TEST REPORT

ACCORDING TO IES LM-80-2015
For

LEDYI LIGHTING CO.,LTD

Yuechang Industrial Park,Shiyan,Bao'an,Shenzhen,China

Model: 2835 White SMD LED

Report Type: 9000 Hours Test Report	**Product Type:** LED Package
Test Engineer:	Pote Wang
Report Number:	R2DG160721050-10-9000
Test Date:	2016-07-26 to 2017-08-05
Report Date:	2017-08-16
Reviewed By:	Daniel Duan / EE Manager
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

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1 - General Information

1.1 Description of LED Light Sources

Sample Size:

75 PCS samples were received on 2016-07-21. The samples were numbered from 1 to 25, 26 to 50 and 51 to 75.

Manufacturer:	LEDYI LIGHTING CO.,LTD
Part Number:	2835 White SMD LED
Part Type:	LED Package
Drive Level:	DC 60mA
Nominal CCT:	2700K

1.2 Standards Used:

- IESNA LM-80-15: IES Approved Method for Measuring Lumen Maintenance of LED Light Sources.
- ENERGY STAR® Program Guidance Regarding LED Package, LED Array and LED Module Lumen Maintenance Performance Data Supporting Qualification of Lighting Products(This test method was not accredited by IAS)

1.3 Testing Equipment

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
Integral Sphere	EVERFINE	Diameter 0.3m	1011119	0.3m	2017-03-09	2018-03-08
Programmable Test Power for LEDs	EVERFINE	LED300E	1008002	15V/2000mA	2017-03-03	2018-03-02
High accuracy array spectroradiometer	EVERFINE	HAAS-2000	1012016T	380-780nm	2017-03-09	2018-03-08
Standard Light Source	EVERFINE	D062	1011093	3000K	2016-09-13	2017-09-12
Precision digital stabilized DC power supply	EVERFINE	WY605-V110	G115987CJ7321114	300VA	2017-03-03	2018-03-02
Multilayer aging machine	BACL	B2-270	20022	25°C~130°C	2016-12-08	2017-12-07
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090006	(50V/15A)	2017-03-03	2018-03-02

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 Measurement Uncertainty

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°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, 60mA

Part Number:	2835 White SMD LED
Number of Units:	25
Case Temperature:	>53°C
Ambient Temperature:	>50°C
Life Test Drive Current:	60mA
Measurement Current:	60mA

Data Set 2: 85°C,60mA

Part Number:	2835 White SMD LED
Number of Units:	25
Case Temperature:	>83°C
Ambient Temperature:	>80°C
Life Test Drive Current:	60mA
Measurement Current:	60mA

Data Set 3: 105°C,60mA

Part Number:	2835 White SMD LED
Number of Units:	25
Case Temperature:	>103°C
Ambient Temperature:	>100°C
Life Test Drive Current:	60mA
Measurement Current:	60mA

2 - Summary of Test Result

Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration	Reported TM-21 L_{70} Lifetime
1	25	0	1000	9000	>54000hours
2	25	0	1000	9000	>54000hours
3	25	0	1000	9000	>54000hours

Average Lumen Maintenance (Percentage of Initial Luminous Flux)

Data Set:	1000	2000	3000	4000	5000	6000	7000	8000	9000
1	100.31%	100.10%	99.94%	99.77%	99.58%	99.42%	99.29%	99.10%	98.92%
2	100.18%	99.90%	99.69%	99.49%	99.19%	98.96%	98.76%	98.50%	98.26%
3	100.08%	99.72%	99.44%	99.20%	98.82%	98.56%	98.33%	98.05%	97.78%

Average Color Maintenance

Data Set:	1000	2000	3000	4000	5000	6000	7000	8000	9000
1	0.0001	0.0003	0.0006	0.0008	0.0012	0.0015	0.0017	0.0020	0.0025
2	0.0002	0.0005	0.0007	0.0010	0.0013	0.0017	0.0019	0.0021	0.0022
3	0.0004	0.0006	0.0011	0.0013	0.0016	0.0017	0.0019	0.0023	0.0024

