





TEST REPORT IEC TR 62778 Application of IEC 62471 for the assessment of blue light hazard to light sources and luminaires	
Report Number :	6150077.50P
Date of issue :	2023-02-03
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Name of Testing Laboratory preparing the Report	DEKRA Testing and Certification (Shanghai) Ltd. 3/F, #250, Jiangchangsan Road building 16 Headquarter Economy Park Shibeil Hi-Tech Park, Jing'an District, Shanghai, P.R.C 200436
Applicant's name	Lumileds (Shanghai) Management Co., Ltd.
Address :	Building 1-A, No. 19 & 20, Lane 299, Wenshui Road, Jing'an District, Shanghai, 200072, 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 :	Integral LED module	
Trade Mark :	LUMILEDS	
Manufacturer	Lumileds (Shanghai) Management Co., Ltd. Building 1-A, No. 19 & 20, Lane 299, Wenshui Road, Jing'an District, Shanghai, 200072, China	
Model/Type reference	L2C6-AABBCDEEFGGHH (For details see Model list)	
Ratings	For details see 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, Jing'an District, Shanghai, P.R.C 200436
<input type="checkbox"/>	Associated CB Testing Laboratory:	
Testing location/ address		
Tested by (name, function, signature)		Nancy Wang 
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 L2C6-50902L02A0600 Has been tested according to the IEC 62471(first edition, 2006-07) at 200mm and been classified as RG 2 at 450mA and RG1 at 170mA Have been tested according to the EN 62471:2008 at 200mm and been classified as RG 2 at 450mA and RG1 at 170mA Have been tested according to the IEC/TR 62778:2014 and been classified as RG 2 at 450mA and RG1 Unlimited at 170mA for blue light hazard.</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, Jing'an 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 BS EN 62471:2008</p> <p><input checked="" type="checkbox"/> The product fulfills 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)	40 Vdc
Rated current (mA)	450 – 3600 mA max current
Rated CCT (K):	--
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	2023-01-19
Date (s) of performance of tests	2023-02-03
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	
Decision rules applied Procedure 2 "Accuracy Method" as stated in the IEC Guide 115:2007.	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC 62471-2:	
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	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> Not applicable

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) : Lumileds (Shanghai) Management Co., Ltd
Building 1-A, No. 19 & 20, Lane 299, Wenshui
Road, Jing'an District, Shanghai, 200072, China

General product information:

Full tests were performed on model L2C6-50902L02A0600.

The products were considered as worst case which should be evaluated at 200mm.

The sample of L2C6-50902L02A0600 was tested at 200mm from the light source.

Base on the Model list which listed on the appendix 2, The tested sample can be considered as

typical product worst product

Which the results can be reference used for the other models.

Type test was performed according to IEC 62471:2006 procedure.

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 (m) :	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.....		L2C6-50902L02A0600		
Test voltage (V)		--		—
Test current (mA)		450 mA		—
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	5333	
x/y colour coordinates			0,3369 / 0,3607	
Blue light hazard radiance	L _B	W/(m ² •sr ¹)	2,43E+04	@11mrad
Blue light hazard irradiance	E _B	W/m ²	--	
Luminance	L	cd/m ²	3,05E+07	@11mrad
Illuminance	E	lx	1,86E+04	
Supplementary information: Per IEC/TR 62778:2014 E _{thr} = 1253 lx D _{min} = 770 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	L2C6-50902L02A0600		
	Test voltage (V)	--		—
	Test current (mA)	338 mA		—
	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	5301	
x/y colour coordinates			0,3378 / 0,3622	
Blue light hazard radiance	L _B	W/(m ² •sr ¹)	1,93E+04	@11mrad
Blue light hazard irradiance	E _B	W/m ²	--	
Luminance	L	cd/m ²	2,47E+07	@11mrad
Illuminance	E	lx	1,49E+04	
Supplementary information: Per IEC/TR 62778:2014 E _{thr} = 1283 lx D _{min} = 680 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	L2C6-50902L02A0600		
	Test voltage (V)	--		—
	Test current (mA)	226 mA		—
	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	5269	
x/y colour coordinates			0,3387 / 0,3631	
Blue light hazard radiance	L _B	W/(m ² •sr ¹)	1,34E+04	@11mrad
Blue light hazard irradiance	E _B	W/m ²	--	
Luminance	L	cd/m ²	1,76E+07	@11mrad
Illuminance	E	lx	1,05E+04	
Supplementary information: Per IEC/TR 62778:2014 E _{thr} = 1310 lx D _{min} = 567 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	L2C6-50902L02A0600		
	Test voltage (V)	--		—
	Test current (mA)	114 mA		—
	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	5220	
x/y colour coordinates			0,3401 / 0,3633	
Blue light hazard radiance	L _B	W/(m ² •sr ¹)	6,52E+03	@11mrad
Blue light hazard irradiance	E _B	W/m ²	--	
Luminance	L	cd/m ²	8,72E+06	@11mrad
Illuminance	E	lx	5,18E+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	2022/2/27	2023/2/26
7	Irradiance measurements	CL6 Spectral irradiance standard (SH 350)	300-3000nm	2022/2/27	2023/2/26
7	Irradiance measurements	CL7 Spectral irradiance standard (SH 351)	200-400nm	2022/2/27	2023/2/26
7	Irradiance measurements	Photometric detector head (SH 359)	380nm-800nm	2022/2/26	2023/2/25
7	Irradiance measurements Radiance measurements	Wattmeter (SH030)	500V,40A	2022/10/10	2023/10/10

