LCTECH

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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:

SSL Downlight Retrofit Kits

Models No.:

531791XX

(Where XX denotes CCT and could be 11-30 which refers 3000K)

Test Date: Jan. 23, 2016 to Jan. 25, 2016

Test Lab.: LCTECH (Zhongshan) Testing Service Co.,Ltd
2/F.,Technology and Enterprise Development Center, Guangyuan Road, Xiaolan, Zhongshan, Guangdong, China

Test Note:

Complied by:		**Reviewed by:**	
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Project Engineer		**Technical Manager**	
Jan. 29, 2016		**Jan. 29, 2016**	

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1. General

1.1 Product Information

Brand Name	ETI, Commercial Eletric
Trade Mark	-
Product Type	SSL Downlight Retrofit Kits
Model Number	531791XX
Rated Inputs	120VAC 60Hz
Rated Power	18 w
Rated Light output	1300 lm
Declared CCT	3000 K
Power Supply	LED Driver, model: not provided
LED Package, Array or Module	67-21S Series(3000K)
Receipt Samples	1 unit
Date of Receipt Samples	Jan. 23, 2016
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	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	2015-02-05	2016-02-04
AC Power supply	LC-I-987	APW-110N	2015-02-05	2016-02-04
Power analyzer	LC-I-928	WT210	2015-02-08	2016-02-08
Power analyzer	LC-I-954	WT210	2015-03-04	2016-03-04
Multimeter	LC-I-972	Fluke 17B	2015-08-17	2016-08-16
Photometric colorimetric electric system (2 meter sphere)	LC-I-900	SPR3000	Before use	Before use
Standard lamp	LC-I-917	24V100W	2015-10-09	2016-10-08
Luminous Flux Standard Lamp	LC-I-946	110V/200W	2015-10-17	2016-10-16
Goniophotometer(with mirror)	LC-I-902	GMS2000	2012-05-07	2016-05-07
Wireless temperature transmitter	LC-I-978	DWRF-B	2015-02-11	2016-02-10
Wireless temperature transmitter	LC-I-979	DWRF-B	2015-02-11	2016-02-10

2. Test conducted and method

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 goniophotometer.

Spectral radiant flux was measured by a sphere (2 meter)-spectroradiometer system, and the total luminous flux was calculated from these by software automatically.

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 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	120.05V~60Hz	120.00V~60Hz
Input Current(A)	0.147	0.147
Total Power(W)	17.22	17.28
Power Factor	0.977	0.977
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	1390.43	1397.47
Luminaire Efficacy(Lm/W)	90.2	80.87
Correlated Color Temperature (CCT)(K)	2941	-
Color Rendering Index (CRI)	90.2	-
R9	41	-
Chromaticity Coordinate (x,y)	x=0.4432 y=0.4096	-
Chromaticity Coordinate (u,v)	u=0.2516 v=0.3497	-
Chromaticity Coordinate (u',v')	u'=0.2522 v'=0.5245	-
Duv	0.00135	-
Spacing Criteria(0-180°)	-	1.18
Spacing Criteria(90-270°)	-	1.18
Beam angle(°)	-	91.6
Center Beam Intensity(cd)	-	665.4
Zonal lumens in the 0°-60°zone	-	89.01%
Zonal lumens in the 60°-90°zone	-	10.80%
Zonal lumens in the 90°-120°zone	-	0.0%
Zonal lumens in the 120°-180°zone	-	0.3%

