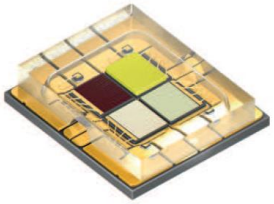
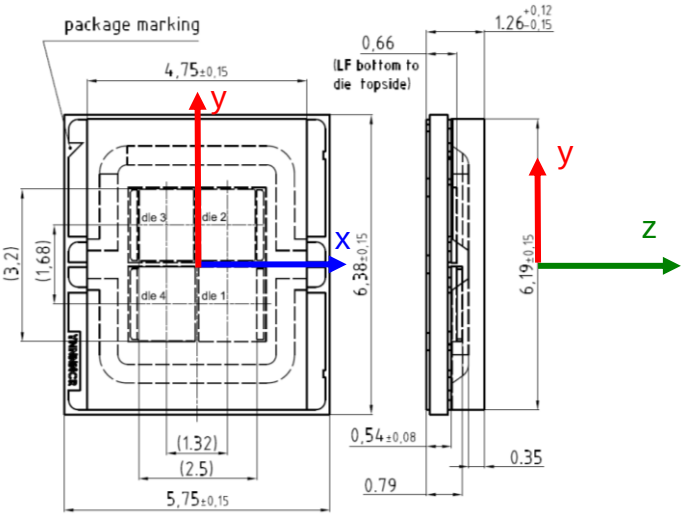
Information for OSRAM rayfile data

LE RTD UW S2WP, OSRAM OSTAR Stage, 4 chips, red, truegreen, deepblue, ultrawhite



1. Position of global coordinate origin vs. Package



The global coordinate origin is at the center of the chips at top package surface. The CAD model provided with this rayfile package has the same global orientation as the rayfile.

