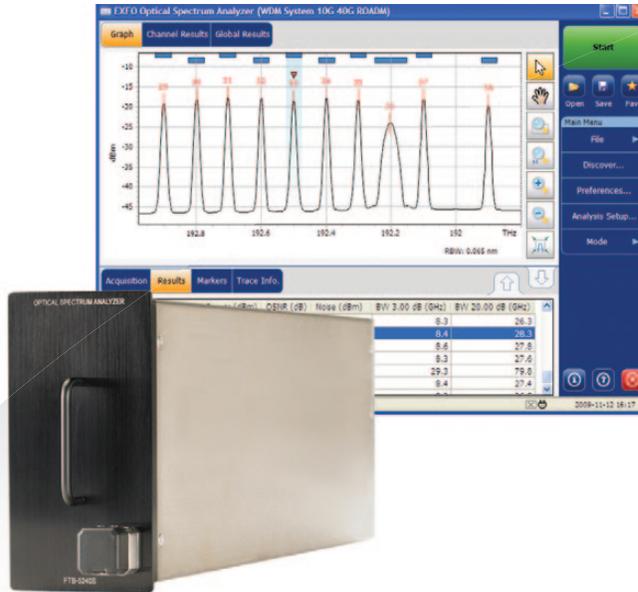


FTB-5240S/BP Optical Spectrum Analyzers



Highly accurate, easy-to-use OSAs for current and next-generation networks

KEY FEATURES

In-band OSNR measurement for 40 Gbit/s and ROADM deployments with the PROS-OSNR breakthrough approach

One-button operation for easy setup and automatic measurement

Truly portable spectral characterization for DWDM network commissioning

Over 90 dB dynamic range per scan

Flexibility to analyze WDM, EDFA, drift, spectral transmittance and DFB laser

High-power option, ideal for multiservice operators and CATV operators



FTB-5240S-BP is protected by US patent 6,636,306 and equivalents in several other countries, as well as published pending application US 2010129074 and equivalents pending in several other countries.

COMPLEMENTARY PRODUCTS



Platform
FTB-500



Compact Platform
FTB-200



Assessing
Next-Gen Networks

SOLUTION FOR NEXT-GENERATION NETWORKS

Consumers and companies around the world require more bandwidth than ever before for data-hungry applications such as video on demand, voice over IP (VoIP), videoconferencing, etc. Accordingly, service providers need to deploy faster and more reliable networks, using novel technologies such as reconfigurable optical add-drop multiplexers (ROADM) or 40G networks.

Reducing downtime in any type of network calls for an accurate measurement of optical signal-to-noise ratio (OSNR), but ROADM and 40 Gbits/s networks present a new and unique challenge as the existing OSNR measurement methods yield incorrect results. EXFO's polarization-resolved optical spectrum OSNR (PROS-OSNR) method is the answer to this new challenge, providing reliable in-band OSNR measurement.

SHARP AND ACCURATE OSNR MEASUREMENT

The IEC subsystem test procedure 61280-2-9 defines OSNR measurement as the power ratio between the peak power and the noise at half the distance between the peaks. Using this method, as shown in figure 1, the noise level at the channel (or peak power) wavelength (N_i) is interpolated from the noise level between the channels ($N(\lambda_i + \Delta\lambda)$ and $N(\lambda_i - \Delta\lambda)$). Figure 2 shows the OSA trace of a DWDM network where the interpolation method can properly troubleshoot the optical layer. However, in ROADM or 40 Gbit/s systems, this method may lead to incorrect results since the noise level between the peaks is no longer directly correlated with the noise level at the channel wavelength. For instance, Figure 3 displays closely spaced 40G signals that require in-band OSNR measurement, since the power level between channels is higher than the actual noise due to channel overlap.

The built-in polarization-resolved optical spectrum method of EXFO's FTB-5240S-P and FTB-5240BP OSAs enables you to achieve accurate in-band OSNR measurements of a ROADM or 40 Gbit/s system directly and automatically.

