Trace

When you click the **Re-analyze** button (at the bottom of the **Results** tab), the system makes a new analysis of the displayed trace.

This is useful to apply changes made to the **Detection threshold** settings, as well as the **Analysis and SNR Settings** (**Setup** window > **General** tab). Changes apply to the selected trace only.

For more information, see the following sections:

- *Setting the Detection Thresholds* on page 35.
- *Setting the Analysis Method* on page 36

You can also re-analyze a trace after you have created, modified, recalled or cleared a channel list, or after you have recalled a trace with a channel list different than the one already in memory. The analyses of traces already opened in the application that are channel-based or that use channel boundaries for noise measurement become invalid.

When you re-analyze a trace with an invalid channel-based analysis, the data displayed in the **Results** tab, as well as the **Quick Save** and **Quick Print** function buttons are reenabled.

Note: *If your trace file was taken with a version of the Optical Spectrum Analyzer application that did not feature the in-band mode, the latter will not be available for reanalyzing your trace and you can only use the IEC mode.*

7 Testing Distributed-Feedback Lasers

You can specifically test distributed-feedback (DFB) lasers with your FTB-5240/5240B.

IMPORTANT

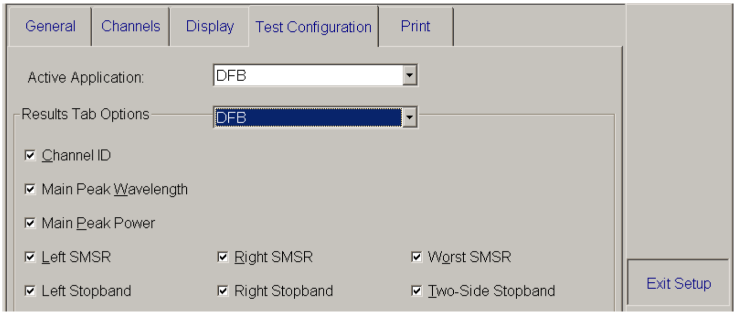
For optimal test results, you must allow a minimum warm up period of two hours for your Optical Spectrum Analyzer before starting your tests.

Selecting the DFB Laser Test Application

The FTB-5240/5240B offers many test applications. One of them is dedicated to testing DFB lasers.

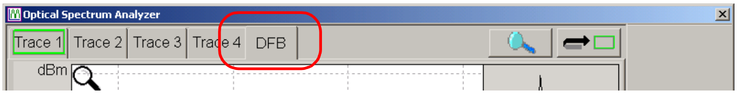
To select the DFB laser application:

1. From the main window, click **Setup**.
2. Click the **Test Configuration** tab.



3. In the **Active Application** list, select **DFB**, and then click **Exit Setup**.

   In the main window, the **DFB** tab appears.



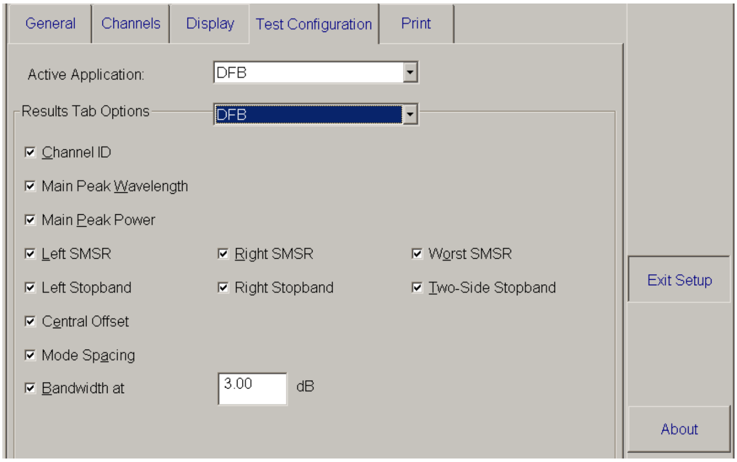
Customizing and Viewing DFB Laser Test Results

You can choose which results you want to see on the **Results** tab of your DFB test.

Note: *You can customize your result display before or after performing the test. The display will change accordingly.*

To customize the DFB laser test result display:

1. From the main window, click **Setup**, and then click the **Test Configuration** tab.



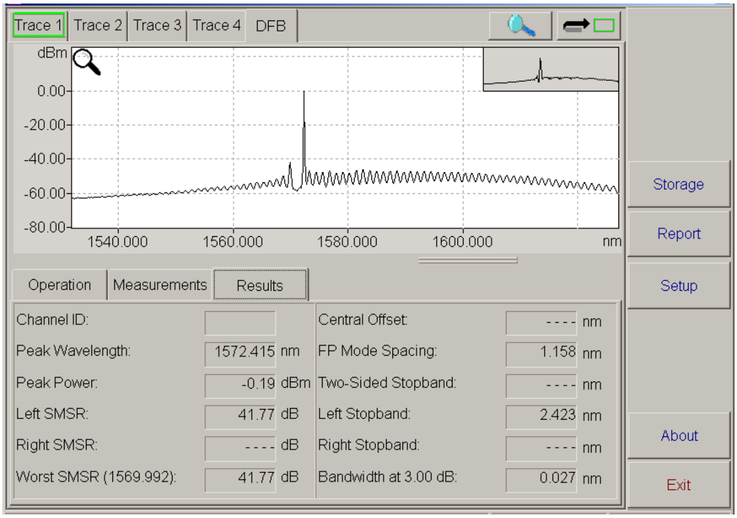
2. In the **Result Tab Options** list, select **DFB**.

3. Select the check box next to the information you require.

- **Channel ID**: indicates the channel for which the results apply.
- **Main Peak Wavelength**: indicates the wavelength of the main mode (highest peak in the trace).
- **Main Peak Power**: indicates the power of the main mode.
- **Left SMSR**: indicates the difference in power between the main mode and the first adjacent sidemode on the left.
- **Right SMSR**: indicates the difference in power between the main mode and the first adjacent sidemode on the right.
- **Worst SMSR**: indicates the difference in power between the main mode and the sidemode with the highest power. The wavelength of the sidemode is indicated in parentheses.
- **Central Offset**: indicates the wavelength of the main mode minus the mean of the wavelengths of the first adjacent left and right sidemodes.
- **Mode Spacing (Fabry-Perot)**: indicates the average estimated frequency or wavelength spacing between adjacent Fabry-Perot modes of the DFB laser. The Fabry-Perot mode spacing is measured over the test range and given at the main mode's wavelength.
- **Two-Side Stopband**: indicates the difference in wavelength between of the closest left and right sidemodes adjacent to the main mode.
- **Left Stopband**: indicates the difference in wavelength between the main mode and the closest sidemode on the left.
- **Right Stopband**: indicates the difference in wavelength between the main mode and the closest sidemode on the right.
- **Bandwidth at *.** dB**: indicates the bandwidth of the main mode peak at the dB value that is entered relative to the DFB peak power.

4. Click **Exit Setup**, to return to the main window.

From the main window, click the **DFB** tab to see the data you have selected on the **Test Configuration** tab.



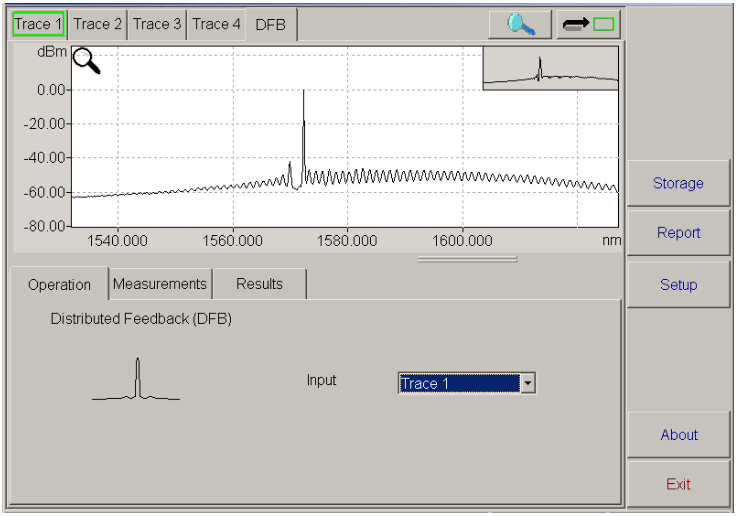
Testing DFB Lasers

Once you have made your FTB-5240/5240B settings (see *Selecting and Configuring a Test Mode* on page 65) in the **Controls** window, you can proceed with the DFB laser test.

To test DFB lasers:

1. From the main window, select a trace tab.
2. Connect the source to the FTB-5240/5240B input port.
3. From the main window, click the **Start** button.

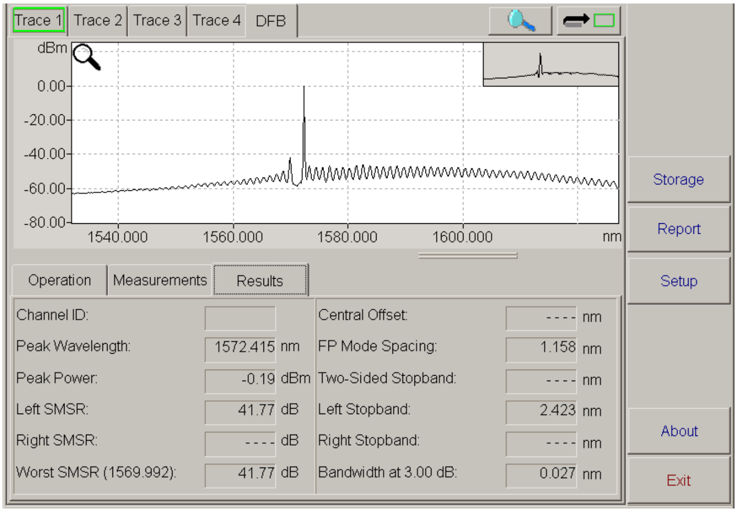
   The button changes **Stop**. The Trace display is updated at every sweep.
4. When the acquisition is done, click the **DFB** tab, and then click the **Operation** tab.



5. In the **Input** list, select the trace tab number in which you have acquired (or recalled) the DFB trace.

6. Click the **Results** tab.

The test results and the information you have selected on the **Test Configuration** tab are displayed.



You can perform manual measurements on the results using markers as explained in *Adjusting the Trace Display* on page 13.

8 Testing Erbium-Doped Fiber Amplifiers

You can specifically test erbium-doped fiber amplifiers (EDFA) with your FTB-5240/5240B.

IMPORTANT

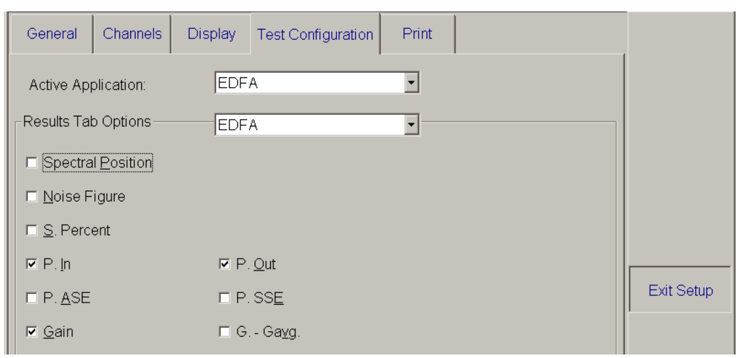
For optimal test results, you must allow a minimum warm up period of two hours for your Optical Spectrum Analyzer before starting your tests.

Selecting the EDFA Application

The FTB-5240/5240B offers many test applications. One of them is dedicated to testing EDFAs.

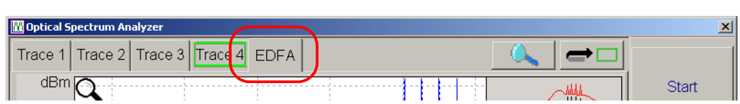
To select the EDFA application:

1. From the main window, click **Setup**.
2. Click the **Test Configuration** tab.



3. In the **Active Application** list, select **EDFA**, and then click **Exit Setup**.

In the main window, the **EDFA** tab appears.



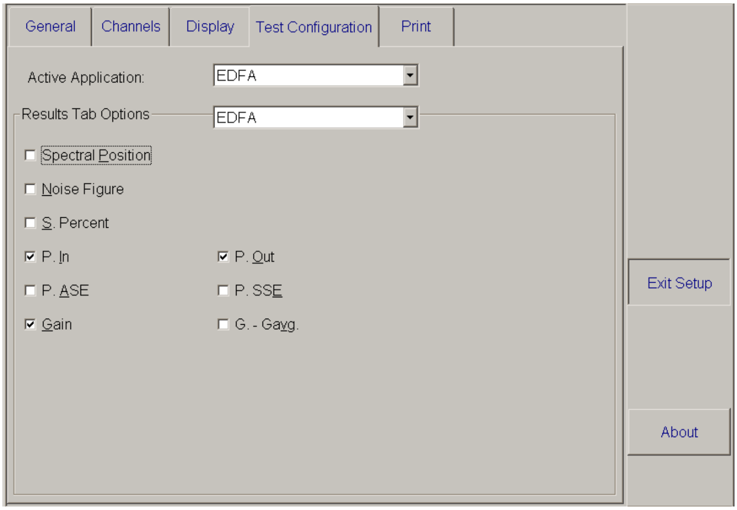
Customizing and Viewing EDFA Test Results

You can choose which results you want to see on the **Results** tab of your EDFA test.

Note: *You can customize your result display before or after performing your test. The display will change accordingly.*

To customize the EDFA test result display:

1. From the main window, click **Setup**, and then click the **Test Configuration** tab.



2. In the **Result Tab Options** list, select **EDFA**.

3. Select the check box next to 5 options according to the information you require:

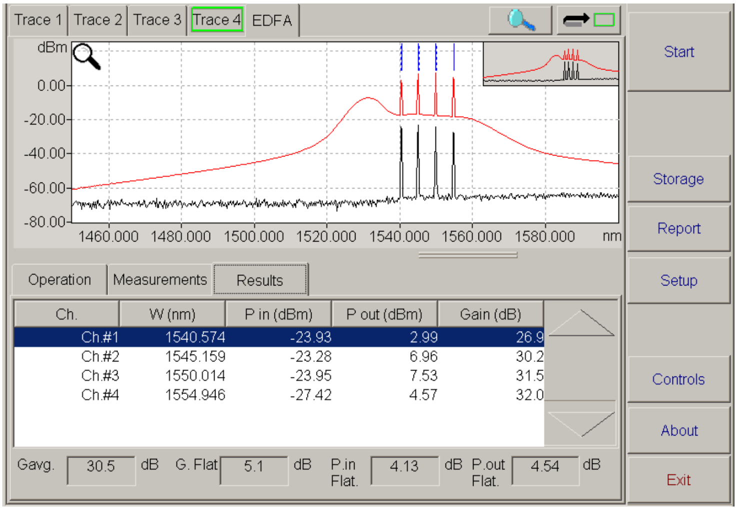
- **Spectral/Frequency Position**: indicates the spectral or frequency position of the corresponding channel from the channel list.
- **Noise Figure**: indicates the EDFA's noise figure measured for each channel.
- **S. Percent**: indicates the current output power according to the measured output power *(P.OUT/[P.OUT + P.ASE])*.
- **P. In**: indicates the input power measured just *before* the EDFA input port.
- **P. Out**: indicates the output power measured just *after* the EDFA output port.
- **P ASE**: indicates the power of the spontaneous emission amplified by the EDFA.
- **P SSE**: indicates the power of the spontaneous emission of the source.
- **Gain**: indicates the gain ($P_{OUT} - P_{IN}$) for each channel.
- **G. - Gavg**: indicates the channel gain minus the average of all channel gains.

Note: *You can find more information about the formulas used for this test in* Formulas Used with Your Optical Spectrum Analyzer *on page 413.*

When 5 options are selected, remaining options become unavailable. You must clear a check box if you want to select another one.

4. Click **Exit Setup**, to return to the main window.

From the main window, select the **EDFA** tab to see the data you have selected on the **Test Configuration** tab.



Scrolling through the channel list is done by clicking the up and down arrow buttons or by pressing the up and down arrow keys on the keyboard.

Testing EDFAs

Once you have defined a channel list (see *Managing Channels and Channel Lists* on page 47), and configured a test mode (*Testing DWDM Systems in Normal, In-Band, or Drift Mode* on page 65), you can proceed with the EDFA test.

To test EDFAs:

1. From the main window, select a trace tab.

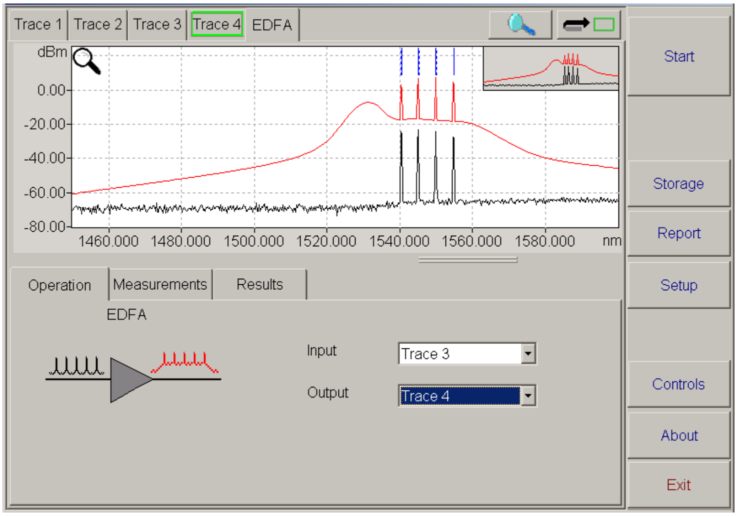
Note: *Steps 2 and 3 can be replaced by recalling a saved trace of this same setup.*

2. Connect the FTB-5240/5240B to the source at the same place where you would connect the EDFA.
3. From the main window, click **Start**.
4. When the acquisition is done, from the main window, select a different trace tab.

Note: *Steps 5 and 6 can be replaced by recalling a saved trace of this same setup.*

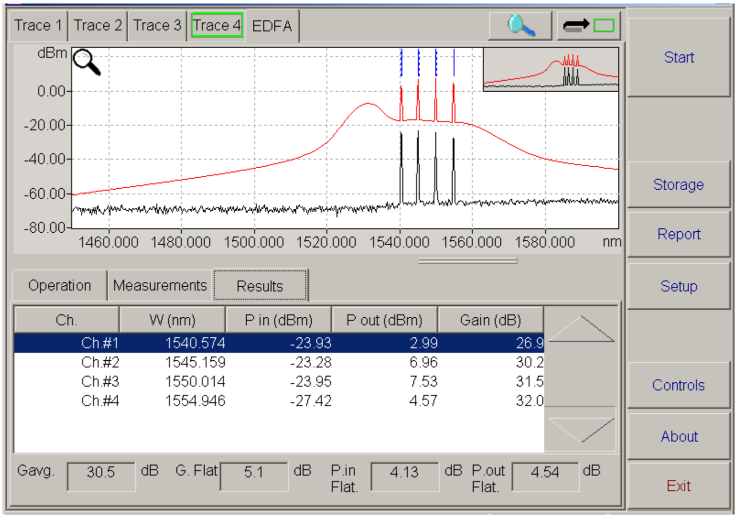
5. Connect the EDFA to the source and connect the FTB-5240/5240B right at the EDFA output.
6. From the main window, click **Start**.

7. When the acquisition is done, click the **EDFA** tab, and then click the **Operation** tab.



8. In the **Input** list, select the trace tab number with which you have acquired (or recalled) the first EDFA trace.

9. In the **Output** list, select the trace tab number with which you have acquired (or recalled) the second EDFA trace.



10. Click the **Results** tab.

The information you have selected on the **Test Configuration** tab is displayed plus 4 global results.

- **Gain Average (Gavg)**: indicates the average of all channel gains.
- **Gain Flatness (G.Flat.)**: indicates the difference between the maximum and minimum gains in all of the channels.
- **Input Power Flatness (P. in. Flat.)**: indicates the difference between the maximum and minimum power in all of the input channels.
- **Output Power Flatness (P. out. Flat.)**: indicates the difference between the maximum and minimum power in all of the output channels.

You can perform manual measurements on the results using markers as explained in *Adjusting the Trace Display* on page 13.

9 Testing Spectral Transmittance

The spectral transmittance is the part of a spectrum passing through a DUT without being lost.

The FTB-5240/5240B module allows you to characterize power transmission of passive WDM components as a function of wavelength.

When testing spectral transmittance, you select a wide source that covers the wavelength span of interest with a good signal-to-noise ratio. Then, you perform an acquisition of this signal on the input, followed by another one on the output of the device under test (DUT).

The spectral transmittance application compares the input and output traces to yield the transmittance result, along with the most common DUT characteristics (insertion loss, bandwidth, etc.).

IMPORTANT

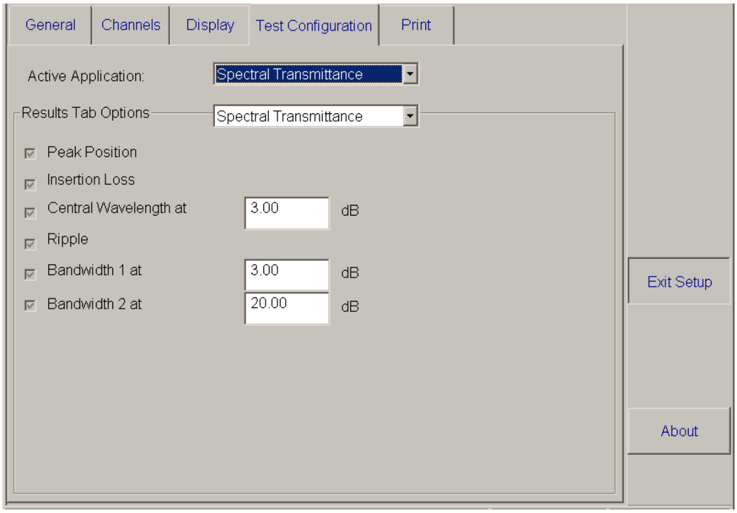
For optimal test results, you must allow a minimum warm up period of two hours for your Optical Spectrum Analyzer before starting your tests.

Selecting the Spectral Transmittance Application

The FTB-5240/5240B offers many test applications. One of them is dedicated to testing passive WDM components.

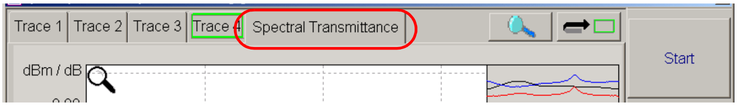
To select the spectral transmittance application:

1. From the main window, click **Setup**.
2. Click the **Test Configuration** tab.



3. In the **Active Application** list, select **Spectral Transmittance**, and then click **Exit Setup**.

   In the main window, the **Spectral Transmittance** tab appears.

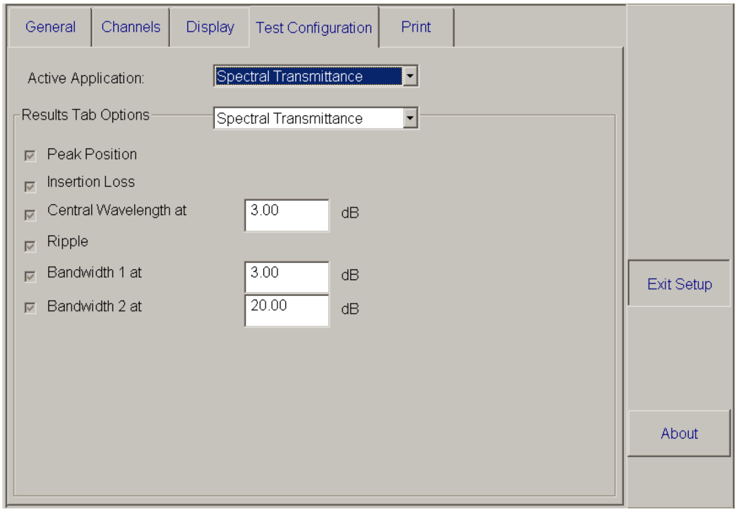


Viewing Spectral Transmittance Test Results

All test results are displayed on the **Results** tab; therefore you do not need to configure the results display.

To view your spectral transmittance results:

1. From the main window, click **Setup**.
2. Click the **Test Configuration** tab.



3. In the **Result Tab Options** list, select **Spectral Transmittance**.

Note: *Since all items are displayed on the* ***Results*** *tab, you cannot clear a selection. However, you can change the power values for the central wavelength and the two bandwidths.*

➤ **Peak Position**: indicates the peak position.

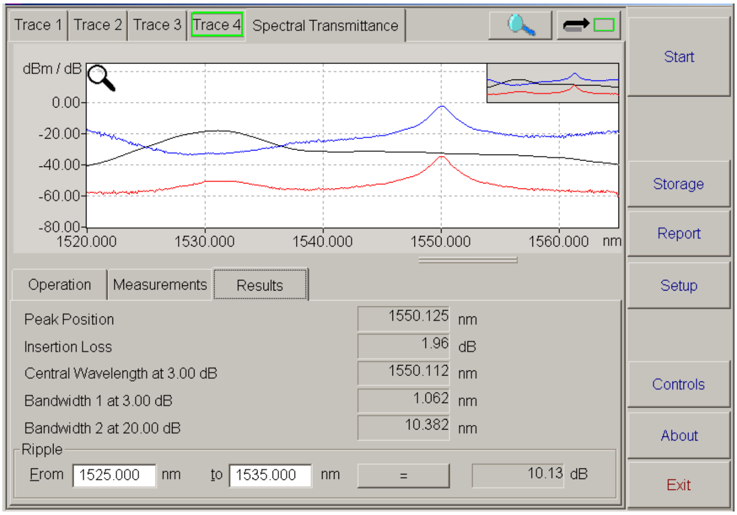
➤ **Insertion Loss**: indicates the insertion loss.

➤ **Central Wavelength at *.****: indicates the central wavelength at a dB value.

- **Ripple**: calculates the ripple, which is simply defined here as the maximum transmittance minus the minimum transmittance. You can set the wavelength boundaries in the **Results** tab.
- **Bandwidth 1 at *.****: indicates the first bandwidth at a dB value.
- **Bandwidth 2 at **.****: indicates the second bandwidth at a dB value.

4. Click **Exit Setup** to return to the main window.

From the main window, click the **Spectral Transmittance** tab to see the changes you have made on the **Test Configuration** tab.



Testing Spectral Transmittance

Once you have configured a test mode (*Testing DWDM Systems in Normal, In-Band, or Drift Mode* on page 65), you can proceed with the spectral transmittance test.

To test spectral transmittance:

1. From the main window, select a trace tab.

Note: *Steps 2 and 3 can be replaced by recalling a saved trace of this same setup.*

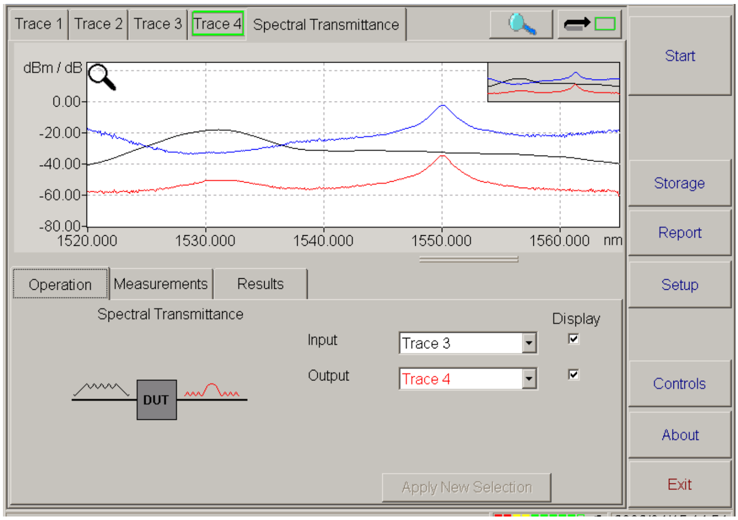
2. Connect the DUT input to the FTB-5240/5240B.
3. From the main window, click **Start**.
4. When the acquisition is done, from the main window, select a different trace tab.

Note: *Steps 5 and 6 can be replaced by recalling a saved trace of this same setup.*

5. Connect the DUT input to the FTB-5240/5240B.

6. From the main window, click **Start**.

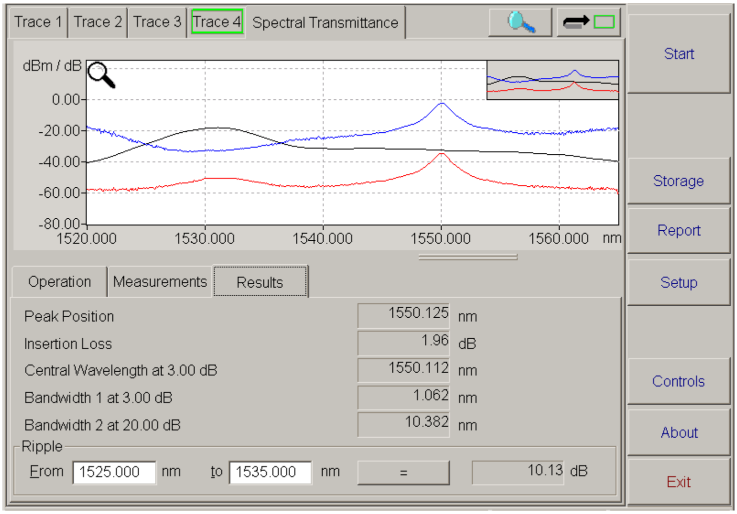
7. When the acquisition is done, click the **Spectral Transmittance** tab, and then click the **Operation** tab.



8. In the **Input** list, select the trace tab number with which you have acquired (or recalled) the first DUT trace.

9. In the **Output** list, select the trace tab number with which you have acquired (or recalled) the second DUT trace.

Note: *If you want the corresponding traces to appear in the display, select the check boxes next to the **Input** and **Output** lists. Otherwise, you will only see the transmittance result trace.*



10. Click the **Results** tab.

If you want to use another trace for the input or output acquisition, return to the **Operation** tab, select the new trace, and then click **Apply New Selection**.

Under **Ripple**, enter the wavelengths from and to which the measurement will be taken. Click =; the result will appear when the analysis is complete.

You can perform manual measurements on the results using markers as explained in *Adjusting the Trace Display* on page 13.

10 Performing a Spectral Analysis

You can specifically perform spectral analyses with your optical spectrum analyzer.

IMPORTANT

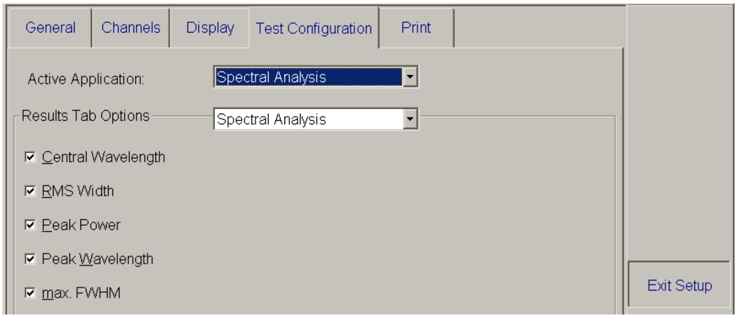
For optimal test results, you must allow a minimum warm up period of two hours for your Optical Spectrum Analyzer before starting your tests.

Selecting the Spectral Analysis Application

The FTB-5240/5240B offers many test applications. One of them is dedicated to spectral analysis.

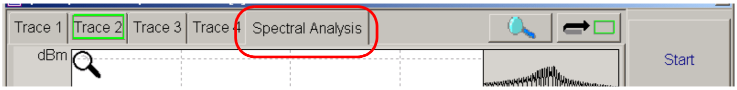
To select the Spectral Analysis application:

1. From the main window, click **Setup**.
2. Click the **Test Configuration** tab.



3. In the **Active Application** list, select **Spectral Analysis**, and then click **Exit Setup**.

   In the main window, the **Spectral Analysis** tab appears.



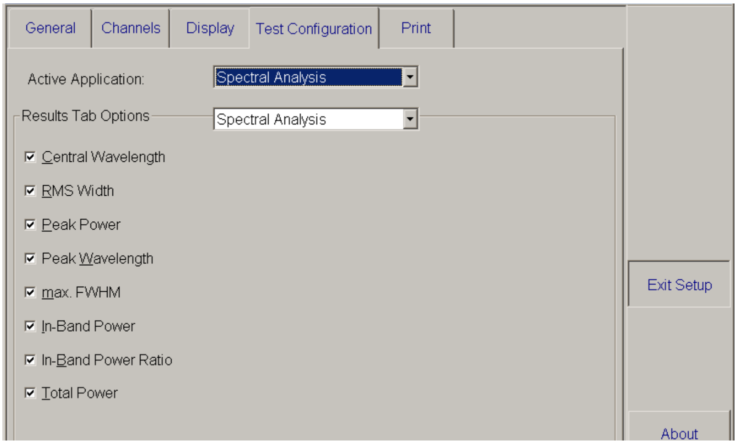
Customizing and Viewing Spectral Analysis Test Results

You can choose which results you want to see on the **Results** tab of your spectral analysis.

