
iOLM

intelligent Optical Link Mapper for FTB-1



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Units of Measurement

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

Patents

Patent protection is being applied for the intelligent Optical Link Mapper, including its proprietary measurement Software.

EXFO's Universal Interface is protected by US patent 6,612,750.

Version number: 1.0.0

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Certification Information

F.C.C. Information

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

CE Information

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

Certification Information

EXFO **CE** DECLARATION OF CONFORMITY

Application of Council Directive(s):	2006/95/EC - The Low Voltage Directive 2004/108/EC - The EMC Directive 2006/66/EC - The Battery Directive 93/68/EEC - CE Marking And their amendments
Manufacturer's Name:	EXFO Inc.
Manufacturer's Address:	400 Godin Avenue Quebec, Quebec Canada, G1M 2K2 (418) 683-0211
Equipment Type/Environment: Trade Name/Model No.:	Test & Measurement / Industrial (PON FTTx / MDU OTDRs) / FTB-700 SERIES

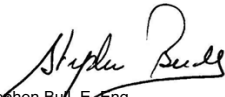
Standard(s) to which Conformity is Declared:

EN 61010-1:2001 Edition 2.0	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements.
EN 61326-1:2006	Electrical Equipment for Measurement, Control and Laboratory Use - EMC Requirements – Part 1: General requirements
EN 60825-1:2007 Edition 2.0	Safety of laser products – Part 1: Equipment classification, requirements, and user's guide
EN 55022: 2006 + A1: 2007	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement

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

Manufacturer

Signature:



Full Name: Stephen Bull, E-Eng
Position: Vice-President Research and Development
Address: 400 Godin Avenue, Quebec (Quebec),
Canada, G1M 2K2
Date: August 18, 2010

1 **Introducing the intelligent Optical Link Mapper**

The intelligent Optical Link Mapper 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.

Available iOLM Models

A wide variety of single mode iOLM models are offered at several wavelengths to cover all fiber applications for PON networks.

Models	Description
FTB-730-023B	1310/1550 nm (SM port)
FTB-730-023-04B-OPM2	1310/1550 nm (SM port) and In-Line broadband power meter with filtered 1625 nm (SM Live port)
FTB-730-000-04B-OPM2	Filtered 1625 nm and In-Line broadband power meter (SM Live port)
FTB-730-236B	1310/1490/1550 nm (SM port)
FTB-730-000-08B	Filtered 1650 nm (SM Live port)
FTB-730-26B-08B	1310/1490 nm (SM port) Filtered 1650 nm (SM Live port)
FTB-730-34B	1550/1625 nm (SM port)

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.

Launch and Receive Fiber

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

Introducing the intelligent Optical Link Mapper

Launch and Receive Fiber

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.

The iOLM application allows you to manually set the lengths of both your launch and receive cables. In addition, it is possible to automatically measure the launch or receive cables. When carrying out the calibration, the application will perform a fast measurement and evaluate length of the fiber. For this reason, only the cable under test must be connected to the module when performing a calibration.

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).

See *Configuring Test Parameters* on page 33 for more details.

Conventions

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



WARNING

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



CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in *minor or moderate injury*. Do not proceed unless you understand and meet the required conditions.



CAUTION

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



IMPORTANT

Refers to information about this product you should not overlook.

2 **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

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

Your instrument is a Class 1 laser product in compliance with standards IEC 60825-1 and 21 CFR 1040.10. Laser radiation may be encountered at the output port.

The following label indicates that a product contains a Class 1 source:



3 Getting Started with intelligent Optical Link Mapper

Inserting and Removing Test Modules

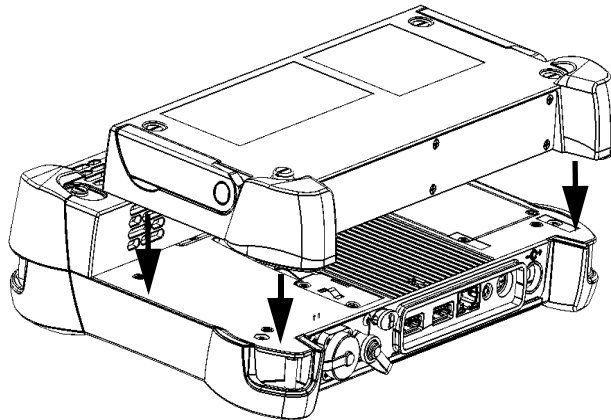


CAUTION

Never insert or remove a module while the FTB-1 is turned on. This will result in immediate and irreparable damage to both the module and unit.

To insert a module into the FTB-1:

1. Turn off your unit.
2. Position the unit so that its front panel rests on a flat surface such as a table.
3. Place the module on the platform making sure that the bumpers and the shorter sides of the module are flush with those of the platform. If necessary, slightly move the module until alignment is correct.

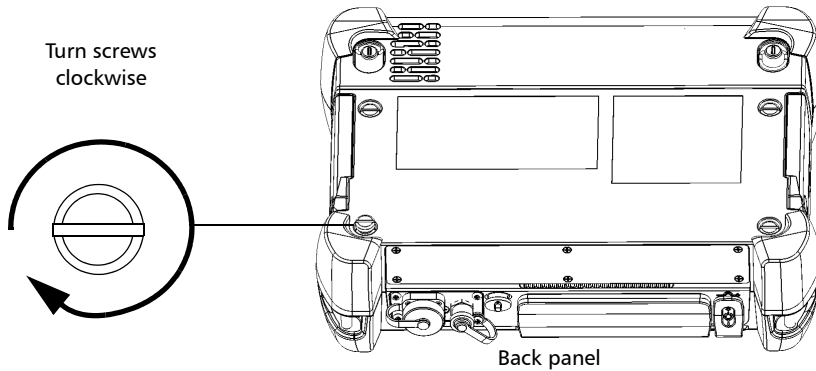


Getting Started with intelligent Optical Link Mapper

Inserting and Removing Test Modules

4. Using a flat screwdriver, turn the screws (4) clockwise until they are tightened.

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



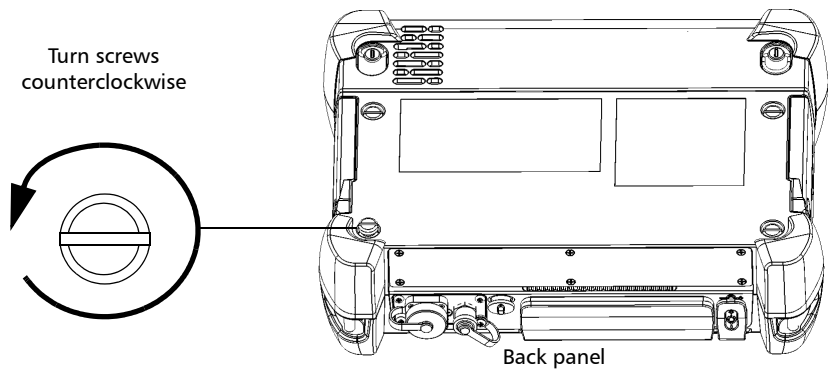
When you turn on the unit, the startup sequence will automatically detect the module.

Getting Started with intelligent Optical Link Mapper

Inserting and Removing Test Modules

To remove a module from the FTB-1:

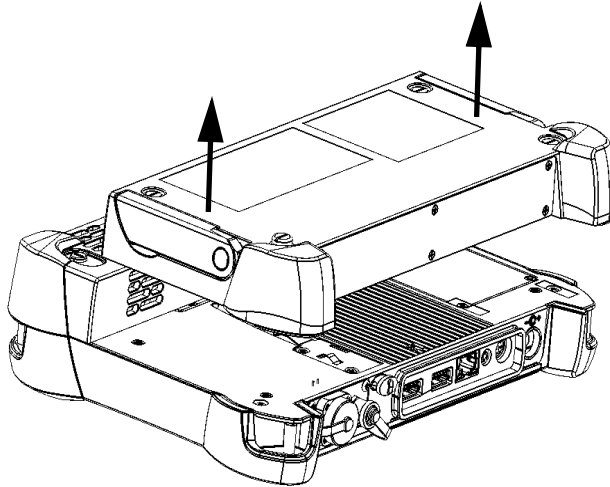
- 1.** Exit Mini ToolBox and turn off your unit.
- 2.** Position the unit so that its front panel rests on a flat surface such as a table.
- 3.** Using a flat screwdriver, turn the screws (4) counterclockwise until they are loose. Since they are captive screws, you cannot remove them completely.



Getting Started with intelligent Optical Link Mapper

Inserting and Removing Test Modules

4. Hold the module by its sides (*NOT by the connectors*) and pull it up.



CAUTION

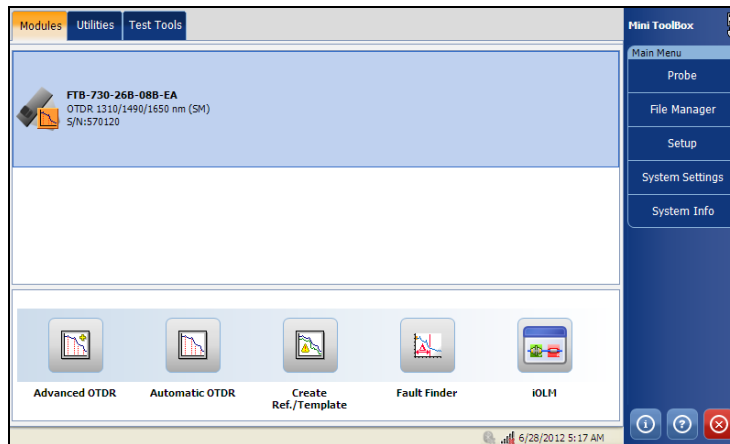
Pulling a module by its connectors could seriously damage both the module and connector. Always pull a module by its casing.

Starting Module Applications

Your modules can be configured and controlled from their dedicated applications in Mini ToolBox.

To start a module application:

From Mini ToolBox, at the bottom of the window, press the button corresponding to the desired application.

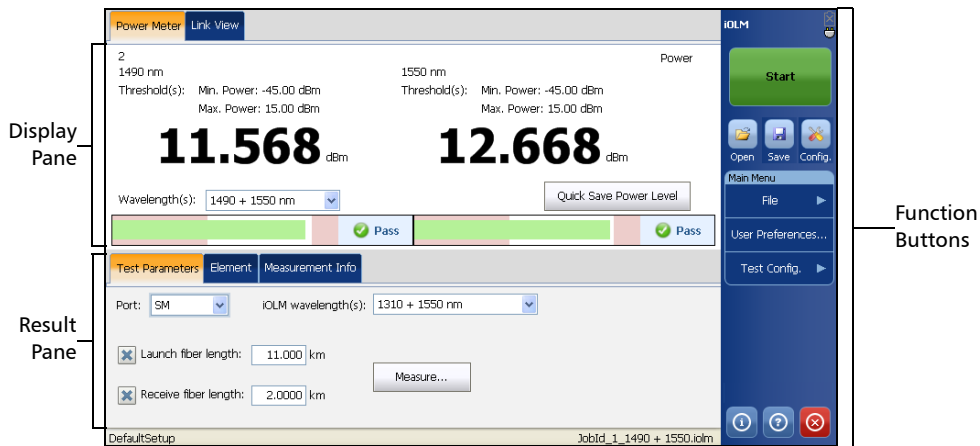


Getting Started with intelligent Optical Link Mapper

Starting Module Applications

To start the Power Meter or Probe application:

From **Main Menu**, press **Power Meter** or **Probe**.

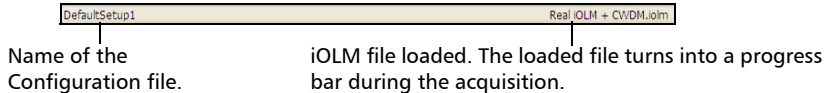


Status Bar

The status bar, located at the bottom of the main window, identifies the selected configuration file in the application, acquisition wavelength (when an acquisition is in progress), the acquisition progress bar, and the current operational status of the intelligent Optical Link Mapper.

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


Status bar before starting acquisition and after loading/saving a file.



Exiting the Application

Closing any application that is not currently being used helps releasing system memory.

To close the application from the main window:

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

Note: *When you press the **Exit** button, a dialog box is displayed if unsaved data is present in the memory, press **Yes**, if you want to save the data or press **No** to exit without saving.*

4 **Preparing your intelligent Optical Link Mapper 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 microscope. 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 isopropyl alcohol.
 - 2b.** Use compressed air to dry completely.
 - 2c.** Visually inspect the fiber end to ensure its cleanliness.

Preparing your intelligent Optical Link Mapper for a Test

Cleaning and Connecting Optical Fibers

- 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.

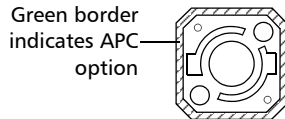
- 4.** Push the connector in so that the fiber-optic cable is firmly in place, thus ensuring adequate contact.

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.*

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.

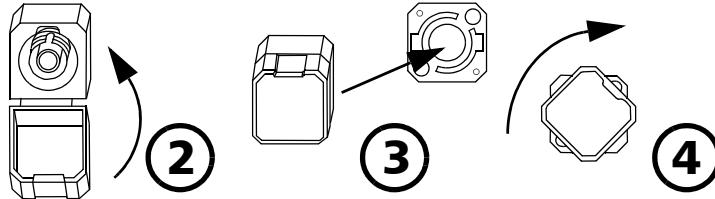


IMPORTANT

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.

