



# TEST REPORT

According to ANSI/IES LM-80-15  
For

**Samsung Electronics Co., LTD.**  
1, Samsung-Ro, Giheung-Gu, Yongin-City, Gyeonggi-Do 17113, Korea

**Model: SPMWHx228FD5WAWOSG**

<b>Report Type:</b> 12000 Hours Test Report		<b>Product Type:</b> LED Package	
<b>Test Engineer:</b>	Pote Wang	<i>Pote Wang</i>	
<b>Report Number:</b>	RSZ181214503-10		
<b>Test Date:</b>	2017-05-26 to 2018-12-09		
<b>Report Date:</b>	2018-12-21		
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<b>Test Facility:</b>	Test facility was located at No.69, Pulongcun , Puxinhu Industrial Area, Tangxia , Dongguan, Guangdong, China.		
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<b>Accreditation:</b>	The IAS Accreditation Number TL-460.		

**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 used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Dongguan).

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## 1 - General Information

### 1.1 Description of LED Light Sources

#### Sample Size:

75 PCS samples were received on 2017-05-26. The samples were numbered from 1 to 25, 25 to 50 and 51 to 75.

Manufacturer:	Samsung Electronics Co., LTD.
Part Number:	SPMWHx228FD5WAWOSG
Part Type:	LED Package
Drive Level:	DC 200mA
Nominal CCT:	2700K
Power:	0.6W
Average Current Density per LED die:	110.8mA/mm <sup>2</sup>
Average Power Density per LED die:	0.33W/mm <sup>2</sup>
CRI:	80
Die Spacing:	0.4mm

#### Sampling Method:

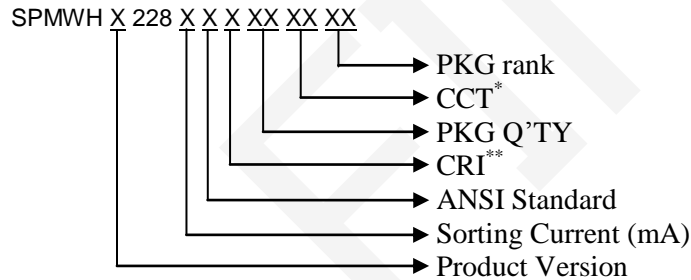
LED samples for IESNA LM-80 testing consist of units built from a minimum of three manufacturing lots with each manufacturing lot built from different wafer lots built on non-consecutive days.

These manufacturing lots are picked to represent a wide parametric distribution.

#### Family products covered by this report:

According to *ENERGY STAR<sup>®</sup> 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<sup>®</sup> Requirements for the Use of LM-80 Data* (September 28, 2017)

This report covers the following models:



Note:

\*2700K=WO, 3000K=VO, 3500K=UO, 4000K=TO, 5000K=RO, 5700K=QO, 6500K=PO

\*\*The CRI of models is 80

#### Note:

1. The applicant Samsung Electronics Co., LTD. declare that their products with model SPMWHx228FD5WAWOSG are the same to the products in report#RSZ170526516-10 and is authorized by original applicant to use their test data.
2. All the data in previous report (RSZ170526516-10) is shared in this report.

### 1.2 Standards and Reference Documentations

- ANSI/IES LM-80-15: IES Approved Method for Measuring Lumen Maintenance of LED Light Sources.
- CIE 127:2007: Measurement of LEDs
- ENERGY STAR<sup>®</sup> Requirements for the Use of LM-80 Data (This standard was not accredited by IAS)

### 1.3 Testing Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
0.3m integrating sphere	EVERFINE	Diameter 0.3m	1011119	2018-03-18	2019-03-18
Programmable Test Power for LEDs	EVERFINE	LED300E	1008002	2018-03-26	2019-03-26
High accuracy array spectroradiometer	EVERFINE	HAAS-2000	1012016T	2018-03-18	2019-03-18
Standard Light Source	EVERFINE	D062	1011064	2018-01-15	2019-01-15
Precision digital stabilized DC power supply	EVERFINE	WY605-V110	G115987CJ7321114	2018-03-26	2019-03-26
Multilayer aging machine	BACL	B2-270	20015	2018-03-13	2019-03-13
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11060002	2018-06-15	2019-06-15
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090007	2018-03-26	2019-03-26
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090005	2018-03-26	2019-03-26

### 1.4 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.

### 1.5 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 ASTM E230 Table 1 "Special Limits".

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.

The relative humidity within chamber was kept less than 65% during test.

For photometry measurement, the ambient temperature during test was set to  $25^{\circ}C \pm 2^{\circ}C$ , RH <65%.

### 1.6 Photometric Measurement Method and Uncertainty

Integrating sphere and spectroradiometer is used to measure luminous flux and chromaticity coordinate  $u'v'$ .  $2\pi$  measurement was used and sample was driven by DC power supply. The forward current was regulated to within  $\pm 0.5\%$  of the nominal value. The test system was calibrated by halogen reference lamp. The ambient temperature during test was set to  $25^{\circ}C \pm 2^{\circ}C$ , RH <65%. The temperature measurement point was located in the sphere and the temperature was detected by a temperature probe.

The uncertainty of the light output measurements is  $U=1.59\%$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is  $U=21K$  ( $K=2$ ), at the 95% confidence level.

The uncertainty of the temperature is  $U=0.8671^{\circ}C$  ( $K=2$ ), at the 95% confidence level.

### 1.7 Statement of Traceability

Bay Area Compliance Laboratories Corp. (Dongguan) attested that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).

## 1.8 Sample Set

### Data Set 1: 85°C, 200mA

Part Number: SPMWHx228FD5WAWOSG  
Number of Units: 25  
Case Temperature: >83°C  
Ambient Temperature: >80°C  
Life Test Drive Current: 200mA  
Measurement Current: 200mA

### Data Set 2: 105°C, 200mA

Part Number: SPMWHx228FD5WAWOSG  
Number of Units: 25  
Case Temperature: >103°C  
Ambient Temperature: >100°C  
Life Test Drive Current: 200mA  
Measurement Current: 200mA

### Data Set 3: 115° C, 200mA

Part Number: SPMWHx228FD5WAWOSG  
Number of Units: 25  
Case Temperature: >113°C  
Ambient Temperature: >110°C  
Life Test Drive Current: 200mA  
Measurement Current: 200mA

## 2 - Summary of Test Result

Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration	$\alpha$	$\beta$	Reported TM-21 L <sub>70</sub> Lifetime
1	25	0	1000hrs	12000hrs	2.763E-06	1.000	>72000
2	25	0	1000hrs	12000hrs	3.628E-06	1.001	>72000
3	25	0	1000hrs	12000hrs	4.208E-06	1.001	>72000

