

| <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>   |  |
|--|--|
| Report reference No .....  | RSZ161226555-03  |
| Compiled by (+ signature) .....  | Zero Gao <i>Zero Gao</i>   |
| Approved by (+ signature) .....  | Harrison Huang <i>Harrison Huang</i>   |
| Date of issue .....  | 2017-01-17   |
| Testing laboratory .....   | Bay Area Compliance Laboratories Corp. (Dongguan)  |
| Address .....  | No.69 Pulong Village Puxinhu Industry Zone Tangxia,Dongguan, China.                                  |
| Testing location .....   | Same as above  |
| Applicant .....  | Hongli Zhihui Group Co.,Ltd.   |
| Address .....  | No.1, Xianke Yi Road, Huadong Town, Huadu District, Guangzhou, China                                 |
| Standard .....   | IEC TR 62778:2014 (Second Edition)   |
| Test sample(s) received.....   | 2016-12-28   |
| Test in period.....  | 2016-12-28 to 2017-01-17   |
| Procedure deviation .....  | N.A.   |
| Non-standard test method .....   | N.A.   |
| <b>Note:</b> The test data was only valid for the test sample(s). This test report is prepared for the customer shown above and for the specific product described herein. It must not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Dongguan). |  |
| Type of test object .....  | LED  |
| Trademark .....  | N.A.   |
| Model/type reference .....   | P2835W6H5-C03-8D3AA3   |
| Multiple Models.....   | P2835W*H5-C03-*D*A**   |
| Manufacturer.....  | Hongli Zhihui Group Co.,Ltd.<br>No.1, Xianke Yi Road, Huadong Town, Huadu District, Guangzhou, China |
| Rating .....   | Input:10Vdc, 120mA   |
| Copy of marking plate:   | None   |

|   |  |
|---|--|
| <b>Test item particulars</b> .....  |  |
| <b>Product evaluated</b> .....  | <input checked="" type="checkbox"/> <b>LED package</b><br><input type="checkbox"/> <b>LED module</b><br><input type="checkbox"/> <b>Lamp</b><br><input type="checkbox"/> <b>Luminaire</b>                        |
| <b>Rated voltage (V)</b> .....  | See rating   |
| <b>Rated current (mA)</b> .....   | 120mA  |
| <b>Rated CCT (K)</b> .....  | 6000-7000K   |
| <b>Rated Luminance (Mcd/m<sup>2</sup>)</b> .....  | Not specified  |
| <b>Component report data used</b> .....   | <input type="checkbox"/> <b>Not applicable</b><br><input checked="" type="checkbox"/> <b>LED package</b><br><input type="checkbox"/> <b>LED module</b><br><input type="checkbox"/> <b>Lamp</b><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(ass)  |  |
| -test object does not meet the requirement.....:F(ail)  |  |
| <b>General remarks:</b>   |  |
| <p>The test results presented in this report relate only to the object tested.</p> <p>This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.</p> <p>"(See Enclosure #)" refers to additional information appended to the report.</p> <p>"(See appended table)" refers to a table appended to the report.</p> <p>Throughout this report a point is used as the decimal separator.</p> <p>List of test equipment must be kept on file and available for review.</p> <p><b>Remark:</b></p> <p>This report consists of 8 pages and following appendixes:</p> <p>Appendix A EUT photos</p> <p>Appendix B Test equipment list</p> |  |

**General product information:**

This product is LED chip, test model is P2835W6H5-C03-8D3AA3. Rated input is 10Vdc, 120mA.

Multiple Models are P2835W\*H5-C03-\*D\*A\*\*, and they are electrically identical with the same PCB LAYOUT and circuit as model P2835W6H5-C03-8D3AA3, only differences between those models are the correlated colour temperature, color rendering index, welding material and silicone part number.

Hereby declare that there are some differences between our Multiple Models and testing products.

All the asterisk meaning in the model numbers are listed as below:

