

## FTB-5200 Series

NETWORK TESTING—OPTICAL



**The most complete line of OSAs available: top resolution for all applications and channel spacings**

### Three models adapted to your reality

#### FTB-5240B Optical Spectrum Analyzer

- The high-end solution for testing 12.5 GHz ultra-DWDM networks, network elements and components
- ROADM-ready **NEW**

#### FTB-5240 Optical Spectrum Analyzer

- The choice for 50 GHz spacing and network element testing applications
- ROADM-ready **NEW**

#### FTB-5230 Optical Spectrum Analyzer

- The cost-effective OSA for CWDM and 100 GHz DWDM networks

### Platform compatibility

FTB-400 Universal Test System



**NEW**  
**In-Band OSNR**  
**ROADM Testing**

## The Benefit of Choice Without the Drawback of Compromise

Housed in the rugged and powerful FTB-400 Universal Test System, FTB-5200 series OSA modules cover all applications—**networks, network elements, components, ROADMs, drift, pass/fail, 40 Gbit/s**, etc.—and all channel spacings, **from CWDM to 12.5 GHz ultra-DWDM**. Most importantly, they deliver top resolution all the way through. The result: no-compromise performance, whatever your network specificities and testing requirements.

### FTB-5200 Series Application Matrix

	FTB-5230	FTB-5240	FTB-5240B
Channel comparison	√	√	√
Pass/fail testing	√	√	√
Drift and monitoring	√	√	√
CWDM in-channel power measurement	√		
EDFA testing (gain, flatness, noise figure, etc.)		√	√
Spectral transmittance		√	√
Fabry-Perot laser analysis		√	√
DFB laser analysis			√
ROADM		√	√

### FTB-5200 Series: Key Features

- Wide spectral range: 1250 to 1650 nm
- High-resolution characterization of CWDM, DWDM and ultra-DWDM networks, network elements and components
- One-touch testing, for fast results
- Optical rejection ratio: up to 50 dBc at 0.2 nm
- Wavelength accuracy: down to 15 pm
- Patented design
- Future-proof: 40 Gbit/s ready

### Unique Feature: Adaptable Resolution Bandwidth

Most OSAs offer hardware-based resolution bandwidth options through variable slit sizes. In addition to decreasing the robustness of the instrument, such an approach lacks flexibility, since the quality of the data is only as good as the acquisition resolution. EXFO's OSAs have fixed bandwidth; acquired data is always top resolution, but the software allows to filter it with variable resolution. This brings extra flexibility without compromising on specifications and data quality.

### FTB-400 Universal Test System

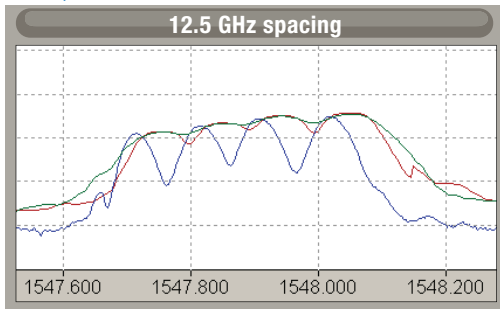
Offered with an 8-slot module receptacle and compound rubber bumpers, the tough, powerful FTB-400 is an advanced portable platform built for real-life test conditions. This guarantees that your modules will survive the inevitable bumps and drops in the field or from a lab bench. It houses all the modules listed in this document, and many more.



# Choose Your OSA

OSA selection is very much influenced by channel spacing and your system's required optical signal-to-noise ratio (OSNR). The figures below display typical OSNR values for each EXFO OSA at various channel spacings.

