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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 Shop Light

Models No.:

557011##-A(##=41-50,91-99)

(The product is 4000K luminaire, ## can be 41-50 and 91-99 and represent different client and sales districts.)

Test Date:	May. 25, 2021 to Jun. 1, 2021
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
Jun. 5, 2021		**Jun. 5, 2021**	

Table of Contents

1. General

1.1 Product Information

Brand Name	Commercial Electric
Factory 1	Name: ETI Solid State Lighting (Zhuhai) Ltd Address: No.1, Zhongzhu Road South, Science & Technology Innovation Coast, High Tech District, Zhuhai City, Guangdong Prov., China
Factory 2	Name: NVC VIETNAM TECHNOLOGY AND LIGHTING COMPANY LIMITED Address: Lot CN23-1, Yen Phong Industrial park, Dong Phong commune, Yen Phong district, Bac Ninh province VIETNAM
Product Type	LED Shop Light
Model Number	557011##-A(##=41-50,91-99)
Rated Inputs	120VAC, 60Hz
Rated Power	38W
Rated Light output	3000lm
Declared CCT	4000K
Power Supply	ETI-AD03800228135SNA
LED Package, Array or Module	SPMWH1228xxxxxxxxx, Samsung Electronics Co., LTD.
Receipt Samples	1 unit
Sample Code of lab.	210517105035
Date of Receipt Samples	May. 17, 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	2021-04-22	2022-04-21
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	120.02 V~60Hz	119.98 V~60Hz
Input Current(A)	0.371	0.374
Total Power(W)	36.84	37.24
Power Factor	0.828	0.829
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-	3166.12
Luminaire Efficacy(lm/W)	-	85.02
Correlated Color Temperature (CCT)(K)	4139	-
Color Rendering Index (CRI)	84.2	-
R9	14	-
Chromaticity Coordinate (x,y)	x = 0.3737 y = 0.3698	-
Chromaticity Coordinate (u,v)	u = 0.2234 v = 0.3317	-
Chromaticity Coordinate (u',v')	u' = 0.2234 v' = 0.4975	-
Duv	-0.0013	-
Zone Lumens between 0-60 º	-	80.59%
Beam Angle(50%Imax)	-	C0/180=109.2° C90/270=107.0°

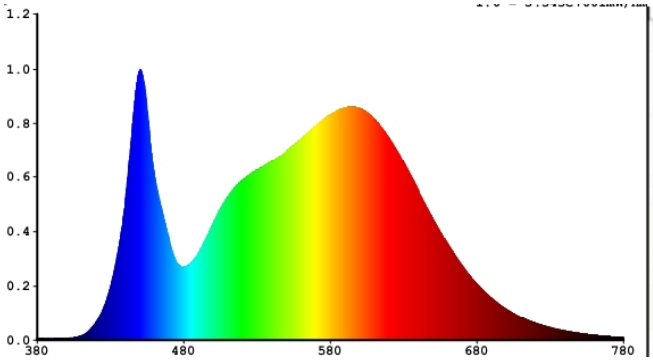
3.3 Color Rendering Details

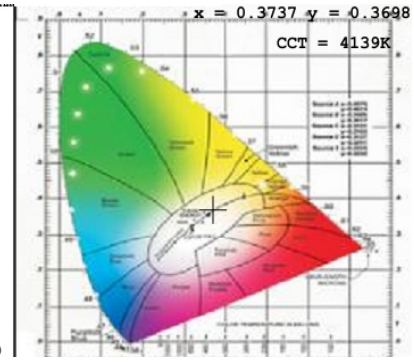
R1	R2	R3	R4	R5	R6	R7	R8
83	90	95	84	83	86	87	67
R9	R10	R11	R12	R13	R14	R15	-
14	76	83	65	85	97	77	-

