TEST REPORT

According to ANSI/IES LM-80-15
For

Xiamen Dacol Phototoelectronics Technology Co., Ltd.

No. 8021 Xiang'an West Road(Xiang'an) industrial zone, Torch Hi-Tech Industrial Development Zone , Xiamen City,Fujian,China

Model: SMD-2835

Report Type: 9000 Hours Test Report	**Product Type:** LED Package
Test Engineer:	Pote Wang
Report Number:	R2DG171116050-10-9000-M1
Test Date:	2017-11-21 to 2018-12-01
Report Date:	2019-01-24
Reviewed By:	Blake Zhang / EE Engineer
Revised Note:	The previous report R2DG171116050-10-9000 is replaced by this report on 2019-01-24
Test Facility:	Test facility was located at No.69,Pulongcun ,Puxinhu Industrial Area, Tangxia , Dongguan, Guangdong, China.
Prepared By:	Bay Area Compliance Laboratories Corp. (Dongguan). No.69,Pulongcun ,Puxinhu Industrial Area, Tangxia , Dongguan, Guangdong, China. Tel: +86-0769-86858888 Fax:+86-0769-86858588
Accreditation:	The IAS Accreditation Number TL-460.

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1 - General Information

1.1 Description of LED Light Sources

Sample Size:

75 PCS samples were received on 2017-11-16. The samples were numbered from 1 to 25, 26 to 50 and 51 to 75.

Manufacturer:	Xiamen Dacol Phototoelectronics Technology Co., Ltd.
Part Number:	SMD-2835
Part Type:	LED Package
Drive Level:	DC 30mA
Nominal CCT:	3000K
Power:	1.08W
Average Current Density per LED die:	78.9mA/mm^2
Average Power Density per LED die:	1.421W/mm^2
CRI:	80
Die Spacing:	0.084mm

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.

1.2 Standards Used:

- ANSI/IES LM-80-15: IES Approved Method for Measuring Lumen Maintenance of LED Light Sources.
- CIE 127:2007: Measurement of LEDs
- ENERGY STAR® 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	11090003	2018-05-04	2019-05-04

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 ±3% of the specified value of the manufacturer during maintenance test, and was within ±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°C below the corresponding nominal case temperature. Surrounding air was maintained at a temperature that was greater than or equal to 5°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 ±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°C ± 2°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'. 2π measurement was used and sample was drived by DC power supply. The forward current was regulated to within ±0.5% of the nominal value. The test system was calibrated by halogen reference lamp. The ambient temperature during test was set to 25°C ± 2°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 (luminous flux) measurements is U=1.6% (K=2), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is U=20K (K=2), at the 95% confidence level. The uncertainty of the CRI is U=1.6 (K=2) , at the 95% confidence level.

The uncertainty of the temperature is U=0.8671°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: 55°C, 30mA

Part Number:	SMD-2835
Number of Units:	25
Case Temperature:	>53°C
Ambient Temperature:	>50°C
Life Test Drive Current:	30mA
Measurement Current:	30mA

Data Set 2: 85°C, 30mA

Part Number:	SMD-2835
Number of Units:	25
Case Temperature:	>83°C
Ambient Temperature:	>80°C
Life Test Drive Current:	30mA
Measurement Current:	30mA

Data Set 3: 105°C, 30mA

Part Number:	SMD-2835
Number of Units:	25
Case Temperature:	>103°C
Ambient Temperature:	>100°C
Life Test Drive Current:	30mA
Measurement Current:	30mA

2 - Summary of Test Result

Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration	α	β	Reported TM-21 L_{70} Lifetime
1	25	0	1000hrs	9000hrs	3.463E-06	1.004	>54000hrs
2	25	0	1000hrs	9000hrs	4.027E-06	1.003	>54000hrs
3	25	0	1000hrs	9000hrs	4.565E-06	1.002	>54000hrs

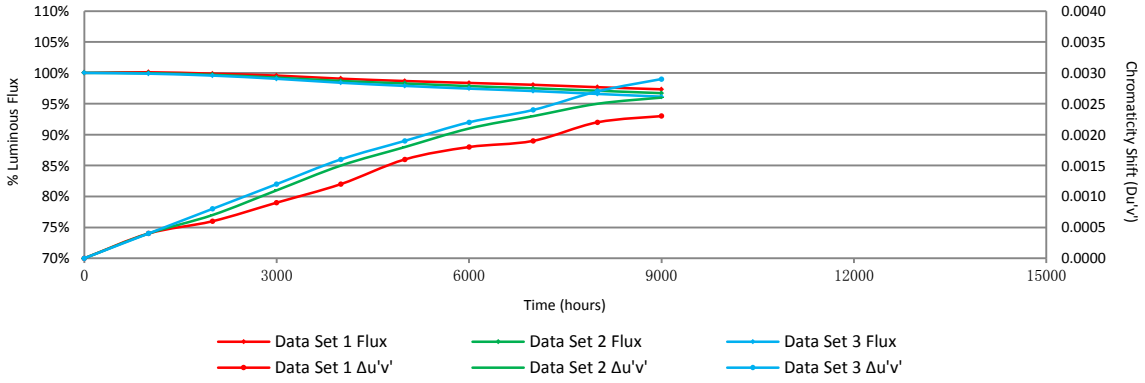
Average Lumen Maintenance (Percentage of Initial Luminous Flux)

