APPLICATION CERTIFICATION FCC Part 15C
On Behalf of
Dongguan Luxun Electronic Technology Co., Ltd

Bluetooth earphone

Model No.: X3

FCC ID: 2ATRA-X3

Prepared for	:	Dongguan Luxun Electronic Technology Co., Ltd
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Report No.	:	ATE20191640
Date of Test	:	November 11, 2019
Date of Report	:	November 18, 2019

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Test Report Certification

Applicant	:	Dongguan Luxun Electronic Technology Co., Ltd
Manufacturer	:	Dongguan Luxun Electronic Technology Co., Ltd
EUT	:	Bluetooth earphone
Model No.	:	X3

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247
ANSI C63.10: 2013

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 15.247 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 : November 11, 2019
Date of Report : November 18, 2019

Prepared by :
(Bob Wang, Engineer)

Approved & Authorized Signer :
(Sean Liu, Manager)

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

Model Number	:	X3
Bluetooth version	:	V5.0
Frequency Range	:	2402MHz-2480MHz
Number of Channels	:	79
Antenna Gain(Max)	:	1.0dBi
Antenna type	:	Integral Antenna
Modulation mode	:	GFSK, π/4 DQPSK, 8DPSK
Power Supply	:	DC 3.7V (Powered by Lithium battery) or DC 5.0V (Powered by USB port)
Applicant	:	Dongguan Luxun Electronic Technology Co., Ltd
Address	:	No.8, Yongxing Road, Miaobianwang, Shipai Town, Dongguan, China
Manufacturer	:	Dongguan Luxun Electronic Technology Co., Ltd
Address	:	No.8, Yongxing Road, Miaobianwang, Shipai Town, Dongguan, China

1.2.Accessory and Auxiliary Equipment

AC/DC Power Adapter (provided by laboratory)	:	Model:BEK-QC-001 INPUT: 120V~60Hz OUTPUT:5V/1A

1.3.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

1.4.Measurement Uncertainty

Radiated emission expanded uncertainty (9kHz-30MHz)	:	U=2.66dB, k=2
Radiated emission expanded uncertainty (30MHz-1000MHz)	:	U=4.28dB, k=2
Radiated emission expanded uncertainty (1G-18GHz)	:	U=4.98dB, k=2
Radiated emission expanded uncertainty (18G-26.5GHz)	:	U=5.06dB, k=2
Conduction Emission Expanded Uncertainty (Mains ports, 9kHz-30MHz)	:	U=2.72dB, k=2
Conduction Emission Expanded Uncertainty (Telecommunication ports, 150kHz-30MHz)	:	U=2.94dB, k=2
Power disturbance Expanded Uncertainty	:	U=2.92dB, k=2
Harmonic current expanded uncertainty	:	U=0.512%, 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	ESR	101817	Jan. 05, 2019	1 Year
Spectrum Analyzer	Rohde&Schwarz	FSV40	101495	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
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	SUHNER	N-5m(Frequency range:9KHz-26.5GHz)	NO.3	Jan. 05, 2019	1 Year
RF COAXIAL CABLE	SUHNER	N-5m(Frequency range:9KHz-26.5GHz)	NO.4	Jan. 05, 2019	1 Year
RF COAXIAL CABLE	SUHNER	N-1m(Frequency range:9KHz-26.5GHz)	NO.5	Jan. 05, 2019	1 Year
RF COAXIAL CABLE	SUHNER	N-1m(Frequency range:9KHz-26.5GHz)	NO.6	Jan. 05, 2019	1 Year
Temporary antenna connector	NTGS	14AE	N/A	Jan. 21, 2019	N/A

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

3. OPERATION OF EUT DURING TESTING

3.1.Operating Mode

The mode is used: Transmitting mode
Low Channel: 2402MHz
Middle Channel: 2441MHz
High Channel: 2480MHz
Hopping

3.2.Configuration and peripherals

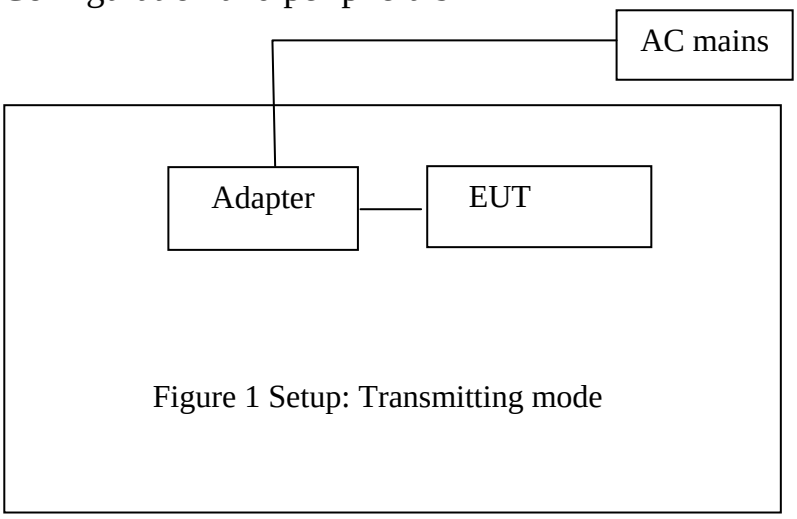


Figure 1 Setup: Transmitting mode

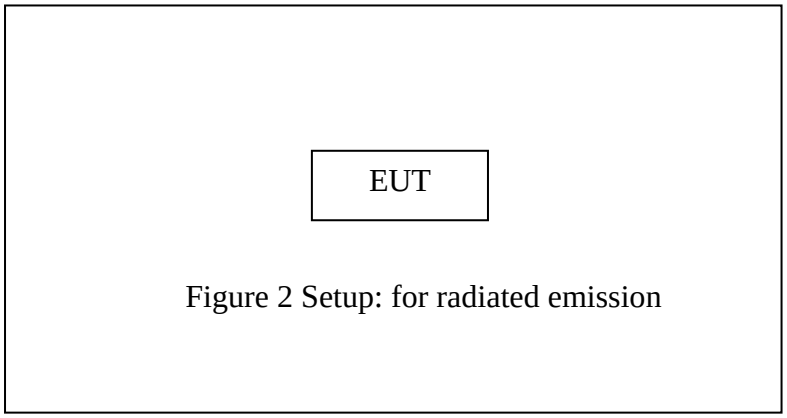


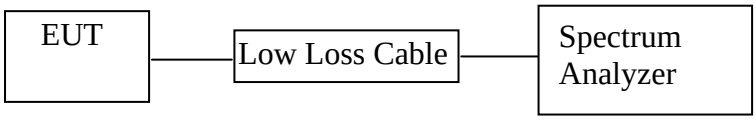
Figure 2 Setup: for radiated emission

4. TEST PROCEDURES AND RESULTS

FCC Rules	Description of Test	Result
Section 15.247(a)(1)	20dB Bandwidth Test	Compliant
Section 15.247(a)(1)	Carrier Frequency Separation Test	Compliant
Section 15.247(a)(1)(iii)	Number Of Hopping Frequency Test	Compliant
Section 15.247(a)(1)(iii)	Dwell Time Test	Compliant
Section 15.247(b)(1)	Maximum Peak Output Power Test	Compliant
Section 15.247(d) Section 15.209	Radiated Emission Test	Compliant
Section 15.247(d)	Band Edge Compliance Test	Compliant
Section 15.207	AC Power Line Conducted Emissions Test	Compliant
Section 15.203	Antenna Requirement	Compliant

5. 20DB BANDWIDTH TEST

5.1.Block Diagram of Test Setup



5.2.The Requirement For Section 15.247(a)(1)

Section 15.247(a)(1): Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

5.3.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.

5.4.Operating Condition of EUT

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

5.4.2.Turn on the power of all equipment.

5.4.3.Let the EUT work in TX (Hopping off) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.

5.5.Test Procedure

5.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

5.5.2.Set RBW of spectrum analyzer to 30 kHz and VBW to 100 kHz.

5.5.3.The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

5.6.Test Result

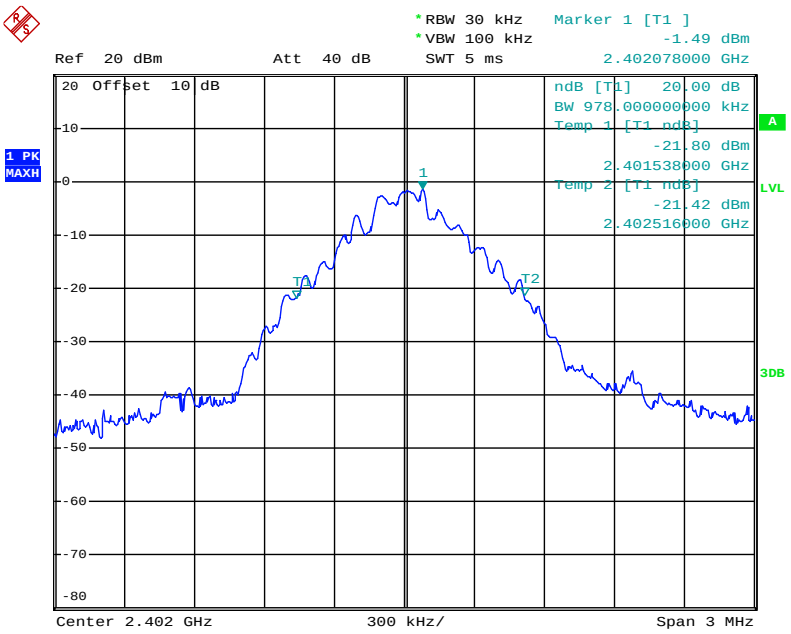
Test Lab: Shielding room

Channel	Frequency (MHz)	GFSK 20dB Bandwidth (MHz)	Π/4-DQPSK 20dB Bandwidth (MHz)	8DPSK 20dB Bandwidth (MHz)	Result
Low	2402	0.978	1.356	1.356	Pass
Middle	2441	0.984	1.356	1.356	Pass
High	2480	0.978	1.356	1.356	Pass

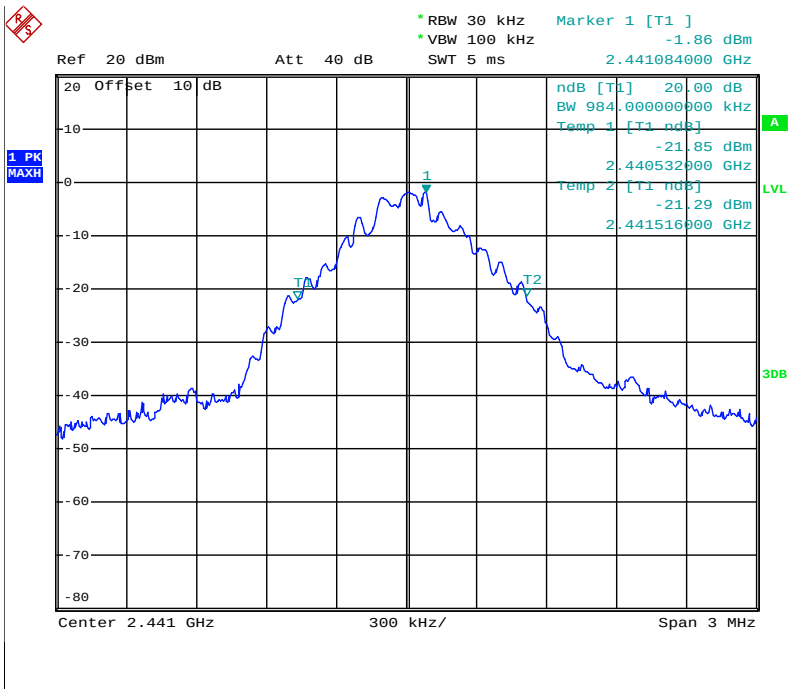
The spectrum analyzer plots are attached as below.

