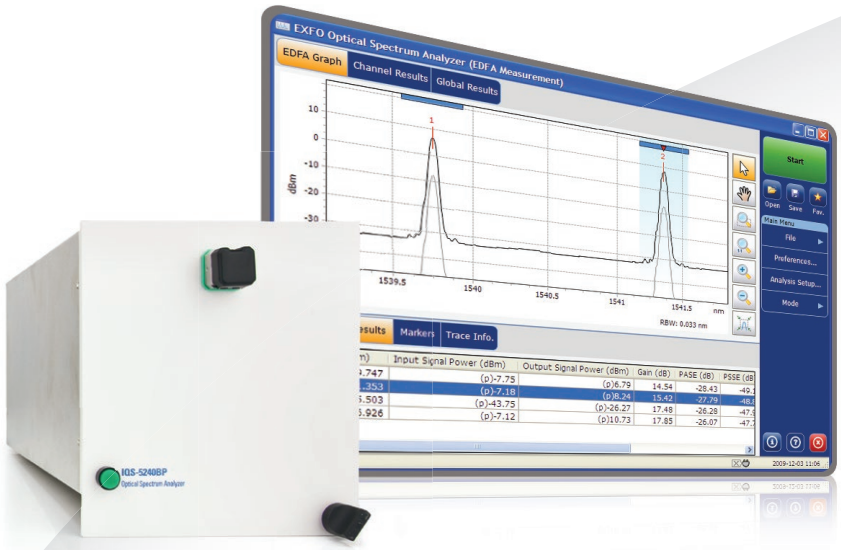
IQS-5240S-P/BP Optical Spectrum Analyzers



WDM AWARE™ TECHNOLOGY

100G

FROST & SULLIVAN
2012 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

- Pol-Mux OSNR measurement capability for 40G and 100G coherent signals, compliant with the IEC 61282-12 standard (under revision)
- Flexibility to analyze WDMs, EDFAs, drift, spectral transmittance, FP and DFB lasers
- Automatic impairment identification for faster troubleshooting
- Compliant with Recommendation ITU-T G.697
- Fast, accurate scans—no compromise on dynamic range or resolution bandwidth
- GPIB or LAN remote control using SCPI commands
- One-button operation for easy setup and automatic measurement

COMPLEMENTARY PRODUCTS

Platform
IQS-600

High-Speed Multiservice Test Module
IQS-88100NGE Power Blazer

EXFO

UNIQUE POL-MUX OSNR MEASUREMENT TECHNOLOGY

OSNR has long been recognized as a key performance indicator in wavelength-division multiplexing (WDM) networks, because it provides a multichannel assessment of signal quality in a very short period of time. In addition, OSNR can predict bit error rate (BER) within just a few minutes, while typical BER tests must run for hours or days.

The IEC 61280-2-9 standard defines OSNR measurement as the power ratio between the signal 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, because the noise level between the peaks is no longer directly correlated with the noise level at the channel wavelength. EXFO's in-band OSNR is the answer to this challenge.

WDM AWARE™
POL-MUX TECHNOLOGY

For Pol-Mux signals at 40G and 100G, neither the IEC nor the in-band method work. This calls for a new measurement method: Pol-Mux OSNR.

FIRST POL-MUX OSA IN THE MARKET

EXFO's Pol-Mux OSA is the first third-party instrument for Pol-Mux OSNR measurements that is not limited to any specific system vendor. The new commissioning assistant, which is the key feature of the new Pol-Mux OSA, is perfect for Pol-Mux OSNR measurements during turn-up. Based on the channel shutdown method, it provides highly accurate amplified spontaneous emission (ASE) OSNR measurements.

The commissioning assistant can be utilized after the user has first taken a measurement at the receiver with all of the channels turned on, and then acquired a series of traces, each taken with one channel turned off. The Pol-Mux OSA then performs the Pol-Mux OSNR calculations via a user-friendly wizard.

The commissioning assistant therefore greatly accelerates OSNR measurements based on the channel shutdown method, and drastically reduces potential human errors. In addition, two standards-compliant calculation approaches are available in the commissioning assistant: one compliant with the IEC-61282-12 standard (under revision), and the other compliant with the China Communications Standards Association (CCSA) method YD/T 2147-2010.

IMPAIRMENT IDENTIFICATION FOR FASTER TROUBLESHOOTING

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 nonlinear effects.

This is now possible with EXFO's WDM Investigator, which provides detailed information about the signal and noise for each channel. 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).

HIGH RESOLUTION FOR DENSE SIGNAL ANALYSIS

With 33 pm (or ~4.5 GHz) resolution bandwidth defined as the FWHM of the OSA filter shape, the IQS-5240BP can analyze all densely spaced signals, including important 25 GHz ITU-grid WDM signals, and any high-speed modulated lasers/emitters.

Combined with a very sharp rejection ratio (–35 dBc at 0.1 nm), the optical signal-to-noise ratio (OSNR) and modulated band profile can be measured with high accuracy. To ensure accurate noise and broad signal power measurements, the noise-equivalent bandwidth (NEB) of the OSA is calibrated at many points from 1250 nm to 1650 nm.

ANALYZE ANY WDM NETWORK

The IQS-5240S-P/BP OSA series covers your DWDM applications and all channel spacings from 12.5 GHz DWDM to CWDM. This is what we call “no-compromise performance,” whatever your network specificities and testing requirements may be.

