

VTC 2400

Far-field emission analysis

Key features at a glance

- ▲ Single-shot VCSEL array/LED characterization
- ▲ Measure the irradiance, radiant intensity and numerical aperture of the whole emitter ensemble
- ▲ Uniformity control of the radiation pattern
- ▲ Identification of highest intensity spot needed for laser safety evaluations
- ▲ Radiometric calibration traceable to the PTB



The VTC 2400 is a high-resolution 2D measurement system specifically designed to accurately determine the radiant intensity or irradiance distribution of VCSEL and LED devices in the far field. It consists of a light-permeable screen with a monochrome camera suitable for measurements in the near infrared wavelength region – fully integrated in a light-proof housing suitable for lab and production applications.

\\ SYSTEM SETUP

The core functionality of the VTC 2400 is provided by a combination of the screen and the 5 MP infrared camera. The device-under-test illuminates the screen from one side and creates a spatially resolved mapping of the radiant intensity and irradiance. The camera captures this distribution from its transmission profile. Consequently, the setup allows the measurement of angular distribution of the far field distribution of the VCSEL array or LED.

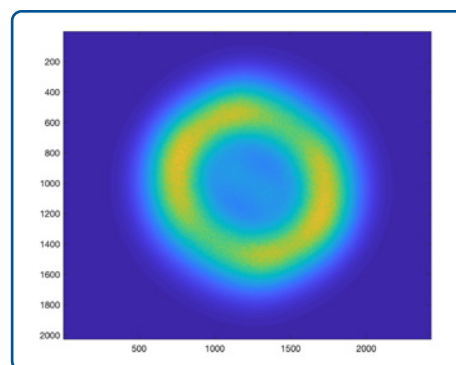
The system is equipped with a robust housing to protect the test system against dust and environmental light. The distance from camera to screen is fixed to 400 mm by default. The DUT can be placed in variable distance in front of the screen. The overall system comes with an absolute radiometric calibration traceable to national standards (PTB). To verify compliance of the DUT with IEC laser safety standards, the VTC 2400 enables identification of the maximum intensity spot of the emission pattern.



▲ The VTC 2400 comprises a monochrome camera and a light-permeable screen to measure the irradiance/radiant intensity distribution of infrared VCSEL arrays/LEDs.

\\ KEY RESULTS

- » Absolute irradiance or radiant intensity
- » Angular and spatial distribution of the emitted light
- » Numerical aperture
- » Cross-section profile of the emission pattern
- » Identification of the highest intensity spot



▲ The VTC 2400 is made for measuring and analyzing the 2D radiant intensity distribution of IR emitters.

\\ TECHNICAL SPECIFICATIONS

VTC 2400					
Camera					
Sensor resolution	5 Megapixel				
Sensor size	8.4 x 7.1 mm				
Effective number of pixels	2048 x 2048 px				
Pixel size (camera)	3.45 μm				
Pixel size (screen)	Typ. 49 μm				
Lens	24 mm				
AD converter	12 bit				
Exposure time	> 40 μs – 10 s				
Wavelength range	400 – 1100 nm				
Calibration range	800 – 1000 nm				
Measurement					
Max. opening angle (typical) ¹⁾	$\pm 25^\circ$ for 100 mm DUT-to-screen distance $\pm 45^\circ$ for 50 mm DUT-to-screen distance $\pm 60^\circ$ for 30 mm DUT-to-screen distance				
Measurement quantities		Irradiance		Radiant intensity	
Measurement range (per pixel) (typical) ¹⁾		30 mm	100 mm	30 mm	100 mm
	850 nm	2.5 x 10 ⁻⁴ – 3.5 x 10 ³ W/m ²		1.4 x 10 ⁻⁶ – 3.7 W/sr	1 x 10 ⁻⁵ – 35.4 W/sr
	940 nm	1.4 x 10 ⁻³ – 4 x 10 ³ W/m ²		7.9 x 10 ⁻⁶ – 4 W/sr	8 x 10 ⁻⁵ – 40.4 W/sr
Accuracy	8.5 % (6.5 % at calibrated WL)				
Repeatability	0.05 %				
Non-Linearity	0.3 %				
Non-Uniformity (RNU 95) (typical) ¹⁾	3.1 % @ 30 mm 2 % @ 100 mm				
General					
Camera-to-screen distance (typical)	400 mm				
Screen (W x H)	100 mm x 100 mm				
Interface	Ethernet				
Size (L x W x H)	570.3 mm x 136 mm x 163 mm				
Weight	5.4 kg				
Power supply	24 V				
Operating conditions	15 – 35 °C 20 – 80 % RMH non-condensing				
Trigger interface	Yes (opto-coupled input)				

¹⁾ Values for typical systems. Exact specifications depend on dimensions of the system and components.

\\ ORDERING INFORMATION

Order number	Description
Camera	
VTC2400-0001	Basic camera device VTC 2400 far-field
Screen, protective cover and stray light frame	
VTC2400-100	Standard cover/frame w/100 x 100 screen
Calibration	
CAL-911	VTC calibration from 800 – 900 nm in 30 mm distance
CAL-912	VTC calibration from 900 – 1000 nm in 30 mm distance
CAL-913	VTC calibration from 800 – 900 nm in 100 mm distance
CAL-914	VTC calibration from 900 – 1000 nm in 100 mm distance
CAL-915	VTC calibration from 800 – 900 nm in 50 mm distance
CAL-916	VTC calibration from 900 – 1000 nm in 50 mm distance
System configurations (examples)	
VTS-240-0002	<ul style="list-style-type: none"> Basic camera device VTC 2400 far-field (VTC2400-0001) Standard cover/frame w/100 x 100 screen (VTC2400-100) VTC calibration from 800 – 900 nm and from 900 – 1000 nm in 30 mm distance (CAL-911 and CAL-912) Software: LumiSuite SDK and GUI (SW-550)
VTS-240-0004	<ul style="list-style-type: none"> Basic camera device VTC 2400 far-field (VTC2400-0001) Standard cover/frame w/100 x 100 screen (VTC2400-100) VTC calibration from 800 – 900 nm and from 900 – 1000 nm in 100 mm distance (CAL-913 and CAL-914) Software: LumiSuite SDK and GUI (SW-550)