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-A-2835HW-2C-S1-08L-PCT-HR6

Report Type: 10000 Hours Test Report	**Product Type:** LED Package
Reviewed By:	Pote Wang
Report Number:	RSZ200925501-10-10000
Test Date:	2020-09-30 to 2021-12-11
Report Date:	2021-12-23
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:

50 PCS test samples were in good condition and received on 2020-09-25. The samples were numbered from 1 to 25 and 26 to 50.

Manufacturer:	Hongli Zhihui Group Co.,Ltd. Guangzhou Branch
Part Number:	HL-A-2835HW-2C-S1-08L-PCT-HR6
Part Type:	LED Package
#Drive Level:	DC 150mA
#Nominal CCT:	2700K
#Power:	0.99W
#Average Current Density per LED die:	1033.343 mA/mm^2
#Average Power Density per LED die:	3.410 W/mm^2
#CRI:	95
#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	CCT (K)	Series	Parallel	Power density (W/mm^2)	Current density per LED die (mA/mm^2)	Current per die (mA)	Die Spacing(mm)	Current (mA)
Master model	HL-A-2835HW-2C-S1-08L-PCT-HR6	95	2700	2	1	0.1010	1033.343	150	0.15	150
multiple model	HL-**-2835H***W-2C-S1-08*-PCT-HR6-***	95	2200-6500	2	1	0.1010	1033.343	150	0.15	150
	HL-**-2835D***W-2C-S1-08*-PCT-HR6-***	95	2200-6500	2	1	0.1010	861.11	150	0.15	150
	HL-**-2835D***W-2-S1-08*-PCT-HR6-***	95	2200-6500	1	2	0.0521	430.55	75	0.15	150
	HL-**-2835D***W-2-S1-08*-PCT-HR6-***	95	2200-6500	1	2	0.1010	861.11	150	0.15	300
	HL-**-2835D***W-2-S1-08*-PCT-HR6-***	95	2200-6500	1	2	0.0204	172.22	30	0.15	60
	HL-**-2835H***W-2-S1-08*-PCT-	95	2200-6500	1	2	0.0521	516.67	75	0.15	150

	HR6-***									
multiple model	HL-**-2835H***W-2-S1-08*-PCT-HR6-***	95	2200-6500	1	2	0.1010	1033.343	150	0.15	300
	HL-**-2835H***W-2-S1-08*-PCT-HR6-***	95	2200-6500	1	2	0.0204	206.67	30	0.15	60
	HL-**-2835H***W-S1-08*-PCT-HR6-***	95	2200-6500	1	1	0.0521	1033.343	150	/	150
	HL-**-2835H***W-S1-08*-PCT-HR6-***	95	2200-6500	1	1	0.0204	413.34	60	/	60
	HL-**-2835D***W-S1-08*-PCT-HR6-***	95	2200-6500	1	1	0.0521	861.11	150	/	150
	HL-**-2835D***W-S1-08*-PCT-HR6-***	95	2200-6500	1	1	0.0204	344.45	60	/	60
	SL-*E2835FTA-12EA*	95	2200-6500	1	2	0.0510	516.67	75	0.15	150
	SL-*E2835FTA-12EA*H	95	2200-6500	1	2	0.0510	516.67	75	0.15	150
	SL-*E2835FTA-12EA*-*	95	2200-6500	1	2	0.0510	516.67	75	0.15	150
	SL-*E2835FTA-12EA*-**	95	2200-6500	1	2	0.0510	516.67	75	0.15	150
	SL-*E2835FTA-12EA*-***	95	2200-6500	1	2	0.0510	516.67	75	0.15	150
	SL-*E2835FTA-12EA*H-*	95	2200-6500	1	2	0.0510	516.67	75	0.15	150
	SL-*E2835FTA-12EA*H-**	95	2200-6500	1	2	0.0510	516.67	75	0.15	150
	SL-*E2835FTA-12EA*H-***	95	2200-6500	1	2	0.0510	516.67	75	0.15	150
	SL-*E2835FTA-12EA*/*	95	2200-6500	1	2	0.0510	516.67	75	0.15	150
	SL-**E2835FTA-12EA****-APH***	95	2200-6500	1	2	0.0510	516.67	75	0.15	150
	SL-*E2835FTA-11CA*H	95	2200-6500	1	1	0.0204	413.34	60	/	60
	SL-*E2835FTA-11CA*H-**	95	2200-6500	1	1	0.0204	413.34	60	/	60
	SL-*E2835FTA-11CA*	95	2200-6500	1	1	0.0204	413.34	60	/	60
	SL-**E2835FTA-11CA****-APH***	95	2200-6500	1	1	0.0204	413.34	60	/	60

Note:

The model name begins with "HL", such as "HL-**-2835H***W-2C-S1-08*-PCT-HR6-***","*" 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, which stands for the customer code.

