



IESNA LM-80-2008

MEASURING LUMEN MAINTENANCE OF LED LIGHT SOURCES

MEASUREMENT AND TEST REPORT

For

Guangzhou Hongli Opto-Electronic Co., Ltd.

No.1, Xianke Yi Road, Huadong Town, Huadu District, Guangzhou, China

Model:HL-A-4014HW-S1-HR3-DM

Report Type: 6000 Hours Test Report	Product Type: LED Package
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Report Number: RSZ140110505-10	
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Report Date: 2014-10-21	
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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

Devices tested

Part Number: HL-A-4014HW-S1-HR3-DM
 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	2014-03-04	2015-03-04
Programmable Test Power for LEDs	EVERFINE	LED300E	1008002	15V/2000mA	2014-03-12	2015-03-12
High accuracy array spectroradiometer	EVERFINE	HAAS-2000	1012016T	380-780nm	2013-12-26	2014-12-26
Standard Light Source	EVERFINE	D062	1011093	N/A	2014-05-06	2015-05-06
Precision digital stabilized DC power supply	EVERFINE	WY605	G115987CJ 7321114	300VA	2014-03-12	2015-03-12
Multilayen aging machine	BACL	B2-270	8/Oct/54	N/A	2014-08-11	2015-08-11
Adjustable constant-current DC switching power supply	GOTER	WYG-5V40A	1#	0~5V,0~40A	2014-03-12	2015-03-12
Adjustable constant-current DC switching power supply	GOTER	WYG-5V40A	2#	0~5V,0~40A	2014-03-12	2015-03-12
Adjustable constant-current DC switching power supply	GOTER	LLA120011 2-U	2012082001	0~5V,0~40A	2013-12-31	2014-12-31

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 $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$, 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 $U=21\text{K}$ ($K=2$), 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 °C, 85 °C and Ts 105 °C were received at 2014-01-10 and tested during 2014-02-01 to 2014-10-13. The samples were numbered from 1 to 25, 26 to 50 and 51 to 75

Data Set 1: 55 °C, 60mA

Part Number:	HL-A-4014HW-S1-HR3-DM
Number of Units:	25
Actual Case Temperature(T _S):	T _S =53.9 °C
Actual Ambient Temperature(T _A):	T _A =51.8 °C
Life Test Drive Current:	I _F = 60mA
Measurement Current:	I _F = 60mA

Data Set 2: 85 °C,60mA

Part Number:	HL-A-4014HW-S1-HR3-DM
Number of Units:	25
Actual Case Temperature(T _S):	T _S =84.2 °C
Actual Ambient Temperature(T _A):	T _A =82.3 °C
Life Test Drive Current:	I _F =60mA
Measurement Current:	I _F = 60mA

Data Set 3: 105 °C, 60mA

Part Number:	HL-A-4014HW-S1-HR3-DM
Number of Units:	25
Actual Case Temperature(T _S):	T _S =104.1 °C
Actual Ambient Temperature(T _A):	T _A =103.4 °C
Life Test Drive Current:	I _F = 60mA
Measurement Current:	I _F = 60mA

2 - SUMMARY OF TEST RESULT

Data Set:	Data Set 1, 55 °C, 60mA
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:	97.56%
Average Chromaticity Shift at 6000 hours ($\Delta u'v'$):	0.0020
Reported TM-21 L ₇₀ Lifetime:	>36,000 hours

Data Set:	Data Set 2, 85 °C, 60mA
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:	97.24%
Average Chromaticity Shift at 6000 hours($\Delta u'v'$):	0.0024
Reported TM-21 L ₇₀ Lifetime:	>36,000 hours

Data Set:	Data Set 3, 105 °C, 60Ma
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:	96.88%
Average Chromaticity Shift at 6000 hours($\Delta u'v'$):	0.0027
Reported TM-21 L ₇₀ Lifetime:	>36,000 hours