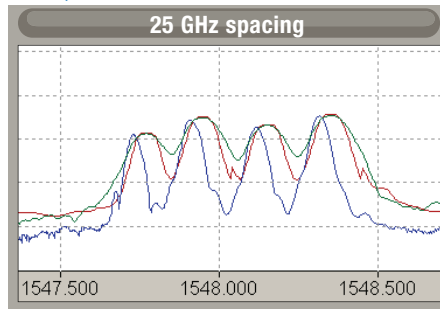
Example 1:



**Measured OSNR at 6.75 GHz:**

FTB-5240B: 26 dB  
 FTB-5240: 8 dB  
 FTB-5230: 3 dB

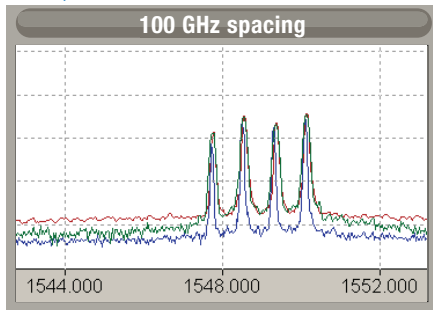
Example 2:



**Measured OSNR at 12.5 GHz:**

FTB-5240B: 43 dB  
 FTB-5240: 29 dB  
 FTB-5230: 14 dB

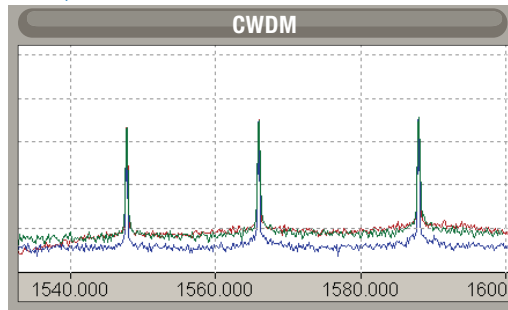
Example 3:



**Measured OSNR at 50 GHz:**

FTB-5240B: 53 dB  
 FTB-5240: 46 dB  
 FTB-5230: 46 dB

Example 4:



**Measured OSNR at 50 GHz:**

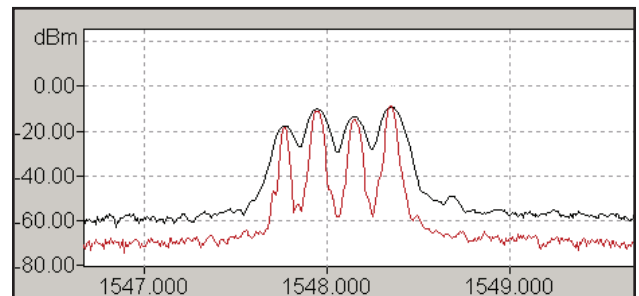
FTB-5240B: 55 dB  
 FTB-5240: 51 dB  
 FTB-5230: 49 dB

Selecting the optimal optical spectrum analyzer comes down to two main aspects: your current needs and your future needs.

## Resolution vs. OSNR

When choosing your OSA, channel spacing must be taken into consideration. It is so important that given a specific required OSNR, using an OSA with insufficient resolution can lead to flawed system diagnosis, as seen in the illustration below, which shows tests conducted with different OSAs on a 50 GHz system.

The lower-resolution OSA displayed on the graph would be excellent with 100 GHz spacing. However, using it to test a 50 GHz-spacing system leads to the conclusion that the system does not meet the requirements, while in fact it does.



Black trace: lower-resolution OSA.  
 Red trace: higher-resolution OSA.

## Spotlight: the FTB-5240/FTB-5240B OSAs

The FTB-5240B and FTB-5240 are the flagships of EXFO's OSA line, and are used by our worldwide network service provider customer base to test today's most critical DWDM systems.

The FTB-5240B is a high-end instrument that provides you with best-in-class specifications and performance, meeting your most stringent needs. The FTB-5240 is a mid-range OSA that is ideal for characterizing systems with channel spacing as low as 50 GHz.



### Adjustable Scanning Range

Thanks to an adjustable wavelength scanning range, the FTB-5240 and FTB-5240B OSAs let test operators focus on a specific band, delivering faster acquisition time and enhanced resolution. They cover all telco bands and all potential optical supervisory channels (OSCs).

### High Dynamic Range

With measurable input powers ranging from +18 dBm per channel to -75 dBm, the FTB-5240 OSA delivers an impressive 93 dB of dynamic range and high power accuracy. Accurately characterize components and systems with narrow channel spacing.

