Optical Component Analyzer (OCA-1000)

The OCA-1000 is a multi-channel optical component analyzer that simultaneously measures insertion loss (IL), polarization dependent loss (PDL), and optical power (P) on multiple optical paths. The measurement is based on the Mueller Matrix method, which offers fast characterization of wavelength dependent optical parameters that are critical in today's optical communication systems. The base model can have up to 8 channels. Custom 8 or 16-channel expansion units can be added to increase the system capacity to up to 40 channels.

The instrument comes with a control program with built-in functions to display measured power, IL, and PDL vs. wavelength or to monitor the time variation of power/IL for all channels simultaneously to determine their stability. For AWG characterization, the data analysis software also calculates passband center wavelength, bandwidth, and flatness as well as interchannel crosstalk (from adjacent and nonadjacent channels).

The OCA-1000 is an ideal solution for easy, accurate characterization of components and modules with multiple outputs, including DWDMs, ROADMs, AWGs and PLCs. It can be used with various tunable lasers, such as those from Keysight or Santec. This flexibility makes full use of existing laser resources and reduces the cost of making such measurements. Its rapid measurement reduces the time required to characterize devices with large numbers of ports, enabling higher production throughput.

Specifications:

Number of channels	8 channels in base unit; Custom 8 or 16-channel expansion units available (Up to 40 channels total)
Wavelength range	1260 ~1360 nm (O-band) and 1480 ~ 1620 nm (C + L bands)
Optical power range[1]	−60 dBm to +8 dBm
Optical power accuracy[1]	± 0.5 dB
Optical power variation for different channels[1]	± 0.1 dB
Integration time of power meter	0.5 ~ 1000 ms
PDL measurement range[2]	0 ~ 20 dB
PDL measurement uncertainty[2]	± (0.02 + 2% of PDL) dB @PDL<10dB ± (0.02 + 5% of PDL) dB @10<PDL<20dB
PDL resolution	0.01 dB
PDL repeatability[2]	± 0.02 dB
IL measurement range[3]	0 to 60 dB (single point or stepped wavelength sweep mode) 0 to 55 dB (continuous wavelength sweep mode)
IL measurement uncertainty[3]	± (0.01 + IL× 0.5%) dB
IL resolution	0.002 dB
IL repeatability[2]	± 0.005 dB
Sweep period of 6-state PDL/IL measurement (typ.)	(2+wavelength sweep range (nm)/40)×6 seconds when laser sweep speed is 40 nm/s
Fiber type	C/L band PSG in: PM 1550 Panda fiber O band PSG in: PM 1300 Panda fiber PSG outputs: SMF-28
Optical Connector Type	PSG in/out: FC/APC standard Detector inputs: FC free space
Communication	USB (USB 2.0), GPIB (IEEE 488.2)
Operating temperature	10 ~ 40 °C
Storage temperature	-20 ~ 60 °C
Operating humidity	< 80 %, non-condensing
Mechanical Dimensions (One unit)	1U 19" rack mountable enclosure, 12" depth

Notes:
1. At 23 ± 5 °C.
2. With DUT input power >−10dBm, DUT IL <20dB, and integration time = 10ms.
3. With DUT input power >5dBm, integration time = 100ms.
4. Recommended laser brands:
   - Any Keysight/Agilent tunable laser with trigger output.
   - Santec 5 and 7 series tunable lasers with trigger output (confirm with GP)

Features:

- Wide wavelength range
- High PDL accuracy
- High channel-to-channel uniformity
- User-friendly control program

Applications:

- PDL vs. wavelength measurement
- IL vs. wavelength measurement
- IL/Power vs. Time
- Pass band parameters: center frequency, BW, ripple, noise floor
- Fiber optic component characterization
- Network component characterization (e.g. DWDM, ROADM.)
- Planar Lightwave Circuits (PLC)
- Photonic Integrated Circuit (PIC)

Related Products:

- PDL Meter (PDL-201)
- PDL Calibration Artifact (CS-PDL)
- Polarization Measurement System (PSGA-101)
- Bare Fiber Adapter (PEZ-001)

Tech Info:

- What is Polarization?
- Application Note for PDL Measurement

Order Information:

OCA — 1000 — □□

# of Channels:
8 standard

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Typical Performance Data:

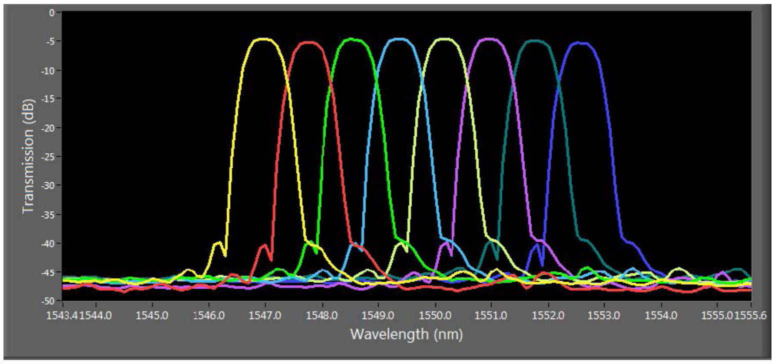


Figure 1. Transmission vs. wavelength for 8 channels of an arrayed waveguide grating (AWG). Pass bands for each channel are clearly visible.

