



# TEST REPORT

## Of IESNA LM-80-15

|                                                                  |                                                                                   |
|------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| <b>Kunde:</b><br><i>Client:</i>                                  | Yangzhou Edison Opto Corporation                                                  |
| <b>Adresse:</b><br><i>Address:</i>                               | No.101 HuaYang West Rd., Yangzhou City, Jiangsu Province, China 225000            |
| <b>Hersteller:</b><br><i>Manufacturer:</i>                       | Yangzhou Edison Opto Corporation                                                  |
| <b>Adresse:</b><br><i>Address:</i>                               | No.101 HuaYang West Rd., Yangzhou City, Jiangsu Province, China 225000            |
| <b>Name der Marke:</b><br><i>Brand Name:</i>                     |  |
| <b>Beschreibung des Produkts:</b><br><i>Product Description:</i> | LED 2835 package                                                                  |
| <b>Modelle:</b><br><i>Models:</i>                                | 2835-3V-0.2W                                                                      |
| <b>Bewertung:</b><br><i>Rating:</i>                              | IF:60mA, VF:2.9-3.0V                                                              |
| <b>Verfahren:</b><br><i>Method:</i>                              | Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays and Modules |
| <b>Prüfergebnis*:</b><br><i>Test result*:</i>                    |                                                                                   |

|                                                   |                                                     |                                                   |                                                     |
|---------------------------------------------------|-----------------------------------------------------|---------------------------------------------------|-----------------------------------------------------|
| <b>Datum der Prüfung:</b><br><i>Date of Test:</i> | <b>Datum der Emission:</b><br><i>Date of Issue:</i> | <b>Klassifizierung:</b><br><i>Classification:</i> | <b>Gegenstand der Prüfung:</b><br><i>Test item:</i> |
| 2020-09-28-2022-02-10                             | 2022-02-23                                          | Commission Test                                   | LM-80 Test                                          |

**Prüflabor (Testlabor) / Testing Laboratory:**  
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Scan code to check authenticity



## Test Summary

| Life test condition |              |                       | Summary of result |                               |                                              |                                            |                                               |
|---------------------|--------------|-----------------------|-------------------|-------------------------------|----------------------------------------------|--------------------------------------------|-----------------------------------------------|
| Test condition      | Current (mA) | Case temperature (°C) | Test duration (h) | Average lumen maintenance (%) | Maximum chromaticity shift ( $\Delta u'v'$ ) | Average Power Density (W/mm <sup>2</sup> ) | Average Current Density (mA/mm <sup>2</sup> ) |
| 1                   | 60           | 55                    | 12000             | 95.67%                        | 0.0031                                       | 0.0287                                     | 8.6207                                        |
| 2                   | 60           | 85                    | 12000             | 95.27%                        | 0.0033                                       |                                            |                                               |
| 3                   | 60           | 105                   | 12000             | 94.49%                        | 0.0036                                       |                                            |                                               |

### 1. Number of LED Light Sources tested

- 25 Packages tested at actual case temperature 55.9°C
- 25 Packages tested at actual case temperature 85.7°C
- 25 Packages tested at actual case temperature 105.5°C

### 2. Description of LED Light Sources

- Part Number: 2835-3V-0.2W
- Part Type: LED 2835 package
- IF =60mA, CCT(Nominal) =3000K

### 3. Description of auxiliary equipment

- 1) EVERFINE LT-200A Accelerated Aging-Life Test System for LEDs
- 2) Instrument Integrating sphere 0.5m
- 3) SENSING SPR-3000 Photometric, Colorimetric& Electric System for Light Sources

### 4. Operating time

LED packages are driven with a constant direct current.

- Number of units : 25 at 55°C, 85°C and 105°C
- Drive current : 60mA
- Typical voltage : 2.9-3.0V

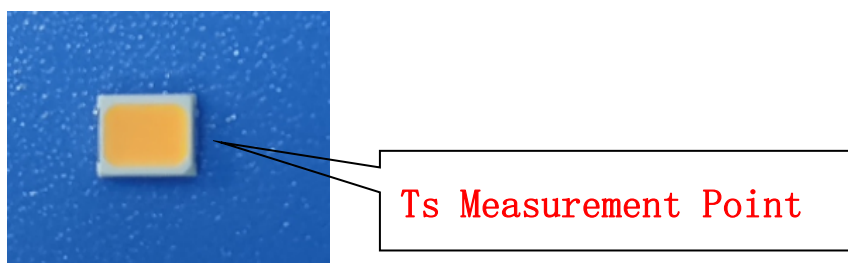
## 5. Ambient conditions including airflow, temperature and relative humidity

The minimal airflow is maintained in chamber.

The ambient temperature around the LED packages inside chamber is controlled by air flowing and the thermocouple readings are monitored.

- Case temperature : Contorlled to  $-2^{\circ}\text{C}$
- Surrounding air temperature : Contorlled to  $-5^{\circ}\text{C}$
- Relative humidity :  $< 65\% \text{RH}$

## 6. Case temperature (Test point temperature)



## 7. Drive current of the LED Light Sources during lifetime test

See Sub-clause 9.1, 9.2 and 9.3

## 8. Initial luminous flux and forward voltage

See the table

## 9. Lumen maintenance data for each individual LED Light Sources

See the table

| Quantity | Model        | Serial Number                     |
|----------|--------------|-----------------------------------|
| 25       | 2835-3V-0.2W | A01-A25 ( $55^{\circ}\text{C}$ )  |
| 25       | 2835-3V-0.2W | B01-B25 ( $85^{\circ}\text{C}$ )  |
| 25       | 2835-3V-0.2W | C01-C25 ( $105^{\circ}\text{C}$ ) |



