

OPTICAL SPECTRUM ANALYZERS
CMA5000a OSA 425/OSA 400

1250 nm to 1650 nm

Remote Control
 Ethernet

Field Portable DWDM/CWDM Testers



Build-to order product



Today's competitive environment demands that networks offer exceptional performance and reliability with minimal down time. When characterizing and documenting such stringent performance levels, the CMA5000a Optical Spectrum Analysis (OSA) applications are the ideal single solution for facilitating accurate and efficient channel management, power balancing and tuning throughout the network. The OSA applications lower CWDM and DWDM installation and maintenance costs by providing industry leading spectral analysis of system critical parameters.

Operating from 1250 nm to 1650 nm, these OSA modules for the CMA5000a are the perfect tools for testing large wavelength range CWDM system.

Two different modules are available to meet all test requirements: the OSA 425 and the OSA 400.

- **OSA 425:** the optimized cost OSA.
 This OSA is ready for field operation and harsh environment. Its internal calibration valid over all temperature range gives you accurate power and wavelength measurement in all conditions without any user calibration

- **OSA 400**
 The OSA 400 extends the performances of the OSA 425 and provides lab specifications in a rugged field module. With best in class ORR, this OSA can compute OSNR measurements with very high accuracy. The unique flat top filter can drop signals up to 40 Gb/s to perform transport analysis.

The compact size of the OSA module conveniently fits into the CMA5000a Multi-Layer Network Test Platform using a medium bay adapter.

• **Best in Class Optical Rejection for Accurate OSNR Measurements**
 Optical REJECTION Ratio (ORR) is a very important parameter for an Optical Spectrum Analyzer. This parameter gives the noise floor at a specified distance away from the center wavelength of the channel under test (see fig.1). ORR values are generally specified either at 50, 25 or 12.5 GHz away from the center of the channel. High ORR values guarantee high OSNR measurement accuracy. With its high Optical Rejection Ratio, more than 65 dBc at 50 GHz from peak, the OSA400 is the perfect tool for measuring accurate OSNR on DWDM channels.

• **WDM Channel Drift Monitoring Function**

One user specific channel in WDM signals can be selected, and its wavelength and power is monitored. Channel stability can be seen very easily.

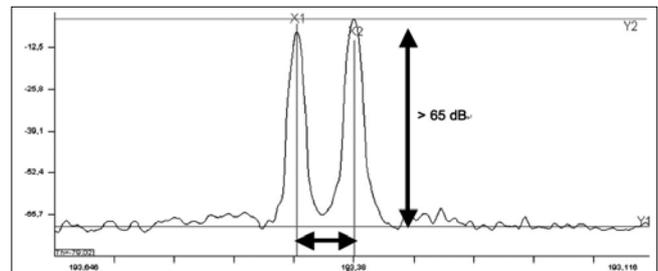
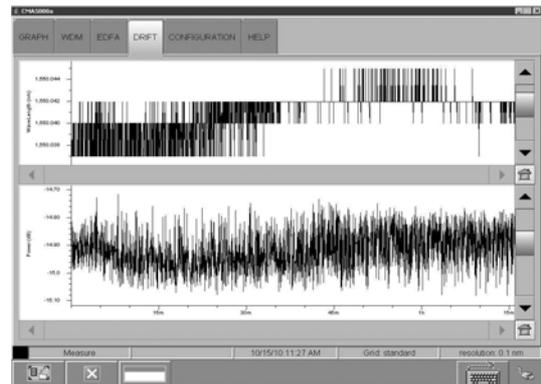


Fig 1: Two peaks at 50 GHz spacing with OSA 400. OSNR measurements are no longer limited by the OSA optical response.

● **Automatic EDFA tests**

Erbium-Doped Fiber Amplifiers (EDFAs) are commonly used in today's WDM networks. Optical amplification is the main function of an EDFA and consequently, the gain is one of the most important parameter to measure. Nevertheless, the gain is depending on many other parameters: wavelengths, polarization, power... In theory, the EDFA gain is supposed to be flat in its operating window, but in practical it can vary from one wavelength to another. The noise figure of an EDFA must also be checked as this value will determine how many amplifiers can be cascaded on a link. That's why it is important to be able to measure the dependence of the EDFA gain to these parameters with an OSA. The CMA5000a OSA's provide automatic test for fast and easy EDFA characterization.

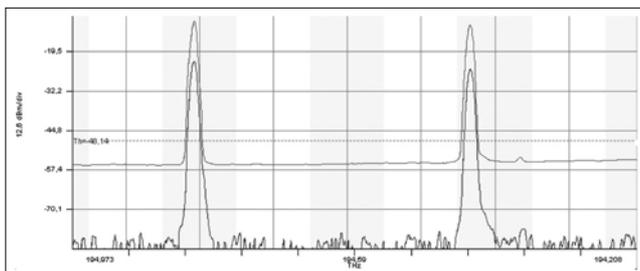


Fig 2: Input and Output EDFA curves display on the same graph for immediate analysis.

