BTS256-LED Tester

https://www.gigahertz-optik.com/en-us/product/bts256-led/

Product tags: VIS ,



Description

The photometric specifications of LEDs must commonly meet very high tolerance requirements even for non-specialist applications such as general and automotive lighting. This is often a problem since the manufacturing tolerances of LEDs can be higher than those permitted in the applications. The tolerance limits offered by LED manufacturers' intensity and color based binning are only applicable if the operating conditions are similar to those in the binning tests. Therefore, manufacturers incorporating LEDs into their products require devices that can accurately measure the precise in-situ photometric performance of LEDs.

Compact spectroradiometer and LED Tester

The compact BTS256-LED enables you to conveniently measure the luminous flux, spectrum, color, and color rendering indices of single LEDs. One special feature is the conical measurement port of the device. The ability to perform measurements of onboard LEDs makes it possible to also include thermal effects in the measurement. The luminous flux, color, color rendering indices and spectrum of an LED are all typically measured within a few seconds. The device is therefore ideal for inspection of incoming products as well as the quality control in production processes. It can also be very useful in the design department.

The BTS256-LED comes in a compact aluminum housing and offers all functions that are necessary for precise measurement of the luminous flux, spectrum, color, and color rendering indices.

*For greatest accuracy and versatility, this device is based on a BiTec light sensor that consists of a V-lambda-filtered Si photodiode and a spectrometer unit that has a CMOS diode array. Si photodiodes are unsurpassed in terms of dynamic range, linearity, and speed. The CMOS diode array-based spectrometer guarantees precise measurement data of the luminous spectrum which is used to determine the color values. The combination of the two detectors enables mutual correction (see article on the BTS technology) for greater precision. This also makes it possible to perform accurate, time-synchronized measurements, e.g., of PWM signals. One cutting-edge feature of the BTS256-LED is its remote-controlled shutter for dark current compensation of the array as well as its software-controlled auxiliary lamp for compensation of light absorbed by the measurement samples (self-absorption correction). The remote control takes place via a USB 2.0 interface using the supplied S-BTS256 software.

LED Binning Color Evaluation

The S-BTS256 software offers many different color space evalutions like MacAdams Ellipses, u'v' circles, ANSI C78.377 or FMVSS 108 color requirement boundaries. Sofware supported tools for checking them are also available.

Traceable Calibration

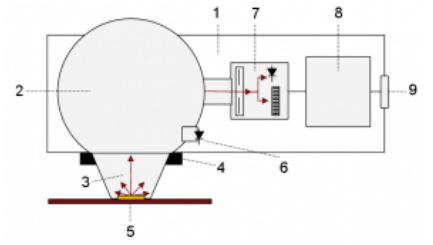
One essential quality of photometric devices is their precise and traceable calibration. Calibration of the BTS256-LED is performed in Gigahertz-Optik's **ISO/IEC 17025 calibration laboratory** that is accredited by DAkkS (D-K-15047-01-00) for the *spectral responsivity* and *spectral irradiance* according to ISO/IEC 17025. The device has two calibrations: one is done using a specially developed reference lamp offering 2pi illumination which enables precise measurement of the luminous flux of diffusely emitting LEDs. The second calibration is for sources that have narrower illumination characteristics.

Options for the BTS256-LED

- Software development kit to enable users to integrate the device in their own software
- Extension to the BTS256-LED Plus Concept (for illuminance and luminous intensity) using other components



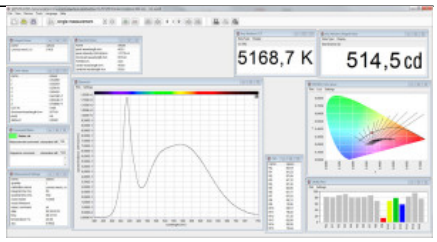
Compact spectroradiometer with internal integrating sphere



