



Ref. No.: LCZF18010293

Version: 1.0

Date of issue: Nov. 16, 2018

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, LLC

188 S. Northwest Highway , Cary, IL 60013, USA

For products:

LED Lamps

Models No.:

LED-8090M30C-G4

Test Date: Nov. 14, 2018 to Nov. 16, 2018

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-001 Rev.1.1

Test Note: /

Complied by:

Ray He

Project Engineer

Nov. 16, 2018

Reviewed by:

Richard Li

Technical Manager

Nov. 16, 2018

The duplication of this report or parts of it and its use for advertising purposes is only allowed with permission of the testing laboratory. This report contains the result of the examination of the product sample submitted by the applicant. A general statement concerning the quality of the products from the series manufacture cannot be derived therefore. This report must not be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Table of Contents

1. General	3
1.1 Product Information	3
1.2 Standards or methods	4
1.3 Equipment list	4
2. Test conducted and method	5
2.1 Ambient Condition	5
2.2 Power Supply Characteristics	5
2.3 Seasoning and Stabilization	5
2.4 Electrical Instrumentation	5
2.5 Color Measurement Method	5
2.6 Total Luminous Flux Measurement Method	5
2.7 Luminous Intensity Distribution Measurement Method	5
2.8 Spatial Non-uniformity of Chromaticity	5
3. Test Result Summary	6
3.1 Electrical data	6
3.2 Photometric data	6
3.3 Color Rendering Details	6
4. Test Data	7
4.1 Spectral Distribution	7
4.2 ANSI Chromaticity Quadrangles Diagram	7
4.3 Goniometry Test Data	8
4.4 Zonal Lumen Summary	8
4.5 Polar Curves	9
4.6 Candela Tabulation	10
Appendix A Product Photo	11

1. General

1.1 Product Information

Brand Name	Light Efficient Design
Product Type	LED Lamp
Model Number	LED-8090M30C-G4
Rated Inputs	220-347VAC, 50/60Hz
Rated Power	110W
Rated Light output	15000 lm
Declared CCT	3000K
Power Supply	Integrated in lamp
LED Package, Array or Module	Model: SPMWHT541MXXXXXXX, manufactured by SAMSUNG ELECTRONICS CO.,LTD.
Receipt Samples	1 unit
Sample Code of lab.	1811140102006
Date of Receipt Samples	Nov. 14, 2018
Note	-

1.2 Standards or methods

The following standards are partly or totally used or referenced for test:

No.	Name
ANSI/NEMA/ ANSLG C78.377-2015	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	2018-01-10	2019-01-09
AC Power supply	LC-I-989	APW-120N	2018-01-10	2019-01-09
Power analyzer	LC-I-928	WT210	2018-01-05	2019-01-05
Power analyzer	LC-I-954	WT210	2018-01-10	2019-01-09
Multimeter	LC-I-972	Fluke 17B	2018-08-01	2019-07-31
Photometric colorimetric electric system [*] (2 meter sphere)	LC-I-956	HAAS-2000	Before use	Before use
Standard lamp ^{**}	LC-PL-I-011	D204C	2018-08-09	2019-08-08
Luminous Flux Standard Lamp ^{***}	LC-PL-I-003	24V100W	2018-08-09	2019-08-08
Goniophotometer(with mirror)	LC-I-902	GMS2000	2018-05-06	2019-05-05
Wireless temperature transmitter	LC-I-978	DWRF-B	2018-02-11	2019-02-10
Wireless temperature transmitter	LC-I-979	DWRF-B	2018-02-11	2019-02-10

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 lamp 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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$; 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 (60 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	347.00 V~60Hz	347.00 V~60Hz
Input Current(A)	0.336	0.336
Total Power(W)	108.52	108.50
Power Factor	0.935	0.935
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	- ⁴	15540.33
Luminaire Efficacy(Lm/W)	-	143.23
Correlated Color Temperature (CCT)(K)	3112	-
Color Rendering Index (CRI)	84.1	-
R9	12	-
Chromaticity Coordinate (x,y)	x = 0.4266 y = 0.3957	-
Chromaticity Coordinate (u,v)	u = 0.2475 v = 0.3443	-
Chromaticity Coordinate (u',v')	u' = 0.2475 v' = 0.5165	-
Duv	-0.0019	-
Zone Lumens between 0-60 °	-	79.44%