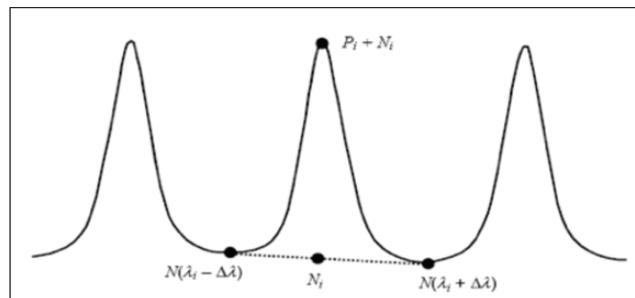


Figure 1: Interpolation method (ref.: IEC 61280-2-9 Ed.2)

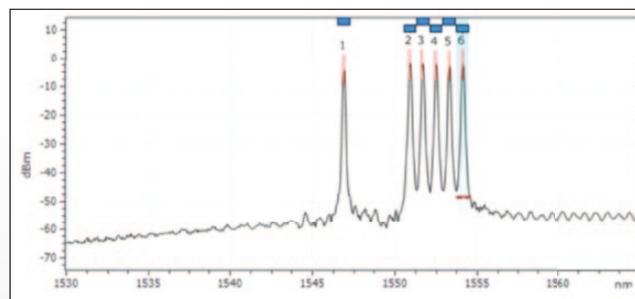


Figure 2: DWDM network suitable for OSNR interpolation method.

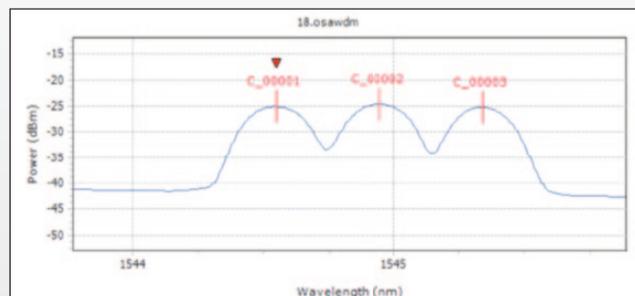


Figure 3: 40G network requiring in-band OSNR measurement.

CHOICE WITHOUT COMPROMISE

The all-new FTB-5240S and FTB-5240BP Optical Spectrum Analyzer (OSA) series covers your DWDM applications and all channel spacings, from 50 GHz DWDM to CWDM. This is what we call “no-compromise performance”, whatever your network specificities and testing requirements.



NIMBLE OSA MEETS SUPERTech PLATFORMS

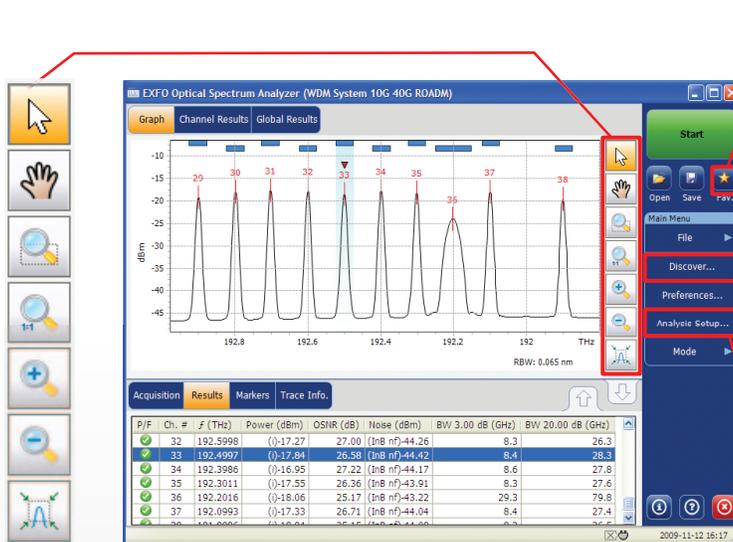
The FTB-5240S OSA test module, housed in either the FTB-500 Platform or the FTB-200 Compact Platform, is purpose-built for fast and accurate dense wavelength-division multiplexing (DWDM) network commissioning and high-speed networking up to 40 Gbit/s.