3 - Test Data

3.1 Data Set 1, 55°C, 60mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	21.50	100.37	100.33	100.09	99.91	99.77	99.67	99.58	99.30	99.02
2	21.40	100.28	100.19	100.05	99.86	99.67	99.53	99.49	99.35	99.21
3	21.35	100.37	100.14	99.95	99.81	99.63	99.53	99.48	99.39	99.34
4	20.96	100.29	100.10	99.86	99.71	99.43	99.19	98.81	98.76	98.66
5	21.21	100.14	99.91	99.81	99.76	99.62	99.34	99.25	98.96	98.54
6	22.35	100.13	99.87	99.78	99.64	99.33	99.11	99.02	98.88	98.84
7	22.02	100.32	99.95	99.91	99.73	99.68	99.32	99.23	99.05	98.96
8	22.18	100.36	100.05	99.95	99.77	99.59	99.37	99.28	99.10	99.01
9	21.95	100.27	99.91	99.68	99.50	99.32	99.18	99.13	98.82	98.59
10	21.54	100.37	100.32	100.05	99.95	99.72	99.58	99.40	99.16	98.98
11	21.50	100.33	100.19	100.09	99.86	99.63	99.49	99.44	99.30	99.26
12	20.85	100.19	100.14	99.90	99.81	99.47	99.38	99.23	99.04	98.85
13	22.32	100.27	100.18	100.04	99.73	99.51	99.37	99.15	98.88	98.75
14	22.12	100.18	99.91	99.82	99.64	99.32	99.28	99.10	98.78	98.51
15	21.12	100.38	100.19	100.05	99.72	99.57	99.38	99.29	99.10	98.82
16	21.30	100.28	100.09	99.95	99.81	99.67	99.53	99.44	99.25	99.01
17	20.76	100.19	99.95	99.76	99.61	99.42	99.28	99.13	99.04	98.80
18	22.02	100.27	100.05	99.86	99.73	99.59	99.50	99.14	98.82	98.50
19	22.34	100.36	100.22	100.18	99.96	99.73	99.64	99.55	99.51	99.37
20	22.34	100.45	100.13	99.96	99.78	99.55	99.46	99.37	99.15	99.02
21	21.19	100.42	100.19	100.14	99.95	99.86	99.72	99.53	99.48	99.29
22	22.20	100.18	99.95	99.82	99.68	99.50	99.41	99.32	99.14	98.96
23	22.26	100.36	100.13	99.87	99.60	99.42	99.24	99.19	98.92	98.70
24	22.32	100.45	100.18	99.91	99.78	99.55	99.28	99.15	99.01	98.88
25	22.10	100.41	100.23	100.14	99.95	99.86	99.68	99.46	99.28	99.10
Ave.	21.73	100.31	100.10	99.94	99.77	99.58	99.42	99.29	99.10	98.92
Med.	21.95	100.32	100.13	99.95	99.77	99.59	99.38	99.28	99.10	98.96
st dev	0.5345	0.0939	0.1319	0.1326	0.1218	0.1539	0.1679	0.1888	0.2182	0.2564
Min.	20.76	100.13	99.87	99.68	99.50	99.32	99.11	98.81	98.76	98.50
Max.	22.35	100.45	100.33	100.18	99.96	99.86	99.72	99.58	99.51	99.37

TM-21 Projection:

Test Duration: 9000 hours

Failures Observed: 0

α: 1.674E-06

β: 1.004

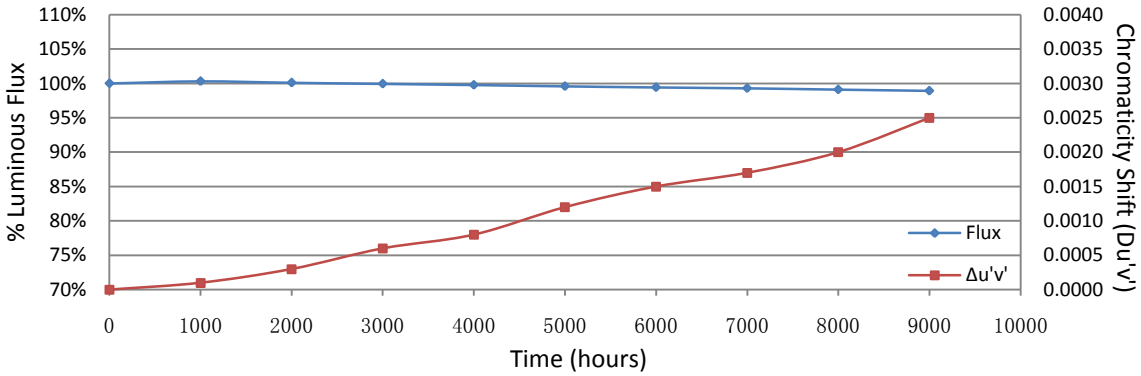
Reported L_{70}: >54000 hours

3.2 Data Set 1, 55°C, 60mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	2.868	2.865	2.866	2.868	2.869	2.868	2.871	2.867	2.864	2.865
2	2.858	2.856	2.855	2.857	2.859	2.858	2.861	2.857	2.853	2.857
3	2.867	2.865	2.864	2.866	2.869	2.867	2.870	2.869	2.864	2.865
4	2.894	2.862	2.860	2.863	2.865	2.863	2.866	2.863	2.860	2.864
5	3.073	2.858	2.859	2.859	2.862	2.861	2.865	2.861	2.858	2.859
6	2.913	2.875	2.874	2.875	2.877	2.875	2.879	2.876	2.873	2.875
7	3.084	2.874	2.873	2.874	2.876	2.874	2.878	2.875	2.872	2.874
8	2.937	2.873	2.872	2.873	2.875	2.874	2.877	2.875	2.871	2.872
9	3.082	2.875	2.874	2.875	2.877	2.876	2.879	2.877	2.873	2.875
10	2.904	2.861	2.860	2.860	2.862	2.861	2.865	2.862	2.857	2.860
11	2.902	2.875	2.874	2.875	2.876	2.877	2.881	2.877	2.872	2.875
12	2.858	2.856	2.855	2.856	2.858	2.861	2.862	2.859	2.855	2.857
13	2.874	2.871	2.870	2.871	2.874	2.872	2.876	2.874	2.869	2.871
14	2.875	2.874	2.875	2.874	2.875	2.877	2.879	2.875	2.871	2.875
15	2.855	2.856	2.856	2.855	2.858	2.857	2.860	2.858	2.854	2.855
16	2.862	2.861	2.863	2.861	2.864	2.862	2.866	2.863	2.860	2.860
17	2.858	2.857	2.857	2.856	2.858	2.858	2.866	2.859	2.857	2.859
18	2.868	2.863	2.865	2.864	2.866	2.864	2.860	2.856	2.853	2.855
19	2.875	2.872	2.871	2.871	2.873	2.874	2.878	2.872	2.870	2.871
20	2.877	2.876	2.875	2.875	2.878	2.879	2.881	2.876	2.875	2.876
21	2.859	2.857	2.857	2.857	2.857	2.858	2.862	2.857	2.854	2.861
22	2.875	2.873	2.874	2.873	2.874	2.878	2.879	2.873	2.872	2.874
23	2.878	2.875	2.875	2.875	2.877	2.875	2.879	2.874	2.872	2.875
24	2.875	2.874	2.876	2.874	2.875	2.875	2.879	2.876	2.871	2.874
25	2.866	2.864	2.866	2.865	2.868	2.866	2.870	2.866	2.863	2.864
Ave.	2.901	2.867	2.867	2.867	2.869	2.868	2.872	2.868	2.865	2.867
Med.	2.875	2.865	2.866	2.868	2.869	2.868	2.871	2.869	2.864	2.865
st dev	0.0699	0.0076	0.0075	0.0075	0.0074	0.0075	0.0076	0.0076	0.0077	0.0076
Min.	2.855	2.856	2.855	2.855	2.857	2.857	2.860	2.856	2.853	2.855
Max.	3.084	2.876	2.876	2.875	2.878	2.879	2.881	2.877	2.875	2.876

