YOKOGAWA

AQ6375

"LONG-WAVE" Optical Spectrum Analyzer

Telecom and Beyond

1200 to 2400 nm

● WORLD CLASS PERFORMANCE

- Long wavelength measurement capability
- High wavelength accuracy & resolution
- High sensitivity
- High speed measurement
- USB for mouse, keyboard, and memory
- Remote operation (GP-IB, RS-232, Ethernet)

● APPLICATIONS

- Lasers
- Passive optical devices
- Optical fiber

For Gas sensing
Medical
Free-space communications
Optical fiber communications

QUALITY ■ INNOVATION ■ FORESIGHT

Bulletin AQ6375-01E

High Performance LONG WAVELENGTH

The AQ6375 is the first bench-top optical spectrum analyzer covering the long wavelength over 2 µm. It is designed for researchers and engineers who have been struggling with inadequate test equipment to measure in these long wavelength ranges.
The AQ6375 achieves high speed measurements with high accuracy, resolution and sensitivity in a compact frame, even while providing full analysis features and a built-in calibrator; troublesome calibration steps and the development of external analysis software is no longer required. Those features are indispensable to research, development, and manufacturing of optical devices in the wavelength range from telecom band to 2 µm.
No other test system can achieve this high performance and ease of use at the same time.

UNPARALLELED OPTICAL PERFORMANCE

Long Wavelength
1200 nm to 2400 nm

The AQ6375 covers not only telecommunication wavelengths, but also the long wavelength region which is used for environmental sensing, medical, and industrial material applications.

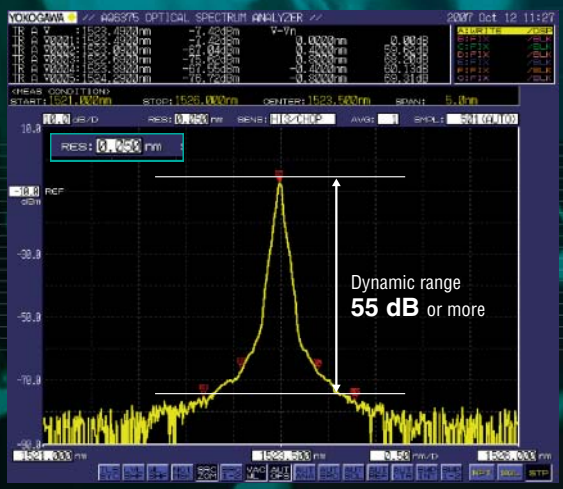
High Sensitivity
+20 dBm to -70 dBm

The AQ6375 can measure optical power as low as -70 dBm, which enables measurements of low power sources or low power output of a device under test. Measurement sensitivity can be chosen from seven categories according to test applications and measurement speed requirements.

The spectrum of a white light source (yellow) and the background noise of AQ6375 (red)

High Resolution & Wide Dynamic Range

The AQ6375 uses a double-pass monochromator structure to achieve high wavelength resolution (0.05 nm) and wide close-in dynamic range (55 dB). Thus, closely allocated signals and noise can be separately measured.



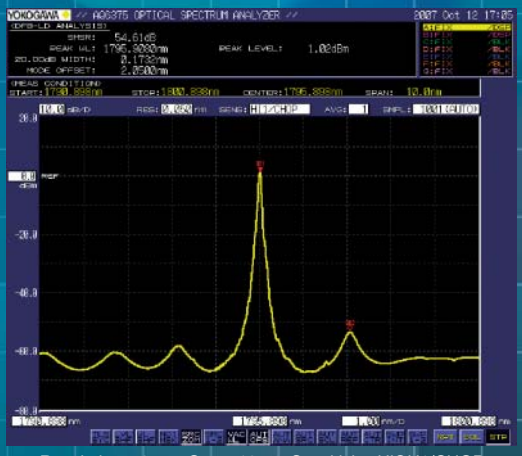
Measured HeNe Laser (1523 nm),
Close-in Dynamic range: @ peak±0.8 nm

