



Test Report issued under the responsibility of:



|  |   |
|--|---|
| <b>TEST REPORT</b><br><b>IEC TR 62778</b><br><b>Application of IEC 62471 for the assessment of blue light hazard to light sources and luminaires</b>   |   |
| <b>Report Number</b> .....   | 6151980.51P   |
| <b>Date of issue</b> .....   | 2024-07-04  |
| <b>Total number of pages</b> .....   | 33  |
| <b>Name of Testing Laboratory preparing the Report</b> .....   | DEKRA Testing and Certification (Shanghai) Ltd.<br>3/F, #250, Jiangchangsan Road building 16 Headquarter<br>Economy Park Shibe Hi-Tech Park, Zhabei District, Shanghai,<br>P.R.C 200436 |
| <b>Applicant's name</b> .....  | Lumileds (Shanghai) Management Co., Ltd.  |
| <b>Address</b> .....   | Building 1-A, No. 19 & 20, Lane 299, Wenshui Road, Jing'an District, Shanghai, 200072, China  |
| <b>Test specification:</b>   |   |
| <b>Standard</b> .....  | IEC TR 62778:2014 (Second Edition)  |
| <b>Test procedure</b> .....  | CB Scheme   |
| <b>Non-standard test method</b> .....  | N/A   |
| <b>Test Report Form No.</b> .....  | IEC62778A   |
| <b>Test Report Form(s) Originator</b> ....   | TÜV SÜD Product Service GmbH  |
| <b>Master TRF</b> .....  | Dated 2016-02   |
| <b>Copyright © 2016 IEC System of Conformity Assessment Schemes for Electrotechnical Equipment and Components (IECEE System). All rights reserved.</b><br>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.<br>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.<br><b>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.</b> |   |
| <b>General disclaimer:</b><br>The test results presented in this report relate only to the object tested.<br>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.<br>The purpose of this report is only for export activities.   |   |

|   |  |  |
|---|--|--|
| <b>Test item description</b> ..... :  | LED module   |  |
| <b>Trade Mark</b> ..... :   | Lumileds   |  |
| <b>Manufacturer</b> .....   | Lumileds (Shanghai) Management Co., Ltd.<br>Building 1-A, No. 19 & 20, Lane 299, Wenshui Road, Jing'an District, Shanghai, 200072, China |  |
| <b>Model/Type reference</b> .....   | L2C5 series; L2C2 series<br>(See details in Appendix 2 model list)   |  |
| <b>Ratings</b> .....  | Max. 41.5 Vdc; Max 1800 mA   |  |
| <b>Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):</b> |  |  |
| <input checked="" type="checkbox"/>   | <b>CB Testing Laboratory:</b>  | DEKRA Testing and Certification (Shanghai) Ltd.  |
|   | <b>Testing location/ address</b> .....   | 3/F, #250, Jiangchangsan Road building 16 Headquarter Economy Park Shibe Hi-Tech Park, Zhabei District, Shanghai, P.R.C 200436 |
| <input type="checkbox"/>  | <b>Associated CB Testing Laboratory:</b>   |  |
|   | <b>Testing location/ address</b> .....   |  |
|   | <b>Tested by (name, function, signature)</b> .....   | Nancy Wang<br>(Project Handler)            |
|   | <b>Approved by (name, function, signature)</b> ..  | Hanson Zhang<br>(Reviewer)                |
| <input type="checkbox"/>  | <b>Testing procedure: CTF Stage 1:</b>   |  |
|   | <b>Testing location/ address</b> .....   |  |
|   | <b>Tested by (name, function, signature)</b> .....   |  |
|   | <b>Approved by (name, function, signature)</b> .....   |  |
| <input type="checkbox"/>  | <b>Testing procedure: CTF Stage 2:</b>   |  |
|   | <b>Testing location/ address</b> .....   |  |
|   | <b>Tested by (name + signature)</b> .....  |  |
|   | <b>Witnessed by (name, function, signature)</b> .....  |  |
|   | <b>Approved by (name, function, signature)</b> .....   |  |
| <input type="checkbox"/>  | <b>Testing procedure: CTF Stage 3:</b>   |  |
| <input type="checkbox"/>  | <b>Testing procedure: CTF Stage 4:</b>   |  |
|   | <b>Testing location/ address</b> .....   |  |

|   |  |  |
|---|--|--|
| 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):**

- 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):**

These tests fulfil the requirements of standard ISO/IEC 17025.

When determining the test conclusion, the Measurement Uncertainty of test has been considered.

The tested sample of

L2C5-65701208E1500

L2C5-50HG1202E0600 (400mA)

L2C5-50HG1202E0600 (300mA)

L2C5-50HG1202E0600 (200mA)

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**.

The tested sample of

L2C5-50HG1202E0600 (170mA)

Have been tested according to the IEC 62471 (first edition, 2006-07) **at 200mm** and been classified as **RG 1**.

Have been tested according to the EN 62471:2008 **at 200mm** and been classified as **RG 1**.

Have been tested according to the IEC/TR 62778:2014 and been classified as **RG 1 Unlimited for blue light hazard**.

The RG2-RG1 threshold current for L2C5-50HG1202E0600 was 178mA.

**Testing location:**

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

**Summary of compliance with National Differences:**

List of countries addressed: EU Group Differences and GB

**The product fulfills the requirements**

EN 62471:2008

BS EN 62471:2008

**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

|   |   |
|---|---|
| <b>Test item particulars</b> .....  | See below   |
| <b>Product evaluated</b> .....  | <input type="checkbox"/> LED package<br><input checked="" type="checkbox"/> LED module<br><input type="checkbox"/> Lamp<br><input type="checkbox"/> Luminaire                           |
| <b>Rated voltage (V)</b> .....  | Max. 41.5 Vdc   |
| <b>Rated current (mA)</b> .....   | Max. 1800 mA  |
| <b>Rated CCT (K)</b> .....  | 2200K/2700K/3000K/3500K/4000K/5000K/5700K/<br>6500K   |
| <b>Rated Luminance (Mcd/m<sup>2</sup>)</b> .....  | --  |
| <b>Component report data used</b> .....   | <input checked="" type="checkbox"/> Not applicable<br><input type="checkbox"/> LED package<br><input type="checkbox"/> LED module<br><input type="checkbox"/> Lamp<br>Report number: -- |
| <b>Possible test case verdicts:</b>   |   |
| - 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)  |
| <b>Testing</b> .....  | --  |
| <b>Date of receipt of test item</b> .....   | 2024-07   |
| <b>Date (s) of performance of tests</b> .....   | 2024-07   |
| <b>General remarks:</b>   |   |
| "(See Enclosure #)" refers to additional information appended to the report.<br>"(See appended table)" refers to a table appended to the report.<br><br><b>Throughout this report a <input checked="" type="checkbox"/> comma / <input type="checkbox"/> point is used as the decimal separator.</b><br><br>The product complied with the following standards:<br><input checked="" type="checkbox"/> IEC 62471:2006<br><input checked="" type="checkbox"/> EN 62471:2008<br><input type="checkbox"/> IEC/TR 62471-2:2009<br><input checked="" type="checkbox"/> IEC/TR 62778:2014<br><br>Decision rules applied Procedure 2 "Simple Acceptance" as stated in the IEC Guide 115:2023. |   |
| <b>Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60068-2-21:</b>   |   |

