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NVLAP TESTING
NVLAP LAB CODE 500080-0

IESNA SUSTAINING MEMBER

Ref. No.: LCZP20080109
Version: 1.0
Date of Issue: May. 22, 2020
Total pages: 11

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 519085

NVC Vietnam Lighting and Technology Co.LTD

Yen Phong Industrial Park Phase 1, Long Chau Ward, Yen Phong District, Bac Ninh province , Vietnam

For products:

Linear Ambient Luminaires w/Indirect component

Models No.:

565672##(##=41-50,91-99)

(Where ## denotes CCT and could be 41-50 and 91-99 which refers 4000K .)

Test Date:	May. 15, 2020 to May. 22, 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-046 Rev.1.3
Test Note:	/

Complied by:		**Reviewed by:**	
Fish Tan	Fish Tan	**Lin Qiu**	Lin
May. 22, 2020		**May. 22, 2020**	

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1. General

1.1 Product Information

Brand Name	Commercial Electric
Category	Indoor
General Application	Linear Ambient
Primary Use	Linear Ambient Luminaires w/Indirect component
Model Number	565672##(##=41-50,91-99)
Rated Inputs	AC120-277V, 50/60Hz
Rated Power	58W(38W+20W)
Rated Light output	6700lm
Declared CCT	4000K
Power Supply	ETI-AD04001100033SDD
LED Package, Array or Module	SPMWHX228FD5WAW0XX, Samsung Electronics Co., LTD.
Dimming	Continuous Dimming
Integral Controls	No
Controls Controllability	No
Receipt Samples	1 unit
Sample Code of lab.	200515102001
Date of Receipt Samples	May. 22, 2020
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- 2017	Specifications for the Chromaticity of Solid State Lighting Products
ANSI/IES TM-30-18*	IES Method for Evaluating Light Source Color Rendition
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

Note:

**For reference only and not in the scope of NVLAP.*

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	2019-12-26	2020-12-25
Power analyzer	LC-I-954	WT210	2019-12-29	2020-12-28
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-008	DWLR-DLR	2020-01-03	2021-01-02
Wireless temperature transmitter	LC-I-PL-009	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 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	119.90 V~60Hz
Input Current(A)	0.479	0.474
Total Power(W)	56.21	55.61
Power Factor	0.978	0.979
I-THD	13.90%	-
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-	6702.19
Luminaire Length(ft)	-	4
Lumens per Foot(lm/ft)	-	1,675.55
Luminaire Efficacy(lm/W)	-	120.52
Correlated Color Temperature (CCT)(K)	4089	-
Color Rendering Index (CRI)	86.7	-
R9	25	-
Chromaticity Coordinate (x,y)	x = 0.3753 y = 0.3693	-
Chromaticity Coordinate (u',v')	u' = 0.2247 v' = 0.4975	-
Duv	-0.0020	-
Zone Lumens between 90-150 °	-	34.17%

3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
86	94	96	85	86	90	87	70
R9	R10	R11	R12	R13	R14	R15	-
25	85	85	67	89	99	81	-

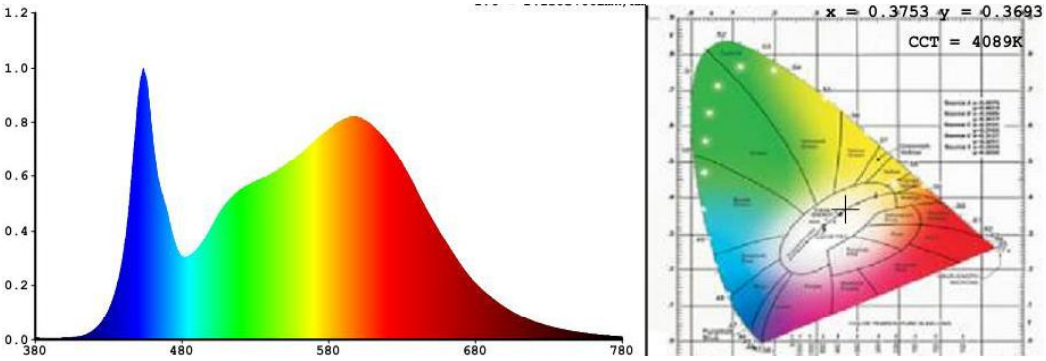
3.4 Electrical data on 277V

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Input Voltage & Frequency	277.01V~60Hz	-
Power Factor	0.889	-
I-THD	17.4%	-

