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-AM-2835H421W-S1-08HL-HR6

Report Type: 10000 Hours Test Report	**Product Type:** LED Package
Reviewed By:	Pote Wang
Report Number:	SZ2220119-02805E-10-10000
Test Date:	2022-01-26 to 2023-04-12
Report Date:	2023-04-20
Approved by:	Blake Zhang / EE Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 5/F(B-West) -7/F, the 3rd Phase of Wan Li Industrial Building D, Shihua Road, Futian Free Trade Zone Shenzhen, Guangdong, China. Tel: +86-755-33320018 Fax: +86-755-33320008
Test Facility:	Test facility was located at No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China.

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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 2022-01-19. The samples were numbered from 1 to 25 and 26 to 50.

Manufacturer:	Hongli Zhihui Group Co.,Ltd. Guangzhou Branch
Part Number:	HL-AM-2835H421W-S1-08HL-HR6
Part Type:	LED Package
Drive Level:	DC 150mA
Nominal CCT:	2700K
Power:	0.51 W
Average Current Density per LED die:	861.113 mA/mm^2
Average Power Density per LED die:	2.928W/mm^2
CRI:	95
Die Spacing:	/

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:

Series Name	Model Name	CRI (typ.)	Total Input Current (mA)	Power (W)	CCT (K)	Number of dies	Driver current per die(mA)	Current Density per Die mA/mm^2)	Power Density per PCB (W/mm^2)	Die Spacing (mm)
Test model	HL-AM-2835H421W-S1-08HL-HR6	95	150	0.51	2700	1	150	861.113	0.0520	/
Multiple model	HL-AM-2835D***W-****-S1-08**-HR*-***	>90	150	0.51	2700-6500	1	150	861.113	0.0520	/
	HL-AM-2835H***W-****-S1-08**-HR*-***	>90	150	0.51	2700-6500	1	150	861.113	0.0520	/

-AM-2835D***W-****-S1-08**-HR*-

1.
2. The second "****" which stands for the Zener chip code or None, no impact on product performances Zener chip code refers to the electrostatic capacity.
3.
4.
5.

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 (This standard was not accredited by NVLAP)

- *ENERGY STAR® Requirements for the Use of LM-80 Data (This standard was not accredited by NVLAP)

1.3 Testing Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
High Accuracy Array Spectroradiometer	EVERFINE	HAAS 2000	P600674CM5391140	2022-09-27	2023-09-26
0.5M Integrating Sphere	EVERFINE	0.5m	NA	2022-09-27	2023-09-26
LED Test Source	EVERFINE	LTS-300	P185616CJ1391143	2022-11-18	2023-11-17
Standard Light Source	EVERFINE	D062	1011093	2021-10-15	2023-10-14
Multilayer aging machine	BACL	B2-270	20015	2022-11-18	2023-11-17
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090004	2022-11-18	2023-11-17

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 $_{LED}$) 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

1.8 Sample Set

Data Set 1: 55°C, 150mA

Part Number:	HL-AM-2835H421W-S1-08HL-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-AM-2835H421W-S1-08HL-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
1	25	0	1000hrs	10000hrs	2.143E-06	1.002	>60000 hours
2	25	0	1000hrs	10000hrs	2.415E-06	1.001	>60000 hours

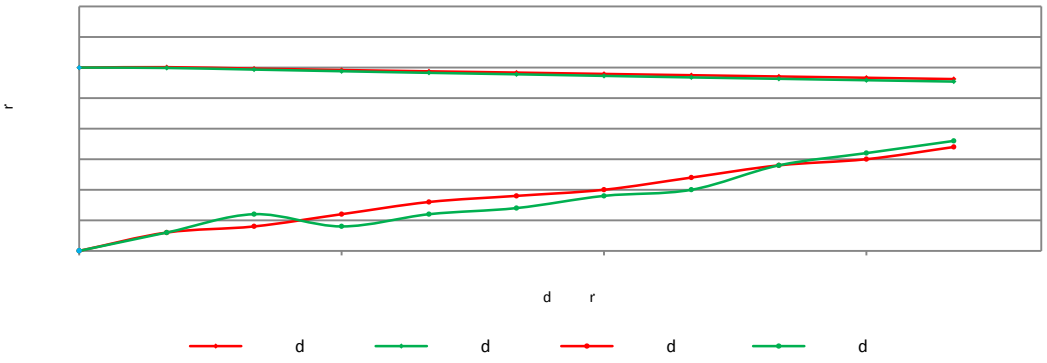
Average Lumen Maintenance (Percentage of Initial Luminous Flux)

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	100.07%	99.83%	99.60%	99.39%	99.18%	98.96%	98.75%	98.54%	98.33%	98.12%
2	99.94%	99.67%	99.40%	99.14%	98.90%	98.64%	98.39%	98.16%	97.93%	97.71%

Average Chromaticity Shift

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	0.0003	0.0004	0.0006	0.0008	0.0009	0.0010	0.0012	0.0014	0.0015	0.0017
2	0.0003	0.0006	0.0004	0.0006	0.0007	0.0009	0.0010	0.0014	0.0016	0.0018