3 - Test Data

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

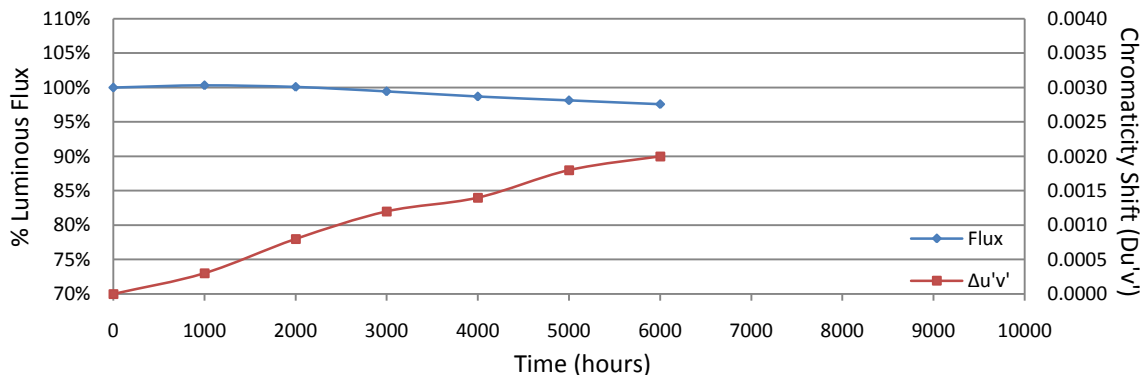
No.	V _F (V)	Φ(lm)	Lumen Maintenance (%)					
	0hr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	3.031	17.76	99.94	99.61	98.99	98.14	97.47	96.79
2	3.026	17.23	100.41	100.17	99.54	98.84	98.37	97.74
3	3.029	17.35	100.23	100.00	99.37	98.62	98.10	97.58
4	3.018	17.63	100.06	99.66	99.04	98.24	97.62	96.94
5	3.027	17.93	100.50	100.22	99.61	99.05	98.44	97.94
6	3.033	18.10	100.39	100.17	99.45	98.90	98.34	97.73
7	3.027	17.79	101.12	100.84	100.17	99.55	98.99	98.59
8	3.012	17.66	100.40	100.17	99.55	98.81	98.19	97.57
9	3.027	17.88	100.17	100.00	99.33	98.66	98.04	97.48
10	3.030	17.83	100.34	100.06	99.38	98.54	97.92	97.36
11	3.028	18.06	100.33	100.06	99.45	98.62	98.06	97.45
12	3.013	18.12	99.94	99.67	99.06	98.23	97.52	97.02
13	3.018	18.02	100.39	100.17	99.56	98.89	98.45	97.95
14	3.029	17.75	100.00	99.77	99.04	98.31	97.69	97.13
15	3.013	17.87	99.83	99.55	98.94	98.10	97.48	96.92
16	3.026	17.99	100.56	100.33	99.72	99.11	98.50	98.05
17	3.022	18.14	100.00	99.78	99.12	98.35	97.68	97.13
18	3.013	17.51	99.60	99.37	98.74	97.89	97.43	96.80
19	3.016	17.75	99.83	99.61	98.99	98.20	97.52	97.01
20	3.029	17.74	101.52	101.24	100.56	100.06	99.61	98.99
21	3.007	18.07	100.22	100.00	99.39	98.62	97.90	97.40
22	3.029	17.53	100.80	100.57	99.94	99.09	98.46	98.23
23	3.012	18.13	99.94	99.78	99.12	98.46	98.01	97.57
24	3.025	18.12	100.00	99.78	99.12	98.57	97.85	97.30
25	3.025	17.92	101.23	100.95	100.28	99.44	98.94	98.33
Ave.	3.023	17.84	100.31	100.06	99.42	98.69	98.10	97.56
Med.	3.026	17.87	100.23	100.00	99.38	98.62	98.04	97.48
st dev	0.0075	0.2500	0.4605	0.4560	0.4486	0.5032	0.5421	0.5705
Min.	3.007	17.23	99.60	99.37	98.74	97.89	97.43	96.79
Max.	3.033	18.14	101.52	101.24	100.56	100.06	99.61	98.99

TM-21 Projection:

Test Duration: 6000 hours
Failures Observed: 0
 α : 5.877E-06
 β : 1.011
Calculated L₇₀: 63,000hours
Reported L₇₀: >36,000hours

