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

LED Ceiling Light

Model name(s):

544365## 544363##

Representative (Tested) Model:

54436511

Model Difference: All models are identical to each, except model name. ##=11-30 intends CCT 3000K, 4000K and 5000K. (The product is color tunable luminaire, tunable from 3000K, 4000K and 5000K).

Prepare By:

Engineer: Leo Liu

Date: 2017-07-11

Review By:

Technical Lead: Vincent Yuan

Date: 2017-07-12

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:	544363##, 544365## (##=11-30)
Product type:	LED Light Engine
Rating Input:	AC120V, 60Hz, 16W
Declared CCT:	3000K
Declared Light output:	1000lm
LED Manufacturer:	Samsung
LED Model:	SPMWHX229A
LED Quantity:	40 pcs
Forward current of LED Chip:	100 mA
Date of Receipt Samples:	2017-06-18
Quantity of Receipt Samples:	3
Sample Number:	170618006-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:	2017-07-12
Revised Date of Test Report:	N/A
Test Report No.:	NTCR17060056
Remark (*If applicable*)	N/A

Test Specifications:	
Date of Test	2017-06-25
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
25.2 °C	56 %	Face Down	90 mins	25 mins

Electrical Data:

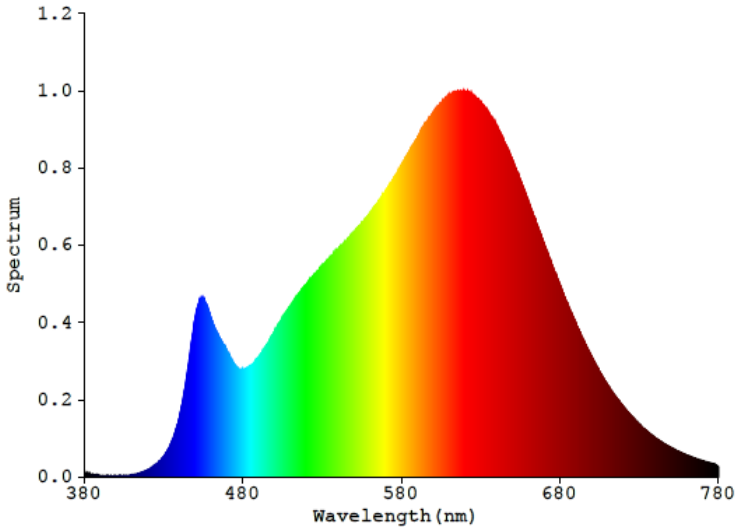
Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.0	60	0.1364	15.98	0.9765

Color Data:

Parameter	Result
CCT (K)	3004
Color Rendering Index (CRI)	92.1
R9	54
Chromaticity, x	0.4372
Chromaticity, y	0.4052
Chromaticity u′	0.2503
Chromaticity v′	0.5219
Duv	0.00039

Special Color Rendering			
R1	92	R9	54
R2	97	R10	92
R3	98	R11	92
R4	91	R12	81
R5	92	R13	94
R6	96	R14	100
R7	90	R15	88
R8	79	-	-

Spectrum Diagram:



Goniophotometer Test Results:

Test Condition:

Test Ambient	Test Humidity	Orientation	Stabilization Time	Test Time
24.6 °C	45 %	Face Down	90 mins	25 mins

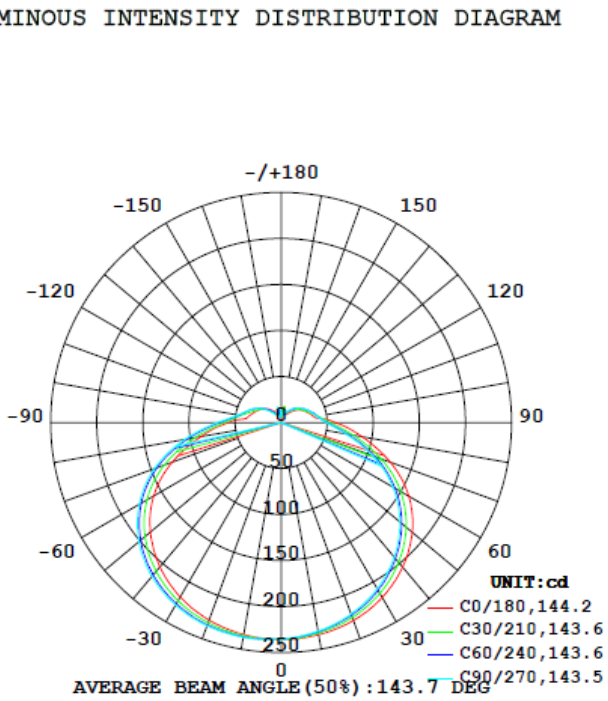
Electrical Data:

