



IESNA LM-80-2008

MEASURING LUMEN MAINTENANCE OF LED LIGHT SOURCES

MEASUREMENT AND TEST REPORT

For

Fujian Lightning Optoelectronic Co., Ltd. Shenzhen Branch

5F, Building B, second phase of Chuangjian Industrial Area, YingRenShi community, Shiyan Street, Baoan District, Shenzhen. 518108 China

Model: T5C

Report Type: 6000 Hours Test Report	Product Type: LED Package
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Report Number: RSZ150414501-10-6000	
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: 17-20V

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	T5C30861*-.**	3000	6	200	18
EMC5050	T5C27761*-.**	2700	6	200	18
EMC5050	T5C27861*-.**	2700	6	200	18
EMC5050	T5C27961*-.**	2700	6	200	18
EMC5050	T5C30761*-.**	3000	6	200	18
EMC5050	T5C30961*-.**	3000	6	200	18
EMC5050	T5C35761*-.**	3500	6	200	18
EMC5050	T5C35861*-.**	3500	6	200	18
EMC5050	T5C35961*-.**	3500	6	200	18
EMC5050	T5C40761*-.**	4000	6	200	18
EMC5050	T5C40861*-.**	4000	6	200	18
EMC5050	T5C40961*-.**	4000	6	200	18
EMC5050	T5C45761*-.**	4500	6	200	18
EMC5050	T5C45861*-.**	4500	6	200	18
EMC5050	T5C45961*-.**	4500	6	200	18
EMC5050	T5C50761*-.**	5000	6	200	18
EMC5050	T5C50861*-.**	5000	6	200	18
EMC5050	T5C50961*-.**	5000	6	200	18
EMC5050	T5C57761*-.**	5700	6	200	18
EMC5050	T5C57861*-.**	5700	6	200	18
EMC5050	T5C57961*-.**	5700	6	200	18
EMC5050	T5C61761*-.**	6100	6	200	18
EMC5050	T5C61861*-.**	6100	6	200	18
EMC5050	T5C61961*-.**	6100	6	200	18
EMC5050	T5C65761*-.**	6500	6	200	18
EMC5050	T5C65861*-.**	6500	6	200	18
EMC5050	T5C65961*-.**	6500	6	200	18

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	11090005	(50V/15A)	2015-03-05	2016-03-04
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090006	(50V/15A)	2015-03-05	2016-03-04
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090009	(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 =53.8 °C
Actual Ambient Temperature(T _A):	T _A =52.1 °C
Life Test Drive Current:	I _F = 200mA
Measurement Current:	I _F = 200mA

Data Set 2: 85 °C,200mA

Part Number:	T5C
Number of Units:	22
Actual Case Temperature(T _S):	T _S =84.1 °C
Actual Ambient Temperature(T _A):	T _A =82.7 °C
Life Test Drive Current:	I _F =200mA
Measurement Current:	I _F = 200mA

Data Set 3: 105 °C, 200mA

Part Number:	T5C
Number of Units:	22
Actual Case Temperature(T _S):	T _S =104.3 °C
Actual Ambient Temperature(T _A):	T _A =103.5 °C
Life Test Drive Current:	I _F = 200mA
Measurement Current:	I _F = 200mA

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:	97.31%
Average Chromaticity Shift at 6000 hours ($\Delta u'v'$):	0.0024
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:	96.52%
Average Chromaticity Shift at 6000 hours($\Delta u'v'$):	0.0021
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:	95.51%
Average Chromaticity Shift at 6000 hours($\Delta u'v'$):	0.0028
Reported TM-21 L ₇₀ Lifetime:	>36,000 hours

