LCTECH

NVLAP TESTING
NVLAP LAB CODE 500080-0

IESNA SUSTAINING MEMBER

Ref. No.: LCZP19080135
Version: 1.0
Date of Issue: Aug. 20, 2019
Total pages: 11

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 PANEL LIGHT

Models No.:

BLU-PLANE-2X2-36W-840

Test Date:	Aug. 14, 2019 to Aug. 15, 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	**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 PANEL LIGHT
Model Number	BLU-PLANE-2X2-36W-840
Rated Inputs	100-240VAC, 50/60Hz
Rated Power	36W
Rated Light output	2750lm
Declared CCT	4000K
Power Supply	BLUi LED driver
LED Package, Array or Module	Samsung
Receipt Samples	1 unit
Sample Code of lab.	190812105005
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 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	230.02 V~50Hz
Input Current(A)	0.160	0.160
Total Power(W)	35.27	35.22
Power Factor	0.960	0.960
I-THD	-	-
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-	3585.69
Luminaire Efficacy(Lm/W)	-	101.81
Correlated Color Temperature (CCT)(K)	4125	-
Color Rendering Index (CRI)	81.3	-
R9	4	-
Chromaticity Coordinate (x,y)	x = 0.3755 y = 0.3751	-
Chromaticity Coordinate (u,v)	u = 0.2225 v = 0.3334	-
Chromaticity Coordinate (u',v')	u' = 0.2225 v' = 0.5001	-
Duv	0.0007	-
Zone Lumens between 0-60 °	-	77.70%
Beam Angle(50%Imax)	-	C0/180=112.9° C90/270=112.3°

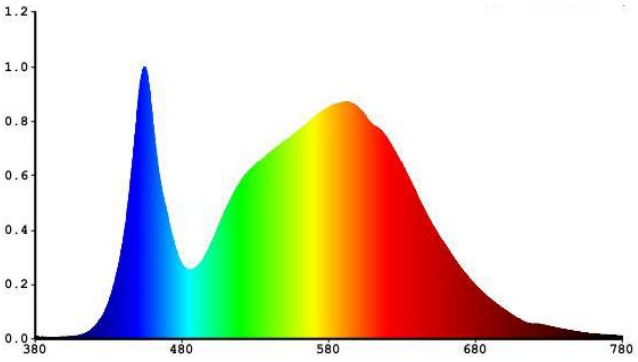
3.3 Color Rendering Details

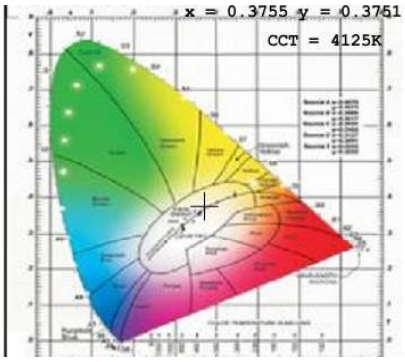
R1	R2	R3	R4	R5	R6	R7	R8
79	88	94	79	79	83	86	63
R9	R10	R11	R12	R13	R14	R15	-
4	71	76	56	82	96	74	-

