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检测
TESTING
CNAS L6478

TEST REPORT

Reference No.	:	WTS19F09066168N
Applicant	:	Shenzhen Destar Opto-Electronics Co.,LTD
Address	:	6th floor,3 building HanHaiDa 7th Industry park,GongMing YuLv Village,Guangming New district,ShenZhen,GuangDong
Manufacturer	:	Shenzhen Destar Opto-Electronics Co.,LTD
Address	:	6th floor,3 building HanHaiDa 7th Industry park,GongMing YuLv Village,Guangming New district,ShenZhen,GuangDong
Product Name	:	SMD3030
Model No.	:	3N128-ABKACK-ZJP-1
Ratings	:	6.0-6.6V, Max.175mA
Standards	:	ANSI/IES LM-80-15 Approved Method: Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays and Modules
Date of Receipt sample	:	2018-04-03
Date of Test	:	2018-04-12 to 2019-10-16
Date of Issue	:	2019-10-17
Test Report Form No.	:	WPL-LM8015A-01A
Test Result	:	See the attached sheets

Remarks:
The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:
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Approved by:

WALTEK SERVICES CO.,LTD. WALTEK TEST REPORT

Akin Xu / Manager

1. Description of Test Samples

Classification: SMD3030
Part Name: Warm White LED
Part Number: 3N128-ABKACK-ZJP-1
Nominal CCT: 2700K

This report also covers the following Series products:

N

2. Standards Used:

- IESNA LM-80-15: IESNA 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 CNAS)
- IES TM-21-11: Projecting long term lumen maintenance of LED light sources

3. Test Facility

The testing facility used by Waltek Services (Foshan) Co., Ltd. is located at No. 13-19, 2/F, 2nd Building, Sunlink International Machinery City, Chencun Town, Shunde District, Foshan, Guangdong, China

4. Operating Cycle

Samples are driven with a constant direct current (DC)

5. 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 Attachment. 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°C ± 2°C, RH <65%.

6. Photometry Measurement Uncertainty

The uncertainty of the light output measurements is U=1.8% (K=2), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is U=20K (K=2), at the 95% confidence level. This calibration results traceable to the Guangzhou Institute of Measurement and Testing Technology.

7. Sample Set

Part Number:	3N128-ABKACK-ZJP-1
Number of Units:	25
Actual Case Temperature(T_S):	T_S =55.8°C
Actual Ambient Temperature(T_A):	T_A =53.1°C
Life Test Drive Current:	I_F = 175mA
Measurement Current:	I_F = 175mA

Part Number:	3N128-ABKACK-ZJP-1
Number of Units:	25
Actual Case Temperature(T_S):	T_S =85.6°C
Actual Ambient Temperature(T_A):	T_A =83.5°C
Life Test Drive Current:	I_F = 175mA
Measurement Current:	I_F = 175mA

Part Number:	3N128-ABKACK-ZJP-1
Number of Units:	25
Actual Case Temperature(T_S):	T_S =104.0°C
Actual Ambient Temperature(T_A):	T_A =103.5°C
Life Test Drive Current:	I_F = 175mA
Measurement Current:	I_F = 175mA

8. SUMMARY OF TEST RESULT

Data Set:	Data sheet 1, 55°C, 175mA
Number of Units:	25
Failures Observed:	0
Test Interval and Test Duration:	0h, 1000h, 2000h, 3000h, 4000h, 5000h, 6000h, 7000h, 8000h, 9000h, 10000h
Average. Lumen Maintenance at 10000 hours:	98.74%
Average Chromaticity Shift at 10000 hours (Δu'v'):	0.0034
Reported TM-21 L_{70} Lifetime:	> 60000 hours

Data Set:	Data sheet 2, 85°C, 175mA
Number of Units:	25
Failures Observed:	0
Test Interval and Test Duration:	0h, 1000h, 2000h, 3000h, 4000h, 5000h, 6000h, 7000h, 8000h, 9000h, 10000h
Average. Lumen Maintenance at 10000 hours:	97.96%
Average Chromaticity Shift at 10000 hours (Δu'v'):	0.0038
Reported TM-21 L_{70} Lifetime:	> 60000 hours

Data Set:	Data sheet 3, 105°C, 175mA
Number of Units:	25
Failures Observed:	0
Test Interval and Test Duration:	0h, 1000h, 2000h, 3000h, 4000h, 5000h, 6000h, 7000h, 8000h, 9000h, 10000h
Average. Lumen Maintenance at 10000 hours:	96.36%
Average Chromaticity Shift at 10000 hours (Δu'v'):	0.0045
Reported TM-21 L_{70} Lifetime:	> 60000 hours

Data sheet 1:

Driver current: 175mA	Target Case temperature: 55°C

Lumen Maintenance:											
S/N	TLF(lm)	Lumen Maintenance (%)									
	Initial(0h)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
1	122.67	100.45	100.16	99.84	99.63	99.31	99.13	99.06	98.89	98.90	98.68
2	122.76	100.71	100.11	99.83	99.73	99.36	99.23	99.04	98.85	98.87	98.80
3	121.17	100.43	100.19	99.82	99.68	99.48	99.12	99.08	98.87	98.83	98.78
4	121.23	100.47	100.23	99.88	99.65	99.46	99.26	98.98	98.91	98.88	98.66
5	122.86	100.65	100.30	99.90	99.63	99.38	99.14	99.06	98.93	98.84	98.83
6	124.93	100.57	100.19	99.79	99.71	99.52	99.16	98.99	98.91	98.90	98.76
7	122.91	100.54	100.12	100.00	99.63	99.40	99.16	99.03	98.94	98.85	98.84
8	121.67	100.52	100.16	99.83	99.73	99.50	99.15	98.97	98.91	98.86	98.74
9	122.77	100.53	100.30	99.79	99.56	99.50	99.19	99.03	98.93	98.78	98.77
10	122.54	100.68	100.09	99.79	99.59	99.44	99.19	98.99	98.93	98.81	98.65
11	123.57	100.75	100.17	99.96	99.62	99.35	99.11	99.03	98.88	98.89	98.74
12	123.35	100.71	100.12	99.90	99.61	99.31	99.12	99.00	98.88	98.87	98.84
13	121.04	100.43	100.19	99.85	99.63	99.48	99.13	99.06	98.89	98.83	98.68
14	122.14	100.34	100.23	99.95	99.69	99.40	99.11	99.04	98.93	98.91	98.66
15	120.75	100.41	100.15	99.92	99.59	99.38	99.30	99.05	98.86	98.86	98.80
16	122.58	100.60	100.16	99.86	99.75	99.49	99.21	98.97	98.86	98.89	98.80
17	121.66	100.51	100.05	99.84	99.57	99.43	99.29	98.96	98.90	98.86	98.65
18	121.73	100.75	100.08	99.94	99.62	99.51	99.11	99.08	98.87	98.80	98.79
19	121.50	100.80	100.22	99.89	99.73	99.39	99.24	99.08	98.87	98.81	98.68
20	122.38	100.65	100.31	99.82	99.74	99.34	99.29	99.02	98.86	98.87	98.84
21	125.35	100.76	100.24	99.98	99.69	99.45	99.21	99.04	98.90	98.94	98.67
22	122.33	100.77	100.10	99.89	99.61	99.40	99.23	98.98	98.93	98.88	98.82
23	123.16	100.48	100.04	100.01	99.52	99.36	99.12	98.96	98.88	98.82	98.71
24	121.01	100.76	100.05	100.00	99.58	99.37	99.27	99.08	98.94	98.84	98.66
25	122.62	100.42	100.28	99.89	99.53	99.50	99.21	98.97	98.91	98.93	98.69
Ave.	**122.43**	**100.59**	**100.17**	**99.89**	**99.64**	**99.42**	**99.19**	**99.02**	**98.90**	**98.86**	**98.74**
Max	125.35	100.80	100.31	100.01	99.75	99.52	99.30	99.08	98.94	98.94	98.84
Min	120.75	100.34	100.04	99.79	99.52	99.31	99.11	98.96	98.85	98.78	98.65
Med	122.54	100.57	100.16	99.89	99.63	99.40	99.19	99.03	98.90	98.86	98.74
Std.dev	1.13	0.14	0.08	0.07	0.07	0.07	0.06	0.04	0.03	0.04	0.07

