LCTECH

NVLAP TESTING
NVLAP LAB CODE 500080-0

IESNA SUSTAINING MEMBER

Ref. No.: LCZP19080145
Version: 1.0
Date of Issue: Aug. 20, 2019
Total pages: 11

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 INGROUND LIGHT

Models No.:

BLU-ROOTZ-R6-4W-830-30

Test Date:	Aug. 14, 2019 to Aug. 15, 2019
Test Lab.:	**LCTECH (Zhongshan) Testing Service Co., Ltd**
	2/F., Building II, Technology and Enterprise Development Center, Guangyuan Road, Xiaolan, Zhongshan, Guangdong, China
	Tel:+86-760-22833366 Fax:+86-760-22833399
	E-mail:Service@lccert.com http://www.lccert.com
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**

Table of Contents

1. General

1.1 Product Information

Brand Name	BLUi
Product Type	LED INGROUND LIGHT
Model Number	BLU-ROOTZ-R6-4W-830-30
Rated Inputs	100-240VAC, 50/60Hz
Rated Power	4W
Rated Light output	313lm
Declared CCT	3000K
Power Supply	Integrated in luminaire
LED Package, Array or Module	OSRAM
Receipt Samples	1 unit
Sample Code of lab.	190812105002
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	230.03 V~50Hz
Input Current(A)	0.021	0.021
Total Power(W)	4.16	4.10
Power Factor	0.850	0.849
I-THD	-	-
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-	299.78
Luminaire Efficacy(Lm/W)	-	73.12
Correlated Color Temperature (CCT)(K)	3073	-
Color Rendering Index (CRI)	83.6	-
R9	10	-
Chromaticity Coordinate (x,y)	x = 0.4291 y = 0.3964	-
Chromaticity Coordinate (u,v)	u = 0.2488 v = 0.3448	-
Chromaticity Coordinate (u',v')	u' = 0.2488 v' = 0.5172	-
Duv	-0.002	-
Zone Lumens between 0-60 °	-	99.20%
Beam Angle(50%Imax)	-	C0/180=26.1° C90/270=25.7°

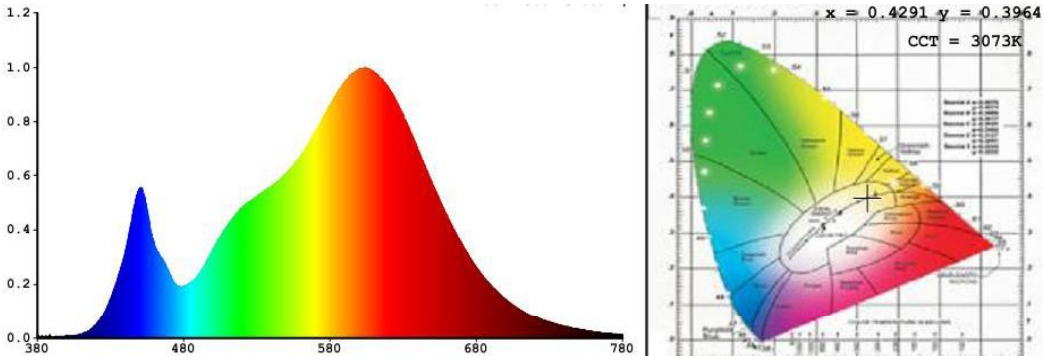
3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
82	91	96	82	83	90	83	60
R9	R10	R11	R12	R13	R14	R15	-
10	80	82	75	85	99	75	-

