





<p>TEST REPORT IEC TR 62778 Application of IEC 62471 for the assessment of blue light hazard to light sources and luminaires</p>	
Report Number.....	: 6001634.50P
Date of issue	: 2017-10-09
Total number of pages	: 23
<p>Name of Testing Laboratory preparing the Report : DEKRA Testing and Certification (Shanghai) Ltd. 3/F, #250, Jiangchangsan Road building 16 Headquarter Economy Park Shibe Hi-Tech Park, Zhabei District, Shanghai, P.R.C 200436</p>	
<p>Applicant's name : Lumileds Malaysia Sdn. Bhd Address..... : No. 3 , Lintang Bayan Lepas 8, Phase 4, Bayan Lepas Industrial Park, 11900 Penang, Malaysia</p>	
<p>Test specification: Standard : IEC TR 62778:2014 (Second Edition) Test procedure : Type Test Non-standard test method : N/A</p>	
<p>Test Report Form No. : IEC62778A Test Report Form(s) Originator : TÜV SÜD Product Service GmbH Master TRF : Dated 2016-02</p>	
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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 (See details in Appendix 2 model list)	
Ratings	Max. 41.5Vdc; Max 1800mA	
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) :	Yuelie Wu 
	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)		

<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 	
<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 L2C5-65701208E1500 Have 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>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 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 type="checkbox"/> LED package <input checked="" type="checkbox"/> LED module <input type="checkbox"/> Lamp <input type="checkbox"/> Luminaire	
Rated voltage (V): Max. 41.5Vdc	
Rated current (mA): Max. 1800mA	
Rated CCT (K): 2200K/2700K/3000K/3500K/4000K/5000K/5700K/ 6500K	
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: 2017-01-03	
Date (s) of performance of tests: 2017-01-03 to 2017-01-12	
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 60385-02:	
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:

L2C5-65701208E1500, with ANSI bin 6500K, is part of the LUXEON CoB product family. The sample measured, L2C5-65701208E1500, with the highest CCT, has the highest typical flux density (lumens per mm² of light emitting surface (LES) area) and highest typical device luminance level within the listed LUXEON CoB product family. The present classification is thus valid (worst case) for all LUXEON CoB L2C5-AABB1202E09FF, L2C5-AABB1203E09FF, L2C5-AABB1204E13FF, L2C5-AABB1205E13FF, L2C5-AABB1208E15FF, L2C5-AABB1211E19FF, L2C5-AABB1216E23FF, L2C5-AABB1612E23FF, L2C5- AABB 1812G23FF, L2C5- AABB 1321E29FF, L2C5- AABB 1825E32FF from ANSI bins equal to 6500K or lower CCT (see TR IEC62778). See the appendix below for an explanation of the type designation.

Full tests were performed on model L2C5-65701208E1500.

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

The sample of L2C5-65701208E1500 was tested at 200mm from the light source. CCT of spectral irradiance was found at 7478 K.

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 type="checkbox"/> LED package <input checked="" type="checkbox"/> LED module <input type="checkbox"/> Lamp <input type="checkbox"/> Luminaire		
Model number		L2C5-65701208E1500		
Test voltage (V)		41,5Vdc		—
Test current (mA)		1800mA		—
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	7478	
x/y colour coordinates			0,3003/0,3115	
Blue light hazard radiance	L _B	W/(m ² •sr ¹)	2,59E+04	@11mrad
Blue light hazard irradiance	E _B	W/m ²	--	
Luminance	L	cd/m ²	2,15E+07	@11mrad
Illuminance	E	lx	6,43E+04	
Supplementary information: Per IEC/TR 62778:2014 E _{thr} = 830 lx D _{min} = 1761 mm				

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

Appendix 2: Model List

L2C5-65701208E1500, with ANSI bin 6500K, is part of the LUXEON CoB product family. The sample measured, L2C5-65701208E1500, with the highest CCT, has the highest typical flux density (lumens per mm² of light emitting surface (LES) area) and highest typical device luminance level within the listed LUXEON CoB product family. The present classification is thus valid (worst case) for all LUXEON CoB L2C5-AABB1202E09FF, L2C5-AABB1203E09FF, L2C5-AABB1204E13FF, L2C5-AABB1205E13FF, L2C5-AABB1208E15FF, L2C5-AABB1211E19FF, L2C5-AABB1216E23FF, L2C5-AABB1612E23FF, L2C5-AABB1812G23FF, L2C5-AABB1321E29FF, L2C5-AABB1825E32FF from ANSI bins equal to 6500K or lower CCT (see TR IEC62778). See the appendix below for an explanation of the type designation.