3.3 Color Rendering Details

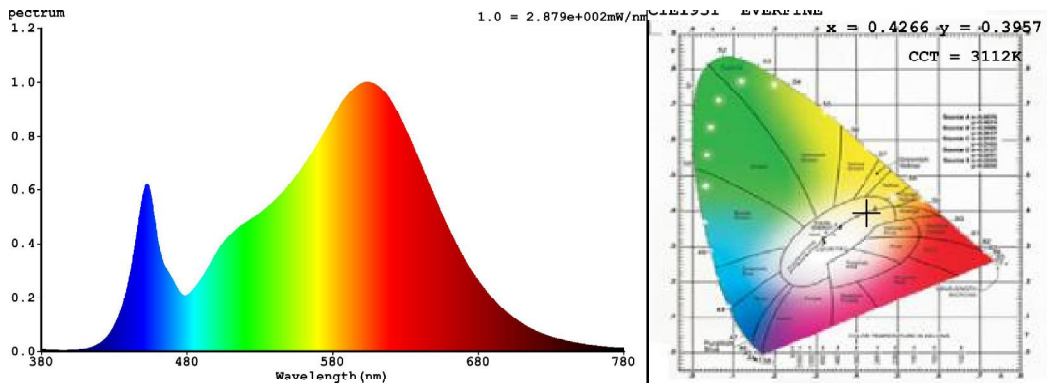
R1	R2	R3	R4	R5	R6	R7	R8
83	93	96	82	84	91	83	61
R9	R10	R11	R12	R13	R14	R15	-
12	83	82	76	86	98	76	-

Note:

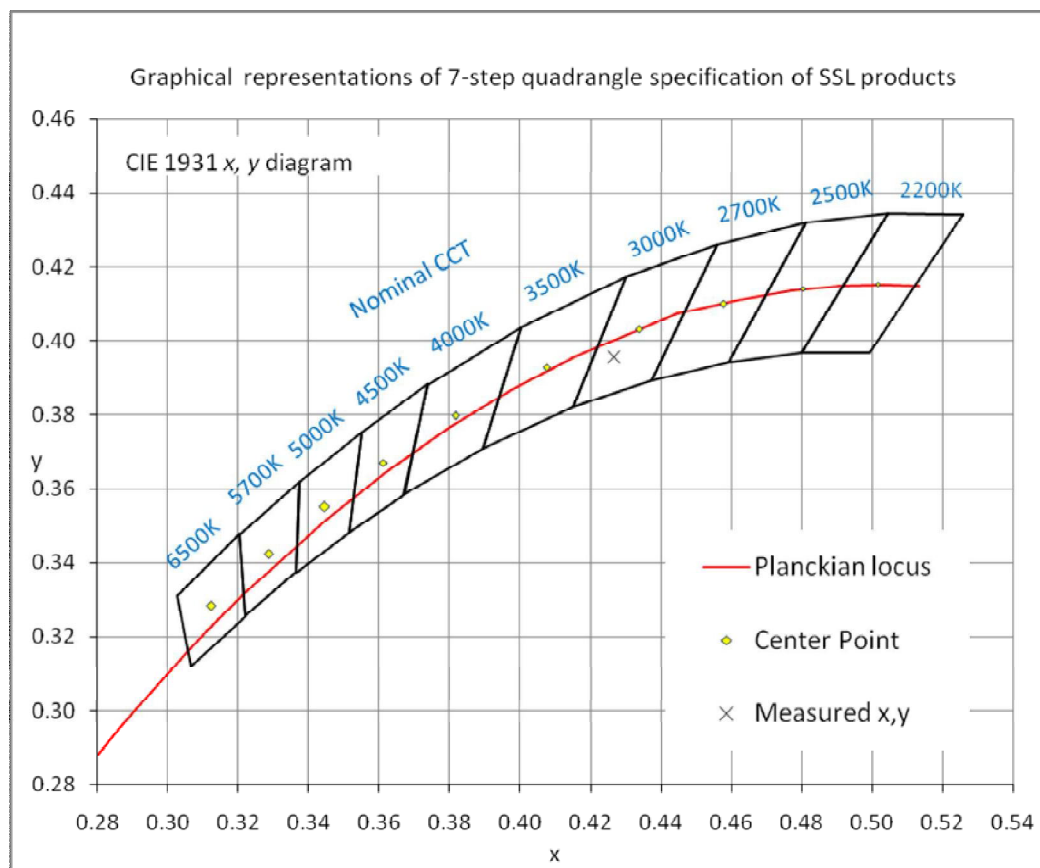
4, Self-absorption is 1.