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

No.	u'	v'	CCT(K)	Chromaticity Shift ($\Delta u'v'$)					
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	0.2629	0.5282	2688	0.0001	0.0007	0.0010	0.0013	0.0013	0.0015
2	0.2608	0.5282	2731	0.0003	0.0007	0.0011	0.0012	0.0016	0.0019
3	0.2636	0.5270	2678	0.0000	0.0006	0.0009	0.0011	0.0014	0.0015
4	0.2593	0.5268	2771	0.0001	0.0007	0.0011	0.0013	0.0017	0.0021
5	0.2579	0.5243	2813	0.0000	0.0006	0.0014	0.0015	0.0017	0.0020
6	0.2608	0.5281	2732	0.0002	0.0007	0.0013	0.0014	0.0019	0.0021
7	0.2587	0.5286	2774	0.0004	0.0008	0.0012	0.0016	0.0018	0.0019
8	0.2591	0.5262	2777	0.0005	0.0008	0.0012	0.0016	0.0018	0.0021
9	0.2626	0.5260	2704	0.0004	0.0006	0.0011	0.0014	0.0016	0.0018
10	0.2576	0.5225	2828	0.0002	0.0008	0.0012	0.0014	0.0017	0.0021
11	0.2600	0.5269	2755	0.0006	0.0006	0.0015	0.0015	0.0016	0.0020
12	0.2592	0.5283	2766	0.0003	0.0005	0.0010	0.0013	0.0014	0.0017
13	0.2596	0.5262	2766	0.0004	0.0009	0.0010	0.0015	0.0020	0.0023
14	0.2628	0.5276	2693	0.0004	0.0009	0.0014	0.0014	0.0018	0.0021
15	0.2602	0.5272	2749	0.0002	0.0007	0.0013	0.0015	0.0020	0.0022
16	0.2566	0.5266	2831	0.0004	0.0009	0.0013	0.0015	0.0018	0.0023
17	0.2605	0.5282	2737	0.0003	0.0009	0.0012	0.0012	0.0016	0.0019
18	0.2594	0.5246	2777	0.0005	0.0010	0.0015	0.0016	0.0020	0.0022
19	0.2584	0.5265	2791	0.0004	0.0007	0.0011	0.0016	0.0018	0.0021
20	0.2599	0.5241	2770	0.0002	0.0006	0.0014	0.0016	0.0019	0.0022
21	0.2582	0.5268	2793	0.0000	0.0008	0.0014	0.0014	0.0018	0.0020
22	0.2600	0.5251	2761	0.0003	0.0011	0.0015	0.0015	0.0020	0.0024
23	0.2602	0.5286	2744	0.0001	0.0007	0.0013	0.0014	0.0018	0.0023
24	0.2630	0.5286	2685	0.0002	0.0008	0.0013	0.0015	0.0018	0.0020
25	0.2636	0.5295	2669	0.0002	0.0006	0.0011	0.0013	0.0017	0.0020
Ave.	0.2602	0.5268	2751	0.0003	0.0008	0.0012	0.0014	0.0018	0.0020
Med.	0.2600	0.5269	2761	0.0003	0.0007	0.0012	0.0014	0.0018	0.0021
st dev	0.0019	0.0017	45.5080	0.0002	0.0001	0.0002	0.0001	0.0002	0.0002
Min.	0.2566	0.5225	2669	0.0000	0.0005	0.0009	0.0011	0.0013	0.0015
Max.	0.2636	0.5295	2831	0.0006	0.0011	0.0015	0.0016	0.0020	0.0024



