

BTS2048-VL-TEC with LDM-1901

<https://www.gigahertz-optik.de/en-us/product/bts2048-vl-tec-with-ldm1901>

Product tags:



Description

The introduction of IEC 62471:2006 was originally prompted by the need to remove LEDs from the existing laser safety standards. Within Europe, EN 62471:2008 specifies the photobiological safety classification of non-coherent optical sources. It is a harmonised standard under the low voltage directive and is therefore required for CE marking of products.

To protect workers from the possible harmful effects of optical radiation, the EU introduced the Artificial Optical Radiation Directive, 2006/25/EC, which became law in all member states from April 2010. The directive makes reference to EN 62471:2008 for all non-laser sources. In Germany, for example, the directive was implemented with the Occupational Health and Safety Ordinance on artificial optical radiation.

Sophisticated radiometric measurement

IEC / EN 62471 describe the possible types of optical radiation hazards and their limits. In addition, suitable measuring methods and their implementation are presented in the standard. For optical hazards to skin and the cornea of eyes, the measurement of irradiance in the spectral range from 200 nm to 3000 nm is required. For hazards to the retina, the measurement of radiance in the spectral range of 300 nm to 1400 nm is specified. The standard states that measurements in the UV or visible spectrum should be comparable to results achievable with a double monochromator. If the emission spectrum of a light source is demonstrably restricted in its spectral bandwidth, for example a white LED, alternative measurement systems such as array spectroradiometers can be a suitable alternative.

Consideration of the light source properties when selecting the measuring device

The main argument for the use of double monochromators is their low internal stray light. This is particularly important for measuring the shorter wavelength content of broadband light sources. For spectrally limited sources, such as LEDs for example, the use of double monochromators and the measurement of the entire spectral range from 200 nm to 3000 nm are not required by IEC / EN 62471.

Spectroradiometer for determining the risk groups of light sources in the spectral range from 300 nm to 1050 nm

With the [BTS2048-VL-TEC](#) spectroradiometer and the LDM-1901 telescope attachment, Gigahertz-Optik offers manufacturers, users and testers a high-quality measuring device for the determination of the risk groups of non-laser sources. Covering the spectral range from 300 nm up to 1050 nm it is suitable for UV-A LEDs, white LEDs and NIR LEDs for example.

- The [BTS2048-VL-TEC](#) without the telescope attached has an 80° field-of-view diffuser for measuring the spectral irradiance. This enables the assessment of risk to skin and the cornea of the eyes.



BTS2048-VL-TEC as a spectral radiance meter



BTS2048-VL-TEC as a spectral irradiance meter

• The [BTS2048-VL-TEC](#) with the LDM-1901 telescope attached measures the spectral radiance for the risk classification of retinal hazards.

Of particular importance to white light LED sources is the assessment of blue light hazard which is determined from spectral radiance measurements over the 300 nm to 700 nm spectral range. For general lighting service products IEC TR 62778 "Application of IEC 62471 for the assessment of blue light hazard to light sources and luminaires" is most relevant.

Spectroradiometer for determining UV hazard 200 nm to 400 nm.

The measurement of UV hazards in the 200 – 400nm spectral region requires the very highest levels of stray light rejection. The [BTS2048-UV](#) is a proven alternative to much larger and complex double monochromator systems for this purpose. It can be used in conjunction with the [BTS2048-VL-TEC](#) for comprehensive coverage of photobiological hazard measurements.

The [BTS2048-VL-TEC](#) spectroradiometer is based on the technology of the BTS2048 Series spectroradiometers, proven in research and industry, providing the required specifications for demanding radiometric measurements:

Spectral resolution and wavelength accuracy

With an optical bandwidth of 2 nm and a pixel resolution of approximately 0.4 nm, the [BTS2048-VL-TEC](#) offers peak wavelength accuracy of ± 0.2 nm. This value is ensured throughout the usable spectral range from 300 nm to 1050 nm because each spectroradiometer is calibrated and adjusted with respect to its wavelength accuracy at a multitude of spectral reference points.

