LCTECH

NVLAP LAB CODE 500080-0

IESNA SUSTAINING MEMBER

Ref. No.: LCZP16070079
Version: 1.0
Date of Issue: Jul. 18, 2016
Total pages: 11

Test report of

IES LM-79-08

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

Rendered to:
LIGHT EFFICIENT DESIGN, DIV OF TADD LLC.
188 S. Northwest Highway Cary, IL 60013

For products:
LED Lamp

Models No.:
LED-8081E27

Test Date:	Jul. 14, 2016
Test Item:	Total luminous flux, Luminous Efficacy, Electrical values, Luminous Intensity Distribution, Chromaticity coordinates, CCT and CRI, Spectral Power Distribution.
Test Lab.:	**LCTECH (Zhongshan) Testing Service Co., Ltd** 2/F., 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
Template No.:	LC-RT-PL/LM79-08/01
Test Note:	

Complied by:		**Reviewed by:**	
Fish Tan	Fish Tan	**Richard Li**	
Project Engineer		**Technical Manager**	
Jul. 18, 2016		**Jul. 18, 2016**	

Table of Contents

1. General

1.1 Product Information

Brand Name	
Trade Mark	-
Product Type	LED Lamp
Model Number	LED-8081E27
Rated Inputs	120-277V, 60Hz
Rated Power	30 W
Rated Light output	N/A
Declared CCT	2700K
Power Supply	N/A
LED Package, Array or Module	SPMWH122BFD5WAV0S2(2700K) ,manufactured by SAMSUNG ELECTRONICS CO.,LTD
Receipt Samples	1 unit
Date of Receipt Samples	Jul. 6, 2016
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	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-923	CHP-500	2016-02-04	2017-02-03
AC Power supply	LC-I-987	APW-110N	2016-02-04	2017-02-03
Power analyzer	LC-I-928	WT210	2016-01-24	2017-01-24
Power analyzer	LC-I-954	WT210	2016-02-04	2017-02-03
Multimeter	LC-I-972	Fluke 17B	2015-08-17	2016-08-16
Photometric colorimetric electric system (2 meter sphere)	LC-I-900	SPR3000	Before use	Before use
Standard lamp	LC-I-917	24V100W	2015-10-09	2016-10-08
Luminous Flux Standard Lamp	LC-I-946	110V/200W	2015-10-17	2016-10-16
Goniophotometer(with mirror)	LC-I-902	GMS2000	2016-05-07	2017-05-07
Wireless temperature transmitter	LC-I-978	DWRF-B	2016-02-03	2017-02-02
Wireless temperature transmitter	LC-I-979	DWRF-B	2016-02-03	2017-02-02

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 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.

Spectral radiant flux was measured by a sphere (2 meter)-spectroradiometer system.

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	277.00V~60Hz	277.03V~60Hz
Input Current(A)	0.129	0.126
Total Power(W)	32.20	32.26
Power Factor	0.901	0.924
I-THD(%)	10.09	-
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-	2927.03
Luminaire Efficacy(Lm/W)	-	90.73
Correlated Color Temperature (CCT)(K)	2615	-
Color Rendering Index (CRI)	82.0	-
R9	14	-
Chromaticity Coordinate (x,y)	x=0.4653 y=0.4091	-
Chromaticity Coordinate (u,v)	u=0.2667 v=0.3517	-
Chromaticity Coordinate (u',v')	u'=0.2667 v'=0.5276	-
Duv	-0.000953	-
Spacing Criteria(0-180°)	-	1.26
Spacing Criteria(90-270°)	-	1.26
Zone Lumens between 0-60 °	-	67.14%

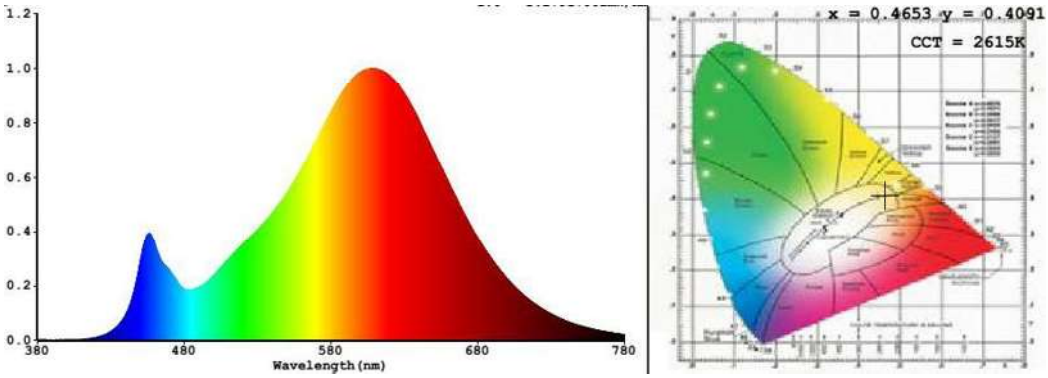
3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
81	92	94	77	80	91	81	59
R9	R10	R11	R12	R13	R14	R15	-
14	83	75	74	83	98	74	-

