




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	6064591.50P
Date of issue.....	2019-10-29
Total number of pages	47
Name of Testing Laboratory preparing the Report.....	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
Applicant's name.....	Lumileds Malaysia Sdn. Bhd
Address	No. 3 , Lintang Bayan Lepas 8, Phase 4, Bayan Lepas Industrial Park, 11900 Penang, Malaysia
Test specification:	
Standard	IEC TR 62778:2014 (Second Edition)
Test procedure	CB Scheme
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
Copyright © 2016 IEC System of Conformity Assessment Schemes for Electrotechnical Equipment and Components (IECEE System). All rights reserved.	
This publication may be reproduced in whole or in part for non-commercial purposes as long as the IECEE is acknowledged as copyright owner and source of the material. IECEE takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.	
If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.	
This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.	
General disclaimer:	
The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report. The purpose of this report is only for export activities.	

Test item description..... :	LED module	
Trade Mark..... :	LUMILEDS	
Manufacturer..... :	Lumileds Malaysia Sdn. Bhd. No. 3 , Lintang Bayan Lepas 8, Phase 4, Bayan Lepas Industrial Park, 11900 Penang, Malaysia	
Model/Type reference..... :	L2C5 series Detailed lists refer to Appendix 2: Model List	
Ratings..... :	Voltage: 41,5 Vdc, current: 600-3200 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, Jing'an 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 
<input type="checkbox"/>	Testing procedure: CTF Stage 1:	
Testing location/ address.....:		
Tested by (name, function, signature).....:		
Approved by (name, function, signature).....:		
<input type="checkbox"/>	Testing procedure: CTF Stage 2:	
Testing location/ address.....:		
Tested by (name + signature).....:		
Witnessed by (name, function, signature)		
Approved by (name, function, signature).....:		
<input type="checkbox"/>	Testing procedure: CTF Stage 3:	
<input type="checkbox"/>	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)		

List of Attachments (including a total number of pages in each attachment): <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) 	
Summary of testing:	
Tests performed (name of test and test clause): <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 L2C5-65701208F1500 Has been tested according to the IEC 62471(first edition, 2006-07) at 200mm and been classified as RG 2 Have been tested according to the EN 62471:2008 at 200mm and been classified as RG 2 Have been tested according to the IEC/TR 62778:2014 and been classified as RG 2 for blue light hazard.</p> <p>L2C5-50701208F1500 Has been tested according to the IEC 62471(first edition, 2006-07) at 200mm and been classified as RG 2 at 1800mA and RG1 at 763mA Have been tested according to the EN 62471:2008 at 200mm and been classified as RG 2 at 1800mA and RG1 at 763mA Have been tested according to the IEC/TR 62778:2014 and been classified as RG 2 at 1800mA and RG1 Unlimited at 763mA for blue light hazard.</p> <p>L2C5-40701208F1500 Has been tested according to the IEC 62471(first edition, 2006-07) at 200mm and been classified as RG 2 at 1800mA and RG1 at 1053mA Have been tested according to the EN 62471:2008 at 200mm and been classified as RG 2 at 1800mA and RG1 at 1053mA Have been tested according to the IEC/TR 62778:2014 and been classified as RG 2 at 1800mA and RG1 Unlimited at 1053mA for blue light hazard.</p>	Testing location: <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>L2C5-30701208F1500</p> <p>Has been tested according to the IEC 62471(first edition, 2006-07) at 200mm and been classified as RG 1.</p> <p>Have been tested according to the EN 62471:2008 at 200mm and been classified as RG 1.</p> <p>Have been tested according to the IEC/TR 62778:2014 and been classified as RG 1 Unlimited for blue light hazard.</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 fulfills the requirements</p>	

<p>Copy of marking plate:</p> <p>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.</p> <p>N/A</p>
--

Test item particulars	
Product evaluated	<input type="checkbox"/> LED package <input checked="" type="checkbox"/> LED module <input type="checkbox"/> Lamp <input type="checkbox"/> Luminaire
Rated voltage (V).....	41,5 Vdc
Rated current (mA).....	600-3200 mA
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..... : 2019-10-11	
Date (s) of performance of tests : 2019-10-11 to 2019-10-12	
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 IEC 62778:	
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 Malaysia Sdn. Bhd.
No. 3 , Lintang Bayan Lepas 8, Phase 4, Bayan
Lepas Industrial Park, 11900 Penang, Malaysia

General product information:

Full tests were performed on model L2C5-65701208F1500, L2C5-50701208F1500, L2C5-40701208F1500, L2C5-30701208F1500.

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

The sample of L2C5-65701208F1500 was tested at 200mm from the light source. The CCT of spectral irradiance was found at 6144 K.

The sample of L2C5-50701208F1500 was tested at 200mm from the light source. The CCT of spectral irradiance was found at 4573 K.

