



Shenzhen Belling Efficiency Testing Lab Co., Ltd



# TEST REPORT

## ANSI/IES LM-80-15

### MEASURING LUMEN MAINTENANCE OF LED LIGHT SOURCES For

**Shenzhen HoneBright Technology Co.,Ltd**

Floor, 5 Building, Hongyu Guangming Valley, 11 Youmagang Road,  
Gongming Town, Guangming District, Shenzhen, China

**Report No.:** BL210714008-9

**Product Description:** SMD LED

**Model No.:** AW-21/C2A1C27Y26JJ

**Test Initiation Date:** 2021-07-15

**Test Completion Date:** 2021-07-15 to 2023-08-07

**Report Issue Date:** 2023-08-14

**Test Standard:** ANSI/IES LM-80-15

**Test Laboratory:** Shenzhen Belling Efficiency Testing Lab Co.,Ltd

**Tested by**

Sam Chen

**Reviewed by**

Jason zhou



*Sam Chen*

*Jason zhou*

Note: The test data was only valid for the test sample(s). This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or use in part without prior written consent from Shenzhen Belling Efficiency Testing Lab Co., Ltd. This report must not be used by the customer to claim product certification, approval, or endorsement By NVLAP, NIST, or any agency of the U.S. Government.

## TABLE OF CONTENTS

<b>1-GENERAL INFORMATION.....</b>	<b>3</b>
1.1 Product Description for Equipment under Test (EUT).....	3
1.2 Family products covered by this report:.....	3
1.3 Drive Level.....	4
1.4 Ambient Conditions for Maintenance Test.....	4
1.5 Photometric measurement uncertainty.....	4
1.6 Standards Used:.....	4
1.7 Test Facility Description.....	4
1.8 Statement of Traceability.....	4
1.9 Test Equipment List.....	5
1.10 Sample Set.....	5
<b>2-Summary of Test Result.....</b>	<b>6</b>
<b>3 Test Data.....</b>	<b>8</b>
3.1 Data Set 1, 55°C, 300mA (Lumen Maintenance).....	8
3.2 Data Set 1, 55°C, 300mA (Forward Voltage).....	10
3.3 Data Set 1, 55°C, 300mA (Chromaticity Shift).....	12
3.4 Data Set 2, 85°C, 300mA (Lumen Maintenance).....	14
3.5 Data Set 2, 85°C, 300mA (Forward Voltage).....	16
3.6 Data Set 2, 85°C, 300mA (Chromaticity Shift).....	18
3.7 Data Set 3, 105°C, 300mA (Lumen Maintenance).....	20
3.8 Data Set 3, 105°C, 300mA (Forward Voltage).....	22
3.9 Data Set 3, 105°C, 300mA (Chromaticity Shift).....	24
<b>4-EUT Photos.....</b>	<b>26</b>

# 1-GENERAL INFORMATION

## 1.1 Product Description for Equipment under Test (EUT)

**Manufacturer:** Shenzhen HoneBright Technology Co.,Ltd

**Brand name:** HoneBright

**Part Number:** AW-21/C2A1C27Y26JJ

**Part Type:** SMD LED

**Product Description:** VF 3V, IF 300mA, 1W

**CCT:** 2700K

**Die Spacing(mm):** N/A

**Average Power Density per LED die(W/mm2):** 1.182

**Average Current Density per LED die(mA/mm2):** 394.167

**Repersnetative CRI (Ra) of the tested sample set  
(Indicate whether the reported calue s the mean or median value of the sample set, or per unit):** 90

**LED light source monitoring interval:** The LED array are inspected at regular interval (24 hours) throughout the 17000 hours test.

**Photometric measurement uncertainty:** 1.8% on flux measurements for LM-80 testing.

## 1.2 Family products covered by this report:

According to ENERGY STAR® Requirements for the Use of LM-80 Data, the following products can be covered by this report base on the information and declaration provided by manufacturer. The information of these models shows that the covered products meet all section 4 requirements of ENERGY STAR® Requirements for the Use of IES/NA LM-80 Data (September 28, 2017)

This report covers the following models:

Test Model Name	Family Model Name	Difference
AW-21/C2A1C27Y26JJ	AW-21/A2A1CXXXXXXJ	First XXX: CCT code; Sencond XX: Flux code; Last X: CRI code.
	AW-21/B2A1CXXXXXXJ	
	AW-21/C2A1CXXXXXXJ	
	AW-21/D2A1CXXXXXXJ	

### 1.3 Drive Level

Samples are driven with a constant direct current (DC) during maintenance test, photometric and electrical measurement. The current value was regulated to within  $\pm 3\%$  of the specified value of the manufacturer during maintenance test, and was within  $\pm 0.5\%$  during photometric and electrical measurement test.

### 1.4 Ambient Conditions for Maintenance Test

For lumen maintenance test, samples within one data set, were installed on cooling boards in thermal chambers with minimal ambient airflow. The case temperature and ambient temperature was monitored by thermocouples which one was soldered to the coldest DUTs' case ( $TMP_{LED}$ ) location, while the other is mounted at a distance of 5 mm above the TMP location. During life testing,  $TMP_{LED}$  of the coldest LEDs were maintained at a temperature that was greater than or equal to  $2^{\circ}C$  below the corresponding nominal case temperature.

Surrounding air was maintained at a temperature that was greater than or equal to  $5^{\circ}C$  below the corresponding nominal case temperature. Thermocouples were shielded from direct DUT optical radiation and comply with Type K.

Samples were connected to DC power supply in series circuits with a constant current. The forward current was regulated to within  $\pm 3\%$  of the specified value of the manufacturer.

Surrounding Air temperature for life test : controlled to within  $-5^{\circ}C$  of the case temperature ( $T_s$ )

Humidity :  $< 65\%$  RH

Ambient temperature for Photometry measurement : maintained at  $25^{\circ}C \pm 2^{\circ}C$

### 1.5 Photometric measurement uncertainty

The uncertainty of the light output measurements is  $U=1.8\%$  ( $K=2$ )

Long term measurement uncertainty is based on reproducibility tests done over a period of one year, calculated to  $K=2$  coverage (i.e. 95% coverage).

### 1.6 Standards Used:

- ANSI/IES LM-80-15: IES Approved Method for Measuring Lumen Maintenance of LED Light Sources.
- CIE 127:2007: Measurement of LEDs(This test method was not accredited by NVLAP)

### 1.7 Test Facility Description

The test facility used by Shenzhen Belling Efficiency Testing Lab Co., Ltd is located at 1Floor, No.1 Building, Meibaohe Industrial Park, Dalang Street, Longhua District, Shenzhen, Guangdong Prov.518101 China.

### 1.8 Statement of Traceability

Shenzhen Belling Efficiency Testing Lab Co., Ltd attested that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).

## 1.9 Test Equipment List

Device	Manufacture	Model No.	Serial No.	Calibration due date
Digital Power Meter	YOKOGAWA	WT310	N.A	2024-03-27
Integral Sphere(0.5M)	SENSING	Ball0516	N.A	2024-03-27
Spectral radiometer	SENSING	SPR-3000	S1101108	2024-03-27
Stop watch	KISLO	K610	N/A	2024-04-19
LED aging equipment	Guangzhou CK	Box0516	N.A	2024-04-11
DC Power Supply	AIKESAI	APS300-5	N.A	2024-03-27
Thermocouple K	OMEGA	Type K	23736-1	2024-04-17

## 1.10 Sample Set

### Sampling Method:

LED samples for ANSI/IES LM-80-15 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. These manufacturing lots are picked to represent a wide parametric distribution. Each Sample is soldered to all of the reliability stress boards for a given set of ANSI/IES LM-80-15 tests.

### Sample Size:

Total 75Pcs; Each Ts test condition 25Pcs, The samples tested at Ts 55°C, Ts 85°C and Ts 105°C were received at 2021-07-14 and tested during 2021-07-15 to 2023-08-07. The samples were numbered from L1 to L25, L26 to L50 and L51 to L75.

## 2-Summary of Test Result

Data Set	1	2	3
Nominal case temperatures	55°C	85°C	105°C
Drive Current	300mA	300mA	300mA
Condition	Ts=54.8°C Ta=53.7°C	Ts=84.2°C Ta=83.6°C	Ts=104.8°C Ta=103.3°C
Sample size	25	25	25
Duration (in Hours)	17000	17000	17000
Intervals (in Hours)	1000	1000	1000
Failure	0	0	0
$\alpha$	2.173E-06	2.288E-06	2.240E-06
$\beta$	1.005	1.003	1.001
Reported L70 (17k) (17000h)	>102000	>102000	>102000
Reported L90 (17k) (17000h)	51,000	48,000	47,000

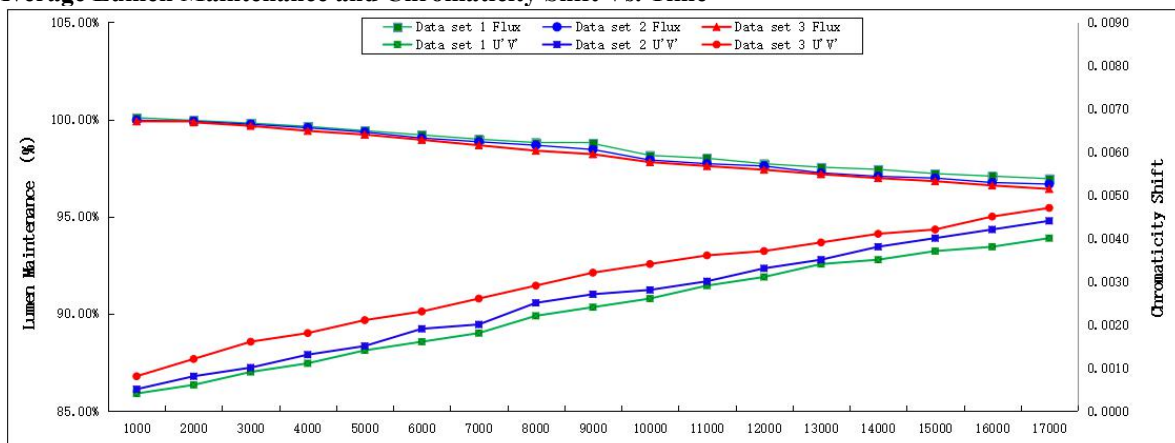
### Average Lumen Maintenance (%)

