LCTECH

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IESNA SUSTAINING MEMBER

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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, ZhuhaiCity, Guangdong Province, P.R. China 519085

For products:

LED Ceiling Light

Models No.:

544503##(##=11-30)

(Where ## denotes CCT and could be 11-30 which refers 3000K, 4000K and 5000K.)

Test Date:	Apr. 25, 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**
Apr. 28, 2017	**Apr. 28, 2017**

Table of Contents

1. General

1.1 Product Information

Brand Name	Hampton Bay
Product Type	LED Ceiling Light
Model Number	544503##(##=11-30)
Rated Inputs	120VAC, 60Hz
Rated Power	14W
Rated Light output	910lm
Declared CCT	3000K
Power Supply	LED Driver
LED Package, Array or Module	Model: SPMWHx229xxxxxxxxx, manufactured by SAMSUNG ELECTRONICS CO., LTD
Receipt Samples	1 unit
Sample Code of lab.	17042011316 + 03 Lens
Date of Receipt Samples	Apr. 20, 2017
Note	This product is a color tunable luminaire, all the tests were tested at 3000K setting.

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	2017-02-04	2018-02-03
AC Power supply	LC-I-987	APW-110N	2017-02-04	2018-02-03
Power analyzer	LC-I-928	WT210	2017-01-19	2018-01-19
Power analyzer	LC-I-954	WT210	2017-02-04	2018-02-03
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	2017-02-10	2018-02-10
Wireless temperature transmitter	LC-I-979	DWRF-B	2017-02-10	2018-02-10

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	120.06 V~60Hz
Input Current(A)	0.127	0.127
Total Power(W)	13.61	13.60
Power Factor	0.895	0.892
I-THD	-	-
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	1000.77	1001.73
Luminaire Efficacy(Lm/W)	73.53	73.66
Correlated Color Temperature (CCT)(K)	3086	-
Color Rendering Index (CRI)	86.2	-
R9	23	-
Chromaticity Coordinate (x,y)	x = 0.4283 y = 0.3962	-
Chromaticity Coordinate (u,v)	u = 0.2484 v = 0.3447	-
Chromaticity Coordinate (u',v')	u' = 0.2484 v' = 0.5170	-
Duv	-0.0019	-
Zone Lumens between 0-60 °	-	45.72 %

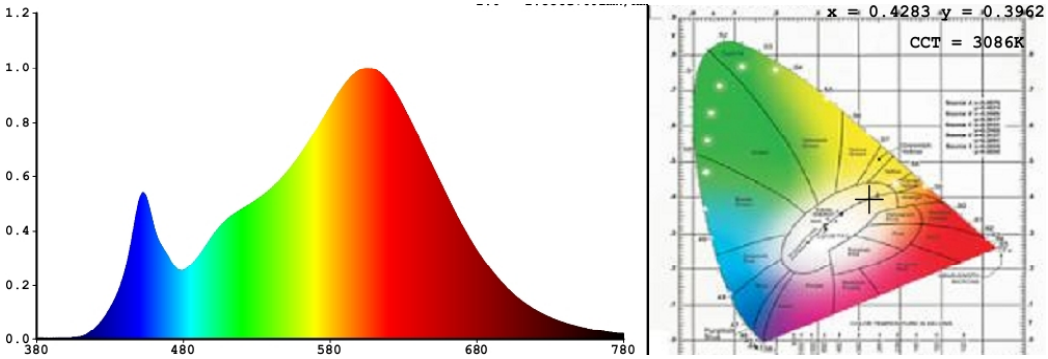
3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
86	95	95	85	87	94	84	65
R9	R10	R11	R12	R13	R14	R15	-
23	88	85	81	88	98	79	-

