As fiber networks rapidly expand with dense wavelength division multiplexing (DWDM) technologies, users are looking for advanced test solutions that offer greater functionality and higher performance for their testing needs. The Acterna Optical Spectrum Analyzer meets these demands by speeding up time to install, commission, troubleshoot, and monitoring DWDM systems and components.

**Advanced optical plug-in for DWDM systems analysis**

Given our long standing experience and knowledge in the field of digital and optical network testing, manufacturers and fiber network operators look to Acterna for industry leading optical spectrum analyzer solutions.

The combination of the MTS-8000 test platform and OSA analyzer offers a lightweight, handheld, and rugged field instrument suitable for any OSA full band and high performance measurement requirements.

Targeted at providing advanced test solutions, the field-ready **full-band DWDM analyzers OSA-160, OSA-161, and OSA-201** use a new opto-mechanical design (Acterna patents). These OSAs are grating-based monochromators offering high optical selectivity for accurate measurement of wavelength, power, and optical signal-to-noise ratio (OSNR) in the presence of multiple channels.

The Acterna **OSA-300, OSA-301, and OSA-303** are **high-performance DWDM analyzers** in the family of grating-based spectrum analyzers designed for ultra-dense WDM applications (UDWDM) with high channel counts and tight channel spacing.

**40G ready**

With the new signal analysis all Acterna OSAs are prepared for high precision channel power measurements in systems with data rates up to 40/43 Gbps.

**Highlights**

- 40/43G ready
- Full-band OSA covering wavelengths of 1250 to 1650 nm for DWDM and CWDM (metro) testing
- High filter selectivity and lab optical performance in a field-modular design
- Highest wavelength accuracy of 10 pm without the need of external calibration
- Built-in, physical constant wavelength reference – no recalibration required over lifetime
- Channel isolation of specified wavelengths for in-depth analysis of signals up to 10.7 Gbps
- Patented dual-port version
- PMD test option
Rugged reliable field solution
Housed in the field dedicated MTS-8000 test platform, OSA measurements can be performed in OSP, CO, and harsh environmental conditions.
A portable, battery-powered instrument, shockproof and drop tested for complete reliability in the field.
The maintenance-free, fast galvanometer drive provides the highest test speed and unsurpassed ruggedness for field use and continuous operation.

Advanced optical performance
The MTS-8000 OSAs offer the full 1250 to 1650 nm DWDM wavelength measurement range combining high wavelength accuracy and high dynamic range.
All instruments are equipped with an internal wavelength reference for on-line calibration without requiring disruption of measurements in progress. The internal wavelength calibrator is based on a physical constant reference that guarantees the highest wavelength accuracy over the instrument’s lifetime without the need of recalibration (Acterna patents).

40G ready
The use of special signal analysis ensures accurate measurements in ultra high speed networks up to 40/43 Gbps.

Easiest to use one-button operation
Auto-Test mode automatically identifies WDM channels, selects the appropriate wavelength range, and provides auto-scaling and system qualification according to pre-defined parameters. One-button testing means that technicians need no special training to carry out a DWDM test making it suitable for both novice and expert technicians.

Flexible measurement capability
In-depth analysis with statistical analysis and long-term monitoring, is provided. This allows for DWDM systems performance verification including the variation of optical system parameters (wavelength, power, and OSNR), as well as a series of measurements over a defined period of time with automatic data storage. Resulting reports are provided with average values, minimum, maximum, and standard deviation of the measured parameters over time.

Built-in test applications
Test applications for optical amplifiers (EDFA) and laser source testing facilitate network component verification.

Powerful Pass/Fail link manager
Graphical and tabular display formats can be selected to assist in the installation, verification, and troubleshooting of multi-channel DWDM systems. Built-in test functions deliver automatic Pass/Fail evaluations based on predefined parameters, saving time with a quick and intuitive overview of the complete set of results.

Channel isolation option (drop option)
A unique channel isolation option is provided to extract a single DWDM channel from the entire spectrum for further analysis with a SONET/SDH analyzer at data rates up to 10.7 Gbps. The built-in tracking function provides wavelength locking to the peak of the selected channel to avoid channel frequency drift problems during long-term measurements.

FiberTrace software and reporting solution
A PC-based software range for office work within a true Windows environment, provides complete and detailed generation of professional OSA reports.