Note: N/A

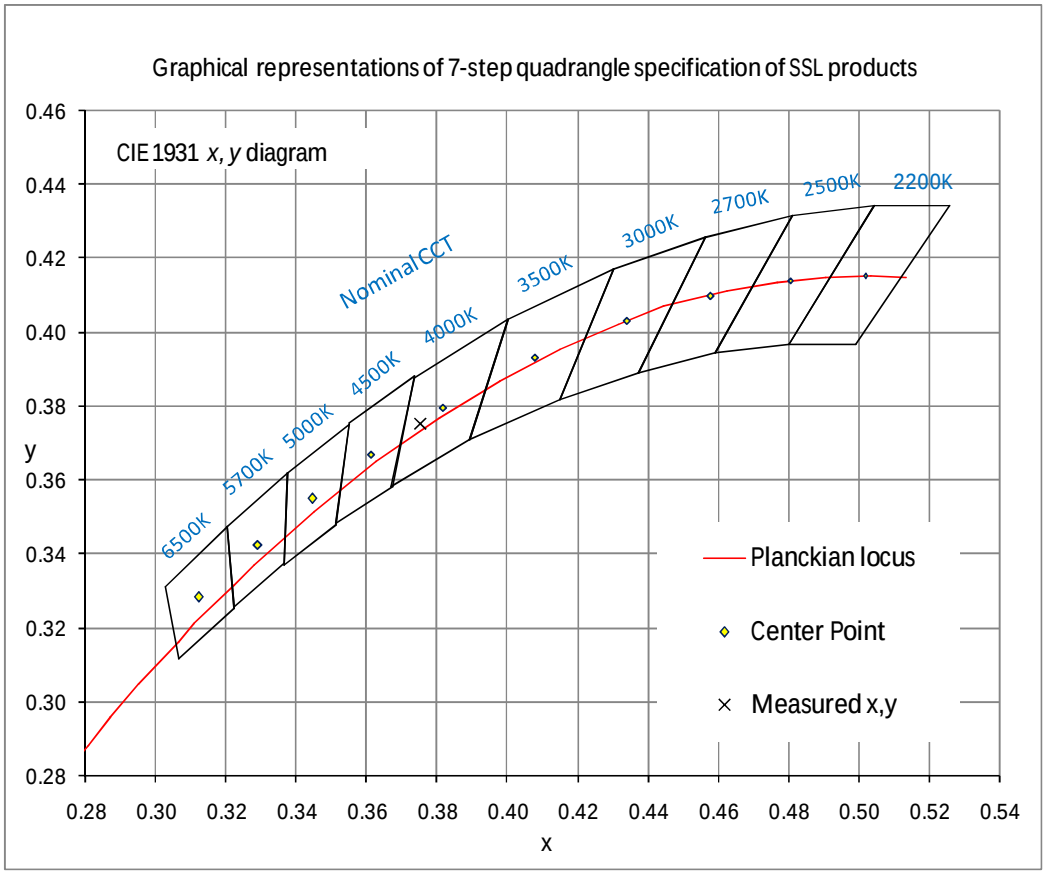
4. Test Data

4.1 Spectral Distribution





4.2 ANSI Chromaticity Quadrangles Diagram



4.3 Goniometry Test Data

CIE Type	Direct	Basic Luminous Shape	Rectangular
Spacing Criteria (0-180)	1.26	Luminous Length	0.24 m
Spacing Criteria (90-270)	1.26	Luminous Width	0.24 m
Spacing Criteria (Diagonal)	1.38	Luminous Height	0.00 m
Test Distance	30.00 m		

4.4 Zonal Lumen Summary

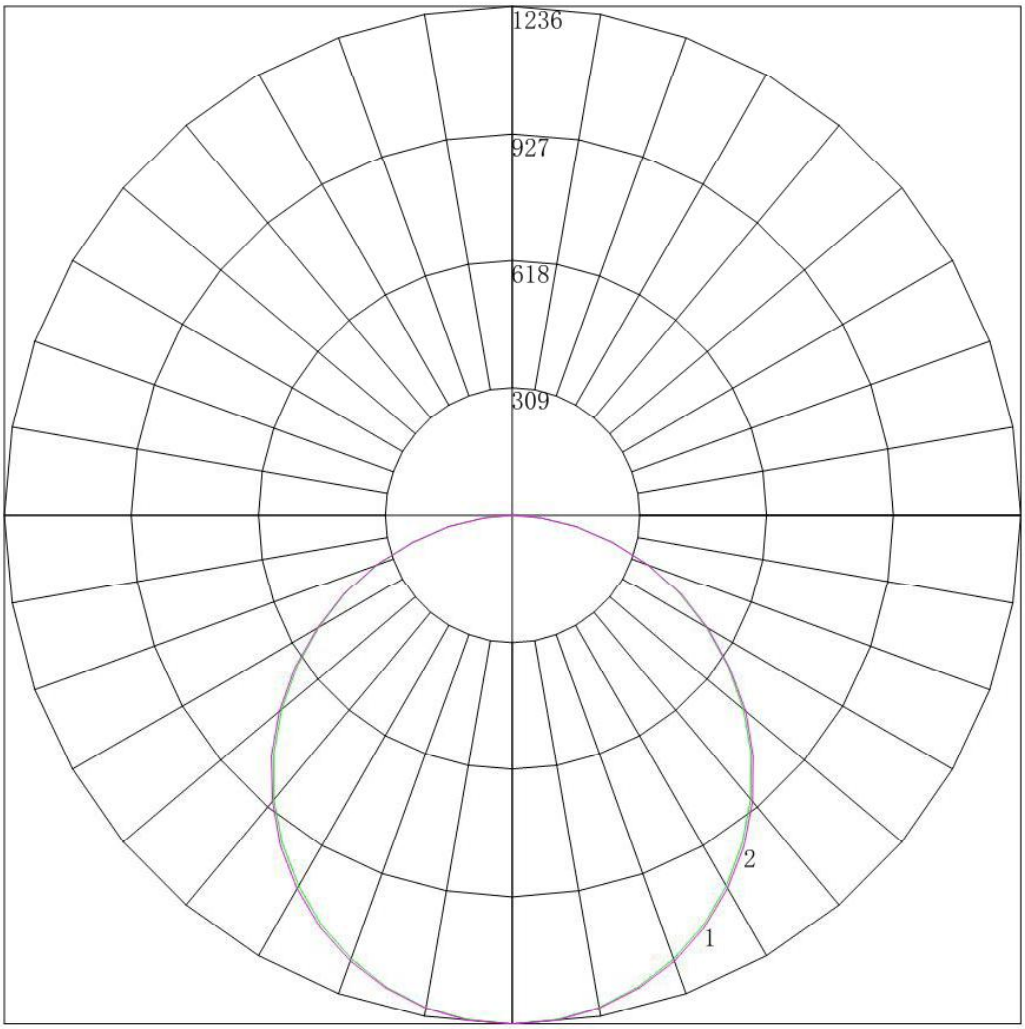
Zone	Lumens	%Lamp	%Fixt
0-20	451.97	12.60	12.60
0-30	959.81	26.80	26.80
0-40	1572.24	43.80	43.80
0-60	2784.65	77.70	77.70
0-80	3494.86	97.50	97.50
0-90	3576.62	99.70	99.70
10-90	3459.64	96.50	96.50
20-40	1120.27	31.20	31.20
20-50	1756.29	49.00	49.00
40-70	1656.55	46.20	46.20
60-80	710.21	19.80	19.80
70-80	266.08	7.40	7.40
80-90	81.75	2.30	2.30
90-110	3.87	0.10	0.10
90-120	4.89	0.10	0.10
90-130	5.89	0.20	0.20
90-150	7.47	0.20	0.20
90-180	9.07	0.30	0.30
110-180	5.20	0.10	0.10
0-180	3585.69	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	116.97
10-20	335.00
20-30	507.84
30-40	612.42
40-50	636.02
50-60	576.40
60-70	444.13
70-80	266.08
80-90	81.75
90-100	2.64
100-110	1.23
110-120	1.02
120-130	1.00
130-140	0.82
140-150	0.76
150-160	0.75
160-170	0.61
170-180	0.24

