



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.:** BL210622008-9

**Product Description:** SMD LED

**Model No.:** AW-21/D2B1C27Y41FJ

**Test Initiation Date:** 2021-06-25

**Test Completion Date:** 2021-06-25 to 2023-07-24

**Report Issue Date:** 2023-07-31

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

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

**Tested by**

Sam Chen

**Reviewed by**

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.

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# 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/D2B1C27Y41FJ

**Part Type:** SMD LED

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

**CCT:** 2700K

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

**Average Power Density per LED die(W/mm2):** 1.183

**Average Current Density per LED die(mA/mm2):** 394.166

**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):** 80

**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/D2B1C27Y41FJ	AW-21/A2B1CXXXXXXJ	First XXX: CCT code; Sencond XX: Flux code; Last X: CRI code.
	AW-21/B2B1CXXXXXXJ	
	AW-21/C2B1CXXXXXXJ	
	AW-21/D2B1CXXXXXXJ	

### 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 2021-06-22 and tested during 2021-06-25 to 2023-07-24. 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=54.4°C Ta=53.7°C	Ts=84.8°C Ta=83.6°C	Ts=104.6°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
$\alpha$	2.112E-06	2.241E-06	2.263E-06
$\beta$	1.007	1.006	1.003
Reported L70 (17k) (17000h)	>102000	>102000	>102000
Reported L90 (17k) (17000h)	53,000	49,000	48,000

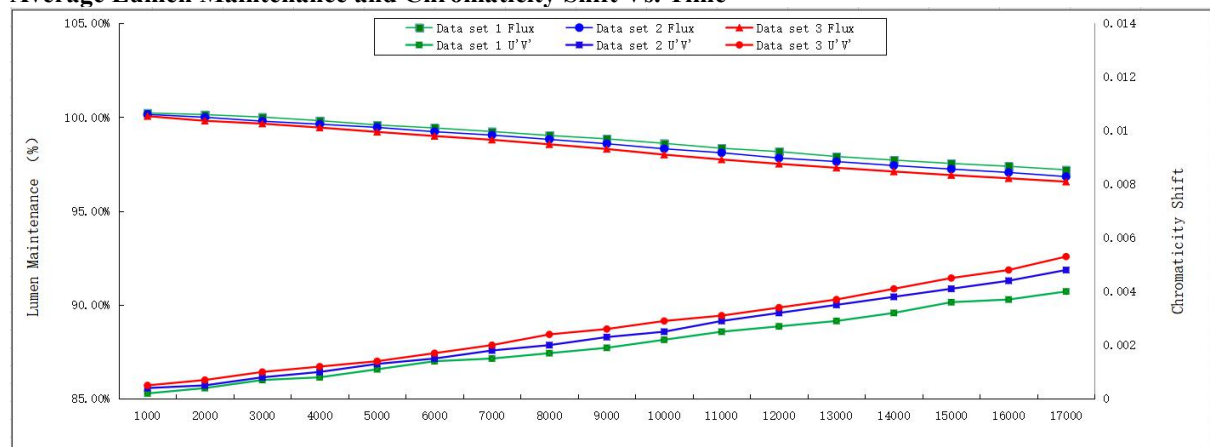
### Average Lumen Maintenance (%)

Data Set	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h
1	100.22	100.13	100.00	99.81	99.58	99.42	99.23	99.02	98.84
2	100.14	99.99	99.78	99.62	99.45	99.22	99.04	98.81	98.58
3	100.05	99.80	99.65	99.44	99.21	98.99	98.79	98.55	98.30
Data Set	10000h	11000h	12000h	13000h	14000h	15000h	16000h	17000h	-
1	98.60	98.34	98.16	97.90	97.71	97.53	97.38	97.19	-
2	98.31	98.10	97.82	97.63	97.42	97.23	97.05	96.83	-
3	98.00	97.74	97.51	97.30	97.10	96.91	96.74	96.56	-


### Average Chromaticity Shift

Data Set	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h
1	0.0002	0.0004	0.0007	0.0008	0.0011	0.0014	0.0015	0.0017	0.0019
2	0.0004	0.0005	0.0008	0.0010	0.0013	0.0015	0.0018	0.0020	0.0023
3	0.0005	0.0007	0.0010	0.0012	0.0014	0.0017	0.0020	0.0024	0.0026
Data Set	10000h	11000h	12000h	13000h	14000h	15000h	16000h	17000h	-
1	0.0022	0.0025	0.0027	0.0029	0.0032	0.0036	0.0037	0.0040	-
2	0.0025	0.0029	0.0032	0.0035	0.0038	0.0041	0.0044	0.0048	-
3	0.0029	0.0031	0.0034	0.0037	0.0041	0.0045	0.0048	0.0053	-

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




### TM-21 Report for Lumen Maintenance



## TM-21 Report

Table 1: Report at each LM-80 Test Condition					
Description of LED Light Source Tested (manufacturer, model, catalog number)		Shenzhen HoneBright Technology Co.,Ltd AW-21/D2B1C27Y41FJ			
		Test Condition 1 - 55°C Case Temp		Test Condition 2 - 85°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)	300	DUT drive current used in the test (mA)	300	DUT drive current used in the test (mA)	300
Test duration (hours)	17,000	Test duration (hours)	17,000	Test duration (hours)	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	Test duration used for projection (hour to hour)	8,000 - 17,000
Tested case temperature (°C)	55	Tested case temperature (°C)	85	Tested case temperature (°C)	105
$\alpha$	2.112E-06	$\alpha$	2.241E-06	$\alpha$	2.263E-06
B	1.007	B	1.006	B	1.003
Reported L70(17k) (hours)	>102000	Reported L70(17k) (hours)	>102000	Reported L70(17k) (hours)	>102000

Table 2: Interpolation Report (projection based on <i>in-situ</i> temperature entered)	
$T_{s,1}$ (°C)	105.00
$T_{s,1}$ (K)	378.15
$\alpha_1$	2.263E-06
$B_1$	1.003
$T_{s,2}$ (°C)	-
$T_{s,2}$ (K)	-
$\alpha_2$	-
$B_2$	-
$E_s/k_s$	-
A	-
$B_0$	1.003
$T_{s,i}$ (°C)	105.00
$T_{s,i}$ (K)	378.15
$\alpha_i$	2.263E-06
Reported L70(17k) at 105°C (hours)	>102000



## TM-21 Report

Table 1: Report at each LM-80 Test Condition					
Description of LED Light Source Tested (manufacturer, model, catalog number)		Shenzhen HoneBright Technology Co.,Ltd AW-21/D2B1C27Y41FJ			
		Test Condition 1 - 55°C Case Temp		Test Condition 2 - 85°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)	300	DUT drive current used in the test (mA)	300	DUT drive current used in the test (mA)	300
Test duration (hours)	17,000	Test duration (hours)	17,000	Test duration (hours)	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	Test duration used for projection (hour to hour)	8,000 - 17,000
Tested case temperature (°C)	55	Tested case temperature (°C)	85	Tested case temperature (°C)	105
$\alpha$	2.112E-06	$\alpha$	2.241E-06	$\alpha$	2.263E-06
B	1.007	B	1.006	B	1.003
Reported L90(17k) (hours)	53,000	Reported L90(17k) (hours)	49,000	Reported L90(17k) (hours)	48,000

Table 2: Interpolation Report (projection based on <i>in-situ</i> temperature entered)	
$T_{s,1}$ (°C)	105.00
$T_{s,1}$ (K)	378.15
$\alpha_1$	2.263E-06
$B_1$	1.003
$T_{s,2}$ (°C)	-
$T_{s,2}$ (K)	-
$\alpha_2$	-
$B_2$	-
$E_s/k_s$	-
A	-
$B_0$	1.003
$T_{s,i}$ (°C)	105.00
$T_{s,i}$ (K)	378.15
$\alpha_i$	2.263E-06
Reported L90(17k) at 105°C (hours)	48,000

