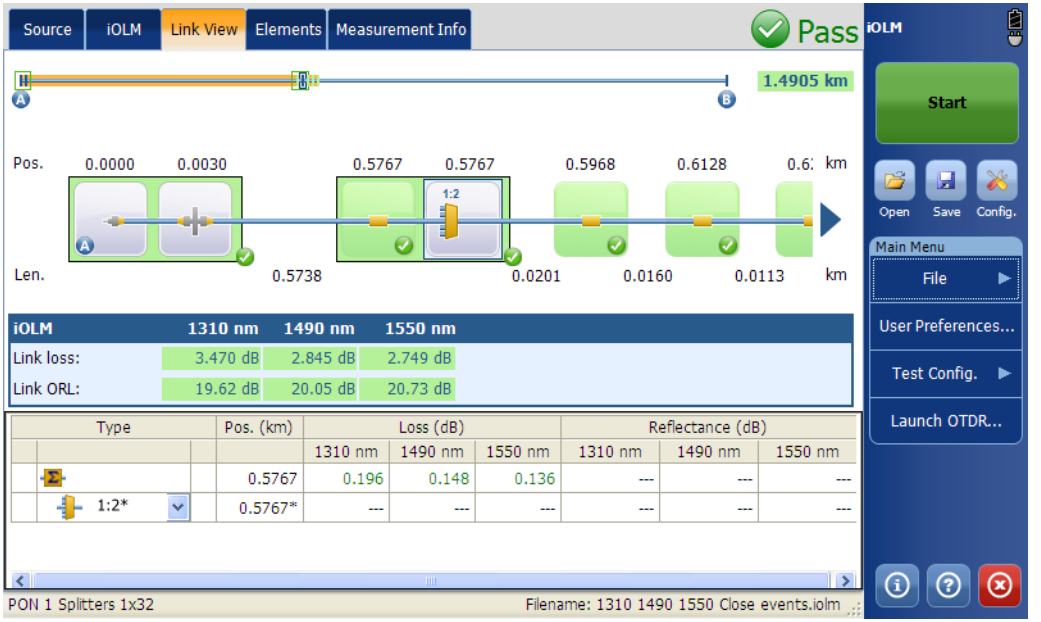
User Guide

iOLM

intelligent Optical Link Mapper



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Telecom Test and Measurement

EXPERTISE REACHING OUT

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

Patents

Feature(s) of this product is/are protected by one or more of US patent 6,612,750; and US patent 8,576,389 and equivalent patents pending and/or granted in other countries.

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Certification Information

North America Regulatory Statement

This unit was certified by an agency approved in both Canada and the United States of America. It has been evaluated according to applicable North American approved standards for product safety for use in Canada and the United States.

Electronic test and measurement equipment is exempt from FCC part 15, subpart B compliance in the United States of America and from ICES-003 compliance in Canada. However, EXFO Inc. makes reasonable efforts to ensure compliance to the applicable standards.

The limits set by these standards are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the user guide, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

European Community Declaration of Conformity

Warning: This is a class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

An electronic version of the declaration of conformity for your product is available on our website at *www.exfo.com*. Refer to the product’s page on the Web site for details.

1 Introducing the intelligent Optical Link Mapper

The intelligent Optical Link Mapper (iOLM) is an optimized application for access/FTTx network characterization. Depending on the iOLM module configuration, the application can be used before and after network activation.

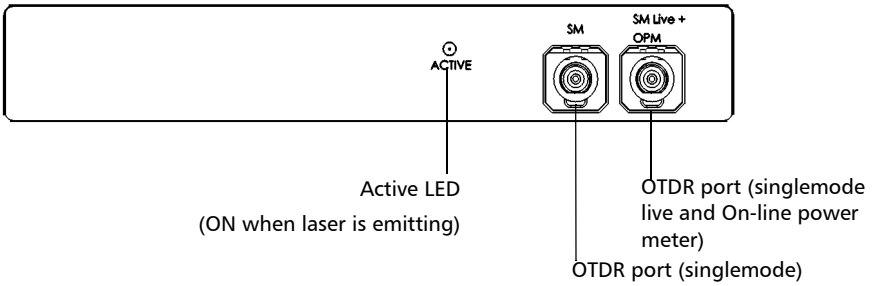
The iOLM module can be equipped optionally with an inline power meter. The power meter is called inline because the acquisition is done using the SM live port used for iOLM measurements. Optionally, you can measure the power levels for two wavelengths in a single acquisition, if two wavelengths are used for testing.

Note: *Your screen display may differ slightly from the figures in this user documentation depending on the platform you are using.*

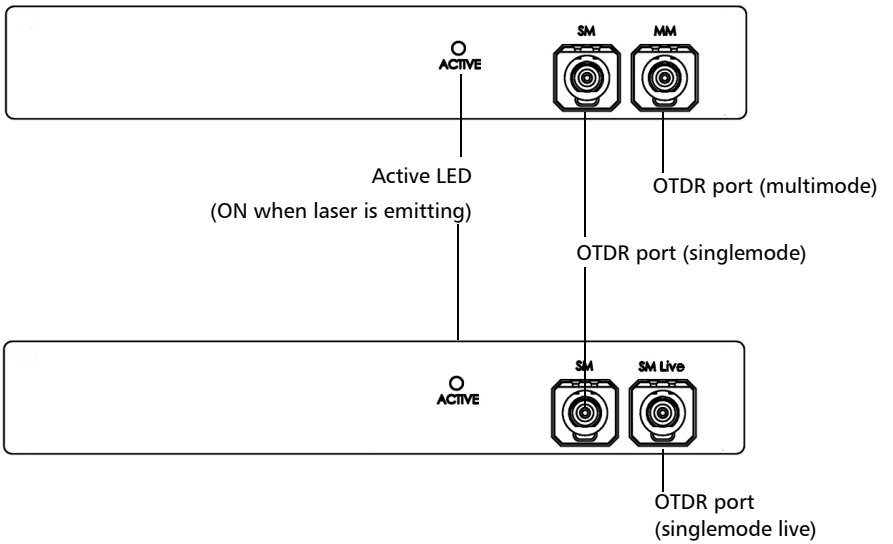
Note: *Depending on the model and options you have purchased, some features may not be available.*

Note: *In this documentation, the words "tap" and "double-tap" (related to the use of a touchscreen) replace the words "click" and "double-click".*

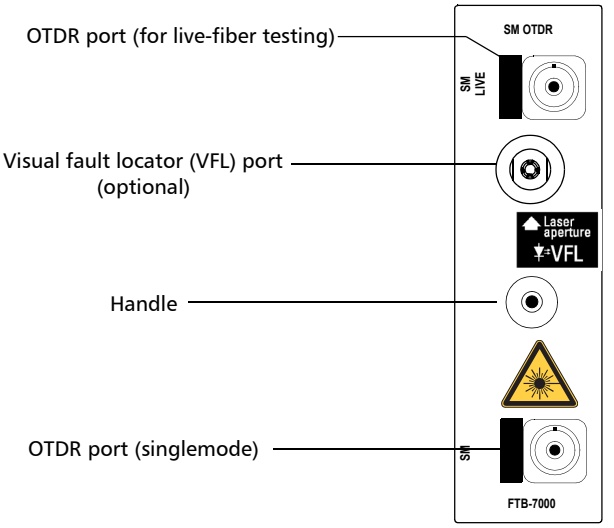
FTB-730 / FTB-730G / FTB-730G+ for FTB-1



FTB-720 / FTB-720G / FTB-720G+ for FTB-1

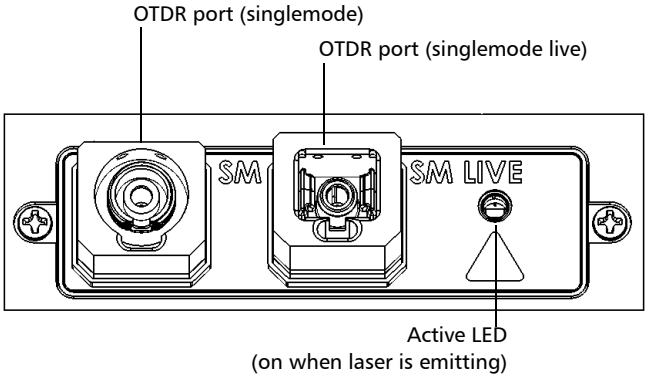


FTB-7000 Series for FTB-2, FTB-2 Pro, and FTB-500

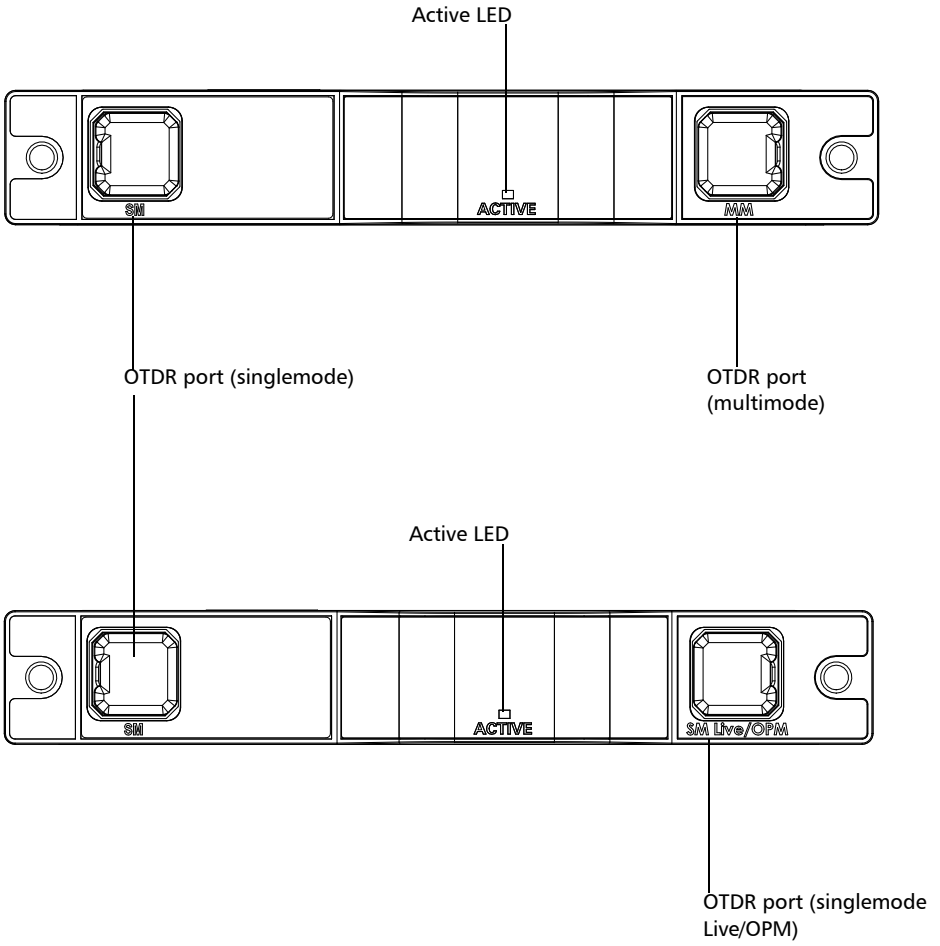


Singlemode and singlemode live models

MAX-700B Series



FTB-700C Series, MAX-700C Series, FTB-700Gv2 Series, and FTBx-700C Series



Principles of Operation

The iOLM application uses the hardware of an EXFO OTDR to perform acquisitions and characterize the various elements detected on the probed link. However, while a regular OTDR takes one averaged trace at a time, with one given set of test parameters, the iOLM takes a series of measurements and integrates them into a simple and intuitive Link View.

The test parameters for each sub-measurement are determined by smart algorithms during the measurement. Just as each link is different, each iOLM measurement is different, with its own set of test parameters according to the link length, loss, and ORL. Test time varies depending on the link tested, but is mostly influenced by total link loss. The application uses information from all sub-measurements to enhance the characterization of each element found on the link, yielding accurate and complete results. Depending on the module configuration, you can perform a single or multiple-wavelength acquisition. In the latter case, results will be provided for each wavelength, and a global pass/fail status for each element is displayed.

The application summarizes the results in a linear representation of the link, displaying each element with its associated position, loss and reflectance, as well as the element type.

Exporting Data to Other Formats

The iOLM application can generate report in various formats and allow batch post-processing of the measurement. The test configuration files can be created from FastReporter and imported on each test unit.

Performing Multimode Measurements

If your module supports multimode measurements, it can test both 62.5 μm and 50 μm fibers. The internal multimode fiber for an EXFO OTDR is 62.5 μm.

- When a 62.5 μm fiber is connected, the loss at the connector can be correctly characterized just like in the case of a singlemode fiber. It is then simple to evaluate a pass/fail criterion in this case.
- When a 50 μm fiber is connected, the loss at the connector depends on many factors:
  - the connector loss itself
  - the 62.5 μm to 50 μm core fiber difference
  - the RBS difference between 50 μm and 62.5 μm fibers

  The measured loss between the OTDR connector and the fiber is typically around 3.3 dB.

  With 50 μm fibers, since the connector loss measurement at the OTDR is imprecise because of major other factors, the iOLM excludes the first connector from the link rather than providing inaccurate information.

With a launch fiber, the connector at link start (connector A) is “On-Link”.

When characterizing a multimode link or a singlemode fiber, launch fibers are recommended. In multimode, the launch and receive fibers must have the same core size as the link under test. Using an unfitting launch or receive fiber would lead to inaccurate results.

The use of an external EF-compliant device such as the SPSB-EF-C30 will ensure a fast and easy way to get accurate loss measurements. For more information about encircled flux compliance, refer to the encircled flux test solution specification sheet.

Launch, Receive, and Loop Fibers

Unlike a traditional OTDR, the iOLM requires only a short launch fiber (>50 m) to benefit from all the advantages of this referencing method, regardless of the link length and loss. A launch fiber longer than 200 m is not recommended when testing PON links. Because the output port of an OTDR may degrade its loss and ORL performances after multiple connections, the use of a launch cable is always recommended.

The first element of the tested link is tagged with the letter (A) into the link view. A launch cable allows you to properly characterize the first connector of the fiber link under test (A) and exclude the OTDR connector's wear from the link evaluation. A reasonable amount of degradation of the OTDR connector is acceptable when using an APC interface; the ORL remains low due to the angle polish, preventing poor near-end resolution. By using a launch fiber, the OTDR connector loss is excluded from the measurement. The iOLM evaluates the OTDR connector loss each time a measurement is performed to inform you about the condition of the connector. It is important to understand that excessive loss at this connector will eventually degrade the measurement capabilities of the instrument. In addition, using a launch cable will help protect your OTDR connector by limiting the number of connections performed directly on that connector. It is easier to repair or replace a launch cable than to replace the OTDR connector.

The last element of the tested link is tagged with the letter (B) into the link view. A receive fiber cable can be used at the end of the link opposite the test module in order to characterize the last connector of the link (B) and increase the precision of the total insertion loss result by comparing differential level of two known fibers (to avoid errors due to different backscatter coefficients of the fiber used in the link). If no receive cable is used, the iOLM application will be able to measure the position and ORL of this connector in unmatched condition, but not its loss. No pass/fail status will be displayed for that connector. The required length of the receive fiber will depend on the loss of the link under test. A higher loss requires a longer pulse to reach the receive fiber level. Unlike the launch fiber, the

receive fiber has the same limitations than that of a traditional OTDR. Test of a 1 km fiber span with less than 2 dB of loss will require only 100 m of receive fiber. Testing a 23 dB PON link will require a receive fiber of 500 m to 2 km, depending on the fiber length after each splitter.

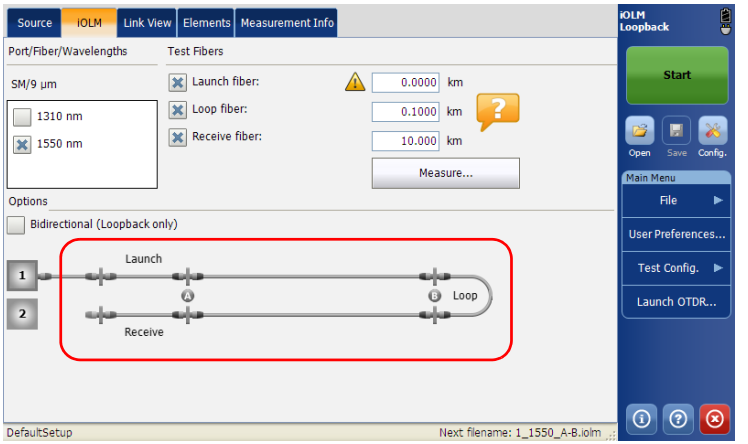
You can have the iOLM application measure the launch and receive cable lengths automatically, or you can enter the values manually. Regardless of the method you use, you have to set the length of the loop fiber manually. After the values are set, the application will perform a calibration during which it does a fast measurement and evaluates the length of the fiber. For this reason, you must connect only the cable under test to the module at this point.

If link elements are found on the fiber under calibration or if the OTDR connector is defective, the calibration will fail and a warning is displayed to explain the reason for the failure. A short patchcord (<5 m) is accepted between the instrument and the fiber under calibration and will be included in the calibrated length. If the calibration is successful, the launch or receive fiber length will be updated in the **Test Parameters** tab.

When performing a measurement, the iOLM will try to match the defined launch and receive fibers with elements found on the link to set the A and B connector positions. If no events are found at specified distances because of a “perfect” connection between link and launch or receive fibers, the iOLM will insert an element at a specified position (with zero loss and ORL).

The loopback measurement modes are designed to test duplex cables and save test time by measuring two fibers at a time.

In the loopback measurement modes, one end of the first fiber is connected to the iOLM through a launch fiber, while the other end is connected to the second fiber using a fiber called a loop. Usually, a receive fiber is used on the proximal end of the second fiber. The loop fiber can be viewed as a receive fiber for the first fiber (the one the iOLM is connected to) and a launch fiber for the second fiber.



The automatic split of the initial measurement can only be performed if the length of the launch, loop and receive fibers are properly specified in the application.

See *Configuring your iOLM* on page 47 for more details.

Software Options

Software options are offered with your unit.

- The iOLM software option gives you access to the iOLM application.
- The iCERT software option gives you access to certification configuration files; these will give you a pass/fail status based on industry standards. Since the thresholds cannot be edited, you are ensured of reliable pass/fail results each time.
- The iEX (iOLM EXpert) software option activates edition of links and custom elements, 2:N splitters, and link reanalysis.
- The Loopback (LB) software option allows you to perform both unidirectional and bidirectional iOLM loopback measurements. Both unidirectional and bidirectional iOLM loopback measurements loop two fibers together at one end to test both fibers at once.
  The unidirectional loopback measurements tests two fibers at once and evaluates both fibers separately.
  The bidirectional loopback measurements provides an auto-pairing function of two measurements (A -> B, B-> A). When both measurements have been correctly differentiated from one another, the application generates the bidirectional measurement for two fibers.
- The PON Last Mile Certification Optimode (iOPT-LM) software option enables you to perform a fiber characterization of the fiber between the ONT and the splitter (access fiber). The option detects the presence of splitters to ensure the fiber is connected to a splitter via a distribution fiber.
- The iMF software option enables you to perform multifiber iOLM test measurements in singlemode, using an externally controlled MPO optical switch.
- The QUAD software option activates the singlemode wavelengths on a unit.

Technical Specifications

To obtain this product's technical specifications, visit the EXFO Web site at *www.exfo.com*.

Conventions

Before using the product described in this guide, 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 Safety Information

General Safety Information

WARNING

Do not install or terminate fibers while a light source is active. Never look directly into a live fiber and ensure that your eyes are protected at all times.

WARNING

The use of controls, adjustments and procedures, namely for operation and maintenance, other than those specified herein may result in hazardous radiation exposure or impair the protection provided by this unit.

IMPORTANT

When you see the following symbol on your unit **, make sure that you refer to the instructions provided in your user documentation. Ensure that you understand and meet the required conditions before using your product.**

IMPORTANT

Other safety instructions relevant for your product are located throughout this documentation, depending on the action to perform. Make sure to read them carefully when they apply to your situation.

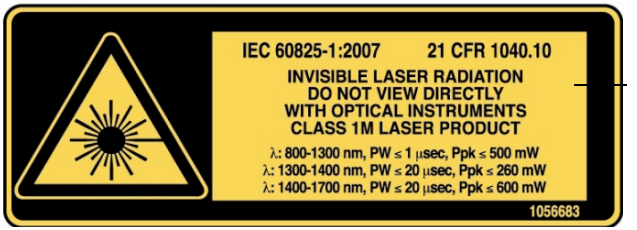
Laser Safety Information for FTB-7000 Series (Units without VFL)

Your instrument is a Class 1M laser product in compliance with standards IEC 60825-1: 2007 and 21 CFR 1040.10, except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007. Laser radiation may be encountered at the output port.

WARNING

Viewing the laser output with certain optical instruments (for example, eye loupes, magnifiers, and microscopes) within a distance of 100 mm may pose an eye hazard.

The following label(s) indicate that the product contains a Class 1M source:

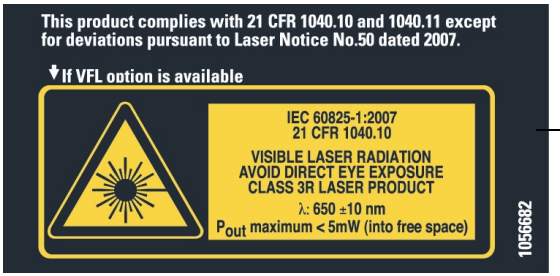


Affixed to module's side panel

Laser Safety Information for FTB-7000 Series (Units with VFL)

Your instrument is a Class 3R laser product in compliance with standards IEC 60825-1: 2007 and 21 CFR 1040.10, except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007. Laser radiation is emitted at the output port. It is potentially harmful in direct intrabeam viewing.

The following label(s) indicate that the product contains a Class 3R source:



Affixed to module's side panel

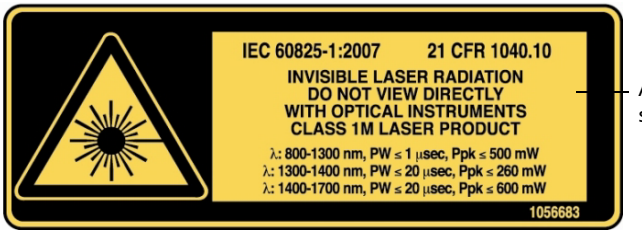
Laser Safety Information for FTB-720/720G/ 720G+ and FTB-730/730G/730G+

Your instrument is a Class 1M laser product in compliance with standards IEC 60825-1: 2007 and 21 CFR 1040.10, except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007. Laser radiation may be encountered at the output port.

WARNING

Viewing the laser output with certain optical instruments (for example, eye loupes, magnifiers, and microscopes) within a distance of 100 mm may pose an eye hazard.

The following label(s) indicate that the product contains a Class 1M source:



Affixed to module's side panel

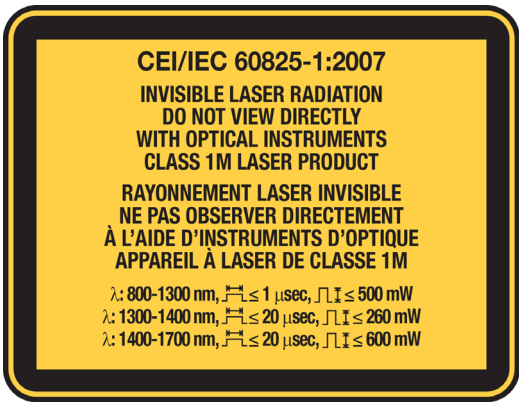
Laser Safety Information for FTB/FTBx/FTB-700Gv2/MAX-700C Series (Units without VFL)

Your instrument is a Class 1M laser product in compliance with standards IEC 60825-1: 2007 and 21 CFR 1040.10, except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007. Laser radiation may be encountered at the output port.

WARNING

Viewing the laser output with certain optical instruments (for example, eye loupes, magnifiers, and microscopes) within a distance of 100 mm may pose an eye hazard.

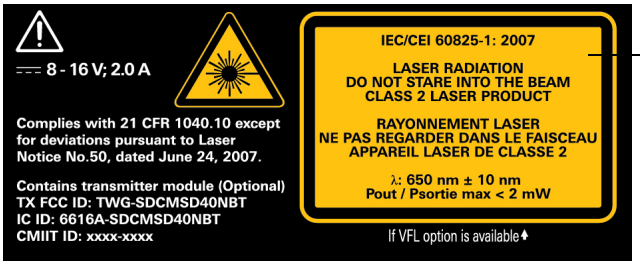
The following label(s) indicate that the product contains a Class 1M source:



MAX-700C Series (Units with VFL)

Your instrument is a Class 2 laser product in compliance with standards IEC 60825-1: 2007 and 21 CFR 1040.10, except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007. Laser radiation is emitted at the output port.

The following label(s) indicate that the product contains a Class 2 source:



Affixed to module's back panel

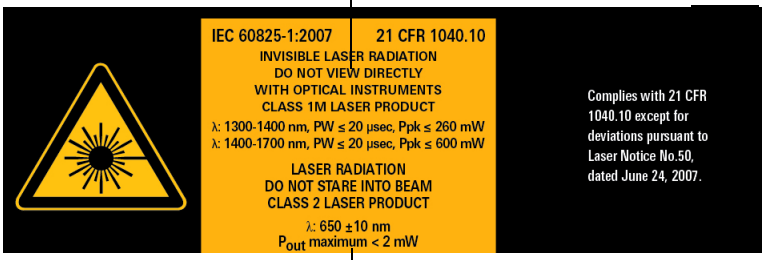
Laser Safety Information for MAX-700B Series

Your instrument is a Class 1M laser product in compliance with standards IEC 60825-1: 2007 and 21 CFR 1040.10, except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007. Laser radiation may be encountered at the output port.

WARNING

Viewing the laser output with certain optical instruments (for example, eye loupes, magnifiers, and microscopes) within a distance of 100 mm may pose an eye hazard.

The following label(s) indicate that the product contains a Class 1M source:



Note: *The label is affixed to the back panel of the unit.*

Electrical Safety Information

For more information on product safety and equipment ratings, refer to the user documentation of your platform.

The power consumption of all intelligent Optical Link Mapper modules is below 10 W.

3 Getting Started with your iOLM

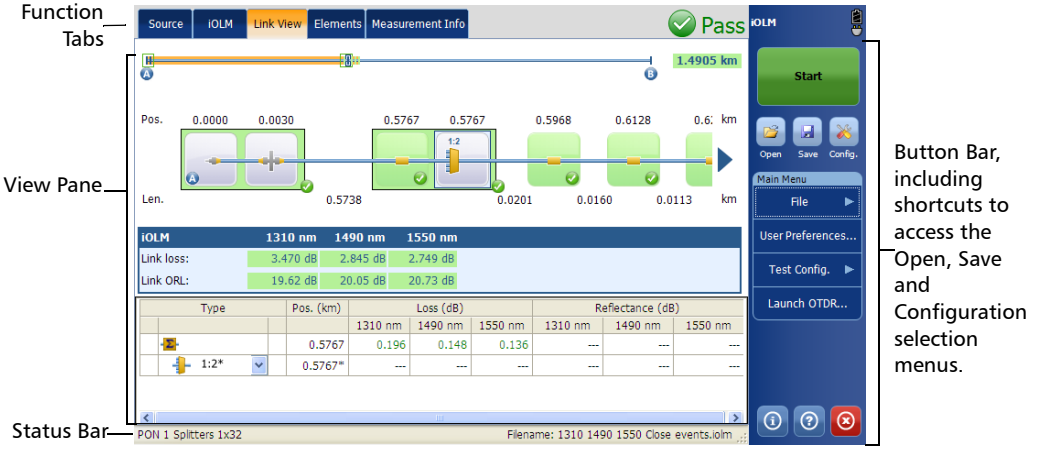
Note: *Please refer to your platform's or unit's user guide for detailed information regarding inserting and removing test modules, and starting applications.*

Note: *In the case of the FTB-700G Series, you can run only one application at a time, either NetBlazer or the iOLM application. To start the iOLM application, from Mini ToolBox, select the OTDR module, then tap the button corresponding to the desired application. To start the NetBlazer application, refer either to the Transport Application user guide or to the Ethernet/Packet Sync/FC/Wireless user guide for more information.*

Note: *Some features for this application are enabled when you purchase the corresponding options. For details on how to activate an option, refer to your platform's or unit's user guide.*

Main Window

The main window allows you to start the acquisition and view measurement results and values.



Status Bar

The status bar, located at the bottom of the main window, identifies the selected configuration file name in the application, acquisition wavelength (when an acquisition is in progress), and the acquisition progress bar of the iOLM. It also displays the next file name according to the autonaming scheme. For more information, see *Naming iOLM Files Automatically* on page 39.

Note: *When an acquisition is not in progress, the file name of the file currently present in memory is displayed.*

Name of the current configuration file.

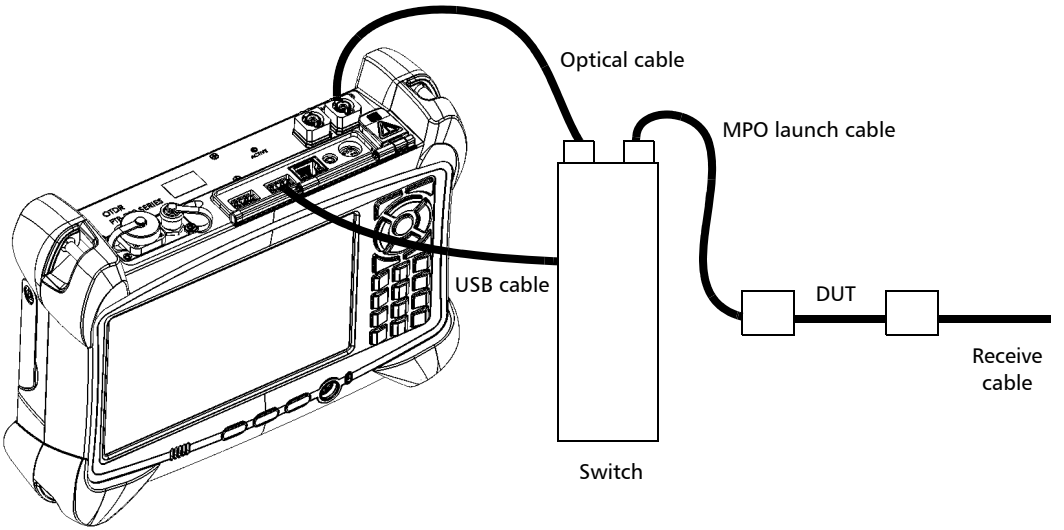
Name of the current loaded iOLM file. The loaded file name and the next file name turns into a progress bar during the acquisition.

Connecting a Switch to the iOLM

The iMF software option enables you to perform multifiber iOLM test measurements in singlemode, using an externally controlled optical switch.

The optical switch is used automatically. A USB cable provides the connection between the platform and the optical switch. For more information, see *Configuring your iOLM* on page 47.

Note: *To allow the iOLM to detect the optical switch, a patchcord shorter than 20 meters should be used to connect the iOLM to the optical port of the switch.*



Note: *Refer to the user documentation that came with your external switch for more information.*

4 Preparing your iOLM for a Test

Cleaning and Connecting Optical Fibers

IMPORTANT

To ensure maximum power and to avoid erroneous readings:

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

To connect the fiber-optic cable to the port:

1. Inspect the fiber using a fiber inspection probe. If the fiber is clean, proceed to connecting it to the port. If the fiber is dirty, clean it as explained below.
2. Clean the fiber ends as follows:
   - **2a.** Gently wipe the fiber end with a lint-free swab dipped in optical-grade liquid cleaner.
   - **2b.** Use a dry swab to dry the connector completely.
   - **2c.** Visually inspect the fiber end to ensure its cleanliness.
3. 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.
4. 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.

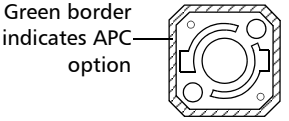
Note: *If your fiber-optic cable is not properly aligned and/or connected, you will notice heavy loss and reflection.*

EXFO uses good quality connectors in compliance with EIA-455-21A standards.

To keep connectors clean and in good condition, EXFO strongly recommends inspecting them with a fiber inspection probe before connecting them. Failure to do so will result in permanent damage to the connectors and degradation in measurements.