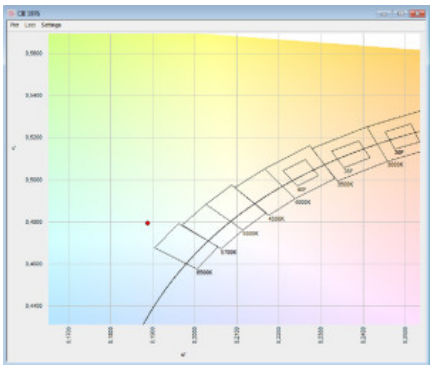
1) BTS256-LED housing 2) 50mm integrating sphere with synthetic coating 3) Conical measurement port 4) Precision bayonet Mount 5) Test LED on a circuit board (device under test) 6) Remote-controlled auxiliary lamp 7) BiTec sensor with Si photodiode, CMOS diode array spectrometer and shutter 8) Microprocessor 9) USB 2.0 interface



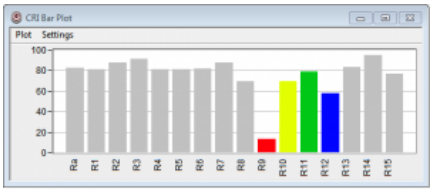
The conical measurement port is placed over the test LED and detects all the radiation in a 2pi space



S-BTS256 user software with modular desktop setup



CIE 1976 chromaticity table with binning fields



CRI Bar Plot

Specifications

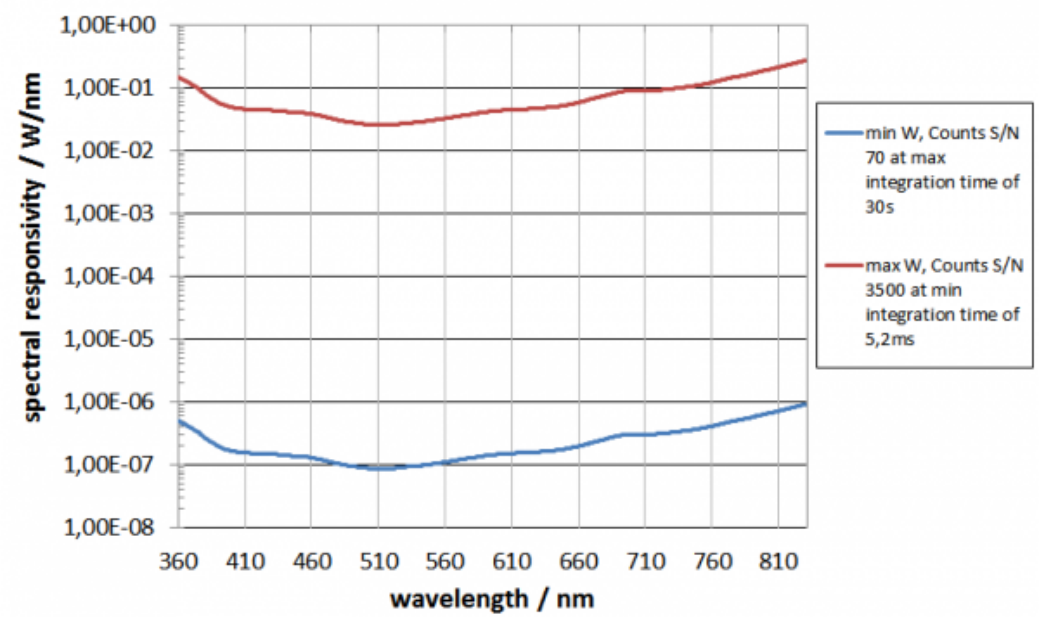
General	
Short description	Spectroradiometer for measurement of the luminous flux, spectrum, color, and color rendering indices of single LEDs
Main features	Compact measurement device with internal integrating sphere, BiTec light sensor, remote-controlled auxiliary lamp and shutter. Fast data logger for the luminous flux. Software (color quantities (x, y, u´, v´, X,Y,Z, delta uv, color temperature, color rendering index (CRI) Ra, R1-R15, TM-30-20, CIE224, CQS, CIE170, etc.))
Measurement range	Luminous flux: 10 mlm - 1100 lm, spectral range: 360 nm - 830 nm, bandwidth: 5 nm with optical bandwidth correction according to CIE 214
Typical applications	Goods-in inspection of individual LEDs, quality assurance of assembled LEDs in production processes, Research and development testing.
Calibration	For diffuse emitting and narrow beam LEDs. Factory calibration. Traceable to international calibration standards.

