TEST REPORT

ACCORDING TO IES LM-80-2015
For

LEDYI LIGHTING CO.,LTD

Yuechang Industrial Park,Shiyan,Bao'an,Shenzhen,China

Model: 5050RGB SMD LED

Report Type: 9000 Hours Test Report	**Product Type:** LED Package
Test Engineer:	Pote Wang
Report Number:	R2DG160808050-10-9000-M1
Test Date:	2016-08-09 to 2017-08-20
Report Date:	2017-10-12
Reviewed By:	Daniel Duan / EE Manager
Revised Note:	The previous report R2DG160808050-10-9000 is replaced by this report on 2017-10-12
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:

75 PCS samples were received by 2016-08-08. The samples were numbered from 1 to 25, 26 to 50 and 51 to 75.

Manufacturer:	LEDYI LIGHTING CO.,LTD
Part Number:	5050RGB SMD LED
Part Type:	LED Package
Drive Level:	DC 20mA
λ_d:	470nm

1.2 Standards Used:

- IESNA LM-80-15: IES Approved Method for Measuring Lumen Maintenance of LED Light Sources.

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	20022	25°C~130°C	2016-12-08	2017-12-08
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090005	(50/15A)	2017-03-03	2018-03-03
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090006	(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 radiant flux 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 (radiant 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.

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, 20mA

Part Number:	5050RGB SMD LED
Number of Units:	25
Case Temperature:	>53°C
Ambient Temperature:	>50°C
Life Test Drive Current:	20mA
Measurement Current:	20mA

Data Set 2: 85°C, 20mA

Part Number:	5050RGB SMD LED
Number of Units:	25
Case Temperature:	>83°C
Ambient Temperature:	>80°C
Life Test Drive Current:	20mA
Measurement Current:	20mA

Data Set 3: 105°C, 20mA

Part Number:	5050RGB SMD LED
Number of Units:	25
Case Temperature:	>103°C
Ambient Temperature:	>100°C
Life Test Drive Current:	20mA
Measurement Current:	20mA

2 - Summary of Test Result

Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration	Reported TM-21 L_{70} Lifetime
1	25	0	1000	9000	>54000hours
2	25	0	1000	9000	>54000hours
3	25	0	1000	9000	>54000hours

Average Radiant Flux Maintenance (Percentage of Initial Radiant Flux)

Data Set:	1000	2000	3000	4000	5000	6000	7000	8000	9000
1	100.37%	99.90%	99.54%	99.38%	99.36%	99.21%	98.89%	98.78%	98.47%
2	100.30%	99.81%	99.26%	99.18%	98.90%	98.79%	98.53%	98.41%	98.11%
3	100.26%	99.75%	99.29%	99.09%	98.87%	98.64%	98.26%	98.12%	97.76%

Average Color Maintenance

Data Set:	1000	2000	3000	4000	5000	6000	7000	8000	9000
1	0.0003	0.0005	0.0006	0.0010	0.0012	0.0016	0.0019	0.0021	0.0024
2	0.0003	0.0006	0.0010	0.0012	0.0015	0.0018	0.0021	0.0023	0.0027
3	0.0002	0.0008	0.0013	0.0015	0.0021	0.0023	0.0024	0.0028	0.0030

3 - Test Data

3.1 Data Set 1, 55°C, 20mA (Radiant Flux Maintenance)

No.	Φ_e (mW)	Radiant Flux Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	69.82	100.26	99.77	99.54	99.44	99.51	99.36	99.15	99.04	98.75
2	69.91	100.41	99.99	99.63	99.33	99.43	99.37	99.18	99.17	98.78
3	70.50	100.50	100.07	99.87	99.70	99.79	99.69	99.45	99.25	98.92
4	70.43	100.43	99.87	99.53	99.32	99.35	99.30	98.99	98.99	98.76
5	70.06	100.41	99.84	99.53	99.49	99.44	99.27	98.96	98.94	98.87
6	70.91	100.17	99.56	99.18	99.00	99.00	98.93	98.62	98.34	98.18
7	71.31	100.48	100.03	99.79	99.68	99.72	99.59	99.52	99.30	98.96
8	70.35	99.97	99.46	99.19	99.12	99.32	99.10	98.78	98.71	98.35
9	70.81	100.40	99.96	99.53	99.21	99.17	99.10	98.81	98.71	98.25
10	71.59	100.01	99.50	99.22	99.09	99.26	99.05	98.85	98.85	98.46
11	69.61	100.45	100.01	99.53	99.31	99.38	99.14	98.97	98.92	98.68
12	71.29	100.17	99.58	99.27	98.98	99.03	98.93	98.74	98.61	98.54
13	71.16	100.15	99.80	99.30	99.03	99.10	98.97	98.79	98.69	98.55
14	71.78	100.14	99.54	99.19	99.09	99.21	99.00	98.93	98.90	98.40
15	70.55	100.31	99.93	99.72	99.46	98.34	98.26	98.21	98.17	98.02
16	70.56	100.34	99.80	99.36	99.33	99.14	98.94	98.67	98.65	98.50
17	70.36	100.37	99.87	99.52	99.50	99.62	99.52	99.23	99.01	98.55
18	70.77	100.49	100.13	99.56	99.46	99.32	99.05	98.83	98.49	98.22
19	70.07	100.74	100.31	99.81	99.66	99.59	99.40	99.00	98.96	98.56
20	69.93	101.02	100.54	100.20	100.17	100.16	99.91	99.56	99.47	98.88
21	71.49	100.39	99.96	99.54	99.36	99.44	99.26	98.88	98.81	98.55
22	70.31	100.44	100.17	99.76	99.53	99.46	99.40	99.10	99.03	98.38
23	70.71	100.34	99.89	99.51	99.48	99.46	99.28	97.10	96.89	96.75
24	71.05	100.15	99.62	99.31	99.10	99.11	98.93	98.76	98.66	98.31
25	68.74	100.58	100.17	99.81	99.74	99.62	99.51	99.24	99.00	98.50
Ave.	70.56	100.37	99.90	99.54	99.38	99.36	99.21	98.89	98.78	98.47
Med.	70.55	100.39	99.89	99.53	99.36	99.38	99.26	98.93	98.90	98.54
st dev	0.70	0.2228	0.2646	0.2531	0.2803	0.3369	0.3285	0.4783	0.4915	0.4352
Min.	68.74	99.97	99.46	99.18	98.98	98.34	98.26	97.10	96.89	96.75
Max.	71.78	101.02	100.54	100.20	100.17	100.16	99.91	99.56	99.47	98.96

