

# FTB-5500B/FTB-5800

NETWORK TESTING—OPTICAL

## Polarization Mode Dispersion Analyzer—FTB-5500B

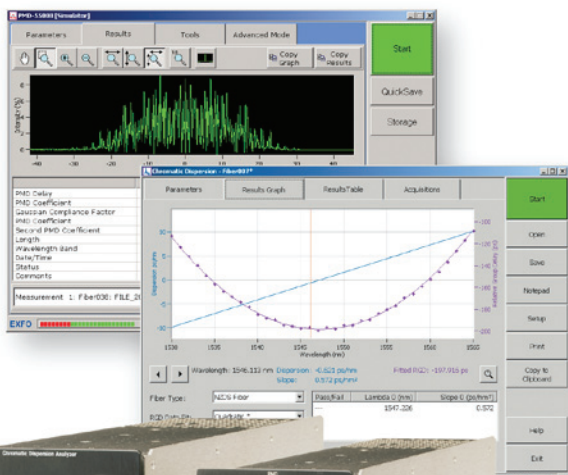
- Less than five-second testing time for any PMD range
- No auto-correlation peak, for enhanced accuracy
- NIST traceable
- Ideal for aerial fibers
- Patented design\*: test through EDFAs
- 100 Gbit/s-ready

## Chromatic Dispersion Analyzer—FTB-5800\*\*

- Complete CD characterization
- Highly accurate phase-shift method
- No communication between source and receiver
- Patented design\*: test through EDFAs
- 100 Gbit/s-ready

## Platform Compatibility

- FTB-500 Platform



\* Protected by US patent 7,227,645 and equivalents in several other countries. Measurement method approved by TIA-FOTP-124A.

\*\* Protected by US patent 6,429,929 and foreign equivalents.



Next-Generation Network Assessment



## Combining CD and PMD for Precise Link Characterization

Designed for ultra-long-haul and 40 Gbit/s applications, EXFO's FTB-5500B PMD and FTB-5800 CD analyzer combo provides you with the speed, accuracy and high performance you need to ensure high-quality network services. Housed in the expert FTB-500 Platform, the FTB-5500B and FTB-5500 test modules survive splashes, knocks and drops—ideal for CO and field conditions.



EXFO's CD and PMD analyzers, housed in the FTB-500 platform

## Measuring Polarization Mode Dispersion the Fast Way

Polarization mode dispersion (PMD) represents a significant danger to both legacy and newly deployed networks. And as systems of 10 Gbit/s and faster develop, PMD concern and awareness continue to grow. EXFO's FTB-5500B PMD Analyzer helps you get ahead in the field. Whether you need to verify the capacity of legacy fiber or upgrade a network to any speed, the modular FTB-5500B is fast, reliable and ready to go.



FTB-5500B PMD Analyzer

### Key Features

- Five-second testing time
- No auto-correlation peak
- Testing through EDFAs
- Suitable for all networks

### Key Benefits

- Test more fiber, faster
- Ultra-high accuracy
- Reduce test cost
- Future-proof: 100 Gbit/s-ready, designed for long-haul and ultra-long-haul networks

### Second-Order PMD

Particularly important in multichannel transmission and as rates reach 40 Gbit/s and higher, second-order PMD is derived from the measured PMD value. EXFO's software provides second-order PMD delay and coefficient values for telecom fibers. These values allow you to characterize fibers and cables more precisely than simple PMD and better control the transmission quality of high-speed systems.

## Characterizing Chromatic Dispersion in the Field

The ongoing race to develop high-speed transmission systems and to increase available bandwidth is facing certain limitations. Chromatic dispersion (CD) measurements are becoming more and more critical for carriers and service providers looking to improve their systems by upgrading to extreme speed. EXFO's FTB-5800 CD Analyzer offers high performance in a field-ready unit for all chromatic dispersion testing situations.



