TEST REPORT

ACCORDING TO IES LM-80-15
For

Lumileds Holding B.V.

370 W. Trimble Road, San Jose, CA 95131, USA

Model: L128-2780RC35000A1

Report Type: 9000 Hours Test Report	**Product Type:** LED Package
Test Engineer:	Pote Wang
Report Number:	R2DG181108050-10
Test Date:	2016-08-26 to 2017-09-05
Report Date:	2018-11-08
Reviewed By:	Daniel Duan / EE Engineer
Test Facility:	Test facility was located at No.69,Pulongcun ,Puxinhu Industrial Area, Tangxia , Dongguan, Guangdong, China.
Prepared By:	Bay Area Compliance Laboratories Corp. (Dongguan). No.69,Pulongcun ,Puxinhu Industrial Area, Tangxia , Dongguan, Guangdong, China. Tel: +86-0769-86858888 Fax:+86-0769-86858588

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1 - General Information

1.1 Description of LED Light Sources

Sample Size:

60 PCS samples were received on 2016-08-26. The samples were numbered from 1 to 30 and 31 to 60.

Manufacturer:	Lumileds Holding B.V.
Part Number:	L128-2780RC35000A1
Part Type:	LED Package
Drive Level:	DC 100mA
Nominal CCT:	2700K
Power:	1W
Average Current Density per LED die:	906.43mA/mm^2
Average Power Density per LED die:	9.5W/mm^2
CRI:	80
Die Spacing:	0.15mm

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.

Family products covered by this report:

According to *ENERGY STAR® Requirements for the Use of LM-80 Data*, the following products can be covered by this report base on the information and declaration provided by manufacturer. The information of these models shows that the covered products meet all section 4 requirements of *ENERGY STAR® Requirements for the Use of LM-80 Data* (September 28, 2017)

This report covers the following models:

Model Name	Total Input Current (mA)	Power (W)	Number of dies	Driver current per die (mA)	Current Density per Die (mA/mm^2)	Power Density per PCB (W/mm^2)	Die Spacing (mm)
L128-xx80RC3500xxx	100	1	3	100	906.43	0.102	0.15

Note:

1. The first and second x denote designates nominal CCT (27=2700K, 30=3000K, 35=3500K, 40=4000K,45=4500K,50=5000K,57=5700K,60=6000K,65=6500K)，

2. The last three x denote designates Lumileds internal codes (0A1, 0B1, 0C1, etc. shares the same base part)

Note:

1. The applicant Lumileds Holding B.V. declare that their products with model L128-2780RC35000A1 are the same to the products in report # RSZ160826505-10-9000 and is authorized by original applicant to use their test data.

2. All the data in previous report (RSZ160826505-10-9000) is shared in this report.

1.2 Standards Used:

- IESNA LM-80-15: IES Approved Method for Measuring Lumen Maintenance of LED Light Sources.
- CIE 127:2007: Measurement of LEDs
- ENERGY STAR® Requirements for the Use of LM-80 Data (This standard was not accredited by IAS)

1.3 Testing Equipment

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
0.3m integrating sphere	EVERFINE	Diameter 0.3m	1011119	0.3m	2017-03-09	2018-03-09
Programmable Test Power for LEDs	EVERFINE	LED300E	1008002	15V/2000mA	2017-03-03	2018-03-03
High accuracy array spectroradiometer	EVERFINE	HAAS-2000	1012016T	380-780nm	2017-03-09	2018-03-09
Standard Light Source	EVERFINE	D062	1011093	3000K	2016-09-13	2017-09-13
Precision digital stabilized DC power supply	EVERFINE	WY605-V110	G115987C J7321114	300VA	2017-03-03	2018-03-03
Multilayer aging machine	BACL	B2-270	20005	25°C~130°C	2017-09-01	2018-09-01
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090009	(50/15A)	2016-12-15	2017-12-15
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090004	(50/15A)	2017-03-03	2018-03-03

1.4 Drive Level

Samples are driven with a constant direct current (DC) during maintenance test, photometric and electrical measurement. The current value was regulated to within ±3% of the specified value of the manufacturer during maintenance test, and was within ±0.5% during photometric and electrical measurement test.

1.5 Ambient Conditions for Maintenance Test

For lumen maintenance test, samples within one data set, were installed on cooling boards in thermal chambers with minimal ambient airflow. The case temperature and ambient temperature

was monitored by thermocouples which one was soldered to the coldest DUTs' case (TMP_{LED}) location, while the other is mounted at a distance of 5 mm above the TMP location.

During life testing, TMP_{LED} of the coldest LEDs were maintained at a temperature that was greater than or equal to 2°C below the corresponding nominal case temperature. Surrounding air was maintained at a temperature that was greater than or equal to 5°C below the corresponding nominal case temperature. Thermocouples were shielded from direct DUT optical radiation and comply with ASTM E230 Table 1 "Special Limits".

