FCOMP/-PRO Option

For T-BERD®/MTS-2000V2, -4000 V2 and OneAdvisor-800 Platforms

User Manual

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User Manual

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This product, and the batteries used to power the product, should not be disposed of as unsorted municipal waste and should be collected separately and disposed of according to your national regulations.

VIAVI has established a take-back processes in compliance with the EU Waste Electrical and Electronic Equipment (WEEE) Directive, 2012/19/EU, and the EU Battery Directive, 2006/66/EC.

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Article 33 of EU REACH regulation (EC) No 1907/2006 requires article suppliers to provide information if a listed Substances of Very High Concern (SVHC) is present in an article above a certain threshold.

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EU CE Marking Directives (LV, EMC, RoHS, RE)

This product conforms with all applicable CE marking directives. Please see EU Declaration of Conformity for details.

Contents

About This Guide

The VIAVI equipments provide handheld, modular platforms designed for the construction, validation and maintenance of fiber networks.

The topics discussed in this chapter are as follows:

Purpose and scope

The purpose of this guide is to help you successfully use the equipment features and capabilities. This guide includes task-based instructions that describe how to configure, use, and troubleshoot the equipment with OTDR/Fibercomplete module and FCOMP/-PRO software option.

Assumptions

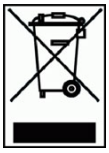
We are assuming that you have basic computer and mouse/track ball experience and are familiar with basic telecommunication and fiber optic concepts and terminology.

Technical assistance

If you require technical assistance, call 1-844-GO-VIAVI. For the latest TAC information, go to http://www.viavisolutions.com/en/services-and-support/support/technical-assistance.

Recycling Information

VIAVI recommends that customers dispose of their instruments and peripherals in an environmentally sound manner. Potential methods include reuse of parts or whole products and recycling of products components, and/or materials.



Waste Electrical and electronic Equipment (WEEE) Directive

In the European Union, this label indicates that this product should not be disposed of with household waste. It should be deposited at an appropriate facility to enable recovery and recycling.

Conventions

This guide uses naming conventions and symbols, as described in the following tables.

Table 1 Typographical conventions

Description	Example
User interface actions appear in this **typeface**.	On the Status bar, click **Start**.
Buttons or switches that you press on a unit appear in this **TYPEFACE**.	Press the **ON** switch
Code and output messages appear in this `typeface`.	`All results okay`
Text you must type exactly as shown appears in this **`typeface`**.	Type: **`a:\set.exe`** in the dialog box
Variables appear in this ***typeface***.	Type the new ***hostname***.
Book references appear in this ***typeface***.	Refer to ***Newton's Telecom Dictionary***
A vertical bar | means "or": only one option can appear in a single command.	`platform [a|b|e]`
Square brackets [ ] indicate an optional argument.	`login [platform name]`
Slanted brackets < > group required arguments.	<`password`>

Table 2 Keyboard and menu conventions

Description	Example
A plus sign + indicates simultaneous keystrokes.	Press **Ctrl+s**
A comma indicates consecutive key strokes.	Press **Alt+f,s**
A slanted bracket indicates choosing a submenu from menu.	On the menu bar, click **Start > Program Files**.

Table 3 Symbol conventions

	**This symbol represents a general hazard.**
	**This symbol represents a risk of electrical shock.**
	**NOTE** This symbol represents a Note indicating related information or tip.
	**This symbol, located on the equipment or its packaging indicates that the equipment must not be disposed of in a land-fill site or as municipal waste, and should be disposed of according to your national regulations.**

Table 4 Safety definitions

	**WARNING** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
	**CAUTION** Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

1

FCOMP/-PRO Principles

This chapter describes the features and usage of the FiberComplete PRO (FCOMP-PRO) - The fiber acceptance testing process control application.

The topics discussed in this chapter are as follows:

General introduction

FiberCompletePRO™ is the first solution to fully automate all the fundamental fiber-qualification tests, such as bidirectional insertion loss (IL), optical return loss (ORL) and optical time domain reflectometry (OTDR), with one module from one optical port. For high fiber count projects, it is now possible to automatically test up to 12 ribbon fibers with the Multi-fiber MPO optical switch module.

Select the best module and software configuration upon the fiber qualification tests needed:

- **Bi-Directional insertion loss (IL) and ORL with FiberComplete Fault Finder modules**:
  - available with E41xx-FCOMPFF and E41xx-B-FCOMP (no OTDR capabilities)
- **Bi-Directional insertion loss (IL), ORL and OTDR** (unidirectional and/or bi-directional):
  - available with E41xx-B FCOMP and E41xxC FCOMP Fiber Complete modules
  - available with E41xx-B modules implemented with E41OTDRPM optical power meter option and EOTDR-TO-FCOMP-UPG software option.
- **On-board bi-directional OTDR event analysis**
  - TrueBIDIR Method (two units at each end of the link)
    - available with E41xx-A, E41xx-B, E41xx-C, E41xx-B FCOMP and E41xxC FCOMP Fiber Complete modules with ETRUEBIDIR-FCOMP-PRO software option
  - Loopback Method (a single unit at one end and a loop cable at the other end)
    - available with Smart OTDR A & B, E41xx-A, E41xx-B, E41xx-C, E41xx-B and E41xxC FCOMP Fiber Complete FCOMP modules with ELOOPBACK-FCOMP-PRO software option
- **High Fiber Count automatic IL/ORL + OTDR sequences:**
  - available with E41MPO12SM compact MPO based embedded switch module and with E41xx B FCOMP and E41xx C FCOMP FiberComplete modules.
- **High Fiber Count automatic Bi-directionnal OTDR sequences:**
  - available with E41MPOxxSM MPO based switch and with E41xx-A, E41xx-B, E41xx-C OTDR modules, E41xx B FCOMP and E41xx C FCOMP Fiber-Complete modules

NOTE

VIAVI recommends to perform FiberComplete / FiberComplete-PRO measurements with test platforms from the same range.

FCOMP/-PRO Tests description

Loss test and Loss test + OTDR

Requirements

FiberComplete Loss Test and Loss Test + OTDR are used to perform automatically and through a single connection port, the following tests:

- Bidirectional insertion loss (IL) using the Continuous Wave (OCWR).
- Bidirectional optical return loss (ORL) using the continuous wave mode (OCWR).
- Distance/length measurements using Time Fly.
- Unidirectional / manual Bidirectional OTDR (when TrueBIDIR or Loopback Software options are not installed) and/or fault analysis, according to the module/option installed.

To carry out the measurements, 2 equipments are needed, both equipped with FiberComplete capable modules and broadband power meters on the mainframes.

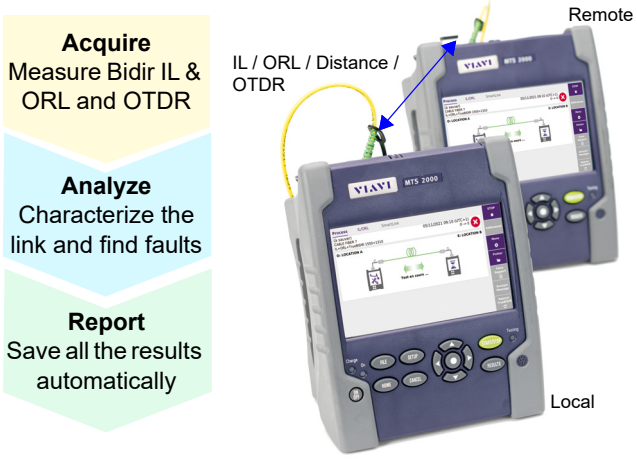
Using one unit at each end of the fiber under test and without any connection/disconnection, IL/ORL and distance measurements are performed and results exchanged via the fiber under test (FUT).

If the OTDR is selected, an OTDR measurement is launched automatically:

- **Unidirectional mode**: the OTDR acquisition is performed from the local unit where the test has be initiated. Traces are saved locally
- **Bidirectional mode**: the OTDR acquisition is initiated successively from each unit. The traces are saved locally. (See “TrueBIDIR OTDR” on page 75 for automated and real-time bi-directional OTDR analysis

If the **Fault Finder** is set to **Yes** (note: it automatically set the **OTDR** to **No**), a failed value of IL and/or ORL triggers the fault finder function automatically in order to identify the worst faulty elements.

Figure 1 Configuration for IL/ORL + OTDR/Fault Finder function



Configurations

Two configurations are available, depending on the tests that have to be performed:

- Construction/Installation tests with loss, optical return loss, distance and OTDR.
- Acceptance Tests with loss, optical return loss and distance, and faults detection in case of problem.

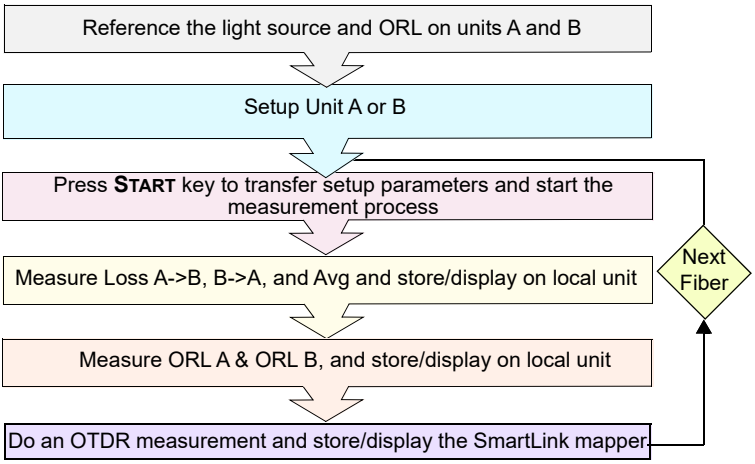
Construction/Installation Test

In this configuration, bidirectional IL and ORL, length and/or unidirectional/bidirectional OTDR measurements are performed.

The bidirectional IL/ORL and length results are stored on each unit witih SW version <23.5x only.
For SW version >= 23.5x: only the local unit (the one that initiates START) stores all results files.

The OTDR traces are stored on the local unit where the test has been initiated.

Figure 2 Construction/Installation Test



If a Bidirectional OTDR measurement is performed, the OTDR results are automatically saved on each unit;

- The OTDR results trace for acquisition performed from Location A to Location B is stored on the local unit (Location A)
- The OTDR results trace for acquisition performed from Location B to Location A is stored on the remote unit (Location B)

If TrueBIDIR, all the OTDR measurements are stored on the local unit

Acceptance Tests

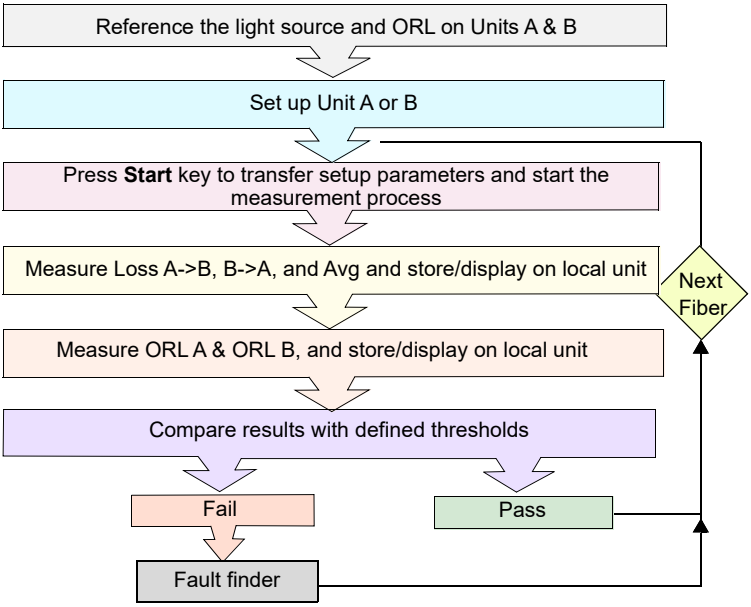
In this configuration, the bidirectional IL, ORL and length measurements are performed and results are automatically stored on local unit.

If the **Fault Finder** function has been selected in the **Setup** menu, and if at least one result exceeds the defined IL/ORL thresholds, the predominant defects by event type causing the failure (Splice > 0.3 dB, Connector > 0.75 dB, Reflectance > -32 dB and Bend > 1 dB) are identified and located.

The Fault Finder screen displays an easy to interpret result table that prompts predominant issues for easy troubleshooting.

Figure 3 Fault Finder view

Figure 4 Acceptance Test



Default configuration in Loss Test (+ OTDR) mode

Press the key 

to configure automatically the acquisition parameters as follows:

- General
  - Launch/Receive Cable: **No**
  - Unit: **meter**
- Acquisition
  - IL/ORL Measurement: **IL/ORL Bidir.**
  - Lasers: **1310/1550**
  - Fault Finder: **No**
  - OTDR measurement: **Unidir**
  - OTDR Acquisition: **Auto**
  - Laser: **1550 nm**
- Alarms
  - Link Loss (CW): Default (0dB min, 40dB max)
  - Link ORL (CW): Default (27dB min)
  - Link Length; Default (None)
  - OTDR: Fail / Default
  - OTDR Advanced: Launch Cable Min./ Receive Cable Min: None

  Parameters specific if OTDR measurement is defined: see "Loss test and OTDR (unidir or manual bidir)" page 51.
- Link
  - Change Fiber Nbr: **Increment**
  - Direction: **A -> B**
  - Extremities are different: **No**
- Report
  - File save in: **disk/[Function]**
  - Filenaming: **[Fiber_Id][Fiber_Num]**
  - File Content: **All Results .fcpro**
  - Auto Store: **Yes**
  - Report As: **pdf**
  - Report Layout: **Standard**

Instant bi-directional OTDR analysis: Loopback Method

This test is used to perform a bi-directionnal OTDR process and analysis on 2 fibers, at the same time, using a single test device

Requirements

To perform a loopback measurement, you need:

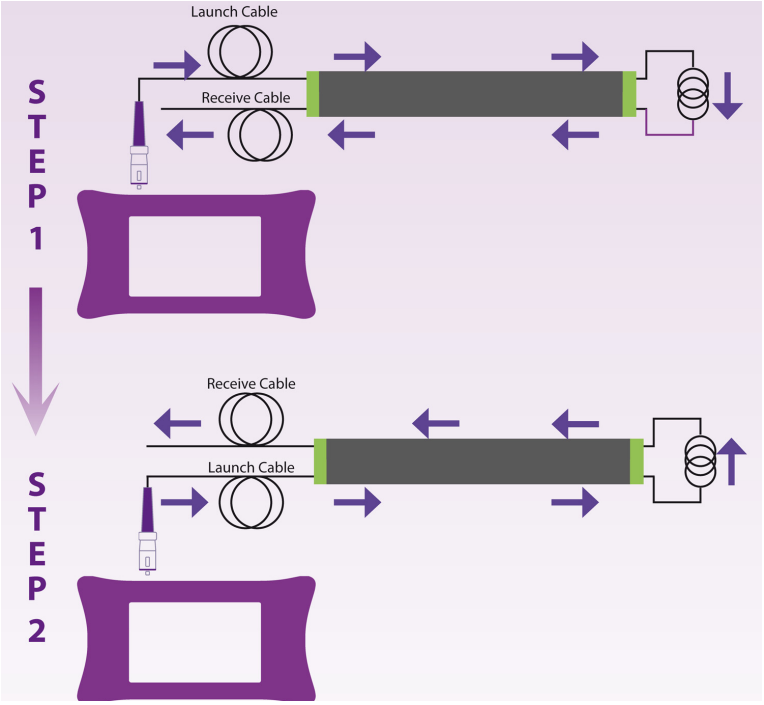
- Launch cable/cord
- Loopback cable/cord
- Receive cable/cord
- To get the right match of events, it is important to validate the link continuity/route of the two fibers by using a VFL or the real-time OTDR mode

Measurement process

To perform the measurement, follow the wizard that guides the user through the different steps of operation. A technician at location A, connects the launch & receive cable/cord to the two fibers to be tested. A second technician at location B, connects the loopback cable/cord that will "loop" the two fibers together.

1. Once the installation and configuration are performed, press START and follow the popup indications
2. Once completed, disconnect the launch cord from the device. Then, connect the receive cord, which will then become the launch cord.
3. Press **START** to launch the test on the other direction.
4. At the end of the process, the results (average loss values coming from both directions, both ends) are displayed in the SmartLink tab. A switch button allows to view 1st fiber or 2nd fiber bi-directional OTDR results.

Figure 5 Loopback bi-directionnal measurement process



Instant bi-directional OTDR analysis: TrueBIDIR method

This test is used to perform a bi-directionnal OTDR process and analysis on 1 fiber, using two devices at each end of the link.

Requirements

To perform a TrueBIDIR measurement, you would need:

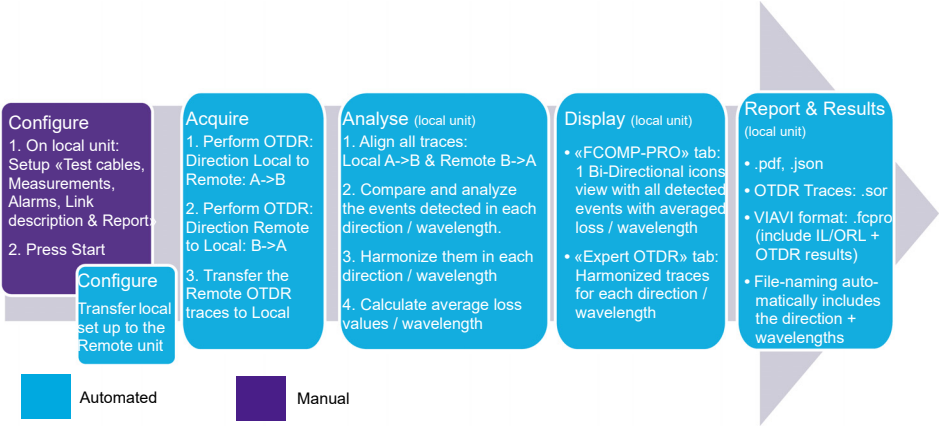
- Launch cable/cord
- Receive cable/cord

NOTE

The moment the instruments are connected to the Fiber Under Test (FUT) an instant continuity check automatically pairs the units and performs length measurement.

Measurement process

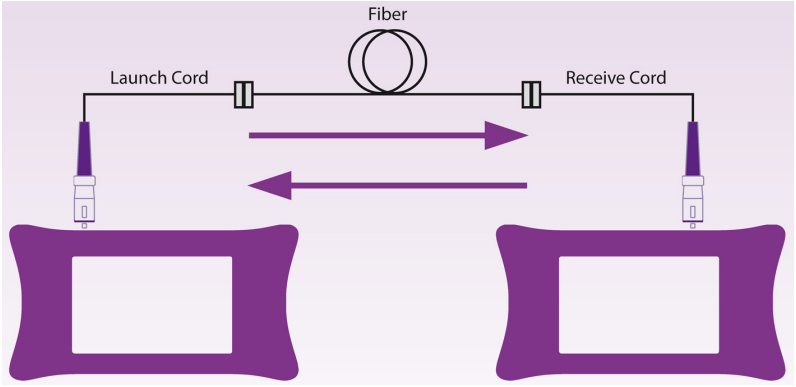
Figure 6 TrueBIDIR measurement process



A technician at location A, connects the launch cable/cord to the fiber to be tested. A second technician at location B, connects the receive cable/cord. As soon as it connects a beep is emitted and a green line is displayed on the Process schematic.

1. Once the installation and configuration are finished, press START and let the device perform the measurement sequence.
2. A testing arrow flashes until the end of the measurement process. At the end of the complete sequence, a beep is also emitted.
3. The bi-directional OTDR results (average loss values coming from both directions, both ends) are displayed in the SmartLink tab.

Figure 7 TrueBIDIR measurement process

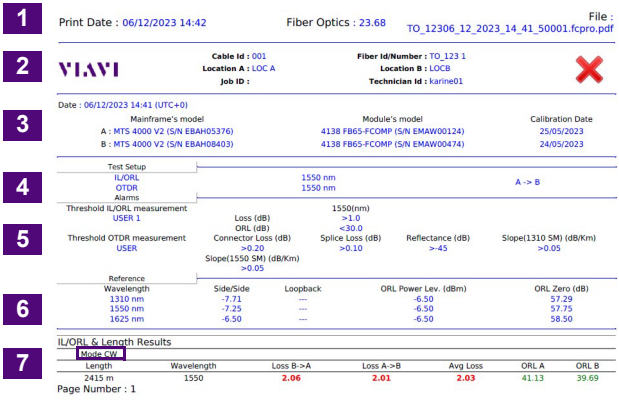


Report (.pdf)

The pdf report generated from FCOMP/-PRO results contains different features.