Note: *You can customize your result display before or after performing your test. The display will change accordingly.*

To customize the Spectral Analysis test result display:

1. From the main window, click **Setup**, and then click the **Test Configuration** tab.



2. In the **Result Tab Options** list, select **Spectral Analysis**.

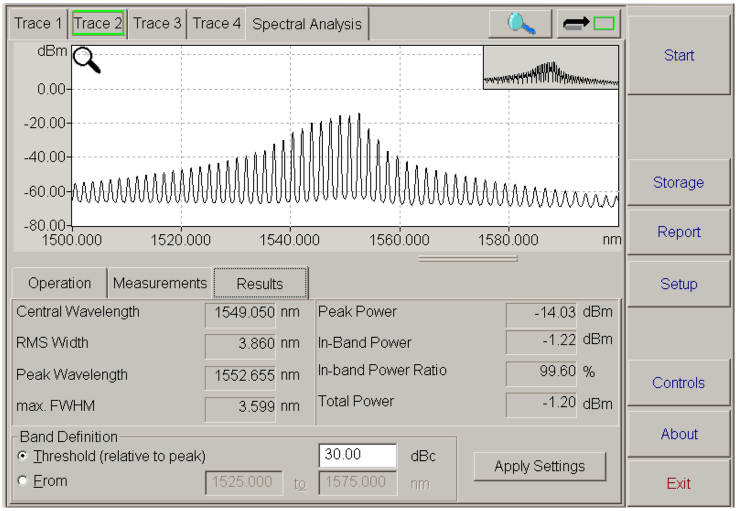
3. Select the check boxes for the options you want displayed.

- **Central Wavelength**: indicates the center of mass wavelength in the band (the selected range).
- **RMS Width**: indicates the second moment of the spectral distribution.
- **Peak Power**: indicates the power at the highest point of the analysis.
- **Peak Wavelength**: indicates the wavelength at the highest point of the analysis.
- **Max. FWHM**: indicates the full width at the half-maximum position of the trace. If there are more than one half-maximums on the left or right sides of the peak, the furthest half-maximum is used.
- **In-Band Power**: indicates the integrated power of the selected range.
- **In-Band Power Ratio**: indicates the ratio of the in-band power to the total power in watts.
- **Total Power**: indicates the integrated power of the acquisition window.

Note: *You can find more information about the formulas used for this analysis in* Formulas Used with Your Optical Spectrum Analyzer *on page 413.*

4. Click **Exit Setup** to return to the main window.

From the main window, click the **Spectral Analysis** tab to see the data you have selected on the **Test Configuration** tab.



Performing a Spectral Analysis

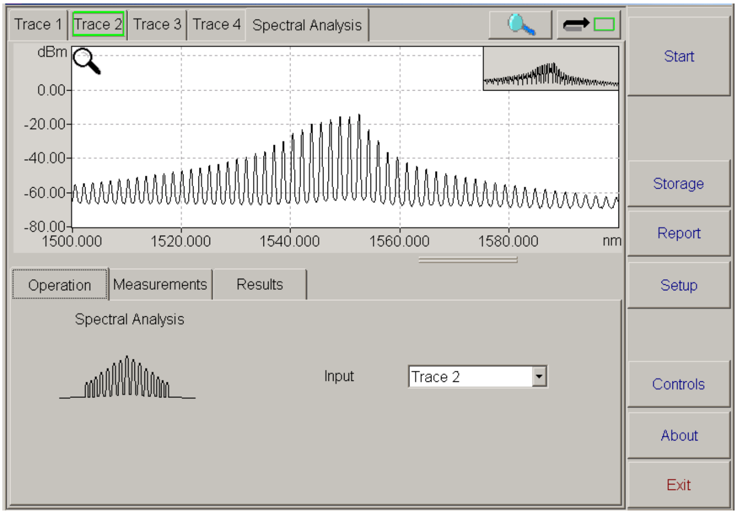
This section presents the procedure to perform the spectral analysis of an optical source.

To perform a spectral analysis:

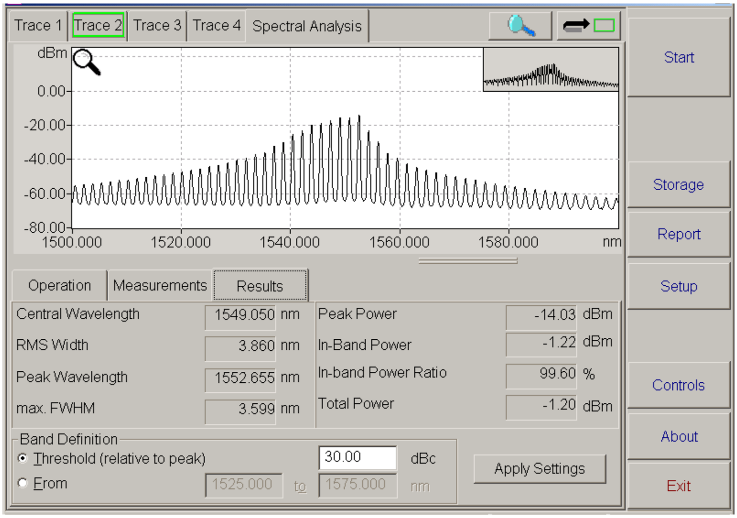
1. From the main window, select a trace tab.

Note: *Steps 2 and 3 can be replaced by recalling a saved trace of this same setup.*

2. Connect the DUT input to the FTB-5240/5240B.
3. From the main window, click **Start**.
4. When the acquisition is done, click the **Spectral Analysis** tab, and then click the **Operation** tab.



5. In the **Input** list, select the trace tab number with which you have acquired (or recalled) the trace.



6. Click the **Results** tab.

If required, under **Band Definition**, you can select a power threshold relative to the peak, or set a wavelength range. The appropriate text box becomes available according to your selection. To use these new settings, click **Apply Settings**.

Note: *The absolute and relative threshold on the **General** tab of the **Setup** window do not apply here.*

You can perform manual measurements on the results using markers as explained in *Adjusting the Trace Display* on page 13.

11 Testing Fabry-Perot Lasers

You can specifically test Fabry-Perot lasers with your optical spectrum analyzer.

IMPORTANT

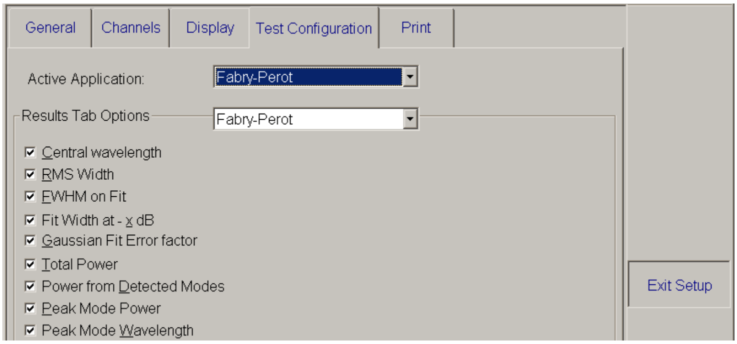
For optimal test results, you must allow a minimum warm up period of two hours for your Optical Spectrum Analyzer before starting your tests.

Selecting the Fabry-Perot Laser Application

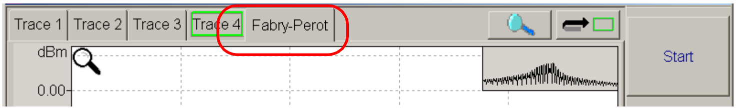
The FTB-5240/5240B offers many test applications. One of them is dedicated to testing Fabry-Perot lasers.

To select the Fabry-Perot application:

1. From the main window, click **Setup**.
2. Click the **Test Configuration** tab.



3. In the **Active Application** list, select **Fabry-Perot**, and then click **Exit Setup**.
4. In the main window, the **Fabry-Perot** tab appears.



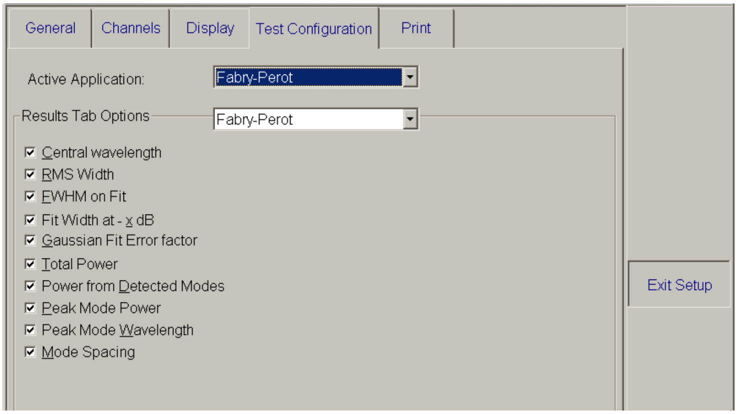
Customizing and Viewing Fabry-Perot Laser Test Results

You can choose which results you want to see on the **Results** tab of your Fabry-Perot tests.

Note: *You can customize your result display before or after performing your test. The display will change accordingly.*

To customize the Fabry-Perot test result result display:

1. From the main window, click **Setup**, and then click the **Test Configuration** tab.



2. In the **Result Tab Options** list, select **Fabry-Perot**.

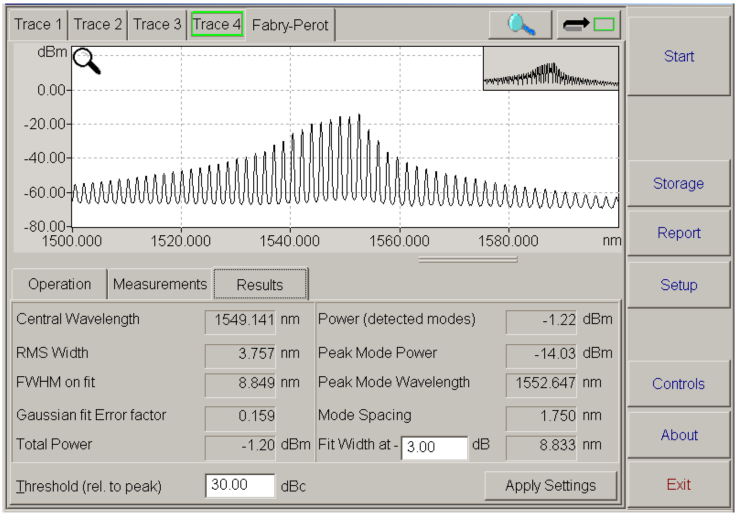
3. Select the check boxes for the options you want displayed.

- **Central Wavelength**: indicates the center of mass wavelength in all of the detected modes.
- **RMS Width**: indicates the second moment of the spectral distribution.
- **FWHM on Fit**: indicates the full width at the half-maximum position of the Gaussian fit curve.
- **Fit Width at x dB**: indicates the width of the fit curve at x dB. You can set the x value from the **Results** tab.
- **Gaussian Fit Factor Error**: indicates the normalized RMS error factor in the Gaussian fit.
- **Total Power**: indicates the integrated power of the acquisition window.
- **Power from Detected Modes**: indicates the integrated power from the starting point of the first mode to the ending point of the last mode.
- **Peak Mode Power**: indicates the power of the peak mode of the Fabry-Perot laser.
- **Peak Mode Wavelength**: indicates the wavelength of the peak mode of the Fabry-Perot laser.
- **Mode Spacing**: indicates the average wavelength or frequency difference between the longitudinal modes of the Fabry-Perot laser. It is measured over the test range and interpolated at the central wavelength.

Note: *You can find more information about the formulas used for this test in* Formulas Used with Your Optical Spectrum Analyzer *on page 413.*

4. Click **Exit Setup**. You return to the main window.

From the main window, click the **Fabry-Perot** tab to see the data you have selected on the **Test Configuration** tab.



Testing Fabry-Perot Lasers

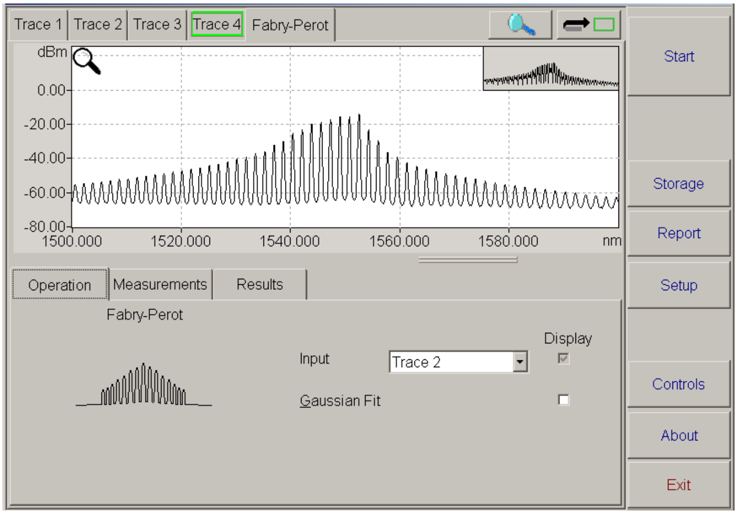
This section presents the procedure to test Fabry-Perot lasers.

To test a Fabry-Perot laser:

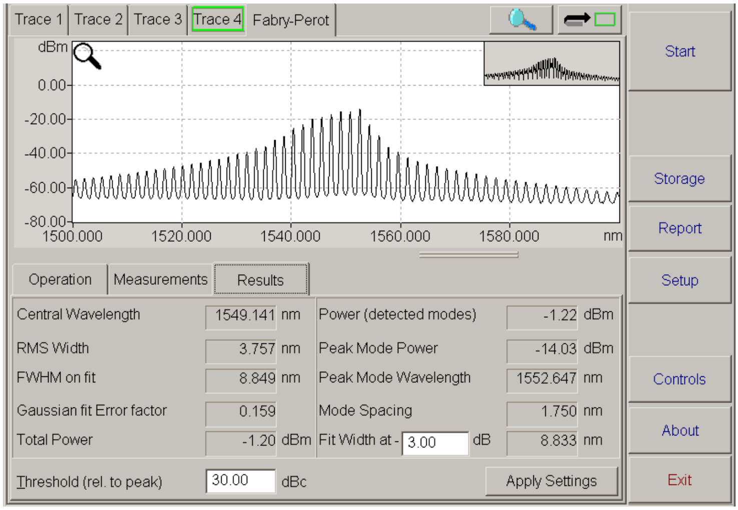
1. From the main window, select a trace tab.

Note: *Steps 2 and 3 can be replaced by recalling a saved trace of this same setup.*

2. Connect the DUT input to the FTB-5240/5240B.
3. From the main window, click **Start**.
4. When the acquisition is done, click the **Fabry-Perot** tab, and then click the **Operation** tab.



5. In the **Input** list, select the trace tab number with which you have acquired (or recalled) the trace.



6. Click the **Results** tab.

If required, you can change the values in the **Threshold (rel. to peak)** and **Fit Width at** boxes. To apply your changes, click **Apply Settings**.

Note: *The threshold used in this analysis is the threshold relative to the peak. If you change the detection threshold in the* ***Setup*** *window, it will not affect the Fabry-Perot laser test.*

You can perform manual measurements on the results using markers as explained in *Adjusting the Trace Display* on page 13.

12 Comparing Traces

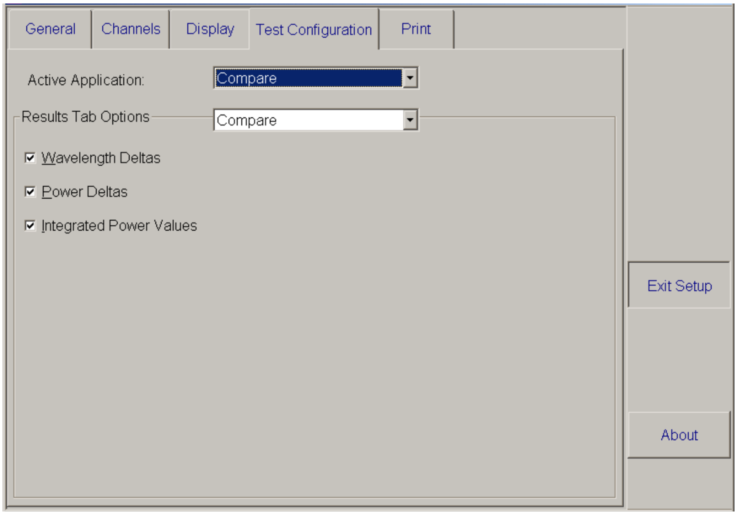
Comparing traces you have acquired allows you to quickly pinpoint differences. You can compare the traces both on a graph and in a table.

Selecting the Compare Application

The FTB-5240/5240B offers many test applications. One of them is dedicated to trace comparison.

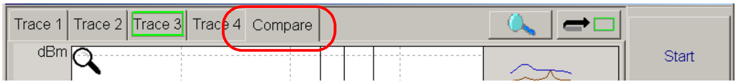
To select the Compare application:

1. From the main window, click **Setup**.
2. Click the **Test Configuration** tab.



3. In the **Active Application** list, select **Compare**, and then click **Exit Setup**.

In the main window, the **Compare** tab appears.



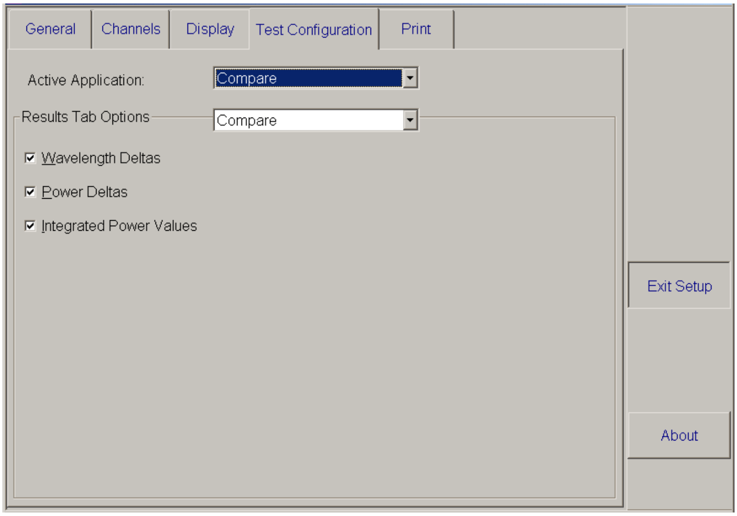
Customizing and Viewing Compared Trace Results

You can choose which results you want to see on the **Measurements** tab of your trace comparison results.

Note: *You can customize your result display before or after performing your test. The display will change accordingly.*

To customize the compared trace displays:

1. From the main window, click **Setup**, and then click the **Test Configuration** tab.



2. In the **Result tab options** list, select **Compare**.

3. Select the check boxes for the options you want displayed.

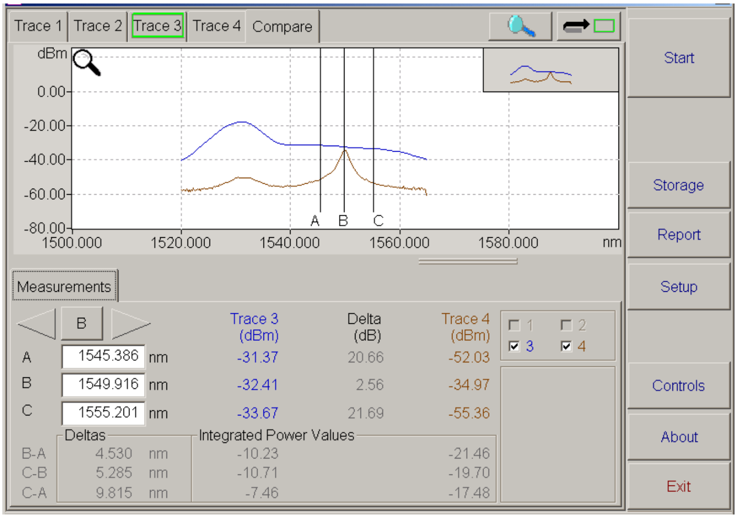
➤ **Spectral deltas**: indicates the wavelength or frequency deltas corresponding to the current markers' positions.

➤ **Power deltas**: indicates the power deltas for the various marker combinations.

➤ **Integrated power values**: indicates the integrated power for each displayed trace. It is calculated between two of the three markers. All three combinations are displayed in the **Measurements** tab.

4. Click **Exit Setup** to return to the main window.

From the main window, click the **Compare** tab to see the data you have selected on the **Test Configuration** tab.



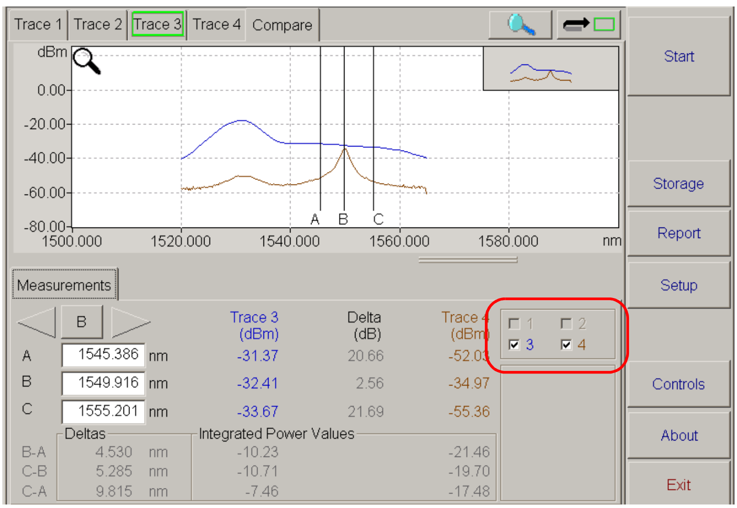
Comparing Traces

The traces you want to compare must have at least a common portion of their wavelength ranges. If not, no comparison will be possible.

To compare traces:

1. Acquire or load traces, using a different trace tab for each.

2. Click the **Compare** tab.



3. On the right side of the **Measurements** tab, select the check boxes corresponding to the tab numbers with which you have acquired (or recalled) the traces.

The traces appear in different colors to facilitate visual comparison. The corresponding column in the table present the same color.

Note: *You can customize the trace colors, see* Setting Colors for the Various Elements *on page 151.*

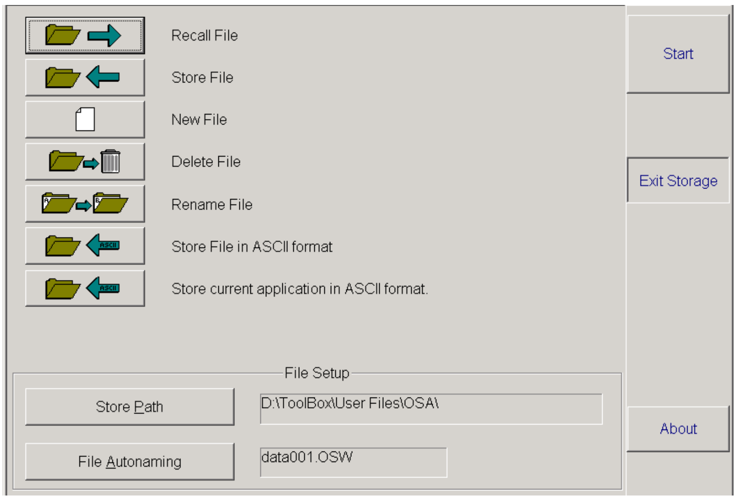
You can perform manual measurements on the results using markers as explained in *Adjusting the Trace Display* on page 13.

13 Managing Trace Files

Management of your trace files is all done in one window.

Selecting a Storage Medium and Location

Before storing or recalling a trace, ensure that, under **File Setup**, the medium shown is the correct one.



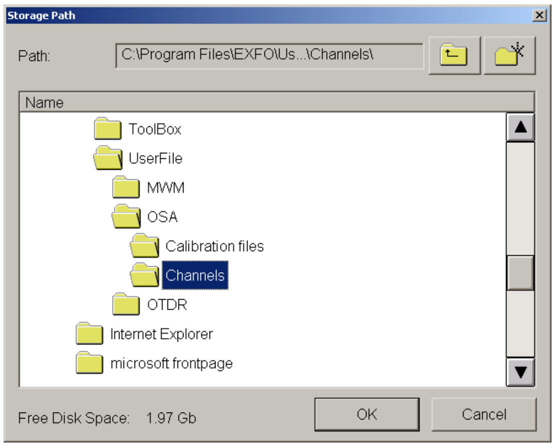
The **Store File**, **New File**, and **Store file in ASCII format** buttons are available only when at least one trace has been recalled in the application.

If the location you want to use to save or retrieve your files is different from the displayed storage path, you can select another one.

To select a storage medium and location:

1. From the main window, click **Storage**.

2. Click **Store Path**.



3. Select the desired directory, using  to move up the system tree if needed.

   If you want to create a folder, click , then name your new folder as desired.

4. Once you have reached the folder you want, click **OK**. You return to the **Storage** window.

   The selected storage path appears beside the **Store Path** button.

Saving a Trace File

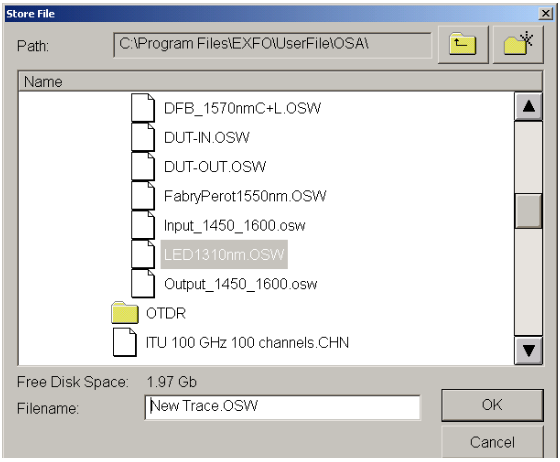
The application saves only the selected trace. Ensure that, in the main window, the tab containing the trace you want to store has a green outline.

To save files:

1. From the main window, click **Storage**, then click **Store File**.

   OR

   From the main window, click **Quick Save**.



Note: *The **Quick Save** function button is displayed in the main window only when a trace is displayed in the selected tab. If a trace analysis becomes invalid, the **Quick Save** function button becomes unavailable. For more information, see* Reanalyzing the Current Trace *on page 88.*

2. If required, change the storage location.

   For more information, see *Selecting a Storage Medium and Location* on page 127.

3. If required, change the file name.

   For information on provided file name, see *Naming a Trace File Automatically* on page 131.

IMPORTANT

Once a trace is overwritten, you cannot access it anymore.

Naming a Trace File Automatically

The application suggests a default name each time a trace is saved (even in ASCII format). By setting the default name and number of the first trace to be saved, all subsequent traces will be saved with the same name and incremental number structure. The three-character extension will change accordingly. Traces have an *OSW* extension and ASCII files have a *TXT* extension.

To set the autonaming properties:

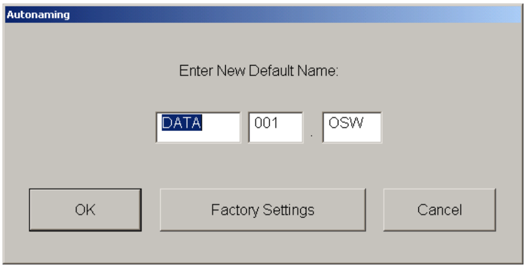
1. From the main window, click **Storage**.
2. Under **File Setup**, click the **File Autonaming** button.
3. In the **Autonaming** dialog box, in any of the boxes, type the new content.

   From left to right:

   ➤ The first box is the trace name.

   ➤ The second box is the trace number.

   ➤ The third box is the trace format extension.



4. Click **OK** to apply the changes.

Opening a Trace File

Working with stored traces saves you time as you do not need to perform acquisitions again. You can continue working where you left off.

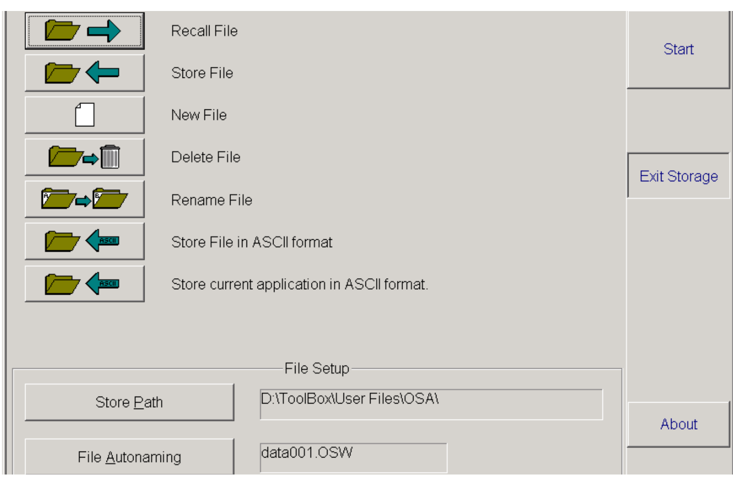
Note: *The FTB-5240/5240B Optical Spectrum Analyzer application cannot recall traces acquired with the FTB-5230 OSA.*

IMPORTANT

A file saved in a version of the application that features the In-Band mode cannot be opened from an older version of the application that did not support the In-Band mode.

To open a trace file:

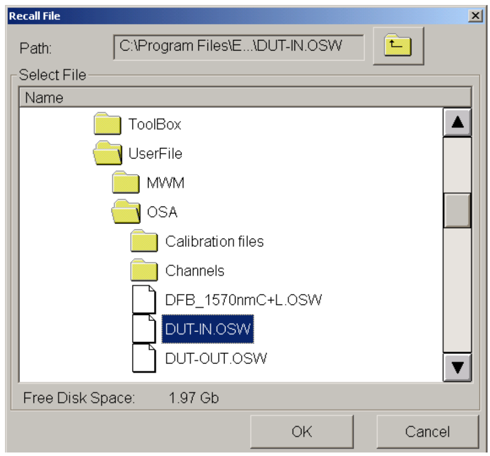
1. From the main window, select the trace tab on which you want to open the file and click **Storage**.
2. In the storage window, click **Recall File**.



➤ If an unsaved trace is present, a message appears asking you if you want to save the trace. Click **Yes** to save it. You can now open a trace.

3. In the **Recall File** dialog box, select a trace to open and click **OK**.

The trace appears on the tab previously selected.



If a channel list is associated to the trace you are recalling and the list is different from one already loaded in the application, you are offered to replace the already loaded channel list with the new one.

IMPORTANT

For recalled traces with a channel-based analysis or an analysis that uses channel boundaries for noise measurement, all those that are not associated to the currently loaded channel list become invalid.

If you have changed the channel list, for already recalled traces, the channel-based analyses or those that use channel boundaries for noise measurement become invalid. If you have kept the old channel list, the newly recalled trace's analysis becomes invalid.

For a trace with an invalid channel-based analysis, the data displayed on the Results tab, as well as the Quick Save and Quick Print function buttons are unavailable.

To reanalyze traces, see *Reanalyzing the Current Trace* on page 88.

Deleting a Trace File

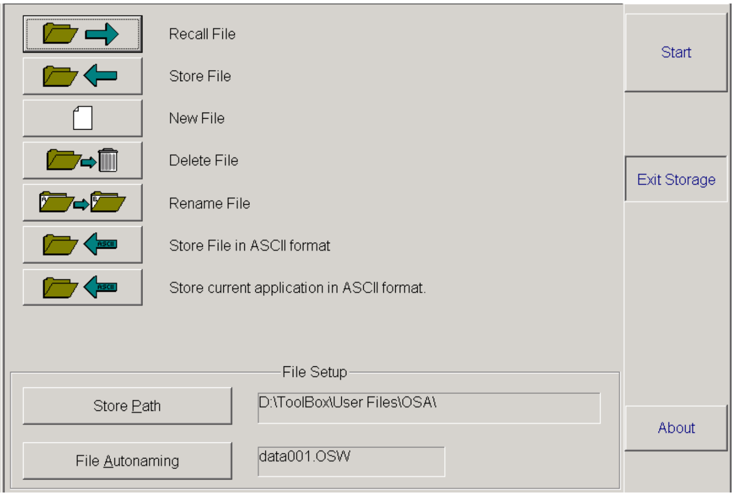
You might need to delete trace files to free up disk space, or because you do not need them anymore.

IMPORTANT

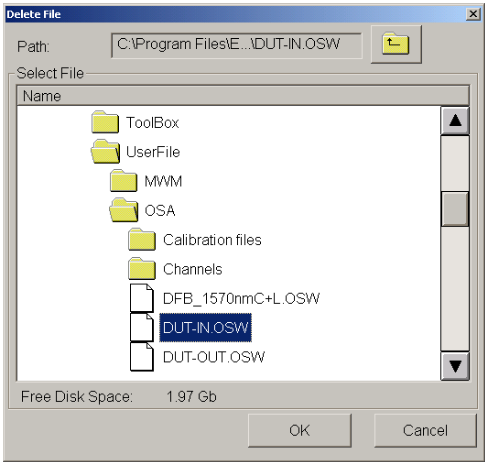
Once a file is deleted, you cannot retrieve it.

To delete a trace:

1. From the main window, click **Storage**.
2. In the storage window, click **Delete File**.



3. In the **Delete File** dialog box, select a file to delete.



4. Click **OK** to accept the selection, then click **OK** again to confirm.

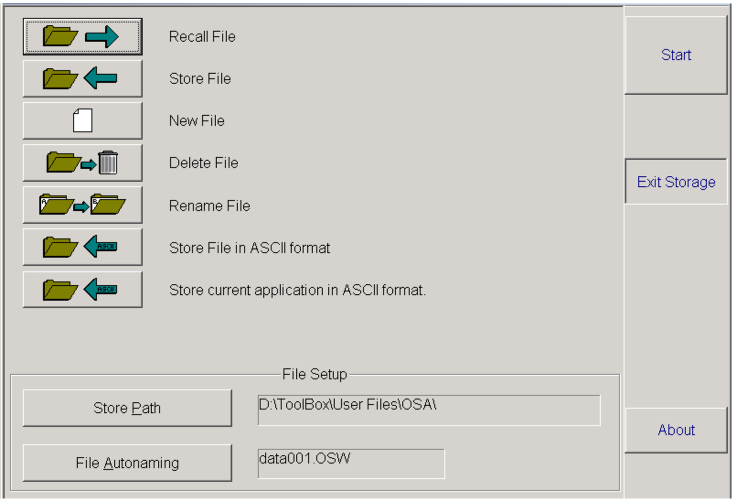
Renaming a Trace File

Renaming trace files can help you manage them better.

