TEST REPORT

According to ANSI/IES LM-80-15
For

Hongli Zhihui Group Co.,Ltd. Guangzhou Branch

Room 316, Building 2, No.1, Xianke Yi Road, Huadong Town, Huadu District, Guangzhou, China

Model: HL-C3535K9W1EA(Ra1)-FC

Report Type: 10000 Hours Test Report	**Product Type:** LED Package
Reviewed By:	Pote Wang
Report Number:	RSZ201026503-10-10000
Test Date:	2020-11-23 to 2022-01-20
Report Date:	2022-03-15
Approved by:	Blake Zhang / EE Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Dongguan). No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China. Tel: +86-0769-86858888 Fax:+86-0769-86858588

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1 - General Information

1.1 Description of LED Light Sources

Sample Size:

60 PCS test samples were in good condition and received on 2020-10-26. The samples were numbered from 1 to 30 and 31 to 60.

Manufacturer:	Hongli Zhihui Group Co.,Ltd. Guangzhou Branch
Part Number:	HL-C3535K9W1EA(Ra1)-FC
Part Type:	LED Package
#Drive Level:	DC 800mA
#Nominal CCT:	2700K
#Power:	2.34 W
#Average Current Density per LED die:	410mA/mm^2
#Average Power Density per LED die:	1.2W/mm^2
#CRI:	70
#Die Spacing:	NA

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)	Number of dies	Driver current per die(mA)	Current Density per Die (mA/mm^2)	Power Density per PCB (W/mm^2)	Die Spacing (mm)
HL-C3535K9W1EA(Ra1)-FC	800	2.34	2700	1	800	410	0.1932	/
HL-C3535K9W1EA(Ra1)-FC	800	2.34	2700-6500	1	800	410	0.1932	/
HL-C3535K9W1EA(Ra1)-FC-LVR	800	2.34	2700-6500	1	800	410	0.1932	/
HL-C3535F77W1EA(Ra1)-FC	500	1.4	2700-6500	1	500	383	0.1176	/
HL-C3535F77W1EA(Ra1)-FC-LVR	500	1.4	2700-6500	1	500	383	0.1176	/
HL-C3535K9W1GA(Ra1)-FC	800	2.34	2700-6500	1	800	410	0.1932	/
HL-C3535K9W1GA(Ra1)-FC-LVR	800	2.34	2700-6500	1	800	410	0.1932	/
HL-C3535F77W1GA(Ra1)-FC	500	1.4	2700-6500	1	500	383	0.1176	/
HL-C3535F77W1GA(Ra1)-FC-LVR	500	1.4	2700-6500	1	500	383	0.1176	/
HL-C3535K9W1EA(Ra1)-FC(Ag60)	800	2.34	2700-6500	1	800	410	0.1932	/
HL-C3535F77W1EA(Ra1)-FC(Ag60)	500	1.4	2700-6500	1	500	383	0.1176	/
HL-C3535K9W1EA(Ra1)-FC(Au120)-CY	800	2.34	2700-6500	1	800	410	0.1932	/
HL-C3535F77W1EA(Ra1)-FC(Au120)-CY	500	1.4	2700-6500	1	500	383	0.1176	/
HL-C3535K9W1GA(Ra1)-FC(Au120)-CY	800	2.34	2700-6500	1	800	410	0.1932	/

Model Name	Total Input Current (mA)	Power (W)	CCT (K)	Number of dies	Driver current per die(mA)	Current Density per Die (mA/mm^2)	Power Density per PCB (W/mm^2)	Die Spacing (mm)
HL-C3535F77W1GA(Ra1)-FC(Au120)-CY	500	1.4	2700-6500	1	500	383	0.1176	/
HL-C3535K9W3GA(Ra1)-FC	800	2.34	2700-6500	1	800	410	0.1932	/
HL-C3535F77W3GA(Ra1)-FC	500	1.4	2700-6500	1	500	383	0.1176	/
HL-C3535K9W5GA(Ra1)-FC	800	2.34	2700-6500	1	800	410	0.1932	/
HL-C3535F77W5GA(Ra1)-FC	500	1.4	2700-6500	1	500	383	0.1176	/
HL-C3535K9W3GA(Ra1)-FC-LVR	800	2.34	2700-6500	1	800	410	0.1932	/
HL-C3535F77W3GA(Ra1)-FC-LVR	500	1.4	2700-6500	1	500	383	0.1176	/
HL-C3535K9W5GA(Ra1)-FC-LVR	800	2.34	2700-6500	1	800	410	0.1932	/
HL-C3535F77W5GA(Ra1)-FC-LVR	500	1.4	2700-6500	1	500	383	0.1176	/
HL-C3535K9W1GA(Ra1)-FC-LVR-QX	800	2.34	2700-6500	1	800	410	0.1932	/
HL-C3535F77W5GA(Ra1)-FC-LVR-QX	500	1.4	2700-6500	1	500	383	0.1176	/

1.2 Standards and Reference Documentations

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

1.3 Testing Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
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	B2-270	20022	2021-02-24	2022-02-23
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090009	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 luminous flux and chromaticity coordinate u'v'. 2π measurement was used and sample was drived by DC power supply. The forward current was regulated to within ±0.5% of the nominal value. The test system was calibrated by halogen reference lamp. The ambient temperature during test was set to 25°C ± 2°C, RH <65%. The temperature measurement point was located in the sphere and the temperature was detected by a temperature probe.

