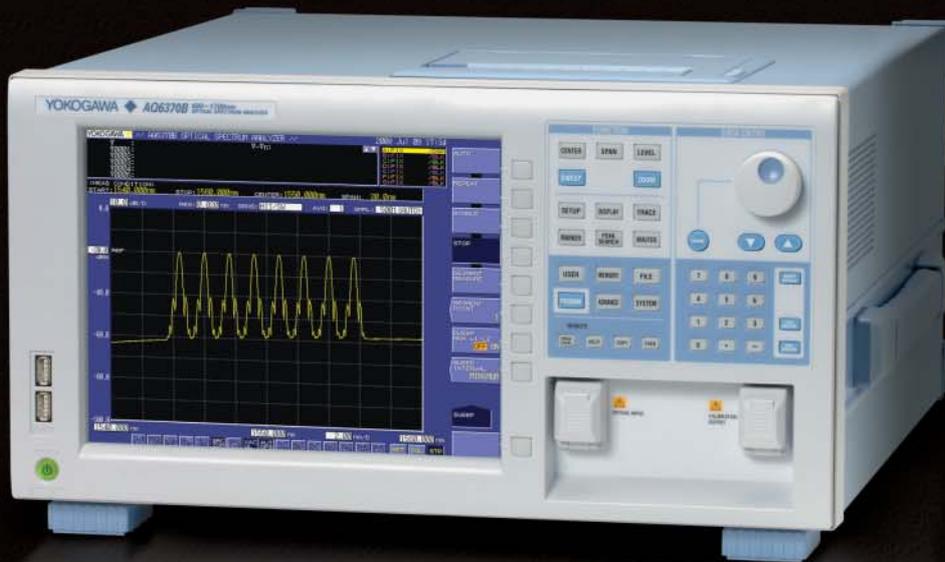


# AQ6370B

## Optical Spectrum Analyzer



● **Drastically Improves Measurement Throughput**

- Fast measurement
- Fast data transfer
- Quick key & command response

● **Enhanced User Interface**

- Mouse and keyboard operation
- Trace zoom capability
- USB interface for storage devices

● **World Class Optical Performance<sup>\*1</sup>**

- High wavelength resolution: 0.02 nm
- Wide close-in dynamic range
- Multimode fiber test capability (up to GI 62.5/125  $\mu$ m)

● **30% Reduced Weight (19kg)<sup>\*2</sup>**

\*1 In the diffraction-grating-based optical spectrum analyzer industry as of July 2008

\*2 In comparison with AQ6317B optical spectrum analyzer.

QUALITY ■ INNOVATION ■ FORESIGHT

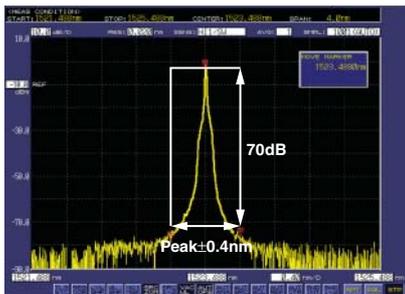


# World Class Optical Performance and Flexibility\*

## EXCELLENT SIGNAL SEPARATION

The AQ6370B uses a newly developed high performance monochromator to achieve high wavelength resolution (0.02 nm) and wide close-in dynamic range (70 dB).

With the sharper spectral characteristics of the new monochromator, OSNR measurement of 50 GHz spacing DWDM transmission systems and EDFA evaluation with multiple wavelength sources can successfully be performed.



Close-in Dynamic Range  
70 dB at peak  $\pm 0.4$  nm, resolution setting 0.02 nm (typical)

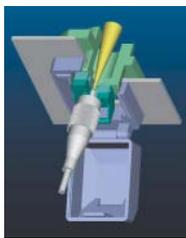
## MULTIMODE FIBER TEST CAPABILITY

The AQ6370B uses a free space input structure that can handle up to GI 62.5/125 multimode fiber. Multimode fiber is commonly used in high speed Ethernet network, such as GE-PON.

The free space input is also beneficial for measurement repeatability as insertion loss variation at the input connector is smaller than the other input type which has an optical fiber inside the monochromator.



