



TEST REPORT

FCC ID: 2APLDLM800

Product Name	:	2.4G Wireless Barcode Scanner
Model Name	:	LM800, LM810, LM700, LM710, LM8201
Brand Name	:	LM
Report No.	:	PTC18040808301E-FC01
Prepared for		
Dongguan longxin barcode equipment co.,LTD		
NO.136,At the North of shiyang Street, Wentang, Dongcheng District, Dongguan, Guangdong, China		
Prepared by		
DongGuan Precise testing &Certification Corp. Ltd		
Building D, Baoding Technology Park, Guangming Road 2, Guangming Community, Dongcheng District, Dongguan, Guangdong, China		



1TEST RESULT CERTIFICATION

Applicant's name : Dongguan longxin barcode equipment co.,LTD
Address : NO.136,At the North of shiyang Street, Wentang, Dongcheng District, Dongguan, Guangdong, China
Manufacture's name : Dongguan longxin barcode equipment co.,LTD
Address : NO.136,At the North of shiyang Street, Wentang, Dongcheng District, Dongguan, Guangdong, China
Product name : 2.4G Wireless Barcode Scanner
Model name : LM800, LM810, LM700, LM710, LM8201
Brand Name : N/A
Standards : FCC CFR47 Part 15 Section 15.249
Test procedure : ANSI C63.10: 2013
Test Date : April 10, 2018 to May 08, 2018
Date of Issue : May 08, 2018
Test Result : Pass

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

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Test Engineer:

Leo Yang / Engineer

Technical Manager:

Chris Du / Manager



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2 Test Summary

Test Items	Test Requirement	Result
AC Power Conducted Emission	15.207	PASS
20dB Bandwidth	15.215(c)	PASS
Band edge	15.249 15.205 15.209	PASS
Field Strength of Fundamental Emissions	15.249(a) 15.249(c)	PASS
Radiated Spurious Emissions	15.205(a) 15.209(a)	PASS
Antenna Requirement	15.203	PASS



PRECISE TESTING

Report No.: PTC18040808301E-FC01

3 TEST FACILITY

DongGuan Precise testing & Certification Corp. Ltd

Building D, Baoding Technology Park, Guangming Road2, Dongcheng District, Dongguan, Guangdong,
China, Dongguan, 523129

FCC Registration Number: 790290

A2LA Certificate No.: 4408.01

IC Registration Number: 12191A-1

Test Lab: Shenzhen BCTC Testing Co., Ltd.

Address: BCTC Building & 1-2F, East of B Building, Pengzhou Industrial, Fuyuan 1st Road, Qiaotou
Community, Fuyong Street, Bao'an District, Shenzhen, China

FCC Registered No.: 712850

IC Registration Number: 23583

Test items: Radiated Spurious Emission(18GHz to 25GHz)



4 General Information

4.1 General Description of E.U.T.

Product Name	:	2.4G Wireless Barcode Scanner
Model Name	:	LM800, LM810, LM700, LM710, LM8201 (Note: The samples are the same except appearance and model number. So LM800 was selected for full tested.)
Operating frequency	:	2402MHz-2481MHz
Numbers of Channel	:	80
Data Rate	:	1Mbps
Antenna Type	:	Internal Antenna
Antenna Gain	:	-90dBi
Type of Modulation	:	GFSK
Power supply	:	DC 3V, 800mAh Battery



4.2 Test Mode

The EUT has been tested under its typical operating condition. Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting. Only the worst case data were reported.

For Radiated: The EUT's antenna was pre-tested under the following modes:

Test Mode	Description
Mode A	X-Y axis
Mode B	Y-Z axis
Mode C	X-Z axis

From the above modes, the worst case was found in Mode A, Therefore only the test data of the mode was recorded in this report.

Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2402	21	2422	41	2442	61	2462
2	2403	22	2423	42	2443	62	2463
3	2404	23	2424	43	2444	63	2464
4	2405	24	2425	44	2445	64	2465
5	2406	25	2426	45	2446	65	2466
6	2407	26	2427	46	2447	66	2467
7	2408	27	2428	47	2448	67	2468
8	2409	28	2429	48	2449	68	2469
9	2410	29	2430	49	2450	69	2470
10	2411	30	2431	50	2451	70	2471
11	2412	31	2432	51	2452	71	2472
12	2413	32	2433	52	2453	72	2473
13	2414	33	2434	53	2454	73	2474
14	2415	34	2435	54	2455	74	2475
15	2416	35	2436	55	2456	75	2476
16	2417	36	2437	56	2457	76	2477
17	2418	37	2438	57	2458	77	2478
18	2419	38	2439	58	2459	78	2479
19	2420	39	2440	59	2460	79	2480
20	2421	40	2441	60	2461	80	2481



The 3 channels of lower, middle and higher were chosen for test.

Channel	Frequency(MHz)
1	2402
41	2442
80	2481



5 Equipment During Test

5.1 Equipments List

RF Conducted Test

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration Due
MXG Signal Analyzer	Agilent	N9020A	MY56070279	10Hz-30GHz	Apr 07, 2019
Coaxial Cable	CDS	79254	46107086	10Hz-30GHz	Oct 09, 2018

Remark: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

Radiated Emissions

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration Due
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	9KHz-3GHz	Sep. 03, 2018
Loop Antenna	Schwarzbeck	FMZB 1519	012	9 KHz -30MHz	Aug 31, 2018
Bilog Antenna	SCHWARZBECK	VULB9160	9160-3355	25MHz-2GHz	Aug 31, 2018
Preamplifier (low frequency)	SCHWARZBECK	BBV 9475	9745-0013	1MHz-1GHz	Sep. 03, 2018
Cable	Schwarzbeck	PLF-100	549489	9KHz-3GHz	Sep. 03, 2018
Spectrum Analyzer	Agilent	E4407B	MY45109572	9KHz-40GHz	Oct. 13, 2018
Horn Antenna	SCHWARZBECK	9120D	9120D-1246	1GHz-18GHz	Aug. 31, 2018
Power Amplifier	LUNAR EM	LNA1G18-40	J10100000081	1GHz-26.5GHz	Aug. 31, 2018
Cable	H+S	CBL-26	N/A	1GHz-26.5GHz	Sep. 03, 2018



Radiated Emission (Test Frequency from 18GHz-25GHz)

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration Due
Spectrum Analyzer	Agilent	E4407B	MY45109572	9KHz-26.5GHz	2018.08.26
Test Receiver	R&S	ESPI	101396	9KHz-7GHz	2018.08.26
Horn Antenna	SCHWARZBECK	BBHA 9170	9170-181	14GHz-40GHz	2018.09.02
Amplifier	SCHWARZBECK	BBV 9721	9721-205	18GHz-40GHz	2018.08.26
RF Cable	R&S	R204	R21X	1GHz-40GHz	2018.08.26

Conducted Emissions

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration Due
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	9KHz-3GHz	Sep. 03, 2018
Artificial Mains Network	Rohde&Schwarz	L2-16B	000WX31025	9KHz-300MHz	Sep. 03, 2018
Artificial Mains Network	Rohde&Schwarz	ENV216	101342	9KHz-300MHz	Sep. 03, 2018



5.2 Measurement Uncertainty

Parameter	Uncertainty
RF output power, conducted	±1.0dB
Power Spectral Density, conducted	±2.2dB
Radio Frequency	± 1 x 10 ⁻⁶
Bandwidth	± 1.5 x 10 ⁻⁶
Time	±2%
Duty Cycle	±2%
Temperature	±1°C
Humidity	±5%
DC and low frequency voltages	±3%
Conducted Emissions (150kHz~30MHz)	±3.64dB
Radiated Emission(30MHz~1GHz)	±5.03dB
Radiated Emission(1GHz~25GHz)	±4.74dB
Remark: The coverage Factor (k=2), and measurement Uncertainty for a level of Confidence of 95%	



5.3 Description of Support Units

Equipment	Model No.	Series No.
Adapter	Model: PS65B150Y3000S Input: AC120V, 60Hz, 1.5A Output: DC 5V, 3000mA	N/A



6 Conducted Emission

Test Requirement: : FCC CFR 47 Part 15 Section 15.207
Test Method: : ANSI C63.10: 2013
Test Result: : PASS
Frequency Range: : 150kHz to 30MHz
Class/Severity: : Class B