**9.1 Test condition 1: 55 °C, Drive Current : 60mA**

| Item    | V <sub>F</sub> (V) | Flux(lm) | R <sub>a</sub> | T=55°C Luminous Maintenance (%) |        |        |        |        |        |        |        |        |        |        |        |
|---------|--------------------|----------|----------------|---------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| No.     | 0 h                |          |                | 1000h                           | 2000h  | 3000h  | 4000h  | 5000h  | 6000h  | 7000h  | 8000h  | 9000h  | 10000h | 11000h | 12000h |
| A01     | 3.02               | 24.28    | 92.8           | 99.99                           | 99.21  | 98.85  | 98.51  | 97.93  | 97.24  | 97.17  | 96.82  | 96.36  | 95.99  | 95.89  | 95.75  |
| A02     | 3.06               | 24.27    | 92.7           | 99.94                           | 99.16  | 98.87  | 98.44  | 97.81  | 97.10  | 96.79  | 96.34  | 96.01  | 95.76  | 95.59  | 95.44  |
| A03     | 3.01               | 24.16    | 93.3           | 99.89                           | 99.17  | 98.83  | 98.57  | 97.87  | 97.27  | 97.33  | 96.88  | 96.57  | 96.36  | 96.16  | 95.86  |
| A04     | 3.00               | 23.95    | 93.1           | 99.97                           | 99.17  | 98.84  | 98.54  | 97.88  | 97.28  | 96.95  | 96.61  | 96.27  | 96.07  | 95.92  | 95.75  |
| A05     | 3.06               | 24.21    | 93.4           | 99.94                           | 99.26  | 99.03  | 98.71  | 97.91  | 97.69  | 96.93  | 96.60  | 96.26  | 95.90  | 95.82  | 95.53  |
| A06     | 3.05               | 22.93    | 92.5           | 99.92                           | 99.26  | 98.88  | 98.53  | 97.89  | 97.31  | 97.11  | 96.76  | 96.33  | 95.99  | 95.94  | 95.78  |
| A07     | 2.99               | 24.07    | 93.6           | 100.00                          | 99.28  | 98.94  | 98.56  | 97.93  | 97.41  | 97.11  | 96.66  | 96.34  | 96.06  | 95.98  | 95.82  |
| A08     | 3.03               | 24.15    | 93.3           | 99.96                           | 99.29  | 99.00  | 98.56  | 97.91  | 97.63  | 97.08  | 96.63  | 96.32  | 96.13  | 95.92  | 95.73  |
| A09     | 3.05               | 23.95    | 92.6           | 100.01                          | 99.25  | 98.82  | 98.33  | 97.66  | 97.34  | 97.15  | 96.81  | 96.47  | 96.26  | 96.21  | 95.95  |
| A10     | 3.02               | 22.75    | 92.8           | 100.04                          | 99.48  | 98.99  | 98.63  | 98.08  | 97.55  | 96.77  | 96.44  | 96.03  | 95.85  | 95.68  | 95.54  |
| A11     | 3.01               | 24.11    | 93.3           | 99.99                           | 99.28  | 98.91  | 98.43  | 97.85  | 97.27  | 96.86  | 96.50  | 96.17  | 96.00  | 95.86  | 95.59  |
| A12     | 3.03               | 24.16    | 93.1           | 100.06                          | 99.39  | 98.94  | 98.54  | 97.96  | 97.37  | 96.84  | 96.41  | 95.98  | 95.68  | 95.55  | 95.40  |
| A13     | 3.05               | 24.26    | 92.9           | 100.04                          | 99.47  | 99.09  | 98.56  | 97.97  | 97.35  | 97.10  | 96.62  | 96.19  | 95.82  | 95.72  | 95.56  |
| A14     | 3.07               | 24.15    | 93.2           | 99.92                           | 99.32  | 98.96  | 98.55  | 97.86  | 97.42  | 96.82  | 96.47  | 96.15  | 95.96  | 95.78  | 95.56  |
| A15     | 3.04               | 24.35    | 92.6           | 100.04                          | 99.43  | 99.00  | 98.48  | 98.00  | 97.25  | 96.68  | 96.35  | 96.04  | 95.84  | 95.64  | 95.50  |
| A16     | 3.02               | 24.15    | 93.4           | 99.93                           | 99.15  | 98.80  | 98.39  | 97.85  | 97.20  | 96.73  | 96.37  | 96.04  | 95.72  | 95.64  | 95.52  |
| A17     | 3.05               | 24.23    | 93.5           | 100.04                          | 99.27  | 98.89  | 98.34  | 97.84  | 97.13  | 96.96  | 96.60  | 96.26  | 96.01  | 95.79  | 95.50  |
| A18     | 3.08               | 24.19    | 92.4           | 99.95                           | 99.29  | 98.93  | 98.48  | 97.92  | 97.24  | 97.20  | 96.83  | 96.49  | 96.28  | 96.20  | 95.92  |
| A19     | 3.04               | 24.04    | 93.3           | 99.98                           | 99.22  | 98.85  | 98.44  | 97.89  | 97.25  | 97.15  | 96.79  | 96.44  | 96.07  | 95.87  | 95.75  |
| A20     | 3.07               | 23.92    | 93.1           | 100.04                          | 99.30  | 98.89  | 98.36  | 97.88  | 97.16  | 97.05  | 96.65  | 96.31  | 95.94  | 95.77  | 95.48  |
| A21     | 3.02               | 24.05    | 92.6           | 99.97                           | 99.45  | 99.02  | 98.60  | 97.93  | 97.35  | 97.18  | 96.73  | 96.35  | 96.11  | 96.02  | 95.78  |
| A22     | 3.02               | 23.65    | 92.7           | 99.95                           | 99.26  | 98.96  | 98.43  | 97.88  | 97.31  | 96.91  | 96.45  | 96.02  | 95.73  | 95.57  | 95.43  |
| A23     | 3.05               | 23.75    | 93.6           | 100.02                          | 99.37  | 98.93  | 98.48  | 97.98  | 97.46  | 97.14  | 96.79  | 96.47  | 96.23  | 96.09  | 95.85  |
| A24     | 3.07               | 24.45    | 92.5           | 100.01                          | 99.28  | 98.92  | 98.39  | 97.79  | 97.16  | 97.22  | 96.86  | 96.55  | 96.19  | 96.11  | 95.94  |
| A25     | 3.05               | 23.83    | 93.4           | 100.02                          | 99.22  | 98.87  | 98.29  | 97.83  | 97.35  | 97.04  | 96.61  | 96.36  | 96.17  | 96.09  | 95.86  |
| Avg.    | 3.04               | 24.00    | 93.03          | 99.98                           | 99.29  | 98.92  | 98.49  | 97.89  | 97.32  | 97.01  | 96.62  | 96.27  | 96.00  | 95.87  | 95.67  |
| Med.    | 3.04               | 24.15    | 93.10          | 99.99                           | 99.28  | 98.92  | 98.48  | 97.89  | 97.31  | 97.05  | 96.62  | 96.31  | 96.00  | 95.87  | 95.73  |
| ST dev. | 0.0239             | 0.3953   | 0.3803         | 0.0469                          | 0.0952 | 0.0736 | 0.1018 | 0.0802 | 0.1455 | 0.1746 | 0.1701 | 0.1791 | 0.1874 | 0.2010 | 0.1773 |
| Max.    | 3.08               | 24.45    | 93.60          | 100.06                          | 99.48  | 99.09  | 98.71  | 98.08  | 97.69  | 97.33  | 96.88  | 96.57  | 96.36  | 96.21  | 95.95  |
| Min.    | 2.99               | 22.75    | 92.40          | 99.89                           | 99.15  | 98.80  | 98.29  | 97.66  | 97.10  | 96.68  | 96.34  | 95.98  | 95.68  | 95.55  | 95.40  |