The sample of L2C5-40701208F1500 was tested at 200mm from the light source. The CCT of spectral irradiance was found at 3816 K.

The sample of L2C5-30701208F1500 was tested at 200mm from the light source. The CCT of spectral irradiance was found at 2976 K.

Amendment 1 report: (6039987.50P)

This report is issued to suspend the original test report 6039987.50P, dated on 2018-09-28, to include following changed and/or additions:

- Add new model: See New Model list

After review, no test was considered necessary.

Amendment 2 report: (6051921.50P)

This report is issued to suspend the original test report 6051921.50P, dated on 2019-06-18, to include following changed and/or additions:

- Add new model: L2C5-30701208F1500

Full tests were performed on model L2C5-30701208F1500.

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		P
	- 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 type="checkbox"/> LED package <input checked="" type="checkbox"/> LED module <input type="checkbox"/> Lamp <input type="checkbox"/> Luminaire		
	Model number		L2C5-65701208F1500		
	Test voltage (V)		--		—
	Test current (mA)		1800 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	6144	
x/y colour coordinates				0,3178 / 0,3485	
Blue light hazard radiance		L _B	W/(m ² •sr ¹)	2,02E+04	@11mrad
Blue light hazard irradiance		E _B	W/m ²	--	
Luminance		L	cd/m ²	2,32E+07	@11mrad
Illuminance		E	lx	7,05E+04	
Supplementary information:					
Per IEC/TR 62778:2014					
Eth _r = 1149 lx					
D _{min} = 1567 mm					

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE: Spectroradiometric measurement				
	Measurement performed on:	<input type="checkbox"/> LED package <input checked="" type="checkbox"/> LED module <input type="checkbox"/> Lamp <input type="checkbox"/> Luminaire			
	Model number	L2C5-50701208F1500			
	Test voltage (V)	--			—
	Test current (mA)	1800 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		Symbol	Units	Result	Remark
Correlated colour temperature		CCT	K	4573	
x/y colour coordinates				0,3599 / 0,3720	
Blue light hazard radiance		L _B	W/(m ² •sr ¹)	2,20E+04	@11mrad
Blue light hazard irradiance		E _B	W/m ²	--	
Luminance		L	cd/m ²	2,51E+07	@11mrad
Illuminance		E	lx	8,58E+04	
Supplementary information: Per IEC/TR 62778:2014 Ethr= 1141 lx Dmin= 1734 mm					

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE:Spectroradiometric measurement				
	Measurement performed on:	<input type="checkbox"/> LED package <input checked="" type="checkbox"/> LED module <input type="checkbox"/> Lamp <input type="checkbox"/> Luminaire			
	Model number	L2C5-50701208F1500			
	Test voltage (V)	--			—
	Test current (mA)	1350 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	4509	
x/y colour coordinates				0,3626 / 0,3756	
Blue light hazard radiance		L _B	W/(m ² •sr ¹)	1,66E+04	@11mrad
Blue light hazard irradiance		E _B	W/m ²	--	
Luminance		L	cd/m ²	1,95E+07	@11mrad
Illuminance		E	lx	6,50E+04	
Supplementary information: Per IEC/TR 62778:2014 Ethr= 1175 lx Dmin= 1488 mm					

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE:Spectroradiometric measurement				
	Measurement performed on:	<input type="checkbox"/> LED package <input checked="" type="checkbox"/> LED module <input type="checkbox"/> Lamp <input type="checkbox"/> Luminaire			
	Model number	L2C5-50701208F1500			
	Test voltage (V)	--			—
	Test current (mA)	900 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		Symbol	Units	Result	Remark
Correlated colour temperature		CCT	K	4677	
x/y colour coordinates				0,3560 / 0,3672	
Blue light hazard radiance		L _B	W/(m ² •sr ¹)	1,16E+04	@11mrad
Blue light hazard irradiance		E _B	W/m ²	--	
Luminance		L	cd/m ²	1,42E+07	@11mrad
Illuminance		E	lx	4,54E+04	
Supplementary information: Per IEC/TR 62778:2014 Ethr= 1224 lx Dmin= 1218 mm					

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE: Spectroradiometric measurement				
	Measurement performed on:	<input type="checkbox"/> LED package <input checked="" type="checkbox"/> LED module <input type="checkbox"/> Lamp <input type="checkbox"/> Luminaire			
	Model number	L2C5-50701208F1500			
	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	4561	
x/y colour coordinates				0,3609 / 0,3754	
Blue light hazard radiance		L _B	W/(m ² •sr ¹)	5,91E+03	@11mrad
Blue light hazard irradiance		E _B	W/m ²	--	
Luminance		L	cd/m ²	7,69E+06	@11mrad
Illuminance		E	lx	2,31E+04	
Supplementary information: N/A					

