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:T7C308C1R-***

Report Type: 6000 Hours Test Report	**Product Type:** LED Package
Test Engineer:	Bill Xiong, Pote Wang
Report Number:	RSZ150825502-10
Test Date:	2015-09-11 to 2016-05-18
Report Date:	2016-05-26
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1 - General Information

1.1 Description of LED Light Sources

Devices tested

Part Number: T7C308C1R-*****
Part Type: LED Package
Nominal CCT: 3000K

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)	Series Name	Model Name	CCT(K)
EMC7070	T7C277C1R-*****	2700	EMC7070	T7C507C1R-*****	5000
EMC7070	T7C278C1R-*****	2700	EMC7070	T7C508C1R-*****	5000
EMC7070	T7C279C1R-*****	2700	EMC7070	T7C509C1R-*****	5000
EMC7070	T7C27CC1R-*****	2700	EMC7070	T7C50CC1R-*****	5000
EMC7070	T7C307C1R-*****	3000	EMC7070	T7C537C1R-*****	5300
EMC7070	T7C308C1R-*****	3000	EMC7070	T7C538C1R-*****	5300
EMC7070	T7C309C1R-*****	3000	EMC7070	T7C539C1R-*****	5300
EMC7070	T7C30CC1R-*****	3000	EMC7070	T7C53CC1R-*****	5300
EMC7070	T7C357C1R-*****	3500	EMC7070	T7C577C1R-*****	5700
EMC7070	T7C358C1R-*****	3500	EMC7070	T7C578C1R-*****	5700
EMC7070	T7C359C1R-*****	3500	EMC7070	T7C579C1R-*****	5700
EMC7070	T7C35CC1R-*****	3500	EMC7070	T7C657C1R-*****	6500
EMC7070	T7C407C1R-*****	4000	EMC7070	T7C658C1R-*****	6500
EMC7070	T7C408C1R-*****	4000	EMC7070	T7C659C1R-*****	6500
EMC7070	T7C409C1R-*****	4000			
EMC7070	T7C40CC1R-*****	4000			
EMC7070	T7C457C1R-*****	4500			
EMC7070	T7C458C1R-*****	4500			
EMC7070	T7C459C1R-*****	4500			
EMC7070	T7C45CC1R-*****	4500			

Note: The "*****" in the models means the internal code number. It can be numbers or letters.

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	0.3m	2016-03-10	2017-03-09
Programmable Test Power for LEDs	EVERFINE	LED300E	1008002	15V/2000mA	2016-03-04	2017-03-03
High accuracy array spectroradiometer	EVERFINE	HAAS-2000	1012016T	380-780nm	2016-03-10	2017-03-09
Standard Light Source	EVERFINE	D062	1011093	3000K	2015-09-17	2016-09-16
Precision digital stabilized DC power supply	EVERFINE	WY605-V110	G115987CJ7321114	300VA	2016-03-04	2017-03-03
Multilayer aging machine	BACL	B2-270	20024	25℃~110℃	2016-03-04	2017-03-03
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11060002	(50/15A)	2015-07-08	2016-07-07
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090007	(50/15A)	2016-03-04	2017-03-03
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090005	(50/15A)	2016-03-04	2017-03-03

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 69Pcs;
Each Ts test condition 23Pcs
The samples tested at Ts 55℃, Ts 85℃ and Ts 105℃ were received at 2015-08-27 and tested during 2015-09-11 to 2016-05-18. The samples were numbered from 1 to 23, 24 to 46 and 47 to 69

Data Set 1: 55℃,200mA	
Part Number:	T7C308C1R-*****
Number of Units:	23
Actual Case Temperature(T_S):	TS =54.2℃
Actual Ambient Temperature(T_A):	TA =53.1℃
Life Test Drive Current:	IF = 200mA
Measurement Current:	IF = 200mA

Data Set 2: 85℃,200mA	
Part Number:	T7C308C1R-*****
Number of Units:	23
Actual Case Temperature(T_S):	TS =84.1℃
Actual Ambient Temperature(T_A):	TA =82.5℃
Life Test Drive Current:	IF =200mA
Measurement Current:	IF = 200mA

Data Set 3: 105℃, 200mA	
Part Number:	T7C308C1R-*****
Number of Units:	23
Actual Case Temperature(T_S):	TS =104.5℃
Actual Ambient Temperature(T_A):	TA =103.1℃
Life Test Drive Current:	IF = 200mA
Measurement Current:	IF = 200mA

