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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

NVC VIETNAM TECHNOLOGY AND LIGHTING COMPANY LIMITED

Lot CN23-1, Yen Phong Industrial park, Dong Phong commune, Yen Phong district, Bac Ninh province VIETNAM

For products:

LED Ceiling Light

Models No.:

564212###(##=41-50, #=0-9)

(The product is 4000K luminaire, ## can be 41-50, # can be 0-9 and represent different client and sales districts.)

Test Date: Jan. 19, 2021 to Jan. 20, 2021

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Template No.: LC-RT-PL-001 Rev.1.4

Test Note:

Complied by:		**Reviewed by:**	
Fish Tan	Fish Tan	**Lin Qiu**	Lin
Jan. 29, 2021		**Jan. 29, 2021**	

Table of Contents

1. General

1.1 Product Information

Brand Name	Commercial Electric, Hampton Bay
Product Type	LED Ceiling Light
Model Number	564212###(##=41-50, #=0-9)
Rated Inputs	120VAC, 60Hz
Rated Power	7W
Rated Light output	650lm
Declared CCT	4000K
Power Supply	ETI-AD00700050135SNA
LED Package, Array or Module	SPMWH1229AQ5SGT*SM, Samsung Electronics Co., LTD.
Receipt Samples	1 unit
Sample Code of lab.	210116106008
Date of Receipt Samples	Jan. 16, 2021
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 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	2020-12-23	2021-12-22
AC Power supply	LC-I-989	APW-120N	2020-12-23	2021-12-22
Power analyzer	LC-I-928	WT210	2020-12-25	2021-12-24
Power analyzer	LC-I-954	WT210	2020-12-25	2021-12-24
Multimeter	LC-I-972	FLUKE	2020-07-20	2021-07-19
Photometric colorimetric electric system* (2 meter sphere)	LC-I-956	HAAS-2000	Before use	Before use
Standard lamp**	LC-PL-I-011	D204C	2020-07-14	2021-07-13
Luminous Flux Standard Lamp***	LC-PL-I-003	24V/100W	2020-07-14	2021-07-13
Goniophotometer(with mirror)	LC-I-902	GMS-2000	2020-04-23	2021-04-22
Wireless temperature transmitter	LC-I-PL-009	DWLR-DLR	2020-12-24	2021-12-23
Wireless temperature transmitter	LC-I-PL-008	DWLR-DLR	2020-12-24	2021-12-23

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	120.01 V~60Hz	120.04 V~60Hz
Input Current(A)	0.066	0.066
Total Power(W)	6.70	6.68
Power Factor	0.849	0.848
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-	784.18
Luminaire Efficacy(lm/W)	-	117.39
Correlated Color Temperature (CCT)(K)	3939	-
Color Rendering Index (CRI)	86.5	-
R9	24	-
Chromaticity Coordinate (x,y)	x = 0.3834 y = 0.3793	-
Chromaticity Coordinate (u,v)	u = 0.2261 v = 0.3354	-
Chromaticity Coordinate (u',v')	u' = 0.2261 v' = 0.5031	-
Duv	0.0003	-
Zone Lumens between 0-60 °	-	61.50 %
Beam Angle(50%Imax)	-	C0/180= 129.2° C90/270= 128.4°

