FCC RADIO TEST REPORT

FCC ID: 2ARTQ-PM80N

Product: power meter

Trade Name: N/A

Model Name: PM80N

Serial Model: PM80, PM90, PM90W

Report No.: UNIA2018110216FR-01

Prepared for

Okaylight Technology Co.,LTD

1st Floor, Building 3, LiKe Science and Technology Park, Changsheng North Road, Dalang Town, Dongguan, Guangdong Province, China

Prepared by

Shenzhen United Testing Technology Co., Ltd.

2F, Annex Bldg, Jiahuangyuan Tech Park, #365 Baotian 1 Rd, Tiegang Community, Xixiang Str, Bao'an District, Shenzhen, China

TEST RESULT CERTIFICATION

Applicant's name .....: Okaylight Technology Co.,LTD

Address.....: 1st Floor, Building 3, LiKe Science and Technology Park, Changsheng North Road, Dalang Town, Dongguan, Guangdong Province, China

Manufacture's Name.....: Okaylight Technology Co.,LTD

Address.....: 1st Floor, Building 3, LiKe Science and Technology Park, Changsheng North Road, Dalang Town, Dongguan, Guangdong Province, China

Product description

Product name .....: power meter

Trade Mark.....: N/A

Model and/or type reference .: PM80N, PM80, PM90, PM90W

Standards .....: FCC Part 15 Subpart B

This device described above has been tested by Shenzhen United Testing Technology Co., Ltd., and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test.....: Oct. 24, 2018

Date (s) of performance of tests.....: Oct. 24, 2018 -- Nov. 08, 2018

Date of Issue.....: Nov. 08, 2018

Test Result.....: Pass

Prepared by: Kahn.Yang

Kahn yang/Editor

Reviewer: Shenwin Qian

Shenwin Qian/Supervisor

Approved & Authorized Signer: Liuze

Liuze/Manager

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1 TEST SUMMARY

1 TEST PROCEDURES AND RESULTS

FCC		
47 CFR PART 15,Subpart B	Conducted Emission	PASS
47 CFR PART 15,Subpart B	Radiated emission	PASS

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement Range (MHz)
Below 1.705	30
1.705 to 108	1000
108 to 500	2000
500 to 1000	5000
Above 1000	5th harmonic of the highest frequency or 40GHz, whichever is lower

Remark: The highest frequency of the internal sources of the EUT is below 108 MHz.

2 TEST FACILITY

Test Firm : Shenzhen United Testing Technology Co., Ltd.

Address : 2F, Annex Bldg, Jiahuangyuan Tech Park, #365 Baotian 1 Rd, Tiegang Community, Xixiang Str, Bao'an District, Shenzhen, China

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.The testing quality system of our laboratory meets with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

CNAS-LAB Code: L6494

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of testing Laboratories.

Designation Number: CN1227

Test Firm Registration Number: 674885

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files.

3 MEASUREMENT UNCERTAINTY

Measurement Uncertainty

Conducted Emission Expanded Uncertainty	=	2.23dB, k=2
Radiated emission expanded uncertainty(9kHz-30MHz)	=	3.08dB, k=2
Radiated emission expanded uncertainty(30MHz-1000MHz)	=	4.42dB, k=2
Radiated emission expanded uncertainty(Above 1GHz)	=	4.06dB, k=2

2 GENERAL INFORMATION

2.1 ENVIRONMENTAL CONDITIONS

During the measurement the environmental conditions were within the listed ranges:

Temperature	Normal Temperature:	25℃
Voltage	Normal Voltage	DC 6.0V from battery
Other	Relative Humidity	55 %
	Air Pressure	101 kPa

2.2 GENERAL DESCRIPTION OF EUT

Equipment	power meter
Trade Mark	N/A
Model Name	PM80N
Serial No.	PM80, PM90, PM90W
Model Difference	All models have the same functionality, software and electronics, only the color, front frame shape and model names may differ. Test sample model: PM80N
FCC ID	2ARTQ-PM80N
Antenna Type	N/A
Antenna Gain	N/A
Frequency Range	N/A
Number of Channels	N/A
Modulation Type	N/A
Battery	DC 6.0V
Power Source	DC 6.0V from battery
Adapter Model	N/A

2.3 CARRIER FREQUENCY OF CHANNELS

N/A

2.4 OPARATION OF EUT DURING TESTING

N/A

2.5 DESCRIPTION OF TEST SETUP

Operation of EUT during Conducted testing: N/A

Note : This device is pure battery powered and does not require charging

Operation of EUT during Radiation and Above1GHz Radiation testing:

