Report No.: LCS170406048BS

TEST REPORT of IESNA LM-80-08

Approved Method for Measuring Lumen Maintenance of LED Light Sources

Client.....	:	EVERSTAR OPTOELECTRONICS PVT LTD.
Address.....	:	1011, filix Towers, LBS Marg, Bhandup (W), Mumbai, India
Brand Name.....	:	EVERSTAR
Testing laboratory.....	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Address.....	:	B Area, 2F, Building B, Zhongyu Green High-tech Industrial Park, Wenge Road, Heshuikou, Gongming Street, Guangming New District, Shenzhen, Guangdong, China
Product description	:	LED light source
Model.....	:	ES-X3030-106V
Rating.....	:	IF:150mA, VF: 5-7V
Date of Test.....	:	June 10, 2017 – June 22, 2018
Date of Issue.....	:	June 23, 2018

Test by:	**Check by:**	**Approved by:**
James	Ian Luo	
James Zhang/ Project Engineer	Ian Luo/ Director	Jesse Liu/ Manager

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Test Summary

Life test condition			Summary of result		
Test condition	Current (mA)	Case temperature (℃)	Test duration (h)	Average lumen maintenance (%)	Maximum chromaticity shift (△u'v')
1	150	55	9000	96.51%	0.0034
2	150	85	9000	96.13%	0.0035
3	150	105	9000	95.56%	0.0039

1. Number of LED light sources tested

-25 Packages tested at actual case temperature 54.7℃

-25 Packages tested at actual case temperature 84.8℃

-25 Packages tested at actual case temperature 104.8℃

2. Description of LED light sources

- Part Number: ES-X3030-106V
- Part Type: LED Package
- IF =150mA, CCT(Nominal) = 1500-25000K

3. Description of auxiliary equipment

1) EVERFINE LT-200A Accelerated Aging-Life Test System for LEDs

2) Instrument Integrating sphere 0.5m

3) SENSING SPR-3000 Photometric, Colorimetric& Electric System for Light Sources

4. Operating time

LED packages are driven with a constant direct current.

- Number of units : 25 at 55℃, 85℃ and 105℃
- Drive current : 150 mA
- Typical voltage : 5-7V

5. Ambient conditions including airflow, temperature and relative humidity

The minimal airflow is maintained in chamber.

The ambient temperature around the LED packages inside chamber is controlled by air flowing and the thermocouple readings are monitored.

- Case temperature : Contorlled to -2℃
- Surrounding air temperature : Contorlled to -5℃
- Relative humidity : ＜ 65%RH

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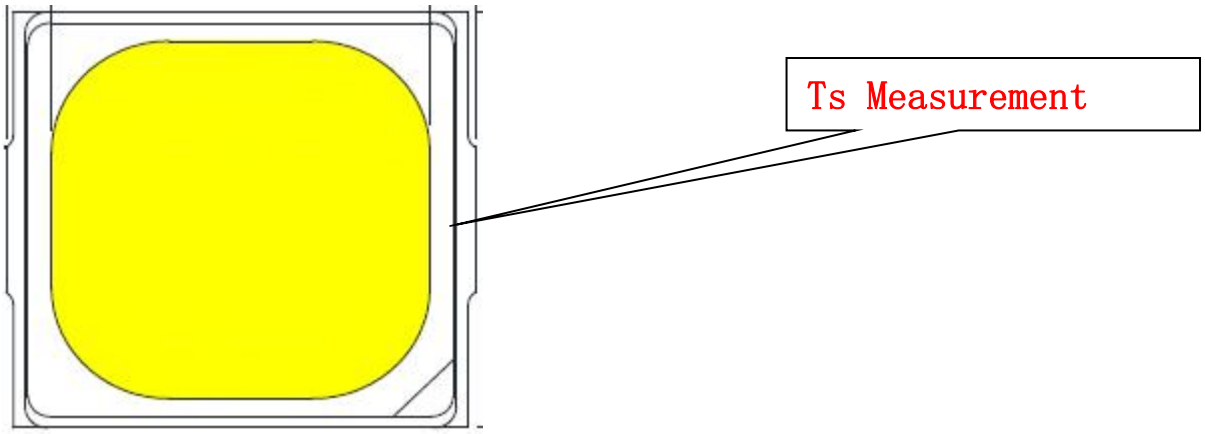
6. Case temperature (Test point temperature)



7. Drive current of the LED light source during lifetime test

See Sub-clause 9.1, 9.2 and 9.3

8. Initial luminous flux and forward voltage

See the table

9. Lumen maintenance data for each individual LED light source

See the table

Quantity	Model	Serial Number
25	ES-X3030-106V	A01-A25 (55℃)
25	ES-X3030-106V	B01-B25 (85℃)
25	ES-X3030-106V	C01-C25 (105℃)

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9.1 Test condition 1: 55 ℃, Drive Current : 150mA