- The first page always features all set up information, as well as the Link Insertion Loss, ORL and length results.

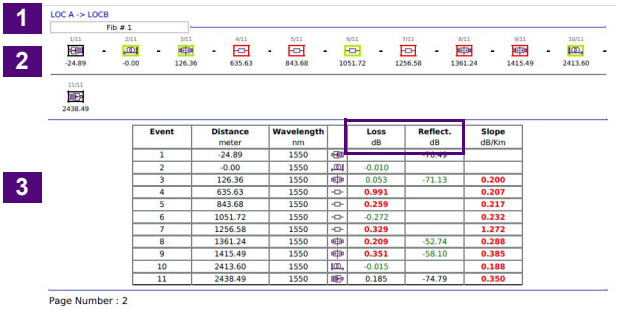
Figure 8 PDF report - Page 1



Section	
1	Report generation date, SW version, Filenaming
2	VIAVI logo (can be customized), link description information from the device set up
3	List of the devices used for the test
4	Test set up per wavelength and direction (the report is generated from the device starting the test, the direction indicated is the one from this device)
5	Thresholds for IL/ORL and OTDR measurement
6	Reference values
7	Features the link IL/ORL/Length results. IL/ORL results come from: Mode = CW = Continuous Wave if IL/ORL Bidir. were performed. Mode = OTDR if only TrueBIDIR tests were performed (no IL/ORL Bidir. sequence). Length result always come from the Time fly measurement at 1550nm.

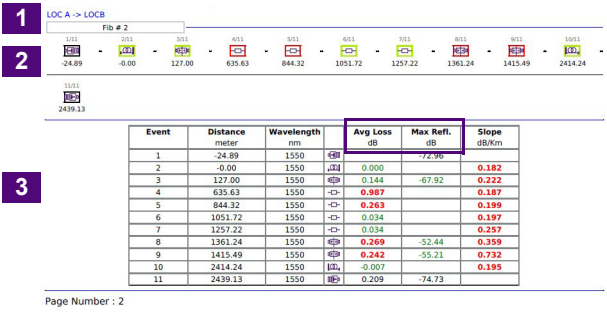
- The second page features all events Loss and ORL as well as slope results.

Figure 9 PDF report - Page 2 OTDR Unidir.



Section	OTDR Unidir.
1	Direction of the test
2	Unidirectional icon SmartLink view
3	Unidirectional Table featuring: each event location with Loss/Reflectance per wavelength; slope per fiber section

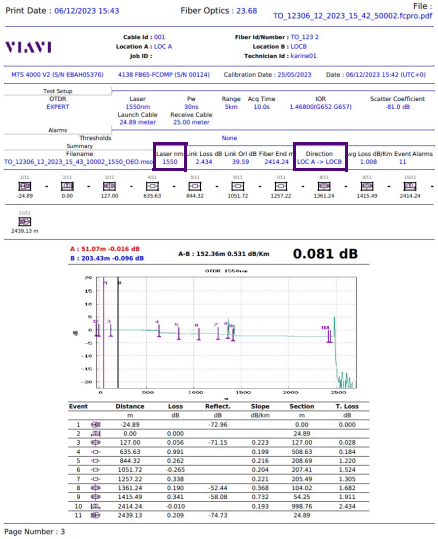
Figure 10 PDF report - Page 2 OTDR TrueBIDIR

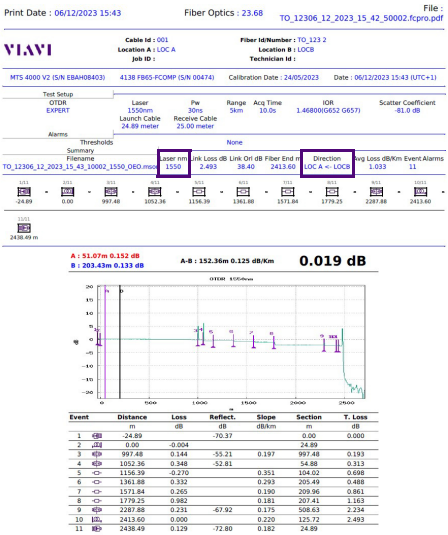


Section	OTDR TrueBIDIR
1	Direction of the test
2	Bi-directional icon SmartLink view
3	Bi-directionnal Table featuring : each event location with Average Loss/ Max. Reflectance per wavelength ; average slope per fiber section

- The next pages feature each unidirectional OTDR detailed test results for each wavelength and each direction.

Figure 11 PDF report - Page 3, 4...





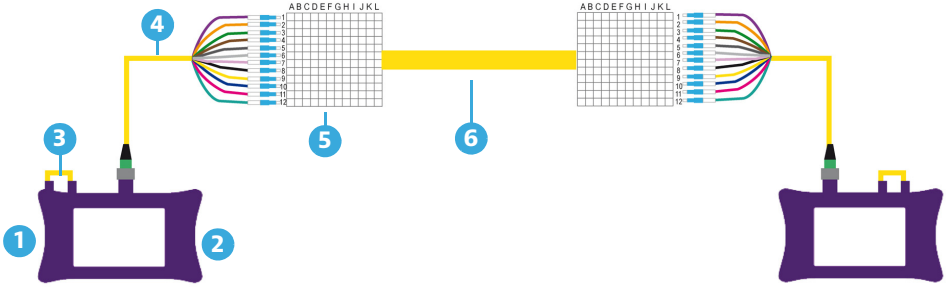
High Fiber Count

High Fiber count allows you to scale all the bi-directional test capabilities and automate the test sequencing of high-density fiber cables. Multiple fibers can be certified with a one button press and a single test sequence.

By adding a MPO switch module, a bulk of 12 fibers or a ribbon cable can be tested in a single sequence, including an automatic fiber continuity test and mapping to establish MPO polarity and type (A,B, C).

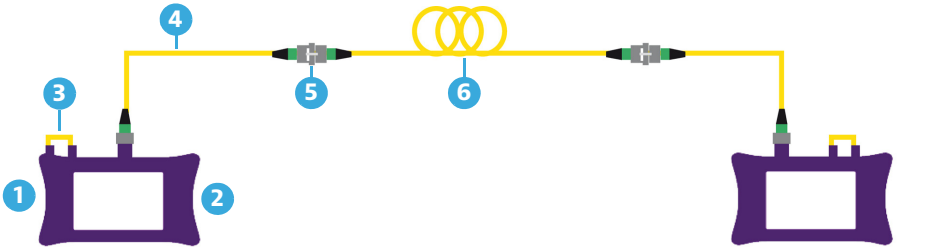
Via the **Manage Project** softkey  , configure and create the Cable view that will help you automate and sequence multiple fibers tests plus track the progress and status of the fibers, labels and ribbons to test and/or to be tested.

Figure 12 Testing simplex fiber connector network (scenario 1)



1	OTDR Module	3	Bend sensitive jumper	5	Patch panel
2	MPO switch module	4	25m fanout cable MPO to simplex connectors	6	Fiber link under test

Figure 13 Testing native MPO Network (scenario 2)



1	OTDR Module	3	Bend sensitive jumper	5	MPO Bulkhead adaptor
2	MPO switch module	4	20m MPO launch cable	6	MPO link under test

2

Establishing references for Loss & ORL measurements, without Switch

This chapter describes the activation of FCOMP/FCOMP-PRO function and the process to perform the Loss and ORL references using a two-cord reference method or a loop-back reference method.

Refer to Chapter 7 for Loss and ORL referencing with the MPO switch module.

The topics discussed in this chapter are as follows:

Activating the function

1 Press the HOME button.

2 Select the icon FiberComplete (FCOMP) 

or FiberComplete PRO (FCOMP-PRO) 

.

Establishing References

To get a meaningful measurement, the light sources and the two launch/test cords used for the measurement have to be referenced (zeroed out). The references are valid for all fibers that will be tested during the day without disconnecting the test cords from the test port. If, at anytime, the test cords are disconnected from the test instruments and/or have been contaminated by dirt or dust, the test cords have to be re-inspected and referencing stage has to be redone.

Reference methods for insertion loss and ORL testing

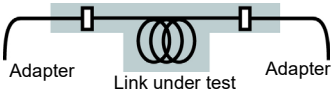
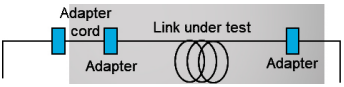
Three Referencing methods are available.

- **Default Ref.**: immediate process, no measurement uncertainty is guaranteed.
- **Loopback Ref.**: less accurate than Side by Side
- **Side by side Ref.**: most accurate method, both test sets must be at the same location during the referencing process.

Table 5 Reference methods for Insertion Loss and ORL Testing

	Loopback Reference Method	**Side-by-side Two -Cord Reference method**
Setup requirement	No specific requirement	Units shall be at the same location for references
Description	Each unit is performing its own IL reference, with its module port source connected to the mainframe power-meter.	Each unit is performing its own IL reference, and units are connected using two test cords and a bulkhead adapter.
Recommendations	Easiest process. Not recommended for short links. One the reference is performed, do not disconnect jumper from the test port	Most accurate reference method, but both units must be at the same location for the referencing process. Once the reference is performed, do not disconnect jumper from test ports

Table 5 Reference methods for Insertion Loss and ORL Testing

	Loopback Reference Method	**Side-by-side Two -Cord Reference method**
Loss principle	Loss measurement includes link connectors. 	Loss measurement includes one link connector. To include both connector add a reference grade adapter cord (as recommended in IEC standards). 

Default References

Click on the icon to fill the table with default reference values.

As soon as the icon is pressed and the table filled with default reference value, the display returns automatically to **Process** page.

NOTE

«Default references» are Loss / ORL power levels & ORL Zero values with perfect injection conditions, brand new & cleaned connections (test port + test cables) and APC terminated test cables & typical length <50m.

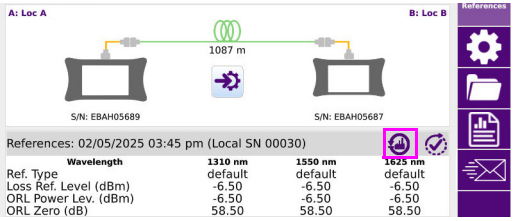
No measurement uncertainty is guaranteed when «Default references» are set up.

«Default references» are not suitable for fiber link certifications.

«Default references» are convenient for quick demonstrations, first trainings or workaround solution in certains deteriorated conditions.

The following figure show the default values:

Figure 14 Default References



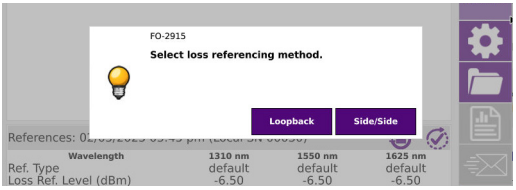
Reference process (Loopback and Side by Side)

The Power Meter option is mandatory onto the Mainframe.

Each test equipment must set its own references and follow this process:

1 From the results page, press **References** > **Start Ref** keys and follow the step by step instructions to perform references on each unit.

Figure 15 Choose between side by side or loopback for your loss referencing method



NOTE

Once the referencing method has been selected, the key **Skip** is available at each step. It enables to skip the step(s), and, if necessary, to return to process page.

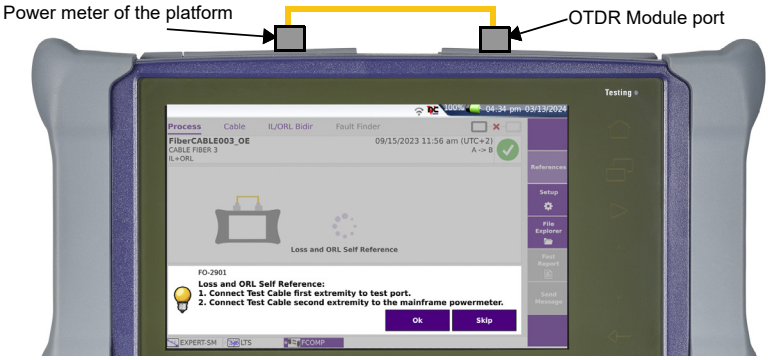
Loopback Referencing method

The loopback referencing is used when the two units are at different location.

After clicking on **Loopback**, the wizard will guide you through two steps:

1 The Loss and ORL reference is used for loss and ORL testing. Connect the test cord from the module port to the mainframe powermeter and press **Ok** to start referencing.

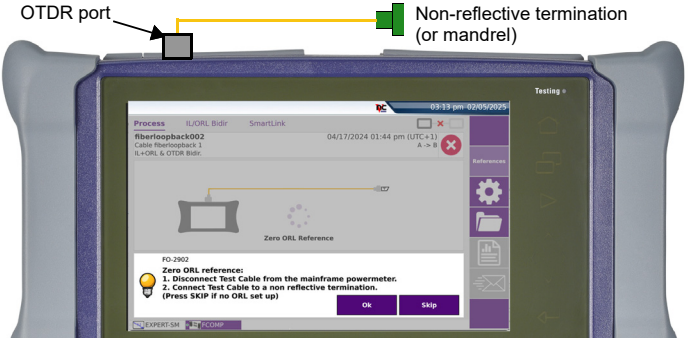
Figure 16 Loss and ORL reference



2 The zero ORL self reference is necessary for ORL testing. Once the self reference measurement has been carried out, the Zero ORL adjustment can be performed

Connect the test cord from the module port to the non-reflective termination via a mating sleeve.
A Reference accessory kit is delivered with each FiberComplete module. If you don't have a non-reflective termination, a mandrel can be used. Press **Ok** to start referencing.

Figure 17 Zero ORL reference



NOTE

Non-reflective terminations are mandatory when bend insensitive test cords and/or PC connectors are used.

Side-by-Side referencing method

The side-by-side referencing is used when the two units are at the same location and is the preferred method for better loss measurement accuracy. After clicking on **Side/Side**, the wizard will guide you through three steps:

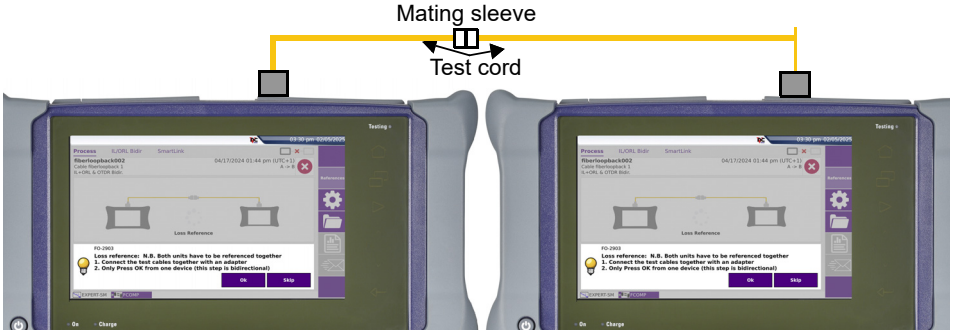
1. Loss and ORL reference is still required for ORL testing. Connect the test cord from the module port to the mainframe powermeter and press **Ok** to start referencing.
2. The zero ORL reference is necessary for ORL testing. Once the self reference measurement has been carried out, the Zero ORL adjustment can be performed

   Connect the test cord from the module port to the non-reflective termination via a mating sleeve. If you don't have a non-reflective termination a mandrel can be used. Press **Ok** to start referencing.
3. For the loss reference, connect the test cord from the module port of the local unit, toward the module port of the secondary one via a mating sleeve or adapter. Press **Ok** to start referencing.

NOTE

The side by side last step reference: "Loss reference" is bidirectionnal and performed automatically on both units.

Figure 18 Loss Reference



Test cables verification

Enhancement of IL/ORL CW measurement: new Test Cable verification with Reference grade jumper

Test cables are crucial for ensuring accurate IL/ORL measurements. As they can rapidly be damaged in case of multiple connections / disconnections, it is interesting to control their connector's loss time to time.

VIAVI new Test cables verification step provides a measurement with Green/Orange/Red status for user guidance. A wizard helps to follow all required steps with Loopback or Side by side method. The result is clearly identified in the Referencing Table section as well as indicated in all reports.

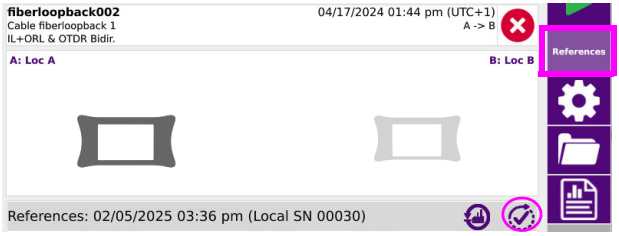
CAUTION

Test Cables Verification is not available with Default References.

1 Just after the referencing process, connect a reference grade jumper (Loss < 0.2 dB) to the Test Cables.

2 In the Reference screen, click on the icon .

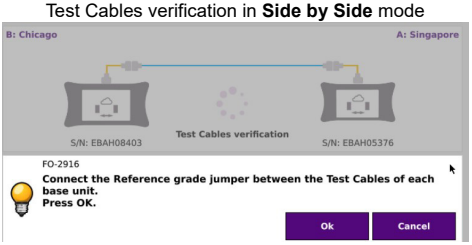
Figure 19 Reference screen with Test Cable Verification key



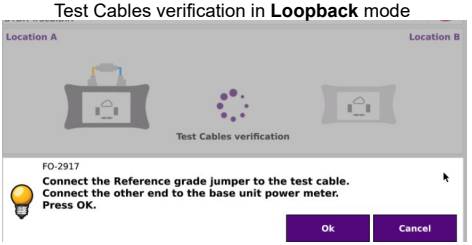
3 Follow the Wizard.

Figure 20 Test Cables verification

Test Cables verification in **Side by Side** mode

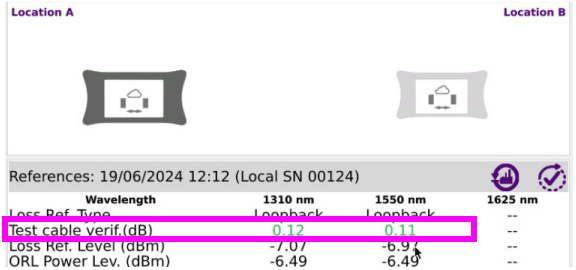


Test Cables verification in **Loopback** mode



A new Test Cables verification measure is displayed with green / orange / red status.

Figure 21 Test Cable Verification results



3

Loss test only (Bidirectional IL/ORL + Fault Finder) with Fault Finder modules or FiberComplete modules

This chapter describes the process to perform Loss tests, from configuration of the equipment to the analysis of the results.

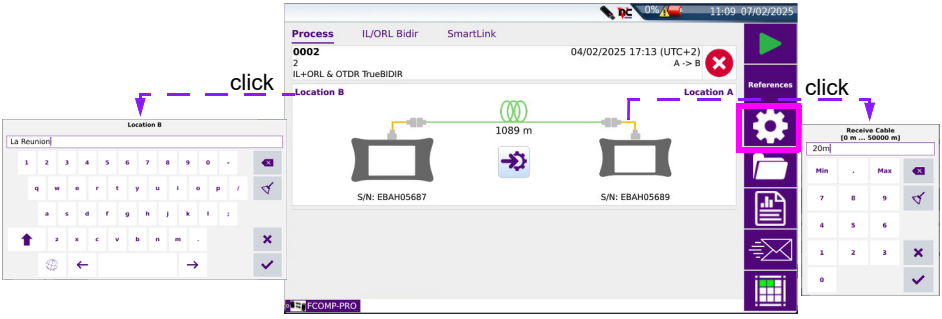
The topics discussed in this chapter are as follows:

Configuring the Loss test

Once FCOMP/FCOMP-PRO function is selected on both units and Loss/ORL references have been correctly performed, the configuration and parameters can be set up.

From the Process page, press **Setup** key.

Figure 22 Process Page



NOTE

Short cuts (loc.ID, Test cable length): directly adjust the locID from both locations and test cables length.

Each menu can be setup manually, however pre-defined VIAVI SmartConfigs and previously saved, user-defined, Default configurations are also available in the General page: **Load Test Config.** button Load Test Config. .