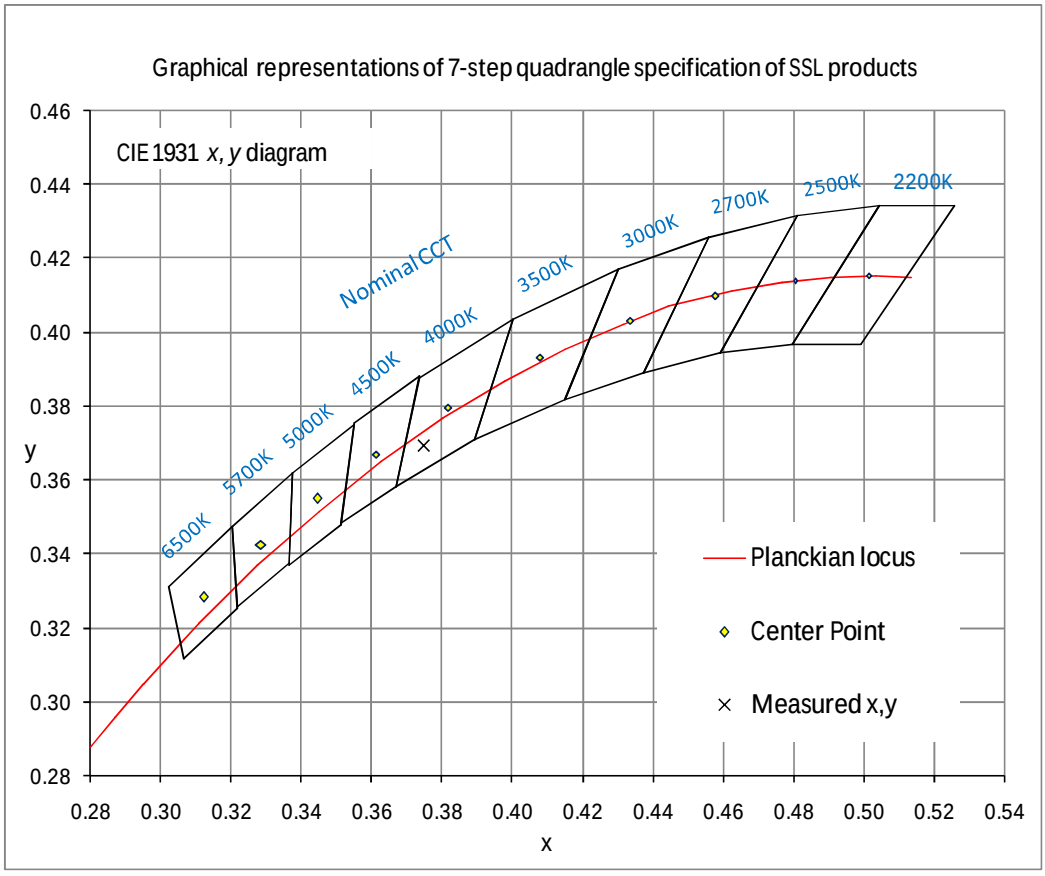
Note: *N/A.*

4. Test Data

4.1 Spectral Distribution



4.2 ANSI Chromaticity Quadrangles Diagram



Goniometry Test Data

CIE Type	General Diffuse	Basic Luminous Shape	Rectangular w/Sides
Spacing Criteria (0-180)	N.A.	Luminous Length	1.16 m
Spacing Criteria (90-270)	N.A.	Luminous Width	0.18 m
Spacing Criteria (Diagonal)	N.A.	Luminous Height	0.04 m
Test Distance	29.63 m		

