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-2835DVW-2C-S1-08L-PCT-HR5

Report Type: 10000 Hours Test Report	**Product Type:** LED Package
Reviewed By:	Pote Wang
Report Number:	RSZ200925503-10-10000
Test Date:	2020-09-30 to 2021-12-11
Report Date:	2022-01-10
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

TABLE OF CONTENTS

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-AS-2835DVW-2C-S1-08L-PCT-HR5
Part Type:	LED Package
#Drive Level:	DC 60mA
#Nominal CCT:	2700K
#Power:	1.2W
#Average Current Density per LED die:	270.334mA/mm^2
#Average Power Density per LED die:	2.703W/mm^2
#CRI:	90
#Die Spacing:	0.15mm

Sampling Method:

LED samples for IESNA LM-80 testing consist of units built from a minimum of three manufacturing lots with each manufacturing lot built from different wafer lots built on non-consecutive days.
These manufacturing lots are picked to represent a wide parametric distribution.

Family products covered by this report:

According to *ENERGY STAR® Requirements for the Use of LM-80 Data*, the following products can be covered by this report base on the information and declaration provided by manufacturer. The information of these models shows that the covered products meet all section 4 requirements of *ENERGY STAR® Requirements for the Use of LM-80 Data* (September 28, 2017)

This report covers the following models:

Model name	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	Current (mA)
HL-AS-2835DVW-2C-S1-08L-PCT-HR5	90	2700K	2	1	0.1225	270.334	60	0.15	60
HL-**-2835DV***W-2C-S1-08*-PCT-HR5-***	90	2200-6500K	2	1	0.1225	270.334	60	0.15	60
HL-**-PU2835DV***W-2C-S1-08*-PCT-HR5-***	90	2200-6500K	2	1	0.1225	270.334	60	0.15	60
HL-**-2835DV***W-2C-S1-08*-PCT-HR5(R9)-***	90	2200-6500K	2	1	0.1225	270.334	60	0.15	60
HL-**-PU2835DV***W-2C-S1-08*-PCT-HR5(R9)-***	90	2200-6500K	2	1	0.1225	270.334	60	0.15	60
HL-**-2835DV***W-2C-S1-08*-PCT-HR5-***	90	2200-6500K	2	1	0.0612	135.167	30	0.15	30
HL-**-PU2835DV***W-2C-S1-08*-PCT-HR5-***	90	2200-6500K	2	1	0.0612	135.167	30	0.15	30
HL-**-2835DV***W-2C-S1-08*-PCT-HR5(R9)-***	90	2200-6500K	2	1	0.0612	135.167	30	0.15	30
HL-**-PU2835DV***W-2C-S1-08*-PCT-HR5(R9)-***	90	2200-6500K	2	1	0.0612	135.167	30	0.15	30
HL-**-2835DV***W-S1-08*-PCT-HR5-***	90	2200-6500K	1	1	0.0612	270.334	60	/	60
HL-**-PU2835DV***W-S1-08*-PCT-HR5-***	90	2200-6500K	1	1	0.0612	270.334	60	/	60
HL-**-2835DV***W-S1-08*-PCT-HR5(R9)-***	90	2200-6500K	1	1	0.0612	270.334	60	/	60
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HL-**-2835DV***W-S1-08*-PCT-HR5(R9)-***	90	2200-6500K	1	1	0.0306	135.167	30	/	30
HL-**-PU2835DV***W-S1-08*-PCT-HR5(R9)-***	90	2200-6500K	1	1	0.0306	135.167	30	/	30
HL-**-2835DV***W-2-S1-08*-PCT-HR5-***	90	2200-6500K	1	2	0.1225	270.334	60	0.15	120
HL-**-PU2835DV***W-2-S1-08*-PCT-HR5-***	90	2200-6500K	1	2	0.1225	270.334	60	0.15	120
HL-**-2835DV***W-2-S1-08*-PCT-HR5(R9)-***	90	2200-6500K	1	2	0.1225	270.334	60	0.15	120
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HL-**-2835DV***W-2-S1-08*-PCT-HR5-***	90	2200-6500K	1	2	0.1021	225.278	50	0.15	100
HL-**-PU2835DV***W-2-S1-08*-PCT-HR5-***	90	2200-6500K	1	2	0.1021	225.278	50	0.15	100
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HL-**-2835DV***W-2-S1-08*-PCT-HR5-***	90	2200-6500K	1	2	0.0306	67.583	15	0.15	30
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HL-**-2835HV***W-2-S1-08*-PCT-HR5-***	90	2200-6500K	1	2	0.0612	255.495	30	0.15	60
HL-**-PU2835HV***W-2-S1-08*-PCT-HR5-***	90	2200-6500K	1	2	0.0612	255.495	30	0.15	60
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HL-**-2835HV***W-2C-S1-08*-PCT-HR5-***	90	2200-6500K	2	1	0.0612	255.495	30	0.15	30
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HL-**-2835DV***W-2C-S1-08*-PCT-HR5-T6-***	90	2200-6500K	2	1	0.1225	270.334	60	0.15	60
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Note:

