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-AS-3030HW-3C-S1-08L-PCT-HR3(R9)

Report Type: 10000 Hours Test Report	**Product Type:** LED Package
Reviewed By:	Pote Wang
Report Number:	RSZ201203510-10-10000
Test Date:	2020-12-08 to 2022-03-03
Report Date:	2022-03-09
Approved by:	Bill Xiong / 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:

50 PCS test samples were in good condition and received on 2020-12-03. The samples were numbered from 1 to 25 and 26 to 50.

Manufacturer:	Hongli Zhihui Group Co.,Ltd. Guangzhou Branch
Part Number:	HL-AS-3030HW-3C-S1-08L-PCT-HR3(R9)
Part Type:	LED Package
#Drive Level:	DC 100mA
#Nominal CCT:	2700K
#Power:	1.0W
#Average Current Density per LED die:	688.895mA/mm^2
#Average Power Density per LED die:	2.296W/mm^2
#CRI:	80
#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 type	Model name	CRI (typ.)	CCT (typ.)	Series	Parallel	Power density (W/mm^2)	Current density per LED die (mA/mm^2)	Current per die (mA)	Distance between of dies （mm）	Current (mA)
Test model	HL-AS-3030H466W-3C-S1-08L-PCT-HR3(R9)	80	2700K	3	1	0.1111	688.895	100	0.15	100
multiple model	HL-AS-3030HW-3C-S1-08L-PCT-HR3(R9)	80	2700K	3	1	0.1111	688.895	100	0.15	100
multiple model	HL-**-3030H***W-3C-S1-08*-PCT-HR3(R9)-***	80	2200-6500K	3	1	0.1111	688.895	100	0.15	100
multiple model	HL-**-3030H***W-3C-S1-08*-PCT-HR3-***	80	2200-6500K	3	1	0.1111	688.895	100	0.15	100
multiple model	HL-**-3030D***W-3C-S1-08*-PCT-HR3(R9)-***	80	2200-6500K	3	1	0.1111	574.075	100	0.15	100
multiple model	HL-**-3030D***W-3C-S1-08*-PCT-HR3-***	80	2200-6500K	3	1	0.1111	574.075	100	0.15	100
multiple model	HL-**-3030D***W-3-S1-08*-PCT-HR3(R9)-***	80	2200-6500K	1	3	0.072	344.445	60	0.15	180
multiple model	HL-**-3030D***W-3-S1-08*-PCT-HR3-***	80	2200-6500K	1	3	0.072	344.445	60	0.15	180
multiple model	HL-**-3030H***W-3-S1-08*-PCT-HR3(R9)-***	80	2200-6500K	1	3	0.072	516.668	60	0.15	180
multiple model	HL-**-3030H***W-3-S1-08*-PCT-HR3-***	80	2200-6500K	1	3	0.072	516.668	60	0.15	180
multiple model	HL-**-3030D***W-3-S1-08*-PCT-HR3(R9)-***	80	2200-6500K	1	3	0.023	114.815	20	0.15	60
multiple model	HL-**-3030D***W-3-S1-08*-PCT-HR3-***	80	2200-6500K	1	3	0.023	114.815	20	0.15	60
multiple model	HL-**-3030H***W-3-S1-08*-PCT-HR3(R9)-***	80	2200-6500K	1	3	0.023	137.778	20	0.15	60

Model type	Model name	CRI (typ.)	CCT (typ.)	Series	Parallel	Power density (W/mm^2)	Current density per LED die (mA/mm^2)	Current per die (mA)	Distance between of dies （mm）	Current (mA)
multiple model	HL-**-3030H***W-3-S1-08*-PCT-HR3-***	80	2200-6500K	1	3	0.023	137.778	20	0.15	60
multiple model	HL-**-3030D***W-3-S1-08*-PCT-HR3(R9)-***	80	2200-6500K	1	3	0.0567	287.04	50	0.15	150
multiple model	HL-**-3030D***W-3-S1-08*-PCT-HR3-***	80	2200-6500K	1	3	0.0567	287.04	50	0.15	150
multiple model	HL-**-3030H***W-3-S1-08*-PCT-HR3(R9)-***	80	2200-6500K	1	3	0.0567	344.445	50	0.15	150
multiple model	HL-**-3030H***W-3-S1-08*-PCT-HR3-***	80	2200-6500K	1	3	0.0567	344.445	50	0.15	150
multiple model	SL-*B3030YTA-31KA*	80	2200-6500K	3	1	0.1111	688.895	100	0.15	100
multiple model	SL-*B3030YTA-31KA*H	80	2200-6500K	3	1	0.1111	688.895	100	0.15	100
multiple model	SL-*B3030YTA-31KA*-**	80	2200-6500K	3	1	0.1111	688.895	100	0.15	100
multiple model	SL-*B3030YTA-31KA*H-**	80	2200-6500K	3	1	0.1111	688.895	100	0.15	100
multiple model	SL-*3030YTA-31KA*/*	80	2200-6500K	3	1	0.1111	688.895	100	0.15	100
multiple model	SL-*3030YTA-31KA*H/*	80	2200-6500K	3	1	0.1111	688.895	100	0.15	100