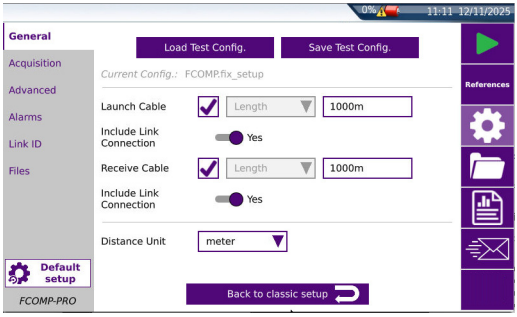
VIAVI Pre-defined configuration files are:

- IL ORL: select this configuration file to run an IL/ORL only Measurement sequence.
- IL ORL Unidir OTDR
- TrueBIDIR
- IL ORL TrueBIDIR
- IL ORL Fault Finder: select this configuration file to run a IL/ORL + Fault finder Measurement sequence

General page

From Setup screen, press **General** on the left of the screen.

Figure 23 General parameters



Configuration file

A pre-defined configuration (one configuration file defined in FCOMP saves both FCOMP and Expert OTDR setup) can be loaded from the setup menu, or the current configuration can be saved in a file.

Loading a FiberComplete configuration file

FiberComplete configuration file includes FCOMP setup and file parameters.

To load a configuration file previously created and apply parameters to new tests:

1 Press menu key Load Test Config. .

2 Select the configuration file in the wished directory.

3 Press **Load Config.**

4 When the configuration file has been loaded, the config. name is displayed.

NOTE

Some configuration files are available in the equipment: press **File** and select **disk** > **config** > **FCOMP**.

Saving the parameters from FiberComplete configuration

Once all the setup parameters are configured, it can be saved in a configuration file.

This configuration file can then be recalled for future tests.

To save parameters in a configuration file:

1 In the **General** page, press Save Test Config..
The onscreen keyboard displays

2 Enter a name for the configuration file.

Figure 24 Save Configuration file - Onscreen keyboard

NOTE
Configuration file is saved by default in the directory `disk` / `config` / `FCOMP`.

3 Press ✓ to validate
The configuration file is saved with the extension «fo_cfg» (icon).

NOTE
The FiberComplete configuration file includes data storage and measurement settings of FCOMP. This configuration file can be shared and reused with other units.

Test Cables

- **Launch Cable** / **Receive Cable**

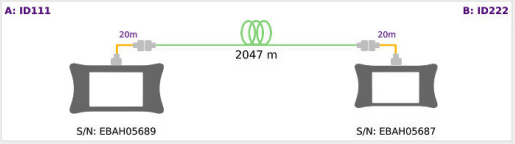
  Not selected: no length is entered for the launch cord/cable.

  Length: manually enter the length of the launch cord/cable or use the ruler key  to measure it.

  A dialog box prompt the user to connect the launch cable to the test port. This cable must be disconnected from the fiber under test (FUT). Press **Confirm** to do the launch cable measurement. Once the measurement is completed, the distance is automatically entered in the numerical keypad.

NOTE

The length displayed in the Process page is the Fiber Under Test length, thus it excludes the launch and receive cables length setup.



- **Include Link Connection**

Defining the **Launch Cable** and/or **Receive Cable** parameter with a distance will automatically activate the corresponding parameter **Include Link Connection**. This parameter is of no use with the "Loss Test set Fault Finder" only measurement sequence.

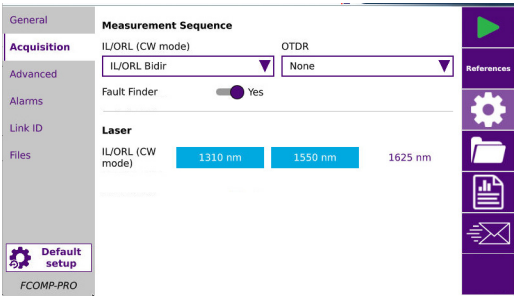
Distance Unit

Select the unit for the distance measurement: km / kfeet / miles / meter / feet.

Changing the unit will automatically convert the **Launch Cable** and **Receive Cable length** distance in the new setup Distance Unit.

Acquisition page

Figure 25 IL/ORL parameters



Measurement Sequence

- **IL/ORL Measurement**

  IL/ORL Bidir: Insertion Loss and ORL measurements perform from both ends.

  IL Bidir.: Insertion Loss measurement performs from both ends

  None: Neither IL nor ORL is measured.

A measurement will be performed only if at least IL or IL/ORL parameter is selected.

- **Fault Finder**

  Set to **Yes**: if Loss and/or ORL exceeds one limit value defined in the **IL/ORL Alarms** (see “Alarms page” on page 35), the Fault Finder function is automatically triggered in order to identify the faulty events.

  Set to **No**: the Fault finder function is not activated (no fault finding occurs, even if one value exceeds the thresholds).

NOTE

If the IL/ORL Alarm thresholds have not been defined, and the **Fault Finder** parameter is selected, then the IL/ORL alarms are defined with **Default** values.

If «Fault Finder» parameter is set to Yes, the «OTDR» measurement is automatically set to No, and vice-versa (only if the OTDR function is available on the module).

Laser

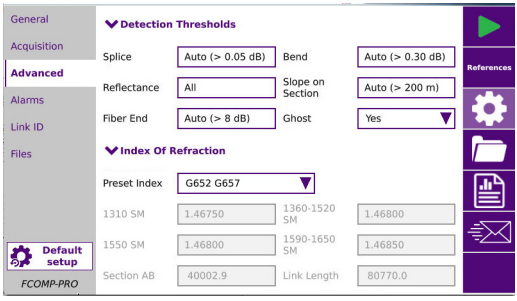
Select the desired wavelength(s) for **IL/ORL (CW mode)** measurement.

Advanced page

Press **Advanced** to define:

- For IL/ORL Measurement Sequence:
  - Index of Refraction
- For IL/ORL + Fault finder Measurement Sequence:
  - Detection Thresholds for each different event
  - Index of Refraction to be defined
  - Scatter Coefficient to be defined

Figure 26 Advanced Setup - Detection thresholds and Index of Refraction



Detection Thresholds

Open **Detection thresholds** sub-menu and define the thresholds for the following events:

Splice

Select if a level of detection for splice must be defined.

Click on the text box and select a value:

– Enter a min level of detection, from 0.01 dB (**Min**) to 1.99 dB (**Max**).
– **No**: no splice detection
– **Auto**: to automatically detect splice

Reflectance

Select if level of detection for reflectance must be defined.

Click on the text box and select a value:

– Enter a min level of detection, from -98 dB (**Min**) to -11 dB (**Max**).
– **None**: no reflectance detection
– **All**: all reflectances are detected (click on  and validate to define **All**).

Fiber end

Once parameter is selected, click on the text box to display the numeric keypad and select the required value:

– **Auto** (recommended): option in which the equipment automatically detects the end of a fiber.
– **> 3** (**Min**) to **> 20 dB** (**Max**) (steps of 1 dB): threshold of detection of end of fiber.

Bend

With any dual or triple-wavelength measurement module, the user will have access to the macro bend detection function in the test setup. Each event of the selected wavelengths will then be compared.

Once parameter is selected, click on the text box to display the numeric keypad and select the wished value:

– **None**: Bend will not be detected.
– **Auto**: Bend will be automatically detected (>0.30 dB).
– **Define by user:** Enter the bend value (in dB), with numeric keypad.

Slope on section

Define the minimum section length for the slope measurement:

– set up between 0 and 1000m. **Auto** is set to 200m

Ghosts

Choice (**Yes** / **No** / **No Analysis**) of whether information relating to ghosts is to be displayed. If ghosts are displayed, the reflection icon in the table of results appears dotted and the reflection value is displayed in brackets on the trace, for example «(R:-50 dB)».

Index of Refraction

Click on **Index of Refraction** to open the sub-menu and define the group refraction index of the whole fiber (see Figure 26 on page 31).

Preset Index

User Define for each wavelength (1310 SM, 1360-1520 SM, 1550 SM, 1590-1650 SM) a refraction index of 1.30000 to 1.69999. The selection of an index alters the value of the section AB (actual distance between cursors A and B).

Predefined It is possible to choose one of the predefined values given for certain cables. The corresponding indices given in the table below are repeated on the screen.

Table 6 Predefined index values (Single Mode)

Wavelength (nm)	1310 SM	1360 - 1520 SM	1550 SM	1590 - 1650 SM
Generic G652 G657	1.46750	1.46800	1.46800	1.46850
Generic G653 G655	1.46750	1.46800	1.46800	1.46850
Generic G 654 E	1.46550	1.46550	1.46550	1.46550
ATT SM	1.46600	1.46700	1.46700	1.46700
Corning SMF-28	1.46750	1.46810	1.46810	1.46810
Corning SMF-DS	1.47180	1.47110	1.47110	1.47110
Corning SMF-LS	1.47100	1.47000	1.47000	1.47000
Corning-Leaf	1.46890	1.46840	1.46840	1.46900
Draka SMF	1.46750	1.46800	1.46800	1.46850

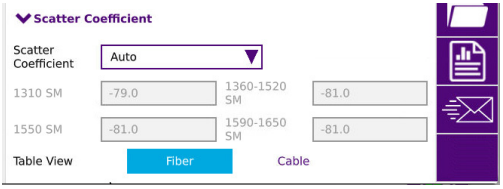
Table 6 Predefined index values (Single Mode)

Wavelength (nm)	1310 SM	1360 - 1520 SM	1550 SM	1590 - 1650 SM
Draka Longline	1.46700	1.46700	1.46710	1.46750
Draka Teralight	1.46820	1.46820	1.46830	1.46850
Draka Benbright	1.46750	1.46750	1.46800	1.46850
Fitel Furukawa	1.47000	1.47000	1.47000	1.47000
OFS Lucent Allwave	1.46750	1.46750	1.46750	1.46850
Lucent Truewave	1.47100	1.47100	1.47000	1.47000
SpecTran SM	1.46750	1.46810	1.46810	1.46810
Sterlite	1.46700	1.46700	1.46750	1.46750
Sumitomo Litespec	1.46600	1.46600	1.46700	1.47000
Sumitomo Pure	1.46600	1.46600	1.46700	1.47000

Scatter coefficient

Click on **Scatter coefficient** to open the sub-menu and define the value for the back-scatter to be used in measurements.

Figure 27 Advanced Setup - Scatter Coefficient and Table View parameters



Auto is the recommended setting.

User Select, for each wavelength, the backscatter coefficient of -99 dB to -50 dB by increments of 0.1dB. Modification of the backscatter coefficient K changes the measurements of reflectance and ORL.

Auto Backscatter coefficients are selected automatically for each wavelength.

In Multimode, two predefined scatter coefficients are available:

Generic 50 850 MM - > -66.3 dB

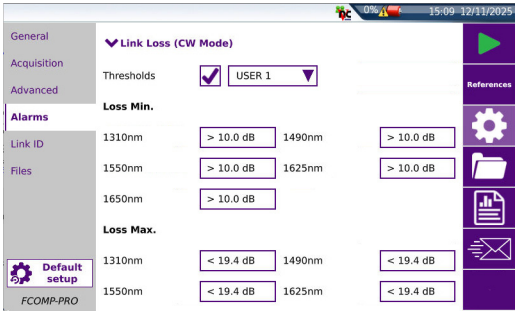
	1300 MM -> -73.7 dB
Generic 62.5	850 MM -> -66.1 dB
	1300 MM -> -70.3 dB

The default values are given in the paragraph "Reflectance" page 32.

Alarms page

Press **Alarms** to configure the alarms parameters for IL/ORL results.

Figure 28 IL/ORL Alarms parameters



Link Loss and Link ORL alarms

Configure the alarms thresholds for Link loss and/or Link ORL:

- **Thresholds**: select the parameter to define alarms thresholds for Link loss/Link ORL

  If the parameter **Thresholds** is not selected, no pass/fail thresholds and analysis are applied to the results.

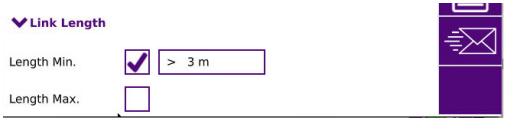
  Default: VIAVI defined thresholds (**ORL**: < 27 dB & **Loss**: >40 dB for each wavelength)

  USER 1 to 4: Selectable and user-defined thresholds. Up to 4 thresholds can be saved.

  Enter a loss threshold, usually corresponding to the optical loss budget, for each wavelength (dB) and enter an ORL threshold for each wavelength (dB).

Link length

Figure 29 Length Alarms parameters



Define the alarm thresholds for fiber length:

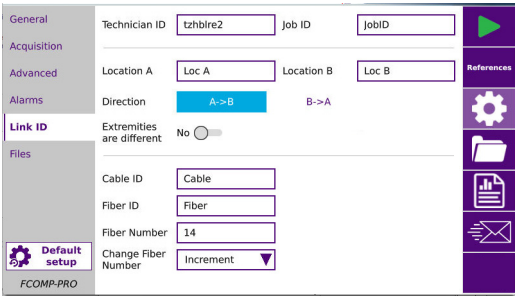
- **Length Min / Length Max**. Define the minimum and maximum length of the fiber. If the length detected exceeds those thresholds, an alarm triggers.

Link ID page

Fiber link identifiers and description parameters are recorded in the results files which are used for data tracking, analytics, and post processing.

Press **Link ID** to configure the link parameters for IL/ORL results.

Figure 30 Link Description



Copy File/Link To all

The softkey **Copy File/Link To all** allows to apply the Link and File configuration parameters of the current applications to all the other active Fiber Optic applications (OTDR).

Technician Id

Click on the text box to enter the name of the operator carrying out the measurement.

Job Id

Click on the text box to enter a description of the measurement to be performed.

Direction

The direction shows if the acquisition has been made from the origin to extremity (A->B) or from the extremity to origin (B->A). Changing direction in the trace simplifies post-processing e.g. for manual bi-directional analysis.

Location A

The name of the Location A of the link may be entered here, using the onscreen keyboard.

Location B

The name of the Location B of the link may be entered here, using the onscreen keyboard.

Extremities are different

In some cases, it is interesting to save different information for the origin and the extremity of the cable.

Select **Yes** if the extremities are different.

In this case, the following parameters are different for each location.

Cable Id

This parameter allows to enter an identification of the cable, using the onscreen keyboard.

Fiber Id

Click on the text box to enter a name for the fiber, using the onscreen keyboard.

Fiber Number

1 Click on the text box to modify the parameter using the numeric keypad.

The fiber number can be automatically incremented/decremented at each new file save as described below.

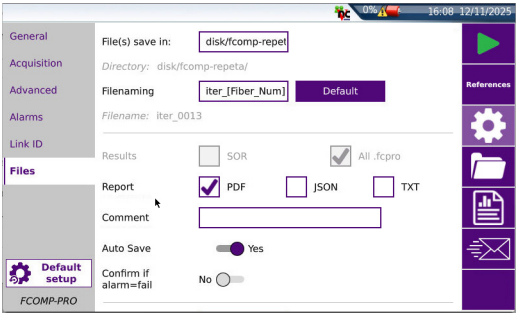
Change Fiber Nbr

Increment	the fiber number is automatically incremented at each new file-save.
Decrement	the fiber number is automatically decremented at each new file-save
No	the Fiber number must not automatically modified.

Files page

Press **Files** to configure the files parameters for IL/ORL results.

Figure 31 Files parameters



Copy File/Link To all

The softkey **Copy File/Link To all** allows to apply the Link and File configuration parameters of the current applications to all the other active Fiber Optic applications (OTDR).

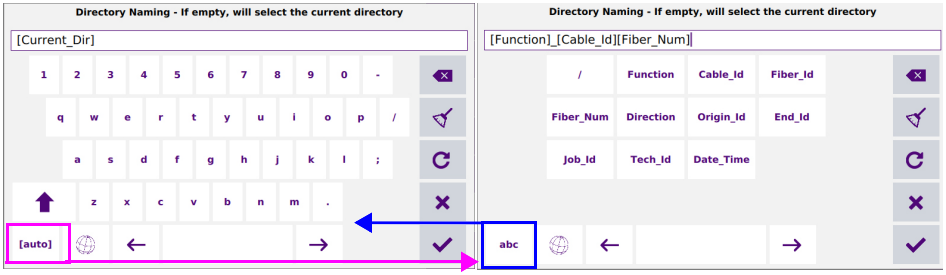
File(s) save in

Click on the text box to display the keyboard and enter the directory where the measurement results and files will be stored

In the onscreen keyboard, select the Auto pre-defined fields (previously set in the File menu) or, press **abc** key to manually enter directory name and path. Then, press **Enter** to confirm.

Example: `disk/FCOMP/Test`

Figure 32 Directory - Onscreen keyboard



Click on or leave the box empty to select the Current Directory for file saving.

Press to validate.

Press to modify the keyboard language: English / French / German.

Directory

This line displays the directory selected/created into which the file(s) will be saved.

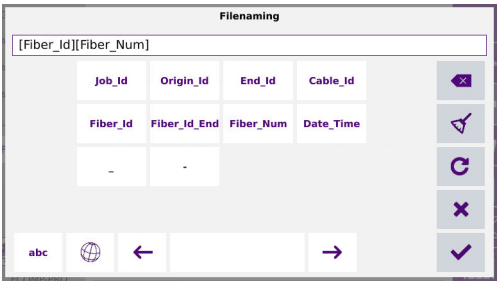
Filenaming

Select **Filenaming** parameter and click on the text box to modify the file name convention.

Use the onscreen keyboard to view and select the [Auto] pre-defined fields (previously set in File menu) or, press **abc** key to manually enter a file name. Then, press to validate.

NOTE
Maximum number of characters for the Filenaming is 100.

Figure 33 Filenaming - Keyboard (auto)



or

Click on to apply the default file name.

Default Filename for FCOMP results

Filenaming convention in Fiber View

In Fiber View, the default filenaming rule is as follows:

```
[Fiber_Id][Fiber_Num]
```

Filenaming convention in Cable View

In Cable View, the filenaming convention is as follows:

```
[Cable_Id]
```

As soon as the Cable Id changes, the result table is cleared and the next tests are stored with the new Cable Id name.

The table view can be modified in the **Setup** page (see page 30).

Filenaming

The expected file name is displayed in grey under **Filenaming**.

Report

Select the report format to be generated:

PDF select to generate a report in a pdf file.

JSON select to generate json file(s) compatible with VIAVI test process automation (job manager and StrataSync cloud data management system).

TXT select to generate a txt file of the results.

If all parameters are defined with **No**, only the .sor (or .msor/.csor) file will be saved.

Comment

Click on **Comment** text box to enter a specific comment to the project.

Auto Save

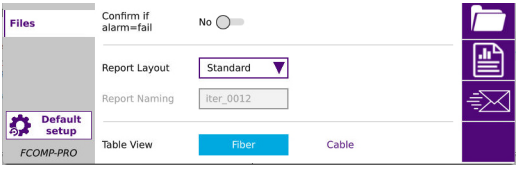
Select **Yes** to store automatically the trace or traces resulting from each acquisition according to the filenaming rules. If the filename already exists, the user will be prompted to overwrite the "old" result or discard the current result and keep the "old" file

Confirm if alarm = fail

Select **Confirm if alarm = fail** to display a confirmation dialog box if a value exceeds alarm thresholds, and to be able to choose to save or not the trace.
If no alarm is detected on trace, it is automatically stored.

Report Layout

Figure 34 Files parameters: report layout and table view



This parameter allows to define the report page setting and is available exclusively if a **pdf** and/or **txt file** has been defined in the **Report As** parameter.:

Standard in multi-traces display, one pdf report page is generated for each trace.

Consolidated in multi-traces display, one pdf report page is generated for all traces

Report naming

If **Consolidated** is defined for **Report Layout**, click on the Report Naming text box to modify the name of the report file for the result trace.

Using the onscreen keyboard, enter a name manually for the file and press  to validate.

If no name is entered, the report name by default applies: `Report_FCOMP-PRO`.

Table View

The **Table view** parameter allows selecting the type of table results to be displayed.

- **Fiber** select to display the measurement results of one fiber at a time, display in **IL/ORL** tab. (See "IL/ORL BiDir View" page 47).
  The report and saved file(s) contain the results of one fiber.
- **Cable** select to display the measurement pass/fail results of multiple tested fibers display in **Cable** tab. Access to detailed loss/ORL values via the **IL/ORL** tab. The report and saved file(s) contain the results of multiple fibers (except .json format). See "Cable view" page 46.