4.3 Zonal Lumen Summary

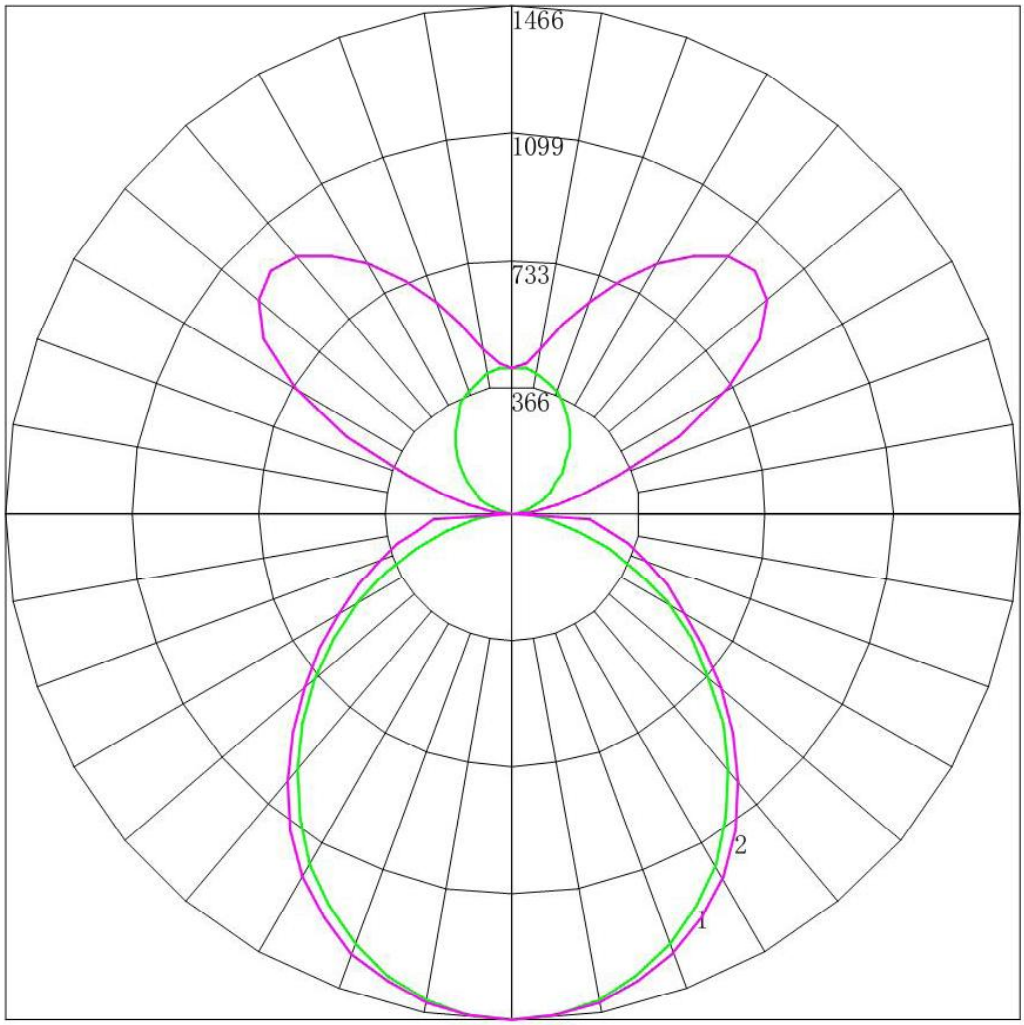
Zone	Lumens	%Lamp	%Fixt
0-20	532.31	7.90	7.90
0-30	1120.49	16.70	16.70
0-40	1810.74	27.00	27.00
0-60	3086.66	46.10	46.10
0-80	3832.36	57.20	57.20
0-90	3977.54	59.30	59.30
10-90	3839.08	57.30	57.30
20-40	1278.43	19.10	19.10
20-50	1964.85	29.30	29.30
40-70	1721.4	25.70	25.70
60-80	745.70	11.10	11.10
70-80	300.22	4.50	4.50
80-90	145.18	2.20	2.20
90-110	367.14	5.50	5.50
90-120	836.08	12.50	12.50
90-130	1393.25	20.80	20.80
90-150	2290.27	34.20	34.20
90-180	2724.65	40.70	40.70
110-180	2357.51	35.20	35.20
0-180	6702.19	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	138.46
10-20	393.85
20-30	588.17
30-40	690.25
40-50	686.43
50-60	589.49
60-70	445.48
70-80	300.22
80-90	145.18
90-100	93.19
100-110	273.95
110-120	468.94
120-130	557.17
130-140	507.64
140-150	389.38
150-160	256.23
160-170	136.69
170-180	41.46

