

Agilent 86120C Multi-Wavelength Meter Technical Specifications



The Agilent 86120C Multi-Wavelength Meter is a Michelson interferometer-based instrument that measures wavelength and optical power of laser light in the 1270 to 1650 nm 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 5 GHz.

This technical specifications sheet describes the measurement accuracy and operating condition of the Agilent 86120C Multi-Wavelength Meter. The **specifications** apply to all functions 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 15 minutes continuous operation, and when the instrument is in NORMAL UPDATE mode.

Wavelength

Range

1270 to 1650 nm (182 to 236 THz)

Absolute accuracy, laser lines separated by ≥ 15 GHz

± 2 ppm (± 0.003 nm at 1550 nm and 1310 nm)

Differential accuracy¹

± 1 ppm

Minimum resolvable separation^{1,2}

(equal power lines input)

10 GHz (0.08 nm at 1550 nm, 0.06 nm at 1300 nm)

Display resolution

0.001 nm

Power

Calibration accuracy

± 0.5 dB (at ± 30 nm from 1310 and 1550 nm)

Flatness, 30 nm from any wavelength

1270 to 1600 nm¹

± 0.2 dB

1270 to 1650 nm¹

± 0.5 dB

Linearity³

± 0.3 dB

Polarization dependence,

1270 to 1600 nm

± 0.5 dB

1600 to 1650 nm¹

± 1.0 dB

Display resolution

0.01 dB

¹ Characteristic

² For lines separated by less than 15 GHz, wavelength accuracy is reduced.

³ 1270 to 1600 nm, lines above -30 dBm



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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 200 lines are input, only the 200 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.

Specifications

Sensitivity^{4,5}

1270 to 1600 nm, single line input -40 dBm

1600 to 1650 nm, single line input -30 dBm

1270 to 1650 nm, multiple lines input¹

30 dB below total input power; but not less than single line input sensitivity

Selectivity

2 lines input separated by ≥ 50 GHz¹ 25 dB

2 lines input separated by ≥ 15 GHz¹ 10 dB

Input Power

Maximum displayed level (sum of all lines input)
+10 dBm

Maximum safe input level (sum of all lines input)
+18 dBm

Maximum Number of Laser Lines Input

200

Input Return Loss

With flat contacting connectors 35 dB

With angled contacting connectors (option 022) 50 dB

Measurement Cycle Time

Normal update mode¹

1.0 sec (1 measurement/sec)

Wavelength Units

nm (vacuum or standard air), cm^{-1} , THz

Power Units

dBm, mW, μW

Measurement Modes

List by Wavelength Table, List by Power Table, Single Wavelength and Power, Average Wavelength and Total Power

Delta Modes

Delta Wavelength, Delta Power, Delta Wavelength and Power

Built in Automatic Measurement Applications

Signal-to-noise ratio¹

0.1 nm noise bandwidth, lines above -25 dBm

>35 dB, channel spacing ≥ 100 GHz

>27 dB, channel spacing ≥ 50 GHz

Signal-to-noise ratio¹ of modulated lasers (with averaging)

0.1 nm noise bandwidth, lines above -25 dBm

>35 dB with 100 averages, channel spacing ≥ 100 GHz

>27 dB with 100 averages, channel spacing ≥ 50 GHz

Drift

Maximum, minimum, total drift (max-min) of wavelengths and powers over time

Fabry-Perot characterization

Mean wavelength, Peak wavelength, Mode spacing, Full-width at half maximum, Peak amplitude, Total power, Sigma.

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

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)

Weight

9 kg (19 lb)

Environmental

	Operational	Storage
Temperature (warranted)	0° C to +55° C	-40° C to +70° C
Humidity (type tested)	<95% R.H. at +40° C, 5 day soak	Noncondensing 90% R.H. at +65° C for 24 hrs.
Shock (type tested)	300 g, half sine, 2 msec pulse	
Vibration (type tested)	Random, 5 g rms 5 to 500 Hz, 10 min./axis Sine, 0.75 g (0 to peak) 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	

Note: "type tested" means tested, but not warranted, for continuous operation.

Power Requirements

Voltage and frequency

88 to 269 VAC, 45 Hz to 440 Hz

Maximum power

70 watts max (125 VA max)

¹ Characteristic

² For lines separated by less than 15 GHz, wavelength accuracy is reduced.

³ 1270 to 1600 nm, lines above -30 dBm

⁴ Characteristic noise floor -60 dBm

⁵ Contact Agilent for availability of special instruments with higher sensitivity.

Ordering Information

Ordering Information

Agilent 86120C Multi-Wavelength Meter

Standard instrument includes a front-panel FC/PC optical fiber connector interface and a user's manual.

Connector options replacing the standard FC/PC connector interface:

- Option 011** HMS-10
- Option 013** DIN
- Option 014** ST
- Option 017** SC

- Option 022** Replace flat physical contact interface with angled physical contact interface

Additional connector interfaces can be ordered separately:

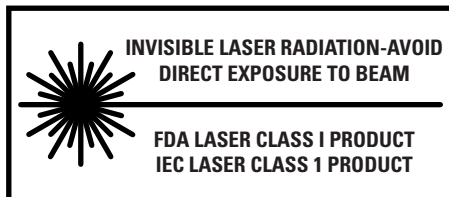
- 81000AI** Diamond HMS-10 connector interface
- 81000FI** FC/PC/SPC/APC connector interface
- 81000GI** D4 connector interface
- 81000KI** SC connector interface
- 81000SI** DIN 47256/4108.6 connector interface
- 81000VI** ST connector interface
- 81000WI** Biconic connector interface

Fixed external 10 dB attenuators:

- Option 412** FC/PC
- Option 417** FC/APC (requires Option 022)

Other options:

- Option UK5** Nylon carrying case with shoulder strap
- Option UK6** Commercial calibration certificate with test data
- Option UK7** Hard carrying case



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