iOLM intelligent Optical Link Mapper

ee				i	ntelligent O	otical Link N	/lapper			_ 🗖 🗙
	Element	s Info							🕜 Pa:	Start
•									1.4905 k	M Open Save Report
Pos. 0.0000 0.0	030		0.5767	0.596						km File ► Identification
Len.	-0	0.5738	C	.0201	0.0160	0.0113		0.8663	B	km Test Configuration
										User Preferences
iOLM	1310 nm	1490 nm	1550 n	m						
Link loss:	3.470 dB	2.845 dB	2.749 (IB						
Link ORL:	19.62 dB	20.05 dB	20.73 (IB						
Туре	Pos. (km)		Loss (dB)		R	eflectance (dB))			
		1310 nm	1490 nm	1550 nm	1310 nm	1490 nm	1550 nm			
2	0.0000	1.242	0.981	0.936	-54.7	-55.3	-55.3			
- v 🤇	0.0000				-74.9	-72.3	-76.8			
										i ? <mark>S</mark>
DefaultSetup									File name: 1310 149	90 1550 Close events.iolm



www.EXFO.com Telecom Test and Measurement Copyright © 2011–2018 EXFO Inc. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form, be it electronically, mechanically, or by any other means such as photocopying, recording or otherwise, without the prior written permission of EXFO Inc. (EXFO).

Information provided by EXFO is believed to be accurate and reliable. However, no responsibility is assumed by EXFO for its use nor for any infringements of patents or other rights of third parties that may result from its use. No license is granted by implication or otherwise under any patent rights of EXFO.

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

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

Trademarks

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

Units of Measurement

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

Patents

Feature(s) of this product is/are protected by one or more of: US patent 8,687,957 and equivalent patents pending and/or granted in other countries; US patent 8,576,389 and equivalent patents pending and/or granted in other countries; US patent 9,170,173; US patent 9,571,186; patent appl. US 2017/0149496 A1; US patent 9,134,197 and equivalent patents pending and/or granted in other countries; and US 9,506,838; US design patent D798,171 and equivalent(s) in other countries.

Version number: 21.0.1.1

Contents

	Certification Information	vi
1	Introducing the intelligent Optical Link Mapper Principles of Operation	
	Testing Modes	
	Exporting Data to Other Formats	
	Performing Multimode Measurements	
	Launch, Receive, and Loop Fibers	
	Software Options	
	Technical Specifications	
	Conventions	15
2	Safety Information	. 17
	General Safety Information	17
	Laser Safety Information for FTB-7000 Series (Units without VFL)	19
	Laser Safety Information for FTB-7000 Series (Units with VFL)	20
	Laser Safety Information for FTB-700Gv2/FTB/FTBx/MAX-700C Series (Units without VFL) .	
	Laser Safety Information for MAX-700C Series (Units with VFL)	
	Laser Safety Information for MAX-700B Series	
	Electrical Safety Information	24
3	Getting Started With Your iOLM	. 25
	Main Window	25
	Status Bar	
	Status Bar Connecting an Optical Switch to the iOLM	
4		27
4	Connecting an Optical Switch to the iOLM	27 . 29
4	Connecting an Optical Switch to the iOLM Preparing Your iOLM for a Test Cleaning and Connecting Optical Fibers Installing the EXFO Universal Interface (EUI)	27 . 29 29 31
4	Connecting an Optical Switch to the iOLM Preparing Your iOLM for a Test Cleaning and Connecting Optical Fibers Installing the EXFO Universal Interface (EUI) Naming Trace Files Automatically	27 . 29 29 31 32
4	Connecting an Optical Switch to the iOLM Preparing Your iOLM for a Test Cleaning and Connecting Optical Fibers Installing the EXFO Universal Interface (EUI) Naming Trace Files Automatically Reverting to Factory Settings	27 . 29 31 32 38
4	Connecting an Optical Switch to the iOLM Preparing Your iOLM for a Test Cleaning and Connecting Optical Fibers Installing the EXFO Universal Interface (EUI) Naming Trace Files Automatically Reverting to Factory Settings Configuring Your iOLM	27 . 29 31 32 38 39
4	Connecting an Optical Switch to the iOLM Preparing Your iOLM for a Test Cleaning and Connecting Optical Fibers Installing the EXFO Universal Interface (EUI) Naming Trace Files Automatically Reverting to Factory Settings	27 . 29 31 32 38 39
	Connecting an Optical Switch to the iOLM Preparing Your iOLM for a Test Cleaning and Connecting Optical Fibers Installing the EXFO Universal Interface (EUI) Naming Trace Files Automatically Reverting to Factory Settings Configuring Your iOLM	27 29 31 32 38 39 55
	Connecting an Optical Switch to the iOLM Preparing Your iOLM for a Test Cleaning and Connecting Optical Fibers Installing the EXFO Universal Interface (EUI) Naming Trace Files Automatically Reverting to Factory Settings Configuring Your iOLM Enabling or Disabling the Automated Acquisition Sequence	27 29 31 32 38 39 55 . 59
	Connecting an Optical Switch to the iOLM Preparing Your iOLM for a Test Cleaning and Connecting Optical Fibers Installing the EXFO Universal Interface (EUI) Naming Trace Files Automatically Reverting to Factory Settings Configuring Your iOLM Enabling or Disabling the Automated Acquisition Sequence Working With the DWDM Module	27 29 31 32 38 39 55 59
	Connecting an Optical Switch to the iOLM Preparing Your iOLM for a Test Cleaning and Connecting Optical Fibers Installing the EXFO Universal Interface (EUI) Naming Trace Files Automatically Reverting to Factory Settings Configuring Your iOLM Enabling or Disabling the Automated Acquisition Sequence Working With the DWDM Module Main Features	27 29 31 32 38 39 55 59 59 60
	Connecting an Optical Switch to the iOLM Preparing Your iOLM for a Test Cleaning and Connecting Optical Fibers Installing the EXFO Universal Interface (EUI) Naming Trace Files Automatically Reverting to Factory Settings Configuring Your iOLM Enabling or Disabling the Automated Acquisition Sequence Working With the DWDM Module Main Features Selecting a Channel Filter	27 . 29 31 32 38 39 55 . 59 60 61 62

Contents

6	Working With the CWDM Module	67
	Main Features	
	Selecting a Channel Filter	68
	Selecting a Channel	
	Managing Favorite Channels	
	Performing Live-Fiber Testing	
	Understanding Fiber Water Peak	73
7	Managing Test Configurations	75
	Impacts of Test Configurations	76
	Selecting a Test Configuration	77
	Creating a Test Configuration	79
	Setting the Test Configuration Properties	
	Defining the Link for Your Test	
	Selecting Certification Standards	
	Setting Custom Power Meter Thresholds	
	Modifying a Test Configuration	
	Importing a Test Configuration	108
	Exporting a Test Configuration	
	Deleting a Test Configuration	112
8	Performing Acquisitions	115
	Performing a Standard or Loopback Acquisition	
	Performing a Bidirectional Loopback Acquisition	117
	Stopping an Acquisition	121
9	Customizing Your iOLM	123
	Setting the Default Storage Folder	
	Saving Files in Bellcore Format	124
	Customizing Reports	
	Activating the Automated Report Creation	127
	Enabling or Disabling Sound Notifications	129
	Displaying or Hiding Fiber Sections	130
	Selecting the Distance Units	131
10) Understanding Diagnostics	133
	Using the Inline Power Meter (Optional on Some Models)	
•••	Understanding the Inline Power Meter	
	Setting Custom Power Meter Thresholds	
	Selecting the Measurement Mode	
	Measuring Power Levels	
	Performing an iOLM Acquisition with a Power Meter	

Contents

12 Using Your Module as a Source	145
13 Starting the Classic OTDR Application	149
14 Analyzing and Managing Results	151
Viewing Results in the Link View	
Viewing Results of Elements and Fiber Section Details	
Editing Element Types	
Managing Elements and Analyzing Links	
Viewing Measurement Information Viewing Multifiber Results	
15 Managing Files	
Opening Files Saving Files	
Exporting Files to the Bellcore Format	
Generating a Report	
16 Maintenance	189
Cleaning EUI Connectors	
Recalibrating the Unit	
Recycling and Disposal	
17 Troubleshooting	195
Viewing Online Documentation	
Contacting the Technical Support Group	195
Viewing Information About Your iOLM	
Transportation	196
18 Warranty	197
General Information	197
Liability	
Exclusions	
Certification	
Service and Repairs EXFO Service Centers Worldwide	
Index	201

Certification Information

North America Regulatory Statement

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

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

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

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

European Community Declaration of Conformity

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

The full text of the EU declaration of conformity is available at the following Internet address: *www.exfo.com/en/resources/legal-documentation*.

The intelligent Optical Link Mapper (iOLM) is an optimized application for access/FTTx network characterization. This OTDR-based application uses multipulse acquisitions and advanced algorithms to deliver detailed information on every element on the link.

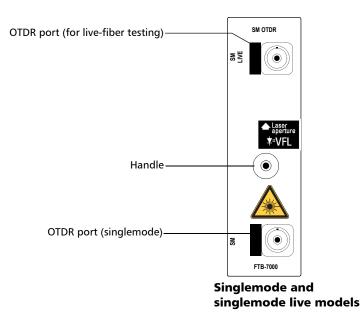
Depending on the type of acquisition you want to perform and the environment you are working in, different modules are available for your tests:

- ➤ The standard iOLM uses advanced algorithms that dynamically define the testing parameters, as well as the number of acquisitions that best fit the network under test. As soon as the trace is analyzed, all results are combined into a single link view. Specific diagnostics are also provided to help you with the troubleshooting process.
- ➤ The FTB/FTBx-740C-DWC module allows you to perform specific acquisitions using the DWDM (dense wavelength-division multiplexing) technology in the C-band and is designed to test through field mux/demux channels. This high-resolution particular type of module provides complete end-to-end link characterization and helps troubleshooting metro Ethernet links as well as commercial services. See Working With the DWDM Module on page 59 for details.
- ➤ The FTB/FTBx-740C-CW module covers up to 18 CWDM ITU channels, from 1270 nm to 1610 nm (with a channel spacing of 20 nm), and is designed to test through field mux/demux channels. This high-resolution particular type of CWDM (coarse wavelength-division multiplexing) module provides complete end-to-end link characterization and helps troubleshooting commercial, C-RAN networks as well as metro Ethernet links deployments. See Working With the CWDM Module on page 67 for details.

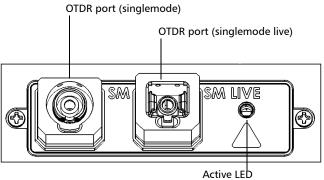
The iOLM module can be equipped optionally with an inline power meter. The power meter is called inline because the acquisition is done using the SM live port used for iOLM measurements. Optionally, you can measure the power levels for two wavelengths in a single acquisition if two wavelengths are used for testing. See *Using the Inline Power Meter (Optional on Some Models)* on page 135 for details.

- **Note:** Depending on the model and options you have purchased, some features may not be available.
- **Note:** In this documentation, the words "tap" and "double-tap" (related to the use of a touchscreen) replace the words "click" and "double-click".



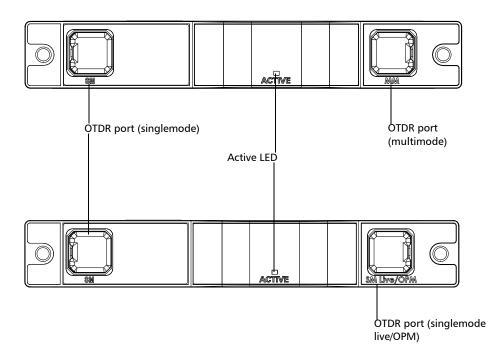


MAX-700B Series

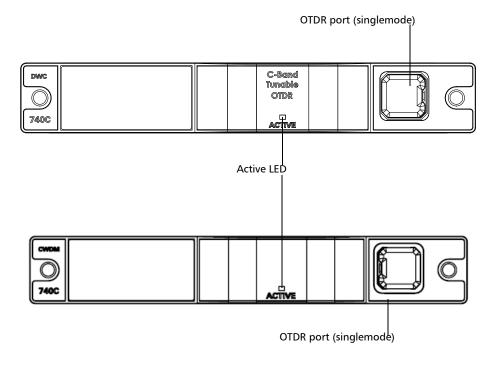


⁽on when laser is emitting)

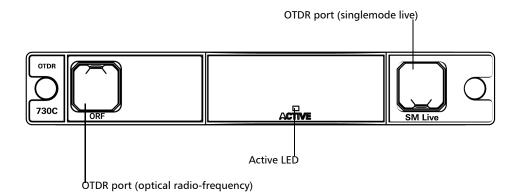
FTB-700C Series, MAX-700C Series, FTB-700Gv2 Series, and FTBx-700C Series



FTB/FTBx-740C



FTBx-730C-SM7-TAM



iOLM

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.

Testing Modes

There are basically two ways to use the iOLM:

- Standard: The acquisitions and analysis processes are designed for general fiber testing such as short links, long haul or PON networks.
- Optimode: Depending on the module you are using, different
 Optimode test configurations are available. The IADV software option gives you access to different Optimodes.

Optimode is a test configuration using an algorithm intended for specific use cases, which overpass the iOLM standard mode performances in given testing topologies. It is designed to meet performance and certification requirements of specific applications. Trace acquisitions and analyses are optimized for speed, accuracy, detection sensitivity with specific test parameters such as link length, link loss, splitters, and so on. Refer to the iOLM technical specifications for the Optimodes available and their corresponding specifications. You can also contact EXFO to ensure the Optimode is designed for your use cases. See *Selecting a Test Configuration* on page 77 for details.

Exporting Data to Other Formats

The iOLM application can generate reports in PDF format and allow batch post-processing of the measurements. The test configuration files can be created from EXFO's FastReporter and imported into each test unit.

Performing Multimode Measurements

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

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

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

With 50 μ m fibers, since the connector loss measurement at the OTDR is imprecise because of major other factors, the iOLM excludes the first connector from the link to avoid providing inaccurate information.

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

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

In addition to the fiber under test, there is a launch and receive fiber. Sometimes, a loop fiber can be used to test two fibers at a time.

You can have the iOLM application measure the launch and receive cable lengths automatically or you can enter the values manually. Regardless of the method you use, you have to set the length of the loop fiber manually. See *Configuring Your iOLM* on page 39 for details.

After the values are set, the application will perform a calibration during which it does a fast measurement and evaluates the length of the fiber. For this reason, you must connect only the cable under test to the module at this point.

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

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 the link and launch or receive fibers, the iOLM will insert an element at a specified position (with zero loss and ORL).

Launch Fibers

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

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

Receive Fibers

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

Note: Splitters are not supported if your unit is equipped with an FTB/FTBx-740C module.

Loop Fibers

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

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

ntelligent Optical Link Mapper - Loopback Bidirectional (0)	_ 🗇 🗙
Source IOLM Link View Blements Info	Start
Fiber type/Port/Wavelengths Test Fibers	Start
OS2 Singlemode V Launch fiber: 0.2000 km	
1310 nm Loop fiber: 0.2000 km	Open Save Report
1550 nm Receive fiber: 0.2000 km	Main Menu
Calibrate	File 🕨
Options	Identification
Bidirectional (Loopback only)	Test Configuration
Launch Your company_Bidirectional	User Preferences
	Launch OTDR
Receive Your company_Bidirectional	
Connect the iOLM to the launch fiber and tap "Start".	
It is recommended to connect a jumper between the instrument and the launch fiber.	

The automatic split of the initial measurement can only be performed if the length of the launch, loop and receive fibers are properly specified in the application. See *Configuring Your iOLM* on page 39 for details.

Software Options

Software options are offered with your unit.

- ► IOLM: gives you access to the iOLM application.
- > QUAD: activates singlemode wavelengths on units.
- ► IADV: offers many features designed for advanced users.
- ILOOP: allows you to perform unidirectional and bidirectional iOLM loopback measurements, which consist in looping two fibers together at one end to test both of them at once. Unidirectional loopback measurements test both fibers at once and evaluate them separately, whereas bidirectional loopback measurements pair two measurements automatically (A -> B, B-> A) and then generates the bidirectional measurement for the two fibers.
- ▶ IPRO: includes the IADV option. It offers all of the iOLM features.
- ICERT: gives you access to a list of certification standards you can apply to different test configurations; these will give you a pass/fail status based on industry standards. Since the thresholds cannot be edited, you are ensured of reliable pass/fail results each time.
- ► The CWDM-10W option enables 10 wavelengths in the 1430 nm 1610 nm range.
- ► The CWDM-18W option enables the 18 wavelengths available.
- The CWDM-8W option enables 8 wavelengths in the 1470 nm - 1610 nm range.
- ► The M-1310W option enables the 1310 nm wavelength.

Technical Specifications

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

Conventions

Conventions

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



WARNING

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



CAUTION

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



CAUTION

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



IMPORTANT

Refers to information about this product you should not overlook.



General Safety Information



WARNING

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



WARNING

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



WARNING

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.



WARNING

Use only accessories designed for your unit and approved by EXFO. For a complete list of accessories available for your unit, refer to its technical specifications or contact EXFO.

Safety Information

General Safety Information

IMPORTANT

When you see the following symbol on your unit 2, make sure that you refer to the instructions provided in your user documentation. Ensure that you understand and meet the required conditions before using your product.

IMPORTANT

When you see the following symbol on your unit 2, it indicates that the unit is equipped with a laser source, or that it can be used with instruments equipped with a laser source. These instruments include, but are not limited to, modules and external optical units.

IMPORTANT

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

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

Your instrument is a Class 1M laser product in compliance with standards IEC 60825-1: 2007 and 21 CFR 1040.10, except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007. It is also in compliance with IEC 60825-1: 2014. Laser radiation may be encountered at the output port.



WARNING

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

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



Affixed to module's side panel

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

Your instrument is a Class 3R laser product in compliance with standards IEC 60825-1: 2007 and 21 CFR 1040.10, except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007. It is also in compliance with IEC 60825-1: 2014. Laser radiation is emitted at the output port. It is potentially harmful in direct intrabeam viewing.

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



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

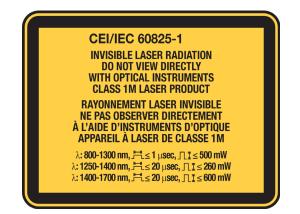
Your instrument is a Class 1M laser product in compliance with standards IEC 60825-1: 2007 and 21 CFR 1040.10, except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007. It is also in compliance with IEC 60825-1: 2014. Laser radiation may be encountered at the output port.



WARNING

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

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



Laser Safety Information for MAX-700C Series (Units with VFL)

Your instrument is a Class 2 laser product.

It is in compliance with standards IEC 60825-1: 2007 and 21 CFR 1040.10, except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007. It is also in compliance with IEC 60825-1: 2014. Laser radiation is emitted at the output port.

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



Laser Safety Information for MAX-700B Series

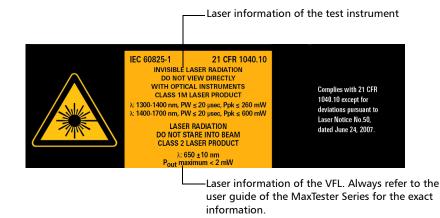
Your instrument is a Class 1M laser product in compliance with standards IEC 60825-1: 2007 and 21 CFR 1040.10, except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007. It is also in compliance with IEC 60825-1: 2014. Laser radiation may be encountered at the output port.



WARNING

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

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



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

Electrical Safety Information

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

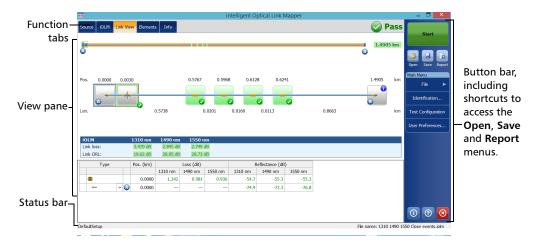
The power consumption of all intelligent Optical Link Mapper modules is below 10 W.

3 Getting Started With Your iOLM

- **Note:** Please refer to your platform's or unit's user guide for detailed information regarding inserting and removing test modules, and starting applications.
- **Note:** Some features for this application are enabled when you purchase the corresponding options. For more information on the software options available for your unit, see Software Options on page 14. For details on how to activate an option, refer to your platform's or unit's user guide.

Main Window

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

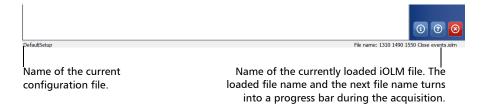


Note: Your screen display may differ slightly from the illustrations presented in this user guide depending on the platform you are using.

Status Bar

The status bar, located at the bottom of the main window, identifies the selected configuration file name in the application, acquisition wavelength (when an acquisition is in progress), and the acquisition progress bar of the iOLM. It also displays the next file name according to the autonaming scheme. For more information, see *Naming Trace Files Automatically* on page 32.

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



Connecting an Optical Switch to the iOLM

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

With this software option, the MPO optical switch can be used for measurement automation. Since the MPO automation is designed for short MPO links, which are typically found in data centers, Short Link Close Events and Fast Short Link Optimodes are specifically designed for that kind of measurement. However, both Optimodes are limited in range. Refer to the iOLM technical specifications for more details.

The optical switch is used automatically. A USB cable provides the connection between the platform and the optical switch. For more information, see *Configuring Your iOLM* on page 39.

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



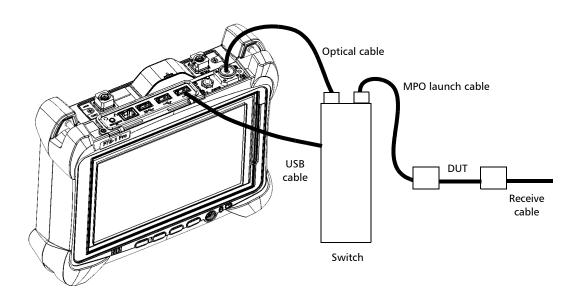
IMPORTANT

Handle MPO connectors carefully and always clean them before each connection.

To avoid excessive loss and reflectance, the input and output connectors of the MPO switch must remain in perfect condition. With these type of connectors, keep the number of connections to a minimum.

Getting Started With Your iOLM

Connecting an Optical Switch to the iOLM



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

Preparing Your iOLM for a Test

Cleaning and Connecting Optical Fibers



4

MPORTANT

To ensure maximum power and to avoid erroneous readings:

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

To connect the fiber-optic cable to the port:

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

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 screw sleeve, tighten the connector enough to firmly maintain the fiber in place. Do not overtighten, as this will damage the fiber and the port.

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

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

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

Installing the EXFO Universal Interface (EUI)

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



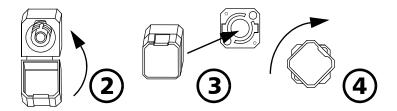


IMPORTANT

EXFO strongly recommends to only use APC module connectors.

