FCC RADIO TEST REPORT

FCC ID:2AWRS-Y22

Product：	Wireless Mouse
Trade Name：	N/A
Model Name：	Y22
Serial Model：	Y11,Y11B,Y12,Y12B,Y13,Y13B,Y21,Y21B,Y22B, Y23,Y23B,Y31,Y31B,Y32,Y32B,Y33,Y33B,Y41, Y41B,Y42,Y42B,Y43,Y43B,GF-F7,GF-F7B, GM-F8,GF-F8B,GF-F9,GF-F9B
Report No.：	UNIA20061802ER

Prepared for

Dongguan yooey technology co.,ltd.

No.3 longyuan street,xiagan second industrial park,Chang`an Guangdong,PRC

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 RESULTCERTIFICATION

Applicant's name.....:	Dongguan yooey technology co.,ltd.
Address .....:	No.3 longyuan street,xiagan second industrial park,Chang'an Guangdong,PRC
Manufacture's Name .....:	Dongguan yooey technology co.,ltd.
Address .....:	No.3 longyuan street,xiagan second industrial park,Chang'an Guangdong,PRC
Product description	
Product name.....:	Wireless Mouse
Trade Mark.....:	N/A
Model and/or type reference .:	Y22,Y11,Y11B,Y12,Y12B,Y13,Y13B,Y21,Y21B,Y22B,Y23,Y23B, Y31,Y31B,Y32,Y32B,Y33,Y33B,Y41,Y41B,Y42,Y42B,Y43,Y43B, GF-F7,GF-F7B,GM-F8,GF-F8B,GF-F9,GF-F9B
Standards.....:	FCC Rules and Regulations Part 15 Subpart C Section 15.249, ANSI C63.10: 2013

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.....:	
Date (s) of performance of tests.....:	Jun. 06, 2020 ~ Jun. 22, 2020
Date of Issue.....:	Jun. 22, 2020
Test Result.....:	Pass

Prepared by: Bob liao/Editor

Reviewer: Kahn yang/Supervisor

Approved & Authorized Signer: Liuze/Manager

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11. TEST SUMMARY

1.1TEST PROCEDURES AND RESULTS

DESCRIPTION OF TEST	RESULT	STANGARD
CONDUCTED EMISSIONS TEST	N/A	FCC Part 15.207
RADIATED EMISSION TEST	COMPLIANT	FCC Part15.209/15.249
BAND EDGE	COMPLIANT	FCC Part15.249(d)
OCCUPIED BANDWIDTH MEASUREMENT	COMPLIANT	FCC Part15.215
ANTENNA REQUIREMENT	COMPLIANT	FCC Part15.203

1.2 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. This approval result is accepted by MRA of APLAC.

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

A2LA Certificate Number: 4747.01

The EMC Laboratory has been accredited by A2LA, and in compliance with ISO/IEC 17025:2017 General Requirements for testing Laboratories.

FCC Registration Number: 674885

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission.

IC Registration Number: 21947

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada.

1.3 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

22. GENERAL INFORMATION

2.12.1GENERAL DESCRIPTION OF EUT

Equipment	Wireless Mouse
Trade Mark	N/A
Model Name	Y22
Serial No.	Y11,Y11B,Y12,Y12B,Y13,Y13B,Y21,Y21B,Y22B,Y23, Y23B,Y31,Y31B,Y32,Y32B,Y33,Y33B,Y41,Y41B,Y42, Y42B,Y43,Y43B,GF-F7,GF-F7B,GM-F8,GF-F8B, GF-F9,GF-F9B
Model Difference	All Model are identical except model name.
FCC ID	
Antenna Type	PCB Antenna
Antenna Gain	1dBi
Frequency Range	2402~2480MHz
Number of Channels	BT BLE:40CH 2.4G: 79CH
Modulation Type	BT: GFSK 2.4G: GFSK
Battery	DC 3V by 2*1.5V AAA battery
PowerSource	DC 5V by Adapter AC 100V/60Hz DC 3V by 2*1.5V AAA battery

2.22.2 Carrier Frequency of Channels

2.4G Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

BT4.2 BLE Channel List							
Channel	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**
01	2402	11	2422	21	2442	31	2462
02	2404	12	2424	22	2444	32	2464
03	2406	13	2426	23	2446	33	2466
04	2408	14	2428	24	2448	34	2468
05	2410	15	2430	25	2450	35	2470
06	2412	16	2432	26	2452	36	2472
07	2414	17	2434	27	2454	37	2474
08	2416	18	2436	28	2456	38	2476
09	2418	19	2438	29	2458	39	2478
10	2420	20	2440	30	2460	40	2480

2.32.3 Operation of EUT during testing

Operating Mode
The mode is used: Transmitting mode
Low Channel: 2402MHz
Middle Channel: 2440MHz
High Channel: 2480MHz

2.4 2.4DESCRIPTION OF TEST SETUP

Operation of EUT during Conducted testing:

Operation of EUT duringRadiation testing:

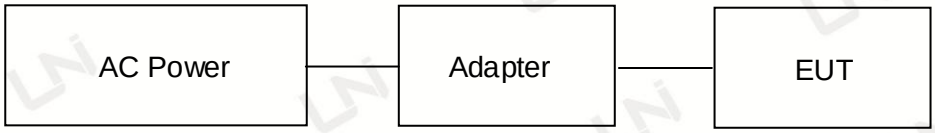


Table forauxiliary equipment:

Equipment Description	Manufacturer	Model	Calibration Due Date
N/A	N/A	N/A	N/A

2.5 2.5MEASUREMENT INSTRUMENTS LIST

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
CONDUCTED EMISSIONS TEST					
1	AMN	Schwarzbeck	NNLK8121	8121370	2020.09.06
2	AMN	ETS	3810/2	00020199	2020.09.06
3	EMI TEST RECEIVER	Rohde&Schwarz	ESCI	101210	2020.09.06
4	AAN	TESEQ	T8-Cat6	38888	2020.09.06
RADIATED EMISSION TEST					
1	Horn Antenna	Sunol	DRH-118	A101415	2020.09.06
2	BicoNILog Antenna	Sunol	JB1 Antenna	A090215	2020.09.06
3	PREAMP	HP	8449B	3008A00160	2020.09.06
4	PREAMP	HP	8447D	2944A07999	2020.09.06
5	EMI TEST RECEIVER	Rohde&Schwarz	ESR3	101891	2020.09.06
6	VECTOR Signal Generator	Rohde&Schwarz	SMU200A	101521	2020.09.06
7	Signal Generator	Agilent	E4421B	MY4335105	2020.09.06
8	MXA Signal Analyzer	Agilent	N9020A	MY50510140	2020.09.06
9	MXA Signal Analyzer	Agilent	N9020A	MY51110104	2020.09.06
10	ANT Tower&Turn table Controller	Champro	EM 1000	60764	2020.09.06
11	Anechoic Chamber	Taihe Maorui	9m*6m*6m	966A0001	2020.09.06
12	Shielding Room	Taihe Maorui	6.4m*4m*3m	643A0001	2020.09.06
13	RF Power sensor	DARE	RPR3006W	15I00041SNO88	2021.3.14
14	RF Power sensor	DARE	RPR3006W	15I00041SNO89	2021.3.14
15	RF power divider	Anritsu	K241B	992289	2020.09.06
16	Wideband radio communication tester	Rohde&Schwarz	CMW500	154987	2020.09.06
17	Biconical antenna	Schwarzbeck	VHA 9103	91032360	2020.09.06
18	Biconical antenna	Schwarzbeck	VHA 9103	91032361	2020.09.06
19	Broadband Hybrid Antennas	Schwarzbeck	VULB9163	VULB9163#958	2020.09.06
20	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1680	2020.09.06
21	Active Receive Loop Antenna	Schwarzbeck	FMZB 1919B	00023	2020.09.06
22	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170651	2021.03.14
23	Microwave Broadband Preamplifier	Schwarzbeck	BBV 9721	100472	2020.09.06
24	Active Loop Antenna	Com-Power	AL-130R	10160009	2021.05.10
25	Power Meter	KEYSIGHT	N1911A	MY50520168	2021.05.10
26	Frequency Meter	VICTOR	VC2000	997406086	2021.05.10
27	DC Power Source	HYELEC	HY5020E	055161818	2021.05.10

