TEST REPORT

According to ANSI/IES LM-80-15
For

Lumileds Holding B.V.

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

Model: L128-2790RC35000B1

Report Type: 12000 Hours Test Report	**Product Type:** LED Package
Test Engineer:	Pote Wang
Report Number:	R2DG190705051-10
Test Date:	2017-11-21 to 2019-06-03
Report Date:	2019-07-09
Reviewed By:	Bill Xiong / 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
Accreditation:	The IAS Accreditation Number TL-460.

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1 - General Information

1.1 Description of LED Light Sources

Sample Size:

50 PCS samples were received on 2017-11-21. The samples were numbered from 1 to 25 and 26 to 50.

Manufacturer:	Lumileds Holding B.V.
Part Number:	L128-2790RC35000B1
Part Type:	LED Package
Drive Level:	DC 100mA
Nominal CCT:	2700K
Power:	1 W
Average Current Density per LED die:	906.43 mA/mm^2
Average Power Density per LED die:	9.5 W/mm^2
CRI:	90
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:

Multiple model	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-xx90RC35xxxxx (Test model: L128-2790RC35000B1)	100	1	3	100	906.43	0.102041	0.15

Note 1:

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 five x denote designates= Lumileds internal codes (0A1, 0B1, 0C1, etc.=shares the same base part).

Note 2:

1. The applicant Lumileds Holding B.V. declare that their products with model L128-2790RC35000B1 are the same to the products in report# R2DG171121050-10-12000 and is authorized by original applicant to use their test data.

2. All the data in previous report (R2DG171121050-10-12000) is shared in this report.

1.2 Standards and Reference Documentations

- ANSI/IES 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	Calibration date	Calibration due date
0.3m integrating sphere	EVERFINE	Diameter 0.3m	1011119	2019-03-18	2020-03-17
Programmable Test Power for LEDs	EVERFINE	LED300E	1008002	2019-03-26	2020-03-25
High accuracy array spectroradiometer	EVERFINE	HAAS-2000	1012016T	2019-03-18	2020-03-17
Standard Light Source	EVERFINE	D062	G100278CJ7351206	2018-12-24	2019-12-24
Precision digital stabilized DC power supply	EVERFINE	WY605-V110	G115987CJ7321114	2019-03-26	2020-03-25
Multilayer aging machine	BACL	B2-270	20015	2019-03-13	2020-03-12
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11060010	2019-03-26	2020-03-25
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090008	2018-06-15	2019-06-15

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 Photometric Measurement Method and Uncertainty

Integrating sphere and spectroradiometer is used to measure luminous flux and chromaticity coordinate u'v'. 2π measurement was used and sample was drived by DC power supply. The forward current was regulated to within ±0.5% of the nominal value. The test system was calibrated by halogen reference lamp. The ambient temperature during test was set to 25°C ± 2°C, RH <65%. The temperature measurement point was located in the sphere and the temperature was detected by a temperature probe.

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.

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: 85°C, 100mA

Part Number:	L128-2790RC35000B1
Number of Units:	25
Case Temperature:	>83°C
Ambient Temperature:	>80°C
Life Test Drive Current:	100mA
Measurement Current:	100mA

Data Set 2: 105°C, 100mA

Part Number:	L128-2790RC35000B1
Number of Units:	25
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	α	β	Reported TM-21 L_{70} Lifetime
1	25	0	1000hrs	12000hrs	2.985E-06	0.999	>72000hrs
2	25	0	1000hrs	12000hrs	3.493E-06	0.996	>72000hrs

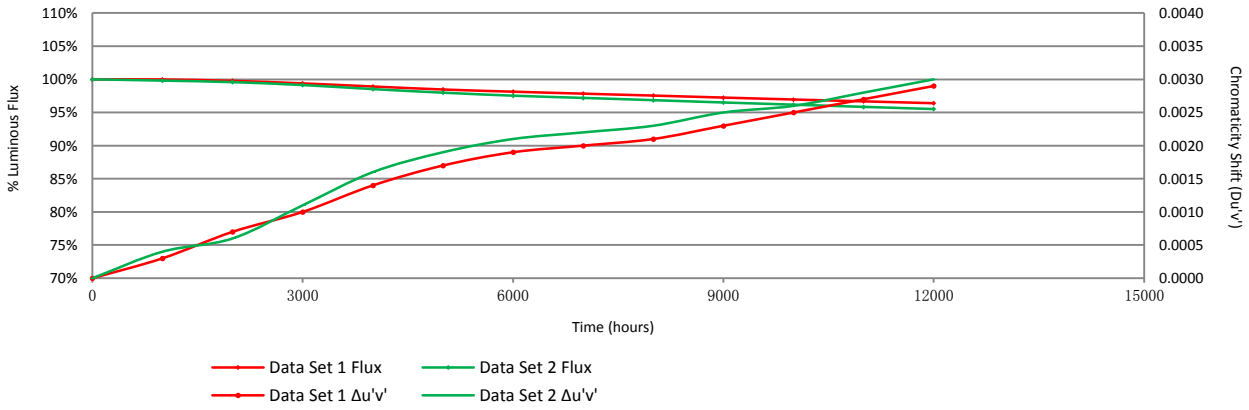
Average Lumen Maintenance (Percentage of Initial Luminous Flux)