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	100.10%	99.87%	99.56%	99.06%	98.68%	98.37%	98.07%	97.68%	97.34%
2	99.94%	99.68%	99.23%	98.69%	98.28%	97.86%	97.50%	97.11%	96.71%
3	99.87%	99.56%	99.04%	98.40%	97.89%	97.45%	97.06%	96.59%	96.15%

Average Chromaticity Shift

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	0.0004	0.0006	0.0009	0.0012	0.0016	0.0018	0.0019	0.0022	0.0023
2	0.0004	0.0007	0.0011	0.0015	0.0018	0.0021	0.0023	0.0025	0.0026
3	0.0004	0.0008	0.0012	0.0016	0.0019	0.0022	0.0024	0.0027	0.0029

Average Lumen Maintenance and Chromaticity Shift VS. Time



3 - Test Data

3.1 Data Set 1, 55°C, 30mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	110.3	100.09	99.91	99.73	99.37	99.18	98.82	98.46	98.10	97.64
2	110.7	100.18	100.09	99.73	99.19	98.92	98.55	98.28	97.83	97.56
3	110.6	100.18	99.82	99.55	99.01	98.55	98.28	98.01	97.65	97.29
4	111.6	99.91	99.64	99.28	98.75	98.39	98.30	98.12	97.85	97.49
5	110.3	100.18	99.91	99.73	99.27	98.91	98.55	98.19	97.64	97.37
6	111.3	100.27	100.18	99.91	99.73	99.28	99.10	98.92	98.56	98.11
7	110.4	100.27	99.91	99.55	99.00	98.82	98.64	98.28	98.01	97.55
8	110.6	100.18	100.09	99.91	99.28	98.82	98.46	98.01	97.38	97.20
9	110.3	99.91	99.73	99.46	98.82	98.46	98.19	98.01	97.64	97.37
10	110.5	100.09	99.91	99.64	99.10	98.82	98.37	98.19	97.74	97.47
11	110.5	100.09	99.82	99.46	99.19	98.64	98.55	98.28	98.01	97.65
12	109.8	100.18	99.82	99.54	99.09	98.54	98.00	97.72	97.54	97.18
13	109.5	100.09	99.91	99.54	99.09	98.63	98.17	97.90	97.44	97.08
14	109.4	100.09	99.73	99.45	99.09	98.81	98.63	98.35	97.81	97.35
15	111.6	99.91	99.73	99.64	99.19	98.92	98.66	98.48	97.85	97.58
16	109.8	100.09	99.91	99.54	99.00	98.63	98.36	98.09	97.81	97.36
17	109.3	100.09	99.73	99.45	99.09	98.72	98.44	98.08	97.71	97.35
18	109.1	99.91	99.54	99.18	98.63	98.08	97.62	97.34	96.61	96.24
19	108.3	99.82	99.63	99.26	98.71	98.34	97.88	97.60	97.23	96.95
20	108.8	100.09	99.82	99.54	98.71	98.25	97.89	97.61	97.06	96.69
21	109.2	99.91	99.63	99.36	98.81	98.35	97.99	97.44	96.98	96.52
22	110.4	100.36	100.09	99.73	99.00	98.46	98.10	97.74	97.64	97.46
23	109.4	100.09	99.82	99.45	99.18	98.90	98.63	98.45	98.08	97.90
24	108.7	100.18	100.09	99.72	99.08	98.80	98.53	98.07	97.79	97.42
25	110.4	100.27	100.18	99.64	99.28	98.73	98.55	98.10	97.92	97.64
Avg.	110.0	100.10	99.87	99.56	99.06	98.68	98.37	98.07	97.68	97.34
Med.	110.3	100.09	99.82	99.54	99.09	98.72	98.44	98.09	97.74	97.37
st dev	0.9	0.1384	0.1784	0.1844	0.2428	0.2836	0.3349	0.3575	0.4039	0.4068
Min.	108.3	99.82	99.54	99.18	98.63	98.08	97.62	97.34	96.61	96.24
Max.	111.6	100.36	100.18	99.91	99.73	99.28	99.10	98.92	98.56	98.11