EUT

2.6 MEASUREMENT INSTRUMENTS LIST

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
CONDUCTED EMISSIONS TEST					
1	AMN	Schwarzbeck	NNLK8121	8121370	2019.09.09
2	AMN	ETS	3810/2	00020199	2019.09.09
3	EMI TEST RECEIVER	Rohde&Schwarz	ESCI	101210	2019.09.09
4	AAN	TESEQ	T8-Cat6	38888	2019.09.09
RADIATED EMISSION TEST					
1	Horn Antenna	Sunol	DRH-118	A101415	2019.09.29
2	BicoNILog Antenna	Sunol	JB1 Antenna	A090215	2019.09.29
3	PREAMP	HP	8449B	3008A00160	2019.09.09
4	PREAMP	HP	8447D	2944A07999	2019.09.09
5	EMI TEST RECEIVER	Rohde&Schwarz	ESR3	101891	2019.09.09
6	VECTOR Signal Generator	Rohde&Schwarz	SMU200A	101521	2019.09.28
7	Signal Generator	Agilent	E4421B	MY4335105	2019.09.28
8	MXA Signal Analyzer	Agilent	N9020A	MY50510140	2019.09.28
9	MXA Signal Analyzer	Agilent	N9020A	MY51110104	2019.09.09
10	ANT Tower&Turn table Controller	Champro	EM 1000	60764	2019.09.28
11	Anechoic Chamber	Taihe Maorui	9m*6m*6m	966A0001	2019.09.09
12	Shielding Room	Taihe Maorui	6.4m*4m*3m	643A0001	2019.09.09
13	RF Power sensor	DARE	RPR3006W	15I00041SNO88	2019.03.14
14	RF Power sensor	DARE	RPR3006W	15I00041SNO89	2019.03.14
15	RF power divider	Anritsu	K241B	992289	2019.09.28
16	Wideband radio communication tester	Rohde&Schwarz	CMW500	154987	2019.09.28
17	Biconical antenna	Schwarzbeck	VHA 9103	91032360	2019.09.08
18	Biconical antenna	Schwarzbeck	VHA 9103	91032361	2019.09.08
19	Broadband Hybrid Antennas	Schwarzbeck	VULB9163	VULB9163#958	2019.09.08
20	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1680	2019.01.12
21	Active Receive Loop Antenna	Schwarzbeck	FMZB 1919B	00023	2019.11.02
22	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170651	2019.03.14
23	Microwave Broadband Preamplifier	Schwarzbeck	BBV 9721	100472	2019.10.24
24	Active Loop Antenna	Com-Power	AL-130R	10160009	2019.05.10
25	Power Meter	KEYSIGHT	N1911A	MY50520168	2019.05.10

3 TEST CONDITIONS AND RESULTS

3.1 CONDUCTED EMISSIONS TEST

Limit

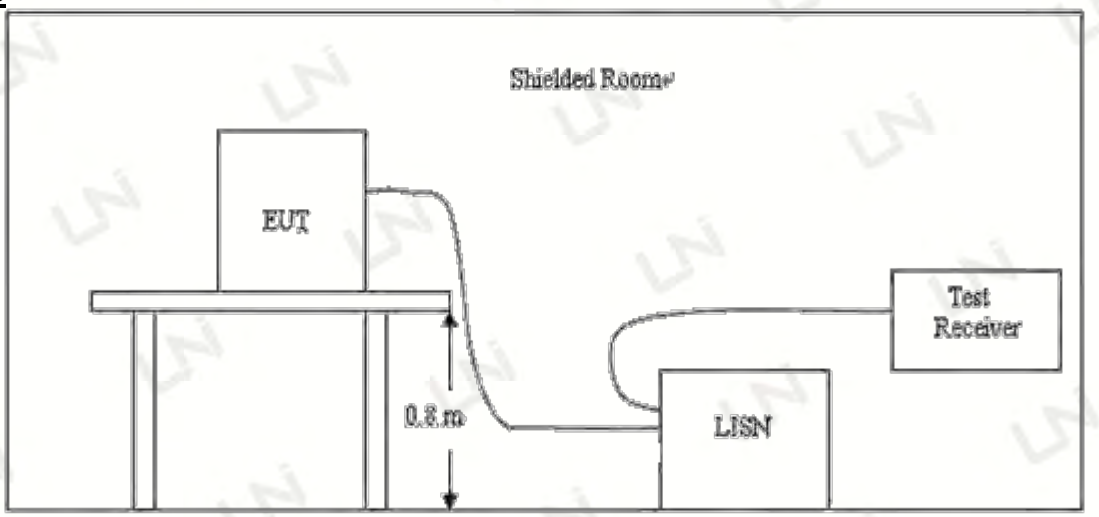
For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreasing linearly with the logarithm of the frequency

For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

Test Setup



Test Procedure

1, The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. A wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4:2014.
2, Support equipment, if needed, was placed as per ANSI C63.4:2014
3, All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4:2014.
4, If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5, All support equipments received AC power from a second LISN, if any.
6, The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7, Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.

