



IESNA LM-80-2008

MEASURING LUMEN MAINTENANCE OF LED LIGHT SOURCES

MEASUREMENT AND TEST REPORT

For

Fujian Lightning Optoelectronic Co.,Ltd.Shenzhen Branch

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Baoan District, Shenzhen. 518108 China

Model: T5C

Report Type: 6000 Hours Test Report	Product Type: LED Package
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Report Number: RSZ150414502-10-6000	
Test Date: 2015-04-20 to 2015-12-26	
Report Date: 2016-01-07	
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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: T5C
 Part Type: LED Package
 Nominal CCT: 3000K
 Forward Voltage: 24-28V

Family products covered by this report:

According to ENERGY STAR® Program Guidance Regarding LED Package, LED Array and LED Module Lumen Maintenance Performance Data Supporting Qualification of Lighting Products, the following products can be covered by this report base on the declaration letter of manufacturer (see attachment B for more information). The information of these models shows that the covered products meet all section 3 item 7 requirements of ENERGY STAR® Program Guidance Regarding LED Package, LED Array and LED Module Lumen Maintenance Performance Data Supporting Qualification of Lighting Products (September 9, 2011)

Series Name	Model Name	CCT(K)	Number of Dies	Current(mA)	Volt(v)
EMC5050	T5C30881*-.**	3000	8	200	26
EMC5050	T5C27781*-.**	2700	8	200	26
EMC5050	T5C27881*-.**	2700	8	200	26
EMC5050	T5C27981*-.**	2700	8	200	26
EMC5050	T5C30781*-.**	3000	8	200	26
EMC5050	T5C30981*-.**	3000	8	200	26
EMC5050	T5C35781*-.**	3500	8	200	26
EMC5050	T5C35881*-.**	3500	8	200	26
EMC5050	T5C35981*-.**	3500	8	200	26
EMC5050	T5C40781*-.**	4000	8	200	26
EMC5050	T5C40881*-.**	4000	8	200	26
EMC5050	T5C40981*-.**	4000	8	200	26
EMC5050	T5C45781*-.**	4500	8	200	26
EMC5050	T5C45881*-.**	4500	8	200	26
EMC5050	T5C45981*-.**	4500	8	200	26
EMC5050	T5C50781*-.**	5000	8	200	26
EMC5050	T5C50881*-.**	5000	8	200	26
EMC5050	T5C50981*-.**	5000	8	200	26
EMC5050	T5C57781*-.**	5700	8	200	26
EMC5050	T5C57881*-.**	5700	8	200	26
EMC5050	T5C57981*-.**	5700	8	200	26
EMC5050	T5C61781*-.**	6100	8	200	26
EMC5050	T5C61881*-.**	6100	8	200	26
EMC5050	T5C61981*-.**	6100	8	200	26
EMC5050	T5C65781*-.**	6500	8	200	26
EMC5050	T5C65881*-.**	6500	8	200	26
EMC5050	T5C65981*-.**	6500	8	200	26

Disclaimer:

The truthfulness and accuracy of all the technical information above for the covered LED products is ensured by manufacturer of LED light source. Bay Area Compliance Laboratories Corp. (Dongguan) isn't responsible or gives any guarantees for the truthfulness of the technical information.

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	20015	25°C~110°C	2015-03-05	2016-03-05
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	11090008	(50/15A)	2015-07-08	2016-07-07
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11060002	(50V/15A)	2015-07-08	2016-07-07

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 66Pcs;

Each Ts test condition 22Pcs

The samples tested at Ts 55 °C, Ts 85 °C and Ts 105 °C were received at 2015-04-14 and tested during 2015-04-20 to 2015-12-26. The samples were numbered from 1 to 22, 23 to 44 and 45 to 66

Data Set 1: 55 °C, 200mA

Part Number:	T5C
Number of Units:	22
Actual Case Temperature(T_S):	$T_S = 53.6$ °C
Actual Ambient Temperature(T_A):	$T_A = 52.2$ °C
Life Test Drive Current:	$I_F = 200$ mA
Measurement Current:	$I_F = 200$ mA

Data Set 2: 85 °C, 200mA

Part Number:	T5C
Number of Units:	22
Actual Case Temperature(T_S):	$T_S = 84.2$ °C
Actual Ambient Temperature(T_A):	$T_A = 82.6$ °C
Life Test Drive Current:	$I_F = 200$ mA
Measurement Current:	$I_F = 200$ mA

