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Test report of

## IES LM-79-08

Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Rendered to:

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Suite 5, Valley Towers, Valley Road, Birkirkara BKR9022, Malta

For products:

LED DOWNLIGHT

Models No.:

BLU-RETRO-R-14W-830-38

**Test Date:** Aug. 14, 2019 to Aug. 19, 2019

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**Test Note:**

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## 1. General

### 1.1 Product Information

Brand Name	BLUi
Product Type	LED DOWNLIGHT
Model Number	BLU-RETRO-R-14W-830-38
Rated Inputs	36VDC
Rated Power	14W
Rated Light output	1325lm
Declared CCT	3000K
Power Supply	Integrated in luminaire
LED Package, Array or Module	CREE
Receipt Samples	1 unit
Sample Code of lab.	190812105018
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  $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ ; 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  $\pm 0.2$  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	36.41 V	36.55 V
Input Current(A)	0.350	0.350
Total Power(W)	12.75	12.81
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)	-	1363.96
Luminaire Efficacy(Lm/W)	-	106.48
Correlated Color Temperature (CCT)(K)	3053	-
Color Rendering Index (CRI)	83.2	-
R9	11	-
Chromaticity Coordinate (x,y)	x = 0.4343 y = 0.4052	-
Chromaticity Coordinate (u,v)	u = 0.2484 v = 0.3476	-
Chromaticity Coordinate (u',v')	u' = 0.2484 v' = 0.5214	-
Duv	0.0008	-
Zone Lumens between 0-60 °	-	98.10%
Beam Angle(50%Imax)	-	C0/180=37.8° C90/270=38.0°

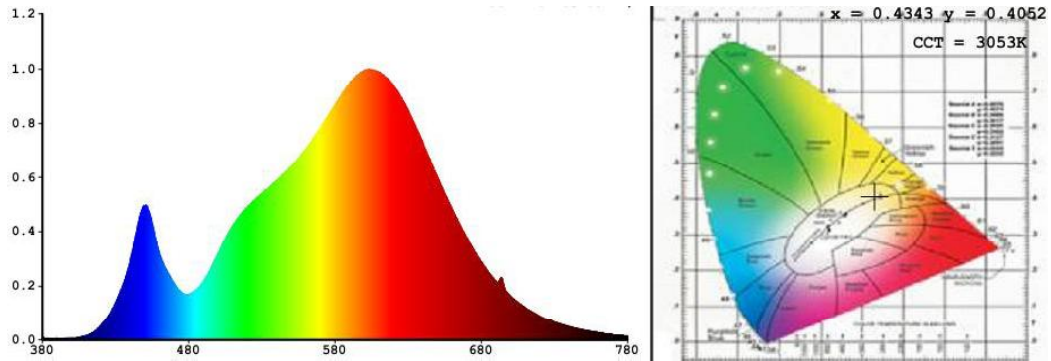
#### 3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
82	90	97	82	81	87	85	62
R9	R10	R11	R12	R13	R14	R15	-
11	76	82	70	83	98	74	-