The uncertainty of the light output measurements is U=1.59% (K=2), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is U=21K (K=2), at the 95% confidence level.

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

1.7 Statement of Traceability

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

1.8 Sample Set

Data Set 1: 55°C, 800mA

Part Number:	HL-C3535K9W1EA(Ra1)-FC
Number of Units:	30
Case Temperature:	>53°C
Ambient Temperature:	>50°C
Life Test Drive Current:	800mA
Measurement Current:	800mA

Data Set 2: 105°C, 800mA

Part Number:	HL-C3535K9W1EA(Ra1)-FC
Number of Units:	30
Case Temperature:	>103°C
Ambient Temperature:	>100°C
Life Test Drive Current:	800mA
Measurement Current:	800mA

2 - Summary of Test Result

Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration	α	β	Reported TM-21 L_{70} Lifetime
1	30	0	1000hrs	10000hrs	2.795E-06	1.005	>60000 hours
2	30	0	1000hrs	10000hrs	3.339E-06	1.005	>60000 hours

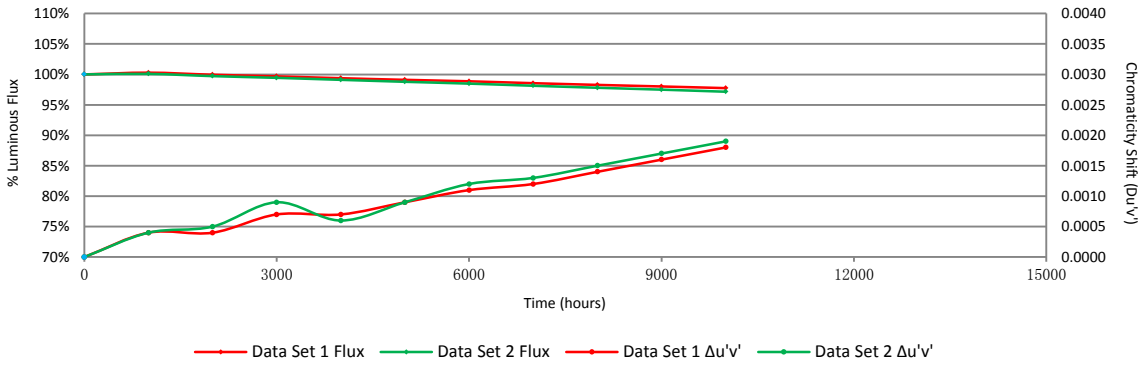
Average Lumen Maintenance (Percentage of Initial Luminous Flux)

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	100.29%	99.95%	99.68%	99.38%	99.11%	98.87%	98.56%	98.28%	98.02%	97.75%
2	100.09%	99.72%	99.44%	99.11%	98.79%	98.49%	98.14%	97.81%	97.50%	97.16%

Average Chromaticity Shift

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	0.0004	0.0004	0.0007	0.0007	0.0009	0.0011	0.0012	0.0014	0.0016	0.0018
2	0.0004	0.0005	0.0009	0.0006	0.0009	0.0012	0.0013	0.0015	0.0017	0.0019

