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 Downlight

Model name(s):
531931##

Representative (Tested) Model:
53193101

Model Difference: ## =00-10 intends CCT is 2700K.

Prepare By:

Engineer: Leo Liu
Date: 2017-07-31

Review By:

Technical Lead: Vincent Yuan
Date: 2017-07-31

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:	531931## (## =00-10)
Product type:	LED Down Light
Rating Input:	AC120V, 60Hz, 10.5W
Declared CCT:	2700K
Declared Light output:	670 lm
LED Manufacturer:	Samsung
LED Model:	SPMWH1221
LED Quantity:	24 pcs
Forward current of LED	150mA
Date of Receipt Samples:	2017-07-13
Quantity of Receipt	3
Sample Number:	170713001-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:	2017-07-31
Revised Date of Test Report:	N/A
Test Report No.:	NTCR17070052
Remark (*If applicable*)	N/A

Test Specifications:	
Date of Test	2017-07-13
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
25.5 °C	40 %	Face Down	90 min	25 min

Electrical Data:

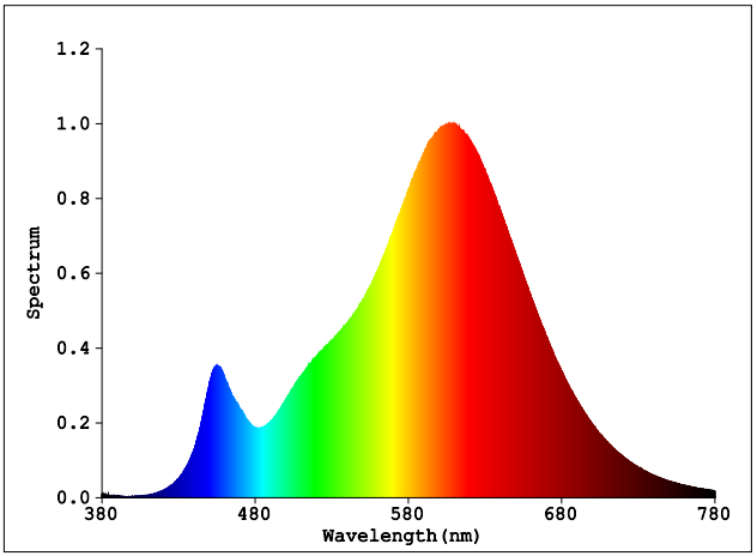
Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.0	60	0.0878	9.67	0.9175

Color Data:

Parameter	Result
CCT (K)	2670
Color Rendering Index (CRI)	82.8
R9	12
Chromaticity, x	0.4609
Chromaticity, y	0.4085
Chromaticity u′	0.2641
Chromaticity v′	0.5267
Duv	-0.00084

Special Color Rendering			
R1	82	R9	12
R2	93	R10	85
R3	94	R11	79
R4	80	R12	78
R5	82	R13	85
R6	93	R14	97
R7	81	R15	74
R8	58	-	-

Spectrum Diagram:



Goniophotemeter Test Results:

Test Condition:

Test Ambient	Test Humidity	Orientation	Stabilization Time	Test Time
25.1 °C	37 %	Face Down	90 min	25 min

Electrical Data:

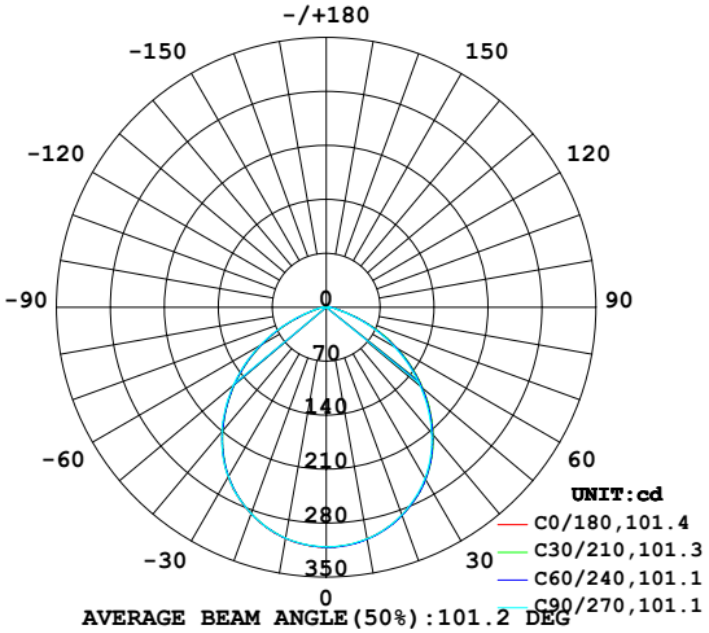
Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.0	60	0.0878	9.67	0.9176

