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-2835HW-2C-S1-08-PCT-HR5

Report Type: 9000 Hours Test Report	**Product Type:** LED Package
Test Engineer:	Pote Wang
Report Number:	RSZ181027501-10-9000
Test Date:	2018-10-27 to 2019-11-20
Report Date:	2019-11-21
Reviewed By:	Blake Zhang / EE Engineer
Test Facility:	Test facility was located at No.69,Pulongcun ,Puxinhu Industrial Area, Tangxia , Dongguan, Guangdong, China.
Prepared By:	Bay Area Compliance Laboratories Corp. (Dongguan). No.69,Pulongcun ,Puxinhu Industrial Area, Tangxia , Dongguan, Guangdong, China. Tel: +86-0769-86858888 Fax:+86-0769-86858588
Accreditation:	The IAS Accreditation Number TL-460.

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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 2018-10-27. The samples were numbered from 1 to 25 and 26 to 50.

#Manufacturer:	Hongli Zhihui Group Co.,Ltd. Guangzhou Branch
#Part Number:	HL-AS-2835HW-2C-S1-08-PCT-HR5
#Part Type:	LED Package
#Drive Level:	DC 150mA
#Nominal CCT:	2700K
#Power:	1 W
#Average Current Density per LED die:	861.11 mA/mm^2
#Average Power Density per LED die:	2.768 W/mm^2
#CRI:	90
#Die Spacing:	0.15 mm

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	CRI	CCT	Series	Parallel	Power density (W/mm^2)	Current density per LED die (mA/mm^2)	Current per die (mA)	Distance between of dies	Current (mA)
HL-AS-2835HW-2C-S1-08-PCT-HR5	90	2700K	2	1	0.1021	861.11	150	0.15	150
HL-AS-2835HW-2C-S1-08-PCT-HR5(R9)	90	2700K	2	1	0.1021	861.11	150	0.15	150
HL-AS-2835HW-2C-S1-08L-PCT-HR5	90	2700K	2	1	0.1021	861.11	150	0.15	150
HL-AS-2835HW-2C-S1-08L-PCT-HR5(R9)	90	2700K	2	1	0.1021	861.11	150	0.15	150
HL-AS-2835DW-2C-S1-08-PCT-HR5	90	2700K	2	1	0.1021	861.11	150	0.15	150
HL-AS-2835DW-2C-S1-08-PCT-HR5(R9)	90	2700K	2	1	0.1021	861.11	150	0.15	150
HL-AS-2835DW-2C-S1-08L-PCT-HR5	90	2700K	2	1	0.1021	861.11	150	0.15	150
HL-AS-2835DW-2C-S1-08L-PCT-HR5(R9)	90	2700K	2	1	0.1021	861.11	150	0.15	150
HL-AS-2835HW-S1-08-PCT-HR5	90	2700K	1	1	0.0510	861.11	150	/	150
HL-AS-2835HW-S1-08-PCT-HR5(R9)	90	2700K	1	1	0.0510	861.11	150	/	150
HL-AS-2835HW-S1-08L-PCT-HR5	90	2700K	1	1	0.0510	861.11	150	/	150

