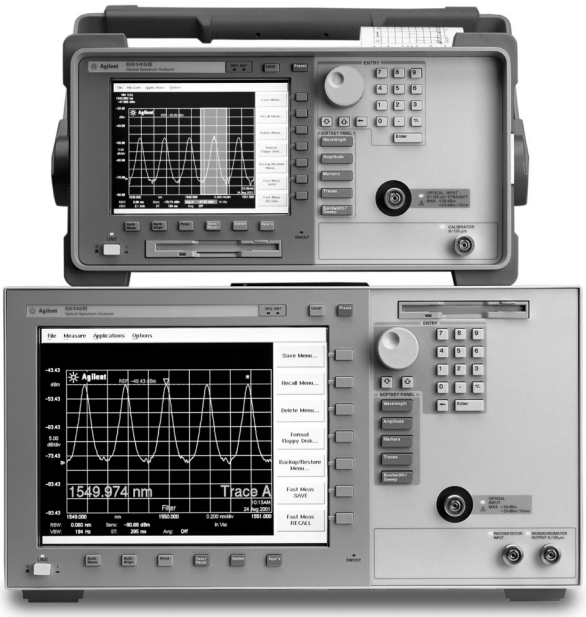
Agilent 8614xB Optical Spectrum Analyzer Family

Technical Specifications



NEW!

- **Filter Mode**
  Enables you to drop a single DWDM channel or measure time resolved chirp (TRC)
- **Excellent "Close-In" Dynamic Range**
  Accurately characterize 50 GHz WDM system performance
- **High Throughput**
  Fast sweep speeds at high sensitivity to maximize measurement throughput
- **Built-In Applications**
  Agilent's new application concept makes complex and repetitive measurements simple
- **Benchtop and Portable Platforms**
  Choose between a large screen or small footprint package

	Benchtop	Portable
Ideal for critical WDM system and component characterization	**Agilent 86142B**	**Agilent 86145B**
Ideal for a wide range of applications at value prices	**Agilent 86140B**	**Agilent 86143B**
Features multimode monochromator output	**Agilent 86141B**	——
Features filter mode, single mode monochromator output	**Agilent 86146B**	**Agilent 86144B**

Agilent Technologies offers a wide variety of optical spectrum analyzers (OSA) to meet your test needs whether it's in R&D, manufacturing, installation, or maintenance and commissioning. Both benchtop and portable models are available at different price and performance points so you can choose the most cost effective solution to meet your test needs.

The **specifications** apply to all functions autocoupled over the temperature range 0 to 55° C and relative humidity <95% (unless otherwise noted). All specifications apply after the instrument's temperature has been stabilized after 1 hour continuous operation and the auto-align routine has been run. Unless otherwise noted, specifications apply without USER CAL.

Characteristics and Specifications

The distinction between specifications and characteristics is described as follows:

- Specifications describe warranted performance.
- Characteristics provide useful, but nonwarranted information about the functions and performance of the instrument.

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Specifications

The 86144B and 86146B specifications are for the 50 µm internal path only.

Description	Models/Specifications	Notes
Wavelength	**Agilent 8614xB**	
Range	600 nm to 1700 nm	
Span Range	0.2 nm to full range and zero span	
Accuracy		
After calibration with internal calibration source and with enhanced wavelength calibration on for specified range.		
1480-1570 nm	±0.01 nm	
1570-1620 nm	±0.025 nm	
After calibration with external reference source(s)		
±10 nm of calibration reference point(s)	±0.01 nm	
After user calibration over full wavelength range (600-1700 nm)	±0.2 nm	T(20-30°C)
Absolute Accuracy (factory cal. 2 yr. cycle)	±0.5 nm	
Tuning Repeatability	±0.002 nm	
Reproducibility (≤1 min)	±0.002 nm	
Span Linearity		
1525-1570 nm	±0.01 nm	Char., T(20-30°C)
for spans <40 nm	±0.02 nm	

Resolution Bandwidth (RBW)	Agilent 86140B, 86142B, 86143B, 86145B	Agilent 86144B, 86146B	Agilent 86141B, 86140B-025, 86143B-025	Notes
FWHM (3 dB Bandwidth)	0.06, 0.1, 0.2, 0.5, 1, 2, 5, 10 nm	0.06, 0.07, 0.1, 0.14, 0.2, 0.33, 0.5, 1, 2, 5, 10 nm	0.07, 0.1, 0.2, 0.5, 1, 2, 5, 10 nm	Resolution of 10 nm is available for first order grating response only.
Noise Marker Bandwidth Accuracy				
using noise markers 1525-1610 nm				
≥0.5 nm	±2%		±3%	
0.2 nm	±3%		±5%	
0.1 nm	±7%		±10%	
0.06 nm	±12%		——	

Char. indicates the number is a characteristic.
T(#) indicates temperature dependence.
With applied input fiber 9/125 µm.

