IESNA LM-80-2008

MEASURING LUMEN MAINTENANCE OF LED LIGHT SOURCES

MEASUREMENT AND TEST REPORT

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-LT005F33W-100B10C10(Ra2)

Report Type: 7000 Hours Test Report	**Product Type:** LED Array
Test Engineer:	Daniel Duan
Report Number:	RSZ131101510-10-M3
Test Date:	2013-11-05 to 2014-09-15
Report Date:	2019-01-12
Revised Note:	The previous report RSZ131101510-10-M2 is replaced by this report on 2019-01-12
Reviewed By:	Jeanne Han /Safety Manager
Prepared By:	Bay Area Compliance Laboratories Corp. (Dongguan). No.69, Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China Tel: +86-0769-86858888 Fax:+86-0769-86858588

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1 - GENERAL INFORMATION

1.1 Description of LED Light Sources

Devices tested

Part Number: HL-LT005F33W-100B10C10(Ra2)

Part Type: LED

Model name	CCT(typ.)	CRI (typ.)	Series	Parallel	Power intensity(W/mm^2)	Dies Spacing (mm)	Current(A)
50B5C10(Ra2)	4000 K	80					
	5000 K	80					
	5700K	80					
	6000 K	80					
	6500 K	80					
HL-LT005F38W-50B5C10(Ra1)	3000K	70	10	5	0.0293	1.185	1.75
	4000 K	70					
	5000 K	70					
	5700 K	70					
	6000 K	70					
	6500 K	70					
HL-LT005F38W-50B5C10(Ra2)	3000K	80	10	5	0.0293	1.185	1.75
	4000 K	80					
	5000 K	80					
	5700K	80					
	6000 K	80					
	6500 K	80					
HL-LT005F45W-50B5C10(Ra1)	3000K	70	10	5	0.0293	1.185	1.75
	4000 K	70					
	5000 K	70					
	5700 K	70					
	6000 K	70					
	6500 K	70					
HL-LT005F45W-50B5C10(Ra2)	3000K	80	10	5	0.0293	1.185	1.75
	4000 K	80					
	5000 K	80					
	5700K	80					
	6000 K	80					
	6500 K	80					
HL-LT005F33W-40B4C10(Ra1)	3000K	70	10	4	0.0234	1.185	1.4
	4000 K	70					
	5000 K	70					
	5700 K	70					
	6000 K	70					
	6500 K	70					
HL-LT005F33W-40B4C10(Ra2)	3000K	80	10	4	0.0234	1.185	1.4
	4000 K	80					
	5000 K	80					
	5700K	80					
	6000 K	80					
	6500 K	80					
HL-LT005F22W-40B4C10(Ra1)	3000K	70	10	4	0.0234	1.185	1.4
	4000 K	70					
	5000 K	70					
	5700 K	70					
	6000 K	70					
	6500 K	70					
HL-LT005F22W-	3000K	80	10	4	0.0234	1.185	1.4

Model name	CCT(typ.)	CRI (typ.)	Series	Parallel	Power intensity(W/mm^2)	Dies Spacing (mm)	Current(A)
40B4C10(Ra2)	4000 K	80					
	5000 K	80					
	5700K	80					
	6000 K	80					
	6500 K	80					
HL-LT005F38W-40B4C10(Ra1)	3000K	70	10	4	0.0234	1.185	1.4
	4000 K	70					
	5000 K	70					
	5700 K	70					
	6000 K	70					
	6500 K	70					
HL-LT005F38W-40B4C10(Ra2)	3000K	80	10	4	0.0234	1.185	1.4
	4000 K	80					
	5000 K	80					
	5700K	80					
	6000 K	80					
	6500 K	80					
HL-LT005F45W-40B4C10(Ra1)	3000K	70	10	4	0.0234	1.185	1.4
	4000 K	70					
	5000 K	70					
	5700 K	70					
	6000 K	70					
	6500 K	70					
HL-LT005F45W-40B4C10(Ra2)	3000K	80	10	4	0.0234	1/F1 8.DC q23	