4.4 Polar Curves

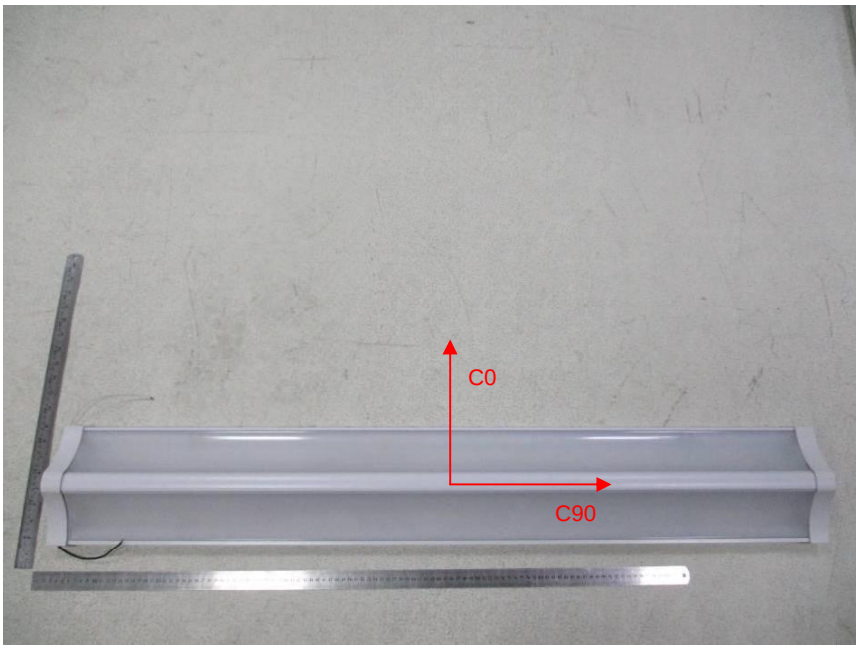


Maximum Candela = 1465.935 Located At Horizontal Angle = 0, Vertical Angle = 0
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)