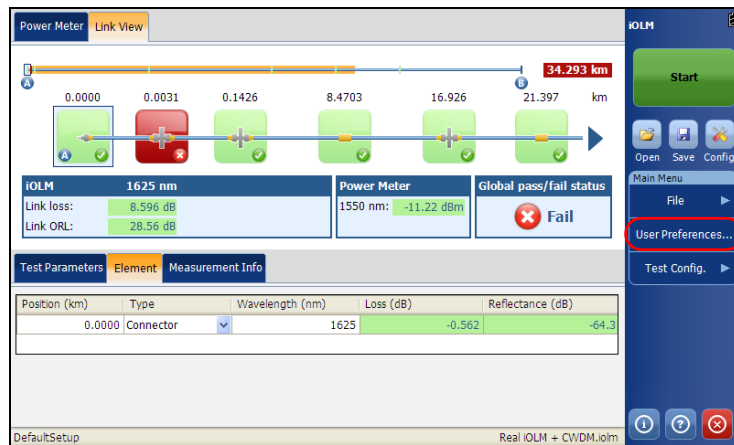
Note: *The preference settings are user specific.*

Defining General Settings

The **General** tab allows you to enable/disable **File functionalities**, **Generate report on save**, **Sound notifications**, and set the **Distance unit** for the application.

To set general settings:

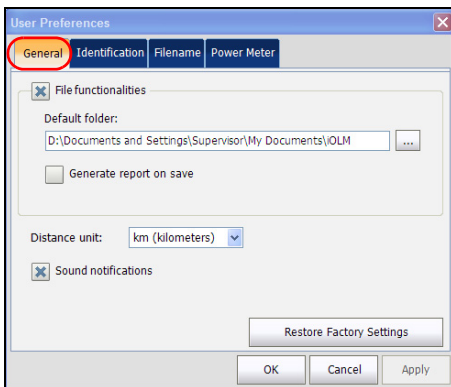
1. From the **Main Menu**, press **User Preferences**.



Setting User Preferences

Defining General Settings

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, Open, Save, Filename, etc.) will be visible on the screen.

Note: When **File Functionalities** is disabled, you will not be notified when files are saved, that is, the warning message will not be displayed.

Note: When **File Functionalities** is disabled, the **File Save Path** 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 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.

- **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 **File** in the **Report** menu.*

Note: *If a report file already exists on disk, a number in parenthesis will be automatically incremented at the end of the file name to avoid unwanted overwrites.*

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

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

- **Sound Notification:** If enabled, you will hear a sound when the unit detects important events.

Press **Restore Factory Settings** to remove all the changes and apply the default values.

Setting User Preferences

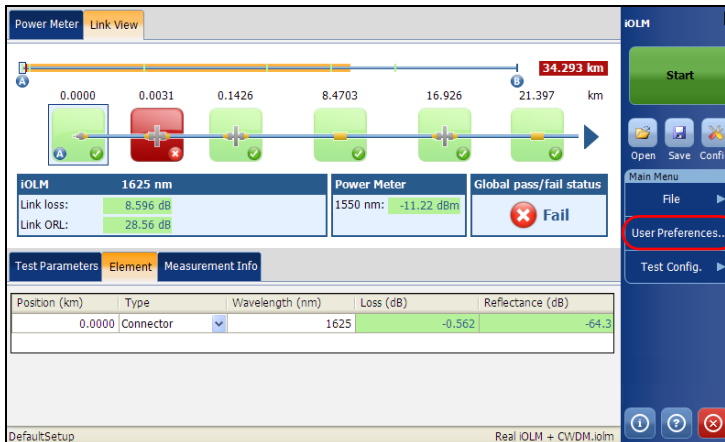
Defining Measurement Identification

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 42 for more details).

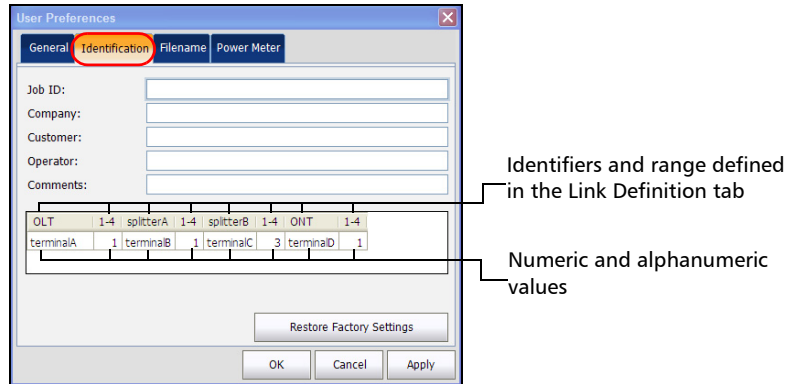
To enter Identification Information:

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



The screenshot displays the IOLM software interface. At the top, there's a 'Power Meter Link View' section showing a fiber link diagram with several components and their positions (0.0000, 0.0031, 0.1426, 8.4703, 16.926, 21.397 km). Below this, there are several data boxes: 'IOLM 1625 nm' with 'Link loss: 8.596 dB' and 'Link ORL: 28.56 dB'; 'Power Meter 1550 nm: -11.22 dBm'; and 'Global pass/fail status' showing a 'Fail' status with a red 'X' icon. A 'Test Parameters' table is visible at the bottom, with columns for Position (km), Type, Wavelength (nm), Loss (dB), and Reflectance (dB). The table contains one row: Position (km) 0.0000, Type Connector, Wavelength (nm) 1625, Loss (dB) -0.562, Reflectance (dB) -64.3. On the right side, there's a vertical menu with options: Start, Open, Save, Config., Main Menu, File, User Preferences... (highlighted with a red circle), and Test Config. The bottom of the screen shows 'DefaultSetup' and 'Real IOLM + CVD/DM.iolm'.

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 **Link Definition** under the **Test Config** tab.

The file name generated for future acquisitions will contain the combination of the numeric and alphanumeric values specified in the respective fields. For more understanding on file name auto-naming, see *Naming iOLM Files Automatically* on page 26.

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

Press **Restore Factory Settings** to remove all the changes and apply the default values.

Setting User Preferences

Defining Measurement Identification

Naming iOLM Files Automatically

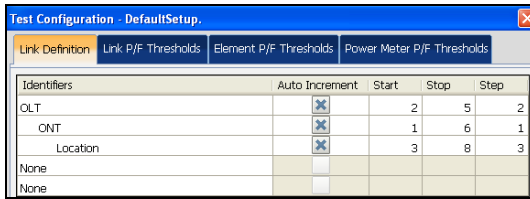
Each time you start an acquisition, the application suggests a file name based on auto-naming settings. This file name appears in the Status bar, after the file is saved.

The file name is made of a static part (alphanumeric) and a variable part (numeric). The numeric part is incremented, according to the **Identifiers** selection (based on enable or disable **Auto Increment** checkbox). Variable part increases or decreases until it reaches the **Stop** value.

Note: See *Modifying Link Definition on page 42 for more details on how to specify the **Start**, **Stop**, and **Step** values.*

Note: *All the file name components are enabled in this example. See *Customizing the File Name on page 28 to enable file name components.**

Consider the following figures as an example of auto-naming feature.

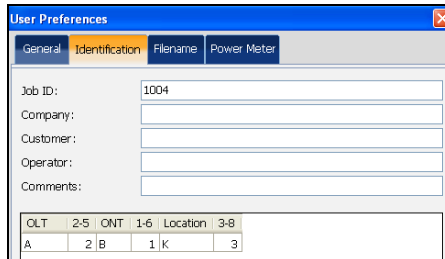


Identifiers	Auto Increment	Start	Stop	Step
OLT	<input checked="" type="checkbox"/>	2	5	2
ONT	<input checked="" type="checkbox"/>	1	6	1
Location	<input checked="" type="checkbox"/>	3	8	3
None	<input type="checkbox"/>			
None	<input type="checkbox"/>			

You can find the above screen at **Test Config. > Manage > Modify > Link Definition** tab.

In the figure above, you can modify the **Identifiers**, **Start**, **Stop**, and **Step** values and check the **Auto Increment** check boxes to enable the auto increment of the identifier values. See *Modifying Link Definition on page 42*, for more details on how to specify the **Start**, **Stop**, and **Step** values.

Note: The identifiers defined in the **Link Definition** tab will be displayed in the table under **User Preferences** in the **Identification** tab.



OLT	2-5	ONT	1-6	Location	3-8
A	2	B	1	K	3

You can find the above screen 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 **Link Definition** tab will be displayed in the measurement range in the table under **User Preferences** in the **Identification** tab. See *Defining Measurement Identification* on page 24 for more details.

After an acquisition is successfully saved, the file name will be 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 will be

<Job Id>_A2_B1_K3_<wavelength>.iolm

Note: If the **ONT**, **OLT**, and location values (A, B, and K) 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 **Step** value, that is, for second acquisition file name, the location value will be 6.

Setting User Preferences

Customizing the File Name

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.

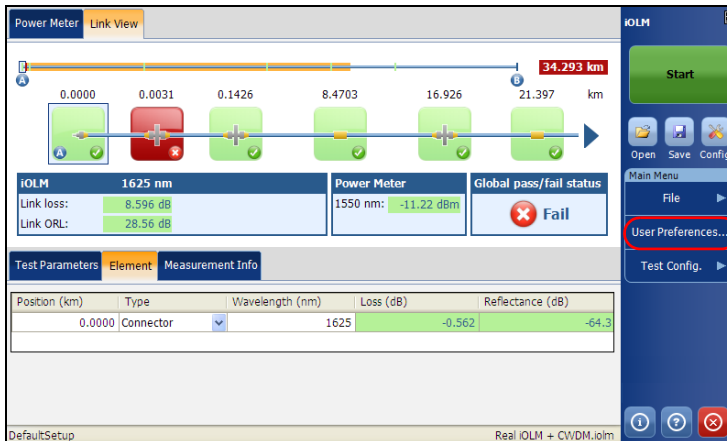
Note: The process of incrementation continues till the first number (that is, OLT value) reaches the stop value.

Customizing the File Name

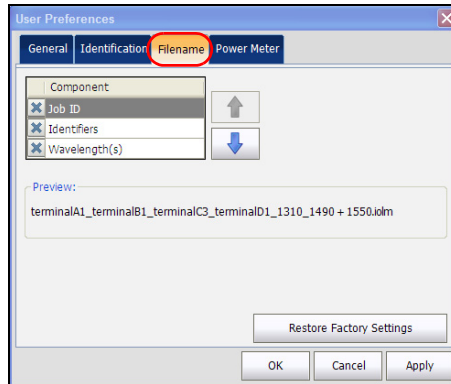
The application provides a way to define the name of the file to be saved. Defining a file auto-naming format will allow you to quickly and automatically name the files in a sequential order. The customized file name appears when the file is saved using the **Save** or **Save As** option. It is possible to select which fields you want to include in the file name and the order in which it should be displayed.

To customize the file name:

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



2. Select the **Filename** tab.



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.*

Setting User Preferences

Customizing the File Name

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

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 press **Save**.*

5. Press **Apply** to save the changes.
6. Press **OK** to save the changes and close the window, or press **Cancel** to exit without saving.

Press **Restore 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”.*

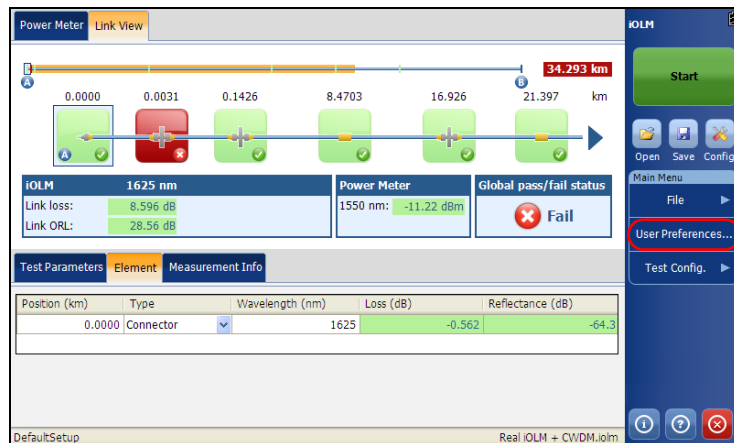
Customizing the Power Meter

The **Power Meter** tab allows you to select the power meter mode which affects the available wavelengths in the **Power Meter** tab of the main window.

Note: *The **Power Meter** tab is only displayed when the two-channel power meter is present in the module.*

To customize the power meter:

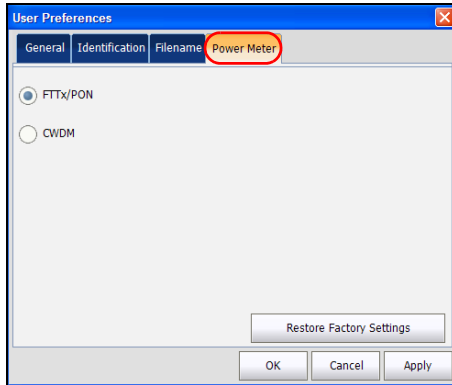
1. From the **Main Menu**, press **User Preferences**.



