

IESNA LM-80-2008

MEASURING LUMEN MAINTENANCE OF LED LIGHT SOURCES

MEASUREMENT AND TEST REPORT

For

Xiamen Dacol Photoelectronics Technology Co., Ltd.

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

Model: 3014

Report Type: 6000 Hours Test Report		Product Type: LED Package	
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Report Number:	R2DG130220051-10		
Test Date:	2013-06-25 to 2014-03-05		
Report Date:	2014-03-11		
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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: 3014
 Part Name: SMD
 Part Type: LED Package
 Nominal CCT: 3500K

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, length:0.3M ,0- 1999LUMEN	2013-03-08	2014-03-08
Programmable Test Power for LEDs	EVERFINE	LED300E	1008002	15V/2000mA	2013-03-25	2014-03-25
High accuracy array spectroradiometer	EVERFINE	HAAS-2000	1012016T	380-780nm	2013-03-08	2014-03-08
Standard Light Source	EVERFINE	D062	1011093	3000K	2013-05-23	2014-05-23
Precision digital stabilized DC power supply	EVERFINE	WY605	G115987CJ 7321114	300VA	2013-03-25	2014-03-25
LM-80 Aging equipment	BACL	N/A	#5	N/A	2013-03-25	2014-03-25
Adjustable constant-current DC switching power supply	GOTER	WYG-5V40A	N/A	N/A	2013-03-26	2014-03-26

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 75pcs samples tested at Ts 55 °C, 85 °C and Ts 105 °C were received at 2013-05-30 and tested during 2013-06-25 to 2014-03-05. The samples were numbered from 1 to 25, 26 to 50 and 51 to 75.

Data Set 1: 55 °C, 30mA

Part Number:	3014
Number of Units:	25
Actual Case Temperature(T_S):	$T_S = 54.2$ °C
Actual Ambient Temperature(T_A):	$T_A = 52.6$ °C
Life Test Drive Current:	$I_F = 30$ mA
Measurement Current:	$I_F = 30$ mA

Data Set 2: 85 °C,30mA

Part Number:	3014
Number of Units:	25
Actual Case Temperature(T_S):	$T_S = 83.7$ °C
Actual Ambient Temperature(T_A):	$T_A = 82.1$ °C
Life Test Drive Current:	$I_F = 30$ mA
Measurement Current:	$I_F = 30$ mA

Data Set 3: 105 °C, 30mA

Part Number:	3014
Number of Units:	25
Actual Case Temperature(T_S):	$T_S = 103.6$ °C
Actual Ambient Temperature(T_A):	$T_A = 102.2$ °C
Life Test Drive Current:	$I_F = 30$ mA
Measurement Current:	$I_F = 30$ mA

2 - SUMMARY OF TEST RESULT

Data Set:	Data Set 1, 55 °C, 30 mA
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:	97.48%
Average Chromaticity Shift at 6000 hours ($\Delta u'v'$):	0.0015
Reported TM-21 L ₇₀ Lifetime:	>36,000 hours

Data Set:	Data Set 2, 85 °C, 30 mA
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:	97.05%
Average Chromaticity Shift at 6000 hours($\Delta u'v'$):	0.0016
Reported TM-21 L ₇₀ Lifetime	>36,000 hours

Data Set:	Data Set 3, 105 °C, 30 mA
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:	96.52%
Average Chromaticity Shift at 6000 hours($\Delta u'v'$):	0.0018
Reported TM-21 L ₇₀ Lifetime	>36,000 hours

