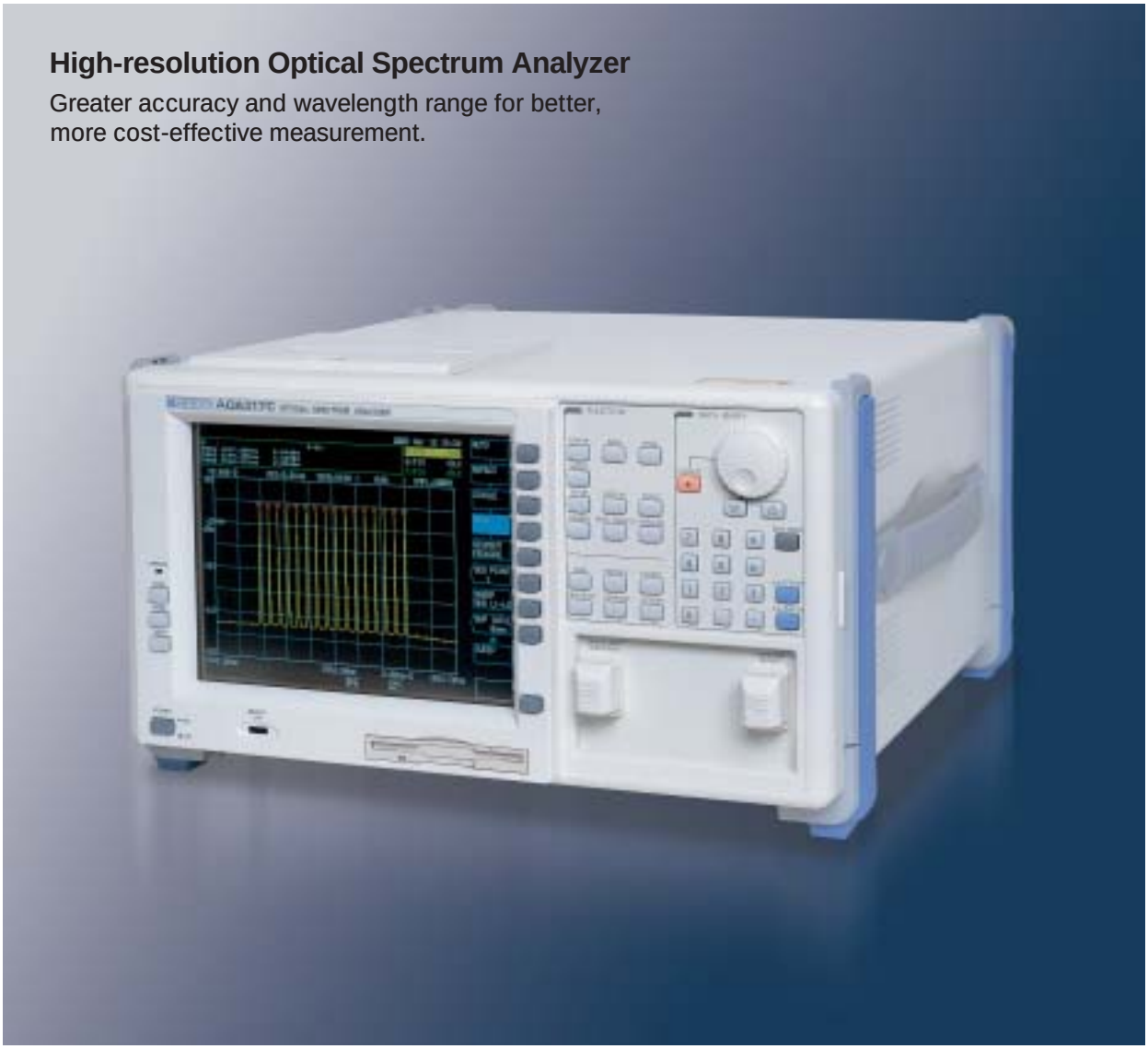
Optical Spectrum Analyzer
AQ6317C

High-resolution Optical Spectrum Analyzer

Greater accuracy and wavelength range for better,
more cost-effective measurement.