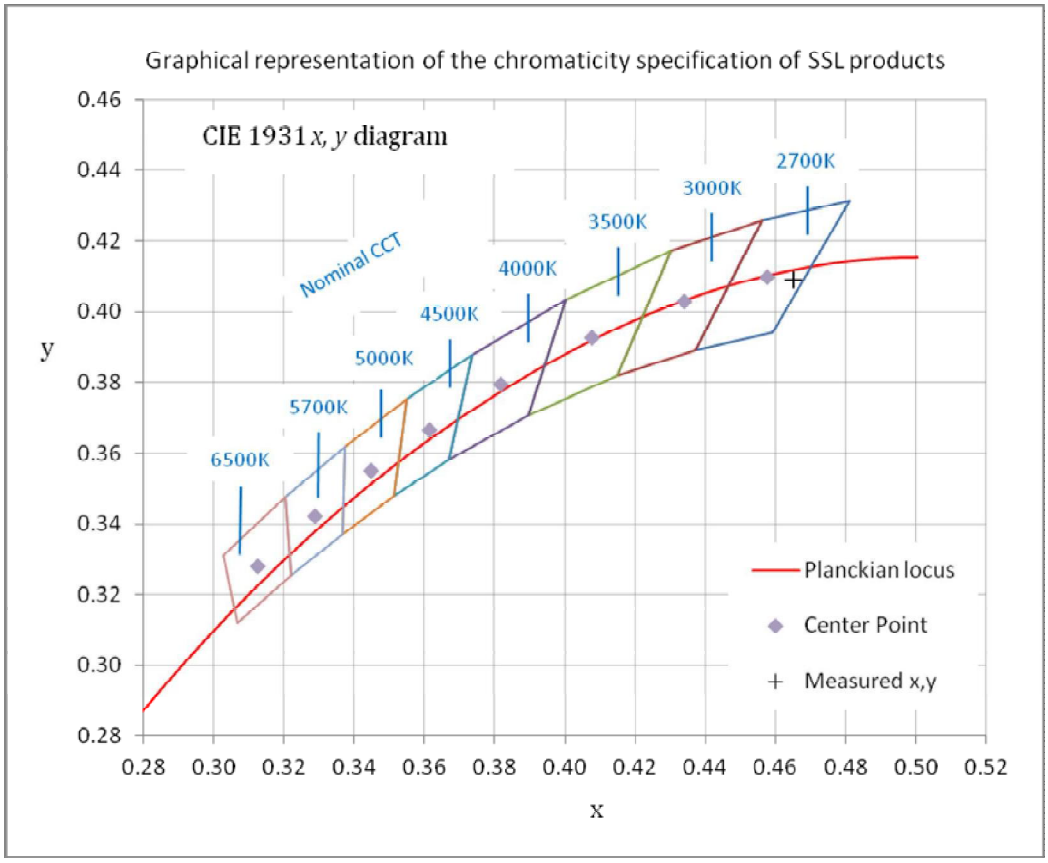
Note: N.A.

4. Test Data

4.1 Spectral Distribution



4.2 ANSI Chromaticity Quadrangles Diagram



4.3 Goniometry Test Data

CIE Type	Direct lighting	Basic Luminous Shape	Circular w/ Sides
Spacing Criteria (0-180°)	1.26	Luminous Diameter	125 mm
Spacing Criteria (90-270°)	1.26	Luminous Height	33mm
Spacing Criteria (Diagonal)	1.36		
Test Distance	29.54 m		

