TEST REPORT

ACCORDING TO 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: A2835W1H3-D01-8D2AA1

Report Type: 6000 Hours Test Report	**Product Type:** LED Package
Test Engineer:	Pote Wang
Report Number:	RSZ160930505-10-M5
Test Date:	2016-10-09 to 2017-06-18
Report Date:	2019-04-15
Reviewed By:	Daniel Duan / EE Manager
Revised Note:	The previous report RSZ160930505-10-M4 is replaced by this report on 2019-04-15
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

1 - General Information

1.1 Description of LED Light Sources

Sample Size:

90 PCS samples were received on 2016-09-30. The samples were numbered from 1 to 30, 31 to 60 and 61 to 90.

Manufacturer:	Hongli Zhihui Group Co.,Ltd. Guangzhou Branch
Part Number:	A2835W1H3-D01-8D2AA1
Part Type:	LED Package
Drive Level:	DC 90mA
Nominal CCT:	2700K
Power:	0.36 W
Average Current Density per LED die:	1038.78mA/mm^2
Average Power Density per LED die:	4.16 W/mm^2
CRI:	80
Die Spacing:	N/A

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)

Test Model Number

Test Model Number	Multiple Models	Details
A2835W1H3-D01-8D2AA1	HL-A-2835HW-S1-08HL-HR3	Only different Model name for different market
	HL-AM-2835HW-S1-08HL-HR3	
	HL-A-2835HW-S1-08HL-HR3(R9)	
	HL-AM-2835HW-S1-08HL-HR3(R9)	
	HL-AM-2835HW-S1-08-HR3	
	HL-AM-2835HW-S1-08-HR3(R9)	
	P*2835W*H6-D01-8D2A*	1. Different Model name for different market 2. 4 is a letter which stand for special code which do not affect product performance. 3. A * is a number from 1 to 9 which stand for CCT. 1 means 2600-2800K, 2 means 2800-3100K, 3 means 3800-4250K, 4 means 4750-5300K, 5 means 5700-6500K, 6 means 6000-7000K, 8 means 3200-3800K, 9 means 5050-5650K. 4. Third * is a serial number from 1 to 9.

1.2 Standards Used:

- IESNA 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
Integral Sphere	EVERFINE	Diameter 0.3m	1011119	2017-03-09	2018-03-08
Programmable Test Power for LEDs	EVERFINE	LED300E	1008002	2017-03-03	2018-03-02

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
High accuracy array spectroradiometer	EVERFINE	HAAS-2000	1012016T	2017-03-09	2018-03-08
Standard Light Source	EVERFINE	D062	1011093	2016-09-13	2017-09-12
Precision digital stabilized DC power supply	EVERFINE	WY605-V110	G115987CJ7321114	2017-03-03	2018-03-02
Multilayer aging machine	BACL	B2-270	20005	2016-09-01	2017-09-01
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090009	2016-12-15	2017-12-14
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090004	2017-03-03	2018-03-02

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 2 CB B >L3>-daL3>-daL3>-daL3>-da

1.6 Measurement Uncertainty

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, 90mA

Part Number:	A2835W1H3-D01-8D2AA1
Number of Units:	30
Case Temperature:	>53°C
Ambient Temperature:	>50°C
Life Test Drive Current:	90mA
Measurement Current:	90mA

Data Set 2: 85°C, 90mA

Part Number:	A2835W1H3-D01-8D2AA1
Number of Units:	30
Case Temperature:	>83°C
Ambient Temperature:	>80°C
Life Test Drive Current:	90mA
Measurement Current:	90mA

Data Set 3: 105°C, 90mA

Part Number:	A2835W1H3-D01-8D2AA1
Number of Units:	30
Case Temperature:	>103°C
Ambient Temperature:	>100°C
Life Test Drive Current:	90mA
Measurement Current:	90mA

