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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  
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For products:

LED STRIP LIGHT

Models No.:

BLU-FLEXI-HE-18W-830-IP20-5M

**Test Date:** Sep. 16, 2019

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**Test Note:**

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## 1. General

### 1.1 Product Information

Brand Name	BLUi
Product Type	LED STRIP LIGHT
Model Number	BLU-FLEXI-HE-18W-830-IP20-5M
Rated Inputs	24VDC
Rated Power	18W
Rated Light output	2230lm
Declared CCT	3000K
Power Supply	Integrated in luminaire
LED Package, Array or Module	N/A
Receipt Samples	1 unit
Sample Code of lab.	190906101001
Date of Receipt Samples	Sep. 6, 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	23.60 V	23.58 V
Input Current(A)	0.763	0.763
Total Power(W)	18.01	18.00
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)	-	2388.00
Luminaire Efficacy(Lm/W)	-	132.67
Correlated Color Temperature (CCT)(K)	3057	-
Color Rendering Index (CRI)	87.0	-
R9	30	-
Chromaticity Coordinate (x,y)	x = 0.4297 y = 0.3958	-
Chromaticity Coordinate (u,v)	u = 0.2495 v = 0.3447	-
Chromaticity Coordinate (u',v')	u' = 0.2495 v' = 0.5170	-
Duv	-0.0023	-
Zone Lumens between 0-60 °	-	78.20%
Beam Angle(50%Imax)	-	C0/180=115.4° C90/270=115.4°

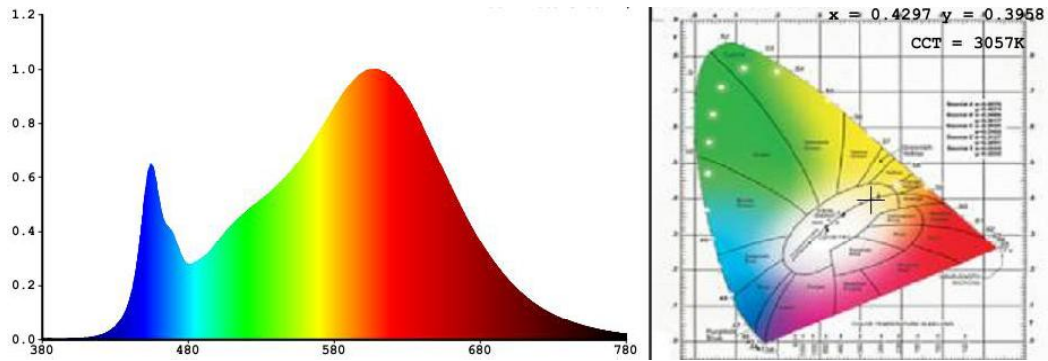
#### 3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
87	96	94	84	88	94	84	68
R9	R10	R11	R12	R13	R14	R15	-
30	90	84	77	90	98	81	-