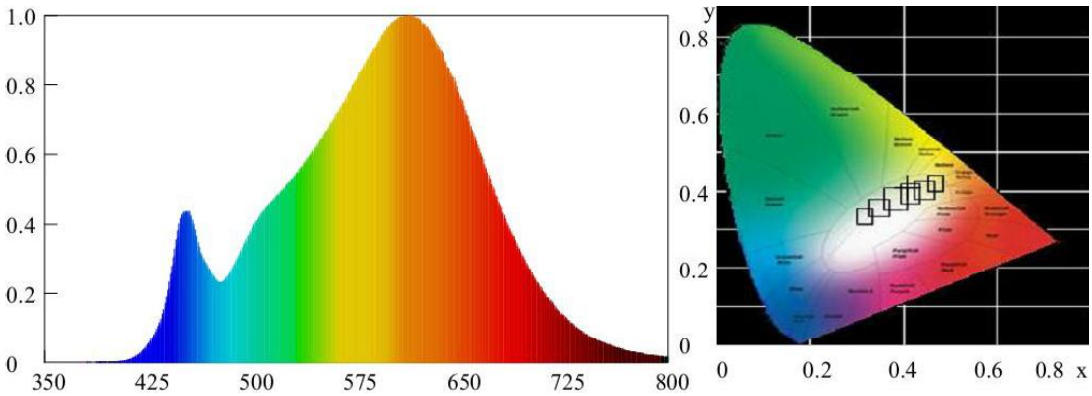
3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
91	95	98	89	91	94	89	76
R9	R10	R11	R12	R13	R14	R15	-
41	88	88	79	90	100	83	-

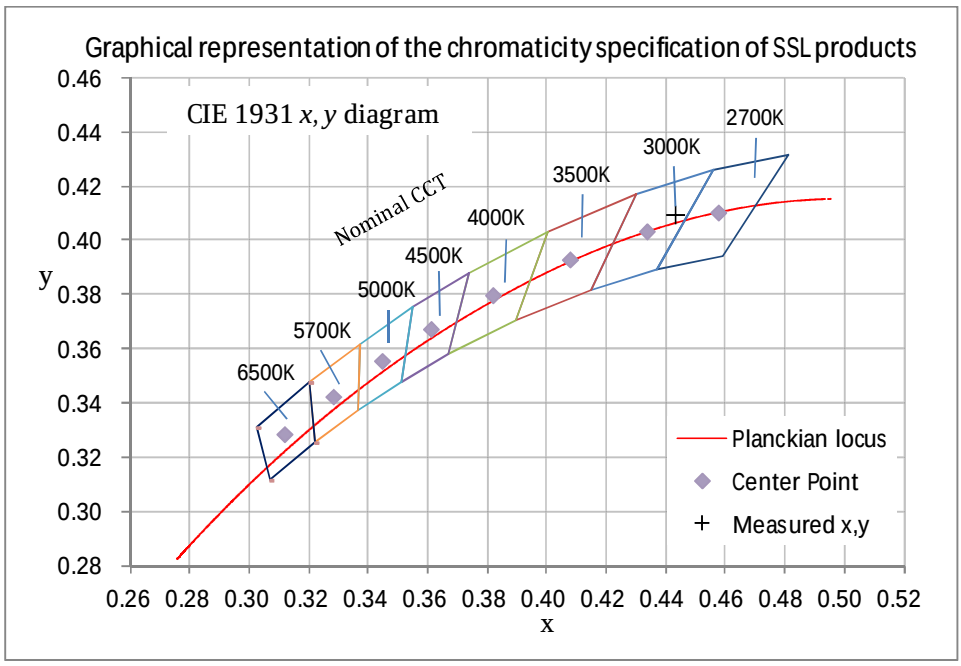
Note: N.A.

4. Test Data

4.1 Spectral Distribution



4.2 ANSI Chromaticity Quadrangles Diagram



4.3 Goniometry Test Data

CIE Type	Direct	Basic Luminous Shape	Circular
Spacing Criteria (0-180)	1.18	Luminous Length	0.11 m(Diameter)
Spacing Criteria (90-270)	1.18	Luminous Width	0.11 m(Diameter)
Spacing Criteria (Diagonal)	1.24	Luminous Height	0.00 m
Test Distance	29.68 m		

