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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 CEILING LIGHT

Models No.:

BLU-BULKZ-D2-20W-830

Test Date:	Aug. 21, 2019 to Aug. 23, 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	Kargel Yuan	**Lin Qiu**	Lin
Project Engineer		**Technical Manager**	
Aug. 27, 2019		**Aug. 27, 2019**	

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1. General

1.1 Product Information

Brand Name	BLUi
Product Type	LED CEILING LIGHT
Model Number	BLU-BULKZ-D2-20W-830
Rated Inputs	220-240VAC, 50/60Hz
Rated Power	20W
Rated Light output	1850lm
Declared CCT	3000K
Power Supply	Integrated in luminaire
LED Package, Array or Module	SAMSUNG
Receipt Samples	1 unit
Sample Code of lab.	190819105001
Date of Receipt Samples	Aug. 19, 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	230.05 V~50Hz
Input Current(A)	0.127	0.126
Total Power(W)	20.01	20.36
Power Factor	0.980	0.980
I-THD	-	-
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-	1862.74
Luminaire Efficacy(Lm/W)	-	91.49
Correlated Color Temperature (CCT)(K)	3002	-
Color Rendering Index (CRI)	83.1	-
R9	19	-
Chromaticity Coordinate (x,y)	x = 0.3703 y = 0.3693	-
Chromaticity Coordinate (u,v)	u = 0.2214 v = 0.3312	-
Chromaticity Coordinate (u',v')	u' = 0.2214 v' = 0.4968	-
Duv	-0.0004	-
Zone Lumens between 0-60 °	-	73.40%
Beam Angle(50%Imax)	-	C0/180=113.9° C90/270=113.7°

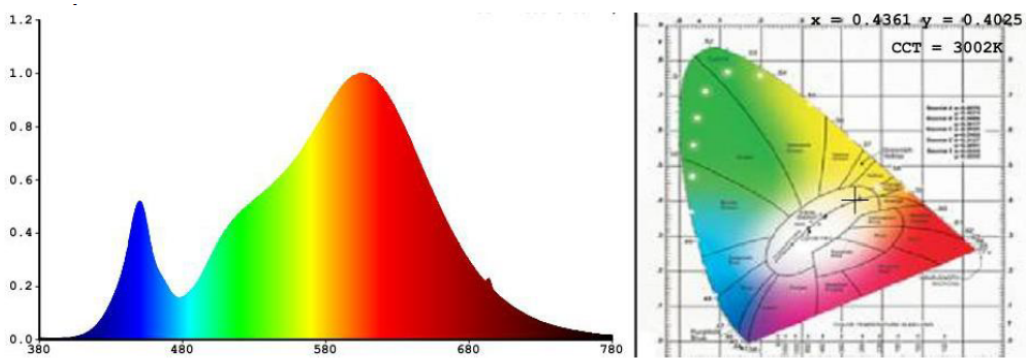
3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
84	92	96	83	84	87	87	69
R9	R10	R11	R12	R13	R14	R15	-
19	79	82	63	86	98	79	-