Higher wavelength accuracy for S-, C- and L-band ranges

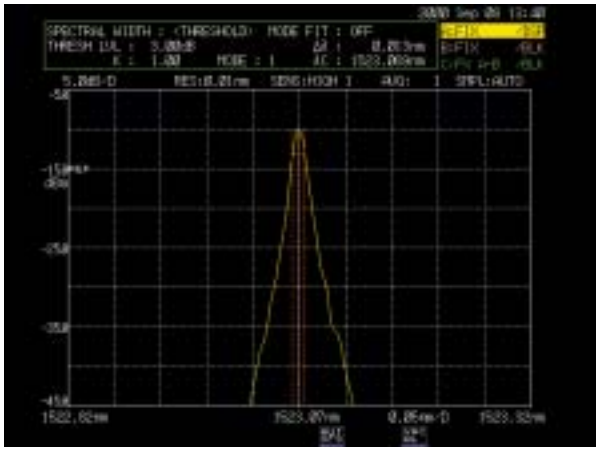
The advent of transmission systems via metro networks, like Gigabit Ethernet and CWDM, Raman amplifiers, and TDFA that employ a shifted pumping source wavelength has expanded optical communications wavelength range requirements.

The AQ6317C Optical Spectrum Analyzer more than meets the latest needs, with its new waveform analysis function, S-, C- and L-band coverage, superior wavelength accuracy throughout the measurement range, faster measurement speeds in high-sensitivity mode and capability to improve manufacturing throughput.

Features

●High wavelength accuracy
Achieves high wavelength accuracy of ±0.1 nm for the entire range from 600 to 1750 nm, and to ±0.02 to ±0.04 nm at 1450 to 1620 nm (S-, C- and L-band).

●High wavelength resolution
Achieves wavelength resolution of 0.015 nm or less, enabling analysis of WDM signals at 25 GHz spacing.



Example of DFB laser spectrum measurement

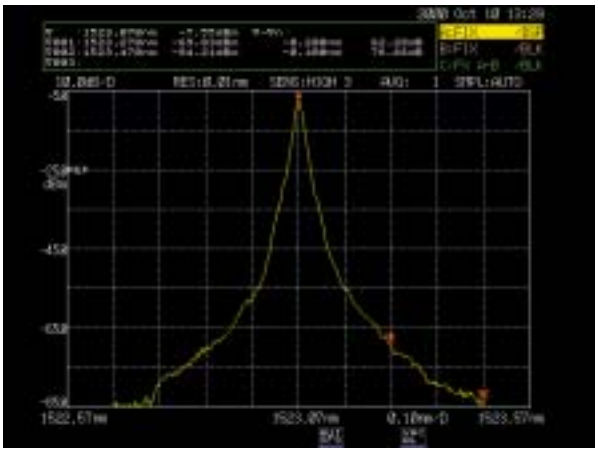
●Versatile analysis functions
Analysis functions for WDM and other optical devices such as LD, LED and FBG.

●Synchronous sweep
In conjunction with the AQ4321A/4321D Tunable Laser Source, much higher wavelength resolution/wide dynamic range can be achieved by high-speed synchronous sweep at a maximum of 10 nm/second.

●Wide-band, high-sensitivity, high-power measurement
High sensitivity allows measurement of light at down to –90 dBm, covering from 1200 to 1600 nm. With possible measurement of up to +20 dBm per one resolution, WDM optical amplifiers and high-powered laser diodes can be measured directly.

●Enhanced measurement speed
Twice the measurement speed of conventional spectrum analyzers in high-sensitivity mode (measurement sensitivity: HIGH 3).

●Wide dynamic range
The dynamic range is 70dB or more at peak ±0.4 nm and 60 dB at peak ±0.2 nm for optimal 50 GHz spacing WDM signal analysis performance.



Example of dynamic range measurement

●Low polarization dependency
Polarization dependency reduced to ±0.05 dB, for accurate optical amplifier gain and other critical measurements.

●High level accuracy
Accurate within ±0.3 dB.