Samples were connected to DC power supply in series circuits with a constant current. The forward current was regulated to within ±3% of the specified value of the manufacturer.

The relative humidity within chamber was kept less than 65% during test.

For photometry measurement, the ambient temperature during test was set to 25°C ± 2°C, RH <65%.

1.6 Measurement Uncertainty

The uncertainty of the light output (luminous flux) 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. The uncertainty of the CRI is U=1.7 (K=2), at the 95% confidence level.

The uncertainty of the temperature is U=0.8671°C (K=2), at the 95% confidence level.

1.7 Statement of Traceability

Bay Area Compliance Laboratories Corp. (Dongguan) attested that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).

1.8 Sample Set

Data Set 1: 55°C, 100mA

Part Number:	L128-2780RC35000A1
Number of Units:	30
Case Temperature:	>53°C
Ambient Temperature:	>50°C
Life Test Drive Current:	100mA
Measurement Current:	100mA

Data Set 2: 105°C,100mA

Part Number:	L128-2780RC35000A1
Number of Units:	30
Case Temperature:	>103°C
Ambient Temperature:	>100°C
Life Test Drive Current:	100mA
Measurement Current:	100mA

2 - Summary of Test Result

Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration	Reported TM-21 L_{70} Lifetime	Reported TM-21 L_{90} Lifetime
1	30	0	1000	9000	>54000 hours	50000 hours
2	30	0	1000	9000	>54000 hours	36000 hours

Average Lumen Maintenance (Percentage of Initial Luminous Flux)

Data Set:	1000	2000	3000	4000	5000	6000	7000	8000	9000
1	100.23%	100.03%	99.82%	99.59%	99.34%	99.11%	98.90%	98.69%	98.49%
2	99.85%	99.54%	99.23%	98.90%	98.58%	98.27%	98.00%	97.71%	97.43%

Average Color Maintenance

Data Set:	1000	2000	3000	4000	5000	6000	7000	8000	9000
1	0.0005	0.0009	0.0012	0.0017	0.0023	0.0027	0.0031	0.0032	0.0036
2	0.0008	0.0011	0.0016	0.0020	0.0026	0.0030	0.0032	0.0035	0.0039

3 - Test Data

3.1 Data Set 1, 55°C, 100mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	116.1	100.34	100.17	100.09	99.83	99.57	99.40	99.22	98.97	98.88
2	124.9	100.16	99.92	99.68	99.28	98.88	98.64	98.48	98.16	97.92
3	120.7	100.17	100.08	99.83	99.59	99.25	98.92	98.67	98.51	98.26
4	120.8	100.25	99.92	99.75	99.50	99.25	98.84	98.59	98.34	98.18
5	124.8	100.08	99.76	99.44	99.36	99.12	98.88	98.72	98.56	98.40
6	124.2	100.16	99.84	99.60	99.28	99.11	98.95	98.55	98.39	98.23
7	119.5	100.33	100.17	99.92	99.83	99.58	99.41	99.16	98.91	98.83
8	121.4	100.16	99.92	99.84	99.59	99.26	99.09	98.76	98.68	98.35
9	124.4	100.08	99.76	99.68	99.36	99.20	98.87	98.63	98.39	98.31
10	124.4	100.32	100.24	99.92	99.60	99.36	99.12	98.87	98.71	98.39
11	120.3	100.33	100.17	99.92	99.67	99.42	99.09	98.92	98.67	98.50
12	121.3	100.41	100.33	100.08	99.92	99.59	99.34	99.01	98.93	98.85
13	126.2	100.24	100.08	99.84	99.76	99.29	99.13	98.81	98.65	98.57
14	121.2	100.17	99.92	99.83	99.75	99.34	99.09	98.84	98.60	98.35
15	122.5	100.16	99.84	99.76	99.43	99.18	99.10	98.94	98.78	98.53
16	124.1	100.32	100.16	99.92	99.52	99.11	98.95	98.87	98.63	98.31
17	123.2	100.24	100.08	99.84	99.59	99.27	99.03	98.94	98.86	98.70
18	124.5	100.08	99.84	99.76	99.44	99.12	98.96	98.80	98.63	98.47
19	123.0	100.16	99.92	99.67	99.59	99.51	99.27	99.11	98.94	98.70
20	125.2	100.32	100.24	100.16	99.84	99.52	99.20	98.88	98.64	98.40
21	125.0	100.24	100.08	99.92	99.68	99.60	99.28	99.12	98.88	98.80
22	118.2	100.42	100.17	99.92	99.75	99.58	99.49	99.24	99.07	98.98
23	118.9	100.25	99.83	99.66	99.50	99.33	99.16	98.99	98.74	98.57
24	122.4	100.33	100.08	99.75	99.43	99.18	98.86	98.77	98.45	98.20
25	122.5	100.16	99.92	99.84	99.59	99.35	99.18	98.94	98.69	98.37
26	124.8	100.24	100.16	99.92	99.68	99.36	99.04	98.96	98.88	98.56
27	128.0	100.08	99.84	99.53	99.22	99.06	98.91	98.75	98.36	98.13
28	124.5	100.32	100.16	99.92	99.76	99.68	99.44	99.28	99.04	98.80
29	122.3	100.16	100.08	99.75	99.67	99.51	99.35	99.26	99.10	98.94
30	124.0	100.32	100.16	99.92	99.76	99.52	99.27	98.95	98.63	98.31
Ave.	122.8	100.23	100.03	99.82	99.59	99.34	99.11	98.90	98.69	98.49
Med.	123.1	100.24	100.08	99.84	99.59	99.33	99.10	98.90	98.68	98.44
st dev	2.6	0.0995	0.1603	0.1585	0.1848	0.1973	0.2089	0.2130	0.2358	0.2674
Min.	116.1	100.08	99.76	99.44	99.22	98.88	98.64	98.48	98.16	97.92
Max.	128.0	100.42	100.33	100.16	99.92	99.68	99.49	99.28	99.10	98.98