The model name begins with "HL", such as "HL-**-2835DV***W-2C-S1-08*-PCT-HR5-***","*" 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.

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
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090003	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, 60mA

Part Number:	HL-AS-2835DVW-2C-S1-08L-PCT-HR5
Number of Units:	25
Case Temperature:	>53°C
Ambient Temperature:	>50°C
Life Test Drive Current:	60mA
Measurement Current:	60mA

Data Set 2: 105°C, 60mA

Part Number:	HL-AS-2835DVW-2C-S1-08L-PCT-HR5
Number of Units:	25
Case Temperature:	>103°C
Ambient Temperature:	>100°C
Life Test Drive Current:	60mA
Measurement Current:	60mA

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	2.519E-06	1.003	>60000 hours	43000 hours
2	25	0	1000hrs	10000hrs	3.020E-06	1.003	>60000 hours	36000 hours

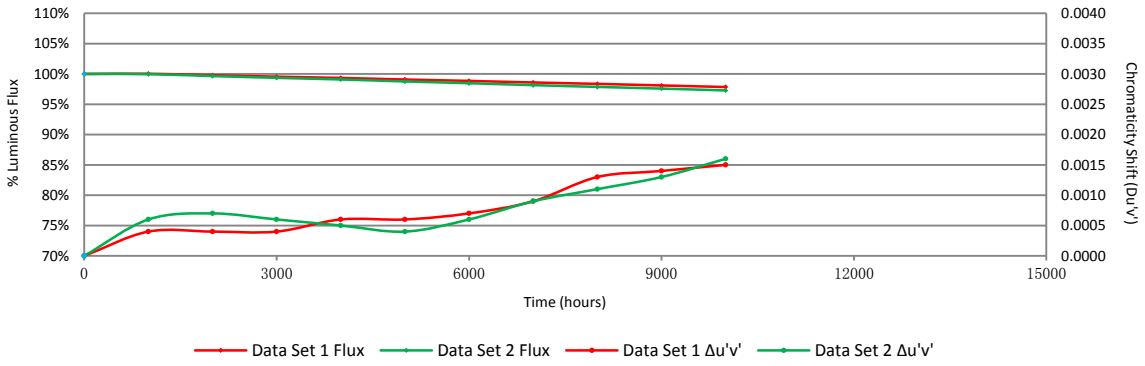
Average Lumen Maintenance (Percentage of Initial Luminous Flux)

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	100.03%	99.79%	99.55%	99.34%	99.08%	98.85%	98.59%	98.36%	98.10%	97.84%
2	99.96%	99.65%	99.35%	99.09%	98.76%	98.47%	98.15%	97.86%	97.58%	97.28%