Installing the EXFO Universal Interface (EUI)

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

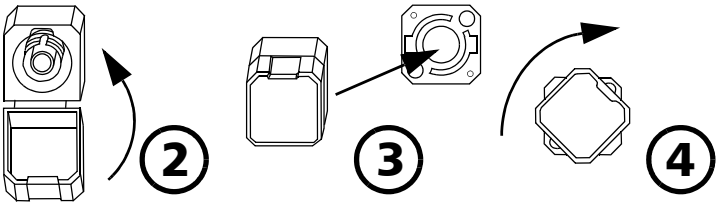


IMPORTANT

EXFO strongly recommends to only use APC module connectors.

To install an EUI connector adapter onto the EUI baseplate:

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



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

5 Setting User Preferences

The **User Preferences** window allows you to set general settings, identification settings, and select the power meter mode.

Note: *The preference settings are user specific.*

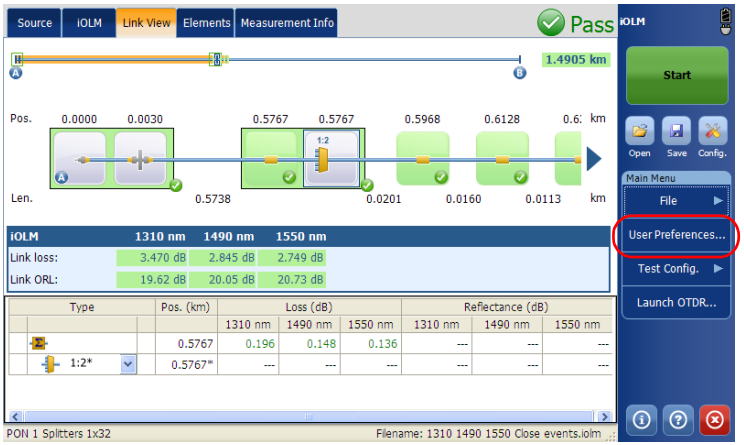
Defining General Settings

The **General** tab allows you to enable/disable items such as sound, fiber section information, file functionalities, whether you save a report upon saving files and export the file to OTDR Bellcore (.sor) format, and set the distance unit for the application.

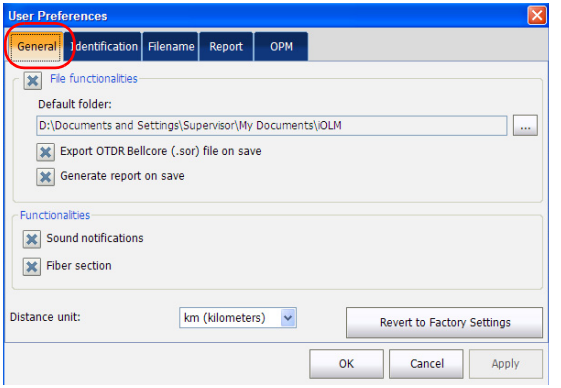
Note: *The .sor format is not supported by the bidirectional loopback measurement.*

To set general settings:

1. From the **Main Menu**, tap **User Preferences**.



2. Select the **General** tab.



3. Under the **General** tab, configure the following settings:

➤ **File Functionalities**: If enabled, any user interface control related to file functionalities (for example, Default path, Export OTDR bellcore file, Generate report on save, Open, Save, Filename, etc.) will be visible on the screen.

Note: *If the **File Functionalities** option is disabled, the application does not notify you with the warning message when files are saved. When **File Functionalities** is disabled, the **Default folder**, **Export OTDR Bellcore (.sor) file on save**, and **Generate Report** options are also disabled.*

➤ **File Save Path**: Enter the location for saving the files. This path is used to save the iOLM files and OTDR Bellcore (.sor) files after an acquisition.

Note: *The default path provided by the operating system is used to save the files the first time you start an acquisition.*

- **Export OTDR Bellcore (.sor) file on save**: If enabled, an OTDR Bellcore (.sor) file is generated for each wavelength whenever the iOLM measurement is saved. The wavelength value that is appended to the filename and it is separated with an "_" (underscore).

Note: *When the iOLM bidirectional loopback process is successful, the application does not generate the corresponding OTDR Bellcore (.sor) file, even if the **Export OTDR Bellcore (.sor) file on save** option is enabled.*

Note: *The Bellcore (.sor) fails if the iOLM measurement doesn't contain the necessary intermediate OTDR data, or if the iOLM acquisition process is interrupted by the user, or it is self interrupted because of a live fiber is present in iOLM measurement.*

- **Generate Report on Save**: If enabled, the report is automatically saved each time the measurement is saved.

Note: *You can also generate a report by selecting **Report** in the **File** menu.*

- **Distance Unit**: Select the distance unit from the drop-down menu.

Note: *The units displayed in the application and report depend on the unit selected here.*

- **Sound Notification**: If enabled, you will hear a sound when the unit detects important events.
- **Fiber section(s)**: If enabled, you can select the section in the link view and the corresponding details of the selected section are displayed in the **Elements** table.

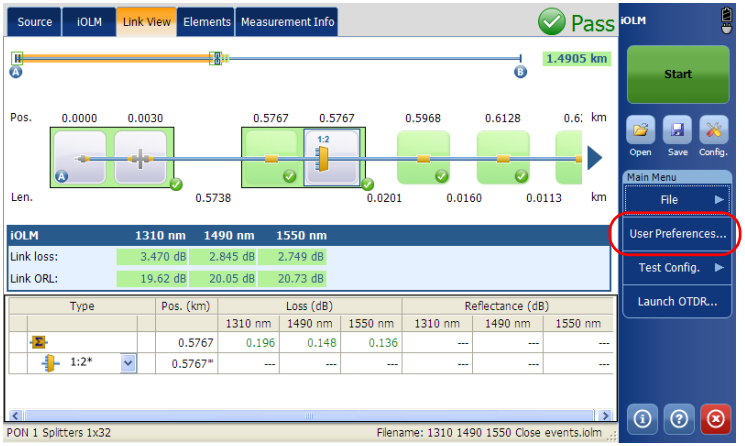
Tap **Revert to Factory Settings** to remove all the changes and apply the default values.

Defining Measurement Identification

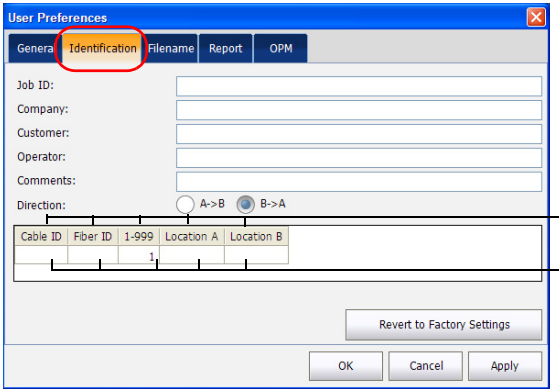
You can define the measurement identification information, that is, job ID, company information, customer name, name of the operator, and comments for the future acquisition in the **Identification** tab. The identifiers defined in the **Link Definition** tab are also displayed here (see *Modifying Link Definition* on page 64 for more details).

To enter identification information:

1. From the **Main Menu**, tap **User Preferences**.



2. Select the **Identification** tab.



3. Define the identification information as needed.

   The range describes the auto-increment start and stop values for the identifiers. It is specified in the **Identifiers** tab under the **Test Configuration** window.

   The file name generated for future acquisitions will contain the combination of the numeric and alphanumeric values specified in the respective fields. For more information on file autonaming, see *Naming iOLM Files Automatically* on page 39.

4. Select the direction of the iOLM file from the **Direction** option.

Note: *When working in unidirectional loopback, the direction is disabled because it will be set automatically by the loopback process. In a bidirectional loopback measurement, the direction is automatically set to Bidirectional.*

5. Tap **Apply** to save the changes.

6. Tap **OK** to save the changes and close the window, or tap **Cancel** to exit without saving.

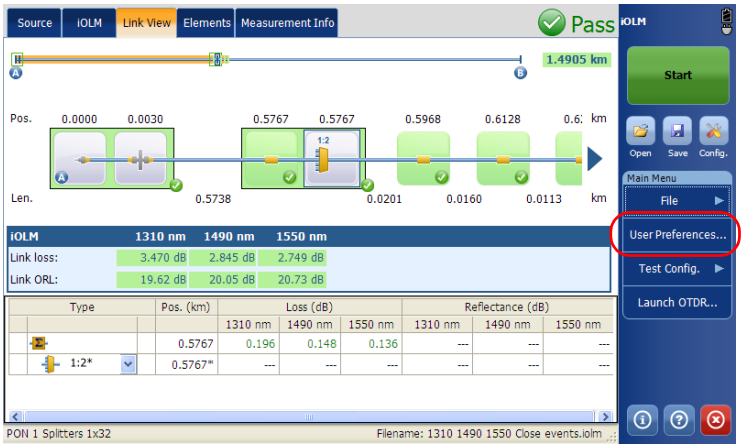
Tap **Revert to Factory Settings** to remove all the changes and apply the default values.

Customizing the File Name

The application provides a way to define the name of the file to be saved. Defining a file autonaming format allows you to quickly and automatically name the files in a sequential order. The customized file name appears when the file is saved. It is possible to select which fields you want to include in the file name and the order in which it should be displayed. With the loopback option, the direction can be appended to the name of the file.

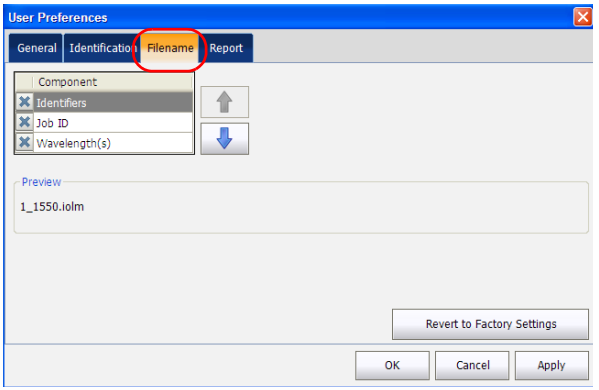
To customize the file name:

1. From the **Main Menu**, tap **User Preferences**.

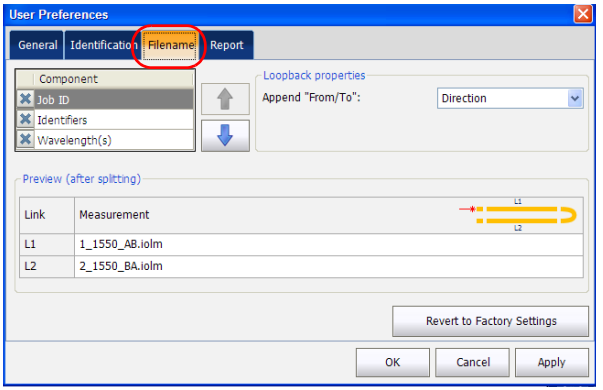


2. Select the **Filename** tab.

Standard measurement



Loopback measurements



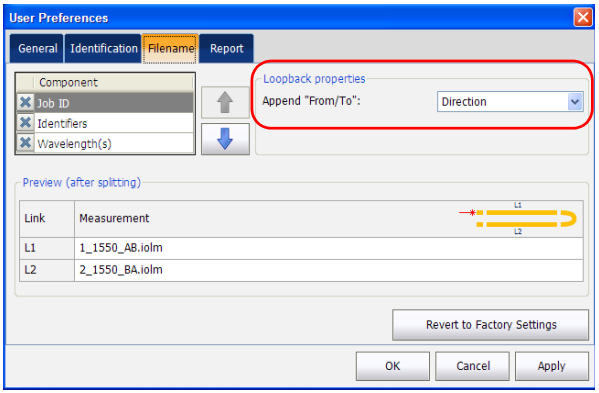
3. Select which component you want to include in the file name from the list of available choices:

   - **Job ID**: indicates the Job ID configured in the **Preferences** under the **Identification** tab.
   - **Wavelength(s)**: indicates the current iOLM and power meter wavelengths.
   - **Identifiers**: indicates the identifier value configured in the **Preferences** under the **Identification** tab.

Note: *The identifier value is automatically incremented after a new acquisition is successfully saved using **Save** option. The **Save As** option will not increment the identifier value automatically.*

4. Tap Up ( ) or Down ( ) to change the order in which the components will appear in the file name.

5. If you have the loopback (LB) software option, under **Loopback properties**, select **Append "From/To"** to append the direction to the name of the file.



Based on the items you have selected, a preview of the file name is displayed under **Preview**. The components are separated with an "_" (underscore).

Note: *If you do not select any file component, the **Save As** window appears even when you tap **Save**.*

6. Tap **Apply** to save the changes.
7. Tap **OK** to save the changes and close the window, or tap **Cancel** to exit without saving.

Tap **Revert to Factory Settings** to remove all the changes and apply the default values.

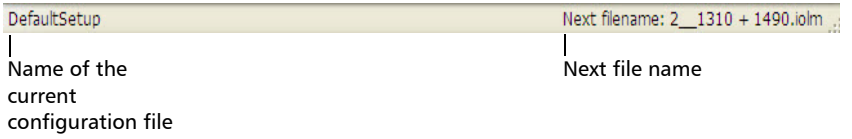
Note: *If the "Wavelengths" file name component is selected, then all of the iOLM wavelengths present in the iOLM measurement are added to the file name. When the power meter level is present in the measurement, power meter wavelengths are added to the file name. For example, if the wavelength is the only file name component selected under the* ***Filename*** *tab, the iOLM measurement is done at 1625 nm and the power meter measurement is done at 1490 nm + 1550 nm, then the file name will be "1625_1490 + 1550.iolm".*

Naming iOLM Files Automatically

Each time you start an acquisition, the application suggests a next file name based on autonaming settings.

The application displays the next file name in the status bar in the following scenarios:

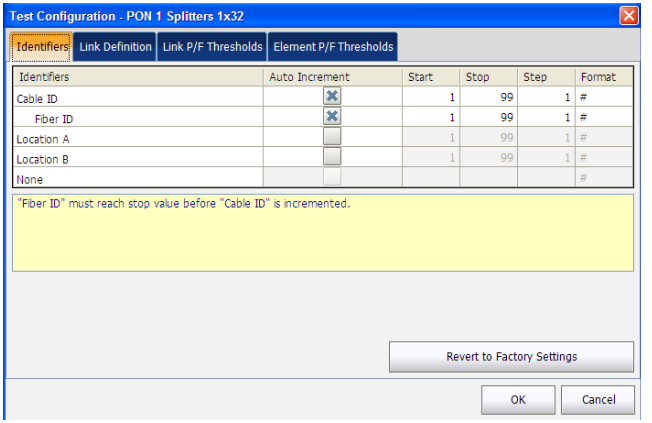
- When the application is started for the first time, the status bar displays the next file name. You can change the name of the next file through the **Filename** tab. When you load the iOLM file the application displays the corresponding file name in the status bar.
- When the acquisition is complete and the file is not saved, the next file name is displayed. Once the file is saved the application displays the file name.



The application displays the file name in the Status bar, after the file is saved.

Note: *All the file name components are enabled in this example. See* Customizing the File Name *on page 34 to enable file name components.*

Consider the figure below as an example of autonaming feature.



You can find the above window at **Test Config.** > **Manage** > **Modify** > **Identifiers** tab.

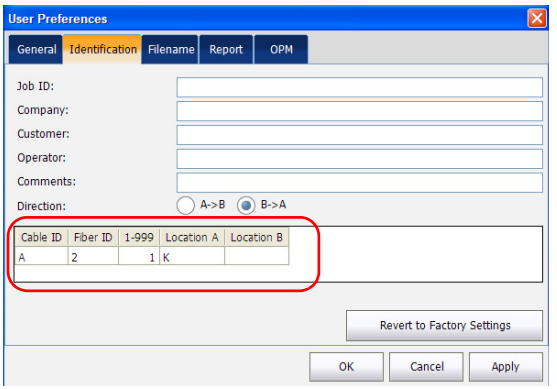
In the figure above, you can modify the identifiers, start, stop, and step values and enable the auto increment of the identifier values. See *Modifying Identifiers* on page 62 for more details on how to specify the start, stop, and step values.

You can select the number of digits displayed for the incremented or decremented values.

Select "#" if you want to keep the value exactly in the same format as defined in the start and stop values. If a value is to be incremented from 1 to 10, it becomes 1, 2, 3, ... 9, 10. One "#" is the default format.

Select two, three, or four "#" if you want all values to be expressed with the same number of digits. The application fills the empty spaces with zeros before the increment or decrement to ensure the appropriate format is displayed. For example, if you select two "#" and the value is to be incremented from 1 to 10, it becomes 01, 02, 03, ... 09, 10.

Note: *The identifiers defined in the **Identifiers** tab are displayed in the **Identification** tab of the **User Preferences** window.*



You can find the above window at **User Preferences** > **Identification** tab.

In the figure above, you can specify the values of the identifiers, such as **OLT** as A, OLT measurement range as 2, **ONT** as B, and so on.

Note: *By default, the start values specified in the **Identifiers** tab are displayed in the measurement range in the table under **User Preferences** in the **Identification** tab. See* Defining Measurement Identification *on page 32 for more details.*

After an acquisition is successfully saved, the file name is the combination of job ID, identifiers, and the wavelength. These values are separated in the file name with an "_" (underscore).

For example, the file name after the first acquisition is <Job ID>_A2_B1_K3_<wavelength>.iolm

Note: *If the ONT, OLT, and location values are not specified, then the file name will only contain the Job ID value, numeric identifiers value, and the wavelength.*

After a new acquisition is successfully saved, the location value will increment by the set step value, that is, for the second acquisition file name, the location value will be 6.

So, the file name after the second acquisition can be

<Job Id>_A2_B1_K6_<wavelength>.iolm

When the location value reaches the stop value, it resets to start value and ONT value starts incrementing by step value.

The auto increment of values proceeds from right to left.

Note: *The auto increment continues until the first number (that is, OLT value) reaches the stop value.*

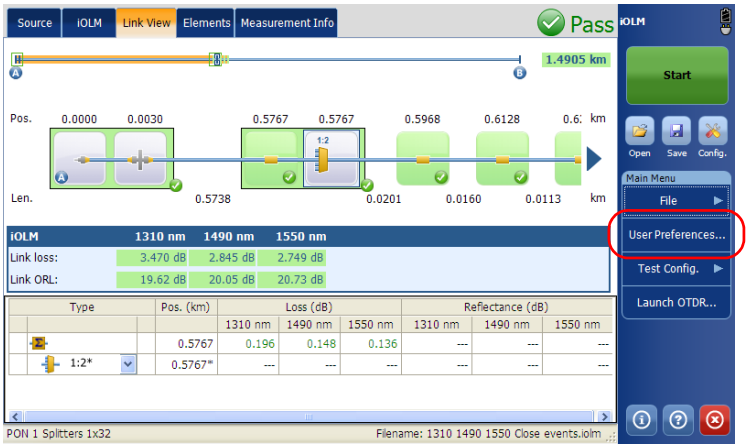
Customizing the iOLM Report

The application allows you to personalize the iOLM report.

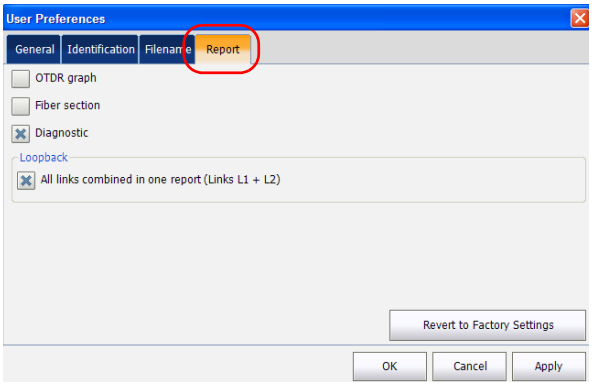
Note: *You can only generate PDF reports for loopback measurements.*

To customize the iOLM report:

1. From the **Main Menu**, tap **User Preferences**.



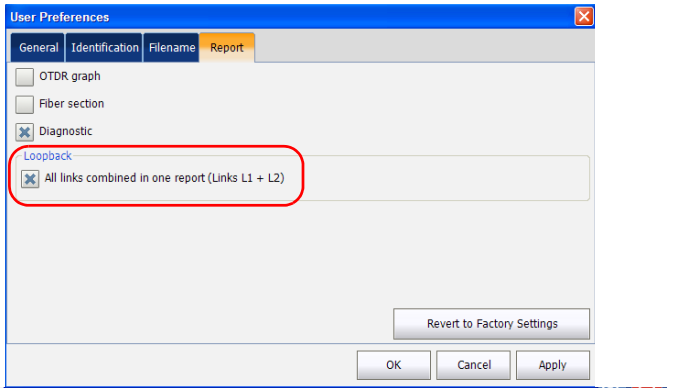
2. Select the **Report** tab.



3. If your unit allows it, select the report file type from **File type** option.
4. Select the **OTDR Graphic** option to display the OTDR graph in the iOLM report.

Note: *The OTDR graph generation fails if the iOLM measurement does not contain the necessary intermediate OTDR data, or if the iOLM acquisition process is interrupted by the user, or it is self interrupted because of a live fiber is present in iOLM measurement.*

5. Select **Fiber section(s)** option to display the section information in the iOLM report.
6. Select **Diagnostic** option to display the diagnostics information in the iOLM report.
7. If you have the loopback (LB) software option, under **Loopback**, select the checkbox if you want to generate a report with all links combined in one report.



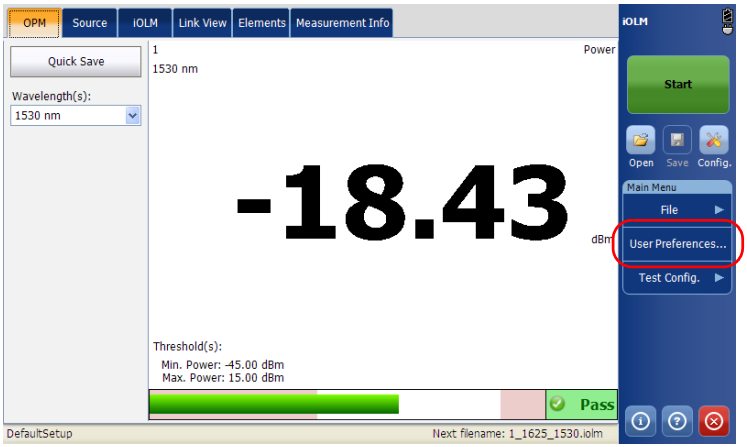
Tap **Revert to Factory Settings** to remove all the changes and apply the default status.

Customizing the Optical Power Meter

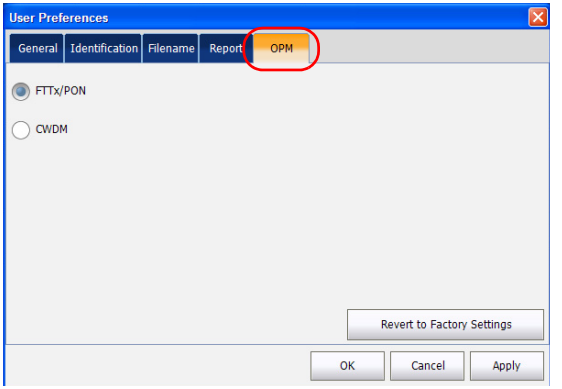
The **OPM** tab is available when an inline power meter is available in the module. This tab allows you to select the power meter mode which affects the available wavelengths in the **OPM** tab of the main window.

To customize the Optical Power Meter:

1. From the **Main Menu**, tap **User Preferences**.



2. Select the **OPM** tab.



3. Select the power meter mode. The choices are **FTTx/PON** and **CWDM**.

Note: *The wavelengths available in the **OPM** tab are those used for the selected power meter mode.*

4. Tap **Apply** to save the changes.
5. Tap **OK** to save the changes and close the window, or tap **Cancel** to exit without saving.

Tap **Revert to Factory Settings** to remove all the changes and apply the default values.

Configuring your iOLM

The **iOLM** tab displays the settings used for taking measurements. The iOLM performs the acquisition on the port and wavelengths selected in the iOLM tab; the values are preserved for the next acquisition.

The loopback mode allows you to test two fibers at once, which saves time and manipulations. If you have activated the loopback option for your application, it is ready to use when needed.

When working in loopback mode, there are three rules to follow so the loopback can give appropriate results:

- Both fibers under test and connected to the loop must have the same length.
- The launch and receive lengths must be specified correctly.
- The length of the loop must be specified correctly.

The loopback measurement is especially designed for testing cables formed of a pair of identical fibers of an equivalent length. The measuring time is optimized because two fibers are checked in a single measurement.

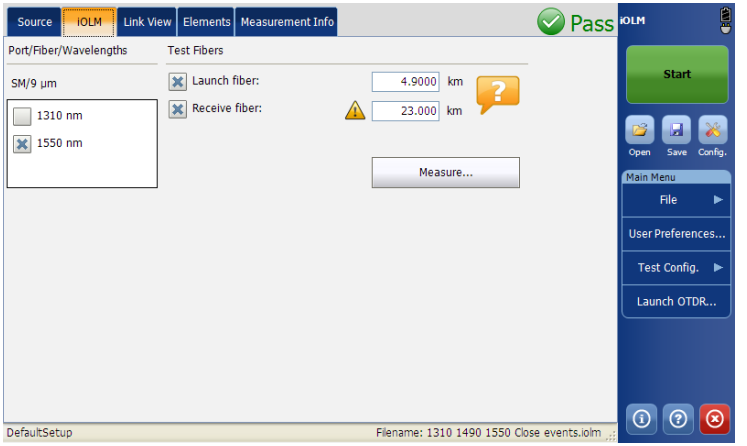
Note: *You cannot use the files created using the loopback mode to perform a second loopback operation.*

When you work with the launch, receive and loop fiber lengths, you can set the values yourself. You can also let the application determine the most appropriate launch and receive fiber values.

If you have the iMF software option, you can perform multifiber iOLM test measurements in singlemode, using an externally controlled MPO optical switch.

To configure the iOLM:

1. From the main window, select the **iOLM** tab.



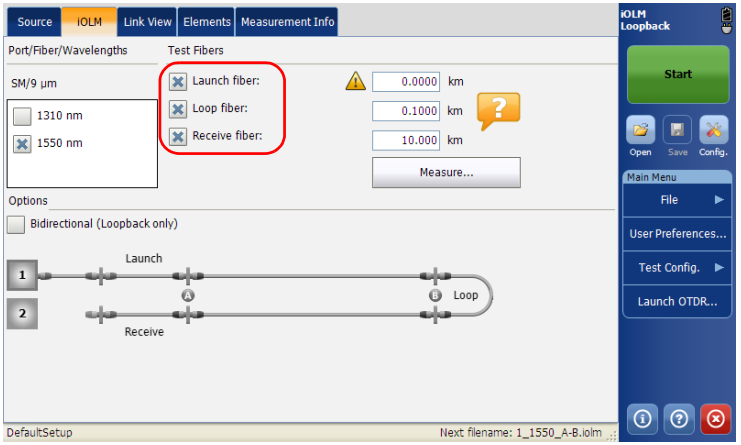
2. If two ports are available on your module, select which one to use for your test. The fiber core is also selected at this point; for C fibers, select 50 µm, and for D fibers, select 62.5 µm.

3. Select the wavelengths for the next acquisition. The available wavelengths depend on the iOLM module.

4. Specify if a launch and receive fibers are connected to the link under test.

If you have the loopback (LB) software option and if you want to test in loopback mode, select the loop fiber checkbox.

See *Launch, Receive, and Loop Fibers* on page 8 for more details.

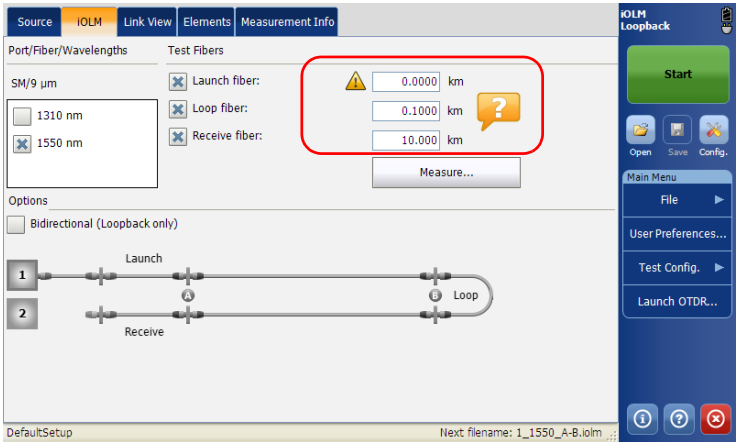


You can specify the launch, receive and loop fiber lengths manually. To do so, go to step 5. If you prefer to let the application determine the most appropriate launch and receive fiber values automatically, go to step 6.

5. If you want to specify the launch, receive and loop fiber lengths manually, enter the values in the corresponding boxes.

The acceptable range is from 0 to 5 km for the launch fiber and 0 to 10 km for the receive fiber.

The range for the loop fiber is from 0 to 5 km.



When specifying a launch and a receive fibers, as well as a loop fiber, two different icons may appear when the fiber length is out of the recommended range. If you tap on the icons, the application then suggests the appropriate values.

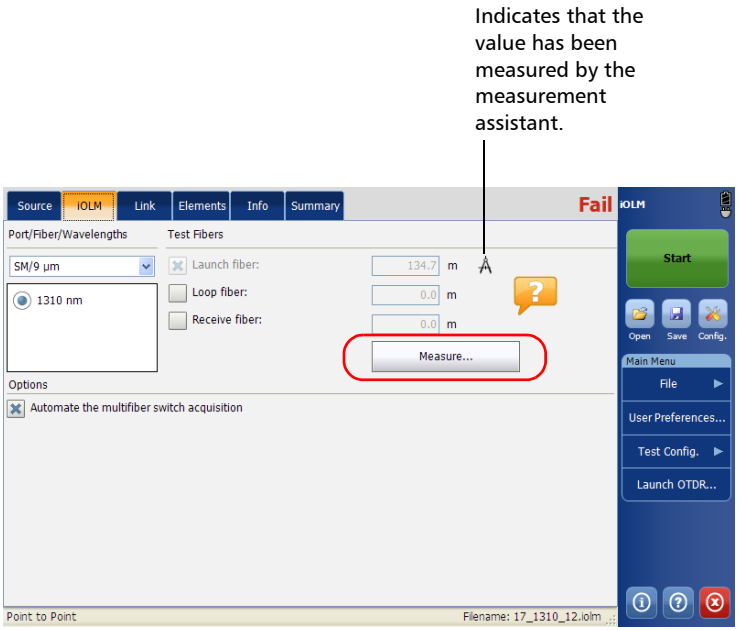
- The icon appears if the provided values are required but not selected and if the values entered are not within the appropriate range.
- The icon is displayed if the values are not within the appropriate range.

The help icon opens a window suggesting the appropriate fiber length for an expected link loss. The icon is not available when a non-supported configuration is selected.

You can go now directly to step 7.

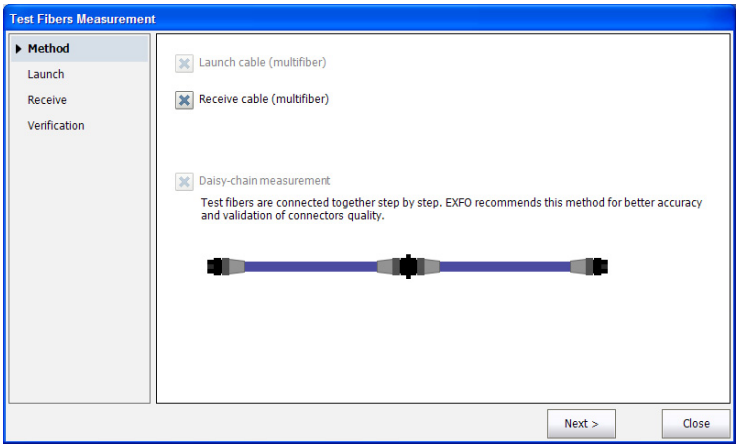
6. If you want to specify the launch and receive fiber lengths automatically, proceed as follows:

6a. Tap **Measure** to access the measurement assistant.

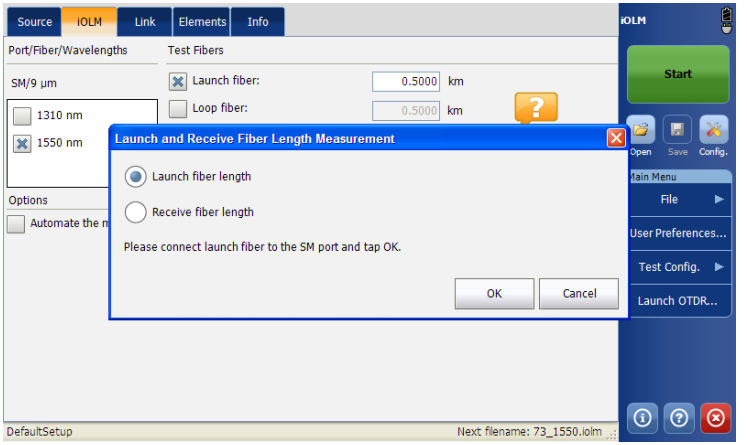


6b. Select the test fibers to measure and follow the instructions on-screen.