NOTE

When **Cable** view is selected the filenaming is force to [Cable ID]. A change of the Cable ID, reset the table and create a new recorded file.

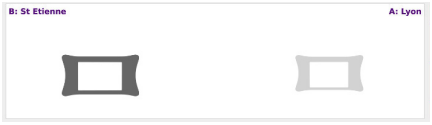
Performing the tests

Once the **Setup** is configured on one unit, the units can be connected to the fiber to be tested.

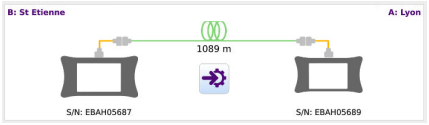
Automatic pairing / continuity check

As soon as the remote (B) unit is connected to the fiber, the local (A) unit detects it (and vice-versa).

A green line links the two units and the length of the fiber is measured and displayed as well.



One unit is disconnected from the fiber link, or there is a break



Both units are connected to the same fiber

Sending a message

Once both units are paired via the fiber to be tested, each one can send a message to the other.

This message can be sent to inform the far end technician about launching a test, waiting before launching the test, cleaning the connectors...

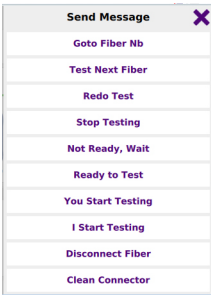
To send a message to the distant unit:

1 Go to the **Results** page.

2 Press  key.

A list of pre-defined messages displays.

Figure 35 Messages list



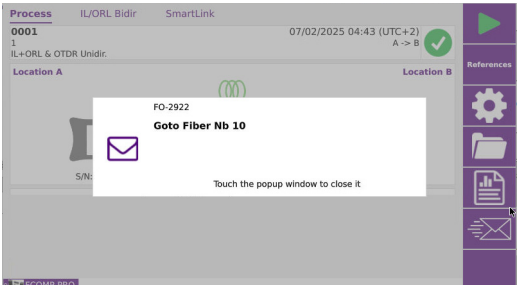
3 Select the message to send.

NOTE

If the message "Go to Fiber Nb" is selected, enter the fiber number and validate.

The message displays automatically on the distant unit.

Figure 36 Example of a message received at far end



Starting the test

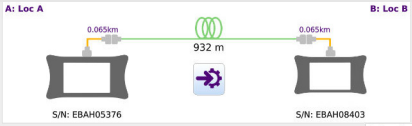
Below are described the steps when bidirectional IL/ORL is selected in the **Setup** menu.

CAUTION

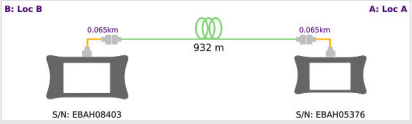
Make sure the **References** softkey is not selected and don't press START REF

NOTE

When a project, created with CableSLM option, is opened, the key is not available on the remote unit. Indeed, no remote set up transfer would make sense as the project opened on the local unit contains all the set up information.



Process Page - **Remote** Unit



1 If necessary, press  to transfer the complete setup configuration of the local unit to the distant one.

2 Press **START** key to launch the test.

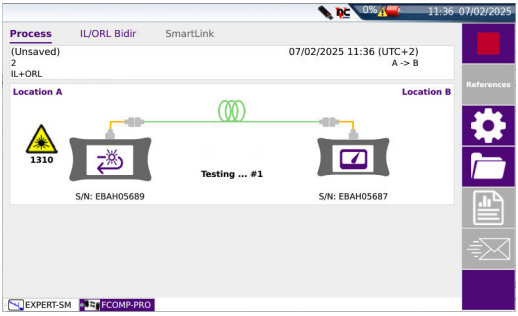
a The local unit at loc. A setup is automatically transferred to the remote unit at Loc. B.

b Unit A and B are performing IL test and mutually exchange their result values

c Unit A and B are performing ORL test (using OCWR mode) and mutually exchange their result values.

Process Page - **Local** Unit

Figure 37 Test in progress



d Once all tests are performed, results are displayed on both units, in IL/ORL Bidir. results page.

If **Fault Finder** parameter is set to **Yes** and an IL or ORL value reaches one of the user defined thresholds, the Fault Finder starts.

Results screen

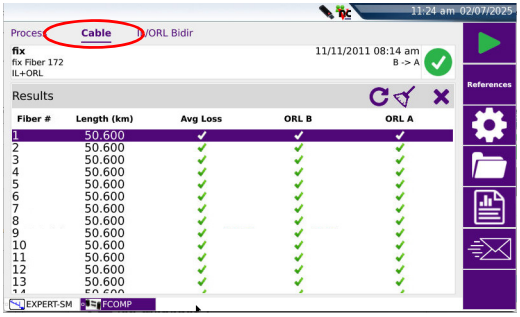
Once the tests are completed, the IL/ORL results are displayed and stored on the local unit (.fcpro format).

Cable view

NOTE
The Cable view is different from Cable page if a Project has been created with Cable-SLM Software option).

If, in **Setup** > **Analysis**, the parameter **Table View** is set to **Cable**, the **Cable** tab contains below results:

Figure 38 Result Cable View



The **Cable View** displays pass/fail results of multiple fibers:

- the length
- the global pass/fail verdict of the average loss of multiple wavelengths
- the ORL A and ORL B pass/fail verdict of multiple wavelengths

Click on ✕ to delete the entire table. Press **OK** to confirm.

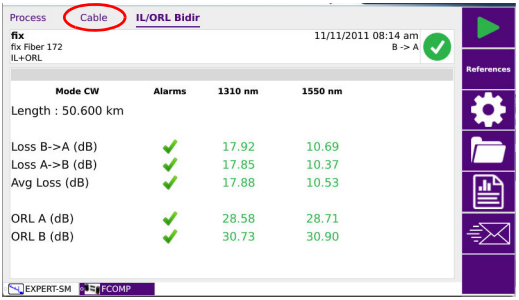
Select one line and click on to delete only this line. Press **OK** to confirm in the dialog box.

Click on to retest a specific fiber: a dialog box displays asking if you want to retest the same fiber and rewrite the corresponding lines in the table. Press **OK** to confirm.

IL/ORL BiDir View

In the **IL/ORL Bidir** tab, detailed measurement values per wavelength and direction are available:

Figure 39 Results IL/ORL Bidir



The IL/ORL View allows to display results:

- Loss B -> A and loss A -> B at each wavelength
- the average loss at each wavelength
- the ORL A and ORL B at each wavelength
- the Length is displayed on top of the table

NOTE

The length measurement is based by default on the Index of Refraction of G652 G657 fibers which is 1.468. This value can be changed: go to Expert OTDR **setup** / **Display** / **Index of Refraction**.

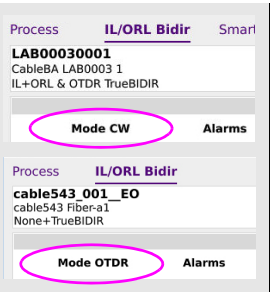
- For each line the **Alarms** status is indicated with an icon:
  - ✓ if thresholds are defined in the Setup menu: results do not exceed alarm thresholds.
  - ✗ if thresholds are defined in the Setup menu: some results exceed alarm thresholds.

    Click on the icon ⓘ to display the causes of the alarm.

NOTE

When bidir IL/ORL performed with the laser/powermeter, this indication is displayed: « **Mode: CW** ».

Otherwise, when no Bidir IL/ORL tests are selected in the setup, the unit will still display Bidir IL/ORL calculated by the OTDR with the Indication: « **Mode: OTDR** ».



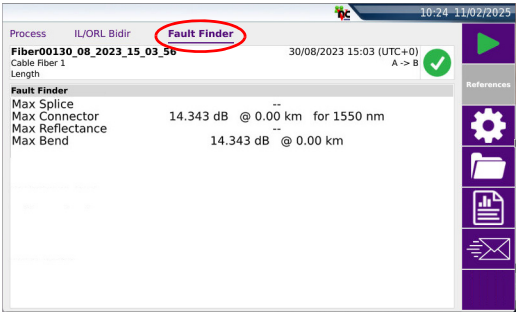
Fault Finder

If, in **Setup** > **Acquisition**, the **Fault Finder** parameter is set to **Yes**, a Fault analysis is automatically launched, if one value (IL and/or ORL) exceeds the IL/ORL thresholds defined (Splice > 0.3 dB, Connector > 0.75 dB, Reflectance > -32 dB and Bend > 1 dB).

As soon as the Fault Finder finishes its analysis, an easy to interpret table displays. It indicates the attenuation values and/or reflectance of the predominant defects that may have caused the IL / ORL values to fail.

1 Select **Fault** tab to display Fault Finder result.

Figure 40 Fault finder result screen



Manual saving and report generation

Once a IL/ORL test is completed, the results are automatically saved (.fcpro format file), if the **Auto Store** parameter has been defined to **Yes** (see page 41).

.txt / .pdf / .json reports are also generated if the parameter **Report** is defined (see page 40).

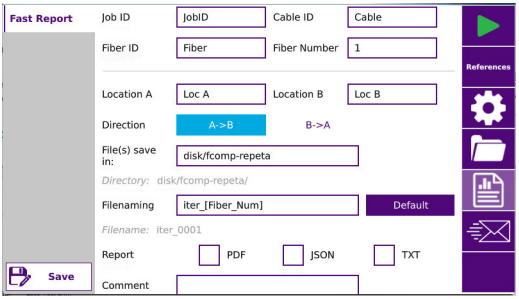
However, if a modification is done (modification of alarm thresholds, comments ...), the file can be saved manually.

To manually save results and generate a report:

1 Press **Fast Report** soft key  .

2 In the menu, configure the file naming and saving mode (and the report)

Figure 41 Fast Report configuration



a Define a **Job Id** and **Cable Id**.

b **Fiber Id**: enter a name for the fiber, using the onscreen keyboard.

c **Fiber Number**: enter/modify the number of the fiber using the onscreen keyboard.

d In the **Location A** and **Location B** parameters, enter/modify the name for Origin and Extremity.

e In the **Direction** parameter, select/modify the direction, to define if the measurement has been performed from Origin to Extremity (**A -> B**) or from Extremity to Origin (**B -> A**).

f Click on **File(s) save in:** and enter the directory path in the edition keyboard or

Click on key to define the current directory as directory for file saving.

g Click on **Filenaming** text box and enter a name for the file in the edition keyboard.

or

In the keyboard, click on key to apply the auto filenaming.

h Click on **Comment** text box to enter a specific comment to the saving.

i In the **Report** parameter, select:

- **PDF** to save the results in a .fcpro file and to generate a report in a pdf file.
- **TXT** to save the results in a .fcpro file and to generate a txt file of the results.
- **JSON** to generate json file(s) compatible with VIAVI test process automation (job manager and StrataSync cloud data management system)

If all parameters are set to **No**, only the .fcpro file will be saved.

3 Once saving is configured as wished, press **Save** key

4 Enter a name for the file in the edition keypad

or

Press to apply the file name defined in the Setup Report menu, in **Filenaming** parameter (see page 39)

5 Press to validate.

NOTE
The .fcpro file and the txt, pdf and / or json files will have the same name.

Once saving is completed, a sound is emitted onto the unit.

4

Loss test and OTDR (unidir or manual bidir)

(when TrueBIDIR or Loopback SW options not installed)

This chapter describes the process to perform Loss tests and OTDR, from configuration of the equipment to the analysis of the results.

The topics discussed in this chapter are as follows:

Configuring the OTDR test (unidir and/or manual bidir - no TrueBIDIR or Loopback)

Once FCOMP/-PRO function is selected on both units and references have been performed, the configuration and parameters can be set up.

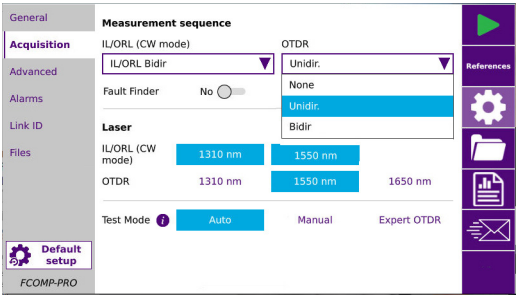
From Process page, press  to access the menus.

In this chapter only the OTDR test configuration is described, as well as specific parameters from Report setup; refer to Chapter 3 for configuration of the other parameters.

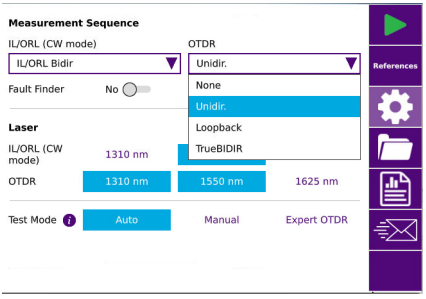
OTDR parameters

Figure 42 OTDR Setup

Without TrueBIDIR or Loopback software options installed



With TrueBIDIR or Loopback software options installed



OTDR Acquisition parameters

OTDR Measurement

- **None.**: No OTDR measurement is performed.
- **Unidir.**: OTDR measurement is performed from one direction only, from the unit where the START is initiated. Unidir OTDR without IL/ORL is not allowed. For only OTDR acquisitions, go to **Expert-OTDR** app.
- **Bidir.**: Each unit performs an OTDR measurement. OTDR traces are not exchanged and remain stored on each unit. A post processing is necessary to get the Bi-directional analysis and calculation. For full automation: install TrueBIDIR or Loopback software. see Chapter 6 on page 75

Laser

Select the laser(s) to be used for acquisitions.

Acquisition mode

Select the otdr acquisition mode:

Auto

- **Laser** can be set by the user.
- **Pulse/ Range/ Resolution/ Acquisition time** are automatically defined, based on the fiber link length auto measurement.

Manual

- **Laser/ Pulse/ Acquisition time** can be set by the user.
- **Range / Resolution** are automatically defined.

Expert OTDR

The OTDR set up is 100% done in **Expert-OTDR** app for full OTDR set up adjustment.

See OTDR user manual for more details.

Advanced page

The **Advanced** parameters for OTDR acquisitions are similar to Loss tests:

- **Detection Thresholds**: see page 31
- **Index of Refraction**: see page 33
- **Scatter Coefficient**: see page 34
- The **Analysis** parameters are defined by default and cannot be modified from FCOMP function. To modify the Analysis parameter, go to Expert OTDR function.

Alarms page

Press **Alarms** to configure the alarms parameters for the OTDR acquisition.

Go down and press **OTDR** to display the OTDR alarm thresholds:

- **Alarm Level** define the alarm level to apply for OTDR acquisition: **None** / **Fail** / **Warning**.

If **None** level is defined, no alarm thresholds will be applied to otdr results.

If **Fail** level is defined, configure the **Threshold** parameters:

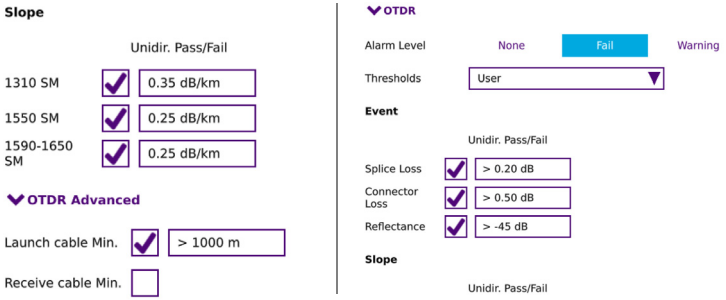
- **Thresholds** select the user defined thresholds to be used:
  - **Default:** Select one this parameter to configure the alarm thresholds with default values.
  - **TIA-568 3 / TIA-568 3.RL35 / ISO/IEC 11801 2010 or 2014 / ISO/IEC 14763-3 2019 / IEC 61280-4-5 (2020):** Select one of this parameter to configure the alarm thresholds with predefined values for standards:

Table 7 Singlemode Modules

	Splice Loss	Connector loss	Reflectance	Slope	ORL
Default	> 0.20 dB	> 0.50 dB	> - 35 dB	> 1.00 dB/km	< 27 dB
TIA-568.3	> 0.30 dB	> 0.75 dB	No	> 1.00 dB/km	No
TIA-568.3 RL35		> 0.75 dB	> - 35 dB	> 1.00 dB/km	
ISO/IEC 11801 (2010)		> 0.50 dB	> - 35 dB	> 0.40 dB/km	
ISO/IEC 14763-3 (2014)		> 0.75 dB	No	> 0.40 dB/km	
ISO/IEC 14763-3 (2019)		> 0.75 dB	> - 35 dB	> 0.40 dB/km	
IEC 61280-4-5 (2020)		> 0.75 dB	> - 35 dB	> 0.40 dB/km	

  - **User**: define your own thresholds values for one or several elements: Splice Loss / Connector Loss / Reflectance / Slope / Launch Cable Min / Receive Cable Min / Avg Splice Loss per Link.

Figure 43 OTDR Alarms: User configuration



If **Warning** level is defined, configure the values above which alarms occur for **Splice Loss**, **Connector Loss** and **Reflectance** parameters.

See OTDR User Manual for more information on alarms configuration.

Files page

The following parameters are available exclusively if the OTDR measurement set up is not **None** (see "OTDR parameters" page 52).

Type

In this parameter, select the parameter **Single Trace .sor** to save each trace in a .sor file.

If the parameter is not selected, the OTDR results are saved and included in .fcpro format file (need FiberCable SW to read it).

Starting the test

Below are described the steps when bidirectional IL/ORL and OTDR test are selected in the **Setup** menu.

CAUTION

Make sure the References softkey is not selected and don't press START REF!

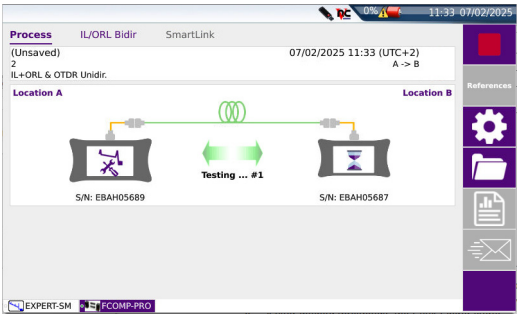
Press **References** key again to unselect it and return to the standard Process page.

1 If necessary, press  to transfer the configuration of this unit to the distant unit.

2 Press **START** key to launch the test.

- **a** The configuration is automatically transfer to the distant unit, if the key  has not been pressed previously.
- **b** Unit A and B are performing IL test and mutually exchange their result values
- **c** Unit A and B are performing ORL test (using OCWR mode) and mutually exchange their result values.
- **d** If OTDR parameter is set to **Yes**, the OTDR acquisition starts.

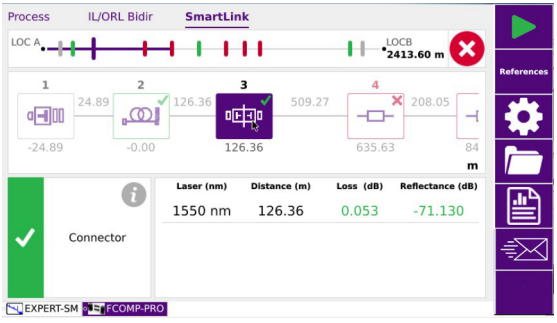
Figure 44 Test in progress



OTDR Results screen

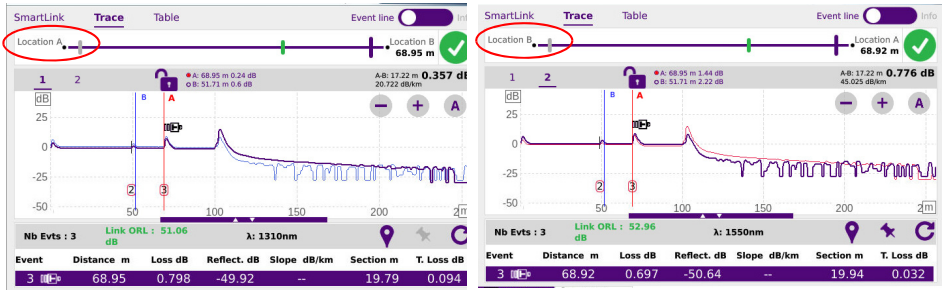
Once the test sequence is completed, a SmartLink tab displays the uni-directional OTDR results.