The model name begins with "SL", such as " SL-*E2835FTA-12EA*H-***","*" is described in detail as follows :

1. The first * is the letters I, N, W representing CCT. I mean less than 3700k; N means 3700-4700K.

   For more than 4700K.

2. The second * is a different product solution, and the third, fourth, and fifth * are different version Numbers.

The first and second * of SL-**E2835FTA-12EA****-APH*** is a numbers 27, 30,40,50,65, which stand for CCT. Number From three to six * is a different product solution, 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
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	2021-09-24	2022-09-23
Standard Light Source	EVERFINE	D062	1011093	2021-10-15	2022-10-14
Multilayer aging machine	BACL	B2-270	20023	2021-02-24	2022-02-23
Program-controlled D.C. Stabilized Voltage Supply	Hanshenpuyuan	HSPY-200-01	N/A	2021-06-30	2022-06-29

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, 150mA

Part Number:	HL-A-2835HW-2C-S1-08L-PCT-HR6
Number of Units:	25
Case Temperature:	>53°C
Ambient Temperature:	>50°C
Life Test Drive Current:	150mA
Measurement Current:	150mA

Data Set 2: 105°C, 150mA

Part Number:	HL-A-2835HW-2C-S1-08L-PCT-HR6
Number of Units:	25
Case Temperature:	>103°C
Ambient Temperature:	>100°C
Life Test Drive Current:	150mA
Measurement Current:	150mA

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	10000hrs	2.522E-06	1.007	>60000 hours	44000 hours
2	25	0	1000hrs	10000hrs	2.998E-06	1.006	>60000 hours	37000 hours

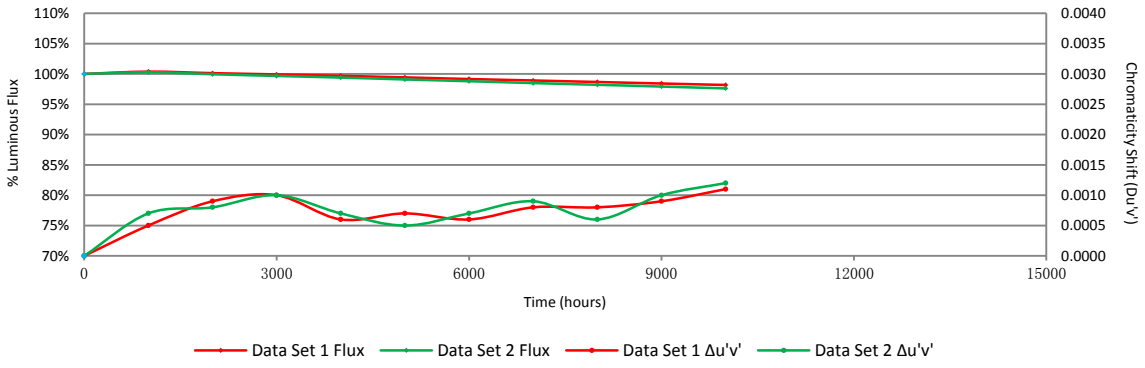
Average Lumen Maintenance (Percentage of Initial Luminous Flux)

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	100.38%	100.13%	99.92%	99.69%	99.43%	99.16%	98.92%	98.67%	98.42%	98.18%
2	100.29%	99.95%	99.67%	99.40%	99.09%	98.80%	98.49%	98.21%	97.92%	97.61%

Average Chromaticity Shift

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	0.0005	0.0009	0.0010	0.0006	0.0007	0.0006	0.0008	0.0008	0.0009	0.0011
2	0.0007	0.0008	0.0010	0.0007	0.0005	0.0007	0.0009	0.0006	0.0010	0.0012

