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Complimentary Reference Material

This PDF has been made available as a complimentary service for you to assist in evaluating this model for your testing requirements.

TMG offers a wide range of test equipment solutions, from renting short to long term, buying refurbished and purchasing new. Financing options, such as Financial Rental, and Leasing are also available on application.

TMG will assist if you are unsure whether this model will suit your requirements.

Call TMG if you need to organise repair and/or calibrate your unit.

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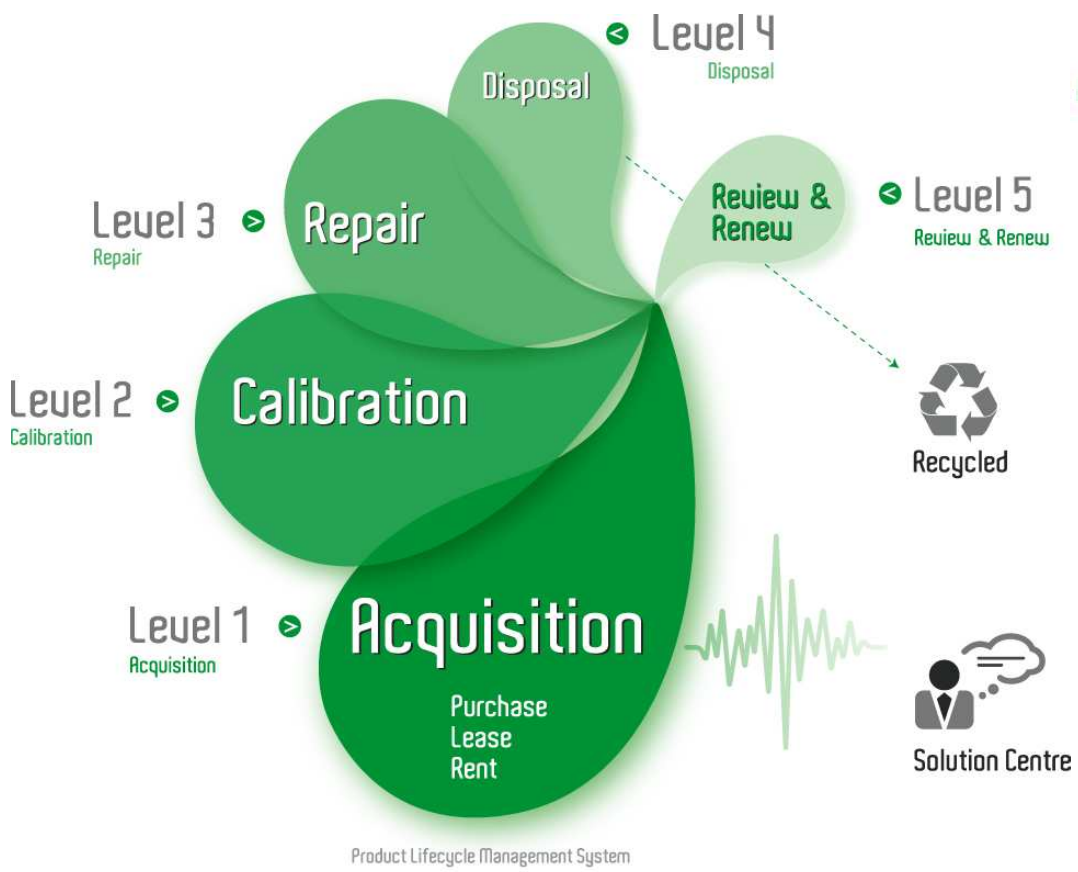

Optical Spectrum Analyzer

FTB-5240/5240B

User Guide

P/N: 1036708

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www.exfo.com · info@exfo.com

Optical Spectrum Analyzer

FTB-5240/5240B

User Guide

P/N: 1036708
December 2002

If the equipment described herein bears the CE symbol, the said equipment complies with the applicable European Union Directive and Standards mentioned in the Declaration of Conformity.

EXFO's Commerce And Government Entities (CAGE) code under the North Atlantic Treaty Organization (NATO) is 0L8C3.

Trademarks

EXFO's trademarks have been identified as such. However, the presence or absence of such identification does not affect the legal status of any trademark.

Units of Measurement

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

The information contained in this publication is subject to change without notice.

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 performed on all 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 been tested and found to comply with the limits for a Class A digital device. Please refer to the Declaration of Conformity.

Independent Laboratory Testing

This unit has undergone extensive testing according to the European Union Directive and Standards. All pre-qualification tests were performed internally, at EXFO, while all final tests were performed externally, at an independent, accredited laboratory. This guarantees the unerring objectivity and authoritative compliance of all test results.

IMPORTANT

Use of shielded remote I/O cables, with properly grounded shields and metal connectors, is recommended in order to reduce radio frequency interference that may emanate from these cables.

EXFO
Electro-Optical Engineering

DECLARATION OF CONFORMITY

Application of Council Directive(s):	73/23/EEC - The Low Voltage Directive 89/336/EEC - The EMC Directive
Manufacturer's Name:	EXFO ELECTRO-OPTICAL ENG.
Manufacturer's Address:	465 Godin Avenue, Vanier, Quebec Canada G1M 3G7 (418) 683-0211
Equipment Type/Environment:	Industrial Scientific Equipment
Trade Name/Model No.:	FTB-5240 Optical Spectrum Analyzer
Year of Conformity Assessment:	2000

Standard(s) to which Conformity is Declared:

EN 61010-1:1993 / A2: 1995	**Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements**
EN 55022: 1994/ A2: 1997	**Limits and methods of measurement of radio disturbance characteristics of information technology equipment**
EN 61326:1997/ A1: 1998	**Electrical Equipment for Measurement, Control and Laboratory Use – EMC Requirements**

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: 465 Godin Avenue Vanier, Quebec, Canada
Date: March 13, 2002

EXFO
Electro-Optical Engineering

DECLARATION OF CONFORMITY

Application of Council Directive(s):	73/23/EEC - The Low Voltage Directive 89/336/EEC - The EMC Directive
Manufacturer's Name:	EXFO ELECTRO-OPTICAL ENG.
Manufacturer's Address:	465 Godin Avenue, Vanier, Quebec Canada G1M 3G7 (418) 683-0211
Equipment Type/Environment:	Industrial Scientific Equipment
Trade Name/Model No.:	FTB-5240B Optical Spectrum Analyzer
Year of Conformity Assessment:	2001

Standard(s) to which Conformity is Declared:

EN 61010-1:1993/ A2: 1995	**Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements**
EN 55022: 1994/ A2: 1997	**Limits and methods of measurement of radio disturbance characteristics of information technology equipment**
EN 61326:1997/ A1: 1998	**Electrical Equipment for Measurement, Control and Laboratory Use – EMC Requirements**

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Manufacturer

Signature: Stephen Bull

Full Name:	Stephen Bull, E. Eng
Position:	Vice-President Research and Development
Address:	465 Godin Avenue Vanier, Quebec, Canada
Date:	November 15, 2001

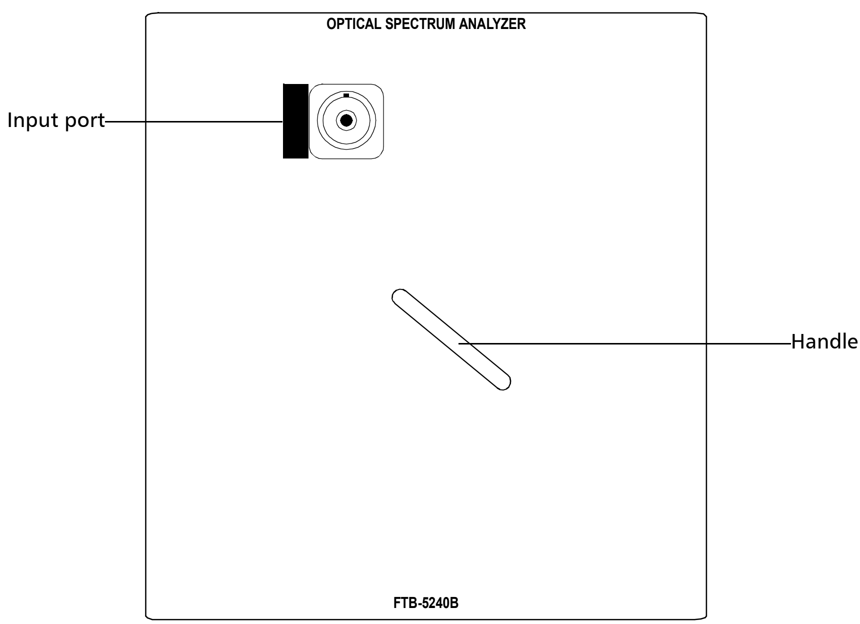
1 Introducing the FTB-5240/5240B Optical Spectrum Analyzer

General Information

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

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.



Your optical spectrum analyzer, used with the FTB-400 platform, can measure most parameters in a DWDM system. It can be used during installation, commissioning, maintenance and troubleshooting. It is the instrument to use to ensure proper DWDM system operation.

Moreover, its portability allows you to test anywhere in the field and does not confine you to a laboratory.

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 technology—using SCPI commands or LabVIEW drivers available on the installation CD-ROM).

Available Models

The optical spectrum analyzer comes in two different models:

- FTB-5240 offers two test modes (Normal 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 to perform tasks, such as the following:

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

Safety 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

Inserting and Removing Test Modules

CAUTION

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

WARNING

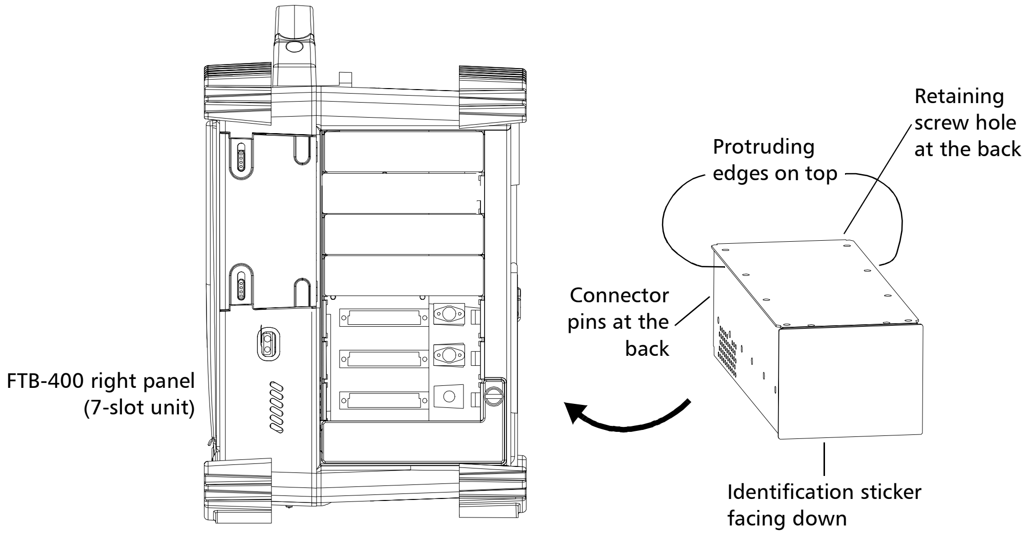
When the laser safety light ( ) is flashing on the FTB-400, at least one of your modules is emitting an optical signal. Please check all modules, as it might not be the one you are currently using.

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

1. Exit ToolBox and power 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 retaining screw hole.

CAUTION

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

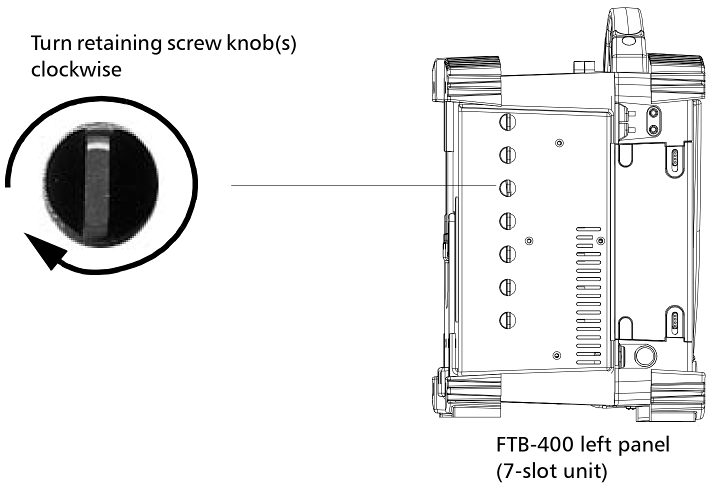


4. Insert the protruding edges of the module into the grooves of the unit's module slot.

5. Push the module all the way to the back of the slot, until the retaining screw makes contact with the unit casing.

6. Place the FTB-400 so that its left panel is facing you.

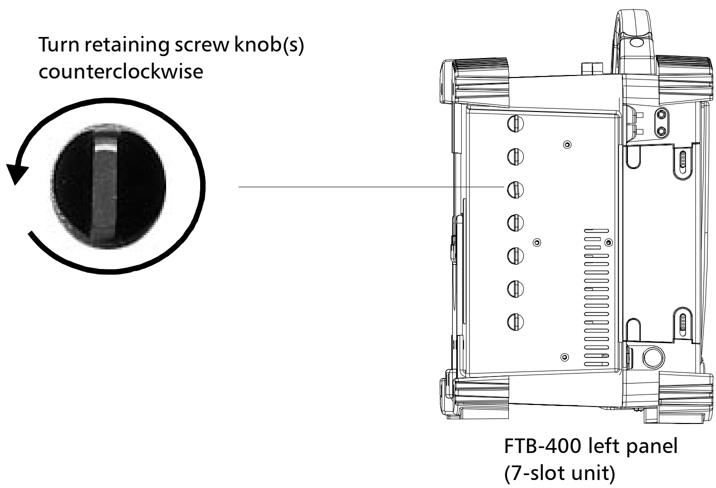
7. While applying slight pressure to the module, turn the retaining screw clockwise until it is tightened. This will secure the module into its “seated” position.



When you turn on the FTB-400, the startup sequence will automatically detect the module.

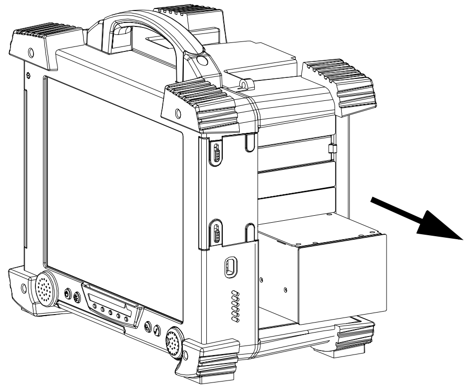
To remove a module from the FTB-400 Universal Test System:

1. Position the FTB-400 so that the left panel is facing you.
2. Turn the retaining screw counterclockwise until it stops. The module will be slowly released from the slot.



3. Place the FTB-400 so that the right panel is facing you.

4. Hold the module by its side 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.

5. Cover empty slots with the supplied protective covers.

CAUTION

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

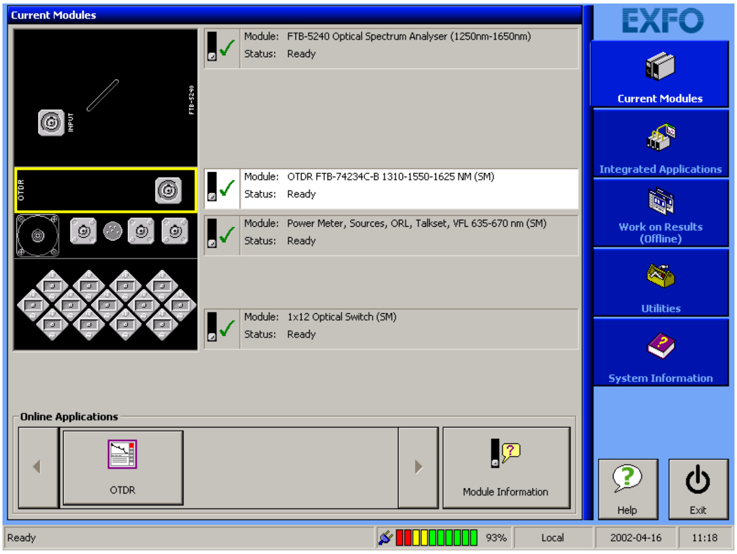
Launching the Optical Spectrum Analyzer Application

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

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

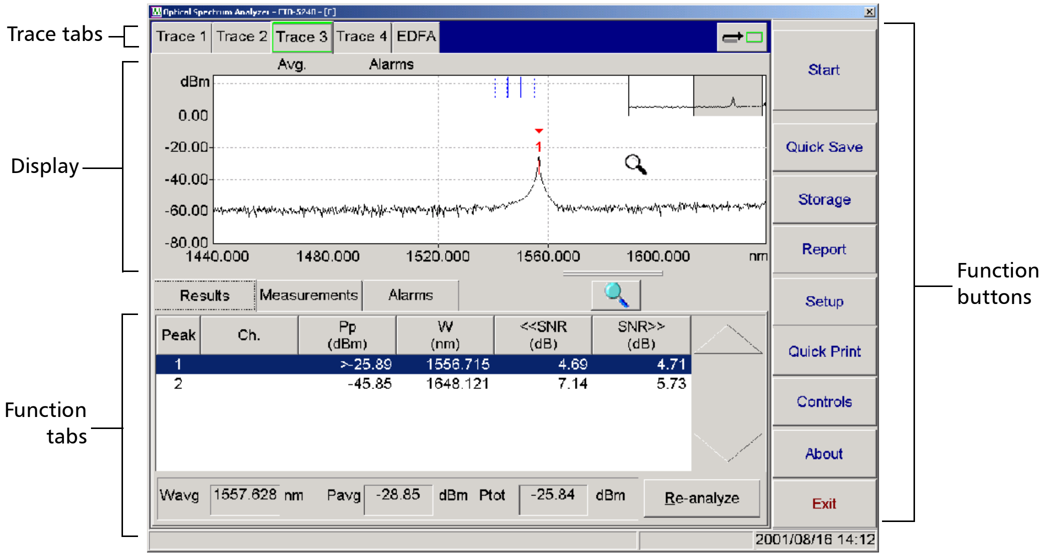
To launch the Optical Spectrum Analyzer application:

1. From the **Current Modules** function tab, click on the row corresponding to the module application you wish to launch. It will turn white to indicate that it is highlighted.



2. Click on the corresponding button in the **Online Applications** box to start the application (you can also double-click on its row).

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



Status Bar

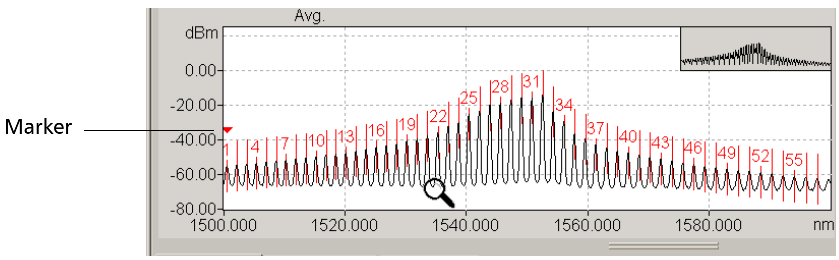
The status bar, located at the bottom of the main window, identifies the current operational status of the FTB-5240/5240B Optical Spectrum Analyzer.

Performing Manual Measurements on Your Test Results

Once you have performed a test, you can manually perform measurements on parts of the results.

Selecting Individual Channel Results

You can select result lines and locate them more easily by selecting the corresponding peak on the graph. A small red marker will point down at the peak, and the corresponding row in the *Results* tab will be highlighted.



When you select a peak in the **Results** tab of your tests, the red marker will move accordingly to indicate the corresponding peak.

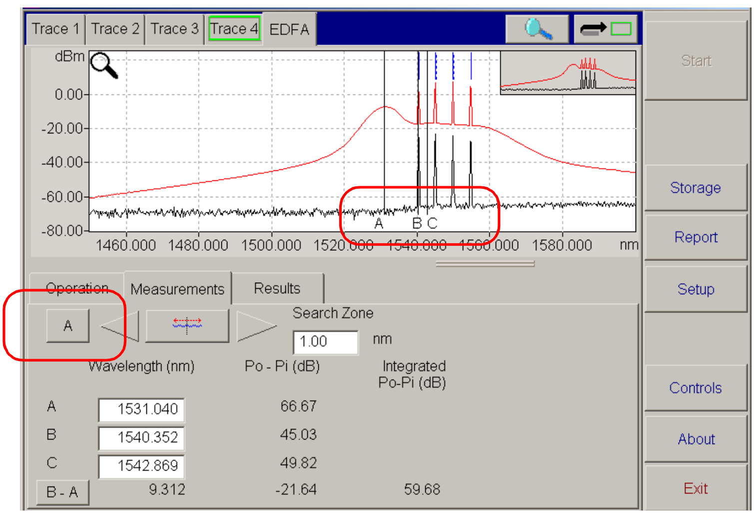
To close in on a particular peak, see *Adjusting Trace Display Resolution* on page 14.

Selecting and Moving Markers

In the **Measurements** tab of your tests, you will notice three markers identified by the letters A, B and C. These markers are represented both in the graph and table display to customize your measurements.

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

1. In any **Measurements** tab, click on the marker selection button until you see the letter of the marker you want to move, or click directly on the marker in the *Trace* display. The marker letter *(A, B* or *C)* appears on the marker selection button.



2. Drag the marker to the desired area in the display. You will notice that the corresponding field changes according to the marker's position. If you want to set a precise value for the marker, simply type it in the field.

On the lower left-hand corner of the screen, you will notice a button indicating a subtraction of two of the marker letters. Click on it to change the marker order according to your testing needs. The results will change accordingly in the table display.

The markers can also be moved with the left and right arrow buttons according to a precise type.

- : use this setting to move the marker over the whole trace.
- : use this setting to move the marker over dips. Set the search zone in the field next to the arrow buttons.
- : use this setting to move the marker over peaks. Set the search zone in the field next to the arrow buttons.

Adjusting Trace Display Resolution

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

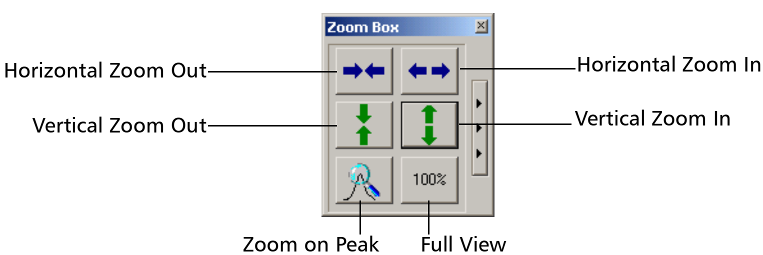
Selecting the Zoom Center

To select the exact center of the area you want to zoom, simply position the magnifying glass on that area. Any zoom activity will be performed according to the zoom center you have selected.

Zooming

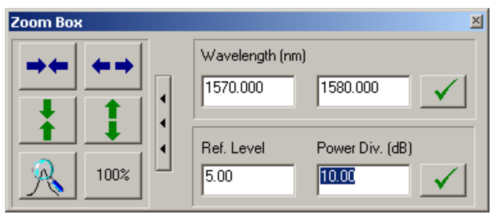
The zooming tools are located in a convenient floating box. To open this window, click on . You can move this box around the display by clicking on its title bar and dragging it around.

To zoom in or out of a trace, use the zoom buttons as follows:



- The horizontal and vertical zoom in will increase the trace size in the corresponding axis.
- The horizontal and vertical zoom out will decrease the trace size in the corresponding axis.
- The full view button will revert the trace to its original size.
- The Zoom on Peak button will automatically enlarge the area where the selected peak is located. If you click on this button while in the **Measurement** tab of any test, it will position marker A on the selected peak, and markers B and C respectively 3 dB before and after the peak.

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



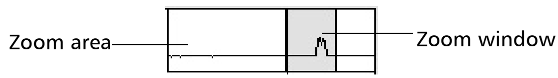
In the **Wavelength (Frequency)** fields (depending on your current display), you can enter a range for the display to center on in the horizontal axis.

In the **Ref. Level** and **Power Div.** fields, you can enter precise values for the display to center on in the vertical axis.

In both cases, click on ✓ to apply your changes. To close the zoom box, click on ✕.

Moving a Trace from the Zoom Window

The zoom window in the upper right-hand corner of the graph display section helps you see where you are on the trace. The gray zoom area accurately defines the portion of the trace you see on the screen.

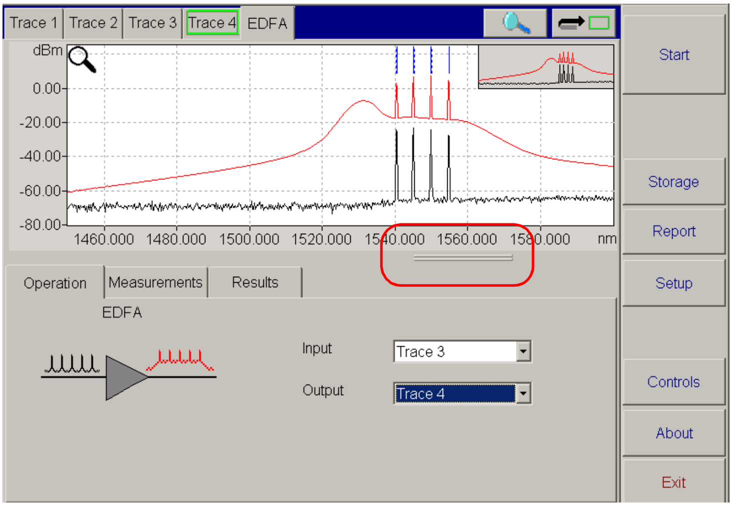


To move the zoom area within the zoom window, click on it and drag it to the location you want to view.

Note: *In Drift mode, the tools can only be used on the trace containing the magnifying glass Click anywhere in the other trace to change the magnifying glass's location.*

Adjusting Window Height

A split bar divides the data display region and option sheets. You can move it up or down by clicking on it to obtain a larger view of the graph or table display.



Exiting the Application

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

To close the application from the main window:

➤ Click on  (in the top right corner of the main window).

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

3 Preparing Your Optical Spectrum Analyzer for a Test

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.**
- **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.

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.

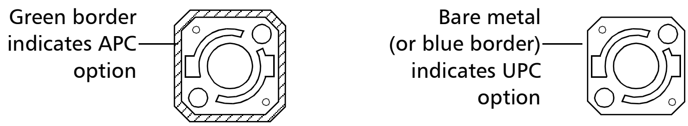
3. Push the connector in so that the fiber-optic cable is firmly in place, thus ensuring adequate contact.