3.2 Data Set 1, 55°C, 30mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	36.27	36.27	36.45	36.28	36.28	36.57	36.86	36.27	36.65	36.28
2	36.15	36.14	36.29	36.13	36.12	36.37	36.62	36.24	36.46	36.15
3	36.29	36.19	36.26	36.10	36.07	36.41	36.73	36.11	36.47	36.09
4	36.51	36.49	36.47	36.48	36.48	36.75	36.64	36.50	36.88	36.50
5	36.21	36.17	36.36	36.19	36.16	36.46	36.72	36.18	36.55	36.17
6	36.19	36.16	36.35	36.18	36.18	36.43	36.68	36.18	36.55	36.20
7	36.46	36.35	36.63	36.36	36.37	36.64	36.95	36.45	36.72	36.36
8	36.19	36.16	36.35	36.17	36.37	36.41	36.66	36.17	36.51	36.16
9	36.18	36.16	36.35	36.16	36.16	36.45	36.69	36.18	36.51	36.17
10	36.12	36.10	36.26	36.10	36.11	36.34	36.59	36.10	36.44	36.09
11	36.43	36.39	36.58	36.38	36.38	36.70	36.98	36.40	36.73	36.40
12	36.37	36.36	36.91	36.35	36.34	36.64	36.90	36.36	36.72	36.39
13	36.08	36.03	36.25	36.04	36.18	36.37	36.54	36.05	36.37	36.05
14	36.08	36.05	36.23	36.06	36.07	36.34	36.58	36.08	36.38	36.07
15	36.30	36.13	36.32	36.13	36.13	36.57	36.68	36.25	36.47	36.14
16	36.40	36.08	36.36	36.08	36.08	36.38	36.62	36.11	36.56	36.08
17	36.16	36.14	36.34	36.19	36.15	36.44	36.67	36.20	36.51	36.17
18	36.27	36.09	36.35	36.09	36.09	36.38	36.61	36.16	36.45	36.12
19	36.08	36.05	36.25	36.04	36.06	36.32	36.57	36.09	36.43	36.05
20	36.13	36.10	36.31	36.09	36.09	36.38	36.66	36.15	36.44	36.10
21	36.09	36.11	36.34	36.12	36.19	36.46	36.68	36.16	36.49	36.12
22	36.11	36.07	36.29	36.09	36.09	36.37	36.61	36.11	36.42	36.11
23	36.10	36.10	36.26	36.07	36.08	36.35	36.58	36.12	36.45	36.09
24	36.33	36.33	36.52	36.32	36.32	36.67	36.90	36.34	36.68	36.31
25	36.33	36.36	36.50	36.30	36.28	36.62	36.88	36.33	36.67	36.29
Avg.	36.23	36.18	36.38	36.18	36.19	36.47	36.70	36.21	36.54	36.19
Med.	36.19	36.14	36.35	36.13	36.16	36.43	36.67	36.18	36.51	36.15
st dev	0.13	0.13	0.15	0.12	0.12	0.13	0.13	0.12	0.13	0.12
Min.	36.08	36.03	36.23	36.04	36.06	36.32	36.54	36.05	36.37	36.05
Max.	36.51	36.49	36.91	36.48	36.48	36.75	36.98	36.50	36.88	36.50

3.3 Data Set 1, 55°C, 30mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')								
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	0.2500	0.5188	3031	0.0003	0.0005	0.0008	0.0011	0.0014	0.0017	0.0019	0.0025	0.0027
2	0.2493	0.5176	3056	0.0002	0.0006	0.0008	0.0011	0.0017	0.0017	0.0019	0.0024	0.0026
3	0.2503	0.5186	3024	0.0004	0.0006	0.0009	0.0012	0.0019	0.0019	0.0020	0.0023	0.0026
4	0.2491	0.5170	3066	0.0004	0.0006	0.0009	0.0013	0.0018	0.0020	0.0021	0.0026	0.0027
5	0.2498	0.5179	3043	0.0004	0.0006	0.0009	0.0013	0.0015	0.0019	0.0022	0.0026	0.0028
6	0.2486	0.5181	3070	0.0004	0.0006	0.0008	0.0011	0.0015	0.0019	0.0021	0.0026	0.0028
7	0.2488	0.5171	3075	0.0003	0.0005	0.0010	0.0013	0.0015	0.0017	0.0019	0.0026	0.0027
8	0.2504	0.5183	3025	0.0005	0.0006	0.0009	0.0013	0.0016	0.0020	0.0021	0.0024	0.0025
9	0.2501	0.5179	3034	0.0004	0.0005	0.0009	0.0012	0.0014	0.0015	0.0018	0.0021	0.0023
10	0.2497	0.5168	3052	0.0003	0.0006	0.0008	0.0011	0.0014	0.0019	0.0020	0.0021	0.0022
11	0.2498	0.5179	3042	0.0004	0.0005	0.0009	0.0011	0.0014	0.0014	0.0017	0.0022	0.0023
12	0.2503	0.5160	3044	0.0004	0.0006	0.0010	0.0013	0.0016	0.0018	0.0020	0.0020	0.0021
13	0.2497	0.5183	3043	0.0003	0.0005	0.0009	0.0012	0.0015	0.0015	0.0017	0.0020	0.0021
14	0.2488	0.5168	3076	0.0004	0.0007	0.0009	0.0013	0.0016	0.0016	0.0019	0.0021	0.0022
15	0.2481	0.5175	3089	0.0004	0.0006	0.0009	0.0013	0.0017	0.0016	0.0018	0.0020	0.0021
16	0.2482	0.5179	3082	0.0004	0.0006	0.0009	0.0012	0.0014	0.0017	0.0019	0.0021	0.0022
17	0.2499	0.5183	3036	0.0004	0.0008	0.0010	0.0014	0.0019	0.0021	0.0022	0.0020	0.0021
18	0.2507	0.5181	3018	0.0004	0.0005	0.0009	0.0013	0.0015	0.0016	0.0019	0.0021	0.0022
19	0.2497	0.5178	3046	0.0003	0.0006	0.0009	0.0013	0.0014	0.0017	0.0019	0.0021	0.0022
20	0.2491	0.5173	3064	0.0004	0.0006	0.0009	0.0013	0.0016	0.0017	0.0019	0.0018	0.0019
21	0.2504	0.5183	3025	0.0002	0.0009	0.0010	0.0012	0.0017	0.0019	0.0020	0.0022	0.0024
22	0.2515	0.5197	2987	0.0004	0.0005	0.0009	0.0012	0.0015	0.0016	0.0017	0.0019	0.0022
23	0.2506	0.5172	3027	0.0003	0.0005	0.0009	0.0014	0.0016	0.0017	0.0019	0.0019	0.0022
24	0.2489	0.5172	3070	0.0004	0.0006	0.0010	0.0013	0.0016	0.0018	0.0021	0.0019	0.0021
25	0.2493	0.5179	3055	0.0002	0.0005	0.0009	0.0013	0.0016	0.0018	0.0020	0.0020	0.0023
Avg.	0.2496	0.5178	3047	0.0004	0.0006	0.0009	0.0012	0.0016	0.0018	0.0019	0.0022	0.0023
Med.	0.2497	0.5179	3044	0.0004	0.0006	0.0009	0.0013	0.0016	0.0017	0.0019	0.0021	0.0022
st dev	0.0008	0.0008	24	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0001	0.0003	0.0003
Min.	0.2481	0.5160	2987	0.0002	0.0005	0.0008	0.0011	0.0014	0.0014	0.0017	0.0018	0.0019
Max.	0.2515	0.5197	3089	0.0005	0.0009	0.0010	0.0014	0.0019	0.0021	0.0022	0.0026	0.0028