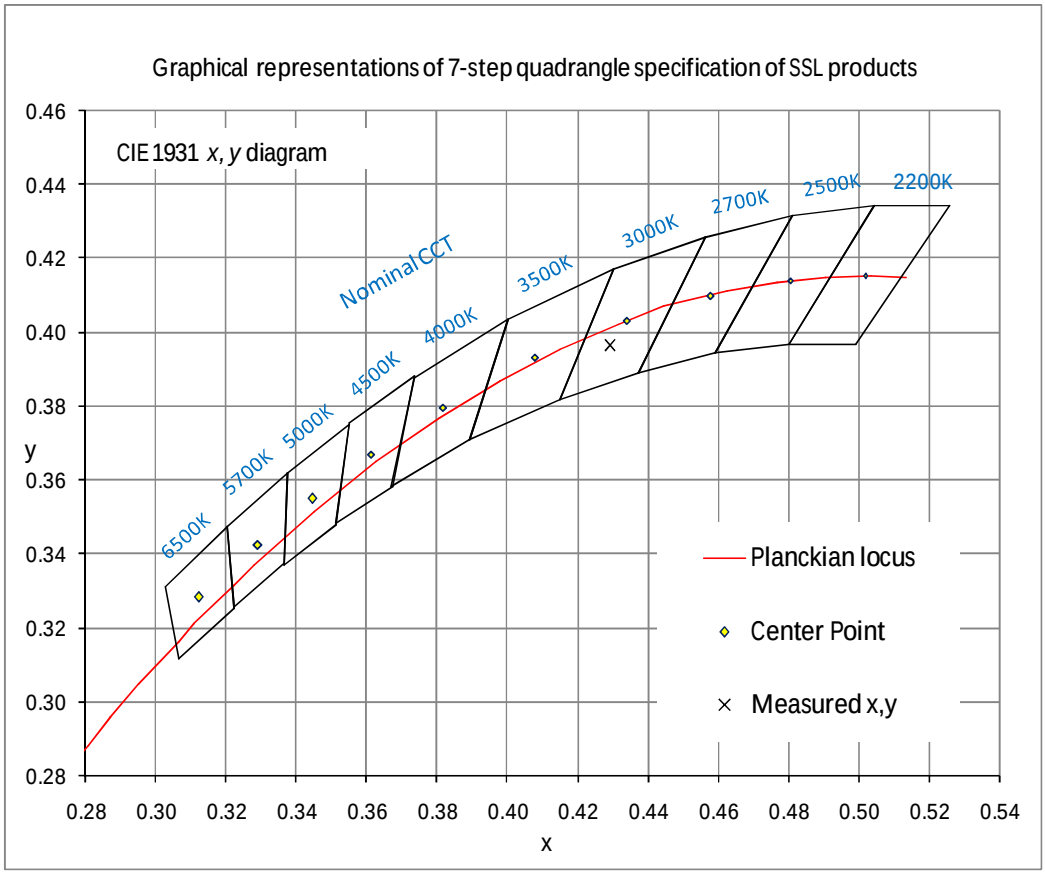
Note: N/A

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)	0.44	Luminous Length	0.05 m (Diameter)
Spacing Criteria (90-270)	0.44	Luminous Width	0.05 m (Diameter)
Spacing Criteria (Diagonal)	0.46	Luminous Height	0.00 m
Test Distance	30.00 m		