Housing the FTB-5240S in the FTB-200 platform makes it the smallest, high-performance, portable solution for spectral characterization of next-generation networks on the market. When equipped with in-band OSNR measurement capabilities, this versatile OSA can also be combined with the FTB-8140 Transport Blazer test module to create a unique test solution for commissioning reconfigurable optical add/drop multiplexers (ROADMs), packet optical transport platforms (POT-Ps) and 40 Gbit/s systems.

QUICKER SETUPS—EASIER TESTING

The application software has been designed to optimize all testing operations—boosting productivity.

Easy-to-use zooming capabilities and quick translation of the signal trace.



Favorites button enables direct access to your defined configuration list—right in the field



Discover button automatically adjusts the settings to identify all channels in one easy step. It automatically selects optimal settings for quick system qualification.



Setups and test configurations can easily be defined and stored in the instrument



ADVANCED EDFA ANALYSIS

Since amplifiers are critical elements in all networks, it is crucial to ensure that they are optimized, that the gain is well-distributed and that the output power is flat. Now, you can further optimize EDFAs by measuring key parameters such as gain per channel, noise figure, gain flatness, gain slope, etc. More importantly, you can save and print this precious information.

DRIFT MEASUREMENTS

You can now monitor power, wavelength and OSNR over time. Follow the evolution of these critical parameters, set relative or absolute thresholds and get alarm notifications when they are crossed. You can also view the current and historical status of all channels in a single view called the dashboard and view the WDM trace of any acquisition that displays a change of state (i.e., when a threshold is crossed).



ACCURATE SPECTRAL TRANSMITTANCE

With the advent of larger spectral content through the implementation of 40G and 100G, knowing the bandwidth of any given filter and the residual network bandwidth guarantees proper transmission. The new Spectral Transmittance software feature now compares the filtered wavelength to the nominal one, showing insertion loss, channel isolation and bandwidth at different power levels.

IN-DEPTH DFB LASER ANALYSIS

Make sure your transmitters are within specifications. With the DFB Laser Analysis feature, you can now characterize a DFB laser source for central wavelength, peak power, bandwidth, side-mode suppression ratio (SMSR) and much more.



FASTER IS ALWAYS BETTER

Testing speed is critical, which is why EXFO's FTB-5240S and FTB-5240BP OSAs can complete a scan and display the results in less than one second—that's fast enough for highly efficient network element adjustments on the go.

HIGH-POWER OPTION

With today's high-power signals making their way into the DWDM space, it is critical to have an OSA that can measure them accurately without risking damaging your test equipment. The FTB-5240S matches this need, offering a high-power option (FTB-5240S-HPW) allowing up to +23 dBm input power per channel. The option is available with or without the in-band capability.

SPECIFICATIONS ^a

SPECTRAL MEASUREMENT		
	FTB-5240S and FTB-5240S-P	FTB-5240BP
Wavelength range (nm)	1250 to 1650	1250 to 1650
Wavelength uncertainty (nm) ^b	±0.05 ±0.01 ^{c, d}	±0.03 ±0.01 ^{c, d}
Reference	Internal ^e	Internal
Resolution bandwidth (FWHM) (nm) ^f	0.065 ^{b, d}	0.033 ^{b, d}
Wavelength linearity (nm)	±0.01 ^{b, d}	±0.01 ^{b, d}
Wavelength repeatability 2 σ (nm)	±0.003 ^g	±0.002 ^g

POWER MEASUREMENT			
	FTB-5240S and FTB-5240S-P	FTB-5240BP	HPW Option
Dynamic range (dBm) (per channel) ^b	-80 ^h to +18	-80 ^h to +18	-70 ^h to +23
Maximum total safe power (dBm)	+23	+23	+29
Absolute power uncertainty (dB) ⁱ	±0.5	±0.5	±0.5
Power repeatability 2 σ (dB) ^{d, g}	±0.05	±0.04	±0.05

