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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 Street Light

Models No.:

BLU-AXIS-150W-850-T2

Test Date: Jul. 15, 2020

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Jul. 16, 2020

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Jul. 16, 2020

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1. General

1.1 Product Information

Brand Name	BLUi
Product Type	LED Street Light
Model Number	BLU-AXIS-150W-850-T2
Rated Inputs	100-277VAC, 50/60Hz
Rated Power	150W
Rated Light output	19500lm
Declared CCT	5000K
Power Supply	Inventronics
LED Package, Array or Module	Lumileds SMD 3030
Receipt Samples	1 unit
Sample Code of lab.	200713105001
Date of Receipt Samples	Jul. 13, 2020
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	2020-01-06	2021-01-05
AC Power supply	LC-I-989	APW-120N	2020-01-06	2021-01-05
Power analyzer	LC-I-928	WT210	2019-12-29	2020-12-28
Power analyzer	LC-I-954	WT210	2019-12-26	2020-12-25
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	2019-08-01	2020-07-31
Luminous Flux Standard Lamp****	LC-PL-I-003	24V100W	2019-08-01	2020-07-31
Goniophotometer(with mirror)	LC-I-902	GMS2000	2020-04-23	2021-04-22
Wireless temperature transmitter	LC-I-PL-008	DWLR-DLR	2020-01-03	2021-01-02
Wireless temperature transmitter	LC-I-PL-009	DWLR-DLR	2020-01-03	2021-01-02

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 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	229.96 V~50Hz	230.03 V~50Hz
Input Current(A)	0.656	0.655
Total Power(W)	148.60	148.43
Power Factor	0.985	0.985
I-THD	-	-
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-	19465.79
Luminaire Efficacy(Lm/W)	-	131.14
Correlated Color Temperature (CCT)(K)	4956	-
Color Rendering Index (CRI)	73.8	-
R9	-15	-
Chromaticity Coordinate (x,y)	x = 0.3467 y = 0.3572	-
Chromaticity Coordinate (u,v)	u = 0.2104 v = 0.3251	-
Chromaticity Coordinate (u',v')	u' = 0.2104 v' = 0.4876	-
Duv	0.0021	-
Zone Lumens between 0-60 °	-	86.60%
Beam Angle(50%Imax)	-	C0/180=129.2° C90/270=56.5°

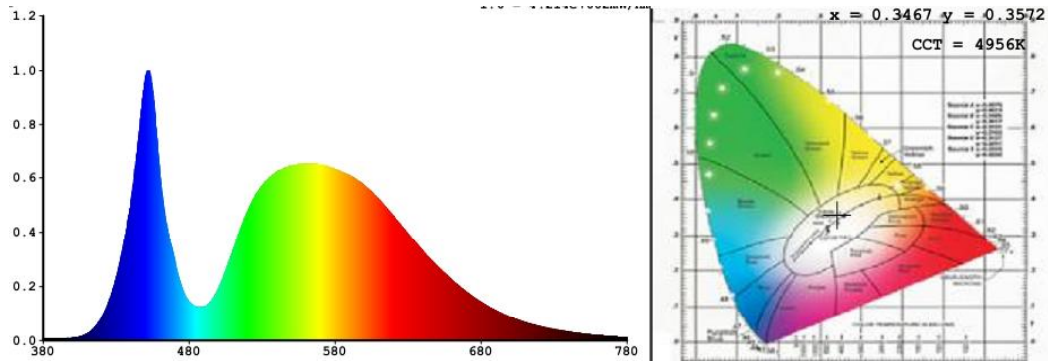
3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
72	79	81	73	71	69	84	62
R9	R10	R11	R12	R13	R14	R15	-
-15	46	68	38	73	89	68	-