Appendix 1: Photo Documentation



L2C6-50902L02A0600

Appendix 2: Model List

L2C6-AABBCDEEFGGHH

Where

AA: designates nominal CCT(27=2700K,30=3000K,35=3500K,40=4000K,50=5000K)

BB: designates minimum CRI(90=90 CRI)

C: designates color target of SDCM (2=2 SDCM)

D: designates product configuration of series (L= 12 series)

EE: designates product configuration of parallel (02= 2 parallel, 04= 4 parallel, 06= 6 parallel ,08= 8 parallel ,10= 10 parallel,11= 11 parallel,12= 12 parallel, 13= 13 parallel, 16= 16 parallel)

F: designates options for product generation (A= Gen1)

GG: designates light emitting surface(LES) diameter (06=6.3mm, 09=9.8mm, 13=13mm,15=14.5mm, 22=22mm)

HH: designates options for product specification(00= On BBL, X0= Core Pro)

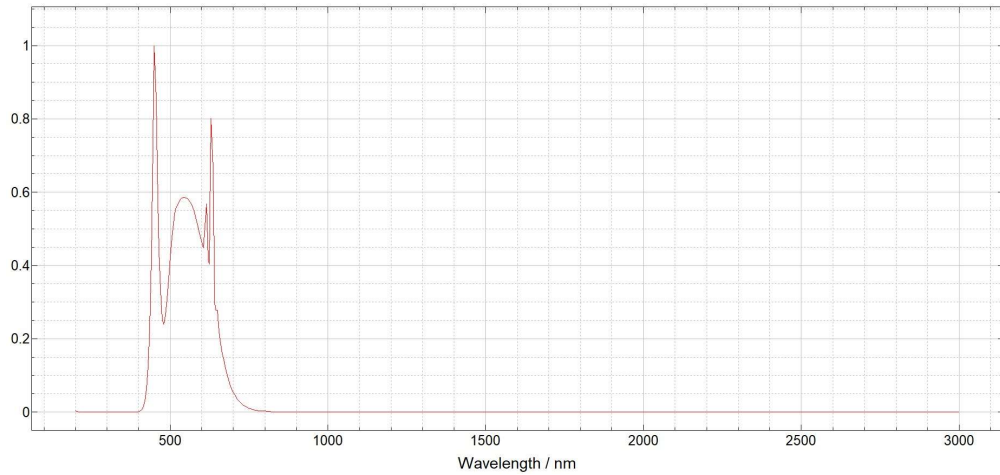
PART NUMBER	NOMINAL CCT (K)	MINIMUM CRI	TYPICAL FLUX (lm)	LES (mm)	TYPICAL FLUX DENSITY (lm/mm ²)	TEST CURRENT (mA)	MAXIMUM CURRENT (mA)	MAXIMUM VOLTAGE (V)
L2C6-27902L02A0600	2700	90	843	6.3	27,1	180	450	40
L2C6-30902L02A0600	3000	90	892	6.3	28,6	180	450	40
L2C6-35902L02A0600	3500	90	932	6.3	29,9	180	450	40
L2C6-40902L02A0600	4000	90	960	6.3	30,8	180	450	40
L2C6-50902L02A0600	5000	90	963	6.3	30,9	180	450	40
L2C6-27902L02A0900	2700	90	883	9.8	11,7	180	450	40
L2C6-30902L02A0900	3000	90	913	9.8	12,1	180	450	40
L2C6-35902L02A0900	3500	90	951	9.8	12,6	180	450	40
L2C6-40902L02A0900	4000	90	979	9.8	13,0	180	450	40
L2C6-50902L02A0900	5000	90	982	9.8	13,0	180	450	40
L2C6-27902L04A0900	2700	90	1836	9.8	24,3	360	900	40
L2C6-30902L04A0900	3000	90	1889	9.8	25,1	360	900	40
L2C6-35902L04A0900	3500	90	1968	9.8	26,1	360	900	40
L2C6-40902L04A0900	4000	90	2012	9.8	26,7	360	900	40