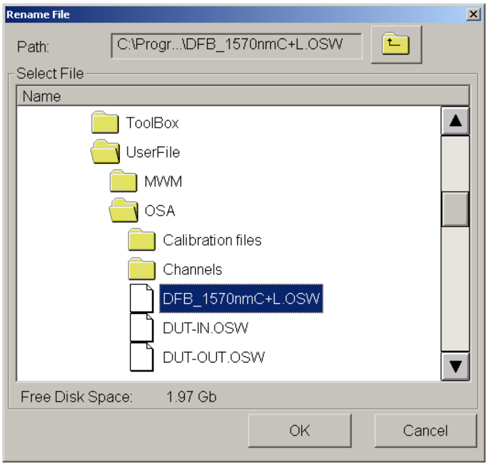
To change the name of a trace:

1. From the main window, click **Storage**.

2. In the storage window, click **Rename File**.

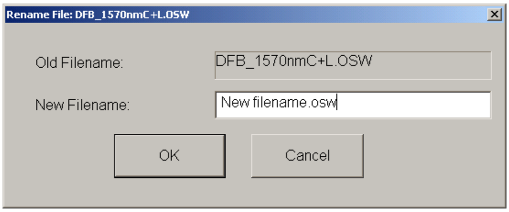


3. In the **Rename File** dialog box, select a file to rename.



4. Click **OK**.

A second **Rename File** window appears.



5. Enter the new trace name, and click **OK**.

Exporting a Trace File in ASCII Format

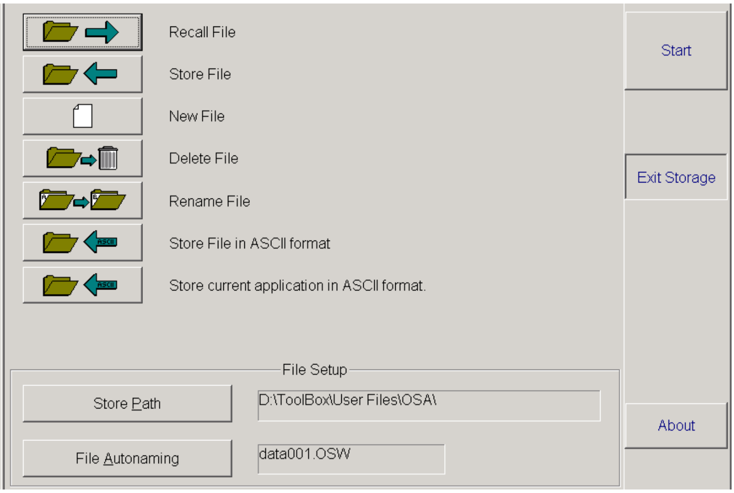
Exporting trace files in ASCII format can allow you to consult data in any word processing program.

IMPORTANT

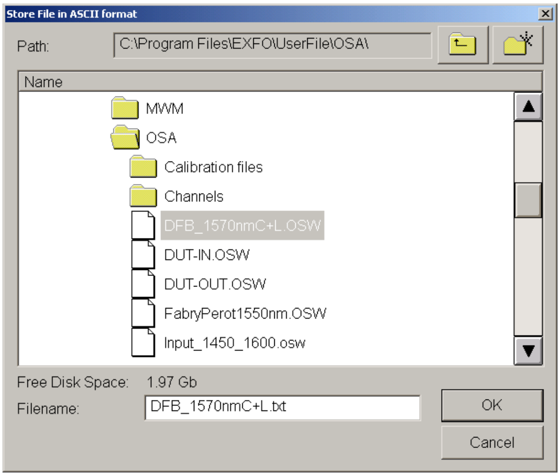
The OSA application cannot open traces saved in ASCII format. Therefore, you might consider saving the trace in the default EXFO OSA format before exporting it in ASCII format.

To export a trace in ASCII format:

1. From the main window, click **Storage**.
2. In the storage window, click **Store File in ASCII**.



3. In the **Filename** box, enter a self-explanatory name for your file (ASCII files bear the .TXT extension).



4. Click **OK** to save the trace file in ASCII format.

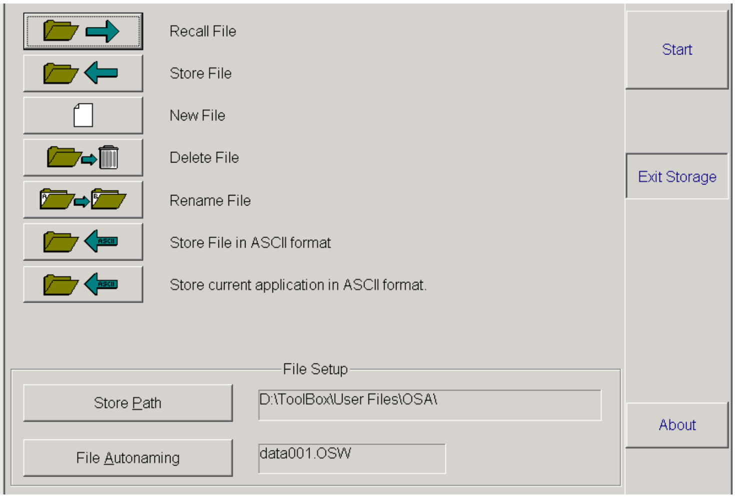
Exporting an Application in ASCII Format

You might want to export your test applications in ASCII format.

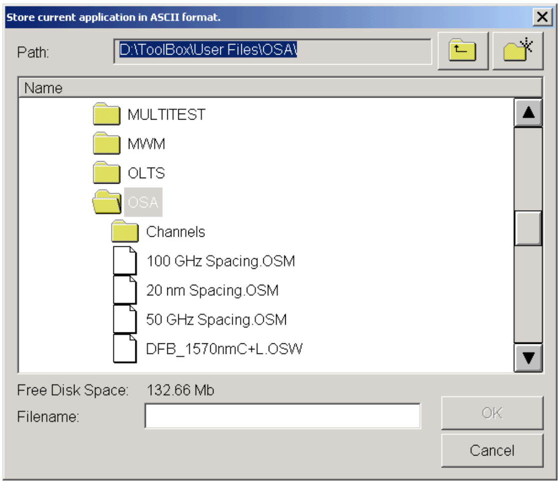
To export an application in ASCII format:

1. From the main window, click **Storage**.

2. In the storage window, click **Store current application in ASCII**.



3. In the **Filename** box, enter a self-explanatory name for your file (ASCII files bear the .TXT extension).



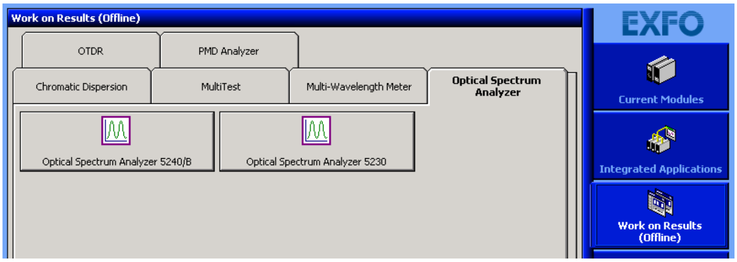
4. Click **OK** to save the application in ASCII format.

Viewing Trace Files without an OSA Module

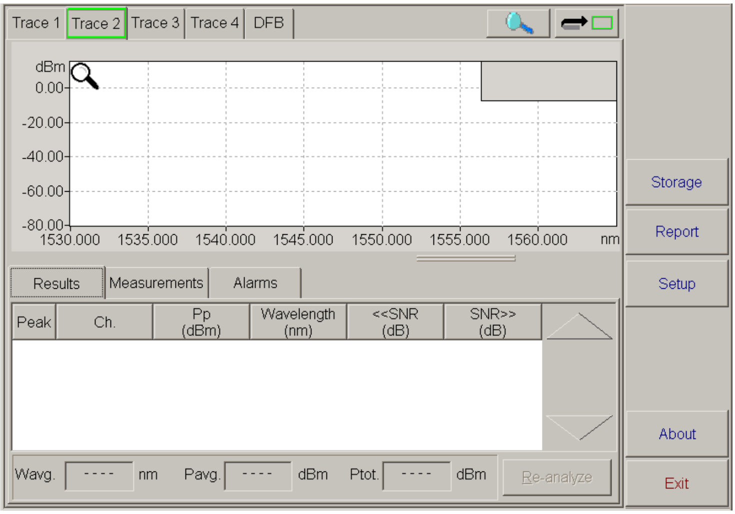
You may view traces you have previously acquired and perform analyses on them outside the usual test application. This could be useful if you want to work on a unit which does not contain an OSA module.

To view your files in offline mode:

1. From ToolBox, click the **Work on Results (Offline)** function tab.
2. Click the **Optical Spectrum Analyzer** tab.



3. Click the button corresponding to the Optical Spectrum Analyzer viewer you want to open.



This viewer functions like the complete OSA application, except that you cannot perform acquisitions or change the control settings.

To perform tests on your previously acquired traces, see the corresponding sections in this user guide.

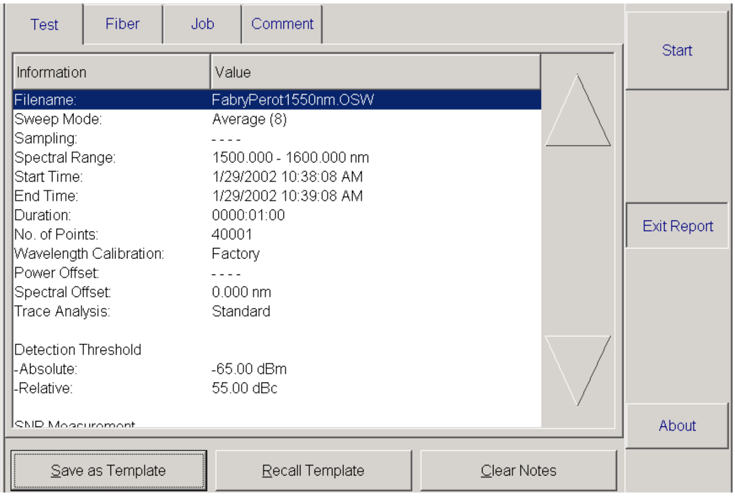
14 Managing Reports

Your Optical Spectrum Analyzer allows you to produce reports after you have acquired traces.

Viewing Trace Reports

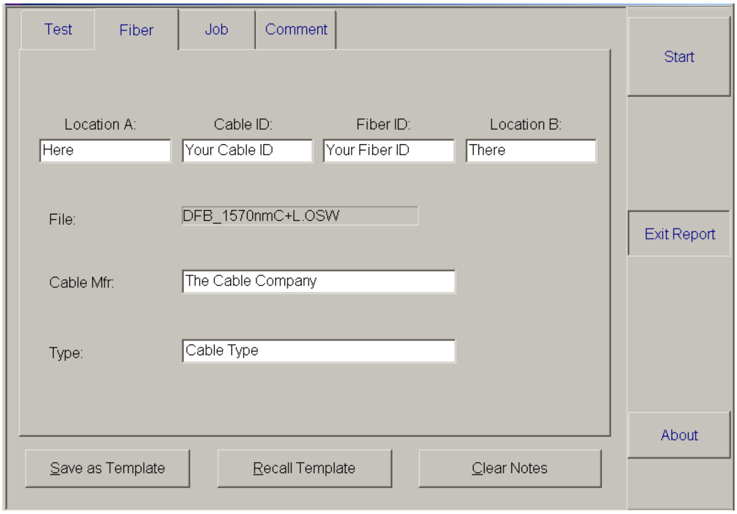
Once you have acquired a trace, you can view the corresponding report by clicking **Report** from the main window.

➤ The **Test** tab displays the data associated with your acquisition.

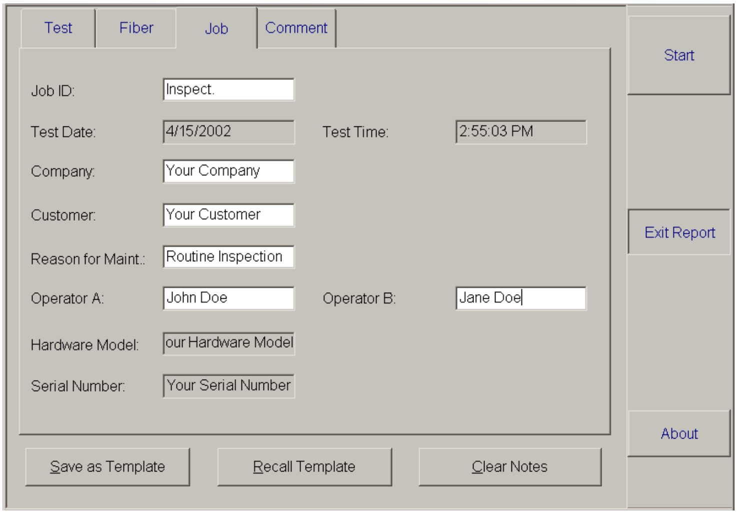


➤ The **Fiber** tab allows you to enter information about the fiber you are currently testing. Locations A and B are set to the fiber's beginning and end locations. You can also enter the Cable and Fiber ID in the corresponding boxes.

In the lower part of the tab, you can enter the cable manufacturer and type.



➤ The **Job** tab allows you to enter data on the job you are doing. The date, time, hardware model and serial number are set automatically.



➤ In addition, the **Report** window features a **Comments** tab, where you can enter any other useful information about the current job.

At the bottom of the tab, you will find buttons to manage the settings.

➤ **Save as Template** saves the current entries of the **Report** window for later use. This way, you do not have to re-enter data such as the operator or customer names every time you perform a test.

Saving data as a template overwrites the previously saved template.

➤ **Recall Template** will bring back the data you have last saved using the **Save as Template** button.

If you have unsaved data, the recalled data will replace it.

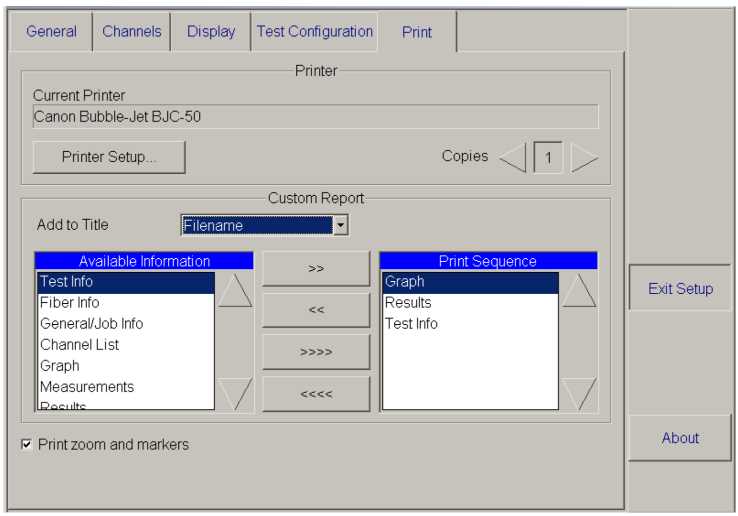
➤ **Clear Notes** clears the data in the **Report** window. You will be prompted to confirm. If you want to keep the data, click **Cancel**, then save it by clicking **Save as Template**.

Printing an Acquisition Report

You might want to print a report of your acquisition for reference.

To print a report:

1. Click **Setup**.
2. Click the **Print** tab.



3. Make sure the correct printer is selected from the **Current Printer** box. To change or set up the printer, click **Printer Setup**.
4. Enter the number of copies to print in the **Copies** box.
5. To add an item, such as the contractor or job location, to the report title, select the appropriate item from the **Add to Title** scroll-down list. If you do not want to add anything to the title, select **Nothing**.
6. Select which data you want to include in your report by choosing the data category in the **Available Information** column and clicking 

to transfer it to the **Print Sequence** column.

To remove an item from the **Print Sequence** column, select it, and then click <<.

To select all the items and put them in the **Print Sequence** list, click >>>>.

To remove all the items from the **Print Sequence** column, click <<<<.

Note: *The item you add to the list will always appear where you have positioned the highlight. If the highlight is on an item, the new item will appear above it on the list.*

7. To include the zoom factor and markers in your report, select the **Print zoom and markers** box in the lower left-hand part of the window.
8. To exit the **Setup** window, click **Exit Setup**.

To print your report, from the main window, click **Quick Print**. The system will print the report as you have set it in the **Print** tab.

IMPORTANT

The Quick Print function button is displayed in the main window only when a trace is displayed in the selected tab. If a trace's analysis becomes invalid, the Quick Print function button becomes inactive. For more information, see *Reanalyzing the Current Trace* on page 88.

Note: *The system will* not *prompt you to set the appropriate printer or confirm that you want to print. It will proceed immediately. To cancel printing the report, click **Cancel** in the pop-up window before the document has been sent to the printer.*

15 Customizing Graphical Settings

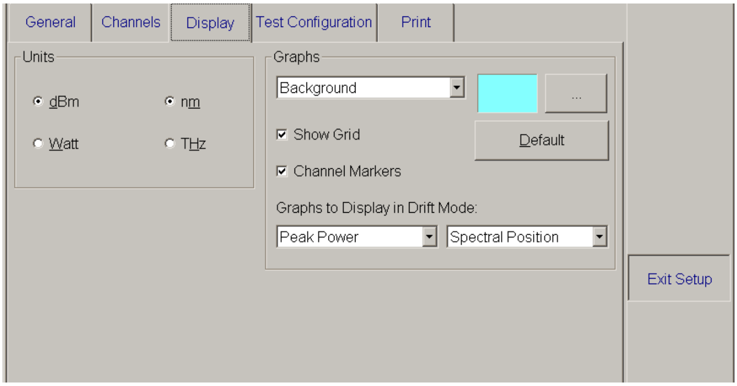
You might need to change the graphical settings to have a better view of your results.

Setting Colors for the Various Elements

Each element in your display, such as the traces themselves, background, or the various markers can be customized independently.

To set a different color for the graphical element of your choice:

1. From the main window, click **Setup**.
2. Click the **Display** tab.



3. Under **Graphs**, from the list, select the item for which you want to change the color.

   The default color appears on the right.

4. To change the color, click .

   A standard Windows color-selection menu appears.

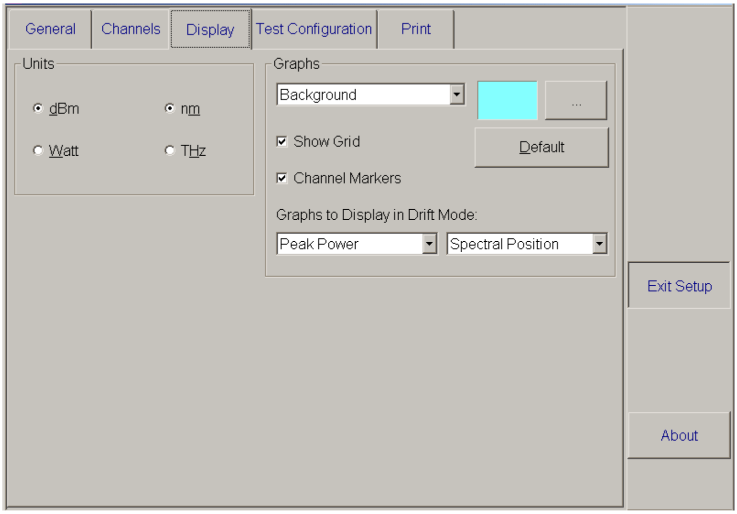
5. Select a color or create a new one, and click **OK**.
6. Repeat steps 3 to 5 for each item whose color you want to change.

Displaying and Hiding the Result Table

You might need to hide or display the result table to have a better view of your results.

To change the table status:

1. From the main window, click **Setup**.
2. Click the **Display** tab.



3. Under **Graphs**, select the **Show Grid** check box to display the result table in the main view.

   OR

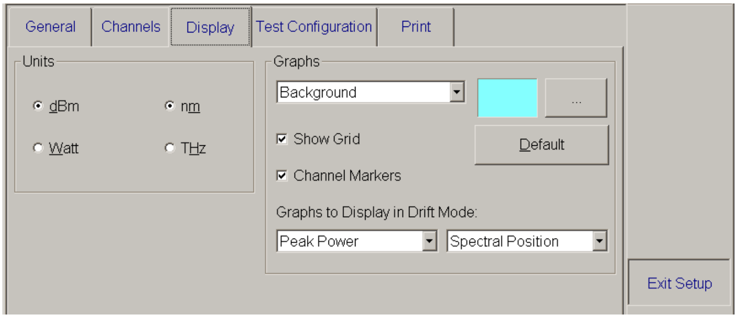
   Clear the check box to hide it.

Displaying or Hiding Channel Markers

You might need to hide or display the channel markers for a better view of your results.

To display or hide channel markers:

1. From the main window, click **Setup**.
2. Select the **Display** tab.



3. Under **Graphs**, select the **Channel markers** check box to display the markers in the main view.

   OR

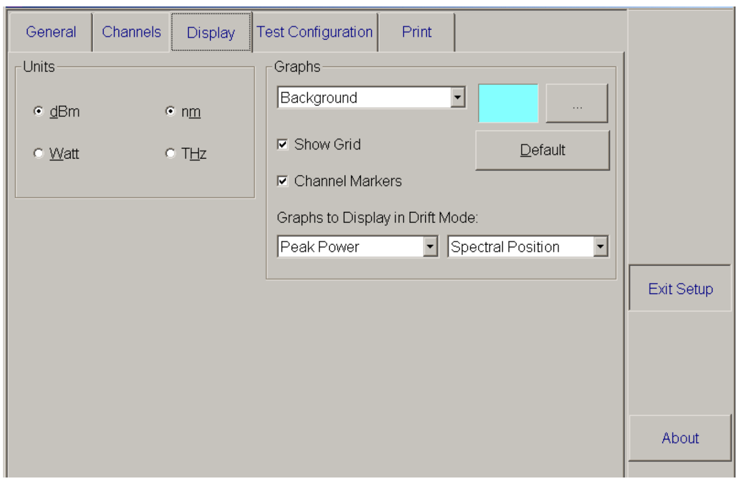
   Clear the check box to hide the markers.

Reverting to Default Graphical Settings

You can easily revert to the default graphical settings if need be. This way you do not need to go back to each element to change them.

To revert to the default graphical settings:

1. From the main window, click **Setup**.
2. Click the **Display** tab.



3. Under **Graphs**, click **Default**.
4. Confirm if you want to revert to the original colors or not.

16 Maintenance

To help ensure long, trouble-free operation:

- Always clean fiber-optic connectors before using them.
- Keep the unit free of dust.
- Clean the unit casing and front panel with a cloth slightly dampened with water.
- Store unit at room temperature in a clean and dry area. Keep the unit out of direct sunlight.
- Avoid high humidity or significant temperature fluctuations.
- Avoid unnecessary shocks and vibrations.
- If any liquids are spilled on or into the unit, turn off the power immediately and let the unit dry completely.

WARNING

Use of controls, adjustments, and procedures for operation and maintenance other than those specified herein may result in hazardous radiation exposure.

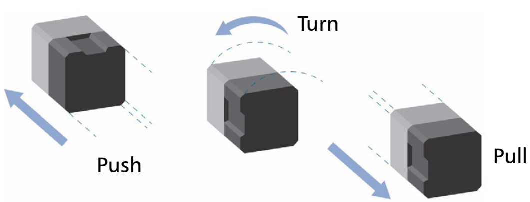
Cleaning EUI Connectors

Regular cleaning of EUI connectors will help maintain optimum performance. There is no need to disassemble the unit.

> **IMPORTANT**
> **If any damage occurs to internal connectors, the module casing will have to be opened and a new calibration will be required.**

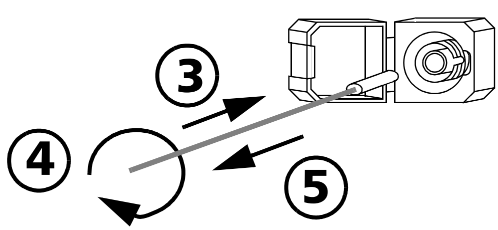
To clean EUI connectors:

1. Remove the EUI from the instrument to expose the connector baseplate and ferrule.



2. Moisten a 2.5 mm cleaning tip with *one drop* of isopropyl alcohol (alcohol may leave traces if used abundantly).

3. Slowly insert the cleaning tip into the EUI adapter until it comes out on the other side (a slow clockwise rotating movement may help).



4. Gently turn the cleaning tip one full turn, then continue to turn as you withdraw it.

5. Repeat steps 3 to 4 with a dry cleaning tip.

Note: *Make sure you don't touch the soft end of the cleaning tip.*

6. Clean the ferrule in the connector port as follows:

6a. Deposit *one drop* of isopropyl alcohol on a lint-free wiping cloth.

IMPORTANT

Isopropyl alcohol may leave residues if used abundantly or left to evaporate (about 10 seconds).

Avoid contact between the tip of the bottle and the wiping cloth, and dry the surface quickly.

6b. Gently wipe the connector and ferrule.

6c. With a dry lint-free wiping cloth, gently wipe the same surfaces to ensure that the connector and ferrule are perfectly dry.

6d. Verify connector surface with a portable fiber-optic microscope (for example, EXFO's FOMS) or fiber inspection probe (for example, EXFO's FIP).

WARNING

Verifying the surface of the connector WHILE THE UNIT IS ACTIVE WILL result in permanent eye damage.

7. Put the EUI back onto the instrument (push and turn clockwise).

8. Throw out cleaning tips and wiping cloths after one use.

Recalibrating the Unit

Manufacturing and service center calibrations are based on the ISO/IEC 17025 Standard, which states that calibration documents must not contain a recommended calibration interval, unless this has been previously agreed upon with the customer.

Validity of specifications depends on operating conditions. For example, the calibration validity period can be longer or shorter depending on the intensity of use, environmental conditions and unit maintenance. You should determine the adequate calibration interval for your unit according to your accuracy requirements.

Under normal use, EXFO recommends calibrating your unit every year.

17 Troubleshooting

Obtaining Online Help

A printable PDF version of the FTB-5240/5240B Optical Spectrum Analyzer user guide is available in the EXFO ToolBox folder installed on your FTB-400 or on your computer.

Note: *You will also find the PDF version of the user guide on your installation CD.*

Contacting the Technical Support Group

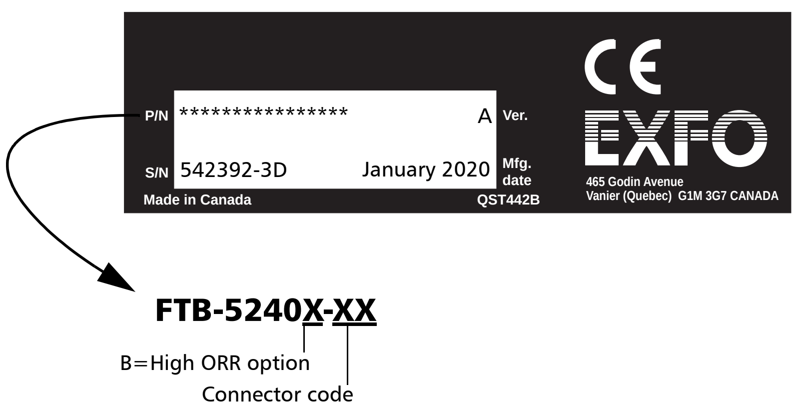
To obtain after-sales service or technical support for this product, contact EXFO at one of the following numbers. The Technical Support Group is available to take your calls from Monday to Friday, 8:00 a.m. to 7:00 p.m. (Eastern Time in North America).

For detailed information about technical support, visit the EXFO Web site at www.exfo.com.

Technical Support Group
400 Godin Avenue
Quebec (Quebec) G1M 2K2
CANADA

1 866 683-0155 (USA and Canada)
Tel.: 1 418 683-5498
Fax: 1 418 683-9224
support@exfo.com

To accelerate the process, please have information such as the name and the serial number (see the product identification label—an example is shown below), as well as a description of your problem, close at hand.



Transportation

Maintain a temperature range within specifications when transporting the unit. Transportation damage can occur from improper handling. The following steps are recommended to minimize the possibility of damage:

- ➤ Pack the unit in its original packing material when shipping.
- ➤ Avoid high humidity or large temperature fluctuations.
- ➤ Keep the unit out of direct sunlight.
- ➤ Avoid unnecessary shocks and vibrations.

18 Warranty

General Information

EXFO Electro-Optical Engineering Inc. (EXFO) warrants this equipment against defects in material and workmanship for a period of one year from the date of original shipment. EXFO also warrants that this equipment will meet applicable specifications under normal use.

During the warranty period, EXFO will, at its discretion, repair, replace, or issue credit for any defective product, as well as verify and adjust the product free of charge should the equipment need to be repaired or if the original calibration is erroneous. If the equipment is sent back for verification of calibration during the warranty period and found to meet all published specifications, EXFO will charge standard calibration fees.

IMPORTANT

The warranty can become null and void if:

- **unit has been tampered with, repaired, or worked upon by unauthorized individuals or non-EXFO personnel.**
- **warranty sticker has been removed.**
- **case screws, other than those specified in this guide, have been removed.**
- **case has been opened, other than as explained in this guide.**
- **unit serial number has been altered, erased, or removed.**
- **unit has been misused, neglected, or damaged by accident.**

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL EXFO BE LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

Liability

EXFO shall not be liable for damages resulting from the use of the product, nor shall be responsible for any failure in the performance of other items to which the product is connected or the operation of any system of which the product may be a part.

EXFO shall not be liable for damages resulting from improper usage or unauthorized modification of the product, its accompanying accessories and software.

Exclusions

EXFO reserves the right to make changes in the design or construction of any of its products at any time without incurring obligation to make any changes whatsoever on units purchased. Accessories, including but not limited to fuses, pilot lamps, batteries and universal interfaces (EUI) used with EXFO products are not covered by this warranty.

This warranty excludes failure resulting from: improper use or installation, normal wear and tear, accident, abuse, neglect, fire, water, lightning or other acts of nature, causes external to the product or other factors beyond EXFO's control.

IMPORTANT

EXFO will charge a fee for replacing optical connectors that were damaged due to misuse or bad cleaning.

Certification

EXFO certifies that this equipment met its published specifications at the time of shipment from the factory.

Service and Repairs

EXFO commits to providing product service and repair for five years following the date of purchase.

To send any equipment for service or repair:

1. Call one of EXFO's authorized service centers (see *EXFO Service Centers Worldwide* on page 166). Support personnel will determine if the equipment requires service, repair, or calibration.
2. If equipment must be returned to EXFO or an authorized service center, support personnel will issue a Return Merchandise Authorization (RMA) number and provide an address for return.
3. If possible, back up your data before sending the unit for repair.
4. Pack the equipment in its original shipping material. Be sure to include a statement or report fully detailing the defect and the conditions under which it was observed.
5. Return the equipment, prepaid, to the address given to you by support personnel. Be sure to write the RMA number on the shipping slip. *EXFO will refuse and return any package that does not bear an RMA number.*

Note: *A test setup fee will apply to any returned unit that, after test, is found to meet the applicable specifications.*

After repair, the equipment will be returned with a repair report. If the equipment is not under warranty, you will be invoiced for the cost appearing on this report. EXFO will pay return-to-customer shipping costs for equipment under warranty. Shipping insurance is at your expense.

Routine recalibration is not included in any of the warranty plans. Since calibrations/verifications are not covered by the basic or extended warranties, you may elect to purchase FlexCare Calibration/Verification Packages for a definite period of time. Contact an authorized service center (see *EXFO Service Centers Worldwide* on page 166).

EXFO Service Centers Worldwide

If your product requires servicing, contact your nearest authorized service center.

EXFO Headquarters Service Center
400 Godin Avenue
Quebec (Quebec) G1M 2K2
CANADA

1 866 683-0155 (USA and Canada)
Tel.: 1 418 683-5498
Fax: 1 418 683-9224
quebec.service@exfo.com

EXFO Europe Service Center
Omega Enterprise Park, Electron Way
Chandlers Ford, Hampshire S053 4SE
ENGLAND

Tel.: +44 2380 246810
Fax: +44 2380 246801
europe.service@exfo.com

EXFO China Service Center/
Beijing OSIC
Beijing New Century Hotel
Office Tower, Room 1754-1755
No. 6 Southern Capital Gym Road
Beijing 100044
P. R. CHINA

Tel.: +86 (10) 6849 2738
Fax: +86 (10) 6849 2662
beijing.service@exfo.com

A Technical Specifications

IMPORTANT

The following technical specifications can change without notice. The information presented in this section is provided as a reference only. To obtain this product's most recent technical specifications, visit the EXFO Web site at *www.exfo.com*.

SPECIFICATIONS [a]

Spectral Measurement		FTB-5230	FTB-5240	FTB-5240B
Wavelength range (nm)		1250 to 1650	1250 to 1650	1250 to 1650
Resolution bandwidth FWHM [b, c] (nm)		≤0.1	0.065 [f]	0.033 [f]
Wavelength uncertainty [c, h] (nm)		±0.1 [f]	±0.05	±0.03
		±0.02 [d, f]	±0.015 [d]	±0.015 [d]
Wavelength repeatability [e] (nm)		–	±0.003	±0.003
Wavelength linearity [c] (nm)	typical	–	±0.01	±0.01
Amplitude Measurement				
Dynamic range [c] (dBm)		10 [f] to –60	18 [f] to –75 [g]	18 [f] to –75 [g]
Power uncertainty [i] (dB)		±0.4 [f]	±0.4	±0.4
Optical rejection ratio [c] (dBc)				
at 12.5 GHz (±0.1 nm)	typical			40
	minimum			35
at 25 GHz (±0.2 nm)	typical		40	50
	minimum		35	45
at 50 GHz (±0.4 nm)	typical	40	50	55
	minimum		45	50
at 100 GHz (±0.8 nm)	typical	45		
PDL at 1550 nm (dB)	typical	±0.1	±0.07	±0.07
	maximum	–	±0.15	±0.15
Scanning time (s)		4 (35 nm span, multiple-peak analysis)	<1.5 (35 nm span, full resolution, multiple-peak analysis)	
ORL (dB)		≥40	≥40	≥40
In-Band OSNR Measurement			**FTB-5240**	**FTB-5240B**
OSNR dynamic range [j] (dB)			>40	>40
Measurement uncertainty (dB)	typical		±0.5	±0.5
Scanning time (min)	typical		<1	<1

Notes

a. All specifications are for a temperature of 23 °C ±2 °C with a FC/UPC connector unless otherwise specified, after warmup.
b. Full width at half maximum.
c. From 1520 nm to 1610 nm.
d. After user calibration in the same test session within 10 nm from each calibration point.
e. Over 1 minute in Real mode.
f. Typical.
g. With averaging.
h. User calibration may be required.
i. At 1550 nm, –10 dBm input.
j. For optical noise level > –60 dBm.

