

OSA20

- The OSA20 is a fast optical spectrum analyzer based on diffraction grating and designed for both R&D and production environments.



KEY FEATURES AND BENEFITS

Spectral range: 1250–1700 nm (240 - 176 THz)

Resolution bandwidth: 20 pm (2.5 GHz)

Sweep speed: 2000 nm/s

Wavelength accuracy: ± 10 pm (1.25 GHz)

Built-in calibration source

Intuitive user interface

12-inch touchscreen

Remote operation: Ethernet, GPIB, USB-B

8 application-oriented analysis modes

Full suite of analysis tools

The OSA20 is the most practical, high performance optical spectrum analyzer (OSA) on the market today. It is the fastest OSA based on diffraction grating that operates in the 1250 to 1700 nm range. Designed around the renowned filter technology, the OSA20 provides a fast, accurate, high dynamic range scan, eliminating compromises of conventional instruments. It is also the first OSA of its type to incorporate a touch sensitive display with multitouch gesture control.

FAST

The OSA20 is the fastest OSA of its kind with a maximum sweep speed of 2000 nm/s. It uses a fixed monochromator bandwidth of 20 pm and a fixed sampling resolution of 2 pm for all scans. This means every measurement is taken at the highest resolution and the highest accuracy. Sweep speed is determined solely by the choice of the sensitivity level.

The sweep speed defines the sweep time over a user defined span whereas the sweep rate defines the complete sweep cycle over this span. Typical sweep data for a sensitivity level of -60 dBm at center wavelength of 1475 nm (without analysis) is provided below.

| SWEEP SPEED | | | |
|-----------------------|------------|------------|----------|
| Sweep/Span at -60 dBm | Sweep time | Sweep rate | # points |
| Sweep cycle / 1 nm | 1.6 ms | 110 ms | 501 |
| Sweep cycle / 10 nm | 14.2 ms | 142 ms | 5001 |
| Sweep cycle / 100 nm | 131 ms | 300 ms | 50,001 |
| Sweep cycle / 450 nm | 640 ms | 890 ms | 225,001 |

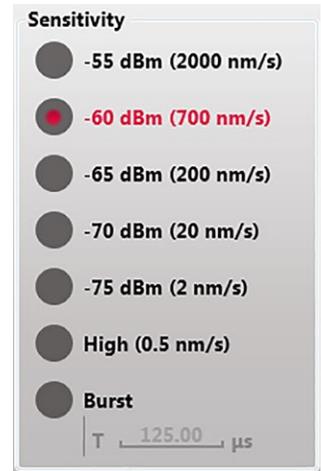


Figure 1. Sweep speed

The burst sensitivity is adapted to burst signals and dedicated to GPON measurements. The duty cycle must be in the range 2-100 % with a period between 124 and 2001 μ s.

ACCURATE

Wavelength

The opto-mechanic design of the OSA20 guarantees excellent wavelength repeatability and uniform performance over the full wavelength range from 1250 to 1700 nm. Combined with an internal acetylene gas cell, this provides unparalleled wavelength accuracy.

- Absolute wavelength accuracy:
 - ± 10 pm over 1500-1640 nm
 - ± 25 pm over 1250-1700 nm
- Wavelength repeatability: ± 2 pm

Monochromator

EXFO filter technology is used to create a monochromator with extremely sharp edges and an extremely low level of stray light. These are key parameters to obtain highly resolved measurements in combination with a high dynamic range. The dynamic range in the vicinity of the filter curve is commonly called optical rejection ratio (ORR).

- ORR ≥ 55 dB beyond ± 0.1 nm from the peak
- Stray light suppression ratio ≥ 73 dB

In addition to the native bandwidth of around 20 pm, the spectral resolution bandwidth is adjustable. You can select the desired spectral resolution bandwidth:

- From 50 to 2000 pm with a 1 pm step on the abscissa in nm
- From 6 to 400 GHz with a 0.1 GHz step on the abscissa in THz

Optical power

The monochromator optics is achromatic, enabling accurate power measurements over the full wavelength range.

Level/Wavelength flatness:

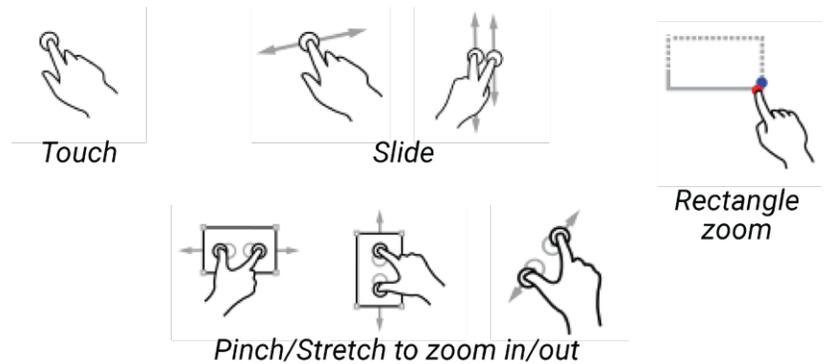
- ± 0.15 dB over 1500-1640 nm
- ± 0.25 dB over 1250-1700 nm

EASY TO USE

Multitouch gesture control

The OSA20 is operated through its 12 inch capacitive touchscreen with multitouch gesture control, an industry first. This allows very fast navigation as well as intuitive scrolling and zooming.