**9.1.1 Test condition 1: 55 °C, Drive Current : 60mA**

| No.     | T=55°C Chromaticity Shift ( $\Delta u'v'$ ) |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
|---------|---------------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|         | 0 h                                         |        |        | 1000h  | 2000h  | 3000h  | 4000h  | 5000h  | 6000h  | 7000h  | 8000h  | 9000h  | 10000h | 11000h | 12000h |
|         | u'                                          | v'     | CCT(K) |        |        |        |        |        |        |        |        |        |        |        |        |
| A01     | 0.2492                                      | 0.5198 | 3057   | 0.0002 | 0.0004 | 0.0007 | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0019 | 0.0022 | 0.0024 | 0.0025 | 0.0029 |
| A02     | 0.2491                                      | 0.5196 | 3059   | 0.0005 | 0.0006 | 0.0008 | 0.0008 | 0.0011 | 0.0015 | 0.0017 | 0.0019 | 0.0023 | 0.0026 | 0.0028 | 0.0030 |
| A03     | 0.2488                                      | 0.5201 | 3048   | 0.0003 | 0.0006 | 0.001  | 0.0009 | 0.0012 | 0.0015 | 0.0017 | 0.0019 | 0.0021 | 0.0025 | 0.0029 | 0.0031 |
| A04     | 0.2486                                      | 0.5200 | 3058   | 0.0004 | 0.0005 | 0.0008 | 0.0009 | 0.0011 | 0.0014 | 0.0015 | 0.0018 | 0.0019 | 0.0029 | 0.0031 | 0.0033 |
| A05     | 0.2492                                      | 0.5196 | 3042   | 0.0003 | 0.0005 | 0.0008 | 0.001  | 0.0008 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0024 | 0.0026 | 0.0030 |
| A06     | 0.2491                                      | 0.5196 | 3053   | 0.0003 | 0.0005 | 0.001  | 0.001  | 0.0011 | 0.0014 | 0.0016 | 0.0019 | 0.0021 | 0.0025 | 0.0028 | 0.0029 |
| A07     | 0.2493                                      | 0.5198 | 3055   | 0.0005 | 0.0006 | 0.0008 | 0.0009 | 0.0012 | 0.0015 | 0.0017 | 0.0021 | 0.0022 | 0.0027 | 0.0029 | 0.0030 |
| A08     | 0.2490                                      | 0.5196 | 3049   | 0.0002 | 0.0004 | 0.0006 | 0.001  | 0.0014 | 0.0017 | 0.0018 | 0.0021 | 0.0025 | 0.0025 | 0.0028 | 0.0031 |
| A09     | 0.2487                                      | 0.5201 | 3050   | 0.0003 | 0.0003 | 0.0005 | 0.0009 | 0.0012 | 0.0015 | 0.0018 | 0.0020 | 0.0023 | 0.0026 | 0.0028 | 0.0030 |
| A10     | 0.2486                                      | 0.5200 | 3044   | 0.0005 | 0.0007 | 0.0008 | 0.0009 | 0.0011 | 0.0015 | 0.0019 | 0.0023 | 0.0027 | 0.0027 | 0.0030 | 0.0032 |
| A11     | 0.2486                                      | 0.5202 | 3057   | 0.0001 | 0.0003 | 0.0006 | 0.0007 | 0.001  | 0.0013 | 0.0017 | 0.0020 | 0.0024 | 0.0026 | 0.0029 | 0.0031 |
| A12     | 0.2488                                      | 0.5201 | 3053   | 0.0003 | 0.0006 | 0.0008 | 0.0008 | 0.0011 | 0.0015 | 0.0017 | 0.0020 | 0.0022 | 0.0025 | 0.0027 | 0.0030 |
| A13     | 0.2486                                      | 0.5197 | 3055   | 0.0003 | 0.0004 | 0.0006 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0022 | 0.0025 | 0.0027 | 0.0029 | 0.0031 |
| A14     | 0.2491                                      | 0.5203 | 3043   | 0.0003 | 0.0005 | 0.0008 | 0.0011 | 0.0012 | 0.0015 | 0.0017 | 0.0019 | 0.0020 | 0.0025 | 0.0028 | 0.0030 |
| A15     | 0.2490                                      | 0.5200 | 3054   | 0.0002 | 0.0003 | 0.0006 | 0.0009 | 0.0011 | 0.0014 | 0.0016 | 0.0017 | 0.0019 | 0.0025 | 0.0029 | 0.0032 |
| A16     | 0.2487                                      | 0.5198 | 3052   | 0.0002 | 0.0004 | 0.0007 | 0.001  | 0.0013 | 0.0015 | 0.0017 | 0.0019 | 0.0021 | 0.0029 | 0.0031 | 0.0032 |
| A17     | 0.2493                                      | 0.5203 | 3050   | 0.0004 | 0.0006 | 0.0009 | 0.0011 | 0.0013 | 0.0016 | 0.0020 | 0.0023 | 0.0027 | 0.0027 | 0.0027 | 0.0031 |
| A18     | 0.2491                                      | 0.5200 | 3047   | 0.0004 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.002  | 0.0023 | 0.0025 | 0.0028 | 0.0029 | 0.0030 | 0.0033 |
| A19     | 0.2488                                      | 0.5197 | 3054   | 0.0001 | 0.0003 | 0.0005 | 0.0007 | 0.0009 | 0.0013 | 0.0017 | 0.0021 | 0.0025 | 0.0025 | 0.0028 | 0.0032 |
| A20     | 0.2486                                      | 0.5201 | 3057   | 0.0003 | 0.0004 | 0.0008 | 0.001  | 0.0012 | 0.0016 | 0.0018 | 0.0019 | 0.0021 | 0.0026 | 0.0029 | 0.0031 |
| A21     | 0.2491                                      | 0.5202 | 3044   | 0.0002 | 0.0003 | 0.0007 | 0.0011 | 0.0011 | 0.0015 | 0.0017 | 0.0019 | 0.0021 | 0.0027 | 0.0030 | 0.0032 |
| A22     | 0.2490                                      | 0.5198 | 3046   | 0.0004 | 0.0006 | 0.0008 | 0.0009 | 0.0011 | 0.0014 | 0.0017 | 0.0020 | 0.0023 | 0.0028 | 0.0031 | 0.0033 |
| A23     | 0.2492                                      | 0.5196 | 3056   | 0.0002 | 0.0004 | 0.0008 | 0.0012 | 0.0014 | 0.0015 | 0.0016 | 0.0019 | 0.0020 | 0.0029 | 0.0030 | 0.0032 |
| A24     | 0.2490                                      | 0.5202 | 3047   | 0.0003 | 0.0004 | 0.0005 | 0.0007 | 0.0012 | 0.0015 | 0.0019 | 0.0023 | 0.0027 | 0.0027 | 0.0029 | 0.0031 |
| A25     | 0.2488                                      | 0.5201 | 3052   | 0.0003 | 0.0005 | 0.0007 | 0.0008 | 0.0013 | 0.0016 | 0.0017 | 0.0020 | 0.0022 | 0.0025 | 0.0027 | 0.0030 |
| Avg.    | 0.2489                                      | 0.5199 | 3051   | 0.0003 | 0.0005 | 0.0007 | 0.0009 | 0.0012 | 0.0015 | 0.0017 | 0.0020 | 0.0023 | 0.0026 | 0.0029 | 0.0031 |
| Med.    | 0.2490                                      | 0.5200 | 3052   | 0.0003 | 0.0005 | 0.0008 | 0.0009 | 0.0012 | 0.0015 | 0.0017 | 0.0020 | 0.0022 | 0.0026 | 0.0029 | 0.0031 |
| ST dev. | 0.0002                                      | 0.0002 | 5.0787 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0003 | 0.0002 | 0.0002 | 0.0001 |
| Max.    | 0.2493                                      | 0.5203 | 3059   | 0.0005 | 0.0007 | 0.0010 | 0.0012 | 0.0015 | 0.0020 | 0.0023 | 0.0025 | 0.0028 | 0.0029 | 0.0031 | 0.0033 |
| Min.    | 0.2486                                      | 0.5196 | 3042   | 0.0001 | 0.0003 | 0.0005 | 0.0007 | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0019 | 0.0024 | 0.0025 | 0.0029 |



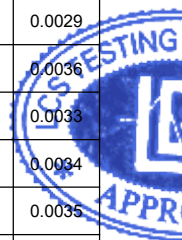
**9.2 Test condition 2: 85 °C, Drive Current : 60mA**

