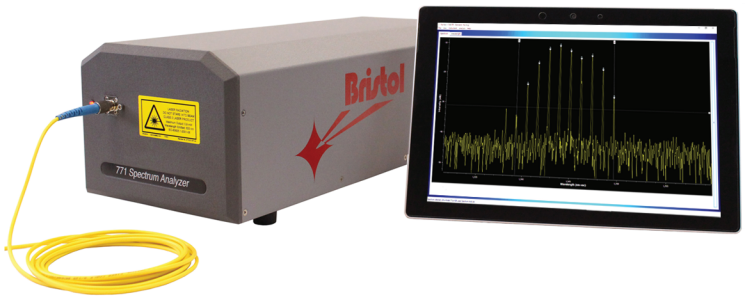
Bristol Instruments

771 Series

LASER SPECTRUM ANALYZER



The most complete laser wavelength and spectral characterization from the visible to mid-IR.

The 771 Series Laser Spectrum Analyzer from Bristol Instruments is a unique instrument that operates as both a high-accuracy wavelength meter and a high-resolution spectrum analyzer. It is for scientists and engineers who need to know the spectral properties of their lasers with the reliable accuracy that is required for the most demanding applications.

Most precise wavelength and spectral measurement

The 771 Laser Spectrum Analyzer combines proven Michelson interferometer technology with fast Fourier transform analysis to measure both a laser's wavelength and spectrum. Absolute wavelength is determined to an accuracy as high as ± 0.2 parts per million. And, with a spectral resolution as high as 2 GHz and an optical rejection ratio (ORR) of > 40 dB, the system provides the most detailed information about a laser's spectral properties.

Continuous calibration for reliable accuracy

Two versions of the 771 Laser Spectrum Analyzer are available. The model 771A is the most precise, measuring wavelength to an accuracy of ± 0.2 parts per million (± 0.0002 nm at 1000 nm). For experiments that are less exacting, the model 771B is a lower-priced alternative with an accuracy of ± 0.75 parts per million (± 0.0008 nm at 1000 nm). These specifications are guaranteed by continuous calibration with a built-in wavelength standard, thereby ensuring the most meaningful experimental results.

Broad wavelength coverage and straightforward operation

The 771 Laser Spectrum Analyzer is available in four broad wavelength configurations to satisfy virtually any experimental requirement. These ranges are the VIS (375 – 1100 nm), NIR (520 – 1700 nm), IR (1 – 5 µm) and MIR (1.5 – 12 µm). The system operates with a PC, running under Windows, via USB or Ethernet interface. Software is provided to control measurement parameters and to display spectra and to report wavelength data. Or, the system can become part of an experiment using a library of commands for custom or LabVIEW programming.

FEATURES

- Wavelength measurement and spectral analysis with one instrument
- Absolute wavelength measured to an accuracy as high as ± 0.0001 nm
- Spectral resolution as high as 2 GHz
- Automatically measures OSNR to > 40 dB
- Continuous calibration with a built-in wavelength standard
- Operation available from 375 nm to 12 µm
- Operation with CW and high-repetition rate pulsed lasers
- Input power requirement as low as 5 nW

