IESNA LM-80-2008

MEASURING LUMEN MAINTENANCE OF LED LIGHT SOURCES

MEASUREMENT AND TEST REPORT

For

Shenzhen Runlite Technology Co., Ltd

Building 15,Tantou Wset Industrial Zone,Songgang Street,Baoan District,Shenzhen City,China.

Model: EMC3030

Report Type: 6000 hours test report of 55℃ 6000 hours test report of 85℃ 9000 hours test report of 105 ℃	**Product Type:** LED Package
Test Engineer:	Daniel Duan
Report Number:	RSZ141117508-10-9000
Test Date:	2014-11-19 to 2015-11-29
Report Date:	2015-12-16
Reviewed By:	Jeanne Han /EE Manager
Prepared By:	Bay Area Compliance Laboratories Corp. (Dongguan). Pu Long Cun 69, Puxinghu Industrial Area, Tangxia Town, Dongguan, Guangdong, P.R.China. Tel: +86-0769-86858888 Fax:+86-0769-86858588

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1 - GENERAL INFORMATION

1.1 Description of LED Light Sources

Devices tested

Part Number: EMC3030
Part Type: LED Package
Nominal CCT: 2700K

1.2 Standards Used:

- IESNA LM-80-08: 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 Test Facility

The testing facility used by Bay Area Compliance Laboratories Corp. (Dongguan). is located at Pu Long Cun 69, Puxinghu Industrial Area, Tangxia Town, Dongguan, Guangdong, P.R.China.

1.4 Description of Auxiliary Equipment

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
Integral Sphere	EVERFINE	Diameter 0.3m	1011119	380-780nm, Diameter:0.3m,0-1999Lumen	2015-03-25	2016-03-25
Programmable Test Power for LEDs	EVERFINE	LED300E	1008002	15V/2000mA	2015-03-05	2016-03-05
High accuracy array spectroradiometer	EVERFINE	HAAS-2000	1012016T	380-780nm	2015-03-25	2016-03-25
Standard Light Source	EVERFINE	D062	1011093	N/A	2015-08-05	2016-08-05
Precision digital stabilized DC power supply	EVERFINE	WY605	G115987C J7321114	300VA	2015-03-05	2016-03-05
Multilayer aging machine	BACL	B2-270	20013	25℃~110℃	2015-09-14	2016-09-13
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11060002	（50V/15A）	2015-07-11	2016-07-11
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11060010	（50V/15A）	2015-03-05	2016-03-05
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090007	（50V/15A）	2015-03-05	2016-03-05

1.5 Operating Cycle

Samples are driven with a constant direct current (DC)

1.6 Ambient Conditions

For lumen maintenance test, samples were operated in thermal chambers with minimal ambient airflow. For long term reliability test, the case temperature was controlled by mounting several thermocouples on a sample reliability stress board at the designated thermal measurement point, as shown in APPENDIX. The ambient temperature T_A was measured by several thermocouples at a distance of 5 mm above the reliability test board. The relative humidity within chamber was less than 65%.

For photometry measurement, temperature was set to 25℃ ± 2℃, RH <65%.

1.7 Photometry 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. This calibration results traceable to the NATIONAL INSTITUTE OF METROLOGY (NIM).

1.8 Sample Set

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.
Each Sample is soldered to all of the reliability stress boards for a given set of IESNA LM-80 tests.

Sample Size:
Total 75Pcs;
Each Ts test condition 25Pcs
The samples tested at Ts 55℃, Ts 85℃ and Ts 105℃ were received at 2014-11-17 and tested during 2014-11-19 to 2015-11-29. The samples were numbered from 1 to 25, 26 to 50 and 51 to 75

Data Set 1: 55°C, 150mA	
Part Number:	EMC3030
Number of Units:	25
Actual Case Temperature(T_S):	T_S =54.3℃
Actual Ambient Temperature(T_A):	T_A =51.4℃
Life Test Drive Current:	I_F = 150mA
Measurement Current:	I_F = 150mA

Data Set 2: 85°C,150mA	
Part Number:	EMC3030
Number of Units:	25
Actual Case Temperature(T_S):	T_S =84.2℃
Actual Ambient Temperature(T_A):	T_A =82.4℃
Life Test Drive Current:	I_F =150mA
Measurement Current:	I_F = 150mA

