

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):
535051##

Representative (Tested) Model:
535051##

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

Prepare By:

Derek Lai

Engineer: Derek Lai

Date: 2018-06-04

Review By:

Vincent Yuan

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:	535051## (##=11-30)
Product type:	Under-Cabinet Luminaire
Rating Input:	AC120/60Hz 15W
Declared CCT:	3000K
Declared Light output:	1000 lm
LED Manufacturer:	Samsung
LED Model:	SPMWH1228xxxxxxxxx
LED Quantity:	77 pcs
Forward current of LED Chip:	120 mA
Date of Receipt Samples:	2018-05-18
Quantity of Receipt Samples:	1
Sample Number:	180518001-S1

Laboratory Information:

Test Laboratory:	Dongguan New Testing Centre Co., Ltd
Laboratory Address:	3F, No. 1 the 1 st 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.:	NTCR18050061
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
<p>1. Photometric and Electrical measurements – Light Distribution Method:</p> <p>Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, 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.</p>
<p>2. Photometric and Electrical Measurements – Integrating Sphere Method:</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. 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.</p>

Integrating Sphere Test Results:

Test Condition:

Test Ambient	Test Humidity	Orientation	Stabilization Time	Test Time
24.8	40.7	Face Down	90	25

Electrical Data:

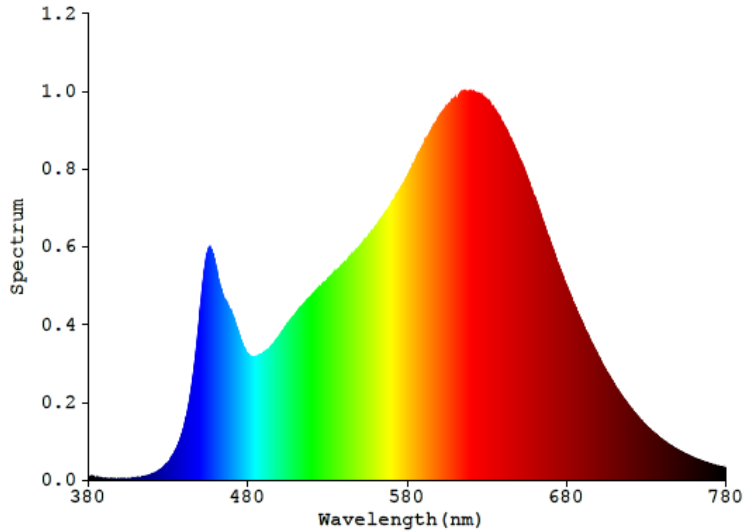
Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.0	60	0.1242	14.62	0.9818

Color Data:

Parameter	Result
CCT (K)	2991
Color Rendering Index (CRI)	92.6
R9	64
Chromaticity, x	0.4315
Chromaticity, y	0.3918
Chromaticity u'	0.2524
Chromaticity v'	0.5157
Duv	-0.00422

Special Color Rendering			
R1	96	R9	64
R2	98	R10	98
R3	95	R11	94
R4	92	R12	82
R5	96	R13	98
R6	94	R14	98
R7	89	R15	92
R8	82	-	-

Spectrum Diagram:



Goniophotometer Test Results :

Test Condition:

Test Ambient	Test Humidity	Orientation	Stabilization Time	Test Time
24.8	40.7	Face Down	90	25

Electrical Data:

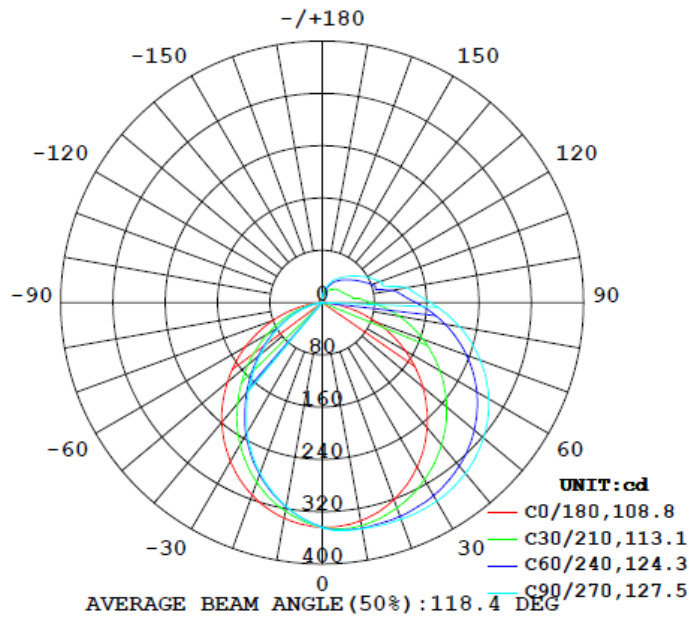
Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.0	60	0.1242	14.62	0.9818