HL-AS-2835HW-S1-08L-PCT-HR5(R9)	90	2700K	1	1	0.0510	861.11	150	/	150
HL-AS-2835DW-S1-08-PCT-HR5	90	2700K	1	1	0.0510	861.11	150	/	150
HL-AS-2835DW-S1-08-PCT-HR5(R9)	90	2700K	1	1	0.0510	861.11	150	/	150
HL-AS-2835DW-S1-08L-PCT-HR5	90	2700K	1	1	0.0510	861.11	150	/	150
HL-AS-2835DW-S1-08L-PCT-HR5(R9)	90	2700K	1	1	0.0510	861.11	150	/	150
HL-AS-2835D90W-2C-S1-08-PCT-HR5-CS-KY	90	2700K	2	1	0.1021	301.84	150	0.15	150
HL-AS-2835D90W-2C-S1-08-PCT-HR5 -KY	90	2700K	2	1	0.1021	301.84	150	0.15	150
HL-AS-2835D90W-2C-S1-08L-PCT-HR5-CS-KY	90	2700K	2	1	0.1021	301.84	150	0.15	150
HL-AS-2835D90W-2C-S1-08L-PCT-HR5 -KY	90	2700K	2	1	0.1021	301.84	150	0.15	150
HL-AS-2835DW-2C-S1-08-PCT-HR5-CS-KY	90	2700K	2	1	0.1021	301.84	150	0.15	150
HL-AS-2835DW-2C-S1-08-PCT-HR5 -KY	90	2700K	2	1	0.1021	301.84	150	0.15	150
HL-AS-2835DW-2C-S1-08L-PCT-HR5-CS-KY	90	2700K	2	1	0.1021	301.84	150	0.15	150
HL-AS-2835DW-2C-S1-08L-PCT-HR5 -KY	90	2700K	2	1	0.1021	301.84	150	0.15	150
SL-*D2835FTA-21EA*	90	2700K	2	1	0.1021	861.11	150	0.15	150
SL-*D2835FTA-21EA*H	90	2700K	2	1	0.1021	861.11	150	0.15	150
SL-*D2835FTA-21EA*-**	90	2700K	2	1	0.1021	861.11	150	0.15	150
SL-*D2835FTA-21EA*-***	90	2700K	2	1	0.1021	861.11	150	0.15	150
SL-*D2835FTA-21EA*-*	90	2700K	2	1	0.1021	861.11	150	0.15	150
SL-*D2835FTA-21EA*H-*	90	2700K	2	1	0.1021	861.11	150	0.15	150
SL-*D2835FTA-21EA*H-**	90	2700K	2	1	0.1021	861.11	150	0.15	150
SL-*D2835FTA-21EA*H-***	90	2700K	2	1	0.1021	861.11	150	0.15	150
SL-*D2835FTA-21EA*/*	90	2700K	2	1	0.1021	861.11	150	0.15	150
SL-*D2835FTA-21EA*H/*	90	2700K	2	1	0.1021	861.11	150	0.15	150
SL-**D2835FTA-21EA****-APH***	90	2700K	2	1	0.1021	861.11	150	0.15	150
SL-*D2835FTA-11EA*	90	2700K	1	1	0.0510	861.11	150	/	150
SL-*D2835FTA-11EA*H	90	2700K	1	1	0.0510	861.11	150	/	150

Note:
1. The first * is the letters I, N, W representing CCT. I means less than 3700K; N means 3700K-4700K; W For more than 4700K. The second * is different product solutions (color coordination and application, special solutions, etc.), the third * and the fourth * and the fifth are different version numbers.
2. The first and second * of SL-**D2835FTA-31KA****-APH*** is a numbers 27, 30,40,50,65, which stand for CCT. Number From three to six * is a different product solution (Color coordinate and applications and special solution etc…), from seven to nine * 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
0.3m integrating sphere	EVERFINE	Diameter 0.3m	1011119	2019-03-18	2020-03-17
Programmable Test Power for LEDs	EVERFINE	LED300E	1008002	2019-03-26	2020-03-25
High accuracy array spectroradiometer	EVERFINE	HAAS-2000	1012016T	2019-03-18	2020-03-17
Standard Light Source	EVERFINE	D062	G100278CJ7351206	2018-12-24	2019-12-24
Precision digital stabilized DC power supply	EVERFINE	WY605-V110	G115987CJ7321114	2019-03-26	2020-03-25
Multilayer aging machine	BACL	B2-270	20023	2019-03-13	2020-03-12
DC Power Supply	BACL	B12001-12	90023	2018-12-17	2019-12-17

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).

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1.8 Sample Set

Data Set 1: 85°C, 150mA

Part Number:	HL-AS-2835HW-2C-S1-08-PCT-HR5
Number of Units:	25
Case Temperature:	>83°C
Ambient Temperature:	>80°C
Life Test Drive Current:	150mA
Measurement Current:	150mA

Data Set 2: 105°C,150mA

Part Number:	HL-AS-2835HW-2C-S1-08-PCT-HR5
Number of Units:	25
Case Temperature:	>103°C
Ambient Temperature:	>100°C
Life Test Drive Current:	150mA
Measurement Current:	150mA

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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	9000hrs	2.694E-06	1.005	>54000 hours
2	25	0	1000hrs	9000hrs	3.267E-06	1.004	>54000 hours