|   |   |
|---|---|
| <p>The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided .....</p>  | <p><input type="checkbox"/> <b>Yes</b><br/> <input checked="" type="checkbox"/> <b>Not applicable</b></p> |
| <p><b>When differences exist; they shall be identified in the General product information section.</b></p>  |   |
| <p><b>Name and address of factory (ies) .....</b> : Lumileds (Shanghai) Management Co., Ltd<br/>         Building 1-A, No. 19 &amp; 20, Lane 299, Wenshui Road, Jing'an District, Shanghai, 200072, China</p>   |   |
| <p><b>General product information:</b></p> <p>Full tests were performed on model L2C5-65701208E1500 and L2C5-50HG1202E0600.</p> <p>The products considered as worst case which should be evaluated at 200mm.</p> <p>The sample of L2C5-65701208E1500 was tested at 200mm from the light source. CCT of spectral irradiance was found at 7478 K.</p> <p>The sample of L2C5-50HG1202E0600 was tested at 200mm from the light source. CCT of spectral irradiance was found at 5399 K.</p> <p>Type test was performed according to IEC 62471:2006 procedure.</p> <p><b>Amendment 1 report:</b></p> <p>This report is issued to suspend the original test report 6001634.50P, dated on 2017-10-09, to include following changed and/or additions:</p> <ul style="list-style-type: none"> <li>- Add an alternative factory as follows:<br/>             Name: Fujian Lightning Optoelectronic Co., Ltd<br/>             Address: Optoelectronic Industrial Park, Hutou Town, Anxi County, Quanzhou City, Fujian Province, China</li> </ul> <p>After review, no test was considered necessary.</p> <p><b>Amendment 2 report:</b></p> <p>This report is issued to suspend the original test report 6133077.50P, dated on 2022-06-06, to include following changed and/or additions:</p> <ul style="list-style-type: none"> <li>- New models were added in Model list with bold letters.</li> </ul> <p>After review, full tests were performed on model <b>L2C5-50HG1202E0600</b>.</p> |   |

| IEC TR 62778 |   |   |            |
|--------------|---|---|------------|
| Clause       | Requirement + Test  | Result - Remark   | Verdict    |
| <b>7</b>     | <b>MEASUREMENT INFORMATION FLOW</b>   |   | <b>P</b>   |
| <b>7.1</b>   | <b>Basic flow</b>   |   | <b>P</b>   |
|              | 'Law of conservation of luminance' applied  |   | N/A        |
|              | Use of only true luminance/radiance values  |   | P          |
|              | In case of luminaire:<br>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        |
| <b>7.2</b>   | <b>Conditions for the radiance measurement</b>  |   | <b>P</b>   |
|              | Standard condition applied<br>(200mm distance, 0,011rad field of view)  |   | P          |
|              | Non-standard condition applied  |   | N/A        |
| <b>7.3</b>   | <b>Special cases (I): Replacement by a lamp or LED module of another type</b>   |   | <b>N/A</b> |
|              | 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        |
| <b>7.4</b>   | <b>Special cases (II): Arrays and clusters of primary light sources</b>   |   | <b>N/A</b> |
|              | LED package is evaluated as .....   | <input type="checkbox"/> RG0 unlimited<br><input type="checkbox"/> RG1 unlimited                                    | N/A        |
|              | $E_{thr}$ of LED package applies to array   |   | N/A        |
| <b>8</b>     | <b>RISK GROUP CLASSIFICATION</b>  |   | <b>P</b>   |
|              | Risk group achieved:  |   | P          |
|              | - .. Risk Group 0 unlimited   |   | N/A        |
|              | - .. Risk Group 1 unlimited   | L2C5-50HG1202E0600<br>(170mA)   | P          |
|              | - $E_{thr}$ ..... (lx) :<br>Distance to reach RG1 ..... (m) :   | Refer to the<br>Supplementary information<br>of<br><b>TABLE: Spectroradiometric<br/>measurement</b><br>as following | P          |

| IEC TR 62778 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |

| TABLE:Spectroradiometric measurement   |                           |   |               |         |
|--|---------------------------|---|---------------|---------|
|  | Measurement performed on: | <input type="checkbox"/> LED package<br><input checked="" type="checkbox"/> LED module<br><input type="checkbox"/> Lamp<br><input type="checkbox"/> Luminaire |               |         |
|  | Model number.....         | L2C5-65701208E1500  |               |         |
|  | Test voltage (V) .....    | 41,5 Vdc  |               | —       |
|  | Test current (mA) .....   | 1800 mA   |               | —       |
|  | Test frequency (Hz).....  | --  |               | —       |
|  | Ambient, t(°C) .....      | 25°C  |               | —       |
|  | Measurement distance..... | <input checked="" type="checkbox"/> 20 cm<br><input type="checkbox"/> ... cm  |               | —       |
|  | Source size .....         | <input checked="" type="checkbox"/> Non-small<br><input type="checkbox"/> Small :   |               | —       |
|  | Field of view .....       | <input type="checkbox"/> 100 mrad<br><input checked="" type="checkbox"/> 11 mrad<br><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 <sub>B</sub>            | W/(m <sup>2</sup> •sr <sup>1</sup> )  | 2,59E+04      | @11mrad |
| Blue light hazard irradiance   | E <sub>B</sub>            | W/m <sup>2</sup>  | --            |         |
| Luminance  | L                         | cd/m <sup>2</sup>   | 2,15E+07      | @11mrad |
| Illuminance  | E                         | lx  | 6,43E+04      |         |
| Supplementary information:<br>Per IEC/TR 62778:2014<br>E <sub>thr</sub> = 830 lx<br>D <sub>min</sub> = 1761 mm |                           |   |               |         |