Data Set 3: 105°C, 150mA	
Part Number:	EMC3030
Number of Units:	25
Actual Case Temperature(T_S):	T_S =104.4℃
Actual Ambient Temperature(T_A):	T_A =103.2℃
Life Test Drive Current:	I_F = 150mA
Measurement Current:	I_F = 150mA

2 - SUMMARY OF TEST RESULT

Data Set:	**Data Set 1, 55°C, 150mA**
Number of Units:	25
Failures Observed:	0
Test Interval and Test Duration:	0h,1000h,2000h,3000h,4000h,5000h,6000h
Average. Lumen Maintenance at 6000 hours:	98.20%
Average Chromaticity Shift at 6000 hours (Δu'v'):	0.0014
Reported TM-21 L_{70} Lifetime:	>36,000hours

Data Set:	**Data Set 2, 85°C, 150mA**
Number of Units:	25
Failures Observed:	0
Test Interval and Test Duration:	0h,1000h,2000h,3000h,4000h,5000h,6000h
Average. Lumen Maintenance at 6000 hours:	97.25%
Average Chromaticity Shift at 6000 hours(Δu'v'):	0.0022
Reported TM-21 L_{70} Lifetime:	>36,000hours

Data Set:	**Data Set 3, 105°C, 150mA**
Number of Units:	25
Failures Observed:	0
Test Interval and Test Duration:	0h,1000h,2000h,3000h,4000h,5000h,6000h,7000h,8000h,9000h
Average. Lumen Maintenance at 6000 hours:	96.59%
Average. Lumen Maintenance at 9000 hours:	94.51%
Average Chromaticity Shift at 6000 hours(Δu'v'):	0.0025
Average Chromaticity Shift at 9000 hours (Δu'v'):	0.0035
Reported TM-21 L_{70} Lifetime:	46,000 hours

3 - Test Data

3.1 Data Set 1, 55°C, 150 mA (Lumen Maintenance)

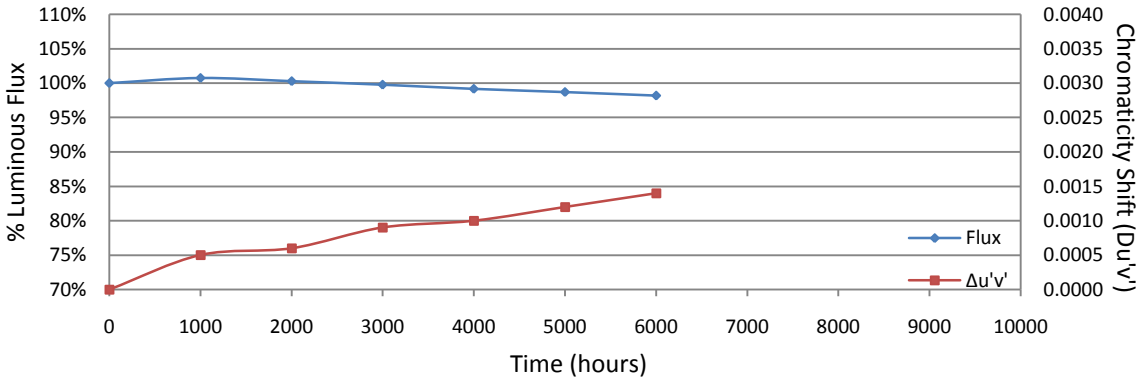
No.	V_F(V)	Φ(lm)	Lumen Maintenance (%)					
	0hr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	6.476	104.5	100.38	100.19	99.71	99.23	98.85	98.47
2	6.454	103.5	100.39	99.61	99.13	98.45	97.97	97.20
3	6.514	104.0	100.77	100.19	99.33	98.65	98.27	97.98
4	6.457	104.4	100.00	99.71	99.04	98.37	97.89	97.32
5	6.393	104.9	101.05	100.95	100.57	99.81	99.52	98.95
6	6.491	103.5	100.68	100.29	99.61	98.94	98.55	98.07
7	6.520	103.8	100.39	99.90	99.52	98.84	98.46	97.98
8	6.495	103.4	100.58	100.10	99.52	98.94	98.36	97.87
9	6.414	103.6	99.90	99.23	99.13	98.65	98.07	97.59
10	6.443	102.4	100.98	100.68	100.39	99.61	99.02	98.44
11	6.453	103.3	100.29	100.29	99.71	99.13	98.55	97.97
12	6.505	104.2	100.77	100.29	100.00	99.33	99.14	98.37
13	6.412	102.2	101.37	100.78	100.29	99.61	99.02	98.43
14	6.501	101.5	100.69	100.39	99.80	99.41	99.01	98.62
15	6.425	103.9	100.87	100.38	100.10	99.52	99.04	98.56
16	6.457	103.4	100.77	100.29	99.71	99.03	98.55	98.16
17	6.506	101.3	101.28	100.99	100.30	99.80	99.41	98.91
18	6.497	102.5	100.88	100.29	99.61	99.02	98.54	98.05
19	6.484	103.9	100.87	100.19	99.71	99.13	98.65	98.46
20	6.463	104.2	100.67	100.58	100.00	99.62	99.04	98.56
21	6.463	103.3	101.16	100.58	99.90	99.32	98.84	98.26
22	6.448	103.1	100.68	100.00	99.61	99.13	98.64	98.16
23	6.448	103.9	100.77	100.38	99.71	99.23	98.85	98.27
24	6.509	104.1	101.06	100.48	100.19	99.62	99.04	98.46
25	6.502	103.6	100.87	100.10	99.61	99.03	98.55	97.78
Ave.	6.469	103.5	100.72	100.28	99.77	99.18	98.71	98.20
Med.	6.463	103.6	100.77	100.29	99.71	99.13	98.65	98.26
st dev	0.0351	0.9	0.3567	0.3982	0.3967	0.3975	0.4156	0.4331
Min.	6.393	101.3	99.90	99.23	99.04	98.37	97.89	97.20
Max.	6.520	104.9	101.37	100.99	100.57	99.81	99.52	98.95