Average Chromaticity Shift

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

Average Lumen Maintenance and Chromaticity Shift VS. Time



3 - Test Data

3.1 Data Set 1, 55°C, 60mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	121.20	100.25	100.08	99.92	99.50	99.34	99.26	99.01	98.84	98.76	98.68
2	121.00	100.08	99.75	99.59	99.26	99.01	98.60	98.43	98.35	97.93	97.69
3	122.00	100.49	100.33	100.16	99.84	99.34	98.85	98.52	98.03	97.87	97.62
4	122.10	100.08	99.92	99.67	99.59	99.51	99.43	99.26	98.69	98.44	98.20
5	119.60	100.42	100.33	100.25	99.92	99.75	99.50	99.16	98.75	98.49	98.33
6	121.50	100.08	99.92	99.75	99.75	99.42	99.18	99.01	98.85	98.68	98.44
7	122.80	100.16	99.92	99.59	99.35	98.78	98.21	97.96	97.80	97.72	97.64
8	121.70	99.84	99.67	99.42	99.34	98.85	98.77	98.52	97.95	97.53	97.37
9	121.50	99.84	99.59	99.34	99.09	98.52	98.27	97.94	97.78	97.45	97.04
10	120.40	99.92	99.58	99.50	99.42	99.09	98.75	98.50	98.34	98.01	97.76
11	122.00	100.08	99.43	99.26	99.18	99.10	98.77	98.61	98.28	97.87	97.70
12	122.60	99.92	99.67	99.43	99.35	99.10	98.94	98.69	98.21	97.88	97.55
13	120.70	99.92	99.75	99.42	99.34	99.17	98.92	98.67	98.59	98.43	98.18
14	120.80	99.92	99.67	99.42	99.25	99.09	99.01	98.68	98.43	98.10	98.01
15	121.90	99.84	99.75	99.43	99.18	98.93	98.69	98.36	98.28	98.20	97.87
16	121.50	99.92	99.67	99.34	99.09	99.01	98.68	98.44	98.27	97.86	97.70
17	122.50	100.08	99.84	99.43	99.18	99.02	98.86	98.53	98.37	98.04	97.71
18	122.10	100.33	99.92	99.67	99.34	99.18	99.10	98.85	98.77	98.61	98.20
19	120.80	100.17	99.67	99.59	99.34	99.09	99.01	98.76	98.51	98.34	98.18
20	120.90	99.92	99.83	99.59	99.34	99.26	99.17	98.84	98.76	98.59	98.18
21	123.70	100.16	99.76	99.43	99.11	98.79	98.14	97.82	97.57	97.25	97.01
22	121.70	99.92	99.67	99.51	99.10	98.77	98.52	98.36	98.11	97.95	97.45
23	123.00	99.76	99.51	99.27	99.19	99.02	98.94	98.70	98.54	98.21	97.89
24	121.60	99.84	99.75	99.42	99.26	99.18	99.10	98.77	98.68	98.27	97.94
25	121.80	99.75	99.67	99.43	99.10	98.77	98.60	98.44	98.19	98.11	97.78
Avg.	121.66	100.03	99.79	99.55	99.34	99.08	98.85	98.59	98.36	98.10	97.84
Med.	121.70	99.92	99.75	99.43	99.34	99.09	98.86	98.61	98.35	98.10	97.78
st dev	0.89	0.20	0.22	0.25	0.23	0.27	0.35	0.35	0.35	0.39	0.40
Min.	119.60	99.75	99.43	99.26	99.09	98.52	98.14	97.82	97.57	97.25	97.01
Max.	123.70	100.49	100.33	100.25	99.92	99.75	99.50	99.26	98.85	98.76	98.68

