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| Report reference No .....: SZ2240314-12721E-SF   |  |
| Compiled by (+ signature) .....: Engineer: Max Li  |  |
| Approved by (+ signature) .....: Team Leader:Harrison Huang  |  |
| Date of issue .....: 2024-03-22  |  |
| Testing laboratory .....: Bay Area Compliance Laboratories Corp. (Dongguan)  |  |
| Address .....: No.12, Pulong East 1 <sup>st</sup> Road, Tangxia Town, Dongguan, Guangdong, China   |  |
| Testing location .....: Same as above  |  |
| Applicant .....: Hongli Zhihui Group Co.,Ltd. Guangzhou Branch   |  |
| Address .....: Room 316, Building 2, No.1, Xianke Yi Road, Huadong Town, Huadu District, Guangzhou, China  |  |
| Standard .....: IEC 62471:2006   |  |
| Test sample(s) received.....: 2024-03-14   |  |
| Test in period.....: 2024-03-14  |  |
| Procedure deviation .....: N.A.  |  |
| Non-standard test method .....: N.A.   |  |
| Type of test object .....: LED package   |  |
| Trademark .....: NA  |  |
| Model/type reference .....: HL-C3535K4R3GA   |  |
| Manufacturer.....: Hongli Zhihui Group Co.,Ltd. Guangzhou Branch<br>Room 316, Building 2, No.1, Xianke Yi Road, Huadong Town, Huadu District, Guangzhou, China |  |
| Rating .....: Input: 2.0-2.8Vdc,700mA  |  |
| Copy of marking plate:<br>None   |  |

:

Tested lamp .....:LED package  
 Tested lamp system .....:N.A

Lamp cap .....:N.A  
 Bulb.....:N.A  
 Rated of the lamp .....:See rating  
 Furthermore marking on the lamp.....:N.A.  
 Seasoning of lamps according EN standard .....: No seasoning  
 Temperature by measurement.....:22.5°C  
 Information for safety use.....:N.A

:

-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)

The test results presented in this report relate only to the object tested.  
 This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.  
 "(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 point is used as the decimal separator.

"EUT" as referred in this report is LED package, the test model is HL-C3535K4R3GA.

| IEC 62471:2006 |  |                 |         |
|----------------|--|-----------------|---------|
| Clause         | Requirement – Test   | Result - Remark | Verdict |
| 4              | EXPOSURE LIMITS  |                 | P       |
|                | Contents of the whole Clause 4 of IEC 62471: 2006 moved into a new informative Annex ZB                |                 | P       |
|                | Clause 4 replaced by the following:  |                 | P       |
|                | Limits of the Artificial Optical Radiation have been applied instead of those fixed in IEC 62471: 2006 | See Table 6.1   | P       |
| Annex ZB       | EXPOSURE LIMITS  |                 | P       |
| 4.1            | General  |                 | P       |

| IEC 62471:2006 |  |                 |         |
|----------------|--|-----------------|---------|
| Clause         | Requirement – Test   | Result - Remark | Verdict |
| 4.3.3          | Retinal blue light hazard exposure limit   |                 | P       |
|                | To protect against retinal photochemical injury from chronic blue-light exposure, the integrated spectral radiance of the light source weighted against the blue-light hazard function, $B(\lambda)$ , i.e., the blue-light weighted radiance, $L_B$ , shall not exceed the levels defined by: |                 | P       |

$$L_B \cdot t = \sum_t \sum_{\lambda} L_{\lambda}(\lambda, t) \cdot B(\lambda) \cdot t \cdot \lambda \leq 10^6 \text{ J} \cdot \text{m}^{-2} \cdot \text{sr}$$

N

| IEC 62471:2006 |   |                 |         |
|----------------|---|-----------------|---------|
| Clause         | Requirement – Test                                    | Result - Remark | Verdict |
| 4.3.7          | Infrared radiation hazard exposure limits for the eye |                 | P       |