TM-21 Projection:

Test Duration: 6000 hours
Failures Observed: 0
α: 5.142E-06
β: 1.013
Calculated L_{70}: 72,000hours
Reported L_{70}: >36,000hours

3.2 Data Set 1, 55°C, 150 mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')					
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	0.2615	0.5284	2717	0.0005	0.0008	0.0010	0.0014	0.0016	0.0016
2	0.2597	0.5277	2757	0.0004	0.0008	0.0009	0.0011	0.0013	0.0014
3	0.2610	0.5291	2723	0.0004	0.0006	0.0007	0.0009	0.0011	0.0013
4	0.2615	0.5295	2712	0.0005	0.0006	0.0008	0.0010	0.0011	0.0013
5	0.2627	0.5310	2682	0.0004	0.0006	0.0009	0.0011	0.0012	0.0014
6	0.2593	0.5271	2769	0.0007	0.0008	0.0011	0.0013	0.0014	0.0016
7	0.2603	0.5269	2748	0.0005	0.0006	0.0008	0.0010	0.0011	0.0013
8	0.2598	0.5271	2757	0.0005	0.0006	0.0009	0.0010	0.0011	0.0013
9	0.2605	0.5271	2742	0.0007	0.0008	0.0011	0.0014	0.0016	0.0017
10	0.2612	0.5295	2717	0.0005	0.0006	0.0008	0.0009	0.0009	0.0011
11	0.2607	0.5268	2741	0.0003	0.0005	0.0008	0.0009	0.0012	0.0014
12	0.2622	0.5289	2699	0.0004	0.0004	0.0008	0.0009	0.0009	0.0011
13	0.2624	0.5309	2688	0.0004	0.0006	0.0010	0.0012	0.0013	0.0014
14	0.2591	0.5282	2767	0.0004	0.0006	0.0007	0.0009	0.0010	0.0012
15	0.2626	0.5315	2682	0.0004	0.0004	0.0008	0.0010	0.0011	0.0014
16	0.2613	0.5282	2721	0.0005	0.0006	0.0009	0.0011	0.0013	0.0015
17	0.2633	0.5306	2671	0.0004	0.0006	0.0009	0.0010	0.0011	0.0013
18	0.2624	0.5299	2693	0.0005	0.0006	0.0008	0.0010	0.0011	0.0013
19	0.2621	0.5284	2705	0.0004	0.0006	0.0009	0.0011	0.0013	0.0015
20	0.2606	0.5282	2736	0.0005	0.0005	0.0008	0.0009	0.0010	0.0012
21	0.2589	0.5259	2782	0.0006	0.0006	0.0007	0.0010	0.0011	0.0013
22	0.2594	0.5263	2769	0.0006	0.0008	0.0010	0.0011	0.0013	0.0016
23	0.2616	0.5307	2706	0.0004	0.0004	0.0007	0.0009	0.0010	0.0013
24	0.2600	0.5275	2753	0.0005	0.0004	0.0008	0.0009	0.0010	0.0012
25	0.2613	0.5280	2723	0.0004	0.0006	0.0009	0.0011	0.0013	0.0015
Ave.	0.2610	0.5285	2726	0.0005	0.0006	0.0009	0.0010	0.0012	0.0014
Med.	0.2612	0.5282	2723	0.0005	0.0006	0.0008	0.0010	0.0011	0.0013
st dev	0.0012	0.0016	31.3767	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002
Min.	0.2589	0.5259	2671	0.0003	0.0004	0.0007	0.0009	0.0009	0.0011
Max.	0.2633	0.5315	2782	0.0007	0.0008	0.0011	0.0014	0.0016	0.0017