Item	V_F(V)	Flux(lm)	T=55℃Luminous Maintenance (%)								
No.	0 h		1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h
A01	6.24	123.5	100.21	99.71	99.32	99.06	98.82	98.34	97.65	97.16	96.56
A02	6.17	125.2	100.16	99.66	99.27	99.08	98.75	98.22	97.51	97.11	96.51
A03	6.17	124.7	100.09	99.61	99.26	99.02	98.86	98.26	97.66	97.12	96.65
A04	6.19	125.7	100.12	99.69	99.21	98.98	98.78	98.22	97.62	97.02	96.50
A05	6.23	122.9	99.98	99.66	99.19	99.06	98.84	98.14	97.92	97.10	96.55
A06	6.23	123.6	100.06	99.64	99.29	99.01	98.76	98.22	97.64	97.13	96.56
A07	6.16	125.3	100.16	99.72	99.33	99.09	98.81	98.28	97.76	97.06	96.64
A08	6.17	124.8	100.05	99.68	99.27	99.08	98.74	98.19	97.91	97.04	96.59
A09	6.18	125.8	100.32	99.92	99.45	99.12	98.73	98.16	97.84	97.10	96.55
A10	6.22	123.0	100.06	99.76	99.39	99.00	98.74	98.29	97.76	97.06	96.42
A11	6.21	122.7	100.15	99.71	99.33	99.06	98.68	98.20	97.62	97.11	96.40
A12	6.18	125.9	100.16	99.78	99.38	99.03	98.73	98.25	97.66	97.02	96.58
A13	6.25	124.0	100.04	99.76	99.36	99.08	98.65	98.16	97.54	97.04	96.43
A14	6.16	123.0	99.99	99.64	99.28	99.02	98.71	98.12	97.68	97.13	96.49
A15	6.22	122.0	100.11	99.76	99.39	99.06	98.64	98.26	97.51	97.02	96.42
A16	6.15	123.1	100.16	99.65	99.27	99.02	98.71	98.27	97.62	97.04	96.42
A17	6.21	122.1	100.24	99.76	99.36	99.08	98.63	98.23	97.52	97.09	96.59
A18	6.21	122.8	100.06	99.67	99.29	99.03	98.68	98.22	97.54	97.12	96.54
A19	6.18	126.0	100.19	99.70	99.32	99.05	98.74	98.29	97.65	97.06	96.52
A20	6.25	124.1	100.24	99.76	99.39	99.08	98.65	98.27	97.55	97.12	96.45
A21	6.23	123.6	99.98	99.69	99.35	99.02	98.70	98.13	97.55	97.04	96.47
A22	6.16	125.3	100.06	99.67	99.26	99.06	98.63	98.18	97.61	97.05	96.43
A23	6.17	124.8	100.14	99.74	99.38	99.04	98.69	98.29	97.77	97.09	96.58
A24	6.18	125.8	100.18	99.73	99.34	99.08	98.65	98.15	97.52	97.06	96.49
A25	6.22	123.0	100.24	99.74	99.33	99.08	98.60	98.24	97.76	97.07	96.52
Ave.	6.20	124.1	100.13	99.71	99.32	99.05	98.72	98.22	97.65	97.08	96.51
Med.	6.19	124.0	100.14	99.71	99.33	99.06	98.71	98.22	97.64	97.07	96.52
St dev	0.0311	1.2848	0.0888	0.0636	0.0615	0.0334	0.0694	0.0583	0.1207	0.0402	0.0717
Max.	6.25	126.0	100.32	99.92	99.45	99.12	98.86	98.34	97.92	97.16	96.65
Min.	6.15	122.0	99.98	99.61	99.19	98.98	98.60	98.12	97.51	97.02	96.40

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9.1.1 Test condition 1: 55 ℃, Drive Current : 150mA