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.*

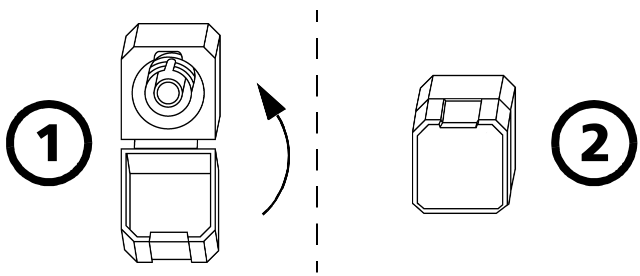
Installing the EXFO Universal Interface (EUI)

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, as shown below:

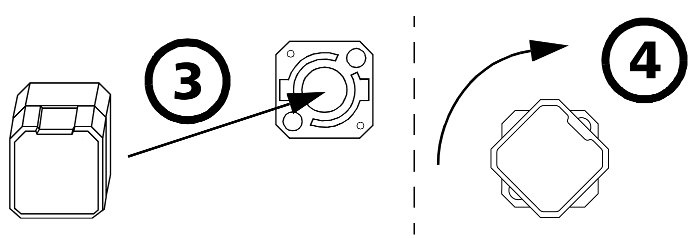


To install an EUI connector adapter onto the EUI baseplate:

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. Turn the connector adapter clockwise on the baseplate to lock it in place.



IMPORTANT

Your module was designed to work with the FTB-400 platform and has been calibrated according to its physical orientation within the appropriate platform. If you use the module in the FTB-300, for which it was not intended, you may need to perform a calibration to maintain the original specifications. You could also consider servicing your module for a recalibration.

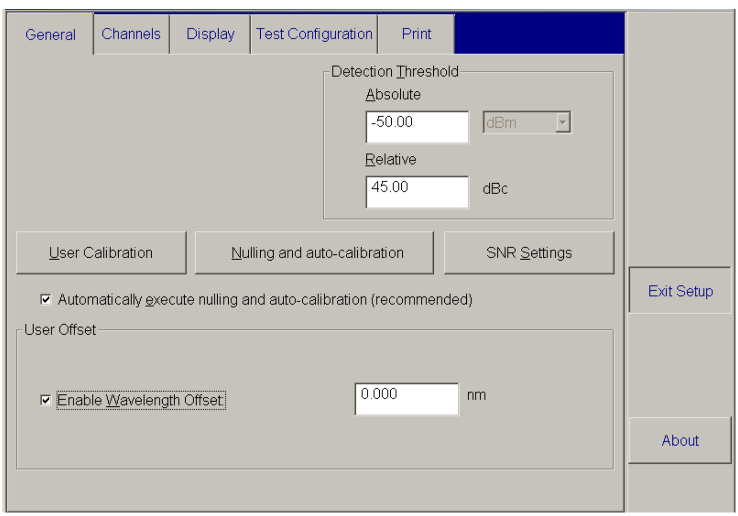
Performing an Automatic Calibration (FTB-5240B Only)

Calibrating your module can help you achieve better results. It is particularly important when the accuracy of the measurement you wish to perform 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 on **Setup**.
2. Select the **General** tab.



3. Click on **Nulling and Auto-Calibration**.
4. Follow the on-screen instructions to complete your calibration.

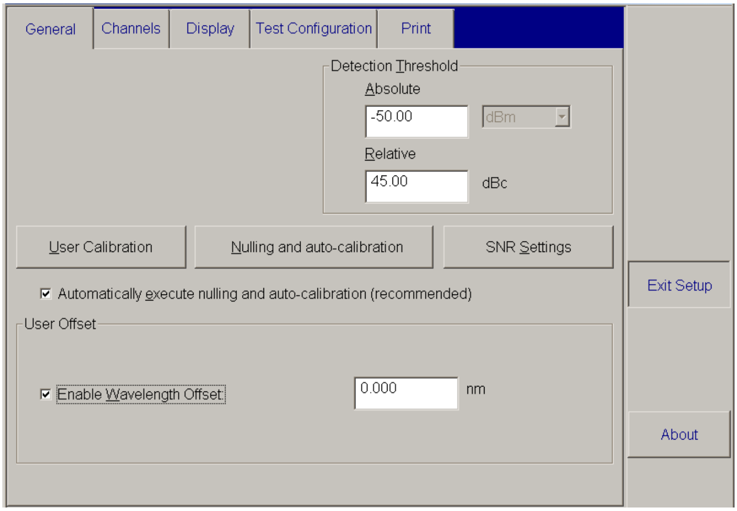
Performing a Wavelength Calibration

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

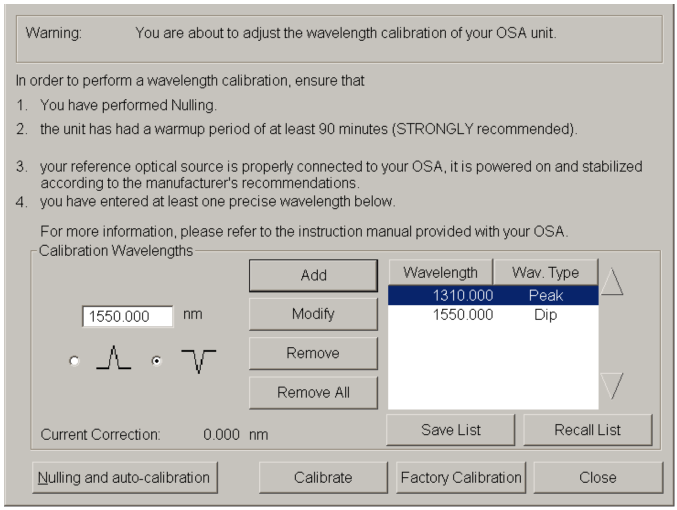
This type of calibration is designed to define a complete reference in one scan, not a series of steps.

To access the User Wavelength Calibration window,

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



3. Click on **User Calibration** to access the **User-Performed Wavelength Calibration** window.



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.

Adding Calibration Wavelengths

You can add up to 100 calibration wavelengths to your list.

To add a calibration wavelength:

1. Enter a wavelength value in the **Calibration Wavelengths** field.

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

3. Click on **Add** to add your new wavelength to the list on the right side of the window. The new wavelength will always appear at the end of the list.

Modifying Calibration Wavelengths

Any of the already entered calibration wavelengths can be modified if needed.

To modify a calibration wavelength:

1. Select the value you want to modify from the list on the right side of the window.
2. Enter the correct wavelength value in the **Calibration Wavelengths** field.
3. Specify if it is a peak  or a dip .
4. Click on **Modify** to replace the value you have selected with the value you have entered in the **Calibration Wavelengths** field.

Deleting Calibration Wavelengths

You can easily delete unnecessary wavelengths.

To delete a calibration wavelength:

1. Select the value you want to delete from the list on the right side of the window.
2. Click on **Remove**. The value will be deleted automatically.

   OR

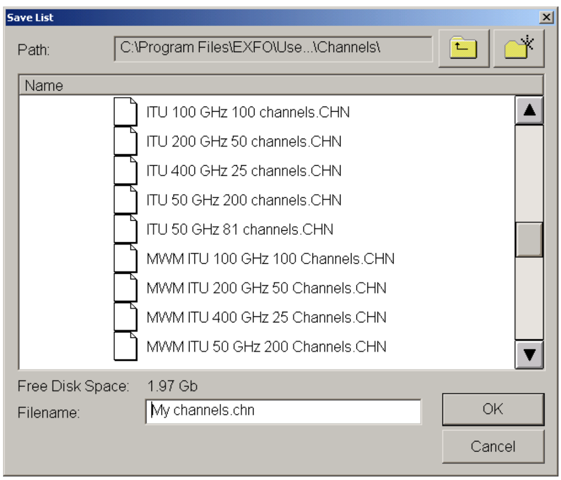
   If you want to remove all values at the same time, click on **Remove All**. The values will be deleted automatically. You do not need to select any values from the list.

Saving a Calibration List

It is possible for you to save a calibration wavelength list for future use. 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 Wavelength Calibration** window, after entering all the wavelengths you want to save, click on **Save List**.
2. A window appears, prompting you to enter a name for this list.



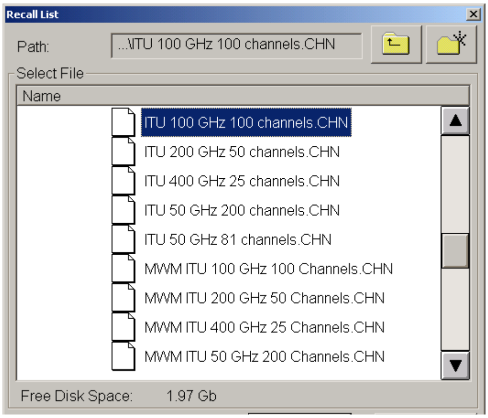
3. When you are done, click on **OK** to confirm your action. **Cancel** will bring you back to the **User Wavelength Calibration** window without saving the list.

Recalling a Calibration List

If you have saved a wavelength calibration lists previously, you can easily retrieve, and use it again.

To recall a list:

1. In the **User Wavelength Calibration** window, click on **Recall List**.
2. Select the list you want to recall from the list of available files.



3. When you are done, click on **OK** to confirm your action. **Cancel** will bring you back to the **User Wavelength Calibration** window without recalling the list.

Launching the Calibration

Once you have entered the desired wavelengths in your list, connect your source to the input port of the OSA and click on **Calibrate**. The process should take around 15 minutes.

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

IMPORTANT

You will need a source (either tunable or DFB), a dip filter or a wavelength-reference absorption cell combined with a white wideband source to perform the calibration. Ensure that your source is stabilized according to the manufacturer's specifications, and that the current test conditions comply with the specified environmental conditions.

The user calibration requires that the following conditions be met by each of the reference signals in order to be considered valid:

- 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.

Reverting to the Factory Calibration

If you ever need to revert to the factory calibration, simply click on **Factory Calibration**. You will be prompted to confirm your action and the unit will then revert to its original calibration.

Nulling the Offsets

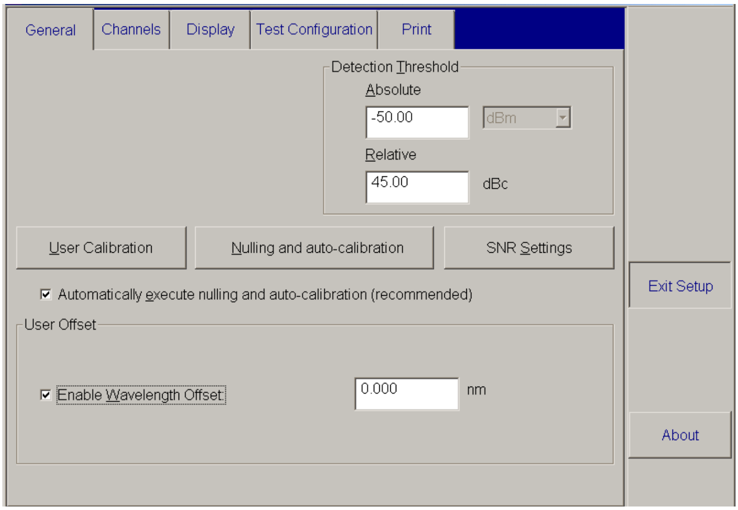
Nulling is designed to cancel the effects of any internal electronic signal that may drift over long periods of time or following significant changes in ambient temperature.

For optimum performance, it is recommended to perform a nulling before each critical measurement since it improves the power accuracy of weak signals (–55 dBm or less). This will also improve the wavelength accuracy.

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

To null the offsets on your OSA module:

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



3. Click on **Nulling** (**Nulling and auto-calibration** for the FTB-5240B). At this point, the system may ask you to disconnect incoming signals. If this is the case, disconnect the signals to attain an optimal accuracy.

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

You can disable the automatic nulling and calibration by unchecking the **Automatically execute nulling** (**Automatically nxecute nulling and auto-calibration** for the FTB-5240B) box.

CAUTION

EXFO strongly recommends leaving the automatic nulling and calibration enabled. If left without nulling or calibration for more than a thousand scans, your OSA module will begin to show signs of degradation, and its motor could be damaged.

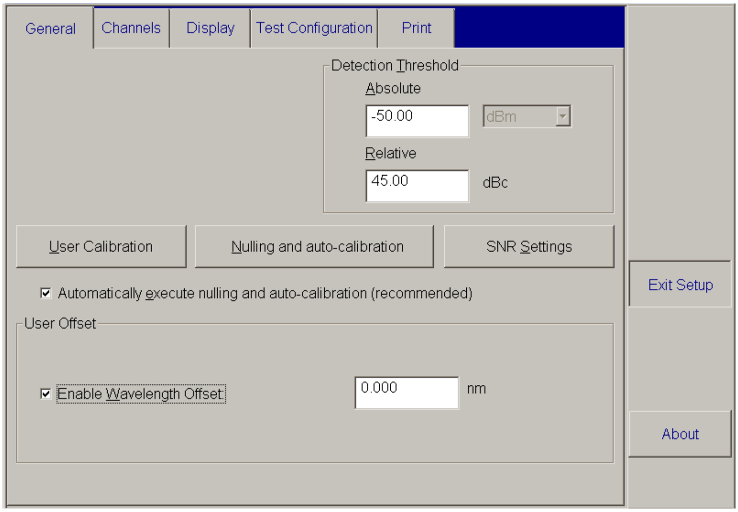
Enabling the Wavelength Offset

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 set in the* Setup *menu will only take effect with the next acquisition and apply to all four trace tabs. The change or calibration will also take effect if you click on* Re-analyze *in your trace's result tab after acquiring it.*

To enable the wavelength offset:

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



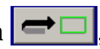
3. In the **User Offset** panel, check the **Enable Wavelength Offset** box.

Enabling the wavelength offset will make the wavelength field available. To enter a wavelength offset, simply enter a value in nm in the field.

4 Setting Up Your Optical Spectrum Analyzer

Before performing any spectral analysis, you must set up your OSA module and test application with the right parameters. The following chapter will guide you through these steps.

Selecting the Active Trace

The active trace selection button , next to the **Start** button, will allow you to move from traces 1 through 4 without changing the current display.

The green frame will move from one trace tab to another; the “framed” trace tab will become the active tab. Any change, such as saving, loading, performing acquisitions, or tests will affect it.

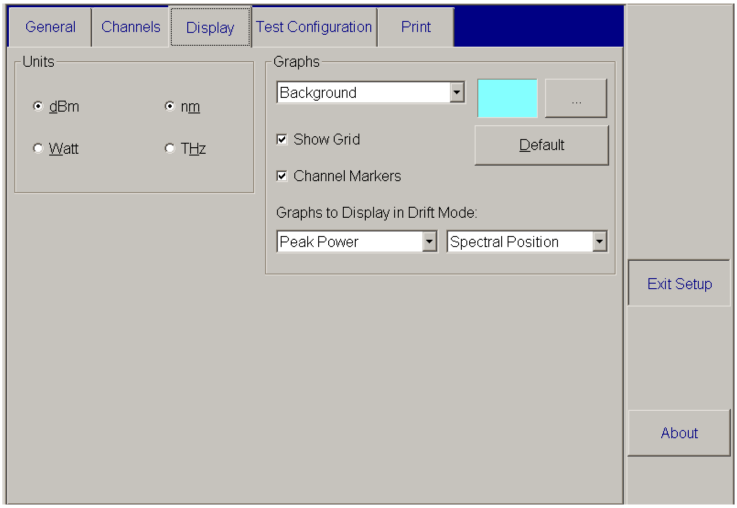
If you are working with dBm as units, the pull-down menu next to the detection threshold is disabled. If you are working with watts, you can change the units in the pull-down menu, from W to pW.

Setting the Power Units

The tests you want to perform can require different power units.

To set the power unit you wish to work with:

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



3. In the **Units** panel, select **dBm** or **Watt**.

   If you choose watts, you can also select which units suit you best by scrolling up or down the pull-down menu in the **Detection Threshold** panel of the **General** tab. This is also true for channel creation or modification. You can find more information about the detection threshold in *Setting the Detection Threshold* on page 36, and more information about the channels and channel lists in *Managing Channels and Channel Lists* on page 43.

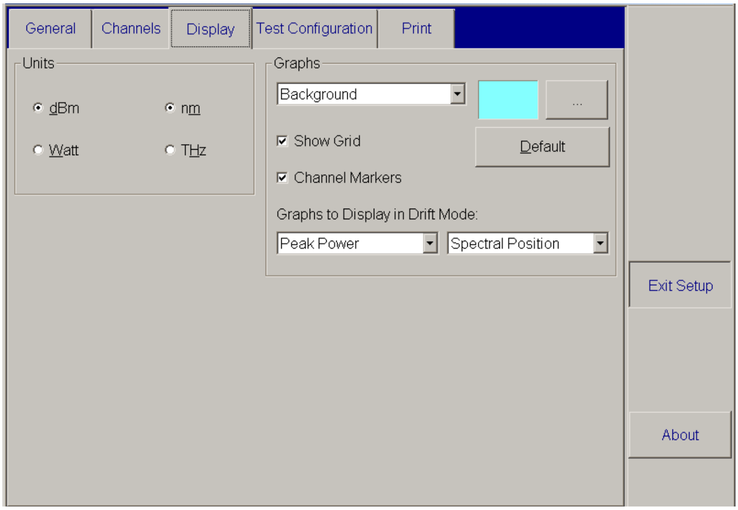
4. Click on **Exit Setup**. The tests will now be performed using the units you have selected. If you have already acquired traces or performed tests, the results will change according to the units as well.

Setting the Spectral Units

It is possible to change the spectral units if your tests require it.

To set the spectral units:

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



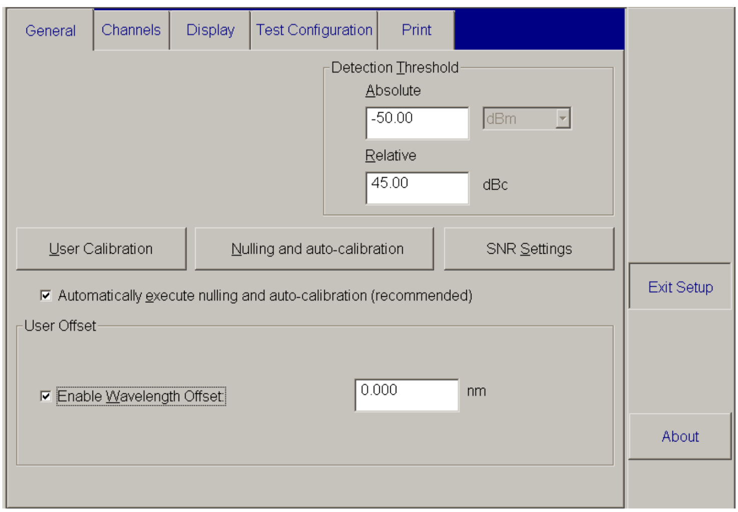
3. In the **Units** panel, select **nm** or **THz**.
4. Click on **Exit Setup**. The tests will now be performed according to the units you have selected. If you have already acquired traces or performed tests, the results will change according to the units as well.

Setting the Detection Threshold

The detection threshold is the minimum power that a peak must have to be detected by the OSA module.

To set the detection threshold:

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



3. In the **Detection Threshold** panel, enter the threshold at which you want to start detecting peaks according to the power unit you have chosen (dBm or W).

   You can set an absolute threshold, which keeps you from detecting any peak below the threshold value you have set, or a relative threshold, which keeps you from detecting any signal x dBc below the maximum signal found on the trace, using the dBc value you have set.

   To change the power units, see *Setting the Power Units* on page 34.

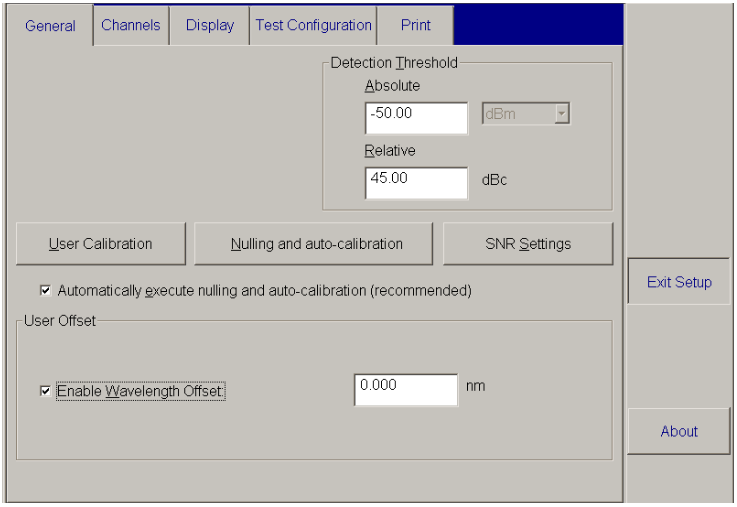
4. Click on **Exit Setup**. From now on, when you perform tests, peaks below the value you have selected will not be detected.

Setting the Signal-to-Noise Ratio Parameters

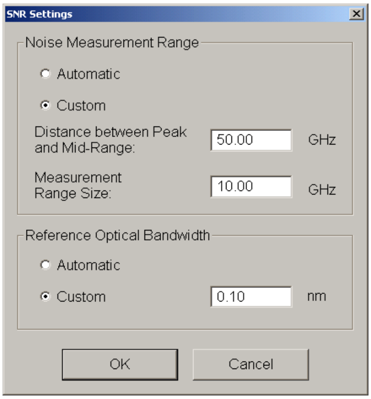
The signal-to-noise ratio (SNR) allows you to measure the difference between the noise floor and the top of a signal's peak.

To set the SNR calculation parameters:

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



3. Click on **SNR Settings**.

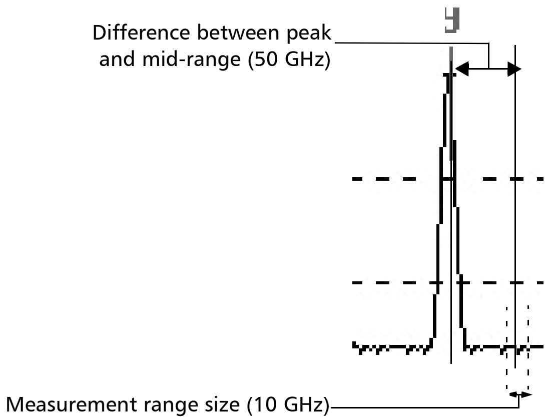


4. You can choose to have the SNR automatically calculated by selecting the **Automatic** radio button in the **Noise Measurement Range** panel. The default values are 50.00 GHz for the **Difference Between Peak and Mid-Range** and 10.00 GHz for the **Measurement Range Size**.

5. If you choose **Custom**, you must enter the proper settings in the right section of the window.

5a. In the **Distance Between Peak and Mid-Range** field, enter the distance between the peak wavelength and the center of the noise measurement range. The default value is 50.00 GHz.

5b. In the **Measurement Range Size** field, enter the range on both sides of the external limit of the distance-from-peak value. The default value is 10.00 GHz.



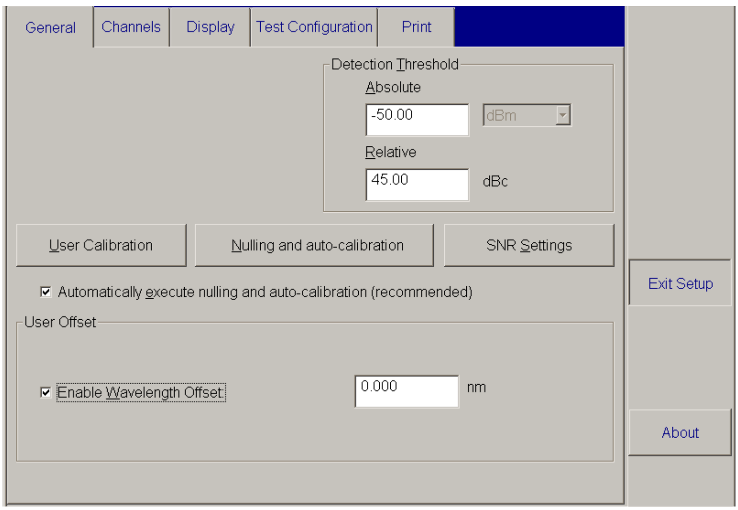
6. Click on **OK** to confirm your choice, or on **Cancel** to return to the **General** tab without changing your settings.

Setting the Reference Optical Bandwidth

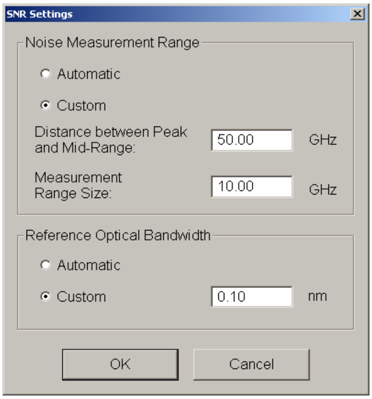
You can choose to apply a reference optical bandwidth if your test procedure requires it. This feature is particularly useful if you intend to compare SNR figures from different OSAs, which may have different resolutions and noise-equivalent bandwidths.

To set the reference optical bandwidth:

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



3. Click on **SNR Settings**.



4. You can choose to use the **Automatic** reference optical bandwidth calculation. With this selection, SNR measurements will be made using the OSA's true noise-equivalent bandwidth. This value is calibrated for each OSA and will vary from one unit to another.

   OR

   If you choose **Custom**, the SNR calculations will be made assuming that your OSA unit has the noise-equivalent bandwidth as defined in the corresponding text field. The default suggested value is 0.10 nm.

5. Click on **OK** to confirm your changes, or on **Cancel** to return to the **General** tab without changing your settings.

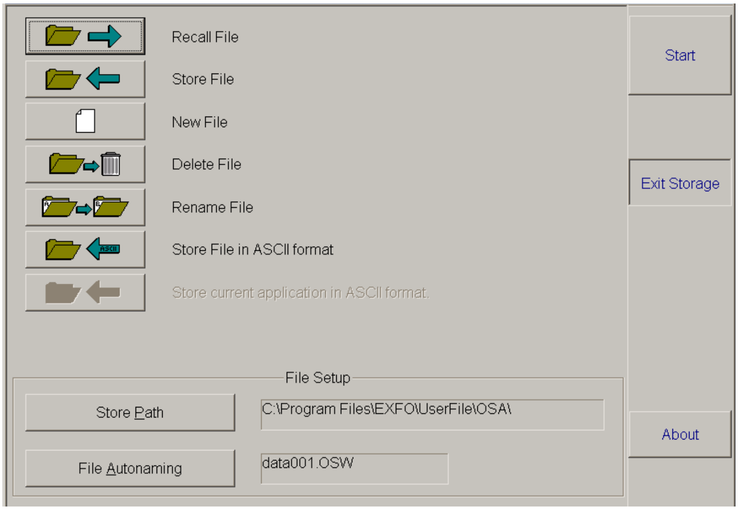
Clearing the Trace Display

If the trace you just acquired is not satisfactory (wrong test control mode, bad settings, etc.), you can clear the *Trace* display and start over.