Notes:

The family models and tested model could meet all the requirements listed as below:

a. The model name begins with "HL", such as "HL-**-3030H***W-3C-S1-08*-PCT-HR3(R9)-***","*" is described in detail as follows :
   1. The first“**” is a letter A or AS which stands for the Market demand.
   2. The second“***” is a number from 1 to 999 which stands for the brightness level.
   3. The third“*” is a letter L or None which stands for the bonding wire style.
   4. The fourth“***”is the letter or blank, which stands for the customer code.

b. The model name begins with "SL", such as" SL-*B3030YTA-31KA*H-**","*" is described in detail as follows:
   1. The first * is the letters I, N, W representing CCT. I means less than 3700K; N means 3700-4700K; W for more than 4700K.
   2. The second * is a different product solution, and the third and fourth * is different version numbers.
   3. The third and fourth * is different version numbers.

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	20005	2022-01-04	2023-01-03
Program-controlled D.C. Stabilized Voltage Supply	Hanshenpuyuan	HSPY-200-01	N/A	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, 100mA

Part Number:	HL-AS-3030HW-3C-S1-08L-PCT-HR3(R9)
Number of Units:	25
Case Temperature:	>53°C
Ambient Temperature:	>50°C
Life Test Drive Current:	100mA
Measurement Current:	100mA

Data Set 2: 105°C, 100mA

Part Number:	HL-AS-3030HW-3C-S1-08L-PCT-HR3(R9)
Number of Units:	25
Case Temperature:	>103°C
Ambient Temperature:	>100°C
Life Test Drive Current:	100mA
Measurement Current:	100mA

2 - Summary of Test Result

Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration	α	β	Reported TM-21 L_{70} Lifetime
1	25	0	1000hrs	10000hrs	2.590E-06	1.005	>60000 hours
2	25	0	1000hrs	10000hrs	3.099E-06	1.005	>60000 hours

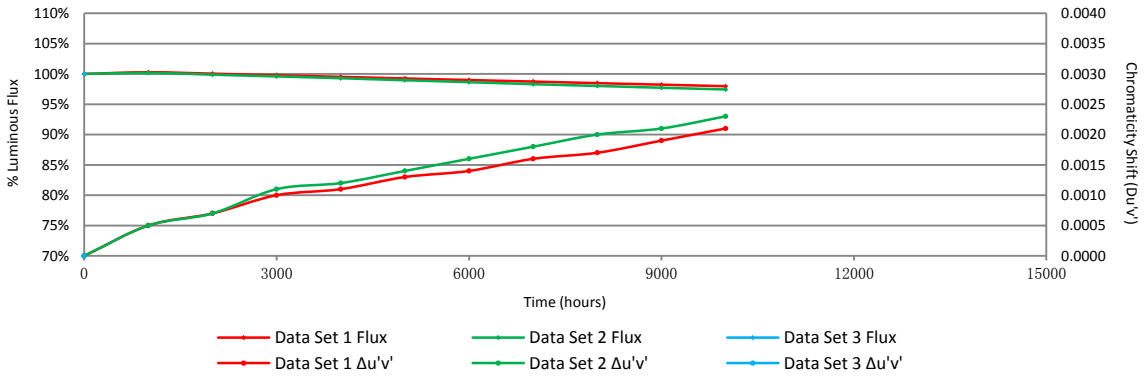
Average Lumen Maintenance (Percentage of Initial Luminous Flux)

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	100.28%	100.04%	99.78%	99.52%	99.25%	98.99%	98.74%	98.48%	98.23%	97.97%
2	100.17%	99.87%	99.59%	99.29%	98.96%	98.64%	98.31%	98.02%	97.72%	97.44%

Average Chromaticity Shift

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	0.0005	0.0007	0.0010	0.0011	0.0013	0.0014	0.0016	0.0017	0.0019	0.0021
2	0.0005	0.0007	0.0011	0.0012	0.0014	0.0016	0.0018	0.002	0.0021	0.0023