L 2 C 5 – A A B B C C C C E D D F F

Where:

- A A Nominal CCT (22=2200K, 27=2700K, 30=3000K, 35=3500K, 40=4000K, 50=5000K, 57=5700K, 65=6500K)
 B B Minimum CRI (70=70CRI, 80=80CRI, 90=90CRI)
 C C C C Product configuration (1202, 1203, 1204, 1205, 1208, 1211, 1216, 1612, 1812, 1321, 1825)
 D D Light emitting surface (LES) size (09=9mm, 13=13mm, 15=15mm, 19=19mm, 23=23mm, 29=29mm)
 E Forward Voltage (E=36V, G=54V)
 F F Options for product specification (00, PL, 0L, M0)

Part number	CRI	CCT (K)	Typical Flux (lm)	LES (mm)	Typ Flux Density (lm/mm ²)	Max Voltage (V)	Max Current (mA)
L2C5-50701208E1500	> 70	5000	4900	15	27.7	41.5	1800
L2C5-40701208E1500	> 70	4000	4830	15	27.3	41.5	1800
L2C5-57701208E1500	> 70	5700	4760	15	26.9	41.5	1800
L2C5-65701208E1500	> 70	6500	4637	15	26.2	41.5	1800
L2C5-30701208E1500	> 70	3000	4610	15	26.1	41.5	1800
L2C5-35701208E1500	> 70	3500	4610	15	26.1	41.5	1800
L2C5-40801208E1500	> 80	4000	4542	15	25.7	41.5	1800
L2C5-40801208E150L	> 80	4000	4542	15	25.7	41.5	1800
L2C5-50801208E1500	> 80	5000	4542	15	25.7	41.5	1800
L2C5-50801208E150L	> 80	5000	4542	15	25.7	41.5	1800
L2C5-57801208E1500	> 80	5700	4529	15	25.6	41.5	1800
L2C5-57801208E150L	> 80	5700	4529	15	25.6	41.5	1800
L2C5-40701203E0900	> 70	4000	1629	9	25.6	41.5	600
L2C5-50701203E0900	> 70	5000	1629	9	25.6	41.5	600
L2C5-35801208E1500	> 80	3500	4455	15	25.2	41.5	1800
L2C5-35801208E150L	> 80	3500	4455	15	25.2	41.5	1800
L2C5-57701203E0900	> 70	5700	1587	9	24.9	41.5	600
L2C5-30801208E1500	> 80	3000	4368	15	24.7	41.5	1800
L2C5-30801208E150L	> 80	3000	4368	15	24.7	41.5	1800
L2C5-40701205E1300	> 70	4000	3258	13	24.5	41.5	1200
L2C5-50701205E1300	> 70	5000	3258	13	24.5	41.5	1200
L2C5-65701203E0900	> 70	6500	1546	9	24.3	41.5	600
L2C5-30701203E0900	> 70	3000	1532	9	24.1	41.5	600

