LCTECH

NVLAP TESTING
NVLAP LAB CODE 500080-0

IESNA SUSTAINING MEMBER

Ref. No.: LCZP16120487
Version: 1.0
Date of Issue: Jan. 9, 2017
Total pages: 12

Test report of

IES LM-79-08

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

Rendered to:

Elec-Tech International Co., Ltd.
No.1 Jinfeng Road, Tangjiawan Town, Xiangzhou District, Zhuhai City, Guangdong Province, P.R.China

For products:

LED Ceiling Light

Models No.:

544372##(##=41-50)

(Where ## denotes CCT and could be 41-50 identifies 4000K)

Test Date:	Jan. 4, 2017 to Jan. 6, 2017
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	**Richard Li**
Project Engineer	**Technical Manager**
Jan. 9, 2017	**Jan. 9, 2017**

Table of Contents

1. General

1.1 Product Information

Brand Name	Commercial Electric
Product Type	LED Ceiling Light
Model Number	544372##(##=41-50)
Rated Inputs	120-277V,50/ 60Hz
Rated Power	22W
Rated Light output	1600lm
Declared CCT	4000K
Power Supply	LED Driver
LED Package, Array or Module	Model: SPMWHx229xxxxxxxxx, manufactured by SAMSUNG ELECTRINICS CO., LTD.
Receipt Samples	1 unit
Date of Receipt Samples	Dec. 28, 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	2016-08-10	2017-08-09
Photometric colorimetric electric system (2 meter sphere)	LC-I-900	SPR3000	Before use	Before use
Standard lamp	LC-PL-I-002	24V100W	2016-10-08	2017-10-07
Luminous Flux Standard Lamp	LC-PL-I-001	110V/200W	2016-09-24	2017-09-23
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 (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 and a sphere (2 meter)-spectroradiometer 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, and the color characteristics (Color rendering index, correlated color temperature, chromaticity coordinate) were calculated from these 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	120.00 V~60Hz	120.03 V~60Hz
Input Current(A)	0.177	0.177
Total Power(W)	20.86	20.86
Power Factor	0.981	0.982
I-THD	-	-
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	1663.10	1667.01
Luminaire Efficacy(Lm/W)	79.73	79.91
Correlated Color Temperature (CCT)(K)	4014	-
Color Rendering Index (CRI)	85.0	-
R9	16	-
Chromaticity Coordinate (x,y)	x = 0.3807 y = 0.3796	-
Chromaticity Coordinate (u,v)	u = 0.2242 v = 0.3352	-
Chromaticity Coordinate (u',v')	u' = 0.2242 v' = 0.5028	-
Duv	0.00124	-
Zone Lumens between 0-60 °	-	55.2%

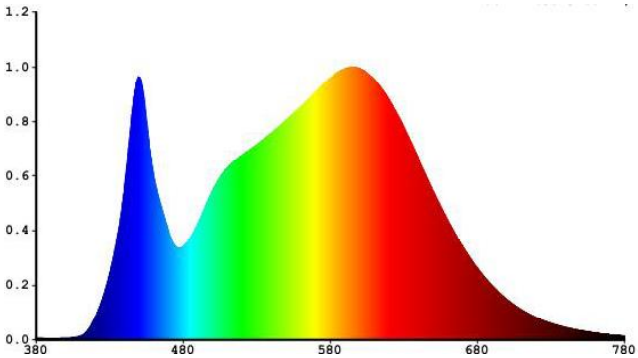
3.3 Color Rendering Details

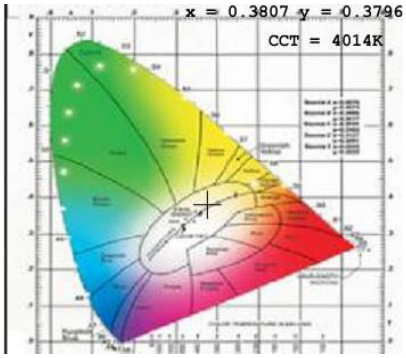
R1	R2	R3	R4	R5	R6	R7	R8
83	91	96	84	84	87	87	67
R9	R10	R11	R12	R13	R14	R15	-
16	78	84	70	85	98	77	-

Note: N.A.