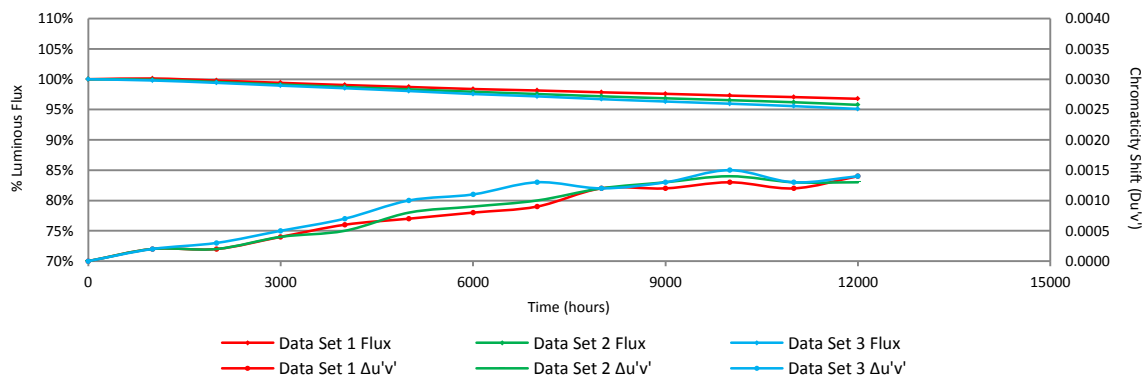
Average Lumen Maintenance (Percentage of Initial Luminous Flux)

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs
1	100.12%	99.78%	99.40%	99.04%	98.72%	98.38%	98.14%	97.84%	97.59%	97.30%	97.05%	96.77%
2	99.91%	99.53%	99.12%	98.71%	98.33%	97.93%	97.56%	97.18%	96.85%	96.54%	96.20%	95.77%
3	99.79%	99.40%	98.94%	98.51%	98.05%	97.56%	97.17%	96.71%	96.32%	95.96%	95.56%	95.10%

Average Chromaticity Shift

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs
1	0.0002	0.0002	0.0004	0.0006	0.0007	0.0008	0.0009	0.0012	0.0012	0.0013	0.0012	0.0014
2	0.0002	0.0002	0.0004	0.0005	0.0008	0.0009	0.0010	0.0012	0.0013	0.0014	0.0013	0.0013
3	0.0002	0.0003	0.0005	0.0007	0.0010	0.0011	0.0013	0.0012	0.0013	0.0015	0.0013	0.0014

Average Lumen Maintenance and Chromaticity Shift VS. Time



### 3 - Test Data

#### 3.1 Data Set 1, 85°C, 200mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)											
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs
1	74.8	100.12	99.73	99.37	99.01	98.89	98.49	98.33	97.89	97.73	97.26	97.19	96.91
2	73.9	100.22	99.74	99.47	99.08	98.73	98.36	98.01	97.65	97.38	97.00	96.92	96.62
3	74.3	100.16	99.80	99.45	99.41	99.29	98.83	98.80	98.57	97.97	97.51	96.88	96.46
4	74.5	100.32	99.97	99.54	99.14	98.67	98.38	98.01	97.52	97.26	96.68	96.31	96.24
5	74.1	100.28	99.92	99.23	98.83	98.30	98.14	98.07	97.50	97.25	96.71	96.21	95.95
6	74.7	100.17	99.60	99.08	98.75	98.31	98.02	97.60	97.51	97.27	96.66	96.57	95.95
7	74.9	100.13	99.93	99.31	98.74	98.29	97.92	97.44	97.17	97.13	96.57	96.23	95.87
8	75.5	100.21	99.91	99.87	99.68	99.31	98.79	98.46	98.28	98.14	97.93	97.72	97.47
9	74.8	100.21	99.85	99.55	99.49	99.18	98.70	98.54	98.24	98.09	97.90	97.71	97.53
10	74.2	100.15	99.78	99.35	99.02	98.84	98.54	98.13	98.02	97.78	97.56	97.16	97.05
11	74.4	100.11	99.73	99.38	99.17	99.06	98.98	98.88	98.74	97.93	97.70	97.23	97.18
12	75.1	100.09	99.65	99.39	98.82	98.51	98.22	97.98	97.63	97.20	97.16	96.99	96.57
13	74.4	100.08	99.87	99.19	98.82	98.55	98.05	97.76	97.47	97.27	97.15	97.12	96.64
14	74.7	100.33	100.01	99.63	99.21	98.93	98.74	98.61	97.82	97.66	97.31	97.18	96.56
15	74.5	99.95	99.53	99.19	98.60	98.17	97.83	97.57	97.23	97.06	96.90	96.62	96.36
16	73.1	100.03	99.75	99.47	99.44	98.93	98.34	98.02	97.66	97.44	97.24	97.06	96.68
17	74.7	100.07	99.64	99.56	99.18	98.82	98.64	98.34	98.05	97.77	97.52	97.32	97.15
18	74.0	99.81	99.59	99.54	98.88	98.57	98.30	98.12	98.09	97.86	97.53	97.39	97.19
19	73.8	99.55	99.28	98.74	98.41	98.17	97.74	97.57	97.51	97.17	97.00	96.76	96.50
20	74.3	100.15	100.13	99.46	99.21	98.82	98.65	98.61	98.28	98.18	98.05	97.87	97.75
21	74.3	100.17	99.97	99.50	99.07	98.63	98.34	98.14	97.99	97.86	97.59	97.47	97.40
22	74.4	100.17	99.84	99.40	98.80	98.56	97.88	97.59	97.19	97.07	96.77	96.45	96.12
23	75.0	100.13	99.84	99.67	99.39	99.25	99.20	99.03	98.95	98.67	98.63	98.33	98.19
24	74.1	100.18	99.42	99.08	98.70	98.35	98.08	97.73	97.42	97.21	96.92	96.57	96.15
25	74.8	100.16	100.04	99.59	99.25	98.94	98.41	98.18	97.66	97.35	97.31	96.98	96.76
Avg.	74.4	100.12	99.78	99.40	99.04	98.72	98.38	98.14	97.84	97.59	97.30	97.05	96.77
Med.	74.4	100.15	99.80	99.45	99.07	98.73	98.36	98.12	97.66	97.44	97.26	97.06	96.64
st dev	0.5	0.16	0.20	0.23	0.31	0.35	0.38	0.44	0.48	0.43	0.50	0.53	0.60
Min.	73.1	99.55	99.28	98.74	98.41	98.17	97.74	97.44	97.17	97.06	96.57	96.21	95.87
Max.	75.5	100.33	100.13	99.87	99.68	99.31	99.20	99.03	98.95	98.67	98.63	98.33	98.19