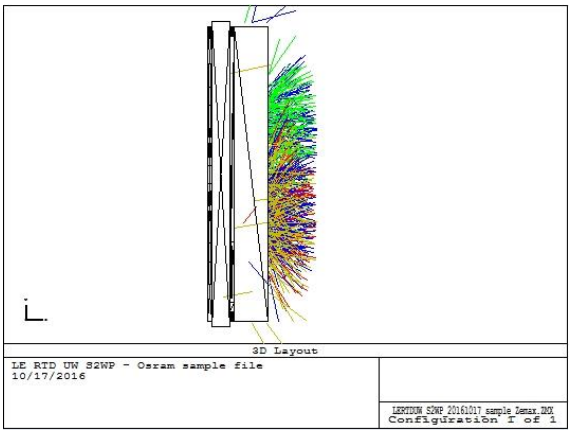


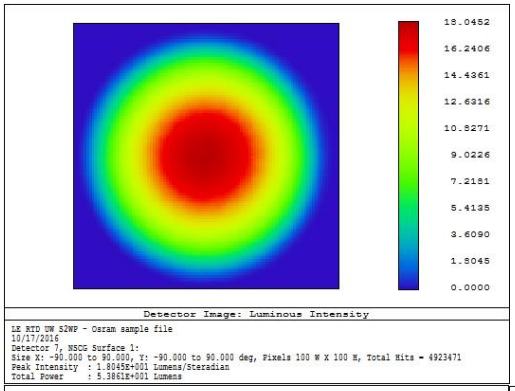
Fig. 1: Orientation of LED

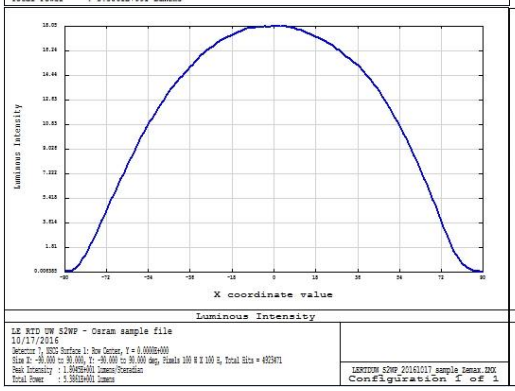
2. General Properties of the Rayfile

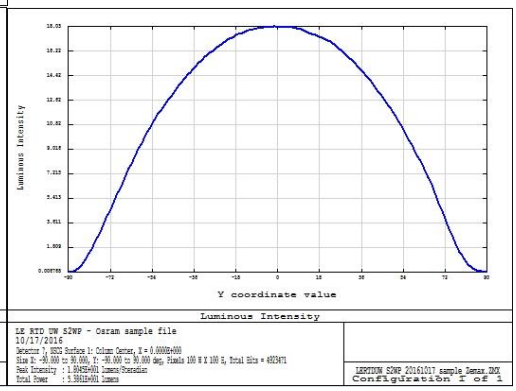
- the starting points of the rays need to be in air
- the rays are randomly ordered in the rayfile
- the CAD model provided with this rayfile package is intended for the design of mechanical components and not valid for optical raytracing calculations
- the global coordinate origin as well as the starting points of the rays are not the position of the virtual focus and are not the position of the LED chip
- the units used for the coordinates in the rayfile and for the CAD model are mm
- the virtual focus of this rayfile (10M rays) with respect to the above coordinate origin is:
  x = 0.646, -0.682, 0.694, -0.736 mm
  y = 0.808, 0.836, -0.845, -0.833 mm
  z = -0.389, -0.449, -0.422, -0.457 mm

3. *Luminous intensity* (units: cd)

