LM-79-08 Test Report

For

ETI Solid State Lighting (Zhuhai) Ltd

No.1, Zhongzhu Road South, Science & Technology Innovation Coast, High Tech District, Zhuhai City, Guangdong Prov., China

Inseparable SSL Luminaires

Model Name(s):
546901##-A

Representative (Tested) Model:
54690111-A

Model Difference: Where "##" denotes color tunable, 11-30 identifies CCT tunable to 3000K, 4000K and 5000K

Prepare by：

Derek Lai

Engineer: Derek Lai
Date: 2019-05-22

Review by:

Vincent Yuan

Technical Lead: Vincent Yuan
Issue Date: 2019-06-04
Revised Date: N/A

Note: 1. The results contained in this report pertain only to the tested samples.

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3. This report does not imply product certification, approval, or endorsement by NVLAP, or any agency of the Federal Government.

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Address: 3F, No. 1 the 1st North Industry Road, Songshan Lake Science & Technology Park, Dongguan, Guangdong, China
Tel: 86-769-22212079
Website: http://www.ntc-cert.com

Product Information:

Client Name:	ETI Solid State Lighting (Zhuhai) Ltd
Brand Name:	ETI, Commercial Electric
Model Number:	546901##-A(##=11-30)
Product Type:	Inseparable SSL Luminaires
Rating Input:	120Vac, 60Hz, 11.5W
Declared CCT:	3000K/4000K/5000K
Declared Light Output:	810 lm
LED Manufacturer:	Samsung
LED Model:	SPMWHX228FD5WAW0XX
LED Quantity:	44 pcs

Test Information:

Standard Lamp:	Total Spectral Radiant Flux Standard Lamp, trace to NIST. 1. D908S for Gonio 2. D215S for Integrating Sphere
Date of Receipt Samples:	2019-04-17
Quantity of Receipt Samples:	1 pcs
Sample Number:	190417004-S1

Laboratory Information:

Test Laboratory:	Dongguan New Testing Centre Co., Ltd
Laboratory Address:	3F, No. 1 the 1st North Industry Road, Songshan Lake Science & Technology Park, Dongguan, Guangdong, China
Laboratory Contact Name:	Neil Zhong
Laboratory Contact E-mail:	Neil_ntc@163.com

Report Information:

Issued Date of Test Report:	2019-06-04
Revised Date of Test Report:	N/A
Test Report No.:	NTCR19050100
Remark *(If applicable)*:	1. The Luminaires has two Appearance structures, one structure with ON/OFF switch, other structure without ON/OFF switch.

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Test Specification:	
Date of Test	2019-04-26
Test Item	1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate
Reference Standard	IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products ANSI C78.377-2017 Specifications for the Chromaticity of Solid State Lighting Products CIE 13.3-1995 Method of Measuring and Specifying Color Rendering Properties of Light Sources CIE 15-2004 Technical Report Colorimetry

Test Methods:

1. Photometric and Electrical Measurements – Light Distribution Method:

Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at 25 °C ± 1°C, measured at a point not more than 1 m from the sample and at the same height as the sample. The sample was operated at required Voltage and Frequency. It was stabilized before measurement was made. Luminous Flux, Luminaire Efficacy and Zonal Lumen were calculated from the software taken at 1° vertical intervals and 15° horizonal intervals.

2. Photometric and Electrical Measurements – Integrating Sphere Method:

Photometric parameters were measured using an integrating sphere, as spectroradiometer and software. The ambient temperature condition inside the sphere was measured at 25 °C± 1°C. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The sample was operated at require Voltage and Frequency. It was stabilized before measurement was made. Chromaticity Coordinates, Correlated Color Temperature and Color Rendering Index were calculated from the spectral radiant flux measurements taken at least 1 nm intervals over the rage of 380 to 780 nm.