TM-21 Projection:

Test Duration: 9000 hours

Failures Observed: 0

α: 1.908E-06

β: 1.003

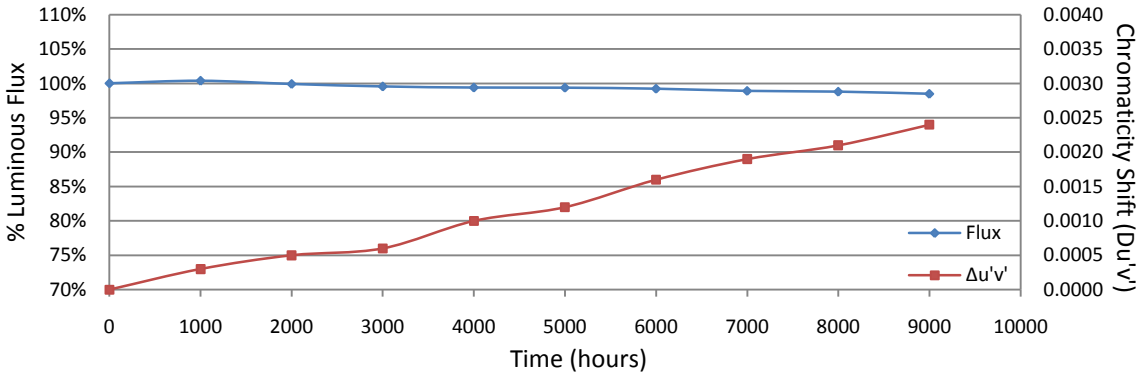
Reported L_{70}: >54000 hours

3.2 Data Set 1, 55°C, 20mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	6.941	6.934	6.952	6.950	6.960	6.957	6.951	6.947	6.950	6.971
2	6.961	6.956	6.975	6.971	6.980	6.978	6.973	6.972	6.968	6.961
3	6.951	6.944	6.960	6.956	6.965	6.960	6.957	6.954	6.951	6.950
4	6.948	6.947	6.963	6.966	6.967	6.969	6.963	6.962	6.956	6.953
5	6.947	6.943	6.961	6.961	6.965	6.964	6.958	6.955	6.954	6.953
6	6.939	6.939	6.950	6.948	6.957	6.957	6.950	6.950	6.946	6.967
7	6.939	6.939	6.956	6.953	6.957	6.961	6.953	6.951	6.952	6.948
8	6.948	6.950	6.964	6.965	6.968	6.966	6.961	6.961	6.961	6.956
9	6.969	6.993	6.980	6.981	6.984	6.987	6.979	6.981	6.976	6.969
10	6.938	7.227	6.950	6.946	6.950	6.956	6.953	6.951	6.949	6.942
11	6.980	6.944	6.964	6.960	6.968	6.966	6.967	6.963	6.958	6.957
12	6.939	6.931	6.947	6.950	6.954	6.952	6.951	6.946	6.943	6.990
13	6.941	6.933	6.951	6.952	6.957	6.954	6.953	6.952	6.950	6.945
14	6.947	6.944	6.955	6.955	6.964	6.966	6.963	6.956	6.956	6.954
15	6.932	6.930	6.944	6.948	6.953	6.950	6.949	6.947	6.944	6.940
16	6.943	6.937	6.954	6.953	6.957	6.962	6.957	6.954	6.954	6.950
17	6.943	6.943	6.957	6.956	6.957	6.968	6.959	6.956	6.956	6.952
18	6.998	6.941	6.962	6.960	6.963	6.966	6.959	6.957	6.952	6.995
19	6.956	6.951	6.969	6.968	6.970	6.969	6.966	6.964	6.964	6.957
20	6.945	6.947	6.959	6.960	6.962	6.962	6.961	6.957	6.957	6.952
21	6.944	6.942	6.961	6.958	6.960	6.966	6.959	6.955	6.955	6.954
22	6.941	6.938	6.950	6.952	6.953	6.960	6.952	6.949	6.944	6.947
23	6.947	6.945	6.959	6.960	6.960	6.965	6.957	6.953	6.956	6.948
24	6.936	6.933	6.950	6.950	6.954	6.956	6.948	6.953	6.949	6.942
25	6.942	6.938	6.953	6.959	6.959	6.958	6.955	6.956	6.953	6.946
Ave.	6.949	6.955	6.958	6.958	6.962	6.963	6.958	6.956	6.954	6.956
Med.	6.944	6.943	6.957	6.956	6.960	6.962	6.957	6.955	6.954	6.953
st dev	0.015	0.058	0.009	0.008	0.008	0.008	0.007	0.008	0.008	0.014
Min.	6.932	6.930	6.944	6.946	6.950	6.950	6.948	6.946	6.943	6.940
Max.	6.998	7.227	6.980	6.981	6.984	6.987	6.979	6.981	6.976	6.995

