



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: ET2835KDC1HVC-0

Report Type: 15000 Hours Test Report		Product Type: LED Package	
Reviewed By:	Pote Wang	<i>Pote Wang</i>	
Report Number:	SZ2200706-68590E-10-15000		
Test Date:	2020-07-08 to 2022-04-02		
Report Date:	2022-10-25		
Approved by:	Bill Xiong / EE Engineer		
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Test Facility:	Test facility was located at No.12, Pulong East 1 st Road, Tangxia Town, Dongguan, Guangdong, China.		

Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.(Shenzhen). This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, or any agency of the U.S. Government.

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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:	ET2835KDC1HVC-0
Part Type:	LED Package
Drive Level:	DC 350mA
Nominal CCT:	2700K
Power:	1.05W
Average Current Density per LED die:	1039.81mA/mm ²
Average Power Density per LED die:	3.12W/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:

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)
ET2835KDC1HVC-0	350	1.05	2700	1	2	1039.81	0.111	0.15
ET2835XDC1XXX-X	350	1.05	2200-6500	1	2	1039.81	0.111	0.15
ET2835XDD1XXX-X	350	1.05	2200-6500	1	2	968.75	0.111	0.15
ET2835XDE1XXX-X	350	1.05	2200-6500	1	2	904.17	0.111	0.15
ET2835XDF1XXX-X	350	1.05	2200-6500	1	2	729.17	0.111	0.15
ET2835XDG1XXX-X	350	1.05	2200-6500	1	2	673.08	0.111	0.15
ET2835XDH1XXX-X	350	1.05	2200-6500	1	2	602.78	0.111	0.15
ET2835XDJ1XXX-X	350	1.05	2200-6500	1	2	469.29	0.111	0.15
ET2835XDK1XXX-X	350	1.05	2200-6500	1	2	387.5	0.111	0.15
ET2835XDL1XXX-X	350	1.05	2200-6500	1	2	352.27	0.111	0.15
ET2835XDM1XXX-X	350	1.05	2200-6500	1	2	727.6	0.111	0.15
ET2835XDN1XXX-X	350	1.05	2200-6500	1	2	301.39	0.111	0.15
ET2835XDP1XXX-X	350	1.05	2200-6500	1	2	305.46	0.111	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	2021-09-27	2022-09-26
0.5M Integrating Sphere	EVERFINE	0.5m	NA	2021-09-27	2022-09-26
LED Test Source	EVERFINE	LTS-300	P185616CJ1391143	2022-01-05	2023-01-04
Standard Light Source	EVERFINE	D062	1011093	2021-10-15	2022-10-14
Multilayer aging machine	BACL	B2-384	N/A	2022-01-04	2023-01-03
Program-controlled D.C. Stabilized Voltage Supply	Hanshenpu yuan	HSPY-60-03	N/A	2022-01-05	2023-01-04

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 $\pm 3\%$ of the specified value of the manufacturer during maintenance test, and was within $\pm 0.5\%$ 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 $2^{\circ}C$ below the corresponding nominal case temperature. Surrounding air was maintained at a temperature that was greater than or equal to $5^{\circ}C$ 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 $\pm 3\%$ 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 $25^{\circ}C \pm 2^{\circ}C$, 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 driven by DC power supply. The forward current was regulated to within $\pm 0.5\%$ of the nominal value. The test system was calibrated by halogen reference lamp. The ambient temperature during test was set to $25^{\circ}C \pm 2^{\circ}C$, 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, 350mA

Part Number: ET2835KDC1HVC-0
Number of Units: 25
Case Temperature: >83°C
Ambient Temperature: >80°C
Life Test Drive Current: 350mA
Measurement Current: 350mA

Data Set 2: 105°C, 350mA

Part Number: ET2835KDC1HVC-0
Number of Units: 25
Case Temperature: >103°C
Ambient Temperature: >100°C
Life Test Drive Current: 350mA
Measurement Current: 350mA

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	2.013E-06	1.004	>90000 hours	54000 hours
2	25	0	1000hrs	15000hrs	2.229E-06	1.003	>90000 hours	49000 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	2.006E-06	1.005	>90000 hours	55000 hours
2	25	0	1000hrs	15000hrs	2.214E-06	1.003	>90000 hours	49000 hours

Average Lumen Maintenance (Percentage of Initial Luminous Flux)

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	100.20%	100.00%	99.80%	99.60%	99.41%	99.20%	99.01%	98.79%	98.59%
2	100.12%	99.88%	99.65%	99.42%	99.22%	98.98%	98.76%	98.53%	98.31%

Data Set:	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
1	98.39%	98.20%	98.01%	97.80%	97.61%	97.42%
2	98.09%	97.87%	97.67%	97.44%	97.22%	97.01%

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

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	100.24%	100.06%	99.84%	99.65%	99.47%	99.25%	99.07%	98.85%	98.66%
2	100.18%	99.93%	99.67%	99.45%	99.25%	99.02%	98.81%	98.58%	98.35%

Data Set:	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
1	98.45%	98.26%	98.08%	97.87%	97.69%	97.47%
2	98.14%	97.94%	97.74%	97.52%	97.29%	97.04%

Average Chromaticity Shift

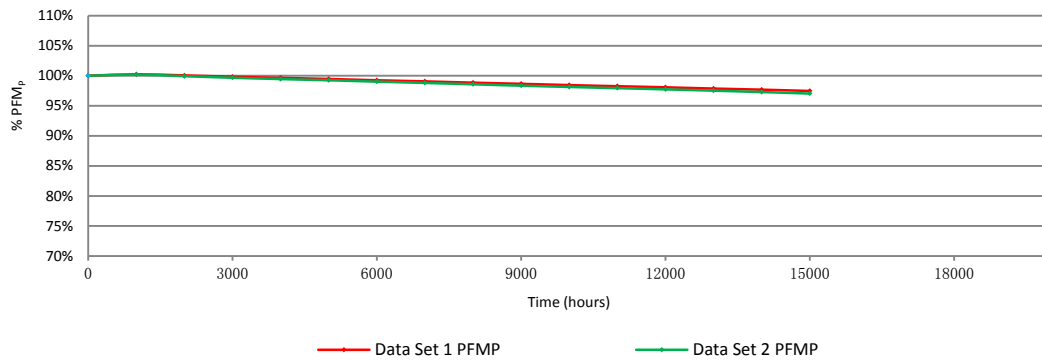
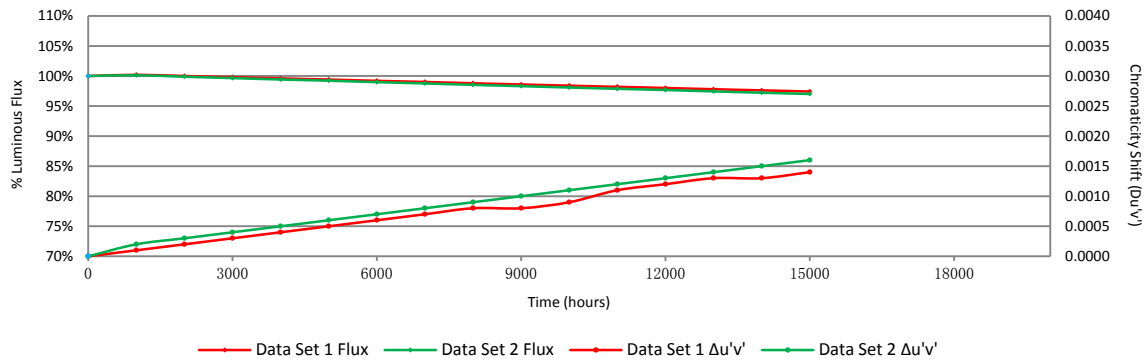
Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0008
2	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010

Data Set:	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
1	0.0009	0.0011	0.0012	0.0013	0.0013	0.0014
2	0.0011	0.0012	0.0013	0.0014	0.0015	0.0016

Average Wavelength

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	617.3	617.5	616.8	617.3	616.8	617.4	617.4	616.8	617.5
2	615.3	616.4	616.4	616.0	616.8	616.5	616.3	615.9	615.8