2 - Summary of Test Result

Data Set:	**Data Set 1, 55 ℃,200mA**
Number of Units:	23
Failures Observed:	0
Test Interval and Test Duration:	0h,1000h,2000h,3000h,4000h,5000h,6000h
Average. Lumen Maintenance at 6000 hours:	98.29%
Average Chromaticity Shift at 6000 hours (Δu'v'):	0.0022
Reported TM-21 L_{70} Lifetime:	>36000 hours

Data Set:	**Data Set 2, 85 ℃, 200mA**
Number of Units:	23
Failures Observed:	0
Test Interval and Test Duration:	0h,1000h,2000h,3000h,4000h,5000h,6000h
Average. Lumen Maintenance at 6000 hours:	97.94%
Average Chromaticity Shift at 6000 hours(Δu'v'):	0.0029
Reported TM-21 L_{70} Lifetime:	>36000 hours

Data Set:	**Data Set 3, 105 ℃, 200mA**
Number of Units:	23
Failures Observed:	0
Test Interval and Test Duration:	0h,1000h,2000h,3000h,4000h,5000h,6000h
Average. Lumen Maintenance at 6000 hours:	97.18%
Average Chromaticity Shift at 6000 hours(Δu'v'):	0.0033
Reported TM-21 L_{70} Lifetime:	>36000 hours

3 - Test Data

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

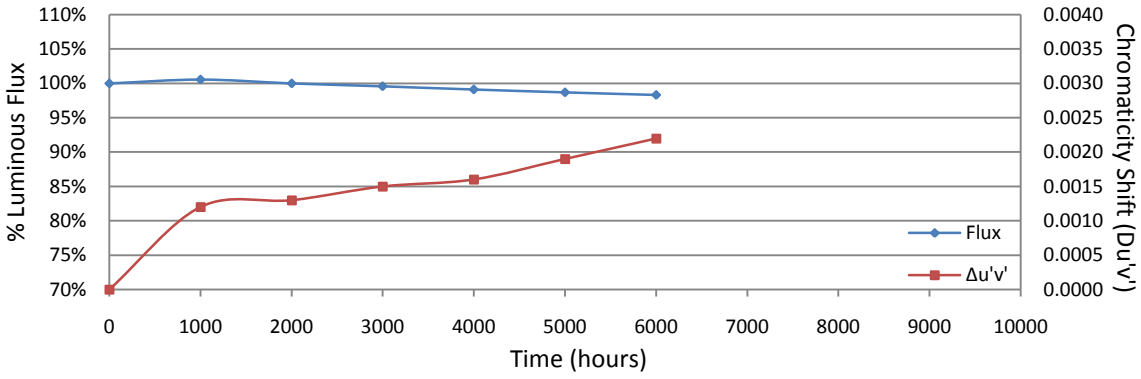
No.	V_F(V)	Φ(lm)	Lumen Maintenance (%)					
	0hr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	36.06	1051	100.19	99.33	98.57	98.19	97.91	97.43
2	35.97	1067	100.28	99.91	99.16	98.69	98.41	97.94
3	35.96	1058	100.28	99.34	99.05	98.87	98.20	97.92
4	35.96	1053	100.85	100.57	99.81	99.15	98.67	98.20
5	36.03	1051	100.67	100.48	99.71	99.33	98.95	98.38
6	35.96	1057	100.19	100.09	99.62	99.15	98.86	98.58
7	35.86	1055	100.09	99.72	99.24	98.67	98.48	97.91
8	36.05	1061	100.57	99.72	99.43	98.77	98.30	98.11
9	35.99	1054	100.85	100.19	99.91	99.34	99.15	98.96
10	36.07	1067	100.37	99.63	99.53	98.97	98.41	98.13
11	35.95	1034	101.16	100.58	100.48	100.00	99.61	99.23
12	36.22	1033	100.87	100.48	99.90	99.32	98.94	98.74
13	35.96	1054	100.38	100.28	99.72	99.24	98.77	98.39
14	36.03	1059	100.19	99.43	99.24	98.77	98.30	97.64
15	36.10	1065	100.09	99.91	99.25	98.97	98.69	98.31
16	35.97	1057	100.19	99.72	99.43	99.15	98.86	98.39
17	35.93	1055	101.04	100.09	99.72	99.43	99.15	98.96
18	35.89	1032	100.97	100.10	99.81	99.71	99.42	98.84
19	35.97	1059	101.04	100.38	99.72	99.15	98.58	98.39
20	35.95	1055	100.38	99.62	99.34	98.96	98.39	97.73
21	36.02	1059	100.76	100.28	99.53	99.15	98.68	98.49
22	35.95	1049	100.57	100.19	99.90	99.33	98.67	98.00
23	36.01	1062	100.19	99.81	99.34	98.68	98.31	98.12
Ave.	35.99	1054	100.53	99.99	99.54	99.09	98.68	98.29
Med.	35.97	1055	100.38	100.09	99.53	99.15	98.67	98.31
st dev	0.08	10	0.3480	0.3876	0.3841	0.3818	0.4045	0.4521
Min.	35.86	1032	100.09	99.33	98.57	98.19	97.91	97.43
Max.	36.22	1067	101.16	100.58	100.48	100.00	99.61	99.23

