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IESNA SUSTAINING MEMBER

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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 MODULE

Models No.:

BLU-IS-3L-12W-830-38

Test Date:	Aug. 15, 2019 to Aug. 19, 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 MODULE
Model Number	BLU-IS-3L-12W-830-38
Rated Inputs	36VDC
Rated Power	12W
Rated Light output	1130lm
Declared CCT	3000K
Power Supply	Integrated in luminaire
LED Package, Array or Module	CREE
Receipt Samples	1 unit
Sample Code of lab.	190812105017
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 voltage of DC power supply (instantaneous 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 DC voltage and current were less than 0.1 percent.

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	35.99 V	36.00 V
Input Current(A)	0.328	0.327
Total Power(W)	11.81	11.75
Power Factor	1.000	1.000
I-THD	-	-
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-	1471.89
Luminaire Efficacy(Lm/W)	-	125.27
Correlated Color Temperature (CCT)(K)	3087	-
Color Rendering Index (CRI)	83.1	-
R9	12	-
Chromaticity Coordinate (x,y)	x = 0.4292 y = 0.3983	-
Chromaticity Coordinate (u,v)	u = 0.2481 v = 0.3453	-
Chromaticity Coordinate (u',v')	u' = 0.2481 v' = 0.5179	-
Duv	-0.0012	-
Zone Lumens between 0-60 °	-	96.80%
Beam Angle(50%Imax)	-	C0/180=35.5° C90/270=36.2°

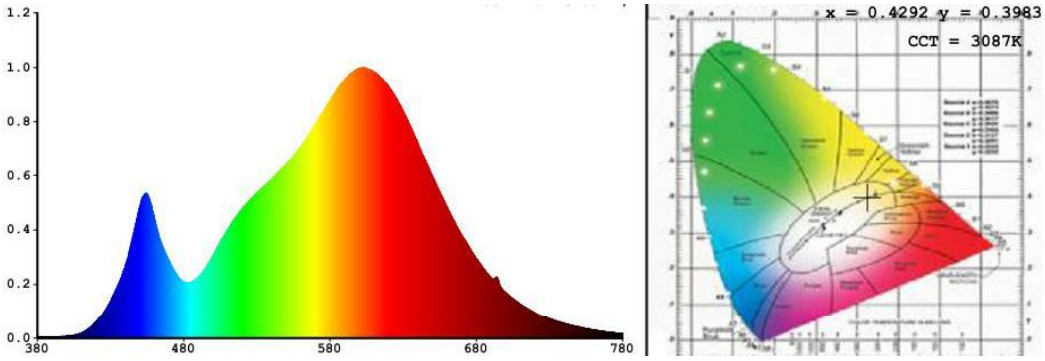
3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
82	91	97	81	82	88	84	61
R9	R10	R11	R12	R13	R14	R15	-
12	78	80	71	84	98	75	-