3.3 Data Set 1, 55°C, 20mA (Chromaticity Shift)

No.	u'	v'	λ_d (nm)	Chromaticity Shift (Δu'v')								
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	0.1915	0.3888	470.8	0.0002	0.0003	0.0005	0.0008	0.0013	0.0021	0.0022	0.0024	0.0027
2	0.1922	0.3891	470.5	0.0003	0.0004	0.0006	0.0008	0.0009	0.0018	0.0018	0.0021	0.0024
3	0.1899	0.3885	471.5	0.0001	0.0002	0.0005	0.0010	0.0013	0.0016	0.0019	0.0019	0.0024
4	0.1919	0.3880	470.5	0.0003	0.0001	0.0004	0.0006	0.0009	0.0014	0.0014	0.0016	0.0023
5	0.1919	0.3878	470.4	0.0003	0.0003	0.0004	0.0007	0.0010	0.0014	0.0016	0.0018	0.0021
6	0.1908	0.3874	470.9	0.0001	0.0004	0.0003	0.0008	0.0008	0.0013	0.0015	0.0017	0.0021
7	0.1906	0.3872	471.0	0.0004	0.0002	0.0007	0.0010	0.0013	0.0017	0.0020	0.0021	0.0025
8	0.1926	0.3841	469.7	0.0001	0.0006	0.0003	0.0006	0.0013	0.0015	0.0019	0.0022	0.0023
9	0.1905	0.3786	470.2	0.0006	0.0006	0.0008	0.0011	0.0012	0.0013	0.0020	0.0025	0.0028
10	0.1902	0.3893	471.4	0.0001	0.0008	0.0004	0.0007	0.0008	0.0013	0.0014	0.0017	0.0020
11	0.1914	0.3869	470.6	0.0006	0.0005	0.0007	0.0011	0.0013	0.0017	0.0019	0.0022	0.0028
12	0.1921	0.3860	470.2	0.0002	0.0007	0.0005	0.0009	0.0010	0.0013	0.0018	0.0021	0.0025
13	0.1906	0.3878	471.1	0.0001	0.0004	0.0004	0.0005	0.0010	0.0014	0.0016	0.0019	0.0020
14	0.1925	0.3861	470.0	0.0001	0.0007	0.0004	0.0008	0.0010	0.0014	0.0018	0.0021	0.0023
15	0.1899	0.3924	471.9	0.0003	0.0004	0.0007	0.0010	0.0018	0.0015	0.0018	0.0021	0.0022
16	0.1920	0.3865	470.3	0.0003	0.0006	0.0006	0.0010	0.0012	0.0015	0.0019	0.0023	0.0027
17	0.1899	0.3908	471.7	0.0004	0.0006	0.0007	0.0012	0.0015	0.0015	0.0021	0.0024	0.0027
18	0.1928	0.3842	469.6	0.0005	0.0006	0.0012	0.0013	0.0015	0.0017	0.0018	0.0021	0.0025
19	0.1923	0.3906	470.6	0.0006	0.0006	0.0008	0.0011	0.0011	0.0014	0.0019	0.0023	0.0021
20	0.1905	0.3899	471.3	0.0002	0.0005	0.0013	0.0016	0.0025	0.0028	0.0028	0.0031	0.0030
21	0.1921	0.3864	470.2	0.0003	0.0005	0.0007	0.0009	0.0012	0.0016	0.0018	0.0021	0.0026
22	0.1919	0.3857	470.2	0.0002	0.0004	0.0007	0.0010	0.0011	0.0016	0.0019	0.0024	0.0022
23	0.1920	0.3833	470.0	0.0004	0.0005	0.0007	0.0010	0.0010	0.0014	0.0015	0.0016	0.0019
24	0.1903	0.3875	471.2	0.0004	0.0002	0.0006	0.0010	0.0011	0.0013	0.0018	0.0023	0.0028
25	0.1919	0.3900	470.7	0.0004	0.0004	0.0008	0.0011	0.0011	0.0019	0.0023	0.0026	0.0031
Ave.	0.1914	0.3873	470.7	0.0003	0.0005	0.0006	0.0010	0.0012	0.0016	0.0019	0.0021	0.0024
Med.	0.1919	0.3875	470.6	0.0003	0.0005	0.0006	0.0010	0.0011	0.0015	0.0018	0.0021	0.0024
st dev	0.0009	0.0028	0.6	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003
Min.	0.1899	0.3786	469.6	0.0001	0.0001	0.0003	0.0005	0.0008	0.0013	0.0014	0.0016	0.0019
Max.	0.1928	0.3924	471.9	0.0006	0.0008	0.0013	0.0016	0.0025	0.0028	0.0028	0.0031	0.0031