TM-21 Projection:	
Test Duration	10000 h
Failures Observed	0
α	1.301E-06
β	1.000
Reported L_{70}	>60000 h
Reported L_{90}	>60000 h

Chromaticity:										
S/N	1	2	3	4	5	6	7	8	9	10
CIEu'	0.2613	0.2608	0.2617	0.2574	0.2607	0.2583	0.2595	0.2627	0.2605	0.2612
CIEv'	0.5326	0.5335	0.5326	0.5315	0.5313	0.5315	0.5319	0.5321	0.5320	0.5326
CCT(K)	2703	2710	2695	2790	2721	2770	2743	2678	2724	2706
S/N	11	12	13	14	15	16	17	18	19	20
CIEu'	0.2600	0.2610	0.2617	0.2612	0.2608	0.2613	0.2575	0.2611	0.2619	0.2594
CIEv'	0.5315	0.5335	0.5326	0.5327	0.5315	0.5327	0.5316	0.5316	0.5327	0.5318
CCT(K)	2734	2707	2696	2706	2719	2704	2787	2712	2691	2747
S/N	21	22	23	24	25	**Ave.**	Max	Min	Med	Std.dev
CIEu'	0.2585	0.2606	0.2599	0.2625	0.2604	**0.2605**	0.2627	0.2574	0.2608	0.0014
CIEv'	0.5316	0.5313	0.5315	0.5320	0.5320	**0.5321**	0.5335	0.5313	0.5320	0.0006
CCT(K)	2766	2724	2736	2681	2724	**2723**	2790	2678	2719	30

Chromaticity Shift (Δu'v'):

S/N	Initial(0h)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
1	0	0.0008	0.0014	0.0018	0.0020	0.0023	0.0025	0.0027	0.0031	0.0032	0.0033
2	0	0.0011	0.0012	0.0017	0.0022	0.0023	0.0026	0.0027	0.0032	0.0033	0.0035
3	0	0.0007	0.0013	0.0018	0.0023	0.0025	0.0026	0.0027	0.0031	0.0032	0.0033
4	0	0.0008	0.0013	0.0019	0.0022	0.0024	0.0026	0.0029	0.0030	0.0031	0.0035
5	0	0.0008	0.0015	0.0018	0.0019	0.0024	0.0026	0.0028	0.0031	0.0033	0.0032
6	0	0.0010	0.0014	0.0016	0.0020	0.0023	0.0027	0.0029	0.0030	0.0032	0.0034
7	0	0.0008	0.0014	0.0015	0.0020	0.0024	0.0026	0.0028	0.0031	0.0031	0.0032
8	0	0.0008	0.0015	0.0016	0.0021	0.0025	0.0025	0.0029	0.0031	0.0033	0.0034
9	0	0.0009	0.0014	0.0015	0.0022	0.0024	0.0026	0.0030	0.0032	0.0030	0.0033
10	0	0.0007	0.0013	0.0019	0.0021	0.0023	0.0026	0.0028	0.0030	0.0031	0.0033
11	0	0.0008	0.0014	0.0017	0.0020	0.0023	0.0026	0.0029	0.0031	0.0033	0.0034
12	0	0.0009	0.0011	0.0016	0.0021	0.0023	0.0025	0.0030	0.0032	0.0033	0.0034
13	0	0.0007	0.0014	0.0016	0.0021	0.0023	0.0026	0.0029	0.0032	0.0032	0.0033
14	0	0.0007	0.0015	0.0016	0.0022	0.0023	0.0026	0.0028	0.0030	0.0031	0.0034
15	0	0.0008	0.0014	0.0016	0.0019	0.0024	0.0026	0.0028	0.0030	0.0031	0.0034
16	0	0.0010	0.0014	0.0017	0.0021	0.0023	0.0025	0.0028	0.0031	0.0033	0.0032
17	0	0.0007	0.0014	0.0017	0.0020	0.0024	0.0025	0.0029	0.0030	0.0032	0.0034
18	0	0.0011	0.0014	0.0016	0.0021	0.0024	0.0025	0.0028	0.0030	0.0031	0.0034
19	0	0.0009	0.0014	0.0019	0.0021	0.0024	0.0025	0.0029	0.0031	0.0030	0.0033
20	0	0.0009	0.0013	0.0017	0.0020	0.0025	0.0026	0.0028	0.0031	0.0031	0.0034
21	0	0.0010	0.0012	0.0017	0.0020	0.0024	0.0025	0.0028	0.0031	0.0033	0.0034
22	0	0.0008	0.0015	0.0015	0.0019	0.0025	0.0025	0.0029	0.0030	0.0031	0.0034
23	0	0.0007	0.0011	0.0016	0.0020	0.0024	0.0025	0.0028	0.0031	0.0031	0.0033
24	0	0.0010	0.0013	0.0015	0.0022	0.0024	0.0025	0.0029	0.0031	0.0031	0.0035
25	0	0.0008	0.0012	0.0015	0.0022	0.0023	0.0026	0.0027	0.0032	0.0030	0.0032
Ave.	**0**	**0.0008**	**0.0013**	**0.0017**	**0.0021**	**0.0024**	**0.0026**	**0.0028**	**0.0031**	**0.0032**	**0.0034**
Max	0	0.0011	0.0015	0.0019	0.0023	0.0025	0.0027	0.0030	0.0032	0.0033	0.0035
Min	0	0.0007	0.0011	0.0015	0.0019	0.0023	0.0025	0.0027	0.0030	0.0030	0.0032
Med	0	0.0008	0.0014	0.0016	0.0021	0.0024	0.0026	0.0028	0.0031	0.0031	0.0034
Std.dev	0	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