TM-21 Projection:

Test Duration: 9000 hours

Failures Observed: 0

α: 2.210E-06

β: 1.005

Reported L_{70}: >54000 hours

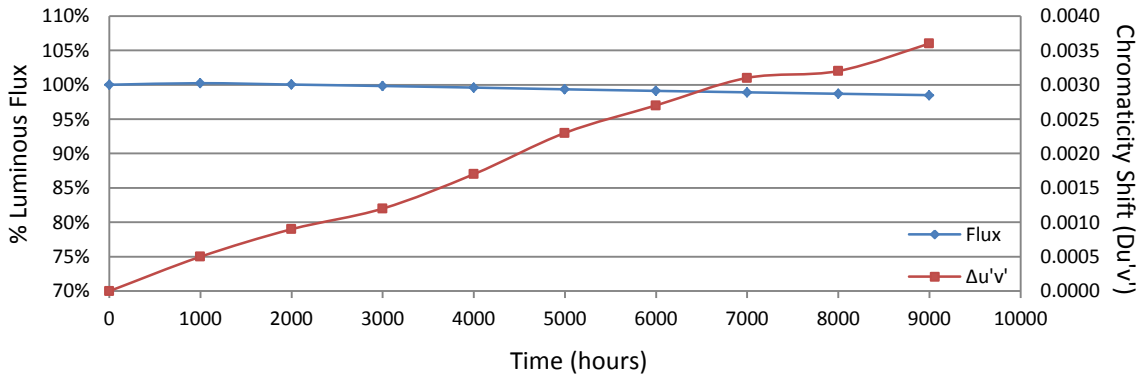
Reported L_{90}: 50000 hours

3.2 Data Set 1, 55°C, 100mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	8.965	8.974	8.950	8.943	8.954	8.949	8.951	8.952	8.940	8.961
2	8.981	8.994	8.966	8.957	8.974	8.962	8.958	8.962	8.960	8.973
3	8.937	8.952	8.929	8.911	8.933	8.918	8.924	8.928	8.921	8.927
4	8.954	8.968	8.944	8.929	8.949	8.937	8.935	8.940	8.933	8.940
5	8.934	8.949	8.927	8.906	8.922	8.918	8.918	8.914	8.915	8.919
6	8.960	8.973	8.950	8.939	8.954	8.943	8.941	8.945	8.937	8.949
7	8.976	8.989	8.969	8.951	8.968	8.953	8.959	8.958	8.957	8.965
8	8.982	8.998	8.981	8.962	8.981	8.971	8.969	8.969	8.979	8.982
9	8.934	8.941	8.927	8.907	8.925	8.913	8.915	8.914	8.914	8.927
10	8.943	8.956	8.932	8.918	8.933	8.925	8.919	8.921	8.924	8.938
11	8.947	8.956	8.940	8.925	8.938	8.930	8.928	8.925	8.931	8.965
12	8.967	8.977	8.961	8.945	8.956	8.950	8.943	8.945	8.943	8.967
13	8.933	8.948	8.922	8.913	8.936	8.916	8.910	8.911	8.911	8.927
14	8.948	8.954	8.942	8.929	8.942	8.931	8.923	8.920	8.928	8.951
15	8.960	8.968	8.949	8.942	8.955	8.943	8.937	8.934	8.941	8.964
16	8.932	8.945	8.921	8.912	8.931	8.917	8.914	8.910	8.914	8.924
17	8.930	8.943	8.916	8.906	8.928	8.914	8.914	8.908	8.907	8.931
18	9.007	9.016	8.998	8.981	8.996	8.986	8.991	8.985	8.981	8.996
19	8.929	8.943	8.921	8.913	8.922	8.913	8.913	8.904	8.910	8.925
20	8.926	8.939	8.919	8.913	8.919	8.911	8.910	8.908	8.916	8.930
21	8.999	9.007	8.988	8.979	8.990	8.984	8.983	8.983	8.976	8.989
22	8.928	8.948	8.926	8.914	8.921	8.918	8.915	8.921	8.916	8.929
23	8.949	8.962	8.942	8.938	8.938	8.929	8.927	8.935	8.926	8.939
24	8.934	8.946	8.922	8.916	8.920	8.919	8.918	8.917	8.912	8.926
25	8.963	8.978	8.952	8.943	8.954	8.944	8.946	8.970	8.944	8.954
26	8.935	8.944	8.928	8.942	8.927	8.919	8.918	8.926	8.916	8.930
27	8.952	8.966	8.946	8.937	8.942	8.935	8.929	8.940	8.933	8.947
28	8.919	8.933	8.916	8.906	8.915	8.906	8.908	8.913	8.909	8.920
29	8.970	8.984	8.964	8.954	8.962	8.954	8.957	8.970	8.958	8.962
30	8.933	8.947	8.924	8.912	8.931	8.919	8.912	8.924	8.912	8.932
Ave.	8.951	8.963	8.942	8.931	8.944	8.934	8.933	8.935	8.932	8.946
Med.	8.948	8.956	8.941	8.929	8.938	8.930	8.926	8.927	8.927	8.940
st dev	0.022	0.022	0.022	0.022	0.022	0.022	0.023	0.024	0.022	0.022
Min.	8.919	8.933	8.916	8.906	8.915	8.906	8.908	8.904	8.907	8.919
Max.	9.007	9.016	8.998	8.981	8.996	8.986	8.991	8.985	8.981	8.996