Setting User Preferences

Customizing the Power Meter

2. Select the **Power Meter** tab.



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

Note: *The wavelength available in the **Power Meter** tab will be those used for the selected power meter mode.*

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

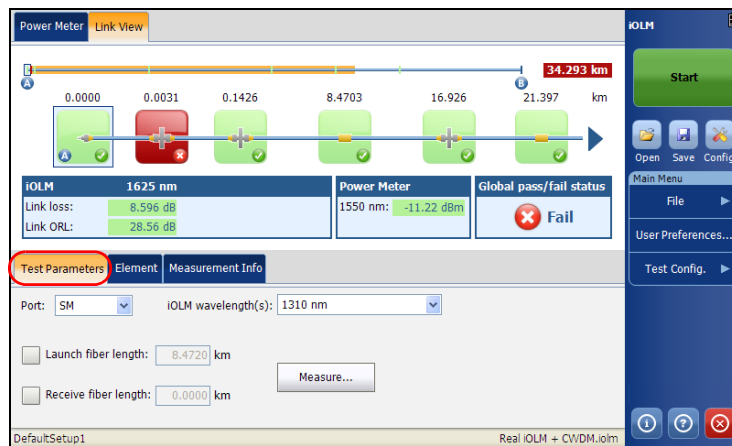
Press **Restore Factory Settings** to remove all the changes and apply the default values.

Configuring Test Parameters

The **Test Parameters** tab displays the settings used for taking measurements. The iOLM will perform the acquisition on the port and wavelengths selected in the **Test Parameters** tab. The values of the **Test Parameters** tab will be preserved for the next acquisition.

To configure the test parameters:

1. From the main window, select the **Test Parameters** tab.



2. Change the settings as needed.
 - **Port:** The choices are **SM** and **SM Live**. The choices will be displayed only if two ports are available in the iOLM module.
 - **iOLM Wavelength(s):** Select the iOLM Wavelengths for the next acquisition. The available wavelengths depend on the iOLM module.
 - **Launch Fiber Length:** Specify if a launch fiber is connected between the test unit and the link under test and, enter the length of the launch fiber. The acceptable range is from **0** to **5 km**. See *Launch and Receive Fiber* on page 3 for more details.

Setting User Preferences

Configuring Test Parameters

- **Receive Fiber Length:** Specify if a receive fiber is connected at the end of the link under test, and enter the length of the receive fiber. If selected, the receive fiber will be included in the acquisition. The acceptable range is from **0** to **5 km**. See *Launch and Receive Fiber* on page 3 for more details.
- **Measure:** Press **Measure** to automatically calibrate the launch or receive fiber length.

6 Managing Test Configurations

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

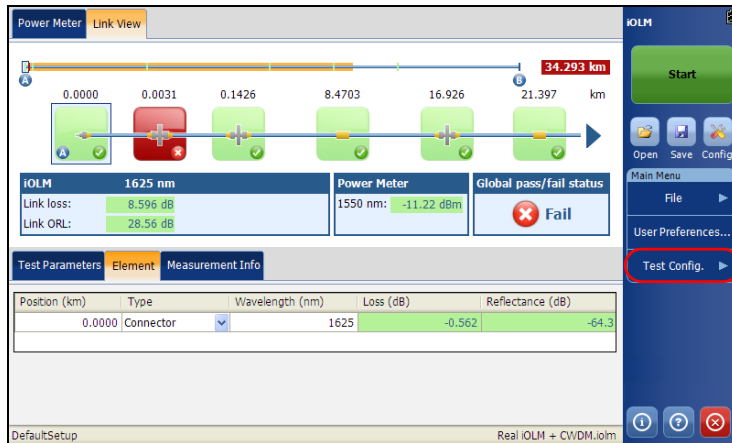
Selecting a Test Configuration

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

Note: *If no configuration files are available, the application will use the default configuration settings. To manage the test configuration parameters, see Modifying a Test Configuration on page 42.*

To select the test configuration:

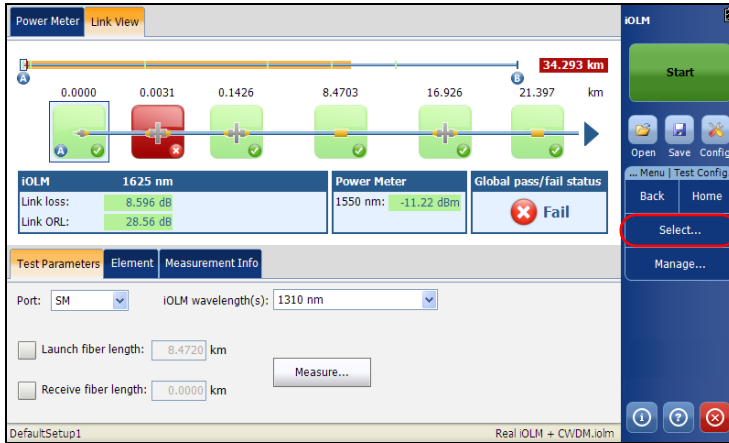
1. From the **Main Menu**, press **Test Config.** or press .



Managing Test Configurations

Selecting a Test Configuration

2. Press **Select**.

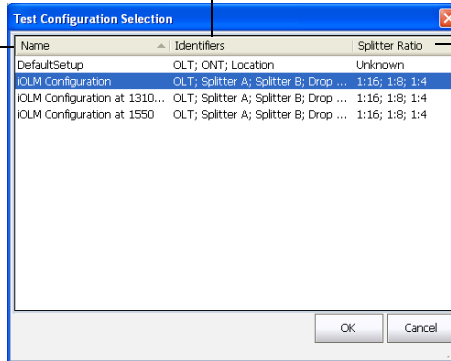


3. Select the test configuration file.

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.



Note: Click 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. Press **OK** to apply the configuration and close the window, or press **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.

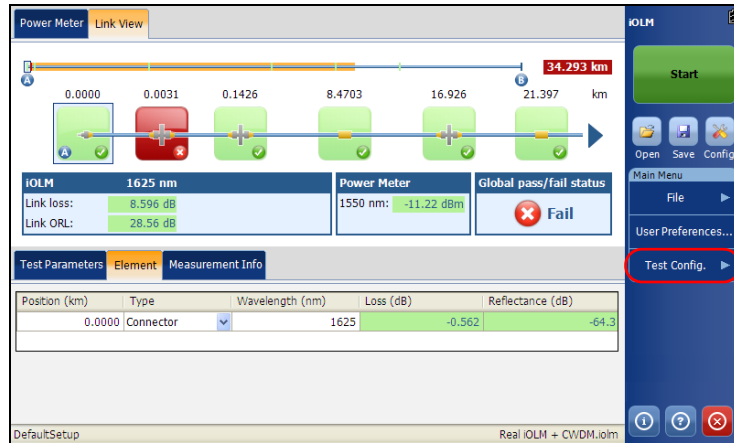
The pass/fail thresholds defined in the configuration file will have no impact on the capacity of the iOLM application to perform measurements. Only the pass/fail status of the link or link elements will be determined by the user-defined thresholds.

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:

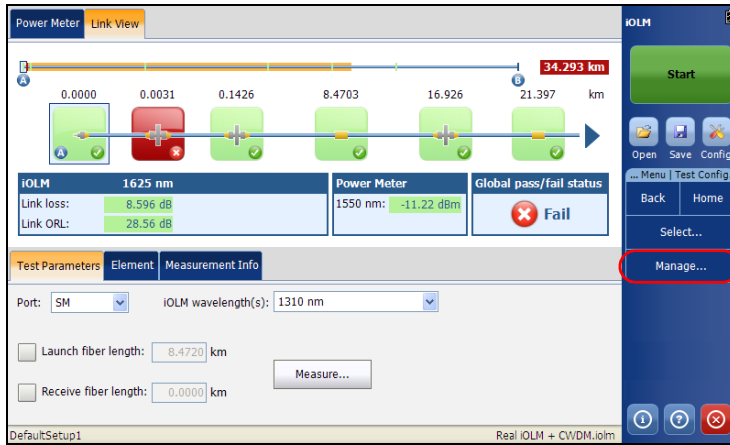
1. From the **Main Menu**, press **Test Config**.



Managing Test Configurations

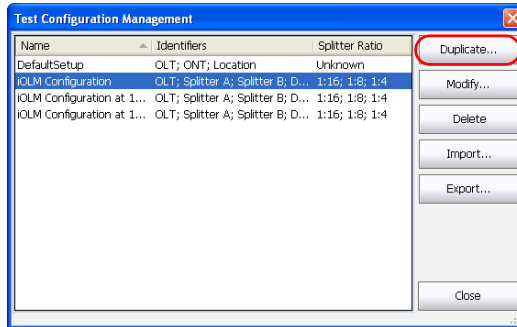
Creating a Test Configuration

2. Select **Manage**.



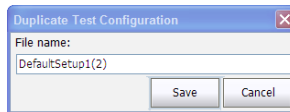
3. Select the test configuration file to duplicate.

4. Press **Duplicate**.



The default file name is displayed. You can modify the file name, if required.

5. Press **Save** to save the file or press **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 42 for more details.

6. Press **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.*

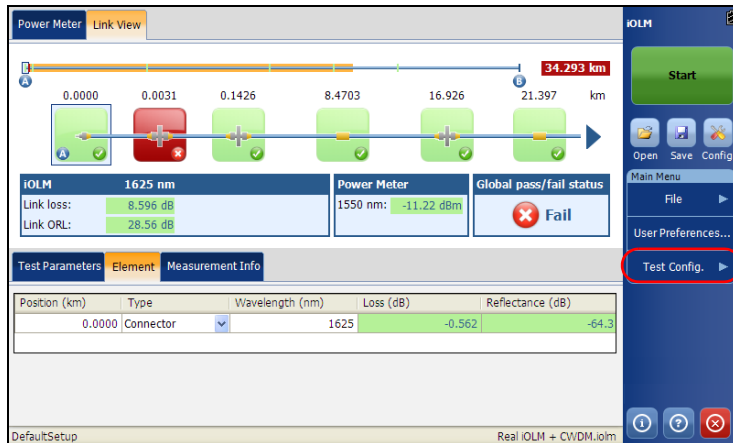
Modifying Link Definition

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

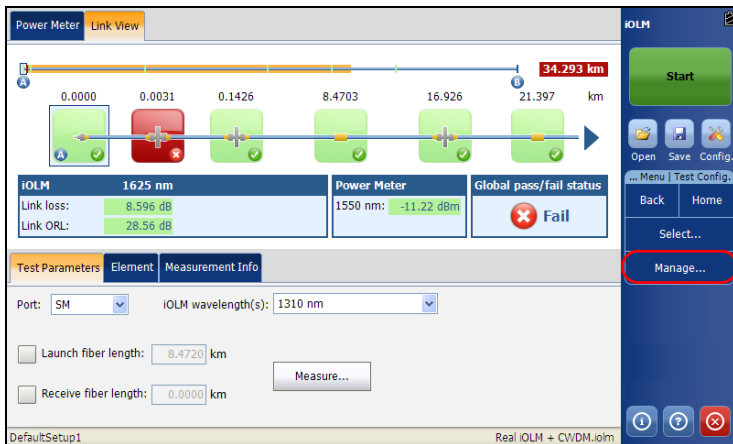
The links defined in the Link definition tab are based on the network topology. For example, if there are 2 splitters present in the PON network, you may define two stages of splitter with their respective split ratio. You may change the IOR value, or change or rename the identifiers according to the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

To modify link definition:

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



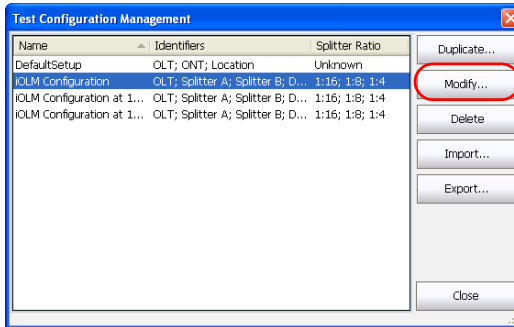
2. Select **Manage.**



Managing Test Configurations

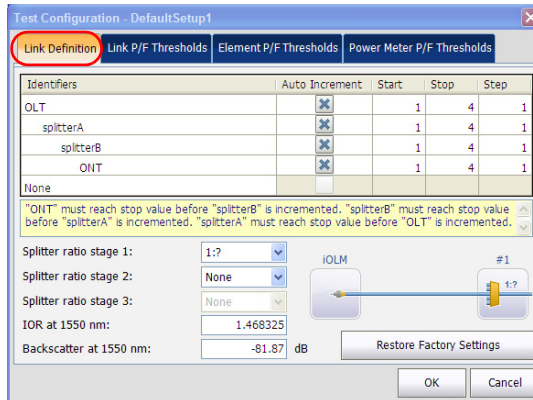
Modifying a Test Configuration

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



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

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



6. Under **Link Definition**, modify the following settings, as needed.

- **Identifiers:** Select the **Identifier** from the list of available choices. You can also edit the identifier, if required.

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

- **Auto Increment:** Enables the numeric part of the identifiers to be incremented/decremented after the acquisition has been saved successfully.
- **Start:** Enter the start value for the identifier.
- **Stop:** Enter the stop value for the identifier.
- **Step:** Enter the step value for the identifier.

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**.*

- **Splitter Ratio:** 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 upto 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.*

Managing Test Configurations

Modifying a Test Configuration

- **IOR at 1550 nm:** 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 at 1550 nm:** 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: *The iOLM application automatically calculates the IOR and Backscatter values for other wavelengths.*

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

Press **Restore Factory Settings** to remove all the changes and apply the default values.

