



Test Report issued under the responsibility of:



TEST REPORT IEC TR 62778 Application of IEC 62471 for the assessment of blue light hazard to light sources and luminaires	
Report Number	6013021.50P V1.1
Date of issue	2019-05-07
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Name of Testing Laboratory preparing the Report	DEKRA Testing and Certification (Shanghai) Ltd. 3/F, #250, Jiangchangsan Road building 16 Headquater Economy Park Shibeil Hi-Tech Park, Zhabei District, Shanghai, P.R.C 200436
Applicant's name	Lumileds Commercial (Shanghai) Co., Ltd
Address	No. 9, Lane 888, Tianlin Road, Shanghai, China
Test specification:	
Standard	IEC TR 62778:2014 (Second Edition)
Test procedure	Type test
Non-standard test method	N/A
Test Report Form No.	IEC62778A
Test Report Form(s) Originator	TÜV SÜD Product Service GmbH
Master TRF	Dated 2016-02
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Test item description :	LUXEON 5050	
Trade Mark :	LUMILEDS	
Manufacturer :	Lumileds Commercial (Shanghai) Co., Ltd No. 9, Lane 888, Tianlin Road, Shanghai, China	
Model/Type reference :	LUXEON 5050 series Detailed lists refer to Appendix 2: Model List	
Ratings :	Max voltage: 27 Vdc, Max current: 240 mA Detailed information please refer to Appendix 2: Model List.	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
<input checked="" type="checkbox"/> CB Testing Laboratory:	DEKRA Testing and Certification (Shanghai) Ltd.	
Testing location/ address:	3/F, #250, Jiangchangsan Road building 16 Headquater Economy Park Shibe Hi-Tech Park, Zhabei District, Shanghai, P.R.C 200436	
<input type="checkbox"/> Associated CB Testing Laboratory:		
Testing location/ address:		
Tested by (name, function, signature):	Yuting Peng	
Approved by (name, function, signature):	Hanson Zhang	
Testing procedure: CTF Stage 1:		
Testing location/ address:		
Tested by (name, function, signature):		
Approved by (name, function, signature):		
Testing procedure: CTF Stage 2:		
Testing location/ address:		
Tested by (name + signature):		
Witnessed by (name, function, signature):		
Approved by (name, function, signature):		
Testing procedure: CTF Stage 3:		
Testing procedure: CTF Stage 4:		
Testing location/ address:		

Tested by (name, function, signature).....:		
Witnessed by (name, function, signature)		
Approved by (name, function, signature).....:		
Supervised by (name, function, signature)		

<p>List of Attachments (including a total number of pages in each attachment):</p> <ul style="list-style-type: none"> ● Appendix 1: Photo Documentation ● Appendix 2: Model List ● Appendix 3: Relative Spectrum Of Tested Sample(s) ● Appendix 4: Table 6.1 Based On IEC 62471:2006 ● Appendix 5: Table 6.1 Based On EN62471:2008, Attachment To IEC 62471 European Group Differences And National Differences ● Appendix 6: Blue Light Hazard-forward Current Relationship (Non-mandatory Information) 	
<p>Summary of testing:</p>	
<p>Tests performed (name of test and test clause):</p> <p>These tests fulfil the requirements of standard ISO/IEC 17025. When determining the test conclusion, the Measurement Uncertainty of test has been considered.</p> <p>The tested sample of L150-5770502400000 from LUXEON 5050 series list at appendix 2 Have been tested according to the IEC 62471 (first edition, 2006-07) at 200mm and been classified as RG 2 at maximum current 240mA. Have been tested according to the EN 62471:2008 at 200mm and been classified as RG 2 at maximum current 240mA. Have been tested according to the IEC/TR62778:2014 and been classified as RG 2 for blue light hazard at maximum current 240mA.</p> <p>The sample of L150-5770502400000 was tested at 60mA, 120mA, 180mA and 240mA. Current at RG1 to RG2 boundary was deducted to be 96mA. (See appendix 6 for detail).</p>	<p>Testing location:</p> <p>DEKRA Testing and Certification (Shanghai) Ltd. 3/F, #250, Jiangchangsan Road building 16 Headquater Economy Park Shibe Hi-Tech Park, Zhabei District, Shanghai, P.R.C 200436</p>
<p>Summary of compliance with National Differences (List of countries addressed): EN Standards</p> <p>EN 62471:2008</p> <p><input checked="" type="checkbox"/> The product fulfils the requirements</p>	