Model name	CCT(typ.)	CRI (typ.)	Series	Parallel	Power intensity(W/mm^2)	Dies Spacing (mm)	Current(A)
30B3C10(Ra2)	4000 K	80					
	5000 K	80					
	5700K	80					
	6000 K	80					
	6500 K	80					
HL-LT005F38W-30B3C10(Ra1)	3000K	70	10	3	0.0174	0.88	1.05
	4000 K	70					
	5000 K	70					
	5700 K	70					
	6000 K	70					
	6500 K	70					
HL-LT005F38W-30B3C10(Ra2)	3000K	80	10	3	0.0174	1.185	1.05
	4000 K	80					
	5000 K	80					
	5700K	80					
	6000 K	80					
	6500 K	80					
HL-LT005F45W-30B3C10(Ra1)	3000K	70	10	3	0.0174	1.185	1.05
	4000 K	70					
	5000 K	70					
	5700 K	70					
	6000 K	70					
	6500 K	70					
HL-LT005F45W-30B3C10(Ra2)	3000K	80	10	3	0.0174	1.185	1.05
	4000 K	80					
	5000 K	80					
	5700K	80					
	6000 K	80					
	6500 K	80					
HL-LT005F33W-20B2C10(Ra1)	3000K	70	10	2	0.0114	1.185	0.7
	4000 K	70					
	5000 K	70					
	5700 K	70					
	6000 K	70					
	6500 K	70					
HL-LT005F33W-20B2C10(Ra2)	3000K	80	10	2	0.0114	1.185	0.7
	4000 K	80					
	5000 K	80					
	5700K	80					
	6000 K	80					
	6500 K	80					
HL-LT005F22W-20B2C10(Ra1)	3000K	70	10	2	0.0114	1.185	0.7
	4000 K	70					
	5000 K	70					
	5700 K	70					
	6000 K	70					
	6500 K	70					
HL-LT005F22W-	3000K	80	10	2	0.0114	1.185	0.7

Model name	CCT(typ.)	CRI (typ.)	Series	Parallel	Power intensity(W/mm^2)	Dies Spacing (mm)	Current(A)
20B2C10(Ra2)	4000 K	80					
	5000 K	80					
	5700K	80					
	6000 K	80					
	6500 K	80					

HL-LT005F38W-

1.7 Photometry 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. This calibration results traceable to the NATIONAL INSTITUTE OF METROLOGY (NIM).

1.8 Sample Set

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.
Each Sample is soldered to all of the reliability stress boards for a given set of IESNA LM-80 tests.

Sample Size:
Total 30Pcs;
Each Ts test condition 15Pcs
The samples tested at Ts 85℃ and TS 100℃ were received at 2013-11-01 and tested during 2013-11-05 to 2014-09-15. The samples were numbered from 1to 15 and 16 to 30.

Data Set 1: 85°C,3500mA	
Part Number:	HL-LT005F33W-100B10C10(Ra2)
Number of Units:	15
Actual Case Temperature(T_S):	T_S =84.0℃
Actual Ambient Temperature(T_A):	T_A =82.6℃
Life Test Drive Current:	

2 - SUMMARY OF TEST RESULT

Data Set:		**Data Set 1, 85°C, 3500mA**
Number of Units:		15
Failures Observed:		0
Test Interval and Test Duration:		0h,1000h,2000h,3000h,4000h,5000h,6000h,7000h
Average. Lumen Maintenance at7000 hours:		96.63%
Average Chromaticity Shift at 7000 hours	:	0.0027
Reported TM-21 L_{70} Lifetime:		>39,000 hours

Data Set:		**Data Set 2, 100°C, 3500mA**
Number of Units:		15
Failures Observed:		0
Test Interval and Test Duration:		0h,1000h,2000h,3000h,4000h,5000h,6000h,7000h
Average. Lumen Maintenance at 7000 hours:		95.76%
Average Chromaticity Shift at 7		0.0032
Reported TM-21 L_{70} Lifetime:		>39,000 hours

