GAMMA SCIENTIFIC™
Light Measurement Solutions

Gamma Scientific Spectroradiometers

9925 Carroll Canyon Road San Diego, CA 92131 | 858-279-8034 | contact@gamma-sci.com | www.gamma-sci.com

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Spectroradiometers

As the inventors of the first high-performance, computer-controlled LED spectroradiometers, Gamma Scientific has continued to set the standard in spectroradiometer accuracy and reliability.

Spectroradiometers from Gamma Scientific are trusted by the world's leading organizations to provide accurate measurements.

RadOMA spectroradiometers feature a proprietary optical design and back thinned CCD technology that provides exceptional low-light measurements, superior blue light sensitivity and highly accurate measurements of wavelength, color and power.

Original system calibration is performed in Gamma Scientific's NVLAP accredited laboratory using NIST-traceable standards.

RadOMA spectroradiometers can be self-calibrated and do not have to be returned to the factory for calibration.

Spectroradiometer Applications

- LED Testing
- Display Measurement
- Thin Film Reflectance
- NVIS Testing

About Gamma Scientific

Since 1961 Gamma Scientific has produced LED, display and light measurement test solutions for production and R&D environments. Gamma Scientific instruments are trusted by leading global organizations that require high-speed, precision measurements and custom configurations for the most challenging environments. Gamma Scientific also operates a NVLAP accredited laboratory that performs LM-79/LM-80 LED testing and is ISO 17025 compliant. NVLAP Lab Code 200823-0.

To view the complete line of test and measurement solutions from Gamma Scientific, please visit our website at www.gamma-sci.com.

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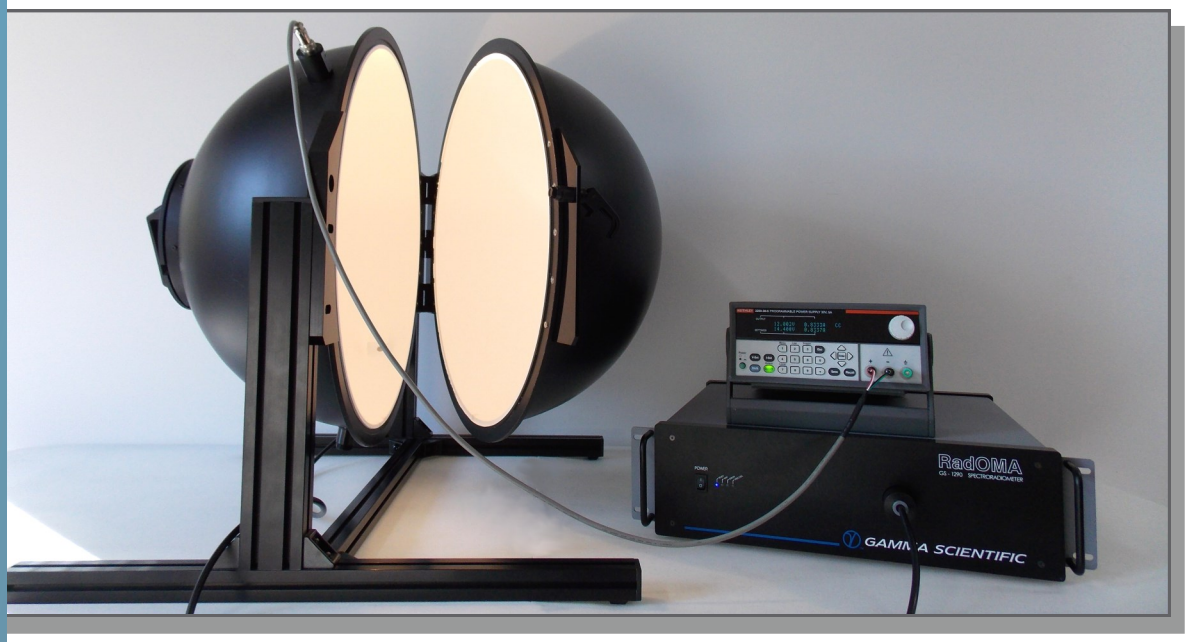
Spectroradiometer Features



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The Gamma Scientific Spectroradiometer Advantage