Data Set	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h
1	100.09	99.95	99.81	99.64	99.42	99.20	98.98	98.81	98.76
2	99.96	99.90	99.75	99.57	99.35	99.04	98.85	98.67	98.45
3	99.90	99.85	99.67	99.41	99.22	98.95	98.67	98.39	98.21
Data Set	10000h	11000h	12000h	13000h	14000h	15000h	16000h	17000h	-
1	98.15	98.00	97.72	97.54	97.43	97.21	97.08	96.95	-
2	97.91	97.72	97.60	97.25	97.07	96.98	96.75	96.67	-
3	97.80	97.60	97.41	97.18	96.98	96.82	96.60	96.42	-


### Average Chromaticity Shift


Data Set	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h
1	0.0004	0.0006	0.0009	0.0011	0.0014	0.0016	0.0018	0.0022	0.0024
2	0.0005	0.0008	0.0010	0.0013	0.0015	0.0019	0.0020	0.0025	0.0027
3	0.0008	0.0012	0.0016	0.0018	0.0021	0.0023	0.0026	0.0029	0.0032
Data Set	10000h	11000h	12000h	13000h	14000h	15000h	16000h	17000h	-
1	0.0026	0.0029	0.0031	0.0034	0.0035	0.0037	0.0038	0.0040	-
2	0.0028	0.0030	0.0033	0.0035	0.0038	0.0040	0.0042	0.0044	-
3	0.0034	0.0036	0.0037	0.0039	0.0041	0.0042	0.0045	0.0047	-

### Average Lumen Maintenance and Chromaticity Shift Vs. Time



### TM-21 Report for Lumen Maintenance

		<b>TM-21 Report</b>					
<b>Description of LED Light Source Tested (manufacturer, model, catalog number)</b>		<b>Table 1: Report at each LM-80 Test Condition</b>					
		Shenzhen HoneBright Technology Co.,Ltd AW-21/C2A1C27Y26JJ					
<b>Test Condition 1 - 55°C Case Temp</b>		<b>Test Condition 2 - 85°C Case Temp</b>		<b>Test Condition 3 - 105°C Case Temp</b>		<b>Table 2: Interpolation Report (projection based on <i>in-situ</i> temperature entered)</b>	
Sample size	25	Sample size	25	Sample size	25	T <sub>5,1</sub> (°C)	105.00
Number of failures	0	Number of failures	0	Number of failures	0	T <sub>5,1</sub> (K)	378.15
DUT drive current used in the test (mA)	300	DUT drive current used in the test (mA)	300	DUT drive current used in the test (mA)	300	α <sub>1</sub>	2.240E-06
Test duration (hours)	17,000	Test duration (hours)	17,000	Test duration (hours)	17,000	B <sub>1</sub>	1.001
Test duration used for projection (hour to hour)	8,000 - 17,000	Test duration used for projection (hour to hour)	8,000 - 17,000	Test duration used for projection (hour to hour)	8,000 - 17,000	T <sub>5,2</sub> (°C)	-
Tested case temperature (°C)	55	Tested case temperature (°C)	85	Tested case temperature (°C)	105	T <sub>5,2</sub> (K)	-
α	2.173E-06	α	2.288E-06	α	2.240E-06	α <sub>2</sub>	-
B	1.005	B	1.003	B	1.001	B <sub>2</sub>	-
Reported L70(17k) (hours)	>102000	Reported L70(17k) (hours)	>102000	Reported L70(17k) (hours)	>102000	E <sub>a</sub> /k <sub>6</sub>	-
						A	-
						B <sub>0</sub>	1.001
						T <sub>5,1</sub> (°C)	105.00
						T <sub>5,1</sub> (K)	378.15
						α <sub>1</sub>	2.240E-06
						Reported L70(17k) at 105°C (hours)	>102000

		<b>TM-21 Report</b>					
<b>Description of LED Light Source Tested (manufacturer, model, catalog number)</b>		<b>Table 1: Report at each LM-80 Test Condition</b>					
		Shenzhen HoneBright Technology Co.,Ltd AW-21/C2A1C27Y26JJ					
<b>Test Condition 1 - 55°C Case Temp</b>		<b>Test Condition 2 - 85°C Case Temp</b>		<b>Test Condition 3 - 105°C Case Temp</b>		<b>Table 2: Interpolation Report (projection based on <i>in-situ</i> temperature entered)</b>	
Sample size	25	Sample size	25	Sample size	25	T <sub>5,1</sub> (°C)	105.00
Number of failures	0	Number of failures	0	Number of failures	0	T <sub>5,1</sub> (K)	378.15
DUT drive current used in the test (mA)	300	DUT drive current used in the test (mA)	300	DUT drive current used in the test (mA)	300	α <sub>1</sub>	2.240E-06
Test duration (hours)	17,000	Test duration (hours)	17,000	Test duration (hours)	17,000	B <sub>1</sub>	1.001
Test duration used for projection (hour to hour)	8,000 - 17,000	Test duration used for projection (hour to hour)	8,000 - 17,000	Test duration used for projection (hour to hour)	8,000 - 17,000	T <sub>5,2</sub> (°C)	-
Tested case temperature (°C)	55	Tested case temperature (°C)	85	Tested case temperature (°C)	105	T <sub>5,2</sub> (K)	-
α	2.173E-06	α	2.288E-06	α	2.240E-06	α <sub>2</sub>	-
B	1.005	B	1.003	B	1.001	B <sub>2</sub>	-
Reported L90(17k) (hours)	51,000	Reported L90(17k) (hours)	48,000	Reported L90(17k) (hours)	47,000	E <sub>a</sub> /k <sub>6</sub>	-
						A	-
						B <sub>0</sub>	1.001
						T <sub>5,1</sub> (°C)	105.00
						T <sub>5,1</sub> (K)	378.15
						α <sub>1</sub>	2.240E-06
						Reported L90(17k) at 105°C (hours)	47,000

### 3 Test Data

#### 3.1 Data Set 1, 55°C, 300mA (Lumen Maintenance)

Sample No.	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h
L1	129.4	100.18	100.03	99.82	99.74	99.42	99.24	99.04	98.83	98.79
L2	127.3	100.04	100.00	99.76	99.65	99.48	99.16	98.96	98.75	98.70
L3	127.4	100.06	99.88	99.78	99.67	99.50	99.14	99.03	98.68	98.65
L4	129.8	100.00	99.83	99.70	99.59	99.25	99.10	98.85	98.67	98.63
L5	129.2	99.99	99.86	99.69	99.62	99.36	99.06	98.94	98.79	98.75
L6	126.0	100.08	99.97	99.73	99.53	99.28	99.08	98.83	98.77	98.70
L7	126.1	100.14	99.91	99.90	99.66	99.47	99.29	98.98	98.92	98.86
L8	129.9	100.15	100.07	99.87	99.75	99.54	99.21	99.01	98.91	98.89
L9	130.2	100.13	99.97	99.84	99.70	99.46	99.26	99.05	98.94	98.84
L10	128.4	99.98	99.90	99.75	99.69	99.31	99.18	98.95	98.76	98.72
L11	127.5	100.10	99.95	99.71	99.67	99.27	99.15	98.92	98.71	98.67
L12	126.7	100.17	99.92	99.86	99.55	99.37	99.24	98.97	98.70	98.64
L13	128.1	100.16	100.02	99.88	99.54	99.43	99.20	99.06	98.73	98.68
L14	126.7	100.11	100.04	99.85	99.64	99.51	99.26	98.99	98.98	98.91
L15	127.1	100.05	99.93	99.77	99.68	99.29	99.19	98.91	98.74	98.70
L16	129.5	100.01	99.87	99.72	99.63	99.52	99.31	99.09	98.97	98.90
L17	127.4	99.98	99.94	99.74	99.57	99.32	99.11	98.97	98.72	98.69
L18	127.0	100.09	99.96	99.80	99.71	99.44	99.23	99.07	98.77	98.71
L19	127.1	100.20	100.05	99.89	99.67	99.53	99.25	99.08	98.93	98.85
L20	128.2	100.16	100.06	99.90	99.72	99.38	99.22	99.00	98.81	98.73
L21	126.0	100.12	99.89	99.83	99.73	99.55	99.17	99.10	98.88	98.80
L22	129.4	100.04	99.85	99.79	99.60	99.41	99.27	99.02	98.96	98.92
L23	127.4	100.19	100.01	99.88	99.56	99.49	99.30	98.93	98.85	98.80
L24	127.7	100.03	99.99	99.91	99.61	99.56	99.07	98.84	98.63	98.61
L25	128.4	100.02	99.84	99.81	99.58	99.45	99.28	98.82	98.80	98.76
Ave.	127.9	100.09	99.95	99.81	99.64	99.42	99.20	98.98	98.81	98.76
Med.	127.5	100.09	99.95	99.81	99.65	99.44	99.21	98.98	98.79	98.73
st dev	1.2750	0.0707	0.0735	0.0696	0.0655	0.0955	0.0747	0.0825	0.1036	0.0944
Min.	126.0	99.98	99.83	99.69	99.53	99.25	99.06	98.82	98.63	98.61
Max.	130.2	100.20	100.07	99.91	99.75	99.56	99.31	99.10	98.98	98.92



