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LCTECH (ZHONGSHAN) TESTING SERVICE CO., LTD. LABORATORY

Test report of

IES LM-79-08

Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Rendered to:

Imminent Teknologies Limited
Suite 5, Valley Towers, Valley Road, Birkirkara BKR9022, Malta

For products:

LED WEATHERPROOF LIGHT

Models No.:

BLU-ECO-120-48W-860

Test Date:	Aug. 14, 2019 to Aug. 15, 2019
Test Lab.:	**LCTECH (Zhongshan) Testing Service Co., Ltd**
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Test Sites:	1/F., Building I, Technology and Enterprise Development Center, Guangyuan Road, Xiaolan, Zhongshan, Guangdong, China
Template No.:	LC-RT-PL-001 Rev.1.2
Test Note:	

Complied by:	**Reviewed by:**
Kargel Yuan	**Lin Qiu**
Project Engineer	**Technical Manager**
Aug. 20, 2019	**Aug. 20, 2019**

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1. General

1.1 Product Information

Brand Name	BLUi
Product Type	LED WEATHERPROOF LIGHT
Model Number	BLU-ECO-120-48W-860
Rated Inputs	220-240VAC, 50/60Hz
Rated Power	48W
Rated Light output	4800lm
Declared CCT	6000K
Power Supply	BLUi LED driver
LED Package, Array or Module	Samsung
Receipt Samples	1 unit
Sample Code of lab.	190812105004
Date of Receipt Samples	Aug. 12, 2019
Note	-

1.2 Standards or methods

The following standards are partly or totally used or referenced for test:

No.	Name
ANSI/NEMA/ ANSLG C78.377-2011 or 2015 or 2017	Specifications for the Chromaticity of Solid State Lighting Products
ANSI C82.77-2002	Harmonic Emission Limits—Related Power Quality Requirements for Lighting Equipment
CIE Pub. No. 13.3-1995	Method of Measuring and Specifying Color Rendering of Light Sources
CIE Pub. No. 15:2004	Colorimetry
IES LM-79-08	Electrical and Photometric Measurements of Solid-State Lighting Products

1.3 Equipment list

Instrument	ID	Model name	Cal. date	Next cal. Date
AC Power supply	LC-I-987	APW-120N	2019-01-08	2020-01-07
AC Power supply	LC-I-989	APW-120N	2019-01-08	2020-01-07
Power analyzer	LC-I-928	WT210	2019-01-02	2020-01-01
Power analyzer	LC-I-954	WT210	2019-01-08	2020-01-07
Multimeter	LC-I-972	Fluke 17B	2019-07-29	2020-07-28
Photometric colorimetric electric system* (2 meter sphere)	LC-I-956	HAAS-2000	Before use	Before use
Standard lamp**	LC-PL-I-011	D204C	2018-11-21	2019-11-20
Luminous Flux Standard Lamp***	LC-PL-I-003	24V100W	2018-11-21	2019-11-20
Goniophotometer(with mirror)	LC-I-902	GMS2000	2019-05-06	2020-05-05
Wireless temperature transmitter	LC-I-978	DWRF-B	2019-01-07	2020-01-06
Wireless temperature transmitter	LC-I-979	DWRF-B	2019-01-07	2020-01-06

Note:

* Bandwidth of spectroradiometer is 1 nm.

** halogen lamp, 100W, omni-directional type, and its traceability to NIM.

*** halogen lamp, 100W, omni-directional type, and its traceability to NIM.

2. Test conducted and method

The luminaire was operated at least 2 hours to reach stabilization and temperature equilibrium before test.

2.1 Ambient Condition

The ambient temperature in which measurements are being taken was maintained at 25 °C ± 1°C; the air flow around the sample(s) being tested did not affect the performance.

2.2 Power Supply Characteristics

The AC power supply had a sinusoidal voltage wave shape at the prescribed frequency (50 Hz) such that the RMS summation of the harmonic components does not exceed 3 percent of the fundamental during operation of the test item.

The voltage of AC power supply (RMS voltage) applied to the device under test was regulated to within±0.2 percent under load.

2.3 Seasoning and Stabilization

No seasoning was performed in accordance with IESNA LM-79-08. And before the measurement, the sample was stabilized until the light output and power variations were less than 0.5% in 30 minutes intervals (3 readings, 15 minutes apart).

