TEST REPORT

According to ANSI/IES LM-80-15
For

EBRIGHT SHENZHEN OPTO-ELECTRONIC CO.,LTD

Area C 10th floor 1st building 7th industrial park gongming street yulv community Guangming district shenzhen city

Model: ET3030RDC2LVC-0

Report Type: 15000 Hours Test Report	**Product Type:** LED Package
Reviewed By:	Pote Wang
Report Number:	SZ2200706-68598E-10-15000
Test Date:	2020-07-08 to 2022-03-25
Report Date:	2022-10-25
Approved by:	Blake Zhang / EE Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 5/F(B-West) -7/F, the 3rd Phase of Wan Li Industrial Building D, Shihua Road, Futian Free Trade Zone Shenzhen, Guangdong, China. Tel: +86-755-33320018 Fax: +86-755-33320008
Test Facility:	Test facility was located at No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China.

TABLE OF CONTENTS

1 - General Information 3
1.1 Description of LED Light Sources# 3
1.2 Standards and Reference Documentations 3
1.3 Testing Equipment 4
1.4 Drive Level 4
1.5 Ambient Conditions for Maintenance Test 4
1.6 Photometric Measurement Method and Uncertainty 4
1.7 Statement of Traceability 4
1.8 Sample Set 5

2 - Summary of Test Result 6

3 - Test Data 8
3.1 Data Set 1, 85°C, 200mA (Lumen Maintenance) 8
3.2 Data Set 1, 85°C, 200mA (400-700nm Photon Flux Maintenance) 10
3.3 Data Set 1, 85°C, 200mA (Chromaticity Shift) 12
3.4 Data Set 1, 85°C, 200mA (Forward Voltage) 14
3.5 Data Set 1, 85°C, 200mA (Wavelength) 16
3.6 Data Set 2, 105°C, 200mA (Lumen Maintenance) 18
3.7 Data Set 2, 105°C, 200mA (400-700nm Photon Flux Maintenance) 20
3.8 Data Set 2, 105°C, 200mA (Chromaticity Shift) 22
3.9 Data Set 2, 105°C, 200mA (Forward Voltage) 24
3.10 Data Set 2, 105°C, 200mA (Wavelength) 26

4 - DUT Photo 28
4.1 Mechanical Dimensions 28
4.2 DUT Photo 28

Directions 29

1 - General Information

1.1 Description of LED Light Sources#

Sample Size:

50 PCS test samples were in good condition and received on 2020-07-06. The samples were numbered from 1 to 25 and 26 to 50.

Manufacturer:	EBRIGHT SHENZHEN OPTO-ELECTRONIC CO.,LTD
Part Number:	ET3030RDC2LVC-0
Part Type:	LED Package
Drive Level:	DC 200mA
Nominal CCT:	2700K
Power:	1.2W
Average Current Density per LED die:	1187.74 mA/mm^2
Average Power Density per LED die:	3.5 W/mm^2
CRI:	70
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)	CCT (K)	Series	Parallel	Current Density per LED die (mA/mm^2)	Power Density per PCB (W/mm^2)	Die Spacing (mm)
ET3030RDC2LVC-0	200	1.2	2700	2	1	1187.74	0.133	0.15
ET3030XDC2LXX-X	200	1.2	2200-6500	2	1	1187.74	0.133	0.15
ET3030XDD2LXX-X	200	1.2	2200-6500	2	1	1107.15	0.133	0.15
ET3030XDE2LXX-X	200	1.2	2200-6500	2	1	1033.34	0.133	0.15
ET3030XDF2LXX-X	200	1.2	2200-6500	2	1	833.34	0.133	0.15
ET3030XDG2LXX-X	200	1.2	2200-6500	2	1	794.87	0.133	0.15
ET3030XDH2LXX-X	200	1.2	2200-6500	2	1	688.89	0.133	0.15
ET3030XDJ2LXX-X	200	1.2	2200-6500	2	1	536.33	0.133	0.15
ET3030XDK2LXX-X	200	1.2	2200-6500	2	1	442.86	0.133	0.15
ET3030XDL2LXX-X	200	1.2	2200-6500	2	1	402.60	0.133	0.15
ET3030XDM2LXX-X	200	1.2	2200-6500	2	1	374.40	0.133	0.15
ET3030XDN2LXX-X	200	1.2	2200-6500	2	1	344.45	0.133	0.15
ET3030XDP2LXX-X	200	1.2	2200-6500	2	1	349.10	0.133	0.15

Note:
X1=internal code, it can be 0 to 9，or A to Z.
X2=internal code, it can be 0 to 9，or A to Z.
X3X4= CCT;
X5=internal code, it can be 0 to 9，or A to Z.

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 (This standard was not accredited by NVLAP)
- *ANSI/ASABE S640 JUL2017 Quantities and Units of Electromagnetic Radiation for Plants (Photosynthetic Organisms) (This standard was not accredited by NVLAP)
- *ANSI/ASABE S642 SEP2018: Recommended Methods for Measurement and Testing of LED Products for Plant Growth and Development (This standard was not accredited by NVLAP)

1.3 Testing Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
High Accuracy Array Spectroradiometer	EVERFINE	HAAS 2000	P600674CM5391140	2022-09-27	2023-09-26
0.5M Integrating Sphere	EVERFINE	0.5m	NA	2022-09-27	2023-09-26
LED Test Source	EVERFINE	LTS-300	P185616CJ1391143	2022-01-05	2023-01-04
Standard Light Source	EVERFINE	D062	1011093	2021-10-15	2023-10-14
Multilayer aging machine	BACL	B2-270	20015	2022-01-04	2023-01-03
DC Power Supply	BACL	B12001-12	90023	2022-01-04	2023-01-03

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 Photometric Measurement Method and Uncertainty

Integrating sphere and spectroradiometer is used to measure spectral power distribution and photon flux. 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.

1.7 Statement of Traceability

Bay Area Compliance Laboratories Corp. (Shenzhen) 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, 200mA

Part Number:	ET3030RDC2LVC-0
Number of Units:	25
Case Temperature:	>83°C
Ambient Temperature:	>80°C
Life Test Drive Current:	200mA
Measurement Current:	200mA

Data Set 2: 105°C, 200mA

Part Number:	ET3030RDC2LVC-0
Number of Units:	25
Case Temperature:	>103°C
Ambient Temperature:	>100°C
Life Test Drive Current:	200mA
Measurement Current:	200mA

2 - Summary of Test Result

Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration	α	β	Reported TM-21 L_{70} Lifetime	Reported TM-21 L_{90} Lifetime
1	25	0	1000hrs	15000hrs	2.397E-06	1.003	>90000 hours	45,000 hours
2	25	0	1000hrs	15000hrs	2.577E-06	1.001	>90000 hours	41,000 hours

Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration	α	β	Reported TM-21 Q_{70} Lifetime	Reported TM-21 Q_{90} Lifetime
1	25	0	1000hrs	15000hrs	2.307E-06	1.003	>90000 hours	47,000 hours
2	25	0	1000hrs	15000hrs	2.393E-06	1.003	>90000 hours	45,000 hours

Average Lumen Maintenance (Percentage of Initial Luminous Flux)

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	100.03%	99.80%	99.55%	99.31%	99.08%	98.87%	98.63%	98.40%	98.17%
2	99.98%	99.70%	99.41%	99.11%	98.83%	98.52%	98.26%	98.02%	97.78%

Data Set:	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
1	97.94%	97.71%	97.48%	97.23%	96.99%	96.76%
2	97.54%	97.28%	97.02%	96.77%	96.52%	96.26%

Average Photon Flux Maintenance, Photosynthetic 400-700nm (PFM_P) (Percentage of Initial)

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	100.25%	99.87%	99.62%	99.34%	99.15%	99.00%	98.74%	98.50%	98.27%
2	100.11%	99.75%	99.51%	99.25%	99.04%	98.86%	98.62%	98.44%	98.13%

Data Set:	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
1	98.04%	97.82%	97.63%	97.35%	97.11%	96.96%
2	97.91%	97.69%	97.45%	97.22%	96.99%	96.77%

