LCTECH

NVLAP TESTING
NVLAP LAB CODE 500080-0

IESNA SUSTAINING MEMBER

Ref. No.: LCZP20040038
Version: 1.0
Date of Issue: May. 18, 2020
Total pages: 11

LCTECH GUANGDONG TESTING SERVICES CO.,LTD. LABORATORY

Test report of

IES LM-79-08

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

Rendered to:

ETI Solid State Lighting (Zhuhai) Ltd
No.1, Zhongzhu Road South,Science & Technology Innovation Coast, High Tech District, Zhuhai City, Guangdong Prov., China

For products:

LED Downlgiht

Models No.:

538271##(##=00-99)

(The product is a color tunable luminaire, tunable to 2200K, 2700K to 5000K and ## can be 00-99 and represent different client and sales districts.)

Test Date:	May. 16, 2020
Test Lab.:	**LCTECH Guangdong Testing Services 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
Test Sites:	1/F., Building I, Technology and Enterprise Development Center, Guangyuan Road, Xiaolan, Zhongshan, Guangdong, China
Template No.:	LC-RT-PL-001 Rev.1.4
Test Note:	

Complied by:		**Reviewed by:**	
Fish Tan	Fish Tan	**Lin Qiu**	Lin
May. 18, 2020		**May. 18, 2020**	

Table of Contents

1. General

1.1 Product Information

Brand Name	Commercial Electric
Product Type	LED Downlight
Model Number	538271##(##=00-99)
Rated Inputs	120VAC, 60Hz
Rated Power	11W
Rated Light output	650lm
Declared CCT	2700K, 3000K, 3500K, 4000K, 5000K
Power Supply	ETI-AD01100250036DDA
LED Package, Array or Module	SPMWH6229AQ7SGW*SM +SPMWH1228FD7WAL*SE, SAMSUNG ELECTRONICS CO., LTD.
Receipt Samples	1 unit
Sample Code of lab.	200513105007
Date of Receipt Samples	May. 13, 2020
Note	2700K was selected for the test.

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	2020-04-24	2021-04-23
Wireless temperature transmitter	LC-I-PL-009	DWLR-DLR	2020-01-03	2021-01-02
Wireless temperature transmitter	LC-I-PL-008	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 lamp/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 (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	120.03 V~60Hz	120.00V~60Hz
Input Current(A)	0.090	0.090
Total Power(W)	10.31	10.35
Power Factor	0.954	0.954
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-	691.71
Luminaire Efficacy(lm/W)	-	66.83
Correlated Color Temperature (CCT)(K)	2707	-
Color Rendering Index (CRI)	92.0	-
R9	55	-
Chromaticity Coordinate (x,y)	x = 0.4577 y = 0.4076	-
Chromaticity Coordinate (u,v)	u = 0.2624 v = 0.3506	-
Chromaticity Coordinate (u',v')	u' = 0.2624 v' = 0.5259	-
Duv	-0.0009	-
Zone Lumens between 0-60 °	-	79.52 %
Beam Angle(50%Imax)	-	C0/180= 113.0° C90/270= 112.8°

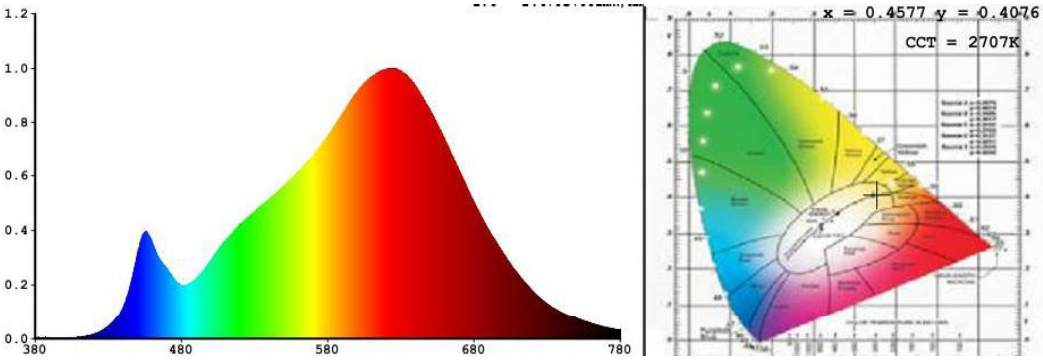
3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
92	97	98	91	92	96	90	79
R9	R10	R11	R12	R13	R14	R15	-
55	92	92	83	94	99	88	-

