YOKOGAWA

AQ6331

Optical Spectrum Analyzer

A compact, lightweight,
portable optical spectrum analyzer
for DWDM system installation and maintenance.

Bulletin AQ6331-01E

Compact, lightweight and high-spec!

The AQ6331 is a new portable optical spectrum analyzer (OSA) offering the advanced performance required for 50 GHz DWDM network testing, in both C-band and L-band.

The compact body of the AQ6331 houses all the features required for DWDM system evaluation.

Further, the AQ6331 presents excellent wavelength resolution, with accuracy and dynamic range equal to conventional bench-top OSAs for research and development applications.

The AQ6331 is an optical spectrum analyzer that can be used not only for installation and maintenance of DWDM systems, but also in research and development applications.

Features

Compact and lightweight

Approx. 315 (W) x 200 (H) x 225 (D) mm and only 10 kg., yet offers a light source for wavelength calibration and printer as standard.

High wavelength accuracy

Provides ±0.02 nm wavelength accuracy at 1520 to 1580 nm, and ±0.05 nm at 1580 to 1620 nm, assuring wavelength accuracy of C-/L-band with an internal light source for wavelength calibration.

Internal wavelength calibration function

Wavelength calibration is carried out without using an external light source due to a built-in reference light source. Optical fiber connection for calibration is unnecessary because connection to the reference light source occurs automatically, through an internal optical switch.

High dynamic range and high wavelength resolution

Dynamic range is 55 dB or more (peak ±0.4 nm) and wavelength resolution is 0.05 nm (min.), enabling measurement of DWDM systems of 50 GHz spacing.

High power measurement

Optical amplifier output and high output laser diodes in DWDM systems can be measured directly because the range of measurement level is +20 dBm.

Low polarization dependency

Can accurately measure optical amplifier gain, etc., because polarization dependency is as low as ±0.05 dB.

Long-term analysis function

Can monitor changes to each DWDM channel peak over time.

Convenient programming function

Shortens measurement time because measurement conditions and processes, etc., can be input to memory prior to measurement.

Individual trace of three waveforms

Displays individual traces of three waveforms. Can also compare two waveforms — a reference waveform and a measurement result — to determine the difference between the two waveforms.

Internal high-speed printer

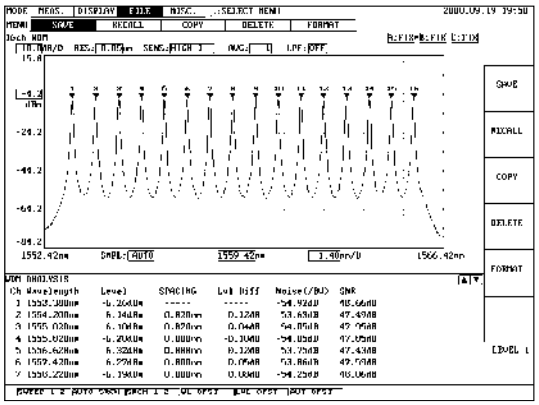
8.4-inch large display

Applications

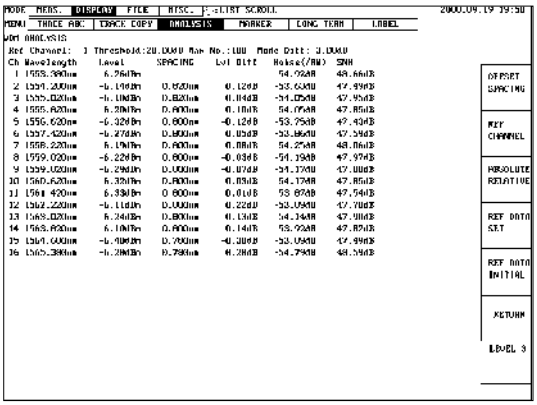
● DWDM analysis function

The AQ6331 can simultaneously measure up to 100 channels of DWDM signals.