To install an EUI connector adapter onto the EUI baseplate:

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



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

Naming Trace Files Automatically

The autonaming feature is useful to make a relevant naming scheme for your tests. This also ensures that you do not overwrite measurements by mistake. You can select which item goes in the measurement name, as well as the type of separator you want to use in between.

Note: The file name has a limit of 260 characters, including the folder name.

A preview is available to show you the final output of the name.

The measurement name is made of one or more static parts (alphanumeric) and one or more variable parts (numeric) that will be incremented or decremented, as follows:

If you choose incrementation	If you choose decrementation
Variable part increases until it reaches the <i>highest possible value</i> with the selected number of digits, then restarts at the indicated start value.	Variable part decreases until it reaches the stop value, then restarts at the <i>highest possible value</i> with the selected number of digits.

Note: To decrement values, the start number must be higher than the stop number.

After saving a result, the unit prepares the next file name by incrementing (or decrementing) the suffix.

A measurement can contain more than one files. You can use preset, or custom identifiers to help differentiate the measurements within the file.

Note: Custom identifiers will be added to the measurement name if a corresponding value is set for them.

The measurement names can be incremented using one or more identifiers. Selecting a single identifier will follow the incrementation (or decrementation) value you have set.

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

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

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

The file name can be incremented using one or more identifiers. Selecting a single identifier will follow the incrementation (or decrementation) value you have set.

When selecting more than one identifier, the latter appear sequentially in the order that you have set, and the incrementation will start with the last item in the list (the one with the farthest indentation). For example, if you have a file name with the Location, Cable and Fiber identifiers, in that order, the first item to be incremented is the Fiber identifier, then Cable, then Location:

Location 1, Cable 1, Fiber 1 Location 1, Cable 2, Fiber 1 Location 1, Cable 2, Fiber 2 and so forth.

Note: If you choose not to save a particular trace file, the suggested file name remains available for the next trace you acquire.

This function is particularly useful when testing multiple-fiber cables.

If you deactivate the automatic file naming function, you will need to specify a file name each time you save a result.

The autonaming parameters can be set for current measurements that have not been saved yet.

It is also possible to revert the settings to their default values. See *Reverting to Factory Settings* on page 38 for details.

To configure the automatic file naming:

- 1. From the Main Menu, tap Identification.
- 2. From the Apply to list, ensure that Next acquisition is selected.

	Id	entification				×
		Apply to:	Next acquisitio	on		~
Identifier	Value		Increment	File Name	^	
Company	Your company			×		
Customer						
Operator A						
Operator B						
Comments						
Cable ID	Cable 1		Not active	×		
ri 10	F1 0					

3. Select the desired identifiers to include in the file name. You can change the order of appearance of the highlighted component with the up and down arrow buttons.

If an identifier has an arrow icon, a predefined list with choices is available, but you can also enter your own customized identifier name. If you select **None**, it disables the field from the list.

Note: When an identifier is set to **None**, its value is cleared and it cannot be edited unless you set it back to another value.

Naming Trace Files Automatically

	>		oopback me	asureme	-		ndard loopback or re are two Value
	>	• Next acquisitic	on: only one	• Value o	column		olayed.
		Iden	tification			×	
-			Apply to:	Next acquisition		~	
	Identifier	Value		Increment	File Name	^	
	Job ID Company	Your company			×		
	Customer				_		To modify the order
	Operator A						-
	Operator B						of appearance of
Items that can be	Comments						the selected
included in the	Cable ID	Cable 1		Not active	×		–identifiers in the file
file name	Fiber ID	Fiber 2		2		-	name
	Location A			Not active			
	Location B			Not active			
	None						
	Direction	A->B		~	×		
	Custom file name					-	
This was down in	Wavelength(s)	1310				~	—To select the
This preview is—	File name preview :		Separ	ator: Underscore	e (_)	~	
updated	Your company_Cable 1_A-B.io	m ^	Increment	d	ear Values		separator in the
automatically as		. [Revert	to Factory Setting	IS		automatic
you make your		· .					numbering section
selections					ОК	Cancel	J
Sciccions							-
			To r	evert to	factory	settin	igs (not available for

To revert to factory settings (not available for the Current acquisition)

- **Note:** When working with the DWDM or CWDM modules, the wavelength used for the acquisition is displayed in the **Value** column next to **Wavelength(s)**.
- **Note:** When working in unidirectional loopback, the direction is disabled because it will be set automatically by the loopback process. In a bidirectional loopback measurement, the direction is automatically set to Bidirectional.

Naming Trace Files Automatically

- **4.** If you want to increment automatically the cable ID, the fiber ID or any other custom identifier, proceed as follows:
 - Comments ٢ Cable ID Cable 1 Not active × ♦ Fiber ID Fiber 2 2 Location A Not active Location B Not active None A->B Direction × Custom file name Wavelength(s) 1310 File name preview : Separator: Underscore (_) Your company Cable 1 A-B.iolm Clear Values Increment.. Revert to Factory Settings Cancel ОК
 - **4a.** Tap the **Increment** button.

4b. In the **Increment** window, select the **Auto Increment** check box corresponding to the identifier you want to increment.

Cable ID Fiber ID Location A	×	1	999	1	#		
	×				#		
Location A		01	99	1	##		
LUCAUUTI A	×	01	999	1	##		
Location B		1	999	1	#		
'Location A' must reach stop value before 'Fiber ID' is incremented. 'Fiber ID' must reach stop value before 'Cable ID' is incremented.							

4c. Enter the start, stop and step values as desired.

- **Note:** The identifiers are processed in order, from the one with the largest indentation to the one with the smallest. For a given identifier, when the increment value reaches the stop value, the incrementation automatically switches to the next identifier. The order of the identifiers in the increment window (and thereby the order of increment) follows the order of the identification window.
- **Note:** An identifier set to None will not appear in the increment window.
- **Note:** To decrement values, the start number must be higher than the stop number.
 - **4d.** Select the format for the incrementation value. This will determine how many digits are used and the information will be displayed accordingly in the **Identification** window.
 - 4e. Tap OK to return to the Identification window.
 - 5. Tap OK to confirm your new settings and to return to the main window.

The new settings will apply the next time you perform an acquisition.

Reverting to Factory Settings

To clear the values:

- 1. From the Main Menu, tap Identification.
- 2. In the Apply to list, select Next acquisition.
- **3.** Tap the **Clear Values** button.

Cable ID	Cable 1		Not active	×			
Fiber ID	Fiber 2		2				
Location A			Not active				
Location B			Not active				
None							
Direction	A->B	~		×			
Custom file name							
Wavelength(s)	1310				~		
File name preview :	File name preview : Separator: Underscore (_)						
Your company_Cable 1_A-B.io	lm ^	Increment	Cle	ar Values			
	~	Revert to	Factory Setting	i			
				ОК	Cancel		

4. Tap **OK** to return to the main window.

All values in the **Value** column are erased from the white boxes.

Reverting to Factory Settings

As long as the file was not already saved, you can revert to factory settings in your menus. However, the **Revert to Factory Settings** button is valid only for the window or tab where you use it.

Configuring Your iOLM

Depending on the type of unit you have purchased, you can configure your iOLM according to your testing needs. All the settings you can adjust in your configuration are conveniently located in a single tab. You can select the port and wavelengths to use; the values are preserved for the next acquisition.

If you include launch, receive and loop fiber lengths in your configuration, you can let the application determine the most appropriate launch and receive fiber values, or you can set them yourself.

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

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

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

Configuring Your iOLM in Standard Mode

The standard mode allows you to test simple fibers with or without launch and receive fibers.

To configure the iOLM in standard mode:

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

3	intelligent Optical Link Mapper	_ = = = <mark>×</mark>
Source OLM Link View Elements Info		
iber type/Port/Wavelengths Test Fibers		Start
DM4 Multimode 50 μm 🗸 🗙 Launch fiber:	0.0670 km	
× 850 nm	5.0000 km	Open Save Rep
1300 nm Receive fiber:	0.0670 km	Main Menu
	Calibrate	File
		Identification
		Test Configuratio
		User Preferences.

2. If the ICERT software option is activated, select the port to use for your test. The fiber core is also selected at this point; for C fibers, select 50 μ m, and for D fibers, select 62.5 μ m.

		intelligent Optical Link Mapper	_ 🖬 🗙
Source IOLM Link View	Elements Info		
Fiber type/Port/Wavelengths	Test Fibers		Start
OM4 Multimode 50 µm 🗸 🗸	X Launch fiber:	0.0670 km	
🗙 850 nm	Loop fiber:	5.0000 km	Open Save Report
1300 nm	Receive fiber:	0.0670 km	Main Menu
		Calibrate	File 🕨
			Identification
			Test Configuration
			User Preferences

- **Note:** When the ICERT software option is not activated, you cannot select a fiber type in the list of available choices.
- **Note:** Even if the ICERT software option is activated, when the fiber type and port are defined in a specific test configuration, you cannot modify them in the *iOLM* tab. You need to edit the test configuration to modify them.

3. If you have a standard iOLM, select the wavelengths for the next acquisition. The available wavelengths depend on the iOLM module.

OR

If you have a DWDM or a CWDM module, select a channel filter and a specific channel. See *Working With the DWDM Module* on page 59 or *Working With the CWDM Module* on page 67 for details.

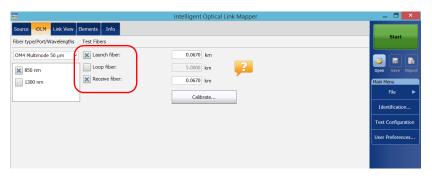
Standard iOLM

		intelligent Optical Link Mapper	_ 🗇 🗙
Source IOLM Link View Ele	ments Info		
Fiber type/Port/Wavelengths T	est Fibers		Start
OM4 Multimode 50 µm 🗸	X Launch fiber:	0.0670 km	
🗙 850 nm	Loop fiber:	5.0000 km	Open Save Report
1300 nm	X Receive fiber:	0.0670 km	Main Menu
		Calibrate	File 🕨
	l		Identification
			Test Configuration
			User Preferences

DWDM and CWDM modules

🖷 intelligent Optical Link Mapper	-	σ	\times
Source OLM Link View Elements Info			
Fiber type/Port/Wavelengths Test Fibers		Start	
OS1 Singlemode V X Launch fiber: 0.0670 km	Open	Save	Report
	Main N	File	Þ
		entificatio	

4. Specify if launch and receive fibers are connected to the link under test. See *Launch, Receive, and Loop Fibers* on page 10 for details.



If you want to let the application measure the launch and receive fiber lengths values automatically, go to step 5. You can also specify the launch and receive fiber lengths manually. To do so, go to step 6.

- **5.** If you want to specify the launch and receive fiber lengths automatically, proceed as follows:
 - 5a. Tap Calibrate to access the measurement assistant.

ab	intelligent Optical Link Mapper	_ = = 🗾 🗙
Source		
Fiber type/Port/Wavelengths Test Fibers		Start
OM4 Multimode 50 µm 💙 🐹 Launch fiber:	0.0670 km	
850 nm	5.0000 km	Open Save Report
1300 nm Receive fiber:	0.0670 km	Main Menu
	Calibrate	File 🕨
		Identification
		Test Configuration
		User Preferences

5b. Select the test fibers to measure and follow the instructions on-screen.



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

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

ntelligent Optical Link Mapper	_ 6	×
Source OLM Link View Benents Info Fiber type/Port/Wavelengths Test Fibers 0.0670 km MM4 Mutimode 50 µm Image: Loop fiber: 0.0670 km I 300 nm Image: Receive fiber: 0.0670 km I 300 nm Image: Receive fiber: 0.0670 km Calibrate Calibrate		tion

All values and settings you have selected, such as the port and wavelengths, are preserved for the next acquisition.

Configuring Your iOLM in Loopback Mode

The IPRO or ILOOP software options allow you to test in loopback mode. This mode is especially designed for testing cables formed of a pair of identical fibers of an equivalent length. The measuring time is optimized because two fibers are checked in a single measurement. If you have activated the option for your application, it is ready to use when needed. The loopback mode will give the best results if you follow the three rules below:

- Both fibers under test, that are connected to the loop, must have the same length.
- > The launch and receive lengths must be specified correctly.
- > The length of the loop must be specified correctly.
- **Note:** You cannot use the files created using the loopback mode to perform a second loopback operation.

To configure the iOLM in loopback mode:

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

••	intelligent Optical Link Mapper	_ 0 ×
Source - OLM Link View Elements Info		
Fiber type/Port/Wavelengths Test Fibers		Start
OM4 Multimode 50 µm 🗸 🗶 Launch fiber:	0.0670 km	
🗙 850 nm	5.0000 km	Open Save Report
1300 nm Receive fiber:	0.0670 km	Main Menu
	Calibrate	File 🕨
		Identification
		Test Configuration
		User Preferences

2. If the ICERT software option is activated, select the port to use for your test. The fiber core is also selected at this point; for C fibers, select 50 μ m, and for D fibers, select 62.5 μ m.



- **Note:** When the ICERT software option is not activated, you cannot select a fiber type in the list of available choices.
- **Note:** Even if the ICERT software option is activated, when the fiber type and port are defined in a specific test configuration, you cannot modify them in the **iOLM** tab. You need to edit the test configuration to modify them.

3. If you have a standard iOLM, select the wavelengths for the next acquisition. The available wavelengths depend on the iOLM module.

OR

If you have a DWDM or a CWDM module, select a channel filter and a specific channel. See *Working With the DWDM Module* on page 59 or *Working With the CWDM Module* on page 67 for details.

Standard iOLM

	i	ntelligent Optical Link Mapper	_ 🗇 🗙
Source IOLM Link View Element	ts Info		
Fiber type/Port/Wavelengths Test F	Fibers		Start
OM4 Multimode 50 µm 🗸 🗶 L	aunch fiber:	0.0670 km	
🗙 850 nm	.oop fiber:	5.0000 km	Open Save Report
🔜 1300 nm 💌 R	teceive fiber:	0.0670 km	Main Menu
l		Calibrate	File 🕨
			Identification
			Test Configuration
			User Preferences

DWDM and CWDM modules

ntelligent Optical Link Mapper		- a ×
Source OLM Link View Elements Info		
Fiber type/Port/Wavelengths Test Fibers		Start
OS1 Singlemode V X Launch fiber:	0.0670 km	
Channel filter: Loop fiber:	0.0000 km	Open Save Report
100GHz V Receive fiber:	0.0670 km	Main Menu
Selected channel: 41 - 194,100 THz - 1544.526 nm	Calibrate	File 🕨
	Calibrate	Identification
		Test Configuration

4. Specify if launch, receive, and loop fibers are connected to the link under test. See *Launch*, *Receive*, *and Loop Fibers* on page 10 for details.

••	intelligent Optical Link Mapper - Loopback	_ 🗇 🗙
Source OLM Link View Elements Info		
Fiber type/Port/Wavelengths Test Fibers		Start
OM4 Multimode 50 µm	0.0670 km	
850 nm Loop fiber:	0.0150 km	Open Save Report
1300 nm	0.0670 km	Main Menu
	Calibrate	File ►
Options		Identification
Bidirectional (Loopback only)		Test Configuration
Launch		User Preferences
2 42 42		
Receive		

If you want to let the application measure the launch and receive fiber lengths values automatically, go to step 5. You can also specify the launch, receive and loop fiber lengths manually. To do so, go to step 6.

Note: The application cannot measure the loop fiber length automatically. You must specify the value manually.

- **5.** If you want to specify the launch and receive fiber lengths automatically, proceed as follows:
 - 5a. Tap Calibrate to access the measurement assistant.

88	intelligent Optical Link Mapper - Loopback	_ 🗇 🗡
Source IOLM Link View Elements Info		Start
Fiber type/Port/Wavelengths Test Fibers		Start
OM4 Multimode 50 µm	0.0670 km	
850 nm X Loop fiber:	0.0150 km	Open Save Report
1300 nm	0.0670 km Calbrate	Main Menu File ►
Options		Identification
Bidirectional (Loopback only)		Test Configuration
Launch	Loop	User Preferences
2 Receive		

5b. Select the test fibers to measure and follow the instructions on-screen.

ŀ	Test Fiber Calibration		
	Launch fiber length		
	Receive fiber length		
	Please connect launch fiber to the SM port and tap OK.		
		ОК	Cancel

5c. Proceed to step 7.

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

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

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

88		intelligent Optical Link Mapper - Loopback	_ 0 ×
Source IOLM Link View E	lements Info		Start
Fiber type/Port/Wavelengths	Test Fibers	\frown	Start
OM4 Multimode 50 µm 🗸	X Launch fiber:	0.0670 km	
🗶 850 nm	X Loop fiber:	0.0150 km	Open Save Report
1300 nm	Keceive fiber:	0.0670 km	Main Menu
		Calibrate	File 🕨
Options			Identification
Bidirectional (Loopback on	у)		Test Configuration
Launch	-e/ə		User Preferences
2	0	() Loop	

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

Note: Bidirectional measurements are only available in singlemode.

	🚥 intelligent Optical Link Mapper - Loopback Bidirectional (0)	_ 6 ×	
	Source IOLM Link View Elements Info	Start	
	Fiber type/Port/Wavelengths Test Fibers	Start	
	OS2 Singlemode v X Launch fiber: 0.2000 km		
	1310 nm 🔀 Loop fiber: 0.2000 km	Open Save Report	
	1550 nm Receive fiber: 0.2000 km	Main Menu	
	Calibrate	File 🕨	
1	Options	Identification	
l	Bidirectional (Loopback only)		
	Launch Your company_Bidrectional	User Preferences	
		Launch OTDR	
	Receive Your company_Bidirectional		
	Connect the iOLM to the launch fiber and tap "Start". It is recommended to connect a jumper between the instrument and the launch fiber.		

All values and settings you have selected, such as the port and wavelengths, are preserved for the next acquisition.

Configuring Your iOLM to Work With the Optical Switch

Note: You cannot use the optical switch with the FTB/FTBx-740C-DWC and FTB/FTBx-740C-CW modules.

The IPRO software option also allows you to perform multifiber iOLM test measurements in singlemode, using an externally controlled MPO optical switch. See *Connecting an Optical Switch to the iOLM* on page 27 for details.

Note: The optical switch does not support the loopback mode.

To configure the iOLM to work with the optical switch:

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

••	intelligent Optical Link Mapper (0)	_ 0 ×
Source IOLM Link View Elements Info		
Fiber type/Port/Wavelengths Test Fibers		Start
OS1 Singlemode V 🗙 Launch fiber:	0.2000 km	
X 1310 nm	0.2000 km	Open Save Report
1550 nm Receive fiber:	0.2000 km	Main Menu
	Calibrate	File 🕨
Options		Identification
Automate the multifiber switch acquisition		Test Configuration
		User Preferences
		Launch OTDR

2. If the ICERT software option is activated, select the port to use for your test.

••	intelligent Optical Link Mapper (0)	_ 0 ×
Source IOLM Link View Elements Info		
Fiber type/Port/Wavelengths Test Fibers		Start
OS1 Singlemode	0.2000 km	
🗙 1310 nm	0.2000 km	Open Save Repo
1550 nm Receive fiber:	0.2000 km	Main Menu
	Calibrate	File
Options		Identification
Automate the multifiber switch acquisition		Test Configuration
		User Preferences
		Launch OTDR

- **Note:** When the ICERT software option is not activated, you cannot select a fiber type in the list of available choices.
- **Note:** Even if the ICERT software option is activated, when the fiber type and port are defined in a specific test configuration, you cannot modify them in the **iOLM** tab. You need to edit the test configuration to modify them.
 - **3.** Select the wavelengths for the next acquisition. The available wavelengths depend on the iOLM module.

	•	intelligent Optical Link Mapper (0)	_ 🖬 🗙
	Source OLM Link View Elements Info		
	Fiber type/Port/Wavelengths Test Fibers		Start
	OS1 Singlemode V 🗙 Launch fiber:	0.2000 km	
(X 1310 nm	0.2000 km	Open Save Report
	1550 nm Receive fiber:	0.2000 km	Main Menu
U	J	Calibrate	File 🕨
	Options		Identification
	Automate the multifiber switch acquisition		Test Configuration
			User Preferences
			Launch OTDR

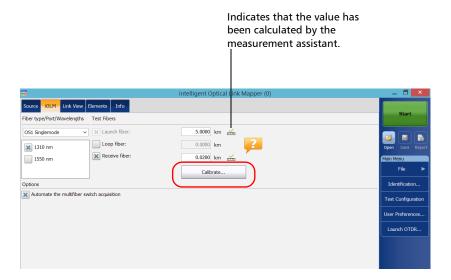
- **4.** Specify if launch and receive fibers are connected to the link under test. See *Launch, Receive, and Loop Fibers* on page 10 for details.
- **Note:** You must calibrate the launch and receive fibers with the measurement assistant to perform acquisitions.

88	intelligent Optical Link Mapper (0)	_ 6 ×
Source IOLM Link View Elements Info		
Fiber type/Port/Wavelengths Test Fibers		Start
OS1 Singlemode V X Launch fiber: X 1310 nm Loop fiber: X Receive fiber:	0.2000 km	Open Save Report
1550 nm	0.2000 km Calibrate	Main Menu File ►
Options		Identification
Automate the multifiber switch acquisition		Test Configuration
		User Preferences
		Launch OTDR

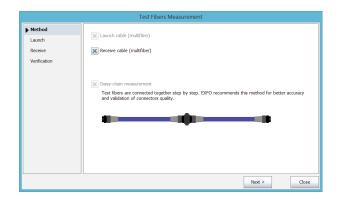
5. Select the Automate the multifiber switch acquisition checkbox.

ntelligent Optical Link Mapper (0)	_ 🗆 🗙	
Source OLM Link View Elements Info	Start	
Fiber type/Port/Wavelengths Test Fibers		
OS1 Singlemode V X Launch fiber: 0.2000 km		
1310 nm Loop fiber: 0.2000 km	Open Save Repor	
1550 nm Receive fiber: 0.2000 km	Main Menu	
Calibrate	File 🕨	
Options	Identification	
Automate the multifiber switch acquisition	Test Configuration	
	User Preferences	
	Launch OTDR	

- **6.** The application calibrates the launch and receive fiber length values automatically with the measurement assistant. The values cannot be set manually. To do so, proceed as follows:
 - 6a. Tap Calibrate to access the measurement assistant.



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



Note: When the MPO optical switch is connected and you are using the measurement assistant, the loss and reflectance thresholds are defined by the application and cannot be changed. These thresholds represent the recommended values for optimal performance. Sometimes, the loss and reflectance values may not be within the optimal thresholds. The link measurement can still be performed, but the dynamic range and the resolution performance will be altered.

IMPORTANT

EXFO strongly recommends to scan all fibers during the calibration process to fully validate the test cable.