GFSK Mode

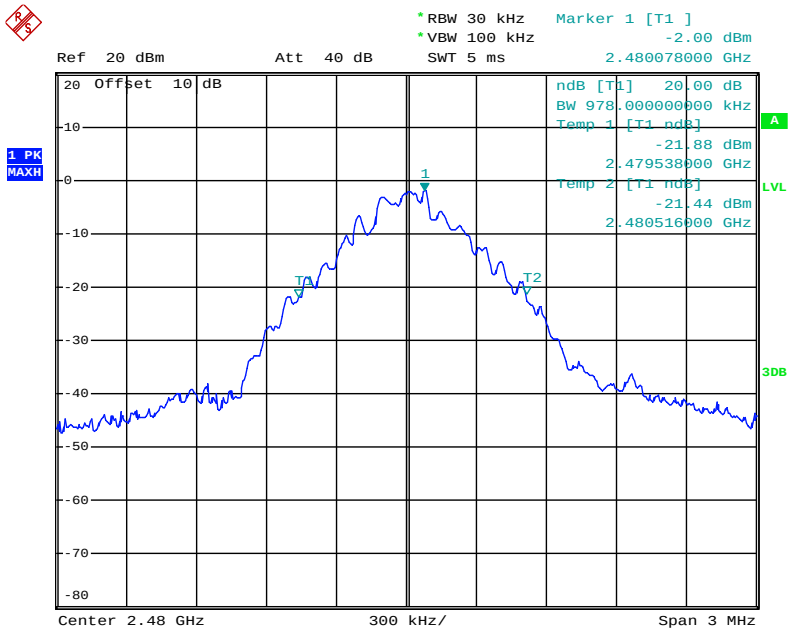
Low channel



Middle channel

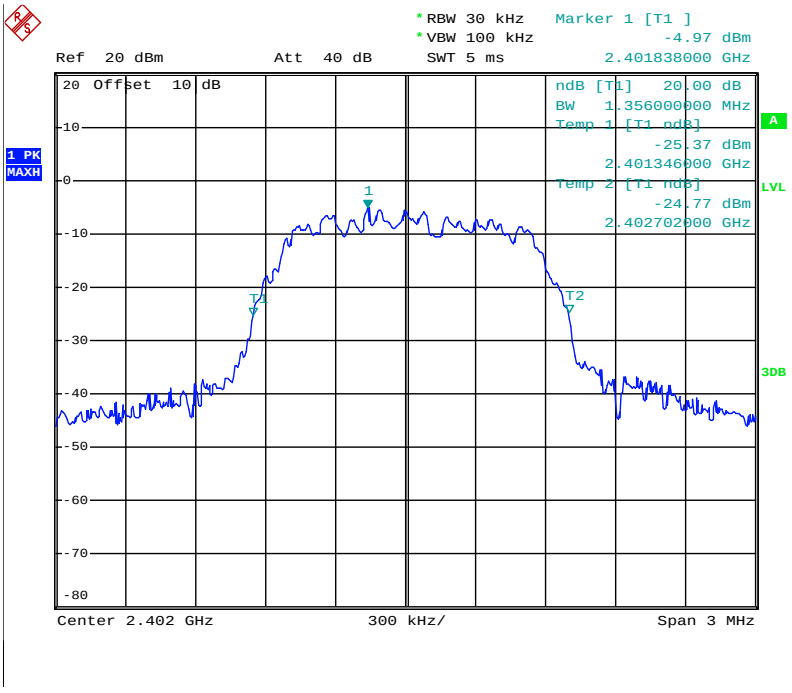


High channel

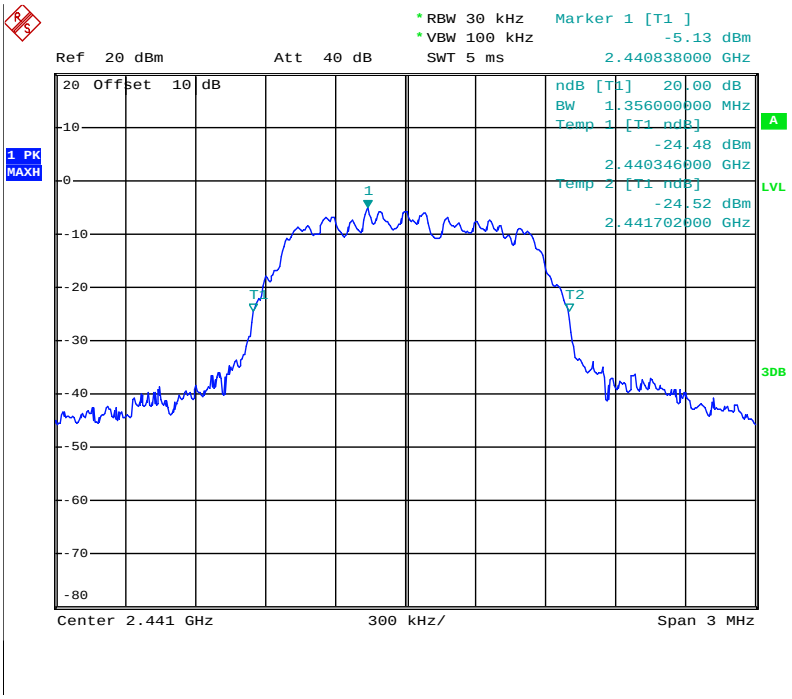


Π/4-DQPSK Mode

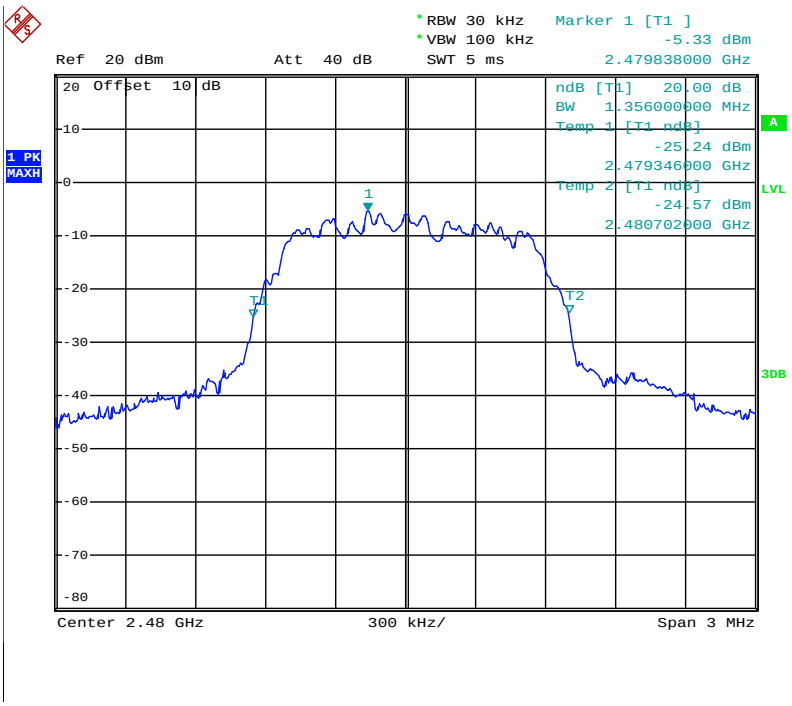
Low channel



Middle channel

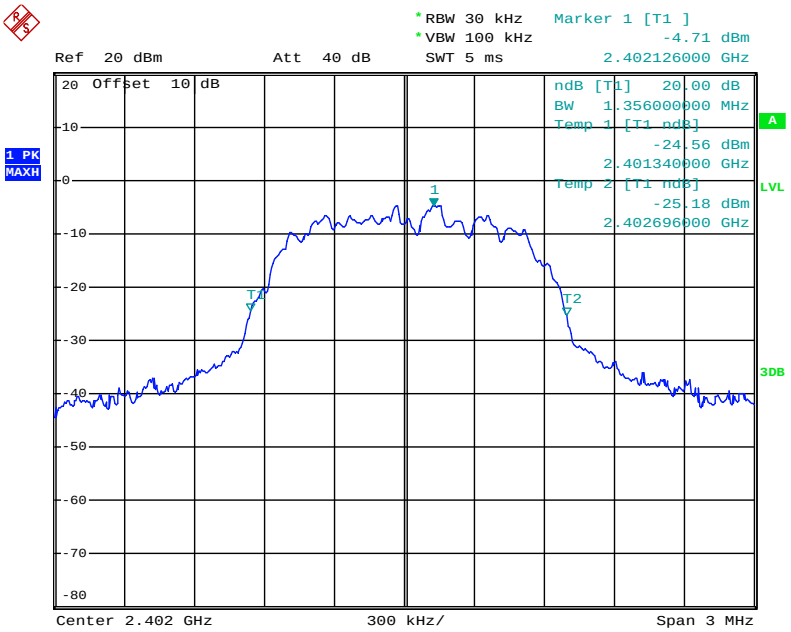


High channel

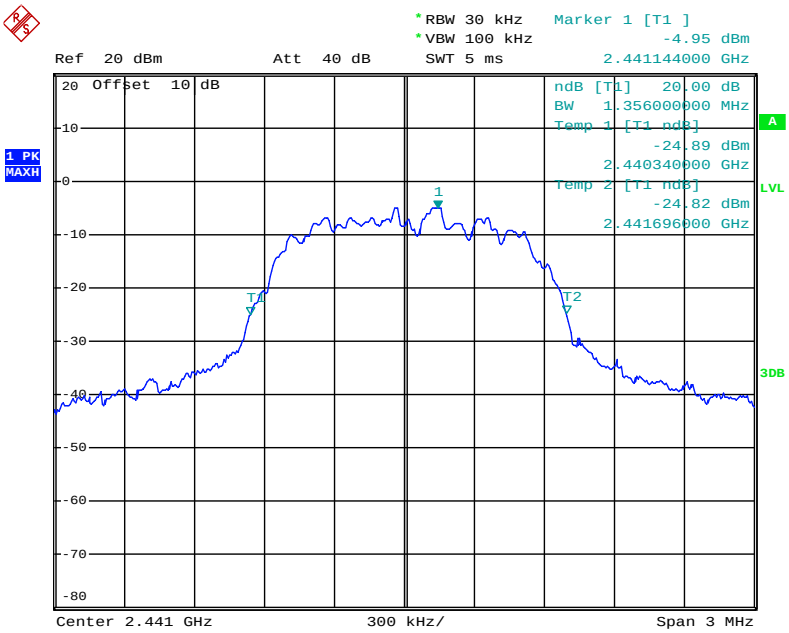


8DPSK Mode

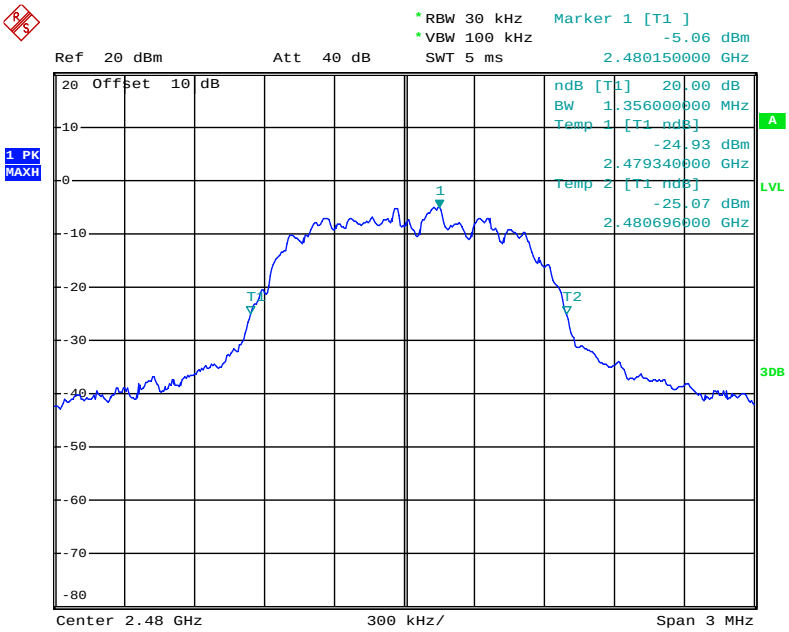
Low channel



Middle channel

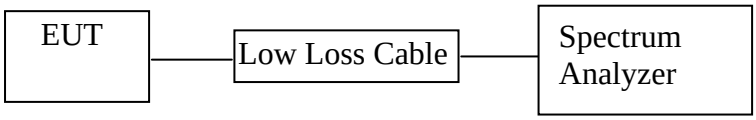


High channel



6. CARRIER FREQUENCY SEPARATION TEST

6.1.Block Diagram of Test Setup



6.2.The Requirement For Section 15.247(a)(1)

Section 15.247(a)(1): Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

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 (Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.

6.5.Test Procedure

6.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

6.5.2.Set RBW of spectrum analyzer to 30 kHz and VBW to 100 kHz. Adjust Span to 3 MHz.

6.5.3.Set the adjacent channel of the EUT Maxhold another trace.

6.5.4.Measurement the channel separation

6.6.Test Result

Test Lab: Shielding room

GFSK

Channel	Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result
Low	2402	1.002	25KHz or 2/3*20dB bandwidth	Pass
	2403			
Middle	2440	1.002	25KHz or 2/3*20dB bandwidth	Pass
	2441			
High	2479	1.002	25KHz or 2/3*20dB bandwidth	Pass
	2480			

Π/4-DQPSK

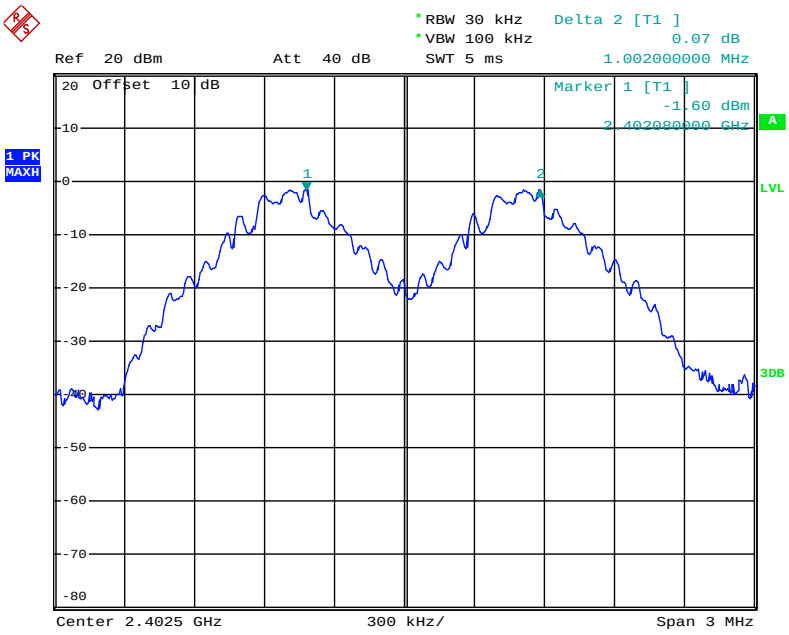
Channel	Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result
Low	2402	1.002	25KHz or 2/3*20dB bandwidth	Pass
	2403			
Middle	2440	1.008	25KHz or 2/3*20dB bandwidth	Pass
	2441			
High	2479	1.008	25KHz or 2/3*20dB bandwidth	Pass
	2480			

8DPSK

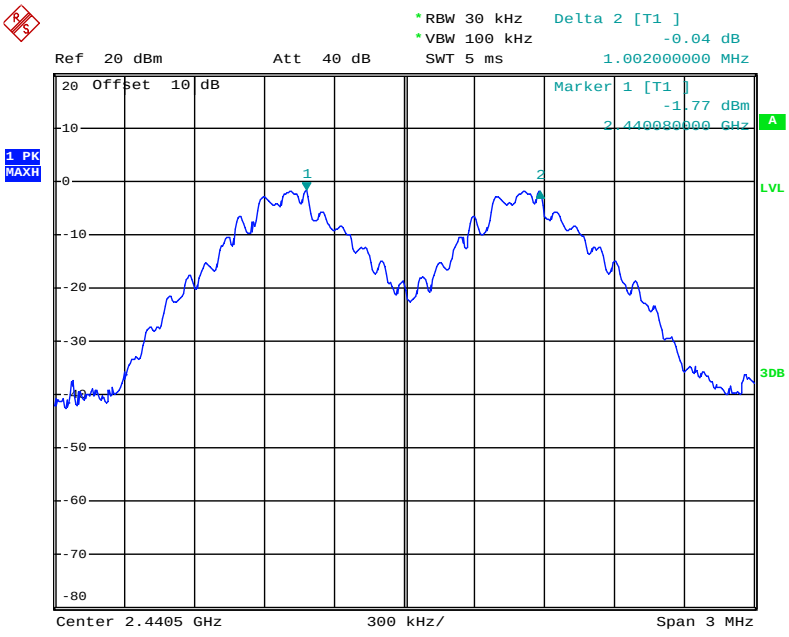
Channel	Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result
Low	2402	0.996	25KHz or 2/3*20dB bandwidth	Pass
	2403			
Middle	2440	1.002	25KHz or 2/3*20dB bandwidth	Pass
	2441			
High	2479	1.002	25KHz or 2/3*20dB bandwidth	Pass
	2480			