Note: N/A

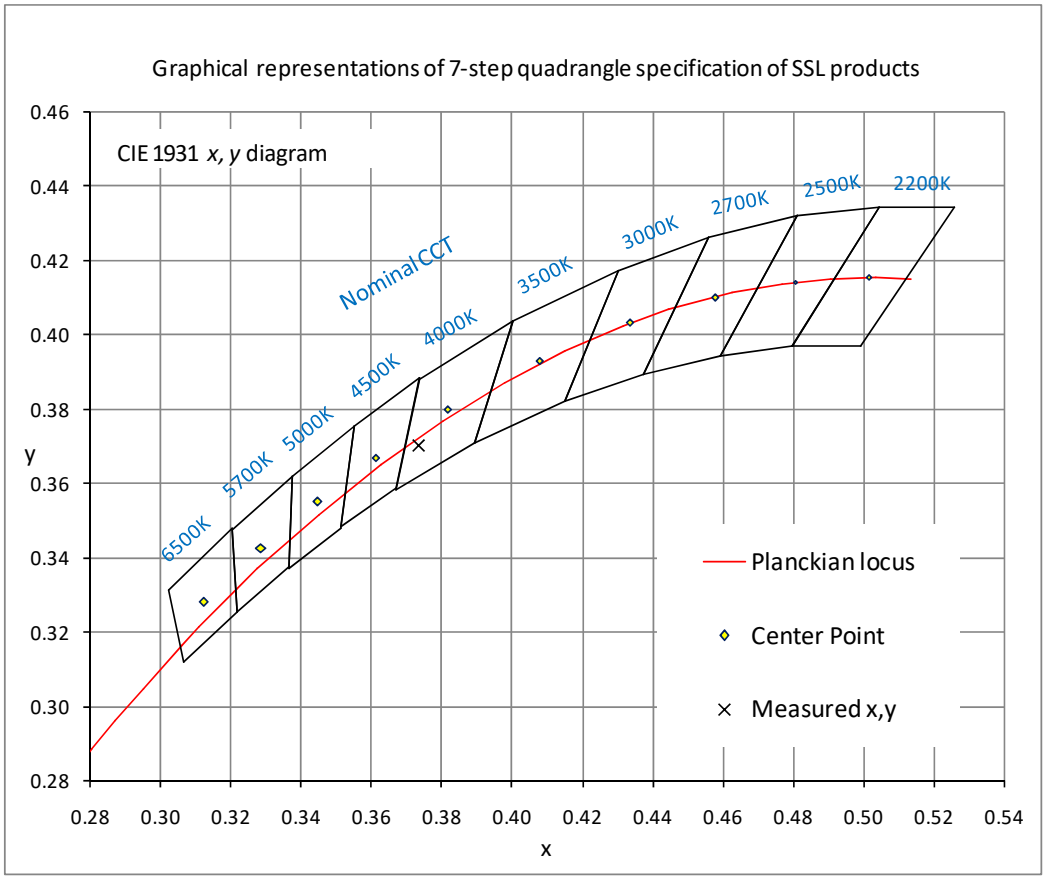
4. Test Data

4.1 Spectral Distribution





4.2 ANSI Chromaticity Quadrangles Diagram



4.3 Goniometry Test Data

CIE Type	Direct	Basic Luminous Shape	Rectangular
Spacing Criteria (0-180)	1.22	Luminous Length	0.92 m
Spacing Criteria (90-270)	1.30	Luminous Width	0.07 m
Spacing Criteria (Diagonal)	1.38	Luminous Height	0.00 m
Test Distance	29.83 m		