Forward Voltage:											
S/N	V_F(V)										
	Initial(0h)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
1	6.28	6.28	6.28	6.27	6.25	6.23	6.29	6.28	6.27	6.25	6.26
2	6.24	6.27	6.27	6.26	6.28	6.30	6.27	6.29	6.28	6.23	6.27
3	6.28	6.27	6.24	6.30	6.28	6.28	6.26	6.28	6.26	6.25	6.23
4	6.21	6.24	6.28	6.24	6.27	6.24	6.27	6.25	6.24	6.24	6.28
5	6.20	6.25	6.23	6.25	6.28	6.29	6.26	6.27	6.29	6.29	6.28
6	6.25	6.27	6.26	6.27	6.25	6.23	6.25	6.27	6.29	6.25	6.24
7	6.28	6.25	6.29	6.24	6.25	6.26	6.29	6.29	6.23	6.28	6.26
8	6.27	6.23	6.26	6.24	6.29	6.30	6.27	6.25	6.25	6.27	6.30
9	6.22	6.26	6.26	6.24	6.29	6.30	6.24	6.30	6.28	6.26	6.25
10	6.28	6.25	6.28	6.25	6.29	6.27	6.29	6.30	6.25	6.28	6.29
11	6.24	6.26	6.28	6.25	6.26	6.26	6.28	6.26	6.29	6.26	6.23
12	6.25	6.27	6.28	6.26	6.30	6.28	6.29	6.26	6.26	6.29	6.24
13	6.28	6.24	6.28	6.28	6.29	6.28	6.23	6.29	6.26	6.26	6.23
14	6.29	6.25	6.28	6.23	6.28	6.26	6.25	6.25	6.29	6.28	6.24
15	6.28	6.26	6.27	6.28	6.29	6.27	6.25	6.23	6.28	6.29	6.25
16	6.29	6.25	6.28	6.25	6.28	6.24	6.27	6.28	6.27	6.30	6.28
17	6.21	6.28	6.27	6.28	6.27	6.24	6.28	6.29	6.25	6.26	6.28
18	6.29	6.30	6.26	6.29	6.29	6.27	6.28	6.28	6.28	6.24	6.27
19	6.28	6.27	6.26	6.24	6.29	6.24	6.23	6.26	6.25	6.24	6.24
20	6.28	6.23	6.27	6.29	6.27	6.26	6.24	6.24	6.26	6.29	6.25
21	6.25	6.24	6.25	6.25	6.29	6.24	6.26	6.26	6.25	6.27	6.26
22	6.20	6.26	6.28	6.29	6.24	6.27	6.26	6.27	6.30	6.26	6.23
23	6.24	6.30	6.26	6.29	6.24	6.26	6.29	6.29	6.27	6.26	6.28
24	6.26	6.29	6.24	6.28	6.29	6.25	6.24	6.25	6.28	6.29	6.24
25	6.22	6.30	6.23	6.27	6.29	6.27	6.26	6.29	6.28	6.27	6.26
Ave.	**6.26**	**6.26**	**6.27**	**6.26**	**6.28**	**6.26**	**6.26**	**6.27**	**6.27**	**6.27**	**6.26**
Max	6.29	6.30	6.29	6.30	6.30	6.30	6.29	6.30	6.30	6.30	6.30
Min	6.20	6.23	6.23	6.23	6.24	6.23	6.23	6.23	6.23	6.23	6.23
Med	6.26	6.26	6.27	6.26	6.28	6.26	6.26	6.27	6.27	6.26	6.26
Std.dev	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02

Data sheet 2:

Driver current: 175mA	Target Case temperature: 85°C

Lumen Maintenance:											
S/N	TLF(lm)	Lumen Maintenance (%)									
	Initial(0h)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
26	123.51	100.25	99.52	99.43	99.07	98.77	98.43	98.35	98.18	98.02	97.96
27	124.00	100.21	99.59	99.25	99.12	98.72	98.43	98.29	98.12	98.18	98.05
28	123.01	100.11	99.56	99.41	98.95	98.63	98.57	98.34	98.10	97.94	97.84
29	124.76	100.06	99.78	99.32	99.17	98.86	98.52	98.33	98.16	98.00	97.98
30	121.94	100.21	99.58	99.35	98.96	98.69	98.63	98.20	98.16	98.16	97.85
31	120.28	100.10	99.82	99.21	98.90	98.76	98.62	98.20	98.16	98.13	98.03
32	124.11	100.30	99.62	99.35	98.97	98.72	98.44	98.29	98.10	97.94	97.98
33	122.08	100.34	99.61	99.36	99.06	98.67	98.57	98.31	98.16	98.15	97.90
34	124.78	100.39	99.72	99.30	99.13	98.78	98.49	98.23	98.12	98.16	98.07
35	122.90	100.27	99.78	99.24	99.19	98.77	98.53	98.34	98.14	98.11	98.01
36	123.31	100.14	99.66	99.27	98.98	98.81	98.60	98.30	98.17	98.14	97.94
37	122.76	99.93	99.56	99.44	99.19	98.75	98.61	98.33	98.13	98.16	97.96
38	124.33	100.19	99.68	99.34	98.93	98.76	98.49	98.38	98.15	98.01	97.94
39	121.25	99.92	99.56	99.30	99.08	98.70	98.41	98.29	98.17	98.10	97.96
40	123.78	100.23	99.57	99.22	99.07	98.77	98.46	98.27	98.19	98.17	97.84
41	122.11	99.94	99.53	99.39	99.01	98.80	98.49	98.22	98.16	98.19	97.91
42	123.91	100.33	99.83	99.34	99.12	98.83	98.53	98.38	98.19	97.97	97.87
43	124.03	99.99	99.71	99.28	99.03	98.67	98.60	98.33	98.19	98.09	98.04
44	123.49	100.02	99.73	99.25	99.15	98.68	98.62	98.36	98.12	98.17	98.02
45	119.98	100.29	99.48	99.23	99.11	98.66	98.46	98.20	98.16	98.19	98.05
46	126.38	100.17	99.56	99.44	99.17	98.65	98.56	98.31	98.18	97.95	98.06
47	120.44	100.10	99.75	99.45	99.04	98.80	98.49	98.27	98.11	98.08	97.84
48	125.82	100.11	99.61	99.44	98.91	98.70	98.61	98.23	98.10	98.16	97.83
49	125.18	100.31	99.76	99.23	99.15	98.65	98.63	98.41	98.19	98.18	97.97
50	121.64	100.07	99.59	99.37	99.04	98.83	98.50	98.40	98.14	97.99	98.07
Ave.	**123.19**	**100.16**	**99.65**	**99.33**	**99.06**	**98.74**	**98.53**	**98.30**	**98.15**	**98.09**	**97.96**
Max	126.38	100.39	99.83	99.45	99.19	98.86	98.63	98.41	98.19	98.19	98.07
Min	119.98	99.92	99.48	99.21	98.90	98.63	98.41	98.20	98.10	97.94	97.83
Med	123.49	100.17	99.61	99.34	99.07	98.75	98.53	98.31	98.16	98.13	97.96
Std.dev	1.68	0.14	0.10	0.08	0.09	0.07	0.07	0.06	0.03	0.09	0.08