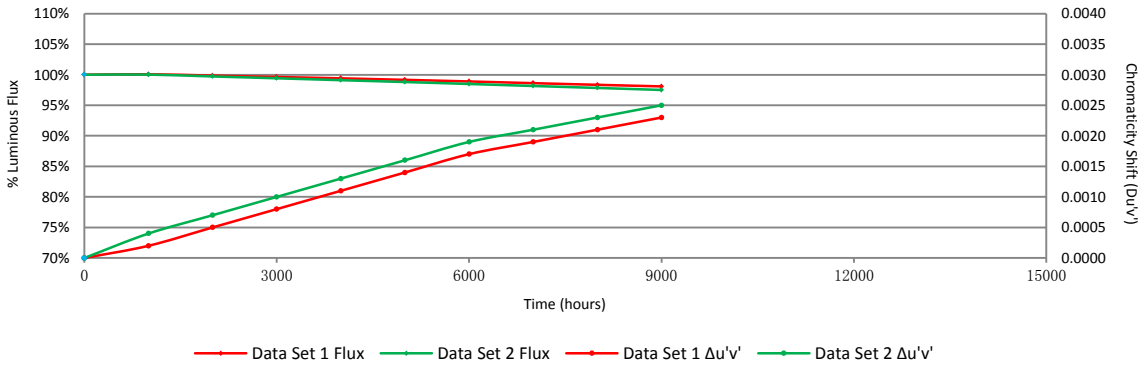
Average Lumen Maintenance (Percentage of Initial Luminous Flux)

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	100.08%	99.85%	99.63%	99.41%	99.16%	98.90%	98.62%	98.35%	98.09%
2	100.02%	99.72%	99.42%	99.11%	98.81%	98.49%	98.16%	97.84%	97.51%

Average Chromaticity Shift

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	0.0002	0.0005	0.0008	0.0011	0.0014	0.0017	0.0019	0.0021	0.0023
2	0.0004	0.0007	0.001	0.0013	0.0016	0.0019	0.0021	0.0023	0.0025

Average Lumen Maintenance and Chromaticity Shift VS. Time



3 - Test Data

3.1 Data Set 1, 85°C, 150mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	112.1	99.91	99.73	99.46	99.38	98.93	98.75	98.57	98.22	98.04
2	108.8	100.18	99.82	99.45	99.26	99.08	98.62	98.44	98.16	97.70
3	112.8	100.09	99.91	99.73	99.47	99.29	98.94	98.67	98.32	98.14
4	111.8	100.18	99.91	99.55	99.28	99.02	98.75	98.48	98.21	97.94
5	111.9	100.09	100.00	99.91	99.64	99.37	99.29	99.02	98.75	98.48
6	113.0	100.35	100.09	99.82	99.73	99.56	99.38	99.03	98.67	98.32
7	109.9	100.18	100.09	100.00	99.73	99.45	99.09	98.73	98.45	98.18
8	110.5	100.27	99.82	99.64	99.55	99.37	99.19	99.00	98.82	98.46
9	111.5	100.27	100.09	99.82	99.55	99.37	99.01	98.65	98.48	98.30
10	110.7	100.18	100.00	99.73	99.64	99.19	99.01	98.74	98.46	98.28
11	111.7	100.18	100.09	99.91	99.64	99.37	99.10	98.75	98.39	98.12
12	112.0	99.82	99.64	99.38	99.29	99.11	98.84	98.48	98.30	98.13
13	110.6	100.27	100.09	100.00	99.91	99.73	99.37	99.10	98.73	98.55
14	111.1	100.18	100.00	99.91	99.82	99.55	99.28	98.92	98.65	98.38
15	109.6	99.82	99.54	99.09	98.81	98.63	98.36	98.18	97.99	97.81
16	112.0	99.91	99.46	99.20	98.93	98.66	98.48	98.13	97.95	97.59
17	110.8	100.09	99.64	99.37	99.10	98.83	98.47	98.19	97.92	97.65
18	111.6	99.82	99.46	99.10	98.84	98.66	98.48	98.21	97.85	97.58
19	112.5	100.09	99.82	99.47	99.02	98.93	98.76	98.58	98.40	98.04
20	111.7	99.91	99.73	99.64	99.37	99.10	98.75	98.57	98.21	98.03
21	111.7	100.09	99.82	99.55	99.46	99.28	99.19	98.84	98.66	98.48
22	111.6	100.09	99.91	99.82	99.46	99.28	98.84	98.66	98.30	98.03
23	112.2	100.27	100.09	100.00	99.64	99.20	99.02	98.66	98.40	98.13
24	111.7	99.91	99.64	99.37	99.10	98.84	98.48	98.21	98.03	97.76
25	112.3	99.91	99.82	99.73	99.55	99.29	99.11	98.75	98.40	98.13
Avg.	111.4	100.08	99.85	99.63	99.41	99.16	98.90	98.62	98.35	98.09
Med.	111.7	100.09	99.82	99.64	99.46	99.20	98.94	98.66	98.39	98.13
st dev	1.0	0.16	0.20	0.28	0.30	0.30	0.31	0.28	0.27	0.29
Min.	108.8	99.82	99.46	99.09	98.81	98.63	98.36	98.13	97.85	97.58
Max.	113.0	100.35	100.09	100.00	99.91	99.73	99.38	99.10	98.82	98.55