4.4 Zonal Lumen Summary

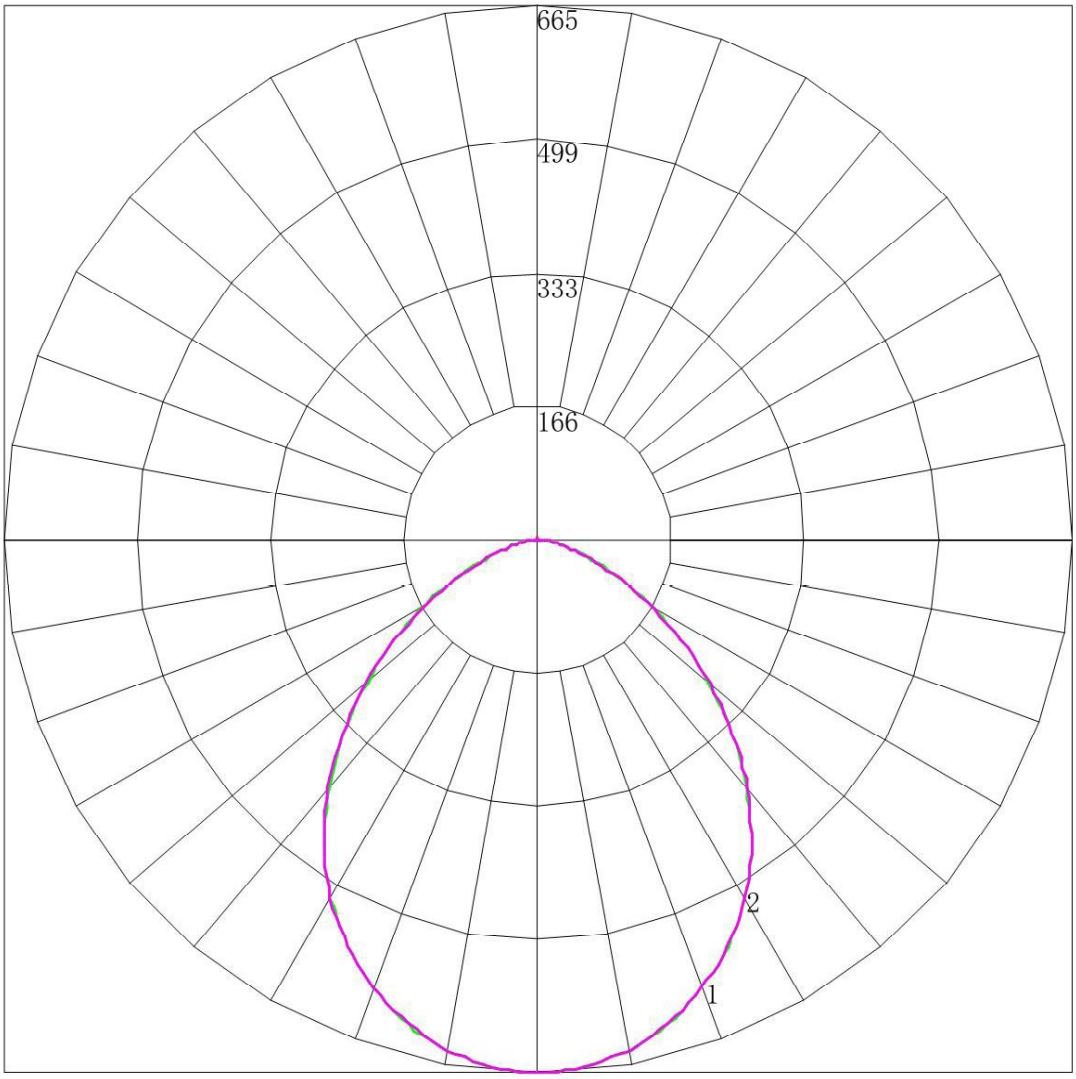
Zone	Lumens	%Lamp	%Fixt
0-20	238.91	17.10	17.10
0-30	496.23	35.50	35.50
0-40	785.62	56.20	56.20
0-60	1244.01	89.00	89.00
0-80	1386.49	99.20	99.20
0-90	1395.36	99.80	99.80
10-90	1332.6	95.40	95.30
20-40	546.71	39.10	39.10
20-50	810.86	58.00	58.00
40-70	563.98	40.40	40.40
60-80	142.48	10.20	10.20
70-80	36.90	2.60	2.60
80-90	8.87	0.60	0.60
90-110	0.22	0.00	0.00
90-120	0.34	0.00	0.00
90-130	0.51	0.00	0.00
90-150	1.03	0.10	0.10
90-180	2.23	0.20	0.20
110-180	2.01	0.10	0.10
0-180	1397.59	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	62.76
10-20	176.15
20-30	257.32
30-40	289.39
40-50	264.15
50-60	194.24
60-70	105.59
70-80	36.90
80-90	8.87
90-100	0.14
100-110	0.08
110-120	0.12
120-130	0.17
130-140	0.19
140-150	0.33
150-160	0.49
160-170	0.50
170-180	0.20