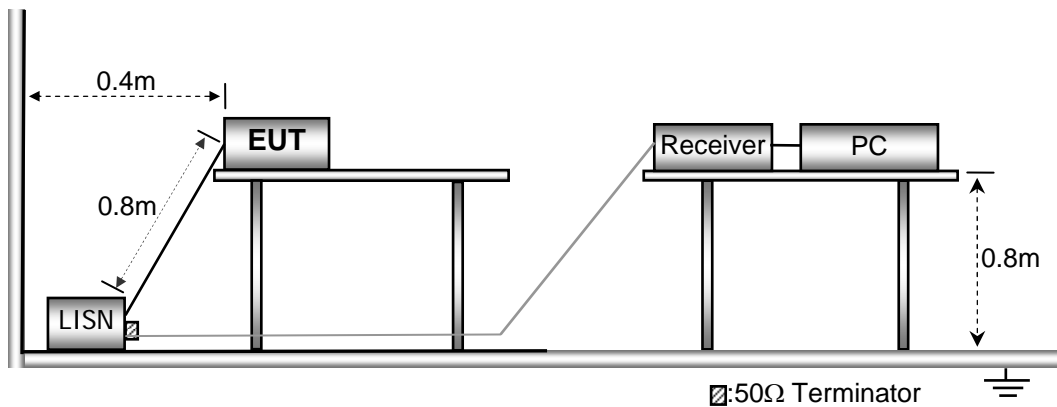
6.1 E.U.T. Operation

Operating Environment :

Temperature: : 25.5 °C
Humidity: : 51 % RH
Atmospheric Pressure: : 101.2kPa

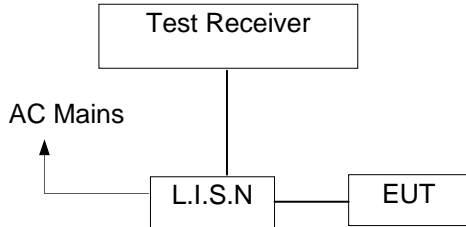
6.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10:2013.





6.3 Test SET-UP (Block Diagram of Configuration)



6.4 Measurement Procedure

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured was complete.

6.5 Conducted Emission Limit

Conducted Emission

Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note:

1. The lower limit shall apply at the transition frequencies
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

6.6 Measurement Description

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

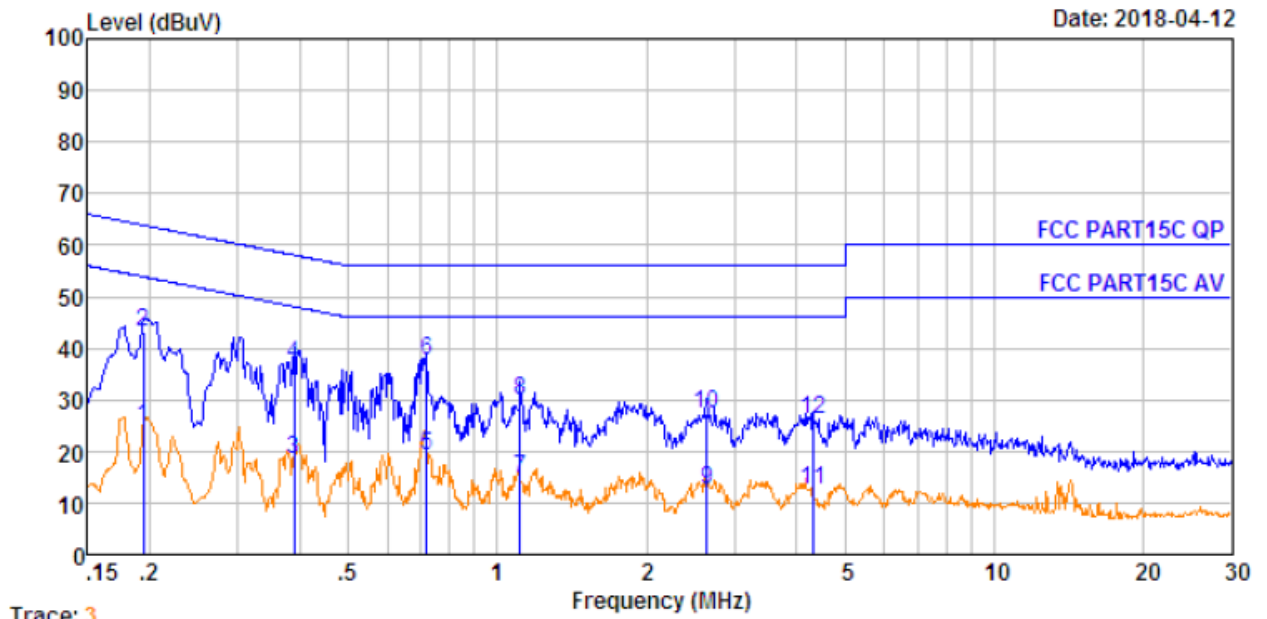
6.7 Conducted Emission Test Result

Pass.

Please refer to the following pages for worst mode.



Line-AC 120V/60Hz

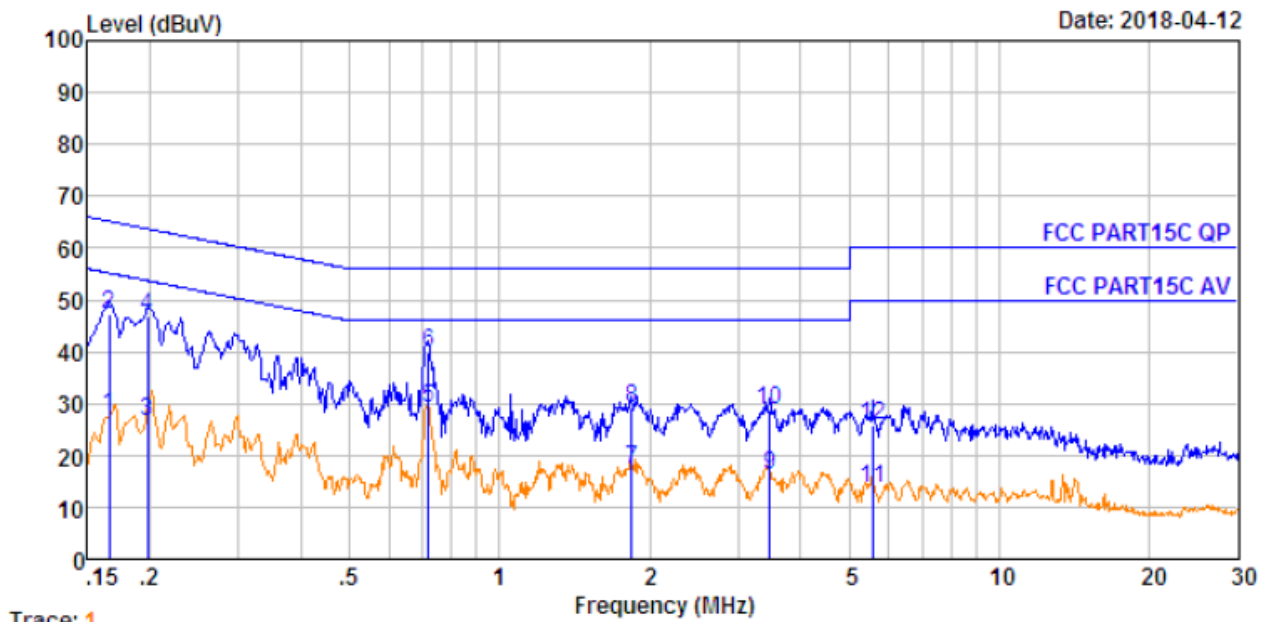


Trace: 3

No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBUV	Emission Level dBUV	Limit dBUV	Over Limit dB	Remark
1.	0.194	0.27	9.58	15.04	24.89	53.84	-28.95	Average
2.	0.194	0.27	9.58	33.46	43.31	63.84	-20.53	QP
3.	0.389	0.40	9.73	8.18	18.31	48.08	-29.77	Average
4.	0.389	0.40	9.73	26.64	36.77	58.08	-21.31	QP
5.	0.720	0.44	9.80	9.04	19.28	46.00	-26.72	Average
6.	0.720	0.44	9.80	27.50	37.74	56.00	-18.26	QP
7.	1.111	0.46	9.82	4.34	14.62	46.00	-31.38	Average
8.	1.111	0.46	9.82	19.46	29.74	56.00	-26.26	QP
9.	2.636	0.47	9.87	2.05	12.39	46.00	-33.61	Average
10.	2.636	0.47	9.87	16.94	27.28	56.00	-28.72	QP
11.	4.315	0.48	9.90	2.20	12.58	46.00	-33.42	Average
12.	4.315	0.48	9.90	15.96	26.34	56.00	-29.66	QP