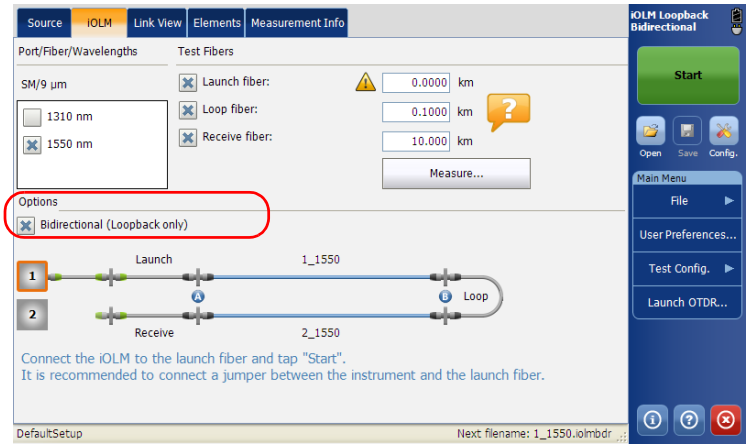
Measurement assistant with MPO optical switch connected



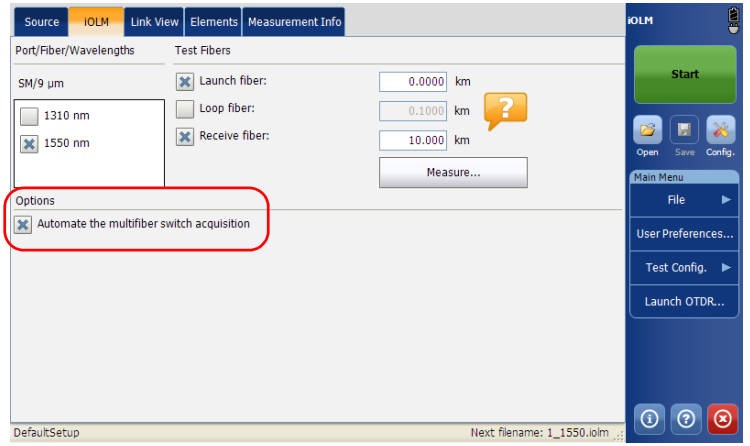
Measurement assistant without MPO optical switch connected



7. If you have selected the **Loop fiber** checkbox, you can choose to work with the **Bidirectional (Loopback only)** option or not.



8. If you have the iMF software option, you can work with an externally controlled optical switch. For more information, see *Connecting a Switch to the iOLM* on page 23.



6 Managing Test Configurations

This section explains the procedure to select, create, view and modify the test configuration.

Selecting a Test Configuration

The test configuration is selected to apply the configuration settings (thresholds, link definition parameters, etc.) in the iOLM application for the next acquisition.

- There are two types of configuration files that are activated with the iCERT software option.

Note: *These configurations do not contain splitters, therefore they are not suitable for testing PON links.*

  - The configuration files that do comply to the certification standard are indicated with a blue bubble with a “c” in the middle ( ).
  - The EXFO configuration files do not comply with the certification standard.

- The PON Last Mile Certification Optimode (iOPT-LM) software option enables you to perform a fiber characterization of the fiber between the ONT and the splitter (access fiber). The option detects the presence of splitters to ensure the fiber is connected to a splitter via a distribution fiber.

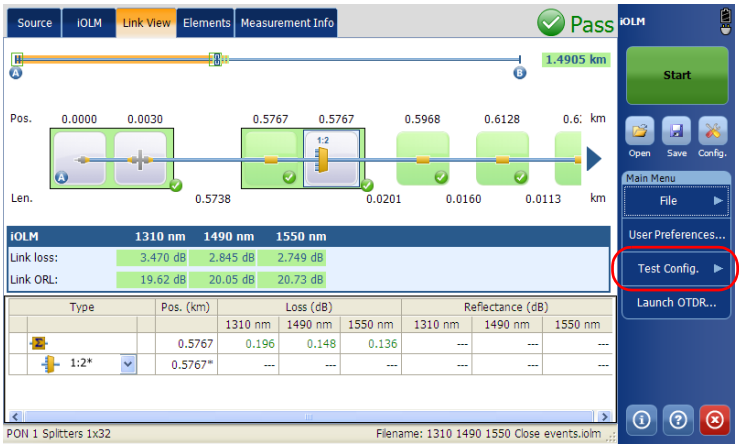
  Optimode is a test configuration using an algorithm intended for specific use cases, which overpass the iOLM standard mode performances in given testing topologies.

  The optimode test configuration has some limitations and may cause your unit to display odd results if it is used in cases other than what it has been designed for.

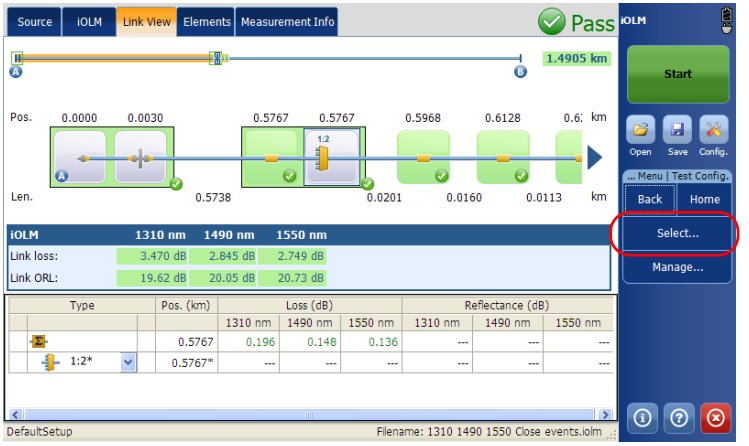
  Refer to the iOLM technical specifications for the optimode available and the appropriate specifications. You can also contact EXFO to ensure the optimode is designed for your use cases.

To select the test configuration:

1. From the **Main Menu**, tap **Test Config**.



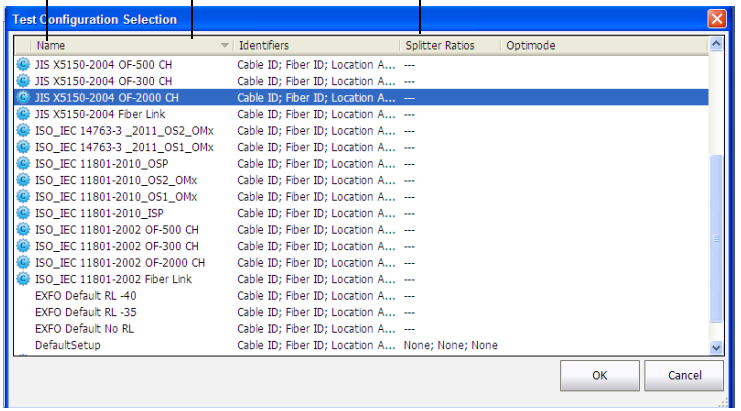
2. Tap **Select**.



3. Select the test configuration file.

Name of the configuration file.

Name of the identifiers present in the file. When more than one identifier is present, they will be separated by a semicolon.



Split ratio which is defined for each stage of the splitter defined. When more than one splitter is defined, they will be separated by a semicolon.

Configuration files which are not PON are indicated by "---".

Note: *If you have selected any measurement where 2:N is available, then it is displayed as Read Only mode in the* ***Test Configuration Selection*** *dialog box even if the iOLM EXpert option is not activated*

Note: *Tap on the column to sort the column in ascending or descending order. By default, the configuration list will be sorted in ascending order according to the Name column.*

4. Select the test configuration from the list of available choices.

5. Tap **OK** to apply the configuration and close the window, or tap **Cancel** to exit without applying changes.

Impacts of Test Configurations

Before performing an acquisition, you can select or edit a test configuration that fits the link under test. This configuration contains specific pass/fail thresholds and the definition of any expected PON splitter. Once selected, the configuration will be used for all following measurements.

The configuration data is structured in the same way than an iOLM result file. Each result file contains the entire configuration data used for the measurement.

Using a test configuration may influence the minimum reach of the measurement in terms of loss. For instance, the expected loss budget of a link that includes splitters will force the acquisition to cover at least this loss budget. Because of this, using an accurate test configuration can improve the accuracy of the measurements. If an inaccurate configuration file is used, some link element types might be wrongly defined. For instance, if no splitter stage is defined, actual splitters will be described as splices or connectors. This will not affect the reflectance and loss values associated with the link elements, only their type. After a measurement is completed, a link element type can be changed in order to apply the correct pass/fail threshold.

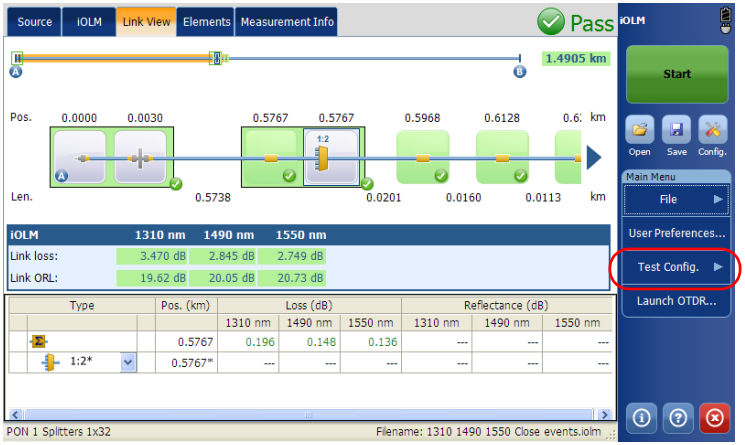
The pass/fail thresholds defined in the configuration file will have no impact on the capacity of the iOLM application to perform measurements. Only the pass/fail status of the link or link elements will be determined by the user-defined thresholds.

Creating a Test Configuration

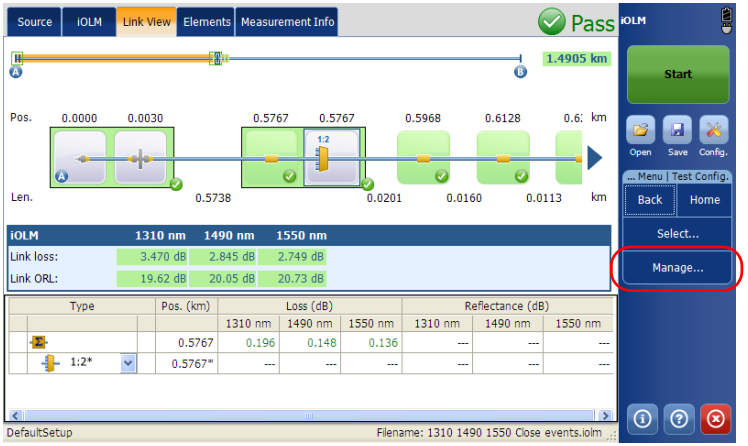
The **Duplicate** button allows you to create a copy of a selected configuration file.

To create a copy of test configuration:

1. From the **Main Menu**, tap **Test Config**.

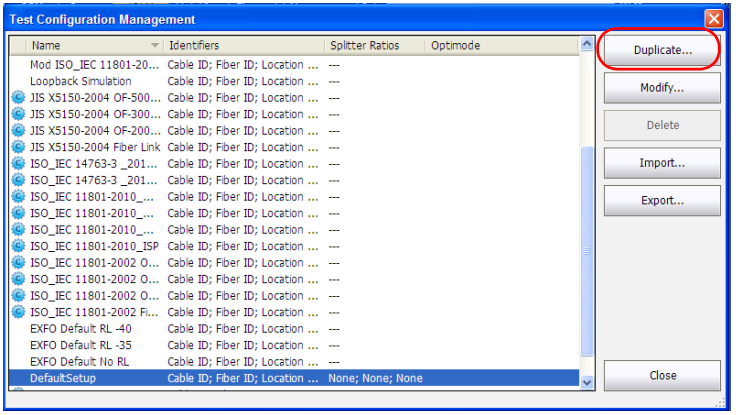


2. Select **Manage**.



3. Select the test configuration file to duplicate.

4. Tap **Duplicate**.



5. The default file name is displayed. You can modify the file name, if required.
6. Tap **Save** to save the file or tap **Cancel** to exit without saving.

Note: *A number between parenthesis will be automatically incremented at the end of the file name to avoid unwanted overwrites.*

A new copy of the selected configuration file is created. You can modify the duplicated file, if required. See *Modifying a Test Configuration* on page 61 for more details.

7. Tap **Close** to close the window.

Modifying a Test Configuration

The **Modify** button in the **Manage** main menu allows you to view the selected configuration file and modify it, if required.

Note: *The test configuration settings will be effective for the next acquisition.*

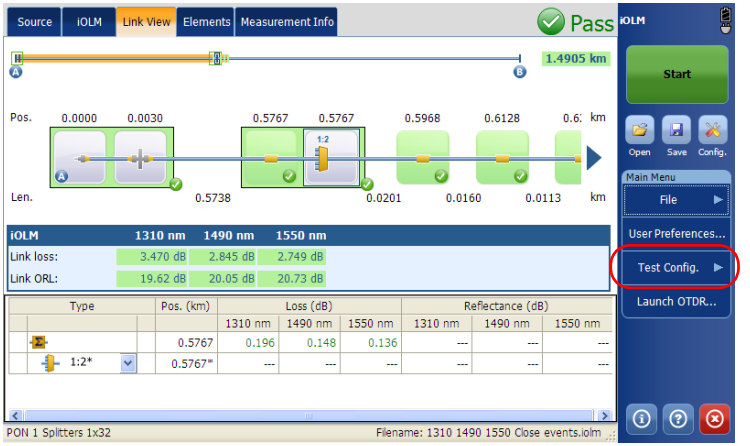
Note: *If the default factory settings file, or any predefined file is selected, the **Modify** button will appear as **View**, which means that you cannot modify the factory test configuration files. Also, you cannot modify the files created by the supervisor, if you are logged in the module as a operator or any user with lower privileges than supervisor.*

Modifying Identifiers

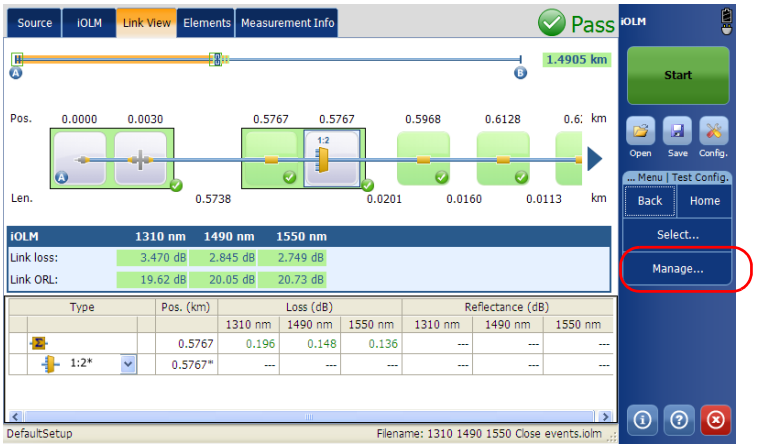
The **Identifiers** tab allows you to view and modify the identifier values.

To modify Identifiers:

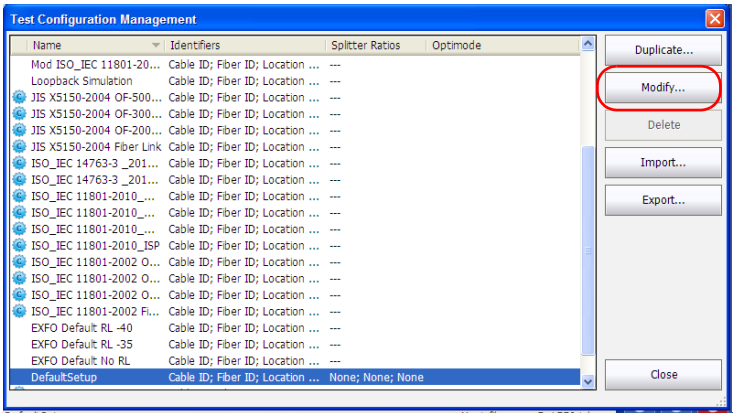
1. From the **Main Menu**, tap **Test Config**.



2. Select **Manage**.

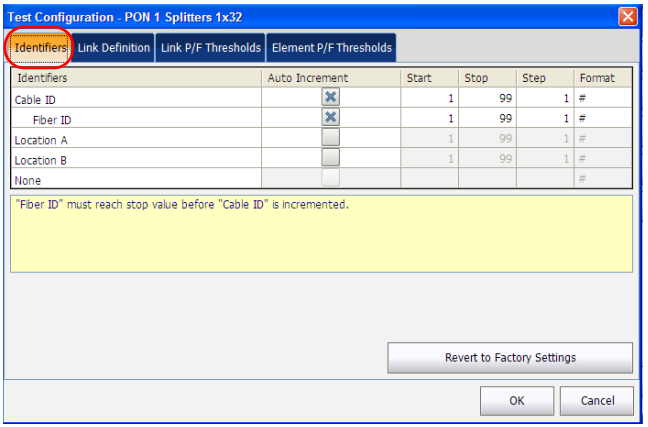


3. Select the test configuration file to modify.
4. Tap **Modify**.



The name of the configuration is displayed on the title bar of the window.

5. Select the **Identifiers** tab.



6. Under **Identifiers**, select the identifiers from the list of available choices.

Note: *Two identifiers cannot have the same name.*

7. Under **Auto Increment**, enable or disable the auto increment option. It enables the numeric part of the identifiers to be incremented/decremented after the acquisition has been saved successfully.
8. Enter the start, stop, and step values for the identifier under **Start**, **Stop**, and **Step**.

Note: *The Step value must be smaller than the difference between the Start and Stop values. If the Start is greater than the Stop, then the identifier value begins decrementing by the specified Step.*

9. Tap **OK** to save the changes and close the window, or tap **Cancel** to exit without saving.

Tap **Revert to Factory Settings** to remove all the changes and apply the default values associated with the selected configuration.

Modifying Link Definition

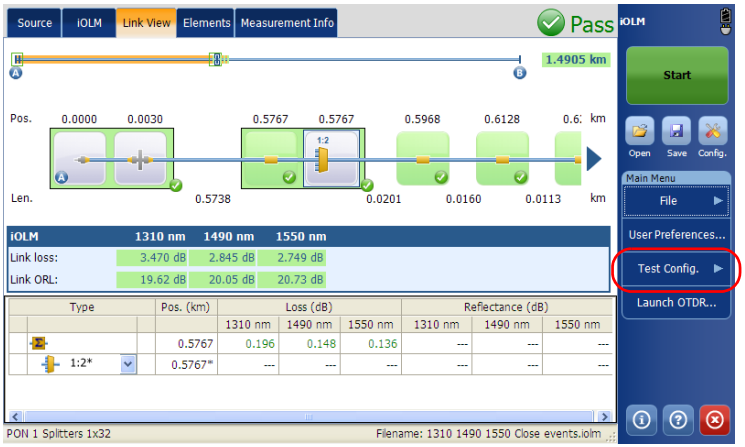
The **Link Definition** tab allows you to view and modify the link definition.

The links defined in the **Link Definition** tab are based on the network topology. For example, if there are 2 splitters present in the PON network, you may define two stages of splitter with their respective split ratio. You may change the IOR value, or change or rename the identifiers according to the network, which will help you to identify where the measurement is done in the PON network. The modifications will be applicable for future acquisitions.

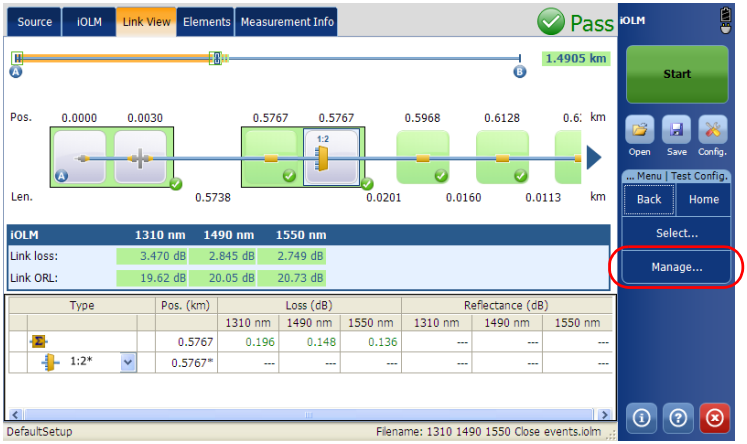
Note: *Splitters are available only for PON configurations.*

To modify link definition:

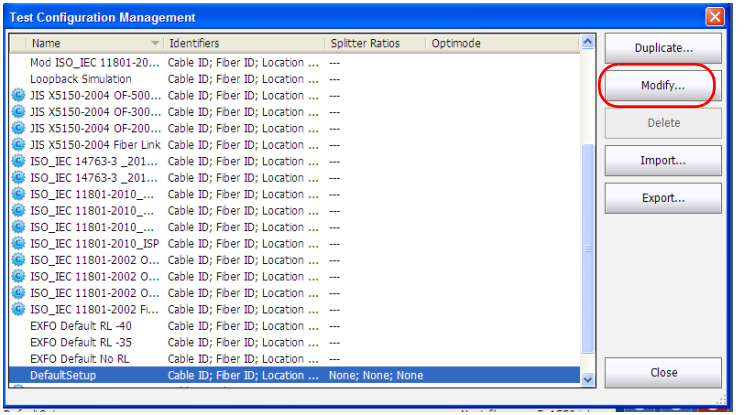
1. From the **Main Menu**, tap **Test Config**.



2. Select **Manage**.

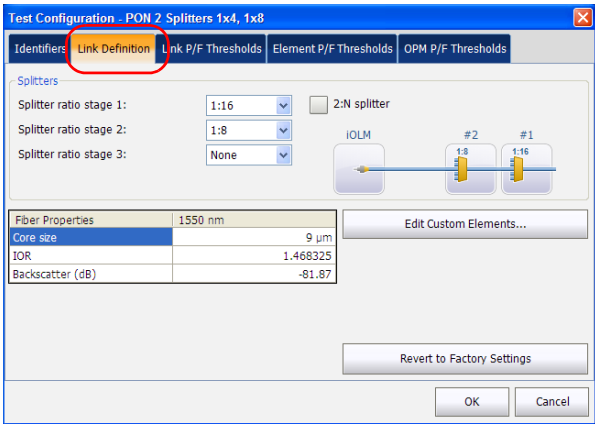


3. Select the test configuration file to modify.
4. Tap **Modify**.



The name of the configuration is displayed on the title bar of the window.

5. Select the **Link Definition** tab.



6. Select the split ratio of a splitter at a given stage.

Select **1:?** if the splitter ratio is unknown. The iOLM finds the splitter ratio automatically and the element is not tested for pass/fail.

If **None** is selected as Splitter Ratio Stage, then the iOLM will not try to find or apply a split ratio at the given stage.

The PON network can have multiple splitters. The iOLM application supports testing a PON network having maximum of three splitters. So, the splitter ratios can be defined up to three stages.

Note: *The splitter ratios are defined at different stages, depending on how they are defined in the network.*

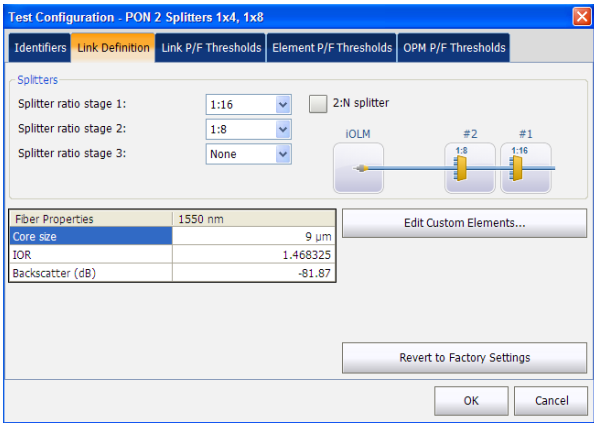
Note: *The link view displays the link element closest to the iOLM module to the left and then proceeds towards the right.*

- **Core size**: When a multimode port is selected, the default fiber core size is 50 μm.
- **IOR**: Refraction index of the iOLM measurement, also known as *group index*. If you modify this parameter, the distance measurements for the trace will be adjusted.
- **Backscatter (dB)**: Rayleigh backscatter coefficient setting of the iOLM measurement. If you modify this parameter, the reflectance and ORL measurements for the trace will be adjusted.

Note: *For the multimode wavelengths, the values are defined at 850 nm. For the singlemode wavelengths, the values are defined at 1550 nm. The iOLM application automatically calculates the IOR and Backscatter values for other wavelengths.*

7. Tap **OK** to save the changes and close the window, or tap **Cancel** to exit without saving.

Tap **Edit Custom Elements** to add, edit, or delete the custom element. For more information, see *Managing Custom Elements (Optional, iOLM EXpert Mode Only)* on page 72. If the iOLM EXpert option is not activated, you can view the custom element present in the test configuration by tapping **View Custom Elements**.



Tap **Revert to Factory Settings** to apply the default values associated with the selected configuration.

Note: *Revert to Factory Settings does not change the modifications done in the* ***Edit Custom Element****.*

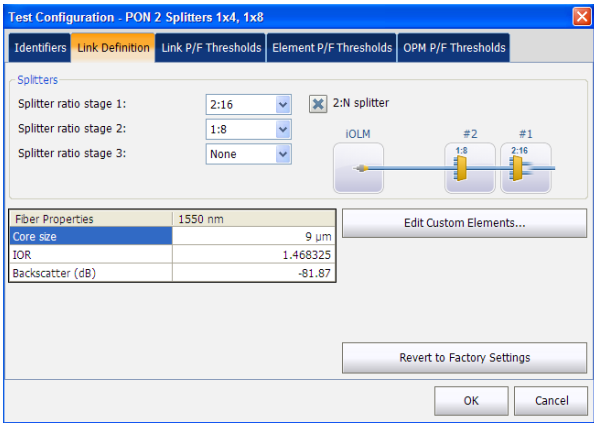
Enabling 2:N Splitters (Optional, iOLM EXpert Mode Only)

Note: *The bidirectional loopback measurements are not supported by 1:N splitter and 2:2 splitter elements.*

The 2:N splitter can be used to create network redundancy. If a network break occurs, the operator can connect through the other network branch. This ensures active communication while the repairing of the broken network is in progress.

If the 2:N splitter is selected for the **Splitter ratio stage 1** field and the test configuration is imported on a unit where the iOLM EXpert is not activated then the 2:N splitter is automatically replaced by 1:N splitter. For example, if in the test configuration stage 1 is selected as 2:128 and the iOLM EXpert option is deactivated, then it is automatically replaced by 1:128.

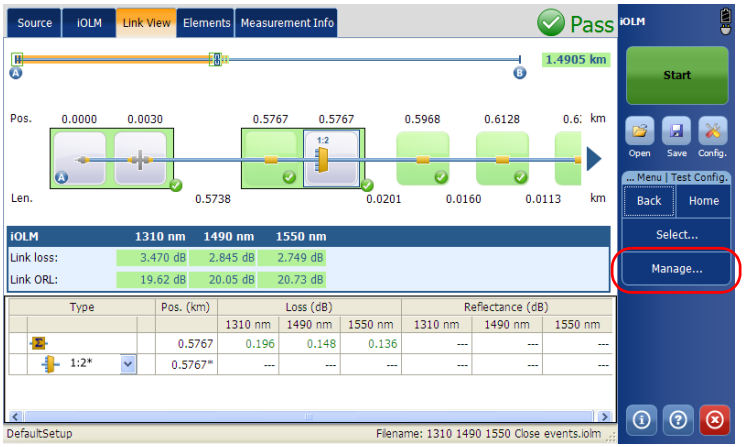
In the Splitter ratio stage 1 field, if 1:? or None is selected and you have enabled the 2:N splitter option, then the 1:? and None are replaced by a splitter value of 2:2.



Note: *The threshold for the 2:N splitter is displayed in the **Element P/F Thresholds** tab only if the 2:N splitter is selected in **Link Definition** tab.*

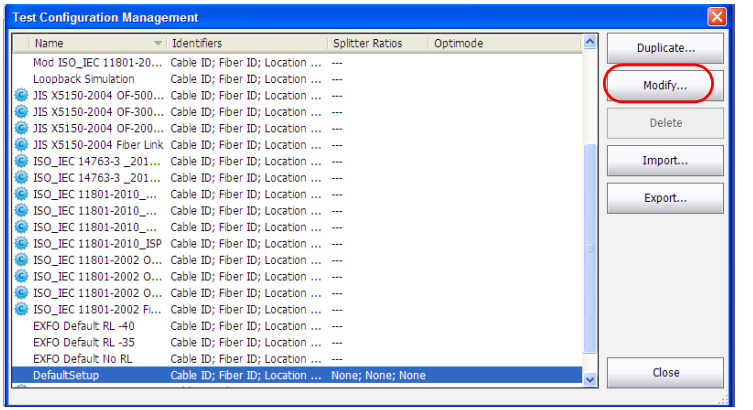
To enable the 2:N splitter:

1. From the **Main Menu**, tap **Test Config** > **Manage**.

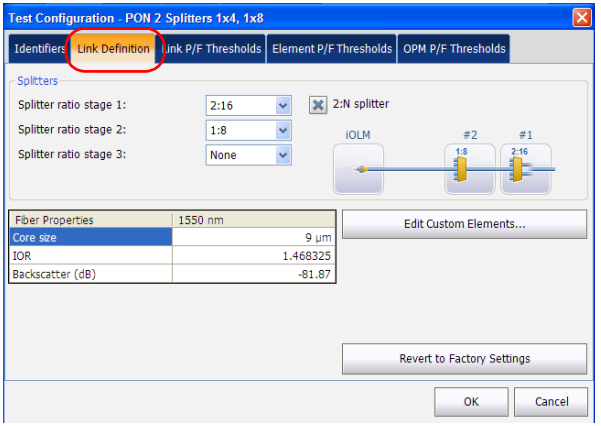


2. Select the test configuration file to modify from the test configuration list file.

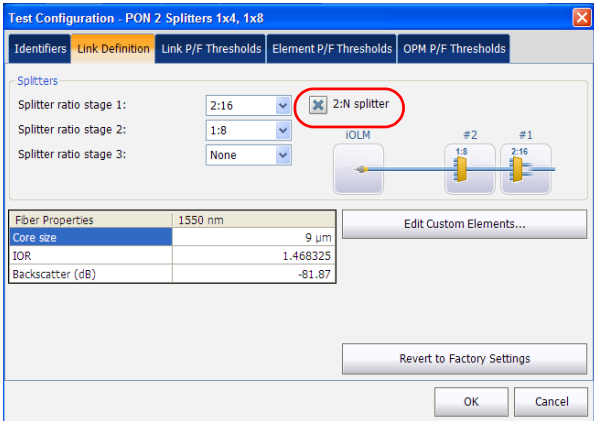
3. Tap **Modify**.



4. Select the **Link Definition** tab from the test Configuration.



5. Enable **2:N splitter**.



6. Select the required ratio from **Splitter ratio stage 1**.

7. Tap **OK** to save your changes or **Cancel** to discard them.

The element pass/fail status remains unknown in the following scenarios:

- If any element is followed by 2:N splitter in the link then the element's loss pass/fail status is displayed as unknown.
- If the element has a reflectance value and it is placed after the 2:N splitter element, then the element's reflectance pass/fail status is displayed as unknown.
- If the 2:N splitter is in a group of elements and an element follow the 2:N splitter in the group, then the pass/fail status of group is displayed as unknown.

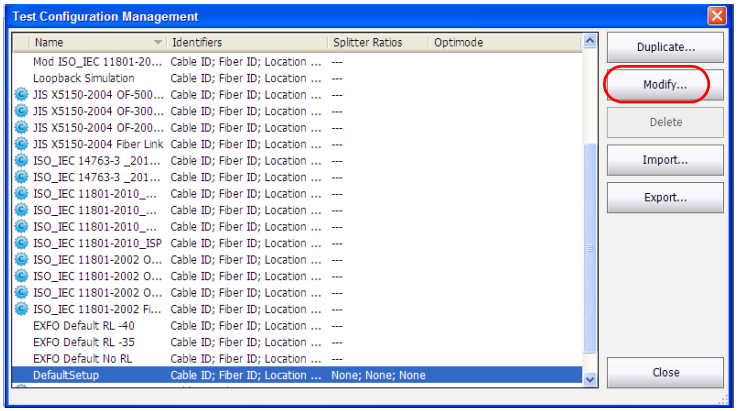
Managing Custom Elements (Optional, iOLM EXpert Mode Only)

The application allows you to add, modify or delete custom elements when the iOLM EXpert option is activated. You can add custom elements of two basic element types: splice or connector. Each custom element must have its unique name. You can view and edit the element's pass/fail threshold of the custom element in the **Element P/F Threshold** tab.