Sample No.	Lumen Maintenance (%)								
	10000h	11000h	12000h	13000h	14000h	15000h	16000h	17000h	-
L1	98.16	97.98	97.71	97.61	97.49	97.32	97.07	96.95	-
L2	98.15	98.05	97.78	97.64	97.52	97.28	97.15	97.02	-
L3	98.04	97.94	97.65	97.50	97.39	97.13	97.05	96.82	-
L4	97.99	97.84	97.52	97.40	97.26	97.11	97.03	96.88	-
L5	98.17	98.06	97.80	97.71	97.59	97.39	97.24	97.16	-
L6	97.85	97.67	97.27	97.15	97.00	96.87	96.67	96.58	-
L7	98.28	98.09	97.69	97.56	97.41	97.15	97.10	96.91	-
L8	98.32	98.15	97.89	97.72	97.57	97.37	96.99	96.85	-
L9	98.24	98.07	97.79	97.54	97.46	97.30	97.23	97.09	-
L10	98.12	98.00	97.62	97.45	97.38	97.16	97.01	96.92	-
L11	98.06	97.87	97.63	97.40	97.34	97.10	97.04	96.87	-
L12	98.02	97.83	97.54	97.43	97.31	97.07	97.00	96.86	-
L13	98.09	97.95	97.85	97.59	97.47	97.35	97.12	97.05	-
L14	98.37	98.23	97.87	97.75	97.61	97.42	97.18	97.14	-
L15	98.11	98.03	97.72	97.41	97.35	97.19	97.13	96.84	-
L16	98.27	98.08	97.77	97.65	97.48	97.21	97.09	96.98	-
L17	98.05	97.92	97.76	97.60	97.45	97.24	97.11	97.00	-
L18	98.10	97.99	97.73	97.58	97.50	97.23	97.19	96.99	-
L19	98.34	98.27	97.97	97.80	97.73	97.43	97.22	97.15	-
L20	98.13	98.01	97.70	97.49	97.40	97.12	97.06	96.89	-
L21	98.26	98.14	97.86	97.62	97.51	97.18	97.12	96.96	-
L22	98.31	98.12	97.95	97.67	97.55	97.31	97.16	97.14	-
L23	98.20	98.04	97.74	97.39	97.32	97.20	97.12	96.94	-
L24	97.98	97.86	97.66	97.47	97.30	97.14	97.08	96.90	-
L25	98.14	97.93	97.63	97.42	97.27	97.02	96.94	96.76	-
Ave.	98.15	98.00	97.72	97.54	97.43	97.21	97.08	96.95	-
Med.	98.14	98.01	97.73	97.56	97.45	97.20	97.10	96.94	-
st dev	0.1282	0.1335	0.1491	0.1451	0.1462	0.1333	0.1158	0.1347	-
Min.	97.85	97.67	97.27	97.15	97.00	96.87	96.67	96.58	-
Max.	98.37	98.27	97.97	97.80	97.73	97.43	97.24	97.16	-

**3.2 Data Set 1, 55°C, 300mA (Forward Voltage)**

Sample No.	Forward Voltage (V)									
	0hr(Initial)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h
L1	3.194	3.130	3.182	3.165	3.173	3.143	3.139	3.168	3.164	3.172
L2	3.149	3.125	3.143	3.189	3.169	3.137	3.135	3.145	3.137	3.140
L3	3.161	3.126	3.137	3.151	3.157	3.168	3.155	3.154	3.159	3.140
L4	3.167	3.137	3.171	3.143	3.178	3.133	3.169	3.142	3.137	3.152
L5	3.144	3.146	3.168	3.153	3.135	3.159	3.143	3.148	3.143	3.178
L6	3.138	3.147	3.154	3.140	3.163	3.174	3.164	3.154	3.148	3.142
L7	3.136	3.124	3.161	3.126	3.186	3.137	3.166	3.143	3.179	3.175
L8	3.157	3.127	3.146	3.165	3.143	3.145	3.161	3.128	3.141	3.143
L9	3.134	3.183	3.159	3.140	3.154	3.174	3.140	3.156	3.153	3.131
L10	3.181	3.142	3.143	3.164	3.179	3.162	3.144	3.139	3.158	3.136
L11	3.151	3.176	3.129	3.178	3.169	3.148	3.170	3.153	3.138	3.145
L12	3.153	3.124	3.139	3.168	3.183	3.163	3.165	3.128	3.167	3.143
L13	3.186	3.184	3.172	3.163	3.159	3.134	3.161	3.150	3.168	3.191
L14	3.132	3.134	3.139	3.140	3.153	3.149	3.133	3.170	3.159	3.133
L15	3.144	3.142	3.168	3.181	3.143	3.162	3.153	3.158	3.149	3.173
L16	3.164	3.142	3.131	3.137	3.149	3.160	3.150	3.135	3.169	3.139
L17	3.137	3.141	3.186	3.195	3.143	3.146	3.161	3.142	3.147	3.124
L18	3.144	3.127	3.170	3.167	3.159	3.155	3.128	3.162	3.163	3.175
L19	3.141	3.133	3.158	3.150	3.148	3.144	3.138	3.141	3.174	3.151
L20	3.177	3.138	3.169	3.177	3.174	3.160	3.132	3.168	3.136	3.140
L21	3.141	3.131	3.179	3.141	3.191	3.132	3.148	3.153	3.169	3.192
L22	3.134	3.131	3.150	3.147	3.136	3.174	3.139	3.147	3.160	3.147
L23	3.149	3.121	3.173	3.147	3.179	3.148	3.158	3.164	3.166	3.180
L24	3.140	3.143	3.142	3.138	3.171	3.145	3.159	3.127	3.180	3.140
L25	3.176	3.160	3.174	3.157	3.171	3.134	3.132	3.162	3.134	3.176
Ave.	3.153	3.141	3.158	3.157	3.163	3.151	3.150	3.149	3.156	3.154
Med.	3.149	3.137	3.159	3.153	3.163	3.148	3.150	3.150	3.159	3.145
st dev	0.0179	0.0178	0.0168	0.0179	0.0161	0.0135	0.0132	0.0126	0.0142	0.0203
Min.	3.132	3.121	3.129	3.126	3.135	3.132	3.128	3.127	3.134	3.124
Max.	3.194	3.184	3.186	3.195	3.191	3.174	3.170	3.170	3.180	3.192

Sample No.	Forward Voltage (V)								
	10000h	11000h	12000h	13000h	14000h	15000h	16000h	17000h	-
L1	3.163	3.139	3.154	3.167	3.129	3.165	3.143	3.160	-
L2	3.157	3.138	3.128	3.189	3.139	3.140	3.174	3.126	-
L3	3.145	3.176	3.148	3.132	3.177	3.155	3.162	3.151	-
L4	3.160	3.153	3.124	3.181	3.141	3.154	3.132	3.137	-
L5	3.169	3.151	3.175	3.167	3.141	3.144	3.130	3.145	-
L6	3.144	3.135	3.120	3.169	3.127	3.189	3.160	3.183	-
L7	3.172	3.134	3.128	3.149	3.140	3.156	3.139	3.171	-
L8	3.151	3.141	3.156	3.150	3.168	3.166	3.157	3.130	-
L9	3.145	3.159	3.142	3.170	3.148	3.159	3.144	3.159	-
L10	3.138	3.138	3.135	3.158	3.167	3.150	3.163	3.167	-
L11	3.179	3.170	3.120	3.153	3.160	3.161	3.171	3.179	-
L12	3.141	3.168	3.142	3.128	3.137	3.182	3.134	3.183	-
L13	3.184	3.173	3.140	3.161	3.148	3.136	3.135	3.149	-
L14	3.169	3.143	3.139	3.137	3.169	3.150	3.162	3.139	-
L15	3.171	3.143	3.128	3.190	3.126	3.152	3.148	3.157	-
L16	3.158	3.150	3.168	3.147	3.143	3.164	3.138	3.170	-
L17	3.146	3.170	3.133	3.148	3.180	3.157	3.170	3.135	-
L18	3.153	3.169	3.167	3.148	3.142	3.167	3.132	3.144	-
L19	3.165	3.165	3.151	3.181	3.153	3.138	3.137	3.126	-
L20	3.166	3.135	3.182	3.172	3.174	3.173	3.160	3.145	-
L21	3.177	3.146	3.149	3.136	3.153	3.143	3.156	3.136	-
L22	3.154	3.175	3.181	3.147	3.167	3.173	3.148	3.160	-
L23	3.149	3.170	3.168	3.141	3.147	3.143	3.143	3.145	-
L24	3.178	3.162	3.145	3.134	3.128	3.158	3.129	3.185	-
L25	3.143	3.166	3.128	3.143	3.157	3.178	3.164	3.145	-
Ave.	3.159	3.155	3.146	3.156	3.150	3.158	3.149	3.153	-
Med.	3.158	3.153	3.142	3.150	3.148	3.157	3.148	3.149	-
st dev	0.0135	0.0147	0.0188	0.0180	0.0163	0.0140	0.0143	0.0181	-
Min.	3.138	3.134	3.120	3.128	3.126	3.136	3.129	3.126	-
Max.	3.184	3.176	3.182	3.190	3.180	3.189	3.174	3.185	-