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Integrating Sphere Test Results:

Test Condition:

Test Ambient (°C)	Test Humidity (%)	Orientation	Stabilization Time (minute)	Test Time (minute)
24.6	40.4	Face Down	90	10

Electrical Data:

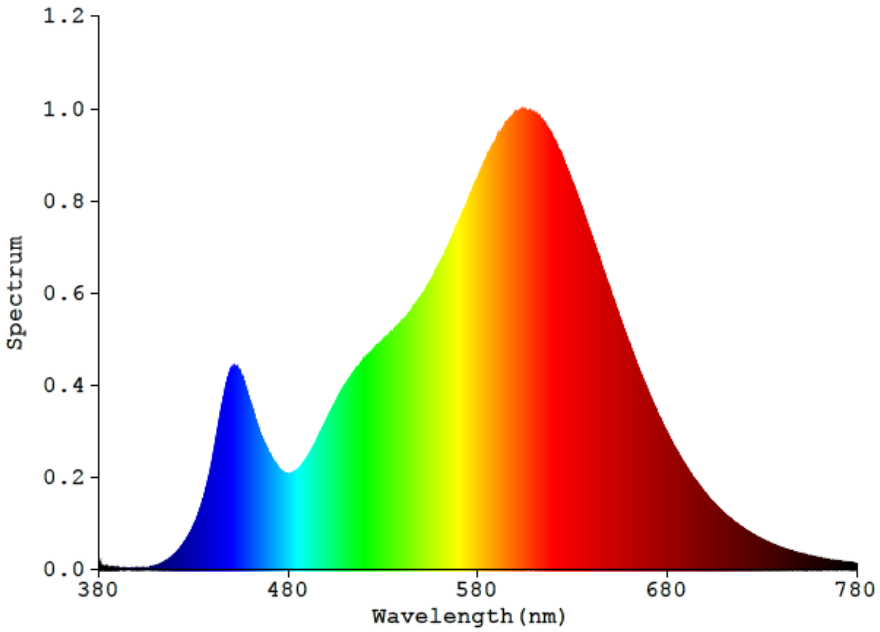
Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
120.0	60	0.1190	11.38	0.7971

Color Data:

Parameter	Result
CCT(K)	2973
Ra	84.1
R9	13
Chromaticity, x	0.4379
Chromaticity, y	0.4028
Chromaticity, u'	0.2518
Chromaticity, v'	0.5210
Duv	-0.00063

Special Color Rendering			
R1	83	R9	13
R2	92	R10	83
R3	96	R11	82
R4	82	R12	77
R5	83	R13	85
R6	91	R14	99
R7	83	R15	75
R8	61	-	-

Spectrum Diagram:



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Goniophotometer Test Results:

Test Condition:

Test Ambient (°C)	Test Humidity (%)	Orientation	Stabilization Time (minute)	Test Time (minute)
24.4	40.6	Face Down	90	25

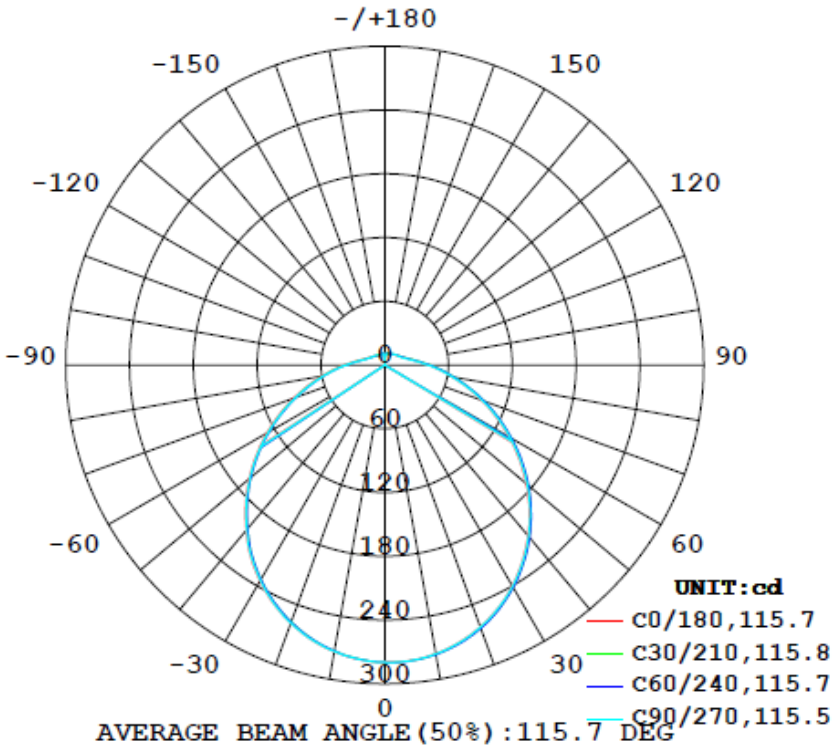
Electrical Data:

Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
120.0	60	0.1190	11.38	0.7971

Goniophotometer Data:

Parameter	Results
Total Luminous (lm)	999.6
Luminous Efficacy (lm/w)	87.84
Zonal Lumens Distribution (0-60°)	63.8%
Beam Angle (°)	115.7

Luminous Intensity Distribution Diagram:



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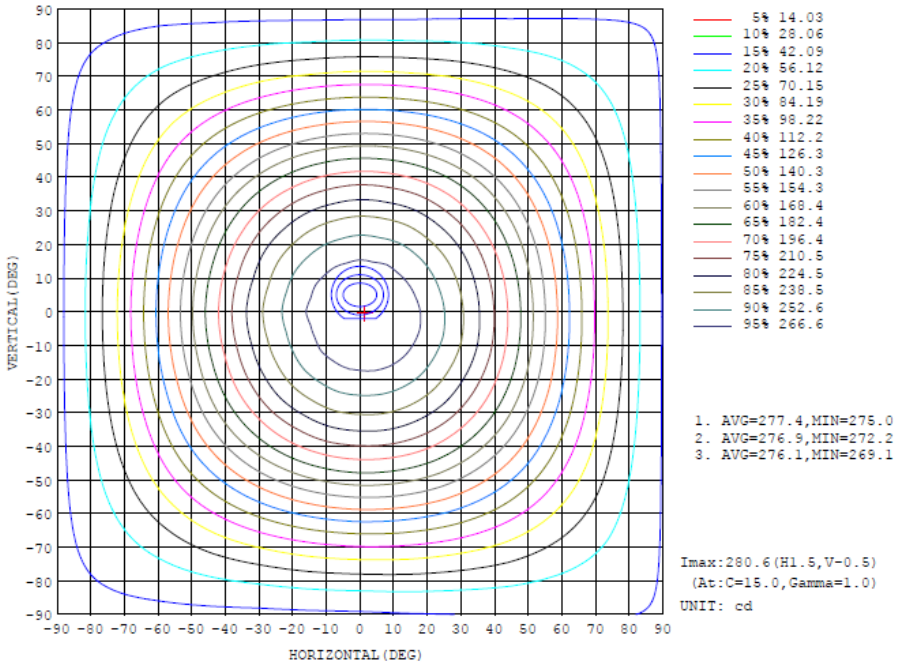
Zonal Flux Diagram:

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum,lamp
10	275.9	276.6	275.9	275.1	273.9	273.2	273.8	274.9	0- 10	26.47	26.47	2.65,2.65
20	262.2	263.7	262.5	260.7	258.7	256.9	258.6	260.3	10- 20	75.86	102.3	10.2,10.2
30	239.7	241.8	240.1	237.3	234.8	232.6	234.3	236.8	20- 30	115.2	217.5	21.8,21.8
40	209.4	212.5	210.0	206.2	202.8	201.0	202.4	205.9	30- 40	139.3	356.8	35.7,35.7
50	173.5	176.3	174.6	170.0	166.8	164.4	165.8	169.9	40- 50	145.7	502.5	50.3,50.3
60	134.7	137.7	135.7	131.3	128.2	125.7	126.7	131.0	50- 60	125.0	627.5	62.8,62.8
70	97.04	99.76	97.49	93.56	91.18	88.62	89.36	94.67	60- 70	111.3	738.7	74.9,74.9
80	64.54	66.89	64.24	61.54	60.25	57.97	57.99	60.87	70- 80	81.42	820.2	83.1,83.1
90	41.28	42.86	40.42	38.84	38.36	36.75	36.34	38.21	80- 90	54.16	884.3	88.5,88.5
100	27.22	28.22	26.30	25.31	25.27	24.20	23.68	24.98	90-100	34.62	918.9	91.9,91.9
110	19.94	20.57	19.23	18.66	18.59	17.70	17.61	18.32	100-110	23.10	942.0	94.2,94.2
120	16.38	17.02	16.04	15.62	15.24	14.46	14.75	15.30	110-120	16.96	959.0	95.9,95.9
130	14.47	15.02	14.43	14.04	13.48	12.73	13.23	13.80	120-130	13.23	972.2	97.3,97.3
140	12.99	13.53	13.51	13.38	12.07	11.50	12.34	12.95	130-140	10.36	982.6	98.3,98.3
150	12.04	12.54	12.22	11.90	11.14	10.67	11.26	11.89	140-150	7.695	990.3	99.1,99.1
160	11.43	11.81	11.32	11.06	10.65	10.24	10.62	11.08	150-160	5.265	995.5	99.6,99.6
170	11.55	11.84	10.86	10.92	11.00	11.16	10.92	10.98	160-170	3.133	998.7	99.9,99.9
180	0.0027	0	0	0	0	0	0	0	170-180	0.9125	999.6	100,100
DEG	LUMINOUS INTENSITY:cd Less than 35% Percent = 18.4 %									UNIT:lm		