| IEC TR 62778   |   |   |                 |         |
|--|---|---|-----------------|---------|
| Clause   | Requirement + Test                          |   | Result - Remark | Verdict |
|  | <b>TABLE:Spectroradiometric measurement</b> |   |                 |         |
|  | <b>Measurement performed on:</b>            | <input type="checkbox"/> LED package<br><input checked="" type="checkbox"/> LED module<br><input type="checkbox"/> Lamp<br><input type="checkbox"/> Luminaire |                 |         |
|  | <b>Model number</b> .....                   | L2C5-50HG1202E0600  |                 |         |
|  | <b>Test voltage (V)</b> .....               | 41,5 Vdc  |                 | —       |
|  | <b>Test current (mA)</b> .....              | 400 mA  |                 | —       |
|  | <b>Test frequency (Hz)</b> .....            | --  |                 | —       |
|  | <b>Ambient, t(°C)</b> .....                 | 25°C  |                 | —       |
|  | <b>Measurement distance</b> .....           | <input checked="" type="checkbox"/> 20 cm<br><input type="checkbox"/> ... cm  |                 | —       |
|  | <b>Source size</b> .....                    | <input checked="" type="checkbox"/> Non-small<br><input type="checkbox"/> Small :   |                 | —       |
|  | <b>Field of view</b> .....                  | <input type="checkbox"/> 100 mrad<br><input checked="" type="checkbox"/> 11 mrad<br><input type="checkbox"/> 1,7 mrad (for small sources)                     |                 | —       |
| Item   | Symb ol                                     | Units   | Result          | Remark  |
| Correlated colour temperature  | CCT   | K   | 5399            |         |
| x/y colour coordinates   |   |   | 0,3344/0,3276   |         |
| Blue light hazard radiance   | L <sub>B</sub>                              | W/(m <sup>2</sup> •sr <sup>1</sup> )  | 1,86E+04        | @11mrad |
| Blue light hazard irradiance   | E <sub>B</sub>                              | W/m <sup>2</sup>  | --              |         |
| Luminance  | L   | cd/m <sup>2</sup>   | 1,94E+07        | @11mrad |
| Illuminance  | E   | lx  | 1,26E+04        |         |
| Supplementary information:<br>Per IEC/TR 62778:2014<br>E <sub>thr</sub> = 1039 lx<br>D <sub>min</sub> = 697 mm |   |   |                 |         |

| IEC TR 62778   |   |   |                 |         |
|--|---|---|-----------------|---------|
| Clause   | Requirement + Test                          |   | Result - Remark | Verdict |
|  | <b>TABLE:Spectroradiometric measurement</b> |   |                 |         |
|  | <b>Measurement performed on:</b>            | <input type="checkbox"/> LED package<br><input checked="" type="checkbox"/> LED module<br><input type="checkbox"/> Lamp<br><input type="checkbox"/> Luminaire |                 |         |
|  | <b>Model number</b> .....                   | L2C5-50HG1202E0600  |                 |         |
|  | <b>Test voltage (V)</b> .....               | 41,5 Vdc  |                 | —       |
|  | <b>Test current (mA)</b> .....              | 300 mA  |                 | —       |
|  | <b>Test frequency (Hz)</b> .....            | --  |                 | —       |
|  | <b>Ambient, t(°C)</b> .....                 | 25°C  |                 | —       |
|  | <b>Measurement distance</b> .....           | <input checked="" type="checkbox"/> 20 cm<br><input type="checkbox"/> ... cm  |                 | —       |
|  | <b>Source size</b> .....                    | <input checked="" type="checkbox"/> Non-small<br><input type="checkbox"/> Small :   |                 | —       |
|  | <b>Field of view</b> .....                  | <input type="checkbox"/> 100 mrad<br><input checked="" type="checkbox"/> 11 mrad<br><input type="checkbox"/> 1,7 mrad (for small sources)                     |                 | —       |
| Item   | Symb ol                                     | Units   | Result          | Remark  |
| Correlated colour temperature  | CCT   | K   | 5440            |         |
| x/y colour coordinates   |   |   | 0,3336/0,3278   |         |
| Blue light hazard radiance   | L <sub>B</sub>                              | W/(m <sup>2</sup> •sr <sup>1</sup> )  | 1,60E+04        | @11mrad |
| Blue light hazard irradiance   | E <sub>B</sub>                              | W/m <sup>2</sup>  | --              |         |
| Luminance  | L   | cd/m <sup>2</sup>   | 1,62E+07        | @11mrad |
| Illuminance  | E   | lx  | 9,20E+03        |         |
| Supplementary information:<br>Per IEC/TR 62778:2014<br>E <sub>thr</sub> = 1014 lx<br>D <sub>min</sub> = 602 mm |   |   |                 |         |

| IEC TR 62778   |   |   |                 |         |
|--|---|---|-----------------|---------|
| Clause   | Requirement + Test                          |   | Result - Remark | Verdict |
|  | <b>TABLE:Spectroradiometric measurement</b> |   |                 |         |
|  | <b>Measurement performed on:</b>            | <input type="checkbox"/> LED package<br><input checked="" type="checkbox"/> LED module<br><input type="checkbox"/> Lamp<br><input type="checkbox"/> Luminaire |                 |         |
|  | <b>Model number</b> .....                   | L2C5-50HG1202E0600  |                 |         |
|  | <b>Test voltage (V)</b> .....               | 41,5 Vdc  |                 | —       |
|  | <b>Test current (mA)</b> .....              | 200 mA  |                 | —       |
|  | <b>Test frequency (Hz)</b> .....            | --  |                 | —       |
|  | <b>Ambient, t(°C)</b> .....                 | 25°C  |                 | —       |
|  | <b>Measurement distance</b> .....           | <input checked="" type="checkbox"/> 20 cm<br><input type="checkbox"/> ... cm  |                 | —       |
|  | <b>Source size</b> .....                    | <input checked="" type="checkbox"/> Non-small<br><input type="checkbox"/> Small :   |                 | —       |
|  | <b>Field of view</b> .....                  | <input type="checkbox"/> 100 mrad<br><input checked="" type="checkbox"/> 11 mrad<br><input type="checkbox"/> 1,7 mrad (for small sources)                     |                 | —       |
| Item   | Symb<br>ol                                  | Units   | Result          | Remark  |
| Correlated colour temperature  | CCT   | K   | 5407            |         |
| x/y colour coordinates   |   |   | 0,3343/0,3303   |         |
| Blue light hazard radiance   | L <sub>B</sub>                              | W/(m <sup>2</sup> •sr <sup>1</sup> )  | 1,14E+04        | @11mrad |
| Blue light hazard irradiance   | E <sub>B</sub>                              | W/m <sup>2</sup>  | --              |         |
| Luminance  | L   | cd/m <sup>2</sup>   | 1,19E+07        | @11mrad |
| Illuminance  | E   | lx  | 6,71E+03        |         |
| Supplementary information:<br>Per IEC/TR 62778:2014<br>E <sub>thr</sub> = 1044 lx<br>D <sub>min</sub> = 507 mm |   |   |                 |         |