3.4 Data Set 2, 85°C, 30mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	108.3	100.18	99.82	99.26	98.61	98.25	97.69	97.14	96.77	96.31
27	109.7	99.82	99.45	99.18	98.45	97.99	97.45	96.90	96.63	96.26
28	109.9	99.91	99.73	99.36	99.18	98.82	98.64	98.36	98.09	97.82
29	111.1	100.09	99.82	99.28	98.92	98.65	98.20	97.75	97.30	97.03
30	110.4	99.73	99.46	99.09	98.37	98.01	97.74	97.28	96.74	96.29
31	110.8	99.91	99.82	99.55	99.01	98.65	98.56	98.19	97.74	97.47
32	109.5	100.18	99.91	99.54	99.09	98.63	98.36	98.08	97.53	97.08
33	109.4	99.91	99.63	99.09	98.90	98.45	98.08	97.90	97.81	97.35
34	109.2	100.09	99.91	99.36	98.53	98.35	97.80	97.62	97.16	96.61
35	108.8	99.91	99.72	99.36	98.90	98.53	97.98	97.52	96.97	96.51
36	110.4	99.82	99.55	99.09	98.55	98.10	97.64	97.37	96.74	96.47
37	110.8	99.82	99.73	99.19	98.83	98.38	97.74	97.38	96.93	96.48
38	109.8	100.09	99.82	99.36	98.91	98.45	98.27	98.00	97.54	97.18
39	110.5	100.09	99.73	99.28	98.55	98.37	97.92	97.65	97.47	97.10
40	110.8	99.91	99.64	99.46	98.83	98.38	98.01	97.74	97.20	96.66
41	109.7	99.91	99.73	99.45	99.00	98.45	97.81	97.45	96.99	96.72
42	109.9	99.82	99.45	99.00	98.27	97.73	97.36	97.09	96.54	96.18
43	109.2	99.82	99.63	98.99	98.44	98.17	97.62	97.25	96.89	96.43
44	110.1	100.09	99.73	99.18	98.46	97.91	97.55	97.28	97.00	96.73
45	110.2	99.73	99.46	98.82	98.37	97.91	97.55	97.01	96.46	96.01
46	111.0	100.09	99.82	99.19	98.65	98.38	97.93	97.39	97.12	96.58
47	111.9	99.91	99.55	99.20	98.48	97.86	97.41	96.96	96.60	96.16
48	111.7	99.91	99.64	99.02	98.57	98.21	97.58	97.14	96.78	96.33
49	109.6	99.73	99.54	99.00	98.27	97.81	97.45	97.08	96.99	96.62
50	112.2	100.09	99.82	99.47	99.02	98.57	98.22	98.04	97.77	97.42
Avg.	110.2	99.94	99.68	99.23	98.69	98.28	97.86	97.50	97.11	96.71
Med.	110.1	99.91	99.73	99.20	98.61	98.37	97.80	97.39	96.99	96.61
st dev	1.0	0.1435	0.1438	0.1910	0.2732	0.2990	0.3576	0.4146	0.4426	0.4726
Min.	108.3	99.73	99.45	98.82	98.27	97.73	97.36	96.90	96.46	96.01
Max.	112.2	100.18	99.91	99.55	99.18	98.82	98.64	98.36	98.09	97.82

