

TEST REPORT

According to IES LM-80-2015
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-EMC-5050D90W-B1C12-S1-HR3

Report Type: 9000 Hours Test Report	Product Type: LED Package
Reviewed By:	Pote Wang
Report Number:	SZ2220119-02851E-10
Test Date:	2016-12-13 to 2017-12-23
Report Date:	2022-01-24
Approved by:	Blake Zhang / EE Engineer

Bay Area Compliance Laboratories Corp. (Dongguan).
No.12, Pulong East 1st

Prepared By:



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1 - General Information

1.1 Description of LED Light Sources

Sample Size:

50 PCS samples were received on 2016-10-27. The samples were numbered from 1 to 25 and 26 to 50.

Manufacturer:	Hongli Zhihui Group Co.,Ltd. Guangzhou Branch
Part Number:	HL-EMC-5050D90W-B1C12-S1-HR3
Part Type:	LED Package
#Drive Level:	DC 120mA
#Nominal CCT:	2700K
#Power:	4.5W
#Current Density per LED die:	241.5mA/mm ²
#Power Density per LED die:	0.755W/mm ²
#CRI:	80
#Die Spacing:	0.24mm

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)	Distance between of dies(mm)	Current (mA)
Master model	HL-EMC-5050D90W-B1C12-S1-HR3	80	2700	12	1	0.1728	241.5	120	0.24	120
	HL-EMC-5050D***W-B1C12-S1-HR3-***	80	2200-6500	12	1	0.1728	241.5	120	0.24	120
	HL-EMC-5050D***W-B1C10-S1-HR3-***	80	2200-6500	10						

multiple model

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1.8 Sample Set

Data Set 1: 85°C, 120mA

Part Number: HL-EMC-5050D90W-B1C12-S1-HR3
Number of Units: 25
Case Temperature: >83°C
Ambient Temperature: >80°C
Life Test Drive Current: 120mA
Measurement Current: 120mA

Data Set 2: 105°C, 120mA

Part Number: HL-EMC-5050D90W-B1C12-S1-HR3
Number of Units: 25
Case Temperature: >103°C
Ambient Temperature: >100°C
Life Test Drive Current: 120mA
Measurement Current: 120mA



2 - Summary of Test Result

Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration			Reported TM-21 L ₇₀ Lifetime
1	25	0	1000hrs	9000hrs	2.700E-06	1.003	>54000hours
2	25	0	1000hrs	9000hrs	3.511E-06	1.001	>54000hours

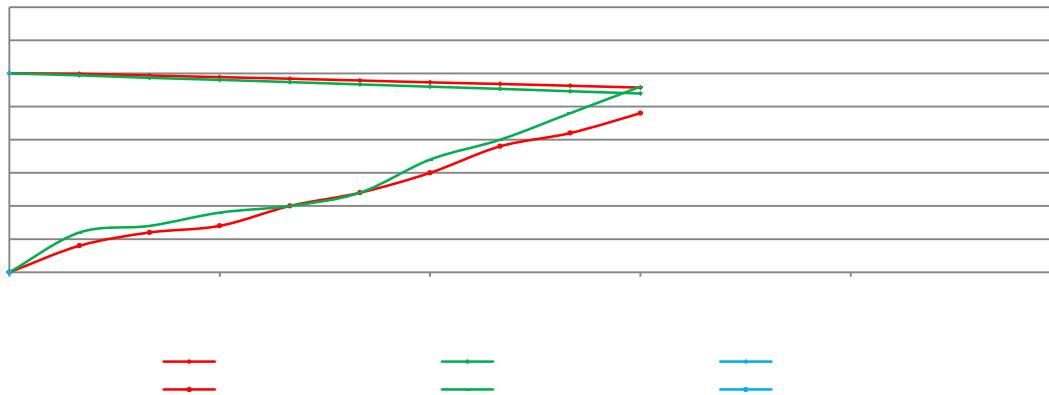
Average Lumen Maintenance (Percentage of Initial Luminous Flux)

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	99.94%	99.69%	99.44%	99.20%	98.93%	98.65%	98.41%	98.14%	97.86%
2	99.71%	99.33%	99.03%	98.69%	98.34%	98.00%	97.67%	97.31%	96.97%

