Prizmatix

Application Note #008

Guidelines to Measurement of UHP-LEDs with a Simple Laser Power Meters

Introduction

The optical power of Ultra High Power (UHP) LEDs is in many cases beyond the measurement limits of the regular power meter. Also beam properties such as collimation and beam spot size need to be considered and taken into account during the measurement process to obtain correct data. This application note provides guidelines how to accurately measure Prizmatix UHP-Mic-LED-XXX sources.

Measurement Procedure

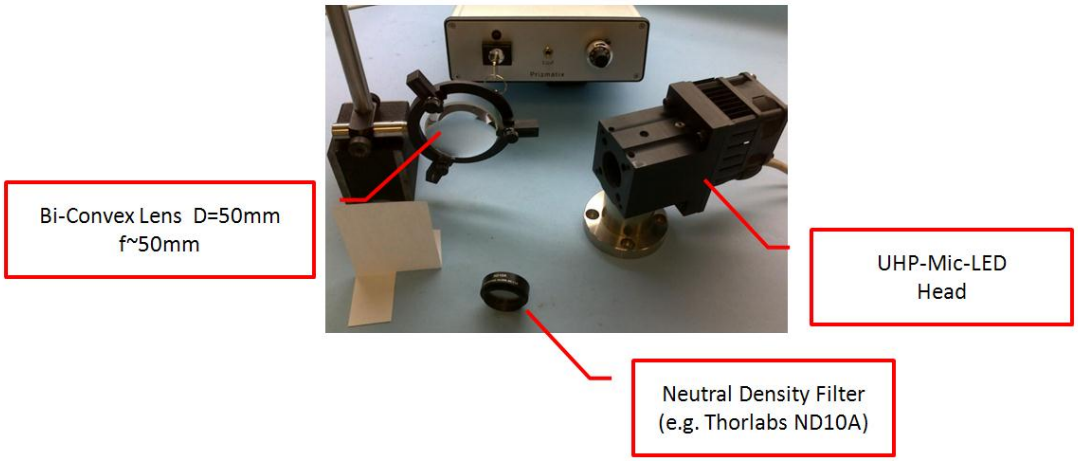
In order to do the power measurements we will need following:

- Power meter*
- Lens with diameter of ~50mm and focal length of ~50mm
- Neutral Density filter of about ND=1 (~10% transmission)
- UHP-Mic-LED

* For this example we used Ophir Optronics NOVA II with PD300UV sensor. More information on this power meter may be found at: www.ophiropt.com

Main Office	European Sales Office	North America Sales Office
Phone: +972-27-2500097	Phone: +44-(0)77-9172-9592	Phone: +1-(248)-436-8085
Fax: +972-27-2500096	Fax: +44-(0)20-7681-2977	Fax: +1-(248)-281-5236
sales@prizmatix.com	sales.europe@prizmatix.com	sales.usa@prizmatix.com

P.O.B. 4234 Modiin-Ilite 71919, Israel



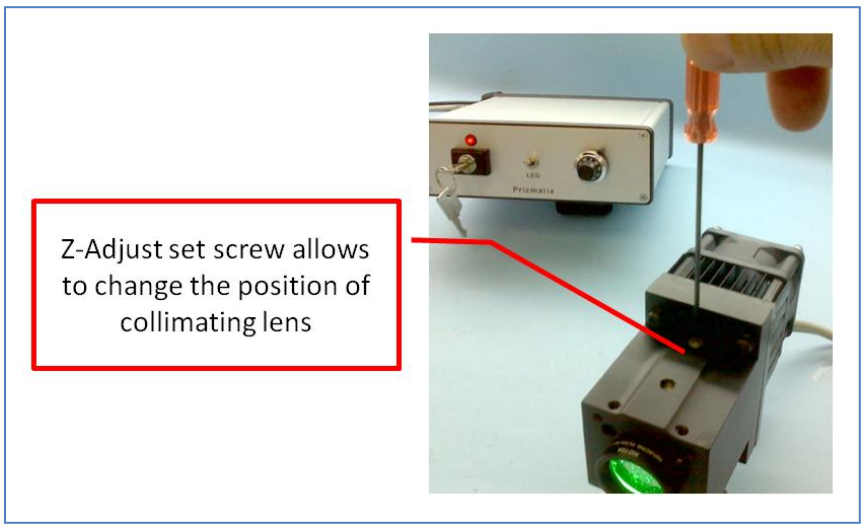
The power data supplied in Prizmatix specification sheets of UHP-Mic-LED is provided based on a collimated position of the Z-Adjust lens. Therefore the first step shall be adjustment of the collimation of the UHP-Mic-LED.