Average Lumen Maintenance and Chromaticity Shift VS. Time



3 - Test Data

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

No.		Lumen Maintenance (%)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	44.79	100.11	99.98	99.80	99.60	99.35	99.06	98.79	98.62	98.44	98.26
2	45.75	100.09	99.80	99.78	99.58	99.41	99.23	99.06	98.82	98.60	98.45
3	45.52	100.04	99.89	99.54	99.38	99.19	98.90	98.62	98.46	98.15	97.85
4	45.24	100.15	99.93	99.82	99.56	99.23	98.96	98.81	98.63	98.36	98.12
5	45.85	100.07	99.78	99.63	99.35	99.08	98.87	98.71	98.41	98.17	97.93
6	45.42	99.98	99.76	99.27	99.10	98.88	98.63	98.41	98.17	97.95	97.71
7	45.15	100.11	99.80	99.27	99.07	98.80					

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

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

No.			CCT(K)										
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
1	0.2624	0.5280	2700	0.0002	0.0005	0.0005	0.0007						

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

No.		Lumen Maintenance (%)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
26	44.73	99.91	99.66	99.28	99.02	98.68	98.44	98.23	97.97	97.67	97.41
27	46.02	99.98	99.70	99.44	99.17	98.89	98.76	98.50	98.39	98.26	98.15
28	44.87	100.22	99.98	99.64	99.35	99.15	98.86	98.55	98.28	97.95	97.70
29	45.44	100.02	99.82	99.74	99.47	99.23	98.94	98.72	98.48	98.22	97.95
30	45.27	99.76	99.62	99.25	98.96	98.65	98.37	98.14	97.90	97.66	97.48

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

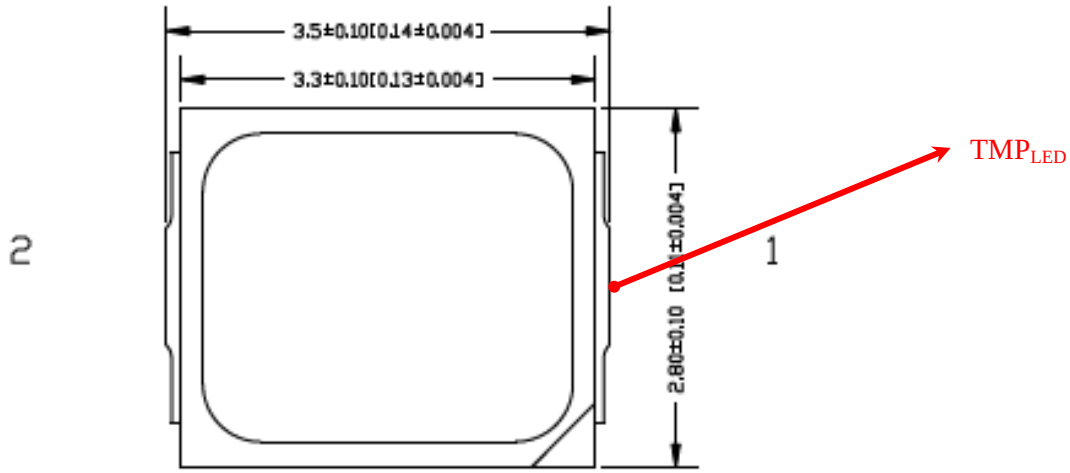
No.	Forward Voltage (V)										
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
26	3.143	3.134	3.142	3.137	3.163	3.150	3.140	3.145	3.136	3.137	3.155
27	3.147	3.136	3.132	3.128	3.143	3.164	3.131	3.132	3.149	3.144	3.120
28	3.147	3.130	3.150	3.140	3.127	3.126	3.132	3.130	3.144	3.126	3.125

nA (Chromaticity Shift) 05.68 640.78 Tm0 g *8 re5807.1 .4.262

)										
	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs
	0.0002	0.0003	0.0004	0.0005	0.0006	0.0008				

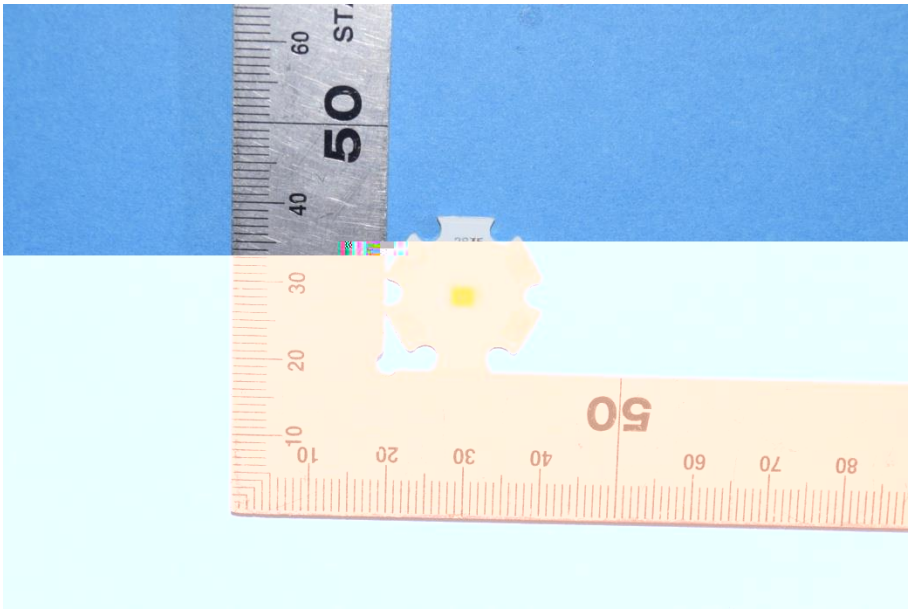
4 - DUT Photo

4.1 Mechanical Dimensions



All dimensions are in millimeter

4.2 DUT Photo



Directions