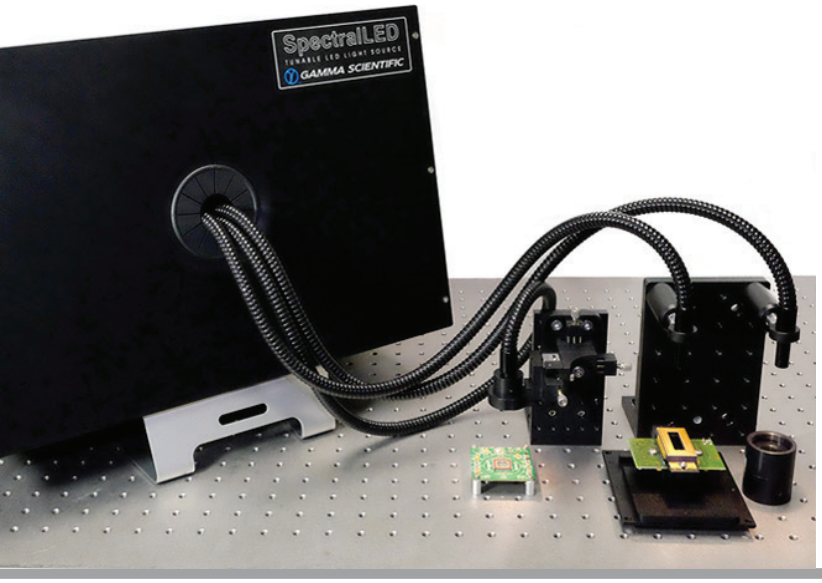
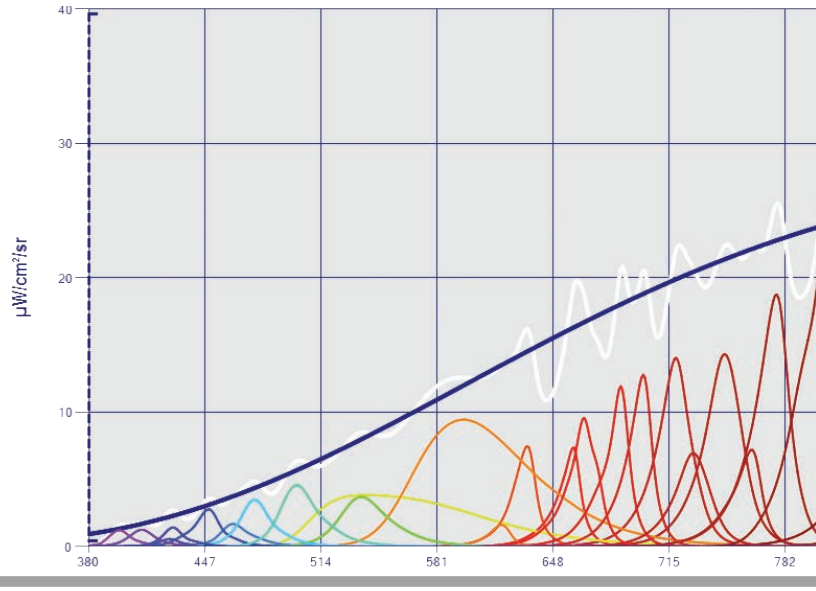
GAMMA SCIENTIFIC™

# SpectralLED™ - Tunable LED Light Source




## UNPRECEDENTED RESOLUTION AND ACCURACY

## FOR CAMERA AND IMAGE SENSOR CALIBRATION

Gamma Scientific is proud to introduce its next generation

**Uniform LED Light Source, the SpectralLED™**

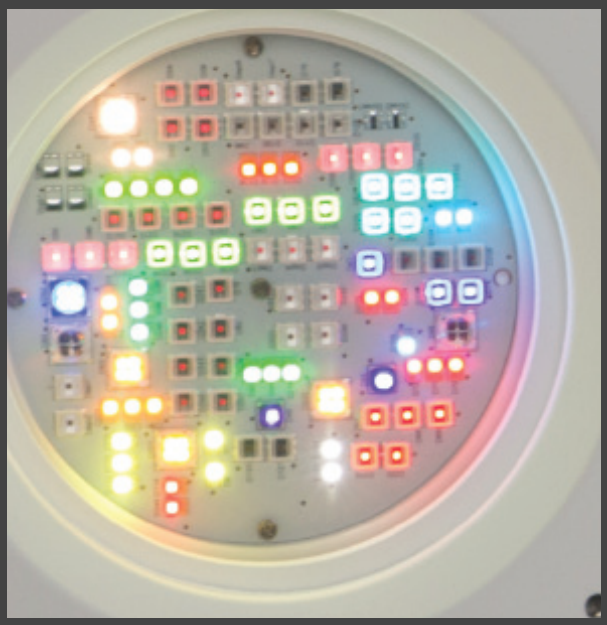
Don't let the complexity of other light sources slow you down