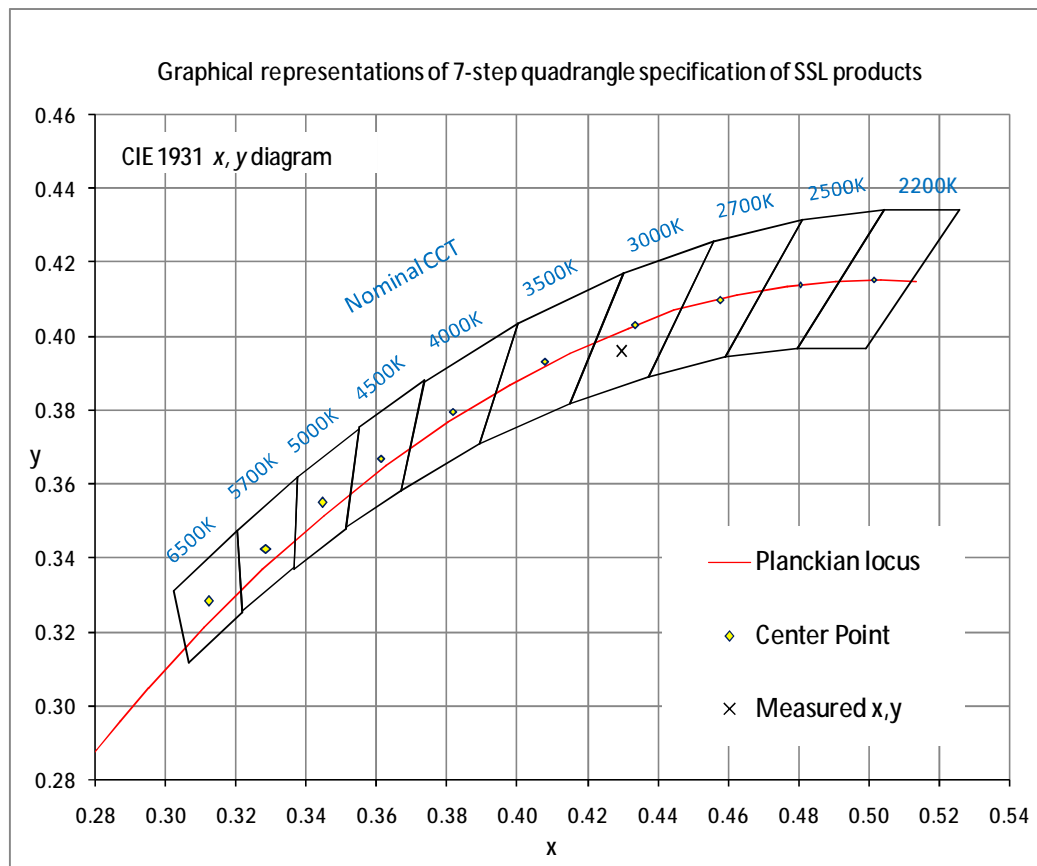
Note: N/A

## 4. Test Data

### 4.1 Spectral Distribution



### 4.2 ANSI Chromaticity Quadrangles Diagram



#### 4.3 Goniometry Test Data

CIE Type	Direct	Basic Luminous Shape	Rectangular
Spacing Criteria (0-180)	1.28	Luminous Length	1.00 m
Spacing Criteria (90-270)	1.28	Luminous Width	0.02 m
Spacing Criteria (Diagonal)	1.40	Luminous Height	0.00 m
Test Distance	30.00 m		

#### 4.4 Zonal Lumen Summary

Zone	Lumens	%Lamp	%Fixt
0-20	296.50	12.40	12.40
0-30	632.71	26.50	26.50
0-40	1042.66	43.70	43.70
0-60	1866.4	78.20	78.20
0-80	2332.88	97.70	97.70
0-90	2377.17	99.50	99.50
10-90	2300.7	96.30	96.30
20-40	746.16	31.20	31.20
20-50	1176.78	49.30	49.30
40-70	1123.23	47.00	47.00
60-80	466.48	19.50	19.50
70-80	166.99	7.00	7.00
80-90	44.29	1.90	1.90
90-110	4.10	0.20	0.20
90-120	5.19	0.20	0.20
90-130	6.25	0.30	0.30
90-150	8.31	0.30	0.30
90-180	10.83	0.50	0.50
110-180	6.73	0.30	0.30
0-180	2388.00	100.00	100.00