3.3 Data Set 1, 55°C, 60mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')								
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	0.2640	0.5090	2746	0.0003	0.0004	0.0008	0.0013	0.0016	0.0020	0.0022	0.0021	0.0022
2	0.2634	0.5087	2763	0.0003	0.0002	0.0003	0.0005	0.0013	0.0017	0.0018	0.0019	0.0020
3	0.2661	0.5098	2695	0.0001	0.0003	0.0004	0.0004	0.0012	0.0018	0.0020	0.0022	0.0022
4	0.2649	0.5098	2723	0.0001	0.0006	0.0004	0.0006	0.0013	0.0019	0.0022	0.0024	0.0024
5	0.2655	0.5083	2715	0.0001	0.0002	0.0002	0.0004	0.0010	0.0013	0.0013	0.0023	0.0021
6	0.2625	0.5088	2783	0.0002	0.0004	0.0003	0.0002	0.0010	0.0014	0.0014	0.0022	0.0022
7	0.2649	0.5094	2723	0.0000	0.0002	0.0001	0.0002	0.0006	0.0011	0.0012	0.0019	0.0022
8	0.2647	0.5103	2725	0.0001	0.0004	0.0004	0.0003	0.0009	0.0014	0.0015	0.0022	0.0024
9	0.2635	0.5085	2760	0.0000	0.0003	0.0009	0.0011	0.0007	0.0009	0.0012	0.0022	0.0021
10	0.2640	0.5094	2744	0.0001	0.0003	0.0005	0.0012	0.0012	0.0011	0.0014	0.0020	0.0023
11	0.2646	0.5094	2730	0.0002	0.0001	0.0005	0.0009	0.0010	0.0008	0.0010	0.0016	0.0019
12	0.2653	0.5096	2714	0.0001	0.0003	0.0007	0.0011	0.0015	0.0014	0.0013	0.0020	0.0023
13	0.2628	0.5088	2775	0.0000	0.0002	0.0006	0.0010	0.0014	0.0015	0.0018	0.0019	0.0023
14	0.2625	0.5094	2778	0.0000	0.0001	0.0007	0.0012	0.0015	0.0017	0.0021	0.0020	0.0024
15	0.2633	0.5094	2760	0.0001	0.0003	0.0007	0.0011	0.0016	0.0016	0.0019	0.0019	0.0024
16	0.2645	0.5089	2736	0.0000	0.0003	0.0006	0.0009	0.0013	0.0017	0.0018	0.0019	0.0024
17	0.2661	0.5091	2697	0.0001	0.0002	0.0006	0.0008	0.0013	0.0015	0.0014	0.0020	0.0042
18	0.2656	0.5109	2702	0.0001	0.0004	0.0006	0.0008	0.0013	0.0016	0.0016	0.0022	0.0054
19	0.2629	0.5086	2773	0.0000	0.0002	0.0004	0.0008	0.0013	0.0016	0.0018	0.0019	0.0024
20	0.2641	0.5099	2741	0.0002	0.0003	0.0008	0.0009	0.0013	0.0017	0.0020	0.0021	0.0024
21	0.2642	0.5091	2743	0.0001	0.0003	0.0009	0.0009	0.0012	0.0016	0.0021	0.0020	0.0023
22	0.2641	0.5090	2744	0.0001	0.0003	0.0008	0.0009	0.0012	0.0016	0.0019	0.0020	0.0024
23	0.2636	0.5087	2757	0.0000	0.0002	0.0008	0.0009	0.0013	0.0017	0.0019	0.0019	0.0030
24	0.2603	0.5093	2833	0.0001	0.0002	0.0007	0.0009	0.0011	0.0017	0.0021	0.0020	0.0021
25	0.2633	0.5114	2751	0.0000	0.0003	0.0009	0.0009	0.0011	0.0016	0.0018	0.0018	0.0019
Ave.	0.2640	0.5093	2744	0.0001	0.0003	0.0006	0.0008	0.0012	0.0015	0.0017	0.0020	0.0025
Med.	0.2641	0.5093	2744	0.0001	0.0003	0.0006	0.0009	0.0013	0.0016	0.0018	0.0020	0.0023
st dev	0.0013	0.0007	31.0364	0.0001	0.0001	0.0002	0.0003	0.0002	0.0003	0.0004	0.0002	0.0008
Min.	0.2603	0.5083	2695	0.0000	0.0001	0.0001	0.0002	0.0006	0.0008	0.0010	0.0016	0.0019
Max.	0.2661	0.5114	2833	0.0003	0.0006	0.0009	0.0013	0.0016	0.0020	0.0022	0.0024	0.0054