Note: *Remember that this operation will affect the* active *trace (the one with the green frame). Ensure that you have selected the right trace before proceeding.*

To clear the trace display:

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



2. Click on **New File**. A dialog box asks you to confirm that you want to delete the currently displayed trace.

3. Click on **Yes**. A dialog box appears, asking you if you want to save the currently displayed data.

   If you click on **Yes**, you are prompted to find the location where you want to save the displayed trace. If you click on **No**, you return to the main window and the **Trace** display is cleared.

5 Managing Channels and Channel Lists

Testing DWDM systems involves testing many channels on the same fiber. Your optical spectrum analyzer allows you to define these channels one at a time or quickly generate them from current data. You can also rapidly create a list of equally spaced channels. These channels are mostly related to the standard ITU wavelength grid, for which standard ITU channel files are provided with your module. These channel definitions are necessary to allow drift and alarm tracking.

Once a channel list is created, you can modify it in any way. The following sections explain how to perform all these tasks.

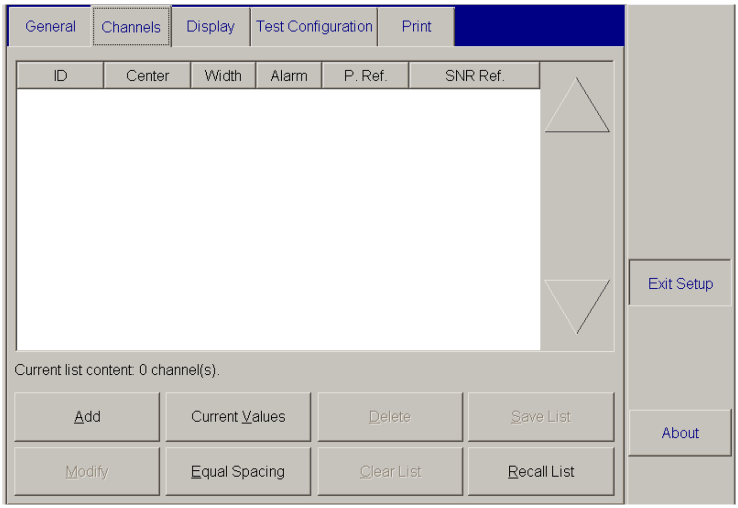
Creating a Single Channel

You can create a channel according to your specific needs.

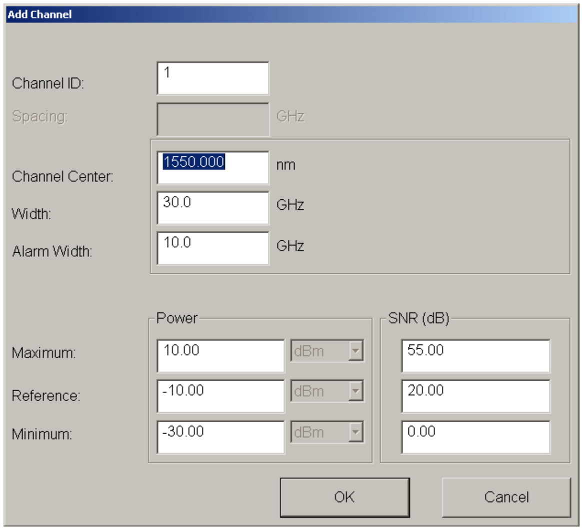
To create only one channel:

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

2. Select the **Channels** tab.



3. Click on **Add**.



4. Fill in the text fields as explained below:

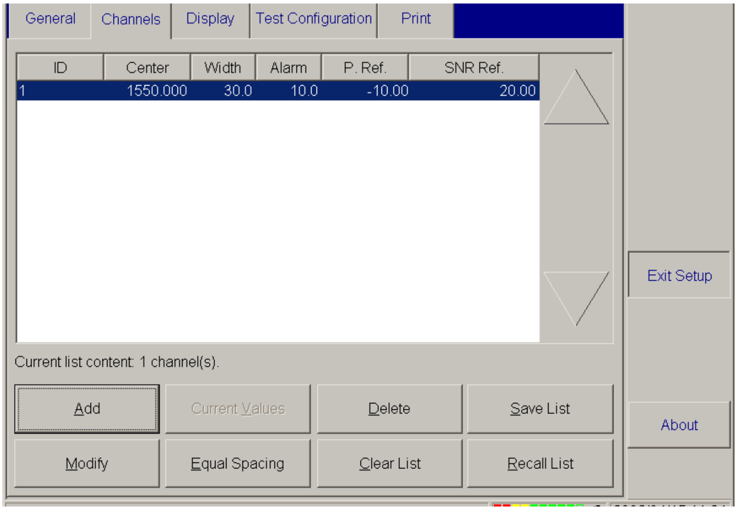
- **Channel ID**: Enter the name of the channel you want to create. The field accepts alphanumeric values.
- **Spacing**: The **Spacing** field is disabled because you are creating only one channel. It will only be available when creating a list of equally spaced channels. For more information, see *Creating a List of Equally Spaced Channels* on page 47.
- **Channel Center**: Enter the channel's central wavelength (between 1250 nm and 1650 nm).
- **Width**: Enter the width for all the channels in your fiber. A typical value represents 10 % of the channel spacing. For example, if you have a channel spacing of 100 GHz, the channel width would be 10 GHz.

- **Alarm Width**: Enter the width in which the central wavelength is allowed to move. Generally, this value represents 90 % of the channel width. For example, if you have a channel width of 10 GHz, the alarm width would be 9 GHz. The smaller the alarm width, the stricter the controls on the channel movement.
- **Maximum Power**: Enter the maximum power allowed for that specific channel without you being notified.
- **Reference Power**: Enter the power used as a reference for the Drift mode graph display.
- **Minimum Power**: Enter the minimum power allowed for that specific channel without you being notified.

Note: *For the maximum, reference and minimum power, if you are working with dBm as the unit, the pull-down menu next to the detection threshold is disabled, as you cannot change the units. If you are working with watts, you can change the units in the pull-down menu, from W to pW. To change the power units, see* *Setting the Power Units on page 34.*

- **Maximum SNR**: Enter the maximum SNR allowed for that specific channel without you being notified.
- **Reference SNR**: Enter the SNR used as a reference for the Drift mode graph display.
- **Minimum SNR**: Enter the minimum SNR allowed for that specific channel without you being notified.

5. Click on **OK**. The window disappears and you return to the **Channels** page, which contains the channel list, including the new channel.

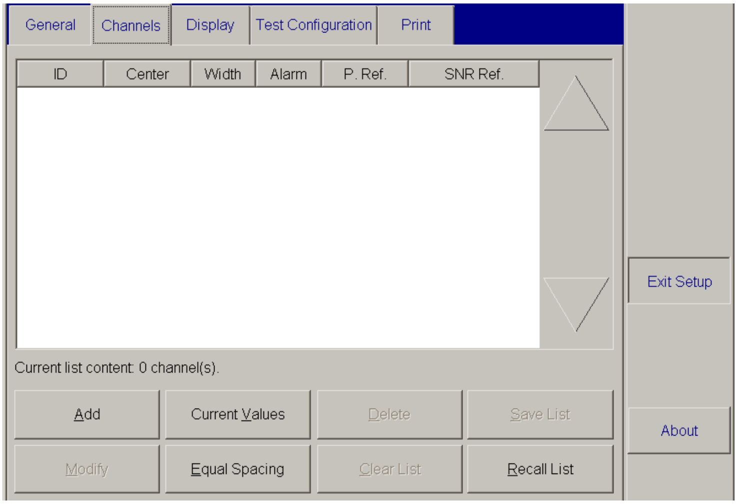


Creating a List of Equally Spaced Channels

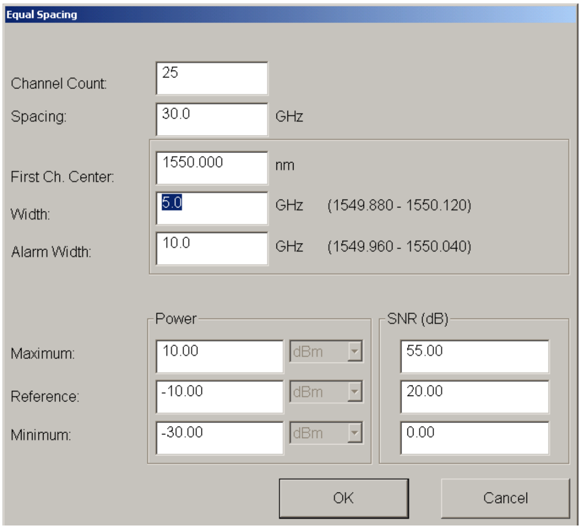
A list of equally spaced channels can be used to comply with a standardized wavelength grid, for example. Your optical spectrum analyzer allows you to create a list in one step.

To create equally spaced channels:

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



3. Click on **Equal Spacing**.



4. Fill in the text fields as explained below.

➤ **Channel Count**: Enter the number of channels (between 1 and 100) in your fiber.

➤ **Spacing**: Enter the space between channels (between 20 GHz and 1000 GHz).

➤ **First Ch. Center**: Enter the central wavelength of the first channel (between 1250 nm and 1650 nm).

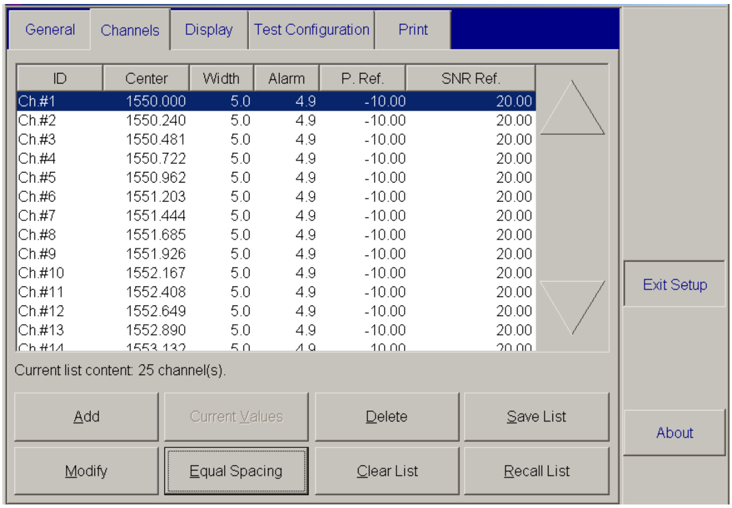
➤ **Width**: Enter the width for all the channels in your fiber. A typical value represents 10 % of the *channel spacing*. For example, if you have a channel spacing of 100 GHz, the channel width would be 10 GHz.

- **Alarm Width**: Enter the width in which the central wavelength is allowed to move. Generally, this value represents 90 % of the *channel width*. For example, if you have a channel width of 10 GHz, the alarm width would be 9 GHz. The smaller the alarm width, the stricter the controls on the channel movement.
- **Maximum Power**: Enter the maximum power allowed for that specific channel without you being notified.
- **Reference Power**: Enter the power used as a reference for the Drift mode graph display.
- **Minimum Power**: Enter the minimum power allowed for that specific channel without you being notified.

Note: *For the maximum, reference and minimum power, if you are working with dBm as the unit, the pull-down menu next to the detection threshold is disabled, as you cannot change the units. If you are working with watts, you can change the units in the pull-down menu, from W to pW. To change the power units, see* *Setting the Power Units on page 34.*

- **Maximum SNR**: Enter the maximum SNR allowed for that specific channel without you being notified.
- **Reference SNR**: Enter the SNR used as a reference for the Drift mode graph display.
- **Minimum SNR**: Enter the minimum SNR allowed for that specific channel without you being notified.

5. Once you have entered all your parameters, click on **OK**. You return to the **Channels** tab and a list of equally spaced channels appears.



Note: *ITU-based channel files are provided with your application.*

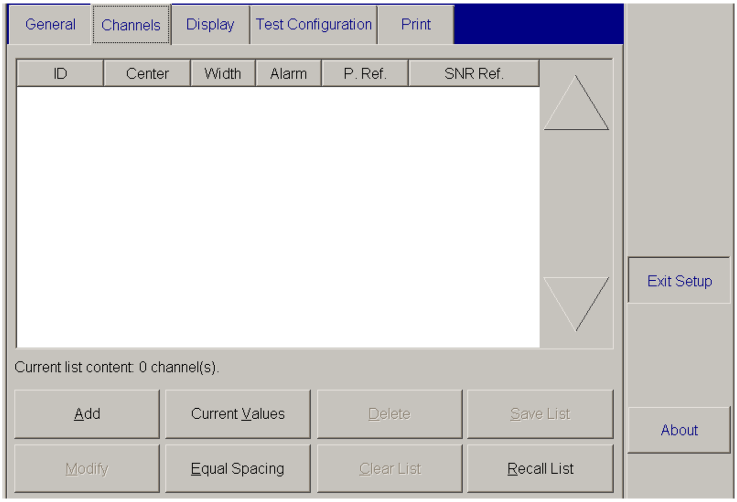
Creating a Channel List with Current Acquisition Values

This function allows you to create a channel list based on a trace you have just acquired.

Note: *You must have acquired a trace before using the* Current Values *feature. See* Testing DWDM Systems in Normal or Drift Mode *on page 63 for more information.*

To create a channel list using the Current Values button:

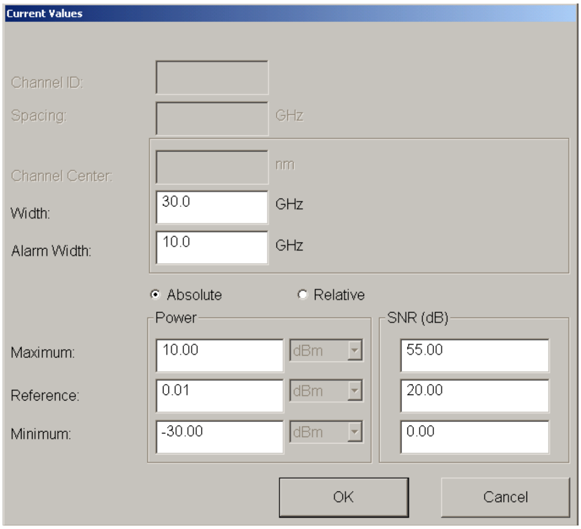
1. From the main window, click on **Setup**.
2. Select the **Channels** tab. The channel list should be empty. If not, clear the list as explained in *Clearing the Channel List* on page 61.



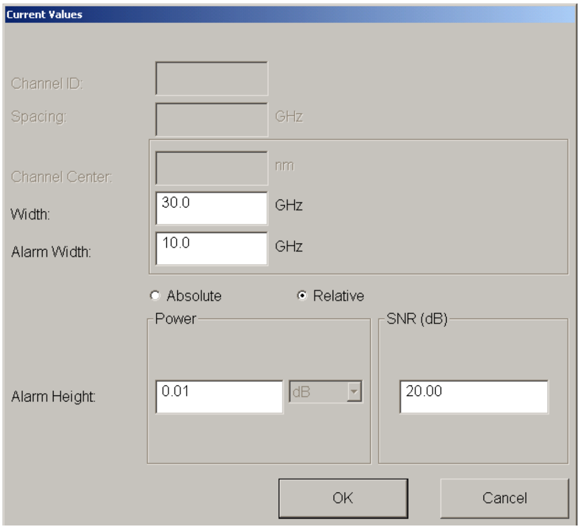
3. Click on **Current Values**.
4. If you wish to modify some information on the list you are about to create, use the corresponding fields. For more information on these fields, see *Creating a Single Channel* on page 43.

5. You can select to use absolute or relative power and SNR thresholds. These thresholds are the limits within which the peak can move without causing an alarm.

➤ **Absolute** mode will allow you to set precise values for power and SNR (maximum, reference and minimum). These are constant values and will be used for every channel on the list.



➤ **Relative** mode will allow you to use the actual power and SNR of each peak to create corresponding channel values. The **Alarm Height** is the window within which each peak can vary without causing an alarm.



6. Click on **OK** to create the list.

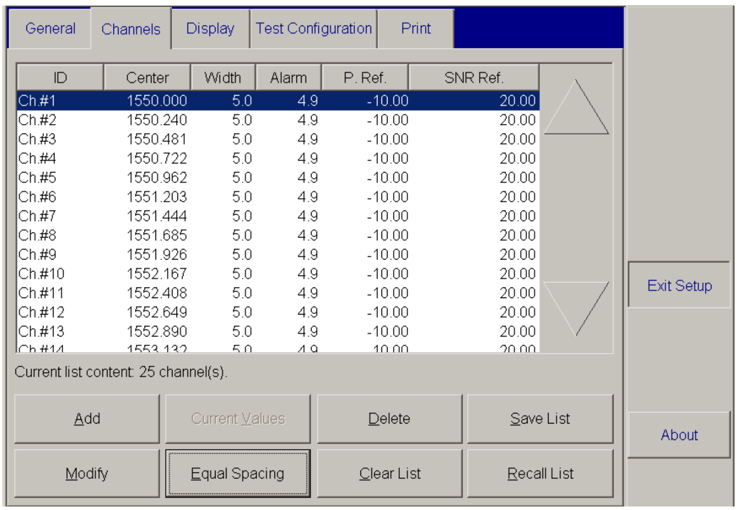
Note: *When creating a list with the* Current Values *button while a list is already in your* Channels *tab, the new list will replace any previous list without prompting you to save. Ensure that you want to overwrite the current list before creating a new one.*

Modifying Channels

When your DWDM system is modified to accept more channels or to accept a different ITU grid, it is easy to modify existing channels.

To modify a channel:

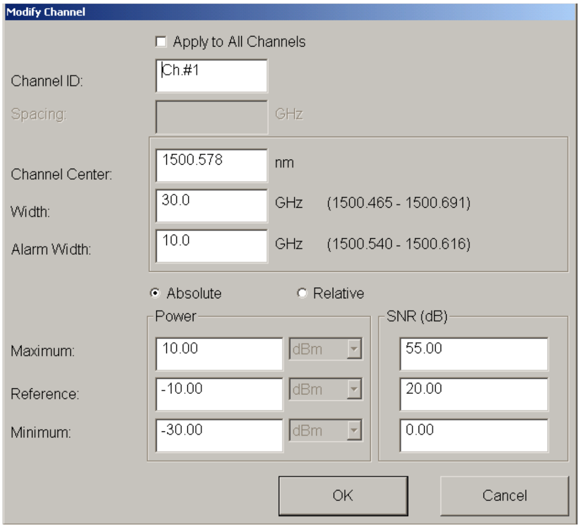
1. From the main window, click on **Setup**.
2. Select the **Channels** tab.



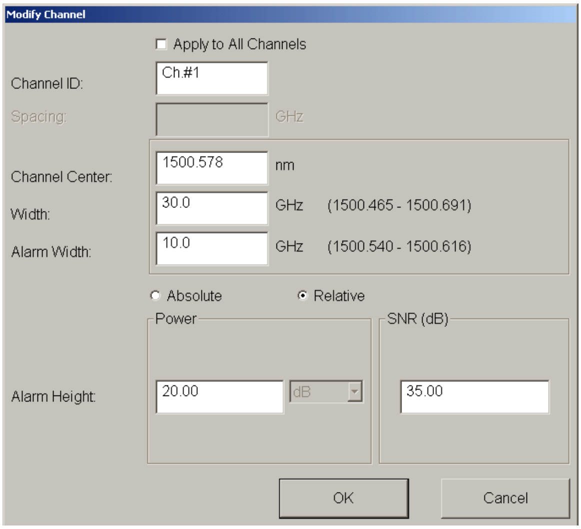
3. Select the channel to be modified from the channel list.
4. Click on **Modify**.
5. If you want the changes to apply to all of your channels, check the **Apply to All Channels** box. You must check the box before applying your changes, otherwise, they will not be applied to all of the channels.

6. Modify the appropriate values. For more information on the meaning of the different values, see *Creating a Single Channel* on page 43. If you leave a field empty, it will remain as it was before your modifications.

➤ The **Absolute** mode will allow you to set precise values for power and SNR (maximum, reference and minimum). These are constant values.



➤ The **Relative** mode will allow you to use the actual power and SNR of the peak to create the corresponding channel values. The **Alarm Height** is the window within which the peak can vary without causing an alarm.



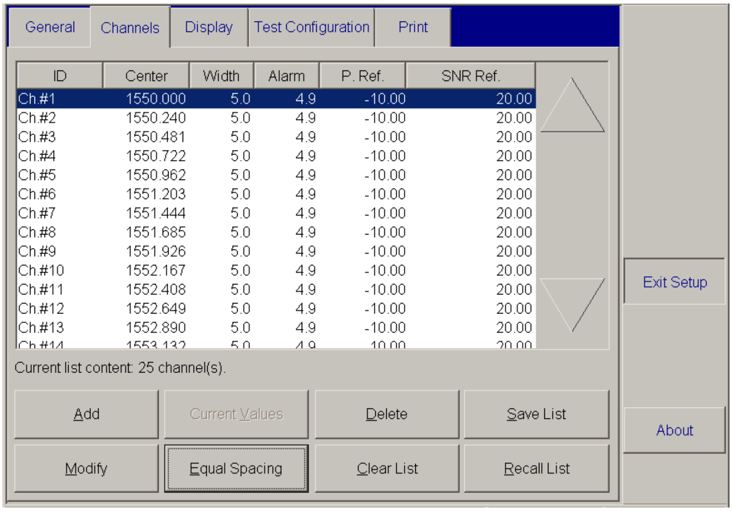
7. Click on **OK**. The window disappears and you return to the **Channels** tab where the channel list now displays the newly modified data.

Deleting Channels

When your DWDM system is modified to reduce the number of channels on a fiber or to accept a different ITU grid, it is easy to delete existing channels.

To delete a channel:

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



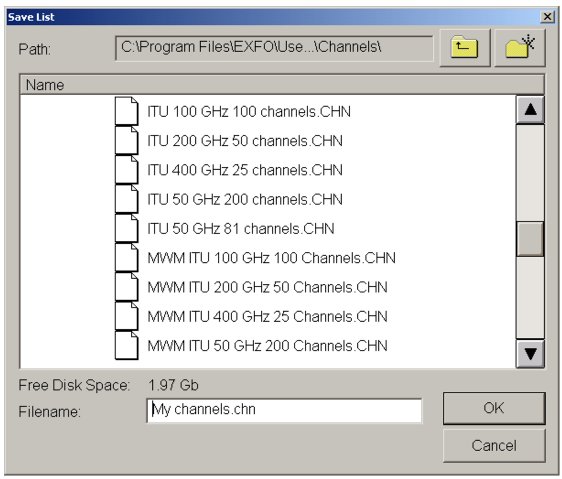
3. Select the channel to be deleted from the channel list and click on **Delete**. A confirmation window appears.
4. Click on **Yes** to delete the selected channel and return to the **Channels** tab. Click on **No** to return to the **Channels** tab without deleting the selected channel.

Saving a Channel List

Once you have created or modified a channel list, you can save it for the next time you test the same fiber.

To save a channel list:

1. Ensure that a channel list appears on the **Channels** page.
2. Click on **Save List**.



3. Enter a self-explanatory filename for the channel list or scroll up and down the list with the arrows to select the file you want to overwrite.
4. Click on **OK**. The channel list is saved and you return to the channel list.

   If the name already exists, a warning message will appear, asking you if you want to overwrite the file. To do so, click on **Yes**. To rename the file, click on **No**. To cancel the operation, click on **Cancel**.

Recalling a Channel List

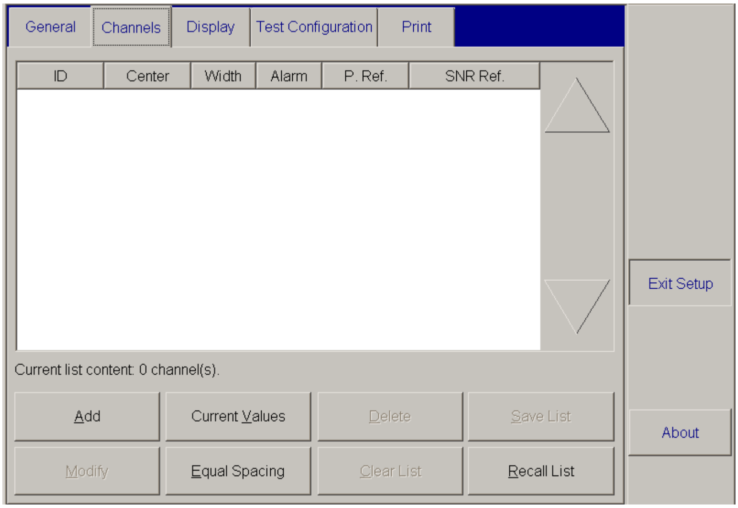
When you retest a specific fiber for which you have already configured a channel list, you can recall it instead of configuring it again.

Note: *If an unsaved channel list already appears in the* Channels *page, you will be prompted to save the displayed list before recalling an existing channel list.*

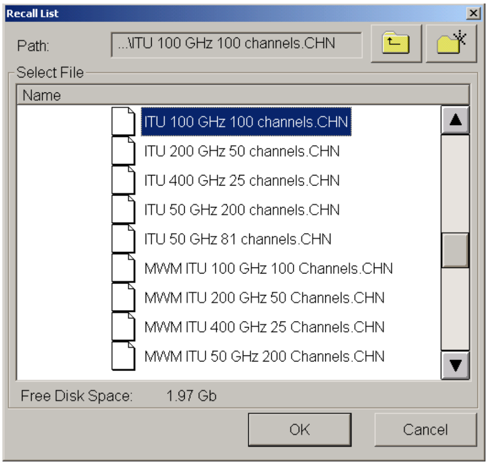
To recall a channel list:

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

2. Select the **Channels** tab.



3. Click on **Recall List**.



4. Find and select the channel list file.

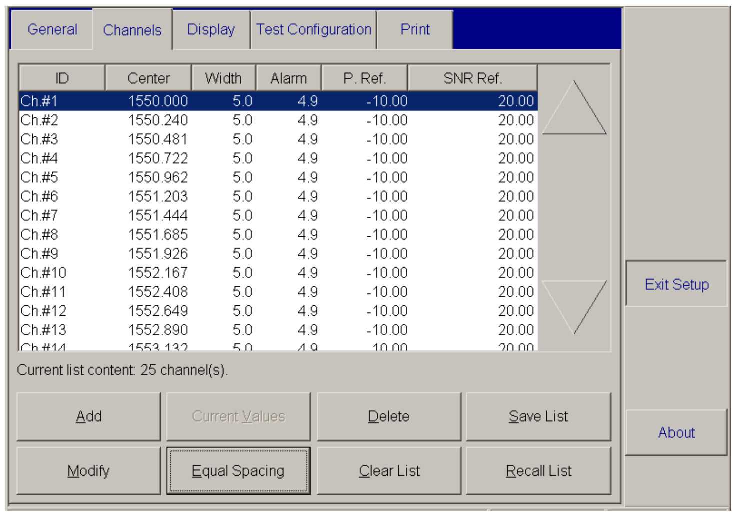
5. Click on **OK**. The window disappears and you return to the **Channels** tab where the channel list now appears.

