



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-2835VDW-3C-S1-08-PCT-HR3(R9)

Report Type: 9000 Hours Test Report	Product Type: LED Package
Test Engineer:	Pote Wang

Report Number: RSZ180319505-10-9000

Note: The test data was only valid for the test sample(s). This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Dongguan).

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Bay Area Compliance Laboratories Corp. (Dongguan)

No.69, Pulongcun, Puxinhu Industrial Area Tangxia ,
Dongguan, Guangdong, China.
The IAS Accreditation Number TL-460

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1.3 Testing Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
1.0m integrating sphere	SENSING	SCD-20008	N/A	2018-06-28	2019-06-28
spectroradiometer	SENSING	SCD-20008	N/A	2018-06-28	2019-06-28
DC Power Supply	Hanshenpu Yuan	HSPY-100-05	2013010210003	2018-05-04	2019-05-04
Standard Light Source	EVERFINE	D204	G100283CJ6351178	2018-12-24	2019-12-24
DC Power Supply	BACL	B25001	90020	2018-12-17	2019-12-17
Multilayer aging machine	BACL	B2-270	20023	2019-03-13	2020-03-12
Multilayer aging machine	BACL	B2-270	20024	2019-03-13	2020-03-12
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090005	2019-03-26	2020-03-25
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090003	2018-05-04	2019-05-04

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 $\pm 3\%$ of the specified value of the manufacturer during maintenance test, and was within $\pm 0.5\%$ 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 $2^{\circ}C$ below the corresponding nominal case temperature. Surrounding air was maintained at a temperature that was greater than or equal to $5^{\circ}C$ below the corresponding nominal case temperature. Thermocouples were shielded from direct DUT optical radiation and comply with B 341 2 .

Samples were connected to DC power supply in series circuits with a constant current. The forward current was regulated to within $\pm 3\%$ 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 $25^{\circ}C \pm 2^{\circ}C$, RH <65%.

1.6 Photometric Measurement Method and Uncertainty

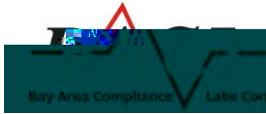
Integrating sphere and spectroradiometer is used to measure luminous flux and chromaticity coordinate u_v . 2 measurement was used and sample was driven by DC power supply. The forward current was regulated to within $\pm 0.5\%$ of the nominal value. The test system was calibrated by halogen reference lamp. The ambient temperature during test was set to $25^{\circ}C \pm 2^{\circ}C$, 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 $U=0.8671^{\circ}C$ ($K=2$), 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, 20mA

Part Number: HL-AS-2835VDW-3C-S1-08-PCT-HR3(R9)

Number of Units: 25

Case Temperature: >83°C

Ambient Temperature: >80°C

Life Test Drive Current: 20mA

Measurement Current: 20mA

Data Set 2: 105°C, 20mA

Part Number: HL-AS-2835VDW-3C-S1-08-PCT-HR3(R9)