TM-21 Projection:

Test Duration: 6000 hours
Failures Observed: 0
α: 4.479E-06
β: 1.009
Calculated L_{70}: 82000 hours
Reported L_{70}: >36000 hours

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

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')					
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	0.2469	0.5157	3134	0.0013	0.0015	0.0015	0.0017	0.0023	0.0028
2	0.2475	0.5169	3110	0.0007	0.0006	0.0010	0.0011	0.0016	0.0021
3	0.2476	0.5168	3108	0.0013	0.0018	0.0021	0.0021	0.0028	0.0030
4	0.2474	0.5164	3115	0.0005	0.0004	0.0009	0.0012	0.0016	0.0020
5	0.2475	0.5169	3110	0.0006	0.0001	0.0005	0.0012	0.0015	0.0018
6	0.2474	0.5163	3116	0.0007	0.0003	0.0007	0.0009	0.0013	0.0017
7	0.2466	0.5177	3127	0.0016	0.0012	0.0011	0.0011	0.0017	0.0022
8	0.2476	0.5170	3104	0.0014	0.0009	0.0007	0.0008	0.0013	0.0019
9	0.2465	0.5146	3154	0.0011	0.0007	0.0008	0.0008	0.0016	0.0019
10	0.2478	0.5167	3102	0.0015	0.0014	0.0022	0.0031	0.0034	0.0035
11	0.2476	0.5160	3113	0.0015	0.0014	0.0015	0.0013	0.0013	0.0019
12	0.2477	0.5155	3113	0.0016	0.0016	0.0016	0.0013	0.0018	0.0023
13	0.2474	0.5173	3109	0.0013	0.0016	0.0014	0.0011	0.0013	0.0021
14	0.2477	0.5168	3106	0.0016	0.0018	0.0018	0.0014	0.0017	0.0025
15	0.2474	0.5169	3111	0.0012	0.0013	0.0014	0.0013	0.0014	0.0019
16	0.2475	0.5168	3109	0.0012	0.0016	0.0020	0.0017	0.0018	0.0017
17	0.2478	0.5164	3105	0.0012	0.0019	0.0022	0.0022	0.0024	0.0023
18	0.2470	0.5148	3139	0.0012	0.0019	0.0017	0.0021	0.0021	0.0021
19	0.2471	0.5164	3124	0.0009	0.0016	0.0019	0.0018	0.0019	0.0016
20	0.2473	0.5155	3125	0.0014	0.0017	0.0023	0.0021	0.0026	0.0025
21	0.2476	0.5168	3107	0.0013	0.0016	0.0021	0.0018	0.0021	0.0022
22	0.2477	0.5170	3102	0.0010	0.0010	0.0015	0.0017	0.0021	0.0025
23	0.2478	0.5165	3105	0.0013	0.0017	0.0021	0.0026	0.0028	0.0031
Ave.	0.2474	0.5164	3115.1	0.0012	0.0013	0.0015	0.0016	0.0019	0.0022
Med.	0.2475	0.5167	3110.0	0.0013	0.0015	0.0015	0.0014	0.0018	0.0021
st dev	0.0004	0.0008	13.1	0.0003	0.0005	0.0005	0.0006	0.0006	0.0005
Min.	0.2465	0.5146	3102.0	0.0005	0.0001	0.0005	0.0008	0.0013	0.0016
Max.	0.2478	0.5177	3154.0	0.0016	0.0019	0.0023	0.0031	0.0034	0.0035