■ FTB-5800 CD Analyzer

### Key Features

Personalized data management  
Phase-shift method  
Testing through EDFAs  
Suitable for all networks

### Key Benefits

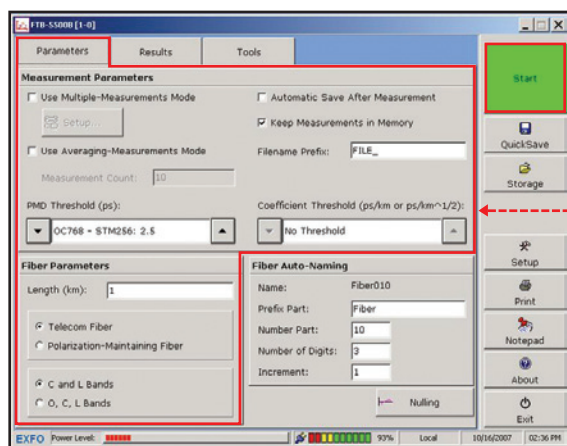
Generate clear, customized report  
Ultra-high accuracy  
Reduce test cost  
Future-proof: 100 Gbit/s-ready, designed for long-haul, ultra-long-haul and WDM networks

# Powerful Software Features at the Touch of a Button

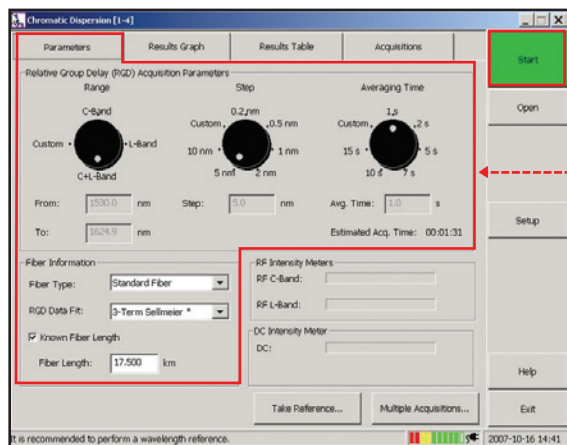
EXFO's ToolBox software suite runs the FTB-500's test module applications. The user-friendly touchscreen provides easy access to menus and functions, for highly productive, yet simple testing in the field.

## Set and test.

Simple test setup parameters for error-free testing.



FTB-5500B PMD Analyzer



FTB-5800 CD Analyzer

TEST

SET

- Measurement parameters
- Fiber parameters

# Powerful Software Features at the Touch of a Button (Cont'd)

Personalized data management for clear, customized report creation.

## Benefit from statistical analysis

- Averaging multiple test on one fiber
- Gathering data from end-to-end fibers and calculating total PMD (link creation)

The screenshot shows the 'Results' tab of the FTB-5500B software. A graph plots Intensity (%) on the y-axis (0 to 30) against Delay (ps) on the x-axis (-2 to 2). Below the graph, a table lists the following results:

Parameter	Value
PMD Value	0.785 ps
PMD Coefficient	0.7851 ps/km <sup>1/2</sup>
Gaussian Compliance Factor	1.069
Second order PMD	0.2771 ps/nm ( 0.3559 ps <sup>2</sup> )
Second PMD Coefficient	0.2771 ps/nm.km ( 0.3559 ps <sup>2</sup> .km )
Length	1.000 km
Wavelength Band	1514.62 - 1526.66 nm
Date/Time	2003-04-16 10:23:53
Status	Valid
Comments	Random coupling fiber measured in telecom mode with C b...

Annotations with red dashed lines point to specific features:

- PMD value** and **PMD coefficient** point to the top two rows of the results table.
- Second-order PMD and coefficient** point to the third and fourth rows.
- Pass/fail threshold** points to a green 'Pass' button at the bottom right of the results area.

Large graphic display of both the dispersion and the relative group delay.

## Benefit from statistical analysis

- Multiple measurement capabilities for testing over long time periods
- Threshold detection for dispersion and slope

The screenshot shows the 'Results Graph' and 'Results Table' tabs of the FTB-5800 software. The graph plots Dispersion (ps/nm) on the left y-axis (0 to 30) and Relative Group Delay (ps) on the right y-axis (0 to 140000) against Wavelength (nm) on the x-axis (1530 to 1620). A blue line represents the dispersion curve, and a purple line represents the relative group delay curve. Below the graph, the following data is shown:

RGD Equation:  $-3.41667 \times 10^{-6} + 0.921952 \times 10^{-2} + 2.09177 \times 10^{-2} \times \lambda^2$

RGD Weighted RMS Error: 265.325 ps

Wavelength: 1577.450 nm    Dispersion: 18.336 ps/(nm.km)    Fitted RGD: 64342.993 ps

Slope: 0.058323 ps/(nm<sup>2</sup>.km)

Fiber Type: Standard Fiber    State: Lambda\_0 (nm)    Slope 0 (ps/(nm<sup>2</sup>.km))

RGD Data Fit: 3-Term Sellmeier \*    Fit: 1327.255    0.093185

Fiber Length: 80.000 km

Annotations with red dashed lines point to:

- Calculated CD curve** points to the purple line on the graph.
- Group delay curve FIT** points to the blue line on the graph.
- Fiber type** points to the 'Standard Fiber' dropdown menu.