Average Lumen Maintenance and Chromaticity Shift VS. Time



3 - Test Data

3.1 Data Set 1, 55°C, 100mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	120.70	100.25	99.92	99.83	99.75	99.59	99.25	99.17	98.76	98.51	98.26
2	119.90	100.42	100.17	99.83	99.67	99.33	99.17	98.92	98.50	98.25	98.00
3	121.20	100.17	100.08	99.83	99.75	99.42	99.17	98.76	98.43	98.18	97.94
4	122.70	100.41	100.08	99.67	99.43	99.19	99.02	98.61	98.29	97.96	97.80
5	122.60	100.08	99.92	99.67	99.51	99.27	98.94	98.86	98.78	98.45	98.12
6	122.20	100.16	99.67	99.51	99.10	98.77	98.53	98.28	98.12	98.04	97.79
7	121.50	100.25	99.92	99.51	99.34	99.18	98.93	98.60	98.11	97.78	97.53
8	120.80	100.33	100.08	99.67	99.50	99.25	99.01	98.68	98.26	98.18	98.01
9	121.90	100.33	99.92	99.59	99.34	99.18	98.93	98.52	98.28	97.95	97.79
10	120.80	100.25	100.08	99.75	99.34	99.09	98.76	98.43	98.18	98.01	97.76
11	121.70	100.41	100.16	99.92	99.42	99.18	98.93	98.44	98.19	97.95	97.70
12	122.60	100.24	99.76	99.51	99.35	99.02	98.69	98.45	98.04	97.72	97.47
13	121.40	100.08	99.75	99.42	99.18	98.85	98.68	98.60	98.35	97.94	97.53
14	121.50	100.25	99.92	99.51	99.42	99.09	98.85	98.35	98.19	97.78	97.61
15	120.90	100.33	100.08	99.75	99.17	98.92	98.59	98.43	98.35	98.10	97.77
16	119.20	100.42	100.08	99.92	99.75	99.50	99.16	98.99	98.83	98.32	98.07
17	120.10	100.25	100.17	99.75	99.17	98.83	98.67	98.58	98.42	98.25	98.00
18	122.20	100.41	100.33	100.08	99.84	99.59	99.26	99.02	98.94	98.85	98.45
19	122.10	100.08	99.75	99.59	99.34	99.10	98.85	98.77	98.61	98.36	98.20
20	121.30	100.16	99.92	99.75	99.42	99.26	99.01	98.85	98.60	98.52	98.43
21	122.10	100.33	100.25	99.92	99.67	99.26	99.02	98.77	98.28	97.95	97.62
22	120.90	100.25	100.08	99.83	99.75	99.42	99.09	98.84	98.59	98.43	98.18
23	116.90	100.34	100.26	100.17	100.09	99.83	99.57	99.40	99.23	98.97	98.63
24	121.40	100.33	100.25	100.08	99.84	99.59	99.42	99.18	98.93	98.68	98.43
25	122.90	100.49	100.41	100.33	99.92	99.59	99.35	98.94	98.70	98.62	98.21
Avg.	121.26	100.28	100.04	99.78	99.52	99.25	98.99	98.74	98.48	98.23	97.97
Med.	121.40	100.25	100.08	99.75	99.43	99.25	99.01	98.76	98.42	98.18	98.00
st dev	1.29	0.11	0.19	0.23	0.26	0.27	0.26	0.28	0.31	0.34	0.32
Min.	116.90	100.08	99.67	99.42	99.10	98.77	98.53	98.28	98.04	97.72	97.47
Max.	122.90	100.49	100.41	100.33	100.09	99.83	99.57	99.40	99.23	98.97	98.63