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	0.14 m
Spacing Criteria (90-270)	1.30	Luminous Width	0.09 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	1999.81	12.90	12.90
0-30	4248.98	27.30	27.30
0-40	6964.06	44.80	44.80
0-60	12345.6	79.40	79.40
0-80	15219.75	97.90	97.90
0-90	15451.02	99.40	99.40
10-90	14934.45	96.10	96.10
20-40	4964.25	31.90	31.90
20-50	7794.57	50.20	50.20
40-70	7273.57	46.80	46.80
60-80	2874.15	18.50	18.50
70-80	982.12	6.30	6.30
80-90	231.27	1.50	1.50
90-110	35.35	0.20	0.20
90-120	44.08	0.30	0.30
90-130	51.80	0.30	0.30
90-150	68.74	0.40	0.40
90-180	89.31	0.60	0.60
110-180	53.96	0.30	0.30
0-180	15540.33	100.00	100.00

Total Luminaire Efficiency = 100.00%

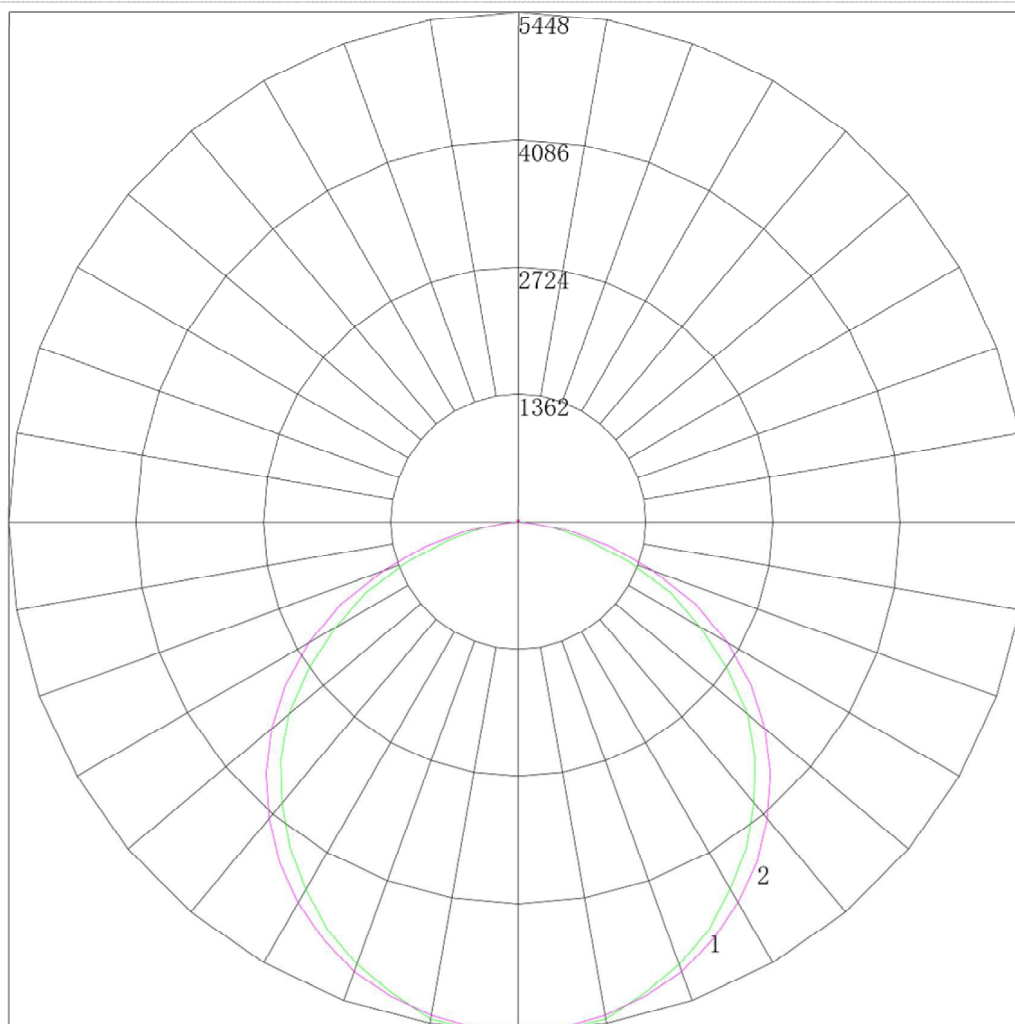
ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	516.57
10-20	1483.24
20-30	2249.17
30-40	2715.08
40-50	2830.32
50-60	2551.21
60-70	1892.04
70-80	982.12
80-90	231.27
90-100	24.11
100-110	11.24
110-120	8.73
120-130	7.72
130-140	7.51
140-150	9.42
150-160	9.90
160-170	7.72
170-180	2.96