3.3 Data Set 1, 55°C, 100mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')								
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	0.2574	0.5292	2801	0.0004	0.0007	0.0012	0.0016	0.0019	0.0022	0.0026	0.0028	0.0031
2	0.2558	0.5311	2826	0.0004	0.0009	0.0013	0.0018	0.0022	0.0025	0.0028	0.0032	0.0035
3	0.2607	0.5321	2718	0.0004	0.0009	0.0012	0.0017	0.0021	0.0025	0.0028	0.0030	0.0034
4	0.2599	0.5301	2743	0.0005	0.0009	0.0016	0.0019	0.0023	0.0027	0.0031	0.0032	0.0036
5	0.2587	0.5328	2756	0.0004	0.0009	0.0016	0.0020	0.0024	0.0028	0.0032	0.0033	0.0037
6	0.2591	0.5351	2738	0.0005	0.0010	0.0016	0.0020	0.0024	0.0027	0.0031	0.0032	0.0037
7	0.2593	0.5301	2755	0.0003	0.0007	0.0013	0.0016	0.0020	0.0025	0.0028	0.0029	0.0033
8	0.2564	0.5271	2833	0.0005	0.0009	0.0016	0.0020	0.0025	0.0028	0.0033	0.0035	0.0037
9	0.2579	0.5323	2775	0.0005	0.0010	0.0016	0.0020	0.0024	0.0028	0.0031	0.0033	0.0037
10	0.2583	0.5337	2762	0.0005	0.0009	0.0015	0.0020	0.0023	0.0028	0.0031	0.0033	0.0037
11	0.2597	0.5305	2745	0.0005	0.0009	0.0013	0.0021	0.0025	0.0028	0.0032	0.0034	0.0039
12	0.2582	0.5304	2778	0.0005	0.0007	0.0010	0.0019	0.0023	0.0027	0.0031	0.0032	0.0036
13	0.2592	0.5337	2743	0.0004	0.0009	0.0010	0.0017	0.0022	0.0026	0.0029	0.0030	0.0034
14	0.2568	0.5276	2820	0.0005	0.0009	0.0012	0.0017	0.0025	0.0029	0.0033	0.0034	0.0037
15	0.2593	0.5322	2746	0.0004	0.0006	0.0009	0.0014	0.0022	0.0026	0.0028	0.0029	0.0033
16	0.2596	0.5323	2740	0.0005	0.0009	0.0011	0.0016	0.0023	0.0027	0.0030	0.0032	0.0035
17	0.2560	0.5289	2832	0.0005	0.0010	0.0012	0.0017	0.0025	0.0029	0.0032	0.0035	0.0038
18	0.2591	0.5336	2746	0.0004	0.0008	0.0010	0.0015	0.0021	0.0025	0.0029	0.0031	0.0035
19	0.2570	0.5317	2797	0.0004	0.0005	0.0008	0.0015	0.0023	0.0026	0.0030	0.0033	0.0036
20	0.2598	0.5327	2733	0.0005	0.0009	0.0011	0.0016	0.0023	0.0027	0.0031	0.0031	0.0035
21	0.2574	0.5304	2794	0.0004	0.0009	0.0011	0.0015	0.0022	0.0026	0.0029	0.0031	0.0034
22	0.2589	0.5257	2784	0.0004	0.0009	0.0012	0.0017	0.0025	0.0029	0.0032	0.0034	0.0037
23	0.2591	0.5287	2767	0.0005	0.0010	0.0013	0.0017	0.0025	0.0030	0.0033	0.0036	0.0038
24	0.2591	0.5310	2756	0.0006	0.0010	0.0013	0.0017	0.0024	0.0028	0.0031	0.0034	0.0035
25	0.2566	0.5289	2820	0.0005	0.0011	0.0013	0.0017	0.0025	0.0029	0.0034	0.0034	0.0037
26	0.2564	0.5293	2821	0.0004	0.0009	0.0011	0.0016	0.0023	0.0028	0.0031	0.0032	0.0035
27	0.2595	0.5344	2733	0.0005	0.0009	0.0011	0.0016	0.0023	0.0027	0.0030	0.0031	0.0034
28	0.2585	0.5333	2758	0.0005	0.0009	0.0012	0.0017	0.0023	0.0028	0.0031	0.0033	0.0036
29	0.2589	0.5316	2758	0.0004	0.0009	0.0011	0.0016	0.0023	0.0027	0.0030	0.0031	0.0035
30	0.2599	0.5323	2733	0.0004	0.0010	0.0012	0.0017	0.0025	0.0028	0.0032	0.0033	0.0036
Ave.	0.2584	0.5311	2770	0.0005	0.0009	0.0012	0.0017	0.0023	0.0027	0.0031	0.0032	0.0036
Med.	0.2589	0.5314	2758	0.0005	0.0009	0.0012	0.0017	0.0023	0.0027	0.0031	0.0032	0.0036
st dev	0.0013	0.0023	34	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.	0.2558	0.5257	2718	0.0003	0.0005	0.0008	0.0014	0.0019	0.0022	0.0026	0.0028	0.0031
Max.	0.2607	0.5351	2833	0.0006	0.0011	0.0016	0.0021	0.0025	0.0030	0.0034	0.0036	0.0039



