RF TEST REPORT

Report No.: SHATBL2412019-2W01

Applicant	:	Fujian Iselected E-commerce Co., Ltd.
Product Name	:	2.4GHz Wireless Keyboard
Brand Name	:	N/A
Model Name	:	SPK6348
FCC ID	:	2BMNP-SPK6348
Test Standard	:	FCC CFR Title 47 Part 15 Subpart C Section 15.249
Date of Receipt	:	2024.12.6
Date of Test	:	2024.12.6~2024.12.24
Issue Date	:	2024.12.24

Report Prepared by : Chris Xu

(Chris Xu)

Report Approved by : Guozheng Li

(Ghost Li)

Authorized Signatory : Terry Yang

(Terry Yang)

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REVISION HISTORY

Rev.	Issue Date	Revisions	Revised by
00	2024.12.24	Initial Release	/

DECLARATION OF REPORT

1. The device has been tested by ATBL, and the test results show that the equipment under test (EUT) is in compliance with the requirements of 47 CFR 15.249. And it is applicable only to the tested sample identified in the report.

2. This report shall not be reproduced except in full, without the written approval of ATBL, this document only be altered or revised by ATBL, personal only, and shall be noted in the revision of the document.

3. The general information of EUT in this report is provided by the customer or manufacture, ATBL is only responsible for the test data but not for the information provided by the customer or manufacture.

4. The results in this report is only apply to the sample as tested under conditions. The customer or manufacturer is responsible for ensuring that the additional production units of this model have the same electrical and mechanical components.

5. In this report, '☐' indicates that EUT does not support content after '☐', and '☑' indicates that it supports content after '☑'

SUMMARY OF TEST RESULT

Report Section	Standard Section	Test Item	Judgment	Remark
3.1	§15.249&15.209	Radiated Emission	Compliant	--
3.2	§15.249	Band Edges	Compliant	--
3.3	§15.215	20dB Bandwidth	Compliant	--
3.4	§15.207	Conducted Emission	Not applicable	--
3.5	§15.203	Antenna Requirement	Compliant	--

Note: The EUT is battery operated without AC mains.

1. GENERAL DESCRIPTION

1.1. Applicant

Name	:	Fujian Iselected E-commerce Co., Ltd.
Address	:	15th Floor, Building A, Aofeng Plaza, No. 2 Aofeng Road, Taijiang District, Fuzhou City, Fujian Province, China

1.2. Manufacturer

Name	:	MMD (Shanghai) Electronic Technology Co., Ltd.
Address	:	Room107, Building 17 , No. 525 Yuanjiang Road, Minhang District, Shanghai, China

1.3. Factory

Name	:	Dongguan Lingjie Electronics Technology Co.,Ltd
Address	:	No. 23, Tianyuan Revitalization North Road, Dongguan City, Guangdong Province

1.4. General Information of EUT

General Information	
Equipment Name	2.4GHz Wireless Keyboard
Brand Name	N/A
Model Name	SPK6348
Series Model	N/A
Model Difference	N/A
Antenna Gain	-4.62dBi
Antenna Type	PCB Antenna
Sample No:	202410090006031
Power Source	DC 1.5V For Battery
Battery	Rated Voltage：1.5V
Hardware version	VER:1.1
Software version	VER:1.0
Connecting I/O Port(s)	Refer to the remark below.

Remark:

The above information of EUT was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.5. Equipment Specification

Equipment Specification	
Operation Frequency	2402 MHz to 2480 MHz
Maximum field strength	For keyboard:92.43dBuV/m(PK)@3m
Modulation	GFSK
Number of channels	40
Antenna Designation	PCB antenna (Met 15.203 Antenna requirement)

1.6. Modification of EUT

No modifications are made to the EUT during all test items.

1.7. Laboratory Information

Company Name	:	Shanghai ATBL Technology Co., Ltd.
Address	:	Building 8,No.160 Basheng Road, Waigaoqiao Free Trade Zone, Pudong New Area, Shanghai
Telephone	:	+86(0)21-51298625

1.8. Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

47 CFR Part 15 Subpart C §15.249

ANSI C63.10-2020

Remark:

All test items were verified and recorded according to the standards and without any deviation during the test.

2. TEST CONFIGURATION OF EUT

2.1. Carrier Frequency Channel

Channel	Frequency (MHz)	Channel	Frequency (MHz)
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**

Remark:

Low Channel: **CH1_2402 MHz**; Middle Channel: **CH20_2440 MHz**; High Channel: **CH40_2480 MHz**.

2.2. Test Modes

NO.	TEST MODE DESCRIPTION
1	Low channel GFSK
2	Middle channel GFSK
3	High channel GFSK

Note:
1. Only the result of the worst case was recorded in the report, if no other cases.
2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
3. The EUT adjusts the frequency through the button.

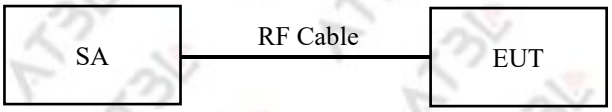
2.3. Block Diagram of Test System

2.3.1. For AC Power-Line Conducted Emission

N/A

2.3.2. For Radiated Spurious Emission

2.3.3. For Conducted Test



2.4. Description of Support Units

NO.	Unit	Brand	Model	Description
1	/	/	/	/
2	/	/	/	/

2.5. Test Software and Power Level

During the test, the channel and power control software provided by the customer is used to control the operation channel and output power level.

2.6. EUT Operating Conditions

For AC power-line conducted emission, the EUT was connected under the large package sizes transmission.

For radiated spurious emission and conducted test, the engineering test program was provided and make the EUT to continuous transmit/receive.

2.7. Equipment List

2.7.1. For AC Power-Line Conducted Emission

Equipment Name	Manufacturer	Model	Serial No.	Equipment No.	Calibration Until	Note
Test Receiver	R&S	ESPI	101679	SHATBL-E012	2025.05.21	
LISN	R&S	ENV216	100300	SHATBL-E013	2025.05.21	
LISN	R&S	ENV216	100333	SHATBL-E041	2025.05.21	
Thermometer	DeLi	N/A	N/A	SHATBL-E016	2025.09.19	
Test Software	FALA	EZ-EMC	N/A	SHATBL-E046	N/A	

2.7.2. For Radiated Spurious Emission

Equipment Name	Manufacturer	Model	Serial No.	Equipment No.	Calibration Until	Note
Signal analyzer	Agilent	N9020A	MY50200811	SHATBL-E017	2025.05.21	
Amplifier	JPT	JPA0118-55-303A	1910001800055000	SHATBL-E006	2025.05.21	
Amplifier	JPT	JPA-10M1G32	21010100035001	SHATBL-E005	2025.05.21	
Antenna/Turn table Controller	Brilliant	N/A	N/A	SHATBL-E007	N/A	
Loop Antenna	Daze	ZN30900C	20077	SHATBL-E042	2025.05.21	
Bilog Antenna	SCHWARZBECK	VULB 9168	01174	SHATBL-E008	2025.05.21	
Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120D	02334	SHATBL-E009	2025.05.21	
Horn Antenna	COM-POWER	AH-1840	10100008	SHATBL-E043	2025.05.21	
Thermometer	DeLi	N/A	N/A	SHATBL-E015	2025.09.19	
Test Software	FALA	EMC-RI	N/A	SHATBL-E046	N/A	

Remark: Calibration duration for above equipments is 1 year.