Goniophotometer Data:

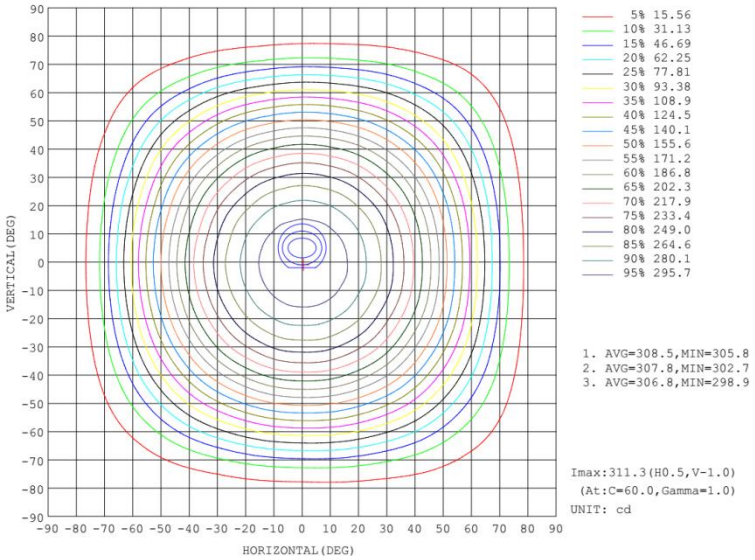
Parameter	Result
Total Luminous (lm)	763.52
Total Luminous per foot (lm/ft)	N/A
Luminous Efficacy (lm/w)	78.97
Zonal Lumens Distribution (0-60°)	84.5%
Beam Angle (°)	101.2
Center Beam Candle Power (cd)	311.4

Luminous Intensity Distribution Diagram:

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	305.2	306.0	304.9	304.7	304.6	303.9	304.2	304.4	0- 10	29.39	29.39	3.85,3.85
20	287.0	288.0	286.6	285.9	285.4	284.0	284.9	286.1	10- 20	83.73	113.1	14.8,14.8
30	257.6	258.8	256.3	255.0	254.5	252.7	254.3	256.1	20- 30	125.4	238.5	31.2,31.2
40	215.2	216.3	212.7	210.9	210.1	207.9	210.8	213.5	30- 40	147.0	385.5	50.5,50.5
50	163.2	163.8	159.5	156.8	155.8	154.3	157.5	161.1	40- 50	143.6	529.1	69.3,69.3
60	105.6	106.1	101.5	98.28	96.93	95.57	99.39	103.7	50- 60	116.3	645.4	84.5,84.5
70	47.64	48.60	44.40	41.33	39.54	38.33	42.16	45.75	60- 70	70.73	716.1	93.8,93.8
80	13.48	13.71	12.69	11.45	10.85	10.80	11.98	13.10	70- 80	25.38	741.5	97.1,97.1
90	2.549	3.094	2.345	1.440	1.107	0.9522	1.032	1.877	80- 90	7.148	748.7	98.1,98.1
100	2.711	3.031	2.938	2.080	1.541	1.407	1.608	2.564	90-100	2.119	750.8	98.3,98.3
110	2.944	3.378	3.311	2.352	1.788	1.628	1.894	2.707	100-110	2.486	753.3	98.7,98.7
120	3.117	3.525	3.517	2.505	1.924	1.748	2.056	2.654	110-120	2.516	755.8	99,99
130	3.168	3.526	3.588	2.568	1.996	1.826	2.062	2.585	120-130	2.333	758.1	99.3,99.3
140	2.813	3.347	3.520	2.552	2.027	1.844	1.958	2.337	130-140	1.983	760.1	99.6,99.6
150	2.597	3.044	3.333	2.487	2.063	1.794	1.783	2.416	140-150	1.557	761.7	99.8,99.8
160	2.724	2.240	3.072	2.241	2.097	1.828	1.328	2.374	150-160	1.089	762.8	99.9,99.9
170	1.464	2.095	2.654	2.042	1.588	1.816	1.248	2.087	160-170	0.5969	763.4	100,100
180	0.0013	0.0046	0.0070	0.0078	0.0040	0.0049	0.0070	0.0088	170-180	0.1450	763.5	100,100
DEG	LUMINOUS INTENSITY:cd Less than 35% Percent = 10.8 %									UNIT:lm		