AQ6375

Optical Spectrum Analyzer

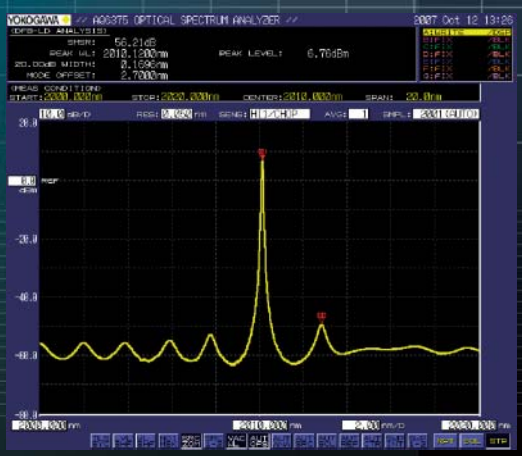
Measurement Examples

1800nm DFB-LD



Resolution: 50 pm, Span: 10 nm Sensitivity: HiGH1/CHOP

2010nm DFB-LD



Resolution: 50 pm, Span: 20 nm Sensitivity: HiGH1/CHOP

GREATER EFFICIENCY
High speed Measurement

High Speed Sweep

With proprietary sweep technique the AQ6375 achieves a much faster sweep speed than conventional measurement systems which use a monochromator. Max. sweep time is only 0.5 sec. in 100 nm span.

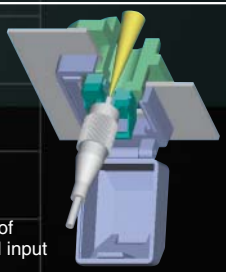
Fast Command Processing and Data Transfer

Applying a fast microprocessor, the AQ6375 achieves very fast command processing speed and Ethernet provides up to 100 times faster data transfer speed than the GP-IB.

SUPPORT MULTIMODE FIBER
Free-Space Optical Input

Applicable fiber: SMF and MMF

The AQ6375 uses a free space input structure, not having an optical fiber inside the monochromator, that can handle multimode fibers. The free space input is also beneficial for measurement repeatability.



Structure of the optical input

EASY CALIBRATION
Built-in Calibrator

The AQ6375 comes with the built-in calibrator for wavelength calibration and optical alignment adjustment of the monochromator in order to maintain accurate measurements. The calibration and adjustment are automatically performed and completed within a couple of minutes.

Wavelength Calibration

Calibrates with the designate absorption line of Acetylene gas.

Optical Alignment Adjustment

Corrects mechanical movements inside the monochromator caused by shock and vibration.

Note. the wavelength can also be calibrated with an external light source.

EASY ANALYSIS

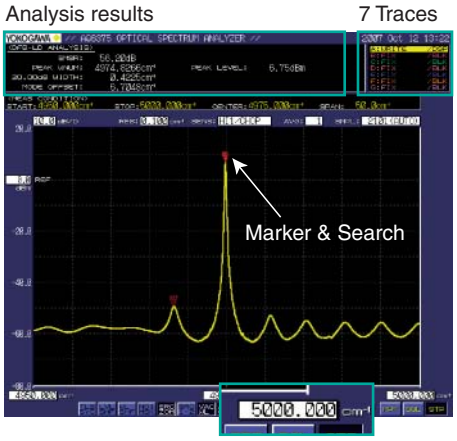
Traces and Analysis Functions

nm / THz / cm^{-1}
Multiple choices of x-axis indication

VARIOUS ANALYSIS FUNCTIONS
Thirteen types of built-in analysis functions are available for popular applications. The analysis can be automatically performd and provide results. The functions include: Spectral width, Notch, SMSR, DFB-LD, OSNR, EDFA, Filter, and more.

7 TRACES & CALCULATION FUNCTIONS
The AQ6375 has seven individual traces for measurement data. Some traces can be used for calculations (subtraction between traces), max/min hold, averaging, etc.

MARKER & SEARCH FUNCTIONS



cm^{-1} indication

EASY OPERATION

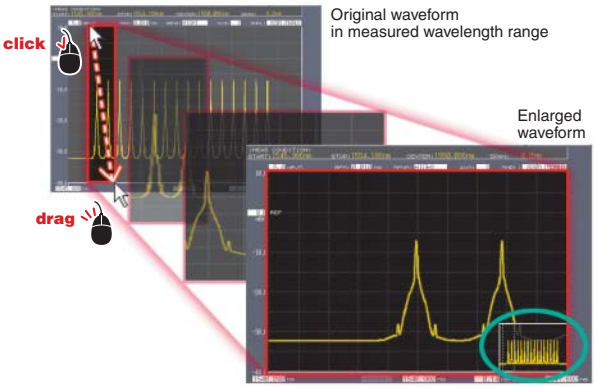
Key & Mouse Operation

INTUITIVE OPERABILITY
The AQ6375 inherits our intuitive front panel design from our conventional models for proven easy use and operation.