Clearing the Channel List

You might need to clear the channel list to start a new test.

To clear the channel list:

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



3. Click on **Clear List**. A confirmation dialog box appears.
4. To clear the entire list, click on **Yes**. You return to the **Channels** tab and the list is empty. To return to the channel list without clearing the list, click on **No**. For more information on deleting a single channel, see *Deleting Channels* on page 57.

6 Testing DWDM Systems in Normal or Drift Mode

Optical spetrum 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.

A wavelength-selective passive component is an optical filter displaying high loss at some wavelengths and low loss at others. Consequently, many of the tests performed on these devices determine optical loss as a function of wavelength.

Selecting and Configuring a Test Control Mode

Your optical spectrum analyzer gives you different ways to test all your DWDM systems. To select test methods, you must first choose a test control mode.

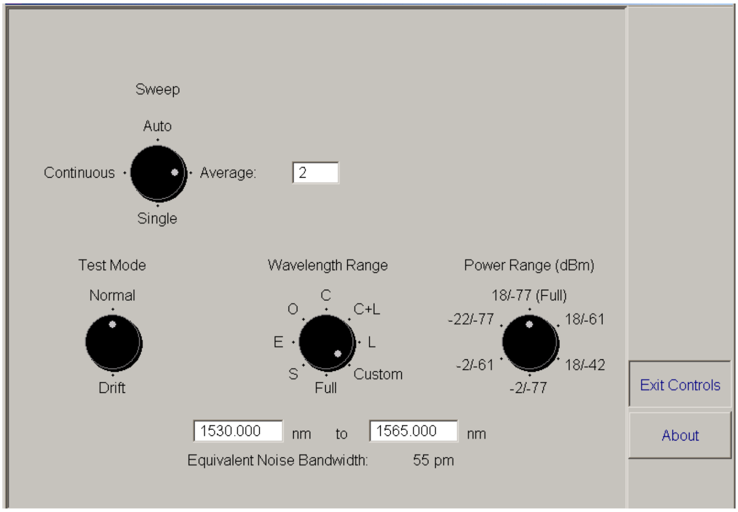
Note: *Changes set in the **Control** window will only take effect with subsequent acquisitions.*

Your OSA provides two different test control modes. These modes allow you to obtain specific data.

- **Normal** (default): allows you to sweep across the channel spectrum.
- **Drift**: allows you to measure variations over time for every channel on a fiber.

To select a test mode:

1. From the main window, click on **Controls**.



2. Click on the desired test control mode with the **Test Mode** dial.

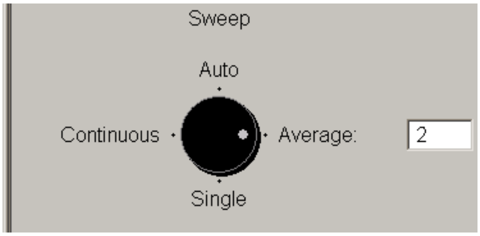
Note: *If you have previously made a wavelength calibration as explained in* Performing a Wavelength Calibration *on page 23, you will notice the mention* ***User-Calibrated Module*** *in the upper right-hand corner of the Control window.*

Once you have selected a test control mode, you must configure it. You will find the instructions in *Configuring Normal Mode* on page 65 and *Configuring Drift Mode* on page 66.

Configuring Normal Mode

In Normal mode, you can perform measurements on various optical spectrum parameters.

When you select Normal mode (for more information about selecting a test control mode, see *Selecting and Configuring a Test Control Mode* on page 63) the following dial appears on the top part of the **Controls** window. With this dial, select the type of sweep you want to perform when acquiring spectrum data.



- **Auto**: Spectrum measurements are performed with eight sweeps, on which the average is based. This is the default sweep mode.
- **Average**: Spectrum measurements are performed based on the number of sweeps you have entered in the text field. 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 on **Stop**. They will be averaged by the number of required acquisitions needed to cover the selected range. The results are refreshed after each acquisition.

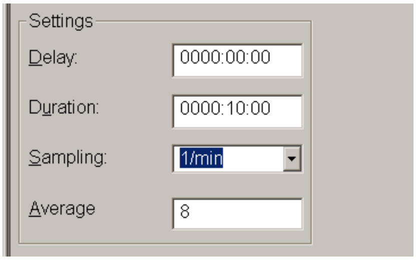
Click on **Exit Controls**. You are ready to start acquiring traces. For more information, see *Measuring DWDM System Performance* on page 70.

Configuring Drift Mode

In Drift mode, you can measure variations over time in a channel spectrum.

Note: *You must already have defined channels in order to perform drift monitoring. For more information, see* Managing Channels and Channel Lists *on page 43.*

When you select the Drift mode (for more information about selecting a test control mode, see *Selecting and Configuring a Test Control Mode* on page 63), the following section appears on the top part of the **Controls** window. From this section, you can configure the various parameters offered in Drift mode.



- **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. By default, the duration is set to 10 minutes.
- **Sampling**: Select the appropriate sampling rate. This value determines the frequency of the sweeps. The default value is 1/min.
- **Average**: Enter the number of sweeps (between 1 and 99) upon which you want to average the measurement results. The default value is 1 (no averaging).

Note: *Remember that the amount of data stored will increase according to the* Duration *and* Sampling *settings. Larger files can affect loading and saving performances. EXFO also recommends using faster sampling rates for short durations only, as the same performance issues apply.*

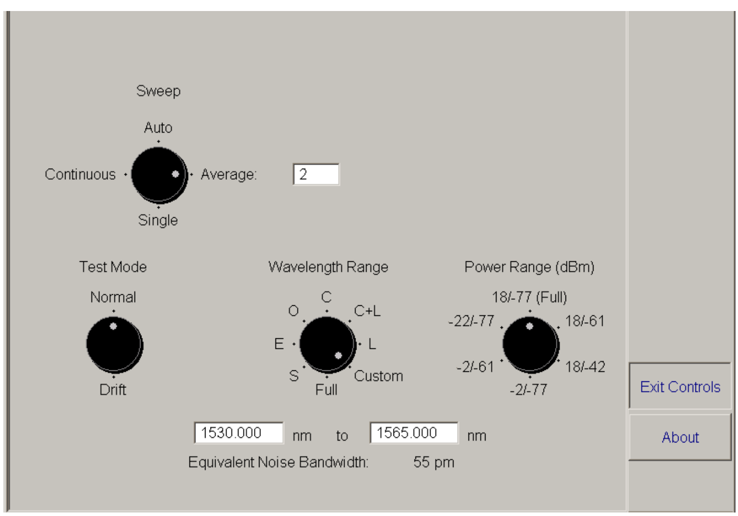
Click on **Exit Controls**. You return to the main window and are ready to start acquiring spectrum traces. For more information, see *Measuring DWDM System Performance* on page 70.

Selecting the Wavelength or Frequency Range

Before performing measurements on an optical spectrum, you must select the wavelength or frequency range to use, depending on which units you are working with.

To select the wavelength or frequency range:

1. From the main window, click on **Controls**.



2. Select the range with the **Wavelength/Frequency Range** dial. The name of the dial will change according to the selected units (see *Setting the Spectral Units* on page 35 for more details).

- **Full**: This selection uses the OSA's entire range (from 1250 nm to 1625 nm, or 239.8340 THz to 181.6924 THz).
- **S**: The S-band stands for Short band and ranges from 1460 nm to 1530 nm or 205.3373 THz to 195.9428 THz.
- **E**: The E stands for Extended band and ranges from 1360 nm to 1460 nm or 220.4356 THz to 205.3373 THz.
- **O**: The O stands for Original band and ranges from 1260 nm to 1360 nm or 237.9305 THz to 220.4356 THz.
- **C**: The C-band stands for Conventional band and ranges from 1530 nm to 1565 nm or 195.9428 THz to 191.5607 THz.
- **C+L**: This selection combines both Conventional and Long bands.
- **L**: The L-band stands for Long band and ranges from 1565 nm to 1625 nm or 191.5607 THz to 184.4877 THz.
- **Custom**: This selection allows you to define a range.

Note: *With some selections, namely the **Full** range, the accuracy obtained may be compromised.*

When the current selection does not give optimum accuracy, you will be notified by a message appearing on the lower part of your screen.

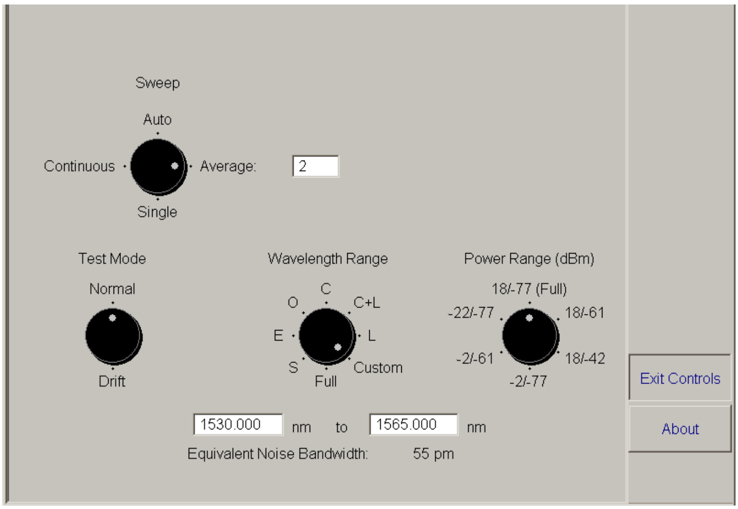
3. Once you have selected the wavelength range, click on **Exit Controls** to return to the main window.

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 on **Controls**.



2. Select the allowable power input with the **Power Range (dBm)** dial.
3. Once you have selected the power range, click on **Exit Controls** to return to the main window.

Measuring DWDM System Performance

When measuring DWDM system performance, you expect to gather a certain amount of meaningful data. This data can be one of the following:

➤ the number of channels present on your fiber

➤ the channels' frequency/central wavelength

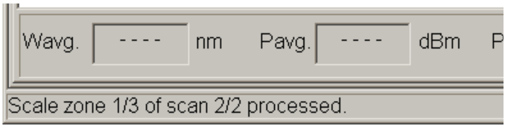
➤ the comparison between what your channels' central wavelength, power and signal-to-noise ratio should be and what they are in reality

The OSA gives you access to this data quickly and easily.

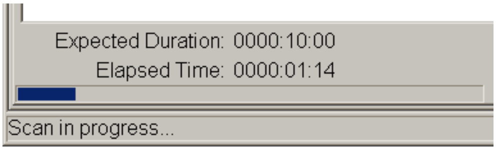
To test a DWDM system:

1. Select and configure the test control mode as explained in *Selecting and Configuring a Test Control Mode* on page 63.
2. Select the desired wavelength range and allowable power input as explained in *Selecting the Wavelength or Frequency Range* on page 67 and *Selecting the Power Range* on page 69.
3. Go to the **Trace** tab to select where you want to display the acquired trace. You can do this by directly clicking on the corresponding tab, or by using the active trace selection button as explained in *Selecting the Active Trace* on page 33.
4. Connect your system's fiber to the OSA input port.
5. From the main window in the test application, click on **Start**. The button reads **Stop** and the test begins according to your configuration. The **Trace** display is updated at every sweep. Once the test is complete, the final trace is displayed and the detailed results appear in the **Results** tab.

If you are performing a Normal mode scan, you will notice a progress indicator on the lower left part of the window. This indicator will help you see the progress of your test.



If you are performing a Drift mode scan, you will notice a progress bar 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.



Note: *Once this channel data has been acquired, you can use it to create a list of channels. For more information, see* Creating a Channel List with Current Acquisition Values *on page 51.*

6. If desired, save the trace as explained in *Storing a Trace File* on page 121.

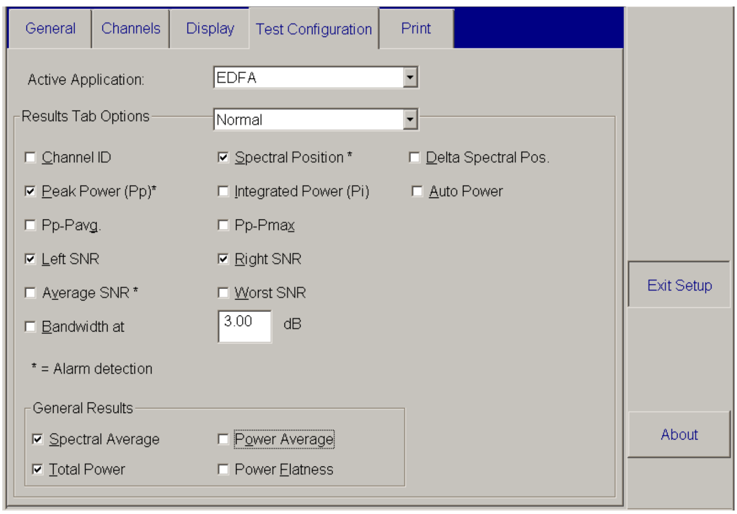
Customizing and Viewing Normal Test Mode Results

It is possible to select which results you would like displayed in the **Results** tab of your Normal mode test.

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

To customize Normal test results:

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



3. Select **Normal** in the **Result Tab Options** list.

4. Check five out of the twelve available items according to the information you need.

➤ **Channel ID**: indicates the channel ID of the matching channel in the channel list.

➤ **Spectral/Frequency Position**: indicates the spectral or frequency position.

➤ **Delta Spectral Pos.**: indicates the spectral position delta for each channel.

➤ **Peak Power (Pp)**: indicates the peak power.

➤ **Integrated Power (Pi)**: indicates the integrated power. Integrated power is the sum of the power values included between the channel's automatically detected boundaries.

In some cases, for instance CATV signals, signals with high frequency modulation, or signals with an inherent linewidth greater than one tenth of the OSA's resolution bandwidth, this calculation of power becomes a better estimation of the true channel power.

➤ **Auto Power (Pauto)**: indicates the automatic power (the software will choose the best value between Pp and Pi).

➤ **P–Pavg**: indicates the current channel's peak power (Pp) minus the average of peak powers (Pavg) of all the detected channels.

➤ **P–Pmax**: indicates the current channel's peak power (Pp) minus the most powerful detected channel’s peak power.

➤ **Bandwidth at *.****: indicates the bandwidth of the channel at a dB value that you can adjust in the corresponding field.

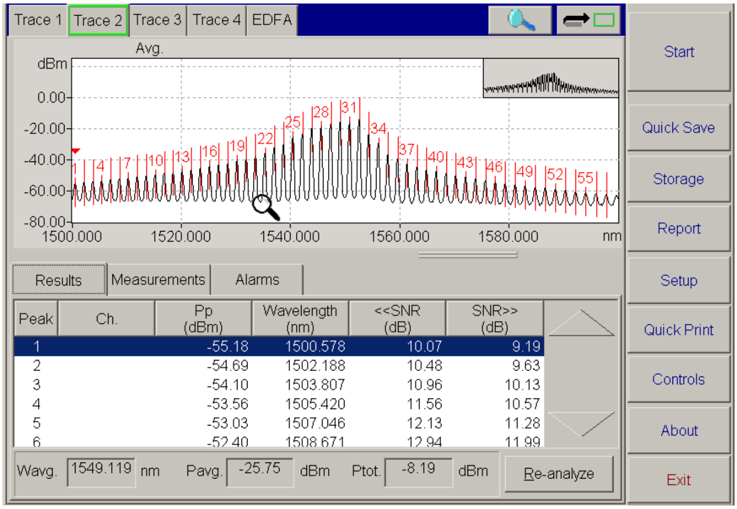
- **Left SNR**: indicates the SNR to the left of the signal.
- **Right SNR**: indicates the SNR to the right of the signal.
- **Average SNR**: indicates the average SNR calculated using the left and right SNR.
- **Worst SNR**: indicates the worst SNR of the signal to the left and right of the channel.

Note: *You can change the SNR settings as instructed in* Setting the Signal-to-Noise Ratio Parameters *on page 37.*

Once you have checked five items, the remaining items become grayed out. You must deselect an item to choose another, since you can see only five items at a time on the results page.

5. If desired, you can also select up to three out of the four global result types in order to display them.
   - **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. Click on **Exit Setup**. You return to the main window.

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



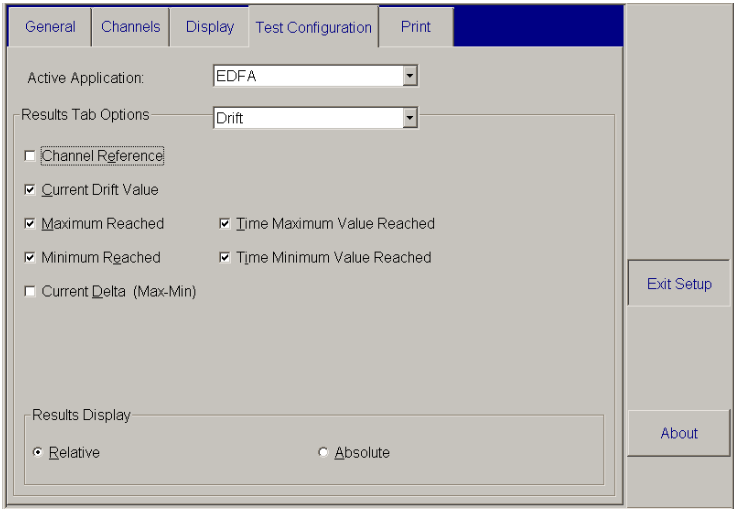
To scroll the channel list, you can use the up and down arrow buttons. You can also press the up and down keyboard arrow keys.

To perform manual measurements on your results, use the markers as explained in *Performing Manual Measurements on Your Test Results* on page 12.

Customizing and Viewing Drift Mode Test Results

To customize Drift test results:

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



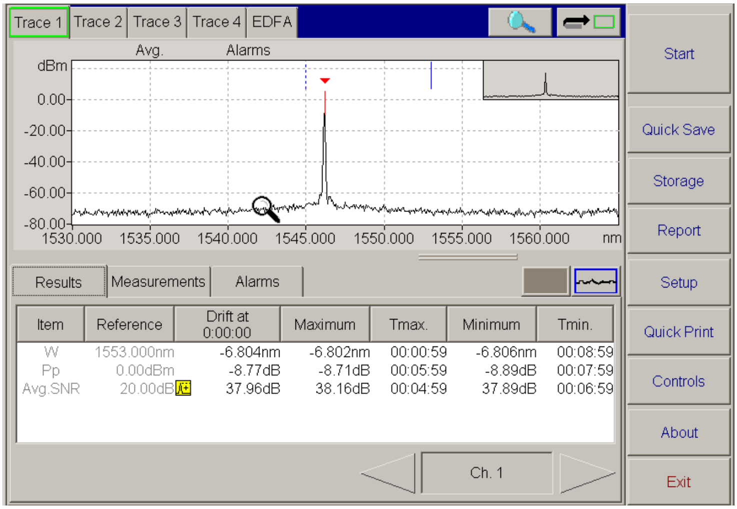
3. Select **Drift** in the **Result Tab Options** list.
4. Check six out of the seven available items according to the information you need.
   - **Channel Reference**: indicates the channel reference value for your drift.
   - **Current Drift Value**: indicates the current drift value (you will see **Drift at [time]** in the **Results** tab).
   - **Maximum Reached**: indicates the maximum wavelength or frequency value reached during the drift according to your choice of units.

- **Minimum Reached**: indicates the minimum wavelength or frequency value reached during the drift according to your choice of units.
- **Current Delta (Max. - Min.)**: indicates the current delta (maximum value minus minimum value) for the channel.
- **Time of Maximum Value**: indicates the time of the drift at which the channel was at its highest value.
- **Time of Minimum Value**: indicates the time of the drift at which the channel was at its lowest value.

Once you have checked six items, the remaining items become grayed out. You must deselect an item to choose another, since you can see only six items at a time on the results page.

5. Select if you want the results to be absolute or relative to the reference.
   - Absolute results will always give you the result value (e.g. The reference value 1514.684 nm becomes 1514.693 after five minutes of drifting).
   - Relative results will always give you the variation value (e.g. The reference 1514.694 nm had a variation of -0.011 nm after five minutes of drifting).
6. Click on **Exit Setup**. You return to the main window.

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

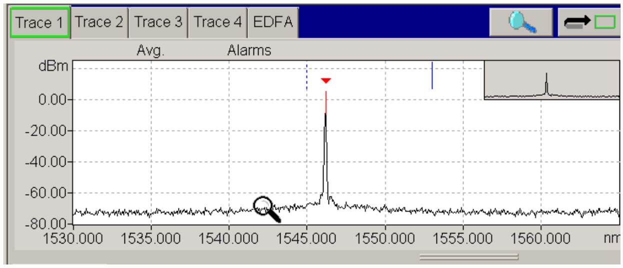


To scroll the channel list, you can use the right and left arrow buttons.

To perform manual measurements on your results, use the markers as explained in *Performing Manual Measurements on Your Test Results* on page 12.

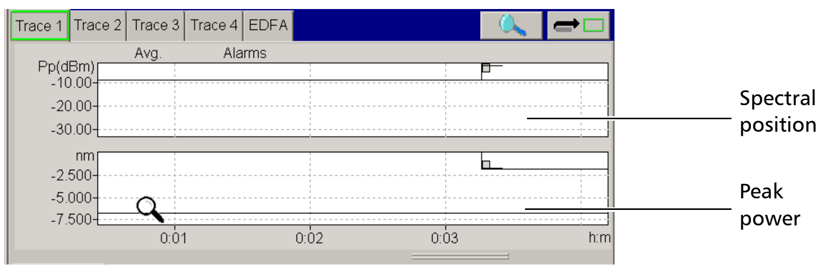
Once channel drift (wavelength and power) has been measured over a certain period of time, you can view test results in the **Results** tab, but you can also see them in the trace display.

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 situation, the **Trace Toggle** buttons look like this:

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

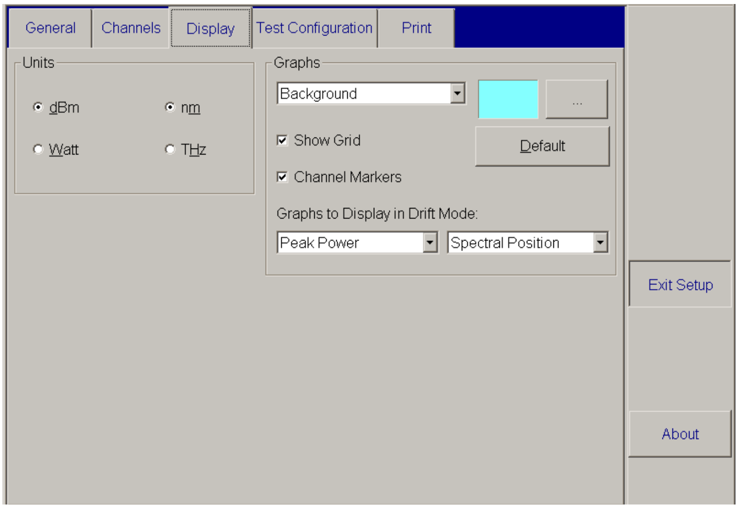


In this situation, the **Trace Toggle** buttons look like this:

You can only view two out of the three traces at a same time.

To select which traces to view:

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

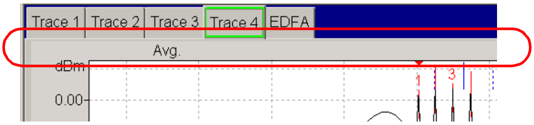


3. In the **Graphs** panel, use the pull-down **Graphs to display in Drift mode** menus to select which graphs to view in the trace display.

   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.

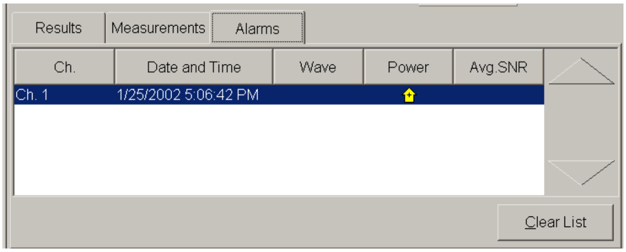


Note: *If an alarm occurs during the acquisition, a symbol will appear next to the faulty value, allowing you to quickly pinpoint the alarms.*

When you select 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 the wavelength, power, as well as the average 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 on **Clear List**. The list of alarms will be permanently deleted until you make a new acquisition.

Re-Analyzing the Current Trace

If you press on the **Re-analyze** button located under the arrow buttons of the **Results** tab, the system will launch a new analysis of the trace you have acquired. This function is useful to apply changes made in the **General** tab of the **Setup** window. The changes will apply to the selected trace only.

7 Testing Distributed-Feedback Lasers

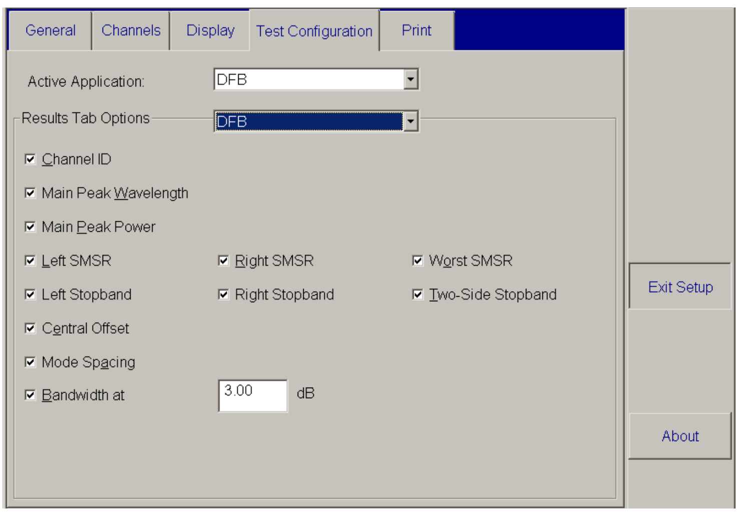
You can specifically test distributed-feedback (DFB) lasers with your OSA.

Selecting the DFB Laser Application

Your optical spectrum analyzer allows you to select different applications to test.

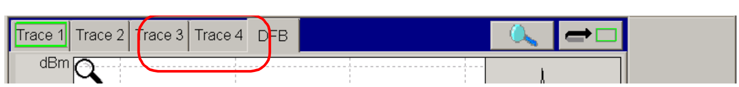
To select the DFB laser application:

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



3. In the **Active Application** list, select **DFB**.

Once you return to the main window by clicking on **Exit Setup**, you will notice that the tab next to the four traces changes according to the active application.



