LCTECH

NVLAP TESTING
NVLAP LAB CODE 500080-0

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-MOD-8W-930-38

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-MOD-8W-930-38
Rated Inputs	36VDC
Rated Power	8W
Rated Light output	770lm
Declared CCT	3000K
Power Supply	Integrated in luminaire
LED Package, Array or Module	CREE
Receipt Samples	1 unit
Sample Code of lab.	190812105012
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)	0.223	0.211
Total Power(W)	8.04	7.59
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)	-	859.51
Luminaire Efficacy(Lm/W)	-	113.24
Correlated Color Temperature (CCT)(K)	3073	-
Color Rendering Index (CRI)	93.5	-
R9	13	-
Chromaticity Coordinate (x,y)	x = 0.4599 y = 0.4116	-
Chromaticity Coordinate (u,v)	u = 0.2507 v = 0.3471	-
Chromaticity Coordinate (u',v')	u' = 0.2507 v' = 0.5206	-
Duv	-0.0005	-
Zone Lumens between 0-60 °	-	98.60%
Beam Angle(50%Imax)	-	C0/180=39.1° C90/270=40.0°

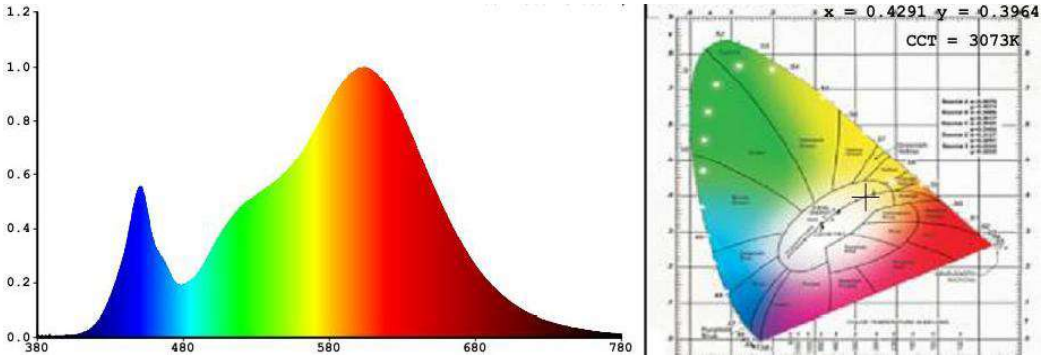
3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
82	90	97	83	82	88	84	62
R9	R10	R11	R12	R13	R14	R15	-
13	77	82	73	84	98	75	-