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

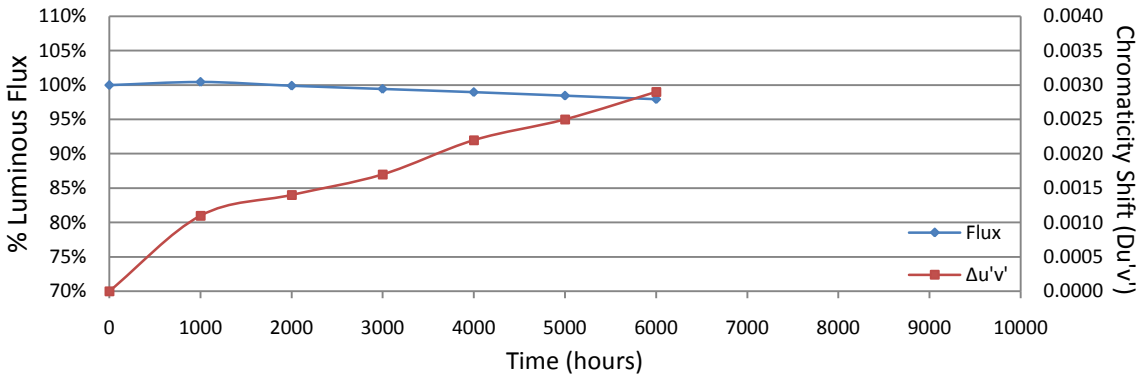
No.	V_F(V)	Φ(lm)	Lumen Maintenance (%)					
	0hr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
24	35.94	1034.0	100.87	100.19	99.90	99.71	99.13	98.65
25	35.97	1047.0	100.29	100.19	99.81	99.62	99.04	98.47
26	36.38	1007.0	100.30	99.90	99.60	99.29	98.64	98.11
27	36.04	1029.0	100.10	99.90	99.51	98.93	98.54	98.06
28	35.91	1037.0	100.29	99.52	99.42	98.84	98.46	97.88
29	35.90	1044.0	100.48	99.33	98.75	98.66	97.99	97.51
30	35.92	1055.0	100.47	100.28	99.72	99.15	98.48	98.01
31	35.97	1061.0	100.38	100.09	99.34	98.87	98.40	97.93
32	36.00	1051.0	100.67	99.81	99.62	99.33	99.05	98.57
33	35.94	1057.0	100.57	100.19	99.43	99.05	98.39	97.82
34	36.00	1051.0	100.10	99.81	99.14	98.95	98.19	97.53
35	36.30	989.0	100.72	100.24	100.13	99.70	99.24	98.76
36	35.90	1025.0	100.39	99.90	99.71	99.12	98.73	98.15
37	35.91	1039.0	100.29	99.62	99.04	98.36	97.59	97.21
38	36.30	977.1	100.50	99.51	99.35	99.03	98.79	98.34
39	35.89	1056.0	100.09	99.81	99.15	98.67	98.11	97.73
40	36.00	1050.0	100.57	100.19	99.81	99.52	98.86	98.48
41	36.22	1031.0	100.58	99.22	98.64	98.06	97.87	97.28
42	35.98	1068.0	100.47	99.63	99.16	98.41	98.13	97.75
43	35.91	1044.0	100.38	99.71	99.43	98.66	98.08	97.51
44	35.96	1053.0	100.38	99.81	99.05	98.39	97.82	97.44
45	35.90	1034.0	100.48	100.29	99.52	98.84	98.16	97.68
46	35.96	1048.0	100.57	100.19	99.43	98.66	98.19	97.71
Ave.	36.01	1038.6	100.43	99.88	99.42	98.95	98.43	97.94
Med.	35.96	1044.0	100.47	99.90	99.43	98.93	98.40	97.88
st dev	0.14	22.1	0.1967	0.3147	0.3610	0.4455	0.4507	0.4456
Min.	35.89	977.1	100.09	99.22	98.64	98.06	97.59	97.21
Max.	36.38	1068.0	100.87	100.29	100.13	99.71	99.24	98.76

TM-21 Projection:

Test Duration: 6000 hours
Failures Observed: 0
α: 4.975E-06
β: 1.009
Calculated L_{70}: 74000 hours
Reported L_{70}: >36000 hours