2.4 Electrical Instrumentation

The calibration uncertainties of the instruments for AC voltage and current were less than 0.2 percent, and the calibration uncertainty of the AC power meter was less than 0.5 percent(95 % confidence interval, k=2).

2.5 Color Measurement Method

Spectral radiant flux was measured by a sphere (2 meter)-spectroradiometer system, and the color characteristics (Color rendering index, correlated color temperature, chromaticity coordinate) were calculated from these by software automatically.

2.6 Total Luminous Flux Measurement Method

Total luminous flux was measured by type C goniophotometer system.

Light intensity distribution was measured by a type C goniophotometer (with mirror) which can keep the sample in burn position when the tests conduct, and the total luminous flux was calculated from the intensity data by software automatically.

2.7 Luminous Intensity Distribution Measurement Method

Luminous intensity distribution was measured by a mirror-type goniophotometer (Type C) which can keep the sample in burn position when the tests conduct, and the kinds of graph were generated by software automatically.

2.8 Spatial Non-uniformity of Chromaticity

The customer did not require this measurement.

3. Test Result Summary

3.1 Electrical data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Input Voltage & Frequency	230.00 V~50Hz	229.98 V~50Hz
Input Current(A)	0.219	0.219
Total Power(W)	48.81	48.76
Power Factor	0.967	0.967
I-THD	-	-
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-	4750.74
Luminaire Efficacy(Lm/W)	-	97.43
Correlated Color Temperature (CCT)(K)	5856	-
Color Rendering Index (CRI)	84.3	-
R9	15	-
Chromaticity Coordinate (x,y)	x = 0.3246 y = 0.3389	-
Chromaticity Coordinate (u,v)	u = 0.2023 v = 0.3169	-
Chromaticity Coordinate (u',v')	u' = 0.2023 v' = 0.4753	-
Duv	0.0025	-
Zone Lumens between 0-60 °	-	67.80%
Beam Angle(50%Imax)	-	C0/180=110.9° C90/270=127.1°

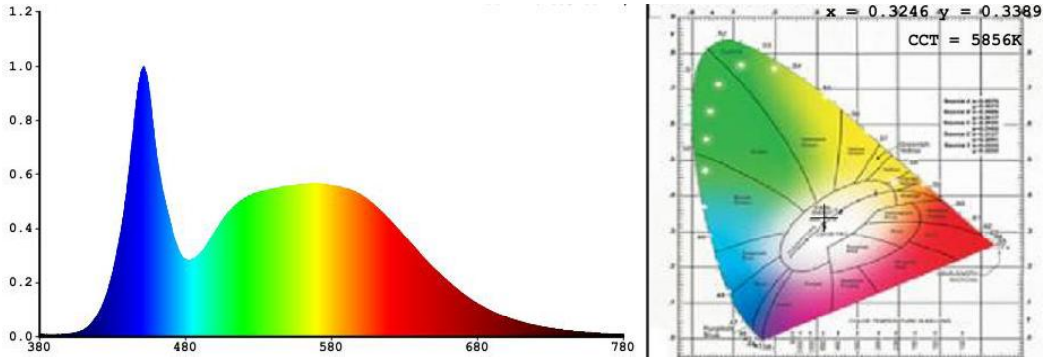
3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
83	88	91	85	84	84	89	71
R9	R10	R11	R12	R13	R14	R15	-
15	72	84	64	84	95	78	-