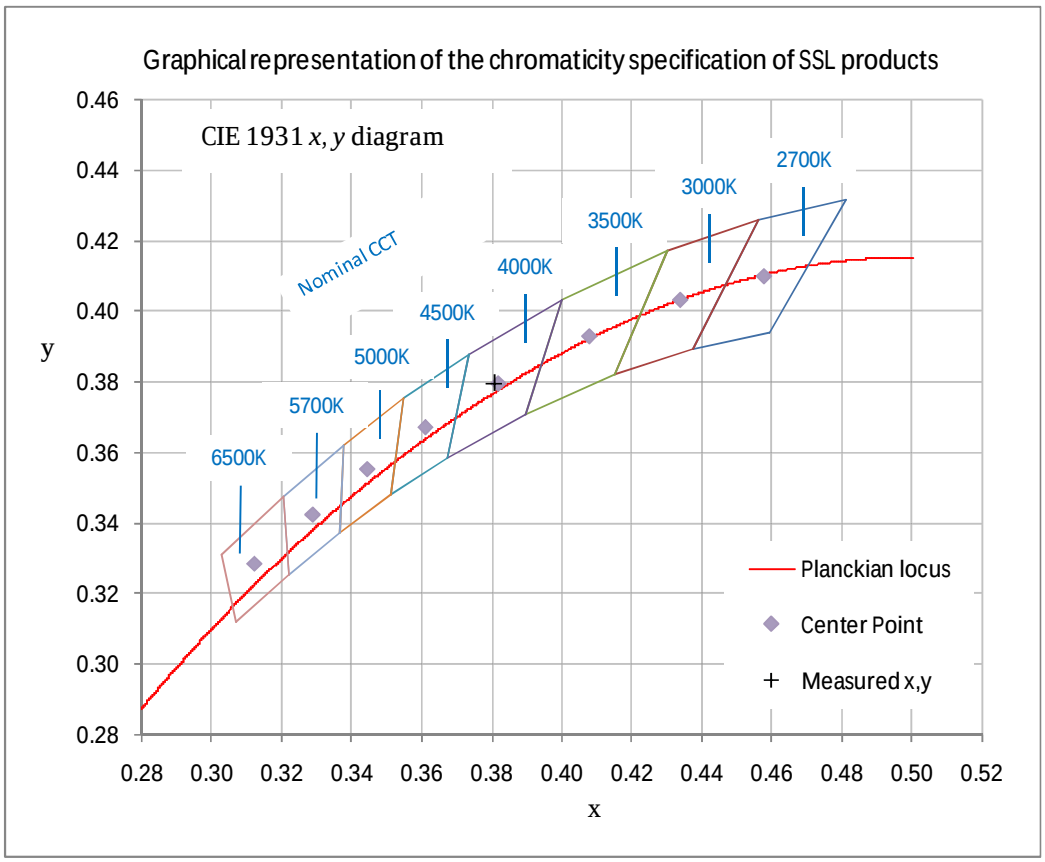
4. Test Data

4.1 Spectral Distribution





4.2 ANSI Chromaticity Quadrangles Diagram



4.3 Goniometry Test Data

CIE Type	Semi-Direct	Basic Luminous Shape	Circular w/ Sides
Spacing Criteria (0-180)	1.30	Luminous Length	0.39 m (Diameter)
Spacing Criteria (90-270)	1.30	Luminous Width	0.39 m (Diameter)
Spacing Criteria (Diagonal)	1.44	Luminous Height	0.05 m
Test Distance	29.65 m		