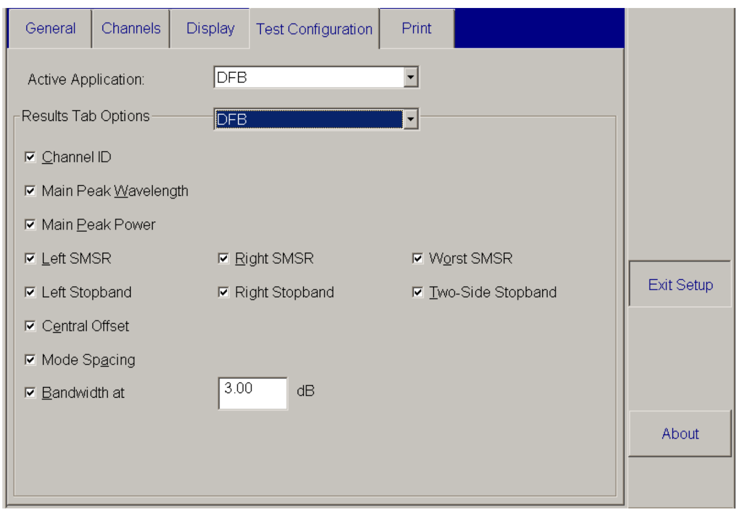
Customizing and Viewing DFB Laser Test Results

It is possible to select which results you would like displayed in the **Results** tab of the **DFB** test tab.

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

To customize the DFB Laser test result display:

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



3. Select **DFB** in the **Result Tab Options** list.

4. Check one or more of the available items according to the information you need.

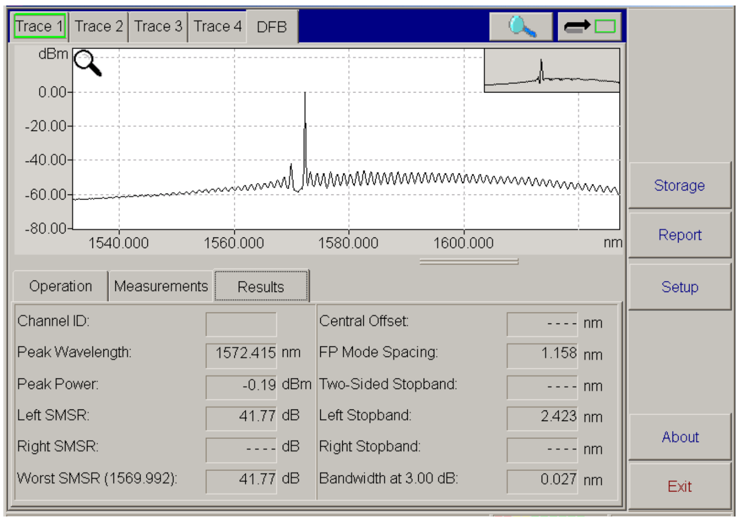
- **Channel ID**: indicates the channel ID.
- **Main Peak Wavelength**: indicates the wavelength of the main mode (the largest peak) in the trace.
- **Main Peak Power**: indicates the power of the main mode (the largest peak) in the trace.
- **Left SMSR**: indicates the difference in power between the main mode and the first sidemode adjacent to the main mode on the left side.
- **Right SMSR**: indicates the difference in power between the main mode and the first sidemode adjacent to the main mode on the right side.
- **Worst SMSR**: indicates the difference in power between the main mode and the most powerful sidemode. The wavelength where the sidemode is located is indicated between parentheses.
- **Central Offset**: indicates the wavelength of the main mode minus the mean of the wavelength of the left and right closest 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 peak wavelength.
- **Two-Side Stopband**: indicates the difference in wavelength between the left and the right closest sidemodes adjacent to the main mode.
- **Left Stopband**: indicates the difference in wavelength between the main mode and the closest sidemode on the left side.

➤ **Right Stopband**: indicates the difference in wavelength between the main mode and the closest sidemode on the right side.

➤ **Bandwidth at *.****: indicates the bandwidth of the main mode peak at *.** dB relative to the DFB peak power.

5. Click on **Exit Setup**. You return to the main window.

If you click on the **DFB** tab once in the main window, the **Results** tab appears with the data you have selected from the **Test Configuration** tab.

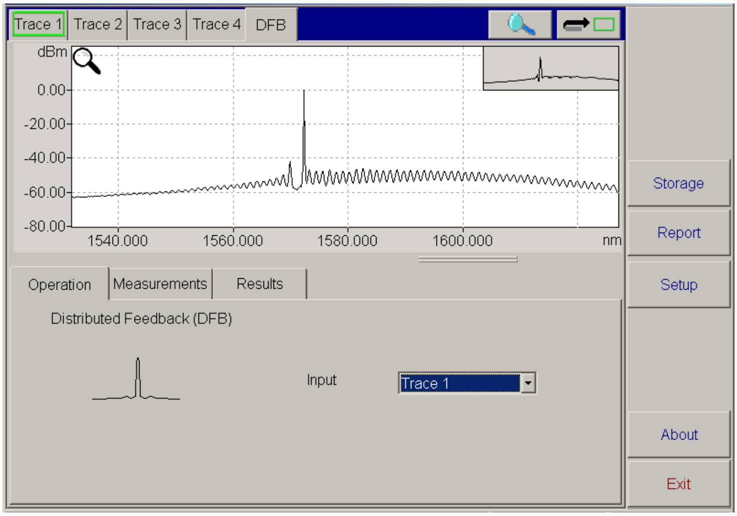


Testing DFB Lasers

Testing DFB lasers is a very simple procedure.

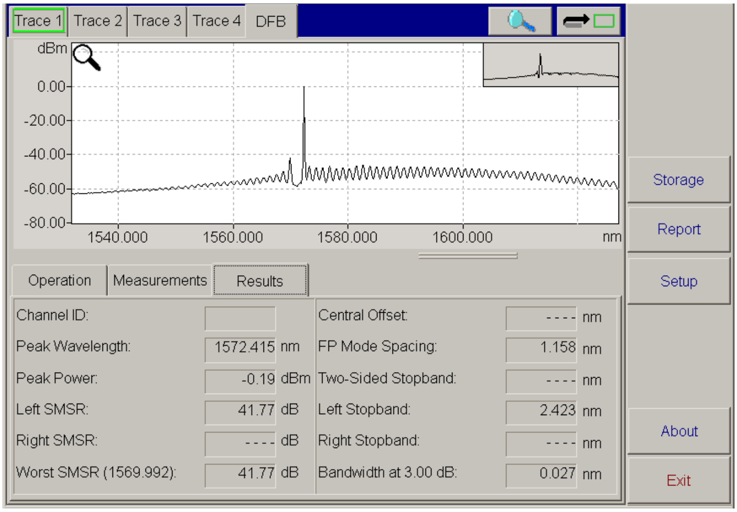
To test DFB lasers:

1. Configure your OSA module in the **Controls** window. For more information, see *Selecting and Configuring a Test Control Mode* on page 63.
2. Connect your source to the OSA input port.
3. From the main window in the test application, click on **Start**. The button reads **Stop** and the test starts according to your configuration. The Trace display is updated at every sweep. Once the test is complete, the final trace is displayed.
4. Click on the **DFB** tab to go into component testing.



5. From the pull-down menu of the **Operation** tab, select the trace in which you have recalled or acquired a DFB trace.

6. Click on the **Results** tab. The corresponding page appears after the system has computed the distributed-feedback characteristics and shows the test results.



To perform manual measurements on your results, use the markers as explained in *Performing Manual Measurements on Your Test Results* on page 12.

8 Testing Erbium-Doped Fiber Amplifiers

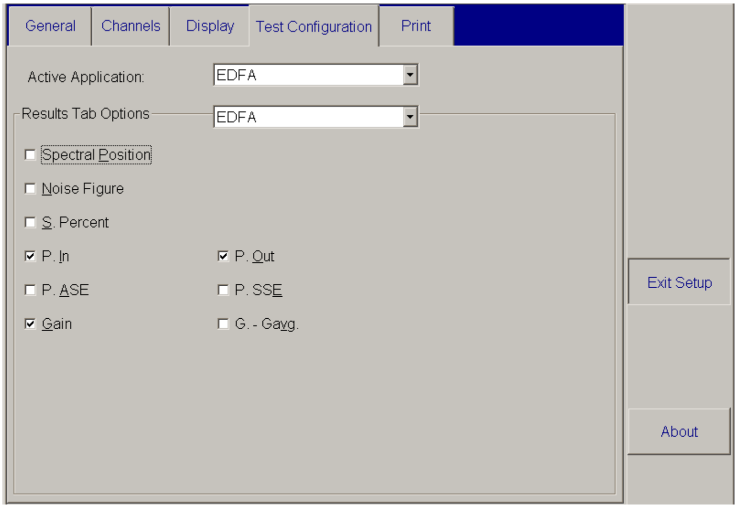
You can specifically test erbium-doped fiber amplifiers (EDFA) with your OSA.

Selecting the EDFA Application

Your OSA allows you to select different applications to test.

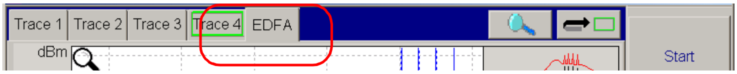
To select the EDFA application:

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



3. In the **Active Application** list, select **EDFA**.

Once you return to the main window by clicking on **Exit Setup**, you will notice that the tab next to the four traces changes according to the active application.



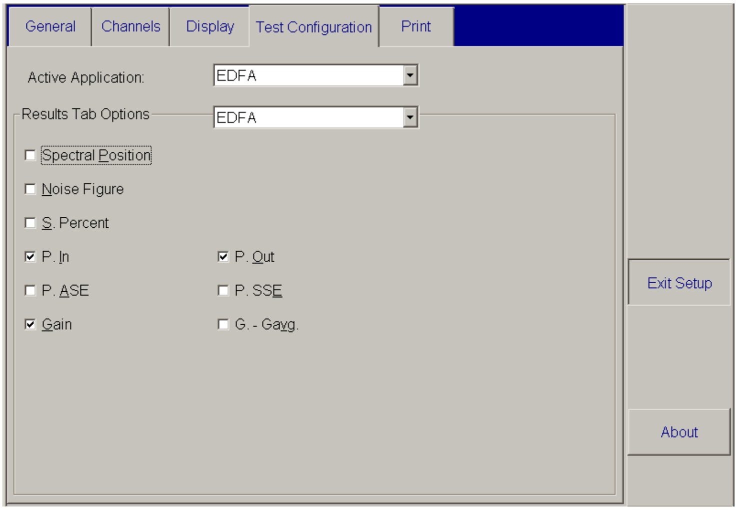
Customizing and Viewing EDFA Test Results

It is possible to select which results you would like displayed in the **Results** tab of the **EDFA** test tab.

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 on **Setup**.
2. Click on the **Test Configuration** tab.



3. Select **EDFA** in the **Result Tab Options** list.

4. Check five out of the ten available items according to the information you need.

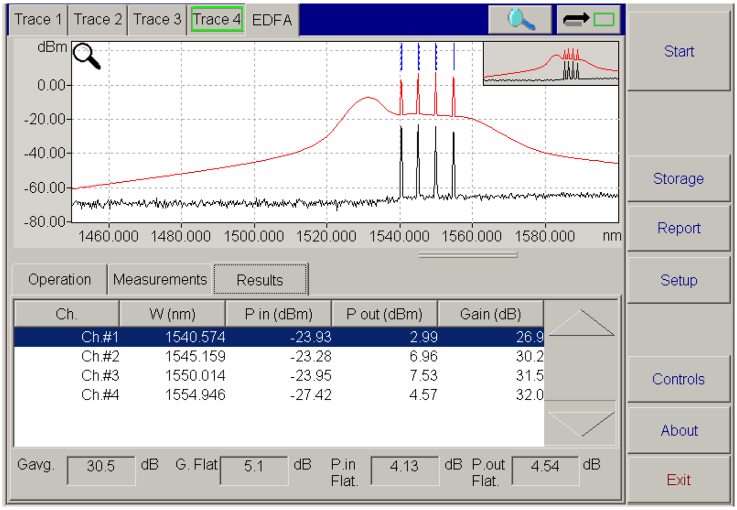
    - **Spectral/Frequency Position**: indicates the spectral or frequency position of the corresponding channel from the channel list.
    - **Noise Figure**: indicates the EDFA's noise figure measured in each channel.
    - **S. Percent**: indicates the current output power according to the measured output power *(P.OUT/[P.OUT + P.ASE])*.
    - **P. In**: indicates the input power measured just *before* the EDFA's input port.
    - **P. Out**: indicates the output power measured just *after* the EDFA's 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 407.*

Once you have checked five items, the remaining items become grayed out. You must deselect an item to choose another.

5. Click on **Exit Setup**. You return to the main window.

If you click on the **EDFA** tab once in the main window, the **Results** tab appears with the data you have selected from the **Test Configuration** tab.



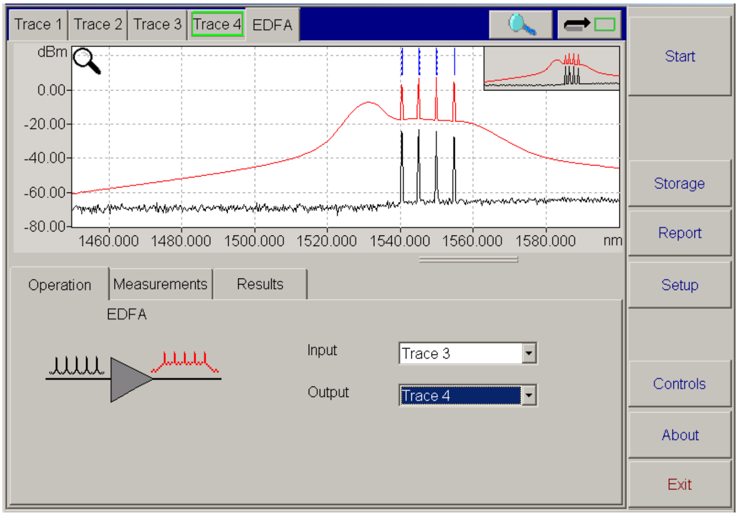
To scroll the channel list, you can use the up and down arrow buttons. You can also press the up and down keyboard arrow keys.

Testing EDFAs

Testing erbium-doped fiber amplifiers is a very simple procedure.

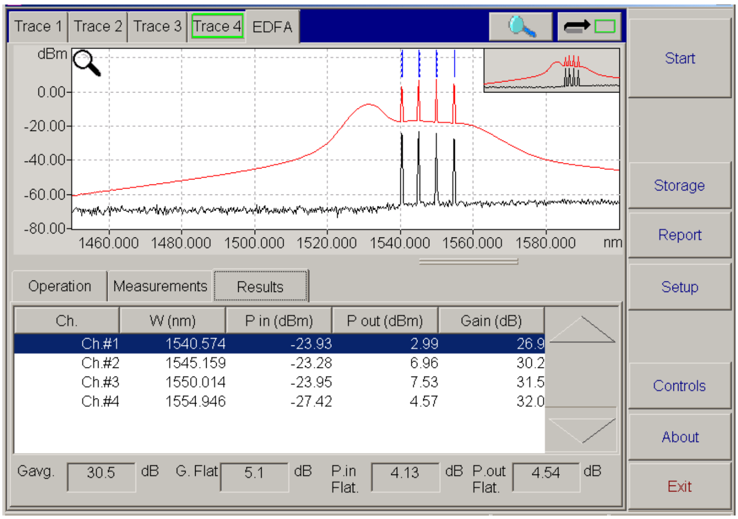
To test EDFAs:

1. Define a channel list. For more information, see *Managing Channels and Channel Lists* on page 43.
2. From one of the trace tabs (**Trace 1**, for example), perform a simple acquisition just *before* the EDFA's input port. For more information, see *Testing DWDM Systems in Normal or Drift Mode* on page 63. You can also recall a trace previously acquired before the EDFA's input port.
3. From a different trace tab (**Trace 2**, for example), perform an acquisition just *after* the EDFA's output port. For more information, see *Testing DWDM Systems in Normal or Drift Mode* on page 63. You can also recall a trace acquired after the EDFA's output port.
4. Click on the **EDFA** tab to go into component testing.



5. From the **Input** list box in the **Operation** tab, select the trace tab where the trace acquired *before* the input port is displayed (in this case, Trace 1). The selected trace appears in the display.

6. From the **Output** list box in the **Operation** tab, select the trace tab where the trace acquired *after* the output port is displayed (in this case, Trace 2).



7. Click on the **Results** tab to show the EDFA test results.

Note: *The alarms will be detected from the wavelength (spectral position), Peak Power, and Average SNR values.*

Four global results will be displayed in addition to the items you have selected:

- **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.

To perform manual measurements on your results, use the markers as explained in *Performing Manual Measurements on Your Test Results* on page 12.

9 Testing Spectral Transmittance

The spectral transmittance is the part of a spectrum passing through a DUT without being lost. This version of the software allows you to test it quickly and easily.

This feature on your OSA module allows you to characterize power transmission of passive WDM components as a function of wavelength.

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

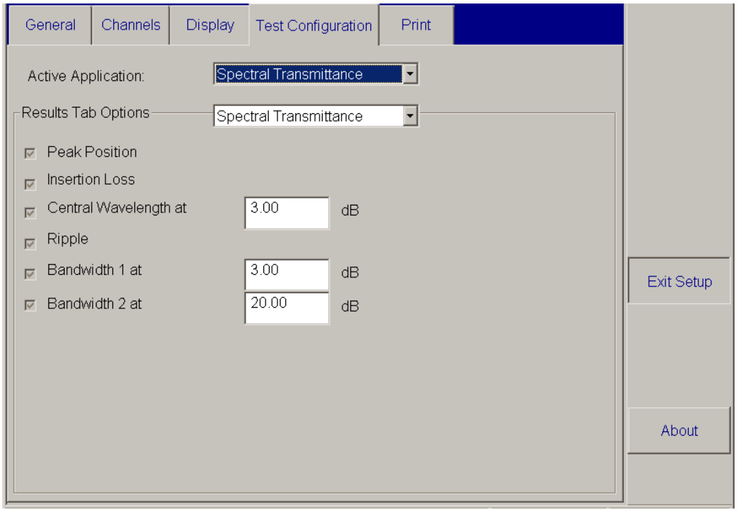
The spectral transmittance application would compare the input and output traces to yield the transmittance result, along with the most common DUT characteristics (insertion loss, bandwidth, etc.).

Selecting the Spectral Transmittance Application

Your optical spectrum analyzer allows you to select different applications to test.

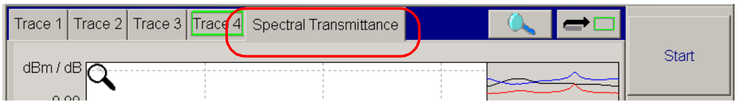
To select the Spectral Transmittance application:

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



3. In the **Active Application** list, select **Spectral Transmittance**.

Once you return to the main window by clicking on **Exit Setup**, you will notice that the tab next to the four traces will change according to the active application.



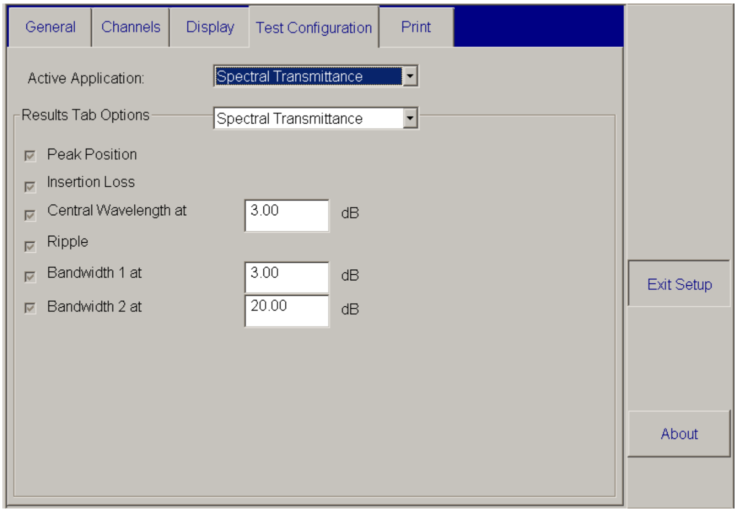
Viewing Spectral Transmittance Test Results

You can view your results after performing a spectral transmittance test.

To view your spectral transmittance results:

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

2. Click on the **Test Configuration** tab.



3. Select **Spectral Transmittance** in the **Result Tab Options** list.

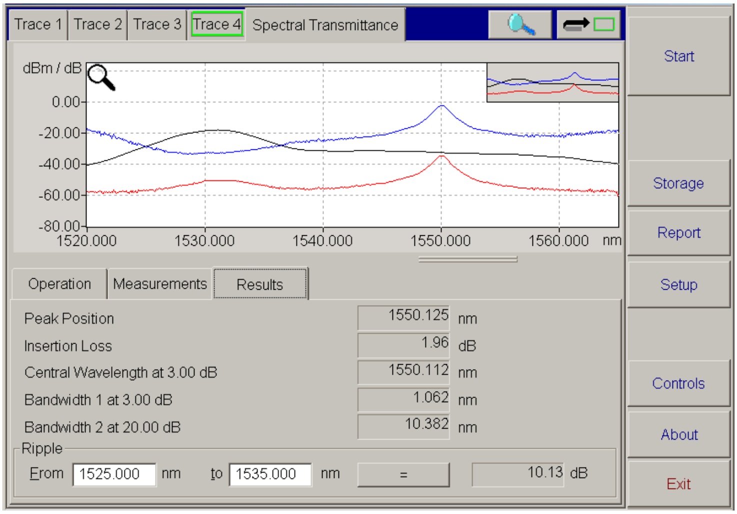
Note: *Since it is possible to see all items in the **Results** tab, you cannot deselect items. You can, however, change the figures in the* Central Wavelength at, Bandwidth 1 at, *and* Bandwidth 2 at *fields.*

- **Peak Position**: indicates the peak position.
- **Insertion Loss**: indicates the insertion loss.
- **Central Wavelength at *.****: indicates the central wavelength at a dB value that you can adjust from the **Test Configuration** tab.

- **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 that you can adjust from the **Test Configuration** tab.
- **Bandwidth 2 at **.****: indicates the second bandwidth at a dB value that you can adjust from the **Test Configuration** tab.

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

If you click on **Results** in the **Spectral Transmittance** tab, you will see the data set in the **Test Configuration** tab.

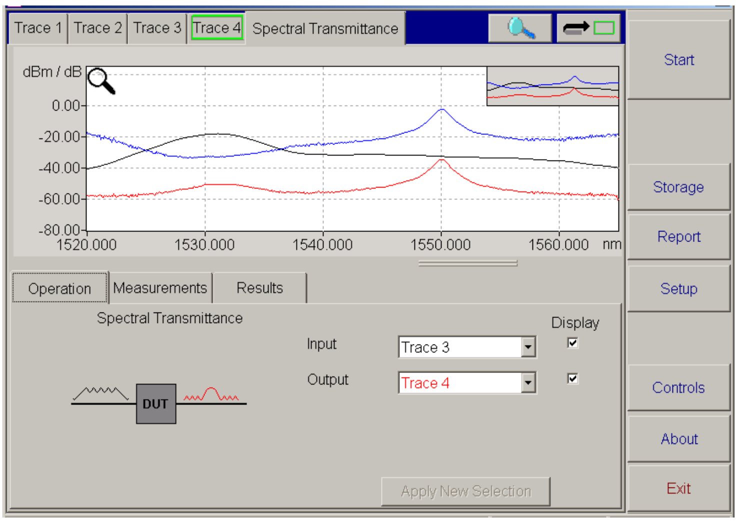


Testing Spectral Transmittance

Testing spectral transmittance is a very simple procedure.

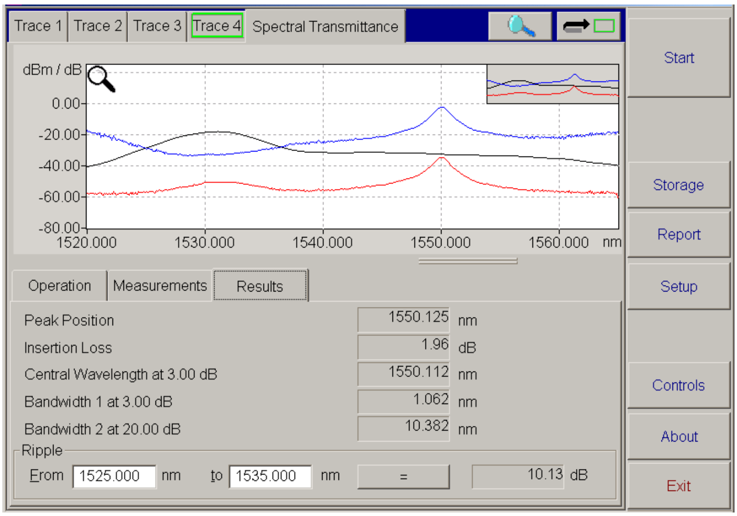
To test spectral transmittance:

1. From one of the trace tabs (**Trace 1**, for example), perform a simple acquisition of your DUT's input. For more information, see *Testing DWDM Systems in Normal or Drift Mode* on page 63. You can also recall an acquired trace of the DUT's input.
2. From a different trace tab (**Trace 2**, for example), perform an acquisition of your DUT's output. For more information, see *Testing DWDM Systems in Normal or Drift Mode* on page 63. You can also recall an acquired trace of the DUT's output.
3. Click on the **Spectral Transmittance** tab to go into component testing.



4. From the **Input** list box, select the tab where the trace of the DUT's input port is displayed (in this case, Trace 2).
5. From the **Output** list box, select the trace tab where the trace of the DUT's output port is displayed (in this case, Trace 3).

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



6. Click on the **Results** tab. After the system has computed the spectral transmittance, it will show the test results. If you want to use another trace in the **Input** or **Output** fields, return to the **Operation** tab, select the new trace, then click on **Apply New Selection**.

To calculate the Ripple, select the wavelengths to and from which the measurement will be taken. Then, click on =. The result will appear when the analysis is complete.

To perform manual measurements on your results, use the markers as explained in *Performing Manual Measurements on Your Test Results* on page 12.

10 Performing a Spectral Analysis

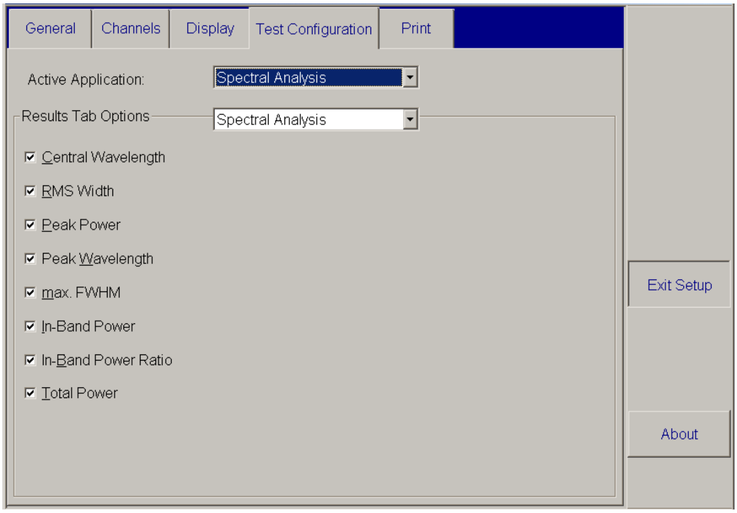
You can specifically perform spectral analyses with your optical spectrum analyzer.