2 - Summary of Test Result

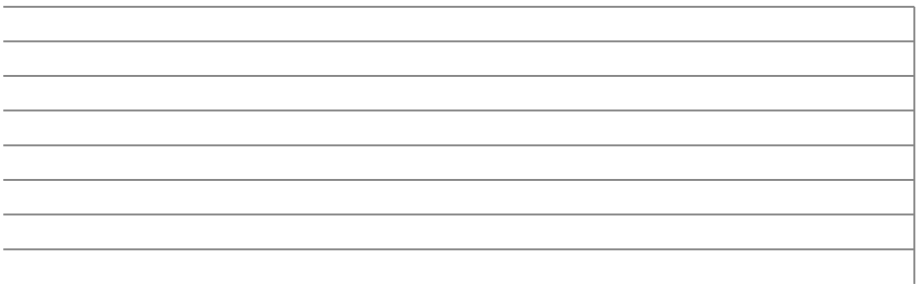
Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration	Reported TM-21 L_{70} Lifetime
1	30	0			

3.2 Data Set 1, 55°C, 90mA (Forward Voltage)

No.	Forward Voltage (V)						
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	2.981	2.983	2.988	2.999	2.984	2.990	2.984
2	2.987	2.953	2.957	2.989	2.957	2.959	2.953
3	2.985	2.982	2.986	3.009	2.987	2.992	2.984
4	2.980	2.978	2.981	2.989	2.995	2.987	2.982
5	2.981	2.981	2.984	3.009	2.987	2.989	2.982
6	2.952	2.990	2.993	3.001	2.993	2.999	2.990
7	2.975	2.975	2.978	2.979	2.983	2.983	2.978
8	2.976	2.975	2.977	2.980	2.999	2.984	2.975
9	2.972	2.970	2.975	2.974	2.976	2.981	2.971
10	2.975	2.974	2.978	2.979	2.975	2.982	2.977
11	2.978	2.977	2.980	2.982	2.982	2.986	2.975
12	2.994	2.993	2.998	3.004	2.995	3.001	2.990
13	2.981	2.978	2.984	2.986	2.981	2.987	2.980
14	2.994	2.992	2.996	3.002	2.995	2.999	2.993
15	2.980	2.976	2.981	2.987	2.986	2.987	2.979
16	2.987	2.987	2.992	2.993	2.995	2.996	2.989
17	2.969	2.967	2.972	2.974	2.970	2.974	2.968
18	2.988	2.986	2.989	2.992	2.993	2.994	2.987