4.4 Zonal Lumen Summary

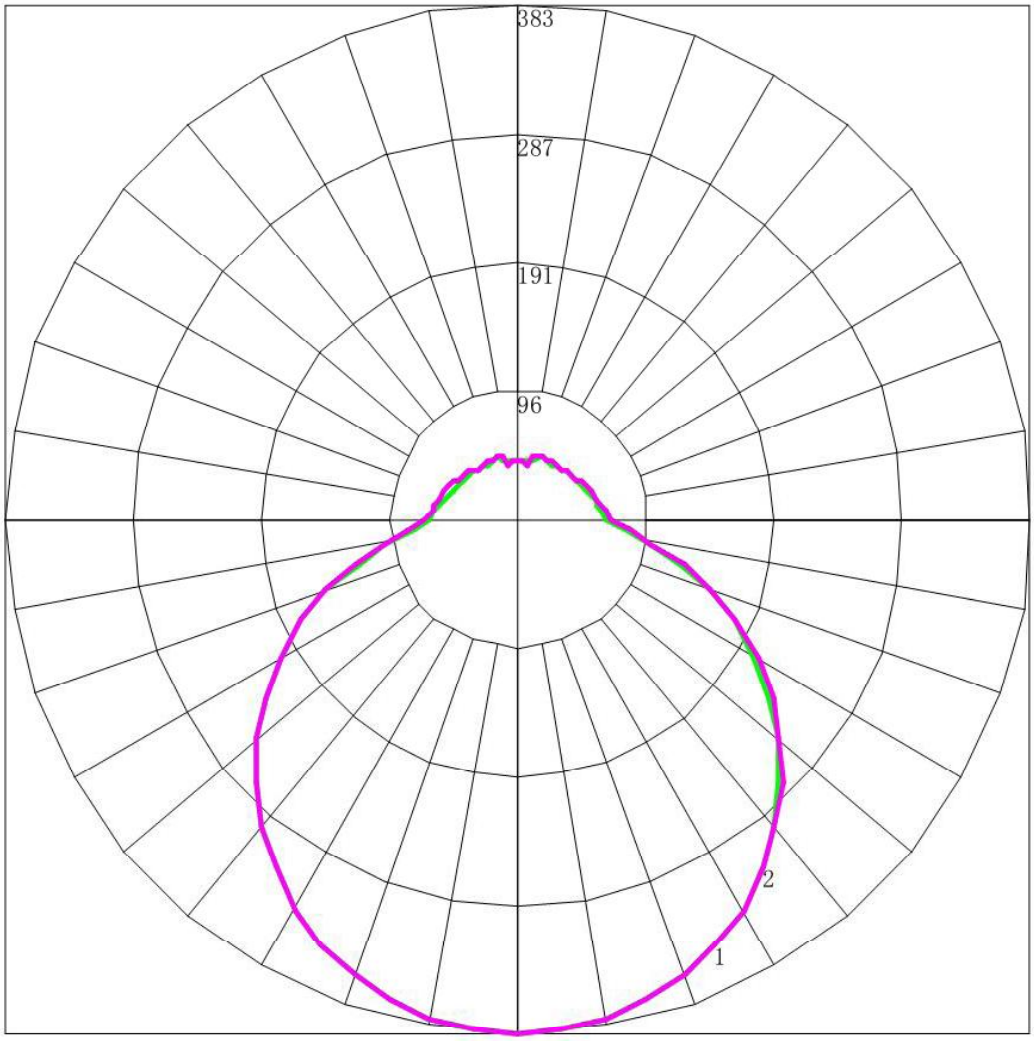
Zone	Lumens	%Lamp	%Fixt
0-20	140.88	8.50	8.50
0-30	301.71	18.10	18.10
0-40	500.32	30.00	30.00
0-60	920.80	55.20	55.20
0-80	1231.39	73.90	73.90
0-90	1322.21	79.30	79.30
10-90	1285.93	77.10	77.10
20-40	359.44	21.60	21.60
20-50	573.62	34.40	34.40
40-70	597.72	35.90	35.90
60-80	310.60	18.60	18.60
70-80	133.36	8.00	8.00
80-90	90.82	5.40	5.40
90-110	133.11	8.00	8.00
90-120	188.58	11.30	11.30
90-130	235.95	14.20	14.20
90-150	305.14	18.30	18.30
90-180	344.79	20.70	20.70
110-180	211.68	12.70	12.70
0-180	1667.01	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	36.28
10-20	104.59
20-30	160.83
30-40	198.61
40-50	214.18
50-60	206.31
60-70	177.23
70-80	133.36
80-90	90.82
90-100	70.16
100-110	62.95
110-120	55.46
120-130	47.37
130-140	38.76
140-150	30.43
150-160	22.42
160-170	13.16
170-180	4.07