L2C5-35701203E0900	> 70	3500	1532	9	24.1	41.5	600
L2C5-30801208E15PL	> 80	3000	4245	15	24.0	41.5	1800
L2C5-57701205E1300	> 70	5700	3173	13	23.9	41.5	1200
L2C5-40801203E0900	> 80	4000	1514	9	23.8	41.5	600
L2C5-40801203E090L	> 80	4000	1514	9	23.8	41.5	600
L2C5-50801203E0900	> 80	5000	1514	9	23.8	41.5	600
L2C5-57801203E0900	> 80	5700	1510	9	23.7	41.5	600
L2C5-27801208E1500	> 80	2700	4193	15	23.7	41.5	1800
L2C5-40701211E1900	> 70	4000	6726	19	23.7	41.5	2400
L2C5-40701211E190L	> 70	4000	6726	19	23.7	41.5	2400
L2C5-50701211E1900	> 70	5000	6726	19	23.7	41.5	2400
L2C5-65701205E1300	> 70	6500	3091	13	23.3	41.5	1200
L2C5-30701205E1300	> 70	3000	3072	13	23.1	41.5	1200
L2C5-35701205E1300	> 70	3500	3072	13	23.1	41.5	1200
L2C5-57701211E1900	> 70	5700	6536	19	23.1	41.5	2400
L2C5-35801203E0900	> 80	3500	1461	9	23.0	41.5	600
L2C5-35801203E090L	> 80	3500	1461	9	23.0	41.5	600
L2C5-40801205E1300	> 80	4000	3028	13	22.8	41.5	1200
L2C5-40801205E130L	> 80	4000	3028	13	22.8	41.5	1200
L2C5-50801205E1300	> 80	5000	3028	13	22.8	41.5	1200
L2C5-57801205E1300	> 80	5700	3019	13	22.7	41.5	1200
L2C5-30801203E0900	> 80	3000	1432	9	22.5	41.5	600
L2C5-30801203E090L	> 80	3000	1432	9	22.5	41.5	600
L2C5-65701211E1900	> 70	6500	6368	19	22.5	41.5	2400
L2C5-35801205E1300	> 80	3500	2963	13	22.3	41.5	1200
L2C5-35801205E130L	> 80	3500	2963	13	22.3	41.5	1200
L2C5-30701211E1900	> 70	3000	6328	19	22.3	41.5	2400
L2C5-35701211E1900	> 70	3500	6328	19	22.3	41.5	2400
L2C5-30801203E09PL	> 80	3000	1415	9	22.2	41.5	600
L2C5-40901208E1500	> 90	4000	3902	15	22.1	41.5	1800
L2C5-40801211E1900	> 80	4000	6238	19	22.0	41.5	2400
L2C5-40801211E190L	> 80	4000	6238	19	22.0	41.5	2400
L2C5-50801211E1900	> 80	5000	6238	19	22.0	41.5	2400
L2C5-50801211E190L	> 80	5000	6238	19	22.0	41.5	2400
L2C5-27801203E0900	> 80	2700	1398	9	22.0	41.5	600
L2C5-57801211E1900	> 80	5700	6220	19	21.9	41.5	2400
L2C5-57801211E190L	> 80	5700	6220	19	21.9	41.5	2400
L2C5-30801205E1300	> 80	3000	2905	13	21.9	41.5	1200
L2C5-30801205E130L	> 80	3000	2905	13	21.9	41.5	1200
L2C5-35901208E1500	> 90	3500	3800	15	21.5	41.5	1800
L2C5-30801205E13PL	> 80	3000	2830	13	21.3	41.5	1200
L2C5-35801211E1900	> 80	3500	6038	19	21.3	41.5	2400
L2C5-35801211E190L	> 80	3500	6038	19	21.3	41.5	2400