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE: Spectroradiometric measurement				
	Measurement performed on:	<input type="checkbox"/> LED package <input checked="" type="checkbox"/> LED module <input type="checkbox"/> Lamp <input type="checkbox"/> Luminaire			
	Model number	L2C5-40701208F1500			
	Test voltage (V)	--			—
	Test current (mA)	1800 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	3816	
x/y colour coordinates				0,3904 / 0,3869	
Blue light hazard radiance		L _B	W/(m ² •sr ¹)	1,55E+04	@11mrad
Blue light hazard irradiance		E _B	W/m ²	--	
Luminance		L	cd/m ²	2,67E+07	@11mrad
Illuminance		E	lx	9,17E+04	
Supplementary information: Per IEC/TR 62778:2014 Ethr= 1726 lx Dmin= 1457 mm					

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE: Spectroradiometric measurement				
	Measurement performed on:	<input type="checkbox"/> LED package <input checked="" type="checkbox"/> LED module <input type="checkbox"/> Lamp <input type="checkbox"/> Luminaire			
	Model number	L2C5-40701208F1500			
	Test voltage (V)	--			—
	Test current (mA)	1350 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	3799	
x/y colour coordinates				0,3920 / 0,3897	
Blue light hazard radiance		L _B	W/(m ² •sr ¹)	1,26E+04	@11mrad
Blue light hazard irradiance		E _B	W/m ²	--	
Luminance		L	cd/m ²	2,11E+07	@11mrad
Illuminance		E	lx	7,45E+04	
Supplementary information: Per IEC/TR 62778:2014 Ethr= 1675 lx Dmin= 1334 mm					

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE:Spectroradiometric measurement				
	Measurement performed on:	<input type="checkbox"/> LED package <input checked="" type="checkbox"/> LED module <input type="checkbox"/> Lamp <input type="checkbox"/> Luminaire			
	Model number	L2C5-40701208F1500			
	Test voltage (V)	--			—
	Test current (mA)	900 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	3705	
x/y colour coordinates				0,3980 / 0,3959	
Blue light hazard radiance		L _B	W/(m ² •sr ¹)	8,52E+03	@11mrad
Blue light hazard irradiance		E _B	W/m ²	--	
Luminance		L	cd/m ²	1,46E+07	@11mrad
Illuminance		E	lx	5,04E+04	
Supplementary information: N/A					

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE: Spectroradiometric measurement				
	Measurement performed on:	<input type="checkbox"/> LED package <input checked="" type="checkbox"/> LED module <input type="checkbox"/> Lamp <input type="checkbox"/> Luminaire			
	Model number	L2C5-40701208F1500			
	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	3668	
x/y colour coordinates				0,4016 / 0,4019	
Blue light hazard radiance		L _B	W/(m ² •sr ¹)	4,27E+03	@11mrad
Blue light hazard irradiance		E _B	W/m ²	--	
Luminance		L	cd/m ²	7,41E+06	@11mrad
Illuminance		E	lx	2,48E+04	
Supplementary information: N/A					

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE:Spectroradiometric measurement				
	Measurement performed on:	<input type="checkbox"/> LED package <input checked="" type="checkbox"/> LED module <input type="checkbox"/> Lamp <input type="checkbox"/> Luminaire			
	Model number	L2C5-30701208F1500			
	Test voltage (V)	--			—
	Test current (mA)	1800 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	2976	
x/y colour coordinates				0,4428 / 0,4131	
Blue light hazard radiance		L _B	W/(m ² •sr ¹)	5,87E+03	@11mrad
Blue light hazard irradiance		E _B	W/m ²	--	
Luminance		L	cd/m ²	2,20E+07	@11mrad
Illuminance		E	lx	6,70E+04	
Supplementary information: N/A					

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE: Angular light distribution	N/A

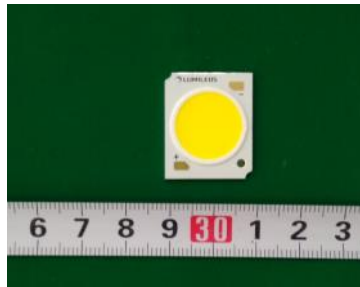
List of test equipment used:

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.

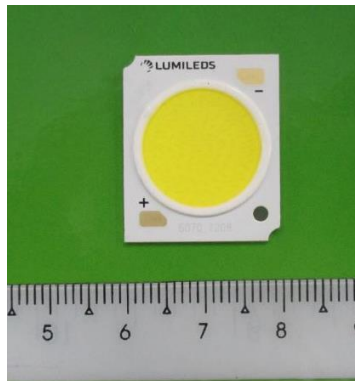
Note: This page may be removed when CTF stage 1 CTF stage 2 are not used. See also clause 4.8 in OD 2020 for more details.