4.5 Polar Curves

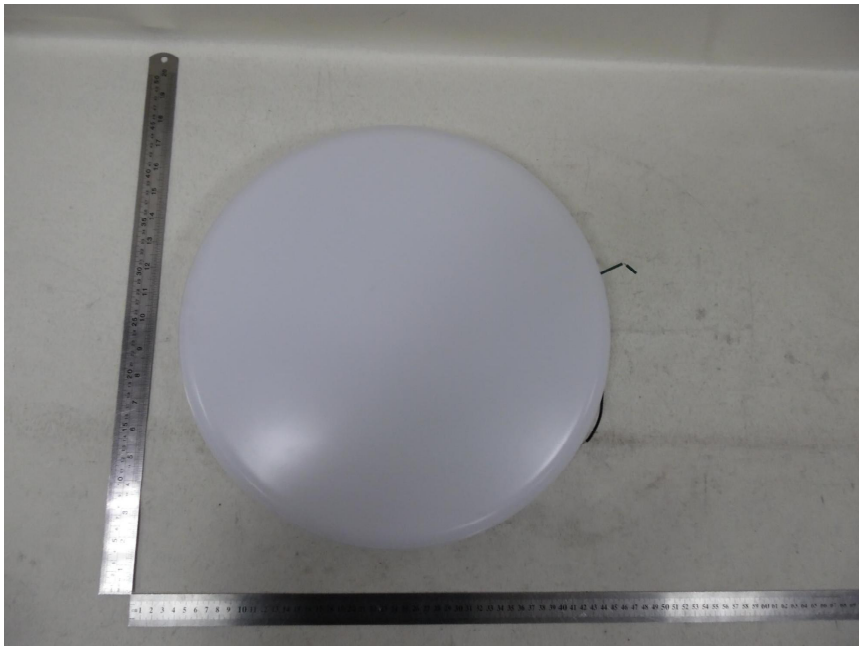


Maximum Candela = 382.839 Located At Horizontal Angle = 0, Vertical Angle = 0
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)

