



# 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-LH1611F95W-18B4C12(Ra4)-FC-DS**

**Report Type:**

7000 Hours Test Report

**Product Type:**

LED Module

**Reviewed By:**



2023-05-30 t 2024-04-02



## TABLE OF CONTENTS

<b>1 - General Information</b> .....	<b>3</b>
1.1 Description of LED Light Sources#.....	3
1.2 Standards and Reference Documentations.....	4
1.3 Testing Equipment.....	4
1.4 Drive Level.....	4
1.5 Ambient Conditions for Maintenance Test.....	4
1.6 Photometric Measurement Method and Uncertainty.....	4
1.7 Statement of Traceability.....	5
1.8 Sample Set.....	5
<b>2 - Summary of Test Result</b> .....	<b>6</b>
<b>3 - Test Data</b> .....	<b>7</b>
3.1 Data Set 1, 55°C, 750mA (Lumen Maintenance).....	7
3.2 Data Set 1, 55°C, 750mA (Forward Voltage).....	8
3.3 Data Set 1, 55°C, 750mA (Chromaticity Shift).....	9
3.4 Data Set 2, 105°C, 750mA (Lumen Maintenance).....	10
3.5 Data Set 2, 105°C, 750mA (Forward Voltage).....	11
3.6 Data Set 2, 105°C, 750mA (Chromaticity Shift).....	12
<b>4 - DUT Photo</b> .....	<b>13</b>
4.1 Mechanical Dimensions.....	13
4.2 DUT Photo.....	13
<b>Directions</b> .....	<b>14</b>



## 1 - General Information

### 1.1 Description of LED Light Sources<sup>#</sup>

#### Sample Size:

30 PCS test samples were in good condition and received on 2023-05-22. The samples were numbered from 1 to 15 and 16 to 30.

Manufacturer:	Hongli Zhihui Group Co.,Ltd.Guangzhou Branch
Part Number:	HL-LH1611F95W-18B4C12(Ra4)-FC-DS
Part Type:	LED Module
Drive Level:	DC 750mA
Nominal CCT:	2700K
Power:	27W
Average Current Density per LED die:	567.628mA/mm <sup>2</sup>
Average Power Density per LED die:	1.703W/mm <sup>2</sup>
CRI:	90
Die Spacing:	0.2mm

#### 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<sup>®</sup> 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<sup>®</sup> Requirements for the Use of LM-80 Data* (September 28, 2017)

This report covers the following models:

Model type	Model name	CRI(typ.)	CCT(typ.)	Series&Parallel	Power density (W/mm <sup>2</sup> )	Current density per LED die (mA/mm <sup>2</sup> )	Current per die(mA)	Distance between of dies	Current (mA)
Tested model	HL-LH1611F95W-18B4C12(Ra4)-FC-DS	90	2700K	B2C12+B2C12	0.1755	567.628	375	0.2	750
Multiple models	HL-LH1308F95W-9B2C12(Ra*)-FC-DS	80-90	2700K-6500K	B1C12+B1C12	0.0700				





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).

### 1.8 Sample Set

#### Data Set 1: 55°C, 750mA

Part Number: HL-LH1611F95W-18B4C12(Ra4)-FC-DS

Number of Units: 15

Case Temperature:  $>53^{\circ}C$

Ambient Temperature:  $>50^{\circ}C$

Life Test Drive Current: 750mA

Measurement Current: 750mA

#### Data Set 2: 105°C, 750mA

Part Number: HL-LH1611F95W-18B4C12(Ra4)-FC-DS

Number of Units: 15

Case Temperature:  $>103^{\circ}C$

Ambient Temperature:  $>100^{\circ}C$

Life Test Drive Current: 750mA

Measurement Current: 750mA



## 2 - Summary of Test Result

Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration			Reported TM-21 L <sub>70</sub> Lifetime	Reported TM-21 L <sub>90</sub> Lifetime
1	15	0	1000hrs	7000hrs	2.442E-06	1.002	>39000 hours	>39000 hours
2	15	0	1000hrs	7000hrs	2.892E-06	1.002	>39000 hours	37,000 hours