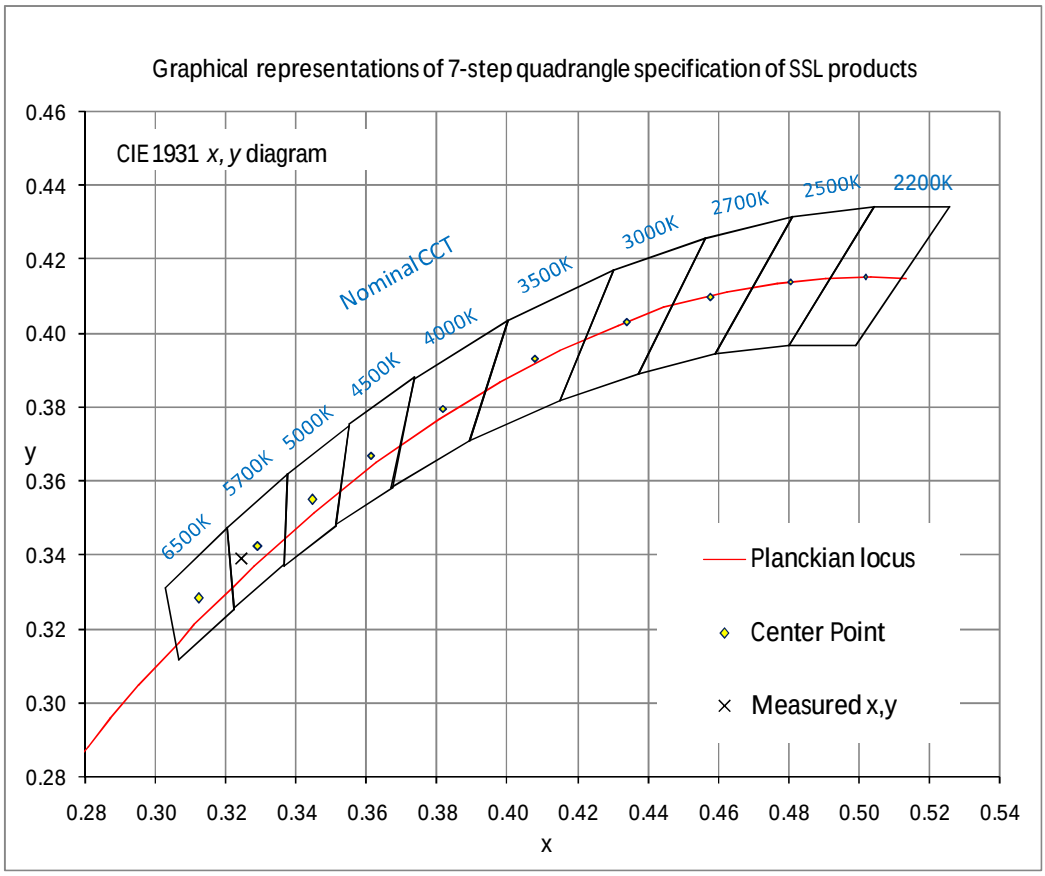
Note: N/A

4. Test Data

4.1 Spectral Distribution



4.2 ANSI Chromaticity Quadrangles Diagram



4.3 Goniometry Test Data

CIE Type	Direct	Basic Luminous Shape	Rectangular w/Sides
Spacing Criteria (0-180)	1.30	Luminous Length	1.16 m
Spacing Criteria (90-270)	1.26	Luminous Width	0.09 m
Spacing Criteria (Diagonal)	1.40	Luminous Height	0.03 m
Test Distance	30.00 m		