L2C5-40701216E2300	> 70	4000	8751	23	21.1	41.5	3200
L2C5-40701216E230L	> 70	4000	8751	23	21.1	41.5	3200
L2C5-40701612E2300	> 70	4000	8751	23	21.1	55.5	2400
L2C5-50701216E2300	> 70	5000	8751	23	21.1	41.5	3200
L2C5-50701612E2300	> 70	5000	8751	23	21.1	55.5	2400
L2C5-27801205E1300	> 80	2700	2795	13	21.1	41.5	1200
L2C5-30801211E1900	> 80	3000	5920	19	20.9	41.5	2400
L2C5-30801211E190L	> 80	3000	5920	19	20.9	41.5	2400
L2C5-57701216E2300	> 70	5700	8567	23	20.6	41.5	3200
L2C5-57701612E2300	> 70	5700	8567	23	20.6	55.5	2400
L2C5-30801211E19PL	> 80	3000	5830	19	20.6	41.5	2400
L2C5-40901203E0900	> 90	4000	1301	9	20.5	41.5	600
L2C5-30901208E1500	> 90	3000	3610	15	20.4	41.5	1800
L2C5-30901208E150L	> 90	3000	3610	15	20.4	41.5	1800
L2C5-27801211E1900	> 80	2700	5758	19	20.3	41.5	2400
L2C5-22801208E1500	> 80	2200	3552	15	20.1	41.5	1800
L2C5-65701216E2300	> 70	6500	8347	23	20.1	41.5	3200
L2C5-65701612E2300	> 70	6500	8347	23	20.1	55.5	2400
L2C5-30701216E2300	> 70	3000	8294	23	20.0	41.5	3200
L2C5-30701612E2300	> 70	3000	8294	23	20.0	55.5	2400
L2C5-35701216E2300	> 70	3500	8294	23	20.0	41.5	3200
L2C5-35701612E2300	> 70	3500	8294	23	20.0	55.5	2400
L2C5-35901203E0900	> 90	3500	1267	9	19.9	41.5	600
L2C5-27901208E1500	> 90	2700	3483	15	19.7	41.5	1800
L2C5-27901208E150L	> 90	2700	3483	15	19.7	41.5	1800
L2C5-40801216E2300	> 80	4000	8176	23	19.7	41.5	3200
L2C5-40801216E230L	> 80	4000	8176	23	19.7	41.5	3200
L2C5-40801612E2300	> 80	4000	8176	23	19.7	55.5	2400
L2C5-50801216E2300	> 80	5000	8176	23	19.7	41.5	3200
L2C5-50801216E230L	> 80	5000	8176	23	19.7	41.5	3200
L2C5-50801612E2300	> 80	5000	8176	23	19.7	55.5	2400
L2C5-57801216E2300	> 80	5700	8151	23	19.6	41.5	3200
L2C5-57801216E230L	> 80	5700	8151	23	19.6	41.5	3200
L2C5-57801612E2300	> 80	5700	8151	23	19.6	55.5	2400
L2C5-40901205E1300	> 90	4000	2601	13	19.6	41.5	1200
L2C5-35901205E1300	> 90	3500	2533	13	19.1	41.5	1200
L2C5-35801216E2300	> 80	3500	7878	23	19.0	41.5	3200
L2C5-35801216E230L	> 80	3500	7878	23	19.0	41.5	3200
L2C5-35801612E2300	> 80	3500	7878	23	19.0	55.5	2400
L2C5-40701204E1300	> 70	4000	2509	13	18.9	41.5	900
L2C5-50701204E1300	> 70	5000	2509	13	18.9	41.5	900
L2C5-40901211E1900	> 90	4000	5358	19	18.9	41.5	2400
L2C5-30901203E0900	> 90	3000	1200	9	18.9	41.5	600

L2C5-30901203E090L	> 90	3000	1200	9	18.9	41.5	600
L2C5-22801203E0900	> 80	2200	1184	9	18.6	41.5	600
L2C5-30801216E2300	> 80	3000	7724	23	18.6	41.5	3200
L2C5-30801216E230L	> 80	3000	7724	23	18.6	41.5	3200
L2C5-30801612E2300	> 80	3000	7724	23	18.6	55.5	2400
L2C5-57701204E1300	> 70	5700	2443	13	18.4	41.5	900
L2C5-35901211E1900	> 90	3500	5218	19	18.4	41.5	2400
L2C5-30801216E23PL	> 80	3000	7641	23	18.4	41.5	3200
L2C5-27901203E0900	> 90	2700	1161	9	18.2	41.5	600
L2C5-27901203E090L	> 90	2700	1161	9	18.2	41.5	600
L2C5-30901205E1300	> 90	3000	2418	13	18.2	41.5	1200
L2C5-30901205E130L	> 90	3000	2418	13	18.2	41.5	1200
L2C5-27801216E2300	> 80	2700	7546	23	18.2	41.5	3200
L2C5-27801612E2300	> 80	2700	7546	23	18.2	55.5	2400
L2C5-65701204E1300	> 70	6500	2380	13	17.9	41.5	900
L2C5-22801205E1300	> 80	2200	2368	13	17.8	41.5	1200
L2C5-30701204E1300	> 70	3000	2360	13	17.8	41.5	900
L2C5-35701204E1300	> 70	3500	2360	13	17.8	41.5	900
L2C5-30901211E1900	> 90	3000	5005	19	17.7	41.5	2400
L2C5-30901211E190L	> 90	3000	5005	19	17.7	41.5	2400
L2C5-40801204E1300	> 80	4000	2332	13	17.6	41.5	900
L2C5-50801204E1300	> 80	5000	2332	13	17.6	41.5	900
L2C5-57801204E1300	> 80	5700	2325	13	17.5	41.5	900
L2C5-22901208E1500	> 90	2200	3095	15	17.5	41.5	1800
L2C5-27901205E1300	> 90	2700	2322	13	17.5	41.5	1200
L2C5-27901205E130L	> 90	2700	2322	13	17.5	41.5	1200
L2C5-22801211E1900	> 80	2200	4878	19	17.2	41.5	2400
L2C5-35801204E1300	> 80	3500	2244	13	16.9	41.5	900
L2C5-40901216E2300	> 90	4000	7023	23	16.9	41.5	3200
L2C5-40901612E2300	> 90	4000	7023	23	16.9	55.5	2400
L2C5-40701202E0900	> 70	4000	1075	9	16.9	41.5	400
L2C5-50701202E0900	> 70	5000	1075	9	16.9	41.5	400
L2C5-27901211E1900	> 90	2700	4783	19	16.9	41.5	2400
L2C5-27901211E190L	> 90	2700	4783	19	16.9	41.5	2400
L2C5-30801204E1300	> 80	3000	2200	13	16.6	41.5	900
L2C5-35901216E2300	> 90	3500	6839	23	16.5	41.5	3200
L2C5-35901612E2300	> 90	3500	6839	23	16.5	55.5	2400
L2C5-57701202E0900	> 70	5700	1047	9	16.5	41.5	400
L2C5-30801204E13PL	> 80	3000	2179	13	16.4	41.5	900
L2C5-22901203E0900	> 90	2200	1032	9	16.2	41.5	600
L2C5-27801204E1300	> 80	2700	2152	13	16.2	41.5	900
L2C5-30701202E0900	> 70	3000	1026	9	16.1	41.5	400
L2C5-35701202E0900	> 70	3500	1026	9	16.1	41.5	400