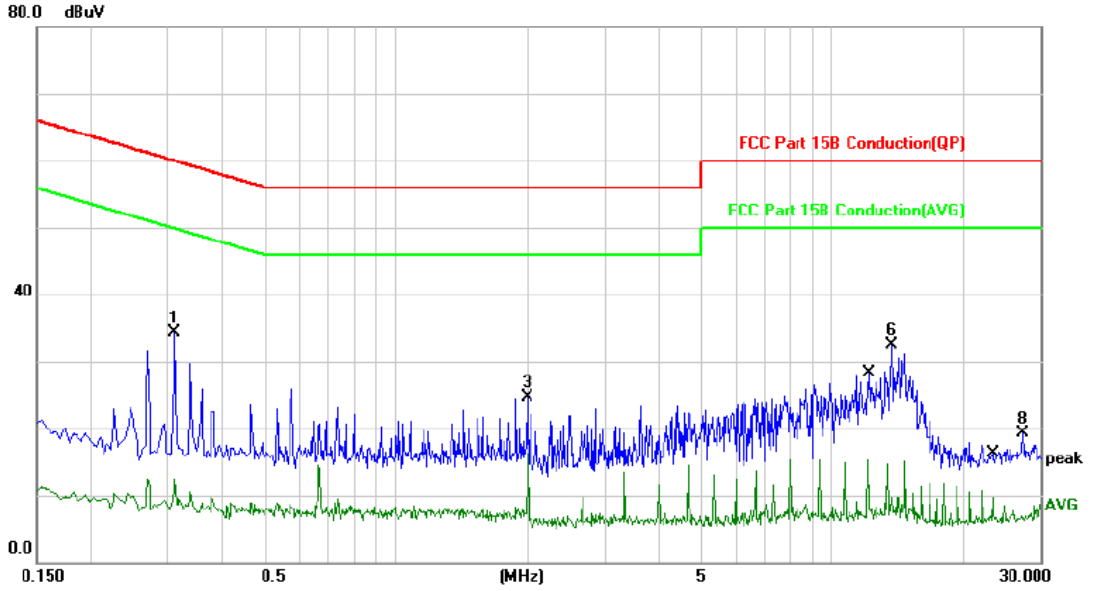
Test Result

---PASS---

Please refer to test data as follows:

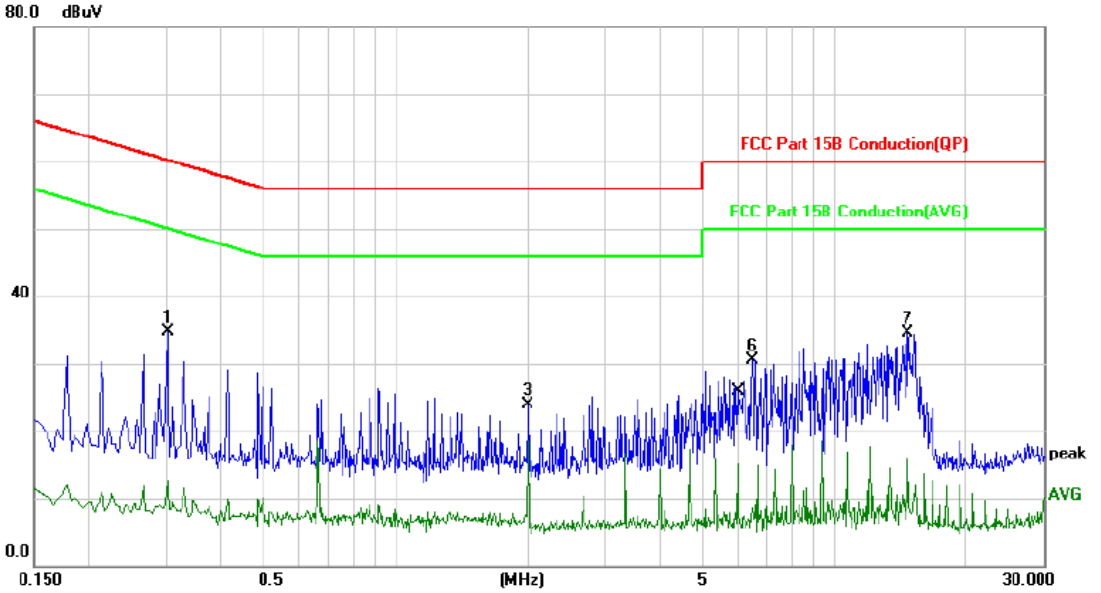
Temperature:	25℃	Relative Humidity:	48%
Test Date:	Oct. 30, 2018	Pressure:	1030hPa
Test Voltage:	AC 120V 60Hz DC 6.0V from battery	Polarization:	