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	2019/2/27	2020/2/26
7	Irradiance measurements	CL6 Spectral irradiance standard (SH 350)	300-3000nm	2019/2/27	2020/2/26
7	Irradiance measurements	CL7 Spectral irradiance standard (SH 351)	200-400nm	2019/2/27	2020/2/26
7	Irradiance measurements	Photometric detector head (SH 359)	380nm-800nm	2019/2/26	2020/2/25
7	Irradiance measurements Radiance measurements	Wattmeter (SH030)	500V,40A	2019/10/10	2020/10/10

Appendix 1: Photo Documentation



L2C5-65701208F1500



L2C5-50701208F1500



L2C5-40701208F1500



L2C5-30701208F1500

Overview

Appendix 2: Model List

L2C5-65701208F1500, L2C5-50701208F1500, L2C5-40701208F1500 and L2C5-30701208F1500 are part of Lumileds LUXEON CoB Core Range Gen 4 product line. The samples are with 6500K, 5000K, 4000K and 3000K CCT separately, and we got different hazard classifications for them at different driven current. The tested sample of L2C5-65701208F1500 is with the highest CCT in that product line, and the tested samples L2C5-50701208F1500, L2C5-40701208F1500 and L2C5-30701208F1500 are with 5000K, 4000K and 3000K CCT in the product line. The classifications are thus valid (worst case) within the LUXEON CoB Core Range Gen 4 product line with part number L2C5-AABBCCCCDEEFF, where AA represents nominal ANSI CCT bins can be equal to or lower than the tested CCT values (see TR IEC62778), and BB represents CRI ranging from 70 and above, and CCCC represents product configuration, and D represents options for product specification, and EE represents for light emitting surface (LES) size, and FF represents for options for product specification. See the appendix below for an explanation of the type designation.

L 2 C 5 - A A B B C C C C D E E F F

Where

A A: designates nominal CCT (e.g. 22=2200K, 27=2700K, 30=3000K, 32=3200K, 35=3500K, 40=4000K, 50=5000K, 57=5700K, 65=6500K or any nominal CCT less than 6500K)

B B: designates minimum CRI (e.g. 70=70CRI, 80=80CRI, 90=90CRI or any CRI greater than min 70)

C C C C: designates product configuration (e.g. 1202, 1203, 1204, 1205, 1208, 1211, 1216, 1812, 1321, 1825)

D: designates options for product specification (For Gen 4, D = F)

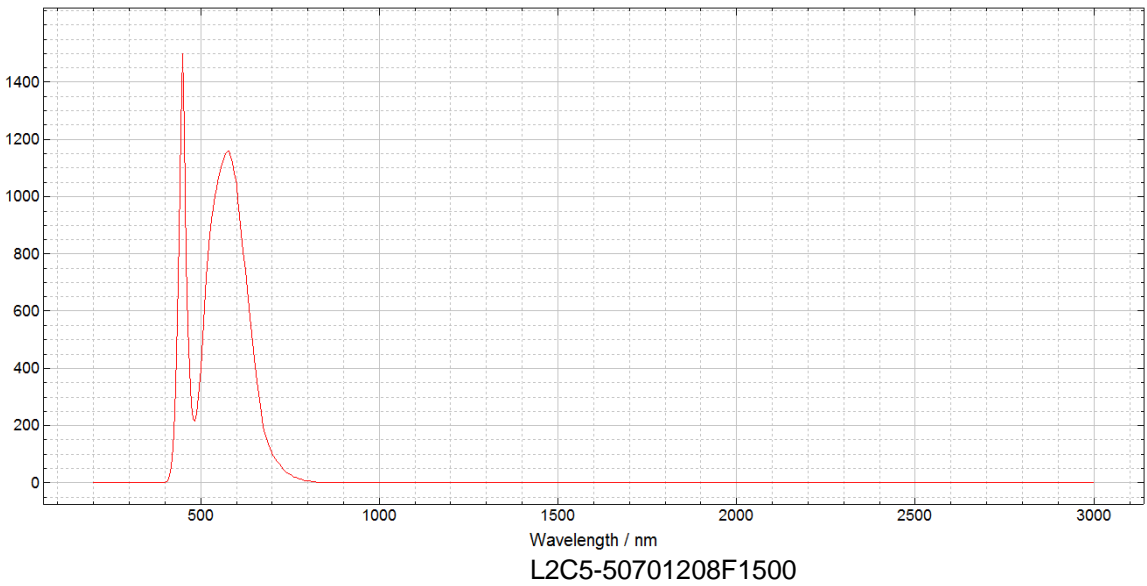
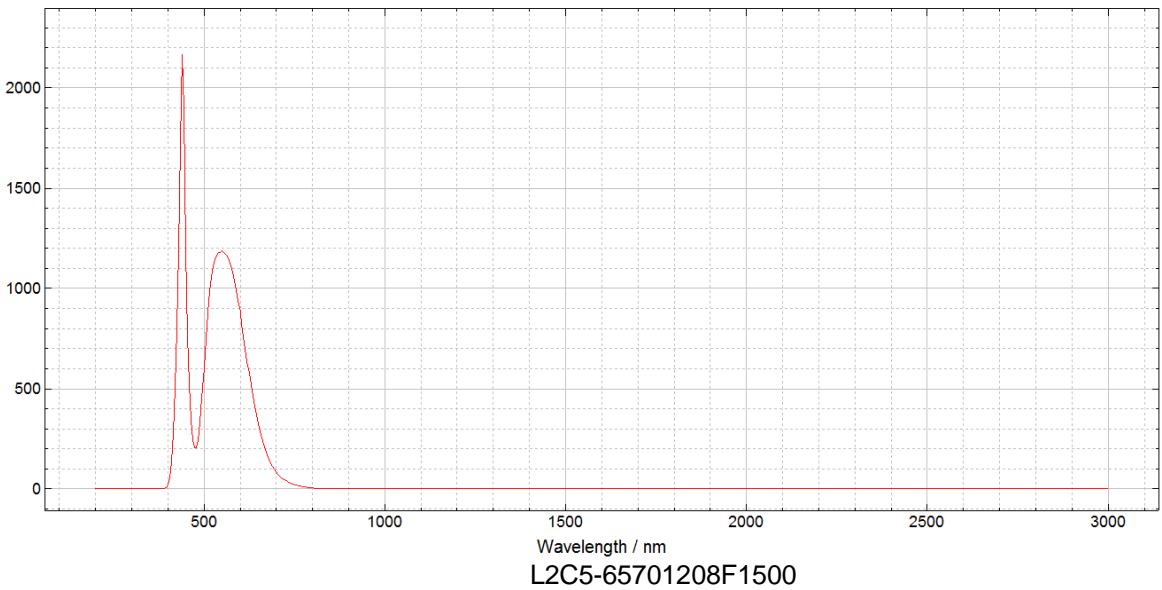
E E: designates light emitting surface (LES) size (06=6mm, 09=9mm, 13=13mm, 15=15mm, 19=19mm, 23=23mm, 29=29mm, 32=32mm)