Average Lumen Maintenance and Chromaticity Shift VS. Time



3 - Test Data

3.1 Data Set 1, 55°C, 150mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	83.76	100.45	100.35	100.20	99.88	99.56	99.31	99.12	99.06	98.97	98.82
2	85.05	100.22	99.93	99.80	99.45	99.27	99.08	98.74	98.50	98.46	98.02
3	85.29	100.32	100.09	99.89	99.53	99.21	98.98	98.65	98.37	98.01	97.80
4	84.87	100.42	100.16	100.05	99.72	99.18	98.95	98.73	98.40	98.13	97.96
5	85.35	100.50	100.22	100.00	99.74	99.48	99.09	98.90	98.73	98.30	98.13
6	84.26	100.11	100.06	99.98	99.93	99.87	99.49	99.30	98.90	98.64	98.50
7	85.03	100.53	100.18	99.80	99.58	99.22	98.91	98.68	98.57	98.34	97.79
8	85.16	100.55	100.38	99.96	99.92	99.48	99.28	99.03	98.74	98.41	98.34
9	82.61	100.57	100.52	100.13	99.85	99.67	99.31	99.10	98.95	98.73	98.60
10	84.32	100.51	100.33	100.06	99.88	99.74	99.45	99.25	99.06	98.80	98.46
11	84.95	100.58	100.45	100.41	99.94	99.74	99.39	99.11	98.89	98.66	98.42
12	83.90	100.55	100.31	100.25	100.17	100.08	99.69	99.49	99.28	98.82	98.65
13	83.34	100.26	99.93	99.75	99.70	99.66	99.52	99.23	99.10	98.86	98.78
14	83.34	100.42	99.86	99.75	99.29	98.97	98.81	98.43	98.09	97.72	97.37
15	84.35	100.34	99.98	99.81	99.62	99.41	99.09	98.81	98.64	98.32	98.08
16	83.77	100.19	99.65	99.63	99.34	99.18	99.06	98.87	98.75	98.34	98.25
17	84.33	100.38	100.08	99.88	99.60	99.47	99.17	98.97	98.80	98.62	98.41
18	83.47	100.50	100.37	99.84	99.76	99.53	99.16	98.91	98.66	98.37	97.88
19	84.58	100.56	100.24	99.88	99.81	99.63	99.28	99.03	98.64	98.57	98.49
20	84.36	100.09	99.85	99.60	99.42	99.09	98.84	98.44	98.22	98.01	97.64
21	84.11	100.08	99.92	99.75	99.61	99.05	98.88	98.69	98.54	98.19	97.84
22	85.14	100.43	100.16	100.06	99.77	99.28	99.06	98.84	98.45	98.11	97.85
23	85.25	100.38	100.13	99.89	99.52	99.37	99.17	98.96	98.51	98.23	97.78
24	84.80	100.35	100.20	100.01	99.83	99.23	99.12	98.83	98.58	98.55	98.48
25	85.53	100.29	99.93	99.67	99.40	99.28	99.03	98.78	98.41	98.37	98.15
Avg.	84.44	100.38	100.13	99.92	99.69	99.43	99.16	98.92	98.67	98.42	98.18
Med.	84.36	100.42	100.16	99.89	99.72	99.41	99.12	98.90	98.64	98.37	98.15
st dev	0.76	0.15	0.21	0.20	0.22	0.27	0.23	0.26	0.29	0.30	0.38
Min.	82.61	100.08	99.65	99.60	99.29	98.97	98.81	98.43	98.09	97.72	97.37
Max.	85.53	100.58	100.52	100.41	100.17	100.08	99.69	99.49	99.28	98.97	98.82