***Simple, Versatile, and Bright***

The SpectralLED™ solves all your requirements with one compact device

***Make Light Work For You***


9925 Carroll Canyon Rd San Diego, CA 92131 USA | Phone: +1.858.279.8034 | www.gamma-sci.com



## FEATURES & BENEFITS

- Unprecedented Resolution and Accuracy - 35 Discrete LED Wavelengths Covering the Visible and NIR
- Powerful Synthesis Engine - Quickly Simulate any CIE Illuminant or X-RITE™ (Macbeth™) Color Patch
- Flexible Interface - Built-in RMS Spectral Fitting for Simulation of Any User Imported Spectra
- Uniform 75mm Radiance Output Port or Optional Fiber Optic Output for Irradiance
- Easily Adaptable - for Automated Test Systems and Production Line Integration
- Pure DC Constant Current Drivers and Built-in Optical Feedback Photodiode System - Ensure Accurate Output in Real Time
- On-board Thermal Electric Cooler and Feedback - for LED Temperature Control
- ISO/IEC 17025 NVLAP Calibration Laboratory (Lab Code 200823-0) - Ensures Superior Wavelength and Color Accuracy

Incorporating some of the newest and brightest surface-mount LEDs available, the **SpectralLED™** delivers a nearly continuous spectrum comprised of 35 discrete wavelength LEDs. This allows for an unprecedented color gamut and applications otherwise impossible for traditional halogen or LED light sources.

**SpectralLED™** light sources simplify the calibration process by allowing you to quickly simulate and change between a huge variety of traditional light sources. Select a preset CIE Illuminant or X-RITE™ (Macbeth™) color patch, or import your own spectrum and let the internal RMS spectral fitting find the best match instantly.

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**Light sources are only as accurate as the calibration.** As a world leader in high performance spectroradiometers, and with an in-house ISO/IEC 17025 NVLAP Accredited Calibration Laboratory (Lab Code 200823-0), you can trust the NIST-traceable calibration that comes programmed into every **SpectralLED™** source.

**Replace multiple instruments with a single device.** With a fully spectrally tunable output spectrum, all you need is one **SpectralLED™** to generate any spectral power distribution. Whether it be blackbody, daylight, fluorescent, LED, or something completely unique, the **SpectralLED™** can give you an accurate match.

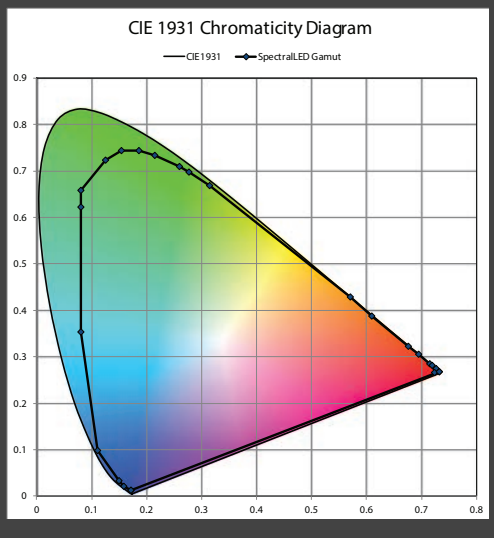

**SpectralLED™ Model RS-7-2**

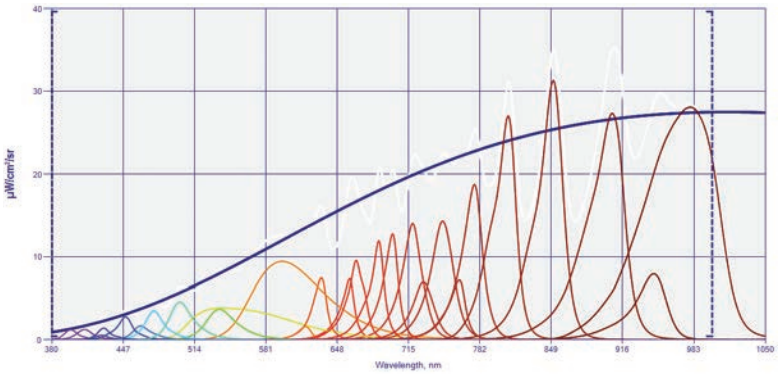
1 meter integrating sphere with 300mm output port providing greater than 99% uniformity

## INDUSTRY APPLICATIONS

- Camera and Image Sensor Calibration (CCD, CMOS, etc.)
- Ambient Light Sensor Calibration
- Photodiode Detector Responsivity
- OEM Camera Manufacturing
- Spectrum/Illuminant Simulation
- Diagnostic Medical Imaging
- Technical and Industrial Photography

## CIE 1931 COLOR GAMUT DIAGRAM




### SpectralLED™ Illuminant A (Blackbody 2856K)

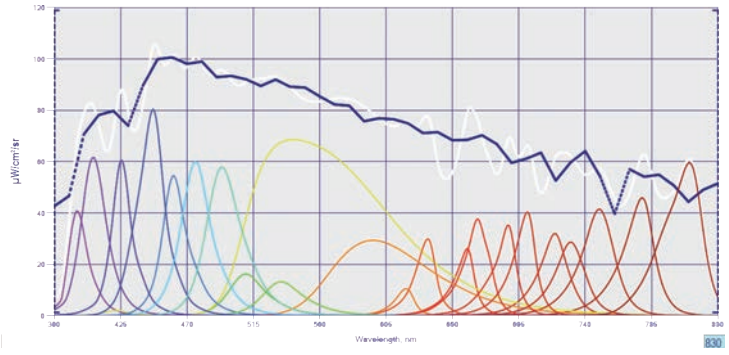
Simulation using RMS Spectrum Fitting. Target (Blue) Output (White)