GENERAL SPECIFICATIONS			
Temperature			
	operating	0 °C to 40 °C	(32 °F to 104 °F)
	storage	−20 °C to 50 °C	(−4 °F to 120 °F)
Relative humidity		0 % to 95 % non-condensing	
Connectors		EI (EXFO UPC Universal Interface)	
		EA (EXFO APC Universal Interface)	
Size (H x W x D) (module)		96 mm x 76 mm x 260 mm	(3 3/4 in x 3 in x 10 1/4 in)
Weight (module)		2.2 kg	(4.8 lb)

B SCPI Command Reference

This appendix presents detailed information on the commands and queries supplied with your FTB-5240/5240B Optical Spectrum Analyzer.

IMPORTANT

Since the FTB-400 can house many instruments, you must explicitly specify which instrument you want to remotely control.

You must add the following mnemonic *at the beginning of any command or query* that you send to an instrument (except for IEEE 488.2 and platform commands):

LINStrument<LogicalInstrumentPos>:

where *<LogicalInstrumentPos>* corresponds to the identification number of the instrument.

FTB-400 backplane identificaton number

1Y

Instrument slot number:
2-slot backplane: 0 or 1;
7-slot backplane: 0 to 6

For information on modifying unit identification, refer to your platform user guide.

Quick Reference Command Tree

Command						Parameter(s)	P.
ABORt[1..n]							179
CALCulate[1..n]	CHANnel	ADD				<Name>,<Center[<wsp>M|HZ]>	180
		AUTO					182
		BANDwidth				<Channel index>,<Bandwidth[<wsp>HZ]>|MAXimum|MINimum	183
		BANDwidth?				<Channel index>[,MAXimum|MINimum]	185
		BANDwidth	ALARm			<Channel index>,<AlarmBandwidth[<wsp>HZ]>|MAXimum|MINimum	187
			ALARm?			<Channel index>[,MAXimum|MINimum]	189
		CENTer				<Channel index>,<Center[<wsp>M|HZ]>	191
		CENTer?				<Channel index>	193
		COUNT?					194
		DELete				<Channel index>	195
			ALL				196
		NAME				<Channel index>,<Name>	197
		NAME?				<Channel index>	199
		OSNR	MAXimum			<Channel index>,<OsnrMax[<wsp>DB]>|MAXimum|MINimum	200
			MAXimum?			<Channel index>[,MAXimum|MINimum]	203

Command						Parameter(s)	P.
			MINimum			<Channel index>,<OsnrMin[<wsp>DB]>|MAXimum|MINimum	205
			MINimum?			<Channel index>[,MAXimum|MINimum]	208
			REFerence			<Channel index>,<OsnrRef[<wsp>DB]>|MAXimum|MINimum	210
			REFerence?			<Channel index>[,MAXimum|MINimum]	213
		POWer	MAXimum			<Channel index>,<PowerMax[<wsp>DBM|W]>|MAXimum|MINimum	215
			MAXimum?			<Channel index>[,MAXimum|MINimum]	217
			MINimum			<Channel index>,<PowerMin[<wsp>DBM|W]>|MAXimum|MINimum	219
			MINimum?			<Channel index>[,MAXimum|MINimum]	222
			REFerence			<Channel index>,<PowerRef[<wsp>DBM|W]>|MAXimum|MINimum	224
			REFerence?			<Channel index>[,MAXimum|MINimum]	227
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	CNSCan					<CalcOnNewScan>	232
	CNSCan?						233
	DFB	BANDwidth	LEVel			<PowerLevel>|MAXimum|MINimum	234
			LEVel?			[MAXimum|MINimum]	236
		BANDwidth?					238

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<tr><td></td><td></td><td>OFFSet?</td><td></td><td></td><td></td><td></td><td>241</td></tr>
<tr><td></td><td></td><td>POSition?</td><td></td><td></td><td></td><td></td><td>242</td></tr>
<tr><td></td><td></td><td>POWer?</td><td></td><td></td><td></td><td></td><td>243</td></tr>
<tr><td></td><td></td><td>SBANd</td><td>LEFT?</td><td></td><td></td><td></td><td>244</td></tr>
<tr><td></td><td></td><td></td><td>RIGHt?</td><td></td><td></td><td></td><td>245</td></tr>
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<tr><td></td><td>EDFA</td><td>GAIN?</td><td></td><td></td><td></td><td><ChannelIndex></td><td>254</td></tr>
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<tr><td></td><td></td><td></td><td>[INPut]?</td><td></td><td></td><td></td><td>265</td></tr>
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Command						Parameter(s)	P.
			OUTPut?				267
		SPERcent?				<ChannelIndex>	268
							270
	MODE					EDFA|TRAN|DFB|SAN	271
	MODE?						272
	NORMal	BANDwidth	LEVel			<PowerLevel[<wsp>DB]>|MAXimum|MINimum	273
			LEVel?			[MAXimum|MINimum]	274
		POWer	FLATness?				275
			INTegrated?			<Start[<wsp>M|HZ]>,<Stop[<wsp>M|HZ]>	276
	OSNR	NMR	AUTO			<AutoNmr>	278
			AUTO?				279
			DISTance			<Distance[<wsp>HZ]>	280
			DISTance?				281
			RANGe			<Range[<wsp>HZ]>	282
			RANGe?				283
		ROB				<RefOptBand[<wsp>M]>	284
		ROB?					285
		ROB	AUTO			<AutoRefOptBand>	286
			AUTO?				287
	PEAKlist	COUNt?					288
	PLISt	[PEAK]?				<PeakIndex>	289
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Command						Parameter(s)	P.
	SANalysis						292
		SELect				TRC1|TRC2|TRC3|TRC4	293
		SELect?					294
		POWer	IBANd	RATio?			295
			IBANd?				296
			PEAK?				297
			RANGe	RELative		<RelPowerRangeState>	298
				RELative?			299
			THReshold	RELative	PEAK	<RelPeakPowerThreshold[<wsp>DB]>|MAXimum|MINimum|DEFault	300
					PEAK?	[MAXimum|MINimum|DEFault]	302
			TOTal?				304
		WAVelength	CENTer?				305
			FWHM?				306
			PEAK?				307
			RANGe	[UPPer]		<UpperRangeWavelength[<wsp>M|HZ]>|MAXimum|MINimum|DEFault	308
				[UPPer]?		[MAXimum|MINimum|DEFault]	310
				LOWer		<LowerRangeWavelength[<wsp>M|HZ]>|MAXimum|MINimum|DEFault	312
				LOWer?		[MAXimum|MINimum|DEFault]	314
			RMS?				316
	THReshold					<PowerThreshold[<wsp>DBM|W]>|MAXimum|MINimum	317

Command						Parameter(s)	P.
	THReshold?					[MAXimum|MINimum]	318
	TRANsmission						319
	TRANsmission	BANDwidth	LEVel			<BandwidthIndex>,<PowerLevel[<wsp>DB]>|MAXimum|MINimum	320
			LEVel?			<BandwidthIndex>[,MAXimum|MINimum]	322
		BANDwidth?				<BandwidthIndex>	324
		CENTer	LEVel			<PowerLevel[<wsp>DB]>|MAXimum|MINimum	326
			LEVel?			[MAXimum|MINimum]	328
		CENTer?					330
		LOSS?					331
		PPOSition?					332
		RIPPle	STARt			<Start[<wsp>M|HZ]>|MAXimum|MINimum	333
			STARt?			[MAXimum|MINimum]	335
			STOP			<Stop[<wsp>M|HZ]>|MAXimum|MINimum	337
			STOP?			[MAXimum|MINimum]	339
		RIPPle?					341
		SELect	[INPut]			TRC1|TRC2|TRC3|TRC4	342
			[INPut]?				343
			OUTPut			TRC1|TRC2|TRC3|TRC4	344
			OUTPut?				345
CALibration[1..n]	ZERO	[AUTO]				<AutoZero>|ON|OFF|ONCE	346

Command						Parameter(s)	P.
		[AUTO]?					347
INITiate[1..n]	[IMMediate]						348
	CONTinuous					<ContinuousAcqState>	349
	CONTinuous?						350
	STATe?						351
MMEMory[1..n]	DATA	TYPE				BINary|ASCii	352
		TYPE?					353
	LOAD	CLISt				<Filename>	354
		CONFiguration				<Filename>	355
		OVERwrite				<Overwrite>	356
		OVERwrite?					357
		OVERwrite	CLISt			<Overwrite>	358
			CLISt?				359
		TRACe				TRC1|TRC2|TRC3|TRC4,<Filename >	360
	STORe	CLISt				<Filename>	361
		CONFiguration				<Filename>	362
		TRACe				<Label>,<Filename>	363
		TRACe	OVERwrite			<Overwrite>	364
			OVERwrite?				365
SENSe[1..n]	AVERage	[STATe]				<AverageState>	366
		[STATe]?					367

Command						Parameter(s)	P.
		COUNt				<AverageCount>|MAXimum|MINimum	368
		COUNt?				[MAXimum|MINimum]	370
		COUNt	AUTO			<AverageCountAuto>	372
			AUTO?				374
	POWer	[DC]	RANGe	AUTO		<AutoRange>	375
				AUTO?			376
				SCALe		<Range>	377
				SCALe?			378
				SCALe	LIST?		379
		THReshold	RELative			<RelativePowerThreshold[<wsp>DB]>|MAXimum|MINimum	380
			RELative?			[MAXimum|MINimum]	381
		WAVelength	OFFSet			<Offset[<wsp>M]>|MAXimum|MINimum	383
			OFFSet?			[MAXimum|MINimum]	385
			OFFSet	ACTivate		<OffsetState>	387
				ACTivate?			388
			RANGe	LOWer		<Start[<wsp>M|HZ]>|MAXimum|MINimum	389
				LOWer?		[MAXimum|MINimum]	391
				[UPPer]		<Stop[<wsp>M|HZ]>|MAXimum|MINimum	393
				[UPPer]?		[MAXimum|MINimum]	395
STATus	OPERation	BIT[1..n]	CONDition?				397

Command						Parameter(s)	P.
TRACe[1..n]	[DATA]	PREamble?				TRC1|TRC2|TRC3|TRC4	398
	[DATA]?					TRC1|TRC2|TRC3|TRC4	400
	FEED	CONTrol				TRC1|TRC2|TRC3|TRC4,ALWays	402
		CONTrol?				TRC1|TRC2|TRC3|TRC4	404
	INFormation?					TRC1|TRC2|TRC3|TRC4	405
	POINts?					TRC1|TRC2|TRC3|TRC4	407
UNIT[1..n]	POWer					DBM|W	408
	POWer?						409
	SPECtrum					M|HZ	410
	SPECtrum?						411

Product-Specific Commands—Description

:ABORt[1..n]

Description	This command is used to stop running scan, measurement or aquisition in progress. This command is an event and has no associated *RST condition or query form. However, the equivalent of the ABORt command is performed on any acquisition in progress.
Syntax	:ABORt[1..n]
Parameter(s)	None
Example(s)	ABOR
See Also	INITiate[1..n]:IMMediate INITiate[1..n]:STATe? INITiate[1..n]:CONTinuous INITiate[1..n]:CONTinuous?

:CALCulate[1..n]:CHANnel:ADD

Description	Adds a new channel to list of channels. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. *RST has no effect on channels.
Syntax	:CALCulate[1..n]:CHANnel:ADD<wsp><Name>,<Center[<wsp>M|HZ]>
Parameter(s)	➤ *Name:* The program data syntax for <Name> is defined as a <STRING PROGRAM DATA> element. Name of the new channel (case sensitive). Maximum length: 7 characters. ➤ *Center:* The program data syntax for <Center> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> elements are: M|HZ. Center of the channel being added. Range is dependent on OSA module limits.

:CALCulate[1..n]:CHANnel:ADD

Example(s)	CALC:CHAN:ADD "CHAN123",1550.25NM
Notes	The new channel must not be in conflict with an existing channel. The channel being added is in conflict if its name already exists in another channel or if it overlaps with another channel.
See Also	CALCulate[1..n]:CHANnel:CENTer CALCulate[1..n]:CHANnel:CENTer? CALCulate[1..n]:CHANnel:NAME CALCulate[1..n]:CHANnel:NAME? CALCulate[1..n]:CHANnel:DELete

:CALCulate[1..n]:CHANnel:AUTO

Description	Builds channel list according to peaks from active trace. All previous channels are destroyed. The OSA module must be in Ready state with no acquisition in progress for this command to be accepted. Active trace must be loaded and have at least one detected peak for this command to be successful. *RST has no effect on channels.
Syntax	:CALCulate[1..n]:CHANnel:AUTO
Parameter(s)	None
Example(s)	TRAC:FEED:CONT TRC1,ALW MMEM:LOAD:TRAC TRC1,"FabryPerot1550nm.OSW" CALC:CHAN:AUTO
Notes	A maximum of 200 channels are built. If there are more than 200 peaks are present, the first 200 will be used to build the channel list.
See Also	CALCulate[1..n]:CHANnel:ADD CALCulate[1..n]:CHANnel:DELete:ALL

:CALCulate[1..n]:CHANnel:BANDwidth

Description

Sets bandwidth of a channel.

For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress.

*RST has no effect on channels.

Syntax

:CALCulate[1..n]:CHANnel:BANDwidth<wsp><Channel index>,<Bandwidth[<wsp>HZ]>|MAXimum|MINimum

Parameter(s)

➤ *Channel index:*

The program data syntax for <Channel index> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element.

Index of channel.

The maximum value for the index varies with the number of channels currently on the list. The list contains a maximum of 200 channels.
Range: [1 ... 200]

➤ *Bandwidth:*

The program data syntax for <Bandwidth> is defined as a <numeric_value> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> element is HZ. The <Bandwidth> special forms MINimum and MAXimum are accepted on input.

:CALCulate[1..n]:CHANnel:BANDwidth

	MINimum allows to set the instrument to the smallest supported value. MAXimum allows to set the instrument to the greatest supported value. New bandwidth of the channel. Range: [5.0E+9 … 2.0E+12] Hz ([5 ... 2000] GHz)
Example(s)	CALC:CHAN:DEL:ALL CALC:CHAN:ADD "CHAN123",1550.25NM CALC:CHAN:BAND 1,1.0E+11
Notes	The new bandwidth must not put the channel in conflict with an existing channel. A channel is in conflict when it overlaps with another channel.
See Also	CALCulate[1..n]:CHANnel:BANDwidth?

:CALCulate[1..n]:CHANnel:BANDwidth?

Description	This query returns the bandwidth of a channel. *RST has no effect on channels.
Syntax	:CALCulate[1..n]:CHANnel:BANDwidth?<wsp> <Channel index>[,MAXimum|MINimum]
Parameter(s)	➤ *Channel index:* The program data syntax for <Channel index> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. Index of channel. The maximum value for the index varies with the number of channels currently on the list. The list contains a maximum of 200 channels. Range: [1 ... 200] ➤ *Parameter 2:* The program data syntax for the second parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MAXimum|MINimum. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value.
Response Syntax	<Bandwidth>

:CALCulate[1..n]:CHANnel:BANDwidth?

Response(s)	*Bandwidth:* The response data syntax for <Bandwidth> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Bandwidth for the channel (in Hz).
Example(s)	TRAC:FEED:CONT TRC1,ALW MMEM:LOAD:TRAC TRC1,"FabryPerot1550nm.OSW" CALC:CHAN:AUTO CALC:CHAN:BAND? 30
See Also	CALCulate[1..n]:CHANnel:BANDwidth

:CALCulate[1..n]:CHANnel:BANDwidth: ALARm

Description	Sets bandwidth alarm value for a channel. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. *RST has no effect on channels.
Syntax	:CALCulate[1..n]:CHANnel:BANDwidth:ALARm<wsp><Channel index>,<AlarmBandwidth[<wsp>HZ]>|MAXimum|MINimum
Parameter(s)	➤ *Channel index:* The program data syntax for <Channel index> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. Index of channel.

:CALCulate[1..n]:CHANnel:BANDwidth:ALARm

The maximum value for the index varies with the number of channels on the list. The list contains a maximum of 200 channels.
Range: [1 ... 200]

➤ *AlarmBandwidth:*

The program data syntax for <AlarmBandwidth> is defined as a <numeric_value> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> element is HZ. The <AlarmBandwidth> special forms MINimum and MAXimum are accepted on input.

MINimum allows to set the instrument to the smallest supported value.
MAXimum allows to set the instrument to the greatest supported value.

Alarm bandwidth of the channel.
Range: [3E+8 … 1.9999E+12] Hz ([0.3 .. 1999.9] GHz)

Example(s)

CALC:CHAN:DEL:ALL
CALC:CHAN:ADD "CHAN123",1540.0NM
CALC:CHAN:ALAR 1,1.5E+10

Notes

The new alarm bandwidth must not exceed channel bandwidth.

See Also

CALCulate[1..n]:CHANnel:BANDwidth
CALCulate[1..n]:CHANnel:BANDwidth?
CALCulate[1..n]:CHANnel:BANDwidth:ALARm?

:CALCulate[1..n]:CHANnel:BANDwidth: ALARm?

Description	This query returns the alarm bandwidth value of a channel. *RST has no effect on channels.
Syntax	:CALCulate[1..n]:CHANnel:BANDwidth:ALARm? <wsp><Channel index>[,MAXimum|MINimum]
Parameter(s)	➤ *Channel index:* The program data syntax for <Channel index> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. Index of channel. The maximum value for the index varies with the number of channels on the list. The list contains a maximum of 200 channels. Range: [1 ... 200] ➤ *Parameter 2:* The program data syntax for the second parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MAXimum|MINimum. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value.

:CALCulate[1..n]:CHANnel:BANDwidth:ALARm?

Response Syntax	<AlarmBandwidth>
Response(s)	*AlarmBandwidth:* The response data syntax for <AlarmBandwidth> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Alarm bandwidth for the channel (in Hz).
Example(s)	CALC:CHAN:DEL:ALL CALC:CHAN:ADD "CHAN123",1540.0NM CALC:CHAN:BAND:ALAR? 1
See Also	CALCulate[1..n]:CHANnel:BANDwidth CALCulate[1..n]:CHANnel:BANDwidth? CALCulate[1..n]:CHANnel:BANDwidth:ALARm

:CALCulate[1..n]:CHANnel:CENTer

Description

Sets central spectral value (wavelength or frequency) of a channel.

For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress.

*RST has no effect on channels.

Syntax

:CALCulate[1..n]:CHANnel:CENTer<wsp><Channel index>,<Center[<wsp>M|HZ]>

Parameter(s)

➤ *Channel index:*

The program data syntax for <Channel index> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element.

Index of channel.

The maximum value for the index varies with the number of channels on the list. The list contains a maximum of 200 channels.
Range: [1 ... 200]

➤ *Center:*

The program data syntax for <Center> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> elements are: M|HZ.

:CALCulate[1..n]:CHANnel:CENTer

	Center of the channel. Range is dependent on OSA module limits.
Example(s)	CALC:CHAN:DEL:ALL CALC:CHAN:ADD "CHAN123",1540.0NM CALC:CHAN:CENT 1,1.55E-6
Notes	The new center must not put the channel in conflict with an existing channel. A channel is in conflict when it overlaps with another channel.
See Also	CALCulate[1..n]:CHANnel:ADD CALCulate[1..n]:CHANnel:CENTer?

:CALCulate[1..n]:CHANnel:CENTer?

Description	This query returns the central spectral value (wavelength or frequency) of a channel. *RST has no effect on channels.
Syntax	:CALCulate[1..n]:CHANnel:CENTer?<wsp><Channel index>
Parameter(s)	*Channel index:* The program data syntax for <Channel index> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. Index of channel. The maximum value for the index varies with the number of channels on the list. The list contains a maximum of 200 channels. Range: [1 ... 200]
Response Syntax	<Center>
Response(s)	*Center:* The response data syntax for <Center> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Center for the channel (in m or Hz).
Example(s)	TRAC:FEED:CONT TRC1,ALW MMEM:LOAD:TRAC TRC1,"FabryPerot1550nm.OSW" CALC:CHAN:AUTO CALC:CHAN:CENT? 2
See Also	CALCulate[1..n]:CHANnel:CENTer

:CALCulate[1..n]:CHANnel:COUNT?

Description	This query returns the number of channels on the list. *RST has no effect on channels.
Syntax	:CALCulate[1..n]:CHANnel:COUNT?
Parameter(s)	None
Response Syntax	<ChannelCount>
Response(s)	*ChannelCount:* The response data syntax for <ChannelCount> is defined as a <NR1 NUMERIC RESPONSE DATA> element. Number of channels on the list.
Example(s)	CALC:CHAN:ADD "Ch1",1530NM CALC:CHAN:ADD "Ch2",1.55E-6 CALC:CHAN:COUN?

:CALCulate[1..n]:CHANnel:DELete

Description	Deletes a channel from list of channels. The OSA module must not be in acquisition for this command to be accepted. *RST has no effect on channels.
Syntax	:CALCulate[1..n]:CHANnel:DELete<wsp><Cha nnel index>
Parameter(s)	*Channel index:* The program data syntax for <Channel index> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. Index of channel. The maximum value for the index varies with the number of channels on the list. The list contains a maximum of 200 channels. Range: [1 ... 200]
Example(s)	CALC:CHAN:ADD "Ch1",1530NM CALC:CHAN:ADD "Ch2",1.55E-6 CALC:CHAN:DEL 2
See Also	CALCulate[1..n]:CHANnel:DELete:ALL

:CALCulate[1..n]:CHANnel:DELete:ALL

Description	Deletes all channels from list of channels. An acquisition cannot be in progress for this command to be accepted. *RST has no effect on channels.
Syntax	:CALCulate[1..n]:CHANnel:DELete:ALL
Parameter(s)	None
Example(s)	CALC:CHAN:ADD "Ch1",1530NM CALC:CHAN:ADD "Ch2",1.55E-6 CALC:CHAN:DEL:ALL
See Also	CALCulate[1..n]:CHAN:DELete

:CALCulate[1..n]:CHANnel:NAME

Description	Changes a channel name. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. *RST has no effect on channels.
Syntax	:CALCulate[1..n]:CHANnel:NAME<wsp><Channel index>,<Name>
Parameter(s)	➤ *Channel index:* The program data syntax for <Channel index> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. Index of channel. The maximum value for the index varies with the number of channels on the list. The list contains a maximum of 200 channels. Range: [1 ... 200] ➤ *Name:* The program data syntax for <Name> is defined as a <STRING PROGRAM DATA> element. The name of the channel is case sensitive and its maximum length is 7 characters.

:CALCulate[1..n]:CHANnel:NAME

Example(s)	CALC:CHAN:DEL:ALL CALC:CHAN:ADD "Ch1",1530NM CALC:CHAN:ADD "Ch2",1.55E-6 CALC:CHAN:NAME 2,"NEWCHAN"
Notes	The name of the channel must be different from the other channel names.
See Also	CALCulate[1..n]:CHANnel:ADD CALCulate[1..n]:CHANnel:NAME?

:CALCulate[1..n]:CHANnel:NAME?

Description	This query returns the name of a channel. *RST has no effect on channels.
Syntax	:CALCulate[1..n]:CHANnel:NAME?<wsp><Chan nel index>
Parameter(s)	*Channel index:* The program data syntax for <Channel index> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. Index of channel. The maximum value for the index varies with the number of channels on the list. The list contains a maximum of 200 channels. Range: [1 ... 200]
Response Syntax	<Name>
Response(s)	*Name:* The response data syntax for <Name> is defined as a <STRING RESPONSE DATA> element. Channel name.
Example(s)	CALC:CHAN:DEL:ALL CALC:CHAN:ADD "Ch1",1530NM CALC:CHAN:ADD "Ch2",1.55E-6 CALC:CHAN:NAME? 2
See Also	CALCulate[1..n]:CHANnel:ADD CALCulate[1..n]:CHANnel:NAME

:CALCulate[1..n]:CHANnel:OSNR:MAXimum

Description

Sets maximum SNR value for a channel.

For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress.

*RST has no effect on channels.

Syntax

:CALCulate[1..n]:CHANnel:OSNR:MAXimum<wsp><Channel index>,<OsnrMax[<wsp>DB]>|MAXimum|MINimum

Parameter(s)

➤ *Channel index:*

The program data syntax for <Channel index> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element.

Index of channel.

:CALCulate[1..n]:CHANnel:OSNR:MAXimum

The maximum value for the index varies with the number of channels on the list. The list contains a maximum of 200 channels.
Range: [1 ... 200]

➤ *OsnrMax:*

The program data syntax for <OsnrMax> is defined as a <numeric_value> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> element is DB. The <OsnrMax> special forms MINimum and MAXimum are accepted on input.

MINimum allows to set the instrument to the smallest supported value.
MAXimum allows to set the instrument to the greatest supported value.

Maximum optical signal-to-noise ratio for the channel.
Range: [0.02 … 55.0] dB

:CALCulate[1..n]:CHANnel:OSNR:MAXimum

Example(s)	CALC:CHAN:DEL:ALL CALC:CHAN:ADD "Ch1",1.53E-6 CALC:CHAN:OSNR:MAX 1,45.00
Notes	The new maximum OSNR must be higher than reference OSNR of the channel.
See Also	CALCulate[1..n]:CHANnel:OSNR:REFerence CALCulate[1..n]:CHANnel:OSNR:REFerence? CALCulate[1..n]:CHANnel:OSNR:MINinmum CALCulate[1..n]:CHANnel:OSNR:MINinmum? CALCulate[1..n]:CHANnel:OSNR:MAXimum?

:CALCulate[1..n]:CHANnel:OSNR:MAXimum?

Description

This query returns the maximum SNR value for a channel.

*RST has no effect on channels.

Syntax

:CALCulate[1..n]:CHANnel:OSNR:MAXimum?<wsp><Channel index>[,MAXimum|MINimum]

Parameter(s)

➤ *Channel index:*

The program data syntax for <Channel index> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element.

Index of channel.

The maximum value for the index varies with the number of channels on the list. The list contains a maximum of 200 channels.
Range: [1 ... 200]

➤ *Parameter 2:*

The program data syntax for the second parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MAXimum|MINimum.

MINimum is used to retrieve the instrument's smallest supported value.
MAXimum is used to retrieve the instrument's greatest supported value.

:CALCulate[1..n]:CHANnel:OSNR:MAXimum?

Response Syntax	<OsnrMax>
Response(s)	*OsnrMax:* The response data syntax for <OsnrMax> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Maximum optical signal-to-noise ratio for the channel (in dB).
Example(s)	CALC:CHAN:DEL:ALL CALC:CHAN:ADD "Ch1",1.53E-6 CALC:CHAN:OSNR:MAX? 1
See Also	CALCulate[1..n]:CHANnel:OSNR:REFerence CALCulate[1..n]:CHANnel:OSNR:REFerence? CALCulate[1..n]:CHANnel:OSNR:MINinmum CALCulate[1..n]:CHANnel:OSNR:MINinmum? CALCulate[1..n]:CHANnel:OSNR:MAXimum

:CALCulate[1..n]:CHANnel:OSNR:MINimum

Description	Sets the minimum SNR value for a channel. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. *RST has no effect on channels.
Syntax	:CALCulate[1..n]:CHANnel:OSNR:MINimum<wsp><Channel index>,<OsnrMin[<wsp>DB]>|MAXimum|MINimum
Parameter(s)	➤ *Channel index:* The program data syntax for <Channel index> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. Index of channel.

:CALCulate[1..n]:CHANnel:OSNR:MINimum

The maximum value for the index varies with the number of channels on the list. The list contains a maximum of 200 channels.
Range: [1 ... 200]

➤ *OsnrMin:*

The program data syntax for <OsnrMin> is defined as a <numeric_value> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> element is DB. The <OsnrMin> special forms MINimum and MAXimum are accepted on input.

MINimum allows to set the instrument to the smallest supported value.
MAXimum allows to set the instrument to the greatest supported value.

Minimum optical signal-to-noise ratio for the channel.
Range: [0.0 … 54.98] dB

:CALCulate[1..n]:CHANnel:OSNR:MINimum

Example(s)	CALC:CHAN:DEL:ALL CALC:CHAN:ADD "Ch1",1.53E-6 CALC:CHAN:OSNR:MIN 1,10.00
Notes	The new minimum OSNR must be lower than the reference OSNR of the channel.
See Also	CALCulate[1..n]:CHANnel:OSNR:REFerence CALCulate[1..n]:CHANnel:OSNR:REFerence? CALCulate[1..n]:CHANnel:OSNR:MAXinmum CALCulate[1..n]:CHANnel:OSNR:MAXinmum? CALCulate[1..n]:CHANnel:OSNR:MINimum?

:CALCulate[1..n]:CHANnel:OSNR: MINimum?

Description	This query returns the minimum SNR value for a channel. *RST has no effect on channels.
Syntax	:CALCulate[1..n]:CHANnel:OSNR:MINimum?<wsp><Channel index>[,MAXimum|MINimum]
Parameter(s)	➤ *Channel index:* The program data syntax for <Channel index> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. Index of channel. The maximum value for the index varies with the number of channels on the list. The list contains a maximum of 200 channels. Range: [1 ... 200] ➤ *Parameter 2:* The program data syntax for the second parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MAXimum|MINimum. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value.

:CALCulate[1..n]:CHANnel:OSNR:MINimum?

Response Syntax	<OsnrMin>
Response(s)	*OsnrMin:* The response data syntax for <OsnrMin> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Minimum optical signal-to-noise ratio for the channel (in dB).
Example(s)	CALC:CHAN:DEL:ALL CALC:CHAN:ADD "Ch1",1.53E-6 CALC:CHAN:OSNR:MIN? 1
See Also	CALCulate[1..n]:CHANnel:OSNR:REFerence CALCulate[1..n]:CHANnel:OSNR:REFerence? CALCulate[1..n]:CHANnel:OSNR:MAXinmum CALCulate[1..n]:CHANnel:OSNR:MAXinmum? CALCulate[1..n]:CHANnel:OSNR:MINimum

:CALCulate[1..n]:CHANnel:OSNR:REFerence

Description	Sets the reference SNR value for a channel. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. *RST has no effect on channels.
Syntax	:CALCulate[1..n]:CHANnel:OSNR:REFerence<wsp><Channel index>,<OsnrRef[<wsp>DB]>|MAXimum|MINimum
Parameter(s)	➤ *Channel index:* The program data syntax for <Channel index> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. Index of channel.

:CALCulate[1..n]:CHANnel:OSNR:REFerence

The maximum value for the index varies with the number of channels on the list. The list contains a maximum of 200 channels.
Range: [1 ... 200]

➤ *OsnrRef:*

The program data syntax for <OsnrRef> is defined as a <numeric_value> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> element is DB. The <OsnrRef> special forms MINimum and MAXimum are accepted on input.

MINimum allows to set the instrument to the smallest supported value.
MAXimum allows to set the instrument to the greatest supported value.

Reference optical signal-to-noise ratio for the channel.
Range: [0.01 … 54.99] dB

:CALCulate[1..n]:CHANnel:OSNR:REFerence

Example(s)	CALC:CHAN:DEL:ALL CALC:CHAN:ADD "Ch1",1.53E-6 CALC:CHAN:OSNR:REF 1,12.50
Notes	The new reference OSNR must be higher than minimum OSNR and lower than maximum OSNR of the channel.
See Also	CALCulate[1..n]:CHANnel:OSNR:MINimum CALCulate[1..n]:CHANnel:OSNR:MINimum? CALCulate[1..n]:CHANnel:OSNR:MAXimum CALCulate[1..n]:CHANnel:OSNR:MAXimum? CALCulate[1..n]:CHANnel:OSNR:REFerence?

:CALCulate[1..n]:CHANnel:OSNR:REFerence?

Description	This query returns the reference SNR value for a channel. *RST has no effect on channels.
Syntax	:CALCulate[1..n]:CHANnel:OSNR:REFerence?<wsp><Channel index>[,MAXimum|MINimum]
Parameter(s)	➤ *Channel index:* The program data syntax for <Channel index> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. Index of channel. The maximum value for the index varies with the number of channels on the list. The list contains a maximum of 200 channels. Range: [1 ... 200] ➤ *Parameter 2:* The program data syntax for the second parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MAXimum|MINimum. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value.

:CALCulate[1..n]:CHANnel:OSNR:REFerence?

Response Syntax	<OsnrRef>
Response(s)	*OsnrRef:* The response data syntax for <OsnrRef> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Reference optical signal-to-noise ratio for the channel (in dB).
Example(s)	CALC:CHAN:DEL:ALL CALC:CHAN:ADD "Ch1",1.53E-6 CALC:CHAN:SNR:REF? 1
See Also	CALCulate[1..n]:CHANnel:OSNR:MINimum CALCulate[1..n]:CHANnel:OSNR:MINimum? CALCulate[1..n]:CHANnel:OSNR:MAXimum CALCulate[1..n]:CHANnel:OSNR:MAXimum? CALCulate[1..n]:CHANnel:OSNR:REFerence

:CALCulate[1..n]:CHANnel:POWer:MAXimum

Description

Sets maximum allowed power for a channel.