GFSK Mode

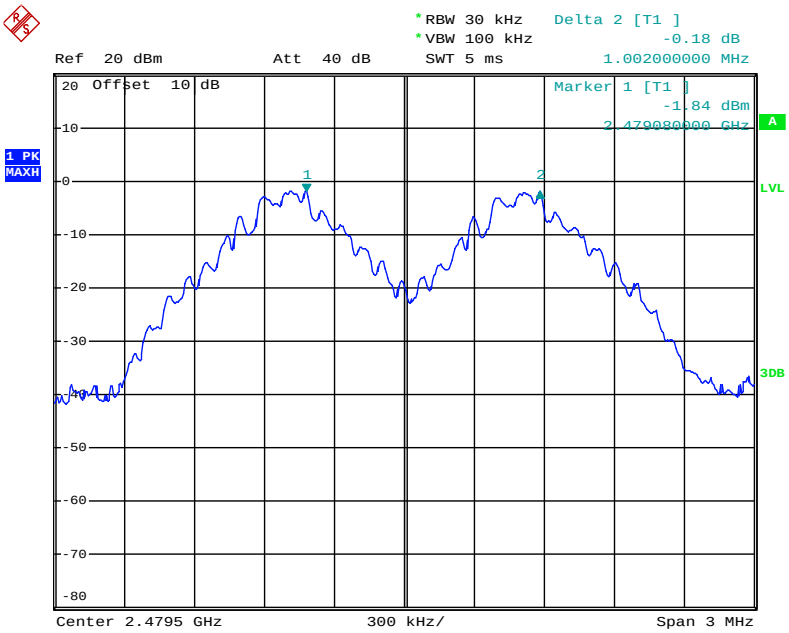
Low channel



Middle channel

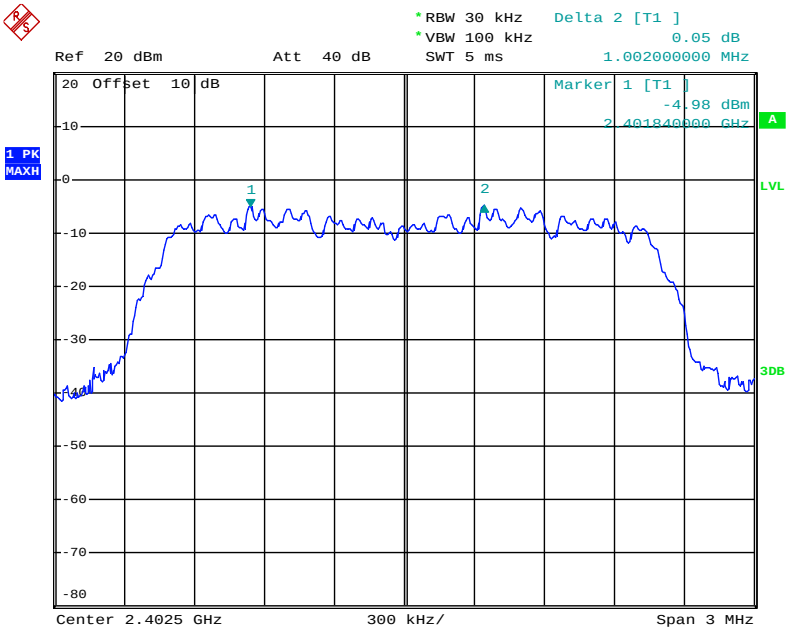


High channel

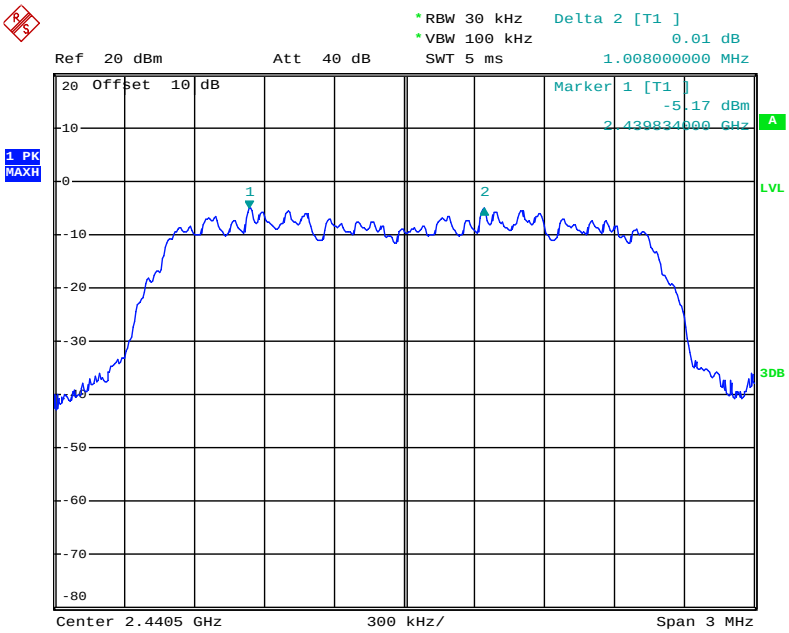


Π/4-DQPSK Mode

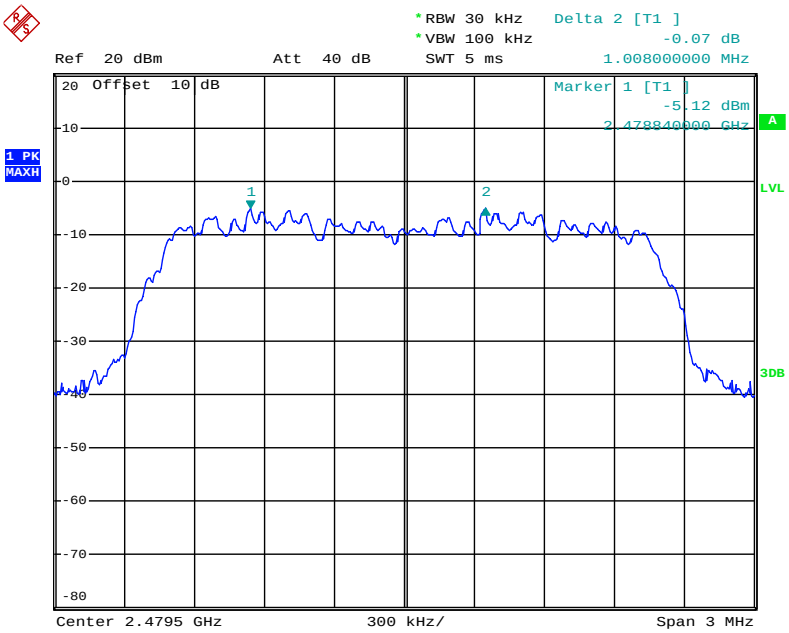
Low channel



Middle channel

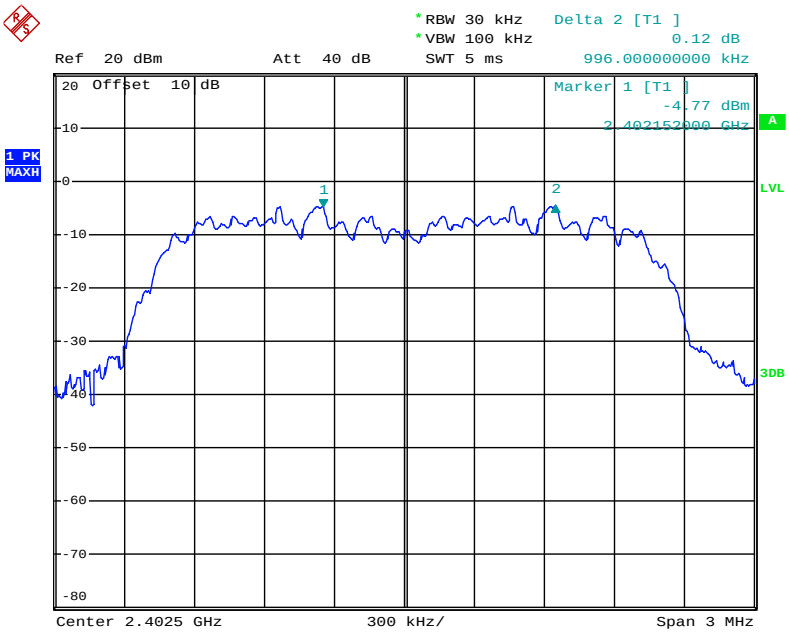


High channel

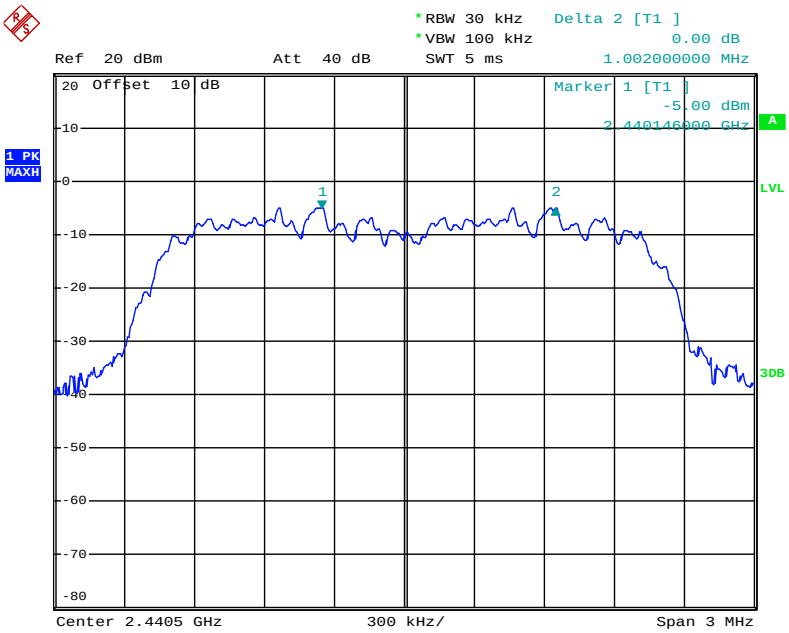


8DPSK Mode

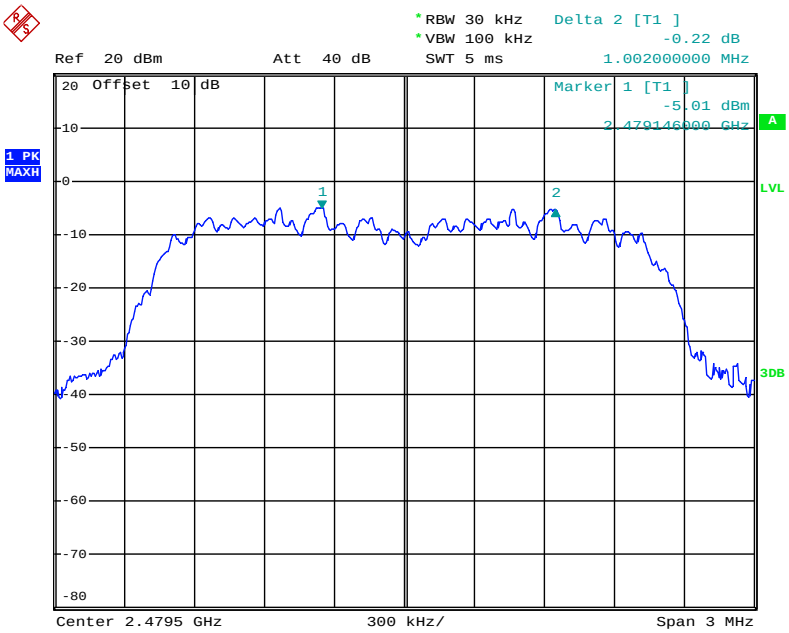
Low channel



Middle channel

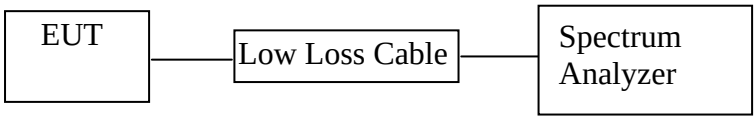


High channel



7. NUMBER OF HOPPING FREQUENCY TEST

7.1.Block Diagram of Test Setup



7.2.The Requirement For Section 15.247(a)(1)(iii)

Section 15.247(a)(1)(iii): Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

7.3.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.

7.4.Operating Condition of EUT

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

7.4.2.Turn on the power of all equipment.

7.4.3.Let the EUT work in TX (Hopping on) modes measure it.

7.5.Test Procedure

7.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

7.5.2.Set the spectrum analyzer as RBW=100 kHz, VBW=300 kHz.

7.5.3.Max hold, view and count how many channel in the band.

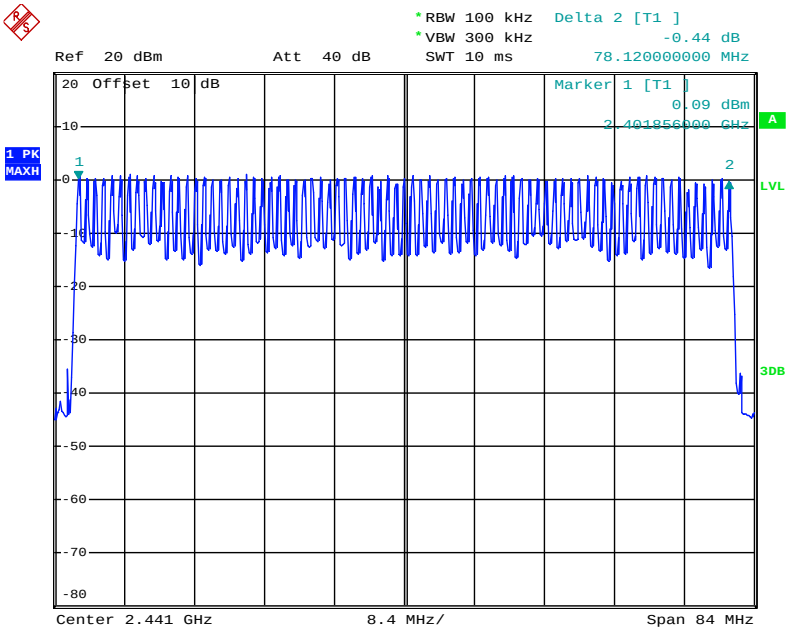
7.6.Test Result

Test Lab: Shielding room

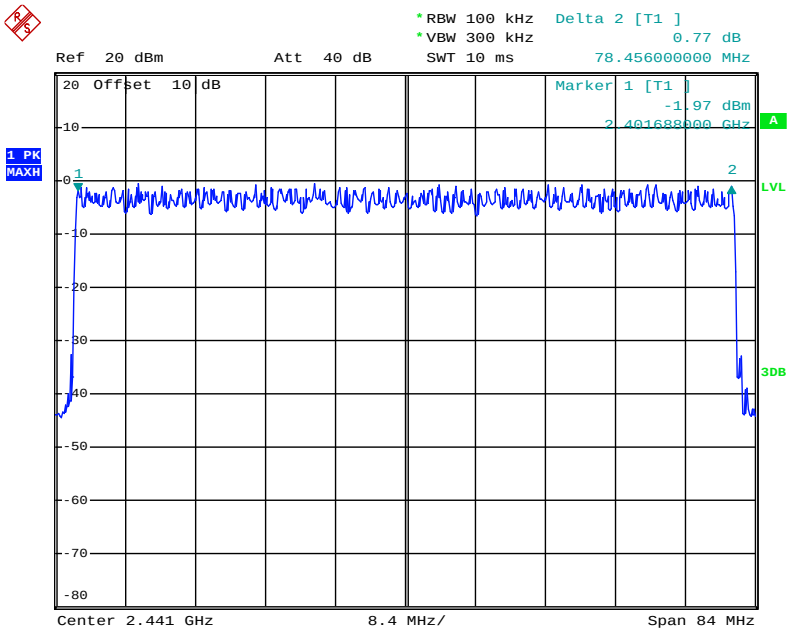
Total number of hopping channel	Measurement result(CH)	Limit(CH)	Result
	79	⩾15	Pass

The spectrum analyzer plots are attached as below.