3.2 Data Set 1, 55°C, 100mA (Forward Voltage)

No.	Forward Voltage (V)										
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	8.895	8.889	8.916	8.925	8.909	8.923	8.914	8.904	8.897	8.901	8.895
2	8.918	8.922	8.925	8.943	8.933	8.940	8.947	8.938	8.926	8.922	8.920
3	8.870	8.870	8.888	8.897	8.885	8.892	8.887	8.882	8.870	8.874	8.870
4	8.912	8.901	8.923	8.934	8.916	8.928	8.916	8.919	8.903	8.903	8.903
5	8.885	8.876	8.898	8.896	8.896	8.906	8.900	8.893	8.878	8.880	8.882
6	8.922	8.926	8.930	8.935	8.937	8.942	8.940	8.931	8.922	8.916	8.920
7	8.907	8.899	8.922	8.924	8.913	8.929	8.925	8.917	8.901	8.901	8.901
8	8.910	8.903	8.918	8.917	8.915	8.925	8.939	8.915	8.897	8.903	8.897
9	8.903	8.901	8.917	8.918	8.909	8.921	8.926	8.912	8.903	8.901	8.899
10	8.899	8.903	8.910	8.918	8.909	8.920	8.913	8.907	8.905	8.899	8.899
11	8.914	8.928	8.932	8.934	8.927	8.938	8.937	8.924	8.918	8.914	8.916
12	8.899	8.895	8.910	8.915	8.910	8.923	8.924	8.907	8.897	8.903	8.903
13	8.899	8.899	8.914	8.919	8.910	8.922	8.908	8.905	8.907	8.907	8.893
14	8.912	8.937	8.923	8.925	8.922	8.934	8.927	8.918	8.914	8.914	8.907
15	8.916	8.916	8.920	8.928	8.925	8.938	8.934	8.923	8.916	8.916	8.910
16	8.920	8.928	8.937	8.938	8.933	8.948	8.937	8.928	8.928	8.928	8.930
17	8.878	8.872	8.893	8.885	8.884	8.896	8.893	8.878	8.876	8.874	8.870
18	8.903	8.899	8.917	8.914	8.898	8.920	8.914	8.902	8.903	8.899	8.893
19	8.918	8.910	8.924	8.922	8.915	8.932	8.927	8.912	8.907	8.907	8.903
20	8.901	8.905	8.921	8.919	8.921	8.935	8.921	8.917	8.912	8.910	8.907
21	8.910	8.907	8.927	8.920	8.921	8.925	8.928	8.915	8.914	8.912	8.907
22	8.914	8.918	8.922	8.934	8.923	8.932	8.927	8.931	8.916	8.918	8.910
23	8.937	8.933	8.940	8.948	8.941	8.950	8.953	8.944	8.939	8.930	8.928
24	8.897	8.901	8.909	8.914	8.913	8.936	8.917	8.914	8.901	8.899	8.905
25	8.903	8.899	8.911	8.915	8.913	8.956	8.912	8.914	8.901	8.895	8.899
Avg.	8.906	8.905	8.918	8.921	8.915	8.928	8.923	8.914	8.906	8.905	8.903
Med.	8.907	8.903	8.920	8.920	8.915	8.929	8.925	8.915	8.905	8.903	8.903
st dev	0.014	0.018	0.012	0.014	0.014	0.015	0.016	0.015	0.016	0.014	0.015
Min.	8.870	8.870	8.888	8.885	8.884	8.892	8.887	8.878	8.870	8.874	8.870
Max.	8.937	8.937	8.940	8.948	8.941	8.956	8.953	8.944	8.939	8.930	8.930

