LCTECH

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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 DOWNLIGHT

Models No.:

BLU-VALUE-23-23W-840-80

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**

Table of Contents

1. General

1.1 Product Information

Brand Name	BLUi
Product Type	LED DOWNLIGHT
Model Number	BLU-VALUE-23-23W-840-80
Rated Inputs	50VDC
Rated Power	23W
Rated Light output	2145lm
Declared CCT	4000K
Power Supply	Integrated in luminaire
LED Package, Array or Module	Samsung
Receipt Samples	1 unit
Sample Code of lab.	190812105024
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	51.56 V	51.68 V
Input Current(A)	0.351	0.350
Total Power(W)	18.10	18.07
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)	-	2302.75
Luminaire Efficacy(Lm/W)	-	127.43
Correlated Color Temperature (CCT)(K)	3971	-
Color Rendering Index (CRI)	84.0	-
R9	12	-
Chromaticity Coordinate (x,y)	x = 0.3825 y = 0.3802	-
Chromaticity Coordinate (u,v)	u = 0.2251 v = 0.3356	-
Chromaticity Coordinate (u',v')	u' = 0.2251 v' = 0.5034	-
Duv	0.001	-
Zone Lumens between 0-60 °	-	97.10%
Beam Angle(50%Imax)	-	C0/180=65.1° C90/270=64.8°

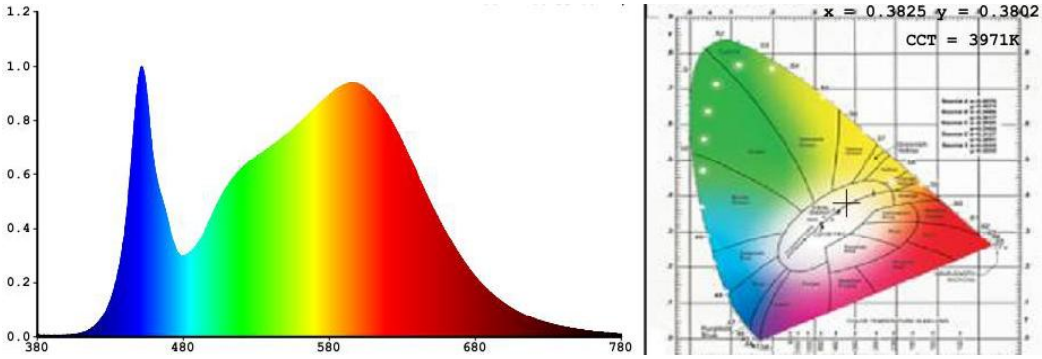
3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
82	90	96	83	82	87	86	66
R9	R10	R11	R12	R13	R14	R15	-
12	77	82	64	85	98	76	-