Sample waveform of an 850nm laser with a multimode fiber (62.5/125 mm)



Structure of the free space monochromator input

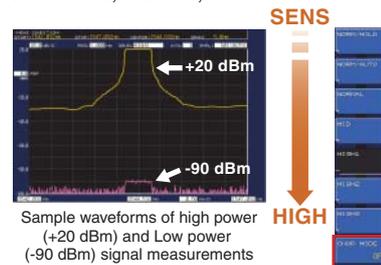
## WIDE MEASUREMENT RANGE

### Power: +20 dBm to -90 dBm

The AQ6370B can measure optical power as high as +20 dBm, which enables direct measurement of high power sources such as optical amplifiers and pump lasers for Raman amplifiers. Measurement sensitivity can be chosen from seven categories according to test applications and measurement speed requirements.

### Wavelength: 600 nm to 1700 nm

The AQ6370B covers not only telecommunication wavelengths, but also the visible light wavelength region which is used for home electronics, medical, and industrial material applications.



Sample waveforms of high power (+20 dBm) and Low power (-90 dBm) signal measurements

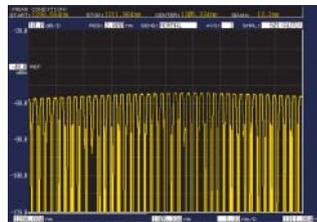
**Level sensitivity settings:**  
NORM Hold, NORM Auto, NORM, MID, and HIGH (1, 2, and 3), that correspond to sensitivity from -60 dBm through -90 dBm.

**High dynamic range mode setting:**  
SWITCH mode is to obtain a better dynamic range by reducing an influence of stray-light. They are applicable in MID and HIGH mode.

## PULSED LIGHT MEASUREMENT CAPABILITY

The AQ6370B can catch the peak power of a pulsed signal using PEAK HOLD or using an externally provided trigger to synchronize with the measured signal. It can be applied to the transmission loop testing of telecommunication systems, and also to the low power measurement at the early stage of laser chip development since it works in the high sensitivity modes.

CW light measurement mode



Pulsed light measurement mode



Sample waveform of a pulsed light signal

\* In the diffraction-grating-based optical spectrum analyzer industry as of July 2008

# Real-Time Remote Operation for Monitoring and Troubleshooting

## AQ6370 Viewer (Optional Application Software)

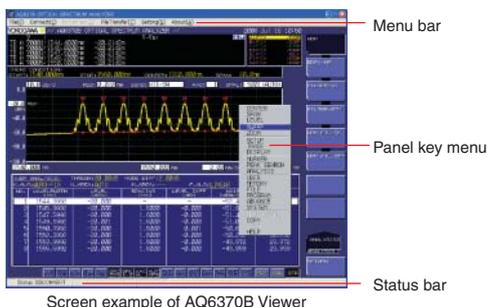
The AQ6370Viewer is a package of the PC application softwares for AQ6370, AQ6370B, and AQ6375.

The AQ6370BViewer is designed to work with the AQ6370B Optical Spectrum Analyzer. It has the same user interface and functions as the AQ6370B so that you can easily display and analyze waveform data acquired by the AQ6370B.

### Viewer function

Trace data files saved on the AQ6370B can be retrieved and analyzed on a PC.

Note. Measurement cannot be initiated in the Viewer mode.



Screen example of AQ6370B Viewer

## Remote Control function

The remote control allows you to set measurement conditions and to execute a measurement on AQ6370B Optical Spectrum Analyzer from anywhere on the Ethernet network. Upon completion of a measurement on AQ6370B, AQ6370BViewer downloads and shows the updated traces.

Note. The program function is not supported. Some other restrictions may apply.

## File Transfer function

Files can be exchanged between AQ6370B and PC. Program files edited on AQ6370B Viewer can also be transferred to AQ6370B.



## PC Requirements

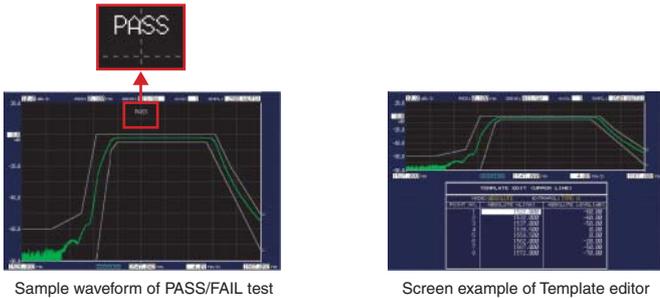
- <Hardware> HDD: 50 MB or more of available disk space  
Memory: 512 MB or more
- <OS> Windows 2000 (Service Pack 4 or later) or  
Windows XP (Service Pack 1 or later)

\*Windows 2000 and Windows XP are registered trademarks of Microsoft Corporation of the United States.

