APPLICATION CERTIFICATION FCC Part 15C
On Behalf of
SUN HEI (WORLDWIDE) ELECTRONIC CO., LTD.

2.4G WIRELESS MOUSE

Model No.: MPK02, SKU#386337

FCC ID: VAC-MPK02-01

Prepared for	:	SUN HEI (WORLDWIDE) ELECTRONIC CO., LTD.
Address	:	UNIT B, 15/F., WING CHEUNG IND. BLDG., 58-70, KWAI CHEONG RD., KWAI CHUNG, N.T. HONG KONG.
Prepared by	:	Shenzhen Accurate Technology Co., Ltd.
Address	:	1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China. Tel: (0755) 26503290 Fax: (0755) 26503396

Report Number	:	ATE20190119
Date of Test	:	Feb. 17, 2019-Feb. 27, 2019
Date of Report	:	Feb. 28, 2019

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Test Report Certification

Applicant	:	SUN HEI (WORLDWIDE) ELECTRONIC CO., LTD.
Address	:	UNIT B, 15/F., WING CHEUNG IND. BLDG., 58-70, KWAI CHEONG RD., KWAI CHUNG, N.T. HONG KONG.
Manufacturer	:	XIANGSHUN ELECTRONIC PRODUCTS CO., LTD.
Address	:	The Third Industry District, Xiaobian, Changan Town, Dongguan City, Guangdong, China.
Product	:	2.4G WIRELESS MOUSE
Model No.	:	MPK02, SKU#386337
Trade name	:	N/A

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.249
ANSI C63.10: 2013

The EUT was tested according to FCC 47CFR 15.249 for compliance to FCC 47CFR 15.249 requirements

The device described above is tested by SHENZHEN ACCURATE TECHNOLOGY CO. LTD to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section 15.249 limits. The measurement results are contained in this test report and Shenzhen ACCURATE TECHNOLOGY CO. LTD is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of SHENZHEN ACCURATE TECHNOLOGY CO. LTD.

Date of Test :	Feb. 17, 2019-Feb. 27, 2019
Date of Report :	Feb. 28, 2019
Prepared by :	(Tim[illegible]ng Engineer)
Approved & Authorized Signer :	(Sean Liu, Manager)

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

EUT	:	2.4G WIRELESS MOUSE
Model No.	:	MPK02, SKU#386337
Trade Name	:	N/A
Power Supply	:	DC 1.5V(Powered by battery)
Operate Frequency	:	2402-2480MHz
Number of channel	:	40
Modulation mode	:	GFSK
Antenna Gain	:	0dBi
Antenna type	:	PCB Antenna
Applicant	:	SUN HEI (WORLDWIDE) ELECTRONIC CO., LTD.
Address	:	UNIT B, 15/F., WING CHEUNG IND. BLDG., 58-70, KWAI CHEONG RD., KWAI CHUNG, N.T. HONG KONG.
Manufacturer	:	XIANGSHUN ELECTRONIC PRODUCTS CO., LTD.
Address	:	The Third Industry District, Xiaobian, Changan Town, Dongguan City, Guangdong, China
Date of sample received	:	Feb. 16, 2019
Date of Test	:	Feb. 17, 2019-Feb. 27, 2019

1.2.Special Accessory and Auxiliary Equipment

N/A

1.3.Model difference declaration

MPK02, SKU#386337 are identical in interior structure, electrical circuits and components, and the difference of model number is due to the different appearance's color of the product.

1.4.Channel frequency

1CH	2402 MHz	21CH	2442 MHz
2CH	2404 MHz	22CH	2444 MHz
3CH	2406 MHz	23CH	2446 MHz
4CH	2408 MHz	24CH	2448 MHz
5CH	2410 MHz	25CH	2450 MHz
6CH	2412 MHz	26CH	2452 MHz
7CH	2414 MHz	27CH	2454 MHz
8CH	2416 MHz	28CH	2456 MHz
9CH	2418 MHz	29CH	2458 MHz
10CH	2420 MHz	30CH	2460 MHz
11CH	2422 MHz	31CH	2462 MHz
12CH	2424 MHz	32CH	2464 MHz
13CH	2426 MHz	33CH	2466 MHz
14CH	2428 MHz	34CH	2468 MHz
15CH	2430 MHz	35CH	2470 MHz
16CH	2432 MHz	36CH	2472 MHz
17CH	2434 MHz	37CH	2474 MHz
18CH	2436 MHz	38CH	2476 MHz
19CH	2438 MHz	39CH	2478 MHz
20CH	2440 MHz	40CH	2480 MHz

1.5.Description of Test Facility

EMC Lab : Recognition of accreditation by Federal Communications Commission (FCC)
The Designation Number is CN1189
The Registration Number is 708358

Listed by Innovation, Science and Economic Development Canada (ISEDC)
The Registration Number is 5077A-2

Accredited by China National Accreditation Service for Conformity Assessment (CNAS)
The Registration Number is CNAS L3193

Accredited by American Association for Laboratory Accreditation (A2LA)
The Certificate Number is 4297.01

Name of Firm : Shenzhen Accurate Technology Co., Ltd.
Site Location : 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

1.6.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. MEASURING DEVICE AND TEST EQUIPMENT

Table 1: List of Test and Measurement Equipment

Kind of equipment	Manufacturer	Type	S/N	Calibrated dates	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 05, 2019	1 Year
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 05, 2019	1 Year
Spectrum Analyzer	Rohde&Schwarz	FSV-40	101495	Jan. 05, 2019	1 Year
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 05, 2019	1 Year
Pre-Amplifier	Rohde&Schwarz	CBLU1183540-01	3791	Jan. 05, 2019	1 Year
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 05, 2019	1 Year
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 05, 2019	1 Year
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 05, 2019	1 Year
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 05, 2019	1 Year
Open Switch and Control Unit	Rohde&Schwarz	OSP120 + OSP-B157	101244 + 100866	Jan. 05, 2019	1 Year
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 05, 2019	1 Year
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 05, 2019	1 Year
Highpass Filter	Wainwright Instruments	WHKX3.6/18G-10SS	N/A	Jan. 05, 2019	1 Year
Band Reject Filter	Wainwright Instruments	WRCG2400/2485-2375/2510-60/11SS	N/A	Jan. 05, 2019	1 Year
RF Coaxial Cable (Conducted Emission)	SUHNER	N-2m	No.2	Jan. 05, 2019	1 Year
RF Coaxial Cable (Radiated Emission)	SUHNER	N-5m	NO.3	Jan. 05, 2019	1 Year
RF Coaxial Cable (Radiated Emission)	SUHNER	N-5m	NO.4	Jan. 05, 2019	1 Year
RF Coaxial Cable (Radiated Emission)	SUHNER	N-1m	NO.5	Jan. 05, 2019	1 Year
RF Coaxial Cable (Radiated Emission)	SUHNER	N-1m	NO.6	Jan. 05, 2019	1 Year
Conducted Emission Measurement Software: ES-K1 V1.71					
Radiated Emission Measurement Software: EZ_EMC V1.1.4.2					

3. OPERATION OF EUT DURING TESTING

3.1.Operating Mode

The mode is used: **Transmitting mode**

Low Channel: 2402 MHz
Middle Channel: 2440 MHz
High Channel: 2480 MHz

3.2.Configuration and peripherals

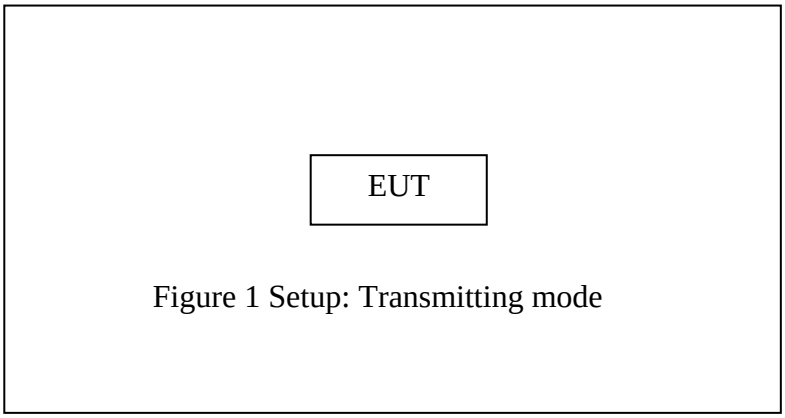


Figure 1 Setup: Transmitting mode

Note: New battery is used during all test

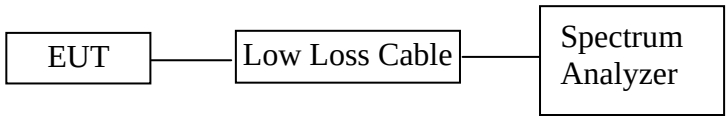
4. TEST PROCEDURES AND RESULTS

FCC Rules	Description of Test	Result
Section 15.215(c)	20dB Bandwidth	Compliant
Section 15.249(d)	Band Edge Compliance Test	Compliant
Section 15.205(a), Section 15.209(a), Section 15.249, Section 15.35	Radiated Spurious Emission Test	Compliant
Section 15.207	AC Power Line Conducted Emission Test	N/A
Section 15.203	Antenna Requirement	Compliant

Note: The power supply mode of the EUT is DC 1.5V, According to the FCC standard requirements, conducted emission is not applicable.

5. 20DB BANDWIDTH MEASUREMENT

5.1.Block Diagram of Test Setup



5.2.The Requirement For Section 15.215(c)

The bandwidth of a frequency hopping channel is the 20 dB emission bandwidth, measured with the hopping stopped. The system RF bandwidth is equal to the channel bandwidth multiplied by the number of channels in the hopset. The hopset shall be such that the near-term distribution of frequencies appears random, with sequential hops randomly distributed in both direction and magnitude of change in the hopset while the long-term distribution appears evenly distributed.

5.3.Operating Condition of EUT

5.3.1.Setup the EUT and simulator as shown as Section 5.1.

5.3.2.Turn on the power of all equipment.

5.3.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402, 2440, 2480MHz.

5.4.Test Procedure

5.4.1.Place the EUT on the table and set it in transmitting mode.

5.4.2.Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

5.4.3.Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz, Detector function=peak, Trace=max hold, Sweep=auto.