4.5 Polar Curves



Maximum Candela = 665.397 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	665.397	665.397	665.397	665.397	665.397	665.397	665.397
1	665.264	665.220	664.978	665.242	665.089	664.759	665.223
2	665.132	664.492	664.801	664.537	664.097	664.078	664.568
3	664.072	663.653	663.610	663.611	662.952	663.023	663.958
4	663.365	662.373	662.573	662.045	661.764	661.926	662.736
5	661.597	661.335	660.698	660.987	661.279	659.507	660.817
6	659.300	659.128	658.646	658.495	658.394	657.857	658.898
7	656.870	656.214	656.263	656.312	656.149	655.636	656.543
8	654.086	654.139	654.057	653.843	653.154	653.172	654.057
9	650.552	659.744	660.544	658.874	658.538	657.247	650.306
10	648.254	647.848	647.196	647.581	646.592	646.820	648.343
11	644.454	643.897	643.158	643.943	643.510	642.577	643.938
12	640.434	639.857	639.937	639.908	639.018	639.194	640.493
13	636.015	635.818	635.150	635.190	634.285	634.400	635.477
14	631.862	631.160	630.605	630.493	630.057	629.873	631.072
15	626.030	625.818	625.244	625.025	625.037	624.465	625.794
16	621.346	620.344	620.478	620.262	619.576	619.541	620.342
17	615.426	614.804	614.521	614.772	613.346	613.826	615.850
18	609.815	608.557	608.851	608.620	608.567	607.603	609.133
19	602.745	602.553	602.586	602.689	601.940	601.997	603.856
20	596.118	596.482	596.166	596.075	595.642	595.510	597.095
21	589.358	589.242	589.459	589.107	588.640	588.719	589.593
22	582.730	582.443	582.377	582.007	581.858	581.353	583.138
23	576.015	574.872	575.229	574.312	574.130	574.538	575.462
24	567.532	567.587	567.308	566.992	567.084	567.001	567.611
25	561.037	559.641	559.564	558.900	559.135	558.734	559.891
26	551.670	551.606	550.695	550.962	550.702	550.798	551.779
27	543.363	543.549	542.929	543.421	543.260	543.278	544.015
28	535.101	534.940	534.943	534.889	534.629	534.462	535.554
29	525.646	525.846	525.015	525.738	525.404	524.924	526.089
30	516.809	516.574	516.322	516.411	516.134	516.305	517.497
31	506.559	506.200	506.130	506.445	505.785	505.554	507.378
32	497.104	495.759	496.908	496.677	496.273	496.167	497.478
33	486.942	485.649	486.053	485.829	484.978	485.726	486.617
34	475.631	475.672	475.066	475.048	474.718	474.821	476.193
35	464.585	463.420	464.278	463.714	464.435	463.480	464.548
36	452.390	452.913	452.276	453.042	453.117	453.079	454.298
37	440.726	440.839	440.980	440.959	441.645	440.965	441.345
38	428.576	429.647	428.890	429.604	429.314	429.622	431.095
39	416.867	417.617	416.712	417.808	417.888	417.047	418.054
40	404.098	405.366	404.555	405.526	405.204	405.639	407.150
41	391.815	393.071	392.862	393.289	392.522	393.482	395.374
42	380.770	380.202	380.750	381.030	381.095	381.150	382.289
43	367.161	368.635	367.270	368.176	367.597	368.092	370.993
44	355.806	355.545	355.467	356.026	355.949	355.669	356.992
45	343.037	342.036	343.090	343.458	343.443	343.535	343.384
46	330.401	329.807	330.404	329.567	330.826	330.452	332.044
47	317.632	316.474	318.446	317.418	317.240	317.902	318.218
48	304.907	304.863	305.077	305.424	305.065	305.129	306.573
49	292.138	292.259	291.839	292.194	292.250	291.806	292.441
50	278.618	279.920	279.374	279.803	279.722	279.696	280.491
51	266.380	266.918	266.732	266.727	266.797	265.955	267.014
52	254.936	254.667	254.664	254.645	254.312	254.128	254.758
53	241.637	241.732	241.361	241.591	241.212	240.653	241.411
54	230.371	230.143	229.315	229.795	228.638	228.847	229.766