### 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	154.6	100.18	100.12	100.01	99.85	99.60	99.42	99.18	98.95	98.71
L2	153.6	100.16	100.08	99.92	99.69	99.44	99.24	99.14	98.90	98.72
L3	155.3	100.26	100.16	100.06	99.88	99.61	99.50	99.28	99.10	98.93
L4	153.2	100.12	100.02	99.91	99.70	99.53	99.38	99.15	98.92	98.69
L5	154.4	100.28	100.20	100.05	99.93	99.77	99.65	99.41	99.16	99.02
L6	153.9	100.21	100.10	99.99	99.75	99.50	99.40	99.24	99.07	98.91
L7	154.3	100.15	100.09	99.95	99.73	99.53	99.32	99.10	98.93	98.74
L8	153.9	100.19	100.08	99.95	99.72	99.47	99.37	99.17	99.00	98.78
L9	154.2	100.31	100.18	100.09	99.92	99.74	99.54	99.30	99.03	98.88
L10	154.0	100.29	100.21	100.04	99.81	99.64	99.45	99.25	99.07	98.90
L11	153.6	100.23	100.09	99.95	99.81	99.57	99.47	99.30	99.03	98.79
L12	153.8	100.15	100.06	99.90	99.75	99.54	99.34	99.15	98.97	98.79
L13	154.4	100.27	100.13	100.05	99.84	99.69	99.52	99.28	99.07	98.92
L14	154.9	100.20	100.13	100.01	99.78	99.53	99.34	99.13	98.96	98.78
L15	154.8	100.14	100.04	99.95	99.84	99.57	99.39	99.18	98.96	98.82
L16	154.9	100.11	100.02	99.88	99.67	99.40	99.22	99.02	98.86	98.71
L17	155.5	100.25	100.17	100.04	99.82	99.58	99.39	99.19	99.02	98.87
L18	154.9	100.20	100.10	99.95	99.76	99.56	99.40	99.22	98.94	98.75
L19	155.1	100.28	100.19	100.11	99.92	99.66	99.56	99.40	99.22	99.08
L20	154.3	100.24	100.16	100.06	99.87	99.55	99.42	99.31	99.11	98.94
L21	155.0	100.26	100.14	99.99	99.75	99.50	99.31	99.21	98.99	98.83
L22	153.2	100.16	100.10	99.95	99.76	99.53	99.34	99.20	98.93	98.72
L23	154.1	100.24	100.17	100.06	99.90	99.64	99.48	99.28	99.00	98.85
L24	155.0	100.27	100.19	100.08	99.94	99.68	99.50	99.31	99.13	98.91
L25	154.7	100.32	100.26	100.12	99.98	99.75	99.62	99.40	99.21	98.99
Ave.	154.4	100.22	100.13	100.00	99.81	99.58	99.42	99.23	99.02	98.84
Med.	154.4	100.23	100.13	100.01	99.81	99.57	99.40	99.22	99.00	98.83
st dev	0.6322	0.0609	0.0616	0.0690	0.0869	0.0952	0.1074	0.0967	0.0955	0.1058
Min.	153.2	100.11	100.02	99.88	99.67	99.40	99.22	99.02	98.86	98.69
Max.	155.5	100.32	100.26	100.12	99.98	99.77	99.65	99.41	99.22	99.08



Sample No.	Lumen Maintenance (%)								
	10000h	11000h	12000h	13000h	14000h	15000h	16000h	17000h	-
L1	98.48	98.21	97.98	97.69	97.52	97.31	97.12	96.87	-
L2	98.44	98.15	97.98	97.71	97.53	97.33	97.19	97.04	-
L3	98.69	98.46	98.31	98.10	97.87	97.72	97.60	97.37	-
L4	98.50	98.27	98.08	97.80	97.57	97.44	97.32	97.14	-
L5	98.75	98.47	98.29	98.03	97.79	97.62	97.42	97.26	-
L6	98.66	98.36	98.22	97.94	97.73	97.50	97.32	97.14	-
L7	98.45	98.23	98.03	97.74	97.58	97.36	97.18	96.95	-
L8	98.53	98.27	98.07	97.81	97.59	97.42	97.26	97.12	-
L9	98.69	98.41	98.22	97.99	97.76	97.57	97.46	97.23	-
L10	98.61	98.32	98.11	97.80	97.56	97.34	97.23	96.99	-
L11	98.54	98.25	98.13	97.87	97.74	97.55	97.43	97.23	-
L12	98.52	98.28	98.07	97.84	97.67	97.44	97.23	97.04	-
L13	98.72	98.50	98.32	98.08	97.84	97.66	97.55	97.37	-
L14	98.52	98.27	98.05	97.73	97.54	97.32	97.15	97.00	-
L15	98.58	98.32	98.09	97.90	97.73	97.57	97.42	97.24	-
L16	98.52	98.27	98.07	97.86	97.73	97.54	97.37	97.14	-
L17	98.66	98.37	98.22	97.98	97.78	97.59	97.48	97.34	-
L18	98.47	98.18	97.97	97.71	97.50	97.33	97.19	96.98	-
L19	98.82	98.56	98.42	98.20	97.96	97.82	97.61	97.36	-
L20	98.73	98.47	98.30	98.11	97.90	97.75	97.56	97.40	-
L21	98.61	98.36	98.14	97.89	97.75	97.60	97.47	97.30	-
L22	98.48	98.23	98.11	97.81	97.58	97.43	97.32	97.15	-
L23	98.63	98.42	98.22	97.92	97.77	97.63	97.49	97.35	-
L24	98.72	98.44	98.22	97.91	97.69	97.48	97.35	97.16	-
L25	98.79	98.55	98.36	98.19	98.01	97.85	97.68	97.52	-
Ave.	98.60	98.34	98.16	97.90	97.71	97.53	97.38	97.19	-
Med.	98.61	98.32	98.13	97.89	97.73	97.54	97.37	97.16	-
st dev	0.1134	0.1161	0.1262	0.1496	0.1423	0.1577	0.1579	0.1655	-
Min.	98.44	98.15	97.97	97.69	97.50	97.31	97.12	96.87	-
Max.	98.82	98.56	98.42	98.20	98.01	97.85	97.68	97.52	-

### 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	2.998	3.002	3.018	2.990	2.981	3.010	3.006	3.009	2.973	2.997
L2	2.999	2.973	3.008	2.984	3.003	3.014	3.003	2.983	2.986	2.990
L3	3.000	3.004	3.009	3.017	2.982	2.998	3.001	2.997	2.985	3.013
L4	2.991	2.982	3.019	2.988	2.997	2.985	2.995	3.020	2.991	2.989
L5	2.993	2.978	3.010	2.984	2.997	2.991	2.972	2.999	2.989	3.018
L6	2.996	2.991	3.001	3.003	3.009	2.994	2.983	2.992	2.993	2.993
L7	2.992	2.973	2.988	3.009	3.000	2.988	3.001	3.014	2.985	3.012
L8	3.003	2.991	3.013	3.017	2.993	3.016	2.983	3.016	2.988	2.986
L9	2.994	3.000	3.000	3.017	2.980	3.019	2.970	3.005	3.005	3.012
L10	2.994	3.009	2.992	2.991	2.993	2.999	2.981	2.984	2.973	2.997
L11	3.004	2.985	3.014	3.007	2.994	2.995	2.974	2.994	3.004	3.007
L12	3.002	2.978	3.000	3.014	2.985	3.005	2.973	3.016	2.991	3.000
L13	2.993	2.978	3.009	2.984	2.994	2.987	2.991	3.005	2.993	3.009
L14	3.000	2.973	2.992	2.990	2.985	2.994	2.978	2.997	3.004	2.991
L15	3.009	2.991	2.998	3.014	2.998	2.992	2.971	2.991	3.003	2.999
L16	3.001	3.008	2.994	2.988	2.975	2.993	2.978	3.004	2.976	2.997
L17	3.000	3.000	3.019	3.013	2.974	3.002	3.005	2.981	2.990	3.008
L18	3.009	2.989	3.008	3.007	2.985	3.009	2.998	3.010	2.976	3.017
L19	2.990	2.994	3.009	2.992	3.007	3.009	3.004	3.020	3.000	2.987
L20	2.992	3.006	3.012	2.993	2.991	3.019	2.986	3.016	2.981	3.013
L21	3.001	2.984	2.980	3.006	2.997	2.993	2.986	2.993	3.008	2.990
L22	3.004	2.986	2.984	2.998	2.979	2.989	3.004	3.003	2.973	2.989
L23	3.002	2.971	2.993	2.986	3.005	3.002	2.996	2.999	3.004	3.012
L24	2.989	3.005	3.011	2.983	2.998	3.011	3.008	3.009	3.006	2.989
L25	3.001	2.988	2.985	2.981	2.978	2.981	3.004	2.999	2.998	3.002
Ave.	2.998	2.990	3.003	2.998	2.991	3.000	2.990	3.002	2.991	3.001
Med.	3.000	2.989	3.008	2.993	2.993	2.998	2.991	3.003	2.991	2.999
st dev	0.0056	0.0121	0.0116	0.0127	0.0102	0.0111	0.0130	0.0114	0.0114	0.0105
Min.	2.989	2.971	2.980	2.981	2.974	2.981	2.970	2.981	2.973	2.986
Max.	3.009	3.009	3.019	3.017	3.009	3.019	3.008	3.020	3.008	3.018