3 - Test Data

3.1 Data Set 1, 85°C, 3500mA (Lumen Maintenance)

No.	V_F(V)	Φ(lm)	Lumen Maintenance (%)						
	0hr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs
1	30.810	9891.40	100.08	99.79	99.04	98.40	97.60	97.00	96.51
2	30.820	9872.09	99.62	99.41	98.69	98.20	97.57	96.99	96.46
3	30.790	9881.74	99.69	99.46	98.70	98.13	97.46	96.98	96.35
4	30.920	9789.98	100.66	100.26	99.48	98.85	98.10	97.52	96.98
5	31.010	9727.19	99.98	99.75	99.02	98.58	97.89	97.44	97.05
6	30.820	9901.06	99.72	99.48	98.73	98.23	97.64	97.22	96.74
7	31.140	9683.72	99.52	99.31	98.55	97.99	97.24	96.71	96.11
8	30.880	9838.28	99.57	99.35	98.62	98.07	97.36	96.81	96.28
9	31.070	9698.21	99.67	99.41	98.64	98.00	97.26	96.74	96.17
10	31.030	9862.43	100.54	100.13	99.39	98.71	97.93	97.37	96.85
11	30.860	9954.19	100.16	99.96	99.19	98.55	97.89	97.35	96.87
12	30.760	9765.83	100.32	99.92	99.14	98.34	97.52	96.93	96.33
13	30.790	9780.32	100.39	100.17	99.43	98.96	98.38	97.98	97.48
14	30.750	9736.85	99.75	99.50	98.76	98.13	97.39	96.89	96.25
15	30.810	9789.98	100.11	99.86	99.11	98.72	97.94	97.56	97.08
Ave.	30.884	9811.55	99.99	99.72	98.97	98.39	97.68	97.17	96.63
Med.	30.820	9789.98	99.98	99.75	99.02	98.34	97.60	97.00	96.51
st dev	0.1223	81.2881	0.3711	0.3219	0.3170	0.3192	0.3319	0.3619	0.4051
Min.	30.750	9683.72	99.52	99.31	98.55	97.99	97.24	96.71	96.11
Max.	31.140	9954.19	100.66	100.26	99.48	98.96	98.38	97.98	97.48

TM-21 Projection:

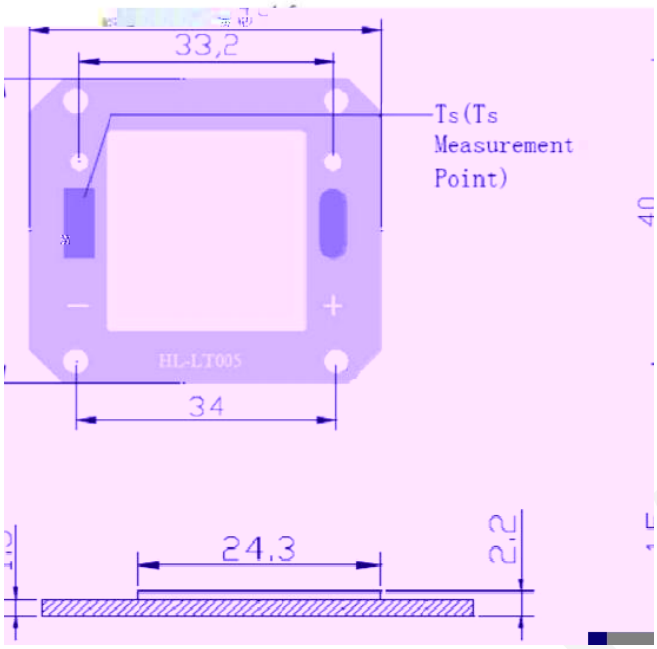
3.3 Data Set 2, 100°C, 3500mA (Lumen Maintenance)