3.2 Data Set 1, 55°C, 150mA (Forward Voltage)

No.	Forward Voltage (V)										
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	6.247	6.252	6.238	6.232	6.271	6.248	6.249	6.263	6.253	6.275	6.244
2	6.282	6.296	6.284	6.278	6.305	6.296	6.291	6.303	6.325	6.330	6.305
3	6.299	6.309	6.297	6.292	6.333	6.309	6.306	6.323	6.316	6.316	6.295
4	6.253	6.267	6.251	6.253	6.278	6.264	6.266	6.274	6.267	6.271	6.255
5	6.257	6.267	6.255	6.255	6.280	6.265	6.264	6.264	6.275	6.273	6.253
6	6.280	6.300	6.280	6.276	6.311	6.298	6.296	6.296	6.286	6.298	6.282
7	6.253	6.266	6.251	6.247	6.276	6.266	6.267	6.275	6.260	6.270	6.257
8	6.280	6.299	6.278	6.274	6.299	6.293	6.288	6.293	6.291	6.298	6.280
9	6.232	6.249	6.234	6.226	6.253	6.247	6.246	6.269	6.251	6.254	6.234
10	6.251	6.262	6.255	6.244	6.271	6.263	6.263	6.279	6.267	6.271	6.253
11	6.244	6.260	6.249	6.249	6.274	6.266	6.259	6.281	6.254	6.271	6.253
12	6.299	6.315	6.297	6.299	6.320	6.312	6.308	6.350	6.314	6.337	6.301
13	6.230	6.239	6.228	6.226	6.253	6.243	6.238	6.263	6.238	6.267	6.234
14	6.255	6.267	6.255	6.255	6.274	6.262	6.267	6.287	6.266	6.294	6.261
15	6.238	6.259	6.238	6.242	6.258	6.254	6.250	6.274	6.254	6.303	6.244
16	6.247	6.257	6.240	6.240	6.267	6.256	6.254	6.271	6.255	6.302	6.251
17	6.267	6.283	6.265	6.267	6.293	6.277	6.280	6.294	6.279	6.310	6.269
18	6.255	6.268	6.253	6.257	6.276	6.264	6.266	6.276	6.268	6.305	6.261
19	6.251	6.260	6.244	6.242	6.267	6.259	6.263	6.278	6.261	6.282	6.265
20	6.269	6.283	6.267	6.265	6.287	6.283	6.279	6.298	6.282	6.285	6.286
21	6.280	6.292	6.280	6.288	6.301	6.297	6.286	6.301	6.295	6.336	6.290
22	6.338	6.349	6.336	6.343	6.360	6.348	6.345	6.352	6.347	6.349	6.359
23	6.290	6.296	6.288	6.288	6.309	6.297	6.294	6.316	6.296	6.309	6.295
24	6.272	6.285	6.269	6.261	6.289	6.282	6.275	6.305	6.283	6.292	6.278
25	6.315	6.331	6.309	6.313	6.337	6.322	6.324	6.333	6.318	6.338	6.324
Avg.	6.267	6.280	6.266	6.264	6.290	6.279	6.277	6.293	6.280	6.297	6.273
Med.	6.257	6.268	6.255	6.257	6.280	6.266	6.267	6.287	6.275	6.298	6.265
st dev	0.026	0.027	0.026	0.028	0.027	0.026	0.025	0.026	0.027	0.026	0.029
Min.	6.230	6.239	6.228	6.226	6.253	6.243	6.238	6.263	6.238	6.254	6.234
Max.	6.338	6.349	6.336	6.343	6.360	6.348	6.345	6.352	6.347	6.349	6.359