3.3 Data Set 2, 85°C, 150 mA (Lumen Maintenance)

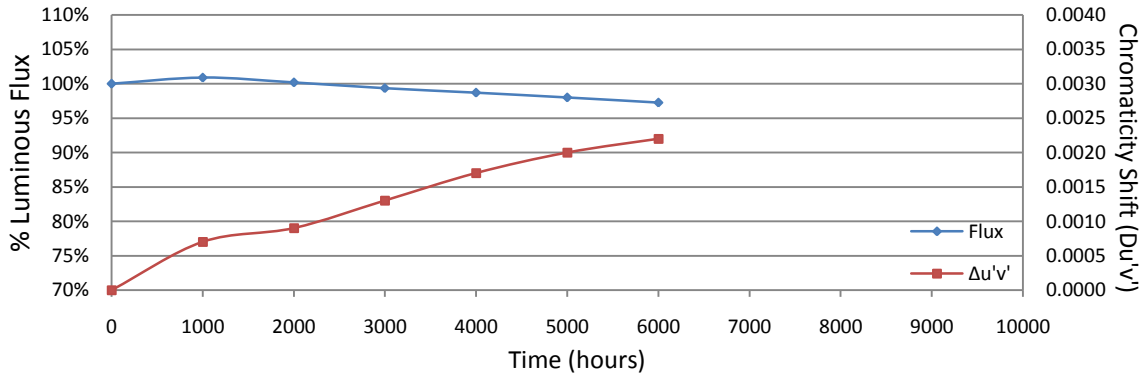
No.	V_F(V)	Φ(lm)	Lumen Maintenance (%)					
	0hr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
26	6.497	104.5	100.10	99.71	98.76	98.18	97.51	96.65
27	6.471	100.5	101.39	100.90	100.00	99.32	98.54	97.77
28	6.496	103.1	100.68	99.81	98.74	97.96	97.19	96.65
29	6.490	101.7	101.08	100.39	99.41	98.82	98.15	96.79
30	6.502	103.0	100.97	100.49	100.00	99.32	98.54	97.86
31	6.461	103.4	100.68	100.10	99.13	98.26	97.78	97.10
32	6.472	103.2	101.36	100.58	100.10	99.42	98.74	98.06
33	6.435	102.8	100.68	100.00	99.32	98.54	97.76	96.96
34	6.438	103.1	101.84	100.78	99.52	98.93	98.45	97.58
35	6.449	103.5	100.68	99.81	99.23	98.55	97.78	96.81
36	6.417	103.4	101.06	100.29	99.23	98.55	97.87	97.10
37	6.482	103.3	100.48	99.81	99.03	98.26	97.48	96.70
38	6.499	104.4	101.25	100.57	99.43	98.95	98.18	97.61
39	6.459	98.2	100.72	99.68	98.97	98.32	97.77	97.08
40	6.490	103.1	101.36	100.39	99.81	99.13	98.45	97.58
41	6.516	100.5	99.90	100.50	99.50	98.77	98.22	97.92
42	6.478	100.7	100.79	99.21	98.45	97.77	97.06	96.52
43	6.428	103.9	101.35	99.42	98.56	97.88	97.21	96.54
44	6.484	95.6	101.80	100.59	99.85	99.18	98.43	97.72
45	6.482	103.6	101.54	100.19	99.52	98.94	98.36	97.97
46	6.492	99.5	101.48	99.70	99.35	98.69	97.97	97.17
47	6.505	102.8	101.36	100.10	99.22	98.64	97.96	97.25
48	6.466	103.9	99.71	100.77	99.81	99.04	98.56	97.69
49	6.448	102.6	100.39	100.39	99.32	98.83	98.25	97.56
50	6.449	104.0	99.23	99.62	98.94	98.27	97.69	96.63
Ave.	6.472	102.3	100.88	100.15	99.33	98.66	98.00	97.25
Med.	6.478	103.1	100.97	100.19	99.32	98.69	97.97	97.17
st dev	0.0264	2.1	0.6522	0.4572	0.4482	0.4626	0.4707	0.5053
Min.	6.417	95.6	99.23	99.21	98.45	97.77	97.06	96.52
Max.	6.516	104.5	101.84	100.90	100.10	99.42	98.74	98.06