Figure 45 SmartLink View



To access the OTDR traces, select the Expert OTDR tab at the bottom of the screen. For results screen of IL/ORL and Cable, see "Results screen" page 45.

Figure 46 OTDR results - Manual «Bidir OTDR» selected



In bidirectional mode:

- The OTDR results trace for acquisition performed from Location A to Location B is stored on the local unit (Location A).
- The OTDR results trace for acquisition performed from Location B to Location A is stored on the remote unit (Location B).

The end of fiber is re-calculated and re-positionned based on the far end unit internal launch cable (~30m). This is especially visible on short links where a short pulsewidth may be used.

For more information on trace results, refer to OTDR Module User Manual.

Manual otdr saving and report generation

Saving traces and creating a report

Once the results page is displayed, the results can be saved and a report can be generated directly from the results screen.

For information on report generation for IL/ORL results, see “Manual saving and report generation” on page 49.

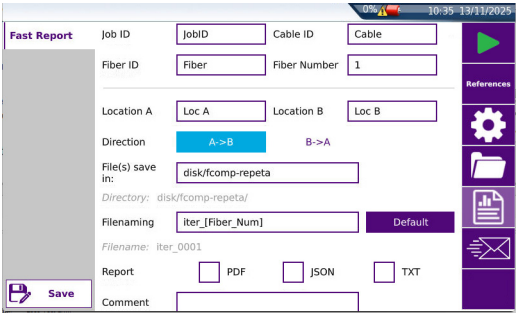
Saving and report can have been automatically generated if, in the file configuration, the **Auto Store** parameter has been set to **Yes** from Setup menu of the OTDR with the appropriate **Save Mode:** see OTDR User Manual.

To generate a report:

1 Press soft key  .
A menu displays under the trace.

2 In the menu, configure the file saving mode (and the report)

Figure 47 Fast report configuration



a If wished, define/modify the name for the Job, the Fiber and/or the Cable clicking on **Job ID / Fiber ID / Cable ID** and on the text box to display the keyboard.

b Modify the **Fiber Number**.

c In the **Location A** and **Location B** parameters, enter/modify the name of Origin and Extremity.

d In the **Direction** parameter, select/modify the direction, to define if the measurement has been performed from Origin to Extremity (**A -> B**) or from Extremity to Origin (**B -> A**).

e Click on **File(s) save in:** and enter the directory path in the edition keyboard
or
Click on key  to define the current directory as directory for file saving.

f Click on **Filenaming** text box and enter a name for the file in the onscreen keyboard.
or
In the onscreen keyboard, click on key  to apply the auto filenaming.

g In the **Report** parameter, select:

PDF to save the results in a .fcpro file and to generate a report in a pdf file.

TXT to save the results in a .fcpro file and to generate a txt file of the results.

JSON to generate json file(s) compatible with VIAVI test process automation (job manager and StrataSync cloud data management system).

h Click on **Comment** text box to enter a specific comment to the saving.

i

If all parameters are defined with **No**, only the .fcpro file will be saved.

3 Once saving is configured as wished, press **Save** key 

.

4 Enter a name for the file in the onscreen keyboard.

or

Press  to apply the file name defined in the Setup screen, in **Filenaming** parameter: `[Fiber Id][Fiber_Num]`.

5 Press  to validate

Once saving is completed, a sound is emitted onto the Platform.

The pdf report is composed of two files: the pdf report for 1st Fiber and the pdf report for 2nd fiber.

NOTE

The file and the report are saved in the last storage media and directory selected.

Opening a report

1 To open the report, press **File Explorer** key

2 In the **Explorer** page, in the directory selected, select the file of the report.

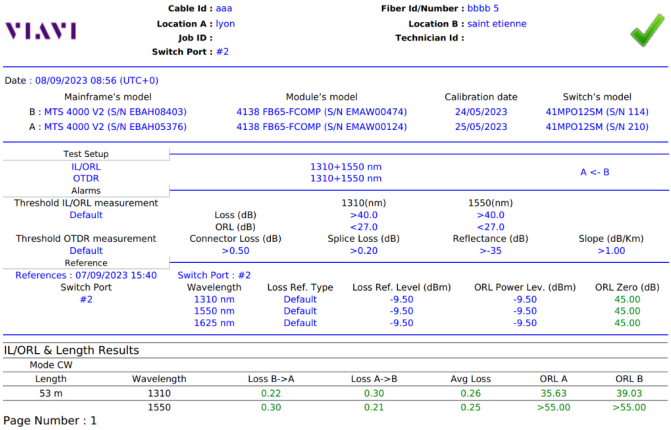
For the txt file: ... *.txt*

For the pdf file: ... *.pdf*

3 Press **Load**.

The file opens on the equipment.

Figure 48 Example of PDF report



VIAVI

Cable Id : aaa
Location A : lyon
Job ID :
Switch Port : #2

Fiber Id/Number : bbbb 5
Location B : saint etienne
Technician Id :

Date : 08/09/2023 08:56 (UTC+0)

Mainframe's model	Module's model	Calibration date	Switch's model
B : MTS 4000 V2 (S/N EBAH08403)	4138 FB65-FCOMP (S/N EMAW00474)	24/05/2023	41MPO12SM (S/N 114)
A : MTS 4000 V2 (S/N EBAH05376)	4138 FB65-FCOMP (S/N EMAW00124)	25/05/2023	41MPO12SM (S/N 210)

Test Setup				
IL/ORL	1310+1550 nm			A <- B
OTDR	1310+1550 nm			
Alarms				
Threshold IL/ORL measurement		1310(nm)	1550(nm)	
Default	Loss (dB)	>40.0	>40.0	
	ORL (dB)	<27.0	<27.0	
Threshold OTDR measurement	Connector Loss (dB)	Splice Loss (dB)	Reflectance (dB)	Slope (dB/Km)
Default	>0.50	>0.20	>-35	>1.00
Reference				

References : 07/09/2023 15:40	Switch Port : #2				
Switch Port	Wavelength	Loss Ref. Type	Loss Ref. Level (dBm)	ORL Power Lev. (dBm)	ORL Zero (dB)
#2	1310 nm	Default	-9.50	-9.50	45.00
	1550 nm	Default	-9.50	-9.50	45.00
	1625 nm	Default	-9.50	-9.50	45.00

IL/ORL & Length Results

Mode CW

Length	Wavelength	Loss B->A	Loss A->B	Avg Loss	ORL A	ORL B
53 m	1310	0.22	0.30	0.26	35.63	39.03
	1550	0.30	0.21	0.25	>55.00	>55.00

Page Number : 1

CAUTION

To modify the VIAVI logo, set by default on the header of the pdf report, save your logo in a jpg file called `logo.jpg` and place it to the root of the disk: `disk > logo.jpg`.

NOTE

A pdf report can also be generated from the File Explorer page onto the equipment (see user manual of the equipment).

5

Loopback OTDR

This chapter describes the use of FiberComplete PRO - Bi-Directional OTDR Loopback method.

The topics discussed in this chapter are as follows:

Configuring the Loopback Test

Once the license is installed onto the equipment (see Base Unit User Manual):

1 Validate the icon FiberComp. PRO on the **Home** page.

2 Press  to display the configuration screen.

Test Cables parameters

1 In the **General** page, select **Test Cables**.

2 Once the Test Cables menu is displayed, configure the parameters for Loopback OTDR acquisitions to be performed.

Figure 49 Loopback - Process page

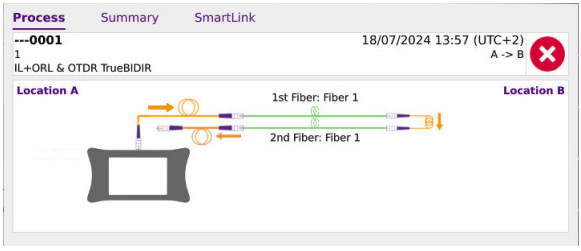
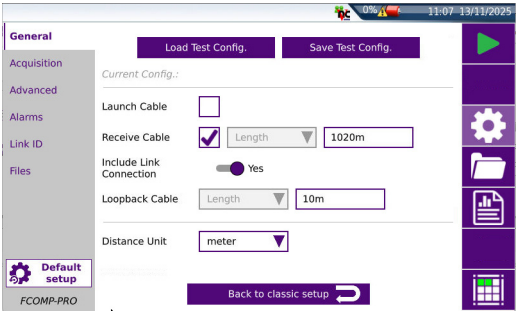


Figure 50 Test Cables parameters



Launch Cable End / Receive Cable Start

No All the results are displayed and referenced on the basis of the board of the module.

Length Click on **Length** to display the numeric keyboard and:

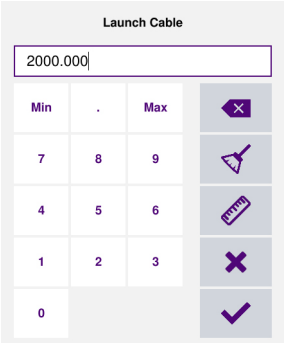
– enter a length (Min= 0 / Max=50 km / 164.042 kfeet / 31.075 miles)

or

– Click on  to perform a measurement of the launch cable: a dialog box informing to connect the launch cable displays. Press Confirm once it is connected to start the measurement.

Once the measurement is completed, the distance is automatically entered in the numeric keypad.

Click on  to validate (or on  to cancel).



Loopback Cable

Click on the text box to define the loopback cable length: if known, enter the length or click on the key  to calculate the length: press **Confirm** to validate.

Unit

Select the unit for the distance measurement: **km** / **kfeet** / **miles** / **meter** / **feet**.

Acquisition page

OTDR Measurement

Select **Loopback** to be able to perform the OTDR measurement in loopback mode.

Laser

The acquisition will be carried out on the wavelength(s) selected.

Acquisition Mode

Select the type of acquisition to be performed:

Auto The acquisition is automatically performed using the best pulse, range and resolution.

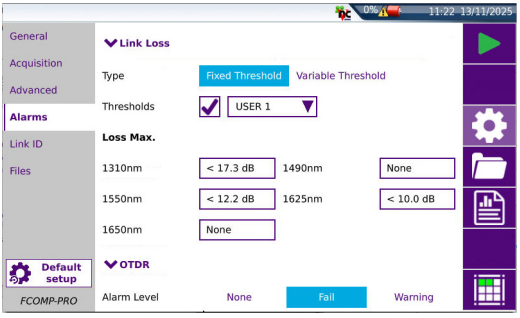
Expert OTDR The acquisition is performed according the parameters configuration for in Expert OTDR mode (see OTDR User Manual for more information on Expert OTDR configuration).).

Alarms page

1 In the **Setup** menu, press **Alarms**.

2 Once the **Alarms** menu is displayed, configure the **Link Loss** thresholds.

Figure 51 Loopback Loss Alarm Thresholds



Type select if the alarms must be defined with **Fixed Thresholds** or **Variable thresholds**.

If **Fixed thresholds** are defined, configure the parameter **Thresholds**:

– Select the user defined thresholds to be used: **User 1** / **User 2** / **User 3** / **User 4** and enter limits for **Loss** for each wavelength (dB)

– Or select the **Default** parameter to define thresholds by default for **Loss** value: < 40 dB for each wavelength

– Select **None** if alarm thresholds must not be defined.

If **Variable Thresholds** are defined, only pre-set values are defined per fiber length section. (See a VIAVI representative to get a customization of these parameters).

NOTE

The selected pass/fail thresholds will apply to the average slope loss, event loss and max reflectance.

3 Configure the OTDR alarms thresholds: see "Alarms page" page 53.

See OTDR User Manual for more information on alarms configuration.

The following rules apply between the Alarms set up in Fcomp app & results displayed in Fcomp app & Expert OTDR app.

Table 8 Alarms set up in Fcomp

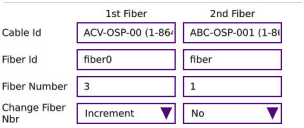
Test Sequence	OTDR Acq.	FCOMP app Alarms	Expert OTDR app Alarms
Loopback	Auto	Set by the user	Set by the user
	Expert OTDR		
Alarm displayed in →		FCOMP Smart link FCOMP pdf report: page 1	Expert Unidir Trace

Link ID page

Only different or extra parameters than the OTDR link parameters are described (see OTDR User Manual for a complete description of all the available parameters).

1st Fiber / 2nd Fiber

Click on **1st fiber** or **2nd Fiber** and in the sub-menu



Fiber Id Select the **Fiber Id** and modify if necessary the fiber name.

Fiber Number Select the **Fiber number** parameter and click on left or right arrow to modify the Number

Change Fiber Nbr Select **Change Fiber Nbr** and select

- **Increment** the fiber number is automatically incremented at each new file-save.
- **Decrement** the fiber number is automatically decremented at each new file-save
- **User defined** Use **Edit Number** softkey to enter the increment/decrement value for fiber number.

Note: to decrement the number, enter the sign «-» before the number. Example: -1.

Min: -999 / Max: 999 / Auto: 0

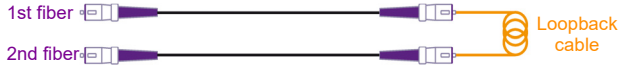
- **No** the Fiber number must not automatically modified.

Cable Id Select the **Cable Id** parameter and enter/modify the cable identifier.

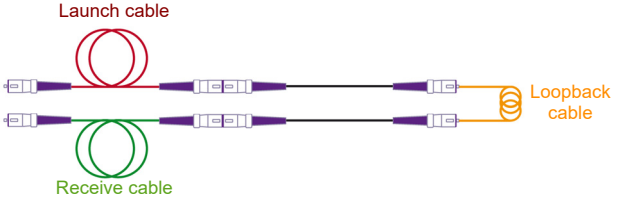
Performing the tests

Below are described the steps when Loopback OTDR measurement has been selected and inspection of the connectors has been validated.

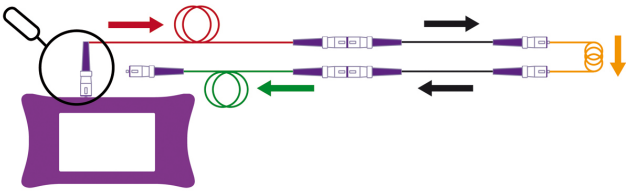
1 Connect a **loopback cable** at each fiber end



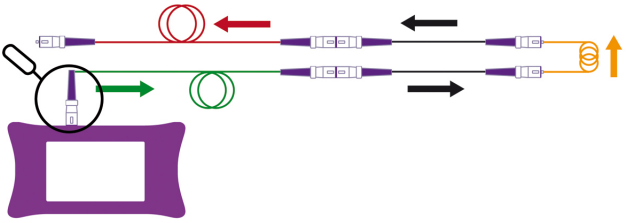
2 Connect a **launch cable** at 1st fiber - Origin
Connect a **receive cable** at 2nd fiber - Origin -



3 Connect the **launch cable** free extremity to the OTDR port.
Press **Start**.
The acquisition measures through Fiber 1 to Fiber 2:
Launch Cable+ Fiber 1 + Loopback cable + Fiber 2 + Receive Cable.



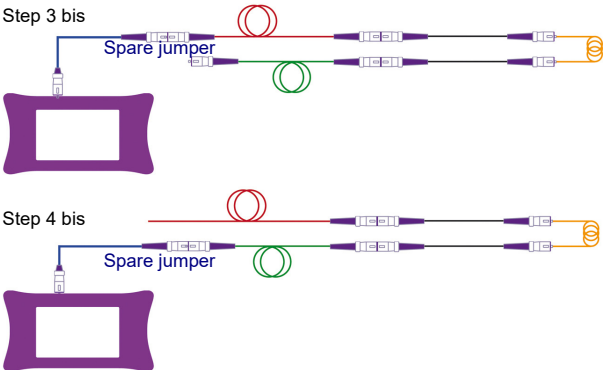
4 Disconnect the **Launch cable** from the OTDR port.
Connect the **Receive cable** free extremity to the OTDR port.
Press **Start**
The acquisition measures through Fiber 2 to Fiber 1:
Receive Cable+ Fiber 2 + Loopback cable + Fiber 1 + Launch Cable



Once measurement is completed, the results display.

Tips: the above process if performing a high volume of measurements can lead to accelerated damages of the OTDR port, potentially impacting measurement accuracy.

To mitigate this risk, it is possible to insert a short jumper (30cm maximum length with identical fiber /connector type as LC/RC) between the OTDR port and the test cable, acting as a protective buffer.



Results screen

Once the tests are completed, the results screen displays, both with Loopback view and with OTDR result trace.

Results page

The Results page can display either:

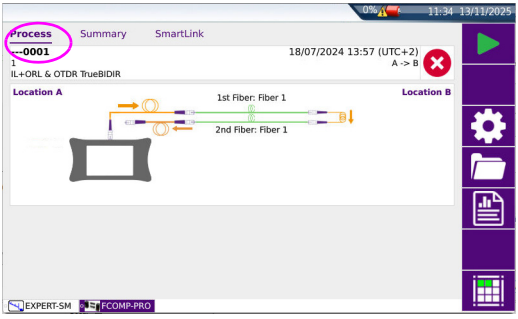
- the **Process** view, displaying the graphical representation of the measurement and the Loss results for each fiber

  or
- the **Summary** view, for the 1st and the 2nd fiber.

  or
- the **SmartLink** view, with a graphical representation of the link.

Process View

Figure 52 Result Loopback- Process view



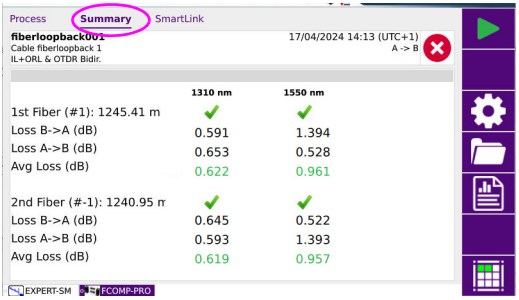
On the upper part, a graphical representation of the installation for the test is displayed, with the Identifier for each component (name of the location and of the loopback, fiber numbers...).

Summary view

The Summary tab allows to display a summary table of the loss measurement for the first and second fiber.

The results displayed in green or red are values for which a threshold has been defined: in green, the value does not exceed the thresholds defined in OTDR setup, in red it exceeds the thresholds. See “Alarms page” on page 64.

Figure 53 Summary View

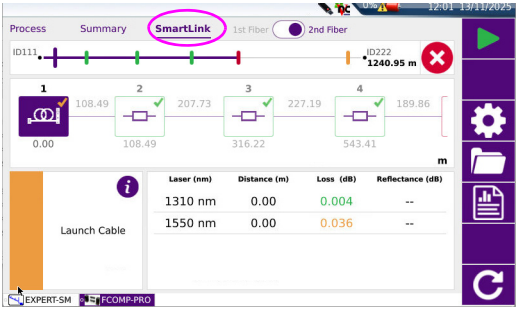


SmartLink view

Click on **SmartLink** to display a SmartLink view of each measured fiber:

Select **1st Fiber** or **2nd Fiber**  to display the results for the first or second fiber.

Figure 54 SmartLink View



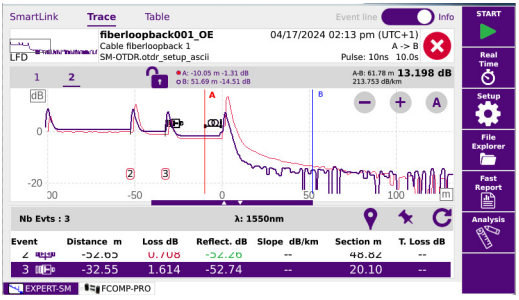
The event is displayed with a red icon if it is above the alarm thresholds defined in the setup menu.
A green icon is displayed if it lies within the thresholds.

OTDR results trace / SmartLink results

OTDR Results trace

In Expert OTDR tab, the OTDR results traces are displayed with the results table.

Figure 55 OTDR Results trace

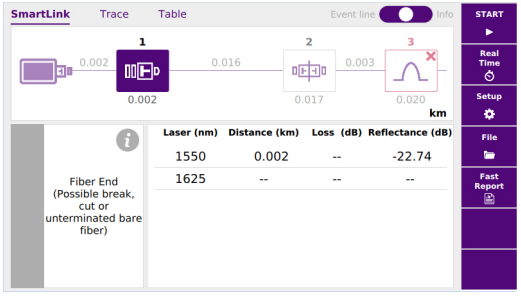


The results displayed in green or red are values for which a threshold has been defined: in green, the value does not exceed the thresholds defined in OTDR setup, in red it exceeds the thresholds. See “Configuring the Alarms parameters” on page 26.