L2C5-30901203E09C0	> 90	3000	1006	9	15.8	41.5	600
L2C5-40801202E0900	> 80	4000	999	9	15.7	41.5	400
L2C5-50801202E0900	> 80	5000	999	9	15.7	41.5	400
L2C5-30901216E2300	> 90	3000	6518	23	15.7	41.5	3200
L2C5-30901216E230L	> 90	3000	6518	23	15.7	41.5	3200
L2C5-30901612E2300	> 90	3000	6518	23	15.7	55.5	2400
L2C5-35801202E0900	> 80	3500	992	9	15.6	41.5	400
L2C5-22901205E1300	> 90	2200	2063	13	15.5	41.5	1200
L2C5-22801216E2300	> 80	2200	6394	23	15.4	41.5	3200
L2C5-22801612E2300	> 80	2200	6394	23	15.4	55.5	2400
L2C5-30801202E0900	> 80	3000	973	9	15.3	41.5	400
L2C5-40901204E1300	> 90	4000	2003	13	15.1	41.5	900
L2C5-27901216E2300	> 90	2700	6269	23	15.1	41.5	3200
L2C5-27901216E230L	> 90	2700	6269	23	15.1	41.5	3200
L2C5-27901612E2300	> 90	2700	6269	23	15.1	55.5	2400
L2C5-35901204E1300	> 90	3500	1950	13	14.7	41.5	900
L2C5-22901211E1900	> 90	2200	4165	19	14.7	41.5	2400
L2C5-27801202E0900	> 80	2700	922	9	14.5	41.5	400
L2C5-30901204E1300	> 90	3000	1840	13	13.9	41.5	900
L2C5-22801204E1300	> 80	2200	1823	13	13.7	41.5	900
L2C5-40901202E0900	> 90	4000	858	9	13.5	41.5	400
L2C5-27901204E1300	> 90	2700	1788	13	13.5	41.5	900
L2C5-22901216E2300	> 90	2200	5570	23	13.4	41.5	3200
L2C5-22901612E2300	> 90	2200	5570	23	13.4	55.5	2400
L2C5-35901202E0900	> 90	3500	836	9	13.1	41.5	400
L2C5-30901202E0900	> 90	3000	810	9	12.7	41.5	400
L2C5-30HG1204E1300	> 90	3000	1660	13	12.5	41.5	900
L2C5-22801202E0900	> 80	2200	781	9	12.3	41.5	400
L2C5-27901202E0900	> 90	2700	766	9	12.0	41.5	400
L2C5-22901204E1300	> 90	2200	1589	13	12.0	41.5	900
L2C5-22901202E0900	> 90	2200	694	9	10.9	41.5	400
L2C5-40951203E09M0	> 95	4000	1175	9	18.5	41.5	600
L2C5-27951203E09M0	> 95	2700	1075	9	16.9	41.5	600
L2C5-30801812G2300	> 80	3000	8800	23	21.2	62.3	2100
L2C5-40801812G2300	> 80	4000	9300	23	22.4	62.3	2100
L2C5-50801812G2300	> 80	5000	9225	23	22.2	62.3	2100
L2C5-40701812G2300	> 70	4000	9947	23	23.9	62.3	2100
L2C5-50701812G2300	> 70	5000	9947	23	23.9	62.3	2100
L2C5-27801321E2900	>80	2700	11723	29	17.5	45.0	4200
L2C5-27901321E2900	>90	2700	9740	29	14.5	45.0	4200
L2C5-30701321E2900	>70	3000	12886	29	19.2	45.0	4200
L2C5-30801321E2900	>80	3000	12000	29	17.9	45.0	4200
L2C5-30901321E2900	>90	3000	10126	29	15.1	45.0	4200