The Power of Precision in Spectral Analysis

SPECIFICATIONS — 771 Series

MODEL	771A	771B
LASER TYPE [1]	CW, quasi-CW (repetition rate > 10 MHz), and pulsed (repetition rate > 50 kHz, pulse length > 50 ns)	
WAVELENGTH		
Range	*VIS:* 375 - 1100 nm *NIR:* 520 - 1700 nm *IR:* 1 - 5 µm	*VIS:* 375 - 1100 nm *NIR:* 520 - 1700 nm *IR:* 1 - 5 µm *MIR:* 1.5 - 12 µm
Absolute Accuracy [2, 3, 4]	± 0.2 ppm ± 0.0002 nm @ 1000 nm ± 0.002 cm^{-1} @ 10,000 cm^{-1} ± 60 MHz @ 300,000 GHz	± 0.75 ppm (± 1 ppm for MIR) ± 0.0008 nm @ 1000 nm ± 0.008 cm^{-1} @ 10,000 cm^{-1} ± 225 MHz @ 300,000 GHz
Spectral Resolution [5]	*Standard:* 4 GHz (8 GHz for IR) *High:* 2 GHz (4 GHz for IR) *Low:* 33 GHz (64 GHz for IR)	
Calibration	Continuous with built-in stabilized single-frequency HeNe laser	Continuous with built-in standard HeNe laser
Display Resolution	9 digits	8 digits
Units [6]	nm, µm, cm^{-1}, GHz, THz	
OPTICAL REJECTION RATIO [7, 8, 9]	> 40 dB (> 30 dB for MIR)	
MINIMUM INPUT POWER [9, 10, 11]	*VIS:* 0.07 µW (375 nm) 0.008 µW (750 nm) 0.04 µW (1100 nm) *NIR:* 0.3 µW (520 nm) 0.02 µW (1100 nm) 0.03 µW (1700 nm) *IR:* 0.3 µW (1 µm) 0.04 µW (3 µm) 0.5 µW (5 µm) *MIR:* 1 µW (1.5 µm) 0.005 µW (7 µm) 0.04 µW (12 µm)	
MEASUREMENT TIME (RATE) [12]	*VIS / NIR:* < 2 s *IR / MIR:* 1 s	
INPUTS/OUTPUTS		
Optical Input [13]	*VIS / NIR:* Pre-aligned FC/UPC connector (9 µm core diameter) - optional free beam-to-fiber coupler *IR / MIR:* Collimated beam, 2-3 mm diameter aperture, visible tracer beam to facilitate alignment	
Instrument Interface	High-speed USB and Ethernet interface with Windows-based display program Library of commands for custom and LabVIEW programming	
COMPUTER REQUIREMENTS	PC running Windows 7, 8 or 10, 1 GB available RAM, USB 2.0 (or later) port, monitor, pointing device	
ENVIRONMENTAL [9]		
Warm-Up Time	< 15 minutes	None
Temperature	+15°C to +30°C (-10°C to +70°C storage)	
Pressure	500 - 900 mm Hg	
Humidity	≤ 90% R.H. at + 40°C (no condensation)	
DIMENSIONS AND WEIGHT		
Dimensions (H x W x D) [14]	*VIS / NIR:* 5.6" x 6.5" x 15.0" (142 mm x 165 mm x 381 mm) *IR / MIR:* 7.5" x 6.5" x 15.0" (191 mm x 165 mm x 381 mm)	
Weight	14 lbs (6.3 kg)	
POWER REQUIREMENTS	90 - 264 VAC, 47 - 63 Hz, 50 VA max	

(1) Operation with pulsed lasers may result in modulation artifacts in the form of false spectral features. These modulation artifacts are reduced with averaging.
(2) Defined as measurement uncertainty, or maximum wavelength error, using a coverage factor of 3 providing a confidence level of ≥ 99.7%.
(3) Wavelength Meter Mode: 771A - for laser spectral bandwidth less than 1 GHz (FWHM). 771B - for laser spectral bandwidth less than 10 GHz (FWHM). When bandwidth is greater, wavelength accuracy is reduced.
(4) Spectrum Analyzer Mode: wavelength axis is calibrated to system's accuracy.
(5) Wavelength accuracy and optical rejection ratio may be reduced with High-Resolution mode and Low-Resolution mode.
(6) Data in units of nm, µm, and cm^{-1} are given as vacuum values.
(7) For single measurement with CW lasers, FWHM < 10 GHz, and 10,000 times (1,000 times for MIR) minimum input power. A reduced optical rejection ratio may result with pulsed lasers, lasers with larger bandwidth, and/or lasers with lower power.
(8) A co-ad averaging feature can be used to reduce the noise level and therefore improve the optical rejection ratio. Optical rejection ratio can be improved by about 5 dB and 10 dB by averaging 25 and 100 samples, respectively.
(9) Characteristic performance, but non-warranted.
(10) Optical power required to achieve a signal-to-noise ratio of approximately 1 dB.
(11) Sensitivity at other wavelengths can be determined from graphs that are available upon request.
(12) Time to generate a spectrum over the system's entire operational wavelength range. Smaller measurement ranges are available for the VIS and NIR versions to reduce measurement time to 1 s.
(13) IR and MIR required beam height is 5.4 ± 0.25".
(14) IR and MIR instrument height is adjustable (7.25 ± 0.25") for alignment purposes.

CE

Bristol Instruments reserves the right to change the detail specifications as may be required to permit improvements in the design of its products. Specifications are subject to change without notice.

05–16