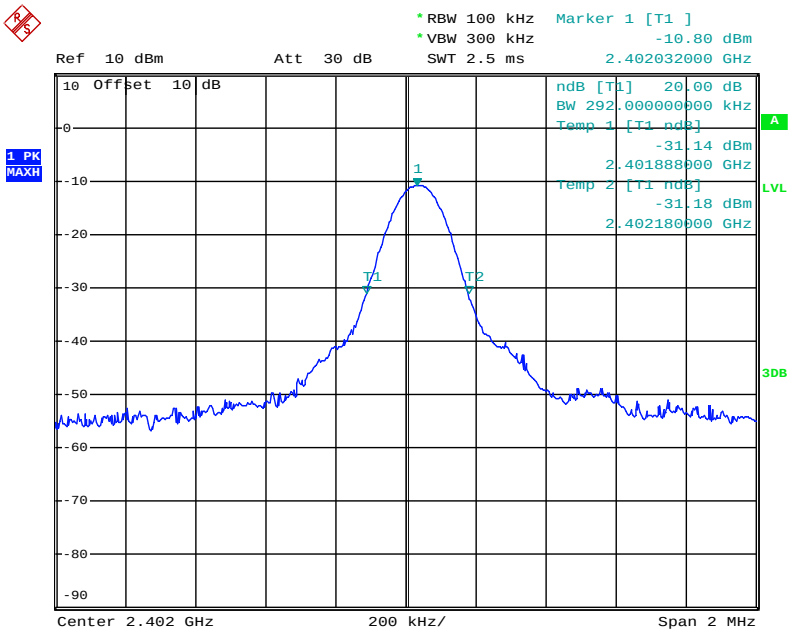
5.4.4.Set the measured low, middle and high frequency and test 20dB bandwidth with spectrum analyzer.

5.5. Test Result

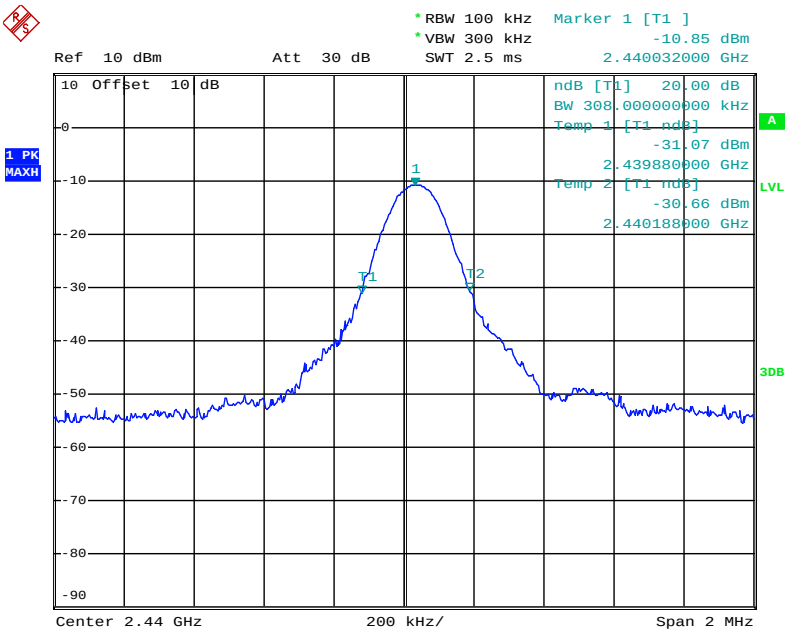
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
Low	2402	0.292
Middle	2440	0.308
High	2480	0.308

The spectrum analyzer plots are attached as below.

Low channel



Middle channel



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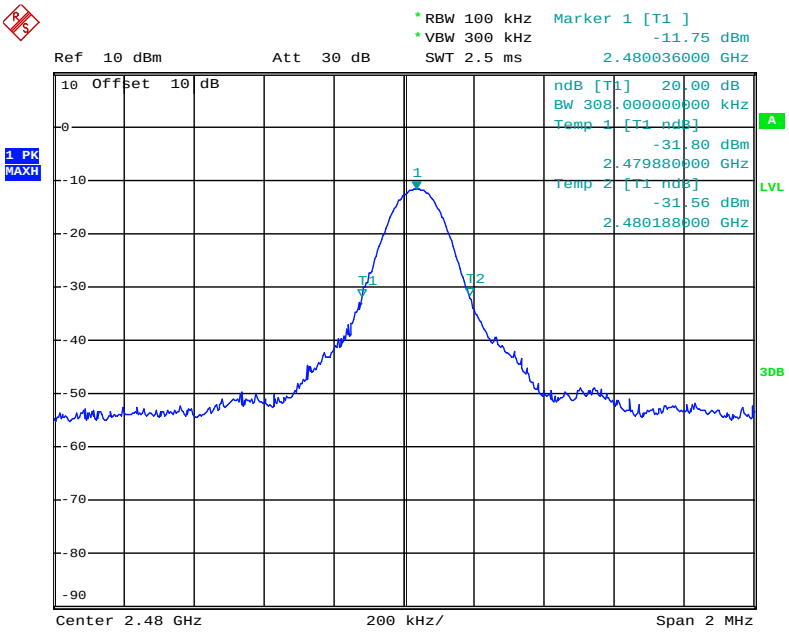
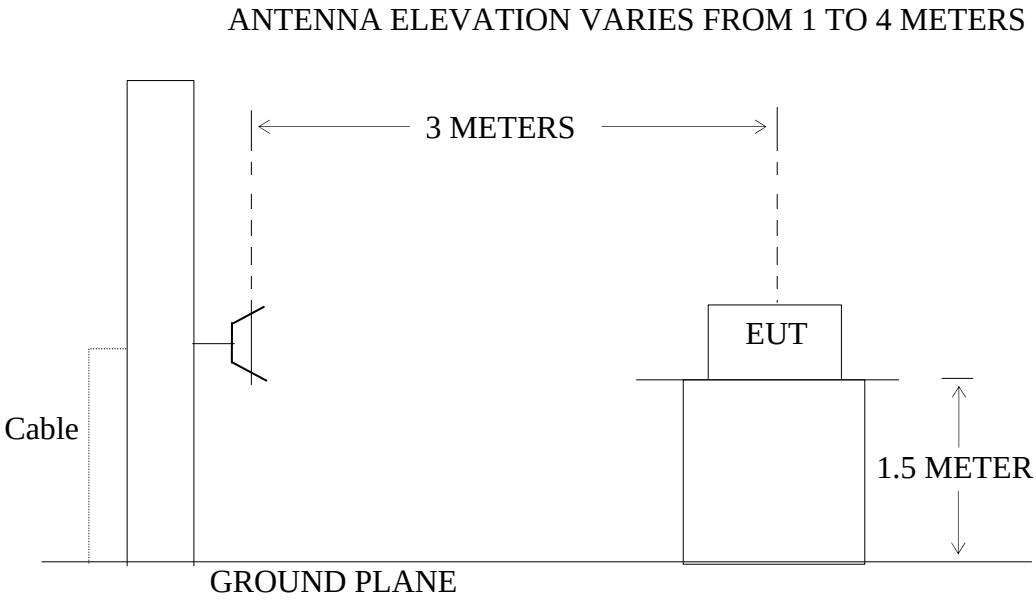
High channel



Date: 20.FEB.2019 14:05:08

6. BAND EDGE COMPLIANCE TEST

6.1.Block Diagram of Test Setup



6.2.The Requirement For Section 15.249

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

6.3.EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

6.4.Operating Condition of EUT

6.4.1.Setup the EUT and simulator as shown as Section 6.1.

6.4.2.Turn on the power of all equipment.

6.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402, 2480MHz.

6.5.Test Procedure

Radiate Band Edge:

6.5.1. The EUT is placed on a turntable, which is 1.5m above the ground plane and worked at highest radiated power.

6.5.2. The turntable was rotated for 360 degrees to determine the position of maximum emission level.

6.5.3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.

6.5.4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:

RBW=1MHz, VBW=1MHz

6.5.5.The band edges was measured and recorded.

6.6.Test Result

Note:The EUT is tested radiation emission in three axes. Only worse case is reported.

ACCURATE TECHNOLOGY CO., LTD.
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Site: 1# Chamber
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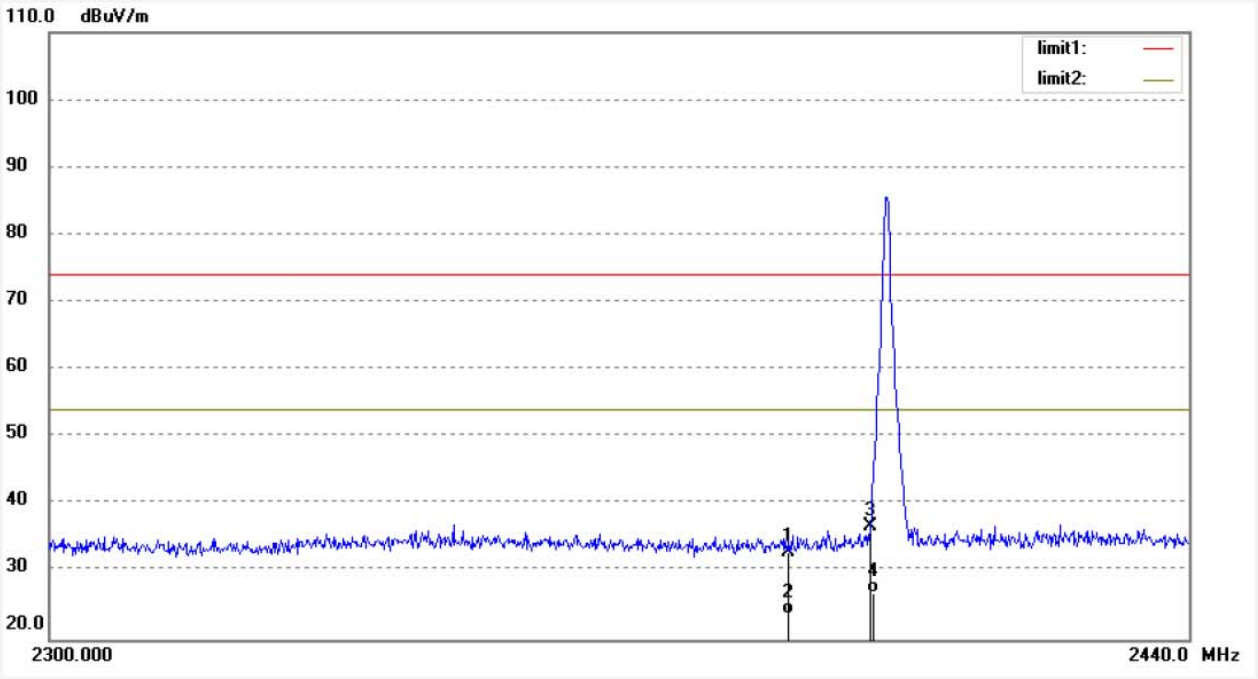
Job No.: FRANK2019 #443
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: 2.4G WIRELESS MOUSE
Mode: TX 2402MHz
Model: MPK02
Manufacturer: XIANGSHUN ELECTRONIC PRODUCTS CO., LTD

Polarization: Horizontal
Power Source: DC 1.5V
Date: 19/02/21/
Time: 10/03/49
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20190119



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	39.20	-6.32	32.88	74.00	-41.12	peak	200	44	
2	2390.000	30.12	-6.32	23.80	54.00	-30.20	AVG	200	295	
3	2400.000	43.07	-6.27	36.80	74.00	-37.20	peak	200	211	
4	2400.000	33.15	-6.27	26.88	54.00	-27.12	AVG	200	103	