L2C5-35801321E2900	>80	3500	12240	29	18.3	45.0	4200
L2C5-40701321E2900	>70	4000	13596	29	20.3	45.0	4200
L2C5-40801321E2900	>80	4000	12702	29	19.0	45.0	4200
L2C5-50701321E2900	>70	5000	13596	29	20.3	45.0	4200
L2C5-50801321E2900	>80	5000	12702	29	19.0	45.0	4200
L2C5-56901321E2900	>90	5600	10936	29	16.3	45.0	4200
L2C5-57701321E2900	>70	5700	13310	29	19.9	45.0	4200
L2C5-65701321E2900	>70	6500	13545	29	20.2	45.0	4200
L2C5-27801825G3200	>80	2700	17097	33	20.2	62.3	4500
L2C5-27901825G3200	>90	2700	14204	33	16.8	62.3	4500
L2C5-30701825G3200	>70	3000	18792	33	22.2	62.3	4500
L2C5-30801825G3200	>80	3000	17500	33	20.7	62.3	4500
L2C5-30901825G3200	>90	3000	14768	33	17.5	62.3	4500
L2C5-35801825G3200	>80	3500	17850	33	21.1	62.3	4500
L2C5-40701825G3200	>70	4000	19827	33	23.5	62.3	4500
L2C5-40801825G3200	>80	4000	18523	33	21.9	62.3	4500
L2C5-50701825G3200	>70	5000	19827	33	23.5	62.3	4500
L2C5-50801825G3200	>80	5000	18523	33	21.9	62.3	4500
L2C5-56901825G3200	>90	5600	15949	33	18.9	62.3	4500
L2C5-57701825G3200	>70	5700	19410	33	23.0	62.3	4500
L2C5-65701825G3200	>70	6500	19754	33	23.4	62.3	4500

L 2 C 5 – A A B B C C C C E D D F F

Where:

- A A Nominal CCT (27=2700K, 30=3000K, 33=3300K, 35=3500K, 40=4000K, 50=5000K)
 B B HG=High Gamut
 C C C C Product configuration (1202, 1203, 1204, 1205, 1208, 1211, 1216)
 D D Light emitting surface (LES) size (09=9mm, 13=13mm, 15=15mm, 19=19mm, 23=23mm)
 E Forward Voltage (E=36V, G=54V)
 F F Options for product specification (00=base part)