Product	
Calibration uncertainty	± 5 % for luminous flux λ u(*k*=2) (360 – 399) nm 7 % (400 – 830) nm 5 %
Sensor	Bi-Technology sensor with a photometric broadband detector and a array spectrometer. Integrated aperture for automatic dark signal adjustment.
Input optics	Integrating sphere with synthetic ODM98 coating and protective window at the sphere port. Cone adapter coated with ODP97 for radiation absorption. 10 mm diameter measurement port. LED auxiliary lamp. Adapter change effect ± 0.5 % Max. xy responsivity deviation of the 10mm measurement port ± 2 % Max. z responsivity deviation of the 10mm measurement port ± 2 % (1 mm to 11mm)
Spectral Detector	
Chip	CMOS diode array
Spectral range	(360 - 830) nm
Optical Bandwidth	5 nm
Data Resolution	1 nm
Integration Time	(5.2 - 30000) ms
Shutter	Automatic aperture for dark signal measurements with the same integration time as that of light measurements. Aperture delay = 100ms .
Typical measurement time	1100 lm ≤ 5ms (white light) 10 mlm ≤ 30s (white light)
Peak wavelength	± 0.5 nm
Dominant wavelength	± 1 nm
Repeatability Δx and Δy	± 0.0001 (Standard illuminant type A) ± 0.0002 (LED)
Δy Δx uncertainty	± 0.0020 (Standard illuminant type A) ± 0.0035 (typ. LED)
CCT Measurement range	(1700 - 17000) K
ΔCCT	± 50K (standard illuminant type A) ± 2% (depending on the LED spectrum)
CRI (color rendering index)	Ra and R1 to R15
Stray Light	6E-4 (Blue LED) 6E-4 (Green LED) 6E-4 (Red LED) 1E-3 (White LED)
Integral Detector	
max. luminous flux	70000 lm
Filter	Spectral responsivity with fine CIE photometric matching. Online correction of the photometric matching through spectral measurement data (spectral missmatch factor correction).

f1' (spectral mismatch)	≤ 6 % (uncorrected) ≤ 1.5 % (f1' a*($s_z(\lambda)$) respectively F*($s_z(\lambda)$) corrected by spectral data, done automatically by BTS technology)
ADC	12Bit
Measurement time	(0.1 - 6000) ms
Noise equivalent luminous flux	0.05 mlm

Graphs

Spectral responsivity



Miscellaneous

Microprocessor	16Bit, 25ns instruction cycle time
Power Supply	5VDC to 7VDC, 250mA peak during capacitor charging of the auxiliary lamp
Interface	USB 2.0 (Type B USB port)
Temperature range	Operation: (10 to 30) °C Storage: (-10 to 50) °C
Dimensions	160 mm x 85 mm x 60 mm (Length x Width x Height)
Weight	500 g
Transport case	Plastic hard-top casing, 333 mm x 280 mm x 70 mm, 650g
Info	The typical uncertainty considerations in the data sheet refer to the calibration conditions (temperature, humidity, warm-up, modulation, etc.) and, as this is not possible, do not include user effects such as aging, contamination, etc.