**3.2 Data Set 1, 85°C, 200mA (Forward Voltage)**

No.	Forward Voltage (V)												
	Ohr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs
1	2.965	2.935	2.934	2.925	2.934	2.924	2.928	2.931	2.940	2.925	2.927	2.923	2.926
2	2.994	2.969	2.975	2.947	2.977	2.946	2.946	2.968	2.989	3.012	2.954	2.947	2.952
3	2.993	2.950	2.960	2.941	2.961	2.938	2.940	2.947	2.979	2.969	2.945	2.942	2.938
4	2.970	2.947	2.938	2.940	2.969	2.936	2.944	2.982	2.967	2.959	2.949	2.938	2.937
5	2.965	2.937	2.944	2.922	2.945	2.932	2.925	2.946	2.987	2.925	2.968	2.963	2.923
6	2.968	2.964	2.948	2.955	2.967	2.949	2.951	2.977	2.966	2.963	2.956	2.950	2.948
7	2.959	3.006	3.022	2.940	2.946	2.957	2.970	2.963	3.006	2.940	2.950	2.975	2.948
8	2.971	2.970	3.024	2.944	2.962	2.947	2.946	2.947	2.966	2.951	2.953	2.949	2.942
9	2.956	2.956	2.946	2.996	2.959	2.942	2.952	2.955	2.956	2.998	2.966	2.956	2.946
10	2.941	2.945	2.925	2.931	2.936	2.923	2.944	2.937	2.928	2.943	2.928	2.933	2.987
11	2.953	2.970	2.943	2.938	2.958	2.937	2.953	2.952	2.975	2.943	2.961	2.952	2.944
12	2.964	2.961	2.950	2.965	2.969	2.954	2.966	2.996	2.982	2.986	2.977	2.973	2.969
13	2.949	2.944	2.935	2.937	2.950	2.939	2.995	2.962	2.948	2.933	2.944	2.950	2.938
14	2.975	2.985	2.956	2.970	2.981	2.966	2.971	2.977	2.980	3.018	2.985	2.992	2.963
15	2.959	2.947	2.943	2.948	2.965	2.944	2.946	2.962	2.964	2.986	2.965	2.951	2.944
16	2.980	2.984	2.933	2.959	2.956	2.962	3.033	3.001	3.003	2.945	2.968	2.954	2.941
17	2.960	2.959	2.952	2.953	2.961	2.950	2.964	2.955	2.975	2.948	2.955	2.947	2.950
18	2.961	2.950	2.946	2.968	3.027	2.947	2.958	2.957	2.962	2.958	2.962	2.949	2.952
19	2.965	2.967	2.950	2.956	2.962	2.947	2.978	2.974	2.970	2.974	2.959	2.960	2.952
20	2.961	2.950	2.947	2.945	2.954	2.942	2.961	2.966	2.965	2.948	2.958	2.948	2.947
21	2.962	2.949	2.932	2.938	2.941	2.933	2.950	2.958	2.981	2.983	3.001	2.944	2.941
22	2.961	2.969	2.948	2.955	3.023	2.944	2.965	2.953	2.982	3.004	2.980	2.945	2.951
23	2.954	2.970	2.945	3.012	2.956	2.953	2.949	2.953	2.993	2.939	2.953	2.978	2.950
24	2.947	2.936	2.948	2.956	2.950	2.999	2.936	2.988	2.949	2.935	2.937	2.930	2.934
25	2.955	2.945	2.948	2.944	2.949	2.947	2.951	2.959	2.965	2.945	2.946	2.944	2.939
Avg.	2.964	2.959	2.952	2.951	2.962	2.946	2.957	2.963	2.971	2.961	2.958	2.952	2.946
Med.	2.961	2.956	2.947	2.947	2.959	2.946	2.951	2.959	2.970	2.951	2.956	2.949	2.946
st dev	0.012	0.017	0.024	0.020	0.022	0.015	0.022	0.017	0.018	0.027	0.017	0.015	0.013
Min.	2.941	2.935	2.925	2.922	2.934	2.923	2.925	2.931	2.928	2.925	2.927	2.923	2.923
Max.	2.994	3.006	3.024	3.012	3.027	2.999	3.033	3.001	3.006	3.018	3.001	2.992	2.987