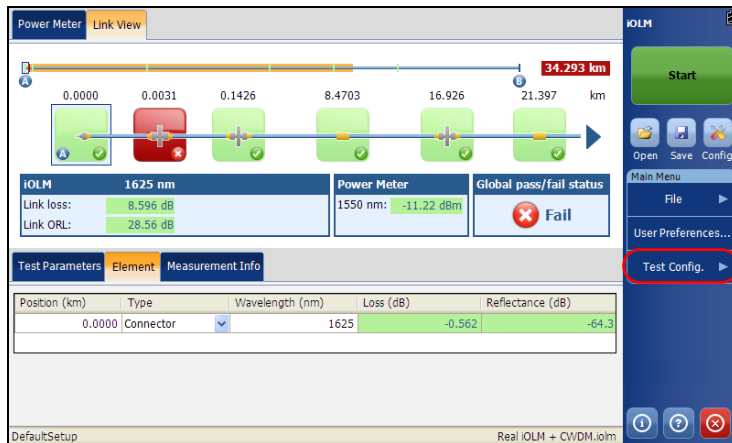
Note: *See Naming iOLM Files Automatically on page 26 for an example of automatic numbering.*

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.

To modify link pass/fail thresholds:

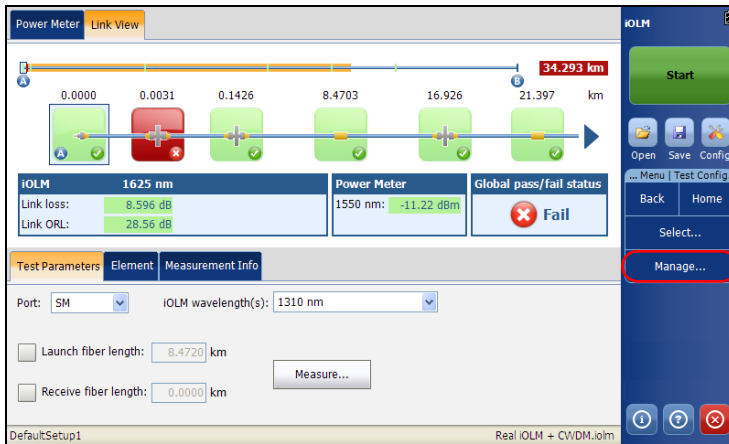
1. From the **Main Menu**, press **Test Config.**



Managing Test Configurations

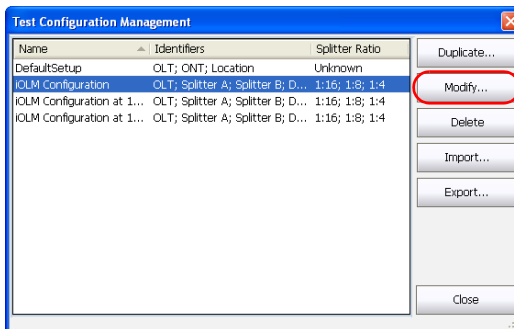
Modifying a Test Configuration

2. Select **Manage**.

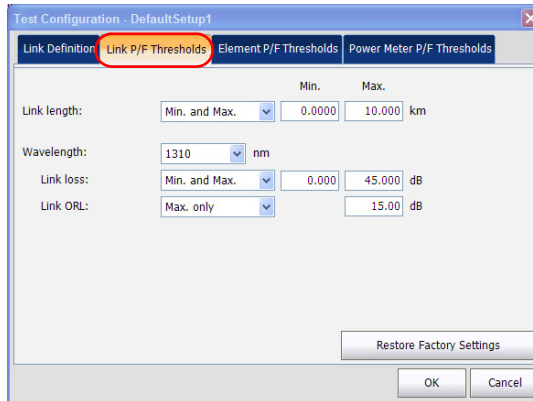


3. Select the test configuration file to modify.

4. Press **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 not 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.

Managing Test Configurations

Modifying a Test Configuration

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

Press **Restore Factory Settings** to remove all the changes and apply the default values.

Modifying Element Pass/Fail Thresholds

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

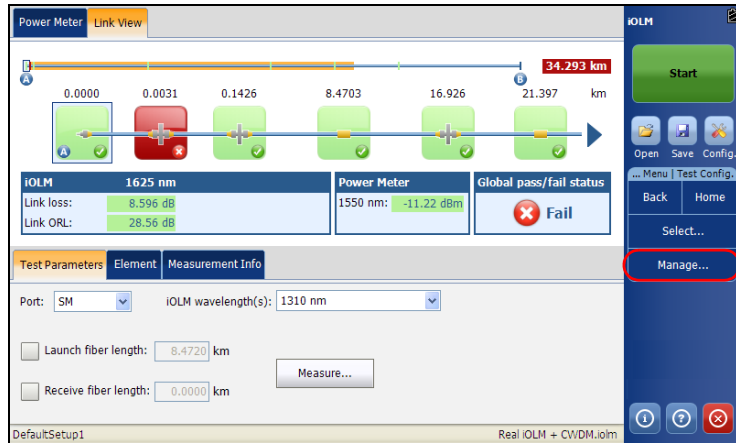
To modify element pass/fail thresholds:

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

The screenshot shows the IOLM software interface. At the top, there's a 'Power Meter' and 'Link View' tab. Below that, a fiber link diagram is shown with a total length of 34.293 km. The diagram includes several components: a connector at 0.0000 km, a component at 0.0031 km, a component at 0.1426 km, a component at 8.4703 km, a component at 16.926 km, and a component at 21.397 km. Below the diagram, there are three status boxes: 'IOLM 1625 nm' showing Link loss: 8.596 dB and Link ORL: 28.56 dB; 'Power Meter 1550 nm' showing -11.22 dBm; and 'Global pass/fail status' showing a red 'Fail' icon. Below these is a 'Test Parameters' table with columns for Position (km), Type, Wavelength (nm), Loss (dB), and Reflectance (dB). The table contains one row: Position (km) 0.0000, Type Connector, Wavelength (nm) 1625, Loss (dB) -0.562, Reflectance (dB) -64.3. On the right side, there's a 'Main Menu' with options: Start, Open, Save, Config., File, User Preferences..., and Test Config. (highlighted with a red circle). At the bottom, there are navigation buttons: Home, Help, and Exit.

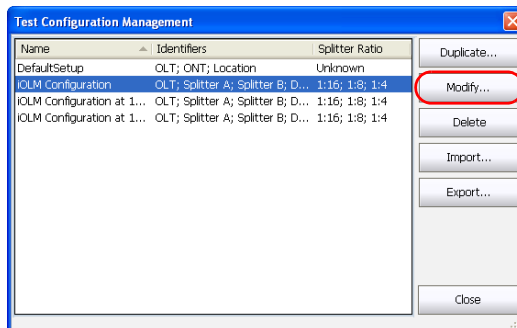
Position (km)	Type	Wavelength (nm)	Loss (dB)	Reflectance (dB)
0.0000	Connector	1625	-0.562	-64.3

2. Select **Manage**.



3. Select the test configuration file to modify.

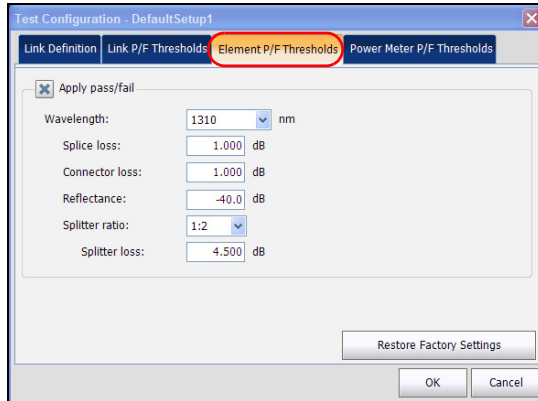
4. Press **Modify**.



Managing Test Configurations

Modifying a Test Configuration

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



6. Enable the **Apply Pass/Fail** option to access the parameters, and modify them as needed.

Note: The available wavelength choices depends on the iOLM module.

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.

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

Press **Restore Factory Settings** to remove all the changes and apply the default values.

Modifying Power Meter Pass/Fail Thresholds

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

Note: *The **Power Meter 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**, press **Test Config**.

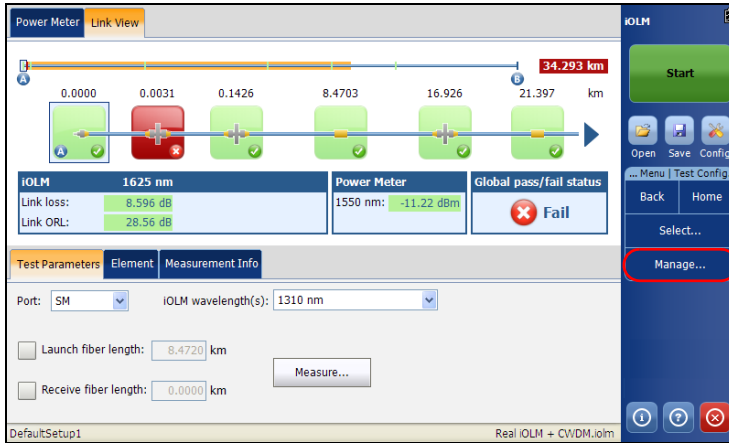
The screenshot displays the 'Power Meter Link View' window. At the top, a fiber link diagram shows a path from 0.0000 km to 34.293 km with several components. Below the diagram, a table shows IOLM parameters: 1625 nm, Link loss: 8.596 dB, Link ORL: 28.56 dB, Power Meter: 1550 nm: -11.22 dBm, and Global pass/fail status: Fail. A 'Test Parameters' table is also visible, showing a connector at 0.0000 km with a wavelength of 1625 nm, loss of -0.562 dB, and reflectance of -64.3 dB. The 'Test Config' button in the Main Menu is circled in red.

Position (km)	Type	Wavelength (nm)	Loss (dB)	Reflectance (dB)
0.0000	Connector	1625	-0.562	-64.3

Managing Test Configurations

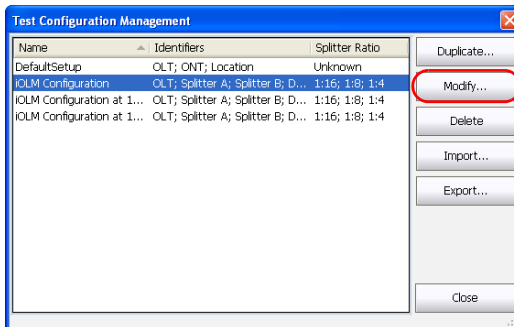
Modifying a Test Configuration

2. Select **Manage**.

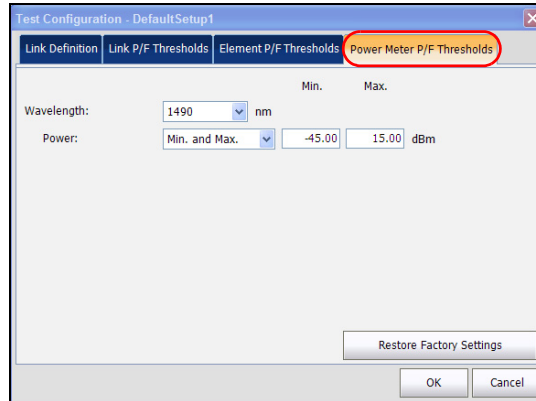


3. Select the test configuration file to modify.

4. Press **Modify**.



5. Select the **Power Meter P/F Thresholds** tab.



6. Under **Power Meter 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. Press **OK** to save the changes and close the window, or press **Cancel** to exit without saving.

Press **Restore Factory Settings** to remove all the changes and apply the default values.

Managing Test Configurations

Modifying a Test Configuration

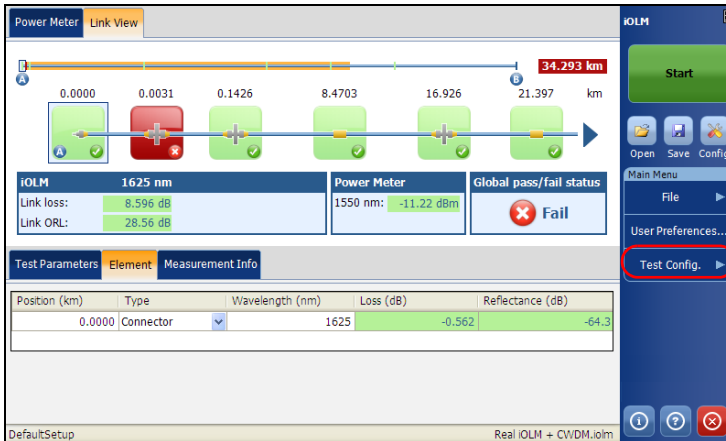
Deleting Test Configuration

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

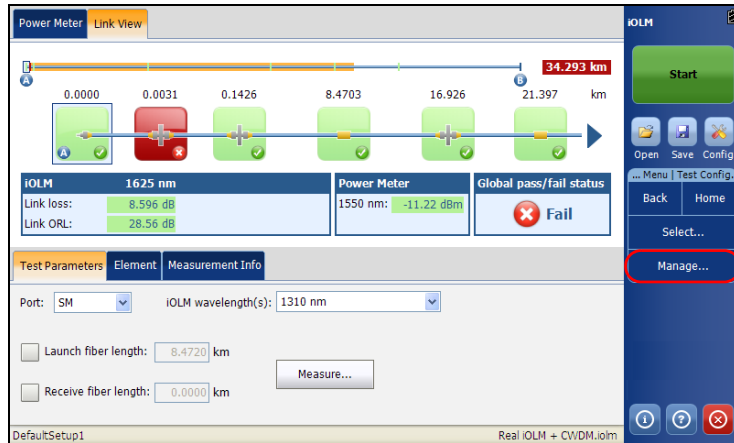
Note: *You cannot delete the default factory settings or predefined configuration files.*

To delete a test configuration:

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



2. Select **Manage**.

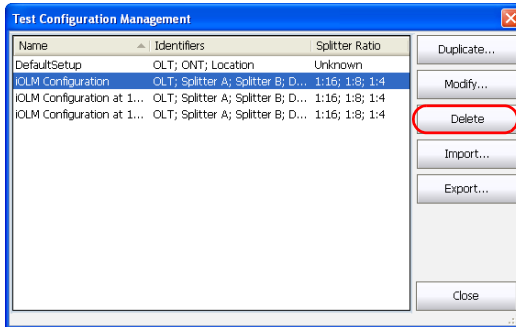


3. Select the test configuration file to delete.

Managing Test Configurations

Modifying a Test Configuration

4. Press **Delete**.



A confirmation message is displayed.