Goniophotometer Data:

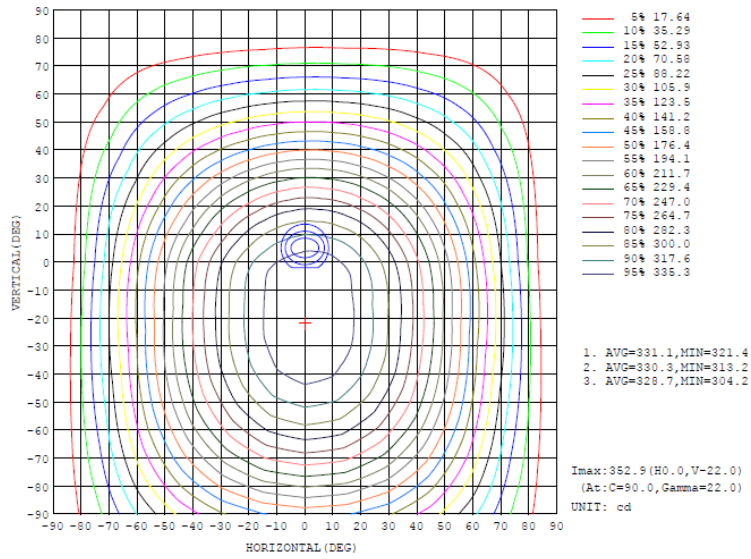
Parameter	Result
Total Luminous (lm)	1246.08
Total Luminous per foot (lm/ft)	429.68
Luminous Efficacy (lm/w)	85.23
Zonal Lumens Distribution (0-60°)	62.1%
Beam Angle (°)	118.4

Luminous Intensity Distribution Diagram:

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



Isocandela Diagram:



Zonal Flux Diagram:

ZONAL FLUX DIAGRAM:

y	C0	C45	C90	C135	C180	C225	C270	C315	y	Φ none	Φ total	lum.lamp
10	338.9	348.6	351.5	346.2	335.0	319.9	316.7	323.9	0- 10	32.40	32.40	2.6,2.6
20	320.9	341.6	352.7	336.4	313.5	284.6	277.7	291.0	10- 20	92.02	124.4	9.99,9.99
30	290.5	328.4	350.8	320.7	280.6	240.0	229.8	248.2	20- 30	138.9	269.3	21.1,21.1
40	250.0	307.4	341.1	298.5	239.1	189.8	175.5	197.6	30- 40	167.9	431.1	34.6,34.6
50	201.0	279.8	322.1	270.0	189.4	136.0	123.1	144.6	40- 50	176.5	607.6	48.8,48.8
60	146.6	245.0	294.1	235.8	126.0	86.47	76.84	93.83	50- 60	166.1	773.7	62.1,62.1
70	88.22	204.4	257.3	195.9	80.44	43.79	38.39	49.35	60- 70	140.2	913.9	73.2,73.2
80	32.84	160.3	213.5	153.3	28.18	10.09	8.006	13.84	70- 80	104.3	1018	81.7,81.7
90	0.0748	114.3	165.6	109.1	0.0492	0.1477	0.2217	0.1534	80- 90	69.18	1086	87.2,87.2
100	1.648	75.65	131.5	72.68	2.087	0.1619	0.2304	0.1553	90-100	46.86	1132	90.9,90.9
110	3.032	63.13	94.66	60.39	3.517	0.1629	0.2159	0.1609	100-110	32.74	1166	92.6,92.6
120	4.201	51.10	78.30	50.39	4.694	0.1455	0.1845	0.1301	110-120	23.91	1192	95.4,95.6
130	5.191	43.20	63.34	42.85	5.558	0.1785	0.2040	0.1844	120-130	19.88	1212	97.2,97.2
140	5.940	36.88	51.21	36.90	6.460	0.2632	0.2473	0.2787	130-140	14.70	1226	98.4,98.4
150	5.568	29.13	41.12	29.95	7.378	0.5640	0.3348	0.5713	140-150	10.15	1237	99.2,99.2
160	4.716	21.11	29.69	21.09	6.212	1.619	0.7975	1.581	150-160	6.064	1243	99.7,99.7
170	3.222	15.36	18.79	10.94	5.092	2.729	3.161	4.288	160-170	2.842	1245	100,100
180	3.995	3.544	1.154	3.457	4.002	2.555	1.216	3.449	170-180	0.6093	1246	100,100
DEG	LUMINOUS INTENSITY:cd Less than 95 Percent = 17.5 %										UNIT:lm	

