LM-79-08 Test Report

For

ELEC-TECH INTERNATIONAL CO LTD

No.1 Jinfeng Road, Tangjiawan Town, Xiangzhou District, Zhuhai City, Guangdong Province, P.R. China 519085

Under-Cabinet Luminaire

Model name(s):
535061##

Representative (Tested) Model:
535061##

Model Difference: ##=11-30 identifies 3000K

.

Prepare By:

Engineer: Derek Lai

Date: 2018-06-04

Review By:

Technical Lead: Vincent Yuan

Date: 2018-06-27

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

Product Information:

Client Name:	ELEC-TECH INTERNATIONAL CO LTD
Brand Name:	ETI
Model Number:	535061## (##=11-30)
Product type:	Under-Cabinet Luminaire
Rating Input:	AC120/60Hz 22W
Declared CCT:	3000K
Declared Light output:	1500 lm
LED Manufacturer:	Samsung
LED Model:	SPMWH1228xxxxxxxxx
LED Quantity:	99 pcs
Forward current of LED Chip:	120 mA
Date of Receipt Samples:	2018-05-18
Quantity of Receipt Samples:	1
Sample Number:	180518002-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:	2018-06-27
Revised Date of Test Report:	N/A
Test Report No.:	NTCR18050064
Remark (*If applicable*)	N/A

Test Specifications:	
Date of Test	2018-06-04
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 C78.377-2008 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 120 Volts AC, 60Hz. It was stabilized before measurement was made. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1° vertical intervals and 22.5° Vertical intervals.

2. Photometric and Electrical Measurements – Integrating Sphere Method:

Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25º C ± 1º 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 120 Volts AC, 60Hz. 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 5 nm intervals over the range of 380 to 780 nm.

Integrating Sphere Test Results:

Test Condition:

Test Ambient	Test Humidity	Orientation	Stabilization Time	Test Time
25.1	40.4	Face Down	90	25

Electrical Data:

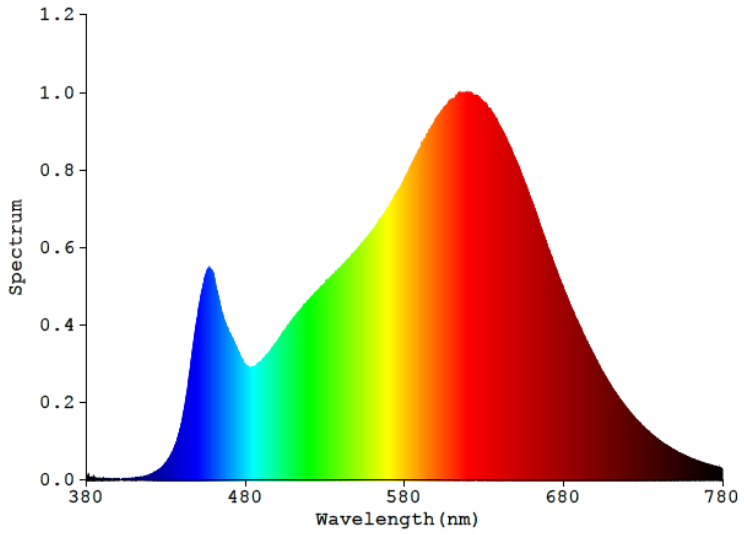
Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.0	60	0.1843	21.78	0.9849

Color Data:

Parameter	Result
CCT (K)	2946
Color Rendering Index (CRI)	92.6
R9	62
Chromaticity, x	0.4347
Chromaticity, y	0.3932
Chromaticity u′	0.2539
Chromaticity v′	0.5167
Duv	-0.00410

Special Color Rendering			
R1	95	R9	62
R2	99	R10	99
R3	95	R11	93
R4	92	R12	83
R5	95	R13	97
R6	95	R14	98
R7	89	R15	91
R8	81	-	-

Spectrum Diagram:



Goniophotemeter Test Results :

Test Condition:

Test Ambient	Test Humidity	Orientation	Stabilization Time	Test Time
25.1	40.4	Face Down	90	25

