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):
538021##

Representative (Tested) Model:
53802101

Model Difference: Where "##" denotes color temperature, the CCT and input power are tunable, 01~10 identifies CCT tunable to 2700K, 3000K, 3500K, 4000K and 5000K, power tunable to 15W/12W/9W.

Prepare By:

Engineer: Leo Liu
Date: 2017-11-21

Review By:

Technical Lead: Vincent Yuan
Date: 2017-11-23

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:	Commercial Electric
Model Number:	538021##(##=01-10)
Product type:	LED Down Light
Rating Input:	AC120V, 60Hz, 15W
Declared CCT:	2700K
Declared Light output:	1000lm
LED Manufacturer:	Samsung
LED Model:	SPMWHX229A
LED Quantity:	42 pcs
Forward current of LED Chip:	100mA
Date of Receipt Samples:	2017-11-10
Quantity of Receipt Samples:	3
Sample Number:	171110002-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:	2017-11-23
Revised Date of Test Report:	N/A
Test Report No.:	NTCR17110079
Remark (*If applicable*)	Product may contain Black Decorative Ring.

Test Specifications:	
Date of Test	2017-11-10
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
25.0 °C	51 %	Face Down	90 mins	25 mins

Electrical Data:

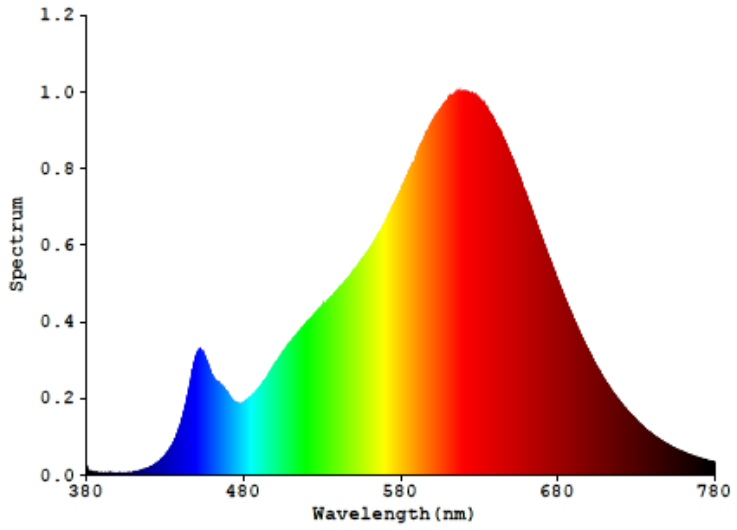
Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.0	60	0.1217	14.28	0.9777

Color Data:

Parameter	Result
CCT (K)	2616
Color Rendering Index (CRI)	91.1
R9	50
Chromaticity, x	0.4650
Chromaticity, y	0.4088
Chromaticity u′	0.2667
Chromaticity v′	0.5274
Duv	-0.00107

Special Color Rendering			
R1	91	R9	50
R2	97	R10	93
R3	97	R11	92
R4	91	R12	87
R5	92	R13	93
R6	97	R14	100
R7	88	R15	86
R8	76	-	-

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

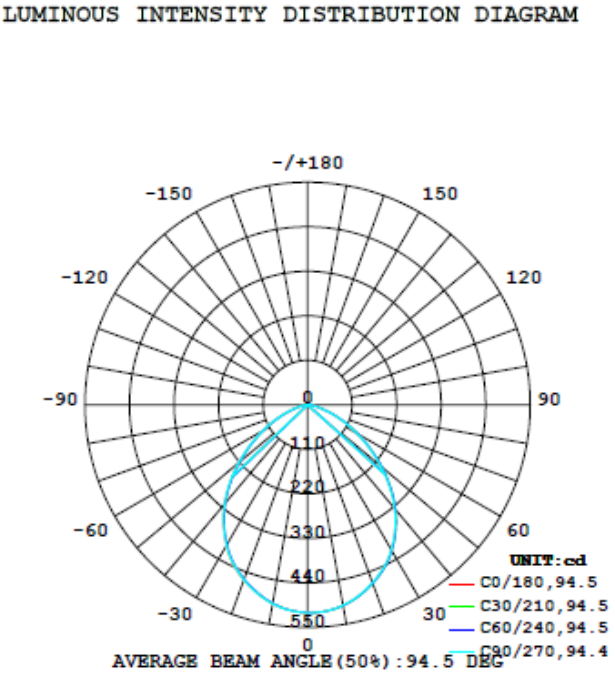
Electrical Data:

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.0	60	0.1217	14.28	0.9777

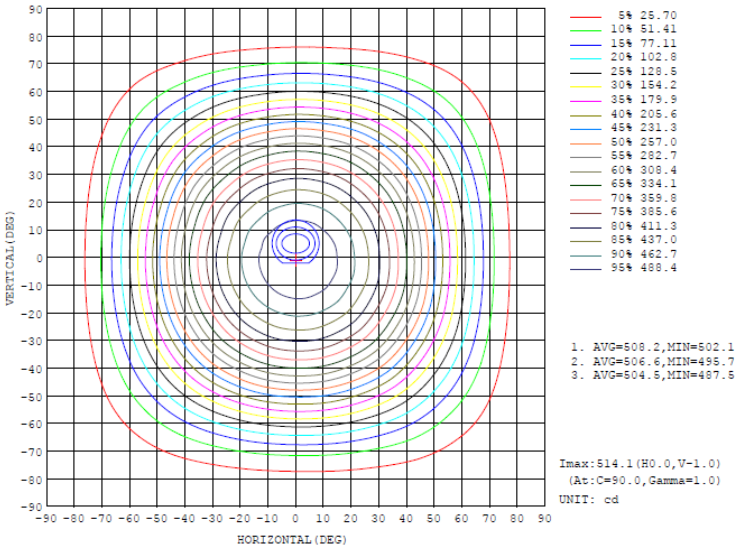
Goniophotometer Data:

Parameter	Result
Total Luminous (lm)	1130.45
Total Luminous per foot (lm/ft)	N/A
Luminous Efficacy (lm/w)	79.16
Zonal Lumens Distribution (0-60°)	87.9%
Beam Angle (°)	94.5
Center Beam Candle Power (cd)	514

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	503.3	504.3	502.8	500.1	498.7	497.0	499.1	500.7	0- 10	48.41	48.41	4.28,4.28
20	468.2	471.1	467.9	463.8	460.7	457.6	460.3	464.0	10- 20	136.7	185.1	16.4,16.4
30	413.8	418.4	413.5	407.4	401.8	396.9	400.7	406.8	20- 30	201.9	387.0	34.2,34.2
40	334.9	339.9	334.1	326.1	320.2	314.8	319.7	327.1	30- 40	230.6	617.6	54.6,54.6
50	236.6	242.1	236.0	228.6	222.4	216.9	222.1	229.4	40- 50	215.0	832.6	73.6,73.6
60	140.2	144.2	139.3	133.0	128.0	124.3	128.2	134.6	50- 60	161.0	993.6	87.9,87.9
70	61.82	65.07	61.12	56.96	53.59	50.61	53.62	57.87	60- 70	92.63	1086	96.1,96.1
80	18.92	20.42	19.23	18.17	16.92	15.53	16.55	17.57	70- 80	35.62	1122	99.2,99.2
90	0.0091	0.3817	0.0413	0	0	0	0	0.0121	80- 90	8.610	1130	100,100
100	0	0	0	0	0	0	0	0	90-100	0.0027	1130	100,100
110	0	0	0	0	0	0	0	0	100-110	0	1130	100,100
120	0	0	0	0	0	0	0	0	110-120	0	1130	100,100
130	0	0	0	0	0	0	0	0	120-130	0	1130	100,100
140	0	0	0	0	0	0	0	0	130-140	0	1130	100,100
150	0	0	0	0	0	0	0	0	140-150	0	1130	100,100
160	0	0	0	0	0	0	0	0	150-160	0	1130	100,100
170	0	0	0	0	0	0	0	0	160-170	0	1130	100,100
180	0	0	0	0	0	0	0	0	170-180	0	1130	100,100
DEG	LUMINOUS INTENSITY:cd Less than 35% Percent = 10.4 %									UNIT:lm		

Luminous Distribution Intensity Data:

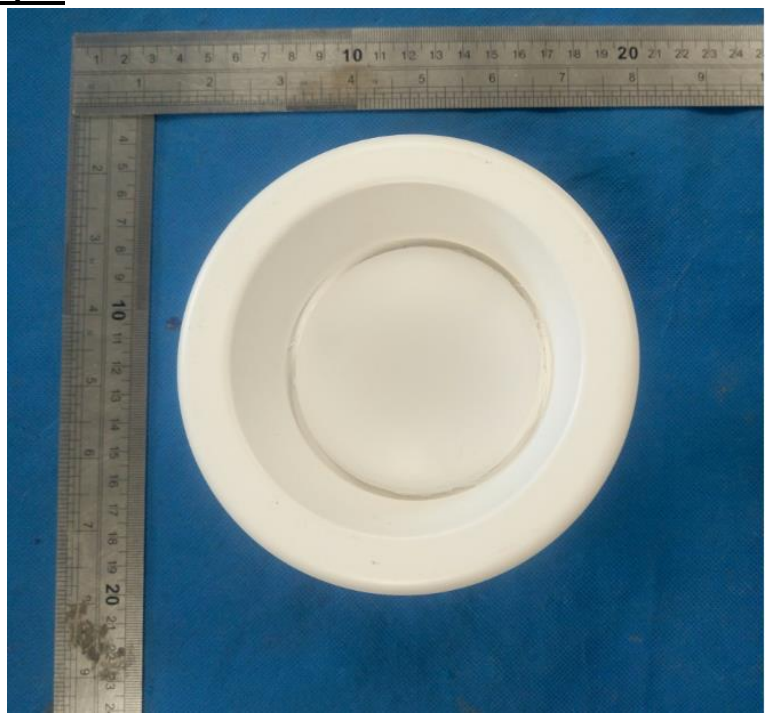
Table--1 UNIT: cd

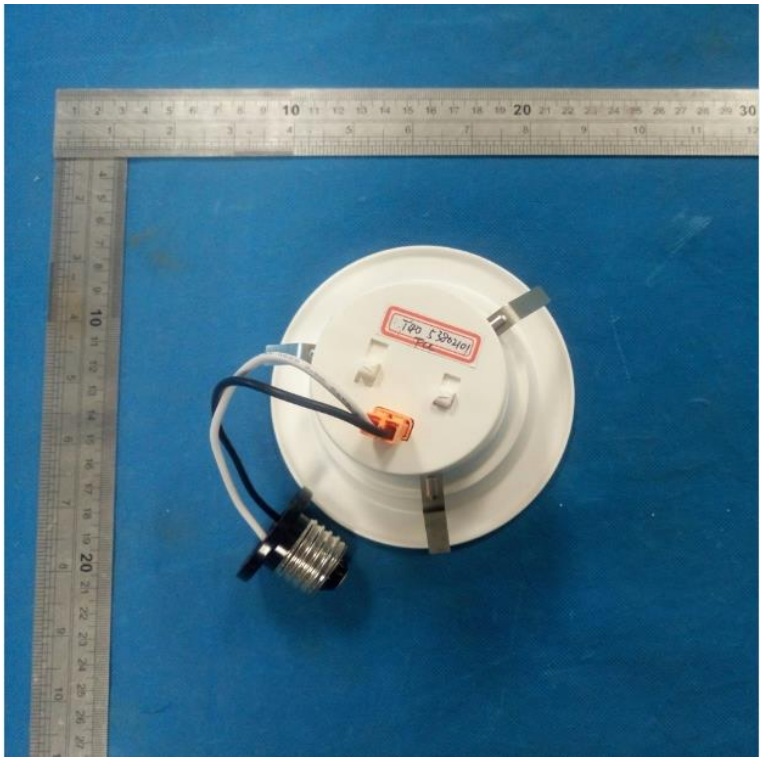
γ (DEG) \ C (DEG)	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270
0	513	513	514	514	514	514	514	514	514	513	513	514	513	513	514	514	514	514	514
5	511	512	512	512	512	512	512	511	511	510	510	509	509	509	509	509	509	509	510
10	503	504	504	504	504	503	503	503	501	500	500	499	499	497	498	497	498	498	499
15	488	490	490	490	489	489	488	487	485	484	483	482	482	480	481	480	480	480	482
20	468	470	470	471	469	469	468	467	465	464	462	461	461	458	460	458	459	459	460
25	444	447	446	448	446	446	444	442	440	439	437	436	435	432	433	431	432	432	434
30	414	417	416	418	416	416	414	412	409	407	404	403	402	398	400	397	399	398	401
35	377	380	379	381	379	379	376	374	371	369	365	364	363	359	361	358	360	360	362
40	335	339	338	340	337	337	334	332	328	326	322	321	320	316	318	315	317	317	320
45	287	292	290	293	290	290	287	285	281	279	275	273	272	268	269	267	269	269	272
50	237	241	239	242	239	239	236	234	231	229	225	223	222	218	220	217	219	219	222
55	187	190	189	191	189	189	186	184	181	179	176	174	173	170	171	169	170	171	173
60	140	144	142	144	142	142	139	138	135	133	130	129	128	125	126	124	126	126	128
65	98.3	101	100	102	100	99.3	97.4	96.0	93.8	91.9	89.7	88.0	87.6	85.4	86.0	84.5	85.5	86.1	87.8
70	61.8	64.5	63.3	65.1	63.3	62.9	61.1	60.1	58.1	57.0	54.8	53.8	53.6	51.2	52.3	50.6	51.7	52.0	53.6
75	34.1	35.9	35.1	36.3	35.2	35.0	33.8	33.2	31.9	31.2	29.9	29.3	29.0	27.7	28.3	27.3	27.9	27.9	28.8
80	18.9	20.0	19.5	20.4	19.8	19.9	19.2	19.1	18.3	18.2	17.2	17.1	16.9	15.9	16.4	15.5	16.1	15.9	16.6
85	8.41	9.26	8.87	9.53	9.07	9.18	8.65	8.53	7.91	7.67	7.07	6.79	6.68	6.01	6.29	5.78	6.07	6.09	6.46
90	0.00	0.23	0.12	0.38	0.19	0.18	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	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
100	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
105	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
110	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
115	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
120	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
125	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
130	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
135	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
140	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
145	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
150	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
155	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
160	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
165	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
170	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
175	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
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