3 - Test Data

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

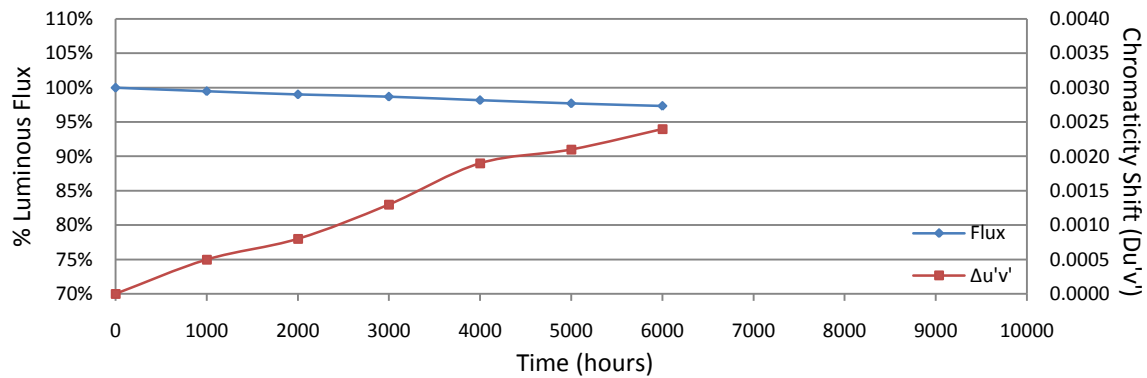
No.	V _F (V)	Φ(lm)	Lumen Maintenance (%)					
	0hr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	19.34	527.0	99.53	99.09	98.60	97.97	97.31	96.60
2	19.60	511.6	99.59	99.12	98.83	97.93	97.15	96.70
3	19.36	522.4	99.43	99.00	98.77	98.47	97.70	97.21
4	19.59	511.9	99.53	99.12	98.73	98.52	97.62	97.54
5	19.40	523.0	99.56	99.02	98.57	98.30	97.88	97.80
6	19.39	522.6	99.48	99.22	98.78	98.64	98.35	97.82
7	19.33	521.3	99.44	98.98	98.73	97.76	97.20	97.18
8	19.41	531.6	99.12	98.57	98.36	97.80	97.35	97.01
9	19.40	529.8	99.32	98.81	98.53	97.98	97.62	97.11
10	19.40	523.4	99.64	99.35	98.89	98.13	97.44	97.10
11	19.60	513.1	99.55	99.30	98.93	98.23	97.84	97.21
12	19.33	523.5	99.14	98.78	98.40	97.88	97.69	96.94
13	19.35	526.7	99.64	99.18	98.78	98.16	97.80	97.61
14	19.32	521.0	99.65	99.12	98.85	98.35	97.43	97.20
15	19.59	516.0	99.48	98.88	98.53	97.95	97.46	97.23
16	19.41	525.8	99.56	99.07	98.63	98.14	97.55	97.13
17	19.35	535.8	98.94	98.49	97.89	97.35	97.07	96.68
18	19.35	531.8	99.36	99.04	98.68	98.35	97.80	97.25
19	19.59	509.8	99.41	99.04	98.69	98.57	98.47	98.10
20	19.38	522.5	99.43	98.99	98.70	98.60	98.41	98.11
21	19.56	509.0	99.69	99.00	98.96	98.35	97.98	97.49
22	19.74	524.6	99.54	99.05	98.80	98.44	98.15	97.77
Ave.	19.45	522.0	99.46	99.01	98.66	98.17	97.69	97.31
Med.	19.40	522.8	99.50	99.04	98.71	98.19	97.66	97.21
st dev	0.1224	7.4273	0.1882	0.2069	0.2341	0.3249	0.3991	0.4261
Min.	19.32	509.0	98.94	98.49	97.89	97.35	97.07	96.60
Max.	19.74	535.8	99.69	99.35	98.96	98.64	98.47	98.11

TM-21 Projection:

Test Duration: 6000 hours
Failures Observed: 0
 α : 4.415E-06
 β : 0.999
Calculated L₇₀: 81,000 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	0.2444	0.5171	3191	0.0006	0.0009	0.0013	0.0017	0.0018	0.0020
2	0.2461	0.5188	3132	0.0005	0.0009	0.0011	0.0018	0.0019	0.0030
3	0.2463	0.5186	3128	0.0007	0.0010	0.0015	0.0023	0.0024	0.0031
4	0.2467	0.5192	3114	0.0005	0.0009	0.0013	0.0017	0.0019	0.0025
5	0.2465	0.5192	3119	0.0006	0.0008	0.0013	0.0018	0.0023	0.0021
6	0.2464	0.5191	3123	0.0008	0.0009	0.0013	0.0018	0.0023	0.0022
7	0.2458	0.5182	3143	0.0005	0.0008	0.0012	0.0018	0.0023	0.0024
8	0.2463	0.5196	3120	0.0005	0.0009	0.0013	0.0018	0.0022	0.0021
9	0.2458	0.5187	3141	0.0005	0.0008	0.0013	0.0016	0.0021	0.0022
10	0.2463	0.5187	3128	0.0005	0.0008	0.0013	0.0024	0.0026	0.0032
11	0.2469	0.5176	3121	0.0004	0.0007	0.0013	0.0015	0.0020	0.0023
12	0.2459	0.5189	3136	0.0004	0.0005	0.0019	0.0022	0.0018	0.0028
13	0.2460	0.5190	3133	0.0005	0.0006	0.0011	0.0020	0.0015	0.0014
14	0.2464	0.5185	3127	0.0006	0.0009	0.0014	0.0023	0.0019	0.0029
15	0.2465	0.5194	3117	0.0005	0.0007	0.0012	0.0019	0.0016	0.0021
16	0.2457	0.5192	3140	0.0004	0.0007	0.0013	0.0016	0.0014	0.0024
17	0.2465	0.5195	3116	0.0006	0.0008	0.0013	0.0016	0.0024	0.0023
18	0.2458	0.5182	3144	0.0004	0.0007	0.0012	0.0025	0.0031	0.0018
19	0.2464	0.5185	3127	0.0005	0.0007	0.0012	0.0025	0.0021	0.0026
20	0.2460	0.5193	3130	0.0006	0.0008	0.0011	0.0016	0.0016	0.0020
21	0.2463	0.5190	3125	0.0005	0.0007	0.0011	0.0024	0.0030	0.0026
22	0.2463	0.5187	3127	0.0004	0.0007	0.0011	0.0016	0.0017	0.0025
Ave.	0.2462	0.5188	3131	0.0005	0.0008	0.0013	0.0019	0.0021	0.0024
Med.	0.2463	0.5189	3128	0.0005	0.0008	0.0013	0.0018	0.0020	0.0023
st dev	0.0005	0.0006	15.9851	0.0001	0.0001	0.0002	0.0003	0.0004	0.0004
Min.	0.2444	0.5171	3114	0.0004	0.0005	0.0011	0.0015	0.0014	0.0014
Max.	0.2469	0.5196	3191	0.0008	0.0010	0.0019	0.0025	0.0031	0.0032



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

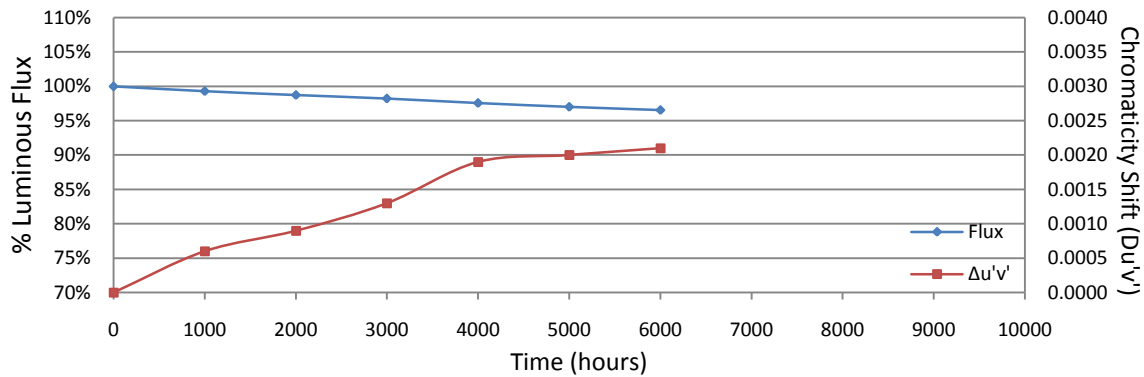
No.	V _F (V)	Φ(lm)	Lumen Maintenance (%)					
	0hr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
23	19.54	508.7	99.31	98.72	97.99	97.07	96.48	95.93
24	19.56	511.9	99.51	99.00	98.38	97.75	97.38	96.85
25	19.30	523.5	99.31	98.83	98.36	97.78	97.48	96.73
26	19.29	510.6	99.29	98.55	98.37	97.55	97.08	96.46
27	19.39	519.7	99.31	98.77	98.31	97.31	97.29	96.90
28	19.40	518.4	99.11	98.86	97.96	97.67	97.15	96.55
29	19.60	515.2	99.32	98.84	98.23	98.06	97.46	97.03
30	19.54	507.3	99.43	98.96	98.62	98.56	98.21	97.56
31	19.38	525.4	99.56	98.84	98.23	97.35	96.84	96.04
32	19.38	511.3	99.51	99.10	98.30	97.46	96.97	96.23
33	19.32	522.3	99.08	98.41	97.91	97.47	96.59	96.00
34	19.36	517.1	99.44	98.90	98.26	98.10	97.06	96.96
35	19.33	527.9	99.34	98.50	98.11	97.42	97.14	96.87
36	19.55	508.8	99.47	98.80	98.29	97.33	96.80	96.46
37	19.30	519.7	99.19	98.40	98.23	97.61	96.90	96.40
38	19.53	502.1	99.36	98.73	98.29	97.29	96.91	96.67
39	19.60	516.4	98.93	98.35	97.62	97.02	96.63	96.40
40	19.30	523.3	99.20	98.53	97.90	97.15	96.67	95.97
41	19.55	506.3	99.23	98.50	98.28	97.35	96.44	96.27
42	19.40	524.4	99.50	98.72	98.25	97.35	96.78	96.19
43	19.40	522.8	99.08	98.55	98.26	97.51	96.79	96.61
44	19.32	524.7	99.14	98.48	98.25	97.66	96.93	96.32
Ave.	19.42	516.7	99.30	98.70	98.20	97.54	97.00	96.52
Med.	19.40	517.8	99.31	98.72	98.25	97.47	96.92	96.46
st dev	0.1104	7.3409	0.1671	0.2129	0.2120	0.3590	0.3990	0.4073
Min.	19.29	502.1	98.93	98.35	97.62	97.02	96.44	95.93
Max.	19.60	527.9	99.56	99.10	98.62	98.56	98.21	97.56