5. Press **Yes** to delete the file or press **No** to cancel the deletion.

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

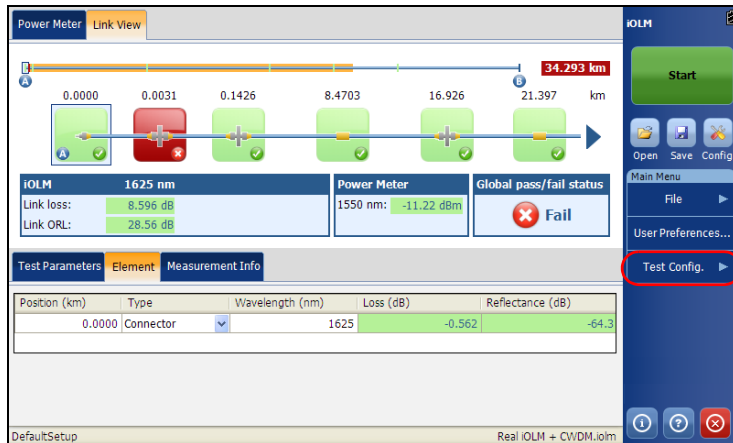
Importing or Exporting a Test Configuration

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: 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:

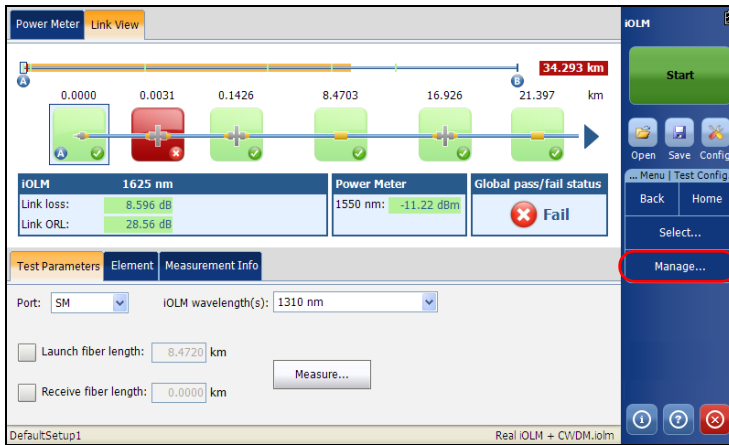
1. From the **Main Menu**, press **Test Config.**



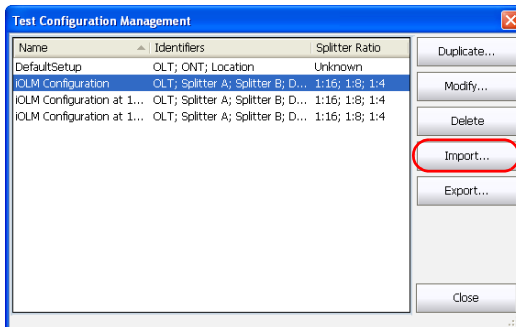
Managing Test Configurations

Importing or Exporting a Test Configuration

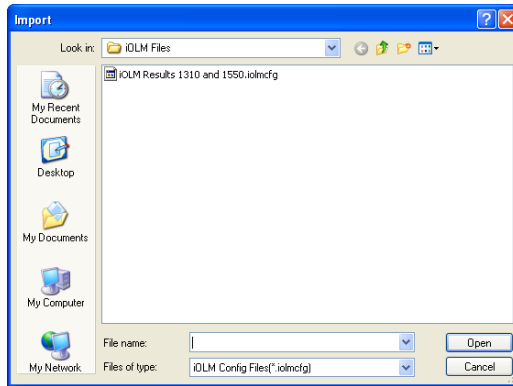
2. Select Manage.



3. Press Import.

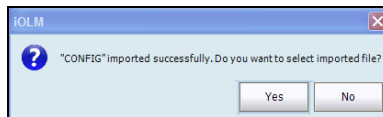


4. An **Import** dialog box opens, select the file to import and press **Open**.



A confirmation message is displayed.

5. Press **Yes** to select the file or press **No** to cancel the selection.

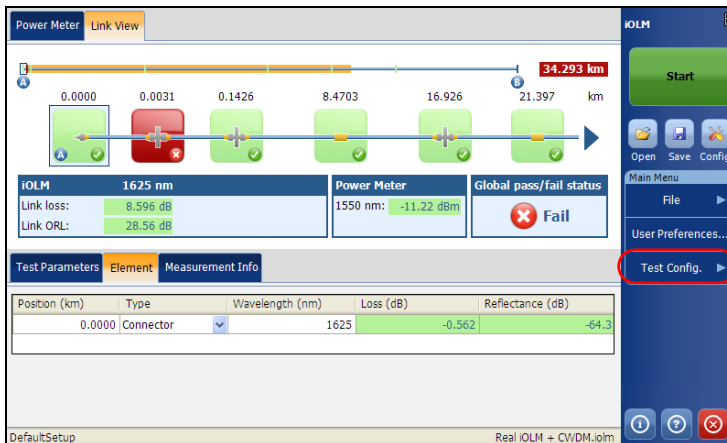


Managing Test Configurations

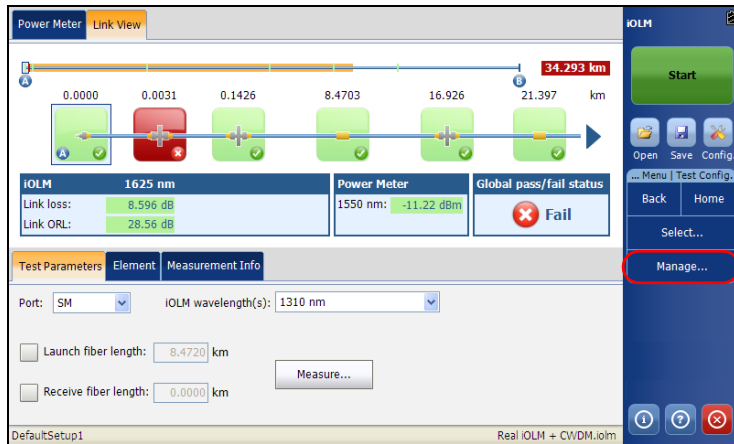
Importing or Exporting a Test Configuration

To export a test configuration:

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

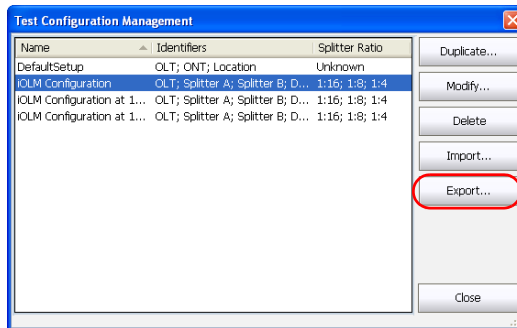


2. Select **Manage**.



3. Select the test configuration file.

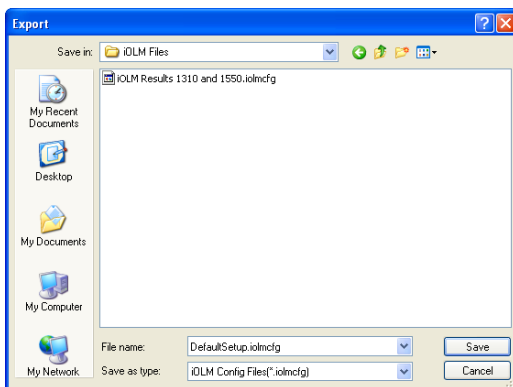
4. Press **Export** to export the configuration to an external storage device.



Managing Test Configurations

Importing or Exporting a Test Configuration

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



7 Starting an Acquisition

This section explains the acquisition process of the intelligent Optical Link Mapper.

Starting an iOLM Acquisition

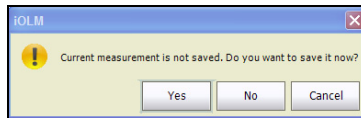
This section explains the iOLM acquisition process. The iOLM allows you to characterize a fiber-optic span, usually optical fiber sections joined by splices and connectors. The iOLM provides an inside view of the fiber, and can calculate fiber length, breaks, total return loss, splice, connector, and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

To perform an iOLM acquisition:

1. Press **Start**.

The application displays a confirmation message asking to save unsaved data (if any) before starting a new acquisition.

2. Select **Yes**, **No**, or **Cancel** as required.



Note: *You will not be asked to save the file if the file functionalities are not activated. See Setting User Preferences on page 21 for more details.*

When an iOLM acquisition starts, the link view and element details are displayed by default.

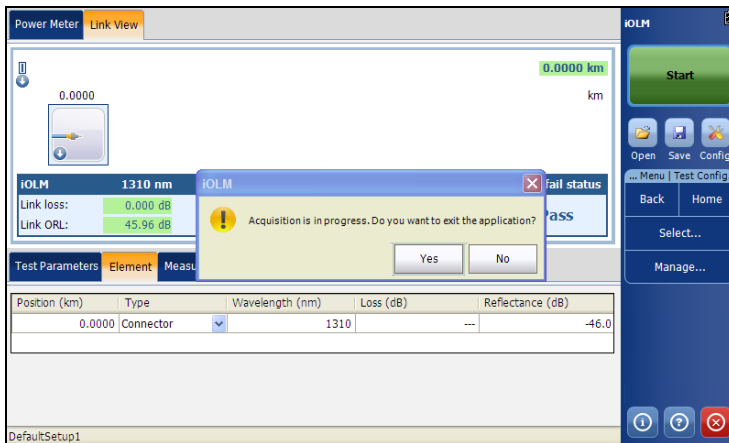
The progress of the overall acquisition for all wavelengths is displayed in the status bar. For example, if two wavelengths have to be processed, at the end of the first wavelength acquisition the overall progress will be 50 %.

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

Starting an Acquisition

Starting an iOLM Acquisition

When an iOLM acquisition is in progress and you try to exit the application, a confirmation message is displayed.

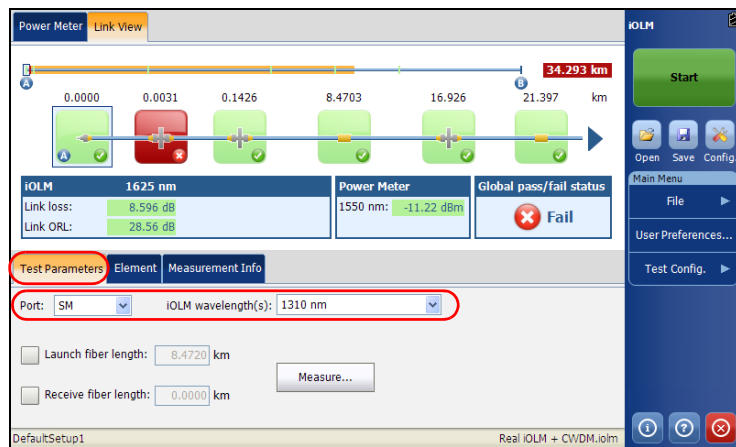


Starting a Single-Wavelength Acquisition

The single-wavelength acquisition allows you to take an acquisition on a specific wavelength if multiple wavelengths are present in the module.

To start single wavelength acquisition:

1. From the **Test Parameters** tab, select the port to use.
2. Select the desired **iOLM Wavelength(s)** (one wavelength).



3. Press **Start**.

Starting an Acquisition

Starting a Multiple-Wavelength Acquisition

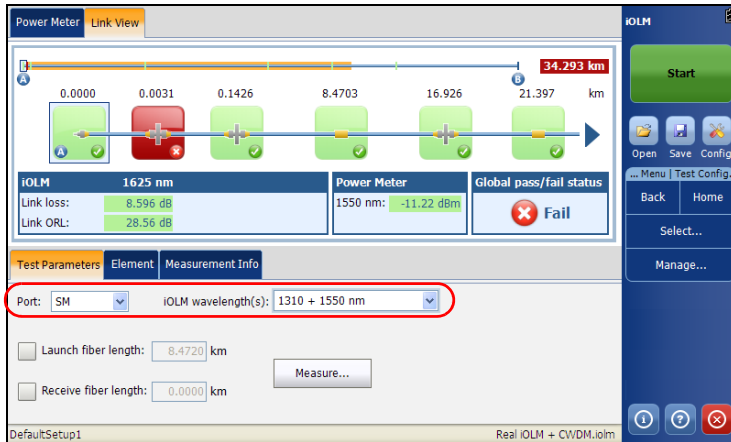
Starting a Multiple-Wavelength Acquisition

The multiple-wavelength acquisition allows you to take an acquisition on multiple wavelengths, if multiple wavelengths are present in the module.