Isocandela Diagram:



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Luminous Distribution Intensity Data:

Table--1 UNIT: cd

γ (DEG) \ C(DEG)	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270
0	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280	280
5	279	279	279	279	279	279	279	279	278	279	278	278	278	278	278	277	278	278	278
10	276	277	276	277	277	277	276	276	275	275	274	274	274	273	273	273	273	273	274
15	270	271	271	271	271	271	270	270	269	269	268	268	268	266	266	266	267	267	267
20	262	264	263	264	264	263	263	262	261	261	259	259	259	257	257	257	257	258	259
25	252	254	254	254	254	253	252	252	250	250	249	248	248	246	246	246	246	247	247
30	240	241	241	242	242	242	240	240	238	237	236	235	235	233	233	233	233	233	234
35	225	227	227	228	228	227	226	225	223	223	221	220	220	218	218	218	218	218	219
40	209	211	211	213	212	212	210	209	207	206	205	203	203	202	201	201	201	202	202
45	192	194	195	195	195	194	193	191	190	189	188	186	185	184	183	183	183	184	185
50	173	175	176	176	176	176	175	173	171	170	169	167	167	165	165	164	164	165	166
55	154	156	157	157	157	157	155	154	152	151	150	148	147	146	145	145	145	145	146
60	135	137	137	138	138	137	136	134	133	131	130	129	128	127	126	126	126	126	127
65	116	117	118	118	118	117	116	115	113	112	111	110	109	108	107	107	107	107	108
70	97.0	98.9	99.5	99.8	99.6	98.7	97.5	96.1	94.6	93.6	92.6	91.6	91.2	89.6	89.4	88.6	88.6	88.5	89.4
75	79.7	81.7	81.9	82.4	81.8	81.3	79.7	78.8	77.2	76.5	75.5	74.9	74.6	73.4	73.1	72.2	72.1	71.8	72.6
80	64.5	66.4	66.6	66.9	66.2	65.6	64.2	63.5	62.0	61.5	60.7	60.4	60.2	59.0	58.8	58.0	57.7	57.5	58.0
85	51.7	53.3	53.4	53.7	52.9	52.3	51.1	50.5	49.3	48.9	48.3	48.2	48.1	47.2	46.9	46.2	45.9	45.6	45.9
90	41.3	42.6	42.7	42.9	42.2	41.5	40.4	39.9	39.0	38.8	38.5	38.4	38.4	37.6	37.4	36.7	36.5	36.1	36.3
95	33.2	34.4	34.5	34.5	33.8	33.2	32.3	31.8	31.1	31.0	30.8	30.9	30.8	30.3	30.1	29.5	29.3	28.9	29.0
100	27.2	28.1	28.3	28.2	27.6	27.1	26.3	25.9	25.3	25.3	25.2	25.3	25.3	24.8	24.7	24.2	23.9	23.6	23.7
105	23.0	23.7	23.8	23.7	23.3	22.8	22.1	21.7	21.3	21.3	21.2	21.3	21.2	20.9	20.8	20.4	20.2	19.9	20.0
110	19.9	20.5	20.6	20.6	20.2	19.8	19.2	19.0	18.5	18.7	18.4	18.6	18.6	18.1	18.2	17.7	17.7	17.3	17.6
115	17.8	18.5	18.3	18.6	18.1	18.1	17.3	17.2	16.6	16.8	16.6	17.1	16.6	16.2	16.3	15.8	16.0	15.6	15.9
120	16.4	17.0	16.8	17.0	16.6	16.7	16.0	15.9	15.4	15.6	15.8	16.2	15.2	14.8	14.9	14.5	14.7	14.4	14.8
125	15.3	15.8	15.7	15.9	15.6	15.7	15.1	15.1	14.7	14.7	14.4	14.9	14.3	13.7	13.9	13.5	13.8	13.5	13.9
130	14.5	14.9	14.8	15.0	14.8	14.9	14.4	14.6	14.2	14.0	13.7	13.7	13.5	13.0	13.1	12.7	13.0	12.9	13.2
135	13.7	14.2	14.0	14.3	14.0	14.3	14.0	14.1	13.8	13.7	13.2	13.0	12.7	12.3	12.4	12.1	12.3	12.3	12.9
140	13.0	13.5	13.3	13.5	13.2	13.6	13.5	13.6	13.1	13.4	12.8	12.3	12.1	11.7	11.8	11.5	11.7	11.7	12.3
145	12.5	12.8	12.6	12.9	12.7	13.1	12.9	13.1	12.7	12.6	12.0	11.8	11.5	11.1	11.3	11.0	11.3	11.3	11.8
150	12.0	12.4	12.2	12.5	12.3	12.9	12.2	12.6	12.0	11.9	11.4	11.4	11.1	10.7	10.9	10.7	11.0	11.3	11.3
155	11.7	12.0	11.8	12.1	11.9	12.1	11.7	11.9	11.4	11.1	10.8	11.0	10.9	10.5	10.7	10.4	10.7	10.5	10.8
160	11.4	11.8	11.5	11.8	11.5	11.7	11.3	11.5	11.2	11.1	10.2	10.8	10.7	10.3	10.5	10.2	10.5	10.2	10.6
165	11.6	11.9	11.6	11.8	11.4	11.6	11.2	11.0	10.3	10.8	10.7	10.3	10.7	10.5	10.6	10.4	10.6	10.5	10.7
170	11.6	11.8	11.5	11.8	11.3	11.7	10.9	10.8	10.7	10.9	10.7	11.0	11.0	11.2	11.4	11.2	11.4	11.2	10.9
175	9.00	9.05	9.01	9.36	9.37	9.22	9.16	9.10	8.88	8.90	9.01	8.84	8.60	8.74	8.93	8.86	8.85	8.81	8.82
180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table--2 UNIT: cd