Main Office
Phone: +972-27-2500097
Fax: +972-27-2500096
sales@prizmatix.com

European Sales Office
Phone: +44-(0)77-9172-9592
Fax: +44-(0)20-7681-2977
sales.europe@prizmatix.com

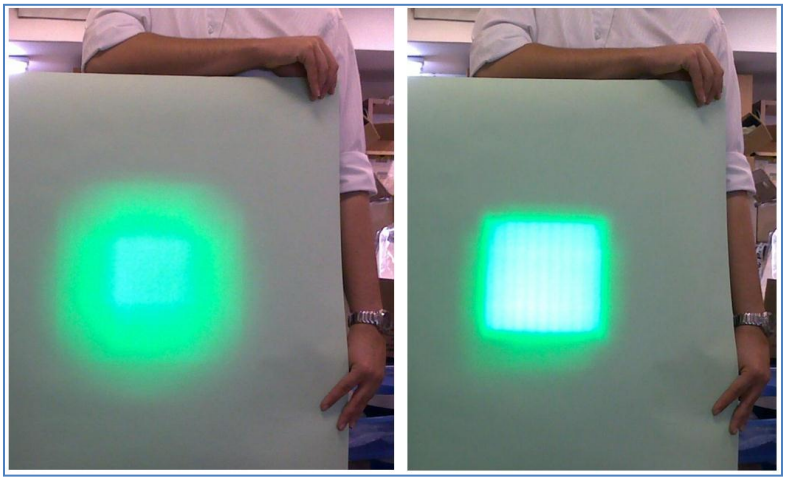
North America Sales Office
Phone: +1-(248)-436-8085
Fax: +1-(248)-281-5236
sales.usa@prizmatix.com

P.O.B. 4234 Modiin-Ilite 71919, Israel



The correctly collimated beam shall be checked at a far field (few meters from the LED head).

The beam seen in the image on the right can be considered as collimated:



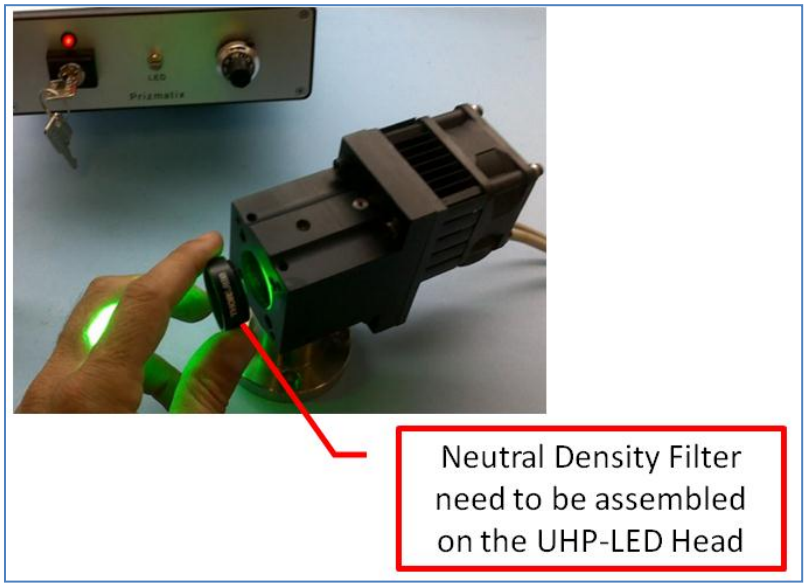
For the next steps we shall use the ND filter to decrease the light output. This should be fitted into the SM1 thread at the front of the UHP-Mic-LED.