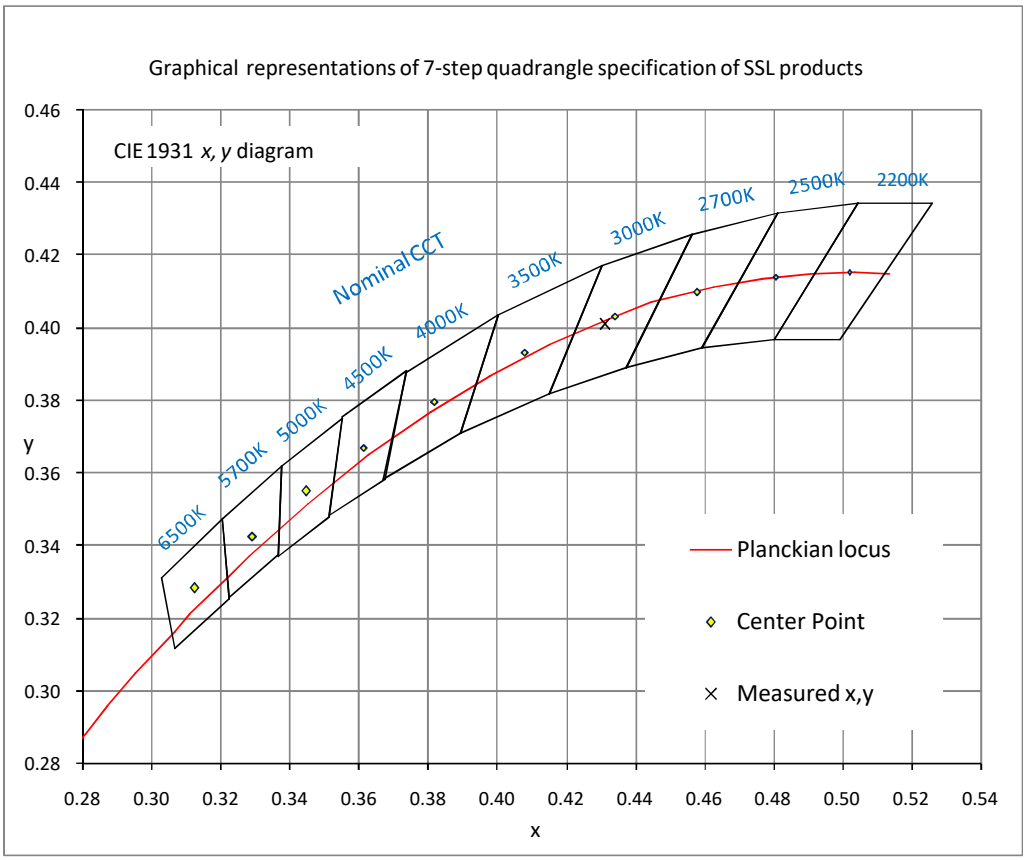
Note: N/A

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)	0.66	Luminous Length	0.04 m (Diameter)
Spacing Criteria (90-270)	0.66	Luminous Width	0.04 m (Diameter)
Spacing Criteria (Diagonal)	0.62	Luminous Height	0.00 m
Test Distance	30.00 m		

4.4 Zonal Lumen Summary

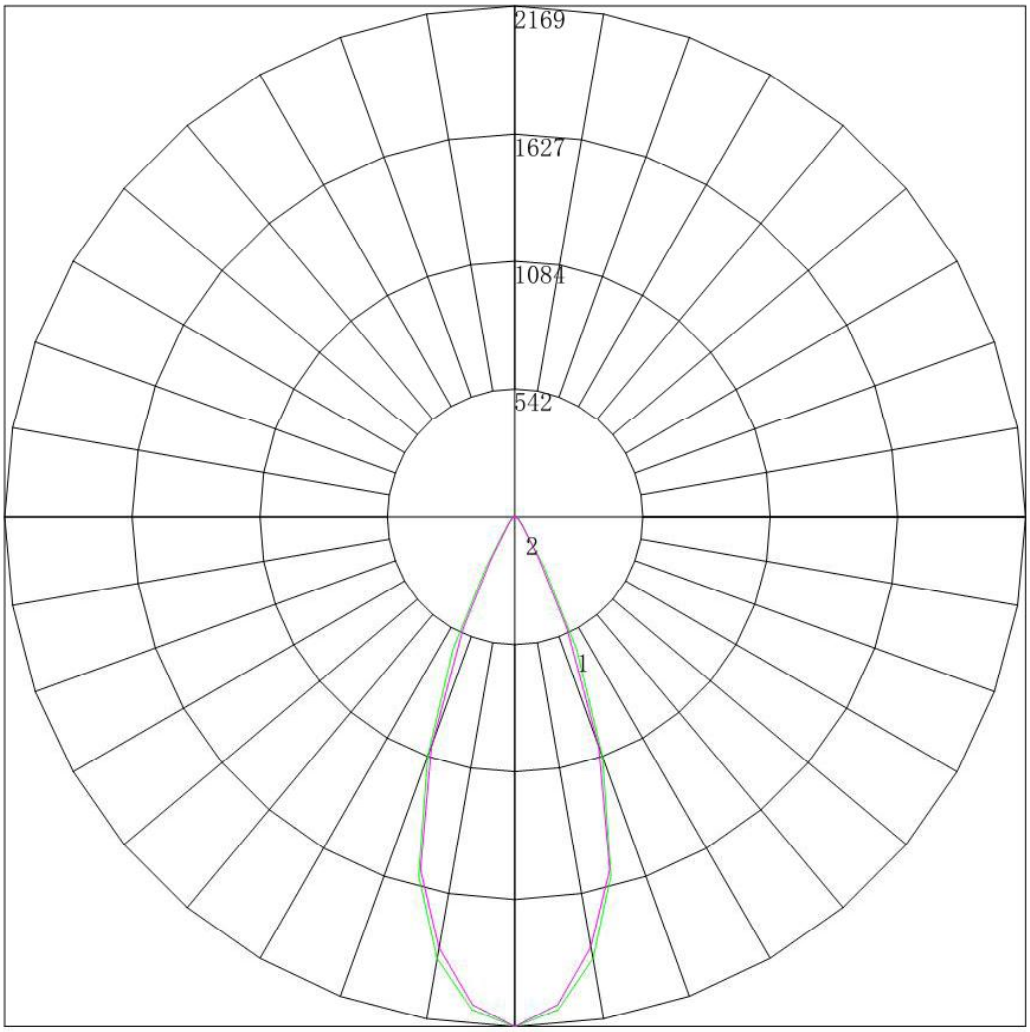
Zone	Lumens	%Lamp	%Fixt
0-20	620.45	61.20	61.20
0-30	891.71	87.90	87.90
0-40	959.01	94.50	94.50
0-60	1000.41	98.60	98.60
0-80	1012.41	99.80	99.80
0-90	1013.04	99.90	99.90
10-90	817.96	80.60	80.60
20-40	338.56	33.40	33.40
20-50	364.78	36.00	36.00
40-70	49.72	4.90	4.90
60-80	11.99	1.20	1.20
70-80	3.68	0.40	0.40
80-90	0.64	0.10	0.10
90-110	0.00	0.00	0.00
90-120	0.00	0.00	0.00
90-130	0.00	0.00	0.00
90-150	0.11	0.00	0.00
90-180	1.46	0.10	0.10
110-180	1.46	0.10	0.10