Data Set 3: 105 °C, 200mA

Part Number:	T5C
Number of Units:	22
Actual Case Temperature(T_S):	$T_S = 104.1$ °C
Actual Ambient Temperature(T_A):	$T_A = 103.2$ °C
Life Test Drive Current:	$I_F = 200$ mA
Measurement Current:	$I_F = 200$ mA

2 - SUMMARY OF TEST RESULT

Data Set:	Data Set 1, 55 °C, 200mA
Number of Units:	22
Failures Observed:	0
Test Interval and Test Duration:	0h,1000h,2000h,3000h,4000h,5000h,6000h
Average. Lumen Maintenance at 6000 hours:	96.92%
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, 200mA
Number of Units:	22
Failures Observed:	0
Test Interval and Test Duration:	0h,1000h,2000h,3000h,4000h,5000h,6000h
Average. Lumen Maintenance at 6000 hours:	96.33%
Average Chromaticity Shift at 6000 hours($\Delta u'v'$):	0.0023
Reported TM-21 L ₇₀ Lifetime:	>36,000 hours

Data Set:	Data Set 3, 105 °C, 200mA
Number of Units:	22
Failures Observed:	0
Test Interval and Test Duration:	0h,1000h,2000h,3000h,4000h,5000h,6000h
Average. Lumen Maintenance at 6000 hours:	95.48%
Average Chromaticity Shift at 6000 hours($\Delta u'v'$):	0.0024
Reported TM-21 L ₇₀ Lifetime:	>36,000 hours

3 - Test Data

3.1 Data Set 1, 55 °C, 200mA (Lumen Maintenance)

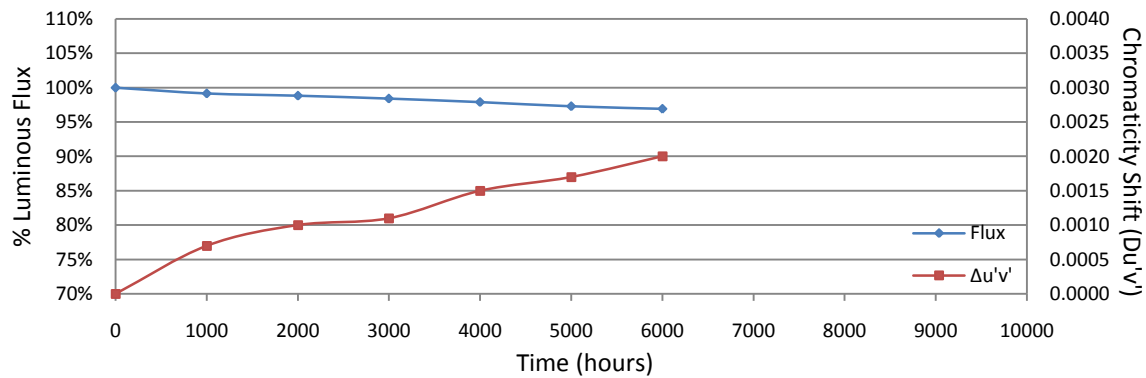
No.	V _F (V)	Φ(lm)	Lumen Maintenance (%)					
	0hr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	25.92	630.4	99.21	98.86	98.41	97.76	97.27	97.08
2	26.25	650.3	98.94	98.77	98.59	98.37	97.42	96.97
3	26.16	648.8	99.21	99.18	99.11	98.38	98.06	97.63
4	26.47	640.9	99.14	98.85	98.08	97.04	96.77	96.63
5	26.19	638.1	99.14	98.82	98.14	97.38	97.09	96.72
6	26.05	641.3	99.20	99.06	98.35	97.97	96.99	96.55
7	26.34	636.7	98.93	98.51	98.30	97.68	97.19	96.80
8	26.27	645.8	99.24	98.84	98.58	97.86	97.51	97.38
9	26.22	644.8	99.40	99.12	98.71	98.60	97.98	97.64
10	26.15	635.3	98.77	98.73	98.24	97.75	96.95	96.76
11	26.14	639.0	99.17	98.92	98.23	97.48	96.90	96.54
12	26.12	607.8	98.96	98.21	97.96	97.22	96.78	96.33
13	25.86	627.6	99.09	98.66	98.12	97.55	96.75	96.22
14	26.06	625.6	99.38	99.26	98.90	98.31	97.55	97.15
15	26.17	643.6	99.18	98.87	98.71	98.07	97.14	96.92
16	26.24	627.3	98.80	98.37	97.85	96.83	96.33	96.14
17	26.25	632.9	99.37	98.70	98.53	98.09	97.14	96.93
18	26.28	631.3	99.02	98.56	98.26	97.54	97.20	96.71
19	26.09	651.5	99.22	98.77	98.30	97.76	97.59	97.18
20	26.13	636.2	99.76	99.07	98.84	98.77	98.02	97.74
21	26.25	636.4	99.31	99.01	98.65	98.51	98.05	97.42
22	25.99	634.1	99.10	98.63	98.42	98.23	97.40	96.81
Ave.	26.16	636.6	99.16	98.81	98.42	97.87	97.28	96.92
Med.	26.17	636.6	99.17	98.83	98.38	97.81	97.19	96.87
st dev	0.1374	9.7938	0.2177	0.2599	0.3172	0.5154	0.4691	0.4494
Min.	25.86	607.8	98.77	98.21	97.85	96.83	96.33	96.14
Max.	26.47	651.5	99.76	99.26	99.11	98.77	98.06	97.74