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.0	60	0.1364	15.98	0.9766

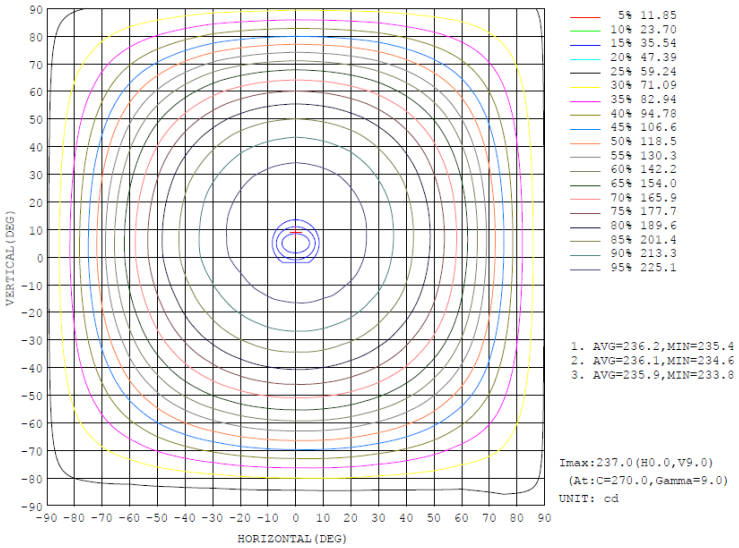
Goniophotometer Data:

Parameter	Result
Total Luminous (lm)	1145.8
Total Luminous per foot (lm/ft)	N/A
Luminous Efficacy (lm/w)	71.7
Zonal Lumens Distribution (0-90°)	84.0%
Beam Angle (°)	143.7
Center Beam Candle Power (cd)	235

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	234.2	231.5	230.4	231.0	234.1	235.8	236.8	235.8	0- 10	22.38	22.38	1.95,1.95
20	228.9	224.3	221.6	223.1	228.5	232.9	235.1	232.9	10- 20	65.48	87.86	7.67,7.67
30	219.4	212.2	208.4	210.9	218.9	225.7	229.0	226.1	20- 30	103.5	191.4	16.7,16.7
40	204.9	195.3	190.9	193.9	204.8	213.6	218.2	214.3	30- 40	133.0	324.4	28.3,28.3
50	185.6	173.3	168.2	172.2	185.2	196.0	201.4	196.9	40- 50	150.9	475.3	41.5,41.5
60	159.9	145.7	139.9	144.2	159.7	171.9	178.1	173.0	50- 60	154.5	629.8	55,55
70	126.0	111.5	105.5	109.2	125.6	139.1	146.2	140.8	60- 70	141.6	771.4	67.3,67.3
80	89.06	75.71	70.97	73.34	88.24	98.78	106.3	101.2	70- 80	112.6	883.9	77.1,77.1
90	58.52	51.09	48.75	49.92	57.56	64.08	69.19	65.99	80- 90	78.46	962.4	84,84
100	36.23	40.46	39.30	40.18	36.48	45.67	47.35	46.43	90-100	53.60	1016	88.7,88.7
110	31.26	34.07	34.18	34.14	31.74	36.86	38.31	37.39	100-110	40.22	1056	92.2,92.2
120	26.50	28.73	29.67	29.16	27.52	29.43	31.33	29.70	110-120	31.56	1088	94.9,94.9
130	20.93	24.20	24.69	24.91	23.31	22.14	22.07	20.98	120-130	23.43	1111	97,97
140	14.10	18.99	19.16	21.00	18.44	14.63	13.21	12.76	130-140	15.38	1127	98.3,98.3
150	10.09	13.61	13.97	16.66	13.79	9.252	9.428	8.730	140-150	8.833	1135	99.1,99.1
160	12.98	12.33	11.82	12.17	10.29	8.460	14.28	14.36	150-160	5.470	1141	99.6,99.6
170	17.35	15.46	8.710	13.19	12.76	11.45	16.90	16.22	160-170	3.737	1145	99.9,99.9
180	3.313	6.477	5.449	5.391	3.311	6.470	5.451	5.369	170-180	1.175	1146	100,100
DEG	LUMINOUS INTENSITY:cd Less than 35% Percent = 21.4 %									UNIT:lm		