3.3 Data Set 1, 55°C, 150mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')									
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	0.2588	0.5307	2764	0.0006	0.0010	0.0011	0.0012	0.0011	0.0008	0.0009	0.0009	0.0007	0.0008
2	0.2596	0.5330	2738	0.0004	0.0009	0.0010	0.0008	0.0010	0.0008	0.0010	0.0011	0.0010	0.0005
3	0.2590	0.5323	2752	0.0006	0.0009	0.0009	0.0006	0.0013	0.0006	0.0007	0.0010	0.0010	0.0009
4	0.2594	0.5326	2743	0.0006	0.0008	0.0011	0.0005	0.0010	0.0005	0.0007	0.0005	0.0006	0.0007
5	0.2592	0.5340	2741	0.0004	0.0007	0.0010	0.0006	0.0007	0.0006	0.0007	0.0008	0.0007	0.0009
6	0.2586	0.5327	2759	0.0005	0.0008	0.0010	0.0006	0.0009	0.0006	0.0009	0.0007	0.0007	0.0009
7	0.2595	0.5323	2743	0.0004	0.0008	0.0009	0.0006	0.0007	0.0008	0.0009	0.0007	0.0007	0.0009
8	0.2594	0.5309	2750	0.0006	0.0009	0.0011	0.0006	0.0005	0.0004	0.0006	0.0004	0.0006	0.0007
9	0.2616	0.5317	2701	0.0006	0.0009	0.0009	0.0006	0.0007	0.0005	0.0006	0.0007	0.0007	0.0009
10	0.2598	0.5315	2740	0.0005	0.0008	0.0010	0.0005	0.0004	0.0005	0.0006	0.0004	0.0006	0.0009
11	0.2580	0.5325	2773	0.0005	0.0009	0.0010	0.0004	0.0006	0.0006	0.0009	0.0008	0.0010	0.0012
12	0.2599	0.5316	2737	0.0005	0.0011	0.0012	0.0008	0.0005	0.0006	0.0009	0.0009	0.0010	0.0013
13	0.2584	0.5306	2772	0.0006	0.0009	0.0012	0.0009	0.0005	0.0005	0.0007	0.0007	0.0009	0.0011
14	0.2615	0.5318	2702	0.0006	0.0009	0.0010	0.0004	0.0005	0.0005	0.0007	0.0005	0.0004	0.0007
15	0.2589	0.5307	2762	0.0005	0.0009	0.0010	0.0005	0.0007	0.0007	0.0010	0.0009	0.0008	0.0012
16	0.2599	0.5330	2731	0.0005	0.0007	0.0010	0.0005	0.0004	0.0005	0.0006	0.0008	0.0009	0.0012
17	0.2592	0.5312	2753	0.0006	0.0008	0.0011	0.0006	0.0006	0.0004	0.0006	0.0009	0.0012	0.0012
18	0.2597	0.5308	2744	0.0005	0.0010	0.0011	0.0007	0.0005	0.0006	0.0008	0.0009	0.0011	0.0012
19	0.2578	0.5305	2785	0.0007	0.0009	0.0012	0.0007	0.0007	0.0005	0.0008	0.0007	0.0010	0.0014
20	0.2596	0.5305	2748	0.0004	0.0007	0.0009	0.0004	0.0006	0.0007	0.0010	0.0009	0.0014	0.0016
21	0.2582	0.5310	2774	0.0005	0.0009	0.0010	0.0006	0.0008	0.0008	0.0009	0.0007	0.0010	0.0010
22	0.2603	0.5335	2721	0.0005	0.0009	0.0011	0.0005	0.0006	0.0006	0.0009	0.0007	0.0011	0.0013
23	0.2573	0.5321	2789	0.0005	0.0009	0.0009	0.0005	0.0005	0.0006	0.0008	0.0006	0.0011	0.0014
24	0.2590	0.5314	2755	0.0006	0.0009	0.0011	0.0006	0.0006	0.0004	0.0006	0.0007	0.0013	0.0014
25	0.2601	0.5332	2727	0.0004	0.0008	0.0009	0.0006	0.0005	0.0006	0.0008	0.0008	0.0013	0.0014
Avg.	0.2593	0.5318	2748	0.0005	0.0009	0.0010	0.0006	0.0007	0.0006	0.0008	0.0008	0.0009	0.0011
Med.	0.2594	0.5317	2748	0.0005	0.0009	0.0010	0.0006	0.0006	0.0006	0.0008	0.0007	0.0010	0.0011
st dev	0.0010	0.0010	22	0.0001	0.0001	0.0001	0.0002	0.0002	0.0001	0.0001	0.0002	0.0003	0.0003
Min.	0.2573	0.5305	2701	0.0004	0.0007	0.0009	0.0004	0.0004	0.0004	0.0006	0.0004	0.0004	0.0005
Max.	0.2616	0.5340	2789	0.0007	0.0011	0.0012	0.0012	0.0013	0.0008	0.0010	0.0011	0.0014	0.0016