L2C6-50902L04A0900	5000	90	2018	9.8	26,8	360	900	40
L2C6-27902L06A1300	2700	90	2697	13.0	20,3	540	1350	40
L2C6-30902L06A1300	3000	90	2809	13.0	21,2	540	1350	40
L2C6-35902L06A1300	3500	90	2927	13.0	22,1	540	1350	40
L2C6-40902L06A1300	4000	90	3019	13.0	22,8	540	1350	40
L2C6-50902L06A1300	5000	90	3031	13.0	22,8	540	1350	40
L2C6-27902L08A1500	2700	90	3578	14.5	21,7	720	1800	40
L2C6-30902L08A1500	3000	90	3706	14.5	22,5	720	1800	40
L2C6-35902L08A1500	3500	90	3861	14.5	23,4	720	1800	40
L2C6-40902L08A1500	4000	90	4002	14.5	24,2	720	1800	40
L2C6-50902L08A1500	5000	90	4014	14.5	24,3	720	1800	40
L2C6-27902L10A1500	2700	90	4445	14.5	26,9	900	2250	40
L2C6-30902L10A1500	3000	90	4630	14.5	28,1	900	2250	40
L2C6-35902L10A1500	3500	90	4757	14.5	28,8	900	2250	40
L2C6-40902L10A1500	4000	90	4944	14.5	30,0	900	2250	40
L2C6-50902L10A1500	5000	90	4959	14.5	30,0	900	2250	40
L2C6-27902L11A2200	2700	90	4913	22.0	12,9	990	2475	40
L2C6-30902L11A2200	3000	90	5141	22.0	13,5	990	2475	40
L2C6-35902L11A2200	3500	90	5368	22.0	14,1	990	2475	40
L2C6-40902L11A2200	4000	90	5499	22.0	14,5	990	2475	40
L2C6-50902L11A2200	5000	90	5513	22.0	14,5	990	2475	40
L2C6-27902L13A2200	2700	90	5782	22.0	15,2	1170	2925	40
L2C6-30902L13A2200	3000	90	6076	22.0	16,0	1170	2925	40
L2C6-35902L13A2200	3500	90	6319	22.0	16,6	1170	2925	40
L2C6-40902L13A2200	4000	90	6470	22.0	17,0	1170	2925	40
L2C6-50902L13A2200	5000	90	6489	22.0	17,1	1170	2925	40
L2C6-27902L16A2200	2700	90	7156	22.0	18,8	1440	3600	40
L2C6-30902L16A2200	3000	90	7441	22.0	19,6	1440	3600	40
L2C6-35902L16A2200	3500	90	7813	22.0	20,6	1440	3600	40

L2C6-40902L16A2200	4000	90	7924	22.0	20,9	1440	3600	40
L2C6-50902L16A2200	5000	90	7946	22.0	20,9	1440	3600	40
L2C6-30902L08A15X0	3000	90	3765	14.5	22,8	720	1800	40
L2C6-30902L10A15X0	3000	90	4682	14.5	28,4	900	2250	40
L2C6-30902L11A22X0	3000	90	5174	22.0	13,6	990	2475	40

