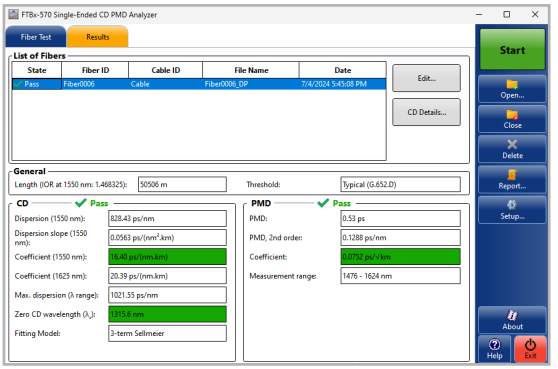
User Guide

FTBx-570

Single-Ended CD PMD Analyzer



www.EXFO.com

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

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

Trademarks

Units of Measurement

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

Patents

The exhaustive list of patents is available at EXFO.com/patent.

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Regulatory Information

USA Electromagnetic Interference Regulatory Statement

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

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

Canada Electromagnetic Interference Regulatory Statement

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference.

Cet équipement génère, utilise et peut émettre de l'énergie radio-fréquence et, s'il n'est pas installé et utilisé conformément à la documentation de l'utilisateur, il peut occasionner une interférence néfaste aux communications radio. L'utilisation de cet équipement dans une zone résidentielle est susceptible d'occasionner une interférence néfaste.

Caution: This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.

Attention : Cet appareil n'est pas destiné à être utilisé dans des environnements résidentiels et peut ne pas assurer la protection adéquate à la réception radioélectrique dans ce type d'environnements.

This is a class A, group 1 product.

Ceci est un produit de classe A, groupe 1.

➤ Class A equipment: Equipment that is, by virtue of its characteristics, highly unlikely to be used in a residential environment, including a home business shall be classified as class A and shall comply with the class A limits specified in the applicable ICES standard. Characteristics considered in this assessment include price, marketing and advertising methodology, the degree to which the functional design inhibits applications suitable to residential environments, or any combination of features that would effectively preclude the use of such equipment in a residential environment.

Classe A : Matériel qui, en raison de ses caractéristiques, ne sera fort probablement pas utilisé dans un milieu domiciliaire ni par des entreprises établies à domicile. Parmi les caractéristiques considérées dans cette évaluation, il y a le prix, les méthodes de commercialisation

et de publicité, la mesure dans laquelle les fonctions de l'appareil font qu'il ne se prête pas à des applications convenant au milieu domiciliaire ou toute combinaison de ces caractéristiques qui aurait pour conséquence d'en prévenir effectivement l'utilisation à domicile. Utilisé également pour indiquer les limites d'émission correspondantes qui s'appliquent à un tel matériel.

- Class B equipment: Equipment that cannot be classified as Class A shall comply with the Class B limits specified in the applicable ICES standard.

  Classe B : Matériel qui ne peut pas être inclus dans la classe A. Utilisé également pour indiquer les limites d'émission correspondantes qui s'appliquent à un tel matériel.

- Group 1 equipment: group 1 contains all equipment which is not classified as group 2 equipment, and includes equipment such as laboratory and scientific equipment, industrial process, measurement and control equipment.

  Group 2 equipment: group 2 contains all ISM RF equipment in which radio-frequency energy in the frequency range 9 kHz to 400 GHz is intentionally generated and used or only used locally, in the form of electromagnetic radiation, inductive and/or capacitive coupling, for the treatment of material for inspection/analysis purposes, or for transfer of electromagnetic energy.

  Appareils du groupe 1 : le groupe 1 réunit tous les appareils compris dans le domaine d'application de la présente Norme, qui ne sont pas classés comme étant des appareils du groupe 2. Le groupe 1 inclut les appareils scientifiques et de laboratoire, les processus industriels, appareils de mesure ou de contrôle.

  Appareils du groupe 2 : le groupe 2 réunit tous les appareils ISM à fréquences radioélectriques dans lesquels de l'énergie à fréquences radioélectriques dans la plage de fréquences comprises entre 9 kHz et 400 GHz est produite et utilisée volontairement ou uniquement utilisée localement sous forme de rayonnement électromagnétique, de

couplage inductif et/ou capacitif, pour le traitement de la matière, à des fins d'examen ou d'analyse ou pour le transfert d'énergie électromagnétique.

Supplier's Declaration of Conformity (SDoC)

The SDoC for your product is as follows:

CAN ICES-001 (A) / NMB-001 (A)

EU and UK Electromagnetic Compatibility Regulatory Statement

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

Simplified EU and UK Declaration of Conformity

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

EU Economic Operator

EXFO Solutions SAS
2, rue Jacqueline Auriol,

Saint-Jacques-de-la-Lande,

35091 Rennes Cedex 9

FRANCE

1 Introducing the FTBx-570 Single-Ended CD PMD Analyzer

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

The FTBx-570 Single-Ended CD PMD Analyzer is a combined CD (chromatic dispersion) and PMD (polarization mode dispersion) analyzer that can perform both measurements from a single end of the fiber. It features a single connector port and software for both types of measurements. CD and PMD are characterized by tapping a single button. This is done without the need for a remote unit or light source.

As long as the remote end of the of the fiber is unterminated and with a UPC connector, a single technician can perform advanced testing, that is, CD and PMD measurements, including O-band measurement. The results are also compiled into a single test file and a single report for both tests.

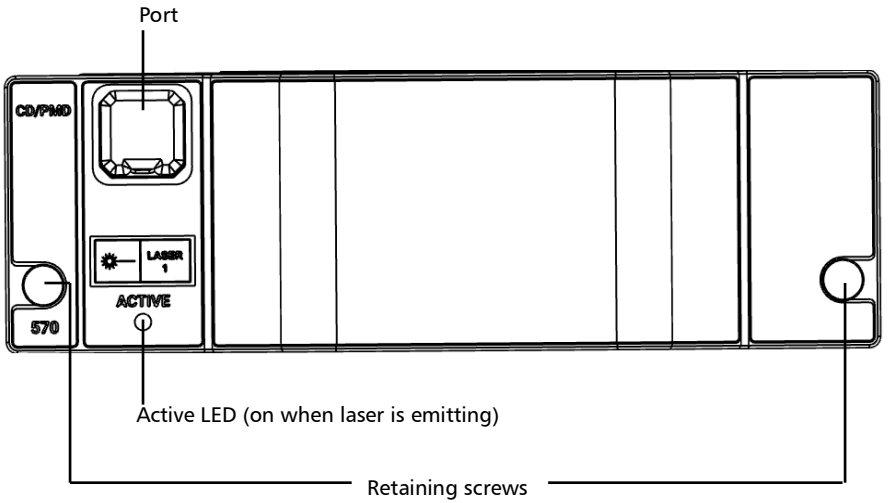
Main Features

Your unit includes the following:

- Single connector port for CD and PMD measurements
- O-band measurements (unit-specific feature)
- Custom index of refraction (IOR)
- Fast start-up
- EXFO Exchange integration
- FastReporter 3 integration

Module Description

The figure below illustrates the front panel for your FTBx-570 Single-Ended CD PMD Analyzer.



Typical Applications

With its dynamic range, level of accuracy and feature set, the FTBx-570 Single-Ended CD PMD Analyzer is a perfect tool for any network manager or technician to perform advance testing of 10 Gbit/s networks or faster, on any fiber length up to 240 km in SCL-band and 120 km in O-band, achievable with very low-loss fiber in both cases. The FTBx-570 Single-Ended CD PMD Analyzer helps validating fiber quality for the given speed or providing information enabling compensation.

Available Options

The following options are available for the FTBx-570 module:

Option	Description
FTBx-570-CD-PMD-O-XX	➤ CD and PMD measurements ➤ O: O-band measurement capability ➤ XX: Input optical connector (UPC or APC)

The following platforms can host the FTBx-570 module:

- FTB-1v2 Pro
- FTB-2 Pro
- FTB-4 Pro

Basic FTBx-570 Single-Ended CD PMD Analyzer Operation

The purpose of the FTBx-570 Single-Ended CD PMD Analyzer unit is to be simple of use, with minimal parameter setting requirements. The parameter most likely to be changed by a user is the fiber type.

In order to achieve optimal measurements, you must however remember a few concepts:

➤ The measurement technique for the unit requires only a strong reflective event at the end of the link to perform CD and PMD measurements. The length measurement is taken at the location of this reflective event at a wavelength of 1550 nm.

Note: *Reflective events are caused by an abrupt discontinuity in the index of refraction. They cause a significant portion of the energy initially launched into the fiber to be reflected back toward the source.*

➤ You must have a UPC connector at the end of the fiber to measure the overall link. If the appropriate termination is not found, the unit returns an error message (see *Solving Common Problems* on page 53 for details).

Note: *Other reflective terminations include mirror connectors, fiber pigtailed mirrors, and cleaved fibers. However, do not use fiber loop mirrors or Faraday-type mirrors.*

Once the fiber end event position is found, the unit checks the dynamics and evaluates the wavelength range over which to perform the measurement. It then selects the acquisition conditions and sequence of the measurement before starting the acquisition itself.

You must also remember that the fiber under test (FUT) must meet the following requirements for optimal testing conditions:

- The FUT must be terminated by a UPC connector or a mirror (for very long links).
- The FUT length must be less than 240 km in SCL-band and less than 120 km in O-band.
- The FUT must not have any spectral filters, such as OADM, MUX/DEMUX, or similar devices.

Note: *Since the instrument is single-ended, it cannot measure through components that allow light to travel only in one direction, such as amplifiers and circulators.*

Technical Specifications

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

Conventions

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

WARNING

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

CAUTION

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

CAUTION

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

IMPORTANT

Refers to information about this product you should not overlook.

2 Safety Information

WARNING

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

WARNING

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

WARNING

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

WARNING

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

CAUTION

This product does not contain any user-serviceable components, except if indicated otherwise in this document. Any unauthorized product changes or modifications will invalidate warranty and all applicable regulatory certifications and approvals.

IMPORTANT

Refer to the documentation provided by the manufacturers of any accessories used with your EXFO product. It may contain environmental and/or operating conditions limiting their use.

IMPORTANT

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

IMPORTANT

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

IMPORTANT

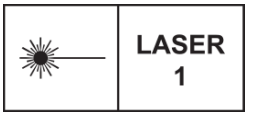
Other safety instructions relevant for your product are located throughout this documentation, depending on the action to perform. Make sure to read them carefully when they apply to your situation.

Laser Safety Information

Your instrument is in compliance with standard IEC 60825-1: 2014 + A11: 2021 and IEC 60825-1 Ed. 3.