Average Chromaticity Shift

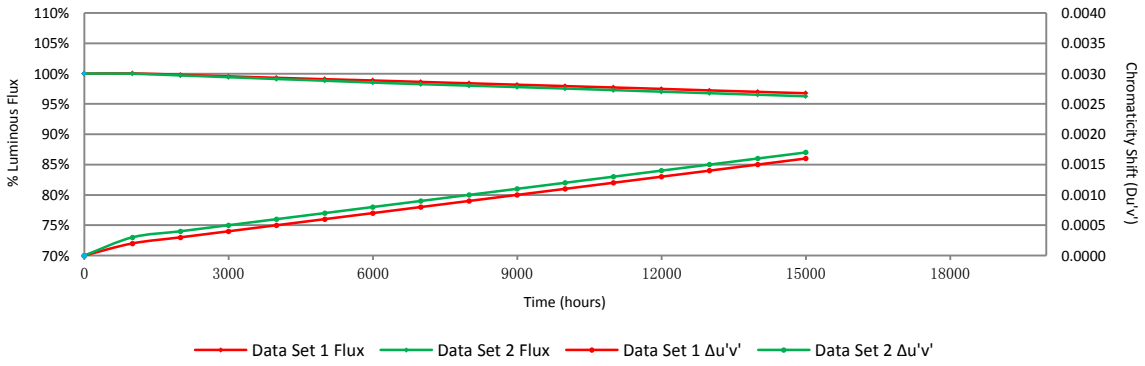
Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.001
2	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.001	0.0011

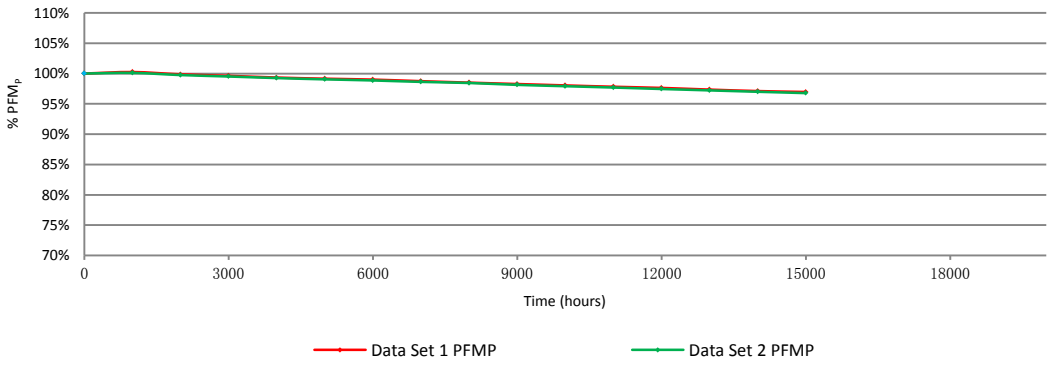
Data Set:	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
1	0.0011	0.0012	0.0013	0.0014	0.0015	0.0016
2	0.0012	0.0013	0.0014	0.0015	0.0016	0.0017

Average Wavelength

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	597.0	597.1	597.4	597.7	597.6	597.8	597.4	598.0	598.2
2	597.1	597.5	597.2	597.4	597.6	597.3	597.4	597.5	598.0

Data Set:	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
1	598.1	598.1	598.3	598.1	598.2	598.3
2	598.1	598.2	598.3	598.3	598.2	598.1





3 - Test Data

3.1 Data Set 1, 85°C, 200mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	204.72	99.98	99.74	99.39	99.00	98.65	98.48	98.23	98.12	98.04
2	211.13	100.05	99.81	99.71	99.35	99.09	98.83	98.55	98.32	98.13
3	204.19	100.05	99.84	99.62	99.31	99.23	99.03	98.93	98.85	98.54
4	210.16	100.01	99.94	99.63	99.52	99.21	99.10	99.02	98.88	98.74
5	203.57	100.05	99.79	99.42	99.22	99.10	99.01	98.76	98.59	98.24
6	205.38	100.01	99.81	99.57	99.18	99.01	98.77	98.40	98.12	97.94
7	203.53	100.02	99.71	99.59	99.30	99.04	98.91	98.54	98.36	98.10
8	207.20	100.02	99.84	99.50	99.11	98.92	98.76	98.51	98.42	98.16
9	206.15	99.96	99.75	99.67	99.48	99.23	99.10	98.82	98.60	98.26
10	207.50	100.01	99.88	99.61	99.22	99.08	98.82	98.55	98.19	98.08
11	210.49	100.06	99.89	99.57	99.37	99.14	98.76	98.55	98.21	97.87
12	202.88	99.97	99.71	99.33	99.21	99.02	98.77	98.60	98.25	98.16
13	210.11	100.02	99.77	99.55	99.41	99.05	98.76	98.56	98.27	98.14
14	205.25	100.03	99.70	99.47	99.36	99.18	98.98	98.60	98.52	98.20
15	209.84	100.05	99.73	99.65	99.58	99.42	99.18	98.88	98.56	98.28
16	207.21	99.99	99.73	99.44	99.12	98.85	98.53	98.22	97.99	97.72
17	205.38	100.02	99.68	99.29	99.03	98.87	98.78	98.69	98.33	97.96
18	209.85	100.08	99.76	99.44	99.13	99.02	98.69	98.40	98.26	97.88
19	203.03	99.99	99.66	99.34	99.07	98.81	98.70	98.47	98.17	98.02
20	205.74	100.03	99.95	99.70	99.48	99.14	98.90	98.69	98.41	98.33
21	208.07	100.10	99.83	99.64	99.54	99.32	99.16	99.00	98.71	98.33
22	209.80	100.10	99.98	99.72	99.59	99.39	99.04	98.89	98.75	98.40
23	206.49	100.06	99.77	99.52	99.17	98.92	98.71	98.47	98.24	98.12
24	206.71	100.09	99.79	99.58	99.50	99.11	98.84	98.62	98.38	98.07
25	206.55	100.08	99.85	99.75	99.52	99.26	99.16	98.83	98.53	98.45
Avg.	206.84	100.03	99.80	99.55	99.31	99.08	98.87	98.63	98.40	98.17
Med.	206.55	100.03	99.79	99.57	99.31	99.09	98.83	98.60	98.36	98.14
st dev	2.54	0.04	0.09	0.13	0.18	0.18	0.19	0.22	0.24	0.22
Min.	202.88	99.96	99.66	99.29	99.00	98.65	98.48	98.22	97.99	97.72
Max.	211.13	100.10	99.98	99.75	99.59	99.42	99.18	99.02	98.88	98.74

No.	Lumen Maintenance (%)					
	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
1	97.87	97.48	97.37	97.18	97.02	96.89
2	97.79	97.43	97.11	96.85	96.50	96.22
3	98.47	98.11	97.85	97.52	97.21	96.98
4	98.47	98.11	97.74	97.44	97.11	96.75
5	98.03	97.72	97.52	97.28	97.15	96.96
6	97.61	97.39	97.31	97.20	96.95	96.58
7	97.79	97.66	97.39	97.16	96.97	96.82
8	98.06	97.74	97.52	97.20	96.87	96.53
9	98.00	97.92	97.81	97.58	97.44	97.28
10	97.89	97.77	97.55	97.35	97.21	97.01
11	97.56	97.23	96.86	96.60	96.32	96.10
12	98.08	97.75	97.53	97.28	97.10	96.84
13	97.80	97.39	97.12	96.76	96.40	96.02
14	98.05	97.97	97.75	97.56	97.17	96.92
15	98.14	98.05	97.69	97.47	97.24	97.10
16	97.50	97.24	97.03	96.77	96.50	96.30
17	97.73	97.65	97.52	97.19	97.08	96.97
18	97.61	97.33	96.98	96.74	96.54	96.28
19	97.83	97.68	97.57	97.39	97.26	97.11
20	98.08	97.96	97.69	97.50	97.29	97.06
21	98.08	97.93	97.80	97.55	97.26	97.06
22	98.07	97.80	97.45	97.14	96.82	96.52
23	97.93	97.66	97.53	97.22	96.88	96.67
24	97.84	97.66	97.42	97.18	96.85	96.58
25	98.17	98.00	97.82	97.66	97.56	97.33
Avg.	97.94	97.71	97.48	97.23	96.99	96.76
Med.	97.93	97.72	97.52	97.22	97.08	96.84
st dev	0.25	0.27	0.28	0.29	0.33	0.36
Min.	97.50	97.23	96.86	96.60	96.32	96.02
Max.	98.47	98.11	97.85	97.66	97.56	97.33