3.3 Data Set 1, 55°C, 100mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')									
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	0.2598	0.5335	2731	0.0004	0.0006	0.0009	0.0007	0.0010	0.0012	0.0014	0.0016	0.0017	0.0019
2	0.2619	0.5331	2690	0.0004	0.0005	0.0009	0.0010	0.0011	0.0013	0.0016	0.0016	0.0018	0.0021
3	0.2599	0.5337	2727	0.0006	0.0007	0.0011	0.0014	0.0015	0.0016	0.0017	0.0019	0.0018	0.0023
4	0.2610	0.5343	2703	0.0006	0.0006	0.0011	0.0012	0.0015	0.0016	0.0016	0.0019	0.0019	0.0022
5	0.2594	0.5342	2736	0.0007	0.0007	0.0011	0.0011	0.0014	0.0016	0.0016	0.0021	0.0022	0.0023
6	0.2609	0.5337	2707	0.0005	0.0006	0.0009	0.0010	0.0011	0.0014	0.0016	0.0016	0.0021	0.0022
7	0.2606	0.5334	2716	0.0006	0.0009	0.0011	0.0011	0.0013	0.0016	0.0017	0.0019	0.0022	0.0025
8	0.2609	0.5331	2709	0.0006	0.0007	0.0011	0.0011	0.0014	0.0016	0.0020	0.0017	0.0020	0.0022
9	0.2616	0.5338	2693	0.0005	0.0007	0.0010	0.0009	0.0010	0.0012	0.0015	0.0014	0.0019	0.0019
10	0.2625	0.5329	2678	0.0004	0.0006	0.0011	0.0010	0.0011	0.0013	0.0017	0.0016	0.0018	0.0021
11	0.2603	0.5340	2719	0.0005	0.0008	0.0012	0.0012	0.0013	0.0014	0.0016	0.0016	0.0019	0.0020
12	0.2608	0.5340	2707	0.0005	0.0006	0.0011	0.0011	0.0013	0.0015	0.0015	0.0014	0.0017	0.0019
13	0.2608	0.5341	2708	0.0006	0.0007	0.0010	0.0010	0.0012	0.0015	0.0016	0.0014	0.0018	0.0018
14	0.2604	0.5345	2715	0.0006	0.0007	0.0010	0.0010	0.0012	0.0016	0.0017	0.0016	0.0020	0.0019
15	0.2607	0.5333	2714	0.0007	0.0009	0.0013	0.0013	0.0014	0.0017	0.0019	0.0020	0.0024	0.0024
16	0.2612	0.5332	2703	0.0005	0.0008	0.0011	0.0010	0.0013	0.0013	0.0016	0.0015	0.0017	0.0019
17	0.2600	0.5338	2725	0.0004	0.0006	0.0009	0.0009	0.0012	0.0013	0.0016	0.0017	0.0018	0.0017
18	0.2602	0.5336	2722	0.0004	0.0006	0.0010	0.0011	0.0013	0.0015	0.0018	0.0021	0.0020	0.0019
19	0.2610	0.5339	2704	0.0006	0.0008	0.0011	0.0011	0.0013	0.0016	0.0017	0.0019	0.0020	0.0020
20	0.2616	0.5332	2696	0.0004	0.0009	0.0010	0.0010	0.0012	0.0014	0.0017	0.0019	0.0020	0.0021
21	0.2606	0.5335	2715	0.0004	0.0006	0.0011	0.0010	0.0013	0.0015	0.0018	0.0021	0.0020	0.0023
22	0.2607	0.5338	2711	0.0006	0.0007	0.0010	0.0012	0.0013	0.0015	0.0017	0.0018	0.0019	0.0021
23	0.2605	0.5324	2720	0.0005	0.0007	0.0009	0.0011	0.0013	0.0014	0.0014	0.0016	0.0019	0.0020
24	0.2597	0.5336	2732	0.0004	0.0006	0.0009	0.0011	0.0012	0.0014	0.0014	0.0018	0.0017	0.0022
25	0.2604	0.5344	2714	0.0004	0.0006	0.0009	0.0009	0.0011	0.0014	0.0014	0.0018	0.0020	0.0023
Avg.	0.2607	0.5336	2712	0.0005	0.0007	0.0010	0.0011	0.0013	0.0014	0.0016	0.0017	0.0019	0.0021
Med.	0.2607	0.5337	2714	0.0005	0.0007	0.0010	0.0011	0.0013	0.0015	0.0016	0.0017	0.0019	0.0021
st dev	0.0007	0.0005	14	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002
Min.	0.2594	0.5324	2678	0.0004	0.0005	0.0009	0.0007	0.0010	0.0012	0.0014	0.0014	0.0017	0.0017
Max.	0.2625	0.5345	2736	0.0007	0.0009	0.0013	0.0014	0.0015	0.0017	0.0020	0.0021	0.0024	0.0025