TM-21 Projection:

Test Duration: 6000 hours
Failures Observed: 0
 α : 4.762E-06
 β : 0.997
Calculated L₇₀: 74,000 hours
Reported L₇₀: >36,000 hours

3.2 Data Set 1, 55 °C, 200mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift ($\Delta u'v'$)					
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	0.2481	0.5184	3083	0.0007	0.0009	0.0012	0.0015	0.0015	0.0017
2	0.2487	0.5198	3057	0.0006	0.0008	0.0009	0.0006	0.0016	0.0020
3	0.2478	0.5186	3089	0.0006	0.0009	0.0009	0.0021	0.0019	0.0021
4	0.2475	0.5189	3094	0.0007	0.0010	0.0010	0.0022	0.0021	0.0023
5	0.2481	0.5183	3082	0.0004	0.0008	0.0010	0.0018	0.0020	0.0022
6	0.2474	0.5187	3100	0.0005	0.0009	0.0012	0.0022	0.0027	0.0029
7	0.2483	0.5177	3083	0.0005	0.0010	0.0012	0.0016	0.0019	0.0024
8	0.2481	0.5193	3078	0.0006	0.0011	0.0012	0.0011	0.0016	0.0019
9	0.2473	0.5156	3125	0.0006	0.0011	0.0012	0.0013	0.0016	0.0018
10	0.2477	0.5181	3096	0.0007	0.0010	0.0012	0.0014	0.0017	0.0020
11	0.2477	0.5173	3101	0.0007	0.0009	0.0012	0.0009	0.0011	0.0014
12	0.2480	0.5183	3085	0.0002	0.0003	0.0004	0.0014	0.0018	0.0024
13	0.2479	0.5177	3093	0.0005	0.0008	0.0009	0.0009	0.0009	0.0012
14	0.2473	0.5175	3109	0.0008	0.0009	0.0010	0.0009	0.0005	0.0011
15	0.2478	0.5181	3091	0.0008	0.0009	0.0010	0.0016	0.0016	0.0012
16	0.2487	0.5185	3065	0.0010	0.0012	0.0013	0.0019	0.0018	0.0024
17	0.2481	0.5188	3080	0.0011	0.0014	0.0013	0.0017	0.0017	0.0024
18	0.2463	0.5158	3149	0.0011	0.0013	0.0014	0.0016	0.0017	0.0015
19	0.2479	0.5181	3091	0.0011	0.0016	0.0017	0.0013	0.0010	0.0016
20	0.2481	0.5190	3078	0.0007	0.0011	0.0013	0.0022	0.0030	0.0027
21	0.2486	0.5188	3068	0.0007	0.0012	0.0014	0.0012	0.0019	0.0028
22	0.2474	0.5178	3104	0.0006	0.0012	0.0014	0.0008	0.0006	0.0015
Ave.	0.2479	0.5181	3091	0.0007	0.0010	0.0011	0.0015	0.0017	0.0020
Med.	0.2479	0.5183	3090	0.0007	0.0010	0.0012	0.0014	0.0017	0.0020
st dev	0.0005	0.0010	19.8817	0.0002	0.0003	0.0003	0.0005	0.0006	0.0005
Min.	0.2463	0.5156	3057	0.0002	0.0003	0.0004	0.0006	0.0005	0.0011
Max.	0.2487	0.5198	3149	0.0011	0.0016	0.0017	0.0022	0.0030	0.0029