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

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')					
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
24	0.2470	0.5158	3131	0.0012	0.0016	0.0018	0.0023	0.0025	0.0028
25	0.2470	0.5166	3123	0.0008	0.0009	0.0011	0.0019	0.0023	0.0029
26	0.2473	0.5163	3118	0.0016	0.0016	0.0019	0.0025	0.0027	0.0033
27	0.2475	0.5151	3122	0.0014	0.0018	0.0019	0.0025	0.0028	0.0033
28	0.2470	0.5160	3130	0.0012	0.0018	0.0019	0.0025	0.0027	0.0034
29	0.2476	0.5158	3115	0.0009	0.0016	0.0021	0.0028	0.0033	0.0039
30	0.2474	0.5174	3106	0.0009	0.0013	0.0017	0.0022	0.0028	0.0030
31	0.2478	0.5165	3105	0.0008	0.0016	0.0018	0.0017	0.0021	0.0025
32	0.2456	0.5133	3187	0.0005	0.0013	0.0017	0.0016	0.0019	0.0026
33	0.2472	0.5165	3121	0.0010	0.0013	0.0018	0.0017	0.0018	0.0023
34	0.2472	0.5160	3122	0.0008	0.0012	0.0014	0.0023	0.0027	0.0033
35	0.2473	0.5141	3135	0.0009	0.0012	0.0015	0.0023	0.0026	0.0033
36	0.2472	0.5153	3130	0.0011	0.0014	0.0014	0.0018	0.0018	0.0026
37	0.2468	0.5164	3131	0.0009	0.0012	0.0014	0.0016	0.0023	0.0023
38	0.2472	0.5149	3131	0.0008	0.0015	0.0014	0.0016	0.0022	0.0023
39	0.2463	0.5158	3151	0.0007	0.0009	0.0011	0.0014	0.0020	0.0021
40	0.2392	0.5016	3499	0.0011	0.0014	0.0021	0.0023	0.0026	0.0031
41	0.2470	0.5154	3133	0.0008	0.0012	0.0013	0.0024	0.0022	0.0023
42	0.2473	0.5165	3116	0.0013	0.0014	0.0017	0.0020	0.0021	0.0024
43	0.2472	0.5169	3117	0.0014	0.0013	0.0015	0.0021	0.0023	0.0027
44	0.2476	0.5161	3113	0.0017	0.0015	0.0018	0.0026	0.0030	0.0035
45	0.2467	0.5161	3135	0.0015	0.0013	0.0015	0.0024	0.0026	0.0033
46	0.2474	0.5165	3113	0.0019	0.0020	0.0029	0.0035	0.0041	0.0047
Ave.	0.2468	0.5153	3142.8	0.0011	0.0014	0.0017	0.0022	0.0025	0.0029
Med.	0.2472	0.5160	3123.0	0.0010	0.0014	0.0017	0.0023	0.0025	0.0029
st dev	0.0017	0.0031	79.5	0.0004	0.0003	0.0004	0.0005	0.0005	0.0006
Min.	0.2392	0.5016	3105.0	0.0005	0.0009	0.0011	0.0014	0.0018	0.0021
Max.	0.2478	0.5174	3499.0	0.0019	0.0020	0.0029	0.0035	0.0041	0.0047