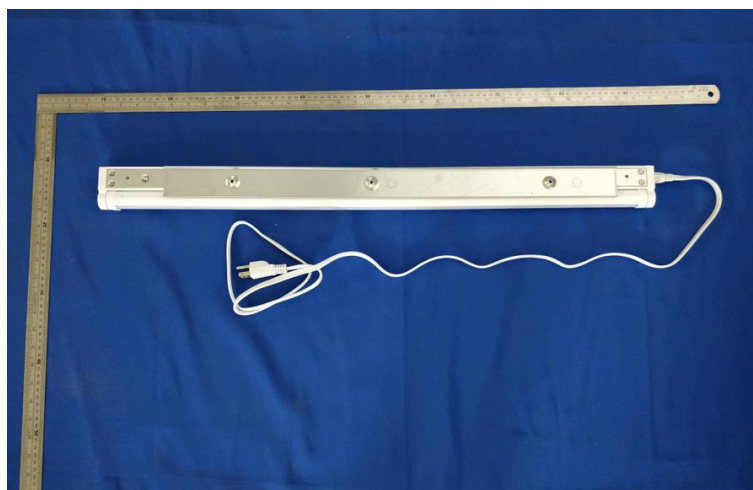
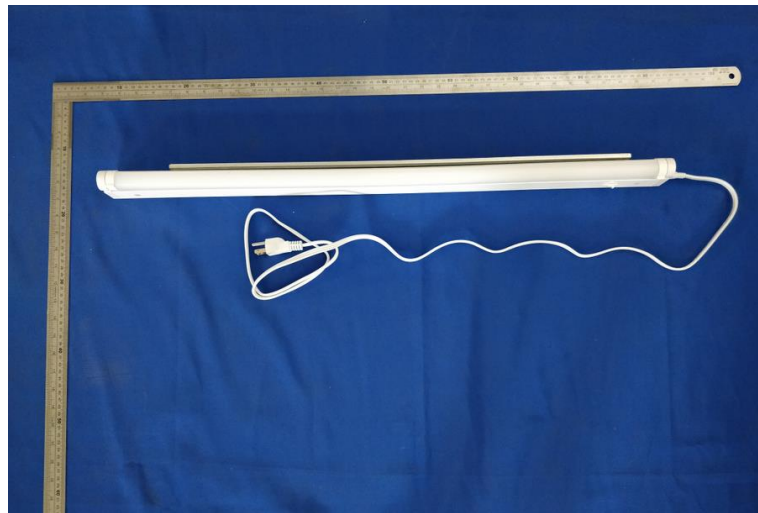
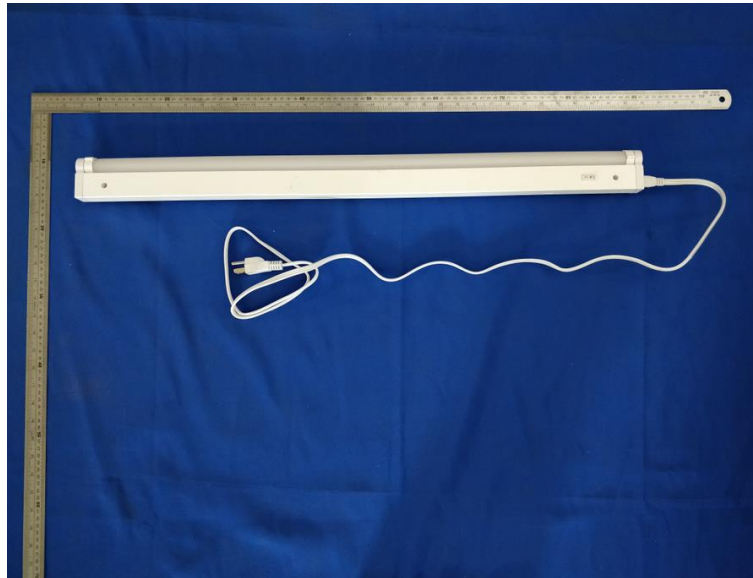
Luminous Distribution Intensity Data:

Table--1 UNIT: cd

C (DEG) y (DEG)	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	
0	344	343	343	343	343	344	344	344	344	344	345	345	344	343	343	343	343	344	344	
5	343	345	347	349	349	350	350	350	349	348	347	345	341	338	335	333	332	331	332	
10	339	344	347	349	350	351	351	350	348	346	344	341	335	329	324	320	318	316	317	
15	332	338	342	346	349	352	353	351	347	342	338	333	326	317	310	304	300	298	298	
20	321	329	334	342	348	352	353	350	344	336	329	322	313	302	293	285	280	277	278	
25	307	317	325	336	345	351	352	349	341	329	318	308	299	284	273	263	258	254	255	
30	290	302	313	328	341	349	351	346	336	321	305	292	281	264	251	240	233	229	230	
35	272	284	300	319	334	345	347	341	329	310	290	273	261	242	227	215	207	203	203	
40	250	265	284	307	326	338	341	335	320	299	274	253	239	218	201	189	180	176	175	
45	226	243	267	295	316	330	333	326	309	285	257	231	215	192	175	162	153	149	149	
50	201	221	249	280	304	319	322	315	296	270	238	208	189	166	149	136	127	123	123	
55	174	195	229	263	289	306	309	302	282	253	219	184	163	139	122	111	103	99.4	99.1	
60	147	170	208	245	273	290	294	286	266	236	198	159	136	112	96.8	86.5	80.0	76.6	76.8	
65	118	144	186	226	255	273	277	269	248	216	177	135	108	85.2	72.7	64.0	58.9	56.3	56.6	
70	88.2	119	164	204	235	253	257	250	228	196	156	110	80.4	59.5	50.4	43.8	39.9	38.0	38.4	
75	59.5	93.4	142	183	214	232	236	229	207	175	134	86.7	53.2	36.5	30.7	25.7	23.1	21.5	22.1	
80	32.8	70.0	119	160	191	208	214	205	185	153	113	64.7	28.2	17.3	14.0	10.1	8.38	7.56	8.01	
85	10.7	48.9	97.2	138	168	185	190	182	162	131	91.8	45.3	8.51	3.50	1.18	0.46	0.40	0.34	0.34	
90	0.07	30.7	75.0	114	144	161	166	158	139	109	70.8	28.3	0.05	0.04	0.10	0.15	0.19	0.21	0.22	
95	0.61	21.2	60.6	96.6	124	140	146	139	122	94.0	59.1	21.3	1.23	0.06	0.11	0.15	0.18	0.21	0.22	
100	1.65	18.1	47.3	75.7	109	126	132	125	105	72.7	45.1	18.4	2.09	0.08	0.12	0.16	0.20	0.23	0.23	
105	2.33	17.0	42.2	69.4	84.3	93.4	97.5	93.1	84.2	66.1	41.2	17.7	2.85	0.10	0.13	0.17	0.20	0.23	0.23	
110	3.03	17.0	38.6	63.1	80.8	91.6	94.7	90.5	78.6	60.4	37.9	17.8	3.52	0.11	0.13	0.16	0.19	0.22	0.22	
115	3.65	17.4	35.8	56.5	73.1	83.3	86.4	82.8	71.7	55.1	35.5	18.1	4.13	0.15	0.12	0.15	0.18	0.20	0.20	
120	4.20	17.6	33.8	51.1	66.1	75.2	78.3	74.9	64.9	50.4	33.6	18.3	4.70	0.25	0.12	0.15	0.17	0.19	0.18	
125	4.74	17.4	32.2	46.8	60.1	67.9	70.4	67.4	58.9	46.3	32.0	18.4	5.14	0.43	0.14	0.16	0.17	0.19	0.19	
130	5.19	17.2	30.8	43.2	54.5	61.1	63.3	60.8	53.5	42.9	30.4	18.5	5.56	0.82	0.19	0.18	0.19	0.21	0.20	
135	5.67	16.3	29.2	40.0	49.8	55.1	57.0	54.9	48.7	39.7	28.9	18.2	6.00	1.34	0.27	0.21	0.22	0.24	0.23	
140	5.94	16.4	26.5	36.9	45.2	49.7	51.3	49.5	44.4	36.8	27.0	17.5	6.46	2.06	0.44	0.26	0.25	0.26	0.25	
145	5.81	15.7	24.9	33.9	40.9	44.6	46.1	44.6	40.3	33.9	24.5	16.5	6.88	2.74	0.71	0.36	0.30	0.29	0.28	
150	5.57	14.2	22.3	29.1	36.6	40.0	41.1	40.0	36.4	30.0	20.1	14.4	7.38	3.59	1.16	0.56	0.40	0.36	0.33	
155	5.19	13.0	20.0	25.6	30.7	35.2	36.2	35.2	31.3	25.8	19.4	12.1	6.91	4.09	1.97	0.94	0.63	0.52	0.48	
160	4.72	11.0	17.4	21.1	24.8	28.8	29.7	29.3	26.3	21.1	17.6	11.2	6.21	4.44	2.98	1.62	1.09	0.91	0.80	
165	4.09	8.45	14.5	18.8	21.4	23.3	23.8	23.7	21.7	18.2	13.0	8.73	5.75	4.73	4.12	2.88	2.11	1.70	1.58	
170	3.32	4.78	10.2	15.4	16.8	18.5	18.8	18.6	16.7	10.9	8.60	6.62	5.09	4.26	3.64	3.73	3.73	3.22	3.16	
175	2.86	3.24	3.67	7.19	9.33	11.8	12.1	12.1	8.19	6.44	6.15	6.01	5.07	4.48	3.91	3.65	3.44	2.85	4.12	4.77
180	3.99	3.89	3.77	3.54	3.22	3.12	1.15	3.40	3.21	3.46	3.63	3.80	4.00	3.89	3.77	3.55	3.23	3.13	1.22	

