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IESNA  
SUSTAINING  
MEMBER

Ref. No.: LCZP18070267

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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.:

504041##(##=11-30)

(Where "##" denotes color temperature, 11-30 identifies 3000K)

**Test Date:** Aug. 15, 2018

**Test Item:** Total luminous flux, Luminous Efficacy, Electrical values, Luminous Intensity  
Distribution, Chromaticity coordinates, CCT and CRI, Spectral Power Distribution.

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**Template No.:** LC-RT-PL-001 Rev.1.1

**Test Note:**

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## 1. General

### 1.1 Product Information

Brand Name	ETI
Product Type	Inseparable SSL Luminaire
Model Number	504041##(##=11-30)
Rated Inputs	120-277VAC, 50/60Hz
Rated Power	9W
Rated Light output	800lm
Declared CCT	3000K
Power Supply	Integrated in luminaire
LED Package, Array or Module	SPMWHX228FD5WAW0XX, Samsung Electronics Co., LTD.
Receipt Samples	1 unit
Sample Code of lab.	180816104001
Date of Receipt Samples	Aug. 16, 2018
Note	-



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## 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.



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## 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  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ ; 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  $\pm 0.2$  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.



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### 3. Test Result Summary

#### 3.1 Electrical data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Input Voltage & Frequency	120.00 V~60Hz	120.02 V~60Hz
Input Current(A)	0.076	0.076
Total Power(W)	8.83	8.81
Power Factor	0.973	0.972
Off-state Power(W)	-	-

#### 3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-***	889.89
Luminaire Efficacy(lm/W)	-	101.01
Correlated Color Temperature (CCT)(K)	3027	-
Color Rendering Index (CRI)	86.2	-
R9	26	-
Chromaticity Coordinate (x,y)	x = 0.4308 y = 0.3947	-
Chromaticity Coordinate (u,v)	u = 0.2507 v = 0.3445	-
Chromaticity Coordinate (u',v')	u' = 0.2507 v' = 0.5167	-
Duv	-0.003	-
Zone Lumens between 0-60 °	-	68.30 %

#### 3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
88	98	91	84	88	95	82	64
R9	R10	R11	R12	R13	R14	R15	-
26	95	84	79	91	96	81	-

Note:

\*\*\* Self-absorption is 1.



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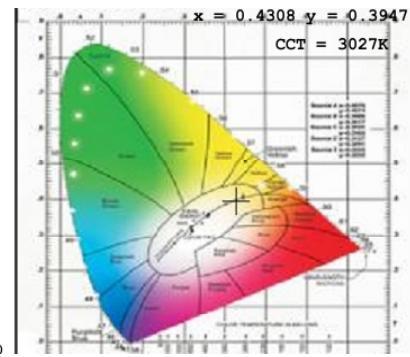
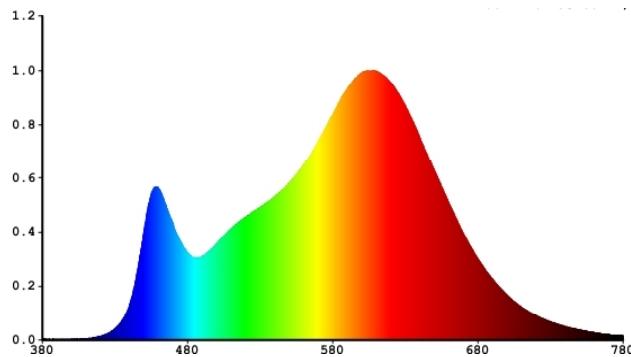
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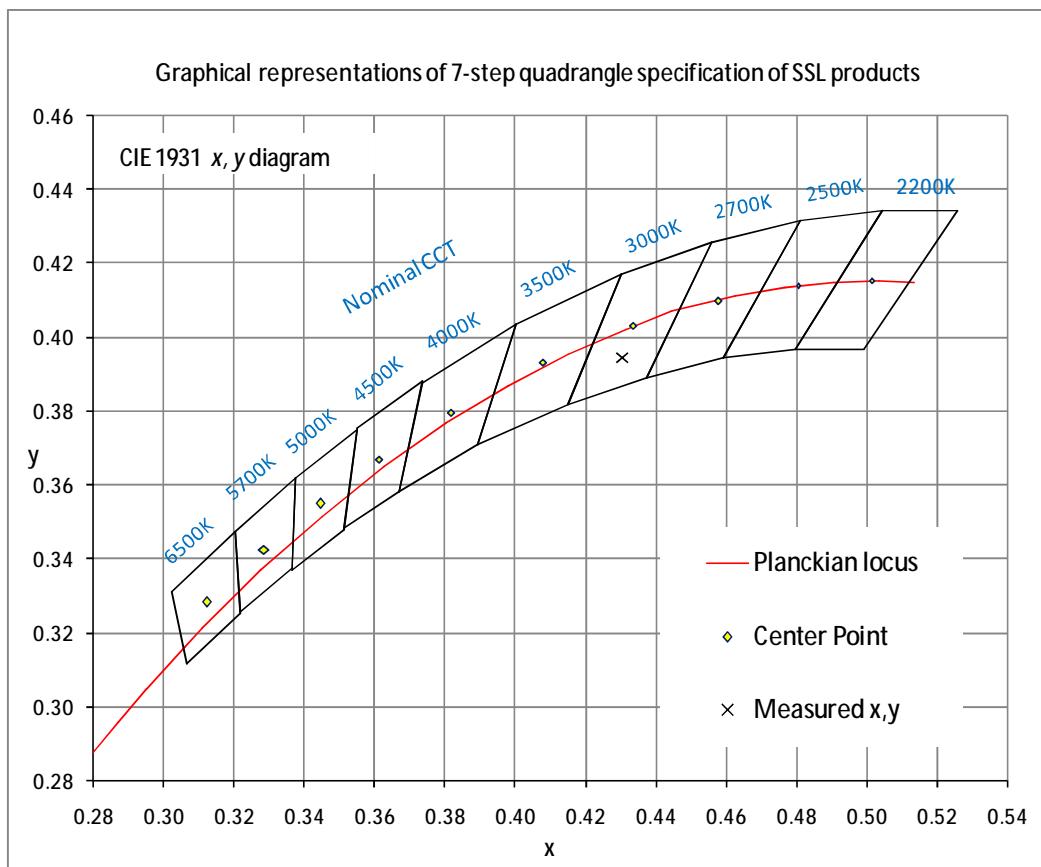
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## 4. Test Data