Selecting the Spectral Analysis Application

Your optical spectrum analyzer allows you to select different applications to test.

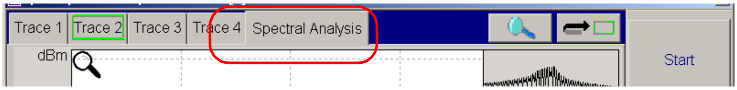
To select the Spectral Analysis application:

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



3. In the **Active Application** list, select **Spectral Analysis**.

Once you return to the main window by clicking on **Exit Setup**, you will notice that the tab next to the four traces will change according to the active application.



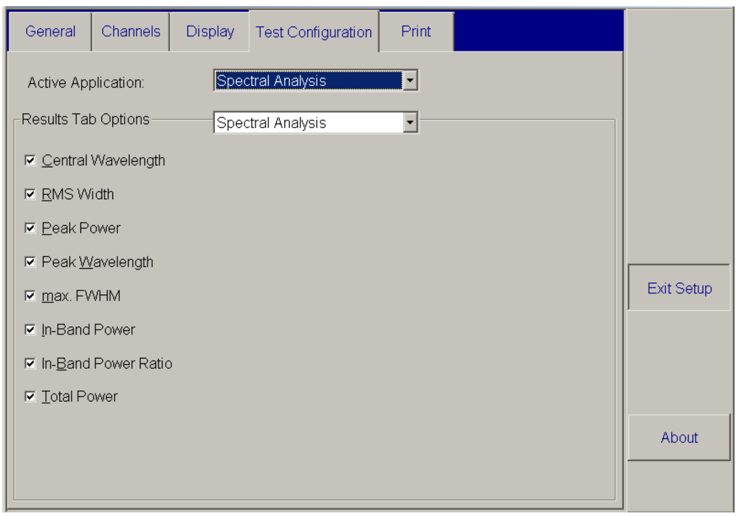
Customizing and Viewing Spectral Analysis Test Results

It is possible to select which results you would like displayed in the **Results** tab of the **Spectral Analysis** test tab.

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 on **Setup**.
2. Click on the **Test Configuration** tab.



3. Select **Spectral Analysis** in the **Result Tab Options** list.

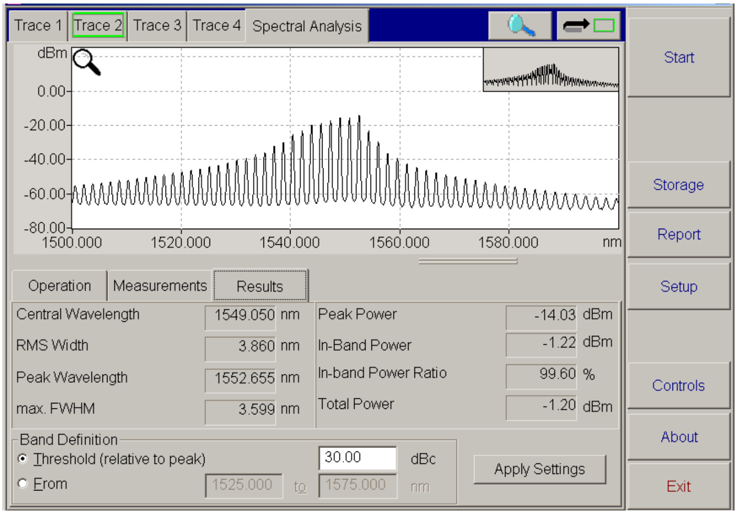
4. Check the items you want to view.

- **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 test in* Formulas Used with Your Optical Spectrum Analyzer *on page 407.*

5. Click on **Exit Setup**. You return to the main window.

If you click on the **Spectral Analysis** tab once in the main window, the **Results** tab appears with the data you have selected from the **Test Configuration** tab.



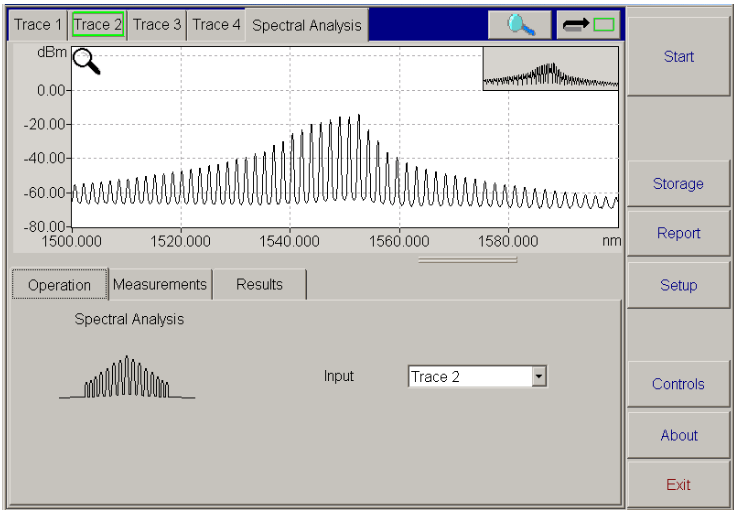
Performing a Spectral Analysis

Performing a spectral analysis is a very simple procedure.

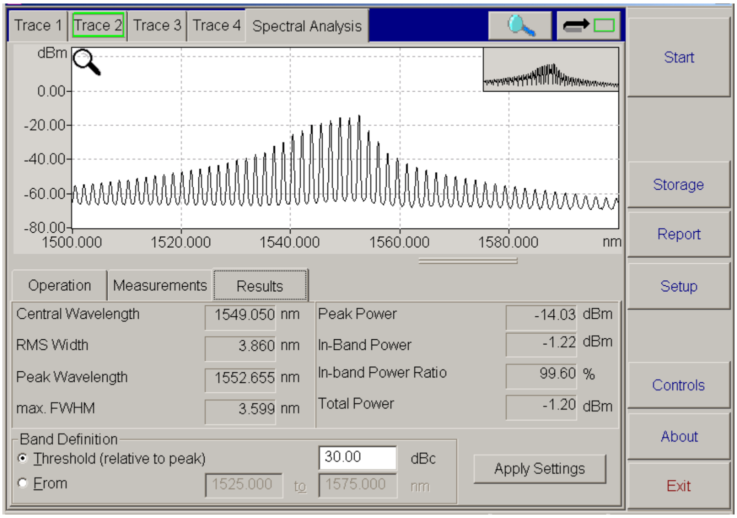
To perform a spectral analysis:

1. From one of the trace tabs (**Trace 1**, for example), perform an acquisition with the unit you want to test. You can also recall a trace.

2. Click on the **Spectral Analysis** tab to go into component testing.



3. From the **Input** list box in the **Operation** tab, select the trace tab where the trace is displayed. It will appear in the display.



4. Click on the **Results** tab to show the spectral analysis test results.

5. If desired, modify the band definition on the lower part of the window. You can select a power threshold relative to the peak, or set a wavelength range by selecting the corresponding radio button. The fields to the right will become available accordingly. To apply your changes, click on **Apply Settings**.

Note: *The absolute and relative threshold of the* ***General*** *tab of* ***Setup*** *window are not used for spectral analyses.*

To perform manual measurements on your results, use the markers as explained in *Performing Manual Measurements on Your Test Results* on page 12.

11 Testing Fabry-Perot Lasers

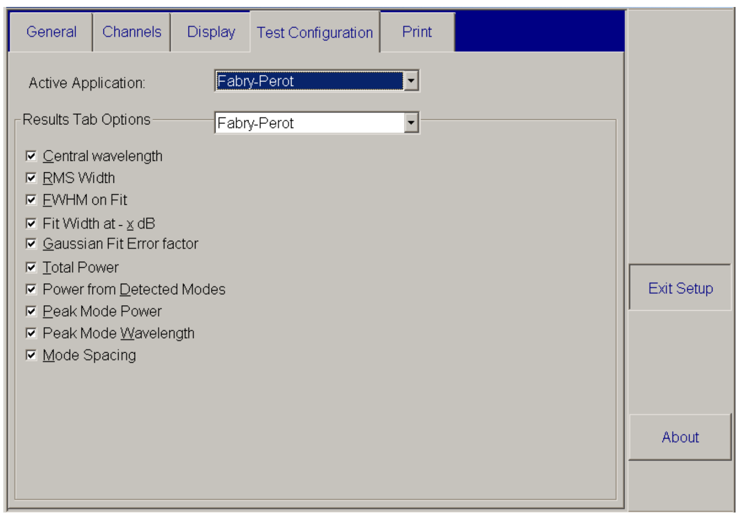
You can specifically test Fabry-Perot lasers with your optical spectrum analyzer.

Selecting the Fabry-Perot Laser Application

Your optical spectrum analyzer allows you to select different applications to test.

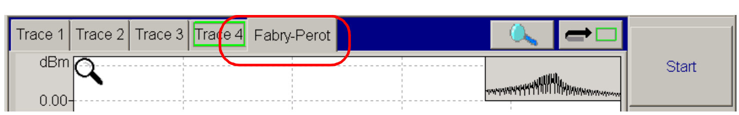
To select the Fabry-Perot application:

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



3. In the **Active Application** list, select **Fabry-Perot**.

Once you return to the main window by clicking on **Exit Setup**, you will notice that the tab next to the four traces will change according to the active application.



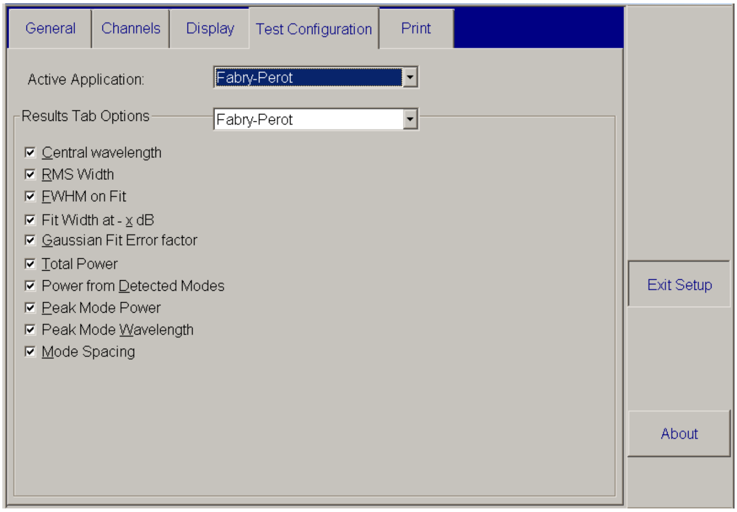
Customizing and Viewing Fabry-Perot Laser Test Results

It is possible to select which results you would like displayed in the **Results** tab of the **Fabry-Perot** test tab.

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 display:

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



3. Select **Fabry-Perot** in the **Result Tab Options** list.

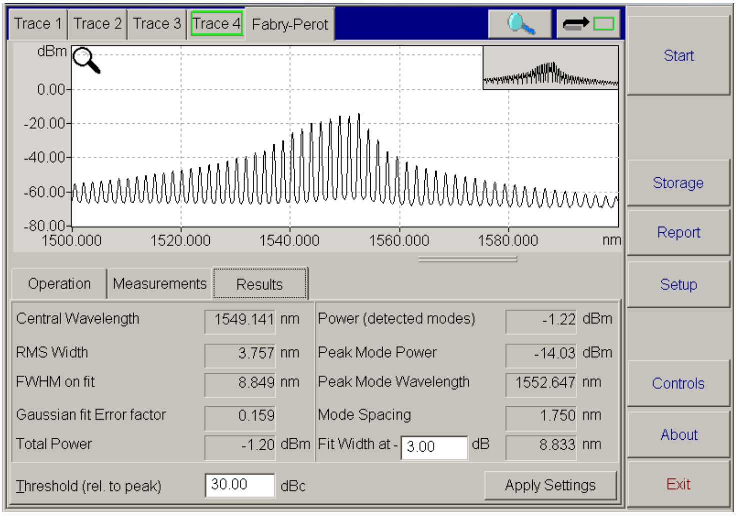
4. Check the items you want to view.

- **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 407.*

5. Click on **Exit Setup**. You return to the main window.

If you click on the **Fabry-Perot** tab once in the main window, the **Results** tab appears with the data you have selected from the **Test Configuration** tab.

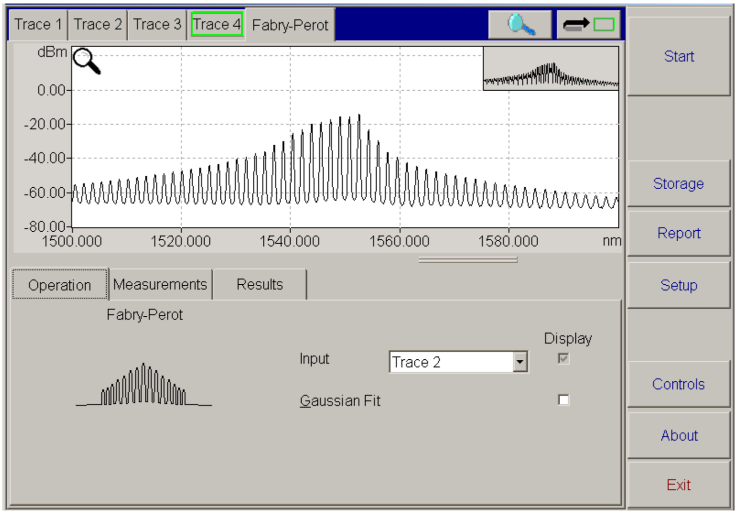


Testing Fabry-Perot Lasers

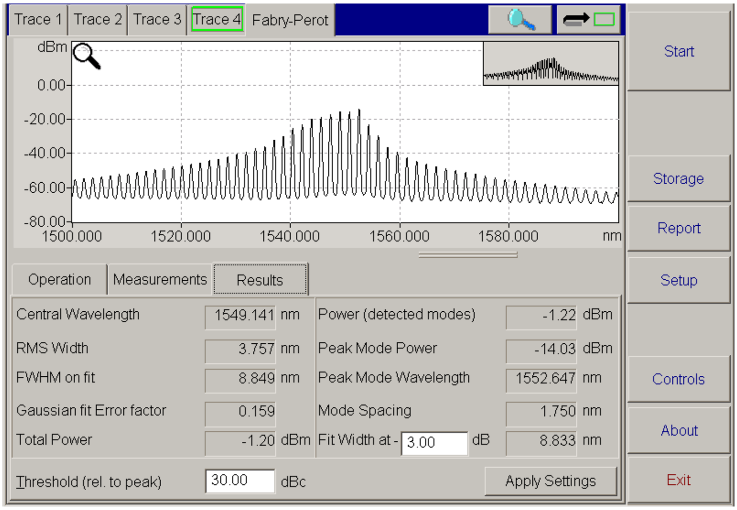
Testing Fabry-Perot lasers is a very simple procedure.

To test a Fabry-Perot laser:

1. From one of the trace tabs (**Trace 1**, for example), perform an acquisition with the laser you want to test. You can also recall a trace.
2. Click on the **Fabry-Perot** tab to go into component testing.



3. From the **Input** list box in the **Operation** tab, select the trace tab where the trace is displayed. It will appear in the display.



4. Click on the **Results** tab to show the Fabry-Perot test results.

5. If desired, modify the threshold and bandwidth by entering values in the corresponding fields. To apply your changes, click on **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 your Fabry-Perot laser test.*

To perform manual measurements on your results, use the markers as explained in *Performing Manual Measurements on Your Test Results* on page 12.

12 Comparing Traces

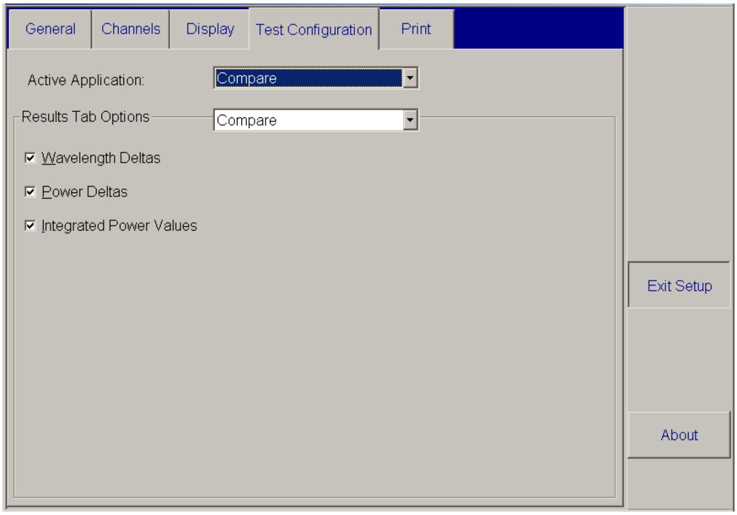
Comparing traces you have acquired allows you to quickly pinpoint differences. You can compare the traces both on a graph or table.

Selecting the Compare Application

Your optical spectrum analyzer allows you to select amongst different applications to test.

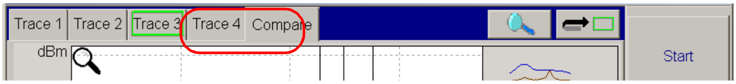
To select the Compare application:

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



3. In the **Active Application** list, select **Compare**.

Once you return to the main window by clicking on **Exit Setup**, you will notice that the last tab on the right will change according to the active application.



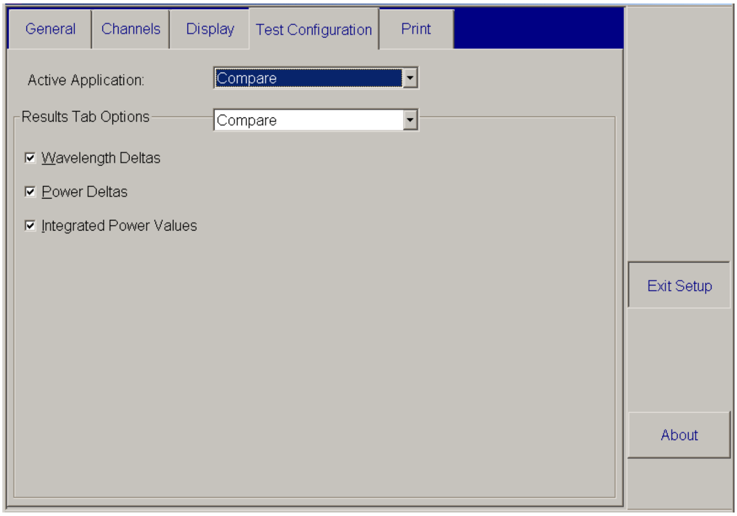
Customizing and Viewing Compared Trace Results

It is possible to select the results would like to see in the **Measurements** tab of the **Compare** test tab.

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 on **Setup**.
2. Select the **Test Configuration** tab.



3. Select **Compare** in the **Result Tab Options** list.

4. Check the items you want to view in the **Measurements** tab as you compare traces.

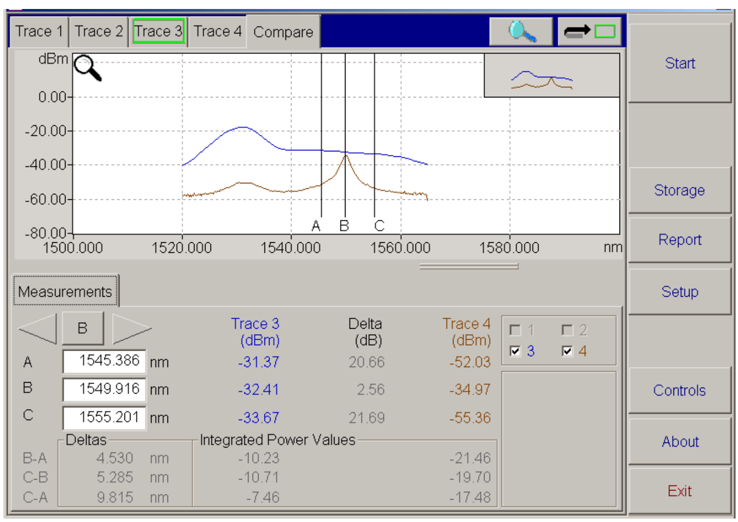
➤ **Wavelength Deltas**: indicates the wavelength deltas corresponding to the current markers' positions.

➤ **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.

5. Click on **Exit Setup**. You return to the main window.

If you click on the **Compare** tab once in the main window, the **Measurement** tab appears with the data you have selected from the **Test Configuration** tab.

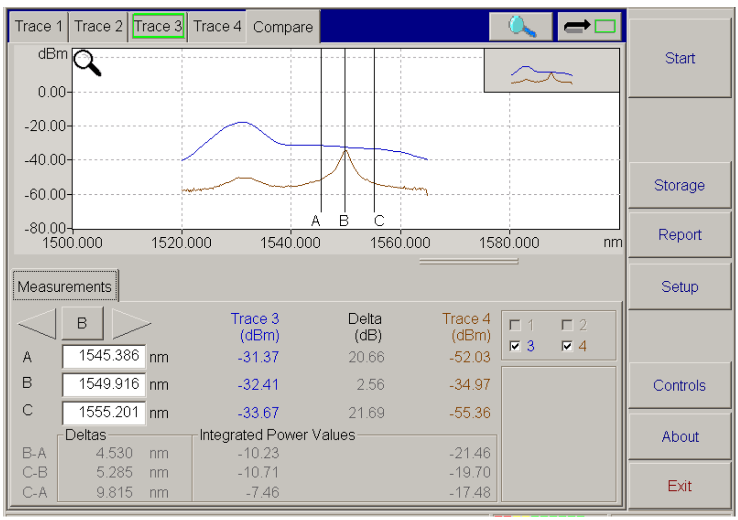


Comparing Traces

You can compare up to four traces at a time.

To compare traces:

1. Acquire or load the traces you want to compare, using a different trace tab for each.
2. Select the **Compare** tab.



3. Select the traces to compare by checking the corresponding boxes.

The traces you have selected will appear in a different color to facilitate visual comparison. The corresponding column in the table will also bear the same color.

Note: *You can customize the trace colors in* Setting Colors for the Various Elements *on page 143.*

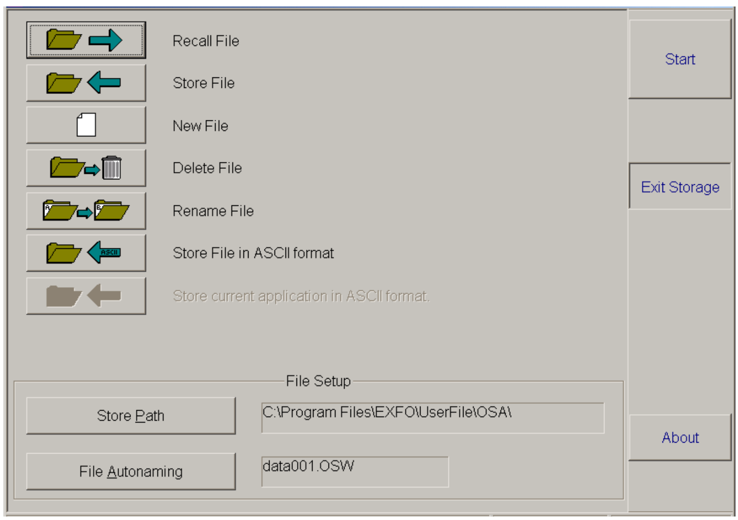
To perform manual measurements on your results, use the markers as explained in *Performing Manual Measurements on Your Test Results* on page 12.

13 Managing Trace Files

You can manage your trace files in one convenient window. Click on **Storage** from the main window to access it.

Selecting a Storage Medium and Location

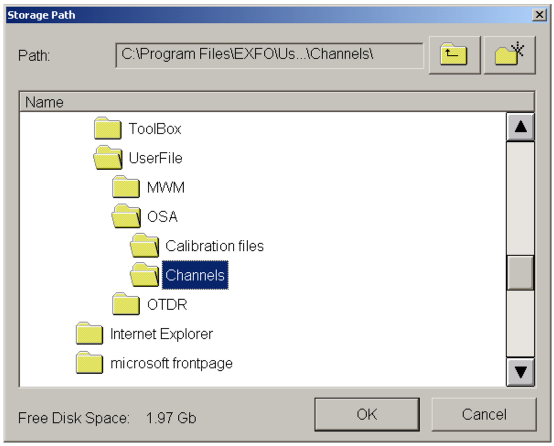
Before storing or recalling a trace, ensure that the correct medium is shown in the **File Setup** panel of the **Storage** window.



If this is not the location you want to use to save or retrieve your files, you can select another one.

To select a storage medium and location:

1. From the main window, click on **Storage**.
2. Click on **Store Path**.



3. Select the desired directory, using  to move up the system tree if needed. If you want to create a folder, click on , then name your new folder as desired.
4. Once you have reached the folder you want, click on **OK**. You return to the **Storage** window. The selected storage path appears beside the **Store Path** button.

Storing a Trace File

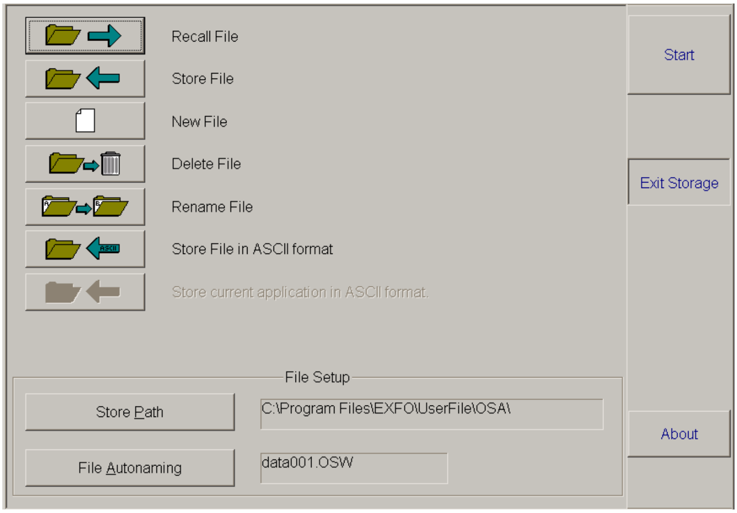
Before storing a trace, blease keep in mind that the trace stored is always the one found under the active **Trace** tab (framed in green).

Storing a Trace File from the Storage Window

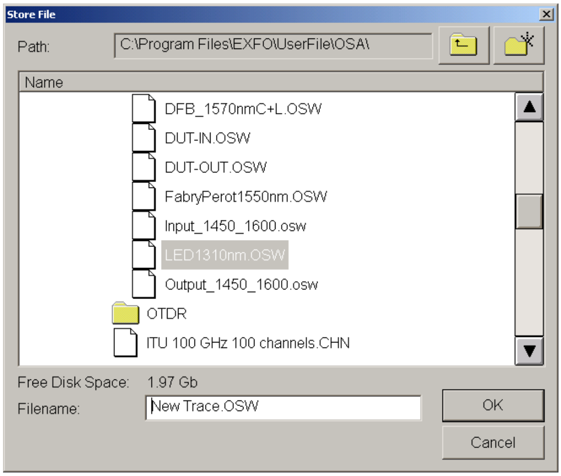
It is possible to save traces for future use.