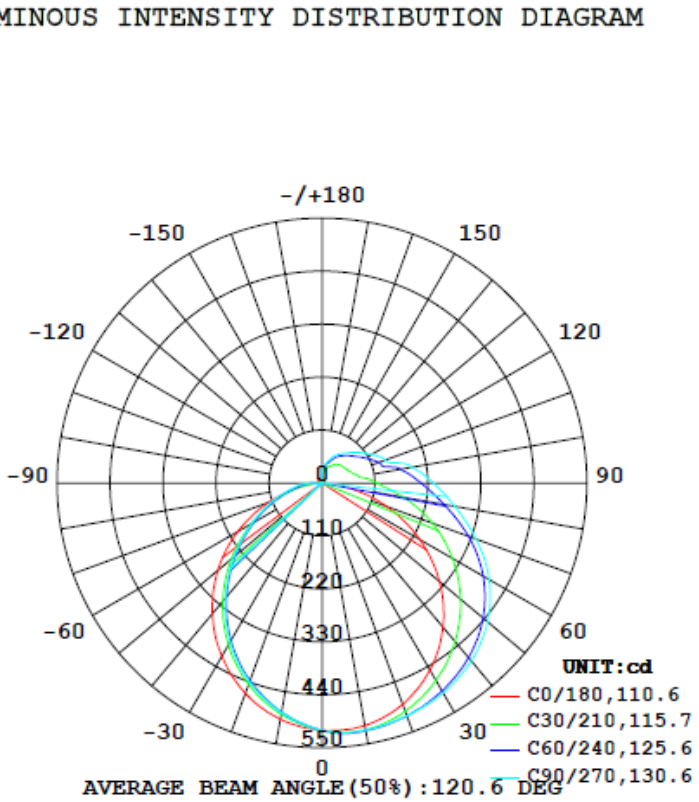
Electrical Data:

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.0	60	0.1845	21.80	0.9850

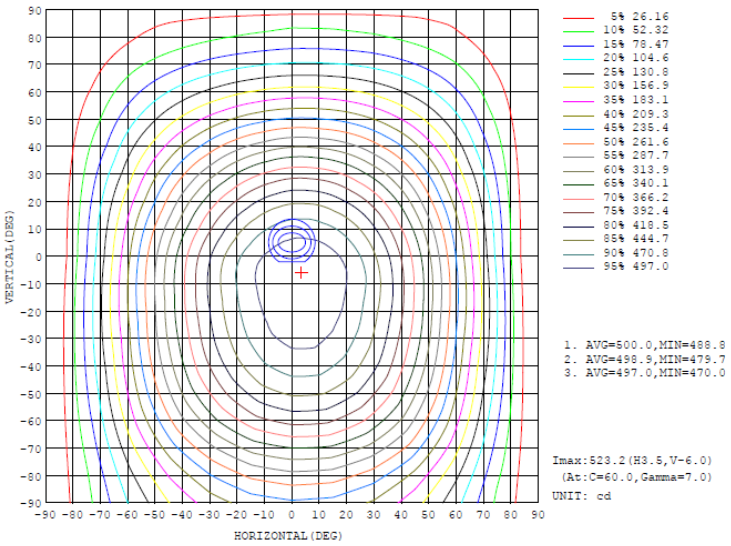
Goniophotometer Data:

Parameter	Result
Total Luminous (lm)	1925.25
Total Luminous per foot (lm/ft)	527.46
Luminous Efficacy (lm/w)	88.30
Zonal Lumens Distribution (0-60°)	61.5%
Beam Angle (°)	120.6

Luminous Intensity Distribution Diagram:



Isocandela Diagram:



Zonal Flux Diagram:

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum,lamp
10	511.6	522.1	521.3	512.8	498.5	484.4	484.0	493.8	0- 10	48.56	48.56	2.52,2.52
20	489.4	510.3	514.4	492.5	465.2	439.3	440.0	456.4	10- 20	138.7	187.3	9.72,9.72
30	448.1	487.6	503.3	462.4	415.9	380.7	381.6	403.6	20- 30	210.7	398.0	20.7,20.7
40	390.6	454.5	482.3	424.6	354.4	311.8	312.0	336.6	30- 40	256.8	654.8	34,34
50	318.3	411.2	448.5	379.0	282.5	237.4	238.0	261.2	40- 50	272.3	927.2	48.2,48.2
60	234.4	356.8	400.6	325.4	201.7	165.0	167.6	184.7	50- 60	257.5	1185	61.5,61.5
70	142.9	292.9	340.1	264.5	118.7	100.7	107.5	115.4	60- 70	217.5	1402	72.8,72.8
80	53.04	222.8	280.2	201.4	40.17	47.78	61.00	57.66	70- 80	161.6	1564	81.2,81.2
90	0.1306	167.5	231.2	156.1	0.1907	4.107	10.94	9.250	80- 90	107.3	1671	86.8,86.8
100	2.119	129.8	189.4	119.8	4.410	0.2746	0.3524	0.2559	90-100	69.98	1741	90.4,90.4
110	4.588	100.5	141.0	94.12	6.988	0.2738	0.3381	0.2610	100-110	51.92	1793	93.1,93.1
120	6.239	83.08	119.2	79.69	8.651	0.2517	0.2996	0.2490	110-120	40.96	1834	95.3,95.3
130	8.257	72.02	98.58	69.70	10.19	0.3089	0.3261	0.3075	120-130	32.07	1866	96.9,96.9
140	8.990	63.86	82.02	62.28	11.53	0.4209	0.4055	0.4242	130-140	24.38	1890	98.2,98.2
150	8.445	53.75	69.09	54.35	11.70	0.7761	0.5203	0.8036	140-150	17.43	1908	99.1,99.1
160	7.404	42.50	54.19	41.79	10.56	1.921	1.049	2.010	150-160	10.94	1919	99.7,99.7
170	5.795	31.75	38.31	20.79	9.422	4.102	3.685	5.548	160-170	5.302	1924	99.9,99.9
180	8.801	8.207	3.182	7.905	8.823	8.197	3.358	7.942	170-180	1.166	1925	100,100
DEG	LUMINOUS INTENSITY:cd Less than 35% Percent = 19.5 %									UNIT:lm		

Luminous Distribution Intensity Data:

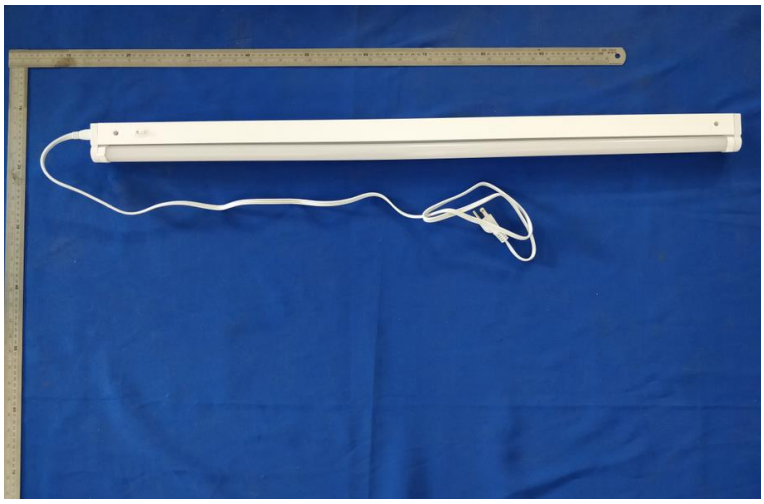
Table--1 UNIT: cd

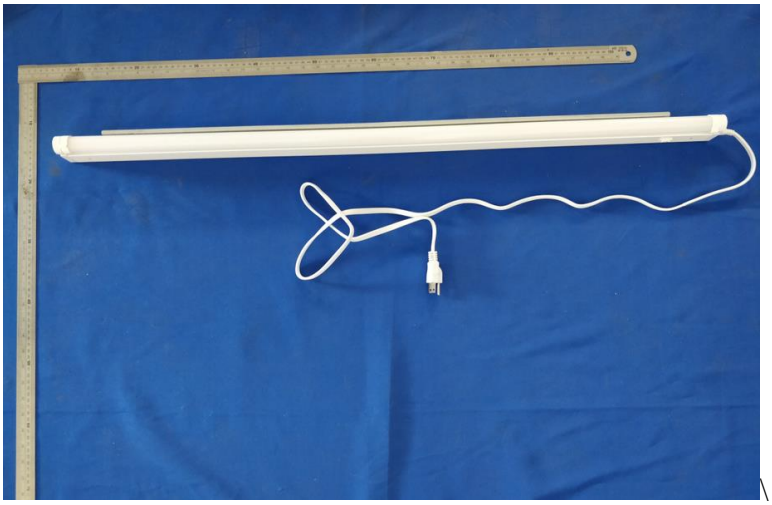
γ (DEG) \ C (DEG)	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270
0	514	513	514	514	514	513	514	514	514	513	514	514	514	513	514	514	514	513	514
5	515	517	520	521	522	522	521	521	519	517	514	511	508	505	503	501	500	500	501
10	512	516	520	522	522	522	521	519	516	513	509	504	498	491	488	484	483	483	484
15	503	511	515	518	520	520	519	516	509	504	498	492	484	474	468	464	462	462	464
20	489	499	505	510	515	516	514	510	501	492	482	476	465	453	445	439	437	437	440
25	471	484	491	500	508	512	510	504	492	478	464	455	442	428	419	411	409	409	413
30	448	463	473	488	499	505	503	495	480	462	443	429	416	399	388	381	378	378	382
35	422	438	453	472	487	496	494	485	467	444	420	402	387	368	356	347	344	344	348
40	391	410	429	454	474	484	482	471	451	425	395	371	354	333	321	312	308	308	312
45	356	377	403	434	457	469	467	455	433	403	368	338	320	296	284	275	271	271	275
50	318	342	375	411	436	450	449	436	412	379	339	304	282	258	246	237	235	234	238
55	278	305	345	386	413	427	426	414	388	353	309	268	243	219	207	201	197	198	201
60	234	266	313	357	386	402	401	389	362	325	279	231	202	179	170	165	163	164	168
65	189	226	279	326	356	372	372	359	333	296	247	193	160	140	133	132	131	133	136
70	143	184	244	293	324	340	340	328	302	265	215	157	119	102	99.9	101	102	104	107
75	97.1	144	208	258	289	308	309	298	270	232	182	122	77.6	66.2	69.7	72.3	75.3	78.2	81.8
80	53.0	107	171	223	257	277	280	269	242	201	150	89.4	40.2	36.5	43.1	47.8	52.8	57.1	61.0
85	17.4	72.4	137	191	229	250	254	244	217	176	123	60.3	11.3	13.8	22.8	32.0	38.8	43.5	47.1
90	0.13	47.0	113	168	206	227	231	222	196	156	104	43.6	0.19	0.16	0.48	4.11	5.16	10.5	10.9
95	0.76	37.2	96.9	149	185	205	211	201	177	140	90.0	34.6	2.88	0.14	0.20	0.25	0.30	0.33	0.34
100	2.12	32.5	78.2	130	166	184	189	181	159	120	73.4	31.4	4.41	0.17	0.22	0.27	0.32	0.35	0.35
105	3.43	32.0	70.8	109	133	156	162	151	127	103	66.6	31.5	5.90	0.19	0.23	0.28	0.33	0.36	0.36
110	4.59	33.0	65.2	100	126	138	141	136	120	94.1	62.0	32.6	6.99	0.20	0.22	0.27	0.32	0.34	0.34
115	5.39	34.2	61.0	91.0	114	127	131	125	110	86.4	58.8	33.9	8.01	0.23	0.22	0.26	0.30	0.32	0.32
120	6.24	35.1	58.4	83.1	104	115	119	114	100	79.7	56.8	34.9	8.65	0.34	0.22	0.25	0.29	0.31	0.30
125	7.11	34.0	56.2	76.9	94.9	105	108	103	91.3	74.2	54.9	35.4	9.39	0.55	0.25	0.27	0.30	0.32	0.31
130	8.26	34.3	54.6	72.0	86.9	95.5	98.6	94.2	84.0	69.7	53.4	35.8	10.2	0.88	0.31	0.31	0.33	0.35	0.34
135	8.86	33.4	52.8	67.7	80.4	87.4	89.5	86.4	78.0	65.7	51.7	34.9	10.9	1.51	0.42	0.36	0.37	0.39	0.37
140	8.99	33.6	49.4	63.9	74.4	80.3	82.0	79.5	72.3	62.3	49.8	33.7	11.5	2.19	0.61	0.42	0.41	0.43	0.41
145	8.85	32.8	46.4	60.0	69.1	73.9	75.3	73.2	67.4	58.9	44.8	31.4	11.9	2.85	0.93	0.54	0.48	0.48	0.45
150	8.45	28.1	41.6	53.7	63.7	67.9	69.1	67.4	62.7	54.3	39.3	27.7	11.7	3.96	1.33	0.78	0.61	0.55	0.52
155	8.16	26.3	39.3	48.1	55.8	62.0	63.0	61.7	56.3	48.5	39.1	26.0	11.4	5.08	2.21	1.17	0.86	0.74	0.69
160	7.40	23.0	36.3	42.5	48.3	53.0	54.2	53.3	49.7	41.8	36.6	24.1	10.6	5.94	3.35	1.92	1.32	1.16	1.05
165	6.75	15.8	30.4	38.5	42.9	45.8	46.4	45.9	43.1	35.8	24.9	18.0	9.92	5.99	4.34	3.27	2.43	2.02	1.87
170	5.79	8.60	21.6	31.7	34.8	37.5	38.3	37.6	30.3	20.8	18.1	14.2	9.42	6.06	4.86	4.10	4.11	3.84	3.69
175	6.26	7.00	8.41	15.4	19.7	24.6	26.0	16.3	14.3	15.6	14.7	12.4	9.94	7.70	6.63	5.89	4.34	5.21	6.83
180	8.80	8.68	8.50	8.21	7.63	7.61	3.18	7.98	7.56	7.90	8.27	8.56	8.82	8.70	8.50	8.20	7.61	7.61	3.36