### 3.3 Data Set 1, 55°C, 300mA (Chromaticity Shift)

Sample No.	u'	v'	CCT(K)	Chromaticity Shift Δu'v'								
	0hr(Initial)			1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h
L1	0.2556	0.5270	2850	0.0001	0.0003	0.0006	0.0009	0.0011	0.0012	0.0014	0.0016	0.0018
L2	0.2592	0.5288	2764	0.0004	0.0007	0.0008	0.0010	0.0013	0.0014	0.0016	0.0023	0.0026
L3	0.2603	0.5297	2737	0.0005	0.0007	0.0009	0.0012	0.0013	0.0015	0.0016	0.0020	0.0022
L4	0.2569	0.5287	2814	0.0002	0.0004	0.0008	0.0013	0.0018	0.0019	0.0021	0.0028	0.0030
L5	0.2570	0.5290	2810	0.0005	0.0008	0.0010	0.0013	0.0015	0.0016	0.0018	0.0025	0.0026
L6	0.2567	0.5252	2835	0.0004	0.0005	0.0010	0.0012	0.0016	0.0017	0.0019	0.0026	0.0028
L7	0.2594	0.5279	2763	0.0003	0.0004	0.0006	0.0009	0.0013	0.0014	0.0015	0.0020	0.0021
L8	0.2580	0.5292	2786	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0017	0.0021	0.0023
L9	0.2593	0.5302	2756	0.0002	0.0003	0.0008	0.0012	0.0014	0.0015	0.0016	0.0020	0.0022
L10	0.2602	0.5304	2736	0.0004	0.0007	0.0009	0.0010	0.0014	0.0016	0.0017	0.0021	0.0023
L11	0.2586	0.5282	2779	0.0005	0.0007	0.0012	0.0013	0.0018	0.0020	0.0021	0.0025	0.0027
L12	0.2598	0.5285	2751	0.0001	0.0003	0.0006	0.0010	0.0013	0.0015	0.0017	0.0023	0.0024
L13	0.2569	0.5299	2807	0.0003	0.0005	0.0008	0.0009	0.0011	0.0013	0.0014	0.0017	0.0018
L14	0.2583	0.5286	2784	0.0005	0.0007	0.0012	0.0014	0.0018	0.0020	0.0022	0.0027	0.0028
L15	0.2563	0.5267	2835	0.0003	0.0006	0.0011	0.0013	0.0018	0.0020	0.0021	0.0022	0.0023
L16	0.2586	0.5310	2767	0.0004	0.0006	0.0008	0.0010	0.0013	0.0014	0.0016	0.0019	0.0021
L17	0.2567	0.5278	2822	0.0004	0.0007	0.0012	0.0013	0.0017	0.0019	0.0020	0.0025	0.0027
L18	0.2544	0.5269	2878	0.0003	0.0005	0.0009	0.0010	0.0012	0.0013	0.0015	0.0016	0.0018
L19	0.2578	0.5281	2796	0.0005	0.0007	0.0011	0.0012	0.0016	0.0018	0.0020	0.0027	0.0028
L20	0.2608	0.5278	2734	0.0003	0.0005	0.0011	0.0013	0.0015	0.0016	0.0018	0.0022	0.0023
L21	0.2576	0.5284	2798	0.0004	0.0006	0.0010	0.0012	0.0014	0.0016	0.0017	0.0022	0.0024
L22	0.2604	0.5301	2733	0.0005	0.0007	0.0010	0.0011	0.0013	0.0014	0.0016	0.0021	0.0022
L23	0.2583	0.5276	2788	0.0003	0.0005	0.0007	0.0009	0.0013	0.0015	0.0016	0.0019	0.0021
L24	0.2616	0.5299	2708	0.0005	0.0006	0.0010	0.0012	0.0014	0.0016	0.0018	0.0021	0.0023
L25	0.2580	0.5295	2786	0.0004	0.0007	0.0011	0.0014	0.0015	0.0017	0.0019	0.0026	0.0027
Ave.	0.2583	0.5286	2785	0.0004	0.0006	0.0009	0.0011	0.0014	0.0016	0.0018	0.0022	0.0024
Med.	0.2583	0.5286	2786	0.0004	0.0006	0.0009	0.0012	0.0014	0.0016	0.0017	0.0022	0.0023
st dev	0.0017	0.0013	41.19	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003
Min.	0.2544	0.5252	2708	0.0001	0.0003	0.0006	0.0009	0.0011	0.0012	0.0014	0.0016	0.0018
Max.	0.2616	0.5310	2878	0.0005	0.0008	0.0012	0.0014	0.0018	0.0020	0.0022	0.0028	0.0030

Sample No.	Chromaticity Shift $\Delta u'v'$								
	10000h	11000h	12000h	13000h	14000h	15000h	16000h	17000h	-
L1	0.0020	0.0021	0.0024	0.0026	0.0028	0.0029	0.0030	0.0032	-
L2	0.0029	0.0033	0.0035	0.0038	0.0039	0.0040	0.0042	0.0043	-
L3	0.0024	0.0027	0.0031	0.0033	0.0035	0.0036	0.0037	0.0039	-
L4	0.0033	0.0035	0.0038	0.0041	0.0042	0.0044	0.0046	0.0047	-
L5	0.0028	0.0032	0.0036	0.0039	0.0041	0.0043	0.0044	0.0046	-
L6	0.0030	0.0032	0.0034	0.0036	0.0037	0.0039	0.0041	0.0042	-
L7	0.0024	0.0026	0.0030	0.0033	0.0035	0.0036	0.0038	0.0040	-
L8	0.0025	0.0027	0.0031	0.0033	0.0034	0.0037	0.0038	0.0039	-
L9	0.0024	0.0027	0.0030	0.0032	0.0033	0.0035	0.0037	0.0039	-
L10	0.0024	0.0026	0.0027	0.0031	0.0032	0.0033	0.0034	0.0036	-
L11	0.0029	0.0033	0.0036	0.0037	0.0038	0.0039	0.0041	0.0042	-
L12	0.0026	0.0029	0.0033	0.0036	0.0037	0.0039	0.0041	0.0043	-
L13	0.0021	0.0025	0.0029	0.0031	0.0032	0.0034	0.0035	0.0036	-
L14	0.0031	0.0033	0.0035	0.0038	0.0039	0.0040	0.0042	0.0043	-
L15	0.0025	0.0029	0.0032	0.0036	0.0038	0.0041	0.0043	0.0044	-
L16	0.0023	0.0026	0.0030	0.0033	0.0035	0.0037	0.0038	0.0039	-
L17	0.0028	0.0031	0.0033	0.0035	0.0036	0.0037	0.0039	0.0041	-
L18	0.0019	0.0020	0.0022	0.0023	0.0024	0.0025	0.0026	0.0028	-
L19	0.0029	0.0032	0.0034	0.0035	0.0037	0.0038	0.0040	0.0041	-
L20	0.0025	0.0027	0.0029	0.0032	0.0033	0.0034	0.0036	0.0037	-
L21	0.0026	0.0029	0.0032	0.0035	0.0036	0.0038	0.0039	0.0041	-
L22	0.0023	0.0027	0.0030	0.0032	0.0034	0.0036	0.0038	0.0040	-
L23	0.0024	0.0027	0.0030	0.0033	0.0034	0.0035	0.0037	0.0039	-
L24	0.0024	0.0027	0.0029	0.0031	0.0033	0.0034	0.0035	0.0037	-
L25	0.0028	0.0032	0.0033	0.0034	0.0036	0.0038	0.0040	0.0042	-
Ave.	0.0026	0.0029	0.0031	0.0034	0.0035	0.0037	0.0038	0.0040	-
Med.	0.0025	0.0027	0.0031	0.0033	0.0035	0.0037	0.0038	0.0040	-
st dev	0.0003	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	-
Min.	0.0019	0.0020	0.0022	0.0023	0.0024	0.0025	0.0026	0.0028	-
Max.	0.0033	0.0035	0.0038	0.0041	0.0042	0.0044	0.0046	0.0047	-

**3.4 Data Set 2, 85°C, 300mA (Lumen Maintenance)**

Sample No.	$\Phi$ (lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h
L26	127.0	100.00	99.96	99.81	99.67	99.50	99.23	99.06	98.91	98.68
L27	126.5	100.03	99.98	99.71	99.57	99.47	99.12	99.01	98.77	98.57
L28	129.2	99.93	99.89	99.65	99.52	99.27	98.97	98.87	98.61	98.43
L29	127.5	100.05	100.01	99.90	99.69	99.42	99.20	98.96	98.76	98.55
L30	129.9	99.99	99.87	99.83	99.62	99.45	99.07	98.90	98.67	98.56
L31	128.7	100.08	100.04	99.84	99.65	99.51	99.24	98.98	98.84	98.60
L32	129.5	99.92	99.85	99.67	99.49	99.37	98.99	98.77	98.65	98.42
L33	127.7	99.98	99.91	99.78	99.60	99.35	99.09	98.78	98.64	98.45
L34	127.8	99.86	99.71	99.62	99.50	99.15	98.88	98.68	98.49	98.31
L35	130.0	100.04	99.99	99.77	99.63	99.36	99.08	98.89	98.80	98.59
L36	129.9	99.96	99.80	99.69	99.61	99.33	99.01	98.84	98.69	98.44
L37	126.9	99.94	99.92	99.86	99.47	99.18	98.93	98.86	98.58	98.36
L38	129.1	100.07	100.03	99.85	99.64	99.44	99.22	99.00	98.85	98.71
L39	128.8	99.84	99.79	99.66	99.45	99.24	99.05	98.79	98.57	98.40
L40	128.7	99.91	99.86	99.68	99.48	99.29	98.96	98.70	98.45	98.28
L41	126.0	100.06	100.02	99.87	99.74	99.56	99.21	98.99	98.86	98.61
L42	127.1	100.01	99.97	99.76	99.54	99.32	98.98	98.76	98.56	98.37
L43	129.1	99.90	99.88	99.72	99.44	99.23	98.89	98.66	98.48	98.27
L44	126.4	99.85	99.83	99.79	99.58	99.46	99.14	98.88	98.74	98.65
L45	126.5	99.97	99.93	99.75	99.59	99.31	99.00	98.83	98.62	98.38
L46	129.6	99.87	99.82	99.70	99.53	99.39	99.02	98.82	98.60	98.39
L47	129.0	99.95	99.84	99.73	99.50	99.38	99.06	98.80	98.66	98.34
L48	126.2	100.02	100.00	99.74	99.55	99.30	98.92	98.71	98.59	98.35
L49	127.9	99.89	99.81	99.63	99.51	99.22	98.91	98.74	98.52	98.25
L50	130.5	99.88	99.76	99.64	99.56	99.34	98.95	98.88	98.73	98.20
Ave.	128.2	99.96	99.90	99.75	99.57	99.35	99.04	98.85	98.67	98.45
Med.	128.7	99.96	99.89	99.74	99.56	99.35	99.02	98.84	98.65	98.42
st dev	1.3733	0.0736	0.0921	0.0821	0.0785	0.1065	0.1126	0.1105	0.1270	0.1439
Min.	126.0	99.84	99.71	99.62	99.44	99.15	98.88	98.66	98.45	98.20
Max.	130.5	100.08	100.04	99.90	99.74	99.56	99.24	99.06	98.91	98.71