Neutral-AC 120V/60Hz



Trace: 1

No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBuV	Emission Level dBuV	Limit dBuV	Over Limit dB	Remark
1.	0.166	0.23	9.56	17.85	27.64	55.16	-27.52	Average
2.	0.166	0.23	9.56	37.50	47.29	65.16	-17.87	QP
3.	0.198	0.28	9.62	16.63	26.53	53.71	-27.18	Average
4.	0.198	0.28	9.62	36.95	46.85	63.71	-16.86	QP
5.	0.720	0.44	9.83	18.81	29.08	46.00	-16.92	Average
6.	0.720	0.44	9.83	29.46	39.73	56.00	-16.27	QP
7.	1.839	0.47	9.88	7.11	17.46	46.00	-28.54	Average
8.	1.839	0.47	9.88	18.64	28.99	56.00	-27.01	QP
9.	3.472	0.47	9.93	5.74	16.14	46.00	-29.86	Average
10.	3.472	0.47	9.93	18.35	28.75	56.00	-27.25	QP
11.	5.564	0.52	9.97	3.22	13.71	50.00	-36.29	Average
12.	5.564	0.52	9.97	15.34	25.83	60.00	-34.17	QP



7 Field Strength of Fundamental Emission and Radiated Spurious Emissions

Test Requirement: : FCC Part C section 15.205 & 15.209 & 15.249
 Test Method: : ANSI C63.10: 2013
 Test Result: : PASS
 Measurement Distance: : 3m
 Limit: : See the follow table
 15.209 limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	20log ^{(2400/F(kHz))} + 80
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	20log ^{(24000/F(kHz))} + 40
1.705 ~ 30	30	30	100 * 30	20log ⁽³⁰⁾ + 40
30 ~ 88	100	3	100	20log ⁽¹⁰⁰⁾
88 ~ 216	150	3	150	20log ⁽¹⁵⁰⁾
216 ~ 960	200	3	200	20log ⁽²⁰⁰⁾
Above 960	500	3	500	20log ⁽⁵⁰⁰⁾

Note: 1. Emission level in dBuV/m=20 log (uV/m)

2. Measurement was performed at an antenna to the closed point of EUT distance of meters.

The field strength of emission from intentional radiators operated within these frequency bands shall comply with the following:

15.249(a) Limit:

Fundamental Frequency (MHz)	Field strength of fundamental		Field strength of harmonics	
	mV/m	dBuV/m	uV/m	dBuV/m
902-928	50	94	500	54
2400-2483.5	50	94	500	54
5725-5875	50	94	500	54
24000-24250	250	108	2500	68

7.1 EUT Operation

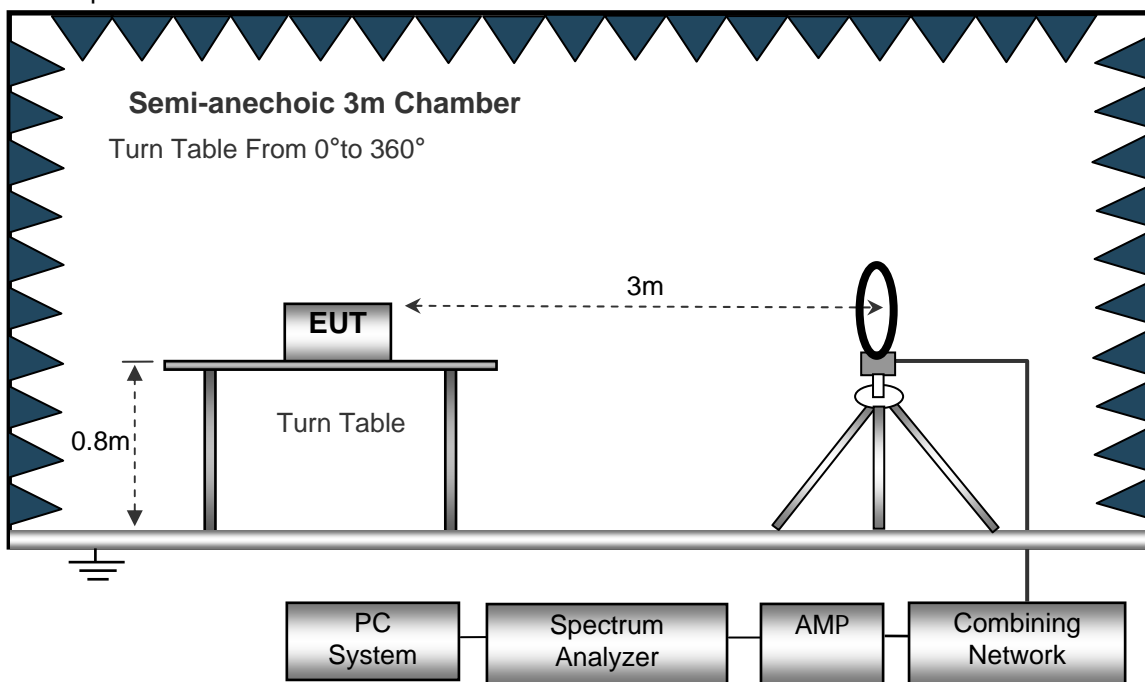
Operating Environment :

- Temperature: : 23.5 °C
- Humidity: : 51.1 % RH
- Atmospheric Pressure: : 101.2kPa
- Test Voltage : DC 3*1.5V Battery

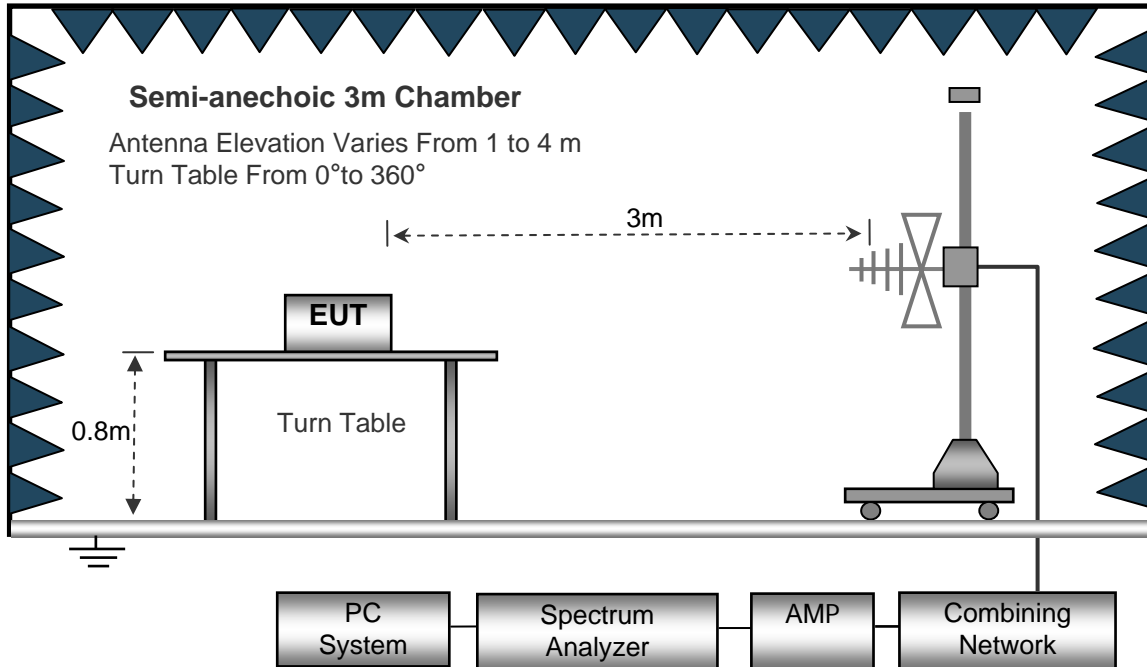
7.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site

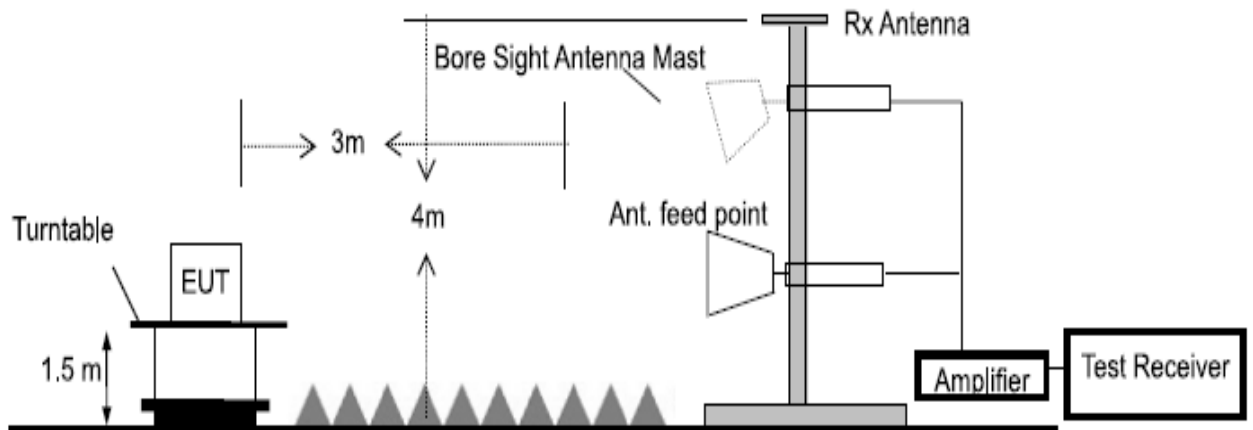
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.