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

N/A

Test item particulars: See below	
Product evaluated	<input checked="" type="checkbox"/> LED package <input type="checkbox"/> LED module <input type="checkbox"/> Lamp <input type="checkbox"/> Luminaire
Rated voltage (V)	Max: 27 Vdc
Rated current (mA)	Max:240 mA
Rated CCT (K)	2200K / 2500K / 2700K / 3000K / 4000K / 5000K / 5700K Details information please refer to Appendix 2: Model List.
Rated Luminance (Mcd/m²)	--
Component report data used	<input checked="" type="checkbox"/> Not applicable <input type="checkbox"/> LED package <input type="checkbox"/> LED module <input type="checkbox"/> Lamp Report number: --
Possible test case verdicts:	
- test case does not apply to the test object..... : N/A	
- test object does meet the requirement..... : P (Pass)	
- test object does not meet the requirement..... : F (Fail)	
Testing : --	
Date of receipt of test item	2017-07-11
Date (s) of performance of tests	2017-07-11 to 2017-07-12
General remarks:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. Throughout this report a <input checked="" type="checkbox"/> comma / <input type="checkbox"/> point is used as the decimal separator. The product complied with the following standards: <input checked="" type="checkbox"/> IEC 62471:2006 <input checked="" type="checkbox"/> EN 62471:2008 <input type="checkbox"/> IEC/TR 62471-2:2009 <input checked="" type="checkbox"/> IEC/TR 62778:2014	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC60598-2-13:	

<p>The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided.....:</p>	<p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> Not applicable</p>
<p>When differences exist; they shall be identified in the General product information section.</p>	
<p>Name and address of factory (ies)..... : Lumileds Commercial (Shanghai) Co., Ltd No. 9, Lane 888, Tianlin Road, Shanghai, China</p>	
<p>General product information:</p> <p>L150-5770502400000, with ANSI bin 5700K, is part of the LUXEON 5050 product family. The sample measured, L150-5770502400000 has the highest typical flux, highest typical device luminance level and highest CCT within the listed LUXEON 5050 product family. The present classification is thus valid (worst case) for all LUXEON 5050 with part number L150-AABB50CCxxxxx where AA represents nominal ANSI CCT bins could be equal to 5700K or lower, BB represents CRI could be HG and from 70 to 90 (see TR IEC62778). CC represents voltage, could be 6V and 24V. Note that for 6V samples, the current is 4 times as much as that of 24V samples for same flux output and thereby the same risk. See the appendix below for an explanation of the type designation.</p> <p>The sample of L150-5770502400000 was tested at 60mA, 120mA, 180mA and 240mA. Current RG1 to RG2 boundary was deducted to be 96mA which could be applied to all LUXEON 5050 with part number L150-AABB50CCxxxxx where AA represents nominal ANSI CCT bins could be equal to 5700K or lower. See appendix 6 for detail.</p> <p>The products considered as worst case which should be evaluated at 200mm.</p> <p>The sample of L150-5770502400000 was tested at 200mm from the light source. CCT of spectral irradiance was found at 5917 K.</p> <p>Base on the Model list which listed on the appendix 2, The tested sample can be considered as <input type="checkbox"/> typical product <input checked="" type="checkbox"/> worst product Which the results can be reference used for the other models.</p> <p>Type test was performed according to IEC 62471:2006 procedure.</p>	

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict
7	MEASUREMENT INFORMATION FLOW		P
7.1	Basic flow		P
	'Law of conservation of luminance' applied		N/A
	Use of only true luminance/radiance values		P
	In case of luminaire: The light source is operated in the luminaire under similar conditions as when tested as a component		N/A
	In case E_{thr} value for RG2 was established the peak value was derived from angular light distribution		N/A
7.2	Conditions for the radiance measurement		P
	Standard condition applied (200mm distance, 0,011rad field of view)		P
	Non-standard condition applied		N/A
7.3	Special cases (I): Replacement by a lamp or LED module of another type		N/A
	Light source is a white light source		N/A
	Evaluation done based on highest luminance		N/A
	Evaluation done based on CCT value		N/A
7.4	Special cases (II): Arrays and clusters of primary light sources		N/A
	LED package is evaluated as : <input type="checkbox"/> RG0 unlimited <input type="checkbox"/> RG1 unlimited		N/A
	E_{thr} of LED package applies to array		N/A
8	RISK GROUP CLASSIFICATION		P
	Risk group achieved:		P
	-...Risk Group 0 unlimited		N/A
	-...Risk Group 1 unlimited		N/A
	- E_{thr} (lx) : - Distance to reach RG1 (mm) ::	Refer to the Supplementary information of TABLE: Spectroradiometric measurement as following	P