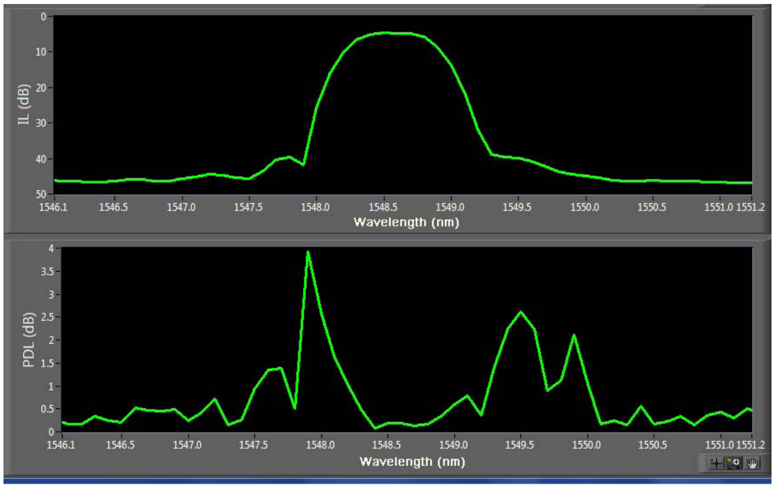
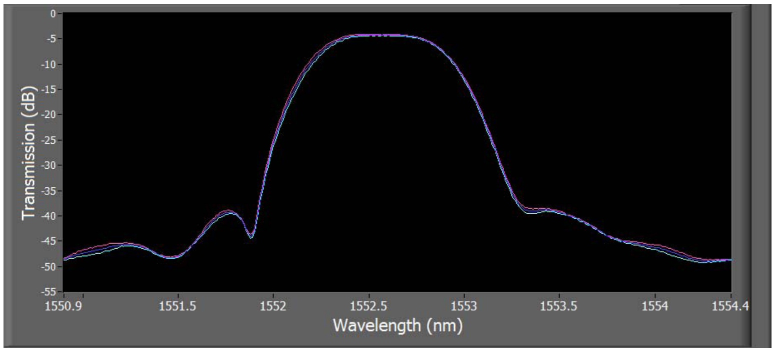


Figure 2. IL and PDL vs. wavelength for one channel of the AWG. PDL is relatively flat over the passband of this channel.



CH 8 | Maximum | Mininum | Channel Spacing (GHz) 100 | Pass Band (GHz) 25

	ITU Central	Center WL	3dB BW	10dB BW	20dB BW	IL (dB)	Flatness (dI	PDL	xtalk	Adjacent xtalk	Non-Adjacent xtalk
Ave	1552.524	1552.570	0.621	0.900	1.126	4.427	0.144	0.301	-31.686	-33.609	-36.151
Max	1552.524	1552.568	0.629	0.913	1.138	4.391	0.239	0.301	-31.165	-32.988	-35.813
Min	1552.524	1552.572	0.612	0.886	1.112	4.463	0.049	0.301	-32.165	-34.186	-36.459

Figure 3 Detailed transmission vs. wavelength data for one channel of the same AWG. The plot shows the maximum, minimum, and average transmission vs. wavelength. The difference between maximum and minimum is an indication of the polarization dependent behavior for this device. The table shows the passband, flatness, and crosstalk information for this channel.

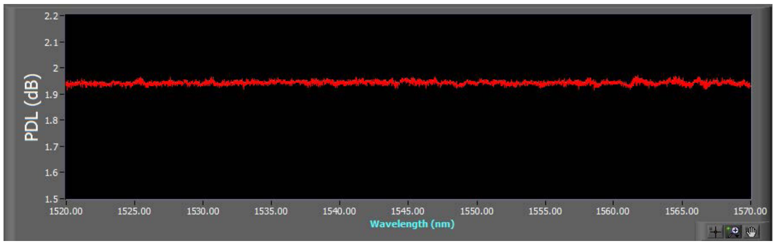


Figure 4. PDL vs. wavelength for a 1.96dB PDL artifact. The data indicates that the PDL of this device is relatively flat over the tested wavelength range.