To store a trace file from the storage window:

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



2. Click on **Store File**.



3. A default trace name is suggested in the text field of the **Store File** window. If the default trace name is acceptable, click on **OK**.

   To modify the suggested trace name, click on it. Type in the name you want.

4. From the **Store File** window, click on **OK** to store the file or **Cancel** to exit.

   If the name already exists, you will be asked if you want to overwrite the current file.

IMPORTANT

Once a trace is overwritten, it is permanently deleted and cannot be recalled.

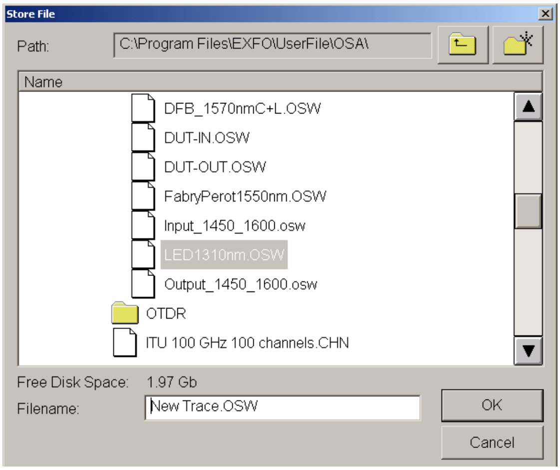
5. Click on **Yes** to overwrite the existing trace or on **No** to exit without saving the changes.

Storing a Trace File from the Main Window

After acquiring a trace, you can quickly store it from the main window of the test application without going through the **Storage** window. This is useful when you do not want to perform other operations on traces, or when you want to save traces under the four tabs without switching between the **Storage** and main windows.

To store a file from the main window:

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



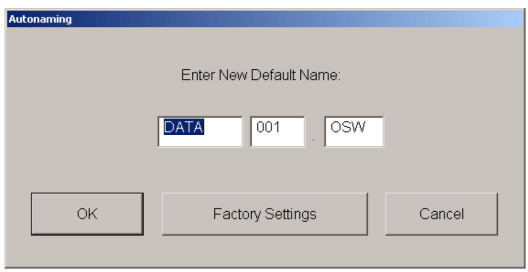
2. If necessary, change the location of the file to be stored. For more information, see *Selecting a Storage Medium and Location* on page 119.
3. If necessary, change the filename. For related information, see *Naming a Trace File Automatically* on page 124.
4. Use the proposed filename, or change it if you want, then click on **OK** to save the file. The **Store File** window disappears and you return to the main window of the test application. To return to the main window without storing the trace file, click on **Cancel**.

Naming a Trace File Automatically

A default name is suggested each time a trace is stored (even in ASCII format). By setting the default name and number of the first trace to be stored, all subsequent traces will be stored or 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 on **Storage**.
2. Click on **File Autonaming** in the **File Setup** panel.



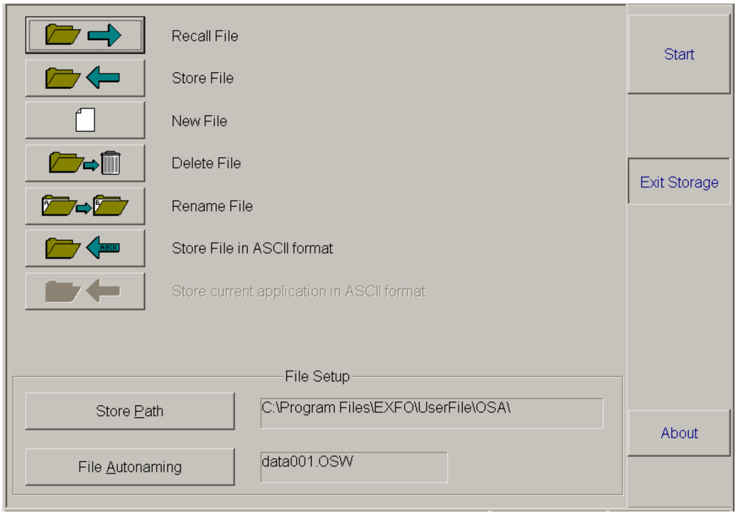
3. In the left section of the **Autonaming** window, delete the current name and type in a new default name.
4. In the middle section, delete the current number and type in a new one.
5. In the right section, delete the current extension and type in the desired three-character extension.
6. Click on **OK** when the default name is correct, **Cancel** to exit without saving, or **Factory Settings** to return to the default naming scheme.

Recalling a Trace File

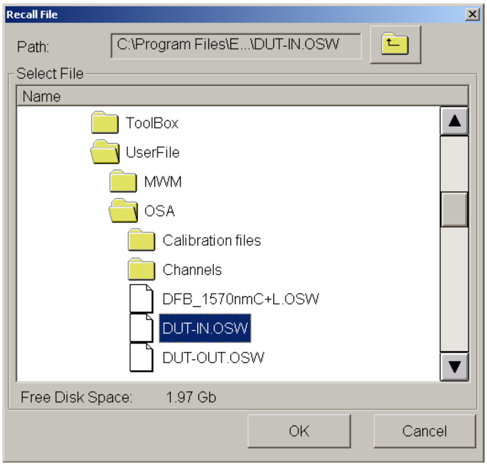
Recalling a trace file saves you time as you do not need to perform your acquisition again and can continue working where you left off.

To recall a trace file:

1. Select the trace tab where you want to recall the file.
2. From the main window, click on **Storage**.



3. Click on **Recall File**. If you have not already acquired a trace, the **Recall File** window appears.



If you had already acquired (but not saved) a trace, a warning window appears, asking you if you want to save the current trace. Click on **Yes** to store the trace. Once the trace is stored, you can load a new trace. Click on **No** to display the new trace without storing the previously acquired one. Click on **Cancel** to return to the previous window.

4. Scroll through the list of files in the **Recall File** window and select the trace to be recalled.

5. Click on **OK** to recall the file. The trace appears in the selected **Trace** display (framed in green).

Deleting a Trace File

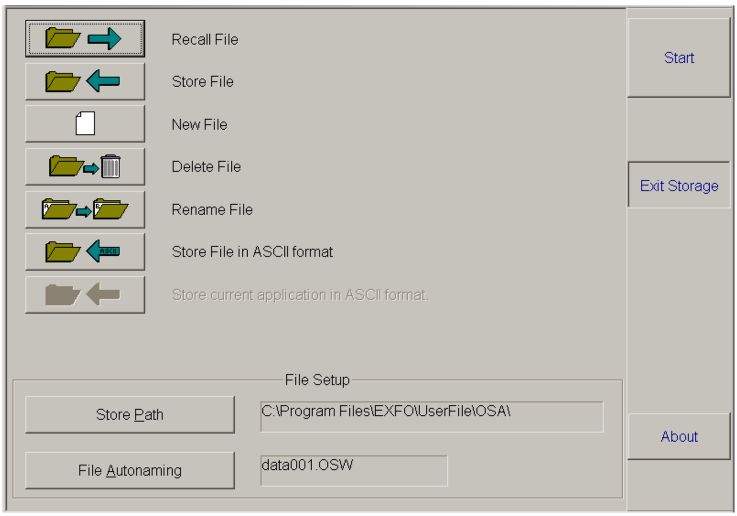
You might need to delete trace files to free up disk space, or simply because you do not need them anymore.

IMPORTANT

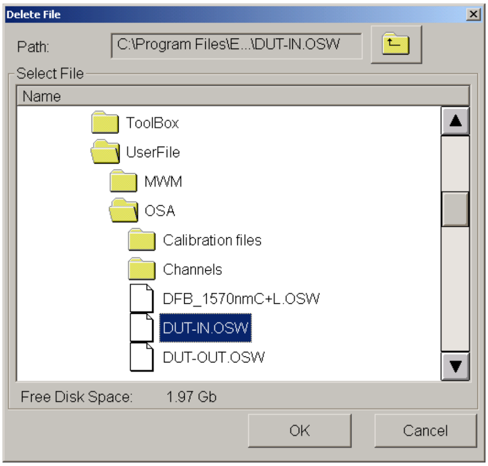
Once a file is deleted, you cannot retrieve it.

To delete a trace:

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



2. Click on **Delete File**.



3. Scroll through the list in the **Delete File** window and select the file to be deleted.

4. Click on **OK** to accept the selection or on **Cancel** to exit without deleting the file. A confirmation dialog box appears.

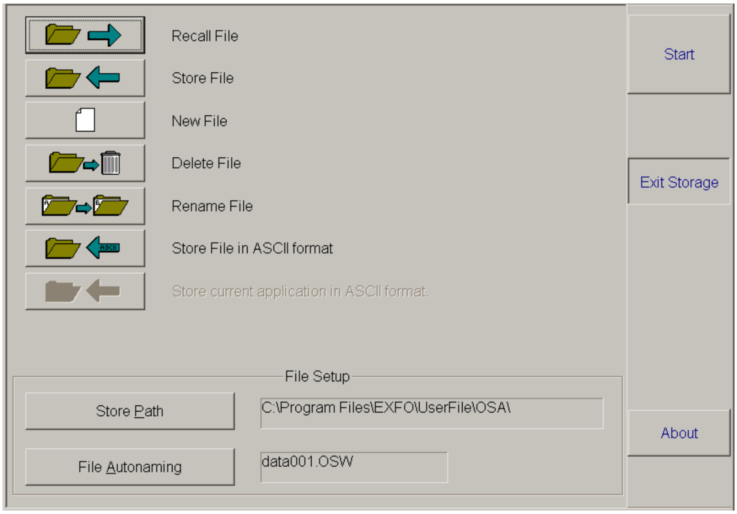
5. To confirm the deletion, click on **OK**. Clicking on **Cancel** exits the window without deleting the trace.

Renaming a Trace File

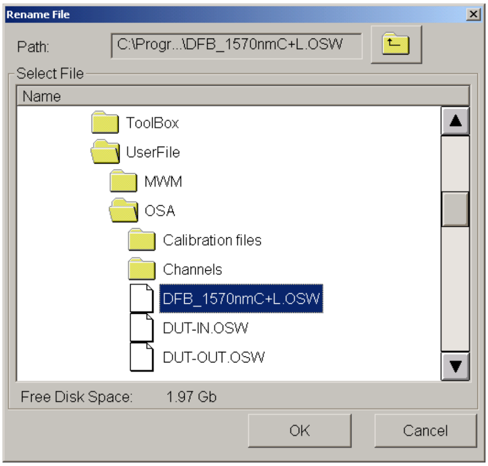
Renaming trace files can help you manage them better.

To change the name of a trace:

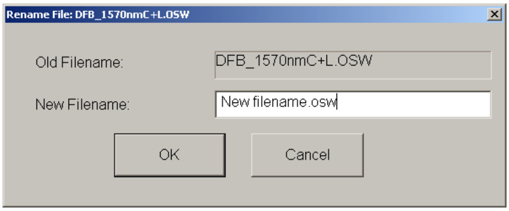
1. From the main window, click on **Storage**.



2. Click on **Rename File**.



3. Scroll through the **Rename File** window and select the file to rename.
4. Click on **OK**. A second **Rename File** window appears.



5. Enter the new trace name and click on **OK**. Clicking **Cancel** exits the window and no changes are made.

Exporting a Trace File in ASCII Format

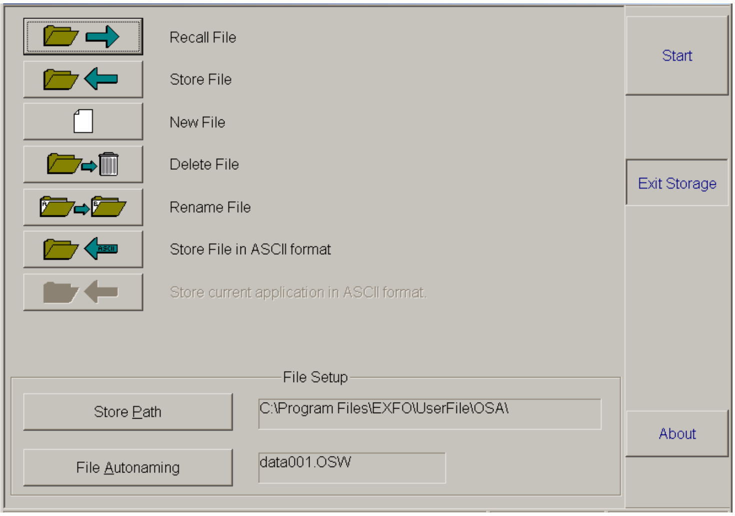
Exporting trace files in ASCII format can allow you to consult data in any word processing program.

IMPORTANT

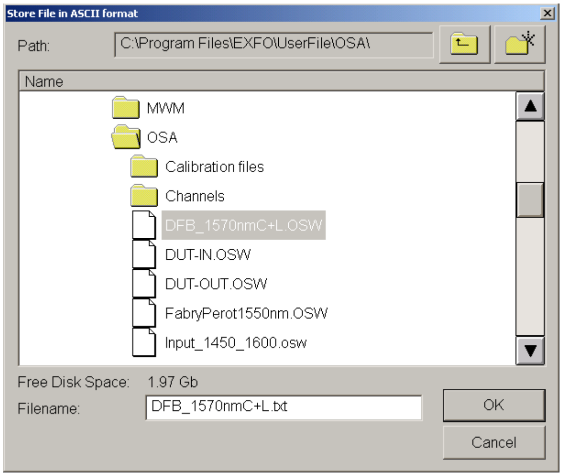
Once a trace is exported in ASCII format, you cannot load it as a trace in the OSA. Therefore, you might consider saving the trace in the default EXFO OSA format before exporting it into ASCII format.

To export a trace in ASCII format:

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



2. Click on *Store File in ASCII.*



3. Enter a self-explanatory name for your file (remember that ASCII files bear the .TXT extension).

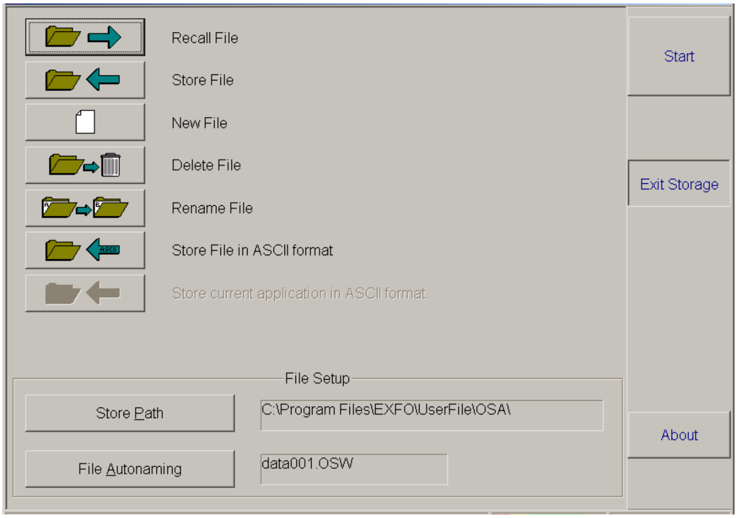
4. Click on **OK** to save the trace file in ASCII format or **Cancel** to return to the **Storage** window without saving.

Exporting an Application in ASCII Format

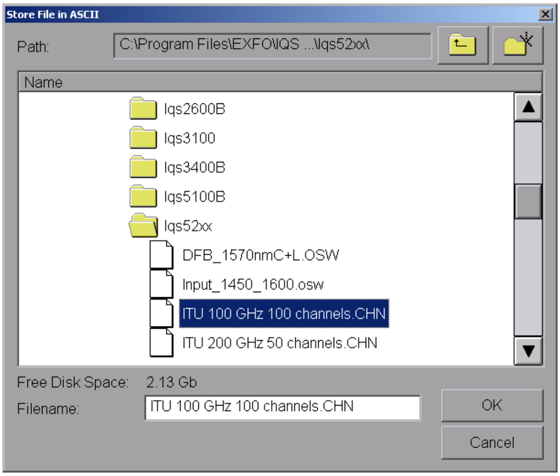
You might want to export your testing applications in ASCII format.

To export an application in ASCII format:

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



2. Click on **Store current application in ASCII**.



3. Enter a self-explanatory name for your file (remember that ASCII files bear the .TXT extension).

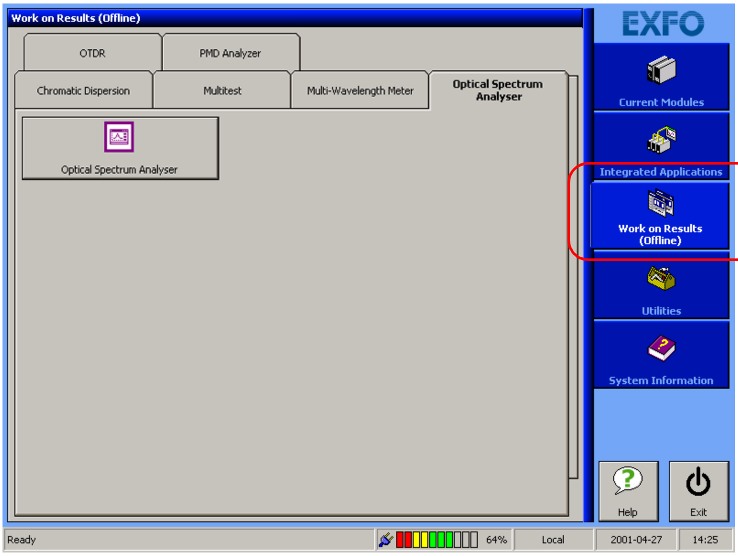
4. Click on **OK** to save the application in ASCII format or **Cancel** to return to the **Storage** window without saving.

Viewing Files in Offline Mode

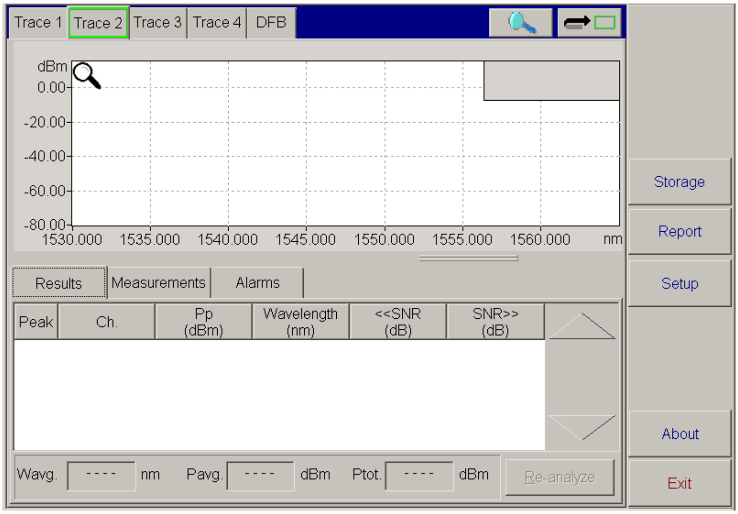
ToolBox 6 allows you to view traces you have previously acquired and perform analyses on them outside the active application. This could be especially useful if you want to work on a unit which does not contain an actual OSA module.

To view your files in Offline mode:

1. In ToolBox 6, select **Work on Results (Offline)**.
2. Locate the tab where the OSA application is located, and select it.



3. Click on the OSA application button to open the viewer.



This viewer functions exactly like the actual OSA application, except that you cannot perform acquisitions or change the controls settings.

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

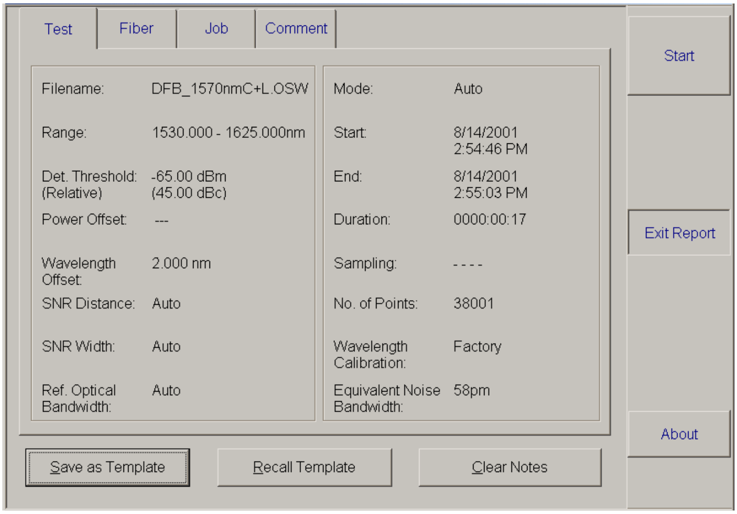
14 Managing Reports

Your optical spectrum analyzer allows you to produce reports after you have acquired traces.

Viewing Trace Reports On-Screen

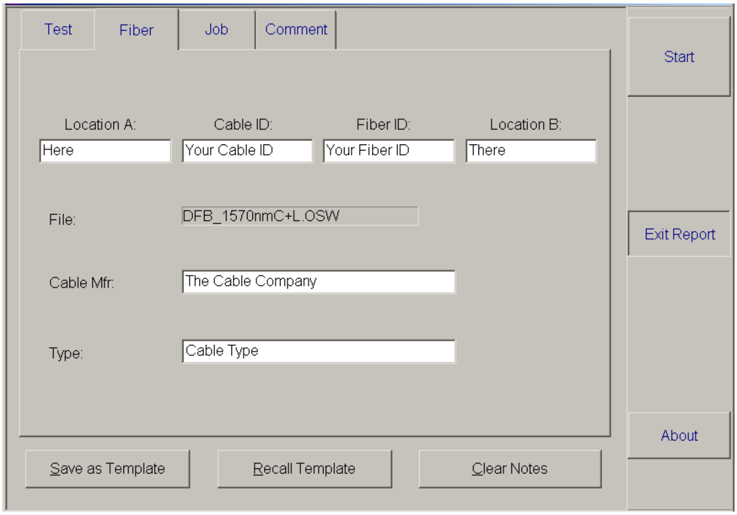
Once you have acquired a trace, you can view the corresponding report by clicking on the **Report** button from the main window.

➤ The **Test** tab will give you the data associated with your acquisition.

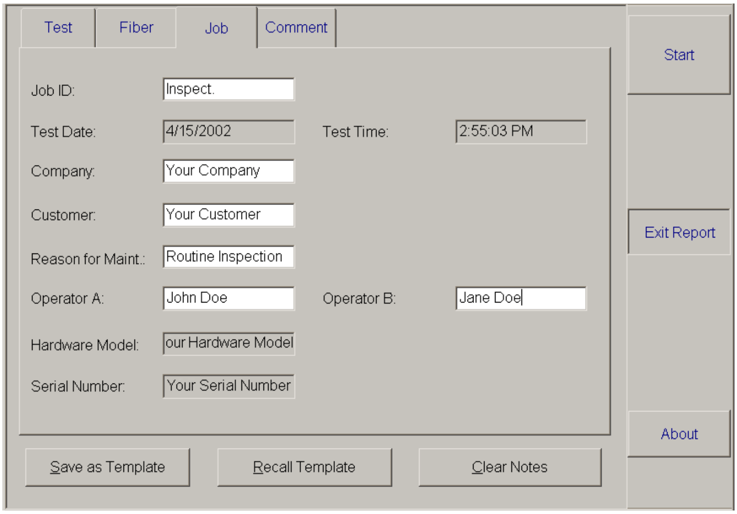


➤ The **Fiber** tab allows you to enter information about the fiber you are currently testing. Locations A and B are set to the fiber's beginning and end locations. You can also enter the Cable and Fiber ID in the corresponding fields.

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 **Comment** 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** allows you to save 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.

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

Note: *If you have entered data without saving it, the recalled data will replace it. The system will ask if you want to overwrite the current file or not. Saving a configuration as a template will overwrite the previously saved template.*

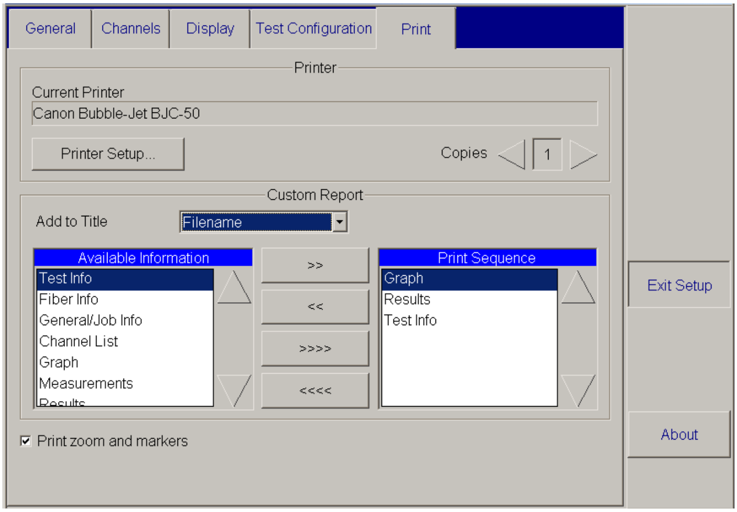
➤ **Clear Notes** erases the data in the **Report** window. You will be prompted to confirm erasing the data or not. If you want to keep the data, click on **Cancel**, then save it by clicking on **Save as Template**.

Printing an Acquisition Report

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

To print a report:

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



3. Make sure the correct printer is selected from the **Current Printer** field. To change or set up the printer, click on **Printer Setup...**.
A standard Windows **Print Setup** screen will appear and allow you to change the printer settings.
4. Type the number of copies you want to print in the **Copies** field.
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 on **>>** to transfer it to the **Print Sequence** column.

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

   To select all the items and put them in the **Print Sequence** list, click on **>>>>**. To remove all the items from the **Print Sequence** column, click on **<<<<**.

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 add the zoom factor and markers to your report, check the **Print zoom and markers** box in the lower left-hand part of the window.

8. To exit the **Setup** window, click on **Exit Setup**.

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

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 on **Cancel** in the pop-up window before the document has gone completely through the spool.*

15 Customizing Graphical Settings

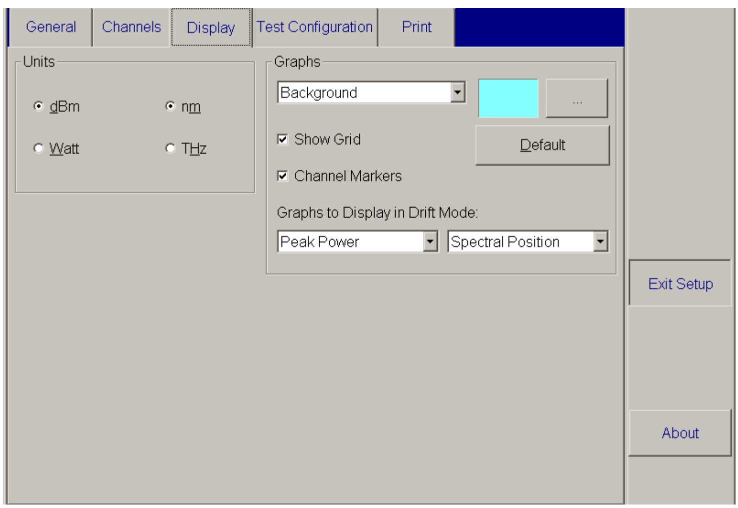
You might need to change the graphical settings to have a better view of your results.