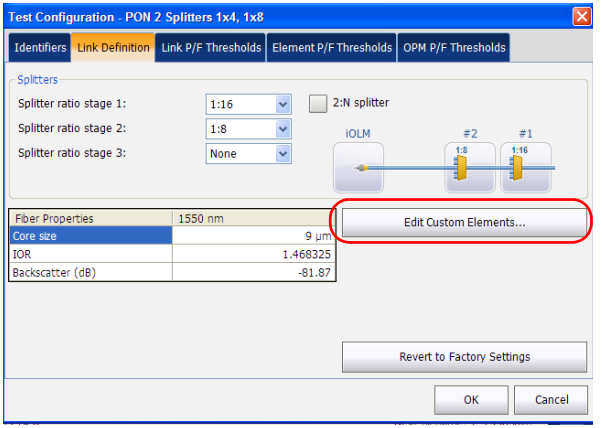
If the iOLM EXpert option is not activated, then you will not be able to edit the element pass/fail threshold for the custom element and if the measurement file contains custom elements, the custom elements are displayed in the **Element P/F Threshold** tab under the **Measurement Settings**.

To add a custom element:

1. From the **Main Menu**, select **Test Config.** > **Manage**.
2. Select the test configuration file to modify.
3. Tap **Modify**.

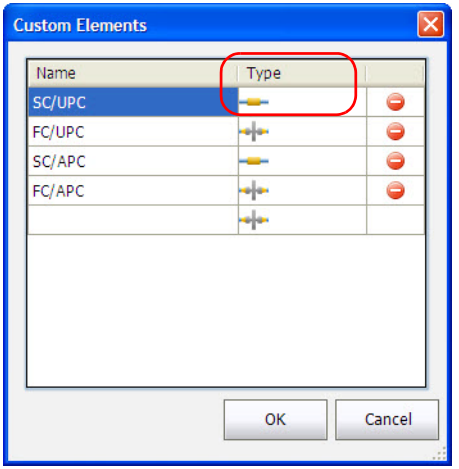


4. Tap **Link Definition** > **Edit Custom Elements**.



5. Enter the custom element name under the **Name** column in the **Custom Elements** dialog box. The name of the custom element can contain a maximum of 12 characters.

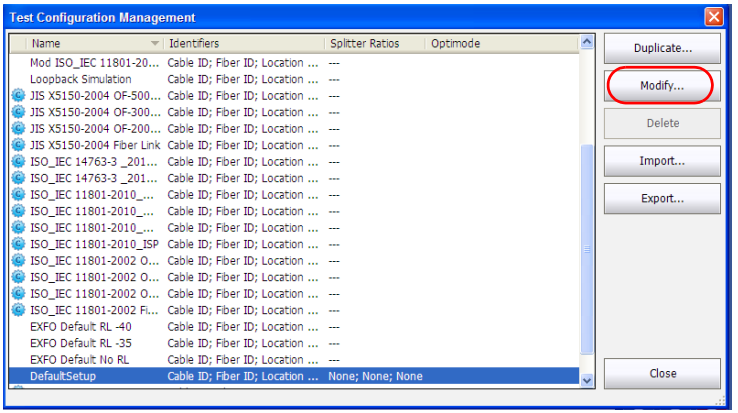
6. Select the custom element type under the **Type** column.



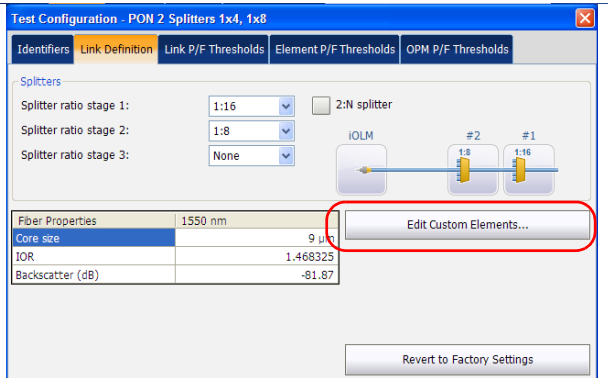
7. Tap **OK** to save the changes and close the dialog box, or tap **Cancel** to exit without saving.

To modify the custom element:

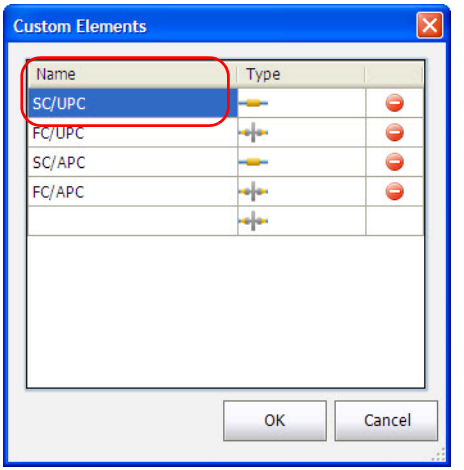
1. From the **Main Menu**, select **Test Config.** > **Manage**.
2. Select the test configuration file to modify.
3. Tap **Modify**.



4. Select **Link Definition** > **Edit Custom Elements**.



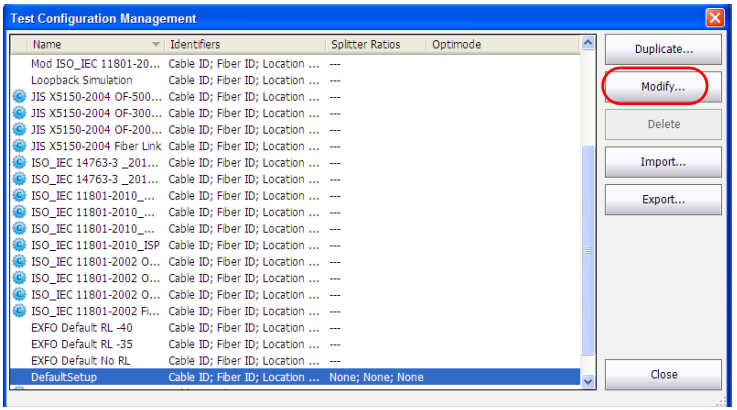
5. Select the custom element name under the **Name** column and modify it as needed.



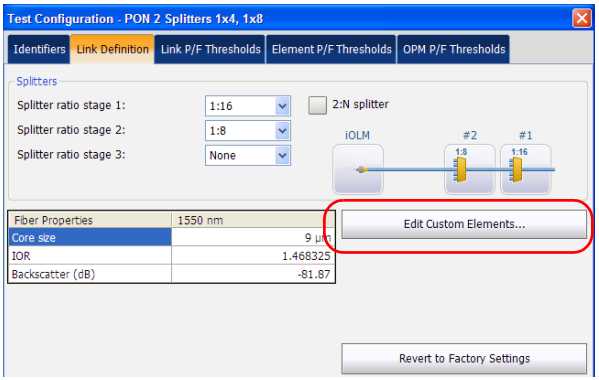
6. Select the required custom element type under the **Type** column.
7. Tap **OK** to save the changes and close the dialog box, or tap **Cancel** to exit without saving.

To delete the custom element:

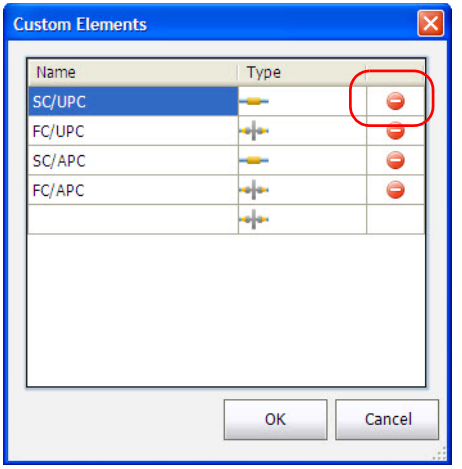
1. From the **Main Menu**, select **Test Config.** > **Manage**.
2. Select the test configuration file to modify.
3. Tap **Modify**.



4. Select **Link Definition** > **Edit Custom Elements**.



5. Tap the or icon (depending on the unit) beside the custom element which you want to delete.



6. Tap **OK** to save the changes and close the dialog box, or tap **Cancel** to exit without saving.

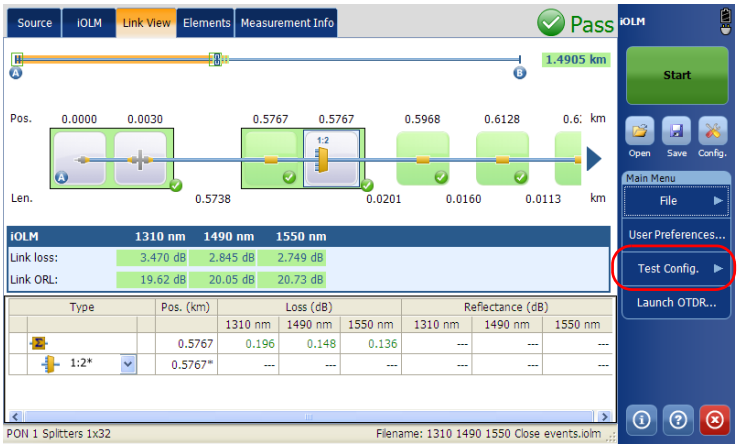
Modifying Link Pass/Fail Thresholds

This tab allows you to apply modification to the link pass/fail thresholds. If the selected wavelength is *Any*, the values edited will be applied to all the wavelengths present.

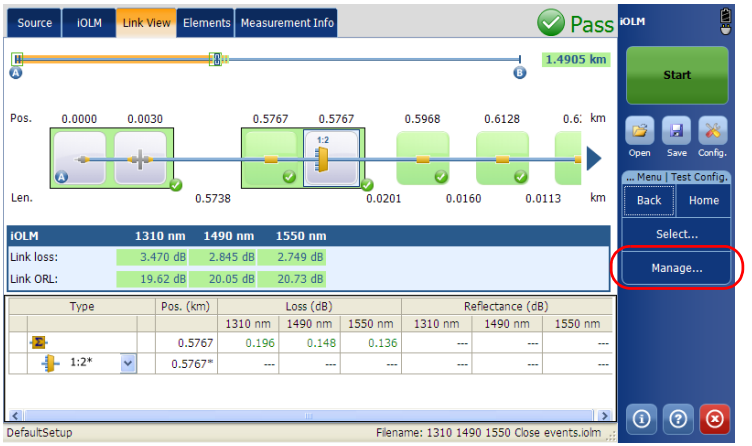
Note: *Pass/Fail thresholds cannot be viewed or edited for some configurations related to specific standards.*

To modify link pass/fail thresholds:

1. From the **Main Menu**, tap **Test Config**.

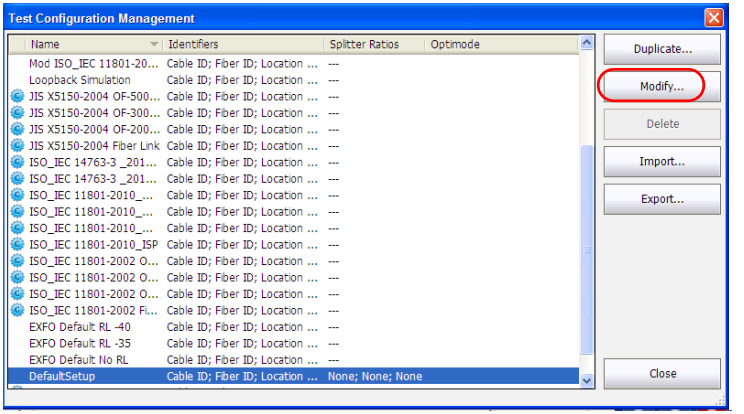


2. Select **Manage**.

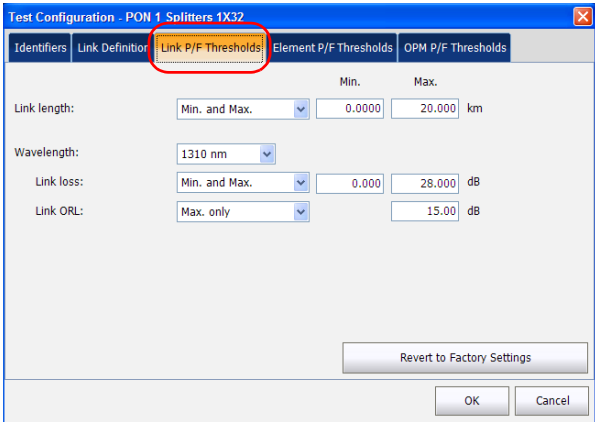


3. Select the test configuration file to modify.

4. Tap **Modify**.



5. Select the **Link P/F Thresholds** tab.



6. Under **Link P/F Thresholds**, modify the following parameters, as needed.

➤ **Link Length**: Select the link length threshold type from the available choices and then modify the link length as required.

Note: *The minimum link length cannot be greater than the maximum link length.*

➤ **Wavelength**: Select the wavelength for which the different Pass/Fail threshold values can be specified. The available choices of the wavelength depend on the iOLM module.

➤ **Link Loss**: Select the Link Loss threshold type from the available choices and then modify the link loss as required.

Note: *The minimum link loss cannot be greater than the maximum link loss.*

➤ **Link ORL**: Select the Link ORL (Optical Return Loss) threshold type from the available choices and then modify the link ORL as required. The optical return loss (ORL) refers to the total effect of multiple reflections and scattering events within a fiber-optic system.

7. Tap **OK** to save the changes and close the window, or tap **Cancel** to exit without saving.

Tap **Revert to Factory Settings** to remove all the changes and apply the default values associated with the selected configuration.

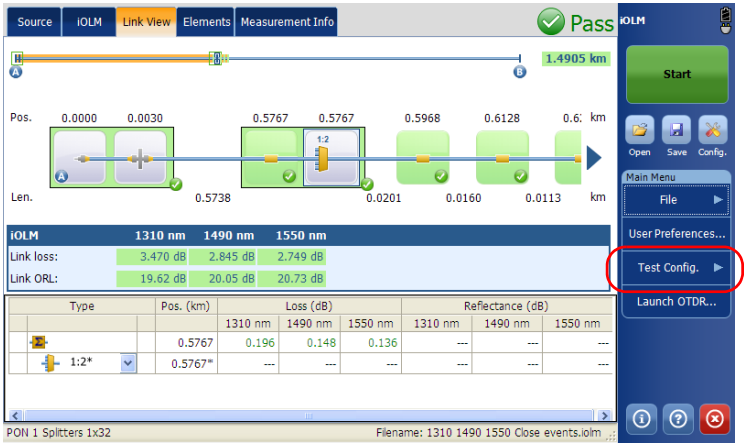
Modifying Element Pass/Fail Thresholds

This tab allows you to apply modifications to the element pass/fail thresholds.

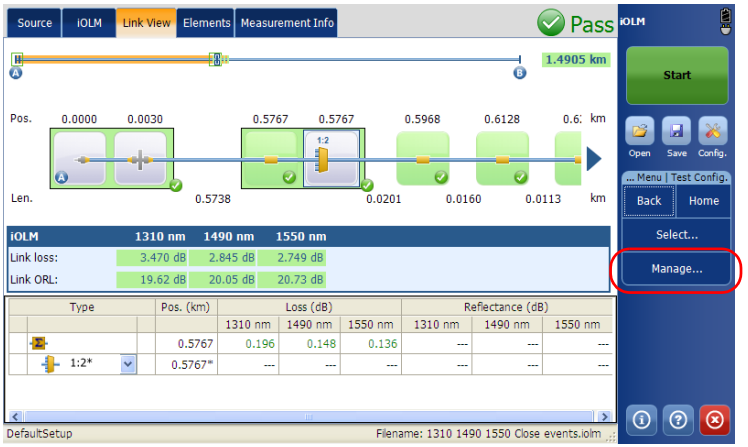
Note: *Pass/Fail thresholds cannot be viewed or edited for some configurations related to specific standards.*

To modify element pass/fail thresholds:

1. From the **Main Menu**, tap **Test Config**.

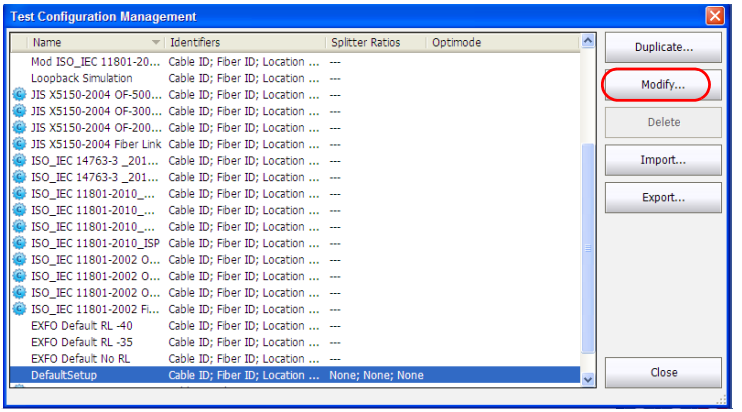


2. Select **Manage**.

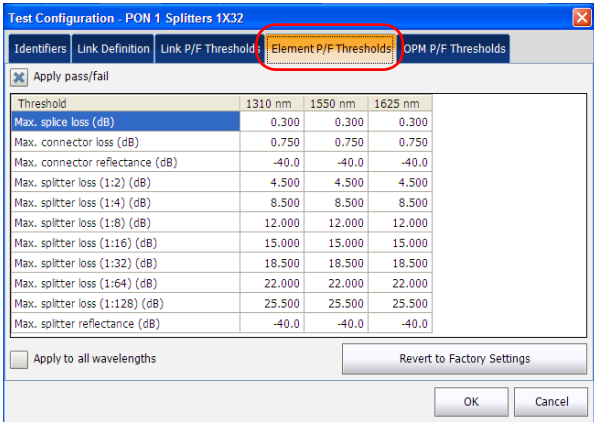


3. Select the test configuration file to modify.

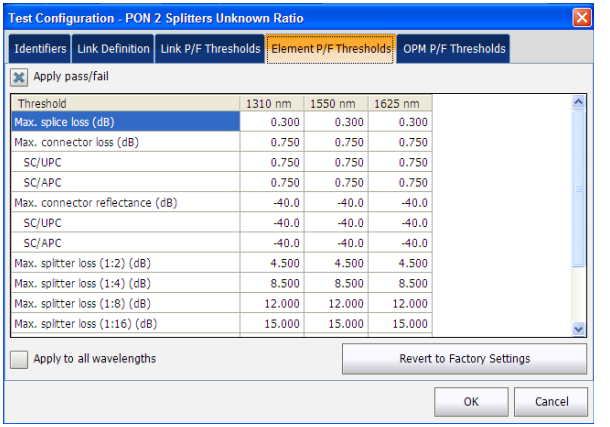
4. Tap **Modify**.



5. Select the **Element P/F Thresholds** tab.



The **Threshold** column displays the threshold values for Splice, Connector, and Splitter ratios (1:N and 2:N) for each available wavelength in the test configuration settings. The custom elements are displayed in the group under Max. connector loss or Max. connector reflectance or Max. splice loss. This information is also displayed in the iOLM report.



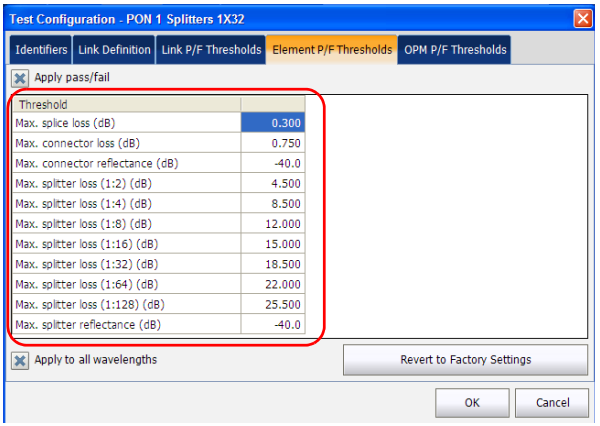
6. Enable the **Apply pass/fail** option to access the parameters, and modify them as needed. You can add, edit, and delete the custom element by tapping on the custom element. For steps to modify or create custom elements, see *Managing Custom Elements (Optional, iOLM EXpert Mode Only)* on page 72.

Note: *The pass/fail thresholds of the custom elements can only be edited when the iOLM EXpert option is activated.*

Note: *The available wavelength choices depend on the iOLM module.*

7. Tap **OK** to save the changes and close the window, or tap **Cancel** to exit without saving.

   Select **Apply to all wavelengths** to display the common threshold values for all the wavelengths. If any threshold has different values for its wavelengths, then the cell will be empty.



   Tap **Revert to Factory Settings** to remove all the changes and apply the default values associated with the selected configuration.

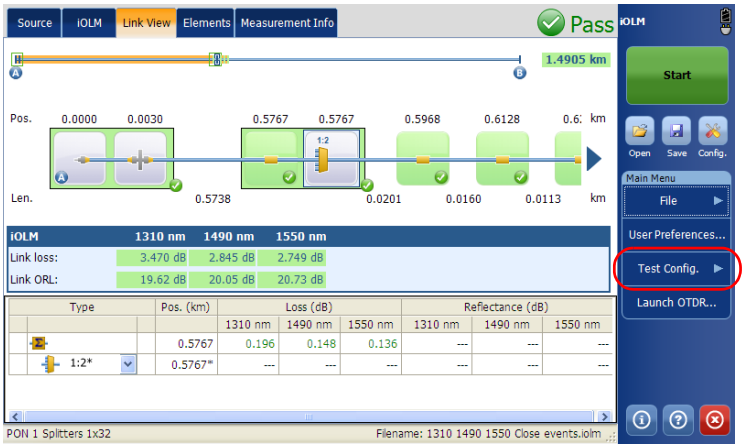
Modifying Power Meter Pass/Fail Thresholds

This tab allows you to modify the power meter pass/fail thresholds.

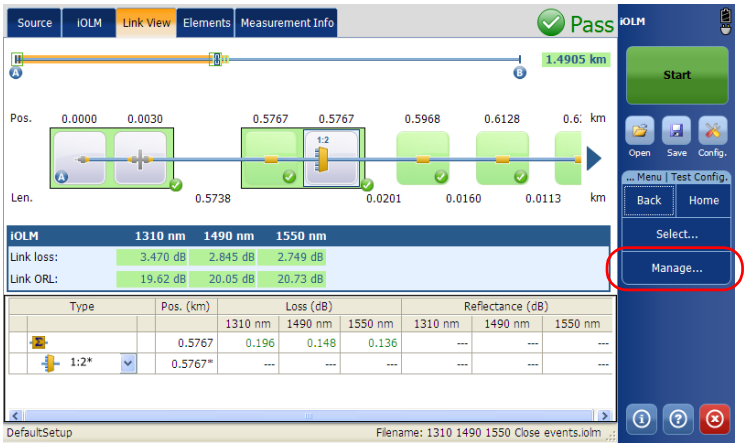
Note: *The **OPM P/F Thresholds** tab will only be available if an inline power meter is present in the module.*

To modify power meter pass/fail thresholds:

1. From the **Main Menu**, tap **Test Config**.

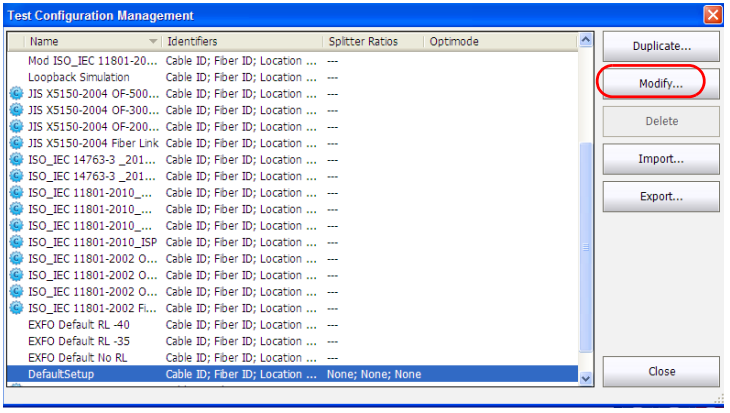


2. Select **Manage**.

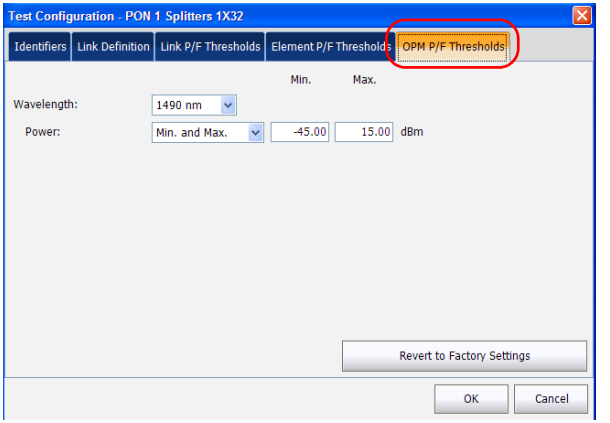


3. Select the test configuration file to modify.

4. Tap **Modify**.



5. Select the **OPM P/F Thresholds** tab.



6. Under **OPM P/F Thresholds**, modify the following parameters, as needed.

➤ **Wavelength**: Select the wavelength for which the different Pass/Fail threshold values can be specified. The available choices of the wavelength depends on the iOLM module and the Power Meter settings in the **Preferences** tab.

Note: *The **Any** wavelength option will be displayed only if more than one wavelength is present. If **Any** wavelength is selected, the threshold values will be applied to all the wavelengths present in the drop-down box.*

➤ **Power**: Select the power threshold type from the available choices and then modify the power as required.

7. Tap **OK** to save the changes and close the window, or tap **Cancel** to exit without saving.

Tap **Revert to Factory Settings** to remove all the changes and apply the default values associated with the selected configuration.

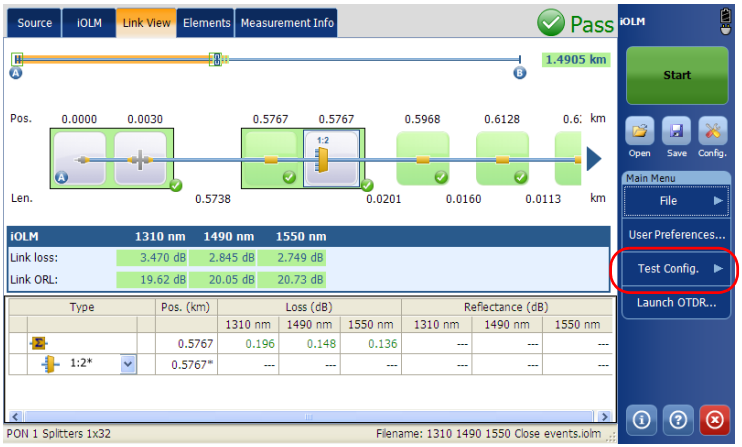
Deleting Test Configuration

The **Delete** button allows you to delete an existing configuration file.

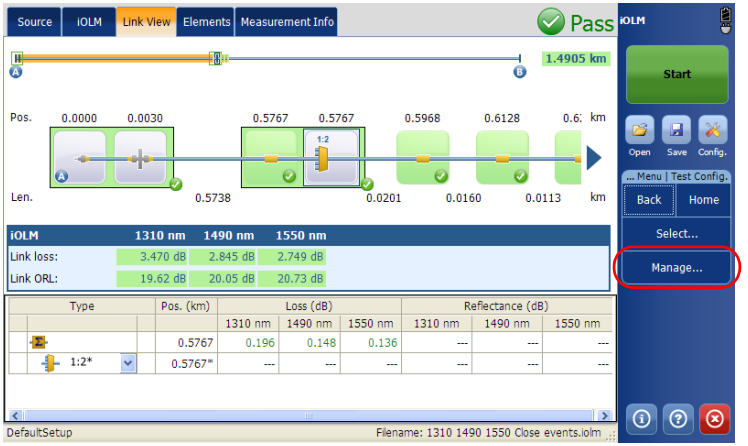
Note: *You cannot delete the DefaultSetup configuration or iCERT standard-compliant configurations.*

To delete a test configuration:

1. From the **Main Menu**, tap **Test Config**.

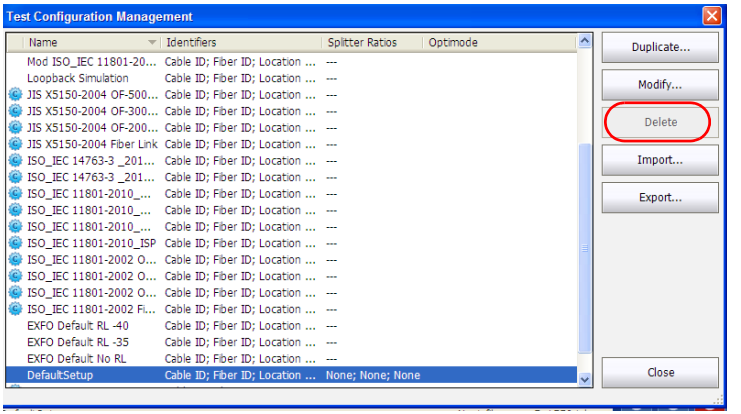


2. Select **Manage**.



3. Select the test configuration file to delete.

4. Tap **Delete**.



A confirmation message is displayed.

5. Tap **Yes** to delete the file or tap **No** to cancel the deletion.

6. Tap **Close** to close the window.

Importing or Exporting a Test Configuration

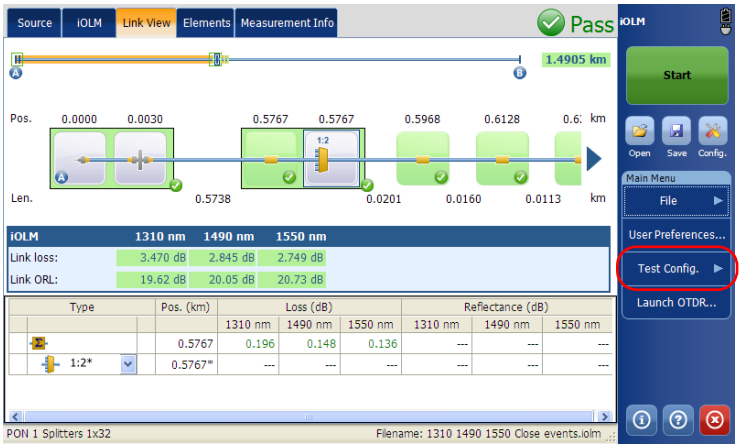
The **Import** button allows you to import test configuration from an external storage device and the **Export** button allows you to export the selected configuration to an external storage device.

Note: *To import iCERT configurations and its duplicates, you need to activate the option on the unit.*

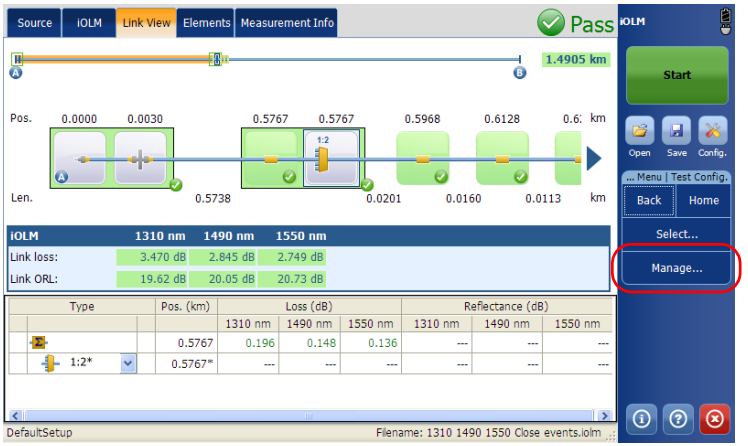
Note: *If a USB device is connected to the module, the default path for import/export will be the USB device.*

To import a test configuration:

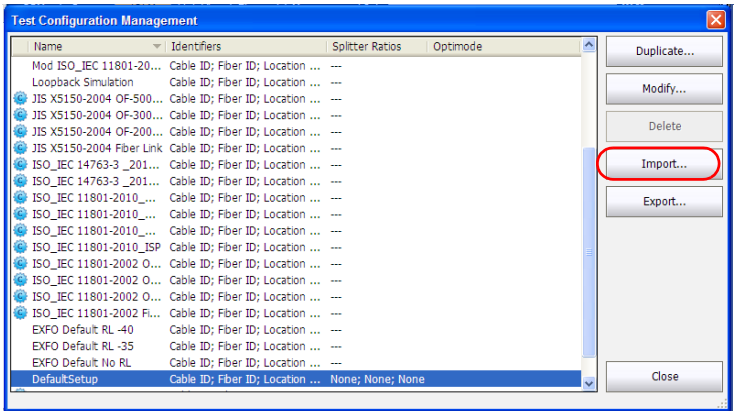
1. From the **Main Menu**, tap **Test Config**.