Sample No.	Forward Voltage (V)								
	10000h	11000h	12000h	13000h	14000h	15000h	16000h	17000h	-
L1	3.015	3.007	3.008	2.994	2.995	2.985	2.996	2.984	-
L2	3.005	3.004	2.990	2.987	2.993	2.998	3.006	3.007	-
L3	3.004	2.978	3.014	2.987	2.983	3.016	2.978	3.000	-
L4	3.017	2.973	2.992	2.979	2.995	3.015	2.978	2.984	-
L5	2.983	2.980	2.986	2.982	2.993	2.994	2.988	3.003	-
L6	2.993	2.973	2.988	2.972	2.986	2.982	3.005	2.986	-
L7	3.001	2.972	3.000	2.977	3.012	3.010	2.991	2.990	-
L8	3.013	2.974	2.998	2.979	2.984	3.008	3.000	2.981	-
L9	3.017	2.979	2.989	3.000	3.001	3.019	3.009	3.007	-
L10	2.999	2.989	2.990	2.971	2.987	3.015	2.996	2.994	-
L11	3.006	2.980	3.012	2.970	2.994	2.980	2.973	2.985	-
L12	3.000	2.995	3.018	3.010	3.015	3.008	2.985	2.983	-
L13	3.011	2.986	2.996	2.991	2.995	3.010	2.994	2.994	-
L14	3.005	2.973	3.009	2.982	3.011	2.994	2.995	3.006	-
L15	3.014	3.010	3.007	2.995	2.996	2.998	2.982	3.005	-
L16	3.007	2.983	3.004	2.993	3.015	2.981	3.008	2.974	-
L17	3.006	2.974	3.011	2.996	2.983	3.003	2.996	3.000	-
L18	3.018	2.978	2.992	3.003	3.008	3.010	2.982	2.997	-
L19	2.993	3.005	3.006	3.006	3.012	2.983	2.992	2.974	-
L20	2.992	3.000	2.993	3.009	3.013	2.981	2.996	3.002	-
L21	3.011	3.010	2.996	2.976	3.002	3.000	2.991	2.973	-
L22	2.988	2.975	3.017	2.983	3.018	3.008	2.979	2.971	-
L23	2.989	3.010	3.018	2.978	3.002	3.012	2.989	3.003	-
L24	3.002	3.000	3.008	2.972	3.015	3.002	2.992	2.989	-
L25	2.990	3.001	2.993	2.972	3.010	2.995	2.991	2.980	-
Ave.	3.003	2.988	3.001	2.987	3.001	3.000	2.992	2.991	-
Med.	3.005	2.983	3.000	2.983	3.001	3.002	2.992	2.990	-
st dev	0.0102	0.0141	0.0104	0.0125	0.0115	0.0125	0.0097	0.0117	-
Min.	2.983	2.972	2.986	2.970	2.983	2.980	2.973	2.971	-
Max.	3.018	3.010	3.018	3.010	3.018	3.019	3.009	3.007	-

### 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	0.2604	0.5298	2734	0.0001	0.0002	0.0005	0.0007	0.0010	0.0013	0.0014	0.0015	0.0017
L2	0.2619	0.5267	2716	0.0003	0.0005	0.0007	0.0008	0.0011	0.0014	0.0015	0.0017	0.0019
L3	0.2603	0.5294	2738	0.0001	0.0002	0.0004	0.0006	0.0009	0.0012	0.0013	0.0014	0.0017
L4	0.2611	0.5278	2727	0.0002	0.0003	0.0006	0.0007	0.0009	0.0011	0.0012	0.0014	0.0015
L5	0.2600	0.5270	2754	0.0004	0.0006	0.0009	0.0011	0.0013	0.0016	0.0017	0.0019	0.0021
L6	0.2609	0.5301	2723	0.0003	0.0006	0.0008	0.0010	0.0014	0.0018	0.0019	0.0020	0.0023
L7	0.2626	0.5300	2688	0.0001	0.0004	0.0007	0.0009	0.0010	0.0013	0.0014	0.0016	0.0018
L8	0.2621	0.5298	2699	0.0002	0.0005	0.0006	0.0007	0.0008	0.0012	0.0013	0.0015	0.0017
L9	0.2612	0.5259	2732	0.0005	0.0008	0.0010	0.0012	0.0016	0.0020	0.0021	0.0022	0.0025
L10	0.2604	0.5303	2732	0.0001	0.0003	0.0004	0.0006	0.0009	0.0013	0.0015	0.0016	0.0018
L11	0.2619	0.5299	2702	0.0001	0.0002	0.0005	0.0006	0.0008	0.0013	0.0014	0.0016	0.0018
L12	0.2624	0.5294	2693	0.0003	0.0005	0.0007	0.0009	0.0011	0.0014	0.0015	0.0017	0.0019
L13	0.2616	0.5299	2708	0.0001	0.0003	0.0005	0.0006	0.0010	0.0013	0.0014	0.0015	0.0016
L14	0.2588	0.5256	2785	0.0002	0.0003	0.0004	0.0005	0.0008	0.0011	0.0012	0.0014	0.0016
L15	0.2614	0.5289	2716	0.0002	0.0004	0.0007	0.0008	0.0012	0.0015	0.0016	0.0017	0.0019
L16	0.2619	0.5312	2697	0.0001	0.0004	0.0006	0.0008	0.0011	0.0014	0.0015	0.0016	0.0017
L17	0.2575	0.5256	2816	0.0004	0.0006	0.0008	0.0010	0.0012	0.0016	0.0017	0.0019	0.0020
L18	0.2599	0.5282	2752	0.0002	0.0004	0.0007	0.0009	0.0011	0.0014	0.0015	0.0016	0.0018
L19	0.2620	0.5298	2701	0.0003	0.0006	0.0008	0.0009	0.0012	0.0015	0.0016	0.0018	0.0020
L20	0.2621	0.5280	2705	0.0003	0.0006	0.0009	0.0011	0.0014	0.0017	0.0018	0.0019	0.0022
L21	0.2609	0.5315	2716	0.0004	0.0005	0.0007	0.0008	0.0012	0.0016	0.0017	0.0019	0.0021
L22	0.2617	0.5288	2711	0.0002	0.0004	0.0006	0.0008	0.0009	0.0012	0.0013	0.0015	0.0017
L23	0.2610	0.5271	2733	0.0001	0.0002	0.0004	0.0006	0.0008	0.0012	0.0013	0.0014	0.0016
L24	0.2609	0.5299	2723	0.0003	0.0005	0.0007	0.0008	0.0011	0.0014	0.0015	0.0016	0.0019
L25	0.2613	0.5280	2723	0.0005	0.0006	0.0009	0.0010	0.0012	0.0014	0.0015	0.0016	0.0019
Ave.	0.2610	0.5287	2725	0.0002	0.0004	0.0007	0.0008	0.0011	0.0014	0.0015	0.0017	0.0019
Med.	0.2612	0.5294	2723	0.0002	0.0004	0.0007	0.0008	0.0011	0.0014	0.0015	0.0016	0.0018
st dev	0.0012	0.0017	28.84	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.	0.2575	0.5256	2688	0.0001	0.0002	0.0004	0.0005	0.0008	0.0011	0.0012	0.0014	0.0015
Max.	0.2626	0.5315	2816	0.0005	0.0008	0.0010	0.0012	0.0016	0.0020	0.0021	0.0022	0.0025

Sample No.	Chromaticity Shift $\Delta u'v'$								
	10000h	11000h	12000h	13000h	14000h	15000h	16000h	17000h	-
L1	0.0020	0.0023	0.0025	0.0028	0.0032	0.0033	0.0034	0.0039	-
L2	0.0021	0.0025	0.0027	0.0028	0.0032	0.0036	0.0037	0.0039	-
L3	0.0021	0.0025	0.0028	0.0030	0.0033	0.0036	0.0037	0.0040	-
L4	0.0018	0.0020	0.0022	0.0024	0.0028	0.0030	0.0031	0.0034	-
L5	0.0024	0.0026	0.0028	0.0030	0.0032	0.0034	0.0036	0.0040	-
L6	0.0027	0.0029	0.0031	0.0034	0.0039	0.0044	0.0046	0.0049	-
L7	0.0021	0.0024	0.0026	0.0028	0.0031	0.0032	0.0034	0.0038	-
L8	0.0020	0.0023	0.0025	0.0028	0.0030	0.0032	0.0034	0.0036	-
L9	0.0027	0.0030	0.0033	0.0034	0.0036	0.0040	0.0041	0.0046	-
L10	0.0021	0.0024	0.0027	0.0028	0.0032	0.0035	0.0036	0.0039	-
L11	0.0020	0.0024	0.0026	0.0028	0.0032	0.0036	0.0038	0.0040	-
L12	0.0022	0.0026	0.0028	0.0030	0.0035	0.0040	0.0041	0.0045	-
L13	0.0019	0.0023	0.0025	0.0027	0.0031	0.0036	0.0037	0.0041	-
L14	0.0018	0.0021	0.0024	0.0025	0.0027	0.0030	0.0032	0.0035	-
L15	0.0021	0.0024	0.0026	0.0027	0.0031	0.0035	0.0037	0.0039	-
L16	0.0020	0.0024	0.0027	0.0030	0.0032	0.0036	0.0038	0.0042	-
L17	0.0022	0.0024	0.0026	0.0029	0.0034	0.0036	0.0038	0.0041	-
L18	0.0022	0.0026	0.0029	0.0032	0.0035	0.0039	0.0041	0.0045	-
L19	0.0024	0.0026	0.0028	0.0029	0.0033	0.0036	0.0037	0.0042	-
L20	0.0024	0.0027	0.0030	0.0032	0.0036	0.0041	0.0042	0.0047	-
L21	0.0024	0.0027	0.0029	0.0031	0.0032	0.0035	0.0036	0.0040	-
L22	0.0020	0.0022	0.0025	0.0027	0.0029	0.0032	0.0034	0.0037	-
L23	0.0019	0.0022	0.0024	0.0026	0.0030	0.0034	0.0035	0.0039	-
L24	0.0023	0.0026	0.0029	0.0031	0.0035	0.0036	0.0037	0.0039	-
L25	0.0022	0.0024	0.0026	0.0029	0.0031	0.0034	0.0036	0.0040	-
Ave.	0.0022	0.0025	0.0027	0.0029	0.0032	0.0036	0.0037	0.0040	-
Med.	0.0021	0.0024	0.0027	0.0029	0.0032	0.0036	0.0037	0.0040	-
st dev	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0004	-
Min.	0.0018	0.0020	0.0022	0.0024	0.0027	0.0030	0.0031	0.0034	-
Max.	0.0027	0.0030	0.0033	0.0034	0.0039	0.0044	0.0046	0.0049	-