MOUSE & KEYBOARD OPERATION
You can easily operate the AQ6375 with only a mouse instead of the front panel keys. The keyboard is useful for entering labels and file names. The front panel key menu appears when right-clicking the mouse.

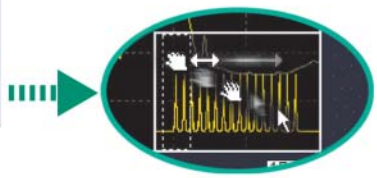
Direct Parameter Entry

TRACE ZOOM CAPABILITY
Trace zoom makes it possible to change display conditions, such as center wavelength and span, by clicking and dragging the mouse to select the designated area to enlarge.



Overview window

OVERVIEW WINDOW
Once the trace is zoomed in, the overview window appears and shows the entire trace. By dragging the zoomed area border in this window with the mouse, the display area in the main trace window can be modified.


Operation in Overview window

EASY DATA HANDLING

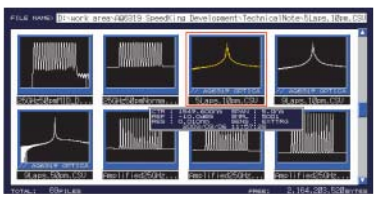
USB & Internal Data Storage

USB STORAGE

The AQ6375 has two USB 1.1 compatible interfaces that support large size removable memory devices such as Flash ROM and hard disk drives (HDD).

LARGE INTERNAL STORAGE (5000+ traces)
The internal storage can save test setups, waveforms, analysis results, and macro program files. It is large enough to save more than five thousand traces.

THUMBNAIL FILE PREVIEW
The Thumbnail file preview function makes it easy to find a particular file out of thousands of files in internal and external storage.


Thumbnail File Preview

Optical Spectrum Analyzer
AQ6375

Building Automated Test Systems

The AQ6375 is equipped with GP-IB, RS-232, and Ethernet (10/100Base-T) interfaces to be connected with an external PC for remote access and building an automated test system. Macro Program is a useful built-in function for making a simple auto test program.

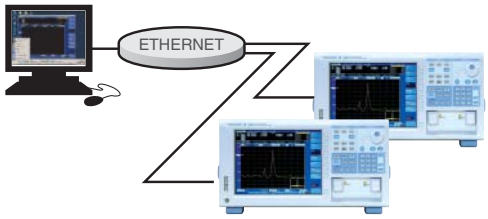
COMPATIBLE WITH SCPI

The standard remote commands of the AQ6375 are compatible with SCPI, which is an ASCII text based standard code and format that conforms to IEEE-488.2.

AQ6317 EMULATION MODE

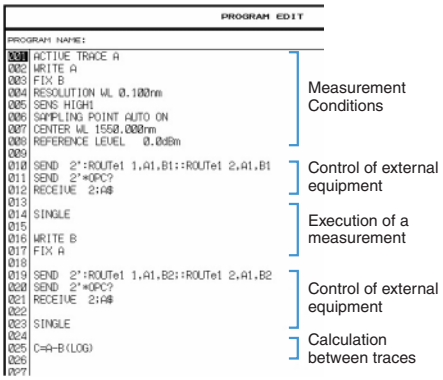
The AQ6375 supports private remote programming codes of Yokogawa's best selling AQ6317 series for users to easily upgrade from their current automated test environment.
(Note. some commands may not be compatible due to changes in specifications and functions.)

LabVIEW® DRIVER available



MACRO PROGRAMMING

Macro programming enables user to easily create test procedures by recording the user's actual key strokes and parameter selections. An external PC is not required because the macro program can also control external equipment through the remote interfaces.



Example of Macro Program

AQ6375 Viewer
- Emulation and Remote Control Software (Optional)

AQ6375Viewer is PC application software designed to work with Yokogawa's AQ6375 Optical Spectrum Analyzer.