Sample No.	Lumen Maintenance (%)								
	10000h	11000h	12000h	13000h	14000h	15000h	16000h	17000h	-
L26	97.99	97.70	97.62	97.36	97.10	96.95	96.86	96.69	-
L27	97.89	97.65	97.60	97.25	97.02	96.97	96.70	96.61	-
L28	97.95	97.66	97.52	97.27	97.10	97.05	96.71	96.57	-
L29	98.02	97.58	97.54	97.18	96.96	96.89	96.84	96.79	-
L30	98.03	97.80	97.65	97.32	97.14	97.11	96.80	96.64	-
L31	98.04	97.77	97.71	97.35	97.07	97.00	96.81	96.75	-
L32	97.96	97.76	97.53	97.16	97.08	96.96	96.63	96.59	-
L33	97.91	97.62	97.48	97.22	97.05	96.92	96.76	96.73	-
L34	97.90	97.74	97.55	97.29	97.16	97.01	96.87	96.78	-
L35	97.84	97.78	97.56	97.30	97.18	97.06	96.79	96.71	-
L36	97.98	97.75	97.50	97.17	97.04	96.91	96.74	96.56	-
L37	97.93	97.76	97.67	97.19	97.15	97.10	96.77	96.72	-
L38	97.86	97.69	97.61	97.32	97.13	97.09	96.83	96.77	-
L39	97.94	97.74	97.51	97.21	97.06	96.97	96.75	96.70	-
L40	97.82	97.68	97.63	97.33	97.19	96.98	96.85	96.65	-
L41	97.85	97.66	97.49	97.34	97.18	97.08	96.74	96.66	-
L42	97.89	97.63	97.57	97.15	97.07	97.02	96.73	96.62	-
L43	97.88	97.81	97.64	97.28	97.03	96.99	96.72	96.68	-
L44	97.80	97.70	97.69	97.19	96.98	96.93	96.69	96.67	-
L45	97.87	97.82	97.73	97.20	97.00	96.93	96.70	96.55	-
L46	97.83	97.79	97.58	97.37	97.11	96.94	96.82	96.74	-
L47	97.89	97.84	97.72	97.14	97.01	96.98	96.69	96.58	-
L48	97.81	97.71	97.64	97.24	96.97	96.86	96.62	96.60	-
L49	98.05	97.67	97.59	97.23	96.99	96.85	96.65	96.61	-
L50	97.92	97.79	97.68	97.26	97.09	96.87	96.78	96.69	-
Ave.	97.91	97.72	97.60	97.25	97.07	96.98	96.75	96.67	-
Med.	97.90	97.74	97.60	97.25	97.07	96.97	96.75	96.67	-
st dev	0.0738	0.0692	0.0750	0.0708	0.0694	0.0752	0.0711	0.0719	-
Min.	97.80	97.58	97.48	97.14	96.96	96.85	96.62	96.55	-
Max.	98.05	97.84	97.73	97.37	97.19	97.11	96.87	96.79	-

**3.5 Data Set 2, 85°C, 300mA (Forward Voltage)**

Sample No.	Forward Voltage (V)									
	0hr(Initial)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h
L26	3.126	3.129	3.150	3.148	3.127	3.144	3.156	3.168	3.171	3.145
L27	3.134	3.140	3.163	3.148	3.138	3.127	3.132	3.139	3.143	3.161
L28	3.131	3.140	3.172	3.138	3.150	3.165	3.145	3.152	3.166	3.160
L29	3.146	3.166	3.142	3.179	3.155	3.135	3.172	3.145	3.156	3.152
L30	3.161	3.162	3.162	3.168	3.155	3.159	3.161	3.153	3.171	3.161
L31	3.165	3.149	3.143	3.170	3.134	3.163	3.172	3.164	3.140	3.167
L32	3.158	3.138	3.158	3.141	3.128	3.156	3.176	3.135	3.165	3.149
L33	3.140	3.155	3.162	3.166	3.129	3.150	3.176	3.145	3.133	3.158
L34	3.154	3.141	3.136	3.165	3.145	3.159	3.140	3.132	3.149	3.135
L35	3.150	3.157	3.167	3.157	3.164	3.155	3.173	3.165	3.174	3.157
L36	3.150	3.164	3.144	3.178	3.128	3.167	3.150	3.172	3.167	3.122
L37	3.134	3.164	3.148	3.144	3.150	3.148	3.155	3.172	3.134	3.166
L38	3.147	3.156	3.170	3.146	3.156	3.162	3.163	3.171	3.130	3.152
L39	3.132	3.156	3.145	3.128	3.131	3.166	3.146	3.149	3.135	3.131
L40	3.150	3.146	3.173	3.137	3.165	3.164	3.140	3.156	3.158	3.150
L41	3.152	3.142	3.139	3.143	3.156	3.162	3.131	3.159	3.147	3.175
L42	3.133	3.138	3.142	3.145	3.163	3.139	3.161	3.138	3.158	3.122
L43	3.167	3.136	3.170	3.132	3.163	3.134	3.134	3.143	3.170	3.164
L44	3.170	3.129	3.170	3.147	3.128	3.163	3.140	3.127	3.173	3.148
L45	3.142	3.167	3.169	3.156	3.140	3.137	3.162	3.135	3.128	3.144
L46	3.148	3.166	3.156	3.132	3.131	3.154	3.131	3.128	3.161	3.159
L47	3.160	3.144	3.154	3.156	3.157	3.139	3.141	3.151	3.150	3.168
L48	3.138	3.152	3.172	3.135	3.129	3.170	3.181	3.157	3.145	3.135
L49	3.140	3.156	3.147	3.143	3.137	3.125	3.147	3.140	3.141	3.172
L50	3.159	3.149	3.180	3.178	3.133	3.176	3.174	3.154	3.167	3.123
Ave.	3.147	3.150	3.157	3.151	3.144	3.153	3.154	3.150	3.153	3.151
Med.	3.148	3.149	3.158	3.147	3.140	3.156	3.155	3.151	3.156	3.152
st dev	0.0123	0.0117	0.0130	0.0153	0.0137	0.0141	0.0162	0.0138	0.0150	0.0156
Min.	3.126	3.129	3.136	3.128	3.127	3.125	3.131	3.127	3.128	3.122
Max.	3.170	3.167	3.180	3.179	3.165	3.176	3.181	3.172	3.174	3.175



Sample No.	Forward Voltage (V)								
	10000h	11000h	12000h	13000h	14000h	15000h	16000h	17000h	-
L26	3.151	3.154	3.135	3.153	3.164	3.125	3.174	3.171	-
L27	3.147	3.132	3.157	3.122	3.164	3.158	3.124	3.172	-
L28	3.134	3.144	3.161	3.144	3.159	3.148	3.137	3.170	-
L29	3.130	3.140	3.137	3.164	3.178	3.130	3.139	3.164	-
L30	3.170	3.133	3.140	3.128	3.134	3.160	3.149	3.173	-
L31	3.170	3.167	3.159	3.126	3.148	3.156	3.124	3.140	-
L32	3.166	3.141	3.160	3.144	3.148	3.150	3.180	3.158	-
L33	3.160	3.148	3.166	3.143	3.140	3.133	3.177	3.155	-
L34	3.173	3.155	3.183	3.147	3.146	3.156	3.126	3.163	-
L35	3.151	3.150	3.157	3.125	3.134	3.157	3.166	3.144	-
L36	3.163	3.167	3.177	3.157	3.153	3.153	3.133	3.172	-
L37	3.172	3.165	3.137	3.161	3.150	3.142	3.145	3.130	-
L38	3.172	3.148	3.154	3.148	3.154	3.159	3.139	3.132	-
L39	3.145	3.149	3.149	3.139	3.154	3.158	3.180	3.146	-
L40	3.159	3.146	3.156	3.149	3.155	3.157	3.141	3.135	-
L41	3.147	3.131	3.154	3.145	3.171	3.147	3.156	3.131	-
L42	3.167	3.131	3.173	3.131	3.141	3.163	3.165	3.135	-
L43	3.165	3.143	3.154	3.128	3.133	3.127	3.162	3.173	-
L44	3.171	3.149	3.148	3.151	3.144	3.128	3.155	3.148	-
L45	3.147	3.150	3.135	3.150	3.171	3.151	3.162	3.160	-
L46	3.146	3.146	3.141	3.174	3.156	3.140	3.154	3.157	-
L47	3.175	3.130	3.148	3.132	3.158	3.131	3.138	3.165	-
L48	3.150	3.133	3.155	3.129	3.173	3.127	3.135	3.168	-
L49	3.136	3.160	3.168	3.159	3.168	3.161	3.141	3.157	-
L50	3.130	3.139	3.171	3.171	3.149	3.131	3.130	3.174	-
Ave.	3.156	3.146	3.155	3.145	3.154	3.146	3.149	3.156	-
Med.	3.159	3.146	3.155	3.145	3.154	3.150	3.145	3.158	-
st dev	0.0143	0.0112	0.0133	0.0147	0.0126	0.0131	0.0177	0.0152	-
Min.	3.130	3.130	3.135	3.122	3.133	3.125	3.124	3.130	-
Max.	3.175	3.167	3.183	3.174	3.178	3.163	3.180	3.174	-