Model No	Driver Current (mA)	2700K	3000K	3500K	4000K	5000K
L2C6-AABBCL02F06HH	450	RG2	RG2	RG2	RG2	RG2
	180	RG1	RG1	RG2	RG2	RG2
	168	RG1	RG1	RG1	RG1	RG1
L2C6-AABBCL02F09HH	450	RG1	RG1	RG1	RG2	RG2
	180	RG1	RG1	RG1	RG1	RG1
L2C6-AABBCL04FGGHH	900	RG2	RG2	RG2	RG2	RG2
	360	RG1	RG1	RG1	RG1	RG1
L2C6-AABBCL06FGGHH	1350	RG2	RG2	RG2	RG2	RG2
	540	RG1	RG1	RG1	RG1	RG1
L2C6-AABBCL08FGGHH	1800	RG2	RG2	RG2	RG2	RG2
	720	RG1	RG1	RG1	RG1	RG1
L2C6-AABBCL10FGGHH	2250	RG2	RG2	RG2	RG2	RG2
	900	RG1	RG1	RG1	RG2	RG2
L2C6-AABBCL11FGGHH	2475	RG2	RG2	RG2	RG2	RG2
	990	RG1	RG1	RG1	RG1	RG1
L2C6-AABBCL13FGGHH	2925	RG2	RG2	RG2	RG2	RG2
	1170	RG1	RG1	RG1	RG1	RG1
L2C6-AABBCL16FGGHH	3600	RG2	RG2	RG2	RG2	RG2
	1440	RG1	RG1	RG1	RG1	RG1

Appendix 3: Relative Spectrum Of Tested Sample(s)



L2C6-50902L02A0600

Appendix 4: Table 6.1 Based On IEC 62471:2006

DUT: L2C6-50902L02A0600, Evaluation Distance: 200mm, Test current: 450mA, Angular subtense of the apparent source α : 75 mrad

IEC 62471									
Clause	Requirement + Test				Result – Remark				Verdict
Table 6.1	Emission limits for risk groups of continuous wave lamps								
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	1,54E+03	10000	2,43E+04	4000000	3,00E+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	3,01E+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	0,15	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: L2C6-50902L02A0600, Evaluation Distance: 200mm, Test current: 338mA, Angular subtense of the apparent source α : 75 mrad

IEC 62471									
Clause	Requirement + Test				Result – Remark				Verdict
Table 6.1	Emission limits for risk groups of continuous wave lamps								
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	1,21E+03	10000	1,93E+04	4000000	2,04E+04
Blue light, small source	$B(\lambda)$	E_B	$W \cdot m^{-2}$	1,0*	--	1,0		400	
Retinal thermal	$R(\lambda)$	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	$28000/\alpha$	2,40E+05	$28000/\alpha$		$71000/\alpha$	
Retinal thermal, weak visual stimulus**	$R(\lambda)$	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	$6000/\alpha$	--	$6000/\alpha$		$6000/\alpha$	
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	0,13	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: L2C6-50902L02A0600, Evaluation Distance: 200mm, Test current: 226mA, Angular subtense of the apparent source α : 75 mrad

IEC 62471									
Clause	Requirement + Test				Result – Remark				Verdict
Table 6.1	Emission limits for risk groups of continuous wave lamps								
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	8,50E+02	10000	1,34E+04	4000000	1,50E+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	1,68E+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	0,12	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: L2C6-50902L02A0600, Evaluation Distance: 200mm, Test current: 114mA, Angular subtense of the apparent source α : 75 mrad

IEC 62471									
Clause	Requirement + Test				Result – Remark				Verdict
Table 6.1	Emission limits for risk groups of continuous wave lamps								
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	4,13E+02	10000	6,52E+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	8,20E+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	0,10	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: L2C6-50902L02A0600, Evaluation Distance: 200mm, Test current: 450mA, Angular subtense of the apparent source α : 75 mrad

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)								
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	1,54E+03	10000	2,43E+04	4000000	3,00E+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	3,01E+05	28000/ α		71000/ α	
Retinal thermal, weak visual stimulus**	$R(\lambda)$	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	545000 0,0017 ≤ α ≤ 0,011	--				
				6000/ α 0,011 ≤ α ≤ 0,1	--				
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	0,15	570		3200	
<p>* 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 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: L2C6-50902L02A0600, Evaluation Distance: 200mm, Test current: 338mA, Angular subtense of the apparent source α : 75 mrad

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)								
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	1,21E+03	10000	1,93E+04	4000000	2,04E+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	2,40E+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	0,13	570		3200	
<p>* 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 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: L2C6-50902L02A0600, Evaluation Distance: 200mm, Test current: 226mA, Angular subtense of the apparent source α : 75 mrad