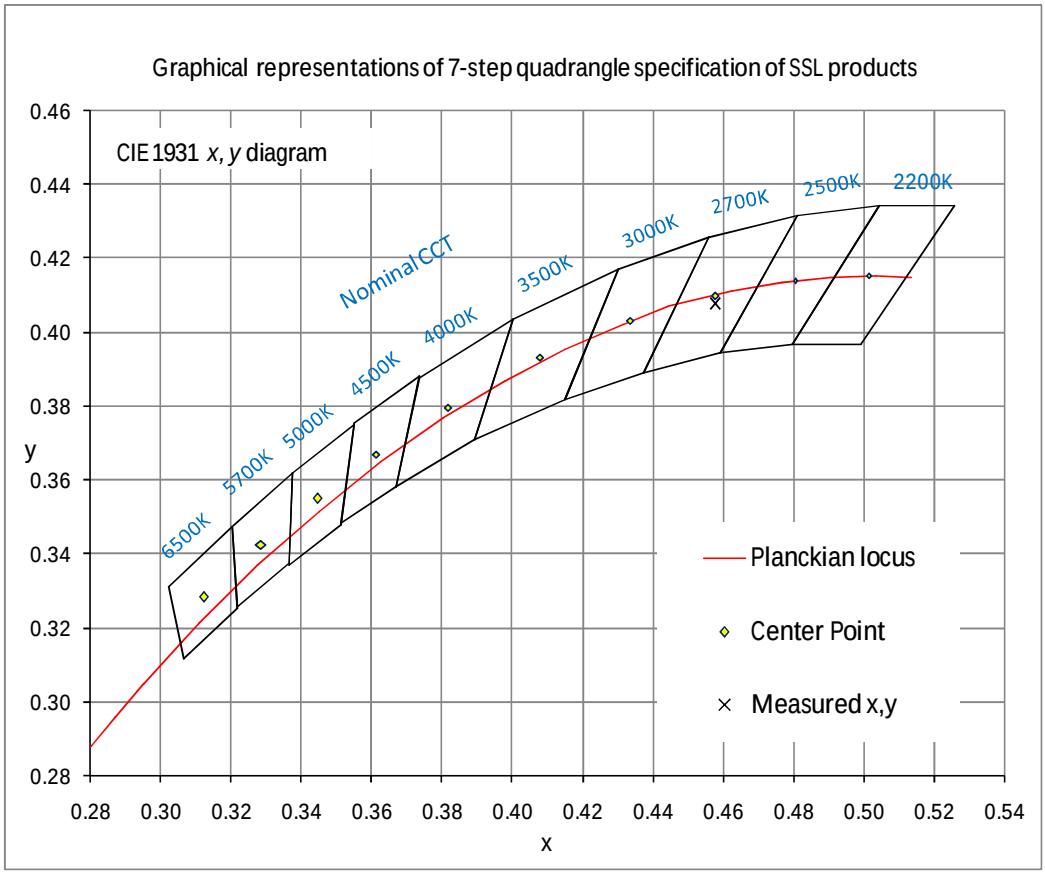
Note: N/A

4. Test Data

4.1 Spectral Distribution



4.2 ANSI Chromaticity Quadrangles Diagram



4.3 Goniometry Test Data

CIE Type	Direct	Basic Luminous Shape	Circular
Spacing Criteria (0-180)	1.28	Luminous Length	0.07 m (Diameter)
Spacing Criteria (90-270)	1.28	Luminous Width	0.07 m (Diameter)
Spacing Criteria (Diagonal)	1.38	Luminous Height	0.00 m
Test Distance	29.63 m		

