ADVANTEST

Q8347
Optical Spectrum Analyzer

Evaluates Optical Narrow-Band-Pass Filters For WDM

- **High resolution: 0.01 nm (at 1.55 μm)**
  0.001 nm (at 0.5 μm)
  1 GHz (at optical frequency mode)
- **High wavelength accuracy: ±0.01 nm**
- **Measurement speed: 1 to 3.5 seconds**
- **Coherence analysis range: ±165 mm**

Q8347

ADVANTEST's Own Interferometer-type Spectrum Analyzer Gets a Boost in Performance!!

Wavelength resolution of 0.01 nm and wavelength Accuracy of ±0.01 nm at the 1550 nm band
(Resolution of 1 GHz, accuracy of ±1 GHz in optical frequency mode)

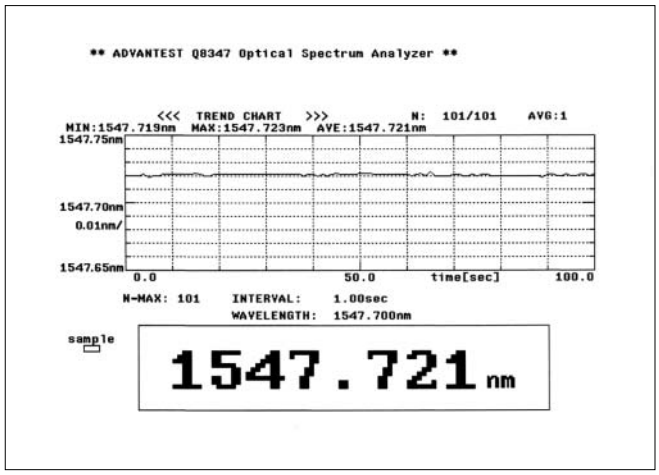
The Q8347 spectrum analyzer enhanced the performance of spectrum analyzer employing a Fourier spectrum system with a Michelson interferometer. The Q8347 achieves wavelength resolution of 0.01 nm and wavelength accuracy of ±0.01 nm (resolution of 1 GHz and accuracy of ±1 GHz in optical frequency mode) at the 1550 nm spectrum band. In addition, the Q8347 is capable of accurately measuring the each wavelength of optical wavelength division multiplexing (WDM) transmission signal by separating the spectrums. It is especially suitable for evaluating characteristics of optical narrow-band-pass filters used for WDM like AWG and Fiber gratings. Also, the Q8347 is powerful for analyzing chirps from LDs and Soliton transmission.

A resolution of 0.001 nm at the 500 nm band

At shorter wavelength, higher resolution can be obtained. The Q8347 has a resolution of 0.001 nm at the 500 nm band, most suitable for analysis of blue LDs.

Trend monitoring function

Incoming power and wavelength can be displayed in digital read-out, as well as a time domain trend chart.



Printer and floppy-disk drive equipped as standard

The system comes with high-speed thermal printer capable of copying the display in 8 seconds. Also, the system has a floppy-disk drive using MS-DOS, allowing easy data storage and analysis. Furthermore, data are stored in text format, facilitating analysis and processing on a personal computer. Also, stored data can be zoomed subsequently.

Optical frequency can displayed

In addition to general wavelength display mode, a measured spectrum can be displayed as optical frequencies. As light can be directly read in units of THz, it is useful for measuring optical WDM and chirps from LDs, and for analyzing Soliton transmission system.

Coherence analysis of ±165 mm

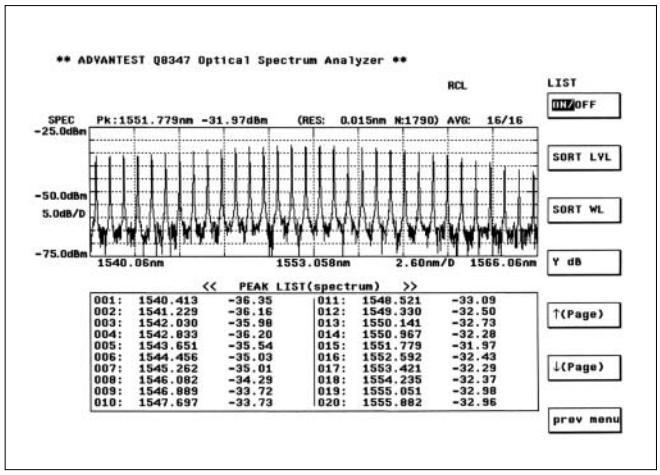
As the Q8347 uses a Michelson interferometer, the system is capable of performing coherence analysis. This function allows easy evaluation of noise suppression performance of LDs for optical discs. Furthermore, the stroke of the interferometer can be greatly increased to allow analysis to be made in a range of ±165 mm. Thus, more detailed analysis can be mode, over and above the conventional secondary maximum peak value (α value).