●Large 9.4-inch color display

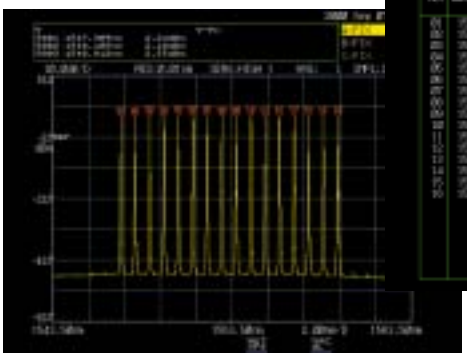
●Pulsed light measurement function

●Three individual trace memories

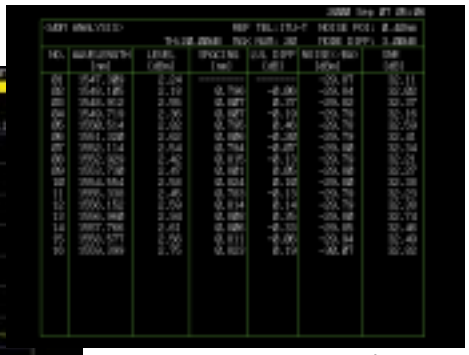
Applications

●WDM signal analysis

Simultaneously measures peak wavelength, peak level and SNR of DWDM signals of up to 256 channels. Measured results can be displayed as wavelength difference/level difference to either the reference channel, or to the ITU-T grid and its fluctuation width, as well as absolute value. The one-touch GUI screen can be used to set reference channel wavelength.



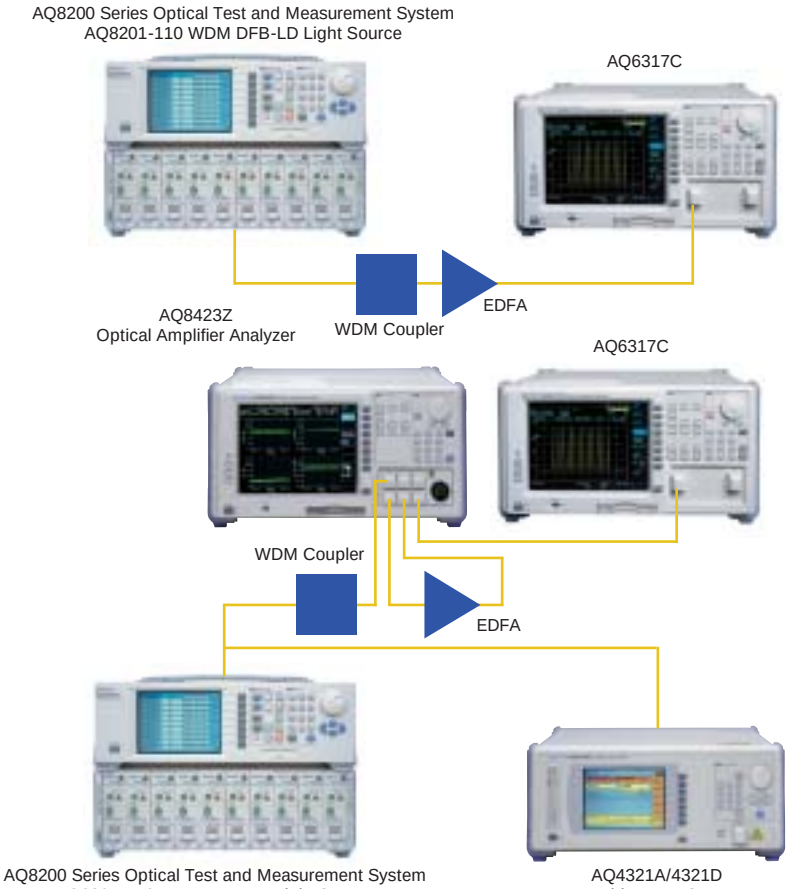
WDM measured waveform

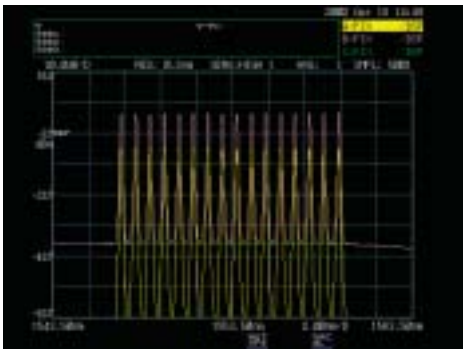


WDM measurement result

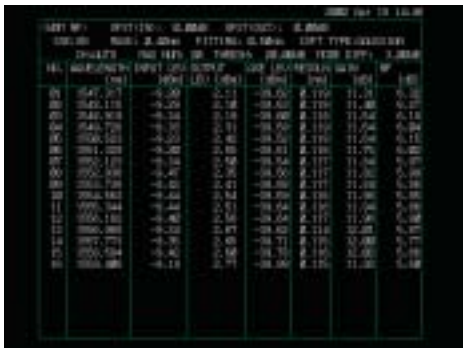
●Optical fiber amplifier (EDFA) evaluation