4.4 Zonal Lumen Summary

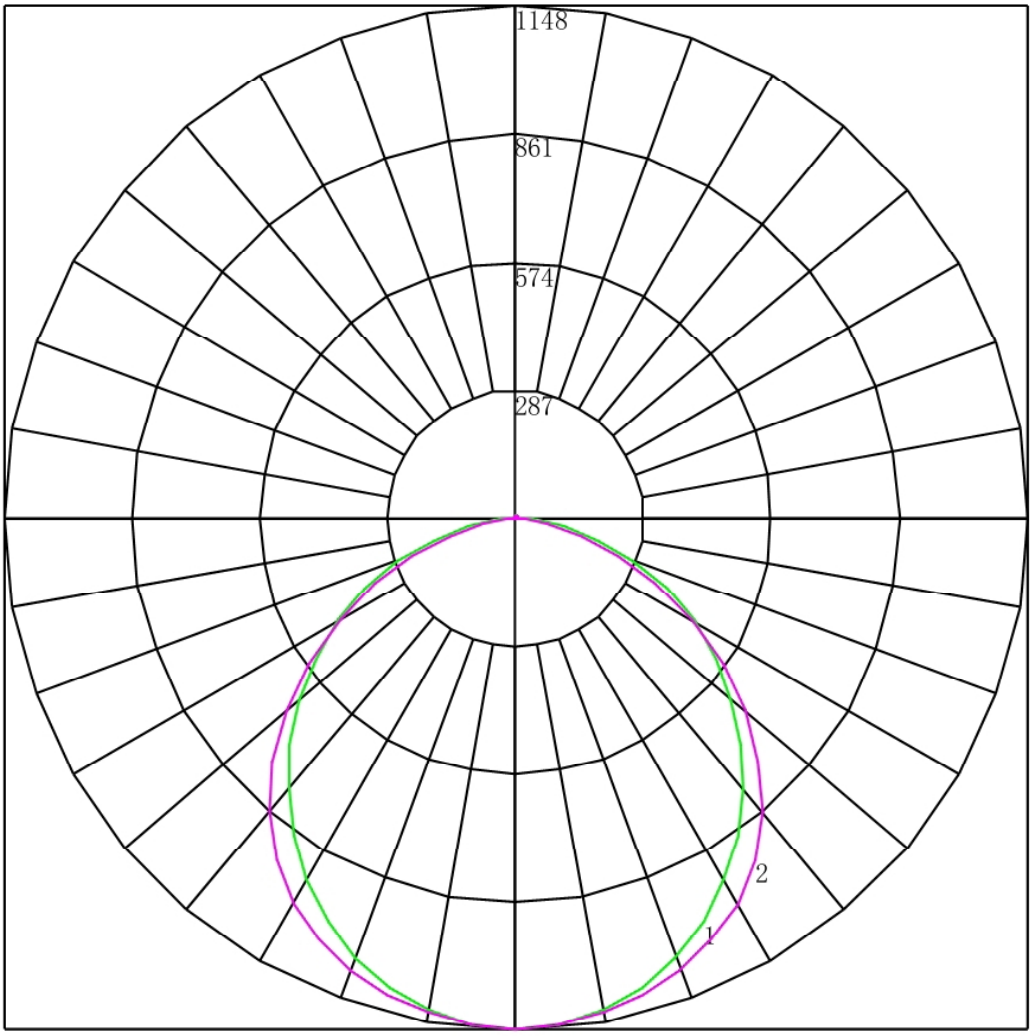
Zone	Lumens	%Lamp	%Fixt
0-20	419.30	13.20	13.20
0-30	890.49	28.10	28.10
0-40	1457.97	46.00	46.00
0-60	2551.67	80.60	80.60
0-80	3112.22	98.30	98.30
0-90	3152.67	99.60	99.60
10-90	3044.11	96.10	96.10
20-40	1038.67	32.80	32.80
20-50	1620.92	51.20	51.20
40-70	1462.65	46.20	46.20
60-80	560.54	17.70	17.70
70-80	191.59	6.10	6.10
80-90	40.45	1.30	1.30
90-110	3.69	0.10	0.10
90-120	5.13	0.20	0.20
90-130	6.59	0.20	0.20
90-150	9.64	0.30	0.30
90-180	13.45	0.40	0.40
110-180	9.76	0.30	0.30
0-180	3166.12	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	108.55
10-20	310.75
20-30	471.19
30-40	567.48
40-50	582.25
50-60	511.45
60-70	368.95
70-80	191.59
80-90	40.45
90-100	2.11
100-110	1.58
110-120	1.43
120-130	1.46
130-140	1.44
140-150	1.61
150-160	1.78
160-170	1.48
170-180	0.55