3.5 Data Set 2, 85°C, 30mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	36.12	36.12	36.66	36.11	36.09	36.35	36.59	36.14	36.48	36.12
27	36.27	36.15	36.30	36.13	36.11	36.42	36.60	36.15	36.49	36.11
28	36.40	36.39	36.55	36.36	36.36	36.67	36.91	36.39	36.83	36.37
29	36.13	36.15	36.78	36.12	36.12	36.38	36.59	36.14	36.49	36.10
30	36.30	36.31	36.47	36.29	36.27	36.56	36.80	36.31	36.65	36.30
31	36.31	36.05	36.21	36.04	36.03	36.31	36.57	36.09	36.41	36.09
32	36.17	36.16	36.32	36.14	36.13	36.44	36.67	36.20	36.52	36.17
33	36.19	36.15	36.72	36.15	36.12	36.42	36.66	36.18	36.52	36.18
34	36.31	36.10	36.28	36.11	36.08	36.37	36.64	36.17	36.45	36.13
35	36.16	36.06	36.24	36.06	36.05	36.36	36.60	36.10	36.45	36.09
36	36.12	36.09	36.28	36.10	36.09	36.36	36.61	36.12	36.47	36.13
37	36.16	36.11	36.31	36.11	36.09	36.44	36.62	36.14	36.50	36.16
38	36.14	36.09	36.26	36.10	36.08	36.34	36.61	36.12	36.44	36.12
39	36.37	36.18	36.37	36.22	36.16	36.65	36.81	36.21	36.67	36.23
40	36.13	36.11	36.30	36.10	36.10	36.36	36.61	36.12	36.44	36.13
41	36.15	36.13	36.19	36.13	36.11	36.37	36.63	36.13	36.49	36.15
42	36.29	36.25	36.45	36.24	36.23	36.69	36.86	36.26	36.61	36.34
43	36.08	36.06	36.59	36.08	36.05	36.35	36.55	36.09	36.42	36.10
44	36.29	36.08	36.27	36.10	36.08	36.37	36.61	36.12	36.43	36.12
45	36.16	36.12	36.53	36.13	36.14	36.39	36.59	36.14	36.47	36.14
46	36.27	36.14	36.31	36.15	36.14	36.41	36.64	36.15	36.51	36.19
47	36.20	36.17	36.51	36.21	36.17	36.44	36.64	36.18	36.22	36.20
48	36.45	36.41	36.61	36.42	36.39	36.75	36.97	36.43	36.52	36.47
49	36.14	36.08	36.17	36.08	36.07	36.36	36.58	36.07	36.14	36.10
50	36.30	36.27	36.46	36.25	36.25	36.60	36.82	36.29	36.36	36.30
Avg.	36.22	36.16	36.41	36.16	36.14	36.45	36.67	36.18	36.48	36.18
Med.	36.19	36.13	36.32	36.13	36.11	36.39	36.62	36.14	36.48	36.14
st dev	0.10	0.10	0.17	0.09	0.09	0.13	0.12	0.09	0.13	0.10
Min.	36.08	36.05	36.17	36.04	36.03	36.31	36.55	36.07	36.14	36.09
Max.	36.45	36.41	36.78	36.42	36.39	36.75	36.97	36.43	36.83	36.47

3.6 Data Set 2, 85°C, 30mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')								
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	0.2490	0.5183	3060	0.0002	0.0007	0.0009	0.0014	0.0018	0.0020	0.0021	0.0021	0.0023
27	0.2489	0.5178	3065	0.0004	0.0006	0.0008	0.0011	0.0015	0.0015	0.0017	0.0020	0.0022
28	0.2507	0.5183	3016	0.0002	0.0007	0.0011	0.0015	0.0019	0.0020	0.0021	0.0019	0.0021
29	0.2491	0.5194	3049	0.0004	0.0007	0.0012	0.0015	0.0018	0.0020	0.0021	0.0020	0.0021
30	0.2500	0.5176	3039	0.0005	0.0009	0.0013	0.0017	0.0020	0.0022	0.0024	0.0020	0.0021
31	0.2497	0.5187	3039	0.0006	0.0009	0.0013	0.0016	0.0019	0.0019	0.0022	0.0024	0.0026
32	0.2489	0.5155	3082	0.0005	0.0009	0.0013	0.0016	0.0019	0.0020	0.0023	0.0023	0.0024
33	0.2497	0.5163	3056	0.0004	0.0007	0.0011	0.0016	0.0019	0.0021	0.0023	0.0025	0.0027
34	0.2507	0.5190	3012	0.0002	0.0007	0.0011	0.0014	0.0018	0.0021	0.0022	0.0024	0.0024
35	0.2494	0.5186	3046	0.0003	0.0007	0.0009	0.0015	0.0017	0.0020	0.0023	0.0022	0.0024
36	0.2503	0.5182	3027	0.0004	0.0008	0.0010	0.0014	0.0018	0.0021	0.0023	0.0023	0.0025
37	0.2483	0.5164	3092	0.0004	0.0008	0.0012	0.0020	0.0020	0.0024	0.0026	0.0030	0.0031
38	0.2495	0.5174	3054	0.0004	0.0007	0.0011	0.0015	0.0018	0.0021	0.0024	0.0030	0.0032
39	0.2483	0.5171	3087	0.0002	0.0008	0.0011	0.0016	0.0019	0.0021	0.0024	0.0028	0.0030
40	0.2497	0.5172	3050	0.0005	0.0006	0.0011	0.0016	0.0017	0.0022	0.0024	0.0031	0.0033
41	0.2495	0.5159	3064	0.0005	0.0007	0.0012	0.0016	0.0019	0.0022	0.0024	0.0030	0.0033
42	0.2490	0.5178	3064	0.0004	0.0005	0.0011	0.0015	0.0018	0.0021	0.0023	0.0028	0.0030
43	0.2493	0.5175	3058	0.0005	0.0006	0.0011	0.0015	0.0018	0.0021	0.0023	0.0027	0.0030
44	0.2501	0.5181	3033	0.0004	0.0007	0.0011	0.0014	0.0018	0.0020	0.0022	0.0029	0.0031
45	0.2507	0.5178	3021	0.0006	0.0007	0.0011	0.0014	0.0020	0.0023	0.0024	0.0026	0.0028
46	0.2502	0.5191	3023	0.0002	0.0007	0.0008	0.0013	0.0018	0.0022	0.0023	0.0028	0.0030
47	0.2490	0.5170	3070	0.0004	0.0006	0.0010	0.0015	0.0019	0.0021	0.0024	0.0022	0.0023
48	0.2483	0.5179	3079	0.0003	0.0006	0.0011	0.0013	0.0017	0.0020	0.0023	0.0021	0.0023
49	0.2507	0.5183	3015	0.0003	0.0006	0.0011	0.0014	0.0016	0.0020	0.0023	0.0023	0.0024
50	0.2484	0.5173	3082	0.0004	0.0007	0.0012	0.0016	0.0018	0.0021	0.0023	0.0022	0.0024
Avg.	0.2495	0.5177	3051	0.0004	0.0007	0.0011	0.0015	0.0018	0.0021	0.0023	0.0025	0.0026
Med.	0.2495	0.5178	3054	0.0004	0.0007	0.0011	0.0015	0.0018	0.0021	0.0023	0.0024	0.0025
st dev	0.0008	0.0010	24	0.0001	0.0001	0.0001	0.0002	0.0001	0.0002	0.0002	0.0004	0.0004
Min.	0.2483	0.5155	3012	0.0002	0.0005	0.0008	0.0011	0.0015	0.0015	0.0017	0.0019	0.0021
Max.	0.2507	0.5194	3092	0.0006	0.0009	0.0013	0.0020	0.0020	0.0024	0.0026	0.0031	0.0033

