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Agilent 8612x Multi-Wavelength Meters

Technical Specifications



Agilent multi-wavelength meters are Michelson interferometer-based instruments that measure wavelength and optical power of laser light over a specified wavelength range. Simultaneous measurements of multiple laser lines are performed allowing measurements of DWDM signals and multiple lines of Fabry-Perot lasers. Each laser line is assumed to have a linewidth (including modulation sidebands) of less than:

- 10 GHz for the 86120B,
- 5 GHz for the 86120C, and
- 2.5 GHz for the 86122A.

This technical specifications sheet describes the measurement accuracy and operating conditions of the Agilent 86120B, 86120C and 86122A Multi-Wavelength Meters. The **specifications** apply to all functions over the temperature range of 0 to 55°C and relative humidity <95% (unless otherwise noted). All specifications apply after the instrument's temperature has been stabilized after 15 minutes continuous operation, and when the instrument is in NORMAL UPDATE mode (86120B and 86120C).

Agilent Technologies

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Definition of Terms

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.

Wavelength

- *Range* refers to the allowable wavelength range of the optical input signal.
- *Absolute accuracy* indicates the maximum wavelength error over the allowed environmental conditions.
- *Differential accuracy* indicates the maximum wavelength error in measuring the wavelength difference between two signals that are simultaneously present.
- *Minimum resolvable separation* indicates the minimum wavelength separation of two laser lines input required to measure each wavelength simultaneously. Two laser lines closer in wavelength than the minimum resolvable separation are not resolved and one average wavelength is displayed.
- *Display resolution* indicates the minimum incremental change in displayed wavelength.

Power

- *Calibration accuracy* indicates the maximum power calibration error at the specified wavelengths over the allowed environmental conditions.
- *Flatness* refers to the maximum amplitude error in a measurement between two lines that are separated in wavelength by no more than the specified amount.
- *Linearity* indicates the maximum power error in measuring the change in power of one laser line.
- *Polarization dependence* indicates the maximum displayed power variation as the polarization of the input signal is varied.
- *Display resolution* indicates the minimum incremental change in displayed power.

Sensitivity

- *Sensitivity* is defined as the minimum power level of a single laser line input to measure wavelength and power accurately. A laser line with less than the minimum power may be measured but with reduced wavelength and power accuracy. For multiple laser lines input, sensitivity may be limited by total input power.

Selectivity

- *Selectivity* indicates the ability to measure the wavelength and power of a weak laser line in the proximity of a specified stronger laser line and separated by the specified amount.

Input Power

- *Maximum displayed level* indicates the maximum total input power (total of all laser lines present) to accurately measure wavelength and power.
- *Maximum safe input power* indicates the maximum total input power (total of all laser lines present) to avoid permanent optical damage to the instrument.

Maximum Number of Lines Input

- *Maximum number of lines input* is the maximum number of displayed lines. If more than the specified number of lines are input, only the longest wavelength lines are displayed.

Input Return Loss

- *Input return loss* indicates the optical power reflected back to the user's fiber cable relative to the input power. It is limited by the return loss of the front panel connector, and assumes the user's connector is good.

Measurement Cycle Time

- *Measurement cycle time* refers to the cycle time when measuring wavelength and power of laser lines. Specific advanced applications may require longer cycle times.