Keyboard and mouse control are also available through the USB interfaces.



EFFICIENT ANALYSIS

Built-in analysis modes

The OSA20 integrates one general operation mode and various built-in application-oriented analysis modes. Each mode has a full suite of analysis tools.

OSA – Optical spectrum analyzer (general)

General operation mode containing most of the analysis tools available on the OSA20.

WDM – Wavelength division multiplexing

This mode is for transmission system analysis: characterization of WDM signals such as coarse WDM, dense WDM and ROADMs.

MML – Multimode laser

Characterization of multiple-longitudinal mode lasers, such as Fabry-Perot laser diodes.

RLT – Recirculating loop transmission

This mode is a special version of WDM that takes into account long distance transmission system analysis with a recirculating loop.

OFA – Optical fiber amplifier

Characterization of optical fiber amplifiers such as erbium doped fiber amplifier.

SML – Single mode laser

Characterization of single mode lasers such as distributed feedback Bragg laser diodes and external cavity lasers.

BBS – Broadband source

Characterization of broadband sources such as semiconductor, Raman or fiber optical amplifiers and superluminescent or edge-emitting LED.

PCT – Passive component tester

Characterization of passive components such as optical filters, isolators or fibers.

FUNCTIONS

| | |
|---------------------|---|
| Scan measurement | Autoset, single, continuous Manual or triggered scan Sensitivity from -75 dBm to -55 dBm, with an additional sensitivity level dedicated to burst signals Adjustable resolution bandwidth |
| Traces | 8 traces Traces types: store, live, average, rolling average, hold min./max., calculate (+ and - lin and - log) Commands: save, load, copy, paste, display/hide |
| Analysis parameters | Auto analysis, noise level, analysis on a selected area of the graph |
| Analysis tools | Peak trough search, spectral width, xdB width, λ mean, λ peak, λ center and σ , FWHM, side modes spacing, Notch width, SMSR, OSNR, ripple, optical power, peak power density, channel detection, loss measurements, pass band test, stop band test |
| Graph display | 4 markers Multiple zoom commands and graphical display items |
| Data handling | Saving/loading: settings, analysis results, screenshots Commands: save, load, copy, paste 256 Go storage on internal drive |
| Other | Autocalibration, remote control |

MODERN INTERFACE

The connectors are located on the right panel of the instrument for easy access.

- To connect devices such as keyboard and mouse, a USB key or disk to export your measurement results, or an external multi-touch screen: 2 USB 3.0-A ports and 4 USB 2.0-A ports (2 on the front panel)
- To remotely control the instrument: 1 USB 2.0-B port, 1 GPIB port and 2 Ethernet ports
- To connect an external screen: you can choose from HDMI, DVI or VGA
- To synchronize scans with a signal: trigger in and out connectors

Rackmount kit

EXFO has designed a special rackmount that enables integrating the OSA20 into a test system for manufacturing. It is a self-supporting assembly of 19 inch width and 8U height.

The kit can be ordered in addition to the OSA20.



Connector cleaning

To maintain the lowest losses and easy maintenance, optical connectors are mounted on a plate that you can unscrew to clean them easily, as shown in the illustration.