**3.3 Data Set 1, 85°C, 200mA (Chromaticity Shift)**

No.	u'	v'	CCT(K)	Chromaticity Shift ( $\Delta u'v'$ )											
				Ohr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs
1	0.2603	0.5270	2748	0.0000	0.0000	0.0003	0.0004	0.0005	0.0009	0.0008	0.0012	0.0012	0.0012	0.0010	0.0014
2	0.2626	0.5271	2700	0.0002	0.0002	0.0003	0.0004	0.0005	0.0007	0.0008	0.0011	0.0012	0.0012	0.0009	0.0011
3	0.2612	0.5259	2732	0.0003	0.0003	0.0004	0.0006	0.0006	0.0007	0.0008	0.0011	0.0011	0.0012	0.0012	0.0015
4	0.2606	0.5268	2743	0.0001	0.0002	0.0004	0.0005	0.0006	0.0009	0.0009	0.0012	0.0012	0.0013	0.0012	0.0013
5	0.2613	0.5275	2725	0.0001	0.0002	0.0006	0.0009	0.0009	0.0008	0.0011	0.0013	0.0015	0.0016	0.0013	0.0015
6	0.2628	0.5312	2680	0.0002	0.0002	0.0004	0.0006	0.0007	0.0008	0.0009	0.0011	0.0011	0.0014	0.0011	0.0015
7	0.2589	0.5252	2786	0.0003	0.0003	0.0002	0.0005	0.0007	0.0007	0.0009	0.0011	0.0011	0.0013	0.0011	0.0013
8	0.2580	0.5245	2809	0.0002	0.0001	0.0003	0.0004	0.0006	0.0008	0.0008	0.0011	0.0011	0.0012	0.0010	0.0012
9	0.2607	0.5271	2738	0.0002	0.0002	0.0003	0.0006	0.0007	0.0008	0.0009	0.0011	0.0012	0.0012	0.0010	0.0013
10	0.2633	0.5282	2681	0.0002	0.0001	0.0002	0.0004	0.0006	0.0006	0.0007	0.0010	0.0012	0.0012	0.0012	0.0013
11	0.2620	0.5276	2710	0.0002	0.0002	0.0003	0.0006	0.0008	0.0008	0.0008	0.0010	0.0011	0.0011	0.0009	0.0011
12	0.2568	0.5233	2842	0.0001	0.0001	0.0002	0.0009	0.0009	0.0009	0.0009	0.0012	0.0011	0.0013	0.0013	0.0014
13	0.2613	0.5284	2720	0.0001	0.0002	0.0004	0.0006	0.0007	0.0008	0.0008	0.0011	0.0011	0.0013	0.0010	0.0010
14	0.2609	0.5279	2731	0.0001	0.0001	0.0004	0.0006	0.0006	0.0008	0.0009	0.0011	0.0011	0.0013	0.0013	0.0014
15	0.2613	0.5284	2721	0.0001	0.0004	0.0006	0.0006	0.0010	0.0010	0.0010	0.0013	0.0013	0.0015	0.0014	0.0015
16	0.2621	0.5267	2712	0.0002	0.0004	0.0004	0.0006	0.0008	0.0009	0.0011	0.0011	0.0013	0.0015	0.0014	0.0016
17	0.2620	0.5285	2706	0.0001	0.0001	0.0002	0.0004	0.0006	0.0006	0.0007	0.0011	0.0012	0.0013	0.0012	0.0014
18	0.2604	0.5252	2753	0.0001	0.0003	0.0004	0.0006	0.0008	0.0009	0.0009	0.0011	0.0012	0.0013	0.0010	0.0012
19	0.2640	0.5279	2668	0.0001	0.0002	0.0003	0.0006	0.0008	0.0008	0.0009	0.0012	0.0013	0.0015	0.0015	0.0017
20	0.2619	0.5289	2707	0.0003	0.0002	0.0003	0.0005	0.0005	0.0007	0.0009	0.0011	0.0012	0.0012	0.0010	0.0012
21	0.2594	0.5255	2774	0.0002	0.0002	0.0004	0.0005	0.0008	0.0008	0.0010	0.0013	0.0014	0.0015	0.0014	0.0016
22	0.2609	0.5279	2732	0.0002	0.0004	0.0004	0.0006	0.0007	0.0009	0.0009	0.0012	0.0013	0.0014	0.0013	0.0014
23	0.2600	0.5274	2752	0.0003	0.0002	0.0004	0.0005	0.0007	0.0007	0.0009	0.0011	0.0011	0.0011	0.0010	0.0010
24	0.2602	0.5249	2759	0.0002	0.0004	0.0006	0.0008	0.0010	0.0011	0.0012	0.0015	0.0016	0.0017	0.0016	0.0018
25	0.2597	0.5266	2761	0.0002	0.0002	0.0004	0.0005	0.0007	0.0008	0.0009	0.0012	0.0013	0.0015	0.0014	0.0015
Avg.	0.2609	0.5270	2736	0.0002	0.0002	0.0004	0.0006	0.0007	0.0008	0.0009	0.0012	0.0012	0.0013	0.0012	0.0014
Med.	0.2609	0.5271	2732	0.0002	0.0002	0.0004	0.0006	0.0007	0.0008	0.0009	0.0011	0.0012	0.0013	0.0012	0.0014
st dev	0.0016	0.0017	40	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002
Min.	0.2568	0.5233	2668	0.0000	0.0000	0.0002	0.0004	0.0005	0.0006	0.0007	0.0010	0.0011	0.0011	0.0009	0.0010
Max.	0.2640	0.5312	2842	0.0003	0.0004	0.0006	0.0009	0.0010	0.0011	0.0012	0.0015	0.0016	0.0017	0.0016	0.0018

**3.4 Data Set 2, 105°C, 200mA (Lumen Maintenance)**

No.	Φ(lm)	Lumen Maintenance (%)											
	Ohr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs
26	74.9	100.16	99.67	99.28	98.97	98.60	97.88	97.66	97.42	97.25	97.18	96.85	96.43
27	74.4	100.22	99.76	99.60	99.21	98.86	98.37	98.24	97.46	97.39	97.23	97.05	96.79
28	74.9	99.75	99.25	98.64	98.10	97.85	97.41	97.05	96.66	96.29	96.19	95.89	95.46
29	74.2	99.81	99.30	98.56	97.84	97.52	97.33	97.18	96.86	96.37	96.21	95.86	95.39
30	74.1	99.91	99.42	99.23	99.00	98.91	98.61	98.39	98.27	97.88	97.54	97.29	97.09
31	74.9	99.85	99.48	99.19	98.62	98.25	97.61	96.82	96.41	95.74	95.43	94.85	94.50
32	74.6	99.96	99.84	99.45	98.67	98.10	97.83	97.64	97.61	97.09	96.92	96.38	96.06
33	74.7	99.88	99.71	99.52	99.24	99.12	99.02	98.69	98.50	97.98	97.70	97.59	97.48
34	74.2	99.99	99.58	99.16	99.00	98.75	98.28	98.14	97.91	97.82	97.63	97.58	97.32
35	74.6	100.01	99.66	99.03	98.75	98.67	98.27	98.00	97.48	97.10	96.70	96.10	95.26
36	74.8	99.79	99.56	99.29	98.85	98.38	98.00	97.55	97.02	96.66	96.16	96.00	95.50
37	75.3	99.91	99.31	98.92	98.26	97.91	97.42	97.26	96.88	96.57	95.99	95.79	95.42
38	74.0	99.91	99.38	98.99	98.62	98.24	98.12	97.85	97.31	96.96	96.84	96.55	96.19
39	74.8	99.88	99.53	99.18	98.89	98.10	97.99	97.75	97.28	96.96	96.56	95.89	95.63
40	74.3	99.96	99.38	99.07	98.64	98.33	98.04	97.81	97.35	96.88	96.60	95.87	95.20
41	74.3	99.70	99.26	99.03	98.65	98.20	98.10	97.32	97.01	96.49	96.11	95.63	94.86
42	74.6	99.96	99.56	99.09	98.73	98.10	97.57	96.89	96.50	96.36	96.19	95.95	95.20
43	74.1	99.92	99.76	99.00	98.61	97.95	97.38	96.71	96.29	96.13	95.90	95.60	95.00
44	74.8	99.92	99.68	98.98	98.57	98.13	97.62	96.90	96.41	96.23	95.82	95.20	94.87
45	74.3	99.89	99.76	99.25	98.87	98.32	97.83	97.09	96.69	96.46	95.95	95.55	95.02
46	73.9	99.93	99.62	99.42	98.98	98.80	98.32	98.13	97.66	97.59	97.42	97.05	96.62
47	74.9	99.88	99.55	99.27	99.04	98.78	98.58	97.93	97.77	97.02	96.81	96.58	96.30
48	74.7	99.95	99.54	98.86	98.47	97.96	97.15	96.87	96.40	96.21	95.60	95.46	94.82
49	74.1	99.76	99.27	98.80	98.22	97.74	97.16	96.96	96.45	96.27	95.48	95.31	95.12
50	74.9	99.76	99.47	99.13	98.89	98.72	98.33	98.29	97.90	97.54	97.25	97.10	96.81
Avg.	74.5	99.91	99.53	99.12	98.71	98.33	97.93	97.56	97.18	96.85	96.54	96.20	95.77
Med.	74.6	99.91	99.55	99.13	98.73	98.25	97.99	97.64	97.28	96.88	96.56	95.95	95.46
st dev	0.4	0.12	0.18	0.25	0.34	0.41	0.49	0.57	0.62	0.61	0.69	0.76	0.87
Min.	73.9	99.70	99.25	98.56	97.84	97.52	97.15	96.71	96.29	95.74	95.43	94.85	94.50
Max.	75.3	100.22	99.84	99.60	99.24	99.12	99.02	98.69	98.50	97.98	97.70	97.59	97.48