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Specifications

	86120B	86120C	86122A	Notes
Wavelength				
Range	700-1650 nm (182-428 THz)	1270-1650 nm (182-236 THz)	1270-1650 nm (182-236 THz)	
Absolute Accuracy	±3 ppm	±2 ppm	±0.5 ppm (Opt.001) ±0.2 ppm (Opt.002)	
at 1550 nm	±0.005 nm	±0.003 nm	±0.75 pm (Opt. 001), ±0.3 pm (Opt. 002)	
at 1310 nm	±0.004 nm	±0.003 nm	±0.65 pm (Opt. 001), ±0.3 pm (Opt. 002)	
for laser lines separated by	≥30 GHz	≥15 GHz	≥10 GHz	
Differential Accuracy[1]	±2 ppm	±1 ppm	±0.25 ppm (Opt. 001) ±0.15 ppm (Opt. 002)	
Minimum Resolvable Separation[1]				
(equal power lines input)	20 GHz	10 GHz	5 GHz	For lines separated by
at 1550 nm	0.16 nm	0.08 nm	0.04 nm	less than the specified
at 1310 nm	0.11 nm	0.06 nm	0.03 nm	amount, wavelength
for laser lines separated by	≥30 GHz	≥15 GHz	≥10 GHz	accuracy is reduced.
Display Resolution	0.001 nm		0.0001 nm	
Fast update mode	0.01 nm		N/A	
Units	nm (vacuum or standard air), cm^{-1}, THz			
Power				
Calibration Accuracy	±0.5 dB (at ±30 nm from 780, 1310, and 1550 nm)	±0.5 dB (at ±30 nm from 1310 and 1550 nm)		
Flatness[1]	±0.2 dB (1200 to 1600 nm) ±0.5 dB (700 to 1650 nm)	±0.2 dB (1270 to 1600 nm) ±0.5 dB (1270 to 1650 nm)		30 nm from any wavelength
Linearity	±0.3 dB (1200 to 1600 nm)	±0.3 dB (1270 to 1600 nm)		Lines above –30 dBm
Polarization Dependence	±0.5 dB (1200 to 1600 nm) ±1.0 dB[1] (700 to 1650 nm)	±0.5 dB (1270 to 1600 nm) ±1.0 dB[1] (1600 to 1650 nm)		
Display Resolution	0.01 dB			
Units	dBm, mW, µW			
Sensitivity[2]				
Single Line Input	–20 dBm (700 to 800 nm) –25 dBm (800 to 1200 nm) –40 dBm (1200 to 1600 nm) –30 dBm (1600 to 1650 nm)	–40 dBm (1270 to 1600 nm) –30 dBm (1600 to 1650 nm)	–37 dBm (1270 to 1600 nm)[3] –27 dBm (1600 to 1650 nm)[3]	
Multiple Lines Input[1,3]	30 dB below total input power, but not less than single line input sensitivity			
Selectivity[1]	25 dB spacing ≥100 GHz 10 dB spacing ≥30 GHz	25 dB spacing ≥50 GHz 10 dB spacing ≥15 GHz	25 dB spacing ≥90 GHz 10 dB spacing ≥10 GHz	
Input Power				
Maximum Displayed Level	+10 dBm			sum of all lines input
Maximum Safe Input Level	+18 dBm			
Return Loss				
With Non-Angled (PC) Connectors	35 dB			
With Angled (PC) Connectors (Option 022)	50 dB			
Measurement Cycle Time	1.0 s		0.5 s	
Maximum Number of Lines	100	200	1000[4]	
Measurement Modes	List by wavelength table, list by power table, peak wavelength and power, average wavelength and total power			Data Logging and sorting by any parameter are included in the 86122A.
Delta Modes	Delta wavelength, delta power, delta wavelength and power			

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Specifications (cont'd)

	86120B	86120C	86122A	Notes
Built in Automatic Measurement Applications				
Signal to Noise Ratio[1,6]				
Channel Spacing ≥200 GHz	>35 dB with 100 averages			0.1 nm noise bandwidth.
Channel Spacing ≥100 GHz		>35 dB with 100 averages	>35 dB with 100 averages	Lines above –25 dBm.
Channel Spacing ≥ 50 GHz		>27 dB with 100 averages	>27 dB with 100 averages	
Drift	Maximum, minimum, total drift (max-min) of wavelengths and powers over time			
Fabry-Perot Characterization		Mean wavelength, peak wavelength, mode spacing full-width half maximum, peak amplitude total power, sigma		
Coherence Length[1]	Fabry-Perot lasers, 1 to 200 mm coherence length, accuracy to within ±5%, 0.75 cycle time			
Additional Features	Power offset, power bars (on or off), user adjustable peak excursion and peak threshold, user adjustable start and stop wavelength limits, graphical display, save and recall instrument states.			
Inputs/Outputs				
Optical Input	9/125 µm single-mode fiber			
Rear Panel Connectors	GPIB, parallel printer port, AC line		LAN, PS/2 for Keyboard & Mouse, SVGA for external monitor, GPIB, parallel printer port, AC Line, optional optical input	
Dimensions and Weight				
Dimensions	140 mm high x 340 mm wide x 465 mm deep (5.5 in x 13.4 in x 18.3 in)		138 h x 425 w x 520 mm d (5.2 in x 16.7 in x 20.5 in)	
Weight	9 kg (19 lb)		14.5 kg (32 lb)	
Environmental				
Operational				
Temperature	0°C to +55°C			15°C to 35°C, <75% R.H. at 35°C for 86122A Opt. 002
Humidity[5]	<95% R.H. at +40°C, 5 day soak			
Shock[5]	300 g		120 g	Half sine, 2 msec pulse
Vibration[5]	5 g rms		2 g rms	Random, 5 to 500 Hz, 10 min./axis
	0.75 g (0 to peak)		0.5 g (0 to peak)	Sine, 5 to 500 Hz, 1 octave/min.
EMC	Conducted and radiated interference is in compliance with CISPR Pub 11, IEC 801-2, IEC 801-3, IEC 801-4 and IEC 555-2			
Storage				
Temperature	–40°C to +70°C			
Humidity[5]	90% R.H. at +65°C for 24 hrs.		95% R.H. at +40°C, 5 day cycle	Noncondensing
Power Requirements				
Voltage and frequency	88 to 269 VAC, 45 Hz to 440 Hz		90 to 264 VAC, 47 Hz to 63 Hz	
Maximum Power	70 watts max (125 VA max)		310 VA max	