Luminous Distribution Intensity Data:

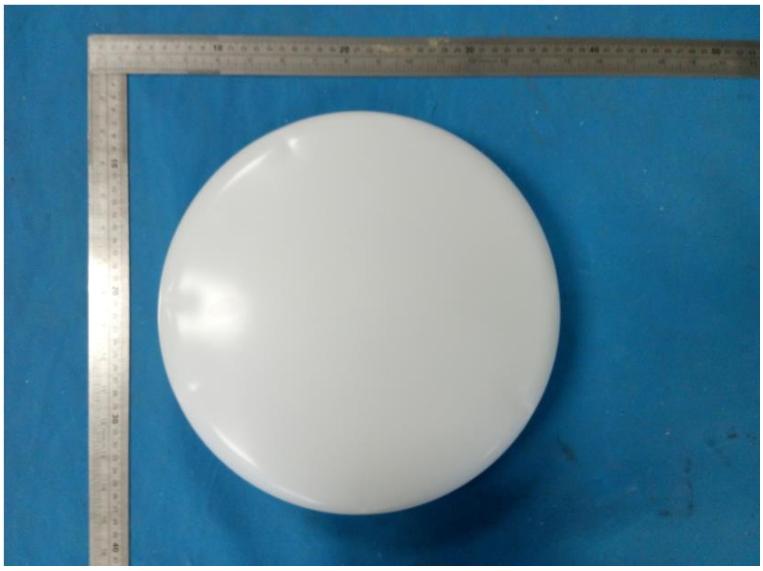
Table--1 UNIT: cd

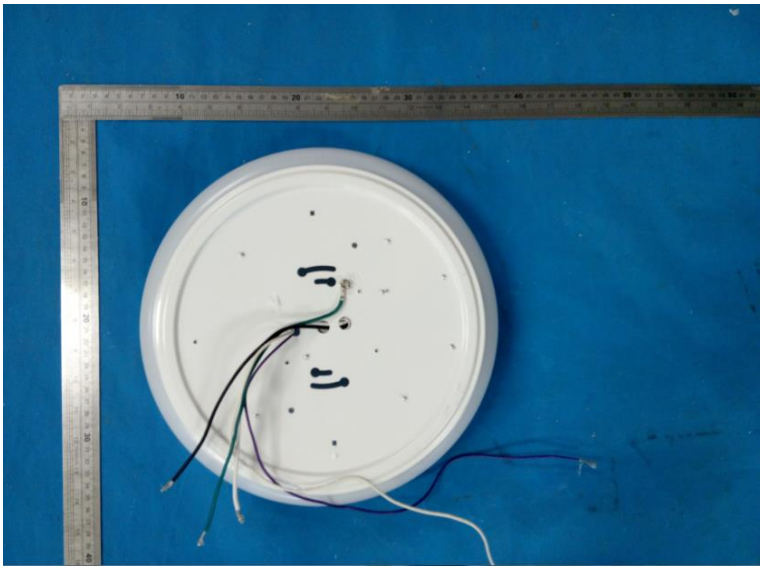
γ (DEG) \ C (DEG)	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270
0	236	235	235	235	235	235	235	235	235	235	235	235	236	235	235	235	235	235	235
5	235	235	234	234	234	233	233	233	233	233	234	234	235	236	236	236	236	236	236
10	234	233	232	232	231	231	230	230	230	231	232	232	234	234	235	236	236	237	237
15	232	231	230	228	227	227	226	226	227	228	228	229	232	233	234	235	236	236	236
20	229	227	226	224	223	222	222	222	222	223	224	226	228	230	232	233	234	235	235
25	225	223	220	219	217	216	216	216	216	218	219	221	224	226	228	230	231	232	233
30	219	217	214	212	210	209	208	209	209	211	213	215	219	221	224	226	228	229	229
35	213	210	207	205	202	201	200	201	201	203	205	208	212	215	218	220	222	224	224
40	205	202	198	195	193	191	191	191	192	194	197	200	205	207	211	214	216	217	218
45	196	192	188	185	182	181	180	180	182	184	187	190	195	199	203	206	208	210	211
50	186	182	177	173	171	169	168	169	170	172	175	180	185	189	193	196	199	200	201
55	174	169	164	160	157	156	155	155	156	159	163	167	173	177	181	185	188	190	191
60	160	155	150	146	143	141	140	140	141	144	148	153	160	164	168	172	175	177	178
65	144	139	133	129	126	125	123	124	125	127	131	136	144	148	153	157	161	162	163
70	126	122	115	111	108	107	106	106	107	109	113	118	126	130	135	139	143	145	146
75	107	103	96.7	92.9	90.1	88.8	87.6	87.7	88.2	90.4	93.6	98.9	107	110	115	119	124	126	127
80	89.1	85.0	79.0	75.7	73.1	72.2	71.0	71.2	71.4	73.3	76.0	81.2	88.2	90.7	94.8	98.8	103	105	106
85	73.6	69.6	64.2	61.5	59.4	58.7	57.8	58.0	58.1	59.6	61.8	66.2	72.7	73.0	76.4	79.6	83.4	85.2	86.4
90	58.5	56.7	53.0	51.1	49.7	49.2	48.8	48.8	48.8	49.9	51.5	54.3	57.6	59.3	61.9	64.1	66.9	68.1	69.2