3 - Test Data

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

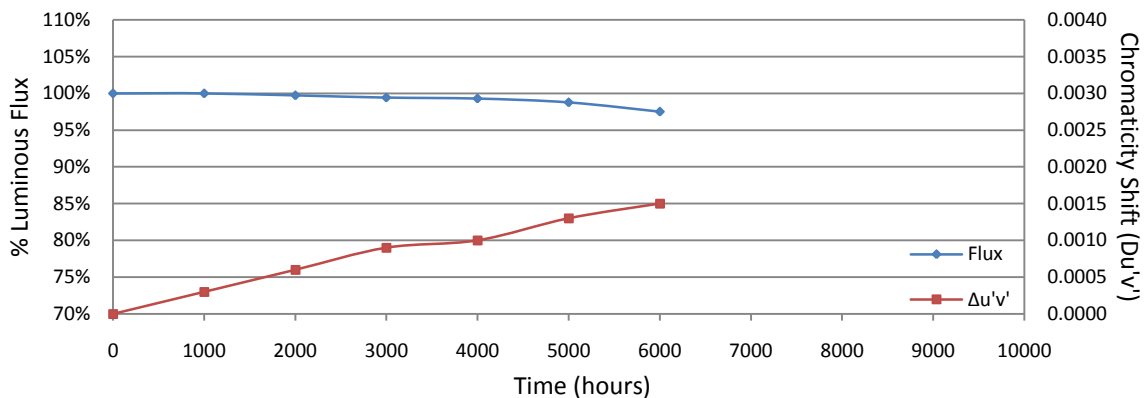
No.	V _F (V)	Φ(lm)	Lumen Maintenance (%)					
	0hr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	2.958	11.97	100.17	99.67	99.50	99.42	98.91	97.58
2	2.974	12.03	100.00	99.58	99.25	99.09	98.75	97.67
3	2.973	12.16	99.84	99.59	99.42	99.26	98.52	97.53
4	2.964	12.28	100.00	99.92	99.43	99.19	98.45	97.15
5	2.973	11.94	100.00	99.92	99.41	99.33	98.83	97.49
6	2.965	12.14	99.92	99.59	99.18	99.01	98.52	97.53
7	2.961	12.21	100.16	99.67	99.43	99.34	98.36	97.54
8	2.970	12.28	99.84	99.51	99.43	99.35	98.37	97.31
9	2.967	12.22	99.84	99.51	99.35	99.10	98.45	97.14
10	2.968	12.18	99.92	99.51	99.43	99.26	98.69	97.54
11	2.968	12.04	100.17	99.83	99.58	99.50	99.00	97.67
12	2.962	12.15	100.08	99.59	99.34	99.26	98.93	97.45
13	2.962	12.31	99.92	99.76	99.68	99.51	99.03	97.89
14	2.967	12.22	99.84	99.51	99.43	99.18	98.77	97.46
15	2.969	12.28	100.16	99.92	99.51	99.35	98.78	97.48
16	2.964	12.24	99.92	99.59	99.43	99.26	98.94	97.39
17	2.961	12.18	99.84	99.67	99.51	99.43	98.93	97.21
18	2.967	12.08	100.17	99.75	99.50	99.42	98.59	97.60
19	2.972	12.20	100.16	99.92	99.43	99.18	98.61	97.38
20	2.966	12.18	99.92	99.67	99.34	99.10	98.85	97.45
21	2.968	12.05	100.08	99.75	99.42	99.34	98.76	97.68
22	2.968	12.23	100.00	99.75	99.35	99.10	98.94	97.55
23	2.972	12.25	100.00	99.67	99.51	99.43	99.02	97.31
24	2.974	12.18	99.92	99.75	99.26	99.10	98.85	97.21
25	2.966	12.33	100.08	99.92	99.35	99.19	98.95	97.73
Ave.	2.967	12.17	100.00	99.70	99.42	99.27	98.75	97.48
Med.	2.967	12.18	100.00	99.67	99.43	99.26	98.78	97.49
st dev	0.0044	0.1036	0.1221	0.1418	0.1062	0.1413	0.2115	0.1867
Min.	2.958	11.94	99.84	99.51	99.18	99.01	98.36	97.14
Max.	2.974	12.33	100.17	99.92	99.68	99.51	99.03	97.89

TM-21 Projection:

Test Duration: 6000 hour
Failures Observed: 0
 α : 4.510E-06
 β : 1.007
Calculated L₇₀: 81,000 hours
Reported L₇₀: >36,000 hours

