FTB-5240S/BP Optical Spectrum Analyzers

WDM AWARE™ TECHNOLOGY

EXFO Connect Compatible

40G

FROST & SULLIVAN 2011 BEST PRACTICES AWARD
GLOBAL PORTABLE FIBER OPTIC TEST EQUIPMENT MARKET SHARE LEADERSHIP AWARD

SPEC SHEET

Highly accurate, easy-to-use intelligent optical spectrum analyzers (OSAs) for current and next-generation networks.

KEY FEATURES

- Intelligent in-band OSNR measurement for 40 Gbit/s and ROADM deployments
- WDM-Aware technology: per-channel optimized setup for accurate results, all the time
- Automatic impairment identification for faster troubleshooting
- Compliant with Recommendaton ITU-T G.697
- One-button operation for easy setup and automatic measurement
- Truly portable spectral characterization for DWDM network commissioning
- EXFO Connect-compatible: automated asset management
- Over 90 dB dynamic range
- Flexibility to analyze WDM, EDFA, drift, spectral transmittance, and Fabry-Perot and DFB laser
- High-power option, ideal for multiservice operators and CATV operators

PLATFORM COMPATIBILITY

Platform
FTB-500

Compact Platform
FTB-200

EXFO | 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/100G networks.

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

The IEC subsystem test procedure 61280-2-9 defines the OSNR measurement as the power ratio between the peak power and the noise at half the distance between the peaks. 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. However, the built-in WDM-Aware technology 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.

WDM-AWARE TECHNOLOGY

- Intelligent setup and analysis on a per-channel basis based on the bit rate, modulation scheme, as well as the network configuration experienced by the wavelength (ROADM, filters, etc.)
- First time right: no guesswork, which eliminates truck rolls
- Training time is significantly reduced as this ready-to-go unit can be taken directly into the field for the live EXFO DWDM experience
- Most accurate and adaptive in-band method on the market

CHOICE WITHOUT COMPROMISE

The FTB-5240S and FTB-5240BP Optical Spectrum Analyzer (OSA) series covers your DWDM applications and all channel spacings, from 25 GHz DWDM to CWDM. This is what we call "no-compromise performance," whatever your network specificities and testing requirements.

NIMBLE OSA MEETS SUPERTECH PLATFORMS

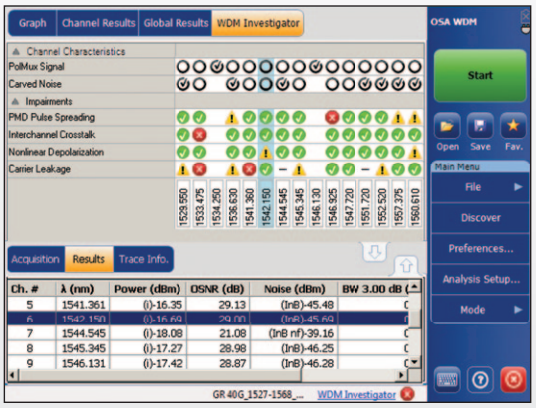
The FTB-5240S OSA test module, housed in either the FTB-500 Platform or the FTB-200 Compact Platform, is purpose-built for fast and accurate dense wavelength-division multiplexing (DWDM) network commissioning and high-speed networking up to 40 Gbit/s.

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 40/43 Gigabit SONET/SDH/OTN 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.

IMPAIRMENT IDENTIFICATION FOR FASTER TROUBLESHOOTING

Operators want to reduce their OPEX, yet WDM networks are becoming increasingly complex, with new technologies being deployed (tighter channel spacing, polarization-multiplexed signals, etc.) that increase the number of potential causes for failure. While past impairment types were relatively few and well-known (excessive loss, high dispersion, excessive ASE noise, etc.), these newly deployed technologies give rise to previously uncommon impairments, such as crosstalk and non-linear effects. As such, telecommunications companies need to find ways to identify these impairments and their impact on signal degradation.

This is now possible with EXFO's WDM Investigator, which provides detailed information about the signal and noise for each channel. This efficient impairment identification makes it possible to pinpoint the defective component more rapidly, thus decreasing troubleshooting time and OPEX. The WDM Investigator



provides information on link characteristics, such as the presence of polarization-multiplexed signals or the presence of carved noise due to filters or ROADMs. It also checks the presence of several types of impairments (crosstalk, non-linear effects, carrier leakage and PMD pulse spreading), and gives an assessment of their severity (OK, warning, risk).

PAYBACK IN JUST A FEW TICKETS

A single unsuccessful troubleshooting ticket can cost astronomical amounts. Each truck roll costs approximately $200 to $300 per hour for the truck, equipment and technician alone. Replacing the wrong 40G transmitter card will amount to another $10 000 or more, and service-level-agreement (SLA) penalties, which can take effect as early as one hour after failure of business services, cost around $10 000 per hour, per channel. Add it all up, and a single troubleshooting ticket can cost between $20 000 and $30 000. The WDM Investigator helps avoid lengthy troubleshooting, and pays for itself in just a few tickets.

POWERFUL FEATURES FOR SIMPLE NETWORK TESTING

The application software of the FTB-5240S/BP OSAs has been designed to optimize all testing operations–boosting productivity.

Favorites Button

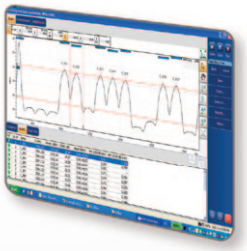
The Favorites button enables direct access to your defined configuration list–right in the field.

i-in-Band

Intelligent setup and analysis on a per-channel basis based on the bit rate, modulation scheme, as well as the network configuration experienced by the wavelength (ROADM filters, etc.).

