

3.5.7 WB-I: Wide Beam Imager

The Ophir Wide Beam Imager: **WB-I** a compact, calibrated accessory for beam profiling cameras, provides a way to measure both size and power distribution of a divergent and large diameter beam coming from sources such as VCSEL, LED as well as parallel beams. It employs a 45mm diffusive plate onto which the beam from the light source is projected. This image is then reduced by 8 times and is reimaged onto the camera focal plane.

VCSELs, LEDs and fiber lasers are used in many sensitive applications. To guarantee the high quality of the devices, it is essential to analyze the beam profile, but those wide, divergent beams place specific requirements on the measurement system:

- The apertures of conventional beam profilers are too small to collect the entire spot of large or divergent light sources.
- Diverging beams cannot be accurately measured with regular detectors because the quantum efficiency of the detector is highly dependent on the angle of incidence.

Compact, ruggedized, and portable design of WB-I enables on-site service of beam profiling of VCSELs and LED systems at the customer site as well as operation at production lines and R&D labs.

- Divergent beams measurement significantly improved due to the possibility of up to 70° angle measurement, compared to 15° of standard beam profiler sensors.
- WB-I accessory, together with the camera and the BeamGage software, provides real-time beam shape analysis and visualization of changes of the beam shape due to different currents can be easily detected.
- Variable attenuation, via set of interchangeable filters or iris enables measuring wide range of light sources of different emitting powers.



Designated for R&D, Production and Service in following fields: Data Telecommunication, Automotive, Remote sensing, Face and gesture recognition

Typical light sources: VCSELs, LED, Wide laser beams, fibers

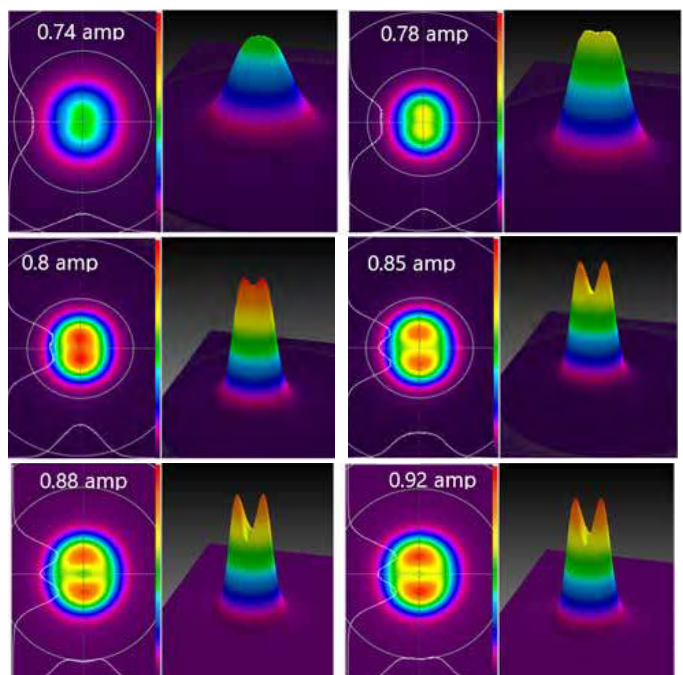
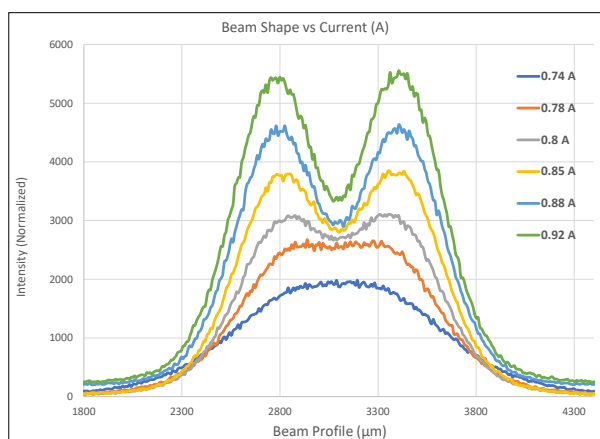
Typical measurements: Far Field energy distribution, Divergence, LIV sweep test VCSELs (beam profile vs current (A))

The WB-I accessory comes in 2 versions: UV-VIS-NIR (350-1100 nm) or SWIR (900-1700nm) designated for Eye- Safe, IR applications.

The WB- I is purchased without camera. For a complete solution that includes BeamGage Professional imaging and analysis software, high-resolution camera can be added.

Application example:

VCSEL energy distribution directly depends on parameters such as current, pulse width and repetition rate and temperature of the device. Therefore, it is essential to measure the angle distribution of VCSELs at various stages of the manufacturing process as well as in R&D and field service. VCSEL behavior on the LIV sweep test: VCSELs are in a so called “LED mode” when there is only a low current applied. Once the current applied to the VCSEL rises, its beam profile changes to “Laser mode”:



WB-I:

- UV-VIS-NIR (350-1100nm) Wavelengths
- Attenuation by accompanied ND filters (ND1 and 2 X ND3)
- Operates with Ophir standard CCD SP920s camera (purchased separately)

WB-I SWIR:

- SWIR (900-1700nm) Wavelengths
- Attenuation by variable iris control (ND filters not needed)
- Operates with Ophir InGaAs SP1203 camera (purchased separately)



Specifications

Model	Wide Beam Imager	Wide Beam Imager SWIR
Wavelengths	350 ⁽¹⁾ -1100nm	900-1700nm
Active area ⁽²⁾	Ø45mm	Ø45mm
Beam sizes ^{(2), (3)}	10mm– 45mm	10mm– 45mm
Angle of incidence	<70°	<70°
Minimum detail ^{(4), (5)}	0.5mm	0.5mm
Lowest measurable signal	100µW/cm ² ⁽⁶⁾	3µW/cm ² (With Iris fully opened at 1550nm)
Maximum power exposure CW ⁽⁷⁾	200W unlimited, 1000W for 1 minute	50W unlimited time
Maximum energy exposure ⁽⁸⁾	For ns pulses 1.5J/cm ²	N/A
CCD recess supported	4.5mm CCD recess camera	17.5 mm (C-Mount)
Dimensions	L=258mm X Ø57mm	L=265mm X Ø57mm (Ø73mm Iris control)
Weight (with camera and support)	0.5 kg (0.7 kg)	0.6 kg (0.8 kg)
Part number	SP90553	SP90605

Notes:

- (1) Camera response down to 350nm. Below this, fluorescence of screen will be imaged
- (2) Limited to 43 mm in Y direction by camera sensor
- (3) 5mm possible with reduced accuracy
- (4) For low contrast artefacts, due to blur effect (-0.8mm)
- (5) Small diameter evaluation error is < 5%, decreases proportionally with increased diameter
- (6) With two ND1 filters mounted on camera
- (7) For WB-I: 80% of the light is diffused inside system, 20% is backward scattered, WB-I SWIR: 50% of the light is diffused inside system, 50% is backward scattered
- (8) At 1.064µm. For wavelengths below 0.9µm, derate to 40% of above, for <0.4µm to 20%