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

No.	u'	v'	CCT(K)	Chromaticity Shift ($\Delta u'v'$)					
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	0.2367	0.5092	3493	0.0002	0.0006	0.0009	0.0010	0.0014	0.0017
2	0.2354	0.5100	3525	0.0005	0.0007	0.0009	0.0009	0.0010	0.0014
3	0.2345	0.5095	3559	0.0005	0.0007	0.0010	0.0011	0.0013	0.0014
4	0.2338	0.5102	3571	0.0002	0.0005	0.0006	0.0008	0.0010	0.0012
5	0.2363	0.5103	3493	0.0003	0.0004	0.0007	0.0008	0.0014	0.0014
6	0.2342	0.5092	3571	0.0004	0.0004	0.0009	0.0008	0.0010	0.0015
7	0.2353	0.5098	3530	0.0003	0.0006	0.0009	0.0009	0.0014	0.0015
8	0.2349	0.5099	3540	0.0004	0.0005	0.0008	0.0010	0.0014	0.0015
9	0.2341	0.5098	3569	0.0005	0.0006	0.0006	0.0009	0.0011	0.0012
10	0.2339	0.5089	3584	0.0006	0.0008	0.0009	0.0010	0.0014	0.0014
11	0.2366	0.5089	3499	0.0004	0.0006	0.0008	0.0010	0.0015	0.0016
12	0.2347	0.5101	3546	0.0005	0.0008	0.0009	0.0011	0.0014	0.0016
13	0.2339	0.5106	3566	0.0004	0.0008	0.0008	0.0009	0.0013	0.0014
14	0.2344	0.5122	3530	0.0001	0.0007	0.0009	0.0010	0.0012	0.0016
15	0.2349	0.5127	3510	0.0003	0.0006	0.0011	0.0012	0.0015	0.0015
16	0.2343	0.5103	3557	0.0001	0.0003	0.0010	0.0013	0.0014	0.0015
17	0.2335	0.5087	3600	0.0004	0.0005	0.0009	0.0011	0.0012	0.0015
18	0.2364	0.5092	3502	0.0001	0.0003	0.0007	0.0011	0.0013	0.0014
19	0.2344	0.5115	3540	0.0003	0.0005	0.0007	0.0008	0.0013	0.0016
20	0.2325	0.5082	3640	0.0002	0.0006	0.0007	0.0009	0.0011	0.0012
21	0.2373	0.5111	3454	0.0005	0.0008	0.0011	0.0012	0.0012	0.0015
22	0.2346	0.5109	3538	0.0003	0.0009	0.0010	0.0013	0.0013	0.0014
23	0.2345	0.5111	3540	0.0004	0.0008	0.0009	0.0010	0.0014	0.0015
24	0.2346	0.5091	3559	0.0004	0.0004	0.0009	0.0011	0.0013	0.0015
25	0.2340	0.5112	3555	0.0003	0.0005	0.0008	0.0012	0.0014	0.0016
Ave.	0.2348	0.5101	3543	0.0003	0.0006	0.0009	0.0010	0.0013	0.0015
Med.	0.2345	0.5100	3540	0.0004	0.0006	0.0009	0.0010	0.0013	0.0015
st dev	0.0011	0.0011	38.8980	0.0001	0.0002	0.0001	0.0001	0.0001	0.0001
Min.	0.2325	0.5082	3454	0.0001	0.0003	0.0006	0.0008	0.0010	0.0012
Max.	0.2373	0.5127	3640	0.0006	0.0009	0.0011	0.0013	0.0015	0.0017



