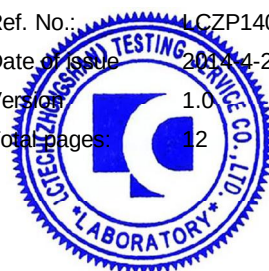




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Test report of
IES LM-79-08
Approved Method: Electrical and Photometric
Measurements of Solid-State Lighting Products

Rendered to:
Elec-Tech International Co., Ltd.
NO.1 JINFENG ROAD ,TANGJIAWAN TOWN,XIANGZHOU
DISTRICT,ZHUHAI CITY,GUANGDONG PROVINCE, P.R.China

For products:
Inseparable SSL Luminaire(Residential)

Models:
540753XX("XX" could be 41-50)
(where "XX" denotes correlated color temperature,41-50 identifies 4000K)

Test date: 2014-4-24
Test laboratory: LCTECH (Zhongshan) Testing Service Co.,Ltd
2/F.,Technology and Enterprise Development Center, Guangyuan Road,
Xiaolan, Zhongshan, Guangdong, China

Laboratory note:

Complied by:		Reviewed by:	
Thomas Liu		Richard Li	
Project Engineer		Technical Manager	
2014-4-24		2014-4-24	

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1 General

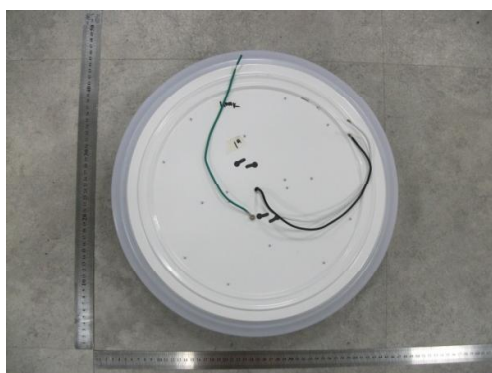
1.1 Product Information

Brand Name	ETI,CE, Hampton Bay
Trade Mark	-
Lamp Type	Inseparable SSL Luminaire(Residential)
Model Number	540753XX("XX" could be 41-50)
Rated Inputs	120V 60Hz
Rated Power	22W
Rated Initial Lamp Lumens	1640lm
Declared CCT	4000K
Power Supply	SX-AD02200106-0380
LED Package, Array or Module	62-217D manufactured by Everlight Electronics.,Ltd
Date of Receipt Samples	2014-4-19
Quantity of Receipt Samples	1 units

Photo



Over view



Part view



1.2 Reference 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

[#] For reference only.

1.4 Equipment list

ID	Instrument	Model name	Cal. date	Next cal. Date
AC Power supply	LC-I-923	CHP-500	2014-03-04	2015-03-03
AC Power supply	LC-I-953	APW-110N	2014-03-04	2015-03-03
Power analyzer	LC-I-928	WT210	2014-03-21	2015-03-20
Power analyzer	LC-I-954	WT210	2014-03-04	2015-03-03
Multimeter	LC-I-972	Fluke 17B	2013-08-14	2014-08-13
Photometric colorimetric electric system (2 meter sphere)	LC-I-900	SPR3000	Before use	Before use
Standard lamp	LC-I-961	24V/100W	2013-10-22	2014-10-21
Goniophotometer(with mirror)	LC-I-902	GMS2000	2013-05-13	2014-05-12
Wireless temperature transmitter	LC-I-958	DWRP-B(0)	2013-08-22	2014-08-21
Wireless temperature transmitter	LC-I-959	DWRP-B(0)	2013-08-22	2014-08-21

2 Test conducted and method

2.1 Ambient Condition

The ambient temperature in which measurements are being taken was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, 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 both sphere-spectroradiometer system and goniophotometer. Spectral radiant flux was measured by a sphere (2 meter)-spectroradiometer system (bandwidth: 1nm), and the total luminous flux was calculated from these by software automatically. 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	120.05V-60Hz	119.54V-60Hz
Input Current	0.173 A	0.173 A
Total Power	20.69 W	20.57 W
Power Factor	0.996	0.996
I-THD	6.23 %	-
Off-state Power	0.0 W	-

