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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, Zhuhai City, Guangdong Province, P.R. China 519085

For products:

Inseparable SSL Luminaire

Models No.:

504031##(##=11-30)

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

Test Date:	Aug. 15, 2018 to Aug. 16, 2018
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-001 Rev.1.1
Test Note:	

Complied by:		**Reviewed by:**	
Kargel Yuan	Kargel Yuan	**Richard Li**	
Project Engineer		**Technical Manager**	
Aug. 30, 2018		**Aug. 30, 2018**	

Table of Contents

1. General

1.1 Product Information

Brand Name	ETI
Product Type	Inseparable SSL Luminaire
Model Number	504031##(##=11-30)
Rated Inputs	120-277VAC, 50/60Hz
Rated Power	12.5W
Rated Light output	1100lm
Declared CCT	3000K, 4000K, 5000K
Power Supply	Integrated in luminaire
LED Package, Array or Module	67-21S Series, EVERLIGHT ELECTRONICS CO., LTD
Receipt Samples	1 unit
Sample Code of lab.	180816104004
Date of Receipt Samples	Aug. 16, 2018
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 C78.377-2015	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	2018-01-10	2019-01-09
AC Power supply	LC-I-987	APW-110N	2018-01-10	2019-01-09
Power analyzer	LC-I-928	WT210	2018-01-05	2019-01-05
Power analyzer	LC-I-954	WT210	2018-01-10	2019-01-09
Multimeter	LC-I-972	Fluke 17B	2018-08-08	2019-08-07
Photometric colorimetric electric system* (2 meter sphere)	LC-I-900	SPR3000	Before use	Before use
Standard lamp**	LC-PL-I-011	D204C	2017-09-07	2018-09-06
Luminous Flux Standard Lamp***	LC-PL-I-003	24V100W	2017-09-22	2018-09-21
Goniophotometer(with mirror)	LC-I-902	GMS2000	2018-05-07	2019-05-06
Wireless temperature transmitter	LC-I-978	DWRF-B	2018-02-11	2019-02-10
Wireless temperature transmitter	LC-I-979	DWRF-B	2018-02-11	2019-02-10

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	120.00 V~60Hz	120.01 V~60Hz
Input Current(A)	0.104	0.104
Total Power(W)	12.29	12.25
Power Factor	0.983	0.982
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-****	1244.49
Luminaire Efficacy(Lm/W)	-	101.59
Correlated Color Temperature (CCT)(K)	3039	-
Color Rendering Index (CRI)	84.6	-
R9	17	-
Chromaticity Coordinate (x,y)	x = 0.4319 y = 0.3982	-
Chromaticity Coordinate (u,v)	u = 0.2498 v = 0.3455	-
Chromaticity Coordinate (u',v')	u' = 0.2498 v' = 0.5183	-
Duv	-0.0016	-
Zone Lumens between 0-60 °	-	68.40 %

3.3 Color Rendering Details

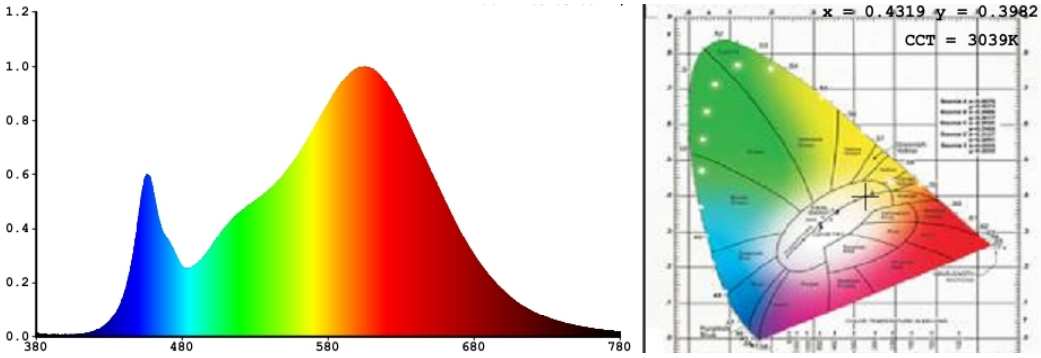
R1	R2	R3	R4	R5	R6	R7	R8
84	95	94	82	85	93	82	62
R9	R10	R11	R12	R13	R14	R15	-
17	87	81	75	87	98	77	-

Note:

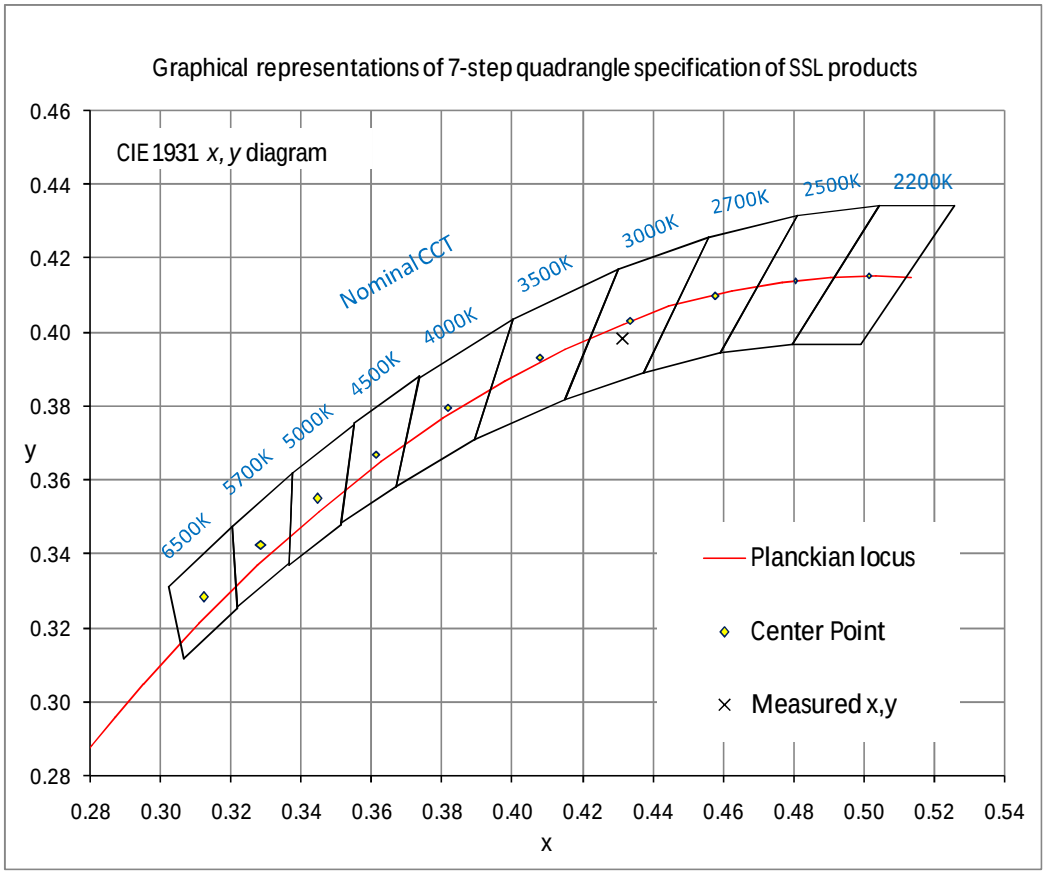
**** Self-absorption is 1.

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
Spacing Criteria (0-180)	1.28	Luminous Length	0.21 m (Diameter)
Spacing Criteria (90-270)	1.28	Luminous Width	0.21 m (Diameter)
Spacing Criteria (Diagonal)	1.40	Luminous Height	0.00 m
Test Distance	29.79 m		