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

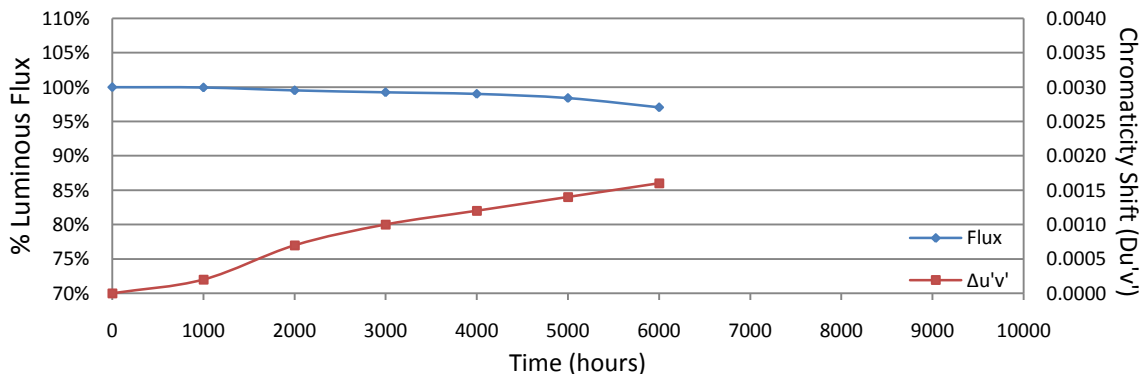
No.	V _F (V)	Φ(lm)	Lumen Maintenance (%)					
	Ohr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
26	2.967	12.21	99.84	99.67	99.26	99.10	98.53	97.22
27	2.968	12.36	99.92	99.68	99.27	99.11	98.62	97.33
28	2.967	12.20	99.92	99.43	99.26	99.10	98.36	97.05
29	2.971	12.16	100.00	99.75	99.59	99.51	98.93	97.78
30	2.971	12.32	99.76	99.43	99.11	99.03	98.30	97.16
31	2.974	12.32	100.08	99.51	99.11	99.03	98.46	97.40
32	2.968	12.20	99.84	99.51	99.10	99.02	98.28	96.89
33	2.964	12.10	99.83	99.67	99.17	99.09	98.26	96.78
34	2.968	12.11	99.75	99.34	99.17	99.09	98.84	97.19
35	2.963	12.26	100.00	99.76	99.43	99.18	98.78	97.23
36	2.973	12.07	100.17	99.50	99.34	99.17	98.43	96.85
37	2.974	12.21	99.92	99.34	99.26	99.18	98.12	96.81
38	2.972	12.27	100.00	99.67	99.43	99.27	98.37	97.56
39	2.961	12.23	100.08	99.51	99.35	99.18	98.45	96.97
40	2.966	12.21	99.92	99.67	99.43	99.10	98.44	96.89
41	2.963	12.28	100.16	99.51	99.19	98.70	98.13	96.74
42	2.968	12.19	99.92	99.67	99.43	98.93	98.36	97.13
43	2.967	12.27	100.08	99.59	99.27	98.78	98.29	96.82
44	2.969	12.20	99.84	99.34	99.18	98.93	98.36	96.97
45	2.967	12.24	100.08	99.67	99.59	99.10	98.37	97.14
46	2.969	12.26	99.76	99.35	98.94	98.69	98.04	96.82
47	2.974	12.21	100.08	99.51	99.18	98.85	98.53	96.89
48	2.974	12.16	100.00	99.51	99.26	99.01	98.36	96.88
49	2.968	12.20	100.08	99.43	99.18	98.85	98.36	96.89
50	2.974	12.26	99.92	99.59	98.94	98.78	98.53	96.90
Ave.	2.969	12.22	99.96	99.54	99.26	99.03	98.42	97.05
Med.	2.968	12.21	99.92	99.51	99.26	99.09	98.37	96.97
st dev	0.0038	0.0685	0.1254	0.1321	0.1660	0.1870	0.2110	0.2615
Min.	2.961	12.07	99.75	99.34	98.94	98.69	98.04	96.74
Max.	2.974	12.36	100.17	99.76	99.59	99.51	98.93	97.78

TM-21 Projection:

Test Duration: 6000 hours
Failures Observed: 0
 α : 5.257E-06
 β : 1.007
Calculated L₇₀: 69,000hours
Reported L₇₀: >36,000hours