**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	153.6	100.11	99.99	99.74	99.64	99.43	99.17	98.96	98.76	98.56
L27	154.4	100.10	99.94	99.79	99.59	99.44	99.24	99.11	98.88	98.70
L28	154.8	100.22	100.06	99.93	99.74	99.54	99.32	99.08	98.85	98.68
L29	154.0	100.17	100.05	99.86	99.68	99.47	99.24	99.05	98.80	98.55
L30	154.7	100.19	99.99	99.73	99.54	99.38	99.20	99.00	98.73	98.51
L31	155.2	100.17	100.06	99.85	99.69	99.47	99.25	99.08	98.89	98.61
L32	153.4	100.25	100.10	99.88	99.75	99.60	99.41	99.24	98.97	98.78
L33	154.9	100.22	100.11	99.92	99.72	99.49	99.23	99.03	98.75	98.54
L34	154.4	100.08	99.95	99.72	99.55	99.43	99.25	99.09	98.91	98.67
L35	154.8	100.18	100.10	99.83	99.64	99.43	99.17	98.96	98.79	98.51
L36	155.2	100.05	99.86	99.63	99.46	99.27	99.01	98.83	98.63	98.44
L37	154.1	100.06	99.91	99.66	99.48	99.33	99.07	98.88	98.60	98.41
L38	153.8	100.10	99.91	99.71	99.57	99.36	99.16	98.97	98.71	98.46
L39	153.6	100.06	99.96	99.75	99.55	99.36	99.11	98.91	98.69	98.45
L40	154.2	100.19	100.02	99.83	99.73	99.54	99.31	99.07	98.80	98.51
L41	154.5	100.24	100.06	99.92	99.75	99.55	99.33	99.15	98.89	98.70
L42	152.7	100.18	100.00	99.86	99.68	99.53	99.26	99.04	98.82	98.59
L43	153.4	100.06	99.89	99.65	99.54	99.41	99.16	99.02	98.78	98.60
L44	153.3	100.06	99.87	99.72	99.55	99.40	99.23	99.10	98.87	98.62
L45	153.6	100.23	100.09	99.92	99.76	99.66	99.42	99.25	98.98	98.79
L46	154.7	100.17	99.99	99.82	99.67	99.58	99.39	99.25	99.04	98.79
L47	152.6	100.11	99.93	99.67	99.55	99.45	99.18	99.04	98.80	98.54
L48	153.9	100.04	99.85	99.60	99.49	99.36	99.10	98.95	98.70	98.47
L49	155.1	100.20	100.06	99.86	99.66	99.52	99.30	99.12	98.88	98.70
L50	154.6	100.06	99.91	99.67	99.48	99.37	99.09	98.94	98.70	98.43
Ave.	154.1	100.14	99.99	99.78	99.62	99.45	99.22	99.04	98.81	98.58
Med.	154.2	100.17	99.99	99.79	99.64	99.44	99.23	99.04	98.80	98.56
st dev	0.7371	0.0696	0.0819	0.1020	0.0967	0.0937	0.1060	0.1091	0.1089	0.1165
Min.	152.6	100.04	99.85	99.60	99.46	99.27	99.01	98.83	98.60	98.41
Max.	155.2	100.25	100.11	99.93	99.76	99.66	99.42	99.25	99.04	98.79

Sample No.	Lumen Maintenance (%)								
	10000h	11000h	12000h	13000h	14000h	15000h	16000h	17000h	-
L26	98.26	98.03	97.81	97.57	97.37	97.14	97.01	96.83	-
L27	98.38	98.17	97.89	97.64	97.49	97.37	97.23	97.05	-
L28	98.44	98.24	97.94	97.70	97.50	97.38	97.19	97.03	-
L29	98.22	98.01	97.75	97.56	97.32	97.12	96.96	96.68	-
L30	98.22	98.02	97.73	97.59	97.39	97.18	96.97	96.70	-
L31	98.37	98.19	97.93	97.71	97.50	97.27	97.04	96.77	-
L32	98.57	98.37	98.11	97.96	97.77	97.57	97.44	97.17	-
L33	98.22	98.01	97.81	97.58	97.36	97.13	96.91	96.69	-
L34	98.36	98.14	97.90	97.71	97.57	97.37	97.24	96.97	-
L35	98.19	97.93	97.67	97.53	97.37	97.18	96.97	96.74	-
L36	98.21	98.00	97.79	97.63	97.39	97.18	97.01	96.77	-
L37	98.16	97.92	97.60	97.45	97.20	97.05	96.83	96.66	-
L38	98.22	98.03	97.77	97.61	97.44	97.22	97.09	96.86	-
L39	98.15	97.92	97.66	97.42	97.18	97.01	96.85	96.60	-
L40	98.27	98.08	97.86	97.66	97.47	97.34	97.12	96.88	-
L41	98.43	98.24	97.94	97.74	97.47	97.32	97.17	97.00	-
L42	98.32	98.07	97.81	97.66	97.52	97.31	97.11	96.92	-
L43	98.29	98.10	97.82	97.62	97.37	97.22	97.06	96.80	-
L44	98.33	98.15	97.82	97.59	97.42	97.20	97.06	96.85	-
L45	98.48	98.27	97.96	97.80	97.55	97.31	97.13	96.94	-
L46	98.55	98.31	98.01	97.79	97.58	97.35	97.18	96.94	-
L47	98.24	98.03	97.74	97.57	97.36	97.16	96.98	96.70	-
L48	98.17	97.97	97.66	97.42	97.20	96.96	96.73	96.47	-
L49	98.47	98.27	97.98	97.73	97.54	97.34	97.22	96.95	-
L50	98.15	97.92	97.59	97.42	97.18	97.02	96.84	96.67	-
Ave.	98.31	98.10	97.82	97.63	97.42	97.23	97.05	96.83	-
Med.	98.27	98.07	97.81	97.62	97.42	97.22	97.06	96.83	-
st dev	0.1261	0.1326	0.1318	0.1287	0.1405	0.1414	0.1582	0.1622	-
Min.	98.15	97.92	97.59	97.42	97.18	96.96	96.73	96.47	-
Max.	98.57	98.37	98.11	97.96	97.77	97.57	97.44	97.17	-

**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	3.007	3.018	3.012	2.983	3.001	3.005	3.016	2.990	2.997	2.989
L27	3.000	2.983	2.986	2.987	3.002	3.008	2.988	3.013	3.006	2.987
L28	2.991	3.015	2.990	3.019	2.984	3.003	3.010	3.004	2.990	2.988
L29	2.995	3.016	3.014	3.019	3.003	3.005	3.009	3.017	3.008	3.017
L30	2.988	2.998	3.013	2.995	2.990	2.987	3.019	2.985	2.993	3.003
L31	2.988	3.013	2.987	2.999	2.998	2.988	2.983	2.984	2.998	3.019
L32	2.995	3.015	2.994	3.002	3.009	2.983	2.995	3.019	2.988	3.009
L33	3.001	2.997	3.011	3.001	2.999	3.003	3.012	3.012	2.995	3.018
L34	2.999	3.000	2.992	2.990	3.014	2.999	2.994	2.997	2.985	3.006
L35	2.999	3.005	3.012	3.013	2.997	3.015	3.015	2.998	3.003	3.016
L36	2.992	2.982	2.995	2.995	2.999	2.999	3.001	2.991	3.005	3.011
L37	2.986	2.997	3.005	3.018	3.011	3.014	2.999	3.000	2.992	2.999
L38	2.989	3.004	2.983	2.981	2.995	2.996	3.016	2.999	3.015	2.999
L39	2.994	3.019	2.989	3.007	3.001	2.987	3.006	3.000	2.994	3.012
L40	3.001	3.004	2.992	3.006	3.006	3.007	2.982	2.993	3.015	3.006
L41	3.000	2.983	3.007	2.996	2.997	2.994	2.984	3.012	2.985	2.986
L42	3.004	3.012	3.013	3.015	3.008	3.003	3.019	3.011	3.004	3.005
L43	2.991	2.980	3.005	3.019	2.992	3.012	3.013	3.004	3.004	2.981
L44	3.001	2.989	3.016	3.005	3.012	3.014	3.006	2.997	2.994	2.992
L45	2.992	3.007	3.007	2.993	3.000	2.991	2.981	2.997	2.998	3.005
L46	3.001	3.020	3.003	3.003	3.007	3.014	3.007	2.999	3.004	2.994
L47	2.998	3.001	3.012	2.999	2.985	2.999	2.980	3.000	3.008	2.992
L48	2.994	2.995	3.005	3.008	2.999	2.991	2.994	3.020	2.994	2.994
L49	2.987	3.019	3.009	2.992	2.984	3.016	2.998	2.991	2.984	2.999
L50	2.986	3.007	3.010	2.982	2.986	3.010	3.004	2.988	2.998	3.018
Ave.	2.995	3.003	3.002	3.001	2.999	3.002	3.001	3.001	2.998	3.002
Med.	2.995	3.004	3.005	3.001	2.999	3.003	3.004	2.999	2.998	3.003
st dev	0.0060	0.0127	0.0104	0.0119	0.0087	0.0100	0.0128	0.0104	0.0088	0.0114
Min.	2.986	2.980	2.983	2.981	2.984	2.983	2.980	2.984	2.984	2.981
Max.	3.007	3.020	3.016	3.019	3.014	3.016	3.019	3.020	3.015	3.019