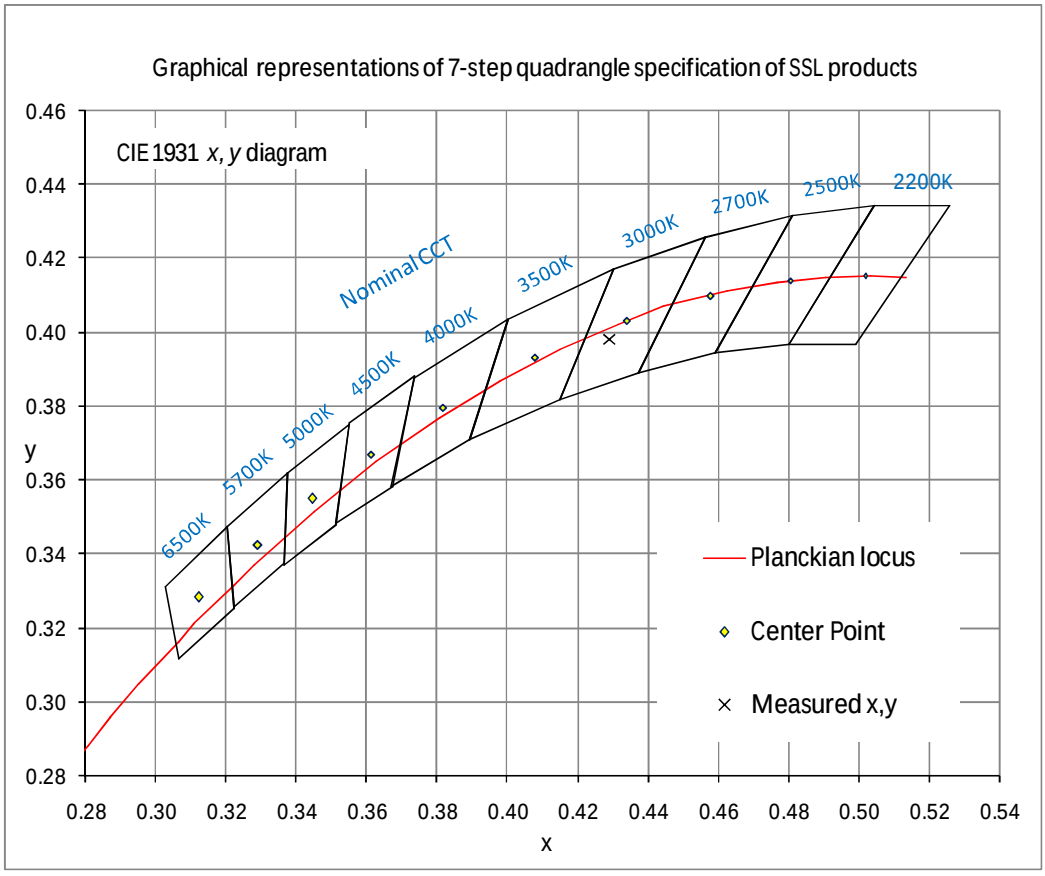
Note: N/A

4. Test Data

4.1 Spectral Distribution



4.2 ANSI Chromaticity Quadrangles Diagram



4.3 Goniometry Test Data

CIE Type	Direct	Basic Luminous Shape	Circular
Spacing Criteria (0-180)	0.60	Luminous Length	0.04 m (Diameter)
Spacing Criteria (90-270)	0.60	Luminous Width	0.04 m (Diameter)
Spacing Criteria (Diagonal)	0.60	Luminous Height	0.00 m
Test Distance	30.00 m		