7.3 Spectrum Analyzer Setup

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

7.4 Test Procedure

1. The testing follows the guidelines in Spurious Radiated Emissions of ANSI C63.10: 2013.
2. Below 1000MHz, The EUT was placed on a turn table which is 0.8m above ground plane. And above 1000MHz, The EUT was placed on a styrofoam table which is 1.5m above ground plane.
3. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (From 1m to 4m) and turntable (from 0 degree to 360 degree) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Test Procedure of measurement (For Above 1GHz): Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.



7.5 Summary of Test Results

Test Frequency: 9KHz-30MHz

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)
--	--	--	--	>20

Note:

The amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

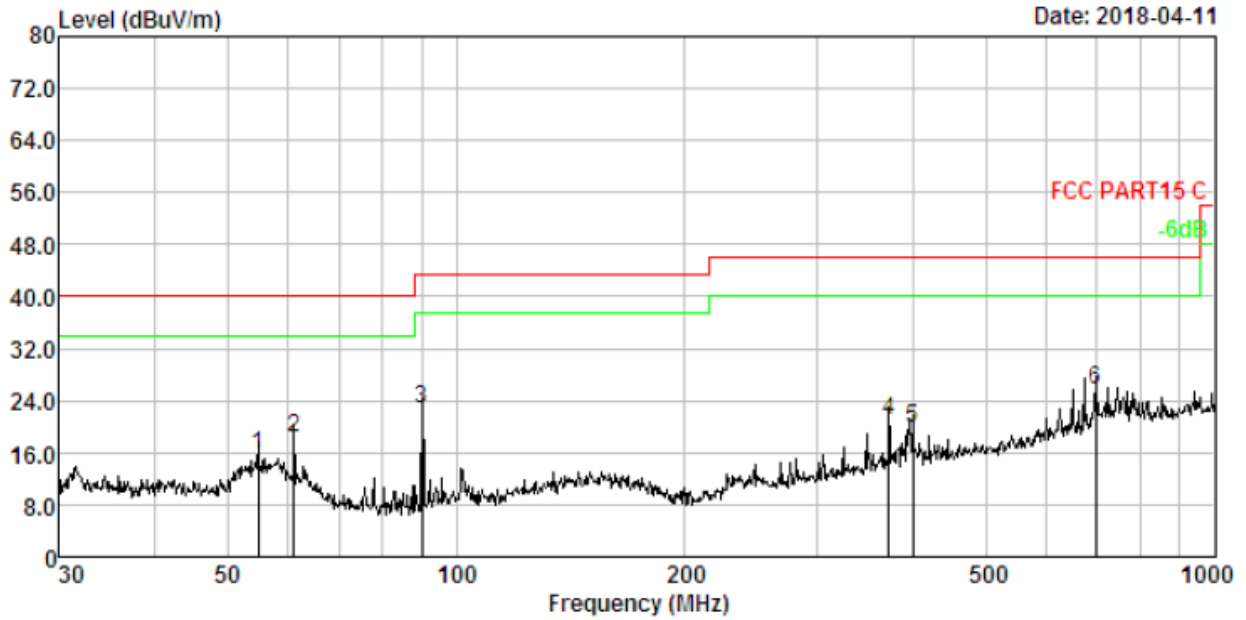
Distance extrapolation factor = $40\log(\text{Specific distance/ test distance})$ (dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor.

Test Frequency: 30MHz ~ 1GHz

Remark: only the worst data were reported.



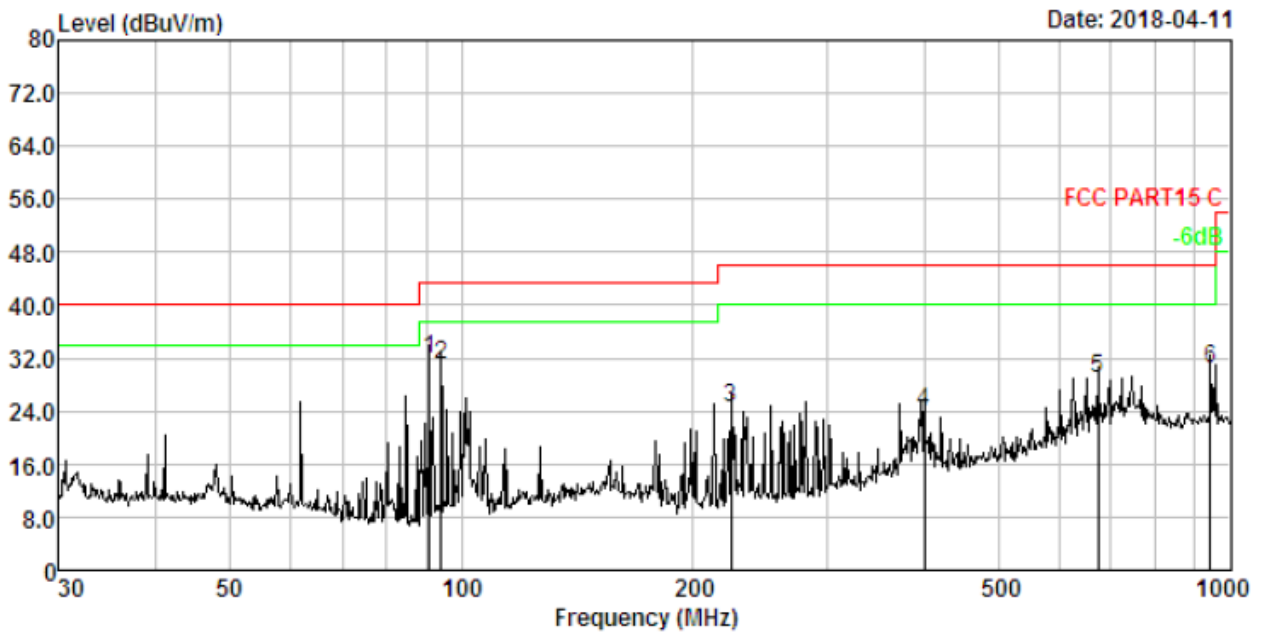
Test plot for Horizontal: 2402MHz



No.	Freq MHz	Cable Loss dB	ANT Factor dB	Receiver Reading dBUV/m	Preamp Factor dB	Emission Level dBUV/m	Limit dBUV/m	Over Limit dB	Remark
1.	54.835	1.60	11.91	32.45	30.18	15.78	40.00	-24.22	QP
2.	61.132	1.70	12.09	34.77	30.22	18.34	40.00	-21.66	QP
3.	90.220	2.05	9.32	41.60	30.35	22.62	43.50	-20.88	QP
4.	372.005	3.33	14.69	33.84	30.85	21.01	46.00	-24.99	QP
5.	400.432	3.40	15.33	31.96	30.87	19.82	46.00	-26.18	QP
6.	696.857	3.90	20.10	32.83	31.06	25.77	46.00	-20.23	QP



Test plot for Vertical: 2402MHz



No.	Freq MHz	Cable Loss dB	ANT Factor dB	Receiver Reading dBUV/m	Preamp Factor dB	Emission Level dBUV/m	Limit dBUV/m	Over Limit dB	Remark
1.	90.855	2.06	9.38	50.82	30.36	31.90	43.50	-11.60	QP
2.	94.098	2.09	9.66	49.73	30.37	31.11	43.50	-12.39	QP
3.	224.519	2.88	10.98	41.41	30.67	24.60	46.00	-21.40	QP
4.	400.432	3.40	15.33	35.98	30.87	23.84	46.00	-22.16	QP
5.	672.845	3.87	19.80	36.19	31.05	28.81	46.00	-17.19	QP
6.	942.131	4.18	23.28	34.11	31.17	30.40	46.00	-15.60	QP



Test Frequency 1GHz-18GHz:

Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
2402(F)	V	92.05	81.69	114	94	-21.95	-12.31
4804	V	57.14	48.25	74	54	-16.86	-5.75
7206	V	55.58	46.57	74	54	-18.42	-7.43
9608	V	53.62	44.18	74	54	-20.38	-9.82
12010	V	52.4	43.62	74	54	-21.6	-10.38
14412	V	50.28	42.08	74	54	-23.72	-11.92
16814	V	48.96	40.58	74	54	-25.04	-13.42
2402(F)	H	93.15	83.26	114	94	-20.85	-10.74
4804	H	56.28	47.92	74	54	-17.72	-6.08
7206	H	54.06	45.15	74	54	-19.94	-8.85
9608	H	52.69	43.26	74	54	-21.31	-10.74
12010	H	50.24	42.05	74	54	-23.76	-11.95
14412	H	45.85	41.25	74	54	-28.15	-12.75
16814	H	40.15	38.49	74	54	-33.85	-15.51

Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
2442(F)	V	93.48	83.62	114	94	-20.52	-10.38
4884	V	55.82	47.26	74	54	-18.18	-6.74
7326	V	54.15	43.62	74	54	-19.85	-10.38
9768	V	53.27	40.25	74	54	-20.73	-13.75
12210	V	51.09	38.15	74	54	-22.91	-15.85
14652	V	48.69	37.42	74	54	-25.31	-16.58
17094	V	44.58	35.06	74	54	-29.42	-18.94
2442(F)	H	92.14	82.47	114	94	-21.86	-11.53
4884	H	56.92	46.25	74	54	-17.08	-7.75
7326	H	54.08	44.18	74	54	-19.92	-9.82
9768	H	52.15	43.62	74	54	-21.85	-10.38
12210	H	50.29	40.28	74	54	-23.71	-13.72
14652	H	48.27	38.26	74	54	-25.73	-15.74
17094	H	42.69	37.49	74	54	-31.31	-16.51



Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
2481(F)	V	91.28	80.47	114	94	-22.72	-13.53
4962	V	56.72	46.26	74	54	-17.28	-7.74
7443	V	54.05	41.27	74	54	-19.95	-12.73
9924	V	53.81	40.08	74	54	-20.19	-13.92
12405	V	52.05	37.26	74	54	-21.95	-16.74
14886	V	50.48	35.04	74	54	-23.52	-18.96
17367	V	48.24	33.28	74	54	-25.76	-20.72
2481(F)	H	90.68	81.57	114	94	-23.32	-12.43
4962	H	55.35	47.82	74	54	-18.65	-6.18
7443	H	54.04	44.16	74	54	-19.96	-9.84
9924	H	52.16	42.06	74	54	-21.84	-11.94
12405	H	50.24	40.68	74	54	-23.76	-13.32
14886	H	48.62	38.72	74	54	-25.38	-15.28
17367	H	43.92	36.29	74	54	-30.08	-17.71

Test Frequency 18GHz-25GHz

The measurements were more than 20dB below the limit and not reported.

8 BAND EDGE EMISSION

8.1 TEST PROCEDURE

The EUT was placed on a styrofoam table which is 1.5m above ground plane.

The measurement procedure at the band edges was simplified by performing the measurement in just one plot. Both, the in-band-emission and the unwanted emission were be encompassed by the span. After trace stabilization, the maximum peak was be determined by a peak detector and the value was marked by an appropriate limit line. The second limit line, which is 20dB below the first, marks the limit for the emissions in the unrestricted band. A maximum-peak-detector marks the highest emission in the unrestricted band next to the band edge.

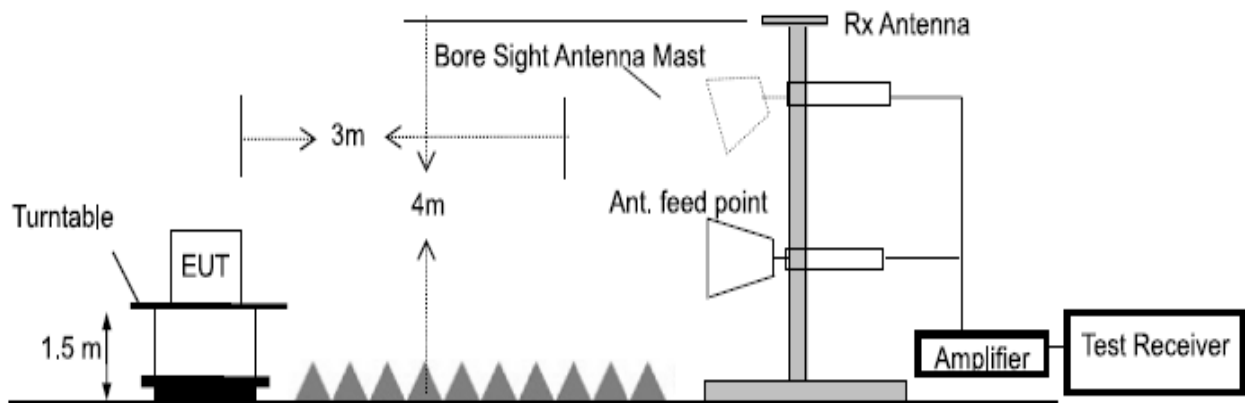
The measurements were performed at the lower end of the 2.4GHz band.

Use the following spectrum analyzer settings:

When spectrum scanned above 1GHz setting resolution bandwidth 1MHz, video bandwidth 3MHz:

EMI Test Receiver	Setting
Attenuation	Auto
RBW	1MHz
VBW	3MHz
Detector	Peak
Trace	Max hold

8.2 TEST SETUP

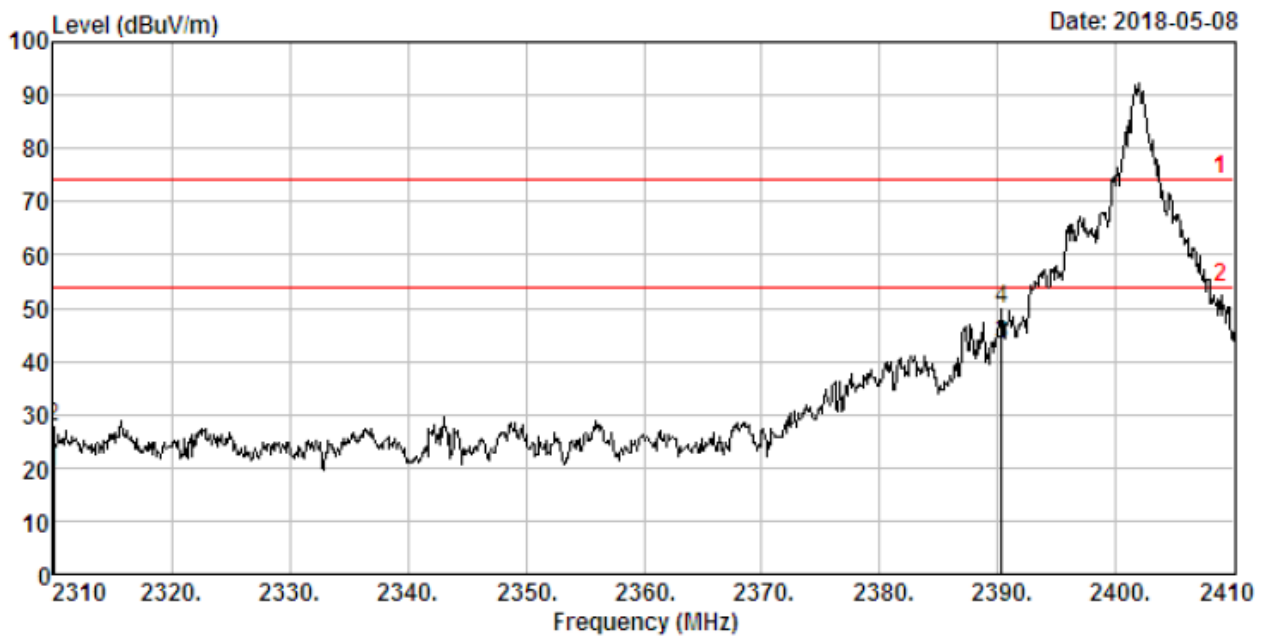




8.3 TEST RESULTS

Operation Mode:	GFSK (CH01: 2402MHz)	Test Date :	May 08, 2018
Test Result:	PASS	Test By:	Leo Yang