3.4 Data Set 2, 85°C, 20mA (Radiant Flux Maintenance)

No.	Φ_e (mW)	Radiant Flux Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	71.18	100.39	100.08	99.73	99.61	99.17	98.90	98.86	98.76	98.51
27	70.79	100.54	99.97	99.46	99.38	99.15	99.04	98.97	98.77	98.45
28	70.91	100.48	100.06	99.56	99.35	99.01	98.90	98.69	98.66	98.51
29	70.51	100.40	99.93	99.40	99.23	98.87	98.71	98.68	98.67	98.61
30	70.61	100.30	99.83	99.38	99.19	99.05	98.98	98.71	98.68	98.41
31	71.72	100.07	99.60	99.15	99.05	98.79	98.72	98.35	98.35	98.02
32	69.73	100.36	99.96	99.27	99.14	98.95	98.90	98.52	98.44	98.32
33	70.02	100.37	99.87	99.31	99.23	99.00	98.94	98.73	98.63	98.30
34	70.61	100.24	99.70	99.26	99.08	98.92	98.87	98.54	98.23	97.93
35	69.84	100.50	100.04	99.51	99.46	99.37	99.33	99.18	98.91	98.58
36	71.67	100.06	99.62	99.00	98.91	98.56	98.40	98.28	98.26	98.00
37	71.67	100.27	99.69	99.02	99.02	98.70	98.66	98.24	98.09	97.87
38	70.57	100.28	99.76	99.08	99.05	98.82	98.68	98.40	98.23	97.75
39	70.90	100.30	99.92	99.38	99.13	98.96	98.84	98.53	98.52	97.90
40	69.67	100.06	99.28	98.59	98.61	98.32	98.15	97.95	97.65	97.20
41	69.71	100.10	99.63	99.02	98.95	98.69	98.58	98.19	97.95	97.45
42	70.54	100.26	99.70	99.15	99.11	98.75	98.55	98.38	98.17	97.72
43	70.25	100.16	99.70	99.16	99.09	98.72	98.68	98.33	98.32	98.02
44	70.78	100.31	99.62	99.01	99.10	98.64	98.53	98.36	98.22	97.91
45	69.66	100.55	100.14	99.50	99.40	99.21	99.12	98.64	98.62	98.19
46	69.71	100.36	99.76	99.27	99.17	98.94	98.85	98.59	98.44	98.31
47	70.65	100.24	99.83	99.42	99.35	99.11	98.84	98.83	98.80	98.44
48	70.56	100.11	99.62	99.16	99.29	99.05	99.04	98.60	98.38	98.26
49	71.01	100.59	100.00	99.31	99.35	99.04	98.94	98.45	98.41	98.08
50	70.57	100.20	99.86	99.31	99.19	98.75	98.48	98.21	98.20	98.00
Ave.	70.55	100.30	99.81	99.26	99.18	98.90	98.79	98.53	98.41	98.11
Med.	70.57	100.30	99.83	99.27	99.17	98.94	98.84	98.53	98.41	98.08
st dev	0.63	0.1570	0.1977	0.2348	0.2036	0.2315	0.2532	0.2736	0.2961	0.3549
Min.	69.66	100.06	99.28	98.59	98.61	98.32	98.15	97.95	97.65	97.20
Max.	71.72	100.59	100.14	99.73	99.61	99.37	99.33	99.18	98.91	98.61

TM-21 Projection:

Test Duration: 9000 hours

Failures Observed: 0

α: 2.051E-06

β: 1.000

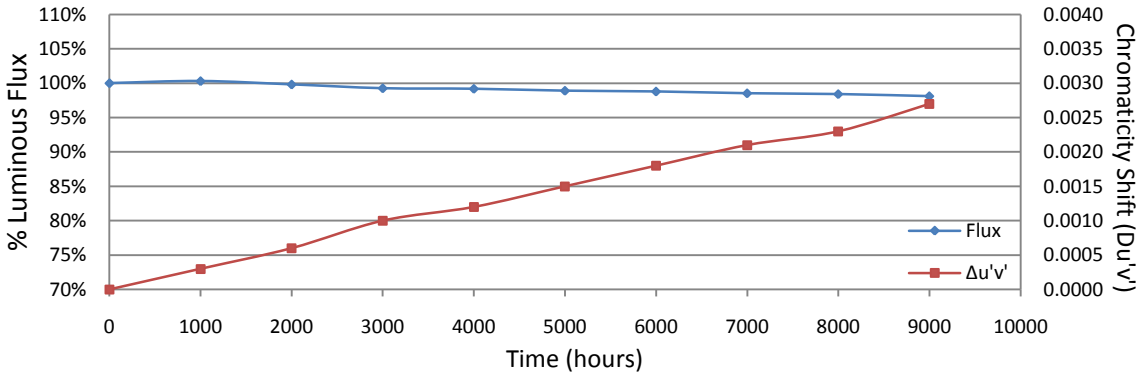
Reported L_{70}: >54000 hours

3.5 Data Set 2, 85°C, 20mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	6.930	6.933	6.943	6.947	6.947	6.966	6.932	6.946	6.940	6.965
27	6.950	6.951	6.965	6.971	6.966	6.988	6.953	6.966	6.961	6.962
28	6.936	6.937	6.950	6.955	6.955	6.969	6.948	6.952	6.946	6.945
29	6.944	6.946	6.958	6.960	6.962	6.973	6.954	6.952	6.950	6.953
30	6.951	6.956	6.967	6.975	6.974	6.988	6.961	6.967	6.964	6.958
31	6.949	6.949	6.957	6.968	6.967	6.981	6.954	6.960	6.958	6.956
32	6.935	6.938	6.950	6.957	6.956	6.968	6.942	6.949	6.947	6.943
33	6.943	6.947	6.954	6.962	6.961	6.979	6.954	6.957	6.956	6.954
34	6.938	6.942	6.952	6.958	6.959	6.969	6.951	6.952	6.947	6.949
35	6.943	6.942	6.959	6.965	6.964	6.975	6.954	6.958	6.951	6.953
36	6.936	6.940	6.949	6.956	6.952	6.967	6.948	6.948	6.947	6.943
37	6.941	6.941	6.949	6.956	6.955	6.967	6.946	6.949	6.949	6.943
38	7.024	6.940	6.948	6.958	6.955	6.962	6.949	6.947	6.947	6.943
39	6.941	6.938	6.951	6.960	6.950	6.962	6.951	6.948	6.944	6.946
40	6.938	6.939	6.952	6.958	6.954	6.967	6.989	6.946	6.945	6.940
41	6.941	6.937	6.953	6.956	6.951	6.968	7.004	6.952	6.948	6.946
42	6.936	6.936	6.947	6.956	6.949	6.965	6.972	6.946	6.941	6.944
43	6.935	6.935	6.950	6.952	6.953	6.962	6.940	6.946	6.950	6.942
44	6.945	6.946	6.957	6.963	6.960	6.971	6.951	6.953	6.951	6.950
45	6.943	6.943	6.952	6.955	6.952	6.968	8.005	6.953	6.947	6.944
46	6.937	6.936	6.947	6.955	6.952	6.963	6.997	6.946	6.946	6.943
47	6.942	6.944	6.951	6.956	6.952	6.967	6.844	6.961	6.959	6.953
48	6.950	6.947	6.962	6.962	6.963	6.970	6.958	6.958	7.448	6.952
49	6.945	6.944	6.956	6.964	6.957	6.973	6.955	6.960	6.956	6.950
50	6.943	6.939	6.955	6.956	6.951	6.968	6.945	6.953	6.947	6.943
Ave.	6.945	6.942	6.953	6.959	6.957	6.970	6.994	6.953	6.970	6.949
Med.	6.942	6.941	6.952	6.958	6.955	6.968	6.953	6.952	6.948	6.946
st dev	0.017	0.006	0.006	0.006	0.007	0.007	0.212	0.006	0.100	0.007
Min.	6.930	6.933	6.943	6.947	6.947	6.962	6.844	6.946	6.940	6.940
Max.	7.024	6.956	6.967	6.975	6.974	6.988	8.005	6.967	7.448	6.965

3.6 Data Set 2, 85°C, 20mA (Chromaticity Shift)

No.	u'	v'	λ_d (nm)	Chromaticity Shift (Δu'v')								
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	0.1899	0.3904	471.7	0.0000	0.0005	0.0010	0.0012	0.0015	0.0019	0.0021	0.0023	0.0025
27	0.1937	0.3834	469.1	0.0000	0.0004	0.0004	0.0008	0.0010	0.0011	0.0016	0.0019	0.0024
28	0.1901	0.3904	471.6	0.0004	0.0006	0.0006	0.0009	0.0013	0.0012	0.0012	0.0013	0.0019
29	0.1917	0.3880	470.6	0.0002	0.0006	0.0009	0.0013	0.0014	0.0010	0.0013	0.0016	0.0022
30	0.1913	0.3915	471.1	0.0003	0.0006	0.0007	0.0010	0.0013	0.0016	0.0021	0.0018	0.0020
31	0.1909	0.3876	470.9	0.0001	0.0006	0.0005	0.0007	0.0011	0.0013	0.0018	0.0022	0.0027
32	0.1919	0.3881	470.5	0.0003	0.0007	0.0010	0.0012	0.0014	0.0016	0.0021	0.0025	0.0031
33	0.1911	0.3895	471.0	0.0000	0.0008	0.0008	0.0010	0.0014	0.0014	0.0019	0.0022	0.0027
34	0.1906	0.3904	471.4	0.0001	0.0008	0.0006	0.0009	0.0013	0.0014	0.0020	0.0022	0.0026
35	0.1900	0.3906	471.7	0.0006	0.0008	0.0014	0.0016	0.0017	0.0021	0.0026	0.0029	0.0034
36	0.1893	0.3911	472.0	0.0001	0.0005	0.0008	0.0012	0.0014	0.0016	0.0020	0.0024	0.0028
37	0.1905	0.3863	471.0	0.0002	0.0004	0.0007	0.0011	0.0013	0.0016	0.0019	0.0023	0.0029
38	0.1899	0.3912	471.8	0.0003	0.0005	0.0007	0.0010	0.0015	0.0015	0.0023	0.0026	0.0030
39	0.1896	0.3914	471.9	0.0004	0.0006	0.0009	0.0012	0.0017	0.0017	0.0021	0.0025	0.0027
40	0.1904	0.3931	471.8	0.0007	0.0008	0.0013	0.0021	0.0022	0.0018	0.0013	0.0013	0.0012
41	0.1906	0.3940	471.8	0.0003	0.0006	0.0016	0.0013	0.0016	0.0019	0.0023	0.0026	0.0030
42	0.1908	0.3878	471.0	0.0004	0.0007	0.0015	0.0015	0.0017	0.0022	0.0025	0.0027	0.0034
43	0.1901	0.3929	471.9	0.0002	0.0006	0.0011	0.0012	0.0016	0.0017	0.0020	0.0023	0.0027
44	0.1906	0.3892	471.2	0.0005	0.0005	0.0014	0.0015	0.0016	0.0019	0.0022	0.0025	0.0029
45	0.1912	0.3903	471.1	0.0005	0.0006	0.0013	0.0013	0.0017	0.0019	0.0022	0.0023	0.0029
46	0.1904	0.3891	471.3	0.0001	0.0005	0.0011	0.0011	0.0016	0.0020	0.0021	0.0024	0.0026
47	0.1906	0.3895	471.3	0.0004	0.0006	0.0013	0.0012	0.0017	0.0043	0.0039	0.0040	0.0032
48	0.1934	0.3849	469.4	0.0002	0.0005	0.0014	0.0013	0.0017	0.0018	0.0023	0.0027	0.0033
49	0.1913	0.3878	470.8	0.0006	0.0007	0.0014	0.0013	0.0018	0.0021	0.0023	0.0027	0.0031
50	0.1906	0.3904	471.3	0.0004	0.0007	0.0015	0.0014	0.0017	0.0017	0.0019	0.0022	0.0028
Ave.	0.1908	0.3896	471.2	0.0003	0.0006	0.0010	0.0012	0.0015	0.0018	0.0021	0.0023	0.0027
Med.	0.1906	0.3903	471.3	0.0003	0.0006	0.0010	0.0012	0.0016	0.0017	0.0021	0.0023	0.0028
st dev	0.0010	0.0025	0.7	0.0002	0.0001	0.0004	0.0003	0.0003	0.0006	0.0005	0.0005	0.0005
Min.	0.1893	0.3834	469.1	0.0000	0.0004	0.0004	0.0007	0.0010	0.0010	0.0012	0.0013	0.0012
Max.	0.1937	0.3940	472.0	0.0007	0.0008	0.0016	0.0021	0.0022	0.0043	0.0039	0.0040	0.0034