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE: Spectroradiometric measurement				
	Measurement performed on:	<input checked="" type="checkbox"/> LED package <input type="checkbox"/> LED module <input type="checkbox"/> Lamp <input type="checkbox"/> Luminaire		
	Model number	L150-5770502400000		
	Test voltage (V)	27 Vdc		
	Test current (mA)	240mA		
	Test frequency (Hz)	--		
	Ambient, t(°C)	25°C		
	Measurement distance	<input checked="" type="checkbox"/> 20 cm <input type="checkbox"/> ... cm		
	Source size	<input checked="" type="checkbox"/> Non-small <input type="checkbox"/> Small :		
	Field of view	<input type="checkbox"/> 100 mrad <input checked="" type="checkbox"/> 11 mrad <input type="checkbox"/> 1,7 mrad (for small sources)		
Item	Symb ol	Units	Result	Remark
Correlated colour temperature	CCT	K	5917	
x/y colour coordinates			0,3232/ 0,3417	
Blue light hazard radiance	L _B	W/(m ² •sr ¹)	2,45E+04	@11mrad
Blue light hazard irradiance	E _B	W/m ²	--	
Luminance	L	cd/m ²	2,33E+07	@11mrad
Illuminance	E	lx	7,47E+03	
Supplementary information: Per IEC/TR 62778:2014 E _{thr} = 950 lx D _{min} = 561 mm				

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE: Spectroradiometric measurement				
	Measurement performed on:	<input checked="" type="checkbox"/> LED package <input type="checkbox"/> LED module <input type="checkbox"/> Lamp <input type="checkbox"/> Luminaire		
	Model number	L150-5770502400000		
	Test voltage (V)	--		—
	Test current (mA)	180mA		—
	Test frequency (Hz)	--		—
	Ambient, t(°C).....	25°C		—
	Measurement distance.....	<input checked="" type="checkbox"/> 20 cm <input type="checkbox"/> ... cm		—
	Source size	<input checked="" type="checkbox"/> Non-small <input type="checkbox"/> Small :		—
	Field of view	<input type="checkbox"/> 100 mrad <input checked="" type="checkbox"/> 11 mrad <input type="checkbox"/> 1,7 mrad (for small sources)		—
Item	Symb ol	Units	Result	Remark
Correlated colour temperature	CCT	K	5917	
x/y colour coordinates			0,3232/ 0,3417	
Blue light hazard radiance	L _B	W/(m ² •sr ¹)	1,80E+04	@11mrad
Blue light hazard irradiance	E _B	W/m ²	--	
Luminance	L	cd/m ²	1,88E+07	@11mrad
Illuminance	E	lx	6,04E+03	
Supplementary information: Per IEC/TR 62778:2014 E _{thr} = 1044 lx D _{min} = 481 mm				

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE: Spectroradiometric measurement				
	Measurement performed on:	<input checked="" type="checkbox"/> LED package <input type="checkbox"/> LED module <input type="checkbox"/> Lamp <input type="checkbox"/> Luminaire		
	Model number	L150-5770502400000		
	Test voltage (V)	--		—
	Test current (mA)	120mA		—
	Test frequency (Hz)	--		—
	Ambient, t(°C).....	25°C		—
	Measurement distance.....	<input checked="" type="checkbox"/> 20 cm <input type="checkbox"/> ... cm		—
	Source size	<input checked="" type="checkbox"/> Non-small <input type="checkbox"/> Small :		—
	Field of view	<input type="checkbox"/> 100 mrad <input checked="" type="checkbox"/> 11 mrad <input type="checkbox"/> 1,7 mrad (for small sources)		—
Item	Symb ol	Units	Result	Remark
Correlated colour temperature	CCT	K	5917	
x/y colour coordinates			0,3232/ 0,3417	
Blue light hazard radiance	L _B	W/(m ² •sr ¹)	1,24E+04	@11mrad
Blue light hazard irradiance	E _B	W/m ²	--	
Luminance	L	cd/m ²	1,33E+07	@11mrad
Illuminance	E	lx	4,26E+03	
Supplementary information: Per IEC/TR 62778:2014 E _{thr} = 1074 lx D _{min} = 398 mm				