4.4 Zonal Lumen Summary

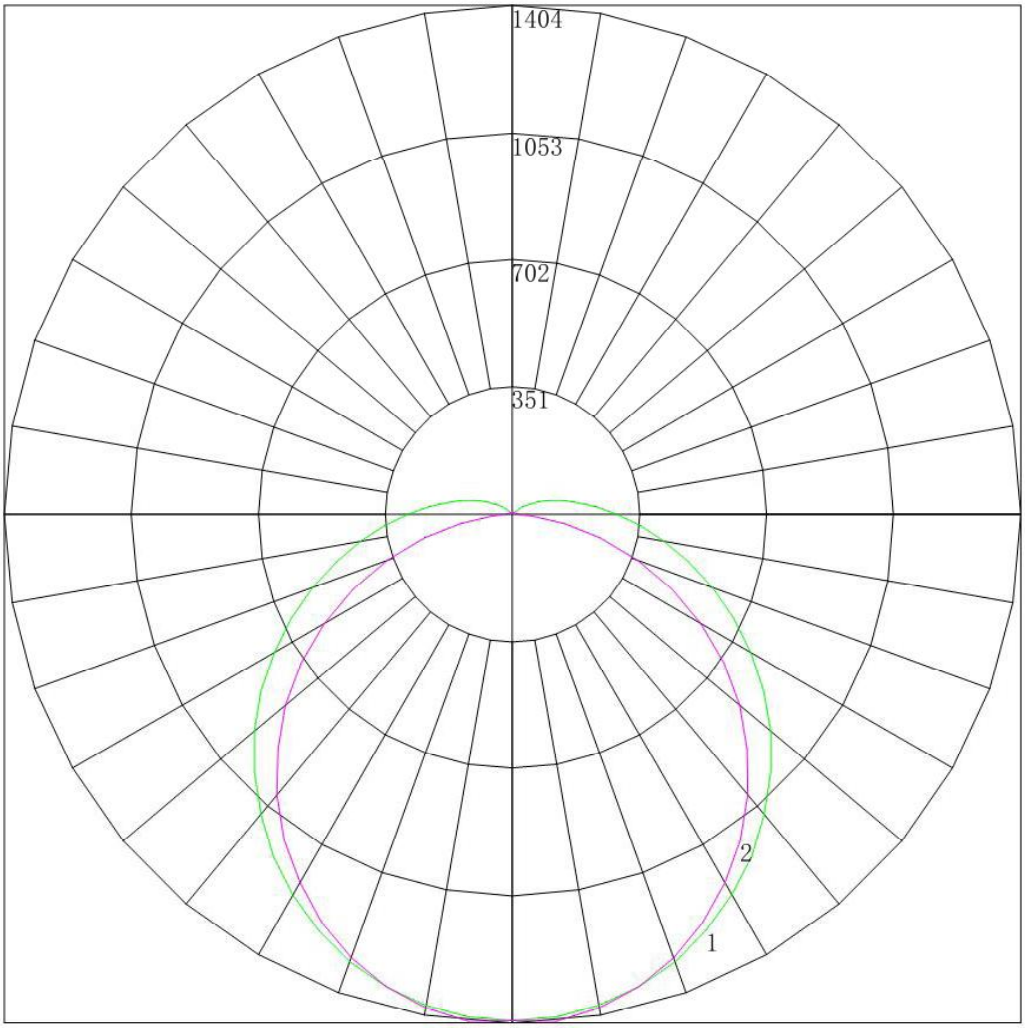
Zone	Lumens	%Lamp	%Fixt
0-20	511.66	10.80	10.80
0-30	1088.46	22.90	22.90
0-40	1789.04	37.70	37.70
0-60	3222.01	67.80	67.80
0-80	4209.04	88.60	88.60
0-90	4464.27	94.00	94.00
10-90	4331.95	91.20	91.20
20-40	1277.38	26.90	26.90
20-50	2016.88	42.50	42.50
40-70	2007.35	42.30	42.30
60-80	987.02	20.80	20.80
70-80	412.65	8.70	8.70
80-90	255.23	5.40	5.40
90-110	223.81	4.70	4.70
90-120	261.19	5.50	5.50
90-130	274.77	5.80	5.80
90-150	282.14	5.90	5.90
90-180	286.47	6.00	6.00
110-180	62.66	1.30	1.30
0-180	4750.74	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	132.32
10-20	379.34
20-30	576.80
30-40	700.58
40-50	739.50
50-60	693.48
60-70	574.37
70-80	412.65
80-90	255.23
90-100	145.16
100-110	78.66
110-120	37.38
120-130	13.57
130-140	4.39
140-150	2.98
150-160	2.27
160-170	1.51
170-180	0.55