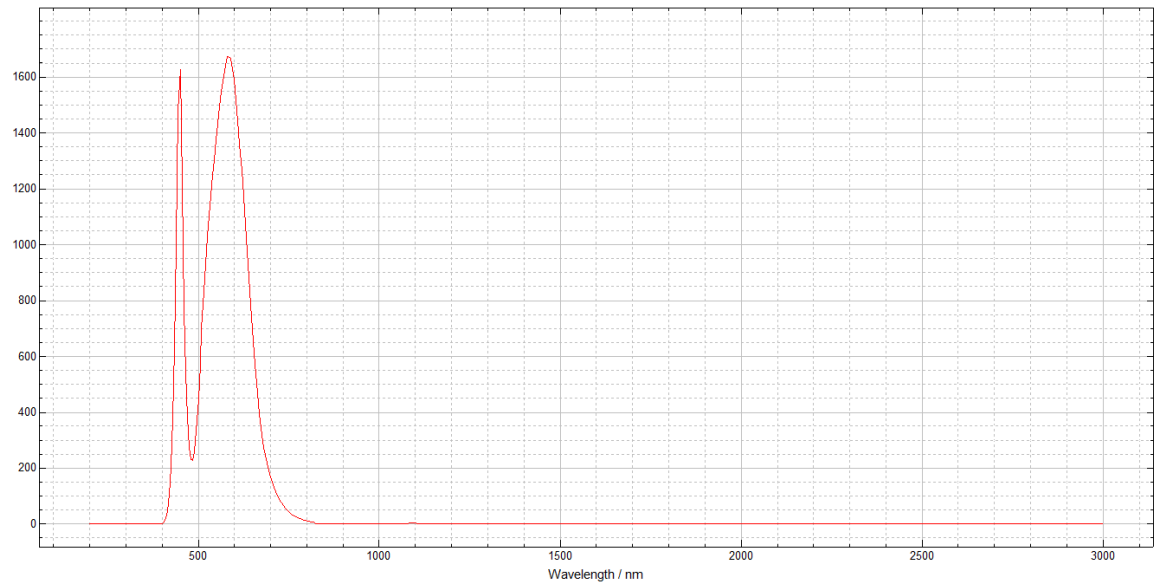
F F: designates options for product specification (00 = base part and can be alphanumeric for marketing use but share same base part configuration, e.g. B0, N0, X0, 0L, -L, etc)