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE: Spectroradiometric measurement				
	Measurement performed on:	<input checked="" type="checkbox"/> LED package <input type="checkbox"/> LED module <input type="checkbox"/> Lamp <input type="checkbox"/> Luminaire		
	Model number	L150-5770502400000		
	Test voltage (V)	--		—
	Test current (mA)	60mA		—
	Test frequency (Hz)	--		—
	Ambient, t(°C).....	25°C		—
	Measurement distance.....	<input checked="" type="checkbox"/> 20 cm <input type="checkbox"/> ... cm		—
	Source size	<input checked="" type="checkbox"/> Non-small <input type="checkbox"/> Small :		—
	Field of view	<input type="checkbox"/> 100 mrad <input checked="" type="checkbox"/> 11 mrad <input type="checkbox"/> 1,7 mrad (for small sources)		—
Item	Symb ol	Units	Result	Remark
Correlated colour temperature	CCT	K	5917	
x/y colour coordinates			0,3232/ 0,3417	
Blue light hazard radiance	L _B	W/(m ² •sr ¹)	6,40E+03	@11mrad
Blue light hazard irradiance	E _B	W/m ²	--	
Luminance	L	cd/m ²	7,15E+06	@11mrad
Illuminance	E	lx	2,31E+03	
Supplementary information: N/A				

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE: Angular light distribution	N/A

List of test equipment used:

A completed list of used test equipment shall be provided in the Test Reports when a Manufacturer Testing Laboratory according to CTF stage 1 or CTF stage 2 procedure has been used.

Note: This page may be removed when CTF stage 1 CTF stage 2 are not used. See also clause 4.8 in OD 2020 for more details.

Clause	Measurement / testing	Testing / measuring equipment / material used, (Equipment ID)	Range used	Last Calibration date	Calibration due date
7	Irradiance measurements Radiance measurements	IDR 300 Monochromator (SH 344)	200-3000nm	/	/
7	Radiance measurements	S009 Telescope (SH 345)	300-1400nm	/	/
7	Radiance measurements	SRS 12 Radiance Standard (SH 348)	300-1400nm	2017/4/25	2018/4/25
7	Irradiance measurements	CL6 Spectral irradiance standard (SH 350)	300-3000nm	2017/4/25	2018/4/25
7	Irradiance measurements	CL7 Spectral irradiance standard (SH 351)	200-400nm	2017/4/25	2018/4/25
7	Irradiance measurements	Photometric detector head (SH 359)	380nm-800nm	2017/4/25	2018/4/25
7	Irradiance measurements Radiance measurements	Wattmeter (SH070)	500V,40A	2016/10/12	2017/10/12

Appendix 1: Photo Documentation



Overview (tested)

Appendix 2: Model List:

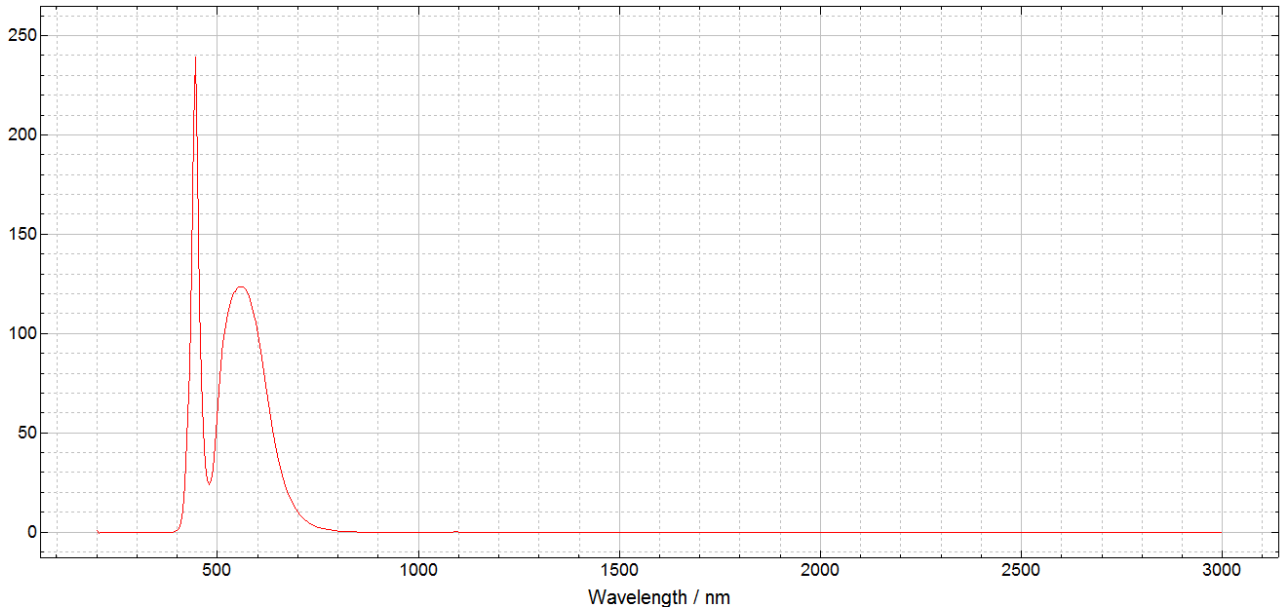
Part number submitted for type testing as following:

Part number	CCT (K)	CRI	Max Voltage(V)	Max Current (mA)
L150-5770502400000	5700	70	26.5	240

L150-5770502400000, with ANSI bin 5700K, is part of the LUXEON 5050 product family. The sample measured, L150-5770502400000 has the highest typical flux, highest typical device luminance level and highest CCT within the listed LUXEON 5050 product family. The present classification is thus valid (worst case) for all LUXEON 5050 with part number L150-AABB50CCxxxx where AA represents nominal ANSI CCT bins could be equal to 5700K or lower, BB represents CRI could be HG and from 70 to 90 (see TR IEC62778). CC represents voltage, could be 6V and 24V. Note that for 6V samples, the current is 4 times as much as that of 24V samples for same flux output and thereby the same risk. See the appendix below for an explanation of the type designation.

Part number	Designates nominal ANSI CCT /CCT (K)	designates minimum CRI	Max Voltage(V)	Max Current (mA)
L150-AABB5024XXXXX	AA	BB	26.5	240
L150-AABB5006XXXXX	AA	BB	6.6	800
L150-AABB50CCXXXXX Where AA - designates nominal ANSI CCT (27=2700K, 30=3000K, 35=3500K, 40=4000K, 50=5000K, 57=5700K) BB - designates minimum CRI or high Gamut (70=70CRI, 80=80CRI, 90=90CRI, HG=high gamut) CC - designates voltage (06V=6V and 24V=24V) XXXXX - reserved for further customization of product specification				

Appendix 3: Relative Spectrum Of Tested Sample(s)



Appendix 4: Table 6.1 Based On IEC 62471:2006

DUT: L150-5770502400000, Evaluation Distance: 200mm, Test current: 240mA, Angular subtense of the apparent source α : 25mrad

IEC 62471									
Clause	Requirement + Test				Result – Remark				Verdict
Table 6.1	Emission limits for risk groups of continuous wave lamps								P
Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	0,003		0,03	
Near UV		E_{UVA}	$W \cdot m^{-2}$	10	0,0000	33		100	
Blue light	$B(\lambda)$	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	7,76E+02	10000	2,45E+04	4000000	3,97E+04
Blue light, small source	$B(\lambda)$	E_B	$W \cdot m^{-2}$	1,0*	--	1,0		400	
Retinal thermal	$R(\lambda)$	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/ α	2,87E+05	28000/ α		71000/ α	
Retinal thermal, weak visual stimulus**	$R(\lambda)$	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	6000/ α	--	6000/ α		6000/ α	
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	0,04	570		3200	
* Small source defined as one with $\alpha < 0,011$ radian. Averaging field of view at 10000 s is 0,1 radian.									
** Involves evaluation of non-GLS source									

DUT: L150-5770502400000, Evaluation Distance: 200mm, Test current: 180mA, Angular subtense of the apparent source α : 25mrad

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1 Emission limits for risk groups of continuous wave lamps									P
Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	0,003		0,03	
Near UV		E_{UVA}	$W \cdot m^{-2}$	10	0,0000	33		100	
Blue light	$B(\lambda)$	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	5,71E+02	10000	1,80E+04	4000000	2,89E+04
Blue light, small source	$B(\lambda)$	E_B	$W \cdot m^{-2}$	1,0*	--	1,0		400	
Retinal thermal	$R(\lambda)$	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/ α	2,15E+05	28000/ α		71000/ α	
Retinal thermal, weak visual stimulus**	$R(\lambda)$	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	6000/ α	--	6000/ α		6000/ α	
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	0,03	570		3200	