### 4.1 Spectral Distribution



### 4.2 ANSI Chromaticity Quadrangles Diagram





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#### 4.3 Goniometry Test Data

CIE Type	Semi-Direct	Basic Luminous Shape	Rectangular w/Sides
Spacing Criteria (0-180)	1.30	Luminous Length	0.22 m
Spacing Criteria (90-270)	1.34	Luminous Width	0.12 m
Spacing Criteria (Diagonal)	1.44	Luminous Height	0.00 m
Test Distance	29.79 m		

#### 4.4 Zonal Lumen Summary

Zone	Lumens	%Lamp	%Fixt
0-20	81.75	9.20	9.20
0-30	175.08	19.70	19.70
0-40	290.52	32.60	32.60
0-60	537.99	60.50	60.50
0-80	733.62	82.40	82.40
0-90	797.86	89.70	89.70
10-90	776.81	87.30	87.30
20-40	208.77	23.50	23.50
20-50	333.92	37.50	37.50
40-70	355.84	40.00	40.00
60-80	195.63	22.00	22.00
70-80	87.25	9.80	9.80
80-90	64.25	7.20	7.20
90-110	71.55	8.00	8.00
90-120	85.88	9.70	9.70
90-130	90.92	10.20	10.20
90-150	91.67	10.30	10.30
90-180	92.03	10.30	10.30
110-180	20.48	2.30	2.30
0-180	889.89	100.00	100.00