The OSA module must be in Ready state with no acquisition in progress for this command to be accepted.

*RST has no effect on channels.

Syntax

:CALCulate[1..n]:CHANnel:POWer:MAXimum<wsp><Channel index>,<PowerMax[<wsp>DBM|W]>|MAXimum|MINimum

Parameter(s)

➤ *Channel index:*

The program data syntax for <Channel index> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element.

Index of channel.

:CALCulate[1..n]:CHANnel:POWer:MAXimum

The maximum value for the index varies with the number of channels on the list. The list contains a maximum of 200 channels.
Range: [1 ... 200]

➤ *PowerMax:*

The program data syntax for <PowerMax> is defined as a <numeric_value> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> elements are: DBM|W. The <PowerMax> special forms MINimum and MAXimum are accepted on input.

MINimum allows to set the instrument to the smallest supported value.
MAXimum allows to set the instrument to the greatest supported value.

Maximum power for the channel.
Range: [-59.98 … 30.0] dBm

Example(s)

CALC:CHAN:DEL:ALL
CALC:CHAN:ADD "Ch1",1.55E-6
CALC:CHAN:POW:MAX 1,15.0DBM

Notes

The new maximum power must be higher than reference power of the channel.

See Also

CALCulate[1..n]:CHANnel:POWer:REFerence
CALCulate[1..n]:CHANnel:POWer:REFerence?
CALCulate[1..n]:CHANnel:POWer:MINimum
CALCulate[1..n]:CHANnel:POWer:MINimum?
CALCulate[1..n]:CHANnel:POWer:MAXimum?

:CALCulate[1..n]:CHANnel:POWer:MAXimum?

Description

This query returns the maximum allowed power for a channel.

*RST has no effect on channels.

Syntax

:CALCulate[1..n]:CHANnel:POWer:MAXimum?<wsp><Channel index>[,MAXimum|MINimum]

Parameter(s)

➤ *Channel index:*

The program data syntax for <Channel index> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element.

Index of channel.

The maximum value for the index varies with the number of channels on the list. The list contains a maximum of 200 channels.
Range: [1 ... 200]

➤ *Parameter 2:*

The program data syntax for the second parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MAXimum|MINimum.

MINimum is used to retrieve the instrument's smallest supported value.
MAXimum is used to retrieve the instrument's greatest supported value.

:CALCulate[1..n]:CHANnel:POWer:MAXimum?

Response Syntax	<PowerMax>
Response(s)	*PowerMax:* The response data syntax for <PowerMax> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Maximum power for the channel (in dBm or W).
Example(s)	CALC:CHAN:DEL:ALL CALC:CHAN:ADD "Ch1",1.55E-6 CALC:CHAN:POW:MAX? 1
See Also	CALCulate[1..n]:CHANnel:POWer:MINimum CALCulate[1..n]:CHANnel:POWer:MINimum? CALCulate[1..n]:CHANnel:POWer:REFerence CALCulate[1..n]:CHANnel:POWer:REFerence? CALCulate[1..n]:CHANnel:POWer:MAXimum

:CALCulate[1..n]:CHANnel:POWer:MINimum

Description

Sets minimum allowed power for a channel.

For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress.

*RST has no effect on channels.

Syntax

:CALCulate[1..n]:CHANnel:POWer:MINimum<wsp><Channel index>,<PowerMin[<wsp>DBM|W]>|MAXimum|MINimum

Parameter(s)

➤ *Channel index:*

The program data syntax for <Channel index> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element.

Index of channel.

:CALCulate[1..n]:CHANNel:POWer:MINimum

The maximum value for the index varies with the number of channels on the list. The list contains a maximum of 200 channels.
Range: [1 ... 200]

➤ *PowerMin:*

The program data syntax for <PowerMin> is defined as a <numeric_value> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> elements are: DBM|W. The <PowerMin> special forms MINimum and MAXimum are accepted on input.

MINimum allows to set the instrument to the smallest supported value.
MAXimum allows to set the instrument to the greatest supported value.

Minimum power for the channel.
Range: [-60.0 … 29.98] dBm
Units: dBm,w

:CALCulate[1..n]:CHANnel:POWer:MINimum

Example(s)	CALC:CHAN:DEL:ALL CALC:CHAN:ADD "Ch1",1.55E-6 CALC:CHAN:POW:MIN 1,-50.50DBM
Notes	The new minimum power must be lower than the reference power of the channel.
See Also	CALCulate[1..n]:CHANnel:POWer:REFerence CALCulate[1..n]:CHANnel:POWer:REFerence? CALCulate[1..n]:CHANnel:POWer:MAXimum CALCulate[1..n]:CHANnel:POWer:MAXimum? CALCulate[1..n]:CHANnel:POWer:MINimum?

:CALCulate[1..n]:CHANnel:POWer: MINimum?

Description	This query returns the minimum allowed power for a channel. *RST has no effect on channels.
Syntax	:CALCulate[1..n]:CHANnel:POWer:MINimum?<wsp><Channel index>[,MAXimum|MINimum]
Parameter(s)	➤ *Channel index:* The program data syntax for <Channel index> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. Index of channel. The maximum value for the index varies with the number of channels on the list. The list contains a maximum of 200 channels. Range: [1 ... 200] ➤ *Parameter 2:* The program data syntax for the second parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MAXimum|MINimum. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value.

:CALCulate[1..n]:CHANnel:POWer:MINimum?

Response Syntax	<PowerMin>
Response(s)	*PowerMin:* The response data syntax for <PowerMin> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Minimum power for the channel (in dBm or W).
Example(s)	CALC:CHAN:DEL:ALL CALC:CHAN:ADD "Ch1",1.55E-6 CALC:CHAN:POW:MIN? 1
See Also	CALCulate[1..n]:CHANnel:POWer:REFerence CALCulate[1..n]:CHANnel:POWer:REFerence? CALCulate[1..n]:CHANnel:POWer:MAXimum CALCulate[1..n]:CHANnel:POWer:MAXimum? CALCulate[1..n]:CHANnel:POWer:MINimum

:CALCulate[1..n]:CHANnel:POWer:REFerence

Description	Sets reference power for a channel. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. *RST has no effect on channels.
Syntax	:CALCulate[1..n]:CHANnel:POWer:REFerence<wsp><Channel index>,<PowerRef[<wsp>DBM|W]>|MAXimum|MINimum
Parameter(s)	➤ *Channel index:* The program data syntax for <Channel index> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. Index of channel.

:CALCulate[1..n]:CHANnel:POWer:REFerence

The maximum value for the index varies with the number of channels on the list. The list contains a maximum of 200 channels.
Range: [1 ... 200]

➤ *PowerRef:*

The program data syntax for <PowerRef> is defined as a <numeric_value> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> elements are: DBM|W. The <PowerRef> special forms MINimum and MAXimum are accepted on input.

MINimum allows to set the instrument to the smallest supported value.
MAXimum allows to set the instrument to the greatest supported value.

Reference power for the channel.
Range: [-59.99 … 29.99] dBm

:CALCulate[1..n]:CHANnel:POWer:REFerence

Example(s)	CALC:CHAN:DEL:ALL CALC:CHAN:ADD "Ch1",1.55E-6 CALC:CHAN:POW:REF 1,0.0DBM
Notes	The new reference power must be higher than minimum power and lower than maximum power of the channel.
See Also	CALCulate[1..n]:CHANnel:POWer:MAXimum CALCulate[1..n]:CHANnel:POWer:MAXimum? CALCulate[1..n]:CHANnel:POWer:MINimum CALCulate[1..n]:CHANnel:POWer:MINimum? CALCulate[1..n]:CHANnel:POWer:REFerence?

:CALCulate[1..n]:CHANnel:POWer:REFerence?

Description	This query returns the reference power for a channel. *RST has no effect on channels.
Syntax	:CALCulate[1..n]:CHANnel:POWer:REFerence?<wsp><Channel index>[,MAXimum|MINimum]
Parameter(s)	➤ *Channel index:* The program data syntax for <Channel index> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. Index of channel. The maximum value for the index varies with the number of channels on the list. The list contains a maximum of 200 channels. Range: [1 ... 200] ➤ *Parameter 2:* The program data syntax for the second parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MAXimum|MINimum. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value.

:CALCulate[1..n]:CHANnel:POWer:REFerence?

Response Syntax	<PowerRef>
Response(s)	*PowerRef:* The response data syntax for <PowerRef> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Reference power for the channel (in dBm or W).
Example(s)	CALC:CHAN:DEL:ALL CALC:CHAN:ADD "Ch1",1.55E-6 CALC:CHAN:POW:REF? 1
See Also	CALCulate[1..n]:CHANnel:POWer:MAXimum CALCulate[1..n]:CHANnel:POWer:MAXimum? CALCulate[1..n]:CHANnel:POWer:MINimum CALCulate[1..n]:CHANnel:POWer:MINimum? CALCulate[1..n]:CHANnel:POWer:REFerence

:CALCulate[1..n]:CHANnel?

Description	This query returns available information on a channel. *RST has no effect on channels.
Syntax	:CALCulate[1..n]:CHANnel?<wsp><Channel index>
Parameter(s)	*Channel index:* The program data syntax for <Channel index> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. Index of channel. The maximum value for the index varies with the number of channels on the list. The list contains a maximum of 200 channels. Range: [1 ... 200]
Response Syntax	<ChannelInfo>
Response(s)	*ChannelInfo:* The response data syntax for <ChannelInfo> is defined as a <DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA> element. Information on the channel in A,B,C,D,E,F,G,H,I,J,K format, where: A=Name (string)

:CALCulate[1..n]:CHANnel?

B=Center (always in m) <NR3 NUMERIC RESPONSE DATA>
C=Bandwidth (always in Hz) <NR3 NUMERIC RESPONSE DATA>
D=AlarmBandwidth (always in Hz) <NR3 NUMERIC RESPONSE DATA>
E=PowerMin (always in dBm) <NR3 NUMERIC RESPONSE DATA>

F=PowerRef (always in dBm) <NR3 NUMERIC RESPONSE DATA>
G=PowerMax (always in dBm) <NR3 NUMERIC RESPONSE DATA>
H=OsnrMin (always in dB) <NR3 NUMERIC RESPONSE DATA>
I=OsnrRef (always in dB) <NR3 NUMERIC RESPONSE DATA>

J=OsnrMax (always in dB) <NR3 NUMERIC RESPONSE DATA>
K=State (Always -1) (NR1 NUMERIC RESPONSE DATA)

:CALCulate[1..n]:CHANnel?

Example(s)	CALC:CHAN:DEL:ALL CALC:CHAN:ADD "Ch1",1.55E-6 CALC:CHAN? 1
See Also	CALCulate[1..n]:CHAnnel:NAME? CALCulate[1..n]:CHANnel:CENTer? CALCulate[1..n]:CHANnel:BANDwidth? CALCulate[1..n]:CHANnel:BANDwidth:ALARm? CALCulate[1..n]:CHANnel:POWer:MINimum? CALCulate[1..n]:CHANnel:POWer:MAXimum? CALCulate[1..n]:CHANnel:POWer:REFerence? CALCulate[1..n]:CHANnel:OSNR:MINimum? CALCulate[1..n]:CHANnel:OSNR:MAXimum? CALCulate[1..n]:CHANnel:OSNR:REFerence?

:CALCulate[1..n]:CNSCan

Description	In previous version, this command set analysis done on each reading (ON) or on the last one only (OFF). Now, this command had no effect. *RST has no effect.
Syntax	:CALCulate[1..n]:CNSCan<wsp><CalcOnNewScan>
Parameter(s)	*CalcOnNewScan:* The program data syntax for <CalcOnNewScan> is defined as a <Boolean Program Data> element. The <CalcOnNewScan> special forms ON and OFF are accepted on input for increased readability. ON corresponds to 1 and OFF corresponds to 0. Calculations on new scan.
Example(s)	CALC:CNSC OFF
See Also	CALCulate[1..n]:CNSCan?

:CALCulate[1..n]:CNSCan?

Description	This query always returns ON. *RST has no effect.
Syntax	:CALCulate[1..n]:CNSCan?
Parameter(s)	None
Response Syntax	<CalcOnNewScan>
Response(s)	*CalcOnNewScan:* The response data syntax for <CalcOnNewScan> is defined as a <NR1 NUMERIC RESPONSE DATA> element. Calculate on new scans.
Example(s)	CALC:CNSC?
See Also	CALCulate[1..n]:CNSCan

:CALCulate[1..n]:DFB:BANDwidth:LEVel

Description	Sets position used for bandwidth calculation in DFB test. Result of bandwidth calculation is queried with CALCulate:DFB:BANDwidth? For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. At *RST, this value is 3.00 dB.
Syntax	:CALCulate[1..n]:DFB:BANDwidth:LEVel<wsp><PowerLevel>|MAXimum|MINimum
Parameter(s)	*PowerLevel:* The program data syntax for <PowerLevel> is defined as a <numeric_value> element. The <PowerLevel> special forms MINimum and MAXimum are accepted on input.

:CALCulate[1..n]:DFB:BANDwidth:LEVel

	MINimum allows to set the instrument to the smallest supported value. MAXimum allows to set the instrument to the greatest supported value. Relative power level. Range: [0.1 … 40.0] dB
Example(s)	CALC:DFB:BAND:LEV 10.50
See Also	CALCulate[1..n]:DFB:BANDwidth:LEVel? CALCulate[1..n]:DFB:BANDwidth? CALCulate[1..n]:DFB

:CALCulate[1..n]:DFB:BANDwidth:LEVel?

Description	This query returns the position used for bandwidth calculation in DFB test. Result of bandwidth calculation is queried with CALCulate:DFB:BANDwidth? At *RST, this value is 3.00 dB.
Syntax	:CALCulate[1..n]:DFB:BANDwidth:LEVel?[<wsp>MAXimum|MINimum]
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MAXimum|MINimum. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value.
Response Syntax	<PowerLevel>

:CALCulate[1..n]:DFB:BANDwidth:LEVel?

Response(s)	*PowerLevel:* The response data syntax for <PowerLevel> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Relative power level (in dB).
Example(s)	CALC:DFB:BAND:LEV?
See Also	CALCulate[1..n]:DFB:BANDwidth:LEVel CALCulate[1..n]:DFB:BANDwidth? CALCulate[1..n]:DFB

:CALCulate[1..n]:DFB:BANDwidth?

Description	This query returns the bandwidth from a DFB test. Position used to calculate this value is set with CALCulate:DFB:BANDwidth:LEVel. A valid DFB test must be loaded for a value to be returned. At *RST, DFB data is unavailable (CALCulate:DFB:SELect value is set to –1).
Syntax	:CALCulate[1..n]:DFB:BANDwidth?
Parameter(s)	None
Response Syntax	<Bandwidth>
Response(s)	*Bandwidth:* The response data syntax for <Bandwidth> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Bandwidth (in m).
Example(s)	MMEM:LOAD:TRAC TRC1,"DFB_1570nmC+L.OSW" CALC:DFB:SEL TRC1 CALC:DFB CALC:DFB:BAND?
Notes	Depending on results of DFB test, this value may be unavailable.
See Also	CALCulate[1..n]:DFB:BANDwidth:LEVel CALCulate[1..n]:DFB:BANDwidth:LEVel? CALCulate[1..n]:DFB

:CALCulate[1..n]:DFB:CHANnel?

Description	This query returns the index and name of the main mode channel from a DFB test. A valid DFB test must be loaded for a value to be returned. At *RST, DFB data is unavailable (CALCulate:DFB:SELect value is set to –1).
Syntax	:CALCulate[1..n]:DFB:CHANnel?
Parameter(s)	None
Response Syntax	<ChannelInfo>
Response(s)	*ChannelInfo:* The response data syntax for <ChannelInfo> is defined as a <DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA> element. Channel info in A,B format where: A=Index (NR1 NUMERIC RESPONSE DATA) B=Name (STRING RESPONSE DATA)
Example(s)	MMEM:LOAD:TRAC TRC1,"DFB_1570nmC+L.OSW" CALC:CHAN:AUTO CALC:DFB:SEL TRC1 CALC:DFB CALC:DFB:CHAN?
Notes	A corresponding channel must be loaded for this query to be successful.
See Also	CALCulate[1..n]:CHANnel:AUTO CALCulate[1..n]:DFB

:CALCulate[1..n]:DFB:FPMS?

Description	This query returns the mean spacing between the Fabry-Perot sidemodes from a DFB test. A valid DFB test must be loaded for a value to be returned. At *RST, DFB data is unavailable (CALCulate:DFB:SELect value is set to –1).
Syntax	:CALCulate[1..n]:DFB:FPMS?
Parameter(s)	None
Response Syntax	<MeanSpace>
Response(s)	*MeanSpace:* The response data syntax for <MeanSpace> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Mean spacing between the Fabry-Perot sidemodes from a DFB test (Hz).
Example(s)	MMEM:LOAD:TRAC TRC1,"DFB_1570nmC+L.OSW" CALC:DFB:SEL TRC1 CALC:DFB CALC:DFB:FPMS?
Notes	Depending on results of DFB test, this value may be unavailable.
See Also	CALCulate[1..n]:DFB

:CALCulate[1..n]:DFB:OFFSet?

Description	This query returns the difference between the main mode's wavelength position and the stopband center. A valid DFB test must be loaded for a value to be returned. At *RST, DFB data is unavailable (CALCulate:DFB:SELect value is set to –1).
Syntax	:CALCulate[1..n]:DFB:OFFSet?
Parameter(s)	None
Response Syntax	<StopBandDiff>
Response(s)	*StopBandDiff:* The response data syntax for <StopBandDiff> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Difference between main mode and stopband center (in Hz).
Example(s)	MMEM:LOAD:TRAC TRC1,"DFB_1570nmC+L.OSW" CALC:DFB:SEL TRC1 CALC:DFB CALC:DFB:OFFS?
Notes	Depending on results of DFB test, this value may be unavailable.
See Also	CALCulate[1..n]:DFB

:CALCulate[1..n]:DFB:POSition?

Description	This query returns the main mode's wavelength position. A valid DFB test must be loaded for a value to be returned. At *RST, DFB data is unavailable (CALCulate:DFB:SELect value is set to –1).
Syntax	:CALCulate[1..n]:DFB:POSition?
Parameter(s)	None
Response Syntax	<Position>
Response(s)	*Position:* The response data syntax for <Position> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Main mode position (in m or Hz).
Example(s)	MMEM:LOAD:TRAC TRC1,"DFB_1570nmC+L.OSW" CALC:DFB:SEL TRC1 CALC:DFB CALC:DFB:POS?
Notes	Depending on results of DFB test, this value may be unavailable.
See Also	CALCulate[1..n]:DFB

:CALCulate[1..n]:DFB:POWer?

Description	This query returns the main mode's power. A valid DFB test must be loaded for a value to be returned. At *RST, DFB data is unavailable (CALCulate:DFB:SELect value is set to –1).
Syntax	:CALCulate[1..n]:DFB:POWer?
Parameter(s)	None
Response Syntax	<Power>
Response(s)	*Power:* The response data syntax for <Power> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Main mode power (in dBm or W).
Example(s)	MMEM:LOAD:TRAC TRC1,"DFB_1570nmC+L.OSW" CALC:CHAN:AUTO CALC:DFB:SEL TRC1 CALC:DFB CALC:DFB:POW?
Notes	Depending on results of DFB test, this value may be unavailable.
See Also	CALCulate[1..n]:DFB

:CALCulate[1..n]:DFB:SBANd:LEFT?

Description	This query returns the difference between the main mode wavelength position and the most powerful sidemode on the left. A valid DFB test must be loaded for a value to be returned. At *RST, DFB data is unavailable (CALCulate:DFB:SELect value is set to –1).
Syntax	:CALCulate[1..n]:DFB:SBANd:LEFT?
Parameter(s)	None
Response Syntax	<LeftStopBand>
Response(s)	*LeftStopBand:* The response data syntax for <LeftStopBand> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Left stopband (in Hz).
Example(s)	MMEM:LOAD:TRAC TRC1,"DFB_1570nmC+L.OSW" CALC:DFB:SEL TRC1 CALC:DFB CALC:DFB:SBAN:LEFT?
Notes	Depending on results of DFB test, this value may be unavailable.
See Also	CALCulate[1..n]:DFB:SBANd:RIGHt? CALCulate[1..n]:DFB:SBANd? CALCulate[1..n]:DFB

:CALCulate[1..n]:DFB:SBANd:RIGHt?

Description	This query returns the difference between the main mode wavelength position and the most powerful sidemode on the right? At *RST, DFB data is unavailable (CALCulate:DFB:SELect value is set to –1).
Syntax	:CALCulate[1..n]:DFB:SBANd:RIGHt?
Parameter(s)	None
Response Syntax	<RightStopBand>
Response(s)	*RightStopBand:* The response data syntax for <RightStopBand> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Right stopband (in Hz).
Example(s)	MMEM:LOAD:TRAC TRC1,"DFB_1570nmC+L.OSW" CALC:DFB:SEL TRC1 CALC:DFB CALC:DFB:SBAN:RIGH?
Notes	Depending on results of DFB test, this value may be unavailable.
See Also	CALCulate[1..n]:DFB:SBANd:LEFT? CALCulate[1..n]:DFB:SBANd? CALCulate[1..n]:DFB

:CALCulate[1..n]:DFB:SBANd?

Description	This query returns the difference between the wavelength position of the most powerful sidemode to the left and right of the main mode. A valid DFB test must be loaded for a value to be returned. At *RST, DFB data is unavailable (CALCulate:DFB:SELect value is set to –1).
Syntax	:CALCulate[1..n]:DFB:SBANd?
Parameter(s)	None
Response Syntax	<StopBand>
Response(s)	*StopBand:* The response data syntax for <StopBand> is defined as a <NR3 NUMERIC RESPONSE DATA> element. stopband (in Hz).
Example(s)	MMEM:LOAD:TRAC TRC1,"DFB_1570nmC+L.OSW" CALC:DFB:SEL TRC1 CALC:DFB CALC:DFB:SBAN?
Notes	Depending on results of DFB test, this value may be unavailable.
See Also	CALCulate[1..n]:DFB:SBANd:LEFT? CALCulate[1..n]:DFB:SBANd:RIGHt? CALCulate[1..n]:DFB

:CALCulate[1..n]:DFB:SELect

Description	Selects trace for DFB testing. At *RST, this value is set to –1 (No trace selected).
Syntax	:CALCulate[1..n]:DFB:SELect<wsp>TRC1|TRC2|TRC3|TRC4
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: TRC1|TRC2|TRC3|TRC4. Input trace to select for DFB testing.
Example(s)	MMEM:LOAD:TRAC TRC1,"DFB_1570nmC+L.OSW" CALC:DFB:SEL TRC1
See Also	CALCulate[1..n]:DFB:SELect? CALCulate[1..n]:DFB

:CALCulate[1..n]:DFB:SELect?

Description	This query returns which trace is used to perform DFB test. At *RST, this value is set to –1 (No trace selected).
Syntax	:CALCulate[1..n]:DFB:SELect?
Parameter(s)	None
Response Syntax	<InputTrace>
Response(s)	*InputTrace:* The response data syntax for <InputTrace> is defined as a <CHARACTER RESPONSE DATA> element. Input trace selected for DFB test. -1 is returned if no input trace was selected.
Example(s)	MMEM:LOAD:TRAC TRC1,"DFB_1570nmC+L.OSW" CALC:DFB:SEL TRC1 CALC:DFB:SEL?
See Also	CALCulate[1..n]:DFB:SELect CALCulate[1..n]:DFB

:CALCulate[1..n]:DFB:SMSR:LEFT?

Description	This query returns the difference between the main mode power and the most powerful sidemode on the left. A valid DFB test must be loaded for a value to be returned. At *RST, DFB data is unavailable (CALCulate:DFB:SELect value is set to –1).
Syntax	:CALCulate[1..n]:DFB:SMSR:LEFT?
Parameter(s)	None
Response Syntax	<LeftSmsr>
Response(s)	*LeftSmsr:* The response data syntax for <LeftSmsr> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Left SMSR in dB (difference between main mode power and power of the most powerful left sidemode).
Example(s)	MMEM:LOAD:TRAC TRC1,"DFB_1570nmC+L.OSW" CALC:DFB:SEL TRC1 CALC:DFB CALC:DFB:SMSR:LEFT?
Notes	Depending on results of DFB test, this value may be unavailable.
See Also	CALCulate[1..n]:DFB:SMSR:RIGHt? CALCulate[1..n]:DFB:SMSR:WORSt? CALCulate[1..n]:DFB

:CALCulate[1..n]:DFB:SMSR:RIGHt?

Description	This query returns the difference between the main mode power and the most powerful sidemode on the right. A valid DFB test must be loaded for a value to be returned. At *RST, DFB data is unavailable (CALCulate:DFB:SELect value is set to –1).
Syntax	:CALCulate[1..n]:DFB:SMSR:RIGHt?
Parameter(s)	None
Response Syntax	<RightSmsr>
Response(s)	*RightSmsr:* The response data syntax for <RightSmsr> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Right SMSR in dB (difference between main mode power and power of the most powerful right sidemode).
Example(s)	MMEM:LOAD:TRAC TRC1,"DFB_1570nmC+L.OSW" CALC:DFB:SEL TRC1 CALC:DFB CALC:DFB:SMSR:RIGH?
Notes	Depending on results of DFB test, this value may be unavailable.
See Also	CALCulate[1..n]:DFB:SMSR:LEFT? CALCulate[1..n]:DFB:SMSR:WORSt? CALCulate[1..n]:DFB

:CALCulate[1..n]:DFB:SMSR:WORSt?

Description	This query returns the difference between the main mode power and the most powerful sidemode. A valid DFB test must be loaded for a value to be returned. At *RST, DFB data is unavailable (CALCulate:DFB:SELect value is set to –1).
Syntax	:CALCulate[1..n]:DFB:SMSR:WORSt?
Parameter(s)	None
Response Syntax	<WorstSmsr>
Response(s)	*WorstSmsr:* The response data syntax for <WorstSmsr> is defined as a <DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA> element. Worst SMSR with position (most powerful secondary mode) in A,B format where: A=Worst SMSR (always in dB) <NR3 NUMERIC RESPONSE DATA> B=Position (always in m) <NR3 NUMERIC RESPONSE DATA>

:CALCulate[1..n]:DFB:SMSR:WORSt?

Example(s)	MMEM:LOAD:TRAC TRC1,"DFB_1570nmC+L.OSW" CALC:DFB:SEL TRC1 CALC:DFB CALC:DFB:SMSR:WORS?
Notes	Depending on results of DFB test, this value may be unavailable.
See Also	CALCulate[1..n]:DFB:SMSR:LEFT? CALCulate[1..n]:DFB:SMSR:RIGHt? CALCulate[1..n]:DFB

:CALCulate[1..n]:DFB

Description	Performs DFB test. For the command to be accepted, a trace must be loaded and selected, the OSA module must be in Ready state with no acquisition in progress. This command is an event and has no associated *RST condition or query form.
Syntax	:CALCulate[1..n]:DFB
Parameter(s)	None
Example(s)	MMEM:LOAD:TRAC TRC1,"DFB_1570nmC+L.OSW" CALC:DFB:SEL TRC1 CALC:DFB
Notes	Depending on input data, this command may fail. For example, a trace with no peak cannot be used.
See Also	CALCulate[1..n]:DFB:SELect

:CALCulate[1..n]:EDFA:GAIN?

Description	This query returns the EDFA channel gain. A valid EDFA test must be loaded for a value to be returned. At *RST, EDFA data is unavailable (All CALCulate:EDFA:SELect values are set to –1).
Syntax	:CALCulate[1..n]:EDFA:GAIN?<wsp><ChannelIndex>
Parameter(s)	*ChannelIndex:* The program data syntax for <ChannelIndex> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. Index of channel. The maximum value for the index varies with the number of channels on the list. The list contains a maximum of 200 channels. Range: [1 ... 200]
Response Syntax	<Gain>
Response(s)	*Gain:* The response data syntax for <Gain> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Channel gain (in dB).

:CALCulate[1..n]:EDFA:GAIN?

Example(s)	MMEM LOAD:TRAC TRC1,"EDFA1500nm_1600nm_Input.OSW" MMEM LOAD:TRAC TRC2,"EDFA1500nm_1600nm_Output.OSW" CALC:CHAN:AUTO CALC:EDFA:SEL:INP TRC1 CALC:EDFA:SEL:OUTP TRC2 CALC:EDFA CALC:EDFA:GAIN? 2
Notes	Depending on results of EDFA test, this value may be unavailable.
See Also	CALCulate[1..n]:EDFA

:CALCulate[1..n]:EDFA:NFIGure?

Description	This query returns the noise figure in EDFA channel. A valid EDFA test must be loaded for a value to be returned. At *RST, EDFA data is unavailable (All CALCulate:EDFA:SELect values are set to –1).
Syntax	:CALCulate[1..n]:EDFA:NFIGure?<wsp><ChannelIndex>
Parameter(s)	*ChannelIndex:* The program data syntax for <ChannelIndex> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. Index of channel. The maximum value for the index varies with the number of channels on the list. The list contains a maximum of 200 channels. Range: [1 ... 200].
Response Syntax	<NoiseFigure>
Response(s)	*NoiseFigure:* The response data syntax for <NoiseFigure> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Channel noise figure (in dB).

:CALCulate[1..n]:EDFA:NFIGure?

Example(s)	MMEM LOAD:TRAC TRC1,"EDFA1500nm_1600nm_Input.OSW" MMEM LOAD:TRAC TRC2,"EDFA1500nm_1600nm_Output.OSW" CALC:CHAN:AUTO CALC:EDFA:SEL:INP TRC1 CALC:EDFA:SEL:OUTP TRC2 CALC:EDFA CALC:EDFA:NFIG? 2
Notes	Depending on results of EDFA test, this value may be unavailable.
See Also	CALCulate[1..n]:EDFA

:CALCulate[1..n]:EDFA:PASE?

Description	This query returns the ASE power for the EDFA channel. A valid EDFA test must be loaded for a value to be returned. At *RST, EDFA data is unavailable (All CALCulate:EDFA:SELect values are set to –1).
Syntax	:CALCulate[1..n]:EDFA:PASE?<wsp><ChannelIndex>
Parameter(s)	*ChannelIndex:* The program data syntax for <ChannelIndex> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. Index of channel. The maximum value for the index varies with the number of channels on the list. The list contains a maximum of 200 channels. Range: [1 ... 200]
Response Syntax	<AsePower>
Response(s)	*AsePower:* The response data syntax for <AsePower> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Channel ASE power (in dBm or W).

:CALCulate[1..n]:EDFA:PASE?

Example(s)	MMEM LOAD:TRAC TRC1,"EDFA1500nm_1600nm_Input.OSW" MMEM LOAD:TRAC TRC2,"EDFA1500nm_1600nm_Output.OSW" CALC:CHAN:AUTO CALC:EDFA:SEL:INP TRC1 CALC:EDFA:SEL:OUTP TRC2 CALC:EDFA CALC:EDFA:PASE? 2
Notes	Depending on results of EDFA test, this value may be unavailable.
See Also	CALCulate[1..n]:EDFA

:CALCulate[1..n]:EDFA:POWer:FLATness:INPut?

Description	This query returns the power flatness of the input EDFA trace. A valid EDFA test must be loaded for a value to be returned. At *RST, EDFA data is unavailable (All CALCulate:EDFA:SELect values are set to –1).
Syntax	:CALCulate[1..n]:EDFA:POWer:FLATness:INPut?
Parameter(s)	None
Response Syntax	<InpPowerFlatness>
Response(s)	*InpPowerFlatness:* The response data syntax for <InpPowerFlatness> is defined as a <NR3 NUMERIC RESPONSE DATA> element. EDFA input power flatness (in dB).
Example(s)	MMEM LOAD:TRAC TRC1,"EDFA1500nm_1600nm_Input.OSW" MMEM LOAD:TRAC TRC2,"EDFA1500nm_1600nm_Output.OSW" CALC:EDFA:SEL:INP TRC1 CALC:EDFA:SEL:OUTP TRC2 CALC:EDFA CALC:EDFA:POW:FLAT:INP?
See Also	CALCulate[1..n]:EDFA

:CALCulate[1..n]:EDFA:POWer:FLATness:OUTput?

Description	This query returns the power flatness of the output EDFA trace. A valid EDFA test must be loaded for a value to be returned. At *RST, EDFA data is unavailable (All CALCulate:EDFA:SELect values are set to –1).
Syntax	:CALCulate[1..n]:EDFA:POWer:FLATness:OUTpu t?
Parameter(s)	None
Response Syntax	<OutpPowerFlatness>
Response(s)	*OutpPowerFlatness:* The response data syntax for <OutpPowerFlatness> is defined as a <NR3 NUMERIC RESPONSE DATA> element. EDFA output power flatness (in dB).
Example(s)	MMEM LOAD:TRAC TRC1,"EDFA1500nm_1600nm_Input.OSW" MMEM LOAD:TRAC TRC2,"EDFA1500nm_1600nm_Output.OSW" CALC:EDFA:SEL:INP TRC1 CALC:EDFA:SEL:OUTP TRC2 CALC:EDFA CALC:EDFA:POW:FLAT:OUTP?
See Also	CALCulate[1..n]:EDFA

:CALCulate[1..n]:EDFA:PSSE?