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs
1	99.98%	99.77%	99.39%	98.92%	98.47%	98.14%	97.84%	97.55%	97.25%	96.96%	96.68%	96.40%
2	99.81%	99.58%	99.14%	98.53%	97.99%	97.54%	97.20%	96.86%	96.51%	96.18%	95.85%	95.52%

Average Chromaticity Shift

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs
1	0.0003	0.0007	0.0010	0.0014	0.0017	0.0019	0.0020	0.0021	0.0023	0.0025	0.0027	0.0029
2	0.0004	0.0006	0.0011	0.0016	0.0019	0.0021	0.0022	0.0023	0.0025	0.0026	0.0028	0.0030

Average Lumen Maintenance and Chromaticity Shift VS. Time



3 - Test Data

3.1 Data Set 1, 85°C, 100mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)											
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs
1	114.8	100.17	99.83	99.48	98.95	98.43	98.00	97.82	97.39	97.13	96.86	96.60	96.34
2	111.2	100.18	100.09	99.64	99.28	98.83	98.38	98.20	98.02	97.66	97.30	97.03	96.76
3	113.0	99.91	99.82	99.47	99.20	98.94	98.85	98.67	98.32	98.05	97.79	97.61	97.35
4	112.2	100.27	100.09	99.91	99.55	99.11	98.75	98.57	98.40	98.04	97.68	97.33	97.15
5	114.8	100.09	99.91	99.56	99.13	98.69	98.61	98.34	98.00	97.74	97.47	97.21	96.86
6	112.8	100.18	99.82	99.47	98.94	98.40	98.14	97.70	97.43	97.16	96.81	96.54	96.19
7	112.5	99.91	99.82	99.38	98.93	98.40	98.31	98.13	97.78	97.42	97.24	97.07	96.80
8	114.2	99.74	99.65	99.39	98.77	98.34	97.99	97.90	97.64	97.37	97.02	96.76	96.41
9	114.5	99.74	99.65	99.21	98.78	98.43	98.17	97.82	97.64	97.38	97.03	96.86	96.59
10	114.6	99.91	99.65	99.39	98.95	98.43	97.99	97.64	97.38	97.21	96.95	96.77	96.60
11	113.2	100.09	99.73	99.38	99.03	98.67	98.23	97.88	97.61	97.35	97.08	96.73	96.47
12	113.1	100.18	99.82	99.38	98.85	98.32	98.23	97.88	97.35	96.99	96.73	96.46	96.11
13	112.7	100.18	100.09	99.65	99.11	98.58	98.31	97.96	97.69	97.25	96.98	96.63	96.36
14	112.2	99.91	99.73	99.29	98.66	98.40	98.04	97.77	97.42	96.97	96.61	96.35	96.08
15	111.1	100.09	99.91	99.55	98.92	98.47	97.84	97.30	97.12	96.85	96.67	96.40	96.04
16	111.4	100.18	99.91	99.55	99.10	98.65	97.94	97.49	97.22	96.86	96.59	96.32	96.14
17	114.3	99.91	99.83	99.56	99.13	98.60	97.90	97.55	97.29	96.94	96.68	96.33	96.06
18	113.6	99.82	99.65	99.21	98.86	98.59	97.98	97.89	97.62	97.45	97.18	97.01	96.74
19	114.2	99.74	99.47	98.95	98.42	97.90	97.81	97.55	97.37	97.02	96.67	96.32	96.06
20	113.3	99.74	99.38	99.12	98.59	98.06	97.79	97.35	97.09	96.82	96.47	96.20	95.76
21	114.1	99.74	99.47	99.04	98.69	98.33	97.90	97.55	97.11	96.76	96.41	96.14	95.79
22	113.6	99.74	99.47	98.94	98.42	97.98	97.80	97.71	97.45	97.10	96.92	96.74	96.48
23	113.5	100.09	99.82	99.47	99.03	98.50	97.97	97.44	97.36	96.92	96.74	96.39	96.04
24	109.9	100.09	99.82	99.45	98.91	98.54	98.36	98.00	97.54	97.36	97.09	96.82	96.54
25	110.1	99.91	99.73	99.36	98.82	98.27	98.09	97.82	97.64	97.37	96.91	96.46	96.19
Avg.	113.0	99.98	99.77	99.39	98.92	98.47	98.14	97.84	97.55	97.25	96.96	96.68	96.40
Med.	113.2	99.91	99.82	99.39	98.93	98.43	98.04	97.82	97.45	97.21	96.92	96.63	96.36
st dev	1.4	0.18	0.19	0.22	0.26	0.27	0.29	0.35	0.34	0.35	0.35	0.37	0.40
Min.	109.9	99.74	99.38	98.94	98.42	97.90	97.79	97.30	97.09	96.76	96.41	96.14	95.76
Max.	114.8	100.27	100.09	99.91	99.55	99.11	98.85	98.67	98.40	98.05	97.79	97.61	97.35