Luminous Distribution Intensity Data:

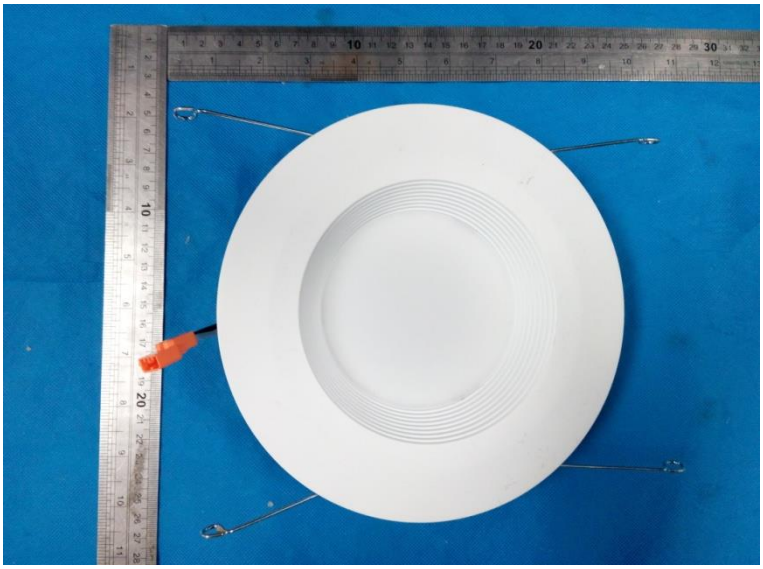
Table--1 UNIT: cd

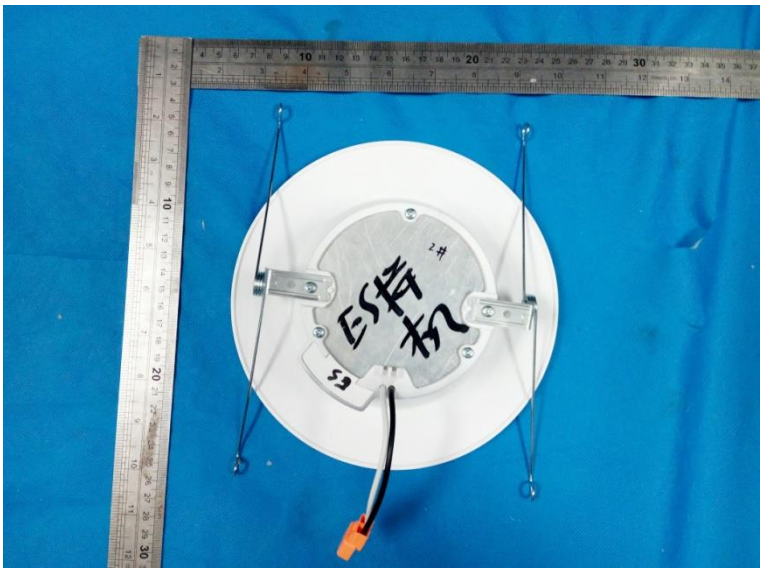
γ (DEG) \ C(DEG)	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270
0	311	311	311	311	311	311	311	311	311	311	311	311	311	311	311	311	311	311	311
5	310	310	310	310	310	310	309	310	310	309	310	309	309	309	309	309	309	309	309
10	305	306	305	306	305	306	305	305	305	305	305	305	305	304	304	304	304	304	304
15	298	298	298	298	298	298	297	298	297	297	297	296	297	296	296	296	296	295	296
20	287	288	287	288	287	287	287	287	286	286	285	285	285	284	285	284	285	284	285
25	274	275	274	275	274	274	273	273	272	272	271	271	271	270	271	270	271	270	271
30	258	259	258	259	258	258	256	257	255	255	254	254	254	253	253	253	254	253	254
35	238	240	238	239	238	238	236	236	235	235	233	233	234	232	233	232	233	233	234
40	215	217	216	216	215	215	213	213	211	211	209	210	210	208	209	208	209	209	211
45	190	192	190	191	189	189	187	187	185	185	183	183	184	182	183	182	183	183	185
50	163	165	164	164	162	161	159	159	157	157	155	155	156	154	155	154	156	156	157
55	135	137	135	135	134	133	131	131	128	128	126	126	127	125	126	125	127	127	129
60	106	108	106	106	104	104	102	101	98.9	98.3	96.5	96.4	96.9	94.9	96.2	95.6	97.1	97.4	99.4
65	76.0	78.2	76.5	76.8	74.9	74.4	72.1	71.6	69.4	68.8	66.8	66.8	67.2	65.0	66.3	65.8	67.5	67.7	69.8
70	47.6	49.7	48.2	48.6	46.9	46.6	44.4	43.9	41.8	41.3	39.5	39.3	39.5	37.5	38.8	38.3	39.9	40.2	42.2
75	24.6	26.1	25.1	25.4	24.2	24.0	22.5	22.1	20.7	20.9	19.2	19.6	19.7	18.0	19.3	18.6	20.1	19.9	21.7
80	13.5	13.9	13.6	13.7	13.4	13.2	12.7	12.4	11.8	11.4	10.9	10.8	10.8	10.4	10.8	10.8	11.3	11.5	12.0
85	7.58	7.97	7.72	8.11	7.93	7.65	7.12	6.81	6.31	5.83	5.20	5.06	5.10	4.58	4.71	4.78	5.13	5.14	5.75
90	2.55	2.66	2.58	3.09	3.11	2.85	2.35	2.10	1.85	1.44	1.18	1.11	1.11	0.96	0.84	0.95	1.02	0.87	1.03