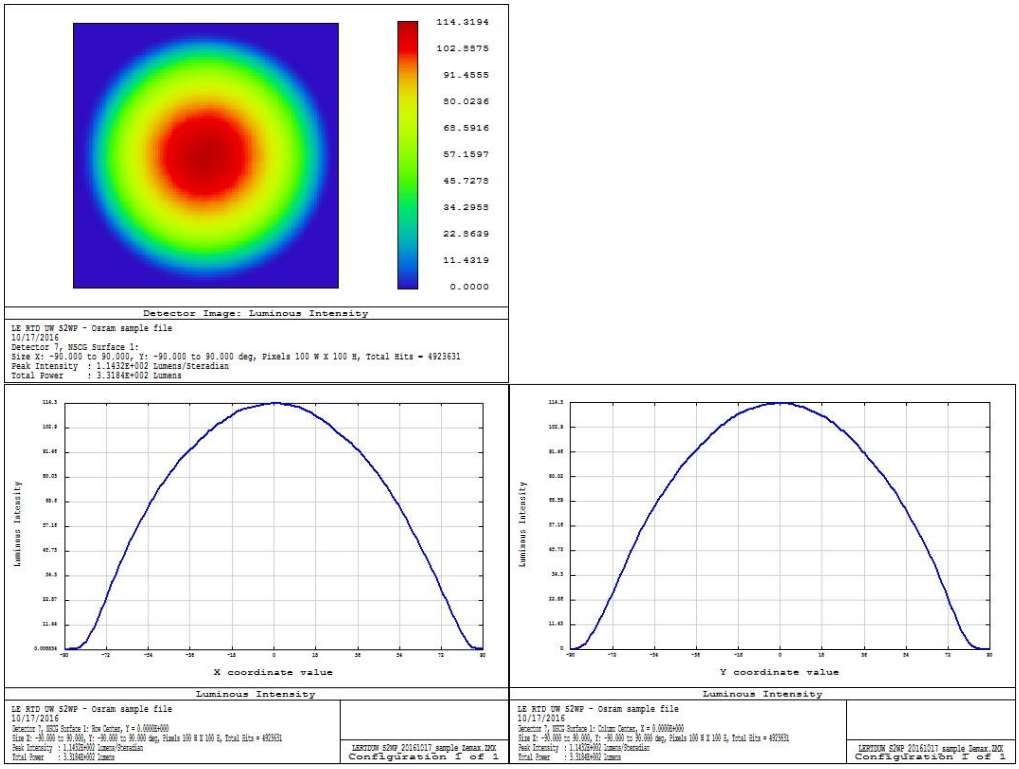
only blue chip on, Φ= 1.68 mW



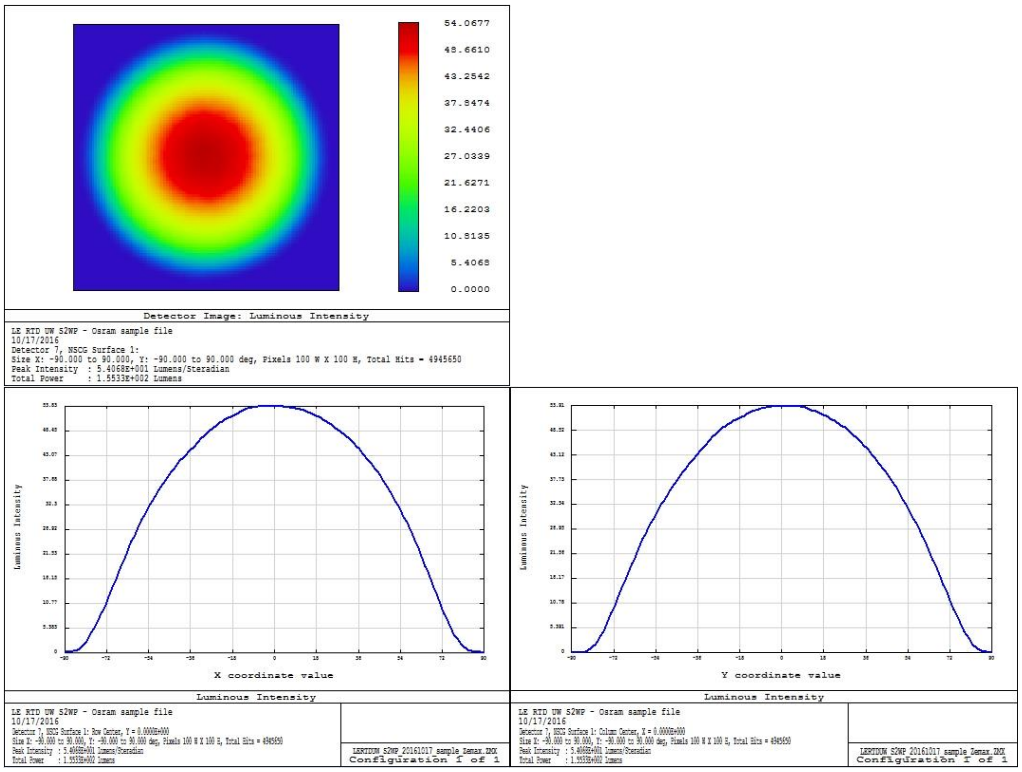




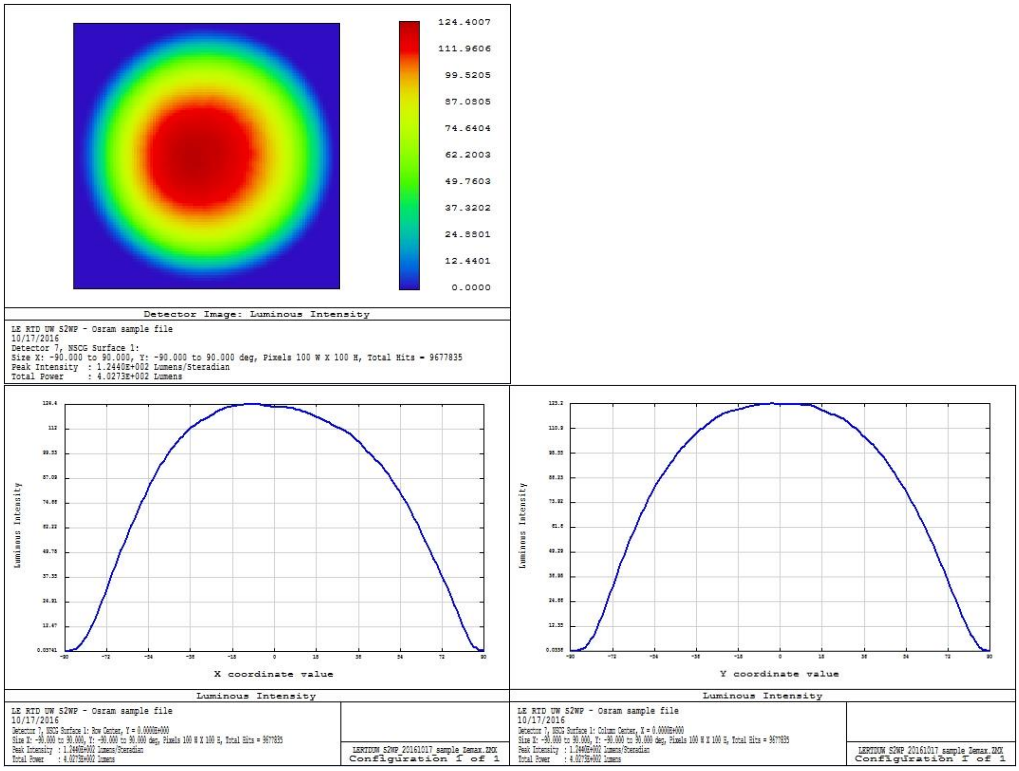
only green chip on, Φv= 337 lm



only red chip on, Φv=157 lm

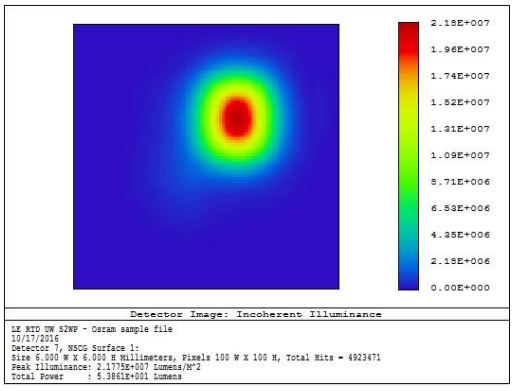


only white chip on, Φ_V= 420lm

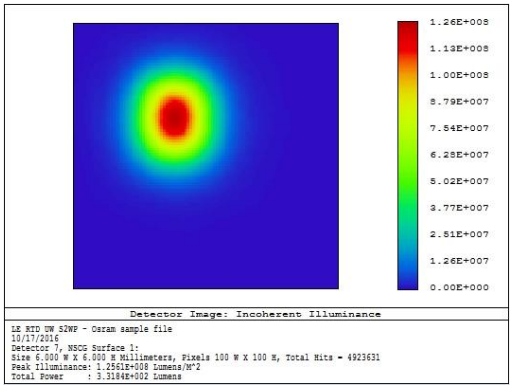


4. ***Near field illuminance / irradiance*** *(units: lx, z=0.1mm)*

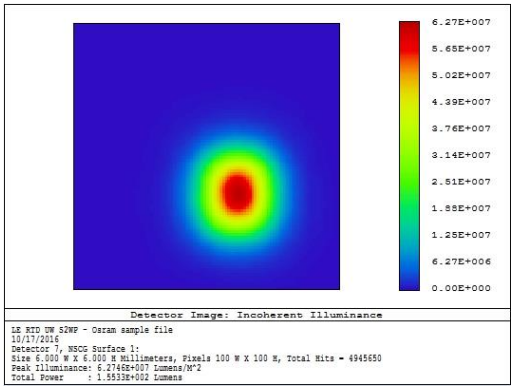
only blue chip on, Φ= 1.68 mW



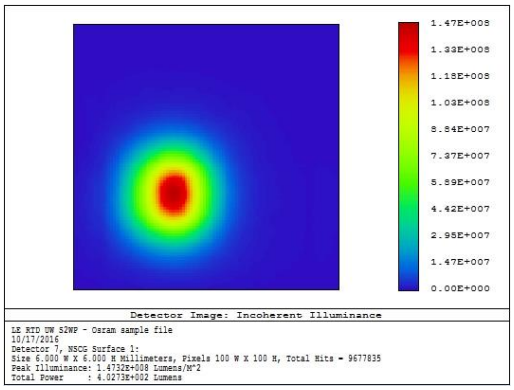
only green chip on, Φ_V= 337 lm



only red chip on, Φ_V=157 lm



only white chip on, Φ_V= 420lm



5. Using white LED OSRAM rayfile data

The spectrum of the LED represented in this rayfile package has two local maxima due to the specific generation principle of white light used for this LED type. The slope in the blue wavelength range has narrow width and a peak wavelength around

446 nm, the slope in the yellow wavelength range has a wide distribution with a peak wavelength around 540-590 nm depending on the LED type.