**3.5 Data Set 2, 105°C, 200mA (Forward Voltage)**

No.	Forward Voltage (V)												
	Ohr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs
26	2.965	2.953	2.954	2.954	2.960	2.955	2.969	2.989	2.993	2.958	2.958	2.957	2.950
27	2.942	2.939	2.933	2.932	2.934	2.975	2.948	2.946	2.988	2.941	2.932	2.938	2.929
28	2.957	2.950	2.943	2.945	2.944	2.954	2.956	2.951	2.959	2.956	2.947	2.947	2.944
29	2.961	2.950	2.951	2.944	2.947	2.941	2.950	2.978	2.960	2.944	2.954	2.945	2.945
30	2.938	2.926	2.928	2.937	2.938	2.921	2.927	2.991	2.935	2.921	2.931	2.925	2.922
31	2.941	2.932	2.942	2.937	2.935	2.928	2.927	2.934	2.933	2.925	2.938	2.929	2.932
32	2.961	2.952	2.944	2.948	2.942	2.936	2.980	2.951	2.966	2.942	2.953	2.952	2.939
33	2.968	2.955	2.964	2.952	2.961	2.945	2.961	2.953	2.975	2.962	2.969	2.948	2.952
34	2.948	2.936	2.943	2.943	2.938	2.929	2.948	2.955	2.944	2.930	2.957	2.931	2.937
35	2.964	2.947	2.950	2.943	2.948	2.970	2.960	2.950	2.984	2.962	2.948	2.950	2.967
36	2.965	2.958	2.956	2.951	2.958	2.950	2.975	2.964	2.968	2.966	2.962	2.960	2.955
37	2.962	2.949	2.941	2.942	2.948	2.944	2.961	2.975	2.961	2.954	2.945	2.944	2.944
38	2.967	2.955	2.953	2.951	2.959	2.953	2.962	2.957	2.968	2.968	2.962	2.952	2.954
39	2.979	2.959	2.953	2.954	2.959	2.953	2.957	2.958	2.964	2.951	2.955	2.955	2.952
40	2.945	2.931	2.931	2.928	2.941	2.928	2.937	2.944	2.941	2.935	2.940	2.934	2.932
41	2.966	2.954	2.953	2.963	2.964	2.977	2.956	2.954	2.987	2.977	2.958	2.973	2.953
42	2.979	2.954	2.955	2.954	2.955	2.949	2.953	2.956	2.960	2.968	2.954	2.959	2.950
43	2.954	2.945	2.936	2.943	2.945	2.936	2.954	2.938	2.940	2.983	2.937	2.945	2.935
44	2.973	2.962	2.967	2.979	2.978	2.957	3.006	2.992	2.979	2.959	2.989	2.969	2.959
45	2.945	2.931	2.938	2.940	2.936	2.934	2.954	2.948	2.958	2.937	2.943	2.972	2.931
46	2.953	2.954	2.944	2.941	2.952	2.942	2.964	2.956	2.978	2.961	2.942	2.947	2.993
47	2.955	2.952	2.950	2.950	2.943	2.937	2.942	2.940	2.949	2.953	2.943	2.939	2.935
48	2.962	2.957	2.953	2.961	2.954	2.947	2.952	2.962	2.957	2.986	2.953	2.949	2.951
49	2.943	2.936	2.938	2.962	2.954	2.931	2.940	2.937	2.936	2.938	2.940	2.934	2.935
50	2.941	2.935	2.944	2.961	2.947	2.951	2.937	2.939	2.946	2.935	2.941	2.932	2.933
Avg.	2.957	2.947	2.947	2.949	2.950	2.946	2.955	2.957	2.961	2.952	2.950	2.947	2.945
Med.	2.961	2.950	2.944	2.948	2.948	2.945	2.954	2.954	2.960	2.954	2.948	2.947	2.944
st dev	0.012	0.010	0.010	0.011	0.011	0.015	0.017	0.017	0.018	0.017	0.013	0.013	0.015
Min.	2.938	2.926	2.928	2.928	2.934	2.921	2.927	2.934	2.933	2.921	2.931	2.925	2.922
Max.	2.979	2.962	2.967	2.979	2.978	2.977	3.006	2.992	2.993	2.986	2.989	2.973	2.993