3.2 Data Set 1, 85°C, 150mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	6.380	6.378	6.368	6.381	6.371	6.380	6.374	6.380	6.378	6.370
2	6.392	6.371	6.384	6.386	6.384	6.390	6.405	6.391	6.387	6.384
3	6.369	6.360	6.356	6.354	6.352	6.356	6.358	6.366	6.364	6.354
4	6.312	6.288	6.296	6.293	6.294	6.291	6.291	6.311	6.305	6.308
5	6.309	6.306	6.311	6.311	6.308	6.309	6.309	6.312	6.346	6.330
6	6.294	6.299	6.302	6.298	6.301	6.298	6.303	6.311	6.306	6.315
7	6.376	6.385	6.392	6.391	6.389	6.383	6.388	6.392	6.401	6.406
8	6.304	6.313	6.316	6.316	6.313	6.318	6.316	6.314	6.358	6.335
9	6.373	6.373	6.372	6.375	6.372	6.371	6.375	6.374	6.376	6.405
10	6.308	6.322	6.329	6.320	6.321	6.321	6.319	6.324	6.331	6.358
11	6.385	6.398	6.412	6.399	6.396	6.395	6.395	6.405	6.407	6.417
12	6.368	6.380	6.395	6.384	6.383	6.380	6.381	6.395	6.444	6.405
13	6.368	6.371	6.380	6.369	6.370	6.369	6.368	6.370	6.432	6.393
14	6.292	6.299	6.326	6.299	6.304	6.300	6.295	6.313	6.347	6.358
15	6.323	6.336	6.352	6.334	6.337	6.335	6.331	6.366	6.345	6.361
16	6.322	6.335	6.350	6.332	6.337	6.331	6.330	6.358	6.368	6.384
17	6.315	6.328	6.353	6.326	6.327	6.326	6.322	6.343	6.332	6.344
18	6.454	6.450	6.455	6.449	6.455	6.451	6.448	6.463	6.455	6.482
19	6.312	6.329	6.332	6.326	6.329	6.329	6.322	6.416	6.331	6.346
20	6.395	6.424	6.424	6.419	6.417	6.419	6.412	6.431	6.422	6.425
21	6.334	6.355	6.371	6.352	6.350	6.358	6.349	6.381	6.367	6.360
22	6.357	6.362	6.378	6.365	6.361	6.364	6.360	6.379	6.372	6.380
23	6.416	6.435	6.443	6.437	6.437	6.434	6.443	6.468	6.438	6.445
24	6.403	6.426	6.428	6.426	6.431	6.428	6.420	6.438	6.428	6.443
25	6.361	6.379	6.382	6.382	6.380	6.377	6.378	6.409	6.381	6.390
Avg.	6.353	6.360	6.368	6.361	6.361	6.361	6.360	6.376	6.377	6.380
Med.	6.361	6.362	6.371	6.365	6.361	6.364	6.360	6.379	6.372	6.380
st dev	0.043	0.045	0.043	0.045	0.045	0.044	0.045	0.047	0.043	0.042
Min.	6.292	6.288	6.296	6.293	6.294	6.291	6.291	6.311	6.305	6.308
Max.	6.454	6.450	6.455	6.449	6.455	6.451	6.448	6.468	6.455	6.482