Average Lumen Maintenance and Chromaticity Shift VS. Time



3 - Test Data

3.1 Data Set 1, 55°C, 800mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	338.80	100.32	99.94	99.76	99.32	99.17	99.03	99.00	98.70	98.47	98.14
2	333.70	100.30	100.18	99.88	99.58	99.22	99.01	98.89	98.68	98.35	98.05
3	335.80	100.21	99.97	99.64	99.43	99.08	98.90	98.51	98.33	98.12	97.83
4	336.80	100.24	99.94	99.61	99.41	99.20	98.90	98.57	98.31	98.04	97.74
5	335.60	100.39	100.09	99.70	99.34	99.20	99.02	98.75	98.51	98.33	98.09
6	335.30	100.39	100.15	99.76	99.61	99.25	99.05	98.42	98.18	97.88	97.73
7	338.00	100.65	100.38	99.88	99.70	99.56	99.26	99.17	98.85	98.58	98.25
8	334.90	100.36	100.00	99.64	99.40	99.04	98.84	98.66	98.45	98.27	97.97
9	336.50	100.45	100.09	99.70	99.41	99.20	98.90	98.75	98.57	98.34	98.13
10	335.00	100.33	100.03	99.91	99.49	99.19	98.75	98.51	98.15	97.88	97.61
11	336.90	100.42	100.27	100.09	99.82	99.53	99.23	98.69	98.46	98.10	97.92
12	337.10	100.39	100.15	100.00	99.85	99.58	99.35	99.05	98.69	98.52	98.16
13	335.10	100.18	100.03	99.82	99.67	99.34	99.07	98.96	98.66	98.36	98.06
14	327.40	100.37	99.88	99.85	99.39	99.14	98.93	98.72	98.35	98.05	97.83
15	326.70	100.37	100.15	99.88	99.63	99.45	99.27	98.90	98.71	98.50	98.26
16	331.80	100.30	99.94	99.91	99.34	99.13	98.88	98.25	97.98	97.65	97.41
17	336.70	100.27	99.82	99.73	99.20	98.96	98.84	98.60	98.25	97.95	97.68
18	337.80	100.33	99.85	99.67	99.41	99.14	98.76	98.58	98.31	97.96	97.72
19	342.80	100.18	99.91	99.39	99.12	98.83	98.72	98.31	97.93	97.70	97.37
20	333.00	100.09	99.88	99.43	99.13	98.95	98.68	98.38	98.11	97.90	97.66
21	335.50	100.36	99.88	99.79	99.28	98.96	98.75	98.54	98.33	98.03	97.70
22	337.00	100.21	99.73	99.58	99.29	98.96	98.75	98.37	98.04	97.86	97.60
23	336.90	100.27	99.85	99.38	99.20	98.96	98.78	98.19	97.86	97.63	97.30
24	339.00	100.24	99.79	99.35	99.09	98.73	98.58	98.29	98.02	97.67	97.37
25	338.20	100.03	99.67	99.32	98.99	98.67	98.37	97.87	97.46	97.28	97.07
26	337.10	100.33	100.12	99.44	99.26	98.99	98.75	98.43	98.22	97.95	97.72
27	335.20	100.30	99.85	99.52	99.31	99.05	98.78	98.33	98.06	97.76	97.49
28	337.40	100.27	99.73	99.61	99.29	99.02	98.67	98.34	97.98	97.81	97.60
29	338.80	100.18	99.73	99.53	99.35	99.03	98.76	98.52	98.23	97.90	97.67
30	333.70	100.06	99.55	99.46	98.98	98.68	98.50	98.23	98.08	97.84	97.39
Avg.	335.82	100.29	99.95	99.68	99.38	99.11	98.87	98.56	98.28	98.02	97.75
Med.	336.60	100.30	99.94	99.69	99.35	99.10	98.84	98.53	98.28	97.96	97.72
st dev	3.18	0.12	0.19	0.21	0.22	0.23	0.23	0.29	0.31	0.31	0.31
Min.	326.70	100.03	99.55	99.32	98.98	98.67	98.37	97.87	97.46	97.28	97.07
Max.	342.80	100.65	100.38	100.09	99.85	99.58	99.35	99.17	98.85	98.58	98.26

3.2 Data Set 1, 55°C, 800mA (Forward Voltage)

No.	Forward Voltage (V)										
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	2.910	2.927	2.928	2.921	2.911	2.924	2.928	2.926	2.933	2.944	2.930
2	2.920	2.939	2.939	2.936	2.958	2.961	2.957	2.955	2.955	2.929	2.937
3	2.907	2.923	2.922	2.921	2.917	2.929	2.932	2.914	2.930	2.925	2.924
4	2.908	2.923	2.923	2.917	2.916	2.947	2.930	2.922	2.938	2.928	2.938
5	2.925	2.931	2.932	2.934	2.935	2.948	2.937	2.934	2.928	2.923	2.931
6	2.922	2.935	2.940	2.931	2.943	2.922	2.921	2.918	2.925	2.920	2.931
7	2.924	2.939	2.938	2.944	2.930	2.931	2.940	2.935	2.931	2.942	2.938
8	2.925	2.936	2.935	2.927	2.935	2.952	2.936	2.937	2.937	2.936	2.944
9	2.919	2.939	2.936	2.942	2.947	2.937	2.936	2.938	2.941	2.937	2.936
10	2.920	2.936	2.933	2.934	2.934	2.952	2.958	2.944	2.922	2.924	2.940
11	2.926	2.941	2.939	2.935	2.943	2.945	2.941	2.938	2.931	2.927	2.920
12	2.917	2.933	2.934	2.931	2.931	2.957	2.952	2.942	2.930	2.923	2.936
13	2.903	2.925	2.923	2.928	2.927	2.926	2.926	2.921	2.928	2.922	2.930
14	2.916	2.932	2.933	2.925	2.934	2.947	2.952	2.945	2.947	2.926	2.936
15	2.906	2.920	2.919	2.913	2.927	2.908	2.926	2.921	2.925	2.931	2.920
16	2.914	2.931	2.928	2.923	2.933	2.937	2.939	2.935	2.925	2.928	2.952
17	2.919	2.934	2.933	2.923	2.947	2.948	2.937	2.942	2.934	2.925	2.927
18	2.915	2.930	2.930	2.920	2.926	2.917	2.927	2.955	2.938	2.924	2.926
19	2.929	2.945	2.943	2.934	2.936	2.941	2.945	2.948	2.925	2.910	2.921
20	2.904	2.916	2.915	2.908	2.917	2.921	2.930	2.906	2.921	2.919	2.945
21	2.926	2.941	2.939	2.928	2.928	2.924	2.928	2.933	2.926	2.927	2.925
22	2.919	2.933	2.932	2.922	2.916	2.931	2.928	2.911	2.919	2.928	2.929
23	2.919	2.933	2.933	2.925	2.920	2.943	2.931	2.910	2.921	2.929	2.928
24	2.929	2.946	2.944	2.946	2.936	2.926	2.926	2.927	2.925	2.921	2.921
25	2.929	2.947	2.944	2.947	2.939	2.946	2.941	2.927	2.922	2.926	2.927
26	2.919	2.932	2.931	2.927	2.919	2.915	2.921	2.913	2.919	2.918	2.916
27	2.917	2.933	2.934	2.923	2.919	2.937	2.920	2.913	2.919	2.921	2.925
28	2.917	2.934	2.934	2.923	2.919	2.929	2.909	2.915	2.921	2.922	2.928
29	2.902	2.918	2.915	2.906	2.916	2.925	2.929	2.927	2.927	2.937	2.938
30	2.906	2.921	2.922	2.913	2.917	2.926	2.924	2.929	2.925	2.942	2.938
Avg.	2.917	2.932	2.932	2.927	2.929	2.935	2.934	2.929	2.929	2.927	2.931
Med.	2.919	2.933	2.933	2.926	2.929	2.934	2.931	2.928	2.927	2.926	2.930
st dev	0.008	0.008	0.008	0.010	0.012	0.013	0.011	0.014	0.009	0.008	0.008
Min.	2.902	2.916	2.915	2.906	2.911	2.908	2.909	2.906	2.919	2.910	2.916
Max.	2.929	2.947	2.944	2.947	2.958	2.961	2.958	2.955	2.955	2.944	2.952