Model No.	Drive current (mA)	CCT						
		2200/2700 K	3000K	3200/3500 K	4000K	5000K	5700K	6500K
L2C5-AABB1202DEEFF	400	RG1	RG1	RG2	RG2	RG2	RG2	RG2
	234	RG1	RG1	RG1	RG1	RG2	RG2	RG2
	170	RG1	RG1	RG1	RG1	RG1	RG2	RG2
L2C5-AABB1203DEEFF	600	RG1	RG1	RG2	RG2	RG2	RG2	RG2
	351	RG1	RG1	RG1	RG1	RG2	RG2	RG2
	254	RG1	RG1	RG1	RG1	RG1	RG2	RG2
L2C5-AABB1204DEEFF	900	RG1	RG1	RG2	RG2	RG2	RG2	RG2
	527	RG1	RG1	RG1	RG1	RG2	RG2	RG2
	382	RG1	RG1	RG1	RG1	RG1	RG2	RG2
L2C5-AABB1205DEEFF	1200	RG1	RG1	RG2	RG2	RG2	RG2	RG2
	702	RG1	RG1	RG1	RG1	RG2	RG2	RG2
	509	RG1	RG1	RG1	RG1	RG1	RG2	RG2
L2C5-AABB1208DEEFF	1800	RG1	RG1	RG2	RG2	RG2	RG2	RG2
	1053	RG1	RG1	RG1	RG1	RG2	RG2	RG2
	763	RG1	RG1	RG1	RG1	RG1	RG2	RG2
L2C5-AABB1211DEEFF	2400	RG1	RG1	RG2	RG2	RG2	RG2	RG2
	1404	RG1	RG1	RG1	RG1	RG2	RG2	RG2

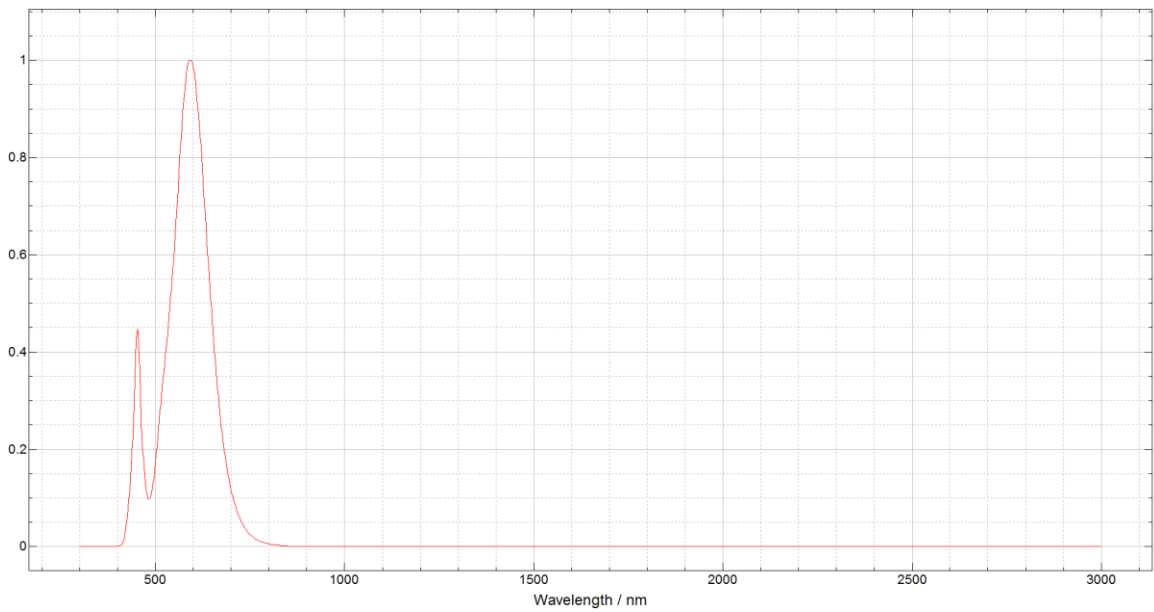
F	1017	RG1	RG1	RG1	RG1	RG1	RG2	RG2
L2C5- AABB1216DEEF F	3200	RG1	RG1	RG2	RG2	RG2	RG2	RG2
	1872	RG1	RG1	RG1	RG1	RG2	RG2	RG2
	1356	RG1	RG1	RG1	RG1	RG1	RG2	RG2
L2C5- AABB1812DEEF F	2400	RG1	RG1	RG2	RG2	RG2	RG2	RG2
	1404	RG1	RG1	RG1	RG1	RG2	RG2	RG2
	1017	RG1	RG1	RG1	RG1	RG1	RG2	RG2
L2C5- AABB1321DEEF F	4200	RG1	RG1	RG2	RG2	RG2	RG2	RG2
	2457	RG1	RG1	RG1	RG1	RG2	RG2	RG2
	1780	RG1	RG1	RG1	RG1	RG1	RG2	RG2
L2C5- AABB1825DEEF F	4500	RG1	RG1	RG2	RG2	RG2	RG2	RG2
	2633	RG1	RG1	RG1	RG1	RG2	RG2	RG2
	1908	RG1	RG1	RG1	RG1	RG1	RG2	RG2