Option: 210mm Integrating Sphere (UMBB-210)

Luminous flux measurement range (integral measurement)	(0.35 - 35000) lm
Sphere diameter	210 mm
Calibration	Luminous flux: ± 5%

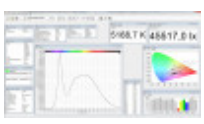
Option: 500mm Integrating Sphere (UMBB-500)

Luminous flux measurement range (integral measurement)	(1.2 - 120000) lm
Sphere diameter	500 mm
Calibration	Luminous flux: ± 5%
Option: Irradiance (DA)	
Measurement range	Illuminance: (0.2 - 25000) lx
Calibration	± 2.2 %
Option: 1000mm Integrating Sphere (UMTB-1000-HFT)	
Luminous flux measurement range (integral measurement)	(4 - 400000) lm
Sphere diameter	1000 mm
Calibration	Luminous flux: ± 5%
Option: Goniometer (GB-GD-360-RB40)	
Luminous intensity measurement range (integral measurement)	(2E-1 - 2E8) cd ; by 1m measurement distance
Calibration	Luminous intensity: ± 4 %

Downloads

Type	Description	File-Type	Download
Dimensions	BTS256-LED dimensions	pdf	https://www.gigahertz-optik.com/assets/Uploads/BTS256-LED-Drawing3.pdf
Brochure	Light measurement solutions for general and specialized lighting	pdf	https://www.gigahertz-optik.com/assets/Uploads/generallighting-broschuere-DINA4-hoch-v2.pdf

Configurable with

Product Name	Product Image	Description	Go to product
S-SDK-BTS256		Software Development Kit for BTS256 variants.	https://www.gigahertz-optik.com/en-us/product/s-sdk-bts256/
S-BTS256		Application software for BTS256 variants.	https://www.gigahertz-optik.com/en-us/product/s-bts256/

Product Name	Product Image	Description	Go to product
UMTB-1000-HFT		Sphere for the luminous flux measurement of 2π and 4π light fixtures inside a sphere. Features: Turnable Integrating sphere with a 1000 mm diameter, extra measurement ports for 2π luminaires with diameters of up to 254mm and auxiliary lamp.	https://www.gigahertz-optik.com/en-us/product/umtb-1000-hft/
UMTB-500-HF		Preconfigured hollow sphere of the UM series modular construction integrating spheres	https://www.gigahertz-optik.com/en-us/product/umtb-500-hf/
UMTB-1000-HF		Preconfigured 1m Integrating Sphere Detector	https://www.gigahertz-optik.com/en-us/product/umtb-1000-hf/
UMDP		Detector ports for the hollow spheres of the UM series modular construction integrating spheres. Features: Mounts for attaching detectors, fiber optic connectors and fiber pipes.	https://www.gigahertz-optik.com/en-us/product/umdp/
SC-05		System control for versatile light measurement applications	https://www.gigahertz-optik.com/en-us/product/sc-05/

Purchasing information

Article-Nr	Modell	Description
Product		
15308420	BTS256-LED	Measurement device, BTS256-LED-CA10 cone adapter, USB cable, hard-top casing, operation manual, S-BTS256 software, calibration certificate.
Re-calibration		
15300226	K-BTS256LED-Phi-S-V01	Recalibration of the BTS256-LED Tester. Only possible with the 10mm cone adapter
Software		
15298218	S-SDK-BTS256	Software Development Kit for the implementation of the BTS256 or variants into custom made software
15307915	S-T-RECAL-BTS256	Software module for functional enhancement of S-BTS256 software. Support of BTS256 series light meter re-calibration via the user.
Accessories		
15320229	BTS256-LED-XX-Z01	Tube for reducing stray light during self-absorption correction measurements with the stand-alone BTS256-LED Tester.

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- After-Sales Support
- Calibrations & Re-Calibrations (ISO/IEC 17025 Calibration Services, factory calibration, Calibration of Third-Party Products)
- Repairs & Updates
- OEM & Feasibility Consulting of Customized Solutions

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