Description	This query returns the SSE power for a channel. A valid EDFA test must be loaded for a value to be returned. At *RST, EDFA data is unavailable (All CALCulate:EDFA:SELect values are set to –1).
Syntax	:CALCulate[1..n]:EDFA:PSSE?<wsp><ChannelIndex>
Parameter(s)	*ChannelIndex:* The program data syntax for <ChannelIndex> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. Index of channel. The maximum value for the index varies with the number of channels on the list. The list contains a maximum of 200 channels. Range: [1 ... 200]
Response Syntax	<SsePower>
Response(s)	*SsePower:* The response data syntax for <SsePower> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Channel SSE power (in dBm or W).

:CALCulate[1..n]:EDFA:PSSE?

Example(s)	MMEM LOAD:TRAC TRC1,"EDFA1500nm_1600nm_Input.OSW" MMEM LOAD:TRAC TRC2,"EDFA1500nm_1600nm_Output.OSW" CALC:CHAN:AUTO CALC:EDFA:SEL:INP TRC1 CALC:EDFA:SEL:OUTP TRC2 CALC:EDFA CALC:EDFA:PSSE? 2
Notes	Depending on results of EDFA test, this value may be unavailable.
See Also	CALCulate[1..n]:EDFA

:CALCulate[1..n]:EDFA:SELect [:INPut]

Description	Selects input trace to use for EDFA testing. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. At *RST, this value is at –1 (No trace selected).
Syntax	:CALCulate[1..n]:EDFA:SELect[:INPut]<wsp>TRC1|TRC2|TRC3|TRC4
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: TRC1|TRC2|TRC3|TRC4. Input trace to select for EDFA testing.
Example(s)	MMEM LOAD:TRAC TRC1,"EDFA1500nm_1600nm_Input.OSW" CALC:EDFA:SEL:INP TRC1
Notes	Selected input trace must be different than selected output trace otherwise a warning will appear.
See Also	CALCulate[1..n]:EDFA:SELect[:INPut]? CALCulate[1..n]:EDFA:SELect:OUTput CALCulate[1..n]:EDFA

:CALCulate[1..n]:EDFA:SELect[:INPut]?

Description	This query returns the input trace used for EDFA testing. At *RST, this value is at –1 (No trace selected).
Syntax	:CALCulate[1..n]:EDFA:SELect[:INPut]?
Parameter(s)	None
Response Syntax	<InputTrace>
Response(s)	*InputTrace:* The response data syntax for <InputTrace> is defined as a <CHARACTER RESPONSE DATA> element. Input trace selected for EDFA test. -1 is returned if no input trace selected.
Example(s)	MMEM LOAD:TRAC TRC1,"EDFA1500nm_1600nm_Input.OSW" CALC:EDFA:SEL:INP TRC1 CALC:EDFA:SEL:INP?
See Also	CALCulate[1..n]:EDFA:SELect[:INPut] CALCulate[1..n]:EDFA:SELect:OUTput CALCulate[1..n]:EDFA

:CALCulate[1..n]:EDFA:SELect:OUTPut

Description	Selects output trace for EDFA testing. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. At *RST, this value is set to –1 (No trace selected).
Syntax	:CALCulate[1..n]:EDFA:SELect:OUTPut<wsp>TRC1|TRC2|TRC3|TRC4
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: TRC1|TRC2|TRC3|TRC4. Output trace to select for EDFA testing.
Example(s)	MMEM LOAD:TRAC TRC2,"EDFA1500nm_1600nm_Output.OSW" CALC:EDFA:SEL:OUTP TRC2
Notes	Selected output trace must be different than selected input trace. Otherwise a warning will appear.
See Also	CALCulate[1..n]:EDFA:SELect:OUTput? CALCulate[1..n]:EDFA:SELect[:INPut] CALCulate[1..n]:EDFA

:CALCulate[1..n]:EDFA:SELect:OUTPut?

Description	This query returns the output trace used for EDFA testing. At *RST, this value is set to –1 (No trace selected).
Syntax	:CALCulate[1..n]:EDFA:SELect:OUTPut?
Parameter(s)	None
Response Syntax	<OutputTrace>
Response(s)	*OutputTrace:* The response data syntax for <OutputTrace> is defined as a <CHARACTER RESPONSE DATA> element. Output trace selected for EDFA test. -1 is returned if no output trace selected.
Example(s)	MMEM:LOAD:TRAC TRC2,"EDFA1500nm_1600nm_Output.OSW" CALC:EDFA:SEL:OUTP TRC2 CALC:EDFA:SEL:OUTP?
See Also	CALCulate[1..n]:EDFA:SELect:OUTput CALCulate[1..n]:EDFA:SELect[:INPut] CALCulate[1..n]:EDFA

:CALCulate[1..n]:EDFA:SPERcent?

Description	Returns the S% value of the EDFA channel. S% (S. Percent): indicates the current output power according to the measured output power (P.OUT/[P.OUT + P.ASE]). A valid EDFA test must be loaded for a value to be returned. At *RST, EDFA data is unavailable (All CALCulate:EDFA:SELect values are set to –1).
Syntax	:CALCulate[1..n]:EDFA:SPERcent?<wsp><ChannelIndex>
Parameter(s)	*ChannelIndex:* The program data syntax for <ChannelIndex> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. Index of channel. The maximum value for the index varies with the number of channels on the list. The list contains a maximum of 200 channels. Range: [1 ... 200]
Response Syntax	<SPercentRatio>

:CALCulate[1..n]:EDFA:SPERcent?

Response(s)	*SPercentRatio:* The response data syntax for <SPercentRatio> is defined as a <NR3 NUMERIC RESPONSE DATA> element. SPercent value (in dB).
Example(s)	MMEM LOAD:TRAC TRC1,"EDFA1500nm_1600nm_Input.OSW" MMEM LOAD:TRAC TRC2,"EDFA1500nm_1600nm_Output.OSW" CALC:CHAN:AUTO CALC:EDFA:SEL:INP TRC1 CALC:EDFA:SEL:OUTP TRC2 CALC:EDFA CALC:EDFA:SPER? 2
Notes	Depending on results of EDFA test, this value may be unavailable.
See Also	CALCulate[1..n]:EDFA

:CALCulate[1..n]:EDFA

Description	Calculates EDFA data. For the command to be accepted, the input and output traces must be loaded and selected and the OSA module must be in Ready state with no acquisition in progress. This command is an event and has no associated *RST condition or query form.
Syntax	:CALCulate[1..n]:EDFA
Parameter(s)	None
Example(s)	MMEM LOAD:TRAC TRC1,"EDFA1500nm_1600nm_Input.OSW" MMEM LOAD:TRAC TRC2,"EDFA1500nm_1600nm_Output.OSW" CALC:CHAN:AUTO CALC:EDFA:SEL:INP TRC1 CALC:EDFA:SEL:OUTP TRC2 CALC:EDFA
See Also	CALCulate[1..n]:EDFA:SELect[:INPut] CALCulate[1..n]:EDFA:SELect:OUTput

:CALCulate[1..n]:MODE

Description	Sets the current test mode. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. At *RST, this value is EDFA.
Syntax	:CALCulate[1..n]:MODE<wsp>EDFA|TRAN|DFB |SAN
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: EDFA|TRAN|DFB|SAN. Test mode.
Example(s)	CALC:MODE EDFA
See Also	CALCulate[1..n]:MODE? CALCulate[1..n]:DFB CALCulate[1..n]:EDFA CALCulate[1..n]:SANalysis CALCulate[1..n]:TRANsmission

:CALCulate[1..n]:MODE?

Description	This query returns the current test mode. At *RST, this value is EDFA.
Syntax	:CALCulate[1..n]:MODE?
Parameter(s)	None
Response Syntax	<TestMode>
Response(s)	*TestMode:* The response data syntax for <TestMode> is defined as a <CHARACTER RESPONSE DATA> element. Current test mode.
Example(s)	CALC:MODE DFB CALC:MODE?
See Also	CALCulate[1..n]:MODE CALCulate[1..n]:DFB CALCulate[1..n]:EDFA CALCulate[1..n]:SANalysis CALCulate[1..n]:TRANsmission

:CALCulate[1..n]:NORMal:BANDwidth:LEVel

Description	Sets the Normal mode power. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. At *RST, this value is 3.00 dB.
Syntax	:CALCulate[1..n]:NORMal:BANDwidth:LEVel<wsp><PowerLevel[<wsp>DB]>|MAXimum|MINimum
Parameter(s)	*PowerLevel:* The program data syntax for <PowerLevel> is defined as a <numeric_value> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> element is DB. The <PowerLevel> special forms MINimum and MAXimum are accepted on input. MINimum allows to set the instrument to the smallest supported value. MAXimum allows to set the instrument to the greatest supported value. Power level. Range: [0.1 … 40.0] dB.
Example(s)	CALC:NORM:BAND:LEV 5.0
See Also	CALCulate[1..n]:NORMal:BANDwidth:LEVel?

:CALCulate[1..n]:NORMal:BANDwidth:LEVel?

Description	This query returns the normal mode power. At *RST, this value is 3.00 dB.
Syntax	:CALCulate[1..n]:NORMal:BANDwidth:LEVel?[<wsp>MAXimum|MINimum]
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MAXimum|MINimum. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value.
Response Syntax	<PowerLevel>
Response(s)	*PowerLevel:* The response data syntax for <PowerLevel> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Power level (in dB).
Example(s)	CALC:NORM:BAND:LEV?
See Also	CALCulate[1..n]:NORMal:BANDwidth:LEVel

:CALCulate[1..n]:NORMal:POWer:FLATness?

Description	This query returns the power flatness value of the active trace. Active trace must be loaded for the command to be accepted. *RST has no effect on this value.
Syntax	:CALCulate[1..n]:NORMal:POWer:FLATness?
Parameter(s)	None
Response Syntax	<NormalPowerFlatness>
Response(s)	*NormalPowerFlatness:* The response data syntax for <NormalPowerFlatness> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Normal output power flatness (in dB).
Example(s)	MMEM LOAD:TRAC TRC1,"DFB_1570nmC+L.OSW" CALC:NORM:POW:FLAT?

:CALCulate[1..n]:NORMal:POWer:INTegrated?

Description	This query calculates and returns the integrated power between two points of the active trace. Active trace must be loaded for the command to be accepted. *RST has no effect on this value.
Syntax	:CALCulate[1..n]:NORMal:POWer:INTegrated?<wsp><Start[<wsp>M|HZ]>,<Stop[<wsp>M|HZ]>
Parameter(s)	➤ *Start:* The program data syntax for <Start> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> elements are: M|HZ. Start value for integrated power calculation. ➤ *Stop:* The program data syntax for <Stop> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> elements are: M|HZ. Stop value for integrated power calculation.

:CALCulate[1..n]:NORMal:POWer:INTegrated?

Response Syntax	<IntegratedPower>
Response(s)	*IntegratedPower:* The response data syntax for <IntegratedPower> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Integrated power (in dBm or W).
Example(s)	MMEM LOAD:TRAC TRC1,"DFB_1570nmC+L.OSW" CALC:NORM:POW:INT? 1569.0NM,1571.0NM
Notes	Start parameter cannot be higher than Stop parameter when spectrum unit is a wavelength, or lower when unit is a frequency.

:CALCulate[1..n]:OSNR:NMR:AUTO

Description	Sets the automatic noise measurement range mode. There must be no acquisition in progress for this command to be accepted. At *RST, this value is ON.
Syntax	:CALCulate[1..n]:OSNR:NMR:AUTO<wsp><AutoNmr>
Parameter(s)	*AutoNmr:* The program data syntax for <AutoNmr> is defined as a <Boolean Program Data> element. The <AutoNmr> special forms ON and OFF are accepted on input for increased readability. ON corresponds to 1 and OFF corresponds to 0. Automatic noise measurement range values for calculation.
Example(s)	CALC:OSNR:NMR:AUTO ON
See Also	CALCulate[1..n]:OSNR:NMR:AUTO?

:CALCulate[1..n]:OSNR:NMR:AUTO?

Description	This query returns the automatic noise measurement range mode. At *RST, this value is ON.
Syntax	:CALCulate[1..n]:OSNR:NMR:AUTO?
Parameter(s)	None
Response Syntax	<AutoNmr>
Response(s)	*AutoNmr:* The response data syntax for <AutoNmr> is defined as a <NR1 NUMERIC RESPONSE DATA> element. Automatic noise measurement range mode used for calculation.
Example(s)	CALC:OSNR:NMR:AUTO?
See Also	CALCulate[1..n]:OSNR:NMR:AUTO

:CALCulate[1..n]:OSNR:NMR:DISTance

Description	Sets the distance between the peak wavelength and the center of the noise measurement range. This value will be used for the SNR calculation. There must be no acquisition in progress for this command to be accepted. At *RST, this value is 0.05 GHz.
Syntax	:CALCulate[1..n]:OSNR:NMR:DISTance<wsp><Distance[<wsp>HZ]>
Parameter(s)	*Distance:* The program data syntax for <Distance> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> element is HZ. Distance between peak and mid-range used for SNR calculation. Range: [0.0 ... 9999.99] GHz.
Example(s)	CALC:OSNR:NMR:DIST 5.5E+12
See Also	CALCulate[1..n]:OSNR:NMR:DISTance?

:CALCulate[1..n]:OSNR:NMR:DISTance?

Description	This query returns the distance between the peak wavelength and the center of the noise measurement range. This value is used for the SNR calculation. At *RST, this value is 0.05 GHz.
Syntax	:CALCulate[1..n]:OSNR:NMR:DISTance?
Parameter(s)	None
Response Syntax	<Distance>
Response(s)	*Distance:* The response data syntax for <Distance> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Distance from peak (in Hz).
Example(s)	CALC:OSNR:NMR:DIST?
See Also	CALCulate[1..n]:OSNR:NMR:DISTance

:CALCulate[1..n]:OSNR:NMR:RANGe

Description	Sets the range on both sides of the external limit of the distance-from-peak value. This value will be used for the SNR calculation. There must be no acquisition in progress for this command to be accepted. At *RST, this value is 0.01 GHz.
Syntax	:CALCulate[1..n]:OSNR:NMR:RANGe<wsp><Range[<wsp>HZ]>
Parameter(s)	*Range:* The program data syntax for <Range> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> element is HZ. Noise measurement range size used for SNR calculation. Range: [0.0 ... 9999.99] GHz.
Example(s)	CALC:OSNR:NMR:RANG 4.4E+9
Notes	The noise measurement range width cannot be higher than the distance.
See Also	CALCulate[1..n]:OSNR:NMR:RANGe?

:CALCulate[1..n]:OSNR:NMR:RANGe?

Description	This query returns the range on both sides of the external limit of the distance-from-peak value. This value will be used for the SNR calculation. At *RST, this value is 0.01 GHz.
Syntax	:CALCulate[1..n]:OSNR:NMR:RANGe?
Parameter(s)	None
Response Syntax	<Range>
Response(s)	*Range:* The response data syntax for <Range> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Bandwidth used for OSNR calculation (in Hz).
Example(s)	CALC:OSNR:NMR:RANG?
See Also	CALCulate[1..n]:OSNR:NMR:RANGe

:CALCulate[1..n]:OSNR:ROB

Description	Sets custom reference optical bandwidth. The SNR calculations will be made assuming that your OSA unit has the noise-equivalent bandwidth as defined here. There must be no acquisition in progress for this command to be accepted. At *RST, this value is 0.1 nm.
Syntax	:CALCulate[1..n]:OSNR:ROB<wsp><RefOptBand[<wsp>M]>
Parameter(s)	*RefOptBand:* The program data syntax for <RefOptBand> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> element is M. Reference optical bandwidth for calculations. Range: [0.1 … 1] nm
Example(s)	CALC:OSNR:ROB 1.5E-10
See Also	CALCulate[1..n]:OSNR:ROB:AUTO CALCulate[1..n]:OSNR:ROB?

:CALCulate[1..n]:OSNR:ROB?

Description	This query returns the custom reference optical bandwidth. At *RST, this value is 0.1 nm.
Syntax	:CALCulate[1..n]:OSNR:ROB?
Parameter(s)	None
Response Syntax	<RefOptBand>
Response(s)	*RefOptBand:* The response data syntax for <RefOptBand> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Reference optical bandwidth used for calculations (in m).
Example(s)	CALC:OSNR:ROB?
See Also	CALCulate[1..n]:OSNR:ROB:AUTO? CALCulate[1..n]:OSNR:ROB

:CALCulate[1..n]:OSNR:ROB:AUTO

Description	This command is used to set automatic or custom reference optical bandwidth. If ON (= automatic selection), SNR measurements will be made using the OSA's true noise-equivalent bandwidth. If OFF (= custom selection), you have to set Reference Optical Bandwidth with the CALCulate[1..n]:OSNR:ROB command. There must be no acquisition in progress for this command to be accepted. At *RST, this value is ON.
Syntax	:CALCulate[1..n]:OSNR:ROB:AUTO<wsp><AutoRefOptBand>
Parameter(s)	*AutoRefOptBand:* The program data syntax for <AutoRefOptBand> is defined as a <Boolean Program Data> element. The <AutoRefOptBand> special forms ON and OFF are accepted on input for increased readability. ON corresponds to 1 and OFF corresponds to 0. Automatic reference optical bandwidth for calculations.
Example(s)	CALC:OSNR:ROB:AUTO ON
See Also	CALCulate[1..n]:OSNR:ROB CALCulate[1..n]:OSNR:ROB:AUTO?

:CALCulate[1..n]:OSNR:ROB:AUTO?

Description	This query returns whether the application equivalent noise bandwidth is in use or not. At *RST, this value is ON.
Syntax	:CALCulate[1..n]:OSNR:ROB:AUTO?
Parameter(s)	None
Response Syntax	<AutoRefOptBand>
Response(s)	*AutoRefOptBand:* The response data syntax for <AutoRefOptBand> is defined as a <NR1 NUMERIC RESPONSE DATA> element. This query lets you know whether the automatic reference optical bandwidth value is used for calculations.
Example(s)	CALC:OSNR:ROB:AUTO?
See Also	CALCulate[1..n]:OSNR:ROB? CALCulate[1..n]:OSNR:ROB:AUTO

:CALCulate[1..n]:PEAKlist:COUNt?

Description	This query returns the number of peaks which are on the current trace. Active trace must be loaded for the command to be accepted.
Syntax	:CALCulate[1..n]:PEAKlist:COUNt?
Parameter(s)	None
Response Syntax	<PeakCount>
Response(s)	*PeakCount:* The response data syntax for <PeakCount> is defined as a <NR1 NUMERIC RESPONSE DATA> element. Number of peaks in active trace.
Example(s)	MMEM LOAD:TRAC TRC1,"DFB_1570nmC+L.OSW" CALC:PEAK:COUN?

:CALCulate[1..n]:PLISt[:PEAK]?

Description	This query returns the information pertaining to a peak. Active trace and peak must be loaded for the command to be accepted.
Syntax	:CALCulate[1..n]:PLISt[:PEAK]?<wsp><PeakIn dex>
Parameter(s)	*PeakIndex:* The program data syntax for <PeakIndex> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. Peak index.
Response Syntax	<PeakInfo>
Response(s)	*PeakInfo:* The response data syntax for <PeakInfo> is defined as a <DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA> element. Peak info in A,B,C,D,E,F,G,H,I,J format where: A = Spectral position (always in m) <NR3 NUMERIC RESPONSE DATA> B = Peak power saturation <NR1 NUMERIC RESPONSE DATA> C = Associated channel <NR1 NUMERIC RESPONSE DATA> D = Peak power (always dBm) <NR3 NUMERIC RESPONSE DATA>

:CALCulate[1..n]:PLISt[:PEAK]?

	E = Integrated power (always dBm) <NR3 NUMERIC RESPONSE DATA> F = SNR left (always dB) <NR3 NUMERIC RESPONSE DATA> G = SNR right (always dB) <NR3 NUMERIC RESPONSE DATA> H = Relative power for bandwidth calculation (always dB) <NR3 NUMERIC RESPONSE DATA> I = Bandwidth (always m) <NR3 NUMERIC RESPONSE DATA>
Example(s)	MMEM LOAD:TRAC TRC1,"DFB_1570nmC+L.OSW" CALC:PLIS? 2
See Also	CALCulate[1..n]:CHANNEL:AUTO TRACE[1..n]:FEED:CONTROL

:CALCulate[1..n]:PLISt:COUNt?

Description	This query returns number of peaks on active trace. Active trace must be loaded for the command to be accepted.
Syntax	:CALCulate[1..n]:PLISt:COUNt?
Parameter(s)	None
Response Syntax	<PeakCount>
Response(s)	*PeakCount:* The response data syntax for <PeakCount> is defined as a <NR1 NUMERIC RESPONSE DATA> element. Number of peaks in active trace.
Example(s)	MMEM LOAD:TRAC TRC1,"DFB_1570nmC+L.OSW" CALC:PLIS:COUN?

:CALCulate[1..n]:SANalysis

Description	Performs Spectral Analysis test. Input trace must be loaded and selected, the OSA module must be in Ready state with no acquisition in progress for the command to be accepted. This command is an event and has no associated *RST condition or query form.
Syntax	:CALCulate[1..n]:SANalysis
Parameter(s)	None
Example(s)	MMEM LOAD:TRAC TRC2,"DUT-OUT.OSW" CALC:SAN:SEL TRC2 CALC:SAN
See Also	CALCulate[1..n]:SANanalysis:SELect

:CALCulate[1..n]:SANalysis:SELect

Description	Sets input trace used for Spectral Analysis test. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. At *RST, this value is set to –1 (No trace selected).
Syntax	:CALCulate[1..n]:SANalysis:SELect<wsp>TRC1|TRC2|TRC3|TRC4
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: TRC1|TRC2|TRC3|TRC4. Trace index for the Spectral Analysis test.
Example(s)	MMEM LOAD:TRAC TRC2,"DUT-OUT.OSW" CALC:SAN:SEL TRC2
See Also	CALCulate[1..n]:SANalysis CALCulate[1..n]:SANalysis:SELect?

:CALCulate[1..n]:SANalysis:SELect?

Description	This query returns the input trace used for Spectral Analysis test. At *RST, this value is set to –1 (No trace selected).
Syntax	:CALCulate[1..n]:SANalysis:SELect?
Parameter(s)	None
Response Syntax	<TraceIndex>
Response(s)	*TraceIndex:* The response data syntax for <TraceIndex> is defined as a <CHARACTER RESPONSE DATA> element. Input trace selected for Spectral Analysis test. -1 is returned if no input trace selected.
Example(s)	MMEM LOAD:TRAC TRC2,"DUT-OUT.OSW" CALC:SAN:SEL TRC2 CALC:SAN:SEL?
See Also	CALCulate[1..n]:SANalysis CALCulate[1..n]:SANanalysis:SELect

:CALCulate[1..n]:SANalysis:POWer:IBANd:RATio?

Description	This query returns the in-band power ratio from Spectral Analysis test. A valid Spectral Analysis test must be loaded for a value to be returned. *RST has no effect on this value (but CALCulate:SAN:SELect is set to –1).
Syntax	:CALCulate[1..n]:SANalysis:POWer:IBANd:RATio?
Parameter(s)	None
Response Syntax	<InbandPowerRatio>
Response(s)	*InbandPowerRatio:* The response data syntax for <InbandPowerRatio> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Spectral Analysis in-band power ratio (in W/W ratio).
Example(s)	MMEM LOAD:TRAC TRC2,"DUT-OUT.OSW" CALC:SAN:SEL TRC2 CALC:SAN CALC:SAN:POW:IBAN:RAT?
See Also	CALCulate[1..n]:SANalysis

:CALCulate[1..n]:SANalysis:POWer:IBANd?

Description	This query returns the in-band power from Spectral Analysis test. A valid Spectral Analysis test must be loaded for a value to be returned. *RST has no effect on this value (but CALCulate:SAN:SELect is set to –1).
Syntax	:CALCulate[1..n]:SANalysis:POWer:IBANd?
Parameter(s)	None
Response Syntax	<InbandPowerRatio>
Response(s)	*InbandPowerRatio:* The response data syntax for <InbandPowerRatio> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Spectral Analysis in-band power (in dBm or W).
Example(s)	MMEM LOAD:TRAC TRC2,"DUT-OUT.OSW" CALC:SAN:SEL TRC2 CALC:SAN CALC:SAN:POW:IBAN?
See Also	CALCulate[1..n]:SANalysis

:CALCulate[1..n]:SANalysis:POWer:PEAK?

Description	This query returns the peak power from Spectral Analysis test. A valid Spectral Analysis test must be loaded for a value to be returned. *RST has no effect on this value (but CALCulate:SAN:SELect is set to –1).
Syntax	:CALCulate[1..n]:SANalysis:POWer:PEAK?
Parameter(s)	None
Response Syntax	<PeakPower>
Response(s)	*PeakPower:* The response data syntax for <PeakPower> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Spectral Analysis peak power (in dBm or W).
Example(s)	MMEM LOAD:TRAC TRC2,"DUT-OUT.OSW" CALC:SAN:SEL TRC2 CALC:SAN CALC:SAN:POW:PEAK?
See Also	CALCulate[1..n]:SANalysis

:CALCulate[1..n]:SANalysis:POWer:RANGe:RELative

Description	Selects relative thresold from Spectral Analysis test. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. At *RST, this value is ON.
Syntax	:CALCulate[1..n]:SANalysis:POWer:RANGe:RELat ive<wsp><RelPowerRangeState>
Parameter(s)	*RelPowerRangeState:* The program data syntax for <RelPowerRangeState> is defined as a <Boolean Program Data> element. The <RelPowerRangeState> special forms ON and OFF are accepted on input for increased readability. ON corresponds to 1 and OFF corresponds to 0. State of the bandwidth definition.
Example(s)	CALC:SAN:POW:RANG:REL ON
See Also	CALCulate[1..n]:SANalysis CALCulate[1..n]:SANalysis:POWer:RANGe:RELati ve? CALCulate[1..n]:SANalysis:POWer:THReshold:RE Lative:PEAK

:CALCulate[1..n]:SANalysis:POWer:RANGe:RELative?

Description	This query returns if the relative threshold is selected in the Spectral Analysis test. At *RST, this value is ON.
Syntax	:CALCulate[1..n]:SANalysis:POWer:RANGe:RELat ive?
Parameter(s)	None
Response Syntax	<RelPowerRangeState>
Response(s)	*RelPowerRangeState:* The response data syntax for <RelPowerRangeState> is defined as a <NR1 NUMERIC RESPONSE DATA> element. State of bandwidth definition.
Example(s)	CALC:SAN:POW:RANG:REL?
See Also	CALCulate[1..n]:SANalysis CALCulate[1..n]:SANalysis:POWer:RANGe:RELati ve CALCulate[1..n]:SANalysis:POWer:THReshold:RE Lative:PEAK

:CALCulate[1..n]:SANalysis:POWer:THReshold:RELative:PEAK

Description	Sets threshold in relation to peak for Spectral Analysis test. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. *RST has no effect on this value (but CALCulate:SAN:SELect is set to –1).
Syntax	:CALCulate[1..n]:SANalysis:POWer:THReshold:RELative:PEAK<wsp><RelPeakPowerThreshold[<wsp>DB]>|MAXimum|MINimum|DEFault
Parameter(s)	*RelPeakPowerThreshold:* The program data syntax for <RelPeakPowerThreshold> is defined as a <numeric_value> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> element is DB. The <RelPeakPowerThreshold> special forms MINimum, MAXimum and DEFault are accepted on input. MINimum allows to set the instrument to the smallest supported value. MAXimum allows to set the instrument to the greatest supported value.

:CALCulate[1..n]:SANalysis:POWer:THReshold:RELative:PEAK

	DEFault allows the instrument to select a value for the <RelPeakPowerThreshold> parameter. Value for the relative to peak threshold.
Example(s)	CALC:SAN:POW:THR:REL:PEAK 20.00
See Also	CALCulate[1..n]:SANalysis CALCulate[1..n]:SANalysis:POWer:THReshold:RELative:PEAK? CALCulate[1..n]:SANalysis:POWer:RANGe:RELative

:CALCulate[1..n]:SANalysis:POWer:THReshold:RELative:PEAK?

Description	This query returns the threshold in relation to peak from Spectral Analysis test. *RST has no effect on this value (but CALCulate:SAN:SELect is set to –1).
Syntax	:CALCulate[1..n]:SANalysis:POWer:THReshold:RELative:PEAK?[<wsp>MAXimum|MINimum|DEFault]
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MAXimum|MINimum|DEFault. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value. DEFault is used to retrieve the instrument's default value.
Response Syntax	<RelPeakPowerThreshold>

:CALCulate[1..n]:SANalysis:POWer:THReshold:RELative:PEAK?

Response(s)	*RelPeakPowerThreshold:* The response data syntax for <RelPeakPowerThreshold> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Value for the threshold in relation to peak calculation (in dB).
Example(s)	CALC:SAN:POW:THR:REL:PEAK? MIN
See Also	CALCulate[1..n]:SANalysis CALCulate[1..n]:SANalysis:POWer:THReshold:Relative:PEAK CALCulate[1..n]:SANalysis:POWer:RANGe:RELative

:CALCulate[1..n]:SANalysis:POWer:TOTal?

Description	This query returns the total power from Spectral Analysis test. A valid Spectral Analysis test must be loaded for a value to be returned. *RST has no effect on this value (but CALCulate:SAN:SELect is set to –1).
Syntax	:CALCulate[1..n]:SANalysis:POWer:TOTal?
Parameter(s)	None
Response Syntax	<TotalPower>
Response(s)	*TotalPower:* The response data syntax for <TotalPower> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Spectral Analysis total power (in dBm or W).
Example(s)	MMEM LOAD:TRAC TRC2,"DUT-OUT.OSW" CALC:SAN:SEL TRC2 CALC:SAN CALC:SAN:POW:TOT?
See Also	CALCulate[1..n]:SANalysis

:CALCulate[1..n]:SANalysis:WAVelength:CENTer?

Description	This query returns the central wavelength from Spectral Analysis test. A valid Spectral Analysis test must be loaded for a value to be returned. *RST has no effect on this value (but CALCulate:SAN:SELect is set to –1).
Syntax	:CALCulate[1..n]:SANalysis:WAVelength:CENTer?
Parameter(s)	None
Response Syntax	<CentralWavelength>
Response(s)	*CentralWavelength:* The response data syntax for <CentralWavelength> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Spectral Analysis central wavelength (in m or Hz).
Example(s)	MMEM LOAD:TRAC TRC2,"DUT-OUT.OSW" CALC:SAN:SEL TRC2 CALC:SAN CALC:SAN:WAV:CENT?
See Also	CALCulate[1..n]:SANalysis

:CALCulate[1..n]:SANalysis: WAVelength:FWHM?

Description	This query returns the FWHM (full width at half-maximum position of the trace) from Spectral Analysis test. A valid Spectral Analysis test must be loaded for a value to be returned. *RST has no effect on this value (but CALCulate:SAN:SELect is set to –1).
Syntax	:CALCulate[1..n]:SANalysis:WAVelength:FWHM?
Parameter(s)	None
Response Syntax	<FullWidthHalfMax>
Response(s)	*FullWidthHalfMax:* The response data syntax for <FullWidthHalfMax> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Spectral Analysis full width half maximum (in m).
Example(s)	MMEM LOAD:TRAC TRC2,"DUT-OUT.OSW" CALC:SAN:SEL TRC2 CALC:SAN CALC:SAN:WAV:FWHM?
See Also	CALCulate[1..n]:SANanalysis

:CALCulate[1..n]:SANalysis: WAVelength:PEAK?

Description	This query returns the peak spectral value (wavelength or frequency) from Spectral Analysis test. A valid Spectral Analysis test must be loaded for a value to be returned. *RST has no effect on this value (but CALCulate:SAN:SELect is set to –1).
Syntax	:CALCulate[1..n]:SANalysis:WAVelength:PEAK?
Parameter(s)	None
Response Syntax	<PeakWavelength>
Response(s)	*PeakWavelength:* The response data syntax for <PeakWavelength> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Spectral Analysis peak wavelength (in m or Hz).
Example(s)	MMEM LOAD:TRAC TRC2,"DUT-OUT.OSW" CALC:SAN:SEL TRC2 CALC:SAN CALC:SAN:WAV:PEAK?
See Also	CALCulate[1..n]:SANalysis

:CALCulate[1..n]:SANalysis:WAVelength:RANGe[:UPPer]

Description	Sets upper range for Spectral Analysis test. For this command to be accepted, a trace must be selected and loaded for this test. *RST has no effect on this value.
Syntax	:CALCulate[1..n]:SANalysis:WAVelength:RANGe[:UPPer]<wsp><UpperRangeWavelength[<wsp>M|HZ]>|MAXimum|MINimum|DEFault
Parameter(s)	*UpperRangeWavelength:* The program data syntax for <UpperRangeWavelength> is defined as a <numeric_value> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> elements are: M|HZ. The <UpperRangeWavelength> special forms MINimum, MAXimum and DEFault are accepted on input. MINimum allows to set the instrument to the smallest supported value. MAXimum allows to set the instrument to the greatest supported value.

:CALCulate[1..n]:SANalysis:WAVelength:RANGe[:UPPer]

	DEFault allows the instrument to select a value for the <UpperRangeWavelength> parameter. The Spectral Analysis upper wavelength.
Example(s)	CALC:SAN:POW:RANG:REL OFF CALC:SAN:WAV:RANG:LOW 1530.00NM CALC:SAN:WAV:RANG:UPP 1500.55NM CALC:SAN
See Also	CALCulate[1..n]:SANalysis CALCulate[1..n]:SANalysis:WAVelength:RANGe:LOWer CALCulate[1..n]:SANalysis:WAVelength:RANGe[:UPPer]?

:CALCulate[1..n]:SANalysis:WAVelength:RANGe[:UPPer]?

Description	This query returns the upper range for Spectral Analysis test. For this command to be accepted, a trace must be selected and present for this test. *RST has no effect on this value.
Syntax	:CALCulate[1..n]:SANalysis:WAVelength:RANGe[:UPPer]?[<wsp>MAXimum|MINimum|DEFault]
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MAXimum|MINimum|DEFault. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value. DEFault is used to retrieve the instrument's default value.
Response Syntax	<UpperWavelengthRange>

:CALCulate[1..n]:SANalysis:WAVelength:RANGe[:UPPer]?