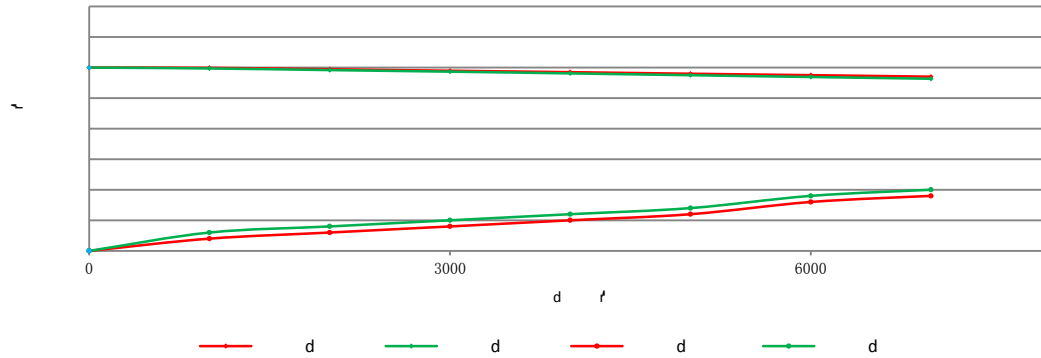
Average Lumen Maintenance (Percentage of Initial Luminous Flux)

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs
1	99.96%	99.72%	99.48%	99.25%	98.99%	98.76%	98.51%
2	99.86%	99.59%	99.33%	99.05%	98.75%	98.46%	98.17%

Average Chromaticity Shift

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs
1	0.0002	0.0003	0.0004	0.0005	0.0006	0.0008	0.0009
2	0.0003	0.0004	0.0005	0.0006	0.0007	0.0009	0.0010

Average Lumen Maintenance and Chromaticity Shift VS. Time





### 3 - Test Data

---

#### 3.1 Data Set 1, 55°C, 750mA (Lumen Maintenance)

No.	Lumen Maintenance (%)							
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs
1	2311.99	99.70	99.41	99.33	98.99	98.73	98.57	98.19
2	2410.79	100.05	99.69	99.50	99.25	98.94	98.50	98.36
3	2384.44	99.72	99.38	99.28	99.07	98.91	98.74	98.58
4	2417.38	99.91	99.67	99.38	99.29	98.96	98.71	98.50



**3.2 Data Set 1, 55°C, 750mA (Forward Voltage)**

No.	Forward Voltage (V)							
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs
1	35.43	35.48	35.49	35.24	35.26	35.46	35.38	35.34
2	35.61	35.88	35.68	35.67	35.62	35.82	35.77	35.72
3	35.53	35.51	35.43	35.45	35.44	35.64	35.82	35.78
4	35.68	35.68	35.72	35.74	35.67	35.62	35.45	35.52
5	35.82	35.83	35.63	35.69	35.62	35.83	35.67	35.62
6	36.05	35.97	35.39	35.23	35.27	35.34	35.42	35.45
7	35.68	35.64	35.76	35.74	35.64	35.62	35.64	35.68
8	35.35	35.42	35.37	35.34	35.32	35.53	35.56	35.52
9	35.83	35.78	35.69	35.64	35.67	35.58	35.52	35.54
10	35.64	35.41	35.75	35.72	35.69	35.62	35.68	35.64
11	35.65	35.71	35.36	35.64	35.58	35.79	35.72	35.76
12	35.67	35.69	35.29	35.27	35.34	35.54	35.62	35.62
13	35.56	35.66	35.37	35.33	35.36	35.56	35.52	35.58
14	35.66	35.69	35.34	35.41	35.44	35.42	35.44	35.42
15	35.57	35.62	35.36	35.32	35.42	35.63	35.68	35.62
Avg.	35.65	35.66	35.51	35.50	35.49	35.60	35.59	35.59
Med.	35.65	35.68	35.43	35.45	35.44	35.62	35.62	35.62
st dev	0.17	0.16	0.17	0.20	0.16	0.14	0.13	0.12
Min.	35.35	35.41	35.29	35.23	35.26	35.34	35.38	35.34
Max.	36.05	35.97	35.76	35.74	35.69	35.83	35.82	35.78





## Bay Area Compliance Laboratories Corp. (Dongguan)

No.12, Pulong East 1<sup>st</sup> Road, Tangxia Town,  
Dongguan, Guangdong, China.

### 3.3 Data Set 1, 55°C, 750mA (Chromaticity Shift)

No.	CCT(K)								
	0hr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs
1	0.2599	0.5285							

(an)

Town,  
China.