	T=55℃Chromaticity Shift (Δu'v')											
No.	0 h			1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h
	u'	v'	CCT(K)									
A01	0.2484	0.5192	3062	0.0003	0.0005	0.0007	0.0012	0.0016	0.0019	0.0023	0.0026	0.0030
A02	0.2488	0.5194	3094	0.0002	0.0003	0.0006	0.0010	0.0015	0.0018	0.0021	0.0025	0.0029
A03	0.2486	0.5196	3051	0.0003	0.0006	0.0009	0.0012	0.0016	0.0019	0.0024	0.0028	0.0033
A04	0.2492	0.5188	3063	0.0004	0.0005	0.0008	0.0012	0.0015	0.0017	0.0022	0.0025	0.0027
A05	0.2490	0.5190	3055	0.0002	0.0004	0.0005	0.0010	0.0012	0.0015	0.0020	0.0024	0.0029
A06	0.2488	0.5194	3044	0.0003	0.0005	0.0007	0.0012	0.0015	0.0018	0.0023	0.0026	0.0026
A07	0.2480	0.5186	3050	0.0005	0.0006	0.0008	0.0012	0.0016	0.0019	0.0022	0.0025	0.0028
A08	0.2482	0.5188	3081	0.0002	0.0004	0.0006	0.0013	0.0018	0.0021	0.0026	0.0029	0.0031
A09	0.2480	0.5196	3057	0.0003	0.0003	0.0005	0.0012	0.0016	0.0019	0.0022	0.0024	0.0027
A10	0.2488	0.5194	2988	0.0004	0.0006	0.0008	0.0012	0.0016	0.0018	0.0021	0.0025	0.0028
A11	0.2484	0.5188	3059	0.0001	0.0003	0.0006	0.0010	0.0014	0.0017	0.0024	0.0028	0.0031
A12	0.2488	0.5192	3091	0.0000	0.0002	0.0006	0.0011	0.0015	0.0019	0.0023	0.0025	0.0027
A13	0.2486	0.5190	3048	0.0003	0.0004	0.0007	0.0014	0.0018	0.0021	0.0024	0.0024	0.0026
A14	0.2492	0.5194	3060	0.0003	0.0005	0.0008	0.0014	0.0016	0.0019	0.0022	0.0025	0.0028
A15	0.2490	0.5186	3052	0.0002	0.0003	0.0006	0.0012	0.0015	0.0018	0.0023	0.0026	0.0029
A16	0.2488	0.5188	3047	0.0002	0.0004	0.0008	0.0013	0.0017	0.0019	0.0024	0.0029	0.0032
A17	0.2480	0.5196	3053	0.0003	0.0005	0.0009	0.0014	0.0017	0.0020	0.0025	0.0028	0.0031
A18	0.2482	0.5194	3084	0.0004	0.0006	0.0009	0.0015	0.0019	0.0024	0.0026	0.0027	0.0029
A19	0.2480	0.5188	3060	0.0001	0.0003	0.0006	0.0010	0.0013	0.0017	0.0021	0.0026	0.0030
A20	0.2488	0.5194	2991	0.0000	0.0004	0.0008	0.0013	0.0016	0.0016	0.0023	0.0028	0.0033
A21	0.2484	0.5188	3057	0.0002	0.0003	0.0007	0.0014	0.0017	0.0019	0.0022	0.0024	0.0028
A22	0.2484	0.5192	2988	0.0003	0.0005	0.0006	0.0012	0.0015	0.0017	0.0024	0.0026	0.0029
A23	0.2488	0.5190	3044	0.0002	0.0004	0.0009	0.0015	0.0018	0.0019	0.0024	0.0028	0.0034
A24	0.2486	0.5194	3050	0.0001	0.0003	0.0005	0.0010	0.0016	0.0019	0.0025	0.0025	0.0030
A25	0.2492	0.5194	3081	0.0002	0.0005	0.0006	0.0011	0.0018	0.0020	0.0026	0.0027	0.0032
Ave.	0.2486	0.5191	3052	0.0002	0.0004	0.0007	0.0012	0.0016	0.0019	0.0023	0.0026	0.0029
Med.	0.2486	0.5192	3055	0.0002	0.0004	0.0007	0.0012	0.0016	0.0019	0.0023	0.0026	0.0029
St dev	0.0004	0.0003	27.7909	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Max.	0.2492	0.5196	3094	0.0005	0.0006	0.0009	0.0015	0.0019	0.0024	0.0026	0.0029	0.0034
Min.	0.2480	0.5186	2988	0.0000	0.0002	0.0005	0.0010	0.0012	0.0015	0.0020	0.0024	0.0026

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9.2 Test condition 2: 85 ℃, Drive Current : 150mA