Amplitude	**Agilent 8614xB**			**Notes**
Sensitivity				Sensitivity is defined as signal value >6 x RMS noise value.
600-750 nm	–60 dBm			$T^{(0\text{-}30°C)}$, 2nd Order
750-900 nm	–75 dBm			
900-1250 nm	–75 dBm			$T^{(0\text{-}30°C)}$
1250-1610 nm	–90 dBm			
1610-1700 nm	–80 dBm			$T^{(20\text{-}30°C)}$
Maximum Measurement Power				Resolution bandwidth setting < channel spacing.
1525-1700 nm	+15 dBm per channel, +30 dBm total			Char.
600-1000 nm	+15 dBm per channel, +30 dBm total			
1000-1525 nm	+12 dBm per channel, +30 dBm total			
Maximum Safe Power				
Total safe power	+30 dBm			
Total power within any 10 nm portion of the spectrum	+23 dBm			
Absolute Accuracy				
at –20 dBm, 1310 nm/1550 nm	±0.5 dB			For resolution ≥0.1 nm
Scale Fidelity				Excluding amplitude errors at low power levels due to noise.
autorange off	±0.05 dB			$T^{(20\text{-}30°C)}$
autorange on	±0.07 dB			
Display Scale (log scale)	0.01-20 dB/DIV, –120 to +90 dBm			
Amplitude Stability (1310 nm, 1550 nm)				
1 minute	±0.01 dB			For signals within 8 dB of top of screen.
15 minutes	±0.02 dB			Char.
Flatness*	**Agilent 86140B, 86143B, 86144B**	**Agilent 86142B, 86145B, 86146B**	**Agilent 86141B, 86140B-025, 86143B-025**	
1290-1330 nm	±0.2 dB	±0.2 dB	±0.2 dB	
1525-1570 nm	±0.2 dB	——	±0.2 dB	
1525-1610 nm	——	±0.2 dB	——	
1250-1610 nm	±0.7 dB			Absorption of light by atmospheric moisture affects flatness at 1350-1420nm.
Polarization Dependence*				For resolution ≥0.2 nm, $T^{(room)}$.
1310 nm	±0.25 dB	±0.12 dB	——	
1530 nm, 1565 nm	±0.2 dB	±0.05 dB	——	
1600 nm	±0.25 dB	±0.08 dB	——	
1250-1650 nm	±0.3 dB	±0.25 dB	±0.5 dB	

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* With applied input fiber 9/125 µm.

Specifications (cont'd)

Dynamic Range	Agilent 86140B, 86143B, 86144B	Agilent 86142B, 86145B, 86146B	Agilent 86141B, 86140B-025, 86143B-025	Notes
In 0.1 nm Resolution Bandwidth*				Excluding multiple order grating response.
1250-1610 nm (chop mode on) ±0.5 nm, ±1 nm, ±5 nm	–70 dB			Char., Chop mode not available on the 86144B/86146B models
1550 nm				
at ±0.8 nm (±100 GHz at 1550 nm)	–60 dB			Average of all states of polarization
at ±0.5 nm (±62.5 GHz at 1550 nm)	–58 dB		–55 dB	Char. (86140B, 86141B, 86143B, 86144B, 86140B-025, 86143B-025
at ±0.4 nm (±50 GHz at 1550 nm)	–55 dB		–52 dB	
at ±0.2 nm (±25 GHz at 1550 nm)	–40 dB	–40 dB	——	Char.

Monochromator Input	Agilent 8614xB	Notes
Input Return Loss		Depends on the quality of the attached connector.
Straight connector (9/125 µm)	>35 dB	

Sweep	Agilent 8614xB	Notes
Max. Sweep Rate	40 nm/56.3 ms	Char.
Max. Sampling Rate in Zero Span	50 µs/trace point	
Sweep Cycle Time		
50 nm span, auto zero off	<180 ms	Char.
50 nm span, auto zero on	<340 ms	
100 nm span	<400 ms	
500 nm span	<650 ms	
ADC Trigger Accuracy		
Jitter (distributed uniformly)	<±0.5 µs	Char.
Trigger delay range	2 µs-6.5 ms	

Pulse Mode Accuracy	Agilent 86140B, 86143B, 86144B	Agilent 86142B, 86145B, 86146B	Agilent 86141B, 86140B-025, 86143B-025	Notes
Turn On (≥2 µs after rising edge)	<±0.2 dB (starting from dark)			Char.
Turn Off (≥10 µs after falling edge)	<±0.2 dB	<±0.2 dB (30 dB extinction)	±0.2 dB	Char. (86140B, 86141B, 86143B, 86144B, 86146B, 86140B-025, 86143B-025)