2.8. Measurement Uncertainty

The reported uncertainty of measurement y±U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of *k*=2, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	RF output power, conducted	±0.958dB
2	Conducted spurious emissions(9KHz~30MHz)	±2.988dB
	All emissions, radiated 9KHz~30MHz	±0.89dB
3	All emissions, radiated 30MHz-1GHz	±2.50dB
4	All emissions, radiated Above1GHz	±3.51dB
5	Occupied bandwidth	±23.20Hz

3. TEST RESULT

3.1. Radiated Emission

3.1.1. Radiated Emission Limit

Standard FCC15.249

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
900-928MHz	50	500
2400-2483.5MHz	50	500
5725-5875MHz	50	500
24.0-24.25GHz	250	2500

Standard FCC 15.209

Frequency (MHz)	Distance Meters	Field Strengths Limit	
		μV/m	dB(μV)/m
0.009 ~ 0.490	300	2400/F(kHz)	---
0.490 ~ 1.705	30	24000/F(kHz)	---
1.705 ~ 30	30	30	---
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	Other:74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

Remark: (1) Emission level dBμV = 20 log Emission level μV/m

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

3.1.2. Test Procedure

1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use minimum resolution bandwidth of 1 MHz. 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. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

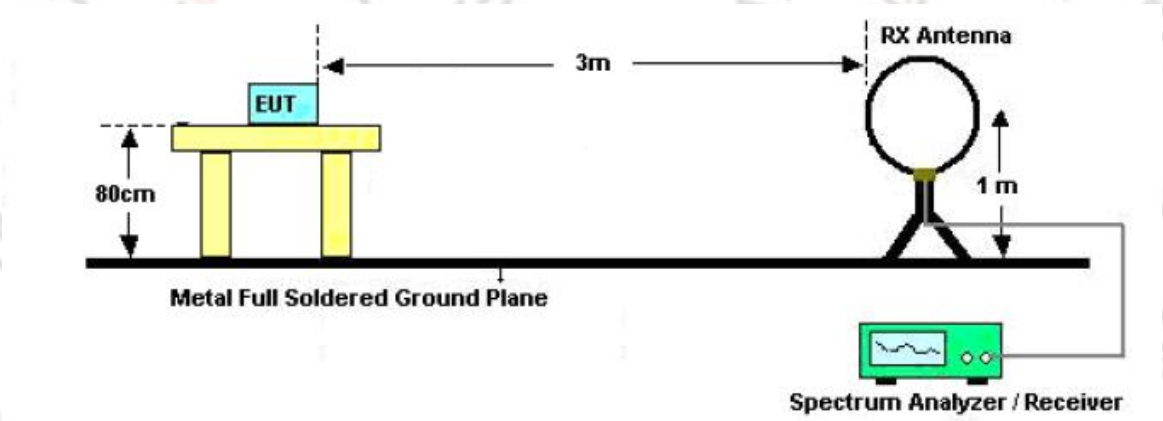
The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
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
Start ~Stop Frequency	1GHz~26.5GHz RBW 2.4MHz/ VBW 8MHz for Peak, RBW 2.4MHz/10Hz for Average

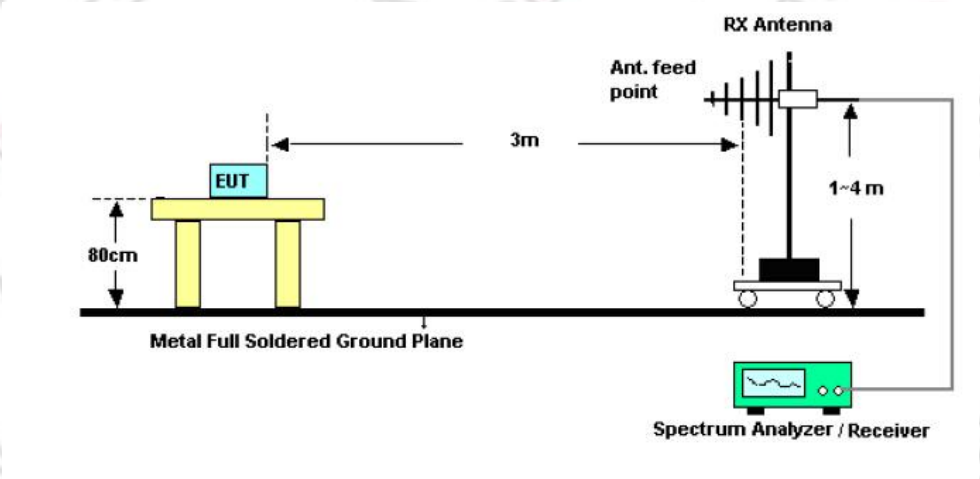
Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

3.1.3. Test Setup

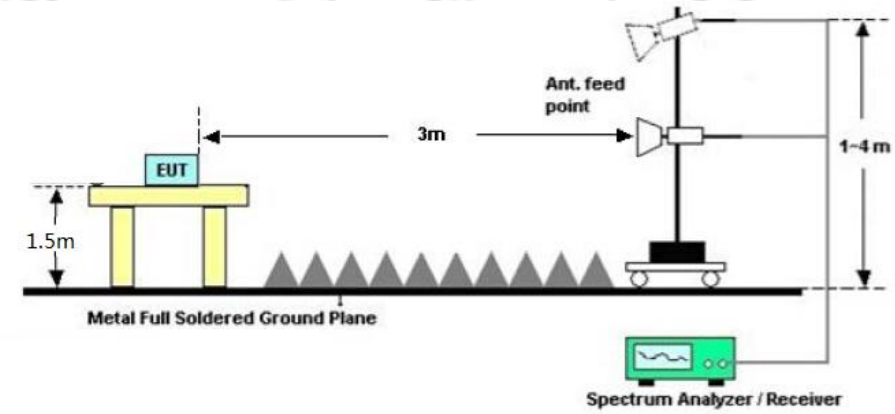
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



3.1.4. Test Result

For 9 kHz ~ 30 MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

For 30 MHz ~ 1 GHz:

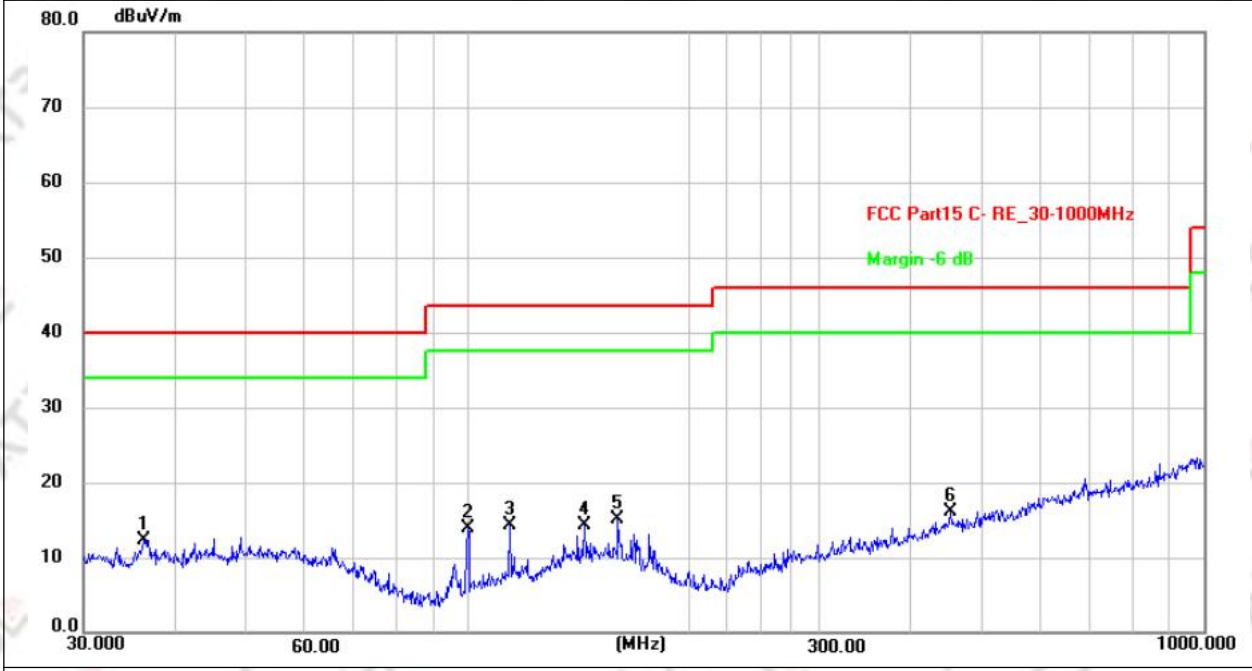
For Mouse:

Note:

1. All modes have been tested, only worst case(2402MHz)mode was recorded in the test report.
2. Emission Level (dBuV/m) = Reading Value (dBuV) + Correction Factor (dB/m).
3. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
4. The emission levels of other frequencies were less than 20dB margin against the limit.
5. Margin value = Emission level-Limit value.

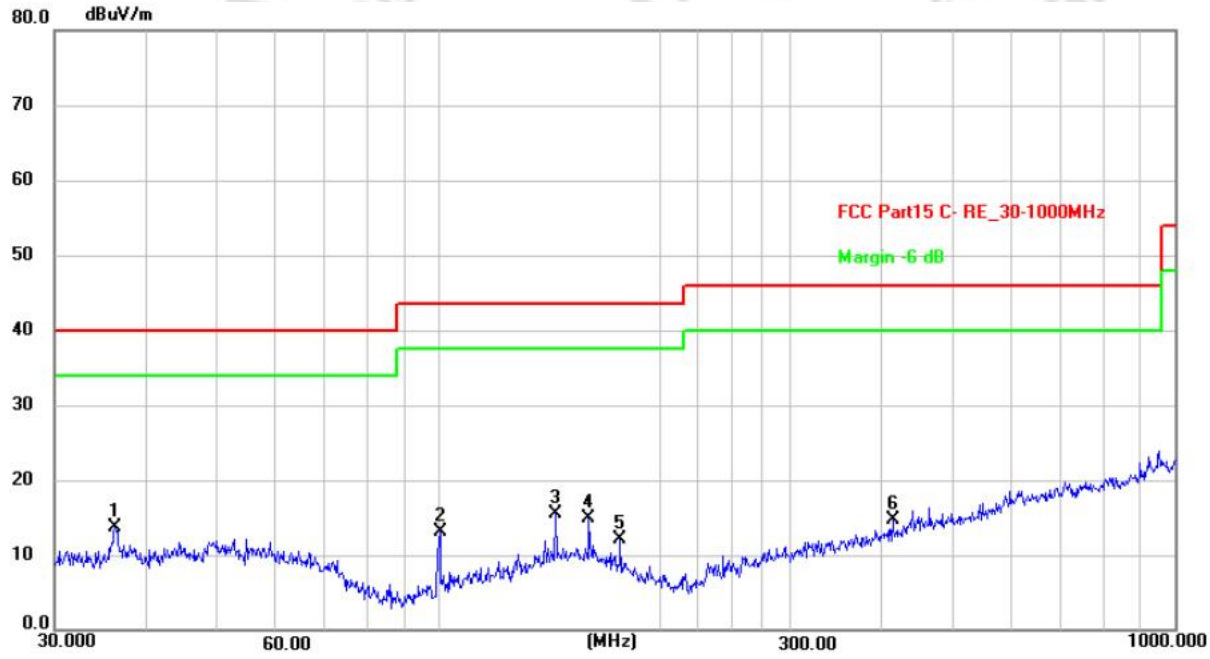
For keyboard:

Polarization	Horizontal	Mode	2402MHz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	36.2541	41.80	-29.47	12.33	40.00	-27.67	peak
2	99.8777	47.51	-33.56	13.95	43.50	-29.55	peak
3	113.7143	46.59	-32.31	14.28	43.50	-29.22	peak
4	143.8295	43.66	-29.37	14.29	43.50	-29.21	peak
5	159.7844	44.12	-28.92	15.20	43.50	-28.30	peak
6	452.7197	40.35	-24.21	16.14	46.00	-29.86	peak

Polarization	Vertical	Mode	2402MHz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	36.2541	43.10	-29.47	13.63	40.00	-26.37	peak
2	100.2286	46.63	-33.52	13.11	43.50	-30.39	peak
3	143.8295	44.79	-29.37	15.42	43.50	-28.08	peak
4	159.7844	43.89	-28.92	14.97	43.50	-28.53	peak
5	176.2686	42.67	-30.59	12.08	43.50	-31.42	peak
6	413.2706	40.49	-25.78	14.71	46.00	-31.29	peak

For 1 GHz ~ 18GHz:

Note:

1.The all data rate modes had been test, but only worse test data was recorded in the test report.

2.In frequency ranges 18 ~25GHz no any other harmonic emissions detected which are tested to compliance with the limit. No recording in the test report. No any other emissions level which are attenuated less than 20dB below the limit. No recording in the test report.

3.We used the filter to test and the main frequency was filtered out.

4.Emission Level (dBuV/m) = Reading Value (dBuV) + Correction Factor (dB/m).

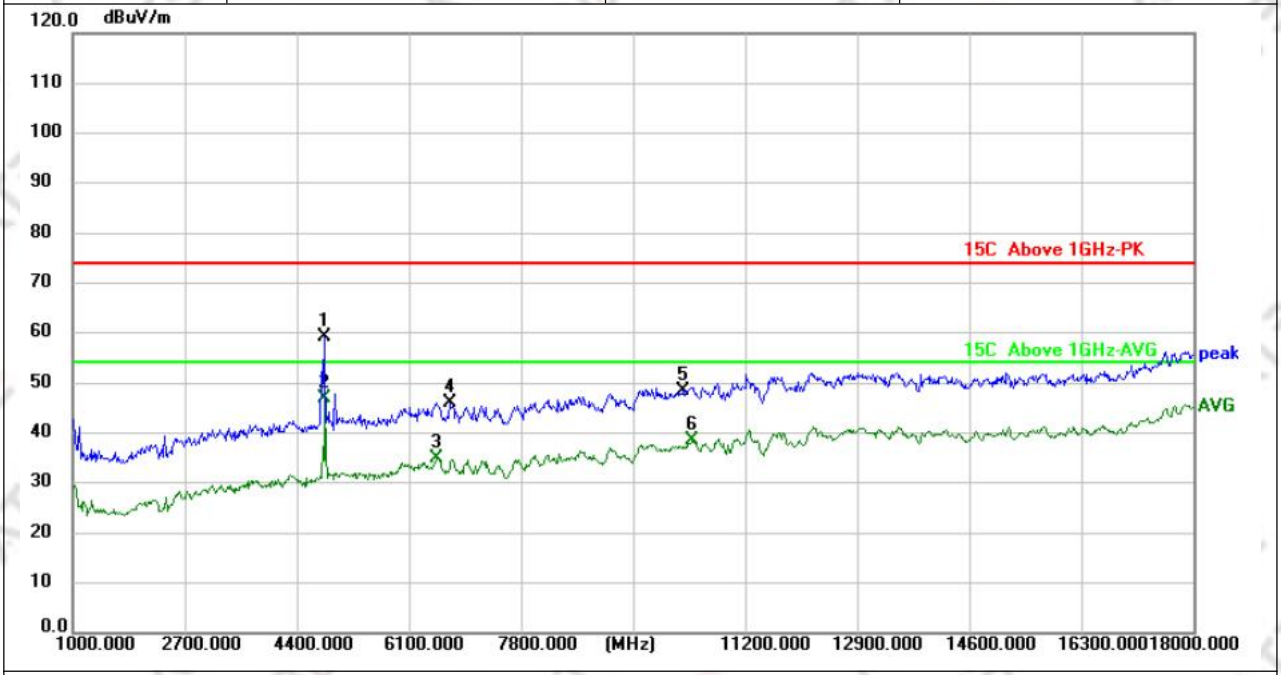
5. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).