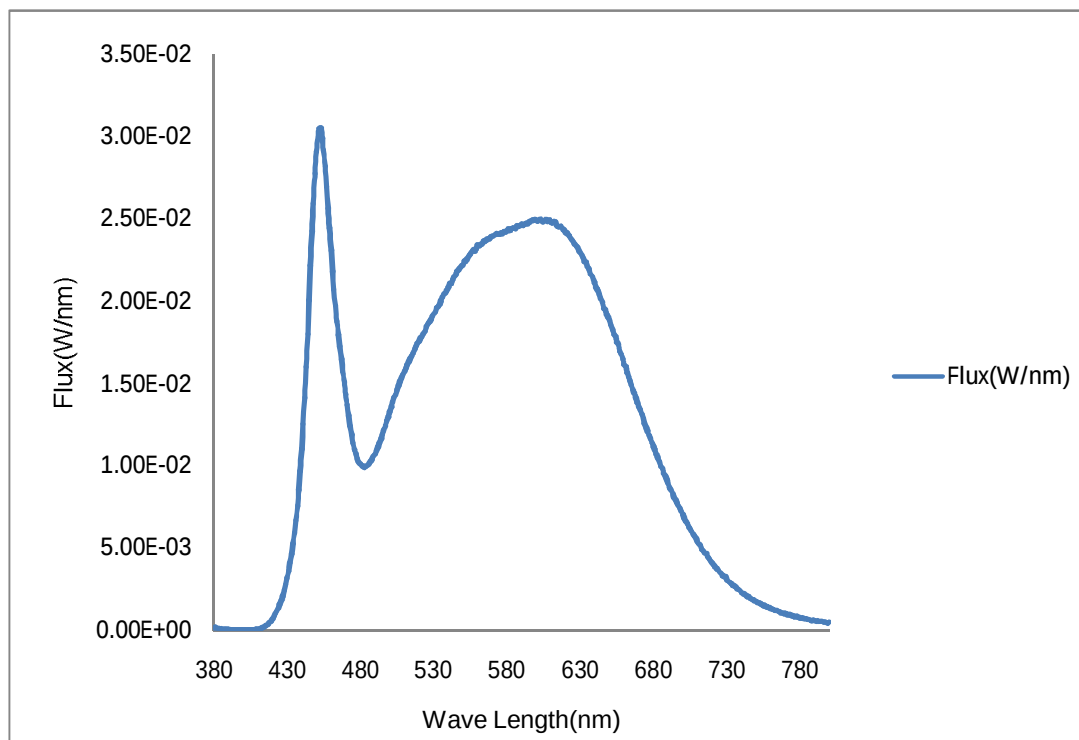
3.2 Photometric data

Criteria Item	Result (Sphere)	Result (Goniophotometer)
Total Lumens	1718.03 lm	1710.31 lm
Luminaire Efficacy	83.04 lm/W	83.15 lm/W
Correlated Color Temperature (CCT)	4054 K	-
Color Rendering Index (CRI)	89.4	-
R9	52	-
Chromaticity Coordinate (x,y)	x=0.3769 y=0.3707	-
Chromaticity Coordinate (u,v)	u=0.2252, v=0.3323	-
Chromaticity Coordinate (u',v')	u'=0.2252 v'=0.4984	-
Duv	-0.00182	-
Beam Angle(50% I _{max})	-	120.2°

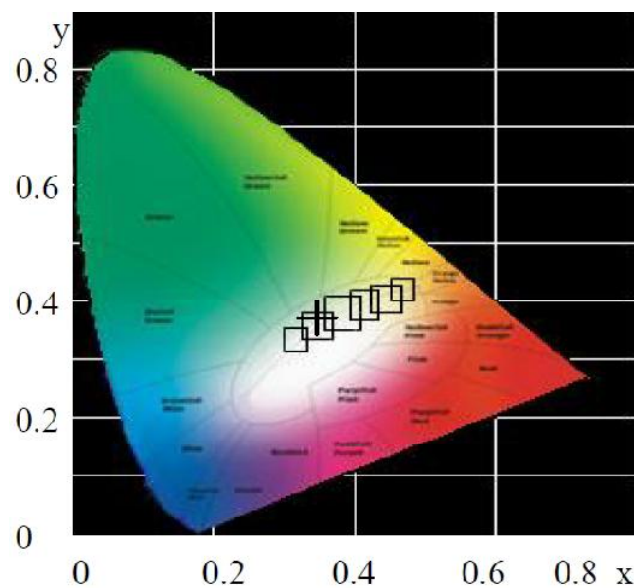
Note: N.A.