3.7 Data Set 3, 105°C, 30mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
51	109.5	99.63	99.27	98.72	97.99	97.35	96.89	96.44	95.89	95.43
52	109.9	99.91	99.45	99.00	98.09	97.63	97.00	96.45	95.81	95.18
53	110.9	100.18	99.82	99.28	98.65	98.29	97.93	97.39	97.02	96.48
54	111.2	99.91	99.64	99.37	98.65	98.20	98.02	97.57	96.94	96.40
55	110.4	99.73	99.46	98.82	98.28	97.64	97.37	96.92	96.38	96.11
56	110.6	99.82	99.37	98.82	98.37	97.92	97.74	97.29	97.02	96.47
57	110.7	99.91	99.64	99.10	98.28	97.92	97.29	97.02	96.39	96.03
58	110.6	99.82	99.46	98.82	98.28	97.74	97.11	96.65	96.11	95.84
59	109.6	99.82	99.54	99.18	98.08	97.54	96.99	96.53	96.26	95.89
60	110.2	99.82	99.64	99.09	98.28	97.82	97.64	97.37	97.01	96.64
61	110.0	99.82	99.73	99.00	98.18	97.82	97.73	97.36	97.18	96.91
62	109.3	99.91	99.63	99.18	98.72	98.17	97.71	97.35	96.80	96.25
63	111.0	99.91	99.55	99.10	98.47	98.20	97.66	97.21	96.58	96.13
64	110.3	99.82	99.73	99.09	98.37	97.73	97.46	97.28	96.92	96.37
65	110.3	99.64	99.27	98.82	98.37	97.91	97.37	97.01	96.65	96.28
66	110.1	99.91	99.64	99.18	98.64	97.91	97.28	96.91	96.37	95.82
67	109.4	99.82	99.63	99.09	98.90	98.26	97.62	97.07	96.44	96.25
68	111.0	99.91	99.64	99.10	98.56	97.84	97.48	97.21	96.58	96.22
69	110.9	99.91	99.46	99.10	98.56	98.11	97.66	97.29	96.84	96.57
70	111.6	100.09	99.73	99.10	98.48	98.03	97.49	96.95	96.77	96.42
71	111.7	99.91	99.55	98.93	98.57	98.03	97.58	97.22	96.69	96.24
72	109.6	100.09	99.64	99.27	98.54	97.90	97.72	97.35	96.90	96.35
73	109.5	99.82	99.63	99.00	98.36	97.81	96.99	96.71	96.26	95.71
74	110.3	99.73	99.55	98.91	98.55	98.28	97.73	97.37	96.92	96.46
75	111.1	99.82	99.37	98.83	97.75	97.21	96.85	96.49	96.04	95.41
Avg.	110.4	99.87	99.56	99.04	98.40	97.89	97.45	97.06	96.59	96.15
Med.	110.3	99.82	99.63	99.09	98.37	97.91	97.49	97.21	96.65	96.25
st dev	0.7	0.1260	0.1426	0.1672	0.2552	0.2796	0.3288	0.3384	0.3811	0.4121
Min.	109.3	99.63	99.27	98.72	97.75	97.21	96.85	96.44	95.81	95.18
Max.	111.7	100.18	99.82	99.37	98.90	98.29	98.02	97.57	97.18	96.91