3.2 Data Set 1, 55°C, 60mA (Forward Voltage)

No.	Forward Voltage (V)										
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	18.45	18.48	18.50	18.49	18.51	18.51	18.52	18.55	18.52	18.52	18.52
2	18.59	18.56	18.58	18.58	18.60	18.55	18.60	18.63	18.59	18.64	18.62
3	18.36	18.34	18.35	18.35	18.36	18.33	18.36	18.41	18.39	18.43	18.38
4	18.65	18.64	18.66	18.65	18.67	18.65	18.67	18.72	18.68	18.74	18.69
5	18.40	18.41	18.43	18.42	18.45	18.41	18.44	18.49	18.44	18.48	18.45
6	18.43	18.43	18.46	18.46	18.48	18.44	18.46	18.51	18.48	18.51	18.48
7	18.54	18.53	18.54	18.55	18.56	18.53	18.55	18.61	18.61	18.62	18.58
8	18.52	18.50	18.53	18.52	18.54	18.51	18.52	18.58	18.54	18.62	18.56
9	18.46	18.46	18.46	18.47	18.49	18.45	18.47	18.52	18.48	18.54	18.49
10	18.49	18.49	18.51	18.50	18.53	18.48	18.49	18.56	18.50	18.58	18.53
11	18.53	18.52	18.55	18.53	18.55	18.53	18.32	18.61	18.54	18.61	18.57
12	18.32	18.32	18.33	18.33	18.35	18.31	18.54	18.38	18.33	18.39	18.35
13	18.60	18.60	18.61	18.60	18.63	18.60	18.61	18.68	18.62	18.66	18.64
14	18.57	18.56	18.57	18.56	18.59	18.56	18.56	18.63	18.58	18.62	18.59
15	18.44	18.44	18.45	18.45	18.47	18.44	18.45	18.51	18.45	18.54	18.48
16	18.31	18.31	18.32	18.32	18.34	18.30	18.31	18.38	18.33	18.40	18.34
17	18.58	18.59	18.59	18.58	18.61	18.59	18.58	18.66	18.60	18.70	18.62
18	18.43	18.44	18.44	18.44	18.46	18.44	18.45	18.50	18.45	18.53	18.47
19	18.59	18.61	18.61	18.61	18.62	18.60	18.61	18.68	18.61	18.69	18.63
20	18.34	18.34	18.34	18.34	18.37	18.34	18.35	18.41	18.35	18.42	18.36
21	18.43	18.41	18.40	18.40	18.41	18.39	18.39	18.46	18.41	18.47	18.42
22	18.43	18.40	18.41	18.41	18.44	18.40	18.40	18.47	18.43	18.50	18.44
23	18.58	18.55	18.55	18.55	18.58	18.57	18.54	18.63	18.57	18.63	18.58
24	18.56	18.53	18.53	18.54	18.55	18.55	18.53	18.60	18.55	18.57	18.56
25	18.64	18.61	18.61	18.63	18.64	18.63	18.62	18.68	18.64	18.67	18.65
Avg.	18.49	18.48	18.49	18.49	18.51	18.48	18.49	18.55	18.51	18.56	18.52
Med.	18.49	18.49	18.51	18.50	18.53	18.51	18.52	18.56	18.52	18.57	18.53
st dev	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Min.	18.31	18.31	18.32	18.32	18.34	18.30	18.31	18.38	18.33	18.39	18.34
Max.	18.65	18.64	18.66	18.65	18.67	18.65	18.67	18.72	18.68	18.74	18.69