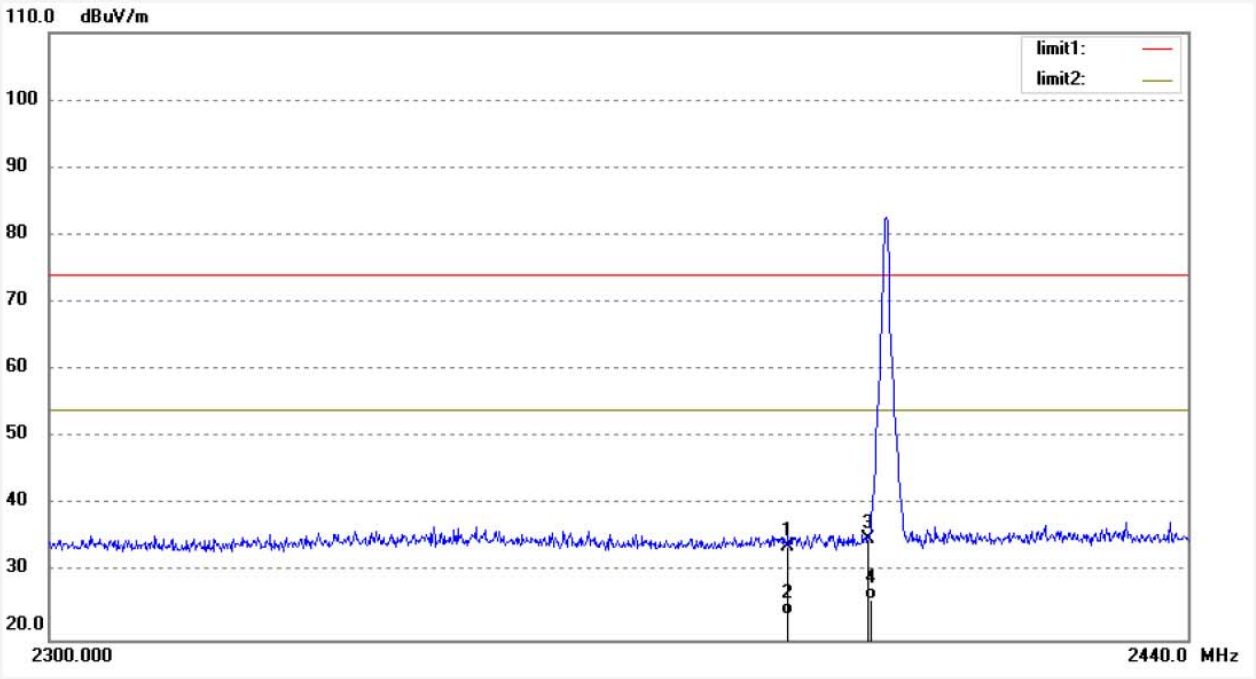
ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2019 #444
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: 2.4G WIRELESS MOUSE
Mode: TX 2402MHz
Model: MPK02
Manufacturer: XIANGSHUN ELECTRONIC PRODUCTS CO., LTD

Polarization: Vertical
Power Source: DC 1.5V
Date: 19/02/21/
Time: 10/06/17
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20190119



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	40.18	-6.32	33.86	74.00	-40.14	peak	150	54	
2	2390.000	30.12	-6.32	23.80	54.00	-30.20	AVG	150	346	
3	2400.000	41.21	-6.27	34.94	74.00	-39.06	peak	150	119	
4	2400.000	32.19	-6.27	25.92	54.00	-28.08	AVG	150	302	

ACCURATE TECHNOLOGY CO., LTD.
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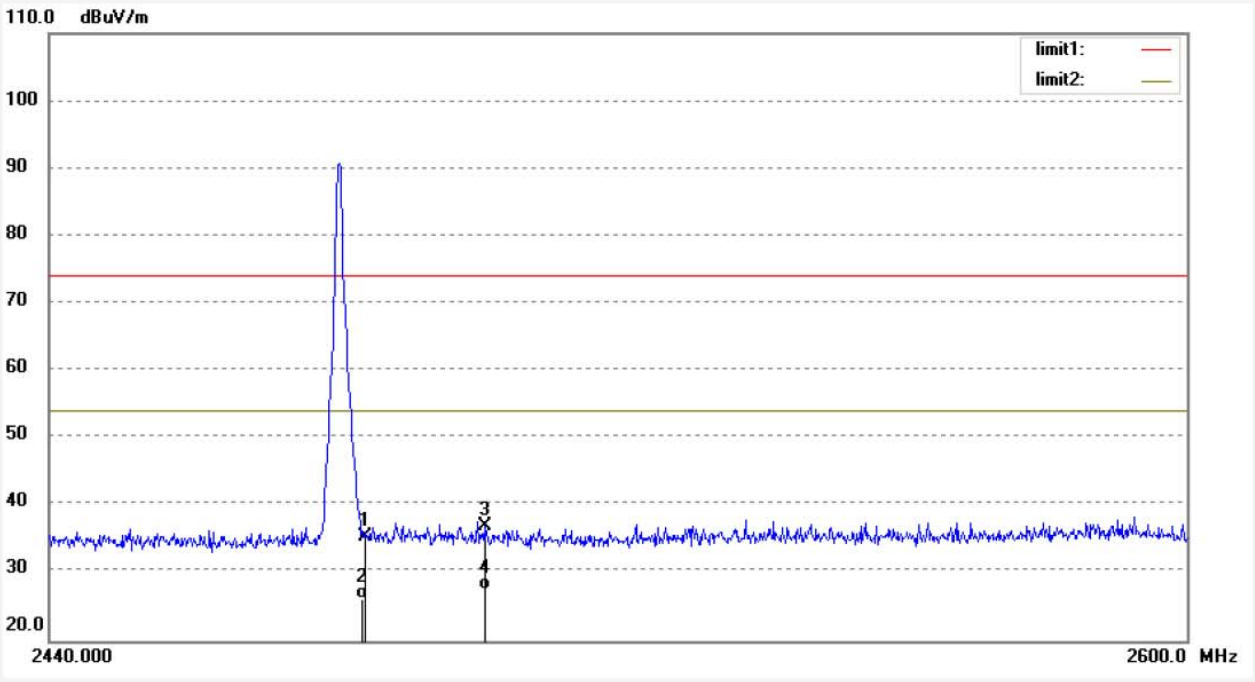
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2019 #442
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: 2.4G WIRELESS MOUSE
Mode: TX 2480MHz
Model: MPK02
Manufacturer: XIANGSHUN ELECTRONIC PRODUCTS CO., LTD

Polarization: Horizontal
Power Source: DC 1.5V
Date: 19/02/21/
Time: 10/02/11
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20190119



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	41.29	-5.89	35.40	74.00	-38.60	peak	200	144	
2	2483.500	32.10	-5.89	26.21	54.00	-27.79	AVG	250	95	
3	2500.000	42.73	-5.81	36.92	74.00	-37.08	peak	200	158	
4	2500.000	33.27	-5.81	27.46	54.00	-26.54	AVG	250	113	

ACCURATE TECHNOLOGY CO., LTD.
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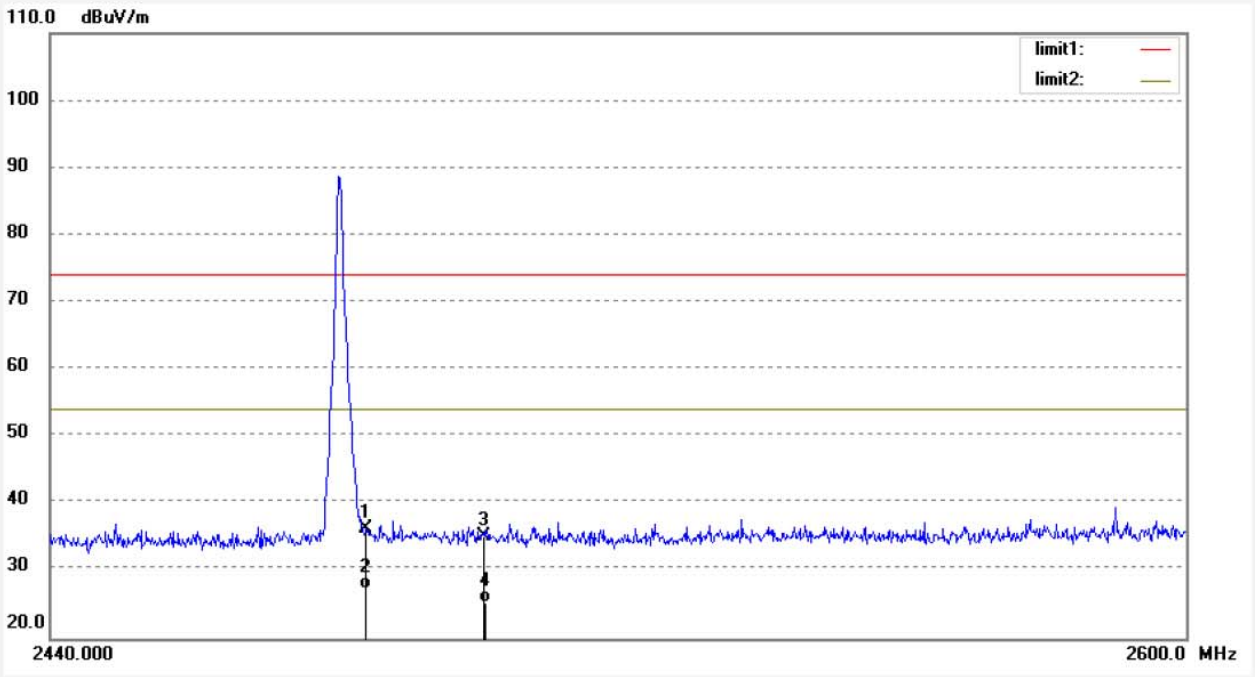
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2019 #441	Polarization: Vertical
Standard: FCC PK	Power Source: DC 1.5V
Test item: Radiation Test	Date: 19/02/21/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 10/00/53
EUT: 2.4G WIRELESS MOUSE	Engineer Signature:
Mode: TX 2480MHz	Distance: 3m
Model: MPK02	
Manufacturer: XIANGSHUN ELECTRONIC PRODUCTS CO., LTD	

Note: Report NO.:ATE20190119



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	42.25	-5.89	36.36	74.00	-37.64	peak	150	281	
2	2483.500	33.12	-5.89	27.23	54.00	-26.77	AVG	150	201	
3	2500.000	40.96	-5.81	35.15	74.00	-38.85	peak	150	321	
4	2500.000	31.18	-5.81	25.37	54.00	-28.63	AVG	150	196	

Note:

1. Emissions attenuated more than 20 dB below the permissible value are not reported.
2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:

   Result = Reading + Corrected Factor
3. Display the measurement of peak values.
4. The average measurement was not performed when peak measured data under the limit of average detection.