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	195.08
10-20	425.37
20-30	271.26
30-40	67.30
40-50	26.23
50-60	15.18
60-70	8.31
70-80	3.68
80-90	0.64
90-100	0.00
100-110	0.00
110-120	0.00
120-130	0.00
130-140	0.00
140-150	0.11
150-160	0.44
160-170	0.63
170-180	0.28

4.5 Polar Curves

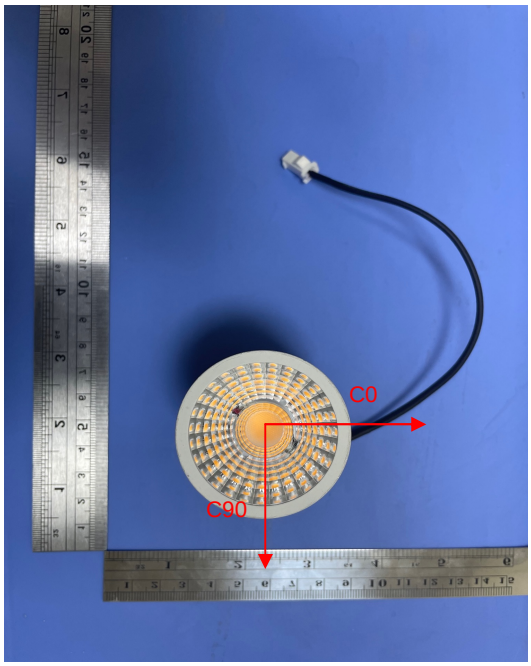


Maximum Candela = 2168.839 Located At Horizontal Angle = 0, Vertical Angle = 0
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)

4.6 Candela Tabulation

	0	15	30	45	60	75	90
0	2168.839	2168.839	2168.839	2168.839	2168.839	2168.839	2168.839
5	2103.971	2100.702	2112.115	2115.536	2112.521	2113.627	2082.743
10	1906.234	1911.922	1931.788	1927.710	1920.357	1921.209	1859.862
15	1580.193	1571.939	1588.249	1582.102	1573.242	1577.886	1551.634
20	1082.183	1085.266	1082.596	1065.142	1059.211	1072.771	1039.531
25	622.110	608.537	591.107	561.138	539.635	535.230	520.215
30	241.042	236.254	225.934	216.136	206.134	199.585	201.134
35	95.424	92.871	90.252	85.255	82.603	80.941	80.852
40	49.747	49.641	49.302	47.686	47.306	47.154	46.463
45	32.658	32.751	32.801	32.323	32.753	32.672	32.058
50	23.129	22.989	23.098	23.033	23.225	23.305	23.111
55	16.553	16.555	16.569	16.600	16.624	16.630	16.436
60	11.676	11.751	11.729	11.786	11.691	11.879	11.669
65	8.187	8.132	8.172	8.187	8.199	8.236	8.176
70	5.503	5.473	5.516	5.533	5.541	5.498	5.450
75	3.355	3.373	3.377	3.352	3.424	3.371	3.453
80	1.655	1.676	1.711	1.664	1.734	1.651	1.637
85	0.358	0.402	0.338	0.337	0.293	0.294	0.275
90	0.000	0.000	0.000	0.000	0.000	0.000	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	0.000	0.000	0.000	0.000
135	0.000	0.000	0.000	0.000	0.000	0.000	0.000
140	0.000	0.045	0.000	0.000	0.000	0.000	0.000
145	0.179	0.223	0.180	0.180	0.135	0.135	0.068
150	0.403	0.402	0.383	0.405	0.360	0.340	0.364
155	0.984	0.938	0.968	0.945	0.924	0.950	0.955
160	1.655	1.653	1.688	1.665	1.667	1.629	1.591
165	2.326	2.346	2.386	2.362	2.365	2.376	2.226
170	2.774	2.793	2.814	2.812	2.748	2.783	2.724
175	2.953	2.971	3.017	2.947	2.996	3.009	2.905
180	3.157	3.157	3.157	3.157	3.157	3.157	3.157

Appendix A Product Photo



Picture 1

Picture 2

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