95	47.3	47.7	45.8	44.6	43.7	43.6	43.8	43.3	43.3	44.0	44.9	44.0	42.7	49.4	51.7	52.9	54.6	55.4	56.0
100	36.2	38.3	40.7	40.5	39.8	39.5	39.3	39.7	39.7	40.2	39.8	37.1	36.5	38.9	44.7	45.7	46.6	47.0	47.4
105	34.1	34.4	36.2	37.2	37.6	37.0	36.7	36.9	36.9	37.0	35.7	34.0	34.0	34.6	39.0	41.1	41.8	42.0	42.1
110	31.3	31.6	32.7	34.1	34.5	34.3	34.2	34.4	34.5	34.1	32.7	31.6	31.7	32.0	34.6	36.9	38.0	38.2	38.3
115	28.9	29.2	29.8	31.2	31.9	31.9	31.9	32.1	32.0	31.5	30.4	29.5	29.6	29.6	31.3	33.0	34.4	34.7	34.8
120	26.5	26.9	27.3	28.7	29.6	29.5	29.7	30.0	29.7	29.2	28.1	27.5	27.5	27.4	28.3	29.4	31.0	31.2	31.3
125	23.9	24.4	24.9	26.5	27.2	27.0	27.2	27.9	27.5	27.0	25.9	25.6	25.5	25.1	25.3	26.0	27.5	27.1	26.9
130	20.9	21.9	22.6	24.2	24.8	24.4	24.7	25.7	25.6	24.9	23.8	23.6	23.3	22.7	22.1	22.1	23.2	22.7	22.1
135	17.3	19.2	20.2	21.8	22.2	21.5	21.9	23.3	23.7	22.8	21.9	21.5	20.9	20.0	18.6	18.1	19.4	18.3	17.3
140	14.1	15.9	17.3	19.0	19.2	18.7	19.2	20.4	21.4	21.0	20.0	19.5	18.4	16.9	15.3	14.6	15.9	14.4	13.2
145	11.4	13.3	14.9	16.0	15.9	15.3	16.3	17.5	18.8	18.8	17.6	17.0	15.8	14.5	12.4	11.6	12.6	11.3	10.4
150	10.1	11.5	12.8	13.6	13.5	12.5	14.0	15.0	16.3	16.7	15.6	15.1	13.8	12.6	10.2	9.25	10.4	9.89	9.43
155	11.6	11.1	11.8	11.6	11.7	10.7	12.5	13.0	14.4	14.6	13.7	13.6	12.4	11.4	9.43	7.99	9.69	10.5	11.2
160	13.0	14.1	13.7	12.3	9.08	9.90	11.8	11.3	10.7	12.2	12.6	12.3	10.3	10.1	10.2	8.46	10.3	13.3	14.3
165	16.3	17.1	16.5	15.3	12.5	9.42	14.2	9.36	9.08	12.7	12.5	12.6	9.12	9.77	11.4	9.50	11.1	14.7	16.9
170	17.4	17.6	17.0	15.5	14.4	12.0	8.71	10.3	11.1	13.2	14.1	14.1	12.8	10.0	8.21	11.5	13.8	15.2	16.9
175	13.4	13.7	13.0	13.3	11.9	10.7	9.96	9.52	10.8	10.7	10.4	10.4	10.4	9.44	9.46	9.34	10.6	10.7	10.7
180	3.31	4.55	5.69	6.48	6.68	6.36	5.45	4.98	5.19	5.39	5.17	4.27	3.31	4.56	5.69	6.47	6.69	6.36	5.45