OPTICAL MEASUREMENT			
	FTB-5240S and FTB-5240S-P	FTB-5240BP	HPW Option
Optical rejection ratio at 1550 nm (dB) at 0.2 nm (25 GHz) at 0.4 nm (50 GHz)	35 (40 typical) 45 (50 typical)	45 (50 typical) 50 (55 typical)	35 (40 typical) 45 (50 typical)
Channel spacing	50 to 200 GHz CWDM	12.5 to 200 GHz CWDM	50 to 200 GHz CWDM
PDL at 1550 nm (dB)	±0.08 ^d	±0.06 ^d	
ORL (dB)	≥40	≥40	
Measurement time (s) ^{d, j} (includes scanning, analysis and display)	<1 (with the FTB-500 Platform)	<1 (with the FTB-500 Platform)	

IN-BAND OSNR MEASUREMENT ^{d, k}		
	FTB-5240S-P only	FTB-5240BP
OSNR dynamic range (dB)	>35 ^l	>35 ^l
OSNR measurement uncertainty (dB)	±0.5 ^m	±0.5 ^m
Repeatability (dB)	±0.2 ⁿ	±0.2 ⁿ
Data signals	Up to 100 Gbit/s ^o	Up to 100 Gbit/s ^o
Measurement time (s) ^{d, j} (includes scanning, analysis and display)	<6 (eight scans)	<6 (eight scans)
Analysis modes	WDM, EDFA, drift, spectral transmittance, DFB	WDM, EDFA, drift, spectral transmittance, DFB

Notes

- All specifications are for a temperature of 23 °C ± 2 °C with an FC/UPC connector unless otherwise specified, after warm-up.
- From 1520 to 1610 nm.
- After user calibration in the same test session within 10 nm from each calibration point.
- Typical.
- Integrated and wavelength-independent self-adjustment.
- Full width at half maximum.
- Over one minute in continuous acquisition mode.
- With averaging.
- At 1550 nm, -10 dBm input.
- 45 nm span, full resolution, 20 peak analysis.
- In-band OSNR measurement performed with 64 scans.
- For an optical noise level of > -60 dBm.
- With PMD ≤15 ps and no crosstalk, uncertainty specification is valid for OSNR ≤ 25 dB. With PMD ≤15 ps and crosstalk, uncertainty specification is valid for OSNR ≤ 20 dB.
- Repeatability specification is valid for OSNR ≤ 25 dB.
- Except for pol-mux and fast polarization scrambled signals.

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
Battery life (hours)		5 (with the FTB-500 Platform)
Connectors		EI (EXFO UPC Universal Interface) EA (EXFO APC Universal Interface)
Size (H x W x D)	FTB-5240S module	96 mm x 51 mm x 260 mm (3 3/4 in x 2 in x 10 1/4 in)
	FTB-5240BP module	96 mm x 76 mm x 260 mm (3 3/4 in x 3 in x 10 1/4 in)
Weight	FTB-5240S module	1.5 kg (3.3 lb)
	FTB-5240BP module	1.7 kg (3.8 lb)

SELECTION GUIDE				
OSA Module	CWDM	DWDM (100 GHz spacing)	DWDM (50 GHz spacing)	ROADM + 40 Gbit/s network
FTB-5240S	X	X	X	
FTB-5240S-P	X	X	X	X
FTB-5240BP	X	X	X	X

LASER SAFETY

21 CFR 1040.10 AND IEC 60825-1
CLASS 1 LASER PRODUCT

ORDERING INFORMATION

FTB-5240S-XX-XX-XX

Model

FTB-5240S = Optical spectrum analyzer
 FTB-5240S-P = Optical spectrum analyzer with polarization controller
 FTB-5240S-HPW = Optical spectrum analyzer with high-power option
 FTB-5240S-P-HPW = Optical spectrum analyzer with polarization controller and high-power option

Connector adapter *

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

Software option *

00 = Without software option
 InB = With In-Band OSNR software

Example: FTB-5240S-P-HPW-EI-EUI-89-InB

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

FTB-5240BP-XX

Model

FTB-5240BP = High resolution optical spectrum analyzer

Connector adapter *

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-5240BP-EI-EUI-89

Note

a. Available with FTB-5240S-P and FTB-5240S-P-HPW only; available with FTB-200 Compact Platform only.

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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. Contact EXFO for prices and availability or to obtain the phone number of your local EXFO distributor.

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