Computer Interfacing	Agilent 8614xB	Notes
Remote Control	Web enabled controls	
Compatibility	IEEE-488.1, IEEE-488.2 (100%)	
Interfaces	GPIB, Parallel Printer Port, External VGA Monitor, Keyboard and Mouse (PS/2)	
Floppy Disk	3.5" 1.44MB, MS-DOS	MS-DOS is a U.S.
Data export	Spreadsheet and Word Processor Compatible (CSV ASCII)	registered trademark of
Graphics export	CGM, PCL, GIF	Microsoft Corporation
Instrument Drivers	Universal Instrument Drivers (PNP), Compatible with VEE, Labview, Visual Basic and C++	Labview is a U.S. registered trademark of National Instruments.

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T(#) indicates temperature dependence.
* With applied input fiber 9/125 µm.

	Benchtop OSA Agilent 86140B, 86141B, 86142B, 86146B	Portable OSA Agilent 86143B, 86144B, 86145B
General Specifications		
Dimensions	222 high x 425 wide x 427 mm long	163 high x 325 wide x 427 mm long
Weight	16.5 Kg	14.5 Kg
Environmental		
Temperature	Operating 0°C to 55°C, Storage –40°C to 70°C	
Humidity	Operating <95% RH, Storage: Noncondensing	
EMI	Conducted and radiated interference is in compliance with CISPR pub11, IEC 801-3,IEC 801-4 and IEC 555-2	
Power Requirements		
Voltage and frequency	90 Vac to 260 Vac, 44 to 444 Hz	
Maximum power consumption	230 W	

Additional Specifications

Agilent 86141B

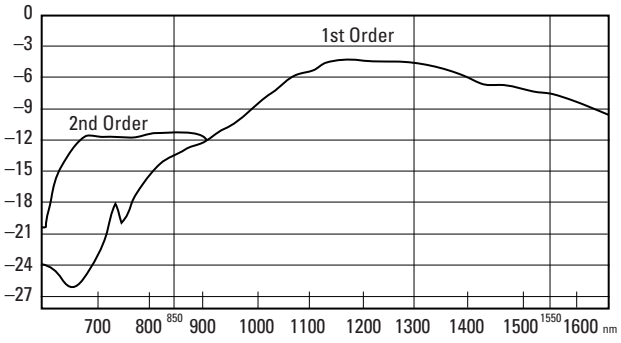
Monochromator Insertion Loss (into 62.5 µm fiber)

(See characteristic plot)[1]

850 nm: <19 dB
1300 nm: <7 dB
1550 nm: <10 dB

Maximum Input Power
+30 dBm total, +23 dBm within any 10 nm portion of the spectrum

Characteristic Monochromator Loss



WARNING
The light emitted from this connector is filtered and slightly attenuated light input to the front-panel MONOCHROMATOR INPUT connector. In the following instrument modes: preselector, and stimulus response, light energy can radiate from the front-panel MONOCHROMATOR OUTPUT connector.

Monochromator

Polarization Dependence[2] for Resolutions ≥0.2 nm
1250 nm to 1650 nm: ±*0.5 dB*[3] *(char.)*
Resolution Selections (FWHM): 0.07 nm and 0.1 nm to 10 nm in a 1, 2, 5 sequence
Input: 50 µm
Output: 62.5 µm

Photodetector Input (in power meter mode)

Accuracy at –20 dBm[4] (1550 nm)
20°C to 30°C: ±0.35 dB
Maximum Safe Power Level: +20 dBm
Scale Fidelity (for ≤0 dBm inputs)[5]
For any Measurement with Fixed Reference Level: ±0.05 dB (char.)
For Multiple Measurements with Different Reference Levels: ±0.07 dB (char.)
Display Resolution
Log: 0.01 dB
Linear: 0.23% of measurement + 0.01% of reference level
Power Range (up to 50 dB in any reference level setting)
Maximum Displayed Level (Char.): 10 dBm, 1250–1610 nm
Sensitivity[6]: –95 dBm (char.), 1250–1610 nm
Flatness (for ≤0 dBm input):[4] *±0.4 dB (char.), 1250–1610 nm*

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[1] Second order is selected when the stop wavelength is at or below 900 nm and resolution is <10 nm.
[2] With applied input fiber that is standard single mode at wavelength of interest
[3] At room temperature
[4] With applied input fiber 9/125 µm
[5] To within 20 dB of the sensitivity noise limit
[6] Sensitivity applied within 1 minute of last zeroing.