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	10000hrs
26	84.72	100.07	100.02	99.54	99.28	99.03	98.91	98.61	98.43	98.23	98.05
27	83.57	100.17	99.90	99.64	99.46	98.96	98.80	98.48	98.35	98.25	98.21
28	83.99	100.26	99.98	99.70	99.62	99.24	99.10	98.77	98.67	98.45	97.93
29	84.20	100.20	99.88	99.52	99.19	99.16	98.86	98.48	98.33	97.87	97.46
30	84.02	100.36	100.02	99.73	99.62	99.18	99.00	98.71	98.56	98.26	97.98
31	84.50	100.36	100.00	99.78	99.50	99.37	99.16	98.86	98.54	98.17	97.78
32	83.68	100.33	99.96	99.50	99.38	99.02	98.86	98.67	98.14	97.73	97.60
33	84.80	100.32	100.17	99.80	99.66	99.42	98.96	98.68	98.41	98.14	97.95
34	84.80	100.33	100.20	99.91	99.49	99.22	99.08	98.77	98.54	98.47	98.40
35	84.52	100.46	100.25	99.79	99.42	98.85	98.53	98.15	97.91	97.63	97.23
36	83.67	100.48	99.94	99.37	98.98	98.72	98.34	97.96	97.80	97.33	97.02
37	84.92	100.25	99.60	99.08	98.66	98.40	97.88	97.59	97.30	97.15	96.88
38	83.87	100.24	100.04	100.02	99.75	99.58	99.05	98.76	98.22	97.82	97.60
39	84.40	100.47	99.91	99.75	99.41	99.02	98.66	98.25	98.09	97.83	97.50
40	82.45	100.49	100.04	99.96	99.83	99.58	99.39	99.04	98.80	98.42	98.14
41	84.95	100.26	99.86	99.72	99.38	99.03	98.91	98.67	98.08	97.60	97.29
42	84.19	100.23	100.05	99.87	99.64	99.29	99.03	98.74	98.54	98.44	98.16
43	84.16	100.18	99.94	99.73	99.48	98.91	98.65	98.37	98.12	97.88	97.33
44	84.62	100.30	99.98	99.72	99.52	99.41	99.15	98.70	98.20	97.97	97.68
45	84.64	100.38	100.06	99.93	99.85	99.41	99.26	98.90	98.56	98.10	97.74
46	83.82	100.35	99.95	99.81	99.37	99.02	98.77	98.46	97.83	97.53	97.10
47	84.40	100.28	99.79	99.57	99.41	98.92	98.68	98.31	98.16	97.88	97.63
48	85.13	100.07	99.48	99.42	99.13	98.80	98.38	98.03	97.90	97.72	97.19
49	85.66	100.29	99.78	99.47	98.96	98.91	98.46	98.31	98.11	97.60	97.22
50	85.55	100.16	100.05	99.52	99.01	98.84	98.23	97.95	97.74	97.52	97.26
Avg.	84.37	100.29	99.95	99.67	99.40	99.09	98.80	98.49	98.21	97.92	97.61
Med.	84.40	100.29	99.98	99.72	99.42	99.03	98.86	98.61	98.20	97.88	97.60
st dev	0.68	0.12	0.17	0.21	0.29	0.28	0.35	0.35	0.34	0.37	0.41
Min.	82.45	100.07	99.48	99.08	98.66	98.40	97.88	97.59	97.30	97.15	96.88
Max.	85.66	100.49	100.25	100.02	99.85	99.58	99.39	99.04	98.80	98.47	98.40

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

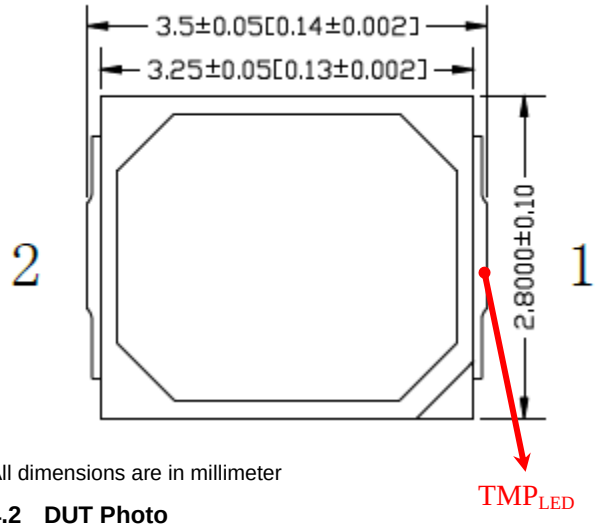
No.	Forward Voltage (V)										
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
26	6.299	6.318	6.303	6.301	6.319	6.311	6.314	6.326	6.321	6.322	6.311
27	6.234	6.245	6.230	6.232	6.253	6.245	6.245	6.265	6.262	6.259	6.242
28	6.259	6.271	6.253	6.253	6.276	6.267	6.269	6.287	6.269	6.278	6.263
29	6.274	6.283	6.263	6.265	6.282	6.278	6.279	6.304	6.286	6.288	6.272
30	6.259	6.270	6.255	6.253	6.270	6.262	6.267	6.285	6.309	6.279	6.259
31	6.274	6.288	6.274	6.269	6.290	6.275	6.282	6.299	6.285	6.293	6.276
32	6.255	6.262	6.244	6.242	6.262	6.254	6.256	6.275	6.274	6.262	6.251
33	6.253	6.271	6.253	6.251	6.271	6.263	6.264	6.289	6.271	6.274	6.261
34	6.278	6.301	6.282	6.282	6.308	6.294	6.292	6.316	6.299	6.296	6.292
35	6.238	6.260	6.238	6.236	6.260	6.250	6.249	6.277	6.254	6.251	6.247
36	6.261	6.277	6.267	6.267	6.284	6.275	6.274	6.289	6.277	6.280	6.278
37	6.284	6.300	6.282	6.286	6.307	6.291	6.295	6.313	6.302	6.307	6.288
38	6.228	6.248	6.232	6.230	6.250	6.242	6.247	6.257	6.245	6.248	6.240
39	6.259	6.279	6.259	6.261	6.279	6.268	6.272	6.284	6.277	6.283	6.265
40	6.244	6.256	6.244	6.240	6.266	6.252	6.255	6.269	6.261	6.271	6.251
41	6.249	6.259	6.244	6.251	6.268	6.254	6.260	6.271	6.262	6.266	6.259
42	6.280	6.295	6.278	6.278	6.296	6.289	6.288	6.304	6.291	6.303	6.288
43	6.257	6.269	6.253	6.249	6.273	6.262	6.267	6.274	6.270	6.275	6.257
44	6.251	6.266	6.253	6.253	6.273	6.265	6.263	6.276	6.280	6.283	6.259
45	6.267	6.278	6.263	6.259	6.281	6.276	6.272	6.285	6.279	6.306	6.265
46	6.238	6.248	6.236	6.234	6.256	6.242	6.249	6.258	6.252	6.270	6.247
47	6.253	6.265	6.247	6.249	6.265	6.260	6.265	6.279	6.285	6.270	6.255
48	6.309	6.320	6.305	6.303	6.317	6.310	6.314	6.331	6.321	6.319	6.305
49	6.267	6.275	6.259	6.263	6.279	6.269	6.271	6.289	6.278	6.313	6.265
50	6.251	6.263	6.249	6.251	6.260	6.260	6.261	6.272	6.273	6.286	6.255
Avg.	6.261	6.275	6.259	6.258	6.278	6.269	6.271	6.287	6.279	6.283	6.266
Med.	6.259	6.271	6.253	6.253	6.273	6.265	6.267	6.285	6.277	6.280	6.261
st dev	0.019	0.020	0.020	0.020	0.019	0.019	0.019	0.020	0.020	0.020	0.019
Min.	6.228	6.245	6.230	6.230	6.250	6.242	6.245	6.257	6.245	6.248	6.240
Max.	6.309	6.320	6.305	6.303	6.319	6.311	6.314	6.331	6.321	6.322	6.311