6. The emission levels of other frequencies were less than 20dB margin against the limit.

7. Margin value = Emission level-Limit value.

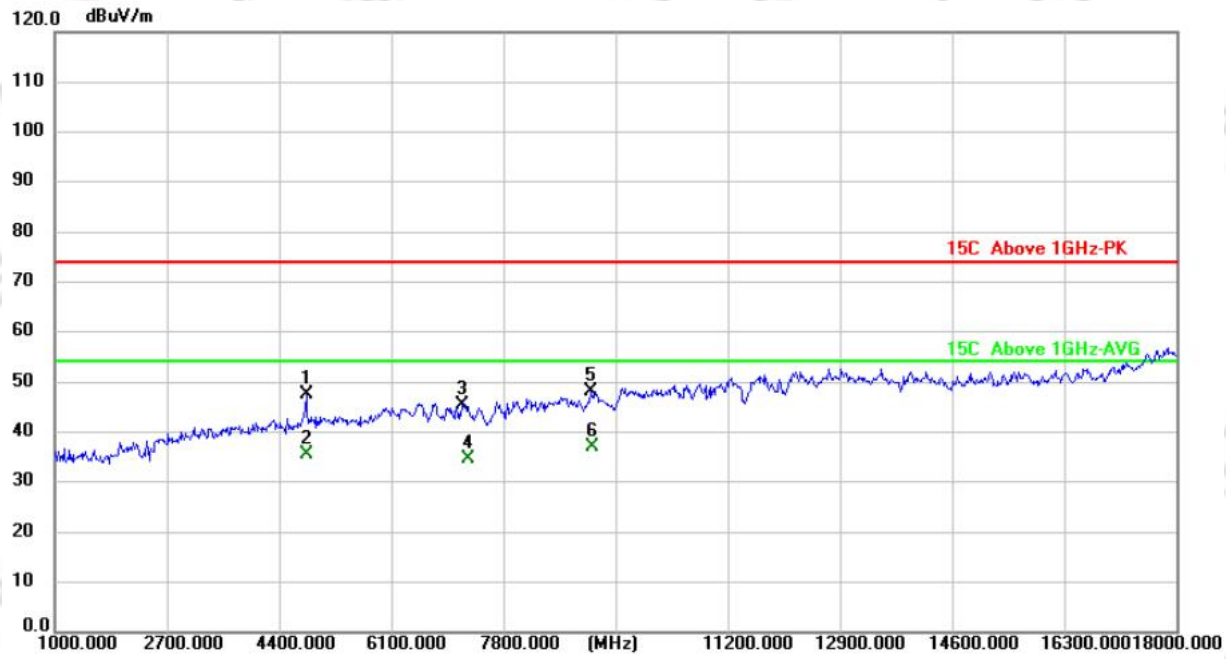
For keyboard:

Polarization	Horizontal	Mode	2402MHz



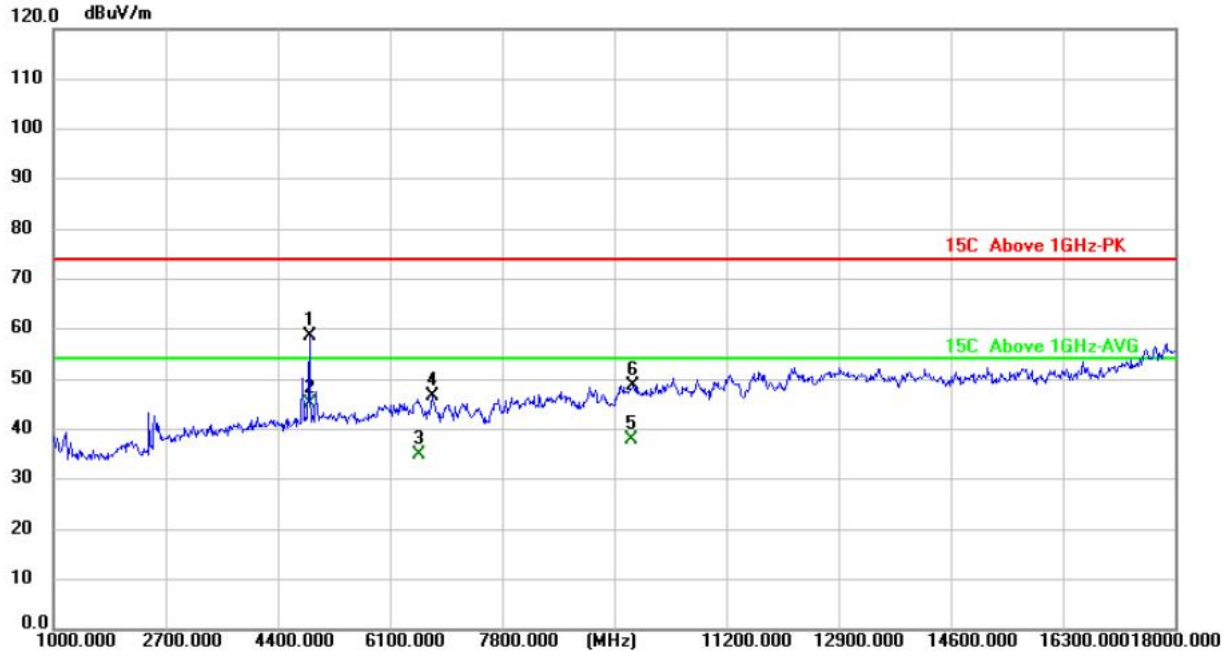
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4808.000	65.03	-5.88	59.15	74.00	-14.85	peak
2 *	4825.000	52.68	-5.81	46.87	54.00	-7.13	AVG
3	6525.000	36.11	-1.06	35.05	54.00	-18.95	AVG
4	6712.000	46.66	-0.72	45.94	74.00	-28.06	peak
5	10265.000	42.97	5.59	48.56	74.00	-25.44	peak
6	10401.000	32.71	5.82	38.53	54.00	-15.47	AVG