Referencing

Deploy and commission your network right from day one. Then, as maintenance, upgrades and troubleshooting occur, compare the latest measurement with the original ones. Rapidly and directly see all changes, those made on purpose and otherwise.



General and Specific

Have all of the DWDM results as well as manual specific information supplied by up to four markers directly available on a single screen. No more toggling between pages to perform full analysis.

SCPI Commands

It is now possible to control the OSA remotely with a full-featured WDM mode SCPI command set.

Print to PDF

Generate a PDF report directly from the unit, making it much quicker and easier to convert reports into an e-mail-friendly format.

Intuitive On-Graph Peak Detection Threshold

Clearly see and differentiate between the signal and the noise. Analyze only that which merits analysis, no more false-peak analysis or low-power peaks ignored.

Note

Advanced features available as options with the FTB-200 platform.

Drift Measurements

You can monitor power, wavelengths 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 visualize the current and historical status of all channels in a single interface called drift dashboard, which enables you to view the WDM trace of any acquisition that displays a change of state (i.e., when a threshold is crossed). You can also build a drift trace from a past DWDM acquisition.

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 and gain slope. More importantly, you can save and print this valuable information.

Accurate Spectral Transmittance

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

Laser Analysis

Make sure that your transmitters are within specifications. With the DFB Laser Analysis feature, you can characterize a DFB laser source for central wavelength, peak power, bandwidth, SMSR, and much more. Automatically characterize Fabry-Perot lasers for central wavelength, RMS width and full-width half-max (FWHM).

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 these signals accurately without risking damage to 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.

FTB-200
THE INTELLIGENT
PLATFORM BUILT
FOR THE SUPERTECH

FTB-500
BOUNDLESS.
CAPABILITIES.
TESTING UNLIMITED.

| WINDOWS ENVIRONMENT | MODULARITY | BUILT-IN APPLICATIONS | THIRD-PARTY APPLICATIONS |
| TOUCHSCREEN | FIELD-MINDED RUGGEDNESS | WIRELESS CONNECTIVITY | USB | WI-FI | BLUETOOTH |

Note
Advanced features available as options with the FTB-200 platform.

EXFO Connect

EXFO Connect

AUTOMATED ASSET MANAGEMENT. GET CONNECTED.

EXFO Connect pushes and stores test equipment automatically in the cloud, allowing you to streamline test operation from build-out to maintenance.

EXPERT TEST TOOLS ON THE FTB-200 PLATFORM

EXpert Test Tools is a series of platform-based software testing tools that enhance the value of the FTB-200 platform, providing additional testing capabilities without the need for additional modules or units.

EXpert TEST TOOLS

EXpert VoIP TEST TOOLS

EXpert VoIP generates a voice-over-IP call directly from the test platform to validate performance during service turn-up and troubleshooting.

› Supports a wide range of signaling protocols, including SIP, SCCP, H.248/Megaco and H.323

› Supports MOS and R-factor quality metrics

› Simplifies testing with configurable pass/fail thresholds and RTP metrics

EXpert IPTV TEST TOOLS

EXpert IP integrates six commonly used datacom test tools into one platform-based application to ensure that field technicians are prepared for a wide range of testing needs.

› Rapidly performs debugging sequences with VLAN scan and LAN discovery

› Validates end-to-end ping and traceroute

› Verifies FTP performance and HTTP availability

EXpert IPTV TEST TOOLS

This powerful IPTV quality assessment solution enables set-top-box emulation and passive monitoring of IPTV streams, allowing quick and easy pass/fail verification of IPTV installations.

› Real-time video preview

› Analyzes up to 10 video streams

› Comprehensive QoS and QoE metrics including MOS score

Note

Advanced features available as options with the FTB-200 platform.

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 2σ (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 2σ (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	25 to 200 GHz CWDM	12.5 to 200 GHz CWDM	25 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, BP	WDM, EDFA, drift, spectral transmittance, DFB

Notes

a. All specifications are for a temperature of 23 °C ± 2 °C with an FC/UPC connector unless otherwise specified, after warm-up.
b. From 1520 to 1610 nm.
c. After user calibration in the same test session within 10 nm from each calibration point.
d. Typical.
e. Integrated and wavelength-independent self-adjustment.
f. Full width at half maximum.
g. Over one minute in continuous acquisition mode.
h. With averaging.
i. At 1550 nm, –10 dBm input.
j. 45 nm span, full resolution, 20 peak analysis.
k. In-band OSNR measurement performed with 64 scans.
l. For an optical noise level of > –60 dBm.
m. 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.
n. Repeatability specification is valid for OSNR ≤ 25 dB.
o. 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 % noncondensing
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 ¾ in x 2 in x 10 ¼ in)
	FTB-5240BP module	96 mm x 76 mm x 260 mm (3 ¾ in x 3 in x 10 ¼ 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

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
Adv = Enables advanced measurement mode [a]
InB = With WDM Aware technology [b]
Inv = Enables the WDM Investigator [c]

Example: FTB-5240S-P-HPW-EI-EUI-89-InB
* EXFO Universal Interface is protected by US patent 6,612,750.

FTB-5240BP-XX-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

Software option
Adv = Enables advanced measurement mode [d]
InB = With WDM Aware technology [d]
Inv = Enables the WDM Investigator

Example: FTB-5240BP-EI-EUI-89-Adv-InB-Inv

Notes

a. Available with FTB-200v2 Compact Platform only.
b. Available with FTB-5240S-P and FTB-5240S-P-HPW only.
c. Available only if InB is enabled.
d. Always included.

LASER SAFETY

Class 1 laser product in compliance with standards IEC 60825-1: 2007 and 21 CFR 1040.10.
Laser radiation may be encountered at the output port.

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