3.3 Data Set 1, 55°C, 800mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')									
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	0.2569	0.5219	54	0.0003	0.0003	0.0011	0.0011	0.0013	0.0013	0.0011	0.0013	0.0014	0.0017
2	0.2590	0.5271	60	0.0004	0.0005	0.0007	0.0007	0.0008	0.0011	0.0011	0.0012	0.0013	0.0014
3	0.2604	0.5281	62	0.0006	0.0006	0.0006	0.0006	0.0008	0.0009	0.0011	0.0014	0.0017	0.0018
4	0.2565	0.5225	2853	0.0004	0.0004	0.0006	0.0006	0.0009	0.0010	0.0013	0.0014	0.0016	0.0018
5	0.2592	0.5265	2773	0.0003	0.0004	0.0009	0.0009	0.0010	0.0012	0.0015	0.0018	0.0019	0.0022
6	0.2586	0.5264	2787	0.0004	0.0005	0.0006	0.0006	0.0007	0.0009	0.0011	0.0014	0.0016	0.0017
7	0.2580	0.5284	2790	0.0004	0.0005	0.0007	0.0007	0.0009	0.0010	0.0012	0.0014	0.0016	0.0019
8	0.2594	0.5253	2774	0.0004	0.0005	0.0006	0.0006	0.0008	0.0009	0.0011	0.0013	0.0015	0.0016
9	0.2572	0.5223	2838	0.0003	0.0004	0.0008	0.0008	0.0010	0.0010	0.0014	0.0015	0.0017	0.0020
10	0.2591	0.5282	2768	0.0004	0.0004	0.0008	0.0008	0.0010	0.0011	0.0014	0.0016	0.0017	0.0019
11	0.2601	0.5295	2741	0.0004	0.0005	0.0006	0.0006	0.0008	0.0011	0.0012	0.0015	0.0016	0.0017
12	0.2588	0.5266	2781	0.0005	0.0005	0.0006	0.0006	0.0009	0.0011	0.0011	0.0013	0.0015	0.0016
13	0.2601	0.5259	2756	0.0003	0.0004	0.0008	0.0008	0.0009	0.0011	0.0012	0.0013	0.0015	0.0016
14	0.2567	0.5234	2843	0.0004	0.0005	0.0005	0.0005	0.0008	0.0010	0.0013	0.0015	0.0017	0.0018
15	0.2596	0.5275	2761	0.0004	0.0004	0.0006	0.0006	0.0008	0.0010	0.0011	0.0013	0.0016	0.0017
16	0.2624	0.5304	2689	0.0004	0.0004	0.0007	0.0007	0.0009	0.0011	0.0011	0.0013	0.0016	0.0018
17	0.2589	0.5253	2786	0.0004	0.0005	0.0008	0.0008	0.0011	0.0013	0.0015	0.0016	0.0018	0.0021
18	0.2593	0.5288	2760	0.0004	0.0004	0.0008	0.0008	0.0011	0.0011	0.0014	0.0016	0.0017	0.0018
19	0.2593	0.5279	2764	0.0004	0.0004	0.0007	0.0007	0.0010	0.0012	0.0012	0.0015	0.0016	0.0018
20	0.2577	0.5234	2821	0.0004	0.0004	0.0008	0.0008	0.0009	0.0011	0.0013	0.0015	0.0017	0.0019
21	0.2595	0.5248	2774	0.0004	0.0003	0.0007	0.0007	0.0010	0.0012	0.0014	0.0015	0.0017	0.0018
22	0.2572	0.5225	2837	0.0004	0.0006	0.0005	0.0005	0.0008	0.0008	0.0011	0.0013	0.0016	0.0018
23	0.2601	0.5276	2748	0.0003	0.0004	0.0006	0.0006	0.0009	0.0011	0.0010	0.0012	0.0015	0.0017
24	0.2600	0.5307	2739	0.0003	0.0004	0.0006	0.0006	0.0008	0.0013	0.0011	0.0014	0.0015	0.0018
25	0.2595	0.5268	2766	0.0004	0.0004	0.0005	0.0005	0.0008	0.0012	0.0012	0.0014	0.0016	0.0018
26	0.2601	0.5279	2749	0.0003	0.0004	0.0006	0.0006	0.0008	0.0011	0.0014	0.0015	0.0016	0.0018
27	0.2599	0.5245	2768	0.0004	0.0004	0.0009	0.0009	0.0011	0.0012	0.0014	0.0015	0.0017	0.0020
28	0.2575	0.5237	2823	0.0005	0.0005	0.0006	0.0006	0.0008	0.0011	0.0013	0.0016	0.0017	0.0018
29	0.2588	0.5272	2778	0.0004	0.0005	0.0006	0.0006	0.0009	0.0011	0.0013	0.0016	0.0018	0.0019
30	0.2606	0.5269	2742	0.0004	0.0004	0.0009	0.0009	0.0012	0.0013	0.0014	0.0017	0.0018	0.0020
Avg.	0.2590	0.5263	2506	0.0004	0.0004	0.0007	0.0007	0.0009	0.0011	0.0012	0.0014	0.0016	0.0018
Med.	0.2593	0.5267	2768	0.0004	0.0004	0.0007	0.0007	0.0009	0.0011	0.0012	0.0015	0.0016	0.0018
st dev	0.0013	0.0024	831	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002
Min.	0.2565	0.5219	54	0.0003	0.0003	0.0005	0.0005	0.0007	0.0008	0.0010	0.0012	0.0013	0.0014
Max.	0.2624	0.5307	2853	0.0006	0.0006	0.0011	0.0011	0.0013	0.0013	0.0015	0.0018	0.0019	0.0022