Item	V_F(V)	Flux(lm)	T=85℃Luminous Maintenance (%)								
No.	0 h		1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h
B01	6.19	125.7	100.06	99.56	99.28	98.92	98.46	98.02	97.26	96.66	96.21
B02	6.23	122.9	100.24	99.62	99.30	98.86	98.44	98.09	97.31	96.71	96.18
B03	6.21	122.8	100.16	99.60	99.28	98.88	98.43	98.03	97.30	96.68	96.18
B04	6.18	126.0	100.05	99.53	99.27	98.87	98.46	98.09	97.27	96.65	96.12
B05	6.25	124.1	100.01	99.55	99.29	98.81	98.42	97.92	97.34	96.69	96.09
B06	6.15	123.1	100.16	99.61	99.28	98.82	98.43	98.07	97.29	96.73	96.13
B07	6.21	122.1	100.13	99.63	99.27	98.86	98.42	98.03	97.25	96.62	96.10
B08	6.18	125.8	100.06	99.55	99.32	98.88	98.43	98.01	97.31	96.65	96.09
B09	6.22	123.0	100.05	99.56	99.26	98.84	98.44	97.90	97.22	96.69	96.17
B10	6.21	122.7	100.10	99.66	99.28	98.92	98.49	98.05	97.26	96.64	96.12
B11	6.18	125.9	100.06	99.55	99.22	98.85	98.42	97.99	97.31	96.65	96.04
B12	6.25	124.0	100.08	99.61	99.30	98.86	98.43	98.02	97.34	96.69	96.03
B13	6.16	123.0	99.98	99.54	99.27	98.81	98.44	97.93	97.30	96.74	96.16
B14	6.22	122.0	100.04	99.59	99.29	98.82	98.45	97.91	97.33	96.62	96.17
B15	6.23	123.6	100.05	99.63	99.28	98.80	98.36	97.92	97.35	96.64	96.11
B16	6.16	125.3	100.03	99.64	99.33	98.86	98.45	98.00	97.34	96.65	96.16
B17	6.17	124.8	100.06	99.62	99.32	98.85	98.41	98.03	97.29	96.68	96.12
B18	6.18	125.8	100.07	99.55	99.27	98.89	98.42	98.05	97.22	96.66	96.14
B19	6.22	123.0	100.10	99.56	99.25	98.91	98.40	97.96	97.26	96.69	96.16
B20	6.24	123.5	100.12	99.52	99.29	98.81	98.36	98.04	97.31	96.74	96.10
B21	6.17	125.2	100.08	99.57	99.28	98.90	98.34	97.92	97.32	96.62	96.12
B22	6.17	124.7	100.09	99.52	99.27	98.85	98.42	98.03	97.25	96.68	96.14
B23	6.19	125.7	100.07	99.50	99.25	98.86	98.35	98.09	97.30	96.66	96.18
B24	6.23	122.9	100.13	99.59	99.23	98.89	98.43	97.91	97.29	96.65	96.11
B25	6.21	122.8	100.09	99.59	99.28	98.82	98.44	98.90	98.38	96.67	96.16
Ave.	6.20	124.0	100.08	99.58	99.28	98.86	98.42	98.04	97.34	96.67	96.13
Med.	6.21	123.6	100.07	99.57	99.28	98.86	98.43	98.02	97.30	96.66	96.13
St dev	0.0294	1.3378	0.0537	0.0424	0.0254	0.0356	0.0359	0.1903	0.2205	0.0345	0.0434
Max.	6.25	126.0	100.24	99.66	99.33	98.92	98.49	98.90	98.38	96.74	96.21
Min.	6.15	122.0	99.98	99.50	99.22	98.80	98.34	97.90	97.22	96.62	96.03

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9.2.1 Test condition 2: 85 ℃, Drive Current : 150mA

	T=85℃Chromaticity Shift (Δu'v')											
No.	0 h			1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h
	u'	v'	CCT(K)									
B01	0.2488	0.5192	3091	0.0002	0.0005	0.0009	0.0016	0.0019	0.0023	0.0026	0.0028	0.0031
B02	0.2486	0.5190	3048	0.0001	0.0003	0.0006	0.0012	0.0016	0.0021	0.0025	0.0029	0.0033
B03	0.2492	0.5194	3060	0.0000	0.0002	0.0005	0.0012	0.0015	0.0020	0.0026	0.0029	0.0032
B04	0.2490	0.5186	3052	0.0003	0.0005	0.0008	0.0015	0.0018	0.0022	0.0024	0.0027	0.0030
B05	0.2488	0.5188	3047	0.0002	0.0003	0.0007	0.0016	0.0019	0.0024	0.0025	0.0028	0.0032
B06	0.2480	0.5196	3053	0.0004	0.0006	0.0008	0.0015	0.0019	0.0025	0.0026	0.0030	0.0033
B07	0.2482	0.5194	3084	0.0002	0.0004	0.0008	0.0014	0.0016	0.0023	0.0024	0.0029	0.0031
B08	0.2480	0.5196	3057	0.0004	0.0006	0.0009	0.0016	0.0018	0.0022	0.0026	0.0028	0.0032
B09	0.2488	0.5194	2988	0.0003	0.0005	0.0008	0.0015	0.0019	0.0024	0.0028	0.0032	0.0035
B10	0.2484	0.5188	3059	0.0002	0.0004	0.0007	0.0016	0.0019	0.0023	0.0028	0.0033	0.0035
B11	0.2488	0.5192	3091	0.0000	0.0003	0.0005	0.0011	0.0015	0.0022	0.0025	0.0028	0.0031
B12	0.2486	0.5190	3048	0.0001	0.0004	0.0008	0.0015	0.0017	0.0022	0.0026	0.0029	0.0033
B13	0.2492	0.5194	3060	0.0003	0.0003	0.0007	0.0016	0.0019	0.0023	0.0028	0.0031	0.0032
B14	0.2488	0.5194	2991	0.0002	0.0004	0.0008	0.0015	0.0018	0.0023	0.0027	0.0030	0.0033
B15	0.2484	0.5188	3057	0.0002	0.0005	0.0009	0.0014	0.0018	0.0024	0.0026	0.0031	0.0032
B16	0.2484	0.5192	2988	0.0003	0.0003	0.0007	0.0016	0.0019	0.0023	0.0027	0.0029	0.0030
B17	0.2488	0.5190	3044	0.0004	0.0005	0.0009	0.0013	0.0018	0.0022	0.0026	0.0029	0.0034
B18	0.2486	0.5194	3050	0.0001	0.0003	0.0008	0.0015	0.0018	0.0023	0.0028	0.0031	0.0033
B19	0.2492	0.5194	3081	0.0003	0.0003	0.0006	0.0012	0.0016	0.0024	0.0026	0.0030	0.0034
B20	0.2484	0.5192	3062	0.0002	0.0004	0.0007	0.0013	0.0018	0.0023	0.0028	0.0032	0.0035
B21	0.2488	0.5194	3094	0.0003	0.0005	0.0008	0.0014	0.0019	0.0026	0.0029	0.0032	0.0033
B22	0.2486	0.5196	3051	0.0004	0.0006	0.0009	0.0015	0.0020	0.0022	0.0027	0.0029	0.0033
B23	0.2492	0.5188	3063	0.0000	0.0002	0.0008	0.0016	0.0021	0.0024	0.0026	0.0029	0.0033
B24	0.2490	0.5190	3055	0.0001	0.0004	0.0008	0.0014	0.0019	0.0025	0.0028	0.0030	0.0032
B25	0.2488	0.5194	2991	0.0002	0.0005	0.0007	0.0016	0.0016	0.0023	0.0027	0.0029	0.0032
Ave.	0.2487	0.5192	3051	0.0002	0.0004	0.0008	0.0014	0.0018	0.0023	0.0026	0.0030	0.0033
Med.	0.2488	0.5192	3055	0.0002	0.0004	0.0008	0.0015	0.0018	0.0023	0.0026	0.0029	0.0033
St dev	0.0003	0.0003	30.8491	0.0001	0.0001	0.0001	0.0002	0.0002	0.0001	0.0001	0.0002	0.0001
Max.	0.2492	0.5196	3094	0.0004	0.0006	0.0009	0.0016	0.0021	0.0026	0.0029	0.0033	0.0035
Min.	0.2480	0.5186	2988	0.0000	0.0002	0.0005	0.0011	0.0015	0.0020	0.0024	0.0027	0.0030