3.2 Data Set 1, 85°C, 200mA (400-700nm Photon Flux Maintenance)

No.	Φ_p (μmol × s^{-1})	400-700nm Photon Flux Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	2.7470	100.87	100.55	100.18	99.78	99.27	99.34	98.91	98.94	98.80
2	2.8310	100.21	99.82	99.72	99.36	99.29	99.15	98.83	98.76	98.59
3	2.7580	100.22	99.85	99.67	99.31	99.27	99.06	98.95	98.84	98.55
4	2.8260	100.21	99.96	99.72	99.50	99.26	99.19	99.04	98.90	98.76
5	2.7490	100.22	99.85	99.45	99.24	99.13	99.09	98.84	98.65	98.25
6	2.7740	100.18	99.86	99.60	99.17	99.06	98.81	98.41	98.16	97.95
7	2.7430	100.18	99.74	99.64	99.27	99.05	98.94	98.54	98.40	98.10
8	2.7850	100.32	99.89	99.57	98.85	98.99	98.85	98.56	98.46	98.17
9	2.7590	100.18	99.82	99.71	99.46	99.28	99.17	98.88	98.66	98.26
10	2.7990	100.25	99.96	99.68	99.25	99.11	98.89	98.61	98.25	97.96
11	2.8280	100.25	99.93	99.61	99.40	99.15	98.83	98.59	98.27	98.09
12	2.7310	100.15	99.78	99.34	99.27	99.08	98.83	98.65	98.28	98.17
13	2.8310	100.21	99.79	99.61	99.43	99.08	98.80	98.62	98.30	98.16
14	2.7590	100.22	99.71	99.49	99.38	99.20	99.06	98.66	98.55	98.19
15	2.8270	100.18	99.75	99.68	99.58	99.47	99.22	98.90	98.59	98.27
16	2.8000	100.21	99.79	99.50	99.14	98.93	98.86	98.54	98.36	98.29
17	2.7700	100.18	99.75	99.35	99.03	98.92	98.84	98.74	98.38	97.98
18	2.8260	100.25	99.79	99.47	99.12	99.04	98.97	98.69	98.30	98.02
19	2.7450	100.15	99.71	99.38	99.09	98.87	98.76	98.51	98.21	98.03
20	2.7740	100.18	99.96	99.71	99.46	99.17	98.92	98.70	98.38	98.31
21	2.8140	100.28	99.89	99.72	99.57	99.36	99.25	99.04	98.76	98.33
22	2.8250	100.25	100.00	99.72	99.58	99.36	99.04	98.87	98.73	98.58
23	2.7630	100.25	99.86	99.60	99.20	98.99	98.81	98.55	98.30	98.15
24	2.7900	100.32	99.89	99.68	99.57	99.21	99.14	98.96	98.75	98.46
25	2.7780	100.25	99.89	99.75	99.50	99.28	99.21	98.81	98.42	98.42
Avg.	2.7853	100.25	99.87	99.62	99.34	99.15	99.00	98.74	98.50	98.27
Med.	2.7780	100.22	99.85	99.64	99.36	99.15	98.97	98.70	98.42	98.25
st dev	0.0330	0.1385	0.1629	0.1698	0.2116	0.1535	0.1726	0.1792	0.2354	0.2395
Min.	2.7310	100.15	99.71	99.34	98.85	98.87	98.76	98.41	98.16	97.95
Max.	2.8310	100.87	100.55	100.18	99.78	99.47	99.34	99.04	98.94	98.80

No.	400-700nm Photon Flux Maintenance (%)					
	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
1	98.62	98.22	98.11	97.60	97.42	97.27
2	98.41	98.16	97.95	97.85	97.70	97.53
3	98.44	98.04	97.79	97.43	97.14	96.92
4	98.48	98.09	97.91	97.66	97.52	97.17
5	98.04	97.71	97.49	97.24	97.09	96.91
6	97.62	97.40	97.26	97.01	96.83	96.50
7	97.78	97.63	97.34	97.05	96.86	96.79
8	98.06	97.74	97.70	97.38	97.06	96.95
9	98.04	97.90	97.79	97.46	97.39	97.25
10	97.57	97.32	97.03	96.82	96.43	96.28
11	97.77	97.67	97.56	97.28	97.10	97.07
12	98.10	97.73	97.55	97.25	97.03	96.81
13	97.99	97.85	97.77	97.49	97.32	97.24
14	98.04	97.93	97.72	97.50	97.10	96.92
15	98.13	98.02	97.67	97.38	97.17	97.06
16	98.18	97.96	97.71	97.54	97.43	97.29
17	97.76	97.62	97.51	97.15	97.04	96.93
18	97.70	97.28	96.96	96.78	96.60	96.50
19	97.85	97.67	97.56	97.34	97.19	97.09
20	98.05	97.91	97.66	97.40	97.19	96.97
21	98.01	97.94	97.73	97.41	96.38	96.52
22	98.16	98.05	97.81	97.49	97.24	97.03
23	97.97	97.65	97.54	97.18	96.82	96.67
24	98.06	97.99	97.89	97.63	97.31	97.06
25	98.13	97.91	97.73	97.55	97.44	97.26
Avg.	98.04	97.82	97.63	97.35	97.11	96.96
Med.	98.04	97.90	97.70	97.40	97.14	96.97
st dev	0.2622	0.2492	0.2667	0.2551	0.3247	0.2952
Min.	97.57	97.28	96.96	96.78	96.38	96.28
Max.	98.62	98.22	98.11	97.85	97.70	97.53

3.3 Data Set 1, 85°C, 200mA (Chromaticity Shift)

No.	u'	v'	Chromaticity Shift (Δu'v')								
	0hr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	0.2633	0.5262	0.0000	0.0005	0.0007	0.0008	0.0009	0.0010	0.0011	0.0012	0.0013
2	0.2629	0.5286	0.0002	0.0002	0.0004	0.0005	0.0006	0.0007	0.0007	0.0008	0.0008
3	0.2640	0.5272	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010	0.0011
4	0.2626	0.5274	0.0002	0.0002	0.0004	0.0005	0.0005	0.0007	0.0007	0.0008	0.0008
5	0.2632	0.5278	0.0002	0.0002	0.0002	0.0004	0.0005	0.0006	0.0007	0.0008	0.0008
6	0.2631	0.5260	0.0003	0.0002	0.0003	0.0005	0.0006	0.0007	0.0008	0.0008	0.0009
7	0.2639	0.5280	0.0003	0.0003	0.0004	0.0006	0.0007	0.0008	0.0009	0.0009	0.0010
8	0.2639	0.5288	0.0003	0.0003	0.0004	0.0005	0.0006	0.0008	0.0009	0.0011	0.0011
9	0.2623	0.5289	0.0002	0.0004	0.0005	0.0005	0.0006	0.0008	0.0008	0.0008	0.0010
10	0.2619	0.5256	0.0003	0.0002	0.0003	0.0005	0.0006	0.0007	0.0008	0.0009	0.0009
11	0.2617	0.5267	0.0002	0.0003	0.0003	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010
12	0.2623	0.5262	0.0002	0.0002	0.0004	0.0005	0.0007	0.0008	0.0009	0.0010	0.0011
13	0.2628	0.5267	0.0002	0.0003	0.0004	0.0004	0.0006	0.0007	0.0008	0.0010	0.0011
14	0.2622	0.5281	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0009	0.0010	0.0010
15	0.2630	0.5269	0.0004	0.0003	0.0004	0.0005	0.0006	0.0008	0.0009	0.0010	0.0011
16	0.2626	0.5256	0.0001	0.0002	0.0002	0.0005	0.0006	0.0007	0.0009	0.0010	0.0010
17	0.2615	0.5250	0.0002	0.0002	0.0004	0.0006	0.0007	0.0008	0.0009	0.0011	0.0011
18	0.2618	0.5259	0.0003	0.0004	0.0005	0.0006	0.0007	0.0007	0.0008	0.0010	0.0010
19	0.2633	0.5272	0.0003	0.0003	0.0005	0.0006	0.0006	0.0007	0.0008	0.0009	0.0010
20	0.2628	0.5262	0.0003	0.0004	0.0005	0.0005	0.0005	0.0007	0.0008	0.0009	0.0010
21	0.2625	0.5255	0.0002	0.0002	0.0003	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010
22	0.2618	0.5263	0.0003	0.0003	0.0004	0.0006	0.0007	0.0007	0.0009	0.0010	0.0011
23	0.2608	0.5273	0.0002	0.0001	0.0004	0.0006	0.0007	0.0008	0.0009	0.0011	0.0012
24	0.2620	0.5258	0.0002	0.0002	0.0002	0.0003	0.0004	0.0005	0.0006	0.0008	0.0009
25	0.2638	0.5284	0.0003	0.0002	0.0004	0.0005	0.0006	0.0008	0.0009	0.0009	0.0010
Avg.	0.2626	0.5269	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010
Med.	0.2626	0.5267	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010
st dev	0.0008	0.0011	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Min.	0.2608	0.5250	0.0000	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0008	0.0008
Max.	0.2640	0.5289	0.0004	0.0005	0.0007	0.0008	0.0009	0.0010	0.0011	0.0012	0.0013