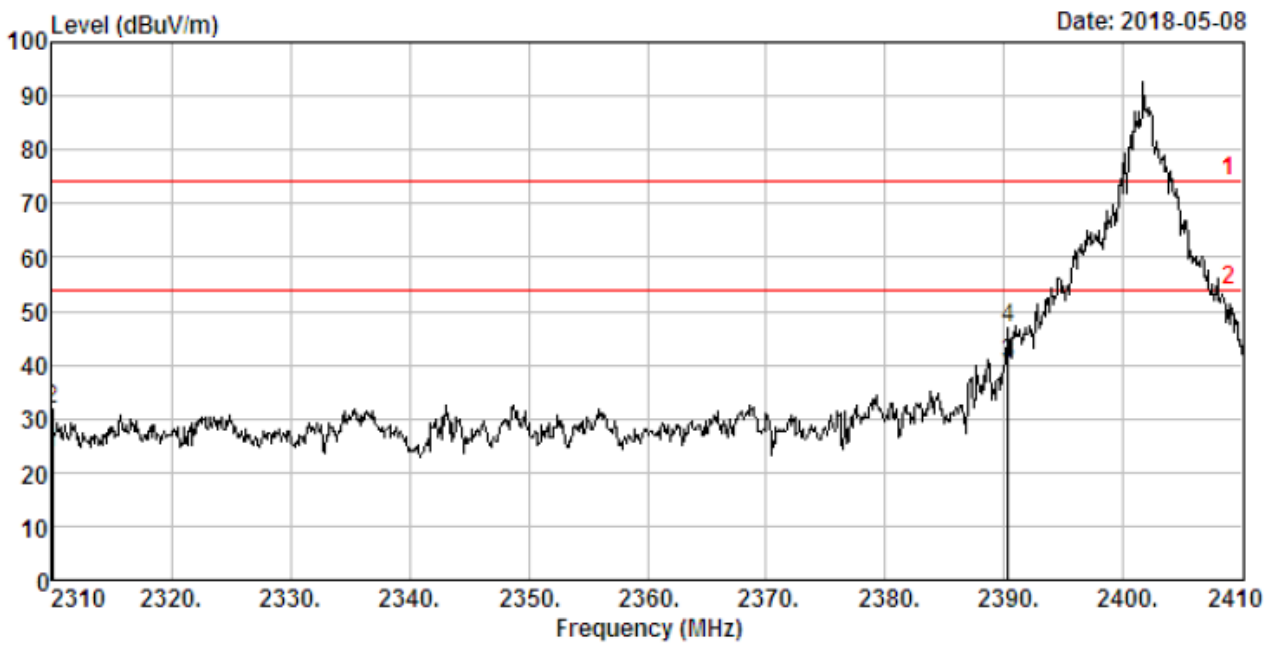
Horizontal



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBUV	Preamp Factor dB	Emission Level dBUV/m	Limit dBUV/m	Over Limit dB	Remark
1.	2310.000	2.71	27.40	16.97	28.00	19.08	54.00	-34.92	Average
2.	2310.000	2.71	27.40	25.55	28.00	27.66	74.00	-46.34	Peak
3.	2390.300	2.77	27.66	40.77	28.00	43.20	54.00	-10.80	Average
4.	2390.300	2.77	27.66	47.47	28.00	49.90	74.00	-24.10	Peak



Vertical

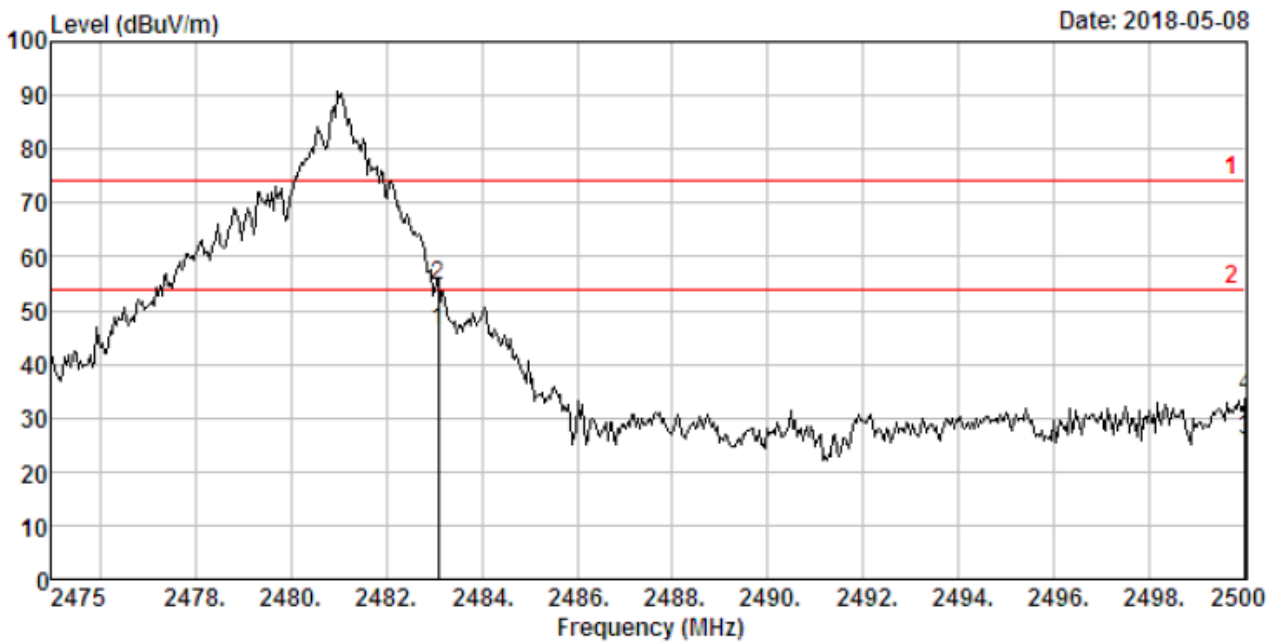


No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark
1.	2310.000	2.71	27.40	21.59	28.00	23.70	54.00	-30.30	Average
2.	2310.000	2.71	27.40	29.55	28.00	31.66	74.00	-42.34	Peak
3.	2390.300	2.77	27.66	37.77	28.00	40.20	54.00	-13.80	Average
4.	2390.300	2.77	27.66	44.47	28.00	46.90	74.00	-27.10	Peak



Operation Mode:	GFSK (CH81: 2481MHz)	Test Date :	May 08, 2018
Test Result:	PASS	Test By:	Leo Yang

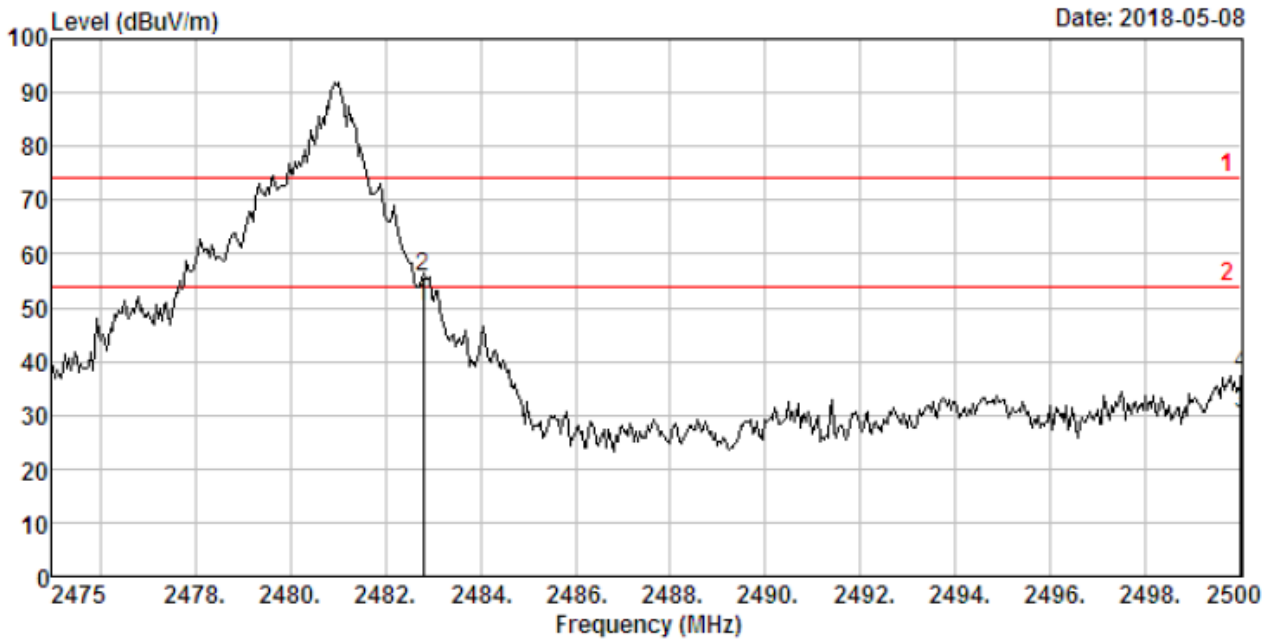
Horizontal



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBUV	Preamp Factor dB	Emission Level dBUV/m	Limit dBUV/m	Over Limit dB	Remark
1.	2483.101	2.84	27.95	43.41	28.00	46.20	54.00	-7.80	Average
2.	2483.101	2.84	27.95	52.00	28.00	54.79	74.00	-19.21	Peak
3.	2500.000	2.86	28.00	22.99	28.00	25.85	54.00	-28.15	Average
4.	2500.000	2.86	28.00	30.94	28.00	33.80	74.00	-40.20	Peak