TM-21 Projection:

Test Duration: 6000 hours
Failures Observed: 0
α: 7.289E-06
β: 1.016
Calculated L_{70}: 51,000hours
Reported L_{70}: >36,000hours

3.4 Data Set 2, 85°C, 150 mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')					
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
26	0.2585	0.5262	2791	0.0011	0.0013	0.0016	0.0016	0.0018	0.0021
27	0.2600	0.5283	2749	0.0007	0.0006	0.0010	0.0011	0.0012	0.0014
28	0.2590	0.5263	2779	0.0009	0.0010	0.0014	0.0019	0.0021	0.0019
29	0.2653	0.5319	2626	0.0006	0.0006	0.0010	0.0014	0.0016	0.0015
30	0.2614	0.5305	2710	0.0004	0.0005	0.0009	0.0012	0.0014	0.0014
31	0.2629	0.5317	2675	0.0008	0.0008	0.0011	0.0015	0.0015	0.0016
32	0.2626	0.5303	2687	0.0008	0.0008	0.0010	0.0013	0.0016	0.0016
33	0.2619	0.5306	2700	0.0009	0.0011	0.0015	0.0018	0.0021	0.0024
34	0.2633	0.5308	2671	0.0005	0.0008	0.0010	0.0014	0.0016	0.0019
35	0.2622	0.5308	2693	0.0007	0.0010	0.0013	0.0017	0.0019	0.0021
36	0.2614	0.5301	2712	0.0007	0.0009	0.0012	0.0016	0.0019	0.0021
37	0.2588	0.5268	2782	0.0003	0.0004	0.0006	0.0010	0.0014	0.0017
38	0.2613	0.5302	2713	0.0007	0.0008	0.0012	0.0014	0.0018	0.0023
39	0.2582	0.5278	2788	0.0010	0.0013	0.0016	0.0019	0.0023	0.0026
40	0.2616	0.5294	2710	0.0004	0.0006	0.0009	0.0012	0.0016	0.0017
41	0.2624	0.5312	2688	0.0006	0.0009	0.0011	0.0021	0.0026	0.0036
42	0.2598	0.5288	2750	0.0010	0.0012	0.0017	0.0017	0.0019	0.0014
43	0.2596	0.5262	2765	0.0005	0.0008	0.0013	0.0017	0.0021	0.0022
44	0.2562	0.5233	2854	0.0010	0.0014	0.0016	0.0022	0.0026	0.0028
45	0.2612	0.5284	2723	0.0006	0.0010	0.0014	0.0020	0.0024	0.0025
46	0.2624	0.5296	2693	0.0008	0.0010	0.0015	0.0021	0.0025	0.0029
47	0.2623	0.5284	2700	0.0006	0.0006	0.0011	0.0018	0.0023	0.0026
48	0.2601	0.5287	2746	0.0007	0.0009	0.0016	0.0022	0.0025	0.0038
49	0.2605	0.5303	2730	0.0006	0.0010	0.0012	0.0020	0.0024	0.0033
50	0.2586	0.5253	2792	0.0009	0.0010	0.0017	0.0018	0.0022	0.0023
Ave.	0.2609	0.5289	2729	0.0007	0.0009	0.0013	0.0017	0.0020	0.0022
Med.	0.2613	0.5294	2713	0.0007	0.0009	0.0012	0.0017	0.0019	0.0021
st dev	0.0020	0.0022	50.2352	0.0002	0.0003	0.0003	0.0003	0.0004	0.0007
Min.	0.2562	0.5233	2626	0.0003	0.0004	0.0006	0.0010	0.0012	0.0014
Max.	0.2653	0.5319	2854	0.0011	0.0014	0.0017	0.0022	0.0026	0.0038