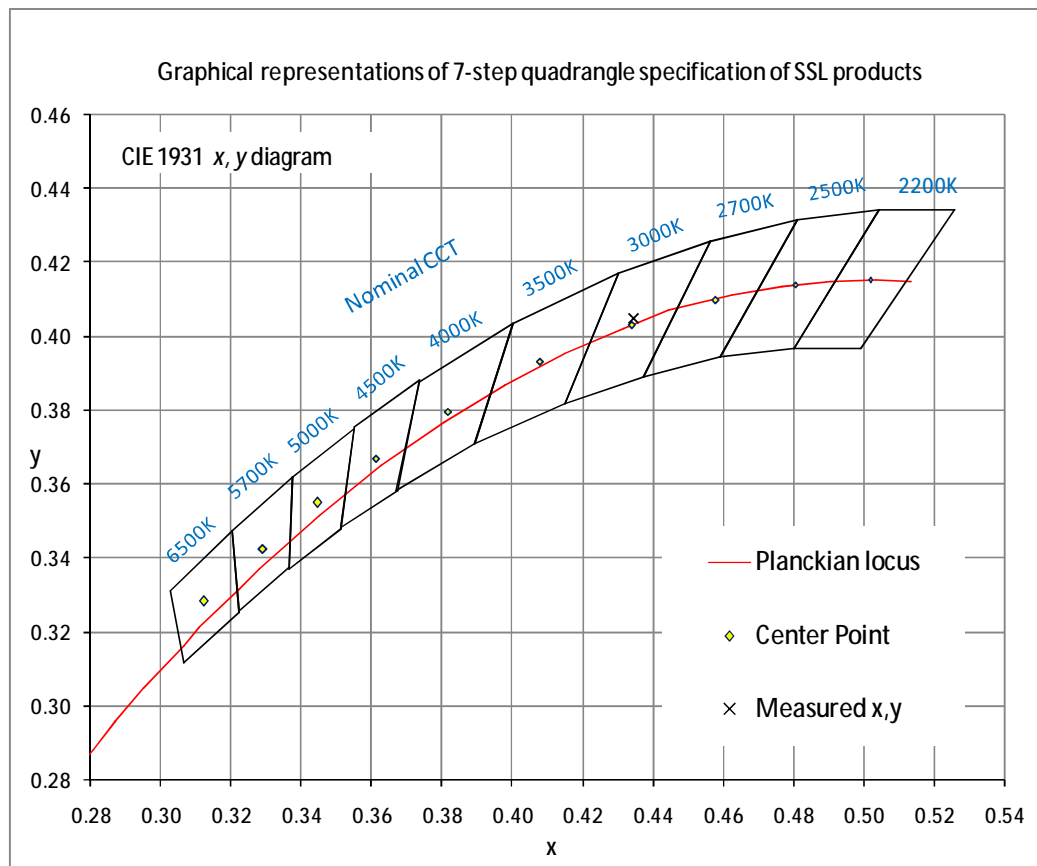
Note: N/A

## 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)	0.64	Luminous Length	0.09 m (Diameter)
Spacing Criteria (90-270)	0.62	Luminous Width	0.09 m (Diameter)
Spacing Criteria (Diagonal)	0.64	Luminous Height	0.00 m
Test Distance	30.00 m		

#### 4.4 Zonal Lumen Summary

Zone	Lumens	%Lamp	%Fixt
0-20	738.70	54.20	54.20
0-30	1103.61	80.90	80.90
0-40	1267.74	92.90	92.90
0-60	1338.6	98.10	98.10
0-80	1360.04	99.70	99.70
0-90	1361.94	99.90	99.90
10-90	1120.71	82.20	82.20
20-40	529.05	38.80	38.80
20-50	577.82	42.40	42.40
40-70	84.89	6.20	6.20
60-80	21.44	1.60	1.60
70-80	7.40	0.50	0.50
80-90	1.90	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	0.29	0.00	0.00
90-180	2.02	0.10	0.10
110-180	2.02	0.10	0.10
0-180	1363.96	100.00	100.00