TM-21 Projection:	
Test Duration	10000 h
Failures Observed	0
α	1.560E-06
β	0.995
Reported L_{70}	>60000 h
Reported L_{90}	>60000 h

Chromaticity:										
S/N	26	27	28	29	30	31	32	33	34	35
CIEu'	0.2609	0.2595	0.2611	0.2584	0.2598	0.2608	0.2605	0.2607	0.2580	0.2613
CIEv'	0.5330	0.5318	0.5304	0.5317	0.5317	0.5336	0.5316	0.5303	0.5316	0.5337
CCT(K)	2710	2744	2717	2768	2738	2711	2724	2726	2776	2700
S/N	36	37	38	39	40	41	42	43	44	45
CIEu'	0.2625	0.2610	0.2596	0.2610	0.2613	0.2623	0.2603	0.2595	0.2610	0.2622
CIEv'	0.5340	0.5328	0.5318	0.5336	0.5305	0.5338	0.5315	0.5317	0.5327	0.5338
CCT(K)	2674	2709	2741	2706	2713	2680	2729	2744	2710	2682
S/N	46	47	48	49	50	**Ave.**	Max	Min	Med	Std.dev
CIEu'	0.2589	0.2605	0.2586	0.2597	0.2608	**0.2604**	0.2625	0.2580	0.2607	0.0012
CIEv'	0.5301	0.5302	0.5317	0.5318	0.5330	**0.5321**	0.5340	0.5301	0.5318	0.0012
CCT(K)	2763	2729	2763	2740	2712	**2724**	2776	2674	2724	27

Chromaticity Shift (Δu'v')

S/N	Initial(0h)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
26	0	0.0014	0.0017	0.0019	0.0023	0.0027	0.0030	0.0033	0.0035	0.0035	0.0038
27	0	0.0012	0.0019	0.0020	0.0026	0.0028	0.0029	0.0033	0.0036	0.0035	0.0036
28	0	0.0013	0.0015	0.0020	0.0023	0.0028	0.0030	0.0034	0.0035	0.0035	0.0038
29	0	0.0014	0.0015	0.0020	0.0026	0.0029	0.0030	0.0034	0.0035	0.0036	0.0039
30	0	0.0011	0.0016	0.0020	0.0024	0.0029	0.0030	0.0032	0.0035	0.0034	0.0039
31	0	0.0013	0.0018	0.0021	0.0026	0.0028	0.0030	0.0033	0.0036	0.0036	0.0038
32	0	0.0014	0.0018	0.0019	0.0024	0.0027	0.0031	0.0033	0.0035	0.0035	0.0036
33	0	0.0014	0.0017	0.0020	0.0024	0.0028	0.0031	0.0032	0.0035	0.0035	0.0038
34	0	0.0014	0.0017	0.0020	0.0026	0.0028	0.0030	0.0034	0.0034	0.0036	0.0038
35	0	0.0012	0.0016	0.0022	0.0025	0.0028	0.0031	0.0034	0.0035	0.0036	0.0038
36	0	0.0011	0.0017	0.0022	0.0024	0.0028	0.0030	0.0032	0.0034	0.0034	0.0036
37	0	0.0012	0.0015	0.0023	0.0027	0.0029	0.0030	0.0031	0.0035	0.0036	0.0039
38	0	0.0013	0.0016	0.0020	0.0025	0.0027	0.0030	0.0034	0.0036	0.0037	0.0038
39	0	0.0013	0.0018	0.0023	0.0024	0.0029	0.0031	0.0032	0.0036	0.0036	0.0037
40	0	0.0013	0.0019	0.0023	0.0023	0.0028	0.0029	0.0034	0.0036	0.0036	0.0037
41	0	0.0014	0.0017	0.0023	0.0025	0.0029	0.0030	0.0033	0.0034	0.0036	0.0039
42	0	0.0012	0.0019	0.0022	0.0024	0.0028	0.0030	0.0032	0.0034	0.0034	0.0038
43	0	0.0014	0.0018	0.0020	0.0025	0.0028	0.0030	0.0032	0.0035	0.0034	0.0039
44	0	0.0012	0.0017	0.0022	0.0026	0.0027	0.0031	0.0031	0.0035	0.0035	0.0038
45	0	0.0012	0.0016	0.0022	0.0024	0.0028	0.0031	0.0032	0.0035	0.0035	0.0038
46	0	0.0014	0.0018	0.0020	0.0026	0.0028	0.0031	0.0033	0.0036	0.0036	0.0039
47	0	0.0012	0.0015	0.0023	0.0026	0.0029	0.0030	0.0032	0.0035	0.0035	0.0038
48	0	0.0012	0.0017	0.0020	0.0025	0.0028	0.0031	0.0033	0.0036	0.0036	0.0039
49	0	0.0011	0.0019	0.0019	0.0024	0.0029	0.0030	0.0033	0.0035	0.0035	0.0037
50	0	0.0015	0.0017	0.0020	0.0025	0.0028	0.0030	0.0033	0.0035	0.0034	0.0039
Ave.	**0**	**0.0013**	**0.0017**	**0.0021**	**0.0025**	**0.0028**	**0.0030**	**0.0033**	**0.0035**	**0.0035**	**0.0038**
Max	0	0.0015	0.0019	0.0023	0.0027	0.0029	0.0031	0.0034	0.0036	0.0037	0.0039
Min	0	0.0011	0.0015	0.0019	0.0023	0.0027	0.0029	0.0031	0.0034	0.0034	0.0036
Med	0	0.0013	0.0017	0.0020	0.0025	0.0028	0.0030	0.0033	0.0035	0.0035	0.0038
Std.dev	0	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