3.5 Data Set 3, 105°C, 150 mA (Lumen Maintenance)

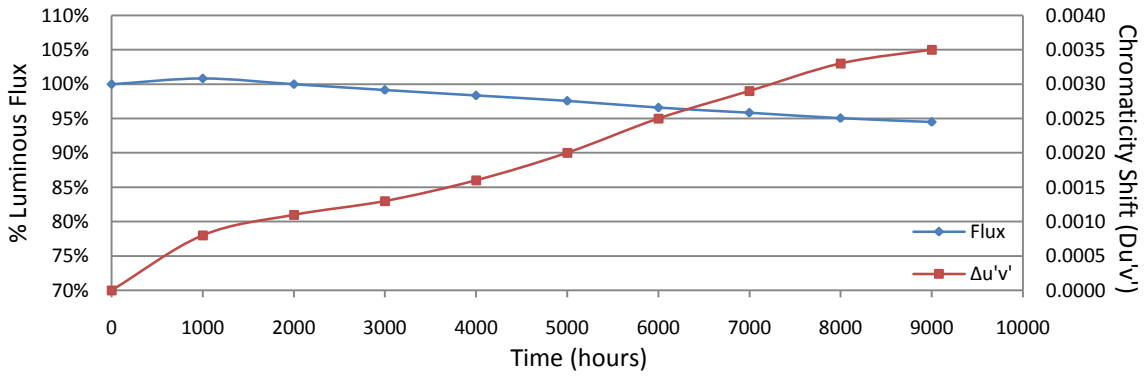
No.	V_F(V)	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
51	6.465	102.8	99.81	99.81	99.12	98.35	97.47	96.52	95.68	94.82	94.02
52	6.487	101.7	102.06	100.88	100.00	99.12	98.26	96.99	96.39	95.22	94.51
53	6.467	103.5	101.64	100.39	99.52	98.65	97.97	97.10	96.17	95.45	93.50
54	6.515	103.0	101.84	100.29	99.22	98.54	97.77	96.97	95.67	95.65	94.85
55	6.481	103.9	101.15	99.71	98.85	97.98	97.11	96.11	95.79	94.85	94.62
56	6.459	101.6	100.59	98.92	98.39	97.48	96.69	95.79	94.35	93.72	93.31
57	6.481	103.0	101.26	100.10	99.61	98.93	98.25	97.48	97.09	96.61	96.22
58	6.415	102.3	101.37	100.49	99.51	98.63	97.95	96.92	96.10	95.02	94.36
59	6.462	104.9	100.95	99.81	99.05	98.19	97.43	96.47	96.19	95.33	95.25
60	6.499	104.9	101.05	99.62	98.76	98.00	97.04	96.19	95.52	95.28	94.93
61	6.477	104.0	100.58	100.48	99.52	98.75	97.88	96.92	95.64	94.88	94.81
62	6.456	103.4	99.90	99.61	98.84	98.16	97.39	96.47	95.79	95.37	95.02
63	6.465	102.3	101.47	100.29	99.32	98.63	97.75	96.00	95.65	95.18	94.79
64	6.446	102.5	101.17	100.10	99.12	98.24	97.42	96.51	95.87	95.08	94.87
65	6.465	103.1	101.36	99.90	98.93	98.25	97.19	96.22	95.57	94.67	94.47
66	6.485	103.1	100.68	99.71	98.84	98.06	97.28	96.32	95.44	94.47	93.83
67	6.378	105.1	100.86	99.43	98.76	98.00	97.15	96.29	95.81	94.80	93.67
68	6.448	104.4	101.05	99.81	98.95	98.08	97.22	96.46	95.38	94.45	94.04
69	6.478	103.7	101.16	99.71	98.94	98.36	97.59	96.72	95.25	94.53	94.17
70	6.445	102.9	100.87	99.22	98.06	97.28	96.69	95.81	95.01	94.28	93.87
71	6.506	104.2	100.00	100.19	99.04	98.18	97.41	96.35	96.07	95.40	94.73
72	6.443	101.6	101.18	100.10	99.31	98.42	97.80	96.62	96.08	94.89	94.15
73	6.458	103.5	99.32	100.39	99.42	98.65	98.07	97.29	96.81	96.19	95.96
74	6.456	105.2	100.19	100.76	99.81	98.86	98.29	97.15	96.58	95.34	94.31
75	6.415	100.9	99.31	100.30	99.21	98.64	97.81	97.09	95.72	95.10	94.58
Ave.	6.462	103.3	100.83	100.00	99.12	98.34	97.56	96.59	95.83	95.06	94.51
Med.	6.465	103.1	101.05	100.10	99.12	98.35	97.47	96.51	95.79	95.08	94.51
st dev	0.0297	1.2	0.7270	0.4666	0.4290	0.4260	0.4545	0.4586	0.5664	0.5930	0.6870
Min.	6.378	100.9	99.31	98.92	98.06	97.28	96.69	95.79	94.35	93.72	93.31
Max.	6.515	105.2	102.06	100.88	100.00	99.12	98.29	97.48	97.09	96.61	96.22