All values and settings you have selected, such as the port and wavelengths, are preserved for the next acquisition.

Enabling or Disabling the Automated Acquisition Sequence

If your module is equipped with both an SM and an SM Live ports, you can perform automated acquisition sequences. The acquisition is always performed on the SM port first, and then on the SM Live port. If your module supports more than one wavelength, you need to select at least one wavelength to perform the acquisition on the SM port and one wavelength on the SM Live port.

When the feature is enabled, the application does not prompt you to connect the fiber on the SM Live port after the acquisition has been completed on the SM port.

When the feature is disabled, the application displays a message to indicate the moment you need to connect the fiber to the SM Live port. However, if you use a coupler between the fibers connected to the SM and SM Live ports, the application will perform the acquisitions one after another, and it will not prompt you.

The application allows you to generate a trace in Bellcore (.sor) format for both SM and SM Live wavelengths when the acquisition has been completed properly.

The acquisition stops automatically after it is complete but you can also stop it at any time while it is in progress.

Whether the feature is enabled or not, only one report is generated after the acquisition sequence is complete. Enabling or Disabling the Automated Acquisition Sequence

To enable or disable the automated acquisition sequence:

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

intelligent Optical Link Mapper		- 0 ×
50 rce - iOLM Lin : View Elements Info		
iber t ype/Post/Wa velengths Test Fibers		Start
OS1 SM + SM Live V Launch fiber:	0.0000 km	
X 1310 nm	0.0000 km	Open Save Repo
1550 nm Receive fiber:	0.0000 km	Main Menu
🗙 1625 nm	Calibrate	File
ptions		Identification
Automate SM and SM Live sequence		Test Configuration.
		User Preferences.
		Launch OTDR

2. Select an SM + SM Live port to use for your test.

	ntelligent Optical Link Mapper		-	٥	×
	Source IOLM Link View Elements Info				
	Fiber type/Port/Wavelengths Test Fibers			Start	
(OS1 SM + SM Live V Launch fiber:	0.0000 km			
1	Loop fiber:	0.0000 km	Open		Report
	1550 nm Receive fiber:	0.0000 km	Main M	lenu	
	🗙 1625 nm	Calibrate		File	•
	Options		Ide	ntificatio	n
	X Automate SM and SM Live sequence		Test C	onfigura	ition
			User	Preferen	ces
			Lau	nch OTE)R

3. Select the wavelengths to use for you test.

intelligent Optical Link Mapper		-	٥	×
Source - iOLM Link View Elements Info			Start	
iber type/Port/Wavelengths Test Fibers			Start	
OS1 SM + SM Live V Launch fiber:	0.0000 km			
🗙 1310 nm 📃 Loop fiber:	0.0000 km	Open		
1550 nm Receive fiber:	0.0000 km	Main M	enu	
🗙 1625 nm	Calibrate		File	•
ptions		Ider	ntificatio	
Automate SM and SM Live sequence		Test C	onfigura	tion
		User F	Preferen	ces
		Laur	nch OTD	R
	iber type/Port/Wavelengths Test Fibers OS1 SM + SM Live → Launch fiber: 1310 nm Loop fiber: 1550 nm Receive fiber:	Source OLM Link Vew Blements Info liber type/Port/Wavelengths Test Fibers 0.0000 km S1 S1M + SM Live Launch fiber: 0.0000 km \$1310 nm Loop fiber: 0.0000 km \$1550 nm Receive fiber: 0.0000 km \$1625 nm Calibrate	Source OLM Lek View Elements Info biter type/Port/Wavelengths Test Fibers OSI SM + SM Leve I Launch fiber: 0.0000 km I S50 nm I S50 nm I S50 nm I Calbrate Definition I de	Source OLM Link View Bennents Info Source OLM Link View Bennents Info Uber type/Port/Wavelengths Test Fibers SSI 4 - SM Live □ Launch fiber: 0.0000 km □ Loop fiber: 0.0000 km □ Source km □ Source km □ Calibrate Deprons

4. To enable the automated acquisition sequence, select the **Automate SM and SM Live sequence** check box.

s intelligent Optical Link Mapper		- a ×
Source IOLM Link View Elements Info		
Fiber type/Port/Wavelengths Test Fibers		Start
OS1 SM + SM Live V Launch fiber:	0.0000 km	
1310 nm	0.0000 km	Open Save Report
1550 nm Receive fiber:	0.0000 km	Main Menu
🗙 1625 nm	Calibrate	File ►
Options		Identification
Automate SM and SM Live sequence		Test Configuration
		User Preferences
		Launch OTDR

5 Working With the DWDM Module

The FTB/FTBx-740C-DWC module allows you to perform specific acquisitions using the DWDM (dense wavelength-division multiplexing) technology in the C-band (between 1528 nm and 1564 nm) and is designed to test through field mux/demux channels. This high-resolution particular type of module provides complete end-to-end link characterization and helps troubleshooting metro Ethernet links as well as commercial services.

Based on the ITU-T standard grid, the FTB/FTBx-740C-DWC module covers a channel spacing of 50/100/200 GHz. The channel width used is always 50 GHz, regardless of the selected channel spacing.

Main Features

The FTB/FTBx-740C-DWC module offers the following:

- > C-band ITU grid channel selection to test through DWDM ports
- ► Mux/demux and add/drop testing
- In-service testing of active networks
- ► High-resolution and short dead zones
- > Selection in a customized favorite channels list
- Testing coupler elements defined as custom elements to determine their pass/fail thresholds (available with the CWDM-DWDM test configuration)
- Creation of MUX/DEMUX element type with custom threshold values for complete link certification and reporting

Selecting a Channel Filter

DWDM increases the bandwidth of an optical fiber by multiplexing several wavelengths onto it. Using the different channel spacings, the module can place several dozens of wavelengths on a single fiber. The channel filter selected by default is 100 GHz.

When you choose a channel filter, the list of available wavelengths is updated accordingly. If the channel that was selected before the change of filter is still available, it will remain selected by default. However, if the channel is no longer available after the change of channel spacing, the one nearest to your previous selection will be selected by default.

To select a specific channel filter:

- **1.** From the main window, go to the **iOLM** tab.
- **2.** From the **Channel filter** list, select a channel spacing width to use for your tests.

	🚥 intelligent Optical Link Mapper		-	٥	\times
	Source IOLM Link View Elements Info				
	Fiber type/Port/Wavelengths Test Fibers			Start	
	OS1 Singlemode V X Launch fiber:	0.0670 km			
1		0.0000 km	Open		Report
C		0.0670 km	Main M	enu	
	Selected channel: 41 - 194.100 THz - 1544.526 nm	Calibrate		File	►
			Ide	ntificatio	m
			Test C	onfigura	ation
			User	Preferen	ces
			Lau	nch OTE	DR

Note: The channels marked as favorites in the **Selected channel** list can be retrieved in the **Channel filter** list. See Managing Favorite Channels on page 62 for details.

Selecting a Channel

Based on the ITU-T DWDM frequency grid, the FTB/FTBx-740C-DWC module offers many wavelengths you can choose from.

Note: Changing the channel filter does not affect the selected channel unless it is not available with the new channel filter.

To select a specific channel:

- 1. From the main window, go to the **iOLM** tab.
- **2.** From the **Selected channel** list, select a wavelength to use for your tests.

	💀 intelligent Optical Link Mapper	-	٥	×
	Source IOLM Link View Elements Info			
	Fiber type/Port/Wavelengths Test Fibers		Start	
	OS1 Singlemode V Launch fiber: 0.0670 km			
	Channel filter: 0.0000 km	Open		Report
_	100GHz Receive fiber: 0.0670 km	Main N	lenu	
	Selected channel:			
		Ide	ntificatio	n
		Test (Configura	tion
		User	Preferen	ces
		Lau	inch OTE	0R

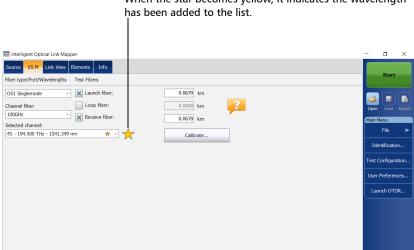
Managing Favorite Channels

You can add the channels you use the most often in a list of favorite channels and recall them for future acquisitions. You can also remove them from the list if they are not relevant anymore.

If you want to display the list of favorite channels only, you can do so.

To add favorite channels:

- **1.** From the main window, go to the **iOLM** tab.
- **2.** From the **Selected channel** list, select the wavelength you want to add to the list.
- **3.** When the wavelength is highlighted in blue, tap \checkmark .

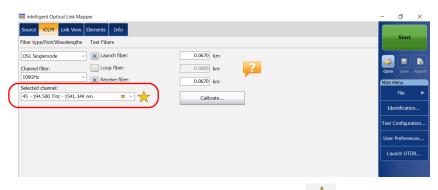


When the star becomes yellow, it indicates the wavelength

Managing Favorite Channels

To remove favorite channels from the list:

- 1. From the main window, go to the **iOLM** tab.
- **2.** From the **Selected channel** list, select a wavelength with a \uparrow next to it.



- **3.** When the wavelength is highlighted in blue, tap \bigstar .
- **Note:** When the star is no longer yellow, it indicates the wavelength has been removed from the list.

To display the list of favorite channels only:

- **1.** From the main window, go to the **iOLM** tab.
- 2. From the Channel filter list, select Favorite channels.

	💀 intelligent Optical Link Mapper	-	σ	×
	Source OLM Link View Elements Info		Start	
	Fiber type/Port/Wavelengths Test Fibers		Start	
	OS1 Singlemode V X Launch fiber: 0.0670 km			
(Channel filter: 0.0000 km	Ope		Report
	100GHz Receive fiber: 0.0670 km	Main	n Menu	
	50GHz m ★ Y Calibrate		File	►
	200GHz	I	dentificatio	on
	Favorite channels	Test	t Configur	ation
		Use	er Preferer	nces
		La	aunch OTI	DR

The list of favorite channels is displayed in the drop-down menu under **Selected channel**.



Performing Live-Fiber Testing

During live-fiber testing, the light signals transmitted in other channels than the channel under test will be largely rejected by the mux/demux as well as the internal iOLM filters, but some residual light that reaches the light detector of the iOLM will increase the electronic noise. This residual light reduces the dynamic range, especially when larger pulse widths are used. The FTB/FTBx-740C-DWC module can test a channel while other channels are live but the channel under test must be dark.

Before performing a test on a specific channel, you have to disconnect the end of the link from the far-end transmitter/receiver device. Consequently, to test a transport fiber with active channels, you must connect the iOLM to a mux/demux port that contains no active channels or devices.

6 Working With the CWDM Module

The FTB/FTBx-740C-CW module covers up to 18 CWDM ITU channels, from 1270 nm to 1610 nm, with a channel spacing of 20 nm, and is designed to test through field mux/demux channels. This high-resolution particular type of CWDM (coarse wavelength-division multiplexing) module provides a complete end-to-end link characterization and helps troubleshooting commercial, C-RAN networks as well as metro Ethernet links deployments.

Note: The official channel values have been shifted by 1 nm (from 1271 nm to 1611 nm). Your iOLM was defined with the values of 1270 nm to 1610 nm for simplicity purposes, but is fully compatible with previous and present channel center wavelengths.

Main Features

The FTB/FTBx-740C-CW module offers the following:

- ► CWDM ITU grid channel selection to test through CWDM ports
- ► Up to 18 CWDM channels covered into a single port, depending on the type of OTDR model and available options
- ► In-service testing of active networks
- ► High-resolution and short dead zones
- > Selection in a customized favorite channels list
- Testing coupler elements defined as custom elements to determine their pass/fail thresholds (available with the CWDM-DWDM test configuration)

Selecting a Channel Filter

The FTB/FTBx-740C-CW module offers two different channel filters. You can choose to work with all the wavelengths available on your unit or with your favorite channels. See *Managing Favorite Channels* on page 70 for details.

To select a specific channel filter:

- **1.** From the main window, go to the **iOLM** tab.
- **2.** Select a channel filter to use for your test.

	🚾 intelligent Optical Link Mapper	-	٥	×
	Source HOLM Link View Elements Info			
	Fiber type/Port/Wavelengths Test Fibers		Start	
	OS1 Singlemode V Launch fiber: 0.0670 km			
1	Channel filter: 0.0000 km	Open	Save	
	All Receive fiber: 0.0670 km	Main N	lenu	
	1330 nm Calibrate		File	►
		Ide	ntificati	on
		Test (onfigur	ation
		User	Prefere	nces
		Lau	nch OT	DR

Note: If no channel has been added to the **Favorite channel** list, the application selects **All** by default.

Selecting a Channel

Based on the ITU-T CWDM wavelength grid, the iOLM offers 18 wavelengths (from 1270 nm to 1610 nm) you can choose from.

To select a specific channel:

- 1. From the main window, go to the **iOLM** tab.
- **2.** From the **Selected channel** list, select a wavelength to use for your tests.



Managing Favorite Channels

You can add the channels you use most often in a list of favorite channels and recall them for future acquisitions. You can also remove them from the list if they are not relevant anymore.

If you want to display the list of favorite channels only, you can do so.

To add favorite channels:

- 1. From the main window, go to the **iOLM** tab.
- **2.** From the **Selected channel** list, select the wavelength you want to add to the list.
- **3.** When the wavelength is highlighted in blue, tap \checkmark .

	ntelligent Optical Link Mapper		- o ×
	Source OLM Link View Elements Info		
	Fiber type/Port/Wavelengths Test Fibers		Start
	OS1 Singlemode V X Launch fiber:	0.0670 km	
	Channel filter: Loop fiber:	0.0000 km	Open Save Report
	All Receive fiber: Selected channel:	0.0670 km	Main Menu
	1550 nm 🛧 🗸	Calibrate	File 🕨
When the star-			Identification
			Test Configuration
becomes yellow, it indicates the			User Preferences
			Launch OTDR
wavelength has been			
added to the list.			
			6 7 8
	CWDM-DWDM		Next file name: Fiber14.iolm

Managing Favorite Channels

To remove favorite channels from the list:

- **1.** From the main window, go to the **iOLM** tab.
- **2.** From the **Selected channel** list, select a wavelength with a \checkmark next to it.

- **3.** When the wavelength is highlighted in blue, tap \bigstar .
- **Note:** When the star is no longer yellow, it indicates the wavelength has been removed from the list.

To display the list of favorite channels only:

- **1.** From the main window, go to the **iOLM** tab.
- 2. From the Channel filter list, select Favorite channels.

•	intelligent Optical Link Mapper	-	٥	×
	Source III Link View Elements Info		Star	
F	iber type/Port/Wavelengths Test Fibers			
[OS1 Singlemode V Launch fiber: 0.0670 km			
	Channel filter: 0.0000 km	Open		Report
	All X Recive fiber: 0.0670 km	Main I	Menu File	
	Favorite channels Calibrate	Ide	entificati	on
		Test	Configu	ation
		User	Prefere	nces
		Lau	unch OT	DR

The list of favorite channels is displayed in the drop-down menu under **Selected channel**.



Performing Live-Fiber Testing

During live-fiber testing, the light signals transmitted in other channels than the channel under test will be largely rejected by the mux/demux, but some residual light that reaches the connectors will increase the electronic noise. This residual light reduces the dynamic range, especially when larger pulse widths are used. The FTB/FTBx-740C-CW module can test a channel while other channels are live but the channel under test must be dark.

Before performing a test on a specific channel, you have to disconnect the end of the link from the far-end transmitter/receiver device. Consequently, to test a transport fiber with active channels, you must connect the iOLM to a mux/demux port that contains no active channels or devices.

Understanding Fiber Water Peak

When water molecules are trapped within the glass core structure of the fiber, the light absorbed, as well as the fiber attenuation, will increase around 1383 nm. This is known as a fiber water peak and is more pronounced on older fibers. When working with a CWDM module, you will notice that wavelengths 1370 nm and 1390 nm are more likely to be affected by this phenomenon. The accuracy of an iOLM measurement performed at one of these two wavelengths may be affected if there are high fiber water peak on specific fiber sections on the link. When this situation is detected, the iOLM will display a diagnosis on the link elements affected. See *Understanding Diagnostics* on page 133 for details.

7

Managing Test Configurations

A predefined default setup configuration is available when you purchase your unit. You can also create your own test configurations by duplicating an existing one and modifying the settings that will meet your specific needs.

IMPORTANT

Some threshold values may be different when a test configuration file is imported. If the thresholds differ for a given wavelength, the application uses the most restrictive threshold values.

Creating custom test configurations is done through duplicating an existing configuration, and then modifying the desired criteria. If you create configurations on one unit and want to transfer them to another unit, you can do so.

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.

Note: Splitters are not supported if your unit is equipped with an FTB/FTBx-740C module.

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. See *Editing Element Types* on page 170 for details.

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.

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.

The IADV software option enables you to perform a characterization of the fiber. With a singlemode module, the option detects the presence of splitters (1:N and 2:N) to ensure the fiber is connected to a splitter via a distribution fiber.

Note: Splitters are not supported if your unit is equipped with an FTB/FTBx-740C module.

Depending on the module you are using, different Optimode test configurations are available. The IADV software option gives you access to different Optimodes. Optimodes use an algorithm intended for specific use cases, which overpasses the iOLM standard mode performances in given testing topologies.

Note: The Optimode has been designed and optimized to work in specific use cases. If it is used in situations other than what it was designed for, it may cause your unit to display odd results.

Refer to the iOLM technical specifications for the Optimode available and the appropriate specifications. You can also contact EXFO to ensure the Optimode is designed for your use cases. See *Testing Modes* on page 8 for details.

Selecting a Test Configuration

To select a test configuration:

1. From the Main Menu, tap Test Configuration.

80		intelligent	Optical Link M	Mapper			_ 0	×
Source - iOLM Link View	Elements Info							
Fiber type/Port/Wavelengths	Test Fibers						Start	
OM4 Multimode 50 µm 🗸	X Launch fiber:	0.0670	km					
🗙 850 nm	Loop fiber:	5.0000	km 🗧	?			Open Save	Report
1300 nm	Receive fiber:	0.0670	km				Main Menu	
		Calif	rate					►
			, according to the second s				Identificati	on
						1	Test Configu	ration
						Y	User Prefere	
						- U		
							(i) (?	\odot
DefaultSetun					Next file name	: Your	company A-	3.jolm

2. In the list of available test configurations, select the configuration you want to use and tap **Close**.

Test Configuration					
Next Acquisition					
DefaultSetup 2 connectors, Custom Pass/Fail Thresholds					
Point to Point 2 connectors, Custom Pass/Fail Thresholds					
PON 1 Splitters 1x32 2 connectors, 1 splitter, Custom Pass/Fall Thresholds					
Short Link Close Events Short Link Close Events, 2 connectors, Custom Pass/Fail Thresholds					
Current Acquisition					
DefaultSetup OM4 Multimode 50 µm, 2 connectors, Custom Pass/Fail Thresholds					
Duplicate Modify Delete Import Export					
Close					

Creating a Test Configuration

You can create your own test configurations by duplicating an existing one and modifying the settings to fit your needs.

To create a test configuration:

1. From the Main Menu, tap Test Configuration.

88		intelligent Optical Link Mapper	_ 🗇 🗡
Source OLM Link View	Elements Info		
Fiber type/Port/Wavelengths	Test Fibers		Start
OM4 Multimode 50 µm 🗸 🗸	X Launch fiber:	0.0670 km	
🗙 850 nm	Loop fiber:	5.0000 km	Open Save Report
1300 nm	Receive fiber:	0.0670 km	Main Menu
		Calibrate	File 🕨
			Identification
		(Test Configuration
			User Preferences
			(1) (2) (2)
DefaultSetup		Next file name: 1	our company_A-B.iolm

Managing Test Configurations

Creating a Test Configuration

2. Select the row corresponding to the configuration that is the closest to the one you want to create, then tap **Duplicate**.

Test Configuration					
Next Acquisition					
DefaultSetup 2 connectors, Custom Pass/Fail Thresholds					
Point to Point 2 connectors, Custom Pass/Fail Thresholds					
OPON 1 Splitters 1x32 2 connectors, 1 splitter, Custom Pass/Fail Thresholds					
Short Link Close Events Short Link Close Events, 2 connectors, Custom Pass/Fail Thresholds					
Current Acquisition					
DefaultSetup OM4 Multimode 50 µm, 2 connectors, Custom Pass/Fail Thresholds					
Duplicate Modify Delete Import Export					
Close					

3. A default name is suggested for the new configuration. Change the name as needed, then tap **Save**.

Note: You cannot have two configurations with the same name.

Duplicate Test Configuration						
File name:						
Test Configuration						
Save						

- **4.** Tap the **Modify** button to change the settings according to your needs:
 - Properties: This is where you can change the name of the configuration, select the port (singlemode, multimode or unspecified) as well as the Optimode you will use. See Setting the Test Configuration Properties on page 82 for details.
 - ➤ Link Definition: This is where you can select the fiber type for your test configuration and the number of connections and splices. See *Defining the Link for Your Test* on page 86 for details.
 - iOLM P/F Thresholds: This is where you can select the certification standards for your test configuration and edit the pass/fail thresholds. See *Selecting Certification Standards* on page 98 for details.
 - OPM P/F Thresholds: This is where you can set the thresholds for your power meter. See Setting Custom Power Meter Thresholds on page 137 for details.
- **5.** Tap **OK** to confirm your changes and close the window. Tap **Cancel** to ignore your changes and close the window.

Setting the Test Configuration Properties

The properties for your test configuration include its name, as well as the Optimode you will use.

To change the test configuration properties:

1. From the Main Menu, tap Test Configuration.

	intelligent Optical Link Mapper	_ 🗇 🗡
Source IOLM Link View Elements Info		
Fiber type/Port/Wavelengths Test Fibers		Start
OM4 Multimode 50 µm 🗸 🔀 Launch fiber:	0.0670 km	
850 nm	5.0000 km	Open Save Report
1300 nm Receive fiber:	0.0670 km	Main Menu
	Calibrate	File 🕨
		Identification
	(Test Configuration
		User Preferences
DefaultSetup	Next Browney	i ? Simon

2. Select the configuration you want to edit and tap Modify.

3. Select the **Properties** tab.

roperties Link Definition iOLM P/F Threshold			
Name DefaultSetup			
Port	Wavelength	s	
Singlemode	✓ 🗙 1310 nm		
Optimode None	~		
		Revert to Factory Settings	
		ОК	Cano

- **4.** If desired, change the configuration name by tapping in the corresponding field and entering your information.
- **Note:** You cannot have two test configurations with the same name.

