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):

544661## 544662##

Representative (Tested) Model:
54466101

Model Difference: All models are identical to each, except model name and finish color. ##=01-10 intends CCT 3000K, 4000K and 5000K. (The product is color tunable luminaire, tunable from 3000K, 4000K and 5000K).

Prepare By:

Engineer: Leo Liu

Date: 2017-08-10

Review By:

Technical Lead: Vincent Yuan

Date: 2017-08-11

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:	544661##, 544662## (##=01-10)
Product type:	LED Light Engine
Rating Input:	AC120-277V, 50/60Hz, 12.5W
Declared CCT:	3000K
Declared Light output:	830lm
LED Manufacturer:	Samsung
LED Model:	SPMWH1228
LED Quantity:	36 pcs
Forward current of LED Chip:	120 mA
Date of Receipt Samples:	2017-08-06
Quantity of Receipt Samples:	1
Sample Number:	170806001-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:	2017-08-11
Revised Date of Test Report:	N/A
Test Report No.:	NTCR17080004
Remark (*If applicable*)	N/A

Test Specifications:	
Date of Test	2017-08-06 to 2017-08-10
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	50 %	Face Down	90 mins	25 mins

Electrical Data:

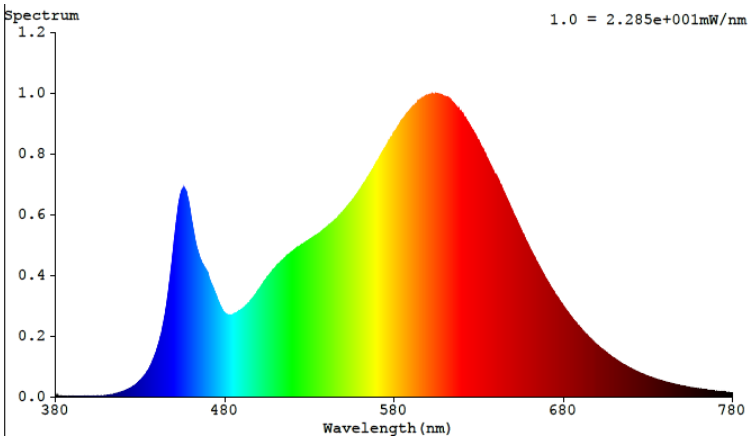
Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.0	60	0.0983	11.35	0.9626

Color Data:

Parameter	Result
CCT (K)	3132
Color Rendering Index (CRI)	85.2
R9	20
Chromaticity, x	0.4243
Chromaticity, y	0.3930
Chromaticity u′	0.2472
Chromaticity v′	0.5150
Duv	-0.00267

Special Color Rendering			
R1	85	R9	20
R2	95	R10	89
R3	93	R11	82
R4	82	R12	75
R5	86	R13	88
R6	94	R14	97
R7	82	R15	79
R8	63	-	-

Spectrum Diagram:



Goniophotometer Test Results:

Test Condition:

Test Ambient	Test Humidity	Orientation	Stabilization Time	Test Time
25.2 °C	50 %	Face Down	90 mins	25 mins

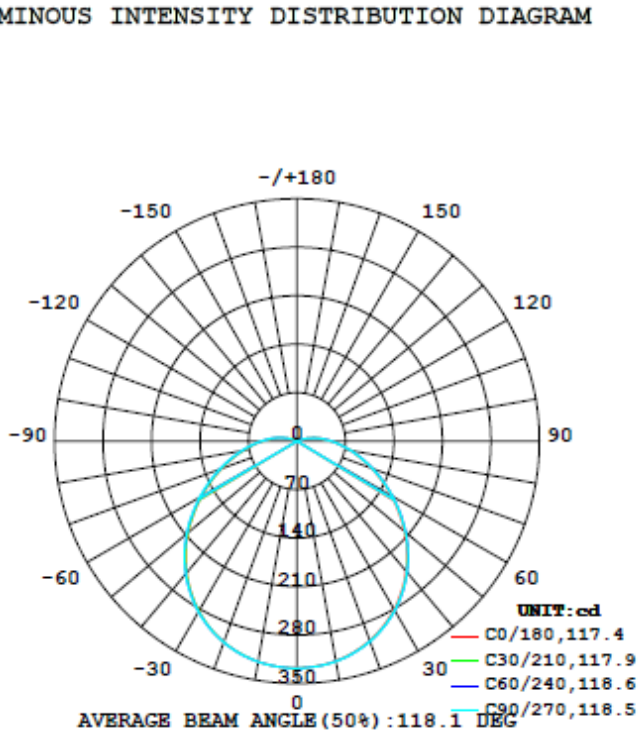
Electrical Data:

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120	60	0.0983	11.35	0.9626

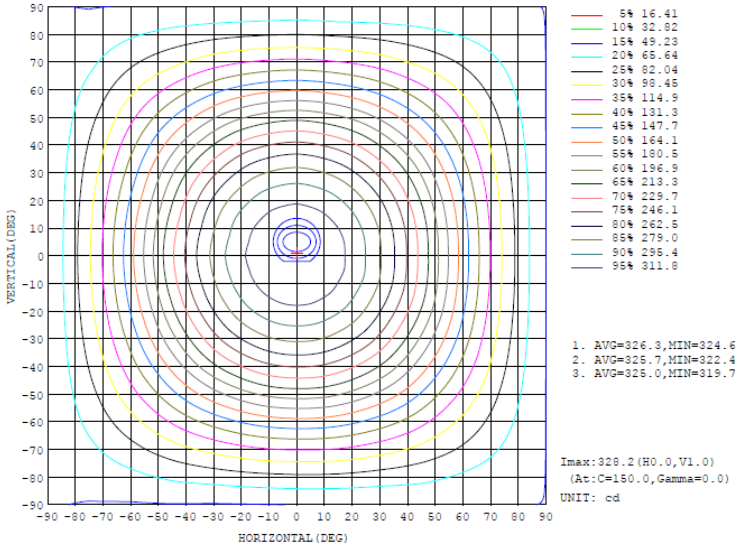
Goniophotometer Data:

Parameter	Result
Total Luminous (lm)	1137.6
Total Luminous per foot (lm/ft)	N/A
Luminous Efficacy (lm/w)	100.2
Zonal Lumens Distribution (0-90°)	94.0%
Beam Angle (°)	118.1
Center Beam Candle Power (cd)	328