| SPECIFICATIONS | | | |
|--------------------|--|---|---|
| Wavelength | Spectral range | 1250-1700 nm / 239.834-176.349 THz | |
| | Span range | 0.5 nm to full range (450 nm) | |
| | Linearity $2\sigma^a$ | ± 6 pm over 1500-1640 nm, ± 20 pm over full range | |
| | Accuracy $2\sigma^a$ | ± 10 pm over 1500-1640 nm, ± 25 pm over full range | |
| | Repeatability 2σ | ± 2 pm / 0.25 GHz at 1550 nm | |
| | Sampling resolution | 2 pm / 0.25 GHz at 1550 nm | |
| | Sampling points | 251 (span of 0.5 nm) to 225,001 (span of 450 nm) | |
| | Reference | Built-in ELED (safety class 1) + Acetylene cell (user calibration by patchcord) | |
| Monochromator | Resolution bandwidth ^{b, c, d} | 20 pm native (20 pm = 2.5 GHz), adjustable over 50–2000 pm with 1 pm step | |
| | Dynamic range (ORR) ^e | ≥ 30 dB (> 35 dB typ.) beyond ± 50 pm from peak ≥ 50 dB (> 55 dB typ.) beyond ± 100 pm from peak ≥ 60 dB (> 63 dB typ.) beyond ± 200 pm from peak | |
| | Stray light suppression ratio ^f | ≥ 73 dB | |
| Optical power | Input power per channel | ≤ 20 dBm | |
| | Total safe power | ≤ 25 dBm | |
| | Level sensitivity ^g | Single scan | High (0.5 nm/s): < -76 dBm (-78 dBm typ.) |
| | | With averaging (Avg Nb of scans) ^h | High (0.5 nm/s): -80 dBm (Avg 3), -85 dBm (Avg 30), -90 dBm (Avg 380) -75 dBm (2 nm/s): -80 dBm (Avg 7), -85 dBm (Avg 70), -90 dBm (Avg 800) |
| | Absolute level accuracy ^{a, i} | ± 0.4 dB at 1310 nm and 1550 nm | |
| | Level linearity ^j | ± 0.07 dB over the full range (input level -50 to 3 dBm) | |
| | Level/wavelength flatness ^k | ± 0.15 dB over 1500-1640 nm, ± 0.25 dB over 1260-1680 nm | |
| Level sampling | ± 0.01 dB over -60 to 20 dBm | | |
| Sweep speed | Sensitivity ^g | -55 dBm at 2000 nm/s to -75 dBm at 2 nm/s | |
| | Sweep cycle/100 nm ^l | 300 ms typ. | |
| | Sampling rate | 1 MHz typ. | |
| Optical interfaces | Optical input | SMF-28 type fiber | |
| | Calibration output | Wavelength reference (see above) | |
| | Connector of input and output | FC/APC or FC/PC or SC/APC or SC/PC | |
| | Return loss | > 38 dB (> 42 dB typ.) at 1310 nm and at 1550 nm (APC connector) | |

a. After user calibration performed after 1 hour warm-up time.

b. Native 17-24 pm over 1500-1620 nm (except in -55 dBm sensitivity), 17-26 pm over 1250-1700 nm.

c. Adjustable resolution bandwidth is calculated from the native bandwidth.

d. Adjustable over 6-400 GHz with 0.1 GHz step on the abscissa in THz.

e. HeNe laser at 1523 nm with ± 2 nm span.

f. Laser at 1523 nm with ± 50 nm span, excluding ± 2 nm around peak.

g. Noise level of 99 % of all data points over 1520-1620 nm.

h. Typical values.

i. Over 18-28°C all sensitivity settings except ± 0.6 dB in -55 dBm and burst sensitivities.

j. Measured at 1310 nm and 1500 nm, except ± 0.3 dB in -55 dBm and burst sensitivities.

k. Except ± 0.35 dB in -55 dBm and burst sensitivities, except for water absorption lines, over 18 °C-28 °C all sensitivity settings.

l. Sweep cycle / 100 nm at -60 dBm sensitivity at center wavelength of 1475 nm.

GENERAL SPECIFICATIONS

| | | |
|-------------------------|------------------------------------|---|
| Environmental | Operating temperature | 5 °C to 35 °C (41 °F to 95 °F) |
| | Performance guaranteed temperature | 18 °C to 28 °C (64 °F to 82 °F) |
| | Storage temperature | -10 °C to 50 °C (14 °F to 122 °F) |
| | Humidity | 80 % RH, non condensing |
| Physical and electrical | Dimensions (W x H x D) | 413 mm x 314 mm x 385 mm (16 ¼ in x 12 ¾ in x 15 ½ in) |
| | Weight | 15 kg (33 lb) |
| | Power supply | 48 V DC input, ≤ 75 VA (adapter 100-240 V AC, 50-60 Hz to 48 V DC provided) |
| | Screen | 12 inch capacitive touchscreen (res. 1024 x 768) |
| External devices | Screen | VGA Port (x1), DVI-D Port (x1), HDMI (x1) |
| | Others (e.g., mouse, hard disk) | USB 2.0-A (x4), USB 3.0-A (x2) |
| Remote interface | Ethernet (2x RJ45) | 1 Gbit/s max. |
| | GPIO (1x IEEE 488) | 7.2 Mbit/s max. |
| | USB (1x USB 2.0-B) | 115 kbit/s max. |
| Triggers | In | Start scan (BNC, 5 V TTL), Gate in RLT mode |
| | Out | Pulse on a user-defined span (BNC, 5 V TTL) |
| Data storage | Internal | 256 Go |
| | External | FAT32, NTFS |
| | File types | csv, binary, jpg, png |

ORDERING INFORMATION

OSA20-XX

Connector ■

- 50 = FC/PC
- 54 = SC/PC
- 58 = FC/APC
- 88 = SC/APC

Example: OSA20-58

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