SmartLink view

Press **SmartLink** tab to display the SmartLink view of the results.

Figure 56 SmartLink results page



Saving results and generating a report

Once the results page is displayed, the results can be saved and a report can be generated directly from the results screen.

Saving and report can have been automatically generated if, in the file configuration, the **Auto Save** parameter has been set to **Yes** (see page 41) with the appropriate **Save Mode**.

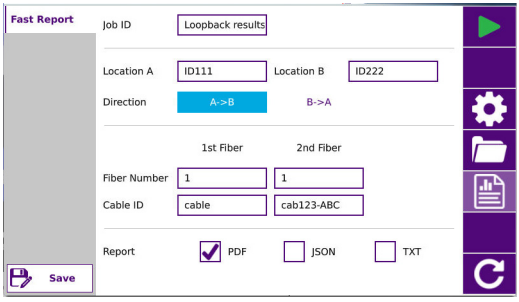
Saving results and creating a report from results page

To generate a report:

1 Press  soft key.
A menu displays under the trace.

2 In the menu, configure the file saving mode (and the report)

Figure 57 Fast report configuration



a Enter a Job ID if necessary.

b In the **Location A** and **Location B** parameters, enter/modify the name of Origin and Extremity.

c In the **Direction** parameter, select/modify the direction, to define if the measurement has been performed from Origin to Extremity (**A -> B**) or from Extremity to Origin (**B -> A**).

d On **1st fiber** or **2nd Fiber** sub-menus:

– Select the **Fiber number** parameter and enter/modify the fiber number.

– Select the **Cable Id** parameter and enter/modify the cable identifier

e In the **Report** parameter, select:

TXT to generate a txt file of the results.

PDF to generate a report in a pdf file.

JSON to generate json file(s) compatible with VIAVI test process automation (job manager and StrataSync cloud data management system).

3 Once saving is configured as wished, press 

.

4 Enter a name for the file in the edition keypad

or

Press  to apply the file name defined in the Setup screen, in **Filenaming** parameter: `[Fiber Id][Fiber_Num]`.

5 Press  to validate

Once saving is completed, a sound is emitted onto the Platform.

The pdf report is composed of two files: the pdf report for 1st Fiber and the pdf report for 2nd fiber.

NOTE

The file and the report are saved in the storage media and directory defined in the setup screen (see page 38).

Opening a report

1 To open the report, press **File** key

2 In the **Explorer** page, in the directory selected, select the file of the report.

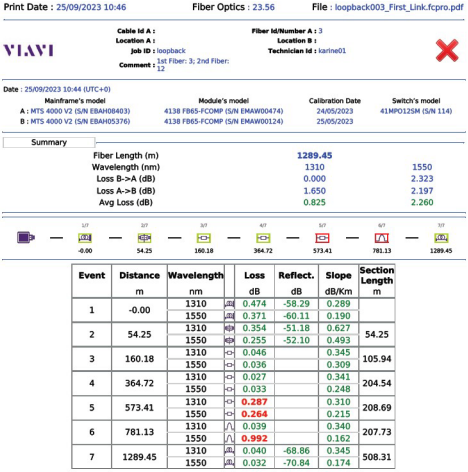
For the txt file: *trace file_sor.txt*

For the pdf file: *trace file.sor.pdf*

3 Press **Load**.

The file opens on the equipment.

Figure 58 Report from Loopback measurement



Print Date : 25/09/2023 10:46 Fiber Optics : 23.56 File : loopback003_First_Link.fcpro.pdf

VIAVI

Cable Id A :
Location A :
Job ID : loopback
Comment : 1st Fiber: 3; 2nd Fiber: 12

Fiber Id/Number A : 3
Location B :
Technician Id : karine01

Date : 25/09/2023 10:44 (UTC+0)

Mainframe's model	Module's model	Calibration Date	Switch's model
A : MTS 4000 V2 (S/N EBAH08403)	4138 FB65-FCOMP (S/N EMAW00474)	24/05/2023	41MPO12SM (S/N 114)
B : MTS 4000 V2 (S/N EBAH05376)	4138 FB65-FCOMP (S/N EMAW00124)	25/05/2023	

Summary

Fiber Length (m)	1289.45	
Wavelength (nm)	1310	1550
Loss B->A (dB)	0.000	2.323
Loss A->B (dB)	1.650	2.197
Avg Loss (dB)	0.825	2.260

-0.00 54.25 160.18 364.72 573.41 781.13 1289.45

Event	Distance m	Wavelength nm	Loss dB	Reflect. dB	Slope dB/Km	Section Length m
1	-0.00	1310	0.474	-58.29	0.289	
		1550	0.371	-60.11	0.190	
2	54.25	1310	0.354	-51.18	0.627	54.25
		1550	0.255	-52.10	0.493	
3	160.18	1310	0.046		0.345	105.94
		1550	0.036		0.309	
4	364.72	1310	0.027		0.341	204.54
		1550	0.033		0.248	
5	573.41	1310	**0.287**		0.310	208.69
		1550	**0.264**		0.215	
6	781.13	1310	0.039		0.340	207.73
		1550	**0.992**		0.162	
7	1289.45	1310	0.040	-68.86	0.345	508.31
		1550	0.032	-70.84	0.174	

CAUTION

To modify the VIAVI logo, set by default on the header of the pdf report, save your logo in a jpg file called `logo.jpg` and place it to the root of the disk: `disk > logo.jpg`.

NOTE

A pdf report can also be generated from the File Explorer page onto the equipment (see user manual of the equipment).

6

TrueBIDIR OTDR

(automated on board bi-directional OTDR)

This chapter describes the use of the TrueBIDIR software option, when the software license has been purchased with an OTDR module.

The topics discussed in this chapter are as follows:

Configuring the True Bidirectional Test

Once the license is installed onto the equipment (see Base Unit User Manual):

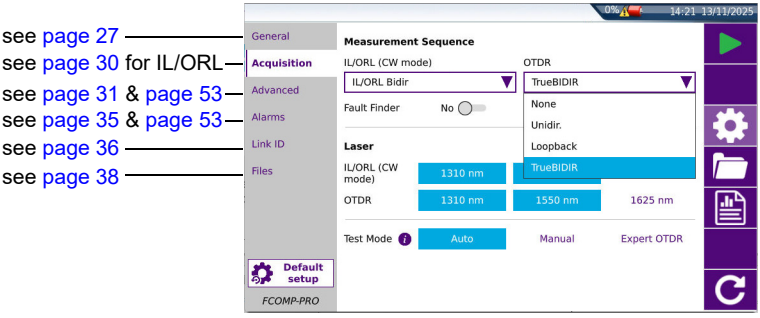
1 Validate the icon 

on the **Home** page.

Figure 59 Home page with FCOMP-PRO icon selected

2 Press **SETUP** to display the configuration screen.

Figure 60 TrueBIDIR - Acquisition Configuration



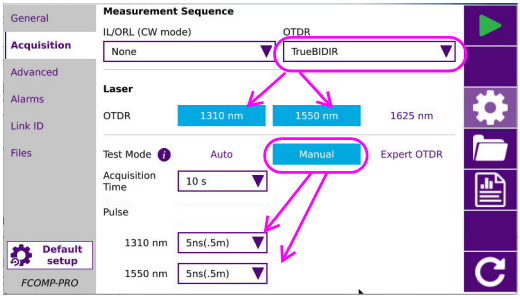
NOTE

With TrueBIDIR configuration, the results are automatically saved (the **Auto Save** parameter is defined to **Yes**, and cannot be modified) - see page 41.

Acquisition page - OTDR acq. mode settings

1. In OTDR parameter, select **TrueBidir**
2. Configure the OTDR **Acquisition Mode** consequently.
3. If **Manual** mode is selected, a different pulse can be defined for each wavelength.

Figure 61 OTDR Manual Acquisition Mode configuration



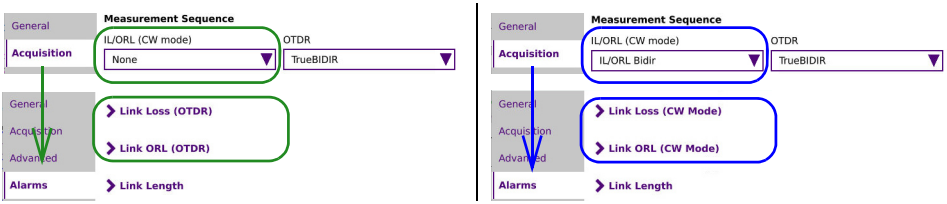
Alarms configuration

Alarms configuration with TrueBIDIR and IL/ORL measurement sequence

The alarms configuration is different according to the selection.

- If only the **TrueBidir** sequence is defined, no **IL/ORL** measurement is selected, then the Alarms for Link Loss and Link ORL will be based on OTDR results only.
- If IL/ORL measurement is included in the sequence (CW mode), then the Alarms for Link Loss and Link ORL will be performed on CW mode and not based on OTDR results.

Figure 62 IL/ORL and OTDR alarms according to measurement sequence

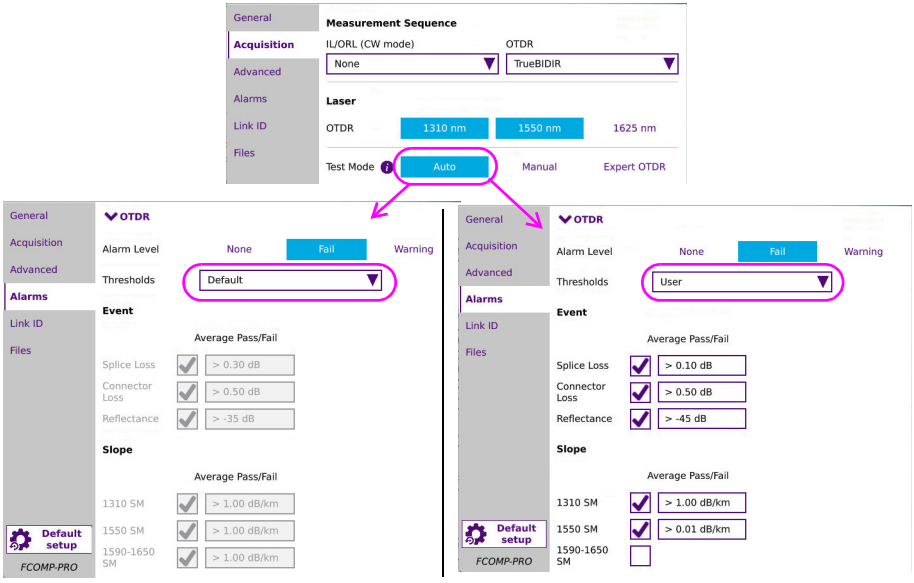


Alarms configuration with OTDR TrueBIDIR and Acquisition Mode

In TrueBIDIR mode, the alarms configuration is different according to the OTDR acquisition mode defined;

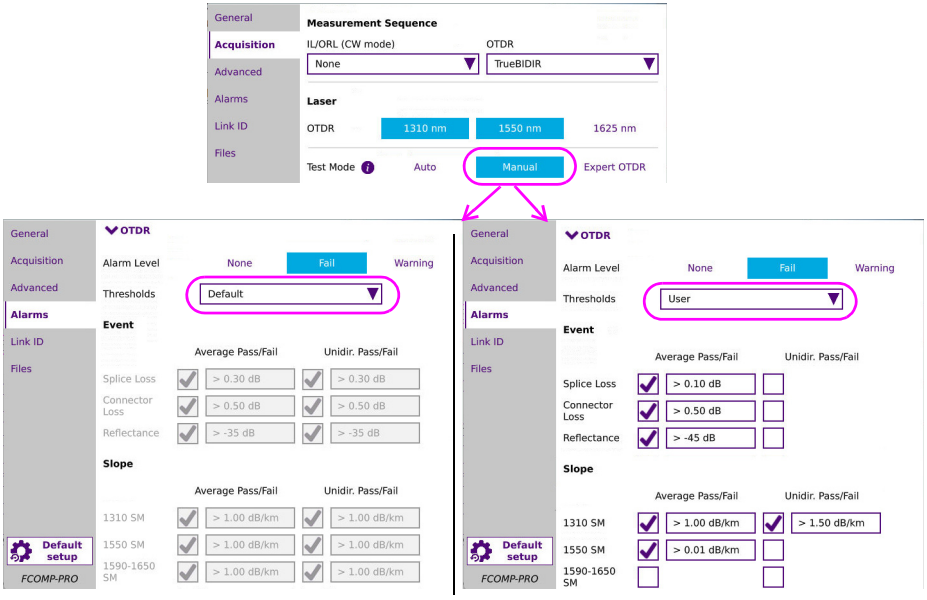
- **Case 1: OTDR TrueBIDIR with Auto acquisition mode**
  The alarms thresholds are only based on averaged results (except for Reflectance : max Reflectance results) for Event and Slope.

Figure 63 Alarms configuration with **Auto** OTDR acquisition Mode



- **Case 2: OTDR TrueBIDIR with Manual acquisition mode**
  The alarms thresholds are based on the averaged and unidirectional results for Event and Slope.

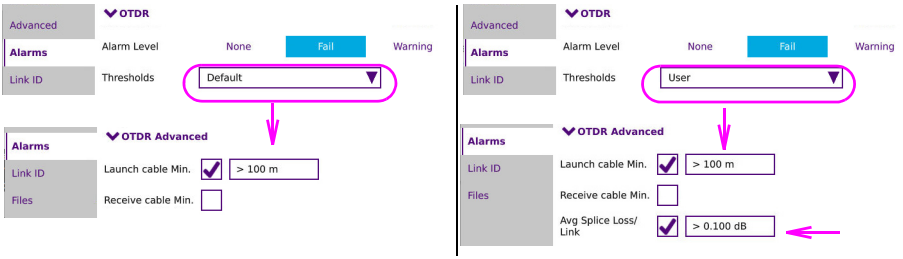
Figure 64 Alarms configuration with **Manual** OTDR acquisition Mode



OTDR Advanced alarms configuration

- **Case 1**
  If **Default** Thresholds are defined, there is no configuration for Average Splice Loss/Link.
- **Case 2**
  If **User** Thresholds are defined, the Average Splice/Loss/Link can be configured.

Figure 65 OTDR Advanced parameter with TrueBIDIR



Process view

In Process view, as soon as each fiber link's extremity has been connected to the Fiber-Complete module, the two devices are communicating and exchanging information such as their respective serial number. The link length is as well immediately measured and displayed.

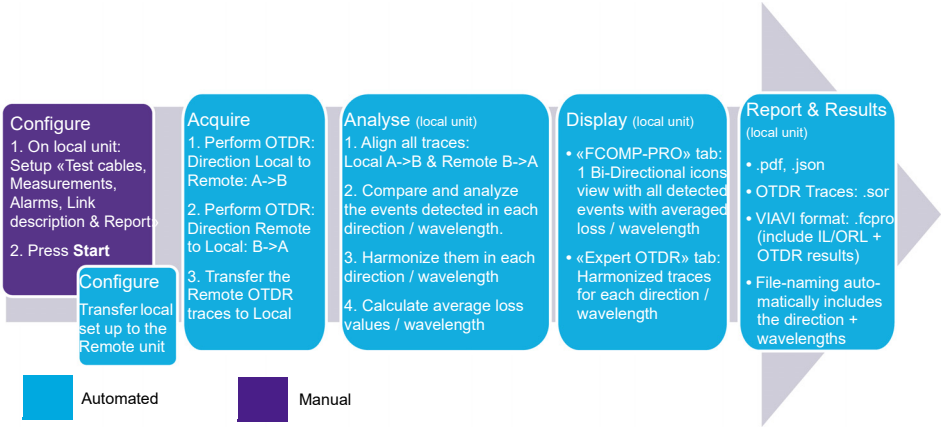
Communication issues

In Process view, if the following is not displayed: serial number, no green line connecting each device, no length result displayed, the units are not able to communicate and the test can not start. Wait 5-30 seconds, the two devices may need some time to adjust all communications due to multiple connections /disconnections or poor first connections quality.

If no communication is yet established after 2 minutes, disconnect and reconnect, it will reset the communication process.

Performing the tests

Figure 66 TrueBIDIR measurement process



See "Instant bi-directional OTDR analysis: TrueBIDIR method" page 9 for more information.

Results

Results views

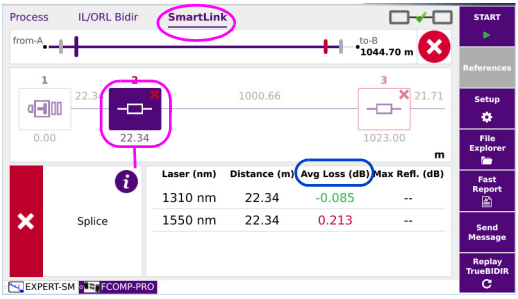
SmartLink view: Bi-Directionnal OTDR results

In FCOMP-PRO, select the **SmarLink** tab at the top. The screen is split in 3 sections.

The screen displays icon-based representation of the average bi-directional OTDR results. Average loss is automatically calculated based on (Event loss A->B + Event loss B->A)/2 -same for the slope-.

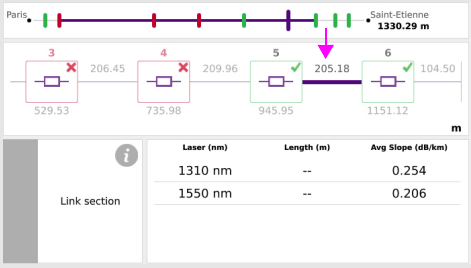
The maximum reflectance of the two directions is automatically compared. Pass/fail status for each element are displayed per OTDR alarms set in FCOMP-PRO.

Figure 67 SmartLink View



NOTE

To display the "Slope measurements results", click on each section link.



Click on one event on the graphical representation to display the loss and reflectance values for each wavelength, and the event description, at the bottom of the display.

The event is framed in green (passed) or red (failed) and:.

- A green icon is displayed if it lies within the thresholds.
- A red icon is displayed if the value exceeds the threshold.

IL/ORL Bidir view: Fiber Link results

IL/ORL Bidir view displays all results related to the entire Fiber link: Link loss, Link ORL, Link Length as well as Average Splice Loss / Link and Sum of Events Loss/ Distance (some conditions are required to get these last two measurements performed).

- When bidir IL/ORL is performed with the laser/powermeter, this indication is displayed: « **Mode: CW** ».
- Otherwise, when no Bidir IL/ORL tests are selected in the setup, the unit will still display Bidir IL/ORL measured by OTDR with the Indication: « **Mode: OTDR** ».

Figure 68 IL/ORL results in CW or OTDR Mode

Mode OTDR	Alarms	1310 nm	1550 nm
Length : 3.324 km			
Loss B->A (dB)	✔	2.09	3.19
Loss A->B (dB)	✔	2.02	3.22
Avg Loss (dB)	✔	2.05	3.20
ORL A (dB)	✔	35.68	38.54
ORL B (dB)	✔	35.33	37.77
Avg Splice Loss/Link		0.073	0.507

Mode CW	Alarms	1310 nm	1550 nm
Length : 3.324 km			
Loss B->A (dB)	✔	2.40	3.41
Loss A->B (dB)	✔	1.42	2.09
Avg Loss (dB)	✔	1.88	2.70
ORL A (dB)	✔	36.98	40.16
ORL B (dB)	✔	32.88	42.06

OTDR traces

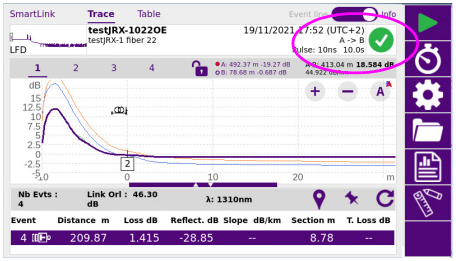
In EXPERT-SM, all uni-directional OTDR traces performed in each direction are displayed with their smartlink and table views.

Example below: the traces **1 & 2** are 1310/1550 nm from A->B and traces **3 & 4** 1310/1550 nm from B->A. The direction of the traces is displayed in the **Info** line caption.