The following label indicates that this product is a:

IEC 60825-1:2014-05



CLASS 1 LASER PRODUCT
INVISIBLE LASER RADIATION
DO NOT VIEW WITH MAGNIFYING GLASS
DO NOT EXPOSE USERS OF TELESCOPIC OPTICS

APPAREIL À LASER DE CLASSE 1
RAYONNEMENT LASER INVISIBLE
NE PAS OBSERVER DIRECTEMENT À L'AIDE D'UNE LOUPE
NE PAS EXPOSER LES UTILISATEURS DE DISPOSITIF OPTIQUE TÉLESCOPIQUE

Complies with FDA performance standards for laser products except for conformance with IEC 60825-1 Ed. 3, as described in Laser Notice No. 56, dated May 8, 2019.

Output fiber / Fibre de sortie :

- Fiber type: / Type de fibre : Singlemode / Monomode
- Fiber core: / Cœur de la fibre : 9 μm

Two lasers are used in the product / Deux lasers sont utilisés dans ce produit :

- Wavelength: / Longueur d'onde (λ) : 1475 - 1626 nm
- Pulse width: / Largeur de l'impulsion  : ≤ 50 ns
- Max. peak power: / Puissance crête maximum  : ≤ 400 mW
- Duty cycle: / Cycle de service : ≤ 2 %
- Beam divergence: / Divergence du faisceau (Φ) : ≥ 0.1264 rad

- Wavelength: / Longueur d'onde (λ) : 1310 ± 10 nm
- Pulse width: / Largeur de l'impulsion  : ≤ 50 ns
- Max. peak power: / Puissance crête maximum  : ≤ 50 mW
- Duty cycle: / Cycle de service : ≤ 5 %

Beam divergence: / Divergence du faisceau (Φ) : ≥ 0.1225 rad

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

Other Safety Symbols on Your Unit

For information about other symbols that may also appear on your unit, refer to the user documentation of your platform.

3 Setting Up the Single-Ended CD PMD Analyzer

The many features of the Single-Ended CD PMD Analyzer are controlled by the Windows compatible software installed on the platform. Please refer to your platform's user guide for more information.

The parameters you set will be kept in memory after turning off the platform.

Configuring Application Details

You can customize the distance units, the CD display values and whether or not you are warned each time a scan is complete.

You can also keep the intermediate data when performing tests. This option should be used when there is a problem with the Single-Ended CD PMD Analyzer or a measurement. Once you have acquired this intermediate data, which represents all of the actions done by the unit when performing the test, you can take this file and send it to EXFO for troubleshooting purposes.

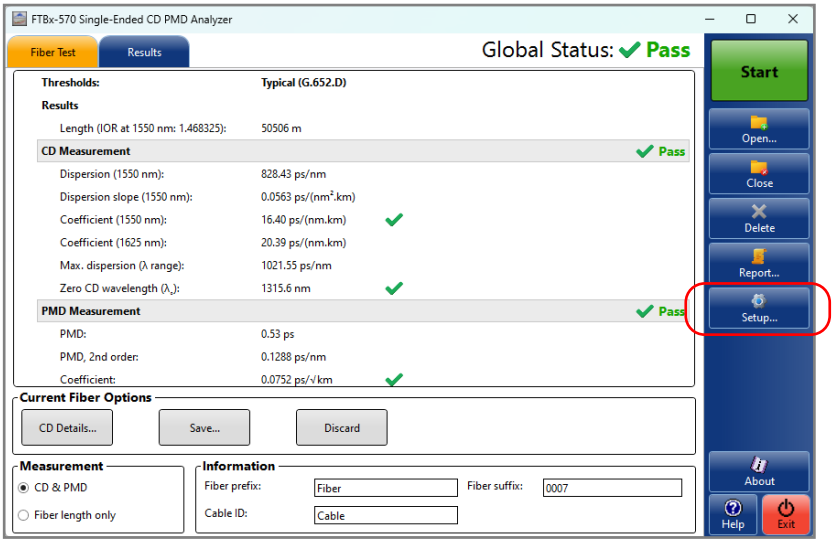
IMPORTANT

Selecting the Keep intermediate data option will increase the size of your result file in a significant manner.

In cases where many events are detected as potential end of fiber events, the assisted fiber length detection is another option that gives you the opportunity to select a specific reflective event as the end of the fiber.

To configure the application details:

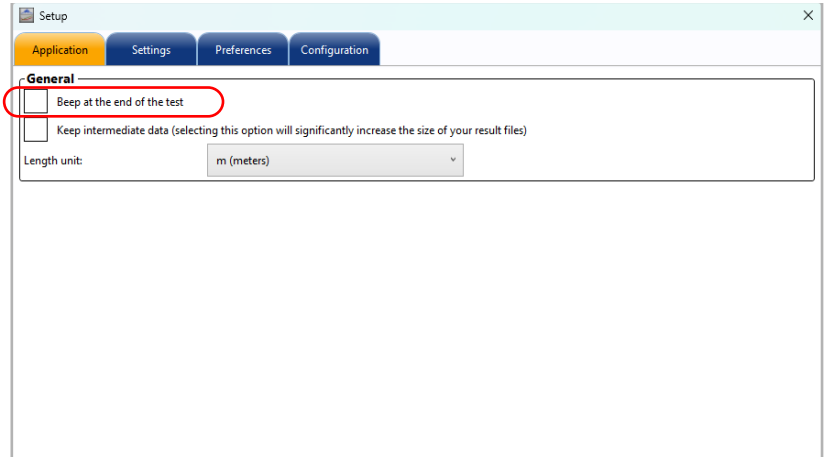
1. From the button bar, tap **Setup**.



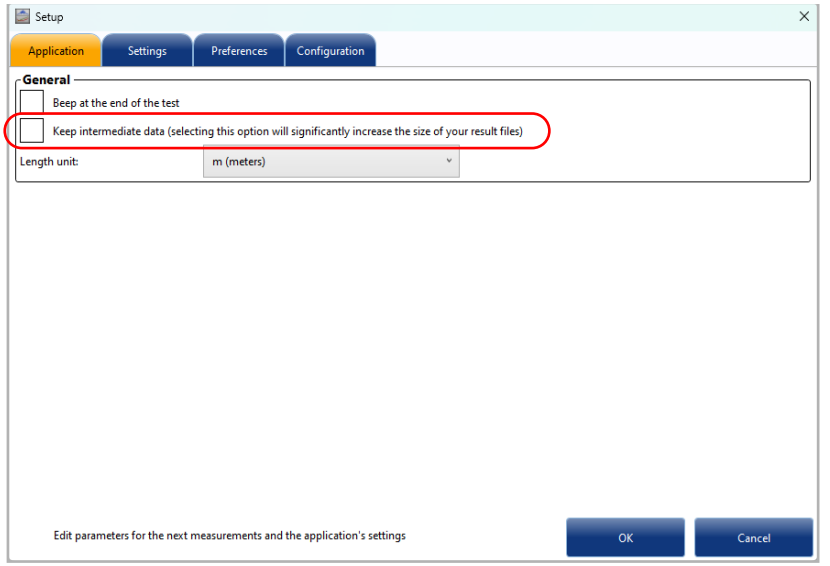
2. Select the **Application** tab.

3. Select the units to use for your measurements.

4. If you want the unit to warn you when a test is complete, select the corresponding option.



5. If you want your Single-Ended CD PMD Analyzer to keep the intermediate data when performing the analysis, select the corresponding option.



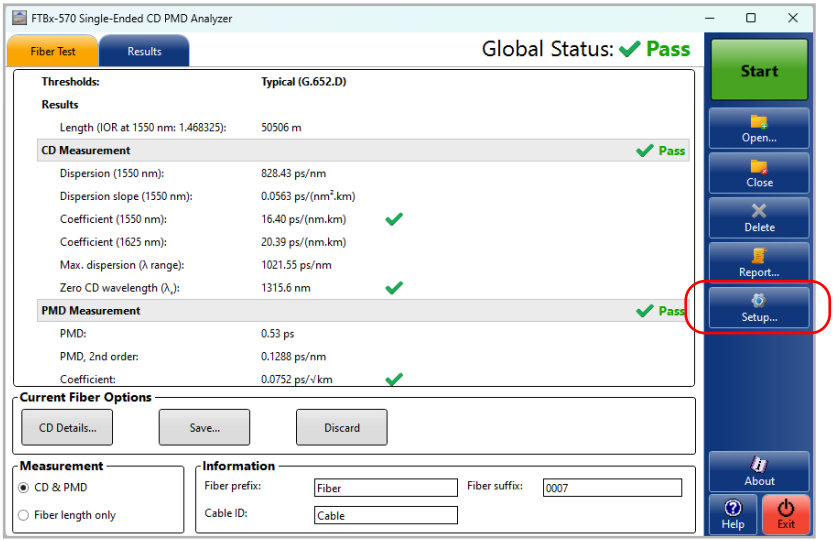
6. To confirm and save the changes, tap **OK**.

Configuring Settings Details

You can customize the index of refraction (IOR), the analysis range, the threshold details and enabling or disabling measurements in O-band.

To configure settings details:

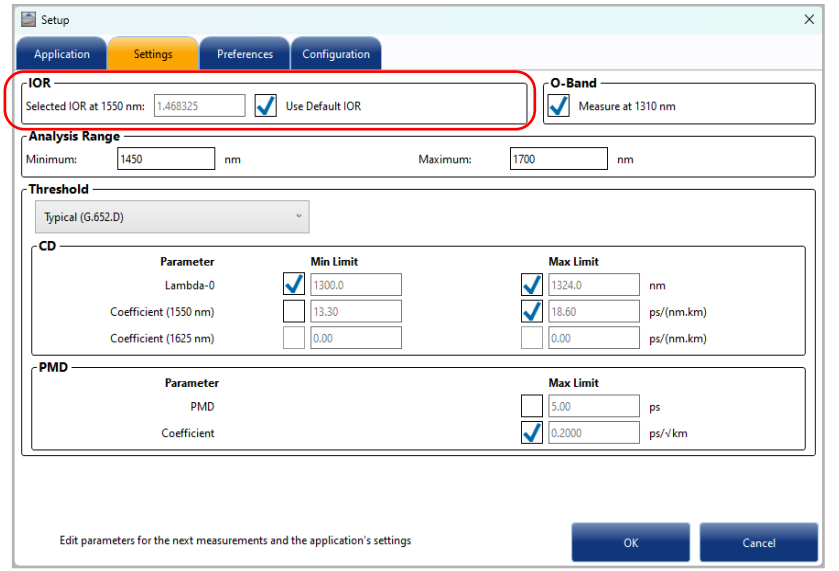
1. From the button bar, tap **Setup**.