3.7 Data Set 3, 105°C, 20mA (Radiant Flux Maintenance)

No.	Φ_e (mW)	Radiant Flux Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
51	71.12	100.44	100.01	99.37	99.34	99.14	98.83	98.48	98.41	98.26
52	70.14	100.33	99.86	99.42	99.22	98.77	98.57	98.22	98.15	97.69
53	69.02	100.38	99.70	99.16	99.00	98.75	98.54	98.35	98.32	97.86
54	70.53	100.17	99.66	99.11	99.11	98.81	98.65	98.28	98.11	97.70
55	70.54	100.14	99.73	99.35	99.22	98.91	98.65	98.55	98.47	98.17
56	71.18	99.99	99.40	98.96	98.78	98.67	98.52	98.08	98.02	97.56
57	69.90	100.07	99.48	99.08	98.97	98.70	98.43	98.18	98.11	98.10
58	69.52	100.23	99.76	99.08	98.88	98.65	98.50	98.10	97.89	97.57
59	70.91	100.06	99.66	98.94	98.72	98.55	98.27	97.90	97.66	97.49
60	71.00	100.04	99.58	98.86	98.75	98.58	98.18	97.72	97.35	97.00
61	70.80	100.14	99.62	99.00	98.84	98.76	98.32	97.85	97.81	97.39
62	70.39	100.03	99.55	99.13	99.06	98.82	98.51	98.05	97.85	97.34
63	70.01	100.40	99.90	99.59	99.36	99.16	98.80	98.36	98.30	97.81
64	70.10	100.19	99.56	99.39	99.04	98.77	98.54	98.19	98.15	97.79
65	70.26	100.58	99.96	99.56	99.30	99.12	99.07	98.59	98.41	98.22
66	70.44	100.24	99.70	99.36	99.03	98.86	98.74	98.38	98.31	97.98
67	70.97	100.01	99.56	99.25	98.80	98.80	98.80	98.45	98.45	97.96
68	70.79	100.21	99.62	99.22	98.98	98.83	98.67	98.23	98.18	98.01
69	70.03	100.34	100.01	99.57	99.34	99.04	98.71	98.36	98.13	97.69
70	69.77	100.32	99.91	99.50	99.38	99.04	98.97	98.55	98.34	97.76
71	70.30	100.43	99.72	99.32	99.16	99.09	98.88	98.58	98.29	97.85
72	71.05	100.51	99.77	99.49	99.45	99.31	99.13	98.73	98.54	98.17
73	69.49	100.47	99.77	99.47	99.27	98.96	98.73	98.16	97.86	97.47
74	70.27	100.40	100.23	99.62	99.27	98.86	98.73	98.15	98.01	97.45
75	70.78	100.34	99.96	99.36	99.03	98.74	98.25	98.02	97.94	97.74
Ave.	70.37	100.26	99.75	99.29	99.09	98.87	98.64	98.26	98.12	97.76
Med.	70.39	100.24	99.72	99.35	99.06	98.82	98.65	98.23	98.15	97.76
st dev	0.56	0.1711	0.1949	0.2213	0.2190	0.1951	0.2447	0.2515	0.2821	0.3108
Min.	69.02	99.99	99.40	98.86	98.72	98.55	98.18	97.72	97.35	97.00
Max.	71.18	100.58	100.23	99.62	99.45	99.31	99.13	98.73	98.54	98.26

TM-21 Projection:

Test Duration: 9000 hours

Failures Observed: 0

α: 2.693E-06

β: 1.002

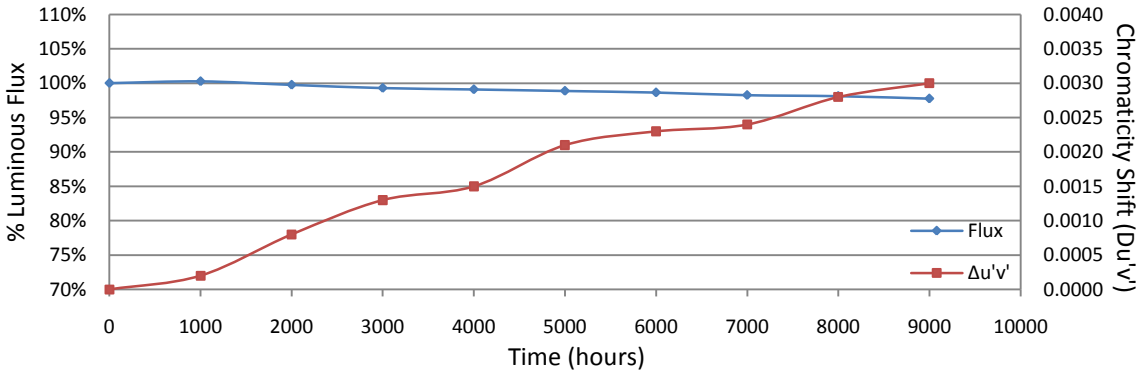
Reported L_{70}: >54000 hours

3.8 Data Set 3, 105°C, 20mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
51	6.943	6.948	6.958	6.959	6.962	6.975	6.964	6.959	6.957	6.955
52	6.943	6.949	6.960	6.962	6.960	6.971	6.961	6.956	6.953	6.951
53	6.963	6.938	6.949	6.952	6.946	6.960	6.947	6.946	6.939	6.943
54	6.943	6.946	6.954	6.956	6.959	6.971	7.008	6.951	6.960	6.952
55	6.944	6.946	6.963	6.963	6.962	6.976	6.953	6.959	7.351	6.955
56	6.945	6.952	6.961	6.960	6.963	6.968	6.959	6.956	6.960	6.953
57	6.950	6.947	6.961	6.961	6.961	6.971	6.963	6.961	6.961	6.952
58	6.940	6.942	6.954	6.955	6.954	6.980	6.950	6.951	6.950	6.943
59	6.949	6.949	6.958	6.963	6.960	6.969	6.961	6.956	6.959	6.950
60	6.951	6.952	6.969	6.964	6.964	6.976	6.964	6.966	6.962	6.957
61	6.936	6.936	6.949	6.948	6.952	6.959	7.025	6.950	6.947	6.944
62	6.948	6.944	6.961	6.962	6.962	6.965	7.132	6.959	6.956	6.950
63	6.939	6.943	6.955	6.956	6.956	6.963	6.954	6.950	6.947	6.944
64	6.948	6.943	6.955	6.957	6.956	6.967	7.058	6.956	6.951	6.949
65	6.958	6.954	6.965	6.962	6.967	6.972	7.960	6.965	6.958	6.956
66	6.968	6.930	6.944	6.943	6.950	6.953	6.945	6.944	6.941	6.936
67	6.941	6.937	6.950	6.944	6.954	6.954	6.947	6.950	7.823	6.940
68	6.944	6.939	6.954	6.950	6.956	6.962	6.975	6.958	6.951	6.949
69	6.960	6.962	6.969	6.969	6.974	6.981	6.971	6.969	6.969	6.967
70	6.947	6.946	6.957	6.957	6.954	6.965	6.952	6.955	6.966	6.946
71	6.943	6.938	6.954	6.950	6.954	6.962	6.952	6.954	6.950	6.946
72	6.962	6.962	7.018	6.972	6.974	6.979	7.040	6.973	6.968	6.962
73	6.948	6.945	6.957	6.961	6.961	6.970	6.958	6.958	6.956	6.952
74	6.943	6.943	6.953	6.957	6.953	6.963	6.950	6.952	6.950	6.946
75	6.941	6.941	6.954	6.955	6.956	6.964	6.954	6.953	6.950	6.943
Ave.	6.948	6.945	6.959	6.958	6.959	6.968	7.016	6.956	7.005	6.950
Med.	6.945	6.945	6.957	6.957	6.959	6.968	6.961	6.956	6.956	6.950
st dev	0.008	0.007	0.014	0.007	0.007	0.008	0.202	0.007	0.188	0.007
Min.	6.936	6.930	6.944	6.943	6.946	6.953	6.945	6.944	6.939	6.936
Max.	6.968	6.962	7.018	6.972	6.974	6.981	7.960	6.973	7.823	6.967

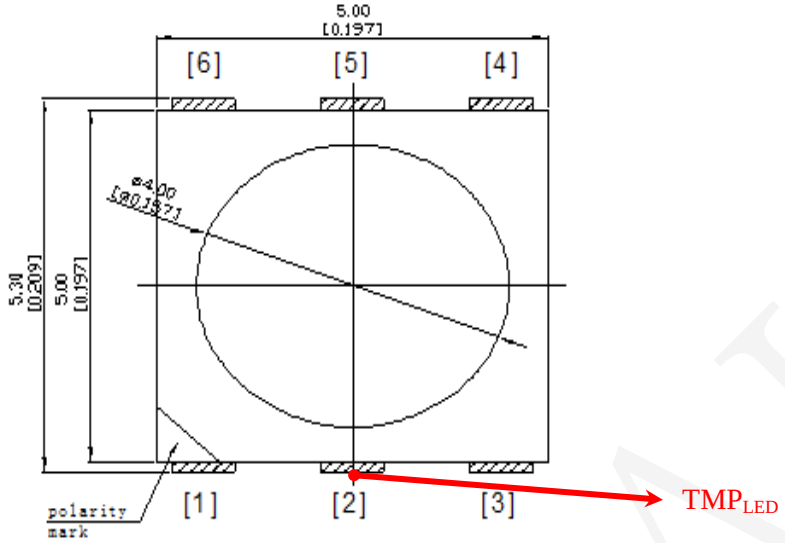
3.9 Data Set 3, 105°C, 20mA (Chromaticity Shift)