4.4 Zonal Lumen Summary

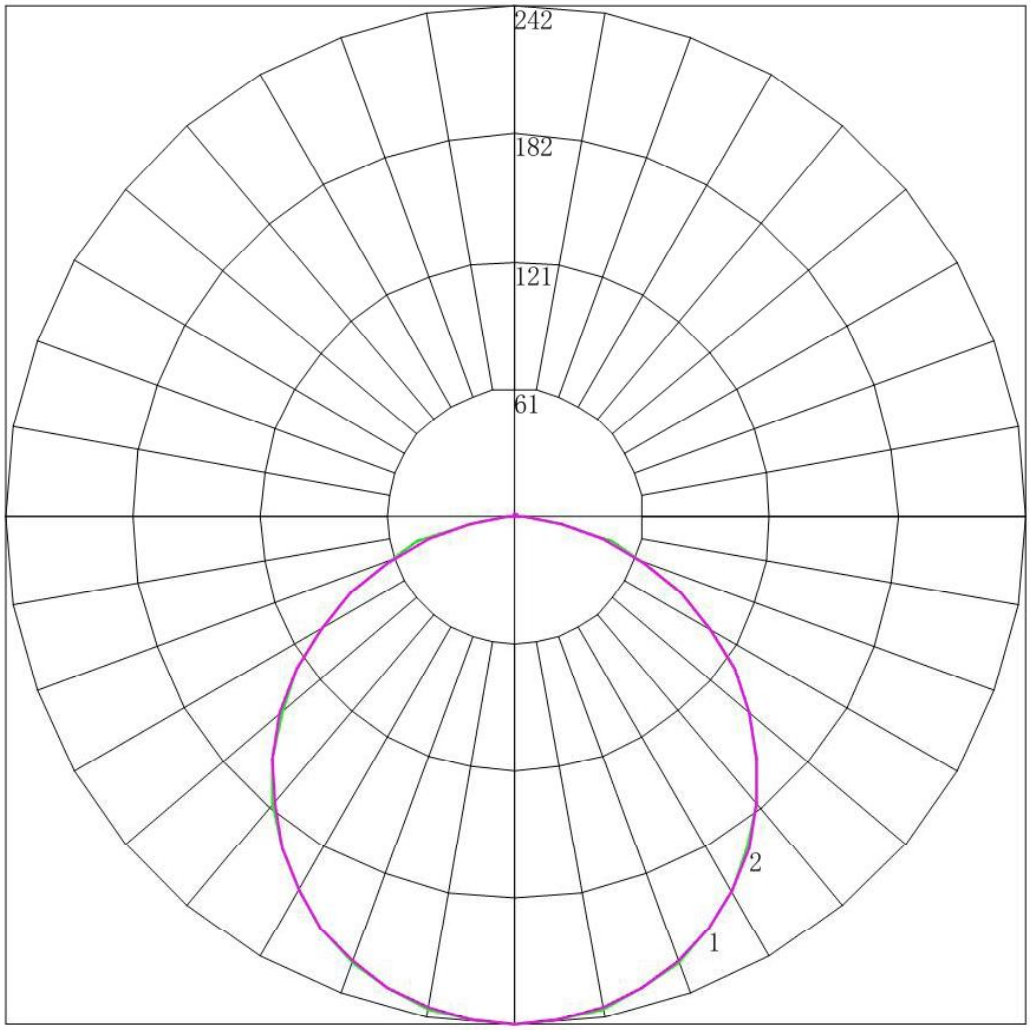
Zone	Lumens	%Lamp	%Fixt
0-20	88.81	12.80	12.80
0-30	189.03	27.20	27.30
0-40	310.24	44.70	44.90
0-60	550.06	79.20	79.50
0-80	682.78	98.30	98.70
0-90	691.47	99.50	100.00
10-90	668.53	96.20	96.60
20-40	221.43	31.90	32.00
20-50	347.37	50.00	50.20
40-70	325.62	46.90	47.10
60-80	132.72	19.10	19.20
70-80	46.92	6.80	6.80
80-90	8.69	1.30	1.30
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	0.24	0.00	0.00
110-180	0.24	0.00	0.00
0-180	691.71	99.60	100.00