The ASE interpolation method is used to measure gain and NF of up to 256 channels, key parameters for optical fiber amplifier evaluation. An ASE level for NF measurements is calculated by using a curve-fit function for WDM signals. The curve-fit and source spontaneous emission (SSE) suppress functions enhance accuracy of an amplifier's NF measurements. In conjunction with the AQ8423Z optical amplifier analyzer, the system can also accurately measure gain and NF using the pulse method, which is optimal for evaluating WDM optical fiber amplifiers.

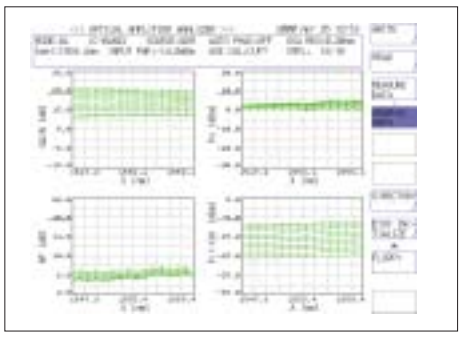




WDM waveform before/after amplification by EDFA



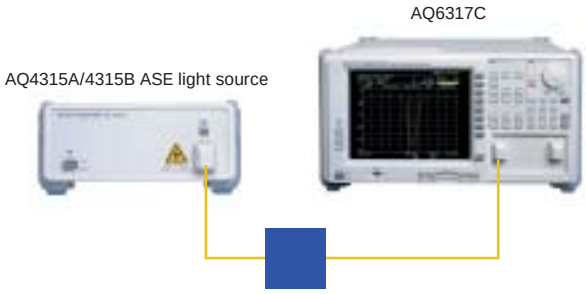
Measurement results of gain and NF

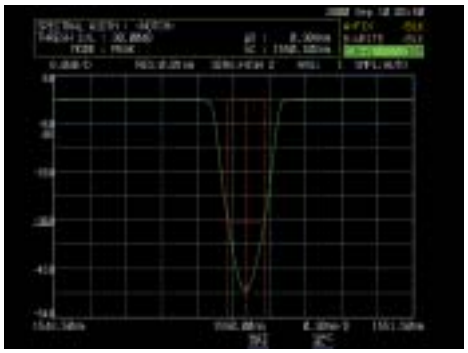


Example of EDFA gain and wavelength dependency of NF measurement (measured results displayed on the AQ8423Z's screen)

●Wide-band light source for evaluating optical passive devices

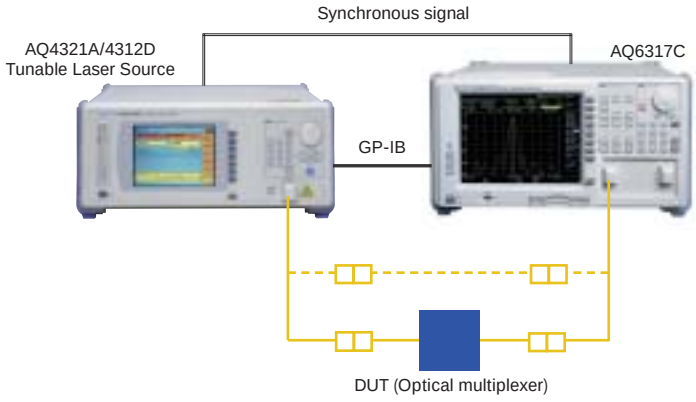
In conjunction with an ASE unit, wide-band light source, etc., you can simply proceed with fiber grating (FBG) and evaluation of passive devices such as WDM filters.
The optical spectrum analyzer's superb optical characteristics enable higher-resolution, wider dynamic range measurements.