Part number	CRI	CCT (K)	Typical Flux (lm)	LES (mm)	Typ Flux Density (lm/mm ²)	Max Voltage (V)	Max Current (mA)
L2C5-50HG1208E1500	> 90	5000	3766	15	21.3	41.5	1800
L2C5-40HG1208E1500	> 90	4000	3626	15	20.5	41.5	1800
L2C5-33HG1208E1500	> 90	3300	3450	15	19.5	41.5	1800
L2C5-35HG1208E1500	> 90	3500	3450	15	19.5	41.5	1800
L2C5-50HG1203E0900	> 90	5000	1229	9	19.3	41.5	600
L2C5-50HG1205E1300	> 90	5000	2506	13	18.9	41.5	1200
L2C5-30HG1208E1500	> 90	3000	3300	15	18.7	41.5	1800
L2C5-40HG1203E0900	> 90	4000	1184	9	18.6	41.5	600
L2C5-40HG1205E1300	> 90	4000	2413	13	18.2	41.5	1200
L2C5-50HG1211E1900	> 90	5000	5153	19	18.2	41.5	2400
L2C5-35HG1203E0900	> 90	3500	1150	9	18.1	41.5	600
L2C5-33HG1203E0900	> 90	3300	1130	9	17.8	41.5	600
L2C5-40HG1211E1900	> 90	4000	4962	19	17.5	41.5	2400
L2C5-27HG1208E1500	> 90	2700	3083	15	17.4	41.5	1800
L2C5-35HG1205E1300	> 90	3500	2300	13	17.3	41.5	1200
L2C5-33HG1205E1300	> 90	3300	2260	13	17.0	41.5	1200
L2C5-30HG1203E0900	> 90	3000	1080	9	17.0	41.5	600
L2C5-35HG1211E1900	> 90	3500	4738	19	16.7	41.5	2400
L2C5-33HG1211E1900	> 90	3300	4656	19	16.4	41.5	2400
L2C5-30HG1205E1300	> 90	3000	2170	13	16.3	41.5	1200
L2C5-50HG1216E2300	> 90	5000	6766	23	16.3	41.5	3200
L2C5-27HG1203E0900	> 90	2700	1008	9	15.8	41.5	600
L2C5-30HG1211E1900	> 90	3000	4470	19	15.8	41.5	2400
L2C5-40HG1216E2300	> 90	4000	6515	23	15.7	41.5	3200
L2C5-27HG1205E1300	> 90	2700	2055	13	15.5	41.5	1200
L2C5-35HG1216E2300	> 90	3500	6210	23	14.9	41.5	3200
L2C5-27HG1211E1900	> 90	2700	4226	19	14.9	41.5	2400
L2C5-33HG1216E2300	> 90	3300	6102	23	14.7	41.5	3200
L2C5-50HG1204E1300	> 90	5000	1930	13	14.5	41.5	900
L2C5-30HG1216E2300	> 90	3000	5859	23	14.1	41.5	3200
L2C5-40HG1204E1300	> 90	4000	1840	13	13.9	41.5	900

L2C5-27HG1216E2300	> 90	2700	5549	23	13.4	41.5	3200
L2C5-35HG1204E1300	> 90	3500	1771	13	13.3	41.5	900
L2C5-33HG1204E1300	> 90	3300	1750	13	13.2	41.5	900
L2C5-50HG1202E0900	> 90	5000	831	9	13.1	41.5	400
L2C5-40HG1202E0900	> 90	4000	800	9	12.6	41.5	400
L2C5-35HG1202E0900	> 90	3500	759	9	11.9	41.5	400
L2C5-27HG1204E1300	> 90	2700	1582	13	11.9	41.5	900
L2C5-33HG1202E0900	> 90	3300	750	9	11.8	41.5	400
L2C5-30HG1202E0900	> 90	3000	720	9	11.3	41.5	400
L2C5-27HG1202E0900	> 90	2700	681	9	10.7	41.5	400
L2C5-50HG1812G2300	> 90	5000	7709	23	18.6	62.3	2100

