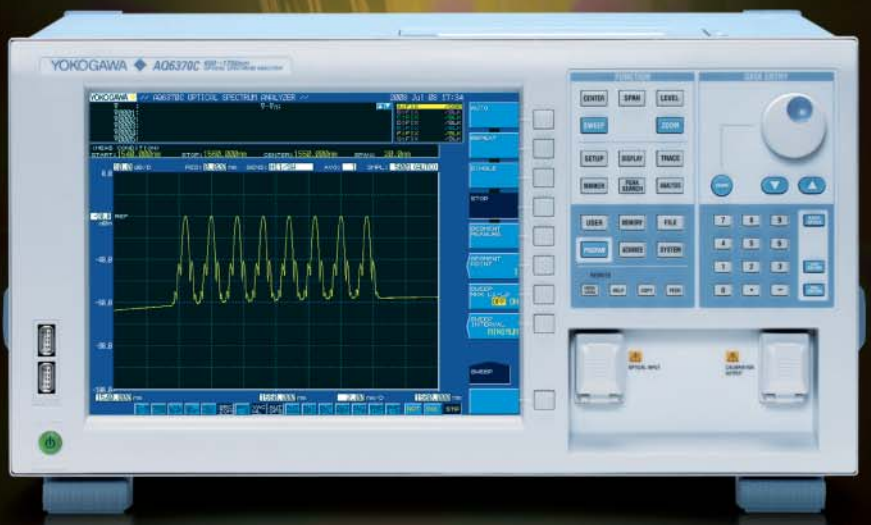
YOKOGAWA

AQ6370C

Optical Spectrum Analyzer



World-class Optical Performance

- Wavelength range: 600 to 1700nm
- High wavelength accuracy: ±0.01nm
- High wavelength resolution: 0.02nm
- Wide dynamic range: 78dB typ.
- Wide level range: +20 to -90dBm
- Fast measurement: 0.2 sec. (100nm span)
- Applicable to single-mode and multimode fibers

QUALITY ■ INNOVATION ■ FORESIGHT

For more information, go to
tmi.yokogawa.com
Test & Measurement Instruments

Bulletin AQ6370C-01EN

Improved World-class Optical Performance

Standard and High-performance models NEW

There are two models available, Standard and High performance. The High performance model provides even higher wavelength accuracy and dynamic range.

High wavelength resolution: 0.02nm

High wavelength accuracy: ±0.01nm NEW

- High performance model: ±0.01nm (C band)
- Standard model: ±0.02nm (C+L band)

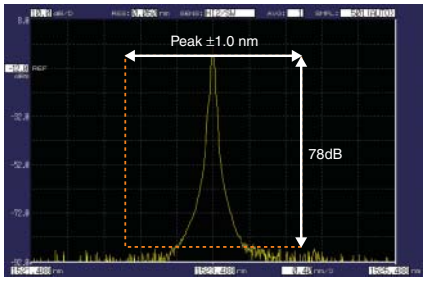
Wavelength range	Standard (-10)	High performance (-20)
1520 to 1580 nm	±0.02 nm	±0.01 nm
1580 to 1620 nm	±0.02 nm	±0.02 nm
1450 to 1520 nm	±0.04 nm	±0.04 nm
Full range	±0.1 nm	±0.1 nm

Ultra-High dynamic range: 78dB typ. NEW

With the reduced stray-light in the monochromator, AQ6370C achieves ultra-high dynamic range of typ. 78dB.