4.4 Zonal Lumen Summary

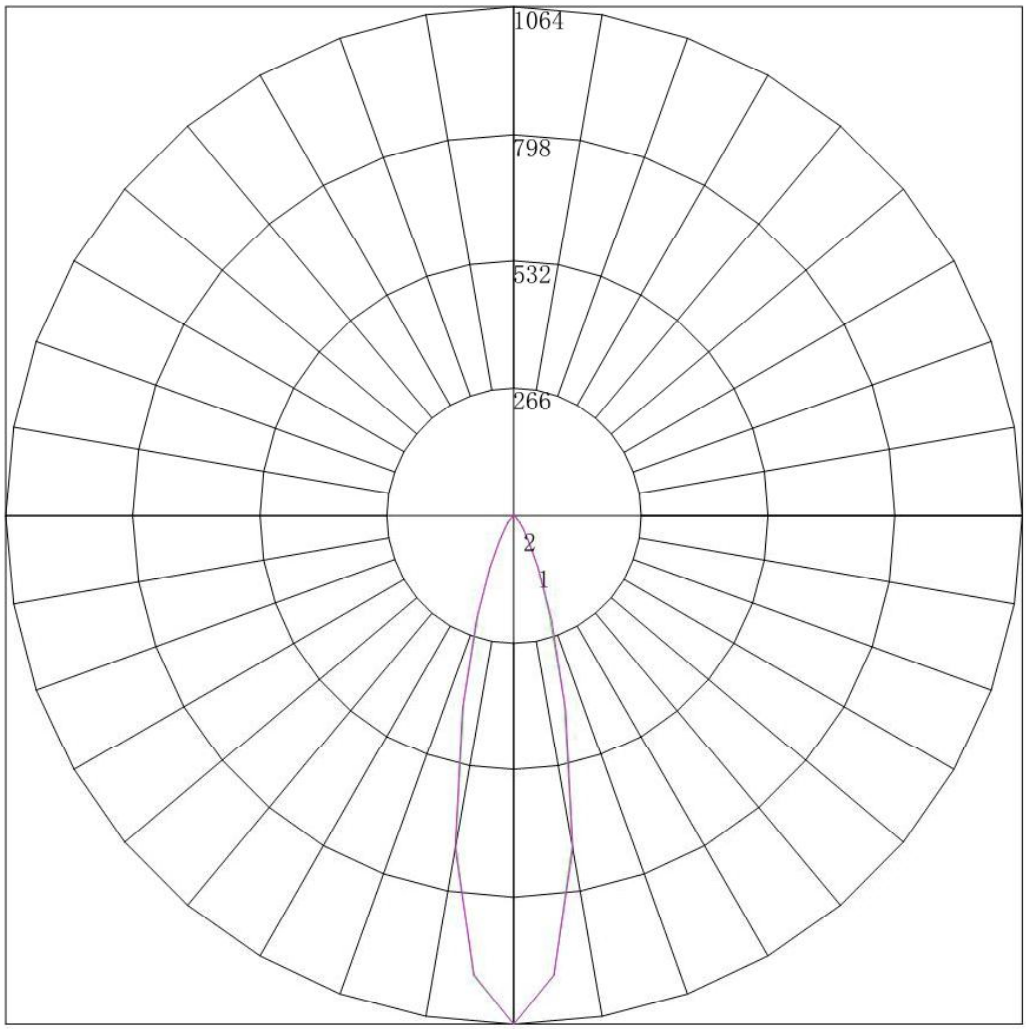
Zone	Lumens	%Lamp	%Fixt
0-20	202.94	67.70	67.70
0-30	261.50	87.20	87.20
0-40	284.70	95.00	95.00
0-60	297.43	99.20	99.20
0-80	299.57	99.90	99.90
0-90	299.60	99.90	99.90
10-90	215.73	72.00	72.00
20-40	81.76	27.30	27.30
20-50	90.79	30.30	30.30
40-70	14.39	4.80	4.80
60-80	2.13	0.70	0.70
70-80	0.48	0.20	0.20
80-90	0.04	0.00	0.00
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	0.00	0.00	0.00
90-180	0.18	0.10	0.10
110-180	0.18	0.10	0.10
0-180	299.78	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	83.87
10-20	119.07
20-30	58.56
30-40	23.20
40-50	9.03
50-60	3.71
60-70	1.65
70-80	0.48
80-90	0.04
90-100	0.00
100-110	0.00
110-120	0.00
120-130	0.00
130-140	0.00
140-150	0.00
150-160	0.03
160-170	0.10
170-180	0.05