- High-resolution: 0.5nm per Pixel
- Multiple Models Covering UV, Visible and near-IR Wavelength Ranges
- High-quality TE cooled back-thinned CCD detector for high sensitivity and stability
- Exceptional Accuracy via High-Resolution Bandwidth Coverage
- Near Real Time (millisecond) Measurement Speed
- Production-line and R&D Software Solutions
- Powerful and Flexible Analysis Software
- Robust and Reliable Design
- NIST-Traceable Field-Calibration
- High Sensitivity and Spectral Resolution
- Self-calibration (system never has to be returned for calibration)
- Superior Wavelength and Color Accuracy
- Large Dynamic Range and Low Stray Light
- Thermal and Mechanical Stability
- Electronic Shutter for fast scans during production LED testing
- Mechanical Shutter to meet the high accuracy demands of R&D

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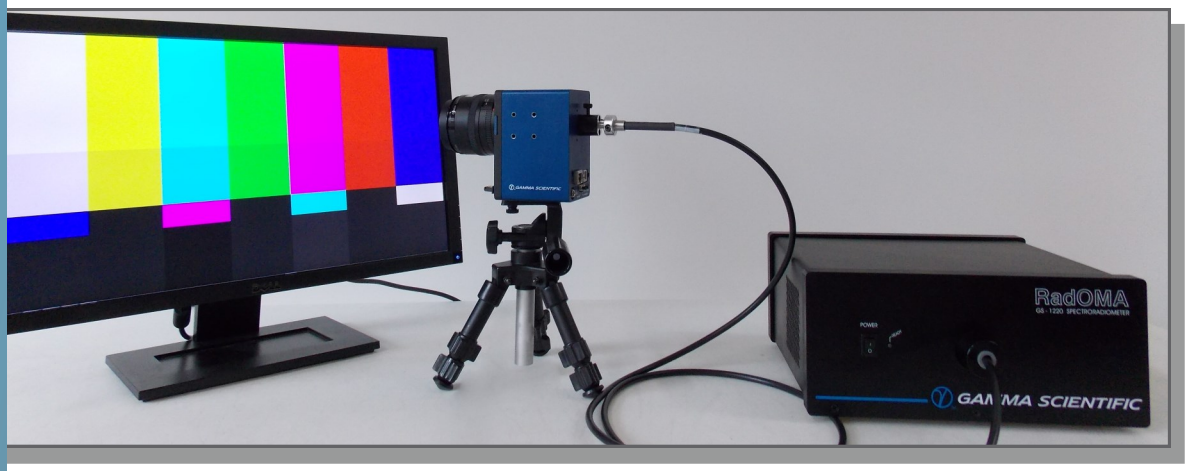
Spectroradiometer Models



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GS-1290 LED Spectroradiometers

The GS-1290 LED spectroradiometer provides high accuracy and near-perfect repeatability. The results are precise, millisecond measurements for LED spectra of all colors.

The system is easily configurable to measure different aspects of LED output, including spectral radiant intensity, luminous intensity, total flux measurements and spatial intensity.

GS-1290 Spectroradiometers for Display Measurement

Spectral measurements of displays can be repeatedly taken in milliseconds with ultra-low uncertainty.

GS-1290 Night Vision Spectroradiometer

The GS-1290-NVIS is specifically configured for ANVIS testing of cockpit displays and lighting. It exceeds all requirements outlined in MIL-L-85762A and MIL-STD-3009.

GS-1220 LED Spectroradiometers

GS-1220 spectroradiometers are optimized for quality control and high speed LED testing applications, with up to 1 ms optical integration time.

GS-1190 LED Spectrometers

The GS-1190 is a high performance, linear CCD array spectrometer, with configurations to test LED intensity and total flux.

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Spectroradiometer Accessories

940 LED Series Goniophotometers

Gamma Scientific's 940 LED Series of Goniophotometers utilize a RadOMA spectroradiometer to capture complete spectral measurements as a function of angle. 940 LED Goniophotometers are designed to analyze angle dependent spatial radiation properties of LED luminaires, lamps and modules.