4.4 Zonal Lumen Summary

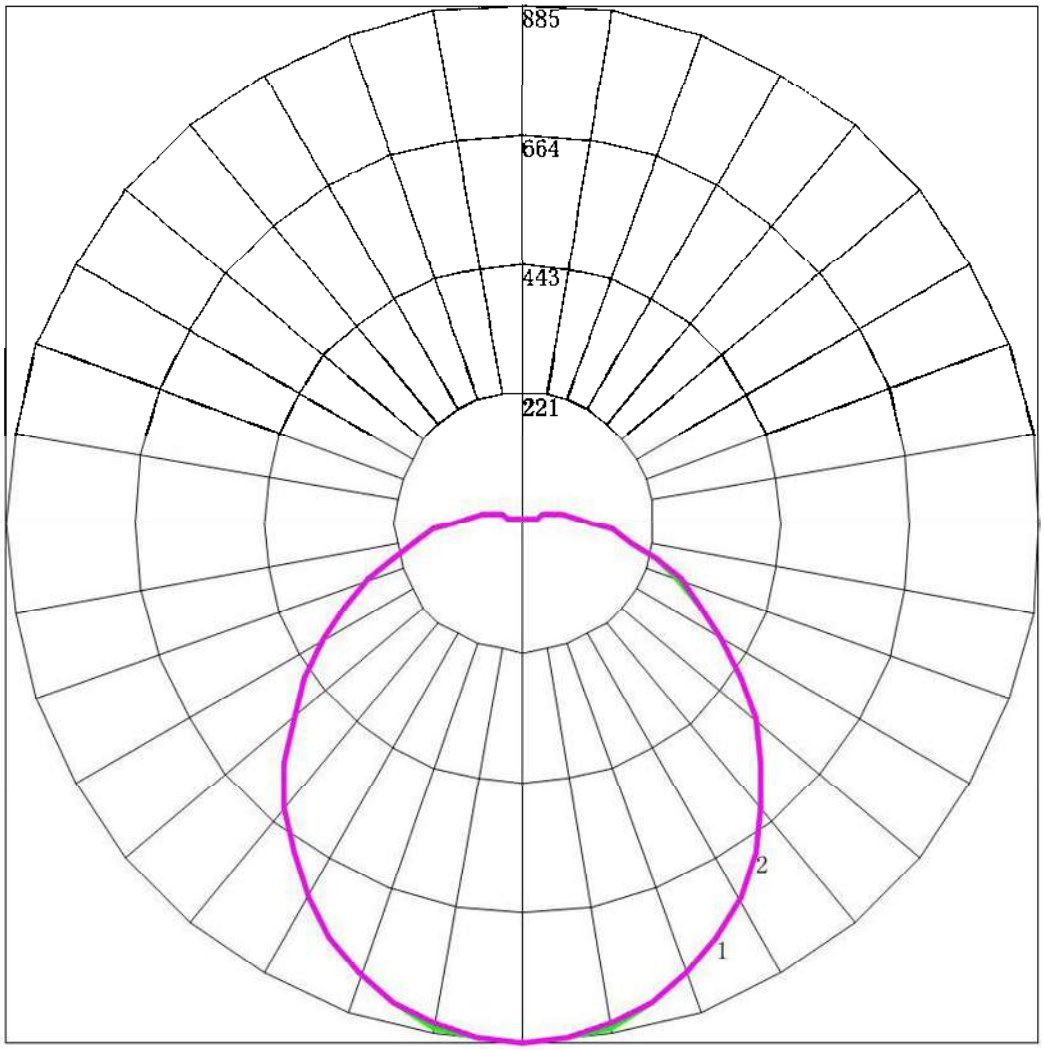
Zone	Lumens	%Lamp	%Fixt
0-20	322.55	11.00	11.00
0-30	682.54	23.30	23.30
0-40	1113.28	38.00	38.00
0-60	1965.11	67.10	67.10
0-80	2547.71	87.00	87.00
0-90	2714.48	92.70	92.70
10-90	2630.81	89.90	89.90
20-40	790.73	27.00	27.00
20-50	1235.37	42.20	42.20
40-70	1186.18	40.50	40.50
60-80	582.60	19.90	19.90
70-80	248.25	8.50	8.50
80-90	166.78	5.70	5.70
90-110	155.24	5.30	5.30
90-120	181.80	6.20	6.20
90-130	194.92	6.70	6.70
90-150	207.61	7.10	7.10
90-180	212.55	7.30	7.30
110-180	57.31	2.00	2.00
0-180	2927.03	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	83.67
10-20	238.88
20-30	360.00
30-40	430.74
40-50	444.64
50-60	407.19
60-70	334.35
70-80	248.25
80-90	166.78
90-100	100.76
100-110	54.48
110-120	26.56
120-130	13.13
130-140	7.75
140-150	4.93
150-160	2.86
160-170	1.56
170-180	0.52