γ (DEG) \ C(DEG)	285	300	315	330	345
0	280	280	280	280	280
5	278	278	279	279	279
10	274	274	275	275	276
15	267	268	269	269	270
20	258	260	260	261	262
25	248	249	250	251	252
30	235	236	237	239	240
35	220	221	222	224	225
40	203	204	206	208	209
45	186	187	189	190	192
50	167	168	170	171	173
55	147	149	150	152	154
60	128	129	131	133	134
65	108	110	112	113	115
70	90.0	91.4	94.7	94.7	96.5
75	73.0	74.6	75.7	77.7	79.0
80	58.4	59.7	60.9	62.5	63.8
85	46.2	47.4	48.3	49.8	51.0
90	36.5	37.3	38.2	39.5	40.6
95	29.1	29.8	30.5	31.6	32.5
100	23.8	24.3	25.0	25.9	26.6
105	20.0	20.5	21.1	21.8	22.5
110	17.5	18.1	18.3	19.1	19.6
115	15.7	16.3	16.5	17.6	17.6
120	14.6	15.1	15.3	16.1	16.4
125	13.8	14.4	14.4	15.1	15.2
130	13.3	14.1	13.8	14.4	14.3
135	12.9	13.8	13.4	13.9	13.5
140	12.4	12.9	12.9	13.5	12.9
145	12.0	12.5	12.4	12.7	12.4
150	11.5	12.1	11.9	12.2	12.0
155	11.0	11.8	11.4	11.8	11.6
160	10.6	11.2	11.1	11.5	11.4
165	10.6	10.9	11.1	11.8	11.6
170	10.2	10.9	11.0	11.5	11.9
175	8.82	8.84	9.03	9.15	9.27
180	0.00	0.00	0.00	0.00	0.00