Line	L



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.3100	33.93	0.31	34.24	59.97	-25.73	peak	
2		0.3100	12.28	0.31	12.59	49.97	-37.38	AVG	
3		1.9980	24.48	0.16	24.64	56.00	-31.36	peak	
4		2.0020	16.06	0.16	16.22	46.00	-29.78	AVG	
5		12.0100	15.30	0.09	15.39	50.00	-34.61	AVG	
6		13.6780	32.37	0.05	32.42	60.00	-27.58	peak	
7		23.3500	9.77	-0.15	9.62	50.00	-40.38	AVG	
8		27.3580	19.32	-0.10	19.22	60.00	-40.78	peak	

Line	N



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.3020	34.81	-0.01	34.80	60.19	-25.39	peak	
2		0.3020	12.65	-0.01	12.64	50.19	-37.55	AVG	
3		2.0020	24.19	-0.23	23.96	56.00	-32.04	peak	
4		2.0020	18.77	-0.23	18.54	46.00	-27.46	AVG	
5		6.0020	15.25	-0.25	15.00	50.00	-35.00	AVG	
6		6.5100	30.86	-0.27	30.59	60.00	-29.41	peak	
7		14.6500	34.79	-0.22	34.57	60.00	-25.43	peak	
8		14.6740	16.20	-0.22	15.98	50.00	-34.02	AVG	

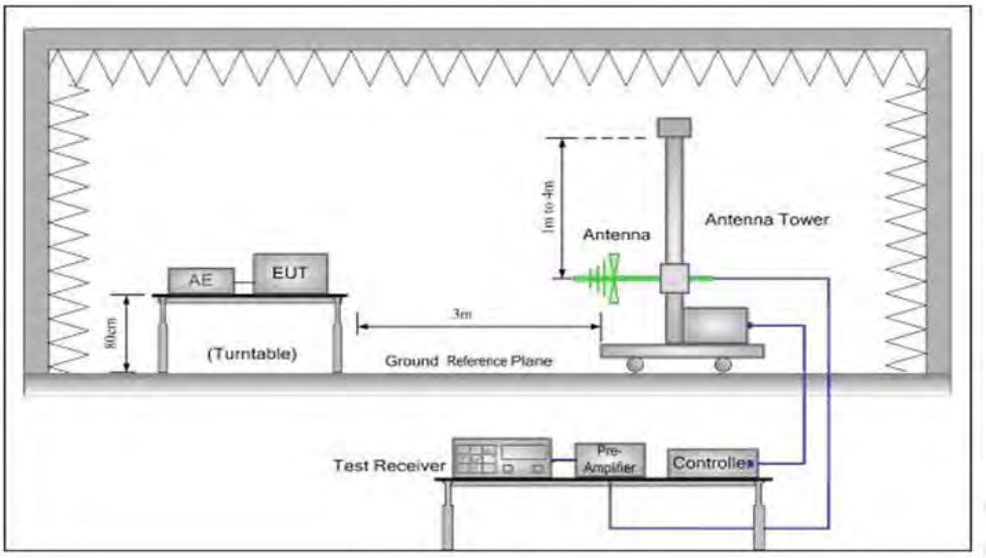
3.2 RADIATED EMISSION TEST 30MHz to 1GHz

Test Requirement:	47 CFR PART 15,Subpart B
Test Method:	ANSI C63.4
Frequency Range:	30MHz to 1GHz
Measurement Distance:	3m
Class:	Class B

Limit

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)
30-88	3	40
88-216	3	43.5
216-960	3	46
Above 960	3	54

Test Setup



Test Procedure

1) The radiated emissions were tested in a semi-anechoic chamber.
2) The EUT is placed on a turntable, which is 0.8m above ground plane.
3) The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4) EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.
5) Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6) And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7) Repeat above procedures until the measurements for all frequencies are complete.