3.3 Data Set 2, 85 °C, 200mA (Lumen Maintenance)

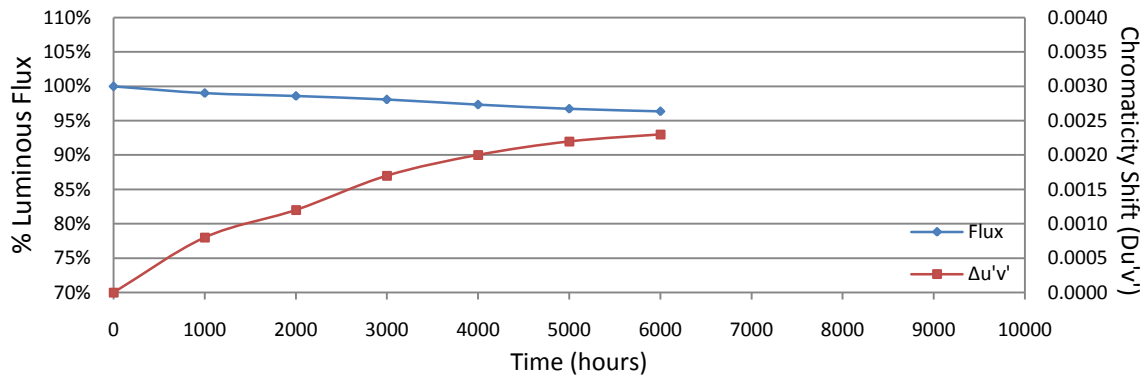
No.	V _F (V)	Φ(lm)	Lumen Maintenance (%)					
	0hr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
23	26.04	643.5	98.63	98.14	97.95	97.16	96.29	95.85
24	25.93	632.3	98.92	98.50	97.91	96.74	95.94	95.68
25	26.44	640.0	99.16	98.66	98.09	97.16	96.66	95.89
26	25.99	647.6	99.09	98.36	97.82	97.16	96.14	95.92
27	26.45	633.6	98.99	98.48	98.22	97.35	97.14	96.84
28	26.34	641.7	98.66	98.24	97.48	96.70	95.75	95.28
29	26.24	649.2	98.86	98.55	97.66	96.78	95.83	95.07
30	26.03	641.7	98.74	98.52	97.87	97.07	96.59	96.57
31	25.87	648.2	98.83	98.58	98.15	97.55	96.65	96.54
32	26.37	658.1	98.63	97.92	97.33	96.47	96.08	95.49
33	26.04	637.3	98.95	98.42	97.80	97.38	96.56	96.42
34	25.89	648.5	98.83	98.23	98.20	97.83	97.18	96.95
35	26.02	651.4	99.25	98.53	98.33	97.97	97.18	96.71
36	26.01	649.0	99.85	99.32	98.67	98.14	97.35	97.06
37	26.16	656.6	99.03	98.58	99.21	98.48	98.00	97.56
38	26.40	636.1	99.18	98.70	98.16	97.44	96.75	96.45
39	26.09	648.5	99.34	98.81	98.43	97.50	96.79	96.19
40	26.03	642.8	99.30	99.22	98.46	97.96	97.43	97.12
41	26.16	640.4	98.86	98.81	98.16	97.64	97.41	97.19
42	26.28	634.7	98.93	98.52	97.48	96.86	96.27	95.64
43	26.20	646.0	98.62	98.34	97.49	96.55	96.21	95.98
44	26.15	652.6	99.31	99.07	98.39	97.61	97.59	96.87
Ave.	26.14	644.5	99.00	98.57	98.06	97.34	96.72	96.33
Med.	26.12	644.8	98.94	98.52	98.12	97.36	96.65	96.43
st dev	0.1774	7.1951	0.2970	0.3350	0.4440	0.5369	0.6255	0.6785
Min.	25.87	632.3	98.62	97.92	97.33	96.47	95.75	95.07
Max.	26.45	658.1	99.85	99.32	99.21	98.48	98.00	97.56