2. Select the **Settings** tab.

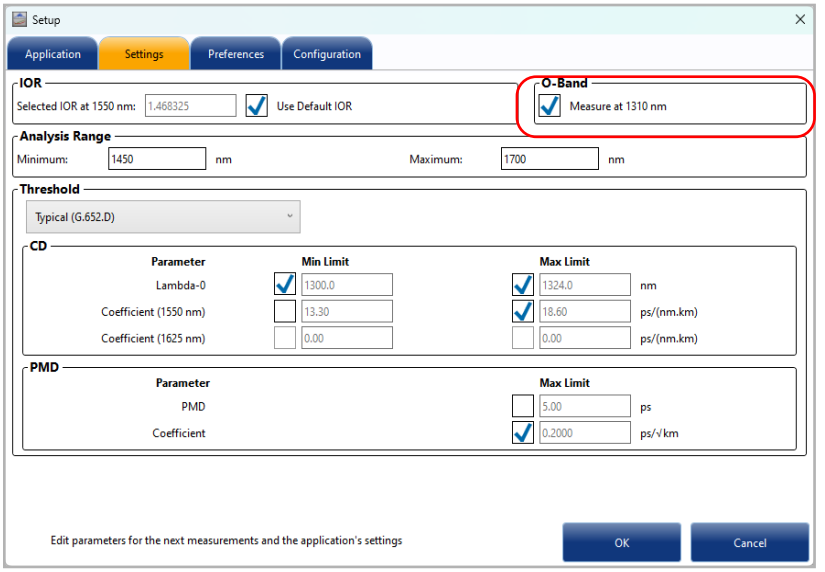
3. Enable or disable the default value for the IOR by selecting the check box. If you disable the default IOR, enter a value in the corresponding text box.

Note: *The Index of Refraction (IOR) is a measure of how much light bends, or refracts, when entering material. It is defined as the ratio of the speed of light in a vacuum to the speed of light in the material.*

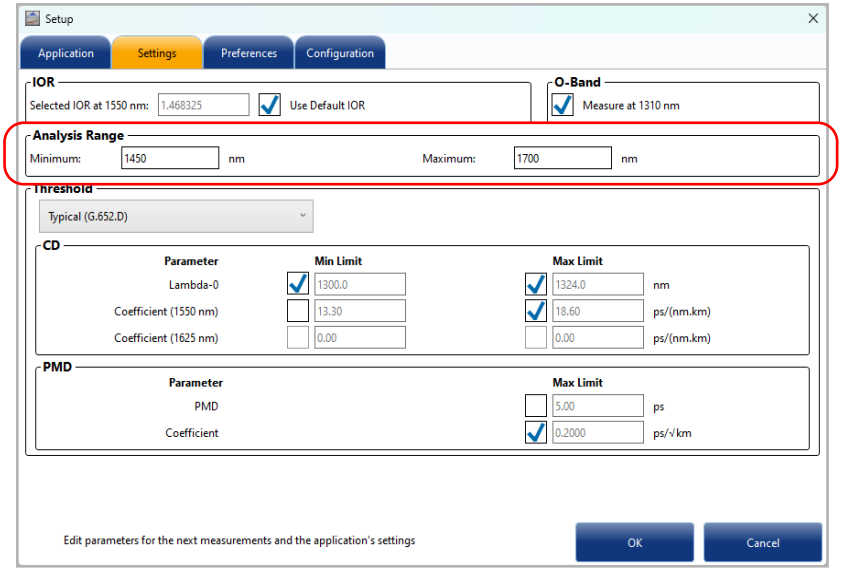


4. Enable or disable the O-band measurement by selecting the corresponding check box.

Note: *O-band measurement capabilities are available on certain units. To check if O-band measurements are available on your unit, see Available Options* on page 3.



5. For the **Analysis Range**, enter minimum and maximum wavelength values. The analysis range is the value used to calculate the ITU grid and the maximum value for the acquisition. The analysis range can be different from the wavelength measurement range.

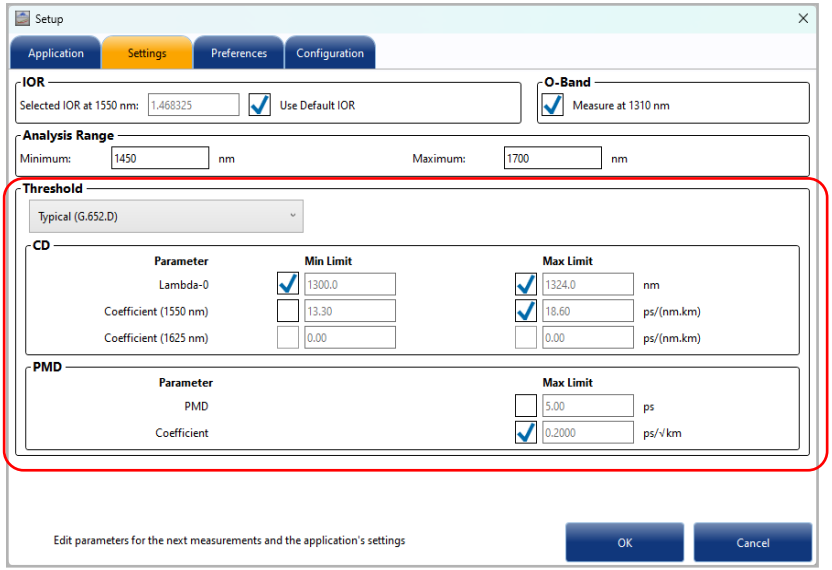


6. The Single-Ended CD PMD Analyzer allows you to specify thresholds both for the CD and PMD aspects of your tests to determine if the results are as expected or if they exceed the specified limits.

Note: *You cannot modify or delete the predefined thresholds provided with your Single-Ended CD PMD Analyzer.*

Select a predefined threshold in the **Thresholds** list. If you select **Custom**, the chromatic dispersion and PMD sections become editable and you can specify which values to use for the items below.

- Lambda-0
- Coefficient (at 1550 nm)
- Coefficient (at 1625 nm)
- PMD
- PMD coefficient



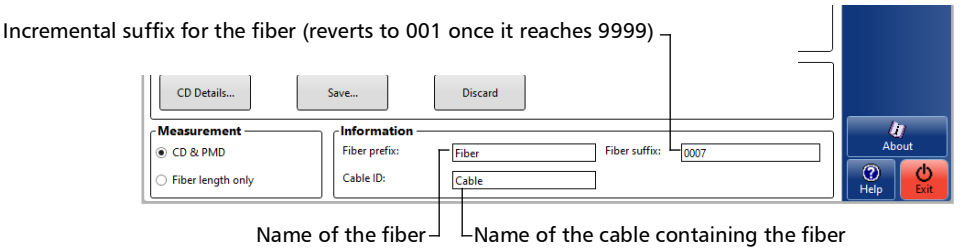
7. To confirm and save the changes, tap **OK**.

Defining the Automatic Fiber Name Format

Each time you make a new acquisition, the fiber name changes automatically according to a pattern you will have previously defined. This name corresponds to the concatenation of a static part (prefix) and a variable part that will be incremented.

To define the fiber name format:

1. From the main window, select the **Fiber Test** tab.
2. Under **Information**, set the various parameters according to your needs.



Note: *The fiber name, cable ID and automated additions to the file name such as the date can be set in the* ***Preferences*** *tab of the* ***Setup*** *window. See* Setting Test Preferences *on page 25 for details.*

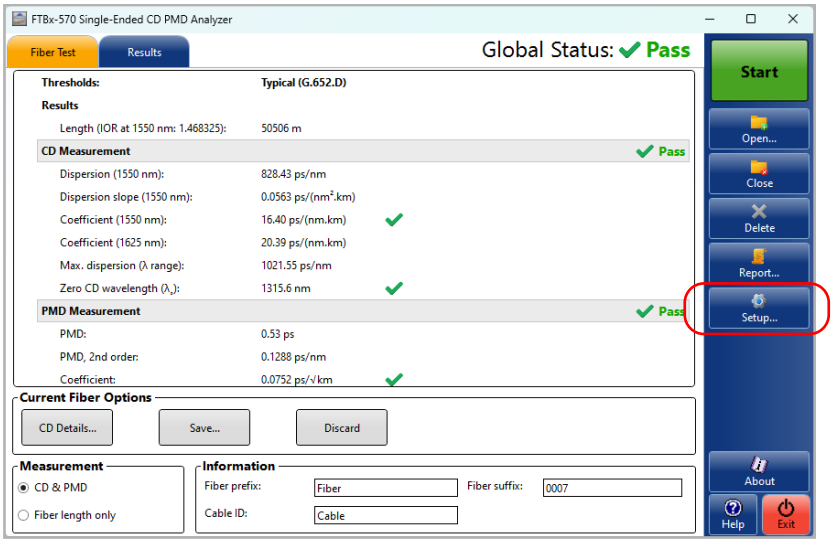
Managing Test Configurations

If you often perform the same test types with preset threshold values, you can speed up your tests by saving configurations.

Note: *The configuration files are independent of the unit on which they were saved. This means that if you transfer or copy the configuration file to another test unit, you can use it as if it had been saved on this new unit.*

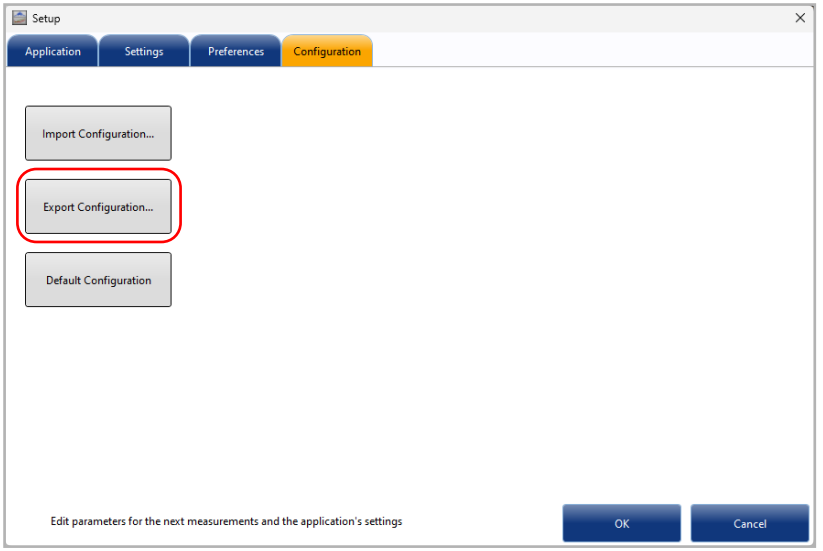
To save a configuration:

1. Set the parameters on your unit as desired.
2. From the main window, tap **Setup**.



3. Select the **Configuration** tab.

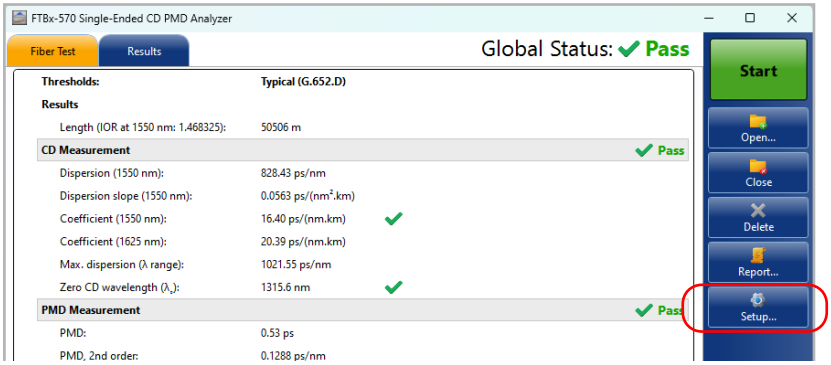
4. Tap **Export Configuration**.