Curve fitting function

The Q8347 provides curve fitting with $sech^2$ and Gaussian functions. Thus, it is useful for spectrum analysis of Soliton transmission system.

List display

Peak values of spectrum or coherence data can be displayed as numerical data containing up to 200 points. The separation and the level of each channel of optical WDM transmission system can be seen at a glance.



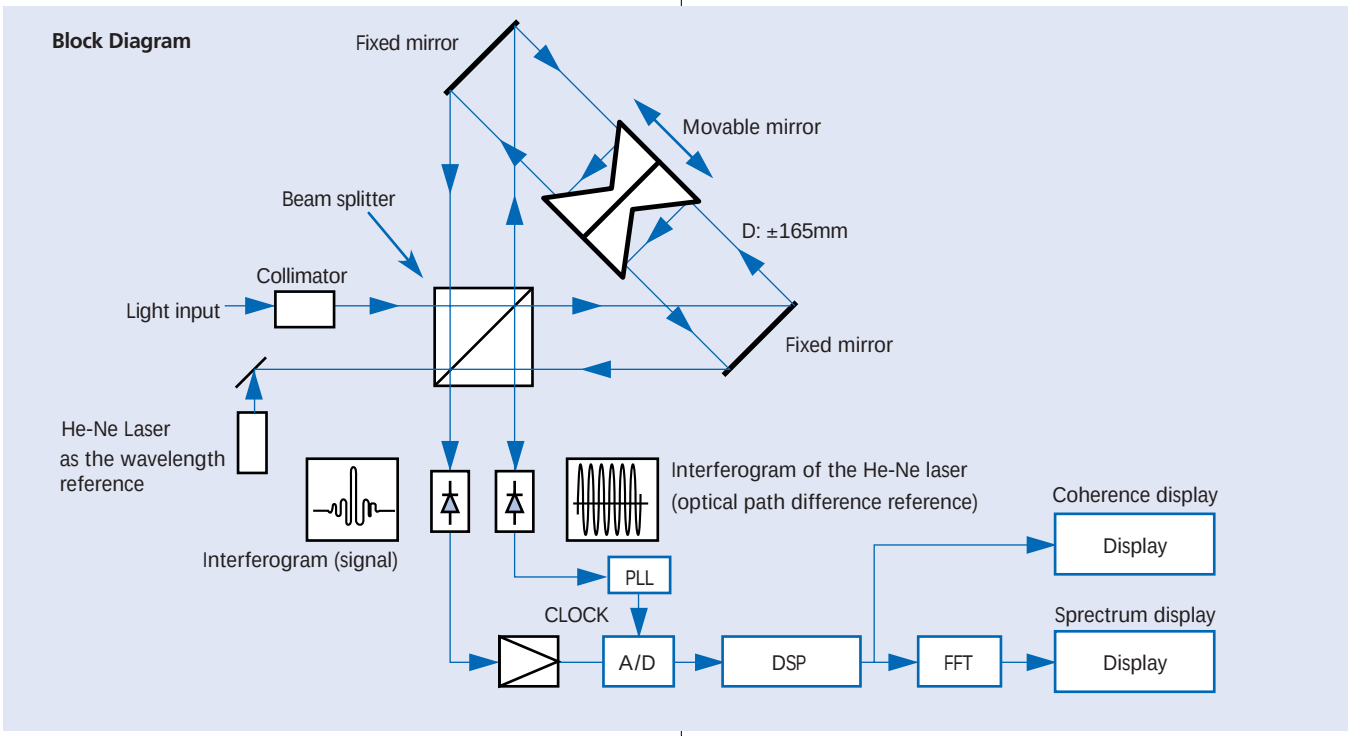
High-speed measurement

The process from trigger to SRQ output takes only 1.0 second in normal resolution mode by using the GPIB, or 2.5 seconds in high-resolution mode. (At long-wavelength band)

Measurement principles

The Q8347 employs the Fourier spectrum system using a Michelson interferometer. The light from the device under measurement is split into two parts and interference introduced between the two resulting paths. The interferogram, taking the optical path difference as the horizontal axis and the interference light intensity as the vertical axis, makes an autocorrelation of the light to be measured.