3.4 Data Set 2, 105°C, 100mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
26	119.60	100.17	99.75	99.50	99.25	99.00	98.83	98.66	98.33	97.99	97.91
27	121.50	100.16	99.84	99.42	99.01	98.60	98.27	98.11	97.78	97.20	97.04
28	121.70	100.08	99.75	99.51	98.93	98.60	98.27	97.86	97.37	96.96	96.88
29	121.00	100.33	99.83	99.67	99.50	99.17	98.93	98.60	98.35	98.18	98.02
30	121.20	100.17	99.83	99.67	99.50	99.26	98.84	98.35	98.10	97.85	97.61
31	120.10	99.92	99.58	99.42	99.08	98.83	98.58	98.25	97.84	97.59	97.34
32	121.80	100.33	99.84	99.59	99.51	99.10	98.85	98.60	98.28	97.70	97.21
33	121.90	99.26	99.02	98.77	98.52	98.28	97.95	97.87	97.54	97.29	96.72
34	120.20	100.17	99.83	99.67	99.58	99.17	98.84	98.59	98.09	97.67	97.34
35	120.60	100.33	100.08	99.92	99.83	99.59	99.34	99.17	99.00	98.92	98.59
36	122.10	100.25	99.92	99.59	99.34	99.02	98.61	98.03	97.54	97.22	97.05
37	119.50	100.50	100.17	99.75	99.67	99.33	98.91	98.58	98.49	97.82	97.66
38	121.30	100.25	100.16	99.51	99.26	98.93	98.68	98.60	98.35	98.10	97.86
39	121.20	100.33	100.17	99.83	99.59	99.26	98.93	98.60	98.27	98.10	97.77
40	120.50	100.50	100.33	99.92	99.67	99.42	99.00	98.51	98.26	98.01	97.68
41	120.60	100.41	100.17	99.75	99.67	99.25	98.92	98.42	98.26	98.01	97.76
42	121.80	100.25	100.08	99.67	99.26	99.01	98.69	98.44	98.28	98.11	97.87
43	120.50	100.25	99.92	99.83	99.25	98.84	98.51	98.09	97.84	97.59	97.26
44	121.50	99.92	99.75	99.42	98.93	98.52	98.11	97.61	97.53	97.12	96.63
45	121.40	100.08	99.92	99.75	99.51	99.09	98.76	98.27	98.02	97.78	97.53
46	120.40	100.25	99.92	99.58	99.09	98.84	98.50	98.17	97.76	97.51	97.26
47	119.10	100.08	99.75	99.50	99.08	98.66	98.40	97.98	97.82	97.31	96.98
48	120.70	100.17	99.92	99.75	99.25	98.92	98.51	98.26	97.93	97.85	97.51
49	120.80	99.92	99.59	99.42	98.92	98.59	98.34	98.18	97.76	97.52	97.27
50	122.10	100.08	99.67	99.34	99.02	98.61	98.36	98.03	97.62	97.54	97.30
Avg.	120.92	100.17	99.87	99.59	99.29	98.96	98.64	98.31	98.02	97.72	97.44
Med.	121.00	100.17	99.84	99.59	99.26	99.00	98.68	98.27	98.02	97.70	97.34
st dev	0.82	0.25	0.26	0.24	0.31	0.32	0.32	0.33	0.38	0.43	0.45
Min.	119.10	99.26	99.02	98.77	98.52	98.28	97.95	97.61	97.37	96.96	96.63
Max.	122.10	100.50	100.33	99.92	99.83	99.59	99.34	99.17	99.00	98.92	98.59

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

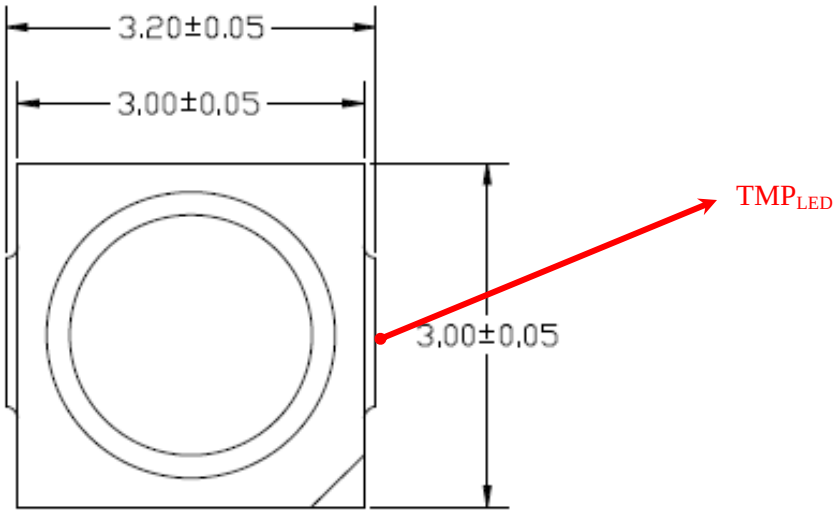
No.	Forward Voltage (V)										
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
26	8.912	8.914	8.926	8.938	8.934	8.953	8.946	8.926	8.918	8.920	8.914
27	8.905	8.912	8.920	8.925	8.924	8.959	8.953	8.915	8.907	8.905	8.907
28	8.912	8.905	8.921	8.921	8.920	8.947	8.945	8.915	8.907	8.905	8.903
29	8.907	8.914	8.920	8.923	8.922	8.944	8.948	8.920	8.914	8.916	8.903
30	8.878	8.891	8.906	8.903	8.897	8.924	8.912	8.897	8.891	8.887	8.880
31	8.914	8.926	8.938	8.940	8.932	8.951	8.946	8.927	8.924	8.922	8.922
32	8.895	8.905	8.919	8.920	8.908	8.922	8.933	8.917	8.901	8.901	8.899
33	8.907	8.918	8.921	8.919	8.916	8.924	8.924	8.917	8.916	8.905	8.901
34	8.918	8.918	8.934	8.937	8.934	8.938	8.928	8.933	8.933	8.930	8.924
35	8.928	8.939	8.947	8.947	8.935	8.947	8.938	8.958	8.943	8.928	8.928
36	8.907	8.912	8.923	8.920	8.912	8.923	8.925	8.913	8.914	8.901	8.910
37	8.891	8.901	8.916	8.913	8.910	8.919	8.914	8.918	8.905	8.903	8.905
38	8.914	8.916	8.922	8.924	8.924	8.929	8.925	8.918	8.918	8.903	8.916
39	8.893	8.893	8.902	8.909	8.910	8.917	8.917	8.904	8.903	8.893	8.895
40	8.899	8.910	8.916	8.915	8.915	8.919	8.919	8.913	8.920	8.903	8.910
41	8.891	8.889	8.905	8.900	8.903	8.907	8.901	8.898	8.901	8.891	8.893
42	8.882	8.885	8.894	8.895	8.891	8.898	8.903	8.885	8.889	8.885	8.882
43	8.895	8.901	8.911	8.915	8.912	8.920	8.912	8.905	8.910	8.901	8.899
44	8.899	8.901	8.901	8.910	8.901	8.910	8.911	8.899	8.901	8.897	8.889
45	8.903	8.901	8.915	8.916	8.910	8.922	8.920	8.909	8.907	8.907	8.901
46	8.905	8.912	8.920	8.925	8.919	8.928	8.928	8.919	8.912	8.907	8.916
47	8.926	8.928	8.935	8.945	8.935	8.954	8.950	8.937	8.941	8.928	8.939
48	8.907	8.905	8.910	8.912	8.905	8.921	8.915	8.907	8.907	8.901	8.910
49	8.916	8.903	8.918	8.922	8.908	8.925	8.922	8.914	8.910	8.905	8.905
50	8.889	8.897	8.899	8.900	8.899	8.911	8.904	8.894	8.893	8.882	8.891
Avg.	8.904	8.908	8.918	8.920	8.915	8.928	8.926	8.914	8.911	8.905	8.906
Med.	8.905	8.905	8.919	8.920	8.912	8.924	8.924	8.915	8.910	8.903	8.905
st dev	0.013	0.013	0.013	0.014	0.013	0.016	0.016	0.015	0.014	0.013	0.014
Min.	8.878	8.885	8.894	8.895	8.891	8.898	8.901	8.885	8.889	8.882	8.880
Max.	8.928	8.939	8.947	8.947	8.935	8.959	8.953	8.958	8.943	8.930	8.939