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

No.	u'	v'	CCT(K)	Chromaticity Shift ($\Delta u'v'$)					
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
26	0.2343	0.5094	3566	0.0001	0.0006	0.0008	0.0011	0.0012	0.0016
27	0.2343	0.5113	3545	0.0003	0.0006	0.0010	0.0011	0.0012	0.0016
28	0.2349	0.5096	3544	0.0001	0.0003	0.0007	0.0009	0.0013	0.0016
29	0.2354	0.5108	3514	0.0002	0.0005	0.0009	0.0011	0.0015	0.0016
30	0.2340	0.5097	3572	0.0001	0.0004	0.0009	0.0011	0.0015	0.0016
31	0.2335	0.5101	3583	0.0004	0.0008	0.0008	0.0010	0.0012	0.0012
32	0.2337	0.5102	3577	0.0002	0.0005	0.0012	0.0013	0.0016	0.0016
33	0.2336	0.5087	3597	0.0004	0.0005	0.0009	0.0010	0.0014	0.0016
34	0.2361	0.5100	3503	0.0001	0.0005	0.0011	0.0013	0.0016	0.0018
35	0.2347	0.5097	3551	0.0002	0.0009	0.0011	0.0012	0.0015	0.0016
36	0.2349	0.5096	3546	0.0003	0.0008	0.0010	0.0012	0.0014	0.0016
37	0.2342	0.5101	3561	0.0001	0.0009	0.0011	0.0012	0.0014	0.0016
38	0.2331	0.5086	3615	0.0002	0.0009	0.0011	0.0013	0.0015	0.0016
39	0.2345	0.5106	3547	0.0001	0.0007	0.0013	0.0014	0.0015	0.0018
40	0.2353	0.5101	3526	0.0004	0.0005	0.0010	0.0010	0.0015	0.0016
41	0.2337	0.5106	3573	0.0001	0.0005	0.0010	0.0010	0.0015	0.0017
42	0.2347	0.5092	3555	0.0003	0.0009	0.0009	0.0009	0.0014	0.0015
43	0.2342	0.5102	3561	0.0004	0.0009	0.0011	0.0012	0.0013	0.0015
44	0.2346	0.5100	3551	0.0001	0.0008	0.0013	0.0013	0.0016	0.0017
45	0.2335	0.5096	3588	0.0001	0.0007	0.0012	0.0012	0.0015	0.0016
46	0.2343	0.5093	3569	0.0001	0.0009	0.0011	0.0011	0.0015	0.0016
47	0.2339	0.5095	3578	0.0003	0.0007	0.0010	0.0013	0.0016	0.0018
48	0.2349	0.5101	3540	0.0002	0.0006	0.0008	0.0010	0.0014	0.0017
49	0.2340	0.5096	3575	0.0001	0.0007	0.0009	0.0013	0.0015	0.0018
50	0.2343	0.5105	3553	0.0003	0.0010	0.0012	0.0012	0.0015	0.0018
Ave.	0.2343	0.5099	3560	0.0002	0.0007	0.0010	0.0012	0.0014	0.0016
Med.	0.2343	0.5100	3561	0.0002	0.0007	0.0010	0.0012	0.0015	0.0016
st dev	0.0007	0.0006	24.9800	0.0001	0.0002	0.0002	0.0001	0.0001	0.0001
Min.	0.2331	0.5086	3503	0.0001	0.0003	0.0007	0.0009	0.0012	0.0012
Max.	0.2361	0.5113	3615	0.0004	0.0010	0.0013	0.0014	0.0016	0.0018