P2835W\*H5-C03-\*D\*A\*\*

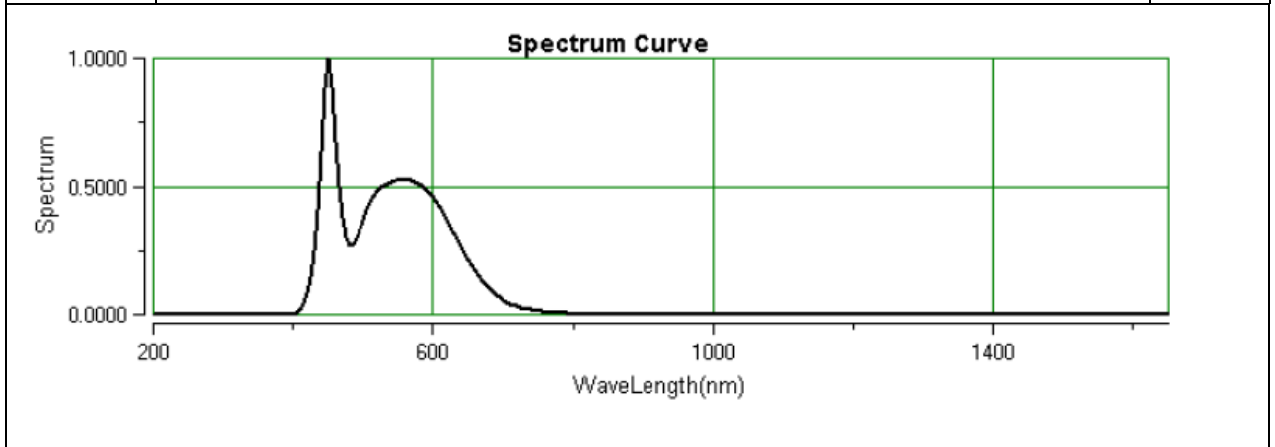
1            2 3 4 5

1. The first asterisk is a number from 1 to 9 which stand for correlated colour temperature. 1 means 2600-2800K, 2 means 2800-3100K, 3 means 3800-4250K, 4 means 4750-5300K, 5 means 5700-6500K, 6 means 6000-7000K, 7 means 2100-2300K, 8 means 3200-3800K, 9 means 5050-5650K.
2. The second asterisk is a number from 6 to 9 which stand for color rendering index. 6 means below 70, 7 means 70-80, 8 means 80-90, 9 means above 90.
3. The third asterisk is a number from 1 to 4 which stand for welding material. 1 means gold wire, 2 means alloyed wire, 3 means K gold wire, 4 means copper wire.
4. The fourth asterisk is an English Letter from A to Z or a number from 0 to 9 which stand for silicone part number.
5. The fifth asterisk is a serial number from 1 to 9.

| 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  |                   | P        |
|              | 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                                     |                   | P        |
|              | In case $E_{thr}$ value for RG2 was established the peak value was derived from angular light distribution  |                   | N        |
| <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        |
| <b>7.3</b>   | <b>Special cases (I): Replacement by a lamp or LED module of another type</b>   |                   | <b>N</b> |
|              | Light source is a white light source  |                   | N        |
|              | Evaluation done based on highest luminance  |                   | N        |
|              | Evaluation done based on CCT value  |                   | N        |
| <b>7.4</b>   | <b>Special cases (II): Arrays and clusters of primary light sources</b>   |                   | <b>N</b> |
|              | LED package is evaluated as ..... :<br><input type="checkbox"/> RG0 unlimited<br><input type="checkbox"/> RG1 unlimited<br><input type="checkbox"/> RG2 unlimited |                   | N        |
|              | $E_{thr}$ of LED package applies to array   |                   | N        |
| <b>8</b>     | <b>RISK GROUP CLASSIFICATION</b>  |                   | <b>P</b> |
|              | Risk group achieved:  |                   | P        |
|              | - .. Risk Group 0 unlimited   |                   | N        |
|              | - .. Risk Group 1 unlimited   |                   | P        |
|              | - Risk Group 2 unlimited  |                   | N        |
|              | - $E_{thr}$ ..... (lx) :<br>Distance to reach RG1 .....(mm) :   | 1142 lx<br>187 mm | P        |

| IEC TR 62778                  |  |   |                        |                 |          |
|-------------------------------|--|---|------------------------|-----------------|----------|
| Clause                        | Requirement + Test                           |   |                        | Result - Remark | Verdict  |
|                               | <b>TABLE: Spectroradiometric measurement</b> |   |                        |                 | <b>P</b> |
|                               | Measurement performed on:                    | <input checked="" type="checkbox"/> LED package<br><input type="checkbox"/> LED module<br><input type="checkbox"/> Lamp<br><input type="checkbox"/> Luminaire |                        |                 | —        |
|                               | Model number.....                            | P2835W6H5-C03-8D3AA3  |                        |                 | —        |
|                               | Test voltage (V) .....                       | 10Vdc   |                        |                 | —        |
|                               | Test current (mA) .....                      | 120mA   |                        |                 | —        |
|                               | Test frequency (Hz).....                     | -   |                        |                 | —        |
|                               | Ambient, t (°C).....                         | 25.0°C  |                        |                 | —        |
|                               | Measurement distance .....                   | <input checked="" type="checkbox"/> 20 cm<br><input type="checkbox"/> ... cm  |                        |                 | —        |
|                               | Source size .....                            | <input type="checkbox"/> Non-small<br><input checked="" type="checkbox"/> Small : 1.1mm   |                        |                 | —        |
|                               | 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                          | Symbol                                       | Units   | Result                 | Remark          |          |
| Correlated colour temperature | CCT  | K   | 6503                   | --              |          |
| x/y colour coordinates        | x/y  |   | 0.3130/0.3274          | --              |          |
| Blue light hazard radiance    | L <sub>B</sub>                               | W/(m <sup>2</sup> •sr <sup>1</sup> )  | 7112                   | --              |          |
| Blue light hazard irradiance  | E <sub>B</sub>                               | W/m <sup>2</sup>  | 8.705x10 <sup>-1</sup> | --              |          |
| Luminance                     | L  | cd/m <sup>2</sup>   | 8.123x10 <sup>6</sup>  | --              |          |
| Illuminance                   | E  | lx  | 994                    | --              |          |
| Supplementary information: NA |  |   |                        |                 |          |