Forward Voltage:											
S/N	V_F(V)										
	Initial(0h)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
26	6.24	6.24	6.24	6.26	6.29	6.27	6.24	6.26	6.29	6.28	6.27
27	6.20	6.27	6.30	6.27	6.25	6.24	6.26	6.28	6.23	6.27	6.23
28	6.27	6.25	6.27	6.26	6.30	6.25	6.25	6.23	6.28	6.26	6.27
29	6.25	6.25	6.28	6.24	6.24	6.25	6.26	6.25	6.28	6.26	6.25
30	6.27	6.24	6.24	6.26	6.26	6.25	6.26	6.24	6.26	6.26	6.27
31	6.28	6.27	6.24	6.29	6.27	6.24	6.29	6.26	6.27	6.26	6.24
32	6.31	6.23	6.26	6.24	6.27	6.26	6.25	6.26	6.27	6.30	6.27
33	6.26	6.27	6.29	6.26	6.28	6.23	6.26	6.29	6.30	6.24	6.24
34	6.25	6.24	6.24	6.27	6.27	6.25	6.26	6.25	6.30	6.28	6.26
35	6.29	6.25	6.24	6.29	6.26	6.24	6.24	6.29	6.29	6.24	6.27
36	6.26	6.29	6.28	6.25	6.26	6.26	6.25	6.27	6.24	6.25	6.27
37	6.25	6.24	6.23	6.28	6.26	6.23	6.23	6.29	6.29	6.25	6.27
38	6.23	6.28	6.24	6.29	6.24	6.24	6.25	6.25	6.28	6.24	6.27
39	6.28	6.30	6.28	6.24	6.24	6.28	6.26	6.28	6.28	6.25	6.30
40	6.28	6.29	6.24	6.23	6.24	6.25	6.29	6.25	6.27	6.25	6.27
41	6.25	6.24	6.28	6.28	6.26	6.27	6.27	6.27	6.26	6.23	6.26
42	6.31	6.24	6.24	6.26	6.24	6.27	6.23	6.29	6.24	6.28	6.24
43	6.22	6.30	6.26	6.25	6.26	6.30	6.29	6.24	6.23	6.29	6.24
44	6.25	6.23	6.23	6.29	6.27	6.25	6.28	6.28	6.30	6.27	6.27
45	6.25	6.28	6.29	6.29	6.28	6.24	6.28	6.25	6.23	6.29	6.25
46	6.29	6.25	6.26	6.29	6.25	6.26	6.25	6.25	6.24	6.27	6.24
47	6.26	6.26	6.26	6.25	6.25	6.27	6.24	6.24	6.26	6.25	6.28
48	6.25	6.24	6.27	6.24	6.23	6.25	6.26	6.25	6.28	6.25	6.25
49	6.21	6.24	6.28	6.25	6.29	6.30	6.29	6.23	6.25	6.25	6.28
50	6.24	6.26	6.29	6.27	6.28	6.28	6.24	6.26	6.29	6.26	6.26
Ave.	**6.26**	**6.26**	**6.26**	**6.26**	**6.26**	**6.26**	**6.26**	**6.26**	**6.27**	**6.26**	**6.26**
Max	6.31	6.30	6.30	6.29	6.30	6.30	6.29	6.29	6.30	6.30	6.30
Min	6.20	6.23	6.23	6.23	6.23	6.23	6.23	6.23	6.23	6.23	6.23
Med	6.25	6.25	6.26	6.26	6.26	6.25	6.26	6.26	6.27	6.26	6.27
Std.dev	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02

Data sheet 3:

Driver current: 175mA	Target Case temperature: 105°C

Lumen Maintenance:											
S/N	TLF(lm)	Lumen Maintenance (%)									
	Initial(0h)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
51	123.26	99.11	98.77	98.37	98.07	97.69	97.49	97.07	96.85	96.67	96.40
52	125.01	99.45	98.73	98.25	98.14	97.54	97.44	97.08	96.81	96.61	96.43
53	126.52	99.31	98.70	98.49	98.15	97.61	97.52	97.03	96.89	96.62	96.41
54	126.58	99.45	98.98	98.42	98.19	97.83	97.30	97.21	96.91	96.71	96.48
55	123.25	99.26	98.67	98.24	97.97	97.69	97.49	97.11	96.89	96.68	96.37
56	125.46	99.45	98.96	98.52	98.06	97.54	97.51	97.23	96.85	96.74	96.30
57	122.44	99.55	98.98	98.49	97.95	97.62	97.34	97.03	96.87	96.74	96.29
58	126.62	99.45	98.74	98.43	97.89	97.83	97.47	97.22	96.84	96.61	96.20
59	125.99	99.53	98.72	98.28	97.89	97.67	97.47	97.13	96.86	96.54	96.35
60	120.48	99.39	99.00	98.25	98.22	97.69	97.35	97.09	96.85	96.73	96.47
61	125.54	99.48	98.87	98.47	98.18	97.74	97.33	97.07	96.88	96.50	96.29
62	120.26	99.09	98.54	98.37	97.98	97.71	97.44	97.06	96.83	96.44	96.33
63	125.13	99.13	99.02	98.53	98.23	97.82	97.50	97.14	96.89	96.62	96.20
64	124.65	99.15	98.95	98.27	97.86	97.68	97.42	97.04	96.80	96.68	96.50
65	124.90	99.48	98.91	98.51	97.90	97.79	97.36	97.08	96.83	96.51	96.42
66	125.37	99.44	98.95	98.49	98.06	97.56	97.38	97.12	96.81	96.74	96.27
67	122.76	99.10	98.74	98.25	97.92	97.57	97.49	97.25	96.86	96.56	96.30
68	123.85	99.44	98.73	98.29	98.08	97.54	97.31	97.06	96.82	96.67	96.29
69	124.28	99.43	98.67	98.43	98.07	97.72	97.36	97.11	96.88	96.44	96.41
70	121.36	99.16	98.82	98.29	97.91	97.62	97.29	97.10	96.81	96.47	96.52
71	124.48	99.25	98.89	98.25	98.05	97.81	97.46	97.05	96.90	96.60	96.41
72	123.86	99.56	98.60	98.29	98.05	97.64	97.36	97.06	96.87	96.74	96.31
73	123.99	99.24	98.97	98.43	98.14	97.57	97.47	97.08	96.85	96.65	96.32
74	126.11	99.45	98.74	98.40	97.96	97.66	97.47	97.12	96.84	96.56	96.41
75	124.28	99.34	98.65	98.33	97.92	97.70	97.46	97.12	96.83	96.45	96.43
Ave.	**124.26**	**99.35**	**98.81**	**98.37**	**98.03**	**97.67**	**97.42**	**97.11**	**96.85**	**96.61**	**96.36**
Max	126.62	99.56	99.02	98.53	98.23	97.83	97.52	97.25	96.91	96.74	96.52
Min	120.26	99.09	98.54	98.24	97.86	97.54	97.29	97.03	96.80	96.44	96.20
Med	124.48	99.43	98.77	98.37	98.05	97.68	97.44	97.09	96.85	96.62	96.37
Std.dev	1.77	0.15	0.14	0.10	0.11	0.09	0.07	0.06	0.03	0.10	0.09

TM-21 Projection:	
Test Duration	10000 h
Failures Observed	0
α	2.721E-06
β	0.990
Reported L_{70}	>60000 h
Reported L_{90}	35000 h