| Item    | V <sub>F</sub> (V) | Flux(lm) | R <sub>a</sub> | T=85°C Luminous Maintenance (%) |        |        |        |        |        |        |        |        |        |        |        |
|---------|--------------------|----------|----------------|---------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| No.     | 0 h                |          |                | 1000h                           | 2000h  | 3000h  | 4000h  | 5000h  | 6000h  | 7000h  | 8000h  | 9000h  | 10000h | 11000h | 12000h |
| B01     | 3.03               | 23.68    | 92.7           | 99.51                           | 99.13  | 98.69  | 98.14  | 97.55  | 97.01  | 96.89  | 96.51  | 96.23  | 96.05  | 95.67  | 95.44  |
| B02     | 3.09               | 23.82    | 92.9           | 99.45                           | 99.03  | 98.51  | 98.00  | 97.50  | 96.97  | 96.64  | 96.26  | 95.93  | 95.62  | 95.26  | 95.06  |
| B03     | 3.02               | 23.61    | 92.9           | 99.49                           | 99.07  | 98.59  | 98.05  | 97.50  | 96.96  | 97.09  | 96.82  | 96.50  | 96.26  | 95.82  | 95.63  |
| B04     | 2.98               | 23.52    | 93.5           | 99.46                           | 99.10  | 98.62  | 98.12  | 97.60  | 96.99  | 96.67  | 96.41  | 96.01  | 95.82  | 95.40  | 95.14  |
| B05     | 3.07               | 23.80    | 93.9           | 99.54                           | 99.18  | 98.62  | 98.14  | 97.49  | 96.83  | 96.67  | 96.39  | 95.99  | 95.66  | 95.34  | 95.10  |
| B06     | 3.09               | 22.29    | 91.9           | 99.51                           | 99.08  | 98.54  | 98.06  | 97.55  | 97.02  | 96.74  | 96.48  | 96.19  | 95.96  | 95.58  | 95.43  |
| B07     | 2.99               | 23.55    | 93.9           | 99.58                           | 99.12  | 98.63  | 98.10  | 97.56  | 97.05  | 96.88  | 96.59  | 96.31  | 96.12  | 95.82  | 95.56  |
| B08     | 3.06               | 23.72    | 93.4           | 99.49                           | 99.16  | 98.64  | 98.10  | 97.53  | 96.99  | 96.87  | 96.57  | 96.27  | 95.91  | 95.54  | 95.24  |
| B09     | 3.03               | 23.54    | 92.2           | 99.52                           | 99.12  | 98.62  | 98.13  | 97.44  | 96.91  | 96.90  | 96.61  | 96.33  | 96.14  | 95.72  | 95.58  |
| B10     | 3.00               | 22.11    | 92.5           | 99.67                           | 99.19  | 98.75  | 98.23  | 97.64  | 97.01  | 96.49  | 96.16  | 95.85  | 95.57  | 95.20  | 95.06  |
| B11     | 3.02               | 23.51    | 93.9           | 99.49                           | 99.06  | 98.61  | 98.09  | 97.51  | 96.88  | 96.71  | 96.33  | 96.09  | 95.78  | 95.33  | 95.05  |
| B12     | 3.06               | 23.71    | 92.6           | 99.59                           | 99.18  | 98.66  | 98.14  | 97.58  | 97.06  | 96.60  | 96.21  | 95.81  | 95.62  | 95.31  | 95.10  |
| B13     | 3.06               | 23.74    | 93.3           | 99.55                           | 99.18  | 98.64  | 98.18  | 97.52  | 97.01  | 96.75  | 96.47  | 96.15  | 95.83  | 95.52  | 95.37  |
| B14     | 3.05               | 23.72    | 93.6           | 99.59                           | 99.19  | 98.64  | 98.18  | 97.49  | 96.96  | 96.59  | 96.30  | 95.99  | 95.78  | 95.32  | 95.03  |
| B15     | 3.06               | 23.71    | 92.3           | 99.66                           | 99.21  | 98.65  | 98.12  | 97.53  | 96.90  | 96.53  | 96.17  | 95.82  | 95.54  | 95.12  | 94.86  |
| B16     | 2.99               | 23.55    | 93.7           | 99.70                           | 99.29  | 98.74  | 98.24  | 97.64  | 97.01  | 96.61  | 96.20  | 95.80  | 95.54  | 95.20  | 95.02  |
| B17     | 3.01               | 23.78    | 93.6           | 99.63                           | 99.23  | 98.68  | 98.15  | 97.62  | 97.10  | 96.70  | 96.42  | 96.01  | 95.67  | 95.29  | 95.16  |
| B18     | 3.10               | 23.64    | 92.8           | 99.48                           | 99.10  | 98.64  | 98.08  | 97.56  | 97.05  | 96.92  | 96.66  | 96.36  | 96.05  | 95.68  | 95.52  |
| B19     | 3.05               | 23.63    | 92.8           | 99.47                           | 99.06  | 98.64  | 98.04  | 97.45  | 96.92  | 96.89  | 96.60  | 96.29  | 96.02  | 95.59  | 95.43  |
| B20     | 3.02               | 23.28    | 93.7           | 99.37                           | 99.04  | 98.48  | 97.94  | 97.47  | 96.96  | 96.79  | 96.51  | 96.13  | 95.91  | 95.58  | 95.32  |
| B21     | 3.01               | 23.50    | 92.9           | 99.51                           | 99.12  | 98.66  | 98.01  | 97.44  | 96.90  | 96.88  | 96.50  | 96.07  | 95.89  | 95.52  | 95.27  |
| B22     | 3.03               | 23.24    | 92.3           | 99.40                           | 99.05  | 98.55  | 98.03  | 97.49  | 96.94  | 96.66  | 96.28  | 95.98  | 95.74  | 95.30  | 95.09  |
| B23     | 3.03               | 23.11    | 93.4           | 99.38                           | 99.03  | 98.56  | 97.96  | 97.55  | 97.01  | 96.89  | 96.62  | 96.34  | 96.16  | 95.79  | 95.49  |
| B24     | 3.04               | 24.04    | 92.8           | 99.50                           | 99.04  | 98.62  | 98.07  | 97.40  | 96.82  | 96.97  | 96.71  | 96.40  | 96.02  | 95.65  | 95.51  |
| B25     | 3.04               | 23.19    | 93.5           | 99.71                           | 99.30  | 98.74  | 98.26  | 98.62  | 97.99  | 96.87  | 96.59  | 96.25  | 95.91  | 95.48  | 95.28  |
| Avg.    | 3.04               | 23.48    | 93.08          | 99.53                           | 99.13  | 98.63  | 98.10  | 97.57  | 97.01  | 96.77  | 96.45  | 96.12  | 95.86  | 95.48  | 95.27  |
| Med.    | 3.03               | 23.61    | 92.90          | 99.51                           | 99.12  | 98.64  | 98.10  | 97.53  | 96.99  | 96.75  | 96.48  | 96.13  | 95.89  | 95.52  | 95.27  |
| ST dev. | 0.0321             | 0.4398   | 0.5902         | 0.0930                          | 0.0783 | 0.0665 | 0.0819 | 0.2275 | 0.2157 | 0.1515 | 0.1803 | 0.2014 | 0.2089 | 0.2077 | 0.2156 |
| Max.    | 3.10               | 24.04    | 93.90          | 99.71                           | 99.30  | 98.75  | 98.26  | 98.62  | 97.99  | 97.09  | 96.82  | 96.50  | 96.26  | 95.82  | 95.63  |
| Min.    | 2.98               | 22.11    | 91.90          | 99.37                           | 99.03  | 98.48  | 97.94  | 97.40  | 96.82  | 96.49  | 96.16  | 95.80  | 95.54  | 95.12  | 94.86  |



**9.2.1 Test condition 2: 85 °C, Drive Current : 60mA**

| No.     | T=85°C Chromaticity Shift ( $\Delta u'v'$ ) |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
|---------|---------------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|         | 0 h                                         |        |        | 1000h  | 2000h  | 3000h  | 4000h  | 5000h  | 6000h  | 7000h  | 8000h  | 9000h  | 10000h | 11000h | 12000h |
|         | u'                                          | v'     | CCT(K) |        |        |        |        |        |        |        |        |        |        |        |        |
| B01     | 0.2494                                      | 0.5195 | 3069   | 0.0003 | 0.0006 | 0.0009 | 0.0011 | 0.0012 | 0.0017 | 0.0020 | 0.0022 | 0.0025 | 0.0023 | 0.0027 | 0.0028 |
| B02     | 0.2486                                      | 0.5195 | 3069   | 0.0003 | 0.0004 | 0.0006 | 0.0008 | 0.0011 | 0.0015 | 0.0017 | 0.0019 | 0.0023 | 0.0028 | 0.0030 | 0.0032 |
| B03     | 0.2489                                      | 0.5198 | 3063   | 0.0002 | 0.0003 | 0.0005 | 0.0008 | 0.0011 | 0.0015 | 0.0017 | 0.0019 | 0.0021 | 0.0027 | 0.0031 | 0.0034 |
| B04     | 0.2484                                      | 0.5202 | 3069   | 0.0003 | 0.0006 | 0.0008 | 0.0011 | 0.0015 | 0.0018 | 0.0019 | 0.0022 | 0.0023 | 0.0031 | 0.0034 | 0.0032 |
| B05     | 0.2489                                      | 0.5196 | 3058   | 0.0002 | 0.0004 | 0.0007 | 0.0012 | 0.0014 | 0.002  | 0.0023 | 0.0027 | 0.0030 | 0.0023 | 0.0024 | 0.0032 |
| B06     | 0.2488                                      | 0.5199 | 3066   | 0.0004 | 0.0007 | 0.0008 | 0.0011 | 0.0016 | 0.002  | 0.0022 | 0.0025 | 0.0027 | 0.0026 | 0.0029 | 0.0031 |
| B07     | 0.2495                                      | 0.5200 | 3070   | 0.0002 | 0.0005 | 0.0008 | 0.0009 | 0.0013 | 0.0017 | 0.0019 | 0.0023 | 0.0024 | 0.0029 | 0.0031 | 0.0031 |
| B08     | 0.2491                                      | 0.5194 | 3061   | 0.0004 | 0.0007 | 0.0009 | 0.001  | 0.0015 | 0.0017 | 0.0018 | 0.0021 | 0.0025 | 0.0027 | 0.0032 | 0.0033 |
| B09     | 0.2484                                      | 0.5200 | 3068   | 0.0003 | 0.0006 | 0.0008 | 0.0011 | 0.0016 | 0.002  | 0.0023 | 0.0025 | 0.0028 | 0.0029 | 0.0027 | 0.0032 |
| B10     | 0.2485                                      | 0.5202 | 3065   | 0.0002 | 0.0005 | 0.0007 | 0.0012 | 0.0015 | 0.0018 | 0.0022 | 0.0026 | 0.0030 | 0.0031 | 0.0032 | 0.0035 |
| B11     | 0.2489                                      | 0.5204 | 3068   | 0.0003 | 0.0004 | 0.0005 | 0.0007 | 0.0012 | 0.0017 | 0.0021 | 0.0024 | 0.0028 | 0.0029 | 0.0031 | 0.0031 |
| B12     | 0.2488                                      | 0.5203 | 3064   | 0.0002 | 0.0005 | 0.0008 | 0.0011 | 0.0014 | 0.0017 | 0.0019 | 0.0022 | 0.0024 | 0.0024 | 0.0027 | 0.0031 |
| B13     | 0.2484                                      | 0.5200 | 3071   | 0.0003 | 0.0004 | 0.0007 | 0.0012 | 0.0013 | 0.0018 | 0.0021 | 0.0023 | 0.0026 | 0.0030 | 0.0027 | 0.0031 |
| B14     | 0.2495                                      | 0.5200 | 3057   | 0.0002 | 0.0005 | 0.0008 | 0.0011 | 0.0015 | 0.002  | 0.0022 | 0.0024 | 0.0025 | 0.0029 | 0.0027 | 0.0029 |
| B15     | 0.2487                                      | 0.5202 | 3064   | 0.0004 | 0.0006 | 0.0009 | 0.0013 | 0.0015 | 0.0019 | 0.0021 | 0.0022 | 0.0024 | 0.0024 | 0.0031 | 0.0036 |
| B16     | 0.2489                                      | 0.5197 | 3067   | 0.0003 | 0.0004 | 0.0007 | 0.0012 | 0.0014 | 0.0019 | 0.0021 | 0.0023 | 0.0025 | 0.0030 | 0.0034 | 0.0033 |
| B17     | 0.2491                                      | 0.5200 | 3063   | 0.0004 | 0.0006 | 0.0009 | 0.0009 | 0.0015 | 0.0018 | 0.0022 | 0.0025 | 0.0029 | 0.0027 | 0.0031 | 0.0034 |
| B18     | 0.2494                                      | 0.5200 | 3063   | 0.0002 | 0.0004 | 0.0008 | 0.0011 | 0.0015 | 0.0018 | 0.0021 | 0.0023 | 0.0026 | 0.0032 | 0.0031 | 0.0035 |
| B19     | 0.2490                                      | 0.5196 | 3072   | 0.0003 | 0.0004 | 0.0006 | 0.001  | 0.0013 | 0.0019 | 0.0023 | 0.0027 | 0.0031 | 0.0025 | 0.0031 | 0.0033 |
| B20     | 0.2489                                      | 0.5197 | 3077   | 0.0002 | 0.0005 | 0.0007 | 0.0009 | 0.0012 | 0.0017 | 0.0019 | 0.0020 | 0.0022 | 0.0027 | 0.0033 | 0.0035 |
| B21     | 0.2495                                      | 0.5203 | 3058   | 0.0003 | 0.0006 | 0.0008 | 0.001  | 0.0016 | 0.0021 | 0.0023 | 0.0025 | 0.0027 | 0.0028 | 0.0030 | 0.0035 |
| B22     | 0.2488                                      | 0.5197 | 3058   | 0.0004 | 0.0007 | 0.0009 | 0.0011 | 0.0014 | 0.0019 | 0.0022 | 0.0025 | 0.0028 | 0.0031 | 0.0035 | 0.0035 |
| B23     | 0.2492                                      | 0.5197 | 3070   | 0.0002 | 0.0003 | 0.0008 | 0.0012 | 0.0014 | 0.0019 | 0.0020 | 0.0023 | 0.0024 | 0.0031 | 0.0032 | 0.0032 |
| B24     | 0.2492                                      | 0.5205 | 3063   | 0.0004 | 0.0005 | 0.0008 | 0.001  | 0.0016 | 0.002  | 0.0024 | 0.0028 | 0.0032 | 0.0027 | 0.0030 | 0.0033 |
| B25     | 0.2487                                      | 0.5199 | 3062   | 0.0002 | 0.0006 | 0.0007 | 0.0011 | 0.0013 | 0.0019 | 0.0020 | 0.0023 | 0.0025 | 0.0029 | 0.0026 | 0.0033 |
| Avg.    | 0.2489                                      | 0.5199 | 3065   | 0.0003 | 0.0005 | 0.0008 | 0.0010 | 0.0014 | 0.0018 | 0.0021 | 0.0023 | 0.0026 | 0.0028 | 0.0030 | 0.0033 |
| Med.    | 0.2489                                      | 0.5200 | 3065   | 0.0003 | 0.0005 | 0.0008 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0023 | 0.0025 | 0.0028 | 0.0031 | 0.0033 |
| ST dev. | 0.0003                                      | 0.0003 | 5.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0003 | 0.0003 | 0.0003 | 0.0002 |
| Max.    | 0.2495                                      | 0.5205 | 3077   | 0.0004 | 0.0007 | 0.0009 | 0.0013 | 0.0016 | 0.0021 | 0.0024 | 0.0028 | 0.0032 | 0.0032 | 0.0035 | 0.0036 |
| Min.    | 0.2484                                      | 0.5194 | 3057   | 0.0002 | 0.0003 | 0.0005 | 0.0007 | 0.0011 | 0.0015 | 0.0017 | 0.0019 | 0.0021 | 0.0023 | 0.0024 | 0.0028 |