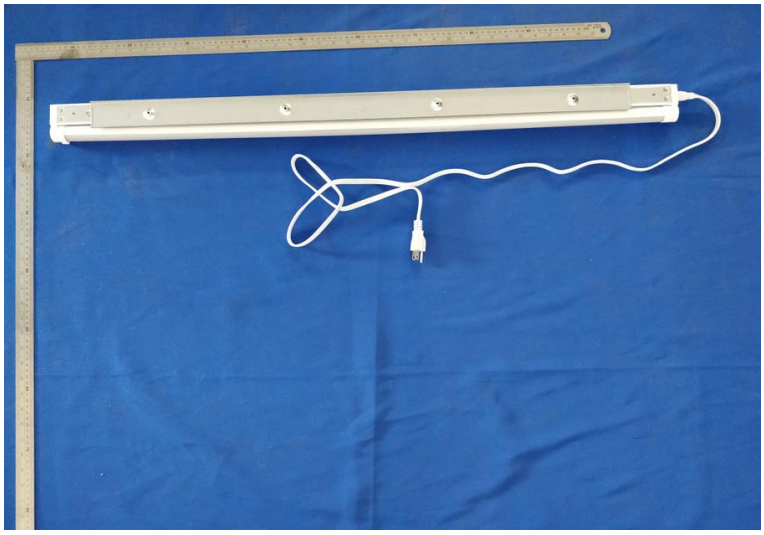
Table--2 UNIT: cd

γ (DEG) \ C (DEG)	285	300	315	330	345
0	514	514	513	514	514
5	502	504	506	509	512
10	486	490	494	499	505
15	467	472	477	486	494
20	443	450	456	467	477
25	417	424	432	444	457
30	386	395	404	417	432
35	353	362	371	386	402
40	317	326	337	352	369
45	280	289	299	315	333
50	242	252	261	276	293
55	206	214	223	236	252
60	172	178	185	195	210
65	139	144	149	156	167
70	110	113	115	119	124
75	83.1	84.8	84.8	84.9	84.5
80	61.4	60.8	57.7	54.6	49.3
85	47.1	45.3	38.7	30.6	21.5
90	11.0	11.8	9.25	7.64	3.25
95	0.33	0.29	0.24	0.17	0.11
100	0.34	0.31	0.26	0.19	0.14
105	0.35	0.32	0.27	0.21	0.17
110	0.34	0.31	0.26	0.21	0.18
115	0.32	0.29	0.25	0.21	0.21
120	0.30	0.28	0.25	0.22	0.31
125	0.31	0.30	0.27	0.26	0.53
130	0.35	0.33	0.31	0.32	0.91
135	0.38	0.37	0.36	0.43	1.49
140	0.42	0.42	0.43	0.62	2.26
145	0.47	0.48	0.56	0.94	3.10
150	0.54	0.59	0.80	1.39	4.06
155	0.73	0.85	1.23	2.28	5.16
160	1.12	1.35	2.01	3.53	6.09
165	2.04	2.43	3.52	5.25	5.78
170	3.92	4.64	5.55	6.59	5.72
175	6.86	6.33	6.24	6.43	6.51
180	7.95	7.65	7.94	8.29	8.54

Photo of Sample:







Equipment List:

Equipment ID	Equipment Name	Last Cal.	Due Cal.
NTC-F01-001	Goniophotometer System	2017-11-18	2018-11-17
NTC-F01-006	2.0 meter Integrating Sphere	2017-11-18	2018-11-17
NTC-F01-013	Standard Lamp	2017-11-18	2018-11-17
NTC-F01-031	Digital Power Meter	2017-11-18	2018-11-17
NTC-F01-019	Temperature & Humidity Meter	2017-11-23	2018-11-22

*******END OF DATASHEET*******

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