3.2 Data Set 1, 85°C, 100mA (Forward Voltage)

No.	Forward Voltage (V)												
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs
1	9.139	9.138	9.166	9.123	9.142	9.153	9.175	9.102	9.121	9.170	9.169	9.135	9.126
2	9.131	9.122	9.154	9.121	9.138	9.137	9.150	9.085	9.110	9.170	9.163	9.124	9.116
3	9.100	9.099	9.131	9.093	9.104	9.120	9.129	9.062	9.085	9.148	9.146	9.099	9.093
4	9.113	9.112	9.145	9.101	9.120	9.135	9.146	9.070	9.104	9.155	9.184	9.116	9.112
5	9.149	9.142	9.179	9.173	9.159	9.167	9.177	9.112	9.135	9.217	9.183	9.146	9.138
6	9.076	9.073	9.096	9.068	9.080	9.089	9.100	9.041	9.064	9.103	9.115	9.067	9.064
7	9.125	9.124	9.157	9.117	9.137	9.148	9.160	9.089	9.114	9.150	9.164	9.122	9.126
8	9.144	9.141	9.170	9.141	9.149	9.171	9.181	9.112	9.131	9.170	9.186	9.149	9.143
9	9.122	9.120	9.147	9.110	9.123	9.138	9.146	9.081	9.110	9.144	9.163	9.119	9.116
10	9.131	9.121	9.164	9.120	9.139	9.149	9.158	9.098	9.123	9.154	9.177	9.130	9.121
11	9.131	9.123	9.167	9.117	9.139	9.153	9.166	9.091	9.123	9.155	9.184	9.133	9.122
12	9.129	9.128	9.171	9.131	9.145	9.166	9.173	9.106	9.127	9.166	9.179	9.148	9.132
13	9.101	9.102	9.139	9.090	9.106	9.129	9.135	9.081	9.100	9.140	9.150	9.107	9.097
14	9.082	9.080	9.108	9.078	9.092	9.096	9.102	9.050	9.079	9.121	9.127	9.087	9.080
15	9.087	9.088	9.118	9.090	9.101	9.107	9.114	9.054	9.083	9.116	9.142	9.091	9.082
16	9.080	9.076	9.098	9.078	9.087	9.091	9.106	9.050	9.064	9.103	9.123	9.077	9.070
17	9.111	9.099	9.138	9.105	9.116	9.133	9.133	9.072	9.100	9.136	9.165	9.113	9.101
18	9.136	9.136	9.168	9.140	9.150	9.159	9.179	9.108	9.141	9.169	9.207	9.151	9.143
19	9.148	9.153	9.188	9.154	9.163	9.177	9.185	9.123	9.148	9.206	9.203	9.156	9.155
20	9.118	9.118	9.170	9.117	9.130	9.147	9.158	9.091	9.118	9.175	9.175	9.132	9.127
21	9.113	9.113	9.165	9.115	9.131	9.127	9.146	9.079	9.106	9.170	9.161	9.124	9.116
22	9.130	9.121	9.166	9.127	9.144	9.152	9.158	9.100	9.121	9.165	9.194	9.132	9.121
23	9.105	9.109	9.143	9.102	9.126	9.131	9.146	9.083	9.098	9.140	9.211	9.116	9.111
24	9.109	9.111	9.142	9.110	9.146	9.126	9.135	9.079	9.104	9.133	9.202	9.110	9.104
25	9.120	9.129	9.146	9.120	9.138	9.136	9.146	9.095	9.112	9.153	9.171	9.125	9.121
Avg.	9.117	9.115	9.149	9.114	9.128	9.137	9.148	9.085	9.109	9.153	9.170	9.120	9.113
Med.	9.120	9.120	9.154	9.117	9.137	9.137	9.146	9.085	9.110	9.154	9.171	9.124	9.116
st dev	0.021	0.021	0.024	0.024	0.022	0.024	0.025	0.022	0.022	0.027	0.026	0.023	0.023
Min.	9.076	9.073	9.096	9.068	9.080	9.089	9.100	9.041	9.064	9.103	9.115	9.067	9.064
Max.	9.149	9.153	9.188	9.173	9.163	9.177	9.185	9.123	9.148	9.217	9.211	9.156	9.155