TM-21 Projection:

Test Duration: 6000 hours
Failures Observed: 0
 α : 5.740E-06
 β : 0.996
Calculated L₇₀: 62,000 hours
Reported L₇₀: >36,000 hours

3.4 Data Set 2, 85 °C, 200mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift ($\Delta u'v'$)					
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
23	0.2484	0.5186	3073	0.0008	0.0013	0.0014	0.0018	0.0023	0.0021
24	0.2478	0.5183	3090	0.0008	0.0013	0.0014	0.0017	0.0019	0.0014
25	0.2476	0.5184	3096	0.0007	0.0012	0.0017	0.0030	0.0042	0.0025
26	0.2482	0.5193	3073	0.0008	0.0012	0.0015	0.0013	0.0022	0.0035
27	0.2480	0.5181	3086	0.0007	0.0011	0.0014	0.0011	0.0004	0.0009
28	0.2486	0.5193	3064	0.0012	0.0013	0.0017	0.0026	0.0019	0.0028
29	0.2486	0.5199	3059	0.0018	0.0023	0.0026	0.0036	0.0028	0.0037
30	0.2484	0.5199	3064	0.0007	0.0014	0.0017	0.0025	0.0018	0.0019
31	0.2487	0.5193	3061	0.0007	0.0009	0.0015	0.0021	0.0021	0.0023
32	0.2484	0.5189	3072	0.0010	0.0013	0.0018	0.0015	0.0022	0.0017
33	0.2480	0.5180	3088	0.0007	0.0011	0.0017	0.0023	0.0024	0.0021
34	0.2482	0.5185	3080	0.0010	0.0012	0.0019	0.0024	0.0026	0.0023
35	0.2479	0.5191	3082	0.0008	0.0012	0.0018	0.0023	0.0027	0.0029
36	0.2473	0.5188	3101	0.0002	0.0008	0.0014	0.0014	0.0022	0.0025
37	0.2489	0.5189	3059	0.0007	0.0011	0.0016	0.0016	0.0006	0.0008
38	0.2484	0.5186	3072	0.0006	0.0012	0.0017	0.0019	0.0027	0.0017
39	0.2477	0.5191	3089	0.0007	0.0011	0.0017	0.0019	0.0017	0.0025
40	0.2479	0.5192	3082	0.0006	0.0009	0.0015	0.0028	0.0025	0.0020
41	0.2472	0.5168	3118	0.0006	0.0011	0.0017	0.0019	0.0027	0.0026
42	0.2477	0.5188	3090	0.0005	0.0010	0.0015	0.0018	0.0026	0.0026
43	0.2486	0.5188	3066	0.0006	0.0009	0.0015	0.0018	0.0028	0.0024
44	0.2482	0.5184	3081	0.0007	0.0012	0.0017	0.0011	0.0021	0.0025
Ave.	0.2481	0.5188	3079	0.0008	0.0012	0.0017	0.0020	0.0022	0.0023
Med.	0.2482	0.5188	3081	0.0007	0.0012	0.0017	0.0019	0.0023	0.0024
st dev	0.0005	0.0007	14.9588	0.0003	0.0003	0.0003	0.0006	0.0008	0.0007
Min.	0.2472	0.5168	3059	0.0002	0.0008	0.0014	0.0011	0.0004	0.0008
Max.	0.2489	0.5199	3118	0.0018	0.0023	0.0026	0.0036	0.0042	0.0037