3.3 Data Set 1, 85°C, 150mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')								
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	0.2617	0.5315	2701	0.0001	0.0004	0.0009	0.0014	0.0017	0.0020	0.0022	0.0023	0.0025
2	0.2610	0.5305	2719	0.0004	0.0006	0.0011	0.0015	0.0018	0.0021	0.0025	0.0027	0.0030
3	0.2575	0.5284	2802	0.0003	0.0005	0.0010	0.0011	0.0017	0.0022	0.0025	0.0028	0.0030
4	0.2601	0.5301	2738	0.0001	0.0003	0.0007	0.0011	0.0014	0.0019	0.0022	0.0025	0.0027
5	0.2593	0.5314	2750	0.0003	0.0004	0.0007	0.0011	0.0014	0.0019	0.0021	0.0023	0.0025
6	0.2599	0.5315	2738	0.0002	0.0004	0.0008	0.0009	0.0014	0.0018	0.0019	0.0020	0.0024
7	0.2644	0.5310	2647	0.0002	0.0004	0.0005	0.0008	0.0013	0.0017	0.0019	0.0022	0.0024
8	0.2653	0.5301	2633	0.0001	0.0006	0.0009	0.0012	0.0014	0.0015	0.0017	0.0019	0.0021
9	0.2601	0.5288	2743	0.0001	0.0004	0.0010	0.0012	0.0013	0.0015	0.0017	0.0020	0.0021
10	0.2634	0.5316	2664	0.0001	0.0002	0.0006	0.0010	0.0011	0.0014	0.0016	0.0017	0.0018
11	0.2641	0.5318	2652	0.0002	0.0004	0.0009	0.0014	0.0017	0.0019	0.0020	0.0021	0.0023
12	0.2626	0.5322	2680	0.0004	0.0006	0.0009	0.0012	0.0016	0.0019	0.0021	0.0023	0.0024
13	0.2633	0.5316	2667	0.0002	0.0005	0.0009	0.0012	0.0014	0.0017	0.0019	0.0021	0.0024
14	0.2594	0.5297	2756	0.0002	0.0005	0.0008	0.0010	0.0012	0.0016	0.0017	0.0018	0.0022
15	0.2587	0.5278	2779	0.0002	0.0006	0.0009	0.0011	0.0013	0.0014	0.0017	0.0019	0.0021
16	0.2604	0.5301	2732	0.0003	0.0005	0.0007	0.0008	0.0013	0.0016	0.0017	0.0019	0.0021
17	0.2617	0.5309	2703	0.0001	0.0004	0.0009	0.0011	0.0014	0.0016	0.0019	0.0020	0.0021
18	0.2634	0.5299	2671	0.0002	0.0006	0.0008	0.0009	0.0013	0.0017	0.0019	0.0022	0.0025
19	0.2606	0.5299	2729	0.0001	0.0004	0.0005	0.0007	0.0009	0.0013	0.0015	0.0019	0.0021
20	0.2623	0.5326	2683	0.0003	0.0004	0.0007	0.0010	0.0012	0.0015	0.0017	0.0020	0.0022
21	0.2594	0.5295	2756	0.0003	0.0004	0.0008	0.0009	0.0011	0.0014	0.0017	0.0019	0.0021
22	0.2602	0.5291	2740	0.0005	0.0009	0.0010	0.0013	0.0015	0.0018	0.0020	0.0023	0.0024
23	0.2597	0.5319	2740	0.0001	0.0004	0.0009	0.0011	0.0015	0.0016	0.0018	0.0022	0.0023
24	0.2590	0.5290	2766	0.0001	0.0002	0.0004	0.0008	0.0013	0.0017	0.0020	0.0022	0.0025
25	0.2597	0.5295	2750	0.0002	0.0004	0.0007	0.0009	0.0012	0.0017	0.0019	0.0021	0.0023
Avg.	0.2611	0.5304	2718	0.0002	0.0005	0.0008	0.0011	0.0014	0.0017	0.0019	0.0021	0.0023
Med.	0.2604	0.5301	2732	0.0002	0.0004	0.0008	0.0011	0.0014	0.0017	0.0019	0.0021	0.0023
st dev	0.0020	0.0013	45	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003
Min.	0.2575	0.5278	2633	0.0001	0.0002	0.0004	0.0007	0.0009	0.0013	0.0015	0.0017	0.0018
Max.	0.2653	0.5326	2802	0.0005	0.0009	0.0011	0.0015	0.0018	0.0022	0.0025	0.0028	0.0030