### 3.6 Data Set 2, 85°C, 300mA (Chromaticity Shift)

Sample No.	u'	v'	CCT(K)	Chromaticity Shift $\Delta u'v'$								
				0hr(Initial)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h
L26	0.2568	0.5275	2822	0.0002	0.0006	0.0009	0.0012	0.0015	0.0018	0.0019	0.0025	0.0028
L27	0.2585	0.5274	2784	0.0005	0.0008	0.0009	0.0010	0.0012	0.0015	0.0016	0.0022	0.0024
L28	0.2593	0.5299	2756	0.0004	0.0008	0.0012	0.0015	0.0018	0.0022	0.0023	0.0028	0.0030
L29	0.2566	0.5283	2822	0.0006	0.0010	0.0014	0.0016	0.0020	0.0024	0.0026	0.0032	0.0034
L30	0.2583	0.5295	2778	0.0002	0.0006	0.0009	0.0013	0.0016	0.0018	0.0019	0.0021	0.0024
L31	0.2569	0.5277	2817	0.0005	0.0007	0.0008	0.0010	0.0014	0.0017	0.0019	0.0025	0.0028
L32	0.2598	0.5287	2750	0.0006	0.0009	0.0012	0.0014	0.0015	0.0019	0.0020	0.0026	0.0028
L33	0.2567	0.5282	2820	0.0004	0.0008	0.0010	0.0011	0.0014	0.0018	0.0019	0.0025	0.0027
L34	0.2570	0.5298	2806	0.0006	0.0009	0.0011	0.0012	0.0013	0.0016	0.0018	0.0024	0.0027
L35	0.2582	0.5291	2784	0.0004	0.0008	0.0009	0.0011	0.0012	0.0014	0.0016	0.0021	0.0024
L36	0.2584	0.5296	2776	0.0005	0.0007	0.0011	0.0014	0.0015	0.0018	0.0019	0.0022	0.0025
L37	0.2577	0.5272	2802	0.0003	0.0006	0.0008	0.0011	0.0013	0.0018	0.0019	0.0021	0.0023
L38	0.2591	0.5295	2762	0.0006	0.0008	0.0010	0.0014	0.0015	0.0021	0.0022	0.0028	0.0030
L39	0.2574	0.5294	2800	0.0004	0.0007	0.0009	0.0012	0.0016	0.0021	0.0022	0.0026	0.0028
L40	0.2590	0.5290	2766	0.0005	0.0008	0.0010	0.0013	0.0015	0.0019	0.0020	0.0025	0.0026
L41	0.2581	0.5263	2798	0.0006	0.0010	0.0013	0.0016	0.0017	0.0022	0.0023	0.0026	0.0028
L42	0.2570	0.5272	2817	0.0004	0.0006	0.0010	0.0012	0.0013	0.0016	0.0017	0.0020	0.0023
L43	0.2571	0.5311	2798	0.0005	0.0007	0.0010	0.0012	0.0016	0.0018	0.0019	0.0025	0.0028
L44	0.2577	0.5273	2802	0.0003	0.0006	0.0009	0.0012	0.0013	0.0015	0.0017	0.0022	0.0025
L45	0.2571	0.5280	2812	0.0005	0.0007	0.0008	0.0009	0.0013	0.0015	0.0017	0.0021	0.0023
L46	0.2585	0.5297	2774	0.0006	0.0009	0.0013	0.0014	0.0017	0.0021	0.0023	0.0028	0.0030
L47	0.2584	0.5260	2792	0.0003	0.0007	0.0010	0.0014	0.0016	0.0020	0.0022	0.0027	0.0030
L48	0.2595	0.5275	2764	0.0005	0.0008	0.0012	0.0015	0.0018	0.0021	0.0023	0.0026	0.0027
L49	0.2553	0.5291	2847	0.0004	0.0007	0.0009	0.0012	0.0014	0.0018	0.0020	0.0025	0.0027
L50	0.2588	0.5303	2765	0.0006	0.0010	0.0011	0.0015	0.0019	0.0023	0.0024	0.0030	0.0031
Ave.	0.2579	0.5285	2793	0.0005	0.0008	0.0010	0.0013	0.0015	0.0019	0.0020	0.0025	0.0027
Med.	0.2581	0.5287	2798	0.0005	0.0008	0.0010	0.0012	0.0015	0.0018	0.0019	0.0025	0.0027
st dev	0.0011	0.0013	24.86	0.0001	0.0001	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0003
Min.	0.2553	0.5260	2750	0.0002	0.0006	0.0008	0.0009	0.0012	0.0014	0.0016	0.0020	0.0023
Max.	0.2598	0.5311	2847	0.0006	0.0010	0.0014	0.0016	0.0020	0.0024	0.0026	0.0032	0.0034

Sample No.	Chromaticity Shift Au'v'								
	10000h	11000h	12000h	13000h	14000h	15000h	16000h	17000h	-
L26	0.0029	0.0030	0.0032	0.0034	0.0036	0.0040	0.0042	0.0043	-
L27	0.0025	0.0026	0.0029	0.0033	0.0034	0.0038	0.0040	0.0043	-
L28	0.0031	0.0032	0.0035	0.0037	0.0039	0.0040	0.0043	0.0044	-
L29	0.0035	0.0036	0.0038	0.0040	0.0043	0.0045	0.0048	0.0050	-
L30	0.0025	0.0026	0.0028	0.0031	0.0032	0.0034	0.0036	0.0038	-
L31	0.0029	0.0030	0.0034	0.0036	0.0038	0.0041	0.0043	0.0044	-
L32	0.0030	0.0031	0.0033	0.0036	0.0039	0.0042	0.0044	0.0046	-
L33	0.0028	0.0029	0.0032	0.0033	0.0036	0.0037	0.0039	0.0041	-
L34	0.0029	0.0031	0.0035	0.0037	0.0039	0.0041	0.0043	0.0044	-
L35	0.0025	0.0027	0.0031	0.0032	0.0036	0.0038	0.0040	0.0042	-
L36	0.0026	0.0028	0.0030	0.0031	0.0036	0.0037	0.0039	0.0042	-
L37	0.0024	0.0026	0.0029	0.0033	0.0035	0.0038	0.0041	0.0042	-
L38	0.0031	0.0033	0.0036	0.0040	0.0044	0.0046	0.0048	0.0050	-
L39	0.0029	0.0031	0.0034	0.0035	0.0038	0.0042	0.0044	0.0047	-
L40	0.0030	0.0031	0.0033	0.0035	0.0037	0.0040	0.0042	0.0044	-
L41	0.0029	0.0030	0.0034	0.0036	0.0038	0.0039	0.0042	0.0043	-
L42	0.0024	0.0026	0.0030	0.0032	0.0036	0.0039	0.0041	0.0042	-
L43	0.0029	0.0031	0.0033	0.0036	0.0037	0.0040	0.0042	0.0045	-
L44	0.0027	0.0029	0.0032	0.0034	0.0038	0.0040	0.0041	0.0044	-
L45	0.0025	0.0026	0.0029	0.0032	0.0035	0.0038	0.0042	0.0044	-
L46	0.0031	0.0032	0.0036	0.0037	0.0039	0.0041	0.0043	0.0046	-
L47	0.0032	0.0033	0.0036	0.0038	0.0040	0.0041	0.0044	0.0046	-
L48	0.0028	0.0030	0.0033	0.0036	0.0040	0.0044	0.0046	0.0048	-
L49	0.0028	0.0030	0.0033	0.0035	0.0038	0.0039	0.0041	0.0042	-
L50	0.0032	0.0033	0.0037	0.0041	0.0042	0.0044	0.0046	0.0048	-
Ave.	0.0028	0.0030	0.0033	0.0035	0.0038	0.0040	0.0042	0.0044	-
Med.	0.0029	0.0030	0.0033	0.0035	0.0038	0.0040	0.0042	0.0044	-
st dev	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	-
Min.	0.0024	0.0026	0.0028	0.0031	0.0032	0.0034	0.0036	0.0038	-
Max.	0.0035	0.0036	0.0038	0.0041	0.0044	0.0046	0.0048	0.0050	-

### 3.7 Data Set 3, 105°C, 300mA (Lumen Maintenance)

Sample No.	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h
L51	126.7	99.88	99.82	99.64	99.45	99.22	98.97	98.67	98.37	98.30
L52	127.1	99.94	99.85	99.72	99.31	99.25	98.99	98.69	98.29	98.07
L53	127.0	100.01	99.95	99.67	99.56	99.32	99.04	98.76	98.70	98.47
L54	126.1	99.89	99.83	99.66	99.34	99.17	98.93	98.65	98.41	98.18
L55	129.3	99.81	99.79	99.53	99.30	99.15	98.96	98.51	98.17	98.10
L56	126.9	99.95	99.92	99.69	99.47	99.10	99.03	98.58	98.50	98.23
L57	126.5	99.84	99.81	99.59	99.44	99.21	98.94	98.72	98.36	98.11
L58	126.8	99.96	99.93	99.70	99.51	99.23	99.02	98.78	98.47	98.25
L59	129.0	99.91	99.86	99.79	99.32	99.30	99.07	98.63	98.59	98.33
L60	126.9	99.86	99.83	99.61	99.33	99.28	99.01	98.80	98.66	98.37
L61	129.8	99.99	99.95	99.71	99.53	99.31	98.87	98.83	98.44	98.24
L62	127.4	100.00	99.96	99.78	99.55	99.13	99.05	98.70	98.40	98.13
L63	128.9	100.02	99.91	99.77	99.35	99.27	99.06	98.68	98.31	98.29
L64	128.1	99.93	99.87	99.67	99.42	99.12	98.88	98.59	98.30	98.08
L65	129.1	99.97	99.88	99.72	99.50	99.29	99.00	98.81	98.48	98.26
L66	129.3	99.80	99.76	99.63	99.48	99.26	98.90	98.75	98.45	98.19
L67	126.4	99.82	99.73	99.54	99.36	99.20	98.79	98.71	98.34	98.28
L68	129.5	99.90	99.84	99.68	99.41	99.18	98.92	98.55	98.26	98.10
L69	128.3	99.92	99.80	99.75	99.46	99.19	98.98	98.60	98.28	98.22
L70	129.7	99.98	99.94	99.76	99.40	99.33	98.91	98.82	98.46	98.17
L71	127.7	99.78	99.75	99.65	99.28	99.22	98.77	98.53	98.25	98.12
L72	129.4	99.87	99.83	99.74	99.43	99.24	98.95	98.62	98.38	98.15
L73	128.9	99.85	99.80	99.73	99.39	99.16	98.89	98.57	98.32	98.27
L74	127.6	99.83	99.78	99.52	99.40	99.14	98.86	98.52	98.19	98.09
L75	126.2	99.79	99.74	99.57	99.29	99.11	98.87	98.61	98.35	98.14
Ave.	127.9	99.90	99.85	99.67	99.41	99.22	98.95	98.67	98.39	98.21
Med.	127.7	99.90	99.83	99.68	99.41	99.22	98.95	98.67	98.37	98.19
st dev	1.2450	0.0736	0.0701	0.0789	0.0837	0.0692	0.0810	0.0992	0.1321	0.1014
Min.	126.1	99.78	99.73	99.52	99.28	99.10	98.77	98.51	98.17	98.07
Max.	129.8	100.02	99.96	99.79	99.56	99.33	99.07	98.83	98.70	98.47