	Standard (-10)	High performance (-20)
Peak±1.0 nm	73 dB	73 dB (Typ.78dB)
Peak±0.4 nm	62 dB	64 dB (Typ.70dB)
Peak±0.2 nm	45 dB	50 dB (Typ.55dB)

* Resolution setting 0.05 nm



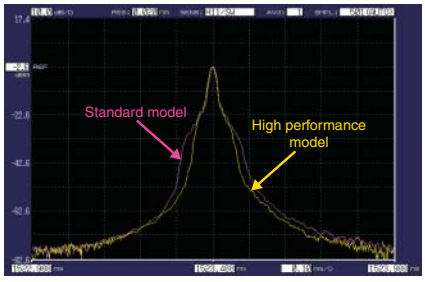
Example of the dynamic range
Peak ±1.0nm, Resolution setting 0.05 nm, High dynamic mode: ON, High performance model

■Sharper filter edge NEW

The high performance model can also achieve a higher dynamic range within 0.2nm of the peak wavelength. With the sharper spectral characteristics of the monochromator, spectral signals in close proximity can be separated clearly and measured accurately.

	Standard (-10)	High performance (-20)
Peak±0.2 nm	55 dB	58 dB (Typ.60dB)
Peak±0.1 nm	37 dB	45 dB (Typ.50dB)

* Resolution setting 0.02 nm



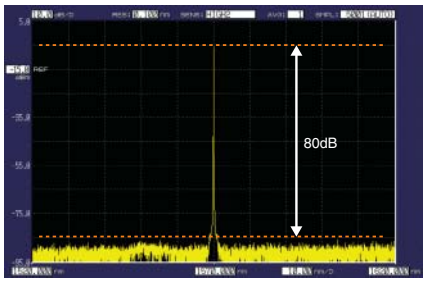
Example of the spectral shape

Stray-light suppression ratio: 80dB typ. NEW

This new specification provides stray-light suppression capability without the High dynamic mode, which takes a longer measurement time. The AQ6370C contributes to shortening the measurement time with the high stray light suppression ratio.

Standard (-10)	High performance (-20)
73dB	76dB (Typ.80dB)

* Resolution setting 0.1 nm



Example of the stray-light suppression ratio
High dynamic mode: OFF, Resolution setting 0.1 nm, High performance model

Wide level range: +20dBm to -90dBm

The AQ6370C can measure high power sources such as optical amplifiers and pump lasers for Raman amplifiers, and very weak optical signals as well. Measurement sensitivity can be chosen from seven categories according to test applications and measurement speed requirements.

■Improved level sensitivity: -85dBm (1000 to1300nm) NEW

■Smoothing function NEW

Reduce noise on the measured spectrum.

- **High dynamic mode**
  Obtain a better dynamic range by reducing the influence of stray-light, which is caused when the input is a strong optical signal.

Free Space Input

- **Multimode and single mode fiber on the same OSA. AQ6370C's low insertion loss for multimode fiber is also beneficial to maintain the excellent measurement efficiency.**
- **Small insertion loss variation at the input connector increases measurement repeatability.**
- **No damage connecting fibers because there is no physical contact.**

■APC level correction NEW

The APC level correction function corrects the level offset caused by an insertion loss of angled PC connector.

Excellent efficiency

Fast measurement: 0.2 sec. (100nm span) NEW

With an advanced monochromator, faster electrical circuits, and noise reduction techniques, the AQ6370C can measure a 100nm wavelength span in 0.2 sec. even when measuring a steep spectrum from DFB-LD or DWDM signals, or when measuring a low power signal from a broadband light source.

Fast Remote Interface (Ethernet, GP-IB)

Wide Span Sweep yet High Resolution

The 50,001 data sampling points expands measurement range in a single sweep while keeping a high wavelength resolution. This makes your measurement easier and more efficient than conventional systems.

Easy Operation

Trace zooming

- **Change display conditions, such as center wavelength and span, by clicking and dragging the mouse.**
- **Enlarge your area of interest instantly and move it at will.**

Mouse & Keyboard operation

- **Front panel operation proven intuitive and easy to use by our many of users.**
- **Even easier with a mouse.**
- **The keyboard helps enter labels and file names.**

Easy Data Handling

USB storage

USB interfaces support large-capacity removable memory and hard disk drives.