3.4 Data Set 2, 105°C, 150mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	110.9	99.91	99.64	99.37	99.19	99.01	98.74	98.47	98.11	97.75
27	110.9	99.91	99.64	99.19	99.10	98.74	98.38	98.20	97.84	97.39
28	111.8	100.00	99.64	99.37	98.93	98.57	98.03	97.76	97.58	97.32
29	111.4	100.18	99.82	99.37	99.01	98.65	98.20	97.76	97.49	97.04
30	110.8	100.18	99.91	99.46	99.10	98.74	98.29	97.92	97.47	97.11
31	111.5	99.91	99.55	99.37	99.10	99.01	98.65	98.30	97.85	97.49
32	110.7	99.82	99.55	99.28	98.92	98.64	98.28	97.92	97.56	97.20
33	109.6	100.27	99.82	99.45	99.18	98.91	98.54	98.08	97.72	97.45
34	111.7	99.91	99.55	99.10	98.66	98.48	98.39	97.94	97.58	97.22
35	110.2	100.00	99.64	99.27	98.91	98.55	98.19	98.00	97.82	97.64
36	111.3	99.91	99.73	99.46	99.01	98.56	98.29	97.93	97.66	97.30
37	109.9	100.09	99.64	99.55	99.18	98.91	98.54	98.18	97.82	97.54
38	108.3	99.91	99.72	99.26	98.98	98.71	98.34	97.97	97.69	97.32
39	111.1	100.18	99.91	99.73	99.46	99.19	99.01	98.65	98.29	97.93
40	108.3	100.18	100.00	99.91	99.82	99.54	99.26	98.89	98.52	98.34
41	111.2	99.73	99.37	99.01	98.65	98.38	98.02	97.75	97.39	97.12
42	111.9	99.82	99.55	99.11	98.84	98.57	98.30	98.12	97.94	97.50
43	110.5	100.09	99.73	99.64	99.28	98.73	98.46	98.10	97.83	97.47
44	110.2	100.09	99.73	99.36	99.09	98.82	98.46	98.09	97.73	97.55
45	112.0	100.09	99.82	99.38	98.93	98.75	98.39	97.95	97.68	97.32
46	112.0	99.91	99.73	99.46	99.20	98.84	98.66	98.21	97.86	97.50
47	111.0	99.91	99.64	99.55	99.28	98.92	98.83	98.56	98.20	97.84
48	108.9	100.28	100.00	99.54	99.36	98.99	98.62	98.26	97.98	97.61
49	111.4	100.09	99.73	99.64	99.46	99.28	98.92	98.65	98.20	98.03
50	111.3	100.09	99.82	99.55	99.19	98.83	98.56	98.29	98.11	97.75
Avg.	110.8	100.02	99.72	99.42	99.11	98.81	98.49	98.16	97.84	97.51
Med.	111.0	100.00	99.73	99.38	99.10	98.75	98.46	98.10	97.82	97.49
st dev	1.1	0.15	0.15	0.20	0.25	0.26	0.30	0.30	0.28	0.31
Min.	108.3	99.73	99.37	99.01	98.65	98.38	98.02	97.75	97.39	97.04
Max.	112.0	100.28	100.00	99.91	99.82	99.54	99.26	98.89	98.52	98.34