**Proprietary electrical design for superior accuracy and reliability.**

- The completely redesigned drive electronics provide a ***pure DC constant current LED drive with floating differential sensing.***
- This means there is ***no flicker and no uncertainty*** in the drive current.
- Couple that with ***built-in optical feedback***, and the **SpectralLED™** is able to accurately control optical output power to within a fraction of a percent.
- ***On-board thermal control*** maintains the LED substrate temperature to ensure spectrum is always stable even at high drive currents.

**Unlimited possibilities for limitless spectra.**

- With independent ***16-bit control on 35 LED channels***, there are virtually infinite possibilities for what the **SpectralLED™** can do for you.
- Compared with other “next-gen” LED light sources, the **SpectralLED™** offers ***more channels, brighter output, higher accuracy***, and more powerful features for simulation.
- ***No external software is required***; the device firmware controls RMS fitting, stores calibration data, and allows for presets to be created.
- Direct integration into production lines or test systems is easy with ***universally compatible USB and RS-232*** interfaces.




### SpectralLED™ Illuminant D65 (Daylight 6500K)

Simulation using RMS Spectrum Fitting. Target (Blue) Output (White)

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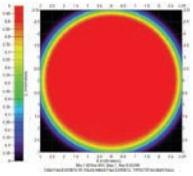
## MEASUREMENT APPLICATIONS

- White Balance
- Quantum Efficiency
- Spatial Non-Uniformity
- Pixel Defects
- Cross Talk
- Vignetting Correction
- Sensitivity
- Responsivity
- Signal-to-Noise
- Linearity
- ISO Speed
- •Saturation
- Exposure
- Dynamic Range
- Hyperspectral Imaging

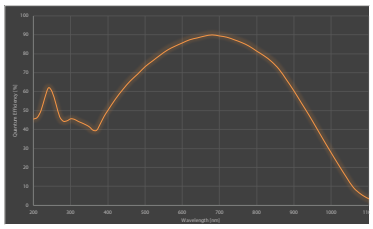
### Spatial Non-Uniformity Testing for Array Sensors

**Find defects or variation in pixel response on 1D and 2D sensors.** SpectralLED™ sources offer a highly uniform output in a variety of optical geometries. Whether you need a radiance or an irradiance light source, there is a configuration perfectly suited for your application.



### Sensor Linearity Characterization

**Accurately characterize sensor linearity with high dynamic range.** Using a proprietary calibration technique and high precision optical feedback, the SpectralLED™ offers unsurpassed output linearity. This makes it the perfect choice for characterizing an unknown sensor's performance.



### Test Quantum Efficency and Responsivity

**Replace monochromators with a solid state design.** By sweeping through individual LED channels, the SpectralLED™ can emulate a traditional monochromator light source. With no moving parts and no halogen input illumination, the solid state SpectralLED™ is the clear choice for demanding applications.

| OPTICAL SPECIFICATIONS | |
|---|---|
| Spectral Range | 380nm - 1000nm (Standard Version, Custom Configurations Available) |
| Spectral Output | 32 Discrete LED Channels, 3 Broadband LED Channels<br>Visible Resolution ≈15nm, NIR Resolution ≈50nm (Typical Channel Spacing) |
| **ACCURACY SPECIFICATIONS** | |
| Illumination Stability | ≥ 99.99% after settling<br>(Channel Dependent, Settling Occurs After ≈50ms for Radiance and ≈2000ms for Color) |
| Illumination Accuracy | ± 1% Absolute NIST Traceable, Calibration Stored Internally |
| Spectral Accuracy | ± 1nm Centroid Wavelength |
| Color Accuracy | CIE 1931 x,y = ±0.003 |
| **GENERAL SPECIFICATIONS** | |
| Supported Operating Systems | USB Drivers for Windows, OSX, and Linux via FTDI virtual COM port<br>Legacy RS-232 Serial Port for Integration into Automated Systems (no OS required) |
| Input Voltage and Power | 110-240 VAC, 50-60Hz, 600W Maximum |
| System Dimensions | Height: 405mm (16in), Width: 460mm (18.1in), Depth: 305mm (12in), Weight: 17.5kg (38.6lbs) |
| **PART NUMBER CONFIGURATIONS** | |
| RS-7-1 | SpectralLED Tunable Light Source - 75mm Output, Radiance<br>Full Spectral Radiance/Irradiance Calibration, Absolute NIST Traceable, Stored Internally |
| RS-7-2 | SpectralLED Tunable Light Source - 300mm Output, Radiance, 1 Meter Sphere with 1 to 4 LED light engines, Radiance Calibration |
| RS-7-3 | SpectralLED Tunable Light Source - Custom Fiber Optic Output, Configuration Required, Inquire for Details |

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