[1] Characteristic
[2] Contact Agilent Technologies for availability of special instruments with higher sensitivity.
[3] Minimum power level required for 86122A Opt. 002 is 5 dB higher than Opt. 001.
[4] For 86122A Opt. 002, number of laser lines may be limited by signal power requirements for accurate wavelength measurements.
[5] Type tested means tested, but not warranted, for continuous operation.
[6] At 1550 nm

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Ordering Information

For the most up-to-date ordering information, please contact your Agilent sales representative or visit our website at: www.agilent.com/comms/lightwave

86120B/C Multi-Wavelength Meter

Optical Connectors

86120x-011	Diamond HMS-10 Connector
86120x-012	FC Connector (default)
86120x-013	DIN Connector
86120x-014	ST Connector
86120x-017	SC Connector
86120x-020	Straight (non-angled) Contact Interface-PC
86120x-022	Angled Contact Interface-APC

Fixed External 10 dB Attenuators

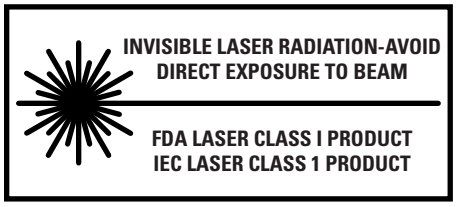
86120x-412	Attenuator with FC/PC Connector (must be ordered with 86120x-020 option)
86120x-417	Attenuator with FC/APC Connector (must be ordered with 86120x-022 option)

Accessories

86120x-AXE	Rack Flange Kit with Handles
86120x-IA4	Rack Flange Kit without Handles
86120x-UK5	Nylon Carrying Case with Shoulder Strap
86120x-UK6	Commercial Calibration Certificate with Test Data
86120x-UK7	Hard Carrying Case

Documentation

86120x-ABA	English Operation Manual (default)
86120x-ABJ	Japanese Operation Manual
86120x-OBO	Do not include an Operation Manual



86122A Multi-Wavelength Meter

Performance Options

86122A-001	Standard Performance (default)
86122A-002	High Accuracy Performance

Optical Connectors

86122A-020	Straight (non-angled) Contact Interface-PC (default)
86122A-022	Angled Contact Interface-APC
86122A-400	Front Panel Fiber Input (default)
86122A-401	Rear Panel Fiber Input
81000AI	Diamond HMS-10 Connector
81000FI	FC Connector (default)
81000KI	SC Connector
81000SI	DIN Connector
81000VI	ST Connector

Fixed External 10 dB Attenustors

86122A-412	Attenuator with FC/PC Connector (must be ordered with 86122A-020 option)
86122A-417	Attenuator with FC/APC Connector (must be ordered with 86122A-022 option)

Accessories

86122A-1CM	Rack Mount Kit without Handles
86122A-1CN	Handle Kit
86122A-1CP	Rack Mount Kit plus Handles
86122A-UK6	Commercial Calibration Certificate with Test Data

Documentation

86122A-ABA	English Operation Manual (default)
86122A-ABJ	Japanese Operation Manual
86122A-OBO	Do not include an Operation Manual

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Printed in USA March 11, 2002
5988-5422EN

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