Integrating Spheres (Luminous and Radiant Flux)

Gamma Scientific integrating spheres are available in a wide range of sizes from 25mm to 3m in diameter. Multi-purpose integrating spheres provide maximum flexibility and are custom built to meet your exact testing requirements. Light measurement spheres for LED testing are optimized for capturing total flux measurements of LEDs, lamps and luminaires.

Choose from our proprietary polytetrafluoroethylene (PTFE) or a specially formulated barium-sulfate coating. The PTFE coating gives > 99% reflectance over the UV/VIS/NIR region, and is almost perfectly Lambertian.

LED Test Sockets

Gamma Scientific offers a variety of precision and ultra-precision LED measurement sockets. These sockets accommodate regular, miniature and sub-miniature LED's and feature a locking flange that snaps firmly into place, ensuring proper alignment with the mechanical axis. Each test socket has banana connectors for use with high-precision power supplies.

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GS-1290 Spectroradiometers

Detector and Wavelength Specifications			
Spectrometer	**GS-1290-1-RM**	**GS-1290-2-RM**	**GS-1290-3-RM**
Nominal Spectral Range	200-800 nm	300-1100 nm	360-940 nm
Datapoint Interval	0.6 nm	0.9 nm	0.6 nm
Spectral Bandwidth	Built-In User Selectable Half-Power Bandwidth (HPBW) **Bold is factory setting**		
	10 nm	20 nm	10 nm
	5.0 nm	10 nm	5.0 nm
	2.5 nm	5.0 nm	2.5 nm
	1.4 nm	**2.7 nm**	**1.4 nm**
	1.0 nm	1.8 nm	1.0 nm
Wavelength Repeatability	0.02 nm	0.03 nm	0.02 nm
Wavelength Accuracy	+/- 0.1 nm	+/- 0.2 nm	+/- 0.1 nm
Accuracy[1]			
Luminous Intensity	± 1%	± 1%	± 1%
Luminous Flux	± 1%	± 1%	± 1%
Chromaticity (CIE1931 xy)[2]	x,y=±0.0015	x,y=±0.002	x,y=±0.0015
Dominant Wavelength[2]	± 0.5 nm	± 0.5 nm	± 0.5 nm
Sensitivity[3]			
Luminous Intensity (10:1 signal-to-noise)	0.002 mcd to 15 kcd	0.002 mcd to 15 kcd	0.002 mcd to 15 kcd
Luminous Flux (12" sphere ; 10:1 signal-to-noise)	0.1 mlm – 240 klm	0.1 mlm – 240 klm	0.1 mlm – 240 klm
Measuring time (range)	5 msec to 300 sec	5 msec to 300 sec	5 msec to 300 sec
Measuring Time at 1 mcd (10:1 signal-to-noise)	40 msec	40 msec	40 msec
Specifications for All Spectrometers			
Stray Light	Less than 1 x 10^{-4} (at 8 times the HPBW from HeNe Laser Line)		
Spectral Sensor	Temperature-Stabilized Back-Thinned 1024x128 element CCD Array		
Electrical Resolution	16 Bit		
Dynamic Range (single scan)	64,000:1		
Computer Interface	USB 2.0		
Control Software	Lightouch LED software for Windows		
Dimensions:	5.25" H x 17.25" W x 16.25" L (13.34" cm x 43.8 cm W x 41.28 cm L)		
Weight	30 lbs (13.6 kg)		

1: Accuracy specifications assume sufficient signal to noise and are valid immediately after proper calibration, relative to the calibration standard.
2: Applies to colored LEDs with sufficient signal-to-noise ratio.
3: Sensitivity specifications assume a 10:1 signal-to-noise ratio for white 5000K CCT LED's.
4: Specifications are subject to change at any time without notice