Number of Units: 25

Case Temperature: >103°C

Ambient Temperature: >100°C

Life Test Drive Current: 20mA

Measurement Current: 20mA

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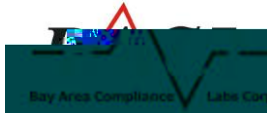
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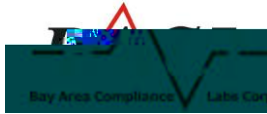
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3.2 Data Set 1, 85°C, 20mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	52.58	52.57	52.52	52.71	52.63	52.48	52.64	52.70	52.53	52.48
2	52.45	52.40	52.49	52.64	52.62	52.39	52.51	52.58	52.40	52.36
3	52.55	52.49	52.49	52.70	52.74	52.39	52.64	52.68	52.43	52.40
4	52.46	52.40	52.49	52.69	52.74	52.49	52.66	52.69	52.54	52.47
5	52.46	52.39	52.47	52.63	52.67	52.38	52.56	52.58	52.52	52.40
6	52.40	52.35	52.45	52.60	52.64	52.35	52.50	52.54	52.42	52.32
7	52.40	52.33	52.45	52.58	52.63	52.34	52.50	52.54	52.38	52.36
8	52.54	52.46	52.46	52.71	52.73	52.49	52.67	52.69	52.40	52.49
9	52.52	52.46	52.44	52.70	52.73	52.47	52.63	52.66	52.56	52.49
10	52.44	52.38	52.46	52.67	52.67	52.41	52.56	52.56	52.41	52.38
11	52.48	52.41	52.45	52.67	52.68	52.40	52.55	52.62	52.54	52.42
12	52.55	52.48	52.46	52.71	52.72	52.48	52.67	52.66	52.58	52.51
13	52.57	52.51	52.46	52.70	52.72	52.49	52.65	52.70	52.50	52.52
14	52.43	52.37	52.44	52.62	52.64	52.35	52.53	52.54	52.55	52.36
15	52.35	52.29	52.42	52.61	52.62	52.30	52.49	52.50	52.59	52.34
16	52.48	52.42	52.47	52.65	52.70	52.45	52.61	52.63	52.58	52.43
17	52.40	52.34	52.43	52.59	52.65	52.35	52.48	52.55	52.63	52.32
18	52.47	52.39	52.47	52.64	52.67	52.43	52.58	52.62	52.48	52.40
19	52.48	52.40	52.44	52.60	52.68	52.38	52.53	52.54	52.48	52.38
20	52.42	52.36	52.47	52.62	52.68	52.35	52.54	52.53	52.43	52.35
21	52.42	52.36	52.43	52.66	52.67	52.41	52.53	52.58	52.51	52.38
22	52.46	52.39	52.47	52.69	52.70	52.46	52.61	52.61	52.43	52.44
23	52.40	52.35	52.45	52.61	52.66	52.39	52.51	52.53	52.50	52.38
24	52.41	52.35	52.48	52.64	52.68	52.41	52.56	52.56	52.48	52.40
25	52.58	52.51	52.44	52.76	52.78	52.52	52.70	52.70	52.45	52.53
Avg.	52.47	52.41	52.46	52.66	52.68	52.41	52.58	52.60	52.49	52.41
Med.	52.46	52.39	52.46	52.65	52.68	52.41	52.56	52.58	52.50	52.40
st dev	0.06	0.07	0.02	0.05	0.04	0.06	0.07	0.07	0.07	0.06
Min.	52.35	52.29	52.42	52.58	52.62	52.30	52.48	52.50	52.38	52.32
Max.	52.58	52.57	52.52	52.76	52.78	52.52	52.70	52.70	52.63	52.53

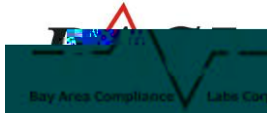


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3.5 Data Set 2, 105°C, 20mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	52.46	52.40	52.44	52.67	52.67	52.40	52.57	52.57	52.47	52.41
27	52.42	52.34	52.44	52.63	52.67	52.45	52.51	52.52	52.50	52.37
28	52.53	52.47	52.48	52.66	52.73	52.48	52.61	52.62	52.47	52.47
29	52.44	52.39	52.45	52.63	52.68	52.40	52.57	52.54	52.48	52.38
30	52.44	52.39	52.44	52.63	52.67	52.40	52.53	52.51	52.60	52.42
31	52.47	52.40	52.44	52.64	52.68	52.44	52.55	52.55	52.48	52.40
32	52.55	52.48	52.46	52.70	52.74	52.52	52.64	52.67	52.44	52.52
33	52.42	52.34	52.44	52.58	52.62	52.37	52.50	52.50	52.56	52.40
34	52.42	52.34	52.40	52.61	52.67	52.39	52.46	52.52	52.49	52.39
35	52.53	52.46	52.49	52.67	52.73	52.48	52.62	52.65	52.47	52.51
36	52.46	52.41	52.47	52.61	52.68	52.39	52.55	52.55	52.50	52.41
37	52.49	52.43	52.49	52.64	52.68	52.43	52.59	52.62	52.55	52.47
38	52.55	52.46	52.53	52.67	52.70	52.40	52.59	52.63	52.58	52.46
39	52.60	52.53	52.50	52.73	52.79	52.43	52.62	52.64	52.47	52.51
40	52.42	52.38	52.49	52.62	52.66	52.52	52.69	52.71	52.43	52.59
41	52.44	52.37	52.45	52.64	52.74	52.42	52.53	52.60	52.60	52.40
42	52.51	52.43	52.47	52.63	52.72	52.48	52.62	52.63	52.48	52.47
43	52.49	52.39	52.46	52.65	52.63	52.43	52.59	52.60	52.55	52.47
44	52.38	52.35	52.47	52.53	52.69	52.33	52.45	52.50	52.58	52.34
45	52.44	52.38	52.47	52.60	52.74	52.40	52.53	52.53	52.48	52.45
46	52.55	52.47	52.47	52.59	52.66	52.45	52.63	52.68	52.56	52.52
47	52.47	52.40	52.45	52.60	52.76	52.39	52.53	52.59	52.53	52.44
48	52.56	52.50	52.45	52.65	52.68	52.51	52.65	52.67	52.56	52.55
49	52.45	52.38	52.46	52.61	52.76	52.40	52.51	52.58	52.63	52.41
50	52.55	52.47	52.44	52.67	52.76	52.47	52.61	52.62	52.50	52.49
Avg.	52.48	52.41	52.46	52.63	52.70	52.43	52.57	52.59	52.52	52.45
Med.	52.47	52.40	52.46	52.63	52.68	52.43	52.57	52.60	52.50	52.45
st dev	0.06	0.05	0.03	0.04	0.04	0.05	0.06	0.06	0.05	0.06
Min.	52.38	52.34	52.40	52.53	52.62	52.33	52.45	52.50	52.43	52.34
Max.	52.60	52.53	52.53	52.73	52.79	52.52	52.69	52.71	52.63	52.59