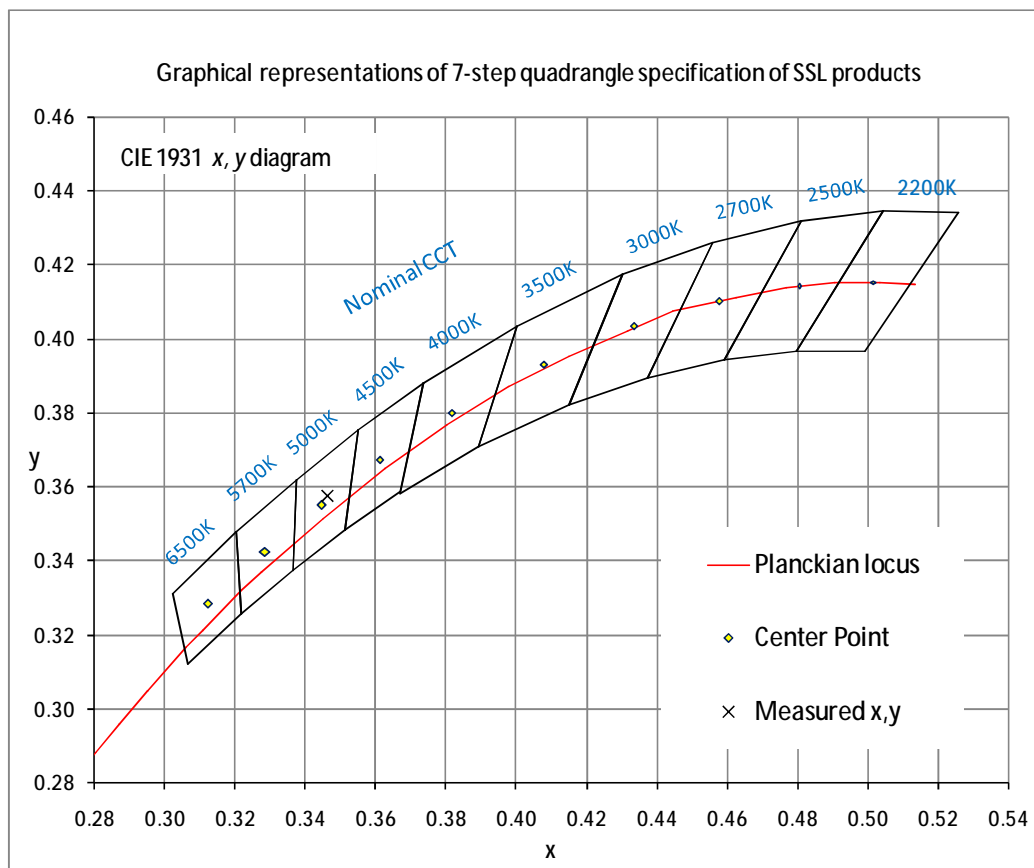
Note: N/A

4. Test Data

4.1 Spectral Distribution



4.2 ANSI Chromaticity Quadrangles Diagram





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4.3 Goniometry Test Data

CIE Type	Direct	Basic Luminous Shape	Rectangular
Spacing Criteria (0-180)	1.52	Luminous Length	0.30 m
Spacing Criteria (90-270)	2.00	Luminous Width	0.14 m
Spacing Criteria (Diagonal)	1.56	Luminous Height	0.00 m
Test Distance	30.02 m		

4.4 Zonal Lumen Summary

Zone	Lumens	%Lamp	%Fixt
0-20	2355.75	12.10	12.10
0-30	5314.1	27.30	27.30
0-40	9200.87	47.30	47.30
0-60	16861.55	86.60	86.60
0-80	19371.58	99.50	99.50
0-90	19465.73	100.00	100.00
10-90	18882.49	97.00	97.00
20-40	6845.12	35.20	35.20
20-50	11087.58	57.00	57.00
40-70	9552.76	49.10	49.10
60-80	2510.02	12.90	12.90
70-80	617.95	3.20	3.20
80-90	94.15	0.50	0.50
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	0.00	0.00	0.00
110-180	0.00	0.00	0.00
0-180	19465.73	100.00	100.00