3.3 Data Set 1, 55°C, 90mA (Chromaticity Shift)

No.			CCT(K)	1 A					
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	0.2625	0.5250	2709	0.0004	0.0005	0.0006	0.0010	0.0013	0.0016
2	0.2627	0.5255	2703	0.0003	0.0004	0.0007	0.0008	0.0009	0.0011
3	0.2616	0.5254	2728	0.0004	0.0009	0.0009	0.0010	0.0014	0.0016
4	0.2615	0.5254	2729	0.0004	0.0008	0.0009	0.0010	0.0014	0.0016
5	0.2619	0.5242	2726	0.0004	0.0009	0.0011	0.0012	0.0014	0.0016
6	0.2615	0.5254	2728	0.0009	0.0011	0.0017	0.0019	0.0024	0.0025
7	0.2615	0.5245	2733	0.0004	0.0005	0.0011	0.0012	0.0015	0.0017
8	0.2610	0.5237	2746	0.0004	0.0006	0.0010	0.0011	0.0014	0.0016
9	0.2623	0.5253	2713	0.0004	0.0006	0.0010	0.0011	0.0014	0.0016
10	0.2619	0.5254	2720	0.0004	0.0006	0.0010	0.0011	0.0014	0.0016
11	0.2634	0.5241	2694	0.0004	0.0005	0.0009	0.0011	0.0013	0.0016
12	0.2611	0.5256	2736	0.0005	0.0007	0.0010	0.0012	0.0014	0.0017
13	0.2608	0.5246	2748	0.0004	0.0006	0.0011	0.0011	0.0013	0.0016
14	0.2625	0.5245	2711	0.0004	0.0006	0.0009	0.0012	0.0013	0.0016
15	0.2613	0.5246	2737	0.0004	0.0007	0.0010	0.0012	0.0014	0.0015
16	0.2619	0.5223	2734	0.0004	0.0006	0.0010	0.0012	0.0014	0.0016
17	0.2613	0.5242	2738	0.0004	0.0006	0.0011	0.0013	0.0014	0.0017
18	0.2607	0.5240	2752	0.0005	0.0007	0.0010	0.0012	0.0014	0.0017
19	0.2610	0.5235	2747	0.0004	0.0006	0.0010	0.0011	0.0013	0.0015
20	0.2627	0.5253	2704	0.0004	0.0006	0.0010	0.0013	0.0015	0.0017
21	0.2607	0.5243	2752	0.0004	0.0007	0.0010	0.0013	0.0013	0.0016
22	0.2621	0.5256	2715	0.0004	0.0006	0.0010	0.0011	0.0014	0.0016
23	0.2638	0.5238	2687	0.0004	0.0006	0.0010	0.0010	0.0013	0.0016
24	0.2615	0.5260	2726	0.0004	0.0006	0.0010	0.0011	0.0014	0.0016
25	0.2615	0.5251	2731	0.0004	0.0006	0.0011	0.0011	0.0014	0.0016
26	0.2631	0.5252	2697	0.0004	0.0006	0.0010	0.0011	0.0014	0.0016
27	0.2605	0.5252	2751	0.0005	0.0007	0.0010	0.0012	0.0015	0.0016
28	0.2632	0.5249	2696	0.0005	0.0007	0.0012	0.0012	0.0016	0.0017
29	0.2610	0.5243	2745	0.0004	0.0006	0.0010	0.0012	0.0014	0.0016
30	0.2631	0.5239	2703	0.0005	0.0007	0.0011	0.0013	0.0014	0.0016
Ave.	0.2619	0.5247	2725	0.0004	0.0007	0.0010	0.0011	0.0014	0.0017
Med.	0.2616	0.5248	2728	0.0004	0.0006	0.0010	0.0011	0.0014	0.0016
st dev	0.0009	0.0008	19	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002
Min.	0.2605	0.5223	2687	0.0003	0.0004	0.0006	0.0008	0.0009	0.0011
Max.	0.2638	0.5260	2752	0.0009	0.0011	0.0017	0.0019	0.0024	0.0025



FIN

3.5 Data Set 2, 85°C, 90mA (Forward Voltage)

No.	Forward Voltage (V)						
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
31	2.983	2.982	2.987	2.995	2.984	2.992	2.982
32	2.978	2.978	2.982	3.006	2.979	2.985	2.982
33	2.972	2.972	2.978	2.983	2.974	2.980	2.975
34	2.986	2.981	2.987	2.989	2.985	2.990	2.984
35	2.995	2.993	3.000	3.033	3.001	3.002	2.994
36	2.950	2.949	2.955	2.960	2.956	2.957	2.950
37	2.980	2.979	2.985	2.985	2.985	2.986	2.981
38	2.989	2.988	2.994	2.997	2.993	2.996	2.987
39	2.989	2.987	2.992	2.991	2.990	2.993	2.986
40	2.975	2.974	2.980	2.996	2.987	2.981	2.977
41	2.979	2.977	2.983	2.992	2.981	2.984	2.978
42	2.982	2.983	2.987	2.990	2.990	2.990	2.980
43	2.988	2.987	2.992	2.992	2.989	2.993	2.986
44	2.991	2.989	2.996	2.997	2.998	2.998	2.992
45	2.989	2.988	2.994	3.017	2.989	2.995	2.989
46	2.979	2.978	2.984	2.995	2.980	2.987	2.981
47	2.977	2.974	2.982	2.993	2.977	2.983	2.978
48	2.952	2.950	2.957	2.958	2.953	2.956	2.957

