

KEYSIGHT TECHNOLOGIES (AGILENT HP)

86146B

The Agilent/Keysight 86146B is a high-performance benchtop optical spectrum analyzer (OSA) featuring a patented double-pass monochromator design. It covers a broad wavelength range of 600 to 1700 nm and excels in characterizing DWDM components, narrowband sources (DFBs), wideband sources (FPs), and optical amplifiers (EDFA, Raman, and SOAs). A key highlight of the 86146B is its versatile filter mode, enabling single wavelength channel drop with fast-tuning speed, low insertion loss, and highly repeatable wavelength accuracy, which also supports time-resolved chirp (TRC) and dispersion penalty (DP) measurements.

SPECIFICATIONS

General

Interfaces	GPIO (Dual ports), RS-232, Parallel (Centronics), VGA output
Display	10.4-inch active matrix color LCD
Warm-up Time	40 minutes for wavelength accuracy; 1 hour for full specifications
Display Update Rate	Up to 40 sweeps/s (span ≤ 10 nm)

Physical

Power Supply	100 V to 240 V AC, 50/60 Hz, 230 VA max
Operating Temperature	0 °C to 55 °C °C
Dimensions (W×H×D)	425 mm x 222 mm x 533 mm mm
Weight	16.5 kg kg

Wavelength Specifications

Wavelength Range	600 nm to 1700 nm
Wavelength Accuracy	+/- 10 pm (1480 to 1570 nm with Option 006 internal calibrator)
Wavelength Reproducibility	+/- 2 pm (short-term)
Resolution Bandwidth (FWHM)	60 pm to 10 nm
Resolution Bandwidth Accuracy	+/- 3% (at 0.1, 0.2, 0.5, 1, 2, 5, 10 nm)
Monochromator Design	Patented double-pass design

Amplitude & Power Specifications

Dynamic Range at +/- 0.5 nm	>= 55 dB (chop off), >= 60 dB (chop on)
Dynamic Range at +/- 1.0 nm	>= 60 dB (chop off), >= 70 dB (chop on)
Power Level Sensitivity (Noise Floor)	down to -90 dBm (1250 nm to 1610 nm)
Maximum Safe Input Power	+30 dBm (total safe input power)
Power Level Accuracy	+/- 0.5 dB (at 1310 nm and 1550 nm)
Flatness	+/- 0.2 dB (1480 nm to 1570 nm)
Polarization Dependence (PDL)	+/- 0.05 dB (1550 nm)
Amplitude Linearity	+/- 0.05 dB (for input power -50 dBm to +10 dBm)
Scale Settings	0.1 to 20 dB/div, Linear
Sweep-Average Display Noise Level	down to -90 dBm

Sweep & Measurement Performance

Minimum Sweep Time	< 180 ms (for 50 nm span)
Measurement Points (Trace Points)	3 to 10001 (user-selectable)

Optical Connections & Interfaces

Optical Input Connector Type	HMS-10/HP (interchangeable FC, SC, ST adapters)
Optical Return Loss	> 35 dB
Internal Monochromator Output/Input Port	Yes (allows tunable filter operation and channel drop)
Fiber Type	9/125 um single-mode (standard), multimode (optional)
External Trigger Input	TTL level, BNC connector

Analysis Functions & Software Features

WDM Analysis	OSNR, Channel Power, Channel Wavelength
DFB/FP Laser Characterization	Yes (built-in application)
EDFA Analysis	Gain, Noise Figure (built-in application)
Spectral Width Measurements	RMS, Envelope, NdB Down (built-in)
Passive Component Test Functions	Yes (built-in application)
Internal Trace Memory	Yes (plus built-in 3.5-inch floppy drive)
Built-in Programming Language	HP Instrument BASIC (IBASIC)
Time-Resolved Chirp (TRC) Application	Supported (built-in TRC and DP application)
Dispersion Penalty (DP) Application	Supported

System Connectivity & I/O Ports

GPIO Interface Ports	Dual ports (GPIO 1 and GPIO 2)
External Monitor Output	VGA (15-pin D-sub)
Parallel Port	Centronics (25-pin D-sub)
Internal Storage Device	3.5-inch Floppy Drive (1.44 MB)

Physical, Power & Environmental

Storage Temperature Range	-40 °C to +75 °C
Maximum Relative Humidity	95% R.H. non-condensing (up to 40 °C)

Factory Configuration & Accessories

Wavelength Calibrator Option	Option 006 (Internal Wavelength Calibrator)
EELED Source Option	Option 002
Connector Adapter Options	FC/PC, SC, ST

Power

Power Consumption	150 W (230 VA)
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Display & Traces

Wavelength Display Resolution	0.001 nm
Amplitude Display Resolution	0.001 dB
Number of Traces	6 (active plus 5 stored)

Storage

Floppy Drive Capacity	1.44 MB
Floppy Drive Media Size	3.5-inch

Environmental

Operating Altitude	Up to 3,000 m (10,000 ft)
Storage Altitude	Up to 15,240 m (50,000 ft)

Interfaces

Keyboard Connector	PS/2
Serial Interface	RS-232 (9-pin D-sub)

Options

Internal Thermal Printer Option	Option 003
Multimode Photodetector Input Option	Option 004

Monochromator & Photodetector

Monochromator Output Port Fiber Type	9/125 µm single-mode
External Photodetector Input Port Fiber Type	9/125 µm single-mode

Filter Mode

Filter Mode Insertion Loss	< 7 dB (nominal at 1550 nm)
Filter Mode Polarization Dependence	< ±0.25 dB (at 1550 nm)
Filter Mode Tuning Time	< 150 ms (for 10 nm step)

EELED Source (Option 002)

Option 002 EELED Spectral Power Density	> -40 dBm/0.1 nm (1530 nm to 1610 nm)
Option 002 EELED Output Power	> -10 dBm (total power)

Current Source (Option 001)

Option 001 Current Source Range	0 to ±100 mA
Option 001 Current Source Resolution	10 µA

Pulse Measurement

Minimum Gated Pulse Width	2 µs
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TECHNOLOGY

Grating-based double-pass monochromator

APPLICATIONS

DWDM component test, laser source characterization, EDFA/Raman amplifier analysis, and Time-Resolved Chirp (TRC) measurement

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