Polarization	Vertical	Mode	2402MHz



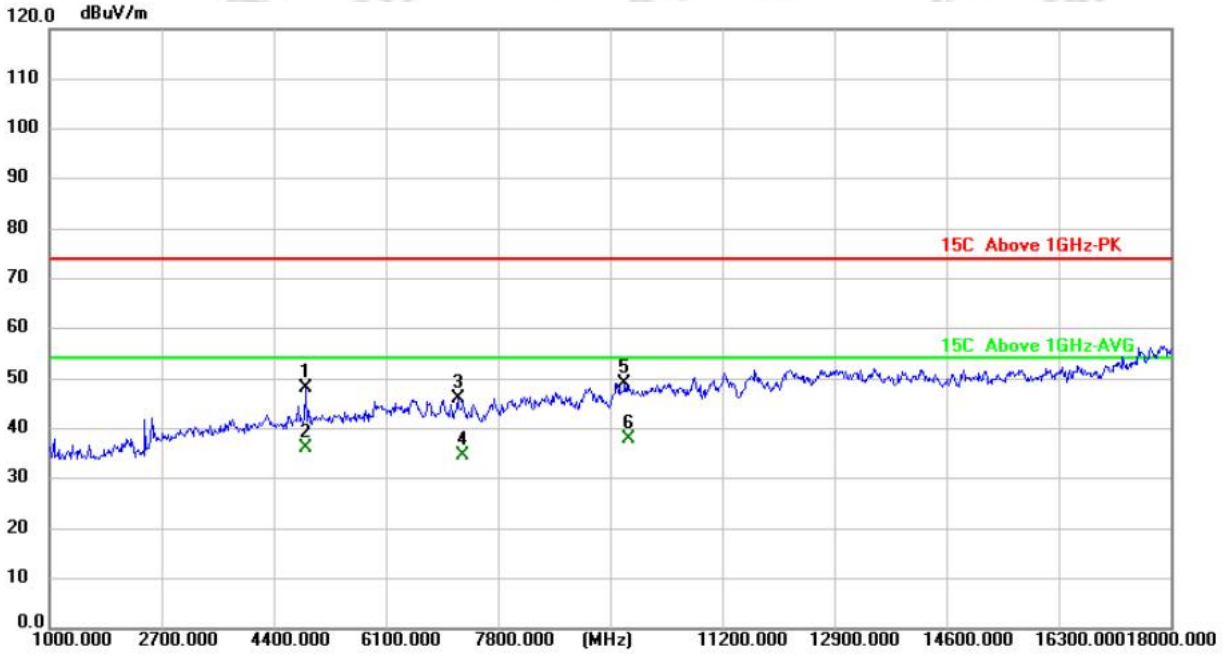
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4808.000	53.47	-5.88	47.59	74.00	-26.41	peak
2	4825.000	41.35	-5.81	35.54	54.00	-18.46	AVG
3	7171.000	45.75	-0.27	45.48	74.00	-28.52	peak
4	7273.000	34.98	-0.31	34.67	54.00	-19.33	AVG
5	9126.000	44.50	3.75	48.25	74.00	-25.75	peak
6 *	9143.000	33.21	3.76	36.97	54.00	-17.03	AVG

Polarization	Horizontal	Mode	2440MHz



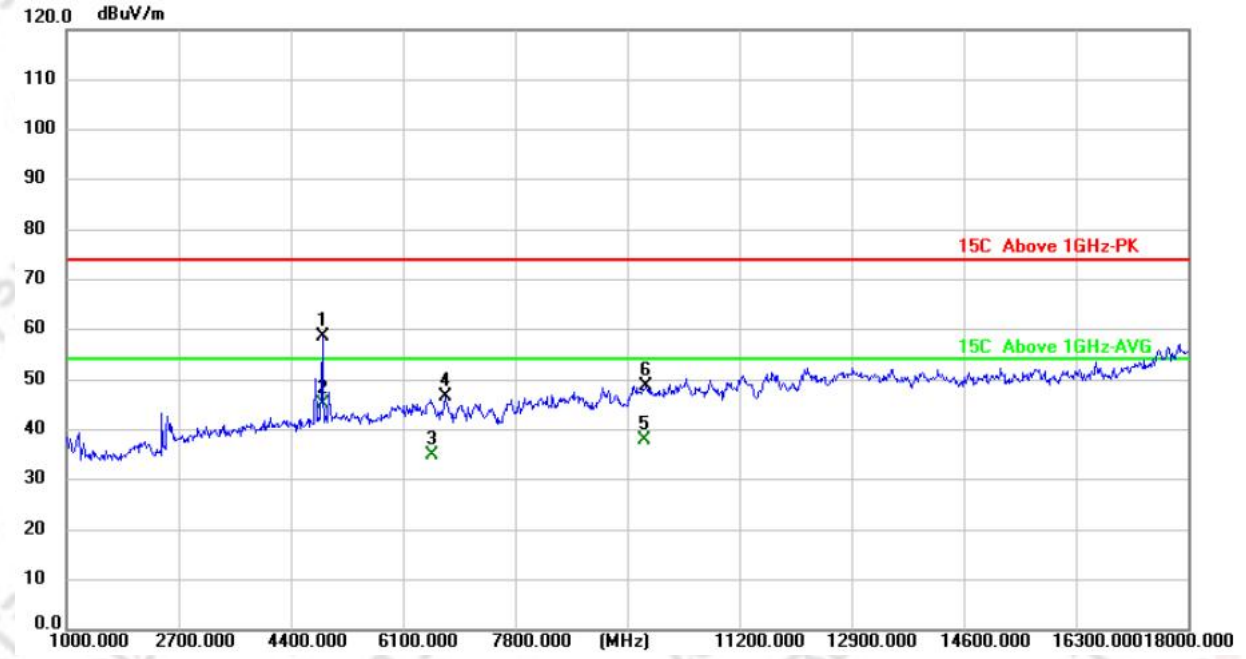
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4876.000	64.35	-5.64	58.71	74.00	-15.29	peak
2 *	4893.000	50.58	-5.57	45.01	54.00	-8.99	AVG
3	6542.000	36.09	-1.02	35.07	54.00	-18.93	AVG
4	6746.000	47.27	-0.65	46.62	74.00	-27.38	peak
5	9755.000	33.22	4.67	37.89	54.00	-16.11	AVG
6	9789.000	43.91	4.72	48.63	74.00	-25.37	peak

Polarization	Vertical	Mode	2440MHz



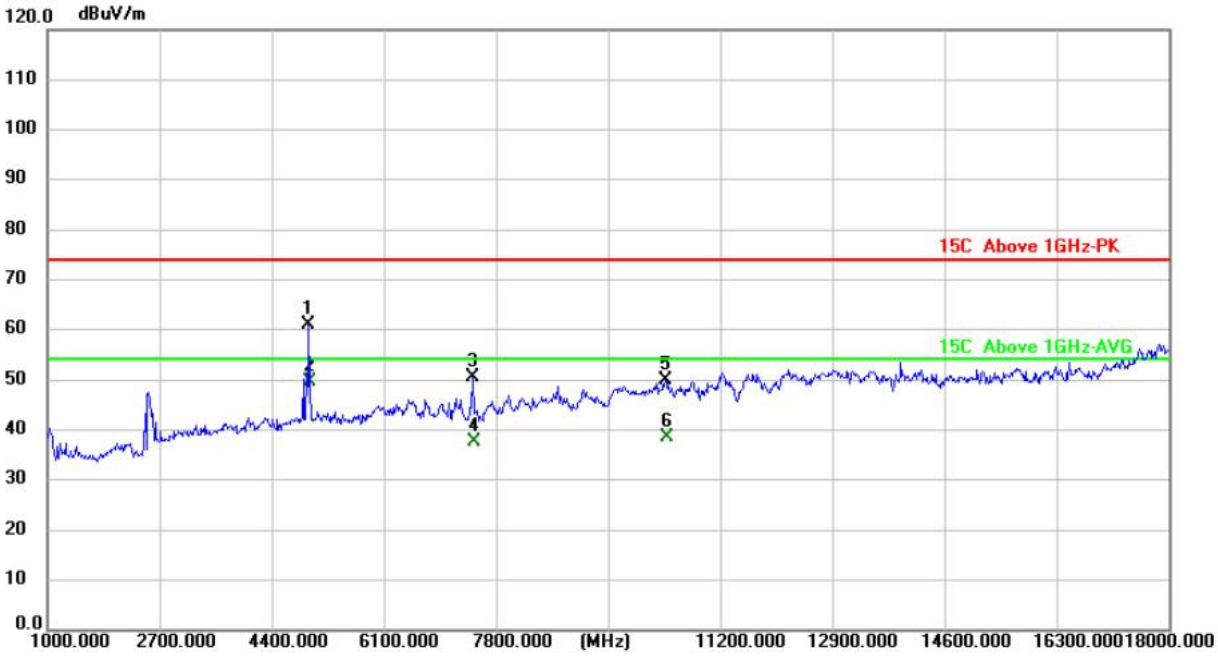
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4876.000	53.80	-5.64	48.16	74.00	-25.84	peak
2	4893.000	41.78	-5.57	36.21	54.00	-17.79	AVG
3	7188.000	46.28	-0.28	46.00	74.00	-28.00	peak
4	7273.000	34.83	-0.31	34.52	54.00	-19.48	AVG
5	9721.000	44.56	4.60	49.16	74.00	-24.84	peak
6 *	9789.000	33.10	4.72	37.82	54.00	-16.18	AVG