3.3 Data Set 1, 55°C, 60mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')									
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	0.2571	0.5346	2782	0.0002	0.0002	0.0001	0.0007	0.0009	0.0009	0.0011	0.0016	0.0013	0.0013
2	0.2571	0.5348	2781	0.0001	0.0003	0.0003	0.0011	0.0012	0.0010	0.0011	0.0014	0.0014	0.0013
3	0.2574	0.5328	2784	0.0004	0.0005	0.0006	0.0006	0.0005	0.0005	0.0007	0.0009	0.0011	0.0011
4	0.2584	0.5365	2747	0.0004	0.0004	0.0004	0.0006	0.0004	0.0007	0.0008	0.0012	0.0013	0.0013
5	0.2583	0.5356	2752	0.0003	0.0000	0.0002	0.0009	0.0006	0.0009	0.0011	0.0013	0.0014	0.0016
6	0.2561	0.5355	2799	0.0002	0.0001	0.0001	0.0011	0.0010	0.0012	0.0015	0.0015	0.0016	0.0019
7	0.2572	0.5352	2778	0.0005	0.0004	0.0005	0.0005	0.0002	0.0004	0.0006	0.0009	0.0011	0.0013
8	0.2573	0.5352	2775	0.0004	0.0003	0.0002	0.0007	0.0009	0.0010	0.0013	0.0017	0.0017	0.0020
9	0.2586	0.5343	2752	0.0004	0.0003	0.0002	0.0008	0.0006	0.0012	0.0013	0.0020	0.0017	0.0018
10	0.2574	0.5354	2772	0.0004	0.0006	0.0004	0.0004	0.0005	0.0007	0.0010	0.0011	0.0011	0.0011
11	0.2594	0.5357	2730	0.0005	0.0006	0.0004	0.0006	0.0004	0.0006	0.0009	0.0013	0.0017	0.0015
12	0.2571	0.5358	2776	0.0004	0.0005	0.0004	0.0004	0.0005	0.0012	0.0013	0.0014	0.0016	0.0016
13	0.2579	0.5355	2761	0.0006	0.0006	0.0005	0.0004	0.0005	0.0006	0.0009	0.0013	0.0013	0.0014
14	0.2581	0.5355	2759	0.0006	0.0007	0.0006	0.0003	0.0002	0.0001	0.0004	0.0012	0.0009	0.0011
15	0.2585	0.5350	2752	0.0004	0.0004	0.0004	0.0005	0.0008	0.0008	0.0011	0.0013	0.0013	0.0013
16	0.2569	0.5351	2785	0.0004	0.0004	0.0004	0.0006	0.0009	0.0007	0.0009	0.0012	0.0017	0.0017
17	0.2564	0.5350	2795	0.0006	0.0006	0.0006	0.0004	0.0004	0.0007	0.0008	0.0010	0.0017	0.0013
18	0.2596	0.5362	2724	0.0002	0.0001	0.0001	0.0009	0.0006	0.0009	0.0010	0.0015	0.0022	0.0022
19	0.2591	0.5359	2736	0.0005	0.0005	0.0004	0.0003	0.0004	0.0004	0.0005	0.0011	0.0011	0.0013
20	0.2566	0.5341	2795	0.0004	0.0005	0.0004	0.0005	0.0002	0.0005	0.0007	0.0016	0.0013	0.0014
21	0.2587	0.5354	2745	0.0004	0.0004	0.0004	0.0007	0.0008	0.0010	0.0012	0.0009	0.0016	0.0015
22	0.2592	0.5351	2736	0.0008	0.0006	0.0007	0.0003	0.0002	0.0005	0.0006	0.0009	0.0010	0.0012
23	0.2578	0.5351	2765	0.0006	0.0005	0.0006	0.0003	0.0004	0.0004	0.0007	0.0008	0.0010	0.0015
24	0.2568	0.5333	2795	0.0005	0.0006	0.0006	0.0006	0.0003	0.0004	0.0006	0.0010	0.0013	0.0016
25	0.2565	0.5355	2791	0.0007	0.0006	0.0005	0.0003	0.0003	0.0005	0.0006	0.0011	0.0012	0.0014
Avg.	0.2577	0.5351	2767	0.0004	0.0004	0.0004	0.0006	0.0006	0.0007	0.0009	0.0013	0.0014	0.0015
Med.	0.2574	0.5352	2772	0.0004	0.0005	0.0004	0.0006	0.0005	0.0007	0.0009	0.0012	0.0013	0.0014
st dev	0.0010	0.0008	22	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
Min.	0.2561	0.5328	2724	0.0001	0.0000	0.0001	0.0003	0.0002	0.0001	0.0004	0.0008	0.0009	0.0011
Max.	0.2596	0.5365	2799	0.0008	0.0007	0.0007	0.0011	0.0012	0.0012	0.0015	0.0020	0.0022	0.0022

3.4 Data Set 2, 105°C, 60mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
26	120.30	100.25	100.17	99.83	99.75	99.33	99.17	98.92	98.67	98.42	98.34
27	121.90	99.75	99.67	99.51	99.34	99.18	99.02	98.77	98.52	98.03	97.95
28	122.30	99.84	99.75	99.43	99.26	98.77	98.69	98.45	98.28	97.87	97.55
29	121.20	99.67	99.26	99.17	98.76	98.51	98.27	97.94	97.52	97.19	96.95
30	120.00	99.75	99.33	99.17	99.00	98.83	98.58	98.42	98.25	98.08	97.92
31	123.20	99.84	99.68	99.43	99.11	98.78	98.70	98.38	97.89	97.65	97.08
32	122.10	99.92	99.75	99.59	99.26	98.94	98.85	98.44	98.12	98.03	97.79
33	122.20	99.92	99.67	99.43	99.18	98.85	98.61	98.28	98.04	97.87	97.55
34	120.90	99.92	99.34	99.17	99.09	99.01	98.68	98.43	98.01	97.77	97.52
35	123.30	100.08	99.51	99.11	98.95	98.86	98.46	98.13	97.89	97.57	97.32
36	122.10	100.16	99.51	99.18	98.94	98.61	98.44	97.95	97.79	97.38	97.30
37	122.80	100.08	99.67	99.19	99.02	98.94	98.70	98.45	98.13	97.96	97.72
38	120.60	99.92	99.59	99.09	98.92	98.76	98.59	98.18	98.01	97.68	97.51
39	121.90	99.84	99.51	99.10	98.69	98.44	97.95	97.54	97.46	97.29	96.88
40	120.30	99.50	99.09	98.92	98.67	98.42	98.17	97.84	97.59	97.01	96.59
41	120.40	99.92	99.83	99.25	98.92	98.75	98.34	98.09	97.84	97.67	97.18
42	121.50	100.08	99.84	99.34	99.01	98.60	98.35	98.19	97.70	97.53	97.28
43	121.00	100.08	99.67	99.50	99.09	98.76	98.35	98.02	97.69	97.60	97.19
44	120.70	100.25	99.92	99.50	99.01	98.84	98.51	98.26	98.09	97.68	97.43
45	121.50	99.92	99.51	99.26	99.01	98.35	97.86	97.61	97.12	97.04	96.71
46	122.30	100.08	99.67	99.35	99.02	98.69	98.20	97.71	97.63	97.14	96.65
47	121.20	99.92	99.59	99.34	98.93	98.27	97.85	97.52	97.19	96.70	96.37
48	120.70	100.25	99.92	99.75	99.59	98.92	98.76	98.43	97.93	97.51	97.27
49	121.30	100.25	100.08	99.59	99.42	98.85	98.35	98.02	97.77	97.69	97.36
50	120.60	99.92	99.83	99.59	99.42	98.76	98.26	97.84	97.35	97.01	96.52
Avg.	121.45	99.96	99.65	99.35	99.09	98.76	98.47	98.15	97.86	97.58	97.28
Med.	121.30	99.92	99.67	99.34	99.02	98.77	98.46	98.18	97.89	97.65	97.30
st dev	0.93	0.19	0.25	0.22	0.26	0.24	0.33	0.36	0.38	0.41	0.49
Min.	120.00	99.50	99.09	98.92	98.67	98.27	97.85	97.52	97.12	96.70	96.37
Max.	123.30	100.25	100.17	99.83	99.75	99.33	99.17	98.92	98.67	98.42	98.34