3.4 Data Set 2, 105°C, 800mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
31	338.30	100.12	99.70	99.53	99.05	98.67	98.40	98.02	97.55	97.31	96.93
32	333.10	100.21	99.88	99.73	99.19	98.89	98.65	98.08	97.72	97.33	97.00
33	334.10	99.97	99.67	99.37	99.04	98.65	98.32	97.79	97.61	97.31	97.04
34	336.10	100.15	99.73	99.43	99.11	98.72	98.45	98.07	97.86	97.53	97.08
35	337.40	100.09	99.73	99.41	99.26	98.96	98.58	98.37	98.01	97.66	97.33
36	333.30	100.15	99.76	99.37	99.10	98.83	98.59	98.38	98.11	97.75	97.36
37	335.80	100.03	99.94	99.76	99.37	99.05	98.75	98.72	98.36	98.00	97.71
38	335.70	100.09	99.79	99.70	99.31	99.05	98.78	98.66	98.42	98.09	97.83
39	334.00	100.12	99.70	99.61	99.19	98.86	98.65	98.41	98.05	97.78	97.46
40	336.70	99.97	99.61	99.20	98.87	98.57	98.34	97.98	97.62	97.33	96.97
41	334.20	100.12	99.34	99.19	98.86	98.50	98.11	97.64	97.19	96.98	96.77
42	335.50	100.12	99.52	99.25	98.96	98.63	98.39	98.03	97.73	97.44	97.11
43	337.20	100.06	99.70	99.38	99.17	98.96	98.72	98.55	98.10	97.84	97.39
44	340.10	99.91	99.71	99.38	99.15	98.85	98.53	98.41	98.15	97.74	97.41
45	339.90	100.09	99.74	99.56	99.12	98.79	98.59	98.00	97.68	97.32	96.91
46	334.60	100.15	99.76	99.52	99.31	99.04	98.66	98.09	97.79	97.52	97.22
47	336.70	100.18	99.82	99.55	99.23	98.96	98.60	98.37	97.89	97.56	97.27
48	339.00	100.32	99.85	99.56	99.32	99.09	98.64	98.20	97.94	97.67	97.26
49	338.90	100.24	99.97	99.44	99.06	98.67	98.29	98.20	97.93	97.46	97.14
50	336.60	100.03	99.70	99.05	98.75	98.46	98.10	97.65	97.30	96.91	96.52
51	335.00	100.18	99.85	99.76	99.19	98.93	98.63	97.94	97.61	97.37	97.01
52	336.90	100.06	99.76	99.61	99.20	98.75	98.46	97.98	97.80	97.48	97.12
53	334.00	100.27	99.70	99.52	99.10	98.71	98.44	98.29	97.99	97.60	97.31
54	332.90	100.06	99.67	99.43	99.16	98.86	98.56	98.20	97.84	97.54	97.27
55	337.90	100.03	99.70	99.44	99.14	98.76	98.37	97.93	97.45	97.10	96.89
56	332.80	100.03	99.76	99.43	99.16	98.95	98.65	98.38	98.17	97.96	97.63
57	335.10	99.97	99.70	99.40	98.99	98.63	98.27	97.85	97.55	97.19	96.87
58	337.40	99.97	99.70	99.41	99.08	98.87	98.61	98.10	97.81	97.60	97.24
59	336.20	99.88	99.55	99.20	98.87	98.51	98.22	97.71	97.35	97.06	96.79
60	337.50	100.06	99.50	99.05	98.87	98.49	98.37	98.16	97.84	97.45	97.04
Avg.	336.10	100.09	99.72	99.44	99.11	98.79	98.49	98.14	97.81	97.50	97.16
Med.	336.15	100.09	99.71	99.43	99.13	98.81	98.54	98.10	97.82	97.50	97.13
st dev	2.05	0.10	0.13	0.19	0.15	0.18	0.18	0.28	0.30	0.29	0.29
Min.	332.80	99.88	99.34	99.05	98.75	98.46	98.10	97.64	97.19	96.91	96.52
Max.	340.10	100.32	99.97	99.76	99.37	99.09	98.78	98.72	98.42	98.09	97.83