Polarization	Horizontal	Mode	2480MHz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4876.000	64.35	-5.64	58.71	74.00	-15.29	peak
2 *	4893.000	50.58	-5.57	45.01	54.00	-8.99	AVG
3	6542.000	36.09	-1.02	35.07	54.00	-18.93	AVG
4	6746.000	47.27	-0.65	46.62	74.00	-27.38	peak
5	9755.000	33.22	4.67	37.89	54.00	-16.11	AVG
6	9789.000	43.91	4.72	48.63	74.00	-25.37	peak

Polarization	Vertical	Mode	2480MHz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4961.000	66.46	-5.34	61.12	74.00	-12.88	peak
2 *	4978.000	54.81	-5.28	49.53	54.00	-4.47	AVG
3	7443.000	50.85	-0.38	50.47	74.00	-23.53	peak
4	7460.000	38.17	-0.38	37.79	54.00	-16.21	AVG
5	10367.000	44.24	5.77	50.01	74.00	-23.99	peak
6	10401.000	32.85	5.82	38.67	54.00	-15.33	AVG

Field Strength of Fundamental

Note:

1. Level (dBuV/m) = Reading Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).

Freq. (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuV/m)	Margin (dB)	Remark	Polarity
2402	106.96	-15.82	91.14	114	-22.86	Peak	Horizontal
2402	73.59	-15.82	57.77	94	-36.23	Average	Horizontal
2402	102.81	-15.82	86.99	114	-27.01	Peak	Vertical
2402	71.99	-15.82	56.17	94	-37.83	Average	Vertical
2440	105.87	-15.56	90.31	114	-23.69	Peak	Horizontal
2440	72.55	-15.56	56.99	94	-37.01	Average	Horizontal
2440	103.28	-15.56	87.72	114	-26.28	Peak	Vertical
2440	71.36	-15.56	55.8	94	-38.2	Average	Vertical
2480	107.75	-15.32	**92.43**	114	-21.57	Peak	Horizontal
2480	72.87	-15.32	57.55	94	-36.45	Average	Horizontal
2480	103.09	-15.32	87.77	114	-26.23	Peak	Vertical
2480	70.87	-15.32	55.55	94	-38.45	Average	Vertical

3.2. Band edge Test

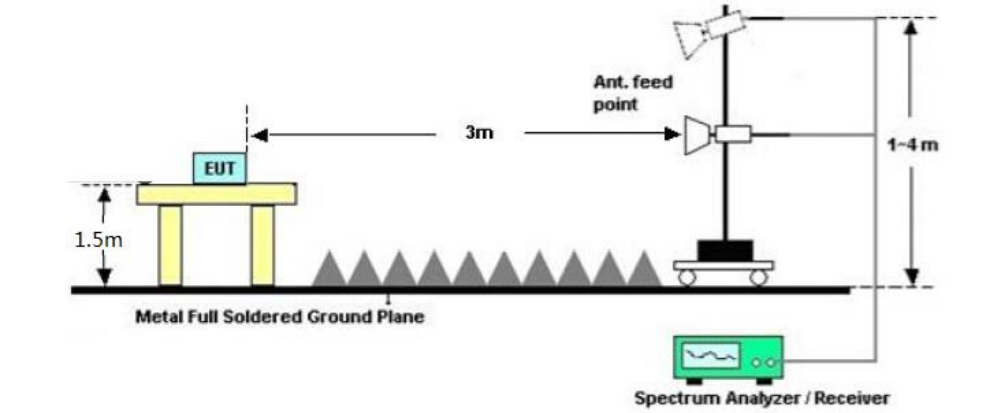
3.2.1. Limit

Frequency Band	Limit of the Field Strength (dBμV/m)	
	Peak	Average
f≤2390MHz	74	54
f≥2483.5MHz	74	54

3.2.2. Test Procedure

1. The EUT operates at transmitting mode. The operate channel is tested to verify the largest transmission and spurious emissions power at the continuous transmission mode.
2. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission: (a) PEAK: RBW=1MHz, VBW=3MHz / Sweep=AUTO
(b) AVERAGE: RBW=1MHz ; VBW=1/on time(1KHz) / Sweep=AUTO

