

Light Measurement Report

Meas. ID M33584
Device ID L32087

Measurement ID M33584
Type of measurement Integrating sphere
Laboratory DOLL Quality Lab
Date tested 5-7-2021
Applicant LumenLight
Contact Peter Aaløse

Device under test

Device ID L32087 *a yellow identification sticker with this number has been attached on the DUT*
Description Red-Light-Therapy for Humans & Animals



Operation conditions 230 VAC
Seasoning NONE
Orientation Internal in an Ø1m integrating sphere.

Summary

An integrating spectral radiometer measurement of the light output for the light source have been completed. This have been done for three settings and over 20 minutes.

Test Laboratory

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Results

The light source were measured in four conditions, one where all the LEDs was turned on, setting 1. One were only the red LEDs was turned on, setting 2, a setting where only the IR LEDs was turned on, setting 3 and finally one were the all the LEDs was turned on, over 20 minutes.

Spectral power distributions

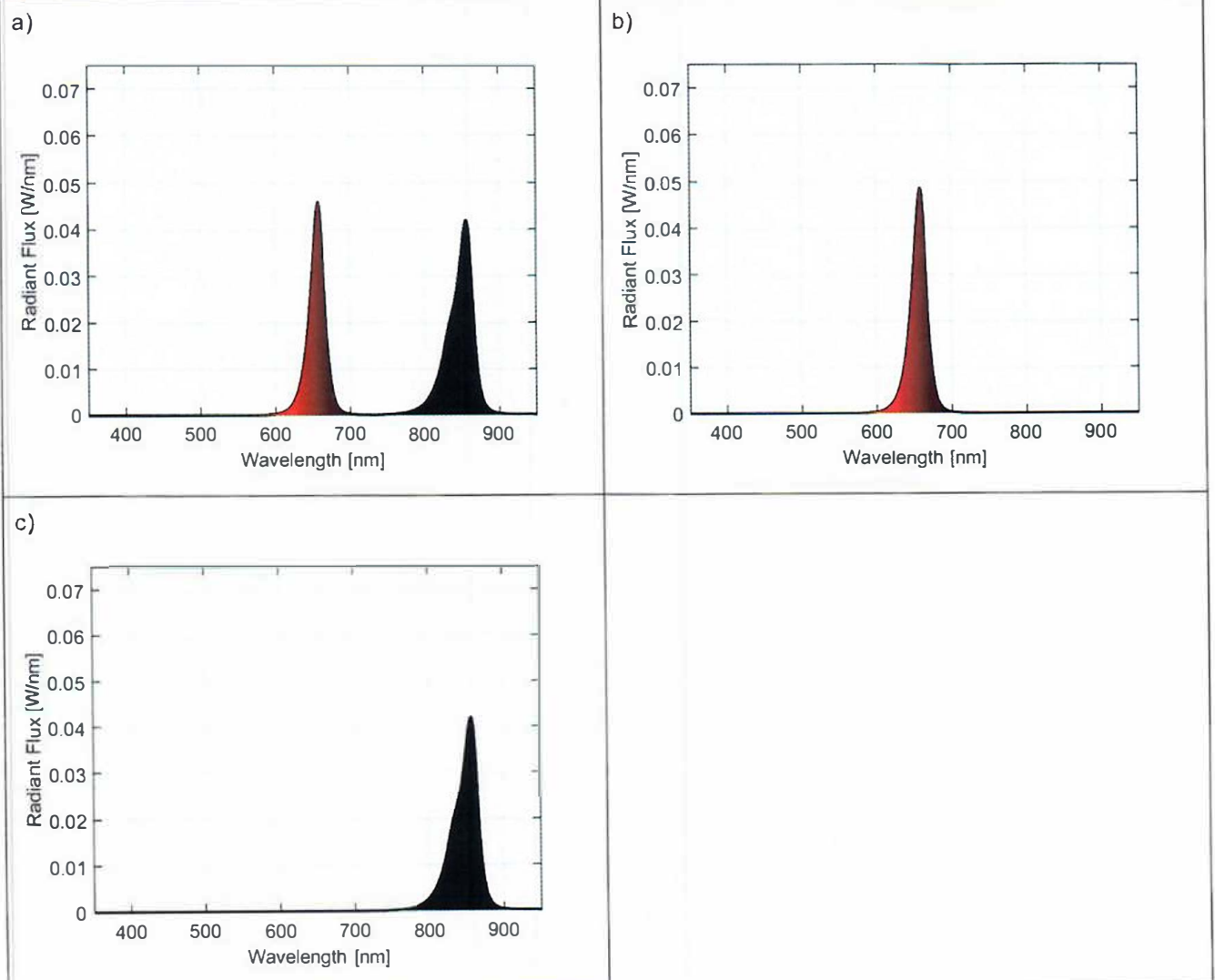


Figure 1 – The spectral power distributions for the three settings, a) Setting 1, b) Setting 2 and c) Setting 3.