No.	Chromaticity Shift (Δu'v')					
	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
1	0.0015	0.0016	0.0017	0.0018	0.0020	0.0021
2	0.0009	0.0011	0.0012	0.0013	0.0015	0.0017
3	0.0012	0.0013	0.0015	0.0016	0.0017	0.0018
4	0.0010	0.0011	0.0013	0.0014	0.0015	0.0017
5	0.0009	0.0010	0.0012	0.0013	0.0014	0.0016
6	0.0010	0.0011	0.0012	0.0012	0.0014	0.0015
7	0.0011	0.0012	0.0013	0.0013	0.0014	0.0015
8	0.0012	0.0012	0.0014	0.0014	0.0015	0.0016
9	0.0010	0.0011	0.0012	0.0012	0.0013	0.0014
10	0.0011	0.0011	0.0010	0.0011	0.0012	0.0014
11	0.0012	0.0012	0.0013	0.0013	0.0015	0.0016
12	0.0012	0.0013	0.0014	0.0014	0.0015	0.0017
13	0.0012	0.0013	0.0014	0.0014	0.0016	0.0017
14	0.0012	0.0012	0.0013	0.0013	0.0015	0.0016
15	0.0012	0.0014	0.0014	0.0014	0.0015	0.0017
16	0.0011	0.0014	0.0015	0.0015	0.0016	0.0017
17	0.0012	0.0014	0.0014	0.0014	0.0016	0.0016
18	0.0012	0.0013	0.0014	0.0014	0.0015	0.0016
19	0.0011	0.0013	0.0013	0.0013	0.0015	0.0015
20	0.0011	0.0013	0.0013	0.0013	0.0014	0.0015
21	0.0011	0.0012	0.0013	0.0013	0.0014	0.0015
22	0.0013	0.0014	0.0015	0.0015	0.0016	0.0018
23	0.0012	0.0014	0.0014	0.0014	0.0015	0.0017
24	0.0009	0.0011	0.0012	0.0012	0.0013	0.0015
25	0.0011	0.0012	0.0014	0.0014	0.0015	0.0017
Avg.	0.0011	0.0012	0.0013	0.0014	0.0015	0.0016
Med.	0.0011	0.0012	0.0013	0.0014	0.0015	0.0016
st dev	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002
Min.	0.0009	0.0010	0.0010	0.0011	0.0012	0.0014
Max.	0.0015	0.0016	0.0017	0.0018	0.0020	0.0021

3.4 Data Set 1, 85°C, 200mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	6.308	6.305	6.269	6.324	6.271	6.318	6.341	6.269	6.328	6.336
2	6.319	6.253	6.252	6.288	6.276	6.271	6.264	6.338	6.278	6.251
3	6.323	6.320	6.278	6.279	6.318	6.301	6.319	6.325	6.291	6.255
4	6.318	6.271	6.250	6.272	6.325	6.275	6.273	6.252	6.268	6.290
5	6.307	6.293	6.286	6.328	6.272	6.319	6.255	6.263	6.346	6.332
6	6.308	6.281	6.278	6.279	6.319	6.309	6.315	6.348	6.343	6.321
7	6.326	6.286	6.275	6.321	6.329	6.265	6.315	6.283	6.314	6.271
8	6.297	6.299	6.325	6.254	6.326	6.316	6.261	6.282	6.346	6.252
9	6.340	6.344	6.269	6.325	6.270	6.314	6.295	6.274	6.278	6.320
10	6.329	6.298	6.336	6.318	6.264	6.327	6.286	6.274	6.268	6.333
11	6.306	6.347	6.328	6.327	6.321	6.329	6.285	6.273	6.264	6.329
12	6.299	6.354	6.336	6.326	6.286	6.328	6.325	6.253	6.255	6.340
13	6.332	6.280	6.279	6.265	6.275	6.273	6.265	6.270	6.341	6.346
14	6.328	6.328	6.304	6.287	6.277	6.275	6.270	6.250	6.275	6.265
15	6.306	6.278	6.275	6.276	6.273	6.263	6.252	6.302	6.276	6.276
16	6.293	6.324	6.302	6.325	6.263	6.327	6.269	6.255	6.271	6.290
17	6.349	6.306	6.344	6.274	6.328	6.327	6.273	6.282	6.333	6.342
18	6.334	6.255	6.284	6.299	6.271	6.276	6.317	6.298	6.341	6.254
19	6.324	6.355	6.327	6.266	6.327	6.329	6.251	6.270	6.294	6.345
20	6.326	6.282	6.339	6.319	6.313	6.320	6.316	6.323	6.254	6.329
21	6.323	6.262	6.327	6.264	6.309	6.289	6.280	6.342	6.347	6.270
22	6.348	6.260	6.271	6.271	6.325	6.263	6.318	6.328	6.261	6.258
23	6.311	6.329	6.253	6.305	6.328	6.304	6.317	6.326	6.259	6.308
24	6.299	6.273	6.330	6.271	6.272	6.274	6.273	6.346	6.251	6.275
25	6.312	6.265	6.264	6.288	6.272	6.280	6.264	6.326	6.326	6.344
Avg.	6.319	6.298	6.295	6.294	6.296	6.299	6.288	6.294	6.296	6.301
Med.	6.319	6.293	6.284	6.288	6.286	6.304	6.280	6.282	6.278	6.308
st dev	0.015	0.032	0.031	0.025	0.026	0.025	0.027	0.033	0.036	0.036
Min.	6.293	6.253	6.250	6.254	6.263	6.263	6.251	6.250	6.251	6.251
Max.	6.349	6.355	6.344	6.328	6.329	6.329	6.341	6.348	6.347	6.346

No.	Forward Voltage (V)					
	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
1	6.319	6.263	6.227	6.277	6.271	6.265
2	6.274	6.274	6.257	6.254	6.276	6.278
3	6.314	6.278	6.269	6.252	6.271	6.271
4	6.253	6.278	6.274	6.277	6.272	6.274
5	6.314	6.298	6.334	6.271	6.257	6.270
6	6.325	6.278	6.258	6.273	6.277	6.275
7	6.256	6.274	6.327	6.273	6.329	6.296
8	6.259	6.278	6.277	6.276	6.270	6.270
9	6.272	6.275	6.335	6.278	6.276	6.293
10	6.325	6.313	6.274	6.278	6.270	6.276
11	6.278	6.300	6.280	6.272	6.329	6.295
12	6.324	6.273	6.284	6.274	6.282	6.271
13	6.279	6.268	6.277	6.277	6.313	6.274
14	6.280	6.275	6.270	6.276	6.271	6.276
15	6.266	6.276	6.273	6.256	6.273	6.267
16	6.271	6.278	6.251	6.291	6.273	6.276
17	6.324	6.261	6.279	6.275	6.279	6.272
18	6.253	6.275	6.279	6.258	6.264	6.273
19	6.277	6.279	6.329	6.272	6.334	6.286
20	6.278	6.267	6.309	6.279	6.309	6.250
21	6.328	6.311	6.327	6.261	6.274	6.273
22	6.328	6.268	6.275	6.275	6.286	6.273
23	6.263	6.275	6.252	6.261	6.261	6.274
24	6.326	6.313	6.328	6.273	6.285	6.277
25	6.270	6.273	6.272	6.256	6.325	6.271
Avg.	6.290	6.280	6.285	6.271	6.285	6.275
Med.	6.278	6.275	6.277	6.273	6.276	6.274
st dev	0.028	0.015	0.030	0.010	0.023	0.010
Min.	6.253	6.261	6.227	6.252	6.257	6.250
Max.	6.328	6.313	6.335	6.291	6.334	6.296

