

# The ideal OSA for telecom device production

AQ6360  
Optical Spectrum Analyzer

Precision Making

Bulletin AQ6360-01EN



# Our fastest OSA optimized for optical device manufacturing

The AQ6360 is a cost-effective optical spectrum analyzer based on diffraction grating technology.

## Ideal performance for manufacturing tests

The AQ6360 satisfies the typical measurement needs of industrial manufacturing of telecom devices such as lasers, optical transceivers and optical amplifiers.

- Wavelength range: 1200 to 1650 nm
- Wavelength resolution: 0.1 to 2 nm
- High wavelength accuracy:  $\pm 0.02$  nm
- High dynamic range: 55 dB
- Wide measurement range: +20 to -80 dBm

## Sweep up to two times faster

The AQ6360 can sweep up two times faster than our models designed for R&D purposes.

## Free space optical input

The free space optical input structure is the most effective to guarantee high coupling efficiency and measurement repeatability.

### Dual-purpose

Accepts both single-mode and multimode optical fibers

### Versatile

Accepts both flat and angle polished connectors

### Worry free

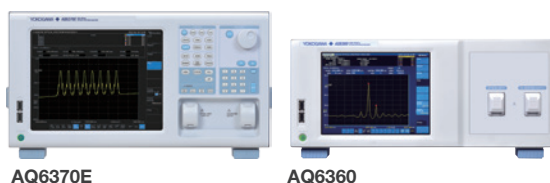
Damage proof internal input connector

### Maintenance-free

No internal fiber to clean

## Built-in wavelength reference source (Factory option)

## Space saving 4U height (1U lower than AQ6370 Series)



## AQ6370 series compatible operation

The AQ6360 inherits the screen and menu layout from our OSA lineup, which is recognized by thousands of users all over the world as the most intuitive and easy-to-use.

## Multi-touch touchscreen

Tap, drag, pinch in and pinch out. The high resolution, responsive 8.4-inch multi-touch capacitive touchscreen makes the operation of the instrument simple and intuitive.



## Built-in analysis functions to increase productivity

More than ten data analysis functions are available, including WDM (OSNR), SMSR, DFB-LD, EDFA, and Spectral width.

## Ready for remote operation

### Ethernet and GPIB remote interfaces

The AQ6360 is equipped with GP-IB, and Ethernet interfaces for remote access and for building automated test systems.

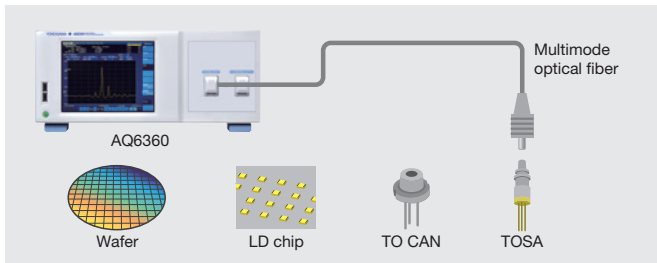
### AQ6370D compatible remote commands

It is compatible with both AQ6370D and AQ6317 commands for easy programming.

## Typical applications

### LD chip and TOSA

The AQ6360 delivers improvements in measurement throughput via a multimode fiber for free space laser beams from wafers, LD chip, TO CAN and TOSA measurements. This is due to the free space input structure of the OSA which accepts multimode fibers without high insertion loss, which occurs when multimode and single mode fibers are mismatched.



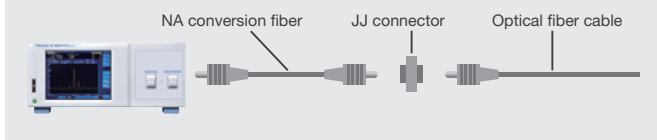
The side mode suppression ratio (SMSR) of laser can be measured quickly and accurately.

### NA Conversion Fiber (optional)

By connecting a GI 50 or GI 62.5 optical fiber with a relatively large NA to the NA Conversion Fiber, the NA Conversion Fiber reduces the loss that occurs at the input and improves the measurement dynamic range during passive device measurements and the stability of optical level measurements during active device measurements.

#### Note

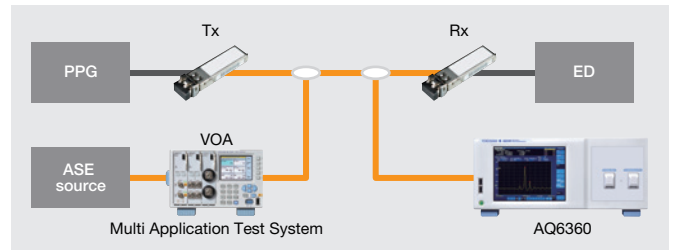
- The stability of measurement results depend on the operating environment.
- If the wavelength resolution of the optical spectrum analyzer is set smaller than 0.05 nm when using the NA converted fiber, the measurement results may become unstable. Setting the wavelength resolution to a larger wavelength resolution, such as 0.1 nm or 0.2 nm, gradually improves the stability of the measurement results.
- When using GI 62.5 and GI 50 multimode optical fibers coupled to NA converted fibers, it is recommended to set the wavelength resolution of the optical spectrum analyzer to 0.2 nm or higher.