TM-21 Projection:

Test Duration: 6000 hours
Failures Observed: 0
 α : 5.738E-06
 β : 0.999
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	0.2465	0.5190	3120	0.0005	0.0007	0.0009	0.0011	0.0009	0.0014
24	0.2462	0.5192	3127	0.0007	0.0009	0.0010	0.0014	0.0012	0.0008
25	0.2457	0.5183	3145	0.0006	0.0008	0.0010	0.0014	0.0022	0.0012
26	0.2464	0.5189	3124	0.0006	0.0010	0.0011	0.0018	0.0025	0.0020
27	0.2463	0.5187	3128	0.0007	0.0010	0.0011	0.0010	0.0013	0.0014
28	0.2468	0.5197	3108	0.0006	0.0010	0.0011	0.0023	0.0021	0.0020
29	0.2469	0.5186	3112	0.0007	0.0009	0.0012	0.0017	0.0019	0.0016
30	0.2469	0.5190	3110	0.0007	0.0009	0.0013	0.0016	0.0015	0.0021
31	0.2457	0.5192	3140	0.0006	0.0009	0.0013	0.0014	0.0017	0.0020
32	0.2467	0.5202	3105	0.0008	0.0011	0.0026	0.0037	0.0032	0.0040
33	0.2461	0.5184	3135	0.0005	0.0008	0.0013	0.0014	0.0009	0.0007
34	0.2465	0.5184	3126	0.0005	0.0009	0.0013	0.0029	0.0022	0.0011
35	0.2455	0.5185	3150	0.0005	0.0009	0.0013	0.0028	0.0030	0.0025
36	0.2467	0.5189	3115	0.0006	0.0008	0.0013	0.0012	0.0022	0.0023
37	0.2462	0.5186	3132	0.0007	0.0009	0.0012	0.0022	0.0028	0.0021
38	0.2462	0.5179	3137	0.0007	0.0009	0.0013	0.0022	0.0028	0.0030
39	0.2458	0.5175	3149	0.0005	0.0007	0.0012	0.0007	0.0008	0.0016
40	0.2447	0.5170	3184	0.0007	0.0009	0.0013	0.0023	0.0022	0.0022
41	0.2463	0.5178	3134	0.0006	0.0008	0.0012	0.0023	0.0025	0.0020
42	0.2457	0.5192	3141	0.0008	0.0010	0.0013	0.0022	0.0022	0.0032
43	0.2454	0.5184	3154	0.0007	0.0010	0.0013	0.0021	0.0026	0.0033
44	0.2460	0.5188	3134	0.0007	0.0009	0.0013	0.0018	0.0024	0.0030
Ave.	0.2461	0.5186	3132	0.0006	0.0009	0.0013	0.0019	0.0020	0.0021
Med.	0.2462	0.5187	3133	0.0007	0.0009	0.0013	0.0018	0.0022	0.0020
st dev	0.0006	0.0007	18.1506	0.0001	0.0001	0.0003	0.0007	0.0007	0.0008
Min.	0.2447	0.5170	3105	0.0005	0.0007	0.0009	0.0007	0.0008	0.0007
Max.	0.2469	0.5202	3184	0.0008	0.0011	0.0026	0.0037	0.0032	0.0040