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9.3 Test condition 3: 105 ℃, Drive Current : 150mA

Item	V_F(V)	Flux(lm)	T=105℃Luminous Maintenance (%)								
No.	0 h		1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h
C01	6.26	122.6	99.98	99.46	99.06	98.56	98.12	97.71	97.11	96.25	95.78
C02	6.20	124.3	100.02	99.55	99.07	98.61	98.11	97.76	97.11	96.27	95.61
C03	6.15	123.8	100.06	99.54	99.00	98.59	98.06	97.69	97.10	96.19	95.50
C04	6.20	124.8	99.97	99.42	99.01	98.60	98.06	97.74	97.13	96.26	95.64
C05	6.24	122.0	99.99	99.49	99.03	98.56	98.07	97.72	97.01	96.21	95.66
C06	6.24	122.7	99.96	99.43	99.07	98.58	98.03	97.78	97.05	96.23	95.58
C07	6.17	124.4	100.06	99.51	99.06	98.57	98.02	97.76	97.02	96.27	95.61
C08	6.18	123.9	100.01	99.52	99.10	98.56	98.01	97.76	97.03	96.24	95.50
C09	6.19	124.9	100.05	99.55	99.08	98.61	98.99	97.74	97.08	96.25	95.57
C10	6.23	122.1	100.06	99.51	99.10	98.57	98.03	97.70	97.06	96.22	95.41
C11	6.22	121.8	99.97	99.44	99.12	98.60	98.99	97.66	97.04	96.19	95.56
C12	6.19	125.0	100.04	99.49	99.11	98.59	98.04	97.69	97.12	96.17	95.65
C13	6.26	123.1	99.96	99.56	99.05	98.58	98.00	97.71	97.15	96.21	95.51
C14	6.17	122.1	99.94	99.50	99.13	98.56	98.07	97.69	97.04	96.22	95.41
C15	6.23	121.1	100.06	99.47	99.09	98.55	98.96	97.67	97.03	96.20	95.58
C16	6.16	122.2	100.11	99.56	99.11	98.60	98.05	97.74	97.06	96.28	95.50
C17	6.22	121.2	100.03	99.58	99.03	98.62	98.10	97.71	97.11	96.24	95.60
C18	6.22	121.9	99.98	99.42	99.12	98.55	98.06	97.72	97.06	96.22	95.61
C19	6.19	125.1	99.95	99.40	99.04	98.56	98.07	97.75	97.03	96.26	95.67
C20	6.26	123.2	99.96	99.43	99.06	98.55	98.02	97.67	97.09	96.28	95.63
C21	6.24	122.7	100.02	99.55	99.11	98.53	98.05	97.69	97.06	96.24	95.58
C22	6.17	124.4	100.06	99.44	99.04	98.60	98.07	97.70	97.09	96.29	95.42
C23	6.18	123.9	100.03	99.49	99.06	98.58	98.09	97.74	97.14	96.28	95.46
C24	6.19	124.9	99.98	99.52	99.10	98.56	98.10	97.68	97.03	96.21	95.51
C25	6.23	122.1	100.03	99.56	99.05	98.50	99.09	97.76	97.04	96.23	95.48
Ave.	6.21	123.2	100.01	99.50	99.07	98.57	98.21	97.72	97.07	96.24	95.56
Med.	6.20	123.1	100.02	99.50	99.07	98.57	98.07	97.71	97.06	96.24	95.58
St dev	0.0330	1.2759	0.0450	0.0538	0.0361	0.0277	0.3569	0.0337	0.0408	0.0325	0.0906
Max.	6.26	125.1	100.11	99.58	99.13	98.62	99.09	97.78	97.15	96.29	95.78
Min.	6.15	121.1	99.94	99.40	99.00	98.50	98.00	97.66	97.01	96.17	95.41