No.	u'	v'	λ_d (nm)	Chromaticity Shift (Δu'v')								
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
51	0.1918	0.3861	470.3	0.0003	0.0008	0.0016	0.0018	0.0022	0.0021	0.0029	0.0028	0.0031
52	0.1911	0.3901	471.1	0.0002	0.0007	0.0013	0.0014	0.0017	0.0017	0.0023	0.0025	0.0025
53	0.1912	0.3889	470.9	0.0002	0.0005	0.0012	0.0013	0.0018	0.0024	0.0025	0.0025	0.0028
54	0.1925	0.3872	470.1	0.0005	0.0006	0.0013	0.0014	0.0018	0.0016	0.0023	0.0026	0.0033
55	0.1912	0.3879	470.8	0.0002	0.0009	0.0015	0.0017	0.0021	0.0020	0.0023	0.0028	0.0033
56	0.1913	0.3864	470.6	0.0001	0.0007	0.0013	0.0014	0.0020	0.0014	0.0016	0.0019	0.0028
57	0.1929	0.3856	469.7	0.0001	0.0009	0.0015	0.0016	0.0024	0.0026	0.0027	0.0026	0.0033
58	0.1919	0.3868	470.3	0.0003	0.0007	0.0014	0.0015	0.0019	0.0024	0.0025	0.0028	0.0026
59	0.1921	0.3869	470.3	0.0003	0.0009	0.0014	0.0016	0.0021	0.0023	0.0027	0.0029	0.0031
60	0.1918	0.3861	470.3	0.0001	0.0010	0.0014	0.0015	0.0023	0.0024	0.0025	0.0027	0.0028
61	0.1901	0.3880	471.3	0.0000	0.0007	0.0013	0.0015	0.0022	0.0024	0.0023	0.0028	0.0028
62	0.1919	0.3869	470.4	0.0001	0.0009	0.0012	0.0015	0.0021	0.0024	0.0024	0.0027	0.0028
63	0.1918	0.3887	470.6	0.0004	0.0009	0.0013	0.0015	0.0022	0.0024	0.0025	0.0028	0.0032
64	0.1928	0.3874	470.0	0.0002	0.0008	0.0013	0.0015	0.0020	0.0022	0.0023	0.0027	0.0029
65	0.1906	0.3900	471.3	0.0004	0.0010	0.0014	0.0015	0.0021	0.0025	0.0025	0.0028	0.0030
66	0.1909	0.3904	471.2	0.0003	0.0009	0.0013	0.0013	0.0021	0.0025	0.0024	0.0027	0.0029
67	0.1910	0.3879	470.9	0.0001	0.0009	0.0012	0.0012	0.0020	0.0023	0.0024	0.0029	0.0029
68	0.1900	0.3922	471.8	0.0002	0.0009	0.0013	0.0013	0.0020	0.0022	0.0023	0.0027	0.0029
69	0.1940	0.3839	469.0	0.0000	0.0008	0.0011	0.0014	0.0020	0.0022	0.0023	0.0026	0.0029
70	0.1934	0.3856	469.5	0.0007	0.0014	0.0017	0.0020	0.0026	0.0029	0.0031	0.0034	0.0034
71	0.1906	0.3900	471.3	0.0001	0.0008	0.0012	0.0015	0.0021	0.0024	0.0025	0.0028	0.0029
72	0.1926	0.3861	470.0	0.0003	0.0008	0.0012	0.0015	0.0021	0.0025	0.0026	0.0030	0.0034
73	0.1936	0.3841	469.2	0.0002	0.0008	0.0010	0.0014	0.0019	0.0024	0.0024	0.0030	0.0031
74	0.1921	0.3886	470.5	0.0002	0.0011	0.0012	0.0016	0.0019	0.0024	0.0025	0.0031	0.0031
75	0.1903	0.3897	471.4	0.0004	0.0006	0.0010	0.0014	0.0018	0.0019	0.0022	0.0031	0.0034
Ave.	0.1917	0.3877	470.5	0.0002	0.0008	0.0013	0.0015	0.0021	0.0023	0.0024	0.0028	0.0030
Med.	0.1918	0.3874	470.5	0.0002	0.0008	0.0013	0.0015	0.0021	0.0024	0.0024	0.0028	0.0029
st dev	0.0011	0.0020	0.7	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0002
Min.	0.1900	0.3839	469.0	0.0000	0.0005	0.0010	0.0012	0.0017	0.0014	0.0016	0.0019	0.0025
Max.	0.1940	0.3922	471.8	0.0007	0.0014	0.0017	0.0020	0.0026	0.0029	0.0031	0.0034	0.0034



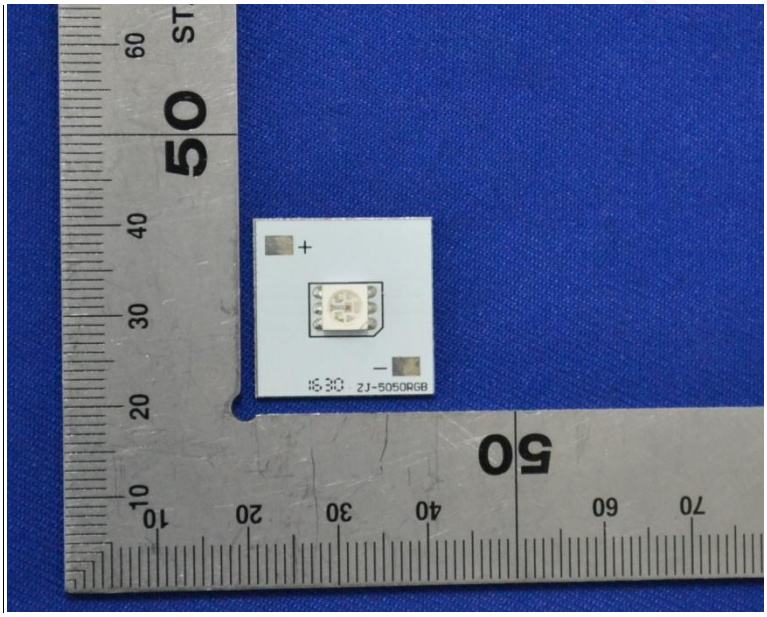
4 - EUT Photo

4.1 Mechanical Dimensions



All dimensions are in millimeter

4.2 EUT Photo



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