3.5 Data Set 3, 105 °C, 200mA (Lumen Maintenance)

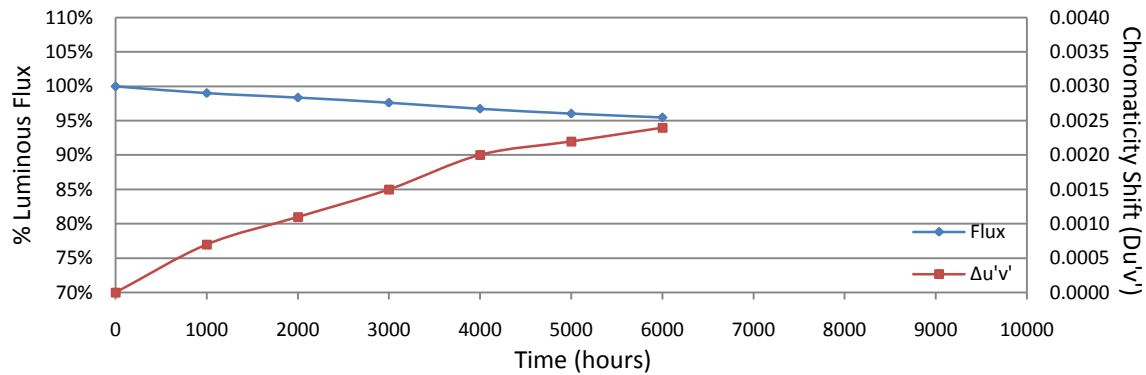
No.	V _F (V)	Φ(lm)	Lumen Maintenance (%)					
	0hr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
45	26.31	639.0	99.01	98.48	97.79	96.73	95.92	95.31
46	26.17	645.4	98.99	98.22	97.57	97.07	96.16	95.32
47	26.05	648.0	99.15	98.67	98.02	97.13	96.67	96.11
48	26.20	639.6	98.95	98.55	97.72	96.89	95.95	95.29
49	26.24	648.5	99.03	98.57	97.67	96.75	96.31	95.81
50	26.08	648.2	99.35	98.72	98.21	97.42	97.16	96.84
51	26.41	635.7	98.87	98.54	97.84	97.06	96.07	95.33
52	26.29	633.8	98.97	98.37	98.01	97.18	96.45	95.55
53	26.07	641.5	99.08	98.07	97.68	95.88	94.86	94.50
54	26.35	637.9	99.03	98.21	97.52	97.02	95.85	95.69
55	25.99	639.0	98.89	98.47	97.98	96.85	96.48	96.06
56	26.18	639.4	99.12	98.20	97.79	96.67	95.93	95.87
57	26.32	632.3	99.04	97.96	97.31	96.28	95.40	95.14
58	26.26	643.2	98.63	97.89	97.25	96.10	95.60	95.18
59	26.26	632.8	99.05	98.44	97.49	96.78	95.97	95.73
60	26.30	638.0	99.17	98.43	97.38	96.46	95.47	95.25
61	26.20	636.0	99.09	98.52	97.91	96.70	96.35	96.05
62	26.24	636.8	98.90	98.65	97.71	96.69	95.74	94.60
63	25.97	641.9	98.91	98.33	97.55	96.73	96.15	95.45
64	25.91	632.0	99.22	98.28	97.31	96.11	95.71	94.97
65	26.48	636.3	98.54	97.64	96.83	96.20	96.18	95.29
66	26.18	644.5	98.63	98.03	97.15	97.01	96.25	95.25
Ave.	26.20	639.5	98.98	98.33	97.62	96.71	96.03	95.48
Med.	26.22	639.0	99.02	98.40	97.67	96.74	96.02	95.32
st dev	0.1442	5.1046	0.1938	0.2787	0.3303	0.3981	0.4818	0.5227
Min.	25.91	632.0	98.54	97.64	96.83	95.88	94.86	94.50
Max.	26.48	648.5	99.35	98.72	98.21	97.42	97.16	96.84

TM-21 Projection:

Test Duration: 6000 hours
Failures Observed: 0
 α : 7.439E-06
 β : 0.997
Calculated L₇₀: 48,000 hours
Reported L₇₀: >36,000 hours