### Key Features

- **Excellent DWDM specifications:** ORR, resolution bandwidth, wavelength range and dynamic range
- **Easy to use:** automated, one-touch functions accessed through a simple, intuitive touchscreen interface
- **Best-in-class ORR option:** unmatched accuracy for OSNR measurements, thanks to the best ORR in the industry: up to 40 dBc at 0.1 nm, 50 dBc at 0.2 nm and 55 dBc at 0.4 nm (typical values)
- **Internal calibration:** internal reference light source maintaining wavelength uncertainty at  $\pm 30$  pm in the C+L band

### Applications

	FTB-5240B	FTB-5240
12.5 GHz ultra-DWDM		
25 GHz ultra-DWDM		
50 GHz DWDM		
100 GHz DWDM		
CWDM		

#### Color Code

- Optimal
- Sufficient, but not optimal
- Overly powerful
- Not suitable

# Spotlight: the FTB-5230 OSA

### Ideal for CWDM Testing

Since CWDM systems generally use uncooled lasers, whose typical wavelength drift is 0.1 nm per degree Celsius, it is critical to track the evolution and drift of the lasers' central wavelength. And since path attenuation can significantly vary within a single channel, passband drift also creates power drift. This is why it becomes extremely important to monitor—simultaneously for all CWDM channels—the evolution of peak power and wavelength over time. The FTB-5230 Optical Spectrum Analyzer's Drift mode functionalities makes this an easy task.

### Total In-Channel Power Measurement

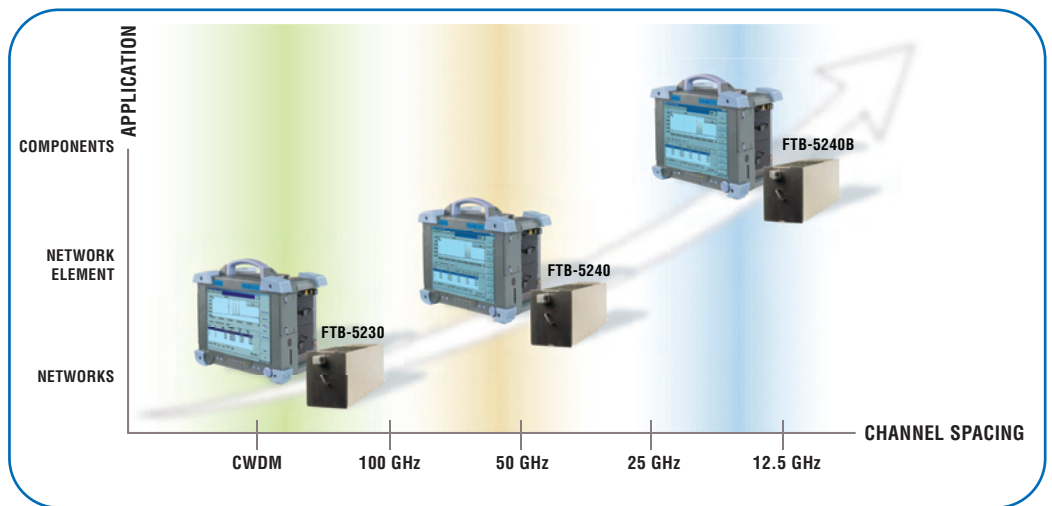
With channels as wide as CWDM channels, monitoring peak power is not enough. The chosen OSA must be able to track the total in-channel power—a feature only offered by EXFO's FTB-5230.

### Key Features

- Developed with a no-frills approach: only includes essential OSA functionalities, delivering first-class cost-effectiveness
- Characterization of down to 50 GHz DWDM systems
- Built-in CWDM testing functionalities
- Wavelength and power drift measurements



Applications	
	FTB-5230
12.5 GHz ultra-DWDM	
25 GHz ultra-DWDM	
50 GHz DWDM	
100 GHz DWDM	
CWDM	