Main Office
Phone: +972-27-2500097
Fax: +972-27-2500096
sales@prizmatix.com

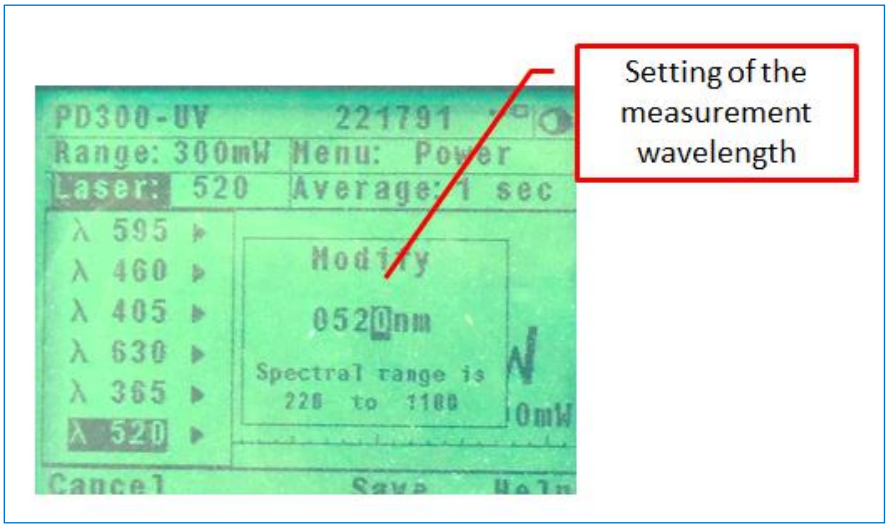
European Sales Office
Phone: +44-(0)77-9172-9592
Fax: +44-(0)20-7681-2977
sales.europe@prizmatix.com

North America Sales Office
Phone: +1-(248)-436-8085
Fax: +1-(248)-281-5236
sales.usa@prizmatix.com

P.O.B. 4234 Modiin-Ilite 71919, Israel



Most laser power meters are calibrated for specific laser wavelengths. In order to get correct reading we need to set the laser wavelength on the power meter display.



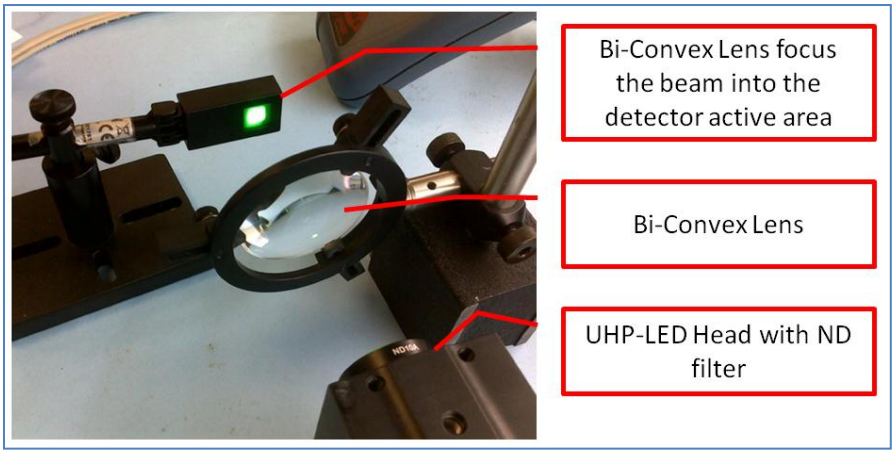
Main Office
Phone: +972-27-2500097
Fax: +972-27-2500096
sales@prizmatix.com

European Sales Office
Phone: +44-(0)77-9172-9592
Fax: +44-(0)20-7681-2977
sales.europe@prizmatix.com

North America Sales Office
Phone: +1-(248)-436-8085
Fax: +1-(248)-281-5236
sales.usa@prizmatix.com

P.O.B. 4234 Modiin-Ilite 71919, Israel

The lens is used to focus the beam into the active area of the power meter sensor.