Detector:
Peak for pre-scan (120kHz resolution bandwidth) Quasi-Peak if maximised peak within 6dB of limit

Note:
For battery operated equipment, the equipment tests shall be performed using a new battery.

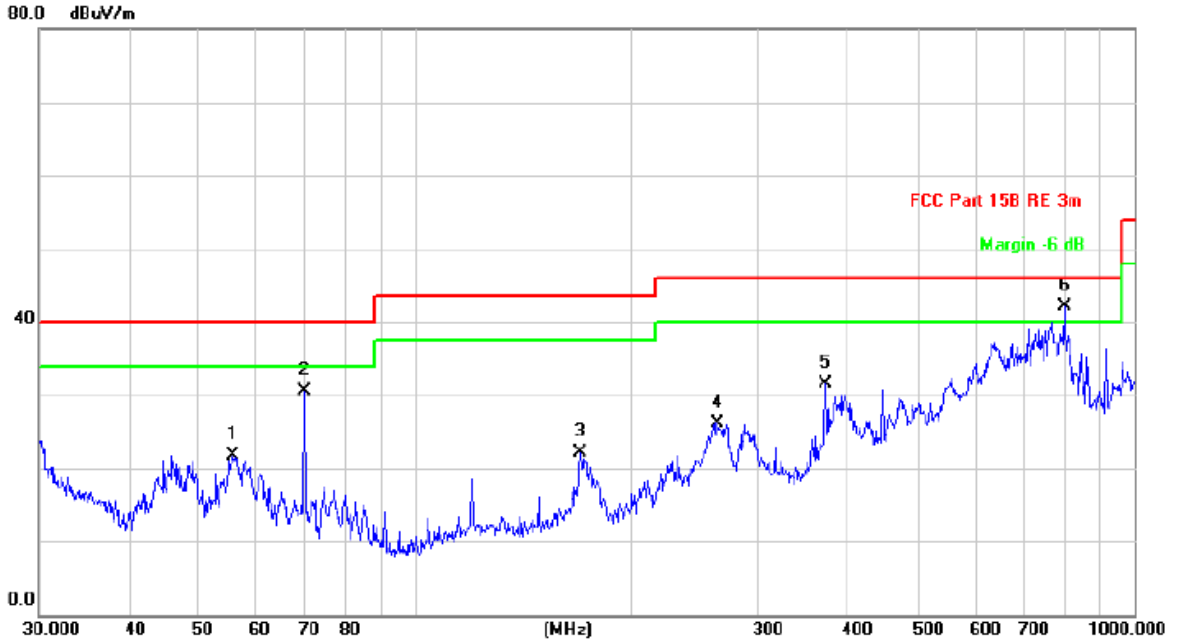
Test Result

---PASS---

Remark:
1. All the test modes completed for test. The worst case of Radiated Emission is Middle channel, the test data of this mode was reported.
2. By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that "Z axis" position was the worst, and test data recorded in this report.
3. Radiated emission test from 9KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9KHz to 30MHz and not recorded in this report.

Temperature:	25℃	Relative Humidity:	48%
Test Date:	Nov. 05, 2018	Pressure:	1030hPa
Test Voltage:	AC 120V 60Hz	Polarization:	