Total Luminaire Efficiency = 100.00%

#### ZONAL LUMEN SUMMARY

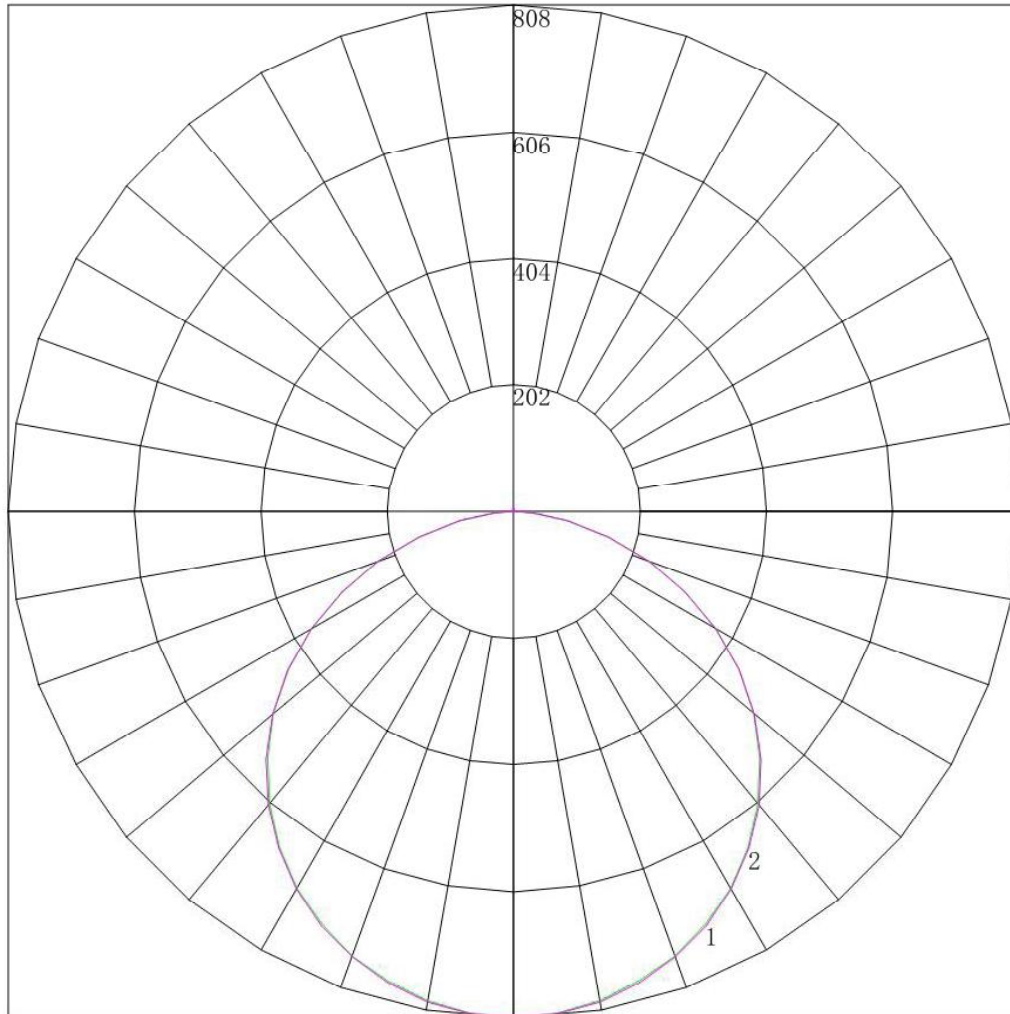
Zone	Lumens
0-10	76.48
10-20	220.02
20-30	336.22
30-40	409.95
40-50	430.62
50-60	393.12
60-70	299.49
70-80	166.99
80-90	44.29
90-100	2.85
100-110	1.25
110-120	1.09
120-130	1.06
130-140	0.99
140-150	1.07
150-160	1.17
160-170	0.97
170-180	0.39





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4.5 Polar Curves



Maximum Candela = 807.798 Located At Horizontal Angle = 0, Vertical Angle = 0  
# 1 - Vertical Plane Through Horizontal Angles (0 - 180)  
# 2 - Vertical Plane Through Horizontal Angles (90 - 270)



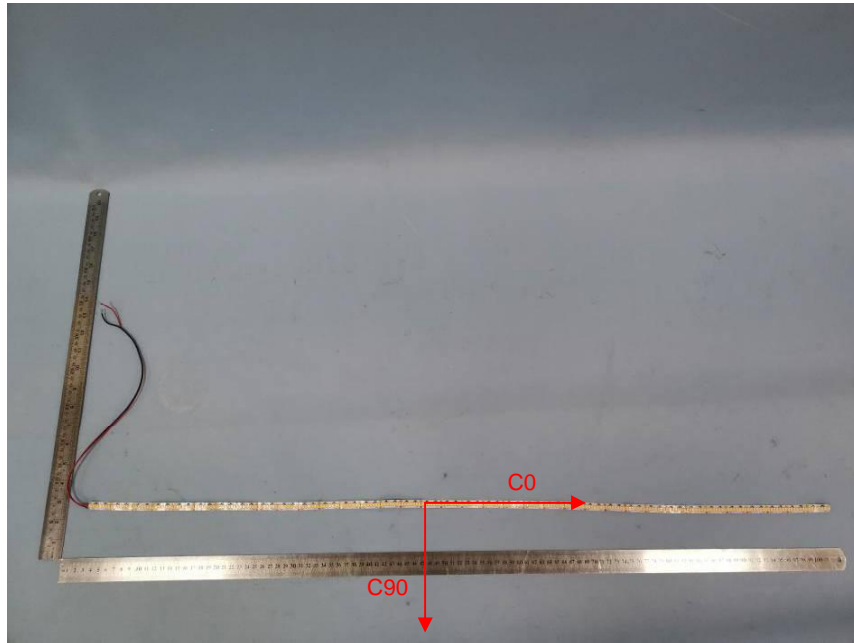
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4.6 Candela Tabulation