2. Select **Manage**.

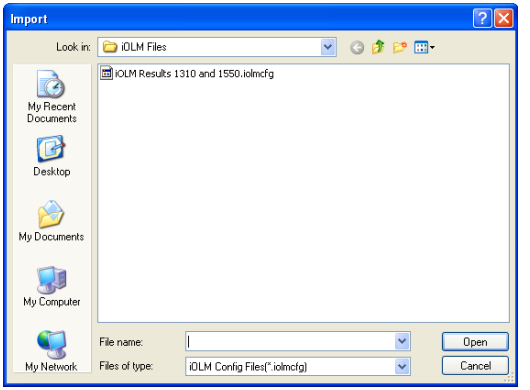


3. Tap **Import**.



4. An **Import** dialog box opens, select the file to import and tap **Open**.

Note: *Depending on the type of unit you are using, the **Open** button may be replaced with an **OK** button.*

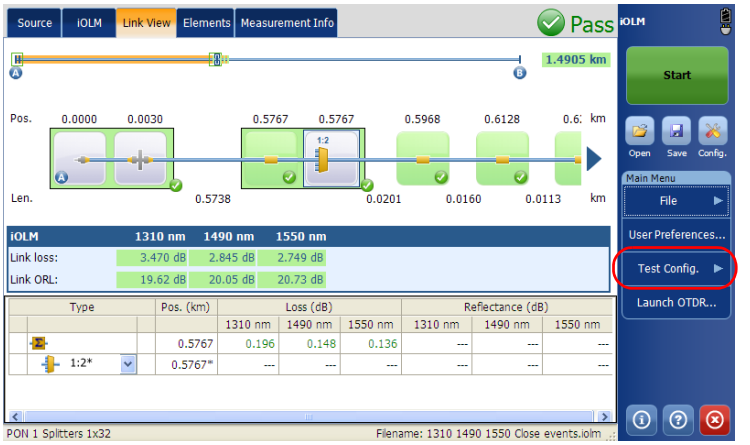


A confirmation message is displayed.

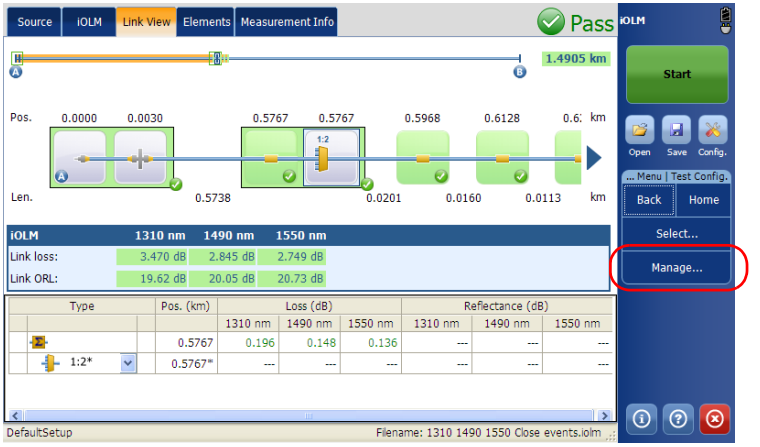
5. Tap **Yes** to select the file or tap **No** to cancel the selection.

To export a test configuration:

1. From the **Main Menu**, tap **Test Config**.

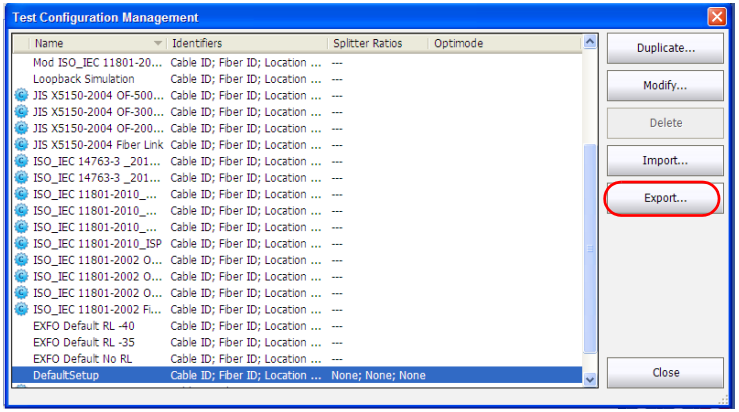


2. Select **Manage**.



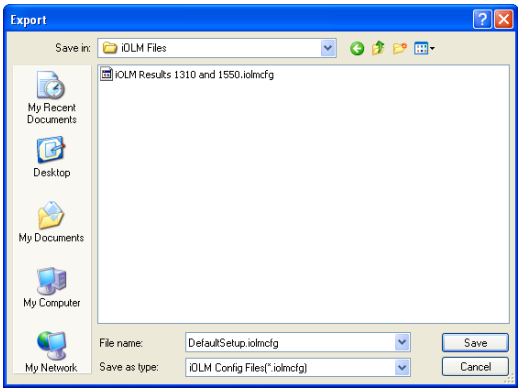
3. Select the test configuration file.

4. Tap **Export** to export the configuration to an external storage device.



5. An **Export** dialog box opens, select the location and tap **Save**.

Note: *Depending on the type of unit you are using, the **Save** button may be replaced with an **OK** button.*



7 Starting an Acquisition

The iOLM allows you to characterize a fiber-optic span, usually optical fiber sections joined by splices and connectors. The iOLM provides an inside view of the fiber, and can calculate fiber length, breaks, total return loss, as well as splice, connector, and total losses.

Performing a Standard or Loopback Acquisition

When an iOLM acquisition starts, the **Link View** tab is displayed by default.

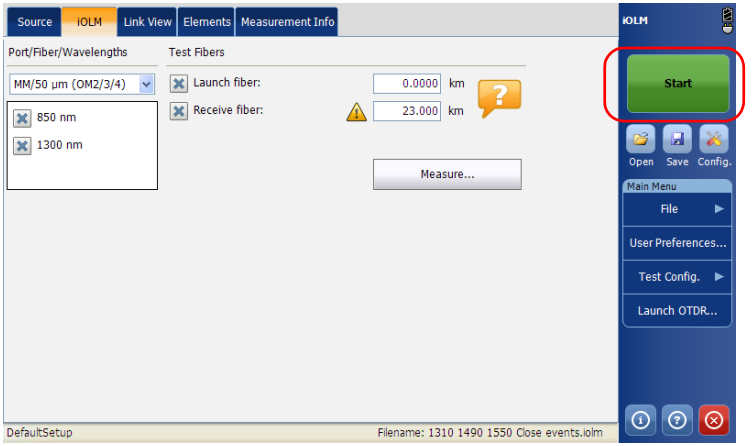
The progress of the overall acquisition for all wavelengths is displayed in the status bar. For example, if two wavelengths have to be processed, at the end of the first wavelength acquisition, the overall progress will be 50 %.

The current wavelength is displayed in front of the acquisition progress.

You can perform standard and loopback acquisitions with the iOLM. For more information on how to perform a loopback measurement, see *Configuring your iOLM* on page 47. To perform bidirectional loopback acquisitions, see *Performing a Bidirectional Loopback Acquisition* on page 99.

To perform an iOLM acquisition:

1. Ensure that the settings for the acquisition are already set. For more information, see *Configuring your iOLM* on page 47.
2. Tap **Start** (for standard and loopback measurements). If you are working with the Short Link Close Events and PON Last Mile specialized measurements, the button will indicate **Start OptiMode**.



The application will prompt you to save unsaved data (if any) before starting a new acquisition.

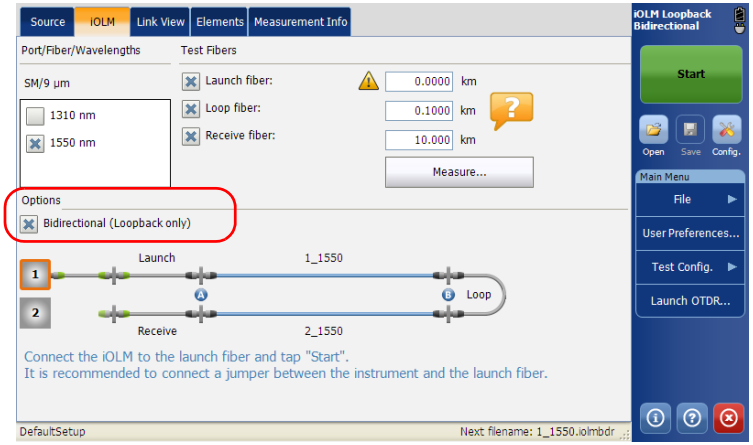
Note: *You will not be asked to save the file if the file functionalities are not activated. See* Setting User Preferences *on page 29 for more details.*

Performing a Bidirectional Loopback Acquisition

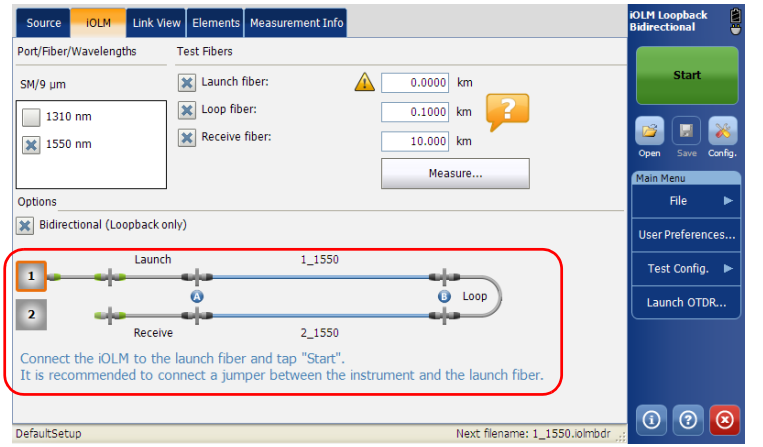
With the iOLM, you can perform bidirectional loopback acquisitions. The acquisition process is done in two main steps. The first acquisition can be repeated until the results are suitable for your needs. Then, you perform the second acquisition, which can be done only once.

To perform a bidirectional acquisition:

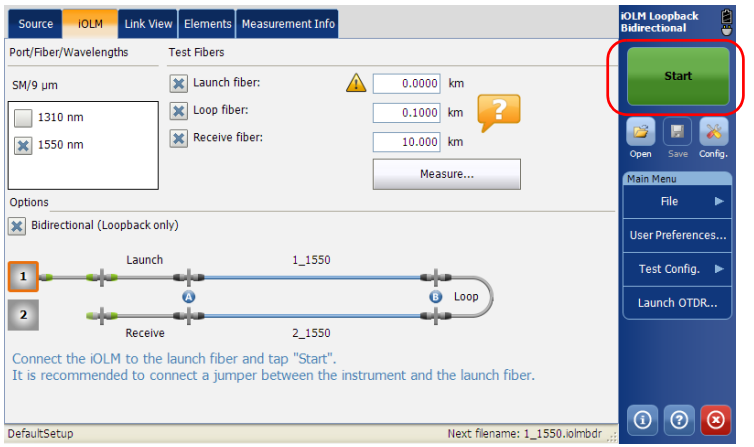
1. Ensure that the settings for the acquisition are already set. For more information, see *Configuring your iOLM* on page 47.
2. Select the **Bidirectional (Loopback only)** checkbox.



3. Select number **One** or **Two** depending on which direction you want to use to test the link first.

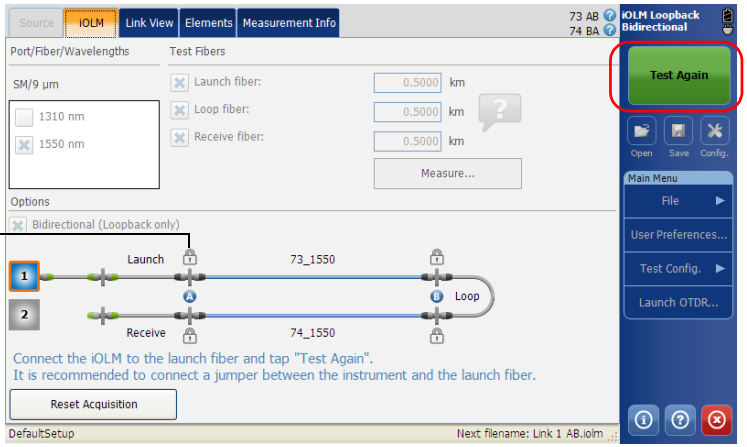


4. Tap **Start**.



Note: *Depending on the number you have selected first, number One or Two turns blue to indicate that the acquisition was made.*

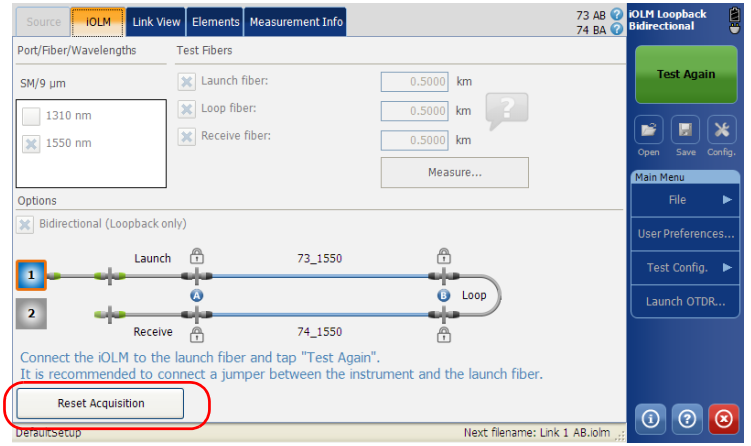
5. If you are not satisfied with the result of the first acquisition, or if the application does not split the link, check the acquisition parameters and the fiber that is connected, then tap **Test Again**.



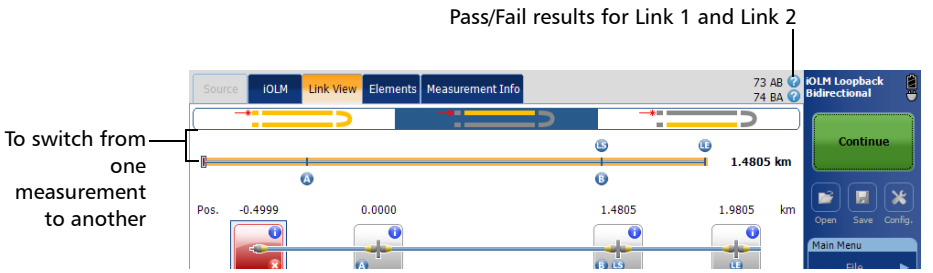
Indicates that you should not disconnect the setup

OR

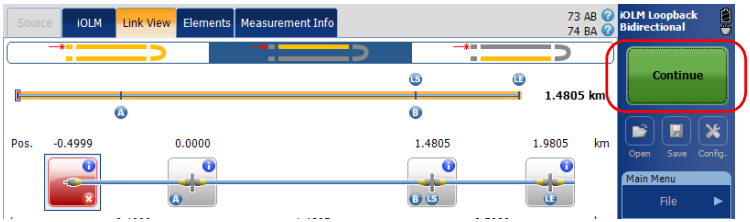
Tap the **Reset Acquisition** button to clear the measurement.



The results of the first acquisition are available in the **Link View** tab.

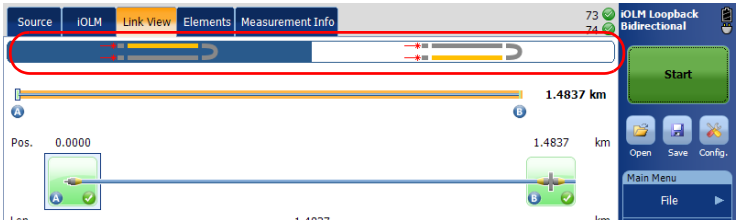


6. Tap **Continue** to perform the second acquisition.



Note: *The second acquisition can only be performed once.*

When both measurements are split properly, the application generates the bidirectional measurement for the two fibers.



Stopping an Acquisition

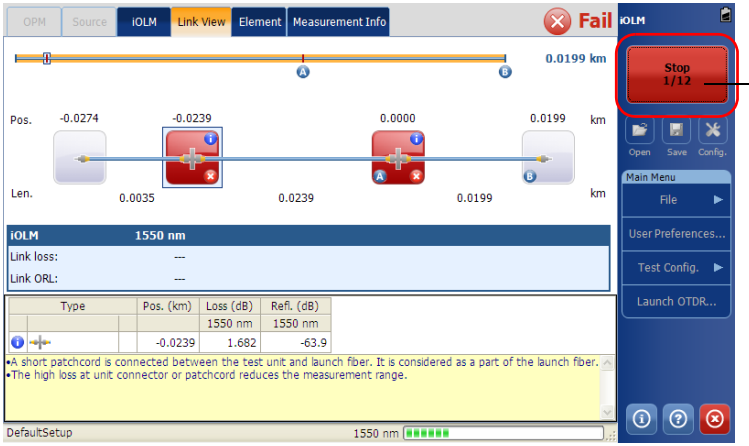
The acquisition stops automatically after the acquisition is complete.

It is possible to stop the acquisition at any time while the acquisition is in progress.

Note: *The unprocessed wavelengths will not be processed when a multiple wavelength acquisition is stopped manually.*

To stop the acquisition:

Tap **Stop** from the main window.



The numbers indicate the port of the switch on which the acquisition is underway.

The stopped acquisition status will be saved in the measurement file. The stopped acquisition status is also displayed in the **Measurement Info** tab.

The global pass/fail status will show unknown or fail when the acquisition is stopped manually.

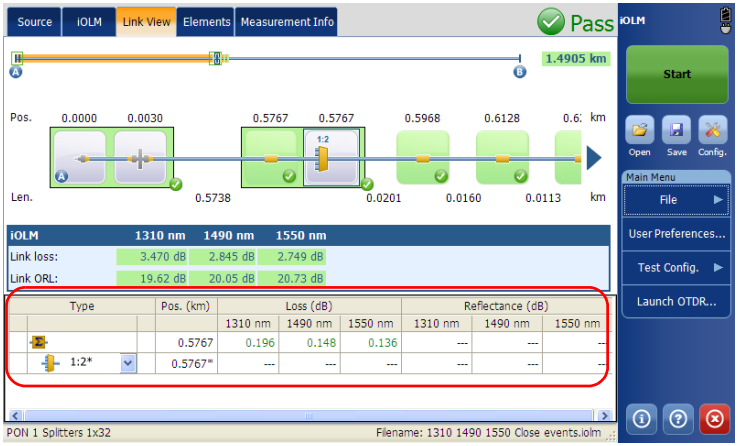
Note: *A manually stopped acquisition should not be considered as a reliable link measurement. To fully characterize a link, a complete acquisition should be performed.*

8 Understanding Diagnostics

This section explains the diagnostics feature available in the iOLM application.

Diagnostics are used to provide additional information about detected problems or ambiguous measurement situations, such as root cause possibilities for the fail status of a link element. The diagnostics provide help to troubleshoot faulty connectors, understand why link elements are tagged as fail or unknown, indicate unexpected instrument or test conditions and so forth.

Link elements with an associated diagnostic are marked with an icon, and the diagnostics are displayed in the **Link View** and **Elements** tabs. More than one diagnostic can be associated with any given element.



Elements diagnostics are associated with specific link elements issues. Each failed link element will have associated diagnostics to assist in troubleshooting. Some elements, such as macrobends, will have associated diagnostics even with a pass status.

9 Using the Inline Power Meter (Optional on Some Models)

This section will help you use the inline power meter and perform acquisitions.

Note: *The **OPM** tab will not be available if no inline power meter is available for your unit.*

Understanding the Inline Power Meter

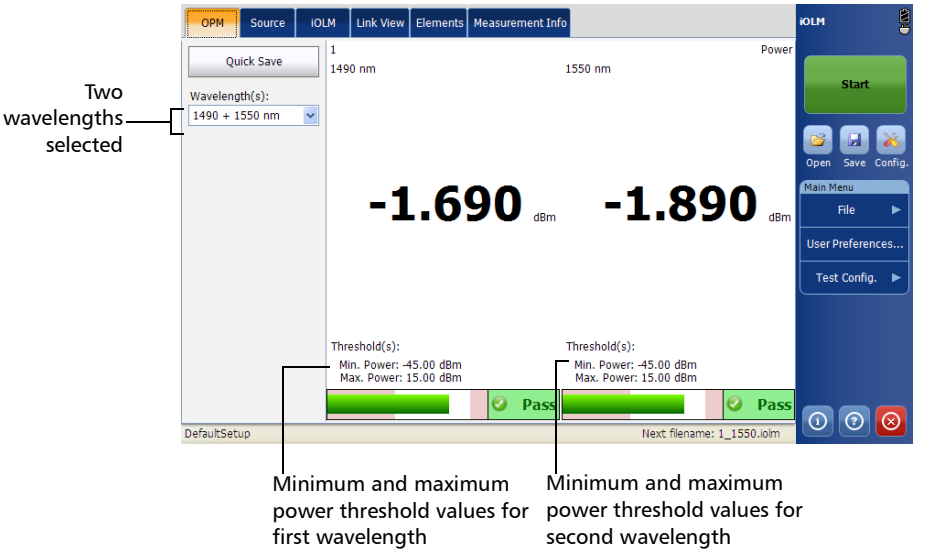
The inline power meter in your module measures the power of the link through the SM live port, which is also used for iOLM measurements.

Minimum and maximum power threshold values are displayed in the same window used to display the current power meter value. The Pass/Fail thresholds wavelength is the same as the current power meter reading.

Note: *The inline power meter can be equipped with two-channels for taking the power meter measurements at multiple wavelengths at once.*

When two power meter values are displayed, one for each channel, according to the wavelength, two sets of minimum and maximum power threshold values are displayed, one for each channel.

A visual representation of the power value for each channel is displayed and updated each time a new power value is measured. This visual representation of power value gives an idea of the power on a scale and power level versus pass/fail thresholds.



The identifiers defined in the **Identification** tab under **User Preferences** are also displayed on this page.

Performing a Power Meter Acquisition

The power meter level is refreshed in real time and can help you to decide if an iOLM acquisition is required to identify the cause and location of a problem. You can select the power meter wavelength from the list of available wavelengths.

Note: *The **OPM** tab will not be available if no power meter is available in the module.*

Note: *The wavelengths depends on the iOLM module.*

If no wavelength is selected, you cannot perform a power meter acquisition.

To perform a power meter acquisition:

1. Select the **OPM** tab.
2. Select the wavelength(s) at which you want to measure the power levels.

The power levels are displayed for the selected wavelength in the **OPM** tab.

When both wavelengths of a two-channels power meter are selected, both power levels will be displayed side by side. Both values will be refreshed at the same time.

Saving the Power Level

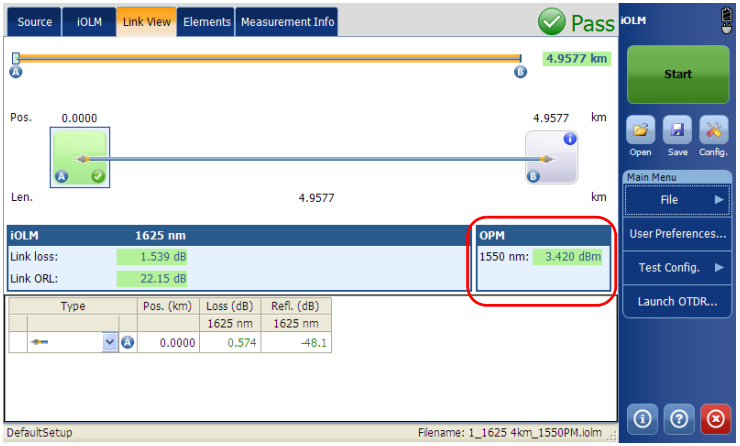
Tapping **Quick Save** saves the current power level(s) into the file for future reference. You can view the file by loading it in the iOLM application. See *Managing Files* on page 151 for more details on opening iOLM files.

To save the power level:

Tap **Quick Save** at any time you want to save the power level.

The power level is saved into a file, the file name is displayed in the status bar.

The saved power level is also displayed in the **OPM** table under the **Link View** tab.



iOLM Acquisition with Power Meter

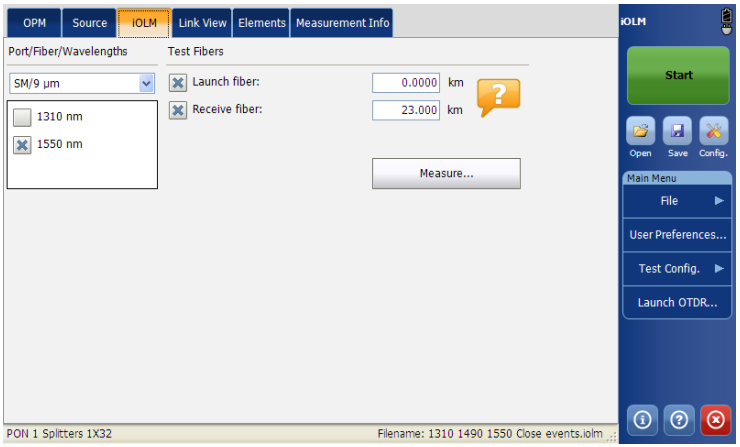
The iOLM and power meter acquisition is performed together to save the iOLM acquisition results along with the power levels (power meter acquisition results) in a file for future reference.

The measurements are taken at the wavelength(s) set in the **OPM** tab.

To perform an iOLM acquisition with power meter:

1. Select the **OPM** tab.
2. Select the wavelength(s) at which you want to take the power meter measurements.

3. Select the SM Live Port and the iOLM wavelength from the **iOLM** tab.



4. Tap **Start**.

Note: *Two power levels are considered for measurement when two wavelengths are selected from the **Wavelength(s)** drop down box for the real-time power meter display.*

Note: *The Power Meter acquisition is taken on the SM Live port.*

Note: *One channel or two channel support for the power meter depends on the iOLM module.*

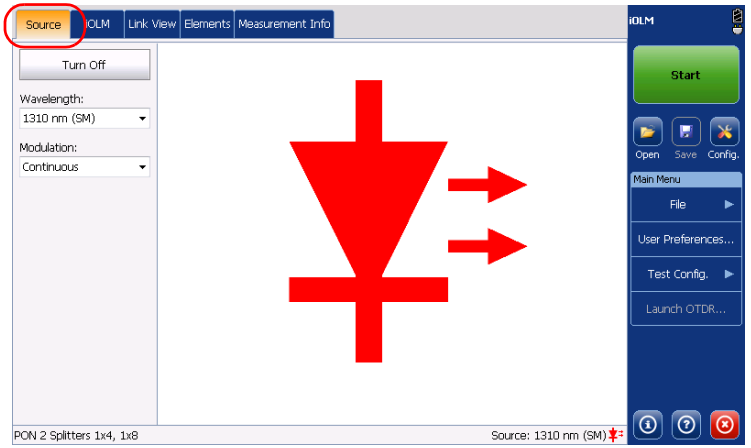
The wavelengths used to take the power meter measurement during iOLM acquisition process are the same as those used to display power levels in real-time.

10 Using the OTDR as a Source

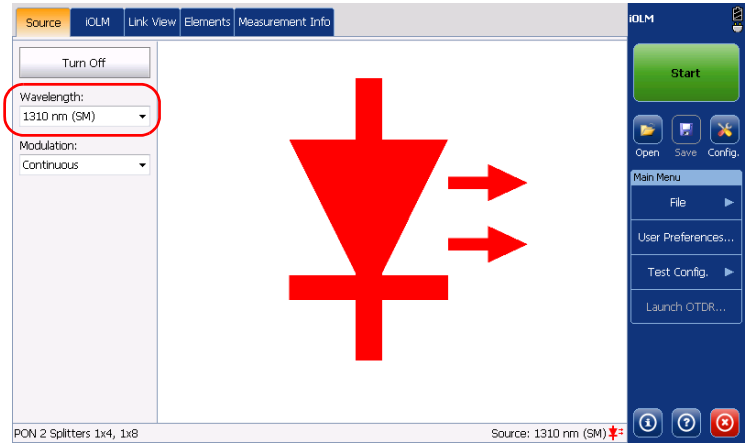
The **Source** tab allows you to operate the existing OTDR laser as a source to do power meter measurements at the other end of the fiber. This helps to quickly locate the correct fiber or perform loss measurements.

To use the OTDR as a source:

1. From the upper panel, select **Source** tab.



2. Select the desired wavelength from the **Wavelength** list.

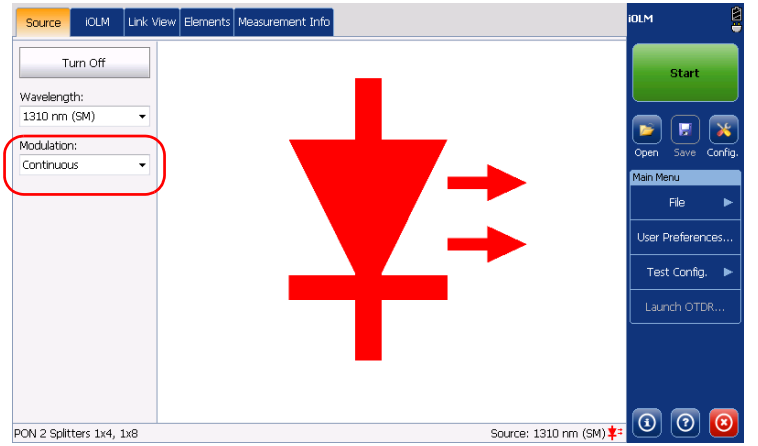


3. Select the desired modulation from the **Modulation** list.

   Select **Continuous** to receive the measurement loss with a power meter at the other end.

   Select **1 kHz** or **2 kHz** to identify the fiber under test, which could be particularly useful when working with cables containing many fibers.

   You can also select **1 kHz + Blink** and **2 kHz + Blink** for easier fiber identification. If you select this pattern, the modulated signal (1 KHz or 2 KHz) is sent for 1 second, then is off for the next second, then be sent again for 1 second, and so on.



4. Select **Turn On** to start emission.

Note: *The application displays the source wavelength, source port, and the turn on state in the status bar.*

11 Starting the Classic OTDR Application

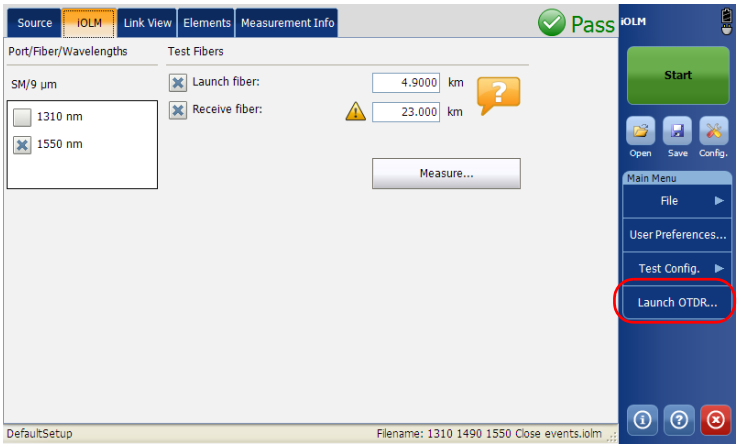
You can start the classic OTDR application without leaving the iOLM application. You can use this option to do real-time acquisitions with the OTDR application and quickly switch back to the iOLM application to do troubleshooting in a more user-friendly environment.

