



Ref. No.: LCZP18010309

Version: 1.0

Date of issue: Nov. 23, 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-8089M30-G4,LED-8089-NW-E40-G4

Test Date: Sep. 20, 2018 to Nov. 21, 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: *LED-8089M30-G4 and LED-8089-NW-E40-G4 are the same except for the model number.*

Complied by:

Ray He

Project Engineer

Nov. 23, 2018

Reviewed by:

Richard Li

Technical Manager

Nov. 23, 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



LCTECH



1. General

1.1 Product Information

Brand Name	Light Efficient Design
Product Type	LED Lamp
Model Number	LED-8089M30-G4,LED-8089-NW-E40-G4
Rated Inputs	120-277VAC, 50/60Hz
Rated Power	80 W
Rated Light output	12000lm
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.	1811210106001
Date of Receipt Samples	Nov. 21, 2018
Note	-



LCTECH



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.



LCTECH



Page 6 of 11

Ref. No.: LCZP18010309 , V1.0

3. Test Result Summary

3.1 Electrical data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Input Voltage & Frequency	120.00 V~60Hz	120.01 V~60Hz
Input Current(A)	0.707	0.707
Total Power(W)	84.24	84.22
Power Factor	0.993	0.993
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	- ⁴	12087.19
Luminaire Efficacy(lm/W)	-	143.52
Correlated Color Temperature (CCT)(K)	3104	-
Color Rendering Index (CRI)	84.2	-
R9	12	-
Chromaticity Coordinate (x,y)	x = 0.4272 y = 0.3961	-
Chromaticity Coordinate (u,v)	u = 0.2477 v = 0.3445	-
Chromaticity Coordinate (u',v')	u' = 0.2477 v' = 0.5167	-
Duv	-0.0018	-
Zone Lumens between 0-60 °	-	79.53%

3.3 Color Rendering Details

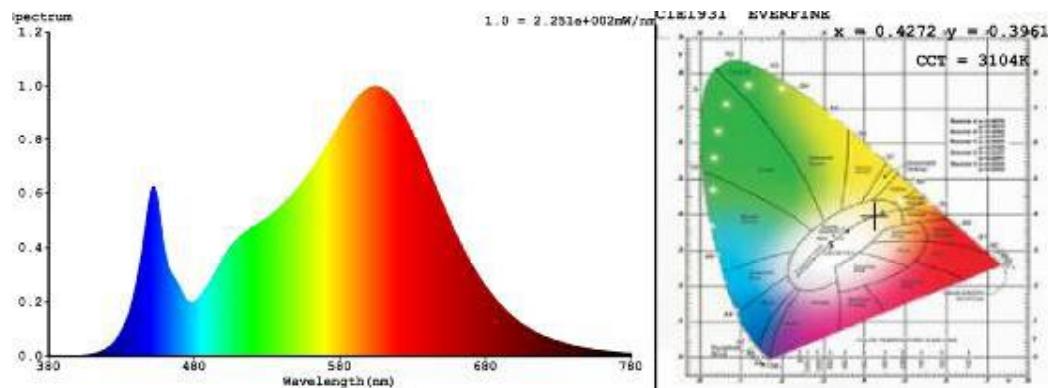
R1	R2	R3	R4	R5	R6	R7	R8
83	93	96	83	84	91	83	61
R9	R10	R11	R12	R13	R14	R15	-
12	83	83	76	86	98	76	-

Note:

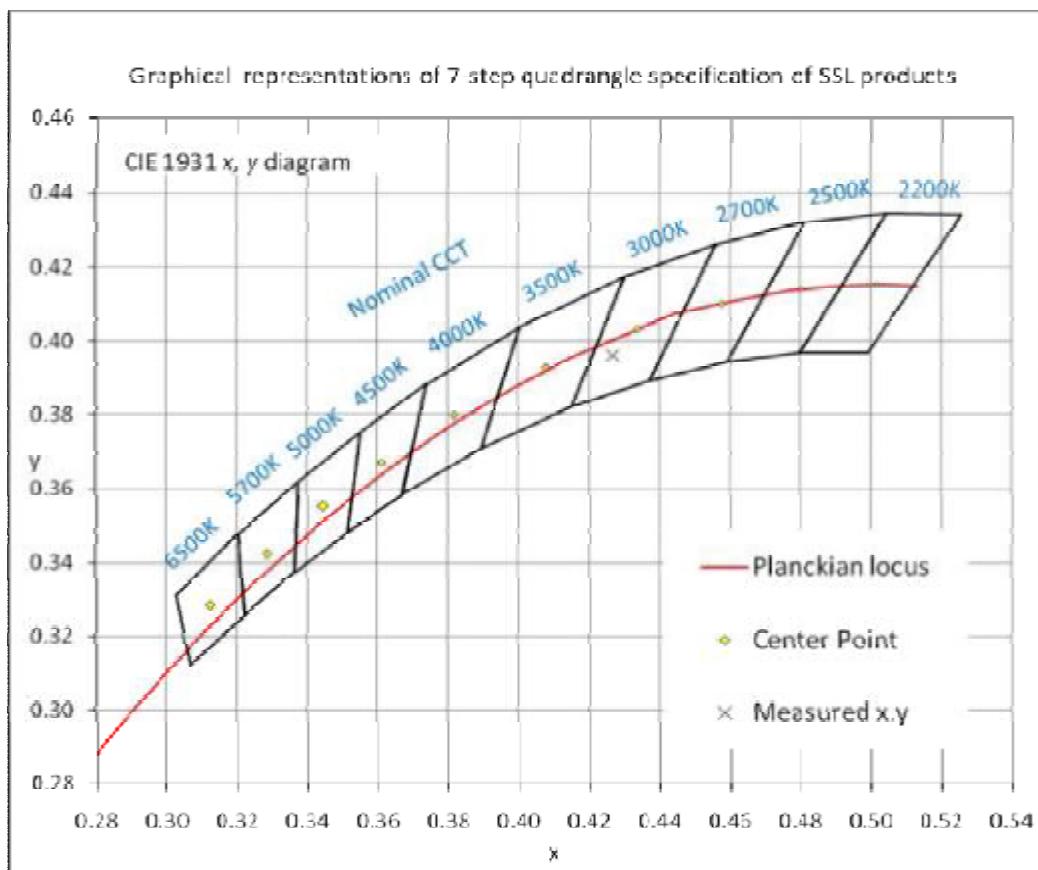
4, Self-absorption is 1.

4. Test Data

4.1 Spectral Distribution



4.2 ANSI Chromaticity Quadrangles Diagram





LCTECH



4.3 Goniometry Test Data

CIE Type	Direct	Basic Luminous Shape	Rectangular
Spacing Criteria (0-180)	1.28	Luminous Length	0.14 m
Spacing Criteria (90-270)	1.30	Luminous Width	0.09 m
Spacing Criteria (Diagonal)	1.40	Luminous Height	0.00 m
Test Distance	30.00 m		

4.4 Zonal Lumen Summary

Zone	Lumens	%Lamp	%Flx
0-20	1543.61	12.80	12.80
0-30	3289.31	27.20	27.20
0-40	5411.67	44.80	44.80
0-60	9612.71	79.50	79.50
0-80	11868.71	98.20	98.20
0-90	12039.17	99.60	99.60
10-90	11841.33	96.30	96.30
20-40	3868.06	32.00	32.00
20-50	6077.33	50.30	50.30
40-70	5684.45	47.00	47.00
60-80	2256.00	18.70	18.70
70-80	772.59	6.40	6.40
80-90	170.46	1.40	1.40
90-110	20.37	0.20	0.20
90-120	25.01	0.20	0.20
90-130	28.86	0.20	0.20
90-150	37.19	0.30	0.30
90-180	48.01	0.40	0.40
110-180	27.64	0.20	0.20
0-180	12087.18	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	397.84
10-20	1145.77
20-30	1745.7
30-40	2122.36
40-50	2209.27
50-60	1991.77
60-70	1483.41
70-80	772.59
80-90	170.46
90-100	14.16
100-110	6.21
110-120	4.65
120-130	3.85
130-140	3.63
140-150	4.71
150-160	5.05
160-170	4.16
170-180	1.61