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

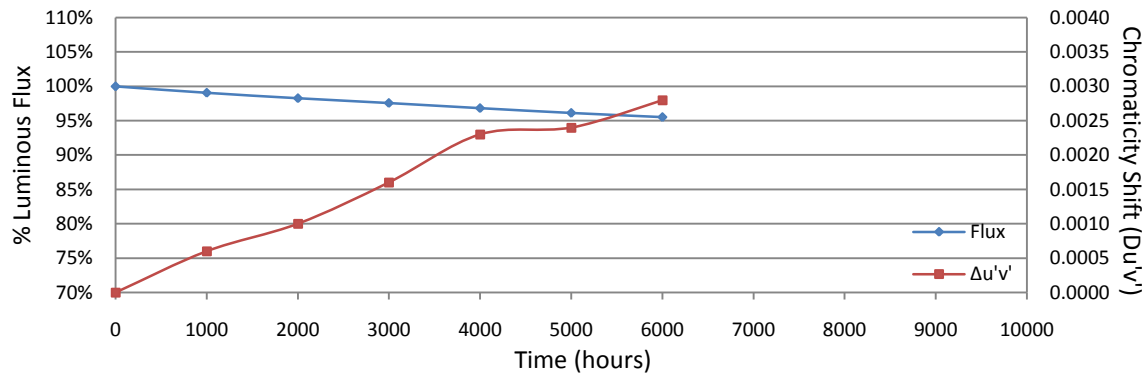
No.	V _F (V)	Φ(lm)	Lumen Maintenance (%)					
	0hr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
45	19.39	516.5	98.94	98.32	97.41	96.63	96.26	95.74
46	19.53	509.5	98.94	98.35	97.45	96.35	95.90	95.09
47	19.35	522.7	99.25	98.43	97.47	96.58	96.17	95.47
48	19.37	526.8	98.99	97.99	97.29	96.26	95.16	94.55
49	19.30	520.2	99.33	98.40	97.75	97.15	96.35	95.60
50	19.39	520.2	99.33	98.71	97.65	97.21	97.12	96.62
51	19.39	528.6	99.36	98.45	97.67	97.35	97.20	96.44
52	19.56	509.9	99.06	98.25	97.92	96.82	96.18	95.67
53	19.38	521.8	99.12	98.39	97.78	96.76	95.59	94.79
54	19.34	513.5	99.14	98.58	98.01	97.37	96.96	96.48
55	19.53	505.7	98.93	98.10	97.82	97.01	95.93	95.47
56	19.35	526.8	98.97	98.27	97.59	96.64	95.96	95.48
57	19.36	520.1	98.81	98.23	97.56	96.87	96.00	95.25
58	19.59	510.1	98.88	98.27	97.61	96.82	96.18	95.79
59	19.46	520.3	99.00	98.02	97.58	96.71	96.23	95.62
60	19.52	505.9	99.13	98.28	97.35	97.00	96.40	95.85
61	19.39	520.9	98.85	98.21	97.56	97.14	96.35	95.53
62	19.32	520.6	98.91	97.98	97.62	97.02	96.83	95.93
63	19.49	504.8	99.05	98.12	97.29	96.55	96.08	95.32
64	19.33	523.9	99.27	98.53	97.69	97.08	95.99	95.38
65	19.38	521.5	98.98	98.20	97.41	96.45	95.47	94.77
66	19.39	518.9	98.92	98.05	97.15	96.28	94.55	94.41
Ave.	19.41	517.7	99.05	98.28	97.57	96.82	96.13	95.51
Med.	19.39	520.2	99.00	98.27	97.58	96.82	96.17	95.50
st dev	0.0848	7.1674	0.1661	0.1937	0.2139	0.3315	0.6110	0.5769
Min.	19.30	504.8	98.81	97.98	97.15	96.26	94.55	94.41
Max.	19.59	528.6	99.36	98.71	98.01	97.37	97.20	96.62