4.5 Polar Curves

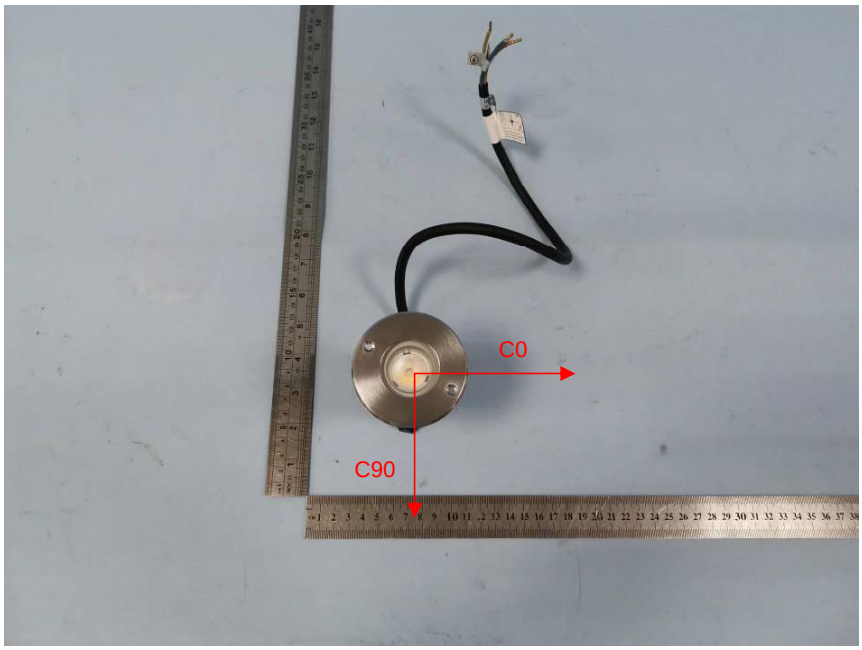


Maximum Candela = 1064.171 Located At Horizontal Angle = 0, Vertical Angle = 0
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)

4.6 Candela Tabulation

	0	15	30	45	60	75	90
0	1064.171	1064.171	1064.171	1064.171	1064.171	1064.171	1064.171
5	966.019	959.142	961.334	965.681	962.047	960.459	964.122
10	700.089	696.379	704.792	712.995	704.678	707.423	707.561
15	405.501	409.606	408.640	419.110	419.324	421.563	418.337
20	216.363	220.268	221.927	225.677	224.038	226.487	229.698
25	115.390	115.262	116.056	117.669	119.585	119.348	119.096
30	61.255	60.909	62.508	62.497	63.403	63.590	63.278
35	33.986	33.657	33.769	33.703	34.692	34.493	34.728
40	19.478	19.616	19.332	19.638	19.934	19.752	19.636
45	10.657	10.547	10.750	10.813	10.926	10.926	11.000
50	5.911	5.934	5.989	5.981	6.004	6.027	6.000
55	3.985	3.986	3.934	3.995	3.995	3.996	4.091
60	2.642	2.642	2.637	2.709	2.686	2.641	2.727
65	1.522	1.568	1.587	1.625	1.603	1.603	1.591
70	0.806	0.873	0.871	0.880	0.790	0.880	0.773
75	0.403	0.403	0.447	0.406	0.451	0.429	0.455
80	0.134	0.157	0.134	0.158	0.135	0.090	0.091
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000
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	0.000	0.000	0.000	0.000	0.000	0.000
145	0.000	0.000	0.000	0.000	0.000	0.000	0.000
150	0.000	0.000	0.000	0.000	0.000	0.000	0.000
155	0.090	0.045	0.044	0.045	0.045	0.045	0.068
160	0.179	0.202	0.224	0.181	0.158	0.181	0.136
165	0.358	0.358	0.380	0.384	0.339	0.406	0.363
170	0.493	0.493	0.559	0.542	0.541	0.497	0.500
175	0.582	0.493	0.536	0.519	0.564	0.519	0.545
180	0.579	0.579	0.579	0.579	0.579	0.579	0.579

Appendix A Product Photo



Picture 1

Picture 2

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