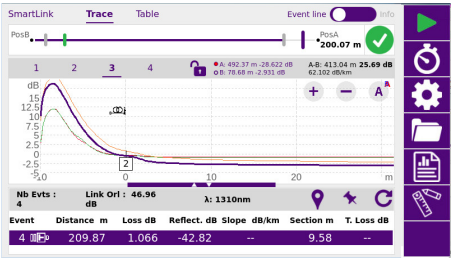
NOTE

All traces (all wavelengths, all direction) are displayed and saved on the "master" unit (the one on which the START was pressed).

Figure 69 OTDR results



1 & 2: 1310/15550 nm A -> B



3 & 4: 1310/15550 nm B -> A

NOTE

By clicking on the upper tabs **SmartLink** and **Table** you have access to additional representation of results, but for the selected direction only. The direction can only be changed via the **Trace** view.

Modify marker [Event Code] and lock all markers

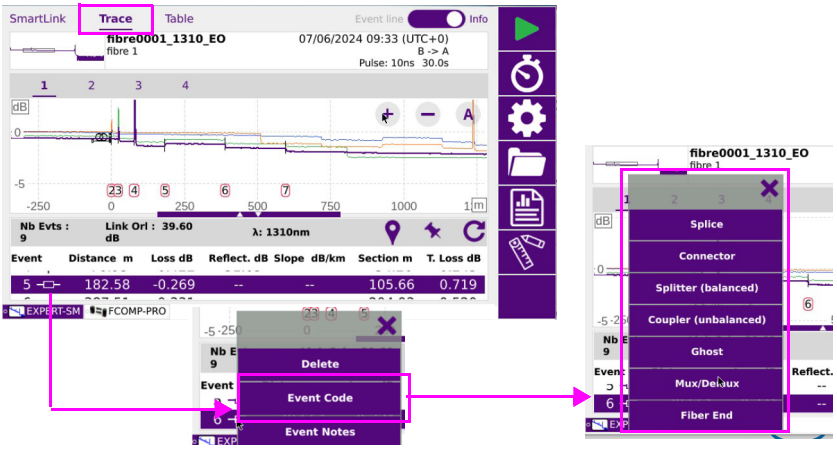
1 Analyze SLM Bi-directionnal OTDR analysis

- **a** In **FCOMP-PRO** app, go to **SmartLink** tab to analyze all markers/ events code.
- **b** If a marker events code is uncorrect, go to **Expert OTDR** app to modify it.

2 Modifying markers on one trace

- **a** In EXPERT-OTDR app, go to **Trace** tab, select # **1** trace (# **1** = Trace from Master to Remote with 1st selected wavelength) (all other traces can be selected as well).
- **b** In the table, below the trace, select the **Marker** icon which code is to change
- **c** With a long press on the selected icon, a list is then displayed.
- **d** Select **[Event Code]**, choose accordingly in the list now displayed.

Figure 70 Event Code

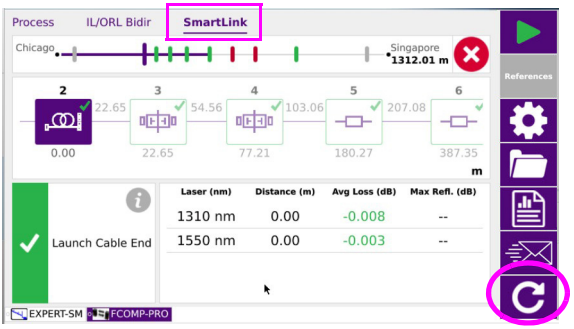


3 Update all OTDR results, raw data & reports with **Replay trueBIDIR** function

a In **FCOMP-PRO** app, go to **SmartLink** tab and press **Replay TrueBIDIR**.

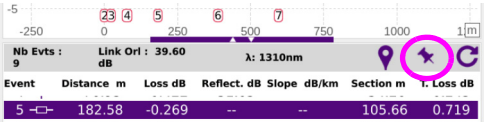
Bi-directionnal OTDR analysis, all individual traces (all wavelengths, all directions) and raw files & reports are automatically updated.

Figure 71 Replay True Bidir key



4 Lock the markers

a In EXPERT-OTDR app, press the **Lock Marker** pin.



CAUTION

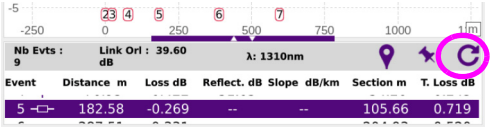
The lock icon can only be activated on the Traces from “Master to Remote” direction.

b When the pin stands in vertical position, all markers are locked for the next acquisitions.

5 Press **Start** for next acquisitions (in FCOMP-PRO app).

Removing marker

1 Press the circled arrow icon on each trace (from one direction only)



2 Replay TrueBIDIR, to update Bi-directionnal OTDR analysis, all individual traces (all wavelengths, all directions) and raw files & reports.

Adding Marker [Event code] and lock all markers

1 Analyze SLM Bi-directionnal OTDR analysis

a Go to **SmartLink** tab to analyze all markers/ events code.

b If a marker event is missing, go to **Expert OTDR** app to add it.

2 Add Markers on all Traces- All wavelengths- One direction only:

In **EXPERT-OTDR** app,

– Go to **Trace** tab, select the trace where the missing event can be very precisely positioned.

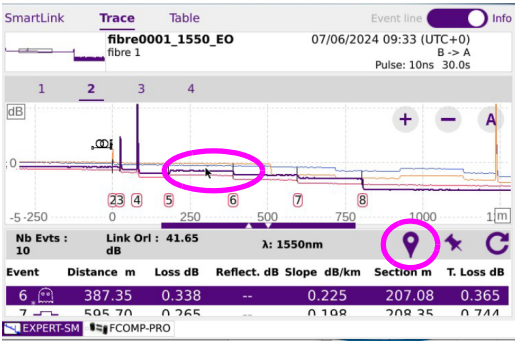
– Position the cursor at the correct distance.

– Press the **Event** icon  .

A new Marker is automatically added. (Modify Event code if needed: see "Modify marker [Event Code] and lock all markers" page 84)

– Repeat on all wavelengths from the SAME direction. Do NOT repeat on the opposite direction.

Figure 72 OTDR Trace - New event

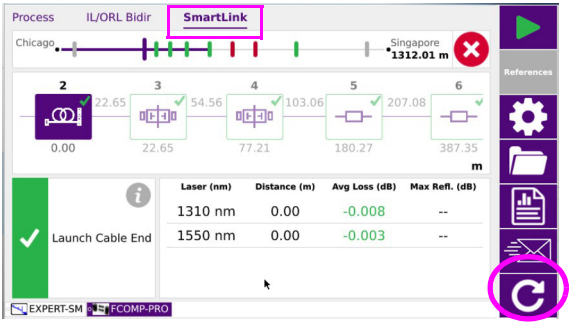


3 Update all OTDR results, raw data & reports with **Replay trueBIDIR** function.

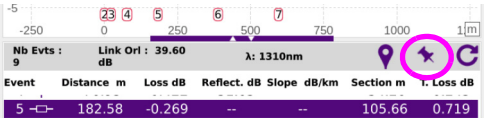
a In FCOMP-PRO app, go to **SmartLink** tab and press **Replay TrueBIDIR**.

Bi-directionnal OTDR analysis, all individual traces (all wavelengths, all directions) and raw files & reports are automatically updated.

Figure 73 OTDR Trace - New event



4 Lock the markers: In EXPERT-OTDR app, press on the **Lock Marker** pin.



When the pin stands in vertical position, all markers are locked for the next acquisitions.

5 Press **Start** for next acquisitions (in Fcomp-PRO app).

Removing marker

1 Press the circled arrow icon on each trace (from one direction only)

2 Replay TrueBIDIR, to update Bi-directionnal OTDR analysis, all individual traces (all wavelengths, all directions) and raw files & reports.

Manual saving and report generation

Once a TrueBIDIR test is completed, the results are saved in:

- .sor files (if “one and all traces” is selected in the set-up)
- .fcpro file (automatically saved)
- .pdf, .json reports (if .pdf or .json have been selected in the set up)

if a display modification has been done such as cursors been added, use key  to save the files with the modification.

Saving traces and creating a report

Once the results page is displayed, the results are automatically saved and a report is generated directly from the results screen.

For information on report generation for IL/ORL results, see “Manual saving and report generation” on page 49.

NOTE

.sor file naming automatically includes: wavelength (1310, 1550, 1625…) and direction: OE for Origin-Extremity, or EO for Extremity-Origin

NOTE

The txt, pdf and json files will have the same name.

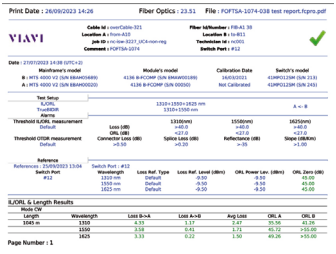
NOTE

The file and the report are saved in the last storage media and directory selected.

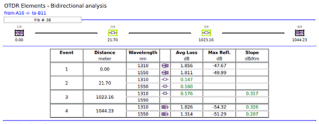
Opening a report

1. To open the report, press **FILE** key
2. In the **Explorer** page, in the directory selected, select the file of the report.
   For the txt file: *trace file.txt*
   For the pdf file: *trace file.pdf*
3. Press **Load**.
   The file opens on the equipment.

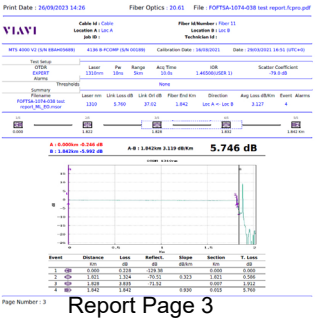
Figure 74 Example of PDF report from TrueBIDIR



Report Page 1



Report Page 2



Report Page 3

CAUTION

To modify the VIAVI logo, set by default on the header of the pdf report, save your logo in a jpg file called `logo.jpg` and place it to the root of the disk: `disk > logo.jpg`.

NOTE

A pdf report can also be generated from the File Explorer page onto the equipment (see user manual of the equipment).

7

High Fiber Count

(FCOMP...+ MPO switch + Cable-SLM)

This chapter describes the use of the MPO module switch (designed to handle high fiber count applications) with Cable-SLM software (automatically activated with the installation of the switch).

Cable-SLM will allow to create a test project for every cable to be tested as well as track project progress in real time and save project test data and generate reports right away.

The option activates a new softkey/button **Manage Project** at the bottom right of the Process page.

The topics discussed in this chapter are as follows:

Establishing references for Loss and ORL measurements

1. Make sure the MPO switch module is plugged and active (icon turned yellow on the home page).
2. Select the **References** soft key.
   2 Referencing methods are available.

- **Default Ref.**: immediate process, no measurement uncertainty is guaranteed.
- **Side by side Ref.**: most accurate method, both test sets must be at the same location during the referencing process.

CAUTION

Once the process of the reference is launched and the reference is performed, never disconnect the test cable from the switch module test port. A good practice is to reference every morning before going on-site.

CAUTION

The end to end polarity has to match the reference polarity (type A with VIAVI test cords).

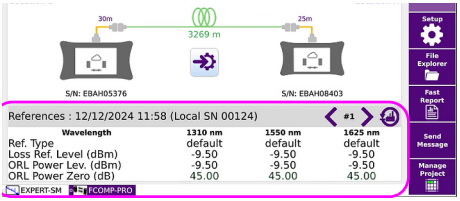
CAUTION

Only references with Polarity A are supported.
If the link uses Polarity B or Polarity C, insert an extra short adaptive cord with the same polarity as the link under test, after setting the references and before starting the test.

Default References

Press the icon to fill the table with default reference values. As soon as the icon is pressed and the table filled with default reference value, the display returns automatically to **Process** page. The following figure show the default values:

Figure 75 Default references



Side By Side Referencing process with simplex connectors (non native MPO networks), with fanout test cables

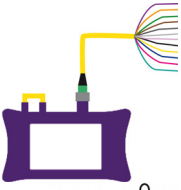
1 Press References, then ▶.

2 The referencing wizard on the screen is not adapted. Follow the below instructions. Side by side referencing will apply.

a **Zero ORL Reference**:

– Fanout with **APC** connectors:
Press ▶ **without any test cable been connected** to the MPO port.
To be performed on both paired devices.

– Fanout with **PC** connectors:
Connect non reflective PC terminal to each fanout strand.
Press OK with test cable been connected to the MPO port
To be performed on both paired devices



b **Self-reference**:

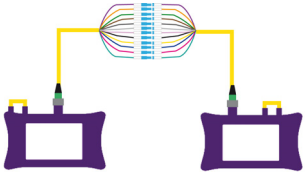
– Connect the MPO reflective terminal directly to the MPO switch port.
Press OK.
To be performed on both paired devices.

c **Loss reference**:

On each paired device, now connect each test cable to the MPO port switch.

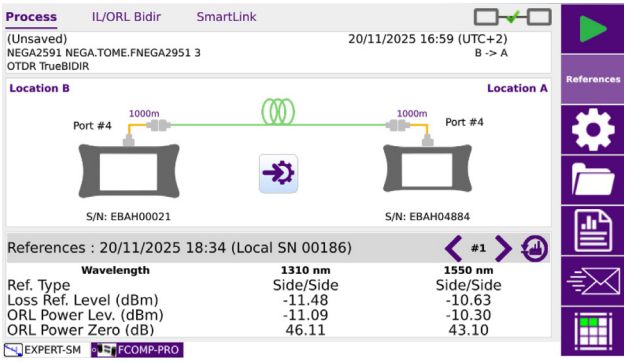
Connect the two MPO fanout test cables together with adaptors.

Check the icon continuity green status. Press OK.



On the top banner of the table is displayed the fiber number “#N”. The left **<** and right **>** arrows allow scanning through the 12 fibers.

Figure 76 Reference results



Referencing process with MPO native networks (no fanout test cables)

Follow the instructions given by the referencing wizard.

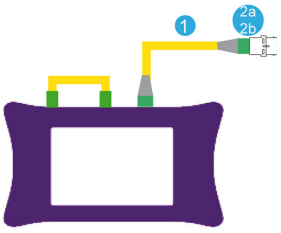
1 Press References, then ▶.

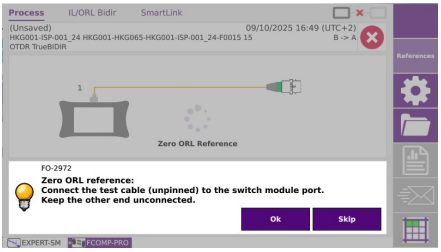
2 Follow the below instructions.

a **Zero ORL Reference**:

– Connect the unpinned extremity of the test jumper to the switch port.

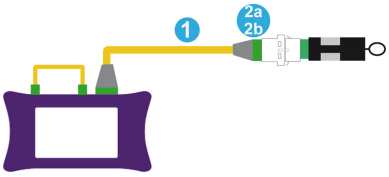
– Keep the other extremity unconnected. The bulkhead adaptor can be installed.

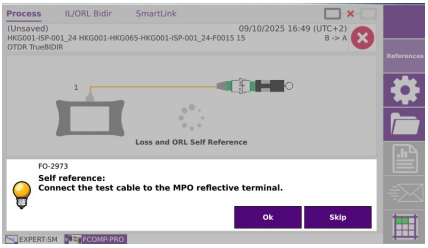




b **Self-reference**:

– Connect the test jumper to the MPO reflective terminal.

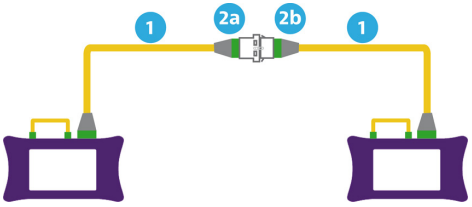


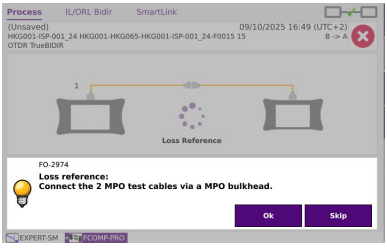


c **Loss reference**:

Connect the two MPO test cables via a MPO bulkhead.

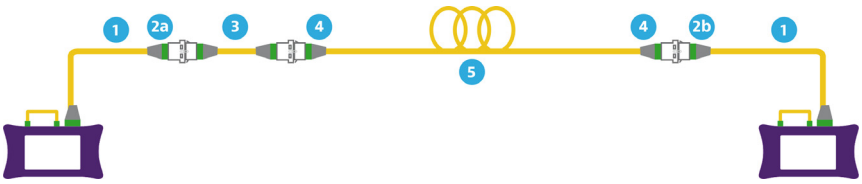
Press OK only on one device.





Alternative to Loss Reference with extra adaptive cord, if conflict with pinned (M) - unpinned (F)

MTP-PRO short jumper allows to adapt to the pinned Male/ unpinned Female network configuration

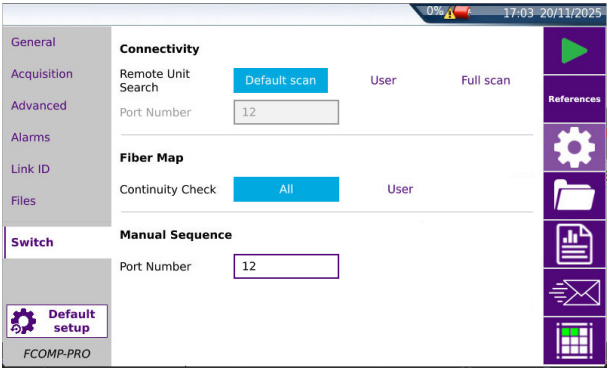


Configuring the MPO Module

Before starting the test, and if a MPO Module switch is installed onto the equipment, it must be activated (by going on the Home page and selecting the MPO switch icon) and configured:

1. In FCOMP-PRO, go to Project page, and press  .
2. Load a config. file. and select accordingly.
   or
   Configure your local manually unit by selecting the appropriate keys
3. Adjust the L**aunch Cable** / **Receive cable** (if not done via the shortcuts)
4. In **General** screen, adjust the **Unit** accordingly: see page 29.
5. In **Files** screen, define the **Table view**: **Fiber** (recommended): see page 42.
6. In **Switch** screen, configure the MPO;

Figure 77 MPO Switch configuration



a **Remote Unit Search**: **Default scan** (recommended)

Default scan: fast & optimized scan (adapted to all polarities type), (optimized connectivity search on the ports 3, 4, 9 and 10). For “Point to Point” links.

User: Set up the port number for initial connectivity (same settings needed on local & remote units).

Full scan: longer but complete scan connectivity (scanning all 12 fibers, starting with port #1.). For use case “switch Remote / no switch Local”.

b **Fiber Map**: set up continuity check:

– **All**: complete scan connectivity

– **User**: Only the set-up range is mapped for fast continuity/ cross connected check.
Fiber Map Set up range gets displayed in white in Process view/ switch section.

c Enter the **Switch port** number for **Manual sequence**.

This section is disabled as soon as a project is loaded (the project opening enables an automatic switch sequence).

Configuring a measurement set up

Do not forget to configure the test set up before creating the project

Creating a project for an automatic switch sequence

To initiate an automatic switch sequence, a project must be created or opened.
A project can be created with or without a label list:

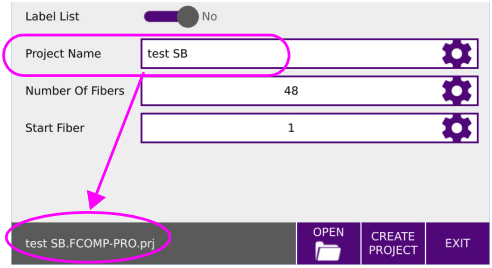
1 Touch  in order to open or create a project.

Managing the test through a project will allow the switching sequence to run automatically.

2 Enter a **Project Name**.

A project directory will be created, and all measurement files will automatically be stored in this dedicated directory.