512MB Internal memory NEW

for over 20,000 traces.

All-at-Once trace filing NEW

All seven traces can be saved in one file at once.

Various Analysis Functions

7 individual traces

- Simultaneous multi-trace display
- Calculation between traces (subtraction between traces)
- Max/Min hold

13 spectral analysis functions

for popular applications, such as:

- **Spectral width analysis**
- **WDM (OSNR) analysis**
- **WDM-NF (EDFA) analysis**
- **DFB-LD analysis**
- **FP-LD analysis**
- **LED analysis**
- **SMSR analysis**
- **Various filter analysis**

With the macro programming, multiple analyses can be combined and executed automatically.

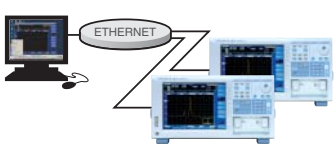
Building Automated Test System

Macro Programming

- **Build a simple auto-measurement system without an external controller.**
- **Easy to create test program by recording the user's actual key strokes and parameter selections.**

Fast remote Interfaces

- **GP-IB, RS-232, and Ethernet (10/100Base-T) interfaces**
- **Improve the testing throughput of test systems by the fast measurement, command processing, and data transfer speed.**
- **SCPI compatible commands and AQ6317 Emulation Mode**
- **LabVIEW® Driver available**



Easy to Keep Accurate

Ambient condition change, vibration and shock to an optical precision product, like an optical spectrum analyzer, will effect the optical components, and eventually degrade optical performance. Using standard functions, The AQ6370C can maintain its high optical performance within a couple of minutes so that you can quickly start a measurement.

Built-in wavelength reference source

The AQ6370C comes equipped with a wavelength reference source for the wavelength calibration and optical alignment.

Wavelength calibration function

Automatically calibrates with the built-in wavelength reference or an external light source, to ensure the wavelength accuracy.

Optical alignment function

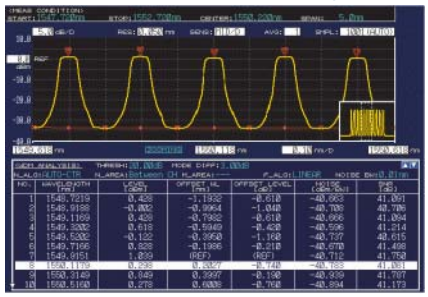
Automatically aligns the optical path in the monochromator using the built-in source to maintain high performance.

Applications

AQ6370C's overall high performance can cover not only manufacturing of optical devices and optical transmission systems but also research and development, and a variety of other applications.

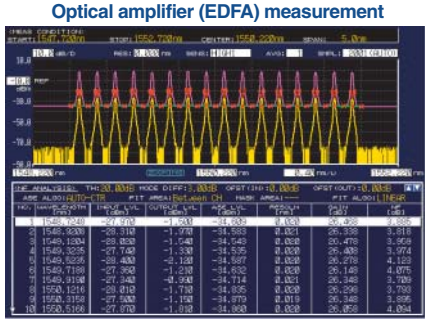
- **Optical active devices**
  (Laser diode/Fiber laser/Optical amplifier/Optical transceiver)
- **Optical passive devices**
  (Filter/FBG/AWG/WSS/ROADM/Optical fiber)
- **Optical transmission equipment (DWDM, CWDM)**
- **Development support of Applied photonics equipment**

OSNR measurement on DWDM system



AQ6370C's wide close-in dynamic range allows accurate OSNR measurement of DWDM transmission systems. 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.

Optical amplifier (EDFA) measurement



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.