3.4 Data Set 2, 105°C, 100mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
31	124.1	99.92	99.60	99.52	99.36	99.11	98.79	98.55	98.31	98.15
32	120.0	99.83	99.58	99.42	99.17	98.92	98.67	98.42	98.25	98.08
33	120.9	99.42	99.09	98.68	98.26	97.77	97.60	97.27	97.02	96.77
34	120.7	99.83	99.42	98.92	98.51	98.09	97.76	97.35	96.93	96.77
35	125.6	99.84	99.60	99.20	98.81	98.41	98.17	98.01	97.69	97.37
36	123.1	99.68	99.43	99.11	98.86	98.62	98.29	98.05	97.64	97.48
37	118.5	99.75	99.41	99.16	98.90	98.73	98.48	98.31	98.14	97.81
38	123.1	99.92	99.76	99.59	99.35	99.03	98.70	98.46	98.13	97.89
39	119.8	99.75	99.42	99.08	98.91	98.75	98.41	98.25	98.00	97.83
40	125.5	99.92	99.68	99.28	99.04	98.57	98.33	98.01	97.77	97.45
41	124.1	99.84	99.60	99.27	98.87	98.63	98.31	98.23	97.82	97.58
42	118.1	100.08	99.83	99.58	99.32	99.07	98.73	98.56	98.48	98.31
43	121.2	99.75	99.50	99.09	98.60	98.35	98.10	97.77	97.52	97.19
44	120.2	99.83	99.42	99.08	98.84	98.50	98.17	98.00	97.67	97.34
45	117.3	99.74	99.57	99.32	98.89	98.47	97.95	97.70	97.53	97.36
46	125.6	99.84	99.52	99.20	98.89	98.57	98.17	97.93	97.53	97.13
47	117.3	99.74	99.40	99.06	98.72	98.47	98.21	97.78	97.53	97.27
48	123.1	100.08	99.68	99.27	99.03	98.70	98.38	97.97	97.64	97.24
49	126.1	99.92	99.60	99.37	99.05	98.65	98.33	97.86	97.38	97.07
50	123.2	100.08	99.68	99.43	99.19	98.78	98.38	98.13	97.73	97.32
51	124.6	99.76	99.52	99.20	98.88	98.64	98.39	98.31	97.99	97.59
52	124.1	99.92	99.52	99.36	98.95	98.55	98.23	98.07	97.74	97.50
53	123.2	99.84	99.51	99.27	98.78	98.38	98.05	97.81	97.56	97.24
54	123.9	99.76	99.44	99.11	98.71	98.39	97.90	97.58	97.26	96.93
55	122.6	99.92	99.51	99.02	98.78	98.37	98.12	97.80	97.39	96.98
56	124.8	99.84	99.36	98.96	98.48	98.24	98.00	97.60	97.28	96.96
57	124.0	99.76	99.35	99.11	98.79	98.39	97.98	97.58	97.42	97.10
58	125.2	99.84	99.52	99.28	98.80	98.56	98.24	97.92	97.68	97.44
59	123.4	99.92	99.76	99.43	99.27	98.95	98.62	98.30	98.14	97.81
60	119.4	100.08	99.83	99.41	99.08	98.83	98.49	98.32	98.16	97.99
Ave.	122.4	99.85	99.54	99.23	98.90	98.58	98.27	98.00	97.71	97.43
Med.	123.2	99.84	99.52	99.24	98.88	98.57	98.27	98.01	97.68	97.36
st dev	2.6	0.1370	0.1570	0.2031	0.2585	0.2902	0.2842	0.3372	0.3756	0.4064
Min.	117.3	99.42	99.09	98.68	98.26	97.77	97.60	97.27	96.93	96.77
Max.	126.1	100.08	99.83	99.59	99.36	99.11	98.79	98.56	98.48	98.31