| IEC TR 62778                      |   |   |                 |         |
|-----------------------------------|---|---|-----------------|---------|
| Clause                            | Requirement + Test                          |   | Result - Remark | Verdict |
|                                   | <b>TABLE:Spectroradiometric measurement</b> |   |                 |         |
|                                   | <b>Measurement performed on:</b>            | <input type="checkbox"/> LED package<br><input checked="" type="checkbox"/> LED module<br><input type="checkbox"/> Lamp<br><input type="checkbox"/> Luminaire |                 |         |
|                                   | <b>Model number</b> .....                   | L2C5-50HG1202E0600  |                 |         |
|                                   | <b>Test voltage (V)</b> .....               | 41,5 Vdc  |                 | —       |
|                                   | <b>Test current (mA)</b> .....              | 170 mA  |                 | —       |
|                                   | <b>Test frequency (Hz)</b> .....            | --  |                 | —       |
|                                   | <b>Ambient, t(°C)</b> .....                 | 25°C  |                 | —       |
|                                   | <b>Measurement distance</b> .....           | <input checked="" type="checkbox"/> 20 cm<br><input type="checkbox"/> ... cm  |                 | —       |
|                                   | <b>Source size</b> .....                    | <input checked="" type="checkbox"/> Non-small<br><input type="checkbox"/> Small :   |                 | —       |
|                                   | <b>Field of view</b> .....                  | <input type="checkbox"/> 100 mrad<br><input checked="" type="checkbox"/> 11 mrad<br><input type="checkbox"/> 1,7 mrad (for small sources)                     |                 | —       |
| Item                              | Symb<br>ol                                  | Units   | Result          | Remark  |
| Correlated colour temperature     | CCT   | K   | 5226            |         |
| x/y colour coordinates            |   |   | 0,3385/0,3371   |         |
| Blue light hazard radiance        | L <sub>B</sub>                              | W/(m <sup>2</sup> •sr <sup>1</sup> )  | 9,79E+03        | @11mrad |
| Blue light hazard irradiance      | E <sub>B</sub>                              | W/m <sup>2</sup>  | --              |         |
| Luminance                         | L   | cd/m <sup>2</sup>   | 1,08E+07        | @11mrad |
| Illuminance                       | E   | lx  | 6,32E+03        |         |
| Supplementary information:<br>N/A |   |   |                 |         |

| IEC TR 62778 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |

|  | <b>TABLE: Angular light distribution</b> | <b>N/A</b> |
|--|--|------------|
|  |  |            |

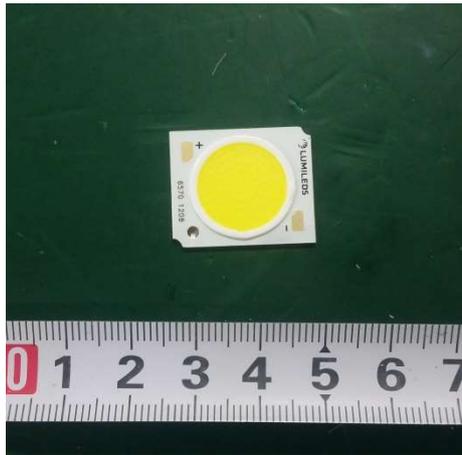
**List of test equipment used:**

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<br>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  | 2024/2/25             | 2025/2/24            |
| 7      | Irradiance measurements                          | CL6 Spectral irradiance standard (SH 350)                     | 300-3000nm  | 2024/2/25             | 2025/2/24            |
| 7      | Irradiance measurements                          | CL7 Spectral irradiance standard (SH 351)                     | 200-400nm   | 2024/2/25             | 2025/2/24            |
| 7      | Irradiance measurements                          | Photometric detector head (SH 359)                            | 380nm-800nm | 2024/2/26             | 2025/2/25            |
| 7      | Irradiance measurements<br>Radiance measurements | Wattmeter (SH030)   | 500V,40A    | 2023/10/10            | 2024/10/10           |

Appendix 1: Photo Documentation



L2C5-65701208E1500



L2C5-50HG1202E0600

## Appendix 2: Model List

**L2C5-65701208E1500, with ANSI bin 6500K, is part of the LUXEON CoB product family.**

**The samples measured are L2C5-65701208E1500 and L2C5-50HG1202E0600. The sample measured, L2C5-65701208E1500, with the highest CCT, has the highest typical flux density (lumens per mm<sup>2</sup> of light emitting surface (LES) and highest typical device luminance level with the listed LUXEON CoB product family. The present classification is thus valid (worst case) for all LUXEON CoB listed below, from ANSI bins equal to 6500K or below CCT (see TR IEC62778). See the appendix below for an explanation of the type designation.**