4.5 Polar Curves

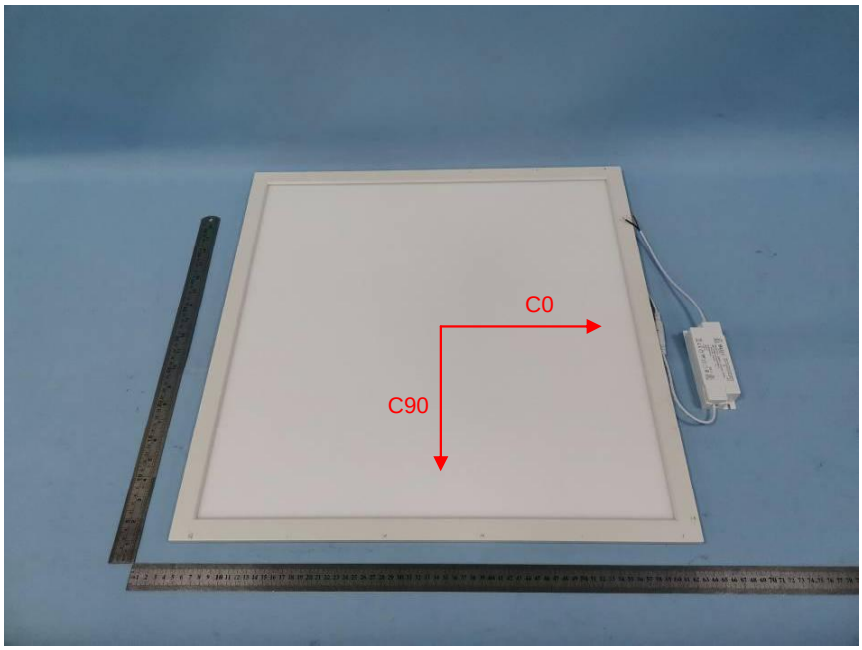


Maximum Candela = 1236.416 Located At Horizontal Angle = 0, Vertical Angle = 0
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)