TM-21 Projection:

Test Duration: 9000 hours

Failures Observed: 0

α: 2.978E-06

β: 1.001

Reported L_{70}: >54000 hours

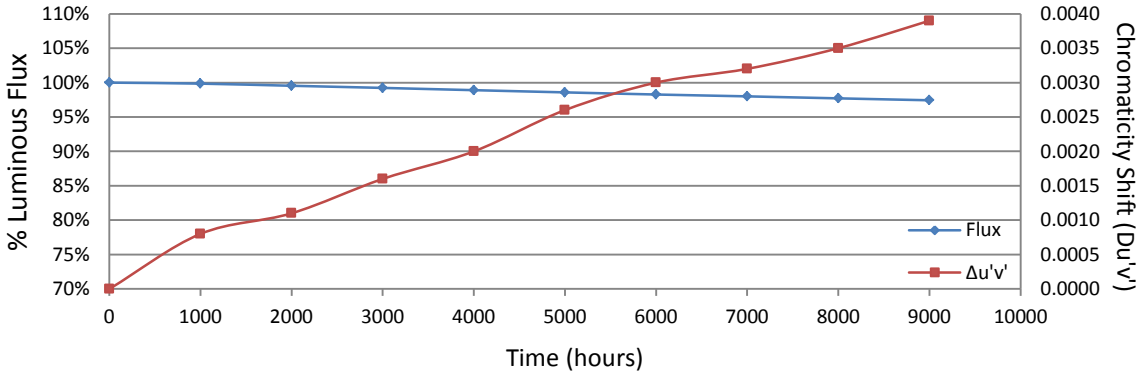
Reported L_{90}: 36000 hours

3.5 Data Set 2, 105°C, 100mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
31	8.959	8.977	8.953	8.955	8.956	8.944	8.944	8.946	8.939	8.958
32	8.982	9.000	8.978	8.970	8.979	8.971	8.968	8.968	8.968	8.974
33	8.944	8.962	8.940	8.946	8.937	8.931	8.926	8.937	8.932	8.935
34	8.915	8.930	8.912	8.904	8.907	8.905	8.906	8.914	8.904	8.909
35	8.944	8.961	8.935	8.931	8.938	8.926	8.925	8.943	8.943	8.939
36	8.922	8.945	8.923	8.912	8.919	8.918	8.912	8.933	8.907	8.922
37	8.931	8.949	8.936	8.919	8.926	8.925	8.917	8.928	8.925	8.934
38	8.909	8.926	8.907	8.902	8.908	8.898	8.895	8.904	8.898	8.903
39	8.979	8.997	8.981	8.978	8.980	8.968	8.972	8.990	8.979	8.983
40	8.942	8.951	8.935	8.937	8.936	8.923	8.928	8.944	8.931	8.931
41	8.978	8.992	8.976	8.968	8.972	8.966	8.962	8.972	8.966	8.990
42	8.992	9.010	8.992	8.990	8.986	8.986	8.980	8.984	8.986	8.991
43	8.934	8.948	8.922	8.930	8.922	8.919	8.915	8.911	8.922	8.924
44	8.996	8.988	8.967	8.955	8.963	8.964	8.957	8.956	8.961	8.963
45	8.984	8.969	8.956	8.945	8.947	8.942	8.940	8.937	8.937	8.947
46	8.942	8.942	8.927	8.919	8.921	8.922	8.910	8.918	8.915	8.921
47	8.968	8.973	8.956	8.952	8.951	8.954	8.942	8.945	8.955	8.953
48	8.927	8.931	8.917	8.906	8.911	8.905	8.898	8.910	8.903	8.914
49	9.000	8.997	8.990	8.981	8.982	8.983	8.977	8.976	8.998	8.983
50	8.935	8.942	8.931	8.920	8.925	8.923	8.919	8.920	8.929	8.920
51	8.965	8.964	8.954	8.940	8.949	8.948	8.935	8.939	8.939	8.945
52	8.941	8.944	8.927	8.923	8.922	8.928	8.915	8.921	8.923	8.923
53	8.965	8.972	8.951	8.983	8.946	8.946	8.941	8.941	8.943	8.946
54	8.974	8.980	8.962	8.960	8.962	8.956	8.956	8.949	8.957	8.960
55	8.925	8.937	8.919	8.910	8.909	8.914	8.902	8.910	8.926	8.912
56	8.925	8.934	8.917	8.918	8.917	8.918	8.911	8.911	8.913	8.913
57	8.988	8.997	8.976	8.973	8.974	8.970	8.971	8.972	8.970	8.977
58	8.916	8.924	8.904	8.903	8.900	8.900	8.900	8.899	8.892	8.896
59	8.932	8.941	8.921	8.917	8.918	8.915	8.914	8.902	8.912	8.918
60	8.963	8.972	8.951	8.950	8.942	8.942	8.944	8.934	8.948	8.945
Ave.	8.953	8.962	8.944	8.940	8.940	8.937	8.933	8.937	8.937	8.941
Med.	8.944	8.962	8.938	8.939	8.938	8.930	8.927	8.937	8.935	8.937
st dev	0.027	0.025	0.026	0.027	0.026	0.025	0.026	0.025	0.027	0.027
Min.	8.909	8.924	8.904	8.902	8.900	8.898	8.895	8.899	8.892	8.896
Max.	9.000	9.010	8.992	8.990	8.986	8.986	8.980	8.990	8.998	8.991