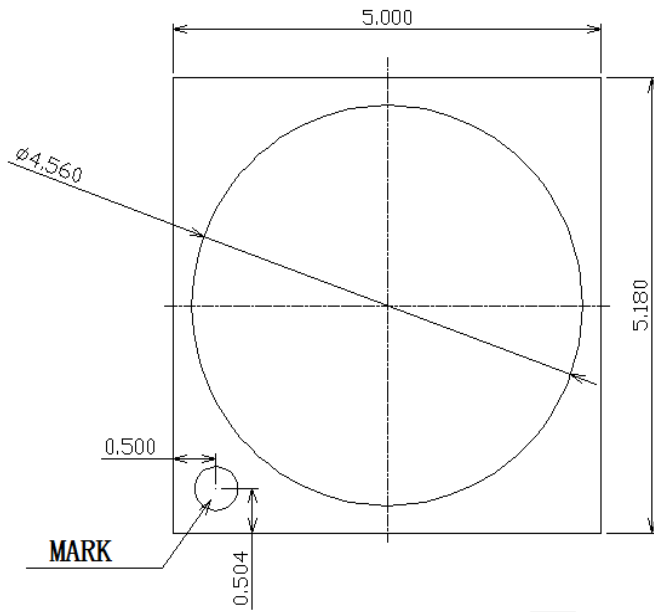
3.6 Data Set 3, 105 °C, 200mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift ($\Delta u'v'$)					
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
45	0.2481	0.5185	3081	0.0008	0.0010	0.0017	0.0022	0.0023	0.0026
46	0.2486	0.5190	3066	0.0009	0.0013	0.0019	0.0012	0.0023	0.0029
47	0.2476	0.5196	3088	0.0006	0.0011	0.0017	0.0030	0.0022	0.0019
48	0.2481	0.5183	3082	0.0006	0.0011	0.0018	0.0015	0.0013	0.0014
49	0.2482	0.5196	3073	0.0006	0.0011	0.0018	0.0031	0.0016	0.0015
50	0.2473	0.5192	3097	0.0006	0.0011	0.0017	0.0023	0.0011	0.0028
51	0.2483	0.5187	3075	0.0008	0.0010	0.0017	0.0022	0.0020	0.0019
52	0.2485	0.5187	3070	0.0006	0.0009	0.0016	0.0006	0.0009	0.0018
53	0.2482	0.5186	3079	0.0008	0.0011	0.0017	0.0028	0.0028	0.0024
54	0.2460	0.5162	3155	0.0008	0.0011	0.0017	0.0006	0.0006	0.0011
55	0.2480	0.5189	3080	0.0010	0.0012	0.0023	0.0035	0.0026	0.0017
56	0.2482	0.5182	3081	0.0002	0.0009	0.0004	0.0005	0.0008	0.0014
57	0.2481	0.5180	3086	0.0001	0.0011	0.0013	0.0031	0.0032	0.0030
58	0.2487	0.5184	3068	0.0009	0.0013	0.0013	0.0027	0.0022	0.0031
59	0.2475	0.5181	3100	0.0008	0.0009	0.0011	0.0021	0.0029	0.0036
60	0.2475	0.5189	3093	0.0006	0.0011	0.0011	0.0021	0.0032	0.0024
61	0.2471	0.5180	3110	0.0006	0.0011	0.0013	0.0018	0.0025	0.0016
62	0.2479	0.5183	3089	0.0007	0.0011	0.0013	0.0020	0.0031	0.0026
63	0.2478	0.5191	3084	0.0006	0.0010	0.0011	0.0013	0.0021	0.0021
64	0.2483	0.5180	3079	0.0006	0.0010	0.0012	0.0019	0.0030	0.0033
65	0.2484	0.5196	3066	0.0008	0.0012	0.0012	0.0018	0.0023	0.0033
66	0.2483	0.5193	3071	0.0007	0.0013	0.0014	0.0024	0.0035	0.0046
Ave.	0.2479	0.5186	3085	0.0007	0.0011	0.0015	0.0020	0.0022	0.0024
Med.	0.2481	0.5187	3081	0.0007	0.0011	0.0015	0.0021	0.0023	0.0024
st dev	0.0006	0.0008	19.2707	0.0002	0.0001	0.0004	0.0008	0.0008	0.0009
Min.	0.2460	0.5162	3066	0.0001	0.0009	0.0004	0.0005	0.0006	0.0011
Max.	0.2487	0.5196	3155	0.0010	0.0013	0.0023	0.0035	0.0035	0.0046