### Color Code

- Optimal
- Sufficient, but not optimal
- Not suitable

# The FTB-5200 Series: Future-Proof Design

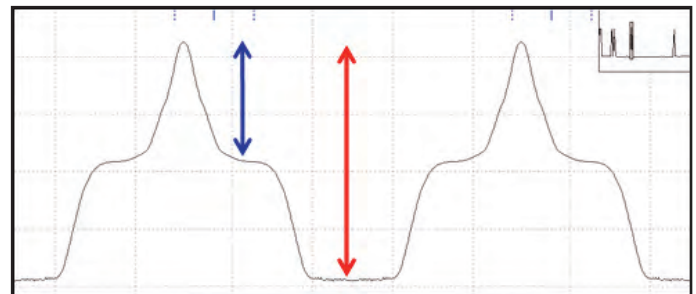
## ROADM Testing

Thanks to their flexible design, EXFO's FTB-5240/5240B OSAs deliver highly accurate optical signal-to-noise ratio (OSNR) measurements for systems where noise fluctuates from channel to channel. The IEC 61280-2-9 defines OSNR measurement as the difference in power between the peak power and the noise at half the distance between the peaks. In ROADM systems, this method may lead to incorrect results.

The built-in polarization diversity detection of EXFO's OSAs enable you to achieve accurate OSNR measurements of a ROADM system, without having to add expensive external hardware.

Combine the 5240/5240B OSA with the FTB-5500B (PMD), FTB-5800 (CD), FTB-8510 (Ethernet) and FTB-8130NG (SONET/SDH) test modules inside the FTB-400 platform, and benefit from a complete and unique ROADM test setup:

- All the flexibility required without compromising on accuracy
- One-box, future-proof solution for OSA, PMD, CD, Ethernet and next-generation SONET/SDH
- Complete ROADM testing: characterization, qualification, turn-up, validation and post-installation verification
- Simultaneous testing on physical, optical, transport and datacom layers

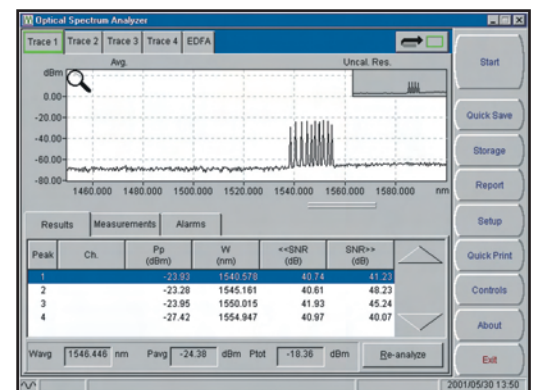


The IEC-61280-2-9 measurement method is shown by the red arrow above, while the real OSNR is shown in blue.

## Ultra DWDM System Analysis

Choose the FTB-5240/5240B to analyze systems with up to 512 channels in DWDM testing mode. View trace ID information, including all parameters in the active measurement, in the report window. Use tabs to gain quick access to functions and test results.

- Results tab: speed up reporting with this complete table of results.
- Measurements tab: isolate trace details using a set of markers and zoom functions.
- Alarms tab: track system behavior through a table of threshold alarm details.



OSAs that base their measurements on the IEC method make critical errors. In-band OSNR measurement solves this issue.

## SPECIFICATIONS <sup>a</sup>

<b>Spectral Measurement</b>		<b>FTB-5230</b>	<b>FTB-5240</b>	<b>FTB-5240B</b>
Wavelength range (nm)		1250 to 1650	1250 to 1650	1250 to 1650
Resolution bandwidth FWHM <sup>b, c</sup> (nm)		≤0.1	0.065 <sup>f</sup>	0.033 <sup>f</sup>
Wavelength uncertainty <sup>c, h</sup> (nm)		±0.1 <sup>f</sup>	±0.05	±0.03
		±0.02 <sup>d, f</sup>	±0.015 <sup>d</sup>	±0.015 <sup>d</sup>
Wavelength repeatability <sup>e</sup> (nm)		–	±0.003	±0.003
Wavelength linearity <sup>c</sup> (nm)	typical	–	±0.01	±0.01