3.5 Data Set 2, 105°C, 60mA (Forward Voltage)

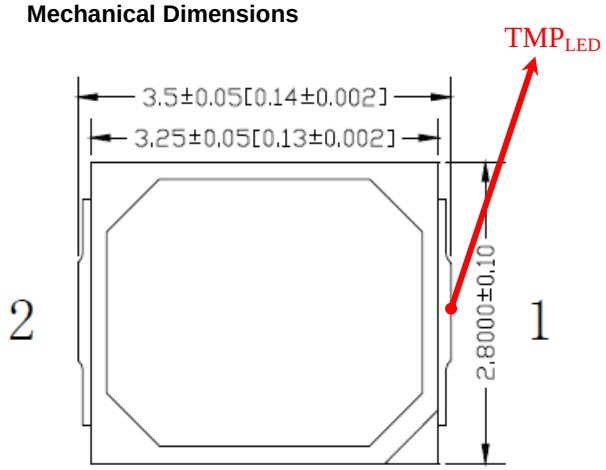
No.	Forward Voltage (V)										
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
26	18.35	18.35	18.36	18.35	18.39	18.37	18.36	18.42	18.43	18.43	18.40
27	18.39	18.37	18.38	18.39	18.41	18.39	18.39	18.44	18.44	18.43	18.42
28	18.34	18.31	18.33	18.31	18.34	18.32	18.32	18.38	18.38	18.37	18.35
29	18.42	18.39	18.42	18.41	18.44	18.41	18.42	18.48	18.45	18.46	18.43
30	18.31	18.30	18.32	18.32	18.34	18.31	18.31	18.37	18.36	18.38	18.36
31	18.57	18.52	18.54	18.54	18.56	18.54	18.54	18.60	18.46	18.59	18.57
32	18.40	18.38	18.41	18.40	18.42	18.39	18.39	18.46	18.41	18.45	18.43
33	18.43	18.41	18.41	18.42	18.44	18.42	18.41	18.48	18.46	18.52	18.45
34	18.42	18.41	18.42	18.42	18.44	18.41	18.42	18.49	18.44	18.48	18.44
35	18.40	18.40	18.40	18.40	18.42	18.39	18.40	18.46	18.42	18.45	18.42
36	18.41	18.41	18.42	18.43	18.45	18.41	18.42	18.49	18.47	18.46	18.45
37	18.39	18.38	18.40	18.39	18.42	18.39	18.39	18.46	18.44	18.42	18.41
38	18.52	18.51	18.52	18.52	18.55	18.52	18.53	18.59	18.57	18.56	18.54
39	18.40	18.40	18.40	18.42	18.43	18.40	18.40	18.47	18.47	18.44	18.43
40	18.32	18.33	18.33	18.33	18.35	18.33	18.33	18.40	18.44	18.35	18.36
41	18.50	18.51	18.51	18.51	18.53	18.49	18.51	18.58	18.57	18.53	18.53
42	18.47	18.48	18.49	18.48	18.50	18.48	18.49	18.55	18.52	18.52	18.51
43	18.55	18.56	18.56	18.56	18.58	18.55	18.55	18.63	18.62	18.59	18.58
44	18.44	18.44	18.44	18.45	18.48	18.44	18.44	18.52	18.52	18.47	18.47
45	18.37	18.38	18.39	18.37	18.41	18.38	18.38	18.46	18.43	18.40	18.41
46	18.50	18.50	18.51	18.49	18.53	18.50	18.50	18.58	18.54	18.54	18.52
47	18.49	18.51	18.50	18.50	18.53	18.49	18.50	18.59	18.55	18.53	18.54
48	18.37	18.37	18.37	18.38	18.40	18.37	18.37	18.44	18.40	18.40	18.40
49	18.59	18.60	18.60	18.59	18.62	18.59	18.59	18.68	18.64	18.63	18.62
50	18.49	18.49	18.49	18.48	18.51	18.48	18.48	18.57	18.54	18.53	18.51
Avg.	18.43	18.43	18.44	18.43	18.46	18.43	18.43	18.50	18.48	18.48	18.46
Med.	18.42	18.41	18.42	18.42	18.44	18.41	18.42	18.48	18.46	18.46	18.44
st dev	0.08	0.08	0.08	0.08	0.08	0.07	0.08	0.08	0.07	0.07	0.07
Min.	18.31	18.30	18.32	18.31	18.34	18.31	18.31	18.37	18.36	18.35	18.35
Max.	18.59	18.60	18.60	18.59	18.62	18.59	18.59	18.68	18.64	18.63	18.62