Figure 78 Project created

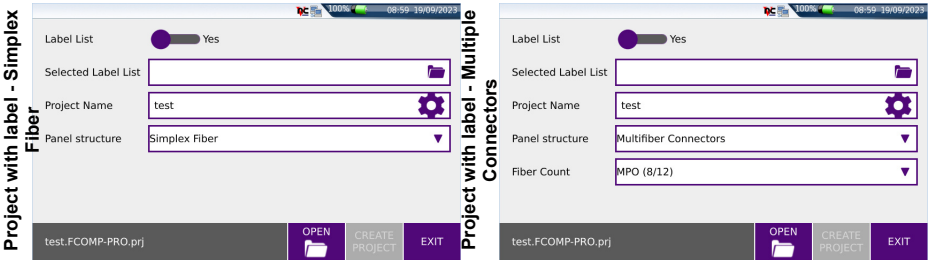


3 If the fibers do not have labels, just fill the project name, number of fibers and start fiber number: see Figure 78.

Or

If a Label list should be used, set “Label list” to **Yes** and browse by clicking on the “selected label list” section. There is an example .csv label list stored in the **Project** directory.

Figure 79 Project with Label



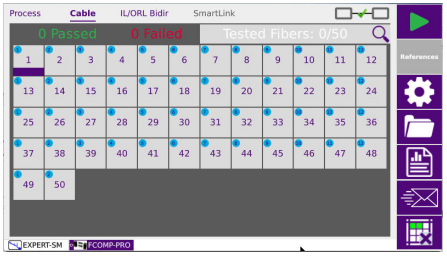
4 Fill the other requested information accordingly.

5 Press **Create Project**.

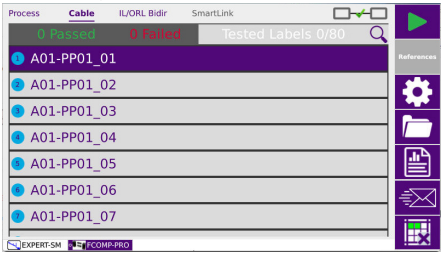
A new **Cable** tab will pop up displaying the Project with each fiber number or with the fiber labels.

Figure 80 Label Project - Simplex Fiber / Multifiber Connectors

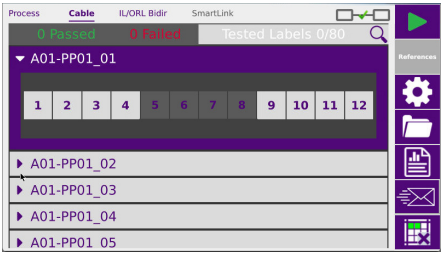
Project without label



Project with label - Simplex Fiber



Project with label - Multiple connectors

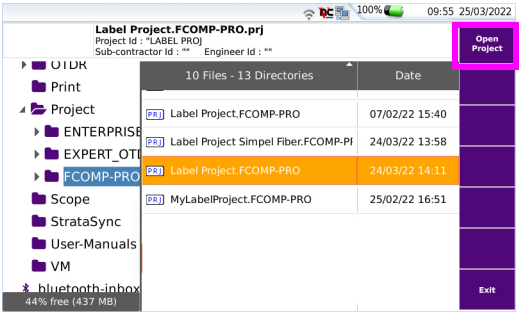


The icon displays on the upper banner.

Opening an existing project

1. In the Project setup page, press **Open**.
2. Select a project file (extension .prj) and press **Open Project**.
   The project displays in the Cable tab of the FCOMP_PRO page.

Figure 81 Opening an existing project



Customizing a test sequence

Project without label or with label for Simplex fiber

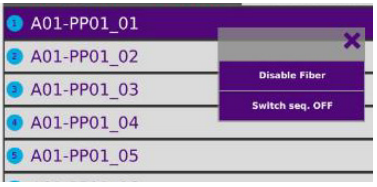
The Cable tab will display a « bingo » card with all squares pre-selected for the test sequence (Blue circle on top left of each square).

A selected fiber/label square is marked with purple at the bottom

1 Make a long press on any square of the bingo card to have access to a select menu.

After a long press on a fiber number, the following actions are available:

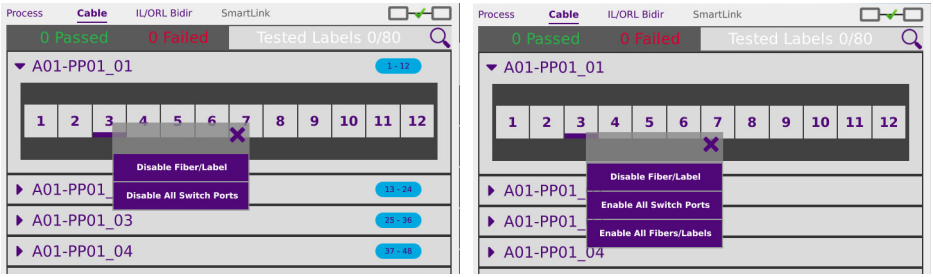
- **Disable Fiber** -> Disable the selected fiber.
- **Switch Seq. ON** -> Enable 12 fibers sequence starting @ selected fiber.
- **Cable Seq. OFF** -> Enable the bulk cable tests starting @ selected fiber.



Project with label - Multiple connectors

With Multifiber connectors, you can unselect fibers one by one with a long press.

Figure 82 Disabled fiber



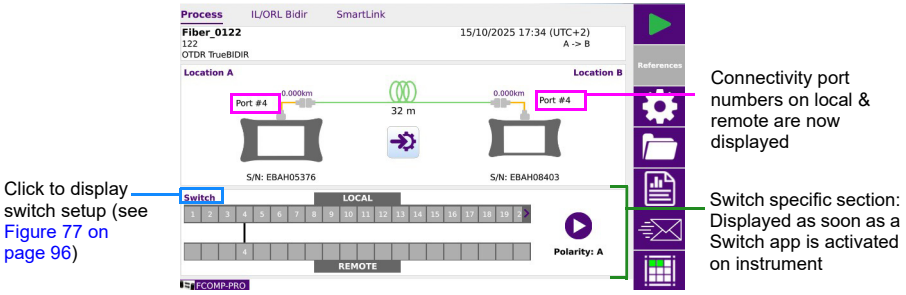
Make a long press on the disabled fiber to reset it as **Enable**d **fiber**.

Validating the end-to-end continuity and polarity

1 Before starting any Bi-directional acquisitions, press to get:

- Fiber Map Continuity check, Port by port.
- Polarity most probable identification.

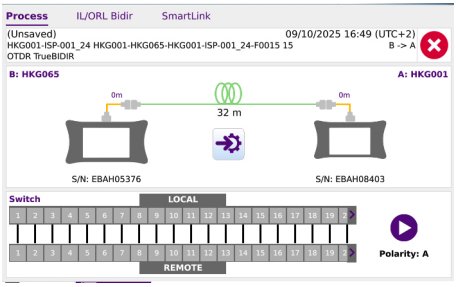
Figure 83 Process - Polarity check



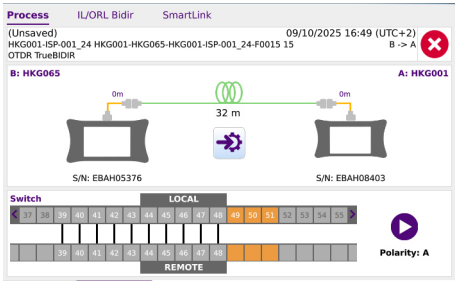
Fiber Map: Results analysis

Polarity identified

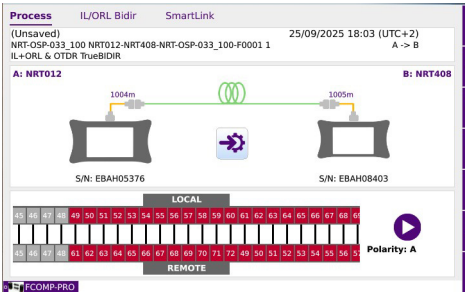
Three different results can occur once the polarity is identified:



Continuity with local port to remote port mapping
Polarity displayed (A, B, C)



Continuity breaks displayed in Orange.
If not remediation, colored ports won't be tested.



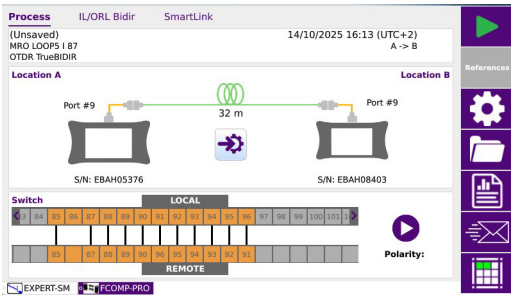
Cross connections are identified in Red (cross connected ports analysis is based on displayed polarity)
If no remediation, colored ports won't be tested.

Polarity not identified

If the polarity is not identified, due to too many cross connections:

- Cross connected & continuity breaks are all displayed in Orange.
- Polarity is set to : ??? and displayed in orange.
- If no remediation, tests will be compromised as the switch sequence operates only on non colored / selected ports in Fiber Map section.

Figure 84 Polarity not identified



Launching the project test process

Once the project is open:

1 Press  – preferably from **Cable** tab to make sure of the fiber selection. Once complete, a message asks to test the next 12 fiber sequence

NOTE

The Setup and the Project are separated; at any time the setup can be modified for the opened Project.

NOTE

When a project is opened, the remote unit does not display the "transfer setting button.

CAUTION

If a test is launched for a fiber already tested, a dialog box displays: "`Test #n already completed. Current results will be overwritten. Test again?`".

Click on **Yes** to confirm the new test, thus, to delete existing file(s).

2 Once all wavelengths are measured, a popup asks:

– Click on **Yes** to test next fiber/label

– Click on **No** to return to Cable tab/Project view.

If «Disable Fiber Test» is pressed while a tested fiber is selected, a dialog box displays: «`You're about to delete acquisition files. Are you sure?`».

Click on **Yes** to confirm the deactivation, and by consequence, to delete corresponding trace(s).

Click on **No** to cancel the action.

Stopping the test

The test stops automatically once the label/fiber test is completed; or the user can press key  at any time to stop the test in progress (not recommended).

In this case, the icon  is displayed on the label row to indicate that not all fibers have been tested.

Results display

In Cable tab

A summary is available on the top of the list indicating the numbers of: Passed / Failed / Tested fibers.

A test status is provided for each fiber with a color coding and an icon.

- Green + checked icon= Passed
- Red + cross icon= Failed
- No color = no test performed

- Dark grey = unselected fiber
- Caution: No alarm or incomplete acquisition -> No color or check/cross icon. A circle is added on the up right position in the fiber number/label box

For Individual fiber results: select the fiber in the cable tab (the selected fiber will be highlighted in purple)

NOTE

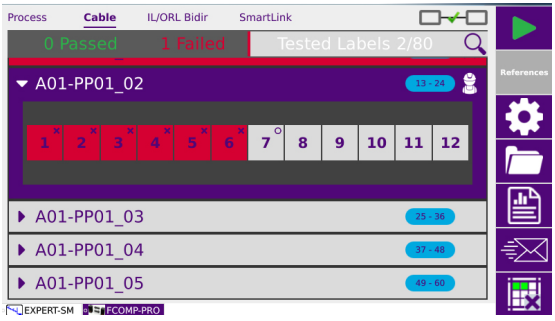
To easily find a fiber, press the search glass icon (top right). It displays a filter to select fiber number or label number.

Bi-directional results : press **IL/ORL Bidir** tab for total link loss and ORL (total link loss & ORL are either acquired either from Continuous Wave or from the OTDR according to the test set up).

Press **Smartlink** for OTDR Averaging results (if TrueBIDIR selected in setup) or **OTDR** unidir (if uniDIR selected in setup).

OTDR traces: Browse in the file explorer to load the appropriate fiber trace.

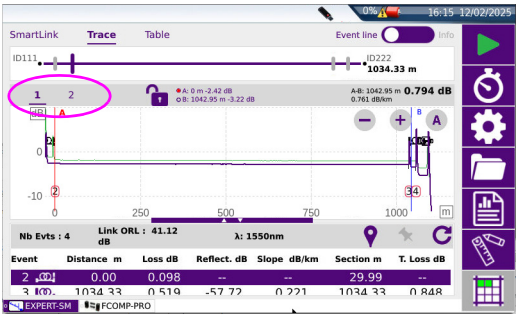
Figure 85 Results for a Label project



Expert OTDR - Trace tab

- The direction is indicated if « info » is selected.
- Clicking on the **Smartlink** or **Table** tabs give access to the other results representation.

Figure 86 OTDR Trace result



Search / Filter function

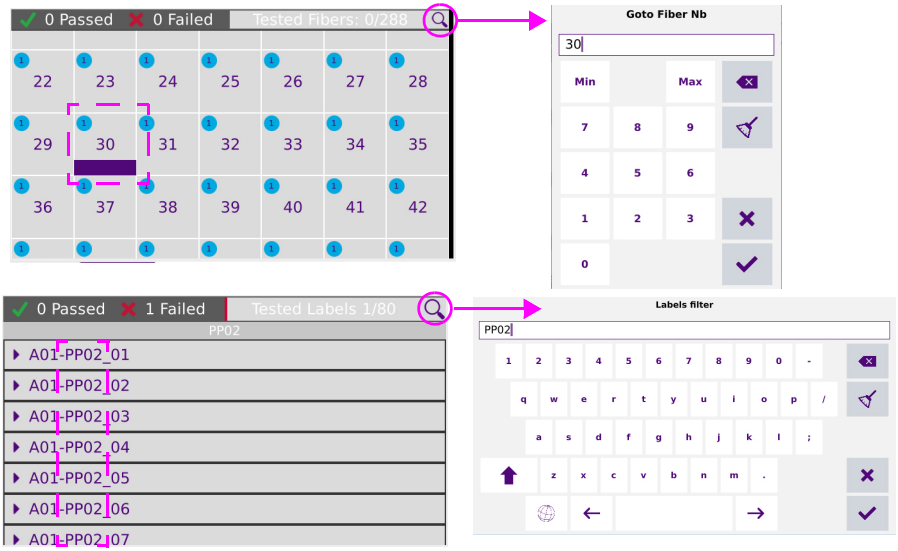
From the Label or SmartGrid project view, the list of label or fiber numbers displayed can be filtered to look for a specific group and avoid long-scrolling.:

1 Once project is displayed, click on Search tool

2 Enter the label Id or the fiber number.

3 Press to validate.
The project table is filtered according to search criteria.

Figure 87 Search/Filter function

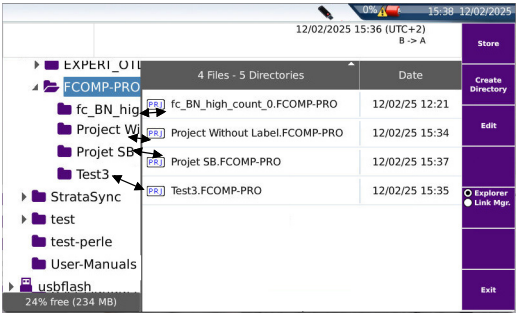


Files and project storage

As soon as a project is created via key  (see "Creating a project for an automatic switch sequence" page 97), a folder, based on the Project ID/Name, is automatically generated with associated sub-directories.

The project and all corresponding test files are saved in `disk/Project/FCOMP-PRO/[Project ID]/`.

Figure 88 Project files

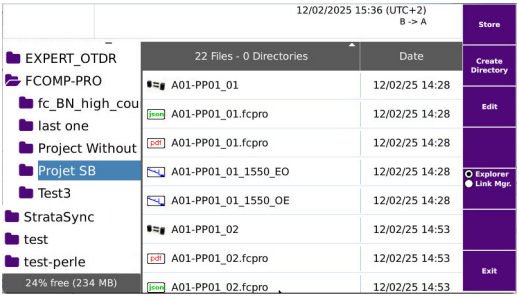


The project .prj file is not visible in the explorer until the project is closed.

For each project, a subdirectory with the project Id is created, containing test OTDR files and summary results (in text and pdf format).

As soon as the project is closed, a summary report is automatically generated and stored in the project directory.

Figure 89 Project directory structure with file contents

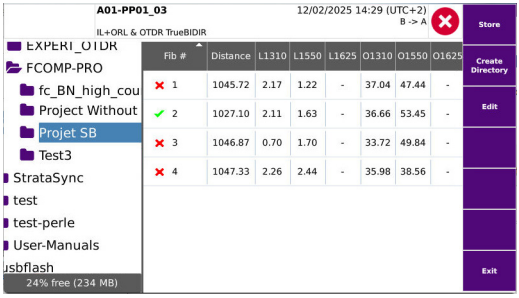


Explorer when a project is open

If a project is open, press  to go to the explorer: the explorer displays all the link information exclusively for the project measurement results.

An icon representing the alarm status is displayed for each measurement result (if alarm thresholds were defined).

Figure 90 Project open in Explorer



Manual saving and report generation

Once a test is completed, the IL/ORL & OTDR results are automatically saved in a .fcpro file.

NOTE

- .sor file naming automatically includes: wavelength (1310, 1550, 1625…) and direction: OE for Origin-Extremity, or EO for Extremity-Origin

A txt / pdf report is also generated if the parameter **Report As** is defined, as well as .sor files if selected in the **Report** set up (see page 40).

Opening a report

1. To open the report, press key .
2. In the **File Explorer** page, in the directory selected, select the file of the report.
   For the txt file: ... *.txt*
   For the pdf file: ... *.pdf*
3. Press **Load**.
   The file opens on the equipment.

CAUTION

To modify the VIAVI logo, set by default on the header of the pdf report, save your logo in a jpg file called `logo.jpg` and place it to the root of the disk: `disk > logo.jpg`.

NOTE

A pdf report can also be generated from the File Explorer page onto the equipment (see user manual of the equipment).

8

Technical specifications and commercial references

This chapter shows the technical specifications of the FCOMP modules, as well as the MPO Module.

It also provides the commercial references of the products available for FCOMP/-PRO option.

The topics discussed in this chapter are as follows:

Technical specifications 4100B and 4100C FiberComplete modules

Typical values, measured at 25°C unless specified.

	4100B FCOMP Modules	4100C FCOMP Modules
IL/ORL/Length		
Central Wavelength[1]	1310 nm ± 20 nm 1550 nm ± 20 nm 1625 nm ± 20 nm	1310 nm -35/+5 1550 nm -40/+0 1625 nm -20/+0
Insertion Loss		
Dynamic range	40 dB	45 dB
IL uncertainty[2]	+/- 0,2 dB	
IL repeatability[3]	0.05 dB	
Display resolution	0.01 dB	
ORL		
ORL display range	from 10 to 55 dB	from 10 to 55 dB
ORL uncertainty	+/- 0.5 dB[4]	
Display resolution	0.01 dB	
Length		
Measurement range	150 km	200 km
Length uncertainty[5]	0/+5m +/-10^{-5} x distance	

1. in CW Mode, with case laser temperature of 25°C
2. side by side reference, excluding connector uncertainty
3. 10 consecutive measurements, without disconnection for E4136BFCOMP
4. from 10 to 40 dB range, with user reference, excluding connector uncertainty
5. measurement @ 1550 nm, excluding group index uncertainty

Please refer to the "OTDR application 4100 series OTDR modules" user manual for OTDR specifications.

MPO Switch Module Technical specifications

Wavelength range	1270 to 1650 nm
Insertion Loss[1 2]	1.2 dB typ
Input port	SC/APC
Output port	MPO APC (pinned)

1. Measured at 1310, 1550 and 1625 nm
2. 2.5 dB maximum

Commercial references

Fiber Complete Modules

FiberComplete Modules	Commercial References
Module B FiberComplete 1310/1550 nm - PC/APC	E4126B-FCOMP-PC/-APC
Module B FiberComplete 1310/1550/1625 nm - PC/APC	E4136B-FCOMP-PC/-APC
Module B FiberComplete 1310/1550/Filtered 1650 nm - APC	E4138FB65-FCOMP-APC
Module C FiberComplete 1310/1550/1625 nm - PC/APC	E4136C-FCOMP-PC/-APC
Module FiberComplete Fault Finder 1310/1550 nm - APC	E4126-FCOMPFF-APC
Module FiberComplete Fault Finder 1310/1550/1625 nm - APC	E4136-FCOMPFF-APC

Kit

Kit	Commercial References
Non-Reflective Optical Terminators Kit	ENRTERMKIT

MPO12 Switch Module

Modules	Commercial Reference
Singlemode MPO Switch Module - 1x12 Pinned MPO - SC/APC	E41MPO12SM

MPO Reflective Terminal

MPO Reflective Terminal	Commercial References
SM MPO unpinned reflective terminal (for ORL referencing with FiberComplete bi-directional modules)	EMPOTERM-F
SM MPO pinned reflective terminal (for ORL referencing with FiberComplete bi-directional modules)	EMPOTERM-M

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English

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