- Peak wavelength (WAVELENGTH) of each channel, peak power level (LEVEL)
- Offset wavelength to the reference channel peak (OFFSET WL), level difference (OFST LVL)
- Noise level (NOISE) of each channel, difference between peak level and noise level (SNR)



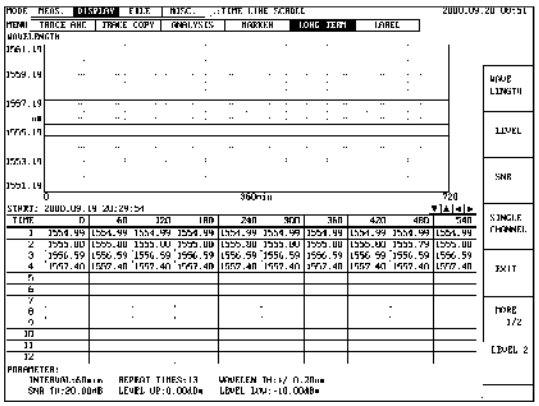
WDM measurement waveform



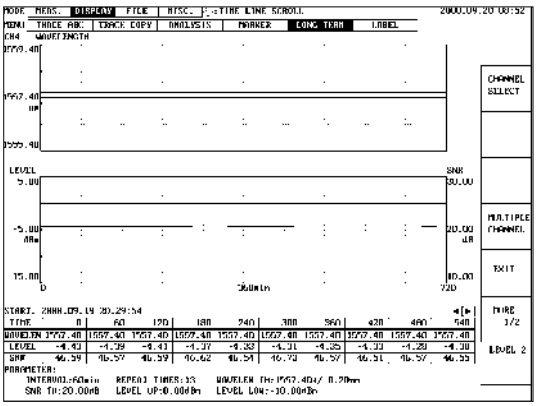
WDM measurement result

● Long-term function

Sweeps at selected intervals and stores the results of DWDM analysis (peak wavelength, peak level and SNR of each channel). This function enables long-term monitoring for changes within each WDM channel.

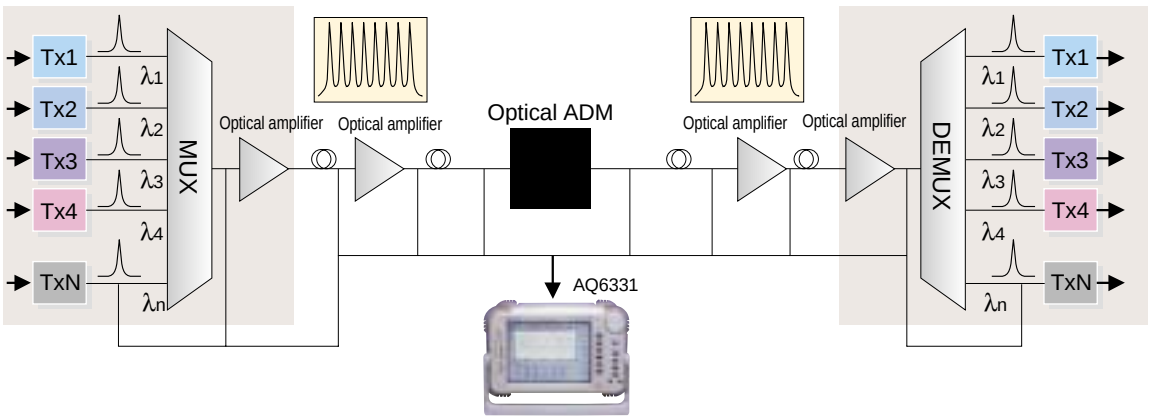


Long-term function (Example of all channel display)



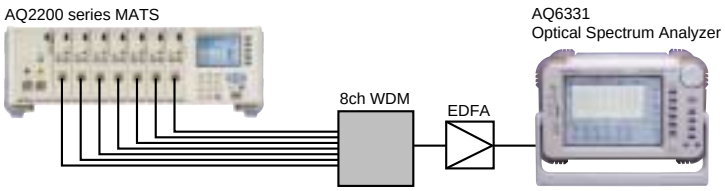
Long-term function (Example of single channel display)

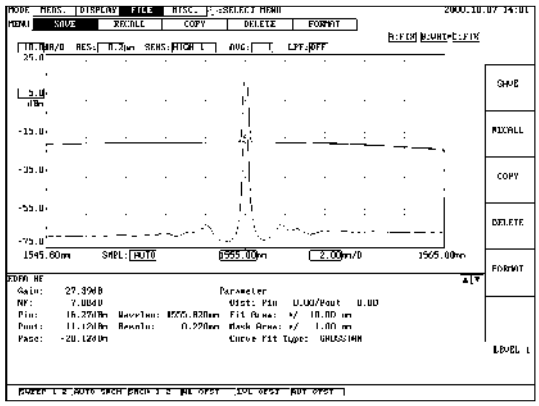
Measurement process of optical spectrum analyzer in DWDM systems



Optical fiber amplifier (EDFA) evaluation

The ASE interpolation method is used to facilitate the measurement of gain, NF (Noise Factor) and key parameters for optical fiber amplifier.