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

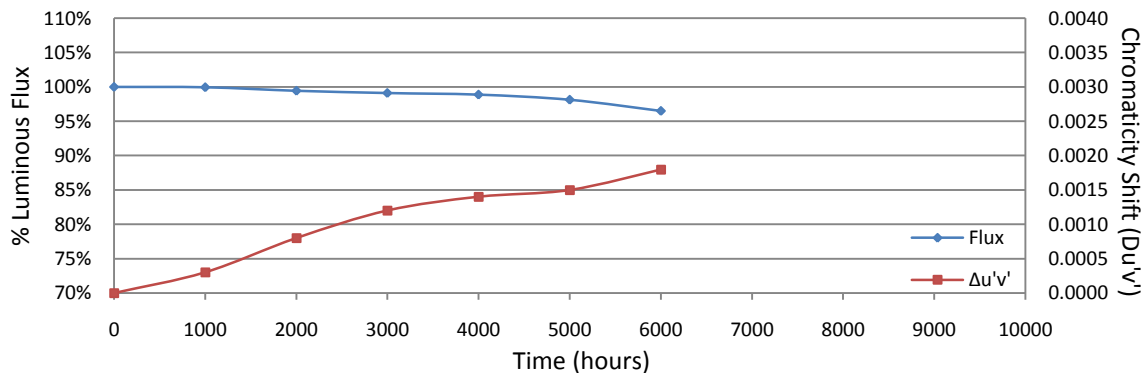
No.	V _F (V)	Φ(lm)	Lumen Maintenance (%)					
	Ohr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
51	2.972	12.32	99.76	99.35	98.94	98.86	97.89	96.02
52	2.967	12.30	100.08	99.67	99.43	99.35	98.62	97.07
53	2.966	12.24	99.84	99.35	99.18	99.02	98.04	96.49
54	2.974	12.30	99.92	99.51	99.27	99.19	98.54	96.59
55	2.969	12.28	100.16	99.67	99.35	99.19	98.45	96.99
56	2.976	12.15	99.84	99.51	98.85	98.68	97.78	95.97
57	2.974	12.39	99.92	99.52	99.27	99.19	97.82	96.53
58	2.968	12.27	100.16	99.59	98.94	98.70	97.88	95.93
59	2.966	12.36	99.92	99.27	99.03	98.71	98.14	96.60
60	2.967	12.33	99.84	99.27	99.19	98.78	98.05	96.59
61	2.970	12.17	99.75	99.34	99.01	98.69	98.19	96.63
62	2.968	12.32	99.92	99.27	98.86	98.70	97.89	96.19
63	2.964	12.18	100.08	99.67	99.26	99.01	98.19	96.80
64	2.965	12.26	99.84	99.35	99.18	98.94	98.21	96.82
65	2.970	12.33	99.76	99.59	99.19	98.95	98.22	96.84
66	2.968	12.36	99.92	99.43	99.19	99.03	98.30	96.93
67	2.970	12.27	100.16	99.51	99.27	98.78	98.37	96.01
68	2.971	12.16	99.84	99.42	99.10	98.77	98.36	96.46
69	2.968	12.16	100.08	99.67	99.26	99.01	98.19	96.46
70	2.965	12.37	100.16	99.35	98.95	98.63	97.90	95.96
71	2.965	12.16	100.08	99.42	98.85	98.52	97.78	96.46
72	2.971	12.10	100.00	99.67	99.01	98.60	97.77	96.12
73	2.974	12.19	100.00	99.26	98.85	98.69	98.20	96.72
74	2.966	11.99	100.00	99.50	99.25	98.92	98.17	96.91
75	2.963	12.26	99.84	99.27	98.86	98.78	98.04	96.82
Ave.	2.969	12.25	99.95	99.46	99.10	98.87	98.12	96.52
Med.	2.968	12.27	99.92	99.43	99.18	98.78	98.17	96.59
st dev	0.0035	0.0973	0.1374	0.1477	0.1786	0.2158	0.2414	0.3560
Min.	2.963	11.99	99.75	99.26	98.85	98.52	97.77	95.93
Max.	2.976	12.39	100.16	99.67	99.43	99.35	98.62	97.07

TM-21 Projection:

Test Duration: 6000 hours
Failures Observed: 0
 α : 6.218E-06
 β : 1.008
Calculated L₇₀: 59,000 hours
Reported L₇₀: >36,000 hours