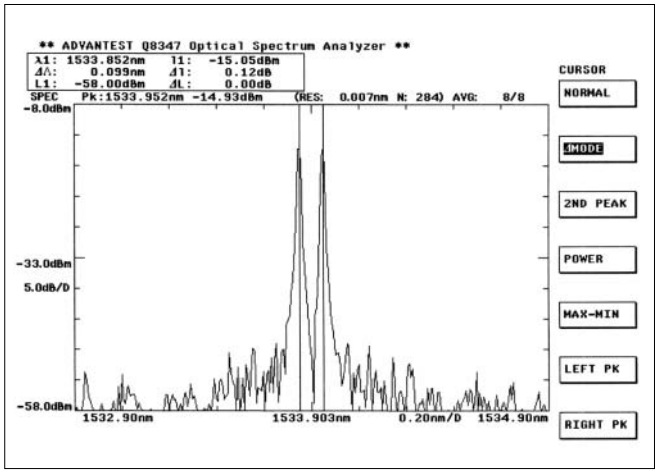
Thus, coherence can be displayed from the interferogram. Also, the optical spectrum can be obtained by performing Fast Fourier Transform (FFT) over the interferogram. As an He-Ne laser is used as the wavelength reference source, the axes of the wavelength and optical path difference are extremely accurate.



Applications

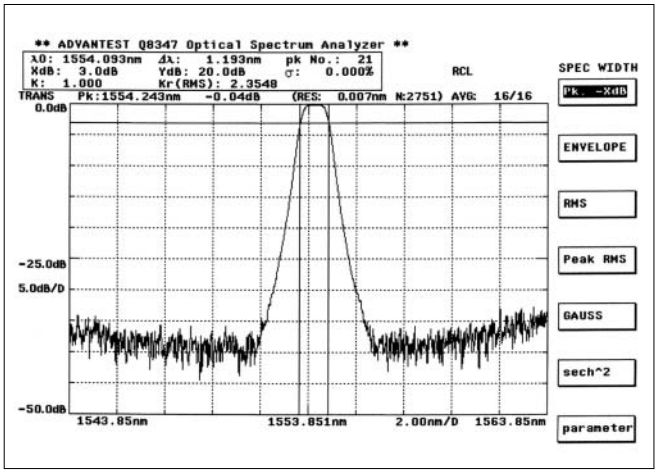
High resolution measurement of spectrums extremely close to each other

The Q8347 accurately measures spectrums extremely close to each other, for example it measures spectrums for WDM transmission systems which employs spectrums separated at 0.1 nm (Approximately 10 GHz at wavelength of 1550 nm).

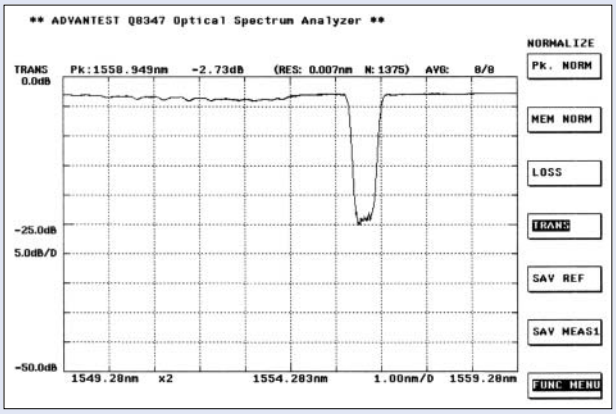


Measuring the transmission characteristics of optical narrow-band-pass filters

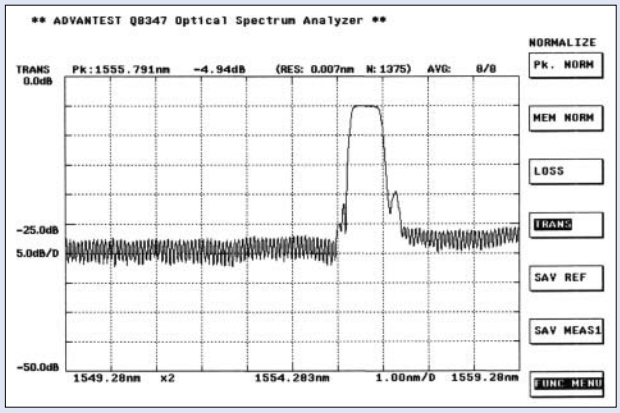
As a system with high-power, wide-band light source such as spontaneous emission light of EDFA or edge-emitting LED, the Q8347 accurately measures the transmission characteristics of optical narrow-band-pass filters employed for EDFA systems at the accuracy ±0.01 nm. In measuring a filter with spectral-width of 1 nm, dynamic range is 35 dB (Averaging 16 times). Linearity at the level 30 dB down from the central wavelength is ±0.5 dB or less.