536.623 6500457.0 1



**3.5 Data Set 2,105°C, 750mA (Forward Voltage)**

No.	Forward Voltage (V)							
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs
16	35.61	35.71	35.67	35.64	35.62	35.57	35.58	35.62
17	35.71	35.66	35.43	35.24	35.28	35.34	35.42	35.45
18	35.57	35.58	35.62	35.68	35.62	35.58	35.64	35.65
19	35.57	35.64	35.19	35.26	35.34	35.54	35.42	35.44
20	35.59	35.49	35.29	35.36	35.34	35.54	35.47	35.42
21	35.39	35.44	35.22	35.36	35.33	35.54	35.52	35.58
22	35.66	35.76	35.42	35.46	35.42	35.42	35.38	35.32
23	35.66	35.68	35.72	35.64	35.62	35.58	35.52	35.45
24	35.50	35.49	35.47	35.56	35.52	35.57	35.64	35.68
25	35.41	35.49	35.62	35.67	35.69	35.89	35.64	35.67
26	35.51	35.47	35.37	35.28	35.31	35.51	35.57	35.52
27	35.65	35.52	35.53	35.57	35.52	35.72	35.62	35.67
28	35.53	35.56	35.57	35.51	35.57	35.78	35.77	35.75
29	35.50	35.49	35.59	35.64	35.64	35.68	35.64	35.62
30	35.55	35.60	35.73	35.75	35.72	35.67	35.62	35.68
Avg.	35.56	35.57	35.50	35.51	35.50	35.60	35.56	35.57
Med.	35.57	35.56	35.53	35.56	35.52	35.57	35.58	35.62
st dev	0.09	0.10	0.17	0.17	0.15	0.14	0.11	0.13
Min.	35.39	35.44	35.19	35.24	35.28	35.34	35.38	35.32
Max.	35.71	35.76	35.73	35.75	35.72	35.89	35.77	35.75