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| Clause         | Requirement – Test  | Result - Remark | Verdict |
|                | To standardize interpolated values, use linear interpolation on the log of given values to obtain intermediate points at the wavelength intervals desired.  |                 | N       |
| 5.3.2          | Calculations  |                 | P       |
|                | The calculation of source hazard values shall be performed by weighting the spectral scan by the appropriate function and calculating the total weighted energy.  |                 | P       |
| 5.3.3          | Measurement uncertainty   |                 | P       |
|                | The quality of all measurement results must be quantified by an analysis of the uncertainty.  |                 | P       |
| 6              | LAMP CLASSIFICATION   |                 | P       |
|                | For the purposes of this standard it was decided that the values shall be reported as follows:  |                 | P       |
|                | – for lamps intended for general lighting service, the hazard values shall be reported as either irradiance or radiance values at a distance which produces an illuminance of 500 lux, but not at a distance less than 200 mm |                 | N       |
|                | – for all other light sources, including pulsed lamp sources, the hazard values shall be reported at a distance of 200 mm   |                 | P       |
| 6.1            | Continuous wave lamps   |                 | P       |
| 6.1.1          | Exempt Group  |                 | P       |
|                | In the except group are lamps, which does not pose any photobiological hazard. The requirement is met by any lamp that does not pose:   |                 | P       |
|                | – an actinic ultraviolet hazard (ES) within 8-hours exposure (30000 s), nor   |                 | P       |
|                | – a near-UV hazard (EUVA) within 1000 s, (about 16 min), nor  |                 | P       |
|                | – a retinal blue-light hazard (LB) within 10000 s (about 2,8 h), nor  |                 | P       |
|                | – a retinal thermal hazard (LR) within 10 s, nor  |                 | P       |
|                | – an infrared radiation hazard for the eye (EIR) within 1000 s  |                 | P       |
| 6.1.2          | Risk Group 1 (Low-Risk)   |                 | N       |
|                | In this group are lamps, which exceeds the limits for the except group but that does not pose:  |                 | N       |
|                | – an actinic ultraviolet hazard (ES) within 10000 s, nor  |                 | N       |
|                | – a near ultraviolet hazard (EUVA) within 300 s, nor  |                 | N       |
|                | – a retinal blue-light hazard (LB) within 100 s, nor  |                 | N       |
|                | – a retinal thermal hazard (LR) within 10 s, nor  |                 | N       |
|                | – an infrared radiation hazard for the eye (EIR) within 100 s   |                 | N       |

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|----------------|--|-----------------|---------|
| Clause         | Requirement – Test   | Result - Remark | Verdict |
|                | Lamps that emit infrared radiation without a strong visual stimulus and do not pose a near-infrared retinal hazard (LIR), within 100 s are in Risk Group 1.  |                 | N       |
| 6.1.3          | Risk Group 2 (Moderate-Risk)   |                 | N       |
|                | This requirement is met by any lamp that exceeds the limits for Risk Group 1, but that does not pose:  |                 | N       |
|                | – an actinic ultraviolet hazard (ES) within 1000 s exposure, nor   |                 | N       |
|                | – a near ultraviolet hazard (EUVA) within 100 s, nor   |                 | N       |
|                | – a retinal blue-light hazard (LB) within 0,25 s (aversion response), nor  |                 | N       |
|                | – a retinal thermal hazard (LR) within 0,25 s (aversion response), nor   |                 | N       |
|                | – an infrared radiation hazard for the eye (EIR) within 10 s   |                 | N       |
|                | Lamps that emit infrared radiation without a strong visual stimulus and do not pose a near-infrared retinal hazard (LIR), within 10 s are in Risk Group 2.   |                 | N       |
| 6.1.4          | Risk Group 3 (High-Risk)   |                 | N       |
|                | Lamps which exceed the limits for Risk Group 2 are in Group 3.   |                 | N       |
| 6.2            | Pulsed lamps   |                 | N       |
|                | Pulse lamp criteria shall apply to a single pulse and to any group of pulses within 0,25 s.  |                 | N       |
|                | A pulsed lamp shall be evaluated at the highest nominal energy loading as specified by the manufacturer.   |                 | N       |
|                | The risk group determination of the lamp being tested shall be made as follows:  |                 | N       |
|                | – a lamp that exceeds the exposure limit shall be classified as belonging to Risk Group 3 (High-Risk)  |                 | N       |
|                | – for single pulsed lamps, a lamp whose weighted radiant exposure or weighted radiance does is below the EL shall be classified as belonging to the Exempt Group   |                 | N       |
|                | – for repetitively pulsed lamps, a lamp whose weighted radiant exposure or weighted radiance dose is below the EL, shall be evaluated using the continuous wave risk criteria discussed in clause 6.1, using time averaged values of the pulsed emission |                 | N       |





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| IEC 62471:2006 |  |                 |         |
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| Clause         | Requirement – Test   | Result - Remark | Verdict |
|                | Spectral weighting function for assessing ultraviolet hazards for skin and eye |                 | -       |
|                |  |                 |         |