4 Test Data

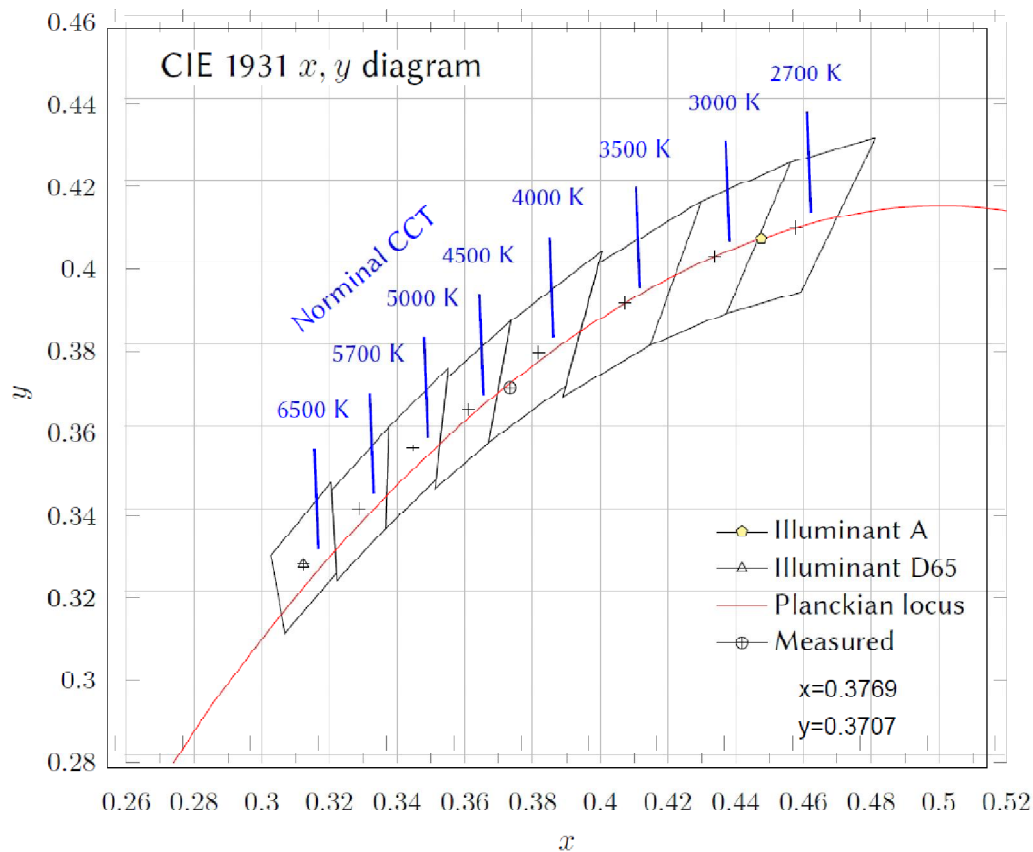
4.1 Spectral Distribution



4.2 Chromaticity Diagram (CIE 1931)



4.3 ANSI Chromaticity Quadrangles Diagram



4.4 Color Rendering Details

R1	R2	R3	R4	R5
89	94	95	88	88
R6	R7	R8	R9	R10
89	92	81	52	83
R11	R12	R13	R14	R15
86	66	91	97	87



4.1 Goniometry Test Data

CIE Type	Semi-Direct	Basic Luminous Shape	Circular w/ Sides
Spacing Criteria (0-180)	1.30	Luminous Length	0.41 m
Spacing Criteria (90-270)	1.30	Luminous Width	0.41m
Spacing Criteria (Diagonal)	1.44	Luminous Height	0.08m
Test Distance	18.54		