3.3 Data Set 1, 85°C, 100mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')											
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs
1	0.2584	0.5300	2775	0.0004	0.0009	0.0011	0.0014	0.0019	0.0020	0.0021	0.0022	0.0023	0.0025	0.0027	0.0028
2	0.2594	0.5311	2750	0.0005	0.0009	0.0011	0.0016	0.0017	0.0021	0.0021	0.0021	0.0022	0.0025	0.0028	0.0030
3	0.2603	0.5309	2731	0.0001	0.0008	0.0010	0.0013	0.0014	0.0016	0.0016	0.0018	0.0020	0.0023	0.0025	0.0026
4	0.2598	0.5292	2750	0.0003	0.0008	0.0011	0.0013	0.0017	0.0014	0.0017	0.0021	0.0023	0.0025	0.0028	0.0030
5	0.2581	0.5302	2781	0.0002	0.0006	0.0011	0.0013	0.0019	0.0019	0.0019	0.0021	0.0023	0.0025	0.0026	0.0029
6	0.2589	0.5301	2765	0.0004	0.0007	0.0013	0.0018	0.0022	0.0023	0.0022	0.0022	0.0025	0.0027	0.0029	0.0030
7	0.2603	0.5315	2729	0.0004	0.0006	0.0011	0.0014	0.0016	0.0017	0.0020	0.0024	0.0026	0.0028	0.0031	0.0035
8	0.2590	0.5307	2759	0.0004	0.0007	0.0010	0.0014	0.0016	0.0016	0.0016	0.0017	0.0020	0.0022	0.0025	0.0028
9	0.2588	0.5298	2767	0.0003	0.0005	0.0009	0.0013	0.0014	0.0016	0.0017	0.0018	0.0019	0.0021	0.0023	0.0025
10	0.2588	0.5310	2762	0.0005	0.0007	0.0010	0.0014	0.0016	0.0018	0.0019	0.0021	0.0023	0.0026	0.0027	0.0028
11	0.2580	0.5292	2787	0.0004	0.0006	0.0010	0.0014	0.0016	0.0016	0.0016	0.0017	0.0019	0.0022	0.0023	0.0025
12	0.2590	0.5300	2762	0.0004	0.0006	0.0011	0.0014	0.0017	0.0018	0.0017	0.0019	0.0020	0.0022	0.0023	0.0024
13	0.2600	0.5312	2736	0.0004	0.0006	0.0009	0.0013	0.0016	0.0019	0.0020	0.0022	0.0024	0.0027	0.0029	0.0032
14	0.2601	0.5307	2736	0.0004	0.0007	0.0011	0.0015	0.0017	0.0020	0.0020	0.0021	0.0023	0.0026	0.0029	0.0031
15	0.2590	0.5308	2759	0.0004	0.0008	0.0011	0.0017	0.0023	0.0024	0.0026	0.0026	0.0028	0.0029	0.0030	0.0033
16	0.2599	0.5308	2740	0.0004	0.0006	0.0011	0.0016	0.0019	0.0022	0.0022	0.0023	0.0025	0.0026	0.0029	0.0031
17	0.2590	0.5305	2760	0.0003	0.0006	0.0011	0.0018	0.0021	0.0023	0.0026	0.0027	0.0030	0.0032	0.0033	0.0035
18	0.2591	0.5306	2757	0.0002	0.0007	0.0010	0.0011	0.0016	0.0018	0.0017	0.0019	0.0020	0.0023	0.0025	0.0027
19	0.2580	0.5291	2789	0.0003	0.0006	0.0010	0.0011	0.0015	0.0020	0.0020	0.0021	0.0024	0.0026	0.0028	0.0030
20	0.2603	0.5302	2735	0.0001	0.0004	0.0009	0.0011	0.0014	0.0020	0.0021	0.0021	0.0022	0.0024	0.0026	0.0028
21	0.2584	0.5303	2774	0.0005	0.0007	0.0011	0.0013	0.0016	0.0023	0.0024	0.0024	0.0026	0.0027	0.0029	0.0031
22	0.2596	0.5309	2745	0.0002	0.0005	0.0009	0.0012	0.0013	0.0018	0.0020	0.0019	0.0021	0.0023	0.0024	0.0026
23	0.2592	0.5295	2760	0.0003	0.0006	0.0009	0.0012	0.0014	0.0019	0.0021	0.0021	0.0023	0.0024	0.0026	0.0027
24	0.2602	0.5301	2737	0.0003	0.0005	0.0009	0.0011	0.0015	0.0016	0.0020	0.0023	0.0025	0.0028	0.0030	0.0033
25	0.2593	0.5299	2757	0.0004	0.0007	0.0010	0.0013	0.0016	0.0019	0.0019	0.0022	0.0024	0.0026	0.0027	0.0030
Avg.	0.2592	0.5303	2756	0.0003	0.0007	0.0010	0.0014	0.0017	0.0019	0.0020	0.0021	0.0023	0.0025	0.0027	0.0029
Med.	0.2591	0.5303	2759	0.0004	0.0006	0.0010	0.0013	0.0016	0.0019	0.0020	0.0021	0.0023	0.0025	0.0027	0.0030
st dev	0.0007	0.0007	17	0.0001	0.0001	0.0001	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
Min.	0.2580	0.5291	2729	0.0001	0.0004	0.0009	0.0011	0.0013	0.0014	0.0016	0.0017	0.0019	0.0021	0.0023	0.0024
Max.	0.2603	0.5315	2789	0.0005	0.0009	0.0013	0.0018	0.0023	0.0024	0.0026	0.0027	0.0030	0.0032	0.0033	0.0035