In the background, a 'Results Table' is visible with columns for Wavelength (nm), RGD (ps), Fitted RGD (ps), RGD Deviation (ps), Dispersion (ps/nm), and Dispersion Slope. The table contains multiple rows of data with checkmarks indicating pass/fail status.

## Additional PMD and CD Combo Advantages

### The Ultra-Long-Haul Advantage

Now you can test whole links instead of only sections, reducing manipulation, error and testing time. Because filtering is done at the receiver end and not at the source, transmission through one-way devices such as isolators and EDFAs is possible. Tests have been performed through as many as 250 cascaded amplifiers over a link length of more than 12 000 km.

### The FLS-5800 CD/PMD Analyzer Source Advantage

A single light source, the FLS-5800 CD/PMD Analyzer Source, can help you characterize CD and PMD—reducing testing time and minimizing the potential for human error.



### Fast-Track Data Post-Processing with FastReporter Software

The optional FastReporter software package provides you with the post-processing tools and functionalities you need to optimize your test cycles, whatever the application. Designed for off-line analysis of field-acquired data, FastReporter offers a truly intuitive graphical user interface, which contributes to boosting productivity.

### Flexible Reporting

Choose from various report templates, including PMD, CD and fiber characterization. Generate comprehensive cable reports in PDF, Excel or HTML format.

### FTB-5500B PMD Analyzer

#### SPECIFICATIONS

Wavelength range (nm)	1260 to 1675 (O to U band)	
Measurement range (ps)	0 to 115	
Sensitivity <sup>a</sup> (dBm)	-45	
Measuring time (s)	4.5 (for any PMD value)	
Absolute uncertainty (strong mode coupling) <sup>b</sup> (ps)	± (0.020 + 2 % of PMD)	
Allows measurement through EDFA	Yes (above 120 EDFAs)	

#### Notes

- a. Typical, for C band. May be increased with averaging. With the FLS-5800, the typical dynamic range is 47 dB.  
b. For C band, assuming averaging over all states of polarization.

#### GENERAL SPECIFICATIONS

Temperature operating	0 °C to 40 °C	(32 °F to 104 °F)
storage	-40 °C to 70 °C	(-40 °F to 158 °F)
Relative humidity	0 % to 93 % non-condensing	
Size (H x W x D) (module only)	9.6 cm x 7.6 cm x 26.0 cm	(3 3/4 in x 3 in x 10 1/4 in)
Weight (module only)	1.5 kg (3.4 lb)	

### FTB-5800 CD Analyzer

#### SPECIFICATIONS<sup>a</sup>

Wavelength range (nm)	1530 to 1625 1200 to 1700 <sup>b</sup>			
Wavelength step (nm)	Minimum	0.1		
Measurement points	Maximum	950, user-definable		
Dynamic range <sup>c</sup> (dB)	42			
Wavelength uncertainty <sup>d</sup> (accuracy) (nm)	0.1			
Dispersion uncertainty <sup>d</sup> (accuracy) (ps/nm)	20 km of G.652	1.6		
	120 km of G.652	3.1		
	20 km of G.655	1.9 (guaranteed)		
Dispersion repeatability <sup>d</sup> (ps/nm)		20 km	80 km	120 km
		0.04	0.2	1.1
	Zero-dispersion wavelength $\lambda_0$ repeatability <sup>d</sup> (nm)	0.1	0.14	0.8
	Dispersion slope repeatability $\lambda_0^d$ (%)	0.03	0.05	0.25
Minimum fiber length (km)	< 1			
Maximum fiber length <sup>e</sup> (km)	> 5400			
Measurement time per point <sup>e</sup> (s)	Minimum	< 1		

#### Notes

- a. All specifications are typical with four seconds averaging time per point (where applicable), at a temperature of 23 °C ± 1 °C, with FC connectors and after warmup time.  
b. Displayed range. Values may be extrapolated.  
c. Dynamic range is defined as the difference between the strongest signal and the weakest signal the receiver can detect. Extra averaging may be required. Uncertainty (accuracy) is not guaranteed at limits of range.  
d. C+L band.  
e. Including EDFAs.  
f. Additional gain setting time may be required prior to the first point of each band.