Data Set:	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
1	616.9	617.2	616.8	616.8	617.0	617.0
2	616.5	616.2	616.2	617.4	616.4	616.3



3 - Test Data

3.1 Data Set 1, 85°C, 350mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	156.15	100.26	99.98	99.83	99.61	99.50	99.27	98.97	98.76	98.49
2	156.27	100.20	100.02	99.70	99.50	99.21	98.96	98.84	98.55	98.34
3	154.66	100.17	100.08	99.87	99.65	99.48	99.19	98.96	98.69	98.51
4	154.76	100.30	100.15	99.88	99.74	99.59	99.44	99.33	99.13	98.82
5	155.70	100.17	99.98	99.83	99.62	99.47	99.29	99.15	98.99	98.82
6	155.98	100.19	100.05	99.88	99.62	99.42	99.23	98.95	98.74	98.62
7	156.12	100.29	100.08	99.92	99.78	99.54	99.36	99.12	98.92	98.78
8	154.16	100.29	100.15	99.90	99.63	99.47	99.33	99.04	98.79	98.68
9	156.75	100.29	100.09	99.94	99.71	99.43	99.21	99.09	98.96	98.81
10	155.55	100.12	99.94	99.72	99.60	99.43	99.29	99.13	98.91	98.60
11	156.70	100.28	100.06	99.81	99.66	99.39	99.13	98.94	98.73	98.47
12	155.60	100.17	100.06	99.85	99.60	99.40	99.19	99.06	98.82	98.54
13	156.10	100.13	99.90	99.65	99.48	99.32	99.05	98.88	98.75	98.64
14	155.70	100.21	100.10	99.96	99.78	99.56	99.38	99.15	99.04	98.81
15	153.82	100.25	99.96	99.75	99.47	99.34	99.05	98.91	98.73	98.61
16	155.93	100.10	99.87	99.67	99.50	99.26	99.08	98.83	98.60	98.41
17	155.41	100.23	99.98	99.81	99.66	99.45	99.21	99.01	98.75	98.49
18	156.45	100.09	99.78	99.51	99.37	99.23	99.05	98.74	98.55	98.40
19	155.07	100.13	99.95	99.73	99.61	99.34	99.14	98.83	98.54	98.43
20	156.70	100.31	100.03	99.76	99.50	99.31	99.06	98.90	98.60	98.34
21	153.29	100.24	99.99	99.77	99.53	99.33	99.15	98.95	98.71	98.53
22	153.31	100.23	100.08	99.90	99.75	99.58	99.35	99.24	98.93	98.72
23	156.42	100.15	99.98	99.83	99.58	99.44	99.31	99.19	99.08	98.89
24	155.64	100.11	99.88	99.76	99.60	99.47	99.17	98.99	98.70	98.51
25	155.90	100.19	99.90	99.67	99.54	99.40	99.24	99.06	98.86	98.58
Avg.	155.53	100.20	100.00	99.80	99.60	99.41	99.20	99.01	98.79	98.59
Med.	155.70	100.20	99.99	99.81	99.61	99.43	99.21	98.99	98.75	98.58
st dev	1.01	0.07	0.09	0.11	0.10	0.10	0.12	0.14	0.17	0.16
Min.	153.29	100.09	99.78	99.51	99.37	99.21	98.96	98.74	98.54	98.34
Max.	156.75	100.31	100.15	99.96	99.78	99.59	99.44	99.33	99.13	98.89



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 The NVLAP Lab Code is 200707-0

No.	Lumen Maintenance (%)					
	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
1	98.21	97.97	97.80	97.68	97.44	97.27
2	98.17	97.99	97.82	97.70	97.57	97.41
3	98.20	98.06	97.91	97.69	97.52	97.32
4	98.67	98.44	98.22	98.08	97.81	97.53
5	98.63	98.48	98.30	98.11	97.94	97.75
6	98.47	98.22	97.91	97.67	97.54	97.26
7	98.48	98.21	98.07	97.82	97.57	97.26
8	98.54	98.40	98.17	97.90	97.77	97.61
9	98.57	98.36	98.16	97.84	97.65	97.51
10	98.37	98.14	97.96	97.68	97.50	97.27
11	98.32	98.08	97.84	97.68	97.49	97.26
12	98.30	98.11	97.90	97.60	97.40	97.29
13	98.40	98.28	98.14	97.94	97.75	97.61
14	98.63	98.36	98.11	97.94	97.76	97.50
15	98.49	98.26	97.99	97.87	97.66	97.48
16	98.22	98.02	97.83	97.63	97.44	97.17
17	98.34	98.16	98.05	97.83	97.59	97.36
18	98.18	98.04	97.81	97.70	97.51	97.28
19	98.26	97.95	97.74	97.48	97.35	97.24
20	98.21	98.10	97.90	97.72	97.54	97.37
21	98.34	98.16	97.96	97.74	97.54	97.36
22	98.43	98.28	98.17	98.05	97.84	97.72
23	98.59	98.40	98.29	98.15	97.92	97.74
24	98.40	98.19	98.06	97.82	97.61	97.38
25	98.35	98.22	98.02	97.74	97.56	97.44
Avg.	98.39	98.20	98.01	97.80	97.61	97.42
Med.	98.37	98.19	97.99	97.74	97.57	97.37
st dev	0.15	0.15	0.16	0.17	0.16	0.17
Min.	98.17	97.95	97.74	97.48	97.35	97.17
Max.	98.67	98.48	98.30	98.15	97.94	97.75

3.2 Data Set 1, 85°C, 350mA (400-700nm Photon Flux Maintenance)

No.	$\Phi_p (\mu\text{mol} \times \text{s}^{-1})$	400-700nm Photon Flux Maintenance (%)								
		0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs
1	2.4060	100.37	100.17	100.04	99.88	99.75	99.58	99.46	99.21	98.96
2	2.4160	100.25	100.08	99.75	99.54	99.25	99.05	98.88	98.59	98.34
3	2.3910	99.75	99.67	99.41	99.21	99.04	98.79	98.49	98.24	98.03
4	2.4110	100.37	100.17	99.96	99.79	99.63	99.46	99.38	99.21	98.88
5	2.4150	100.21	100.04	99.88	99.67	99.50	99.34	99.09	99.01	98.84
6	2.4040	100.21	100.08	99.92	99.63	99.46	99.21	98.96	98.75	98.59
7	2.4090	100.33	100.12	99.96	99.79	99.54	99.38	99.13	98.92	98.80
8	2.4000	100.33	100.25	99.96	99.67	99.54	99.33	99.04	98.79	98.67
9	2.4230	100.37	100.21	100.00	99.79	99.50	99.26	99.13	98.97	98.84
10	2.3970	100.13	99.96	99.75	99.58	99.42	99.25	99.12	98.87	98.58
11	2.4190	100.29	100.17	99.96	99.79	99.63	99.42	99.21	99.09	98.84
12	2.4060	100.21	100.12	99.88	99.63	99.46	99.17	99.04	98.84	98.55
13	2.4110	100.21	99.96	99.71	99.50	99.34	99.05	98.88	98.76	98.63
14	2.4080	100.29	100.17	100.00	99.83	99.63	99.42	99.17	99.04	98.84
15	2.3930	100.33	100.04	99.83	99.50	99.37	99.04	98.87	98.70	98.58
16	2.4040	100.29	100.12	99.92	99.83	99.67	99.46	99.29	99.00	98.84
17	2.4040	100.25	100.04	99.83	99.71	99.46	99.21	99.04	98.75	98.46
18	2.4150	100.17	99.83	99.59	99.38	99.25	99.05	98.76	98.55	98.43
19	2.4030	100.17	100.00	99.75	99.58	99.33	99.08	98.83	98.54	98.38
20	2.4190	100.37	100.12	99.83	99.55	99.38	99.09	98.97	98.64	98.39
21	2.3800	100.29	100.00	99.87	99.75	99.62	99.41	99.29	99.16	99.08
22	2.3710	100.34	100.17	99.96	99.83	99.66	99.37	99.28	98.90	98.78
23	2.4150	100.29	100.12	99.92	99.67	99.50	99.38	99.30	99.17	98.96
24	2.4180	100.17	99.96	99.79	99.67	99.55	99.21	99.09	98.76	98.55
25	2.4130	100.12	99.92	99.59	99.50	99.38	99.17	99.01	98.80	98.55
Avg.	2.4060	100.24	100.06	99.84	99.65	99.47	99.25	99.07	98.85	98.66
Med.	2.4080	100.29	100.08	99.88	99.67	99.50	99.25	99.09	98.84	98.63
st dev	0.0123	0.13	0.13	0.15	0.16	0.16	0.18	0.21	0.24	0.24
Min.	2.3710	99.75	99.67	99.41	99.21	99.04	98.79	98.49	98.24	98.03
Max.	2.4230	100.37	100.25	100.04	99.88	99.75	99.58	99.46	99.21	99.08