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

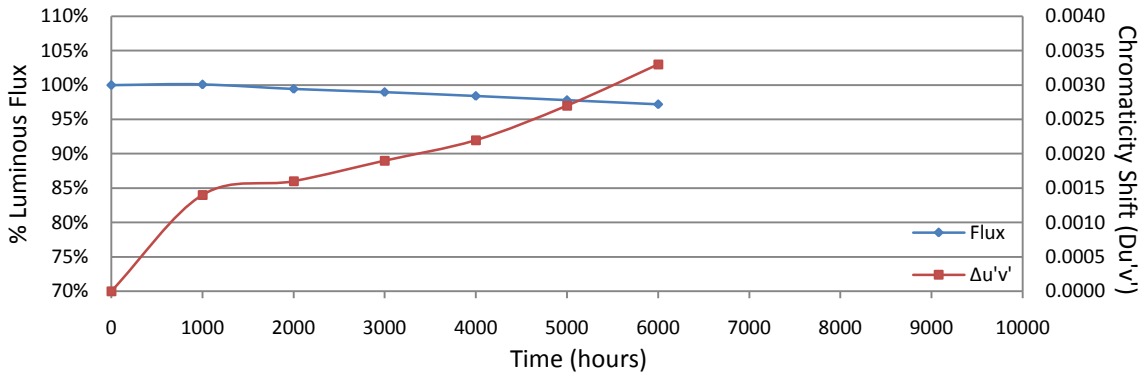
No.	V_F(V)	Φ(lm)	Lumen Maintenance (%)					
	0hr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
47	35.99	1050.0	100.95	100.10	99.43	98.67	98.00	97.24
48	35.91	1016.0	100.10	99.70	99.11	98.72	97.99	97.39
49	36.00	1050.0	100.86	99.90	99.24	98.48	97.90	97.52
50	35.89	1025.0	100.10	99.61	99.32	98.63	98.05	97.56
51	36.14	995.0	100.70	99.87	99.21	98.79	98.35	97.65
52	35.84	1035.0	100.48	99.52	99.23	98.55	97.97	97.20
53	35.93	1049.0	100.48	99.33	98.67	98.19	97.71	97.24
54	35.89	1037.0	99.71	99.04	98.55	98.07	97.69	97.11
55	36.03	1058.0	100.09	99.34	98.77	98.30	97.83	97.26
56	35.88	1044.0	100.48	99.90	99.52	98.75	97.99	97.32
57	35.95	1042.0	100.29	99.81	99.62	98.85	98.27	97.79
58	36.05	1048.0	100.38	99.81	99.24	98.95	98.19	97.42
59	35.86	1024.0	99.90	99.41	98.93	98.14	97.66	96.88
60	35.97	1053.0	99.91	99.05	98.29	97.72	97.06	96.39
61	35.98	1059.0	100.09	99.62	99.34	98.77	98.30	97.64
62	35.90	1046.0	99.90	99.43	98.85	98.47	97.80	97.23
63	36.03	1046.0	99.33	98.95	98.85	98.18	97.71	97.13
64	35.87	1039.0	99.52	99.04	98.94	98.36	97.59	96.92
65	36.39	1016.0	99.31	99.02	98.62	97.92	97.41	97.03
66	35.78	1036.0	99.71	98.94	98.55	97.88	97.30	96.51
67	35.79	1028.0	99.42	98.83	98.54	98.05	97.28	96.57
68	36.13	995.6	100.74	99.68	99.42	98.95	98.46	97.70
69	35.99	1035.0	99.61	98.26	97.78	97.29	96.62	96.39
Ave.	35.96	1035.9	100.09	99.40	98.96	98.38	97.79	97.18
Med.	35.95	1039.0	100.09	99.43	98.94	98.47	97.83	97.24
st dev	0.13	17.5	0.4907	0.4474	0.4456	0.4292	0.4421	0.4127
Min.	35.78	995.0	99.31	98.26	97.78	97.29	96.62	96.39
Max.	36.39	1059.0	100.95	100.10	99.62	98.95	98.46	97.79

TM-21 Projection:

Test Duration: 6000 hours
Failures Observed: 0
α: 5.783E-06
β: 1.006
Calculated L_{70}: 63000 hours
Reported L_{70}: >36000 hours