#### GENERAL SPECIFICATIONS

Size (H x W x D) (module)	9.6 cm x 10 cm x 26 cm	(3 3/4 in x 3 15/16 in x 10 1/4 in)
Weight (module)	2 kg (4.5 lb)	

**ORDERING INFORMATION**

**PMD ANALYZER**

**FTB-5500B-XX**

**Connector \* ■**

- EI-EUI-28 = UPC/DIN 47256
- EI-EUI-76 = UPC/HMS-10/AG
- EI-EUI-89 = UPC/FC narrow key
- EI-EUI-90 = UPC/ST
- EI-EUI-91 = UPC/SC

- EI-EUI-95 = UPC/E-2000
- EA-EUI-28 = APC/DIN 47256
- EA-EUI-89 = APC/FC narrow key
- EA-EUI-91 = APC/SC
- EA-EUI-95 = APC/E-2000

Example: FTB-5500B-EI-EUI-89

**CD ANALYZER**

**FTB-5800-XX**

**Connector ■**

- EI-EUI-28 = UPC/DIN 47256
- EI-EUI-76 = UPC/HMS-10/AG
- EI-EUI-89 = UPC/FC narrow key
- EI-EUI-90 = UPC/ST
- EI-EUI-91 = UPC/SC
- EI-EUI-95 = UPC/E-2000

- EA-EUI-28 = APC/DIN 47256
- EA-EUI-89 = APC/FC narrow key
- EA-EUI-91 = APC/SC
- EA-EUI-95 = APC/E-2000

Example: FTB-5800-EI-EUI-89

**CD/PMD ANALYZER SOURCE**

**FLS-5834A-XX**

**Model ■**

FLS-5834A = 1550 nm and 1625 nm

**Connector ■**

- EI-EUI-28 = UPC/DIN 47256
- EI-EUI-76 = UPC/HMS-10/AG (EI only)
- EI-EUI-89 = UPC/FC narrow key
- EI-EUI-90 = UPC/ST (EI only)
- EI-EUI-91 = UPC/SC
- EI-EUI-95 = UPC/E-2000
- EA-EUI-28 = APC/DIN 47256
- EA-EUI-89 = APC/FC narrow key
- EA-EUI-91 = APC/SC
- EA-EUI-95 = APC/E-2000

Example: FLS-5834A-EI-EUI-89

\* EXFO Universal Interface is protected by US patent 6,612,750.

**POLARIZED LIGHT SOURCE (PMD TESTING ONLY)**

**FLS-110-XXP-XX**

**Model ■**

FLS-110-02P = 1310 nm LED  
FLS-110-03P = 1550 nm LED

**Connector \* ■**

- 58 = FC/APC narrow key
- 89 = FC/UPC narrow key
- 91 = SC/UPC
- EI-EUI-28 = UPC/DIN 47256
- EI-EUI-76 = UPC/HMS-10/A
- EI-EUI-89 = UPC/FC narrow key
- EI-EUI-90 = UPC/ST
- EI-EUI-91 = UPC/SC
- EI-EUI-95 = UPC/E-2000
- EA-EUI-28 = APC/DIN 47256
- EA-EUI-89 = APC/FC narrow key
- EA-EUI-91 = APC/SC
- EA-EUI-95 = APC/E-2000

Example: FLS-110-02P-EI-EUI-89

**SAFETY**

FLS-110	THIS PRODUCT COMPLIES WITH 21 CFR 1040.10 AND 1040.11, AND WITH IEC 60825-1:1993+A1:1997.	CLASS 1 LED PRODUCT
FLS-5834A	IEC 60825-1:2001	CLASS 1M LED PRODUCT

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EXFO is certified ISO 9001 and attests to the quality of these products. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. EXFO has made every effort to ensure that the information contained in this specification sheet is accurate. However, we accept no responsibility for any errors or omissions, and we reserve the right to modify design, characteristics and products at any time without obligation. Units of measurement in this document conform to SI standards and practices. In addition, all of EXFO's manufactured products are compliant with the European Union's WEEE directive. For more information, please visit [www.EXFO.com/recycle](http://www.EXFO.com/recycle). Contact EXFO for prices and availability or to obtain the phone number of your local EXFO distributor.

For the most recent version of this spec sheet, please go to the EXFO website at <http://www.EXFO.com/specs>

In case of discrepancy, the Web version takes precedence over any printed literature.

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