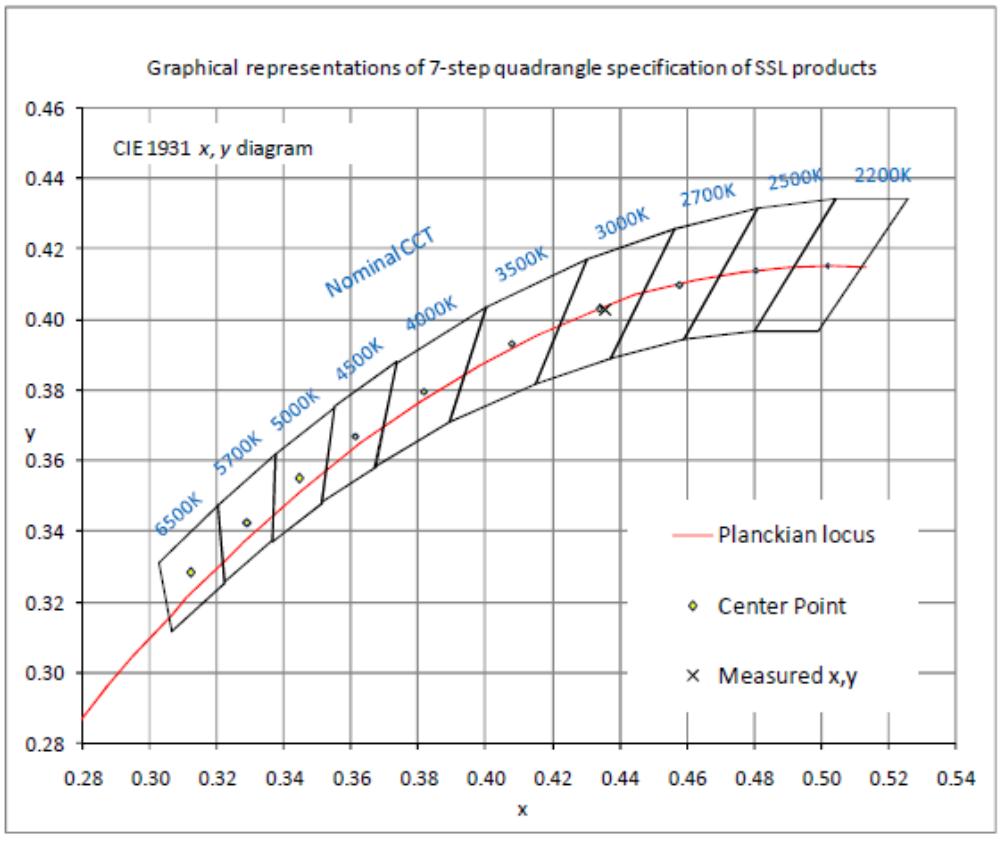
Note: N/A

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 w/ Sides
Spacing Criteria (0-180)	1.26	Luminous Length	0.24 m (Diameter)
Spacing Criteria (90-270)	1.28	Luminous Width	0.24 m (Diameter)
Spacing Criteria (Diagonal)	1.38	Luminous Height	0.03 m
Test Distance	30.00 m		

4.4 Zonal Lumen Summary

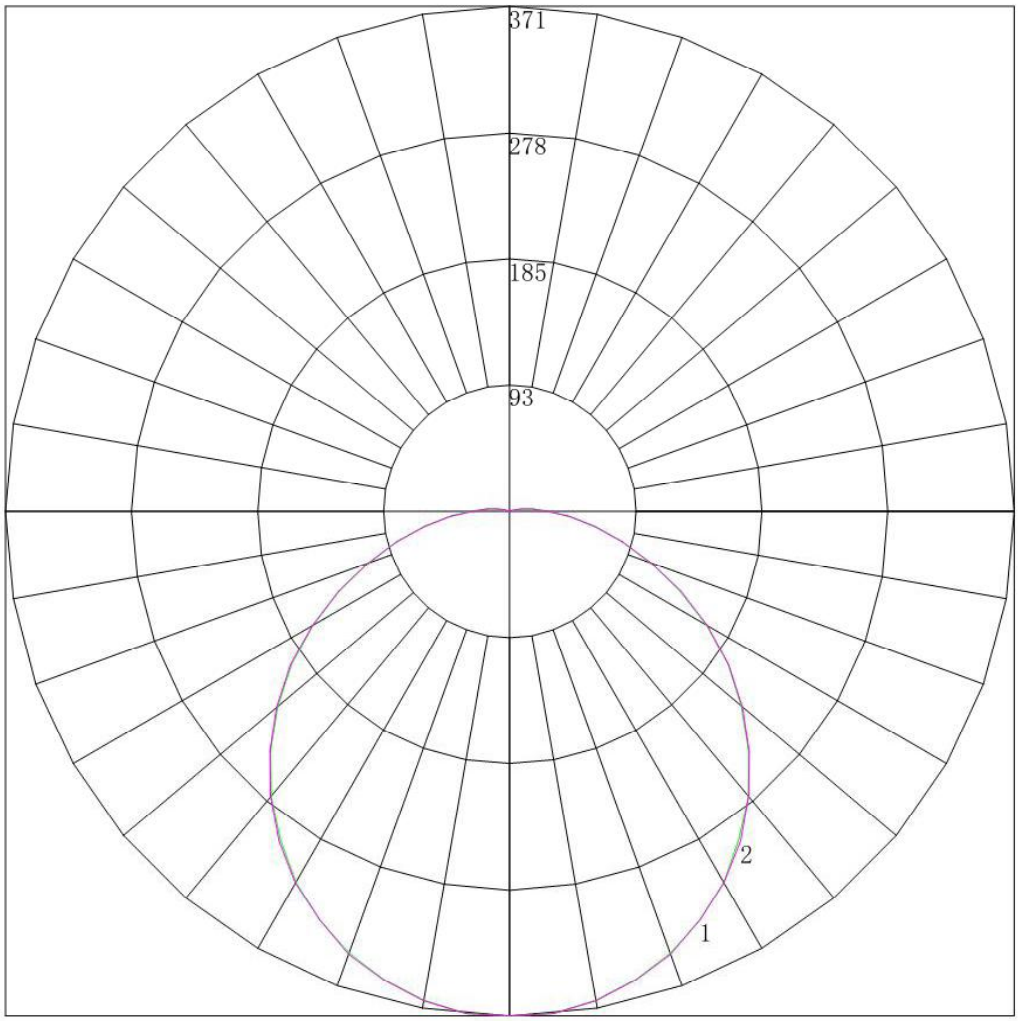
Zone	Lumens	%Lamp	%Fixt
0-20	135.60	11.90	11.90
0-30	288.04	25.20	25.20
0-40	472.13	41.30	41.30
0-60	838.40	73.40	73.40
0-80	1067.47	93.40	93.40
0-90	1116.95	97.70	97.70
10-90	1081.86	94.70	94.70
20-40	336.53	29.40	29.40
20-50	528.12	46.20	46.20
40-70	503.68	44.10	44.10
60-80	229.07	20.00	20.00
70-80	91.65	8.00	8.00
80-90	49.49	4.30	4.30
90-110	24.37	2.10	2.10
90-120	24.89	2.20	2.20
90-130	25.00	2.20	2.20
90-150	25.15	2.20	2.20
90-180	25.79	2.30	2.30
110-180	1.42	0.10	0.10
0-180	1142.74	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	35.10
10-20	100.51
20-30	152.44
30-40	184.09
40-50	191.59
50-60	174.67
60-70	137.41
70-80	91.66
80-90	49.49
90-100	19.77
100-110	4.61
110-120	0.52
120-130	0.11
130-140	0.01
140-150	0.14
150-160	0.30
160-170	0.26
170-180	0.09