3.5 Data Set 1, 85°C, 200mA (Wavelength)

No.	Wavelength (nm)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	599.1	597.9	598.0	598.1	598.0	598.4	597.8	598.3	598.1	598.5
2	598.1	595.2	597.9	595.8	597.8	598.0	597.8	595.1	598.0	598.0
3	598.8	597.9	597.7	598.1	598.0	598.1	598.2	597.8	598.3	598.5
4	598.0	595.2	597.8	595.3	598.1	598.1	598.1	598.1	598.2	598.1
5	598.6	597.9	598.0	598.0	598.0	598.3	598.2	597.2	598.2	598.1
6	598.2	595.3	598.0	598.2	598.1	596.3	598.4	598.0	598.1	598.4
7	598.5	598.5	597.3	597.9	598.0	598.0	598.1	598.5	598.0	598.3
8	598.0	597.6	595.2	597.8	598.2	597.9	598.0	598.1	598.1	597.9
9	598.3	597.5	597.7	597.7	597.9	598.3	595.3	597.7	595.3	598.0
10	598.1	595.4	597.8	597.5	597.3	598.0	598.2	598.1	597.9	598.3
11	598.7	598.0	597.6	598.2	595.2	597.8	598.2	597.7	598.1	598.0
12	598.4	598.1	596.6	595.1	598.1	597.9	597.9	598.1	598.1	597.8
13	598.7	598.6	597.7	598.1	597.8	597.8	597.9	598.2	598.0	598.2
14	598.3	597.9	598.0	598.0	598.2	597.9	598.1	595.0	598.1	598.1
15	598.4	597.8	595.3	597.9	595.5	595.3	597.9	598.6	598.0	598.0
16	598.0	597.9	598.0	597.9	598.1	595.2	598.1	597.6	597.9	598.4
17	598.3	595.1	597.8	597.7	598.0	598.2	598.0	595.0	598.0	598.2
18	598.2	597.9	598.1	598.0	597.8	598.0	597.9	597.8	598.8	598.2
19	598.0	597.9	597.9	597.8	597.9	597.7	596.1	598.1	597.9	598.0
20	597.9	595.1	595.1	597.6	597.8	598.0	598.3	595.1	598.0	598.2
21	598.3	597.2	595.3	597.6	598.0	598.0	598.0	595.3	598.0	598.1
22	598.4	595.2	595.5	595.2	598.0	595.4	597.8	597.8	598.1	598.2
23	598.0	595.8	597.0	597.7	597.2	597.8	597.6	598.0	597.8	598.1
24	598.2	597.9	595.1	597.9	597.7	597.9	598.1	597.8	597.9	598.0
25	598.5	595.2	598.0	595.4	597.9	597.9	597.8	598.0	597.9	598.3
Avg.	598.3	597.0	597.1	597.4	597.7	597.6	597.8	597.4	598.0	598.2
Med.	598.3	597.8	597.7	597.8	598.0	597.9	598.0	597.8	598.0	598.1
st dev	0.3	1.3	1.1	1.1	0.7	0.9	0.7	1.2	0.6	0.2
Min.	597.9	595.1	595.1	595.1	595.2	595.2	595.3	595.0	595.3	597.8
Max.	599.1	598.6	598.1	598.2	598.2	598.4	598.4	598.6	598.8	598.5

No.	Wavelength (nm)					
	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
1	598.3	598.3	598.6	598.6	598.0	598.2
2	598.1	598.0	598.2	598.2	598.1	598.5
3	598.0	598.0	598.2	598.2	598.5	598.6
4	597.9	598.0	598.0	598.2	598.0	598.0
5	598.2	598.1	598.2	598.4	598.3	598.6
6	598.0	598.1	598.0	598.0	598.1	598.1
7	598.1	598.0	598.2	598.1	598.5	598.0
8	598.4	598.4	598.1	598.5	598.9	598.4
9	598.4	598.1	598.8	598.3	598.2	598.0
10	598.1	597.9	598.1	598.8	597.9	597.7
11	598.0	598.1	598.4	598.1	598.1	598.3
12	598.4	598.1	598.2	598.4	598.1	598.4
13	598.1	598.5	598.6	595.1	597.9	598.3
14	598.2	598.2	597.9	598.3	598.2	598.1
15	598.0	598.4	597.8	598.2	598.1	598.6
16	598.2	598.1	598.1	598.3	598.2	598.7
17	598.1	597.7	598.2	598.2	598.1	598.0
18	598.3	598.0	598.3	597.8	598.0	598.5
19	598.6	598.2	598.8	598.0	598.1	598.7
20	598.0	598.1	598.5	597.9	598.3	598.1
21	598.1	598.2	598.7	598.2	598.1	598.6
22	598.0	598.0	598.2	597.9	597.9	598.1
23	597.8	598.0	598.1	598.3	597.8	597.8
24	597.9	598.7	598.4	597.8	598.6	598.0
25	598.0	598.1	598.3	598.3	598.3	598.5
Avg.	598.1	598.1	598.3	598.1	598.2	598.3
Med.	598.1	598.1	598.2	598.2	598.1	598.3
st dev	0.2	0.2	0.3	0.7	0.2	0.3
Min.	597.8	597.7	597.8	595.1	597.8	597.7
Max.	598.6	598.7	598.8	598.8	598.9	598.7

3.6 Data Set 2, 105°C, 200mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	206.00	99.95	99.87	99.84	99.71	99.45	99.13	98.88	98.59	98.37
27	204.94	99.95	99.77	99.54	99.34	99.08	98.86	98.58	98.41	98.13
28	208.62	99.95	99.50	99.03	98.72	98.69	98.29	97.95	97.53	97.48
29	204.72	99.72	99.44	99.18	98.93	98.69	98.43	98.21	98.23	97.94
30	209.52	99.97	99.49	99.23	99.04	98.80	98.62	98.33	97.95	97.77
31	207.64	99.84	99.25	98.93	98.36	98.07	97.75	97.69	97.58	97.39
32	206.90	99.79	99.53	99.31	99.05	98.82	98.53	98.21	98.08	97.82
33	206.25	99.76	99.46	99.16	99.03	98.73	98.46	98.16	98.00	97.68
34	208.68	99.95	99.31	99.10	98.79	98.44	98.04	97.57	97.31	97.04
35	208.20	99.89	99.51	99.27	98.91	98.65	98.26	97.96	97.50	97.26
36	210.35	99.92	99.65	99.52	99.26	98.94	98.54	98.09	97.79	97.58
37	203.67	100.05	99.45	99.05	98.86	98.59	98.30	98.07	97.90	97.75
38	205.37	99.84	99.60	99.12	98.75	98.34	98.03	97.87	97.78	97.58
39	208.52	100.03	99.89	99.48	99.20	98.79	98.29	98.10	97.96	97.77
40	208.34	99.77	99.66	99.37	99.25	98.98	98.72	98.51	98.25	98.02
41	204.92	99.89	99.73	99.35	99.06	98.83	98.61	98.45	98.17	97.92
42	207.94	100.08	99.95	99.76	99.60	99.34	99.07	98.83	98.62	98.30
43	205.69	99.86	99.73	99.19	98.85	98.60	98.07	97.69	97.24	97.10
44	203.90	100.18	99.84	99.66	99.00	98.79	98.58	98.28	97.86	97.54
45	206.92	100.13	99.74	99.53	99.08	98.84	98.65	98.52	98.33	98.07
46	208.42	100.33	100.22	99.92	99.68	99.47	99.27	99.03	98.83	98.56
47	200.61	100.02	99.90	99.68	99.25	98.99	98.48	98.03	97.95	97.50
48	206.10	100.21	99.92	99.60	99.19	98.66	98.41	98.22	97.93	97.70
49	206.94	100.26	100.11	99.71	99.50	99.00	98.77	98.57	98.28	97.95
50	209.76	100.21	99.91	99.62	99.43	99.11	98.96	98.71	98.36	98.18
Avg.	206.76	99.98	99.70	99.41	99.11	98.83	98.52	98.26	98.02	97.78
Med.	206.92	99.95	99.73	99.37	99.06	98.80	98.53	98.21	97.96	97.77
st dev	2.24	0.17	0.24	0.28	0.32	0.32	0.36	0.38	0.40	0.38
Min.	200.61	99.72	99.25	98.93	98.36	98.07	97.75	97.57	97.24	97.04
Max.	210.35	100.33	100.22	99.92	99.71	99.47	99.27	99.03	98.83	98.56

No.	Lumen Maintenance (%)					
	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
26	98.08	97.82	97.61	97.38	97.09	96.93
27	98.06	97.83	97.67	97.40	97.26	97.03
28	97.35	97.16	96.75	96.38	95.95	95.56
29	97.74	97.52	97.25	96.98	96.86	96.62
30	97.54	97.29	97.16	96.88	96.60	96.23
31	97.29	97.10	96.91	96.63	96.24	95.92
32	97.37	97.24	96.90	96.54	96.19	95.91
33	97.30	96.92	96.60	96.35	96.14	95.84
34	96.78	96.54	96.12	95.80	95.62	95.35
35	96.99	96.69	96.55	96.42	96.20	96.04
36	97.42	97.13	96.79	96.65	96.49	96.20
37	97.46	97.17	96.93	96.80	96.51	96.17
38	97.36	97.01	96.83	96.64	96.40	96.19
39	97.43	97.24	96.96	96.80	96.55	96.36
40	97.83	97.56	97.24	96.99	96.80	96.60
41	97.67	97.44	97.14	96.92	96.71	96.40
42	98.09	97.85	97.47	97.10	96.84	96.60
43	96.86	96.59	96.38	96.03	95.81	95.65
44	97.21	96.88	96.56	96.27	95.98	95.72
45	97.89	97.60	97.34	97.21	96.87	96.42
46	98.37	98.21	97.99	97.69	97.44	97.09
47	97.31	96.96	96.78	96.51	96.33	96.17
48	97.47	97.23	97.12	96.80	96.56	96.32
49	97.77	97.41	97.12	96.85	96.62	96.39
50	97.83	97.61	97.38	97.11	96.92	96.73
Avg.	97.54	97.28	97.02	96.77	96.52	96.26
Med.	97.46	97.24	96.96	96.80	96.55	96.23
st dev	0.39	0.41	0.43	0.43	0.45	0.45
Min.	96.78	96.54	96.12	95.80	95.62	95.35
Max.	98.37	98.21	97.99	97.69	97.44	97.09