7. RADIATED SPURIOUS EMISSION TEST

7.1.Block Diagram of Test Setup

7.1.1.Block diagram of connection between the EUT and peripherals

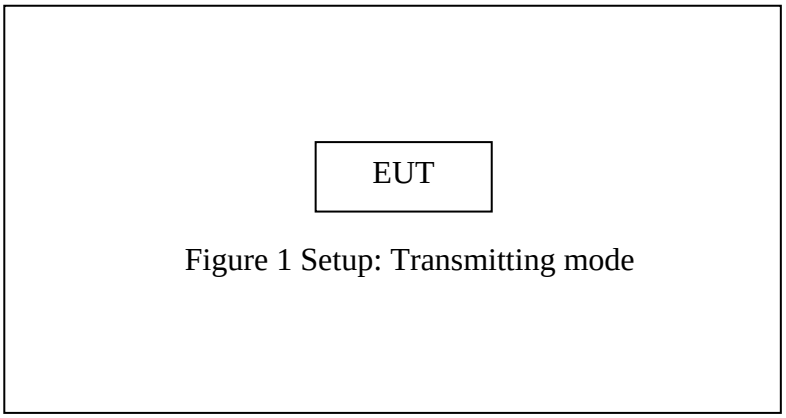
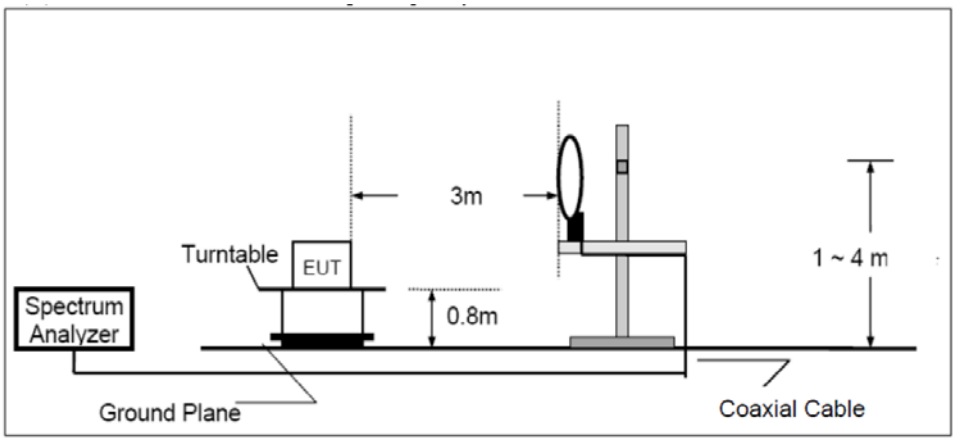


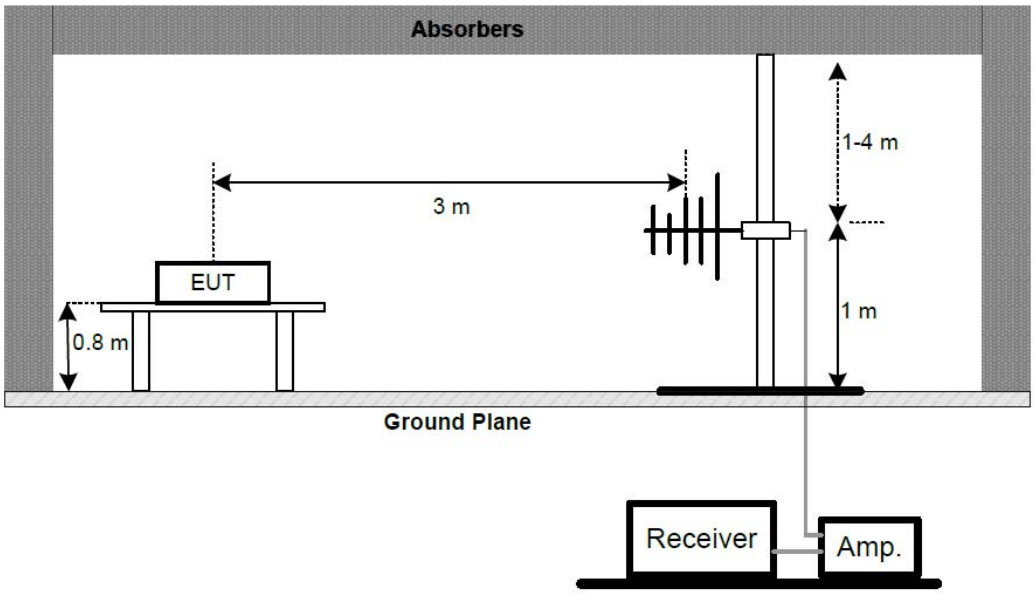
Figure 1 Setup: Transmitting mode

7.1.2.Semi-Anechoic Chamber Test Setup Diagram

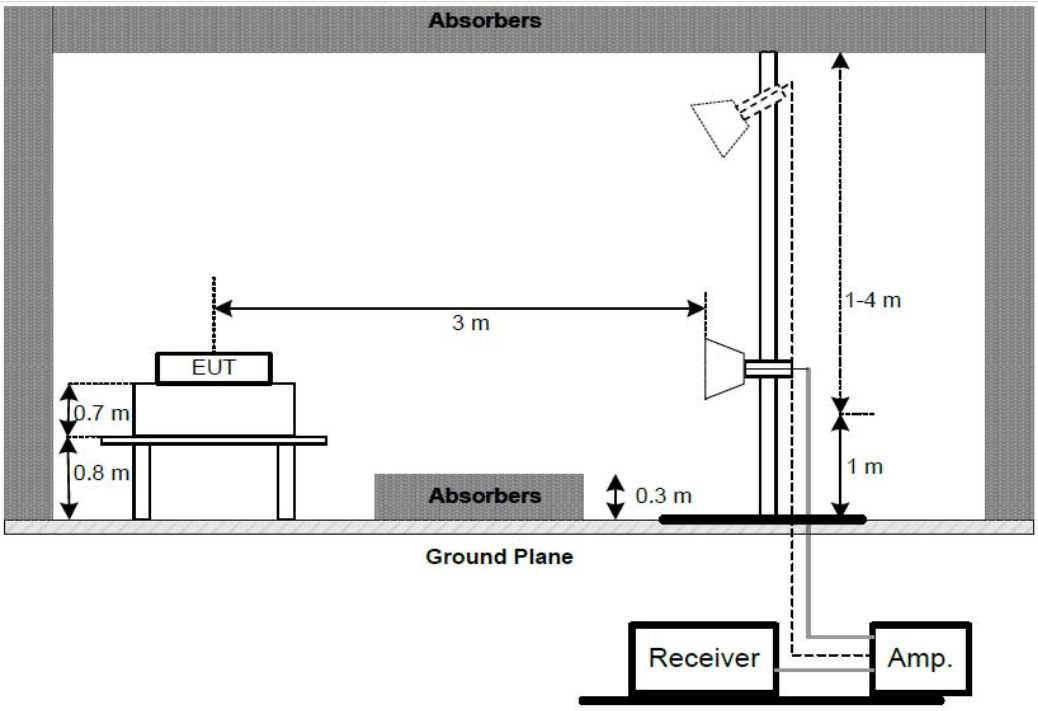
(A) Radiated Emission Test Set-Up, Frequency below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1GHz



(C) Radiated Emission Test Set-Up, Frequency above 1GHz



7.2.The Limit For Section 15.249

Except as provided in paragraph (b) of this section of FCC part C 15.249, 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 products working in the 2400-2483.5MHz band, According to 15.249(a) the Avg limit of fundamental frequency is 94.00dBuV/m. The corresponding peak limit is 114.00dBuV/m. Field strength limits are specified at a distance of 3 meters.

7.3.Restricted bands of operation

7.3.1.FCC Part 15.205 Restricted bands of operation

(a) Except as shown in paragraph (d) of this section, Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1]0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	([2])
13.36-13.41			

[1]Until February 1, 1999, this restricted band shall be 0.490-0.510
[2]Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emission

appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000MHz, Compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000MHz, compliance with the emission limits in Section15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

7.4.Configuration of EUT on Measurement

The equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

7.5.Operating Condition of EUT

7.5.1.Setup the EUT and simulator as shown as Section 7.1.

7.5.2.Turn on the power of all equipment.

7.5.3.Let the EUT work in TX modes and measure it. The transmit frequency are 2402, 2440, 2480MHz.

7.6.Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter(Below 1GHz) and 1.5m(above 1GHz) high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated emission measurement. The EUT was tested in 3 orthogonal planes.

The bandwidth of test receiver is set at 9 kHz in below 30MHz. and set at 120 kHz in 30-1000MHz, and 1MHz in above 1000MHz.

The frequency range from 9 kHz to 25GHz is checked.
The final measurement in band 9-90 kHz, 110-490 kHz and above 1000MHz is performed with Average detector. Except those frequency bands mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.

RBW (120 kHz), VBW (300 kHz) for QP detector below 1GHz
Peak detector above 1GHz

RBW (1 MHz), VBW (3MHz) for Peak measurement

RBW (1 MHz), VBW (10Hz) PK detector for AV measurement

The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading. The basic equation calculation is as follows:
Result = Reading + Corrected Factor
Where Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

7.7.DATA SAMPLE

Frequency (MHz)	Reading (dBμv)	Factor (dB/m)	Result (dBμv/m)	Limit (dBμv/m)	Margin (dB)	Remark
X.XX	49.83	-22.03	27.80	43.50	-15.70	QP

Frequency(MHz) = Emission frequency in MHz
Reading(dBμv) = Uncorrected Analyzer/Receiver reading
Factor (dB/m)= Antenna factor + Cable Loss – Amplifier gain
Result(dBμv/m) = Reading + Factor
Limit (dBμv/m)= Limit stated in standard

Margin (dB) = Result(dBμv/m) - Limit (dBμv/m)

Calculation Formula:

Margin(dB) = Result (dBμv/m)–Limit(dBμv/m)
Result(dBμv/m)= Reading(dBμv)+ Factor(dB/m)

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the limit.

7.8.The Field Strength of Radiation Emission Measurement Results

PASS.

Note: 1. Emissions attenuated more than 20 dB below the permissible value are not reported.

2. *: Denotes restricted band of operation.

3. The EUT is tested radiation emission in three axes. The worst emissions are reported in all channels.

4. The radiation emissions from 9KHz-30MHz and 18GHz-25GHz are not reported, because the test values lower than the limits of 20dB.