* Small source defined as one with $\alpha < 0,011$ radian. Averaging field of view at 10000 s is 0,1 radian.
 ** Involves evaluation of non-GLS source

DUT: L150-5770502400000, Evaluation Distance: 200mm, Test current: 120mA, Angular subtense of the apparent source α : 25mrad

IEC 62471									
Clause	Requirement + Test				Result – Remark				Verdict
Table 6.1	Emission limits for risk groups of continuous wave lamps								P
Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	0,003		0,03	
Near UV		E_{UVA}	$W \cdot m^{-2}$	10	0,0000	33		100	
Blue light	$B(\lambda)$	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	3,95E+02	10000	1,25E+04	4000000	1,99E+04
Blue light, small source	$B(\lambda)$	E_B	$W \cdot m^{-2}$	1,0*	--	1,0		400	
Retinal thermal	$R(\lambda)$	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/ α	1,48E+05	28000/ α		71000/ α	
Retinal thermal, weak visual stimulus**	$R(\lambda)$	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	6000/ α	--	6000/ α		6000/ α	
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	0,02	570		3200	
* Small source defined as one with $\alpha < 0,011$ radian. Averaging field of view at 10000 s is 0,1 radian.									
** Involves evaluation of non-GLS source									

DUT: L150-5770502400000, Evaluation Distance: 200mm, Test current: 60mA, Angular subtense of the apparent source α : 25mrad

IEC 62471									
Clause	Requirement + Test				Result – Remark				Verdict
Table 6.1	Emission limits for risk groups of continuous wave lamps								P
Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	0,003		0,03	
Near UV		E_{UVA}	$W \cdot m^{-2}$	10	0,0000	33		100	
Blue light	$B(\lambda)$	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	2,03E+02	10000	6,40E+03	4000000	
Blue light, small source	$B(\lambda)$	E_B	$W \cdot m^{-2}$	1,0*	--	1,0		400	
Retinal thermal	$R(\lambda)$	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/ α	7,70E+04	28000/ α		71000/ α	
Retinal thermal, weak visual stimulus**	$R(\lambda)$	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	6000/ α	--	6000/ α		6000/ α	
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	0,01	570		3200	
* Small source defined as one with $\alpha < 0,011$ radian. Averaging field of view at 10000 s is 0,1 radian.									
** Involves evaluation of non-GLS source									

Appendix 5: Table 6.1 Based On EN62471:2008, Attachment To IEC 62471 European Group Differences And National Differences

DUT: L150-5770502400000, Evaluation Distance: 200mm, Test current: 240mA, Angular subtense of the apparent source α : 25mrad

EN 62471										
Clause	Requirement + Test			Result – Remark				Verdict		
Table 6.1	Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC)								P	
Risk	Action spectrum	Symbol	Units	Emission Measurement						
				Exempt		Low risk		Mod risk		
				Limit	Result	Limit	Result	Limit	Result	
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	--	--	--	--	
Near UV		E_{UVA}	$W \cdot m^{-2}$	0,33	0,0000	--	--	--	--	
Blue light	$B(\lambda)$	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	7,76E+02	10000	2,45E+04	4000000	3,97E+04	
Blue light, small source	$B(\lambda)$	E_B	$W \cdot m^{-2}$	0,01*	--	1,0		400		
Retinal thermal	$R(\lambda)$	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/ α	2,87E+05	28000/ α		71000/ α		
Retinal thermal, weak visual stimulus**	$R(\lambda)$	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	545000 0,0017 $\leq \alpha \leq$ 0,011	--					
				6000/ α 0,011 $\leq \alpha \leq$ 0,1	--					
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	0,04	570		3200		
<p>* Small source defined as one with $\alpha < 0,011$ radian. Averaging field of view at 10000 s is 0,1 radian.</p> <p>** Involves evaluation of non-GLS source</p> <p>NOTE The action functions: see Table 4.1 and Table 4.2 The applicable aperture diameters: see 4.2.1 The limitations for the angular subtenses: see 4.2.2 The related measurement condition 5.2.3 and the range of acceptance angles: see Table 5.5.</p>										