**9.3 Test condition 3: 105 °C, Drive Current : 60mA**

| Item    | V <sub>F</sub> (V) | Flux(lm) | R <sub>a</sub> | T=105°C Luminous Maintenance (%) |        |        |        |        |        |        |        |        |        |        |        |
|---------|--------------------|----------|----------------|----------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| No.     | 0 h                |          |                | 1000h                            | 2000h  | 3000h  | 4000h  | 5000h  | 6000h  | 7000h  | 8000h  | 9000h  | 10000h | 11000h | 12000h |
| C01     | 3.05               | 23.16    | 92.5           | 99.32                            | 98.84  | 98.25  | 97.65  | 97.12  | 96.49  | 96.55  | 96.12  | 96.00  | 95.56  | 95.25  | 94.62  |
| C02     | 3.10               | 23.18    | 92.6           | 99.46                            | 98.90  | 98.35  | 97.69  | 97.22  | 96.59  | 96.17  | 95.74  | 95.59  | 95.19  | 94.83  | 94.12  |
| C03     | 3.04               | 23.01    | 93.2           | 99.40                            | 98.78  | 98.28  | 97.59  | 97.10  | 96.58  | 96.71  | 96.39  | 96.35  | 95.88  | 95.55  | 94.93  |
| C04     | 3.00               | 23.07    | 93.6           | 99.25                            | 98.76  | 98.26  | 97.56  | 97.12  | 96.61  | 96.33  | 96.02  | 95.86  | 95.55  | 95.10  | 94.43  |
| C05     | 3.08               | 23.28    | 94.3           | 99.37                            | 98.83  | 98.27  | 97.62  | 97.15  | 96.62  | 96.31  | 95.98  | 95.83  | 95.46  | 95.07  | 94.50  |
| C06     | 3.08               | 21.86    | 91.4           | 99.28                            | 98.84  | 98.26  | 97.55  | 97.18  | 96.67  | 96.49  | 96.18  | 96.12  | 95.74  | 95.29  | 94.65  |
| C07     | 3.02               | 22.91    | 94.5           | 99.34                            | 98.81  | 98.23  | 97.52  | 97.14  | 96.60  | 96.50  | 96.16  | 96.00  | 95.71  | 95.35  | 94.70  |
| C08     | 3.07               | 23.12    | 93.7           | 99.41                            | 98.91  | 98.28  | 97.57  | 97.20  | 96.65  | 96.46  | 96.11  | 95.99  | 95.67  | 95.24  | 94.68  |
| C09     | 3.04               | 22.94    | 92.7           | 99.43                            | 98.88  | 98.32  | 98.10  | 97.73  | 97.19  | 96.53  | 96.19  | 96.02  | 95.59  | 95.25  | 94.69  |
| C10     | 3.02               | 21.66    | 91.9           | 99.34                            | 98.85  | 98.23  | 97.53  | 97.08  | 96.50  | 96.15  | 95.77  | 95.61  | 95.19  | 94.76  | 94.10  |
| C11     | 3.03               | 22.96    | 94.2           | 99.29                            | 98.89  | 98.28  | 98.05  | 97.60  | 96.97  | 96.24  | 95.81  | 95.57  | 95.20  | 94.79  | 94.16  |
| C12     | 3.08               | 23.28    | 92.7           | 99.32                            | 98.86  | 98.25  | 97.54  | 97.07  | 96.43  | 96.22  | 95.78  | 95.52  | 95.05  | 94.66  | 94.06  |
| C13     | 3.07               | 23.33    | 92.9           | 99.54                            | 98.95  | 98.39  | 97.65  | 97.24  | 96.71  | 96.48  | 96.15  | 95.99  | 95.64  | 95.37  | 94.83  |
| C14     | 3.06               | 23.08    | 93.3           | 99.44                            | 98.99  | 98.33  | 97.68  | 97.18  | 96.64  | 96.20  | 95.86  | 95.62  | 95.33  | 95.00  | 94.42  |
| C15     | 3.05               | 23.26    | 92.9           | 99.26                            | 98.80  | 98.17  | 97.92  | 97.51  | 96.90  | 96.06  | 95.65  | 95.40  | 95.07  | 94.65  | 94.06  |
| C16     | 3.01               | 23.00    | 93.2           | 99.39                            | 98.86  | 98.26  | 97.55  | 97.12  | 96.46  | 96.11  | 95.65  | 95.51  | 95.07  | 94.62  | 93.91  |
| C17     | 3.04               | 23.37    | 94.0           | 99.51                            | 98.88  | 98.38  | 97.70  | 97.19  | 96.66  | 96.34  | 96.01  | 95.86  | 95.55  | 95.26  | 94.57  |
| C18     | 3.11               | 23.00    | 93.4           | 99.24                            | 98.86  | 98.20  | 97.55  | 97.09  | 96.58  | 96.58  | 96.27  | 96.05  | 95.76  | 95.49  | 94.93  |
| C19     | 3.07               | 23.08    | 93.1           | 99.23                            | 98.79  | 98.22  | 97.57  | 97.13  | 96.59  | 96.53  | 96.19  | 96.02  | 95.62  | 95.17  | 94.56  |
| C20     | 3.03               | 22.87    | 93.3           | 99.28                            | 98.83  | 98.23  | 97.54  | 97.07  | 96.54  | 96.43  | 96.10  | 95.91  | 95.54  | 95.24  | 94.60  |
| C21     | 3.03               | 22.86    | 92.7           | 99.46                            | 98.94  | 98.27  | 97.63  | 97.15  | 96.52  | 96.56  | 96.13  | 95.88  | 95.47  | 95.09  | 94.41  |
| C22     | 3.04               | 22.83    | 92.6           | 99.20                            | 98.72  | 98.19  | 97.50  | 97.01  | 96.38  | 96.29  | 95.86  | 95.62  | 95.34  | 95.01  | 94.33  |
| C23     | 3.05               | 22.47    | 93.5           | 99.33                            | 98.82  | 98.25  | 97.60  | 97.13  | 96.61  | 96.52  | 96.20  | 96.07  | 95.69  | 95.32  | 94.62  |
| C24     | 3.06               | 23.61    | 92.7           | 99.44                            | 98.94  | 98.31  | 97.69  | 97.15  | 96.64  | 96.60  | 96.29  | 96.17  | 95.84  | 95.53  | 94.88  |
| C25     | 3.06               | 22.78    | 93.6           | 99.47                            | 98.88  | 98.24  | 97.81  | 97.25  | 96.72  | 96.42  | 96.09  | 95.95  | 95.54  | 95.18  | 94.57  |
| Avg.    | 3.05               | 23.0     | 93.1           | 99.36                            | 98.86  | 98.27  | 97.65  | 97.20  | 96.63  | 96.39  | 96.03  | 95.86  | 95.49  | 95.12  | 94.49  |
| Med.    | 3.05               | 23.0     | 93.2           | 99.34                            | 98.86  | 98.26  | 97.60  | 97.15  | 96.61  | 96.43  | 96.10  | 95.91  | 95.55  | 95.18  | 94.57  |
| ST dev. | 0.0272             | 0.4278   | 0.7217         | 0.0939                           | 0.0629 | 0.0547 | 0.1586 | 0.1694 | 0.1729 | 0.1749 | 0.2075 | 0.2419 | 0.2464 | 0.2737 | 0.2893 |
| Max.    | 3.11               | 23.6     | 94.5           | 99.54                            | 98.99  | 98.39  | 98.10  | 97.73  | 97.19  | 96.71  | 96.39  | 96.35  | 95.88  | 95.55  | 94.93  |
| Min.    | 3.00               | 21.7     | 91.4           | 99.20                            | 98.72  | 98.17  | 97.50  | 97.01  | 96.38  | 96.06  | 95.65  | 95.40  | 95.05  | 94.62  | 93.91  |