**3.6 Data Set 2, 105°C, 200mA (Chromaticity Shift)**

No.	u'	v'	CCT(K)	Chromaticity Shift ( $\Delta u'v'$ )											
				Ohr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs
26	0.2615	0.5292	2713	0.0002	0.0002	0.0004	0.0005	0.0007	0.0010	0.0012	0.0013	0.0014	0.0015	0.0013	0.0015
27	0.2617	0.5270	2719	0.0001	0.0003	0.0004	0.0006	0.0008	0.0008	0.0011	0.0012	0.0013	0.0013	0.0012	0.0014
28	0.2613	0.5271	2727	0.0002	0.0002	0.0003	0.0005	0.0008	0.0011	0.0010	0.0012	0.0012	0.0013	0.0012	0.0013
29	0.2612	0.5276	2727	0.0002	0.0002	0.0003	0.0006	0.0008	0.0009	0.0010	0.0012	0.0013	0.0014	0.0013	0.0015
30	0.2607	0.5259	2744	0.0002	0.0001	0.0004	0.0006	0.0008	0.0008	0.0010	0.0012	0.0013	0.0014	0.0013	0.0014
31	0.2610	0.5273	2733	0.0002	0.0002	0.0004	0.0005	0.0007	0.0010	0.0009	0.0013	0.0013	0.0014	0.0013	0.0014
32	0.2612	0.5265	2730	0.0002	0.0002	0.0003	0.0004	0.0007	0.0009	0.0009	0.0012	0.0013	0.0013	0.0012	0.0014
33	0.2620	0.5293	2704	0.0001	0.0002	0.0004	0.0006	0.0008	0.0010	0.0009	0.0011	0.0010	0.0011	0.0010	0.0012
34	0.2588	0.5255	2787	0.0002	0.0002	0.0003	0.0006	0.0006	0.0008	0.0010	0.0012	0.0013	0.0013	0.0013	0.0016
35	0.2602	0.5272	2750	0.0002	0.0002	0.0003	0.0006	0.0008	0.0009	0.0009	0.0011	0.0011	0.0013	0.0012	0.0011
36	0.2620	0.5280	2707	0.0003	0.0002	0.0003	0.0006	0.0007	0.0008	0.0010	0.0011	0.0011	0.0011	0.0008	0.0010
37	0.2585	0.5252	2794	0.0003	0.0003	0.0004	0.0008	0.0010	0.0011	0.0012	0.0013	0.0012	0.0014	0.0011	0.0012
38	0.2628	0.5277	2692	0.0002	0.0002	0.0004	0.0004	0.0007	0.0008	0.0010	0.0012	0.0013	0.0016	0.0017	0.0017
39	0.2612	0.5273	2727	0.0002	0.0002	0.0003	0.0005	0.0008	0.0009	0.0012	0.0013	0.0014	0.0016	0.0015	0.0015
40	0.2631	0.5296	2680	0.0002	0.0004	0.0004	0.0006	0.0009	0.0010	0.0009	0.0012	0.0012	0.0013	0.0013	0.0013
41	0.2613	0.5264	2728	0.0002	0.0002	0.0003	0.0004	0.0006	0.0008	0.0010	0.0012	0.0013	0.0015	0.0013	0.0013
42	0.2600	0.5263	2756	0.0003	0.0003	0.0004	0.0004	0.0008	0.0009	0.0009	0.0011	0.0013	0.0014	0.0013	0.0014
43	0.2615	0.5272	2721	0.0003	0.0003	0.0004	0.0006	0.0008	0.0009	0.0012	0.0013	0.0014	0.0016	0.0014	0.0014
44	0.2591	0.5263	2777	0.0002	0.0002	0.0004	0.0005	0.0007	0.0007	0.0010	0.0013	0.0013	0.0013	0.0012	0.0013
45	0.2616	0.5286	2713	0.0003	0.0003	0.0002	0.0004	0.0006	0.0008	0.0010	0.0011	0.0011	0.0013	0.0012	0.0010
46	0.2625	0.5279	2698	0.0002	0.0002	0.0003	0.0005	0.0007	0.0008	0.0009	0.0012	0.0011	0.0013	0.0012	0.0012
47	0.2609	0.5274	2733	0.0002	0.0002	0.0003	0.0004	0.0008	0.0013	0.0014	0.0016	0.0017	0.0019	0.0015	0.0015
48	0.2604	0.5262	2750	0.0002	0.0002	0.0003	0.0003	0.0006	0.0007	0.0008	0.0011	0.0011	0.0013	0.0012	0.0011
49	0.2644	0.5284	2658	0.0002	0.0003	0.0003	0.0004	0.0006	0.0007	0.0010	0.0011	0.0011	0.0013	0.0013	0.0012
50	0.2610	0.5275	2731	0.0001	0.0002	0.0007	0.0009	0.0010	0.0010	0.0010	0.0012	0.0013	0.0014	0.0015	0.0014
Avg.	0.2612	0.5273	2728	0.0002	0.0002	0.0004	0.0005	0.0008	0.0009	0.0010	0.0012	0.0013	0.0014	0.0013	0.0013
Med.	0.2612	0.5273	2727	0.0002	0.0002	0.0003	0.0005	0.0008	0.0009	0.0010	0.0012	0.0013	0.0013	0.0013	0.0014
st dev	0.0013	0.0011	31	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002
Min.	0.2585	0.5252	2658	0.0001	0.0001	0.0002	0.0003	0.0006	0.0007	0.0008	0.0011	0.0010	0.0011	0.0008	0.0010
Max.	0.2644	0.5296	2794	0.0003	0.0004	0.0007	0.0009	0.0010	0.0013	0.0014	0.0016	0.0017	0.0019	0.0017	0.0017

**3.7 Data Set 3, 115°C, 200mA (Lumen Maintenance)**

No.	Φ(lm)	Lumen Maintenance (%)											
	Ohr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs
51	75.3	99.75	99.54	98.90	98.58	97.81	97.36	97.09	96.88	96.11	95.70	95.23	94.79
52	74.5	99.80	99.50	99.22	98.90	98.63	98.48	98.27	98.05	97.93	97.74	97.39	97.14
53	74.8	99.87	99.39	99.22	98.70	98.54	98.06	97.49	97.13	96.73	96.28	95.95	95.46
54	74.2	99.76	99.41	99.12	98.84	98.49	97.86	97.33	97.10	96.62	96.27	95.70	95.08
55	74.4	99.87	99.50	99.06	98.58	98.40	97.93	97.54	96.94	96.68	96.32	95.81	95.46
56	74.8	99.93	99.69	99.17	98.86	98.22	98.09	97.74	96.96	96.78	96.43	95.71	95.10
57	74.9	99.89	99.56	98.82	98.73	98.34	97.78	97.26	96.85	96.78	96.19	95.86	95.33
58	74.4	99.87	99.46	98.64	97.98	97.57	96.93	96.80	96.30	96.18	95.99	95.48	95.01
59	74.6	99.88	99.52	98.86	98.34	97.57	97.31	96.85	96.34	95.58	95.23	94.69	94.09
60	74.5	99.84	99.41	99.21	99.13	98.79	98.46	98.23	98.05	97.43	97.23	97.17	96.70
61	74.6	99.85	99.57	98.87	98.40	97.87	97.29	96.85	96.47	96.27	95.91	95.47	95.10
62	74.5	99.72	99.58	99.26	98.54	97.81	97.17	96.59	96.26	95.96	95.50	94.95	94.46
63	73.9	99.80	99.69	99.24	98.65	97.96	97.51	97.35	96.86	96.04	95.66	95.18	94.91
64	74.7	99.71	99.44	99.28	98.88	98.31	97.66	97.31	96.78	96.55	95.99	95.58	95.22
65	74.4	99.76	99.11	99.01	98.54	97.74	97.29	96.86	96.55	96.44	96.27	96.01	95.75
66	74.7	99.88	99.10	98.53	98.31	97.48	97.00	96.42	96.13	95.77	95.50	94.96	94.40
67	75.0	99.85	99.21	98.71	98.13	97.79	97.34	96.88	96.05	95.78	95.70	95.12	94.38
68	74.9	99.85	99.33	99.09	98.73	98.58	98.26	98.04	97.68	96.98	96.65	96.36	95.93
69	73.9	99.78	99.40	98.73	98.30	97.84	97.11	96.70	96.01	95.58	95.29	94.97	94.63
70	74.8	99.73	99.32	98.82	98.14	98.01	97.22	96.80	96.32	95.73	94.93	94.62	94.22
71	74.7	99.79	99.61	99.16	98.38	97.90	97.24	96.57	96.10	95.47	95.10	94.72	94.42
72	74.7	99.71	99.46	99.14	98.73	98.15	97.43	97.13	96.68	96.41	96.13	95.91	95.61
73	74.2	99.76	99.54	98.75	98.45	98.13	98.07	97.76	96.83	96.48	96.10	95.79	95.28
74	75.1	99.59	98.91	98.11	97.84	97.19	96.62	96.15	95.62	95.33	94.86	94.32	93.64
75	74.6	99.49	98.79	98.66	98.12	98.08	97.60	97.29	96.76	96.41	96.03	95.98	95.27
Avg.	74.6	99.79	99.40	98.94	98.51	98.05	97.56	97.17	96.71	96.32	95.96	95.56	95.10
Med.	74.6	99.80	99.46	99.01	98.54	98.01	97.43	97.13	96.76	96.41	95.99	95.58	95.10
st dev	0.3	0.10	0.23	0.29	0.32	0.40	0.49	0.55	0.60	0.62	0.67	0.73	0.78
Min.	73.9	99.49	98.79	98.11	97.84	97.19	96.62	96.15	95.62	95.33	94.86	94.32	93.64
Max.	75.3	99.93	99.69	99.28	99.13	98.79	98.48	98.27	98.05	97.93	97.74	97.39	97.14