## Advantageous Functions

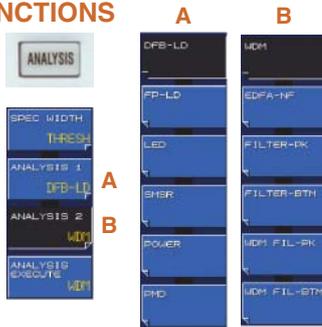
### PASS/FAIL AUTO TEST FUNCTION

The waveform can automatically be judged to PASS or FAIL against specified conditions. Using Template function upper and/or lower limits for the assessment can be set and measured waveform can automatically be compared. It is an effective way to reduce time and human error in assessment, especially for production line tests. The template data can be created and stored in the AQ6370B. It can be edited using a spread sheet on an external computer as well.



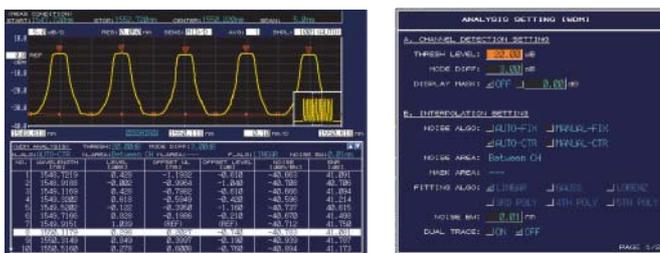
### 13 AUTO ANALYSIS FUNCTIONS

Thirteen types of built-in analysis functions for popular applications can be selected by using Analysis function key on front panel or by mouse operation. The functions automatically perform designated analyses and provide results. The results can be saved in a storage device.



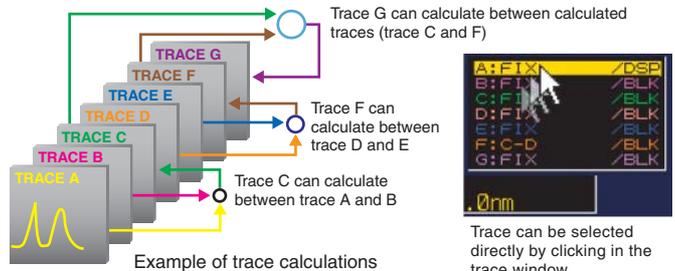
Analysis Parameter Window  
All parameters for an individual analysis are displayed in a dialog box for easy setup.

- WDM analysis (OSNR)
- WDM-NF analysis (EDFA)
- DFB-LD analysis
- Filter analysis, etc.



### 7 TRACES & CALCULATION FUNCTIONS

The AQ6370B has seven individual traces for measurement data. Some traces can be used for calculations (two-trace subtraction and addition), MAX/MIN hold, averaging, and curve fitting.

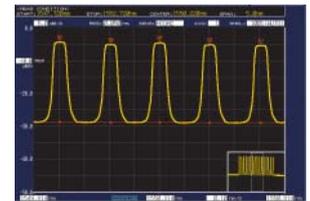


### Enhanced Curve Fit function

The Curve fit function is an approximation technique to exclude an influence of noise and/or signal overlapping on the waveform. Curve fit method can be chosen from Gaussian, Lorenz, 3rd Poly, 4th Poly, and 5th Poly. Curve fit can be applied to an individual trace. Fitting area can be set by line markers (L1 and L2).

#### Analysis mode

When WDM or WDM-NF analysis is executed, one of the curve fit methods is used for a baseline measurement. The curve fit method can be specified in the parameter window of each analysis.



#### Example of curve fitting in selected areas

Noise level of amplified WDM signal can be estimated by using the curve fit in selected areas, even if noise between signals cannot be seen due to a limit of signal separation performance.

#### Marker fitting

The fitting curve can also be applied to the marker positions set by user. For example, this can be used to measure a modulated signal spectrum.