LCTECH

4.5 Polar Curves



Maximum Candela = 5448.072 Located At Horizontal Angle = 0, Vertical Angle = 5

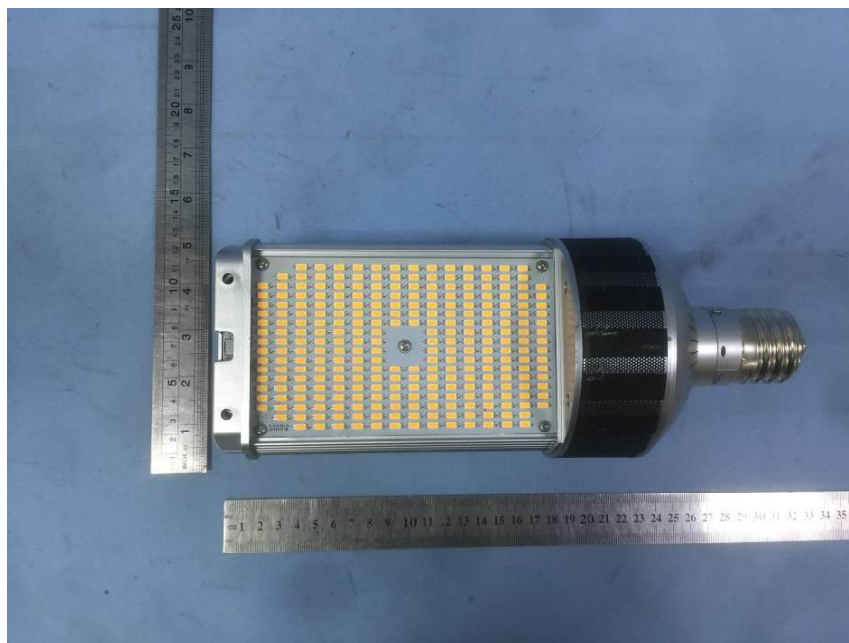
1 - Vertical Plane Through Horizontal Angles (0 - 180)

2 - Vertical Plane Through Horizontal Angles (90 - 270)