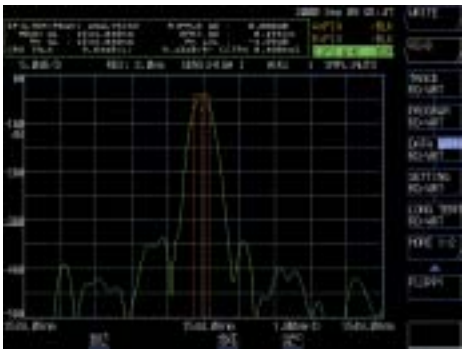



Example of fiber grating notch width measurement

●Evaluating optical passive devices using synchronous sweep

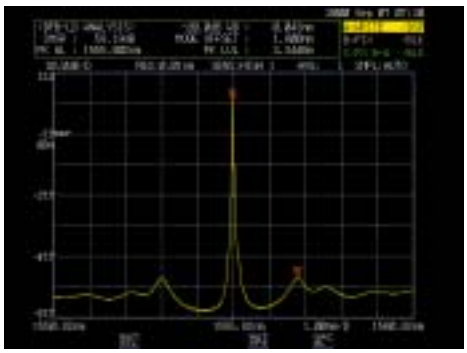
Wide dynamic-range measurement using a synchronous wavelength sweep function of a tunable laser source and optical spectrum analyzer is suitable for evaluating devices with a high crosstalk ratio. The tunable laser source emits a single wavelength and scattered light is cut by the AQ6317C's filter characteristics, making wide dynamic range measurement at over 70 dB possible. In addition, the wavelength sweep of both units is synchronous at a maximum of 10 nm/second for high-speed measurement. Peak/bottom wavelength, level, crosstalk, and ripple width can be simultaneously measured using the optical filter analysis function.

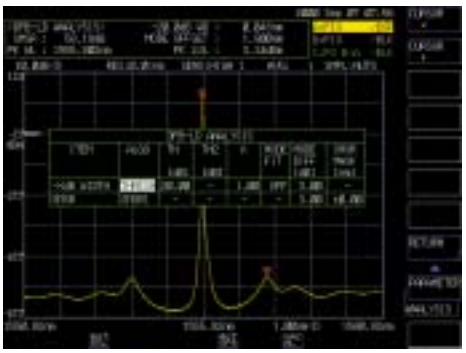



Example of transmission characteristics of WDM filter measurement

●Various parameter evaluations of LED, FP-LD and DFB-LD

Various parameter evaluations such as side mode suppression ratio (SMSR) of DFB-LD, FP-LD and LED can proceed with one-touch operation.

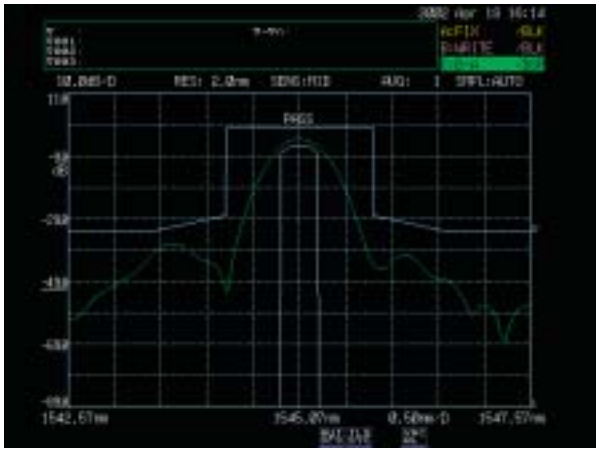

DFB-LD measurement example


Example showing measurement parameter change

Applications

●Template function

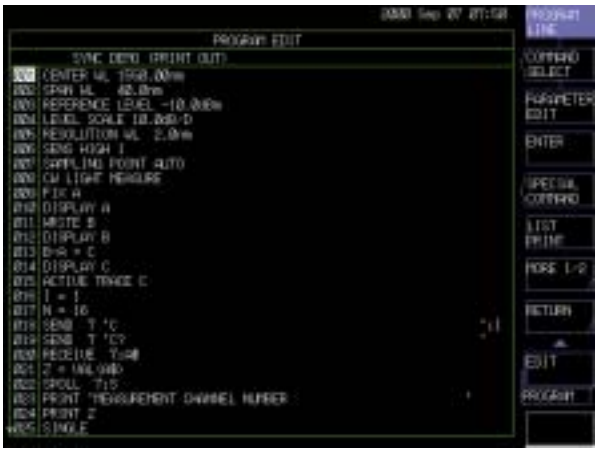
Measured waveforms are compared with the preset template data to judge waveform data quality. An effective function for an assembly line test. The template data can be prepared in a computer and stored in the AQ6317C using a floppy disk.