● **Unique Channel Drop Filter (OSA 400)**

The deployment of DWDM systems presents system engineers and maintenance personnel with the added challenge of how to selectively choose one channel among many and analyze its performance. For example, WDM networks are commonly used to transport SDH/SONET signal. Each data channel is carried on its own unique wavelength. Several channels are transmitted on the fiber at the same time. To analyze the SDH/SONET signal, it is necessary to select and drop the corresponding wavelength. The main challenge is to ensure that the bandwidth of the filter does not degrade the integrity of the channel under test. In the case of a 10 Gbit/s modulated signal, depending on the modulation technique, the bandwidth of the filter within the spectrum analyzer may need to be in excess of 20 GHz. For practical use, it is desirable that the bandwidth of the filter be large enough to accommodate center wavelength drift of both the channel under test and the measuring device, as well as the sidebands of the modulated signal. For a 40 Gbit/s system the bandwidth of the device may need to exceed 80 GHz. The OSA 400 has unique embedded channel drop filter. Any wavelength can be selected via the tunable flat top sharp-edge filter. The bandwidth of the filter is also adjustable depending on the modulation rate of the signal. The OSA 400 filter can support modulation rate up to 40 Gbps. The combination of the OSA module and the SONET/SDH module (XTA or UTA module) in the same CMA5000a platform is particularly useful to completely test WDM links carrying SONET/SDH signals.

Specifications

Osa Specifications	OSA 400	OSA 425
Spectral Range	1250 nm to 1650 nm	
Wavelength Accuracy*1, *2	±40 pm, ±15 pm*3	
Wavelength Repeatability*4	±5 pm	
Wavelength Stability*5	±10 pm	
Wavelength Linearity*2	±15 pm	
Maximum Total Safe Power	+25 dBm	
Power Range per Channel*2, *6	-70 to +20 dBm	
Noise Floor*6, *7	-75 dBm	
Power Accuracy*8	±0.4 dB	
Power Repeatability*4	±0.04 dB	
Power Linearity*1	±0.1 dB	
Power Flatness*2	±0.3 dB	
Power Stability*5	±0.1 dB	
Polarization Dependent Loss*9, *10	±0.1 dB	
Pdl + Repeatability*9	±0.15 dB	
Optical Resolution Bandwidth (FWHM)*2	<60, 100, 200 & 500 pm*12	60 pm (typ.)*2
Setting Resolution Bandwidth	Full, 0.1, 0.2, 0.5, 1 nm	
Optical Rejection Ratio*2, *11	65 dBc at ±50 GHz from peak 55 dBc at ±25 GHz from peak 35 dBc at ±12.5 GHz from peak	40 dBc at ±50 GHz from peak 35 dBc at ±25 GHz from peak 25 dBc at ±12.5 GHz from peak
Optical Return Loss	>45 dB	>40 dB
Maximum Measurement Time	8 s (for 400 nm and 80,000 sampling points)	
Scanning Time*13	<2 s	
Channel Number	1024	
Wavelength Readout Resolution	1 pm	
Power Readout Resolution	0.01 dB	
Internal Temperature Sensor	Yes	
Internal Wavelength Calibration	Yes (Automatic)	

Channel Drop Features

Channel Drop Features	OSA 400	OSA 425
Spectral Range	1250 nm to 1650 nm	NA
Modulation Rate	Up to 40 Gbps	NA
Filter Bandwidth* ⁹	User selectable from 60 to 800 pm	NA
Insertion Loss* ⁹	<10 dB	NA
Autopositioning Accuracy* ¹⁰	±40 pm	NA
Wavelength Resolution	5 pm	NA
Polarization Dependent Loss* ^{9, *10}	±0.1 dB	NA
Optical Bandwidth Resolution	20 pm	NA
Flatness* ¹⁴	Width at 0.2 dB >FWHM/2	NA
Crosstalk* ²	Up to 65 dB	NA

General Specifications

Temperature	Operating: 0° to +40°C Storage: -20° to +70°C
Humidity	95% RH non-condensing
Battery Operation	Yes
Calibration Cycle	1 year recommended
Warranty	1 year standard
EMC	EN61326-1, EN61000-3-2
LVD	EN61010-1

- *1: Signal from -30 to +5 dBm from 15° to 30°C
- *2: In C&L band (1530 nm to 1610 nm)
- *3: User offset with external calibration
- *4: in 5 consecutive scans
- *5: in 1 hour
- *6: with averaging
- *7: in C band (1530 nm to 1570 nm)
- *8: at -15 dBm in C band (1530 nm to 1570 nm)
- *9: at 1550 nm; at 23°C ±2°C
- *10: Typical
- *11: with the finest resolution
- *12: ±10%
- *13: 45 nm scan
- *14: For FWM >150 pm

Ordering Information

Please specify the model/order number, name and quantity when ordering.
The names listed in the chart below are Order Names. The actual name of the item may differ from the Order Name.

The CMA 5500 OSA modules cover the 1250 nm to 1650 nm spectral range.
Two modules are available: the OSA 425 (standard OSA) and the OSA 400 (includes channel isolation feature).
The CMA 5500 OSA's are double-deep (4-Bay) modules that must be used with an MBA or LBA. Each module includes a large choice of connector styles with channel isolation feature that allows the user to select a channel to be isolated to an output port for input to additional test equipment (such as BERT) for optical signals up to 40 Gb/s.

References	Description
5510-100-OSA-XXX	OSA 400 with filter: High resolution Optical Spectrum Analyzer covering 1250 nm to 1650 nm with channel selector for signals up to 40 Gbps
5525-000-OSA-XXX	OSA 425: Optical Spectrum Analyzer covering 1250 nm to 1650 nm
XXX = connector option	UFC = FC/UPC USC = SC/UPC AFC = FC/APC ASC = SC/APC