Chromaticity:										
S/N	51	52	53	54	55	56	57	58	59	60
CIEu'	0.2584	0.2615	0.2602	0.2614	0.2616	0.2621	0.2620	0.2618	0.2604	0.2616
CIEv'	0.5318	0.5338	0.5311	0.5339	0.5335	0.5326	0.5317	0.5339	0.5312	0.5323
CCT(K)	2767	2696	2732	2698	2694	2688	2693	2690	2727	2698
S/N	61	62	63	64	65	66	67	68	69	70
CIEu'	0.2609	0.2613	0.2599	0.2615	0.2602	0.2605	0.2618	0.2619	0.2600	0.2615
CIEv'	0.5316	0.5322	0.5313	0.5339	0.5311	0.5314	0.5336	0.5326	0.5313	0.5322
CCT(K)	2716	2705	2738	2694	2731	2724	2689	2693	2736	2702
S/N	71	72	73	74	75	**Ave.**	Max	Min	Med	Std.dev
CIEu'	0.2606	0.2617	0.2621	0.2607	0.2588	**0.2610**	0.2621	0.2584	0.2614	0.0010
CIEv'	0.5315	0.5336	0.5317	0.5315	0.5300	**0.5322**	0.5339	0.5300	0.5318	0.0011
CCT(K)	2723	2692	2691	2720	2765	**2712**	2767	2688	2702	23

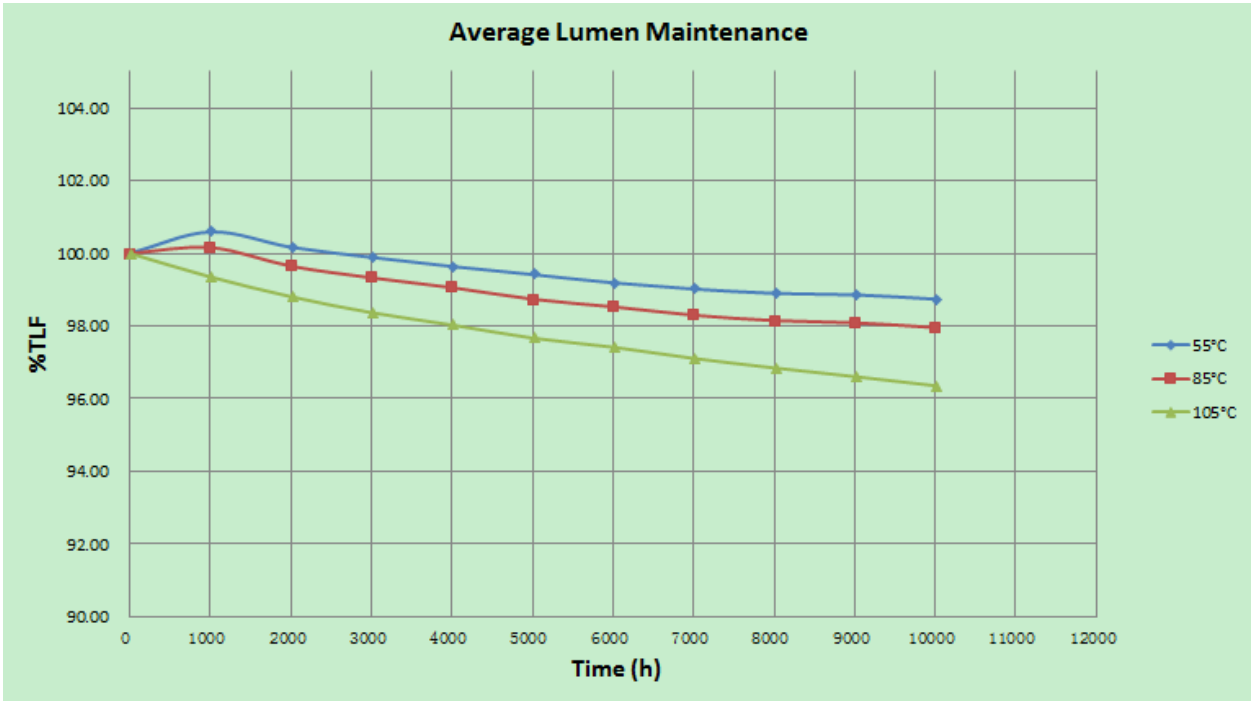
Chromaticity Shift (Δu'v'):

S/N	Initial(0h)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
51	0	0.0017	0.0022	0.0029	0.0030	0.0033	0.0037	0.0038	0.0042	0.0045	0.0046
52	0	0.0019	0.0023	0.0027	0.0031	0.0034	0.0038	0.0039	0.0042	0.0041	0.0046
53	0	0.0019	0.0023	0.0029	0.0030	0.0034	0.0036	0.0040	0.0043	0.0045	0.0045
54	0	0.0019	0.0025	0.0025	0.0031	0.0034	0.0038	0.0039	0.0043	0.0042	0.0046
55	0	0.0019	0.0023	0.0026	0.0030	0.0035	0.0037	0.0040	0.0042	0.0042	0.0044
56	0	0.0020	0.0025	0.0027	0.0033	0.0033	0.0038	0.0038	0.0042	0.0043	0.0047
57	0	0.0021	0.0023	0.0027	0.0029	0.0035	0.0037	0.0039	0.0043	0.0042	0.0044
58	0	0.0018	0.0024	0.0027	0.0032	0.0036	0.0036	0.0039	0.0042	0.0042	0.0047
59	0	0.0019	0.0021	0.0028	0.0030	0.0036	0.0038	0.0039	0.0042	0.0042	0.0044
60	0	0.0018	0.0024	0.0028	0.0031	0.0035	0.0038	0.0039	0.0044	0.0043	0.0047
61	0	0.0018	0.0024	0.0026	0.0031	0.0035	0.0037	0.0040	0.0042	0.0042	0.0045
62	0	0.0017	0.0025	0.0029	0.0031	0.0036	0.0036	0.0041	0.0042	0.0044	0.0046
63	0	0.0020	0.0023	0.0027	0.0029	0.0035	0.0037	0.0040	0.0044	0.0043	0.0045
64	0	0.0018	0.0024	0.0026	0.0029	0.0034	0.0037	0.0040	0.0044	0.0043	0.0045
65	0	0.0019	0.0022	0.0025	0.0030	0.0034	0.0037	0.0039	0.0044	0.0041	0.0046
66	0	0.0017	0.0025	0.0027	0.0032	0.0036	0.0036	0.0041	0.0044	0.0043	0.0044
67	0	0.0018	0.0022	0.0028	0.0030	0.0034	0.0038	0.0040	0.0044	0.0044	0.0045
68	0	0.0019	0.0022	0.0026	0.0031	0.0035	0.0038	0.0040	0.0041	0.0043	0.0046
69	0	0.0020	0.0023	0.0027	0.0033	0.0034	0.0037	0.0040	0.0042	0.0045	0.0046
70	0	0.0019	0.0025	0.0028	0.0032	0.0036	0.0037	0.0039	0.0043	0.0041	0.0045
71	0	0.0018	0.0024	0.0027	0.0032	0.0035	0.0036	0.0039	0.0043	0.0043	0.0044
72	0	0.0021	0.0024	0.0027	0.0030	0.0035	0.0037	0.0041	0.0044	0.0044	0.0046
73	0	0.0020	0.0021	0.0028	0.0032	0.0034	0.0037	0.0040	0.0042	0.0041	0.0044
74	0	0.0021	0.0024	0.0028	0.0029	0.0033	0.0037	0.0040	0.0042	0.0041	0.0045
75	0	0.0018	0.0025	0.0029	0.0030	0.0033	0.0038	0.0041	0.0043	0.0042	0.0046
Ave.	**0**	**0.0019**	**0.0023**	**0.0027**	**0.0031**	**0.0035**	**0.0037**	**0.0040**	**0.0043**	**0.0043**	**0.0045**
Max	0	0.0021	0.0025	0.0029	0.0033	0.0036	0.0038	0.0041	0.0044	0.0045	0.0047
Min	0	0.0017	0.0021	0.0025	0.0029	0.0033	0.0036	0.0038	0.0041	0.0041	0.0044
Med	0	0.0019	0.0024	0.0027	0.0031	0.0035	0.0037	0.0040	0.0043	0.0043	0.0045
Std.dev	0	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