## Connectivity

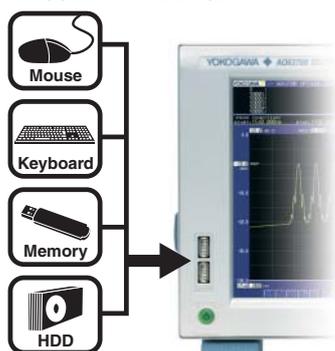
### FRONT PANEL

#### OPTICAL CONNECTORS (USER EXCHANGEABLE)

The AQ6370B adopts a universal type optical connector system for optical input and calibration output enabling direct coupling to major optical connector types. The connectors can be replaced by users.

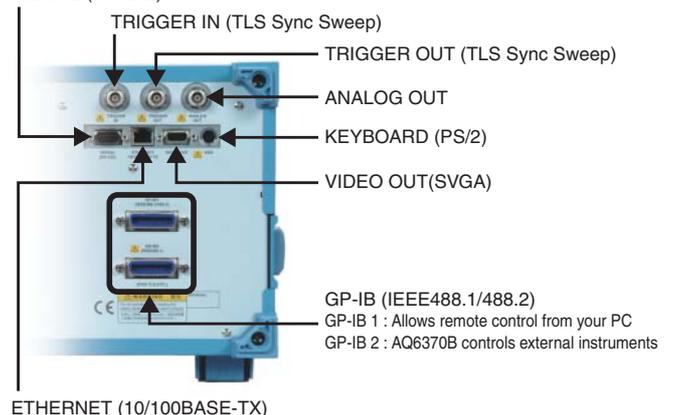


#### USB 1.1 INTERFACE



### REAR PANEL

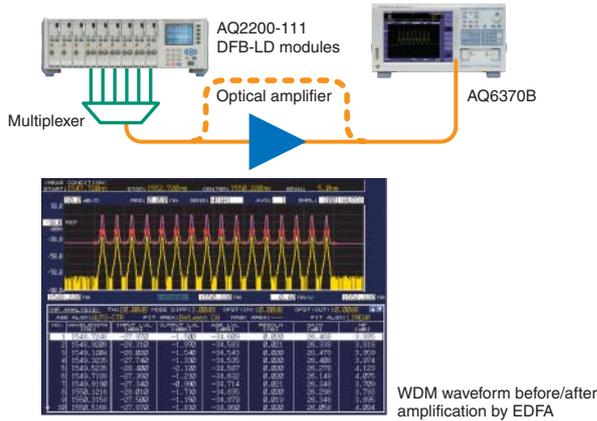
#### SERIAL (RS-232)



# Applications

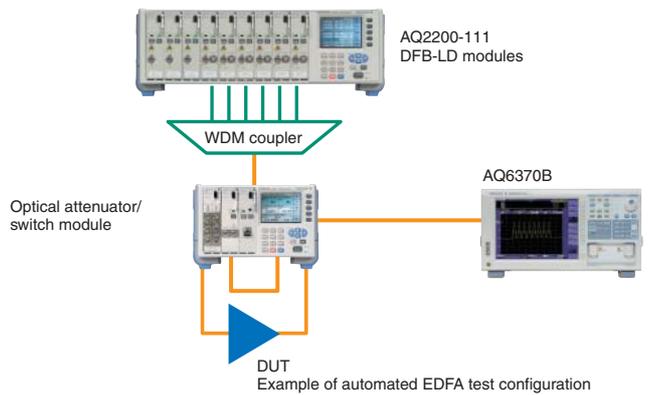
## SIMPLE EDFA TEST

The ASE interpolation method is used to measure gain, NF, and key parameters for optical fiber amplifier evaluation. With WDM-NF analysis function, up to 1024 channels of multiplexed signals can simultaneously be tested. An ASE level for NF measurements is calculated by using a curve-fit function for each WDM channel. The curve-fit and source spontaneous emission (SSE) suppress function enhance a measurement accuracy.