5. Select the location and name for your file, then tap **OK**.

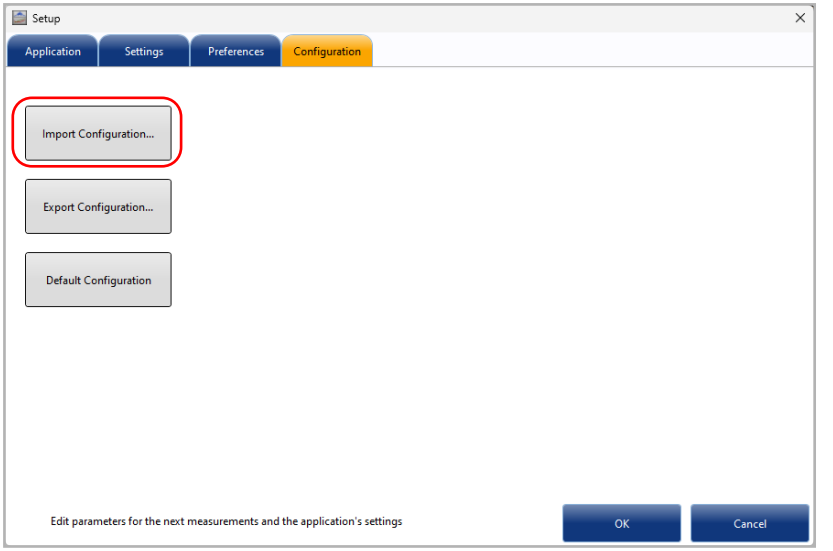
To retrieve an existing configuration file:

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



2. Select the **Configuration** tab.

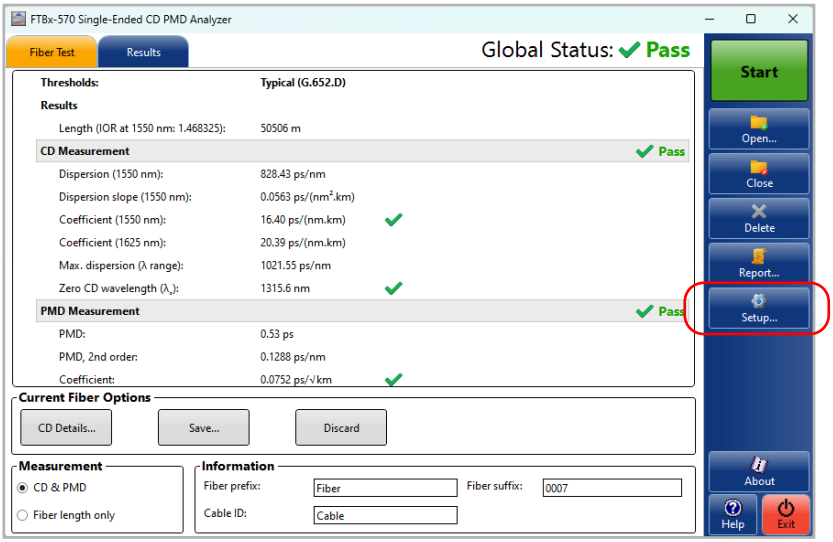
3. Tap **Import Configuration**.



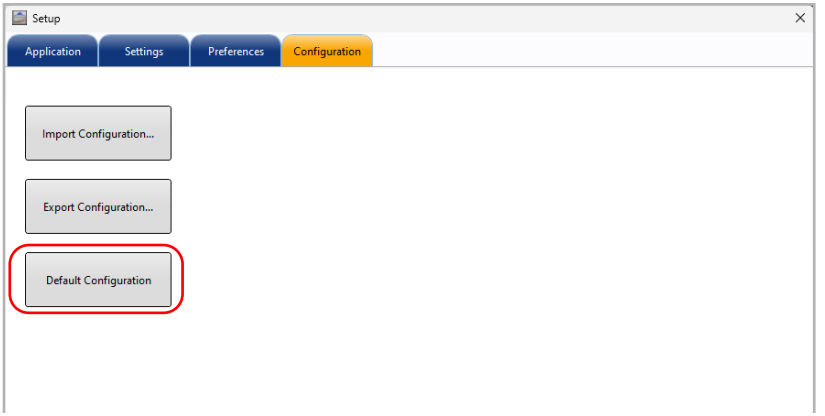
4. Locate the file corresponding to your configuration, then tap **OK**.

To revert to the default configuration:

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



2. Select the **Configuration** tab.
3. Tap **Default Configuration**.

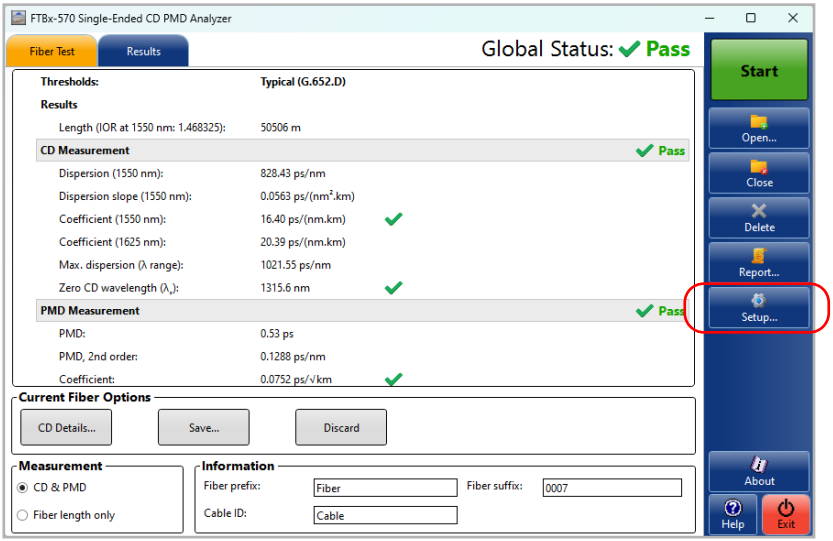


Setting Test Preferences

You can set the auto naming and information preferences for your tests. This will help you better identify the different tests you perform with your module.

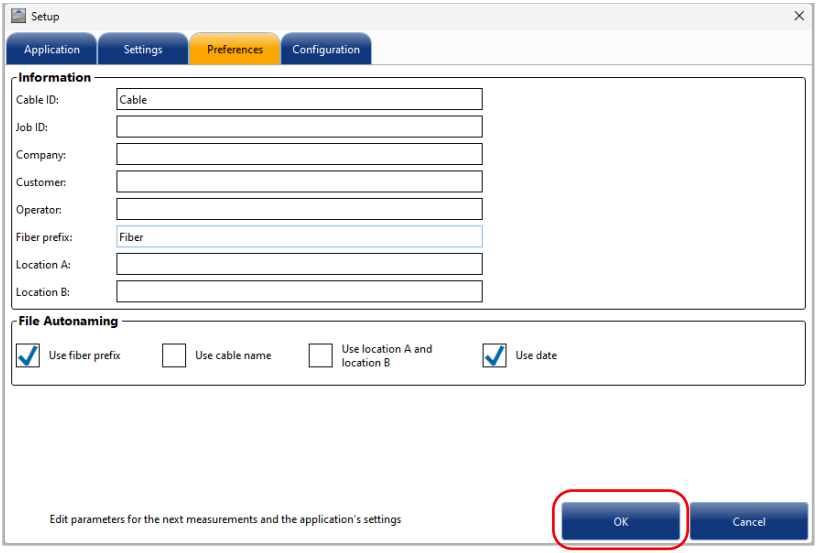
To set the test preferences:

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

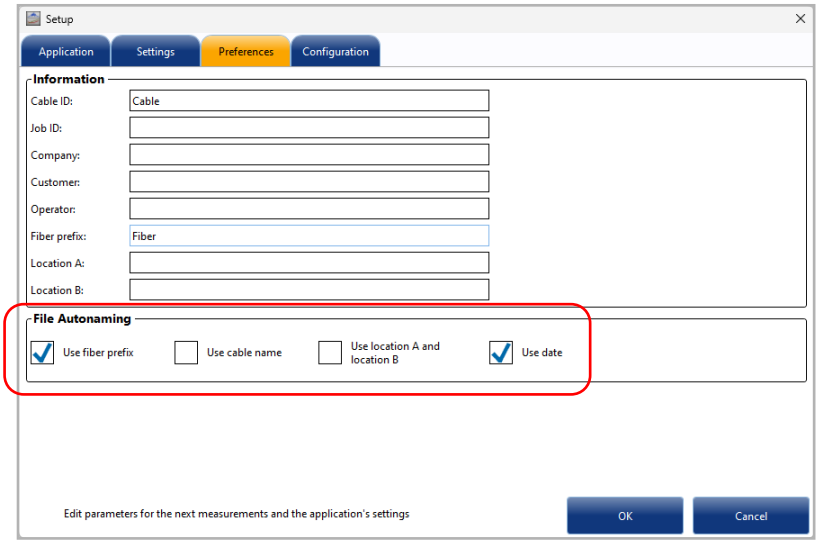


2. Select the **Preferences** tab.

3. Enter the information pertaining to your test. This information will be attached to the acquisitions you perform afterwards. Tap **OK**.



4. If you want the application to automatically include the fiber prefix, cable name, A and B location or date in the file name scheme, select the corresponding option(s).



5. Tap **OK** to confirm your choice.

4 Operating the Single-Ended CD PMD Analyzer

Cleaning and Connecting Optical Fibers

CAUTION

To ensure maximum power and to avoid erroneous readings:

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

To connect the fiber-optic cable to the port:

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

3. Carefully align the connector and port to prevent the fiber end from touching the outside of the port or rubbing against other surfaces.

   If your connector features a key, ensure that it is fully fitted into the port's corresponding notch.