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	10000hrs	11000hrs	12000hrs
26	113.2	100.18	99.91	99.56	98.94	98.32	97.61	97.17	96.73	96.47	96.11	95.76	95.58
27	112.2	100.18	99.82	99.38	99.02	98.57	98.22	97.95	97.59	97.24	96.70	96.35	96.08
28	113.8	99.91	99.82	99.38	98.77	98.42	97.80	97.54	97.28	97.01	96.84	96.57	96.31
29	113.7	99.91	99.82	99.30	98.68	98.07	97.71	97.54	97.19	96.83	96.57	96.31	95.87
30	113.0	99.82	99.56	99.12	98.58	97.88	97.43	97.35	96.99	96.73	96.46	96.19	95.84
31	115.1	99.57	99.48	99.04	98.35	97.74	97.48	97.05	96.79	96.44	96.00	95.74	95.48
32	110.4	99.73	99.55	99.28	98.55	98.10	97.83	97.46	97.37	96.92	96.56	96.38	95.92
33	112.6	99.91	99.73	99.38	98.85	98.31	97.87	97.42	96.80	96.45	96.00	95.65	95.38
34	114.5	99.74	99.56	99.21	98.69	98.25	98.17	97.82	97.21	96.68	96.42	96.07	95.81
35	112.7	99.82	99.47	99.11	98.67	98.31	97.96	97.69	97.25	96.89	96.63	96.36	96.01
36	113.6	99.82	99.47	99.21	98.50	98.06	97.71	97.45	97.27	97.01	96.65	96.39	96.13
37	113.4	99.82	99.74	99.21	98.77	98.15	97.71	97.27	96.91	96.56	96.21	95.86	95.50
38	110.2	99.82	99.46	99.00	98.37	97.73	97.01	96.64	96.19	95.92	95.74	95.28	94.92
39	111.0	99.82	99.46	99.10	98.38	97.66	97.21	96.85	96.67	96.31	95.95	95.68	95.32
40	112.9	99.82	99.47	98.94	98.49	97.79	97.08	96.72	96.37	96.10	95.66	95.31	95.04
41	112.9	99.73	99.38	98.85	98.23	97.87	97.43	97.17	96.99	96.63	96.28	96.01	95.66
42	113.2	99.73	99.47	99.03	98.41	97.79	97.26	97.08	96.73	96.38	96.11	95.76	95.41
43	113.5	99.74	99.47	99.03	98.33	97.71	97.00	96.56	96.12	95.77	95.42	95.07	94.80
44	110.7	99.64	99.46	99.01	98.37	97.92	97.56	97.20	96.84	96.48	96.12	95.75	95.30
45	110.3	99.73	99.64	99.27	98.55	98.01	97.55	97.10	96.83	96.46	96.10	95.83	95.38
46	114.0	99.56	99.39	98.86	98.25	97.63	97.02	96.49	96.23	95.96	95.61	95.18	94.82
47	113.0	99.82	99.65	99.03	98.41	98.05	97.70	97.43	96.99	96.73	96.37	96.11	95.58
48	113.5	99.91	99.74	99.21	98.41	97.89	97.53	97.27	97.00	96.56	96.30	95.86	95.42
49	110.0	99.64	99.36	99.00	98.36	97.73	97.27	96.91	96.55	96.00	95.64	95.27	95.09
50	114.2	99.82	99.65	99.12	98.42	97.72	97.46	96.94	96.58	96.23	95.97	95.62	95.36
Avg.	112.7	99.81	99.58	99.14	98.53	97.99	97.54	97.20	96.86	96.51	96.18	95.85	95.52
Med.	113.0	99.82	99.55	99.12	98.49	97.92	97.55	97.20	96.84	96.48	96.12	95.83	95.48
st dev	1.4	0.15	0.16	0.18	0.21	0.26	0.34	0.38	0.38	0.37	0.38	0.42	0.41
Min.	110.0	99.56	99.36	98.85	98.23	97.63	97.00	96.49	96.12	95.77	95.42	95.07	94.80
Max.	115.1	100.18	99.91	99.56	99.02	98.57	98.22	97.95	97.59	97.24	96.84	96.57	96.31