33. CONDUCTED EMISSIONS TEST

3.1 Conducted Power Line Emission Limit

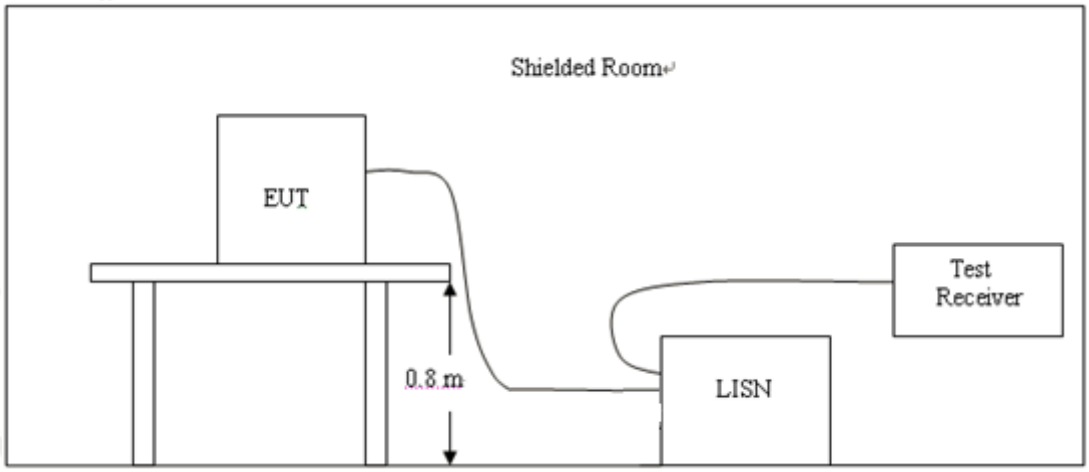
For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following

Frequency (MHz)	Maximum RF Line Voltage(dBμV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15~0.50	79	66	66~56*	56~46*
0.50~5.00	73	60	56	46
5.00~30.0	73	60	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.

3.2 Test Setup



3.3 Test Procedure

1,The equipment was set up as per the test configuration to simulate typical actual usage per the user'smanual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed onthe ground plane as per ANSI C63.10.

2, Support equipment, if needed, was placed as per ANSI C63.10.

3, All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.

4,If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hzpower through a Line Impedance Stabilization Network (LISN) which supplied power source and wasgrounded 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 EUTusing a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has twomonitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1connected 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.

3.4 Test Result

Pass

Remark:

1. All modes were tested at AC 120V and 240V, only the worst result of AC 120V was reported.
2. All modes of Low, Middle, and High channel were tested, only the worst result of High Channel was reported as below:

N/A

4 RADIATED EMISSION TEST

4.1 Radiation Limit

For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength ofradiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the followingvalues：

Limit calculation and transfer to 3m distance as showed in the following table:

Frequency (MHz)	Limit (dBuV/m)	Distance (m)
0.009-0.490	20log(2400/F(KHz))+40log(300/3)	3
0.490-1.705	20log(24000/F(KHz))+40log(30/3)	3
1.705-30.0	69.5	3
30-88	40.0	3
88-216	43.5	3
216-960	46.0	3
Above 960	54.0	3

For intentional device, according to § 15.209(a), the general requirement of field strength of radiatedemissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

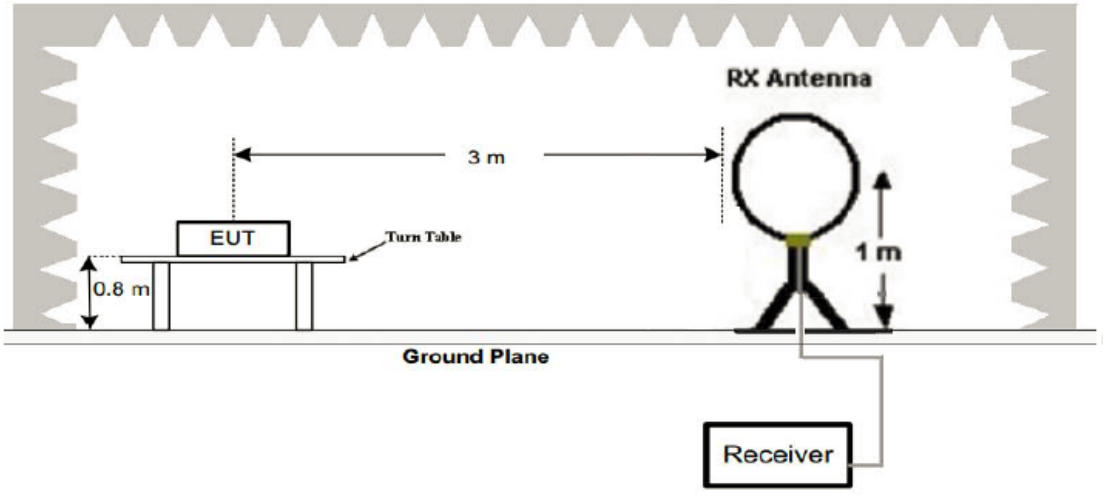
(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

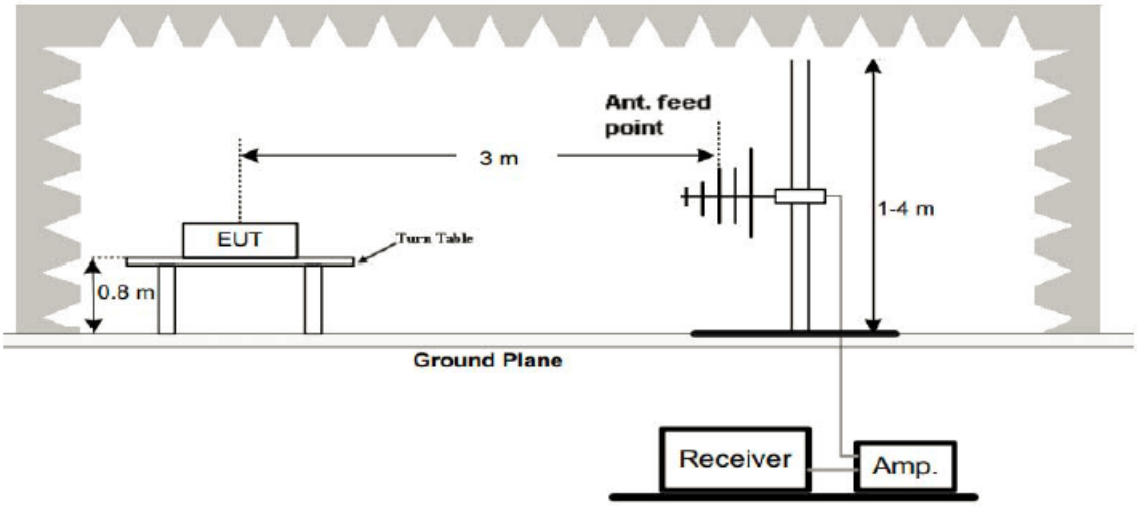
For intentionally used equipment, the general requirements for the magnetic field strength limits of the fundamental and harmonic radiation from the intentional radiator at a distance of 3 meters shall not exceed the above table, as specified in § 15.249(a).

