DOLL- a photonics Greenlab
DTU Fotonik

This document describes the blue hazard estimate on the LED chip (L31092) from Exalight. The LED was measured December 1, 2016.

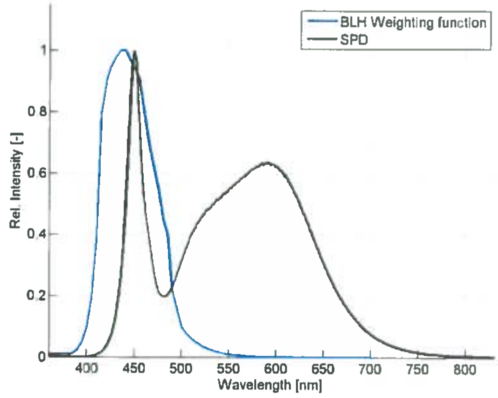

Figure 1 Blue Light Hazard Weighting function vs the Spectral Power distrubution for L31092

Explanation:

The total spectral flux from the LED was measured using an integrating sphere spectrometer. The measured total flux is Φ = 24.1 lm at a current of 60 mA. And the correlated color temperature CCT = 4526 K.

The normalized measured spectral power distribution (SPD) is shown in Figure 1, were also the Blue Light Hazard weighting function is shown.

The blue light hazard efficacy of luminous radiation $K_{B,v}$ for this LED is determined from the measured spectral power distribution (SPD), and will apply for all lamps and luminaires based on this LED.

$K_{B,v} = 6.29\ 10^{-4}$ W/lm

An maximum exposure time of t_{max} = 100 s is reached in the case of a small source for a blue light weighted irradiance of 1 W/m^2. The threshold illuminance E_{thr} below which the light source can never give rise to an exposure time t_{max} < 100 s and the corresponding threshold distance D_{thr} is estimated to

Ethr = 1 W/m^2 / $K_{B,v}$ = 1590 lm/m^2 = 1590 lux,

D_{thr} = 0.0694 m = 69 mm (assuming lambert emission pattern and using the total flux measured)

Labelling of the product is only required for blue light hazard if $t_{max} \leq 100$ s. Light sources are normally evaluated at 200 mm distance or for general lighting applications at the distance where the illuminace is 500 lux. At these conditions the LED is RG1 low risk. The LED is in the RG2 moderate risk group for viewing distances below 69 mm, where tmax < 100 seconds.

Conclusion

The measurements and calculations showed that the LED is in the RG1 low risk group for normal evaluation conditions (200 mm or 500 lux) and needs no labelling related to blue light hazard.

References:

- "PD IEC/TR 62778:2014 - application of IEC 62471 for assessment of blue light hazard to light sources and luminaires"
- "IEC 62471 2006, CIE S009:2002 – Photobiological safety of lamps and lamp systems"

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