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

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

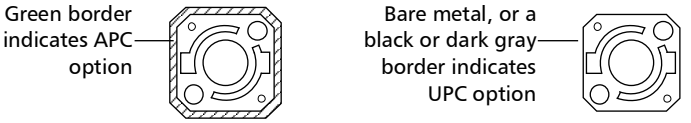
Note: *If your fiber-optic cable is not properly aligned and/or connected, you will notice heavy loss and reflection.*

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

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

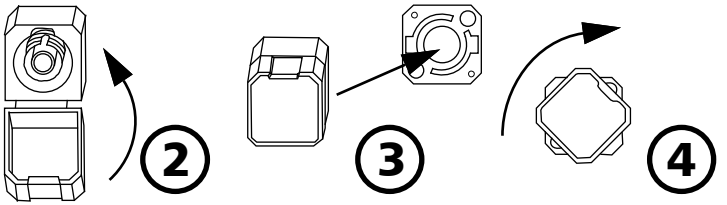
Installing the EXFO Universal Interface (EUI)

The EUI fixed baseplate is available for connectors with angled (APC) or non-angled (UPC) polishing. The type of border around the baseplate indicates which type of connector it is designed for.



To install an EUI connector adapter onto the EUI baseplate:

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



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

Performing a Test

The Single-Ended CD PMD Analyzer allows you to acquire single traces on a specific fiber. You can test the PMD and CD at the same time, or the fiber length only.

IMPORTANT

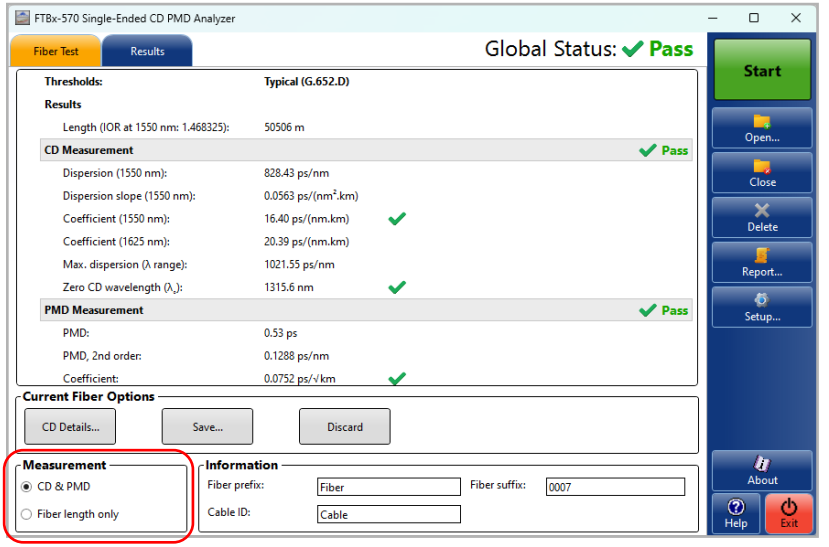
Your FTBx-570 Single-Ended CD PMD Analyzer was designed to automatically determine the length of your fiber and test accordingly. If the test is still performed and the length indicated is not appropriate, this means that a strong reflective event is present on the fiber before the non-reflective termination.

If such a situation occurs, clean the fiber end or add a reflector at the end of the fiber to improve your results.

To start an acquisition:

1. Set the acquisition parameters as needed. See *Configuring Settings Details* on page 15 for more details.

2. Select whether the acquisition will include the PMD and CD, or the fiber length only.



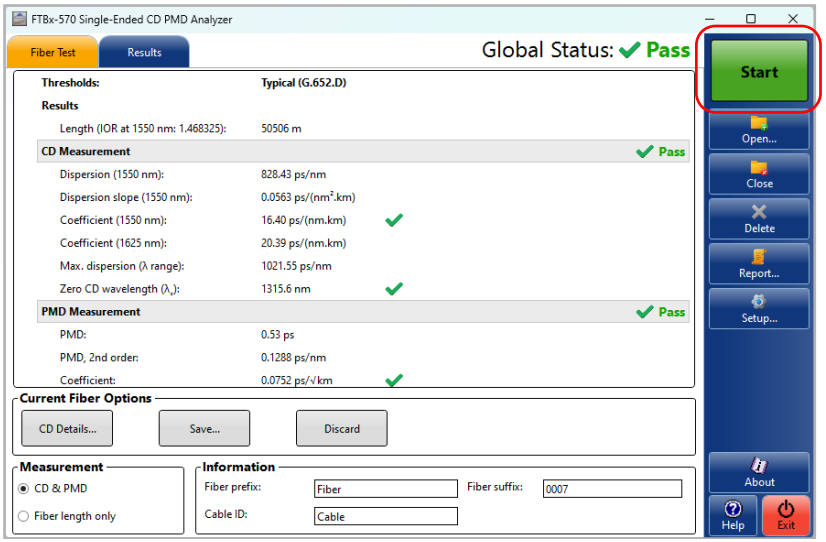
3. Verify that the fiber under test (FUT) is properly connected and that the setup is appropriate.

IMPORTANT

The FUT must be terminated with at least a UPC connector. If there are high losses in the fiber, the FUT can be terminated with a mirror.

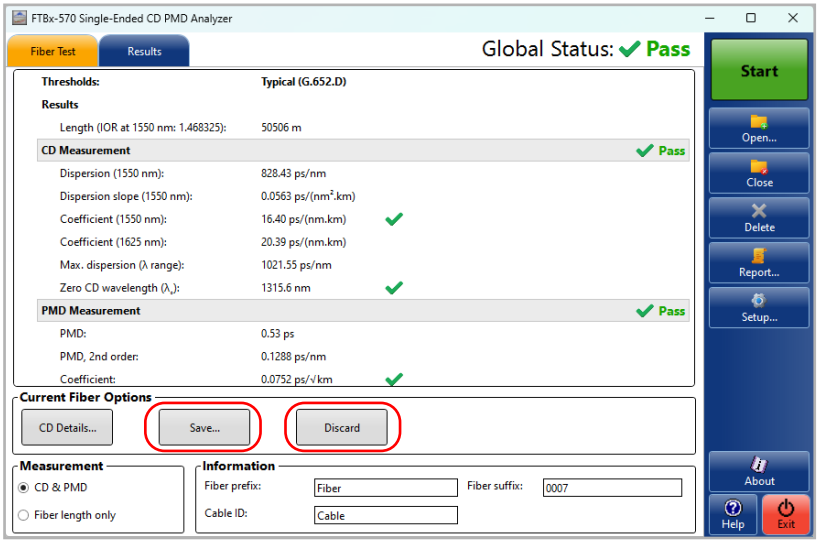
4. From the button bar, tap **Start** to start a measurement sequence.

When the measurement is complete, the results are displayed on the screen.



5. If you are satisfied with the results, tap **Save**. The entry will be sent to the **Results** tab.

If you are not satisfied with the results, tap **Discard** to clear the test window and perform a new test.



To stop the acquisition before it is complete:

Tap the **Stop** button. The button changes back to a green **Start** button.

5 Managing Results

Your FTBx-570 Single-Ended CD PMD Analyzer allows you to work with two types of results:

- Newly acquired results
- Results loaded from existing files

To view and analyze your results, the application provides:

- A graph and a table presenting details for a specific acquisition in the case of chromatic dispersion
- A window giving you an overview of all the available acquisitions, plus the related details

It also offers customizing, saving, export and printing features based on these results.

IMPORTANT

Your FTBx-570 Single-Ended CD PMD Analyzer was designed to automatically determine the length of your fiber and test accordingly. If the test is still performed and the length indicated is not appropriate, this means that a strong reflective event is present on the fiber before the non-reflective termination.

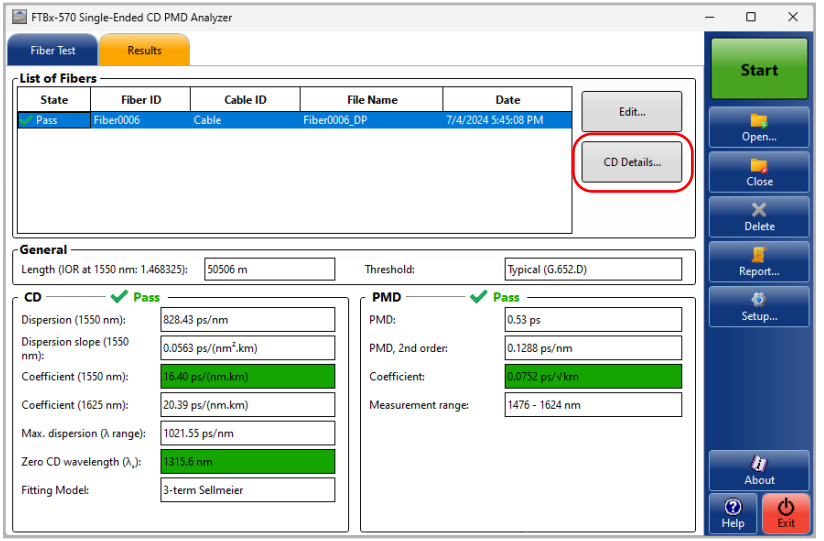
If such a situation occurs, clean the fiber end or add a reflector at the end of the fiber to improve your results.

To view a specific result and the related information:

From the main window **Results** tab, once you have taken a measurement and saved it, or opened measurement files, you can select the fiber for which you want to view the results.

To view CD Details:

In the **Fiber Test** tab or in the **Results** tab, tap **CD Details**.



To specify the type of display to show on the graph:

In the **Chromatic Dispersion** window, under the graph on the left-hand side, select either **Dispersion** or **Dispersion coefficient**.

OR

In the **Relative Group Delay** window, under the graph on the right-hand side, select either **Relative Group Delay** or **Normalized Relative Group Delay**.

The graph and the results in the **Display** table will change accordingly.

Modifying Analysis Parameters and Related Information

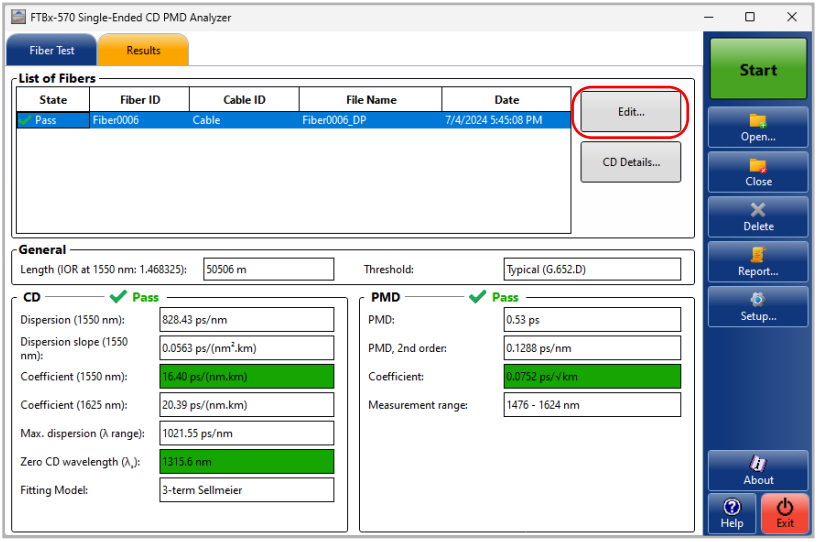
Once you have acquired test results, you can modify the parameters and perform the analysis again with the new settings. You can also add or modify information about the job and cable at this point.