3.5 Data Set 2, 105°C, 800mA (Forward Voltage)

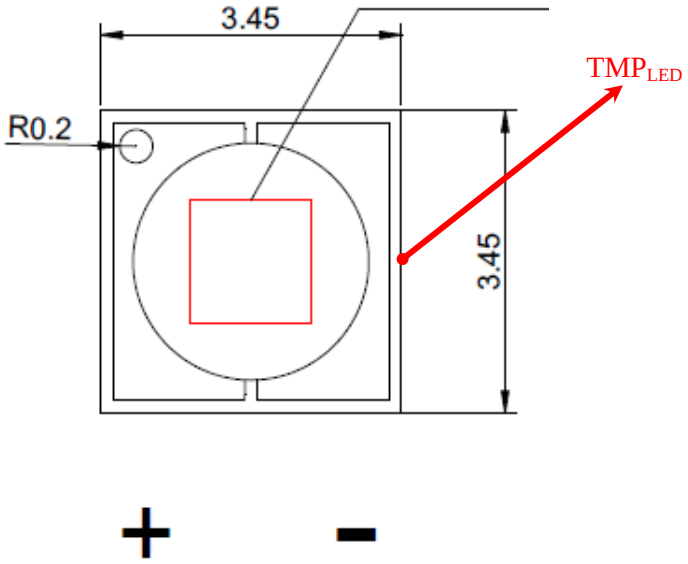
No.	Forward Voltage (V)										
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
31	2.926	2.942	2.940	2.931	2.938	2.933	2.947	2.928	2.938	2.926	2.932
32	2.922	2.935	2.933	2.925	2.936	2.930	2.944	2.926	2.924	2.928	2.927
33	2.914	2.930	2.928	2.921	2.932	2.930	2.930	2.925	2.923	2.928	2.921
34	2.929	2.942	2.941	2.931	2.947	2.924	2.945	2.926	2.929	2.928	2.925
35	2.925	2.944	2.943	2.930	2.943	2.941	2.942	2.923	2.926	2.924	2.924
36	2.922	2.936	2.935	2.923	2.935	2.933	2.926	2.917	2.926	2.927	2.946
37	2.903	2.920	2.919	2.910	2.921	2.937	2.930	2.915	2.913	2.921	2.939
38	2.913	2.928	2.928	2.922	2.921	2.912	2.923	2.928	2.938	2.951	2.942
39	2.928	2.922	2.921	2.915	2.924	2.934	2.925	2.926	2.928	2.934	2.938
40	2.919	2.933	2.934	2.932	2.944	2.944	2.925	2.923	2.923	2.942	2.932
41	2.917	2.932	2.932	2.925	2.943	2.934	2.947	2.917	2.913	2.937	2.938
42	2.924	2.936	2.935	2.928	2.925	2.935	2.938	2.924	2.920	2.942	2.932
43	2.915	2.932	2.933	2.927	2.920	2.933	2.934	2.921	2.917	2.937	2.920
44	2.928	2.947	2.949	2.935	2.939	2.925	2.940	2.930	2.928	2.924	2.924
45	2.929	2.946	2.943	2.936	2.928	2.943	2.958	2.923	2.924	2.923	2.925
46	2.903	2.934	2.916	2.912	2.916	2.917	2.926	2.896	2.915	2.940	2.922
47	2.922	2.940	2.939	2.929	2.928	2.948	2.954	2.914	2.913	2.926	2.928
48	2.924	2.942	2.940	2.935	2.937	2.957	2.956	2.920	2.929	2.922	2.921
49	2.924	2.942	2.943	2.935	2.949	2.946	2.952	2.919	2.919	2.926	2.933
50	2.914	2.932	2.931	2.924	2.929	2.959	2.946	2.915	2.915	2.938	2.921
51	2.913	2.932	2.930	2.922	2.912	2.925	2.946	2.918	2.910	2.922	2.921
52	2.915	2.933	2.932	2.925	2.918	2.940	2.932	2.932	2.922	2.939	2.928
53	2.909	2.920	2.919	2.912	2.924	2.927	2.947	2.900	2.921	2.924	2.922
54	2.906	2.923	2.926	2.918	2.925	2.920	2.938	2.913	2.927	2.924	2.925
55	2.917	2.934	2.935	2.930	2.935	2.943	2.964	2.925	2.928	2.943	2.928
56	2.902	2.917	2.916	2.911	2.914	2.923	2.960	2.921	2.926	2.927	2.946
57	2.905	2.920	2.919	2.914	2.930	2.930	2.931	2.909	2.925	2.924	2.944
58	2.904	2.920	2.919	2.915	2.923	2.935	2.969	2.912	2.926	2.922	2.925
59	2.913	2.931	2.928	2.922	2.921	2.934	2.964	2.920	2.918	2.932	2.924
60	2.915	2.935	2.933	2.926	2.936	2.960	2.957	2.917	2.912	2.935	2.936
Avg.	2.917	2.933	2.931	2.924	2.930	2.935	2.943	2.919	2.923	2.931	2.930
Med.	2.916	2.933	2.933	2.925	2.929	2.934	2.945	2.921	2.924	2.928	2.928
st dev	0.008	0.008	0.009	0.008	0.010	0.012	0.013	0.008	0.007	0.008	0.008
Min.	2.902	2.917	2.916	2.910	2.912	2.912	2.923	2.896	2.910	2.921	2.920
Max.	2.929	2.947	2.949	2.936	2.949	2.960	2.969	2.932	2.938	2.951	2.946