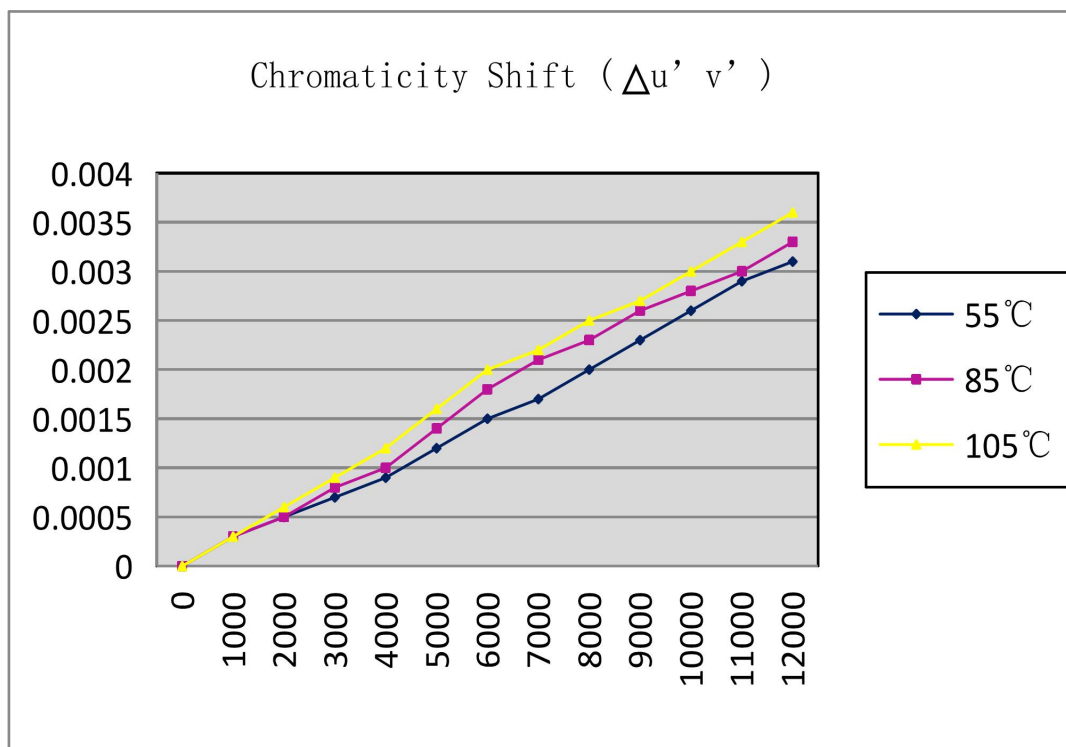
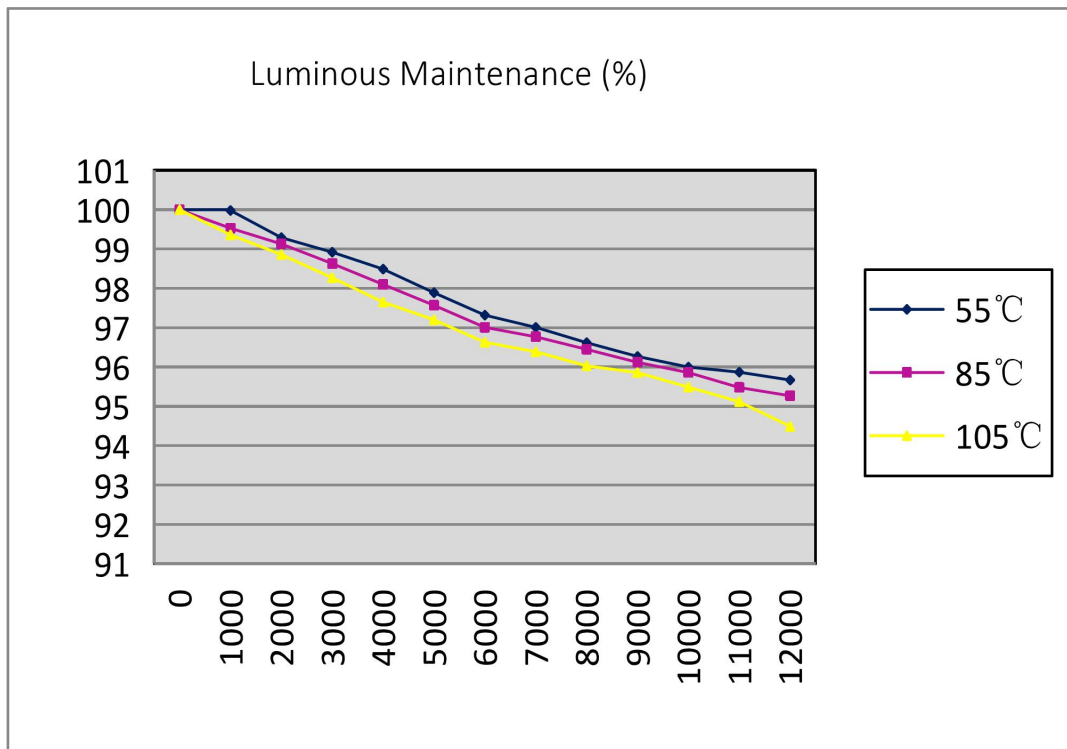