3.4 Data Set 2, 85°C, 60mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	22.07	100.23	100.05	99.77	99.59	99.46	99.14	98.91	98.60	98.32
27	21.13	100.28	100.09	99.91	99.81	99.53	99.34	99.01	98.67	98.34
28	21.98	100.23	99.91	99.73	99.59	99.41	99.23	99.09	99.00	98.82
29	21.34	100.19	99.81	99.34	99.20	99.02	98.88	98.83	98.55	98.45
30	20.87	100.29	100.14	100.05	99.57	99.14	99.04	98.85	98.47	98.08
31	21.72	100.14	99.95	99.82	99.72	99.40	99.17	98.99	98.71	98.43
32	22.06	100.32	100.09	99.86	99.59	99.32	99.18	99.00	98.87	98.73
33	21.97	100.23	99.95	99.59	99.54	99.36	99.14	99.00	98.77	98.63
34	20.47	100.34	100.15	99.95	99.71	99.41	99.22	99.12	98.78	98.49
35	20.81	100.24	100.10	99.90	99.66	99.23	99.04	98.75	98.51	98.37
36	22.50	100.22	100.04	99.96	99.82	99.60	99.47	99.16	98.80	98.67
37	22.34	100.13	99.87	99.73	99.64	99.19	98.93	98.70	98.61	98.16
38	21.72	100.28	99.91	99.86	99.82	99.40	99.08	98.99	98.80	98.39
39	21.90	100.14	99.73	99.50	99.18	98.81	98.54	98.31	98.08	97.95
40	20.95	100.29	99.90	99.71	99.57	99.33	99.19	99.00	98.90	98.66
41	22.27	100.13	99.69	99.51	99.46	99.24	98.92	98.70	98.29	97.98
42	21.34	100.05	99.58	99.39	99.11	98.83	98.64	98.45	98.08	97.94
43	21.58	100.19	99.86	99.54	99.12	98.89	98.70	98.42	98.19	97.91
44	21.75	99.95	99.68	99.36	99.22	98.85	98.48	98.16	98.02	97.89
45	21.66	100.05	99.63	99.49	99.12	98.71	98.38	98.06	97.83	97.55
46	20.56	100.15	99.90	99.61	99.46	99.17	98.83	98.49	98.10	97.71
47	20.58	99.95	99.66	99.47	99.32	99.03	98.83	98.74	98.59	98.54
48	21.75	100.05	99.68	99.40	99.22	98.94	98.67	98.62	98.39	98.07
49	22.14	100.18	100.00	99.77	99.50	99.14	98.87	98.55	98.19	97.92
50	21.72	100.28	100.14	99.95	99.68	99.31	99.13	99.03	98.71	98.48
Ave.	21.57	100.18	99.90	99.69	99.49	99.19	98.96	98.76	98.50	98.26
Med.	21.72	100.19	99.91	99.73	99.57	99.23	99.04	98.83	98.59	98.34
st dev	0.5881	0.1071	0.1787	0.2165	0.2355	0.2467	0.2770	0.3055	0.3202	0.3426
Min.	20.47	99.95	99.58	99.34	99.11	98.71	98.38	98.06	97.83	97.55
Max.	22.50	100.34	100.15	100.05	99.82	99.60	99.47	99.16	99.00	98.82

TM-21 Projection:

Test Duration: 9000 hours

Failures Observed: 0

α: 2.433E-06

β: 1.004

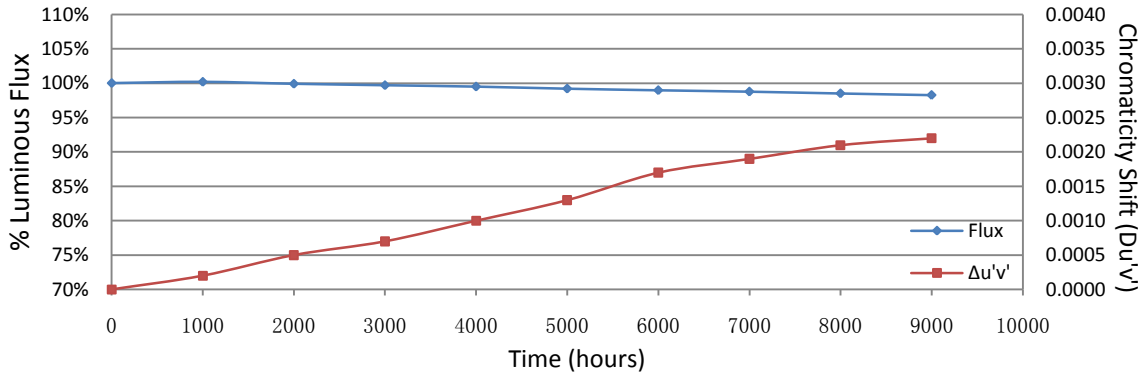
Reported L_{70}: >54000 hours

3.5 Data Set 2, 85°C, 60mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	2.873	2.871	2.875	2.872	2.875	2.874	2.877	2.872	2.872	2.871
27	2.855	2.856	2.858	2.855	2.859	2.857	2.859	2.855	2.852	2.854
28	2.876	2.875	2.876	2.875	2.878	2.876	2.878	2.876	2.872	2.873
29	2.866	2.865	2.865	2.863	2.866	2.865	2.871	2.866	2.863	2.863
30	2.857	2.858	2.858	2.856	2.859	2.858	2.862	2.857	2.855	2.856
31	2.863	2.864	2.864	2.864	2.865	2.869	2.866	2.864	2.860	2.862
32	2.876	2.876	2.877	2.875	2.876	2.876	2.880	2.877	2.873	2.875
33	2.879	2.875	2.876	2.876	2.879	2.879	2.879	2.877	2.874	2.875
34	2.863	2.854	2.856	2.855	2.856	2.857	2.858	2.856	2.851	2.853
35	2.864	2.863	2.864	2.863	2.866	2.864	2.866	2.864	2.860	2.863
36	2.862	2.863	2.865	2.862	2.866	2.867	2.868	2.866	2.861	2.863
37	2.873	2.872	2.873	2.871	2.874	2.875	2.876	2.876	2.870	2.863
38	2.875	2.875	2.874	2.873	2.876	2.877	2.877	2.875	2.870	2.874
39	2.875	2.878	2.877	2.876	2.878	2.878	2.879	2.877	2.873	2.874
40	2.857	2.855	2.856	2.854	2.857	2.858	2.859	2.855	2.853	2.854
41	2.863	2.863	2.865	2.864	2.867	2.866	2.870	2.864	2.862	2.863
42	2.862	2.861	2.862	2.861	2.863	2.863	2.863	2.861	2.857	2.860
43	2.882	2.860	2.863	2.860	2.864	2.863	2.864	2.862	2.857	2.863
44	2.874	2.873	2.872	2.871	2.875	2.874	2.876	2.874	2.871	2.873
45	2.873	2.871	2.873	2.870	2.874	2.874	2.874	2.873	2.872	2.872
46	2.862	2.860	2.862	2.859	2.862	2.863	2.864	2.863	2.860	2.860
47	2.856	2.853	2.857	2.855	2.857	2.856	2.858	2.857	2.852	2.855
48	2.883	2.872	2.873	2.873	2.873	2.874	2.875	2.876	2.870	2.872
49	2.877	2.873	2.876	2.875	2.877	2.876	2.877	2.877	2.872	2.875
50	2.862	2.860	2.863	2.862	2.863	2.863	2.864	2.863	2.860	2.862
Ave.	2.868	2.866	2.867	2.866	2.868	2.868	2.870	2.867	2.864	2.865
Med.	2.866	2.864	2.865	2.864	2.866	2.867	2.870	2.866	2.862	2.863
st dev	0.0085	0.0078	0.0074	0.0077	0.0076	0.0076	0.0076	0.0080	0.0079	0.0076
Min.	2.855	2.853	2.856	2.854	2.856	2.856	2.858	2.855	2.851	2.853
Max.	2.883	2.878	2.877	2.876	2.879	2.879	2.880	2.877	2.874	2.875

3.6 Data Set 2, 85°C, 60mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')								
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	0.2632	0.5090	2765	0.0002	0.0004	0.0009	0.0011	0.0013	0.0017	0.0022	0.0022	0.0021
27	0.2640	0.5092	2746	0.0002	0.0004	0.0005	0.0009	0.0013	0.0017	0.0022	0.0022	0.0020
28	0.2638	0.5098	2746	0.0001	0.0004	0.0007	0.0009	0.0013	0.0015	0.0020	0.0022	0.0022
29	0.2624	0.5083	2788	0.0003	0.0004	0.0008	0.0013	0.0014	0.0017	0.0019	0.0021	0.0023
30	0.2632	0.5084	2768	0.0002	0.0004	0.0004	0.0008	0.0012	0.0016	0.0019	0.0020	0.0023
31	0.2664	0.5125	2678	0.0002	0.0006	0.0006	0.0009	0.0013	0.0018	0.0020	0.0022	0.0023
32	0.2616	0.5085	2804	0.0001	0.0004	0.0007	0.0008	0.0011	0.0016	0.0019	0.0020	0.0022
33	0.2639	0.5082	2753	0.0003	0.0005	0.0006	0.0009	0.0013	0.0016	0.0018	0.0021	0.0023
34	0.2660	0.5105	2694	0.0002	0.0004	0.0006	0.0009	0.0013	0.0016	0.0019	0.0023	0.0022
35	0.2634	0.5081	2765	0.0003	0.0004	0.0007	0.0014	0.0016	0.0018	0.0023	0.0022	0.0023
36	0.2624	0.5084	2786	0.0002	0.0004	0.0006	0.0008	0.0014	0.0016	0.0014	0.0014	0.0007
37	0.2636	0.5086	2757	0.0001	0.0004	0.0005	0.0008	0.0012	0.0016	0.0018	0.0021	0.0023
38	0.2642	0.5087	2744	0.0002	0.0004	0.0006	0.0012	0.0014	0.0018	0.0019	0.0023	0.0025
39	0.2649	0.5091	2726	0.0002	0.0004	0.0008	0.0011	0.0013	0.0016	0.0018	0.0016	0.0020
40	0.2648	0.5089	2729	0.0002	0.0006	0.0009	0.0014	0.0018	0.0022	0.0022	0.0023	0.0022
41	0.2624	0.5078	2790	0.0001	0.0004	0.0006	0.0010	0.0013	0.0017	0.0021	0.0022	0.0019
42	0.2653	0.5097	2713	0.0001	0.0004	0.0005	0.0009	0.0013	0.0017	0.0019	0.0021	0.0025
43	0.2618	0.5087	2799	0.0002	0.0005	0.0005	0.0008	0.0013	0.0015	0.0019	0.0021	0.0024
44	0.2647	0.5100	2726	0.0002	0.0005	0.0006	0.0009	0.0013	0.0017	0.0022	0.0023	0.0025
45	0.2659	0.5099	2700	0.0003	0.0005	0.0007	0.0009	0.0014	0.0016	0.0020	0.0022	0.0024
46	0.2638	0.5082	2754	0.0002	0.0004	0.0006	0.0008	0.0012	0.0017	0.0020	0.0024	0.0026
47	0.2636	0.5080	2760	0.0004	0.0005	0.0007	0.0010	0.0014	0.0017	0.0018	0.0022	0.0025
48	0.2657	0.5102	2702	0.0003	0.0005	0.0008	0.0009	0.0013	0.0016	0.0017	0.0022	0.0025
49	0.2631	0.5085	2771	0.0003	0.0004	0.0005	0.0008	0.0013	0.0017	0.0020	0.0022	0.0023
50	0.2652	0.5105	2712	0.0006	0.0006	0.0007	0.0010	0.0014	0.0018	0.0017	0.0023	0.0025
Ave.	0.2640	0.5091	2747	0.0002	0.0005	0.0007	0.0010	0.0013	0.0017	0.0019	0.0021	0.0022
Med.	0.2638	0.5087	2753	0.0002	0.0004	0.0006	0.0009	0.0013	0.0017	0.0019	0.0022	0.0023
st dev	0.0013	0.0011	34.4147	0.0001	0.0001	0.0001	0.0002	0.0001	0.0001	0.0002	0.0002	0.0004
Min.	0.2616	0.5078	2678	0.0001	0.0004	0.0004	0.0008	0.0011	0.0015	0.0014	0.0014	0.0007
Max.	0.2664	0.5125	2804	0.0006	0.0006	0.0009	0.0014	0.0018	0.0022	0.0023	0.0024	0.0026