CANDELA TABULATION - (Cont.)

55	218.220	217.958	217.887	217.095	216.331	216.536	218.470
56	206.468	206.060	205.664	205.277	204.793	203.938	205.167
57	194.538	193.831	194.037	192.819	191.824	192.310	192.955
58	183.006	181.867	181.881	180.846	180.705	179.976	180.873
59	171.519	170.499	170.762	169.535	168.088	168.086	168.356
60	160.473	159.705	159.466	157.695	157.101	156.301	157.626
61	149.692	148.293	147.927	146.824	146.290	145.090	145.632
62	137.188	137.984	137.558	135.646	134.995	134.076	135.164
63	127.512	127.477	126.725	125.415	124.404	123.348	123.781
64	118.146	117.610	116.687	115.162	114.847	113.763	114.316
65	107.321	107.787	105.943	105.769	104.081	102.969	104.197
66	98.440	97.964	96.765	96.001	94.589	94.219	94.820
67	88.189	88.715	87.653	86.476	85.100	85.183	85.661
68	79.927	79.643	78.850	78.097	77.063	76.368	76.414
69	70.825	70.990	70.467	69.631	68.696	68.344	69.567
70	63.624	63.198	62.966	62.222	61.100	60.276	60.844
71	56.422	55.560	55.773	55.188	54.626	53.682	54.040
72	49.485	48.938	48.934	48.508	47.845	47.349	48.151
73	43.388	43.287	42.801	42.444	41.966	41.613	42.002
74	37.688	37.592	37.462	37.196	36.858	36.644	37.248
75	32.961	32.912	32.586	32.654	32.190	31.719	32.581
76	28.763	28.785	28.637	28.421	28.248	28.224	28.961
77	25.317	25.275	25.239	25.180	25.012	24.883	25.559
78	22.180	22.118	22.062	22.027	21.952	21.894	22.287
79	19.706	19.646	19.525	19.491	19.398	19.367	19.671
80	17.408	17.372	17.385	17.330	17.350	17.191	17.315
81	15.287	15.341	15.267	15.148	15.170	15.146	15.309
82	13.167	13.090	13.171	13.097	13.101	12.992	13.172
83	11.267	11.192	11.163	11.157	11.251	11.080	11.122
84	9.278	9.381	9.332	9.349	9.291	9.321	9.465
85	7.467	7.483	7.435	7.519	7.464	7.430	7.502
86	5.788	5.607	5.714	5.578	5.680	5.672	5.670
87	3.888	3.929	4.015	3.925	3.963	3.890	4.100
88	5.037	5.077	3.861	2.513	2.509	2.571	4.514
89	1.723	1.766	3.353	3.263	3.213	3.162	2.181
90	1.502	0.883	1.324	1.367	0.836	0.922	1.308
91	0.177	0.177	0.199	0.485	0.308	0.635	0.851
92	0.000	0.044	0.044	0.022	0.022	0.000	0.000
93	0.044	0.044	0.044	0.000	0.022	0.066	0.044
94	0.088	0.044	0.000	0.044	0.066	0.022	0.000
95	0.000	0.000	0.022	0.022	0.022	0.022	0.044
96	0.000	0.044	0.044	0.044	0.022	0.044	0.044
97	0.044	0.066	0.044	0.044	0.044	0.022	0.087
98	0.044	0.044	0.044	0.022	0.088	0.044	0.044
99	0.044	0.088	0.044	0.066	0.044	0.088	0.044
100	0.044	0.066	0.066	0.066	0.044	0.044	0.044
101	0.133	0.066	0.022	0.088	0.088	0.110	0.087
102	0.044	0.066	0.066	0.044	0.088	0.066	0.044
103	0.133	0.044	0.044	0.044	0.066	0.066	0.044
104	0.088	0.088	0.044	0.110	0.066	0.110	0.087
105	0.088	0.066	0.088	0.110	0.044	0.066	0.087
106	0.088	0.088	0.066	0.088	0.044	0.066	0.087
107	0.088	0.088	0.066	0.044	0.088	0.066	0.044
108	0.088	0.066	0.088	0.066	0.088	0.110	0.087
109	0.133	0.088	0.110	0.088	0.110	0.066	0.131
110	0.177	0.132	0.110	0.110	0.110	0.066	0.087
111	0.088	0.155	0.132	0.110	0.110	0.088	0.087