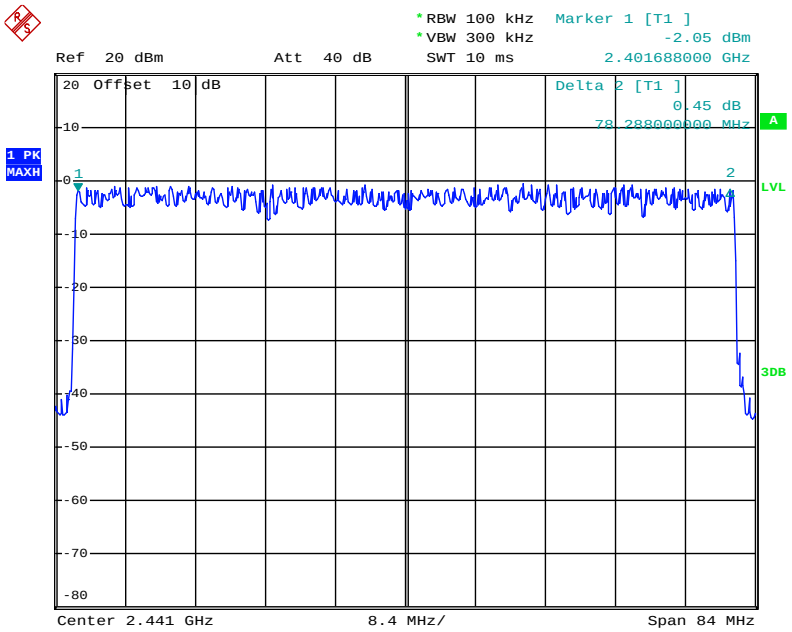
Number of hopping channels (GFSK Mode)



Number of hopping channels (Π/4-DQPSK Mode)

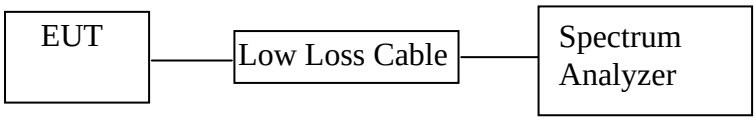


Number of hopping channels (8DPSK Mode)



8. DWELL TIME TEST

8.1.Block Diagram of Test Setup



8.2.The Requirement For Section 15.247(a)(1)(iii)

Section 15.247(a)(1)(iii): Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

8.3.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.

8.4.Operating Condition of EUT

8.4.1.Setup the EUT and simulator as shown as Section 8.1.

8.4.2.Turn on the power of all equipment.

8.4.3.Let the EUT work in TX (Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.

8.5.Test Procedure

8.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

8.5.2.Set center frequency of spectrum analyzer = operating frequency.

8.5.3.Set the spectrum analyzer as RBW=1MHz, VBW=3MHz, Span=0Hz, Adjust Sweep=5ms, 10ms, 15ms. Get the pulse time.

8.5.4.Repeat above procedures until all frequency measured were complete.

8.6.Test Result

Test Lab: Shielding room

GFSK Mode (Worse case)

Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2441	0.40	128.0	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(2*79))×31.6				
DH3	2441	1.70	272.0	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(4*79))×31.6				
DH5	2441	2.99	319.0	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(6*79))×31.6				

Π/4-DQPSK (Worse case)

Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2441	0.42	134.4	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(2*79))×31.6				
DH3	2441	1.72	275.2	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(4*79))×31.6				
DH5	2441	3.01	321.1	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(6*79))×31.6				

8DPSK Mode (Worse case)

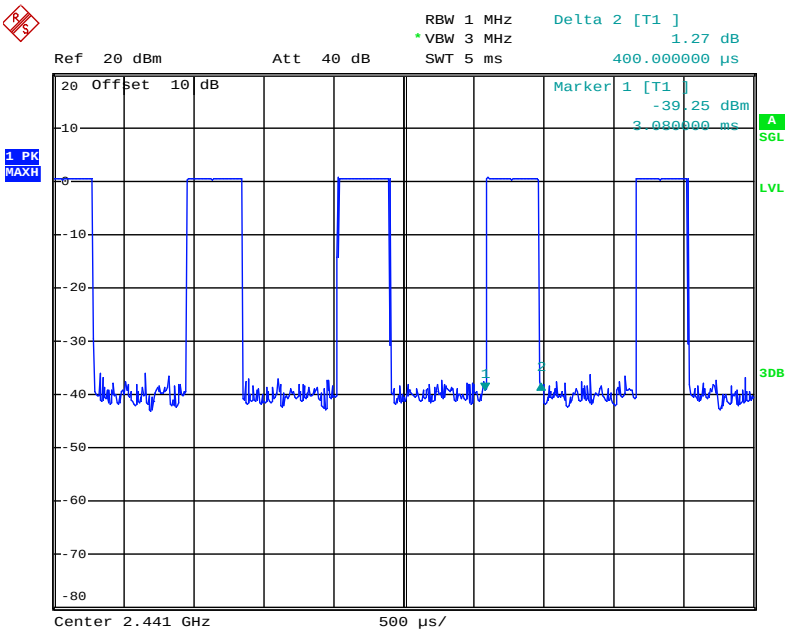
Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2441	0.42	134.4	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(2*79))×31.6				
DH3	2441	1.70	272.0	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(4*79))×31.6				
DH5	2441	2.99	319.0	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(6*79))×31.6				

Note: We tested GFSK mode and Π/4-DQPSK & 8DPSK mode the low, middle and high channel and recorded the Worse case data for all test mode.

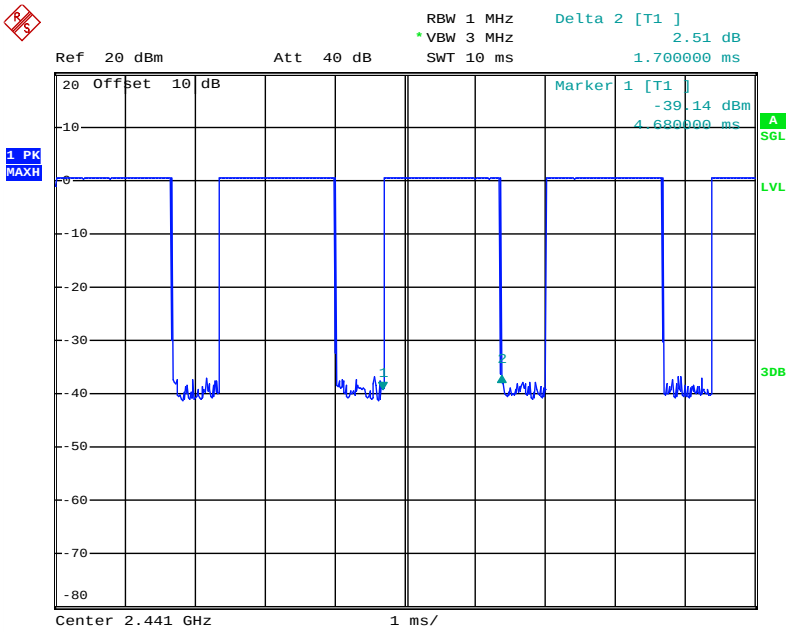
The spectrum analyzer plots are attached as below.