3.5 Data Set 2, 105°C, 150mA (Forward Voltage)

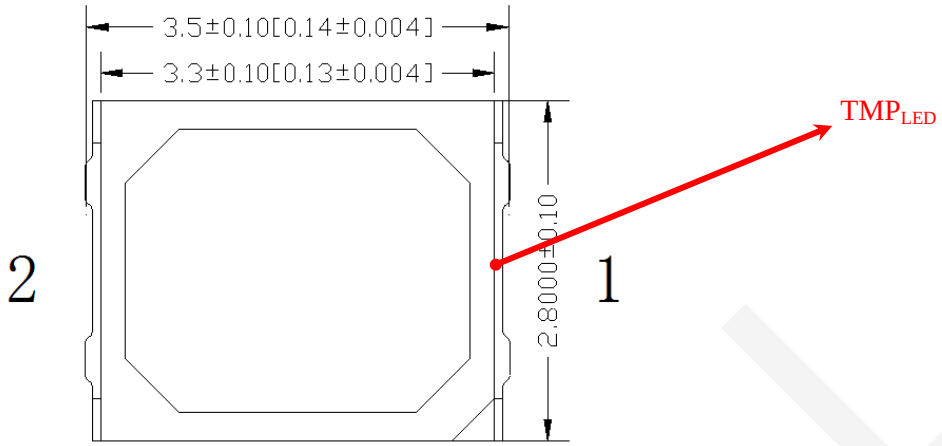
No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	6.431	6.430	6.428	6.424	6.420	6.422	6.416	6.437	6.423	6.435
27	6.368	6.410	6.389	6.386	6.380	6.385	6.385	6.394	6.385	6.434
28	6.352	6.370	6.369	6.369	6.367	6.367	6.361	6.405	6.369	6.420
29	6.359	6.372	6.365	6.367	6.365	6.373	6.361	6.423	6.364	6.418
30	6.369	6.313	6.311	6.315	6.319	6.311	6.307	6.324	6.312	6.336
31	6.297	6.319	6.319	6.314	6.314	6.314	6.308	6.322	6.311	6.323
32	6.345	6.374	6.372	6.362	6.376	6.377	6.363	6.372	6.366	6.376
33	6.275	6.293	6.289	6.293	6.293	6.293	6.284	6.299	6.284	6.291
34	6.293	6.311	6.313	6.306	6.316	6.315	6.301	6.365	6.307	6.313
35	6.302	6.318	6.316	6.314	6.316	6.322	6.309	6.331	6.310	6.327
36	6.405	6.436	6.427	6.430	6.427	6.443	6.413	6.485	6.423	6.442
37	6.273	6.285	6.287	6.298	6.287	6.289	6.283	6.310	6.284	6.294
38	6.307	6.313	6.319	6.313	6.309	6.319	6.307	6.329	6.311	6.322
39	6.298	6.312	6.321	6.317	6.314	6.332	6.305	6.335	6.313	6.324
40	6.262	6.284	6.291	6.290	6.288	6.298	6.283	6.299	6.286	6.293
41	6.384	6.410	6.408	6.413	6.407	6.413	6.396	6.428	6.402	6.422
42	6.378	6.391	6.401	6.397	6.393	6.400	6.387	6.423	6.394	6.399
43	6.290	6.306	6.306	6.314	6.299	6.306	6.294	6.318	6.301	6.313
44	6.321	6.336	6.331	6.343	6.332	6.348	6.326	6.522	6.334	6.337
45	6.348	6.364	6.362	6.369	6.364	6.379	6.361	6.395	6.368	6.376
46	6.345	6.356	6.356	6.356	6.355	6.432	6.355	6.427	6.354	6.369
47	6.284	6.294	6.300	6.294	6.297	6.307	6.295	6.331	6.294	6.307
48	6.328	6.338	6.341	6.355	6.337	6.340	6.334	6.394	6.336	6.349
49	6.354	6.365	6.359	6.380	6.372	6.389	6.359	6.370	6.363	6.371
50	6.357	6.371	6.378	6.380	6.367	6.372	6.365	6.393	6.373	6.379
Avg.	6.333	6.347	6.346	6.348	6.345	6.354	6.338	6.377	6.343	6.359
Med.	6.345	6.338	6.341	6.355	6.337	6.348	6.334	6.372	6.336	6.349
st dev	0.044	0.046	0.043	0.043	0.042	0.047	0.042	0.058	0.043	0.049
Min.	6.262	6.284	6.287	6.290	6.287	6.289	6.283	6.299	6.284	6.291
Max.	6.431	6.436	6.428	6.430	6.427	6.443	6.416	6.522	6.423	6.442