**3.8 Data Set 3, 115°C, 200mA (Forward Voltage)**

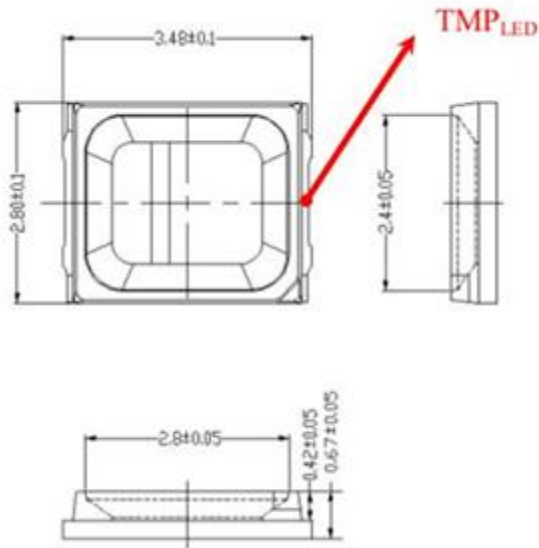
No.	Forward Voltage (V)												
	Ohr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs
51	2.931	2.930	2.926	2.932	2.929	2.918	2.931	2.937	2.931	2.928	2.944	2.927	2.934
52	2.962	2.954	2.950	2.950	2.961	2.943	2.956	2.949	2.962	2.989	2.953	2.950	2.973
53	2.960	2.952	2.942	2.945	2.976	2.944	2.950	2.966	2.951	2.945	2.946	2.943	2.945
54	2.954	2.948	2.956	2.952	2.950	2.940	2.945	2.950	2.949	2.942	2.947	2.956	2.949
55	2.962	2.967	2.949	2.944	2.950	2.942	2.948	3.009	2.954	2.955	2.948	2.954	2.947
56	2.958	2.950	2.955	2.950	2.956	2.945	2.950	2.978	2.961	2.960	2.951	2.969	2.960
57	2.961	2.953	2.957	2.962	2.954	2.947	2.975	2.959	2.955	2.956	2.947	2.949	2.949
58	2.945	2.943	2.937	2.932	2.941	2.931	2.939	2.958	2.949	2.940	2.947	2.944	2.954
59	2.950	2.957	2.939	2.931	2.933	2.930	2.938	2.937	2.961	2.947	2.936	2.931	2.934
60	2.951	2.955	2.952	2.947	2.959	2.950	2.947	2.955	2.957	2.942	2.943	2.943	2.971
61	2.934	3.007	2.934	2.926	2.962	2.918	2.939	2.923	2.927	2.919	2.923	2.922	2.919
62	2.951	2.956	2.940	2.941	2.957	2.937	2.978	2.954	2.949	2.936	2.944	2.944	2.944
63	2.954	2.992	2.949	2.942	2.948	2.943	2.944	2.945	2.951	2.964	2.946	2.957	2.950
64	2.961	2.999	2.950	2.951	2.947	2.950	2.956	2.955	2.968	2.946	2.956	2.980	2.966
65	2.964	2.962	2.956	2.949	2.951	2.952	2.959	2.956	2.981	2.947	2.953	2.999	2.963
66	2.980	2.976	2.945	2.948	2.947	2.953	2.948	2.950	2.958	2.952	2.952	2.948	2.945
67	2.954	2.957	2.941	2.938	2.944	2.938	2.943	2.944	2.955	2.944	2.948	2.940	2.967
68	2.965	2.985	2.948	2.942	2.974	2.943	2.953	2.955	2.954	2.965	2.945	2.947	2.962
69	2.958	2.958	2.945	2.944	2.958	2.943	2.951	2.958	2.955	2.947	2.944	2.968	2.943
70	2.960	2.955	2.945	2.946	2.949	2.947	2.950	2.957	2.965	2.943	2.949	2.951	2.950
71	2.960	2.950	2.950	2.966	2.954	2.947	2.956	2.966	2.968	2.950	2.950	2.948	2.951
72	2.950	2.939	2.937	2.939	2.939	2.936	2.944	3.004	2.943	2.935	2.940	2.944	2.943
73	2.944	2.929	2.929	2.929	2.929	2.923	2.932	2.934	2.943	2.926	2.935	2.927	2.929
74	2.954	2.948	2.944	2.942	2.942	2.936	2.946	2.950	2.953	2.943	2.950	2.944	2.953
75	2.954	2.941	2.937	2.935	2.958	2.932	2.937	2.949	2.956	2.938	2.935	2.937	2.937
Avg.	2.955	2.959	2.945	2.943	2.951	2.940	2.949	2.956	2.954	2.946	2.945	2.949	2.950
Med.	2.954	2.955	2.945	2.944	2.950	2.943	2.948	2.955	2.955	2.945	2.947	2.947	2.949
st dev	0.010	0.020	0.008	0.010	0.012	0.010	0.011	0.019	0.011	0.014	0.007	0.017	0.013
Min.	2.931	2.929	2.926	2.926	2.929	2.918	2.931	2.923	2.927	2.919	2.923	2.922	2.919
Max.	2.980	3.007	2.957	2.966	2.976	2.953	2.978	3.009	2.981	2.989	2.956	2.999	2.973