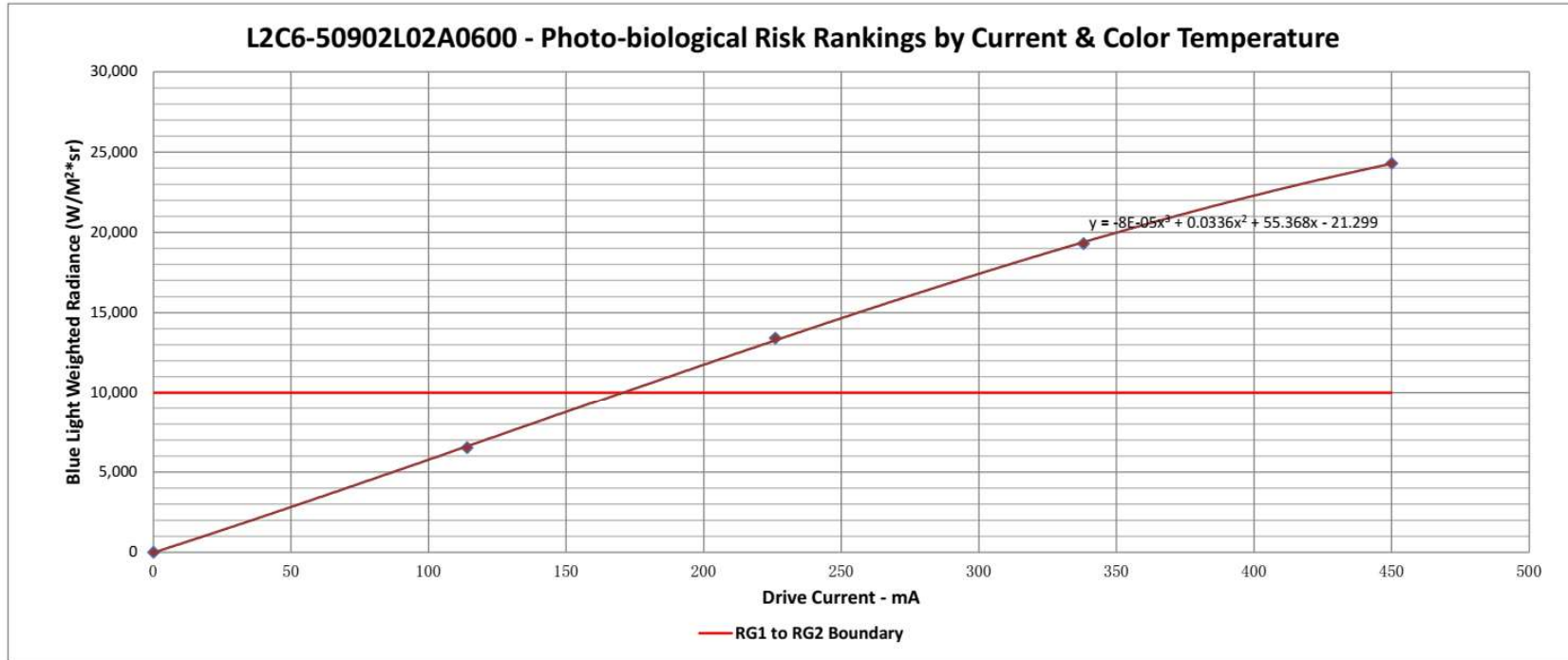
EN 62471									
Clause	Requirement + Test			Result – Remark				Verdict	
Table 6.1	Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC)								
Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	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	8,50E+02	10000	1,34E+04	4000000	1,50E+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	1,68E+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	0,12	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: L2C6-50902L02A0600, Evaluation Distance: 200mm, Test current: 114mA, Angular subtense of the apparent source α : 75 mrad

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)								
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	4,13E+02	10000	6,52E+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	8,20E+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	0,10	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.



	Product ID:	Measured CCT:	Drive Currents (mA)					Regression Formula:	Fit to RG2 Line:	Current @ RG-1 to RG-2 Boundary, mA:
			0	114	226	338	450			
	L2C6-50902L02A0600	5333K	0	6520	13400	19300	24300	$-8E-05x^3 + 0.0336x^2 + 55.368x - 21.29$	9999	170.50

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