95	2.45	2.24	2.23	2.73	2.96	2.81	2.64	2.46	2.30	1.84	1.54	1.38	1.39	1.21	1.10	1.23	1.35	1.18	1.40
100	2.71	2.57	2.53	3.03	3.29	3.13	2.94	2.74	2.56	2.08	1.74	1.54	1.54	1.35	1.27	1.41	1.54	1.35	1.61
105	2.86	2.76	2.74	3.24	3.50	3.36	3.16	2.95	2.75	2.24	1.88	1.65	1.68	1.48	1.40	1.53	1.68	1.50	1.77
110	2.94	2.88	2.89	3.38	3.65	3.52	3.31	3.10	2.88	2.35	1.99	1.73	1.79	1.59	1.51	1.63	1.78	1.60	1.89
115	3.03	2.96	3.00	3.47	3.75	3.64	3.42	3.20	2.96	2.44	2.07	1.78	1.87	1.68	1.60	1.69	1.86	1.68	1.99
120	3.12	2.98	3.05	3.52	3.81	3.72	3.52	3.29	3.03	2.50	2.13	1.81	1.92	1.74	1.67	1.75	1.90	1.74	2.06
125	3.23	2.98	3.07	3.55	3.84	3.76	3.57	3.34	3.07	2.55	2.18	1.83	1.96	1.79	1.73	1.79	1.93	1.77	2.07
130	3.17	3.01	3.04	3.53	3.82	3.77	3.59	3.35	3.08	2.57	2.21	1.83	2.00	1.83	1.77	1.83	1.93	1.77	2.06
135	3.08	2.99	3.00	3.45	3.78	3.74	3.57	3.34	3.07	2.57	2.22	1.83	2.01	1.86	1.80	1.84	1.91	1.75	2.02
140	2.81	2.91	2.98	3.35	3.72	3.68	3.52	3.30	3.03	2.55	2.22	1.81	2.03	1.89	1.83	1.84	1.87	1.72	1.96
145	2.67	2.66	2.93	3.22	3.61	3.58	3.44	3.24	2.98	2.53	2.21	1.77	2.05	1.92	1.86	1.83	1.83	1.67	1.84
150	2.60	2.31	2.80	3.04	3.46	3.45	3.33	3.16	2.92	2.49	2.20	1.73	2.06	1.95	1.89	1.79	1.70	1.41	1.78
155	2.78	2.33	2.50	2.82	3.26	3.31	3.20	3.07	2.86	2.45	2.13	1.66	2.07	1.98	1.89	1.80	1.80	1.24	1.57
160	2.72	2.19	2.18	2.24	3.10	3.14	3.07	2.96	2.78	2.24	2.08	1.45	2.10	2.00	1.90	1.83	1.81	1.14	1.33
165	2.35	2.11	1.64	2.10	2.88	2.95	2.90	2.81	2.62	2.20	1.78	1.36	2.10	2.05	1.97	1.76	1.55	0.95	1.29
170	1.46	1.58	1.80	2.10	2.22	2.61	2.65	2.56	2.26	2.04	1.70	1.54	1.59	2.01	2.03	1.82	1.35	1.30	1.25
175	1.51	1.50	1.62	1.76	1.78	1.76	1.74	1.75	1.69	1.51	1.25	1.22	1.09	0.99	1.01	0.99	1.07	1.13	1.31
180	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.01