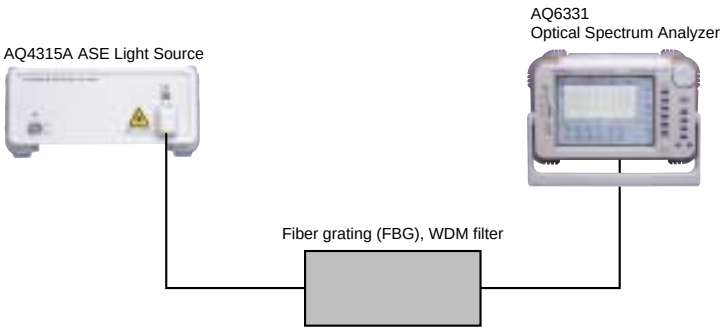


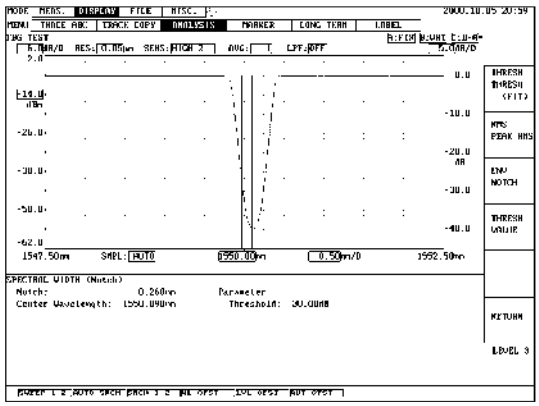


Example of measurement result. (Gain,NF)

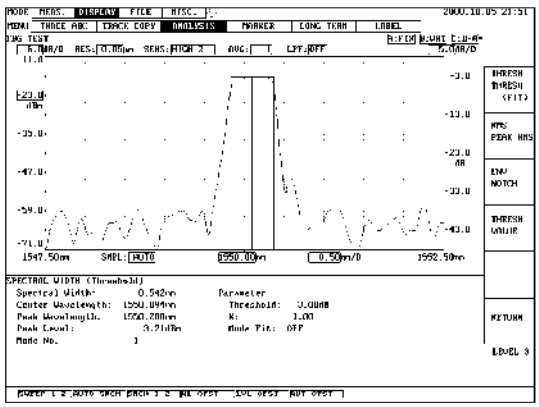
Characteristic evaluation of optical passive devices

In conjunction with the ASE light source, wideband light source, etc., users can establish a very powerful system for the evaluation of passive devices.





Measurement example of notch width in FBG transmission spectrum

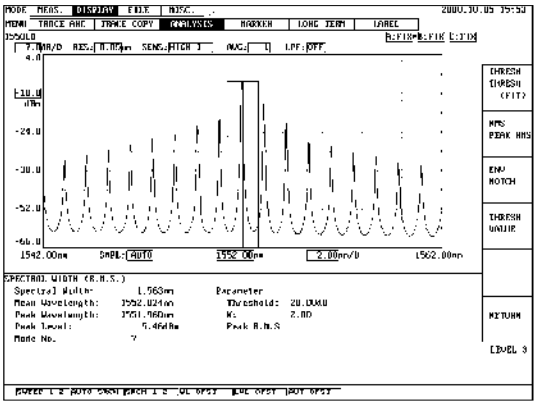


Measurement example of transmission spectrum in FBG reflection spectrum

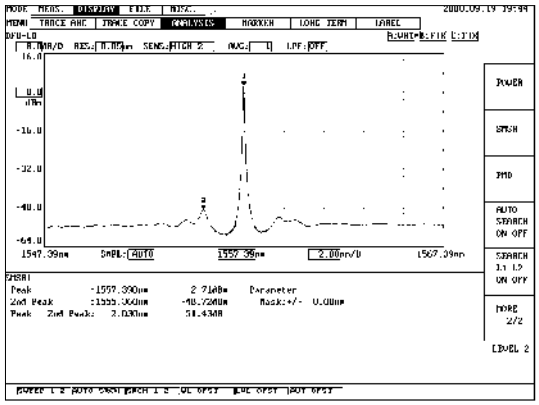
Applications

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

SMSR (Side-Mode Suppression Ratio) of LED, FP-LD and DFB-LD. Parameter evaluations such as Side-Mode Suppression Ratio, etc., can be obtained easily.