4.2 Test Setup

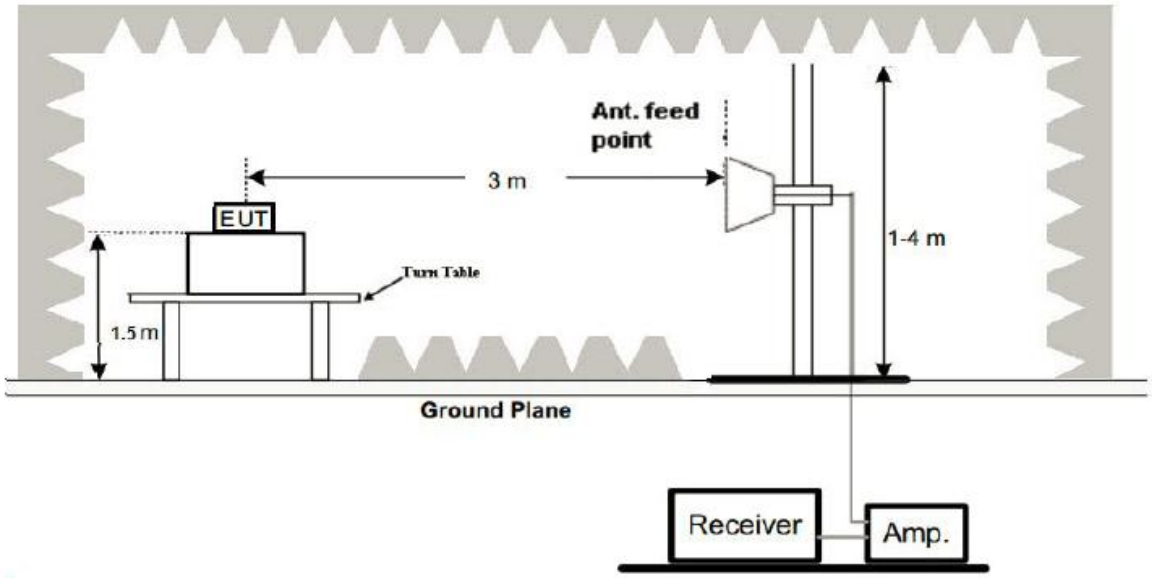
1. Radiated Emission Test-Up Frequency Below 30MHz



2. Radiated Emission Test-Up Frequency 30MHz~1GHz



3. Radiated Emission Test-Up Frequency Above 1GHz



4.3 Test Procedure

1. Below 1GHz measurement the EUT is placed on turntable which is 0.8m above ground plane. And above 1GHz measurement EUT was placed on low permittivity and low tangent turn table which is 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highestemissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna bothhorizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The test frequency range from 9KHz to25GHz per FCC PART 15.33(a).

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

4.4 Test Result

PASS

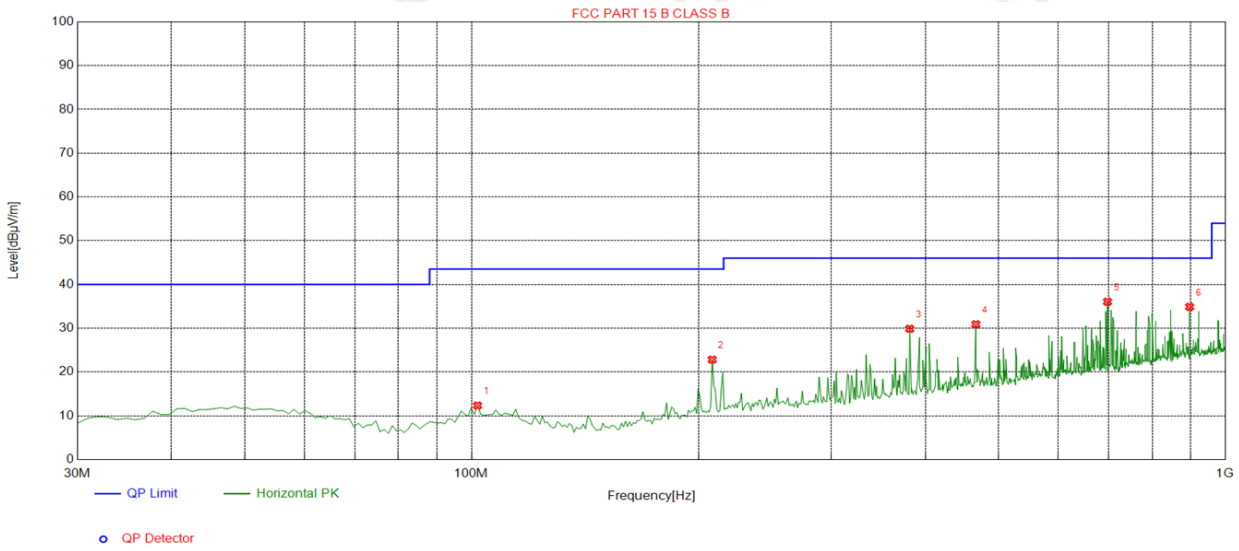
Remark:

1. All the test modes completed for test. The worst case of Radiated Emissionis High 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.

2.4G

Below 1GHz Test Results:

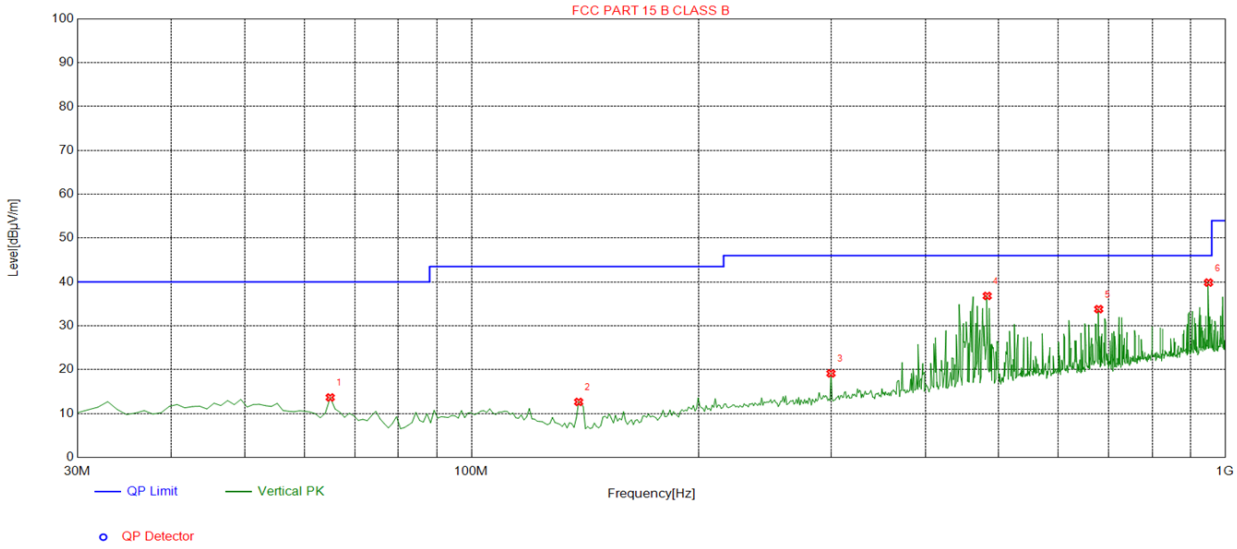
Temperature:	24℃	Relative Humidity:	45%
Test Date:	Jun. 19, 2020	Pressure:	1010hPa
Test Voltage:	AC 120V, 60Hz	Polarization:	Horizontal
Test Mode:	Transmitting mode of GFSK2480MHz		



Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	101.8519	-15.41	27.73	12.32	43.50	31.18	100	51	Horizontal
2	208.6587	-14.83	37.64	22.81	43.50	20.69	100	232	Horizontal
3	381.4915	-10.80	40.67	29.87	46.00	16.13	100	347	Horizontal
4	466.9369	-8.44	39.33	30.89	46.00	15.11	100	232	Horizontal
5	698.0280	-5.09	41.14	36.05	46.00	9.95	100	258	Horizontal
6	897.0771	-1.81	36.70	34.89	46.00	11.11	100	245	Horizontal

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

Temperature:	24℃	Relative Humidity:	45%
Test Date:	Jun. 19, 2020	Pressure:	1010hPa
Test Voltage:	AC 120V, 60Hz	Polarization:	Vertical
Test Mode:	Transmitting mode of GFSK2480MHz		

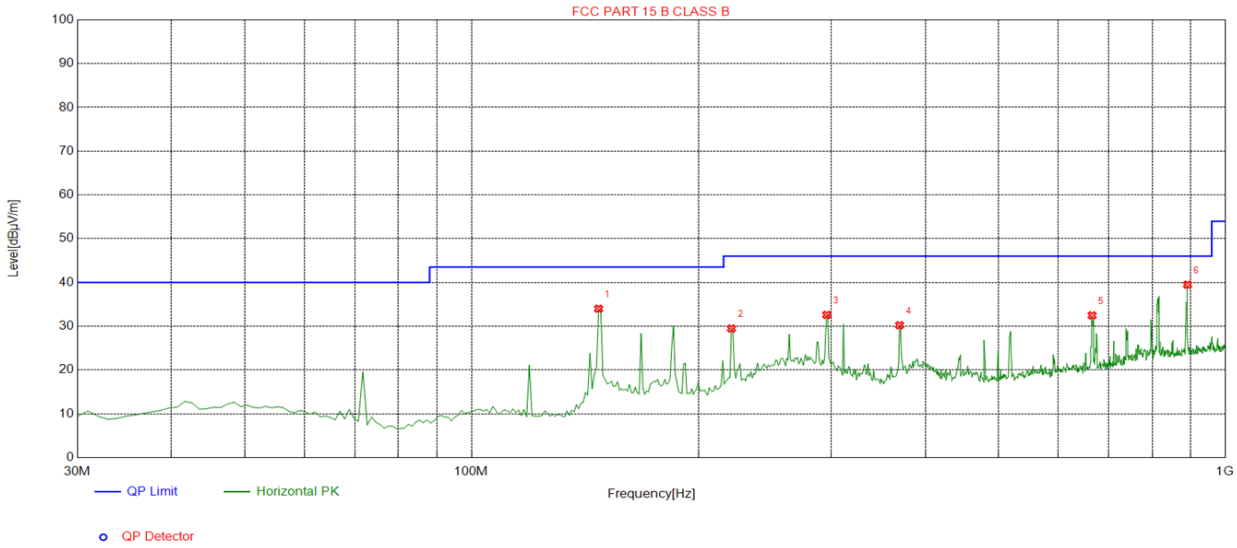


Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	64.9550	-16.40	30.05	13.65	40.00	26.35	100	338	Vertical
2	138.7487	-19.10	31.73	12.63	43.50	30.87	100	261	Vertical
3	299.9299	-12.74	31.88	19.14	46.00	26.86	100	348	Vertical
4	483.4434	-8.48	45.29	36.81	46.00	9.19	100	8	Vertical
5	679.5796	-4.87	38.67	33.80	46.00	12.20	100	18	Vertical
6	950.4805	-1.24	41.10	39.86	46.00	6.14	100	121	Vertical

BT BLE

Below 1GHz Test Results:

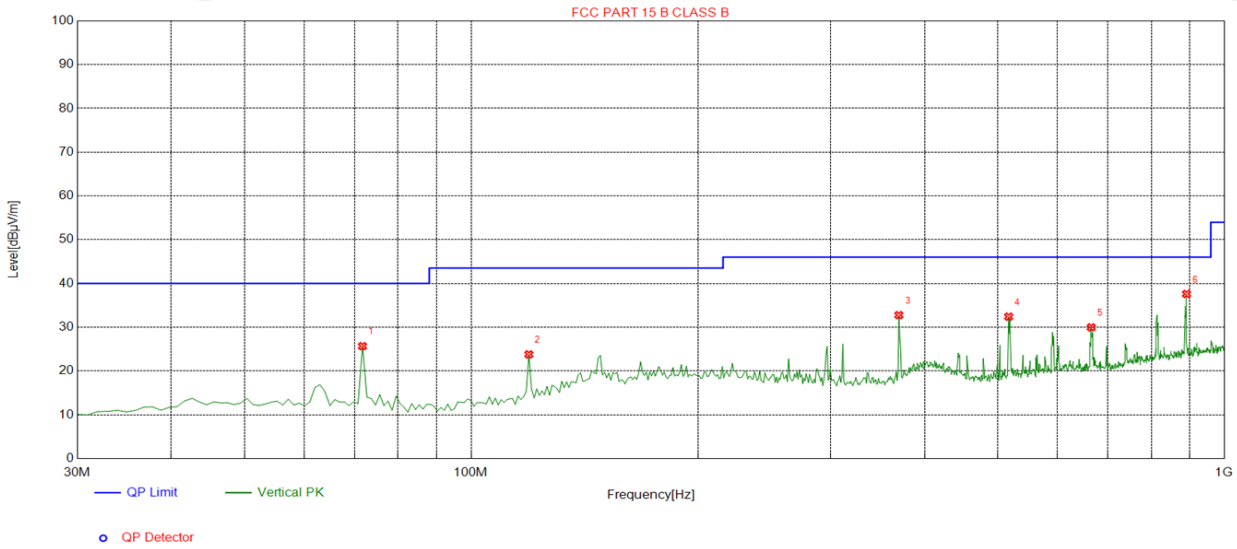
Temperature:	24℃	Relative Humidity:	45%
Test Date:	Jun. 19, 2020	Pressure:	1010hPa
Test Voltage:	AC 120V, 60Hz	Polarization:	Horizontal
Test Mode:	Transmitting mode of GFSK2480MHz		



Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	147.4875	-19.00	53.00	34.00	43.50	9.50	100	335	Horizontal
2	221.2813	-14.53	44.00	29.47	46.00	16.53	100	124	Horizontal
3	296.0460	-12.78	45.37	32.59	46.00	13.41	100	12	Horizontal
4	369.8398	-11.01	41.23	30.22	46.00	15.78	100	300	Horizontal
5	665.9860	-4.81	37.29	32.48	46.00	13.52	100	102	Horizontal
6	891.2513	-1.87	41.36	39.49	46.00	6.51	100	261	Horizontal

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

Temperature:	24℃	Relative Humidity:	45%
Test Date:	Jun. 19, 2020	Pressure:	1010hPa
Test Voltage:	AC 120V, 60Hz	Polarization:	Vertical
Test Mode:	Transmitting mode of GFSK2480MHz		



Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	71.7518	-17.99	43.66	25.67	40.00	14.33	100	265	Vertical
2	119.3293	-16.99	40.78	23.79	43.50	19.71	100	348	Vertical
3	369.8398	-11.01	43.77	32.76	46.00	13.24	100	348	Vertical
4	517.4274	-7.80	40.21	32.41	46.00	13.59	100	220	Vertical
5	665.9860	-4.81	34.78	29.97	46.00	16.03	100	73	Vertical
6	891.2513	-1.87	39.47	37.60	46.00	8.40	100	44	Vertical

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 30MHzwas 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.