Vertical



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBUV	Preamp Factor dB	Emission Level dBUV/m	Limit dBUV/m	Over Limit dB	Remark
1.	2482.800	2.84	27.95	47.28	28.00	50.07	54.00	-3.93	Average
2.	2482.800	2.84	27.95	52.84	28.00	55.63	74.00	-18.37	Peak
3.	2500.000	2.86	28.00	27.42	28.00	30.28	54.00	-23.72	Average
4.	2500.000	2.86	28.00	34.94	28.00	37.80	74.00	-36.20	Peak



9 20 dB Bandwidth Measurement

Test Method : ANSI C63.10: 2013

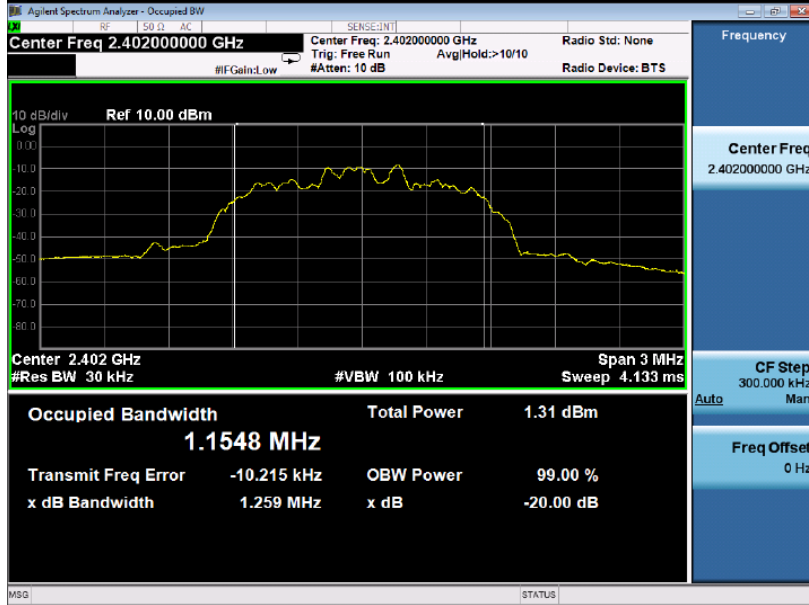
9.1 Test Procedure

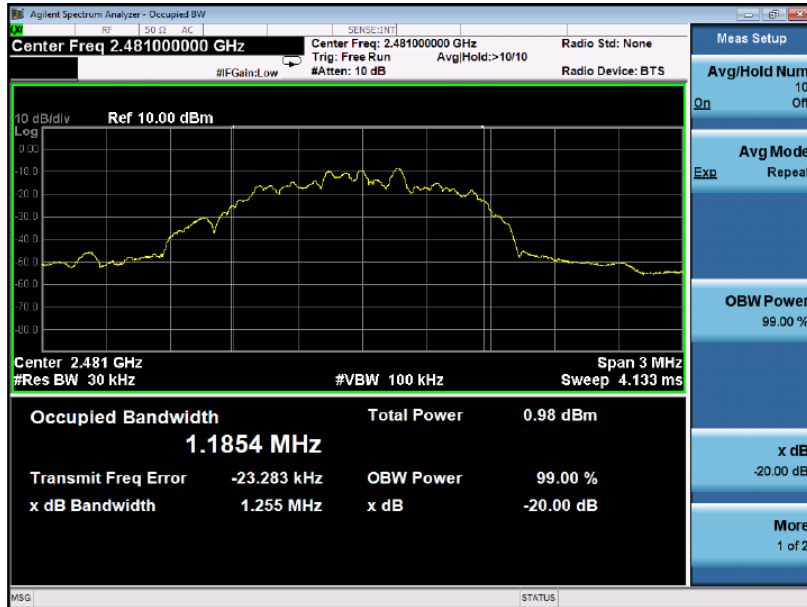
1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator.
2. Set the EUT work on the top, the middle and the bottom operation frequency individually.
3. Set Span= approximately 2 to 5 times the 20dB bandwidth, centered on a hopping channel

The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth(VBW) shall be approximately three times RBW; Sweep = auto; Detector function= peak

9.2 Test Result

Channel number	Channel frequency (MHz)	20dB Down BW(KHz)
01	2402	1259
41	2442	1252
81	2481	1255







10 Antenna Requirement

10.1 Antenna Requirement

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

10.2 Result

The EUT'S antenna, permanent attached antenna, is internal antenna. The antenna's gain is -90dBi and meets the requirement.