3.6 Data Set 2, 105°C, 100mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')									
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
26	0.2598	0.5320	2736	0.0005	0.0007	0.0012	0.0012	0.0015	0.0017	0.0019	0.0019	0.0020	0.0022
27	0.2605	0.5344	2713	0.0004	0.0005	0.0009	0.0010	0.0011	0.0014	0.0017	0.0018	0.0019	0.0021
28	0.2604	0.5338	2717	0.0005	0.0006	0.0011	0.0011	0.0012	0.0014	0.0017	0.0017	0.0018	0.0020
29	0.2606	0.5336	2713	0.0004	0.0007	0.0010	0.0009	0.0012	0.0014	0.0016	0.0018	0.0017	0.0021
30	0.2609	0.5337	2708	0.0005	0.0006	0.0011	0.0011	0.0012	0.0014	0.0017	0.0017	0.0017	0.0019
31	0.2605	0.5316	2725	0.0005	0.0007	0.0011	0.0011	0.0014	0.0016	0.0019	0.0021	0.0019	0.0020
32	0.2608	0.5335	2711	0.0004	0.0006	0.0011	0.0012	0.0014	0.0016	0.0017	0.0021	0.0021	0.0022
33	0.2597	0.5341	2731	0.0008	0.0010	0.0014	0.0014	0.0016	0.0018	0.0018	0.0023	0.0022	0.0021
34	0.2601	0.5310	2735	0.0003	0.0009	0.0016	0.0021	0.0022	0.0023	0.0023	0.0023	0.0027	0.0027
35	0.2612	0.5330	2705	0.0005	0.0008	0.0013	0.0013	0.0014	0.0016	0.0019	0.0020	0.0022	0.0022
36	0.2600	0.5335	2728	0.0006	0.0008	0.0013	0.0013	0.0016	0.0019	0.0020	0.0021	0.0024	0.0026
37	0.2594	0.5326	2744	0.0006	0.0007	0.0011	0.0012	0.0015	0.0018	0.0020	0.0021	0.0024	0.0025
38	0.2615	0.5341	2695	0.0005	0.0009	0.0011	0.0013	0.0015	0.0018	0.0018	0.0022	0.0021	0.0023
39	0.2593	0.5333	2742	0.0004	0.0007	0.0011	0.0011	0.0014	0.0015	0.0017	0.0021	0.0020	0.0021
40	0.2595	0.5336	2736	0.0004	0.0007	0.0011	0.0011	0.0013	0.0015	0.0017	0.0019	0.0020	0.0021
41	0.2605	0.5338	2715	0.0005	0.0006	0.0011	0.0010	0.0012	0.0016	0.0017	0.0018	0.0021	0.0022
42	0.2598	0.5339	2729	0.0006	0.0007	0.0012	0.0013	0.0014	0.0016	0.0020	0.0022	0.0023	0.0024
43	0.2616	0.5333	2694	0.0005	0.0006	0.0013	0.0012	0.0014	0.0015	0.0019	0.0022	0.0023	0.0024
44	0.2612	0.5338	2701	0.0006	0.0008	0.0011	0.0012	0.0015	0.0017	0.0018	0.0021	0.0022	0.0024
45	0.2608	0.5340	2708	0.0004	0.0005	0.0009	0.0010	0.0013	0.0015	0.0017	0.0017	0.0019	0.0023
46	0.2619	0.5324	2691	0.0006	0.0008	0.0010	0.0012	0.0013	0.0015	0.0018	0.0019	0.0021	0.0024
47	0.2628	0.5314	2679	0.0006	0.0009	0.0012	0.0012	0.0013	0.0016	0.0018	0.0019	0.0021	0.0024
48	0.2614	0.5333	2700	0.0004	0.0006	0.0011	0.0011	0.0014	0.0016	0.0017	0.0021	0.0023	0.0021
49	0.2610	0.5341	2704	0.0004	0.0006	0.0010	0.0012	0.0014	0.0017	0.0018	0.0023	0.0022	0.0024
50	0.2591	0.5342	2742	0.0003	0.0005	0.0010	0.0011	0.0014	0.0016	0.0018	0.0022	0.0022	0.0022
Avg.	0.2606	0.5333	2716	0.0005	0.0007	0.0011	0.0012	0.0014	0.0016	0.0018	0.0020	0.0021	0.0023
Med.	0.2605	0.5336	2713	0.0005	0.0007	0.0011	0.0012	0.0014	0.0016	0.0018	0.0021	0.0021	0.0022
st dev	0.0009	0.0009	18	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0001	0.0002	0.0002	0.0002
Min.	0.2591	0.5310	2679	0.0003	0.0005	0.0009	0.0009	0.0011	0.0014	0.0016	0.0017	0.0017	0.0019
Max.	0.2628	0.5344	2744	0.0008	0.0010	0.0016	0.0021	0.0022	0.0023	0.0023	0.0023	0.0027	0.0027