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No.	400-700nm Photon Flux Maintenance (%)					
	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
1	98.67	98.46	98.30	98.09	97.92	97.71
2	98.18	97.97	97.85	97.64	97.60	97.43
3	97.70	97.57	97.41	97.20	97.03	96.82
4	98.67	98.47	98.26	98.09	97.84	97.51
5	98.63	98.47	98.26	98.10	97.93	97.76
6	98.46	98.21	97.88	97.75	97.67	97.25
7	98.42	98.17	98.05	97.76	97.63	97.26
8	98.54	98.42	98.17	97.88	97.75	97.67
9	98.60	98.35	98.18	97.85	97.61	97.52
10	98.37	98.12	97.96	97.66	97.50	97.20
11	98.72	98.55	98.39	98.22	98.02	97.77
12	98.30	98.09	97.80	97.55	97.38	97.22
13	98.42	98.30	98.13	97.93	97.72	97.59
14	98.63	98.34	98.09	97.92	97.76	97.47
15	98.41	98.20	97.99	97.87	97.66	97.45
16	98.71	98.54	98.38	98.17	97.96	97.75
17	98.38	98.17	98.09	97.80	97.59	97.25
18	98.22	98.10	97.85	97.72	97.47	97.27
19	98.25	97.92	97.71	97.46	97.38	97.17
20	98.22	98.14	97.97	97.77	97.60	97.40
21	98.91	98.82	98.66	98.49	98.28	98.11
22	98.44	98.31	98.19	98.06	97.85	97.72
23	98.63	98.47	98.39	98.18	97.97	97.72
24	98.43	98.26	98.10	97.85	97.60	97.39
25	98.30	98.18	98.01	97.64	97.51	97.35
Avg.	98.45	98.26	98.08	97.87	97.69	97.47
Med.	98.43	98.26	98.09	97.85	97.66	97.45
st dev	0.24	0.25	0.26	0.28	0.26	0.27
Min.	97.70	97.57	97.41	97.20	97.03	96.82
Max.	98.91	98.82	98.66	98.49	98.28	98.11

3.3 Data Set 1, 85°C, 350mA (Chromaticity Shift)

No.	u'	v'	Chromaticity Shift ($\Delta u'v'$)								
	Ohr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	0.2587	0.5289	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0007	0.0007
2	0.2585	0.5277	0.0001	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008
3	0.2604	0.5276	0.0000	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008
4	0.2605	0.5276	0.0002	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0008
5	0.2615	0.5311	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009
6	0.2576	0.5284	0.0000	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008
7	0.2582	0.5281	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0010
8	0.2607	0.5282	0.0000	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008
9	0.2579	0.5282	0.0001	0.0001	0.0002	0.0004	0.0005	0.0006	0.0007	0.0009	0.0010
10	0.2597	0.5286	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0010	0.0011
11	0.2590	0.5288	0.0001	0.0001	0.0002	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007
12	0.2595	0.5300	0.0001	0.0002	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008
13	0.2590	0.5286	0.0001	0.0001	0.0002	0.0003	0.0005	0.0006	0.0007	0.0008	0.0009
14	0.2593	0.5291	0.0001	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0009
15	0.2621	0.5303	0.0001	0.0001	0.0002	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009
16	0.2599	0.5302	0.0001	0.0002	0.0003	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008
17	0.2589	0.5291	0.0001	0.0001	0.0002	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007
18	0.2605	0.5279	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009
19	0.2611	0.5308	0.0001	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0008	0.0009
20	0.2582	0.5281	0.0002	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009
21	0.2618	0.5313	0.0002	0.0003	0.0005	0.0006	0.0007	0.0008	0.0008	0.0008	0.0009
22	0.2610	0.5305	0.0002	0.0002	0.0003	0.0004	0.0004	0.0005	0.0007	0.0008	0.0008
23	0.2595	0.5298	0.0001	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008
24	0.2592	0.5272	0.0000	0.0001	0.0002	0.0003	0.0005	0.0006	0.0007	0.0008	0.0009
25	0.2601	0.5297	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0007	0.0008
Avg.	0.2597	0.5290	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0008
Med.	0.2595	0.5288	0.0001	0.0001	0.0002	0.0003	0.0005	0.0006	0.0007	0.0008	0.0008
st dev	0.0012	0.0012	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Min.	0.2576	0.5272	0.0000	0.0001	0.0002	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007
Max.	0.2621	0.5313	0.0002	0.0003	0.0005	0.0006	0.0007	0.0008	0.0008	0.0010	0.0011



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No.	Chromaticity Shift ($\Delta u'v'$)					
	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
1	0.0008	0.0009	0.0010	0.0011	0.0011	0.0012
2	0.0009	0.0010	0.0011	0.0012	0.0013	0.0014
3	0.0009	0.0011	0.0012	0.0013	0.0014	0.0015
4	0.0009	0.0010	0.0011	0.0012	0.0013	0.0014
5	0.0010	0.0011	0.0012	0.0013	0.0014	0.0015
6	0.0009	0.0010	0.0011	0.0012	0.0013	0.0014
7	0.0011	0.0012	0.0013	0.0014	0.0015	0.0016
8	0.0009	0.0010	0.0011	0.0012	0.0013	0.0014
9	0.0010	0.0011	0.0012	0.0013	0.0014	0.0015
10	0.0012	0.0014	0.0015	0.0016	0.0017	0.0018
11	0.0008	0.0009	0.0010	0.0011	0.0012	0.0013
12	0.0009	0.0010	0.0011	0.0012	0.0013	0.0014
13	0.0011	0.0012	0.0013	0.0014	0.0015	0.0016
14	0.0010	0.0011	0.0012	0.0013	0.0015	0.0016
15	0.0010	0.0011	0.0012	0.0013	0.0014	0.0015
16	0.0009	0.0010	0.0011	0.0012	0.0013	0.0014
17	0.0008	0.0009	0.0011	0.0012	0.0013	0.0014
18	0.0010	0.0011	0.0013	0.0014	0.0015	0.0016
19	0.0010	0.0011	0.0012	0.0013	0.0014	0.0015
20	0.0009	0.0010	0.0011	0.0012	0.0012	0.0013
21	0.0009	0.0013	0.0014	0.0014	0.0015	0.0016
22	0.0008	0.0009	0.0010	0.0011	0.0011	0.0012
23	0.0009	0.0010	0.0010	0.0011	0.0012	0.0013
24	0.0010	0.0011	0.0011	0.0012	0.0013	0.0014
25	0.0009	0.0010	0.0010	0.0011	0.0011	0.0012
Avg.	0.0009	0.0011	0.0012	0.0013	0.0013	0.0014
Med.	0.0009	0.0010	0.0011	0.0012	0.0013	0.0014
st dev	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Min.	0.0008	0.0009	0.0010	0.0011	0.0011	0.0012
Max.	0.0012	0.0014	0.0015	0.0016	0.0017	0.0018