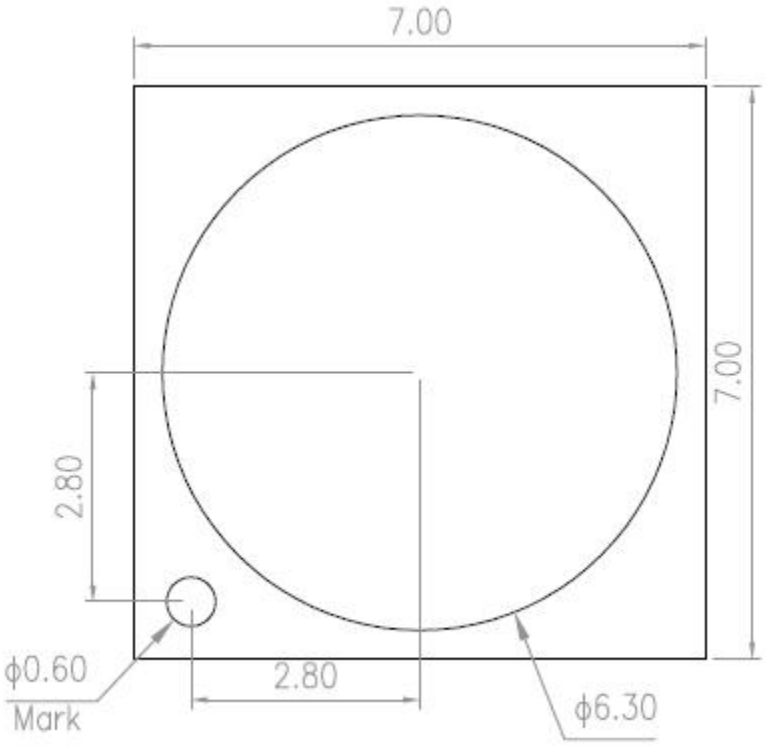
3.6 Data Set 3, 105°C, 200mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')					
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
47	0.2471	0.5163	3123	0.0005	0.0007	0.0009	0.0014	0.0021	0.0031
48	0.2467	0.5151	3144	0.0017	0.0012	0.0011	0.0012	0.0018	0.0024
49	0.2473	0.5166	3117	0.0019	0.0014	0.0019	0.0028	0.0034	0.0040
50	0.2466	0.5146	3151	0.0015	0.0011	0.0011	0.0021	0.0026	0.0031
51	0.2472	0.5156	3126	0.0018	0.0015	0.0016	0.0020	0.0021	0.0029
52	0.2472	0.5165	3121	0.0017	0.0013	0.0015	0.0019	0.0024	0.0027
53	0.2470	0.5168	3123	0.0009	0.0014	0.0016	0.0020	0.0025	0.0032
54	0.2470	0.5163	3126	0.0016	0.0019	0.0020	0.0022	0.0029	0.0035
55	0.2473	0.5170	3114	0.0013	0.0017	0.0020	0.0020	0.0026	0.0034
56	0.2473	0.5179	3107	0.0027	0.0029	0.0032	0.0032	0.0037	0.0045
57	0.2464	0.5149	3154	0.0012	0.0018	0.0032	0.0036	0.0039	0.0040
58	0.2459	0.5158	3161	0.0014	0.0021	0.0024	0.0030	0.0037	0.0044
59	0.2465	0.5155	3148	0.0011	0.0018	0.0016	0.0024	0.0025	0.0032
60	0.2475	0.5165	3113	0.0013	0.0019	0.0022	0.0027	0.0034	0.0043
61	0.2472	0.5173	3115	0.0012	0.0018	0.0019	0.0024	0.0030	0.0036
62	0.2470	0.5160	3129	0.0012	0.0019	0.0021	0.0020	0.0024	0.0025
63	0.2472	0.5153	3130	0.0013	0.0009	0.0013	0.0013	0.0022	0.0027
64	0.2472	0.5174	3113	0.0013	0.0021	0.0024	0.0024	0.0024	0.0032
65	0.2468	0.5155	3137	0.0015	0.0020	0.0028	0.0026	0.0026	0.0029
66	0.2469	0.5161	3131	0.0013	0.0019	0.0023	0.0023	0.0030	0.0039
67	0.2469	0.5154	3137	0.0010	0.0013	0.0015	0.0018	0.0022	0.0025
68	0.2470	0.5151	3136	0.0015	0.0011	0.0018	0.0016	0.0019	0.0021
69	0.2465	0.5161	3143	0.0014	0.0012	0.0018	0.0027	0.0032	0.0035
Ave.	0.2469	0.5161	3130	0.0014	0.0016	0.0019	0.0022	0.0027	0.0033
Med.	0.2470	0.5161	3129	0.0013	0.0017	0.0019	0.0022	0.0026	0.0032
st dev	0.0004	0.0009	15	0.0004	0.0005	0.0006	0.0006	0.0006	0.0007
Min.	0.2459	0.5146	3107	0.0005	0.0007	0.0009	0.0012	0.0018	0.0021
Max.	0.2475	0.5179	3161	0.0027	0.0029	0.0032	0.0036	0.0039	0.0045