GFSK Mode

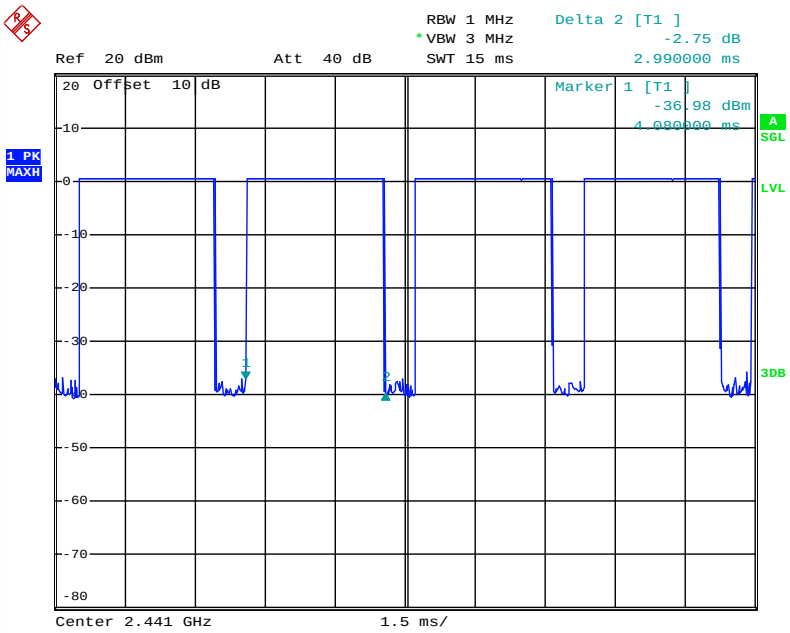
DH1 Middle channel



DH3 Middle channel

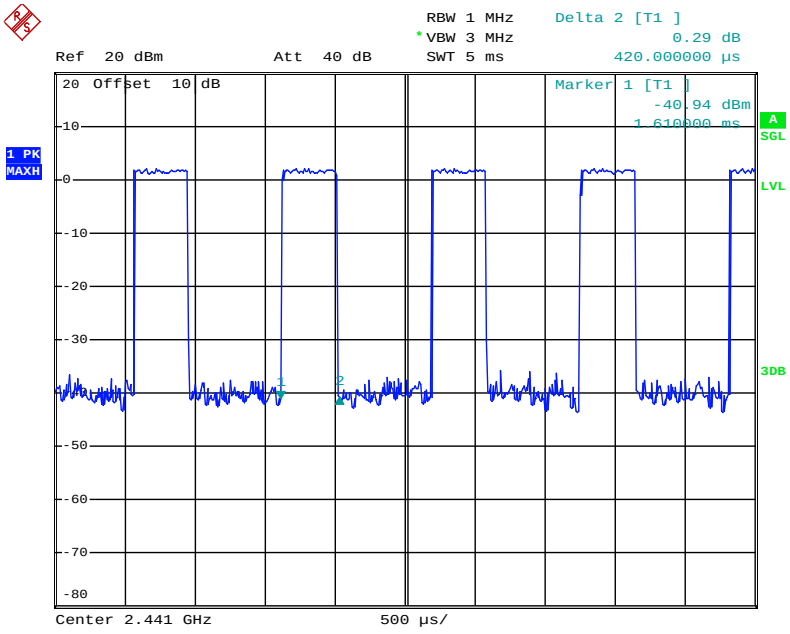


DH5 Middle channel

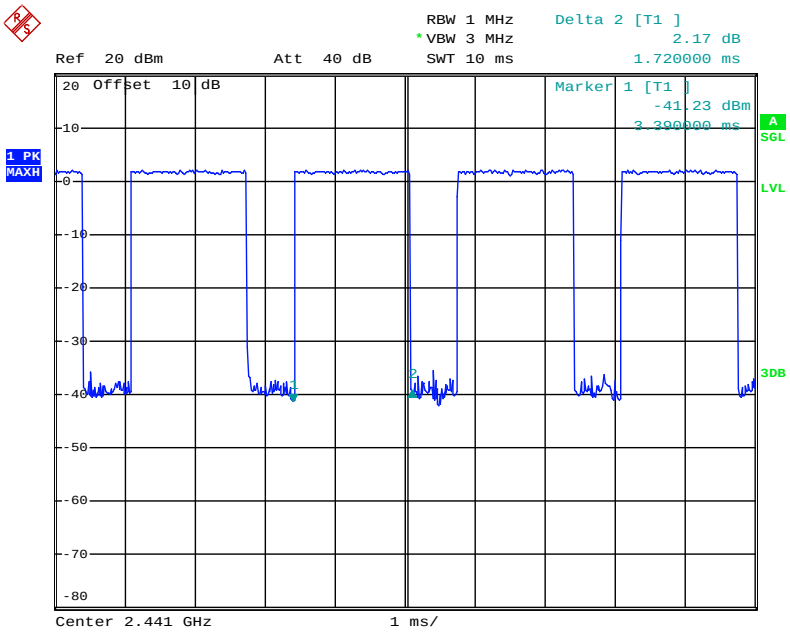


Π/4-DQPSK Mode

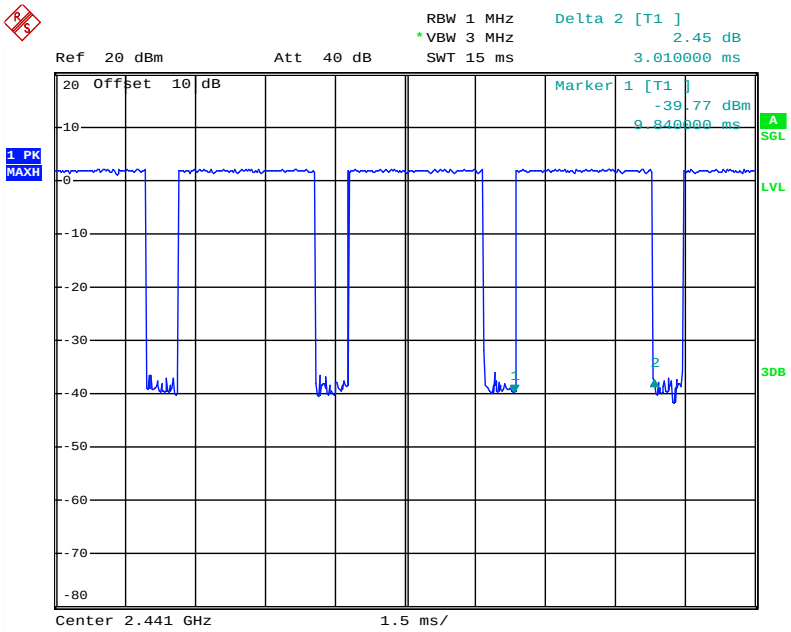
2DH1 Middle channel



2DH3 Middle channel

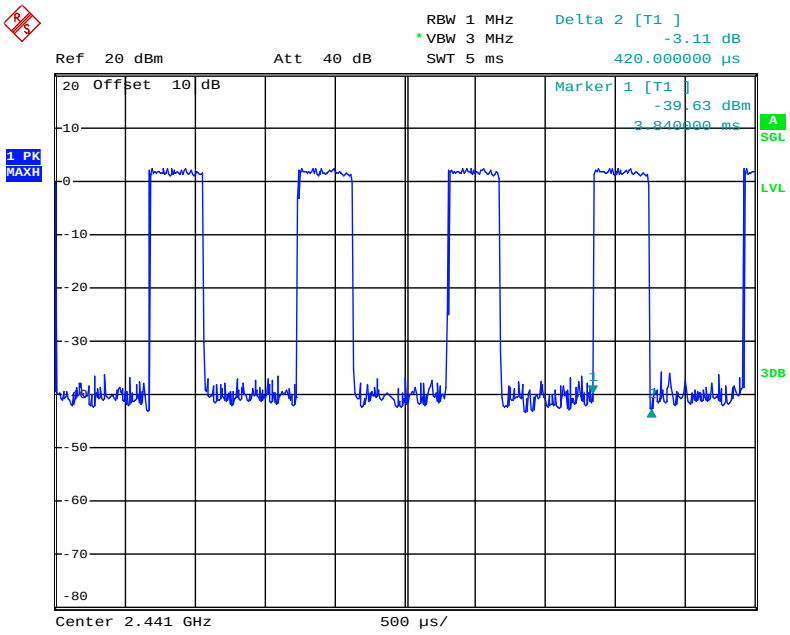


2DH5 Middle channel

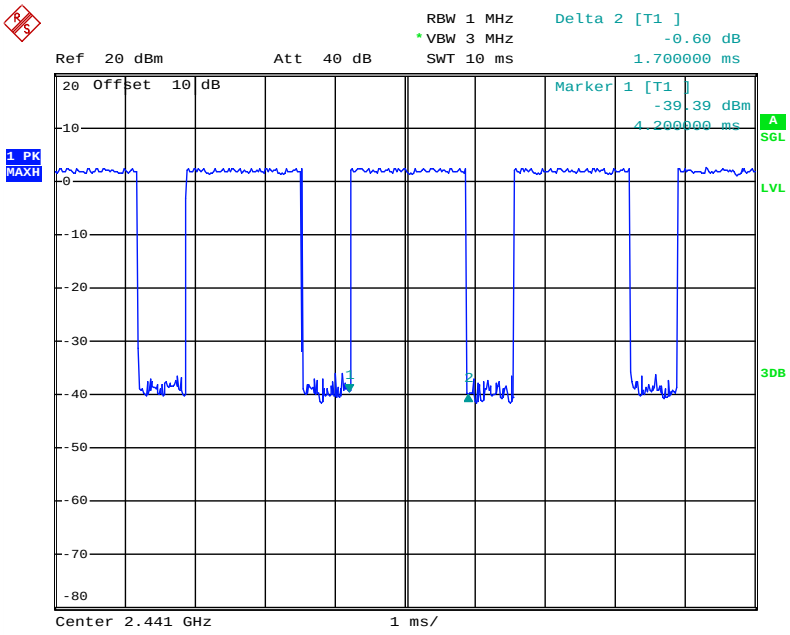


8DPSK Mode

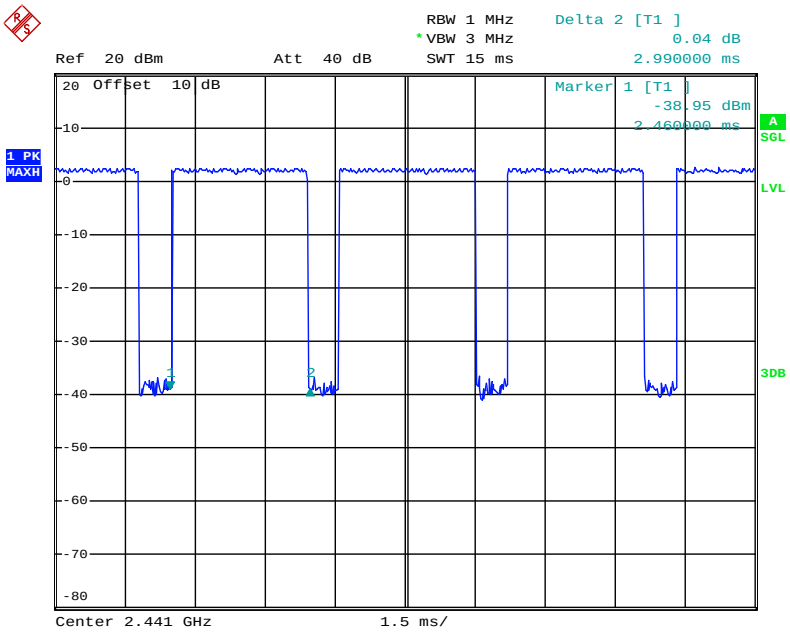
3DH1 Middle channel



3DH3 Middle channel

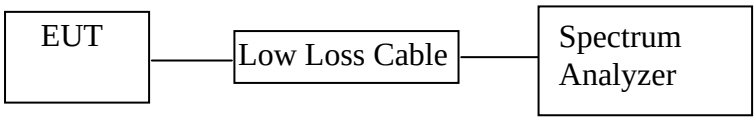


3DH5 Middle channel



9. MAXIMUM PEAK OUTPUT POWER TEST

9.1.Block Diagram of Test Setup



9.2.The Requirement For Section 15.247(b)(1)

Section 15.247(b)(1): For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

9.3.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.

9.4.Operating Condition of EUT

9.4.1.Setup the EUT and simulator as shown as Section 9.1.

9.4.2.Turn on the power of all equipment.

9.4.3.Let the EUT work in TX (Hopping off) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.

9.5.Test Procedure

9.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

9.5.2.Set RBW of spectrum analyzer to 3MHz and VBW to 10MHz.

9.5.3.Measurement the maximum peak output power.

9.6.Test Result

Test Lab: Shielding room

GFSK Mode

Channel	Frequency (MHz)	Peak Output Power (dBm/W)	Limits dBm / W
Low	2402	0.91/0.0012	21 / 0.125
Middle	2441	0.66/0.0012	21 / 0.125
High	2480	0.46/0.0011	21 / 0.125

Π/4-DQPSK Mode

Channel	Frequency (MHz)	Peak Output Power (dBm/W)	Limits dBm / W
Low	2402	3.12/0.0021	21 / 0.125
Middle	2441	2.93/0.0020	21 / 0.125
High	2480	2.75/0.0019	21 / 0.125

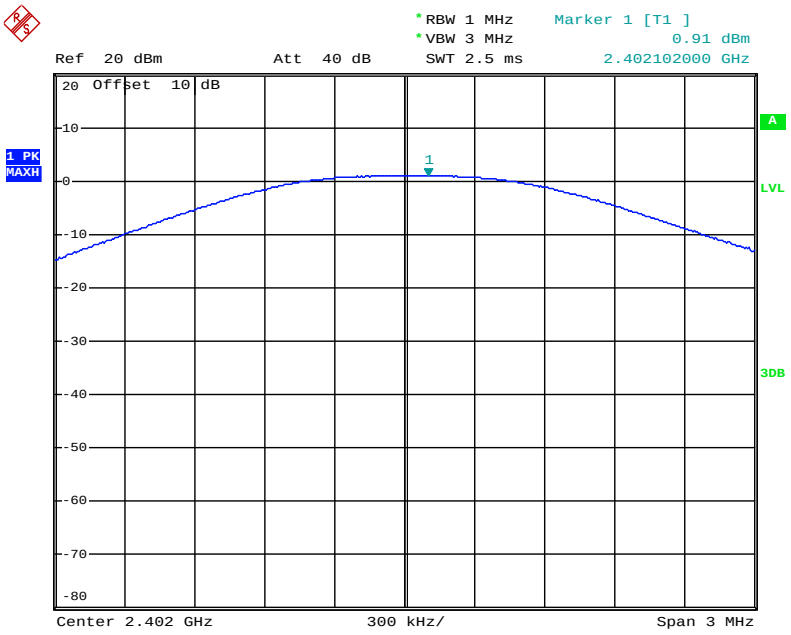
8DPSK Mode

Channel	Frequency (MHz)	Peak Output Power (dBm/W)	Limits dBm / W
Low	2402	3.45/0.0022	21 / 0.125
Middle	2441	3.42/0.0022	21 / 0.125
High	2480	2.97/0.0020	21 / 0.125

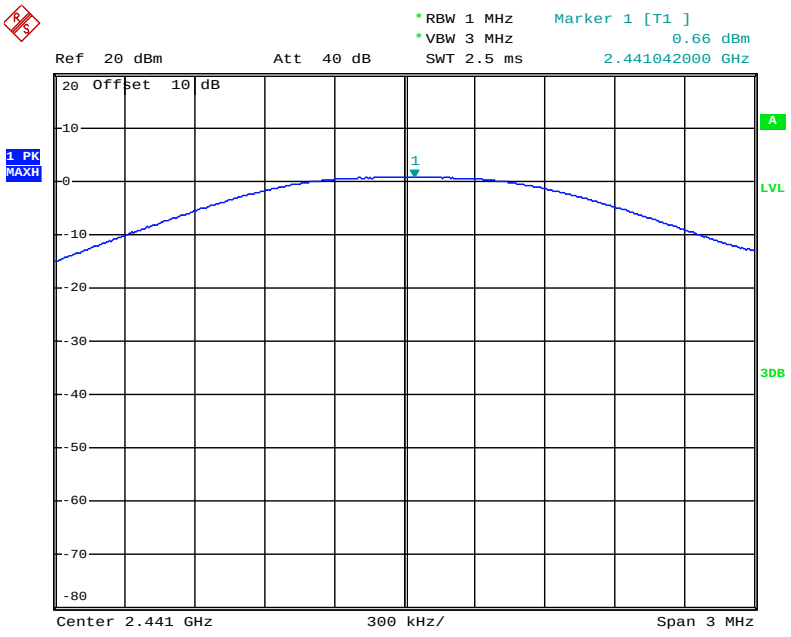
The spectrum analyzer plots are attached as below.