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GS-1220 Spectroradiometers

Detector and Wavelength Specifications			
Spectrometer Model	**GS-1220-0**	**GS-1220-1**	**GS-1220-2**
Nominal Spectral Range	250-900nm UV-VIS	360-900nm VIS	360-1100nm VIS-NIR
Datapoint Interval	0.32 nm	0.32 nm	0.35 nm
Spectral Bandwidth	Built-In User Selectable Half-Power Bandwidth (HPBW) **Bold is factory setting**		
	10 nm	10 nm	10 nm
	5.0 nm	5.0 nm	5.0 nm
	2.5 nm	**2.5 nm**	**2.5 nm**
	1.4 nm	1.4 nm	1.4 nm
	1.0 nm	1.0 nm	1.0 nm
Wavelength Repeatability	0.02 nm	0.02 nm	0.02 nm
Wavelength Accuracy	+/- 0.1 nm	+/- 0.1 nm	+/- 0.1 nm
Accuracy[1]			
Luminous Intensity	± 1%	± 1%	± 1%
Luminous Flux	± 1%	± 1%	± 1%
Chromaticity (CIE1931 xy) [2]	x,y=±0.0015	x,y=±0.0015	x,y=±0.0015
Dominant Wavelength[2]	± 0.5 nm	± 0.5 nm	± 0.5 nm
Sensitivity[3]			
Luminous Intensity (10:1 signal-to-noise)	0.02 mcd to 15 kcd	0.02 mcd to 15 kcd	0.02 mcd to 15 kcd
Luminous Flux[4] (12" sphere ; 10:1 signal-to-noise)	1 mlm – 240 klm	1 mlm – 240 klm	1 mlm – 240 klm
Illuminance Sensitivity (10:1 signal-to-noise)	0.02 mlux - 15,000 lux	0.02 mlux - 15,000 lux	0.02 mlux - 15,000 lux
Measuring time (range)	2 µsec to 2.67 sec	2 µsec to 2.67 sec	2 µsec to 2.67 sec
Measuring Time at 1 mcd (10:1 signal-to-noise)	40 msec	40 msec	40 msec
Specifications for All Spectrometers			
Stray Light	Less than 1 x 10 –4 (at 8 times the HPBW from HeNe Laser Line)		
Spectral Sensor	High Resolution 2048 pixel CCD Sensor		
Temperature Stabilized Sensor	-5° C below ambient		
Electrical Resolution	16 Bit		
Dynamic Range (single scan)	6,670:1		
Computer Interface	USB 2.0		

1: Accuracy specifications assume sufficient signal to noise and are valid immediately after proper calibration, relative to the calibration standard.
2: Applies to colored LEDs with sufficient signal-to-noise ratio.
3: Sensitivity specifications assume a 10:1 signal-to-noise ratio for white 5000K CCT LED's.
4: Luminous flux is with a GS-IS150 integrating sphere calibrated with Deuterium and tungsten standards to cover a 250 to 860nm range
5: Specifications are subject to change at any time without notice