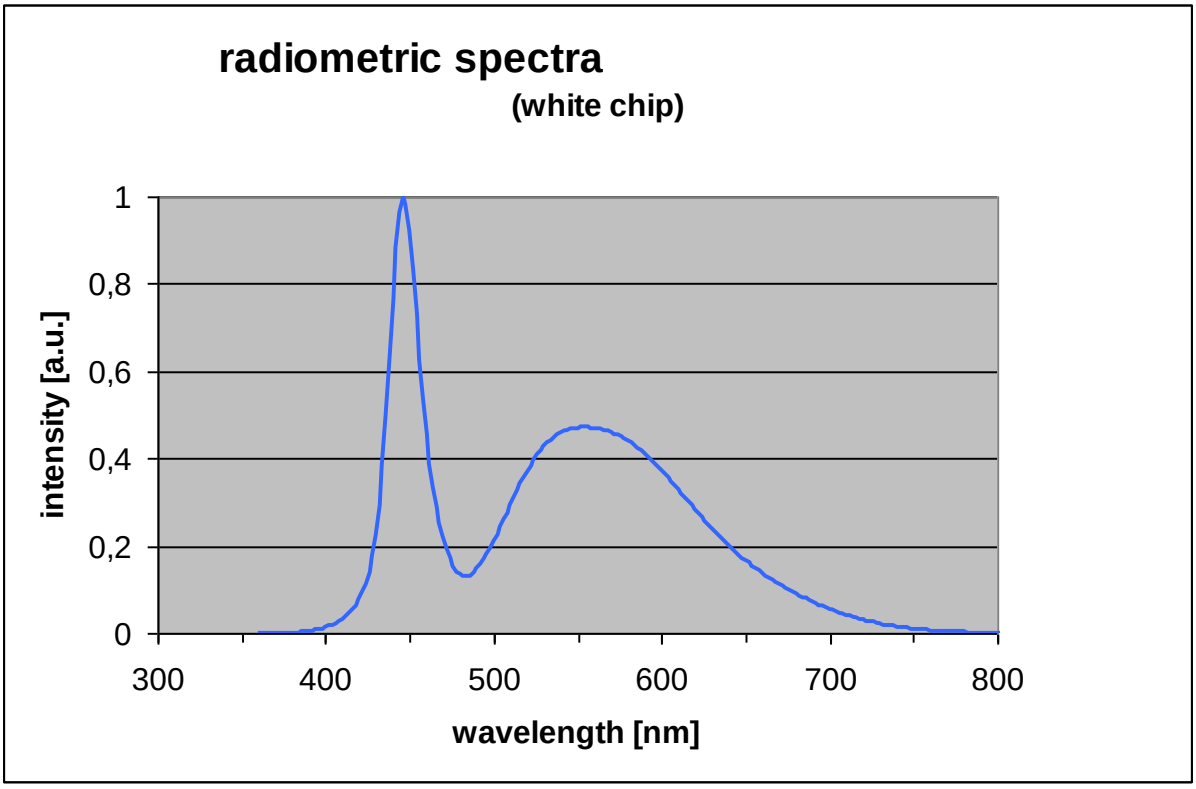


Fig. 3: exemplary radiometric spectra

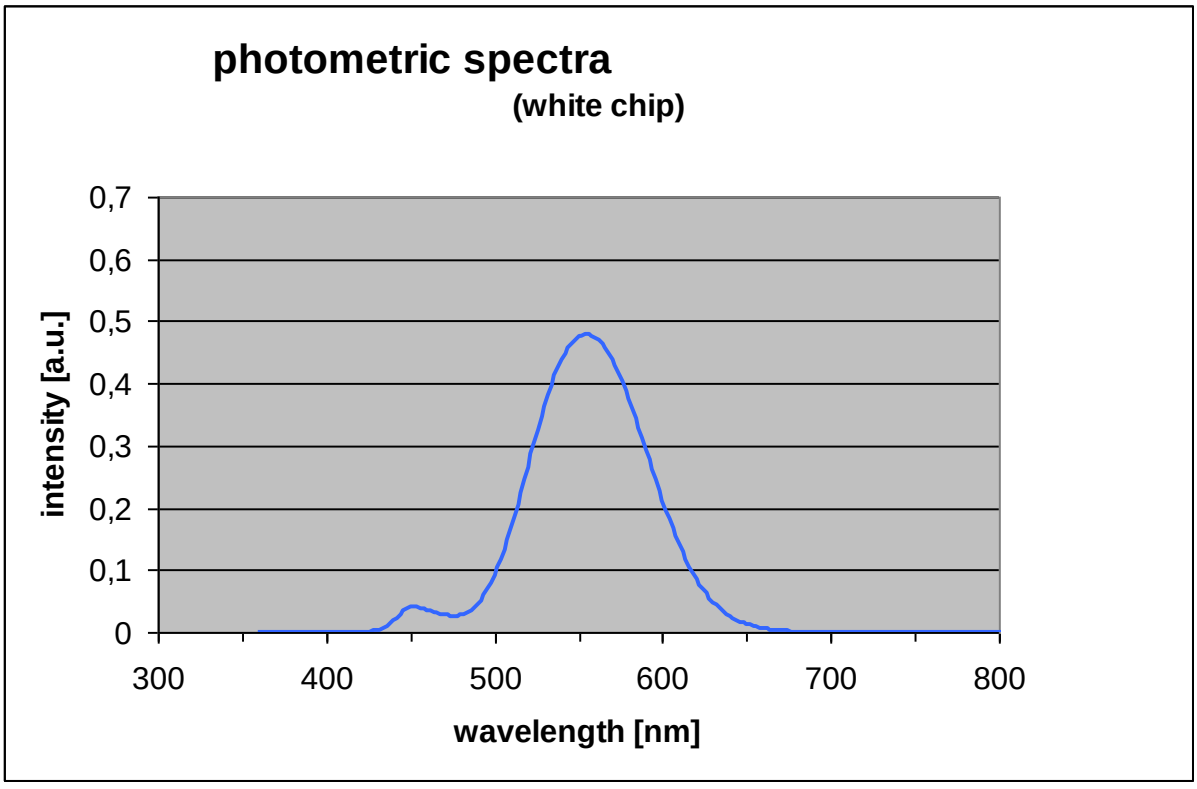


Fig. 4: exemplary photometric spectra

Due to the different angular characteristics of the rays referring to the blue and yellow parts of the spectrum a separation of the ray model in two parts is recommended. Therefore, two rayfiles have been delivered with this rayfile package. One rayfile for the blue and one rayfile for the yellow part of the spectrum. Both rayfiles have the same global coordinate origin and must be placed in a simulation at exactly the same x-,y-,z-coordinates. To use the rayfiles in a simulation the user has to consider the following points:

- "blue" and "yellow" rayfile must be placed at the same x-,y-,z-coordinates
- simulation to be done simultaneously for the two raysets, like two overlapping sources
- Luminous flux contributions of both rayfiles must be chosen, e.g. by integration of the slope of the spectrum for the referring LED color bin.

The luminous flux ratio between yellow and blue depends on the spectrum and is therefore slightly different for the different chromaticity coordinate groups. The table below summarizes typical ratios resulting from the integration of the blue and yellow part of the spectra (separation of both parts at 510 nm):

	Photometric		Radiometric		
	Yellow	Blue	Yellow	Blue	
BQ	0.931	0.069	0.636	0.364	(default setting for Speos, Lighttools, Zemax)

These relationships have to be used with the referring spectra, if the software allows the usage of complete spectra.