### Optical transceiver

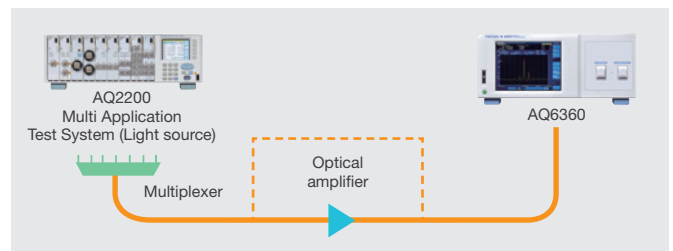
In conjunction with bit error rate test (BERT) equipment, the AQ6360 can measure the center wavelength and spectral width of transceivers and LD modules.

For testing the BER curve of optical transceivers, the broadband light of an ASE source is added to signals. The high sensitivity of the AQ6360 enables it to measure OSNR conditions more accurately than low performance non grating based designs.



### Optical amplifier

The AQ6360 has an automated function to easily calculate the Erbium Doped Fiber Amplifier Noise Figure under the name "EDFA-NF". A typical measurement setup for amplifier testing consists of a set of multiplexed lasers, an attenuator for tuning the laser power level, an optical spectrum analyzer. The OSA takes two high-resolution spectrums. One trace is taken before amplification and one after amplification. From the obtained spectrums, the EDFA-NF Analysis Function automatically detects the laser peaks, extracts the required measurement values, performs the calculations and displays a table with the values of GAIN and NF of the DUT.



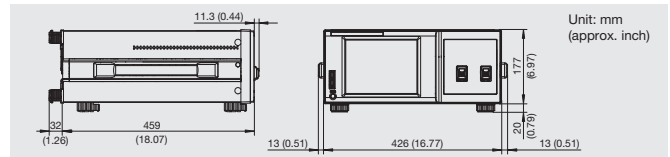
The typical experimental setup for optical amplifier testing



The automated routine for the analysis of optical amplifiers provides a table with their relevant parameters

# Specifications

Items	Specifications
Applicable fiber	SM (9.5/125 μm), GI (50/125 μm, 62.5/125 μm)
Wavelength range <sup>1</sup>	1200 to 1650 nm
Span <sup>1</sup>	0.1 to 450 nm (entire wavelength range), and 0 nm
Wavelength accuracy <sup>1, 2, 4</sup>	±0.02 nm (1520 to 1580 nm), ±0.04 nm (1580 to 1620 nm), ±0.10 nm (1200 to 1650 nm)
Wavelength linearity <sup>1, 2, 4</sup>	±0.02 nm (1520 to 1580 nm, 1580 to 1620 nm)
Wavelength repeatability <sup>1, 2</sup>	±0.01 nm (1 min.)
Wavelength resolution setting <sup>1, 2</sup>	0.1, 0.2, 0.5, 1 and 2 nm
Wavelength resolution bandwidth accuracy <sup>1, 2</sup>	±5%
Minimum sampling resolution <sup>1</sup>	0.001 nm
Number of sampling points	101 to 50001, AUTO
Level sensitivity setting	NORM_HOLD, NORM_AUTO, NORMAL, MID, HIGH1, and HIGH2
Level sensitivity <sup>2, 3</sup>	-80 dBm (1300 to 1620 nm, sensitivity: HIGH2, resolution: 0.1 nm)
Maximum input power <sup>2</sup>	+20 dBm (Input power per set wavelength resolution)
Maximum safe input power <sup>2</sup>	+25 dBm (Total input power)
Level accuracy <sup>2, 3</sup>	±0.5 dB (1310/1550 nm, -20 dBm, sensitivity: MID, HIGH1-2)
Level linearity <sup>2</sup>	±0.1 dB (Input level: -50 to +10 dBm, sensitivity: MID, HIGH1-2)
Level flatness <sup>2</sup>	±0.2 dB (1520 to 1580 nm, 1580 to 1620 nm)
Polarization dependence <sup>2</sup>	±0.1 dB (1550 nm)
Dynamic range <sup>1, 2</sup>	55 dB (Peak ±0.4 nm), 40 dB (Peak ±0.2 nm) (Resolution: 0.1 nm)
Optical return loss <sup>5</sup>	35 dB (Typ., with angled-PC connector)
Optical input connector	FC or SC
Built-in calibration light source (option)	Wavelength reference source (For wavelength calibration)
Sweep time <sup>1, 6</sup>	NORM_AUTO: 0.2 s, NORMAL: 0.5 s, MID: 1 s, HIGH1: 2.5 s, HIGH2: 10 s
Warm-up time	Minimum 1 hour (After warm-up, the wavelength calibration is required.)
Electrical interface	GP-IB, Ethernet, USB, SVGA output
Remote control <sup>7</sup>	GP-IB, Ethernet (TCP/IP), AQ6317 series compatible commands (IEEE488.1) and IEEE488.2
Data storage	Internal storage: 512 MBytes, external storage: USB storage (memory/HDD), file types: CSV (text), Binary, BMP, TIFF
Display <sup>8</sup>	8.4-inch color LCD (Touchscreen, resolution: 800 × 600 pixels)
Dimensions	Approx. 426 (W) × 177 (H) × 459 (D) mm (excluding protector and handle)
Weight	Approx. 15.5 kg
Power requirements	100 to 240 V AC, 50/60 Hz, approx. 100 VA
Environmental conditions	Performance guarantee temperature: +18 to +28°C, Operating temperature: +5 to +35°C, Storage temperature: -10 to +50°C, Humidity: 20 to 80%RH (no condensation)
Safety standards	EN 61010-1 Laser <sup>9</sup> EN 60825-1: 2014+A11: 2021, IEC 60825-1: 2007, GB 7247.1-2012 Class 1
Emission	EN 61326-1 Class A, EN 55011 Class A Group 1, EN 61000-3-2, EN 61000-3-3, RCM EN 55011 Class A Group 1, Korea Electromagnetic Conformity Standard
Immunity	EN 61326-1 Table 2
Recommended calibration period	1 year