**3.9 Data Set 3, 115°C, 200mA (Chromaticity Shift)**

No.	u'	v'	CCT(K)	Chromaticity Shift ( $\Delta u'v'$ )											
				Ohr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs
51	0.2578	0.5243	2816	0.0001	0.0002	0.0003	0.0004	0.0007	0.0008	0.0010	0.0011	0.0012	0.0013	0.0011	0.0012
52	0.2601	0.5259	2756	0.0002	0.0003	0.0004	0.0006	0.0008	0.0011	0.0012	0.0013	0.0014	0.0014	0.0013	0.0014
53	0.2610	0.5263	2737	0.0002	0.0003	0.0005	0.0006	0.0009	0.0010	0.0010	0.0012	0.0015	0.0016	0.0015	0.0015
54	0.2615	0.5265	2724	0.0002	0.0002	0.0004	0.0006	0.0009	0.0010	0.0011	0.0012	0.0013	0.0016	0.0014	0.0015
55	0.2622	0.5286	2701	0.0002	0.0003	0.0006	0.0008	0.0010	0.0011	0.0010	0.0012	0.0013	0.0015	0.0014	0.0016
56	0.2591	0.5264	2776	0.0003	0.0003	0.0003	0.0006	0.0009	0.0010	0.0012	0.0012	0.0013	0.0014	0.0012	0.0014
57	0.2597	0.5271	2759	0.0003	0.0003	0.0004	0.0006	0.0009	0.0011	0.0012	0.0012	0.0014	0.0014	0.0012	0.0014
58	0.2600	0.5281	2750	0.0002	0.0003	0.0004	0.0006	0.0010	0.0015	0.0015	0.0012	0.0013	0.0013	0.0011	0.0011
59	0.2589	0.5245	2789	0.0003	0.0003	0.0004	0.0006	0.0011	0.0013	0.0016	0.0014	0.0014	0.0015	0.0012	0.0014
60	0.2620	0.5280	2707	0.0003	0.0003	0.0004	0.0008	0.0010	0.0010	0.0012	0.0011	0.0012	0.0014	0.0013	0.0015
61	0.2606	0.5275	2740	0.0002	0.0004	0.0004	0.0005	0.0008	0.0008	0.0010	0.0010	0.0011	0.0016	0.0012	0.0012
62	0.2600	0.5250	2764	0.0002	0.0004	0.0005	0.0007	0.0009	0.0011	0.0014	0.0013	0.0014	0.0016	0.0015	0.0014
63	0.2638	0.5307	2660	0.0001	0.0004	0.0005	0.0007	0.0009	0.0012	0.0013	0.0014	0.0014	0.0016	0.0014	0.0013
64	0.2601	0.5265	2755	0.0002	0.0003	0.0003	0.0007	0.0011	0.0011	0.0013	0.0013	0.0015	0.0016	0.0014	0.0015
65	0.2612	0.5261	2733	0.0001	0.0003	0.0006	0.0009	0.0011	0.0011	0.0013	0.0014	0.0016	0.0018	0.0016	0.0015
66	0.2610	0.5285	2726	0.0003	0.0003	0.0005	0.0009	0.0011	0.0011	0.0014	0.0012	0.0012	0.0014	0.0014	0.0012
67	0.2588	0.5262	2784	0.0002	0.0003	0.0005	0.0007	0.0009	0.0009	0.0013	0.0013	0.0012	0.0013	0.0011	0.0013
68	0.2605	0.5286	2737	0.0001	0.0003	0.0004	0.0010	0.0012	0.0013	0.0012	0.0012	0.0013	0.0014	0.0011	0.0014
69	0.2627	0.5276	2695	0.0001	0.0004	0.0006	0.0006	0.0009	0.0008	0.0012	0.0012	0.0013	0.0016	0.0014	0.0013
70	0.2617	0.5276	2716	0.0002	0.0003	0.0007	0.0008	0.0011	0.0011	0.0014	0.0014	0.0016	0.0018	0.0016	0.0015
71	0.2614	0.5277	2722	0.0002	0.0003	0.0006	0.0008	0.0010	0.0012	0.0013	0.0014	0.0014	0.0017	0.0014	0.0013
72	0.2605	0.5271	2743	0.0001	0.0003	0.0004	0.0006	0.0010	0.0011	0.0013	0.0014	0.0015	0.0016	0.0014	0.0015
73	0.2634	0.5288	2676	0.0002	0.0004	0.0006	0.0008	0.0011	0.0013	0.0015	0.0014	0.0014	0.0017	0.0015	0.0014
74	0.2611	0.5285	2724	0.0001	0.0003	0.0004	0.0008	0.0010	0.0009	0.0012	0.0012	0.0011	0.0013	0.0011	0.0010
75	0.2607	0.5272	2737	0.0001	0.0004	0.0005	0.0007	0.0009	0.0009	0.0011	0.0011	0.0012	0.0013	0.0010	0.0012
Avg.	0.2608	0.5272	2737	0.0002	0.0003	0.0005	0.0007	0.0010	0.0011	0.0013	0.0012	0.0013	0.0015	0.0013	0.0014
Med.	0.2607	0.5272	2737	0.0002	0.0003	0.0004	0.0007	0.0010	0.0011	0.0012	0.0012	0.0013	0.0015	0.0014	0.0014
st dev	0.0014	0.0015	35	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0001	0.0001	0.0002	0.0002	0.0001
Min.	0.2578	0.5243	2660	0.0001	0.0002	0.0003	0.0004	0.0007	0.0008	0.0010	0.0010	0.0011	0.0013	0.0010	0.0010
Max.	0.2638	0.5307	2816	0.0003	0.0004	0.0007	0.0010	0.0012	0.0015	0.0016	0.0014	0.0016	0.0018	0.0016	0.0016

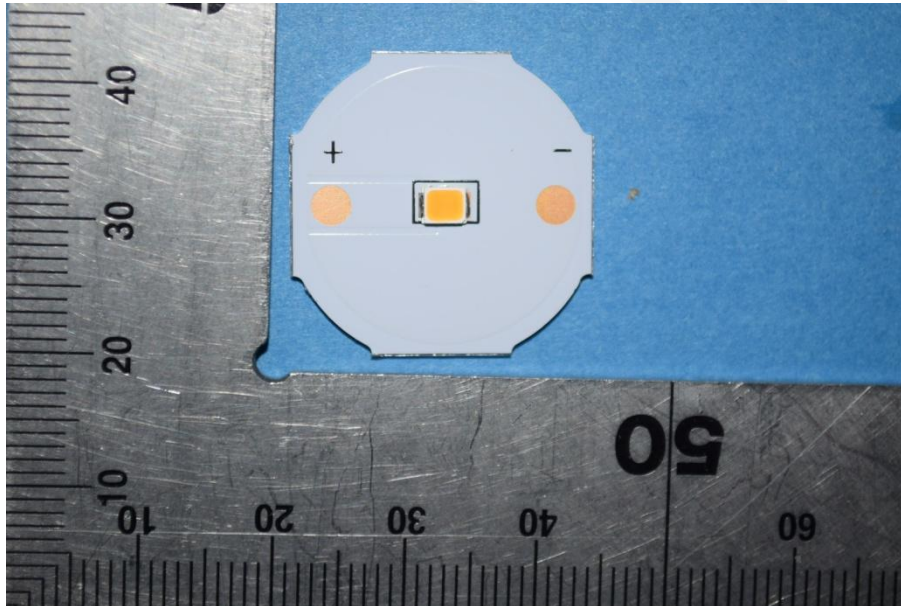
#### 4 - DUT Photo

##### 4.1 Mechanical Dimensions



All dimensions are in millimeter

##### 4.2 DUT Photo



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