4.5 Polar Curves

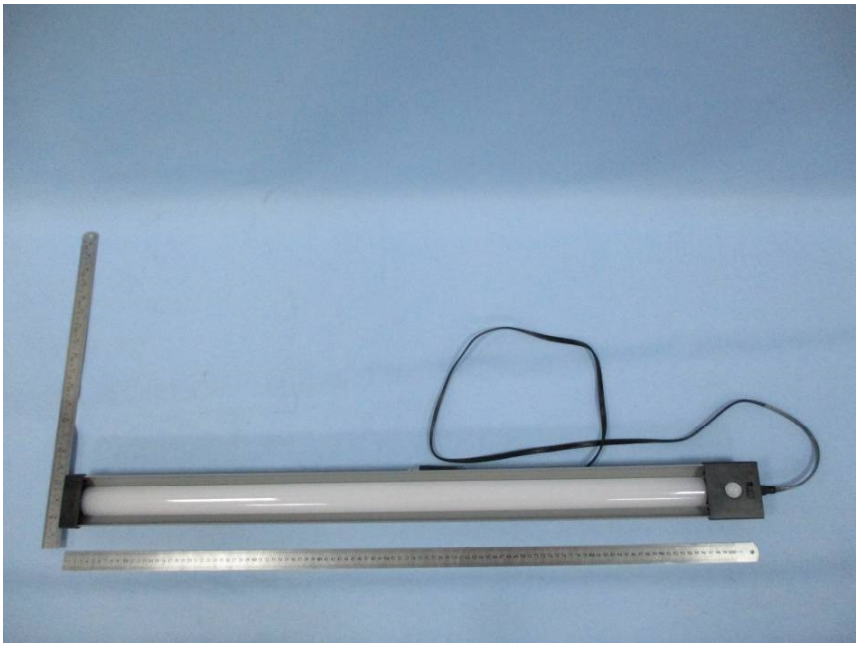


Maximum Candela = 1148.302 Located At Horizontal Angle = 0, Vertical Angle = 0
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)

4.6 Candela Tabulation

	0	15	30	45	60	75	90
0	1148.302	1148.302	1148.302	1148.302	1148.302	1148.302	1148.302
5	1140.046	1141.752	1142.726	1142.133	1142.434	1144.672	1143.297
10	1121.470	1123.178	1124.366	1125.738	1129.256	1130.548	1129.194
15	1090.016	1094.173	1095.575	1100.387	1104.614	1111.395	1109.868
20	1049.320	1054.737	1056.916	1066.374	1073.543	1080.892	1081.794
25	996.688	1005.229	1007.606	1020.461	1033.350	1043.920	1044.493
30	937.280	946.816	950.273	968.625	991.550	999.121	999.487
35	870.111	880.977	885.678	907.503	928.445	939.449	937.158
40	795.268	809.957	816.346	841.680	855.525	863.429	860.421
45	717.375	732.251	740.480	773.292	771.534	776.372	770.714
50	633.244	651.585	660.414	675.504	678.523	679.050	671.780
55	549.159	566.097	573.369	582.485	578.782	574.668	566.403
60	460.093	487.247	492.425	479.257	473.445	463.244	454.368
65	372.103	383.051	384.726	379.618	366.102	354.636	346.031
70	281.646	290.676	289.293	277.620	264.202	252.510	246.139
75	192.805	198.413	195.819	183.082	168.832	159.324	152.646
80	107.283	111.152	107.565	94.916	83.992	76.746	72.862
85	34.774	36.071	32.326	23.745	19.247	17.358	17.628
90	2.872	3.163	3.189	3.074	2.821	2.478	2.699
95	1.750	1.772	1.784	1.715	1.600	1.417	1.349
100	1.660	1.660	1.673	1.582	1.511	1.395	1.306
105	1.660	1.615	1.584	1.559	1.422	1.373	1.262
110	1.526	1.503	1.495	1.448	1.378	1.284	1.219
115	1.526	1.570	1.517	1.403	1.356	1.307	1.262
120	1.615	1.593	1.562	1.559	1.489	1.395	1.393
125	1.705	1.705	1.718	1.648	1.622	1.572	1.567
130	1.750	1.750	1.740	1.715	1.689	1.639	1.610
135	1.885	1.884	1.829	1.827	1.800	1.749	1.785
140	2.154	2.109	2.119	2.094	2.134	2.037	2.002
145	2.468	2.557	2.543	2.539	2.578	2.546	2.525
150	3.096	3.185	3.212	3.208	3.045	3.122	3.134
155	3.949	3.926	3.904	3.898	3.845	3.875	3.830
160	4.666	4.688	4.685	4.656	4.601	4.606	4.483
165	5.295	5.339	5.309	5.324	5.290	5.182	5.180
170	5.923	5.922	5.912	5.881	5.890	5.846	5.745
175	6.371	6.371	6.336	6.304	6.335	6.333	6.181
180	3.289	3.289	3.289	3.289	3.289	3.289	3.289

Appendix A Product Photo



Picture 1

Picture 2

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