**9.3.1 Test condition 3: 105 °C, Drive Current : 60mA**

| No.     | T=105°C Chromaticity Shift ( $\Delta u'v'$ ) |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
|---------|----------------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|         | 0 h                                          |        |        | 1000h  | 2000h  | 3000h  | 4000h  | 5000h  | 6000h  | 7000h  | 8000h  | 9000h  | 10000h | 11000h | 12000h |
|         | u'                                           | v'     | CCT(K) |        |        |        |        |        |        |        |        |        |        |        |        |
| C01     | 0.2492                                       | 0.5196 | 3090   | 0.0002 | 0.0006 | 0.0009 | 0.0012 | 0.0017 | 0.0019 | 0.0022 | 0.0024 | 0.0027 | 0.0025 | 0.0028 | 0.0030 |
| C02     | 0.2487                                       | 0.5193 | 3089   | 0.0003 | 0.0005 | 0.001  | 0.0011 | 0.0015 | 0.0018 | 0.0023 | 0.0022 | 0.0026 | 0.0029 | 0.0034 | 0.0036 |
| C03     | 0.2491                                       | 0.5197 | 3086   | 0.0004 | 0.0006 | 0.0011 | 0.0012 | 0.0015 | 0.0019 | 0.0021 | 0.0023 | 0.0025 | 0.0027 | 0.0033 | 0.0038 |
| C04     | 0.2487                                       | 0.5198 | 3089   | 0.0003 | 0.0007 | 0.0011 | 0.0013 | 0.0017 | 0.0021 | 0.0022 | 0.0025 | 0.0026 | 0.0034 | 0.0037 | 0.0038 |
| C05     | 0.2489                                       | 0.5198 | 3079   | 0.0002 | 0.0006 | 0.0008 | 0.0012 | 0.0015 | 0.0018 | 0.0021 | 0.0025 | 0.0028 | 0.0026 | 0.0025 | 0.0034 |
| C06     | 0.2485                                       | 0.5198 | 3090   | 0.0004 | 0.0004 | 0.0008 | 0.0012 | 0.0014 | 0.0019 | 0.0021 | 0.0024 | 0.0026 | 0.0029 | 0.0034 | 0.0035 |
| C07     | 0.2497                                       | 0.5197 | 3093   | 0.0003 | 0.0006 | 0.001  | 0.0014 | 0.0017 | 0.0021 | 0.0023 | 0.0027 | 0.0028 | 0.0033 | 0.0034 | 0.0036 |
| C08     | 0.2493                                       | 0.5195 | 3082   | 0.0004 | 0.0005 | 0.0009 | 0.0011 | 0.0015 | 0.0019 | 0.0024 | 0.0023 | 0.0027 | 0.0028 | 0.0031 | 0.0036 |
| C09     | 0.2482                                       | 0.5200 | 3087   | 0.0002 | 0.0006 | 0.0008 | 0.0012 | 0.0018 | 0.0021 | 0.0024 | 0.0026 | 0.0029 | 0.0030 | 0.0032 | 0.0035 |
| C10     | 0.2486                                       | 0.5205 | 3087   | 0.0003 | 0.0007 | 0.0011 | 0.0013 | 0.0019 | 0.0022 | 0.0026 | 0.0030 | 0.0034 | 0.0033 | 0.0034 | 0.0035 |
| C11     | 0.2487                                       | 0.5203 | 3088   | 0.0004 | 0.0006 | 0.0009 | 0.0012 | 0.0015 | 0.0019 | 0.0023 | 0.0026 | 0.0030 | 0.0033 | 0.0035 | 0.0037 |
| C12     | 0.2490                                       | 0.5205 | 3085   | 0.0003 | 0.0005 | 0.0008 | 0.0014 | 0.0018 | 0.0018 | 0.0022 | 0.0023 | 0.0025 | 0.0027 | 0.0030 | 0.0035 |
| C13     | 0.2481                                       | 0.5201 | 3091   | 0.0004 | 0.0004 | 0.0007 | 0.0011 | 0.0015 | 0.0019 | 0.0022 | 0.0024 | 0.0027 | 0.0031 | 0.0033 | 0.0033 |
| C14     | 0.2498                                       | 0.5199 | 3079   | 0.0002 | 0.0006 | 0.0008 | 0.0012 | 0.0015 | 0.0019 | 0.0021 | 0.0023 | 0.0024 | 0.0032 | 0.0035 | 0.0036 |
| C15     | 0.2489                                       | 0.5202 | 3079   | 0.0005 | 0.0005 | 0.0007 | 0.0013 | 0.0017 | 0.0019 | 0.0021 | 0.0022 | 0.0024 | 0.0024 | 0.0032 | 0.0034 |
| C16     | 0.2490                                       | 0.5195 | 3091   | 0.0001 | 0.0007 | 0.0011 | 0.0012 | 0.0018 | 0.002  | 0.0022 | 0.0024 | 0.0026 | 0.0032 | 0.0035 | 0.0037 |
| C17     | 0.2493                                       | 0.5203 | 3085   | 0.0003 | 0.0006 | 0.0008 | 0.0012 | 0.0015 | 0.0019 | 0.0023 | 0.0026 | 0.0030 | 0.0030 | 0.0032 | 0.0034 |
| C18     | 0.2496                                       | 0.5202 | 3084   | 0.0004 | 0.0005 | 0.0009 | 0.0012 | 0.0016 | 0.0021 | 0.0024 | 0.0026 | 0.0029 | 0.0031 | 0.0032 | 0.0036 |
| C19     | 0.2488                                       | 0.5199 | 3092   | 0.0002 | 0.0006 | 0.0012 | 0.0014 | 0.0018 | 0.002  | 0.0024 | 0.0028 | 0.0032 | 0.0028 | 0.0033 | 0.0036 |
| C20     | 0.2491                                       | 0.5194 | 3100   | 0.0003 | 0.0004 | 0.0007 | 0.0012 | 0.0015 | 0.0019 | 0.0021 | 0.0022 | 0.0024 | 0.0030 | 0.0032 | 0.0038 |
| C21     | 0.2492                                       | 0.5202 | 3079   | 0.0002 | 0.0006 | 0.0011 | 0.0013 | 0.0017 | 0.002  | 0.0022 | 0.0024 | 0.0026 | 0.0032 | 0.0033 | 0.0035 |
| C22     | 0.2488                                       | 0.5196 | 3079   | 0.0004 | 0.0007 | 0.001  | 0.0012 | 0.0016 | 0.0019 | 0.0022 | 0.0025 | 0.0028 | 0.0031 | 0.0035 | 0.0039 |
| C23     | 0.2491                                       | 0.5195 | 3096   | 0.0004 | 0.0006 | 0.0008 | 0.0013 | 0.0017 | 0.0021 | 0.0022 | 0.0025 | 0.0026 | 0.0033 | 0.0036 | 0.0037 |
| C24     | 0.2491                                       | 0.5207 | 3087   | 0.0003 | 0.0005 | 0.0009 | 0.0012 | 0.0016 | 0.002  | 0.0024 | 0.0028 | 0.0032 | 0.0032 | 0.0033 | 0.0038 |
| C25     | 0.2489                                       | 0.5198 | 3082   | 0.0002 | 0.0006 | 0.001  | 0.0014 | 0.0018 | 0.0019 | 0.0021 | 0.0023 | 0.0025 | 0.0034 | 0.0035 | 0.0039 |
| Avg.    | 0.2490                                       | 0.5199 | 3087   | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0016 | 0.0020 | 0.0022 | 0.0025 | 0.0027 | 0.0030 | 0.0033 | 0.0036 |
| Med.    | 0.2490                                       | 0.5198 | 3087   | 0.0003 | 0.0006 | 0.0009 | 0.0012 | 0.0016 | 0.0019 | 0.0022 | 0.0024 | 0.0027 | 0.0031 | 0.0033 | 0.0036 |
| ST dev. | 0.0004                                       | 0.0004 | 5.6146 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0003 | 0.0003 | 0.0003 | 0.0002 |
| Max.    | 0.2498                                       | 0.5207 | 3100   | 0.0005 | 0.0007 | 0.0012 | 0.0014 | 0.0019 | 0.0022 | 0.0026 | 0.0030 | 0.0034 | 0.0034 | 0.0037 | 0.0039 |
| Min.    | 0.2481                                       | 0.5193 | 3079   | 0.0001 | 0.0004 | 0.0007 | 0.0011 | 0.0014 | 0.0018 | 0.0021 | 0.0022 | 0.0024 | 0.0024 | 0.0025 | 0.0030 |



#### 9.4 Chart



**10. Observation of failures**

No optical, Electrical or mechanical failure of any LED Package was seen during the lifetime testing.