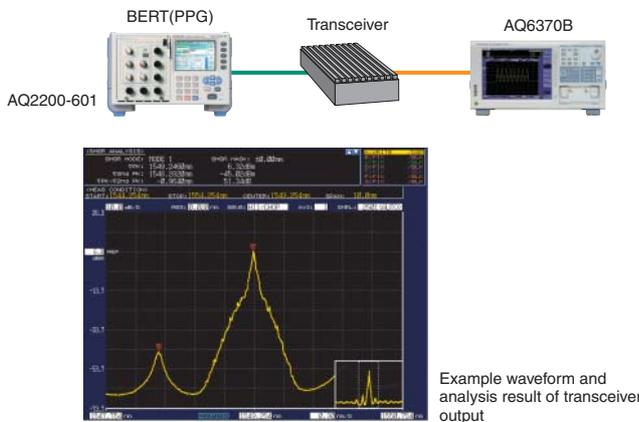
## AUTOMATED EDFA TEST

In conjunction with DFB-LDs, optical attenuator and optical switches, an EDFA auto test system can easily be established. This system does not require manual reconfiguration of optical paths and adjustments of EDFA input power, and that improves measurement throughput and avoids a human error. AQ2200 series is a modular system suitable for building such a system.



## TRANSCIEVER / LD TEST

In conjunction with bit error rate test (BERT) equipment, the AQ6370B can measure the center wavelength and spectral width of transceivers and LD modules. Various built-in analysis functions, such as DFB-LD, FP-LD (VCSEL), and LED facilitate test process.

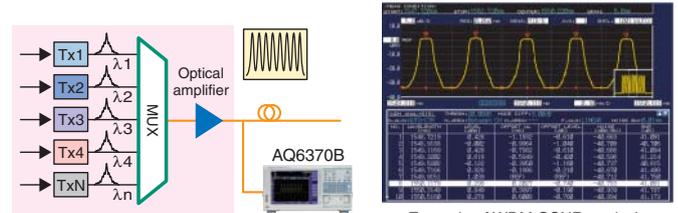


## WDM OSNR TEST

AQ6370B's wide close-in dynamic range allows accurate OSNR measurement of DWDM transmission systems (up to 50 GHz spacing). The built-in WDM analysis function analyzes the measured waveform and shows peak wavelength, peak level and OSNR of WDM signals up to 1024 channels simultaneously. The curve fit function is used to accurately measure noise levels.

Label	Label	Label	THRESHOLD	OSNR	MODE	OFFSET	UNIT	UNIT	UNIT	UNIT	UNIT
1	1548.0219	0.238	-1.1932	-0.610	-40.883	41.201					
2	1548.0188	0.002	-0.6954	-1.840	-40.706	40.705					
3	1548.1168	0.423	-0.7832	-0.910	-40.368	41.894					
4	1549.3332	0.018	-0.5869	-0.420	-40.596	41.214					
5	1549.5332	0.122	-0.3950	-1.180	-40.737	40.815					
6	1549.7168	0.333	-0.1500	-0.210	-40.570	41.895					
7	1549.9151	1.839	(REF)	(REF)	-40.712	41.763					
8	1550.1170	0.403	0.6392	-0.420	-40.788	41.631					
9	1550.3163	0.949	0.2557	-0.130	-40.859	41.767					
10	1550.5148	0.270	0.4239	-0.780	-40.894	41.173					

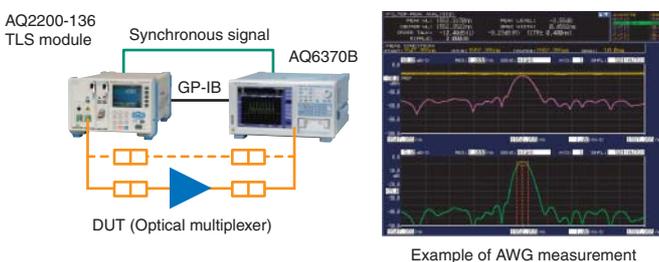
Example of analyzed data table



## PASSIVE COMPONENT TEST

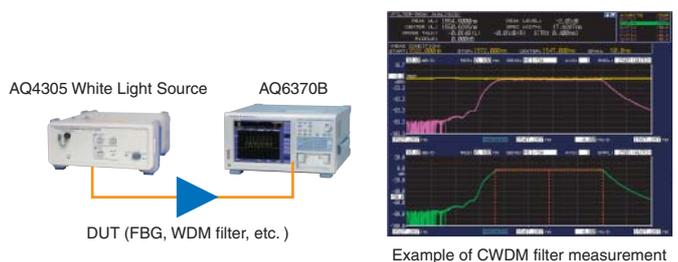
Wide dynamic range measurement using a synchronous wavelength sweep function\* of a tunable laser source and optical spectrum analyzer is suitable for evaluating passive devices and components with a high crosstalk ratio. The tunable laser source emits a single wavelength, and the AQ6370B's filter characteristics cuts source spontaneous emission and scattered light. Thus, this system can achieve wide dynamic range over 70 dB.