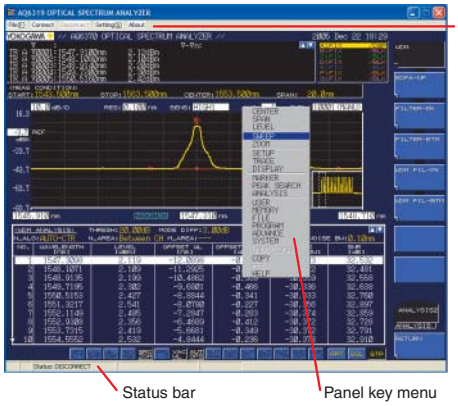
EMULATION

The software has exactly the same user interface and functions as the AQ6375 so that you can easily display and analyze waveform data.

REMOTE CONTROL

Allows to control AQ6375 from anywhere on the Ethernet network. Because of fast data transfer speed of Ethernet, measurement data can be updated in real time.

Note. the data update speed varies depending on network performance and conditions.



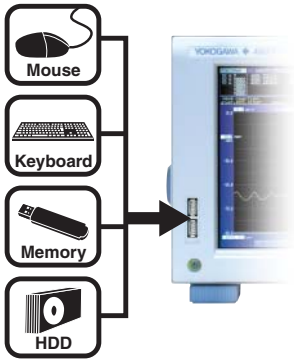
Optical and Electrical Connections

FRONT PANEL

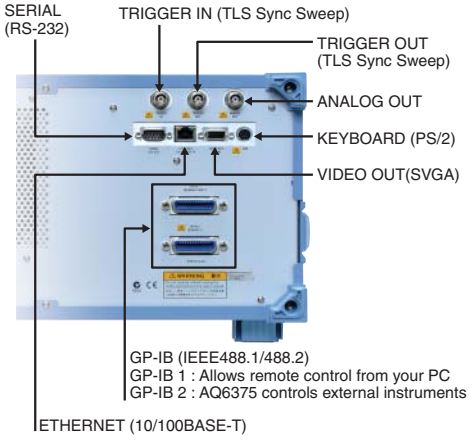
OPTICAL CONNECTORS

The AQ6375 adopts user replaceable optical connector for optical input and calibration output, enabling direct coupling to major optical connector types.

USB 1.1 INTERFACE



REAR PANEL



Specifications

Applicable fiber		SM (9.5/125 μm), GI (50/125 μm, 62.5/125 μm)
Measurement wavelength range 1)		1200 to 2400 nm
Span 1)		0.5 nm to full range and zero span
Wavelength accuracy 1), 2), 3)		±0.05 nm (1520 to 1580 nm) ±0.1 nm (1580 to 1620 nm) ±0.5 nm (Full range)
Wavelength repeatability 1), 2)		±0.015 nm (1 min.)
Measurement data point		101 to 50001
Wavelength resolution setting 1), 2)		0.05, 0.1, 0.2, 0.5, 1.0 and 2.0 nm
Level sensitivity setting 10)		NORM_HOLD, NORM_AUTO, NORMAL, MID, HIGH1, HIGH2 and HIGH3
Level sensitivity 2), 4), 5), 7) (Sensitivity: HIGH3)		-62 dBm (1300 to 1500 nm) -67 dBm (1500 to 1800 nm, 2200 to 2400 nm) -70 dBm (1800 to 2200 nm)
Level accuracy 2), 4), 5), 6)		±1.0 dB (1550 nm, input level: -20 dBm, sensitivity: MID, HIGH1, HIGH2, or HIGH3)
Level linearity 2), 4)		±0.05 dB (Input level: -30 to +10 dBm, sensitivity: HIGH1, HIGH2 or HIGH3)
Maximum input power 2), 4)		+20 dBm (Per channel, full span)
Safe max. input power 2), 4)		+25 dBm (Total safe power)
Close-in dynamic range 1,) 2), 9)		45 dB (Peak ±0.4 nm, 1523 nm, resolution 0.05 nm) 55 dB (Peak ±0.8 nm, 1523 nm, resolution 0.05 nm)
Polarization dependency 2), 4), 6)		±0.1 dB (1550 nm)
Sweep time 1), 7), 8)		NORM AUTO: 0.5 sec, NORMAL: 1 sec, MID: 10 sec, HIGH1: 20 sec
Data storage	Internal memory	64 Traces, 64 programs, 3 template lines
	Internal storage	Max. 128 MByte
	External	USB storage (memory/HDD), FAT32 format
	File type	CSV(text)/Binary, BMP/TIFF
Interface	Remote control	GP-IB, RS-232 and Ethernet (TCP/IP) AQ6317 series compliant commands (IEEE488.1) and IEEE488.2 full support
	Category	GP-IB ×2 (standard/controller), RS-232, Ethernet, USB1.1 ×2, PS/2 (keyboard), SVGA output, Analog output port, Trigger input port, Trigger output port
	Optical connector	Optical input port (free-space): AQ9447 (*) connector adapter required Calibration output port (physical contact): AQ9441 (*) connector adapter required
Printer		Built-in high-speed thermal printer (Factory option)
Display 12)		10.4-inch color LCD (Resolution: 800 × 600)
Power requirement		100 to 240 VAC, 50/60 Hz, approx. 150 VA
Environmental conditions		Operating temperature: +5 to +35°C Storage temperature: -10 to +50°C Humidity: 80 %RH or less (no condensation)
Dimensions and mass 11)		Approx. 426 (W) × 221 (H) × 459 (D) mm, Approx. 27 kg (without printer option)