Example showing template function

●Programming function

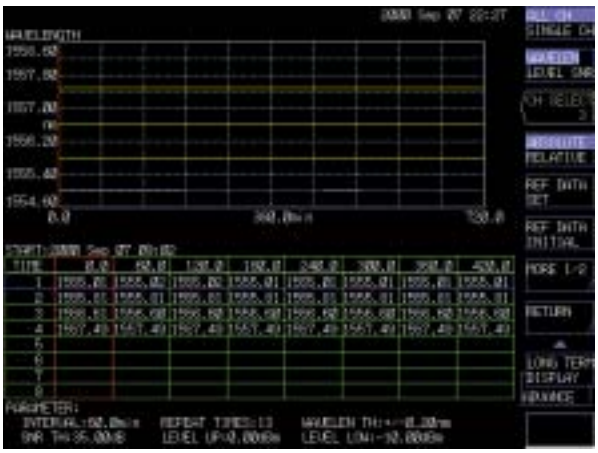
Memorizes measurement conditions, process, etc. at the outset. Program anything from measurement conditions of wavelength sweep width, set resolution, etc. to various analysis functions, printer output and floppy disk storage. Memorizes up to 20 programs, and eliminates complicated manufacturing operations. It also enables a measurement system without use of an external controller by employing the AQ6317C as controller for external equipment.



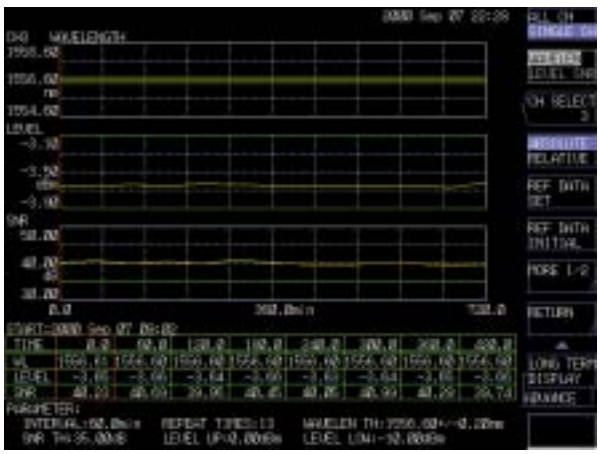
Programming example

●Long-term function

Sweeps all set times, stores and displays (max. 1,000 points) the results of WDM analysis (peak wavelength, peak level and SNR of each channel). An effective function for ascertaining long-term changes or for cycle testing of devices.



Example of long-term function (all channel display)



Example of long-term function (single channel display)

Specifications

Applicable fibers		SM (10/125 µm), GI (50/125 µm)
Measurement wavelength range[1)]		600 to 1750 nm
Wavelength accuracy[1, 2)]		±0.02 nm (1520 to 1580 nm, after calibration with built-in reference light source) ±0.04 nm (1450 to 1520 nm, 1580 to 1620 nm, after calibration with built-in reference light source) ±0.1 nm (600 to 1750 nm, after calibration with built-in reference light source)
Wavelength linearity[1, 2)]		±0.01 nm (1520 to 1580 nm) ±0.02 nm (1450 to 1520nm, 1580 to 1620 nm)
Wavelength repeatability[1, 2)]		±0.005 nm (1 min)
Wavelength resolution[1, 2)]		Max. resolution: 0.015 nm or less (1520 to 1620 nm, RESOLN: 0.01 nm) Resolution setting: 0.01, 0.02, 0.05, 0.1, 0.2, 0.5, 1.0, 2.0 nm
Resolution accuracy[1, 2)]		±5 % (1300 to 1650 nm, RESOLN: 0.05 nm or more, resolution correction: ON)
Measurement level range[2, 3)]		-90 to +20 dBm (1200 to 1650 nm, SENS: HIGH 3) -80 to +20 dBm (1000 to 1200 nm, SENS: HIGH 3) -60 to +20 dBm (600 to 1000 nm, SENS: HIGH 3)
Level accuracy[2, 3, 4, 6)]		±0.3 dB (1310/1550 nm, input level: -30 dBm, SENS: HIGH 1 to 3)
Level linearity[2, 3)]		±0.05 dB (input: -50 to +10 dBm, SENS: HIGH 1 to 3)
Level flatness[2, 3, 6)]		±0.1 dB (1520 to 1580 nm) ±0.2 dB (1450 to 1520nm, 1580 to 1620 nm)
Polarization dependent loss[2, 3, 6)]		±0.05 dB (1550/1600 nm), ±0.05 dB typ. (1310 nm)
Dynamic range[2)]		60 dB (1523 nm, peak: ±0.2 nm, resolution: 0.01 nm) 70 dB (1523 nm, peak: ±0.4 nm, resolution: 0.01 nm) 45 dB (1523 nm, peak: ±0.2 nm, resolution: 0.1 nm)
Sweep time		Approx. 500 ms (SPAN: 100 nm or less, SENS: NORM HOLD, AVR: 1, SMPL: 501, resolution correction: OFF) Approx. 0.5 min (SPAN: 100 nm or less, SENS: HIGH 2, AVR: 1,SMPL: 501, No signal)
Function	Automatic measurement	Program function (20 programs, 200 steps), Long-term measurement function
	Setting of measuring conditions	Span setting: 0 to 1200 nm Measuring sensitivity setting: NORMAL HOLD/AUTO, MID, HIGH 1/2/3 Number of averaging setting: 1 to 1000 times Sample number setting: 11 to 20001, AUTO Automatic setting function of measuring conditions Sweep-between-marker function 0 nm sweep function Pulse light measurement function Air/vacuum wavelength measurement function TLS synchronized measurement function Template function