11 TEST PHOTOS

Conducted Emissions

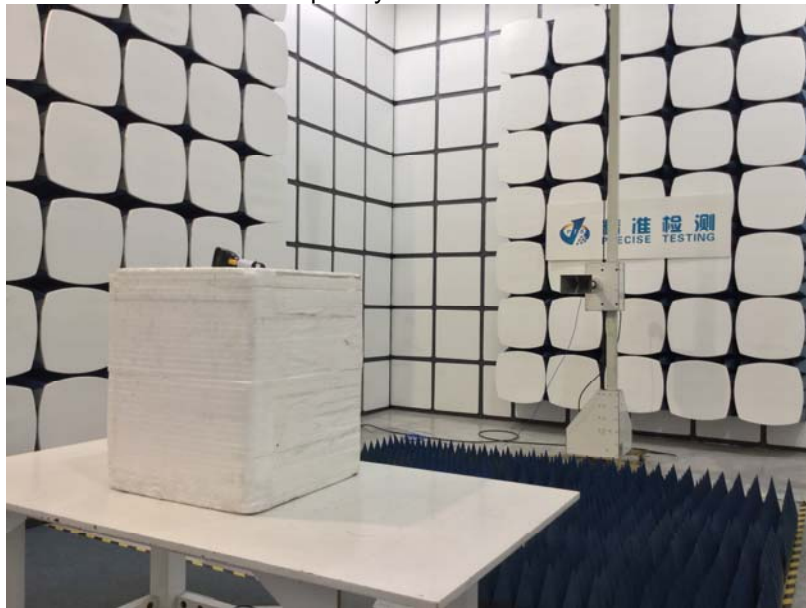


Radiated Spurious Emissions
From 30MHz-1000MHz

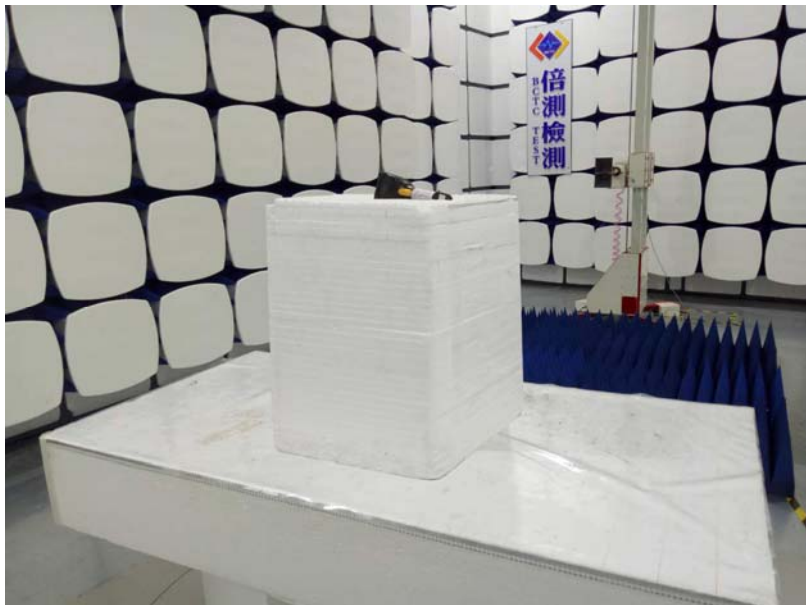




Test frequency from 1GHz-18GHz



Test frequency from 18GHz-25GHz



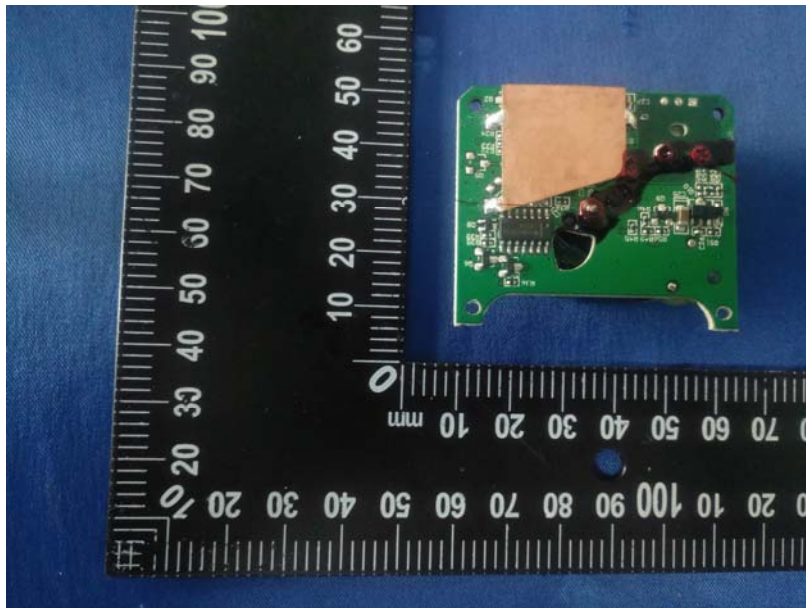


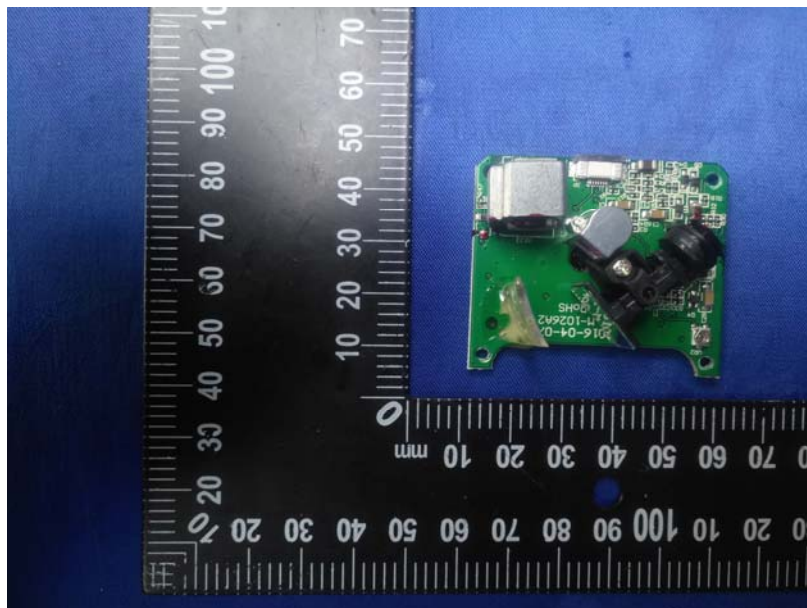
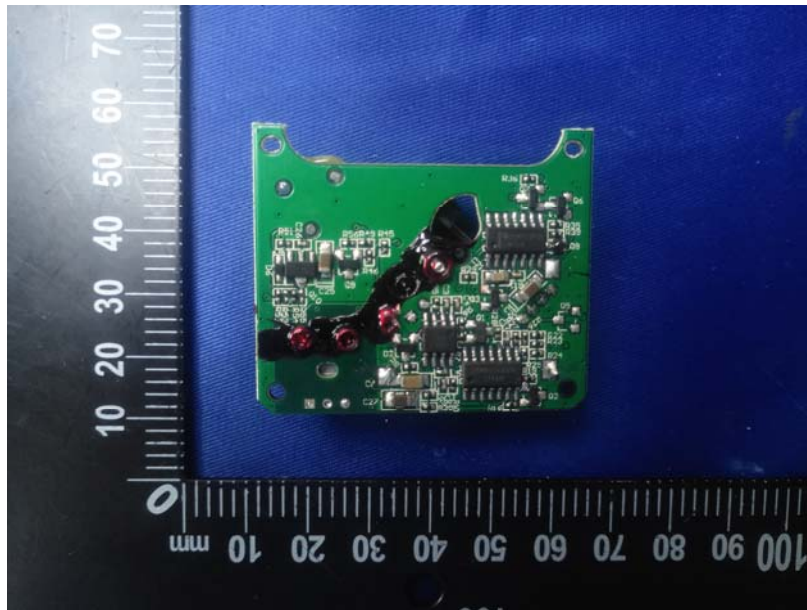
12 EUT PHOTOS

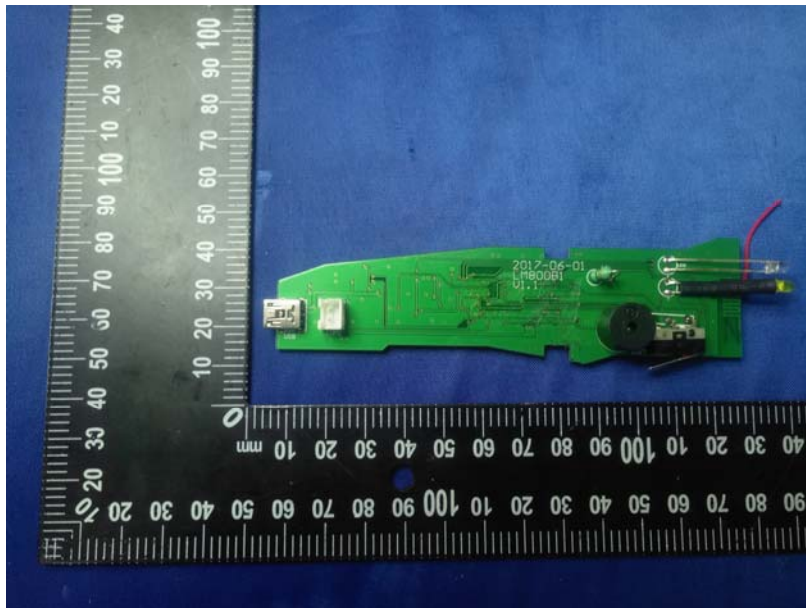
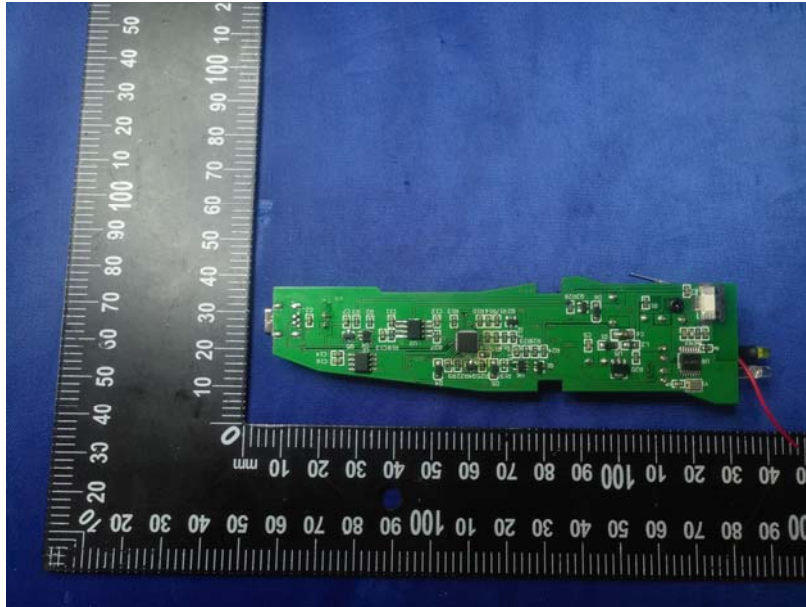


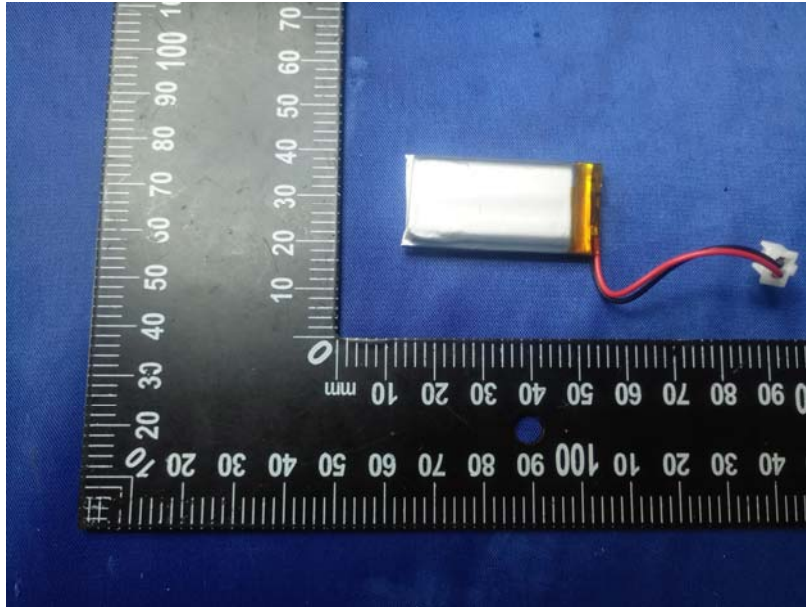












*****THE END REPORT*****