3.6 Data Set 2, 85°C, 90mA (Chromaticity Shift)

No.			CCT(K)	1 A					
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
31	0.2618	0.5216	2739	0.0006	0.0009	0.0013	0.0012	0.0016	0.0018
32	0.2625	0.5246	2711	0.0006	0.0008	0.0011	0.0012	0.0016	0.0018
33	0.2614	0.5247	2733	0.0006	0.0008	0.0011	0.0011	0.0016	0.0018
34	0.2617	0.5233	2734	0.0005	0.0007	0.0010	0.0011	0.0015	0.0017
35	0.2633	0.5245	2694	0.0006	0.0008	0.0012	0.0012	0.0016	0.0018
36	0.2614	0.5242	2735	0.0007	0.0008	0.0013	0.0012	0.0016	0.0018
37	0.2629	0.5249	2701	0.0005	0.0008	0.0012	0.0011	0.0014	0.0017

3.7 Data Set 3, 105°C, 90mA (Lumen Maintenance) 98.5144 44.1 TEST MCID 1766620 g1f4234W*nE

No.		Lumen Maintenance (%)					
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
61	42.03	100.17	99.95	99.81	99.60	99.26	98.95
62	42.12	100.26	99.86	99.60	99.50	99.12	98.96
63	41.75	100.14	99.88	99.62	99.38	99.16	98.97
64	41.38	100.24	100.02	99.86	99.59	99.37	99.11
65	42.01	99.98	99.76	99.52	99.33	99.10	98.64
66	42.21	100.07	99.81	99.64	99.53	99.15	98.91
67	41.26	100.05	99.59	99.35	99.25	98.96	98.69
68	41.30	100.15	99.76	99.39	99.30	99.18	98.86
69	41.42	99.98	99.73	99.40	99.35	98.89	98.43
70	42.47	100.14	99.84	99.41	99.27	99.03	98.75
71	42.05	100.05	99.69	99.45	99.17	98.91	98.69
72			99.64	99.30	99.18	98.73	98.39
73				99.50	99.28	99.02	98.71
7				99.54	99.35	98.85	98
				99.53	99.27	98.75	
		100.14		46	99.13	98.82	

98.82

3.8 Data Set 3, 105°C, 90mA (Forward Voltage)

No.	Forward Voltage (V)						
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
61	2.981	2.984	2.986	2.988	2.983	2.990	2.986
62	2.970	2.973	2.975	2.981	2.970	2.976	2.975
63	2.973	2.971	2.978	2.982	2.974	2.980	2.980
64	2.974	2.973	2.980	2.981	2.975	2.981	2.977
65	2.975	2.976	2.983	2.983	2.979	2.982	2.977
66	2.981	2.981	2.986	2.992	2.983	2.987	2.982
67	2.947	2.945	2.949	2.953	2.947	2.951	2.956
68	2.953	2.951	2.956	2.958	2.951	2.956	2.952
69	2.991	2.989	2.995	2.996	2.991	2.995	2.992
70	2.978	2.976	2.982	2.992	2.979	2.982	2.978
71	2.960	2.957	2.962	2.966	2.958	2.964	2.960
72	2.980	2.977	2.983	2.984	2.978	2.981	2.981
73	2.977	2.975	2.981	2.987	2.977	2.982	2.977
74	2.981	2.977	2.986	2.987	2.984	2.986	2.981
75	2.980	2.977	2.983	2.986	2.989	2.987	2.980
76	2.987	2.986	2.994	2.992	2.993	2.993	2.990
77	2.952	2.948	2.955	2.956	2.954	2.956	2.952
78	2.982	2.981	2.986	2.993	2.989	2.988	2.983
79	2.983	2.980	2.987	2.989	2.986	2.989	2.983
80	2.984	2.983	2.991	2.990	2.989	2.991	2.984
81	2.991	2.987	2.994	2.994	2.988	2.996	2.989
82	2.992	2.988	2.997	2.997	2.992	2.997	2.994
83	2.991	2.989	2.997	2.999	2.993	2.999	2.996
84	2.989	2.989	2.999	3.000	2.992	2.997	2.993
85	2.985	2.983	2.991	2.993	2.984	2.990	2.989
86	2.979	2.976	2.987	2.990	2.980	2.986	2.981

Bay Area Compliance Laboratories Corp. (Dongguan)
No.69, Pulongcun, Puxinhu Industrial Area Tangxia ,
Dongguan, Guangdong, China.