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	322.2	322.9	323.0	323.1	323.5	323.2	323.7	323.1	0- 10	31.07	31.07	2.73,2.73
20	306.5	307.9	307.8	307.9	309.0	308.7	309.4	307.8	10- 20	89.47	120.5	10.6,10.6
30	280.4	282.7	282.2	281.6	283.4	283.6	284.8	282.3	20- 30	136.7	257.2	22.6,22.6
40	244.7	247.8	247.0	246.0	248.0	248.7	250.3	247.4	30- 40	166.5	423.7	37.2,37.2
50	202.2	205.6	204.4	203.0	205.4	206.3	208.5	205.4	40- 50	175.1	598.8	52.6,52.6
60	156.7	160.0	158.8	157.0	159.3	160.7	162.6	159.8	50- 60	162.9	761.7	66.9,66.9
70	114.1	116.8	115.7	114.1	116.0	117.2	119.2	117.0	60- 70	136.0	897.6	78.9,78.9
80	78.00	79.80	78.87	77.71	79.19	80.17	81.78	80.21	70- 80	102.6	1000	87.9,87.9
90	49.08	50.47	49.40	48.59	50.12	50.73	52.08	51.11	80- 90	69.71	1070	94,94
100	26.87	27.32	25.41	24.85	27.25	28.01	28.99	28.51	90-100	42.18	1112	97.8,97.8
110	9.082	9.116	7.644	7.294	9.244	9.605	10.19	10.27	100-110	18.42	1131	99.4,99.4
120	0.6420	0.4287	0.4272	0.4532	0.6861	0.5927	0.6171	0.6829	110-120	3.730	1134	99.7,99.7
130	0.9078	0.6048	0.6349	0.8232	0.8004	0.8535	0.6022	0.8189	120-130	0.5442	1135	99.8,99.8
140	1.496	0.9377	0.9641	1.247	1.600	1.246	1.143	1.150	130-140	0.7729	1136	99.8,99.8
150	1.576	1.243	1.258	1.496	1.779	1.478	1.456	1.442	140-150	0.8486	1136	99.9,99.9
160	1.707	1.467	1.534	1.469	1.531	1.519	1.556	0.9980	150-160	0.6932	1137	100,100
170	1.616	1.186	1.549	1.539	1.388	1.492	1.598	1.058	160-170	0.4042	1138	100,100
180	0.0941	0.2192	0.1756	0.2193	0.0929	0.2178	0.1752	0.2190	170-180	0.1029	1138	100,100
DEG	LUMINOUS INTENSITY:cd Less than 35% Percent = 18.7 %									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	328	328	328	328	328	328	328	328	328	328	328	328	328	328	328	328	328	328	328
5	326	326	326	326	326	326	327	327	327	327	327	327	327	327	327	327	327	326	327
10	322	323	323	323	323	323	323	323	323	323	323	323	324	323	323	323	323	323	324
15	316	316	316	317	317	317	317	317	317	317	317	317	318	317	317	317	318	318	318
20	307	308	307	308	308	308	308	308	308	308	308	308	309	308	309	309	309	309	309
25	295	296	296	297	296	297	296	296	296	296	296	296	297	296	297	297	298	298	298
30	280	282	282	283	282	283	282	282	282	282	281	282	283	282	283	284	285	284	285
35	264	265	265	266	266	266	266	266	265	265	264	265	267	265	267	267	268	268	269
40	245	247	247	248	247	248	247	247	246	246	245	246	248	247	248	249	250	250	250
45	224	226	226	227	227	227	226	226	225	225	224	225	227	226	228	228	230	230	230
50	202	205	204	206	205	206	204	204	203	203	202	203	205	204	206	206	208	208	208
55	179	182	181	182	182	182	181	181	180	180	179	179	182	181	182	183	185	185	185
60	157	159	159	160	159	160	159	158	157	157	156	157	159	158	160	161	162	162	163
65	135	137	136	138	137	138	137	136	135	135	134	135	137	135	137	138	140	140	140
70	114	116	116	117	116	117	116	115	114	114	113	114	116	115	116	117	119	119	119
75	95.0	96.7	96.3	97.2	97.0	97.1	96.2	95.9	94.9	94.9	94.3	94.7	96.6	95.4	97.0	97.6	99.0	99.1	99.5
80	78.0	79.1	79.5	79.8	79.1	79.4	78.9	78.2	77.5	77.7	76.9	77.3	79.2	77.8	79.3	80.2	81.0	81.3	81.8
85	62.8	63.2	63.1	64.4	63.2	63.6	63.3	62.3	61.7	62.4	61.2	61.8	63.9	62.0	63.5	64.6	64.9	65.2	66.2
90	49.1	49.7	49.4	50.5	49.8	49.9	49.4	48.8	48.2	48.6	47.9	48.4	50.1	48.6	49.9	50.7	51.1	51.3	52.1
95	37.7	38.9	38.4	38.8	39.0	38.8	37.6	37.9	37.1	36.9	37.1	37.5	38.6	38.0	38.9	39.2	40.2	40.0	40.1
100	26.9	28.1	27.3	27.3	27.1	26.6	25.4	25.6	24.9	24.9	25.0	25.6	27.3	26.7	27.8	28.0	28.9	28.8	29.0
105	16.8	17.7	17.0	17.2	16.4	16.1	15.3	15.2	14.7	14.8	14.8	15.6	17.1	16.6	17.5	17.7	18.2	18.1	18.6
110	9.08	9.30	8.94	9.12	8.11	7.84	7.64	7.23	7.07	7.29	7.23	7.98	9.24	8.78	9.39	9.60	9.24	9.40	10.2
115	3.41	3.68	3.54	2.99	2.63	2.46	2.06	2.13	1.95	2.03	2.30	2.59	3.56	3.38	3.67	3.49	3.49	3.49	4.09
120	0.64	0.60	0.54	0.44	0.41	0.43	0.43	0.44	0.45	0.45	0.57	0.60	0.69	0.48	0.59	0.59	0.56	0.57	0.62
125	0.75	0.67	0.65	0.46	0.50	0.50	0.52	0.52	0.53	0.61	0.69	0.71	0.63	0.63	0.67	0.61	0.54	0.48	0.52
130	0.91	0.87	0.84	0.60	0.65	0.61	0.63	0.68	0.65	0.82	0.82	0.82	0.80	0.80	0.86	0.85	0.72	0.65	0.60
135	1.13	1.20	1.01	0.84	0.85	0.79	0.79	0.87	0.91	1.28	1.19	1.15	1.06	1.06	1.00	1.13	0.99	0.89	0.97
140	1.50	1.35	1.46	0.94	1.07	1.00	0.96	0.99	1.18	1.25	1.37	1.46	1.60	1.21	1.50	1.25	1.31	1.16	1.14
145	1.51	1.66	1.68	1.16	1.24	1.30	1.10	1.21	1.50	1.35	1.48	0.92	1.44	1.32	1.74	1.46	1.31	1.25	0.95
150	1.58	1.82	1.91	1.24	1.37	1.34	1.26	1.35	1.39	1.50	1.54	0.89	1.78	1.35	1.91	1.48	1.45	1.40	1.46
155	1.64	1.75	1.61	1.33	1.34	1.42	1.43	1.54	1.47	1.57	1.52	1.62	1.69	1.60	1.65	1.49	1.52	1.62	1.49
160	1.71	1.74	1.53	1.47	1.20	1.60	1.53	1.54	1.48	1.47	1.49	1.62	1.53	1.58	1.60	1.52	1.50	1.58	1.56
165	1.61	1.60	1.74	1.47	1.28	1.49	1.63	1.49	1.51	1.29	1.53	1.20	1.25	1.19	1.60	1.57	1.61	1.42	1.45
170	1.62	1.63	1.71	1.19	1.26	1.12	1.55	1.58	1.53	1.54	0.70	1.16	1.39	0.60	1.44	1.49	1.62	1.59	1.60
175	1.17	1.16	1.03	0.98	0.82	0.95	0.95	0.93	0.97	0.97	0.99	1.23	1.27	1.02	1.07	0.43	1.00	1.02	1.04
180	0.09	0.17	0.15	0.22	0.27	0.20	0.18	0.21	0.23	0.22	0.23	0.15	0.09	0.17	0.15	0.22	0.27	0.20	0.18