GFSK Mode

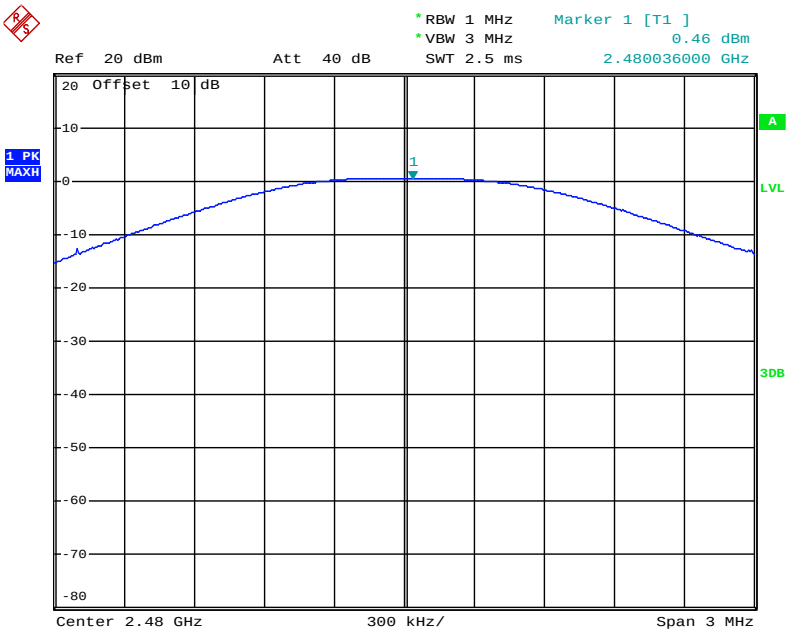
Low channel



Middle channel

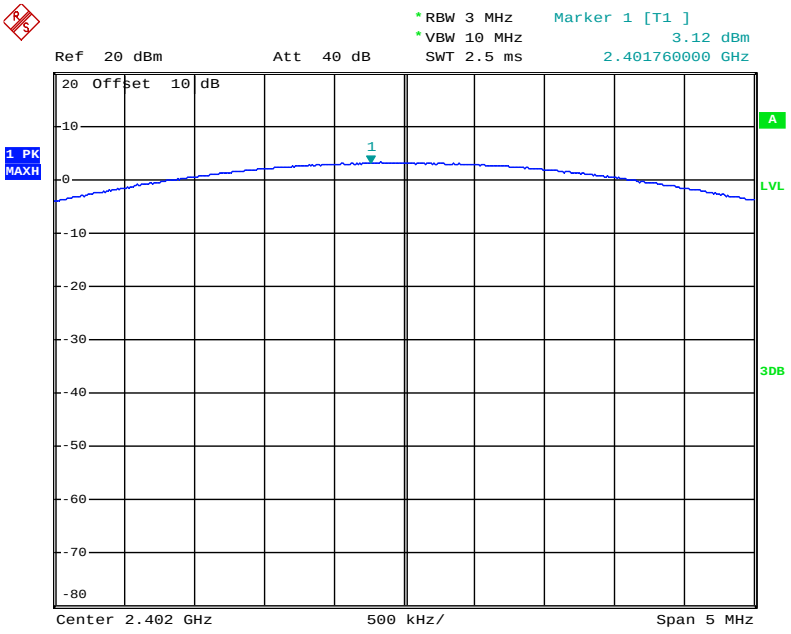


High channel

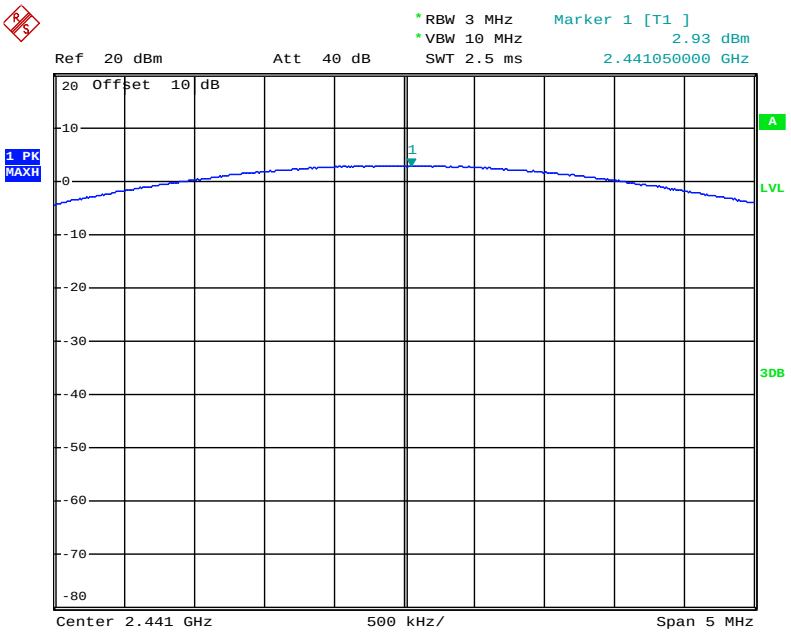


Π/4-DQPSK Mode

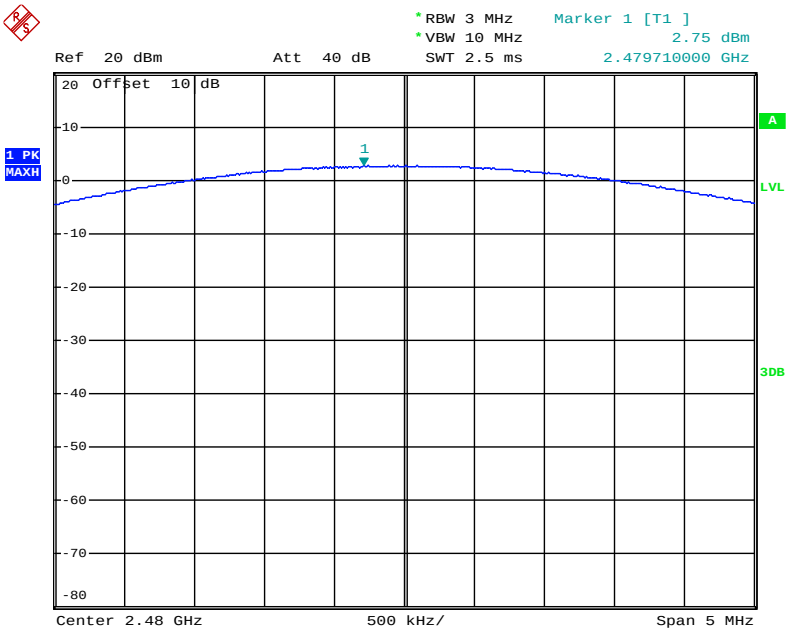
Low channel



Middle channel

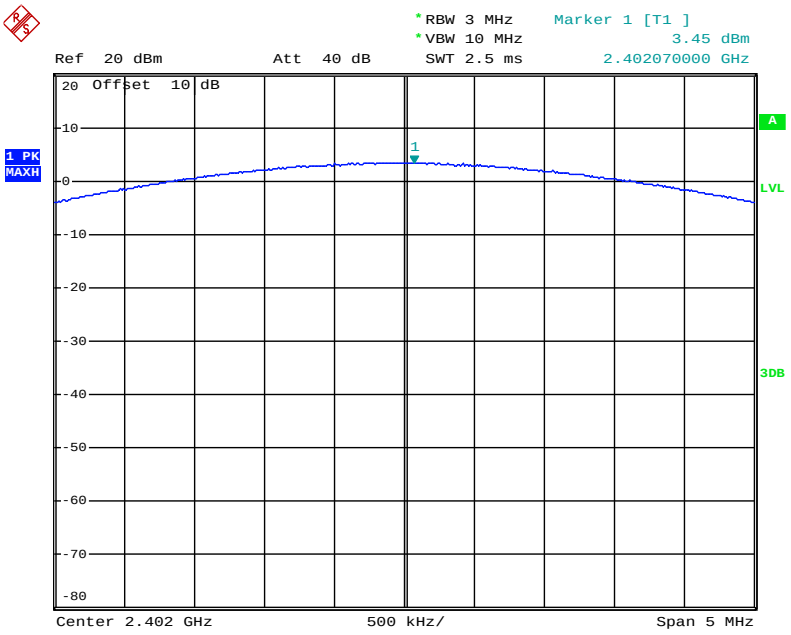


High channel

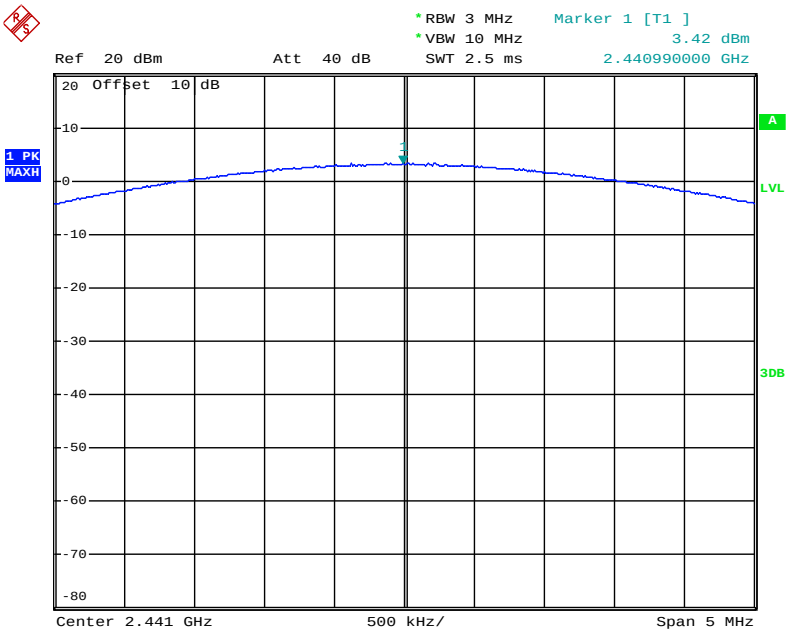


8DPSK Mode

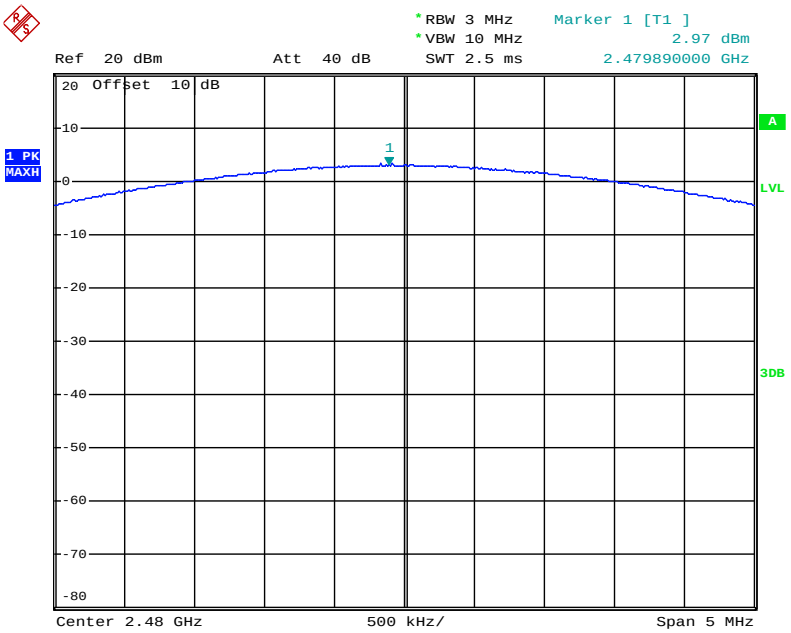
Low channel



Middle channel



High channel



10. RADIATED EMISSION TEST

10.1. Block Diagram of Test Setup

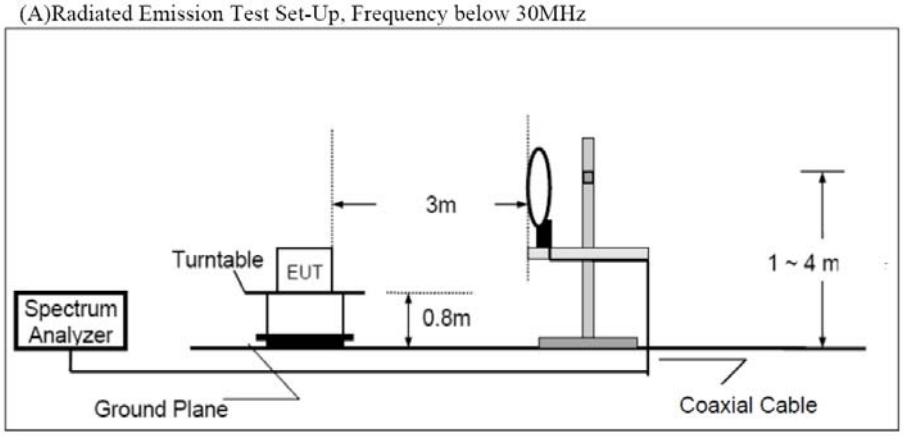
10.1.1. Block diagram of connection between the EUT and peripherals

EUT

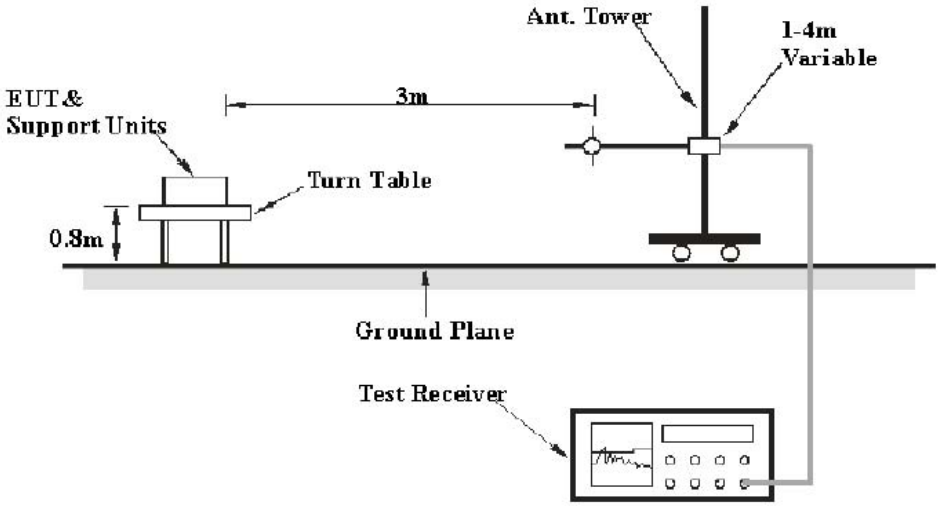
Figure 1 Setup: Transmitting mode

10.1.2. Semi-Anechoic Chamber Test Setup Diagram

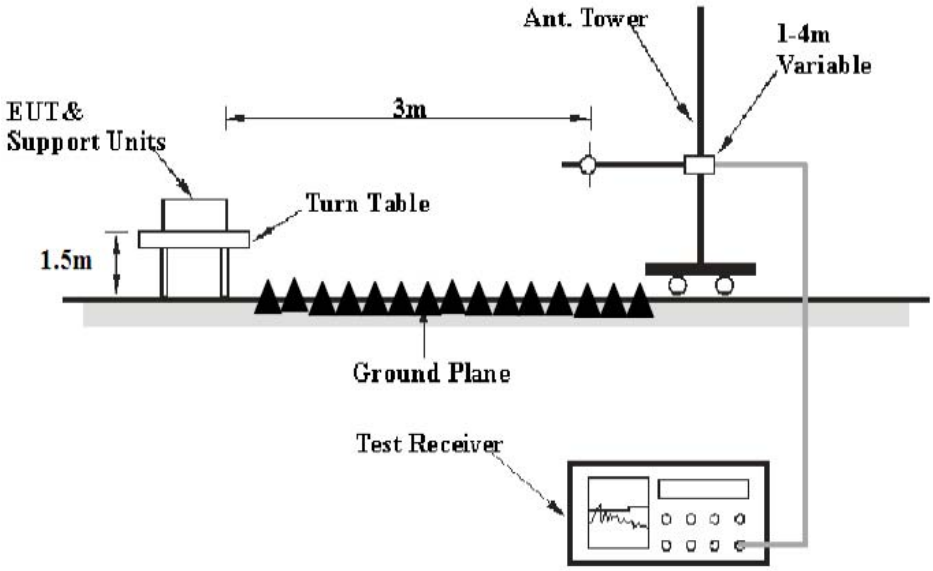
(A)Radiated Emission Test Set-Up, Frequency below 30MHz



(B)Radiated Emission Test Set-Up, Frequency 30MHz-1GHz



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



10.2.The Limit For Section 15.247(d)

Section 15.247(d): 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 (b)(3) of this section, the attenuation required under this paragraph 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).

10.3.Restricted bands of operation

10.3.1.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.

10.4.Configuration of EUT on Measurement

The equipment is 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.

10.5. Operating Condition of EUT

10.5.1. Setup the EUT and simulator as shown as Section 10.1.

10.5.2. Turn on the power of all equipment.

10.5.3. Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.

10.6. Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground(Below 1GHz). The EUT and its simulators are placed on a turntable, which is 1.5 meter high above ground(Above 1GHz). 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 bi-log 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 EUT location must be manipulated according to ANSI C63.10:2013 on radiated emission measurement. This EUT was tested in 3 orthogonal positions and the Worse case position data was reported.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

10.7.Data Sample

Frequency (MHz)	Reading (dBμv)	Factor (dB/m)	Result (dBμv/m)	Limit (dBμv/m)	Margin (dB)	Remark
X.XX	28.66	-15.19	13.47	40.0	-26.53	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(dBμv) + Factor(dB/m)
Limit (dBμv/m) = Limit stated in standard
Margin (dB) = Result(dBμv/m) - Limit (dBμv/m)
QP = Quasi-peak Reading

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.

10.8.Tetst Results

Pass.
Test Lab: 3m Anechoic chamber

Note: 1.We tested GFSK mode, Π/4-DQPSK Mode & 8DPSK mode and recorded the Worse case data (GFSK mode) for all test mode.

2. Testing is carried out with frequency rang 9kHz to the tenth harmonics, which above 3th Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

The measurements greater than 20dB below the limit from 9kHz to 30MHz and 18 to 26.5GHz.

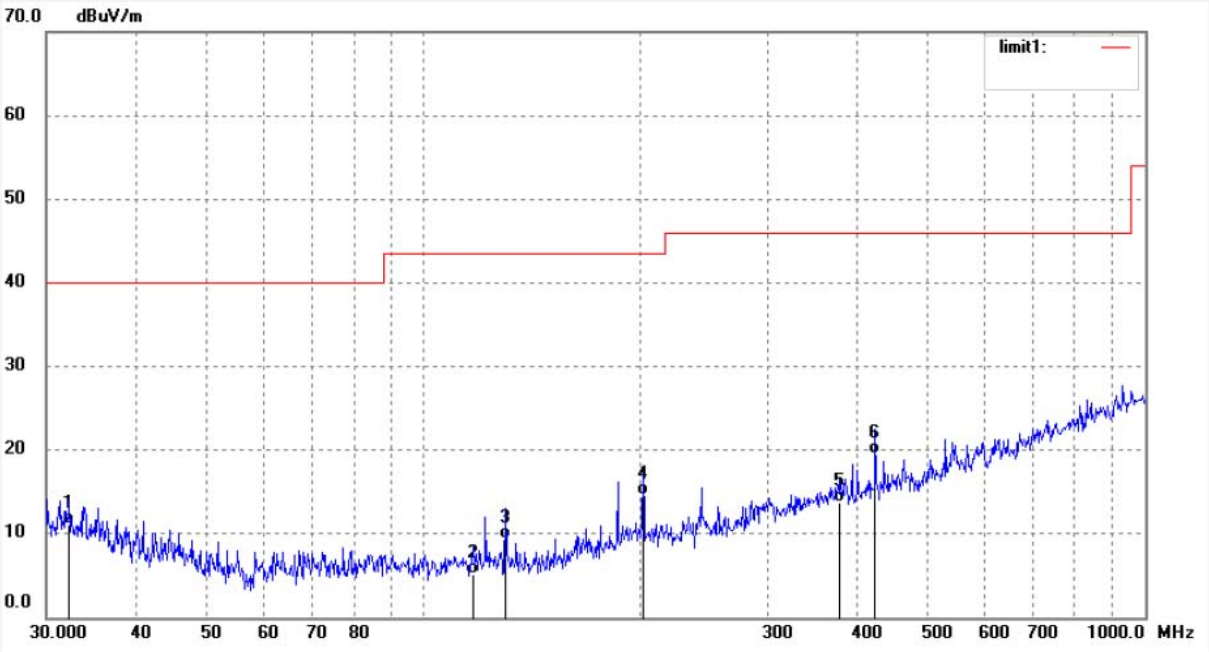
The spectrum analyzer plots are attached as below.

Below 1GHz

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2019-W #410	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2019/11/11
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 10:45:06
EUT: Bluetooth earphone	Engineer Signature: CHARLEY
Mode: TX2402MHz	Distance: 3m
Model: X3	
Manufacturer: Dongguan Luxun Electronic Technology Co., Ltd.	