4.2 Zonal Lumen Summary

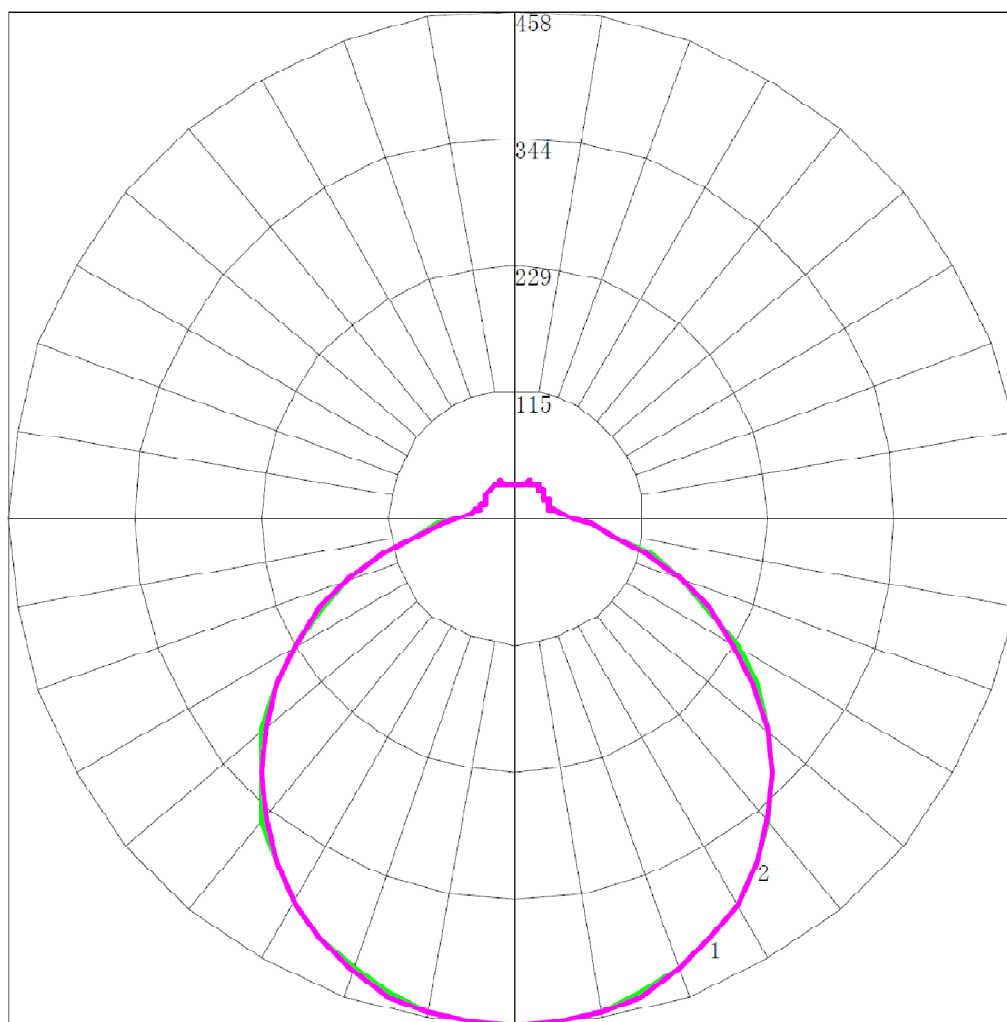
Zone	Lumens	%Lamp	%Fixt
0-30	361.82	21.2	21.2
0-40	598.88	35	35
0-60	1087.8	63.6	63.6
0-90	1491.14	87.2	87.2
90-120	114.65	6.7	6.7
90-130	144.02	8.4	8.4
90-150	191.45	11.2	11.2
90-180	219.18	12.8	12.8
0-180	1710.32	100	100

Total Luminaire Efficiency = 100%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	43.45
10-20	125.48
20-30	192.89
30-40	237.06
40-50	252.31
50-60	236.61
60-70	192.74
70-80	132.66
80-90	77.94
90-100	46.79
100-110	35.9
110-120	31.96
120-130	29.38
130-140	26.02
140-150	21.41
150-160	15.75
160-170	9.14
170-180	2.84

4.3 Polar Curves



Maximum Candela = 458.17 Located At Horizontal Angle = 0, Vertical Angle = 0

1 - Vertical Plane Through Horizontal Angles (0 - 180)

2 - Vertical Plane Through Horizontal Angles (90 - 270)