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9.3.1 Test condition 3: 105 ℃, Drive Current : 150mA

	T=105℃Chromaticity Shift (Δu'v')											
No.	0 h			1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h
	u'	v'	CCT(K)									
C01	0.2486	0.5187	3059	0.0002	0.0006	0.0010	0.0016	0.0020	0.0026	0.0029	0.0030	0.0035
C02	0.2490	0.5189	3091	0.0003	0.0005	0.0011	0.0015	0.0019	0.0025	0.0030	0.0033	0.0036
C03	0.2488	0.5191	3048	0.0004	0.0006	0.0012	0.0016	0.0019	0.0026	0.0029	0.0034	0.0037
C04	0.2494	0.5183	3060	0.0003	0.0007	0.0012	0.0017	0.0021	0.0028	0.0033	0.0036	0.0039
C05	0.2492	0.5185	3052	0.0002	0.0006	0.0009	0.0016	0.0019	0.0025	0.0028	0.0031	0.0036
C06	0.2490	0.5189	3041	0.0004	0.0004	0.0009	0.0016	0.0018	0.0026	0.0029	0.0033	0.0035
C07	0.2482	0.5181	3047	0.0003	0.0006	0.0011	0.0018	0.0021	0.0027	0.0031	0.0034	0.0036
C08	0.2484	0.5183	3078	0.0004	0.0005	0.0010	0.0015	0.0019	0.0026	0.0029	0.0033	0.0037
C09	0.2482	0.5191	3054	0.0002	0.0006	0.0009	0.0016	0.0022	0.0028	0.0030	0.0033	0.0036
C10	0.2490	0.5189	2985	0.0003	0.0007	0.0012	0.0017	0.0023	0.0029	0.0031	0.0035	0.0038
C11	0.2486	0.5183	3056	0.0004	0.0006	0.0010	0.0016	0.0019	0.0026	0.0030	0.0034	0.0037
C12	0.2490	0.5187	3088	0.0003	0.0005	0.0009	0.0018	0.0022	0.0025	0.0029	0.0032	0.0036
C13	0.2488	0.5185	3045	0.0004	0.0004	0.0008	0.0015	0.0019	0.0026	0.0031	0.0034	0.0037
C14	0.2494	0.5189	3057	0.0002	0.0006	0.0009	0.0016	0.0019	0.0027	0.0029	0.0033	0.0036
C15	0.2492	0.5181	3049	0.0005	0.0005	0.0008	0.0017	0.0021	0.0026	0.0029	0.0034	0.0038
C16	0.2490	0.5183	3044	0.0001	0.0007	0.0012	0.0016	0.0022	0.0027	0.0033	0.0036	0.0038
C17	0.2482	0.5191	3050	0.0003	0.0006	0.0011	0.0016	0.0019	0.0026	0.0031	0.0032	0.0037
C18	0.2484	0.5189	3081	0.0004	0.0005	0.0010	0.0016	0.0020	0.0028	0.0033	0.0035	0.0039
C19	0.2482	0.5183	3057	0.0002	0.0006	0.0013	0.0018	0.0022	0.0027	0.0029	0.0033	0.0038
C20	0.2490	0.5189	2988	0.0003	0.0004	0.0008	0.0016	0.0019	0.0026	0.0030	0.0034	0.0037
C21	0.2486	0.5183	3054	0.0002	0.0006	0.0012	0.0017	0.0021	0.0027	0.0031	0.0035	0.0038
C22	0.2486	0.5187	2985	0.0004	0.0007	0.0011	0.0016	0.0020	0.0026	0.0032	0.0036	0.0039
C23	0.2490	0.5185	3041	0.0004	0.0006	0.0009	0.0017	0.0021	0.0028	0.0033	0.0035	0.0038
C24	0.2488	0.5189	3047	0.0003	0.0005	0.0010	0.0016	0.0020	0.0027	0.0031	0.0034	0.0037
C25	0.2494	0.5189	3078	0.0002	0.0006	0.0013	0.0018	0.0022	0.0026	0.0029	0.0032	0.0036
Ave.	0.2488	0.5186	3049	0.0003	0.0006	0.0010	0.0016	0.0020	0.0027	0.0030	0.0034	0.0037
Med.	0.2488	0.5187	3052	0.0003	0.0006	0.0010	0.0016	0.0020	0.0026	0.0030	0.0034	0.0037
St dev	0.0004	0.0003	27.7631	0.0001	0.0001	0.0002	0.0001	0.0001	0.0001	0.0002	0.0002	0.0001
Max.	0.2494	0.5191	3091	0.0005	0.0007	0.0013	0.0018	0.0023	0.0029	0.0033	0.0036	0.0039
Min.	0.2482	0.5181	2985	0.0001	0.0004	0.0008	0.0015	0.0018	0.0025	0.0028	0.0030	0.0035