Sample No.	Forward Voltage (V)								
	10000h	11000h	12000h	13000h	14000h	15000h	16000h	17000h	-
L26	2.999	2.990	3.007	3.005	3.014	2.995	3.011	3.005	-
L27	2.992	2.988	3.006	2.991	2.999	3.004	3.004	2.998	-
L28	2.984	2.991	3.000	2.989	2.999	2.995	3.003	2.995	-
L29	3.007	2.998	3.014	3.001	3.004	3.009	3.006	3.000	-
L30	3.000	3.019	2.999	3.014	3.003	3.002	2.984	3.003	-
L31	3.001	2.999	2.992	2.985	2.993	3.003	3.005	2.991	-
L32	2.988	3.015	2.984	3.012	2.988	2.992	2.996	3.004	-
L33	2.998	3.016	3.012	2.994	3.011	2.997	3.005	2.980	-
L34	3.012	3.011	2.998	3.008	2.981	2.989	2.998	3.014	-
L35	3.012	2.992	3.002	2.995	3.014	3.013	2.990	3.000	-
L36	3.006	2.989	3.002	2.998	3.018	2.990	2.997	2.992	-
L37	3.011	3.001	3.013	3.008	2.989	2.986	3.006	2.983	-
L38	2.983	2.982	2.992	3.011	2.985	3.012	2.993	3.001	-
L39	2.998	2.993	3.016	3.003	3.009	3.012	3.010	3.007	-
L40	2.990	3.002	2.993	3.014	3.005	2.991	3.005	2.996	-
L41	3.003	3.000	3.006	2.992	2.992	2.996	3.016	2.997	-
L42	2.987	2.986	2.999	2.998	2.987	3.001	2.988	2.983	-
L43	3.000	2.983	2.996	3.003	2.988	2.997	2.985	3.005	-
L44	3.002	3.008	2.986	3.016	2.997	3.010	2.991	3.004	-
L45	3.004	3.018	3.004	3.003	3.020	3.016	2.985	3.010	-
L46	2.999	2.986	2.999	3.018	2.999	3.003	3.014	2.984	-
L47	3.008	3.000	2.985	3.004	3.011	2.987	2.988	3.019	-
L48	2.992	2.983	3.009	3.018	2.990	2.996	2.998	2.998	-
L49	3.006	3.009	2.998	2.997	2.994	3.004	2.995	2.981	-
L50	3.016	3.002	3.014	2.985	3.005	3.006	3.004	3.000	-
Ave.	3.000	2.998	3.001	3.002	3.000	3.000	2.999	2.998	-
Med.	3.000	2.999	3.000	3.003	2.999	3.001	2.998	3.000	-
st dev	0.0091	0.0116	0.0092	0.0100	0.0111	0.0087	0.0094	0.0102	-
Min.	2.983	2.982	2.984	2.985	2.981	2.986	2.984	2.980	-
Max.	3.016	3.019	3.016	3.018	3.020	3.016	3.016	3.019	-

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

Sample No.	u'	v'	CCT(K)	Chromaticity Shift Δu'v'								
				0hr(Initial)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h
L26	0.2626	0.5302	2686	0.0003	0.0004	0.0007	0.0010	0.0012	0.0014	0.0016	0.0018	0.0021
L27	0.2594	0.5318	2747	0.0002	0.0003	0.0007	0.0009	0.0013	0.0015	0.0018	0.0020	0.0022
L28	0.2612	0.5284	2723	0.0001	0.0003	0.0006	0.0007	0.0011	0.0013	0.0016	0.0018	0.0021
L29	0.2612	0.5289	2721	0.0003	0.0004	0.0007	0.0009	0.0012	0.0013	0.0017	0.0019	0.0022
L30	0.2611	0.5286	2724	0.0005	0.0007	0.0011	0.0013	0.0016	0.0020	0.0023	0.0025	0.0028
L31	0.2591	0.5257	2780	0.0004	0.0006	0.0010	0.0012	0.0015	0.0017	0.0018	0.0020	0.0024
L32	0.2632	0.5292	2678	0.0003	0.0004	0.0008	0.0009	0.0011	0.0014	0.0016	0.0018	0.0021
L33	0.2577	0.5259	2808	0.0005	0.0006	0.0008	0.0011	0.0014	0.0015	0.0019	0.0022	0.0025
L34	0.2612	0.5264	2730	0.0001	0.0003	0.0005	0.0007	0.0008	0.0010	0.0011	0.0012	0.0016
L35	0.2578	0.5254	2810	0.0006	0.0007	0.0011	0.0014	0.0015	0.0017	0.0020	0.0022	0.0025
L36	0.2615	0.5299	2711	0.0003	0.0004	0.0008	0.0009	0.0011	0.0014	0.0017	0.0020	0.0022
L37	0.2593	0.5242	2781	0.0007	0.0009	0.0013	0.0016	0.0018	0.0021	0.0023	0.0025	0.0027
L38	0.2605	0.5256	2750	0.0001	0.0003	0.0007	0.0009	0.0013	0.0015	0.0019	0.0021	0.0023
L39	0.2602	0.5260	2755	0.0002	0.0003	0.0006	0.0008	0.0010	0.0014	0.0017	0.0019	0.0022
L40	0.2624	0.5313	2687	0.0005	0.0007	0.0011	0.0013	0.0015	0.0017	0.0018	0.0019	0.0021
L41	0.2620	0.5303	2700	0.0003	0.0005	0.0008	0.0010	0.0013	0.0016	0.0018	0.0020	0.0024
L42	0.2620	0.5298	2702	0.0004	0.0005	0.0009	0.0012	0.0015	0.0018	0.0020	0.0023	0.0025
L43	0.2634	0.5278	2679	0.0002	0.0003	0.0007	0.0010	0.0013	0.0016	0.0020	0.0023	0.0026
L44	0.2613	0.5291	2717	0.0006	0.0008	0.0011	0.0014	0.0016	0.0018	0.0020	0.0023	0.0026
L45	0.2603	0.5279	2745	0.0003	0.0004	0.0006	0.0008	0.0010	0.0011	0.0014	0.0016	0.0020
L46	0.2598	0.5288	2750	0.0005	0.0007	0.0010	0.0011	0.0015	0.0017	0.0020	0.0021	0.0023
L47	0.2630	0.5260	2694	0.0004	0.0006	0.0008	0.0009	0.0011	0.0012	0.0013	0.0015	0.0018
L48	0.2616	0.5286	2714	0.0004	0.0005	0.0008	0.0010	0.0013	0.0014	0.0017	0.0018	0.0022
L49	0.2616	0.5299	2709	0.0007	0.0008	0.0011	0.0014	0.0017	0.0020	0.0024	0.0026	0.0028
L50	0.2620	0.5298	2700	0.0003	0.0004	0.0007	0.0008	0.0011	0.0013	0.0017	0.0019	0.0022
Ave.	0.2610	0.5282	2728	0.0004	0.0005	0.0008	0.0010	0.0013	0.0015	0.0018	0.0020	0.0023
Med.	0.2612	0.5286	2721	0.0003	0.0005	0.0008	0.0010	0.0013	0.0015	0.0018	0.0020	0.0022
st dev	0.0015	0.0020	37.52	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0003
Min.	0.2577	0.5242	2678	0.0001	0.0003	0.0005	0.0007	0.0008	0.0010	0.0011	0.0012	0.0016
Max.	0.2634	0.5318	2810	0.0007	0.0009	0.0013	0.0016	0.0018	0.0021	0.0024	0.0026	0.0028