In a multiple wavelength acquisition, the current wavelength in the acquisition is displayed.

To start multiple wavelength acquisition:

1. From the **Test Parameters** tab, select the SM port.
2. Select the desired **iOLM Wavelength(s)** (combination of multiple wavelengths, combined by a '+' sign).



3. Press **Start**.

Stopping an Acquisition

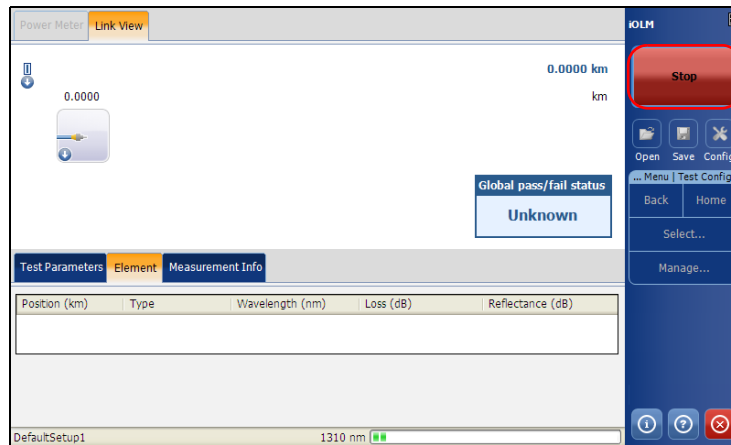
The acquisition stops automatically after the acquisition is complete.

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:

Press **Stop** from the main window.



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.

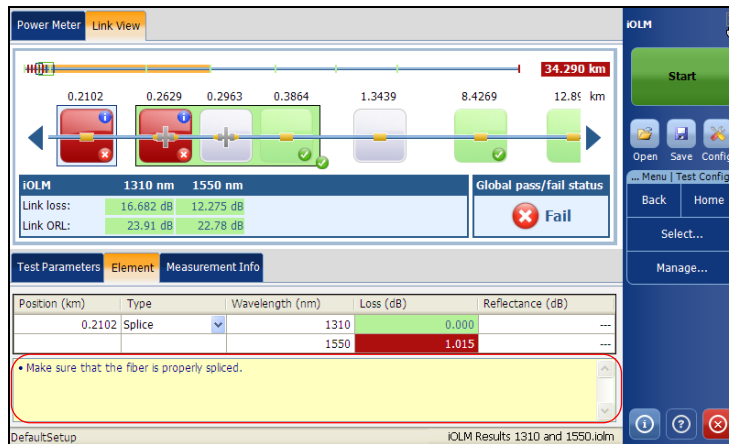
Note: *A manually stopped acquisition should not be considered as a reliable link measurement. To fully characterize a link, a complete acquisition should be performed.*

8 Understanding Diagnostics

This section explains the diagnostics feature available in the intelligent Optical Link Mapper 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 **i** icon, and the diagnostics are displayed in the **Element** tab. More than one diagnostic can be associated with any given element.



The following section describes the Element diagnostics.

Elements Diagnostics

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**

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

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

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.

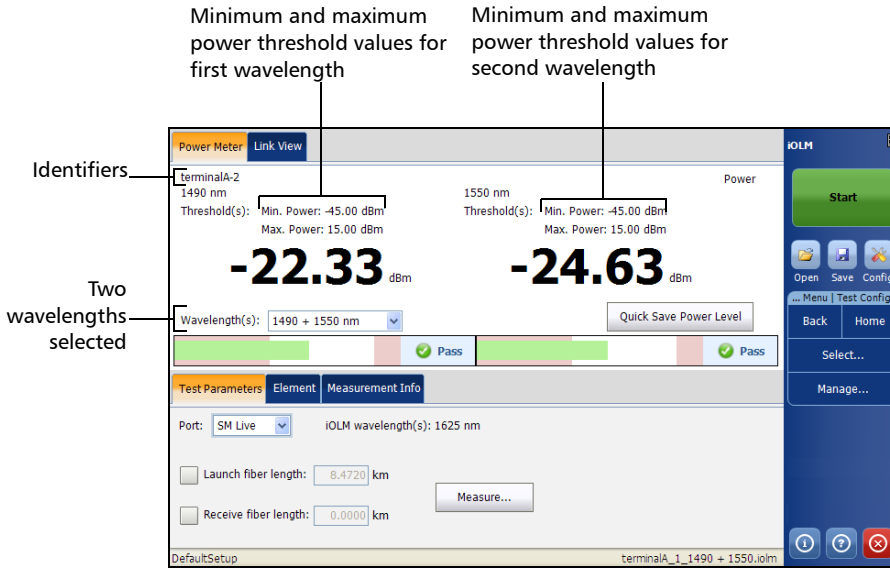
Note: *The inline power meter can be equipped with two-channels for taking the power meter measurements at multiple wavelengths at once.*

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.

Using the Inline Power Meter

Understanding the Inline Power Meter

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.

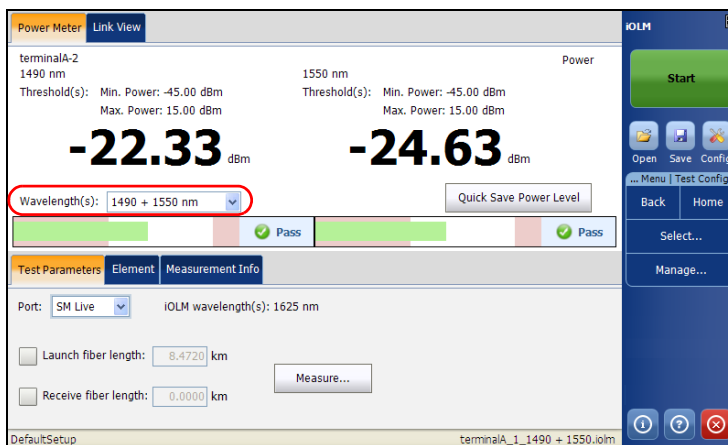
Note: The **Power Meter** tab will not be available if no power meter is available in the module.

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 **Power Meter** tab.
2. Select the wavelength at which you want to measure the power levels.



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

Using the Inline Power Meter

Performing a Power Meter Acquisition

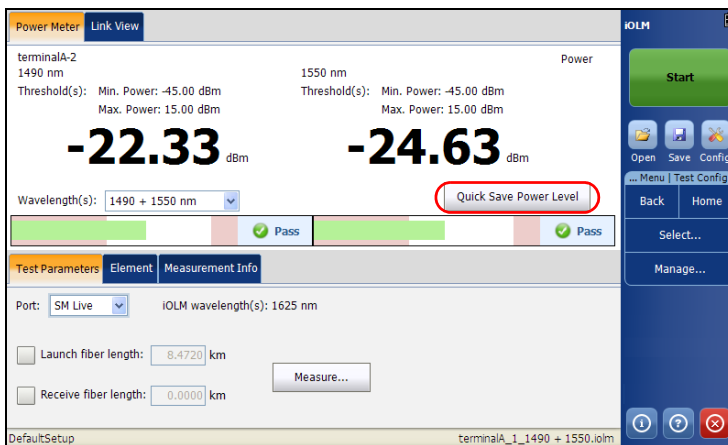
When both wavelengths of a two-channels power meter are selected, both power levels will be displayed side by side. Both values will be refreshed at the same time.

Saving the Power Level

Pressing **Quick Save Power Level** 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 95 for more details on opening iOLM files.

To save the power level:

Press **Quick Save Power Level** 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.

Using the Inline Power Meter

Performing a Power Meter Acquisition

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

The screenshot displays the IOLM software interface. At the top, there are tabs for "Power Meter" and "Link View". The main area shows a "Power Meter" table with the following data:

Wavelength	Power Level
1490 nm	-25.6 dBm
1550 nm	-28.2 dBm

Next to the table is a "Global pass/fail status" section showing a green checkmark and the word "Pass". Below the table, there are sections for "Test Parameters", "Element", and "Measurement Info". The "Test Parameters" section includes a "Port" dropdown set to "SM" and an "IOLM wavelength(s)" dropdown set to "1310 + 1550 nm". There are also input fields for "Launch fiber length" (8.4720 km) and "Receive fiber length" (0.0000 km), along with a "Measure..." button. The bottom of the interface shows "DefaultSetup" and "terminalA_1_1490 + 1550.iolm".

Using the Inline Power Meter

iOLM Acquisition with Power Meter

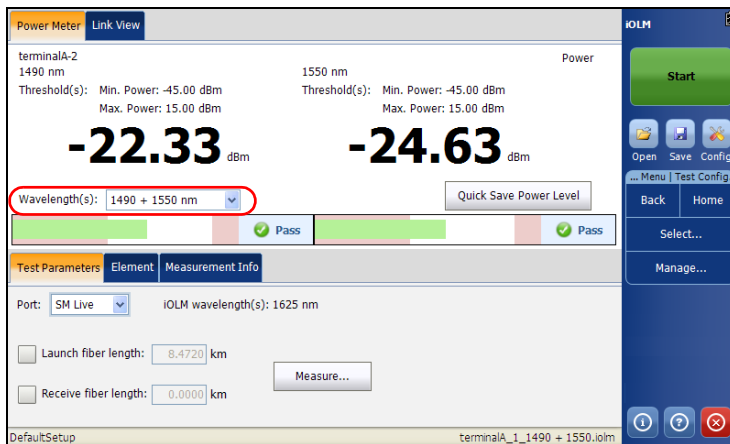
iOLM Acquisition with Power Meter

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.

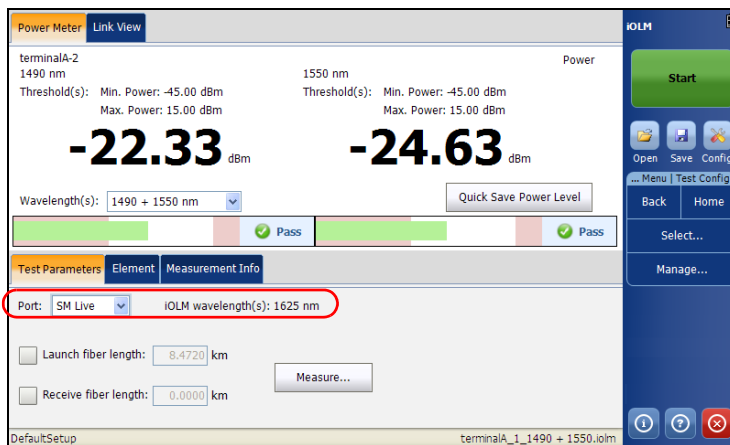
The measurements are taken at the wavelength(s) set in the **Power Meter** tab.

To perform an iOLM acquisition with power meter:

1. Select the **Power Meter** tab.
2. Select the wavelength at which you want to take the power meter measurements.



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



4. Press **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 Managing Results

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

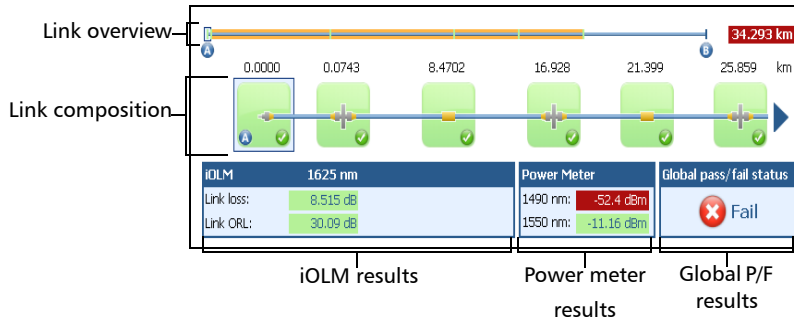
Note: See Using the Inline Power Meter on page 73 for Power Meter results.

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



Managing Results

Link View

Link Overview

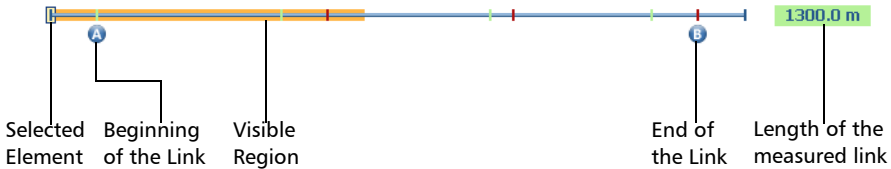
The link overview shows the entire link without scrolling. You can directly select an element by pressing the tick mark (+) representing it.

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 50 for more details.

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

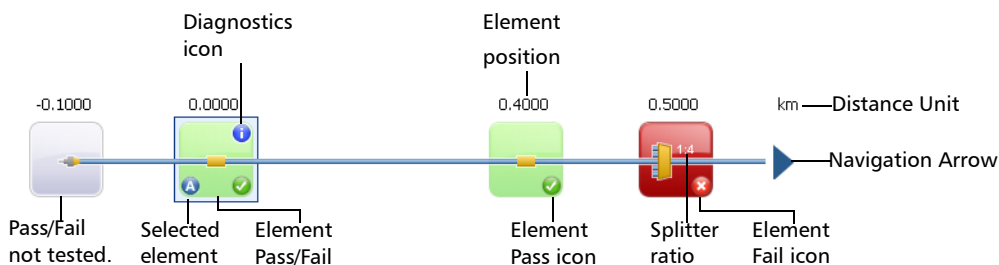


- **Length of the measured link:** Length of the measured link excluding the launch and receive fiber. In other words, the fiber length between point A and point B.
- **Selected Element:** Rectangle representing the selected element.
- **Visible region:** The colored background represent the visible 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.