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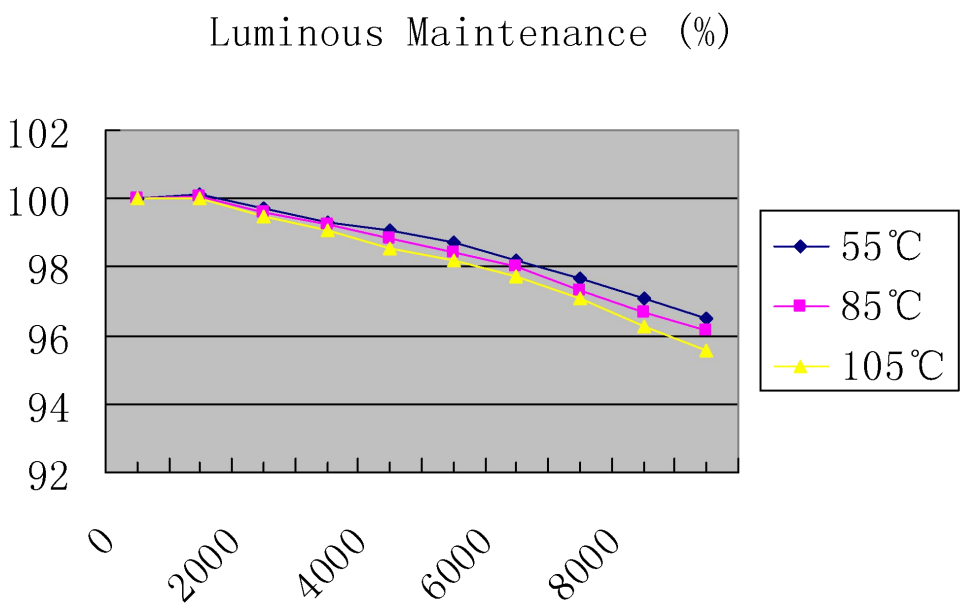
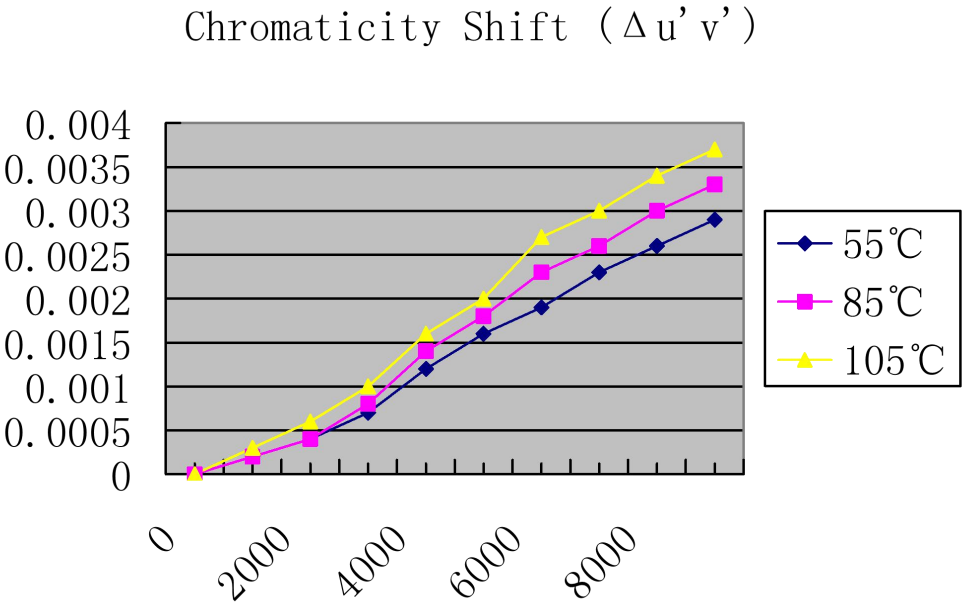
9.4 Chart





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10. Observation of failures

No optical, Electrical or mechanical failure of any LED Package was seen during the lifetime testing.