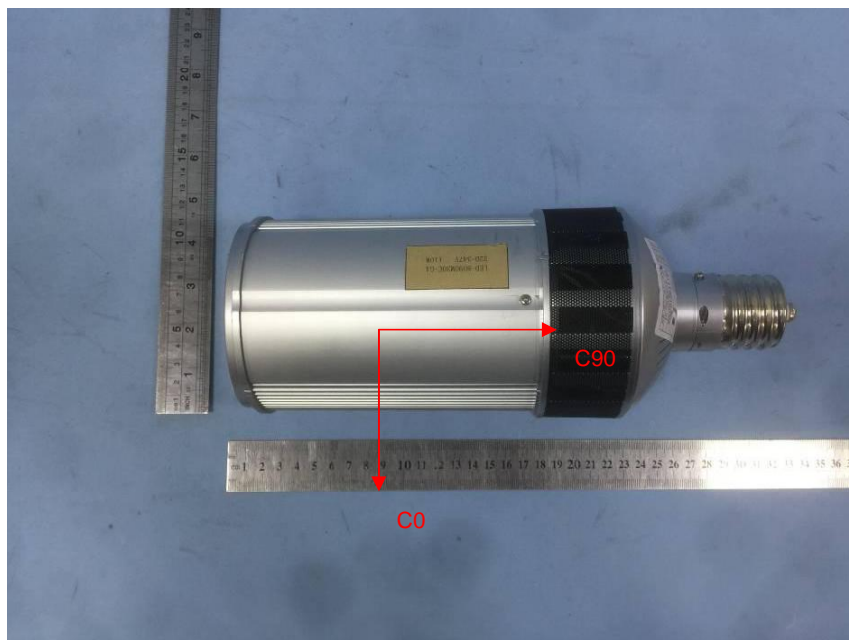
4.6 Candela Tabulation

	<u>0</u>	<u>15</u>	<u>30</u>	<u>45</u>	<u>60</u>	<u>75</u>	<u>90</u>
0	5444.901	5444.901	5444.901	5444.901	5444.901	5444.901	5444.901
5	5448.072	5430.906	5432.956	5428.917	5430.517	5423.820	5427.878
10	5399.610	5382.604	5379.102	5371.306	5371.896	5366.854	5356.650
15	5218.445	5227.548	5258.786	5280.164	5275.095	5266.381	5253.165
20	5038.187	5040.664	5047.419	5095.635	5138.086	5121.053	5123.248
25	4823.507	4831.210	4840.802	4875.081	4942.247	4942.754	4928.820
30	4538.626	4521.542	4575.378	4625.280	4673.843	4723.193	4707.065
35	4253.744	4244.153	4254.701	4328.897	4397.131	4468.419	4448.126
40	3924.930	3927.490	3953.670	3963.173	4083.600	4160.497	4144.837
45	3586.153	3592.768	3583.217	3645.841	3705.821	3809.969	3812.874
50	3203.443	3188.756	3225.626	3249.760	3300.604	3418.612	3443.280
55	2730.603	2741.650	2810.349	2847.599	2892.475	2994.295	3036.058
60	2249.385	2260.232	2302.437	2396.828	2450.023	2538.127	2584.930
65	1799.462	1804.266	1838.177	1909.486	1967.480	2049.958	2095.276
70	1277.663	1292.526	1364.649	1423.150	1465.063	1516.372	1535.692
75	789.968	830.724	894.406	923.992	952.142	985.914	1021.214
80	400.147	446.574	471.392	481.132	496.684	521.193	549.342
85	165.947	169.449	170.320	159.366	160.978	163.961	155.239
90	57.248	58.485	53.162	39.884	28.799	22.342	9.946
95	18.116	22.979	26.773	22.123	16.104	10.024	5.914
100	8.605	12.415	16.902	15.755	12.241	8.814	6.048
105	9.239	10.586	13.003	12.559	10.422	8.096	6.317
110	9.421	9.705	11.200	10.983	9.074	7.603	6.362
115	9.330	9.457	9.847	9.138	8.131	7.311	6.362
120	9.556	9.435	8.901	8.552	8.153	7.648	7.034
125	9.194	9.096	8.991	8.732	8.490	8.253	7.795
130	8.786	8.870	8.923	8.575	8.423	8.298	8.064
135	9.511	9.615	9.509	9.160	9.007	8.971	9.005
140	12.183	12.098	12.078	11.815	11.657	11.640	11.558
145	15.490	15.483	15.323	15.056	15.004	14.892	14.963
150	18.705	18.508	18.297	18.094	18.036	17.897	17.875
155	22.057	21.803	21.654	21.493	21.405	21.239	21.325
160	25.227	25.098	24.922	24.891	24.752	24.692	24.729
165	27.945	27.852	27.738	27.614	27.424	27.339	27.372
170	29.983	29.861	29.699	29.572	29.423	29.335	29.343
175	31.840	31.666	31.592	31.575	31.467	31.398	31.359
180	32.749	32.749	32.749	32.749	32.749	32.749	32.749

Appendix A Product Photo



Picture 1



Picture 2

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