Average Chromaticity Shift

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	0.0004	0.0006	0.0007	0.0010	0.0012	0.0015	0.0019	0.0021	0.0024
2	0.0006	0.0007	0.0009	0.0010	0.0012	0.0017	0.0020	0.0024	0.0028

Average Lumen Maintenance and Chromaticity Shift VS. Time





3 - Test Data

3.1 Data Set 1, 85°C, 120mA (Lumen Maintenance)

No.	(lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	709.5	99.93	99.62	99.39	99.11	98.79	98.73	98.48	98.11	97.83
2	717.9	99.80	99.37	99.12	98.82	98.50	98.12	97.94	97.67	97.31
3	723.0	99.82	99.47	99.24	98.95	98.58	98.27	97.90	97.58	97.29
4	707.6	99.92	99.65	99.48	99.15	98.90	98.56	98.28	98.11	97.74
5	724.8	99.97	99.57	99.45	99.23	99.16	98.92	98.72	98.47	98.29
6	723.9	99.83	99.43	99.10	98.85	98.59	98.36	98.22	98.00	97.72
7	719.1	99.85	99.67	99.35	99.11	98.94	98.62	98.30	98.12	97.91
8	721.8	99.88	99.70	99.57	99.38	99.13	98.78	98.68	98.35	97.94
9	684.8	100.01	99.69	99.39	99.07	98.73	98.57	98.34	98.00	97.72
10	719.9	100.03	99.71	99.33	99.18	98.92	98.68	98.29	98.07	97.74
11	729.9	99.95	99.64	99.52	99.34	99.22	98.84	98.81	98.59	98.44
12	718.5	99.96	99.94	99.72	99.44	99.22	98.97	98.80	98.59	98.41
13	721.1	100.11	100.08	99.86	99.69	99.39	99.03	98.82	98.47	98.27
14	707.1	99.97	99.55	99.15	98.94	98.78	98.50	98.35	98.19	97.98



3.2 Data Set 1, 85°C, 120mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	35.45	35.41	35.46	35.38	35.36	35.39	35.40	35.42	35.39	35.40
2	35.42	35.38	35.42	35.34	35.34	35.38	35.36	35.40	35.36	35.38
3	35.49	35.45	35.49	35.40	35.41	35.43	35.45	35.46	35.43	35.44
4	35.38	35.32	35.36	35.31	35.31	35.33	35.34	35.35	35.34	35.32
5	35.50	35.47	35.49	35.45	35.45	35.47	35.49	35.50	35.50	35.48
6	35.50	35.44	35.48	35.42	35.41	35.40	35.44	35.45	35.45	35.42
7	35.45	35.39	35.45	35.36	35.35	35.37	35.38	35.38	35.41	35.40
8	35.42	35.33	35.38	35.34	35.30	35.33	35.35	35.35	35.36	35.36
9	35.43	35.37	35.41	35.35	35.34	35.36	35.36	35.37	35.38	35.37
10	35.46	35.40	35.44	35.38	35.36	35.38	35.40	35.40	35.41	35.40
11	35.46	35.41	35.44	35.38	35.36	35.38	35.39	35.40	35.40	35.40
12	35.49	35.44	35.50	35.43	35.41	35.41	35.43	35.44	35.43	35.43
13	35.40	35.35	35.41	35.35	35.31	35.30	35.35	35.33	35.35	35.36
14	35.49	35.45	35.49	35.44	35.42	35.43	35.44	35.43	35.45	35.45
15	35.42	35.37	35.42	35.37	35.34	35.38	35.36	35.37	35.39	35.39
16	35.34	35.30	35.35	35.30	35.28	35.28	35.30	35.31	35.34	35.32
17	35.35	35.32	35.36	35.31	35.28	35.29	35.31	35.26	35.34	35.32
18	35.47	35.43	35.48	35.42	35.38	35.41	35.70	35.39	35.44	35.43
19	35.45	35.43	35.47	35.42	35.37	35.41	35.42	35.46	35.43	35.43
20	35.41	35.39	35.43	35.37	35.34	35.37	35.37	35.45	35.40	35.39
21	35.45	35.40	35.46	35.40	35.35	35.39	35.40	35.43	35.40	35.40
22	35.34	35.30	35.35	35.29	35.27	35.29	35.29	35.32	35.28	35.31
23	35.50	35.47	35.52	35.46	35.44	35.46	35.46	35.47	35.48	35.48
24	35.35	35.32	35.35	35.31	35.27	35.30	35.33	35.33		35.30
25	35.47	35.45	35.48	35.45	35.41	35.43	35.43		35.45	
Ave.										