Appendix 3: Relative Spectrum Of Tested Sample(s)





L2C5-40701208F1500



L2C5-30701208F1500

Appendix 4: Table 6.1 Based On IEC 62471:2006

DUT: L2C5-65701208F1500, Evaluation Distance: 200mm, 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								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	7,72E+03	10000	2,02E+04	4000000	3,63E+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	2,43E+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	0,29	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: L2C5-50701208F1500, Evaluation Distance: 200mm, Test current: 1800mA, 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								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	5,86E+03	10000	2,20E+04	4000000	3,17E+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	2,52E+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	0,51	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: L2C5-50701208F1500, Evaluation Distance: 200mm, Test current: 1350mA, 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								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	4,76E+03	10000	1,66E+04	4000000	3,04E+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/ α	2,03E+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	0,45	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: L2C5-50701208F1500, Evaluation Distance: 200mm, Test current: 900mA, 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									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	3,32E+03	10000	1,16E+04	4000000	2,13E+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	1,42E+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	0,32	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: L2C5-50701208F1500, 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									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	1,69E+03	10000	5,91E+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	7,24E+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	0,16	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: L2C5-40701208F1500, Evaluation Distance: 200mm, Test current: 1800mA, 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								P
Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	S _{UV} (λ)	E _s	W•m ⁻²	0,001	0,0000	0,003		0,03	
Near UV		E _{UVA}	W•m ⁻²	10	0,0000	33		100	
Blue light	B(λ)	L _B	W•m ⁻² •sr ⁻¹	100	5,41E+03	10000	1,55E+04	4000000	1,92E+04
Blue light, small source	B(λ)	E _B	W•m ⁻²	1,0*	--	1,0		400	
Retinal thermal	R(λ)	L _R	W•m ⁻² •sr ⁻¹	28000/α	2,05E+05	28000/α		71000/α	
Retinal thermal, weak visual stimulus**	R(λ)	L _{IR}	W•m ⁻² •sr ⁻¹	6000/α	--	6000/α		6000/α	
IR radiation, eye		E _{IR}	W•m ⁻²	100	0,83	570		3200	
* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.									
** Involves evaluation of non-GLS source									

DUT: L2C5-40701208F1500, Evaluation Distance: 200mm, Test current: 1350mA, 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								P
Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	S _{UV} (λ)	E _s	W•m ⁻²	0,001	0,0000	0,003		0,03	
Near UV		E _{UVA}	W•m ⁻²	10	0,0000	33		100	
Blue light	B(λ)	L _B	W•m ⁻² •sr ⁻¹	100	4,39E+03	10000	1,26E+04	4000000	1,71E+04
Blue light, small source	B(λ)	E _B	W•m ⁻²	1,0*	--	1,0		400	
Retinal thermal	R(λ)	L _R	W•m ⁻² •sr ⁻¹	28000/α	1,64E+05	28000/α		71000/α	
Retinal thermal, weak visual stimulus**	R(λ)	L _{IR}	W•m ⁻² •sr ⁻¹	6000/α	--	6000/α		6000/α	
IR radiation, eye		E _{IR}	W•m ⁻²	100	0,61	570		3200	
* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.									
** Involves evaluation of non-GLS source									

DUT: L2C5-40701208F1500, Evaluation Distance: 200mm, Test current: 900mA, 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									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	2,97E+03	10000	8,52E+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	1,12E+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	0,44	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: L2C5-40701208F1500, 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									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	1,48E+03	10000	4,27E+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	5,51E+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	0,22	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: L2C5-30701208F1500, Evaluation Distance: 200mm, Test current: 1800mA, 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									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	2,09E+03	10000	5,87E+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	1,10E+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	0,55	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: L2C5-65701208F1500, Evaluation Distance: 200mm, 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)								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	7,72E+03	10000	2,02E+04	4000000	3,63E+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	2,43E+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	0,29	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: L2C5-50701208F1500, Evaluation Distance: 200mm, Test current: 1800mA, 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)								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	5,86E+03	10000	2,20E+04	4000000	3,17E+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	2,52E+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	0,51	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: L2C5-50701208F1500, Evaluation Distance: 200mm, Test current: 1350mA, 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)								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	4,76E+03	10000	1,66E+04	4000000	3,04E+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	2,03E+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	0,45	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: L2C5-50701208F1500, Evaluation Distance: 200mm, Test current: 900mA, 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)								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	3,32E+03	10000	1,16E+04	4000000	2,13E+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	1,42E+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	0,32	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: L2C5-50701208F1500, 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)								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	1,69E+03	10000	5,91E+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	7,24E+04	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	0,16	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

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.