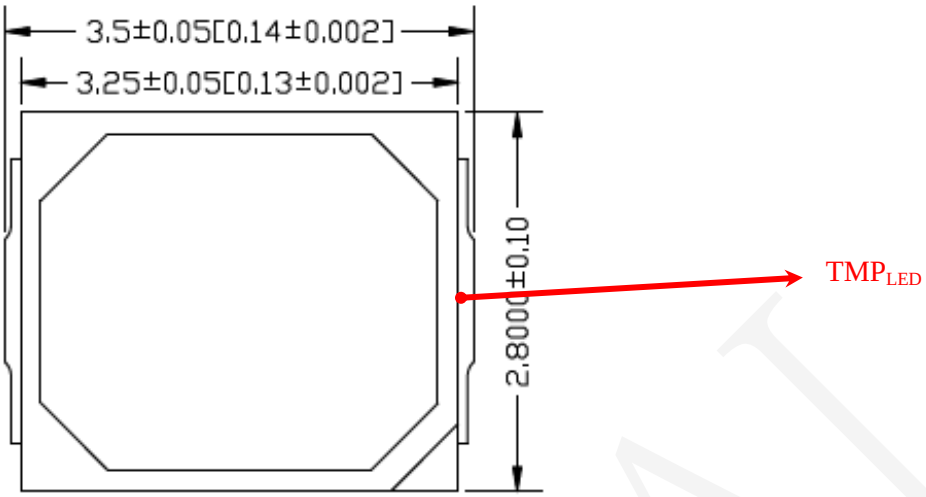
3.6 Data Set 2, 105°C, 100mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')								
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
31	0.2568	0.5301	2808	0.0008	0.0012	0.0017	0.0019	0.0026	0.0031	0.0033	0.0036	0.0039
32	0.2608	0.5300	2725	0.0007	0.0009	0.0013	0.0016	0.0023	0.0027	0.0029	0.0032	0.0035
33	0.2569	0.5281	2815	0.0008	0.0011	0.0017	0.0022	0.0026	0.0031	0.0034	0.0037	0.0040
34	0.2580	0.5296	2785	0.0008	0.0011	0.0016	0.0021	0.0026	0.0030	0.0031	0.0036	0.0039
35	0.2577	0.5320	2780	0.0007	0.0010	0.0015	0.0019	0.0025	0.0030	0.0031	0.0035	0.0038
36	0.2596	0.5325	2740	0.0011	0.0014	0.0019	0.0023	0.0027	0.0032	0.0034	0.0038	0.0041
37	0.2618	0.5320	2697	0.0008	0.0011	0.0016	0.0020	0.0025	0.0029	0.0031	0.0034	0.0038
38	0.2614	0.5322	2702	0.0009	0.0011	0.0016	0.0020	0.0025	0.0029	0.0030	0.0034	0.0038
39	0.2591	0.5307	2757	0.0009	0.0012	0.0017	0.0020	0.0026	0.0030	0.0031	0.0035	0.0039
40	0.2579	0.5321	2776	0.0009	0.0013	0.0017	0.0023	0.0028	0.0030	0.0033	0.0038	0.0042
41	0.2573	0.5315	2793	0.0006	0.0011	0.0016	0.0021	0.0026	0.0030	0.0032	0.0035	0.0038
42	0.2595	0.5276	2762	0.0008	0.0012	0.0017	0.0021	0.0026	0.0030	0.0031	0.0036	0.0039
43	0.2592	0.5303	2757	0.0009	0.0013	0.0018	0.0022	0.0028	0.0031	0.0033	0.0038	0.0042
44	0.2584	0.5281	2784	0.0008	0.0012	0.0016	0.0020	0.0025	0.0030	0.0030	0.0034	0.0037
45	0.2606	0.5285	2734	0.0008	0.0011	0.0016	0.0020	0.0025	0.0029	0.0031	0.0035	0.0038
46	0.2596	0.5340	2732	0.0008	0.0012	0.0016	0.0020	0.0025	0.0030	0.0030	0.0034	0.0039
47	0.2569	0.5279	2818	0.0009	0.0013	0.0017	0.0022	0.0026	0.0030	0.0033	0.0037	0.0041
48	0.2585	0.5318	2764	0.0007	0.0010	0.0015	0.0018	0.0024	0.0029	0.0031	0.0034	0.0038
49	0.2573	0.5315	2793	0.0009	0.0012	0.0018	0.0021	0.0027	0.0030	0.0032	0.0036	0.0040
50	0.2602	0.5328	2726	0.0008	0.0012	0.0016	0.0020	0.0025	0.0030	0.0031	0.0035	0.0038
51	0.2557	0.5289	2839	0.0008	0.0011	0.0017	0.0020	0.0026	0.0030	0.0031	0.0035	0.0039
52	0.2575	0.5315	2789	0.0009	0.0012	0.0016	0.0020	0.0025	0.0029	0.0031	0.0034	0.0038
53	0.2565	0.5285	2822	0.0009	0.0011	0.0017	0.0022	0.0027	0.0030	0.0034	0.0037	0.0041
54	0.2579	0.5307	2783	0.0009	0.0012	0.0018	0.0022	0.0026	0.0031	0.0034	0.0037	0.0040
55	0.2598	0.5330	2733	0.0007	0.0009	0.0014	0.0019	0.0024	0.0028	0.0030	0.0033	0.0038
56	0.2575	0.5313	2788	0.0007	0.0009	0.0014	0.0020	0.0023	0.0028	0.0030	0.0034	0.0039
57	0.2580	0.5299	2783	0.0008	0.0011	0.0016	0.0020	0.0025	0.0029	0.0031	0.0035	0.0038
58	0.2594	0.5327	2743	0.0008	0.0011	0.0016	0.0019	0.0024	0.0028	0.0031	0.0034	0.0038
59	0.2565	0.5293	2818	0.0007	0.0011	0.0016	0.0020	0.0025	0.0030	0.0031	0.0036	0.0039
60	0.2602	0.5298	2738	0.0008	0.0012	0.0018	0.0022	0.0028	0.0032	0.0034	0.0038	0.0041
Ave.	0.2586	0.5306	2769	0.0008	0.0011	0.0016	0.0020	0.0026	0.0030	0.0032	0.0035	0.0039
Med.	0.2582	0.5307	2778	0.0008	0.0011	0.0016	0.0020	0.0026	0.0030	0.0031	0.0035	0.0039
st dev	0.0016	0.0017	37	0.0001	0.0001	0.0001	0.0002	0.0001	0.0001	0.0001	0.0001	0.0002
Min.	0.2557	0.5276	2697	0.0006	0.0009	0.0013	0.0016	0.0023	0.0027	0.0029	0.0032	0.0035
Max.	0.2618	0.5340	2839	0.0011	0.0014	0.0019	0.0023	0.0028	0.0032	0.0034	0.0038	0.0042