	<u>0</u>	<u>15</u>	<u>30</u>	<u>45</u>	<u>60</u>	<u>75</u>	<u>90</u>
<b>0</b>	807.798	807.798	807.798	807.798	807.798	807.798	807.798
<b>5</b>	803.089	803.781	804.283	803.484	804.794	805.460	804.185
<b>10</b>	792.829	794.178	795.007	795.114	795.486	795.745	794.375
<b>15</b>	774.972	778.974	780.120	779.596	779.664	780.330	778.051
<b>20</b>	754.051	757.016	757.204	757.728	760.117	758.242	755.576
<b>25</b>	725.534	728.357	729.094	729.366	731.279	730.478	728.489
<b>30</b>	693.464	694.870	693.922	695.603	696.552	696.695	694.887
<b>35</b>	652.643	655.269	655.037	656.035	656.597	656.443	655.042
<b>40</b>	607.247	608.621	609.590	608.615	610.866	609.562	609.772
<b>45</b>	555.722	558.112	559.027	558.049	559.421	560.257	559.119
<b>50</b>	501.264	502.759	500.932	501.240	502.126	503.745	502.222
<b>55</b>	439.789	441.445	440.342	440.999	438.977	441.088	440.126
<b>60</b>	373.028	374.525	373.153	373.323	372.553	375.366	372.828
<b>65</b>	302.491	303.769	302.536	303.176	301.534	303.890	301.636
<b>70</b>	230.266	230.625	230.204	230.991	229.777	231.725	228.954
<b>75</b>	156.176	156.973	157.456	157.097	156.397	157.012	157.037
<b>80</b>	87.149	88.301	89.515	89.193	88.753	89.288	87.469
<b>85</b>	31.759	33.442	34.263	34.351	34.560	34.898	34.221
<b>90</b>	5.375	5.519	5.927	6.077	6.074	6.110	4.753
<b>95</b>	1.688	1.816	1.839	1.754	1.737	1.544	1.401
<b>100</b>	1.155	1.144	1.144	1.215	1.286	1.340	1.356
<b>105</b>	1.022	1.077	1.122	1.170	1.240	1.294	1.356
<b>110</b>	0.977	1.054	1.032	1.080	1.150	1.226	1.310
<b>115</b>	0.933	0.964	1.077	1.080	1.128	1.181	1.220
<b>120</b>	0.977	1.054	1.100	1.102	1.150	1.203	1.311
<b>125</b>	1.110	1.099	1.189	1.192	1.286	1.226	1.311
<b>130</b>	1.155	1.166	1.167	1.192	1.218	1.249	1.312
<b>135</b>	1.199	1.189	1.234	1.260	1.285	1.294	1.312
<b>140</b>	1.333	1.323	1.391	1.372	1.421	1.498	1.402
<b>145</b>	1.599	1.637	1.705	1.665	1.737	1.725	1.719
<b>150</b>	1.999	2.041	2.064	2.070	2.075	2.134	2.126
<b>155</b>	2.443	2.512	2.468	2.542	2.594	2.656	2.624
<b>160</b>	2.932	2.983	3.006	2.970	3.045	3.042	3.076
<b>165</b>	3.376	3.454	3.455	3.419	3.473	3.496	3.483
<b>170</b>	3.731	3.813	3.837	3.869	3.857	3.882	3.935
<b>175</b>	4.087	4.104	4.106	4.139	4.172	4.291	4.297
<b>180</b>	4.331	4.331	4.331	4.331	4.331	4.331	4.331

## Appendix A Product Photo



Picture 1



Picture 2

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