3.4 Data Set 1, 85°C, 350mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	3.217	3.253	3.261	3.261	3.239	3.239	3.220	3.249	3.233	3.261
2	3.232	3.220	3.231	3.231	3.221	3.238	3.257	3.227	3.238	3.250
3	3.229	3.268	3.237	3.237	3.245	3.255	3.247	3.239	3.237	3.225
4	3.209	3.229	3.221	3.232	3.262	3.227	3.237	3.230	3.229	3.240
5	3.217	3.221	3.258	3.218	3.216	3.225	3.232	3.228	3.247	3.241
6	3.191	3.256	3.228	3.265	3.235	3.235	3.262	3.226	3.227	3.227
7	3.198	3.262	3.244	3.236	3.254	3.228	3.241	3.203	3.227	3.260
8	3.205	3.229	3.257	3.211	3.250	3.238	3.236	3.257	3.242	3.240
9	3.246	3.250	3.261	3.237	3.252	3.205	3.244	3.256	3.255	3.251
10	3.217	3.234	3.221	3.256	3.249	3.230	3.246	3.238	3.238	3.271
11	3.226	3.227	3.235	3.219	3.258	3.219	3.230	3.218	3.230	3.256
12	3.218	3.242	3.275	3.218	3.254	3.236	3.209	3.198	3.260	3.250
13	3.230	3.230	3.246	3.256	3.217	3.248	3.229	3.246	3.229	3.222
14	3.190	3.234	3.246	3.218	3.263	3.238	3.218	3.235	3.230	3.221
15	3.227	3.232	3.221	3.219	3.231	3.228	3.250	3.229	3.249	3.270
16	3.206	3.211	3.241	3.249	3.245	3.236	3.236	3.219	3.231	3.268
17	3.217	3.251	3.237	3.245	3.267	3.228	3.243	3.229	3.227	3.282
18	3.194	3.257	3.265	3.231	3.257	3.236	3.238	3.240	3.217	3.272
19	3.220	3.228	3.250	3.230	3.243	3.266	3.268	3.228	3.229	3.274
20	3.234	3.229	3.252	3.235	3.260	3.240	3.239	3.213	3.240	3.259
21	3.235	3.247	3.219	3.241	3.243	3.219	3.218	3.227	3.227	3.269
22	3.216	3.249	3.267	3.263	3.229	3.237	3.235	3.240	3.248	3.271
23	3.221	3.260	3.258	3.228	3.229	3.231	3.250	3.228	3.261	3.246
24	3.231	3.228	3.255	3.253	3.254	3.242	3.262	3.225	3.253	3.256
25	3.200	3.217	3.229	3.219	3.216	3.242	3.251	3.227	3.228	3.249
Avg.	3.217	3.239	3.245	3.236	3.244	3.235	3.240	3.230	3.237	3.253
Med.	3.217	3.234	3.246	3.235	3.245	3.236	3.239	3.228	3.233	3.256
st dev	0.015	0.016	0.016	0.016	0.016	0.012	0.015	0.014	0.012	0.017
Min.	3.190	3.211	3.219	3.211	3.216	3.205	3.209	3.198	3.217	3.221
Max.	3.246	3.268	3.275	3.265	3.267	3.266	3.268	3.257	3.261	3.282



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No.	Forward Voltage (V)					
	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
1	3.246	3.239	3.242	3.265	3.275	3.249
2	3.220	3.228	3.227	3.265	3.264	3.229
3	3.234	3.271	3.242	3.243	3.239	3.270
4	3.253	3.248	3.235	3.252	3.245	3.243
5	3.226	3.220	3.259	3.220	3.244	3.220
6	3.250	3.234	3.239	3.240	3.233	3.239
7	3.249	3.264	3.228	3.251	3.220	3.231
8	3.216	3.227	3.258	3.268	3.255	3.265
9	3.228	3.245	3.236	3.274	3.246	3.228
10	3.230	3.228	3.255	3.259	3.253	3.231
11	3.255	3.233	3.230	3.278	3.251	3.259
12	3.226	3.240	3.228	3.258	3.255	3.234
13	3.228	3.231	3.227	3.279	3.238	3.261
14	3.226	3.267	3.239	3.257	3.274	3.261
15	3.225	3.246	3.260	3.255	3.252	3.232
16	3.229	3.210	3.231	3.239	3.269	3.230
17	3.213	3.253	3.258	3.250	3.257	3.272
18	3.231	3.244	3.227	3.232	3.233	3.238
19	3.250	3.245	3.250	3.262	3.275	3.235
20	3.255	3.235	3.239	3.233	3.248	3.228
21	3.255	3.267	3.220	3.231	3.243	3.264
22	3.230	3.221	3.227	3.286	3.230	3.223
23	3.228	3.263	3.230	3.272	3.217	3.247
24	3.256	3.220	3.229	3.231	3.254	3.267
25	3.222	3.251	3.244	3.239	3.221	3.230
Avg.	3.235	3.241	3.238	3.254	3.248	3.243
Med.	3.230	3.240	3.236	3.255	3.248	3.238
st dev	0.014	0.017	0.012	0.018	0.017	0.016
Min.	3.213	3.210	3.220	3.220	3.217	3.220
Max.	3.256	3.271	3.260	3.286	3.275	3.272

3.5 Data Set 1, 85°C, 350mA (Wavelength)

No.	Wavelength (nm)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	617.9	617.2	617.1	617.7	617.4	617.3	617.2	618.1	617.7	618.7
2	617.2	617.5	617.2	617.2	616.9	617.3	617.1	617.1	617.6	617.8
3	617.2	616.9	617.2	617.2	617.4	617.1	617.7	617.9	617.1	617.0
4	617.2	617.1	617.3	618.8	617.3	617.2	618.3	617.3	617.4	617.1
5	617.4	617.0	617.5	617.5	617.4	617.5	617.7	617.3	617.2	617.4
6	617.1	616.9	617.5	617.6	617.3	617.2	617.8	617.3	617.7	617.1
7	617.0	617.1	617.1	616.6	617.0	617.2	617.6	617.4	617.3	617.1
8	617.3	617.3	617.1	617.3	617.0	617.4	617.2	617.3	617.4	617.9
9	617.2	617.3	617.7	617.2	617.0	617.2	617.8	617.1	617.2	617.2
10	614.8	617.0	617.6	617.3	617.5	616.8	618.5	617.4	617.2	617.2
11	617.5	617.1	617.3	617.4	617.0	617.9	616.8	617.3	617.2	617.3
12	617.2	617.4	617.2	617.0	617.2	617.3	617.6	617.4	617.2	617.5
13	617.0	616.6	617.2	617.3	617.3	617.3	616.7	618.0	617.4	617.6
14	617.1	617.8	617.4	617.3	617.9	617.2	617.3	617.3	617.3	616.9
15	617.6	617.9	618.4	617.4	617.4	617.1	617.2	617.7	617.3	618.0
16	617.1	617.6	618.6	617.4	617.2	617.4	617.1	617.3	617.7	617.7
17	616.9	617.3	617.4	617.3	617.2	617.9	618.0	617.1	617.6	617.2
18	615.4	617.5	616.7	603.8	617.4	602.8	617.6	617.2	602.2	617.0
19	617.0	617.7	617.7	617.4	617.3	617.5	617.0	617.2	617.6	617.4
20	617.5	617.1	617.3	617.1	618.0	617.5	617.4	617.3	617.3	617.3
21	617.1	617.6	617.8	618.3	617.4	617.2	617.6	617.3	617.2	617.7
22	617.3	617.1	617.7	617.1	617.4	618.4	617.3	618.4	617.0	617.3
23	617.2	617.3	617.2	616.9	617.7	617.0	617.2	617.2	618.5	617.8
24	617.1	617.9	617.6	616.8	617.8	617.7	616.9	617.0	617.6	617.7
25	617.1	616.9	617.6	618.0	617.2	617.1	617.1	617.9	617.2	617.6
Avg.	617.1	617.3	617.5	616.8	617.3	616.8	617.4	617.4	616.8	617.5
Med.	617.2	617.3	617.4	617.3	617.3	617.3	617.3	617.3	617.3	617.4
st dev	0.6	0.3	0.4	2.8	0.3	2.9	0.4	0.4	3.1	0.4
Min.	614.8	616.6	616.7	603.8	616.9	602.8	616.7	617.0	602.2	616.9
Max.	617.9	617.9	618.6	618.8	618.0	618.4	618.5	618.4	618.5	618.7