Response(s)	*UpperWavelengthRange:* The response data syntax for <UpperWavelengthRange> is defined as a <NR3 NUMERIC RESPONSE DATA> element. The Spectral Analysis upper wavelength (in m or Hz).
Example(s)	CALC:SAN:WAV:RANG:UPP?
See Also	CALCulate[1..n]:SANalysis CALCulate[1..n]:SANalysis:WAVelength:RANGe:LOWer CALCulate[1..n]:SANalysis:WAVelength:RANGe[:UPPer]

:CALCulate[1..n]:SANalysis: WAVelength:RANGe:LOWer

Description	Sets lower range for Spectral Analysis test. For this command to be accepted, a trace must be selected and present for this test. *RST has no effect on this value.
Syntax	:CALCulate[1..n]:SANalysis:WAVelength:RANGe:LOWer<wsp><LowerRangeWavelength[<wsp>M|HZ]>|MAXimum|MINimum|DEFault
Parameter(s)	*LowerRangeWavelength:* The program data syntax for <LowerRangeWavelength> is defined as a <numeric_value> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> elements are: M|HZ. The <LowerRangeWavelength> special forms MINimum, MAXimum and DEFault are accepted on input. MINimum allows to set the instrument to the smallest supported value. MAXimum allows to set the instrument to the greatest supported value.

:CALCulate[1..n]:SANalysis: WAVelength:RANGe:LOWer

	DEFault allows the instrument to select a value for the <LowerRangeWavelength> parameter. The Spectral Analysis lower wavelength.
Example(s)	CALC:SAN:POW:RANG:REL OFF CALC:SAN:WAV:RANG:LOW 1530.00NM CALC:SAN:WAV:RANG:UPP 1500.55NM CALC:SAN
See Also	CALCulate[1..n]:SANalysis CALCulate[1..n]:SANalysis:WAVelength:RANGe[:UPPer] CALCulate[1..n]:SANalysis:WAVelength:RANGe:LOWer?

:CALCulate[1..n]:SANalysis:WAVelength:RANGe:LOWer?

Description	This query returns the lower range from Spectral Analysis test. For this command to be accepted, a trace must be selected and present for this test. *RST has no effect on this value.
Syntax	:CALCulate[1..n]:SANalysis:WAVelength:RANGe:LOWer?[<wsp>MAXimum|MINimum|DEFault]
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MAXimum|MINimum|DEFault. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value. DEFault is used to retrieve the instrument's default value.
Response Syntax	<LowerWavelengthRange>

:CALCulate[1..n]:SANalysis:WAVelength:RANGe:LOWer?

Response(s)	*LowerWavelengthRange:* The response data syntax for <LowerWavelengthRange> is defined as a <NR3 NUMERIC RESPONSE DATA> element. The Spectral Analysis lower wavelength (in m or Hz).
Example(s)	CALC:SAN:WAV:RANG:LOW?
See Also	CALCulate[1..n]:SANalysis CALCulate[1..n]:SANalysis:WAVelength:RANGe[:UPPer] CALCulate[1..n]:SANalysis:WAVelength:RANGe:LOWer

:CALCulate[1..n]:SANalysis: WAVelength:RMS?

Description	This query returns the RMS Width from the Spectral Analysis test. A valid Spectral Analysis test must be loaded for a value to be returned. *RST has no effect on this value (but CALCulate:SAN:SELect is set to –1).
Syntax	:CALCulate[1..n]:SANalysis:WAVelength:RMS?
Parameter(s)	None
Response Syntax	<RootMeanSquare>
Response(s)	*RootMeanSquare:* The response data syntax for <RootMeanSquare> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Spectral Analysis RMS width (in m).
Example(s)	MMEM LOAD:TRAC TRC2,"DUT-OUT.OSW" CALC:SAN:SEL TRC2 CALC:SAN CALC:SAN:WAV:RMS?
See Also	CALCulate[1..n]:SANalysis

:CALCulate[1..n]:THReshold

Description	Sets the power detection threshold value. At *RST, this value is –60.0 dBm.
Syntax	:CALCulate[1..n]:THReshold<wsp><PowerThreshold[<wsp>DBM|W]>|MAXimum|MINimum
Parameter(s)	*PowerThreshold:* The program data syntax for <PowerThreshold> is defined as a <numeric_value> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> elements are: DBM|W. The <PowerThreshold> special forms MINimum and MAXimum are accepted on input. MINimum allows to set the instrument to the smallest supported value. MAXimum allows to set the instrument to the greatest supported value. Power detection threshold. Range: [-67.0 ... 15.0]dBm.
Example(s)	CALC:THR -40.0
See Also	CALCulate[1..n]:THReshold?

:CALCulate[1..n]:THReshold?

Description	This query returns the power threshold value. At *RST, this value is -60.0 dBm
Syntax	:CALCulate[1..n]:THReshold?[<wsp>MAXimum |MINimum]
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MAXimum|MINimum. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value.
Response Syntax	<PowerThreshold>
Response(s)	*PowerThreshold:* The response data syntax for <PowerThreshold> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Power detection threshold (in dBm or W).
Example(s)	CALC:THR?
See Also	CALCulate[1..n]:THReshold

:CALCulate[1..n]:TRANsmission

Description	Performs the spectral transmission test. For this command to be accepted, the input and output traces must be loaded and selected, and the OSA module must be in Ready state with no acquisition in progress. This command is an event and has no associated *RST condition or query form.
Syntax	:CALCulate[1..n]:TRANsmission
Parameter(s)	None
Example(s)	MMEM LOAD:TRAC TRC1,"EDFA1500nm_1600nm_Input.OSW" MMEM LOAD:TRAC TRC2,"EDFA1500nm_1600nm_Output.OSW" CALC:TRAN:SEL:INP TRC1 CALC:TRAN:SEL:OUTP TRC2 CALC:TRAN
See Also	CALCulate[1..n]:TRANsmission:SELect:INPut CALCulate[1..n]:TRANsmission:SELect:OUTPut

:CALCulate[1..n]:TRANsmission:BANDwidth:LEVel

Description	Sets the power used to calculate bandwidth in the Transmission test. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. At *RST, value for Bandwidth1 is 3.0 dB and value for Bandwidth2 is 20.0 dB.
Syntax	:CALCulate[1..n]:TRANsmission:BANDwidth:LEVel<wsp><BandwidthIndex>,<PowerLevel[<wsp>DB]>|MAXimum|MINimum
Parameter(s)	➤ *BandwidthIndex:* The program data syntax for <BandwidthIndex> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. Index of the bandwidth to set. Range: [1,2] ➤ *PowerLevel:* The program data syntax for <PowerLevel> is defined as a <numeric_value> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> element is DB. The <PowerLevel> special forms MINimum and MAXimum are accepted on input.

:CALCulate[1..n]:TRANsmission:BANDwidth:LEVel

	MINimum allows to set the instrument to the smallest supported value. MAXimum allows to set the instrument to the greatest supported value. Power level used to calculate bandwidth. Range: [0.1 … 40.0] dB
Example(s)	CALC:TRAN:BAND:LEV 1,5.0
See Also	CALCulate[1..n]:TRANsmission CALCulate[1..n]:TRANsmission:BANDwidth? CALCulate[1..n]:TRANsmission:BANDwidth:LEVel?

:CALCulate[1..n]:TRANsmission:BANDwidth:LEVel?

Description	This query returns the power used to calculate bandwidths. At *RST, value for Bandwidth1 is 3.0 dB and value for Bandwidth2 is 20.0 dB.
Syntax	:CALCulate[1..n]:TRANsmission:BANDwidth:LEVel?<wsp><BandwidthIndex>[,MAXimum|MINimum]
Parameter(s)	➤ *BandwidthIndex:* The program data syntax for <BandwidthIndex> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. Index of the bandwidth to read. Range: [1,2] ➤ *Parameter 2:* The program data syntax for the second parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MAXimum|MINimum. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value.
Response Syntax	<PowerLevel>

:CALCulate[1..n]:TRANsmission: BANDwidth:LEVel?

Response(s)	*PowerLevel:* The response data syntax for <PowerLevel> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Power level for transmission (in dB).
Example(s)	CALC:TRAN:BAND:LEV? 1
See Also	CALCulate[1..n]:TRANsmission CALCulate[1..n]:TRANsmission:BANDwidth? CALCulate[1..n]:TRANsmission:BANDwidth:LEV el

:CALCulate[1..n]:TRANsmission:BANDwidth?

Description	This query returns the bandwidth from Transmission test. At *RST, Transmission data is unavailable (All CALCulate:TRAN :SELect values are set to –1).
Syntax	:CALCulate[1..n]:TRANsmission:BANDwidth?<wsp><BandwidthIndex>
Parameter(s)	*BandwidthIndex:* The program data syntax for <BandwidthIndex> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. Index of the bandwidth to read. Range: [1,2]
Response Syntax	<Bandwidth>

:CALCulate[1..n]:TRANsmission:BANDwidth?

Response(s)	*Bandwidth:* The response data syntax for <Bandwidth> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Bandwidth of transmission (in m).
Example(s)	MMEM LOAD:TRAC TRC1,"EDFA1500nm_1600nm_Input.OSW" MMEM LOAD:TRAC TRC2,"EDFA1500nm_1600nm_Output.OSW" CALC:TRAN:SEL:INP TRC1 CALC:TRAN:SEL:OUTP TRC2 CALC:TRAN CALC:TRAN:BAND? 1
See Also	CALCulate[1..n]:TRANsmission CALCulate[1..n]:TRANsmission:BANDwidth? CALCulate[1..n]:TRANsmission:BANDwidth:LEVel

:CALCulate[1..n]:TRANsmission:CENTer:LEVel

Description	Sets the central wavelength power used to find the most powerful peak central wavelength in Transmission test. At *RST, value is 3.0 dB.
Syntax	:CALCulate[1..n]:TRANsmission:CENTer:LEVel<wsp><PowerLevel[<wsp>DB]>|MAXimum|MINimum
Parameter(s)	*PowerLevel:* The program data syntax for <PowerLevel> is defined as a <numeric_value> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> element is DB. The <PowerLevel> special forms MINimum and MAXimum are accepted on input. MINimum allows to set the instrument to the smallest supported value. MAXimum allows to set the instrument to the greatest supported value.

:CALCulate[1..n]:TRANsmission:CENTer:LEVel

	Power level used to calculate central wavelength. MIN and MAX can also be used as parameters. Range: [0.1 … 40.0] dB
Example(s)	CALC:TRAN:CENT:LEV 2.34
See Also	CALCulate[1..n]:TRANsmission CALCulate[1..n]:TRANsmission:CENTer? CALCulate[1..n]:TRANsmission:CENTer:LEVel?

:CALCulate[1..n]:TRANsmission:CENTer:LEVel?

Description	This query returns the central wavelength power for Transmission test. At *RST, value is 3.0 dB.
Syntax	:CALCulate[1..n]:TRANsmission:CENTer:LEVel?[<wsp>MAXimum|MINimum]
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MAXimum|MINimum. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value.
Response Syntax	<PowerLevel>

:CALCulate[1..n]:TRANsmission:CENTer:LEVel?

Response(s)	*PowerLevel:* The response data syntax for <PowerLevel> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Power level used to calculate central wavelength (in dB).
Example(s)	CALC:TRAN:CENT:LEV?
See Also	CALCulate[1..n]:TRANsmission CALCulate[1..n]:TRANsmission:CENTer? CALCulate[1..n]:TRANsmission:CENTer:LEVel

:CALCulate[1..n]:TRANsmission:CENTer?

Description	This query returns the central wavelength at a dB value that you can adjust with the CALCULATE[1..n]:TRANsmission:CENTer:LEVel command. The central wavelength is weighted average of the measured points. At *RST, Transmission data is unavailable (All CALCulate :TRAN :SELect values are set to –1).
Syntax	:CALCulate[1..n]:TRANsmission:CENTer?
Parameter(s)	None
Response Syntax	<Center>
Response(s)	*Center:* The response data syntax for <Center> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Central position (in m or Hz).
Example(s)	MMEM LOAD:TRAC TRC1,"EDFA1500nm_1600nm_Input.OSW" MMEM LOAD:TRAC TRC2,"EDFA1500nm_1600nm_Output.OSW" CALC:TRAN:SEL:INP TRC1 CALC:TRAN:SEL:OUTP TRC2 CALC:TRAN CALC:TRAN:CENT?
See Also	CALCulate[1..n]:TRANsmission CALCulate[1..n]:TRANsmission:CENTer:LEVel

:CALCulate[1..n]:TRANsmission:LOSS?

Description	This query returns the insertion loss from the transmission test. At *RST, Transmission data is unavailable (All CALCulate :TRAN :SELect values are set to –1).
Syntax	:CALCulate[1..n]:TRANsmission:LOSS?
Parameter(s)	None
Response Syntax	<Loss>
Response(s)	*Loss:* The response data syntax for <Loss> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Insertion loss (in dB).
Example(s)	MMEM LOAD:TRAC TRC1,"EDFA1500nm_1600nm_Input.OSW" MMEM LOAD:TRAC TRC2,"EDFA1500nm_1600nm_Output.OSW" CALC:TRAN:SEL:INP TRC1 CALC:TRAN:SEL:OUTP TRC2 CALC:TRAN CALC:TRAN:LOSS?
See Also	CALCulate[1..n]:TRANsmission

:CALCulate[1..n]:TRANsmission:PPOSition?

Description	This query returns the peak position from the transmission test. At *RST, Transmission data is unavailable (All CALCulate :TRAN :SELect values are set to –1).
Syntax	:CALCulate[1..n]:TRANsmission:PPOSition?
Parameter(s)	None
Response Syntax	<PeakPosition>
Response(s)	*PeakPosition:* The response data syntax for <PeakPosition> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Peak position (in m or Hz).
Example(s)	MMEM LOAD:TRAC TRC1,"EDFA1500nm_1600nm_Input.OSW" MMEM LOAD:TRAC TRC2,"EDFA1500nm_1600nm_Output.OSW" CALC:TRAN:SEL:INP TRC1 CALC:TRAN:SEL:OUTP TRC2 CALC:TRAN CALC:TRAN:PPOS?
See Also	CALCulate[1..n]:TRANsmission

:CALCulate[1..n]:TRANsmission: RIPPle:STARt

Description	Sets the start value for ripple calculation in Transmission test. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress and both traces must be selected and loaded. At *RST, this value is unavailable (0.0) because required traces are unavailable (all CALCulate:TRANsmission:SELect values are set to NSEL).
Syntax	:CALCulate[1..n]:TRANsmission:RIPPle:STARt<wsp><Start[<wsp>M|HZ]>|MAXimum|MINimum
Parameter(s)	*Start:* The program data syntax for <Start> is defined as a <numeric_value> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> elements are: M|HZ. The <Start> special forms MINimum and MAXimum are accepted on input.

:CALCulate[1..n]:TRANsmission:RIPPle:STARt

	MINimum allows to set the instrument to the smallest supported value. MAXimum allows to set the instrument to the greatest supported value. Start value of range. Range is device dependent.
Example(s)	CALC:TRAN:RIPP:STAR 1525.0NM
See Also	CALCulate[1..n]:TRANsmission CALCulate[1..n]:TRANsmission:RIPPle CALCulate[1..n]:TRANsmission:RIPPle:STOP CALCulate[1..n]:TRANsmission:RIPPle:STARt?

:CALCulate[1..n]:TRANsmission:RIPPle:STARt?

Description

This query returns the start value for ripple calculations in Transmission test.
A valid Spectral Transmittance test must be loaded for a value to be returned.

At *RST, this value is unavailable (0.0) because required traces are unavailable (All CALCulate:TRANsmission:SELect values are set to –1).

Syntax

:CALCulate[1..n]:TRANsmission:RIPPle:STARt?[<wsp>MAXimum|MINimum]

Parameter(s)

Parameter 1:

The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MAXimum|MINimum.

MINimum is used to retrieve the instrument's smallest supported value.
MAXimum is used to retrieve the instrument's greatest supported value.

Response Syntax

<Start>

:CALCulate[1..n]:TRANsmission:RIPPle:STARt?

Response(s)	*Start:* The response data syntax for <Start> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Start position for ripple calculation (in m or Hz).
Example(s)	CALC:TRAN:RIPP:STAR 1525.0E-09 CALC:TRAN:RIPP:STAR?
See Also	CALCulate[1..n]:TRANsmission CALCulate[1..n]:TRANsmission:RIPPle CALCulate[1..n]:TRANsmission:RIPPle:STOP CALCulate[1..n]:TRANsmission:RIPPle:STARt

:CALCulate[1..n]:TRANsmission:RIPPle:STOP

Description	Sets the end value for ripple calculation in the transmission test. For this copmmand to be accepted, the OSA module must be in Ready state with no acquisition in progress. At *RST, this value is unavailable (0.0) because required traces are unavailable (All CALCulate:TRANsmission:SELect values are set to –1).
Syntax	:CALCulate[1..n]:TRANsmission:RIPPle:STOP<wsp><Stop[<wsp>M|HZ]>|MAXimum|MINimum
Parameter(s)	*Stop:* The program data syntax for <Stop> is defined as a <numeric_value> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> elements are: M|HZ. The <Stop> special forms MINimum and MAXimum are accepted on input.

:CALCulate[1..n]:TRANsmission: RIPPle:STOP

	MINimum allows to set the instrument to the smallest supported value. MAXimum allows to set the instrument to the greatest supported value. End-of-range value. Range is device-dependent.
Example(s)	CALC:TRAN:RIPP:STOP 1.54E-6
See Also	CALCulate[1..n]:TRANsmission CALCulate[1..n]:TRANsmission:RIPPle CALCulate[1..n]:TRANsmission:RIPPle:STARt CALCulate[1..n]:TRANsmission:RIPPle:STOP?

:CALCulate[1..n]:TRANsmission:RIPPle:STOP?

Description	This query returns the end value for ripple calculations in Transmission test. A valid Spectral Transmittance test must be loaded for a value to be returned. At *RST, this value is unavailable (0.0) because required traces are unavailable (All CALCulate:TRANsmission:SELect values are set to –1).
Syntax	:CALCulate[1..n]:TRANsmission:RIPPle:STOP?[<wsp>MAXimum|MINimum]
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MAXimum|MINimum. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value.
Response Syntax	<Stop>

:CALCulate[1..n]:TRANsmission:RIPPle:STOP?

Response(s)	*Stop:* The response data syntax for <Stop> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Stop position for ripple calculation (in m or Hz).
Example(s)	CALC:TRAN:RIPP:STOP 1540E-09 CALC:TRAN:RIPP:STOP?
See Also	CALCulate[1..n]:TRANsmission CALCulate[1..n]:TRANsmission:RIPPle CALCulate[1..n]:TRANsmission:RIPPle:STARt CALCulate[1..n]:TRANsmission:RIPPle:STOP

:CALCulate[1..n]:TRANsmission: RIPPle?

Description	This query returns the ripple value from Transmission test. At *RST, Transmission data is unavailable (All CALCulate :TRAN :SELect values are set to –1).
Syntax	:CALCulate[1..n]:TRANsmission:RIPPle?
Parameter(s)	None
Response Syntax	<Ripple>
Response(s)	*Ripple:* The response data syntax for <Ripple> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Ripple (in dB).
Example(s)	MMEM LOAD:TRAC TRC1,"EDFA1500nm_1600nm_Input.OSW" MMEM LOAD:TRAC TRC2,"EDFA1500nm_1600nm_Output.OSW" CALC:TRAN:SEL:INP TRC1 CALC:TRAN:SEL:OUTP TRC2 CALC:TRAN CALC:TRAN:RIPP:STAR 1525.0NM CALC:TRAN:RIPP:STOP 1.54E-6 CALC:TRAN:RIPP?
See Also	CALCulate[1..n]:TRANsmission CALCulate[1..n]:TRANsmission:RIPPle:STARt CALCulate[1..n]:TRANsmission:RIPPle:STOP

:CALCulate[1..n]:TRANsmission:SELect[:INPut]

Description	Sets the input trace to be used for the spectral transmission test. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. At *RST, this value is –1 (no trace selected).
Syntax	:CALCulate[1..n]:TRANsmission:SELect[:INPut]<wsp>TRC1|TRC2|TRC3|TRC4
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: TRC1|TRC2|TRC3|TRC4. Input trace to select for Transmission test.
Example(s)	MMEM LOAD:TRAC TRC1,"EDFA1500nm_1600nm_Input.OSW" CALC:TRAN:SEL:INP TRC1
Notes	Selected input trace must be different than selected output trace. Otherwise, a warning will appear.
See Also	CALCulate[1..n]:TRANsmission CALCulate[1..n]:TRANsmission:SELect[:INPut]? CALCulate[1..n]:TRANsmission:SELect:OUTPut

:CALCulate[1..n]:TRANsmission:SELect[:INPut]?

Description	This query returns the input trace used for the spectral transmission test. At *RST, this value is –1 (no trace selected).
Syntax	:CALCulate[1..n]:TRANsmission:SELect[:INPut]?
Parameter(s)	None
Response Syntax	<InputTrace>
Response(s)	*InputTrace:* The response data syntax for <InputTrace> is defined as a <CHARACTER RESPONSE DATA> element. Input trace selected for transmission test. -1 is returned if no input trace was selected.
Example(s)	MMEM LOAD:TRAC TRC1,"EDFA1500nm_1600nm_Input.OSW" CALC:TRAN:SEL:INP TRC1 CALC:TRAN:SEL:INP?
See Also	CALCulate[1..n]:TRANsmission CALCulate[1..n]:TRANsmission:SELect[:INPut] CALCulate[1..n]:TRANsmission:SELect:OUTPut

:CALCulate[1..n]:TRANsmission:SELect:OUTPut

Description	Sets the output trace to be used for the spectral transmission test. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progressq. At *RST, this value is –1 (no trace selected).
Syntax	:CALCulate[1..n]:TRANsmission:SELect:OUTPut <wsp>TRC1|TRC2|TRC3|TRC4
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: TRC1|TRC2|TRC3|TRC4. Output trace to select for transmission test.
Example(s)	MMEM LOAD:TRAC TRC2,"EDFA1500nm_1600nm_Output.OSW" CALC:TRAN:SEL:OUTP TRC2
Notes	Selected output trace must be different than selected input trace. Otherwise, a warning will appear.
See Also	CALCulate[1..n]:TRANsmission CALCulate[1..n]:TRANsmission:SELect:OUTPut? CALCulate[1..n]:TRANsmission:SELect[:INPut]

:CALCulate[1..n]:TRANsmission:SELect:OUTPut?

Description	This query returns the output trace being used for the spectral transmission test. At *RST, this value is –1 (no trace selected).
Syntax	:CALCulate[1..n]:TRANsmission:SELect:OUTPut?
Parameter(s)	None
Response Syntax	<OutputTrace>
Response(s)	*OutputTrace:* The response data syntax for <OutputTrace> is defined as a <CHARACTER RESPONSE DATA> element. Output trace selected for transmission test. -1 is returned if no output trace was selected.
Example(s)	MMEM LOAD:TRAC TRC2,"EDFA1500nm_1600nm_Output.OSW" CALC:TRAN:SEL:OUTP TRC2 CALC:TRAN:SEL:OUTP?
See Also	CALCulate[1..n]:TRANsmission CALCulate[1..n]:TRANsmission:SELect:OUTPut CALCulate[1..n]:TRANsmission:SELect[:INPut]

:CALibration[1..n]:ZERO[:AUTO]

Description	Performs a nulling measurement or enables/disables auto nulling. If the ONCE parameter is used, the OSA module must be in Ready state with no acquisition in progress for this command to be accepted. At *RST, this value is set to OFF.
Syntax	:CALibration[1..n]:ZERO[:AUTO]<wsp><AutoZero>|ON|OFF|ONCE
Parameter(s)	*AutoZero:* The program data syntax for <AutoZero> is defined as a <Boolean Program Data>|<CHARACTER PROGRAM DATA> element. The <AutoZero> special forms ON and OFF are accepted on input for increased readability. ON corresponds to 1 and OFF corresponds to 0. If the ONCE parameter is entered, then a nulling will be performed. If ON or OFF is entered, the automatic nulling will be enabled or disabled, accordingly.
Example(s)	CAL:ZERO:AUTO ON
See Also	CALibration[1..n]:ZERO[:AUTO]?

:CALibration[1..n]:ZERO[:AUTO]?

Description	This query lets you know if automatic nulling measurement has been enabled. At *RST, this value is set to OFF.
Syntax	:CALibration[1..n]:ZERO[:AUTO]?
Parameter(s)	None
Response Syntax	<AutoZero>
Response(s)	*AutoZero:* The response data syntax for <AutoZero> is defined as a <NR1 NUMERIC RESPONSE DATA> element. Automatic nulling state.
Example(s)	CAL:ZERO:AUTO?
See Also	CALibration[1..n]:ZERO[:AUTO]

:INITiate[1..n][:IMMediate]

Description	This command completes one full trigger cycle, returning to IDLE on completion. The operation in progress is instrument-dependent. This command is an event and has no associated *RST condition or query form. However, the equivalent the ABORt command is performed on any acquisition in progress.
Syntax	:INITiate[1..n][:IMMediate]
Parameter(s)	None
Example(s)	/* Auto acquisition */ SENS:AVER:COUN:AUTO ON INIT /* Average acquisition */ SENS:AVER:COUN:AUTO OFF SENS:AVER:COUN 12 INIT
See Also	ABORt[1..n] INITiate[1..n]:CONTinuous INITiate[1..n]:STATe?

:INITiate[1..n]:CONTinuous

Description	Sets continuous acquisition mode and starts an acquisition. At *RST, this value is OFF (all acquisitions are stopped).
Syntax	:INITiate[1..n]:CONTinuous<wsp><Continuous AcqState>
Parameter(s)	*ContinuousAcqState:* The program data syntax for <ContinuousAcqState> is defined as a <Boolean Program Data> element. The <ContinuousAcqState> special forms ON and OFF are accepted on input for increased readability. ON corresponds to 1 and OFF corresponds to 0. Changes the continuous acquisition status. 0 - OFF = Stops the continuous acquisition 1 - ON = Starts the continuous acquisition
Example(s)	/* Continuous acquisition */ SENS:AVER:STAT ON INITiate:CONTinuous ON /* Single acquisition */ SENS:AVER:STAT OFF INITiate:CONTinuous ON
See Also	ABORt[1..n] INITiate[1..n]:IMMediate INITiate[1..n]:STATe? INITiate[1..n]:CONTinuous?

:INITiate[1..n]:CONTinuous?

Description	This query lets you know whether a continuous acquisition is in progress. At *RST, this value is OFF (all acquisitions are stopped).
Syntax	:INITiate[1..n]:CONTinuous?
Parameter(s)	None
Response Syntax	<ContinuousAcqState>
Response(s)	*ContinuousAcqState:* The response data syntax for <ContinuousAcqState> is defined as a <NR1 NUMERIC RESPONSE DATA> element. State of continuous acquisition. 0 - No continuous acquisition in progress 1 - Continuous acquisition in progress
Example(s)	INIT:CONT?
See Also	ABORt[1..n] INITiate[1..n]:IMMediate INITiate[1..n]:STATe? INITiate[1..n]:CONTinuous

:INITiate[1..n]:STATe?

Description	This query lets you know whether a scan is in progress. At *RST, this value is OFF (all acquisitions are stopped).
Syntax	:INITiate[1..n]:STATe?
Parameter(s)	None
Response Syntax	<StartStop>
Response(s)	*StartStop:* The response data syntax for <StartStop> is defined as a <NR1 NUMERIC RESPONSE DATA> element. This query returns the scanning status: 1 - (TRUE) scanning has begun. 0 - (FALSE) scanning has been stopped.
Example(s)	INIT:STAT?
See Also	ABORt[1..n] INITiate[1..n]:IMMediat INITiate[1..n]:CONTinuous

:MMEMory[1..n]:DATA:TYPE

Description	This command is used to set file format when saving a trace in a file. The ASCII format allows you to display all the information using a third-party application. The binary format allows you to save a trace and to load it later for analysis. At *RST, type is BINARY.
Syntax	:MMEMory[1..n]:DATA:TYPE<wsp>BINary|ASCii
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: BINary|ASCii. The file format parameter can be either ASCii or BINary.
Example(s)	MMEM:DATA:TYPE BIN
See Also	MMEMory[1..n]:STORe:TRACe MMEMory[1..n]:DATA:TYPE?

:MMEMory[1..n]:DATA:TYPE?

Description	This query returns a value indicating the file format when saving file. At *RST, type is BINARY.
Syntax	:MMEMory[1..n]:DATA:TYPE?
Parameter(s)	None
Response Syntax	<Type>
Response(s)	*Type:* The response data syntax for <Type> is defined as a <CHARACTER RESPONSE DATA> element. File format when saving into file. Value can be either ASCII or BINARY.
Example(s)	MMEM:DATA:TYPE?
See Also	MMEMory[1..n]:DATA:TYPE

:MMEMory[1..n]:LOAD:CLISt

Description	Loads a channel list. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. *RST has no effect on channels.
Syntax	:MMEMory[1..n]:LOAD:CLISt<wsp><Filename>
Parameter(s)	*Filename:* The program data syntax for <Filename> is defined as a <STRING PROGRAM DATA> element. The <Filename> parameter can either be only the filename or the name and its path. If no path is specified, the default path is used. The default path name depends on location of driver libraries.
Example(s)	MMEM:LOAD:CLIS "C:DATAmychannels.chn"
See Also	MMEMory[1..n]:STORe:CLISt

:MMEMory[1..n]:LOAD:CONFiguration

Description	Loads a configuration file. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. This command is an event and has no associated *RST condition or query form. However, most settings affected by this command are set to default values at *RST.
Syntax	:MMEMory[1..n]:LOAD:CONFiguration<wsp><Filename>
Parameter(s)	*Filename:* The program data syntax for <Filename> is defined as a <STRING PROGRAM DATA> element. The <Filename> parameter can either be only the filename or the name and its path. If no path is specified, the default path is used. The default path name depend on location of driver libraries.
Example(s)	MMEM:LOAD:CONF "config001.cfg"
See Also	MMEMory[1..n]:STORe:CONFiguration

:MMEMory[1..n]:LOAD:OVERwrite

Description	This command is used to select whether local data trace should be overwritten or not when loading a trace file. Attempting to load a file while the value is set to OFF will generate an error if local trace already exists in destination. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress for. At *RST, this value is OFF.
Syntax	:MMEMory[1..n]:LOAD:OVERwrite<wsp><Overwrite>
Parameter(s)	*Overwrite:* The program data syntax for <Overwrite> is defined as a <Boolean Program Data> element. The <Overwrite> special forms ON and OFF are accepted on input for increased readability. ON corresponds to 1 and OFF corresponds to 0. Trace overwrite status: ON = overwrite OFF = Do not overwrite. An error occurs when loading a file if local data already exists in destination.
Example(s)	MMEM:LOAD:OVER ON
See Also	MMEMory[1..n]:LOAD:OVERwrite? MMEMory[1..n]:LOAD:TRACe

:MMEMory[1..n]:LOAD:OVERwrite?

Description	This query lets you know whether local data will be overwritten or not when loading a trace file. At *RST, this value is OFF.
Syntax	:MMEMory[1..n]:LOAD:OVERwrite?
Parameter(s)	None
Response Syntax	<Overwrite>
Response(s)	*Overwrite:* The response data syntax for <Overwrite> is defined as a <NR1 NUMERIC RESPONSE DATA> element. Local trace data overwrite state.
Example(s)	MMEM:LOAD:OVER?
See Also	MMEMory[1..n]:LOAD:OVERwrite

:MMEMory[1..n]:LOAD:OVERwrite:CLISt

Description	This command is used to set whether the local channel list will be overwritten or not when loading a file. *RST has no effect.
Syntax	:MMEMory[1..n]:LOAD:OVERwrite:CLISt<wsp><Overwrite>
Parameter(s)	*Overwrite:* The program data syntax for <Overwrite> is defined as a <Boolean Program Data> element. The <Overwrite> special forms ON and OFF are accepted on input for increased readability. ON corresponds to 1 and OFF corresponds to 0. Channel list overwrite status: ON = overwrite OFF = Do not overwrite. If local channel list exists, it will be is kept as is.
Example(s)	MMEM:LOAD:OVER:CLIS ON
See Also	MMEMory[1..n]:LOAD:OVERwrite:CLISt? MMEMory[1..n]:LOAD:TRACe

:MMEMory[1..n]:LOAD:OVERwrite:CLISt?