DUT: L150-5770502400000, Evaluation Distance: 200mm, Test current: 180mA, Angular subtense of the apparent source α : 25mrad

EN 62471										
Clause	Requirement + Test			Result – Remark				Verdict		
Table 6.1	Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC)								P	
Risk	Action spectrum	Symbol	Units	Emission Measurement						
				Exempt		Low risk		Mod risk		
				Limit	Result	Limit	Result	Limit	Result	
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	--	--	--	--	
Near UV		E_{UVA}	$W \cdot m^{-2}$	0,33	0,0000	--	--	--	--	
Blue light	$B(\lambda)$	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	5,71E+02	10000	1,80E+04	4000000	2,89E+04	
Blue light, small source	$B(\lambda)$	E_B	$W \cdot m^{-2}$	0,01*	--	1,0		400		
Retinal thermal	$R(\lambda)$	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/ α	2,15E+05	28000/ α		71000/ α		
Retinal thermal, weak visual stimulus**	$R(\lambda)$	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	545000 0,0017 $\leq \alpha \leq$ 0,011	--					
				6000/ α 0,011 $\leq \alpha \leq$ 0,1	--					
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	0,03	570		3200		
<p>* Small source defined as one with $\alpha < 0,011$ radian. Averaging field of view at 10000 s is 0,1 radian.</p> <p>** Involves evaluation of non-GLS source</p> <p>NOTE The action functions: see Table 4.1 and Table 4.2 The applicable aperture diameters: see 4.2.1 The limitations for the angular subtenses: see 4.2.2 The related measurement condition 5.2.3 and the range of acceptance angles: see Table 5.5.</p>										

DUT: L150-5770502400000, Evaluation Distance: 200mm, Test current: 120mA, Angular subtense of the apparent source α : 25mrad

EN 62471										
Clause	Requirement + Test			Result – Remark				Verdict		
Table 6.1	Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC)								P	
Risk	Action spectrum	Symbol	Units	Emission Measurement						
				Exempt		Low risk		Mod risk		
				Limit	Result	Limit	Result	Limit	Result	
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	--	--	--	--	
Near UV		E_{UVA}	$W \cdot m^{-2}$	0,33	0,0000	--	--	--	--	
Blue light	$B(\lambda)$	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	3,95E+02	10000	1,25E+04	4000000	1,99E+04	
Blue light, small source	$B(\lambda)$	E_B	$W \cdot m^{-2}$	0,01*	--	1,0		400		
Retinal thermal	$R(\lambda)$	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/ α	1,48E+05	28000/ α		71000/ α		
Retinal thermal, weak visual stimulus**	$R(\lambda)$	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	545000 0,0017 $\leq \alpha \leq$ 0,011	--					
				6000/ α 0,011 $\leq \alpha \leq$ 0,1	--					
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	0,02	570		3200		
<p>* Small source defined as one with $\alpha < 0,011$ radian. Averaging field of view at 10000 s is 0,1 radian.</p> <p>** Involves evaluation of non-GLS source</p> <p>NOTE The action functions: see Table 4.1 and Table 4.2 The applicable aperture diameters: see 4.2.1 The limitations for the angular subtenses: see 4.2.2 The related measurement condition 5.2.3 and the range of acceptance angles: see Table 5.5.</p>										