5. The average measurement was not performed when peak measured data under the limit of average detection.

30MHz-1GHz

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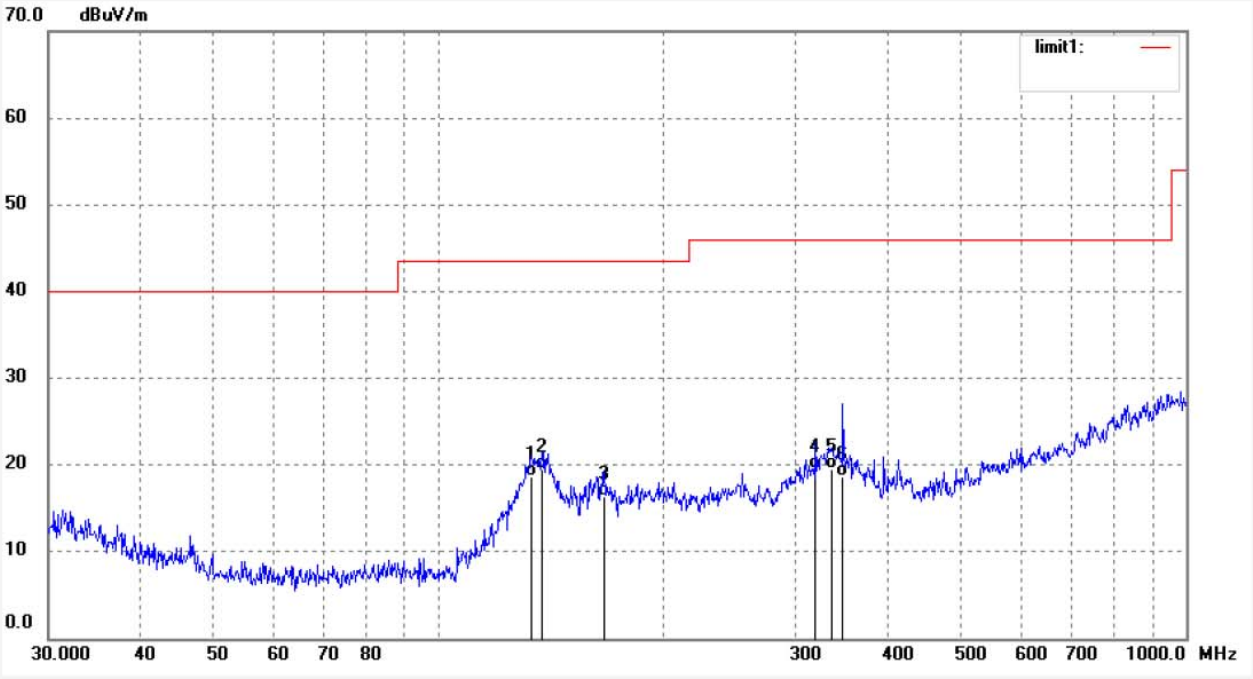
Job No.: FRANK2019 #345
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: 2.4G WIRELESS MOUSE
Mode: TX 2402MHz
Model: MPK02
Manufacturer: XIANGSHUN ELECTRONIC PRODUCTS CO., LTD

Polarization: Horizontal
Power Source: DC 1.5V
Date: 19/02/21/
Time: 8/45/14
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20190119



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	133.0809	46.35	-27.78	18.57	43.50	-24.93	QP	200	115	
2	137.3565	47.41	-27.89	19.52	43.50	-23.98	QP	200	63	
3	166.6384	42.67	-26.36	16.31	43.50	-27.19	QP	200	216	
4	319.2071	40.15	-20.65	19.50	46.00	-26.50	QP	200	93	
5	335.3016	39.41	-19.88	19.53	46.00	-26.47	QP	200	212	
6	347.2921	38.00	-19.42	18.58	46.00	-27.42	QP	200	103	

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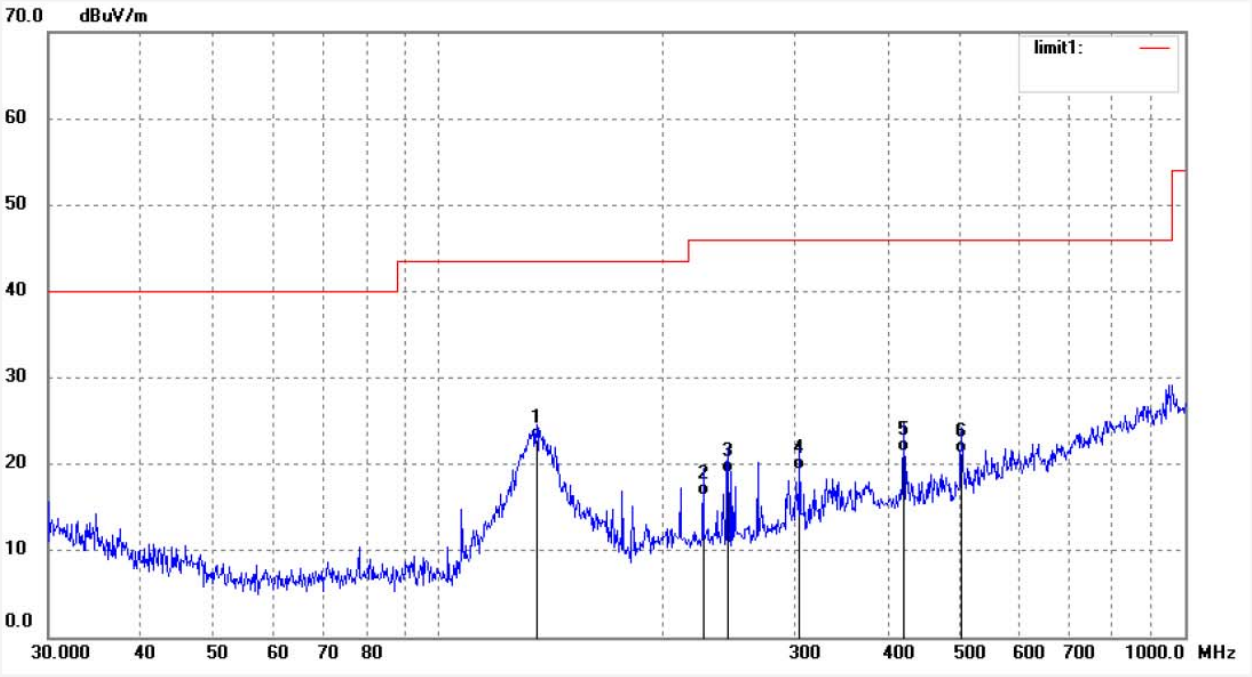
Job No.: FRANK2019 #346
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: 2.4G WIRELESS OPTICA MOUSE
Mode: TX 2402MHz
Model: MPK02
Manufacturer: XIANGSHUN ELECTRONIC PRODUCTS CO., LTD

Polarization: Vertical
Power Source: DC 1.5V
Date: 19/02/21/
Time: 9/02/12
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20190119



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	135.4395	50.70	-27.85	22.85	43.50	-20.65	QP	100	302	
2	226.2202	40.32	-23.93	16.39	46.00	-29.61	QP	100	91	
3	244.4003	42.64	-23.68	18.96	46.00	-27.04	QP	100	165	
4	304.9547	40.45	-21.07	19.38	46.00	-26.62	QP	100	302	
5	419.8509	39.45	-18.00	21.45	46.00	-24.55	QP	100	116	
6	502.2472	37.45	-16.26	21.19	46.00	-24.81	QP	100	293	

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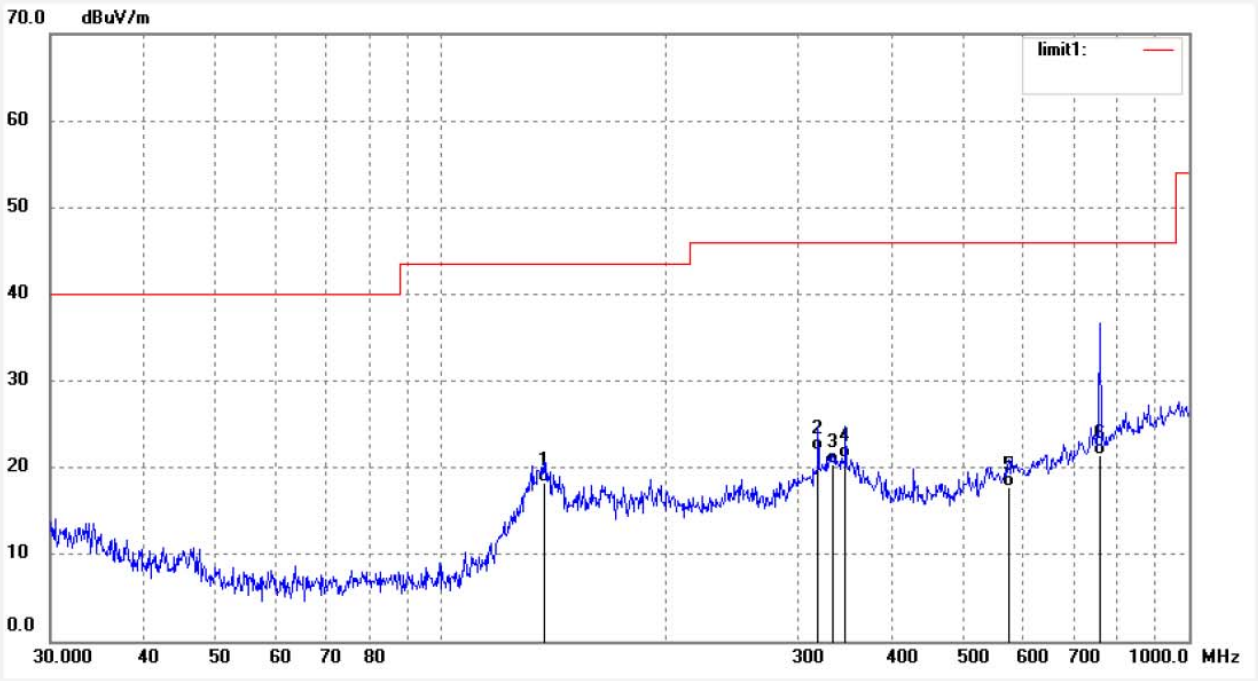
Job No.: FRANK2019 #348
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: 2.4G WIRELESS MOUSE
Mode: TX 2440MHz
Model: MPK02
Manufacturer: XIANGSHUN ELECTRONIC PRODUCTS CO., LTD

Polarization: Horizontal
Power Source: DC 1.5V
Date: 19/02/21/
Time: 09/14/12
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20190119



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	137.3565	46.15	-27.89	18.26	43.50	-25.24	QP	200	302	
2	319.2071	42.64	-20.65	21.99	46.00	-24.01	QP	200	119	
3	334.1254	40.35	-19.94	20.41	46.00	-25.59	QP	200	92	
4	347.2921	40.45	-19.42	21.03	46.00	-24.97	QP	200	196	
5	571.9750	32.15	-14.31	17.84	46.00	-28.16	QP	200	346	
6	760.2866	31.45	-10.04	21.41	46.00	-24.59	QP	200	62	