Sample No.	Lumen Maintenance (%)								
	10000h	11000h	12000h	13000h	14000h	15000h	16000h	17000h	-
L51	97.65	97.49	97.28	97.12	96.83	96.68	96.49	96.33	-
L52	97.54	97.46	97.19	96.87	96.75	96.59	96.30	96.15	-
L53	98.11	98.00	97.83	97.65	97.39	97.23	97.02	96.87	-
L54	97.86	97.59	97.43	97.27	97.13	96.83	96.63	96.44	-
L55	97.53	97.48	97.23	97.06	96.89	96.70	96.61	96.43	-
L56	97.85	97.65	97.48	97.31	97.14	96.94	96.72	96.51	-
L57	97.64	97.45	97.25	96.99	96.80	96.73	96.38	96.17	-
L58	97.96	97.64	97.53	97.25	96.96	96.77	96.60	96.45	-
L59	98.01	97.74	97.56	97.37	97.09	96.88	96.67	96.52	-
L60	97.95	97.80	97.64	97.34	97.27	97.01	96.83	96.67	-
L61	97.94	97.58	97.42	97.23	96.97	96.79	96.62	96.49	-
L62	97.73	97.57	97.41	97.10	96.81	96.64	96.46	96.30	-
L63	97.80	97.71	97.45	97.20	97.00	96.84	96.71	96.47	-
L64	97.69	97.47	97.32	97.15	96.95	96.67	96.57	96.31	-
L65	97.89	97.69	97.57	97.35	97.26	97.15	96.82	96.61	-
L66	97.87	97.53	97.36	97.08	96.87	96.71	96.47	96.29	-
L67	97.88	97.62	97.50	97.32	97.10	97.03	96.70	96.55	-
L68	97.82	97.60	97.46	97.24	97.07	97.00	96.69	96.48	-
L69	97.72	97.43	97.24	96.97	96.85	96.72	96.39	96.18	-
L70	97.84	97.55	97.44	97.14	96.94	96.85	96.59	96.42	-
L71	97.63	97.54	97.29	97.02	96.78	96.62	96.42	96.26	-
L72	97.78	97.51	97.39	97.13	96.84	96.69	96.52	96.35	-
L73	97.77	97.61	97.21	96.94	96.76	96.60	96.41	96.21	-
L74	97.68	97.56	97.22	97.05	96.82	96.78	96.50	96.34	-
L75	97.93	97.67	97.51	97.36	97.17	97.02	96.81	96.65	-
Ave.	97.80	97.60	97.41	97.18	96.98	96.82	96.60	96.42	-
Med.	97.82	97.58	97.42	97.15	96.95	96.78	96.60	96.43	-
st dev	0.1456	0.1268	0.1546	0.1727	0.1780	0.1746	0.1695	0.1740	-
Min.	97.53	97.43	97.19	96.87	96.75	96.59	96.30	96.15	-
Max.	98.11	98.00	97.83	97.65	97.39	97.23	97.02	96.87	-

**3.8 Data Set 3, 105°C, 300mA (Forward Voltage)**

Sample No.	Forward Voltage (V)									
	0hr(Initial)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h
L51	3.142	3.138	3.155	3.145	3.140	3.122	3.182	3.148	3.139	3.130
L52	3.143	3.169	3.169	3.140	3.132	3.142	3.172	3.158	3.169	3.132
L53	3.143	3.166	3.164	3.170	3.147	3.142	3.155	3.137	3.149	3.182
L54	3.139	3.142	3.169	3.159	3.178	3.154	3.129	3.138	3.167	3.135
L55	3.149	3.137	3.159	3.139	3.167	3.155	3.132	3.159	3.168	3.148
L56	3.135	3.150	3.175	3.142	3.150	3.158	3.173	3.184	3.156	3.150
L57	3.147	3.167	3.147	3.165	3.148	3.150	3.136	3.166	3.154	3.132
L58	3.135	3.144	3.153	3.144	3.145	3.124	3.169	3.181	3.164	3.180
L59	3.173	3.141	3.156	3.133	3.178	3.170	3.181	3.145	3.138	3.156
L60	3.131	3.137	3.178	3.138	3.165	3.191	3.162	3.152	3.168	3.176
L61	3.145	3.169	3.149	3.136	3.125	3.161	3.176	3.140	3.173	3.167
L62	3.180	3.159	3.176	3.160	3.158	3.127	3.151	3.180	3.149	3.138
L63	3.187	3.151	3.140	3.139	3.154	3.155	3.146	3.151	3.138	3.169
L64	3.157	3.143	3.156	3.159	3.152	3.124	3.158	3.149	3.163	3.131
L65	3.141	3.181	3.170	3.131	3.140	3.157	3.134	3.149	3.151	3.138
L66	3.159	3.170	3.141	3.179	3.160	3.164	3.150	3.138	3.150	3.185
L67	3.138	3.182	3.147	3.180	3.179	3.189	3.134	3.147	3.154	3.161
L68	3.163	3.180	3.173	3.181	3.162	3.133	3.148	3.158	3.149	3.139
L69	3.130	3.186	3.147	3.143	3.150	3.173	3.168	3.147	3.172	3.150
L70	3.145	3.154	3.156	3.141	3.166	3.122	3.171	3.159	3.155	3.180
L71	3.145	3.182	3.149	3.151	3.176	3.122	3.144	3.148	3.151	3.144
L72	3.158	3.186	3.143	3.159	3.155	3.132	3.130	3.166	3.165	3.142
L73	3.172	3.181	3.159	3.141	3.133	3.137	3.181	3.152	3.162	3.138
L74	3.154	3.171	3.161	3.177	3.163	3.128	3.150	3.156	3.145	3.182
L75	3.131	3.143	3.153	3.174	3.176	3.151	3.155	3.136	3.178	3.131
Ave.	3.150	3.161	3.158	3.153	3.156	3.147	3.155	3.154	3.157	3.153
Med.	3.145	3.166	3.156	3.145	3.155	3.150	3.155	3.151	3.155	3.148
st dev	0.0156	0.0175	0.0114	0.0163	0.0153	0.0205	0.0173	0.0134	0.0114	0.0194
Min.	3.130	3.137	3.140	3.131	3.125	3.122	3.129	3.136	3.138	3.130
Max.	3.187	3.186	3.178	3.181	3.179	3.191	3.182	3.184	3.178	3.185

Sample No.	Forward Voltage (V)								
	10000h	11000h	12000h	13000h	14000h	15000h	16000h	17000h	-
L51	3.164	3.161	3.168	3.174	3.144	3.165	3.160	3.171	-
L52	3.135	3.141	3.146	3.145	3.169	3.165	3.134	3.149	-
L53	3.144	3.174	3.160	3.155	3.174	3.145	3.131	3.165	-
L54	3.124	3.141	3.163	3.167	3.149	3.158	3.160	3.144	-
L55	3.162	3.148	3.160	3.168	3.175	3.124	3.159	3.168	-
L56	3.140	3.147	3.149	3.150	3.176	3.124	3.172	3.119	-
L57	3.128	3.137	3.179	3.174	3.174	3.128	3.144	3.153	-
L58	3.133	3.139	3.166	3.135	3.150	3.130	3.169	3.171	-
L59	3.134	3.156	3.144	3.142	3.161	3.152	3.140	3.171	-
L60	3.171	3.154	3.182	3.160	3.145	3.154	3.144	3.141	-
L61	3.131	3.166	3.163	3.132	3.169	3.131	3.169	3.148	-
L62	3.141	3.165	3.156	3.141	3.182	3.178	3.158	3.164	-
L63	3.136	3.166	3.150	3.155	3.170	3.123	3.164	3.161	-
L64	3.130	3.127	3.146	3.141	3.156	3.168	3.156	3.145	-
L65	3.168	3.146	3.140	3.166	3.143	3.135	3.153	3.159	-
L66	3.142	3.140	3.184	3.165	3.156	3.157	3.145	3.135	-
L67	3.173	3.169	3.144	3.152	3.158	3.166	3.147	3.158	-
L68	3.143	3.124	3.157	3.130	3.162	3.167	3.162	3.137	-
L69	3.160	3.130	3.143	3.154	3.151	3.172	3.149	3.161	-
L70	3.127	3.168	3.183	3.136	3.140	3.142	3.156	3.136	-
L71	3.125	3.153	3.151	3.129	3.162	3.150	3.151	3.130	-
L72	3.155	3.176	3.147	3.176	3.148	3.140	3.140	3.166	-
L73	3.125	3.166	3.143	3.148	3.156	3.122	3.152	3.158	-
L74	3.141	3.175	3.142	3.135	3.148	3.161	3.146	3.126	-
L75	3.127	3.151	3.145	3.132	3.172	3.168	3.160	3.125	-
Ave.	3.142	3.153	3.156	3.150	3.160	3.149	3.153	3.150	-
Med.	3.140	3.153	3.151	3.150	3.158	3.152	3.153	3.153	-
st dev	0.0157	0.0154	0.0140	0.0151	0.0122	0.0179	0.0108	0.0159	-
Min.	3.124	3.124	3.140	3.129	3.140	3.122	3.131	3.119	-
Max.	3.173	3.176	3.184	3.176	3.182	3.178	3.172	3.171	-