No.	V_F(V)	Φ(lm)	Lumen Maintenance (%)						
	0hr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs
16	30.780	9780.32	99.31	98.88	98.02	97.34	96.42	95.79	95.15
17	31.020	9688.55	100.05	99.63	98.79	98.16	97.32	96.85	96.37
18	30.860	9751.34	99.98	99.57	98.73	97.99	97.16	96.62	96.10
19	30.900	9785.15	99.95	99.51	98.65	97.66	96.71	96.16	95.56
20	30.930	9775.49	99.76	99.32	98.48	97.59	96.71	96.09	95.46
21	30.810	9809.30	100.92	100.51	99.65	98.81	97.94	97.27	96.66
22	31.020	9674.06	99.75	99.33	98.44	97.79	97.02	96.56	95.99
23	31.090	9693.38	99.53	99.10	98.26	97.67	96.95	96.49	95.91
24	30.680	9905.89	99.32	98.91	98.05	97.36	96.62	96.04	95.35
25	30.950	9712.70	100.08	99.66	98.76	97.73	96.80	96.13	95.53
26	30.920	9765.83	100.11	99.68	98.82	97.83	96.88	96.20	95.57
27	30.840	9789.98	99.88	99.38	98.53	97.44	96.48	95.84	95.21
28	30.840	9852.77	100.34	99.91	99.05	97.96	97.23	96.76	96.23
29	31.150	9659.57	100.37	99.96	99.09	97.99	97.14	96.53	95.95
30	30.800	9876.91	99.84	99.35	98.51	97.43	96.51	95.89	95.30
Ave.	31.080	9712.70	99.95	99.51	98.66	97.78	96.93	96.35	95.76
Med.	30.820	9804.47	99.95	99.51	98.65	97.73	96.88	96.20	95.57
st dev	30.840	9756.17	0.4137	0.4196	0.4163	0.3785	0.3985	0.4219	0.4550
Min.	30.810	9761.00	99.31	98.88	98.02	97.34	96.42	95.79	95.15
Max.	31.010	9664.40	100.92	100.51	99.65	98.81	97.94	97.27	96.66

TM-21 Projection:

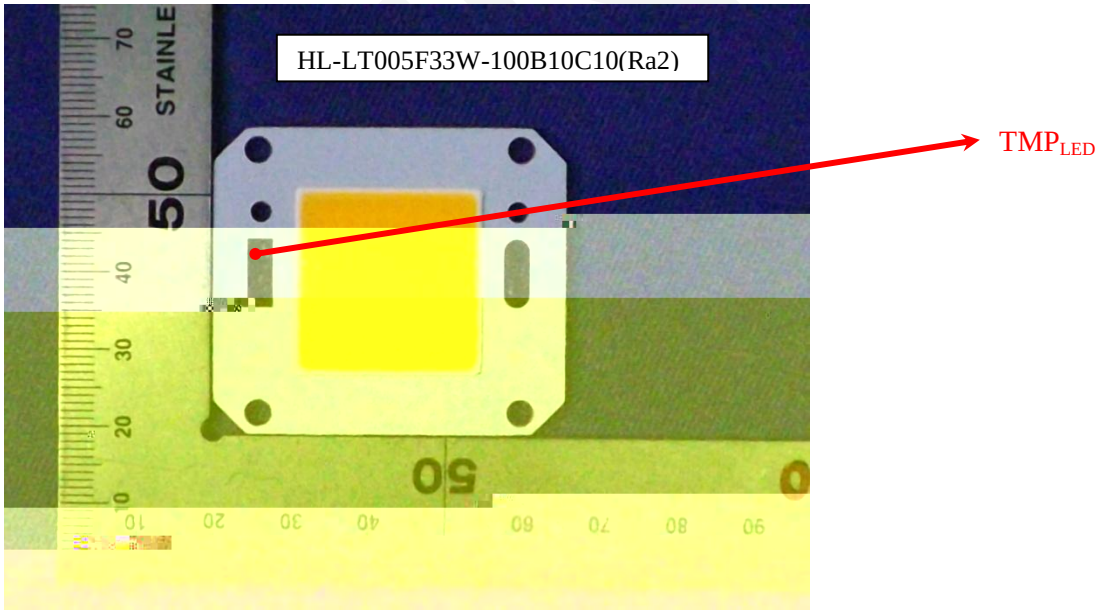
Appendix A – EUT PHOTO

A.1 Mechanical Dimensions (Ta = 25°C)



All dimensions are in millimeter

A.2 EUT Photo



Appendix B– REVISION HISTORY

Report Number	Report Date	Contents
RSZ131101510-10	2014/09/28	Original report.
RSZ131101510-10-M1	2015/03/02	Correct the typos of some titles.
RSZ131101510-10-M2	2015/06/09	Correct the typos of models.
RSZ131101510-10-M3	2019/01/12	Update the Logo and address of lab on the Page1&10 Update Company name and address on page 1. Add DUT Characteristics on page 3 according to ENERGY STAR requirements

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