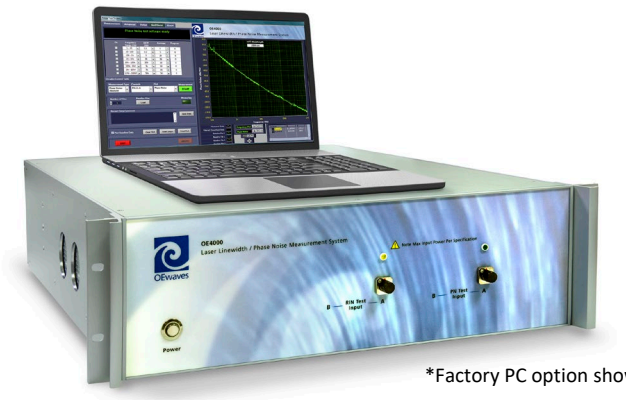
OEwaves
INVENT ▪ DEVELOP ▪ DELIVER

HI-Q® LASER LINEWIDTH / PHASE NOISE ANALYZER

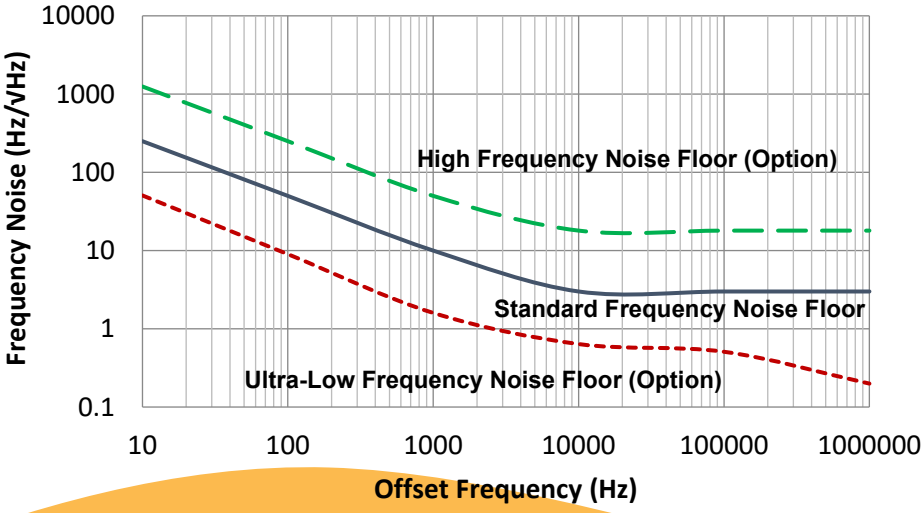
Using a homodyne methodology, HI-Q® Laser Linewidth / Phase Noise Analyzer offers a fully automated measurement of ultra-low phase noise CW laser sources.



*Factory PC option shown

HI-Q® Laser Linewidth / Phase Noise Analyzer is capable of rapidly measuring laser phase noise and estimating its FWHM linewidth down to < 3 Hz without complex setup or reference lasers normally required to make such a narrow linewidth measurement.

This homodyne-based system is unique in wideband measurement without requiring another low noise reference laser source. The complete system operates with ease, speed and precision via a simple PC based graphic user interface. No additional test equipment required. The unmatched ultra-low phase/frequency noise analyzer is scalable to various input wavelength bands and is available with low relative intensity noise (RIN) measurement option.



FEATURES

- Ultra-Low Phase/Frequency Noise Measurement
- Fast Real-Time Measurement
- Instantaneous and Extended FWHM Linewidth Analysis
- No Low Noise Reference Source Required
- User Friendly Interface
- Remote Operation
- 3U x 19” Rack System
- Customizable Configurations, Upgrades, and Options

OPTIONAL CONFIGURATION

- Multiple Input Wavelength Bands within 575 nm – 2100 nm
- Ultra-Low or Dual Noise Floor
- RIN/Excess RIN Measurements
- Extended Offset Frequency Range up to 500 MHz
- Extended Input Power Range
- Frequency Monitoring
- Linewidth Narrowing
- Lorentzian Linewidth Monitoring
- Flexible Options and Upgrades

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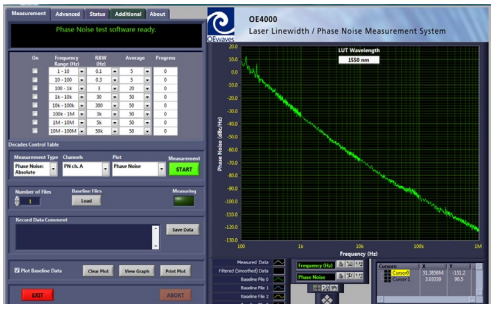
HI-Q® LASER LINEWIDTH/PHASE NOISE ANALYZER