3.7 Data Set 2, 105°C, 200mA (400-700nm Photon Flux Maintenance)

No.	Φ_p (μmol × s^{-1})	400-700nm Photon Flux Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	2.7640	100.04	99.49	99.31	99.10	99.02	98.77	98.55	98.34	98.15
27	2.7660	100.11	99.64	99.35	99.02	98.84	98.59	98.48	98.12	97.87
28	2.8140	100.07	99.75	99.40	99.08	98.79	98.51	98.19	98.12	97.76
29	2.7630	100.14	99.60	99.24	98.99	98.70	98.55	98.34	98.23	98.01
30	2.8250	100.11	99.61	99.50	99.36	99.22	99.04	98.76	98.65	98.44
31	2.8000	100.00	99.68	99.50	99.36	99.21	99.18	98.89	98.71	98.32
32	2.8000	100.18	99.96	99.82	99.54	99.43	99.14	98.89	98.54	98.14
33	2.7680	100.18	99.86	99.60	99.42	99.21	98.99	98.81	98.63	98.41
34	2.8090	100.25	99.79	99.39	99.11	98.83	98.50	98.26	98.11	97.69
35	2.8100	100.18	99.89	99.61	99.40	99.11	98.93	98.68	98.58	98.26
36	2.8240	99.96	99.89	99.68	99.50	99.26	99.22	98.80	98.55	98.30
37	2.7330	100.11	99.89	99.63	99.34	99.12	98.98	98.79	98.61	98.32
38	2.7610	100.14	99.67	99.42	99.28	99.06	98.80	98.41	98.30	97.90
39	2.8140	100.11	99.82	99.47	99.08	98.79	98.58	98.44	98.08	97.76
40	2.8060	100.25	99.89	99.61	99.47	99.29	99.22	98.97	98.72	98.50
41	2.7590	100.07	99.89	99.53	99.13	98.77	98.59	98.44	98.30	98.01
42	2.8170	100.11	99.72	99.65	99.40	99.15	99.04	98.76	98.69	98.33
43	2.7550	100.07	99.78	99.56	99.24	98.98	98.95	98.62	98.26	97.86
44	2.7550	100.15	99.67	99.35	98.98	98.91	98.87	98.69	98.66	98.40
45	2.7970	100.00	99.64	99.54	99.14	98.93	98.53	98.25	98.11	97.78
46	2.8210	100.11	99.61	99.36	99.22	99.04	98.79	98.55	98.37	97.94
47	2.7100	100.11	99.89	99.52	99.15	98.89	98.67	98.38	98.30	97.97
48	2.7900	100.22	99.89	99.68	99.53	99.32	99.18	99.00	98.85	98.64
49	2.7850	100.14	99.71	99.57	99.28	99.03	98.96	98.74	98.60	98.17
50	2.8330	100.00	99.61	99.40	99.22	99.12	98.94	98.73	98.59	98.41
Avg.	2.7872	100.11	99.75	99.51	99.25	99.04	98.86	98.62	98.44	98.13
Med.	2.7970	100.11	99.75	99.52	99.24	99.04	98.93	98.68	98.54	98.15
st dev	0.0320	0.0753	0.1282	0.1381	0.1723	0.1949	0.2410	0.2346	0.2360	0.2709
Min.	2.7100	99.96	99.49	99.24	98.98	98.70	98.50	98.19	98.08	97.69
Max.	2.8330	100.25	99.96	99.82	99.54	99.43	99.22	99.00	98.85	98.64

No.	400-700nm Photon Flux Maintenance (%)					
	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
26	97.97	97.72	97.36	97.07	96.78	96.56
27	97.61	97.22	96.96	96.64	96.38	96.20
28	97.44	97.41	97.12	97.09	96.87	96.55
29	97.72	97.36	97.10	96.71	96.60	96.49
30	98.34	97.95	97.59	97.52	97.45	97.27
31	98.11	98.04	97.75	97.57	97.29	97.25
32	97.93	97.61	97.36	97.14	96.82	96.71
33	98.19	98.09	97.94	97.62	97.36	97.33
34	97.33	97.15	97.05	96.94	96.69	96.55
35	98.19	97.97	97.72	97.51	97.15	96.90
36	98.12	97.84	97.52	97.42	97.06	96.78
37	97.99	97.88	97.69	97.26	97.07	96.82
38	97.61	97.28	96.96	96.78	96.56	96.31
39	97.48	97.30	97.09	96.80	96.70	96.45
40	98.33	98.15	97.86	97.61	97.33	97.18
41	97.86	97.68	97.50	97.17	96.99	96.77
42	98.19	97.94	97.73	97.59	97.48	97.12
43	97.60	97.50	97.24	97.06	96.84	96.52
44	98.11	97.82	97.60	97.46	97.10	96.99
45	97.64	97.53	97.39	97.32	97.03	96.64
46	97.77	97.62	97.34	97.02	96.85	96.63
47	97.79	97.49	97.12	97.05	96.79	96.64
48	98.35	98.21	98.06	97.81	97.63	97.35
49	97.92	97.59	97.41	97.09	96.80	96.45
50	98.09	97.99	97.74	97.39	97.18	96.89
Avg.	97.91	97.69	97.45	97.22	96.99	96.77
Med.	97.93	97.68	97.41	97.17	96.99	96.71
st dev	0.2968	0.3076	0.3171	0.3190	0.3150	0.3287
Min.	97.33	97.15	96.96	96.64	96.38	96.20
Max.	98.35	98.21	98.06	97.81	97.63	97.35

3.8 Data Set 2, 105°C, 200mA (Chromaticity Shift)

No.	u'	v'	Chromaticity Shift (Δu'v')								
	0hr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	0.2626	0.5281	0.0003	0.0004	0.0005	0.0006	0.0006	0.0007	0.0008	0.0009	0.0009
27	0.2631	0.5259	0.0003	0.0004	0.0005	0.0006	0.0007	0.0007	0.0008	0.0008	0.0010
28	0.2639	0.5275	0.0003	0.0004	0.0006	0.0007	0.0007	0.0008	0.0009	0.0009	0.0011
29	0.2620	0.5251	0.0003	0.0004	0.0005	0.0006	0.0007	0.0007	0.0008	0.0009	0.0010
30	0.2624	0.5260	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010	0.0012
31	0.2616	0.5255	0.0003	0.0005	0.0006	0.0006	0.0008	0.0009	0.0009	0.0010	0.0011
32	0.2628	0.5252	0.0003	0.0004	0.0006	0.0006	0.0007	0.0008	0.0009	0.0010	0.0011
33	0.2629	0.5279	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0008	0.0009	0.0010
34	0.2628	0.5272	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010	0.0011
35	0.2622	0.5255	0.0002	0.0004	0.0005	0.0006	0.0007	0.0007	0.0008	0.0009	0.0011
36	0.2644	0.5293	0.0003	0.0003	0.0005	0.0005	0.0007	0.0007	0.0008	0.0009	0.0010
37	0.2615	0.5281	0.0002	0.0003	0.0005	0.0006	0.0007	0.0008	0.0010	0.0010	0.0012
38	0.2635	0.5280	0.0002	0.0003	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010	0.0011
39	0.2617	0.5251	0.0003	0.0004	0.0005	0.0006	0.0008	0.0008	0.0009	0.0010	0.0011
40	0.2621	0.5266	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0009	0.0009	0.0010
41	0.2612	0.5259	0.0001	0.0002	0.0003	0.0005	0.0006	0.0008	0.0009	0.0010	0.0011
42	0.2632	0.5253	0.0003	0.0004	0.0005	0.0006	0.0007	0.0009	0.0010	0.0012	0.0013
43	0.2617	0.5278	0.0003	0.0004	0.0006	0.0007	0.0008	0.0010	0.0010	0.0012	0.0013
44	0.2630	0.5270	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0011	0.0012	0.0013
45	0.2622	0.5250	0.0004	0.0004	0.0005	0.0006	0.0008	0.0009	0.0010	0.0011	0.0012
46	0.2623	0.5247	0.0003	0.0004	0.0005	0.0007	0.0008	0.0009	0.0010	0.0012	0.0010
47	0.2618	0.5254	0.0002	0.0004	0.0005	0.0007	0.0008	0.0009	0.0011	0.0012	0.0012
48	0.2637	0.5260	0.0003	0.0004	0.0005	0.0007	0.0008	0.0009	0.0010	0.0012	0.0013
49	0.2623	0.5281	0.0003	0.0004	0.0006	0.0007	0.0008	0.0009	0.0011	0.0012	0.0013
50	0.2643	0.5271	0.0004	0.0005	0.0006	0.0007	0.0009	0.0010	0.0011	0.0012	0.0013
Avg.	0.2626	0.5265	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010	0.0011
Med.	0.2624	0.5260	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010	0.0011
st dev	0.0009	0.0013	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Min.	0.2612	0.5247	0.0001	0.0002	0.0003	0.0005	0.0006	0.0007	0.0008	0.0008	0.0009
Max.	0.2644	0.5293	0.0004	0.0005	0.0006	0.0007	0.0009	0.0010	0.0011	0.0012	0.0013