4.4 Zonal Lumen Summary

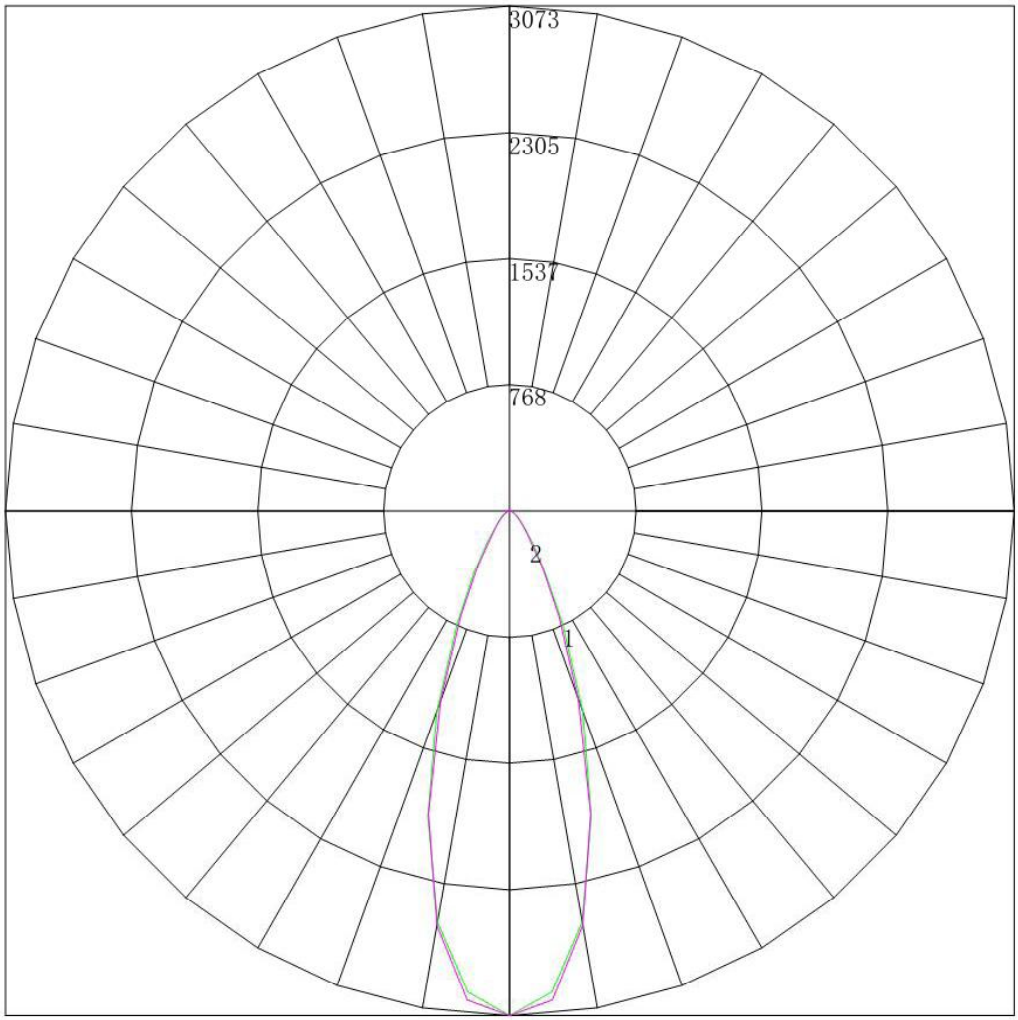
Zone	Lumens	%Lamp	%Fixt
0-20	790.51	53.70	53.70
0-30	1142.86	77.60	77.60
0-40	1300.23	88.30	88.30
0-60	1425.48	96.80	96.80
0-80	1466.49	99.60	99.60
0-90	1469.76	99.90	99.90
10-90	1202.09	81.70	81.70
20-40	509.72	34.60	34.60
20-50	588.37	40.00	40.00
40-70	153.03	10.40	10.40
60-80	41.00	2.80	2.80
70-80	13.23	0.90	0.90
80-90	3.27	0.20	0.20
90-110	0.16	0.00	0.00
90-120	0.16	0.00	0.00
90-130	0.16	0.00	0.00
90-150	0.33	0.00	0.00
90-180	2.12	0.10	0.10
110-180	1.96	0.10	0.10
0-180	1471.88	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	267.67
10-20	522.83
20-30	352.35
30-40	157.37
40-50	78.64
50-60	46.61
60-70	27.77
70-80	13.23
80-90	3.27
90-100	0.16
100-110	0.00
110-120	0.00
120-130	0.00
130-140	0.02
140-150	0.15
150-160	0.58
160-170	0.84
170-180	0.37