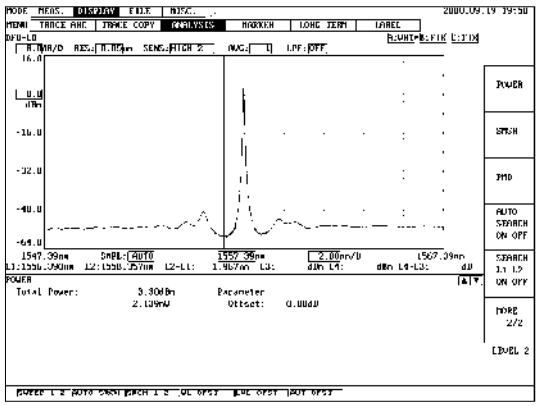
FP-LD measurement example



DFB-LD measurement example

● Power measurement function

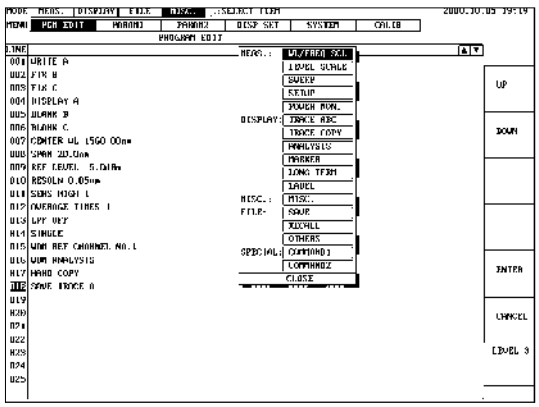
Determines power within selected wavelength boundaries. Measurement range can be freely set



DFB-LD power measurement example

● Programming function

Fully programmable operation enables the setting of measurement conditions such as wavelength sweep width, resolution, various analysis functions, print output and data storage to floppy disk.
This built-in function helps eliminate complicated installation and maintenance procedures, enhancing work efficiency.

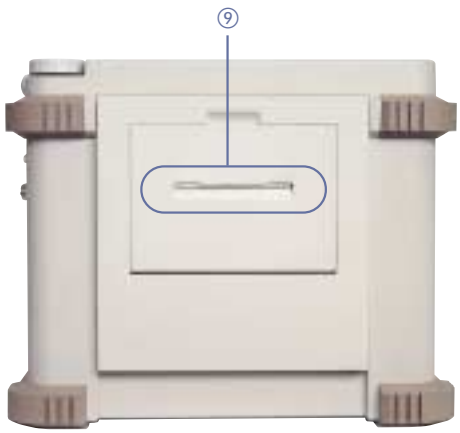


Programming example

Operation panel

Front view

Upper view



Left-side view

Right-side view

① 8.4-inch color LCD

Displays all information such as measurement waveforms, measurement conditions and measured data.

② Soft keys to select displayed menu items

Press a key to select the desired function.

③ Common function keys

To execute common functions.

④ 3.5-inch floppy-disc drive

To store text or graphics files (BMP, TIFF).

⑤ Copy key

To print out data with the built-in printer or an external printer.

⑥ Help key

To display the actions of various function keys.

⑦ Optical input connectors

Compatibility with a variety of connector types is achieved through the exchange method.

⑧ Interfaces

RS-232C, GP-IB, keyboard, mouse, video, printer, and PCMCIA ports are provided.

⑨ Built-in printer

To quickly output screen hard copies.