3.3 Data Set 1, 85°C, 120mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (u'v')						
				0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs



3.4 Data Set 2, 105°C, 120mA (Lumen Maintenance)

No.	(lm)	Lumen Maintenance (%)								
	Ohr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	718.7	99.60	99.14	98.79	98.39	97.94	97.54	97.27	96.84	96.59
27	718.0	99.93	99.74	99.48	99.12	98.83	98.50	98.25	97.92	97.45
28	708.3	99.83	99.65	99.44	99.04	98.74	98.35	98.14	98.01	97.59
29	715.3	99.85	99.30	99.08	98.87	98.53	98.18	97.92	97.54	97.40
30	723.4	99.81	99.53	99.41	98.99	98.56	98.19	97.65	97.40	96.99
31	690.8	99.65	99.41	99.16	98.74	98.45	98.10	97.83	97.38	97.13
32	724.1	99.68	99.19	98.70	98.55	98.11	97.71	97.57	97.25	96.71
33	713.5	99.73	99.50	99.10	98.67	98.32	98.19	97.77	97.59	97.14
34	715.1	99.50	99.34	98.92	98.36	98.08	97.89	97.45	97.15	96.94
35	725.5	99.82	99.39	99.23	99.02	98.65	98.33	97.86	97.55	97.31
36	710.0	99.59	99.31	99.14	98.93	98.56	98.11	97.63	97.44	97.18
37	723.6	99.61	99.12	98.95	98.65	98.20	97.95	97.58	97.25	96.88
38	715.5	99.71	99.19	98.97	98.77	98.42	98.02	97.67	97.15	96.93
39	709.0	99.75	99.22	99.11	98.69	98.24	97.91	97.50	97.28	96.76
40	721.2	99.72	99.17	98.74	98.49	98.13	97.70	97.56	97.13	96.60
41	725.7	99.74	99.32	98.90	98.73	98.25	97.89	97.48	97.06	96.89
42	707.7	99.73	99.49	99.03	98.77	98.33	97.94	97.64	97.15	96.86
43	717.1	99.79	99.51	99.14	98.90	98.61	98.23	98.08	97.60	97.16
44	710.8	99.54	99.06	98.59	98.24	98.03	97.79	97.44	97.27	97.07
45	715.6	99.62	99.08	98.71	98.43	98.11	97.92	97.54	97.14	96.84
46	708.2	99.70	99.15	98.90	98.43	97.98	97.61	97.20	96.81	96.46
47	707.2	99.83	99.49	99.29	98.81	98.43	98.06	97.68	97.26	96.69
48	711.4	99.75	99.37	99.16	98.68	98.51	98.10	97.72	97.23	96.94
49	721.5	99.58	99.24	98.96	98.63	98.39	98.12	97.69	97.21	96.80
50	718.7	99.81	99.26	98.86	98.39	98.00	97.75	97.63	97.23	96.87
Ave.	715.0	99.71	99.33	99.03	98.69	98.34	98.00	97.67	97.31	96.97
Med.	715.5	99.73	99.31	99.03	98.69	98.33	98.02	97.64	97.25	96.93
st dev	7.7968	0.1075	0.1795	0.2348	0.2385	0.2516	0.2398	0.2449	0.2795	0.2798
Min.	690.8	99.50	99.06	98.59	98.24	97.94	97.54	97.20	96.81	96.46
Max.	725.7	99.93	99.74	99.48	99.12	98.83	98.50	98.25	98.01	97.59



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3.5 Data Set 2, 105°C, 120mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	35.47	35.40	35.43	35.39	35.36	35.37	35.41	35.40	35.39	35.41
27	35.43	35.38	35.43	35.37	35.34	35.36	35.38	35.38	35.40	35.39
28	35.42	35.38	35.43	35.37	35.33	35.37	35.38	35.38	35.42	35.38
29	35.49	35.45	35.49	35.43	35.39	35.43	35.44	35.43	35.48	35.44
30	35.46	35.43	35.47	35.40	35.34	35.41	35.45	35.41	35.44	35.41
31	35.50	35.46	35.50	35.45	35.46	35.49	35.49	35.45	35.47	35.45