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No.	Wavelength (nm)					
	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
1	617.4	616.8	617.0	617.2	617.2	618.1
2	617.4	617.4	617.2	617.1	617.9	617.2
3	618.0	617.1	617.8	617.1	618.0	617.9
4	617.3	617.5	618.9	619.0	617.3	617.4
5	617.3	617.4	617.8	617.0	617.5	617.3
6	617.3	617.0	617.8	616.9	617.4	617.4
7	617.1	616.6	617.5	617.1	617.3	617.7
8	617.4	616.9	617.1	617.2	617.6	618.1
9	617.0	617.4	617.1	617.2	617.3	616.9
10	617.2	616.7	617.2	617.1	603.8	604.0
11	617.8	617.4	617.4	617.3	617.3	617.6
12	617.7	617.7	617.7	617.0	617.2	617.3
13	617.2	617.2	617.0	617.8	617.8	617.6
14	617.4	618.8	617.5	617.6	617.2	617.6
15	617.8	617.2	617.6	617.2	617.6	617.9
16	617.0	617.3	617.3	616.9	617.4	617.3
17	617.1	616.9	617.0	617.6	618.2	617.1
18	603.9	616.9	602.5	604.0	617.3	617.2
19	617.8	616.8	617.4	617.2	617.6	617.4
20	617.4	617.3	617.0	617.1	617.3	617.3
21	619.5	617.3	617.2	617.4	617.9	619.6
22	617.1	616.9	617.6	617.7	617.5	617.1
23	617.2	617.4	617.2	617.3	617.5	617.3
24	617.1	617.2	617.2	617.2	617.0	617.5
25	617.4	617.3	617.0	617.2	617.7	617.7
Avg.	616.9	617.2	616.8	616.8	617.0	617.0
Med.	617.3	617.2	617.2	617.2	617.4	617.4
st dev	2.8	0.4	3.0	2.7	2.8	2.8
Min.	603.9	616.6	602.5	604.0	603.8	604.0
Max.	619.5	618.8	618.9	619.0	618.2	619.6

3.7 Data Set 2, 105°C, 350mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	155.97	100.14	99.91	99.73	99.57	99.38	99.19	99.01	98.81	98.63
27	155.73	100.15	99.96	99.62	99.51	99.23	99.00	98.70	98.48	98.30
28	155.38	100.19	99.83	99.58	99.21	99.05	98.80	98.58	98.45	98.20
29	155.59	100.20	99.98	99.72	99.56	99.42	99.24	99.09	98.89	98.70
30	156.23	100.20	99.87	99.73	99.62	99.51	99.30	99.18	98.82	98.55
31	155.58	100.15	99.92	99.63	99.43	99.13	98.95	98.64	98.41	98.07
32	153.15	100.04	99.90	99.69	99.35	99.24	98.89	98.54	98.34	98.18
33	154.37	100.12	99.78	99.63	99.48	99.30	98.95	98.73	98.50	98.30
34	154.28	100.06	99.88	99.68	99.33	99.15	98.88	98.76	98.50	98.28
35	156.22	100.02	99.90	99.60	99.30	99.17	99.06	98.93	98.72	98.52
36	155.33	100.13	99.90	99.67	99.38	99.05	98.74	98.55	98.33	98.18
37	156.05	100.22	99.99	99.76	99.45	99.24	99.04	98.76	98.51	98.24
38	156.33	100.04	99.80	99.62	99.37	99.14	98.89	98.66	98.39	98.16
39	154.38	100.10	99.80	99.48	99.13	98.99	98.72	98.56	98.37	98.16
40	154.75	100.03	99.86	99.57	99.39	99.17	98.95	98.77	98.47	98.31
41	154.32	100.19	100.06	99.88	99.71	99.52	99.18	98.82	98.45	98.22
42	157.27	100.04	99.75	99.46	99.31	99.19	98.96	98.74	98.60	98.40
43	153.31	100.12	99.86	99.57	99.35	99.18	98.94	98.68	98.34	98.11
44	153.63	100.12	99.97	99.66	99.43	99.26	99.11	98.79	98.59	98.37
45	151.42	100.06	99.70	99.49	99.12	98.95	98.83	98.68	98.42	98.27
46	154.29	100.16	100.01	99.77	99.56	99.26	99.02	98.83	98.48	98.17
47	154.94	100.08	99.94	99.72	99.56	99.39	99.16	99.06	98.92	98.70
48	156.70	100.02	99.74	99.52	99.39	99.10	98.77	98.51	98.33	98.07
49	156.21	100.15	99.87	99.67	99.49	99.24	99.03	98.78	98.52	98.35
50	152.79	100.16	99.88	99.73	99.59	99.30	98.98	98.78	98.61	98.36
Avg.	154.97	100.12	99.88	99.65	99.42	99.22	98.98	98.76	98.53	98.31
Med.	155.33	100.12	99.88	99.66	99.43	99.23	98.96	98.76	98.48	98.28
st dev	1.38	0.06	0.09	0.10	0.15	0.14	0.15	0.18	0.18	0.18
Min.	151.42	100.02	99.70	99.46	99.12	98.95	98.72	98.51	98.33	98.07
Max.	157.27	100.22	100.06	99.88	99.71	99.52	99.30	99.18	98.92	98.70



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No.	Lumen Maintenance (%)					
	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
26	98.44	98.24	98.08	97.87	97.70	97.49
27	98.19	97.91	97.78	97.59	97.48	97.36
28	98.08	97.93	97.66	97.35	97.17	96.96
29	98.53	98.36	98.14	97.91	97.72	97.53
30	98.35	98.12	97.80	97.63	97.35	97.09
31	97.90	97.69	97.56	97.38	97.09	96.93
32	97.88	97.55	97.43	97.08	96.82	96.71
33	98.13	97.86	97.75	97.38	97.17	96.96
34	98.14	97.90	97.68	97.49	97.19	97.08
35	98.37	98.15	97.97	97.72	97.58	97.34
36	97.89	97.70	97.48	97.28	97.01	96.68
37	98.05	97.83	97.55	97.32	97.11	96.87
38	97.87	97.65	97.43	97.23	97.06	96.85
39	97.84	97.64	97.29	97.15	96.98	96.74
40	98.07	97.93	97.76	97.63	97.34	97.20
41	97.97	97.60	97.49	97.21	97.00	96.87
42	98.18	97.82	97.62	97.45	97.19	96.98
43	97.91	97.74	97.42	97.16	96.94	96.75
44	98.05	97.90	97.68	97.42	97.16	96.85
45	98.00	97.73	97.48	97.35	97.07	96.76
46	97.92	97.80	97.62	97.40	97.12	96.90
47	98.50	98.41	98.19	98.01	97.82	97.66
48	97.72	97.58	97.40	97.17	96.99	96.72
49	98.13	97.82	97.61	97.36	97.07	96.90
50	98.10	97.93	97.79	97.51	97.36	97.09
Avg.	98.09	97.87	97.67	97.44	97.22	97.01
Med.	98.07	97.83	97.62	97.38	97.16	96.93
st dev	0.21	0.23	0.24	0.25	0.26	0.28
Min.	97.72	97.55	97.29	97.08	96.82	96.68
Max.	98.53	98.41	98.19	98.01	97.82	97.66