Table--2 UNIT: cd

γ (DEG) \ C(DEG)	285	300	315	330	345
0	311	311	311	311	311
5	309	310	309	310	310
10	304	305	304	305	305
15	296	297	297	297	298
20	285	286	286	287	287
25	271	272	273	273	274
30	255	256	256	257	258
35	234	236	236	238	238
40	211	213	213	215	215
45	185	187	188	190	190
50	158	160	161	163	164
55	130	132	133	135	135
60	100	103	104	106	106
65	70.7	73.2	74.1	76.2	76.4
70	42.9	45.1	45.8	47.8	48.0
75	21.6	23.0	23.3	24.7	24.8
80	12.3	12.9	13.1	13.5	13.5
85	6.20	6.78	7.05	7.44	7.57
90	1.38	1.63	1.88	2.12	2.34
95	1.79	2.13	2.31	2.15	2.28
100	2.02	2.41	2.56	2.38	2.51
105	2.19	2.60	2.70	2.45	2.58
110	2.31	2.72	2.71	2.44	2.61
115	2.39	2.74	2.68	2.44	2.63
120	2.41	2.70	2.65	2.40	2.68
125	2.37	2.67	2.65	2.44	2.43
130	2.31	2.57	2.59	2.54	2.01
135	2.22	2.38	2.46	2.45	2.10
140	2.07	2.27	2.34	2.42	2.41
145	2.02	2.27	2.35	2.51	2.62
150	1.99	2.36	2.42	2.54	2.68
155	1.93	2.22	2.29	2.61	2.81
160	1.74	2.16	2.37	2.62	2.81
165	1.63	2.11	2.30	2.48	2.58
170	1.51	1.66	2.09	2.25	1.89
175	1.38	1.42	1.57	1.57	1.50
180	0.01	0.01	0.01	0.00	0.01

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*******