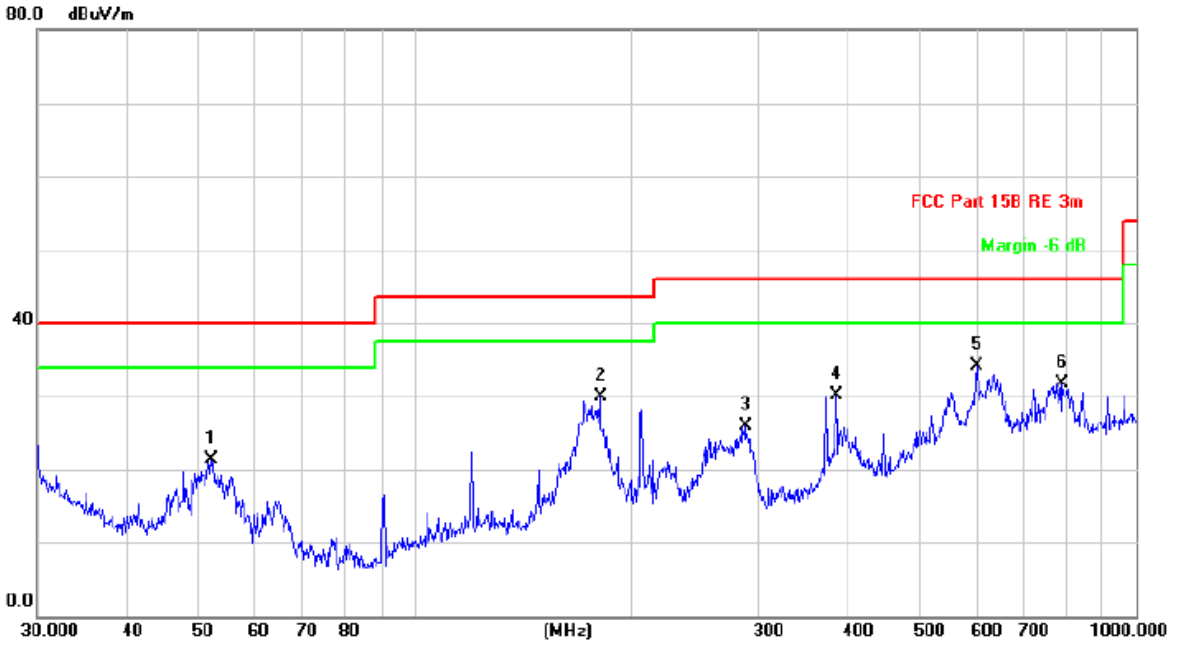
Polarization:	Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		55.6094	40.65	-18.89	21.76	40.00	-18.24	peak			
2		70.0903	48.95	-18.42	30.53	40.00	-9.47	peak			
3		169.5990	35.97	-13.81	22.16	43.50	-21.34	peak			
4		262.8955	38.03	-11.94	26.09	46.00	-19.91	peak			
5		372.0045	40.83	-9.37	31.46	46.00	-14.54	peak			
6	*	798.9797	43.21	-1.05	42.16	46.00	-3.84	peak			

Remark: Absolute Level= Reading Level+ Factor, Margin= Absolute Level – Limit
Factor=Ant. Factor + Cable Loss – Pre-amplifier

Polarization:	Vertical



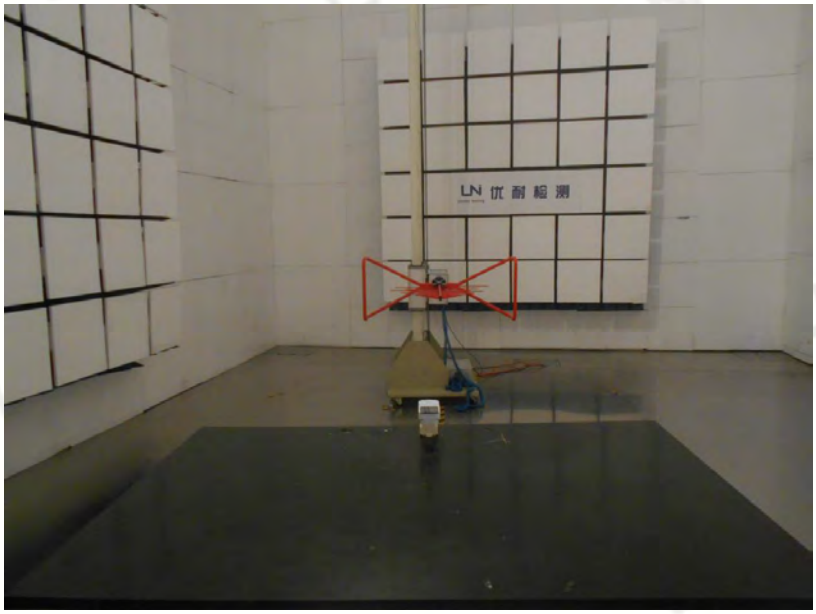
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		52.2079	40.21	-18.81	21.40	40.00	-18.60	peak			
2		180.6488	44.15	-14.32	29.83	43.50	-13.67	peak			
3		286.9823	37.64	-11.67	25.97	46.00	-20.03	peak			
4		383.9318	39.42	-9.28	30.14	46.00	-15.86	peak			
5	*	601.4265	38.89	-4.86	34.03	46.00	-11.97	peak			
6		790.6188	33.53	-1.78	31.75	46.00	-14.25	peak			

NOTE: The highest frequency of the internal sources of the EUT is below 108 MHz.