	Test Configuration - CWDM-DWDM	\times
	Properties Link Definition OLM P/F Thresholds	
(Name DefaultSetup	
	Port Wavelengths Singlemode	
	Optimode None Revert to Factory Settings	
	OK Canc	el

Managing Test Configurations

Setting the Test Configuration Properties

5. Select the port you want to use and if you have a standard iOLM, select the wavelengths as well.

Test Configuration - CWDM-DWDM	;
Properties Link Definition iOLM P/F Thresholds	
Name	
DefaultSetup	
Port	Wavelengths
Singlemode	✓ 1310 nm
	🗙 1550 nm
Optimode	
None	~
	Revert to Factory Settings
	OK Cancel

- **Note:** You should select **Unspecified** when a test configuration has no defined ports or wavelengths.
 - **6.** If you have a DWDM or a CWDM module, select a channel filter and a specific channel. See *Working With the DWDM Module* on page 59 or *Working With the CWDM Module* on page 67 for details.

Test Configuration - CWDM-DWDM	×
Properties Link Definition IOLM P/F Thresholds	
Name DefautSetup	
Port Singlemode V	Channel filter: 10034z
Optimode None ~	
	Revert to Factory Settings
	OK Cancel

7. Select the Optimode you will use for your test.

Test Configuration - CWDM-DWDM	×
Properties Link Definition iOLM P/F Thresholds	
Name	
DefaultSetup	
Port	Wavelengths
Singlemode	1310 nm
	🐹 1550 nm
Optimode	
None	
	Revert to Factory Settings
	OK Cancel

8. Tap **OK** to confirm your changes and close the window. Tap **Cancel** to ignore your changes and close the window.

Defining the Link for Your Test

You can set many criteria to define the link related to a specific test configuration you want to test.

You can specify a fiber type for the link in your configuration. The available fiber types will differ depending if you have a singlemode or a multimode module:

Note: The fiber type can be changed only if the ICERT software option is enabled on the unit.

Available Ports	Fiber Type	Fiber Core	Comments
Singlemode or Singlemode Live	Unspecified	Various	 You will have to chose the fiber type in the iOLM tab.
			 All of the possible standards are available in the iOLM P/F Thresholds tab.
	OS1	Singlemode	Fiber jacket is yellow.
	OS2	9μm	Low water peak fiber designed for CWDM operation.
			Fiber jacket is yellow.

Managing Test Configurations

Defining the Link for Your Test

Available Ports	Fiber Type	Fiber Core	Comments
Multimode	Unspecified	Various	 You will have to chose the fiber type in the iOLM tab.
			 All of the possible standards are available in the iOLM P/F Thresholds tab.
	OM1	Multimode	Modal Bandwidth: 200-500 MHz·km.
		$62.5\mu\mathrm{m}$	Fiber Channel Designation: M6.
			Fiber jacket is orange or slate.
	OM2	Multimode 50 µm	Modal Bandwidth: 500 MHz·km.
			Fiber Channel Designation: M5.
			Fiber jacket is orange.
	OM3		Modal Bandwidth: 1500-2000 MHz·km.
			Laser optimized (VCSEL) at 850 nm.
			Fibre Channel Designation: M5E.
			Fiber jacket is aqua.
	OM4		Modal Bandwidth: 3500-4700 MHz·km.
			Laser optimized (VCSEL) at 850 nm.
			Fiber Channel Designation: M5F.
			Fiber jacket is aqua or violet.

Managing Test Configurations

Defining the Link for Your Test

Available Ports	Fiber Type	Fiber Core	Comments	
Singlemode and Multimode	Unspecified	Various	 You will have to chose the fiber type in the iOLM tab. 	
			 All of the possible standards are available in the iOLM P/F Thresholds tab. 	
	OS1	Singlemode	Fiber jacket is yellow.	
	OS2	9μm	Low water peak fiber designed for CWDM operation.	
			Fiber jacket is yellow.	
	OM1	Multimode	Modal Bandwidth: 200-500 MHz·km.	
	62.8	$62.5\mu\mathrm{m}$	Fiber Channel Designation: M6.	
			Fiber jacket is orange or slate.	
	OM2	Multimode 50 μm	Modal Bandwidth: 500 MHz·km.	
	OM3		Fiber Channel Designation: M5.	
				Fiber jacket is orange.
			Modal Bandwidth: 1500-2000 MHz·km.	
			Laser optimized (VCSEL) at 850 nm.	
	OM4		Fibre Channel Designation: M5E.	
			Fiber jacket is aqua.	
		+	Modal Bandwidth: 3500-4700 MHz·km.	
		Laser optimized (VCSEL) at 85	Laser optimized (VCSEL) at 850 nm.	
			Fiber Channel Designation: M5F.	
			Fiber jacket is aqua or violet.	

The list of certification standards in the **iOLM P/F Thresholds** tab will be filtered according to the type of fiber selected. To see the complete list of standards, select the unspecified fiber type.

When you select a fiber type in the test configuration (one other than unspecified), the application performs a consistency check relative to the previously selected standards and lets you know if there are problems.

The number of custom elements and splitters is used to calculate the dynamic loss budget of the custom thresholds. However, these elements are not used for cabling certification.

Note: Splitters are not supported if your unit is equipped with an FTB/FTBx-740C module.

The splitter ratios can also be defined for a specific link. The PON network can have multiple splitters. The iOLM application supports testing a PON network having a maximum of three splitters.

When setting splitter ratio stage 1, the 2:N splitter can be used to create network redundancy. If a network break occurs, the operator can connect through the other network branch. This ensures active communication while the repairing of the broken network is in progress.

To better suit your needs, you can modify the IOR and backscatter (dB) values according to the core size you have selected. However, the core size cannot be modified for 1550 nm wavelengths.

Another criteria that you can edit are called custom elements. They allow you to apply specific thresholds to components of your link under test so that you can obtain a pass or fail status.

You can select between three basic element types: splice, connector or coupler. Once they are created using a unique name, they can be modified at any time or removed, according to your testing needs.

Note: You can edit the custom elements you have created only if the IADV software option is enabled on the unit.

If needed, you can edit the macrobend detection threshold value. If you do not define one, the application will apply the default value of 0.5 dB automatically when you load a test configuration.

To define the link for your test configuration:

1. From the Main Menu, tap Test Configuration.

••	intelligent Optical Link Mapper	_ 🗖 🗙
Source - IOLM Link View Elements Info		
Fiber type/Port/Wavelengths Test Fibers		Start
OM4 Multimode 50 µm 🗸 🗶 Launch fiber:	0.0670 km	
850 nm	5.0000 km	Open Save Report
1300 nm Receive fiber:	0.0670 km	Main Menu
	Calibrate	File 🕨
		Identification
		Test Configuration
		User Preferences
DefaultSetup		Next file name: Your company_A-B.iolm

- 2. Select the configuration you want to edit and tap Modify.
- **3.** Select the Link Definition tab.

Test Configuration - Defa	aultSetup		×
Properties Link Definit	ion iOLM P/F Thres	holds	
Splitters Splitter ratio stage 1: Splitter ratio stage 2:	2:N	2:2 × 1:8 ×	Fiber type OM4 Multimode 50 µm
Splitter ratio stage 3:		1:16 ~	Dynamic loss budget calculation
iOLM	#3 #2	#1	Connections: 2
	1:16	2:2	Splices: 2 MUX/DEMUX ~ : 1
Fiber Properties 8	50 nm 1	550 nm	Element detection
Core size	50 µm 🗸	9 µm	Macrobend (dB): 0.500
IOR	1.490000	1.468325	
Backscatter (dB)	-66.30	-81.87	Edit Custom Elements
			Revert to Factory Settings
			OK Cancel

- **4.** If you have a standard iOLM, under **Splitters**, 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, the iOLM will not try to find or apply a split ratio at the given stage.
- **Note:** The splitter ratios are defined at different stages, depending on how they are defined in the network.

OR

If you have a DWDM or a CWDM module, go directly to step 6.

	Test Configuration - De	efaultSetup		×
	Properties Link Defi	inition iOLM P/F Th	resholds	
$\left(\right)$	Splitters Splitter ratio stage 1: Splitter ratio stage 2: Splitter ratio stage 3: iOLM			Fiber type OM4 Multimode 50 µm Dynamic loss budget calculation Connections: 2 Spilces: 2 MUX/DEMUX it 1
	Fiber Properties	850 nm	1550 nm	Element detection
	Core size	50 μm 🗸	9 µm	Macrobend (dB): 0.500
	IOR	1.490000	1.468325	
	Backscatter (dB)	-66.30	-81.87	Edit Custom Elements
				Revert to Factory Settings
				OK Cancel

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

Defining the Link for Your Test

5. If the IADV software option is activated, you can enable the **2:N splitter** for the **Splitter ratio stage 1** field by selecting the check box.

Splitters	2:1		Fiber type
Splitter ratio stage 1:	×	2:2 ~	OM4 Multimode 50 µm
Splitter ratio stage 2: Splitter ratio stage 3:		1:8 V 1:16 V	Dynamic loss budget calculation
iOLM	#3 #2	#1	Connections: Splices: MUX/DEMUX
Fiber Properties	850 nm	1550 nm	Element detection
Core size	50 µm 🗸	9 µm	Macrobend (dB): 0.50
IOR	1.490000	1.468325	
Backscatter (dB)	-66.30	-81.87	Edit Custom Elements

- **Note:** The bidirectional loopback measurements are not supported by 1:N splitter and 2:2 splitter elements.
- **Note:** When 1:? or None is selected and you have enabled the 2:N splitter option, the 1:? and None are replaced by a splitter value of 2:2.
 - **6.** If the ICERT software option is activated, select the fiber type in the list of available choices.

Test Configuration - DefaultSetup	×
Properties Link Definition iOLM P/F Thresholds	
Splitters 2:N Splitter ratio stage 1: Image: 2: <	Fiber type QM4 Multimode 50 µm Dynamic loss budget calculation Connections: 2 Splices: 2 [MUX/DEMUX : 1
Fber Properties 850 nm 1550 nm Core see 50 μm ·· 9 μm IOR 1.490000 1.468325 Backscatter (dB) -66.30 -81.87	Element detection Marobend (d8): 0.500 Edit Custom Elements
	Revert to Factory Settings OK Cancel

7. If the ICERT software option is activated, specify the number of connections on your link.

fest Configuration - D	efaultSetup			×
Properties Link Def	finition iOLM	P/F Thresholds		
Splitter ratio stage 1 Splitter ratio stage 2 Splitter ratio stage 3 iOLM	!: : #3	2:N 2:2 1:8 1:16 #2 #1		Fiber type OM4 Multimode 50 µm Dynamic loss budget calculation Connections: 2 Spices: 2 MuX/DEMUX 1
Fiber Properties Core size	850 nm 50	1550 nm	9 μm	Element detection Macrobend (dB): 0.500
IOR Backscatter (dB)		-66.30	1.468325 -81.87	Edit Custom Elements
				Revert to Factory Settings
				OK Cancel

8. If the ICERT software option is activated, specify the number of splices on your link.

est Configuration - D	DefaultSetup		×
Properties Link De	finition iOLM P/F Th	resholds	
Splitters	2:	N	Fiber type
Splitter ratio stage 1	1:	2:2 ~	OM4 Multimode 50 µm ~
Splitter ratio stage 2 Splitter ratio stage 2		1:8 × 1:16 ×	Dynamic loss budget calculation
iOLM	#3 #2	#1	Connections: 2
-	1:16	22	Splices: 2 MUX/DEMUX · : 1
Fiber Properties	850 nm	1550 nm	Element detection
Core size	50 μm . ~	9 µm	Macrobend (dB): 0.500
IOR	1.490000	1.468325	
Backscatter (dB)	-66.30	-81.87	Edit Custom Elements
			Revert to Factory Settings
			OK Cancel

- **9.** If the IADV software option is activated and you want to edit the custom elements, proceed as follows:
 - **9a.** Tap the **Edit Custom Elements** button.

est Configuration - D	efaultSetup		×
Properties Link De	finition iOLM P/F Thre	sholds	
Splitters Splitter ratio stage 1 Splitter ratio stage 2		2:2 ~ 1:8 ~	Fiber type OM4 Multimode 50 μm
Splitter ratio stage 3 iOLM	l: #3 #2	1:16 ~ #1	Dynamic loss budget calculation Connections: 2
-		22	Splices: 2 MUX/DEMUX · : 1
Fiber Properties	850 nm	1550 nm	Element detection
	50 μm 🖂	9 µm	Macrobend (dB): 0.500
IOR Backscatter (dB)	1.490000 -66.30	1.468325 -81.87	Edit Custom Elements
			Revert to Factory Settings
			OK Cancel

9b. In the **Custom Elements** dialog box, to add or modify a custom element, enter the custom element name under the **Name** column.

Name	Туре	
MUX/DEMUX		Û
OADM		Û
Element D		Û

Note: The name of the custom element can contain a maximum of 12 characters.

- **9c.** Select the custom element type under the **Type** column.
- **Note:** Tap the 💼 icon beside the custom element which you want to delete.
 - *9d.* Tap **OK** to save the changes and close the dialog box, or tap **Cancel** to exit without saving.
- **Note:** The **Revert to Factory Settings** button does not change the modifications made in the **Custom Elements** dialog box.
 - **10.** If the ICERT software option is activated and you want to use the custom elements you have created in the dynamic loss budget calculation, proceed as follows:

10a. Select a custom element in the list of available choices.

est Configuration - I	DefaultSetup					>
Properties Link De	finition iOLM P/F	Thresholds				
Splitters		2:N		Fiber type		
Splitter ratio stage	1:	× 2:2	\sim	OM4 Multimode 50 µm		~
Splitter ratio stage	2:	1:8	~			
Splitter ratio stage	3:	1:16	~	Dynamic loss budget cal	culation	
iOLM	#3 #	2 #1		Connections:		2
	1:16	2:2		Splices:		2
-			- (
				MUX/DEMUX	× :	
		1		Element detection		
Fiber Properties Core size	850 nm	1550 nm				
LOR SZE	50 µm		9 µm 1 468325	Macrobend (dB):		0.500
Backscatter (dB)	-66.		-81.87	Edit (ustom Flements	
				Rever	to Factory Setti	nas
					- ,	
					ОК	Cancel

10b. Specify the number of elements you want to add on the link.

11. Under Fiber Properties, you can modify the Core size, IOR and Backscatter (dB) values.

	Test Configuration - D	efaultSetup		×		
	Properties Link Definition iOLM P/F Thresholds					
When a multimode port is selected, the default fiber core size is 50 µm.	Splitters Splitter ratio stage 1: Splitter ratio stage 2: Splitter ratio stage 3: iOLM			Fiber type OM4 Multimode 50 µm Dynamic loss budget calculation Connections: Splices: MUX/DEMUX T		
L	Fiber Properties Core size	850 nm 50 μm	1550 nm 9 μm	Element detection Macrobend (dB): 0.500		
Refraction index of the	IOR Backscatter (dB)	1.490000	1.468325 -81.87	Edit Custom Elements		
measurement, also known as group index.				Revert to Factory Settings		
Known as group mack.				OK Cancel		

Represents the Rayleigh backscatter coefficient setting of the measurement.

- **Note:** The core size cannot be modified for 1550 nm wavelength.
- **Note:** For the multimode wavelengths, the values are defined at 850 nm while the values are defined at 1550 nm for the singlemode wavelengths. The iOLM application automatically calculates the IOR and backscatter values for other wavelengths.

- Test Configuration DefaultSetup × Properties Link Definition iOLM P/F Thresholds Splitters 2:N Fiber type × 2:2 Splitter ratio stage 1: OM4 Multimode 50 µm 1:8 Splitter ratio stage 2: Dynamic loss budget calculation Splitter ratio stage 3: 1:16 IOLM #3 #2 #1 Connections: 2 Splices: 2 1 MUX/DEMUX Element detection Fiber Properties 850 nm 1550 nm 50 µm ~ 9 µm Macrobend (dB): 0.500 1.468325 -81.87 IOR 1.490000 Backscatter (dB) -66.30 Edit Custom Elements.. Revert to Factory Settings ОК Cancel
- **12.** If necessary, specify a macrobend detection value.

13. Tap **OK** to confirm your changes and close the window. Tap **Cancel** to ignore your changes and close the window.

Selecting Certification Standards

Note: This function is available with the ICERT software option only.

The committees and standards configurations you can choose from are grouped by categories. You can select more than one standard and you can select standards from different categories at the same time; the most restrictive values of the selected standards are then used to determine if the test results in a pass or fail status.

Standards are divided into two main categories:

- Cabling: Ensures that the connections and splices are made properly and cumulate fewer losses than the normally expected maximum values. The thresholds are adjusted according to the number of connections and splices, and the thresholds also take into account the normal attenuation of the fiber. They can vary from one type of fiber to another and according to the length of the link. These thresholds do not take into account the limitations of specific communication protocols. There are international standards, but also versions that are more regional, such as for Europe, or specific countries. These standards can evolve with time according to technological progresses. It is therefore important to know which standard to refer to, because the thresholds can be different. Some examples of cabling standards include TIA-568, ISO/IEC 14763 and ISO/IEC 11801.
- Application: These standards are used to validate that a given link can allow a flow according to a communication protocol. They rest on fixed thresholds, which are maximum link loss and length values. These thresholds do not take into account the link topology (number of connections and splices). A short link could, for instance, allow more connections than a longer link. The important factor is to remain within the specified fixed thresholds. Examples of application standards include Ethernet and Fibre Channel.

When a cabling standard is selected, you will need to manually provide the number of connections and splices to correctly calculate the link loss budget (see *Defining the Link for Your Test* on page 86 for details). The more there are connections and splices, the greater the link loss budget is.

Predefined standards are available for you to select, or you can create a custom setting.

To select predefined certification standards:

- intelligent Optical Link Mapper IOLM Link View Elements Info Fiber type/Port/Wavelengths Test Fibers OM4 Multimode 50 µm 🗸 🗙 Launch fiber: 0.0670 km Loop fiber: 5.0000 km 🗙 850 nm X Receive fiber: 1300 nm 0.0670 km Calibrate. Identificatio Test Configuration Jser Preferences (i) ? DefaultSetun Next file name: Y
- 1. From the Main Menu, tap Test Configuration.

2. Select the configuration you want to edit and tap Modify.

Selecting Certification Standards

3. Select the iOLM P/F Thresholds tab.

Certification S	tandard Committees
TIA Example: TIA-568-C.3 Inside Plant	
ISO/IEC Example: ISO/IEC 14763-3:2014	
IEEE Example: 100BASE-FX	
ANSI Fibre Channel Example: Fibre Channel 12-MM-LE-I (133)	
Others Example: ATM, EN, GB, GOST, JIS, PSM4	
Custom (1) User-defined values	

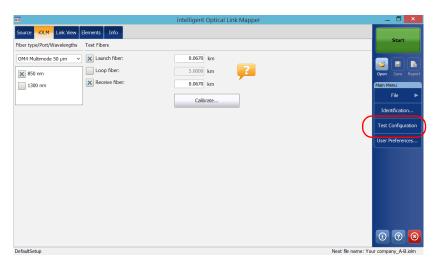
- **4.** In the available items of the configuration, select the certification committee you want and tap the s button at the end of the row.
- **Note:** Depending on the category you select, you may have to tap \rightarrow again to access the list of available certification types.
 - **5.** Select which items of this certification type you want to include.

		Test Co	nfiguration - DefaultS	etup		×
Properties	Link Definition	iOLM P/F Thresholds				
< Back			ISO/IEC Standards			
× ISO/IE	C 14763-3:20	14				^
× ISO/IE	C 14763-3:20	12				
ISO/IEC 14763-3:2006						
ISO/IEC 11801-2010						
ISO/IEC 11801-2002						
X 0F-300 CH						
0F-500 CH						
OF-200	OF-2000 CH *					
					ОК	Cancel

- **6.** Tap **Back** to go to the previous level and select other standards as needed.
- **7.** Tap **OK** to confirm your changes and close the window. Tap **Cancel** to ignore your changes and close the window.

To create custom pass/fail thresholds for fixed or dynamic loss budget:

1. From the Main Menu, tap Test Configuration.



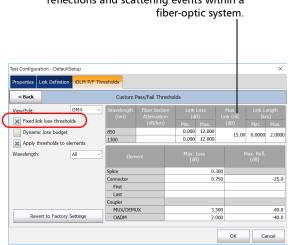
- 2. Select the configuration you want to edit and tap Modify.
- 3. Select the iOLM P/F Thresholds tab.

Test Configuration - DefaultSetup	×
Properties Link Definitio 1 10LM P/F Thresholds	
Certification Standard Committees	
TIA Example: TIA-568-C.3 Inside Plant	>
ISO/IEC Example: IS0/IEC 14763-3:2014	>
IEEE Example: 100BASE-FX	>
ANSI Fibre Channel Example: Fibre Channel 12-MM-LE-I (133)	>
Others Example: ATM, EN, GB, GOST, JIS, PSM4	>
Custom (1) User-defined values	>
ОК	Cancel

Managing Test Configurations

Selecting Certification Standards

- In the available items of the configuration, select **Custom** and tap the 4. button at the end of the row.
- 5. Tap the > button at the end of the row again to access the custom threshold window.
- 6. When the ICERT software option is activated, select the dynamic loss budget that fits your needs according to the chosen fiber type:
 - ► Fixed: You can specify threshold values for the fiber section attenuation, as well as the minimum and maximum link loss values, for each wavelength. You can also set values for the maximum link ORL (Optical Return Loss), and the minimum and maximum link length.
- **Note:** The attenuation threshold value is measured only if the analysis allows the calculation of the attenuation on the fiber section.



The ORL represents the total effect of multiple reflections and scattering events within a

- Dynamic: The dynamic loss budget is calculated according to the fiber length and the elements included in the link definition (such as the number of splices, connections, custom elements, as well as splitters).
- **Note:** Splitters are not supported if your unit is equipped with an FTB/FTBx-740C module.
- **Note:** You can only use one custom element type in the dynamic loss budget calculation.

The link attenuation, as well as the loss values for the splices, connections, and the first and last connections will all be used to calculate the loss budget.

If there is no specific value for the first or last connector, the application will use the value specified for connectors in general.

Test Configuration - Default	Setup									×
Properties Link Definition	iOLM P/F	Thre	esholds							
< Back Custom Pass/Fail Thresholds										
View/Edit: Fixed link loss thresho Dynamic loss budget Apply thresholds to e	olds	~	Wavelength (nm) 850 1300		.000 .000	Max. Link ORL (dB) 15.00	Link Lu (kr Min. 0.0000			
Wavelength:		~								
			Splice				0.300			
			Connector First Last				0.750			-25.0
			Coupler							
		_	MUX/DEMU	JX			3.500			-40.0
Revert to Factory	Settings		OADM				2.000			-40.0
								ок	0	ancel

Selecting Certification Standards

 You can also activate both options at the same time. The more restrictive thresholds of the two type will be considered when testing.