**11. Photometric measurement uncertainty**

2%

**12. TM-21-11 report: Projecting long term lumen maintenance of LED Light Sources**

| Test Condition 1 - 55°C Case Temp                |                | Test Condition 2 - 85°C Case Temp                |                | Test Condition 3 - 105°C Case Temp               |                |
|--------------------------------------------------|----------------|--------------------------------------------------|----------------|--------------------------------------------------|----------------|
| Sample size                                      | 25             | Sample size                                      | 25             | Sample size                                      | 25             |
| Number of failures                               | 0              | Number of failures                               | 0              | Number of failures                               | 0              |
| DUT drive current used in the test (mA)          | 60             | DUT drive current used in the test (mA)          | 60             | DUT drive current used in the test (mA)          | 60             |
| Test duration (hours)                            | 12,000         | Test duration (hours)                            | 12,000         | Test duration (hours)                            | 12,000         |
| Test duration used for projection (hour to hour) | 6,000 - 12,000 | Test duration used for projection (hour to hour) | 6,000 - 12,000 | Test duration used for projection (hour to hour) | 6,000 - 12,000 |
| Tested case temperature (°C)                     | 55             | Tested case temperature (°C)                     | 85             | Tested case temperature (°C)                     | 105            |
| $\alpha$                                         | 2.906E-06      | $\alpha$                                         | 3.117E-06      | $\alpha$                                         | 3.548E-06      |
| B                                                | 0.989          | B                                                | 0.989          | B                                                | 0.988          |
| Reported L70(12k) (hours)                        | >72000         | Reported L70(12k) (hours)                        | >72000         | Reported L70(12k) (hours)                        | >72000         |

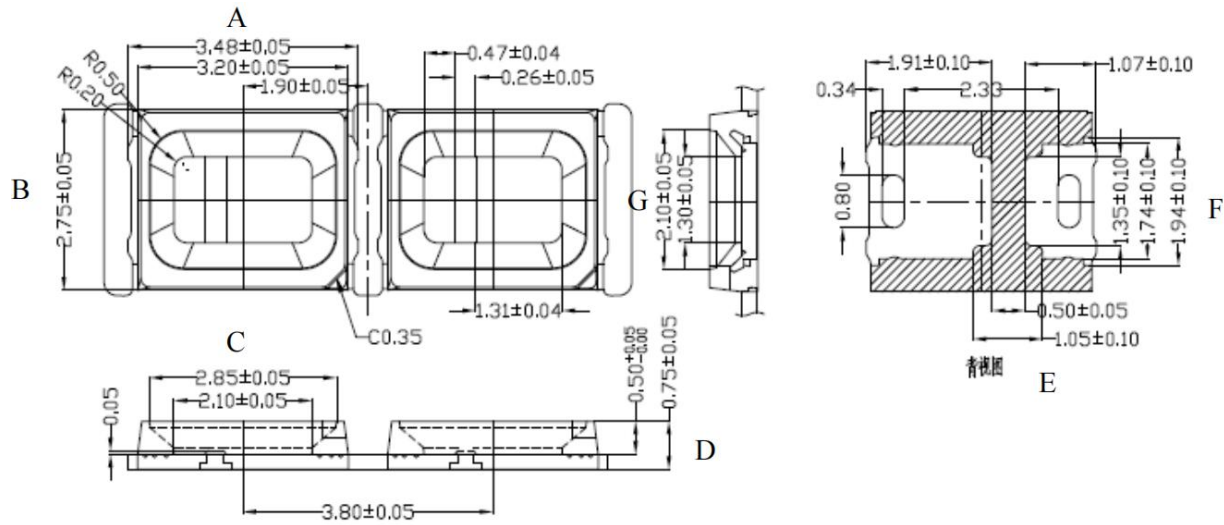


### 13. ENERGY STAR® LM-80 Cover Sheet

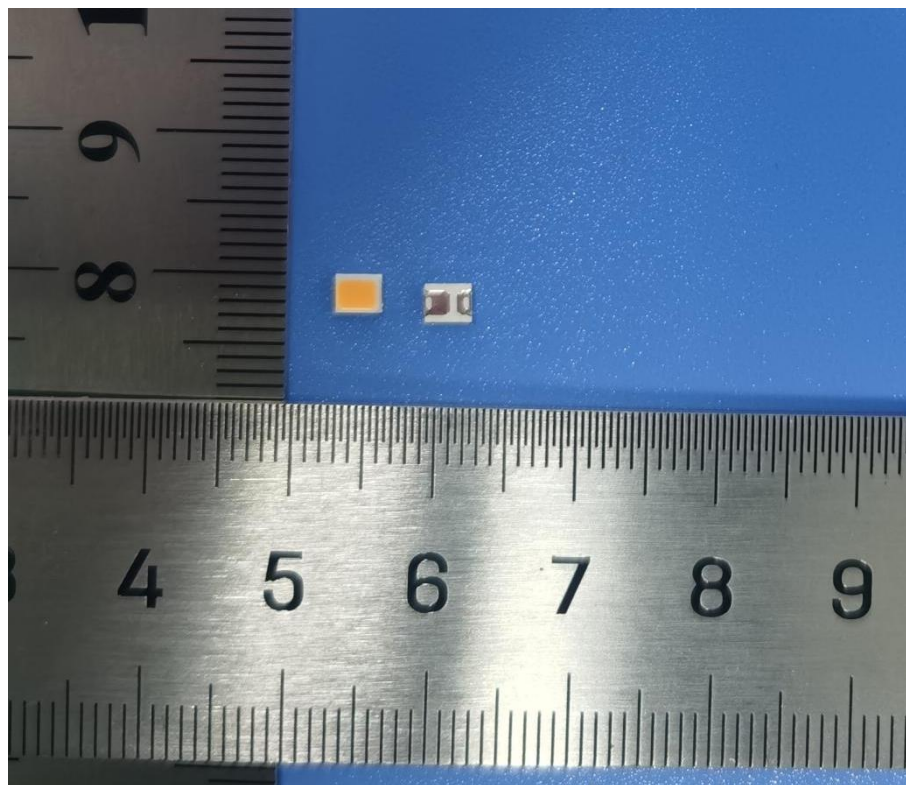
| Administrative Information                                            |                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Tested subcomponent series:                                           | -                                                                                                                                                                                                                                                                                                                                                                                             |
| Tested subcomponent model number:                                     | 2835-3V-0.2W                                                                                                                                                                                                                                                                                                                                                                                  |
| Report issue date:                                                    | February 23, 2022                                                                                                                                                                                                                                                                                                                                                                             |
| Report revision date (if applicable):                                 | -                                                                                                                                                                                                                                                                                                                                                                                             |
| Testing start date:                                                   | September 28, 2020                                                                                                                                                                                                                                                                                                                                                                            |
| Testing completion date:                                              | February 10, 2022                                                                                                                                                                                                                                                                                                                                                                             |
| DUT sampling method:                                                  | LED samples for IESNA LM-80 testing consist of units built from a minimum of three manufacturing lots with each manufacturing lot built from different wafer lots built on non-consecutive days.<br>These manufacturing lots are picked to represent a wide parametric distribution.<br>Each Sample is soldered to all of the reliability stress boards for a given set of IESNA LM-80 tests. |
| DUT Identification                                                    |                                                                                                                                                                                                                                                                                                                                                                                               |
| DUT manufacturer's name:                                              | Yangzhou Edison Opto Corporation                                                                                                                                                                                                                                                                                                                                                              |
| DUT identification, e.g., model number:                               | 2835-3V-0.2W                                                                                                                                                                                                                                                                                                                                                                                  |
| Description of DUT, including if the DUT is an LED package or module: | LED 2835 package                                                                                                                                                                                                                                                                                                                                                                              |
| DUT Characteristics                                                   |                                                                                                                                                                                                                                                                                                                                                                                               |
| Total input power (W):                                                | 0.2                                                                                                                                                                                                                                                                                                                                                                                           |
| Average current density per LED die (mA/mm <sup>2</sup> ):            | 8.6207                                                                                                                                                                                                                                                                                                                                                                                        |
| Average power density per LED die (W/mm <sup>2</sup> ):               | 0.0287                                                                                                                                                                                                                                                                                                                                                                                        |
| Representative CRI (Ra) of the tested sample set:                     | 90                                                                                                                                                                                                                                                                                                                                                                                            |
| Minimum die edge to die edge spacing:                                 | -                                                                                                                                                                                                                                                                                                                                                                                             |



#### 14. Mechanical Dimensions



#### 15. Photo of samples:



\*\*\*\*\*END OF THIS REPORT\*\*\*\*\*