3.6 Data Set 2, 105°C, 800mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')									
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
31	0.2594	0.5285	2760	0.0004	0.0005	0.0009	0.0006	0.0010	0.0012	0.0012	0.0014	0.0015	0.0017
32	0.2594	0.5235	2782	0.0004	0.0005	0.0009	0.0006	0.0010	0.0011	0.0013	0.0014	0.0015	0.0017
33	0.2604	0.5252	2754	0.0004	0.0005	0.0009	0.0006	0.0009	0.0012	0.0013	0.0014	0.0015	0.0018
34	0.2596	0.5284	2756	0.0004	0.0006	0.0008	0.0005	0.0007	0.0010	0.0011	0.0013	0.0014	0.0016
35	0.2598	0.5286	2751	0.0004	0.0006	0.0007	0.0005	0.0007	0.0011	0.0011	0.0012	0.0014	0.0015
36	0.2597	0.5269	2761	0.0004	0.0005	0.0008	0.0006	0.0008	0.0012	0.0012	0.0014	0.0016	0.0017
37	0.2595	0.5268	2767	0.0003	0.0005	0.0011	0.0006	0.0009	0.0014	0.0013	0.0016	0.0018	0.0019
38	0.2580	0.5229	2816	0.0003	0.0004	0.0010	0.0009	0.0011	0.0014	0.0015	0.0016	0.0017	0.0020
39	0.2612	0.5259	2732	0.0004	0.0005	0.0008	0.0007	0.0009	0.0011	0.0013	0.0015	0.0016	0.0017
40	0.2587	0.5272	2782	0.0003	0.0005	0.0010	0.0006	0.0009	0.0012	0.0013	0.0016	0.0017	0.0019
41	0.2606	0.5278	2738	0.0004	0.0006	0.0009	0.0006	0.0008	0.0011	0.0013	0.0015	0.0017	0.0018
42	0.2606	0.5288	2734	0.0004	0.0005	0.0008	0.0004	0.0006	0.0010	0.0012	0.0013	0.0015	0.0017
43	0.2609	0.5293	2726	0.0005	0.0006	0.0009	0.0004	0.0008	0.0010	0.0010	0.0014	0.0015	0.0017
44	0.2593	0.5265	2772	0.0003	0.0004	0.0010	0.0006	0.0010	0.0012	0.0013	0.0016	0.0018	0.0021
45	0.2578	0.5266	2803	0.0004	0.0005	0.0008	0.0006	0.0009	0.0010	0.0013	0.0016	0.0019	0.0021
46	0.2591	0.5260	2777	0.0004	0.0005	0.0008	0.0007	0.0009	0.0012	0.0013	0.0014	0.0017	0.0020
47	0.2606	0.5284	2736	0.0004	0.0005	0.0007	0.0006	0.0010	0.0013	0.0013	0.0016	0.0019	0.0021
48	0.2595	0.5284	2760	0.0004	0.0005	0.0008	0.0006	0.0008	0.0010	0.0010	0.0014	0.0017	0.0018
49	0.2597	0.5276	2757	0.0004	0.0006	0.0008	0.0008	0.0010	0.0013	0.0013	0.0016	0.0019	0.0022
50	0.2602	0.5249	2758	0.0004	0.0005	0.0008	0.0006	0.0009	0.0012	0.0013	0.0014	0.0017	0.0020
51	0.2590	0.5238	2790	0.0004	0.0005	0.0009	0.0006	0.0008	0.0011	0.0013	0.0014	0.0016	0.0018
52	0.2581	0.5272	2795	0.0004	0.0005	0.0009	0.0006	0.0009	0.0013	0.0013	0.0016	0.0018	0.0019
53	0.2593	0.5256	2776	0.0003	0.0004	0.0010	0.0008	0.0009	0.0011	0.0014	0.0017	0.0019	0.0022
54	0.2593	0.5278	2766	0.0004	0.0005	0.0007	0.0006	0.0009	0.0010	0.0011	0.0012	0.0015	0.0018
55	0.2585	0.5278	2783	0.0004	0.0005	0.0008	0.0006	0.0009	0.0012	0.0012	0.0013	0.0014	0.0016
56	0.2590	0.5260	2780	0.0004	0.0006	0.0008	0.0006	0.0009	0.0011	0.0013	0.0014	0.0015	0.0016
57	0.2595	0.5267	2766	0.0004	0.0005	0.0008	0.0006	0.0010	0.0012	0.0014	0.0016	0.0018	0.0019
58	0.2585	0.5228	2807	0.0003	0.0005	0.0012	0.0008	0.0011	0.0014	0.0015	0.0017	0.0020	0.0022
59	0.2604	0.5258	2750	0.0005	0.0005	0.0008	0.0005	0.0007	0.0010	0.0012	0.0015	0.0017	0.0019
60	0.2584	0.5253	2797	0.0005	0.0006	0.0010	0.0008	0.0009	0.0012	0.0014	0.0015	0.0017	0.0019
Avg.	0.2595	0.5266	2768	0.0004	0.0005	0.0009	0.0006	0.0009	0.0012	0.0013	0.0015	0.0017	0.0019
Med.	0.2595	0.5268	2766	0.0004	0.0005	0.0008	0.0006	0.0009	0.0012	0.0013	0.0015	0.0017	0.0018
st dev	0.0009	0.0018	23	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002
Min.	0.2578	0.5228	2726	0.0003	0.0004	0.0007	0.0004	0.0006	0.0010	0.0010	0.0012	0.0014	0.0015
Max.	0.2612	0.5293	2816	0.0005	0.0006	0.0012	0.0009	0.0011	0.0014	0.0015	0.0017	0.0020	0.0022