3.8 Data Set 2, 105°C, 350mA (400-700nm Photon Flux Maintenance)

No.	Φ_p ($\mu\text{mol} \times \text{s}^{-1}$)	400-700nm Photon Flux Maintenance (%)								
		0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs
26	2.4250	100.16	99.96	99.71	99.55	99.38	99.18	98.93	98.76	98.60
27	2.4060	100.25	99.96	99.63	99.54	99.25	99.04	98.75	98.55	98.38
28	2.3970	100.25	99.92	99.58	99.21	99.08	98.83	98.62	98.46	98.25
29	2.4080	100.25	100.04	99.71	99.58	99.46	99.25	99.13	98.88	98.71
30	2.4050	100.25	99.88	99.75	99.63	99.54	99.29	99.17	98.84	98.59
31	2.3950	100.21	99.96	99.62	99.42	99.12	98.96	98.66	98.41	98.08
32	2.3920	100.08	99.92	99.67	99.37	99.25	98.87	98.54	98.37	98.16
33	2.3940	100.21	99.83	99.71	99.50	99.33	99.00	98.79	98.54	98.33
34	2.3980	100.08	99.87	99.67	99.33	99.12	98.87	98.75	98.50	98.29
35	2.4030	100.08	99.96	99.58	99.33	99.21	99.08	98.96	98.79	98.54
36	2.3870	100.21	100.00	99.75	99.46	99.16	98.79	98.62	98.37	98.16
37	2.4100	100.25	100.04	99.75	99.42	99.17	99.09	98.92	98.63	98.42
38	2.4050	100.12	99.92	99.75	99.58	99.42	99.21	99.04	98.84	98.59
39	2.3900	100.13	99.83	99.50	99.16	99.00	98.70	98.58	98.37	98.16
40	2.3930	100.08	99.92	99.58	99.37	99.00	98.96	98.75	98.50	98.33
41	2.3890	100.29	100.17	99.96	99.79	99.62	99.25	98.91	98.53	98.33
42	2.4150	100.08	99.75	99.46	99.30	99.17	98.96	98.72	98.55	98.34
43	2.3810	100.13	99.87	99.62	99.37	99.20	98.95	98.70	98.36	98.11
44	2.3870	100.13	100.00	99.62	99.46	99.25	99.08	98.79	98.58	98.32
45	2.3640	100.13	99.79	99.49	99.07	98.94	98.86	98.69	98.43	98.22
46	2.3870	100.25	100.04	99.79	99.54	99.25	99.04	98.83	98.41	98.11
47	2.4060	100.17	99.96	99.71	99.54	99.38	99.13	99.09	98.96	98.75
48	2.4060	100.08	99.79	99.58	99.38	99.13	98.79	98.50	98.38	98.09
49	2.3990	100.25	99.92	99.71	99.62	99.46	99.25	99.08	98.87	98.62
50	2.3830	100.25	99.96	99.83	99.66	99.33	99.08	98.83	98.66	98.36
Avg.	2.3970	100.18	99.93	99.67	99.45	99.25	99.02	98.81	98.58	98.35
Med.	2.3970	100.17	99.92	99.67	99.46	99.25	99.04	98.79	98.54	98.33
st dev	0.0126	0.07	0.09	0.11	0.17	0.17	0.16	0.19	0.19	0.20
Min.	2.3640	100.08	99.75	99.46	99.07	98.94	98.70	98.50	98.36	98.08
Max.	2.4250	100.29	100.17	99.96	99.79	99.62	99.29	99.17	98.96	98.75



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No.	400-700nm Photon Flux Maintenance (%)					
	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
26	98.35	98.27	98.06	97.86	97.69	97.44
27	98.21	97.96	97.80	97.63	97.51	97.34
28	98.08	97.96	97.66	97.33	97.16	96.95
29	98.55	98.38	98.17	97.92	97.76	97.51
30	98.42	98.13	97.84	97.67	97.34	97.09
31	97.91	97.70	97.58	97.41	97.12	96.91
32	97.87	97.53	97.45	97.07	96.82	96.70
33	98.16	97.91	97.79	97.45	97.24	96.95
34	98.12	97.91	97.66	97.50	97.16	97.00
35	98.38	98.17	97.92	97.75	97.59	97.30
36	97.95	97.78	97.53	97.40	97.07	96.69
37	98.30	98.17	98.01	97.59	97.30	97.01
38	98.46	98.34	98.13	97.92	97.75	97.46
39	97.82	97.66	97.32	97.15	96.99	96.69
40	98.08	97.91	97.74	97.62	97.33	97.16
41	98.07	97.66	97.57	97.32	97.11	96.94
42	98.14	97.76	97.60	97.43	97.18	96.89
43	97.86	97.73	97.44	97.10	96.89	96.68
44	98.03	97.91	97.65	97.40	97.15	96.77
45	97.97	97.72	97.46	97.34	97.08	96.70
46	97.91	97.74	97.61	97.40	97.11	96.86
47	98.50	98.42	98.17	98.05	97.80	97.63
48	97.71	97.55	97.42	97.17	97.01	96.72
49	98.46	98.33	98.17	98.00	97.75	97.58
50	98.11	97.99	97.73	97.57	97.40	97.10
Avg.	98.14	97.94	97.74	97.52	97.29	97.04
Med.	98.11	97.91	97.66	97.45	97.18	96.95
st dev	0.24	0.27	0.26	0.28	0.29	0.31
Min.	97.71	97.53	97.32	97.07	96.82	96.68
Max.	98.55	98.42	98.17	98.05	97.80	97.63

3.9 Data Set 2, 105°C, 350mA (Chromaticity Shift)

No.	u'	v'	Chromaticity Shift ($\Delta u'v'$)								
	0hr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	0.2596	0.5266	0.0001	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008
27	0.2603	0.5312	0.0001	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008
28	0.2596	0.5312	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009
29	0.2598	0.5298	0.0000	0.0001	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009
30	0.2581	0.5277	0.0002	0.0003	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010	0.0011
31	0.2585	0.5286	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009
32	0.2597	0.5275	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0007	0.0008
33	0.2611	0.5306	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010
34	0.2616	0.5311	0.0002	0.0003	0.0004	0.0005	0.0006	0.0008	0.0009	0.0010	0.0011
35	0.2578	0.5297	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010
36	0.2589	0.5310	0.0001	0.0001	0.0002	0.0004	0.0005	0.0006	0.0006	0.0007	0.0008
37	0.2582	0.5289	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009
38	0.2608	0.5291	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010
39	0.2606	0.5312	0.0001	0.0001	0.0002	0.0003	0.0005	0.0006	0.0007	0.0008	0.0009
40	0.2609	0.5307	0.0001	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0009
41	0.2602	0.5292	0.0003	0.0004	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0009
42	0.2581	0.5284	0.0002	0.0003	0.0005	0.0006	0.0007	0.0009	0.0010	0.0011	0.0013
43	0.2614	0.5311	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009
44	0.2600	0.5280	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0007	0.0008
45	0.2619	0.5302	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010	0.0011
46	0.2604	0.5302	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010
47	0.2591	0.5278	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010
48	0.2572	0.5291	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0009	0.0010	0.0010
49	0.2574	0.5287	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010	0.0011
50	0.2620	0.5304	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010	0.0011
Avg.	0.2597	0.5295	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010
Med.	0.2598	0.5297	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0009
st dev	0.0014	0.0014	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Min.	0.2572	0.5266	0.0000	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008
Max.	0.2620	0.5312	0.0003	0.0004	0.0005	0.0006	0.0007	0.0009	0.0010	0.0011	0.0013