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

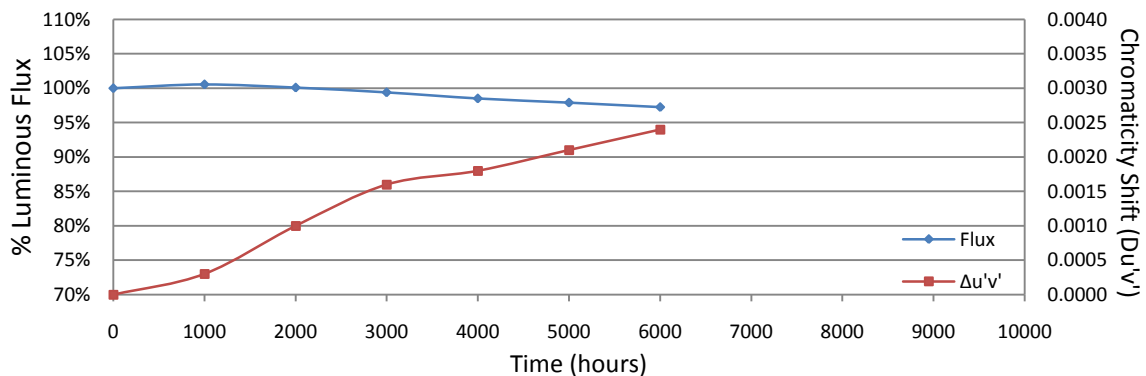
No.	V _F (V)	Φ(lm)	Lumen Maintenance (%)					
	Ohr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
26	3.011	17.88	100.00	99.50	98.88	98.15	97.43	96.70
27	3.006	18.20	100.33	99.95	99.23	98.46	97.86	97.42
28	3.029	17.77	100.90	100.39	99.77	98.93	98.31	97.69
29	3.008	17.97	99.94	99.44	98.72	97.66	96.99	96.33
30	3.029	17.49	100.40	99.94	99.26	98.28	97.60	96.97
31	3.030	17.80	99.94	99.49	98.82	97.92	97.30	96.57
32	3.019	17.40	101.03	100.57	99.83	99.20	98.62	98.05
33	3.034	17.20	101.22	100.81	100.17	99.48	98.95	98.37
34	3.020	18.07	100.55	100.17	99.45	98.62	98.17	97.51
35	3.027	17.37	100.23	99.77	99.02	97.99	97.24	96.55
36	3.012	17.30	100.17	99.77	99.02	98.09	97.28	96.59
37	3.032	18.44	100.38	100.00	99.35	98.54	97.89	97.23
38	3.028	17.73	100.06	99.66	98.93	97.97	97.35	96.62
39	3.030	17.88	101.68	101.29	100.56	99.38	98.94	98.38
40	3.024	18.48	99.84	99.46	98.70	97.84	97.13	96.43
41	3.027	18.18	99.94	99.45	98.79	97.91	97.36	96.75
42	3.024	17.56	101.08	100.63	99.89	99.20	98.52	97.84
43	3.025	18.23	100.16	99.67	98.96	97.97	97.26	96.54
44	3.026	18.23	101.54	101.04	100.38	99.67	99.07	98.30
45	3.029	18.11	100.72	100.22	99.61	98.56	97.85	97.18
46	3.018	17.51	100.06	99.66	98.97	97.89	97.14	96.52
47	3.026	17.88	100.17	99.78	99.05	98.15	97.43	96.76
48	3.031	17.66	100.34	99.83	99.09	98.30	97.73	97.11
49	3.022	17.97	101.11	100.61	100.00	99.28	98.78	98.16
50	3.017	18.69	101.44	101.02	100.32	99.20	98.88	98.34
Ave.	3.023	17.88	100.53	100.08	99.39	98.51	97.88	97.24
Med.	3.026	17.88	100.34	99.94	99.23	98.30	97.73	97.11
st dev	0.0077	0.3896	0.5609	0.5602	0.5706	0.6089	0.6814	0.7121
Min.	3.006	17.20	99.84	99.44	98.70	97.66	96.99	96.33
Max.	3.034	18.69	101.68	101.29	100.56	99.67	99.07	98.38

TM-21 Projection:

Test Duration: 6000 hours
Failures Observed: 0
α: 6.913E-06
β: 1.014
Calculated L₇₀: 54,000hours
Reported L₇₀: >36,000hours