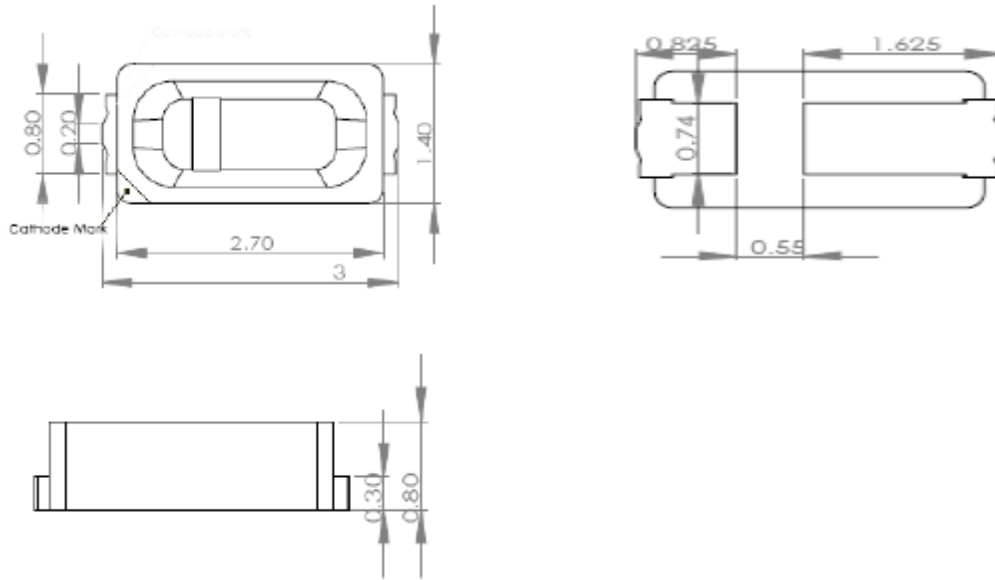
3.6 Data Set 3, 105 °C, 30 mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift ($\Delta u'v'$)					
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
51	0.2347	0.5109	3535	0.0004	0.0009	0.0010	0.0012	0.0013	0.0016
52	0.2341	0.5094	3571	0.0003	0.0008	0.0010	0.0013	0.0014	0.0017
53	0.2337	0.5087	3596	0.0001	0.0006	0.0013	0.0015	0.0016	0.0018
54	0.2336	0.5092	3593	0.0001	0.0006	0.0013	0.0015	0.0016	0.0018
55	0.2345	0.5107	3545	0.0002	0.0009	0.0013	0.0014	0.0016	0.0017
56	0.2346	0.5097	3554	0.0002	0.0010	0.0012	0.0013	0.0015	0.0018
57	0.2344	0.5107	3549	0.0003	0.0009	0.0012	0.0012	0.0012	0.0016
58	0.2338	0.5084	3595	0.0003	0.0008	0.0010	0.0013	0.0014	0.0017
59	0.2328	0.5088	3621	0.0003	0.0009	0.0012	0.0013	0.0016	0.0016
60	0.2343	0.5112	3546	0.0003	0.0008	0.0010	0.0014	0.0016	0.0019
61	0.2343	0.5095	3564	0.0003	0.0007	0.0013	0.0016	0.0017	0.0019
62	0.2350	0.5101	3535	0.0004	0.0010	0.0014	0.0015	0.0016	0.0018
63	0.2348	0.5093	3551	0.0003	0.0008	0.0011	0.0013	0.0013	0.0018
64	0.2334	0.5082	3609	0.0003	0.0009	0.0012	0.0013	0.0016	0.0018
65	0.2339	0.5095	3577	0.0003	0.0010	0.0014	0.0015	0.0016	0.0018
66	0.2330	0.5086	3619	0.0004	0.0008	0.0012	0.0014	0.0016	0.0018
67	0.2351	0.5109	3525	0.0001	0.0008	0.0010	0.0013	0.0013	0.0016
68	0.2349	0.5106	3532	0.0003	0.0009	0.0011	0.0014	0.0014	0.0018
69	0.2349	0.5100	3539	0.0003	0.0009	0.0013	0.0015	0.0016	0.0019
70	0.2347	0.5123	3521	0.0002	0.0008	0.0012	0.0014	0.0015	0.0018
71	0.2348	0.5093	3550	0.0003	0.0008	0.0013	0.0015	0.0016	0.0019
72	0.2352	0.5105	3523	0.0003	0.0006	0.0012	0.0015	0.0016	0.0019
73	0.2344	0.5091	3566	0.0003	0.0007	0.0012	0.0015	0.0017	0.0019
74	0.2374	0.5077	3488	0.0001	0.0010	0.0014	0.0015	0.0016	0.0018
75	0.2334	0.5086	3605	0.0004	0.0008	0.0010	0.0011	0.0013	0.0017
Ave.	0.2344	0.5097	3560	0.0003	0.0008	0.0012	0.0014	0.0015	0.0018
Med.	0.2344	0.5095	3551	0.0003	0.0008	0.0012	0.0014	0.0016	0.0018
st dev	0.0009	0.0011	34.2964	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Min.	0.2328	0.5077	3488	0.0001	0.0006	0.0010	0.0011	0.0012	0.0016
Max.	0.2374	0.5123	3621	0.0004	0.0010	0.0014	0.0016	0.0017	0.0019



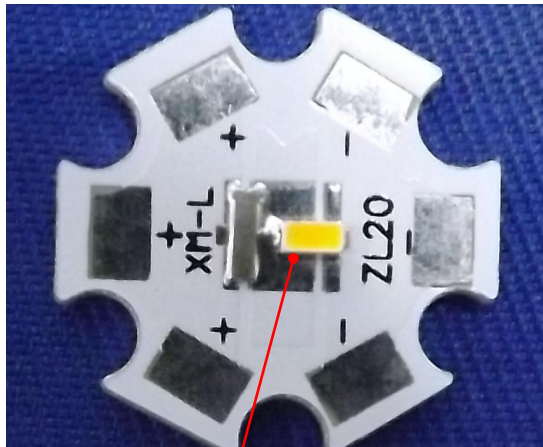
Appendix A – EUT PHOTO

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



Unit: mm

A.2 EUT Photo



TMP_{LED}



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