Total Luminaire Efficiency = 100.00%

#### ZONAL LUMEN SUMMARY

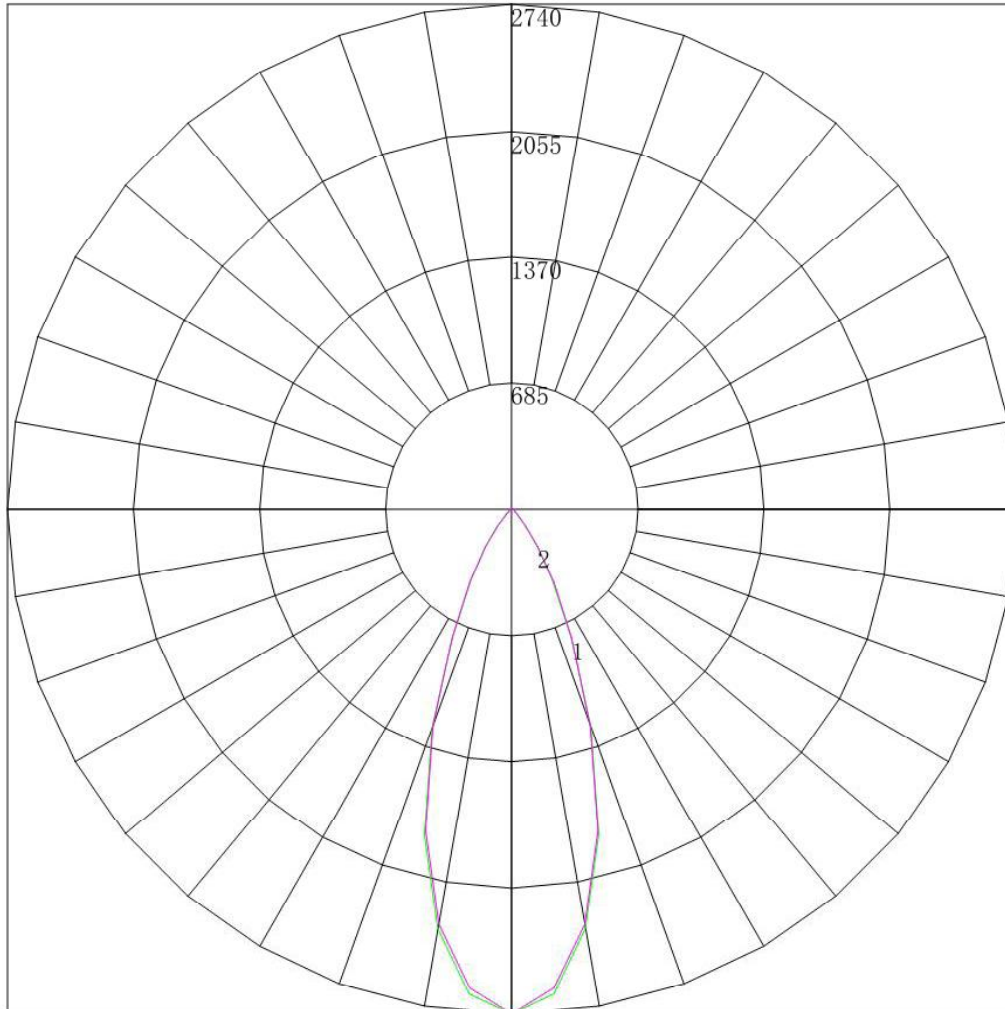
Zone	Lumens
0-10	241.23
10-20	497.47
20-30	364.91
30-40	164.14
40-50	48.77
50-60	22.09
60-70	14.03
70-80	7.40
80-90	1.90
90-100	0.00
100-110	0.00
110-120	0.00
120-130	0.00
130-140	0.05
140-150	0.23
150-160	0.63
160-170	0.77
170-180	0.34





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4.5 Polar Curves



Maximum Candela = 2739.89 Located At Horizontal Angle = 0, Vertical Angle = 0  
# 1 - Vertical Plane Through Horizontal Angles (0 - 180)  
# 2 - Vertical Plane Through Horizontal Angles (90 - 270)