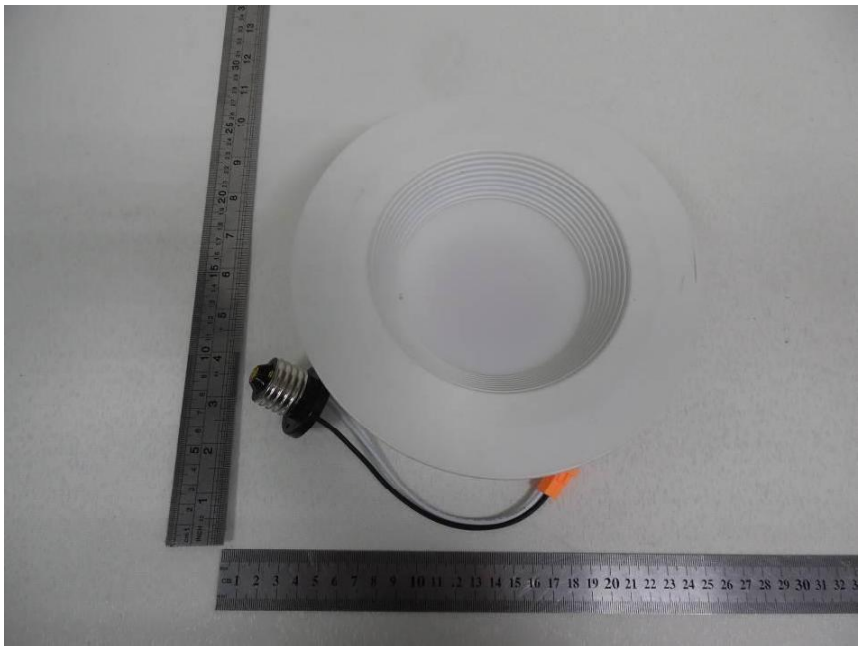
CANDELA TABULATION - (Cont.)