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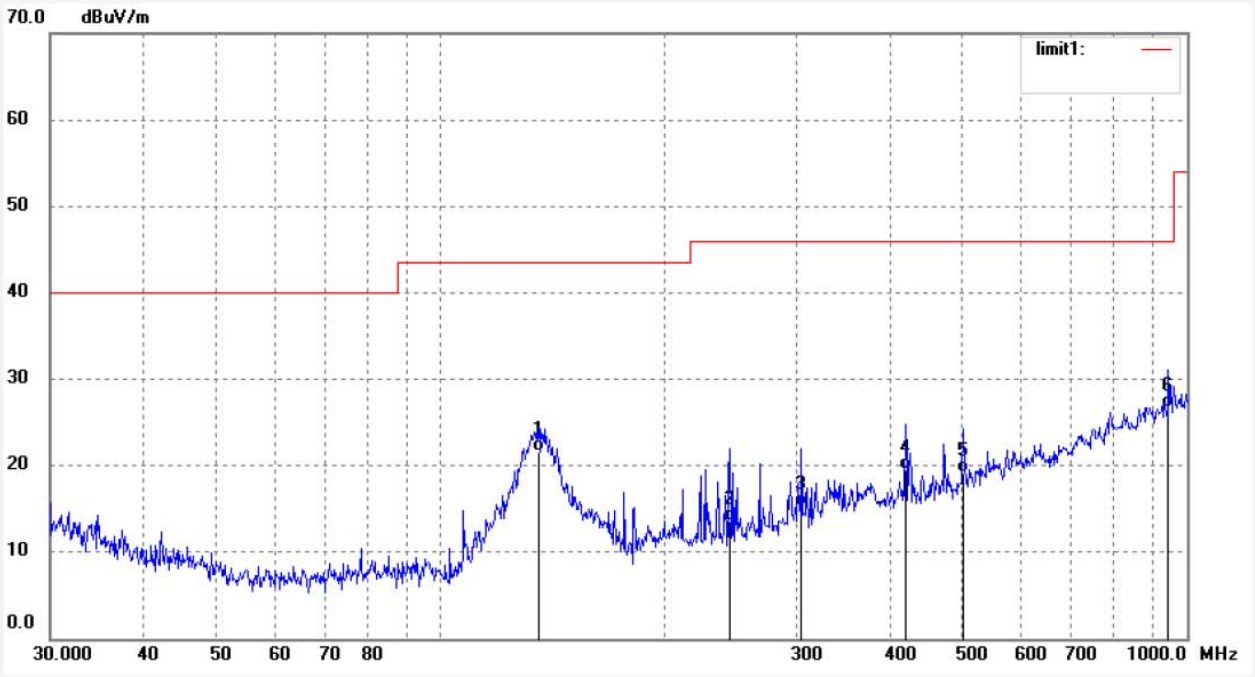
Job No.: FRANK2019 #347
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: 2.4G WIRELESS MOUSE
Mode: TX 2440MHz
Model: MPK02
Manufacturer: XIANGSHUN ELECTRONIC PRODUCTS CO., LTD

Polarization: Vertical
Power Source: DC 1.5V
Date: 19/02/21/
Time: 9/07/24
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20190119



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	135.4395	49.45	-27.85	21.60	43.50	-21.90	QP	100	162	
2	244.4003	37.21	-23.68	13.53	46.00	-32.47	QP	100	211	
3	304.9547	36.45	-21.07	15.38	46.00	-30.62	QP	100	333	
4	419.8509	37.54	-18.00	19.54	46.00	-26.46	QP	100	201	
5	502.2472	35.35	-16.26	19.09	46.00	-26.91	QP	100	92	
6	945.3336	33.12	-6.41	26.71	46.00	-19.29	QP	100	321	

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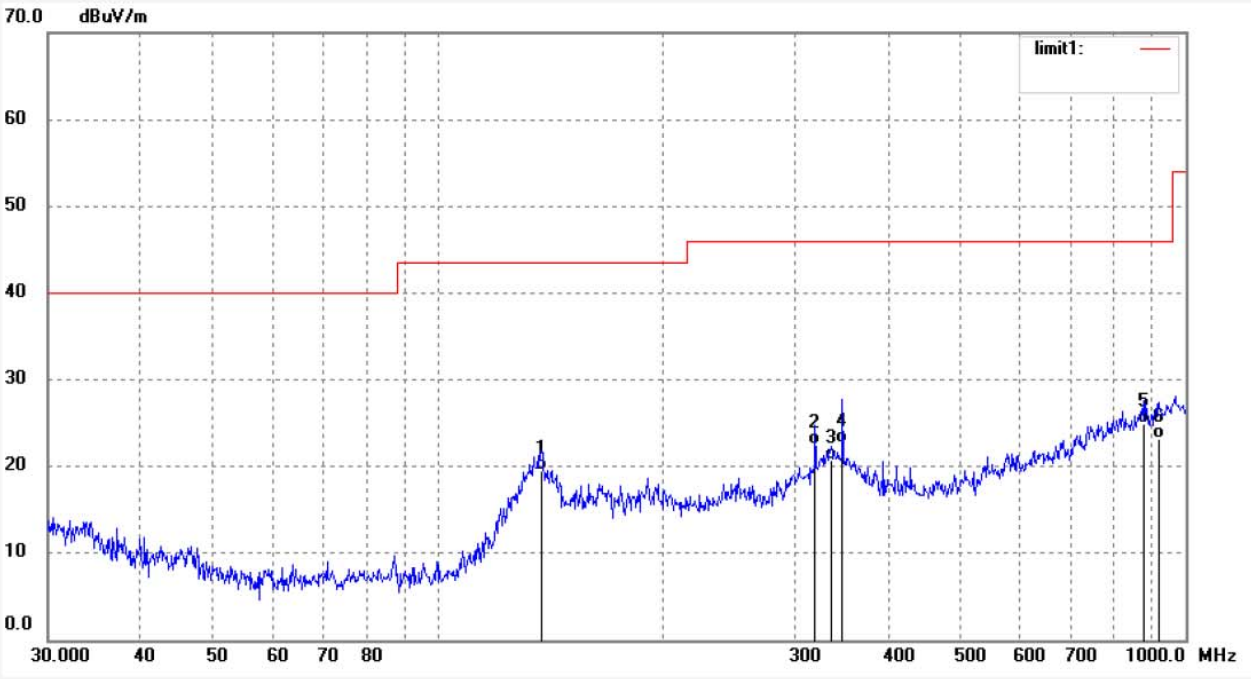
Job No.: FRANK2019 #349
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: 2.4G WIRELESS MOUSE
Mode: TX 2480MHz
Model: MPK02
Manufacturer: XIANGSHUN ELECTRONIC PRODUCTS CO., LTD

Polarization: Horizontal
Power Source: DC 1.5V
Date: 19/02/21/
Time: 9/20/34
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20190119



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	137.3565	47.45	-27.89	19.56	43.50	-23.94	QP	200	103	
2	319.2071	43.15	-20.65	22.50	46.00	-23.50	QP	200	62	
3	335.3016	40.64	-19.88	20.76	46.00	-25.24	QP	200	94	
4	347.2921	42.12	-19.42	22.70	46.00	-23.30	QP	200	116	
5	878.0931	32.45	-7.56	24.89	46.00	-21.11	QP	200	302	
6	912.6952	30.15	-6.97	23.18	46.00	-22.82	QP	200	119	

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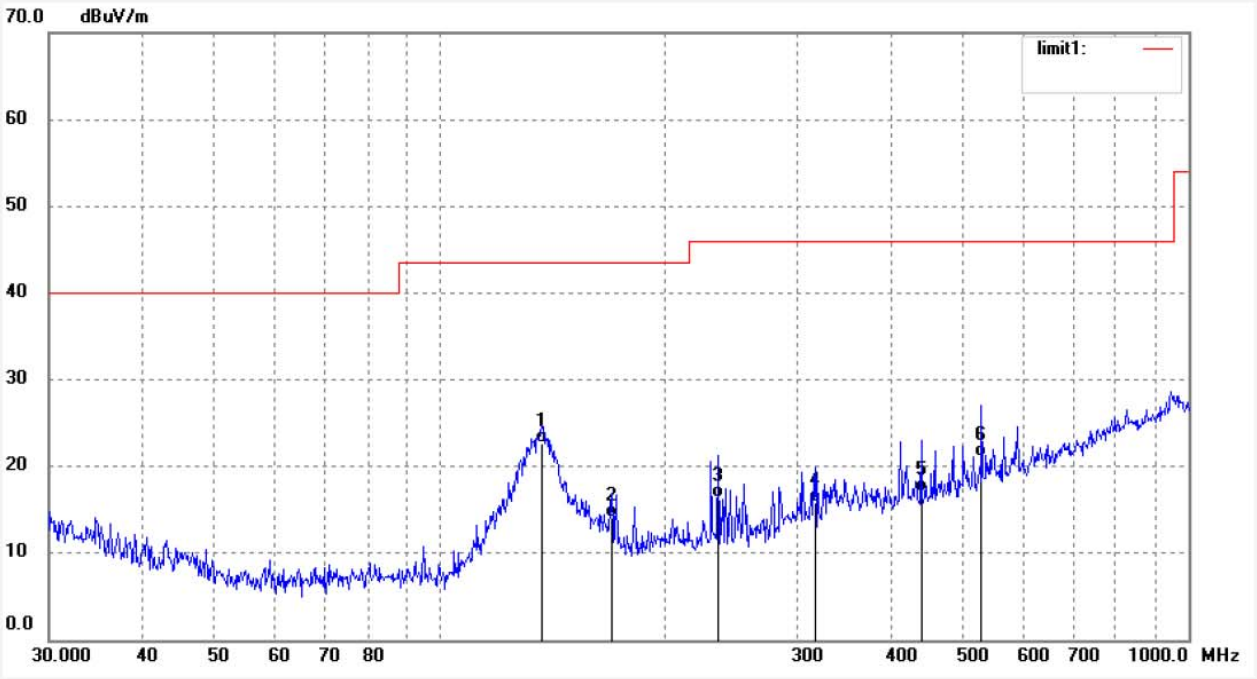
Job No.: FRANK2019 #350	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 1.5V
Test item: Radiation Test	Date: 19/02/21/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 9/34/45
EUT: 2.4G WIRELESS MOUSE	Engineer Signature:
Mode: TX 2480MHz	Distance: 3m
Model: MPK02	
Manufacturer: XIANGSHUN ELECTRONIC PRODUCTS CO., LTD	

Note: Report NO.:ATE20190119



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	136.8746	50.54	-27.89	22.65	43.50	-20.85	QP	100	144	
2	169.5919	40.21	-26.04	14.17	43.50	-29.33	QP	100	322	
3	235.1346	40.12	-23.79	16.33	46.00	-29.67	QP	100	143	
4	316.9717	36.62	-20.74	15.88	46.00	-30.12	QP	100	92	
5	439.4730	34.61	-17.55	17.06	46.00	-28.94	QP	100	135	
6	529.4275	36.45	-15.42	21.03	46.00	-24.97	QP	100	302	