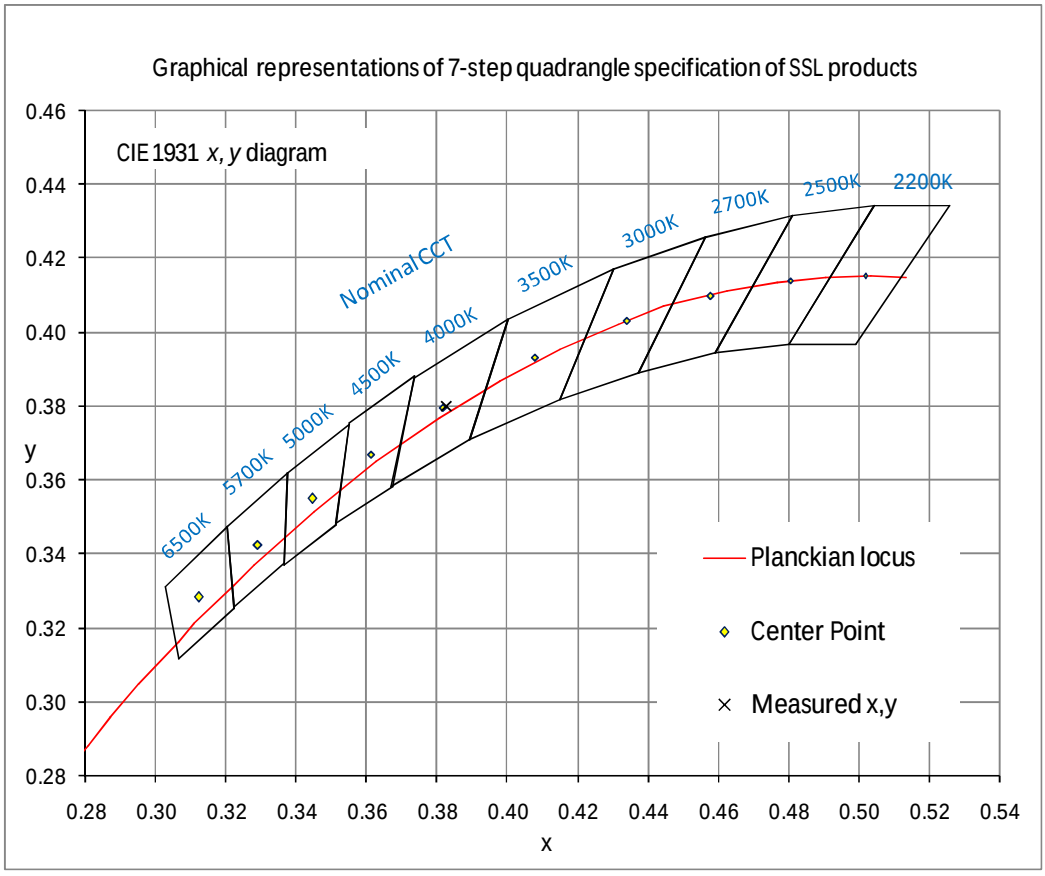
Note: N/A

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)	0.90	Luminous Length	0.19 m (Diameter)
Spacing Criteria (90-270)	0.92	Luminous Width	0.19 m (Diameter)
Spacing Criteria (Diagonal)	1.00	Luminous Height	0.00 m
Test Distance	30.00 m		

4.4 Zonal Lumen Summary

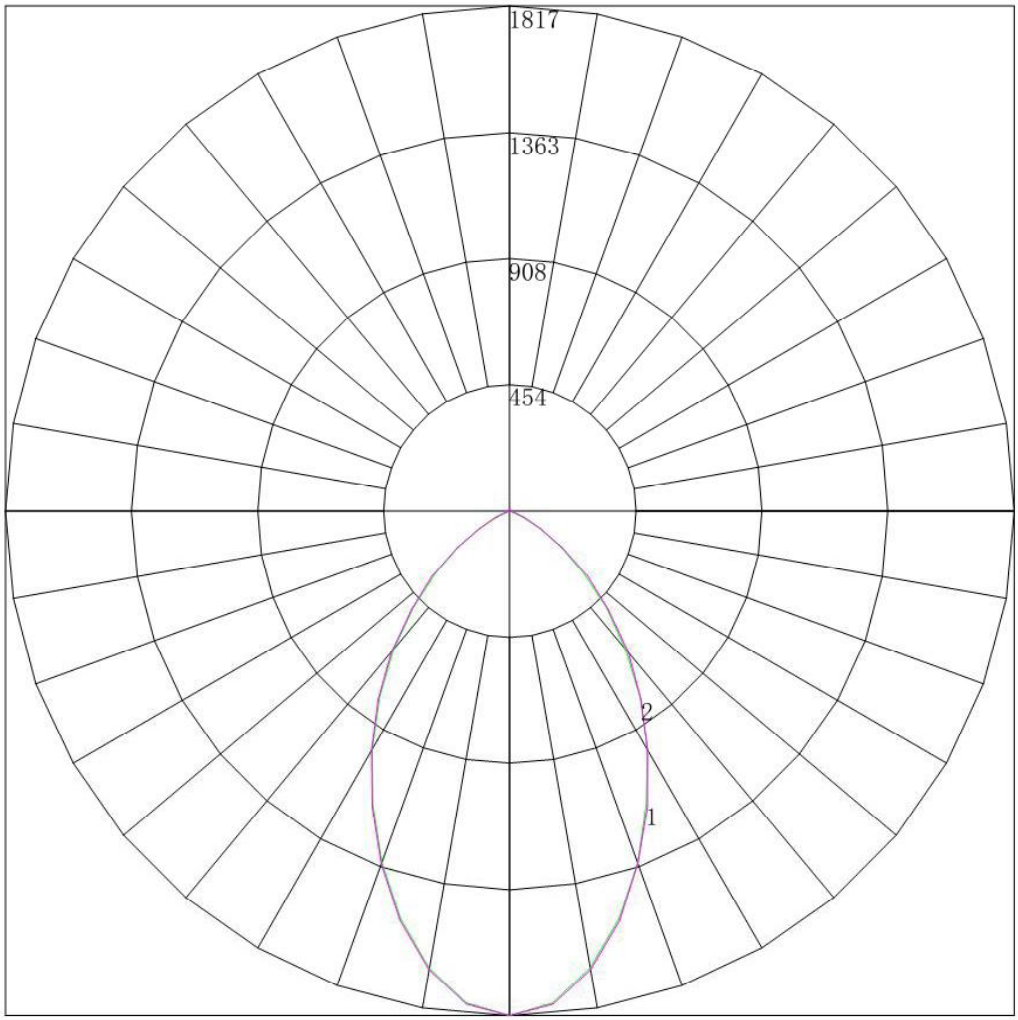
Zone	Lumens	%Lamp	%Fixt
0-20	592.22	25.70	25.70
0-30	1129.21	49.00	49.00
0-40	1641.89	71.30	71.30
0-60	2235.09	97.10	97.10
0-80	2298.75	99.80	99.80
0-90	2298.83	99.80	99.80
10-90	2132.36	92.60	92.60
20-40	1049.67	45.60	45.60
20-50	1434.73	62.30	62.30
40-70	653.21	28.40	28.40
60-80	63.66	2.80	2.80
70-80	3.64	0.20	0.20
80-90	0.08	0.00	0.00
90-110	0.22	0.00	0.00
90-120	0.49	0.00	0.00
90-130	0.94	0.00	0.00
90-150	2.18	0.10	0.10
90-180	3.92	0.20	0.20
110-180	3.70	0.20	0.20
0-180	2302.75	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	166.47
10-20	425.75
20-30	536.99
30-40	512.69
40-50	385.05
50-60	208.14
60-70	60.02
70-80	3.64
80-90	0.08
90-100	0.06
100-110	0.16
110-120	0.27
120-130	0.46
130-140	0.59
140-150	0.65
150-160	0.77
160-170	0.69
170-180	0.28