3.7 Data Set 3, 105°C, 60mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
51	22.49	100.18	99.91	99.73	99.38	99.11	98.89	98.53	98.35	98.22
52	21.27	100.09	99.81	99.67	99.53	99.20	98.97	98.73	98.40	98.07
53	21.31	100.14	99.72	99.48	99.25	98.83	98.59	98.45	98.26	98.12
54	21.24	100.05	99.58	99.48	99.20	98.73	98.59	98.16	97.83	97.69
55	21.87	99.91	99.41	99.18	98.99	98.58	98.22	98.17	97.90	97.58
56	20.46	100.05	99.66	99.41	99.17	98.97	98.88	98.53	98.19	97.90
57	20.68	100.10	99.71	99.37	99.08	98.69	98.36	98.16	97.92	97.68
58	20.74	100.14	99.66	99.13	98.99	98.51	98.36	98.22	97.83	97.49
59	22.00	99.95	99.50	99.14	99.00	98.59	98.14	97.91	97.68	97.41
60	21.34	100.19	99.86	99.44	99.02	98.64	98.36	98.17	97.75	97.52
61	21.90	99.95	99.54	99.22	99.00	98.58	98.36	98.08	97.76	97.40
62	21.12	100.19	99.95	99.72	99.43	99.01	98.72	98.58	98.15	97.77
63	20.90	99.90	99.62	99.28	99.19	98.80	98.56	98.42	98.28	97.94
64	21.75	100.14	99.82	99.45	98.99	98.62	98.39	98.21	97.84	97.61
65	21.48	100.05	99.86	99.53	99.39	98.98	98.65	98.46	98.23	98.00
66	20.36	99.95	99.71	99.31	98.97	98.62	98.33	98.08	97.79	97.69
67	20.43	100.05	99.66	99.61	99.36	98.92	98.78	98.43	98.09	97.80
68	19.85	100.10	99.70	99.55	99.35	99.14	98.84	98.59	98.39	97.98
69	19.87	100.05	99.60	99.25	98.89	98.54	98.44	98.39	98.14	97.68
70	20.40	100.10	99.66	99.22	99.17	98.73	98.38	98.28	98.14	97.84
71	21.24	100.14	99.81	99.58	99.44	99.01	98.73	98.35	97.98	97.60
72	22.46	100.22	99.96	99.73	99.47	98.93	98.71	98.35	98.17	97.86
73	21.25	100.19	99.91	99.67	99.48	99.15	98.73	98.35	97.93	97.69
74	21.94	100.05	99.64	99.54	99.23	99.04	98.68	98.50	98.36	98.04
75	21.53	100.19	99.72	99.30	99.02	98.51	98.33	98.24	97.96	97.86
Ave.	21.20	100.08	99.72	99.44	99.20	98.82	98.56	98.33	98.05	97.78
Med.	21.25	100.10	99.71	99.45	99.19	98.80	98.59	98.35	98.09	97.77
st dev	0.7236	0.0929	0.1434	0.1929	0.1970	0.2250	0.2299	0.1937	0.2239	0.2232
Min.	19.85	99.90	99.41	99.13	98.89	98.51	98.14	97.91	97.68	97.40
Max.	22.49	100.22	99.96	99.73	99.53	99.20	98.97	98.73	98.40	98.22

TM-21 Projection:

Test Duration: 9000 hours

Failures Observed: 0

α: 2.797E-06

β: 1.003

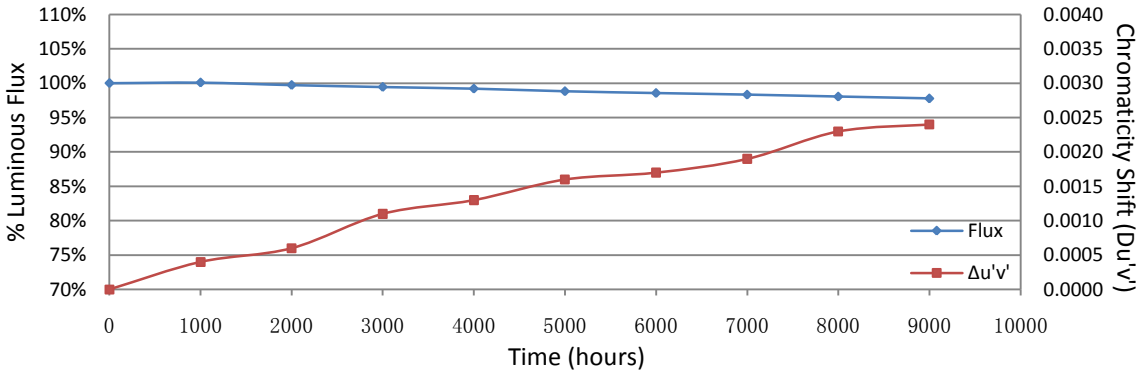
Reported L_{70}: >54000 hours

3.8 Data Set 3, 105°C, 60mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
51	2.868	2.864	2.868	2.865	2.869	2.868	2.869	2.868	2.864	2.867
52	2.863	2.862	2.864	2.862	2.863	2.864	2.865	2.863	2.861	2.861
53	2.855	2.854	2.857	2.853	2.857	2.857	2.856	2.855	2.853	2.853
54	2.857	2.856	2.859	2.856	2.859	2.858	2.858	2.856	2.855	2.855
55	2.878	2.875	2.878	2.876	2.878	2.876	2.878	2.877	2.875	2.877
56	2.867	2.866	2.869	2.867	2.868	2.869	2.868	2.871	2.865	2.870
57	2.858	2.856	2.859	2.856	2.859	2.858	2.859	2.859	2.854	2.857
58	2.858	2.856	2.859	2.855	2.858	2.857	2.858	2.862	2.854	2.856
59	2.877	2.873	2.875	2.873	2.876	2.874	2.875	2.874	2.872	2.874
60	2.857	2.857	2.859	2.856	2.859	2.857	2.858	2.856	2.857	2.857
61	2.877	2.875	2.876	2.875	2.877	2.876	2.878	2.877	2.876	2.874
62	2.857	2.855	2.858	2.856	2.859	2.855	2.857	2.856	2.854	2.855
63	2.856	2.854	2.857	2.855	2.858	2.856	2.861	2.856	2.850	2.853
64	2.861	2.860	2.864	2.862	2.863	2.862	2.864	2.862	2.858	2.861
65	2.886	2.866	2.866	2.865	2.870	2.866	2.870	2.867	2.865	2.864
66	3.010	3.014	3.018	3.013	3.018	3.012	3.014	3.012	3.009	3.011
67	3.013	3.019	3.021	3.017	3.021	3.019	3.021	3.017	3.012	3.015
68	3.012	3.013	3.018	3.015	3.018	3.015	3.013	3.014	3.007	3.010
69	3.012	3.014	3.019	3.016	3.019	3.014	3.015	3.014	3.012	3.012
70	3.018	3.018	3.023	3.021	3.024	3.022	3.022	3.021	3.015	3.018
71	2.865	2.863	2.868	2.865	2.869	2.866	2.867	2.865	2.859	2.864
72	2.876	2.873	2.874	2.874	2.877	2.873	2.877	2.875	2.871	2.873
73	2.864	2.863	2.866	2.863	2.866	2.865	2.865	2.865	2.858	2.862
74	2.886	2.879	2.879	2.878	2.880	2.878	2.881	2.881	2.875	2.876
75	2.867	2.864	2.866	2.865	2.868	2.865	2.867	2.866	2.887	2.863
Ave.	2.896	2.894	2.897	2.894	2.897	2.895	2.897	2.896	2.893	2.894
Med.	2.867	2.864	2.868	2.865	2.869	2.866	2.868	2.867	2.865	2.864
st dev	0.0604	0.0625	0.0631	0.0627	0.0630	0.0622	0.0618	0.0617	0.0610	0.0615
Min.	2.855	2.854	2.857	2.853	2.857	2.855	2.856	2.855	2.850	2.853
Max.	3.018	3.019	3.023	3.021	3.024	3.022	3.022	3.021	3.015	3.018