PMD test option
With the PMD option all OSAs can measure the differential group delay (DGD) for PMD characterization of optical fibers and networks. The measurement is based on the fixed analyzer method (TIA/EIA FOTP-113) together with a broadband source and a variable polarizer.

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**Figure 1** DWDM spectrum display with table of results

**Figure 2** Test set-up display with Pass/Fail settings
Specifications – MTS-8000

Full-band DWDM analyzers
technical specifications (typical at 25 °C)

<table>
<thead>
<tr>
<th>Spectral measurement ranges</th>
<th>Wave length range</th>
<th>1250 to 1650 nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of optical channels</td>
<td>512</td>
<td></td>
</tr>
<tr>
<td>Wavelength accuracy (1)</td>
<td>± 20 pm</td>
<td></td>
</tr>
<tr>
<td>Read out resolution</td>
<td>0.001 nm</td>
<td></td>
</tr>
<tr>
<td>Resolution bandwidth (FWHM)</td>
<td>typ. 75 pm</td>
<td></td>
</tr>
<tr>
<td>Wavelength linearity (over 10 nm)</td>
<td>± 10 pm</td>
<td></td>
</tr>
</tbody>
</table>

| Power measurement ranges    | Dynamic range (6) | −75 to +23 dBm |
|                            | Noise floor RMS (with averaging) (7) | −75 dBm |
|                            | Absolute accuracy (3, 5) | ± 0.4 dB |
|                            | Linearity (3) | ± 0.05 dB |
|                            | Readout resolution | 0.01 dB |
|                            | Scanning time (1250 to 1650 nm) (5) | < 1.5 s |
|                            | Optical rejection ratio (8) | at ±25 GHz (±0.2 nm) typ. 35 dBc |
|                            |                      | at ±50 GHz (±0.4 nm) typ. 45 dBc |
|                            | PDL (4)             | ± 0.1 dB |
|                            | Flatness (3)        | ± 0.2 dB |
|                            | Level reproducibility (3) | ± 0.05 dB |

<table>
<thead>
<tr>
<th>Channel isolation option (OSA-161/201)</th>
<th>Using the channel isolation function, you can drop channels for further signal analysis with a BERT or a Q-factor meter.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wavelength range</td>
<td>1250 to 1650 nm</td>
</tr>
<tr>
<td>Data rates</td>
<td>up to 10.7 Gbps</td>
</tr>
<tr>
<td>Spectral filter</td>
<td>typ. 220 pm</td>
</tr>
<tr>
<td>Insertion loss</td>
<td>typ. ±10 dB</td>
</tr>
<tr>
<td>Tracking mode</td>
<td>auto wavelength control</td>
</tr>
</tbody>
</table>

Dual-port option (OSA-201)
Simultaneous measurement of two fibers for monitoring or component test applications.

Optical ports (physical contact interfaces)

<table>
<thead>
<tr>
<th>Input ports</th>
<th>OSA-160/161</th>
<th>1 x SM</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSA-201</td>
<td>2 x SM</td>
<td></td>
</tr>
</tbody>
</table>

| Output port (drop port) (OSA-161/201) | 1 x SM |

Interface <unknown>
Optical return loss >35 dB
Total safe power +23 dBm

High-performance DWDM analyzers
technical specifications (typical at 25 °C)

<table>
<thead>
<tr>
<th>Spectral measurement ranges</th>
<th>Wave length range</th>
<th>1250 to 1650 nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of optical channels</td>
<td>512</td>
<td></td>
</tr>
<tr>
<td>Wavelength accuracy (2)</td>
<td>typ. ± 10 pm</td>
<td></td>
</tr>
<tr>
<td>Readout resolution</td>
<td>0.001 nm</td>
<td></td>
</tr>
<tr>
<td>Resolution bandwidth (FWHM)</td>
<td>typ. 60 pm</td>
<td></td>
</tr>
<tr>
<td>Wavelength linearity (over 10 nm)</td>
<td>± 10 pm</td>
<td></td>
</tr>
</tbody>
</table>