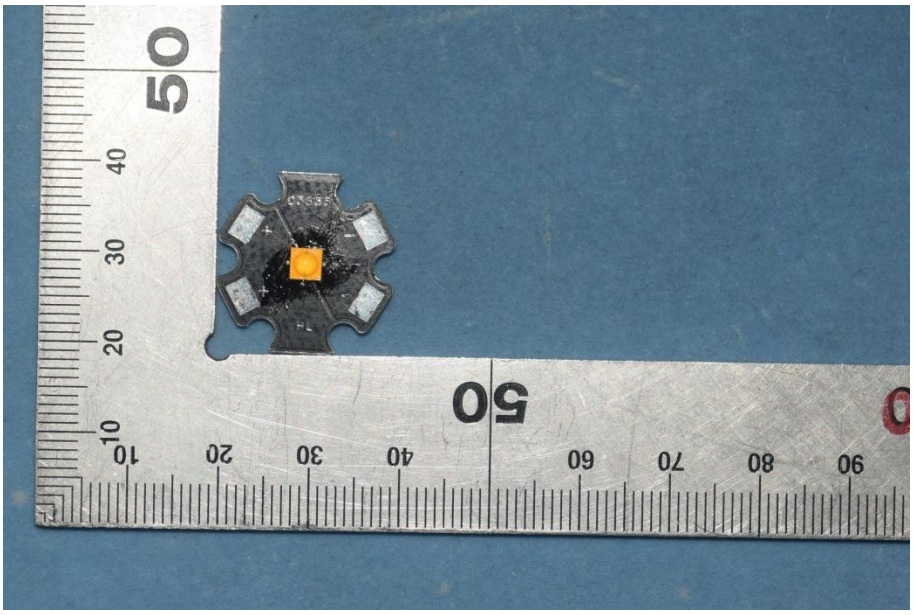
4 - DUT Photo

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.
2. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
3. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
4. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K=2 with the 95% confidence interval.
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**********END OF REPORT**********