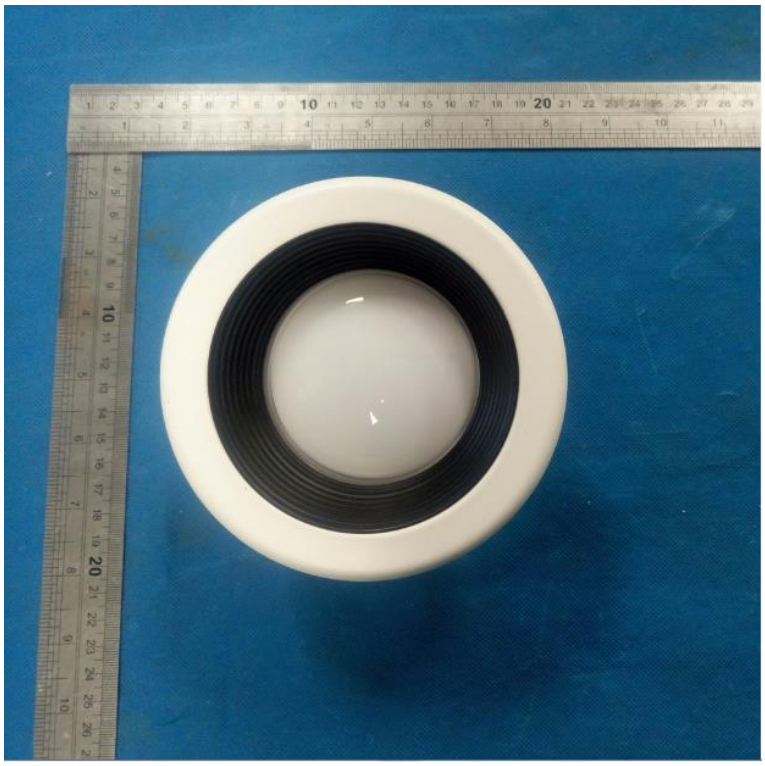
Table--2 UNIT: cd

γ (DEG) \ C (DEG)	285	300	315	330	345
0	514	514	513	513	514
5	510	510	510	511	511
10	499	500	501	502	503
15	483	484	485	487	488
20	461	463	464	466	468
25	435	437	439	441	443
30	402	405	407	410	412
35	364	367	369	373	376
40	321	325	327	331	334
45	273	277	279	284	286
50	223	228	229	234	235
55	175	178	180	184	186
60	130	133	135	138	140
65	89.4	91.7	93.5	96.0	97.7
70	54.6	56.8	57.9	60.3	61.4
75	29.3	30.7	31.4	33.1	33.8
80	16.5	17.4	17.6	18.6	18.8
85	6.66	7.17	7.40	8.09	8.32
90	0.00	0.00	0.01	0.00	0.02
95	0.00	0.00	0.00	0.00	0.00
100	0.00	0.00	0.00	0.00	0.00
105	0.00	0.00	0.00	0.00	0.00
110	0.00	0.00	0.00	0.00	0.00
115	0.00	0.00	0.00	0.00	0.00
120	0.00	0.00	0.00	0.00	0.00
125	0.00	0.00	0.00	0.00	0.00
130	0.00	0.00	0.00	0.00	0.00
135	0.00	0.00	0.00	0.00	0.00
140	0.00	0.00	0.00	0.00	0.00
145	0.00	0.00	0.00	0.00	0.00
150	0.00	0.00	0.00	0.00	0.00
155	0.00	0.00	0.00	0.00	0.00
160	0.00	0.00	0.00	0.00	0.00
165	0.00	0.00	0.00	0.00	0.00
170	0.00	0.00	0.00	0.00	0.00
175	0.00	0.00	0.00	0.00	0.00
180	0.00	0.00	0.00	0.00	0.00

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*******