Sample No.	Chromaticity Shift $\Delta u'v'$								
	10000h	11000h	12000h	13000h	14000h	15000h	16000h	17000h	-
L26	0.0024	0.0028	0.0032	0.0035	0.0038	0.0042	0.0044	0.0049	-
L27	0.0025	0.0029	0.0031	0.0034	0.0036	0.0040	0.0043	0.0046	-
L28	0.0024	0.0027	0.0028	0.0030	0.0033	0.0036	0.0039	0.0045	-
L29	0.0023	0.0027	0.0030	0.0033	0.0035	0.0039	0.0041	0.0047	-
L30	0.0030	0.0035	0.0038	0.0041	0.0044	0.0048	0.0050	0.0053	-
L31	0.0027	0.0031	0.0032	0.0035	0.0038	0.0043	0.0045	0.0048	-
L32	0.0023	0.0028	0.0031	0.0034	0.0036	0.0041	0.0045	0.0050	-
L33	0.0026	0.0030	0.0033	0.0037	0.0040	0.0044	0.0047	0.0051	-
L34	0.0018	0.0023	0.0026	0.0029	0.0031	0.0035	0.0037	0.0043	-
L35	0.0029	0.0031	0.0033	0.0037	0.0041	0.0043	0.0046	0.0049	-
L36	0.0023	0.0026	0.0030	0.0033	0.0036	0.0040	0.0044	0.0048	-
L37	0.0030	0.0033	0.0036	0.0040	0.0042	0.0044	0.0046	0.0049	-
L38	0.0025	0.0029	0.0031	0.0033	0.0036	0.0041	0.0043	0.0048	-
L39	0.0026	0.0028	0.0032	0.0035	0.0038	0.0041	0.0044	0.0047	-
L40	0.0023	0.0026	0.0029	0.0032	0.0036	0.0040	0.0043	0.0048	-
L41	0.0025	0.0027	0.0030	0.0033	0.0036	0.0040	0.0044	0.0048	-
L42	0.0027	0.0030	0.0033	0.0035	0.0037	0.0041	0.0044	0.0047	-
L43	0.0028	0.0032	0.0034	0.0037	0.0039	0.0041	0.0045	0.0051	-
L44	0.0028	0.0032	0.0035	0.0038	0.0041	0.0045	0.0048	0.0054	-
L45	0.0023	0.0026	0.0028	0.0030	0.0033	0.0037	0.0039	0.0043	-
L46	0.0025	0.0028	0.0030	0.0033	0.0036	0.0041	0.0044	0.0048	-
L47	0.0020	0.0024	0.0028	0.0031	0.0034	0.0039	0.0041	0.0046	-
L48	0.0026	0.0031	0.0033	0.0037	0.0040	0.0043	0.0045	0.0049	-
L49	0.0030	0.0033	0.0037	0.0040	0.0044	0.0048	0.0051	0.0054	-
L50	0.0025	0.0030	0.0033	0.0035	0.0039	0.0043	0.0046	0.0049	-
Ave.	0.0025	0.0029	0.0032	0.0035	0.0038	0.0041	0.0044	0.0048	-
Med.	0.0025	0.0029	0.0032	0.0035	0.0037	0.0041	0.0044	0.0048	-
st dev	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	-
Min.	0.0018	0.0023	0.0026	0.0029	0.0031	0.0035	0.0037	0.0043	-
Max.	0.0030	0.0035	0.0038	0.0041	0.0044	0.0048	0.0051	0.0054	-

**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	154.5	100.08	99.90	99.79	99.57	99.34	99.09	98.90	98.66	98.38
L52	153.3	100.13	99.89	99.80	99.63	99.38	99.14	98.98	98.76	98.54
L53	153.5	100.05	99.79	99.62	99.36	99.11	98.91	98.71	98.55	98.27
L54	153.8	100.08	99.78	99.61	99.37	99.13	98.87	98.68	98.51	98.19
L55	154.4	100.09	99.79	99.65	99.42	99.26	99.05	98.90	98.60	98.37
L56	153.7	100.06	99.83	99.70	99.46	99.18	98.98	98.86	98.56	98.25
L57	153.0	100.07	99.77	99.66	99.51	99.23	99.02	98.78	98.59	98.36
L58	155.1	100.12	99.88	99.72	99.46	99.18	98.92	98.70	98.42	98.14
L59	153.4	100.04	99.73	99.52	99.35	99.14	98.87	98.61	98.37	98.15
L60	154.2	100.00	99.81	99.71	99.56	99.38	99.13	98.96	98.69	98.38
L61	154.5	100.08	99.78	99.61	99.40	99.22	99.06	98.86	98.57	98.28
L62	153.2	100.06	99.85	99.67	99.49	99.24	98.99	98.77	98.50	98.19
L63	152.8	100.04	99.86	99.69	99.50	99.31	99.08	98.92	98.76	98.49
L64	153.6	100.00	99.70	99.52	99.36	99.10	98.88	98.66	98.37	98.11
L65	153.6	100.00	99.73	99.60	99.35	99.18	99.01	98.75	98.47	98.24
L66	153.0	100.06	99.86	99.75	99.55	99.36	99.13	98.90	98.67	98.46
L67	154.2	99.97	99.73	99.56	99.36	99.16	98.95	98.78	98.51	98.25
L68	153.7	100.01	99.71	99.51	99.29	99.02	98.76	98.56	98.31	98.09
L69	152.2	100.09	99.88	99.70	99.47	99.18	99.02	98.82	98.63	98.30
L70	154.4	100.07	99.85	99.67	99.51	99.32	99.11	98.87	98.64	98.32
L71	155.0	99.99	99.78	99.58	99.31	99.09	98.82	98.63	98.38	98.21
L72	154.8	100.00	99.78	99.61	99.35	99.08	98.83	98.65	98.46	98.29
L73	152.7	100.00	99.70	99.58	99.33	99.12	98.88	98.61	98.45	98.22
L74	155.2	100.00	99.76	99.61	99.46	99.30	99.09	98.93	98.71	98.53
L75	152.9	100.15	99.89	99.74	99.60	99.33	99.12	98.89	98.68	98.46
Ave.	153.8	100.05	99.80	99.65	99.44	99.21	98.99	98.79	98.55	98.30
Med.	153.7	100.06	99.79	99.65	99.46	99.18	99.01	98.78	98.56	98.28
st dev	0.8146	0.0479	0.0643	0.0809	0.0968	0.1042	0.1128	0.1247	0.1281	0.1285
Min.	152.2	99.97	99.70	99.51	99.29	99.02	98.76	98.56	98.31	98.09
Max.	155.2	100.15	99.90	99.80	99.63	99.38	99.14	98.98	98.76	98.54

Sample No.	Lumen Maintenance (%)								
	10000h	11000h	12000h	13000h	14000h	15000h	16000h	17000h	-
L51	98.02	97.77	97.51	97.37	97.14	96.95	96.73	96.50	-
L52	98.28	97.97	97.81	97.62	97.36	97.15	96.95	96.83	-
L53	97.93	97.70	97.52	97.30	97.05	96.84	96.71	96.51	-
L54	97.85	97.59	97.30	97.12	96.91	96.74	96.56	96.40	-
L55	98.03	97.74	97.51	97.29	97.13	96.97	96.79	96.55	-
L56	98.01	97.79	97.57	97.31	97.07	96.89	96.67	96.49	-
L57	98.03	97.80	97.62	97.45	97.27	97.07	96.87	96.73	-
L58	97.93	97.66	97.43	97.29	97.12	96.93	96.81	96.61	-
L59	97.87	97.58	97.39	97.20	97.01	96.83	96.63	96.46	-
L60	98.03	97.74	97.52	97.31	97.17	97.02	96.90	96.69	-
L61	98.08	97.80	97.62	97.36	97.22	97.03	96.87	96.63	-
L62	97.88	97.60	97.42	97.20	97.05	96.91	96.76	96.62	-
L63	98.27	97.94	97.74	97.50	97.28	97.12	96.97	96.83	-
L64	97.75	97.47	97.19	96.98	96.73	96.49	96.33	96.19	-
L65	97.90	97.71	97.46	97.20	96.94	96.81	96.59	96.38	-
L66	98.14	97.92	97.65	97.50	97.25	97.09	96.91	96.69	-
L67	97.99	97.72	97.45	97.19	96.99	96.84	96.63	96.41	-
L68	97.74	97.46	97.18	96.99	96.82	96.59	96.40	96.23	-
L69	97.95	97.67	97.42	97.24	96.99	96.77	96.60	96.42	-
L70	98.02	97.79	97.59	97.32	97.08	96.89	96.70	96.53	-
L71	97.97	97.75	97.58	97.38	97.21	97.04	96.85	96.74	-
L72	98.08	97.79	97.58	97.34	97.14	96.99	96.87	96.68	-
L73	98.00	97.71	97.45	97.27	97.07	96.92	96.70	96.58	-
L74	98.25	97.94	97.68	97.44	97.23	96.98	96.86	96.67	-
L75	98.09	97.85	97.59	97.45	97.18	96.99	96.86	96.73	-
Ave.	98.00	97.74	97.51	97.30	97.10	96.91	96.74	96.56	-
Med.	98.01	97.74	97.52	97.31	97.12	96.93	96.76	96.58	-
st dev	0.1392	0.1334	0.1506	0.1502	0.1482	0.1555	0.1636	0.1677	-
Min.	97.74	97.46	97.18	96.98	96.73	96.49	96.33	96.19	-
Max.	98.28	97.97	97.81	97.62	97.36	97.15	96.97	96.83	-