Total Luminaire Efficiency = 100.00%

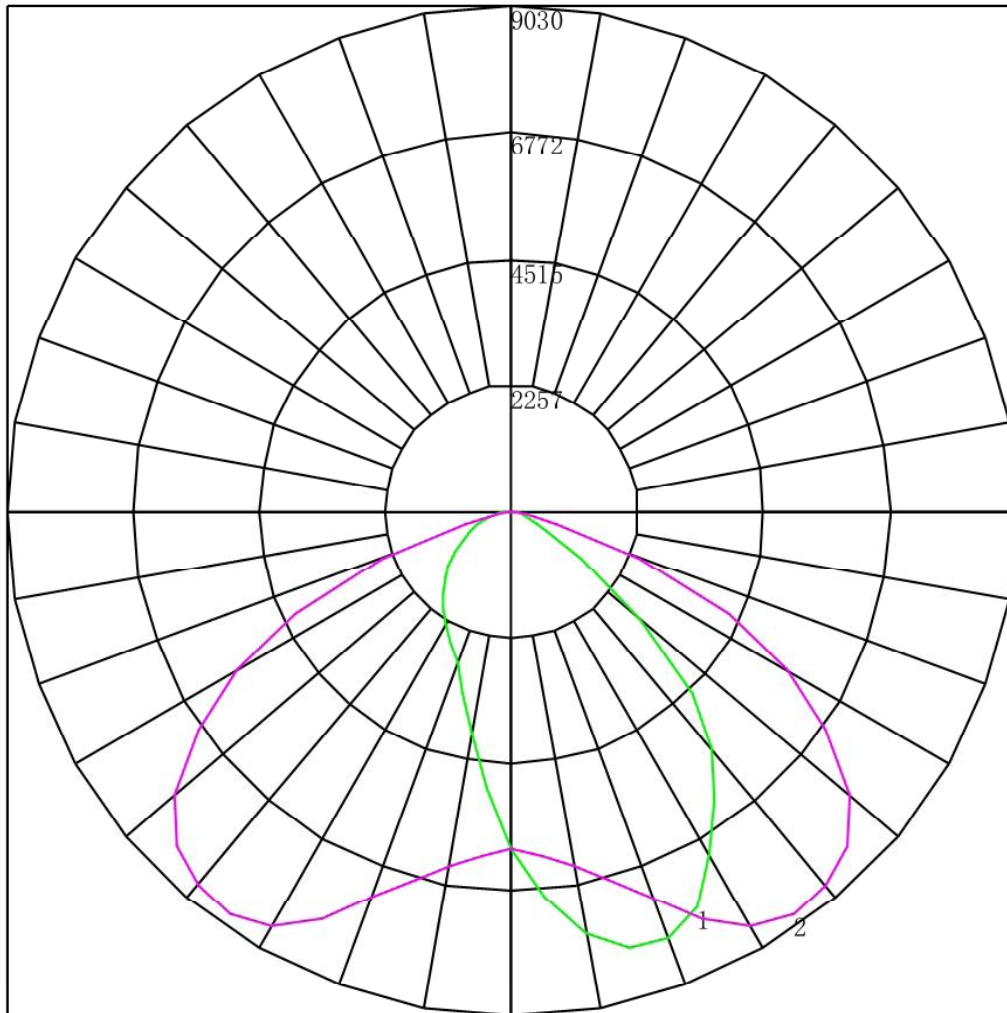
ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	583.24
10-20	1772.51
20-30	2958.35
30-40	3886.76
40-50	4242.46
50-60	3418.22
60-70	1892.07
70-80	617.95
80-90	94.15
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	0.00
160-170	0.00
170-180	0.00



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4.5 Polar Curves



Maximum Candela = 9029.578 Located At Horizontal Angle = 75, Vertical Angle = 40
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>	<u>105</u>	<u>120</u>	<u>135</u>
0	6051.076	6051.076	6051.076	6051.076	6051.076	6051.076	6051.076	6051.076	6051.076	6051.076
5	6940.145	6934.737	6833.803	6748.189	6637.792	6426.010	6200.259	6018.217	5698.290	5409.906
10	7678.228	7656.149	7523.672	7383.085	7135.254	6824.791	6440.880	6044.802	5460.373	4897.123
15	8072.052	8065.745	8004.913	7898.121	7673.722	7293.866	6834.253	6239.011	5361.241	4501.496
20	8154.062	8188.308	8232.466	8243.280	8134.686	7830.981	7370.468	6608.052	5413.511	4219.421
25	7815.210	7899.923	8105.396	8351.425	8512.739	8383.417	8030.597	7067.214	5579.782	4059.908
30	7090.645	7261.874	7689.492	8255.446	8767.779	8864.658	8593.396	7439.410	5692.883	3938.697
35	6327.328	6540.913	7157.334	8026.542	8787.155	9024.621	8806.981	7605.231	5770.386	3755.753
40	5577.530	5855.099	6615.712	7672.370	8669.548	9029.578	8733.083	7522.771	5617.182	3456.554
45	4596.122	5017.434	6036.691	7321.352	8515.894	8954.779	8487.505	6983.402	5270.220	3208.274
50	3007.306	3502.515	4825.928	6695.018	8176.592	8618.180	7908.484	5943.867	4625.411	2607.623
55	1490.586	1812.765	2943.771	5355.834	7252.411	7695.801	6863.092	4386.142	3498.460	2017.562
60	720.960	771.428	1250.416	3192.953	5782.102	6537.759	5691.081	3328.133	2200.731	1412.947
65	508.277	521.795	564.151	1268.890	3569.205	5473.892	4295.121	2487.674	1276.686	954.236
70	372.917	379.360	405.856	492.506	1596.927	3201.064	2445.723	1289.663	782.963	671.124
75	228.815	244.315	269.955	321.864	593.801	1184.177	852.626	510.125	481.061	457.990
80	103.548	117.607	141.759	179.384	271.577	384.497	284.239	256.527	260.672	241.116
85	29.289	25.189	28.478	46.998	85.299	127.385	91.517	68.717	66.418	52.675
90	0.000	0.000	0.000	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	0.000	0.000	0.000
100	0.000	0.000	0.000	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	0.000	0.000	0.000
110	0.000	0.000	0.000	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	0.000	0.000	0.000
120	0.000	0.000	0.000	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	0.000	0.000	0.000
130	0.000	0.000	0.000	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	0.000	0.000	0.000
140	0.000	0.000	0.000	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	0.000	0.000	0.000
150	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
155	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
160	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
165	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
170	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
175	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
180	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Vert. Angles Horizontal Angles