The white chip of this LED is binned in lm. The given blue/yellow weights are optimised for an integrating sphere detector using 5M blue and 5M yellow rays.

The CIE color coordinates calculated from the provided spectrum files could depend on the way the specific optical design software interprets the spectrum (e.g., interpolation between single values). It is recommended to check the calculated color coordinates and, in case of differences to this documentation, to slightly adapt the blue/yellow weights to the needs of the specific calculation algorithm.

In general, there exists no bi-directional relationship between a spectrum and a CIE Cx/Cy color coordinate. A certain color coordinate could be generated with different spectra. Therefore, the provided spectrum file for a specific color bin is an exemplary information. The spectrum of a real LED delivered for the same bin could be different from the spectrum file.

Some optical design software packages do not support the simulation of the complete color spectrum, but only some single wavelengths. In that case it is recommended for the simulation of the white LED to use two monochromatic sources with the peak wavelengths of the blue and yellow part of the LED-spectrum and with the above shown Luminous flux ratio.

6. Software Related Information

ASAP

The provided rayfiles for ASAP are in binary format. Flux is set to a default of 157/337/1.68/420 the user has to adapt the flux setting in the software. Wavelength is set to peak emission wavelength.
The typical radiometric spectrum in ASCII format *.txt is included in the package. Units for wavelength are nm.