Remark: Absolute Level= Reading Level+ Factor, Margin= Absolute Level – Limit
Factor=Ant. Factor + Cable Loss – Pre-amplifier

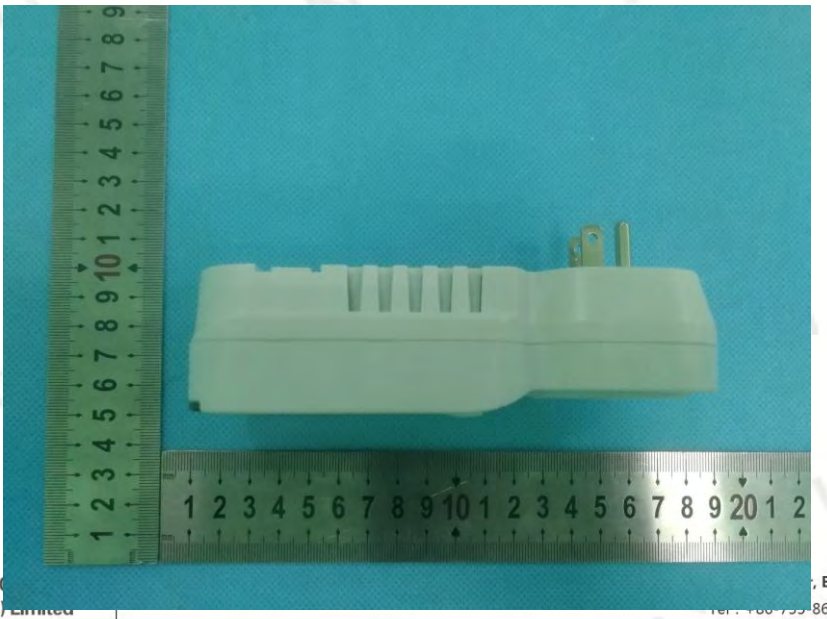
Remark:
(1) Measuring frequencies from 9 kHz to the 1 GHz, Radiated emission test from 9kHz to 30MHz was verified, and no any emission was found except system noise floor.
(2) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
(3) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.