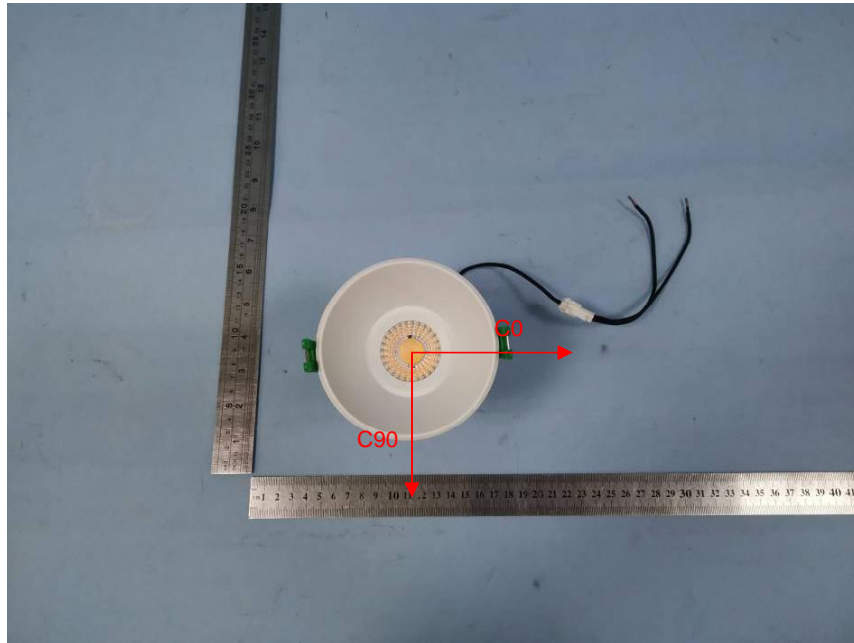
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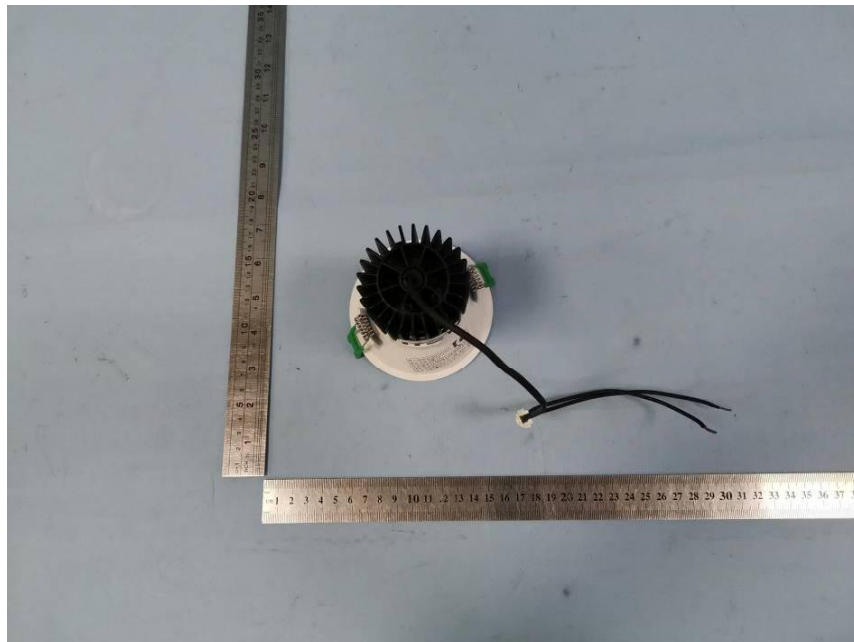
4.6 Candela Tabulation

	<u>0</u>	<u>15</u>	<u>30</u>	<u>45</u>	<u>60</u>	<u>75</u>	<u>90</u>
0	2739.890	2739.890	2739.890	2739.890	2739.890	2739.890	2739.890
5	2641.524	2640.675	2640.372	2637.805	2630.573	2635.855	2609.706
10	2310.042	2314.069	2311.422	2326.119	2305.875	2315.425	2287.316
15	1828.091	1834.599	1800.425	1815.477	1810.694	1806.130	1806.730
20	1258.239	1256.836	1255.578	1247.774	1246.591	1253.090	1249.169
25	768.607	767.489	767.272	766.582	760.600	759.809	765.341
30	441.572	442.994	441.896	448.480	440.284	459.367	456.941
35	253.058	251.228	251.582	250.033	248.472	250.118	246.275
40	122.891	122.158	117.280	118.236	116.762	117.270	112.330
45	51.609	51.359	51.073	51.050	50.047	50.366	50.083
50	35.708	35.691	35.614	35.666	35.781	35.743	35.592
55	23.401	22.986	22.874	22.444	22.436	22.610	22.429
60	17.967	17.845	17.953	17.900	17.867	17.962	17.845
65	14.194	14.254	14.201	14.257	14.289	14.261	14.088
70	10.331	10.303	10.358	10.344	10.329	10.380	10.284
75	6.872	6.846	6.965	6.881	6.863	6.882	6.886
80	3.953	3.906	3.977	3.935	4.028	3.949	3.941
85	1.482	1.504	1.505	1.507	1.530	1.512	1.495
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	0.045	0.045	0.000	0.045	0.000
135	0.090	0.000	0.090	0.045	0.000	0.135	0.000
140	0.180	0.180	0.180	0.135	0.180	0.090	0.068
145	0.269	0.292	0.382	0.292	0.406	0.271	0.272
150	0.719	0.718	0.719	0.719	0.720	0.699	0.681
155	1.347	1.392	1.371	1.372	1.350	1.354	1.271
160	2.156	2.132	2.135	2.159	2.092	2.121	2.041
165	2.830	2.828	2.853	2.856	2.835	2.798	2.765
170	3.324	3.300	3.325	3.328	3.330	3.317	3.263
175	3.638	3.614	3.595	3.643	3.645	3.633	3.624
180	3.814	3.814	3.814	3.814	3.814	3.814	3.814

**Appendix A Product Photo**



Picture 1



Picture 2

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