| IEC 62471:2006 |                    |                 |         |
|----------------|--------------------|-----------------|---------|
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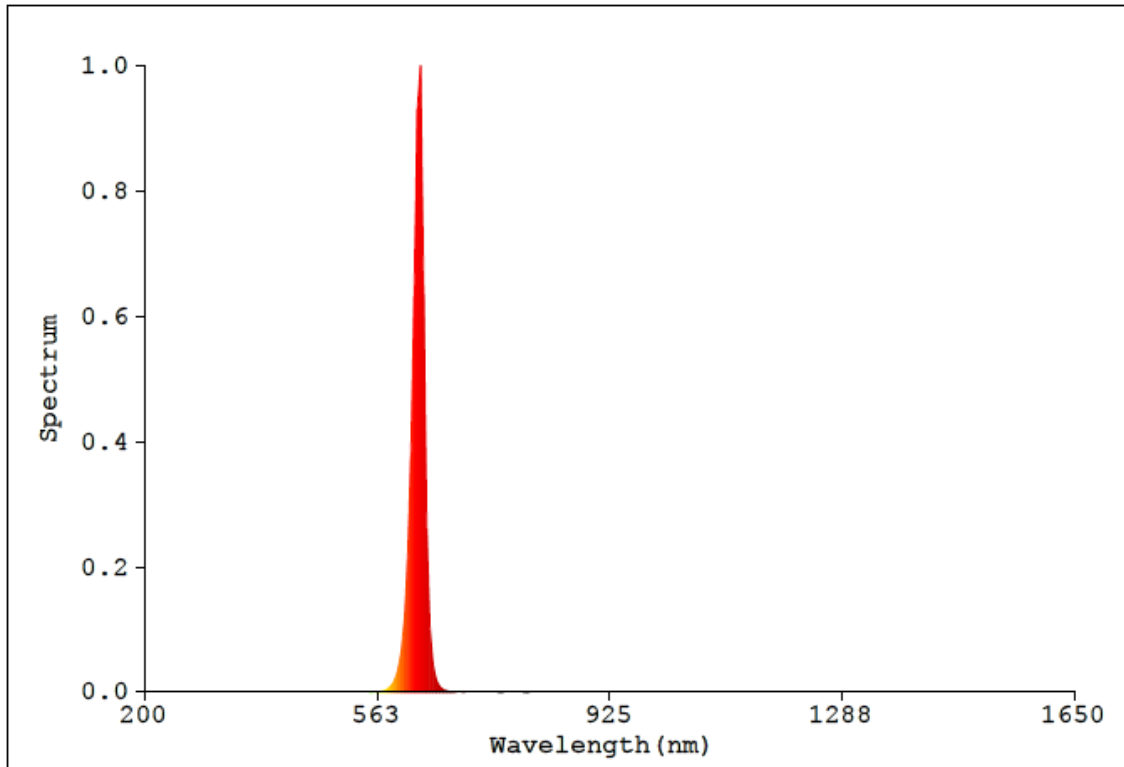
\*Emission lines of a mercury discharge spectrum.

| Summary of the ELs for the surface of the skin or cornea (irradiance based values) |   |            |                         |          |                                |
|--|---|------------|-------------------------|----------|--------------------------------|
| Actinic UV skin & eye  | $E_S = \sum E_\lambda \cdot S(\lambda) \cdot \Delta\lambda$ | 200 – 400  | < 30000                 | 1,4 (80) | 30/t                           |
| Eye UV-A   | $E_{UVA} = \sum E_\lambda \cdot \Delta\lambda$              | 315 – 400  | $\leq 1000$<br>$> 1000$ | 1,4 (80) | 10000/t<br>10                  |
| Blue-light small source  | $E_B = \sum E_\lambda \cdot B(\lambda) \cdot \Delta\lambda$ | 300 – 700  | $\leq 100$<br>$> 100$   | < 0,011  | 100/t<br>1,0                   |
| Eye IR   | $E_{IR} = \sum E_\lambda \cdot \Delta\lambda$               | 780 – 3000 | $\leq 1000$<br>$> 1000$ | 1,4 (80) | 18000/t <sup>0,75</sup><br>100 |
| Skin thermal   | $E_H = \sum E_\lambda \cdot \Delta\lambda$                  | 380 – 3000 | < 10                    | 2π sr    | 20000/t <sup>0,75</sup>        |

| Summary of the ELs for the retina (radiance based values) |  |            |  |  |   |
|---|--|------------|--|--|---|
| Blue light  | $L_B = \sum L_\lambda \cdot B(\lambda) \cdot \Delta\lambda$    | 300 – 700  | 0,25 – 10<br>10-100<br>100-10000<br>$\geq 10000$ | 0,011•√(t/10)<br>0,011<br>0,0011•√t<br>0,1 | 10 <sup>6</sup> /t<br>10 <sup>6</sup> /t<br>10 <sup>6</sup> /t<br>100 |
| Retinal thermal   | $L_R = \sum L_\lambda \cdot R(\lambda) \cdot \Delta\lambda$    | 380 – 1400 | < 0,25<br>0,25 – 10                              | 0,0017<br>0,011•√(t/10)                    | 50000/(α•t <sup>0,25</sup> )<br>50000/(α•t <sup>0,25</sup> )          |
| Retinal thermal (weak visual stimulus)                    | $L_{IR} = \sum L_\lambda \cdot R(\lambda) \cdot \Delta\lambda$ | 780 – 1400 | > 10   | 0,011                                      | 6000/α  |

| IEC 62471:2006 |                    |                 |         |
|----------------|--------------------|-----------------|---------|
| Clause         | Requirement – Test | Result - Remark | Verdict |

Figure of Spectral distribution





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## Appendix A - EUT Photos



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- 1.The information marked # is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report.
- 2.Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
- 3.Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
- 4.The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.
- 5.This report cannot be reproduced except in full, without prior written approval of the Company.
- 6.This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.
- 7.For the difference between the tested model and the multiple models, the applicant had provided a statement and promised to be responsible for its authenticity. The laboratory has confirmed the difference of relevant samples before testing.