No.	Chromaticity Shift (Δu'v')					
	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
26	0.0011	0.0011	0.0013	0.0015	0.0015	0.0017
27	0.0011	0.0012	0.0013	0.0014	0.0015	0.0016
28	0.0012	0.0013	0.0014	0.0015	0.0017	0.0018
29	0.0012	0.0012	0.0013	0.0014	0.0016	0.0017
30	0.0012	0.0013	0.0015	0.0016	0.0017	0.0019
31	0.0012	0.0013	0.0014	0.0016	0.0017	0.0018
32	0.0013	0.0013	0.0015	0.0016	0.0017	0.0019
33	0.0012	0.0013	0.0014	0.0015	0.0016	0.0017
34	0.0013	0.0013	0.0015	0.0015	0.0016	0.0018
35	0.0012	0.0013	0.0014	0.0016	0.0016	0.0018
36	0.0011	0.0013	0.0014	0.0015	0.0015	0.0017
37	0.0013	0.0014	0.0015	0.0018	0.0020	0.0021
38	0.0012	0.0013	0.0014	0.0015	0.0016	0.0018
39	0.0013	0.0014	0.0016	0.0016	0.0017	0.0018
40	0.0010	0.0012	0.0013	0.0014	0.0014	0.0015
41	0.0011	0.0012	0.0014	0.0014	0.0015	0.0016
42	0.0014	0.0015	0.0015	0.0016	0.0016	0.0018
43	0.0014	0.0015	0.0016	0.0016	0.0017	0.0018
44	0.0014	0.0015	0.0016	0.0017	0.0018	0.0019
45	0.0013	0.0014	0.0015	0.0015	0.0015	0.0016
46	0.0010	0.0011	0.0012	0.0012	0.0013	0.0014
47	0.0013	0.0014	0.0015	0.0016	0.0017	0.0017
48	0.0013	0.0014	0.0014	0.0015	0.0016	0.0017
49	0.0014	0.0016	0.0016	0.0017	0.0017	0.0018
50	0.0013	0.0015	0.0015	0.0015	0.0015	0.0017
Avg.	0.0012	0.0013	0.0014	0.0015	0.0016	0.0017
Med.	0.0012	0.0013	0.0014	0.0015	0.0016	0.0018
st dev	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Min.	0.0010	0.0011	0.0012	0.0012	0.0013	0.0014
Max.	0.0014	0.0016	0.0016	0.0018	0.0020	0.0021

3.9 Data Set 2, 105°C, 200mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	6.304	6.273	6.234	6.199	6.316	6.270	6.266	6.250	6.245	6.273
27	6.287	6.247	6.317	6.237	6.317	6.330	6.259	6.256	6.252	6.200
28	6.344	6.273	6.264	6.244	6.247	6.241	6.248	6.244	6.257	6.274
29	6.287	6.257	6.234	6.234	6.220	6.316	6.261	6.323	6.252	6.194
30	6.330	6.250	6.337	6.235	6.217	6.325	6.326	6.270	6.307	6.239
31	6.318	6.326	6.256	6.237	6.215	6.242	6.271	6.328	6.278	6.256
32	6.335	6.247	6.240	6.252	6.318	6.326	6.270	6.260	6.326	6.280
33	6.324	6.262	6.318	6.262	6.319	6.329	6.328	6.278	6.243	6.192
34	6.334	6.221	6.244	6.238	6.317	6.326	6.257	6.244	6.260	6.278
35	6.310	6.329	6.275	6.240	6.309	6.329	6.262	6.328	6.279	6.242
36	6.297	6.261	6.244	6.245	6.244	6.254	6.302	6.269	6.270	6.219
37	6.317	6.244	6.327	6.265	6.316	6.303	6.261	6.337	6.255	6.286
38	6.290	6.317	6.329	6.244	6.308	6.243	6.265	6.314	6.264	6.244
39	6.330	6.326	6.241	6.250	6.241	6.297	6.263	6.262	6.328	6.269
40	6.345	6.276	6.243	6.258	6.317	6.328	6.263	6.328	6.264	6.210
41	6.266	6.280	6.326	6.238	6.316	6.276	6.266	6.260	6.309	6.293
42	6.326	6.325	6.326	6.243	6.216	6.243	6.337	6.332	6.329	6.278
43	6.286	6.325	6.241	6.248	6.216	6.262	6.335	6.255	6.256	6.269
44	6.285	6.299	6.341	6.234	6.279	6.270	6.313	6.268	6.323	6.269
45	6.341	6.326	6.240	6.254	6.316	6.300	6.267	6.285	6.257	6.256
46	6.322	6.242	6.329	6.301	6.216	6.241	6.328	6.264	6.251	6.239
47	6.288	6.250	6.325	6.246	6.241	6.282	6.263	6.275	6.326	6.237
48	6.326	6.248	6.337	6.257	6.318	6.328	6.324	6.265	6.324	6.235
49	6.339	6.241	6.235	6.253	6.313	6.265	6.329	6.269	6.325	6.268
50	6.323	6.330	6.256	6.266	6.243	6.269	6.323	6.346	6.290	6.289
Avg.	6.314	6.279	6.282	6.247	6.276	6.288	6.287	6.284	6.283	6.252
Med.	6.322	6.273	6.264	6.245	6.308	6.282	6.267	6.269	6.270	6.256
st dev	0.023	0.036	0.043	0.018	0.044	0.034	0.032	0.033	0.032	0.030
Min.	6.266	6.221	6.234	6.199	6.215	6.241	6.248	6.244	6.243	6.192
Max.	6.345	6.330	6.341	6.301	6.319	6.330	6.337	6.346	6.329	6.293

No.	Forward Voltage (V)					
	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
26	6.270	6.254	6.265	6.258	6.287	6.269
27	6.256	6.249	6.264	6.246	6.261	6.329
28	6.245	6.240	6.273	6.243	6.249	6.253
29	6.200	6.218	6.235	6.256	6.245	6.240
30	6.239	6.238	6.249	6.266	6.248	6.244
31	6.214	6.266	6.275	6.329	6.260	6.240
32	6.270	6.261	6.263	6.285	6.326	6.328
33	6.238	6.219	6.254	6.261	6.325	6.240
34	6.268	6.238	6.240	6.290	6.249	6.241
35	6.240	6.218	6.253	6.326	6.240	6.269
36	6.263	6.244	6.212	6.275	6.247	6.245
37	6.187	6.247	6.250	6.256	6.268	6.324
38	6.199	6.282	6.194	6.240	6.244	6.329
39	6.217	6.218	6.199	6.245	6.260	6.325
40	6.212	6.218	6.252	6.251	6.241	6.291
41	6.240	6.217	6.242	6.329	6.326	6.297
42	6.205	6.219	6.250	6.248	6.282	6.328
43	6.282	6.236	6.234	6.327	6.336	6.308
44	6.204	6.216	6.189	6.328	6.343	6.327
45	6.265	6.245	6.239	6.243	6.240	6.244
46	6.269	6.264	6.194	6.241	6.329	6.260
47	6.275	6.280	6.262	6.327	6.327	6.286
48	6.279	6.240	6.253	6.325	6.326	6.242
49	6.267	6.283	6.235	6.240	6.327	6.291
50	6.238	6.248	6.238	6.299	6.330	6.250
Avg.	6.242	6.242	6.241	6.277	6.285	6.280
Med.	6.240	6.240	6.249	6.261	6.268	6.269
st dev	0.029	0.022	0.025	0.035	0.039	0.036
Min.	6.187	6.216	6.189	6.240	6.240	6.240
Max.	6.282	6.283	6.275	6.329	6.343	6.329