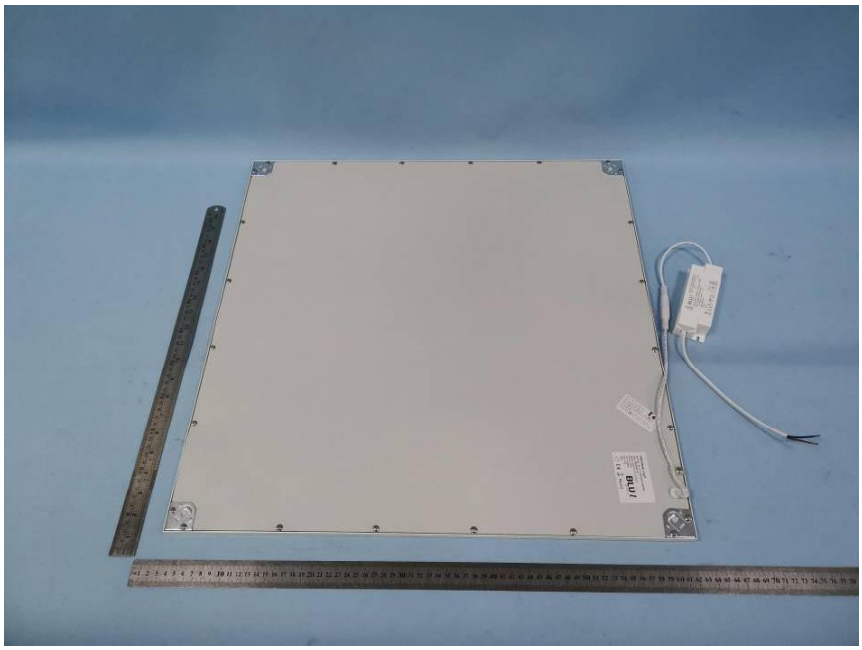
4.6 Candela Tabulation

	0	15	30	45	60	75	90
0	1236.416	1236.416	1236.416	1236.416	1236.416	1236.416	1236.416
5	1230.970	1230.431	1230.969	1230.656	1230.902	1231.150	1232.097
10	1214.091	1213.847	1213.929	1214.210	1214.540	1214.719	1215.906
15	1186.095	1186.214	1186.737	1186.807	1187.442	1187.463	1188.877
20	1147.027	1147.262	1148.156	1149.303	1149.946	1151.203	1153.172
25	1099.632	1099.534	1100.570	1102.461	1102.953	1104.929	1105.370
30	1040.939	1042.468	1042.810	1045.271	1046.551	1047.512	1047.766
35	975.360	975.951	977.959	979.238	980.652	982.286	982.562
40	902.354	901.805	903.992	905.016	906.674	907.517	908.724
45	821.067	821.472	823.205	824.968	827.068	826.761	828.820
50	732.758	734.478	736.744	739.047	738.303	741.166	741.089
55	640.848	642.466	644.388	646.488	646.341	647.265	646.660
60	543.582	544.941	547.190	548.913	548.236	550.236	549.441
65	447.036	445.975	447.787	448.728	450.355	448.908	452.722
70	349.860	347.617	348.945	349.399	348.086	349.268	350.470
75	252.594	251.778	250.894	251.284	249.124	251.137	251.503
80	157.309	159.070	157.974	156.566	156.443	156.628	156.719
85	69.990	68.768	67.867	69.227	67.227	67.973	69.666
90	4.771	5.018	5.154	6.547	6.145	6.010	10.064
95	1.170	1.193	1.193	1.260	1.193	1.170	1.260
100	1.260	1.215	1.216	1.215	1.193	1.193	1.215
105	1.215	1.193	1.216	1.192	1.170	1.148	1.170
110	1.170	1.058	1.058	1.080	1.013	1.035	1.035
115	1.035	1.013	1.058	1.012	0.968	0.945	1.035
120	1.035	1.035	1.080	1.057	1.013	0.990	1.080
125	1.170	1.125	1.148	1.147	1.103	1.148	1.214
130	1.125	1.170	1.148	1.147	1.170	1.170	1.124
135	0.990	0.990	1.013	1.057	0.990	0.990	1.034
140	1.035	1.058	1.035	1.057	1.013	1.013	1.034
145	1.215	1.260	1.238	1.192	1.215	1.215	1.259
150	1.440	1.373	1.396	1.417	1.395	1.373	1.439
155	1.575	1.620	1.621	1.620	1.620	1.576	1.573
160	1.890	1.935	1.891	1.912	1.913	1.891	1.933
165	2.205	2.183	2.183	2.182	2.206	2.161	2.203
170	2.431	2.408	2.386	2.407	2.386	2.431	2.428
175	2.521	2.610	2.634	2.610	2.566	2.588	2.563
180	2.642	2.642	2.642	2.642	2.642	2.642	2.642

Appendix A Product Photo



Picture 1



Picture 2

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