“Typical” or “typ.” in this document means “Typical value”, which is for reference, not guaranteed specification.

<sup>1</sup>: Horizontal scale: In the wavelength display mode <sup>2</sup>: With 9.5/125 μm single mode fiber with a PC type connector, after 1 hour of warm-up, sampling resolution ≤0.05 nm <sup>3</sup>: With 9.5/125 μm single mode fiber (B1.1 type defined on IEC60793-2, PC polished, mode field diameter: 9.5 μm, NA: 0.104 to 0.107) <sup>4</sup>: After wavelength calibration with built-in reference light source or a single longitudinal mode laser (wavelength 1520 to 1560 nm, peak level ≥-20 dBm and absolute wavelength accuracy ±0.003 nm). <sup>5</sup>: With Yokogawa's master single mode fiber with an angled-PC connector. Typical 15 dB with PC connector. <sup>6</sup>: Span: ≤100 nm, number of sampling: 1001, average number: 1 <sup>7</sup>: Some of AQ6317 series commands may not be compatible due to changes in specifications or functions. <sup>8</sup>: There may be some pixels on the LCD that never light or are always lit (0.002% or less of the total number of pixels including RGB). These pixels are not defects. <sup>9</sup>: When the built-in calibration light source is installed.

## Model and suffix code

Model	Suffix	Descriptions
AQ6360		AQ6360 Optical Spectrum Analyzer
Spec. code	-10	Standard model
Optical input connector	-FC	AQ9447 (FC) Connector Adapter
	-SC	AQ9447 (SC) Connector Adapter
Display	-D1	Built-in display
Power cord	-D	UL/CSA standard and PSE compliant, 125 V
	-F	VDE/Korean standard, 250 V
	-H	Chinese standard, 250 V
	-Q	British standard, 250 V
	-R	Australian standard, 250 V
	-N	Brazilian standard, 250 V
	-T	Taiwanese standard, 125 V
	-B	Indian standard, 250 V
	-U	IEC Plug Type B, 250 V
Options	Built-in light source	/LFC Wavelength reference source (FC connector) /LSC Wavelength reference source (SC connector)

## Accessories (optional)

Model	Suffix	Descriptions
AQ9447		AQ9447 Connector Adapter for optical input
Connector type	-FC	FC type
	-SC	SC type
AQ9441		AQ9441 Connector Adapter for calibration output
Connector type	-FC	FC type
	-SC	SC type
735384	-A001	NA conversion fiber (for GI 50 optical fibers)
	-A002	NA conversion fiber (for GI 62.5 optical fibers)
751535		Rack mount kit (For an EIA-compliant Single-housing Rack)
	-J5	Rack mount kit (For an JIS-compliant Single-housing Rack)

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### Yokogawa's Approach to Preserving the Global Environment

- Yokogawa's electrical products are developed and produced in facilities that have received ISO14001 approval.
- In order to protect the global environment, Yokogawa's electrical products are designed in accordance with Yokogawa's Environmentally Friendly Product Design Guidelines and Product Design Assessment Criteria.

This is a Class A instrument based on Emission standards EN61326-1 and EN55011, and is designed for an industrial environment. Operation of this equipment in a residential area may cause radio interference, in which case users will be responsible for any interference which they cause.

## NOTICE

- Before operating the product, read the user's manual thoroughly for proper and safe operation.



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