11. Photometric measurement uncertainty

2%

12. TM-21-11 report: Projecting long term lumen maintenance of LED light source

Test Condition 1 - 55° C Case Temp	
Sample size	25
Number of failures	0
DUT drive current used in the test (mA)	150
Test duration (hours)	9,000
Test duration used for projection (hour to hour)	4,000 - 9,000
Tested case temperature (° C)	55
α	5.313E-06
B	1.013
Calculated L70(9k) (hours)	70,000
Reported L70(9k) (hours)	>54000

Test Condition 2 - 85° C Case Temp	
Sample size	25
Number of failures	0
DUT drive current used in the test (mA)	150
Test duration (hours)	9,000
Test duration used for projection (hour to hour)	4,000 - 9,000
Tested case temperature (° C)	85
α	5.743E-06
B	1.013
Calculated L70(9k) (hours)	64,000
Reported L70(9k) (hours)	>54000

Test Condition 3 - 105° C Case Temp	
Sample size	25
Number of failures	0
DUT drive current used in the test (mA)	150
Test duration (hours)	9,000
Test duration used for projection (hour to hour)	4,000 - 9,000
Tested case temperature (° C)	105
α	6.358E-06
B	1.013
Calculated L70(9k) (hours)	58,000
Reported L70(9k) (hours)	>54000

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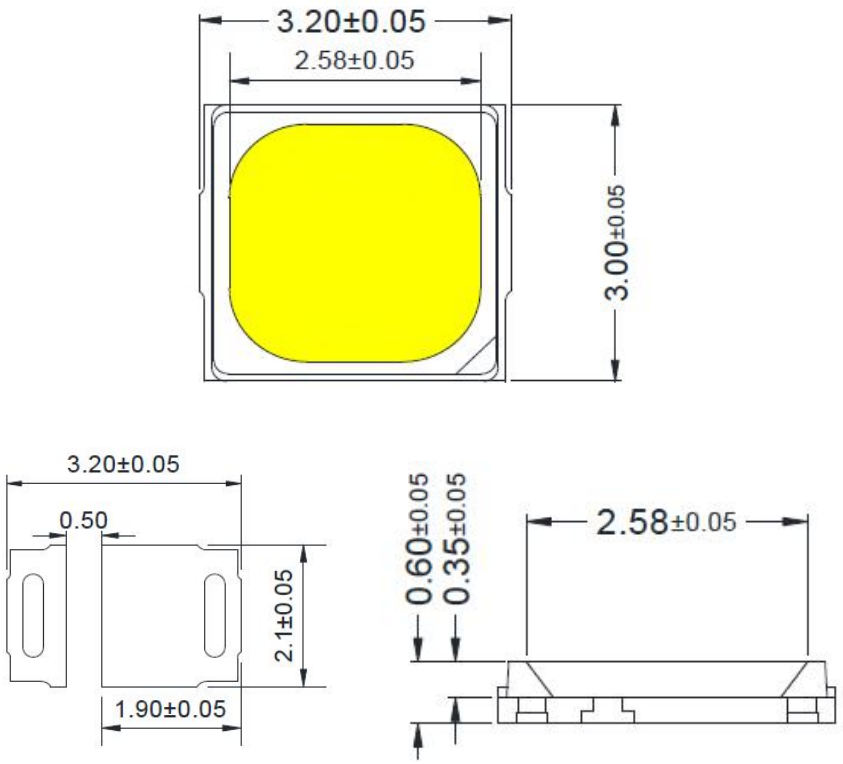
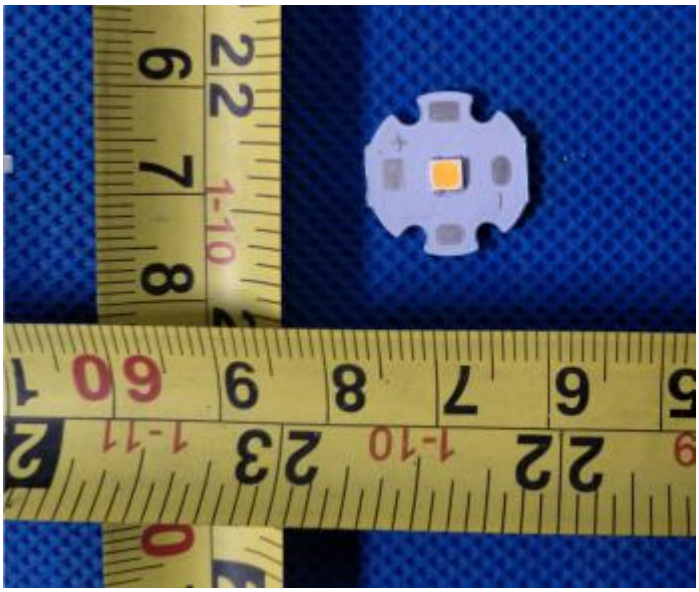
14.Mechanical Dimensions



15. Photo of samples:



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

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