IES TM25

The provided rayfiles for IES TM25 contain the typical spectrum and the typical flux; the user has to adapt the flux setting in the software.
In addition the spectrum is included in the package as *.txt file in ASCII format. Units for wavelength are nm.

Lighttools

This rayfile package contains additionally the LED as a Lighttools library element. This provides the following information:

- link to rayfile with 100k rays, the rayfile should be placed in the same folder as the Lighttools file
- CAD model
- rayfile and CAD model are grouped. In case the grouping is resolved, the correct positioning of rayfile vs. CAD model must be ensured
- typical spectrum of the LED

For importing the library element into an existing Lighttools project, please consider the following:

- File → Load Library Element… → select path and file

The typical radiometric spectrum in ASCII format *.sre is included in the package. Units for wavelength are nm.

Lucidshape

The provided rayfiles for Lucidshape are in binary format. Flux is set to a default of 157/337/1.68/420; the user has to adapt the flux setting in the software.
The typical radiometric spectrum in ASCII format *.txt is included in the package. Units for wavelength are nm.

Simulux

The provided rayfiles for Simulux are in binary format. The rayfiles contain as wavelength information the peak emission wavelength of the LED. Flux is set to a default of 157/337/1.68/420; the user has to adapt the flux setting in the software.

The typical radiometric spectrum in ASCII format *.txt is included in the package.
Units for wavelength are nm.

Speos/Optis

The provided rayfiles for Speos/Optis are in binary format. The rayfile contains the typical color spectrum and the typical Luminous flux. In addition the spectrum is included in the package as *.spectrum file in ASCII format.

TracePro, Photopia

The provided rayfiles for TracePro and Photopia are in binary format. The rayfiles contain as wavelength information the peak emission wavelength of the LED. Flux is set to a default of 157/337/1.68/420; the user has to adapt the flux setting in the software.
The typical radiometric spectrum in ASCII format *.txt is included in the package.
Units for wavelength are nm.

Zemax

The provided rayfiles for Zemax are in binary format. In addition a sample file is included in the package showing the recommended settings and placement of rayfiles and CAD model. The sample file contains the typical Luminous flux of the LED and the typical spectrum (see “sources” tab in the object properties dialog box). Additionally, the radiometric color spectrum is included as *.spcd file in the package.

7. Provided files

file type	file name
rayfile (blue chip)	rayfile_LERTDUW_S2WP_blue_[number of rays]_[YYYYDDMM]_[data format].[extension]
rayfile (truegreen chip)	rayfile_LERTDUW_S2WP_green_[number of rays]_[YYYYDDMM]_[data format].[extension]
rayfile (red chip)	rayfile_LERTDUW_S2WP_red_[number of rays]_[YYYYDDMM]_[data format].[extension]
rayfile (white chip, blue part of spectrum)	rayfile_LERTDUW_S2WP_white_blue_[number of rays]_[YYYYDDMM]_[data format].[extension]
rayfile (white chip, yellow part of spectrum)	rayfile_LERTDUW_S2WP_white_yellow_[number of rays]_[YYYYDDMM]_[data format].[extension]
CAD geometry	LERTDUW_S2WP_[YYYYDDMM]_geometry.IGS LERTDUW_S2WP_[YYYYDDMM]_geometry.STEP LERTDUW_S2WP_[YYYYDDMM]_geometry.SLDPRT
library elements	LERTDUW_S2WP_[YYYYDDMM]_sample_[data format].[extension]
spectrum	LERTDUW_S2WP_[YYYYDDMM]_spectrum.[extension]
information (this file)	LERTDUW_S2WP_[DDMMYY]_info.pdf

8. Disclaimer and User Agreement

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Further explanations:

Information: The information provided in this document consists of rayfile data, CAD data, spectrum data, documentation.

Document: The document has the purpose to make optical simulation and design.

Conditions: The conditions which the Information is based on: The provided data represents one single LED and may in reality not represent the complete possible variation range of all component parameters. Therefore, in certain cases a deviation between the real emission characteristic and the emission characteristic which is encoded in the provided rayfile data could occur.

Recommendation for use of the Products, Safety recommendations: The documentation provided with the rayfile data has to be considered.

9. Revision History

date	type	code
09.12.2014	rayfiles generated	AG
17.10.2016	rayfiles released	US