- **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. This arrow can also appear on the left side.
- **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.

Managing Results

Link View

- **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 71, 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 splitter.

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 82.*

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.

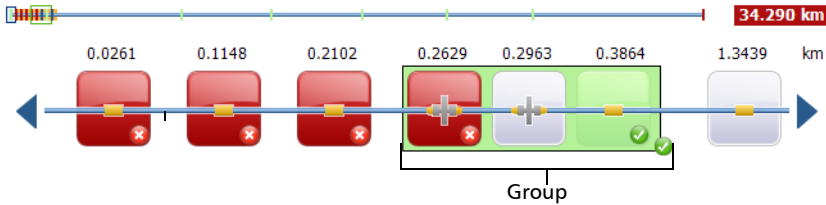
Groups can also be displayed when a link element (such as a splitter) is found to have wavelength dependant loss. In that case, the link element is grouped with a macrobend element. In this particular case, there might not be a physical macrobend next to the link element, but the macrobend icon is used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

Managing Results

Link View

The grouped elements are described below.



Each sub-element is directly displayed as if they were normal elements. See *Link Composition* on page 83 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

Element Name	Element Icon	Element Description
Macrobends		<p>Macrobends can be displayed in the link view when more than one wavelength is present in the measurement.</p> <p>Note: <i>The macrobend will always be displayed as a failed element.</i></p>
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 above 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.

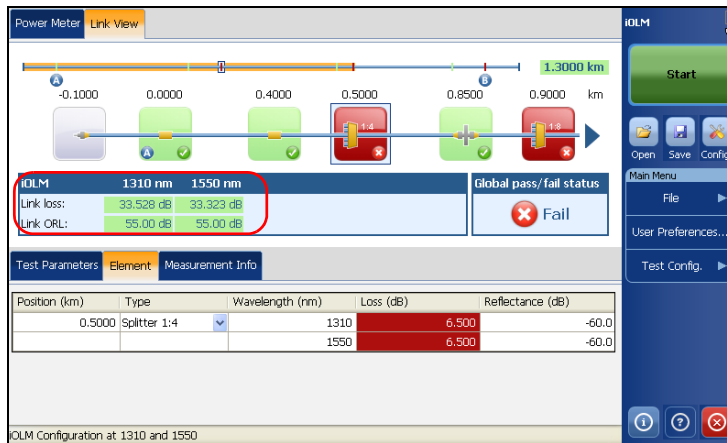
Managing Results

Link View

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.*



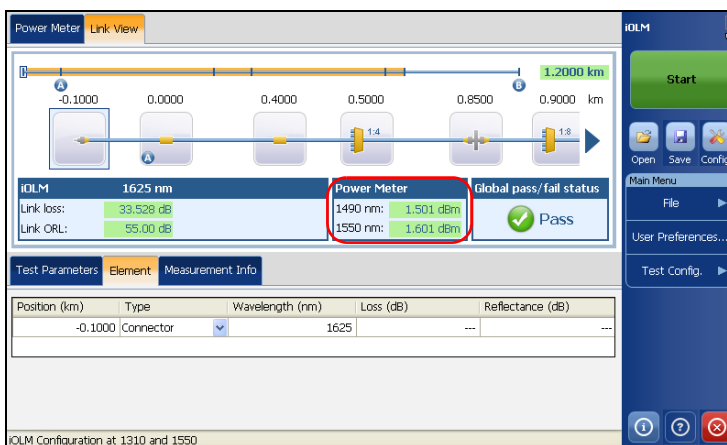
When a multiple-wavelength acquisition is in progress, only the wavelength currently being acquired and the ones already completed are displayed. Link loss and link ORL are displayed for each wavelength. All the values are tested and displayed according to current pass/fail settings.

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 **Power Meter** 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.

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.

Managing Results

Viewing Element Details

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.

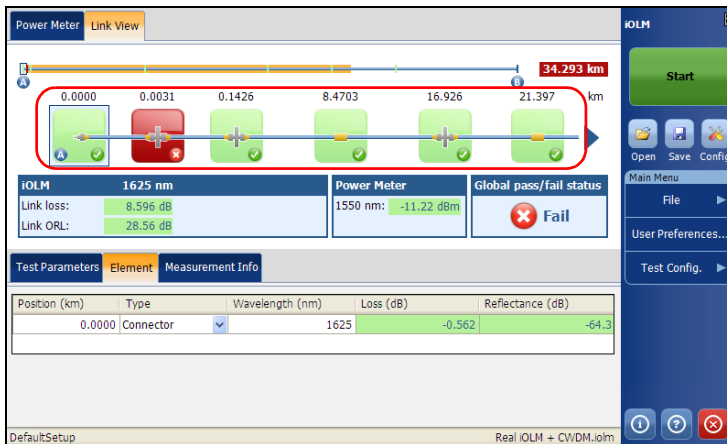
Note: *It is important to complete the entire acquisition process to have a good pass/fail status.*

Viewing Element Details

When an element is selected from the Link view, the details of the corresponding element is displayed in **Element** tab. The loss and reflectance are displayed here, with appropriate coloring based on the pass/fail status of each value.

To view or modify element details:

1. From the main window, press **Element**.
2. Select the element you wish to view/modify.



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

- **Position:** The position of the selected element in the link. The position 0.00 is set on the first element following the launch fiber.
- **Type:** The type of element selected in the Link View. You can modify the type of element by selecting the element type from the drop down menu.

You can also change the splitter ratio if the selected element is splitter.

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.*

- **Wavelength (nm):** The wavelength at which the values have been taken.
- **Loss (dB):** The loss at different wavelengths.
- **Reflectance (dB):** The reflectance at different wavelengths.

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 values are likely to be underestimated. If the loss or reflectance 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.*

Managing Results

Measurement Information

For grouped elements, the following information is displayed:

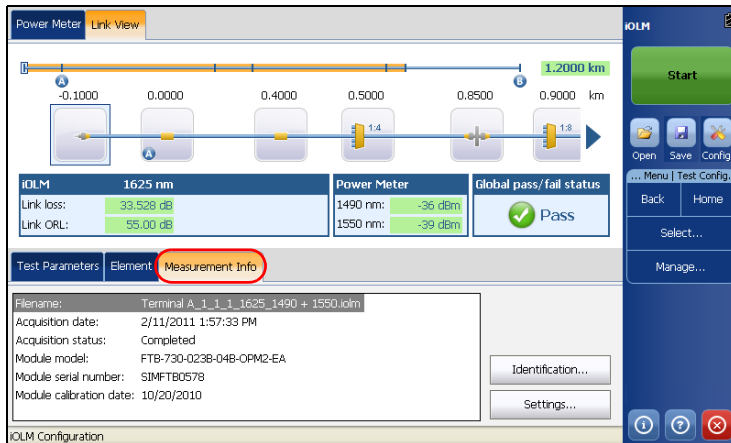
- **Group Loss:** The total loss of the grouped elements.
- **Group Reflectance:** The highest reflectance of the grouped elements.

Measurement Information

This section explains the **Measurement Info** tab.

To view measurement information:

1. From the main window, press **Measurement Info**.



The following information is displayed.

- **File Name:** The name of the file.

Note: If file auto-naming is deactivated, the file name will be “---”.

- **Acquisition Date:** The date and time at which acquisition was done.

- **Acquisition Status:** The status of acquisition. It displays if the acquisition has been taken normally or if it has been interrupted.
- **Module Model:** The model type of the iOLM module when the measurement was created.
- **Module Serial Number:** The serial number of the iOLM module when the measurement was created.
- **Module Calibration Date:** The date of calibration of the iOLM module when the measurement was created.

To view identification information:

1. From the main window press **Measurement Info**.
2. Press **Identification**, to view identification information for the measurement.

OLT	Splitter A	Splitter B	Drop T.	Redundant Fiber
	1	1		

3. Modify the identification information, if required.

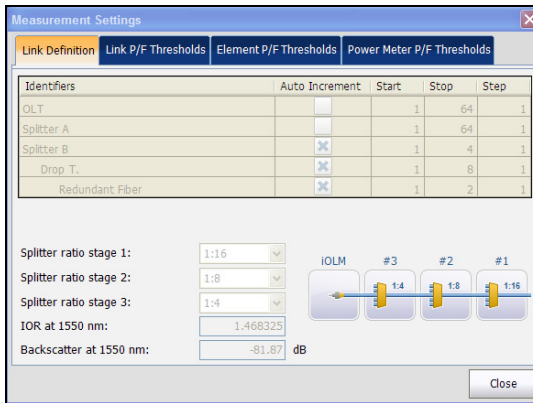
Note: *The modifications done here will be saved in the measurement file only, not in the application user preferences.*

Managing Results

Measurement Information

To view measurement settings:

1. From the main window, press **Measurement Info**.
2. Press **Settings** to view settings of the measurement.



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

Note: See *Modifying a Test Configuration on page 42* to modify the settings for future acquisitions.

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

11 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**, press **File**.

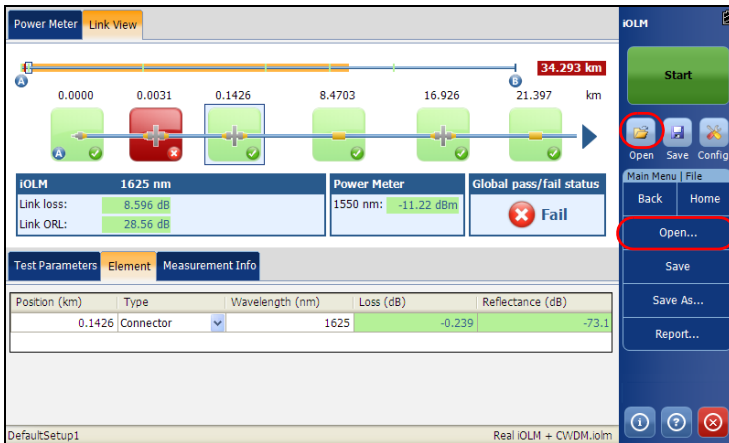
The screenshot displays the iOLM software interface. At the top, there is a 'Power Meter' section with a 'Link View' tab. Below this, a horizontal line represents a link with several measurement points marked at 0.0000, 0.0031, 0.1426, 8.4703, 16.926, and 21.397 km. A total distance of 34.293 km is indicated. Below the link view, there are three summary boxes: 'iOLM 1625 nm' showing Link loss: 8.596 dB and Link ORL: 28.56 dB; 'Power Meter 1550 nm' showing -11.22 dBm; and 'Global pass/fail status' showing a 'Fail' status with a red 'X' icon. Below these is a table with columns for Position (km), Type, Wavelength (nm), Loss (dB), and Reflectance (dB). The table contains one row: 0.0000, Connector, 1625, -0.562, -64.3. At the bottom of the interface, there is a 'Main Menu' panel with a 'File' option highlighted by a red circle. Other options in the main menu include 'Start', 'Open', 'Save', 'Config.', 'User Preferences...', and 'Test Config.'.

Position (km)	Type	Wavelength (nm)	Loss (dB)	Reflectance (dB)
0.0000	Connector	1625	-0.562	-64.3

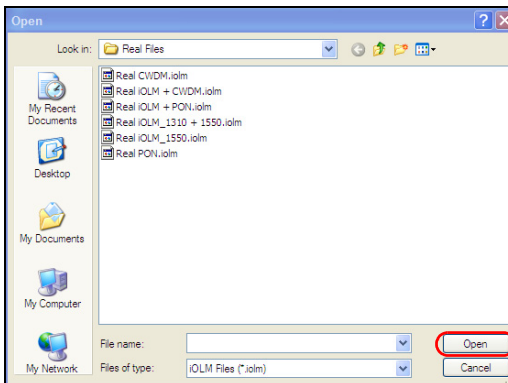
Managing Files

Opening iOLM Files

2. Press **Open** or .



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



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

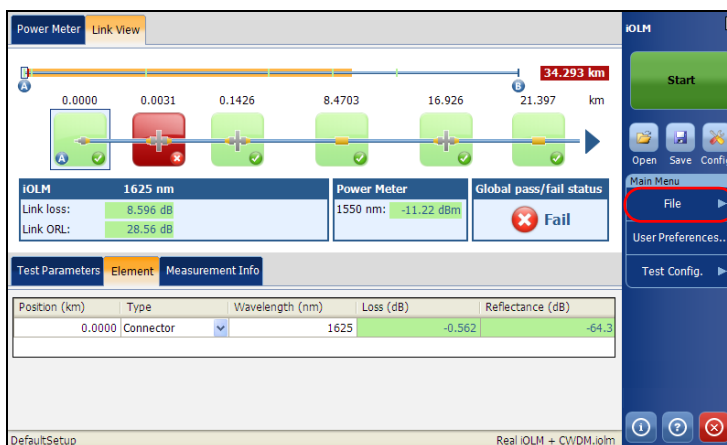
Saving iOLM Files

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:

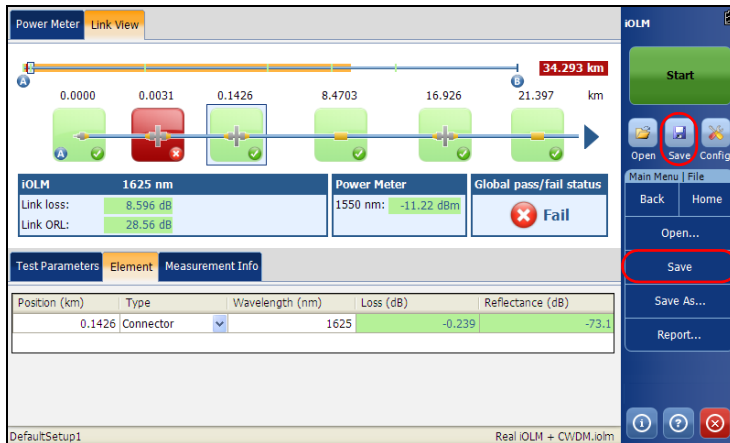
1. From the **Main Menu**, press **File**.