| Model Name         | Series / Group                    | Model Name Explanation   |
|--------------------|-----------------------------------|--|
| L2C2-AABBCCCCDEEFF | LUXEON Core Range CoB Gen 2       | AA - designate nominal CCT (eg: 22=2200K, 27=2700K, 30=3000K, 35=3500K, 40=4000K, 50=5000K, 56=5600K, 57=5700K, 65=6500K)<br>BB - designates minimum CRI (eg: 60=60CRI,70=70CRI, 80=80CRI, 90=90CRI, 95=95CRI)<br>CCCC - designates product configuration (eg: 0406, 1202, 1203, 1204, 1205, 1208, 1210, 1211, 1213, 1216, 1812, 1321, 1825, 2520, 3618) DEEFF - designates options for product specification(any letter or number).   |
| L2C5-AABBCCCCDEEFF | LUXEON Core Range CoB Gen 3       | AA - designate nominal CCT (eg: 22=2200K, 27=2700K, 30=3000K, 35=3500K, 40=4000K, 50=5000K, 56=5600K, 57=5700K, 65=6500K)<br>BB - designates minimum CRI (eg: 60=60CRI,70=70CRI, 80=80CRI, 90=90CRI, 95=95CRI)<br>CCCC - designates product configuration (eg: 0406, 1202, 1203, 1204, 1205, 1208, 1210, 1211, 1213, 1216, 1812, 1321, 1825, 2520, 3618)<br>D - designates options for product specification<br>EE - designates light emitting surface(LES)size(eg: 06=6mm, 09=9mm, 13=13mm, 15=15mm, 19=19mm, 23=23mm, 29=29mm, 32=32mm)<br>FF - designates options for product specification |
| L2C5-AABBCCCCDEEFF | LUXEON Core Range CoB Crisp Color | AA: designates nominal CCT (eg:22=2200K,27=2700K,30=3000K,35=3500K,40=4000K,50=5000K,57=5700K,65=6500K)<br>BB: designates with Product options (eg: HG)<br>CCCC: designates product configuration (eg: 1202,1204,1205 )<br>D: designates options for prodcut specification<br>EE: designates light emitting surface (LES) size (eg :06=6mm,09=9mm,13=13mm,15=15mm,19=19mm,23=23mm)<br>FF: designate options for product specification  |

|                        |   |  |
|------------------------|---|--|
| L2C5-<br>AABBCCCCDEEFF | LUXEON Core<br>Range CoB<br>Crisp White | AA: designates nominal CCT<br>(exampe: 22=2200K,27=2700K.30=3000K,3=3500K,40=4000K,50=5000K,57=5700K,65=6500K , PE=Pesto)<br>BB: designate minimum CRI (example : 70=70 CRI, 80=80 CRI, 90=90 CRI,95=95CRI)<br>CCCC: designates product configuration (example: 1202,1203,1204,1205,1208,1211 )<br>D: designates options for prodcut specification<br>EE: designates light emitting surface (LES) size<br>(example : 06=6mm,09=9mm,13=13mm,15=15mm,19=19mm)<br>FF: designate options for product specification   |
| L2C6-<br>AABBCDEEFGGHH | LUXEON CS<br>CoB CrispColor             | <b>AA - can be any alphanumeric characters, designate nominal ANSI CCT (eg: 22=2700K, 27=2700K, 30=3000K,35=3500K, 40=4000K, 50=5000K, 57=5700K, 65=6500K)</b><br><b>BB - can be any alphanumeric characters, designates with Product options (eg: HG)</b><br><b>C - can be any alphanumeric characters, designates color target of SDCM (eg: 3=3 SDCM)</b><br><b>D - can be any alphanumeric characters, designates product configuration of series (eg: L=12 series)</b><br><b>EE - can be any alphanumeric characters, designates product configuration of parallel (eg: 02= 2 parallel, 03= 3 parallel, 04= 4 parallel, 05= 5 parallel, 06= 6 parallel ,08= 8 parallel ,10= 10 parallel,11= 11 parallel )</b><br><b>F - can be any alphanumeric characters, designates options for product generation</b><br><b>GG - can be any alphanumeric characters, designates light emitting surface(LES)size (eg: 06=6.3mm, 09=9.8mm, 13=13mm, 15=14.5mm, 22=22mm)</b><br><b>HH - can be any alphanumeric characters, designates options for product specification.</b> |

| LUXEON Core Range CoB Gen 2 |                   |       |       |       |       |       |       |       |       |       |
|-----------------------------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Model No                    | Test Current (mA) | 2200K | 2700K | 3000K | 3250K | 3500K | 4000K | 5000K | 5700K | 6500K |
| L2C2-xxxx1205xxxxx          | 445               | RG1   | RG2   | RG2   |
|                             | 1200              | RG2   |
| L2C2-xxxx1208xxxxx          | 712               | RG1   | RG2   | RG2   |
|                             | 1800              | RG2   |
| L2C2-xxxx1211xxxxx          | 979               | RG1   | RG2   | RG2   |
|                             | 2400              | RG2   |

| LUXEON Core Range CoB Gen 3 |                   |       |       |       |       |       |       |       |       |       |  |
|-----------------------------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|
| Model No                    | Test Current (mA) | 2200K | 2700K | 3000K | 3250K | 3500K | 4000K | 5000K | 5700K | 6500K |  |
| L2C5-xxxx1202Exxxx          | 178               | RG1   | RG2   | RG2   |  |
|                             | 400               | RG2   |  |
| L2C5-xxxx1203Exxxx          | 267               | RG1   | RG2   | RG2   |  |
|                             | 600               | RG2   |  |
| L2C5-xxxx1204Exxxx          | 356               | RG1   | RG2   | RG2   |  |
|                             | 900               | RG2   |  |
| L2C5-xxxx1205Exxxx          | 445               | RG1   | RG2   | RG2   |  |
|                             | 1200              | RG2   |  |
| L2C5-xxxx1208Exxxx          | 712               | RG1   | RG2   | RG2   |  |
|                             | 1800              | RG2   |  |
| L2C5-xxxx1211Exxxx          | 979               | RG1   | RG2   | RG2   |  |
|                             | 2400              | RG2   |  |
| L2C5-xxxx1216Exxxx          | 1424              | RG1   | RG2   | RG2   |  |
|                             | 3200              | RG2   |  |
| L2C5-xxxx1321Exxxx          | 1869              | RG1   | RG2   | RG2   |  |
|                             | 4200              | RG2   |  |
| L2C5-xxxx1812Gxxxx          | 1068              | RG1   |  |

|                    |      |     |     |     |     |     |     |     |     |     |
|--------------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|                    | 2100 | RG2 |
| L2C5-xxxx1825Gxxxx | 2225 | RG1 | RG2 | RG2 |
|                    | 4500 | RG2 |