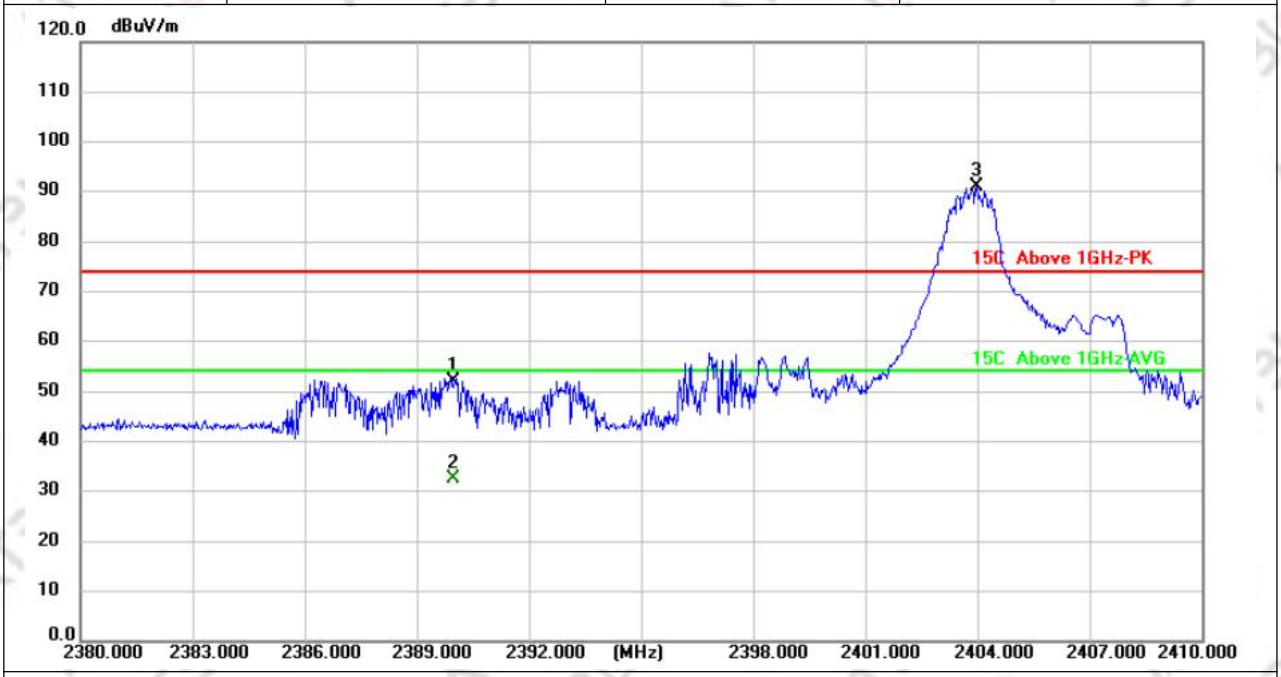
3.2.3. Test Setup



3.2.4. Test Result

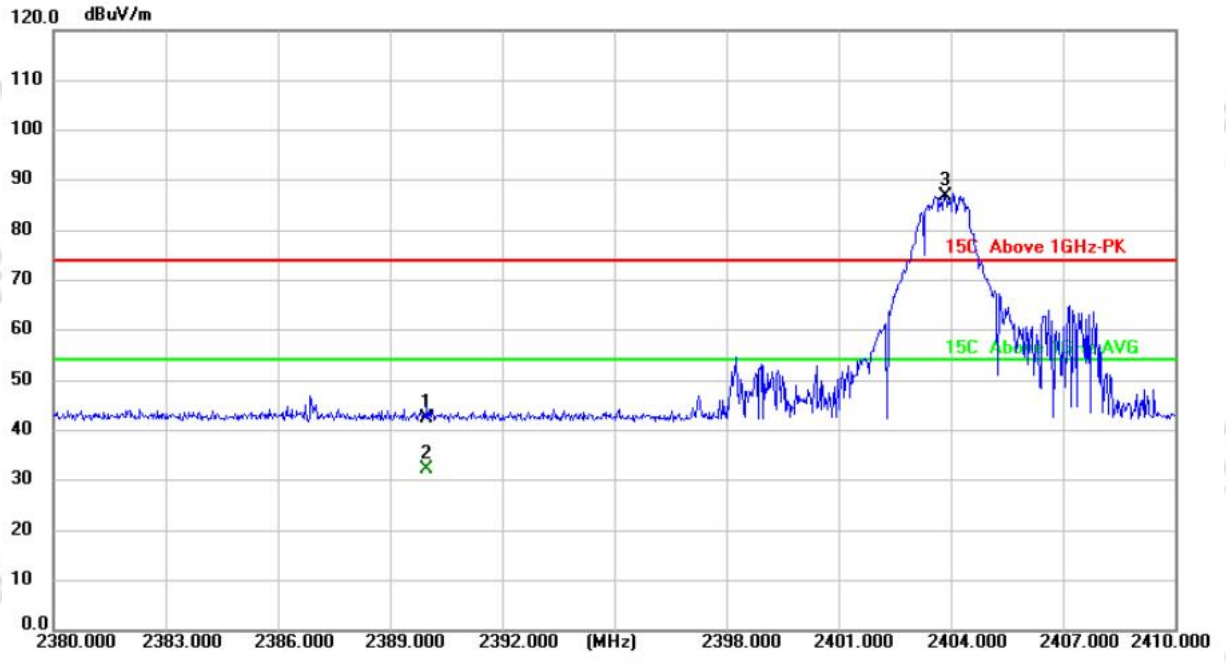
For keyboard:

Polarization	Horizontal	Mode	2402MHz



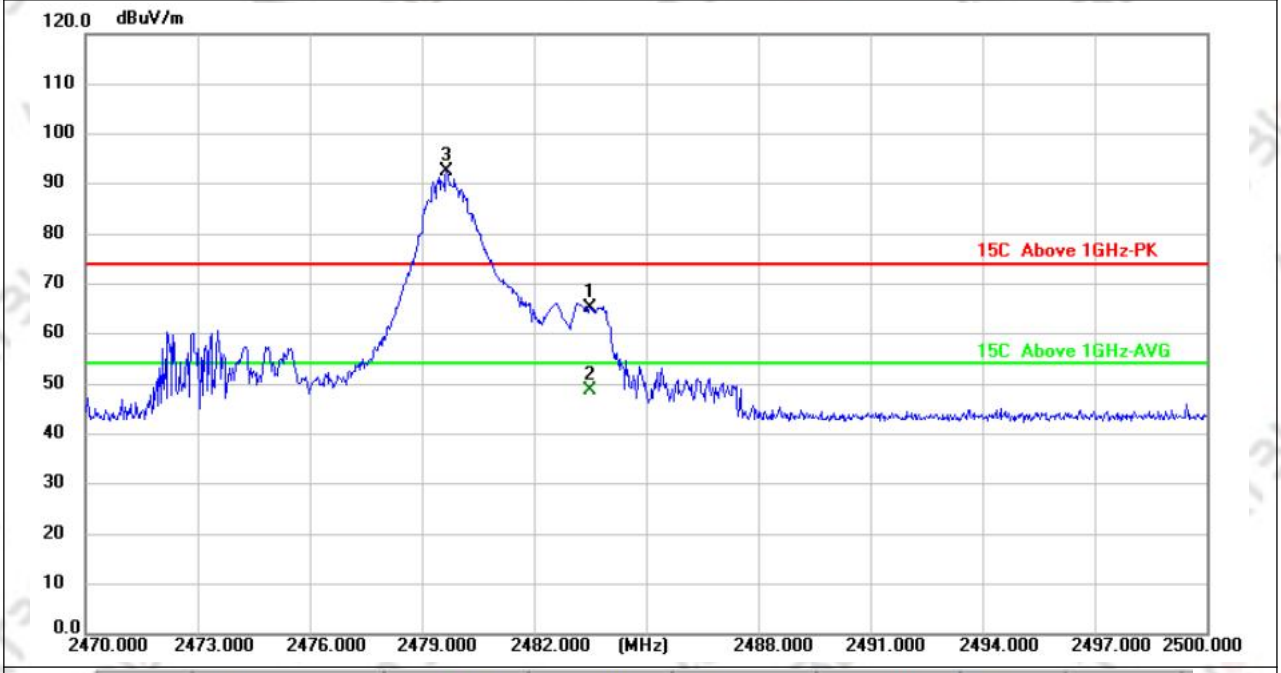
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2390.000	67.98	-15.88	52.10	74.00	-21.90	peak
2	2390.000	48.39	-15.88	32.51	54.00	-21.49	AVG

Polarization	Vertical	Mode	2402MHz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2390.000	58.37	-15.88	42.49	74.00	-31.51	peak
2	2390.000	48.16	-15.88	32.28	54.00	-21.72	AVG

Polarization	Horizontal	Mode	2480MHz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2483.500	80.43	-15.30	65.13	74.00	-8.87	peak
2	2483.500	63.91	-15.30	48.61	54.00	-5.39	AVG

Polarization	Vertical	Mode	2480MHz

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2483.500	79.33	-15.30	64.03	74.00	-9.97	peak
2	2483.500	63.55	-15.30	48.25	54.00	-5.75	AVG

REMARKS:

1.Emission Level (dBuV/m) = Reading Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).

3. The emission levels of other frequencies were less than 20dB margin against the limit.

4. Margin value = Emission level-Limit value.

3.3. 20dB Bandwidth

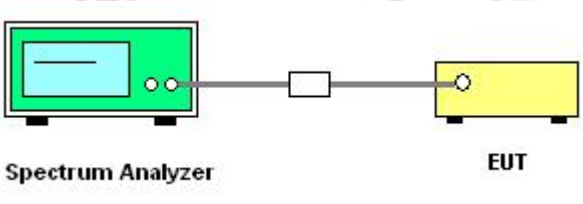
3.3.1. Limit

There is no limit requirement for 20dB Bandwidth.

3.3.2. Test Procedure

1. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
2. Set SPA Centre Frequency = Operation Frequency, RBW= 30 KHz, VBW≥3×RBW.
3. Set SPA Trace 1 Max hold, then View.