Managing Files

Saving iOLM Files

2. Press **Save** or  to save the file. The **Save** option overwrites the existing file with the new file.



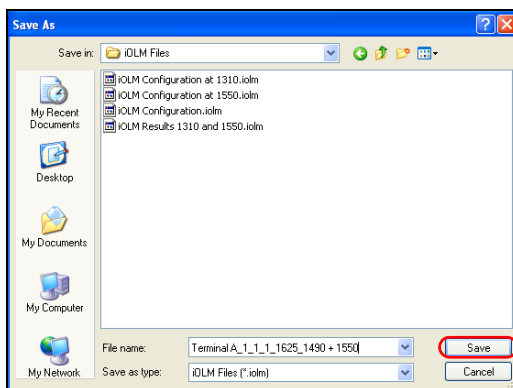
The screenshot displays the iOLM software interface. The top section shows a fiber link diagram with a total length of 34.293 km. The link is divided into segments at 0.0000, 0.0031, 0.1426, 8.4703, 16.926, and 21.397 km. A red connector icon is highlighted at the 0.0031 km position. Below the diagram, the iOLM configuration shows a wavelength of 1625 nm, a link loss of 8.596 dB, and a link ORL of 28.56 dB. The Power Meter shows a reading of -11.22 dBm at 1550 nm. The Global pass/fail status is 'Fail'. The Test Parameters table is shown below:

Position (km)	Type	Wavelength (nm)	Loss (dB)	Reflectance (dB)
0.1426	Connector	1625	-0.239	-73.1

The right sidebar contains a 'Start' button and a menu with 'Open', 'Save', and 'Config.' options. The 'Save' option is highlighted with a red circle. Below the menu are 'Open...', 'Save', 'Save As...', and 'Report...' buttons. The 'Save' button is also highlighted with a red circle. The bottom status bar shows 'DefaultSetup1' and 'Real iOLM + CVDIM.iolm'.

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 will open.

3. Press **Save As** to save the file with a different name or at a different location.
4. Enter the file name and Press **Save**.



Managing Files

Generating a Report

Generating a Report

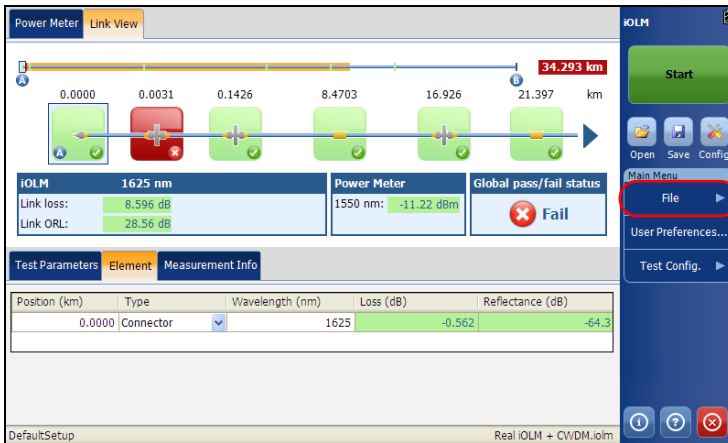
The **Report** menu item allows you to generate an iOLM report, Power meter report or iOLM plus Power Meter Report. The type of report will depend on the type of measurements you have taken.

Note: You need Internet Explorer 7 or above to open .mht files. The UNmht plugin is required to open the report files in any browser other than Internet Explorer. You will get the plugin on the website of the browser.

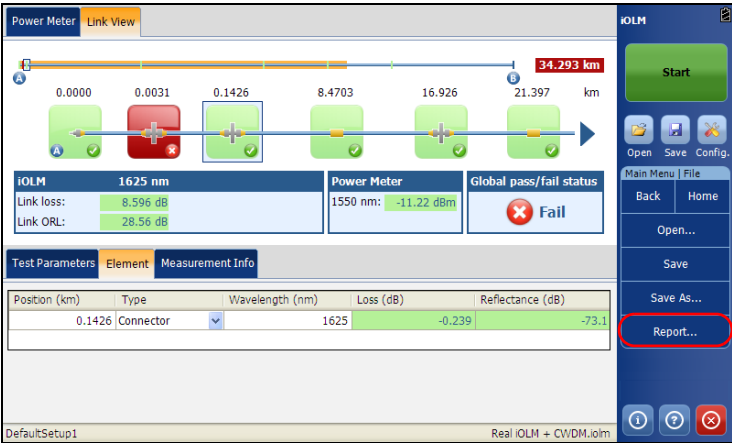
Note: Google Chrome and Safari do not support the UNmht plugin.

To generate a report:

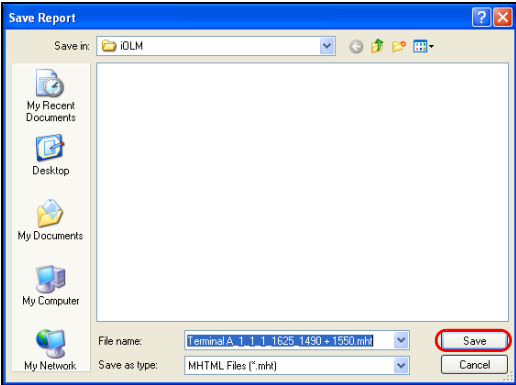
1. From the **Main Menu**, press **File**.



2. Press **Report**.



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



Managing Files

Generating a Report

Below you can see samples for the reports:

Sample iOLM Report

iOLM Report Pass

General Information

Filename: _____
Test date: 2/11/2011 Customer: _____
Test time: 2:27:04 PM Operator: _____
Job ID: _____ Unit's model: FTB-730-023B-04B-OPM2-EA
Company: _____ Unit's S/N: SIMFT80578
Comments: _____

Identifiers

OLT	ONT	Location
Terminal A		

iOLM Results

Link length: 0.0000 km
Acquisition status: Completed

Wavelength (nm)	Link loss (dB)	Link ORL (dB)
1310	0.000	45.83

iOLM Pass/Fail Thresholds

Sample Power Meter Report

Power Meter Report Pass

General Information

Filename: Terminal_A_5_1490 + 1550.iolm Customer: _____
Test date: 2/11/2011 Operator: _____
Test time: 2:30:11 PM Unit's model: FTB-730-023B-04B-OPM2-EA
Job ID: _____ Unit's S/N: SIMFT80578
Company: _____
Comments: _____

Identifiers

OLT	ONT	Location
Terminal A	5	

Power Meter Results

Acquisition status: Completed

Wavelength (nm)	Power (dBm)
1490	8.400
1550	9.200

Power Meter Pass/Fail Thresholds

Sample
iOLM + Power
Meter Report

iOLM + Power Meter Report ✔ Pass

General Information

Filename:	2/11/2011	Customer:
Test date:	1:57:33 PM	Operator:
Test time:		Unit's model: FTB-730-023B-04B-OPM2-EA
Job ID:		Unit's S/N: SIMFTB0578
Company:		
Comments:		

Identifiers

OLT	Splitter A	Splitter B	Drop T.	Redundant Fiber
Terminal A				

iOLM Results

Link length: 1.2000 km

Acquisition status: Completed

Wavelength (nm)	Link loss (dB)	Link ORL (dB)
1625	33.528	55.00

iOLM Pass/Fail Thresholds

Power Meter Results

Wavelength (nm)	Power (dBm)
1490	-36
1550	-39

Power Meter Pass/Fail Thresholds

12 **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

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

Cleaning EUI Connectors

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

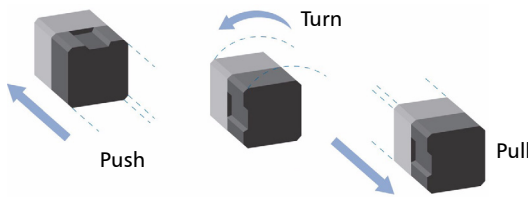


IMPORTANT

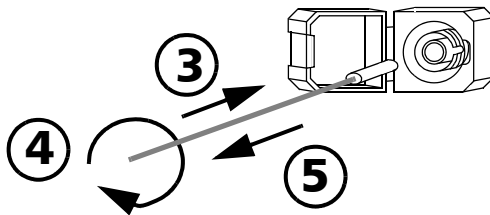
If any damage occurs to internal connectors, the module casing will have to be opened and a new calibration will be required.

To clean EUI connectors:

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



2. Moisten a 2.5 mm cleaning tip with *one drop* of isopropyl alcohol (alcohol may leave traces if used abundantly).
3. Slowly insert the cleaning tip into the EUI adapter until it comes out on the other side (a slow clockwise rotating movement may help).



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

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

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

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

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



IMPORTANT

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

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

- 6b.** Gently wipe the connector and ferrule.
- 6c.** With a dry lint-free wiping cloth, gently wipe the same surfaces to ensure that the connector and ferrule are perfectly dry.
- 6d.** Verify connector surface with a portable fiber-optic microscope (for example, EXFO's FOMS) or fiber inspection probe (for example, EXFO's FIP).



WARNING

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

7. Put the EUI back onto the instrument (push and turn clockwise).
8. Throw out cleaning tips and wiping cloths after one use.

Recalibrating the Unit

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

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

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

Recycling and Disposal (Applies to European Union Only)



Recycle or dispose of your product (including electric and electronic accessories) properly, in accordance with local regulations. Do not dispose of it in ordinary garbage receptacles.



This equipment was sold after August 13, 2005 (as identified by the black rectangle).

- Unless otherwise noted in a separate agreement between EXFO and a customer, distributor, or commercial partner, EXFO will cover costs related to the collection, treatment, recovery, and disposal of end-of-lifecycle waste generated by electronic equipment introduced after August 13, 2005 to an European Union member state with legislation regarding Directive 2002/96/EC.
- Except for reasons of safety or environmental benefit, equipment manufactured by EXFO, under its brand name, is generally designed to facilitate dismantling and reclamation.

For complete recycling/disposal procedures and contact information, visit the EXFO Web site at www.exfo.com/recycle.

13 *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 .

Troubleshooting

Contacting the Technical Support Group

Contacting the Technical Support Group

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

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

Technical Support Group

400 Godin Avenue
Quebec (Quebec) G1M 2K2
CANADA

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

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**, press .



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.

14 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.

Warranty

Liability

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

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

Certification

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

Service and Repairs

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

To send any equipment for service or repair:

1. Call one of EXFO's authorized service centers (see *EXFO Service Centers Worldwide* on page 119). 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 119).

EXFO Service Centers Worldwide

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

EXFO Headquarters Service Center

400 Godin Avenue
Quebec (Quebec) G1M 2K2
CANADA

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

EXFO Europe Service Center

Omega Enterprise Park, Electron Way
Chandlers Ford, Hampshire S053 4SE
ENGLAND

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

EXFO Telecom Equipment (Shenzhen) Ltd.

3rd Floor, Building 10,
Yu Sheng Industrial Park (Gu Shu
Crossing), No. 467,
National Highway 107,
Xixiang, Bao An District,
Shenzhen, China, 518126

Tel: +86 (755) 2955 3100
Fax: +86 (755) 2955 3101
beijing.service@exfo.com

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NOTICE

通告

CHINESE REGULATION ON RESTRICTION OF HAZARDOUS SUBSTANCES

中国关于有害物质限制的规定

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 镉 (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: 1060268

www.EXFO.com · info@exfo.com

CORPORATE HEADQUARTERS	400 Godin Avenue	Quebec (Quebec) G1M 2K2 CANADA Tel.: 1 418 683-0211 · Fax: 1 418 683-2170
EXFO AMERICA	3701 Plano Parkway, Suite 160	Plano TX, 75075 USA Tel.: 1 972 907-1505 · Fax: 1 972 836-0164
EXFO EUROPE	Omega Enterprise Park, Electron Way	Chandlers Ford, Hampshire S053 4SE ENGLAND Tel.: +44 2380 246810 · Fax: +44 2380 246801
EXFO ASIA-PACIFIC	100 Beach Road, #22-01/03 Shaw Tower	SINGAPORE 189702 Tel.: +65 6333 8241 · Fax: +65 6333 8242
EXFO CHINA	Room 2711, Trade Center, No. 4028 Jintian Road, Futian District	Shenzhen 518035 P. R. CHINA Tel.: +86 (755) 8203 2300 · Fax: +86 (755) 8203 2306
	Beijing Global Trade Center, Tower C, Room 1207, 36 North Third Ring Road East, Dongcheng District	Beijing 100013 P. R. CHINA Tel.: +86 (10) 5825 7755 · Fax: +86 (10) 5825 7722
EXFO SERVICE ASSURANCE	270 Billerica Road	Chelmsford MA, 01824 USA Tel.: 1 978 367-5600 · Fax: 1 978 367-5700
TOLL-FREE	(USA and Canada)	1 800 663-3936

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