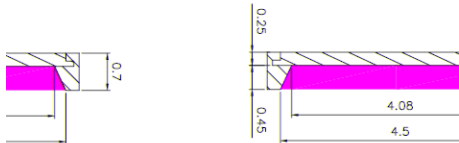
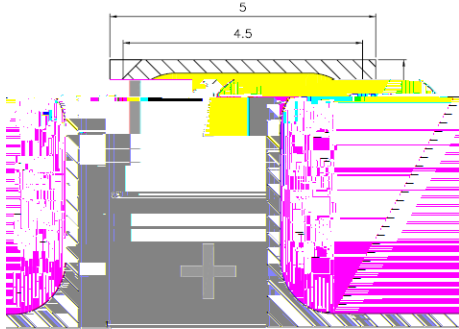


3.6 Data Set 2, 105°C, 120mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (u'v')								
				0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs
26	0.2627	0.5266	2700	0.0006	0.0006	0.0008	0.0010	0.0013	0.0016	0.0018	0.0025	0.0026
27	0.2606	0.5254	2748	0.0004	0.0004	0.0007	0.0009	0.0011	0.0017	0.0017	0.0023	0.0028
28	0.2613	0.5256	2732	0.0005	0.0006	0.0007	0.0013	0.0011	0.0017	0.0017	0.0023	0.0028
29	0.2617	0.5265	2721	0.0006	0.0007	0.0008	0.0012	0.0013	0.0017	0.0019	0.0024	0.0031
30	0.2606	0.5251	2750	0.0007	0.0007	0.0008	0.0011	0.0012	0.0017	0.0021	0.0024	0.0029
31	0.2611	0.5264	2734	0.0006	0.0008	0.0008	0.0009	0.0011	0.0017	0.0021	0.0025	0.0029
32	0.2607	0.5242	2751	0.0004	0.0006	0.0007	0.0009	0.0011	0.0017	0.0021	0.0024	0.0028
33	0.2606	0.5263	2745	0.0006	0.0006	0.0007	0.0008	0.0012	0.0017	0.0020	0.0024	0.0029
34	0.2616	0.5270	2720	0.0005	0.0009	0.0008	0.0010	0.0013	0.0018	0.0021	0.0024	0.0029
35	0.2610	0.5266	2734	0.0005	0.0009	0.0010	0.0010	0.0011	0.0017	0.0021	0.0024	0.0028
36	0.2618	0.5269	2717	0.0005	0.0007	0.0009	0.0008	0.0011	0.0015	0.0018	0.0021	0.0026
37	0.2619	0.5268	2716	0.0007	0.0008	0.0009	0.0009	0.0011	0.0017	0.0022	0.0023	0.0028
38	0.2606	0.5253	2748	0.0005	0.0007	0.0009	0.0009	0.0011	0.0016	0.0022	0.0023	0.0028
39	0.2605	0.5250	2751	0.0006	0.0006	0.0008	0.0010	0.0011	0.0016	0.0021	0.0023	0.0029
40	0.2611	0.5248	2739	0.0005	0.0008	0.0009	0.0010	0.0012	0.0017	0.0022	0.0024	0.0029
41	0.2613	0.5273	2724	0.0006	0.0007	0.0009	0.0009	0.0012	0.0016	0.0021	0.0024	0.0027
42	0.2619	0.5243	2724	0.0006	0.0008	0.0009	0.0009	0.0013	0.0017	0.0022	0.0024	0.0030
43	0.2609	0.5241	2748	0.0006	0.0008	0.0009	0.0010	0.0013	0.0017	0.0021	0.0024	0.0029
44	0.2612	0.5256	2735	0.0006	0.0008	0.0009	0.0013	0.0013	0.0017	0.0022	0.0024	0.0029
45	0.2614	0.5267	2726	0.0006	0.0008	0.0011	0.0012	0.0012	0.0016	0.0020	0.0023	0.0029
46	0.2612	0.5258	2733	0.0006	0.0008	0.0010	0.0011	0.0013	0.0017	0.0021	0.0024	0.0028
47	0.2603	0.5247	2757	0.0006	0.0007	0.0008	0.0009	0.0011	0.0015	0.0019		

4 - DUT Photo

4.1 Mechanical Dimensions



All dimensions are in millimeter

4.2 DUT Photo



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Directions

*****END OF REPORT*****