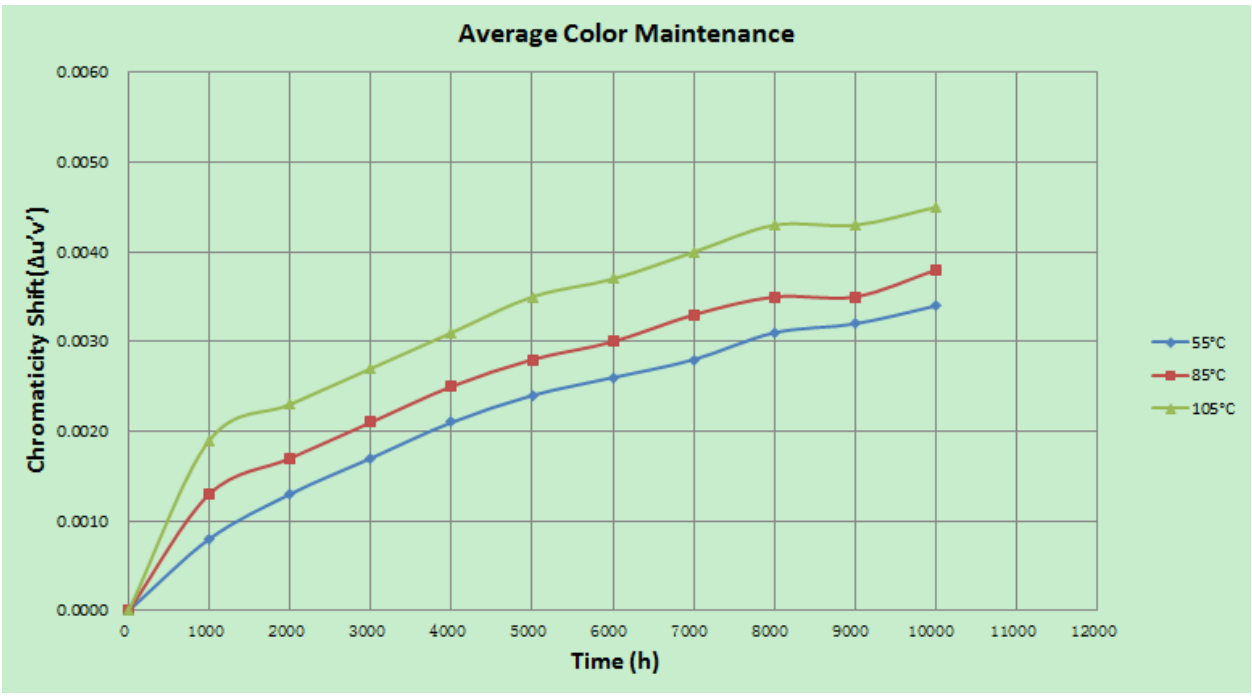
Forward Voltage:											
S/N	V_F(V)										
	Initial(0h)	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h	10000h
51	6.28	6.26	6.28	6.28	6.26	6.27	6.28	6.28	6.29	6.30	6.28
52	6.30	6.24	6.29	6.23	6.24	6.26	6.24	6.29	6.28	6.29	6.29
53	6.20	6.29	6.24	6.26	6.24	6.25	6.23	6.30	6.27	6.29	6.26
54	6.31	6.24	6.27	6.24	6.29	6.29	6.25	6.24	6.25	6.24	6.26
55	6.24	6.23	6.28	6.27	6.25	6.29	6.25	6.26	6.27	6.24	6.28
56	6.25	6.27	6.26	6.23	6.27	6.25	6.30	6.29	6.24	6.27	6.25
57	6.22	6.27	6.28	6.26	6.25	6.28	6.24	6.29	6.23	6.23	6.26
58	6.31	6.23	6.25	6.28	6.26	6.27	6.27	6.29	6.28	6.27	6.23
59	6.21	6.23	6.29	6.24	6.29	6.26	6.29	6.28	6.25	6.25	6.28
60	6.27	6.28	6.27	6.28	6.27	6.28	6.28	6.28	6.28	6.24	6.24
61	6.26	6.27	6.28	6.24	6.27	6.27	6.24	6.29	6.25	6.27	6.25
62	6.27	6.26	6.29	6.29	6.29	6.27	6.26	6.28	6.24	6.27	6.29
63	6.22	6.27	6.30	6.27	6.26	6.26	6.23	6.25	6.27	6.26	6.24
64	6.30	6.27	6.24	6.24	6.24	6.25	6.27	6.27	6.29	6.27	6.23
65	6.21	6.29	6.27	6.28	6.28	6.27	6.28	6.29	6.28	6.28	6.24
66	6.25	6.23	6.24	6.28	6.29	6.25	6.25	6.24	6.30	6.24	6.28
67	6.25	6.24	6.24	6.26	6.23	6.28	6.26	6.29	6.30	6.26	6.26
68	6.24	6.29	6.25	6.28	6.24	6.23	6.27	6.25	6.25	6.29	6.25
69	6.22	6.29	6.23	6.23	6.24	6.24	6.29	6.28	6.30	6.30	6.26
70	6.27	6.23	6.25	6.25	6.26	6.30	6.25	6.27	6.26	6.29	6.29
71	6.25	6.27	6.26	6.24	6.27	6.29	6.29	6.29	6.25	6.26	6.27
72	6.25	6.24	6.29	6.23	6.27	6.29	6.26	6.23	6.26	6.29	6.27
73	6.22	6.29	6.24	6.26	6.28	6.30	6.23	6.26	6.25	6.26	6.24
74	6.25	6.29	6.27	6.29	6.26	6.24	6.25	6.29	6.25	6.29	6.26
75	6.28	6.26	6.24	6.25	6.23	6.29	6.23	6.27	6.24	6.26	6.28
Ave.	**6.25**	**6.26**	**6.26**	**6.26**	**6.26**	**6.27**	**6.26**	**6.27**	**6.27**	**6.27**	**6.26**
Max	6.31	6.29	6.30	6.29	6.29	6.30	6.30	6.30	6.30	6.30	6.29
Min	6.20	6.23	6.23	6.23	6.23	6.23	6.23	6.23	6.23	6.23	6.23
Med	6.25	6.27	6.27	6.26	6.26	6.27	6.26	6.28	6.26	6.27	6.26
Std.dev	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02