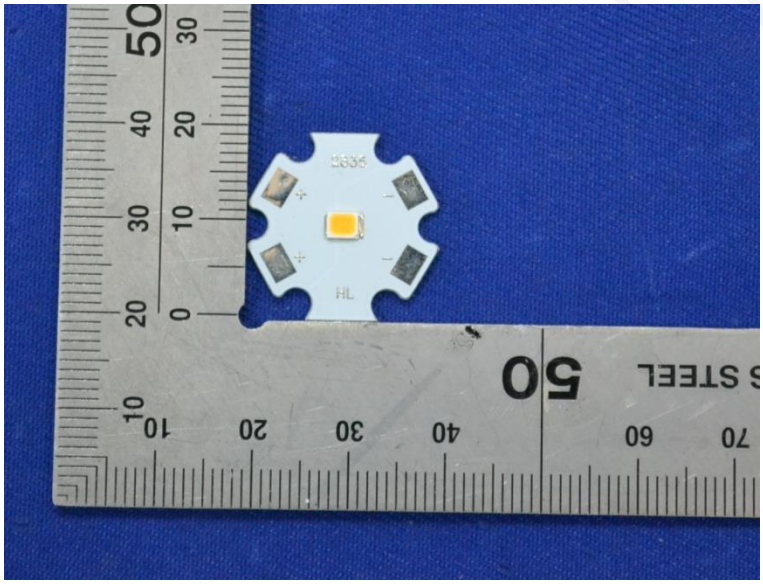
4 - EUT Photo

4.1 Mechanical Dimensions



All dimensions are in millimeter

4.2 EUT Photo



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