	<u>150</u>	<u>165</u>	<u>180</u>
0	6051.076	6051.076	6051.076
5	5210.741	5027.797	4995.354
10	4433.455	4163.546	4060.809
15	3825.596	3467.819	3360.577
20	3399.779	3007.757	2881.138
25	3107.790	2693.688	2581.038
30	2905.020	2475.147	2342.220
35	2695.491	2261.112	2134.043
40	2428.735	2032.657	1924.063
45	2113.766	1766.623	1704.260
50	1783.881	1545.108	1476.076
55	1459.314	1286.959	1249.424
60	1206.482	1043.320	1030.973
65	857.898	838.071	829.645
70	645.485	643.232	640.393
75	456.007	482.683	414.372
80	254.499	211.106	181.682



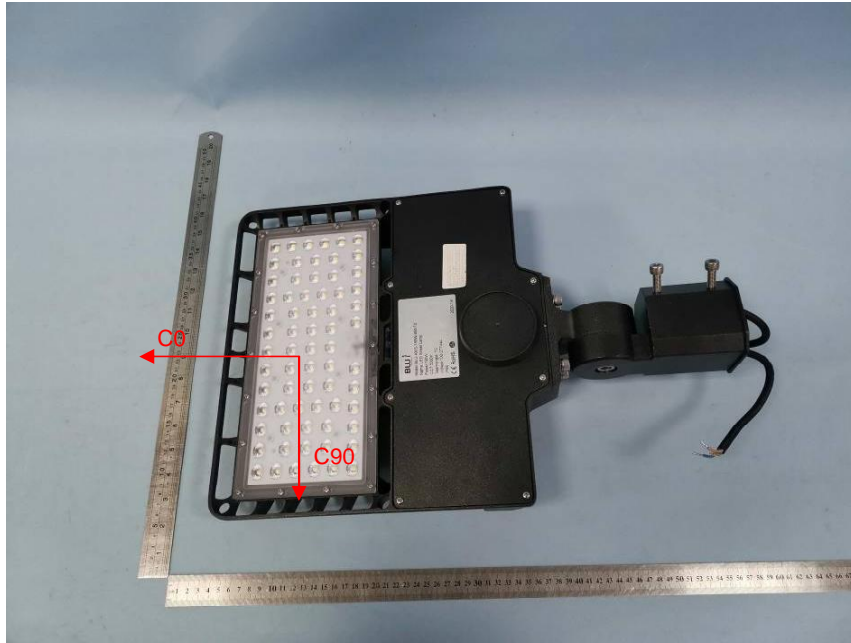
CANDELA TABULATION - (Cont.)

85	47.628	33.254	30.551
90	0.000	0.000	0.000
95	0.000	0.000	0.000
100	0.000	0.000	0.000
105	0.000	0.000	0.000
110	0.000	0.000	0.000
115	0.000	0.000	0.000
120	0.000	0.000	0.000
125	0.000	0.000	0.000
130	0.000	0.000	0.000
135	0.000	0.000	0.000
140	0.000	0.000	0.000
145	0.000	0.000	0.000
150	0.000	0.000	0.000
155	0.000	0.000	0.000
160	0.000	0.000	0.000
165	0.000	0.000	0.000
170	0.000	0.000	0.000
175	0.000	0.000	0.000
180	0.000	0.000	0.000



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Appendix A Product Photo



Picture 1



Picture 2

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