\* TLS SYNC function. It supports AQ4320, AQ4321 and AQ2200-136 Tunable Laser Source.



In conjunction with a white light source, an ASE light source or other broadband light source, you can simply perform evaluation of passive devices such as WDM filters and FBG. The AQ6370B's superb optical characteristics enable higher-resolution and wider dynamic range measurements.

The built-in optical filter analysis function simultaneously reports peak/bottom wavelength, level, crosstalk, and ripple width.



# Optical Spectrum Analyzer AQ6370B

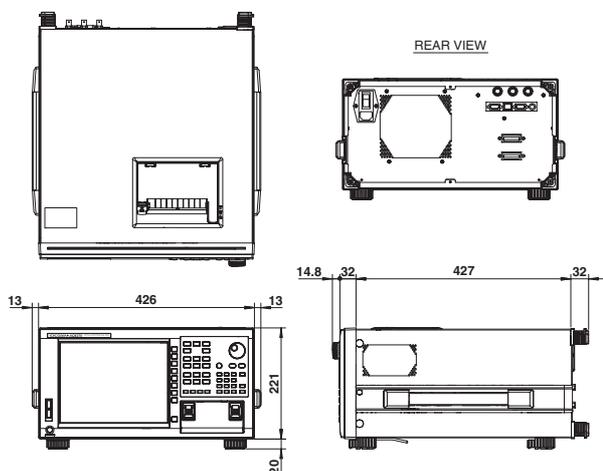
## Specifications

Applicable fiber	SM (9.5/125 μm), GI (50/125 μm, 62.5/125 μm)
Measurement wavelength range <sup>1)</sup>	600 to 1700 nm
Span <sup>1)</sup>	0.5 nm to full range and zero span
Wavelength accuracy <sup>1), 2), 3)</sup>	±0.02 nm (1520 to 1580 nm) ±0.04 nm (1450 to 1520 nm, 1580 to 1620 nm) ±0.1 nm (Full range)
Wavelength linearity <sup>1), 2), 3)</sup>	±0.01 nm (1520 to 1580 nm) ±0.02 nm (1450 to 1520 nm, 1580 to 1620 nm)
Wavelength repeatability <sup>1), 2)</sup>	±0.005 nm (1 min.)
Measurement data point	101 to 50001
Wavelength resolution setting <sup>1), 2)</sup>	0.02, 0.05, 0.1, 0.2, 0.5, 1.0 and 2.0 nm
Resolution accuracy <sup>1), 2), 3)</sup>	±5 % (1450 to 1620 nm, resolution setting: 0.1 to 2.0 nm, resolution correction: ON, measurement data point setting: AUTO)
Level sensitivity setting	NORM_HOLD, NORM_AUTO, NORMAL, MID, HIGH1, HIGH2 and HIGH3
High dynamic range mode	Switch (Sensitivity: MID, HIGH1, HIGH2 and HIGH3)
Level sensitivity <sup>2), 4), 5), 7)</sup> (resolution: 0.05 nm or wider) (Sensitivity: HIGH3)	-90 dBm (1300 to 1620 nm) -80 dBm (1000 to 1300 nm) -60 dBm (600 to 1000 nm)
Level accuracy <sup>2), 4), 5), 6)</sup>	±0.4 dB (1310/1550 nm, input level: -20 dBm, sensitivity: MID, HIGH1, HIGH2 and HIGH3)
Level linearity <sup>2), 4)</sup>	±0.05 dB (Input level: -50 to +10 dBm, sensitivity: HIGH1, HIGH2 and HIGH3)
Level flatness <sup>2), 4), 6)</sup>	±0.1 dB (1520 to 1580 nm) ±0.2 dB (1450 to 1520 nm, 1580 to 1620 nm)
Maximum input power <sup>2), 4)</sup>	+20 dBm (Per channel, full span)
Safe max. input power <sup>2), 4)</sup>	+25 dBm (Total safe power)
Close-in dynamic range <sup>1), 2), 9)</sup> (at 1523 nm)	37 dB (±0.1 nm from peak, resolution: 0.02 nm) 55 dB (±0.2 nm from peak, resolution: 0.02 nm) 45 dB (±0.2 nm from peak, resolution: 0.05 nm) 62 dB (±0.4 nm from peak, resolution: 0.05 nm) 40 dB (±0.2 nm from peak, resolution: 0.1 nm) 57 dB (±0.4 nm from peak, resolution: 0.1 nm)
Polarization dependency <sup>2), 4), 6)</sup>	±0.05 dB (1550/1600 nm) ±0.08 dB (1310 nm)
Sweep time <sup>1), 7), 8)</sup>	Per sensitivity mode; NORM_AUTO: 0.5 sec NORMAL: 1 sec MID: 2 sec HIGH1: 5 sec HIGH2: 20 sec HIGH3: 75 sec