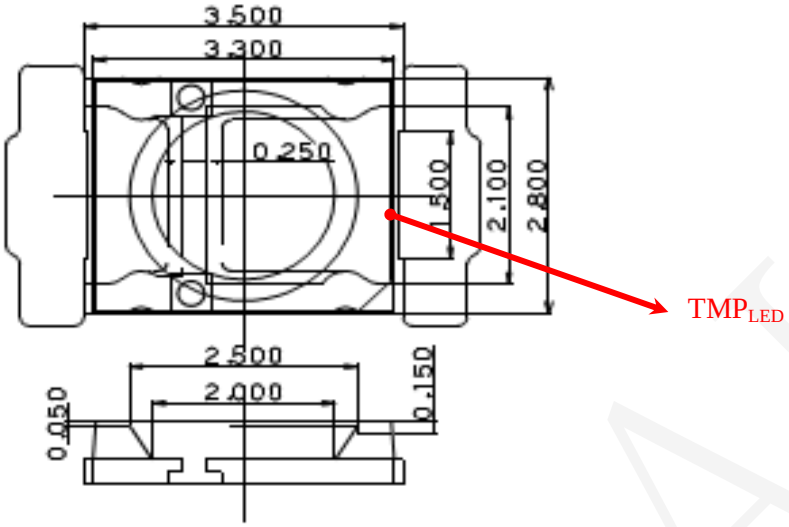
3.9 Data Set 3, 105°C, 60mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')								
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
51	0.2635	0.5088	2758	0.0005	0.0007	0.0007	0.0008	0.0015	0.0016	0.0018	0.0023	0.0024
52	0.2642	0.5121	2727	0.0004	0.0005	0.0005	0.0008	0.0014	0.0017	0.0018	0.0024	0.0026
53	0.2627	0.5090	2778	0.0005	0.0006	0.0005	0.0008	0.0015	0.0015	0.0017	0.0024	0.0024
54	0.2634	0.5087	2762	0.0004	0.0006	0.0010	0.0008	0.0014	0.0015	0.0015	0.0023	0.0023
55	0.2628	0.5095	2773	0.0006	0.0008	0.0015	0.0017	0.0017	0.0018	0.0018	0.0025	0.0026
56	0.2630	0.5086	2771	0.0004	0.0006	0.0012	0.0014	0.0015	0.0016	0.0017	0.0023	0.0023
57	0.2651	0.5099	2716	0.0003	0.0005	0.0011	0.0014	0.0014	0.0015	0.0019	0.0022	0.0022
58	0.2631	0.5091	2767	0.0004	0.0006	0.0010	0.0014	0.0014	0.0016	0.0019	0.0024	0.0024
59	0.2660	0.5118	2690	0.0004	0.0007	0.0011	0.0015	0.0016	0.0016	0.0019	0.0023	0.0025
60	0.2637	0.5097	2749	0.0004	0.0006	0.0013	0.0015	0.0016	0.0017	0.0019	0.0024	0.0024
61	0.2638	0.5091	2751	0.0004	0.0006	0.0011	0.0014	0.0015	0.0016	0.0020	0.0024	0.0024
62	0.2644	0.5090	2738	0.0004	0.0006	0.0010	0.0013	0.0015	0.0014	0.0017	0.0022	0.0023
63	0.2655	0.5110	2702	0.0003	0.0006	0.0010	0.0016	0.0016	0.0016	0.0019	0.0024	0.0023
64	0.2632	0.5077	2772	0.0004	0.0007	0.0013	0.0016	0.0017	0.0017	0.0017	0.0027	0.0030
65	0.2640	0.5086	2748	0.0004	0.0006	0.0011	0.0015	0.0015	0.0018	0.0019	0.0024	0.0025
66	0.2630	0.5192	2723	0.0003	0.0004	0.0011	0.0014	0.0014	0.0016	0.0018	0.0023	0.0023
67	0.2618	0.5173	2758	0.0004	0.0005	0.0011	0.0013	0.0016	0.0017	0.0019	0.0022	0.0021
68	0.2628	0.5186	2731	0.0002	0.0004	0.0009	0.0013	0.0014	0.0014	0.0016	0.0021	0.0020
69	0.2628	0.5189	2729	0.0002	0.0004	0.0007	0.0012	0.0015	0.0017	0.0017	0.0022	0.0024
70	0.2606	0.5184	2779	0.0002	0.0006	0.0011	0.0013	0.0016	0.0017	0.0018	0.0022	0.0024
71	0.2651	0.5082	2726	0.0004	0.0007	0.0011	0.0015	0.0017	0.0019	0.0019	0.0023	0.0025
72	0.2640	0.5107	2738	0.0004	0.0007	0.0012	0.0014	0.0017	0.0019	0.0020	0.0023	0.0025
73	0.2652	0.5101	2715	0.0004	0.0006	0.0013	0.0015	0.0017	0.0019	0.0021	0.0022	0.0025
74	0.2641	0.5098	2740	0.0004	0.0007	0.0011	0.0015	0.0017	0.0020	0.0023	0.0024	0.0026
75	0.2640	0.5096	2743	0.0004	0.0006	0.0017	0.0016	0.0018	0.0021	0.0024	0.0026	0.0026
Ave.	0.2637	0.5113	2743	0.0004	0.0006	0.0011	0.0013	0.0016	0.0017	0.0019	0.0023	0.0024
Med.	0.2637	0.5097	2743	0.0004	0.0006	0.0011	0.0014	0.0015	0.0017	0.0019	0.0023	0.0024
st dev	0.0012	0.0038	24.0674	0.0001	0.0001	0.0003	0.0003	0.0001	0.0002	0.0002	0.0001	0.0002
Min.	0.2606	0.5077	2690	0.0002	0.0004	0.0005	0.0008	0.0014	0.0014	0.0015	0.0021	0.0020
Max.	0.2660	0.5192	2779	0.0006	0.0008	0.0017	0.0017	0.0018	0.0021	0.0024	0.0027	0.0030



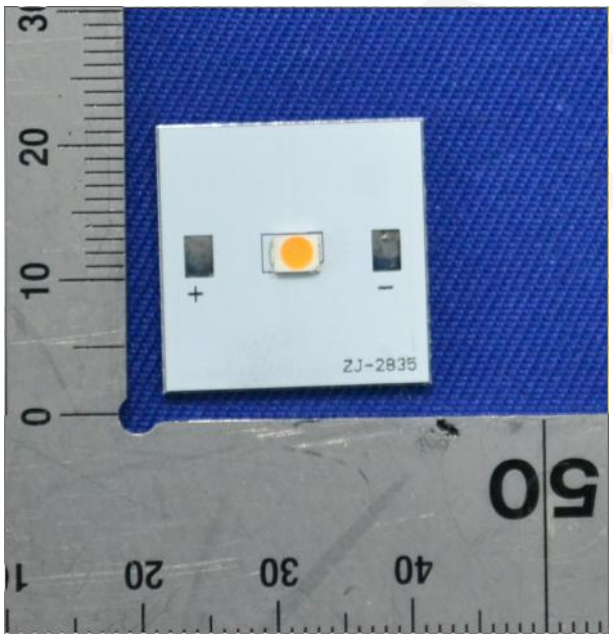
4 - EUT Photo

4.1 Mechanical Dimensions



All dimensions are in millimeter

4.2 EUT Photo



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