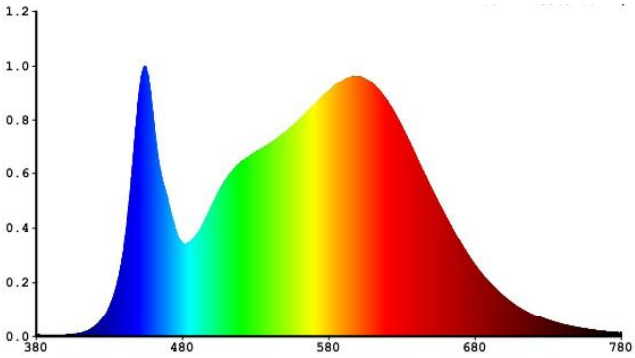
3.3 Color Rendering Details

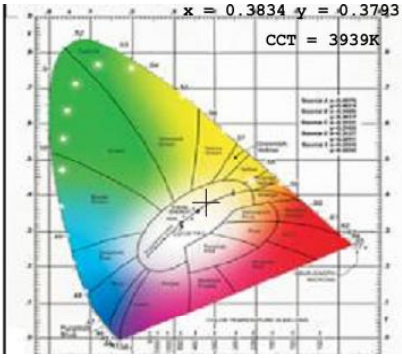
R1	R2	R3	R4	R5	R6	R7	R8
86	93	97	85	85	90	87	69
R9	R10	R11	R12	R13	R14	R15	-
24	83	84	66	88	99	80	-

Note: N/A

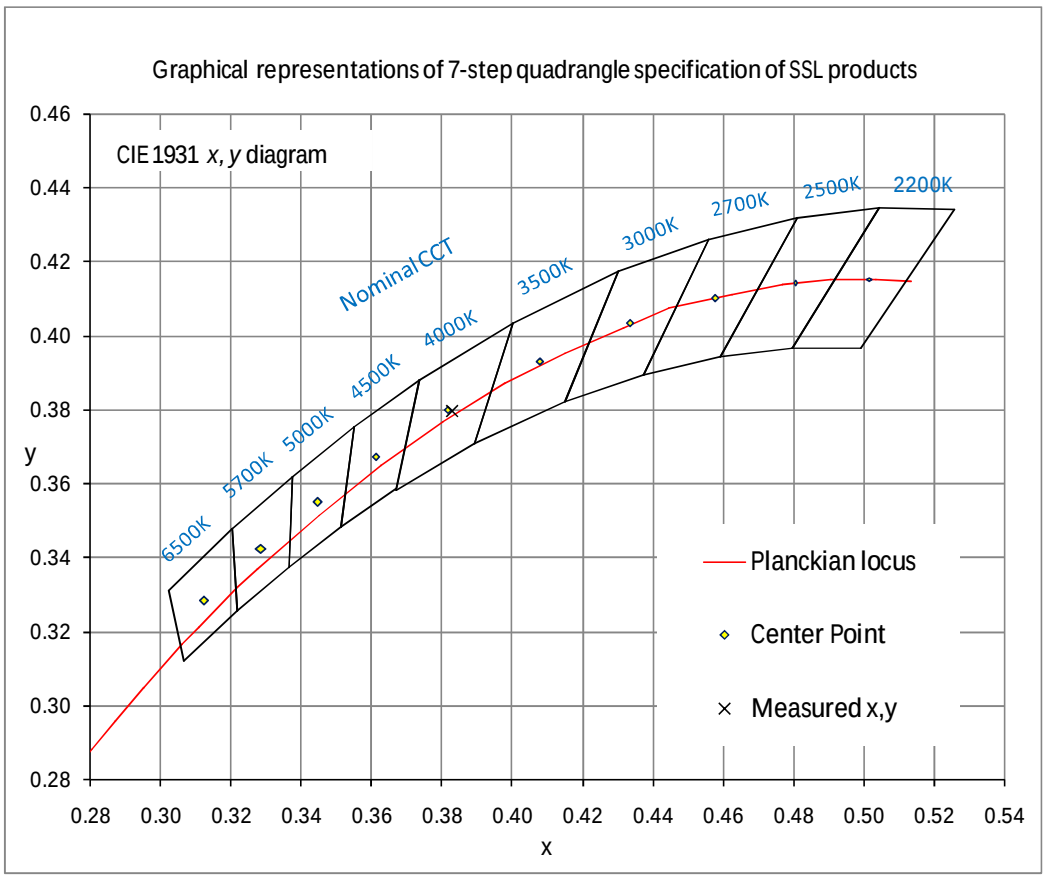
4. Test Data

4.1 Spectral Distribution





4.2 ANSI Chromaticity Quadrangles Diagram



4.3 Goniometry Test Data

CIE Type	Direct	Basic Luminous Shape	Circular w/ Sides
Spacing Criteria (0-180)	1.28	Luminous Length	0.06 m (Diameter)
Spacing Criteria (90-270)	1.28	Luminous Width	0.06 m (Diameter)
Spacing Criteria (Diagonal)	1.44	Luminous Height	0.03 m
Test Distance	30.13 m		