Total Luminaire Efficiency = 100.00%

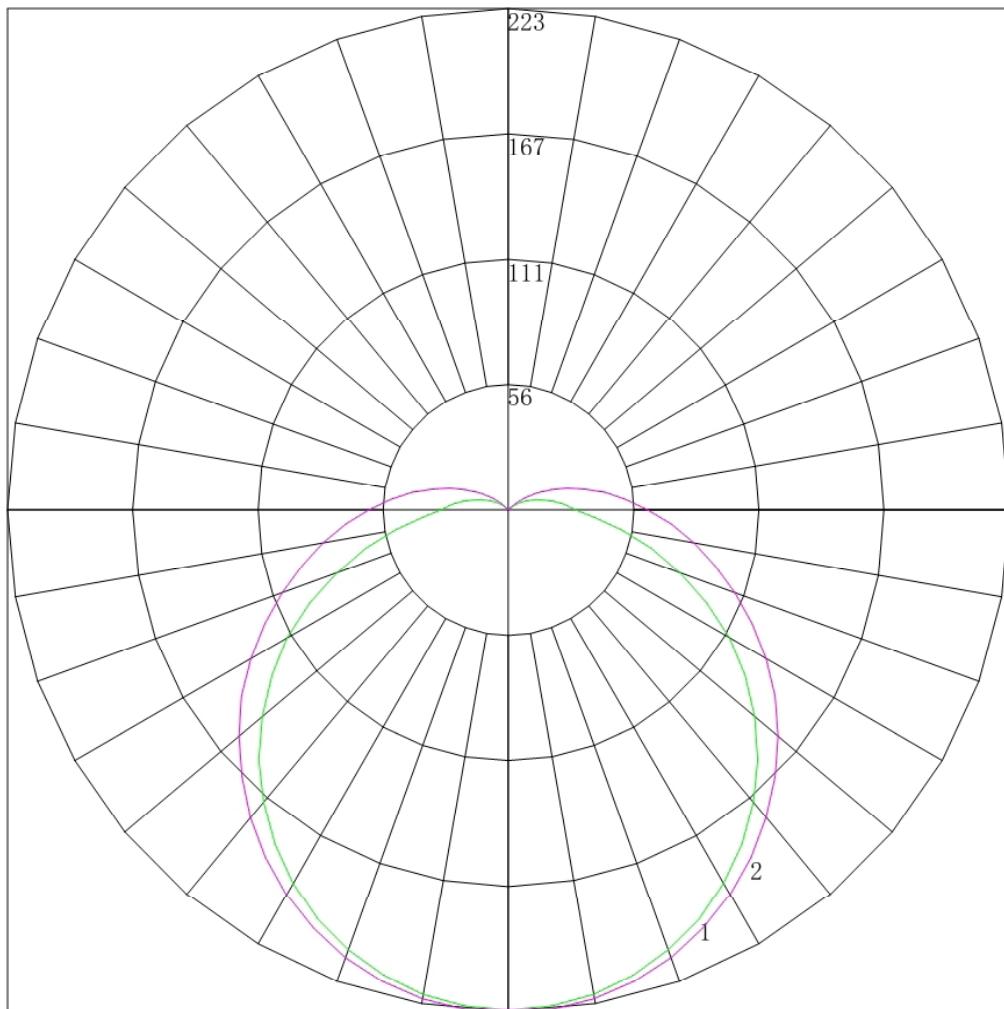
#### ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	21.05
10-20	60.70
20-30	93.32
30-40	115.44
40-50	125.16
50-60	122.31
60-70	108.38
70-80	87.25
80-90	64.25
90-100	44.06
100-110	27.49
110-120	14.33
120-130	5.04
130-140	0.59
140-150	0.16
150-160	0.17
160-170	0.13
170-180	0.05



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#### 4.5 Polar Curves



Maximum Candela = 222.756 Located At Horizontal Angle = 90, Vertical Angle = 5

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

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



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## 4.6 Candela Tabulation

	<u>0</u>	<u>15</u>	<u>30</u>	<u>45</u>	<u>60</u>	<u>75</u>	<u>90</u>
<b>0</b>	222.131	222.131	222.131	222.131	222.131	222.131	222.131
<b>5</b>	221.149	221.306	221.241	221.310	221.377	221.380	222.756
<b>10</b>	218.472	218.719	218.637	218.603	218.921	219.040	220.378
<b>15</b>	213.965	214.193	214.610	214.765	215.159	215.264	216.818
<b>20</b>	207.985	208.306	208.713	209.196	209.826	210.320	211.798
<b>25</b>	200.667	200.881	201.392	202.207	202.878	203.631	204.978
<b>30</b>	191.430	191.806	192.757	193.843	194.956	195.992	197.281
<b>35</b>	181.123	181.504	182.965	184.259	185.795	186.876	188.352
<b>40</b>	169.387	170.177	171.639	173.743	175.549	177.052	178.455
<b>45</b>	156.937	157.735	159.666	162.162	164.485	166.168	167.680
<b>50</b>	142.926	144.311	146.805	149.626	152.756	154.600	156.420
<b>55</b>	128.513	129.907	133.119	136.936	140.518	143.033	144.852
<b>60</b>	113.609	115.057	118.810	123.534	127.795	130.558	132.275
<b>65</b>	97.366	100.073	104.390	110.112	114.738	117.932	119.652
<b>70</b>	81.168	84.575	90.681	96.711	101.970	105.414	107.160
<b>75</b>	65.774	69.792	77.085	83.687	89.734	93.272	95.065
<b>80</b>	51.182	56.324	64.423	71.907	77.827	81.749	83.723
<b>85</b>	38.152	44.373	53.007	60.702	66.985	70.931	72.552
<b>90</b>	29.897	34.784	43.015	50.408	56.606	60.533	62.040
<b>95</b>	25.212	27.761	34.448	41.733	47.268	50.929	52.587
<b>100</b>	20.660	21.852	27.371	33.479	38.548	42.078	43.529
<b>105</b>	16.644	16.746	20.829	26.180	30.804	34.019	35.086
<b>110</b>	12.851	12.754	14.999	19.613	23.966	26.712	27.829
<b>115</b>	9.237	9.209	9.814	13.800	17.437	19.846	20.969
<b>120</b>	5.979	6.132	6.164	8.364	11.618	13.819	14.636
<b>125</b>	3.525	3.523	3.538	3.882	6.440	8.257	9.052
<b>130</b>	1.517	1.472	1.513	1.553	2.213	3.643	4.303
<b>135</b>	0.178	0.201	0.245	0.177	0.199	0.353	0.743
<b>140</b>	0.178	0.156	0.201	0.177	0.199	0.177	0.265
<b>145</b>	0.312	0.245	0.267	0.222	0.266	0.221	0.265
<b>150</b>	0.357	0.312	0.334	0.355	0.332	0.353	0.397
<b>155</b>	0.357	0.357	0.356	0.333	0.354	0.353	0.396
<b>160</b>	0.357	0.424	0.401	0.444	0.398	0.419	0.440
<b>165</b>	0.491	0.491	0.490	0.510	0.487	0.486	0.440
<b>170</b>	0.491	0.557	0.490	0.577	0.509	0.552	0.527
<b>175</b>	0.580	0.535	0.556	0.577	0.553	0.574	0.483
<b>180</b>	0.570	0.570	0.570	0.570	0.570	0.570	0.570