Properties Link Definition	on iOLM P	/F Thr	esholds							
< Back			Custom I	Pass/Fail Th	nreshol	ds				
View/Edit:	OM4 holds	~	Wavelength (nm)	Attenua (dB/kr Link S		Link (dl Min.		Max. Link ORL (dB)	Link L (kı Min.	
X Dynamic loss budge			850 1300	1.000		0.000	12.000 12.000	15.	0.0000 00	2.00
Wavelength: All ~		Element								
			Splice				0.:	300		
			Connector				0.	750		-25.
			First							
			Last		_					
			Coupler							
			MUX/DEMI	JX				500		-40.
Revert to Factor	y Settings		OADM				2.0	000		-40

When the fiber type is specified in the link definition (see *Defining the Link for Your Test* on page 86 for details), you can edit thresholds for this fiber type only. If you have selected unspecified as the fiber type, you can specify threshold values for each available fiber type.

Enter the values you want to use as thresholds in the corresponding cell tables.

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

7. Select the **Apply thresholds to elements** check box to edit the maximum loss (dB) and maximum reflectance (dB) for the splice and connector.

IMPORTANT

An empty cell in the link threshold table means NO THRESHOLD is applied on the acquisition. If you want to set zero as a threshold value, enter 0 in the corresponding cell.

Test Configuration - DefaultSetup Properties Link Definition iOLM P/F Three	esholds		×	–No threshold is applied
< kack View/Edt: 0M4 Fixed link loss thresholds Xoynamic loss budget Xoynamic loss budget	Custom Pass/Fail Three Wavelength (nm) Attenuation (dB/km) Link Sect 850 1.000 1300 1.000	n Link Loss (dB) Lin	Max. hk ORL (dB) 15.00 Link Length (km) Min. Max. 	when the corresponding cell is empty.
Wavelength: All	Element	Max. Loss Budget (dB)	Max. Refl. (dB)	┌─Value used for first and last
	Spice Connector First Last	0.300 0.750	-25.0	connectors when corresponding cells are
Revert to Factory Settings	Coupler MUX/DEMUX OADM	3.500	-40.0 -40.0	empty.
			OK Cancel	

Managing Test Configurations

Setting Custom Power Meter Thresholds

8. Select the wavelength on which you want to apply the customized pass/fail thresholds.

Properties Lir	nk Definition	iOLM P/F	Thre	esholds							
< Back				Custom I	Pass/Fail	Thresho	lds				
View/Edit:	[loss threshol	OM4 ds	~	Wavelength (nm)		uation /km)	Link (di		Max. Link ORL	Link L (kı	
	oss budget			850 1300	Link 1.000 1.000		Min. 0.000 0.000		(dB) 15.0	Min. 00 0.0000	Max. 2.000
Wavelength:		All	~	Elem	ent		Max. Loss (di			Max. Refl. (dB)	
				Spice					300		
				Connector First		_		0.	750		-25.
				Last							
				Coupler		_					
Revert	to Factory S	Settings		MUX/DEMUX OADM		_	3.500				

9. Tap **Back** to return to the previous menu and set other configuration items. Tap **OK** to confirm your changes and close the window. Tap **Cancel** to ignore your changes and close the window.

Setting Custom Power Meter Thresholds

You can set thresholds for the maximum and minimum power, as well as the loss value for each wavelength you have set in the user preferences. See *Setting Custom Power Meter Thresholds* on page 137 for details.

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

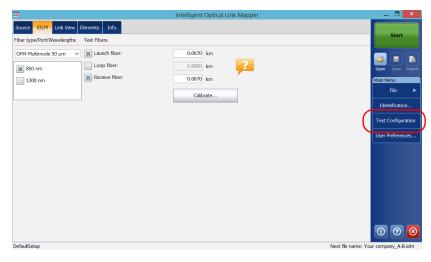
Modifying a Test Configuration

The test configurations you have created or imported can be modified to better fit your requirements.

Note: Depending on the type of unit or measurement, some configuration items may be unavailable.

To edit a test configuration:

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



- 2. Select the configuration you want to edit and tap Modify.
- **3.** Change the criteria as required. See *Creating a Test Configuration* on page 79 for details.

Importing a Test Configuration

You can import test configurations from an external storage device.

IMPORTANT

Some threshold values may be different when a test configuration file is imported. If the thresholds differ for a given wavelength, the application uses the most restrictive threshold values.

- **Note:** To be successfully imported, the test configurations and their duplicates need to be compatible with the hardware and software options available on the unit.
- **Note:** If a USB device is connected to the module, the default path for import will be the USB device.
- Note: You can only import one test configuration at a time.

To import a test configuration:

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

••	intelligent Optical Link Mapper	_ 🗇 🗙
Source OLM Link View Elements Info		Start
OM4 Multimode 50 µm v X Launch fiber:	0.0670 km	Open Save Report
1300 nm	0.0670 km Calibrate	Main Menu File Identification
		Test Configuration User Preferences
DefaultSetup		Next file name: Your company_A-B.iolm

2. From the **Test Configuration** window, tap **Import**.

	Te	st Configurat	tion		
		Next Acquisition	1		
DefaultSetup 2 connectors, Custom Pass/Fail	Thresholds				
Point to Point 2 connectors, Custom Pass/Fail	Thresholds				
PON 1 Splitters 1x32 2 connectors, 1 splitter, Custor	n Pass/Fail Thresh	olds			
Short Link Close Events Short Link Close Events, 2 connectors, Custom Pass/Fall Thresholds					
		Current Acquisitic	on		
DefaultSetup OM4 Multimode 50 µm, 2 connectors, Custom Pass/Fail Thresholds					
	Duplicate	Modify	Delete	Import	Export
					Close

- **3.** Select the file you want to import.
- **4.** Tap **Open** to close the window. The imported configuration is added to the list automatically.

Exporting a Test Configuration

You can export test configurations to an external storage device.

- **Note:** If a USB device is connected to the module, the default path for export will be the USB device.
- *Note:* You can only export one test configuration at a time.

To export a test configuration:

1. From the Main Menu, tap Test Configuration.

		intelligent Optical Link Mapper	_ 🗇 🗙
Source - iOLM Link View	Elements Info		
Fiber type/Port/Wavelengths	Test Fibers		Start
OM4 Multimode 50 µm 🗸 🗸	X Launch fiber:	0.0670 km	
🗙 850 nm	Loop fiber:	5.0000 km	Open Save Report
1300 nm	Receive fiber:	0.0670 km	Main Menu
		Calibrate	File 🕨
	1		Identification
		(Test Configuration
			User Preferences
			I ? 😣
DefaultSetup		Next file name: Y	our company_A-B.iolm

2. From the **Test Configuration** window, select the test configuration you want to export.

Exporting a Test Configuration

3. Tap Export.

Test Configuration					
Next Acquisition					
DefaultSetup 2 connectors, Custom Pass/Fail Thresholds					
Point to Point 2 connectors, Custom Pass/Fail Thresholds					
PON 1 Splitters 1x32 2 connectors, 1 splitter, Custom Pass/Fail Thresholds					
Short Link Close Events Short Link Close Events, 2 connectors, Custom Pass/Fall Thresholds					
Current Acquisition					
DefaultSetup OM4 Multimode 50 µm, 2 connectors, Custom Pass/Fail Thresholds					
Duplicate Modify Delete Import Export					
Close					

- 4. Select the folder where you want to export your file.
- **5.** If desired, modify the file name.
- **6.** Tap **Save** to close the window.

Deleting a Test Configuration

You can remove test configurations from your unit to keep only those relevant for your work.

Note: You must always have at least one configuration in the test configuration window.

To delete a test configuration:

1. From the Main Menu, tap Test Configuration.

88		intelligent Optical Link Mapper	_ 🗇 🗙
Source OLM Link View	Elements Info		
Fiber type/Port/Wavelengths	Test Fibers		Start
OM4 Multimode 50 µm 🗸	X Launch fiber:	0.0670 km	
🗶 850 nm	Loop fiber:	5.0000 km 🔁	Open Save Report
1300 nm	X Receive fiber:	0.0670 km	Main Menu
		Calibrate	File 🕨
			Identification
		(Test Configuration
		<u> </u>	User Preferences
			1 7 8
DefaultSetup		Next file name: You	ur company_A-B.iolm

2. Select the row corresponding to the configuration you want to remove, then tap **Delete**.

Test Configuration					
Next Acquisition					
DefaultSetup 2 connectors, Custom Pass/Fail Thresholds					
Point to Point 2 connectors, Custom Pass/Fail Thresholds					
PON 1 Splitters 1x32 2 connectors, 1 splitter, Custom Pass/Fail Thresholds					
Short Link Close Events Short Link Close Events, 2 connectors, Custom Pass/Fail Thresholds					
Current Acquisition					
DefaultSetup OM4 Multimode 50 μm, 2 connectors, Custom Pass/Fail Thresholds					
Duplicate Modify Delete Import Export					
Close					

3. Confirm your choice.

iO	DLM	×
Are you sure you want to pe	ermanently delete "	DefaultSetup"?
	Yes	No

Performing Acquisitions

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

Performing a Standard or Loopback Acquisition

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

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

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

You can perform standard and loopback acquisitions with the iOLM. For more information on how to perform a loopback measurement, see *Configuring Your iOLM* on page 39. To perform bidirectional loopback acquisitions, see *Performing a Bidirectional Loopback Acquisition* on page 117.

8

To perform an iOLM acquisition:

- **1.** Ensure that the settings for the acquisition are already set. See *Configuring Your iOLM* on page 39 for details.
- **2.** Tap **Start** (for standard and loopback measurements). If you are working with Optimode test configurations, the button will indicate **Start Optimode**.

••	intelligent Optical Link Mapper	_ i ×
Source IOLM Link View Elements Info		
Fiber type/Port/Wavelengths Test Fibers		Start
OM4 Multimode 50 µm 🗸 🐹 Launch fiber:	0.0670 km	
850 nm	5.0000 km	Open Save Report
1300 nm Receive fiber:	0.0670 km	Main Menu
	Calibrate	File 🕨
		Identification
		Test Configuration
		User Preferences
		0 🧿 😣
DefaultSetup		Next file name: Your company A-B.jolm

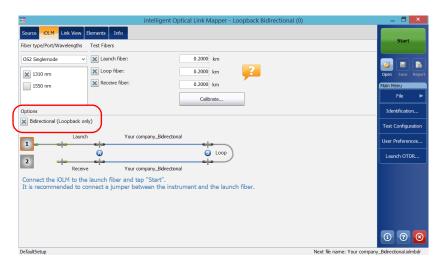
The application will prompt you to save unsaved data (if any) before starting a new acquisition.

Performing a Bidirectional Loopback Acquisition

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

To perform a bidirectional acquisition:

- **1.** Ensure that the settings for the acquisition are already set. See *Configuring Your iOLM* on page 39 for details.
- 2. Select the Bidirectional (Loopback only) checkbox.



Performing Acquisitions

Performing a Bidirectional Loopback Acquisition

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

	intelli	gent Optical Link Mapper - Loopback Bidirectiona	I (0) 🗖	×
Source	Elements Info			
Fiber type/Port/Wavelengths	Test Fibers		Start	
OS2 Singlemode 🗸 🗸	X Launch fiber:	0.2000 km		
🗙 1310 nm	X Loop fiber:	0.2000 km		Report
1550 nm	Receive fiber:	0.2000 km	Main Menu	
		Calibrate	File	
Options	1		Identification	
Bidirectional (Loopback on	ly)		Test Configure	ation
Launch	Your company_E	idirectional	User Preferen	ces
· ·		() Loop	Launch OTD	R
2 Receive	Your company_E	idirectional		
	launch fiber and tap "Star			
It is recommended to co	onnect a jumper between t	ne instrument and the launch fiber.		
			0 0	8
DefaultSetup			Next file name: Your company_Bidirectional.ion	nbdr

4. Tap Start.

🚥 intelligent Optical Link Mapper - Loopback Bidirectional (0)	_ 🗇 🗙
Source OLM Link View Bernerts Info Fiber type/Port/Wavelengths Test Fibers	Start
OS2 Singlemode V Launch fiber: 0.2000 km	
1310 nm Loop fiber: 0.2000 km	Open Save Report
1550 nm 0.2000 km	Main Menu
Calibrate	File 🕨
Options	Identification
Bidirectional (Loopback only)	Test Configuration
Launch Your company_Bidirectional	User Preferences
	Launch OTDR
Receive Your company_Bidirectional	
Connect the iOLM to the launch fiber and tap "Start". It is recommended to connect a jumper between the instrument and the launch fiber.	
te a recommended to connect a jumper between the mad ament and the Marter hoer.	

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

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

	88	_ 1 ×		
	Source IOLM Link View	Elements Info		L1 AB
	Fiber type/Port/Wavelengths	Test Fibers		Test Again
	OS2 Singlemode	X Launch fiber:	0.2000 km	
	🔀 1310 nm	X Loop fiber:	0.2000 km	Open Save Report
	1550 nm	Receive fiber:	0.2000 km	Main Menu
			Calibrate	File 🕨
	Options	1		Identification
Indicates that you-	X Bidirectional (Loopback or	<u>ly)</u>		Test Configuration
should not	Laund	Your company_Bidirect	onal 🛱	User Preferences
disconnect the			Loop	Launch OTDR
setup	2 Receiv	e A Your company_Bidirect	onal A	
	Connect the iOLM to the It is recommended to c	launch fiber and tap "Test Aga onnect a jumper between the in:	m".	
	Reset Acquisition			
				(i) (i) (ii)
	DefaultSetun			Next file name: Link 1 AB.iom

OR

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

× 1310 nm	Loop fiber:	0.2000 km	?	Open Save Report
Options		Calibrate		File Identification
Bidirectional (Loopback on		al 🖺		Test Configuration
Launch	Your company_Bidirection	al ()		User Preferences
2 Receive	Your company_Bidirection			Launch OTDR
	launch fiber and tap "Test Again" onnect a jumper between the instr		fiber.	
Reset Acquisition				
				Next file name: Link 1 AB.jolm
DefaultSetup				Next lie name: Link 1 Ab.iom

Performing Acquisitions

Performing a Bidirectional Loopback Acquisition

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

Pass/Fail results for Link 1 and Link 2

			intelligent Optical Link Mapper - Loopback	Bidirectional (0)			×
T 1.1.6		ink View Elements Info			L1 AB 🔮 L2 BA 🦉	Contin	
To switch from—			-: <u></u> >				
one	· · · · · ·			۵	1.9323 km		
measurement				8		Open Save	Report
to another						Main Menu	
	Pos0.2000	0.0000		1.9323	2.1323 km	File	
						Identificati	on
		∞ ' ⊘		BBO	•	Test Configu	uration
	Len.	0.2000	1.9323	0.2	2000 km	User Prefere	nces

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

		intelligent Optical Link Mapper - Loopback B	idirectional (0)			_ 🗇 🗙
Source	IOLM Link View Elements Info			L1 L2		Continue
	→:==>>		-*			Continue
			6	1.9323		
	۵		8	1.9323	KIII	Open Save Report
						Main Menu
Pos.	-0.2000 0.0000		1.9323	2.1323	km	File 🕨
						Identification
			BBO			Test Configuration
Len.	0.2000	1.9323	0	2000	km	User Preferences

Note: The second acquisition can only be performed once.

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

60	intelligent Optical Link Mapper - Loopback Bidirectional (0)	_ 🗇 🗙
Source iOLM Link View Elements Info	L1 Bidir 🧉	
		Start
	1.9323 km	Open Save Report
Pos. 0.0000	1.9323 km	Main Menu File 🕨
	G ⁺ 0	Identification

Stopping an Acquisition

The acquisition stops automatically after it is complete. You can also stop the acquisition at any time while it is in progress.

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

To stop the acquisition:

Tap **Stop** from the main window.



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

The stopped acquisition status will be saved in the measurement file. It is also displayed in the **Info** tab. See *Viewing Measurement Information* on page 179 for details.

The global pass/fail status will show unknown or fail when the acquisition is stopped manually. See *Global Pass/Fail Status* on page 165 for details.

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.

9

Customizing Your iOLM

You can customize the appearance and behavior of your iOLM application.

Setting the Default Storage Folder

You can change the default storage folder to better suit your needs. You can also work with a USB key. If the USB key is not connected to the device upon saving, the acquisitions are saved in the default storage folder. This path is used to save the iOLM files and OTDR Bellcore (.sor) files after an acquisition.

- **Note:** The .sor format is not supported by the bidirectional loopback measurement.
- **Note:** The **Save As** button allows you to save your files to a folder different from the default storage folder. If you change the storage folder from the **Save As** dialog box, it will be used the next time you use the Save As feature again. The default storage folder will not be modified.

To set the default storage folder:

- From the Main Menu, tap the User Preferences button, then select the General tab.
- 2. If you want to modify the default storage folder, select the File Functionalities check box.

	User Prefere	ences		×
General Report				
File Functionalities				
C:\Users\Supervisor\Do	cuments\iOLM			
Export OTDR Bello				
Functionalties Sound notifications Fiber section				
Distance unit:	km (kilometers)		Revert to Factory	/ Settings
		ОК	Cancel	Apply

3. Tap the web button next to **Default folder**.

- **4.** In the **Browse For Folder** window, select the location where you want to save the file.
- 5. Tap OK to exit the Browse For Folder window.
- 6. Tap **OK** to return to the main window.

Saving Files in Bellcore Format

If this feature is selected, whenever an iOLM measurement is saved, an OTDR Bellcore (.sor) file is generated for each wavelength selected. The wavelength value is appended to the file name and it is separated with an underscore.

Upon saving, the files are send to the default folder you have defined. See *Setting the Default Storage Folder* on page 123 for details.

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

To save files in Bellcore format:

- 1. From the Main Menu, tap the User Preferences button, then select the General tab.
- 2. If you want to save files in Bellcore format, select the File Functionalities check box.

	User Pr	eference	S		×
General Report					
File Functionalities					
C:\Users\Supervisor\Docum	ents\iOLM				
Export OTDR Bellcore (
Functionalities Sound notifications Fiber section					
Distance unit:	km (kilometers)	~		Revert to Factory	Settings
			ОК	Cancel	Apply

3. Select the **Export OTDR Bellcore (.sor) file on save** check box.

	User Preferer	nces
General Report		
File Functionalities		
C:\Users\Supervisor\Do Export OTDR Bello	ore (.sor) file on save	
Functionalties Sound notifications Fiber section		
Distance unit:	km (kilometers) 🗸 🗸	Revert to Factory Settings
		OK Cancel Apply

4. Tap **OK** to return to the main window.

Customizing Reports

You can generate reports directly from your unit in PDF format. Various items can appear on the report. When the IPRO or ILOOP software option are activated, you can generate a loopback measurement report that combines all links into one report as opposed to separate ones.

If you want to generate a report automatically each time a measurement is saved, see *Activating the Automated Report Creation* on page 127 for details. You can also generate a report manually. See *Generating a Report* on page 187 for details.

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

To customize reports:

- 1. From the Main Menu, tap the User Preferences button, then select the **Report** tab.
- 2. Select the check boxes according to your needs.

User Preference	es 💌
General Report	
X OTDR graph	
Fiber section	
X Diagnostic	
Loopback	
All links combined in one report (Links L1 + L2)	
	Revert to Factory Settings
	OK Cancel Apply

- **Note:** The OTDR graph generation fails if the iOLM measurement does not contain the necessary intermediate OTDR data, if the iOLM acquisition process is interrupted by the user, or it is self interrupted because a live fiber is detected.
 - **3.** Tap **OK** to return to the main window.

Activating the Automated Report Creation

You can create a report based on the acquisitions results. When you activate the automated report creation feature, a report is automatically sent in the default folder you have defined each time a measurement is saved. See *Setting the Default Storage Folder* on page 123 for details.

If you want to generate a report manually, see *Generating a Report* on page 187 for details. To select the items that can appear on a PDF report, see *Customizing Reports* on page 126 for details.

To activate automated report creation:

- From the Main Menu, tap the User Preferences button, then select the General tab.
- **2.** If you want to generate a report automatically upon saving, select the **File Functionalities** check box.

	User Pre	eferenc	es		×
General Report					
File Functionalities Default folder:					
C:\Users\Supervisor\Docur	nents\iOLM				
Export OTDR Bellcore					
Functionalities Sound notifications Fiber section					
Distance unit:	km (kilometers)	~		Revert to Factory S	settings
			ОК	Cancel	Apply

Activating the Automated Report Creation

3. Select the **Generate report on save** check box.

	User Preferen	ices 🛛 🗙
General Report		
File Functionalities		
Default folder:		
C:\Users\Supervisor\Docur	nents\iOLM	
Export OTDR Bellcore	(.sor) file on save	
Generate report on sa	ve	
Functionalities		
Sound notifications		
Fiber section		
Distance unit:	km (kilometers) ~	Revert to Factory Settings
		OK Cancel Apply

4. Tap **OK** to return to the main window.

Enabling or Disabling Sound Notifications

The application can emit a sound to inform you that important events are detected or when the acquisition sequence is complete.

To enable or disable sound notifications:

- From the Main Menu, tap the User Preferences button, then select the General tab.
- **2.** If you want to enable sound notifications, select the **Sound notifications** check box.

OR

If you prefer to disable sound notifications, clear the box.

	User Pi	reference	5		×
General Report					
File Functionalities					
Default folder:					
C:\Users\Supervisor\	Documents\iOLM				
Export OTDR Be	llcore (.sor) file on save				
🗙 Generate report	on save				
Functionalities	<u>`</u>				
Sound notifications)				
× Fiber section					
Distance unit:	km (kilometers)	~			
bistance ant.	win (wionieters)		, F	Revert to Factory	Settings
			ОК	Cancel	Apply

3. Tap **OK** to close the window.

Displaying or Hiding Fiber Sections

You can select the section in the link view and the corresponding details of the selected section to be displayed in the **Elements** table.

To display or hide fiber sections:

- From the Main Menu, tap the User Preferences button, then select the General tab.
- **2.** If you want to display fiber sections, select the **Fiber section** check box.

OR

If you prefer to hide fiber sections, clear the box.

	User Preference	S		×
General Report				
File Functionalities				
Default folder:				
C:\Users\Supervisor\[Documents\iOLM			
Export OTDR Bel	lcore (.sor) file on save on save			
Functionalties Sound notifications Fiber section				
Distance unit:	km (kilometers) 🗸	Rev	ert to Factory	Settings
		ОК	Cancel	Apply

3. Tap **OK** to close the window.

Selecting the Distance Units

You can select the distance units that will be used throughout the application.

To select the distance units:

- 1. From the Main Menu, tap the User Preferences button, then select the General tab.
- 2. Select the distance unit in the list of available choices.