Maintenance diagram:

Average Lumen Maintenance diagram



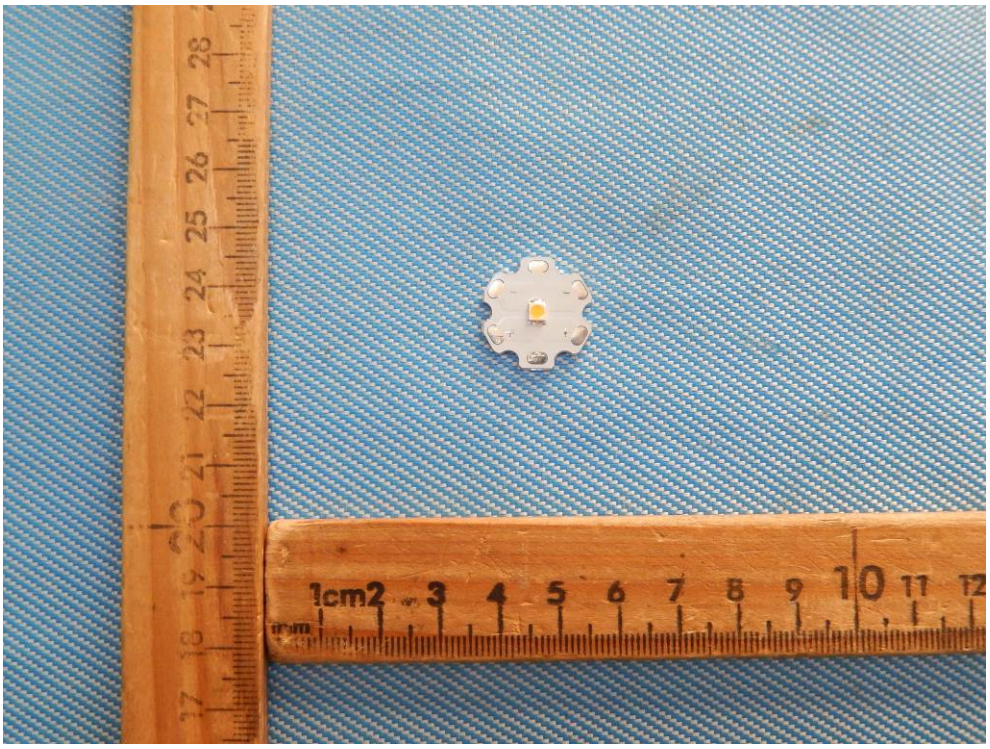
Average Color Maintenance diagram

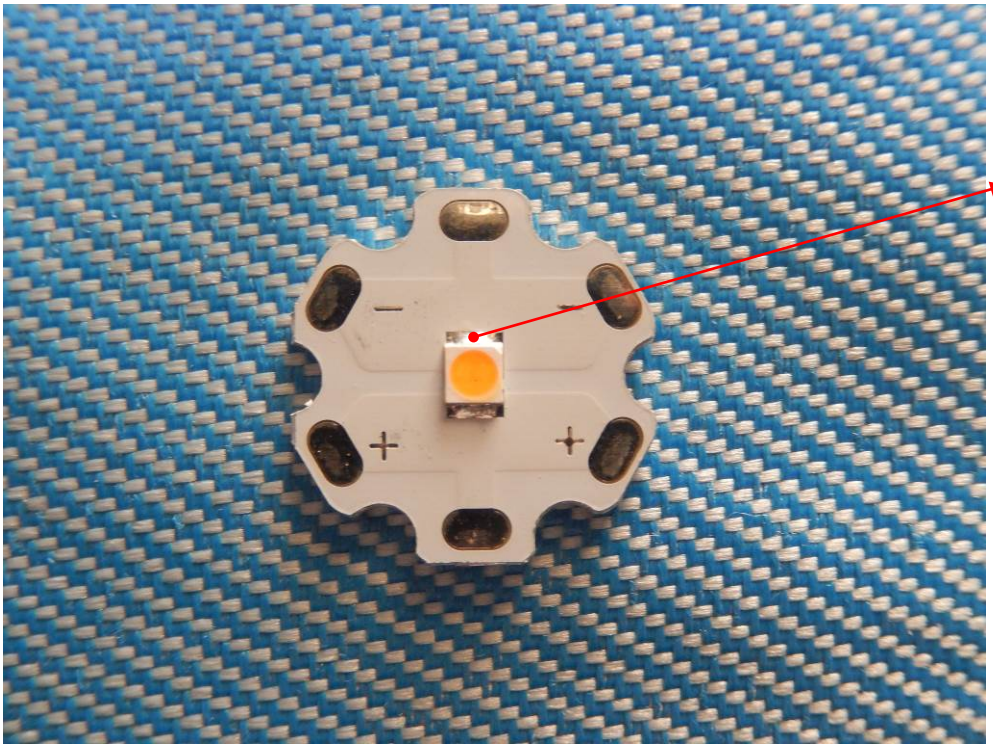


Attachment 1: Equipment List

Equipment	Model/Type	Cal. Due. Date
AC power supply	ApC AFC-110104F	2020-02-26
DC power supply	EVERFINE WY305-V1	2020-02-26
Digital Power Meter	EVERFINE PF2010A-V1	2020-02-13
High accuracy array spectroradio meter	EVERFINE HAAS-2000	2020-02-26
Standard light source	EVERFINE D204	2020-02-26
Standard light source	EVERFINE D062	2020-02-26
Temperature & Humidity Datalogger	Testo 608-H1	2020-02-26
Digital power meter	YOKOGAWA WT310E	2020-04-01
LED accelerated aging and longevity test system	EVERFINE LT-200A	2020-02-26
Walk-in Environmental Test Lab	Dongzhixu BUL-50-26	2020-02-13
Environmental Chamber	KSON THS-D4C-100	2020-02-13
Multimeter	FLUKE 15B	2020-02-13
Temperature Recorder	YOKOGAWA DR231-00-33-1R	2020-02-13

Attachment 2: Photo document





====== End of Report ======