Function	Automatic measurement	Macro program function (64 programs, 200 steps)
	Setting of measuring conditions	Center wavelength setting, Span setting, Measurement data point setting, Wavelength resolution setting, Sensitivity setting, High dynamic range mode setting, Averaging number setting (1 to 999 times), Automatic measuring conditions setting, Sweep between line markers, zero span sweep, 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 setting (0.1 to 10 dB/div. and linear), Vertical sub scale setting (0.1 to 10 dB/div. and linear), Reference level and position setting, Vertical division number setting (8, 10 or 12), Frequency horizontal scale display, Horizontal scale zoom in/out display, Measurement condition display, Noise mask, Data table, Label, Split display, % display, dB/nm (power spectral density) display, dB/km display, Template display
	Traces	7 independent traces, Write/Fix setting, Display/Blank setting, Max./Min. hold, calculation between traces, Roll (Sweep) averaging (2 to 100 times), Normalized, Curve fit/Peak curve fit/Marker curve fit, Trace copy function, Trace clear function
	Marker/Search	Delta marker (Max. 1024), Vertical/Horizontal line marker, Peak search, Next peak search, Bottom search, Next bottom search, Auto search, 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 analysis, FP-LD analysis, 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	Self optical alignment function with built-in light source, Self wavelength calibration function
Data storage	Internal memory	64 Traces, 64 programs, 3 template lines
	Internal storage	Max. 128 MByte
	External	USB storage (memory/HDD) Capability, FAT32 format
	File type	CSV(text)/Binary, BMP/TIFF
Interface	Remote control	GPIO, RS-232C and Ethernet (TCP/IP) AQ6317 series compliant commands (IEEE488.1) and IEEE488.2 full support
	Category	GPIO x2 (standard/controller), RS-232C, Ethernet, USB1.1 x2, PS/2 (keyboard), SVGA output, Analog output port, Trigger input port, Trigger output port
	Optical connector	Free space optical input: Requires AQ9447 (*) connector adapter PC contact built-in light source output: Requires AQ9441 (*) Universal adapter
Printer		Built-in high-speed thermal printer (Factory option)
Display <sup>11)</sup>		10.4-inch color LCD (Resolution: 800 x 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 <sup>10)</sup>		Approx. 426 (W) x 221 (H) x 459 (D) mm, Approx. 19 kg (without printer option)

## Dimensions

Unit : mm  
(approx. inch)



### Note:

- 1) Horizontal scale: wavelength display mode
- 2) At 23±5°C, with 10/125 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
- 4) Vertical scale: absolute power display mode, resolution setting: 0.05 nm or wider, resolution correction: OFF
- 5) With 10/125 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 at 0.05 nm resolution setting.
- 7) High dynamic range mode: OFF, pulse light measurement mode: OFF, TLS sync sweep: OFF, resolution correction: OFF
- 8) Span: any 100 nm or less, measurement data point: 1001, average number: 1
- 9) High dynamic range mode: SWITCH, resolution correction: OFF
- 10) Excluding feet and handles
- 11) 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	Qty
Power cable	1
User's manual (1set)	1

# Optical Spectrum Analyzer AQ6370B

## Factory Installed Options

### BUILT-IN PRINTER

An optional built-in thermal printer is provided to instantly print out a screenshot of the AQ6370B'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
735302		Optical Spectrum Analyzer AQ6370B
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
AQ6370 Viewer	735371		
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**



**Superior Performance**

Optical Spectrum Analyzer  
**AQ6375**



**Long Wavelength (1200 to 2400)**

White Light Source  
**AQ4305**



**Broadband**

Tunable Laser/DFB-LD Sources  
**AQ2200 Series**



**Modular Platform**

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#### 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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