3.6 Data Set 2, 105°C, 150mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')								
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	0.2624	0.5307	2689	0.0002	0.0004	0.0006	0.0009	0.0011	0.0014	0.0016	0.0017	0.0020
27	0.2649	0.5301	2641	0.0004	0.0005	0.0006	0.0007	0.0011	0.0014	0.0017	0.0018	0.0019
28	0.2633	0.5319	2667	0.0003	0.0007	0.0009	0.0011	0.0012	0.0013	0.0016	0.0020	0.0021
29	0.2611	0.5288	2723	0.0004	0.0006	0.0008	0.0011	0.0013	0.0015	0.0017	0.0020	0.0024
30	0.2605	0.5298	2731	0.0002	0.0005	0.0010	0.0011	0.0014	0.0016	0.0017	0.0018	0.0020
31	0.2592	0.5295	2760	0.0005	0.0008	0.0010	0.0011	0.0013	0.0016	0.0017	0.0018	0.0020
32	0.2651	0.5305	2636	0.0003	0.0007	0.0011	0.0014	0.0015	0.0017	0.0019	0.0020	0.0021
33	0.2639	0.5328	2651	0.0006	0.0011	0.0014	0.0018	0.0019	0.0022	0.0024	0.0026	0.0028
34	0.2579	0.5292	2789	0.0004	0.0009	0.0012	0.0016	0.0020	0.0023	0.0027	0.0030	0.0032
35	0.2589	0.5289	2768	0.0003	0.0007	0.0011	0.0016	0.0019	0.0021	0.0024	0.0025	0.0028
36	0.2633	0.5300	2674	0.0004	0.0009	0.0013	0.0017	0.0020	0.0026	0.0029	0.0031	0.0034
37	0.2621	0.5303	2697	0.0001	0.0007	0.0011	0.0014	0.0017	0.0019	0.0021	0.0023	0.0025
38	0.2650	0.5304	2638	0.0002	0.0007	0.0013	0.0015	0.0016	0.0017	0.0022	0.0024	0.0028
39	0.2614	0.5304	2711	0.0002	0.0005	0.0011	0.0014	0.0018	0.0020	0.0021	0.0022	0.0025
40	0.2617	0.5291	2709	0.0004	0.0005	0.0008	0.0011	0.0015	0.0020	0.0021	0.0022	0.0023
41	0.2614	0.5306	2710	0.0004	0.0008	0.0011	0.0014	0.0019	0.0023	0.0025	0.0028	0.0029
42	0.2618	0.5301	2704	0.0003	0.0007	0.0011	0.0014	0.0018	0.0022	0.0023	0.0025	0.0028
43	0.2601	0.5296	2740	0.0006	0.0009	0.0012	0.0016	0.0018	0.0021	0.0023	0.0026	0.0029
44	0.2621	0.5293	2700	0.0004	0.0006	0.0010	0.0015	0.0018	0.0021	0.0022	0.0023	0.0024
45	0.2593	0.5300	2756	0.0004	0.0007	0.0008	0.0013	0.0016	0.0021	0.0022	0.0023	0.0026
46	0.2604	0.5301	2733	0.0004	0.0007	0.0011	0.0013	0.0018	0.0021	0.0023	0.0026	0.0029
47	0.2620	0.5309	2696	0.0005	0.0009	0.0009	0.0012	0.0014	0.0019	0.0022	0.0024	0.0026
48	0.2619	0.5299	2702	0.0005	0.0011	0.0013	0.0014	0.0015	0.0016	0.0021	0.0025	0.0028
49	0.2626	0.5297	2688	0.0004	0.0009	0.0010	0.0012	0.0013	0.0017	0.0020	0.0022	0.0024
50	0.2617	0.5295	2707	0.0001	0.0007	0.0011	0.0015	0.0017	0.0018	0.0019	0.0023	0.0024
Avg.	0.2618	0.5301	2705	0.0004	0.0007	0.0010	0.0013	0.0016	0.0019	0.0021	0.0023	0.0025
Med.	0.2618	0.5300	2704	0.0004	0.0007	0.0011	0.0014	0.0016	0.0019	0.0021	0.0023	0.0025
st dev	0.0019	0.0009	40	0.0001	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0004	0.0004
Min.	0.2579	0.5288	2636	0.0001	0.0004	0.0006	0.0007	0.0011	0.0013	0.0016	0.0017	0.0019
Max.	0.2651	0.5328	2789	0.0006	0.0011	0.0014	0.0018	0.0020	0.0026	0.0029	0.0031	0.0034

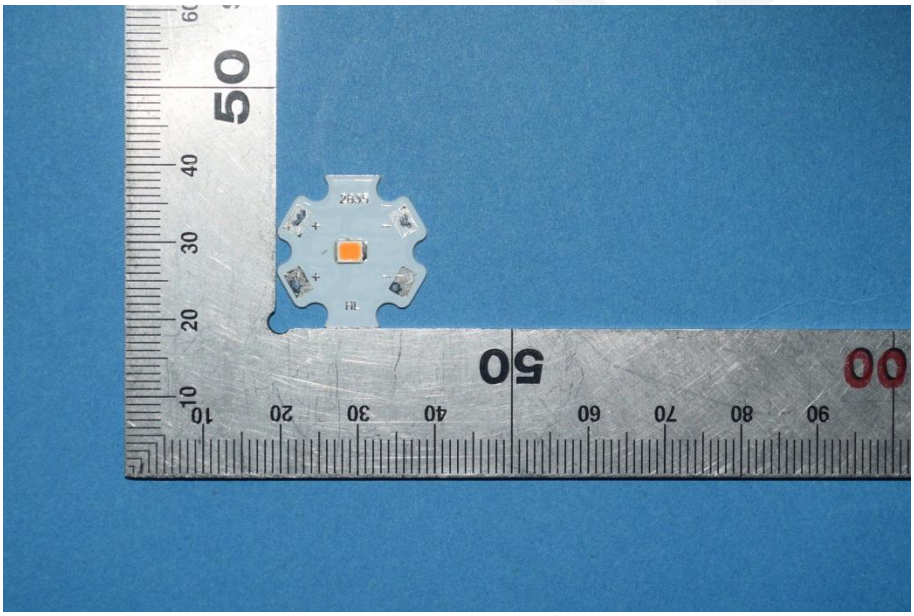
4 - DUT Photo

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 with the 95% confidence interval.
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**********END OF REPORT**********

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