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No.	Chromaticity Shift ($\Delta u'v'$)					
	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
26	0.0009	0.0010	0.0012	0.0013	0.0014	0.0015
27	0.0009	0.0010	0.0011	0.0012	0.0013	0.0014
28	0.0009	0.0010	0.0011	0.0012	0.0013	0.0014
29	0.0010	0.0011	0.0012	0.0013	0.0014	0.0015
30	0.0012	0.0013	0.0014	0.0015	0.0016	0.0017
31	0.0011	0.0012	0.0013	0.0014	0.0015	0.0016
32	0.0009	0.0010	0.0011	0.0012	0.0014	0.0015
33	0.0011	0.0012	0.0013	0.0014	0.0015	0.0016
34	0.0012	0.0013	0.0014	0.0015	0.0016	0.0017
35	0.0011	0.0012	0.0013	0.0014	0.0015	0.0016
36	0.0009	0.0010	0.0011	0.0012	0.0013	0.0014
37	0.0010	0.0011	0.0012	0.0013	0.0014	0.0015
38	0.0011	0.0012	0.0013	0.0014	0.0015	0.0016
39	0.0010	0.0011	0.0012	0.0013	0.0014	0.0015
40	0.0010	0.0011	0.0012	0.0013	0.0014	0.0015
41	0.0009	0.0010	0.0011	0.0012	0.0013	0.0014
42	0.0014	0.0015	0.0016	0.0017	0.0018	0.0018
43	0.0010	0.0011	0.0012	0.0013	0.0014	0.0015
44	0.0009	0.0010	0.0011	0.0012	0.0013	0.0014
45	0.0012	0.0013	0.0014	0.0015	0.0016	0.0017
46	0.0011	0.0012	0.0013	0.0014	0.0015	0.0016
47	0.0011	0.0012	0.0013	0.0014	0.0015	0.0016
48	0.0011	0.0012	0.0013	0.0014	0.0015	0.0016
49	0.0011	0.0012	0.0013	0.0014	0.0015	0.0016
50	0.0012	0.0013	0.0013	0.0014	0.0015	0.0016
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	0.0001	0.0001
Min.	0.0009	0.0010	0.0011	0.0012	0.0013	0.0014
Max.	0.0014	0.0015	0.0016	0.0017	0.0018	0.0018

3.10 Data Set 2, 105°C, 350mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	3.214	3.234	3.228	3.198	3.236	3.237	3.235	3.254	3.269	3.260
27	3.210	3.231	3.234	3.227	3.255	3.231	3.262	3.255	3.272	3.230
28	3.217	3.238	3.215	3.229	3.248	3.219	3.282	3.235	3.216	3.248
29	3.209	3.229	3.233	3.216	3.248	3.269	3.260	3.230	3.228	3.226
30	3.201	3.226	3.264	3.227	3.228	3.254	3.276	3.243	3.254	3.239
31	3.216	3.229	3.219	3.232	3.238	3.264	3.234	3.266	3.241	3.218
32	3.210	3.227	3.229	3.229	3.231	3.220	3.289	3.246	3.257	3.229
33	3.218	3.232	3.228	3.218	3.238	3.275	3.241	3.244	3.214	3.220
34	3.214	3.207	3.217	3.233	3.253	3.259	3.253	3.269	3.246	3.229
35	3.184	3.216	3.220	3.226	3.227	3.230	3.288	3.229	3.228	3.251
36	3.185	3.217	3.233	3.192	3.228	3.272	3.283	3.221	3.220	3.235
37	3.187	3.229	3.258	3.218	3.236	3.221	3.264	3.229	3.231	3.242
38	3.216	3.249	3.245	3.195	3.228	3.268	3.195	3.252	3.248	3.237
39	3.213	3.230	3.246	3.225	3.211	3.231	3.247	3.275	3.249	3.226
40	3.193	3.248	3.264	3.191	3.211	3.243	3.247	3.280	3.246	3.239
41	3.214	3.229	3.257	3.191	3.240	3.233	3.242	3.247	3.233	3.204
42	3.203	3.255	3.244	3.229	3.228	3.248	3.239	3.266	3.228	3.257
43	3.235	3.232	3.218	3.237	3.243	3.255	3.253	3.258	3.230	3.245
44	3.234	3.248	3.218	3.228	3.209	3.259	3.266	3.251	3.231	3.253
45	3.220	3.247	3.200	3.200	3.229	3.280	3.248	3.230	3.249	3.225
46	3.233	3.258	3.208	3.227	3.228	3.269	3.238	3.246	3.267	3.228
47	3.216	3.255	3.219	3.204	3.251	3.252	3.272	3.261	3.242	3.254
48	3.233	3.244	3.240	3.227	3.256	3.245	3.260	3.260	3.267	3.203
49	3.208	3.243	3.246	3.228	3.257	3.248	3.278	3.278	3.240	3.227
50	3.222	3.252	3.212	3.231	3.240	3.262	3.267	3.238	3.265	3.243
Avg.	3.212	3.236	3.232	3.218	3.236	3.250	3.257	3.251	3.243	3.235
Med.	3.214	3.232	3.229	3.227	3.236	3.252	3.260	3.251	3.242	3.235
st dev	0.014	0.013	0.018	0.015	0.014	0.018	0.021	0.016	0.017	0.015
Min.	3.184	3.207	3.200	3.191	3.209	3.219	3.195	3.221	3.214	3.203
Max.	3.235	3.258	3.264	3.237	3.257	3.280	3.289	3.280	3.272	3.260



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.
 The NVLAP Lab Code is 200707-0

No.	Forward Voltage (V)					
	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
26	3.234	3.227	3.237	3.228	3.230	3.229
27	3.249	3.253	3.266	3.228	3.231	3.237
28	3.232	3.220	3.230	3.228	3.236	3.238
29	3.228	3.235	3.228	3.220	3.228	3.246
30	3.232	3.228	3.233	3.228	3.241	3.228
31	3.228	3.215	3.250	3.256	3.261	3.253
32	3.245	3.250	3.267	3.227	3.247	3.253
33	3.229	3.231	3.218	3.230	3.210	3.241
34	3.228	3.206	3.252	3.232	3.235	3.249
35	3.236	3.226	3.229	3.227	3.246	3.239
36	3.233	3.262	3.256	3.227	3.227	3.259
37	3.228	3.248	3.220	3.217	3.220	3.251
38	3.231	3.228	3.231	3.230	3.263	3.231
39	3.238	3.254	3.263	3.253	3.252	3.220
40	3.262	3.234	3.232	3.246	3.207	3.247
41	3.228	3.218	3.253	3.230	3.235	3.229
42	3.252	3.227	3.239	3.233	3.254	3.233
43	3.220	3.228	3.257	3.248	3.254	3.243
44	3.251	3.254	3.236	3.239	3.243	3.236
45	3.240	3.232	3.264	3.230	3.237	3.227
46	3.244	3.236	3.264	3.227	3.228	3.261
47	3.227	3.243	3.260	3.229	3.219	3.247
48	3.244	3.227	3.244	3.259	3.266	3.220
49	3.251	3.251	3.251	3.217	3.229	3.252
50	3.255	3.228	3.254	3.260	3.227	3.234
Avg.	3.238	3.234	3.245	3.234	3.237	3.240
Med.	3.234	3.231	3.250	3.230	3.235	3.239
st dev	0.011	0.014	0.015	0.012	0.016	0.012
Min.	3.220	3.206	3.218	3.217	3.207	3.220
Max.	3.262	3.262	3.267	3.260	3.266	3.261

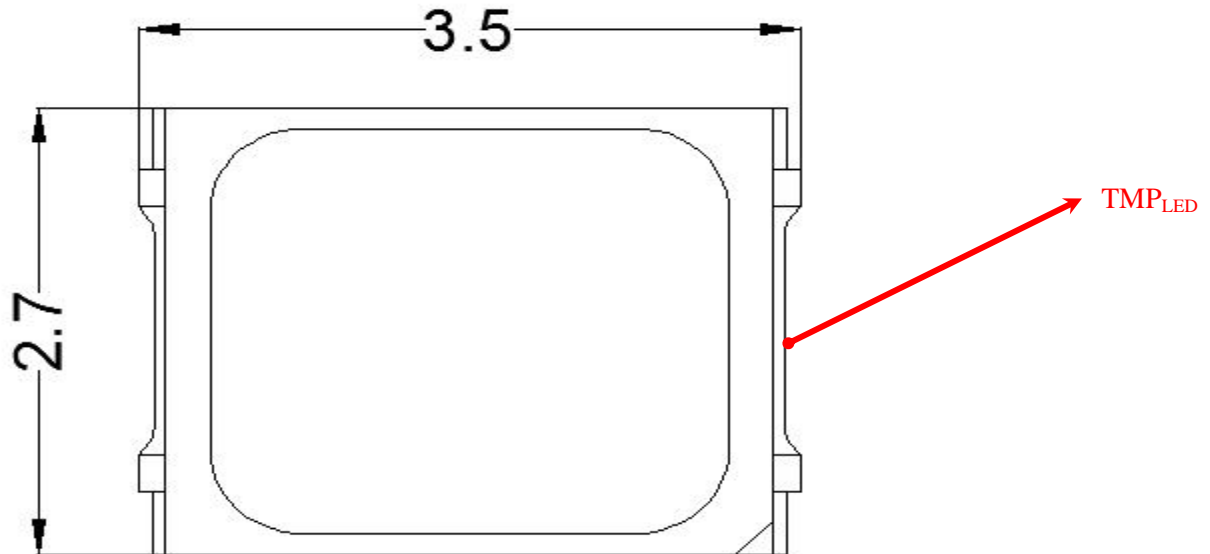
3.11 Data Set 2, 105°C, 350mA (Wavelength)