Table--2 UNIT: cd

γ (DEG) \ C (DEG)	285	300	315	330	345
0	235	235	235	235	235
5	236	236	236	235	235
10	237	236	236	235	234
15	236	236	235	234	233
20	235	234	233	232	230
25	232	232	230	229	226
30	229	228	226	224	222
35	224	223	221	219	216
40	217	217	214	212	208
45	210	209	206	204	200
50	201	199	197	194	190
55	190	188	186	183	178
60	177	176	173	170	165
65	163	161	158	154	150
70	146	144	141	137	132
75	126	125	121	118	113
80	106	104	101	97.9	94.4
85	86.0	84.8	81.9	79.4	76.6
90	68.7	68.1	66.0	64.3	61.9
95	55.7	55.4	54.2	53.2	51.9
100	47.2	47.1	46.4	45.8	40.5
105	42.0	42.1	41.6	39.9	35.2
110	38.3	38.3	37.4	35.1	32.3
115	34.8	34.7	33.4	31.4	29.6
120	31.2	31.2	29.7	28.0	26.9
125	26.6	27.0	25.8	24.5	24.0
130	21.7	22.2	21.0	20.2	20.6
135	16.8	17.5	16.6	16.0	16.9
140	12.5	13.1	12.8	12.2	13.4
145	9.87	10.3	9.90	9.20	10.5
150	9.07	9.39	8.73	8.34	9.49
155	11.6	12.4	11.4	11.5	11.6
160	14.9	14.0	14.4	15.2	14.5
165	17.8	15.5	14.7	19.4	15.0
170	17.4	15.7	16.2	16.5	16.1
175	11.3	12.5	13.4	12.8	12.5
180	4.98	5.18	5.37	5.18	4.24

Photo of Sample:





Equipment List:

Equipment ID	Equipment Name	Last Cal.	Due Cal.
NTC-F01-001	Goniophotometer System	2016-12-03	2017-12-02
NTC-F01-006	2.0 meter Integrating Sphere	2016-12-03	2017-12-02
NTC-F01-013	Standard Lamp	2016-12-27	2017-12-26
NTC-F01-031	Digital Power Meter	2016-12-05	2017-12-04
NTC-F01-019	Temperature & Humidity Meter	2016-11-28	2017-11-27

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

Address: 3F, No. 1 the 1st North Industry Road, Songshan Lake Science & Technology Park, Dongguan, Guangdong, China
Tel: 86-755-2344 3526
Website: http://www.ntc-cert.com