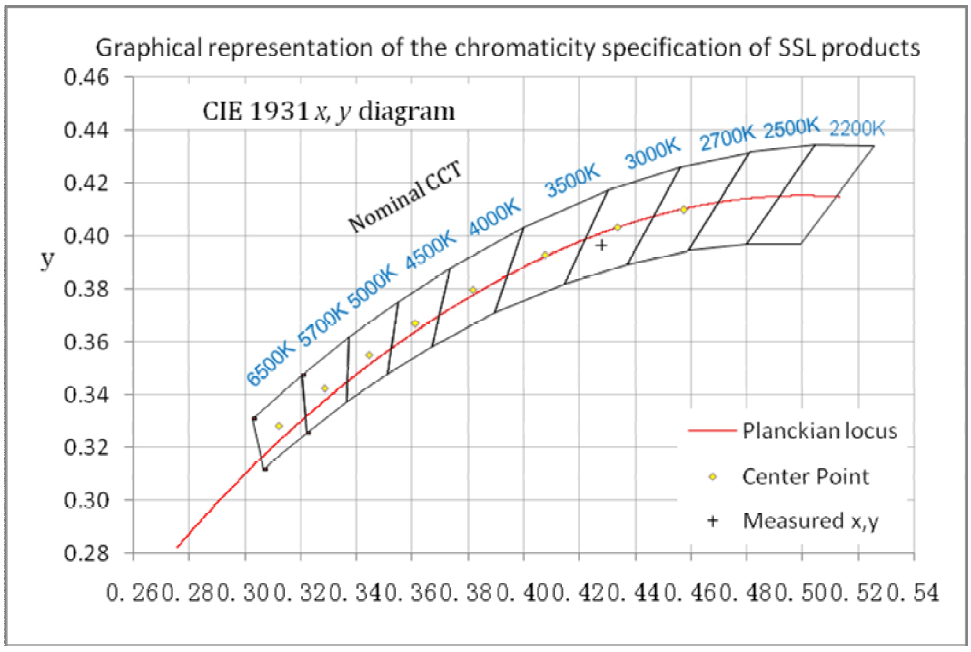
Note: N.A.

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)	1.40	Luminous Length	0.29 m (Diameter)
Spacing Criteria (90-270)	1.40	Luminous Width	0.29 m (Diameter)
Spacing Criteria (Diagonal)	1.56	Luminous Height	0.06 m
Test Distance	29.65 m		

4.4 Zonal Lumen Summary

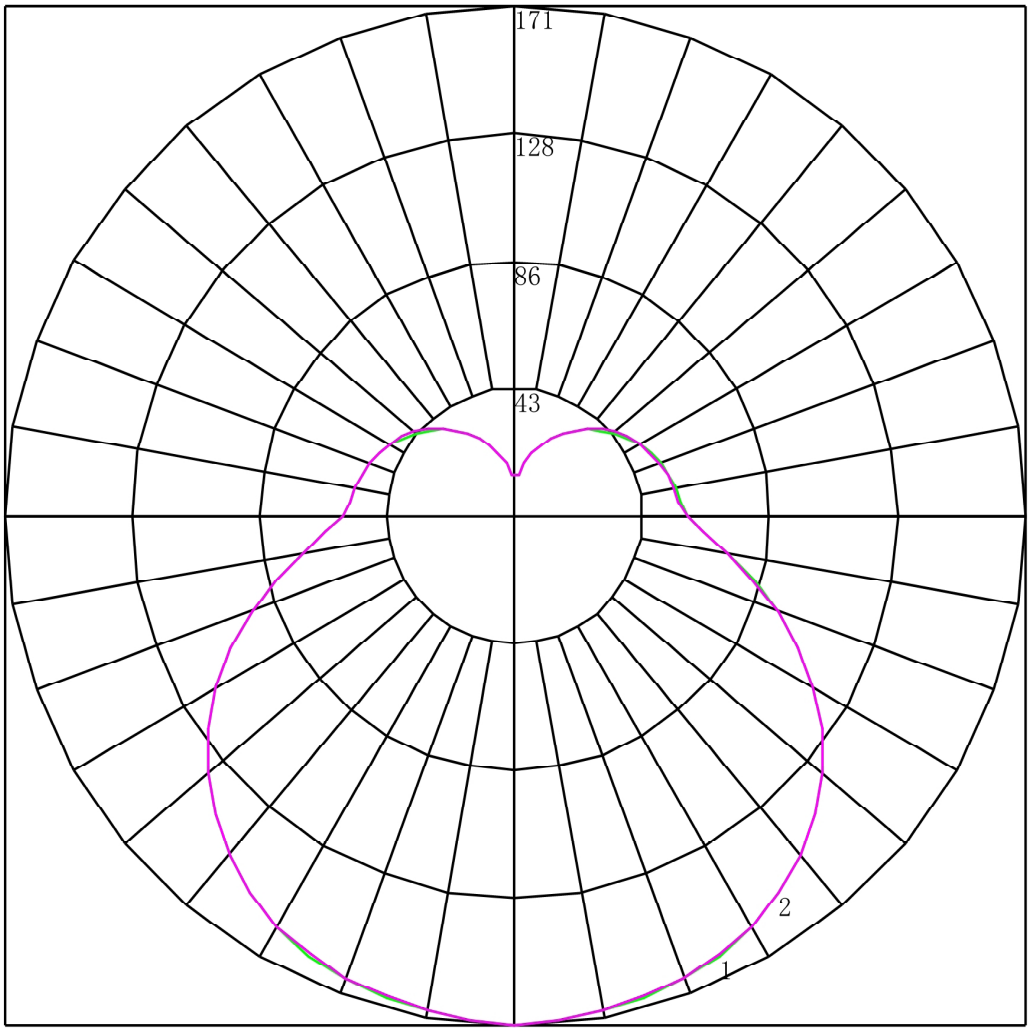
Zone	Lumens	%Lamp	%Fixt
0-20	63.59	6.30	6.30
0-30	138.82	13.90	13.90
0-40	235.77	23.50	23.50
0-60	458.02	45.70	45.70
0-80	649.56	64.80	64.80
0-90	719.58	71.80	71.80
10-90	703.36	70.20	70.20
20-40	172.18	17.20	17.20
20-50	282.09	28.20	28.20
40-70	326.26	32.60	32.60
60-80	191.54	19.10	19.10
70-80	87.53	8.70	8.70
80-90	70.02	7.00	7.00
90-110	116.82	11.70	11.70
90-120	166.41	16.60	16.60
90-130	207.63	20.70	20.70
90-150	261.28	26.10	26.10
90-180	282.15	28.20	28.20
110-180	165.32	16.50	16.50
0-180	1001.73	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	16.22
10-20	47.37
20-30	75.23
30-40	96.96
40-50	109.91
50-60	112.34
60-70	104.01
70-80	87.53
80-90	70.02
90-100	60.78
100-110	56.04
110-120	49.59
120-130	41.22
130-140	31.68
140-150	21.97
150-160	13.23
160-170	6.19
170-180	1.44