Elaborate stray light Suppression

The optical design of the [BTS2048-VL-TEC](#) achieves class-leading low internal stray light for a compact array spectroradiometer ($2E-4$ for typical cold white LED measured at 100 nm lower wavelength). In addition, each [BTS2048-VL-TEC](#) can be individually characterized with regard to its wavelength-dependent scattered light. Using the resulting spectral scattered light matrix, subsequent emission spectra are stray-light corrected after their measurement further reducing the scattered light level by typically 1 to 2 orders of magnitude.

Dynamic range

Due to its thermoelectric cooling, the spectroradiometer offers a very large dynamic range of > 10 decades. Due to the low noise level, the [BTS2048-VL-TEC](#) offers integration times up to 60 s and therefore the highest possible sensitivity.

Crosstalk and pulse signal measurements

The CCD sensor of the BTS2048 spectroradiometer features an electronic

shutter that allows all pixels to be activated and deactivated in a defined manner. With this function, pulsed optical radiation can be precisely measured. To synchronize the luminaire and the measuring device, a trigger signal of the luminaire power supply is required.

The LDM-1901 optical telescope is based on the design of the well-proven LDM-9811, which has been used in research and industry for many years.

200 mm and 1000 mm measuring distance

To assess the risk of retinal hazards, the minimum measurement distance is 200 mm. The LDM-1901 additionally offers a second measuring distance of 1000 mm.

Interchangeable apertures for adjustable field of view

To assess the blue light and thermal hazards to the retina, different fields of view are specified. The LDM-1901 is equipped with changeable apertures for 100 mrad, 11 mrad and 1.7 mrad field of view.

Camera-based viewfinder

To align the meter, the LDM-1901 is equipped with an integrated camera whose image is displayed as a window within the application software. This simplifies the alignment compared to a viewing eyepiece and, importantly, eliminates any danger to the user's eye.

In addition to the high specification and the correct operation of the [BTS2048-VL-TEC](#), the quality of its calibration with and without the LDM-1901 is decisive for the international acceptance of the measured values.

Factory calibration

The Gigahertz-Optik Laboratory offers factory calibrations at the highest level of traceability and calibration performance. The guarantee for this is that factory calibrations are subject to the same quality management as used in the DAkkS accredited test laboratory.

Specifications

General

Short description

Spectral measuring device for risk group classification of non-laser sources in the spectral range from 300 nm to 1050 nm for photobiological safety according to IEC 62471: 2006 and DIN EN 62471 VDE 0837-471: 2009-03.

Main features	<p>CCD sensor based spectroradiometer. Spectral range 300 nm to 1050 nm. CW and pulse measurement.</p> <p>Telescope optics for measuring the spectral radiance at two fixed distances, 200 mm and 1000 mm. Apertures for 100 mrad, 11 mrad and 1.7 mrad field of view. Camera-based viewfinder.</p> <p>Cosine diffuser with 80 ° field of view for measuring the irradiance.</p>
typical applications	Risk group classification of non-laser sources in the spectral range from 300 nm to 1050 nm for photobiological safety according to IEC 62471:2006 and EN 62471:2008.
Calibration	Factory calibrations of the spectral irradiance and radiance sensitivities in the wavelength range from 300 nm to 1050 nm with calibration certificate. Calibration and adjustment of wavelength accuracy.

Purchasing information

Article-Nr	Modell	Description
Product		
15310466	BTS2048-VL-TEC with LDM-1901-V01	Measuring device BTS2048-VL-TEC with LDM-1901-V01 telescope, transport case, users guide, S-BTS2048 software, calibration certificate.
15311342	LDM-1901-V01	LDM-1901 telescope, transport case.
Re-calibration		
15310881	K-BTS2048VLTEC-L-S-V01	Re-calibration of the spectral radiance of a BTS2048-VL-TEC together with an LDM-1901-V01 from 300 nm to 1050 nm. Calibration certificate.