DUT: L2C5-40701208F1500, Evaluation Distance: 200mm, Test current: 1800mA, 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)								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	5,41E+03	10000	1,55E+04	4000000	1,92E+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	2,05E+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	0,83	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: L2C5-40701208F1500, Evaluation Distance: 200mm, Test current: 1350mA, 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)								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	4,39E+03	10000	1,26E+04	4000000	1,71E+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	1,64E+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	0,61	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: L2C5-40701208F1500, Evaluation Distance: 200mm, Test current: 900mA, 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)								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	2,97E+03	10000	8,52E+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	1,12E+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	0,44	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: L2C5-40701208F1500, 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)								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	1,48E+03	10000	4,27E+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	5,51E+04	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	0,22	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

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.

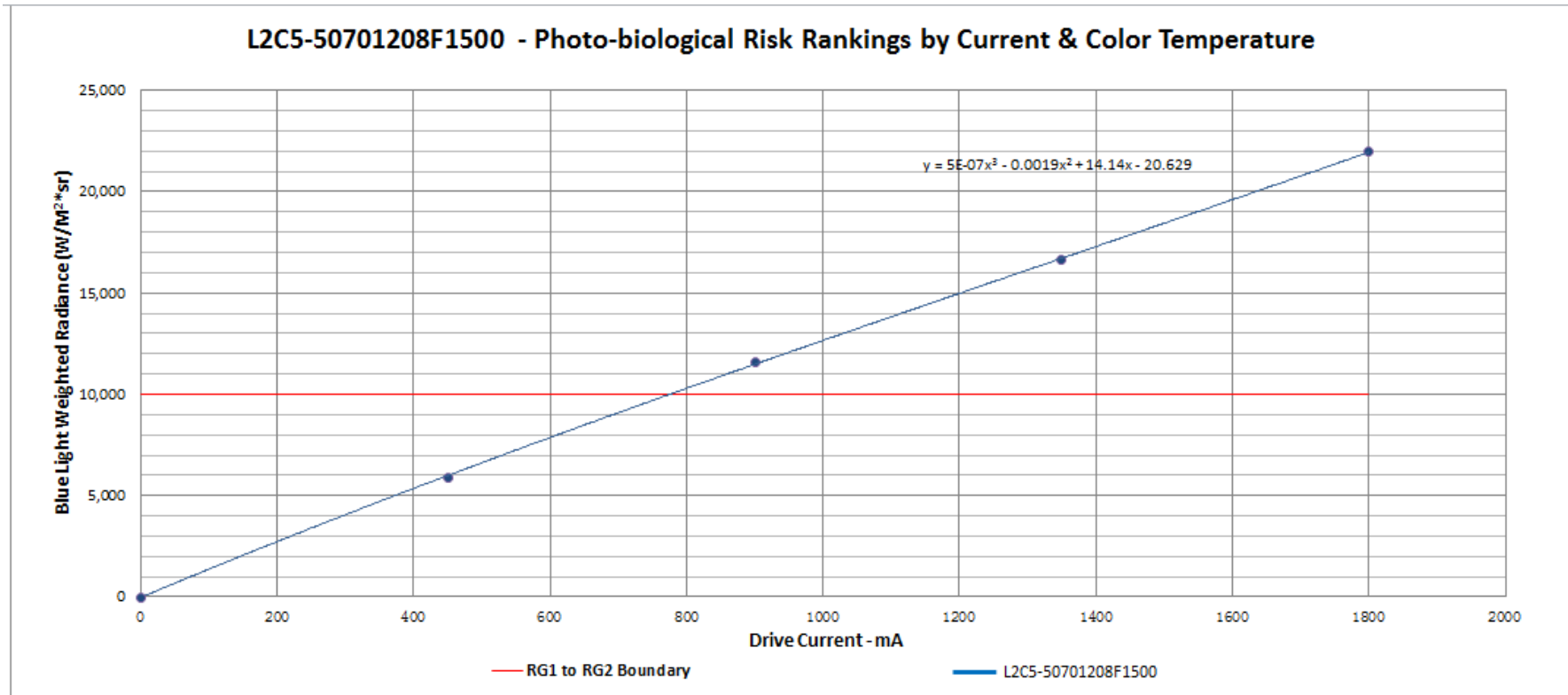
DUT: L2C5-30701208F1500, Evaluation Distance: 200mm, Test current: 1800mA, Angular subtense of the apparent source α : 75 mrad

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)									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	2,09E+03	10000	5,87E+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	1,10E+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	0,55	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	450	900	1350	1800			
L2C5-50701208F1500	4573 K	0	5910	11606	16630	21968	$y = 5E-07x^3 - 0.0019x^2 + 14.14x - 20.629$	10000	763