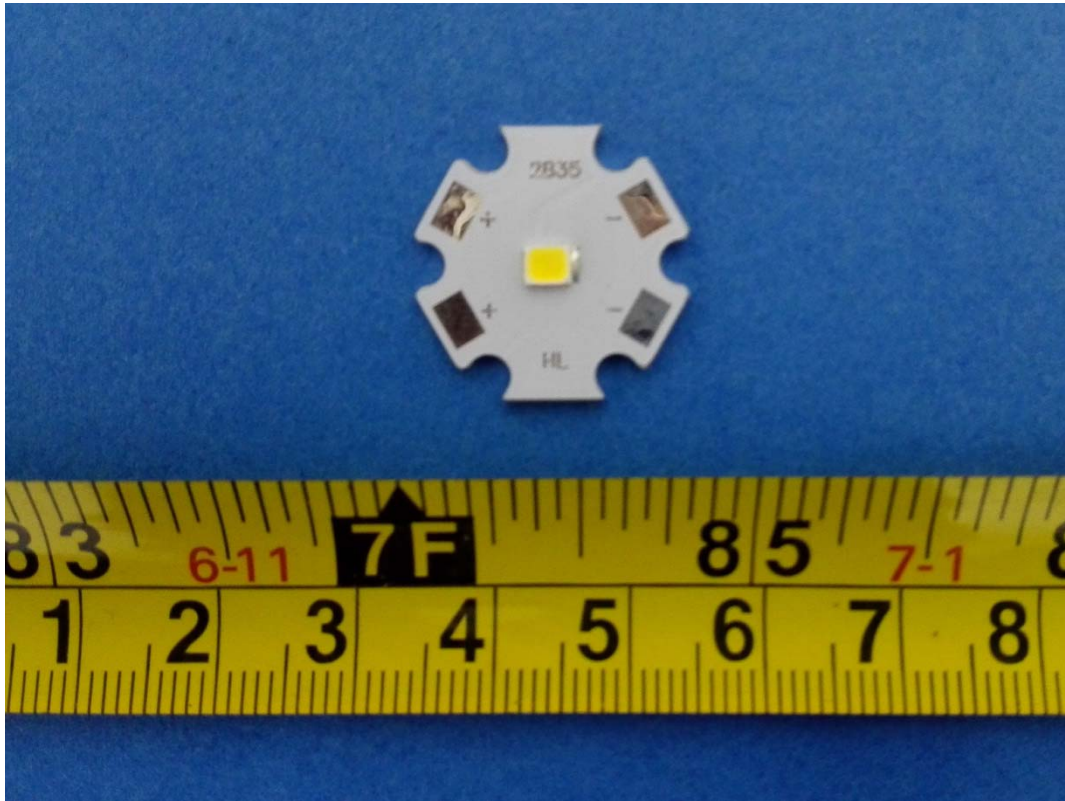
TABLE: Angular light distribution



FINVA

Appendix A - EUT Photos

The front view of EUT



Appendix B Test equipment list

| Equipment Description                         | Model No  | BACL#        | Manufacturer | Last Cal   | Cal Due    |
|---|-----------|--------------|--------------|------------|------------|
| UV-VIS-near IR Spectrophotocolori meter       | PMS-2000  | T-08-SF213   | EVERFINE     | 2016-08-08 | 2017-08-08 |
| Imaging luminance meter                       | CX-2K     | T-08-SF140-1 | EVERFINE     | 2016-08-08 | 2018-08-08 |
| Radiation illuminance meter                   | RD-2000   | T-08-SF140-2 | EVERFINE     | 2016-08-08 | 2018-08-08 |
| Radiation illuminance meter                   | RD-2000   | T-08-SF140-3 | EVERFINE     | 2016-08-08 | 2018-08-08 |
| High Accuracy Array                           | HAAS-2000 | T-08-SF140-4 | EVERFINE     | 2016-08-08 | 2018-08-08 |
| Hygrothermograph                              | PWS280    | T-08-QA026   | N/A          | 2016-03-21 | 2017-03-21 |
| Standard power spectral UV radiation-specific | UVS-8003  | T-08-EE048   | EVERFINE     | 2016-03-21 | 2017-03-21 |
| 80mm sample integrating sphere                | SMS-300   | F-08-SF130   | EVERFINE     | 2016-12-25 | 2018-12-24 |
| Steel tape                                    | HILOCK-19 | T-08-SF100   | TAJIMA       | 2013-4-18  | 2018-4-17  |

\*\*\* End of report \*\*\*