4.4 Zonal Lumen Summary

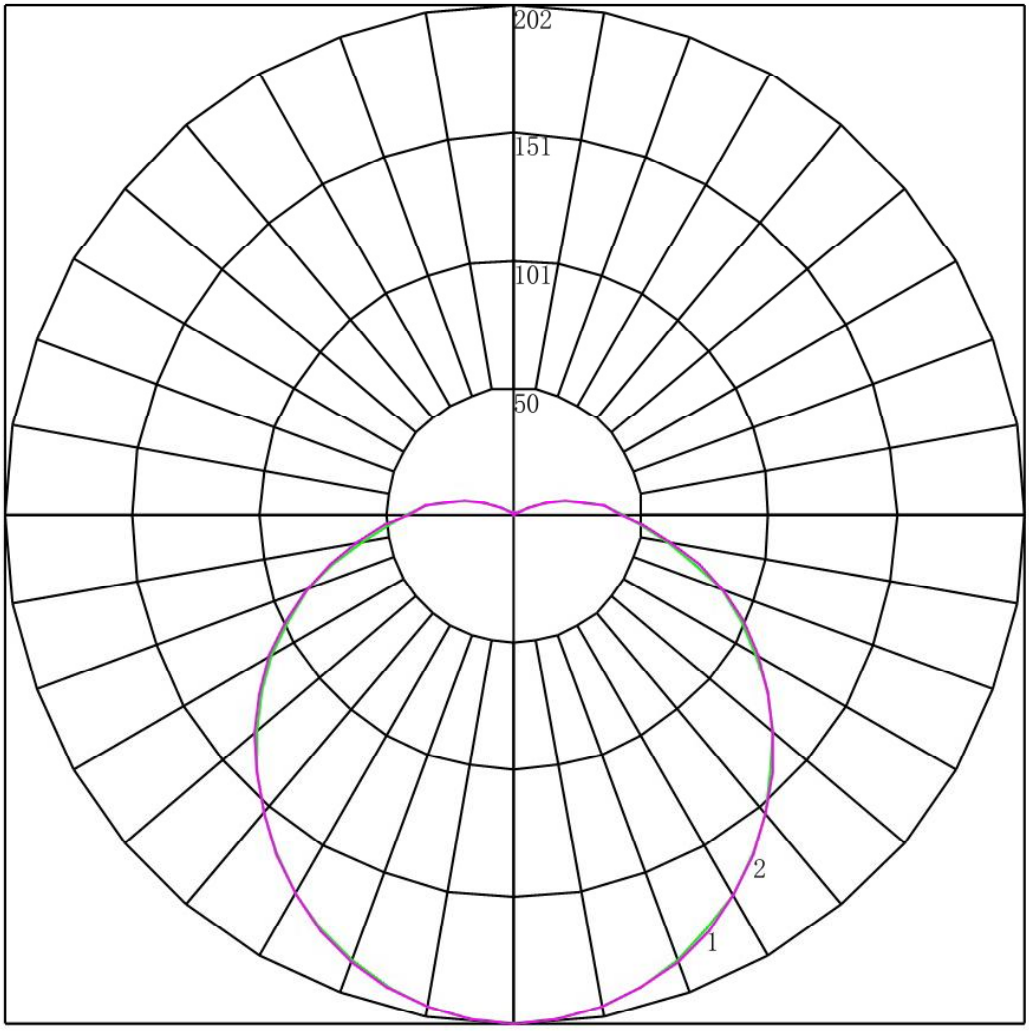
Zone	Lumens	%Lamp	%Fixt
0-20	73.89	9.40	9.40
0-30	157.68	20.10	20.10
0-40	260.70	33.20	33.20
0-60	482.25	61.50	61.50
0-80	660.25	84.20	84.20
0-90	716.30	91.30	91.30
10-90	697.20	88.90	88.90
20-40	186.80	23.80	23.80
20-50	298.41	38.10	38.10
40-70	320.23	40.80	40.80
60-80	178.00	22.70	22.70
70-80	79.33	10.10	10.10
80-90	56.05	7.10	7.10
90-110	60.45	7.70	7.70
90-120	66.95	8.50	8.50
90-130	67.43	8.60	8.60
90-150	67.74	8.60	8.60
90-180	67.88	8.70	8.70
110-180	7.43	0.90	0.90
0-180	784.18	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	19.10
10-20	54.79
20-30	83.79
30-40	103.02
40-50	111.61
50-60	109.95
60-70	98.67
70-80	79.33
80-90	56.05
90-100	38.47
100-110	21.98
110-120	6.50
120-130	0.48
130-140	0.24
140-150	0.07
150-160	0.06
160-170	0.06
170-180	0.02