Total Luminaire Efficiency = 99.60%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	22.94
10-20	65.87
20-30	100.22
30-40	121.21
40-50	125.94
50-60	113.88
60-70	85.80
70-80	46.92
80-90	8.69
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	0.16
170-180	0.08

4.5 Polar Curves

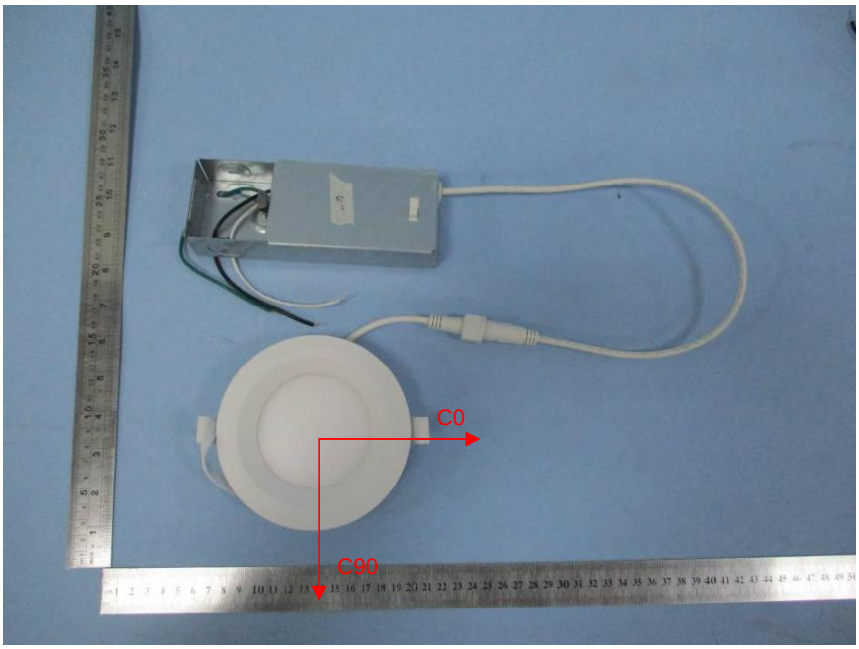


Maximum Candela = 242.311 Located At Horizontal Angle = 0, Vertical Angle = 0
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)

4.6 Candela Tabulation

	0	15	30	45	60	75	90
0	242.311	242.311	242.311	242.311	242.311	242.311	242.311
5	241.429	241.430	241.430	240.991	240.995	240.995	241.003
10	238.786	238.569	238.569	238.132	238.369	238.369	237.953
15	233.059	233.286	233.286	233.075	233.987	233.987	233.159
20	226.450	226.244	226.244	225.818	226.546	226.546	225.314
25	217.198	217.440	217.440	217.024	218.007	218.007	217.034
30	206.184	206.436	206.436	206.249	207.500	207.500	206.138
35	192.967	193.231	193.231	193.056	194.802	194.802	193.064
40	178.869	178.925	178.925	178.544	180.573	180.573	178.682
45	162.568	162.639	162.639	162.272	164.593	164.593	162.993
50	145.386	145.473	145.473	145.122	147.301	147.301	145.561
55	126.883	126.986	126.986	126.871	129.134	129.134	127.257
60	106.617	106.519	106.519	106.643	109.216	109.216	107.209
65	86.351	85.832	85.832	85.754	88.421	88.421	86.290
70	64.763	64.484	64.484	64.645	67.408	67.408	65.372
75	48.022	45.119	45.119	42.877	45.303	45.303	43.145
80	22.028	21.569	21.569	21.988	24.072	24.072	22.226
85	4.406	3.962	3.962	4.398	5.689	5.689	4.358
90	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
100	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
110	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
120	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
130	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
140	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
150	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
160	0.000	0.000	0.000	0.000	0.000	0.000	0.000
165	0.881	0.880	0.880	0.660	0.656	0.656	0.872
170	0.881	0.880	0.880	0.880	0.876	0.876	0.872
175	0.881	0.880	0.880	0.880	0.876	0.876	0.872
180	0.501	0.501	0.501	0.501	0.501	0.501	0.501

Appendix A Product Photo



Picture 1

Picture 2

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