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

No.	u'	v'	CCT(K)	Chromaticity Shift ($\Delta u'v'$)					
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
26	0.2633	0.5282	2680	0.0002	0.0007	0.0013	0.0015	0.0016	0.0019
27	0.2635	0.5273	2679	0.0004	0.0008	0.0016	0.0017	0.0019	0.0021
28	0.2607	0.5263	2743	0.0004	0.0010	0.0016	0.0017	0.0019	0.0021
29	0.2613	0.5264	2728	0.0002	0.0011	0.0015	0.0017	0.0020	0.0023
30	0.2623	0.5277	2703	0.0003	0.0014	0.0018	0.0017	0.0021	0.0023
31	0.2607	0.5280	2735	0.0003	0.0011	0.0016	0.0017	0.0022	0.0024
32	0.2591	0.5228	2792	0.0005	0.0012	0.0018	0.0019	0.0022	0.0024
33	0.2607	0.5270	2740	0.0002	0.0011	0.0015	0.0017	0.0021	0.0024
34	0.2621	0.5286	2703	0.0004	0.0008	0.0015	0.0017	0.0020	0.0023
35	0.2603	0.5267	2749	0.0004	0.0013	0.0018	0.0020	0.0023	0.0025
36	0.2614	0.5276	2721	0.0000	0.0010	0.0015	0.0016	0.0020	0.0023
37	0.2600	0.5288	2746	0.0004	0.0009	0.0017	0.0018	0.0021	0.0026
38	0.2614	0.5265	2727	0.0002	0.0010	0.0018	0.0017	0.0019	0.0022
39	0.2609	0.5280	2731	0.0002	0.0009	0.0016	0.0019	0.0021	0.0023
40	0.2605	0.5276	2742	0.0002	0.0012	0.0018	0.0018	0.0021	0.0026
41	0.2604	0.5280	2742	0.0001	0.0009	0.0017	0.0018	0.0020	0.0023
42	0.2613	0.5287	2720	0.0002	0.0009	0.0017	0.0017	0.0022	0.0024
43	0.2598	0.5285	2752	0.0004	0.0010	0.0015	0.0018	0.0022	0.0026
44	0.2586	0.5291	2774	0.0003	0.0010	0.0014	0.0018	0.0023	0.0028
45	0.2618	0.5279	2713	0.0004	0.0011	0.0017	0.0019	0.0020	0.0023
46	0.2620	0.5286	2706	0.0002	0.0010	0.0013	0.0016	0.0020	0.0023
47	0.2611	0.5285	2724	0.0002	0.0012	0.0016	0.0017	0.0022	0.0024
48	0.2607	0.5269	2741	0.0004	0.0009	0.0017	0.0020	0.0023	0.0025
49	0.2595	0.5252	2773	0.0005	0.0011	0.0015	0.0018	0.0023	0.0024
50	0.2611	0.5293	2720	0.0004	0.0009	0.0015	0.0018	0.0024	0.0027
Ave.	0.2610	0.5275	2731	0.0003	0.0010	0.0016	0.0018	0.0021	0.0024
Med.	0.2609	0.5279	2731	0.0003	0.0010	0.0016	0.0017	0.0021	0.0024
st dev	0.0012	0.0014	26.7253	0.0001	0.0002	0.0001	0.0001	0.0002	0.0002
Min.	0.2586	0.5228	2679	0.0000	0.0007	0.0013	0.0015	0.0016	0.0019
Max.	0.2635	0.5293	2792	0.0005	0.0014	0.0018	0.0020	0.0024	0.0028