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

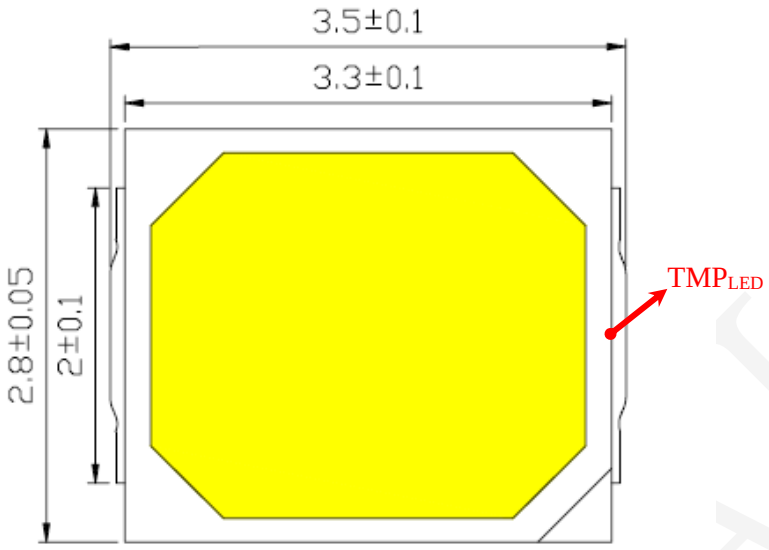
No.	Forward Voltage (V)												
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs
26	9.137	9.138	9.170	9.133	9.151	9.163	9.169	9.118	9.137	9.173	9.202	9.145	9.142
27	9.091	9.097	9.124	9.095	9.111	9.110	9.118	9.072	9.089	9.125	9.149	9.098	9.092
28	9.123	9.128	9.166	9.125	9.140	9.149	9.164	9.112	9.123	9.158	9.188	9.133	9.130
29	9.129	9.118	9.158	9.122	9.135	9.149	9.154	9.114	9.118	9.154	9.160	9.160	9.123
30	9.094	9.091	9.136	9.094	9.108	9.121	9.135	9.098	9.091	9.132	9.200	9.106	9.099
31	9.146	9.142	9.181	9.131	9.152	9.161	9.171	9.133	9.141	9.174	9.201	9.152	9.139
32	9.145	9.140	9.174	9.144	9.156	9.163	9.173	9.135	9.141	9.183	9.199	9.152	9.145
33	9.100	9.103	9.142	9.104	9.116	9.129	9.133	9.098	9.098	9.150	9.163	9.113	9.105
34	9.097	9.091	9.129	9.098	9.102	9.121	9.131	9.093	9.093	9.137	9.146	9.105	9.098
35	9.181	9.187	9.229	9.185	9.198	9.204	9.219	9.185	9.173	9.225	9.235	9.208	9.182
36	9.099	9.102	9.137	9.102	9.105	9.119	9.137	9.093	9.091	9.137	9.149	9.121	9.099
37	9.078	9.072	9.109	9.080	9.085	9.096	9.110	9.070	9.070	9.107	9.122	9.084	9.073
38	9.095	9.091	9.127	9.099	9.108	9.113	9.114	9.087	9.087	9.125	9.140	9.109	9.092
39	9.099	9.102	9.172	9.100	9.111	9.116	9.127	9.091	9.091	9.133	9.142	9.134	9.097
40	9.095	9.093	9.209	9.097	9.103	9.124	9.127	9.091	9.087	9.119	9.145	9.102	9.084
41	9.090	9.096	9.131	9.091	9.099	9.121	9.133	9.083	9.087	9.123	9.144	9.133	9.093
42	9.142	9.136	9.183	9.141	9.151	9.162	9.171	9.141	9.131	9.176	9.191	9.151	9.136
43	9.092	9.090	9.178	9.092	9.101	9.123	9.127	9.089	9.087	9.118	9.144	9.110	9.095
44	9.104	9.103	9.183	9.096	9.103	9.119	9.125	9.098	9.098	9.126	9.145	9.108	9.098
45	9.102	9.100	9.176	9.105	9.104	9.122	9.121	9.089	9.095	9.128	9.145	9.104	9.091
46	9.118	9.115	9.161	9.123	9.129	9.148	9.121	9.118	9.110	9.147	9.170	9.128	9.113
47	9.080	9.085	9.118	9.088	9.086	9.112	9.177	9.079	9.083	9.116	9.140	9.093	9.077
48	9.140	9.141	9.194	9.146	9.146	9.177	9.150	9.141	9.141	9.169	9.212	9.153	9.146
49	9.125	9.123	9.161	9.120	9.130	9.142	9.135	9.110	9.114	9.144	9.172	9.155	9.115
50	9.130	9.130	9.168	9.132	9.138	9.161	9.156	9.139	9.133	9.159	9.187	9.172	9.128
Avg.	9.113	9.113	9.161	9.114	9.123	9.137	9.144	9.107	9.108	9.146	9.168	9.129	9.112
Med.	9.102	9.103	9.166	9.104	9.111	9.124	9.135	9.098	9.098	9.137	9.160	9.128	9.099
st dev	0.025	0.026	0.030	0.024	0.027	0.026	0.026	0.027	0.025	0.027	0.029	0.029	0.026
Min.	9.078	9.072	9.109	9.080	9.085	9.096	9.110	9.070	9.070	9.107	9.122	9.084	9.073
Max.	9.181	9.187	9.229	9.185	9.198	9.204	9.219	9.185	9.173	9.225	9.235	9.208	9.182