3.3.3. Test Setup



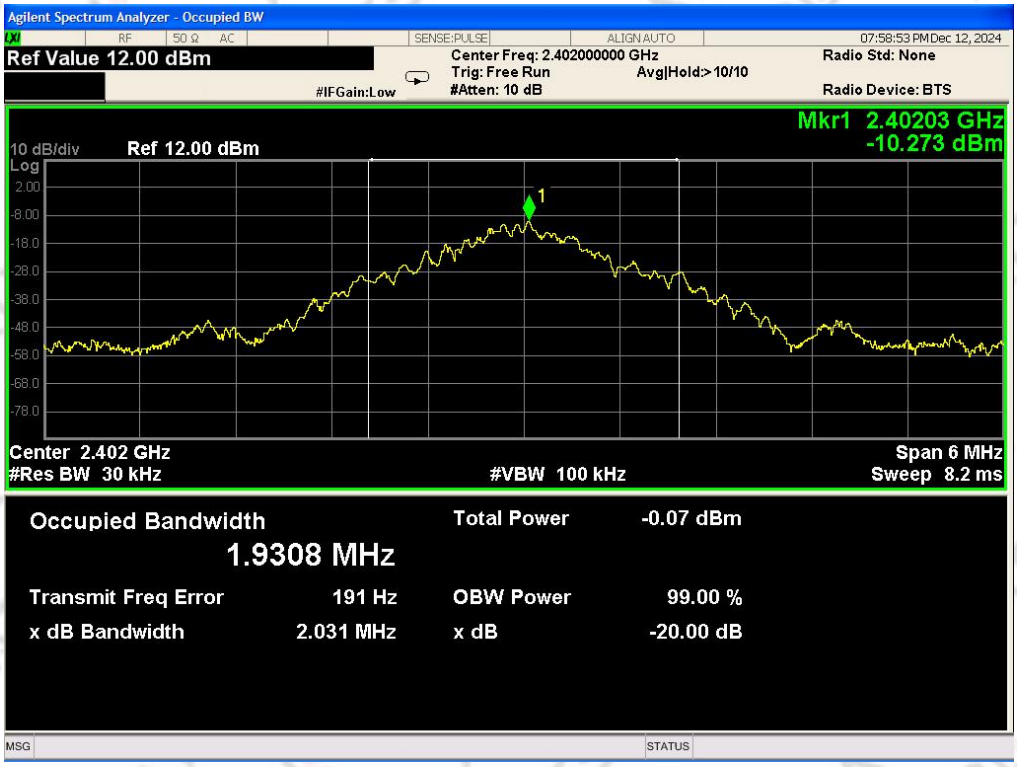
3.3.4. Test Result of 20dB Bandwidth

TEST ITEM	20DB BANDWIDTH
TEST MODULATION	GFSK

For keyboard:

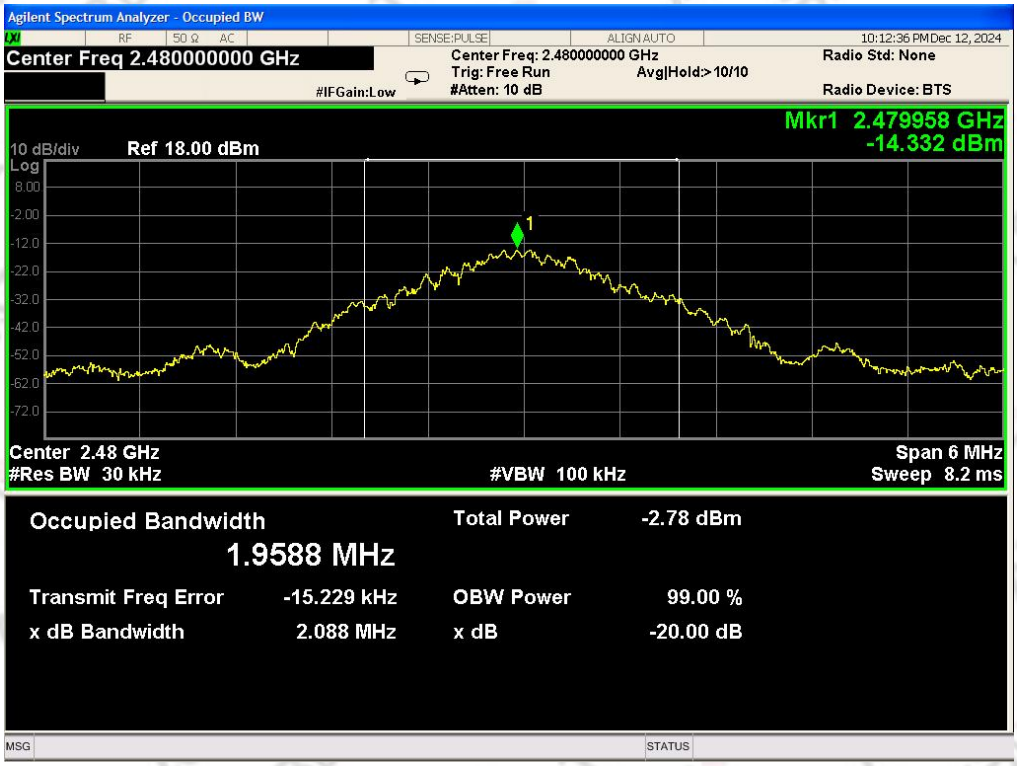
Test Data (MHz)		Criteria
Low Channel	2.031	PASS
Middle Channel	2.090	PASS
High Channel	2.088	PASS

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



3.4. AC Power-Line Conducted Emission

3.4.1. Limit

47 CFR 15.207(a): For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table:

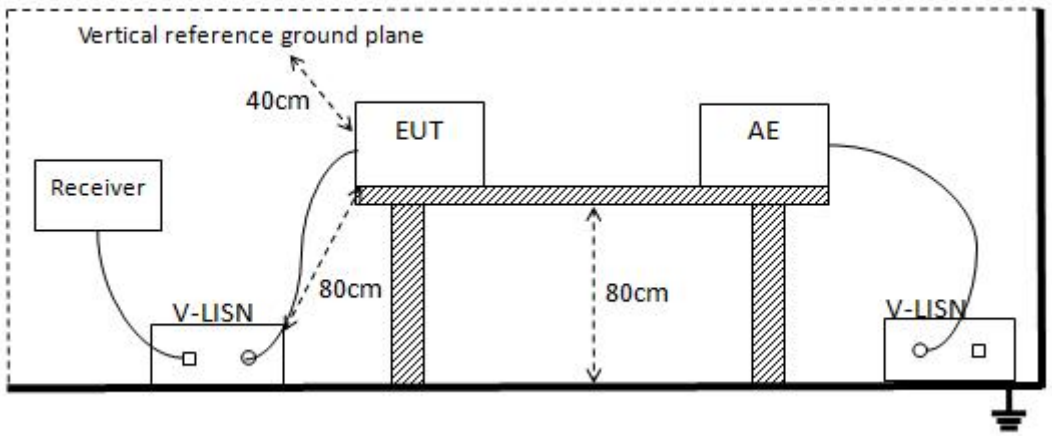
Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

3.4.2. Test Procedure

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9 kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

3.4.3. Test Setup



3.4.4. Test Result of AC Power-Line Conducted Emission

Note:
The product is battery powered , this item is not applicable.

3.5. Antenna Requirement

3.5.1. Standard Requirement

According to *47 CFR 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.

3.5.2. EUT Antenna

The antenna used for the EUT is PCB antenna, which meets the antenna requirements.

4. TEST SETUP PHOTOGRAPHS

Please refer to the Appendix F.

5. EXTERNAL AND INTERNAL PHOTOS OF THE EUT

Please refer to the Appendix G.

※※※※※END OF THE REPORT※※※※※