AQ6370C
Optical Spectrum Analyzer

Major Specifications

Items		Specifications	
Spec-code		Standard (-10)	High performance (-20)
Wavelength range *1		600 to 1700 nm	
Span *1		0.5 nm to 1100 nm (full span), and 0nm	
Wavelength accuracy *1, *2, *5		±0.02 nm (1520 to 1580 nm) ±0.02 nm (1580 to 1620 nm) ±0.04 nm (1450 to 1520 nm) ±0.1 nm (Full range)	±0.01 nm (1520 to 1580 nm) ±0.02 nm (1580 to 1620 nm) ±0.04 nm (1450 to 1520 nm) ±0.1 nm (Full range)
Wavelength linearity *1, *2, *5		±0.01 nm (1520 to 1580 nm) ±0.02 nm (1450 to 1520 nm, 1580 to 1620 nm)	
Wavelength repeatability *1, *2		±0.005 nm (1 min.)	
Wavelength resolution setting *1, *2		0.02, 0.05, 0.1, 0.2, 0.5, 1 and 2 nm	
Wavelength resolution accuracy *1, *2, *5		±5 % (1450 to 1620 nm, Resolution setting: ≥0.1 nm, Resolution correction: ON, Number of sampling: AUTO)	
Min. sampling resolution *1		0.001 nm	
Number of sampling		101 to 50001, AUTO	
Level sensitivity setting		NORM_HOLD, NORM_AUTO, NORMAL, MID, HIGH1, HIGH2 and HIGH3	
High dynamic mode		SWITCH (Sensitivity: MID, HIGH1-3)	
Level sensitivity *2, *3, *4, *7		-90 dBm (1300 to 1620 nm), -85 dBm (1000 to 1300 nm), -60 dBm (600 to 1000 nm) (Sensitivity: HIGH3)	
Maximum input power *2, *3		+ 20 dBm (Per channel, full range)	
Maximum safe input power *2, *3		+ 25 dBm (Total input power)	
Level accuracy *2, *3, *4, *6		±0.4 dB (1310/1550 nm, Input level: -20 dBm, Sensitivity: MID, HIGH1-3)	
Level linearity *2, *3		±0.05 dB (Input level: -50 to +10 dBm, Sensitivity: HIGH1-3)	
Level flatness *2, *3, *6		±0.1 dB (1520 to 1580 nm), ±0.2 dB (1450 to 1520 nm, 1580 to 1620 nm)	
Polarization dependence *2, *3, *6		±0.05 dB (1550/1600 nm), ±0.08 dB (1310 nm)	
Dynamic range *1, *2, *8	Resolution: 0.02 nm	55 dB (Peak±0.2 nm) 37 dB (Peak±0.1 nm)	58 dB (Peak±0.2 nm, Typ.60dB) 45 dB (Peak±0.1 nm, Typ.50dB)
	Resolution: 0.05 nm	73 dB (Peak±1.0 nm) 62 dB (Peak±0.4 nm) 45 dB (Peak±0.2 nm)	73 dB (Peak±1.0 nm, Typ.78dB) 64 dB (Peak±0.4 nm, Typ.70dB) 50 dB (Peak±0.2 nm, Typ.55dB)
	Resolution: 0.1 nm	57 dB (Peak±0.4 nm) 40 dB (Peak±0.2 nm)	60 dB (Peak±0.4 nm, Typ.67dB) 45 dB (Peak±0.2 nm, Typ.50dB)
Stray-light suppression ratio *7, *10		73dB	76dB (Typ. 80dB)
Optical return loss *11		Typ. 35dB (with angled-PC connector)	
Applicable fiber		SM (9.5/125 µm), GI (50/125 µm, 62.5/125 µm)	
Optical connector		Optical input : AQ9447 (*) Connector adapter (option) required. Calibration output: AQ9441 (*) Universal adapter (option) required. (*):connector type FC, SC, or ST type	
Built-in calibration light source		Wavelength reference source (For optical alignment and wavelength calibration)	
Sweep time *1, *7, *9		NORM_AUTO: 0.2 sec, NORMAL: 1 sec, MID: 2 sec, HIGH1: 5 sec, HIGH2: 20 sec, HIGH3: 75sec	
Warm-up time		Minimum 1 hour (After warming up, optical alignment adjustment with built-in light source is required.)	
Electrical interface		GP-IB × 2 (standard/controller), RS-232, Ethernet, USB, PS/2 (keyboard), SVGA output, Analog output port, Trigger input port, Trigger output port	
Remote control *12		GP-IB, RS-232, Ethernet (TCP/IP) AQ6317 series compatible commands (IEEE488.1) and IEEE488.2	
Data storage		Internal storage: 512M Bytes, Internal memory: 64 Traces, 64 programs, 3 template lines, External storage: USB storage (memory/HDD), FAT32 format File types: CSV (text), Binary, BMP, TIFF	
Display *13		10.4-inch color LCD (Resolution: 800 × 600)	
Printer		Built-in thermal printer (Factory installed option)	
Dimensions		426 (W) × 221 (H) × 459 (D) mm (Excluding protector and handle)	
Mass		Approx. 19kg (Without printer option)	
Power requirement		100 to 240 VAC, 50/60 Hz, approx. 150 VA	
Environmental conditions		Performance guarantee temperature: + 18 to + 28 °C, Operating temperature: +5 to +35 °C, Storage temperature: -10 to +50 °C, Humidity: ≤80 %RH (no condensation)	