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	10000hrs	11000hrs	12000hrs
26	0.2593	0.5302	2755	0.0003	0.0006	0.0011	0.0015	0.0016	0.0023	0.0022	0.0021	0.0023	0.0026	0.0027	0.0029
27	0.2596	0.5314	2744	0.0004	0.0006	0.0010	0.0015	0.0016	0.0019	0.0021	0.0022	0.0023	0.0025	0.0027	0.0029
28	0.2591	0.5301	2759	0.0005	0.0006	0.0011	0.0016	0.0020	0.0020	0.0022	0.0024	0.0025	0.0026	0.0027	0.0029
29	0.2597	0.5309	2743	0.0004	0.0006	0.0011	0.0016	0.0019	0.0021	0.0022	0.0026	0.0028	0.0029	0.0030	0.0034
30	0.2601	0.5306	2737	0.0004	0.0006	0.0011	0.0016	0.0019	0.0021	0.0022	0.0024	0.0026	0.0028	0.0029	0.0030
31	0.2592	0.5312	2753	0.0004	0.0007	0.0011	0.0017	0.0021	0.0024	0.0026	0.0029	0.0032	0.0033	0.0036	0.0039
32	0.2600	0.5303	2740	0.0005	0.0008	0.0013	0.0017	0.0021	0.0023	0.0023	0.0023	0.0024	0.0026	0.0027	0.0029
33	0.2601	0.5305	2737	0.0003	0.0005	0.0011	0.0016	0.0020	0.0022	0.0025	0.0025	0.0026	0.0029	0.0031	0.0033
34	0.2580	0.5301	2783	0.0004	0.0005	0.0011	0.0016	0.0018	0.0019	0.0023	0.0023	0.0024	0.0027	0.0028	0.0029
35	0.2578	0.5288	2794	0.0004	0.0006	0.0011	0.0016	0.0018	0.0017	0.0015	0.0018	0.0021	0.0023	0.0026	0.0029
36	0.2602	0.5303	2736	0.0003	0.0005	0.0010	0.0015	0.0017	0.0021	0.0021	0.0020	0.0022	0.0024	0.0027	0.0029
37	0.2595	0.5304	2750	0.0004	0.0006	0.0011	0.0016	0.0017	0.0019	0.0022	0.0020	0.0022	0.0023	0.0025	0.0026
38	0.2599	0.5305	2741	0.0006	0.0006	0.0012	0.0017	0.0019	0.0023	0.0025	0.0025	0.0026	0.0028	0.0029	0.0031
39	0.2584	0.5302	2775	0.0004	0.0006	0.0011	0.0017	0.0019	0.0021	0.0025	0.0025	0.0026	0.0027	0.0030	0.0032
40	0.2594	0.5295	2756	0.0004	0.0006	0.0011	0.0019	0.0022	0.0023	0.0025	0.0025	0.0028	0.0029	0.0031	0.0034
41	0.2612	0.5306	2714	0.0004	0.0006	0.0011	0.0015	0.0017	0.0020	0.0021	0.0022	0.0024	0.0025	0.0026	0.0029
42	0.2596	0.5309	2745	0.0003	0.0005	0.0009	0.0015	0.0017	0.0020	0.0022	0.0021	0.0023	0.0025	0.0026	0.0029
43	0.2602	0.5294	2740	0.0004	0.0006	0.0011	0.0016	0.0021	0.0026	0.0027	0.0027	0.0030	0.0031	0.0033	0.0036
44	0.2601	0.5317	2731	0.0004	0.0006	0.0011	0.0016	0.0019	0.0021	0.0019	0.0018	0.0020	0.0022	0.0023	0.0024
45	0.2593	0.5299	2756	0.0004	0.0006	0.0011	0.0017	0.0021	0.0022	0.0021	0.0020	0.0022	0.0025	0.0027	0.0028
46	0.2582	0.5303	2778	0.0005	0.0006	0.0012	0.0017	0.0019	0.0025	0.0025	0.0026	0.0027	0.0028	0.0029	0.0031
47	0.2589	0.5297	2766	0.0004	0.0006	0.0011	0.0017	0.0020	0.0022	0.0025	0.0027	0.0028	0.0029	0.0031	0.0033
48	0.2589	0.5302	2764	0.0005	0.0008	0.0014	0.0018	0.0022	0.0023	0.0026	0.0027	0.0029	0.0030	0.0031	0.0033
49	0.2601	0.5297	2740	0.0004	0.0005	0.0010	0.0015	0.0018	0.0018	0.0015	0.0015	0.0016	0.0018	0.0020	0.0024
50	0.2589	0.5303	2763	0.0006	0.0007	0.0012	0.0016	0.0019	0.0020	0.0019	0.0020	0.0022	0.0023	0.0024	0.0029
Avg.	0.2594	0.5303	2752	0.0004	0.0006	0.0011	0.0016	0.0019	0.0021	0.0022	0.0023	0.0025	0.0026	0.0028	0.0030
Med.	0.2595	0.5303	2750	0.0004	0.0006	0.0011	0.0016	0.0019	0.0021	0.0022	0.0023	0.0024	0.0026	0.0027	0.0029
st dev	0.0008	0.0006	18	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0003	0.0003	0.0003
Min.	0.2578	0.5288	2714	0.0003	0.0005	0.0009	0.0015	0.0016	0.0017	0.0015	0.0015	0.0016	0.0018	0.0020	0.0024
Max.	0.2612	0.5317	2794	0.0006	0.0008	0.0014	0.0019	0.0022	0.0026	0.0027	0.0029	0.0032	0.0033	0.0036	0.0039