4.5 Polar Curves

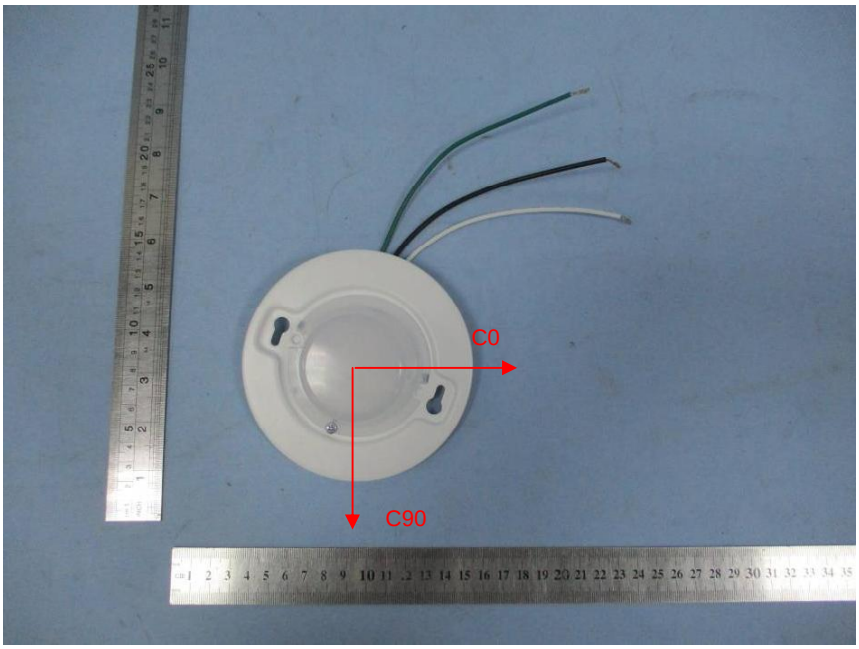


Maximum Candela = 201.967 Located At Horizontal Angle = 0, Vertical Angle = 0
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)