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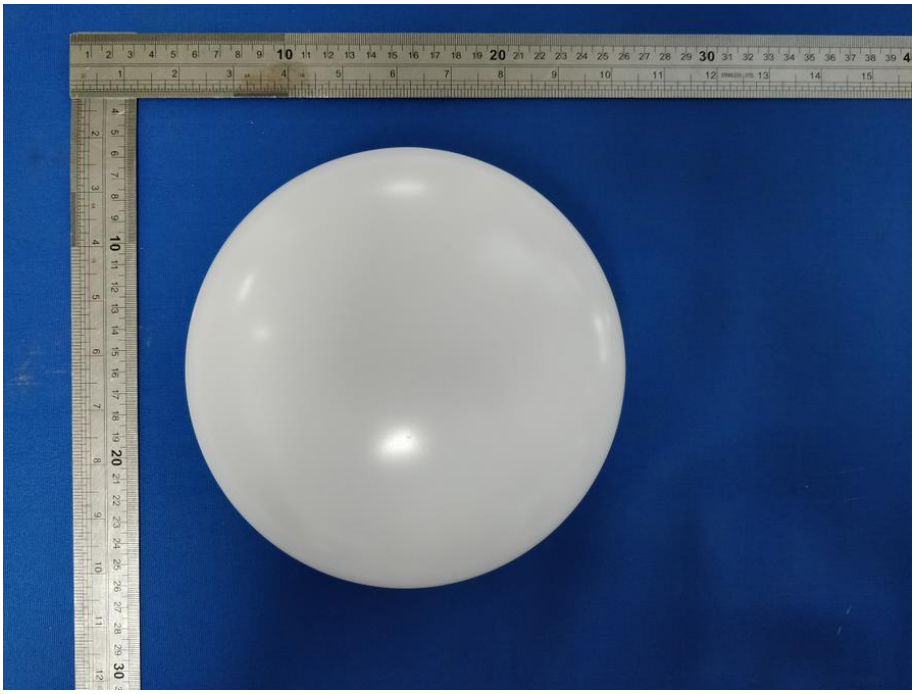
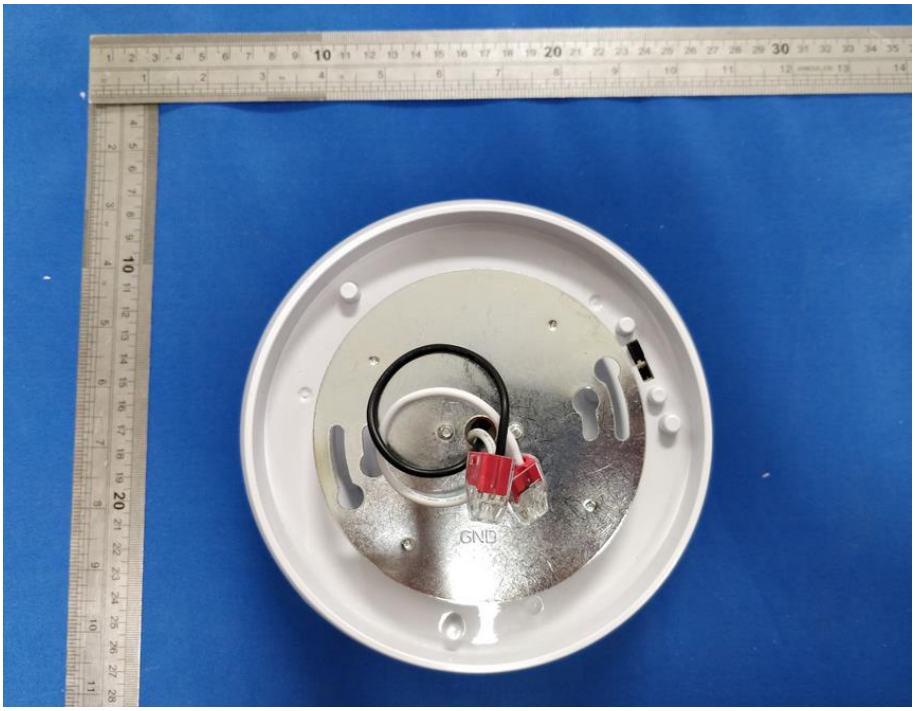
Photo of Sample:

The Structure with ON/OFF switch:





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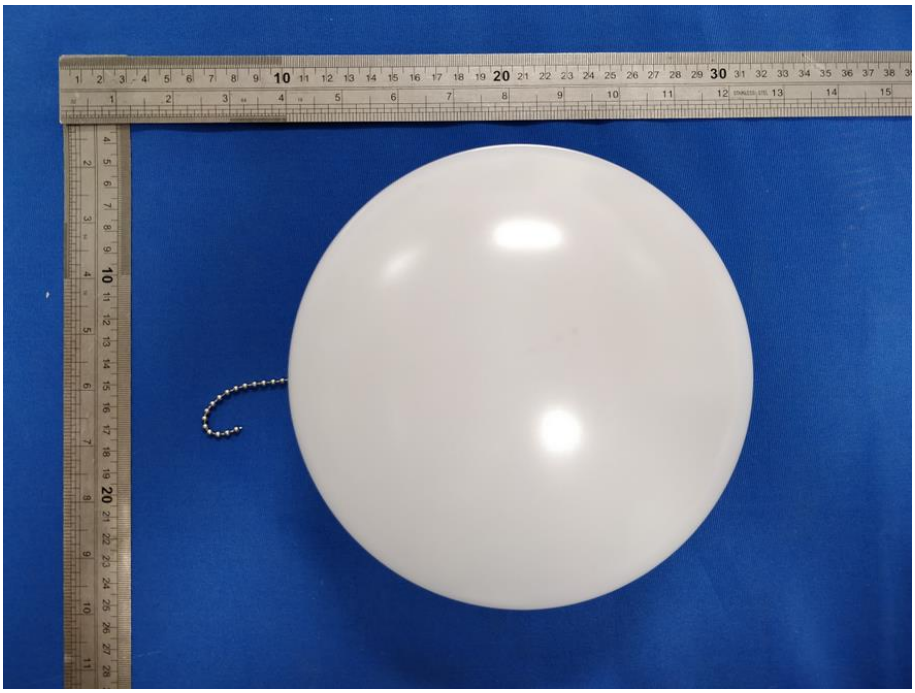
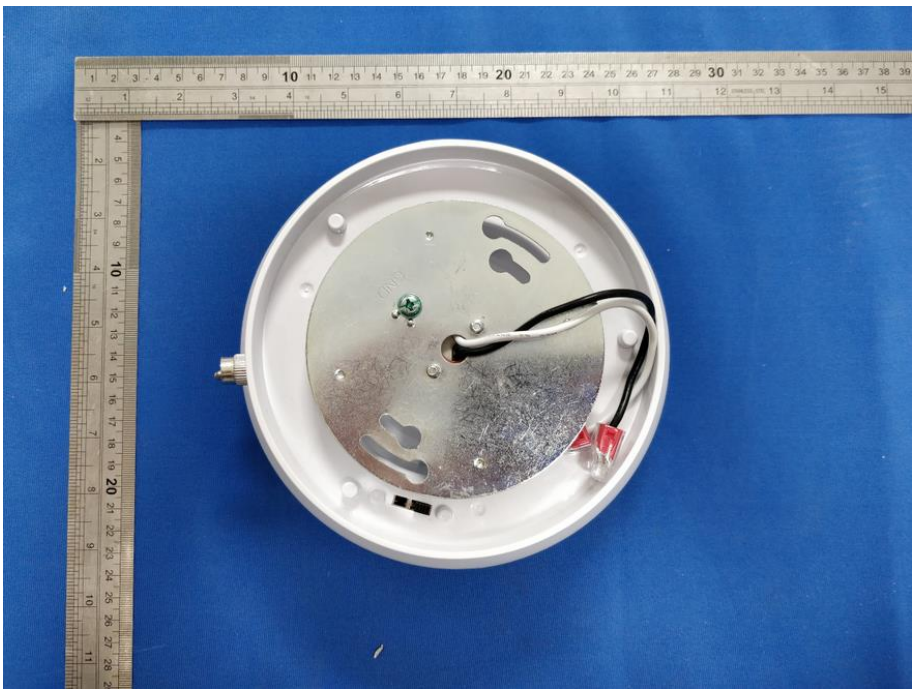
The Structure without ON/OFF switch:





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Equipment List:

Equipment ID	Equipment Name	Last Cal.	Due Cal.
NTC-F01-001	Goniophotometer System	2018-11-16	2019-11-15
NTC-F01-006	2.0 meter Integrating Sphere	2018-11-16	2019-11-15
NTC-F01-012	Standard Lamp	2018-11-13	2019-11-12
NTC-F01-013	Standard Lamp	2018-11-13	2019-11-12
NTC-F01-031	Digital Power Meter	2018-08-29	2019-08-28
NTC-F01-019	Temperature & Humidity Meter	2018-11-12	2019-11-11

************End of Report************

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