Note: *EXFO recommends to run only one instance of the OTDR application per module at a time, either the one you start from ToolBox, or the one you start from the iOLM application.*

Note: *This option is available only when the OTDR or RT software option is activated.*

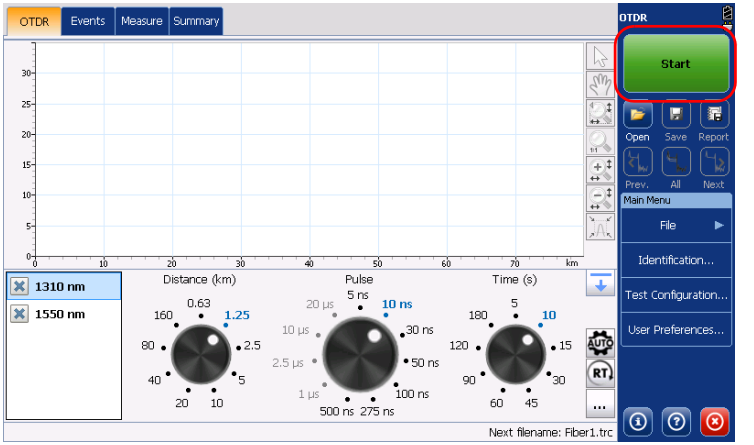
To use the OTDR application:

1. From the **Main Menu**, tap **Launch OTDR**.



Note: *You cannot do any operations related to hardware when the classic OTDR application is started. You will be notified that you need to close the OTDR application to allow interaction with the hardware.*

2. Tap **Start** to start the OTDR acquisition. For more information, refer to the OTDR user guide.



Note: *The aspect of the OTDR application could differ slightly depending on the unit you are using.*

12 Managing Results

This section explains the link view, measurement information, element details, and the results displayed after the acquisition process.

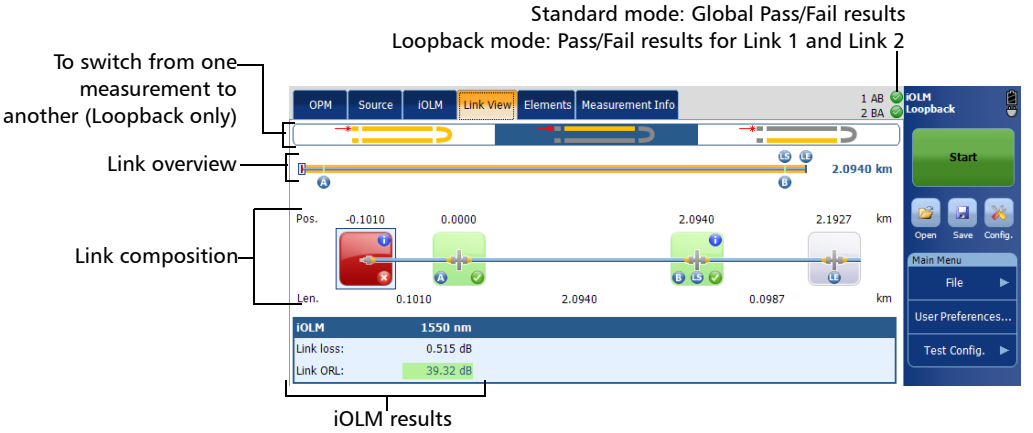
Note: *See* Using the Inline Power Meter (Optional on Some Models) *on page 107 for Power Meter results.*

Link View

The iOLM Link View is an intuitive representation, which combines several measurement results and values into a single view.

The Link view is divided into five different regions.

- Link overview
- Link composition
- Link details, which include
  - iOLM results
  - Power meter results (if power meter measurement is taken)
  - Global Pass/Fail Status



Link Overview

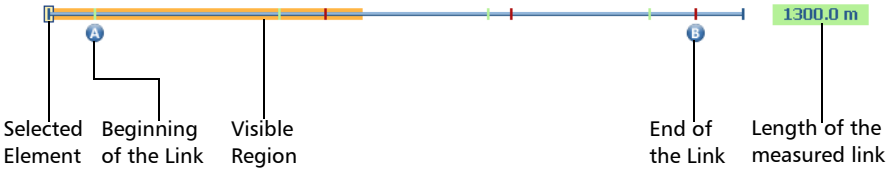
The link overview shows the entire link without scrolling. You can directly select an element by tapping the tick mark ( ) representing it.

The following color codes are used for the link overview.

- Red: If element is fail.
- Green: If element is pass.
- Blue: When the element is not tested for Pass/Fail or the status of the element is unknown.

The pass/fail status also depends on the threshold values specified. See *Modifying Element Pass/Fail Thresholds* on page 82 for more details.

The link overview representing all the elements discovered on the link is described below.



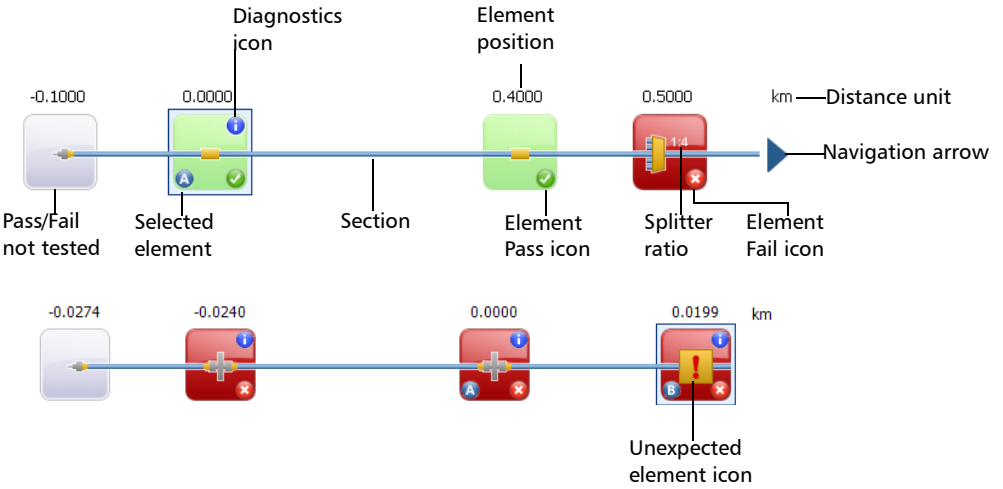
- Length of the measured link: Length of the measured link excluding the launch and receive fiber. In other words, the fiber length between point A and point B.
- Selected element: Rectangle representing the selected element.
- Visible region: The colored background represent the visible region in the Link Composition view.
- Beginning of the link: Beginning of the link under test.
- End of the link: End of the link under test.

Elements before A and after B are referred to as *out of span* elements. Elements out of the span are not tested for pass/fail status, but can have diagnostics on them. If the receive fiber is not defined, the element marked as "B" will not be tested for pass/fail.

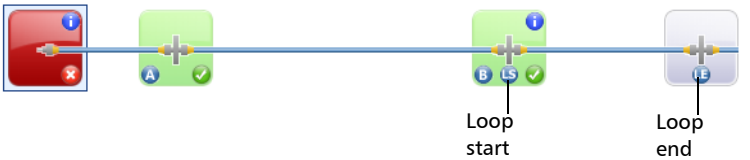
Link Composition

The link composition is described below.

Standard measurement



Loopback measurement



➤ Element position: The distance of the element from the beginning of the link under test.

- Navigation Arrow: The navigation arrow is only displayed when more items are available on a particular side. It indicates that you have to scroll to view those items.
- Selected Element: The gray background represents the currently selected element.
- Letter A: The beginning of the link under test.
- Letter B: The end of the link under test.

Note: *An arrow ( ) icon is displayed on the element, if the start and the end of the link is represented by the same element.*

- Element Pass/Fail: The status of the element whether it is pass, fail, or unknown.
- Element Pass icon : The pass status of the element.
- Element Fail icon : The fail status of the element.
- Pass/Fail not tested: Gray background indicates that the element is unknown. If there is no icon at the right side corner, it indicates that thresholds are not applied on the element and the element is not tested for Pass/Fail.
- Diagnostics icon : This icon specifies that some diagnostics are present on the element. See *Understanding Diagnostics* on page 105 for more details.
- Distance Unit: The units are defined in the **Distance unit** under **General** tab in **User Preferences**.
- Splitter Ratio: The splitter ratio is displayed on the element, if the element type is a splitter.

- Loop Start icon : Indicates the beginning of the loop.
- Loop End icon : Indicates the end of the loop.
- Loop Middle icon : The loop middle icon is displayed on the element if the loop is configured on a single element. The element can be a splice or a connector. When the length of the loop is set to zero, the loop is identified in the middle of the link. An item is automatically added to the links when no one is found.
- Unexpected element icon : For the PON Last Mile measurement type, the unexpected element icon indicates that a problem occurred during the analysis. For example, when a splitter is on the link, a loss and a section of fiber are expected after the splitter. If no splitter is found on the link but a end of fiber is detected, the unexpected element icon is displayed instead of the end of fiber to indicate there is a problem.

Note: *The number of elements displayed in the composition view varies according to the available space, number of elements, and section size.*

Note: *When the link length is large, not all of the elements are visible; you may need to scroll on the link using the navigation arrow.*

Note: *The distance between the elements are not 100 % proportional. To have a proportional representation of the element, see* Link Overview *on page 120.*

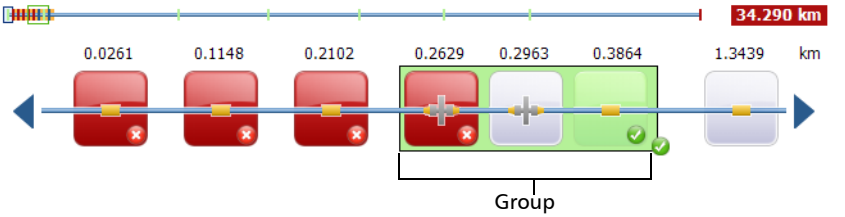
Link Groups

Link elements will be displayed as groups when the iOLM analysis detects several link elements that are too close to one another to be independently characterized. When this occurs, as much information as possible will be displayed for each individual sub-element. The pass/fail status is applied to each sub-element whenever possible, and a global status is also displayed for the group.

Groups can also be displayed when a link element (such as a splitter) is found to have wavelength dependant loss. In that case, the link element is grouped with a macrobend element. In this particular case, there might not be a physical macrobend next to the link element, but the macrobend icon is used to highlight the presence of the wavelength dependant loss.

When elements are grouped, the group loss and group reflectance value is also displayed in the **Elements** tab.

The grouped elements are described below.



Each sub-element is directly displayed as if they were normal elements. See *Link Composition* on page 121 for more details on elements.

Note: *For grouped elements, some values may not be available individually but are available at the group level such as loss and reflectance.*

Note: *If some elements are grouped then the total group loss value is compared with the addition of the thresholds defined for the individual elements in group. If the total group loss value is greater than the addition of the thresholds defined for the individual elements in group, the element will show a fail status.*

You can individually select grouped elements as any other standalone element.

When elements are grouped at the beginning of the link, icon A is displayed on one of the sub-elements.

When elements are grouped at the end of the link, icon B is displayed on one of the sub-elements.

Link View Elements

The iOLM Link View is an intuitive representation which combines several measurement results and values into a single view.

You can find the following elements in the iOLM Link View.

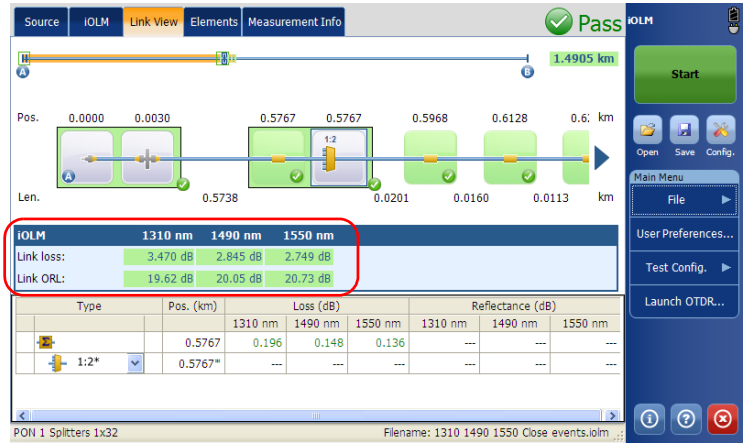
Element Name	Element Icon	Element Description
Macrobends		Macrobends can be displayed in the link view when more than one wavelength is present in the measurement. ***Note:*** *The macrobend will always be displayed as a failed element.*
Out of Range		The out of range element is displayed when the end of fiber could not be detected by the module because of not enough dynamic range.
Splitter		The splitter is a passive fiber optic coupler that divides light from a single fiber into two or more fiber channels. The splitter ratio is displayed beside the icon.
2:N Splitter		2:N splitter can be used to create network redundancy. If a network break occurs, the operator can connect through the other network branch.

Element Name	Element Icon	Element Description
Splice		The splice can indicate the junction of two fiber sections, the presence of a macrobend, or a microbend in the fiber.
Connector		The connector is used to join two fibers.
Switch		Indicates that a switch has been detected.
Fault		For the PON Last Mile measurement type, the unexpected element icon indicates that a problem occurred during the analysis.

iOLM Results

The iOLM acquisition results are displayed in the **iOLM** table for all the wavelengths at which the iOLM acquisition was performed.

Note: *The iOLM results are not displayed if they are not available.*



When a multiple-wavelength acquisition is in progress, only the wavelength currently being acquired and the ones already completed are displayed. Link loss, link ORL, and propagation delay (multimode only) are displayed for each wavelength. For the link loss and the link ORL, the values are tested and displayed according to current pass/fail settings.

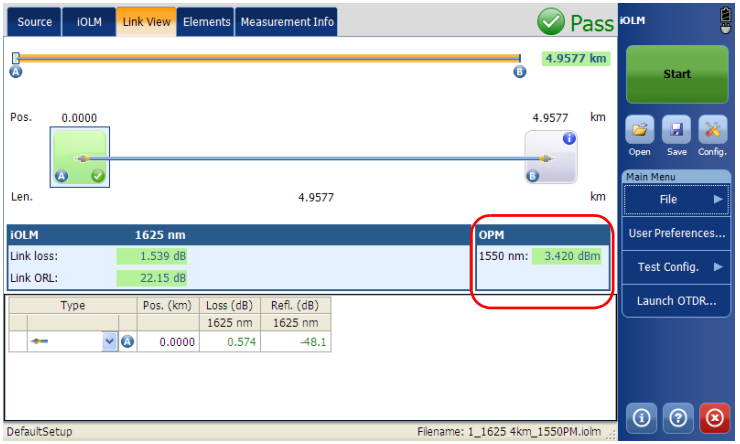
Note: *The propagation delay (multimode only) is a global link measurement which is measured by the OTDR. It is defined by the amount of time necessary for a signal to travel from point A to point B. It may vary between wavelengths.*

Note: *If the link ORL value is saturated, that is, if the value is displayed with a < symbol, the value will be tested for Pass/Fail and it will be able to specify the fail status if the value is fail, but it will not be able to specify the pass status.*

Power Meter Results

The power meter acquisition results are displayed in the **OPM** table for all the wavelengths at which the power meter acquisition was performed.

Note: *The power meter results are not displayed if they are not available.*



More than one wavelengths can be displayed in the power meter section. All the values are tested and displayed according to the current pass/fail settings.

Unidirectional and Bidirectional Loopback Results

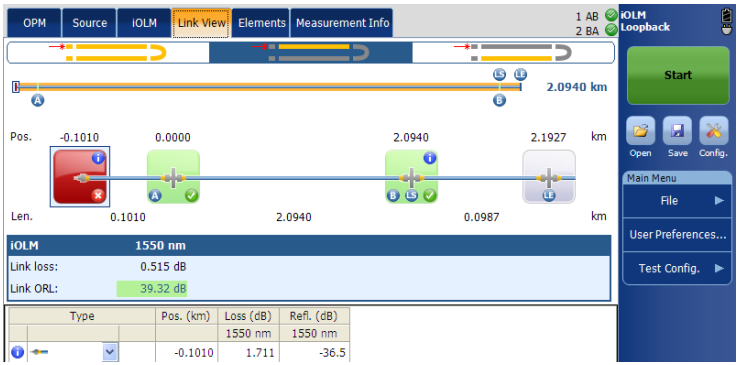
The loopback measurement is especially designed for testing cables formed of a pair of identical fibers of an equivalent length. The measuring time is optimized because two fibers are checked in a single measurement.

The loopback results appear after a successful split.

➤ In the case of a uni-bidirectional loopback measurement:

You can navigate through the split measurement and the original measurement by selecting the appropriate icon at the top of the link view.

The original measurement is analyzed and the pass/fail thresholds are displayed for this measurement. However, there is no overall status for the original measurement. The overall status is only for the split measurements.



➤ In the case of a bidirectional loopback measurement:

After the first measurement is taken, the results are presented exactly as they would be for a non-bidirectional loopback measurement.

After the second measurement is taken, both measurements are split properly, and the application generates the bidirectional measurement for the two fibers.

Global Pass/Fail Status

The global pass/fail status depends on the pass/fail status of the link length, link loss, link ORL, power meter values (if taken), and the link elements.

If any of the status is fail, then the global pass/fail status will be fail.

The status is automatically updated when a value is modified in the application. When the element type is changed from the **Elements** tab, the individual pass/fail status is recalculated, which might affect the global pass/fail status.

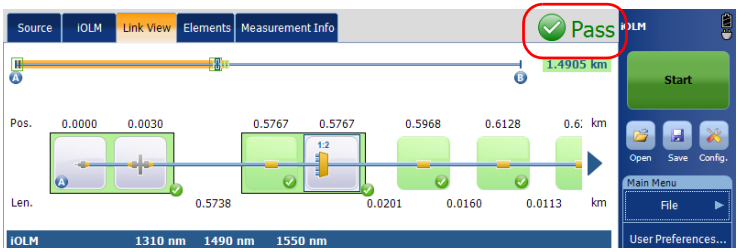
The iOLM application waits for the acquisition to finish before displaying the Pass status. However, the Fail status is displayed as soon as any of the values tested has a Fail status. A fail value can change to unknown or pass when the acquisition is finished.

Note: *It is important to complete the entire acquisition process to have a good pass/fail status.*

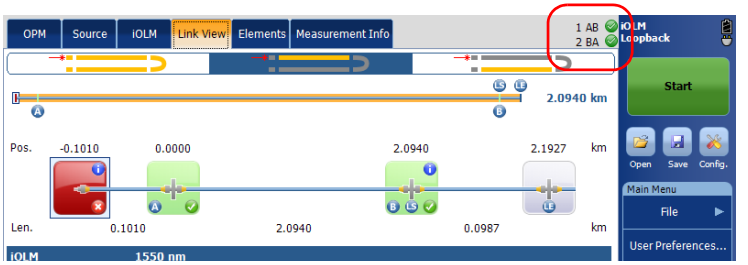
The global pass/fail status of the iOLM measurement is displayed as unknown, if there is no failed value and one element is not tested because it follows the 2:N splitter on the link.

In loopback measurements modes, when the measurement is split (link 1 and link 2), the global pass/fail status is replaced by the link 1 and link 2 statuses.

Standard measurement



Loopback measurements



Viewing Element and Section Details

When an element or section is selected from the **Link View** tab, the details of the corresponding element/section is displayed in the **Elements** tab.

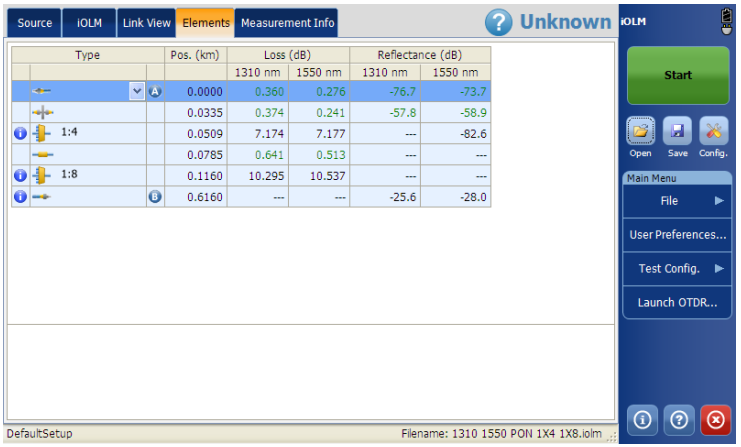
The loss and reflectance are displayed with appropriate coloring based on the pass/fail status of each value.

To view the element or section details:

1. From the **Link View** tab, select the desired element or section.

Note: *You can select the section only if the **Fiber section(s)** option is enabled in the **User Preference** window. For more information, see* Defining General Settings *on page 29.*

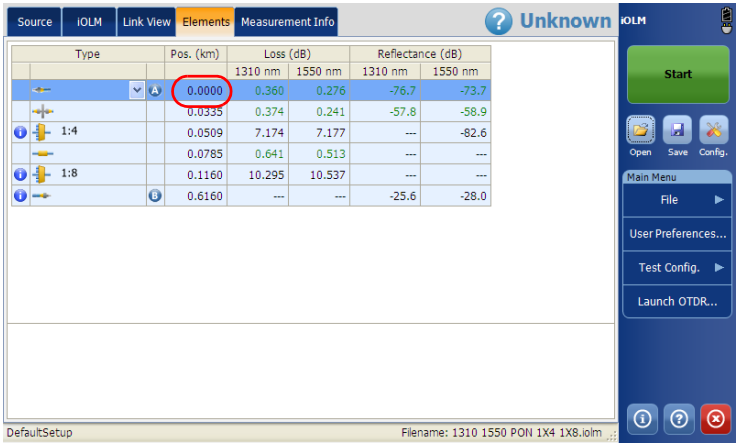
2. From the main window, tap the **Elements** tab. You can view the selected element or section details.



3. Under the **Elements** tab, the following information is displayed.

- **Type**: The type of element selected in the Link View. You can modify the type of element by selecting it from the drop down menu. You can change the splitter ratio if the selected element is a splitter. You can change the element type to splitter ratio 2:N if the iOLM EXpert option is activated and the 2:N splitter ratio is present in the iOLM measurement. If the custom element is defined in the test configuration used for iOLM acquisition, you can select the custom element from the element type list. For more information on custom element, see *Managing Custom Elements (Optional, iOLM EXpert Mode Only)* on page 72.
- The application displays the beginning of the link A and link end B in the element table. If the beginning of the link and link end are in the same element, the application displays in the element table. This information is also displayed in the report.
- In loopback measurement modes, the application displays the link start (A), the loop start (LS), the loop middle (LM) or the loop end (LE) and the link end (B). You can navigate through the split measurement and the original measurement by selecting the appropriate icon at the top of the link view.

➤ **Position**: The position of the selected element in the link. The position 0.00 is set on the first element when the launch fiber is present.



Note: *When an element is selected through **Elements** table, automatically the corresponding element of the link view will get selected*

Note: *The items available in the list depends on the characteristics of the selected element. It may not be possible to change the element type.*

Note: *If the type of an element is modified, a "*" sign is displayed at the value in the **Type** column. When you generate the report the "*"mark is displayed in the **Type** column of the report.*

- **Loss (dB)**: The loss at different wavelengths.
- **Reflectance (dB)**: The reflectance at different wavelengths.
- **Attenuation**: If any section is selected in the Link view then the attenuation value is displayed in the **Elements** table.

Note: *It is possible to underestimate the loss or reflectance value if the noise level is too high (for instance, after a lot of loss on the link, the noise levels increase). In that case, it is possible for the signal processing algorithms to detect an element, and to estimate the loss/reflectance values, but since the measured signal does not completely clear the noise floor, the loss or reflectance/Attenuation values are likely to be underestimated. If the loss or reflectance/Attenuation value is underestimated, the value is displayed with a > symbol.*

Note: *If the loss or reflectance value is saturated, that is, the value is displayed with a > symbol, the value will be tested for Pass/Fail and it will be able to specify the fail status if the value is fail but it will not be able to specify the pass status.*

For grouped elements, the following information is displayed:

- **Group Loss**: The total loss of the grouped elements.
- **Group Reflectance**: The highest reflectance of the grouped elements.

Note: *When the main screen is split, the first row of the element table displays the Group Loss and Group Reflectance, and the second displays the loss and reflectance of the selected element of the group.*

Managing Elements and Analyzing Links (Optional, iOLM EXpert and Loopback Modes)

The application allows you to add and delete elements from both the Link view and **Elements** tab. You can also analyze the link.

Note: *These functionalities are available only if the iOLM EXpert option is activated.*

Adding Elements

The *i*OLM application allows you to add elements by selecting any element or fiber section.

Note: *You cannot add an element after the last element.*

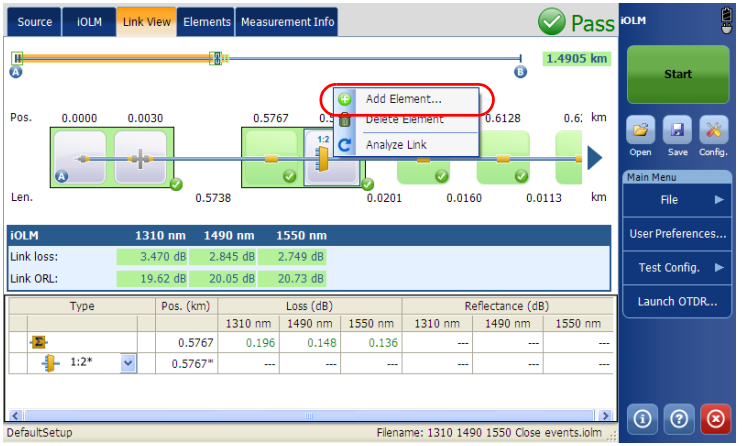
Note: *When an element is edited on a multimode wavelength, it is impossible to change the type of this element to a splitter.*

To add an element:

1. Open an iOLM file.
2. Select the existing element in the Link view where you want to add the new element

   OR

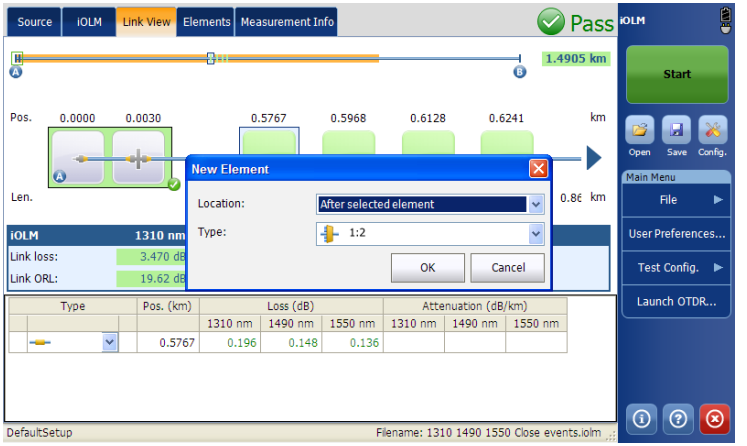
   Select the element from the **Elements** tab.
3. Tap and hold on the element to view the contextual menu and select **Add element**. If a mouse is connected to your platform, then right-click on the element or click and hold down the mouse button to view the contextual menu.



4. In the **New Element** dialog box, configure the element details.

4a. You can add the new element after or before the selected element. The position can be selected as required in the **Location** field.

4b. Select the type of the new element as required.



Note: *The 2:N splitter and custom elements are displayed in the element type list if they are present in the selected iOLM files.*

5. Tap **OK** to apply the changes or **Cancel** to discard them.

Note: *If an element is added, the "*" sign is displayed at the **Position** and **Type** columns in the **Elements** table.*

Note: *You can add an element to a group of elements and it will influence the pass/fail status of the grouped element.*

The application also allows you to add an element by selecting the fiber section.

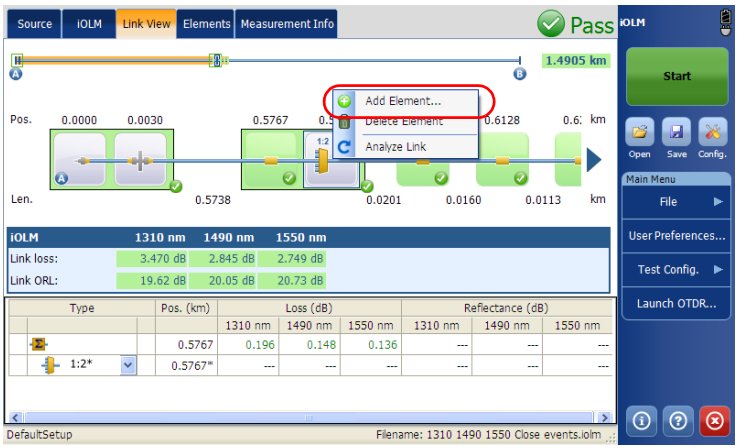
Note: *You can select the fiber section only if the* ***Fiber section*** *option is enabled from* ***User Preferences*** *>* ***General****.*

To add an element on a fiber section:

1. Open an iOLM file.
2. Select the required section in the Link view where you want to add the element.

   OR

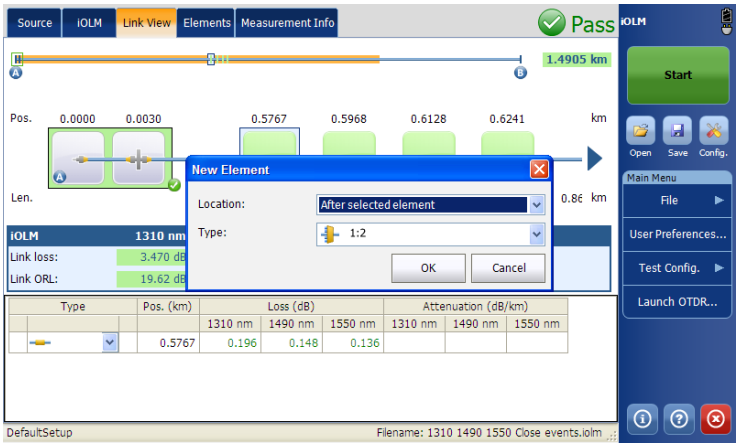
   Select the section from the **Elements** tab.
3. Tap and hold on the fiber section to view the contextual menu and select **Add element**. If a mouse is connected to your platform, then right-click on the fiber section or click and hold down the mouse button to view the contextual menu.



4. Enter the position of the new element in the **Position** field as per your requirement.

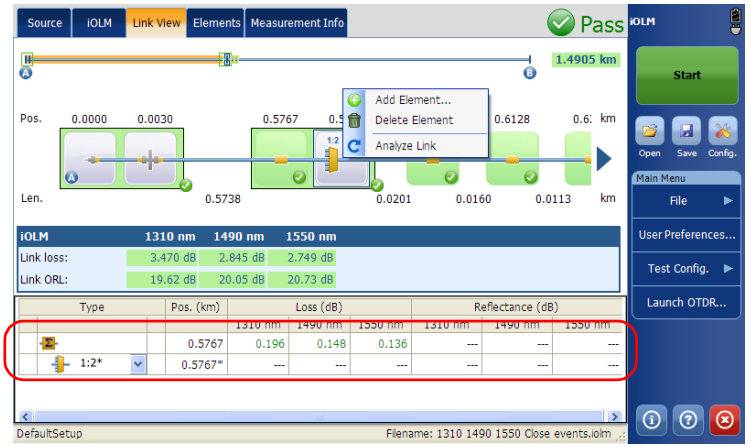
5. Select the element type in the **Type** list.

Note: *The 2:N splitter and custom elements are displayed in the element type list if they are present in the selected iOLM files.*



6. Tap **OK** to apply the changes or **Cancel** to discard them.

When you add a new element to an element or group of elements, the Loss and Reflectance values are set to "---" and the Pass/Fail threshold is not applied to the newly added element. Accordingly the status for the new element is reflected as unknown. The global pass/fail status can be affected after adding an element on an existing element. The added elements are taken into account to determine the pass/fail status of group.



Deleting Elements

The application allows you to delete manually added elements.

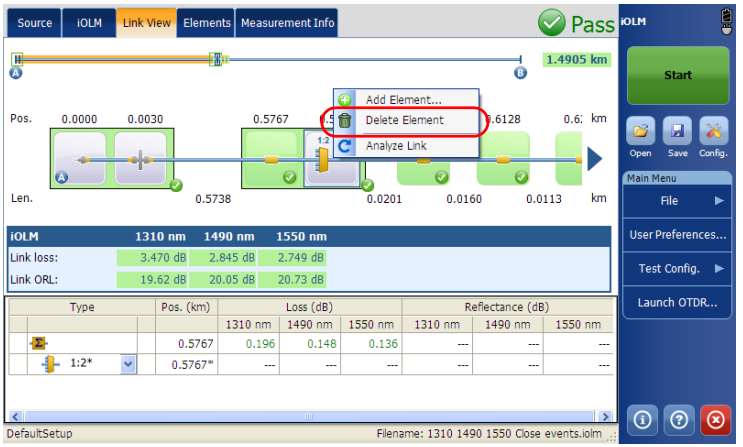
Note: *You cannot delete elements on the link of a loopback measurement for the original measurement, but you can delete added elements when working with the split measurements.*

To delete an element:

1. Open an iOLM file.
2. Select the required element which you want to delete.

   OR

   Select the element from the **Elements** tab.
3. Tap and hold on the element to view the contextual menu. If a mouse is connected to your platform, then right-click on the element or click and hold down the mouse button to view the contextual menu.



4. Select **Delete Element** from the contextual menu or tap Delete from the keyboard.
5. A confirmation message is displayed. Tap **Yes** to continue or **No** to cancel your choice.