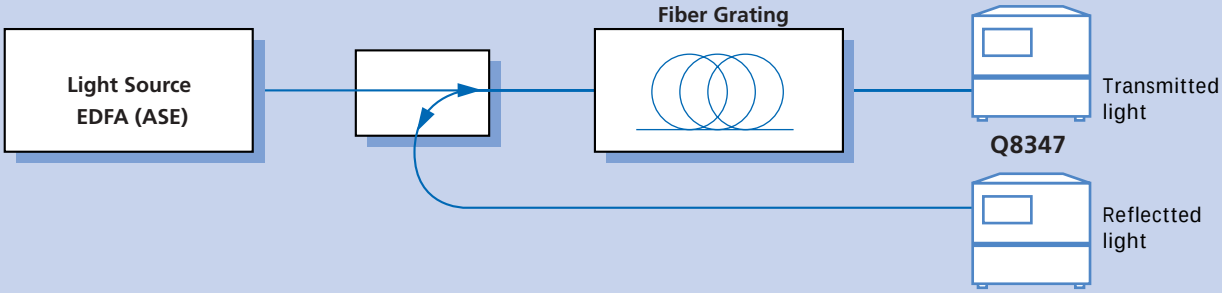
Measurement Examples of Fiber Grating



Transmission characteristics

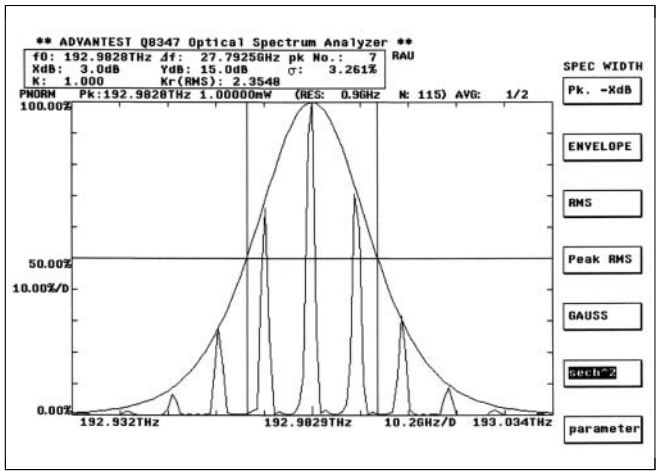


Reflection characteristics



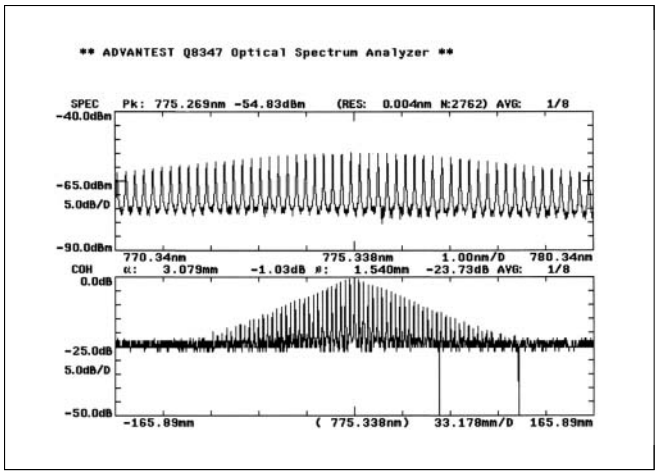
Spectrum measurement of ultra-short light pulse

With the Q8347, spectrum stretch of ultra-short light pulse, Soliton transmission for example, can be directly viewed.
The figure to the right is a copy of the data showing the spectrum width when the ultra-short light pulse at 10 GHz repetition was measured and curve fitting performance with $sech^2$ function.