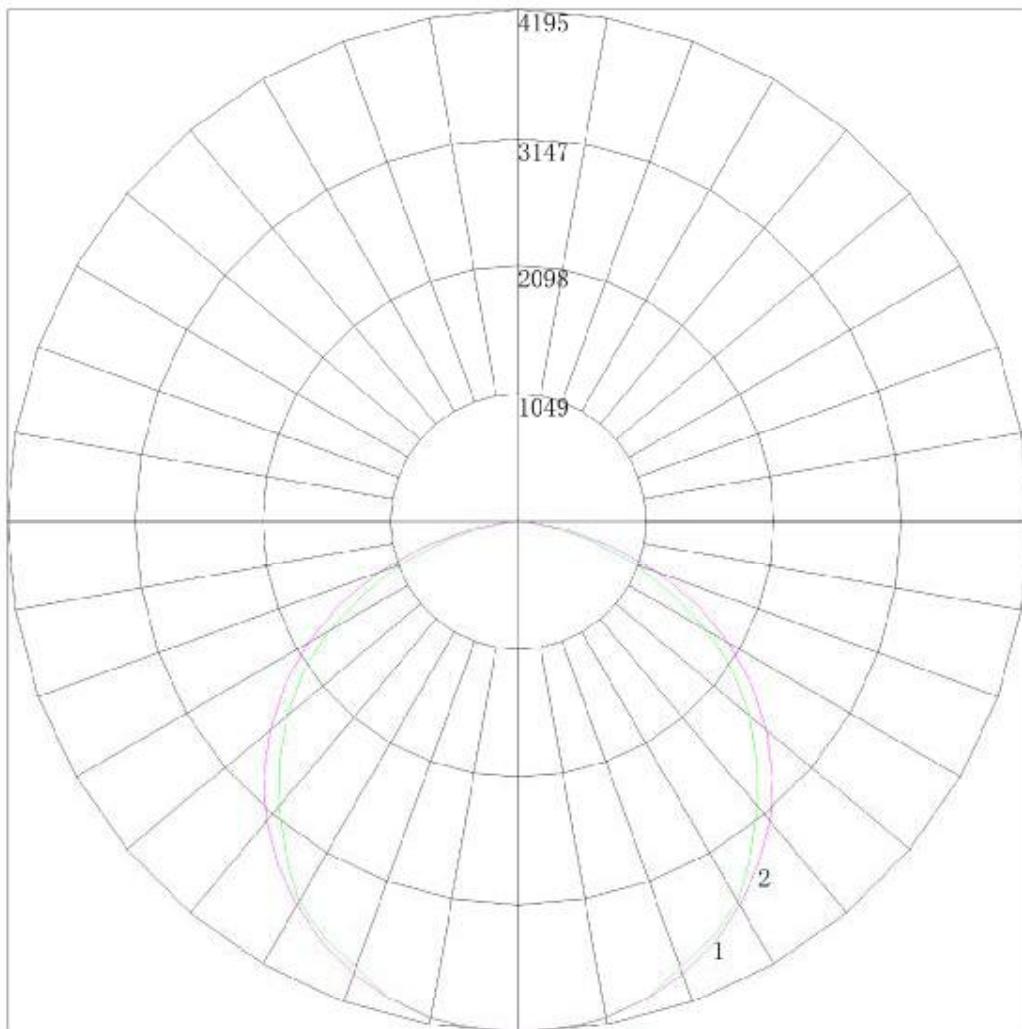
LCTECH



Page 9 of 11

Ref. No.: LCZP18010309 , V1.0

4.5 Polar Curves



Maximum Candela = 4195.422 Located At Horizontal Angle = 0, Vertical Angle = 0

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

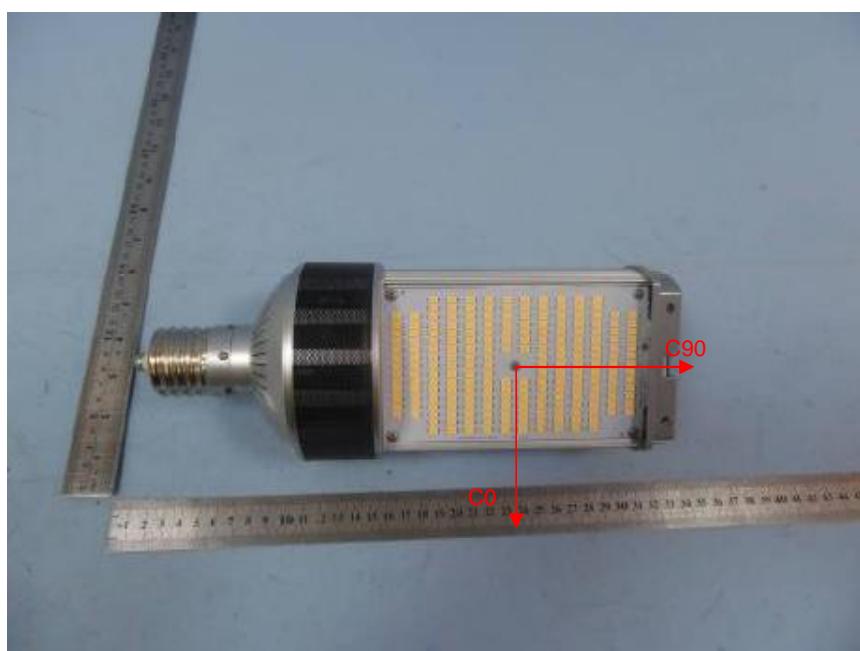
2 - Vertical Plane Through Horizontal Angles (90 - 270)



Appendix A Product Photo



Picture 1



Picture 2

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