Table--2 UNIT: cd

γ (DEG) \ C (DEG)	285	300	315	330	345
0	328	328	328	328	328
5	327	327	327	327	326
10	323	323	323	323	323
15	317	317	317	317	316
20	308	308	308	308	307
25	297	297	296	296	296
30	283	283	282	282	282
35	267	267	266	266	265
40	249	249	247	247	246
45	229	228	227	227	226
50	207	207	205	205	204
55	184	184	182	182	181
60	161	161	160	159	159
65	139	139	138	137	137
70	118	118	117	117	116
75	98.7	98.5	97.6	97.5	96.8
80	80.9	80.8	80.3	80.0	79.1
85	64.7	65.1	64.9	64.3	63.8
90	51.0	51.3	51.1	50.6	50.2
95	40.1	40.3	39.4	39.8	39.2
100	29.3	29.5	28.5	29.0	28.3
105	18.7	19.0	18.3	18.4	17.8
110	10.2	10.4	10.3	9.66	9.43
115	4.21	4.22	4.02	3.93	3.61
120	0.59	0.60	0.68	0.76	0.74
125	0.52	0.50	0.62	0.72	0.72
130	0.70	0.59	0.82	0.92	0.90
135	0.96	0.72	1.17	1.16	1.09
140	0.97	1.07	1.15	1.28	1.57
145	1.27	1.52	1.36	1.56	1.47
150	1.30	1.12	1.44	1.58	1.41
155	1.45	1.21	1.52	1.48	1.71
160	1.16	0.93	1.00	1.26	1.48
165	1.13	0.79	1.25	1.59	1.54
170	1.15	0.77	1.06	1.61	1.57
175	0.95	0.44	0.69	1.04	1.27
180	0.21	0.23	0.22	0.23	0.15

Photo of Sample for 544662##:

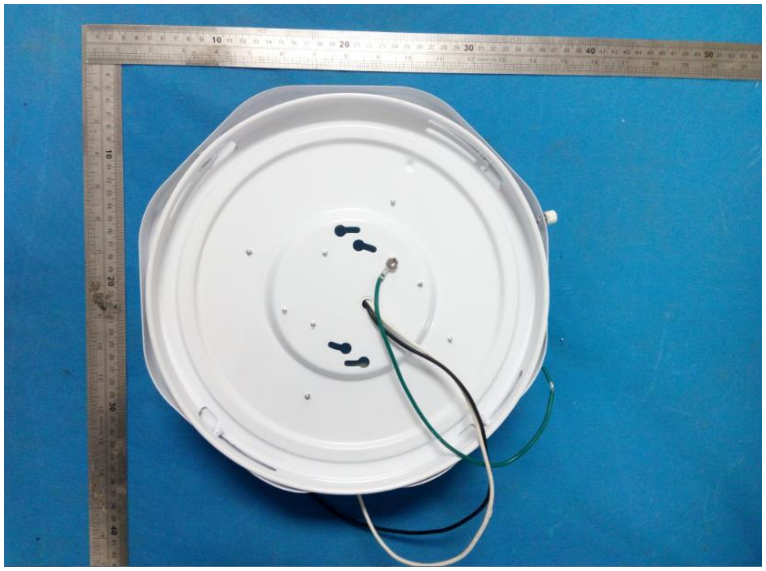
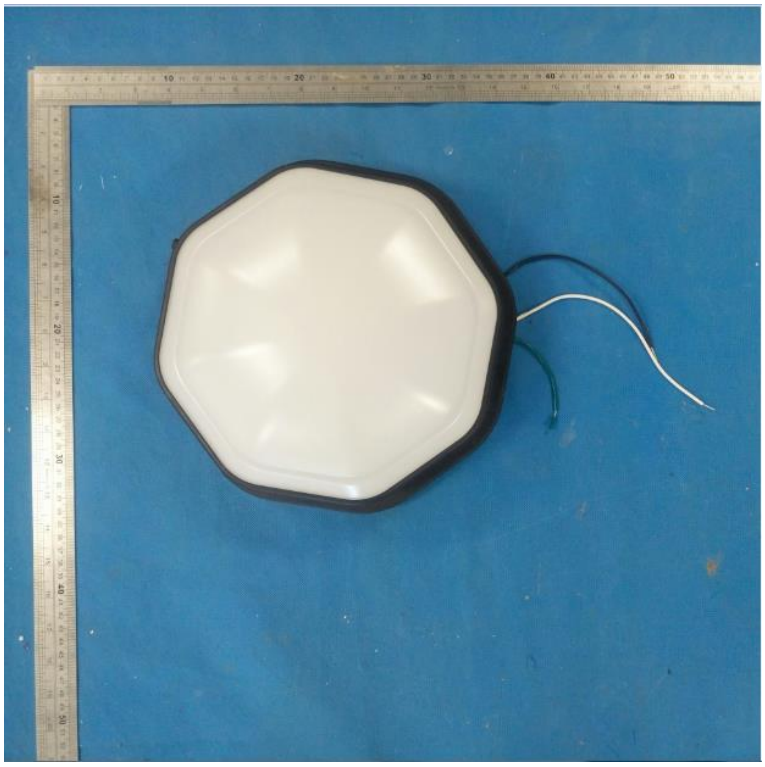
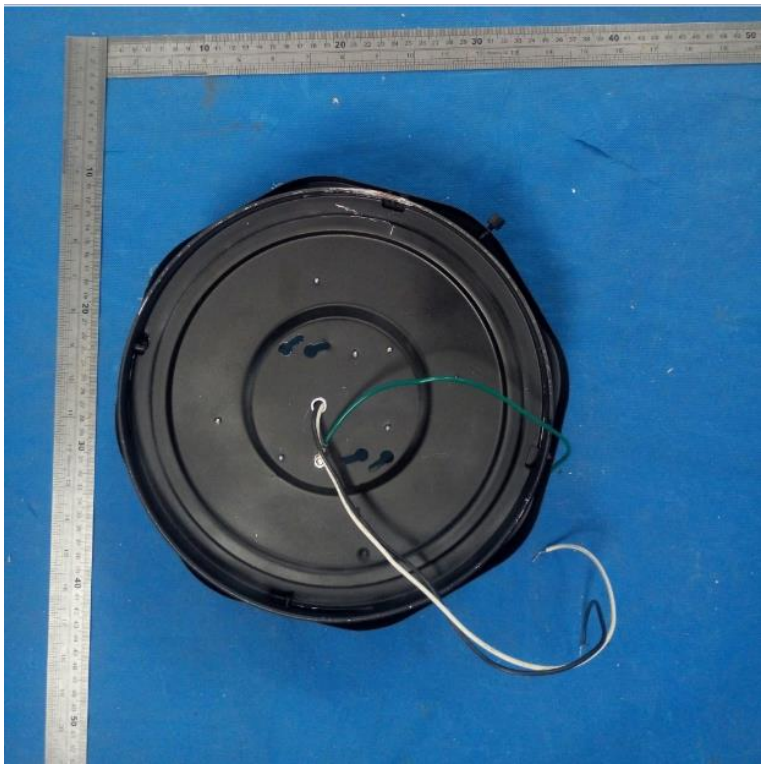


Photo of Sample for 544661##:





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*******