4.5 Polar Curves

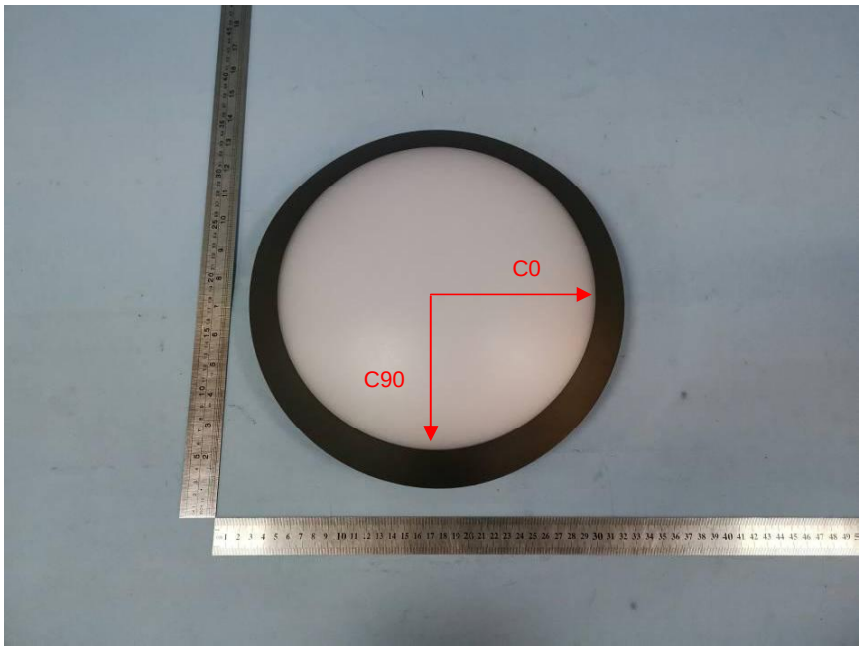


Maximum Candela = 370.925 Located At Horizontal Angle = 0, Vertical Angle = 0
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)