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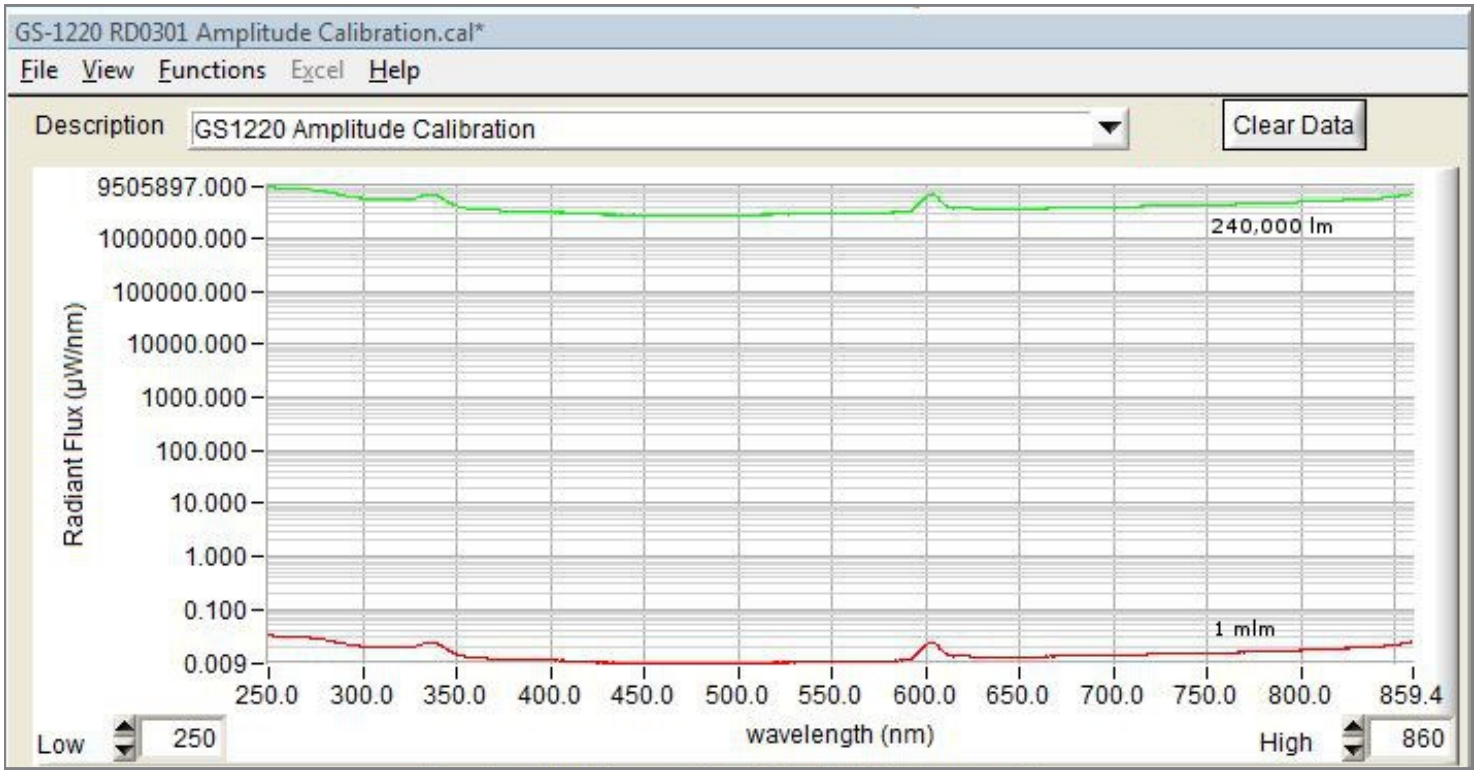
GS-1220 Spectroradiometers



GS-1220 radiant flux-spectral sensitivity range using a GS-IS150 integrating sphere with deuterium and tungsten standards to cover a 250 to 860nm range; 10:1 signal to noise ratio

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GS-1190 Spectroradiometers

Detector and Wavelength Specifications	
Detector	CCD Linear Array Number of Pixels: 2048 Sensing Pixel size: 14µm x 200µm Sensitivity: 1800 V/(l*s) @660nm
Dimensions (mm)	6.3" L x 4.1" W x 2.1" H (160mm L x 103mm W x 54mm H)
Weight	0.7 lbs (0.3 kg)
Spectral Range	380-780 nm
Spectral Resolution:	0.25 – 0.35nm dependent on slit width, and fiber diameter
Gratings	600G/mm
Input	Fiber: SMA 905 ,1000µm core Ø fiber Numerical Aperture = 0.2 Slit: 50 ,100 ,150,350,600µm
Dynamic Range	16 bit or 65536:1
Computer Interface	USB 2.0 ,16 bit ,800KHz
Power Input	5VDC, 140 mA (Power Consumption Rate: 0.6 - 0.7W)
Temperature Range	15°C to 40°C
Software	RadOMA-1190 software package

Measurement Specifications	
Peak Wavelength Accuracy	+/- 0.5 nm
Dominant Wavelength Accuracy	+/- 0.5 nm
Luminous Flux	Range Depends on Sphere size Accuracy: +/- 4%
CIE1931 x,y Accuracy	+/- 0.003
Correlated Color Temperature (CCT)	Range: 1000K to 100,000K Accuracy: +/- 5%
Half-Power Bandwidth (FWHM) Accuracy	+/- 0.5nm
Spectral Purity	+/- 5%
Color Rendering Index (CRI)	+/- 5%

*Standard Operating Range for Gamma Scientific Instruments- Temperature: Minimum: 0°C (32°F) - Maximum: 35° C (95°F); Relative Humidity (Non-Condensing): Minimum: 20% - Maximum 70%
**The information contained in this data sheet is based on Gamma Scientific's internal evaluation and is subject to change at any time without notice.
***Revised on April 9, 2015