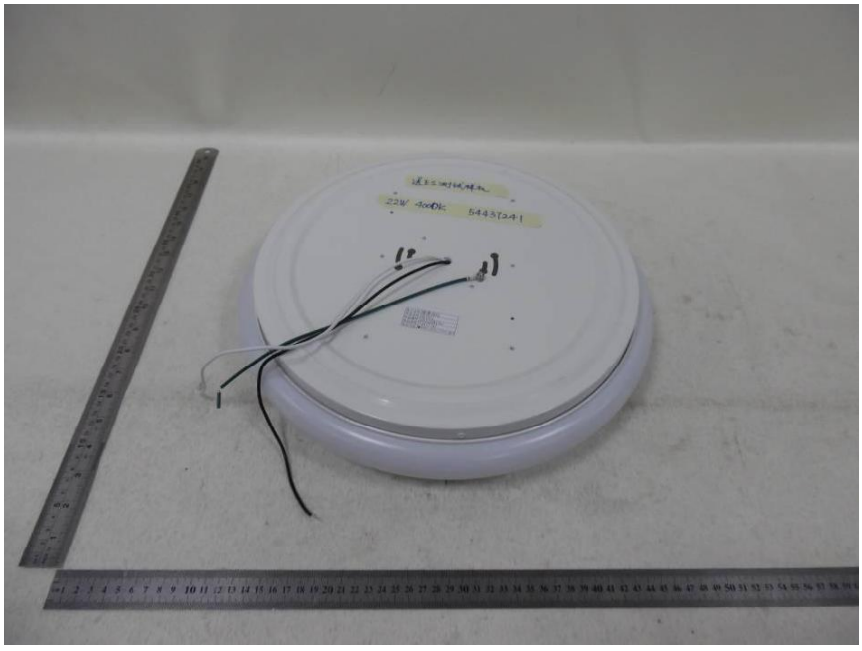
4.6 Candela Tabulation

	0	15	30	45	60	75	90
0	382.839	382.839	382.839	382.839	382.839	382.839	382.839
5	381.959	381.738	381.519	381.959	381.521	381.301	381.098
10	377.558	377.338	377.341	377.339	377.120	376.913	376.748
15	370.517	370.297	369.863	370.298	370.738	369.888	370.222
20	360.836	361.056	360.846	361.056	360.838	360.668	361.086
25	348.955	348.295	348.312	348.955	348.957	348.375	348.905
30	333.994	334.214	334.019	334.433	334.437	333.886	334.114
35	316.832	317.052	316.866	317.713	317.277	317.205	316.712
40	298.350	297.910	298.174	298.791	298.354	298.765	298.440
45	276.788	277.228	277.064	277.449	277.891	277.472	277.993
50	254.346	254.566	254.634	254.786	255.229	255.299	255.371
55	230.143	229.923	230.445	230.804	231.245	231.152	230.573
60	204.181	204.621	204.717	204.840	205.722	205.908	205.776
65	177.778	178.218	178.108	178.878	179.538	180.225	179.673
70	151.375	151.595	151.281	152.035	153.137	153.006	153.571
75	124.093	124.753	124.895	125.632	126.514	126.884	127.033
80	99.890	99.890	100.487	101.212	102.095	102.520	101.800
85	79.648	80.308	80.699	81.411	82.294	82.983	82.658
90	67.327	67.767	68.167	68.870	69.752	70.470	70.042
95	62.486	62.266	62.670	63.368	64.029	64.760	64.822
100	60.286	60.506	60.911	61.166	61.829	62.344	62.211
105	58.526	58.526	58.932	59.406	60.285	60.368	60.471
110	56.326	56.766	56.953	57.645	58.306	58.611	58.731
115	54.565	55.006	55.193	56.105	56.106	56.416	56.991
120	53.685	53.685	54.094	54.566	54.346	54.660	54.816
125	51.925	52.365	52.775	53.246	52.806	53.122	53.075
130	50.605	51.045	51.235	51.485	51.265	51.366	51.335
135	49.285	49.725	49.916	49.945	50.164	50.270	50.465
140	48.405	48.625	48.816	49.065	49.063	49.171	49.160
145	47.965	48.185	47.936	48.404	48.625	48.513	48.290
150	47.965	48.185	48.157	48.185	48.185	48.293	48.290
155	48.405	48.405	48.377	48.404	48.404	48.732	48.290
160	48.845	48.625	48.816	48.844	48.623	48.511	49.160
165	46.645	46.645	46.837	46.863	46.863	46.535	46.985
170	42.684	42.464	42.439	42.464	42.683	42.146	42.199
175	42.244	42.024	42.221	42.025	42.464	42.367	42.634
180	44.918	44.918	44.918	44.918	44.918	44.918	44.918

Appendix 1 Product Photo



Picture 1



Picture 2

Attachment 2
U.S. Department of Energy
Lighting Facts^{CM} Uniform LM-79 Reporting Template

Laboratory Information

Name of test lab	LCTECH (Zhongshan) Testing Service Co.,Ltd
Date of test report	Jan. 9, 2017
Test report number	LCZP16120487
Laboratory contact name	Richard Li

Product Information

Manufacturer	Elec-Tech International Co., Ltd	
Brand name	Commercial Electric	
Model number	544372##(##=41-50)	
SKU(if available)	N/A	
Type of luminaire (for integral lamps, list base type and lamp type)	LED Ceiling Light	
Luminaire aperture	-	in.
Luminaire height	1.97	in.
Luminaire length	15.35	in.
Luminaire width	15.35	in.
Number of units(modular products)	N/A	

Electrical Measurements	Integrating sphere output	Goniophotometer Output	
Input wattage	20.86	20.86	W
Input current	0.177	0.177	A
Input voltage(AC)	120.00	120.03	V
Power factor	0.981	0.982	
Off-state power	0.0	0.0	W

Photometric Characteristics			
Total initial lumen output	1663.10	1667.01	lm
Initial luminaire efficacy	79.73	79.91	lm/W
Correlated color temperature / CCT	4014	K	
Color rendering index/CRI	85.0		
R9value	16		
Duv	0.00124		

Luminous Intensity Distribution		Goniophotometer Output	
Center beam candle power(if applicable)	--	382.839	cd
Beam angle(if applicable)		124.8	°
Zonallumensinthe0°-60°zone		55.2	%
Zonal lumens in the60°-90° zone		24.1	%
Zonallumensinthe90°-120°zone		11.3	%
Zonallumensinthe120°-180°zone		9.4	%

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