4.5 Polar Curves

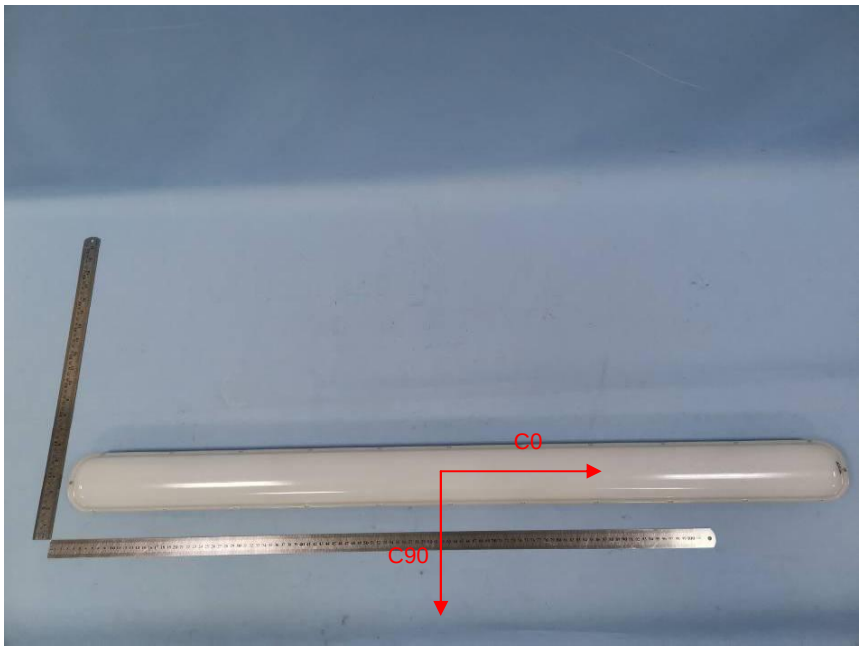


Maximum Candela = 1404.296 Located At Horizontal Angle = 90, Vertical Angle = 5
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)

4.6 Candela Tabulation

	0	15	30	45	60	75	90
0	1397.346	1397.346	1397.346	1397.346	1397.346	1397.346	1397.346
5	1392.067	1391.419	1392.259	1392.056	1390.408	1390.467	1404.296
10	1376.721	1375.173	1374.571	1373.790	1370.867	1370.366	1383.054
15	1349.518	1347.930	1346.279	1343.606	1339.105	1335.808	1349.315
20	1314.307	1311.515	1307.346	1302.924	1296.296	1291.046	1302.708
25	1267.553	1265.524	1259.785	1251.843	1240.392	1234.286	1244.721
30	1213.685	1210.273	1201.720	1190.847	1174.537	1166.520	1174.448
35	1152.525	1145.828	1134.380	1120.659	1099.654	1090.157	1098.462
40	1082.058	1075.930	1059.626	1042.496	1018.529	1006.543	1012.032
45	1009.577	1002.200	981.510	957.778	930.455	915.302	916.931
50	931.281	921.779	895.554	866.954	835.080	816.693	819.007
55	847.302	836.647	811.012	776.013	736.671	713.723	712.283
60	759.431	750.730	720.040	679.789	633.031	604.065	599.822
65	673.529	661.948	627.154	581.940	529.795	495.613	486.705
70	586.911	575.192	539.332	487.241	430.520	381.619	367.201
75	503.782	492.473	454.034	398.974	332.563	274.265	251.030
80	424.457	416.062	376.154	318.582	248.483	179.113	145.991
85	353.945	343.411	305.456	247.244	175.102	102.269	59.478
90	288.847	278.380	242.772	186.291	119.531	52.642	18.462
95	233.726	223.604	190.400	139.799	79.703	28.239	12.739
100	184.825	176.078	145.564	101.325	52.094	15.494	10.267
105	144.960	136.892	110.045	72.561	33.023	8.865	7.836
110	111.226	103.227	81.010	49.695	18.422	6.655	5.903
115	82.055	75.714	56.543	31.111	7.976	4.985	4.328
120	56.776	51.918	36.465	15.928	5.459	3.857	3.247
125	36.195	31.412	19.246	6.714	4.762	3.474	2.931
130	18.210	14.670	7.609	5.631	4.425	3.338	2.793
135	7.024	6.625	6.100	5.226	4.111	3.248	2.834
140	6.308	6.219	5.672	4.911	4.021	3.248	2.922
145	6.040	5.926	5.492	4.843	4.043	3.361	3.100
150	5.861	5.769	5.379	4.821	4.178	3.677	3.506
155	5.727	5.678	5.357	4.978	4.447	4.106	4.000
160	5.682	5.656	5.424	5.113	4.740	4.557	4.541
165	5.682	5.701	5.537	5.316	5.121	5.076	5.036
170	5.682	5.724	5.627	5.586	5.526	5.504	5.533
175	5.727	5.814	5.830	5.834	5.885	5.910	5.938
180	6.035	6.035	6.035	6.035	6.035	6.035	6.035

Appendix A Product Photo



Picture 1

Picture 2

****End of test report****