4.5 Polar Curves



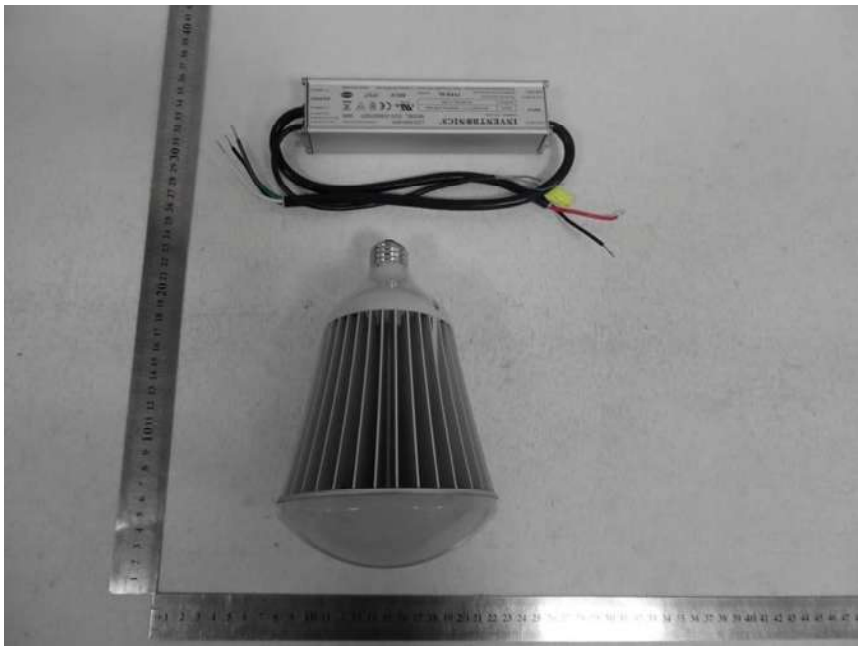
Maximum Candela = 885.208 Located At Horizontal Angle = 0, Vertical Angle = 0
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)

4.6 Candela Tabulation

	0	15	30	45	60	75	90
0	885.208	885.208	885.208	885.208	885.208	885.208	885.208
5	882.499	880.583	880.148	880.782	881.307	880.304	880.551
10	869.301	867.947	868.085	868.155	867.812	867.271	867.755
15	849.024	846.170	845.747	846.348	846.380	846.543	845.862
20	819.089	817.846	818.109	817.648	818.016	818.710	817.353
25	782.642	780.815	780.982	780.771	781.671	781.112	781.228
30	737.848	738.154	737.463	738.006	738.044	738.153	738.617
35	688.772	688.641	688.600	687.673	688.838	688.503	688.476
40	635.151	633.913	633.934	634.549	633.854	634.406	633.809
45	576.198	575.606	576.040	576.060	575.794	576.451	576.095
50	517.202	515.161	515.681	515.412	514.988	515.620	515.073
55	454.884	454.693	454.362	454.503	455.250	454.984	455.096
60	394.446	393.833	393.763	394.443	394.029	394.218	394.030
65	336.629	336.334	336.698	336.587	336.167	336.133	336.839
70	281.566	282.544	282.621	282.830	282.620	282.646	283.564
75	233.145	233.817	233.191	233.500	234.045	233.257	233.946
80	190.100	189.497	189.956	189.927	190.289	189.710	190.726
85	152.080	151.353	151.585	151.327	151.611	151.654	152.816
90	118.211	118.207	118.319	118.506	118.167	118.416	119.476
95	91.423	90.930	91.008	91.180	91.132	91.150	91.750
100	68.392	68.257	68.409	68.194	68.458	68.613	69.292
105	50.431	50.277	50.150	50.181	50.406	50.544	51.142
110	36.053	36.311	36.299	36.376	36.300	36.442	36.909
115	25.740	25.727	25.697	25.821	25.857	25.915	26.376
120	18.573	18.548	18.564	18.581	18.619	18.505	19.151
125	14.115	14.118	14.092	14.110	14.128	14.036	14.363
130	11.450	11.478	11.474	11.449	11.381	11.399	11.578
135	9.876	9.820	9.838	9.835	9.789	9.808	9.837
140	8.959	8.903	8.856	8.854	8.786	8.784	8.748
145	7.866	7.856	7.831	7.807	7.762	7.781	7.747
150	6.948	6.874	6.806	6.782	6.780	6.800	6.703
155	6.118	6.023	6.086	6.063	6.039	5.994	5.963
160	5.812	5.783	5.693	5.627	5.625	5.601	5.615
165	5.550	5.477	5.497	5.430	5.385	5.405	5.354
170	5.506	5.455	5.475	5.343	5.363	5.362	5.354
175	5.594	5.608	5.541	5.517	5.451	5.493	5.484
180	5.521	5.521	5.521	5.521	5.521	5.521	5.521

Appendix 1 Product Photo

Picture 1



Picture 2

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