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	10000hrs
26	0.2597	0.5331	2734	0.0007	0.0007	0.0009	0.0008	0.0005	0.0006	0.0008	0.0008	0.0011	0.0013
27	0.2573	0.5294	2801	0.0006	0.0009	0.0011	0.0007	0.0008	0.0010	0.0012	0.0011	0.0011	0.0014
28	0.2574	0.5299	2796	0.0007	0.0009	0.0011	0.0006	0.0004	0.0006	0.0010	0.0005	0.0009	0.0013
29	0.2596	0.5321	2740	0.0006	0.0008	0.0009	0.0006	0.0007	0.0006	0.0009	0.0007	0.0010	0.0014
30	0.2598	0.5304	2743	0.0006	0.0008	0.0009	0.0006	0.0008	0.0008	0.0009	0.0007	0.0013	0.0012
31	0.2587	0.5319	2761	0.0007	0.0009	0.0010	0.0007	0.0007	0.0006	0.0008	0.0007	0.0012	0.0012
32	0.2592	0.5323	2748	0.0006	0.0008	0.0009	0.0007	0.0005	0.0006	0.0007	0.0006	0.0009	0.0011
33	0.2594	0.5342	2737	0.0007	0.0008	0.0010	0.0008	0.0004	0.0008	0.0009	0.0007	0.0010	0.0014
34	0.2577	0.5313	2785	0.0005	0.0008	0.0009	0.0007	0.0005	0.0008	0.0011	0.0006	0.0011	0.0013
35	0.2563	0.5304	2818	0.0006	0.0010	0.0010	0.0009	0.0005	0.0007	0.0009	0.0004	0.0011	0.0013
36	0.2609	0.5332	2709	0.0006	0.0006	0.0009	0.0005	0.0004	0.0006	0.0009	0.0006	0.0010	0.0013
37	0.2600	0.5325	2732	0.0006	0.0007	0.0009	0.0007	0.0006	0.0008	0.0010	0.0007	0.0011	0.0014
38	0.2583	0.5311	2772	0.0007	0.0010	0.0009	0.0006	0.0005	0.0007	0.0008	0.0006	0.0009	0.0014
39	0.2592	0.5315	2751	0.0006	0.0009	0.0010	0.0006	0.0006	0.0006	0.0007	0.0004	0.0008	0.0012
40	0.2604	0.5325	2722	0.0006	0.0008	0.0010	0.0009	0.0007	0.0008	0.0010	0.0006	0.0009	0.0013
41	0.2592	0.5307	2755	0.0007	0.0008	0.0010	0.0006	0.0006	0.0006	0.0009	0.0003	0.0007	0.0013
42	0.2601	0.5309	2735	0.0007	0.0010	0.0011	0.0006	0.0004	0.0006	0.0009	0.0004	0.0012	0.0012
43	0.2598	0.5317	2738	0.0007	0.0009	0.0011	0.0008	0.0005	0.0007	0.0009	0.0005	0.0008	0.0013
44	0.2589	0.5307	2762	0.0007	0.0009	0.0010	0.0006	0.0005	0.0006	0.0007	0.0009	0.0009	0.0014
45	0.2569	0.5314	2801	0.0008	0.0009	0.0010	0.0005	0.0004	0.0007	0.0008	0.0007	0.0009	0.0012
46	0.2593	0.5314	2750	0.0006	0.0009	0.0011	0.0005	0.0004	0.0006	0.0007	0.0007	0.0008	0.0012
47	0.2573	0.5303	2798	0.0008	0.0009	0.0011	0.0007	0.0004	0.0006	0.0008	0.0006	0.0006	0.0009
48	0.2593	0.5334	2741	0.0007	0.0007	0.0010	0.0008	0.0002	0.0004	0.0007	0.0004	0.0007	0.0011
49	0.2584	0.5307	2772	0.0006	0.0007	0.0010	0.0004	0.0004	0.0007	0.0009	0.0007	0.0009	0.0012
50	0.2594	0.5335	2740	0.0004	0.0007	0.0009	0.0007	0.0009	0.0007	0.0010	0.0007	0.0007	0.0009
Avg.	0.2589	0.5316	2758	0.0007	0.0008	0.0010	0.0007	0.0005	0.0007	0.0009	0.0006	0.0010	0.0012
Med.	0.2592	0.5314	2750	0.0006	0.0008	0.0010	0.0007	0.0005	0.0006	0.0009	0.0006	0.0009	0.0013
st dev	0.0012	0.0012	28	0.0001	0.0001	0.0001	0.0001	0.0002	0.0001	0.0001	0.0002	0.0002	0.0001
Min.	0.2563	0.5294	2709	0.0004	0.0006	0.0009	0.0004	0.0002	0.0004	0.0007	0.0003	0.0006	0.0009
Max.	0.2609	0.5342	2818	0.0008	0.0010	0.0011	0.0009	0.0009	0.0010	0.0012	0.0011	0.0013	0.0014