4.4 Candela Tabulation

	<u>0</u>	<u>15</u>	<u>30</u>	<u>45</u>	<u>60</u>	<u>75</u>	<u>90</u>
0	458.17	458.17	458.17	458.17	458.17	458.17	458.17
5	456.48	456.56	456.65	456.65	456.90	456.90	457.51
10	452.18	451.92	452.09	452.18	452.09	452.35	452.87
15	444.10	444.10	444.10	444.27	444.19	444.53	445.13
20	432.93	433.10	432.84	432.84	432.93	433.02	433.27
25	418.49	418.32	418.41	418.41	418.32	418.15	418.32
30	400.28	400.45	400.45	400.45	400.19	399.93	400.45
35	379.14	379.05	378.88	378.96	378.88	378.45	378.62
40	355.07	354.73	354.47	354.30	354.13	353.96	353.36
45	327.40	327.58	327.23	327.15	326.89	326.80	326.89
50	297.67	298.01	297.41	297.16	296.90	296.30	296.30
55	265.02	265.27	265.45	264.76	264.24	264.24	264.67
60	230.99	230.73	230.82	229.96	230.04	229.61	229.78
65	195.41	194.98	194.47	194.64	194.38	193.78	193.69
70	159.32	159.49	159.15	159.06	158.63	158.29	158.80
75	125.29	125.03	124.95	124.60	124.34	123.83	123.92
80	95.04	94.53	94.70	94.18	93.84	93.84	94.35
85	70.47	70.03	69.78	69.69	69.78	69.43	69.09
90	52.42	52.33	52.16	52.25	51.90	51.73	51.90
95	41.94	42.02	41.68	41.59	41.51	41.33	41.59
100	36.26	36.09	36.18	36.09	36.01	36.09	35.92
105	33.86	33.94	33.69	33.69	33.60	33.43	33.34
110	32.31	32.40	32.31	32.31	32.14	32.23	32.31
115	31.97	32.14	32.14	32.05	32.05	31.97	32.14
120	32.48	32.48	32.40	32.23	32.31	32.40	32.31
125	32.83	32.83	32.74	32.83	32.66	32.57	32.83
130	33.17	33.17	33.17	33.17	33.08	33.17	33.00
135	33.69	33.69	33.60	33.60	33.51	33.51	33.51
140	34.20	34.12	34.12	34.12	34.12	34.12	34.20
145	34.20	34.12	34.12	34.12	34.12	34.12	34.20
150	33.86	33.94	33.94	33.86	33.86	33.94	33.86
155	33.86	33.94	33.94	33.94	33.86	33.86	33.69
160	34.37	34.55	34.37	34.46	34.55	34.29	34.55
165	31.97	32.31	32.40	32.40	32.14	32.48	32.48
170	29.05	28.96	28.96	28.96	28.96	29.30	29.22
175	30.08	29.99	29.82	29.82	29.73	30.08	29.73
180	30.99	30.99	30.99	30.99	30.99	30.99	30.99


Attachment 1
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	2014-4-24
Test report number	LCZP14040140
Laboratory contact name	Richard Li

Product Information

Manufacturer	Elec-Tech International Co., Ltd	
Brand name	ETI,CE, Hampton Bay	
Model number	540753XX("XX" could be 41-50)	
SKU (if available)	N/A	
Type of luminaire (for integral lamps, list base type and lamp type)	Inseparable SSL Luminaire(Residential)	
Luminaire aperture	N/A	in.
Luminaire height	0.08	in.
Luminaire length	0.41	in.
Luminaire width	0.41	in.
Number of units (modular products)	N/A	

Electrical Measurements	Integrating sphere output	Goniophotometer Output	
Input wattage	20.69	20.57	W
Input current	0.173	0.173	A
Input voltage (AC)	120.05	119.54	V
Power factor	0.996	0.996	
Off-state power	0.0	-	W

Photometric Characteristics

Total initial lumen output	1718.03	1710.31	lm
Initial luminaire efficacy	83.04	83.15	lm/W
Correlated color temperature / CCT	4054	K	
Color rendering index / CRI	89.4		
R9 value	52		
Duv	-0.00182		

Luminous Intensity Distribution		Goniophotometer Output	
Center beam candlepower (if applicable)	--	458.166	cd
Beam angle (if applicable)		120.2	°
Zonal lumens in the 0°-60° zone		63.602	%
Zonal lumens in the 60°-90° zone		23.583	%
Zonal lumens in the 90°-120° zone		6.703	%
Zonal lumens in the 120°-180° zone		6.112	%

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