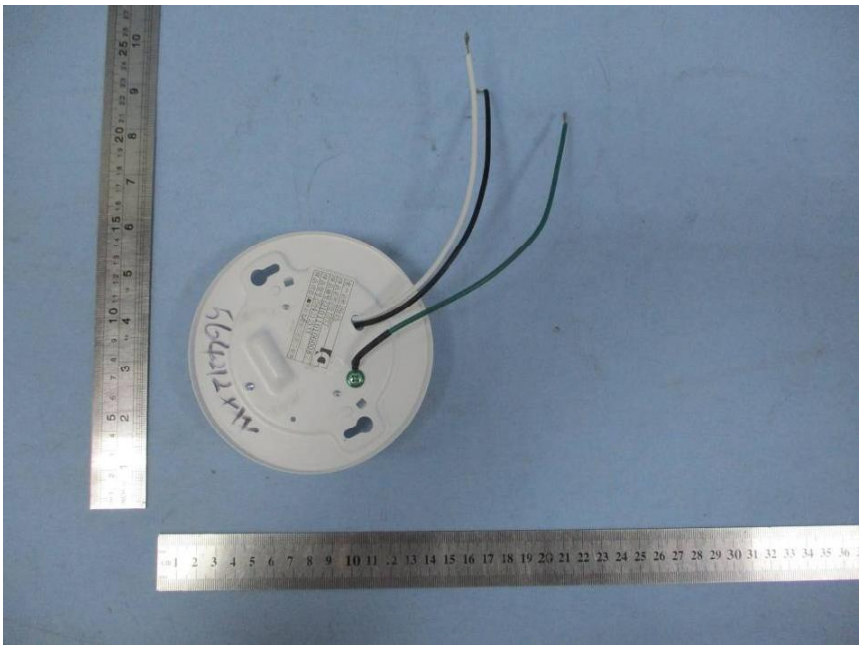
4.6 Candela Tabulation

	0	15	30	45	60	75	90
0	201.967	201.967	201.967	201.967	201.967	201.967	201.967
5	200.965	200.943	201.079	200.967	201.013	200.947	201.201
10	198.189	198.123	198.236	197.993	198.268	198.207	198.320
15	194.003	193.938	194.186	193.837	194.069	194.086	194.223
20	188.451	188.434	188.590	188.455	188.555	188.469	188.775
25	181.488	181.474	181.652	181.530	181.679	181.721	181.932
30	173.387	173.309	173.530	173.423	174.578	173.795	173.783
35	164.240	164.280	164.385	164.544	164.456	164.531	164.599
40	154.319	154.273	154.489	154.439	154.675	154.794	155.054
45	143.989	144.015	144.252	145.448	144.554	144.648	144.879
50	133.385	133.371	133.674	133.570	133.820	133.913	134.299
55	122.327	122.545	122.868	122.739	122.905	122.906	123.224
60	110.995	111.013	112.700	111.271	111.468	111.696	111.878
65	99.117	99.255	99.323	99.531	99.781	99.874	100.038
70	86.921	87.155	87.220	87.382	87.663	87.599	87.882
75	74.361	76.125	74.686	74.938	75.250	75.325	75.636
80	61.709	62.023	62.151	62.244	62.701	62.869	63.030
85	50.105	50.242	50.481	50.594	51.037	51.183	51.415
90	42.960	41.099	41.313	41.557	41.846	42.079	42.005
95	35.224	35.140	35.330	35.357	35.537	35.647	35.837
100	28.306	28.362	28.482	28.385	28.434	28.445	28.499
105	20.843	21.606	20.702	20.551	20.560	20.586	20.755
110	12.970	12.828	12.944	12.921	12.821	12.977	13.011
115	5.825	5.822	5.983	5.950	5.900	6.092	6.213
120	0.728	0.728	1.501	1.090	0.999	1.292	1.306
125	0.046	0.023	0.228	0.432	0.386	0.477	0.630
130	0.137	0.045	0.205	0.500	0.500	0.590	0.675
135	0.137	0.091	0.114	0.386	0.523	0.545	0.540
140	0.091	0.068	0.045	0.205	0.318	0.295	0.180
145	0.000	0.159	0.114	0.114	0.136	0.045	0.000
150	0.137	0.114	0.114	0.136	0.045	0.068	0.000
155	0.182	0.182	0.182	0.136	0.091	0.091	0.000
160	0.273	0.227	0.159	0.204	0.227	0.159	0.090
165	0.228	0.205	0.227	0.272	0.250	0.272	0.180
170	0.228	0.205	0.228	0.227	0.250	0.249	0.135
175	0.228	0.136	0.205	0.227	0.227	0.159	0.180
180	0.107	0.107	0.107	0.107	0.107	0.107	0.107

Appendix A Product Photo



Picture 1



Picture 2

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