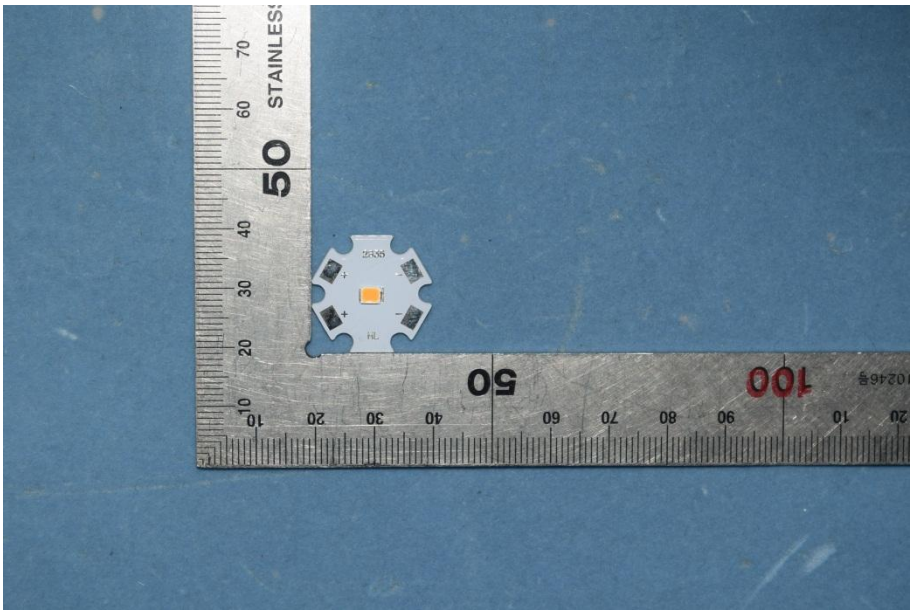
4 - DUT Photo

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**********