3.8 Data Set 3, 105°C, 30mA (Forward Voltage)

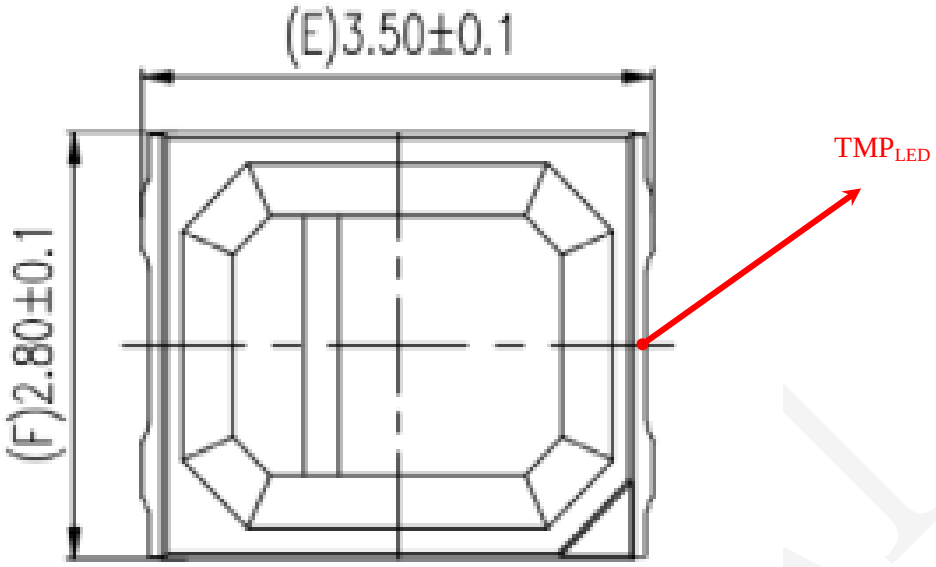
No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
51	36.31	36.26	36.53	36.28	36.27	36.60	36.82	36.29	37.08	36.31
52	36.14	36.10	36.89	36.12	36.11	36.39	36.61	36.11	36.18	36.14
53	36.34	36.31	36.52	36.33	36.32	36.61	36.85	36.32	36.38	36.33
54	36.27	36.25	36.56	36.49	36.26	36.54	36.78	36.25	36.45	36.28
55	36.15	36.11	36.30	36.13	36.13	36.38	36.59	36.15	36.17	36.15
56	36.33	36.29	36.49	36.33	36.31	36.60	36.86	36.33	36.39	36.32
57	36.23	36.17	36.36	36.18	36.18	36.48	36.72	36.20	36.24	36.20
58	36.13	36.09	36.27	36.09	36.07	36.34	36.57	36.12	36.14	36.11
59	36.09	36.04	36.26	36.07	36.04	36.32	36.57	36.08	36.12	36.10
60	36.18	36.12	36.35	36.23	36.12	36.41	36.66	36.18	36.21	36.17
61	36.23	36.06	36.10	36.08	36.14	36.41	36.58	36.08	36.14	36.13
62	36.12	36.08	36.28	36.21	36.08	36.48	36.60	36.17	36.31	36.10
63	36.13	36.09	36.28	36.11	36.09	36.38	36.61	36.12	36.16	36.11
64	36.36	36.40	36.49	36.35	36.26	36.56	36.85	36.32	36.46	36.29
65	36.14	36.10	36.30	36.16	36.09	36.36	36.59	36.24	36.14	36.12
66	36.25	36.09	36.24	36.15	36.09	36.40	36.61	36.11	36.20	36.09
67	36.16	36.10	36.71	36.16	36.11	36.35	36.59	36.11	36.16	36.11
68	36.19	36.10	36.36	36.16	36.08	36.35	36.60	36.11	36.13	36.11
69	36.14	36.12	36.52	36.17	36.13	36.38	36.66	36.14	36.18	36.12
70	36.41	36.35	36.62	36.44	36.36	36.66	36.91	36.38	36.42	36.38
71	36.29	36.24	36.45	36.30	36.23	36.59	36.82	36.25	36.32	36.26
72	36.08	36.04	36.58	36.11	36.04	36.33	36.56	36.06	36.12	36.05
73	36.12	36.07	36.29	36.14	36.08	36.34	36.56	36.10	36.11	36.10
74	36.11	36.06	36.28	36.13	36.06	36.34	36.56	36.09	36.12	36.08
75	36.24	36.18	36.40	36.27	36.16	36.44	36.69	36.20	36.21	36.19
Avg.	36.21	36.15	36.42	36.21	36.15	36.44	36.67	36.18	36.26	36.17
Med.	36.18	36.10	36.36	36.16	36.12	36.40	36.61	36.15	36.18	36.13
st dev	0.09	0.10	0.17	0.11	0.09	0.11	0.12	0.09	0.20	0.09
Min.	36.08	36.04	36.10	36.07	36.04	36.32	36.56	36.06	36.11	36.05
Max.	36.41	36.40	36.89	36.49	36.36	36.66	36.91	36.38	37.08	36.38