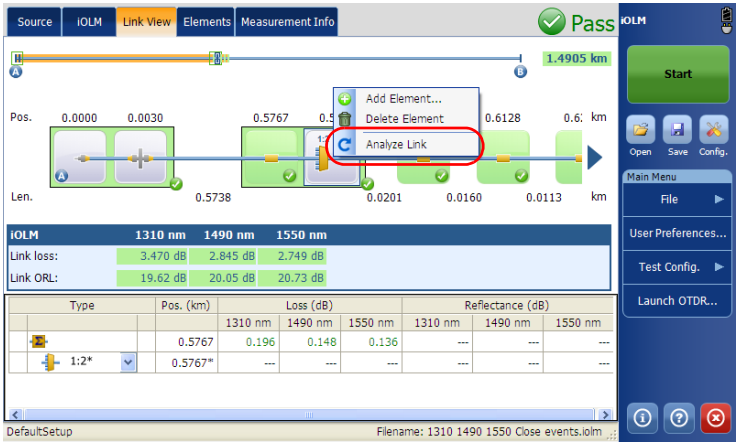
Analyzing Links

The application allows you to reanalyze measurements from the Link view as well as from the **Elements** tab. When you re-analyze the link, it regenerates all the elements from the acquired measurement and resets the link start and link end values. Once a measurement is re-analyzed, any UI element related to the link composition, values, and characteristic are refreshed. All the manually added elements are removed from the link; the global pass/fail status and element table are also refreshed when you analyze the link.

Note: *You cannot analyze elements on the link of a loopback measurement (either original measurement or split measurements).*

To analyze the link:

1. Open an iOLM file.
2. Tap and hold on the Link view to view the contextual menu, and select **Analyze Link**. If a mouse is connected to your platform, then right-click on the Link view or click and hold down the mouse button to view the contextual menu.



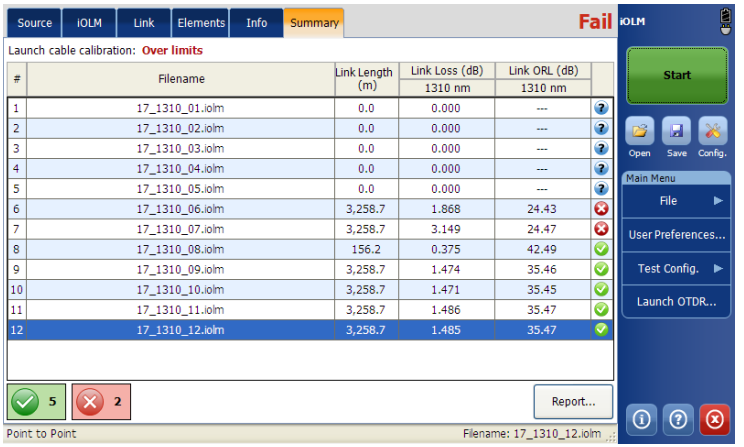
3. A confirmation message is displayed. Tap **Yes** to continue or **No** to cancel your choice.

Viewing Multifiber Results

As soon as you start a multifiber acquisition sequence, a summary with the global pass/fail status for the entire MPO cable is displayed. The results are displayed as the acquisition progresses. Detailed information is shown for each fiber as well.

The summary is not displayed when you open a new file or if an acquisition sequence is started and the externally controlled MPO optical switch is not connected to the unit.

After an acquisition sequence is completed or interrupted, you can select a specific measurement and view the results.



You can set your unit to generate a report automatically after each sequence. For more information, see *Defining General Settings* on page 29.

Measurement Information

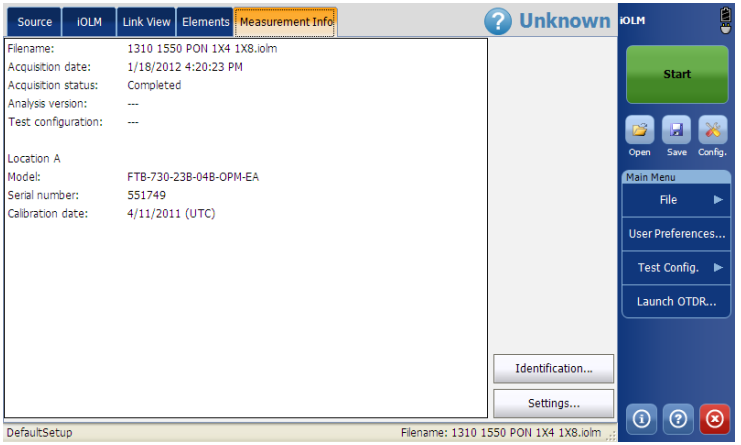
You can find information about a measurement, in the application, such as the file name, the acquisition date, the acquisition status, the analysis version, and the test method.

- The acquisition status indicates if the acquisition has been taken normally or if it has been interrupted.
- The analysis version is the version of the application used to analyze the measurement. It is the same as the install kit version.
- The test method indicates if the measurement was performed in loopback mode or not.

You can also have access to the identification information and to the measurement settings.

To view measurement information:

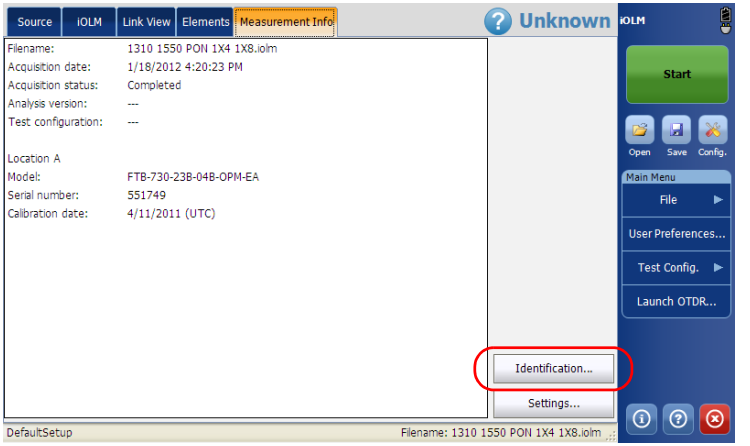
From the main window, tap **Measurement Info**.



Note: *If file autonaming is deactivated, the file name will be "---".*

To view identification information:

1. From the main window tap **Measurement Info**.
2. Tap **Identification**.



3. Modify the identification information, if required.
4. Set the direction of the measurement.

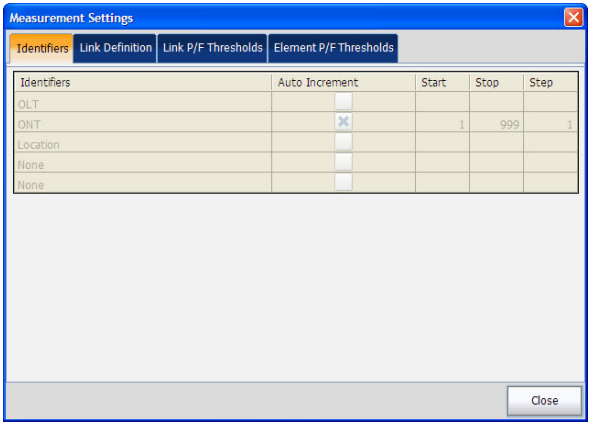
Note: *When working in unidirectional loopback, the direction is disabled because it will be set automatically by the loopback process. In a bidirectional loopback measurement, the direction is automatically set to Bidirectional.*

5. Tap **OK** to save the modification.

Note: *The modifications done here will be saved in the measurement file only, not in the application user preferences.*

To view measurement settings:

1. From the main window, tap **Measurement Info**.
2. Tap **Settings**.



3. By default, the **Identifiers** tab is selected. To view the thresholds, select the corresponding tab.

Note: *See* Modifying a Test Configuration *on page 61 to modify the settings for future acquisitions.*

4. Tap **Close** to close the window.

13 Managing Files

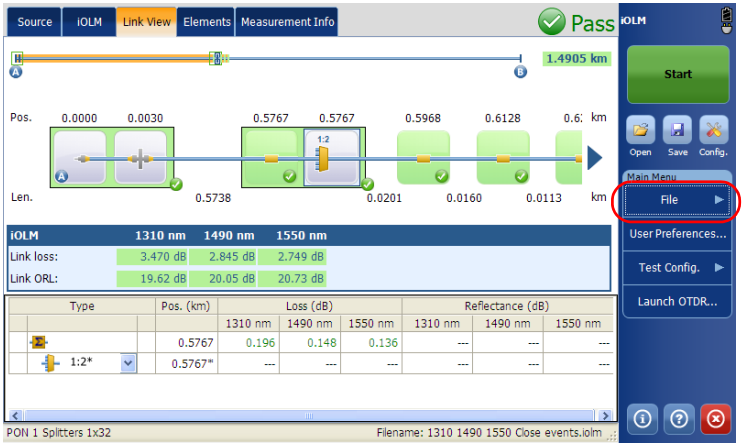
The **File** menu allows you to open an existing file, save a file, and generate a report from the measurement currently in the memory.

Opening iOLM Files

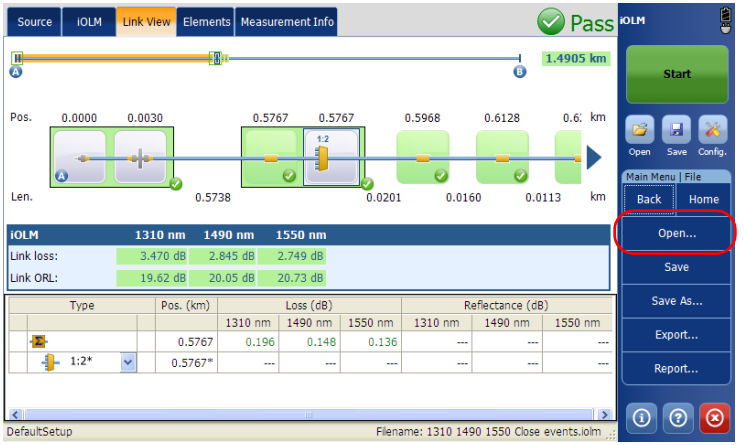
The **Open** menu item allows you to open an existing iOLM file in the application.

To open iOLM files:

1. From the **Main Menu**, tap **File**.

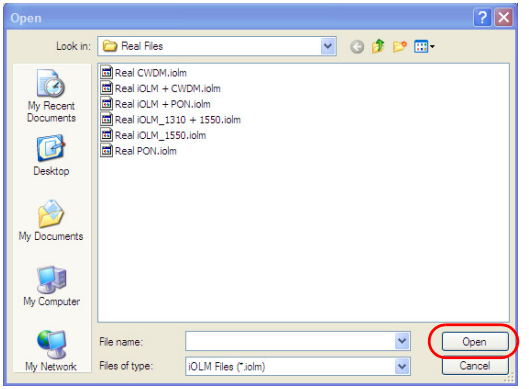


2. Tap **Open**.



3. Select the file you want to open and tap **Open**.

Note: *Depending on the type of unit you are using, the **Open** button may be replaced with an **OK** button.*



The file will be loaded in the application. The **Link View** and **Elements** tab are displayed by default.

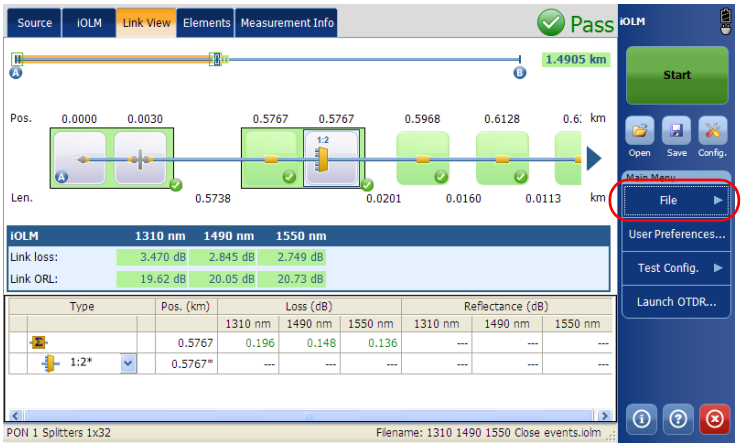
Saving iOLM Files

The **Save** or **Save As** menu item allows you to save an existing iOLM file on the disk.

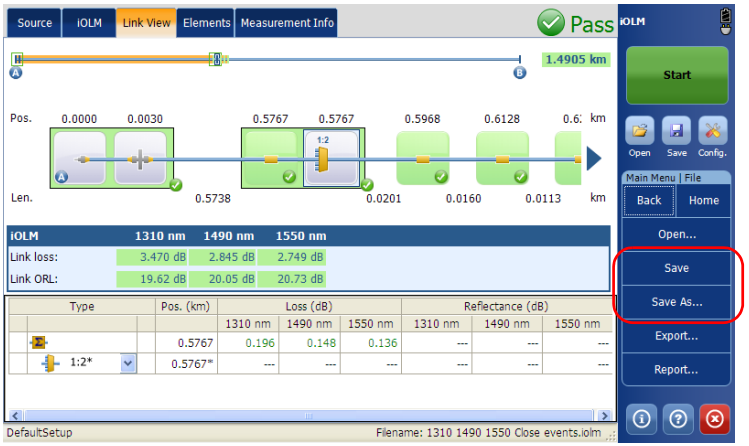
If the wavelengths file name component is selected under the **Filename** tab, then all of the iOLM wavelengths present in the iOLM measurement are added to the file name. If the power meter measurement is present in the application, wavelengths used for the measurement are also added to the file name. For example, if the wavelength is the only file name component selected under the **Filename** tab, the iOLM measurement is done at 1625 nm and the power meter measurement is done at 1490 nm + 1550 nm then the file name will be “1625_1490 + 1550.iolm”.

To save iOLM files:

1. From the **Main Menu**, tap **File**.



2. Tap either **Save** to overwrite the existing file with the new file, or **Save As** to enter a new name or location.



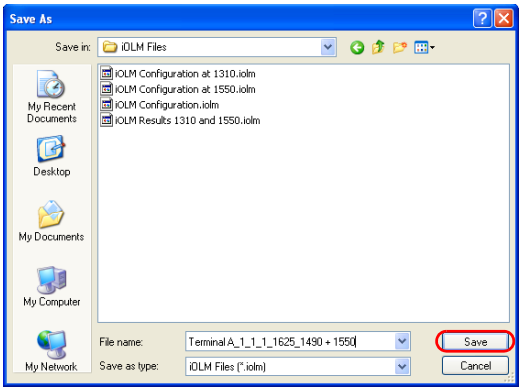
Note: *If a file already exists on the disk and it is saved a first time after an acquisition, a confirmation message will be displayed to overwrite the existing file. If you select* ***No****, the* ***Save As*** *dialog box will open.*

Note: *If an OTDR Bellcore (.sor) file already exists on disk, a number in parenthesis will be automatically incremented at the end of the file name to avoid unwanted overwrite.*

Note: *The .sor format is not supported by the bidirectional loopback measurement.*

3. Enter the file name and tap **Save**.

Note: *Depending on the type of unit you are using, the **Save** button may be replaced with an **OK** button.*



Exporting OTDR Bellcore Files

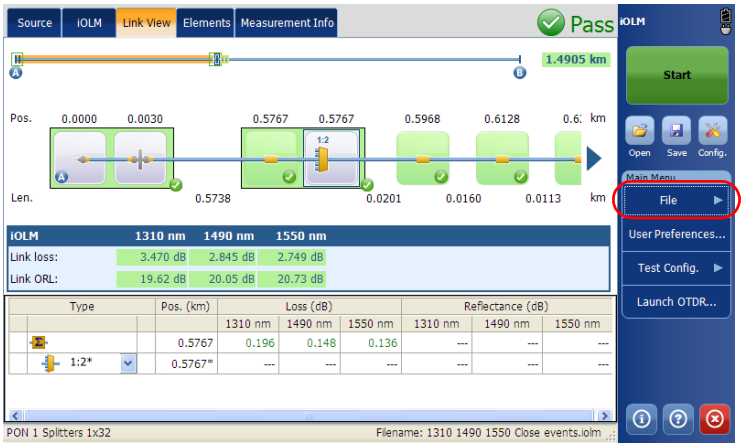
The **Export** option allows you to manually export a OTDR Bellcore file to the disk. If multiple wavelengths are present in the iOLM measurement, a Bellcore (.sor) file is generated for each wavelength.

Note: *The .sor format is not supported by the bidirectional loopback measurement.*

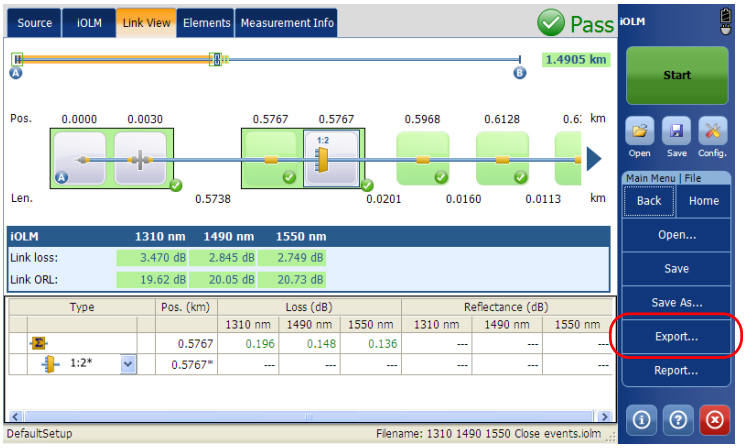
Note: *When a bidirectional measurement is loaded in memory, the **Export** button is disabled.*

To export .sor file:

1. From the **Main Menu**, tap **File**.



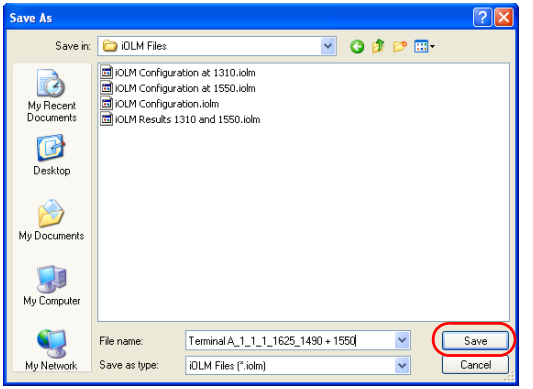
2. Tap **Export** to save the file in .sor format.



3. The default file name is displayed in the **File name** field. You can edit the file name and tap **Save**. If multiple wavelengths are present in the iOLM file, then the wavelengths are appended in the file name while you save the Bellcore (.sor) files.

Note: *Depending on the type of unit you are using, the **Save** button may be replaced with an **OK** button.*

Note: *Application provides the path in dialog box to save the OTDR Bellcore (.sor) file on disk.*



When you attempt to generate the .sor file and that the iOLM measurement does not contain the necessary intermediate OTDR measurements, you are notified that the file was not generated, and the reason why. If you interrupt the generation of the .sor file, you are also notified that the file was not generated.

Generating a Report

The **Report** menu item allows you to generate an iOLM report, Power meter report or iOLM plus Power Meter Report.

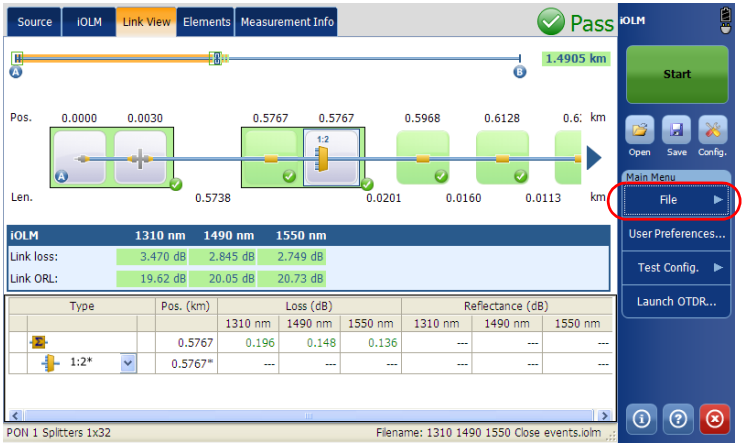
Note: *You need Internet Explorer 7 or later to open .mht files. The UNmht plug-in is required to open the report files in any browser other than Internet Explorer. You can retrieve the plug-in on the website of the browser.*

Note: *In Internet Explorer, you have to enable the **Print Background Colors and Images** option from **File > Page Setup** to print the report properly.*

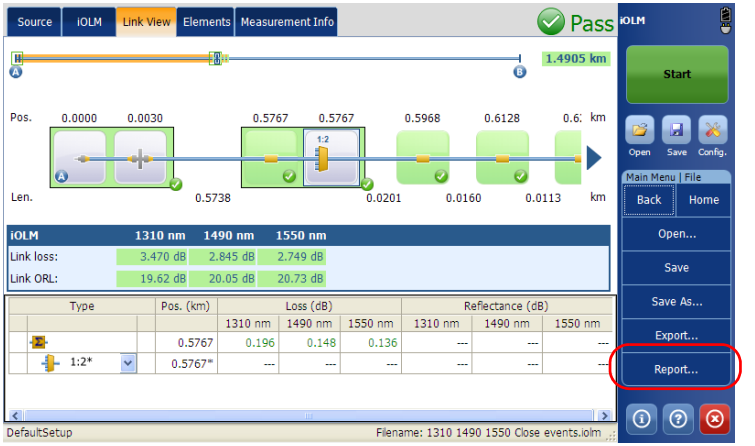
Note: *Google Chrome and Safari do not support the UNmht plug-in.*

To generate a report:

1. From the **Main Menu**, tap **File**.

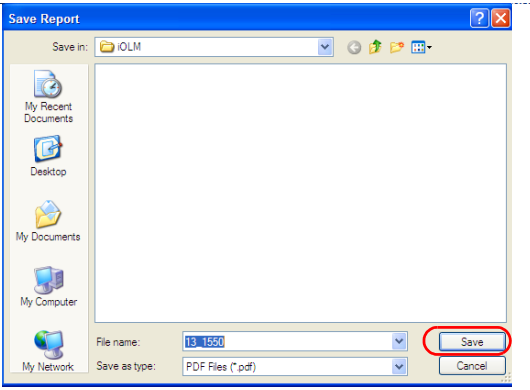


2. Tap **Report**.



3. Enter the report file name and tap **Save**.

Note: *Depending on the type of unit you are using, the **Save** button may be replaced with an **OK** button.*



14 Maintenance

To help ensure long, trouble-free operation:

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

WARNING

The use of controls, adjustments and procedures, namely for operation and maintenance, other than those specified herein may result in hazardous radiation exposure or impair the protection provided by this unit.

Cleaning EUI Connectors

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

IMPORTANT

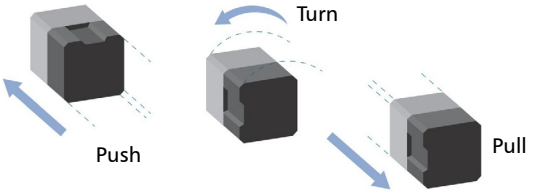
If any damage occurs to internal connectors, the module casing will have to be opened and a new calibration will be required.

WARNING

Looking into the optical connector while the light source is active WILL result in permanent eye damage. EXFO strongly recommends to TURN OFF the unit before proceeding with the cleaning procedure.

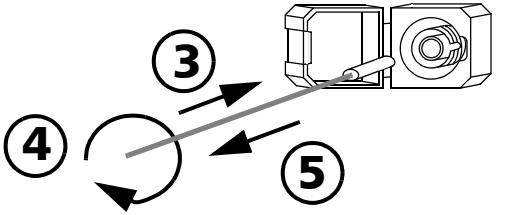
To clean EUI connectors:

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



2. Moisten a 2.5 mm cleaning tip with *one drop* of optical-grade liquid cleaner.

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



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

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

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

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

6a. Deposit *one drop* of optical-grade liquid cleaner on a lint-free wiping cloth.

IMPORTANT

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

6b. Gently wipe the connector and ferrule.

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

6d. Verify connector surface with a fiber inspection probe (for example, EXFO's FIP).

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

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

Recalibrating the Unit

EXFO manufacturing and service center calibrations are based on the ISO/IEC 17025 standard (*General Requirements for the Competence of Testing and Calibration Laboratories*). This standard states that calibration documents must not contain a calibration interval and that the user is responsible for determining the re-calibration date according to the actual use of the instrument.

The validity of specifications depends on operating conditions. For example, the calibration validity period can be longer or shorter depending on the intensity of use, environmental conditions and unit maintenance, as well as the specific requirements for your application. All of these elements must be taken into consideration when determining the appropriate calibration interval of this particular EXFO unit.

Under normal use, the recommended interval for your intelligent Optical Link Mapper is: one year.

For newly delivered units, EXFO has determined that the storage of this product for up to six months between calibration and shipment does not affect its performance (EXFO Policy PL-03).

To help you with calibration follow-up, EXFO provides a special calibration label that complies with the ISO/IEC 17025 standard and indicates the unit calibration date and provides space to indicate the due date. Unless you have already established a specific calibration interval based on your own empirical data and requirements, EXFO would recommend that the next calibration date be established according to the following equation:

Next calibration date = Date of first usage (if less than six months after the calibration date) + Recommended calibration period (one year)

To ensure that your unit conforms to the published specifications, calibration may be carried out at an EXFO service center or, depending on the product, at one of EXFO's certified service centers. Calibrations at EXFO are performed using standards traceable to national metrology institutes.

Note: *You may have purchased a FlexCare plan that covers calibrations. See the Service and Repairs section of this user documentation for more information on how to contact the service centers and to see if your plan qualifies.*

Recycling and Disposal (Applies to European Union Only)

For complete recycling/disposal information as per European Directive WEEE 2012/19/UE, visit the EXFO Web site at www.exfo.com/recycle.

15 Troubleshooting

Viewing Online Documentation

An online version of the intelligent Optical Link Mapper user guide is available at all times from the application.

Note: *You will also find a printable PDF version on your installation DVD.*

To access online help:

At the bottom of the **Main Menu**, tap .

Contacting the Technical Support Group

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

Technical Support Group

400 Godin Avenue
Quebec (Quebec) G1M 2K2
CANADA

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

For detailed information about technical support, and for a list of other worldwide locations, visit the EXFO Web site at www.exfo.com.

If you have comments or suggestions about this user documentation, you can send them to customer.feedback.manual@exfo.com.

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

Viewing Information About the Product

You can view the product version details and technical support information in this window.

To view the information about the product:

From the **Main Menu**, tap .

Transportation

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

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

16 Warranty

General Information

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

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

IMPORTANT

The warranty can become null and void if:

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

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

Liability

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

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

Exclusions

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

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

IMPORTANT

In the case of products equipped with optical connectors, EXFO will charge a fee for replacing connectors that were damaged due to misuse or bad cleaning.

Certification

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

Service and Repairs

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

To send any equipment for service or repair:

1. Call one of EXFO's authorized service centers (see *EXFO Service Centers Worldwide* on page 172). Support personnel will determine if the equipment requires service, repair, or calibration.
2. If equipment must be returned to EXFO or an authorized service center, support personnel will issue a Return Merchandise Authorization (RMA) number and provide an address for return.
3. If possible, back up your data before sending the unit for repair.
4. Pack the equipment in its original shipping material. Be sure to include a statement or report fully detailing the defect and the conditions under which it was observed.
5. Return the equipment, prepaid, to the address given to you by support personnel. Be sure to write the RMA number on the shipping slip. *EXFO will refuse and return any package that does not bear an RMA number.*

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

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

Routine recalibration is not included in any of the warranty plans. Since calibrations/verifications are not covered by the basic or extended warranties, you may elect to purchase FlexCare Calibration/Verification Packages for a definite period of time. Contact an authorized service center (see *EXFO Service Centers Worldwide* on page 172).

EXFO Service Centers Worldwide

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

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

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

EXFO Europe Service Center
Winchester House, School Lane
Chandlers Ford, Hampshire S053 4DG
ENGLAND

Tel.: +44 2380 246800
Fax: +44 2380 246801
support.europe@exfo.com

EXFO Telecom Equipment (Shenzhen) Ltd.
3rd Floor, Building C,
FuNing Hi-Tech Industrial Park, No. 71-3,
Xintian Avenue,
Fuyong, Bao'An District,
Shenzhen, China, 518103

Tel: +86 (755) 2955 3100
Fax: +86 (755) 2955 3101
support.asia@exfo.com

To view EXFO's network of partner-operated Certified Service Centers nearest you, please consult EXFO's corporate website for the complete list of service partners:
http://www.exfo.com/support/services/instrument-services/exfo-service-centers.

A Working With the intelligent Optical Link Mapper in TestFlow

You can perform iOLM measurements with the TestFlow application.

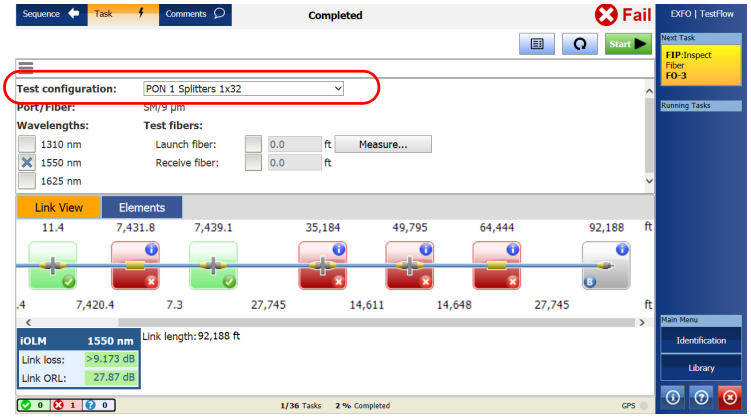
Configuring your iOLM

The iOLM performs the acquisition on the port and wavelengths selected; the values are preserved for the next acquisition.

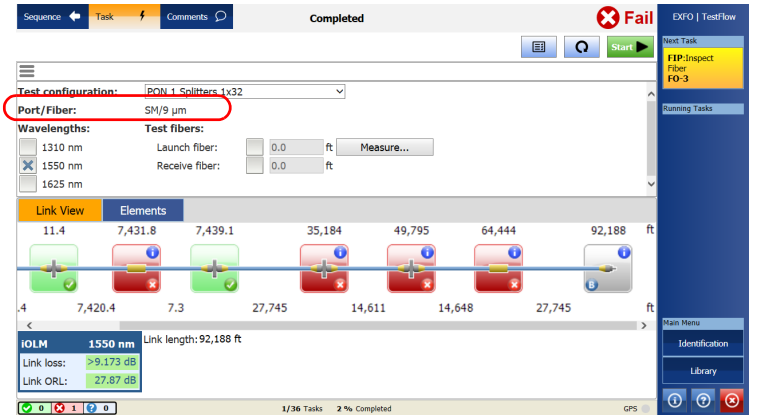
Note: *Some settings, such as wavelengths and test fibers values, cannot be modified if the sequence loaded in TestFlow includes mandatory preset parameters.*

To configure the iOLM:

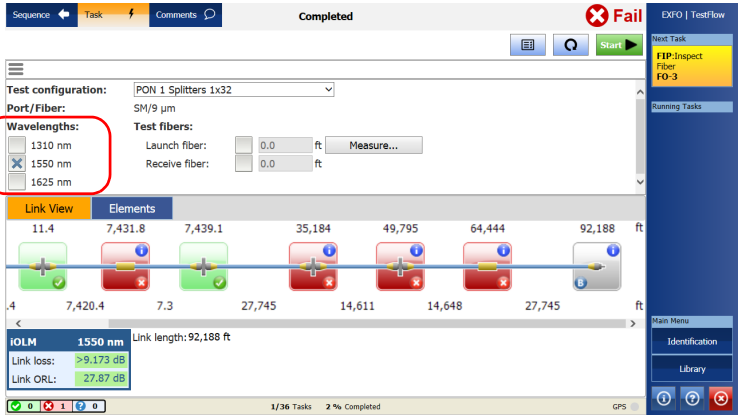
1. Select the test configuration you want to use for your test.



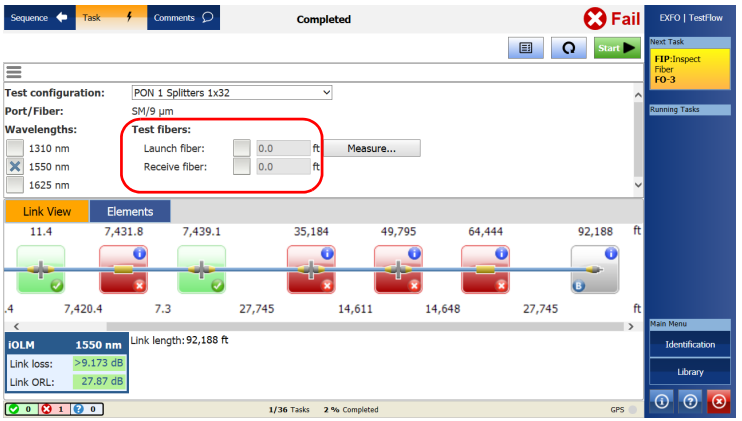
2. If two ports are available on your module, select which one to use for your test. The fiber core is also selected at this point; for C fibers, select 50 µm, and for D fibers, select 62.5 µm.