4.5 Polar Curves

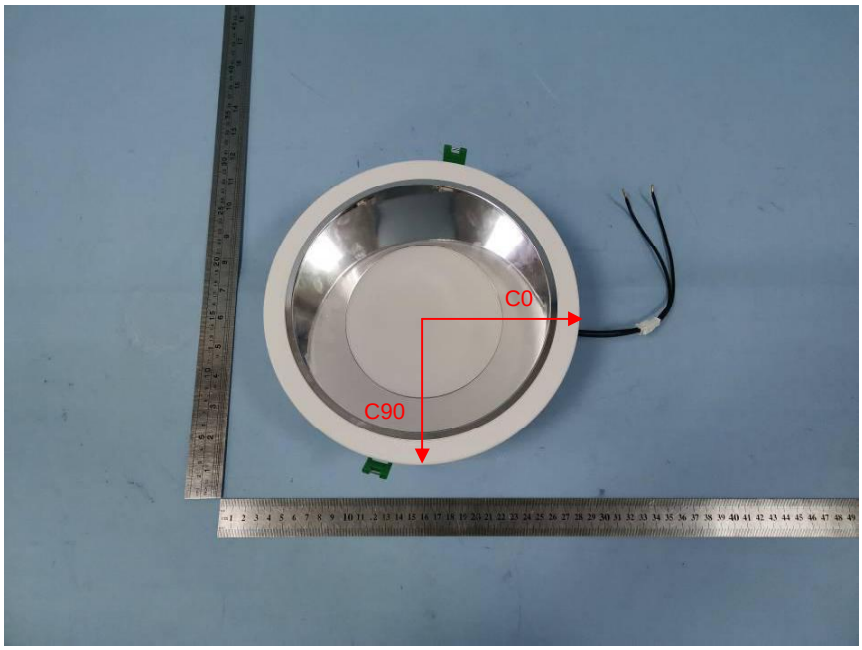


Maximum Candela = 1816.93 Located At Horizontal Angle = 0, Vertical Angle = 0
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)