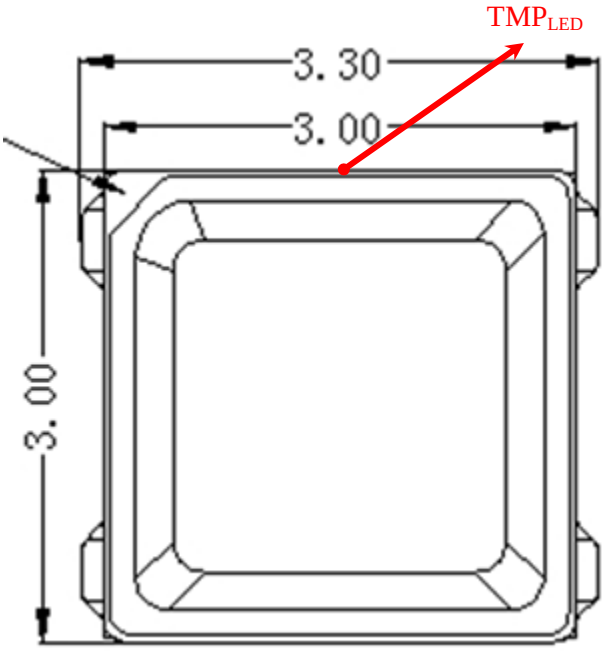
3.10 Data Set 2, 105°C, 200mA (Wavelength)

No.	Wavelength (nm)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	598.5	596.5	597.5	595.2	598.0	595.2	598.1	597.9	598.6	598.2
27	598.3	594.9	597.2	595.1	598.0	597.9	595.1	597.8	597.8	598.0
28	598.5	595.3	598.3	598.0	597.8	598.2	598.1	598.4	597.9	598.3
29	597.9	598.0	597.7	597.7	595.2	597.9	595.2	598.2	598.3	598.1
30	598.1	597.6	598.0	595.2	597.6	598.0	598.0	595.1	595.6	597.7
31	598.2	597.8	597.5	597.6	598.1	597.6	598.0	597.7	597.9	598.3
32	598.4	595.1	597.9	597.7	595.3	595.2	597.8	595.2	598.0	598.1
33	597.8	597.8	596.6	595.1	598.2	597.7	595.4	598.2	597.8	598.1
34	597.5	595.2	595.3	597.9	597.9	597.4	597.9	595.0	598.2	598.1
35	598.3	598.0	597.7	597.6	597.9	598.0	595.1	598.1	595.3	595.2
36	598.3	597.3	597.7	598.3	597.9	595.3	597.9	598.1	597.8	597.9
37	597.5	598.1	597.6	597.8	595.5	597.8	595.1	598.1	595.1	597.8
38	598.1	597.9	598.1	598.0	597.6	598.0	597.6	597.8	598.0	598.2
39	598.3	598.0	598.2	595.4	597.9	598.2	595.2	598.0	597.8	597.9
40	597.7	597.9	597.8	597.6	598.2	598.0	598.0	595.2	598.0	598.2
41	598.0	597.8	598.1	597.7	595.4	597.9	598.0	597.7	597.7	598.0
42	598.1	595.8	598.1	598.1	598.1	598.2	598.1	598.4	598.1	598.0
43	598.4	598.2	597.9	597.8	598.0	597.3	598.1	598.0	597.9	597.9
44	598.0	598.1	598.2	597.9	598.1	598.1	598.2	597.9	598.1	597.9
45	598.7	595.4	595.2	596.3	597.7	598.0	598.0	598.2	598.1	598.0
46	598.7	597.7	595.2	595.5	598.2	598.0	598.1	597.2	597.9	598.3
47	598.0	597.9	597.5	597.9	595.3	597.7	598.0	597.4	598.1	598.1
48	597.8	597.9	597.7	598.1	598.1	597.9	598.5	598.0	598.0	598.0
49	598.7	597.8	597.6	598.0	598.2	598.1	597.9	597.9	596.7	598.2
50	598.4	595.7	598.0	597.9	597.0	597.7	598.2	595.8	595.3	598.3
Avg.	598.2	597.1	597.5	597.2	597.4	597.6	597.3	597.4	597.5	598.0
Med.	598.2	597.8	597.7	597.7	597.9	597.9	598.0	597.9	597.9	598.1
st dev	0.3	1.2	0.9	1.2	1.1	0.9	1.3	1.1	1.0	0.6
Min.	597.5	594.9	595.2	595.1	595.2	595.2	595.1	595.0	595.1	595.2
Max.	598.7	598.2	598.3	598.3	598.2	598.2	598.5	598.4	598.6	598.3

No.	Wavelength (nm)					
	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
26	597.9	598.1	598.0	598.3	598.8	598.3
27	598.1	598.2	598.6	598.6	598.4	598.2
28	598.1	598.1	598.2	598.2	598.2	598.0
29	598.1	598.3	598.7	599.0	598.3	598.2
30	598.6	598.0	598.3	598.3	598.2	598.0
31	597.6	598.1	598.7	598.2	598.4	597.9
32	598.1	598.1	598.3	598.2	598.9	598.3
33	598.3	597.9	598.7	598.5	598.2	598.1
34	597.5	598.1	598.1	598.1	598.1	598.1
35	598.0	598.1	597.8	598.6	598.5	598.5
36	598.1	598.5	598.0	598.2	598.8	598.1
37	598.1	598.1	598.1	597.8	598.3	598.1
38	598.2	598.2	598.2	598.5	598.7	598.1
39	598.1	598.4	598.3	598.3	598.5	597.9
40	598.0	598.6	598.3	598.4	598.1	598.2
41	598.2	598.1	598.0	598.2	595.5	596.1
42	598.4	598.2	598.1	598.1	598.2	598.2
43	597.9	598.3	598.2	598.1	598.1	598.0
44	598.2	598.2	598.4	598.2	598.3	598.1
45	598.5	598.1	598.2	598.3	598.0	598.9
46	598.3	598.1	598.3	598.3	598.0	598.0
47	598.1	597.8	598.1	598.2	598.0	598.5
48	597.9	598.5	598.4	598.0	598.2	598.2
49	598.0	598.1	598.7	598.4	598.2	597.9
50	597.9	598.4	598.3	598.2	597.8	598.3
Avg.	598.1	598.2	598.3	598.3	598.2	598.1
Med.	598.1	598.1	598.3	598.2	598.2	598.1
st dev	0.2	0.2	0.2	0.2	0.6	0.5
Min.	597.5	597.8	597.8	597.8	595.5	596.1
Max.	598.6	598.6	598.7	599.0	598.9	598.9

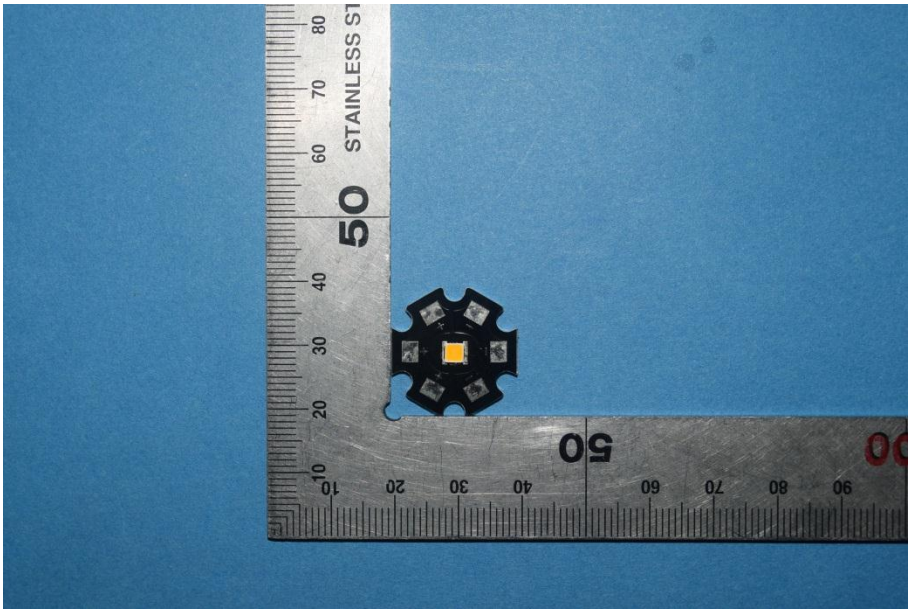
4 - DUT Photo

4.1 Mechanical Dimensions



All dimensions are in millimeter

4.2 DUT Photo



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