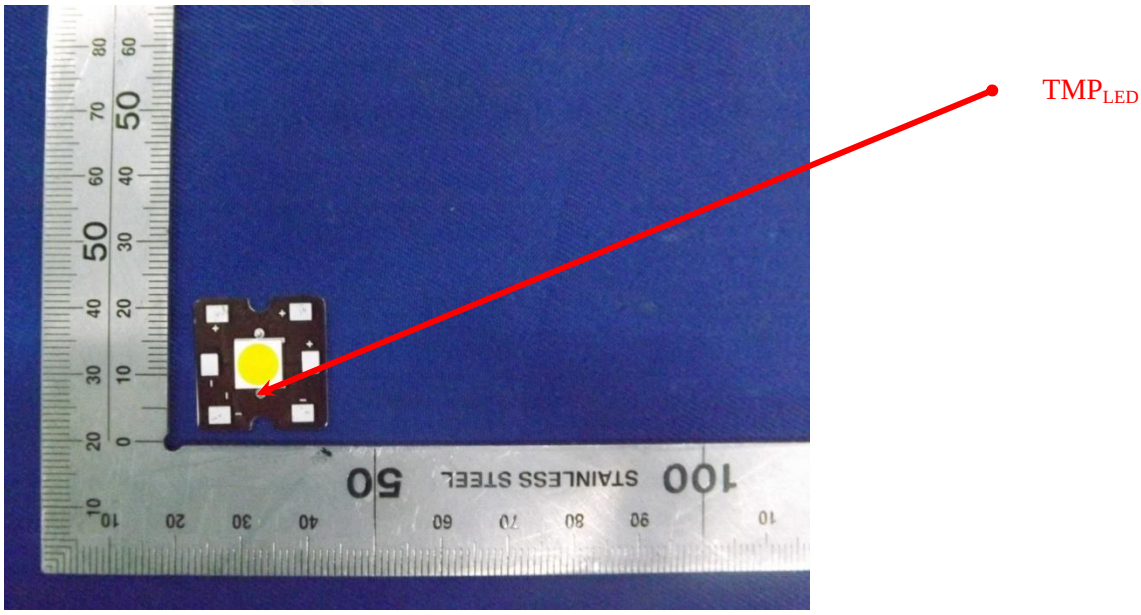
Attachment A – EUT Photo

A.1 Mechanical Dimensions (Ta = 25℃)



All dimensions are in millimeter

A.2 EUT Photo



Attachment B – Family declaration Letter

LIGHTNING

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. Here by attest LED7070 EMC 200mA series are designed with identical material and construction processes. And the tested model T7C308C1R-***** are tested by BACL, the results of which are featured in BACL project RSZ150825502--10. "*****" 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 LED package which attest similarity are only CCT and internal code. The tested model is the greatest current density and power density, and listed in the following table

Series Name	Model Name	CCT(K)	Series Name	Model Name	CCT(K)
EMC7070	T7C277C1R-*****	2700	EMC7070	T7C507C1R-*****	5000
EMC7070	T7C278C1R-*****	2700	EMC7070	T7C508C1R-*****	5000
EMC7070	T7C279C1R-*****	2700	EMC7070	T7C509C1R-*****	5000
EMC7070	T7C27CC1R-*****	2700	EMC7070	T7C50CC1R-*****	5000
EMC7070	T7C307C1R-*****	3000	EMC7070	T7C537C1R-*****	5300
EMC7070	T7C308C1R-*****	3000	EMC7070	T7C538C1R-*****	5300
EMC7070	T7C309C1R-*****	3000	EMC7070	T7C539C1R-*****	5300
EMC7070	T7C30CC1R-*****	3000	EMC7070	T7C53CC1R-*****	5300
EMC7070	T7C357C1R-*****	3500	EMC7070	T7C577C1R-*****	5700
EMC7070	T7C358C1R-*****	3500	EMC7070	T7C578C1R-*****	5700
EMC7070	T7C359C1R-*****	3500	EMC7070	T7C579C1R-*****	5700
EMC7070	T7C35CC1R-*****	3500	EMC7070	T7C657C1R-*****	6500
EMC7070	T7C407C1R-*****	4000	EMC7070	T7C658C1R-*****	6500
EMC7070	T7C408C1R-*****	4000	EMC7070	T7C659C1R-*****	6500
EMC7070	T7C409C1R-*****	4000			
EMC7070	T7C40CC1R-*****	4000			
EMC7070	T7C457C1R-*****	4500			
EMC7070	T7C458C1R-*****	4500			
EMC7070	T7C459C1R-*****	4500			
EMC7070	T7C45CC1R-*****	4500			

Signature: Alisa 2016.5.25
Print name: Alisa
Title: R&D Engineer
LIGHTNING OPTOELECTRONIC TECHNOLOGY(SZ) Co.,LTD.

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