## Amplitude Measurement

Dynamic range <sup>c</sup> (dBm)		10 <sup>f</sup> to –60	18 <sup>f</sup> to –75 <sup>g</sup>	18 <sup>f</sup> to –75 <sup>g</sup>
Power uncertainty <sup>i</sup> (dB)		±0.4 <sup>f</sup>	±0.4	±0.4
Optical rejection ratio <sup>c</sup> (dBc)				
at 12.5 GHz (±0.1 nm)	typical			40
	minimum			35
at 25 GHz (±0.2 nm)	typical		40	50
	minimum		35	45
at 50 GHz (±0.4 nm)	typical	40	50	55
	minimum		45	50
at 100 GHz (±0.8 nm)	typical	45		
PDL at 1550 nm (dB)	typical	±0.1	±0.07	±0.07
	maximum	–	±0.15	±0.15
Scanning time (s)		4 (35 nm span, multiple-peak analysis)	<1.5 (35 nm span, full resolution, multiple-peak analysis)	
ORL (dB)		≥40	≥40	≥40

## In-Band OSNR Measurement

		<b>FTB-5240</b>	<b>FTB-5240B</b>
OSNR dynamic range <sup>j</sup> (dB)		>40	>40
Measurement uncertainty (dB)	typical	±0.5	±0.5
Scanning time (min)	typical	<1	<1

## GENERAL SPECIFICATIONS

Temperature		
operating	0 °C to 40 °C	(32 °F to 104 °F)
storage	–20 °C to 50 °C	(–4 °F to 120 °F)
Relative humidity	0 % to 95 % non-condensing	
Connectors	EI (EXFO UPC Universal Interface) EA (EXFO APC Universal Interface)	
Size (H x W x D) (module)	96 mm x 76 mm x 260 mm	(3 3/4 in x 3 in x 10 1/4 in)
Weight (module)	2.2 kg	(4.8 lb)

### Notes

- All specifications are for a temperature of 23 °C ±2 °C with a FC/UPC connector unless otherwise specified, after warmup.
- Full width at half maximum.
- From 1520 nm to 1610 nm.
- After user calibration in the same test session within 10 nm from each calibration point.
- Over 1 minute in Real mode.
- Typical.
- With averaging.
- User calibration may be required.
- At 1550 nm, –10 dBm input.
- For optical noise level > –60 dBm.

ORDERING INFORMATION

FTB-5230-XX	FTB-5240-XX	FTB-5240B-XX
<p><b>Connector * ■</b></p> <p>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</p> <p>EA-EUI-28 = APC/DIN 47256                      EA-EUI-89 = APC/FC narrow key                      EA-EUI-91 = APC/SC                      EA-EUI-95 = APC/E-2000</p> <p>Example: FTB-5240-EI-EUI-89</p> <p>* EXFO Universal Interface is protected by US patent 6,612,750.</p>		

Rugged Handheld Solutions	Platform-Based Solutions
<p><b>OPTICAL</b></p> <ul style="list-style-type: none"> <li>OTDRs</li> <li>OLTSs</li> <li>Power meters</li> <li>Light sources</li> <li>Talk sets</li> </ul> <p><b>COPPER ACCESS</b></p> <ul style="list-style-type: none"> <li>ADSL/ADSL2+, SHDSL, VDSL test sets</li> <li>VoIP and IPTV test sets</li> <li>Ethernet test sets</li> <li>POTS test sets</li> </ul>	<p><b>OPTICAL FIBER</b></p> <ul style="list-style-type: none"> <li>OTDRs</li> <li>OLTSs</li> <li>ORL meters</li> <li>Variable attenuators</li> </ul> <p><b>DWDM TEST SYSTEMS</b></p> <ul style="list-style-type: none"> <li>OSAs</li> <li>PMD analyzers</li> <li>Chromatic dispersion analyzer</li> </ul> <p><b>TRANSPORT AND DATACOM</b></p> <ul style="list-style-type: none"> <li>Next-generation SONET/SDH and OTN testers</li> <li>SONET/DSn (DS0 to OC-192) testers</li> <li>SDH/PDH (64 kbit/s to STM-64) testers</li> <li>T1/T3, E1 testers</li> <li>10/100 Mbit/s and Gigabit Ethernet testers</li> <li>Fibre Channel testers</li> <li>10 Gigabit Ethernet testers</li> </ul>

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