3.6 Data Set 2, 105°C, 60mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')									
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
26	0.2608	0.5358	2702	0.0003	0.0001	0.0001	0.0007	0.0007	0.0009	0.0012	0.0017	0.0017	0.0018
27	0.2573	0.5354	2774	0.0007	0.0008	0.0008	0.0002	0.0003	0.0004	0.0005	0.0006	0.0006	0.0011
28	0.2565	0.5339	2798	0.0007	0.0006	0.0006	0.0010	0.0008	0.0009	0.0012	0.0016	0.0017	0.0018
29	0.2603	0.5359	2712	0.0004	0.0003	0.0002	0.0010	0.0008	0.0011	0.0014	0.0018	0.0019	0.0023
30	0.2576	0.5354	2768	0.0008	0.0011	0.0010	0.0003	0.0002	0.0001	0.0004	0.0007	0.0006	0.0009
31	0.2590	0.5357	2738	0.0008	0.0008	0.0007	0.0009	0.0005	0.0006	0.0009	0.0007	0.0014	0.0017
32	0.2569	0.5353	2783	0.0009	0.0011	0.0009	0.0003	0.0003	0.0000	0.0002	0.0006	0.0007	0.0007
33	0.2580	0.5354	2759	0.0006	0.0005	0.0004	0.0009	0.0005	0.0006	0.0008	0.0013	0.0014	0.0017
34	0.2572	0.5342	2783	0.0004	0.0006	0.0004	0.0007	0.0002	0.0005	0.0008	0.0012	0.0014	0.0015
35	0.2566	0.5343	2795	0.0006	0.0007	0.0006	0.0004	0.0003	0.0007	0.0008	0.0009	0.0008	0.0012
36	0.2609	0.5358	2700	0.0005	0.0008	0.0007	0.0003	0.0001	0.0004	0.0006	0.0012	0.0008	0.0013
37	0.2573	0.5351	2777	0.0005	0.0008	0.0006	0.0002	0.0002	0.0003	0.0005	0.0008	0.0008	0.0009
38	0.2581	0.5363	2754	0.0006	0.0008	0.0008	0.0001	0.0003	0.0001	0.0005	0.0005	0.0007	0.0009
39	0.2598	0.5362	2720	0.0002	0.0002	0.0001	0.0010	0.0010	0.0013	0.0016	0.0021	0.0017	0.0020
40	0.2571	0.5361	2777	0.0007	0.0009	0.0007	0.0002	0.0003	0.0004	0.0009	0.0013	0.0016	0.0015
41	0.2579	0.5351	2764	0.0005	0.0007	0.0006	0.0003	0.0006	0.0006	0.0010	0.0010	0.0017	0.0020
42	0.2567	0.5356	2785	0.0005	0.0006	0.0005	0.0004	0.0003	0.0007	0.0009	0.0012	0.0016	0.0019
43	0.2581	0.5352	2760	0.0004	0.0006	0.0005	0.0003	0.0003	0.0005	0.0008	0.0011	0.0014	0.0017
44	0.2577	0.5340	2772	0.0006	0.0007	0.0007	0.0003	0.0004	0.0008	0.0010	0.0007	0.0011	0.0017
45	0.2556	0.5349	2813	0.0005	0.0006	0.0005	0.0004	0.0001	0.0005	0.0010	0.0013	0.0017	0.0020
46	0.2574	0.5354	2773	0.0005	0.0007	0.0006	0.0004	0.0001	0.0006	0.0011	0.0014	0.0015	0.0020
47	0.2567	0.5332	2796	0.0005	0.0006	0.0005	0.0007	0.0004	0.0007	0.0010	0.0013	0.0018	0.0020
48	0.2593	0.5352	2733	0.0006	0.0007	0.0007	0.0003	0.0000	0.0005	0.0007	0.0008	0.0016	0.0020
49	0.2578	0.5353	2765	0.0006	0.0008	0.0006	0.0002	0.0001	0.0002	0.0007	0.0008	0.0014	0.0016
50	0.2596	0.5343	2732	0.0005	0.0006	0.0005	0.0006	0.0004	0.0007	0.0012	0.0014	0.0017	0.0021
Avg.	0.2580	0.5352	2761	0.0006	0.0007	0.0006	0.0005	0.0004	0.0006	0.0009	0.0011	0.0013	0.0016
Med.	0.2577	0.5353	2768	0.0005	0.0007	0.0006	0.0004	0.0003	0.0006	0.0009	0.0012	0.0014	0.0017
st dev	0.0014	0.0008	31	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0003	0.0004	0.0004	0.0004
Min.	0.2556	0.5332	2700	0.0002	0.0001	0.0001	0.0001	0.0000	0.0000	0.0002	0.0005	0.0006	0.0007
Max.	0.2609	0.5363	2813	0.0009	0.0011	0.0010	0.0010	0.0010	0.0013	0.0016	0.0021	0.0019	0.0023