### 3.9 Data Set 3, 105°C, 300mA (Chromaticity Shift)

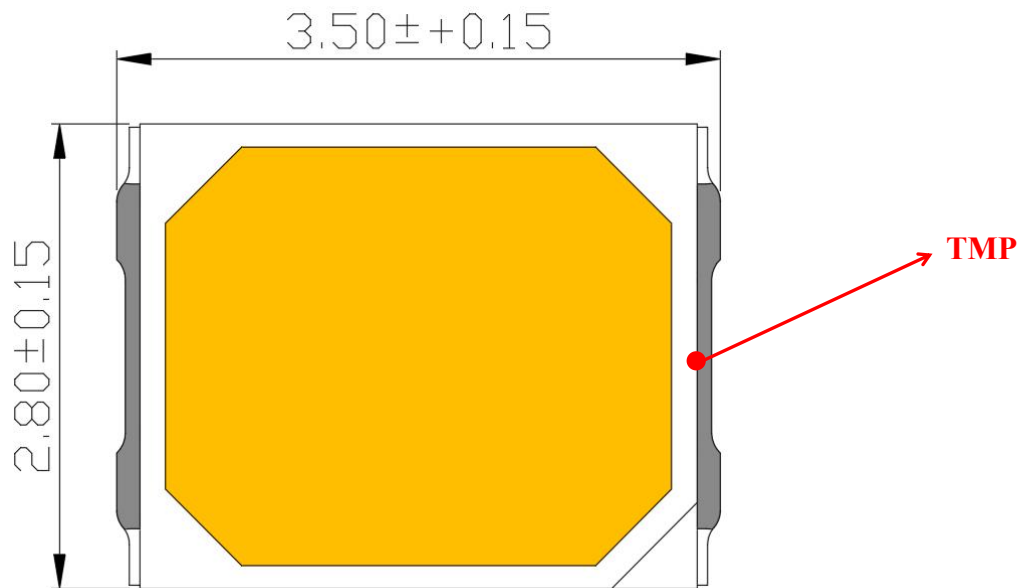
Sample No.	u'	v'	CCT(K)	Chromaticity Shift Δu'v'								
	0hr(Initial)			1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h
L51	0.2590	0.5284	2769	0.0009	0.0014	0.0018	0.0020	0.0022	0.0023	0.0026	0.0028	0.0032
L52	0.2567	0.5287	2817	0.0007	0.0011	0.0014	0.0017	0.0020	0.0022	0.0024	0.0026	0.0028
L53	0.2563	0.5287	2826	0.0005	0.0010	0.0014	0.0017	0.0020	0.0021	0.0024	0.0025	0.0027
L54	0.2598	0.5278	2755	0.0008	0.0013	0.0017	0.0020	0.0023	0.0026	0.0029	0.0030	0.0033
L55	0.2598	0.5297	2747	0.0009	0.0012	0.0015	0.0019	0.0022	0.0024	0.0027	0.0029	0.0031
L56	0.2573	0.5300	2799	0.0007	0.0011	0.0015	0.0018	0.0021	0.0022	0.0026	0.0029	0.0033
L57	0.2583	0.5268	2791	0.0008	0.0012	0.0015	0.0019	0.0020	0.0022	0.0024	0.0027	0.0031
L58	0.2573	0.5278	2808	0.0009	0.0014	0.0018	0.0020	0.0021	0.0024	0.0028	0.0030	0.0033
L59	0.2588	0.5302	2765	0.0008	0.0013	0.0018	0.0021	0.0024	0.0028	0.0029	0.0032	0.0036
L60	0.2566	0.5280	2823	0.0009	0.0013	0.0017	0.0019	0.0021	0.0024	0.0026	0.0029	0.0031
L61	0.2558	0.5286	2837	0.0006	0.0010	0.0015	0.0019	0.0023	0.0027	0.0031	0.0033	0.0035
L62	0.2603	0.5268	2749	0.0007	0.0011	0.0014	0.0018	0.0020	0.0023	0.0024	0.0026	0.0030
L63	0.2591	0.5286	2766	0.0005	0.0010	0.0015	0.0016	0.0019	0.0021	0.0023	0.0027	0.0029
L64	0.2600	0.5293	2743	0.0008	0.0012	0.0016	0.0018	0.0021	0.0022	0.0023	0.0027	0.0031
L65	0.2584	0.5282	2783	0.0009	0.0014	0.0018	0.0022	0.0025	0.0027	0.0028	0.0031	0.0034
L66	0.2586	0.5312	2765	0.0007	0.0010	0.0014	0.0017	0.0021	0.0023	0.0027	0.0031	0.0035
L67	0.2583	0.5268	2791	0.0006	0.0011	0.0014	0.0016	0.0019	0.0022	0.0026	0.0030	0.0034
L68	0.2587	0.5299	2768	0.0008	0.0012	0.0016	0.0017	0.0018	0.0019	0.0023	0.0024	0.0028
L69	0.2587	0.5306	2765	0.0009	0.0013	0.0016	0.0018	0.0021	0.0024	0.0027	0.0031	0.0035
L70	0.2563	0.5292	2824	0.0006	0.0010	0.0014	0.0016	0.0020	0.0024	0.0025	0.0029	0.0031
L71	0.2582	0.5298	2780	0.0009	0.0012	0.0017	0.0019	0.0020	0.0022	0.0024	0.0025	0.0027
L72	0.2578	0.5281	2797	0.0008	0.0013	0.0016	0.0020	0.0023	0.0025	0.0028	0.0030	0.0032
L73	0.2569	0.5291	2813	0.0007	0.0011	0.0015	0.0019	0.0022	0.0025	0.0027	0.0033	0.0036
L74	0.2605	0.5287	2737	0.0006	0.0009	0.0013	0.0014	0.0015	0.0017	0.0021	0.0026	0.0028
L75	0.2563	0.5265	2836	0.0009	0.0012	0.0015	0.0016	0.0020	0.0023	0.0027	0.0029	0.0032
Ave.	0.2582	0.5287	2786	0.0008	0.0012	0.0016	0.0018	0.0021	0.0023	0.0026	0.0029	0.0032
Med.	0.2583	0.5287	2783	0.0008	0.0012	0.0015	0.0018	0.0021	0.0023	0.0026	0.0029	0.0032
st dev	0.0014	0.0012	30.62	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003
Min.	0.2558	0.5265	2737	0.0005	0.0009	0.0013	0.0014	0.0015	0.0017	0.0021	0.0024	0.0027
Max.	0.2605	0.5312	2837	0.0009	0.0014	0.0018	0.0022	0.0025	0.0028	0.0031	0.0033	0.0036



Sample No.	Chromaticity Shift $\Delta u'v'$								
	10000h	11000h	12000h	13000h	14000h	15000h	16000h	17000h	-
L51	0.0035	0.0038	0.0039	0.0040	0.0041	0.0042	0.0045	0.0047	-
L52	0.0032	0.0033	0.0035	0.0036	0.0037	0.0039	0.0043	0.0046	-
L53	0.0028	0.0029	0.0030	0.0031	0.0032	0.0034	0.0037	0.0041	-
L54	0.0037	0.0040	0.0041	0.0043	0.0044	0.0046	0.0048	0.0050	-
L55	0.0033	0.0034	0.0035	0.0037	0.0039	0.0041	0.0042	0.0043	-
L56	0.0037	0.0039	0.0041	0.0042	0.0043	0.0045	0.0048	0.0050	-
L57	0.0034	0.0036	0.0038	0.0040	0.0042	0.0044	0.0045	0.0046	-
L58	0.0035	0.0037	0.0038	0.0040	0.0041	0.0042	0.0046	0.0048	-
L59	0.0040	0.0042	0.0044	0.0046	0.0047	0.0048	0.0050	0.0053	-
L60	0.0032	0.0035	0.0036	0.0038	0.0040	0.0042	0.0045	0.0047	-
L61	0.0038	0.0041	0.0042	0.0044	0.0045	0.0046	0.0049	0.0051	-
L62	0.0033	0.0035	0.0036	0.0037	0.0039	0.0041	0.0044	0.0046	-
L63	0.0033	0.0037	0.0038	0.0040	0.0042	0.0044	0.0048	0.0051	-
L64	0.0033	0.0035	0.0036	0.0038	0.0039	0.0041	0.0045	0.0048	-
L65	0.0037	0.0039	0.0041	0.0043	0.0045	0.0046	0.0048	0.0051	-
L66	0.0038	0.0039	0.0040	0.0041	0.0042	0.0043	0.0045	0.0048	-
L67	0.0035	0.0037	0.0038	0.0040	0.0042	0.0043	0.0047	0.0050	-
L68	0.0030	0.0031	0.0033	0.0035	0.0037	0.0038	0.0040	0.0041	-
L69	0.0040	0.0042	0.0043	0.0044	0.0046	0.0048	0.0052	0.0055	-
L70	0.0032	0.0033	0.0034	0.0035	0.0036	0.0037	0.0040	0.0042	-
L71	0.0028	0.0030	0.0031	0.0032	0.0034	0.0035	0.0039	0.0040	-
L72	0.0034	0.0037	0.0038	0.0040	0.0041	0.0042	0.0043	0.0045	-
L73	0.0038	0.0040	0.0041	0.0043	0.0045	0.0046	0.0048	0.0051	-
L74	0.0029	0.0031	0.0032	0.0034	0.0036	0.0038	0.0042	0.0044	-
L75	0.0035	0.0036	0.0037	0.0038	0.0039	0.0041	0.0043	0.0046	-
Ave.	0.0034	0.0036	0.0037	0.0039	0.0041	0.0042	0.0045	0.0047	-
Med.	0.0034	0.0037	0.0038	0.0040	0.0041	0.0042	0.0045	0.0047	-
st dev	0.0003	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	-
Min.	0.0028	0.0029	0.0030	0.0031	0.0032	0.0034	0.0037	0.0040	-
Max.	0.0040	0.0042	0.0044	0.0046	0.0047	0.0048	0.0052	0.0055	-

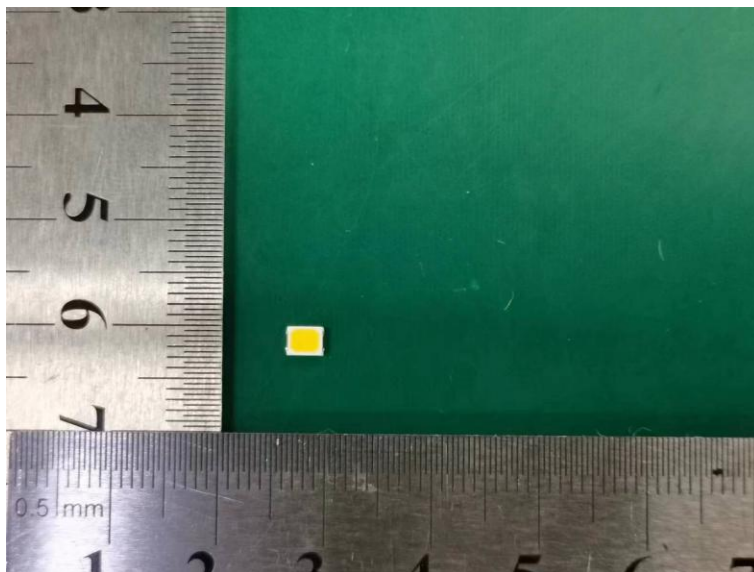
## 4-EUT Photos

### 4.1 Mechanical Dimensions



Note: All dimensions are in millimeters(mm).

### 4.2 EUT Photo



----End of report----