Note: Report NO.:ATE20191640



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	32.2971	31.90	-20.78	11.12	40.00	-28.88	QP	100	104	
2	117.2686	32.63	-27.39	5.24	43.50	-38.26	QP	100	93	
3	129.8477	37.15	-27.71	9.44	43.50	-34.06	QP	100	331	
4	201.4539	38.92	-24.30	14.62	43.50	-28.88	QP	100	205	
5	376.5227	32.46	-18.67	13.79	46.00	-32.21	QP	100	53	
6	422.8115	37.47	-17.97	19.50	46.00	-26.50	QP	100	218	

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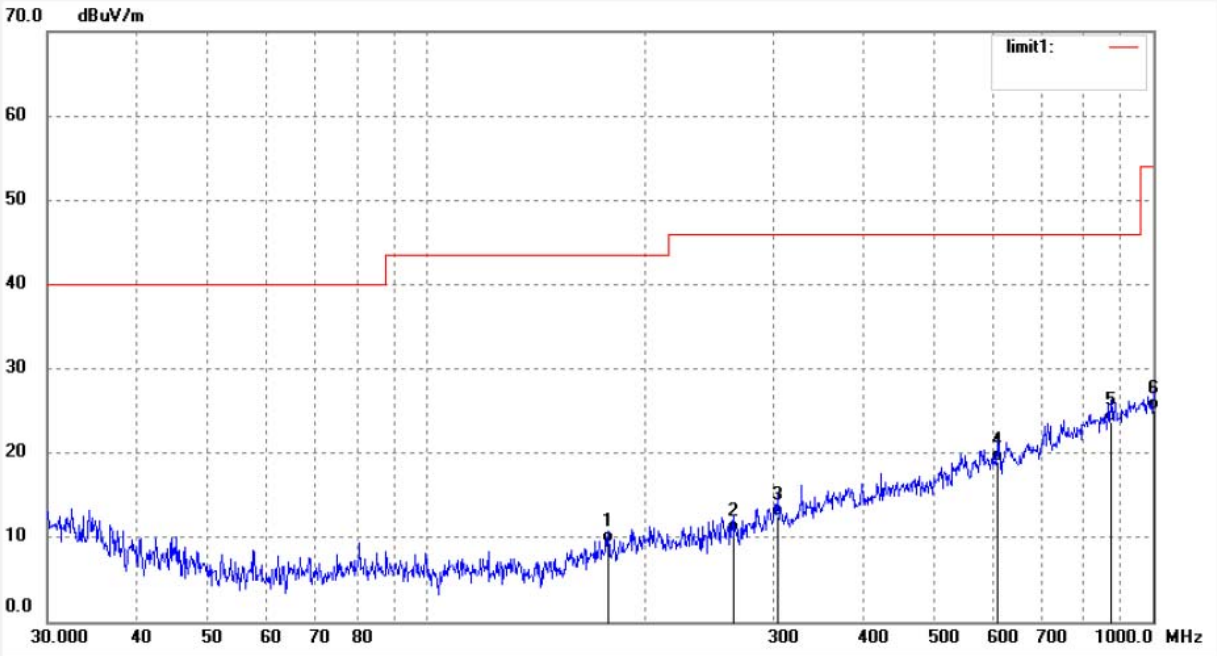
Job No.: FRANK2019-W #411	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2019/11/11
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 10:47:22
EUT: Bluetooth earphone	Engineer Signature: CHARLEY
Mode: TX2402MHz	Distance: 3m
Model: X3	
Manufacturer: Dongguan Luxun Electronic Technology Co., Ltd.	

Note: Report NO.:ATE20191640



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	177.5176	35.62	-26.26	9.36	43.50	-34.14	QP	200	302	
2	264.0416	33.45	-22.80	10.65	46.00	-35.35	QP	200	93	
3	303.8851	33.65	-21.11	12.54	46.00	-33.46	QP	200	125	
4	609.3174	32.45	-13.49	18.96	46.00	-27.04	QP	200	233	
5	875.0131	31.34	-7.61	23.73	46.00	-22.27	QP	200	301	
6	1000.0000	30.13	-5.01	25.12	54.00	-28.88	QP	200	107	

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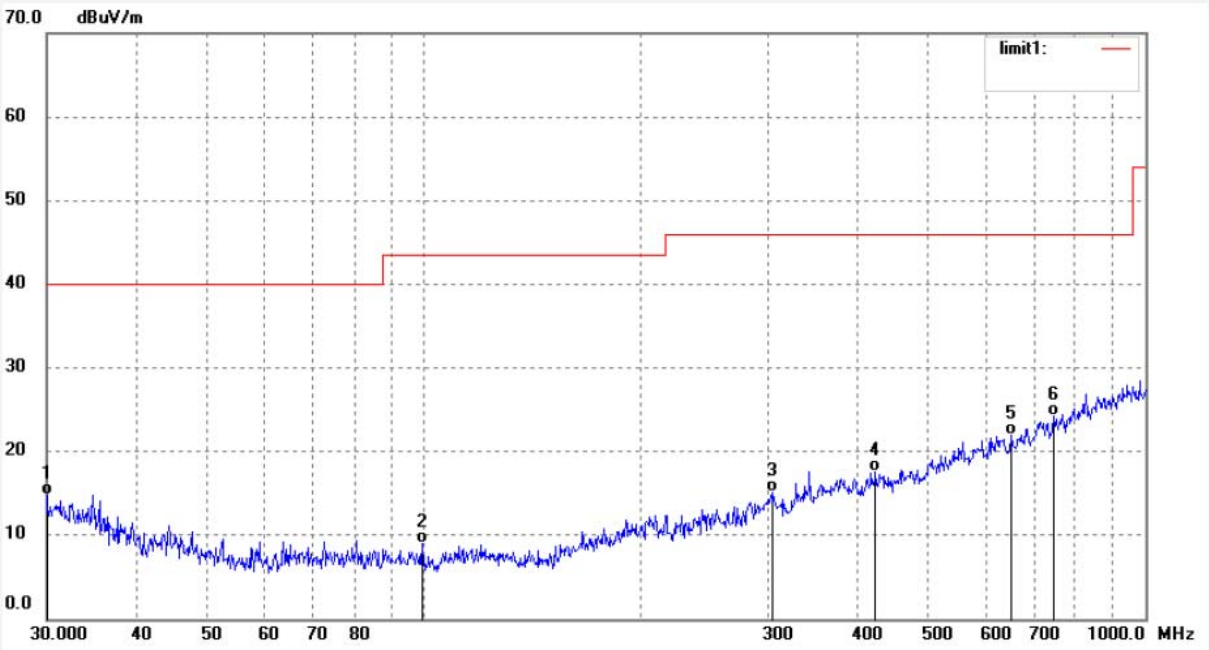
Job No.: FRANK2019-W #412	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2019/11/11
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 10:49:03
EUT: Bluetooth earphone	Engineer Signature: CHARLEY
Mode: TX2441MHz	Distance: 3m
Model: X3	
Manufacturer: Dongguan Luxun Electronic Technology Co., Ltd.	

Note: Report NO.:ATE20191640



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	30.0000	35.04	-20.20	14.84	40.00	-25.16	QP	200	103	
2	99.4176	36.90	-27.97	8.93	43.50	-34.57	QP	200	108	
3	303.8851	36.29	-21.11	15.18	46.00	-30.82	QP	200	211	
4	422.8116	35.63	-17.97	17.66	46.00	-28.34	QP	200	208	
5	651.3831	34.52	-12.63	21.89	46.00	-24.11	QP	200	93	
6	747.0465	34.64	-10.40	24.24	46.00	-21.76	QP	200	112	

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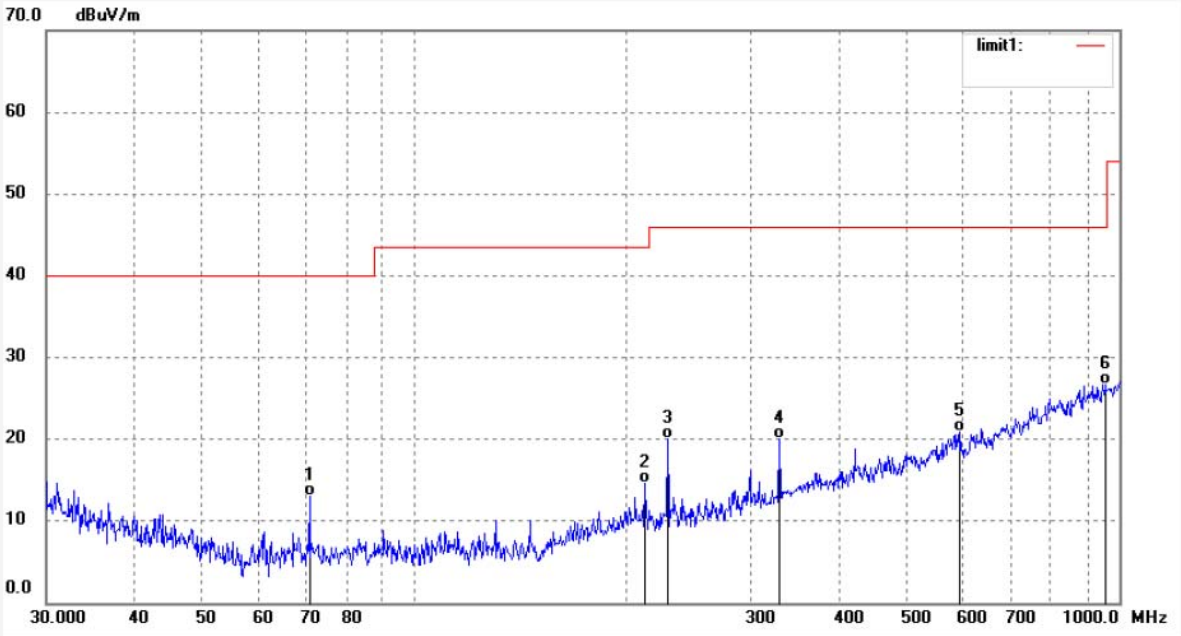
Job No.: FRANK2019-W #413	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2019/11/11
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 10:50:28
EUT: Bluetooth earphone	Engineer Signature: CHARLEY
Mode: TX2441MHz	Distance: 3m
Model: X3	
Manufacturer: Dongguan Luxun Electronic Technology Co., Ltd.	

Note: Report NO.:ATE20191640



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	70.9535	40.60	-27.52	13.08	40.00	-26.92	QP	100	51	
2	212.3559	38.78	-24.09	14.69	43.50	-28.81	QP	100	225	
3	228.6173	43.94	-23.89	20.05	46.00	-25.95	QP	100	331	
4	329.4624	40.23	-20.19	20.04	46.00	-25.96	QP	100	63	
5	594.5143	34.76	-13.81	20.95	46.00	-25.05	QP	100	215	
6	955.3509	32.84	-6.18	26.66	46.00	-19.34	QP	100	109	

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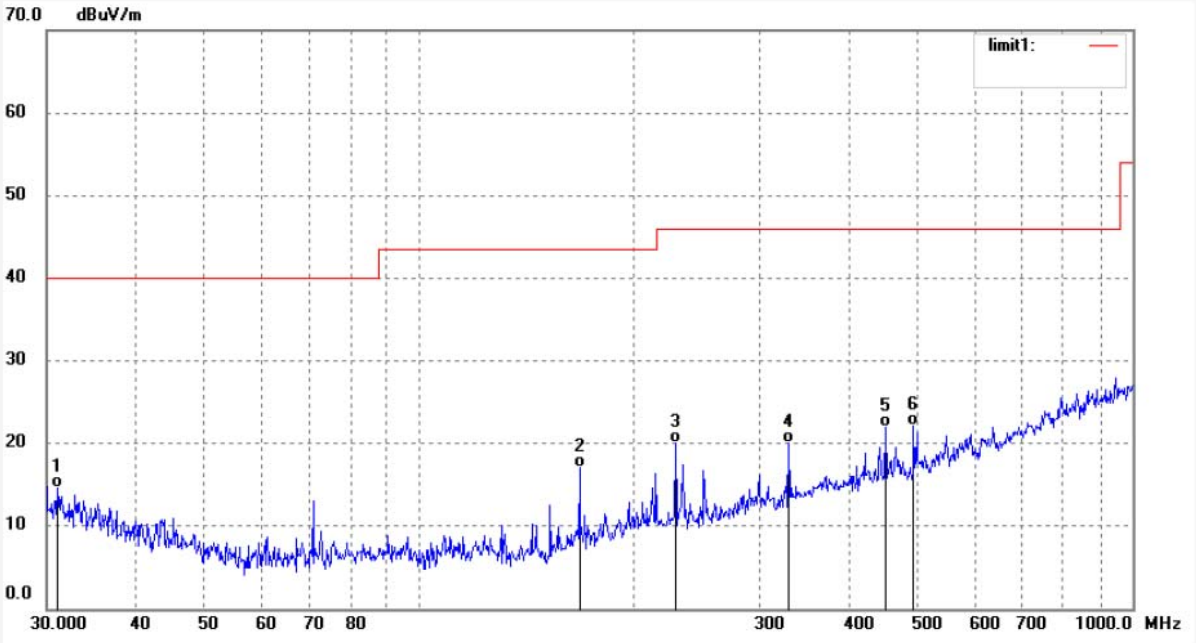
Job No.: FRANK2019-W #414
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Bluetooth earphone
Mode: TX2480MHz
Model: X3
Manufacturer: Dongguan Luxun Electronic Technology Co., Ltd.

Polarization: Vertical
Power Source: DC 3.7V
Date: 2019/11/11
Time: 10:53:36
Engineer Signature: CHARLEY
Distance: 3m

Note: Report NO.:ATE20191640



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	31.0728	35.00	-20.47	14.53	40.00	-25.47	QP	100	305	
2	167.8136	43.22	-26.23	16.99	43.50	-26.51	QP	100	221	
3	228.6173	43.94	-23.89	20.05	46.00	-25.95	QP	100	63	
4	329.4624	40.23	-20.19	20.04	46.00	-25.96	QP	100	331	
5	450.4159	39.20	-17.25	21.95	46.00	-24.05	QP	100	201	
6	493.5009	38.62	-16.40	22.22	46.00	-23.78	QP	100	19	

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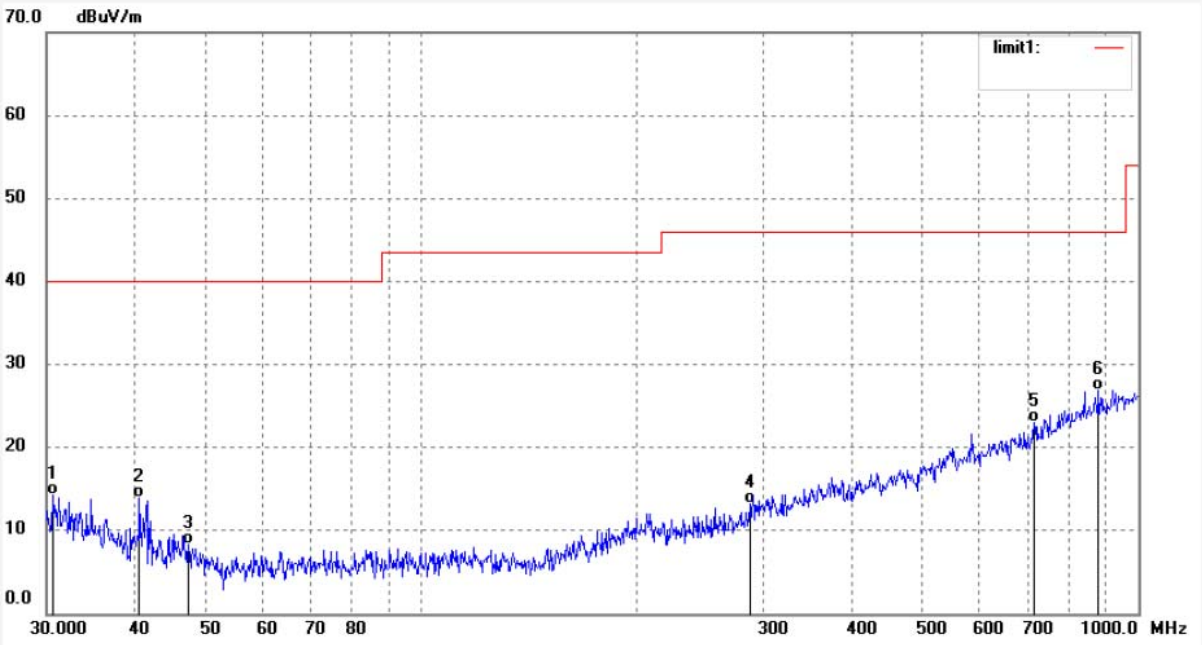
Job No.: FRANK2019-W #415	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2019/11/11
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 10:55:54
EUT: Bluetooth earphone	Engineer Signature: CHARLEY
Mode: TX2480MHz	Distance: 3m
Model: X3	
Manufacturer: Dongguan Luxun Electronic Technology Co., Ltd.	