Note:
1) Horizontal scale: wavelength display mode
2) At 23±5°C, with 9.5/125 μm single mode fiber, after 2 hours of warm-up, after optical alignment with built-in reference light source
3) After wavelength calibration with built-in reference light source, sampling interval: 0.003 nm or less, sensitivity: MID, HIGH1, HIGH2, or HIGH3
4) Vertical scale: absolute power display mode, resolution setting: 0.1 nm or greater
5) 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)
6) Temperature condition changes to 23±3°C for resolution 0.1 nm
7) Pulse light measurement mode: OFF, TLS sync sweep: OFF
8) Span: 100 nm or less, sampling point: 1001, number of average: 1
9) Sensitivity: HIGH 1, HIGH2, or HIGH3
10) Automatically goes to CHOP mode when HIGH1, HIGH2, or HIGH3 is selected
11) Excluding protector and handle
12) Liquid crystal display may include few defective pixels (within 0.002 % with respect to the total number of pixels including RGB). There may be few pixels on the liquid crystal display that do not emit all the time or remains ON all the time. Note that these are not malfunctions.

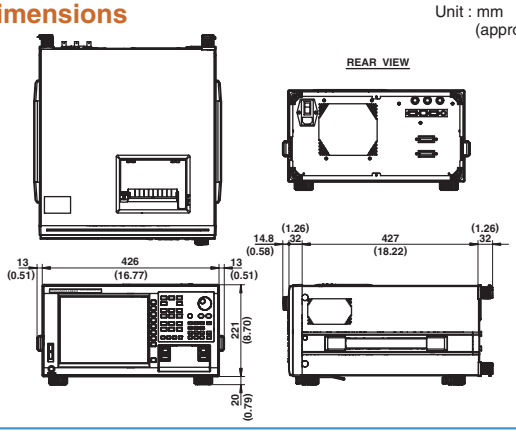
Standard Accessories

Name	Q'ty
Power cable	1
User's manual (1set)	1

Function	Automatic measurement	Macro program function (64 programs, 200 steps)
	Setting of measuring conditions	• Averaging number setting (1 to 999 times) • Automatic measuring condition setting • Sweep between line markers • Zero span sweep (0 nm span) • Automatic measurement data point setting • Pulse light measurement • External trigger measurement • Sweep trigger • Sweep status output • Analog output • TLS synchronized sweep • Air/vacuum wavelength measurement • Pass/Fail judgment with template
	Display	• Level scale (0.1 to 10 dB/div. and linear) • Vertical sub scale (0.1 to 10 dB/div. and linear) • Reference level and position • Vertical division number (8, 10 or 12) • Horizontal scale: wavelength (nm)/ wave number (cm^{-1})/ frequency (THz) • Horizontal scale zoom in/out • Measurement condition display • Noise mask • Data table • Label • Split display • Power spectral density (dB/nm) display, dB/km display, % display • Template display
	Traces	• 7 independent traces • Write/Fix, Display/Blank setting • Max./Min. hold • Calculation between traces • Roll (Sweep) averaging (2 to 100 times) • Normalize • Curve fit/Peak curve fit/Marker curve fit • Trace copy/ clear function
	Marker/Search	• Marker: Delta marker (Max. 1024), Vertical/Horizontal line marker • Search: Peak, Next peak, Bottom, Next bottom, Auto, Search between horizontal line markers, Search in the zooming area
	Analysis	• Spectral width (threshold, envelope, RMS, Peak RMS, notch) • WDM (OSNR) analysis • EDFA-NF analysis • Filter peak/bottom analysis • WDM filter peak/bottom analysis • DFB-LD/ FP-LD/ LED analysis • SMSR analysis • Power analysis • PMD analysis • Pass/Fail judgment with template • Auto analysis • Analysis between horizontal line markers • Analysis in the zooming area
	Other	• Optical alignment function with built-in light source • Wavelength calibration function