TM-21 Projection:

Test Duration: 6000 hours
Failures Observed: 0
 α : 7.316E-06
 β : 0.997
Calculated L₇₀: 48,000 hours
Reported L₇₀: >36,000 hours

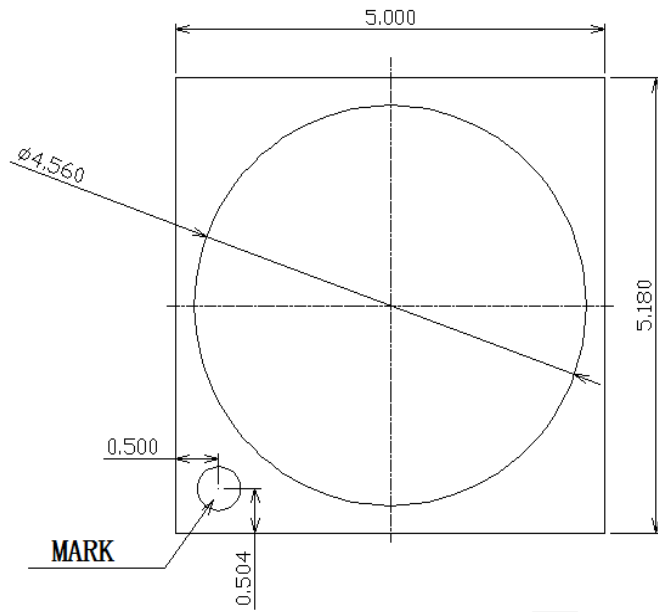
3.6 Data Set 3, 105 °C, 200mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift ($\Delta u'v'$)					
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
45	0.2460	0.5185	3137	0.0011	0.0012	0.0013	0.0021	0.0023	0.0033
46	0.2455	0.5175	3157	0.0009	0.0013	0.0012	0.0019	0.0022	0.0032
47	0.2460	0.5183	3138	0.0008	0.0011	0.0016	0.0009	0.0011	0.0020
48	0.2466	0.5195	3113	0.0018	0.0024	0.0030	0.0037	0.0035	0.0039
49	0.2465	0.5182	3126	0.0007	0.0009	0.0018	0.0028	0.0022	0.0020
50	0.2464	0.5184	3127	0.0005	0.0009	0.0016	0.0022	0.0025	0.0025
51	0.2466	0.5203	3109	0.0005	0.0010	0.0017	0.0020	0.0020	0.0022
52	0.2464	0.5183	3128	0.0003	0.0008	0.0016	0.0027	0.0029	0.0027
53	0.2460	0.5186	3136	0.0004	0.0009	0.0016	0.0022	0.0024	0.0030
54	0.2458	0.5185	3141	0.0004	0.0008	0.0015	0.0019	0.0020	0.0026
55	0.2462	0.5179	3137	0.0005	0.0009	0.0016	0.0026	0.0025	0.0025
56	0.2459	0.5188	3136	0.0005	0.0008	0.0016	0.0018	0.0023	0.0021
57	0.2462	0.5190	3128	0.0004	0.0009	0.0016	0.0023	0.0019	0.0026
58	0.2458	0.5187	3139	0.0006	0.0010	0.0017	0.0031	0.0026	0.0029
59	0.2463	0.5179	3134	0.0004	0.0010	0.0016	0.0019	0.0022	0.0024
60	0.2463	0.5184	3129	0.0006	0.0010	0.0016	0.0032	0.0033	0.0030
61	0.2460	0.5186	3136	0.0006	0.0009	0.0016	0.0025	0.0029	0.0029
62	0.2466	0.5190	3116	0.0006	0.0007	0.0016	0.0019	0.0026	0.0033
63	0.2462	0.5174	3139	0.0006	0.0009	0.0015	0.0011	0.0021	0.0027
64	0.2467	0.5191	3114	0.0006	0.0008	0.0014	0.0024	0.0022	0.0031
65	0.2465	0.5197	3113	0.0006	0.0011	0.0016	0.0028	0.0031	0.0032
66	0.2460	0.5193	3131	0.0007	0.0008	0.0014	0.0023	0.0027	0.0032
Ave.	0.2462	0.5186	3130	0.0006	0.0010	0.0016	0.0023	0.0024	0.0028
Med.	0.2462	0.5186	3133	0.0006	0.0009	0.0016	0.0022	0.0024	0.0028
st dev	0.0003	0.0007	11.5538	0.0003	0.0003	0.0003	0.0007	0.0005	0.0005
Min.	0.2455	0.5174	3109	0.0003	0.0007	0.0012	0.0009	0.0011	0.0020
Max.	0.2467	0.5203	3157	0.0018	0.0024	0.0030	0.0037	0.0035	0.0039