	User Pre	eferences			×
General Report					
File Functionalities					
Default folder:					
C:\Users\Supervisor\I	Documents\iOLM				
🗶 Export OTDR Bel	lcore (.sor) file on save				
Generate report	on save				
Functionalities					
X Sound notifications					
Fiber section					
		_			
Distance unit:	km (kilometers)	·)		Revert to Factory	/ Settings
			ок	Cancel	Apply

3. Tap **OK** to close the window.

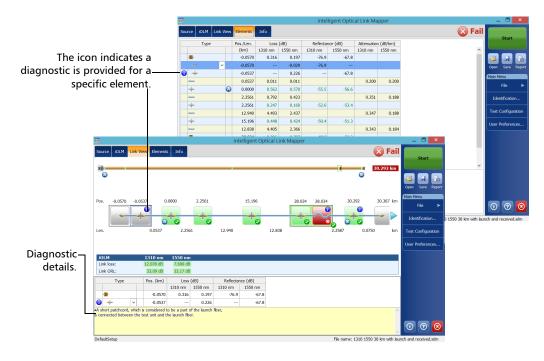
10 Understanding Diagnostics

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. More than one diagnostic can be associated with any given element.

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

To view the diagnostics:

From the **Link View** or **Elements** tab, tap on the **(i)** icon next to the result you want to see.



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

Your unit may be equipped with an inline power meter allowing you to perform acquisitions.

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

Understanding the Inline Power Meter

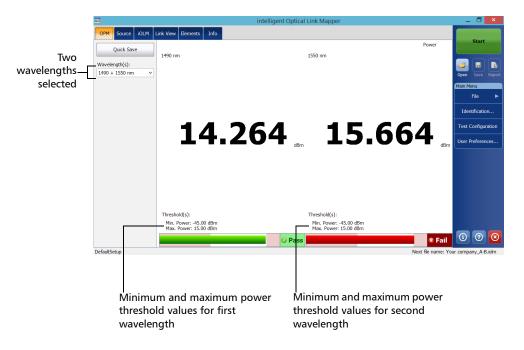
The inline power meter in your module measures the power of the link through the SM Live port, which is also used for iOLM measurements.

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

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 side by side, one for each channel. Both values will be refreshed at the same time. 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.



Setting Custom Power Meter Thresholds

Setting Custom Power Meter Thresholds

You can set thresholds for the maximum and minimum power, and select the wavelength for which the different pass/fail threshold values can be specified. The available choices of wavelength depends on the iOLM module and the measurement mode you have selected for your tests. See *Selecting the Measurement Mode* on page 139 for details.

To set the power meter threshold values:

1. From the Main Menu, tap Test Configuration.

90	i	ntelligent (Optical Link	Mapper		0	×
Source IOLM Link View Elements						Star	rt
Fiber type/Port/Wavelengths Test Fi	ibers						
OM4 Multimode 50 µm 🗸 🗙 La	aunch fiber:	0.0670					
🗙 850 nm	oop fiber:	5.0000	m	2		Open Save	
1300 nm	leceive fiber:	0.0670	m	·		Main Menu	
		Calibr	ite]		File	
						Identifica	tion
					(Test Config	juration
						User Prefer	ences
						i ?	
efaultSetup					Next file name:)	'our company_A	-B.iolm

2. Select the configuration you want to edit and tap Modify.

Setting Custom Power Meter Thresholds

3. Select the OPM P/F Thresholds tab.

Test Configuration - DefaultSetup							
Properties	Link Definition	iOLM P/F Threshold	OPM P/F Thr	esholds			
			Min.	Max.			
Wavelength	c.	1490 nm 🗸					
Power:		Min. and Max.	-45.00	15.00	dBm		
				F			
						Revert to Factory Setti	ngs
						ОК	Cancel

4. Enter the desired values for the minimum and maximum power, and select the wavelength for which the different pass/fail threshold values can be specified.

Test Configuration - DefaultSetup						
Properties	Link Definition	iOLM P/F Thresholds	OPM P/F Thres	holds		
			Min.	Max.		
Wavelength	h:	1490 nm 🗸				
Power:		Min. and Max.	-45.00	15.00	iBm	
\sim						
					Revert to Factory Settings	
					OK Cancel	

- **Note:** Any will be displayed in the list of available wavelengths only if more than one wavelength is present. If you choose Any, the threshold values will be applied to all wavelengths present in the drop-down box.
 - **5.** Tap **OK** to confirm your changes and close the window. Tap **Cancel** to ignore your changes and close the window.

Selecting the Measurement Mode

Selecting the Measurement Mode

You can use the optical power meter in two different modes. This will have an impact on the available wavelengths displayed in the **OPM** tab of the main window.

- You can use the FTTx/PON mode during service activation (at ONT) or to troubleshoot passive optical networks (at ONT, drop terminal, fiber distribution hub or CO). Depending on the configuration of the unit, you can measure more than one wavelength simultaneously.
- The CWDM mode is particularly useful if you want to measure networks or devices carrying only one wavelength. You can measure the output power (in dBm) or loss (in dB) using one of the CWDM wavelengths available.

To select the measurement mode:

Source 0.0 M Link Vew Bennets Info Fiber type/Port/Wavelengths Test Fibers 0.0670 km 3.300 rm 3.300 rm Calibrate Colibrate (Uer Preferences (Uer Preferences		intelligent Optical Link Mapper	_ 🗇 💌
Fiber type/PortWavelenghs Test Fibers OM4 Multimode 50 µm	Source IOLM Link View Elements Info		
■ 1300 rm □ Loop fiber: 0.0670 km Gene Loop fiber: 0.0670 km ■ 1300 rm ■ Calbrate Calbrate Test Configuration	Fiber type/Port/Wavelengths Test Fibers		Start
K50 nm Loop filee: S.0000 km Gum File Gum Gum Gum Gum Gum Gum Gum Gum Gum Gum Gum Gum Gum Gum Gum Gum Gum Gum Gum Gum Gum Gum	OM4 Multimode 50 μm 🗸 🗙 Launch fiber:	0.0670 km	
Luo Init Calbrate Calbrate Test Confouration User Preferences	🗙 850 nm	5.0000 km	
Calibrate	1300 nm Receive fiber:	0.0670 km	Main Menu
Test Confouration User Preferences		Calibrate	File ►
User Preferences			Identification
			Test Configuration
0 0 0			User Preferences
0 0 0			
0 0 0			
0 0 0			
0 0 0			
000			
000			
DefaultSetup Next file name: Your company_A-B.iolm	DefaukSetup		

1. From the Main Menu, tap User Preferences.

Selecting the Measurement Mode

2. Select the OPM tab.

	User Preferences
General Report OPM	
FTTx/PON	
CWDM	
	Durant to Factory Catilog
	Revert to Factory Settings
	OK Cancel Apply

3. Select the power meter mode.

	User Preferences			×
General Report OPM				
FTTX/PON CWDM				
			Revert to Factory S	ettings
		ОК	Cancel	Apply

- **Note:** The selection of the power mode will have an impact on the available wavelengths displayed in the **OPM** tab of the main window.
 - **4.** Tap **Apply** to save the changes.
 - **5.** Tap **OK** to close the window. Tap **Cancel** to exit without saving.

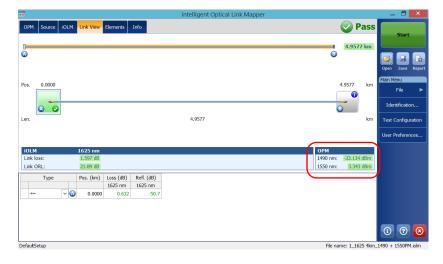
Measuring Power Levels

Measuring Power Levels

The power meter level is refreshed in real time and can help you decide if an iOLM acquisition is required to identify the cause and location of a problem. Depending on your iOLM unit, you can select which wavelength you want to use from the list of available wavelengths. If no wavelength is selected, you cannot perform a power meter acquisition.

You can save the current power levels in a file for future reference and you can view this file anytime by loading it in the iOLM application.

The power levels are also displayed in the Link View tab under OPM.



Measuring Power Levels

To measure power levels:

- **1.** Select the **OPM** tab.
- **2.** Select the wavelengths at which you want to measure the power levels.



3. Tap Quick Save to save the power levels into a file.



Note: Upon saving, the file is automatically sent to the default folder you have defined in the user preferences. See Setting the Default Storage Folder on page 123 for details.

Performing an iOLM Acquisition with a 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 wavelengths selected from the list of available wavelengths.

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.

Note: The power meter acquisition is taken on the SM Live port of the iOLM.

To perform an iOLM acquisition with a power meter:

- **1.** Select the **OPM** tab.
- **2.** Select the wavelengths at which you want to take the power meter measurements.



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

Using the Inline Power Meter (Optional on Some Models)

Performing an iOLM Acquisition with a Power Meter

3. Select a Singlemode Live port and the iOLM wavelengths from the **iOLM** tab.

••	intelligent Optical Link Mapper	_ 🗇 🗙
OPM Source IOLM Link View Elements Info		Start
Fiber type/Port/Wavelengths Test Fibers		Start
OS2 Singlemode Live V K Launch fiber:	0.9000 km	
1625 nm Loop fiber:	0.6500 km	Open Save Report
Receive fiber:	0.6700 km	Main Menu
J	Calibrate	File 🕨
Options		Identification
Automate the multifiber switch acquisition		Test Configuration
		User Preferences
		 (1) (2) (3) (4) (4) (5) (5) (6) (7) (8) (8) (9) (8) (9) (9)
DefaultSetup	Next file name: 1	Your company_A-B.iolm

4. Tap Start.

12 Using Your Module as a Source

You can operate the existing OTDR laser as a source to perform power meter measurements at the other end of the fiber. With this method, you can quickly locate the correct fiber or perform loss measurements.

To use the OTDR as a source:

- 1. From the main window, tap the **Source** tab.
- **2.** If you have a standard iOLM, select the desired wavelength in the list of available choices.

OR

If you have a DWDM or a CWDM module, select a channel filter and a specific channel. See *Working With the DWDM Module* on page 59 or *Working With the CWDM Module* on page 67 for details.

Standard iOLM

60	intelligent Optical Link Mapper	_ 🗇 🗙
Source OLM Link View Bennents Info Turn On Wavelength: 1550 nm (SM) v Modulation: 2 kHz v		Copen Save Report
DWDM and CWDM modu	lles	- 0 X
Source OLM Link View Elements Trifo Turn On		Start Open Save Report Elen Menus File Identification Test Configuration

Note: If you have a DWDM or a CWDM module, the parameters set in the **iOLM** tab are applied automatically in the **Source** tab. See Working With the DWDM Module on page 59 or Working With the CWDM Module on page 67 for details.

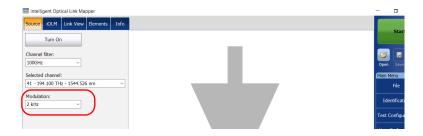
- 3. Select the desired modulation in the list of available choices.
 - ➤ For loss measurement, with a power meter at the other end, select Continuous.
 - ➤ For fiber identification, select 330 Hz, 1 kHz or 2 kHz. This will allow the person at the other end of the link to identify the fiber under test, which could be particularly useful when working with cables containing many fibers.

For easier fiber identification, the application also offers a flashing pattern. If you select this pattern, the modulated signal (1 KHz or 2 KHz) will be sent for 1 second, then will be off for the next second, then be sent again for 1 second, and so on. If you want the OTDR to emit light in a flashing pattern, select **1 kHz + Blink** or **2 kHz + Blink**.

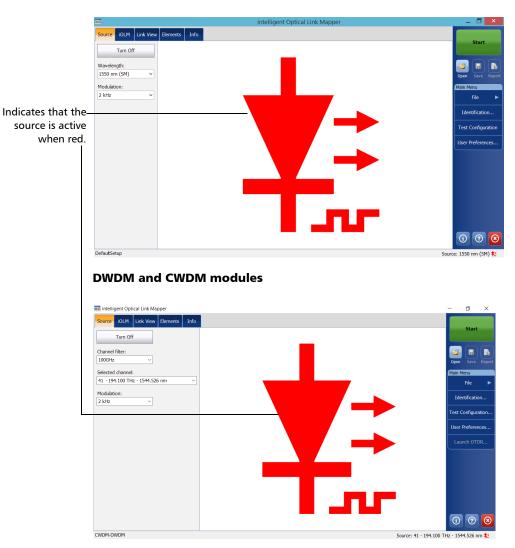
Standard iOLM



DWDM and CWDM modules



4. Tap Turn On. You can stop light emission at any time by tapping Turn Off.



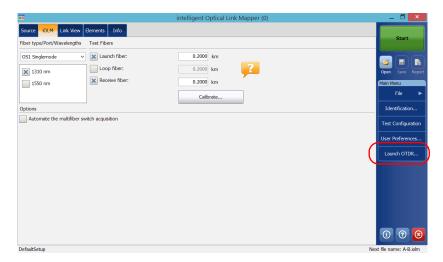
Standard iOLM

13 Starting the Classic OTDR Application

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

- **Note:** EXFO recommends to run only one instance of the OTDR application per module at a time, either the one you start from ToolBox, or the one you start from the iOLM application.
- Note: This option is available only when the IADV software option is activated.

To use the classic OTDR application:



1. From the **iOLM** tab, tap **Launch OTDR**.

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

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



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

14 Analyzing and Managing Results

Once a measurement is performed, you can view the results in different tabs:

- Link View: shows an intuitive representation of a specific link, which combines several measurements results and value into a single view. See Viewing Results in the Link View on page 151 for details.
- Elements: displays detailed results corresponding to the elements or sections selected in the link view. The loss and reflectance are displayed with appropriate coloring based on the pass/fail status of each value. See Viewing Results of Elements and Fiber Section Details on page 168 for details.
- Info: indicates information about a measurement, such as the file name, acquisition date, and acquisition status. See *Viewing Measurement Information* on page 179 for details.
- Summary: is only available when an externally controlled MPO optical switch is connected to the unit. See *Viewing Multifiber Results* on page 180 for details.

Viewing Results in the Link View

The link view is divided into different regions.

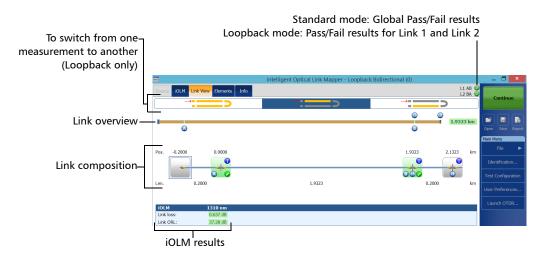
- ► Link overview: displays the entire link from the beginning of the link under test to the end. See *Link Overview* on page 153 for details.
- ► Link composition: displays every element present on the link. See *Link Composition* on page 154 for details.
- iOLM results: present the acquisition results for all wavelengths at which the iOLM acquisition was performed. See *iOLM Results* on page 162 for details.

Analyzing and Managing Results

Viewing Results in the Link View

Power meter results (if power meter measurements are taken): present the acquisition results for all wavelengths at which the power meter acquisition was performed. See *Power Meter Results* on page 164 for details.

➤ Global Pass/Fail Status: shows the status of the link under test. See *Global Pass/Fail Status* on page 165 for details.



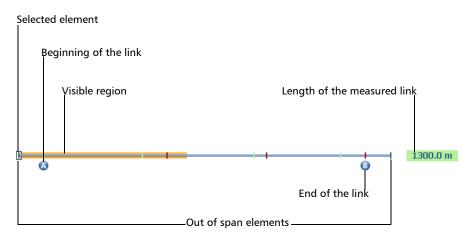
Link Overview

The link overview displays the entire link from the beginning of the link under test to the end.

The following color codes are used for the elements composing the link overview.

- ► Red: The status of the element is fail.
- ► Green: The status of the element is pass.
- Blue: The element is not tested for pass/fail or the status of the element is unknown.

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



Viewing Results in the Link View

- Selected element: The rectangle indicates the position of the selected element in the link composition.
- Beginning of the link: The letter A (launch fiber) indicates the beginning of the link under test. See *Launch, Receive, and Loop Fibers* on page 10 for details.
- Visible region: The colored background represents the visible region in the link composition view.
- End of the link: The letter B (receive fiber) indicates the end of the link under test. See Launch, Receive, and Loop Fibers on page 10 for details.
- Length of the measured link: This value excludes the launch and receive fiber.

Elements before A and after B are referred to as *out of span* elements. These elements are not tested for pass/fail status, but can have diagnostics on them. If no receive fiber is defined, the element marked as "B" will not be tested for pass/fail.

Link Composition

The number of items displayed in the link composition varies according to the available space, number of elements, and section size. When the link length is too long, you may need to scroll on the link using the navigation arrow.

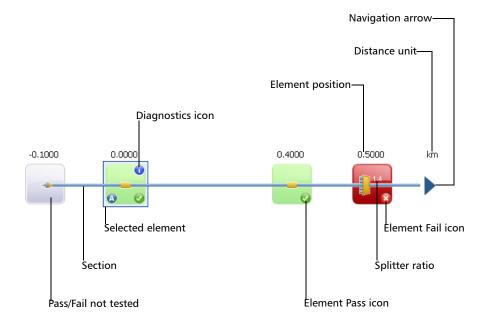
Note: The distance between the elements is not 100 % proportional. To have a proportional representation of the element, see Link Overview on page 153.

The link composition displays every element present on the link.

Analyzing and Managing Results

Viewing Results in the Link View

Standard measurement



Loopback measurement



Analyzing and Managing Results

Viewing Results in the Link View

- Diagnostics icon : This icon specifies that some diagnostics are present on the element to provide additional information about detected problems or ambiguous measurement situations. See Understanding Diagnostics on page 133 for more details.
- Element position: This value represents the distance of the element from the beginning of the link under test.
- Pass/Fail not tested: The gray background indicates that the status of the element is unknown or it has not been evaluated because this element is not part of the link (out of span). If there is no pass or fail icon in the right side corner, it means that thresholds are not applied on this element and it is not tested for a pass or fail status. The element status remains unknown in the following scenarios:
 - ► If any element is followed by a 2:N splitter in the link, then the element's loss pass/fail status is displayed as unknown.
 - If the element has a reflectance value and it is placed after the 2:N splitter element, then the element's reflectance pass/fail status is displayed as unknown.
 - ➤ If the 2:N splitter is in a group of elements and an element follows the 2:N splitter in the group, then the pass/fail status of the group is displayed as unknown.

Note: 2:N splitters are not supported if your unit is equipped with an FTB/FTBx-740C module.

- Selected element: The element outlined in blue indicates that it is currently selected.
- > Section: A fiber section is delimited by two elements.
- Element Pass icon log : Green is associated with a pass status.
- Element Fail icon mail: Red is associated with a fail status.
- ➤ Splitter ratio: The value displayed on the element corresponds to the splitter ratio. See *Defining the Link for Your Test* on page 86 for details.

- Distance unit: You can choose the distance units you will use for your measurements in a list of available choices. See Selecting the Distance Units on page 131 for details.
- Navigation arrow: When more items are available on a particular side, it indicates that you have to scroll to view those items.
- ► Letter A: This indicates the beginning of the link under test (launch fiber). See *Launch, Receive, and Loop Fibers* on page 10 for details.
- ► Letter B: This indicates the end of the link under test (receive fiber). See *Launch, Receive, and Loop Fibers* on page 10 for details.
- **Note:** An arrow () icon is displayed on the element when the start and the end of the link are represented by the same element.
 - Loop start icon beginning of the loop.
 - Loop end icon (1): In loopback measurements, indicates the end of the loop.
 - Loop middle icon (1): In loopback measurements, this icon is displayed on the element if the loop is configured on a single element. The element can be a splice or a connector. When the length of the loop is set to zero, the loop is identified in the middle of the link. An item is automatically added to the links when no one is found.

Viewing Results in the Link View

Element Name	Element Icon	Element Description
Macrobends	~	Macrobends can be displayed in the link view when more than one wavelength is present in the measurement.
		Note: Macrobends are not detected if your unit is equipped with an FTB/FTBx-740C module.
		Note: The macrobend will always be displayed as a failed element.
Out of Range		The out of range element is displayed when the end of fiber could not be detected by the module because of insufficient dynamic range.
Splitter		The splitter is a passive fiber optic coupler that divides light from a single fiber into two or more fiber channels. The splitter ratio is displayed beside the icon.
		<i>Note:</i> Splitters are not supported if your unit is equipped with an FTB/FTBx-740C module.

In addition, you can have elements represented by specific icons.

Analyzing and Managing Results

Viewing Results in the Link View

Element Name	Element Icon	Element Description
2:N Splitter	- -	2:N splitter can be used to create network redundancy. If a network break occurs, the operator can connect through the other network branch.
		Note: 2:N splitters are not supported if your unit is equipped with an FTB/FTBx-740C module.
Splice		The splice can indicate the junction of two fiber sections, the presence of a macrobend, or a microbend in the fiber.
Connector		The connector is used to join two fibers.
Switch		Indicates that a switch has been detected. See <i>Connecting an Optical</i> <i>Switch to the iOLM</i> on page 27 for details.

Analyzing and Managing Results

Viewing Results in the Link View

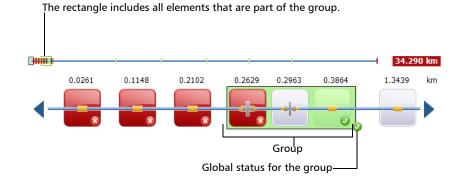
Element Name	Element Icon	Element Description
Fault	- .	For the PON Last Mile measurement type, the fault icon indicates that a problem occurred during the analysis.
		For example, when a splitter is on the link, a loss and a section of fiber are expected after the splitter. If no splitter is found on the link but a end of fiber is detected, the fault icon is displayed instead of the end of fiber to indicate there is a problem.
Coupler		A coupler port is an optical fiber device with one or more input fibers and one or several output fibers. This device is associated with a minimum loss value; for example, a 1 1x2 coupler has a loss of 3 dB.

Sometimes, when the analysis detects several link elements that are too close to one another to be independently characterized, the link elements will be displayed as groups. 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 dependent 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 dependent loss.

Note: Macrobends are not detected if your unit is equipped with an FTB/FTBx-740C module.

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



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

You can select grouped elements individually as you would do with any other standalone element.

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

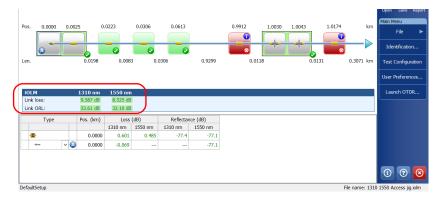
When elements are grouped at the end of the link, icon B is displayed on one of the sub-elements.

iOLM Results

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

When an acquisition is performed with the FTB/FTBx-740C-DWC module, the ITU channel, followed by the frequency (in THz), and the center wavelength (in nm), is displayed in the iOLM acquisition results.

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



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

- **Note:** The propagation delay (multimode only) is a global link measurement which is measured by the OTDR. It is defined by the amount of time necessary for a signal to travel from point A to point B. It may vary between wavelengths.
- **Note:** If the link ORL value is displayed with a < symbol, it is saturated. A test to obtain a pass/fail status can reveal if the element is fail, but will not be able to specify a pass status.