1GHz-18GHz

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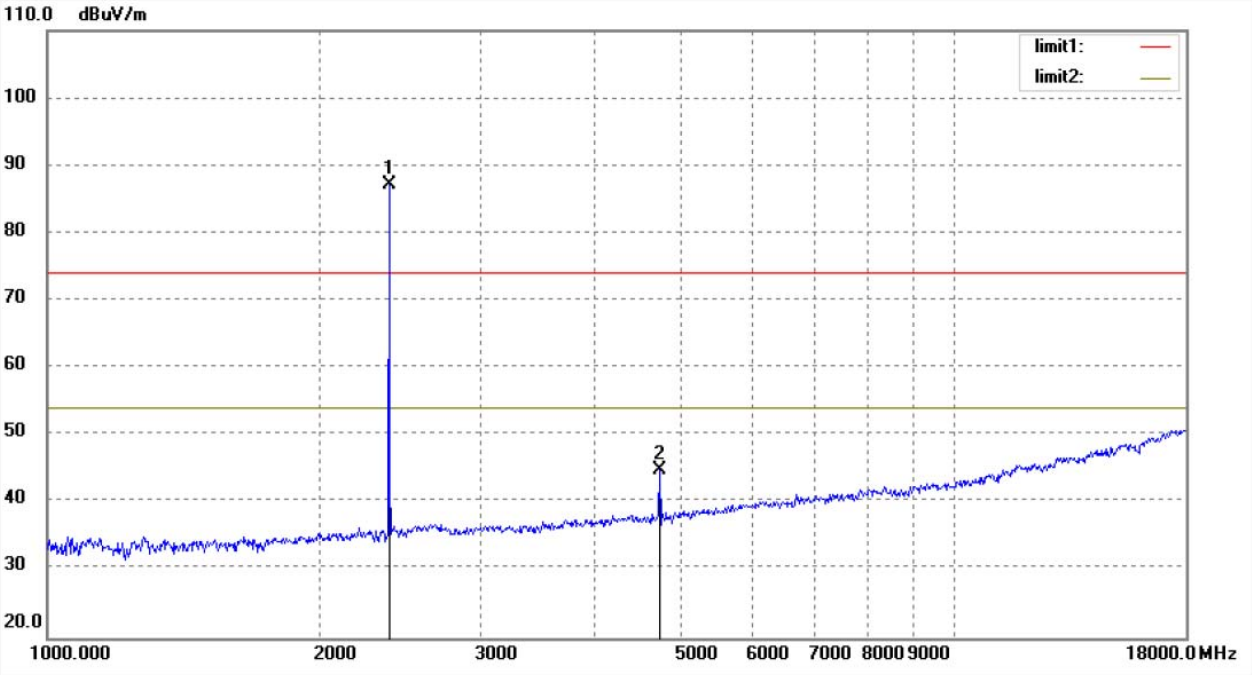
Job No.: FRANK2019 #435
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: 2.4G WIRELESS MOUSE
Mode: TX 2402MHz
Model: MPK02
Manufacturer: XIANGSHUN ELECTRONIC PRODUCTS CO., LTD

Polarization: Horizontal
Power Source: DC 1.5V
Date: 19/02/21/
Time: 9/35/53
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20190119



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2402.419	93.48	-6.37	87.11	114.00	-26.89	peak	250	115	
2	4804.857	44.26	0.70	44.96	74.00	-29.04	peak	250	302	

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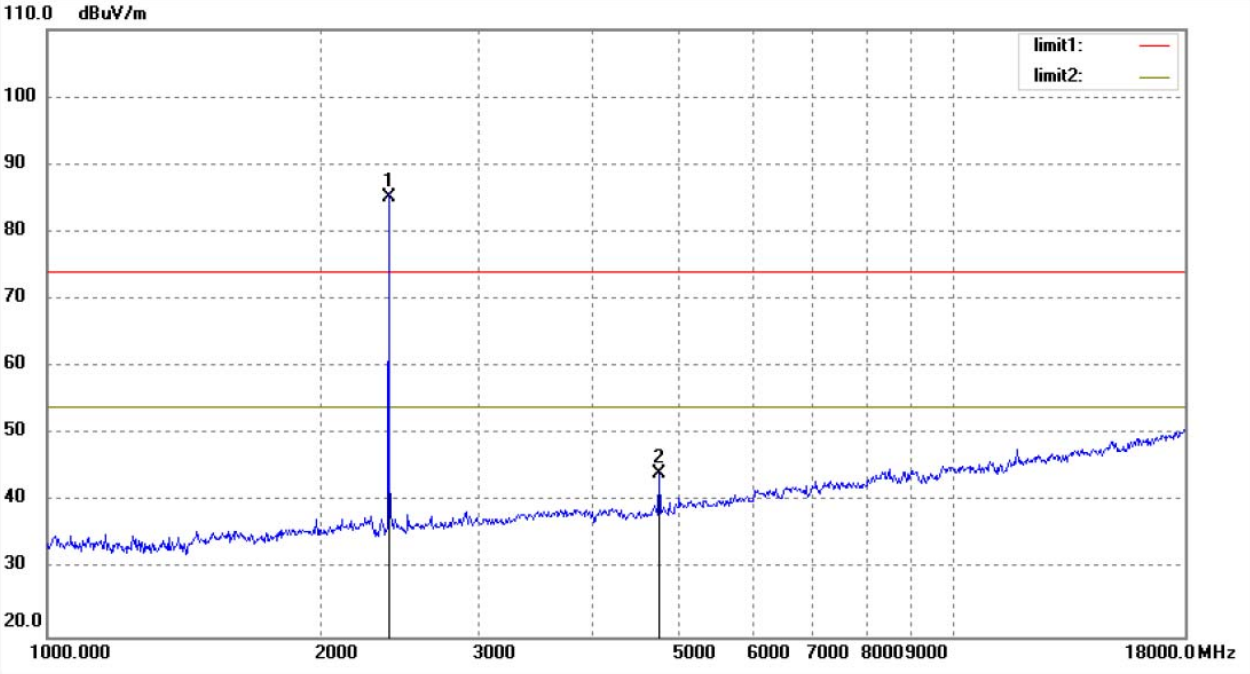
Job No.: FRANK2019 #436
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: 2.4G WIRELESS MOUSE
Mode: TX 2402MHz
Model: MPK02
Manufacturer: XIANGSHUN ELECTRONIC PRODUCTS CO., LTD

Polarization: Vertical
Power Source: DC 1.5V
Date: 19/02/21/
Time: 9/48/06
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20190119



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2402.419	91.60	-6.37	85.23	114.00	-28.77	peak	150	109	
2	4804.857	43.47	0.70	44.17	74.00	-29.83	peak	150	214	

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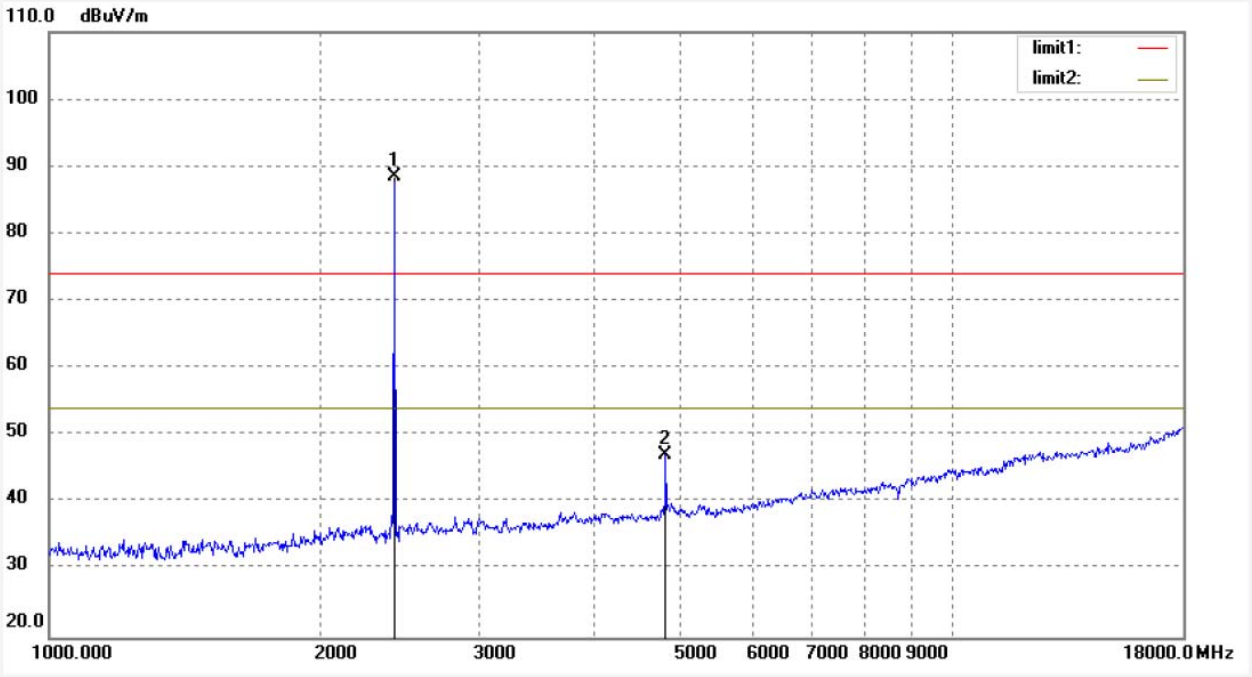
Job No.: FRANK2019 #438
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: 2.4G WIRELESS OPTICA MOUSE
Mode: TX 2440MHz
Model: MPK02
Manufacturer: XIANGSHUN ELECTRONIC PRODUCTS CO., LTD

Polarization: Horizontal
Power Source: DC 1.5V
Date: 19/02/21/
Time: 9/53/38
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20190119



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2440.421	94.80	-6.20	88.60	114.00	-25.40	peak	200	349	
2	4880.824	46.00	1.07	47.07	74.00	-26.93	peak	200	196	