TM-21 Projection:

Test Duration: 9000 hours
Failures Observed: 0
α: 8.126E-06
β: 1.015
Calculated L_{70}: 46,000 hours
Reported L_{70}: 46,000 hours

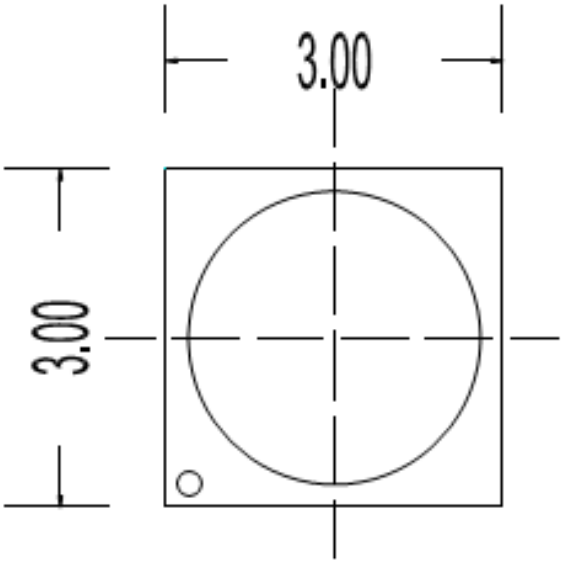
3.6 Data Set 3, 105°C, 150 mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')								
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
51	0.2585	0.5243	2799	0.0010	0.0012	0.0018	0.0021	0.0027	0.0031	0.0034	0.0033	0.0027
52	0.2579	0.5260	2803	0.0006	0.0005	0.0007	0.0011	0.0016	0.0022	0.0024	0.0026	0.0021
53	0.2616	0.5300	2708	0.0006	0.0007	0.0009	0.0011	0.0016	0.0023	0.0027	0.0028	0.0021
54	0.2622	0.5300	2697	0.0007	0.0007	0.0010	0.0013	0.0017	0.0023	0.0025	0.0028	0.0026
55	0.2595	0.5260	2769	0.0006	0.0010	0.0013	0.0016	0.0017	0.0023	0.0026	0.0028	0.0026
56	0.2625	0.5301	2689	0.0009	0.0014	0.0016	0.0018	0.0019	0.0026	0.0024	0.0031	0.0031
57	0.2605	0.5277	2741	0.0008	0.0011	0.0014	0.0018	0.0023	0.0028	0.0030	0.0033	0.0032
58	0.2597	0.5274	2759	0.0008	0.0009	0.0013	0.0017	0.0022	0.0026	0.0029	0.0032	0.0034
59	0.2615	0.5289	2715	0.0008	0.0012	0.0014	0.0019	0.0023	0.0028	0.0030	0.0034	0.0035
60	0.2598	0.5285	2753	0.0008	0.0012	0.0015	0.0019	0.0024	0.0029	0.0032	0.0034	0.0036
61	0.2598	0.5261	2762	0.0010	0.0012	0.0015	0.0022	0.0026	0.0041	0.0047	0.0048	0.0051
62	0.2618	0.5294	2706	0.0011	0.0012	0.0014	0.0019	0.0022	0.0034	0.0043	0.0046	0.0048
63	0.2618	0.5304	2703	0.0006	0.0009	0.0010	0.0009	0.0014	0.0018	0.0024	0.0034	0.0035
64	0.2612	0.5293	2719	0.0009	0.0011	0.0011	0.0012	0.0016	0.0019	0.0023	0.0034	0.0036
65	0.2613	0.5278	2724	0.0007	0.0009	0.0010	0.0010	0.0016	0.0016	0.0019	0.0028	0.0034
66	0.2600	0.5300	2742	0.0008	0.0010	0.0013	0.0015	0.0019	0.0020	0.0026	0.0029	0.0036
67	0.2614	0.5293	2715	0.0007	0.0011	0.0013	0.0014	0.0018	0.0019	0.0027	0.0028	0.0038
68	0.2597	0.5272	2759	0.0007	0.0009	0.0013	0.0014	0.0018	0.0019	0.0025	0.0028	0.0036
69	0.2613	0.5284	2721	0.0010	0.0012	0.0014	0.0016	0.0019	0.0020	0.0026	0.0028	0.0038
70	0.2641	0.5316	2651	0.0007	0.0008	0.0011	0.0012	0.0017	0.0022	0.0026	0.0026	0.0035
71	0.2604	0.5287	2738	0.0010	0.0013	0.0011	0.0016	0.0021	0.0026	0.0033	0.0032	0.0041
72	0.2600	0.5296	2742	0.0009	0.0011	0.0012	0.0014	0.0018	0.0023	0.0032	0.0032	0.0036
73	0.2610	0.5264	2735	0.0013	0.0016	0.0018	0.0019	0.0023	0.0029	0.0036	0.0040	0.0045
74	0.2603	0.5299	2735	0.0006	0.0011	0.0013	0.0013	0.0017	0.0023	0.0028	0.0033	0.0037
75	0.2649	0.5338	2628	0.0016	0.0021	0.0023	0.0024	0.0028	0.0034	0.0040	0.0044	0.0048
Ave.	0.2609	0.5287	2729	0.0008	0.0011	0.0013	0.0016	0.0020	0.0025	0.0029	0.0033	0.0035
Med.	0.2610	0.5289	2735	0.0008	0.0011	0.0013	0.0016	0.0019	0.0023	0.0027	0.0032	0.0036
st dev	0.0016	0.0020	39.3733	0.0002	0.0003	0.0003	0.0004	0.0004	0.0006	0.0006	0.0006	0.0008
Min.	0.2579	0.5243	2628	0.0006	0.0005	0.0007	0.0009	0.0014	0.0016	0.0019	0.0026	0.0021
Max.	0.2649	0.5338	2803	0.0016	0.0021	0.0023	0.0024	0.0028	0.0041	0.0047	0.0048	0.0051