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Table 1 - Showing the Power consumption, radiant flux, luminous flux and efficiencies for the three settings

/	Power [W]	Radiant flux [W]	Efficacy [%]
Setting 1	21.5	2.7	12.5
Setting 2	8.6	1.3	15.1
Setting 3	14.2	1.55	10.9
/	Power [W]	Luminous Flux [lm]	Efficiency [lm/W]
Setting 2	8.6	84.6	9.8

The light source was measured over 20 minutes, Figure 2, where the luminous flux and radiant flux was monitored over time. The radiant flux was calculated in two wavelength bands, 600-750 nm and 750 – 950 nm, in order to see the radiant flux for the two LEDs. It is seen that the radiant flux for the IR LED decreases slightly during the measurement period and that it increases slightly for the red LED. Another thing that is noted is that the radiant flux and luminous flux is lower for the LEDs, when they are turned on at the same time, compared to when they were turned on alone (compare with Table 1).

Radiant Flux and Luminous flux as a function of time

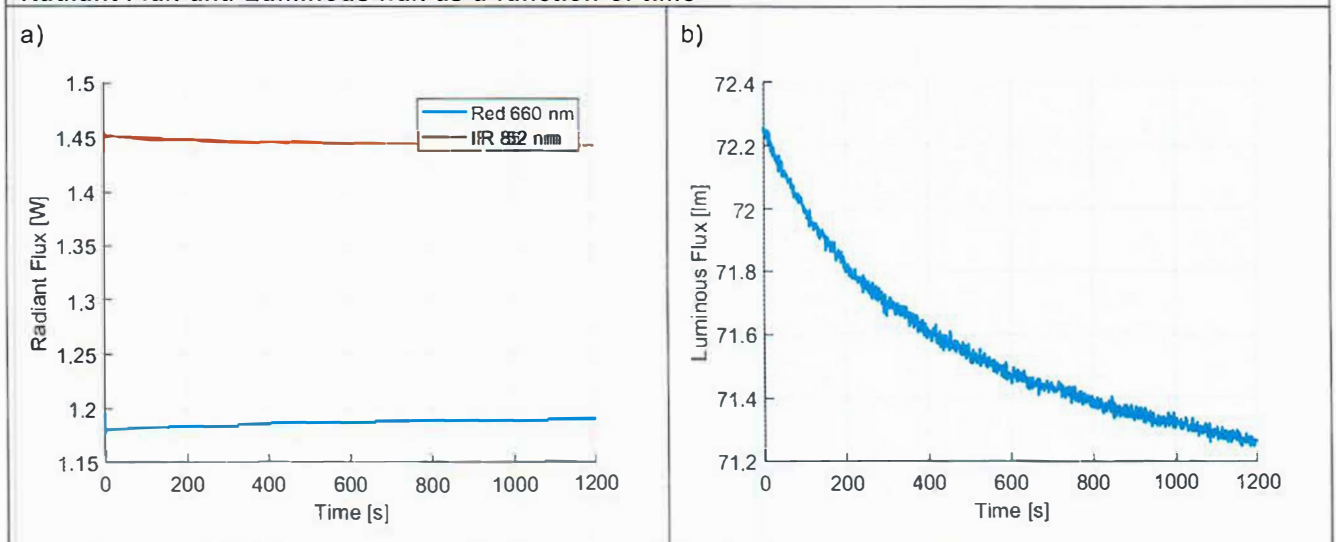


Figure 2 – The radiant flux, a), and luminous flux, b), as a function of time over 20 minutes..

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Measurement setup

The light source was measured using an integrating sphere ($\varnothing 1\text{m}$) fiber coupled to a spectroradiometer (QE65000) from ocean optics. The light source was mounted internally in the sphere in a standing position.

Measurement references:

[1] S 025/E:2015 Test Method for LED Lamps, LED Luminaires and LED Modules

Measurement conditions:

Laboratory ambient temperature: 25.5 °C.

Electrical operation conditions: 230 VAC, 50 Hz

Measurement uncertainties:

The measurement uncertainties in the 350-950 nm range is approximately $\pm 10\%$

The high uncertainty is due to the light source being black and relatively large compared with the measurement optic used to do the measurement. This led to a high correction factor, and as such a high uncertainty.

Equipment

Type	Device name
Spectroradiometer	QE65000
Integrating sphere	ISP1000
Power Analyser	Yokogawa - WT3000
Power supply	Elgar CW1251P ($\pm 0.1\%$ on applied voltage)

DTU Fotonik is the Department of Photonics Engineering at the Technical University of Denmark. DTU Fotonik focusses on research, innovation and education within the field of light, e.g. lasers and LED optical systems, new lighting technologies, optical sensors, and optical communication.

DOLL is a national Green Lab commissioned by the Danish Energy Agency and governed by DTU Fotonik. DOLL is dedicated to test and characterization of photonic components, light sources, lamps and luminaires. DOLL provides impartial documentation for test results in accordance with International and European Standards for conventional and Solid State Lighting.