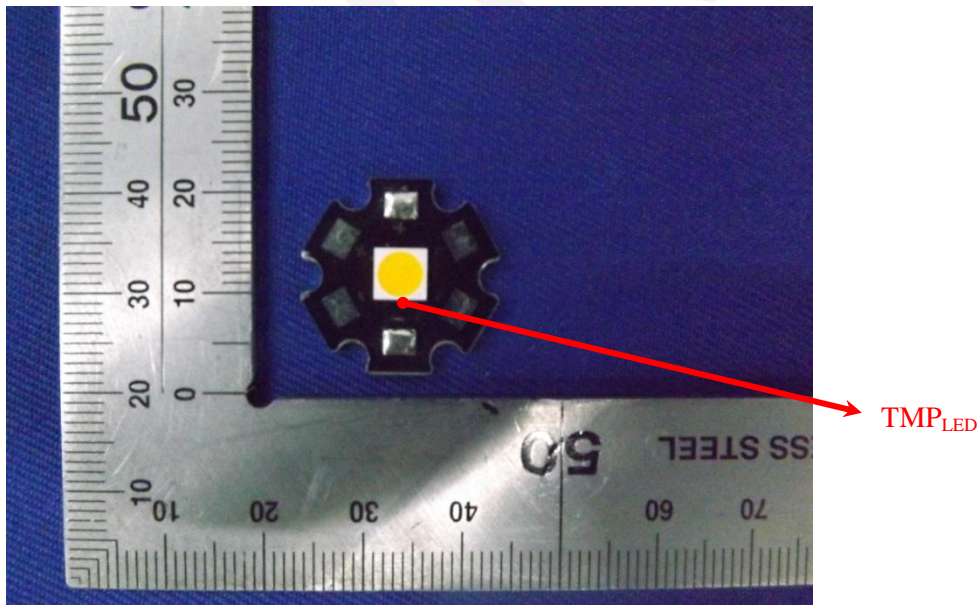
Attachment A – EUT PHOTO

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 T5C30861*-** are tested by BACL, the results of which are featured in BACL project RSZ150414501-10. 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	T5C30861*-**	3000	6	200	18
EMC5050	T5C27761*.-**	2700	6	200	18
EMC5050	T5C27861*.-**	2700	6	200	18
EMC5050	T5C27961*.-**	2700	6	200	18
EMC5050	T5C30761*.-**	3000	6	200	18
EMC5050	T5C30961*.-**	3000	6	200	18
EMC5050	T5C35761*.-**	3500	6	200	18
EMC5050	T5C35861*.-**	3500	6	200	18
EMC5050	T5C35961*.-**	3500	6	200	18
EMC5050	T5C40761*.-**	4000	6	200	18
EMC5050	T5C40861*.-**	4000	6	200	18
EMC5050	T5C40961*.-**	4000	6	200	18
EMC5050	T5C45761*.-**	4500	6	200	18
EMC5050	T5C45861*.-**	4500	6	200	18
EMC5050	T5C45961*.-**	4500	6	200	18
EMC5050	T5C50761*.-**	5000	6	200	18
EMC5050	T5C50861*.-**	5000	6	200	18
EMC5050	T5C50961*.-**	5000	6	200	18
EMC5050	T5C57761*.-**	5700	6	200	18
EMC5050	T5C57861*.-**	5700	6	200	18
EMC5050	T5C57961*.-**	5700	6	200	18
EMC5050	T5C61761*.-**	6100	6	200	18
EMC5050	T5C61861*.-**	6100	6	200	18
EMC5050	T5C61961*.-**	6100	5	200	18
EMC5050	T5C65761*.-**	6500	6	200	18
EMC5050	T5C65861*.-**	6500	6	200	18
EMC5050	T5C65961*.-**	6500	6	200	18

Signature: *Ray 2016.1.6*

Print name: Ray Yuan

Title: NPI Manager

LIGHTNING OPTOELECTRONIC TECHNOLOGY(SZ) Co.,LTD.

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