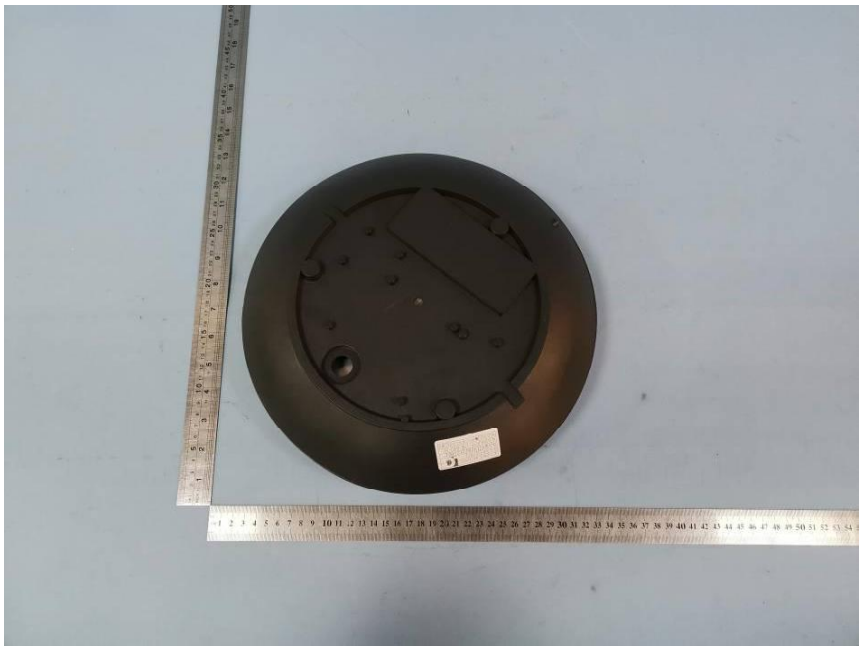
4.6 Candela Tabulation

	0	15	30	45	60	75	90
0	370.925	370.925	370.925	370.925	370.925	370.925	370.925
5	370.473	368.899	368.899	368.899	369.126	369.800	370.479
10	365.058	363.947	364.172	364.172	363.955	364.398	365.538
15	356.485	355.844	355.844	355.844	355.863	356.295	357.005
20	345.655	344.591	344.816	344.591	344.623	345.041	346.227
25	331.215	330.636	330.186	330.861	330.235	331.086	331.407
30	314.519	313.305	313.755	313.755	313.375	314.206	315.241
35	294.213	293.724	294.174	293.949	294.041	294.399	295.930
40	273.004	271.891	271.891	272.341	272.461	272.791	273.477
45	248.637	248.033	248.033	248.258	247.958	248.934	249.227
50	222.464	222.600	221.925	221.925	222.555	223.501	223.632
55	195.841	195.141	195.366	194.915	195.129	195.816	196.686
60	167.412	166.331	166.781	166.781	167.254	167.232	167.946
65	138.081	138.196	138.647	137.971	138.254	138.646	138.757
70	110.555	111.187	111.412	110.962	111.053	111.638	110.916
75	86.188	85.979	86.204	86.654	86.099	86.204	86.218
80	63.626	63.246	63.696	63.696	63.395	63.247	63.765
85	45.125	45.240	44.565	44.340	44.286	44.565	44.006
90	29.782	29.710	29.035	28.810	28.550	28.360	27.842
95	17.599	17.556	17.556	17.331	17.310	16.881	16.614
100	9.025	8.778	9.228	9.003	8.992	8.779	8.531
105	3.610	3.601	3.601	3.826	3.822	3.827	4.040
110	0.902	0.900	0.900	0.900	0.899	0.900	0.898
115	0.451	0.450	0.450	0.450	0.450	0.450	0.450
120	0.000	0.450	0.225	0.000	0.450	0.226	0.450
125	0.000	0.225	0.225	0.000	0.225	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	0.225	0.225	0.000	0.000
145	0.451	0.000	0.225	0.225	0.225	0.225	0.000
150	0.451	0.450	0.450	0.450	0.450	0.450	0.448
155	0.451	0.675	0.450	0.675	0.675	0.676	0.898
160	0.902	0.900	0.900	0.900	0.899	0.900	0.898
165	0.902	0.900	0.900	0.900	0.899	0.900	0.898
170	0.902	0.900	0.900	0.900	0.899	0.900	0.898
175	0.902	0.900	0.900	0.900	0.899	0.900	0.898
180	0.900	0.900	0.900	0.900	0.900	0.900	0.900

Appendix A Product Photo



Picture 1



Picture 2

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