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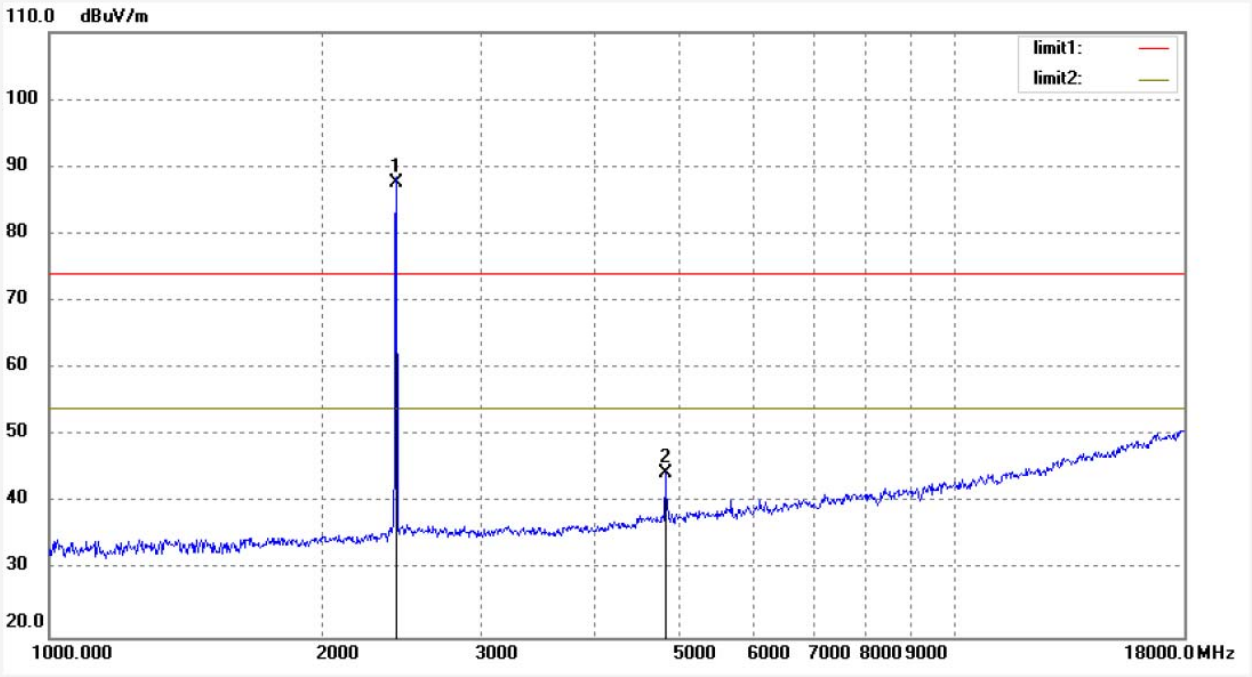
Job No.: FRANK2019 #437
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: 2.4G WIRELESS MOUSE
Mode: TX 2440MHz
Model: MPK02
Manufacturer: XIANGSHUN ELECTRONIC PRODUCTS CO., LTD

Polarization: Vertical
Power Source: DC 1.5V
Date: 19/02/21/
Time: 9/51/33
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20190119



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2440.421	93.86	-6.20	87.66	114.00	-26.34	peak	150	201	
2	4880.828	43.31	1.00	44.31	74.00	-29.69	peak	150	229	

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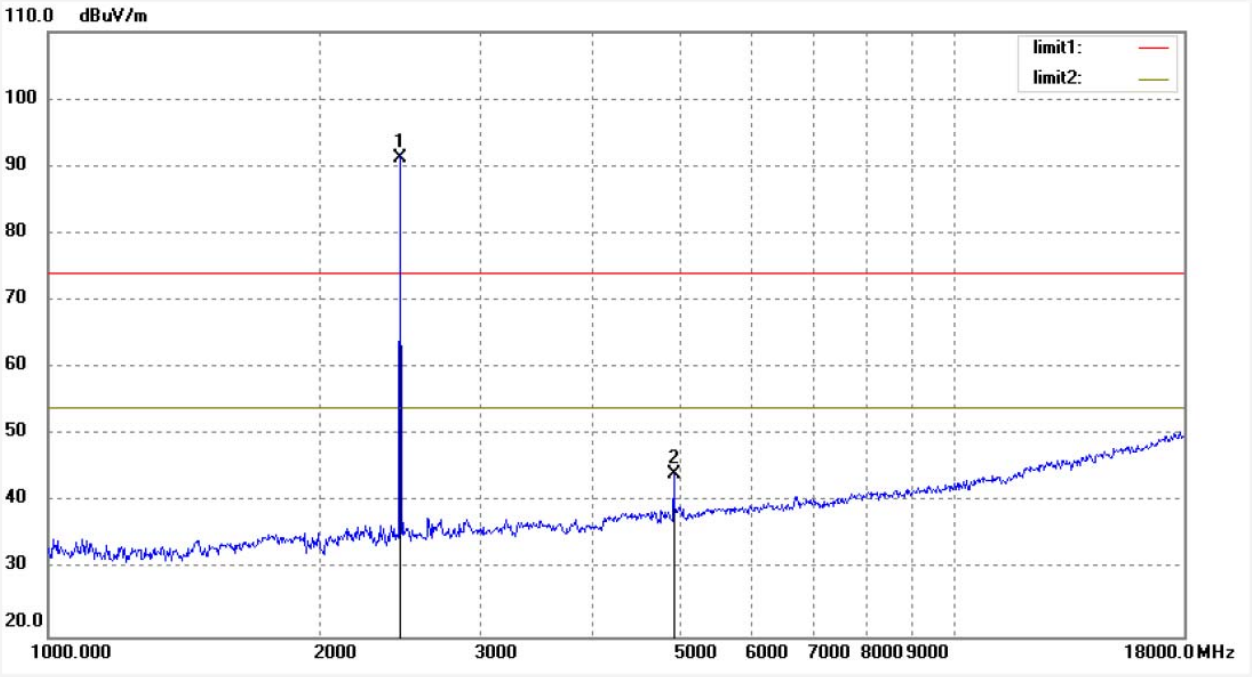
Job No.: FRANK2019 #439
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: 2.4G WIRELESS MOUSE
Mode: TX 2480MHz
Model: MPK02
Manufacturer: XIANGSHUN ELECTRONIC PRODUCTS CO., LTD

Polarization: Horizontal
Power Source: DC 1.5V
Date: 19/02/21/
Time: 9/55/36
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20190119



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.034	97.17	-6.04	91.13	114.00	-22.87	peak	200	332	
2	4960.044	42.66	1.50	44.16	74.00	-29.84	peak	250	106	

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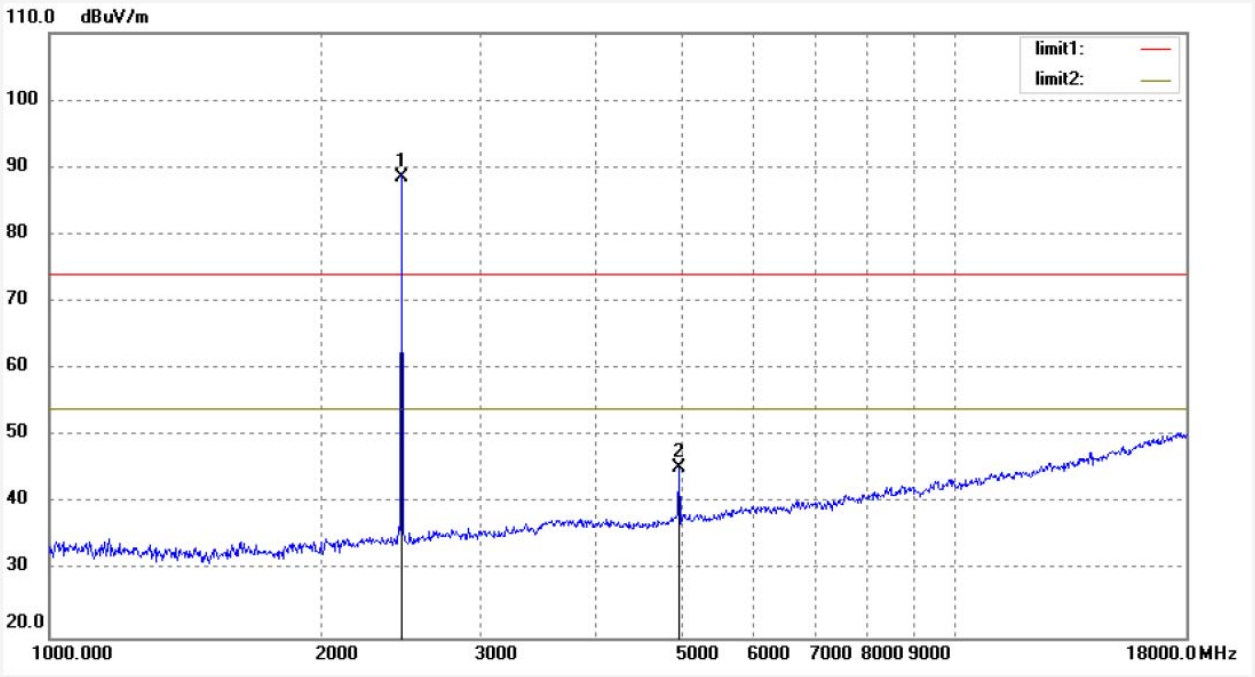
Fax:+86-0755-26503396

Job No.: FRANK2019 #440
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: 2.4G WIRELESS MOUSE
Mode: TX 2480MHz
Model: MPK02
Manufacturer: XIANGSHUN ELECTRONIC PRODUCTS CO., LTD

Polarization: Vertical
Power Source: DC 1.5V
Date: 19/02/21/
Time: 9/59/10
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20190119



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.034	94.59	-6.04	88.55	114.00	-25.45	peak	150	195	
2	4960.046	43.73	1.68	45.41	74.00	-28.59	peak	200	106	

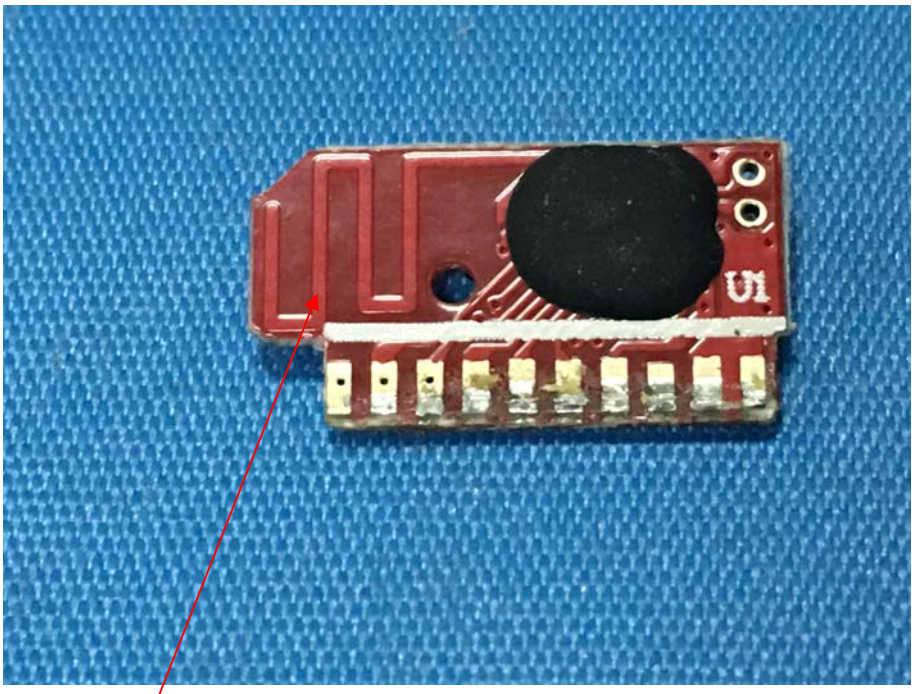
8. ANTENNA REQUIREMENT

8.1.The Requirement

According to 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.

8.2.Antenna Construction

Device is equipped with permanent attached antenna, which isn't displaced by other antenna. The Antenna gain of EUT is 0dBi. Therefore, the equipment complies with the antenna requirement of Section 15.203.



Antenna