⑩ Power switch

Optical Spectrum Analyzer AQ6331

Specifications

Applicable fiber		Single mode fiber (10/125 µm)
Wavelength range		1200 to 1700 nm
Wavelength accuracy [1]		±0.02 nm (1520 to 1580 nm), ±0.05 nm (1580 to 1620 nm), ±0.3 nm (1200 to 1700 nm)
Wavelength linearity [1]		±0.01 nm (1520 to 1580 nm), ±0.02 nm (1580 to 1620 nm)
Wavelength reproducibility [1]		±0.005 nm (1 min.)
Wavelength resolution [1]		0.05 nm or less (Resolution setting: 0.05 nm, 1520 to 1620 nm) 0.1 nm or less (Resolution setting: 0.1 nm, 1520 to 1620 nm) Resolution setting: 0.05, 0.1, 0.2, 0.5, 1.0 nm Resolution accuracy: ≤ ±5 % (Resolution setting: ≤ 0.2 nm)
Measurement level range [1]		-90 to +20 dBm (1200 to 1600 nm, sensitivity: HIGH 3) -80 to +20 dBm (1600 to 1700 nm, sensitivity: HIGH 3)
Level accuracy [1, 2, 3]		±0.3 dB typ. (1550 nm, 1600 nm)
Polarization dependency [1, 3]		±0.05 dB (1550 nm, 1600 nm)
Level linearity [1, 3]		±0.05 dB (Input level: 0 to -50 dBm, sensitivity: HIGH 1 to 3)
Level flatness [1, 3]		±0.1 dB (1520 to 1580 nm) ±0.2 dB (1520 to 1620 nm)
Level reproducibility [1, 3, 5]		±0.02 dB (1550 nm, 1600 nm)
Dynamic range [1, 4]		55 dB or more (1523 nm, peak: ±0.4 nm, resolution: 0.05 nm) 40 dB or more (1523 nm, peak: ±0.2 nm, resolution: 0.05 nm)
Return loss		30 dB typ. (1550 nm, 1600 nm)
Sweep time		Approx. 0.5 sec. (Span: 50 nm, sensitivity: NORMAL HOLD, number of sampling: AUTO, average: 1)
Functions	Measurement condition	Auto-configuration by auto-sweep sensitivity (NORMAL HOLD/AUTO, HIGH 1/2/3), averageing, number of sampling, (11 to 20001, AUTO), sweep between markers, 0-nm sweep, pulse light measurement
	Trace display	3 individual traces (Max/Min, rolling avarage, data calculation), frequency/wavelength axis
	Data analysis	WDM, EDFA, PMD, SMSR, search (Peak, Bottom), spectral width, notch-width, delta-marker, line marker
	Others	Program, long-term measurement, wavelength self-calibration
Memories	FDD (3.5-inch 2HD)	Max. 120 traces
	Internal memory (2MB)	Max. 200 traces
	File type	Trace, programming, measurement condition, text (trace, analysis data, etc.), graphics (BMP, TIFF)
Printer		Built-in high-speed printer
Interfaces		GP-IB, RS-232C, Keyboard (IBM compatible), Mouse (PS/2), Video (SVGA) 7), Printer (Centronics), PCMCIA (1 x Type 3 or 2 x Type 2)
Display		8.4-inch color LCD (800 x 600 dots)
Applicable Connector		AQ9441 (FC) Universal Adapter 6)
Power requirements		AC100 to 120 V, AC200 to 240 V, 48 to 63 Hz, approx. 100 VA
Environmental conditions		Operating temperature: 0 to 50 °C Storage temperature: -20 to +60 °C Humidity: 90 % RH or less (no condensation)
Dimensions and mass		Approx. 315(W) x 200(H) x 255(D) mm, approx. 10 kg
Accessories		Power cord: 1, printer paper: 2 rolls, instruction manual:1, floppy disc: 2

Notes
1) SMF 10/125 µm, after 2-hour warm-up, 10 to 35 °C
2) Input level: -30 dBm, sensitivity: HIGH 1 to 3
3) Resolution: 0.1 nm or more
4) 1523 nm, resolution 0.05 nm, sensitivity: HIGH 1 to 3
5) Input level: -23 dBm, 1 min.
6) FC standard, SC and ST connectors are available
7) Can be displayed on either the AQ6331 LCD or external monitor when Video output (SVGA) is connected.

Model

Product name : AQ6331 Optical Spectrum Analyzer
Model : 810804300-□-□ / □□

- CE : CE marking
- Power cord
  - D : UL/CSA standard(UL3P)
  - F : VDE standard(CEE-C7)
  - G : SAA standard(SAA-3P)
  - Q : BS standard(BS546 3P)
  - H : BS standard(BS 2P)
- Fuse type
  - 1 : 3.15A(AC100V to AC120V)
  - 5 : 2.0A(AC200V to AC240V)

Accessory

Print paper (Roll Type)
Parts Number : 955-892900215(model name : TP-312C)

NOTICE
● Remarks : Export condition is subject to Japanese governmental approval.
Specifications are subject to change without notice.

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