112	0.133	0.110	0.110	0.110	0.110	0.110	0.174
113	0.133	0.088	0.066	0.110	0.110	0.066	0.174
114	0.088	0.155	0.066	0.154	0.154	0.154	0.131
115	0.177	0.110	0.088	0.110	0.110	0.132	0.087
116	0.133	0.110	0.132	0.132	0.088	0.110	0.131
117	0.088	0.132	0.154	0.110	0.110	0.088	0.131
118	0.133	0.155	0.088	0.132	0.154	0.110	0.174
119	0.133	0.110	0.110	0.110	0.110	0.110	0.131
120	0.133	0.132	0.132	0.198	0.176	0.110	0.131
121	0.177	0.155	0.132	0.132	0.088	0.154	0.087
122	0.133	0.155	0.176	0.132	0.154	0.132	0.174
123	0.177	0.155	0.176	0.132	0.154	0.154	0.174
124	0.177	0.199	0.199	0.176	0.176	0.198	0.174
125	0.221	0.199	0.199	0.198	0.220	0.220	0.262
126	0.221	0.199	0.199	0.198	0.220	0.220	0.174
127	0.133	0.199	0.199	0.221	0.242	0.198	0.218
128	0.177	0.199	0.221	0.198	0.220	0.220	0.262
129	0.309	0.243	0.243	0.220	0.220	0.286	0.218
130	0.221	0.265	0.331	0.243	0.264	0.351	0.262
131	0.265	0.243	0.265	0.243	0.264	0.242	0.262
132	0.177	0.331	0.199	0.243	0.242	0.242	0.262
133	0.309	0.243	0.221	0.198	0.220	0.242	0.218
134	0.221	0.265	0.243	0.243	0.264	0.308	0.218
135	0.265	0.199	0.199	0.220	0.198	0.220	0.262
136	0.265	0.243	0.199	0.220	0.198	0.220	0.131
137	0.265	0.221	0.243	0.243	0.220	0.198	0.218
138	0.221	0.265	0.221	0.243	0.242	0.220	0.262
139	0.309	0.265	0.265	0.331	0.242	0.220	0.262
140	0.353	0.309	0.287	0.265	0.264	0.286	0.218
141	0.353	0.397	0.419	0.397	0.440	0.374	0.393
142	0.398	0.419	0.375	0.441	0.374	0.418	0.349
143	0.486	0.486	0.507	0.463	0.462	0.440	0.480
144	0.486	0.508	0.529	0.529	0.528	0.484	0.480
145	0.574	0.552	0.507	0.573	0.506	0.528	0.480
146	0.530	0.574	0.574	0.573	0.573	0.593	0.567
147	0.619	0.640	0.596	0.551	0.594	0.637	0.611
148	0.663	0.662	0.662	0.595	0.705	0.660	0.654
149	0.707	0.706	0.706	0.706	0.727	0.703	0.698
150	0.795	0.839	0.816	0.794	0.793	0.792	0.829
151	0.884	0.883	0.838	0.838	0.859	0.857	0.829
152	0.884	0.883	0.882	0.904	0.881	0.857	0.916
153	1.060	0.971	0.927	0.904	0.969	0.945	0.960
154	0.972	0.971	0.949	0.970	0.991	0.989	1.003
155	1.060	1.060	1.059	1.080	1.101	1.055	1.090
156	1.193	1.170	1.147	1.169	1.145	1.165	1.134
157	1.237	1.148	1.213	1.191	1.233	1.209	1.265
158	1.237	1.258	1.280	1.279	1.255	1.363	1.221
159	1.370	1.347	1.368	1.389	1.387	1.341	1.396
160	1.414	1.457	1.412	1.455	1.497	1.473	1.396
161	1.546	1.523	1.544	1.543	1.563	1.539	1.527
162	1.679	1.589	1.633	1.588	1.607	1.605	1.657
163	1.679	1.678	1.677	1.676	1.673	1.715	1.657
164	1.812	1.722	1.787	1.764	1.739	1.759	1.788
165	1.812	1.832	1.853	1.786	1.850	1.803	1.832
166	1.812	1.876	1.919	1.896	1.894	1.913	1.875
167	1.988	1.898	1.941	1.940	1.894	1.913	1.875
168	2.032	1.965	1.986	1.940	2.004	1.978	1.963