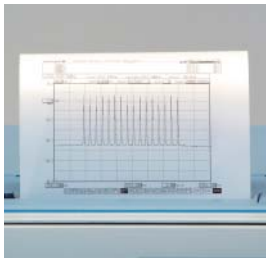
Dimensions

Unit : mm
(approx. inch)



Factory Installed Options

BUILT-IN PRINTER



An optional built-in thermal printer is provided to instantly print out a screenshot of the AQ6375's display, analysis results, a marker list and a macro program list.

Accessory: printer roll paper (1 roll)

OPTICAL CONNECTOR ADAPTERS

For optical input port
AQ9447 Connector Adapter
/FC, /SC, /ST

For calibration output port
AQ9441 Universal Adapter
/RFC, /RSC, /RST

Ordering Information

Model and Suffix Codes

Model	Suffix Codes	Descriptions
735305		Optical Spectrum Analyzer AQ6375
Power cable	-D	Power cord (UL3P)
	-F	Power cord (CEE-C7)
	-R	Power cord (SAA-3P)
	-Q	Power cord (BS3P Rectangular)
	-H	Power cord (BS3P Round)
	-M	Power cord (UL3P with 3P/2P converter)
Factory Installed Options	/FC	AQ9447(FC) Connector adapter for optical input
	/SC	AQ9447(SC) Connector adapter for optical input
	/ST	AQ9447(ST) Connector adapter for optical input
	/RFC	AQ9441(FC) Universal adapter for calibration output
	/RSC	AQ9441(SC) Universal adapter for calibration output
	/RST	AQ9441(ST) Universal adapter for calibration output
	/B5	Built-in thermal printer

Accessories (Optional)

Name		Model	Suffix codes	Specifications
AQ9447 Connector adapter		810804602		For optical Input port
	Connector type		-FCC	FC type
			-SCC	SC type
			-STC	ST type
AQ9441 Universal adapter		813917321		For calibration output port
	Connector type		-FCC	FC type
			-SCC	SC type
			-STC	ST type
Printer roll paper		B9988AE		10 m roll, 10 rolls/1 unit

Related Products

Optical Spectrum Analyzer
AQ6319

600 - 1700 nm
Resolution 10pm

Optical Spectrum Analyzer
AQ6370

600 - 1700 nm
Resolution 20pm

Optical Spectrum Analyzer
AQ6331

PORTABLE 1200 - 1700 nm
Resolution 50pm

Multi Application Test System
AQ2200 system

Modular Platform

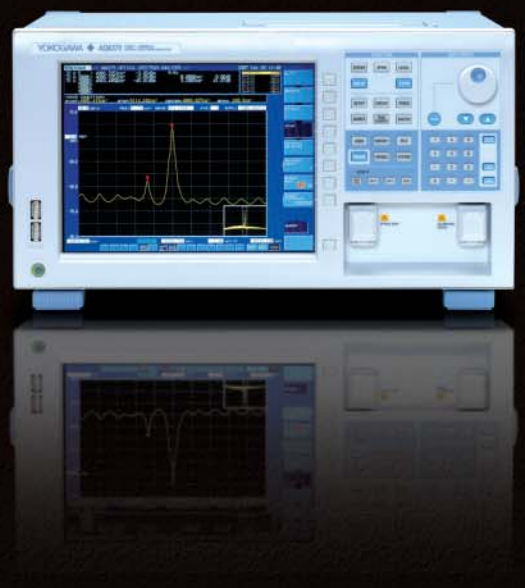
Tunable Laser Source
AQ2200-136

S+C+L band

White Light Source
AQ4305

Broadband

AQ6375 Optical Spectrum Analyzer



Note

- Before operating the product, read the user's manual thoroughly for proper and safe operation.
- If this product is for use with a system requiring safeguards that directly involve personnel safety, please contact the Yokogawa sales offices.

YOKOGAWA

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