Above 1 GHz Test Results: **2.4G**
CH Low (2402MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2402	104.26	-5.84	98.42	114	-15.58	PK
2402	83.52	-5.84	77.68	94	-16.32	AV
4804	55.37	-3.64	51.73	74	-22.27	PK
4804	45.82	-3.64	42.18	54	-11.82	AV
7206	54.73	-0.95	53.78	74	-20.22	PK
7206	45.19	-0.95	44.24	54	-9.76	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2402	103.74	-5.84	97.9	114	-16.10	PK
2402	84.03	-5.84	78.19	94	-15.81	AV
4804	54.68	-3.64	51.04	74	-22.96	PK
4804	45.19	-3.64	41.55	54	-12.45	AV
7206	55.27	-0.95	54.32	74	-19.68	PK
7206	45.71	-0.95	44.76	54	-9.24	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

Note:For fundamental frequency，RBW and VBW set to be 1.5MHz，PK detector for PK value， RMS detector for AV value

CH Middle (2440MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2440	102.49	-5.71	96.78	114	-17.22	PK
2440	83.54	-5.71	77.83	94	-16.17	AV
4880	54.73	-3.51	51.22	74	-22.78	PK
4880	45.27	-3.51	41.76	54	-12.24	AV
7320	55.08	-0.82	54.26	74	-19.74	PK
7320	45.32	-0.82	44.5	54	-9.50	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit						

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2440	102.43	-5.71	96.72	114	-17.28	PK
2440	82.57	-5.71	76.86	94	-17.14	AV
4880	54.62	-3.51	51.11	74	-22.89	PK
4880	44.79	-3.51	41.28	54	-12.72	AV
7320	55.12	-0.82	54.3	74	-19.7	PK
7320	44.96	-0.82	44.14	54	-9.86	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

Note:For fundamental frequency，RBW and VBW set to be 1.5MHz，PK detector for PK value， RMS detector for AV value

CH High (2480MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2480	102.37	-5.65	96.72	114	-17.28	PK
2480	82.61	-5.65	76.96	94	-17.04	AV
4960	54.39	-3.43	50.96	74	-23.04	PK
4960	45.74	-3.43	42.31	54	-11.69	AV
7440	54.28	-0.75	53.53	74	-20.47	PK
7440	44.94	-0.75	44.19	54	-9.81	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2480	102.35	-5.65	96.7	114	-17.3	PK
2480	82.73	-5.65	77.08	94	-16.92	AV
4960	55.14	-3.43	51.71	74	-22.29	PK
4960	45.26	-3.43	41.83	54	-12.17	AV
7440	55.41	-0.75	54.66	74	-19.34	PK
7440	45.72	-0.75	44.97	54	-9.03	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

Note:For fundamental frequency，RBW and VBW set to be 1.5MHz，PK detector for PK value， RMS detector for AV value

Above 1 GHz Test Results: BT BLE
CH Low (2402MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2402	103.33	-5.84	97.49	114	-16.51	PK
2402	83.46	-5.84	77.62	94	-16.38	AV
4804	54.72	-3.64	51.08	74	-22.92	PK
4804	45.85	-3.64	42.21	54	-11.79	AV
7206	55.35	-0.95	54.4	74	-19.6	PK
7206	45.19	-0.95	44.24	54	-9.76	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2402	102.43	-5.84	96.59	114	-17.41	PK
2402	83.29	-5.84	77.45	94	-16.55	AV
4804	55.58	-3.64	51.94	74	-22.06	PK
4804	44.32	-3.64	40.68	54	-13.32	AV
7206	54.86	-0.95	53.91	74	-20.09	PK
7206	44.97	-0.95	44.02	54	-9.98	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

Note:For fundamental frequency，RBW and VBW set to be 1.5MHz，PK detector for PK value， RMS detector for AV value

CH Middle (2440MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2440	102.48	-5.71	96.77	114	-17.23	PK
2440	82.54	-5.71	76.83	94	-17.17	AV
4880	55.39	-3.51	51.88	74	-22.12	PK
4880	45.73	-3.51	42.22	54	-11.78	AV
7320	54.12	-0.82	53.3	74	-20.7	PK
7320	45.24	-0.82	44.42	54	-9.58	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit						

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2440	102.55	-5.71	96.84	114	-17.16	PK
2440	82.69	-5.71	76.98	94	-17.02	AV
4880	54.38	-3.51	50.87	74	-23.13	PK
4880	44.92	-3.51	41.41	54	-12.59	AV
7320	54.86	-0.82	54.04	74	-19.96	PK
7320	45.09	-0.82	44.27	54	-9.73	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

Note:For fundamental frequency，RBW and VBW set to be 1.5MHz，PK detector for PK value， RMS detector for AV value

CH High (2480MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2480	102.29	-5.65	96.64	114	-17.36	PK
2480	82.14	-5.65	76.49	94	-17.51	AV
4960	54.68	-3.43	51.25	74	-22.75	PK
4960	45.12	-3.43	41.69	54	-12.31	AV
7440	54.73	-0.75	53.98	74	-20.02	PK
7440	45.67	-0.75	44.92	54	-9.08	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2480	102.39	-5.65	96.74	114	-17.26	PK
2480	82.41	-5.65	76.76	94	-17.24	AV
4960	54.36	-3.43	50.93	74	-23.07	PK
4960	44.89	-3.43	41.46	54	-12.54	AV
7440	54.88	-0.75	54.13	74	-19.87	PK
7440	45.03	-0.75	44.28	54	-9.72	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

Note:For fundamental frequency，RBW and VBW set to be 1.5MHz，PK detector for PK value， RMS detector for AV value

Remark：
(1) Measuring frequencies from 1 GHz to the 25 GHz.
(2) “F” denotes fundamental frequency; “H” denotes spurious frequency. “E” denotes band edge frequency.
(3) * 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.
(4) Data of measurement within this frequency range ,that the value more than 20dB below limit is not record in the form.
(5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.The resolution bandwidth of test receiver/spectrum analyzer is 1MHzand video bandwidth is 3MHz for peak measurement with peak detectorat frequency above 1GHz.The resolution bandwidth of test receiver/spectrum analyzer is 1MHzand video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
(6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.
(7)All modes of operation were investigated and the worst-case emissionsare reported.

5 BAND EDGE

5.1 Limits

FCC PART 15.249(d) Emissions radiated outside of the specified frequency bands, except for harmonics,shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emissionlimits in §15.209, whichever is the lesser attenuation.

5.2 Test Procedure

The band edge compliance of RF radiated emission should be measured by following the guidance in ANSIC63.10 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT issituated in three orthogonal planes (if appropriate), adjusting the measurement antenna height andpolarization etc. Set RBW to 100KHz and VBM to 300KHz to measure the peak field strength and setRBW to 1MHz and VBW to 10Hz to measure the average radiated field strength.The conducted RF band edge was measured by using a spectrum analyzer. Set span wide enough to capture the highest in-band emission and the emission at the band edge. Set RBW to 100 KHz and VBW to 300 KHz,to measure the conducted peak band edge.