Table--2 UNIT: cd

C (DEG) y (DEG)	285	300	315	330	345															
0	344	344	344	345	345															
5	333	334	336	339	341															
10	317	320	324	329	335															
15	299	304	309	317	324															
20	279	285	291	301	311															
25	257	263	271	282	294															
30	232	239	248	261	276															
35	206	214	224	238	254															
40	179	186	198	213	231															
45	152	159	171	186	205															
50	126	133	145	159	179															
55	102	108	118	132	151															
60	78.9	85.1	93.8	106	123															
65	58.4	63.5	70.4	80.9	95.9															
70	39.7	43.9	49.4	57.6	68.4															
75	23.0	26.3	30.3	36.5	43.6															
80	8.77	11.1	13.8	18.5	22.5															
85	0.42	0.72	1.54	4.02	6.91															
90	0.22	0.20	0.15	0.10	0.07															
95	0.21	0.18	0.14	0.09	0.05															
100	0.22	0.20	0.16	0.11	0.07															
105	0.23	0.20	0.16	0.12	0.09															
110	0.22	0.19	0.16	0.12	0.10															
115	0.20	0.18	0.15	0.13	0.12															
120	0.19	0.17	0.15	0.13	0.20															
125	0.19	0.18	0.16	0.15	0.36															
130	0.21	0.20	0.18	0.20	0.73															
135	0.24	0.23	0.22	0.28	1.22															
140	0.26	0.26	0.28	0.42	1.93															
145	0.30	0.31	0.37	0.63	2.63															
150	0.36	0.40	0.57	1.15	3.44															
155	0.51	0.61	0.91	1.98	4.12															
160	0.85	1.04	1.58	3.01	4.24															
165	1.74	2.02	2.96	4.03	4.53															
170	3.36	3.91	4.29	4.71	4.06															
175	4.79	4.53	4.09	3.73	3.54															
180	3.40	3.21	3.45	3.63	3.81															



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



NVLAP LAB CODE 600150-0

Report No: NTCR18050061
Report Version: V1.1

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