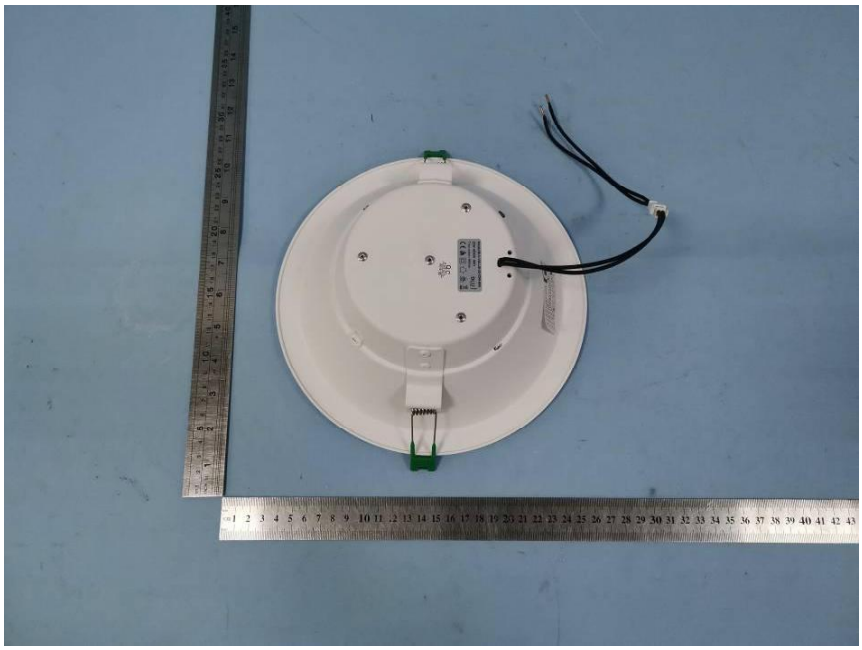
4.6 Candela Tabulation

	0	15	30	45	60	75	90
0	1816.930	1816.930	1816.930	1816.930	1816.930	1816.930	1816.930
5	1778.536	1779.807	1779.039	1779.672	1779.512	1778.088	1781.912
10	1670.205	1671.978	1669.673	1673.409	1672.341	1672.389	1676.565
15	1519.831	1519.673	1518.643	1518.627	1518.796	1519.319	1526.406
20	1347.196	1347.273	1346.275	1349.943	1349.406	1351.074	1351.577
25	1165.503	1166.214	1166.055	1166.161	1167.917	1167.409	1174.685
30	990.794	988.239	989.562	988.617	992.290	992.697	993.709
35	820.097	821.025	820.619	816.691	819.499	819.692	825.244
40	651.697	653.180	651.970	655.928	653.427	656.799	662.614
45	490.959	495.665	493.939	494.744	495.750	496.800	501.551
50	347.299	350.531	358.359	358.262	355.564	357.123	365.606
55	226.530	224.478	226.126	227.611	227.649	227.808	229.475
60	124.013	124.452	125.184	125.884	124.237	125.754	126.358
65	51.777	53.048	52.748	52.893	53.737	53.257	55.758
70	12.212	12.406	11.809	12.594	12.755	12.382	14.490
75	0.361	0.361	0.586	0.699	0.720	0.652	0.718
80	0.180	0.158	0.158	0.203	0.157	0.157	0.202
85	0.000	0.000	0.068	0.090	0.067	0.045	0.000
90	0.045	0.068	0.023	0.000	0.023	0.023	0.000
95	0.045	0.045	0.068	0.045	0.067	0.023	0.090
100	0.090	0.090	0.090	0.090	0.068	0.112	0.135
105	0.135	0.135	0.158	0.113	0.135	0.157	0.179
110	0.180	0.248	0.248	0.180	0.157	0.247	0.269
115	0.270	0.271	0.248	0.270	0.247	0.247	0.269
120	0.315	0.406	0.338	0.338	0.337	0.314	0.359
125	0.496	0.564	0.496	0.495	0.495	0.472	0.538
130	0.631	0.789	0.721	0.653	0.607	0.651	0.718
135	0.721	0.834	0.721	0.766	0.719	0.764	0.718
140	0.811	0.970	0.924	0.811	0.832	0.809	0.852
145	1.036	1.083	1.081	0.991	0.989	0.966	0.987
150	1.172	1.331	1.352	1.283	1.214	1.190	1.256
155	1.667	1.804	1.735	1.711	1.619	1.572	1.570
160	2.073	2.188	2.208	2.049	2.046	2.044	2.063
165	2.569	2.594	2.523	2.477	2.428	2.448	2.512
170	2.839	2.819	2.839	2.792	2.765	2.785	2.736
175	2.974	2.977	2.929	2.972	2.990	3.032	2.915
180	3.092	3.092	3.092	3.092	3.092	3.092	3.092

Appendix A Product Photo



Picture 1



Picture 2

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