5.3 Test Result

PASS

Radiated Band Edge Test: 2.4G

Operation Mode: TX CH Low (2402MHz)

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2310	54.27	-5.81	48.46	74	-25.54	PK
2310	44.92	-5.81	39.11	54	-14.89	AV
2390	54.56	-5.84	48.72	74	-25.28	PK
2390	45.13	-5.84	39.29	54	-14.71	AV
2400	55.06	-5.84	49.22	74	-24.78	PK
2400	45.69	-5.84	39.85	54	-14.15	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2310	54.62	-5.81	48.81	74	-25.19	PK
2310	44.73	-5.81	38.92	54	-15.08	AV
2390	54.89	-5.84	49.05	74	-24.95	PK
2390	45.12	-5.84	39.28	54	-14.72	AV
2400	54.97	-5.84	49.13	74	-24.87	PK
2400	45.28	-5.84	39.44	54	-14.56	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High (2480MHz)

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.5	53.64	-5.65	47.99	74	-26.01	PK
2483.5	44.92	-5.65	39.27	54	-14.73	AV
2500	54.37	-5.72	48.65	74	-25.35	PK
2500	45.16	-5.72	39.44	54	-14.56	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.5	54.13	-5.65	48.48	74	-25.52	PK
2483.5	45.72	-5.65	40.07	54	-13.93	AV
2500	54.68	-5.72	48.96	74	-25.04	PK
2500	46.97	-5.72	41.25	54	-12.75	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Radiated Band Edge Test: BT BLE

Operation Mode: TX CH Low (2402MHz)

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2310	54.39	-5.81	48.58	74	-25.42	PK
2310	45.17	-5.81	39.36	54	-14.64	AV
2390	55.24	-5.84	49.4	74	-24.6	PK
2390	45.31	-5.84	39.47	54	-14.53	AV
2400	54.69	-5.84	48.85	74	-25.15	PK
2400	45.72	-5.84	39.88	54	-14.12	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2310	55.13	-5.81	49.32	74	-24.68	PK
2310	45.76	-5.81	39.95	54	-14.05	AV
2390	54.82	-5.84	48.98	74	-25.02	PK
2390	45.93	-5.84	40.09	54	-13.91	AV
2400	55.68	-5.84	49.84	74	-24.16	PK
2400	46.05	-5.84	40.21	54	-13.79	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: TX CH High (2480MHz)

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.5	55.37	-5.65	49.72	74	-24.28	PK
2483.5	46.28	-5.65	40.63	54	-13.37	AV
2500	55.81	-5.72	50.09	74	-23.91	PK
2500	46.39	-5.72	40.67	54	-13.33	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.5	54.89	-5.65	49.24	74	-24.76	PK
2483.5	46.38	-5.65	40.73	54	-13.27	AV
2500	54.57	-5.72	48.85	74	-25.15	PK
2500	45.39	-5.72	39.67	54	-14.33	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

6 OCCUPIED BANDWIDTH MEASUREMENT

6.1 Test Setup

Same asRadiated Emission Measurement

6.2 Test Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT as normal operation.
3. Based on ANSI C63.10 section 6.9.2: RBW=30KHz. VBW=100KHz, Span=3MHz.
4. The useful radiated emission from the EUT was detected by the spectrum analyzer with peak detector.

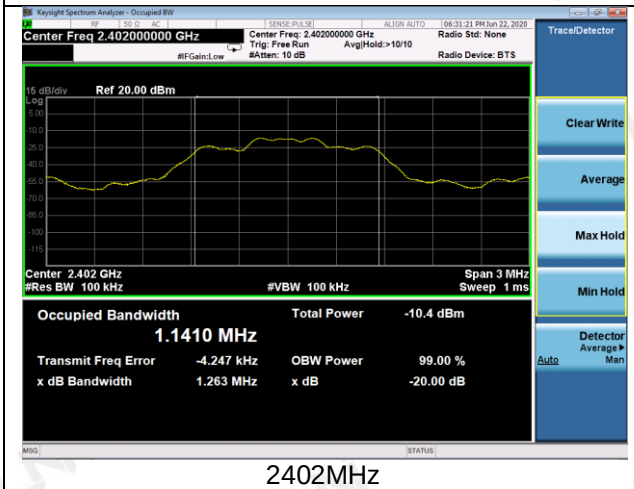
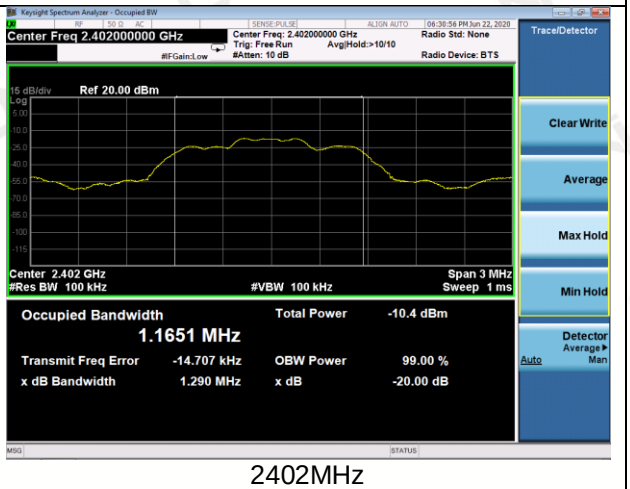
6.3 Measurement Equipment Used

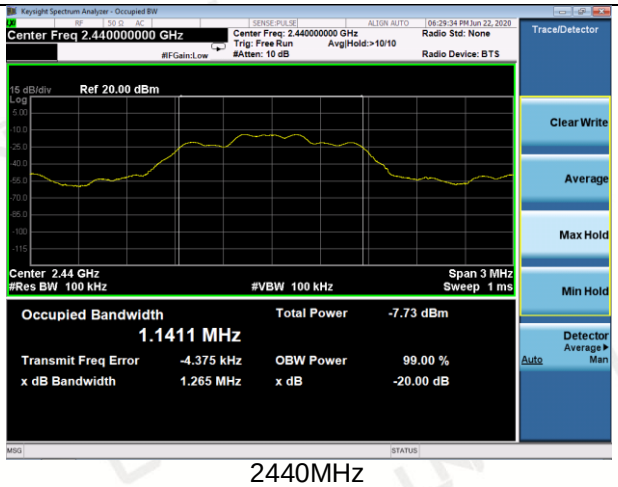
Same asRadiated Emission Measurement

6.4 Test Result

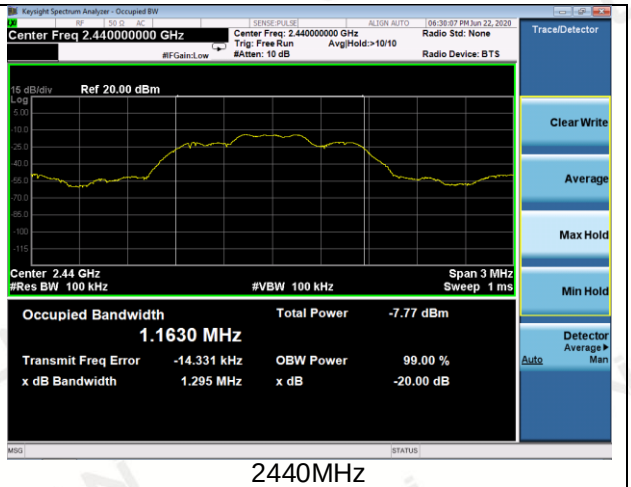
PASS

TEST MODE	Frequency (MHz)	20dB Bandwidth (MHz)	Result
BT BLE	2402	1.1410	PASS
	2440	1.1411	PASS
	2480	1.1414	PASS
2.4G	2402	1.1651	PASS
	2440	1.1630	PASS
	2480	1.1613	PASS