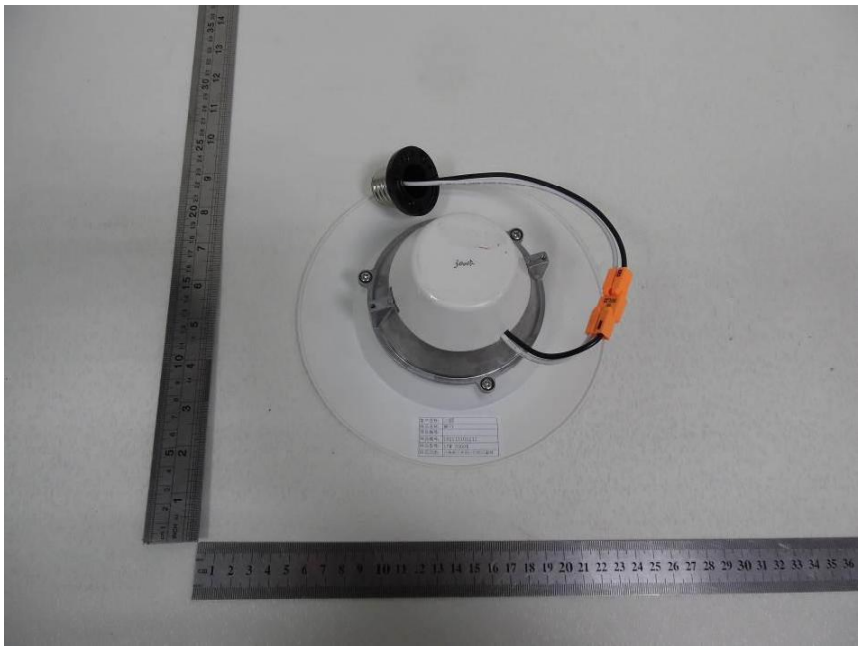
CANDELA TABULATION - (Cont.)

169	2.077	2.009	2.052	2.029	2.004	2.023	2.050
170	2.032	2.075	2.052	2.029	2.026	1.979	2.006
171	2.032	2.075	2.030	2.028	2.092	2.066	2.050
172	2.121	2.141	2.074	2.095	2.114	2.066	2.050
173	2.077	2.141	2.096	2.095	2.114	2.088	2.094
174	2.165	2.119	2.140	2.117	2.092	2.110	2.181
175	2.121	2.163	2.140	2.139	2.158	2.154	2.181
176	2.165	2.163	2.206	2.139	2.136	2.176	2.224
177	2.165	2.163	2.228	2.205	2.202	2.198	2.181
178	2.209	2.163	2.184	2.249	2.290	2.242	2.268
179	2.209	2.163	2.228	2.227	2.246	2.198	2.268
180	2.195	2.195	2.195	2.195	2.195	2.195	2.195

Appendix 1 Product Photo



Picture 1



Picture 2

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

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	Jan. 29, 2016
Test report number	LCZP16010148
Laboratory contact name	Richard Li

Product Information

Manufacturer	Elec-Tech International Co., Ltd	
Brand name	ETI, Commercial Eletric	
Model number	531791XX	
SKU(if available)	N/A	
Type of luminaire (for integral lamps, list base type and lamp type)	SSL Downlight Retrofit Kits	
Luminaire aperture	-	in.
Luminaire height	0.0	in.
Luminaire length	4.3	in.
Luminaire width	4.3	in.
Number of units(modular products)	N/A	

Electrical Measurements	Integrating sphere output	Goniophotometer Output	
Input wattage	17.22	17.28	W
Input current	0.147	0.147	A
Input voltage(AC)	120.05	120.00	V
Power factor	0.977	0.977	
Off-state power	0.0	0.0	W

Photometric Characteristics			
Total initial lumen output	1390.43	1397.47	lm
Initial luminaire efficacy	90.2	80.87	lm/W
Correlated color temperature / CCT	2941	K	
Color rendering index/CRI	90.2		
R9value	41		
Duv	0.00135		

Luminous Intensity Distribution		Goniophotometer Output	
Center beam candle power(if applicable)	--	665.4	cd
Beam angle(if applicable)		91.6	°
Zonallumensinthe0°-60°zone		89.01	%
Zonal lumens in the60°-90° zone		10.80	%
Zonallumensinthe90°-120°zone		0.0	%
Zonallumensinthe120°-180°zone		0.3	%