Coherency analysis at long span

The Q8347 measures coherency of LDs and SLDs (Super Luminescent Diode) to ±165 mm maximum, therefore, the detailed analysis of the device is possible. Also, the 2nd peak value (α value) can be measured and displayed by normalizing the coherence at the maximum peak value with zero optical path difference.
upper: Spectrum Display
lower: Coherence Display



Specifications

			Specifications	
			Normal Mode	High Resolution Mode
Wevelength	Measurment Range		0.35 to 1.75μm	
	Max. Resolution		Approx. 0.1 nm/1.55μm Approx. 0.05 nm/0.85μm	Approx. 0.01 nm/1.55μm Approx. 0.003 nm/0.85μm
	Accuracy		±0.1 nm or less	±0.01 nm or less
	Span		0.01 nm/DIV to 140 nm/DIV	
Level	Measurement Range (Input Sensitivity)		–72 to +10 dBm (1.2 to 1.6 μm) –65 to +10 dBm (0.7 to 1.6 μm) –52 to +10 dBm (0.45 to 1.7 μm) – 42 to +10 dBm (0.35 to 1.75 μm) The minimum level is measured over a 50 nm span and averaging 16times.	
	Accuracy		±1.0 dB (780 nm), ±0.7 dB (1310 nm. 1550 nm) input level –10 dBm	
	Linearity(*1)		±0.1 dB/-20 dB or less ±0.5 dB/-30 dB or less	
	Dynamic Range(*2)		35 dB or more (Value between peak and average display noise level)	
	Repeatability including Polarization Dependence(*3)		±0.1 dB or less (23±5°C)	
	Scale		0.2, 0.5, 1.0, 2.0, 5.0, 10.0 dB/DIV, and LINEAR	
Processing Functions	Measurement Time(*4)		1 sec. or less	2.5 sec. or less (at long wavelength band:0.95~1.75μm) (*5) 3.5 sec. or less (at short wavelength band:0.35~1.05μm)
	Memory Function		16 Screens (Measured Data) with Battery Back up 10 Screens (Measured Conditions) with Battery Back up Floppy Disk (MS-DOS format 720 KB/1.2 MB)	
	Display		Frequency, Super Impose, 3-D, Trend Monitoring (Power, Wavelength) Division into 2 parts, Cursor Function, Corlor Display Customization, Listing	
	Computing/Analysis		Spectrum Analysis, Coherence Analysis (Analysis Range: Max. ±165mm) Spectral-width Calculation, Automatic Peak Search, Normalization (LOSS/TRANS), Averageing, Automatic Setting of the Optimum Measurement Conditions Curve fitting ($sech^2$, Gauss), Smoothing, MAX/MIN Hold	
Input/Output	Input Connector		FC Connector (Internal Fiber:PC Rubbed, GI 50/125)	
	Data Output		GP-IB Equipped as Standard, Direct Plotter Output, Built-in Printer (Printing Speed: 8 sec. or less)	
General Specifications	Operating Environment		Temperature: +10 to +40°C, RH 85% or less (Non-Condensing)	
	Storage Environment		Temperature: –10 to +50°C, RH 90% or less (Non-Condensing)	
	Power	(Main Unit) (Optical Unit)	AC100 to 120 V/220 to 240 V, 48 to 66 Hz, 180 VA or less AC100 to 120 V/220 to 240 V, 48 to 66 Hz, 80 VA or less	
	Dimensions	(Main Unit) (Optical Unit)	Approx. 424 (W) x 221 (H) x 500 (D) mm Approx. 424 (W) x 132 (H) x 500 (D) mm	
	Mass	(Main Unit) (Optical Unit)	16kg or less 20kg or less	
Standard Accesories	Power Cable		A01402 2	
	Fuse		EAWK4A/2A 2 each	
	Interconnection Cable		1	
	Printer Paper		1	
	Floppy Disk		3.5 inch 2DD 1	
	Instruction Manual		1	

*(*1) With input at 0 dBm or less.*
*(*2) At 1.55 μm band, SPAN: 20 nm or less, advance averaging 16 times, Smoothing at 11 point, spectral width calcuration at less than 1 nm.*
*(*3) At wavelength 1.55 μm. to 1.57 μm. In the case of coherent light input, wavelength shift cause the level change of ±0.4 dB or less.*
*(*4) Measurement Condition: On SINGLE measurement, one averaging performed. Measuring time is from triggering to SRQ output. At long wavelength band.*
*(*5) Approx. 5 sec/measurement with advance averaging mode.*

Accessories

Fiber cord with connectors to the both edge
- OCS-F2SPS-2 (SM 10/125μm, 2m, with PC connectors)
- OCS-F2SFW-2 (GI 50/125μm, 2m, with FC connectors)

Fiber Collimator with lens at edge
- OPCL-5G-100/FC (GI 50/125μm 1m, with FC connectors)

Rack-Mount Kit

	Standard	Display Unit		Optical Unit	
		with handles	without handles	with handles	without handles
Rack-mount set	EIA	A02712	A02722	A02708	A02718
	JIS	A02713	A02723	A02709	A02719
Slide rail set		A02615			

Please be sure to read the manual of product thoroughly before using the products.
Specifications may change without notification.