Description	This query lets you know whether local channel list will be overwritten or not when loading a trace file or a channel list. *RST has no effect.
Syntax	:MMEMory[1..n]:LOAD:OVERwrite:CLISt?
Parameter(s)	None
Response Syntax	<Overwrite>
Response(s)	*Overwrite:* The response data syntax for <Overwrite> is defined as a <NR1 NUMERIC RESPONSE DATA> element. Channels list overwrite state.
Example(s)	MMEM:LOAD:OVER:CLIS?
See Also	MMEMory[1..n]:LOAD:OVERwrite:CLISt

:MMEMory[1..n]:LOAD:TRACe

Description	Loads a trace. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. *RST has no effect on traces in memory.
Syntax	:MMEMory[1..n]:LOAD:TRACe<wsp>TRC1|TRC 2|TRC3|TRC4,<Filename>
Parameter(s)	➤ *Label:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: TRC1|TRC2|TRC3|TRC4. Trace index of destination. ➤ *Filename:* The program data syntax for <Filename> is defined as a <STRING PROGRAM DATA> element. The <Filename> parameter can either be only the filename or the name and its path. If no path is specified, the default path is used. The default path name depends on location of driver libraries.
Example(s)	MMEM:LOAD:TRAC TRC1,"Trace.osw"
See Also	MMEMory[1..n]:LOAD:OVERwrite MMEMory[1..n]:STORe:TRACe

:MMEMory[1..n]:STORe:CLISt

Description	Saves a channel list. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. This command is an event and has no associated *RST condition or query form.
Syntax	:MMEMory[1..n]:STORe:CLISt<wsp><Filename>
Parameter(s)	*Filename:* The program data syntax for <Filename> is defined as a <STRING PROGRAM DATA> element. The <Filename> parameter can either be only the filename or the name and its path. If no path is specified, the default path is used. The default path name depends on location of driver libraries.
Example(s)	MMEM:STOR:CLIS "mychannels.chn"
See Also	MMEMory[1..n]:LOAD:CLISt

:MMEMory[1..n]:STORe:CONFiguration

Description	Saves a configuration file. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. This command is an event and has no associated *RST condition or query form.
Syntax	:MMEMory[1..n]:STORe:CONFiguration<wsp><Filename>
Parameter(s)	*Filename:* The program data syntax for <Filename> is defined as a <STRING PROGRAM DATA> element. The <Filename> parameter can either be only the filename or the name and its path. If no path is specified, the default path is used. The default path name depends on location of driver libraries.
Example(s)	MMEM:STOR:CONF "config001.cfg"
See Also	MMEMory[1..n]:LOAD:CONFiguration

:MMEMory[1..n]:STORe:TRACe

Description	Saves trace to a file. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. This command is an event and has no associated *RST condition or query form.
Syntax	:MMEMory[1..n]:STORe:TRACe<wsp><Label>, <Filename>
Parameter(s)	➤ *Label:* The program data syntax for <Label> is defined as a <STRING PROGRAM DATA> element. Trace index ➤ *Filename:* The program data syntax for <Filename> is defined as a <STRING PROGRAM DATA> element. The <Filename> parameter can either be only the filename or the name and its path. If no path is specified, the default path is used. The default path name depends on location of driver libraries.
Example(s)	MMEM:STOR:TRAC TRC1,"Trace.osw"
See Also	MMEMory[1..n]:LOAD:TRACe MMEMory[1..n]:STORe:TRACe:OVERwrite MMEMory[1..n]:DATA:TYPE

:MMEMory[1..n]:STORe:TRACe:OVERwrite

Description	This command is used to set whether an existing file will be overwritten when the MMEMory:STORe:TRACe command is used. Attempting to save a file while the value is set to OFF will generate an error if file is already present. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. At *RST, this value is OFF.
Syntax	:MMEMory[1..n]:STORe:TRACe:OVERwrite<wsp><Overwrite>
Parameter(s)	*Overwrite:* The program data syntax for <Overwrite> is defined as a <Boolean Program Data> element. The <Overwrite> special forms ON and OFF are accepted on input for increased readability. ON corresponds to 1 and OFF corresponds to 0. Overwrite file if existing.
Example(s)	MMEM:STOR:TRAC:OVER ON
See Also	MMEMory[1..n]:STORe:TRACe MMEMory[1..n]:STORe:TRACe:OVERwrite?

:MMEMory[1..n]:STORe:TRACe:OVERwrite?

Description	This query lets you know whether existing files already present will be overwritten when the MMEMory:STORe:TRACe command is used. At *RST, this value is OFF.
Syntax	:MMEMory[1..n]:STORe:TRACe:OVERwrite?
Parameter(s)	None
Response Syntax	<Overwrite>
Response(s)	*Overwrite:* The response data syntax for <Overwrite> is defined as a <NR1 NUMERIC RESPONSE DATA> element. Overwrite file status.
Example(s)	MMEM:STOR:TRAC:OVER?
See Also	MMEMory[1..n]:STORe:TRACe MMEMory[1..n]:STORe:TRACe:OVERwrite

:SENSe[1..n]:AVERage[:STATe]

Description	Turn averaging ON or OFF. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. At *RST, this value is OFF.
Syntax	:SENSe[1..n]:AVERage[:STATe]<wsp><Average State>
Parameter(s)	*AverageState:* The program data syntax for <AverageState> is defined as a <Boolean Program Data> element. The <AverageState> special forms ON and OFF are accepted on input for increased readability. ON corresponds to 1 and OFF corresponds to 0. State of averaging.
Example(s)	/* Continuous acquisition */ SENS:AVER:STAT ON INITiate:CONTinuous ON /* Single acquisition */ SENS:AVER:STAT OFF INITiate:CONTinuous ON
See Also	SENSe[1..n]:AVERage[:STATe]? SENSe[1..n]:AVERage:COUNt SENSe[1..n]:AVERage:COUNt:AUTO

:SENSe[1..n]:AVERage[:STATe]?

Description	This query lets you know whether averaging is ON. At *RST, this value is OFF.
Syntax	:SENSe[1..n]:AVERage[:STATe]?
Parameter(s)	None
Response Syntax	<AverageState>
Response(s)	*AverageState:* The response data syntax for <AverageState> is defined as a <NR1 NUMERIC RESPONSE DATA> element. State of average.
Example(s)	SENS:AVER:STAT?
Notes	For the OSA, CHANnel is optional and uses 1 as the default value (only 1 is accepted).
See Also	SENSe[1..n]:AVERage[:STATe] SENSe[1..n]:AVERage:COUNt? SENSe[1..n]:AVERage:COUNt:AUTO?

:SENSe[1..n]:AVERage:COUNt

Description	Sets the number of scans that will be averaged to produce final trace. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. At *RST, this value is 1.
Syntax	:SENSe[1..n]:AVERage:COUNt<wsp><AverageCount>|MAXimum|MINimum
Parameter(s)	*AverageCount:* The program data syntax for <AverageCount> is defined as a <numeric_value> element. The <AverageCount> special forms MINimum and MAXimum are accepted on input. MINimum allows to set the instrument to the smallest supported value. MAXimum allows to set the instrument to the greatest supported value. Number of scans used to average for the final scan. Range: [1 .. 99]

:SENSe[1..n]:AVERage:COUNt

Example(s)	/* Average acquisition */ SENS:AVER:COUN:AUTO OFF SENS:AVER:COUN 12 INITiate:IMMediate
Notes	For the OSA, CHANnel is optional and uses 1 as the default value (only 1 is accepted).
See Also	SENSe[1..n]:AVERage:COUNt? SENSe[1..n]:AVERage[:STATe] SENSe[1..n]:AVERage:COUNt:AUTO

:SENSe[1..n]:AVERage:COUNt?

Description	This query returns number of scans averaged to produce final trace. At *RST, this value is 1.
Syntax	:SENSe[1..n]:AVERage:COUNt?[<wsp>MAXimum|MINimum]
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MAXimum|MINimum. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value.
Response Syntax	<AverageCount>
Response(s)	*AverageCount:* The response data syntax for <AverageCount> is defined as a <NR1 NUMERIC RESPONSE DATA> element. Number of scans used to average for final scan.

:SENSe[1..n]:AVERage:COUNt?

Example(s)	SENS:AVER:COUN?
Notes	For the OSA, CHANnel is optional and uses 1 as the default value (only 1 is accepted).
See Also	SENSe[1..n]:AVERage:COUNt SENSe[1..n]:AVERage[:STATe]? SENSe[1..n]:AVERage:COUNt:AUTO?

:SENSe[1..n]:AVERage:COUNt:AUTO

Description	Set use of automatic number of scans to compute for final trace. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress for. At *RST, this value is OFF.
Syntax	:SENSe[1..n]:AVERage:COUNt:AUTO<wsp><AverageCountAuto>
Parameter(s)	*AverageCountAuto:* The program data syntax for <AverageCountAuto> is defined as a <Boolean Program Data> element. The <AverageCountAuto> special forms ON and OFF are accepted on input for increased readability. ON corresponds to 1 and OFF corresponds to 0. State of automatic number of scans to average for final scan.

:SENSe[1..n]:AVERage:COUNt:AUTO

Example(s)	/* Auto acquisition */ SENS:AVER:COUN:AUTO ON INIT:IMMediate /* Average acquisition */ SENS:AVER:COUN:AUTO OFF SENS:AVER:COUN 12 INIT:IMMediate
Notes	For the OSA, CHANnel is optional and uses 1 as the default value (only 1 is accepted).
See Also	SENSe[1..n]:AVERage:COUNt:AUTO? SENSe[1..n]:AVERage:COUNt? SENSe[1..n]:AVERage[:STATe]?

:SENSe[1..n]:AVERage:COUNt:AUTO?

Description	This query lets you know the automatic number of scans that will be used to compute for final trace. At *RST, this value is OFF.
Syntax	:SENSe[1..n]:AVERage:COUNt:AUTO?
Parameter(s)	None
Response Syntax	<AverageCountAuto>
Response(s)	*AverageCountAuto:* The response data syntax for <AverageCountAuto> is defined as a <NR1 NUMERIC RESPONSE DATA> element. Status of automatic number of scans that will be used to average for the final scan.
Example(s)	SENS:AVER:COUN:AUTO?
Notes	For the OSA, CHANnel is optional and uses 1 as the default value (only 1 is accepted).
See Also	SENSe[1..n]:AVERage:COUNt:AUTO SENSe[1..n]:AVERage:COUNt SENSe[1..n]:AVERage:COUNt[:STATe]

:SENSe[1..n]:POWer[:DC]:RANGe:AUTO

Description	This command enables or disables the automatic power range. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. At *RST, this value is ON.
Syntax	:SENSe[1..n]:POWer[:DC]:RANGe:AUTO<wsp><AutoRange>
Parameter(s)	*AutoRange:* The program data syntax for <AutoRange> is defined as a <Boolean Program Data> element. The <AutoRange> special forms ON and OFF are accepted on input for increased readability. ON corresponds to 1 and OFF corresponds to 0. The <AutoRange> parameter is a boolean value that determines the status of the automatic power range: 0 - disables AutoRange 1 - enables AutoRange
Example(s)	SENS:POW:RANG:AUTO 1
See Also	SENSe[1..n]:POWer[:DC]:RANGe? SENSe[1..n]:POWer[:DC]:RANGe:AUTO? SENSe[1..n]:POWer[:DC]:RANGe:LIST?

:SENSe[1..n]:POWer[:DC]:RANGe:AUTO?

Description	This query returns a value indicating whether automatic power measurement range is enabled or disabled. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress for. At *RST, this value is ON.
Syntax	:SENSe[1..n]:POWer[:DC]:RANGe:AUTO?
Parameter(s)	None
Response Syntax	<Autorange>
Response(s)	*Autorange:* The response data syntax for <Autorange> is defined as a <NR1 NUMERIC RESPONSE DATA> element. The current <AutoRange> status, where: 0 - the autorange is disabled. 1 - the autorange is enabled.
Example(s)	SENS:CHAN:POW:RANG:AUTO?
See Also	SENSe[1..n]:POWer[:DC]:RANGe? SENSe[1..n]:POWer[:DC]:RANGe:AUTO SENSe[1..n]:POWer[:DC]:RANGe:LIST?

:SENSe[1..n]:POWer[:DC]:RANGe:SCALe

Description	Sets the power scale index that will be used. At *RST, this value is 0.
Syntax	:SENSe[1..n]:POWer[:DC]:RANGe:SCALe<wsp> <Range>
Parameter(s)	*Range:* The program data syntax for <Range> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. Index of range. The maximum value for index is device-dependent.
Example(s)	SENS:POW:RANG:SCAL 2
Notes	Values from list of scales are returned by SENSe:POWer[:DC]:RANGe:SCALe:LIST?
See Also	SENSe[1..n]:POWer[:DC]:RANGe:AUTO SENSe[1..n]:POWer[:DC]:RANGe:AUTO? SENSe[1..n]:POWer[:DC]:RANGe:SCALe:LISt? SENSe[1..n]:POWer[:DC]:RANGe:SCALe?

:SENSe[1..n]:POWer[:DC]:RANGe:SCALe?

Description	This query returns the currently selected power scale index. At *RST, this value is 0.
Syntax	:SENSe[1..n]:POWer[:DC]:RANGe:SCALe?
Parameter(s)	None
Response Syntax	<Range>
Response(s)	*Range:* The response data syntax for <Range> is defined as a <NR1 NUMERIC RESPONSE DATA> element. Current power range index.
Example(s)	SENS:CHAN:POW:RANG?
See Also	SENSe[1..n]:POWer[:DC]:RANGe:AUTO? SENSe[1..n]:POWer[:DC]:RANGe:AUTO SENSe[1..n]:POWer[:DC]:RANGe:SCALe:LIST? SENSe[1..n]:POWer[:DC]:RANGe:SCALe

:SENSe[1..n]:POWer[:DC]:RANGe:SCALe:LIST?

Description	This query returns the list of supported power range scales. *RST has no effect on this query.
Syntax	:SENSe[1..n]:POWer[:DC]:RANGe:SCALe:LIST?
Parameter(s)	None
Response Syntax	<UpperRangePowerList>
Response(s)	*UpperRangePowerList:* The response data syntax for <UpperRangePowerList> is defined as a <DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA> element. List of power ranges supported. Each value is of <NR2 NUMERIC RESPONSE DATA> type. Format: power1, power2, …, powerN Each value is in:dBm.
Example(s)	SENS:POW:RANG:SCAL:LIST?
See Also	SENSe[1..n]:POWer[:DC]:RANGe:SCALe SENSe[1..n]:POWer[:DC]:RANGe:SCALe?

:SENSe[1..n]:POWer:THReshold:RELative

Description	Sets relative detection threshold. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. *RST has no effect.
Syntax	:SENSe[1..n]:POWer:THReshold:RELative<wsp><RelativePowerThreshold[<wsp>DB]>|MAXimum|MINimum
Parameter(s)	*RelativePowerThreshold:* The program data syntax for <RelativePowerThreshold> is defined as a <numeric_value> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> element is DB. The <RelativePowerThreshold> special forms MINimum and MAXimum are accepted on input. MINimum allows to set the instrument to the smallest supported value. MAXimum allows to set the instrument to the greatest supported value. The relative power threshold for peak detection.
Example(s)	SENS:POW:THR:REL 34.65
See Also	CALCulate[1..n]:THReshold SENSe[1..n]:POWer:THReshold:RELative?

:SENSe[1..n]:POWer:THReshold:RELative?

Description	This query returns the relative detection threshold. *RST has no effect.
Syntax	:SENSe[1..n]:POWer:THReshold:RELative?[<wsp>MAXimum|MINimum]
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MAXimum|MINimum. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value.
Response Syntax	<RelativePowerThreshold>

:SENSe[1..n]:POWer:THReshold:RELative?

Response(s)	*RelativePowerThreshold:* The response data syntax for <RelativePowerThreshold> is defined as a <NR3 NUMERIC RESPONSE DATA> element. The relative power threshold for peak detection (in dB).
Example(s)	SENS:POW:THR:REL?
See Also	CALCulate[1..n]:THReshold? SENSe[1..n]:POWer:THReshold:RELative

:SENSe[1..n]:POWer:WAVelength:OFFSet

Description	Sets the wavelength offset. The OSA module must be in Ready state with no acquisition in progress for this command to be accepted. At *RST, this value is 0.0.
Syntax	:SENSe[1..n]:POWer:WAVelength:OFFSet<wsp><Offset[<wsp>M]>|MAXimum|MINimum
Parameter(s)	*Offset:* The program data syntax for <Offset> is defined as a <numeric_value> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> element is M. The <Offset> special forms MINimum and MAXimum are accepted on input.

:SENSe[1..n]:POWer:WAVelength:OFFSet

	MINimum allows to set the instrument to the smallest supported value. MAXimum allows to set the instrument to the greatest supported value. Wavelength offset. Range: [-9.999 … 9.999] nm
Example(s)	SENS:POW:WAV:OFFS 1.0E-9
See Also	SENSe[1..n]:POWer:WAVelength:OFFSet:ACTivate SENSe[1..n]:POWer:WAVelength:RANGe:LOWer SENSe[1..n]:POWer:WAVelength:RANGe:UPPer SENSe[1..n]:POWer:WAVelength:OFFSet?

:SENSe[1..n]:POWer:WAVelength:OFFSet?

Description	This query returns the wavelength offset. At *RST, this value is 0.0.
Syntax	:SENSe[1..n]:POWer:WAVelength:OFFSet?[<wsp>MAXimum|MINimum]
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MAXimum|MINimum. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value.
Response Syntax	<Offset>

:SENSe[1..n]:POWer:WAVelength:OFFSet?

Response(s)	*Offset:* The response data syntax for <Offset> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Wavelength offset (in m).
Example(s)	SENS:POW:WAV:OFFS?
See Also	SENSe[1..n]:POWer:WAVelength:OFFSet:ACTivate? SENSe[1..n]:POWer:WAVelength:RANGe:LOWer? SENSe[1..n]:POWer:WAVelength:RANGe:UPPer? SENSe[1..n]:POWer:WAVelength:OFFSet

:SENSe[1..n]:POWer:WAVelength:OFFSet:ACTivate

Description	Sets wavelength offset state. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. At *RST, this value is OFF.
Syntax	:SENSe[1..n]:POWer:WAVelength:OFFSet:ACTivate<wsp><OffsetState>
Parameter(s)	*OffsetState:* The program data syntax for <OffsetState> is defined as a <Boolean Program Data> element. The <OffsetState> special forms ON and OFF are accepted on input for increased readability. ON corresponds to 1 and OFF corresponds to 0. Wavelength offset status
Example(s)	SENS:POW:WAV:OFFS:ACT ON
See Also	SENSe[1..n]:POWer:WAVelength:OFFset SENSe[1..n]:POWer:WAVelength:OFFset:ACTivate?

:SENSe[1..n]:POWer:WAVelength:OFFSet:ACTivate?

Description	This query lets you know whether the wavelength offset has been enabled. At *RST, this value is OFF.
Syntax	:SENSe[1..n]:POWer:WAVelength:OFFSet:ACTiva te?
Parameter(s)	None
Response Syntax	<OffsetState>
Response(s)	*OffsetState:* The response data syntax for <OffsetState> is defined as a <NR1 NUMERIC RESPONSE DATA> element. Wavelength offset status
Example(s)	SENS:POW:WAV:OFFS:ACT?
See Also	SENSe[1..n]:POWer:WAVelength:OFFset:ACTivat e SENSe[1..n]:POWer:WAVelength:OFFset

:SENSe[1..n]:POWer:WAVelength:RANGe:LOWer

Description	Sets the minimum wavelength for acquisition range. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. At *RST, this value is 1530.0 nm (C-band lower limit).
Syntax	:SENSe[1..n]:POWer:WAVelength:RANGe:LOWer <wsp><Start[<wsp>M|HZ]>|MAXimum|MINimum
Parameter(s)	*Start:* The program data syntax for <Start> is defined as a <numeric_value> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> elements are: M|HZ. The <Start> special forms MINimum and MAXimum are accepted on input.

:SENSe[1..n]:POWer:WAVelength:RANGe:LOWer

	MINimum allows to set the instrument to the smallest supported value. MAXimum allows to set the instrument to the greatest supported value. Minimum wavelength for acquisition range. Range is device-dependent.
Example(s)	SENS:POW:WAV:RANG:LOW 1.52E-6
See Also	SENSe[1..n]:POWer:WAVelength:RANGe:LOWer? SENSe[1..n]:POWer:WAVelength:RANGe:UPPer SENSe[1..n]:POWer:WAVelength:RANGe:OFFset? SENSe[1..n]:POWer:WAVelength:RANGe:OFFset:ACTivate

:SENSe[1..n]:POWer:WAVelength:RANGe:LOWer?

Description	This query returns the minimum wavelength for acquisition range. At *RST, this value is set to 1530.0 nm (C-band lower limit).
Syntax	:SENSe[1..n]:POWer:WAVelength:RANGe:LOWer?[<wsp>MAXimum|MINimum]
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MAXimum|MINimum. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value.
Response Syntax	<Start>

:SENSe[1..n]:POWer:WAVelength:RANGe:LOWer?

Response(s)	*Start:* The response data syntax for <Start> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Minimum wavelength for acquisition range (in m or Hz).
Example(s)	SENS:POW:WAV:RANG:LOW?
See Also	SENSe[1..n]:POWer:WAVelength:RANGe:LOWer SENSe[1..n]:POWer:WAVelength:RANGe:UPPer? SENSe[1..n]:POWer:WAVelength:RANGe:OFFset? SENSe[1..n]:POWer:WAVelength:RANGe:OFFset:ACTivate?

:SENSe[1..n]:POWer:WAVelength:RANGe[:UPPer]

Description

Sets the maximum wavelength for acquisition range.

For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress.

At *RST, this value is set to 1565.0 nm (C-band upper limit).

Syntax

:SENSe[1..n]:POWer:WAVelength:RANGe[:UPPer]<wsp><Stop[<wsp>M|HZ]>|MAXimum|MINimum

Parameter(s)

Stop:

The program data syntax for <Stop> is defined as a <numeric_value> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> elements are: M|HZ. The <Stop> special forms MINimum and MAXimum are accepted on input.

:SENSe[1..n]:POWer:WAVelength:RANGe[:UPPer]

	MINimum allows to set the instrument to the smallest supported value. MAXimum allows to set the instrument to the greatest supported value. Maximum wavelength for acquisition range. Range is device-dependent.
Example(s)	SENS:POW:WAV:RANG:UPP 1.57E-6
See Also	SENSe[1..n]:POWer:WAVelength:RANGe:UPPer? SENSe[1..n]:POWer:WAVelength:RANGe:LOWer SENSe[1..n]:POWer:WAVelength:RANGe:OFFset? SENSe[1..n]:POWer:WAVelength:RANGe:OFFset:ACTivate

:SENSe[1..n]:POWer:WAVelength:RANGe[:UPPer]?

Description	This query returns the maximum wavelength for acquisition range. At *RST, this value is set to 1565.0 nm (C-band upper limit).
Syntax	:SENSe[1..n]:POWer:WAVelength:RANGe[:UPPer]?[<wsp>MAXimum|MINimum]
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MAXimum|MINimum. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value.
Response Syntax	<Stop>

:SENSe[1..n]:POWer:WAVelength:RANGe[:UPPer]?

Response(s)	*Stop:* The response data syntax for <Stop> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Maximum wavelength for acquisition range (in m or Hz).
Example(s)	SENS:POW:WAV:RANG:UPP?
See Also	SENSe[1..n]:POWer:WAVelength:RANGe:UPPer SENSe[1..n]:POWer:WAVelength:RANGe:LOWer? SENSe[1..n]:POWer:WAVelength:RANGe:OFFset? SENSe[1..n]:POWer:WAVelength:RANGe:OFFset:ACTivate?

:STATus:OPERation:BIT[1..n]: CONDition?

Description	This query returns the status of a specific bit (only bit 8 is supported). This bit is used to indicate module's status (busy or ready).
Syntax	:STATus:OPERation:BIT[1..n]:CONDition?
Parameter(s)	None
Response Syntax	<StatusOperation>
Response(s)	*StatusOperation:* The response data syntax for <StatusOperation> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Module status: 1 = module is busy 0= module is ready to process commands.
Example(s)	STAT:OPER:BIT8:COND? Query returns 0 (module is ready to process a new command).

:TRACe[1..n][:DATA]:PREamble?

Description	This query returns a trace's header. *RST has no effect on traces in memory.
Syntax	:TRACe[1..n][:DATA]:PREamble?<wsp>TRC1|TRC2|TRC3|TRC4
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: TRC1|TRC2|TRC3|TRC4. Trace Index
Response Syntax	<TraceHeader>
Response(s)	*TraceHeader:* The response data syntax for <TraceHeader> is defined as a <DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA> element. Select trace information in A,B,C,D,E,F,G,H,I,J,K,L,M,N,O format, where: A = Refresh number <NR1 NUMERIC RESPONSE DATA> B = Averaged scans <NR1 NUMERIC RESPONSE DATA> C = Scans to come <NR1 NUMERIC RESPONSE DATA> D = Last scanned scale index <NR1 NUMERIC RESPONSE DATA>

:TRACe[1..n][:DATA]:PREamble?

E=Number of scales scanned <NR1 NUMERIC RESPONSE DATA>
F=Selected scale value <NR1 NUMERIC RESPONSE DATA>
G=Number of points <NR1 NUMERIC RESPONSE DATA>
H=Range start <NR3 NUMERIC RESPONSE DATA>
I=Range end <NR3 NUMERIC RESPONSE DATA>

J=Resolution <NR3 NUMERIC RESPONSE DATA>
K=RMS noise <NR3 NUMERIC RESPONSE DATA>
L=Sensitivity <NR3 NUMERIC RESPONSE DATA>
M=Total power <NR3 NUMERIC RESPONSE DATA>
N=Peak power <NR3 NUMERIC RESPONSE DATA>
O=Saturation level <NR3 NUMERIC RESPONSE DATA>

Example(s)

MMEM LOAD:TRAC TRC1,"DFB_1570nmC+L.OSW"
TRAC:DATA:PRE? TRC1

See Also

TRACe[1..n][:DATA]?
TRACe[1..n]:INFormation?
TRACe[1..n]:POINts?

:TRACe[1..n][:DATA]?

Description	This query returns the points of a trace. *RST has no effect on traces in memory.
Syntax	:TRACe[1..n][:DATA]?<wsp>TRC1|TRC2|TRC3|TRC4
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: TRC1|TRC2|TRC3|TRC4. Trace Index
Response Syntax	<TraceData>
Response(s)	*TraceData:* The response data syntax for <TraceData> is defined as a <DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA> element. List containing trace data (power, power, power format). Each power value represents a point in the trace and is always returned in dBm as <NR3 NUMERIC RESPONSE DATA> type.

:TRACe[1..n][:DATA]?

Example(s)	MMEM LOAD:TRAC TRC1,"DFB_1570nmC+L.OSW" TRAC:DATA? TRC1
Notes	The number of values on a list can be queried with TRACe:POINt.
See Also	TRACe[1..n][:DATA]:PREamble? TRACe[1..n]:INFormation? TRACe[1..n]:POINts?

:TRACe[1..n]:FEED:CONTrol

Description	Set active trace. Only one trace can be active at a time. Activating another trace will deactivate the current active trace. For this command to be accepted, the OSA module must be in Ready state with no acquisition in progress. At *RST, active trace is set to TRC1.
Syntax	:TRACe[1..n]:FEED:CONTrol<wsp>TRC1|TRC2|TRC3|TRC4,ALWays

:TRACe[1..n]:FEED:CONTrol

Parameter(s)	➤ *Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: TRC1|TRC2|TRC3|TRC4. Trace Index ➤ *Parameter 2:* The program data syntax for the second parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> element for this parameter is ALWays. The value must be ALWays.
Example(s)	TRAC:FEED:CONT TRC1,ALW
See Also	TRACe[1..n]:FEED:CONTrol?

:TRACe[1..n]:FEED:CONTrol?

Description	This query lets you know whether a trace is active. At *RST, active trace is set to TRC1.
Syntax	:TRACe[1..n]:FEED:CONTrol?<wsp>TRC1|TRC2|TRC3|TRC4
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: TRC1|TRC2|TRC3|TRC4. Trace Index
Response Syntax	<ActivationState>
Response(s)	*ActivationState:* The response data syntax for <ActivationState> is defined as a <NR1 NUMERIC RESPONSE DATA> element. Activation trace state: 1 if the trace index is selected, otherwise 0.
Example(s)	TRAC:FEED:CONT TRC1,ALW TRAC:FEED:CONT? TRC1 (will return 1) TRAC:FEED:CONT? TRC3 (will return 0)
See Also	TRACe[1..n]:FEED:CONTrol

:TRACe[1..n]:INFormation?

Description	This query returns all available information on a trace. *RST has no effect on traces in memory.
Syntax	:TRACe[1..n]:INFormation?<wsp>TRC1|TRC2|TRC3|TRC4
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: TRC1|TRC2|TRC3|TRC4. Trace index.
Response Syntax	<TraceInfo>
Response(s)	*TraceInfo:* The response data syntax for <TraceInfo> is defined as a <DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA> element. Selected trace information A,B,C,D,E,F,G,H,I format, where: A = Date and time <STRING RESPONSE DATA> B = Acquisition power range (always in dBm) <NR3 NUMERIC RESPONSE DATA> C = Sweep mode <STRING RESPONSE DATA> D = Test mode <STRING RESPONSE DATA>

:TRACe[1..n]:INFormation?

	E = Power offset (always in dBm) <NR3 NUMERIC RESPONSE DATA> F = Wavelength offset (always in nm) <NR3 NUMERIC RESPONSE DATA> G = Power detection threshold (always in dBm) <NR3 NUMERIC RESPONSE DATA> H = Module model/serial number <NR3 NUMERIC RESPONSE DATA> I = Software version <STRING RESPONSE DATA>
Example(s)	MMEM LOAD:TRAC TRC1,"DFB_1570nmC+L.OSW" TRAC:INF? TRC1
See Also	TRACe[1..n][:DATA]? TRACe[1..n][:DATA]:PREamble? TRACe[1..n]:POINts?

:TRACe[1..n]:POINts?

Description	This query returns the number of points on a trace. *RST has no effect on traces in memory.
Syntax	:TRACe[1..n]:POINts?<wsp>TRC1|TRC2|TRC3|TRC4
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: TRC1|TRC2|TRC3|TRC4. Trace index.
Response Syntax	<PointsCount>
Response(s)	*PointsCount:* The response data syntax for <PointsCount> is defined as a <NR1 NUMERIC RESPONSE DATA> element. Number of points on the trace.
Example(s)	MMEM LOAD:TRAC TRC1,"DFB_1570nmC+L.OSW" TRAC:POIN? TRC1
See Also	TRACe[1..n][:DATA]? TRACe[1..n][:DATA]:PREamble? TRACe[1..n]:INFormation?

:UNIT[1..n]:POWer

Description	Sets the power units. At *RST, this value is W.
Syntax	:UNIT[1..n]:POWer<wsp>DBM|W
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: DBM|W. Power unit.
Example(s)	UNIT:POW DBM
See Also	UNIT[1..n]:POWer?

:UNIT[1..n]:POWer?

Description	This query returns the current power unit. At *RST, this value is W.
Syntax	:UNIT[1..n]:POWer?
Parameter(s)	None
Response Syntax	<PowerUnit.>
Response(s)	*PowerUnit.:* The response data syntax for <PowerUnit.> is defined as a <CHARACTER RESPONSE DATA> element. Current power unit.
Example(s)	UNIT:POW?
See Also	UNIT[1..n]:POWer

:UNIT[1..n]:SPECtrum

Description	Sets the spectrum units. At *RST, this value is M.
Syntax	:UNIT[1..n]:SPECtrum<wsp>M|HZ
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: M|HZ. Spectral unit.
Example(s)	UNIT:SPEC M
See Also	UNIT[1..n]:SPECtrum?

:UNIT[1..n]:SPECtrum?

Description	This query returns the current spectrum unit. At *RST, this value is M.
Syntax	:UNIT[1..n]:SPECtrum?
Parameter(s)	None
Response Syntax	<SpectralUnit.>
Response(s)	*SpectralUnit.:* The response data syntax for <SpectralUnit.> is defined as a <CHARACTER RESPONSE DATA> element. Current spectral unit.
Example(s)	UNIT:SPEC?
See Also	UNIT[1..n]:SPECtrum

C Formulas Used with Your Optical Spectrum Analyzer

The following formulas are used in the various tests available with your OSA module.

EDFA Noise Figure Calculation

According to EDFA theory, this measurement is obtained using the following equation:

$$\text{EDFA noise figure} = \frac{P_{ASE} - GP_{SSE}}{Gh\nu B} + \frac{1}{G}$$

Where

- P_{ASE} is the power of the spontaneous emission amplified by the EDFA,
- P_{SSE} is the power of the spontaneous emission of the source,
- G is the gain at this channel's wavelength,
- h is Plank's constant (6,6256 x 10^{-34} J · s),
- ν is the frequency of the channel, and
- B is the noise equivalent bandwidth, as calibrated at this channel's wavelength.

Central Wavelength Calculation (Fabry-Perot Laser)

The central wavelength is calculated using the following equation:

$$a = \frac{\sum_i p_i \lambda_i}{\sum_i p_i}$$

Where

a is the central wavelength,

λ_i is the wavelength of mode i, and

p_i is the power of mode i.

Central Wavelength Calculation (Spectral Analysis)

The central wavelength is calculated using the following equation:

$$a = \frac{\sum_i p_i \lambda_i}{\sum_i p_i}$$

Where

a is the central wavelength,

λ_i is the wavelength of point i, and

p_i is the power of point i.

Spectral Width Calculation (Fabry-Perot Laser)

The spectral width is calculated using the following equation:

$$b^2 = \frac{\sum_i p_i(\lambda_i - a)^2}{\sum_i p_i}$$

Where

b is the spectral width,

λ_i is the wavelength of mode i,

p_i is the power of mode i, and

a is the central wavelength.

Spectral Width Calculation (Spectral Analysis)

The spectral width is calculated using the following equation:

$$b^2 = \frac{\sum_i p_i(\lambda_i - a)^2}{\sum_i p_i}$$

Where

b is the spectral width,

λ_i is the wavelength of point i,

p_i is the power of point i, and

a is the central wavelength.

Error Factor of Gaussian Fit Calculation

The error factor of the Gaussian Fit is calculated using the following equation:

$$E = \frac{\sqrt{\sum_i (P_i - T_i)^2}}{\sum_i P_i}$$

Where

E is the error factor,

P_i is the peak power of mode i, and

T_i is the power of the Gaussian fit of mode i.

Full Width at Half Maximum on Gaussian Fit Calculation

The full width at half-maximum position of the Gaussian fit curve is calculated using the following calculation:

$$FWHM = 2.355 \times b$$

Where

b is the spectral width.

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