Modifying Cable Information

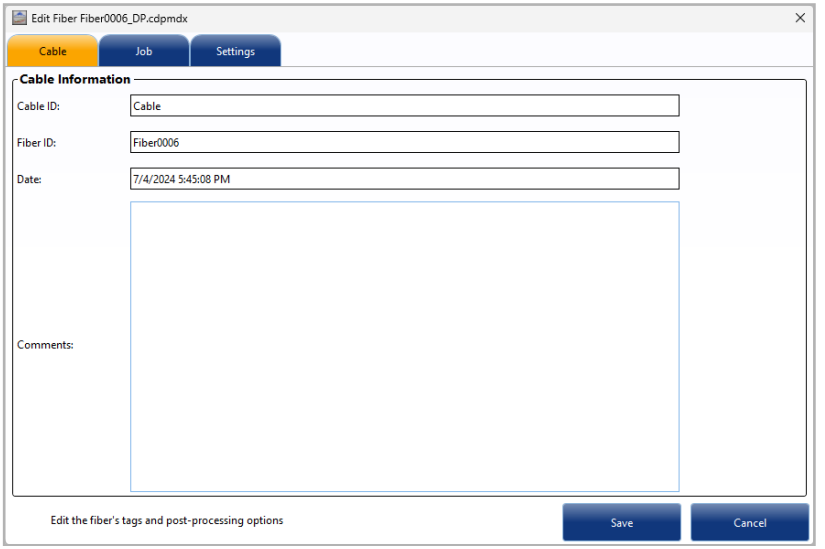
Since the test was already performed, you can add specific comments on the cable at this point, or rename it in a easy to recognize manner.

To modify cable information for your test:

1. Acquire test results by performing a scan, or retrieve a file or files from the **Open** button.
2. In the **Results** tab, tap **Edit.**



3. Select the **Cable** tab.



4. Fill the boxes according to your needs.

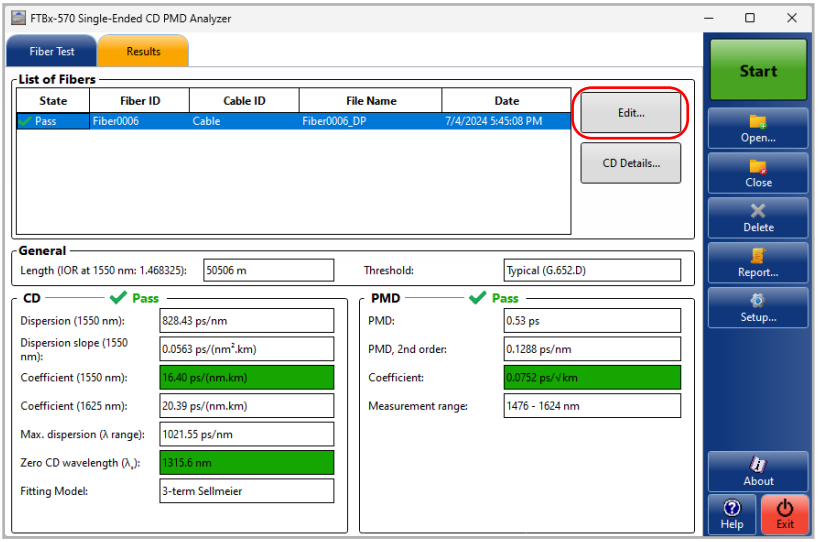
5. When you are done, tap **Save**.

Modifying Job Information

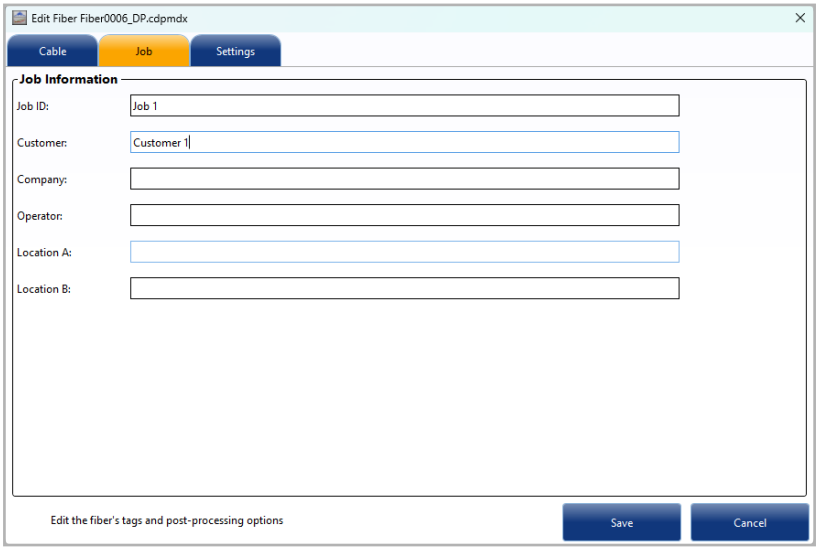
If the job was performed by a different person than the original settings indicated, or if the location changed, you may adjust the information here.

To modify job information for your test:

1. Acquire test results by performing a scan, or retrieve a file or files from the **Open** button.
2. In the **Results** tab, tap **Edit.**



3. Select the **Job** tab.



4. Fill the boxes according to your needs.

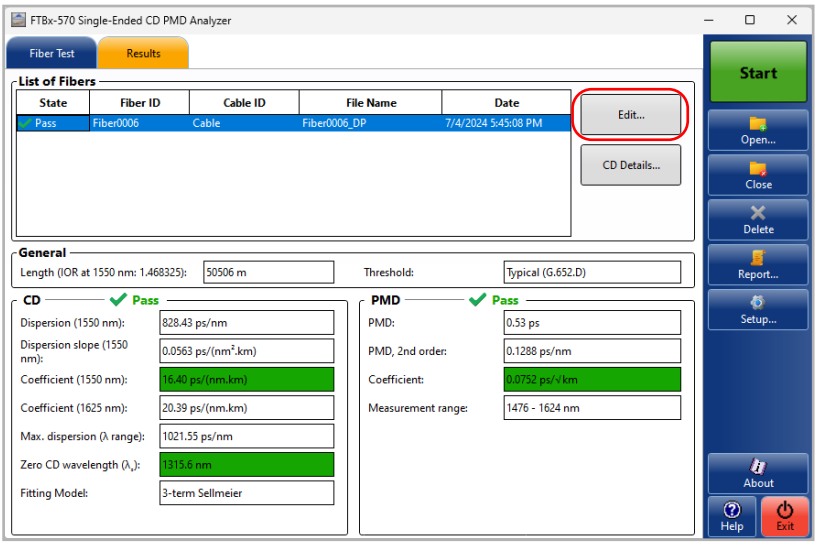
5. When you are done, tap **Save**.

Modifying Settings Parameters

The settings parameters include the index of refraction (IOR), the analysis range, the threshold details and enabling or disabling measurements in O-band.

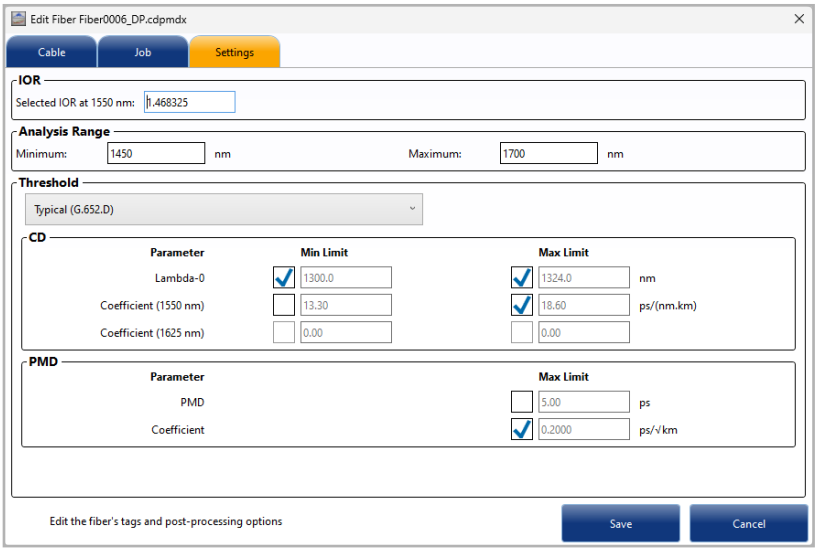
To modify settings parameters for your test:

1. Acquire test results by performing a scan, or retrieve a file or files from the **Open** button.
2. In the **Results** tab, tap **Edit.**



3. Select the **Settings** tab.

4. Change the desired settings parameters (for details on the settings, see *Configuring Settings Details* on page 15).



5. When you are done, tap **Save**. The results are changed accordingly by your unit.

Opening Existing Files

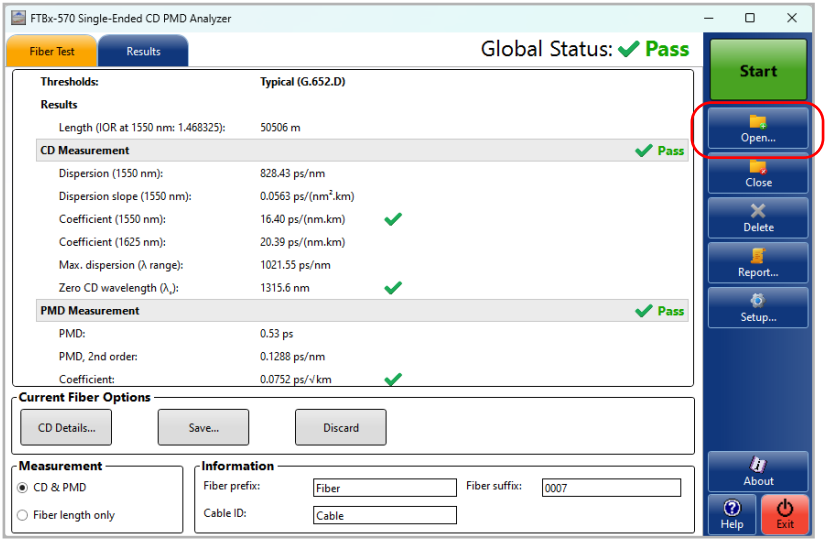
You can open existing files without losing the current results and information.