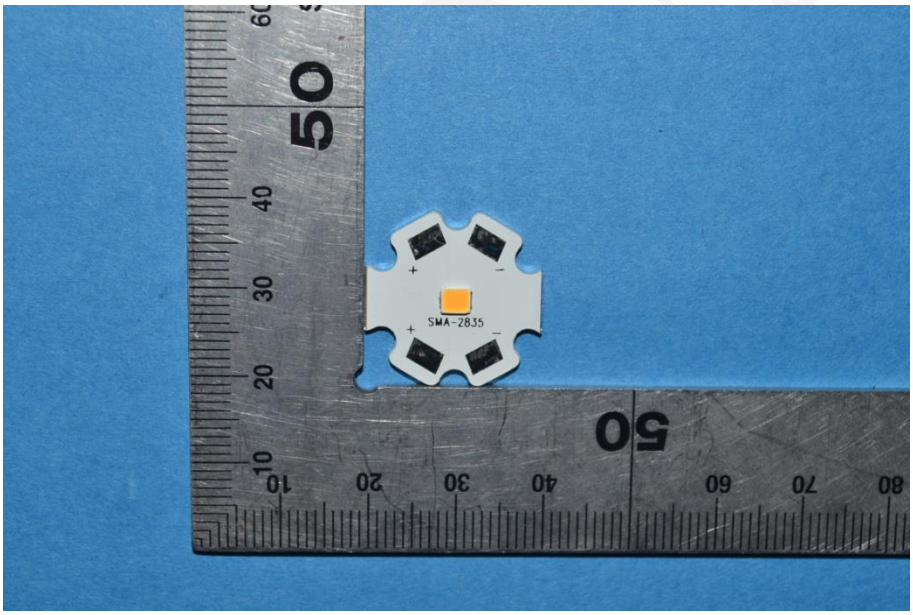
4 - DUT Photo

4.1 Mechanical Dimensions



All dimensions are in millimeter

4.2 DUT Photo



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