Function	Trace display	Level scale setting: 0.1 to 10 dB/div, linear Simultaneous display of 3 independent traces Max./Min. hold display Roll averaging display Calculation-between-traces display Normalized display Curve-fit display 3D display Split display Power density display, % display, dB/km display Frequency display of horizontal axis scale
	Data analysis	WDM waveform analysis (Wavelength/Level/SNR list display), Optical fiber amplifier analysis (GAIN/NF, Single/Multi channel), PMD analysis, Optical filter analysis, DFB-LD analysis, FP-LD analysis, LED analysis, SMSR analysis, Peak search, bottom search, spectral width search, notch width search, Delta marker (max. 256), line marker (analysis range specification), Graph display of long-term measurement result
	Others	Self-wavelength calibration function (using built-in reference light source)
Memory	Built-in FDD (3.5-inch 2HD)	Max. 223 traces
	Internal memory	32 traces, 20 programs
	File format	Trace file, program file, measuring condition file, text file (trace, analysis data, etc.), graphic file (BMP,TIFF)
Printer		Built-in high-speed thermal printer
Interface	Remote control	GP-IB (2 ports) TLS control interfaces (TTL)
	Others	Sweep trigger input (TTL) Sample enable input (TTL) Sample trigger input (TTL) Analog output (0 to 5 V) Video output (VGA)
Display		9.4-inch color LCD (Resolution: 640 x 480 dots)
Optical connector		FC (Standard)
Power requirements		AC 100 to 120 (±10%)/200 to 240 V (±10%), 50/60 Hz, approx. 200 VA
Environmental conditions		Operating temperature: 5 to 40 ºC Storage temperature: -10 to +50 ºC Humidity: 80 % RH or less (no condensation)
Dimensions and mass[5)]		Approx. 425 (W) x 222 (H) x 450 (D) mm, approx. 30 kg
Accessories		Power cord: 1, FD: 2, printer paper: 2, instruction manual: 1

Notes:
1) Horizontal scale: wavelength display mode
2) At 15 to 30 °C, with 10/125 µm single mode fiber, after 2 hours of warm-up, after optical alignment
3) Vertical scale: absolute power display mode, resolution setting: 0.05 nm or more, resolution correction: OFF
4) When 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) is used.
5) Except protector
6) Temperature condition changes to 23±3 °C at 0.05nm resolution setting.

Option

AQ4315A/4315B ASE Source

High-output ASE Source for loss-wavelength characteristics measurement. The AQ4315A covers both C + L bands, while the AQ4315B corresponds to the S-band.

Optical spectrum density	AQ4315A: -13 dBm/nm (typ.) (1530 to 1605 nm) AQ4315B: -25 dBm/nm or more (1450 to 1510 nm)
Optical output	+13dBm or more (SM fiber, FC/PC, 2m)
Time stability	Within 0.01 dBp-p

Specifications are subject to change without notice.

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