4.4 Zonal Lumen Summary

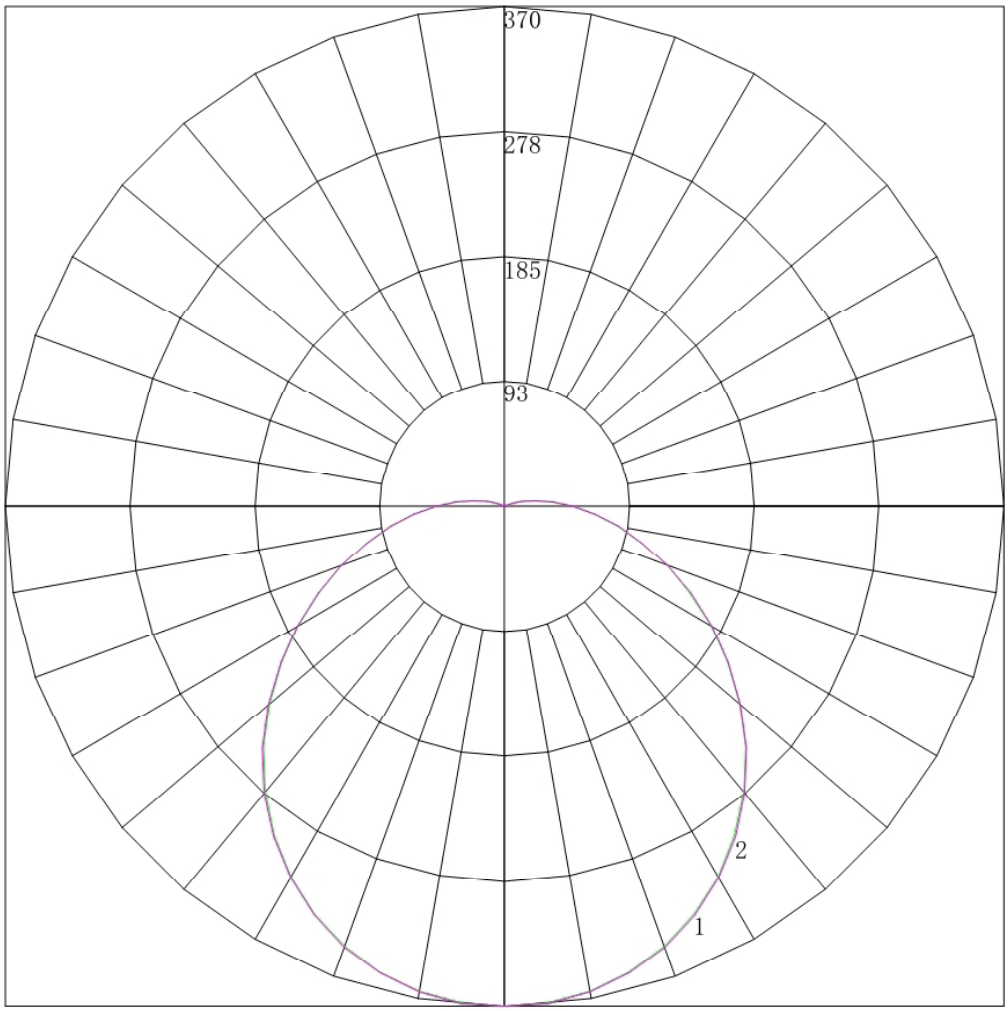
Zone	Lumens	%Lamp	%Fixt
0-20	135.67	10.90	10.90
0-30	288.88	23.20	23.20
0-40	474.81	38.20	38.20
0-60	850.61	68.40	68.40
0-80	1113.59	89.50	89.50
0-90	1187.35	95.40	95.40
10-90	1152.31	92.60	92.60
20-40	339.14	27.30	27.30
20-50	534.11	42.90	42.90
40-70	526.33	42.30	42.30
60-80	262.98	21.10	21.10
70-80	112.45	9.00	9.00
80-90	73.76	5.90	5.90
90-110	54.20	4.40	4.40
90-120	55.92	4.50	4.50
90-130	56.09	4.50	4.50
90-150	56.53	4.50	4.50
90-180	57.13	4.60	4.60
110-180	2.93	0.20	0.20
0-180	1244.49	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	35.04
10-20	100.62
20-30	153.22
30-40	185.93
40-50	194.96
50-60	180.84
60-70	150.53
70-80	112.45
80-90	73.76
90-100	39.66
100-110	14.55
110-120	1.72
120-130	0.17
130-140	0.16
140-150	0.27
150-160	0.29
160-170	0.23
170-180	0.09

4.5 Polar Curves

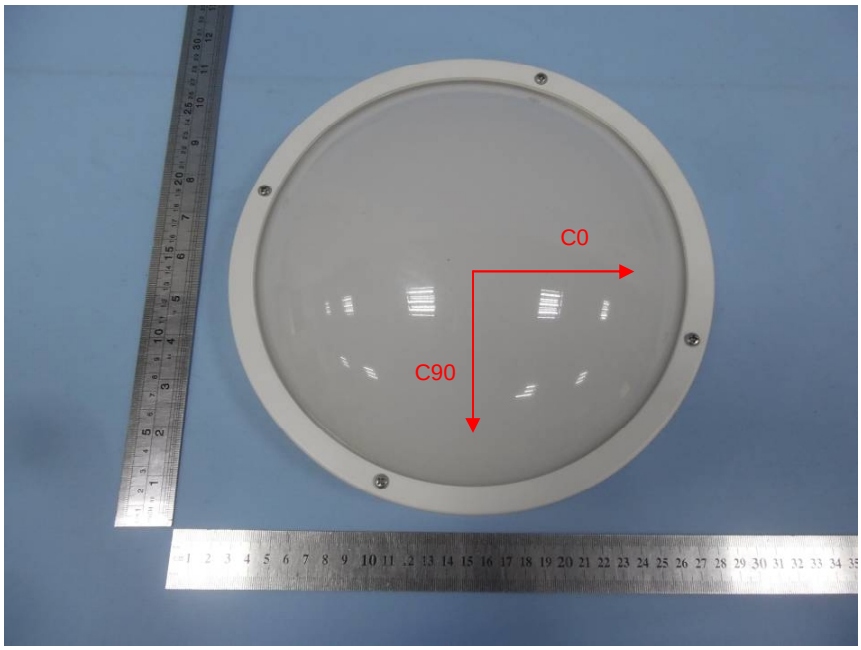


Maximum Candela = 370.049 Located At Horizontal Angle = 0, Vertical Angle = 0
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)