| Power measurement ranges    | Dynamic range (6) | −75 to +23 dBm |
|                            | Noise floor RMS (with averaging) (7) | −75 dBm |
|                            | Absolute accuracy (3, 5) | ± 0.4 dB |
|                            | Linearity (3) | ± 0.05 dB |
|                            | Readout resolution | 0.01 dB |
|                            | Scanning time (1250 to 1650 nm) (7) | < 1.5 s |
|                            | Optical rejection ratio (3) | at ±25 GHz (±0.2 nm) typ. 45 dBc |
|                            |                      | at ±50 GHz (±0.4 nm) typ. 48 dBc |
|                            | PDL (8)             | ± 0.1 dB |
|                            | Flatness (3)        | ± 0.2 dB |
|                            | Level reproducibility (3) | ± 0.05 dB |

| Channel drop option (OSA-301/303) Using the channel isolation function, you can drop channels for further signal analysis with a BERT or a Q-factor meter. |
|---------------------------------------|----------------------------------------------------------------------------|
| Wavelength range                      | 1250 to 1650 nm                                                          |
| Data rates                            | up to 10.7 Gbps                                                          |
| Spectral filter                       | typ. 175 pm                                                              |
| Insertion loss                        | typ. ±10 dB                                                              |
| Tracking mode                         | auto wavelength control                                                  |

Dual-port option (OSA-303)
Simultaneous measurement of two fibers for monitoring or component test applications.

Optical ports (physical contact interfaces)

<table>
<thead>
<tr>
<th>Input ports</th>
<th>OSA-300/301</th>
<th>1 x SM</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSA-303</td>
<td>2 x SM</td>
<td></td>
</tr>
</tbody>
</table>

| Output port (drop port) (OSA-301/303) | 1 x SM |

Interface universal
Optical return loss >35 dB
Total safe power +23 dBm

General specifications
Temperature
Operating +5 to +50 °C/41 to 122 °F
Storage −20 to +60 °C/−4 to 140 °F
Dimensions (w x h x d) 350 x 280 x 150 mm
13.8 x 11.0 x 5.9 in
Weight (plug-in only) 2 kg/5.6 lbs

(1) Built-in, physical constant wavelength calibrator, needs no re-calibration
(2) At 1520 to 1565 nm at 23 °C
(3) At 1520 to 1565 nm at 18 to 28 °C
(4) Max. power per channel +15 dBm, total power +23 dBm
(5) At −10 dBm
(6) −45 dBm to +10 dBm, at 23 °C
(7) Full span 400 nm, 4000 measurement samples, incl. WDM table analysis
(8) 1 min, stable signal, const. temperature

Ordering information

OSA modules
**Full-band DWDM analyzer**
OSA-160 BN 2281/91.01
Single port
OSA-161 BN 2281/91.12
Single port with drop 10.7G
OSA-201 BN 2281/91.14
Dual port with drop 10.7G

**High-performance DWDM analyzer**
OSA-300 BN 2281/91.31
Single port
OSA-301 BN 2281/91.32
Single port with drop 10.7G
OSA-303 BN 2281/91.34
Dual port with drop 10.7G

PMD test option
PMD test kit BN 2281/91.11
Includes PMD evaluation software plus:
**OBS-15** BN 2267/01
Optical Broadband Source plus
**OVP-15** BN 2271/01
Optical Variable Polarizer

Application software

Optical fiber trace software for post-analysis EODS100
Optical fiber trace software for cable acceptance report generation EODS200

Optical connectors

Standard single mode
FC/PC, SC, ST, DIN, LC
Acterna is the world’s largest pro-

vider of communications test solutions for
telecommunications and cable network
operators. A trusted communications test
partner for more than eight decades, Acterna
offers an unmatched portfolio of award-
winning instruments, systems, software
and services that help its customers reduce
network costs while improving performance
and reliability. Headquartered in Germantown,
Maryland, USA—with European and
Asia-Pacific operations based in Eningen,
Germany and Hong Kong—Acterna serves
nearly every major communications service
provider and equipment manufacturer around
the world through a skilled sales and support
organization in 31 countries.

Acterna Advantage℠ — adding value with global
services and solutions

From basic instrument support for your
field technicians to management of complex,
company-wide initiatives, Acterna’s service
professionals are committed to helping you maxi-
mize your return on investment. Whatever your
needs — product support, system management,
education solutions, tailored test & measure-
ment solutions or refurbished equipment — we
offer programs that will give you the competitive
edge. To learn more about how Acterna Advan-
tage can help your business be more successful,
visit the services section on your local web page
at www.acterna.com/.