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 on **Setup**.
2. Select the **Display** tab.



3. In the **Graphs** panel, use the pull-down list to select the item for which you want to change the color. The default color appears on the right.
4. To change the color, click on . A standard Windows color-selection menu will appear. Select the desired color, or create a new one according to your needs.

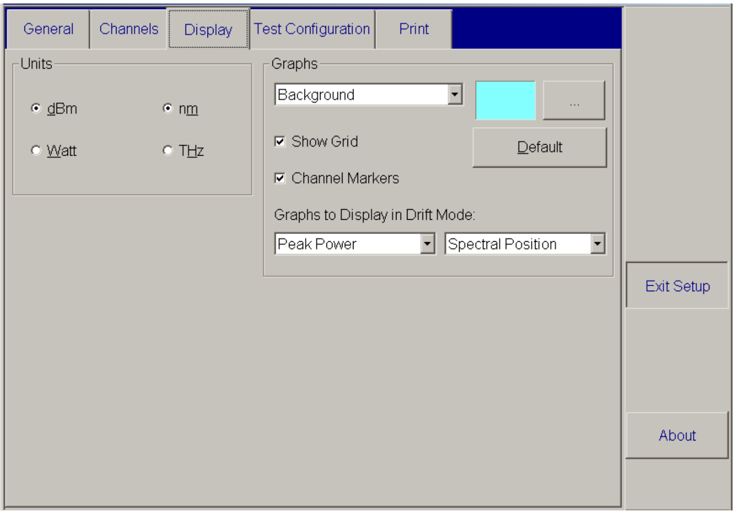
5. Click on **OK** to confirm your choice, or on **Cancel** to go back without changing the color.
6. Repeat steps 3 to 5 for each item whose color you want to change.

Displaying and Hiding the Grid

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

To change the grid status:

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



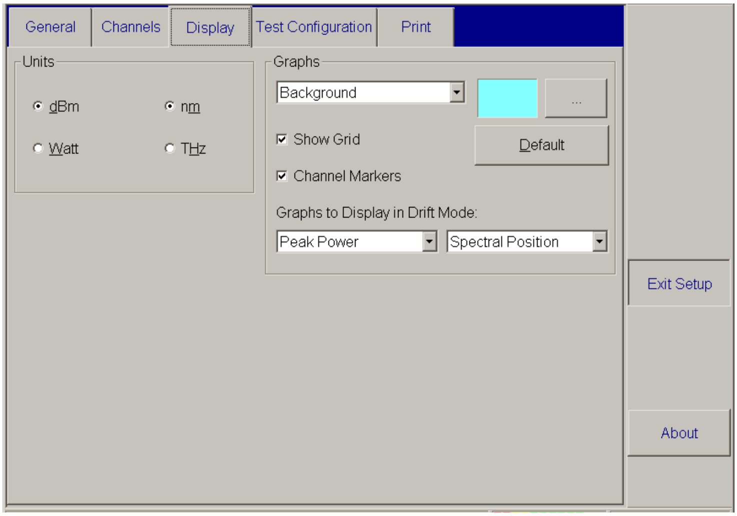
3. In the **Graphs** panel, check the **Show Grid** box to display the grid in the main view. Uncheck the box to hide the grid.

Displaying and Hiding the Channel Markers

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

To change the channel marker status:

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



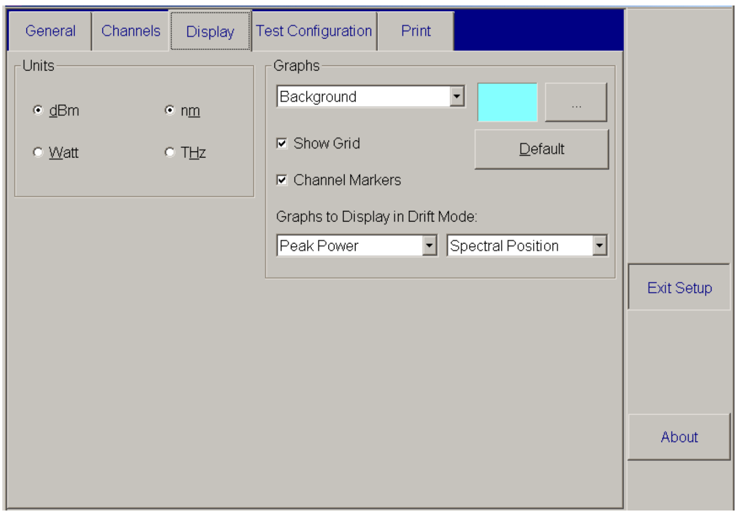
3. In the **Graphs** panel, check the **Channel Markers** box to display the markers in the main view. Uncheck the box to hide the markers.

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 on **Setup**.
2. Select the **Display** tab.



3. In the **Graphs** panel, click on **Default**.
4. Confirm if you want to revert to the original colors or not. You will return to the **Display** tab.

16 Maintenance

To help ensure long, trouble-free operation:

➤ Keep the unit free of dust.

➤ Clean the unit casing 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 the Front Panel

Clean the front panel of the Optical Spectrum Analyzer regularly to avoid buildup of dust, dirt, and other foreign substances.

To clean the front panel:

1. Gently wipe the front panel with a cloth dampened with soapy water.
2. Rinse the front panel with a cloth dampened with water.
3. Dry with a clean wiping cloth.

IMPORTANT

To help keep the connectors and adapters clean, EXFO recommends that you install protective caps when the unit is not in use.
You should also clean the fiber ends before every connection.

Cleaning Connectors Equipped with EUI/EUA Adapters

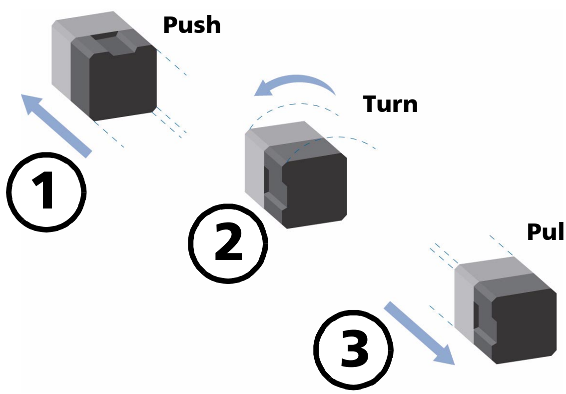
Regular cleaning of connectors equipped with EUI/EUA adapters will help maintain optimum performance. There is no need to disassemble the unit.

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 connectors:

1. Remove the EUI/EUA adapter from the module to expose the optical connector baseplate and ferrule.



2. Use a lint-free wiping cloth and deposit *only one drop* of isopropyl alcohol on it.

IMPORTANT

Since isopropyl alcohol is not absolutely pure, it 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, dry the surface quickly, and use a bottle that distributes only a drop of alcohol at a time.

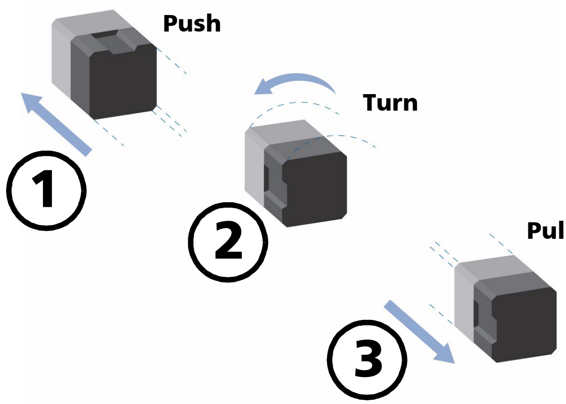
3. Gently wipe the connector and ferrule.
4. With a dry lint-free wiping cloth, gently wipe the same surfaces to ensure that the connector and ferrule are perfectly dry.
5. Throw out the wiping cloths after one use.
6. Verify the surface of the connector with a small, portable fiber-optic microscope.

WARNING

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

To clean EUI/EUA adapters:

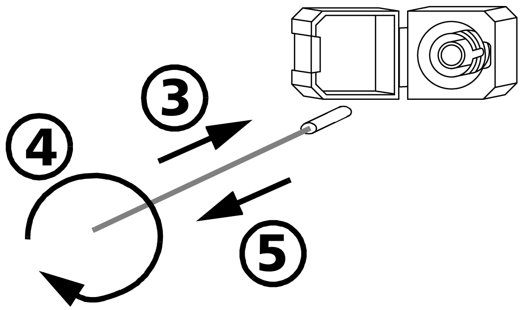
1. Remove the EUI/EUA adapter from the module connector.



2. Moisten a cleaning tip (2.5 mm tip) provided by EXFO with *only one drop* of isopropyl alcohol.

> **IMPORTANT**
> **Alcohol may leave traces if used abundantly. Avoid contact between the tip of the bottle and the cleaning tip, and do not use bottles that distribute too much alcohol at a time.**

3. Slowly insert the cleaning tip into the 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.
5. Continue to turn as you withdraw the cleaning tip.
6. Repeat steps 3 to 5, but this time with a dry cleaning tip (2.5 mm tip provided by EXFO).

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

7. Throw out the cleaning tips after one use.

Cleaning Detector Ports

Regular cleaning of connectors will help maintain optimum performance.

IMPORTANT
To help keep the detectors and adapters clean, EXFO recommends installing protective caps when the unit is not in use. You should also clean the fiber ends before every connection.

To clean detector ports:

1. Remove the detector protective cap and the connector adapter (FOA).
2. If the detector is dusty, remove dirt with compressed air.
3. Take a cleaning tip from the package (supplied with EXFO's power meters) being careful not to touch the soft end of the swab.
4. Moisten the cleaning tip with *only one drop* of isopropyl alcohol.

IMPORTANT
Alcohol may leave traces if used abundantly. Avoid contact between the tip of the bottle and the cleaning tip, and do not use bottles that distribute too much alcohol at a time.

5. While applying light pressure, gently rotate the cleaning tip on the detector window.

CAUTION
To avoid breaking the detector window during cleaning, be careful not to apply too much pressure on it.

6. Repeat previous step, but this time with a dry cleaning tip or blow dry with compressed air.
7. Discard the cleaning tips after one use.

Recalibrating the Unit

If a calibration due date was not indicated by EXFO on the calibration label, this means that the calibration certificate for your FTB-5240/5240B Optical Spectrum Analyzer has been modified in conformity with the ISO/IEC 17025 Standard.

EXFO recommends that an annual calibration be performed on your FTB-5240/5240B Optical Spectrum Analyzer to ensure that it remains within the published specifications. However, as prescribed by the ISO/IEC 17025 Standard, this date can only be set by you.

You should indicate the calibration due date in the space provided on the calibration label.

17 Troubleshooting

Viewing Online Documentation

A PDF version of the FTB-5240/5240B Optical Spectrum Analyzer user guide is conveniently available at all times.

To access the online user guide:

Go to “C:\Program Files\EXFO\Help”. This folder contains a PDF version of the user guide.

Finding Information on the EXFO Web Site

The EXFO Web site provides answers to frequently asked questions (FAQs) regarding the use of your FTB-5240/5240B Optical Spectrum Analyzer.

To access FAQs:

1. Type the following address in your Internet browser: **www.exfo.com**.
2. Click on the **Support** tab.
3. Click on **FAQs** and follow the on-screen instructions. You will be given a list of questions pertaining to your subject.

The EXFO Web site also provides the product’s most recent technical specifications.

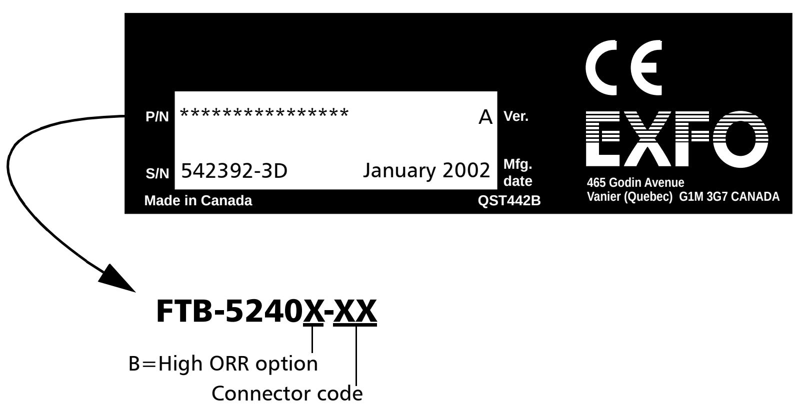
Contacting the Technical Support Group

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, 7:30 a.m. to 8:00 p.m. (Eastern Time in North America).

Technical Support Group
400 Godin Avenue
Vanier (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 of your product (see the product identification label shown below) as well as a description of your problem close at hand.



You may also be requested to provide software and module version numbers. This information, as well as technical support contact information, can be found by clicking on **About** in the button bar.

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 shock and vibration.

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 recalibrate the product free of charge should the equipment need to be repaired or if the original calibration is erroneous.

IMPORTANT

The warranty can become null and void if:

- **the equipment has been tampered with, repaired, or worked upon by unauthorized individuals or non-EXFO personnel.**
- **the warranty sticker has been removed.**
- **case screws, other than those specified in this manual, have been removed.**
- **the case has been opened, other than as explained in this manual.**
- **the equipment serial number has been altered, erased, or removed.**
- **the equipment 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 purchased product, nor shall be responsible for any failure in the performance of other items to which the purchased product is connected or the operation of any system of which the purchased 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, and batteries used with EXFO products are not covered by this warranty.

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 162). 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 the unit has an internal storage device, perform a data backup before sending the unit for repairs.
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, the customer will be invoiced for the cost appearing on this report. Return-to-customer shipping costs will be paid by EXFO for equipment under warranty. Shipping insurance is at the customer's expense.

EXFO Service Centers Worldwide

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

EXFO Headquarters Service Center
400 Godin Avenue
Vanier (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
Le Dynasteur
10/12, rue Andras Beck
92366 Meudon la Forêt Cedex
FRANCE

Tel.: +33.1.40.83.85.85
Fax: +33.1.40.83.04.42
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

EXFO Asia-Pacific Service Center
151 Chin Swee Road
#03-29 Manhattan House
SINGAPORE 169876

Tel.: +65 333 8241
Fax: +65 333 8242
asiapacific.service@exfo.com

Burleigh Instruments Service Center
7647 Main Street Fishers
Victor, NY 14564-8909
USA

Tel.: 1 585 924-9355
Fax: 1 585 924-9072
service@burleigh.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*.

		FTB-5240	FTB-5240B
Spectral measurement			
Wavelength range (nm)		1250 to 1650	1250 to 1650
Resolution bandwidth FWHM[2,3] (nm)		0.065	0.033
Wavelength uncertainty[3,8] (nm)		± 0.05	± 0.03
		± 0.015[4]	± 0.015[4]
Wavelength repeatability[5] (nm)		± 0.003	± 0.003
Wavelength linearity[3] (nm)	typical	± 0.01	± 0.01
Amplitude measurement			
Dynamic range[3] (dBm)		18[6] to -75[7]	18[6] to -75[7]
Power uncertainty[9] (dB)		± 0.4	± 0.4
Optical rejection ratio[3] (dBc)			
at 12.5 GHz (± 0.1 nm)	typical		40
	minimum		35
at 25 GHz (± 0.2 nm)	typical	40	50
	minimum	35	48
at 50 GHz (± 0.4 nm)	typical	50	55
	minimum	45	50
PDL at 1550 nm (dB)	typical	± 0.07	± 0.07
	maximum	± 0.15	± 0.15
Scanning time (s)		< 1.5 (35 nm span, full resolution, multi-peak analysis)	
ORL (dB)		> 35	> 35

Notes

1. All specifications are for a temperature of 23 °C ± 2 °C with a FC/UPC connector unless otherwise specified, after warmup.
2. Full width at half maximum, typical.
3. Within the C- and L-bands.
4. After User Calibration in the same test session within 10 nm from each calibration point.
5. Over 1 minute Real mode.
6. Typical. Linearity may be degraded above + 15 dBm.
7. With averaging.
8. User calibration may be required.
9. At 1550 nm, -10 dBm input.

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)		9.6 cm x 7.6 cm x 26 cm	(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 the *FTB-400 Universal Test System* user guide.

Quick Reference Command Tree

Command						Parameter(s)
ABORt[1..n]						
CALCulate[1..n]	CHANnel	ADD				<Name>,<Center[<wsp>M|HZ]>
		AUTO				
		BANDwidth				<Channel index>,<Bandwidth[<wsp>HZ]>|MAXimum|MINimum
		BANDwidth?				<Channel index>[,MAXimum|MINimum]
		BANDwidth	ALARm			<Channel index>,<AlarmBandwidth[<wsp>HZ]>|MAXimum|MINimum
			ALARm?			<Channel index>[,MAXimum|MINimum]
		CENTer				<Channel index>,<Center[<wsp>M|HZ]>
		CENTer?				<Channel index>
		COUNT?				
		DELete				<Channel index>
			ALL			
		NAME				<Channel index>,<Name>
		NAME?				<Channel index>
		OSNR	MAXimum			<Channel index>,<OsnrMax[<wsp>DB]>|MAXimum|MINimum
			MAXimum?			<Channel index>[,MAXimum|MINimum]

Command						Parameter(s)
			MINimum			<Channel index>,<OsnrMin[<wsp>DB]>|MAXimum|MINimum
			MINimum?			<Channel index>[,MAXimum|MINimum]
			REFerence			<Channel index>,<OsnrRef[<wsp>DB]>|MAXimum|MINimum
			REFerence?			<Channel index>[,MAXimum|MINimum]
		POWer	MAXimum			<Channel index>,<PowerMax[<wsp>DBM|W]>|MAXimum|MINimum
			MAXimum?			<Channel index>[,MAXimum|MINimum]
			MINimum			<Channel index>,<PowerMin[<wsp>DBM|W]>|MAXimum|MINimum
			MINimum?			<Channel index>[,MAXimum|MINimum]
			REFerence			<Channel index>,<PowerRef[<wsp>DBM|W]>|MAXimum|MINimum
			REFerence?			<Channel index>[,MAXimum|MINimum]
	CHANnel?					<Channel index>
	CNSCan					<CalcOnNewScan>
	CNSCan?					
	DFB	BANDwidth	LEVel			<PowerLevel>|MAXimum|MINimum
			LEVel?			[MAXimum|MINimum]
		BANDwidth?				

Command						Parameter(s)
		CHANnel?				
		FPMS?				
		OFFSet?				
		POSition?				
		POWer?				
		SBANd	LEFT?			
			RIGHt?			
		SBANd?				
		SELect				TRC1|TRC2|TRC3|TRC4
		SELect?				
		SMSR	LEFT?			
			RIGHt?			
			WORSt?			
	EDFA	GAIN?				<ChannelIndex>
		NFIGure?				<ChannelIndex>
		PASE?				<ChannelIndex>
		POWer	FLATness	INPut?		
				OUTput?		
		PSSE?				<ChannelIndex>
		SELect	[INPut]			TRC1|TRC2|TRC3|TRC4
			[INPut]?			
			OUTPut			TRC1|TRC2|TRC3|TRC4

Command						Parameter(s)
			OUTPut?			
		SPERcent?				<ChannelIndex>
	MODE					EDFA|TRAN|DFB|SAN
	MODE?					
	NORMal	BANDwidth	LEVel			<PowerLevel[<wsp>DB]>|MAXimum|MINimum
			LEVel?			[MAXimum|MINimum]
		POWer	FLATness?			
			INTegrated?			<Start[<wsp>M|HZ]>,<Stop[<wsp>M|HZ]>
	OSNR	NMR	AUTO			<AutoNmr>
			AUTO?			
			DISTance			<Distance[<wsp>HZ]>
			DISTance?			
			RANGe			<Range[<wsp>HZ]>
			RANGe?			
		ROB				<RefOptBand[<wsp>M]>
		ROB?				
		ROB	AUTO			<AutoRefOptBand>
			AUTO?			
	PEAKlist	COUNt?				
	PLISt	[PEAK]?				<PeakIndex>
		COUNt?				

Command						Parameter(s)
	SANalysis					
		SELect				TRC1|TRC2|TRC3|TRC4
		SELect?				
		POWer	IBANd	RATio?		
			IBANd?			
			PEAK?			
			RANGe	RELative		<RelPowerRangeState>
				RELative?		
			THReshold	RELative	PEAK	<RelPeakPowerThreshold[<wsp>DB]>|MAXimum|MINimum|DEFault
					PEAK?	[MAXimum|MINimum|DEFault]
			TOTal?			
		WAVelength	CENTer?			
			FWHM?			
			PEAK?			
			RANGe	[UPPer]		<UpperRangeWavelength[<wsp>M|HZ]>|MAXimum|MINimum|DEFault
				[UPPer]?		[MAXimum|MINimum|DEFault]
				LOWer		<LowerRangeWavelength[<wsp>M|HZ]>|MAXimum|MINimum|DEFault
				LOWer?		[MAXimum|MINimum|DEFault]
			RMS?			
	THReshold					<PowerThreshold[<wsp>DBM|W]>|MAXimum|MINimum

<table>
<tr><th colspan="6">Command</th><th>Parameter(s)</th></tr>
<tr><td></td><td>THReshold?</td><td></td><td></td><td></td><td></td><td>[MAXimum|MINimum]</td></tr>
<tr><td></td><td>TRANsmission</td><td>BANDwidth</td><td>LEVel</td><td></td><td></td><td><BandwidthIndex>,<PowerLevel[<wsp>DB]>|MAXimum|MINimum</td></tr>
<tr><td></td><td></td><td></td><td>LEVel?</td><td></td><td></td><td><BandwidthIndex>[,MAXimum|MINimum]</td></tr>
<tr><td></td><td></td><td>BANDwidth?</td><td></td><td></td><td></td><td><BandwidthIndex></td></tr>
<tr><td></td><td></td><td>CENTer</td><td>LEVel</td><td></td><td></td><td><PowerLevel[<wsp>DB]>|MAXimum|MINimum</td></tr>
<tr><td></td><td></td><td></td><td>LEVel?</td><td></td><td></td><td>[MAXimum|MINimum]</td></tr>
<tr><td></td><td></td><td>CENTer?</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>LOSS?</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>PPOSition?</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>RIPPle</td><td>STARt</td><td></td><td></td><td><Start[<wsp>M|HZ]>|MAXimum|MINimum</td></tr>
<tr><td></td><td></td><td></td><td>STARt?</td><td></td><td></td><td>[MAXimum|MINimum]</td></tr>
<tr><td></td><td></td><td></td><td>STOP</td><td></td><td></td><td><Stop[<wsp>M|HZ]>|MAXimum|MINimum</td></tr>
<tr><td></td><td></td><td></td><td>STOP?</td><td></td><td></td><td>[MAXimum|MINimum]</td></tr>
<tr><td></td><td></td><td>RIPPle?</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>SELect</td><td>[INPut]</td><td></td><td></td><td>TRC1|TRC2|TRC3|TRC4</td></tr>
<tr><td></td><td></td><td></td><td>[INPut]?</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>OUTPut</td><td></td><td></td><td>TRC1|TRC2|TRC3|TRC4</td></tr>
<tr><td></td><td></td><td></td><td>OUTPut?</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CALibration[1..n]</td><td>ZERO</td><td>[AUTO]</td><td></td><td></td><td></td><td><AutoZero>|ON|OFF|ONCE</td></tr>
</table>

Command						Parameter(s)
		[AUTO]?				
INITiate[1..n]	[IMMediate]					
	CONTinuous					<ContinuousAcqState>
	CONTinuous?					
	STATe?					
MMEMory[1..n]	DATA	TYPE				BINary|ASCii
		TYPE?				
	LOAD	CLISt				<Filename>
		CONFiguration				<Filename>
		OVERwrite				<Overwrite>
		OVERwrite?				
		OVERwrite	CLISt			<Overwrite>
			CLISt?			
		TRACe				TRC1|TRC2|TRC3|TRC4,<Filename >
	STORe	CLISt				<Filename>
		CONFiguration				<Filename>
		TRACe	OVERwrite			<Overwrite>
			OVERwrite?			
						<Label>,<Filename>
SENSe[1..n]	AVERage	[STATe]				<AverageState>
		[STATe]?				

Command						Parameter(s)
		COUNt				<AverageCount>|MAXimum|MINimum
		COUNt?				[MAXimum|MINimum]
		COUNt	AUTO			<AverageCountAuto>
			AUTO?			
	POWer	[DC]	RANGe	AUTO		<AutoRange>
				AUTO?		
				SCALe		<Range>
				SCALe?		
				SCALe	LIST?	
		THReshold	RELative			<RelativePowerThreshold[<wsp>DB]>|MAXimum|MINimum
			RELative?			[MAXimum|MINimum]
		WAVelength	OFFSet			<Offset[<wsp>M]>|MAXimum|MINimum
			OFFSet?			[MAXimum|MINimum]
			OFFSet	ACTivate		<OffsetState>
				ACTivate?		
			RANGe	LOWer		<Start[<wsp>M|HZ]>|MAXimum|MINimum
				LOWer?		[MAXimum|MINimum]
				[UPPer]		<Stop[<wsp>M|HZ]>|MAXimum|MINimum
				[UPPer]?		[MAXimum|MINimum]
TRACe[1..n]	[DATA]	PREamble?				TRC1|TRC2|TRC3|TRC4

Command						Parameter(s)
	[DATA]?					TRC1|TRC2|TRC3|TRC4
	FEED	CONTrol				TRC1|TRC2|TRC3|TRC4,ALWays
		CONTrol?				TRC1|TRC2|TRC3|TRC4
	INFormation?					TRC1|TRC2|TRC3|TRC4
	POINts?					TRC1|TRC2|TRC3|TRC4
UNIT[1..n]	POWer					DBM|W
	POWer?					
	SPECtrum					M|HZ
	SPECtrum?					

Command 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><CalcOnNewS can>
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:OUTput?
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><Ra nge[<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:RELative<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:RELative? CALCulate[1..n]:SANalysis:POWer:THReshold:RELative: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: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:LEVel

: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]

: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

: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|TRC2|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: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

: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

: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:ACTivat e 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:ACTivate?
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:ACTivate 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?

: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 ($6{,}6256 \times 10^{-34}$ 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:

$$\text{FWHM} = 2.355 \times b$$

Where

➤ b is the spectral width.

Index

D

E

F

T

Z