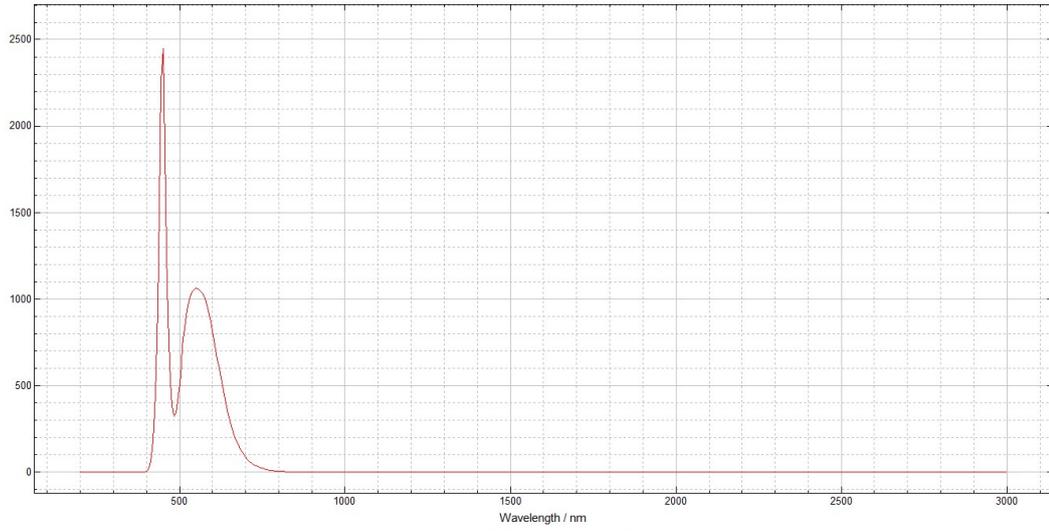
| LUXEON Core Range CoB Crisp Color |                   |       |       |       |       |       |       |       |       |       |
|-----------------------------------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Model No                          | Test Current (mA) | 2200K | 2700K | 3000K | 3250K | 3500K | 4000K | 5000K | 5700K | 6500K |
| L2C5-xxHG1202Exxxx                | 178               | RG1   | RG2   | RG2   |
|                                   | 400               | RG2   |
| L2C5-xxHG1203Exxxx                | 267               | RG1   | RG2   | RG2   |
|                                   | 600               | RG2   |
| L2C5-xxHG1204Exxxx                | 356               | RG1   | RG2   | RG2   |
|                                   | 900               | RG2   |
| L2C5-xxHG1205Exxxx                | 445               | RG1   | RG2   | RG2   |
|                                   | 1200              | RG2   |
| L2C5-xxHG1208Exxxx                | 712               | RG1   | RG2   | RG2   |
|                                   | 1800              | RG2   |
| L2C5-xxHG1211Exxxx                | 979               | RG1   | RG2   | RG2   |
|                                   | 2400              | RG2   |
| L2C5-xxHG1216Exxxx                | 1424              | RG1   | RG2   | RG2   |
|                                   | 3200              | RG2   |

| LUXEON Core Range CoB Crisp White |                   |       |       |       |       |       |       |       |       |       |
|-----------------------------------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Model No                          | Test Current (mA) | 2200K | 2700K | 3000K | 3250K | 3500K | 4000K | 5000K | 5700K | 6500K |
| L2C5-xxxx1202ExxC0                | 178               | RG1   | RG2   | RG2   |
|                                   | 400               | RG2   |
| L2C5-xxxx1203ExxC0                | 267               | RG1   | RG2   | RG2   |
|                                   | 600               | RG2   |
| L2C5-xxxx1204ExxC0                | 356               | RG1   | RG2   | RG2   |

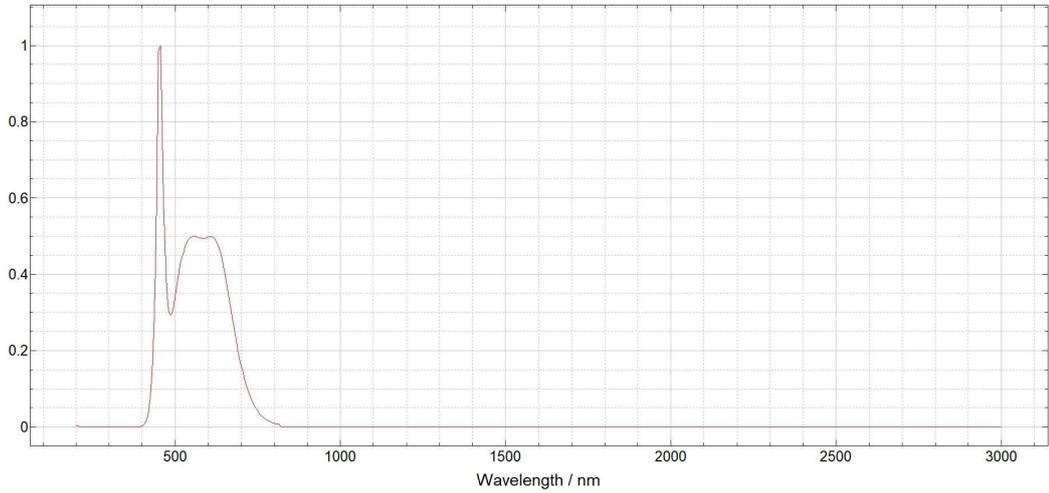
|                    |      |     |     |     |     |     |     |     |     |     |
|--------------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|                    | 900  | RG2 |
| L2C5-xxxx1205ExxC0 | 445  | RG1 | RG2 | RG2 |
|                    | 1200 | RG2 |
| L2C5-xxxx1208ExxC0 | 712  | RG1 | RG2 | RG2 |
|                    | 1800 | RG2 |
| L2C5-xxxx1211ExxC0 | 979  | RG1 | RG2 | RG2 |
|                    | 2400 | RG2 |
| L2C5-xxxx1216ExxC0 | 1424 | RG1 | RG2 | RG2 |
|                    | 3200 | RG2 |

| LUXEON CS CoB CrispColor |                   |       |       |       |       |       |       |       |       |       |
|--------------------------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Model No                 | Test Current (mA) | 2200K | 2700K | 3000K | 3250K | 3500K | 4000K | 5000K | 5700K | 6500K |
| L2C6-xxHGxL02xxxxx       | 178               | RG1   | RG2   | RG2   |
|                          | 400               | RG2   |
| L2C6-xxHGxL03xxxxx       | 267               | RG1   | RG2   | RG2   |
|                          | 600               | RG2   |
| L2C6-xxHGxL04xxxxx       | 356               | RG1   | RG2   | RG2   |
|                          | 900               | RG2   |
| L2C6-xxHGxL05xxxxx       | 445               | RG1   | RG2   | RG2   |
|                          | 1200              | RG2   |
| L2C6-xxHGxL08xxxxx       | 712               | RG1   | RG2   | RG2   |
|                          | 1800              | RG2   |
| L2C6-xxHGxL11xxxxx       | 979               | RG1   | RG2   | RG2   |
|                          | 2400              | RG2   |