4.5 Polar Curves

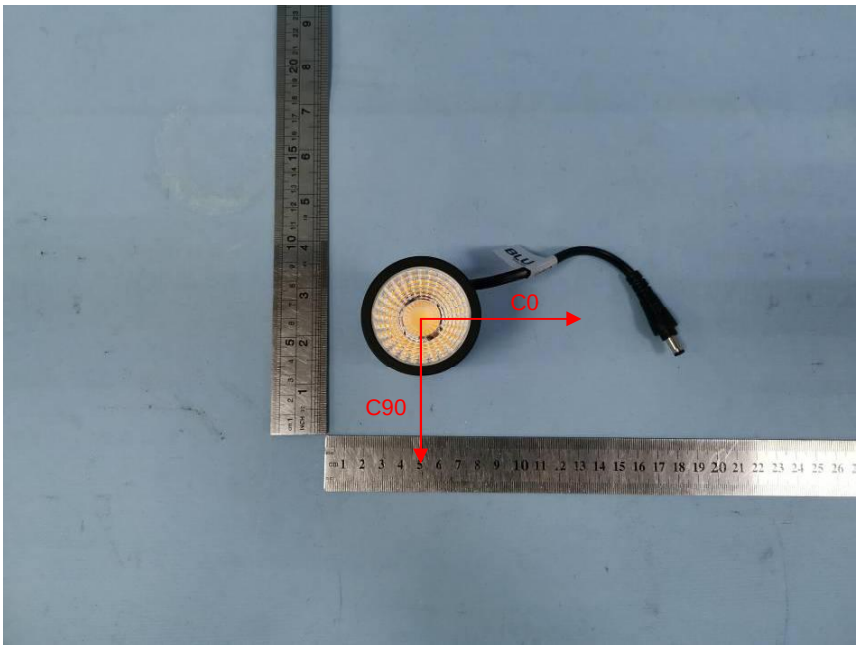


Maximum Candela = 3073.272 Located At Horizontal Angle = 0, Vertical Angle = 0
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)

4.6 Candela Tabulation

	0	15	30	45	60	75	90
0	3073.272	3073.272	3073.272	3073.272	3073.272	3073.272	3073.272
5	2938.999	2937.943	2942.770	2945.023	2937.779	2932.168	2987.617
10	2542.550	2527.524	2529.759	2529.322	2515.548	2518.035	2562.855
15	1925.529	1924.121	1911.074	1908.484	1880.807	1876.930	1909.030
20	1299.495	1280.993	1277.748	1253.031	1232.571	1196.123	1230.138
25	763.630	756.292	751.733	730.659	715.295	700.262	708.425
30	434.273	431.559	422.211	412.764	393.938	382.116	394.114
35	246.335	241.928	241.435	234.174	223.038	219.232	217.490
40	151.069	149.082	148.906	145.182	142.961	138.657	141.014
45	99.636	100.797	99.291	97.972	95.897	93.763	95.229
50	70.733	70.852	70.290	69.668	68.649	67.178	67.795
55	51.934	51.713	51.836	51.552	50.004	49.422	49.917
60	38.416	37.933	38.217	38.148	36.922	36.699	37.554
65	28.266	27.877	27.959	27.570	27.188	27.113	27.533
70	19.891	19.841	19.972	19.496	19.042	18.738	19.120
75	12.745	12.577	12.550	12.297	11.896	11.725	11.687
80	6.736	6.743	6.468	6.340	6.161	5.941	5.949
85	4.734	3.537	2.293	2.211	2.053	1.890	1.857
90	1.092	0.999	0.862	0.631	0.445	0.087	0.000
95	0.000	0.000	0.000	0.000	0.000	0.000	0.000
100	0.000	0.000	0.000	0.000	0.000	0.000	0.000
105	0.000	0.000	0.000	0.000	0.000	0.000	0.000
110	0.000	0.000	0.000	0.000	0.000	0.000	0.000
115	0.000	0.000	0.000	0.000	0.000	0.000	0.000
120	0.000	0.000	0.000	0.000	0.000	0.000	0.000
125	0.000	0.000	0.000	0.000	0.000	0.000	0.000
130	0.000	0.000	0.000	0.023	0.000	0.000	0.000
135	0.046	0.000	0.000	0.000	0.000	0.045	0.066
140	0.000	0.023	0.046	0.046	0.044	0.089	0.066
145	0.137	0.181	0.204	0.203	0.178	0.178	0.199
150	0.546	0.567	0.567	0.587	0.558	0.556	0.533
155	1.229	1.248	1.271	1.218	1.205	1.224	1.243
160	2.230	2.157	2.156	2.166	2.143	2.159	2.222
165	3.050	3.110	3.109	3.090	3.058	3.070	3.113
170	3.778	3.700	3.767	3.700	3.706	3.693	3.736
175	4.005	3.995	3.994	3.948	3.907	3.916	4.004
180	4.186	4.186	4.186	4.186	4.186	4.186	4.186

Appendix A Product Photo



Picture 1

Picture 2

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