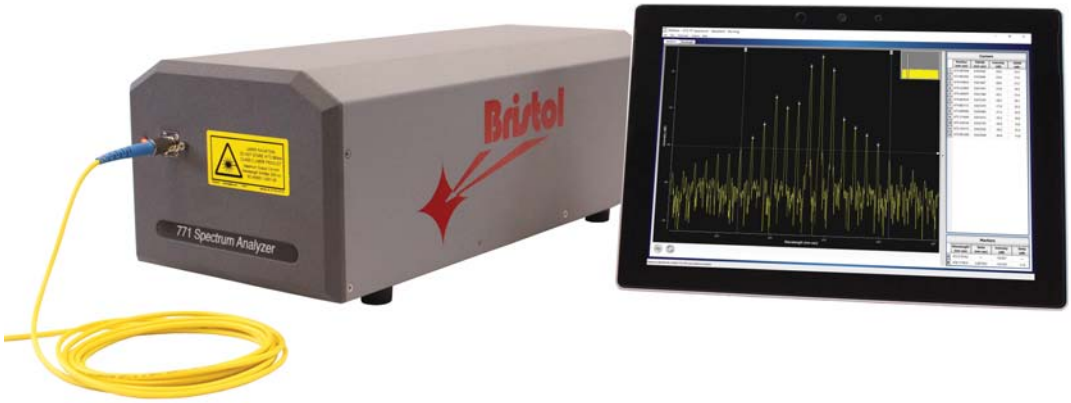
Bristol Instruments

The Power of Precision in Spectral Analysis

LASER SPECTRUM ANALYZER 771 Series

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

The 771 Series Laser Spectrum Analyzer from Bristol Instruments combines proven Michelson interferometer technology with fast Fourier transform analysis resulting in a unique instrument that operates as both a high-resolution spectrum analyzer and a high-accuracy wavelength meter. With spectral resolution up to 2 GHz, wavelength accuracy as high as ± 0.2 parts per million, and an optical rejection ratio of more than 40 dB, the model 771 provides the most detailed information about a laser's spectral properties.



KEY FEATURES

- Spectral analysis and wavelength measurement with one instrument.
- Spectral resolution as high as 2 GHz.
- Wavelength accuracy as high as ± 0.0001 nm.
- Optical rejection ratio greater than 40 dB.
- Continuous calibration with a built-in wavelength standard.
- Input power requirement as low as 3 nW.
- Operation with CW and high-repetition rate pulsed lasers.
- Operation available from 375 nm to 12 µm.
- Measurement time of only 1 second.
- Convenient pre-aligned fiber-optic input for visible and near-IR wavelengths.
- Free-space aperture input with visible alignment aid for IR and mid-IR wavelengths.
- Straightforward operation with PC using USB or Ethernet interfaces.
- Software is provided to control measurement parameters and to display spectra and report wavelength data.

It's Our Business to be Exact!

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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 [2]	**VIS:** 375 - 1100 nm **NIR:** 520 - 1700 nm **IR:** 1 - 5 µm **MIR:** 1 - 12 µm	
Accuracy [3, 4, 5]	± 0.2 ppm (± 1 ppm for λ > 5 µm) ± 0.0002 nm @ 1000 nm ± 0.002 cm^{-1} @ 10,000 cm^{-1} ± 60 MHz @ 300,000 GHz	± 0.75 ppm (± 1 ppm for λ > 5 µm) ± 0.0008 nm @ 1000 nm ± 0.008 cm^{-1} @ 10,000 cm^{-1} ± 225 MHz @ 300,000 GHz
Spectral Resolution [6]	**Standard:** 4 GHz (8 GHz for IR) **High:** 2 GHz (4 GHz for IR) **Low:** 33 GHz (64 GHz for IR)	
Calibration	Continuous - built-in stabilized single-frequency HeNe laser	Continuous - built-in standard HeNe laser
Display Resolution	9 digits	8 digits
Units [7]	nm, µm, cm^{-1}, GHz, THz	
OPTICAL REJECTION RATIO [8, 9, 10]	> 40 dB (> 30 dB for MIR)	
MINIMUM INPUT POWER [10, 11, 12]	**VIS:** 0.009 - 2.0 µW **NIR:** 0.003 - 0.08 µW **IR:** 0.005 - 0.22 µW **MIR:** 0.005 - 2.5 µW	
MEASUREMENT TIME [13]	< 2 s (1 s with smaller measurement ranges)	
INPUTS/OUTPUTS		
Optical Input [14]	**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	USB and Ethernet 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 [10]		
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 L) [15]	**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) MIR capable of operation to 14 µm. However, operation and specifications are not guaranteed beyond 12 µm.
(3) Defined as measurement uncertainty, or maximum wavelength error, using a coverage factor of 3 providing a confidence level of ≥ 99.7%.
(4) 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.
(5) Spectrum Analyzer Mode: wavelength axis is calibrated to system's accuracy.
(6) Wavelength accuracy and optical rejection ratio may be reduced with High-Resolution mode and Low-Resolution mode.
(7) Data in units of nm, µm, and cm^{-1} are given as vacuum values.
(8) 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.
(9) A co-add 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.
(10) Characteristic performance, but non-warranted.
(11) Optical power required to achieve a signal-to-noise ratio of approximately 1 dB.
(12) Sensitivity at specific wavelengths can be determined from graphs that are provided in the 771 Series Product Details brochure.
(13) Time to generate a spectrum over the system's entire operational wavelength range. Smaller measurement ranges are available to reduce measurement time to 1 s.
(14) IR and MIR required beam height is 5.4 ± 0.25".
(15) 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.