4.5 Polar Curves

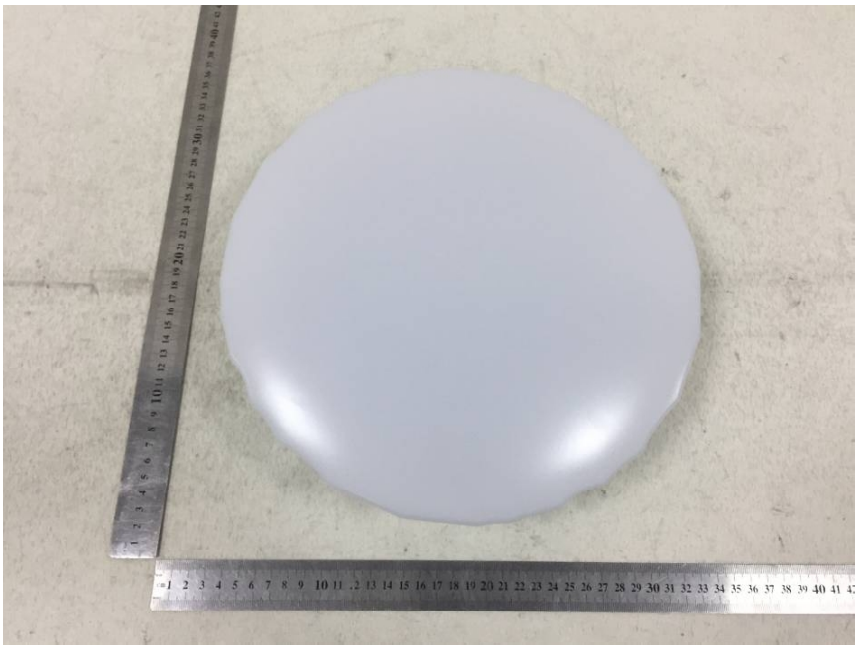


Maximum Candela = 171.115 Located At Horizontal Angle = 0, Vertical Angle = 0
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)