### 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	2.992	2.993	2.992	2.975	2.995	2.998	3.009	2.994	2.985	2.982
L52	2.990	2.995	2.994	3.005	2.977	3.014	2.993	2.993	3.005	3.012
L53	2.993	2.996	2.990	3.003	3.007	2.996	2.992	2.987	2.997	3.008
L54	2.991	2.996	2.979	3.000	2.993	3.009	2.997	3.011	2.991	3.000
L55	3.001	3.012	2.989	2.991	2.992	2.987	2.976	3.003	2.987	2.986
L56	2.989	2.992	3.002	3.007	2.981	3.005	2.983	2.979	2.980	2.979
L57	2.997	3.006	2.984	3.005	2.991	2.986	2.997	3.007	2.988	2.990
L58	2.992	3.014	2.992	3.004	3.008	2.990	3.009	3.009	2.984	3.002
L59	3.001	2.989	2.975	2.979	3.003	2.995	2.976	2.977	3.001	2.985
L60	2.995	3.003	2.984	2.983	3.006	3.000	2.976	3.012	3.009	2.998
L61	2.989	3.015	2.987	2.975	2.995	3.010	2.979	2.995	3.004	2.998
L62	2.995	2.999	2.979	2.988	2.987	3.015	3.004	2.991	3.001	2.978
L63	2.989	2.995	2.999	2.993	2.993	2.998	3.000	3.003	3.003	2.990
L64	2.988	3.001	2.985	2.985	2.979	3.015	2.982	2.979	2.996	2.996
L65	2.986	2.985	3.010	2.987	2.989	3.012	3.007	2.995	2.997	2.986
L66	3.008	2.990	3.006	2.989	3.002	2.994	2.985	3.009	2.981	2.977
L67	2.985	2.994	2.975	2.987	2.988	3.008	2.978	3.007	2.983	3.008
L68	3.002	2.985	3.003	3.000	3.009	3.005	3.010	2.981	2.986	2.988
L69	2.994	3.012	3.002	2.986	3.012	2.985	3.000	3.009	2.975	2.977
L70	2.991	2.994	2.981	2.985	2.989	2.987	2.995	3.007	2.995	2.981
L71	2.995	2.995	2.986	2.978	3.004	3.005	2.982	2.992	2.980	2.985
L72	2.997	3.016	2.983	2.988	2.996	2.986	3.004	2.993	2.999	2.981
L73	2.997	2.997	3.007	3.007	3.004	2.993	2.977	2.992	2.997	2.982
L74	2.999	3.007	2.984	2.976	2.976	2.985	3.005	2.977	2.980	3.009
L75	2.999	3.014	2.991	2.980	2.993	2.998	2.990	2.985	2.993	2.978
Ave.	2.994	3.000	2.990	2.990	2.995	2.999	2.992	2.995	2.992	2.990
Med.	2.994	2.996	2.989	2.988	2.993	2.998	2.993	2.994	2.993	2.986
st dev	0.0055	0.0096	0.0102	0.0107	0.0103	0.0102	0.0120	0.0116	0.0095	0.0112
Min.	2.985	2.985	2.975	2.975	2.976	2.985	2.976	2.977	2.975	2.977
Max.	3.008	3.016	3.010	3.007	3.012	3.015	3.010	3.012	3.009	3.012

Sample No.	Forward Voltage (V)								
	10000h	11000h	12000h	13000h	14000h	15000h	16000h	17000h	-
L51	2.996	2.983	3.001	2.982	3.003	2.974	2.988	2.984	-
L52	3.009	2.978	2.984	2.977	2.993	2.990	2.976	2.998	-
L53	3.000	2.988	2.984	2.992	2.985	3.000	2.985	3.015	-
L54	2.985	3.001	3.007	3.003	3.003	2.986	2.982	3.000	-
L55	3.015	3.007	3.004	3.012	2.997	2.988	2.979	3.004	-
L56	3.002	3.008	3.011	3.011	3.005	2.997	3.010	3.001	-
L57	2.987	3.004	3.013	2.985	3.002	2.982	2.980	3.016	-
L58	3.000	2.989	2.999	2.998	2.998	2.984	2.991	2.996	-
L59	3.012	2.984	2.997	3.000	3.002	2.992	2.980	2.985	-
L60	3.002	2.990	3.014	3.005	3.000	2.980	3.004	2.992	-
L61	3.014	3.001	2.987	3.011	3.000	2.984	2.986	2.991	-
L62	2.991	3.006	2.995	2.984	2.988	2.999	3.003	3.011	-
L63	3.005	2.985	2.983	3.010	2.985	2.998	3.009	2.989	-
L64	2.988	3.007	2.987	2.979	3.009	3.005	3.009	3.014	-
L65	2.999	2.991	2.983	3.008	3.009	3.007	2.998	2.992	-
L66	2.987	2.997	2.990	3.012	2.985	2.981	3.009	2.992	-
L67	2.994	2.975	3.012	2.997	3.008	3.003	2.995	2.998	-
L68	2.996	2.977	2.989	2.996	3.000	2.986	2.988	2.993	-
L69	2.993	2.978	2.996	2.995	2.989	2.987	2.980	3.000	-
L70	2.999	2.991	2.989	3.002	3.011	2.976	3.008	3.004	-
L71	2.994	2.998	3.012	2.987	2.994	3.005	2.974	2.992	-
L72	2.995	2.991	3.012	2.991	3.003	2.984	2.999	2.996	-
L73	2.990	3.003	2.997	3.004	2.997	2.984	3.008	2.987	-
L74	2.995	3.003	3.002	2.985	2.996	3.003	2.979	3.016	-
L75	3.000	2.977	3.002	2.990	3.015	2.984	2.993	3.008	-
Ave.	2.998	2.992	2.998	2.997	2.999	2.990	2.993	2.999	-
Med.	2.996	2.991	2.997	2.997	3.000	2.987	2.991	2.998	-
st dev	0.0083	0.0109	0.0106	0.0111	0.0084	0.0098	0.0123	0.0098	-
Min.	2.985	2.975	2.983	2.977	2.985	2.974	2.974	2.984	-
Max.	3.015	3.008	3.014	3.012	3.015	3.007	3.010	3.016	-