Appendix 3: Relative Spectrum Of Tested Sample(s)



L2C5-65701208E1500



L2C5-50HG1202E0600

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  $\alpha$ : 100 mrad

| IEC 62471   |  |           |                                |                      |                 |                 |          |                 |          |
|---|--|-----------|--------------------------------|----------------------|-----------------|-----------------|----------|-----------------|----------|
| Clause  | Requirement + Test                                       |           |                                |                      | Result – Remark |                 |          |                 | Verdict  |
| <b>Table 6.1</b>  | 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                  | 8,22E+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/ $\alpha$      | 2,97E+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                  | 0,37            | 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  |  |           |                                |                      |                 |                 |          |                 |          |

DUT: L2C5-50HG1202E0600, Evaluation Distance: 200mm, Test Current: 400mA, Angular subtense of the apparent source  $\alpha$ : 33 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                  | 1,29E+03 | 10000           | 1,86E+04 | 4000000         | 2,00E+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/ $\alpha$      | 2,30E+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                  | 0,27     | 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: L2C5-50HG1202E0600, Evaluation Distance: 200mm, Test Current: 300mA, Angular subtense of the apparent source  $\alpha$ : 33 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                  | 9,38E+02 | 10000           | 1,60E+04 | 4000000         | 1,74E+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/ $\alpha$      | 1,97E+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                  | 0,22     | 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: L2C5-50HG1202E0600, Evaluation Distance: 200mm, Test Current: 200mA, Angular subtense of the apparent source  $\alpha$ : 33 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                  | 6,70E+02 | 10000           | 1,14E+04 | 4000000         | 1,23E+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/ $\alpha$      | 1,41E+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                  | 0,19     | 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: L2C5-50HG1202E0600, Evaluation Distance: 200mm, Test Current: 170mA, Angular subtense of the apparent source  $\alpha$ : 33 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                  | 5,97E+02 | 10000           | 9,79E+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/ $\alpha$      | 1,22E+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                  | 0,14     | 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  $\alpha$ : 100 mrad

| EN 62471   |   |           |                                |  |          |                 |          |                 |          |
|--|---|-----------|--------------------------------|--|----------|-----------------|----------|-----------------|----------|
| Clause   | Requirement + Test  |           |                                | Result – Remark                                |          |                 |          | Verdict         |          |
| <b>Table 6.1</b>   | 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  | 8,22E+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/ $\alpha$                                | 2,97E+05 | 28000/ $\alpha$ |          | 71000/ $\alpha$ |          |
| Retinal thermal, weak visual stimulus**  | $R(\lambda)$  | $L_{IR}$  | $W \cdot m^{-2} \cdot sr^{-1}$ | 545000<br>0,0017 $\leq \alpha \leq$ 0,011      | --       |                 |          |                 |          |
|  |   |           |                                | 6000/ $\alpha$<br>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 <math>\alpha &lt; 0,011</math> radian. Averaging field of view at 10000 s is 0,1 radian.<br/>           ** Involves evaluation of non-GLS source<br/>           NOTE The action functions: see Table 4.1 and Table 4.2<br/>           The applicable aperture diameters: see 4.2.1<br/>           The limitations for the angular subtenses: see 4.2.2<br/>           The related measurement condition 5.2.3 and the range of acceptance angles: see Table 5.5.</p> |   |           |                                |  |          |                 |          |                 |          |

DUT: L2C5-50HG1202E0600, Evaluation Distance: 200mm, Test Current: 400mA, Angular subtense of the apparent source  $\alpha$ : 33 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  | 1,29E+03 | 10000           | 1,86E+04 | 4000000         | 2,00E+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/ $\alpha$                                | 2,30E+05 | 28000/ $\alpha$ |          | 71000/ $\alpha$ |          |
| Retinal thermal, weak visual stimulus**   | $R(\lambda)$      | $L_{IR}$  | $W \cdot m^{-2} \cdot sr^{-1}$ | 545000<br>0,0017 $\leq \alpha \leq$ 0,011      | --       |                 |          |                 |          |
|   |                   |           |                                | 6000/ $\alpha$<br>0,011 $\leq \alpha \leq$ 0,1 | --       |                 |          |                 |          |
| IR radiation, eye   |                   | $E_{IR}$  | $W \cdot m^{-2}$               | 100  | 0,27     | 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: L2C5-50HG1202E0600, Evaluation Distance: 200mm, Test Current: 300mA, Angular subtense of the apparent source  $\alpha$ : 33 mrad

| EN 62471   |   |           |                                |  |          |                 |          |                 |          |
|--|---|-----------|--------------------------------|--|----------|-----------------|----------|-----------------|----------|
| Clause   | Requirement + Test  |           |                                | Result – Remark                                |          |                 |          | Verdict         |          |
| <b>Table 6.1</b>   | 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  | 9,38E+02 | 10000           | 1,60E+04 | 4000000         | 1,74E+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/ $\alpha$                                | 1,97E+05 | 28000/ $\alpha$ |          | 71000/ $\alpha$ |          |
| Retinal thermal, weak visual stimulus**  | $R(\lambda)$  | $L_{IR}$  | $W \cdot m^{-2} \cdot sr^{-1}$ | 545000<br>0,0017 $\leq \alpha \leq$ 0,011      | --       |                 |          |                 |          |
|  |   |           |                                | 6000/ $\alpha$<br>0,011 $\leq \alpha \leq$ 0,1 | --       |                 |          |                 |          |
| IR radiation, eye  |   | $E_{IR}$  | $W \cdot m^{-2}$               | 100  | 0,22     | 570             |          | 3200            |          |
| <p>* Small source defined as one with <math>\alpha &lt; 0,011</math> 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<br/> The applicable aperture diameters: see 4.2.1<br/> The limitations for the angular subtenses: see 4.2.2<br/> The related measurement condition 5.2.3 and the range of acceptance angles: see Table 5.5.</p> |   |           |                                |  |          |                 |          |                 |          |

DUT: L2C5-50HG1202E0600, Evaluation Distance: 200mm, Test Current: 200mA, Angular subtense of the apparent source  $\alpha$ : 33 mrad

| EN 62471 |                    |                 |         |
|----------|--------------------|-----------------|---------|
| Clause   | Requirement + Test | Result – Remark | Verdict |