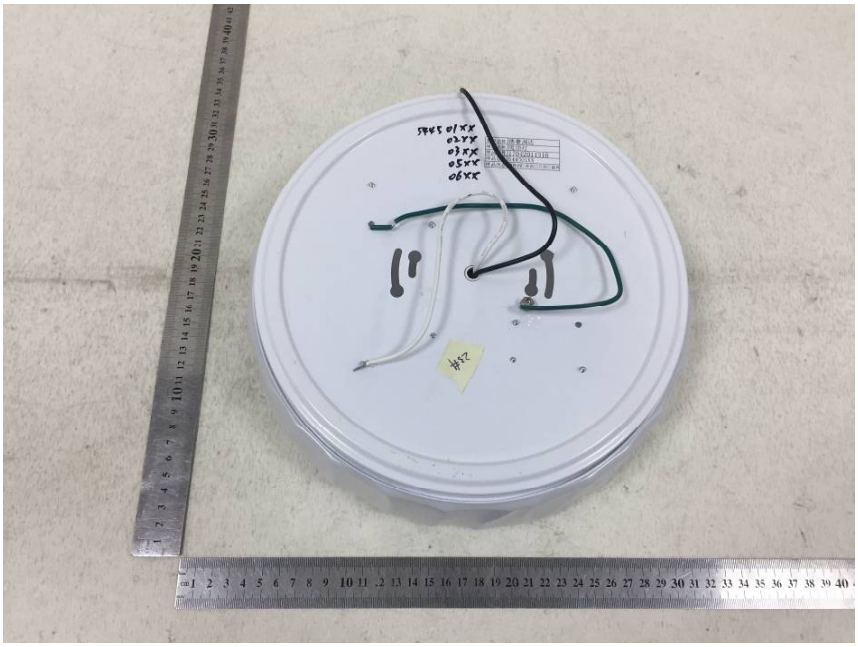
4.6 Candela Tabulation

	0	15	30	45	60	75	90
0	171.115	171.115	171.115	171.115	171.115	171.115	171.115
5	170.367	170.455	170.368	170.324	170.434	170.434	170.369
10	168.829	168.917	168.830	168.765	168.852	168.829	168.744
15	167.466	167.400	167.337	167.228	167.358	167.313	167.296
20	165.575	165.597	165.470	165.383	165.490	165.533	165.408
25	162.981	163.025	162.878	162.748	162.941	162.961	162.774
30	159.464	159.486	159.363	159.234	159.338	159.445	159.262
35	154.847	154.869	154.706	154.645	154.746	154.764	154.741
40	149.264	149.176	149.083	148.979	149.121	149.160	149.078
45	142.449	142.449	142.274	142.281	142.354	142.281	142.449
50	134.667	134.491	134.410	134.463	134.466	134.567	134.416
55	125.654	125.698	125.645	125.591	125.612	125.556	125.636
60	115.806	115.740	115.673	115.621	115.702	115.754	115.803
65	105.078	105.056	105.063	104.817	105.024	105.051	105.004
70	93.867	93.955	93.817	93.749	93.907	93.777	93.898
75	82.788	82.788	82.658	82.615	82.569	82.524	82.528
80	72.236	72.214	72.180	72.008	72.023	72.085	71.993
85	63.487	63.487	63.482	63.312	63.476	63.382	63.389
90	57.859	57.815	57.836	57.668	57.763	57.822	57.770
95	55.529	55.551	55.464	55.296	55.412	55.383	55.356
100	54.386	54.298	54.212	54.066	54.116	54.130	54.170
105	53.243	53.265	53.048	52.858	52.930	52.987	52.941
110	51.880	51.726	51.598	51.541	51.545	51.603	51.624
115	50.077	50.231	50.017	49.894	49.919	49.976	49.912
120	48.186	48.252	48.084	48.027	48.052	48.086	48.156
125	45.900	46.010	45.931	45.897	45.899	46.042	46.181
130	43.482	43.482	43.603	43.569	43.614	43.713	43.810
135	40.712	40.800	40.747	40.890	41.021	41.054	41.176
140	37.855	37.942	37.803	37.904	38.011	38.087	38.104
145	34.821	34.843	34.838	34.917	34.869	35.054	35.075
150	31.655	31.589	31.675	31.711	31.749	31.801	31.914
155	28.358	28.424	28.402	28.417	28.453	28.505	28.578
160	25.104	25.192	24.975	25.035	25.070	25.098	24.978
165	21.719	21.675	21.680	21.609	21.686	21.736	21.773
170	17.806	17.784	17.683	17.722	17.797	17.824	17.779
175	13.541	13.563	13.597	13.637	13.688	13.582	13.345
180	13.283	13.283	13.283	13.283	13.283	13.283	13.283

Appendix 1 Product Photo



Picture 1



Picture 2

Appendix 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	Apr. 28, 2017
Test report number	LCZP17040292
Laboratory contact name	Richard Li

Product Information

Applicant	ELEC-TECH INTERNATIONAL CO LTD	
Brand name	Hampton Bay	
Model number	544503##(##=11-30)	
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	2.36	in.
Luminaire length	11.42	in.
Luminaire width	11.42	in.
Number of units(modular products)	N/A	

Electrical Measurements	**Integrating sphere output**	**Goniophotometer Output**	
Input wattage	13.61	13.59	W
Input current	0.127	0.127	A
Input voltage(AC)	120.00	120.06	V
Power factor	0.895	0.892	
Off-state power	0.0	0.0	W
Photometric Characteristics			
Total initial lumen output	1000.77	1001.73	lm
Initial luminaire efficacy	73.53	73.66	lm/W
Correlated color temperature / CCT	3086	K	
Color rendering index/CRI	86.2		
R9value	23		
Duv	-0.0019		

Luminous Intensity Distribution		**Goniophotometer Output**	
Center beam candle power(if applicable)	--	171.115	cd
Beam angle(if applicable)		147.3	°
Zonallumensinthe0°-60°zone		45.72	%
Zonal lumens in the60°-90° zone		31.68	%
Zonallumensinthe90°-120°zone		19.93	%
Zonallumensinthe120°-180°zone		11.55	%

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