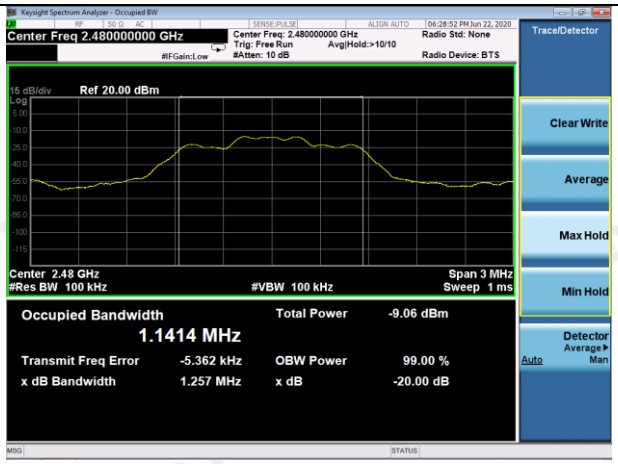
BT BLE	2.4G
	
2402MHz	2402MHz



2440MHz



2440MHz



2480MHz

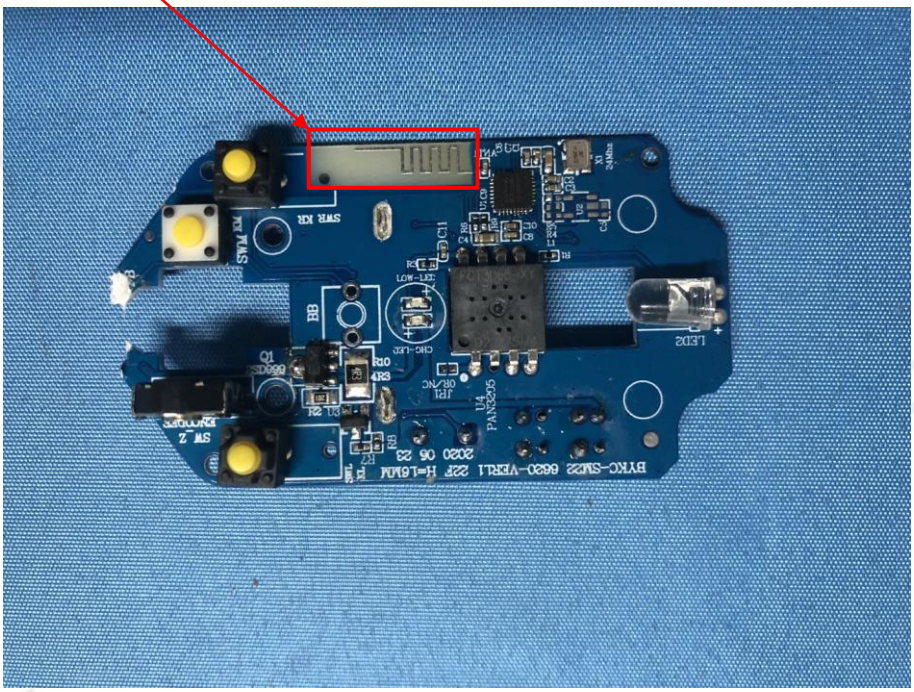
2480MHz

7 ANTENNA REQUIREMENT

Standard Applicable:
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed toensure that no antenna other than that furnished by the responsible party shall be used with the device.

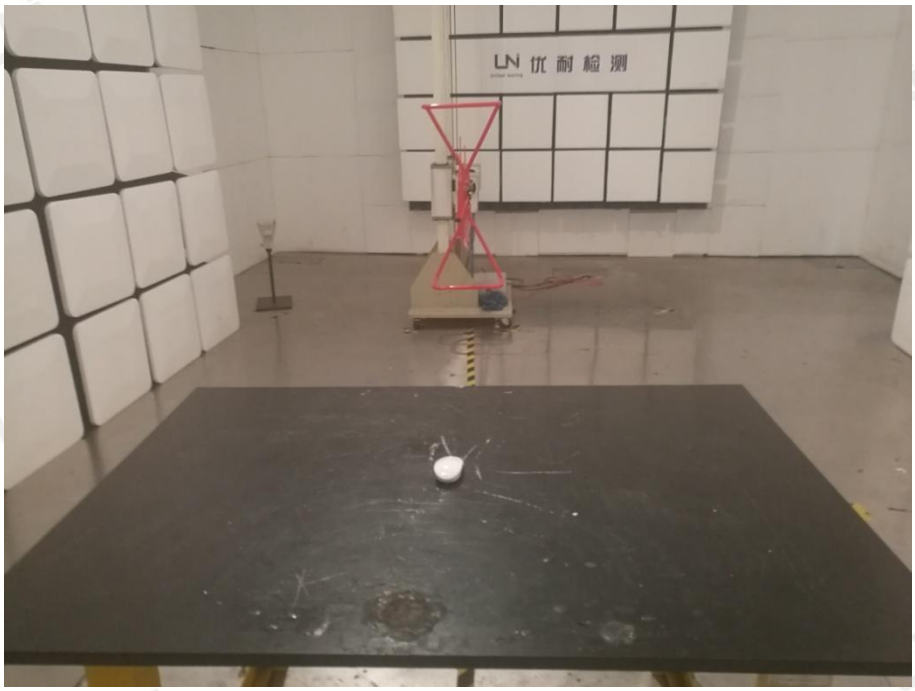
Antenna Connected Construction
The antenna used in this product is a PCB Antenna, The directional gains of antenna used for transmitting is 1dBi.

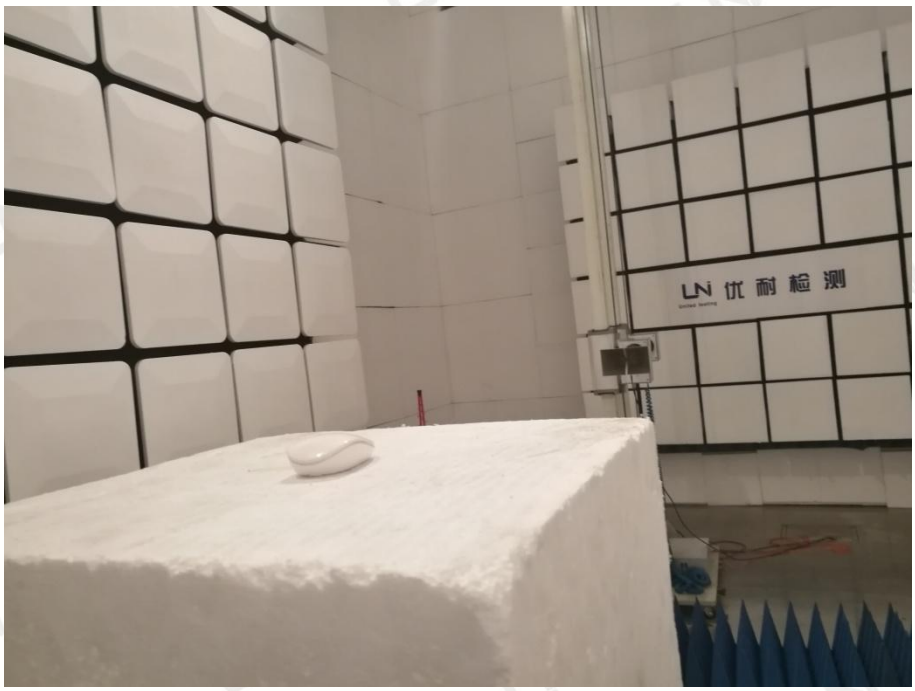
ANTENNA:



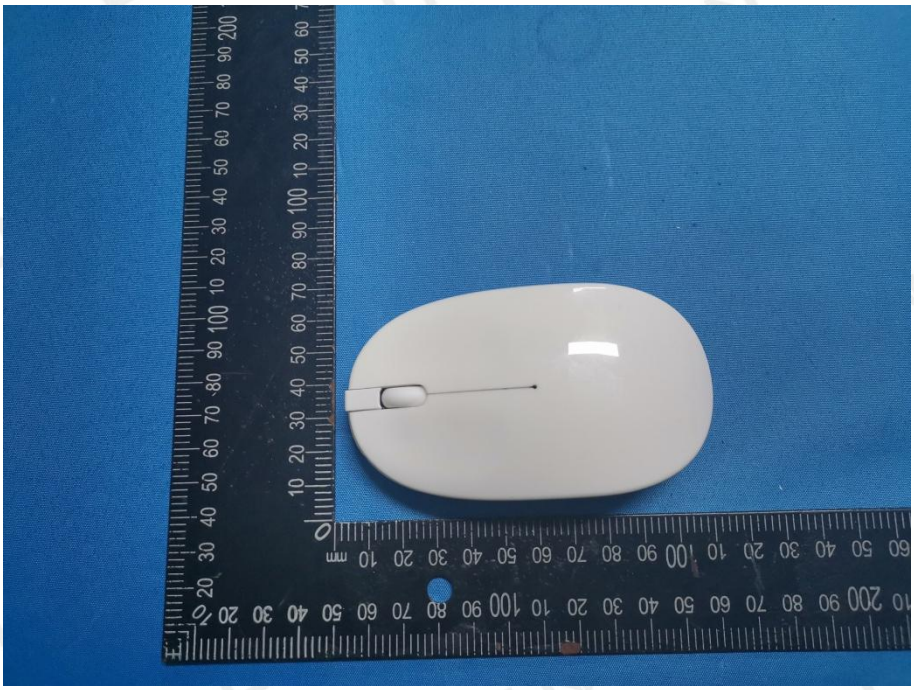
8 PHOTOGRAPH OF TEST

8.1Radiated Emission

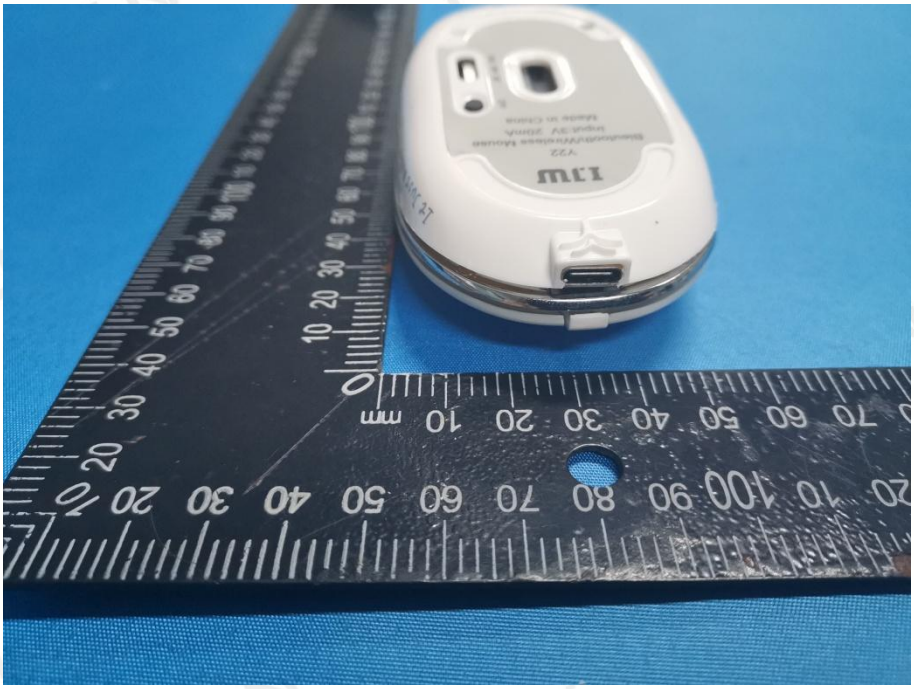


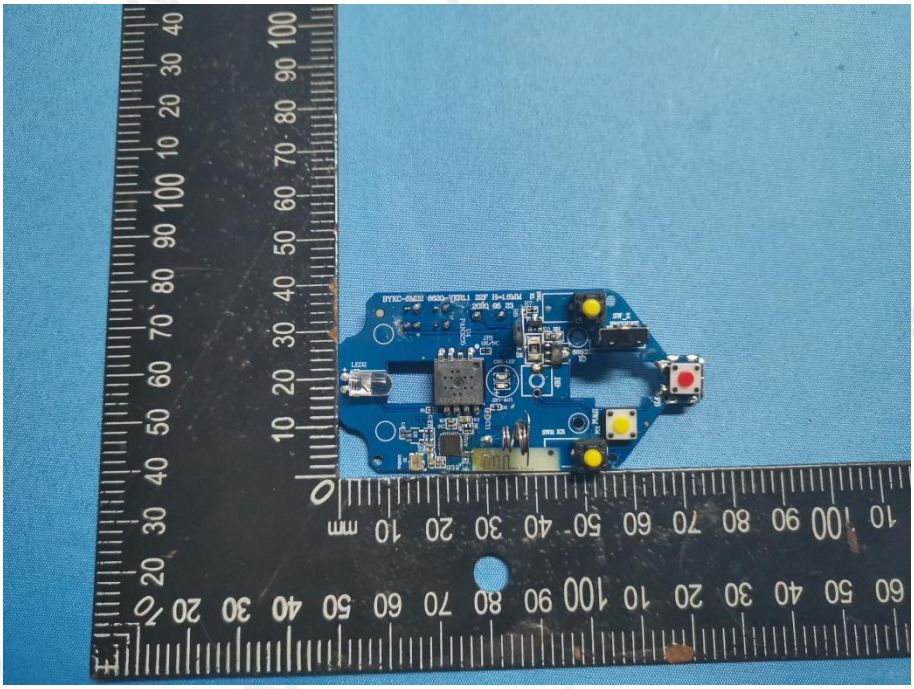


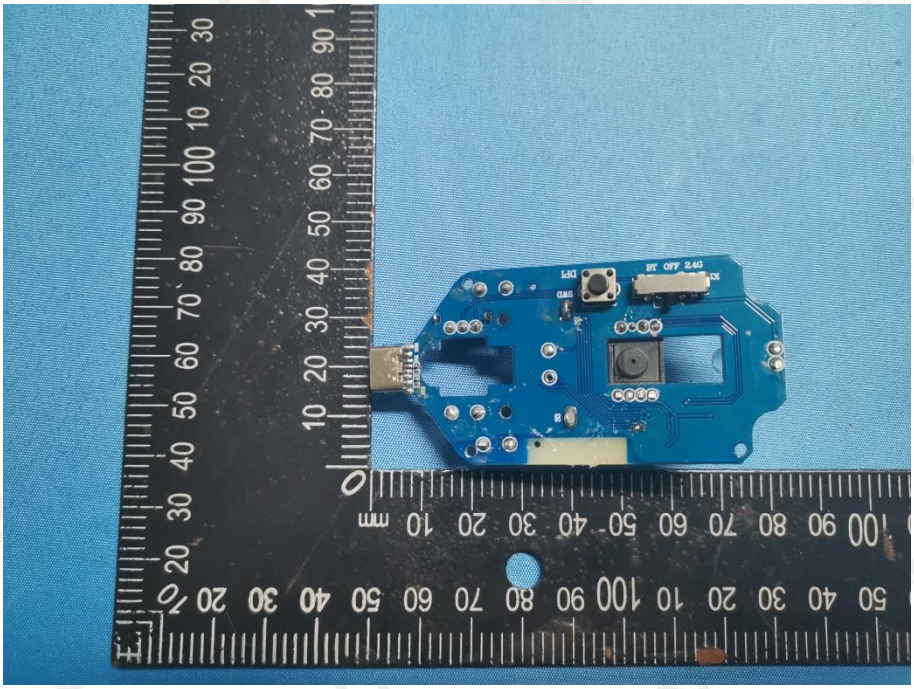
EUT




It Just Works







End of Report