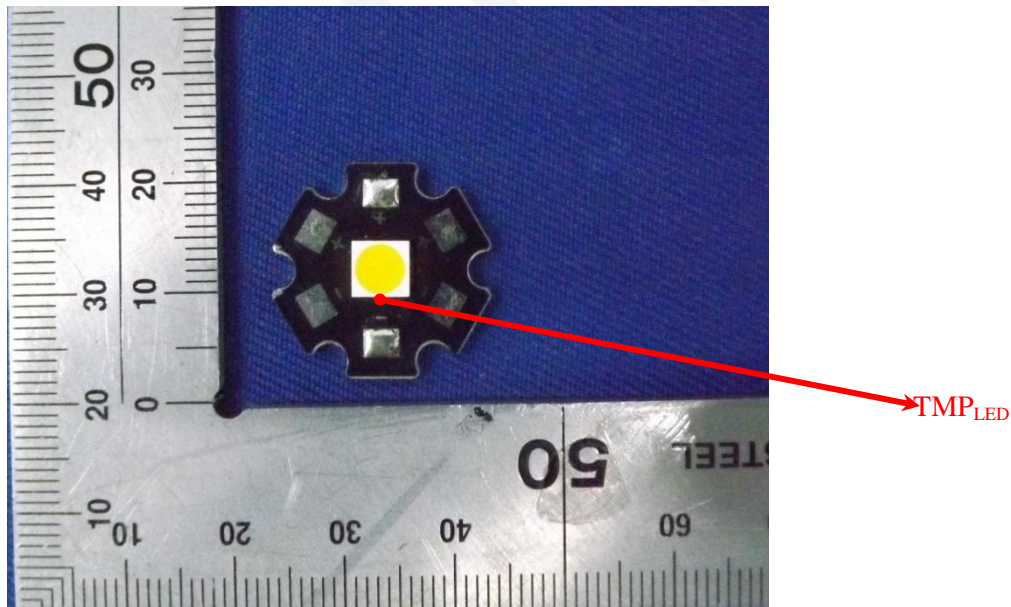
Attachment A – EUT PHOTO

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



All dimensions are in millimeter

A.2 EUT Photo



Attachment B – Family declaration Letter

Fujian Lightning Optoelectronic Co.,Ltd.Shenzhen Branch

Building B ,Wen Tao Technological Park,YingrenshiCommunity,ShiyanStreet,BaoanDistrict,Shenzhen,China

ATTESTATION OF SIMILARITY

To Whom It May Concern:

Fujian Lightning Optoelectronic Co.,Ltd.Shenzhen Branch. hereby attest LED5050 EMC 200mA series are designed with identical material and construction processes. And the tested model T5C30881*-* are tested by BACL, the results of which are featured in BACL project RSZ150414502-10. The first "*" and "***" means the Internal code number. It can be Numbers or letters.

The tested model and the other LED package which attest similarity are designed with identical material and identical construction processes. The differences between the tested model and the other LEDpackage which attest similarity are only CCT and internal code. and listed in the following table:

Series Name	Model Name	CCT(K)	Number of Dies	Current (mA)	Volt (v)
EMC5050	T5C30881*-*	3000	8	200	26
EMC5050	T5C27781*-*	2700	8	200	26
EMC5050	T5C27881*-*	2700	8	200	26
EMC5050	T5C27981*-*	2700	8	200	26
EMC5050	T5C30781*-*	3000	8	200	26
EMC5050	T5C30981*-*	3000	8	200	26
EMC5050	T5C35781*-*	3500	8	200	26
EMC5050	T5C35881*-*	3500	8	200	26
EMC5050	T5C35981*-*	3500	8	200	26
EMC5050	T5C40781*-*	4000	8	200	26
EMC5050	T5C40881*-*	4000	8	200	26
EMC5050	T5C40981*-*	4000	8	200	26
EMC5050	T5C45781*-*	4500	8	200	26
EMC5050	T5C45881*-*	4500	8	200	26
EMC5050	T5C45981*-*	4500	8	200	26
EMC5050	T5C50781*-*	5000	8	200	26
EMC5050	T5C50881*-*	5000	8	200	26
EMC5050	T5C50981*-*	5000	8	200	26
EMC5050	T5C57781*-*	5700	8	200	26
EMC5050	T5C57881*-*	5700	8	200	26
EMC5050	T5C57981*-*	5700	8	200	26
EMC5050	T5C61781*-*	6100	8	200	26
EMC5050	T5C61881*-*	6100	8	200	26
EMC5050	T5C61981*-*	6100	8	200	26
EMC5050	T5C65781*-*	6500	8	200	26
EMC5050	T5C65881*-*	6500	8	200	26
EMC5050	T5C65981*-*	6500	8	200	26

Signature: *Ray 2016.1.6*

Print name: Ray yuan

Title: NPI Manager

LIGHTNING OPTOELECTRONIC TECHNOLOGY(SZ) Co.,LTD.

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