OE4000

SPECIFICATIONS

1530 – 1565 nm

Frequency Noise Offset	10 Hz	100 Hz	1 kHz	1MHz
▪ Ultra Low Noise Floor Option*	50 Hz/√Hz	10 Hz/√Hz	2 Hz/√Hz	0.2 Hz/√Hz
▪ Standard Noise Floor**	250 Hz/√Hz	50 Hz/√Hz	10 Hz/√Hz	3 Hz/√Hz
▪ High Noise Floor Option**	1250 Hz/√Hz	250 Hz/√Hz	50 Hz/√Hz	18 Hz/√Hz

* To measure laser under test (LUT) near the frequency noise floor requires LUT RIN < -100 dBc/Hz @ 10Hz, -130 dBc/Hz @ 1 kHz and -150 dBc/Hz @ 1 MHz
** To measure laser under test (LUT) near the frequency noise floor requires LUT RIN < -100 dBc/Hz @ 10Hz, -130 dBc/Hz @ 1 kHz and -140 dBc/Hz @ 1 MHz

Lorentzian/Instantaneous Linewidth Sensitivity (<10 µs)	Ultra Low Noise Floor: Standard Noise Floor: High Noise Floor:	< 0.5 Hz < 30 Hz < 1 kHz
FWHM Extended Linewidth Estimation Range (<10 ms)	Ultra Low Noise Floor: Standard Noise Floor: High Noise Floor:	3 Hz – 30 kHz 1 kHz – 10 MHz 10 kHz - > 100 MHz
Dynamic Range	60 dB	
White Phase Noise Floor	-160 ± 2 dBc/Hz	
Optical Input Power Range	0 to +10 dBm (PM-FC/APC)	
Offset Frequency Range	10 Hz – 1 MHz	
Measurement Types	Frequency/Phase Noise, Spurious, RIN/Excess RIN (Option)	
Resolution Bandwidth	0.1 Hz – 200 kHz	
Operating Interface	PC (WIN7 PRO+; User supplied) via LAN ; OR Monitor/Keyboard/Mouse (User supplied) via HDMI/USB ; OR Factory supplied PC Laptop (Option)	
Operating Temperature Range	15°C to 35°C	
Power	110 / 120 or 220 / 240 V_{ac} ; 50 / 60Hz	
Size	3U x 19: Rack Mount	

OPTIONS

Input Power Range[1]	Up to 15 dB range no less than -10 dBm AND no higher than +15 dBm
Wavelength Ranges Available[2]	575 – 710 / 740 – 935 / 965 – 1065 / 1000 – 1100 / 1260 – 1360 1360 – 1460 / 1460 – 1530 / 1530 – 1565 / 1565 – 1625 / 1647 – 1655 1900 – 1950 / 1950 – 2100 (Consult factory for custom or multi-wavelength range options)
Extended Offset Frequency Range	1Hz – 10MHz, 1Hz-100MHz, or 100Hz-500MHz
Relative Intensity Noise (RIN)/Excess RIN	-158/-168 ± 2 dB/Hz > 1 MHz (SM-FC/APC; Offset frequency matches system specification; Excess RIN excludes thermal and shot noises; see OE4001 Datasheet for higher frequencies)
Optical Frequency Monitoring	Refresh Rate > 10 Hz
Lorentzian Linewidth Monitoring	Rate > 0.1 Hz (LUT polarization deviation ≤ ±10 %, LUT optical power deviation ≤ ±1 dB)
Linewidth Narrowing	Frequency Noise >0.2 Hz/√Hz @ 1MHz (User supplied external PID controller required)

Note: These specifications are subject to change without notice due to OEwaves ongoing development cycle. Patents Pending.
Unless otherwise noted, all system noise floors are optimum at maximum specified input power range and increases by 2 dB per 1 dB decrease in optical input power.

[1]System noise floors are higher with low power range options. Consult OEwaves Sales for custom low power options and/or performance. Standard input power range may be band dependent.
[2]Phase Noise and RIN Noise Floors for systems with E, S and L telecom bands are 2 dB (typ.) higher than C-band specifications (3 dB with O-band configurations, 5 dB for 1647 – 1655 nm band); 8-12 dB higher for Visible region, 6-7 dB for 735nm-1.1µm, and 3-4 dB for 2 µm Input Wavelength Bands. Consult OEwaves Sales for other details.

OEwaves™

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