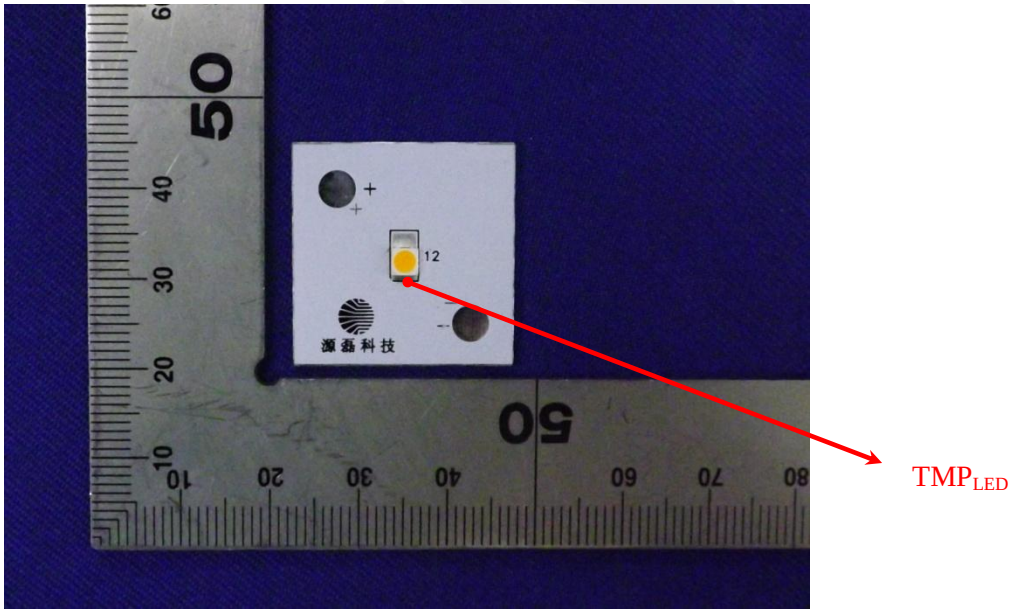
Appendix A – EUT PHOTO

A.1 Mechanical Dimensions (Ta = 25°C)



All dimensions are in millimeter

A.2 EUT Photo



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