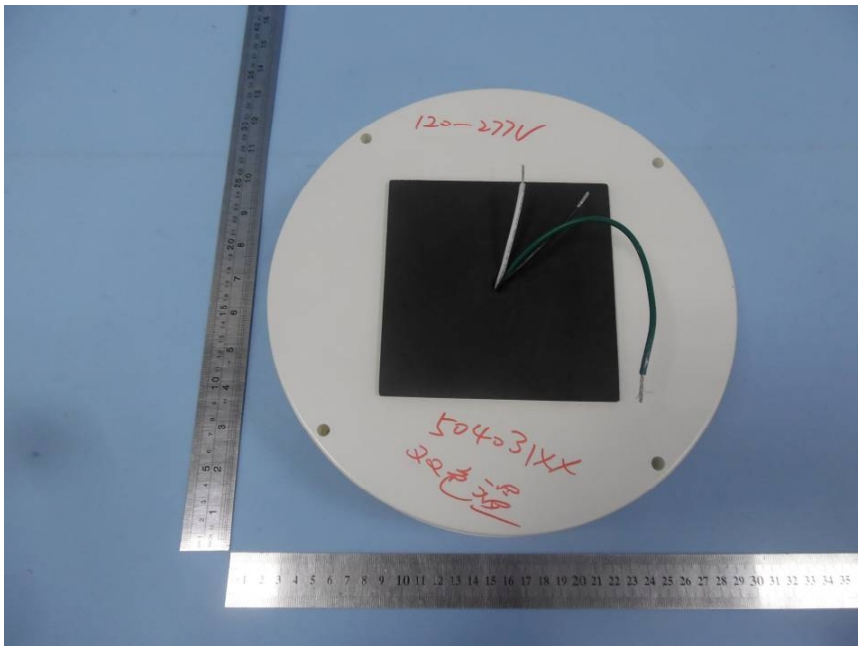
4.6 Candela Tabulation

	0	15	30	45	60	75	90
0	370.049	370.049	370.049	370.049	370.049	370.049	370.049
5	368.937	368.408	368.562	368.542	368.695	368.696	369.524
10	364.313	364.013	364.011	363.463	364.323	363.690	364.924
15	356.842	356.313	356.088	355.921	356.777	356.400	357.582
20	346.437	345.570	345.856	345.807	345.969	345.455	347.275
25	333.008	332.099	332.361	332.167	332.475	331.873	333.833
30	316.422	315.809	316.113	315.754	316.363	316.009	317.294
35	297.257	296.746	296.580	296.967	297.344	297.376	298.587
40	275.825	275.751	276.050	275.364	275.950	275.975	277.006
45	252.791	252.559	252.943	252.408	252.758	252.467	253.744
50	227.579	227.347	227.529	227.677	227.701	227.961	228.402
55	202.011	201.448	201.671	201.704	202.335	202.262	202.310
60	176.576	176.170	176.146	176.086	176.103	176.162	177.548
65	151.319	151.602	151.575	151.355	151.446	151.414	152.517
70	128.641	127.899	128.025	128.156	128.321	128.106	128.504
75	106.230	105.751	106.119	105.709	105.817	105.905	106.215
80	85.464	85.422	85.809	85.703	85.976	85.278	85.964
85	67.589	67.245	67.320	67.250	67.356	66.866	67.301
90	50.825	50.512	50.540	50.349	50.400	50.116	50.321
95	35.840	35.620	35.758	35.753	35.820	35.693	36.083
100	23.345	23.547	23.461	23.311	23.280	23.042	23.435
105	13.518	13.271	12.984	12.975	12.961	13.116	13.088
110	5.558	5.459	5.149	5.034	5.127	5.251	5.350
115	0.889	0.821	0.621	0.554	0.621	0.731	0.796
120	0.178	0.200	0.155	0.177	0.177	0.177	0.177
125	0.222	0.178	0.200	0.222	0.200	0.222	0.089
130	0.178	0.200	0.178	0.200	0.200	0.177	0.221
135	0.222	0.178	0.133	0.177	0.155	0.222	0.177
140	0.311	0.311	0.311	0.288	0.288	0.288	0.310
145	0.356	0.422	0.466	0.466	0.466	0.399	0.443
150	0.578	0.555	0.599	0.577	0.555	0.576	0.575
155	0.623	0.644	0.599	0.621	0.621	0.598	0.619
160	0.756	0.710	0.732	0.732	0.688	0.687	0.708
165	0.934	0.799	0.843	0.865	0.821	0.798	0.840
170	0.845	0.910	0.866	0.865	0.866	0.931	0.840
175	0.845	0.910	0.910	0.932	0.910	0.931	0.884
180	0.982	0.982	0.982	0.982	0.982	0.982	0.982

Appendix A Product Photo



Picture 1



Picture 2

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