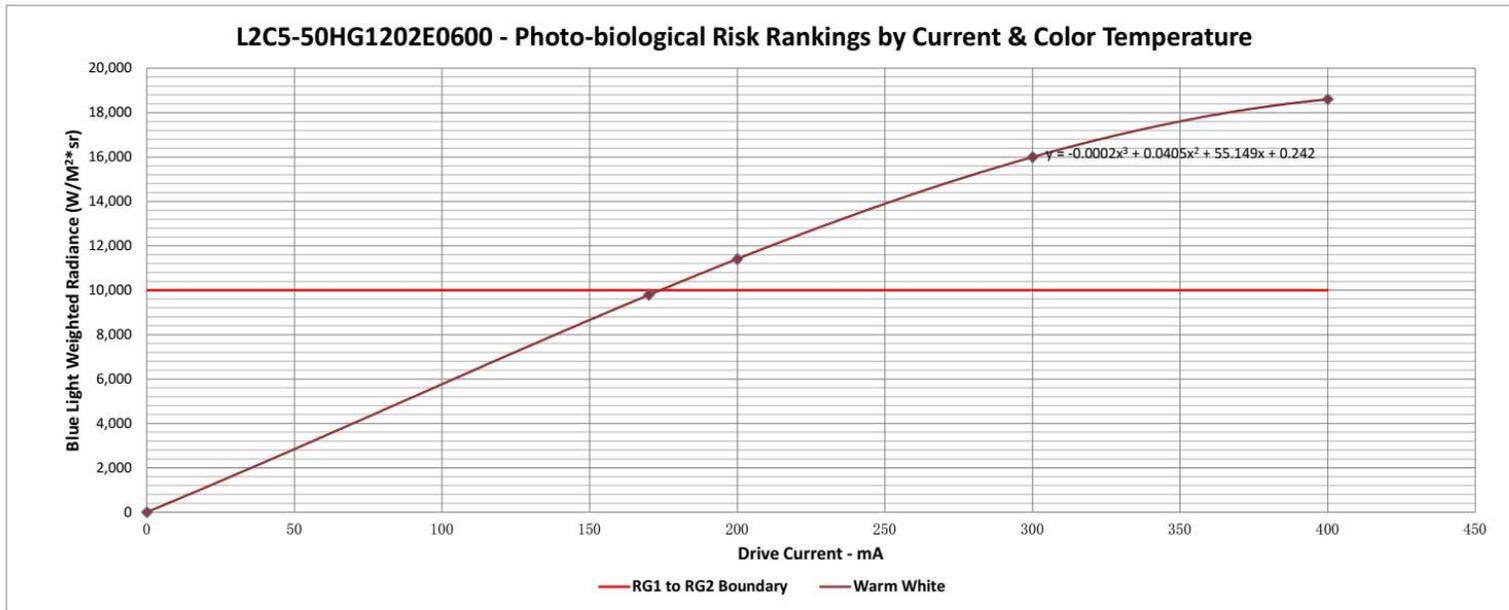
| Table 6.1 Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC)  |                   |           |                                |  |          |                 |          |                 |          |
|--|-------------------|-----------|--------------------------------|--|----------|-----------------|----------|-----------------|----------|
| 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  | 6,70E+02 | 10000           | 1,14E+04 | 4000000         | 1,23E+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/ $\alpha$                                | 1,41E+05 | 28000/ $\alpha$ |          | 71000/ $\alpha$ |          |
| Retinal thermal, weak visual stimulus**  | $R(\lambda)$      | $L_{IR}$  | $W \cdot m^{-2} \cdot sr^{-1}$ | 545000<br>0,0017 $\leq \alpha \leq$ 0,011      | --       |                 |          |                 |          |
|  |                   |           |                                | 6000/ $\alpha$<br>0,011 $\leq \alpha \leq$ 0,1 | --       |                 |          |                 |          |
| IR radiation, eye  |                   | $E_{IR}$  | $W \cdot m^{-2}$               | 100  | 0,19     | 570             |          | 3200            |          |
| <p>* Small source defined as one with <math>\alpha &lt; 0,011</math> 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<br/> The applicable aperture diameters: see 4.2.1<br/> The limitations for the angular subtenses: see 4.2.2<br/> The related measurement condition 5.2.3 and the range of acceptance angles: see Table 5.5.</p> |                   |           |                                |  |          |                 |          |                 |          |

DUT: L2C5-50HG1202E0600, Evaluation Distance: 200mm, Test Current: 170mA, Angular subtense of the apparent source  $\alpha$ : 33 mrad

| EN 62471   |   |           |                                |  |          |                 |          |                 |        |
|--|---|-----------|--------------------------------|--|----------|-----------------|----------|-----------------|--------|
| Clause   | Requirement + Test  |           |                                | Result – Remark                                |          |                 |          | Verdict         |        |
| <b>Table 6.1</b>   | 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  | 5,97E+02 | 10000           | 9,79E+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/ $\alpha$                                | 1,22E+05 | 28000/ $\alpha$ |          | 71000/ $\alpha$ |        |
| Retinal thermal, weak visual stimulus**  | $R(\lambda)$  | $L_{IR}$  | $W \cdot m^{-2} \cdot sr^{-1}$ | 545000<br>0,0017 $\leq \alpha \leq$ 0,011      | --       |                 |          |                 |        |
|  |   |           |                                | 6000/ $\alpha$<br>0,011 $\leq \alpha \leq$ 0,1 | --       |                 |          |                 |        |
| IR radiation, eye  |   | $E_{IR}$  | $W \cdot m^{-2}$               | 100  | 0,14     | 570             |          | 3200            |        |
| <p>* Small source defined as one with <math>\alpha &lt; 0,011</math> 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<br/> The applicable aperture diameters: see 4.2.1<br/> The limitations for the angular subtenses: see 4.2.2<br/> 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.



| CCT Group: | Product ID:        | Measured CCT: | Drive Currents (mA) |          |          |          |          | Regression Formula:                           | Fit to RG2 Line: | Current @ RG-1 to RG-2 Boundary, mA: |
|------------|--------------------|---------------|---------------------|----------|----------|----------|----------|---|------------------|--------------------------------------|
|            |                    |               | 0                   | 170      | 200      | 300      | 400      |   |                  |                                      |
| Cool White | L2C5-50HG1202E0600 | 5399K         | 0                   | 9.79E+03 | 1.14E+04 | 1.60E+04 | 1.86E+04 | $y = -5E-04x^3 + 0.0405x^2 + 55.149x + 0.242$ | 9972             | 178                                  |

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