3.9 Data Set 3, 105°C, 30mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')								
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
51	0.2490	0.5169	3069	0.0004	0.0007	0.0013	0.0016	0.0018	0.0021	0.0022	0.0022	0.0025
52	0.2509	0.5182	3012	0.0004	0.0008	0.0013	0.0016	0.0019	0.0022	0.0024	0.0018	0.0020
53	0.2489	0.5168	3074	0.0004	0.0007	0.0011	0.0016	0.0018	0.0021	0.0023	0.0027	0.0028
54	0.2497	0.5185	3042	0.0006	0.0009	0.0013	0.0016	0.0019	0.0022	0.0023	0.0027	0.0028
55	0.2520	0.5192	2977	0.0004	0.0008	0.0013	0.0015	0.0020	0.0022	0.0025	0.0028	0.0030
56	0.2507	0.5189	3013	0.0004	0.0008	0.0012	0.0016	0.0020	0.0024	0.0026	0.0027	0.0029
57	0.2494	0.5156	3068	0.0004	0.0009	0.0014	0.0016	0.0020	0.0022	0.0025	0.0028	0.0029
58	0.2485	0.5200	3061	0.0004	0.0008	0.0012	0.0016	0.0020	0.0021	0.0022	0.0025	0.0028
59	0.2520	0.5193	2977	0.0006	0.0008	0.0014	0.0017	0.0020	0.0022	0.0024	0.0027	0.0028
60	0.2496	0.5179	3047	0.0004	0.0007	0.0013	0.0016	0.0019	0.0023	0.0025	0.0030	0.0031
61	0.2492	0.5192	3048	0.0004	0.0008	0.0012	0.0017	0.0019	0.0021	0.0024	0.0028	0.0030
62	0.2491	0.5164	3071	0.0005	0.0009	0.0013	0.0017	0.0020	0.0021	0.0023	0.0030	0.0031
63	0.2499	0.5180	3038	0.0004	0.0008	0.0012	0.0016	0.0020	0.0020	0.0023	0.0028	0.0031
64	0.2482	0.5163	3094	0.0004	0.0008	0.0011	0.0018	0.0020	0.0021	0.0024	0.0030	0.0031
65	0.2490	0.5163	3075	0.0006	0.0008	0.0011	0.0017	0.0019	0.0023	0.0025	0.0028	0.0030
66	0.2491	0.5177	3062	0.0005	0.0008	0.0011	0.0018	0.0019	0.0024	0.0025	0.0025	0.0028
67	0.2507	0.5189	3012	0.0004	0.0008	0.0010	0.0015	0.0021	0.0022	0.0024	0.0026	0.0029
68	0.2481	0.5185	3082	0.0004	0.0008	0.0011	0.0016	0.0021	0.0022	0.0023	0.0028	0.0030
69	0.2505	0.5182	3021	0.0004	0.0008	0.0010	0.0016	0.0018	0.0021	0.0022	0.0029	0.0031
70	0.2481	0.5167	3096	0.0004	0.0008	0.0012	0.0016	0.0019	0.0022	0.0024	0.0028	0.0031
71	0.2489	0.5193	3057	0.0005	0.0009	0.0012	0.0017	0.0019	0.0022	0.0025	0.0028	0.0029
72	0.2486	0.5173	3077	0.0003	0.0008	0.0011	0.0016	0.0019	0.0020	0.0023	0.0030	0.0030
73	0.2507	0.5171	3024	0.0004	0.0008	0.0011	0.0018	0.0021	0.0023	0.0023	0.0028	0.0029
74	0.2510	0.5195	3002	0.0003	0.0007	0.0011	0.0017	0.0020	0.0022	0.0022	0.0026	0.0029
75	0.2491	0.5177	3060	0.0004	0.0007	0.0011	0.0017	0.0019	0.0021	0.0023	0.0029	0.0028
Avg.	0.2496	0.5179	3046	0.0004	0.0008	0.0012	0.0016	0.0019	0.0022	0.0024	0.0027	0.0029
Med.	0.2492	0.5180	3057	0.0004	0.0008	0.0012	0.0016	0.0019	0.0022	0.0024	0.0028	0.0029
st dev	0.0011	0.0012	34	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002
Min.	0.2481	0.5156	2977	0.0003	0.0007	0.0010	0.0015	0.0018	0.0020	0.0022	0.0018	0.0020
Max.	0.2520	0.5200	3096	0.0006	0.0009	0.0014	0.0018	0.0021	0.0024	0.0026	0.0030	0.0031

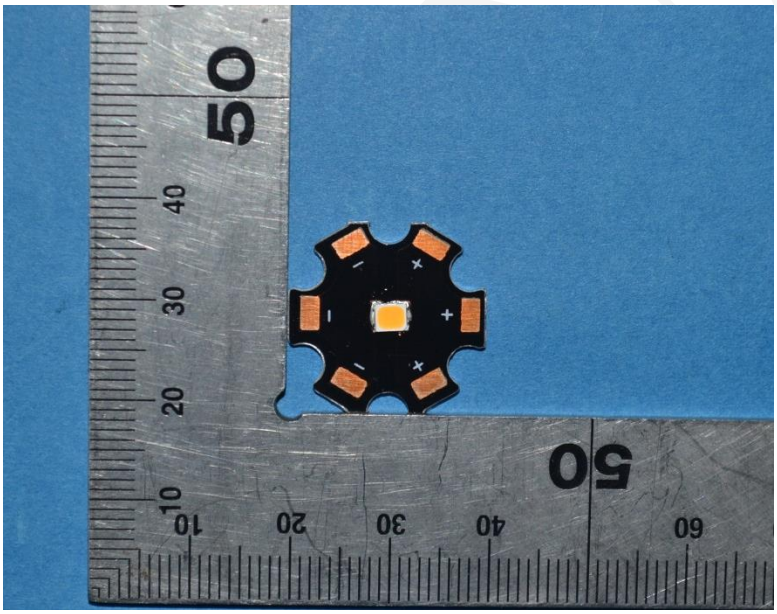
4 - DUT Photo

4.1 Mechanical Dimensions



All dimensions are in millimeter

4.2 DUT Photo



5 - Report Revision

Report Number	Report Date	Contents
R2DG171116050-10-9000	2018-12-05	Original report.
R2DG171116050-10-9000-M1	2019-01-24	Revise the Average Current Density per LED die in page 3.

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