IMPORTANT

If a file is already selected in the list, the opened file will replace the selected file. If no file was selected, the new file will be added at the bottom of the list.

To open an existing file:

1. From the button bar, tap **Open**.



2. In the standard **Open** dialog box, you can select the desired file or files.
3. When you are done selecting the file or files, tap **Open** from the dialog box.

Removing Unwanted Results

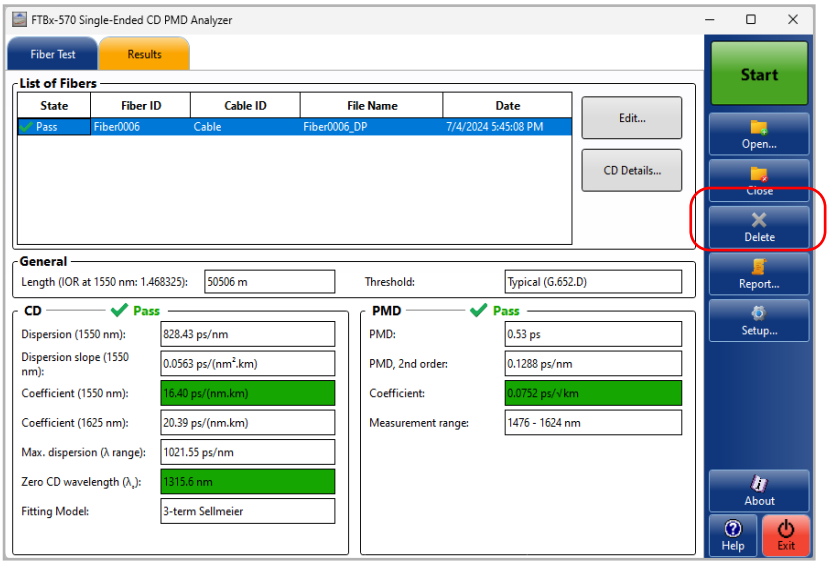
When a problem occurs, such as a fiber break, you may want to remove the corresponding erroneous measurement. This could be useful to avoid distorting results and statistics.

IMPORTANT

Removing a saved file using the Delete button will erase the file from the drive.

To remove unwanted results from the disk:

1. From the main window **Results** tab, once you have taken and saved a measurement or opened measurement files, you can select the fiber to remove.
2. Select the desired fiber by tapping it once, then tap **Delete**.



3. The application will display a confirmation message. Tap **Yes** to confirm.

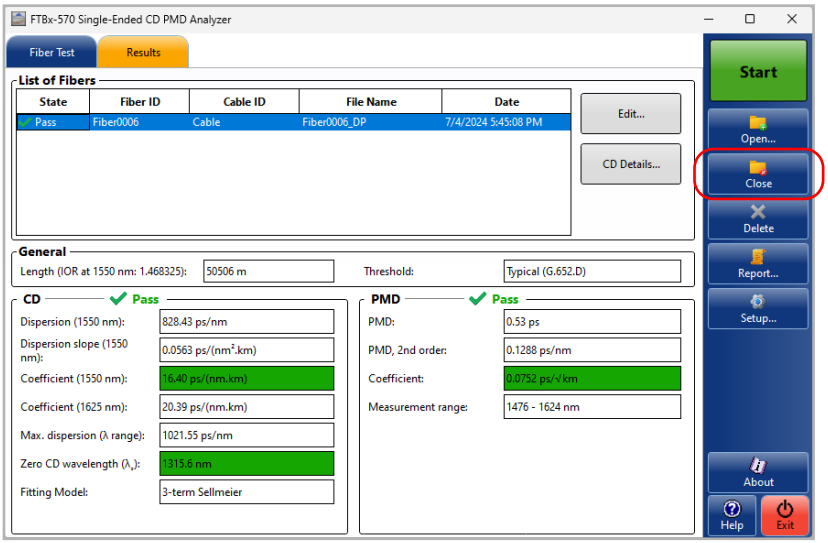
Closing Result Files

For easier result management, you may want to close the result files manually.

Note: *You do not need to close files manually before exiting the Single-Ended CD PMD Analyzer application. You will be prompted if some result files have not been saved.*

To close files:

1. In the **Results** tab, select the file to close.
2. Tap **Close**.

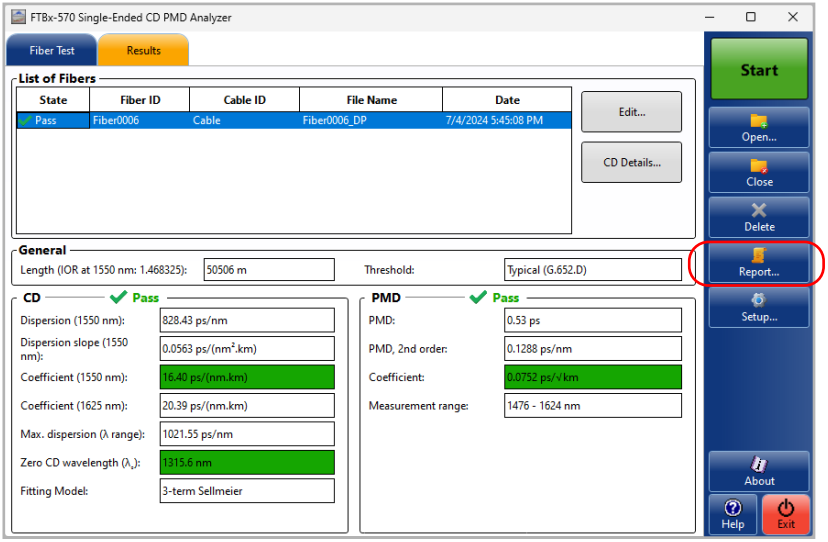


Generating a Report

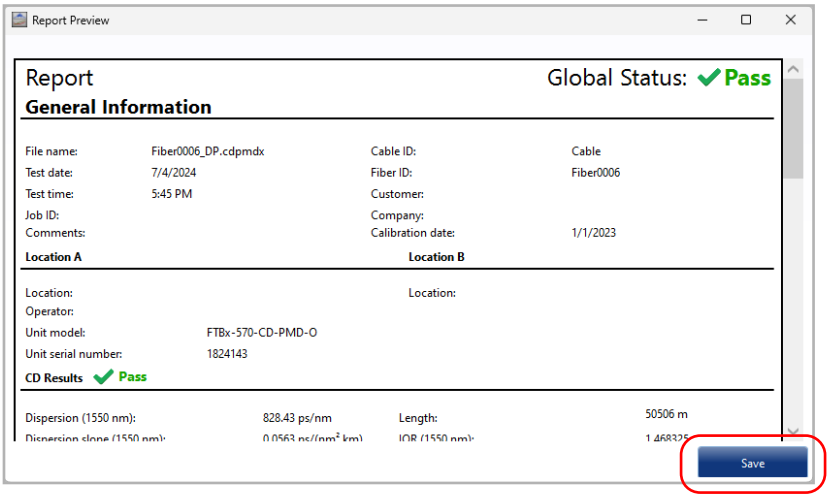
You can generate an html or a PDF report for the currently selected file.

To generate a report:

1. From either the **Fiber Test** or **Results** window, tap **Report**.



2. Select a name and location for your report.



3. Tap **Save** to create the report.

Note: *Should you move your report for further consultation, make sure that you take all of the support files that were created with the report, if any.*

6 Maintenance

To help ensure long, trouble-free operation:

- Always inspect fiber-optic connectors before using them and clean them if necessary.
- Keep the unit free of dirt and dust.
- Clean the unit casing and front panel with a cloth slightly dampened with water.
- Store unit at room temperature in a clean and dry area. Keep the unit out of direct sunlight.
- Avoid high humidity or significant temperature fluctuations.
- Avoid unnecessary shocks and vibrations.

WARNING

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

Cleaning Optical Connectors Using a Mechanical Cleaner

Optical connectors are fixed on your unit and can be cleaned using a mechanical cleaner.

WARNING

Verifying the surface of the connector with a fiber-optic microscope WHILE THE UNIT IS ACTIVE WILL result in permanent eye damage.

CAUTION

If you are cleaning an EUI with a mechanical cleaner, do not remove it from your device to clean it.

To clean a connector using a mechanical cleaner:

1. Insert the cleaning tip into the optical adapter, and push the outer shell into the cleaner.

Note: *The cleaner makes a clicking sound to indicate that the cleaning is done.*

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

Recalibrating the Unit

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

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

Until you collect the required empirical data to support your own calibration interval strategy, EXFO recommends that the next calibration (due) date of an instrument be established according to the following equation:

Next calibration date = Date of first usage + Recommended calibration period (one year)

Note: *You can use the date of first usage only if the product was stored in proper conditions (23 °C ± 5 °C (73,4 °F ± 9 °F)). If it is not the case or if you do not know the date of first usage, you can use the date at which you received the product, as long as the product was sourced from an official EXFO distribution channel.*

Restriction:

Next calibration date ≤ calibration date on certificate + recommended calibration period (one year)+ maximum storage period (six months)

Under normal use, the recommended calibration period for your Single-Ended CD PMD Analyzer is: one year.

For newly delivered units, EXFO has determined that the maximum storage period for this product is up to six months.

EXFO guarantees that proper storage at room temperature for up to the maximum storage period between calibration and shipment will not affect the performance of the test and measurement instruments and will not reduce the recommended validity period before requiring a new calibration.

To help you with calibration follow-up, EXFO provides a special calibration label that complies with the ISO/IEC 17025 standard and indicates the unit calibration date and provides space to indicate the due date.

To ensure that test and measurement instruments conform to the published specifications, calibration must be carried out at the relevant EXFO plant, or, depending on the product, at an EXFO service center, or at one of EXFO's certified service centers. All calibrations are performed using standards traceable to national metrology institutes.

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

Recycling and Disposal

This symbol on the product means that you should recycle or dispose of your product (including electric and electronic accessories) properly, in accordance with local regulations. Do not dispose of it in ordinary garbage receptacles.

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

7 Troubleshooting

Solving Common Problems

Before calling EXFO's technical support, you may want to consider the following solutions to problems that could occur.

Note: *Should you have problems, you can activate the **Keep intermediate data** option in the **Application** tab of the **Setup** window and send the resulting file to EXFO. This will allow us to help troubleshoot the problem.*

General Problems

Message	Possible cause	Solution
No fiber is connected or there is a bad connection.	➤ The fiber is not properly connected. ➤ The connector is broken. ➤ There is a strong loss at the very beginning of the link.	➤ Verify that the fiber is properly connected. ➤ Verify that the connector is not broken. ➤ Verify that the beginning of the fiber under test does not show strong losses. ➤ Clean the connector.
A non-reflective fiber end was found at [distance].	The fiber under test is not terminated by a UPC connector.	Verify that the fiber under test is terminated by a UPC connector.
The signal fall-in noise is at [distance].	➤ The fiber under test is not terminated by a UPC connector. ➤ The distance is above the dynamic range.	➤ Verify that the fiber under test is terminated by a UPC connector. ➤ Make sure that the distance is within the dynamic range.