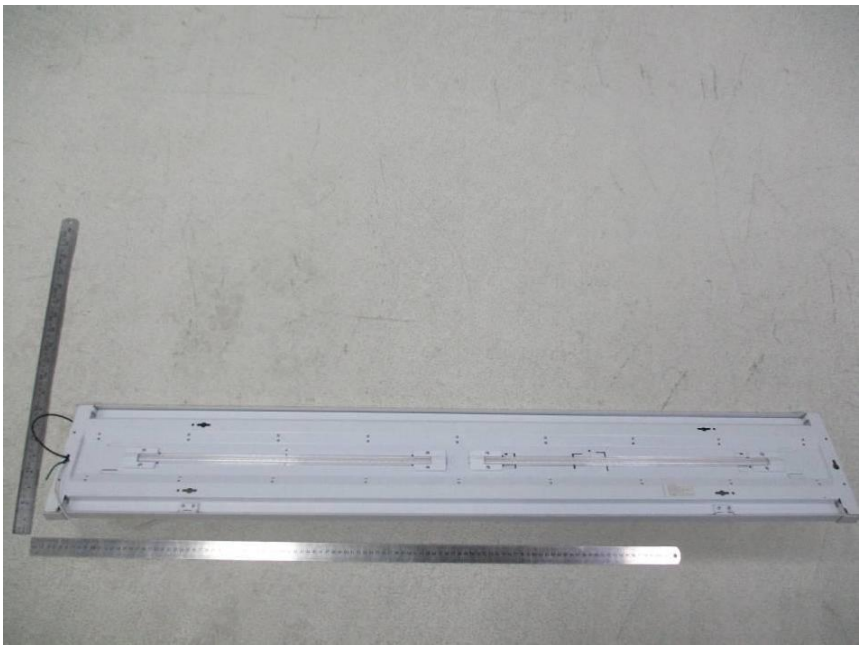
4.5 Candela Tabulation

	0	15	30	45	60	75	90
0	1465.935	1465.935	1465.935	1465.935	1465.935	1465.935	1465.935
5	1457.530	1458.192	1457.792	1458.255	1459.152	1458.729	1459.032
10	1431.432	1431.421	1433.581	1434.774	1437.242	1437.959	1438.324
15	1388.082	1389.164	1392.644	1397.690	1400.426	1404.516	1403.812
20	1330.135	1331.642	1337.401	1345.033	1351.337	1355.984	1355.062
25	1256.263	1260.184	1268.732	1278.975	1287.364	1291.932	1291.645
30	1171.332	1176.111	1187.298	1201.512	1219.963	1214.560	1215.285
35	1073.132	1080.095	1094.632	1110.660	1119.074	1122.294	1120.806
40	970.065	977.220	992.508	1007.732	1016.727	1017.366	1015.973
45	858.151	868.591	882.233	911.274	902.776	903.690	900.355
50	744.911	752.884	766.889	779.059	782.273	785.431	786.031
55	630.343	637.839	648.904	659.444	666.816	675.701	678.178
60	515.775	519.696	546.622	544.477	563.163	572.312	576.797
65	403.862	408.636	421.311	445.956	468.284	485.300	490.514
70	294.602	304.431	324.257	361.261	393.358	410.544	414.586
75	195.517	218.828	244.591	292.802	325.653	342.116	347.286
80	106.605	129.216	183.625	231.572	262.765	279.162	284.300
85	39.811	73.245	129.912	174.515	203.375	219.045	226.059
90	3.096	3.980	18.202	9.424	7.438	6.989	5.608
95	11.059	38.711	187.542	111.544	70.599	61.646	59.535
100	25.656	58.180	346.892	215.299	154.959	137.741	132.875
105	48.216	80.744	446.578	396.633	256.326	219.671	207.077
110	74.756	96.456	481.982	597.241	446.031	359.172	326.147
115	100.855	120.793	486.601	743.214	652.065	559.077	532.361
120	125.626	150.218	494.299	802.868	808.344	746.026	722.182
125	154.821	187.829	493.433	805.229	897.095	880.042	874.902
130	185.343	222.783	491.236	779.966	922.264	948.477	960.752
135	218.077	257.960	488.381	738.522	904.924	962.458	988.363
140	253.907	292.033	482.670	699.852	860.639	934.454	968.086
145	287.525	323.007	474.103	655.527	795.972	876.274	911.140
150	320.259	350.219	466.398	611.420	719.762	800.403	833.055
155	350.780	371.459	455.406	567.526	659.209	716.003	741.596
160	374.667	389.382	445.290	518.358	589.755	632.055	652.294
165	394.573	404.427	435.167	477.095	522.454	549.416	567.306
170	410.497	414.825	427.471	444.843	464.578	479.420	485.769
175	420.229	421.686	425.496	427.079	431.268	434.162	435.294
180	423.135	423.135	423.135	423.135	423.135	423.135	423.135

Appendix A Product Photo



Picture 1



Picture 2

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