Model and suffix code

Model	Suffix code	Descriptions	
AQ6370C		AQ6370C Optical Spectrum Analyzer	
Spec-code	-10	Standard	
	-20	High performance	
Power cord	-D	UL/CSA Standard	
	-F	VDE Standard	
	-R	AS Standard	
	-Q	BS Standard	
	-H	GB Standard	
Factory installed options	/FC	AQ9447(FC) Connector adapter	for optical input
	/SC	AQ9447(SC) Connector adapter	
	/ST	AQ9447(ST) Connector adapter	
	/RFC	AQ9441(FC) Universal adapter	for calibration output
	/RSC	AQ9441(SC) Universal adapter	
	/RST	AQ9441(ST) Universal adapter	
	/B5	Built-in thermal printer	

Accessories (optional)

Model	Suffix code	Descriptions
735371		AQ6370 Viewer (Including AQ6370, AQ6370B, AQ6370C, AQ6375, and AQ6373 Viewers)
810804602		AQ9447 Connector Adapter
Connector type	-FCC	FC type
	-SCC	SC type
	-STC	ST type
813917321		AQ9441 Universal Adapter
Connector type	-FCC	FC type
	-SCC	SC type
	-STC	ST type
751535-E5		19 inch Rack mount kit
B9988AE		Printer roll paper(10 m roll, 10 rolls/1 unit)

*1: Horizontal scale: Wavelength display mode.
*2: With 9.5/125 µm single mode fiber with a PC type connector, after 1 hour of warm-up, after optical alignment with built-in reference light source.
*3: Vertical scale: Absolute power display mode, Resolution setting: ≥0.05 nm, Resolution correction: OFF.
*4: 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).
*5: After wavelength calibration with built-in reference light source.
*6: Temperature condition changes to 23 ±3 °C at 0.05 nm resolution setting.
*7: High dynamic mode: OFF, Pulse light measurement mode: OFF, TLS sync sweep: OFF, Resolution correction: OFF.
*8: 1523nm, High dynamic mode: SWITCH, Resolution correction: OFF
*9: Span: ≤100 nm, Number of sampling: 1001, Average number: 1.
*10: With He-Ne laser (1523nm), 0.1 nm resolution setting, 1520nm to 1620nm except for peak wavelength ±2 nm.
*11: With Yokogawa's master single mode fiber with an angled-PC connector. Typ. 15dB with PC connector.
*12: Some AQ6317 series commands may not be compatible due to changes in specifications or functions.
*13: 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. These are not malfunctions.

* "Typical" or "Typ." in this document means "Typical value", which is for reference, not guaranteed specification.

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