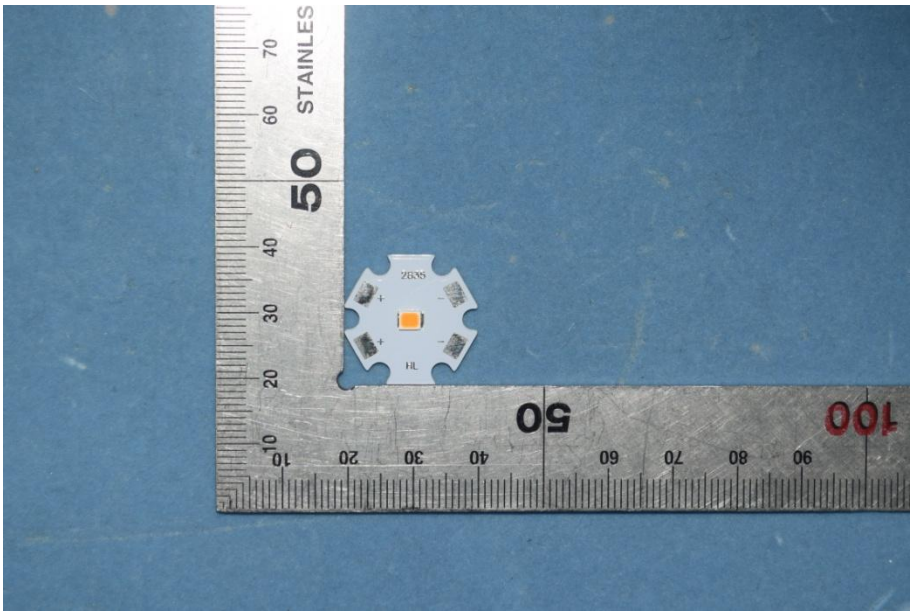
4 - DUT Photo

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**********