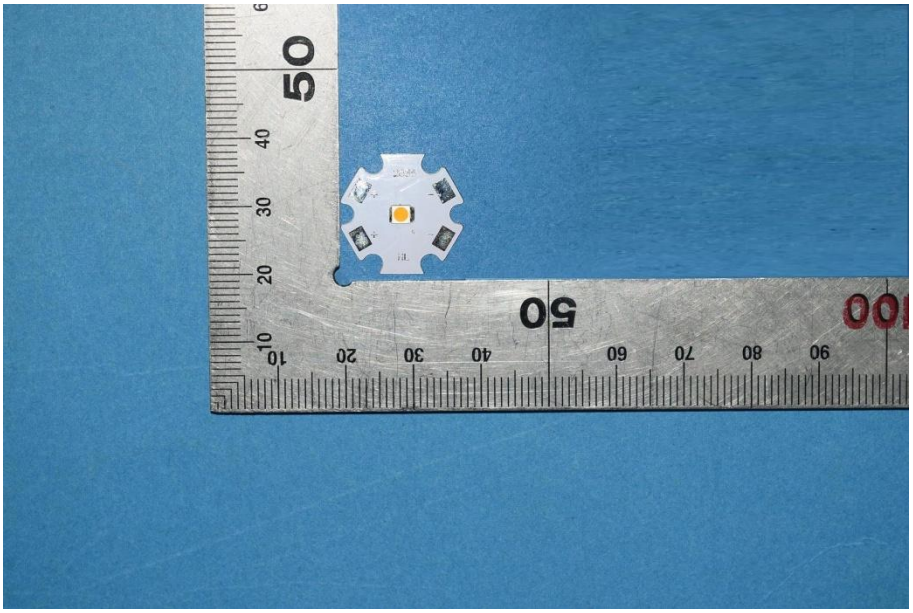
4 - DUT Photo

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**********