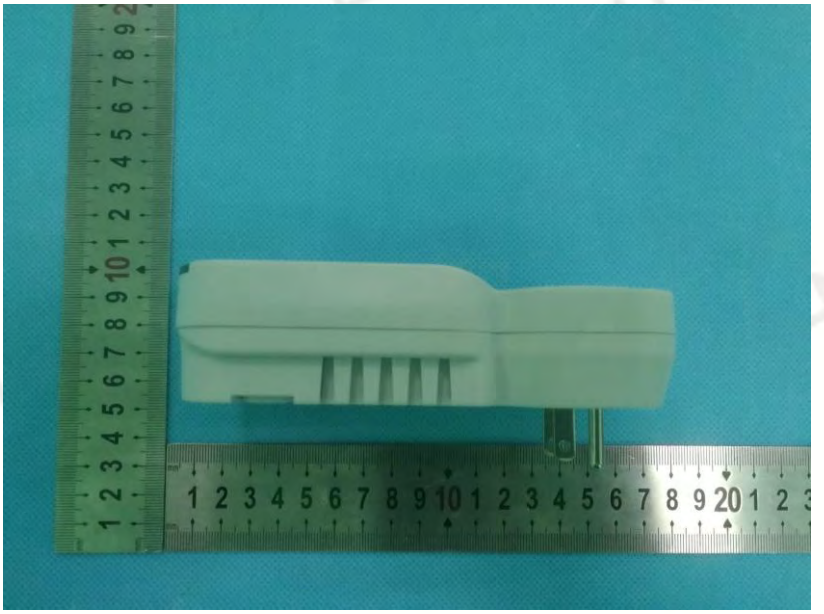
4 PHOTOGRAPH OF TEST



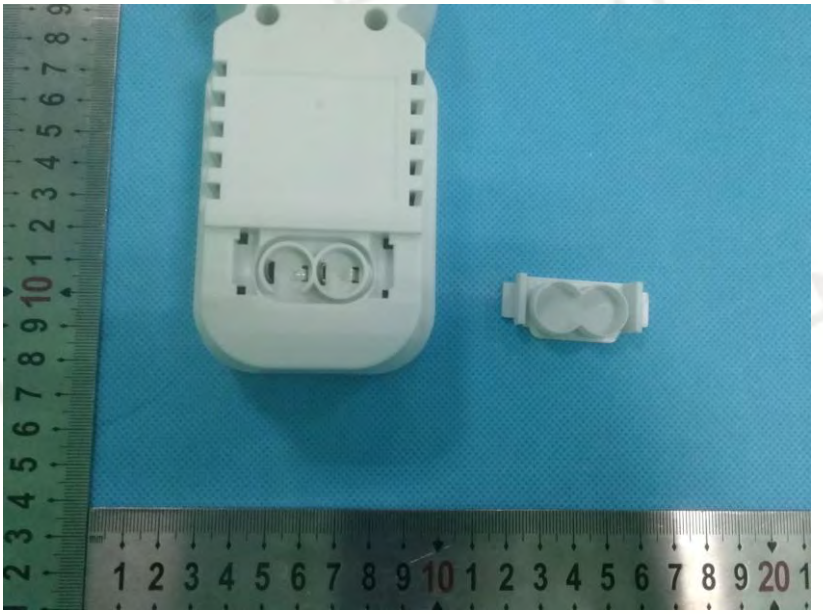
5 PHOTOGRAPH OF EUT

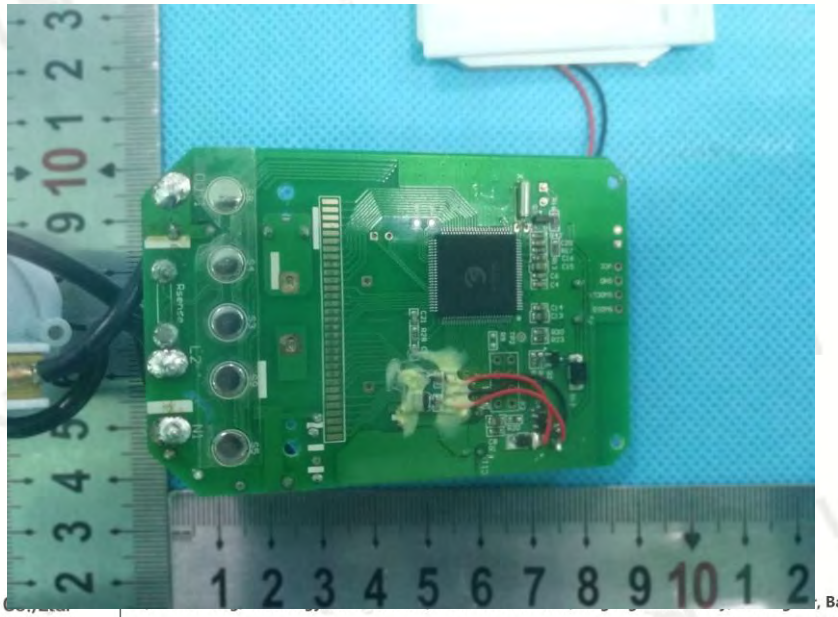
External photos

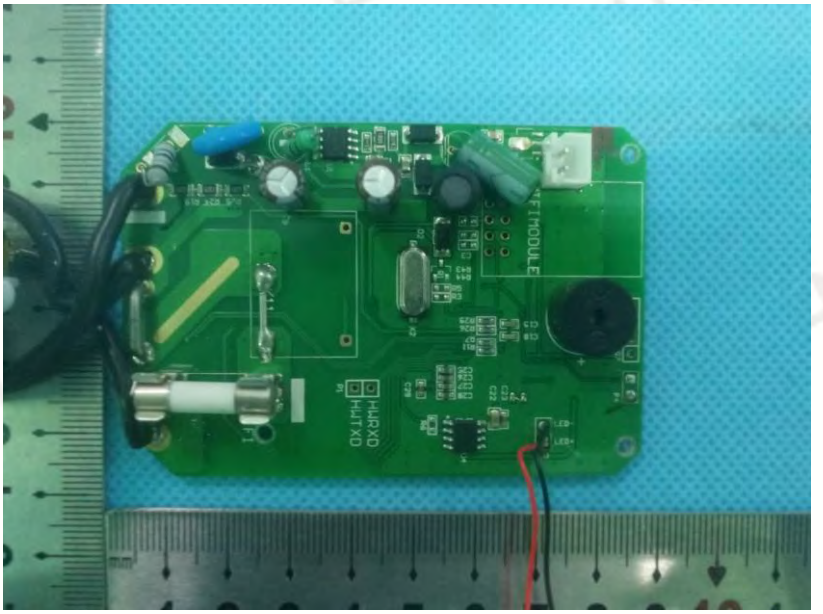




Internal Photos







********** End of Report **********