3.6 Data Set 2, 105°C, 20mA (Chromaticity Shift)

No.			CCT(K)	D ! !) *								
	Ohr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	0.2611	0.5319	2712	0.0004	0.0003	0.0007	0.0013	0.0016	0.0020	0.0024	0.0025	0.0028
27	0.2596	0.5304	2748	0.0003	0.0005	0.0006	0.0007	0.0008	0.0011	0.0014	0.0018	0.0020
28	0.2605	0.5310	2728	0.0001	0.0003	0.0007	0.0003	0.0006	0.0009	0.0011	0.0012	0.0015
29	0.2605	0.5295	2734	0.0006	0.0008	0.0011	0.0009	0.0009	0.0011	0.0013	0.0018	0.0021
30	0.2610	0.5308	2716	0.0010	0.0012	0.0011	0.0013	0.0012	0.0014	0.0016	0.0020	0.0020
31	0.2612	0.5333	2704	0.0006	0.0009	0.0013	0.0013	0.0012	0.0016	0.0017	0.0021	0.0023
32	0.2616	0.5321	2700	0.0005	0.0009	0.0012	0.0013	0.0015	0.0018	0.0021	0.0023	0.0025
33	0.2615	0.5333	2696	0.0005	0.0007	0.0011	0.0012	0.0013	0.0018	0.0022	0.0026	0.0027
34	0.2593	0.5324	2746	0.0004	0.0007	0.0010	0.0013	0.0017	0.0022	0.0025	0.0028	0.0031
35	0.2608	0.5317	2718	0.0005	0.0009	0.0012	0.0011	0.0014	0.0016	0.0018	0.0021	0.0023
36	0.2622	0.5332	2684	0.0004	0.0006	0.0012	0.0013	0.0016	0.0019	0.0021	0.0023	0.0024
37	0.2619	0.5328	2690	0.0005	0.0009	0.0010	0.0010	0.0011	0.0015	0.0016	0.0020	0.0021
38	0.2608	0.5314	2720	0.0003	0.0003	0.0013	0.0013	0.0011	0.0013	0.0018	0.0019	0.0022
39	0.2618	0.5331	2692	0.0004	0.0007	0.0011	0.0012	0.0010	0.0016	0.0021	0.0025	0.0028
40	0.2611	0.5316	2712	0.0004	0.0006	0.0010	0.0013	0.0015	0.0014	0.0018	0.0019	0.0021
41	0.2582	0.5271	2792	0.0007	0.0009	0.0011	0.0014	0.0013	0.0014	0.0017	0.0016	0.0019
42	0.2599	0.5312	2738	0.0003	0.0007	0.0007	0.0013	0.0015	0.0020	0.0023	0.0025	0.0027
43	0.2613	0.5340	2698	0.0010	0.0011	0.0016	0.0016	0.0020	0.0026	0.0031	0.0034	0.0034
44	0.2609	0.5316	2716	0.0007	0.0011	0.0010	0.0011	0.0016	0.0021	0.0027	0.0029	0.0030
45	0.2610	0.5317	2714	0.0007	0.0008	0.0013	0.0010	0.0011	0.0016	0.0025	0.0029	0.0031
46	0.2609	0.5331	2710	0.0003	0.0002	0.0004	0.0010	0.0010	0.0014	0.0018	0.0022	0.0023
47	0.2638	0.5327	2654	0.0006	0.0007	0.0011	0.0006	0.0009	0.0015	0.0019	0.0023	0.0024