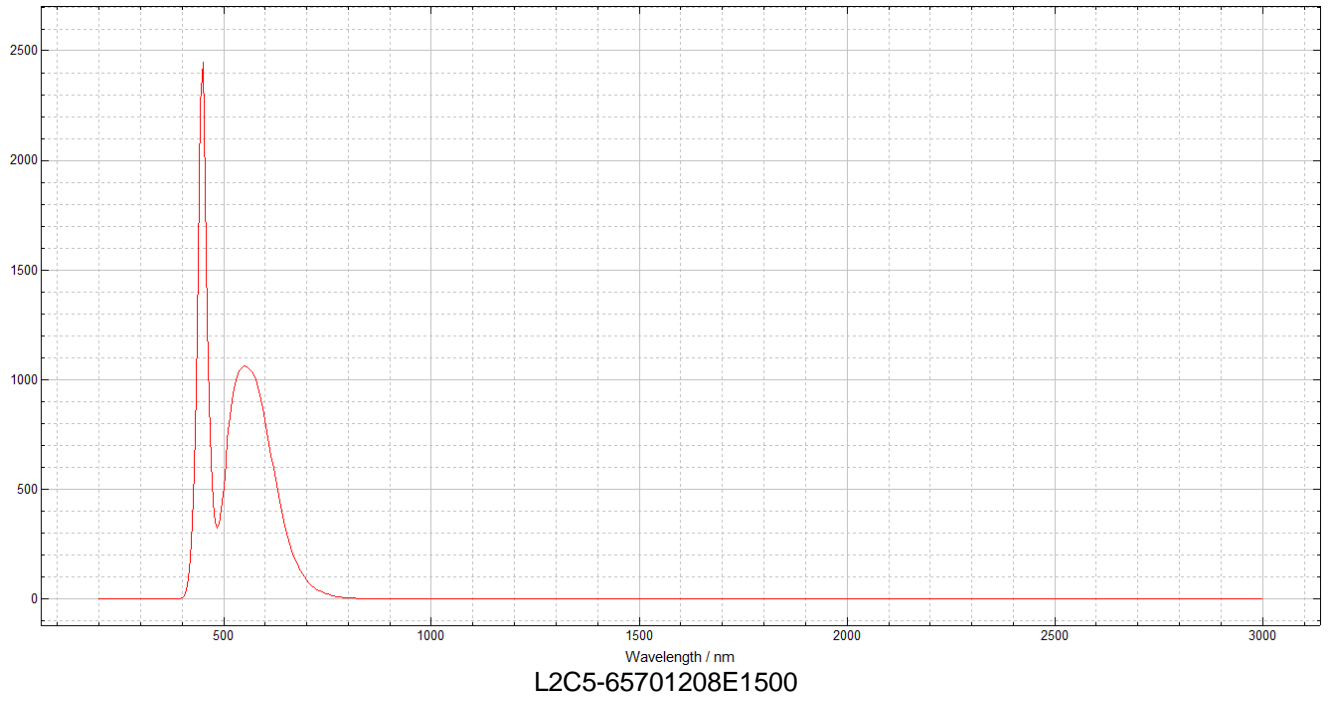
L 2 C 5 – A A B B C C C C E D D F F

Where:

- A A - designates nominal ANSI CCT (30=3000K)
- B B - designates minimum CRI (90=90CRI)
- C C C C - designates product configuration (1202, 1203, 1204, 1205, 1208, 1211)
- D D - designate light emitting surface (LES) size (06=6mm, 09=9mm, 13=13mm, 15=15mm, 19=19mm)
- E Forward Voltage (E=36V)
- F F Options for product specification (C0, CL, M1)

Part number	CRI	CCT (K)	Typical Flux (lm)	LES (mm)	Typ Flux Density (lm/mm ²)	Max Voltage (V)	Max Current (mA)
L2C5-30901202E06C0	> 90	3000	651	6.5	19.6	41.5	400
L2C5-30901202E06CL	> 90	3000	651	6.5	19.6	41.5	400
L2C5-30901208E15C0	> 90	3000	3056	15	17.3	41.5	1800
L2C5-30901208E15CL	> 90	3000	3056	15	17.3	41.5	1800
L2C5-30901203E09C0	> 90	3000	1006	9	15.8	41.5	600
L2C5-30901203E09CL	> 90	3000	1006	9	15.8	41.5	600
L2C5-30901205E13C0	> 90	3000	2050	13	15.4	41.5	1200
L2C5-30901205E13CL	> 90	3000	2050	13	15.4	41.5	1200
L2C5-30901211E19C0	> 90	3000	4215	19	14.9	41.5	2400
L2C5-30901211E19CL	> 90	3000	4215	19	14.9	41.5	2400
L2C5-30901204E13C0	> 90	3000	1579	13	11.9	41.5	900
L2C5-30901204E13CL	> 90	3000	1579	13	11.9	41.5	900
L2C5-30901202E09C0	> 90	3000	679	9	10.7	41.5	400
L2C5-30901202E09CL	> 90	3000	679	9	10.7	41.5	400
L2C5-30901203E09M1	> 90	3000	1136	9	17.9	41.5	600

Appendix 3: Relative Spectrum Of Tested Sample(s)



Appendix 4: Table 6.1 Based On IEC 62471:2006

DUT: L2C5-65701208E1500, Evaluation Distance: 200mm, Test Current: 1800mA, Angular subtense of the apparent source α : 100 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	8,22E+03	10000	2,59E+04	4000000	5,86E+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	2,97E+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	0,37	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: L2C5-65701208E1500, Evaluation Distance: 200mm, Test Current: 1800mA, Angular subtense of the apparent source α : 100 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	8,22E+03	10000	2,59E+04	4000000	5,86E+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	2,97E+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	0,37	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>										

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