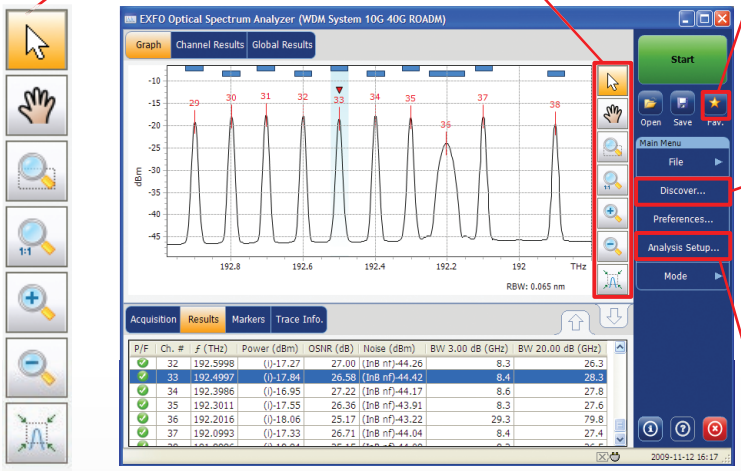
FLEXIBLE AND POWERFUL AUTOMATION

Thanks to the IQS-600 platform’s Windows-based open architecture and Ethernet connectivity, the IQS-5240S-P/BP OSA test modules can be easily controlled remotely using SCPI commands.

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...

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

Analysis Setup...

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

DRIFT MEASUREMENTS

You can 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 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).

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 Spectral Transmittance software feature 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 characterize a DFB laser source for central wavelength, peak power, bandwidth, side-mode suppression ratio (SMSR) and much more.

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.

EXFO

SPECIFICATIONS [a]

SPECTRAL MEASUREMENT

	IQS-5240S and IQS-5240S-P	IQS-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

	IQS-5240S and IQS-5240S-P	IQS-5240BP
Dynamic range (dBm) (per channel) [b]	−80 [h] to +18	−80 [h] to +18
Maximum total safe power (dBm)	+23	+23
Absolute power uncertainty (dB) [i]	±0.5	±0.5
Power repeatability 2σ (dB) [d, g]	±0.05	±0.04

OPTICAL MEASUREMENT

	IQS-5240S and IQS-5240S-P	IQS-5240BP
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)
Channel spacing	25 to 200 GHz CWDM	12.5 to 200 GHz CWDM
PDL at 1550 nm (dB)	±0.08 [d]	±0.06 [d]
ORL (dB)	≥40	≥40

IN-BAND OSNR MEASUREMENT [d, j]

	IQS-5240S-P only	IQS-5240BP
OSNR dynamic range (dB)	>35 [k]	>35 [k]
OSNR measurement uncertainty (dB)	±0.5 [l]	±0.5 [l]
Repeatability (dB)	±0.2 [m]	±0.2 [m]
Data signals	Up to 100 Gbit/s [n]	Up to 100 Gbit/s [n]
Measurement time (s) [d, o] (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

POL-MUX OSNR MEASUREMENT

	Commissioning assistant [q]
Modulation formats	Any, including Pol-Mux formats DP-QPSK and DP-BPSK
Data signals	Up to 400 Gbit/s
Measurements time [d, p]	1 minute and 20 seconds (100 scans) for trace with all channels on. <5 seconds for traces with a single channel off.

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. In-band OSNR measurement performed with 64 scans.
k. For an optical noise level of > −60 dBm.
l. With PMD ≤15 ps and no crosstalk, uncertainty specification is valid for OSNR ≤ 25 dB.
m. Repeatability specification is valid for OSNR ≤ 25 dB.
n. Except for Pol-Mux and fast polarization scrambled signals.
o. 45 nm span, full resolution, 20 peak analysis.
p. 1525 nm to 1570 nm.
q. Data acquisition and analysis available on FTB-500 and FTB-2 Pro. On FTB-200v2, data acquisition on the platform and data analysis on PC

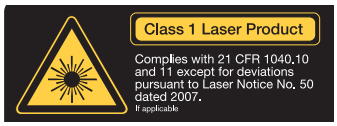
GENERAL SPECIFICATIONS

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
Connectors	EI (EXFO UPC Universal Interface) EA (EXFO APC Universal Interface)
Size (H x W x D)	
IQS-5240S module	125 mm x 112 mm x 282 mm (4 15/16 in x 4 7/16 in x 11 1/8 in)
IQS-5240BP module	125 mm x 112 mm x 282 mm (4 15/16 in x 4 7/16 in x 11 1/8 in)
Weight	
IQS-5240S module	1. 5 kg (3.3 lb)
IQS-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
IQS-5240S	X	X	X	
IQS-5240S-P	X	X	X	X
IQS-5240BP	X	X	X	X

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.

ORDERING INFORMATION

IQS-5240S-NS1623-XX-XX-ADV-XX

Polarization controller option
00 = Without polarization controller
P = With polarization controller

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 [a]
InB = Enables the in-band OSNR option [b]
Inv = Enables the WDM Investigator option [b, c]
Com = Enables the commissioning assistant option [b]

Example: IQS-5240S-NS1623-P-EI-EUI-89-Adv-InB

IQS-5240BP-NS1594-XX-ADV-XX

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 [a]
InB = Enables the in-band OSNR option [a]
Inv = Enables the WDM Investigator option
Com = Enables the commissioning assistant option

Example: IQS-5240BP-NS1594-EI-EUI-89-Adv-InB

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

Notes

a. Always included.
b. Available with IQS-5240S-P only.
c. Requires InB enabled.

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