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

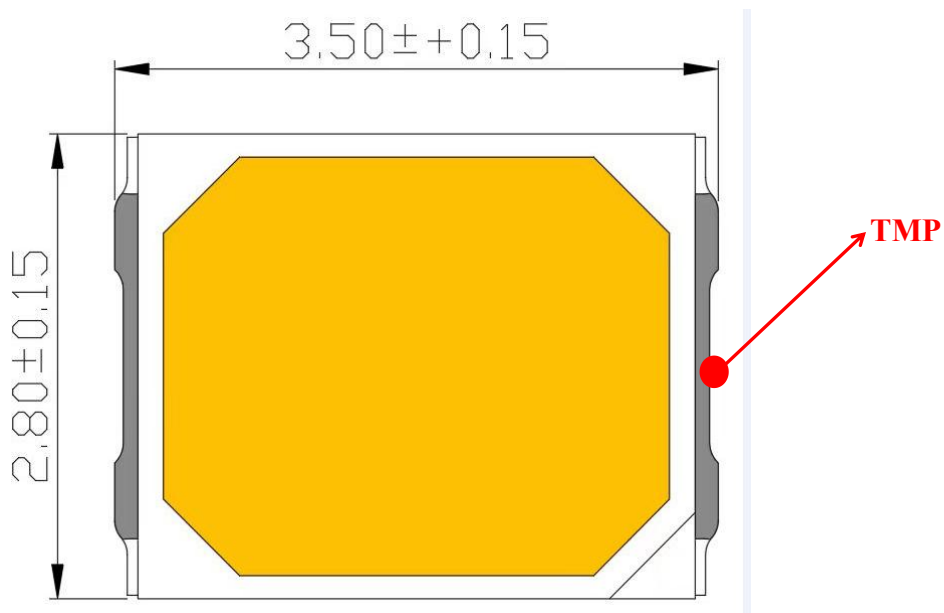
Sample No.	u'	v'	CCT(K)	Chromaticity Shift Δu'v'								
	0hr(Initial)			1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h
L51	0.2607	0.5275	2737	0.0005	0.0009	0.0012	0.0013	0.0015	0.0018	0.0021	0.0024	0.0027
L52	0.2612	0.5245	2739	0.0002	0.0006	0.0009	0.0010	0.0012	0.0016	0.0018	0.0022	0.0025
L53	0.2600	0.5249	2763	0.0004	0.0006	0.0009	0.0011	0.0013	0.0016	0.0020	0.0022	0.0024
L54	0.2581	0.5276	2792	0.0003	0.0007	0.0010	0.0012	0.0014	0.0017	0.0022	0.0024	0.0026
L55	0.2597	0.5256	2767	0.0006	0.0009	0.0011	0.0013	0.0017	0.0020	0.0023	0.0027	0.0029
L56	0.2614	0.5275	2723	0.0004	0.0008	0.0011	0.0013	0.0016	0.0020	0.0023	0.0026	0.0028
L57	0.2619	0.5302	2700	0.0007	0.0009	0.0012	0.0013	0.0014	0.0018	0.0022	0.0024	0.0026
L58	0.2609	0.5301	2723	0.0002	0.0006	0.0007	0.0009	0.0012	0.0016	0.0018	0.0020	0.0022
L59	0.2634	0.5299	2673	0.0005	0.0007	0.0011	0.0012	0.0015	0.0019	0.0022	0.0024	0.0026
L60	0.2596	0.5277	2759	0.0007	0.0009	0.0013	0.0015	0.0018	0.0021	0.0026	0.0030	0.0032
L61	0.2609	0.5296	2724	0.0003	0.0007	0.0008	0.0010	0.0013	0.0016	0.0019	0.0021	0.0025
L62	0.2639	0.5313	2657	0.0003	0.0005	0.0009	0.0011	0.0014	0.0017	0.0020	0.0025	0.0029
L63	0.2627	0.5276	2695	0.0005	0.0008	0.0010	0.0011	0.0014	0.0016	0.0019	0.0023	0.0024
L64	0.2615	0.5290	2715	0.0003	0.0005	0.0008	0.0010	0.0012	0.0015	0.0019	0.0024	0.0027
L65	0.2609	0.5256	2741	0.0004	0.0006	0.0008	0.0010	0.0013	0.0016	0.0020	0.0023	0.0026
L66	0.2626	0.5306	2685	0.0003	0.0006	0.0007	0.0009	0.0012	0.0014	0.0017	0.0020	0.0023
L67	0.2623	0.5293	2696	0.0006	0.0009	0.0012	0.0013	0.0016	0.0018	0.0021	0.0025	0.0026
L68	0.2610	0.5282	2727	0.0006	0.0009	0.0012	0.0014	0.0016	0.0020	0.0024	0.0028	0.0030
L69	0.2630	0.5277	2688	0.0002	0.0004	0.0005	0.0006	0.0009	0.0011	0.0014	0.0017	0.0019
L70	0.2617	0.5303	2704	0.0005	0.0008	0.0011	0.0013	0.0015	0.0018	0.0022	0.0025	0.0027
L71	0.2602	0.5297	2738	0.0007	0.0011	0.0015	0.0017	0.0020	0.0022	0.0026	0.0029	0.0031
L72	0.2615	0.5314	2705	0.0005	0.0008	0.0010	0.0012	0.0013	0.0015	0.0017	0.0019	0.0023
L73	0.2621	0.5252	2717	0.0006	0.0009	0.0012	0.0014	0.0017	0.0019	0.0022	0.0025	0.0029
L74	0.2601	0.5273	2751	0.0004	0.0007	0.0008	0.0009	0.0011	0.0014	0.0018	0.0021	0.0024
L75	0.2636	0.5291	2671	0.0006	0.0009	0.0011	0.0012	0.0013	0.0015	0.0017	0.0021	0.0025
Ave.	0.2614	0.5283	2720	0.0005	0.0007	0.0010	0.0012	0.0014	0.0017	0.0020	0.0024	0.0026
Med.	0.2614	0.5282	2723	0.0005	0.0008	0.0010	0.0012	0.0014	0.0017	0.0020	0.0024	0.0026
st dev	0.0014	0.0020	33.02	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0003
Min.	0.2581	0.5245	2657	0.0002	0.0004	0.0005	0.0006	0.0009	0.0011	0.0014	0.0017	0.0019
Max.	0.2639	0.5314	2792	0.0007	0.0011	0.0015	0.0017	0.0020	0.0022	0.0026	0.0030	0.0032



Sample No.	Chromaticity Shift $\Delta u'v'$								
	10000h	11000h	12000h	13000h	14000h	15000h	16000h	17000h	-
L51	0.0030	0.0032	0.0036	0.0039	0.0042	0.0046	0.0048	0.0051	-
L52	0.0029	0.0031	0.0033	0.0036	0.0039	0.0041	0.0046	0.0052	-
L53	0.0027	0.0029	0.0033	0.0036	0.0040	0.0044	0.0047	0.0052	-
L54	0.0029	0.0030	0.0032	0.0035	0.0038	0.0042	0.0045	0.0051	-
L55	0.0033	0.0035	0.0037	0.0039	0.0042	0.0045	0.0047	0.0053	-
L56	0.0030	0.0032	0.0034	0.0039	0.0044	0.0047	0.0051	0.0057	-
L57	0.0029	0.0031	0.0033	0.0037	0.0041	0.0044	0.0049	0.0054	-
L58	0.0025	0.0027	0.0031	0.0033	0.0036	0.0039	0.0041	0.0047	-
L59	0.0029	0.0032	0.0036	0.0040	0.0045	0.0048	0.0050	0.0057	-
L60	0.0034	0.0036	0.0040	0.0045	0.0048	0.0050	0.0052	0.0057	-
L61	0.0028	0.0031	0.0035	0.0039	0.0042	0.0046	0.0048	0.0050	-
L62	0.0032	0.0034	0.0035	0.0040	0.0044	0.0047	0.0050	0.0053	-
L63	0.0027	0.0029	0.0031	0.0035	0.0039	0.0041	0.0046	0.0049	-
L64	0.0031	0.0032	0.0035	0.0038	0.0041	0.0044	0.0046	0.0053	-
L65	0.0028	0.0030	0.0033	0.0035	0.0039	0.0042	0.0046	0.0051	-
L66	0.0026	0.0028	0.0033	0.0035	0.0040	0.0042	0.0046	0.0050	-
L67	0.0030	0.0031	0.0032	0.0037	0.0040	0.0043	0.0045	0.0049	-
L68	0.0032	0.0035	0.0038	0.0041	0.0047	0.0051	0.0054	0.0060	-
L69	0.0021	0.0022	0.0025	0.0028	0.0033	0.0036	0.0040	0.0043	-
L70	0.0030	0.0031	0.0035	0.0040	0.0044	0.0048	0.0052	0.0058	-
L71	0.0034	0.0036	0.0037	0.0041	0.0045	0.0049	0.0050	0.0054	-
L72	0.0026	0.0028	0.0031	0.0033	0.0038	0.0040	0.0044	0.0051	-
L73	0.0033	0.0035	0.0037	0.0039	0.0045	0.0048	0.0052	0.0058	-
L74	0.0028	0.0031	0.0035	0.0038	0.0043	0.0047	0.0050	0.0057	-
L75	0.0028	0.0030	0.0033	0.0036	0.0039	0.0043	0.0047	0.0050	-
Ave.	0.0029	0.0031	0.0034	0.0037	0.0041	0.0045	0.0048	0.0053	-
Med.	0.0029	0.0031	0.0034	0.0038	0.0041	0.0044	0.0047	0.0052	-
st dev	0.0003	0.0003	0.0003	0.0003	0.0003	0.0004	0.0003	0.0004	-
Min.	0.0021	0.0022	0.0025	0.0028	0.0033	0.0036	0.0040	0.0043	-
Max.	0.0034	0.0036	0.0040	0.0045	0.0048	0.0051	0.0054	0.0060	-

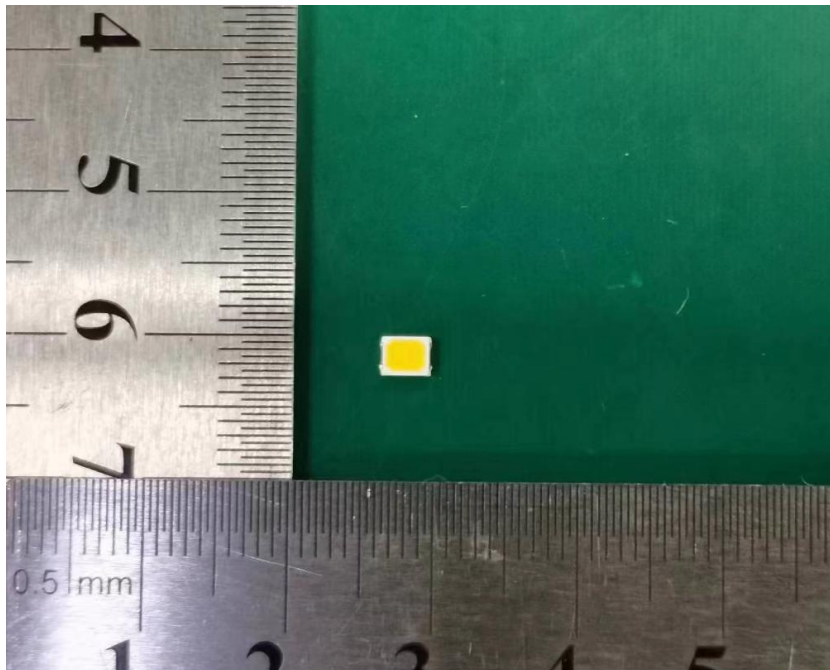
## 4-EUT Photos

### 4.1 Mechanical Dimensions



Note: All dimensions are in millimeters(mm).

### 4.2 EUT Photo



----End of report----