Unidirectional and Bidirectional Loopback Results

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

The loopback results appear after a successful split.

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

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

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

••		intelligent Optical Link Mapper - Loopbach	k Bidirectional (0)	_ 🗇 🗙
Source	IOLM Link View Elements Info			B O A O Continue
	→:==>>			
R			I.9323	
	۵		8	Open Save Report
				Main Menu
Pos.	-0.2000 0.0000		1.9323 2.1323	km File 🕨
				Identification
				Test Configuration
Len.	0.2000	1.9323	0.2000	km User Preferences

> In the case of a bidirectional loopback measurement:

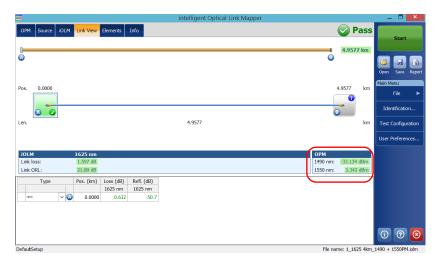
After the first measurement is taken, the results are presented exactly as they would be for a non-bidirectional loopback measurement.

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

Power Meter Results

The power meter acquisition results are displayed 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 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 statuses is fail, then the global pass/fail status will be fail.

If you are working with an FTB/FTBx-740C module, the iOLM will automatically detect the coupler element (one of the elements that can be part of the link) in the following cases:

- A MUX is detected between the link start (element A) and the link end (element B) inclusively. When no launch fiber is defined, element A is excluded from the detection range.
- the iOLM looks for a DEMUX when a MUX is detected. The DEMUX will be placed between the MUX and the link end (element B) if the latter has a loss that can be measured (the receive fiber is long enough). If no element fits these criteria and no receive fiber is defined, the DEMUX is placed on the link end (element B).

Since no pass/fail thresholds are applied on coupler elements detected automatically by the application, the global pass/fail status is not affected by this specific element type. However, when you define the coupler element as a custom element, the thresholds applied on the coupler element affect the global pass/fail status directly. If no thresholds are defined for the custom coupler, this element will not be taken into account in the global pass/fail status. See *Defining the Link for Your Test* on page 86 for details.

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. See *Managing Elements and Analyzing Links* on page 172 for details.

Viewing Results in the Link View

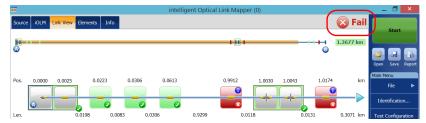
The iOLM application waits for the acquisition to finish before displaying the pass status. However, the fail status is displayed as soon as any of the values tested has a fail status. A fail value can change to unknown or pass when the acquisition is finished.

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

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

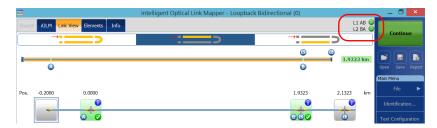
Note: 2:N splitters are not supported if your unit is equipped with an FTB/FTBx-740C module.

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



Standard measurement

Loopback measurements



If you have selected more than one predefined certification standards to perform an acquisition, you can view which ones have a pass or fail status by tapping on the global pass/fail status icon.

				intelligent	Optical Link N	lapper				_ 0 ×
Source iOLM Link	View Elements	Info				<table-cell> Cus</table-cell>	tom Pass/Fail Thres		Fail	Start
Q								•		Open Save Report
Pos. 0.0000	4.8894	15.378	20.409	25.571	30.837	56.086	81.352	98.048	km	
	0	×								
Len. 4.889	94 10.48	9 5.030	5.161	9 5.26	62 25.24	49 25.	267 16.69	6	9.27 km	
iOLM	1310 nm	1490 nm	1550 nm	_	_	_	_	_		
Link loss:			36.008 dB							
Link ORL:	32.52 dB	32.60 dB	33.04 dB							
Туре	Pos. (km)	Los	s (dB)		Reflectance (dB)					

Viewing Results of Elements and Fiber Section Details

Viewing Results of Elements and Fiber Section Details

When an element or fiber section is selected in the link view, the details of the corresponding selection are automatically displayed in the **Elements** tab.

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

The loss or reflectance value may be underestimated 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 estimate the loss/reflectance values, but since the measured signal does not completely clear the noise floor, the loss or reflectance/attenuation values are likely to be underestimated. Underestimated loss, reflectance, and attenuation values are displayed with a > symbol.

Note: If the loss or reflectance value is saturated, it is displayed with a > symbol. The application will be able to specify a fail status if the value is fail, but in all other cases, the application will set the status to unknown.

The 0.0 value is set on the first element when the launch fiber is present.

Note: You can select a section only if the **Fiber section** option is enabled in the **User Preferences** window. See Displaying or Hiding Fiber Sections on page 130 for details.

To view elements or section details:

- **1.** From the **Link View** tab, select the desired element or fiber section on the link composition.
- 2. Tap the **Elements** tab to view the selected element or section details.

Source OLM Link View Bements Info Comparing the second
Image: Weight of the system Image: Weight of the system <t< th=""></t<>
Image: Weight of the system Image: Weight of the system <t< th=""></t<>
· · · · · · · · · · · · · · · · · · ·
0.1947 0.063 0.043 0.324 0.221
ginning of the 0.0000 0.473 0.427 -81.6 -76.8
link 0.0321 0.006 0.006 0.006 0.200 0.200
0.0321 0.402 0.294
- 0.0522 0.035 0.011 0.674 0.200
• • • • • • · · · · · · · · · · · · · ·
End of the link

Editing Element Types

Depending on the characteristics of a specific element, it may be possible to change its type.

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

To edit element types:

1. From the **Elements** tab, select the element you want to modify in the **Type** column.

••								intel	ligent Optic	al Link Ma	apper
Sou	irce	IOLM	Link V	iew	Elements	Info					
		Туре			Pos./Len.	Loss	(dB)	Reflectar	nce (dB)	Attenuatio	n (dB/km)
					(km)	1310 nm	1550 nm	1310 nm	1550 nm	1310 nm	1550 nm
	Σ.		_		-0.1979	0.946	0.743	-54.1	-55.2		
			~)	-0.1979		0.083				
0	-1-		_		-0.1947		0.661	-54.1	-55.2		
	—				0.1947	0.063	0.043			0.324	0.221
	•			۵	0.0000	0.473	0.427	-81.6	-76.8		
	-				0.0321	0.006	0.006			0.200	0.200
					0.0321	0.402	0.294				
	-				0.0522	0.035	0.011			0.674	0.200
				a	0.0843			>.14.5	>.14 1		

- Pass urce iOLM Link View Elements Info Туре Pos./Len. Loss (dB) Reflectance (dB) Attenuation (dB/km) (km) 1310 nm 1550 nm 1310 nm 1550 nm 1310 nm 1550 nm -0.1979 0.743 -54.1 -55.2 0.946 -0.1979 0.083 -0.1947 0.661 -54.1 -55.2 0 1947 0.063 0.043 0.324 0.221 0.0000 0.473 0.427 -81.6 -76.8 0.0321 0.006 0.006 0.200 0.200 0.0321 0.402 0.294 0.0522 0.035 0.011 0.674 0.200 Test Cor 0.0843 >-14.5 >-14.1 ß
- 2. Choose an element type from the list of available choices.

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

- **Note:** Splitters are not supported if your unit is equipped with an FTB/FTBx-740C module.
- **Note:** When the type of an element is modified, a "*" sign is displayed next to the element in the **Type** column. The "*" sign is also displayed in the **Type** column when a report is generated.

Managing Elements and Analyzing Links

The application allows you to add and delete elements. You can also analyze the link after you make changes to a specific link.

Adding Elements

The *i*OLM application allows you to add elements on a link by selecting any element or fiber section. However, you cannot add an element after the last element on a link.

- **Note:** You can select a section only if the **Fiber section** option is enabled in the **User Preferences** window. See Displaying or Hiding Fiber Sections on page 130 for details.
- **Note:** As soon as you add an element manually, the "*" sign is displayed in the **Pos./Len.** and **Type** columns in the **Elements** table.

When you add a new element on a link to an existing element or group of elements, the loss and reflectance values are set to "---" and the pass/fail threshold is not applied to the newly added element. Accordingly the status for the new element is reflected as unknown. The global pass/fail status can be affected after adding an element on an existing element. See *Global Pass/Fail Status* on page 165 for details. The added elements are taken into account to determine the pass/fail status of a group of elements.

Note: You cannot insert elements on the links that result from a multifiber acquisition sequence with the MPO switch.

To add an element:

- **1.** Open an iOLM file.
- **2.** Select an existing element in the link composition where you want to add the new element.

OR

Select an element from the **Elements** tab.

3. Tap and hold on the element to view the contextual menu and select **Add Element**.

			Napper								
Start	🛞 Fail							s Info	ew Element	DLM Link	rce i
km Dpen Save F		 i									
File	1.352 9f km	56.086 81.352		Add Element	5.571 25	09 2	20.40	15.378	4.8894	000	0.
Identification.	16.696 km		25.249	Analyze Link 5.2662		5.1619	5.0305	89 5	10.4	4.88	
User Preference											
						m	1550 ni	1490 nm	1310 nm		LM
						B	>36.008 d	>37.794 dB	>39.448 dB		k loss:
						B	>36.008 d				
)	Reflectance (dE		B	>36.008 d	>37.794 dB	>39.448 dB	уре	k loss: k ORL:
) 1550 nm	Reflectance (dE	1310 nm	B	>36.008 d 33.04 d	>37.794 dB	>39.448 dB 32.52 dB	уре	k loss: k ORL:
					1310 nm	IB IB	>36.008 d 33.04 d Loss (dB)	>37.794 dB 32.60 dB	>39.448 dB 32.52 dB	уре	k loss: k ORL:
			1550 nm	1490 nm	1310 nm	18 18 1550 nm	>36.008 d 33.04 d Loss (dB) 1490 nm	>37.794 dB 32.60 dB 1310 nm	>39.448 dB 32.52 dB Pos. (km)	ype ~	k loss: k ORL:
	10 nm 1490 nm 1550 nm	10 nm 1490 nm 1550 nm	10 nm 1490 nm	10 nm 	13	IB 18 1550 nm 0.284	>36.008 d 33.04 d Loss (dB) 1490 nm 0.284	>37.794 dB 32.60 dB 1310 nm 0.271	>39.448 dB 32.52 dB Pos. (km) 25.571		k loss: k ORL:

Managing Elements and Analyzing Links

- 4. In the New Element dialog box, proceed as follows:
 - 4a. Select the location where you want to add the new element.
 - **4b.** Select the type of the new element.



- **Note:** The 2:N splitter and custom elements are displayed in the element type list if they are present in the selected iOLM files.
 - **4c.** Tap **OK** to confirm your changes and close the window. Tap **Cancel** to ignore your changes and close the window.

To add an element on a fiber section:

- **1.** Open an iOLM file.
- **2.** Select an existing fiber section in the link composition where you want to add the new element.

OR

Select the section from the **Elements** tab.

3. Tap and hold on the fiber section to view the contextual menu and select **Add Element**.

D					in	telligent Op	otical Link M	1apper				_ 🗇 🗡
Source i	OLM Link V	lew Elements	Info								🛛 🔀 Fail	Start
a		<u>(</u>					+			 ©	165.77 km	Open Save Repo
Pos. 0.	0000 4.8894	4.8894	15.378 15.378 15.378 15.378 15.378 15.378 15.378 15.378 15.378 15.378 15.378 15.378 15.378 15.378	20.40	9 25 0 5.1619	5.571 <u>25.5</u>	Add Element. Dekte Eleme Analyze Link 5.2662		56.086	81.352	98 km 16.696 km	Main Menu File Identification Test Configuration User Preferences
iOLM Link loss: Link ORL:		1310 nm >39,448 dB 32.52 dB Pos. (km) 25,571	1490 nm >37.794 dB 32.60 dB 1310 nm 0.271	1550 m >36.008 d 33.04 d Loss (dB) 1490 nm 0.284	3	R 1310 nm	eflectance (dB) 1490 nm) 1550 nm				
*	~	25.571*	0.2/1	0.284	0.284							

Managing Elements and Analyzing Links

- 4. In the New Element dialog box, proceed as follows:
 - **4a.** Enter the position that better suit your needs. To change the distance units, see *Selecting the Distance Units* on page 131.
 - **4b.** Select the type of the new element.



- **Note:** The 2:N splitter and custom elements are displayed in the element type list if they are present in the selected iOLM files.
 - **4c.** Tap **OK** to confirm your changes and close the window. Tap **Cancel** to ignore your changes and close the window.

Deleting Elements

The application allows you to manually delete added elements.

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

To delete an element:

- **1.** Open an iOLM file.
- **2.** In the link composition, select the element you want to delete.

OR

Select the element you want to delete from the **Elements** tab.

3. Tap and hold on the element to view the contextual menu and select **Delete Element**.

					in	telligent Op	tical Link M	lapper				_ 0
Source	iolm <mark>Lir</mark>	Ik View Element	s Info								🛞 Fail	Start
Ð						_	+	-			165.77 km	Open Save R
Pos.	0.0000	4.8894	15.378	20.40		5.571 25.57	Add Element Delete Eleme Analyze Link		56.086	81.352	91 km	Main Menu File Identification.
		894 10.4	189 5	.0305	5.1619		5.2662	25.249	25	.267	16.696 km	Test Configurat
		1310 nm	1490 nm	1550 ni	n		5.2662	25.249	25	.267	16.696 km	
Link lo	155:				n 3		5.2662	25.249	25	.267	16.696 km	
Link lo	155:	1310 nm >39.448 dB	1490 nm >37.794 dB 32.60 dB	1550 m >36.008 d 33.04 d Loss (dB)	n 3 8		flectance (dB))	25	.267	16.696 km	Test Configurat
IOLM Link lo Link Ol	ss: RL:	1310 nm >39.448 dB 32.52 dB	1490 nm >37.794 dB 32.60 dB 1310 nm	1550 m >36.008 d 33.04 d	n 3	Re 1310 nm			25	.267	16.696 km	

4. When the application prompts you, select **Yes** to delete the element or **No** to cancel your choice.

Managing Elements and Analyzing Links

Analyzing Links

The application allows you to reanalyze measurements from the **Link View** or **Elements** tabs. When you reanalyze a link, it regenerates all the elements from the acquired measurement and resets the link start and link end values. Once a measurement is reanalyzed, any element related to the link composition, values, and characteristics, as well as the global pass/fail status is refreshed. All the elements added manually are removed from the link.

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

To analyze the link:

- 1. Open an iOLM file.
- 2. From the Link View or Elements tab, tap and hold to view the contextual menu and select Analyze Link.

•						in	telligent Op	otical Link N	lapper				_ 0 ×
Source	IOLM	Link Vie	ew Elements	Info								🛞 Fail	Start
8			— —								 6	165.77 km	Open Save Repo
	0.0000		4.8894	15.378	20.40	9 2				56.086	81.352	98 km	Main Menu File Identification
Len.		4.8894	10.48	9 5	.0305	5.1619		5.2662	25.249	25.26	57	16.696 km	Test Configuration
IOLM			1310 nm	1490 nm	1550 ni								
Link los Link OF		;	>39.448 dB 32.52 dB	>37.794 dB 32.60 dB	>36.008 d 33.04 d								
	Туре		Pos. (km)		Loss (dB)		F	teflectance (dB)				
				1310 nm	1490 nm	1550 nm	1310 nm	1490 nm	1550 nm				
- <u>2</u> -		~	25.571 25.571*	0.271	0.284	0.284							

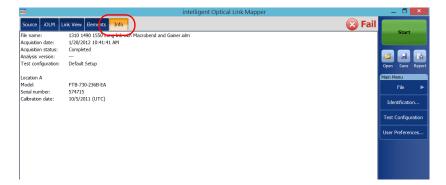
3. When the application prompts you, select **Yes** to analyze the link or **No** to cancel your choice.

Viewing Measurement Information

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

To view measurement information:

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



Note: If the file autonaming is not configured, the file name will be "---". See Naming Trace Files Automatically on page 32 for details.

Viewing Multifiber Results

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

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

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

	💀 intelligent Optical	Link Mapper (0)			_ 🗆 🗙
	Source iOLM Link View Elements Info Summary			🛛 🛛 🔀 Fail	
Indicates if the loss—	Launch cable calibration: Within thresholds				Start
and reflectance	# File name	Link Length (km)	Link Loss (dB) 1310 nm	Link ORL (dB) 1310 nm	
	1 Cable 13 01.jolm	0.3711	0.236	44.10	🐸 🖬 🖻
values of the SPSB	2 Cable 13_02.iolm	0.3711	0.234	44.09 🥥	Open Save Report
connectors comply	3 Cable 13_03.iolm	0.3708	0.234	44.10 🔮	Main Menu
	4 Cable 13_04.iolm	0.3711	0.238	44.09 🤡	File 🕨
with the	5 Cable 13_05.iom 6 Cable 13 06.iom	0.3675	>0.000	38.87 😡	
recommended	6 Cable 13_06.0m	0.3711	0.235	44.07 🔮	Identification
	8 Cable 13 08.iolm	0.3709	0.232	44.10	Test Configuration
thresholds.	9 Cable 13_09.iolm	0.3710	0.221	44.08 🥥	Test Configuration
	10 Cable 13_10.iolm	0.3711	0.238	44.09 🤡	User Preferences
	11 Cable 13_11.iolm	0.3712	0.224	44.12 🤡	
	12 Cable 13_12.iolm	0.3707	0.218	44.11 📀	Launch OTDR
	😪 11 😢 1			Report	1 7 🗵
	DefaultSetup			File na	me: Cable 13_12.iolm

When the results are displayed, you may noticed that all 12 fibers of an MPO test cable do not have exactly the same length. This may be explained by the type of connector used. APC fiber ends tend to be less reflective, compared to the UPC fiber ends, and the position accuracy is also different between the two fiber ends. The distance reliability will vary depending on the Optimode chosen and the OTDR unit used. For exemple, using a FTB-720C module with the Fast Short Link mode will give the worst results and a FTB-750C module used with the Short Link Close Events mode will give the best results.

Sometimes, the APC MPO connections cannot be detected, as no loss and no reflectance are noticeable. Also, if you use the SLCE and FSL Optimodes, when no reflectance is found on an element, the latter will be converted into a connector instead of a splice.

When an MPO switch is connected, the application manages the fibers of the cable as individual fibers with their own elements. No post-treatment is performed to align elements detected on all fibers, or to add elements that may not have been detected on some of the fibers.

You can view the predefined certification standards applied to each fiber and their corresponding pass or fail status by tapping on the status icon at the end of the row.

••	intellige	ent Optical Link Mapper (0)	_ 🗇 🗡
Source IOLM Link View	/ Elements Info Summary Within thresholds	😿 Fail	Start
I Cable 13_01 Joint 2 Cable 13_02 Joint 3 Cable 13_03 Joint 4 Cable 13_04 Joint 5 Cable 13_05 Joint 6 Cable 13_06 Joint 6 Cable 13_06 Joint 7 Cable 13_06 Joint 9 Cable 13_06 Joint 10 Cable 13_03 Joint 10 Cable 13_03 Joint 11 Cable 13_10 Joint 12 Cable 13_12 Joint	File name	Link Length Link Loss (df) Link OR, (df) 0.3711 0.3711 0.400 PF 0.3711 0.41155 0.400 PF 0.3712 0.41155 0.400 PF 0.3713 0.41155 0.41155 0.3711 0.5710 PF 0.5411 (1.01 km) 0.3712 0.5411 (2.01 km) 0.5411 (2.01 km) 0.3710 Fibre Channel 25541.L1 (10 km) 0.5710 (2.5541.L1 (2 km) 0.3710 Fibre Channel 55541.L1 (2 km) 150/JEC 14763-32012 (2.53214) 0.3710 TIA-568.3.0 (Outside Plant CATV) TIA-568.3.0 (Outside Plant CATV)	Open Save Report Same Save Report Telen Image: Configuration Test: Configuration User Preferences Launch OTDR
11 X 1		Report	i 🤊 🗵
DefaultSetup		File na	me: Cable 13_01.iolm

You can set your unit to generate a report automatically after each sequence. For more information, see *Activating the Automated Report Creation* on page 127.

15 Managing Files

Managing your files can be done using the shortcut buttons, or the **File** menu.

Opening Files

You can open files directly from the application to view them.

To open a file:

1. From the main window, tap the 对 button.

OR

From the Main Menu, tap File, then Open.

•	intelligent Optical Link Mapper	= = = ×
Source IOLM Link View Elements Info		🐼 Fail
Fiber type/Port/Wavelengths Test Fibers		Start
OM4 Multimode 50 µm 💙 🐹 Launch fiber:	0.0670 km	
X 850 nm	5.0000 km	Open Save Report
1300 nm Receive fiber:	0.0670 km	Main Menu File
	Calibrate	Back Home
		Open
		Save
		Save As
		Export
		Report
efaultSetup		File name: 1310 1550 Access jig.iolm

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

Saving Files

You can save the files manually for future reference. If you want to export your files in Bellcore format automatically each time you save a measurement, see *Saving Files in Bellcore Format* on page 124 for details.

- **Note:** If an OTDR Bellcore (.sor) file already exists on disk, a number in parenthesis will be automatically incremented at the end of the file name to avoid unwanted overwrite.
- **Note:** The .sor format is not supported by the bidirectional loopback measurement.

To save a file:

From the main window, tap the 🙀 button.

OR

From the Main Menu, tap File, then Save.

••	intelligent Optical Link Mapper	_ 🗇 🗙
Source IOLM Link View Elements Inf		🐼 Fail
Fiber type/Port/Wavelengths Test Fibers		Start
OM4 Multimode 50 µm 🗸 🗙 Launch fil		
850 nm		Open Save Report
1300 nm Receive fi	0.0670 km	Main Menu File
	Calibrate	Back Home
		Open
		Save
		Save As
		Export
		Report
		(i) (2) (2)
DefaultSetup	I I I I I I I I I I I I I I I I I I I	File name: 1310 1550 Access jig.iolm

Saving Files

To save a file under a different name or location:

- telligent Optical Link Mappe 🛞 Fail IOLM Link View Elements Info Source Fiber type/Port/Wavelengths Test Fibers OM4 Multimode 50 µm 🗸 🗶 Launch fiber: 0.0670 km ? 🗙 850 nm Loop fiber: 5.0000 km X Receive fiber: 0.0670 km 1300 nm n Menu | File Back Home Calibrate.. (i) (? DefaultSetup File name: 1310 1550 Access jig.iolm
- 1. From the Main Menu, tap File, then Save As.

- 2. Select the location where you will store your file as needed.
- **3.** Change the name of the file as needed.
- **4.** Tap **Save**.