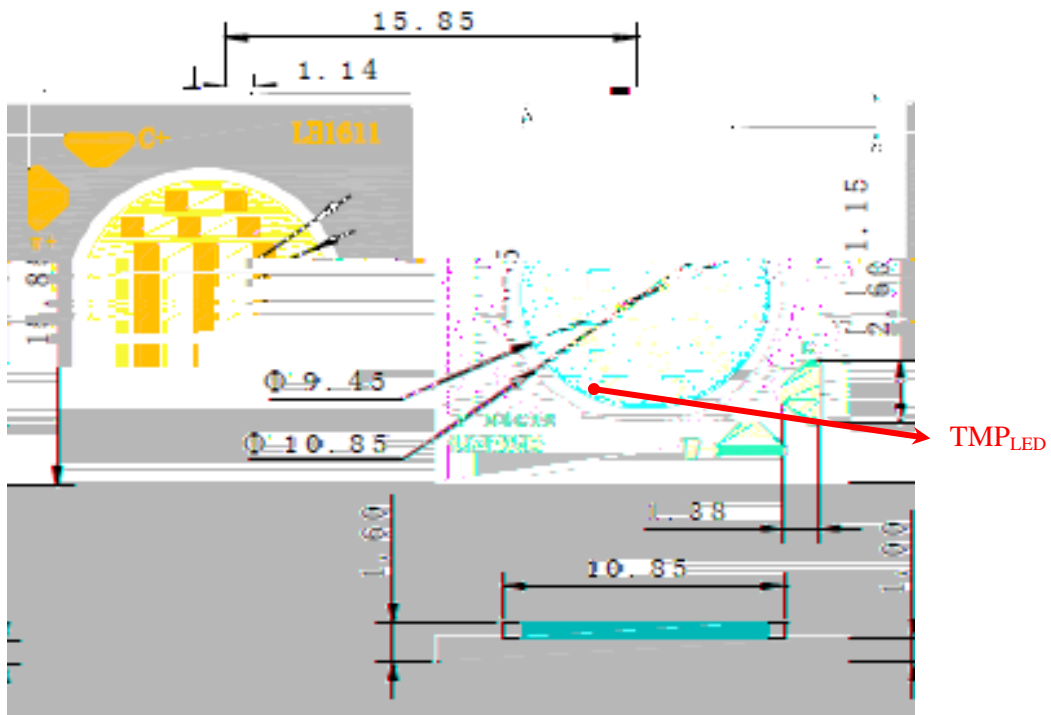


**3.6 Data Set 2,105°C, 750mA (Chromaticity Shift)**

No.	0hr(Initial)		CCT(K)							
				1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs
16	0.2601	0.5291	2742	0.0002	0.0001	0.0002	0.0004	0.0005	0.0007	0.0008
17	0.2623	0.5299	2694	0.0003	0.0001	0.0004	0.0005	0.0007	0.0009	0.0010
18	0.2595	0.5293	2754	0.0002	0.0002	0.0003	0.0004	0.0005	0.0007	0.0008
19	0.2623	0.5297	2694	0.0002	0.0001	0.0002	0.0005	0.0006	0.0010	0.0012
20	0.2589	0.5287	2770	0.0004	0.0003	0.0002	0.0004	0.0005	0.0006	0.0008
21	0.2616	0.5300	2708	0.0004	0.0006	0.0007	0.0010	0.0011	0.0015	0.0016
22	0.2614	0.5299	2712	0.0002	0.0004	0.0005	0.0007	0.0009	0.0010	0.0012
23	0.2596	0.5293	2752	0.0004	0.0007	0.0008	0.0009	0.0010	0.0011	0.0012
24	0.2609	0.5296	2724	0.0004	0.0003	0.0004	0.0001	0.0003	0.0003	0.0004
25	0.2602	0.5295	2740	0.0001	0.0004	0.0006	0.0006	0.0008	0.0008	0.0009
26	0.2597	0.5293	2750	0.0003	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010
27	0.2598	0.5292	2748	0.0001	0.0003	0.0004	0.0005	0.0007	0.0008	0.0009
28	0.2601	0.5298	2740	0.0003	0.0004	0.0006	0.0006	0.0008	0.0008	0.0009
29	0.2605	0.5293	2734	0.0002	0.0004	0.0005	0.0005	0.0007	0.0007	0.0009
30	0.2601	0.5292	2742	0.0002	0.0003	0.0004	0.0006	0.0008	0.0010	0.0011
Avg.	0.2605	0.5295	2734	0.0003	0.0004	0.0005	0.0006	0.0007	0.0009	0.0010
Med.	0.2601	0.5293	2740	0.0002	0.0003	0.0004	0.0005	0.0007	0.0008	0.0009
st dev	0.0010	0.0004	23	0.0001	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003
Min.	0.2589	0.5287	2694	0.0001	0.0001	0.0002	0.0001	0.0003	0.0003	0.0004
Max.	0.2623	0.5300	2770	0.0004	0.0007	0.0008	0.0010	0.0011	0.0015	0.0016

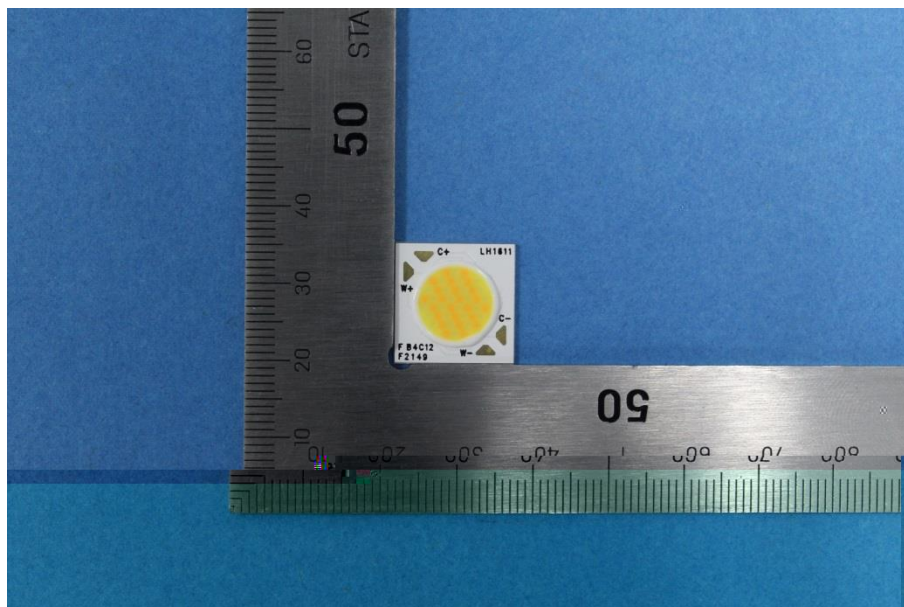
## 4 - DUT Photo

### 4.1 Mechanical Dimensions



All dimensions are in millimeter

### 4.2 DUT Photo





## Bay Area Compliance Laboratories Corp. (Dongguan)

No.12, Pulong East 1<sup>st</sup> Road, Tangxia Town,  
Dongguan, Guangdong, China.

### Directions

---

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