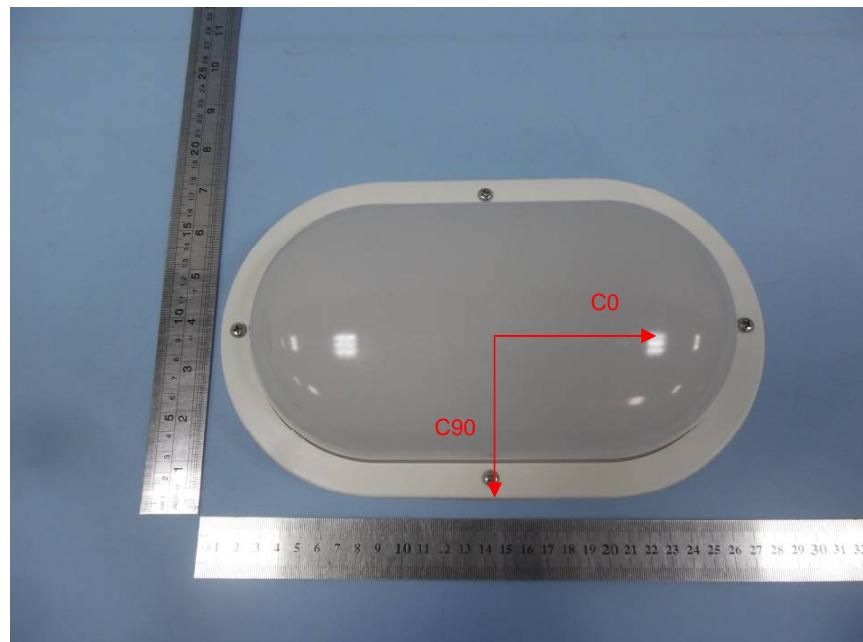
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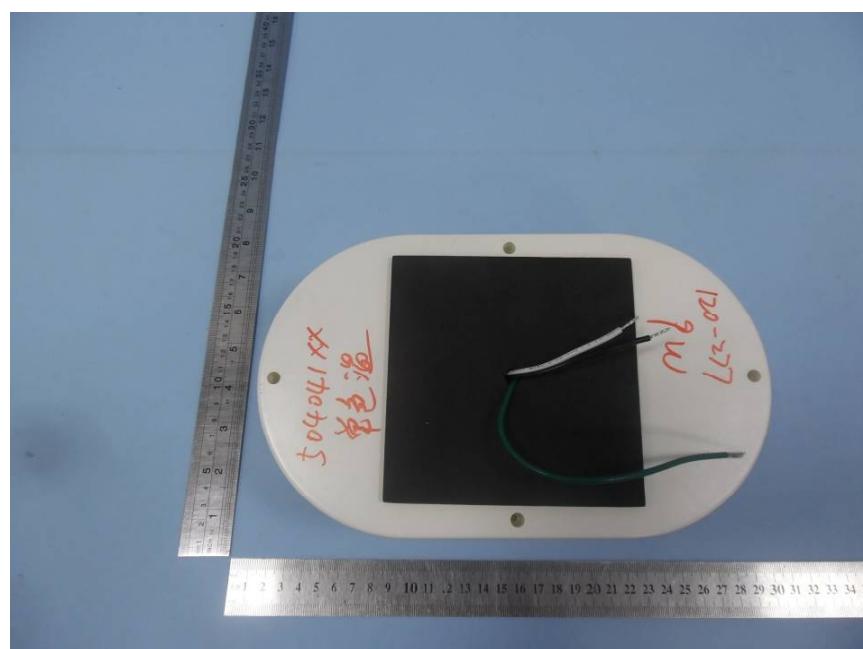
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## Appendix A Product Photo



Picture 1



Picture 2

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