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

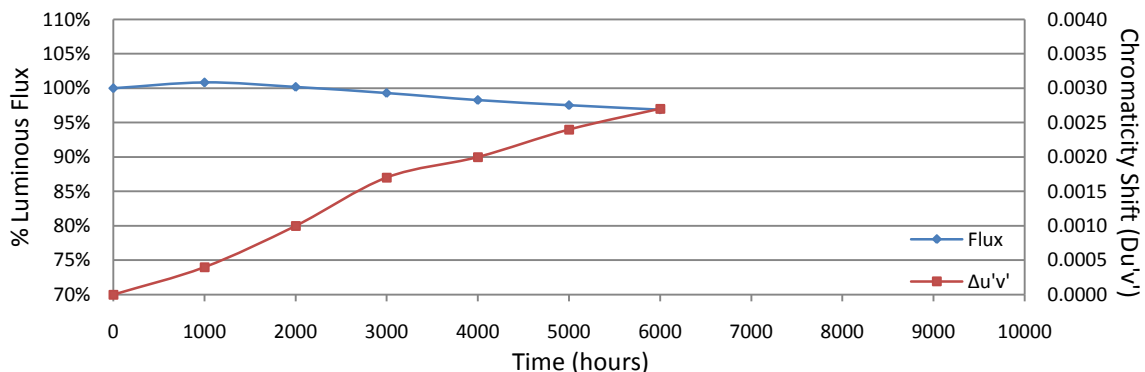
No.	V _F (V)	Φ(lm)	Lumen Maintenance (%)					
	Ohr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
51	3.006	18.57	100.54	99.95	99.14	97.95	97.31	96.82
52	3.019	18.08	101.22	100.55	99.72	98.89	97.95	97.35
53	3.014	18.08	100.55	99.94	99.06	97.90	97.23	96.68
54	3.029	17.72	101.30	100.62	99.77	98.76	98.02	97.35
55	3.014	17.99	100.61	100.00	99.06	97.94	97.22	96.72
56	3.028	17.38	100.75	100.06	99.25	98.04	97.41	96.84
57	3.030	17.71	100.79	100.17	99.32	98.19	97.52	96.89
58	3.012	17.33	101.79	101.21	100.29	99.48	98.62	97.81
59	3.033	17.36	100.58	99.94	99.08	97.93	97.29	96.66
60	3.012	17.72	101.13	100.45	99.66	98.76	97.97	97.35
61	3.034	17.98	100.50	99.83	99.00	97.83	97.22	96.55
62	3.019	18.34	100.38	99.78	98.91	97.76	97.06	96.40
63	3.023	17.58	100.34	99.60	98.75	97.55	96.93	96.30
64	3.011	17.76	100.73	100.06	99.16	98.09	97.47	96.85
65	3.024	18.19	100.66	100.00	99.18	98.02	97.42	96.81
66	3.031	18.18	101.27	100.55	99.72	98.95	98.02	97.41
67	3.024	18.06	100.17	99.50	98.67	97.40	96.73	96.12
68	3.026	18.11	100.72	100.06	99.17	98.01	97.40	96.74
69	3.030	17.66	102.04	101.36	100.51	99.66	98.87	98.24
70	3.021	17.89	100.50	99.83	98.94	98.04	97.15	96.53
71	3.032	17.62	100.91	100.23	99.32	98.13	97.45	96.82
72	3.029	18.43	100.81	100.16	99.13	98.59	97.40	96.69
73	3.011	18.28	100.38	99.78	98.85	97.81	96.99	96.39
74	3.020	17.96	100.95	100.33	99.39	98.27	97.61	96.99
75	3.031	17.87	100.78	100.06	99.16	98.04	97.43	96.70
Ave.	3.023	17.91	100.82	100.16	99.29	98.24	97.51	96.88
Med.	3.024	17.96	100.73	100.06	99.16	98.04	97.41	96.81
st dev	0.0083	0.3307	0.4413	0.4407	0.4440	0.5610	0.4975	0.4784
Min.	3.006	17.33	100.17	99.50	98.67	97.40	96.73	96.12
Max.	3.034	18.57	102.04	101.36	100.51	99.66	98.87	98.24

TM-21 Projection:

Test Duration: 6000 hours
Failures Observed: 0
 α : 8.297E-06
 β : 1.017
Calculated L₇₀: 45,000 hours
Reported L₇₀: >36,000 hours