Most power meters can measure power up to only few 100 milli-watts (mW).

Therefore in order to measure over 0.5Watt of power we first need to calibrate the ND filter and then to use the attenuation factor to calculate the actual power.

The steps of the procedure are as follows:

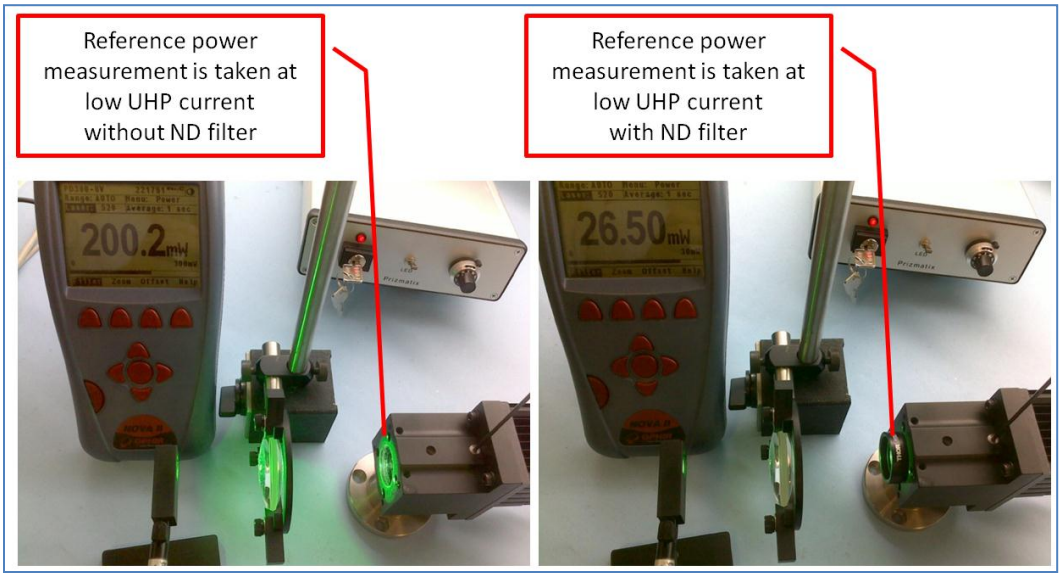
a) Reduce the LED current to a minimum by turning the numerical dial counter-clockwise.
b) Remove the ND filter and align the optical system in such way that the beam will under fill (beam spot is smaller than detector active area) the power meter sensor.
c) Adjust the LED current to get high measurable reading on the power meter (see left image below).
d) Insert the ND filter without changing the setup.
e) Calculate the ND Attenuation Factor (in this example F_{ND} = 200.2/26.5 = 7.55)

Main Office
Phone: +972-27-2500097
Fax: +972-27-2500096
sales@prizmatix.com

European Sales Office
Phone: +44-(0)77-9172-9592
Fax: +44-(0)20-7681-2977
sales.europe@prizmatix.com

North America Sales Office
Phone: +1-(248)-436-8085
Fax: +1-(248)-281-5236
sales.usa@prizmatix.com

P.O.B. 4234 Modiin-Ilite 71919, Israel



f) Increase the power dial to maximum current and take the attenuated power measurement.

Calculate the actual power:

Power=Attenuated Power x F_{ND}

In this example: **Collimated Power = 93.3 x 7.55= 704.4 mW**

for the UHP-Mic-LED-520nm

Main Office	**European Sales Office**	**North America Sales Office**
Phone: +972-27-2500097	Phone: +44-(0)77-9172-9592	Phone: +1-(248)-436-8085
Fax: +972-27-2500096	Fax: +44-(0)20-7681-2977	Fax: +1-(248)-281-5236
sales@prizmatix.com	sales.europe@prizmatix.com	sales.usa@prizmatix.com

P.O.B. 4234 Modiin-Ilite 71919, Israel