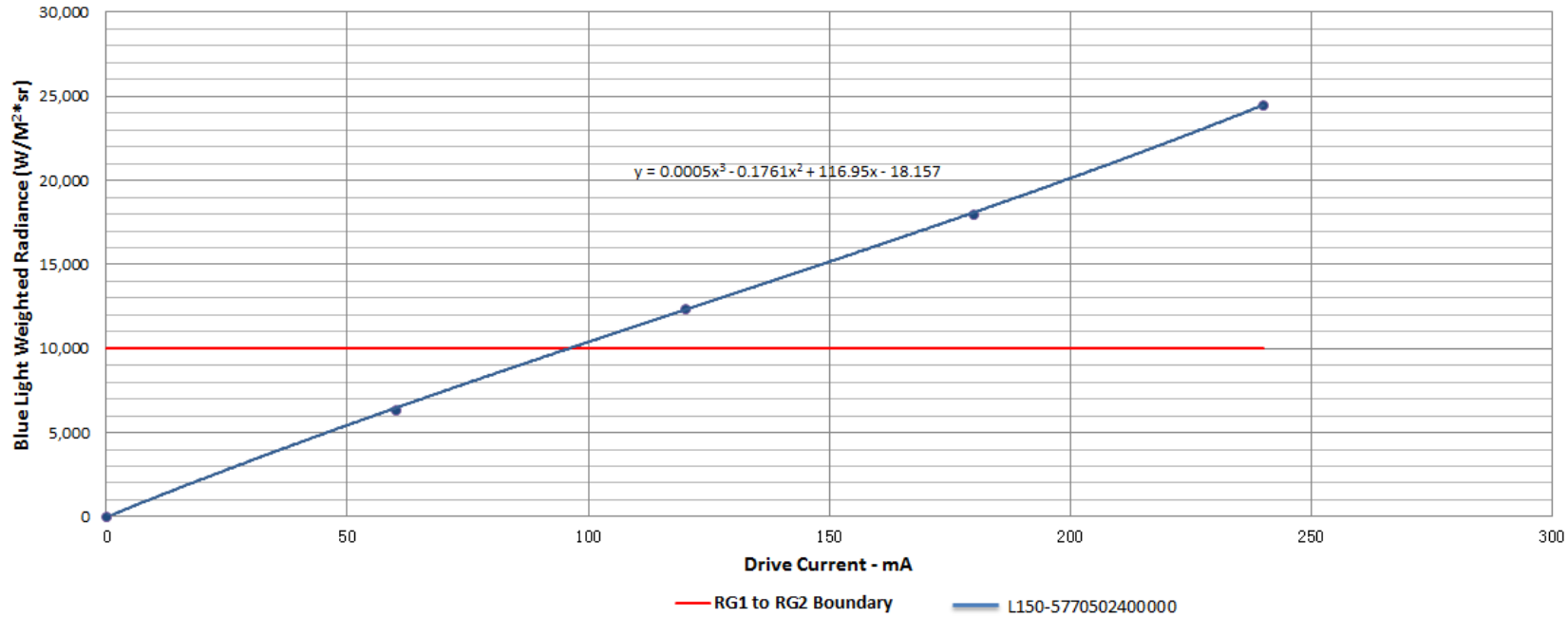
DUT: L150-5770502400000, Evaluation Distance: 200mm, Test current: 60mA, Angular subtense of the apparent source α : 25mrad

EN 62471										
Clause	Requirement + Test			Result – Remark				Verdict		
Table 6.1	Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC)								P	
Risk	Action spectrum	Symbol	Units	Emission Measurement						
				Exempt		Low risk		Mod risk		
				Limit	Result	Limit	Result	Limit	Result	
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	0,0000	--	--	--	--	
Near UV		E_{UVA}	$W \cdot m^{-2}$	0,33	0,0000	--	--	--	--	
Blue light	$B(\lambda)$	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	2,03E+02	10000	6,40E+03	4000000		
Blue light, small source	$B(\lambda)$	E_B	$W \cdot m^{-2}$	0,01*	--	1,0		400		
Retinal thermal	$R(\lambda)$	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/ α	7,70E+04	28000/ α		71000/ α		
Retinal thermal, weak visual stimulus**	$R(\lambda)$	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	545000 0,0017 $\leq \alpha \leq$ 0,011	--					
				6000/ α 0,011 $\leq \alpha \leq$ 0,1	--					
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	0,01	570		3200		
<p>* Small source defined as one with $\alpha < 0,011$ radian. Averaging field of view at 10000 s is 0,1 radian.</p> <p>** Involves evaluation of non-GLS source</p> <p>NOTE The action functions: see Table 4.1 and Table 4.2 The applicable aperture diameters: see 4.2.1 The limitations for the angular subtenses: see 4.2.2 The related measurement condition 5.2.3 and the range of acceptance angles: see Table 5.5.</p>										

Appendix 6: Blue Light Hazard-Forward Current Relationship (Non-mandatory Information)

The diagram below shows the different blue light hazards against different forward currents. It is additional information for reference only.

LUXEON 5050- Photo-biological Risk Rankings by Current & Color Temperature



Product ID:	Measured CCT:	Drive Currents (mA)					Regression Formula:	Fit to RG2 Line:	Current @ RG-1 to RG-2 Boundary, mA:
		0	60	120	180	240			
L150-5770502400000	5917K	0	6395	12410	18025	24491	$y = 0.0005x^3 - 0.1761x^2 + 116.95x - 18.157$	10000	96

-----The End-----