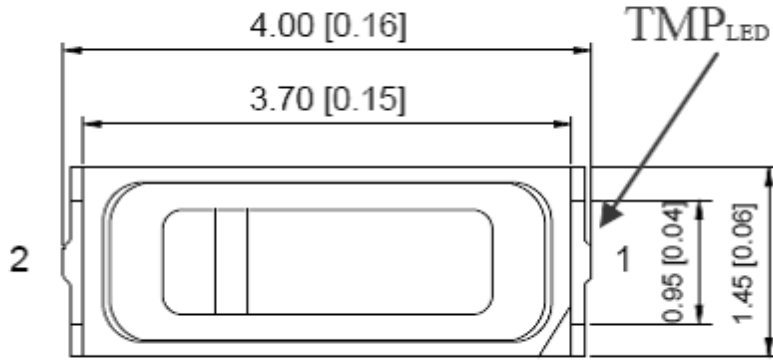
3.6 Data Set 3, 105 °C, 60mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift ($\Delta u'v'$)					
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
51	0.2617	0.5264	2719	0.0006	0.0011	0.0017	0.0020	0.0024	0.0027
52	0.2633	0.5278	2682	0.0005	0.0010	0.0017	0.0021	0.0025	0.0029
53	0.2594	0.5286	2759	0.0004	0.0011	0.0019	0.0021	0.0024	0.0027
54	0.2598	0.5273	2757	0.0004	0.0011	0.0018	0.0024	0.0027	0.0031
55	0.2602	0.5274	2749	0.0003	0.0013	0.0019	0.0020	0.0026	0.0030
56	0.2604	0.5284	2740	0.0006	0.0014	0.0019	0.0021	0.0024	0.0029
57	0.2566	0.5248	2840	0.0003	0.0011	0.0017	0.0019	0.0024	0.0026
58	0.2603	0.5285	2740	0.0002	0.0011	0.0017	0.0020	0.0026	0.0029
59	0.2612	0.5280	2724	0.0002	0.0011	0.0018	0.0018	0.0022	0.0025
60	0.2617	0.5284	2711	0.0007	0.0014	0.0021	0.0020	0.0023	0.0025
61	0.2593	0.5268	2770	0.0003	0.0011	0.0017	0.0019	0.0022	0.0025
62	0.2605	0.5281	2739	0.0004	0.0010	0.0018	0.0020	0.0023	0.0026
63	0.2602	0.5267	2752	0.0004	0.0009	0.0015	0.0018	0.0024	0.0027
64	0.2617	0.5264	2719	0.0005	0.0009	0.0015	0.0018	0.0022	0.0024
65	0.2606	0.5267	2742	0.0003	0.0008	0.0014	0.0017	0.0020	0.0022
66	0.2613	0.5267	2728	0.0003	0.0010	0.0013	0.0018	0.0021	0.0024
67	0.2604	0.5268	2746	0.0005	0.0009	0.0013	0.0018	0.0020	0.0025
68	0.2592	0.5278	2768	0.0003	0.0009	0.0015	0.0019	0.0021	0.0025
69	0.2620	0.5279	2709	0.0004	0.0008	0.0016	0.0018	0.0022	0.0025
70	0.2618	0.5266	2719	0.0005	0.0009	0.0017	0.0020	0.0025	0.0029
71	0.2602	0.5271	2749	0.0005	0.0010	0.0018	0.0020	0.0026	0.0030
72	0.2596	0.5271	2763	0.0006	0.0011	0.0019	0.0020	0.0025	0.0029
73	0.2605	0.5267	2745	0.0005	0.0010	0.0019	0.0021	0.0023	0.0026
74	0.2622	0.5281	2703	0.0006	0.0009	0.0014	0.0020	0.0025	0.0028
75	0.2589	0.5247	2788	0.0005	0.0008	0.0016	0.0021	0.0024	0.0027
Ave.	0.2605	0.5272	2742	0.0004	0.0010	0.0017	0.0020	0.0024	0.0027
Med.	0.2604	0.5271	2742	0.0004	0.0010	0.0017	0.0020	0.0024	0.0027
st dev	0.0014	0.0010	31.3901	0.0001	0.0002	0.0002	0.0001	0.0002	0.0002
Min.	0.2566	0.5247	2682	0.0002	0.0008	0.0013	0.0017	0.0020	0.0022
Max.	0.2633	0.5286	2840	0.0007	0.0014	0.0021	0.0024	0.0027	0.0031



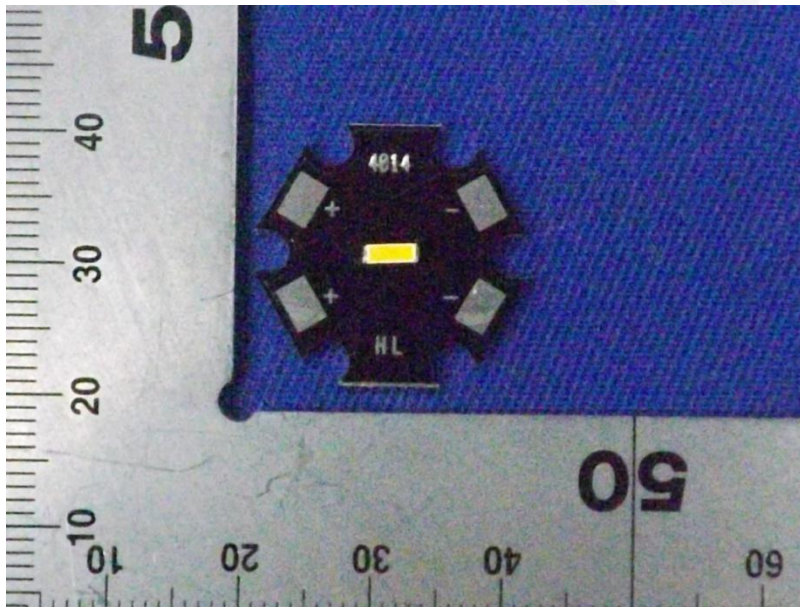
Appendix A – EUT PHOTO

A.1 Mechanical Dimensions (Ta = 25 °C)



All dimensions are in millimeter

A.2 EUT Photo



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