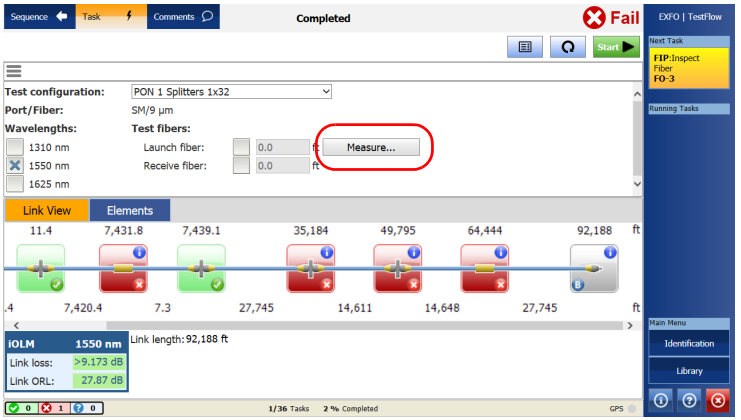
3. Select the wavelengths for the next acquisition. The available wavelengths depend on the iOLM module.



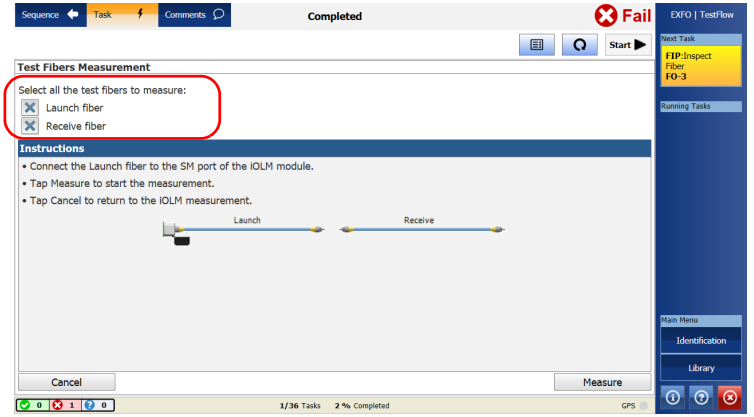
4. Specify if a launch and receive fibers are connected to the link under test, and enter their lengths.



5. If you want to start the measurement assistant to measure the fiber length for the launch and receive fibers, tap **Measure**.



6. Under **Test Fibers Measurement**, select the test fibers to measure.



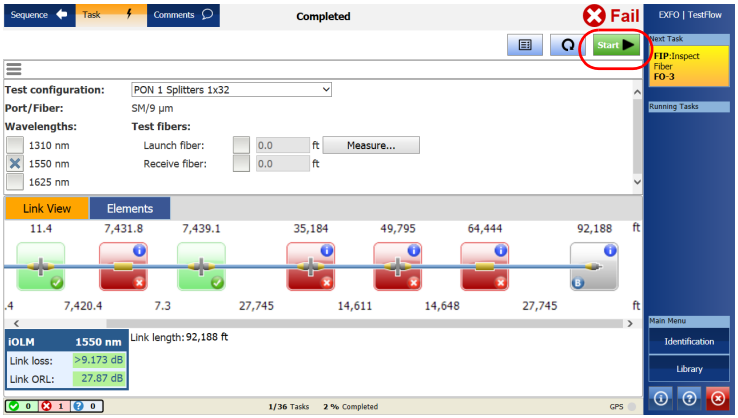
7. Follow the instructions on-screen.

Starting a Standard iOLM Acquisition

The iOLM allows you to characterize a fiber-optic span, usually optical fiber sections joined by splices and connectors. The iOLM provides an inside view of the fiber, and can calculate fiber length, breaks, total return loss, splice, connector, and total losses.

To perform an iOLM acquisition:

Tap **Start**.



When an iOLM acquisition starts, the **Link View** tab is displayed by default.

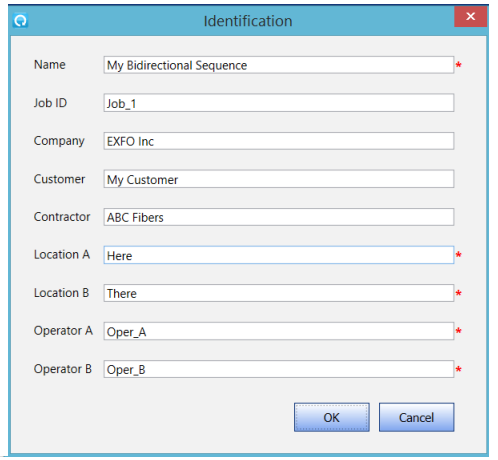
Performing a Bidirectional iOLM Acquisition

A bidirectional iOLM acquisition is obtained when two unidirectional acquisitions are performed one after the other.

When the first acquisition is taken, the bidirectional status is on stand-by. As soon as the second acquisition is complete, TestFlow can process the bidirectional measurement and give the final status automatically.

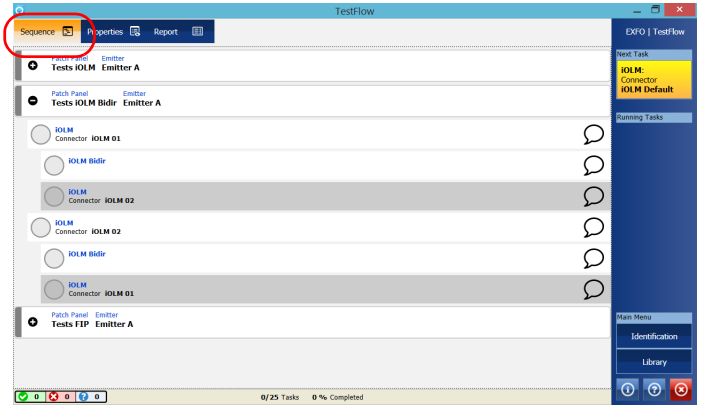
To perform a bidirectional acquisition:

1. In the **Identification** window, enter the required information.

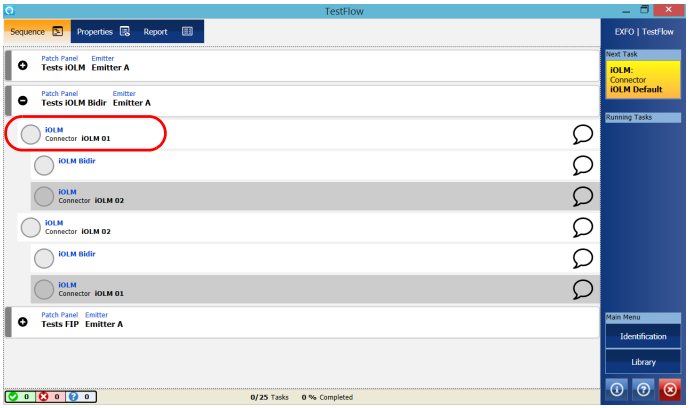


2. Tap **OK**.

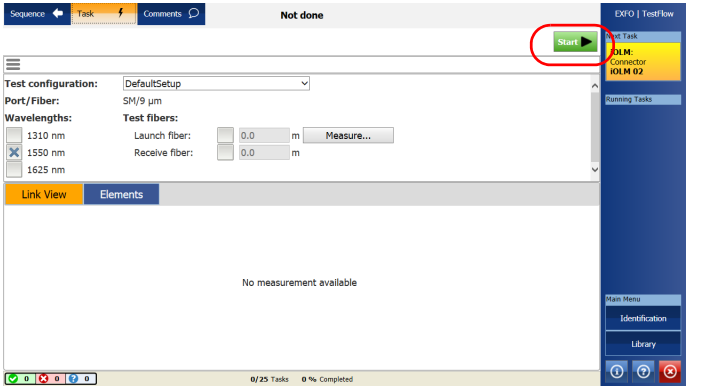
3. In the **Sequence** tab, perform the acquisitions for the first direction:



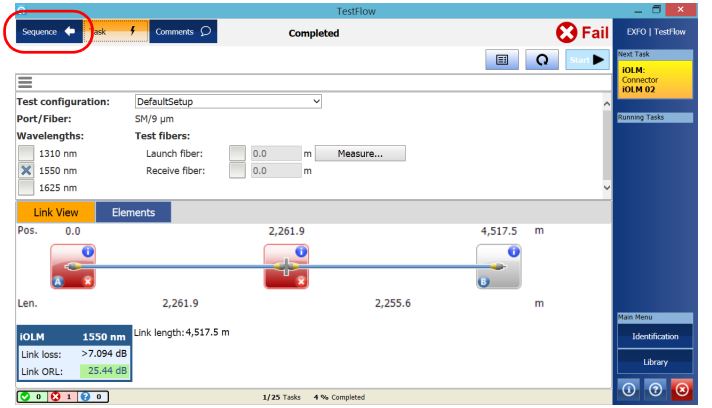
3a. Tap the desired node.



3b. From the **iOLM** window, tap **Start**.



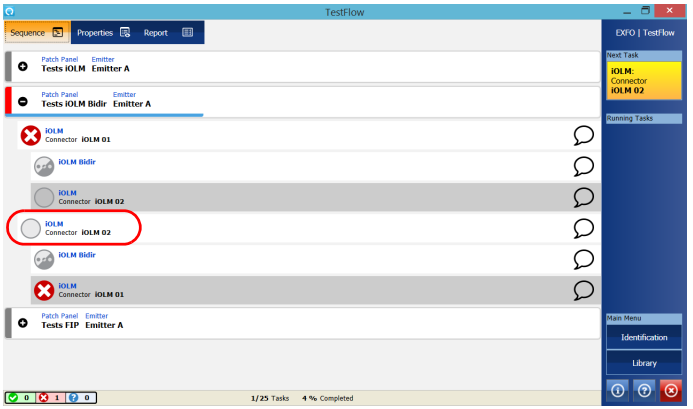
3c. When the acquisition is finished, tap the **Sequence** tab.



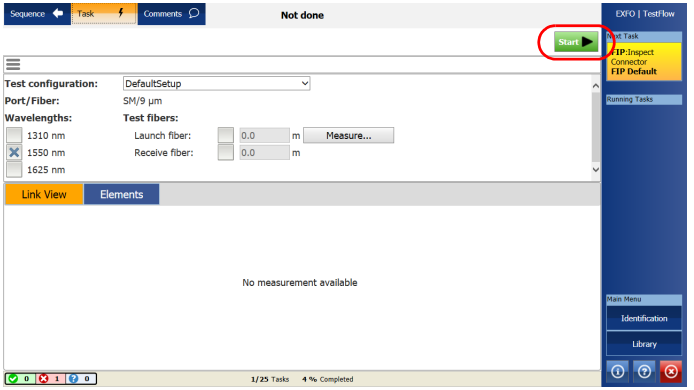
3d. Repeat steps 3a to 3c for all fibers that need to be tested.

4. Perform the acquisitions for the second direction:

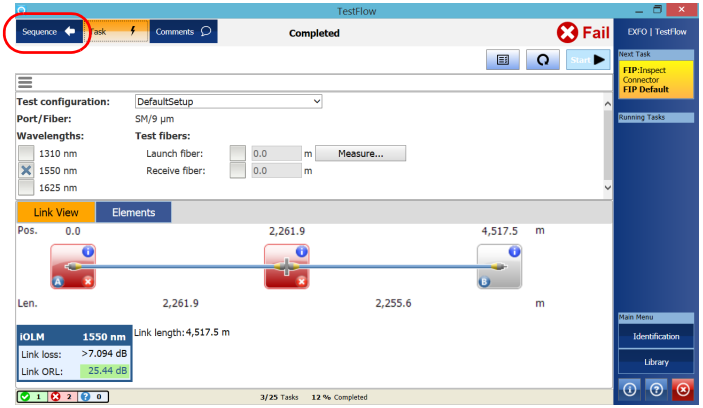
4a. Tap the desired node.



4b. From the **iOLM** window, tap **Start**.

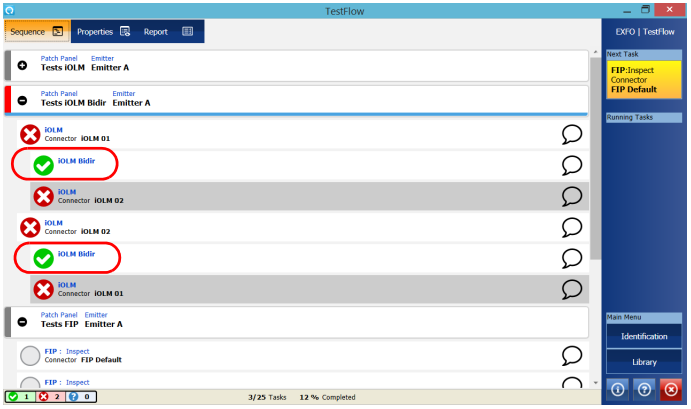


4c. When the acquisition is finished, tap the **Sequence** tab.



4d. Repeat steps 4a to 4c for all fibers that need to be tested.

5. When all fibers of the second direction are tested, TestFlow processes the bidirectional measurement and gives the final status automatically.



Stopping an Acquisition

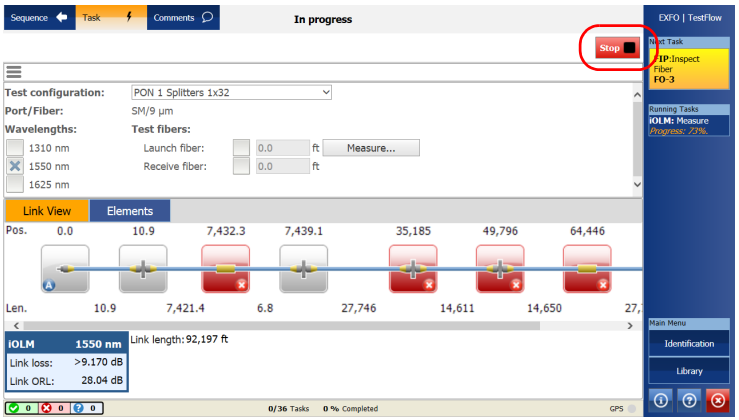
The acquisition stops automatically after the acquisition is complete.

It is possible to stop the acquisition at any time while the acquisition is in progress.

Note: *The unprocessed wavelengths will not be processed when a multiple-wavelength acquisition is stopped manually.*

To stop the acquisition:

Tap **Stop**.



The stopped acquisition status will be saved in the measurement file.

The global pass/fail status will show unknown or fail when the acquisition is stopped manually.

Note: *A manually stopped acquisition should not be considered as a reliable link measurement. To fully characterize a link, a complete acquisition should be performed.*

Link View

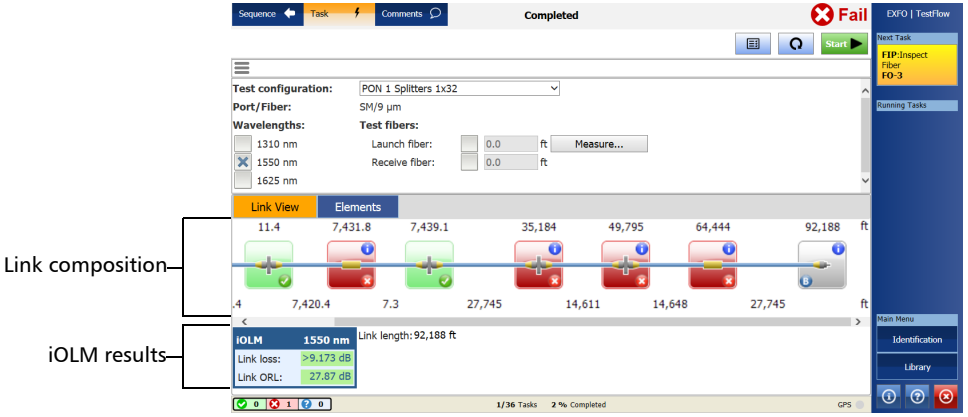
The iOLM Link View is an intuitive representation which combines several measurement results and values into a single view.

You can find the following elements in the iOLM Link View.

Element Name	Element Icon	Element Description
Macrobends		Macrobends can be displayed in the link view when more than one wavelength is present in the measurement. ***Note:*** *The macrobend will always be displayed as a failed element.*
Out of Range		The out of range element is displayed when the end of fiber could not be detected by the module because of an insufficient dynamic range.
Splitter		The splitter is a passive fiber optic coupler that divides light from a single fiber into two or more fiber channels. The splitter ratio is displayed next to the icon.
Splice		The splice can indicate the junction of two fiber sections, the presence of a macrobend, or a microbend in the fiber.
Connector		The connector is used to join two fibers.

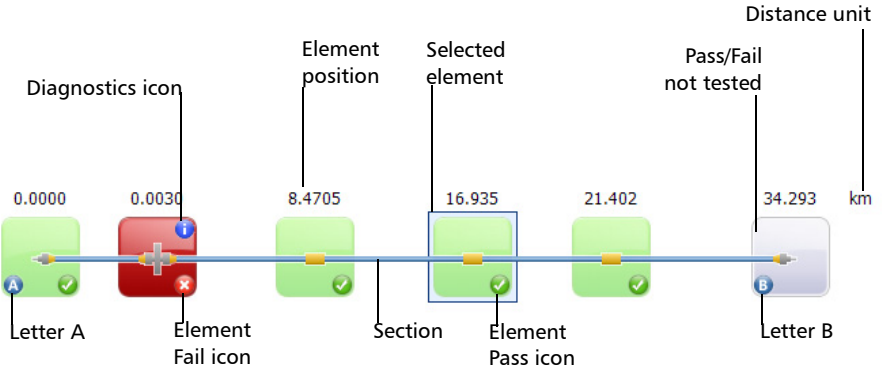
The Link view is divided into two different regions.

- Link composition
- iOLM results



Link Composition

The link composition is described below.



- Diagnostics icon : This icon specifies that some diagnostics are present on the element.
- Element position: The distance of the element from the beginning of the link under test.
- Selected element: The gray background represents the currently selected element.
- Pass/Fail not tested: Gray background indicates that the element is unknown. If there is no icon at the right side corner, it indicates that thresholds are not applied on the element and the element is not tested for Pass/Fail.
- Distance unit: The distance units can be: m, km, ft, kft, or mi.
- Letter A: The beginning of the link under test.
- Letter B: The end of the link under test.

Note: *An arrow ( ) icon is displayed on the element, if the start and the end of the link is represented by the same element.*

- Element Fail icon : The fail status of the element.
- Element Pass icon : The pass status of the element.
- Section: The section of the link under test.
- Scroll bar: The scroll bar is only displayed when more items are available on a particular side.
- Splitter Ratio: The splitter ratio is displayed on the element, if the element type is a splitter.

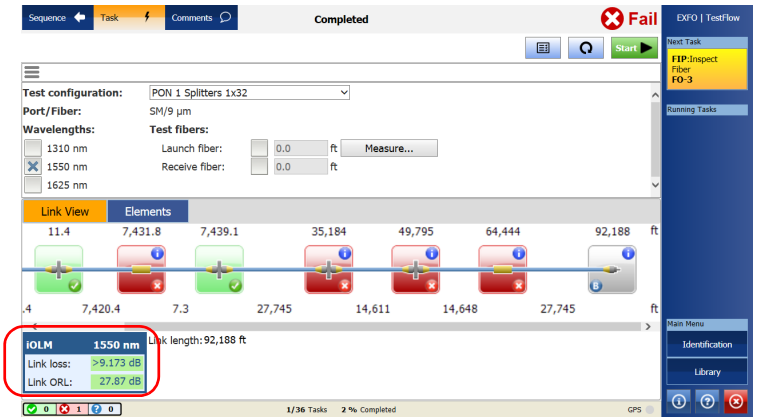
Note: *The number of elements displayed in the composition view varies according to the available space, number of elements, and section size.*

Note: *The distance between the elements are not 100 % proportional.*

iOLM Results

The iOLM acquisition results are displayed at the bottom of the **Link View** tab for all the wavelengths at which the iOLM acquisition was performed.

Note: *The iOLM results are not displayed if they are not available.*



When a multiple-wavelength acquisition is in progress, only the wavelength currently being acquired and the ones already completed are displayed. Link loss and link ORL are displayed for each wavelength. For the link loss and the link ORL, the values are tested and displayed according to current pass/fail settings.

As soon as the measurement is completed or refreshed, the link view automatically scrolls to display the first failed element, if any.

Note: *If the link ORL value is saturated, that is, if the value is displayed with a < symbol, it will be tested to determine the Pass/Fail status. The application will be able to specify the fail status, but not the pass status. Bidirectional measurements do not display any link ORL values.*

Viewing Element and Section Details

The details of the element and section are displayed in the **Elements** tab.

As soon as the measurement is completed or refreshed, the link view automatically scrolls to display the first failed element, if any.

Under the **Elements** tab, the following information is displayed.

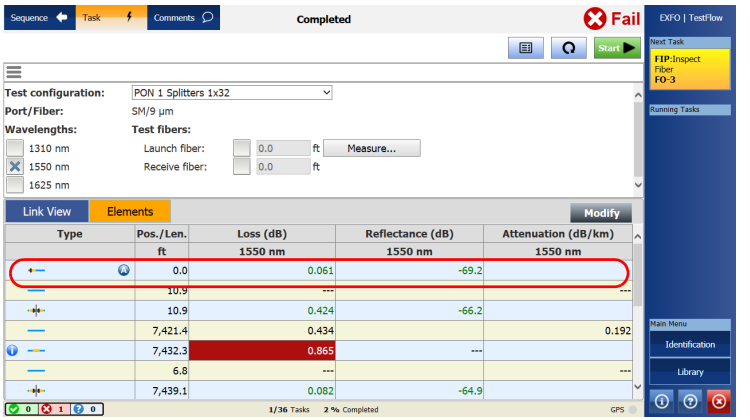
➤ **Type**: The type of element selected in the Link View. You can modify it. You can change the splitter ratio if the selected element is a splitter.

The application displays the beginning of the link and link end in the element table. If the beginning of the link start and link end are in the same element, the application displays in the element table. This information is also displayed in the report.

Note: *The items available in the list depends on the characteristics of the selected element. It may not be possible to change the element type.*

Note: *If the type of an element is modified, a "*" sign is displayed at the value in the **Type** column. For more information, see Editing Element Types* on page 193.

➤ **Position**: The position 0.00 is set on the first element when the launch fiber is present.



➤ **Loss (dB)**: The loss at different wavelengths.

➤ **Reflectance (dB)**: The reflectance at different wavelengths.

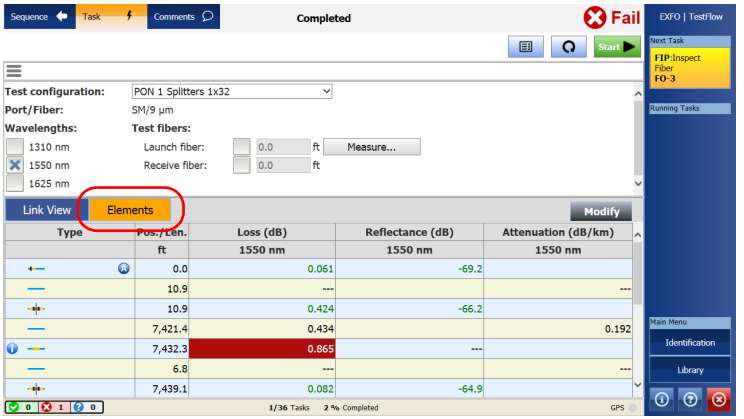
➤ **Attenuation (dB/km)**: If any section is selected in the Link view then the attenuation value is displayed in the **Elements** table.

Note: *It is possible to underestimate the loss or reflectance value if the noise level is too high (for instance, after a lot of loss on the link, the noise levels increase). In that case, it is possible for the signal processing algorithms to detect an element, and to estimate the loss/reflectance values, but since the measured signal does not completely clear the noise floor, the loss or reflectance/Attenuation values are likely to be underestimated. If the loss or reflectance/Attenuation value is underestimated, the value is displayed with a > symbol.*

Note: *If the link ORL value is saturated, that is, if the value is displayed with a < symbol, it will be tested to determine the Pass/Fail status. The application will be able to specify the fail status, but not the pass status. Bidirectional measurements do not display any link ORL values.*

To view the element or section details:

From the main window, tap the **Elements** tab to view the selected element or section details.

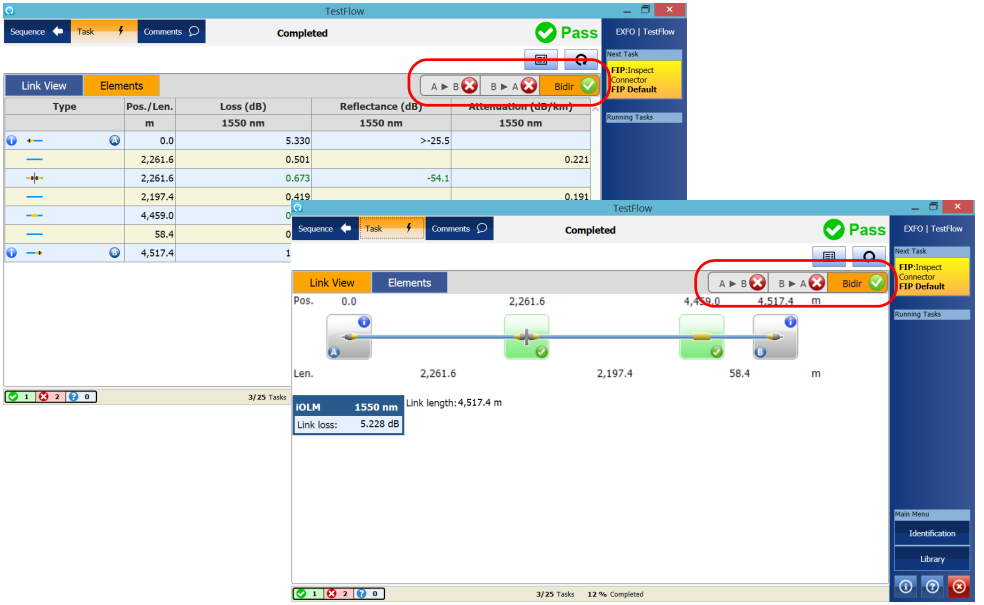


Navigating iOLM Bidirectional Results

IOLM bidirectional measurements are made of two separate unidirectional traces, one in each direction.

When a bidirectional measurement is performed, the application allows you to navigate the results (A->B, B->A and Bidir tabs) in the **Elements** and **Link View** tabs.

Note: *You cannot edit element types in the **Elements** tab.*



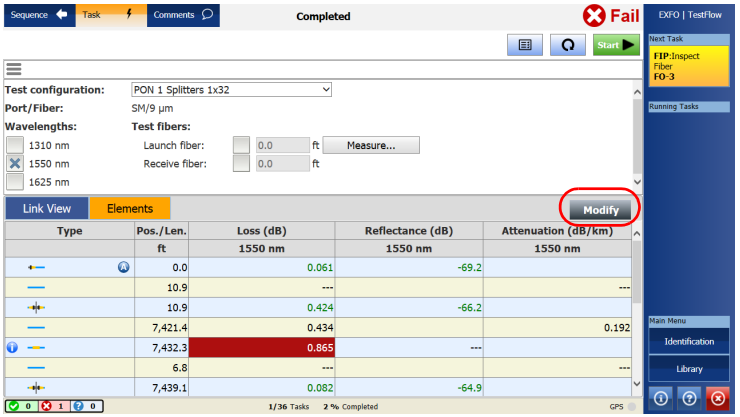
Editing Element Types

The application allows you to modify the element types in the element table. An edit icon indicates the editable rows.

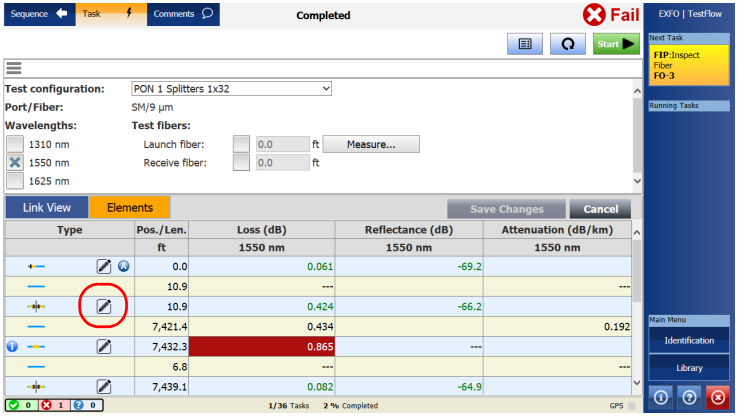
Note: *Editing element types is only possible when working with iOLM unidirectional measurements.*

To edit element types:

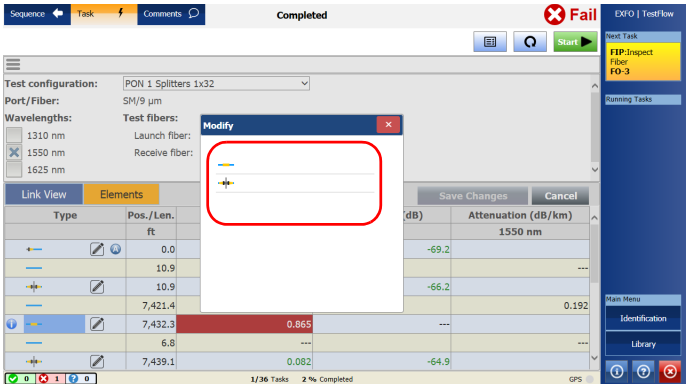
1. From the **Elements** table, tap **Modify**.



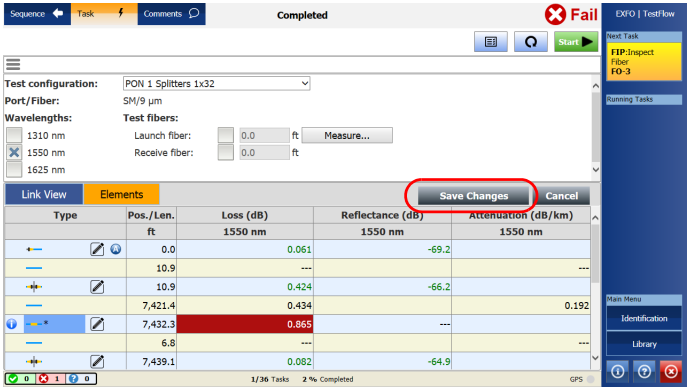
2. Tap the edit icon.



3. Select the element type you want to use in the list.



4. Tap the **Save Changes** button to save your modification.



Note: *Ensure to make all the changes you want to apply before tapping the **Save Changes** button. All changes you made will be lost if you tap **Cancel** before tapping the **Save Changes** button.*

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NOTICE
通告

CHINESE REGULATION ON RESTRICTION OF HAZARDOUS SUBSTANCES
中国关于危害物质限制的规定

NAMES AND CONTENTS OF THE TOXIC OR HAZARDOUS SUBSTANCES OR ELEMENTS CONTAINED IN THIS EXFO PRODUCT
包含在本 **EXFO** 产品中的有毒有害物质或元素的名称和含量

O	Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006 表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。
X	Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363-2006 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。

Part Name 部件名称	Toxic or hazardous Substances and Elements 有毒有害物质和元素					
	Lead 铅 (Pb)	Mercury 汞 (Hg)	Cadmium 隔 (Cd)	Hexavalent Chromium 六价铬 (Cr VI)	Polybrominated biphenyls 多溴联苯 (PBB)	Polybrominated diphenyl ethers 多溴二苯醚 (PBDE)
Enclosure 外壳	O	O	O	O	O	O
Electronic and electrical sub-assembly 电子和电子组件	X	O	X	O	X	X
Optical sub-assembly[a] 光学组件 [a]	X	O	O	O	O	O
Mechanical sub-assembly[a] 机械组件 [a]	O	O	O	O	O	O

a. If applicable.
如果适用。

MARKING REQUIREMENTS
标注要求

Product 产品	Environmental protection use period (years) 环境保护使用期限 (年)	Logo 标志
This EXFO product 本 EXFO 产品	10	
Battery[a] 电池 [a]	5	

a. If applicable.
如果适用。

P/N: 1069684

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