No.	Wavelength (nm)									
	Ohr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	617.2	617.5	617.4	617.2	617.0	617.3	617.5	617.2	617.5	617.6
27	617.0	617.2	617.2	617.1	617.4	617.2	618.0	617.7	618.8	618.0
28	617.7	617.9	617.9	617.1	617.2	617.8	617.7	617.3	617.5	617.5
29	617.3	617.6	617.4	617.7	617.7	617.3	617.9	618.7	617.3	617.6
30	617.8	603.8	604.9	604.9	602.3	617.2	617.1	617.4	617.1	602.5
31	615.0	617.4	616.9	617.7	617.3	617.6	617.4	616.7	604.6	617.4
32	617.3	618.3	617.5	618.0	617.2	617.1	618.0	617.5	617.8	617.5
33	617.1	617.4	617.4	617.6	617.9	617.3	617.4	617.5	618.1	617.1
34	617.6	618.1	617.2	617.5	617.9	617.7	617.1	617.4	617.1	617.3
35	617.2	617.2	617.4	617.1	617.8	618.5	617.1	617.1	617.2	617.6
36	617.8	617.0	617.0	617.4	617.0	616.8	617.3	617.8	617.4	617.3
37	617.1	617.4	617.2	617.1	615.1	617.0	617.4	617.0	618.2	616.9
38	614.4	603.6	617.1	602.5	616.7	617.2	604.5	604.2	604.8	605.0
39	617.3	617.2	617.8	617.5	617.4	617.6	617.1	617.5	617.2	617.8
40	617.4	617.0	617.8	617.3	617.3	616.8	618.0	617.2	617.4	617.2
41	617.2	617.6	617.5	617.6	616.9	617.8	618.7	617.6	617.0	617.1
42	615.1	603.6	602.2	617.3	602.8	617.1	617.2	602.1	604.0	602.5
43	617.4	617.7	618.5	617.7	617.0	616.9	617.8	617.4	617.3	617.9
44	617.6	616.7	617.3	617.7	617.0	617.8	617.3	617.7	617.7	617.4
45	617.1	618.3	617.9	618.1	617.2	617.7	617.7	617.3	616.8	617.8
46	617.5	617.1	617.5	618.0	617.2	617.0	617.7	617.2	617.7	617.4
47	616.9	617.4	617.4	617.1	617.7	617.5	617.9	617.4	617.8	617.4
48	617.0	604.7	617.2	616.9	617.0	603.0	603.8	617.4	617.2	617.3
49	615.0	617.6	617.5	617.4	617.5	617.0	617.4	617.3	617.1	616.8
50	617.2	617.4	617.8	617.6	617.4	617.4	617.1	617.5	617.4	618.0
Avg.	616.9	615.3	616.4	616.4	616.0	616.8	616.5	616.3	615.9	615.8
Med.	617.2	617.4	617.4	617.4	617.2	617.3	617.4	617.4	617.3	617.4
st dev	1.0	5.1	3.9	3.8	4.1	2.9	3.7	4.0	4.3	4.7
Min.	614.4	603.6	602.2	602.5	602.3	603.0	603.8	602.1	604.0	602.5
Max.	617.8	618.3	618.5	618.1	617.9	618.5	618.7	618.7	618.8	618.0

No.	Wavelength (nm)					
	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs
26	617.3	617.2	617.6	617.1	617.0	617.4
27	617.3	617.1	617.3	617.9	617.5	617.6
28	616.9	617.1	617.9	617.2	617.2	617.4
29	617.0	617.2	617.3	616.9	617.2	617.9
30	616.9	604.1	617.1	617.4	618.7	617.7
31	617.2	617.1	617.2	617.4	617.3	617.6
32	618.3	617.7	617.3	617.3	618.1	617.3
33	617.7	617.3	617.3	617.0	617.6	618.0
34	617.3	617.7	617.3	618.2	617.4	617.1
35	618.0	617.7	617.3	618.0	617.9	617.3
36	617.2	617.0	617.1	617.2	617.2	617.1
37	617.1	617.4	617.1	617.1	617.1	617.2
38	605.0	616.9	603.0	617.2	604.8	604.3
39	617.1	617.2	617.2	617.2	617.3	617.2
40	617.1	617.7	617.0	617.9	617.3	617.1
41	619.6	617.1	617.4	617.2	617.0	617.2
42	602.3	602.5	604.6	616.5	604.8	602.1
43	618.5	617.4	617.3	618.0	617.1	618.0
44	617.3	617.2	617.2	617.0	617.1	617.7
45	619.9	617.5	617.1	617.7	617.6	617.2
46	617.5	617.9	617.1	617.8	617.0	616.9
47	617.3	617.3	617.9	617.3	617.7	617.4
48	617.1	617.1	617.3	616.9	616.9	617.5
49	617.3	617.0	617.0	617.3	618.1	617.2
50	617.5	617.3	617.9	617.4	617.6	617.1
Avg.	616.5	616.2	616.2	617.4	616.4	616.3
Med.	617.3	617.2	617.3	617.3	617.3	617.3
st dev	4.0	3.9	3.8	0.4	3.5	4.0
Min.	602.3	602.5	603.0	616.5	604.8	602.1
Max.	619.9	617.9	617.9	618.2	618.7	618.0

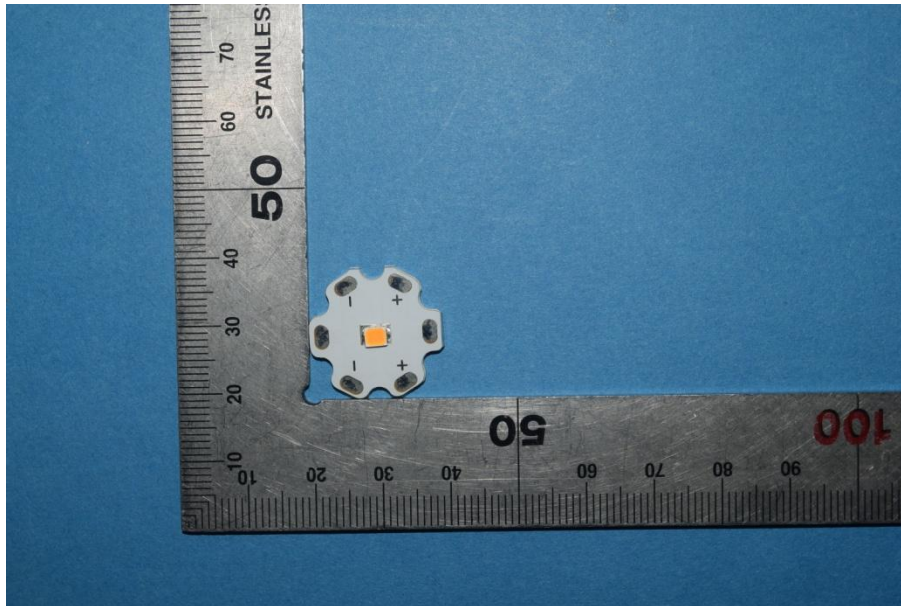
4 - DUT Photo

4.1 Mechanical Dimensions



All dimensions are in millimeter

4.2 DUT Photo



Directions

1. The information marked "superscript #" is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report.
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