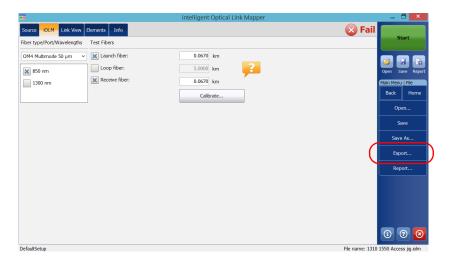
Exporting Files to the Bellcore Format

You can export an OTDR Bellcore file to the disk manually. You can also decide to export files automatically to the Bellcore format each time an iOLM measurement is saved. See *Saving Files in Bellcore Format* on page 124 for details.

If multiple wavelengths are present in the iOLM measurement, a Bellcore (.sor) file is generated for each wavelength.

- **Note:** The .sor format is not supported by the bidirectional loopback measurement.
- **Note:** When a bidirectional measurement is loaded in memory, the **Export** button is disabled.

To export a file manually to the Bellcore format:



1. From the Main Menu, tap File, then Export.

- 2. Select the location where you will store your file as needed.
- **3.** Change the name of the file as needed.
- 4. Tap Save.
- **Note:** When you attempt to generate the .sor file and that the iOLM measurement does not contain the necessary intermediate OTDR measurements, you are notified that the file was not generated, and the reason why. If you interrupt the generation of the .sor file, you are also notified that the file was not generated.

Generating a Report

You can have reports generated for the iOLM, the Power Meter or the iOLM and Power Meter results combined.

You can customize the contents of your report. See *Customizing Reports* on page 126 for details. You can also set the application to generate a report each time a measurement is saved. See *Activating the Automated Report Creation* on page 127 for details.

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

Managing Files

To generate a report:

1. From the main window, tap the **button**.

OR

From the Main Menu, tap File, then Report.

••	intelligent Optical Link Mapper	🗖 💌
Source - IOLM Link View Elements Info		🐼 Fail
Fiber type/Port/Wavelengths Test Fibers		Start
OM4 Multimode 50 µm 🗸 🗶 Launch fiber:	0.0670 km	
850 nm	5.0000 km	Open Save Report
1300 nm Receive fiber:	0.0670 km	Main Menu File
	Calibrate	Back Home
		Open
		Save
		Save As
		Export
		Report
		i ? x
DefaultSetun		Ele name: 1310 1550 Access ilg.jolm

- **2.** Select the location where you will store your file as needed.
- **3.** Change the name of the file as needed.
- 4. Tap Save.

16 Maintenance

To help ensure long, trouble-free operation:

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



WARNING

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

Cleaning EUI Connectors

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



IMPORTANT

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

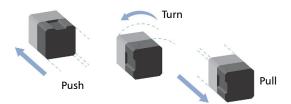


WARNING

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

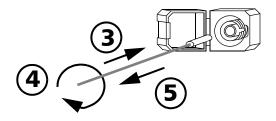
To clean EUI connectors:

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



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

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



- **4.** Gently turn the cleaning tip one full turn, then continue to turn as you withdraw it.
- **5.** Repeat steps 3 to 4 with a dry cleaning tip.

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

- **6.** Clean the ferrule in the connector port as follows:
 - **6a.** Deposit *one drop* of optical-grade liquid cleaner on a lint-free wiping cloth.



IMPORTANT

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

- **6b.** Gently wipe the connector and ferrule.
- **6c.** With a dry lint-free wiping cloth, gently wipe the same surfaces to ensure that the connector and ferrule are perfectly dry.
- *6d.* Verify connector surface with a fiber inspection probe (for example, EXFO's FIP).
- 7. Put the EUI back onto the instrument (push and turn clockwise).
- **8.** Throw out cleaning tips and wiping cloths after one use.

Recalibrating the Unit

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

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

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

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

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

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

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

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

Recycling and Disposal



This symbol on the product means that you should 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.

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

17 Troubleshooting

Viewing Online Documentation

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

To access online help:

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

Contacting the Technical Support Group

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

Technical Support Group

400 Godin Avenue Quebec (Quebec) G1M 2K2 CANADA 1 866 683-0155 (USA and Canada) Tel.: 1 418 683-5498 Fax: 1 418 683-9224 support@exfo.com

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

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

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

Viewing Information About Your iOLM

You can view information about your iOLM such as the version number and contact information for technical support in the **About** window.

To view iOLM information:

From the main window, tap ①.

Transportation

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

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

18 Warranty

General Information

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

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



IMPORTANT

The warranty can become null and void if:

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

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

Liability

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

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

Exclusions

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

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

IMPORTANT

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

Certification

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

Service and Repairs

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

To send any equipment for service or repair:

- **1.** Call one of EXFO's authorized service centers (see *EXFO Service Centers Worldwide* on page 200). 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 200).

EXFO Service Centers Worldwide

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

EXFO Headquarters Service Center

400 Godin Avenue Quebec (Quebec) G1M 2K2 CANADA 1 866 683-0155 (USA and Canada) Tel.: 1 418 683-5498 Fax: 1 418 683-9224 support@exfo.com

EXFO Europe Service Center

Winchester House, School Lane	Tel.: +44 2380 246800
Chandlers Ford, Hampshire S053 4DG	Fax: +44 2380 246801
ENGLAND	support.europe@exfo.com

EXFO Telecom Equipment

(Shenzhen) Ltd. 3rd Floor, Building C, Tel: +86 (755) 2955 3100 FuNing Hi-Tech Industrial Park, No. 71-3, Fax: +86 (755) 2955 3101 Xintian Avenue, support.asia@exfo.com Fuhai, Bao'An District, Shenzhen, China, 518103

To view EXFO's network of partner-operated Certified Service Centers nearest you, please consult EXFO's corporate website for the complete list of service partners:

http://www.exfo.com/support/services/instrument-services/exfo-service-centers.

Index

 *	172, 179
*	
#	
<	
>	

1:? splitter ratio9	1, 92
1:N splitter	89
2:N splitter 89, 92, 156, 159, 166, 174	, 176

A

acquisition
automated sequence 55, 56
multiple wavelengths
progress bar26
single wavelength7
stopped 121
wavelength displayed 26
activating
automated acquisition sequence 55, 56
automated report creation
adding
custom elements
elements on a link 172, 173
elements on fiber sections 175
favorite channels 62, 70
after-sales service 195
analyzing links 172, 178
APC connectors 11, 180
application, certification standards
attenuation, high values73
automated
acquisition sequence
report creation127
autonaming 34, 179

В

backscatter
coefficients 12
values
batch post-processing8
beginning
of the link 154, 157, 161, 168
of the loop157
Bellcore (.sor)
files 123, 124
format55, 184, 186
bidirectional
loopback results163
selecting option49

С

cabling standards	
calculating link loss budget	99
calibration process	54
caution	
of personal hazard	15
of product hazard	15
certification information	vi
certification standards	
predefined	181
selection	81, 98
changing	
default name	
distance units	131
test configuration properties	82
channel	
filter selection	68
spacing selection	60
wavelength selection	61, 69
cleaning	
EUI connectors	190
fiber ends	29
front panel	189

Index

colored background	154
configuration	
file name selected	
name	81
configuring	
automatic file naming	
in loopback mode	
in standard mode	
iOLM	
connecting a switch	
connector	,
A 11, 154, 157,	161, 168
АРС	
В 12, 154, 157,	161, 172
loss	•
MPO	
on link	
UPC	
connectors, cleaning	
conventions, safety	
core size	
coupler	
custom configurations	100, 105
creating	70
deleting	
duplicating	
editing	
exporting	
importing	
selecting	
custom elements	
customer service	199
customizing	100 107
power meter thresholds values	
reports	126
CWDM	
adding favorite channels	
channel filter selection	
channel selection	
dark fiber	
definition	
displaying favorite channels	72

dynamic range	73
electronic noise	73
live-fiber testing	73
main features	67
measurement mode	139
mux/demux channels	73
removing favorite channels	71
residual light	73

D

dark fiber 65, 7	'3
deactivating acquisition sequence 55, 5	6
decrementing name3	32
default folder 123, 124, 12	
defining	
link	90
splitter ratio8	39
definition	
CWDM	1
DWDM	1
standard iOLM	1
deleting	
custom elements9) 5
elements on a link17	7
test configurations 11	2
diagnostics icon	
disabling	
automated acquisition sequence 55, 5	6
sound notifications12	
displaying	
favorite channels	2
fiber sections13	30
distance	
between elements15	54
units131, 157, 17	6
duplicating test configurations7	
DWDM	
adding favorite channels6	52
channel selection6	
channel spacing selection6	
dark fiber6	

definition	1, 59
displaying favorite channels	64
dynamic range	65
electronic noise	65
live-fiber testing	65
main features	59
mux/demux channels	65
removing favorite channels	63
residual light	65
dynamic	
loss budget 102	, 103
range	, 158

Ε

editing	
custom elements	
element types	170
macrobend threshold value	90, 97
pass/fail thresholds	81
power meter thresholds	81
test configurations	107
EF-compliant device	9
electrical safety information	24
electronic noise	65, 73
element	
2:N splitter	159
connector	159
coupler	
fail icon	156
fault	160
macrobend	158
out of range	
pass icon	156
position	
selected	154, 156
splice	
splitter	
switch	
types, edition	
Elements tab 133, 151, 169, 175, 177, 178	170, 173

enabling
2:N splitter
automated acquisition sequence 55, 56
sound notifications129
encircled flux compliance9
end
of the link 12, 154, 157, 161, 172
of the loop157
equipment returns199
EUI
baseplate31
connector adapter31
connectors, cleaning190
dust cap31
exclusion of the first connector9
EXFO universal interface. see EUI
expected loss budget of a link76
exporting
data to other formats8
files in Bellcore format186
test configurations 110

F

factory settings	
fail	
icon	
status 12	1, 153, 156, 165, 181
Fast Short Link	
mode	
Optimode	27
fault	
favorite channels	
adding	
displaying	64, 72
managing	62, 70
removing	63, 71
fiber	
core size	
dark	
identifying by name	
section	

types	86, 87
types, selection	
water peak	
fiber ends, cleaning	
fiber properties	
backscatter	96
core size	96
IOR	96
file	
autonaming	179
exporting in Bellcore format	186
opening	183
saving	184
file name	
configuration	34
decrementing	32
incrementing	32
order of appearance	35
preview	32, 35
separator	35
wavelength value appended	124
first	
connector, exclusion	9
connector, value	103
element on link 11, 154, 157, 1	61, 168
fixed loss budget	102
front panel, cleaning	189
FTTx/PON measurement mode	139

G

General tab 123, 125, 127, 129, 130, 131
generating a report
automated acquisition sequence 55
automatically 126, 127, 181
manually126, 187
global pass/fail status
displayed7, 121, 152, 165, 172
178, 180
for a group of elements
icon 167
graph generation 126

gray background156
group
loss value161
of elements on link 156, 160, 172
reflectance value161

Н

help icon	5
help. see online user guide	
hiding fiber sections 130	0
high attenuation, values73	3

I

icon		
2:N splitter		159
arrow		157
connector		159
coupler		160
diagnostics	133, 154,	156
fail		
fault		160
global pass/fail status		167
help		39
loop end		157
loop middle		157
loop start		157
macrobend		158
out of range		158
pass		156
splice		159
splitter		158
status		181
switch		159
identification label		195
impacts of test configurations		76
importing test configurations		108
incrementing name		32
Info tab	121, 151,	179
inline power meter		
available on unit	106,	135
CWDM, measurement mode.		139

definition2, 135FTTx/PON measurement mode139number of channels available135power levels141threshold values135, 136input connector of MPO switch27inserting test modules25insertion loss12iOI M
basic theory
configuration
definition
equipped with inline power meter 2, 135
loopback acquisitions 115
loopback mode configuration
main window
P/F Thresholds tab 81, 89, 100, 101
results
selecting a port 40, 45, 51, 56
selecting wavelengths 41, 46, 51, 57
standard acquisitions 115, 116
standard mode configuration
tab
testing modes8
working with the switch 50
IOR 89, 96
ITU-T grid 59, 61, 67, 69

J

junction between fiber sections 15	junction	between	fiber	sections		15	59
------------------------------------	----------	---------	-------	----------	--	----	----

L

label, identification1	95
last	
connector, value 1	03
element on link 12, 154, 157, 161, 1	72
launch cable for MPO switch	28

launch fiber		
length		
on a link 10, 11, 13, 42, 47	, 52,	154
157, 161, 168		
launching OTDR application		149
LED		
length		
of the loop		157
of the measured link		154
letter		
A11, 154, 157,	161,	168
В 12, 154, 157,	161,	172
link		
elements		165
end values		178
length		165
loss		
loss budget		
ORL	162,	165
start values		178
link composition		
2:N splitter		
arrow icon		
connector		
coupler		
definition		
diagnostics icon		
distance between elements		
distance units		
element fail icon		
element pass icon		156
element position		
fault		
fiber section		
group of elements		
letter A		
letter B		
loop end icon		
loop middle icon		
loop start icon		
macrobend		
navigation arrow	154,	15/

out of range	158
pass/fail not tested	156
selected element	156
splice	159
splitter	158
splitter ratio	
switch	
Link Definition tab	
link overview	,
beginning of the link	154
definition 151,	
end of the link	
length of the measured link	
selected element	
visible region	
link view	
bidirectional loopback results	163
global pass/fail status 152,	
iOLM results	162
power meter results	
unidirectional loopback results	
Link View tab 115, 120, 133, 151, 169,	178
live-fiber testing	
loop	, , 3
end, icon	157
fiber length 10, 44,	
fiber on a link	
middle, icon	
start, icon	157
loopback	157
all links combined in one report	176
configuration mode	
measurements 13, 116,	
loss	157
at the connector	0
results	
thresholds	
values	
loss budget	1/2
dynamic	102
fixed	
of a link	. 70

Μ

macrobend	0 97 158
main features	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
CWDM	67
DWDM	
main window	
iOLM	25
status bar	
maintenance	
EUI connectors	190
front panel	
general information	
managing elements	
adding on a link	172. 173
adding on fiber sections	
analyzing links	
deleting	
measurement	
assistant	42, 48, 53
information	
of power levels	
measurement modes, inline power i	
CWDM	
FTTx/PON	
middle of the loop	
modes	
Fast Short Link	
Short Link Close Events	
modifying	
backscatter	89, 96
core size	
custom elements	
IOR	
macrobend threshold value	
test configurations	
modulation	146
module	
configuration	
multimode	
singlemode	
mounting EUI connector adapter	21

MPO

cable180, connectors	
launch cable	28
switch	
multifiber	
acquisitions	180
results	180
multimode	
measurements	9
module	87
port 4	1, 96
wavelengths	170
multiple-wavelength acquisition7,	162
mux/demux channels	

Ν

name of the configuration 81	
naming measurement automatically 32	
navigation arrow 154, 157	
noise level 168	
number	
of channels for inline power meter 135	
of connections 93, 99	i.
of digits displayed 33, 37	
of splices	ļ

0

online user guide
OPM
P/F Thresholds tab 81, 106, 138
tab140, 142, 143
optical
cable
switch 27, 50, 172, 180
optical radio-frequency port6
Optimode
definition 8, 77
Fast Short Link 27
selection 81, 85, 180

Short Link Close Events test configuration	
order of appearance in file name	35
ORL10, 11, 12,	102
OTDR	
application	149
Bellcore (.sor) files 123,	124
Bellcore (.sor) format55,	184
graph generation	126
ports 2, 3, 4, 5, 6	5, 55
real-time acquisitions	149
source	
out of range	
element	158
value	
out of span, element	154
output connector of MPO switch	
overall status	

Ρ

pass icon
not tested
status 12, 120, 151, 154, 160, 165, 168
threshold values 81, 137, 163, 165, 172
PDF format for reports
PDF. see online user guide
performing
acquisitions with a power meter
bidirectional loopback acquisitions 117
live-fiber testing65, 73
loopback acquisitions
multifiber measurements
multimode measurements
standard acquisitions 115, 116
PON Last Mile measurements
port selection
power consumption of the iOLM24

power levels
displayed in Link View tab 141
measurements 2, 141, 142
power meter
acquisitions143
available on unit 2, 106, 135
results152, 164
threshold values 81, 106, 135, 136, 137
predefined certification standards
applied to fiber181
selection 99
preview of the file name 32, 35
product
identification label195
specifications 14
progress of the acquisition 115
propagation delay162
Properties tab

R

Rayleigh backscatter coefficient	
length 12, 4	44
on a link 10, 12, 13, 42, 47, 52, 15 157, 161, 172	
reflectance	
on events	31
results16	58
values 54, 76, 151, 156, 17	72
refraction index of the measurement	
removing	
favorite channels	71
test modules	
report	
automatically sent to default folder 12	77
creation 181, 18	
generated automatically, PDF 8, 126, 12	
generated manually	
Report tab	
residual light	
i conadar ngine	

resolution performance54	
results, multifiber	
return merchandise authorization (RMA) 199	
reverting to factory settings	

S

safety	
caution1	5
conventions1	5
warning1	5
saving files	
in Bellcore format12	4
manually	4
selected element 154, 15	6
selecting	
certification standards	8
channel61, 6	9
channel filter6	8
channel spacing6	0
distance units13	1
dynamic loss budget10	2
fiber types8	1
measurement mode for	
inline power meter	9
modulation14	6
Optimode8	5
port40, 45, 51, 5	6
predefined certification standards9	9
split ratio9	1
test configuration77, 7	8
wavelength 41, 46, 51, 57, 14	5
separator used in file name3	5
service and repairs19	9
service centers	0
setting	
automated acquisition sequence 55, 5	6
custom power meter	
threshold values 106, 13	7
default storage folder12	3
fiber values automatically 42, 48, 5	3

launch cable length automatically 10, 39 42, 47, 48, 53
launch cable length manually 10, 39, 42 43, 47, 49
loop fiber length manually 10, 39, 47, 49
power meter threshold values
receive cable length automatically 10, 39
42, 47, 48, 53
receive cable length manually 10, 39, 42 43, 47, 49
test configuration properties
settings, factory
shipping to EXFO 199
Short Link Close Events
measurement 116, 180
Optimode
single wavelength acquisitions7
singlemode
live port 2, 3, 6, 55, 135, 143
live/OPM port4
module
OTDR port
wavelengths
software options 14
sound notifications 129
source, modulation 146
specialized measurements
PON Last Mile 116
Short Link Close Events 116
specifications, product
splice
split measurement
splitter
1:N
2:N
element 158, 170
splitter ratio
1:?
on element 89, 91, 156, 158, 171
stage 192

standard	
configuration mode	40
iOLM definition	1
measurements 1	16
mode	8
starting OTDR application1	49
status	
bar	15
fail 121, 153, 156, 165, 1	81
global pass/fail1	65
icon 1	
of the acquisition 1	21
pass153, 156, 166, 1	81
unknown 121, 153, 156, 166, 1	72
stopping acquisition1	
storage requirements 1	89
sub-element in grouped elements 1	
Summary tab 151, 1	80
switch	80
symbols, safety	15

Т

tab
Elements 133, 151, 168, 169, 170, 173
175, 177, 178
General 123, 125, 127, 129, 130, 131
Info 121, 151, 179
iOLM 39, 144
iOLM P/F Thresholds81, 89, 100, 101
Link Definition
Link View 115, 120, 133, 151, 169, 178
OPM140, 142, 143
OPM P/F Thresholds138
OPM Pass/Fail81, 106
Properties
Report126
Summary151, 180
technical specifications14
technical support195
temperature for storage 189

test configuration

5	
creating	79
deleting	112
duplicating	
editing	
exporting	
impacts	
importing	
Optimode	
properties	
selecting	
testing modes	
Optimode	
standard	
theory, iOLM	
threshold values	
macrobend	
power meter	
total insertion loss	
transportation requirements	
type of fiber	

U

understanding the inline power meter 135
unidirectional loopback results
unknown status 121, 153, 156, 166, 172
UPC connectors 180
USB
cable
device 108, 110, 123
user guide. see online user guide
using
a switch 27, 50
OTDR application 149
OTDR as a source 145

V

value	
first connector	103
last connector	103
out of range	. 39

viewing

diagnostics	133
measurement information	
multifiber results	180
results in Elements tab	168
results in Link View tab	151
visible region	154

W

warranty	
certification	198
exclusions	198
general	197
liability	198
null and void	197
wavelength	
available on unit	2
multimode	. 96
selection	145
singlemode	. 96
value appended to file name	124
working	
with the CWDM module	. 67
with the DWDM module	. 59
with the switch	. 50

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

NAMES AND CONTENTS OF THE TOXIC OR HAZARDOUS SUBSTANCES OR ELEMENTS CONTAINED IN THIS EXFO PRODUCT

包召住争 EA	FU广始中的有4	每 有舌初灰以九系日	的名称双召里	

Part Name 部件名称	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	0	0	0	0	0	0
Electronic and electrical sub-assembly 电子和电气组件	х	0	х	0	х	х
Optical sub-assembly ^a 光学组件 ^a	х	0	0	0	0	0
Mechanical sub-assembly ^a 机械组件 ^a	0	0	0	0	0	0

Note:

注:

This table is prepared in accordance with the provisions of SJ/T 11364.

本表依据 SJ/T 11364 的规定编制。

O: Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.

O:表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 标准规定的限量要求以下。

X: indicates that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572. Due to the limitations in current technologies, parts with the "X" mark cannot eliminate hazardous substances.

X:表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 标准规定的限量要求。

标记"X"的部件,皆因全球技术发展水平限制而无法实现有害物质的替代。

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	5	()

a. If applicable.

如果适用。

P/N: 1073482	
--------------	--

7N. 1073402		
		www.EXFO.com · info@exfo
CORPORATE HEADQUARTERS	400 Godin Avenue	Quebec (Quebec) G1M 2K2 CANADA Tel.: 1 418 683-0211 · Fax: 1 418 683-2170
EXFO AMERICA	3400 Waterview Parkway Suite 100	Richardson, TX 75080 USA Tel.: 1 972-761-9271 · Fax: 1 972-761-9067
EXFO EUROPE	Winchester House, School Lane	Chandlers Ford, Hampshire S053 4DG ENGLAND Tel.: +44 2380 246 800 · Fax: +44 2380 246 801
EXFO ASIA-PACIFIC	62 Ubi Road 1, #09-01/02 Oxley Bizhub 2	SINGAPORE 408734 Tel.: +65 6333 8241 · Fax: +65 6333 8242
EXFO CHINA	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	250 Apollo Drive	Chelmsford MA, 01824 USA Tel.: 1 978 367-5600 · Fax: 1 978 367-5700
EXFO FINLAND	Elektroniikkatie 2	FI-90590 Oulu, FINLAND Tel.: +358 (0) 403 010 300 · Fax: +358 (0) 8 564 5203
TOLL-FREE	(USA and Canada)	1 800 663-3936

© 2018 EXFO Inc. All rights reserved. Printed in Canada (2018-05)