Message	Possible cause	Solution
Unable to find a reflective fiber end. Please verify that the fiber under test is properly connected and terminated by a UPC connector.	Too much loss in the fiber under test	➤ Clean the fiber end. ➤ Add a reflective termination at the end of the fiber.
Optical power is too low.	Too much loss in the fiber under test.	➤ Clean the fiber end. ➤ Add a reflective termination at the end of the fiber.
Unable to find a valid wavelength range.	➤ Too much loss in the fiber under test. ➤ The wavelength range is too large.	➤ Clean the fiber end. ➤ Add a reflective termination at the end of the fiber.
I cannot open my reports.	Some of the report files are missing.	Make sure that you have kept all of the report's support files with the report file itself.

PMD-Related Problems

Message	Possible cause	Solution
Conditions are not optimal for measuring polarization mode dispersion. Cannot perform measurement.	Too much loss in the fiber under test.	➤ Clean the fiber end. ➤ Add a reflective termination at the end of the fiber.
Unable to ensure a correct PMD measurement over the selected wavelength range because of a combination of saturated detector and low optical power.	➤ Fiber end is too reflective. ➤ Unsuitable FUT. The FUT must not cut the 1550 nm wavelength.	If you have put a reflective termination at the end of the fiber, remove it.
The measurement range is too short for a PMD measurement	Measurement range is too short.	Try to use a larger measurement range.
Impossible to find a valid measurement range.	➤ Too much loss in the fiber under test. ➤ Unsuitable FUT. The FUT must not cut the 1550 nm wavelength.	➤ Clean the fiber end. ➤ Add a reflective termination at the end of the fiber.
The unit has detected too important polarization fluctuations on the fiber. No PMD measurement was performed.	➤ The unit was moved during the measurement. ➤ The fiber moved during the measurement.	➤ Make sure not to move the unit. ➤ Make sure that the fiber does not move during the measurement. ➤ Contact EXFO if the problem is still not solved.

CD-Related Problems

Message	Possible cause	Solution
Conditions are not optimal for measuring chromatic dispersion. Cannot achieve good measurement quality.	➤ Too much loss in the fiber under test. ➤ Multiple strong reflections close to each other at the end of fiber.	➤ Clean the fiber end. ➤ Add a reflective termination at the end of the fiber. ➤ In this case, add a receive fiber of at least 200 m. This will remove that condition.
There are not enough valid points to compute the model fit due to low power conditions in the selected range.	➤ Too much loss in the fiber under test. ➤ The wavelength range is unsuitable for this FUT.	➤ Clean the fiber end. ➤ Add a reflective termination at the end of the fiber.
There are not enough valid points to compute the model fit due to detector saturation conditions in the selected range.	➤ Fiber end is too reflective. ➤ Unsuitable FUT. The FUT must not cut the 1550 nm wavelength.	If you have put a reflective termination at the end of the fiber, remove it.
There are not enough valid points to compute the model fit due to a combination of detector saturation and low power conditions in the selected range.	➤ Fiber end is too reflective. ➤ Unsuitable selected wavelength range for the measured FUT (out of the FUT bandwidth). ➤ Unsuitable FUT. The FUT must not cut the 1550 nm wavelength.	If you have put a reflective termination at the end of the fiber, remove it.

Contacting the Technical Support Group

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

Technical Support Group
400 Godin Avenue
Quebec (Quebec) G1M 2K2
CANADA

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

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

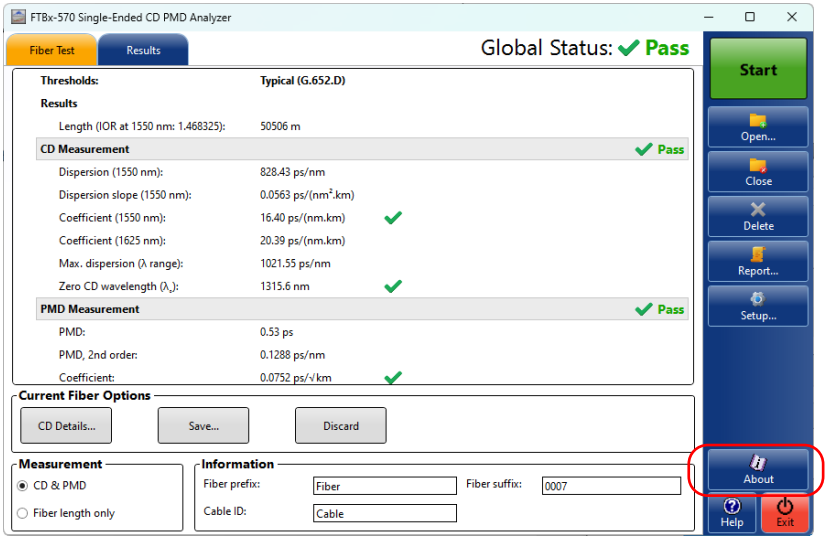
If you have comments or suggestions about this user documentation, you can send them to customer.feedback.manual@exfo.com.

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

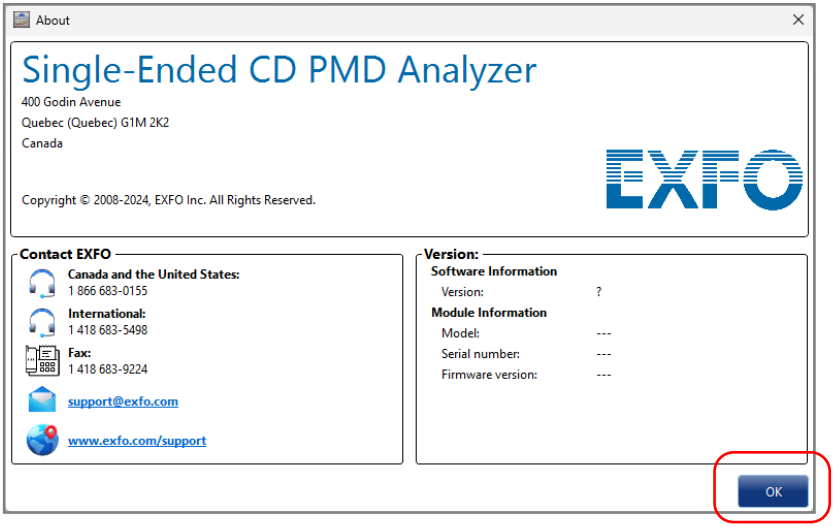
You may also be requested to provide software and module version numbers.

To access information about your unit:

1. From the **Fiber Test** tab or the **Results** tab, tap the **About** function tab.



2. Information about your unit, as well as contact information for the Technical Support Group, is displayed in a window. Tap **OK** to close the window.



Transportation

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

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

8 Warranty

General Information

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

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

IMPORTANT

The warranty can become null and void if:

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

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

Gray Market and Gray Market Products

Gray market is a market where products are traded through distribution channels that are legal but remain unofficial, unauthorized, or unintended by the original manufacturer. Intermediaries using such channels to distribute products are considered to be part of the gray market (hereafter unauthorized intermediary).

EXFO considers that a product originates from the gray market (hereafter gray market product) in the following situations:

- A product is sold by an unauthorized intermediary.
- A product is designed and destined for a particular market and sold on a second market.
- A product is resold, despite being reported lost or stolen.

When products are purchased on the gray market, rather than through an authorized EXFO distribution channel, EXFO is unable to guarantee the source and quality of those products nor the local safety regulations and certifications (CE, UL, etc.).

EXFO will not honor warranty, install, maintain, repair, calibrate, provide technical support nor make any support contracts available for gray market products.

For complete information, refer to EXFO's policy regarding gray market products at www.exfo.com/en/how-to-buy/sales-terms-conditions/gray-market/

Liability

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

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

Exclusions

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

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

IMPORTANT

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

Certification

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

Service and Repairs

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

To send any equipment for service or repair:

1. Call one of EXFO's authorized service centers (see *EXFO Service Centers Worldwide* on page 64). Support personnel will determine if the equipment requires service, repair, or calibration.
2. If equipment must be returned to EXFO or an authorized service center, support personnel will issue a Return Merchandise Authorization (RMA) number and provide an address for return.
3. If possible, back up your data before sending the unit for repair.
4. Pack the equipment in its original shipping material. Be sure to include a statement or report fully detailing the defect and the conditions under which it was observed.
5. Return the equipment, prepaid, to the address given to you by support personnel. Be sure to write the RMA number on the shipping slip. *EXFO will refuse and return any package that does not bear an RMA number.*

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

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

Routine recalibration is not included in any of the warranty plans. Since calibrations/verifications are not covered by the basic or extended warranties, you may elect to purchase FlexCare Calibration/Verification Packages for a definite period of time. Contact an authorized service center (see *EXFO Service Centers Worldwide* on page 64).

EXFO Service Centers Worldwide

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

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

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

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

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

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

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

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

A REST Command Reference

A complete list of the REST commands for your unit is available at all times online. It details the commands with examples and appropriate syntax.

To view the REST command documentation:

From your internet browser, access the following:

http://[IP address of your platform]:5570/Swagger

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

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

Part Name 部件名称	Lead 铅 （Pb）	Mercury 汞 （Hg）	Cadmium 镉 （Cd）	Hexavalent Chromium 六价铬 （Cr(VI)）	Polybrominated biphenyls 多溴联苯 （PBB）	Polybrominated diphenyl ethers 多溴二苯醚 （PBDE）
Enclosure 外壳	O	O	O	O	O	O
Electronic and electrical sub-assembly 电子和电气组件	X	O	X	O	X	X
Optical sub-assembly[a] 光学组件 [a]	X	O	O	O	O	O
Mechanical sub-assembly[a] 机械组件 [a]	O	O	O	O	O	O

Note:
注：
This table is prepared in accordance with the provisions of SJ/T 11364.
本表依据 SJ/T 11364 的规定编制。
O: Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.
O：表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 标准规定的限量要求以下。
X: indicates that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572. Due to the limitations in current technologies, parts with the “X” mark cannot eliminate hazardous substances.
X：表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 标准规定的限量要求。
标记“X”的部件，皆因全球技术发展水平限制而无法实现有害物质的替代。
a. If applicable.
如果适用。

MARKING REQUIREMENTS
标注要求

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

a. If applicable.
如果适用。

www.EXFO.com · info@EXFO.com

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