Note: Report NO.:ATE20191640



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	30.6390	34.61	-20.36	14.25	40.00	-25.75	QP	200	349	
2	40.4411	37.58	-23.67	13.91	40.00	-26.09	QP	200	215	
3	47.3688	33.59	-25.26	8.33	40.00	-31.67	QP	200	66	
4	287.2727	34.95	-21.79	13.16	46.00	-32.84	QP	200	129	
5	716.2038	34.18	-11.09	23.09	46.00	-22.91	QP	200	302	
6	881.1838	34.43	-7.50	26.93	46.00	-19.07	QP	200	106	

Above 1GHz

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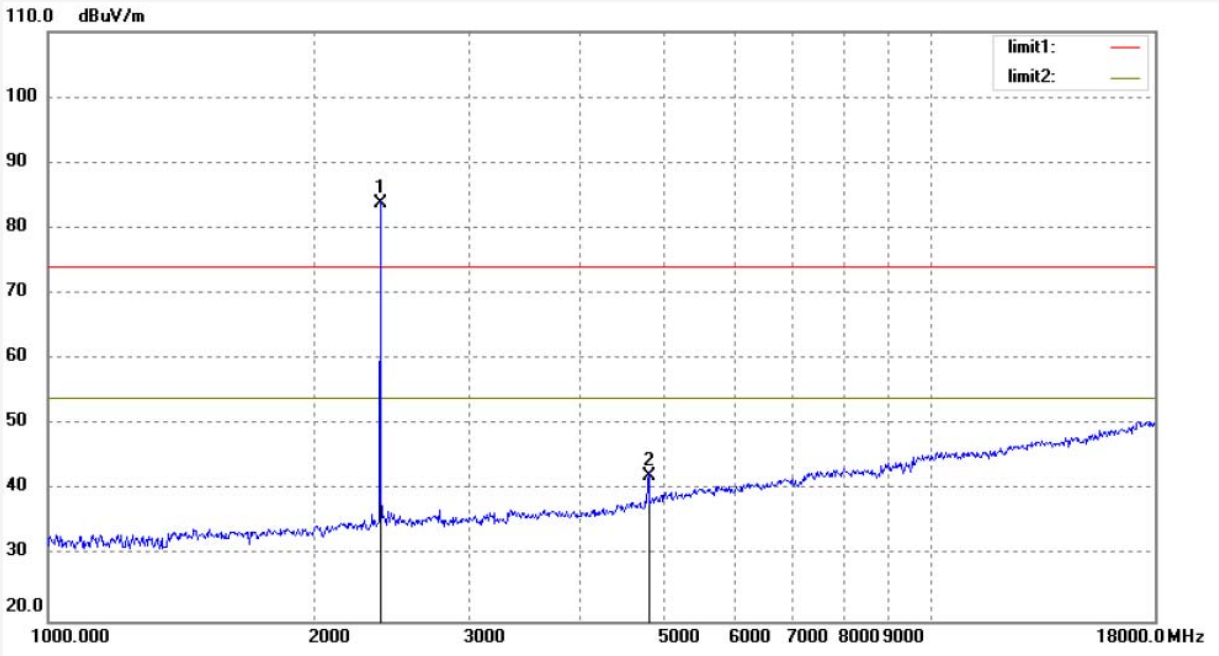
Job No.: FRANK2019-W #474	Polarization: Horizontal
Standard: FCC PK	Power Source: DC3.7V
Test item: Radiation Test	Date: 19/11/11/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 13/45/32
EUT: Bluetooth earphone	Engineer Signature:
Mode: TX2402MHz	Distance: 3m
Model: X3	
Manufacturer: Dongguan Luxun Electronic Technology Co., Ltd.	

Note: Report NO.:ATE20191640



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2402.000	90.21	-6.37	83.84			peak	250	193	
2	4804.000	41.13	1.00	42.13	74.00	-31.87	peak	200	104	

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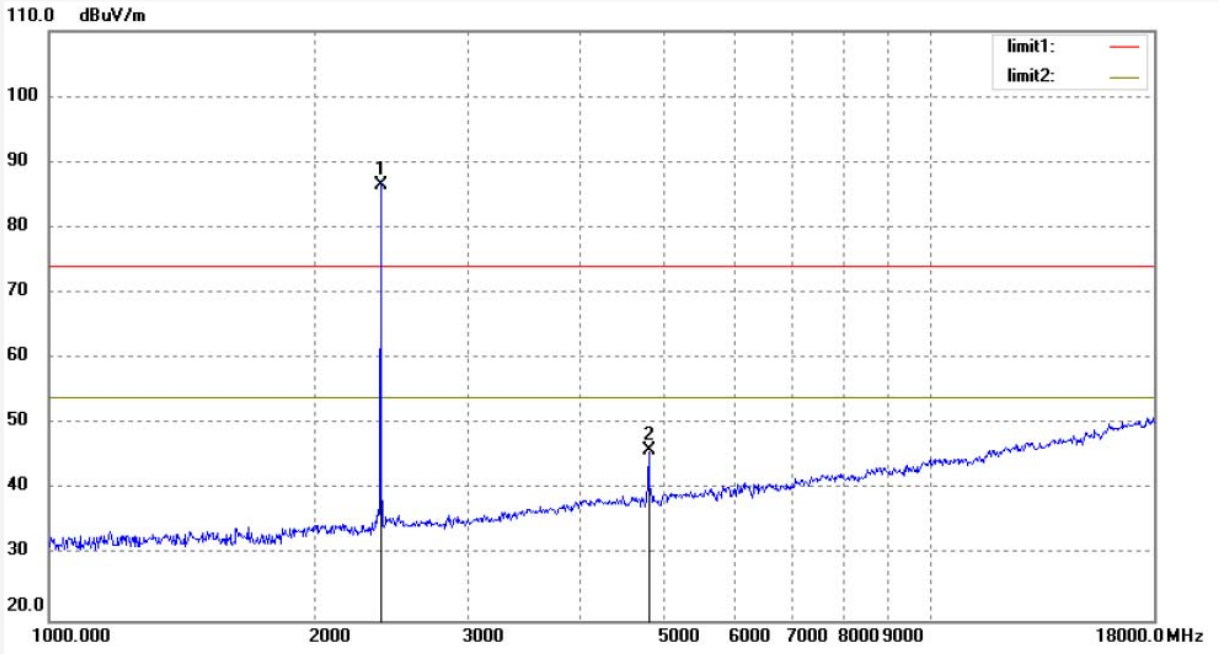
Job No.: FRANK2019-W #475	Polarization: Vertical
Standard: FCC PK	Power Source: DC3.7V
Test item: Radiation Test	Date: 19/11/11/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 13/47/35
EUT: Bluetooth earphone	Engineer Signature:
Mode: TX2402MHz	Distance: 3m
Model: X3	
Manufacturer: Dongguan Luxun Electronic Technology Co., Ltd.	

Note: Report NO.:ATE20191640



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2402.000	92.89	-6.37	86.52			peak	150	93	
2	4804.000	45.01	1.00	46.01	74.00	-27.99	peak	150	186	

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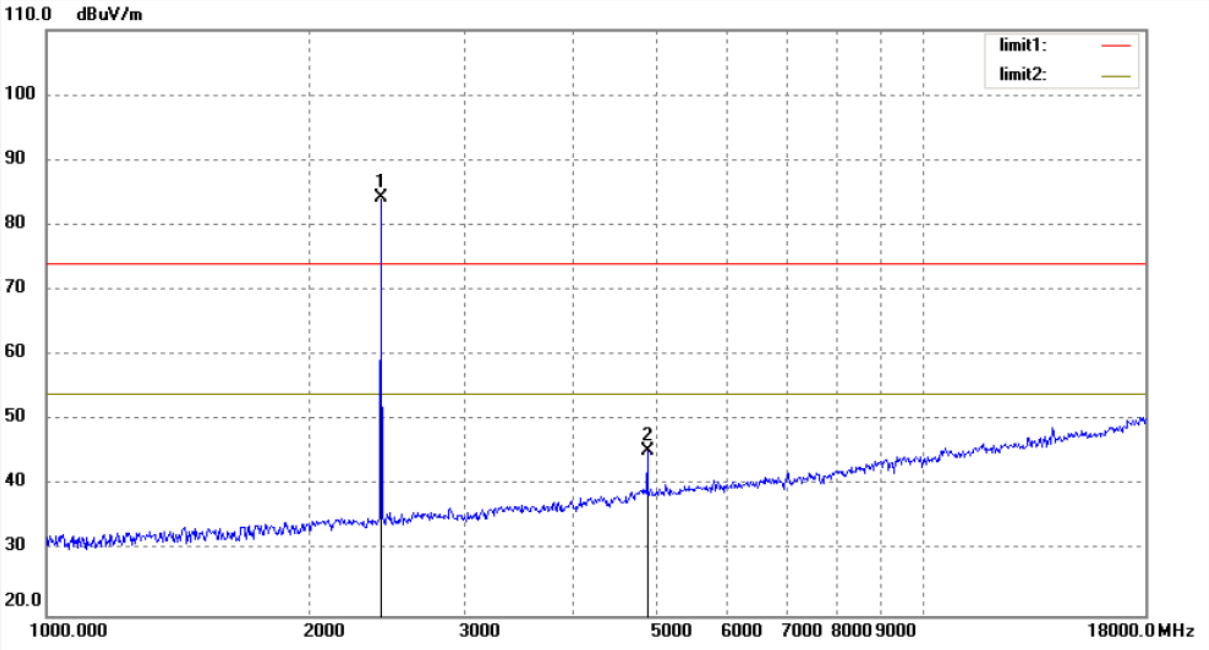
Job No.: FRANK2019-W #476	Polarization: Vertical
Standard: FCC PK	Power Source: DC3.7V
Test item: Radiation Test	Date: 19/11/11/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 13/50/12
EUT: Bluetooth earphone	Engineer Signature:
Mode: TX2441MHz	Distance: 3m
Model: X3	
Manufacturer: Dongguan Luxun Electronic Technology Co., Ltd.	

Note: Report NO.:ATE20191640



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2441.000	90.56	-6.24	84.32			peak	150	102	
2	4882.000	44.02	1.25	45.27	74.00	-28.73	peak	150	320	

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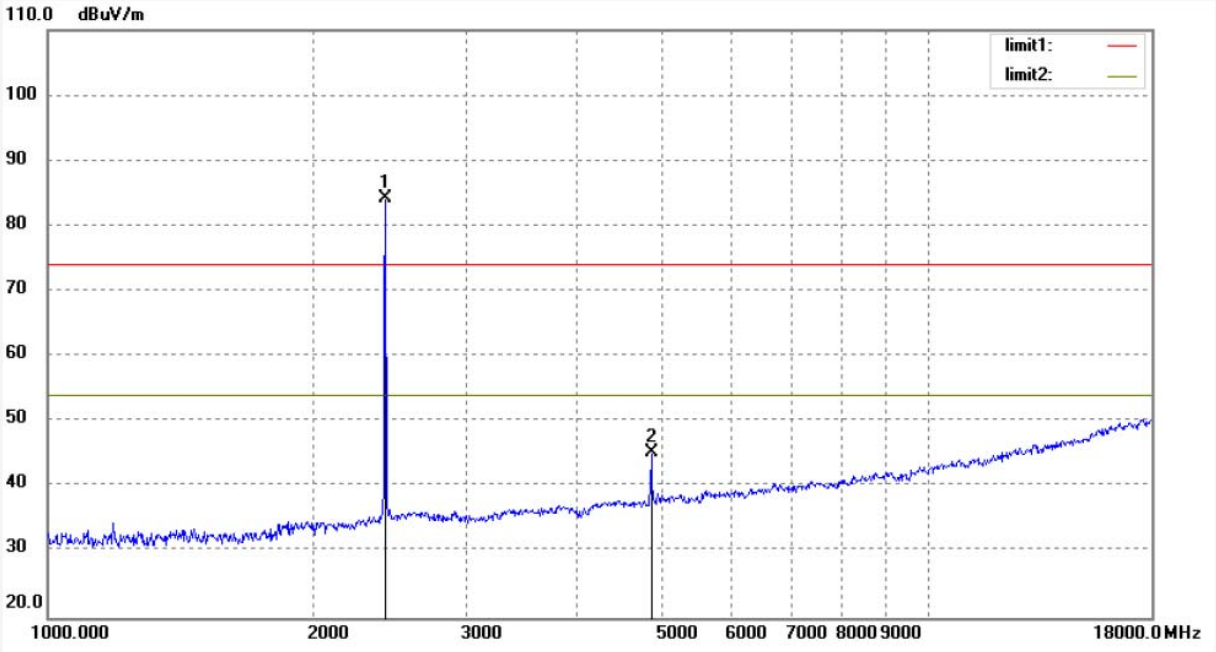
Job No.: FRANK2019-W #477	Polarization: Horizontal
Standard: FCC PK	Power Source: DC3.7V
Test item: Radiation Test	Date: 19/11/11/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 13/53/21
EUT: Bluetooth earphone	Engineer Signature:
Mode: TX2441MHz	Distance: 3m
Model: X3	
Manufacturer: Dongguan Luxun Electronic Technology Co., Ltd.	

Note: Report NO.:ATE20191640



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2441.000	90.31	-6.17	84.14			peak	200	126	
2	4882.000	44.03	1.25	45.28	74.00	-28.72	peak	200	104	

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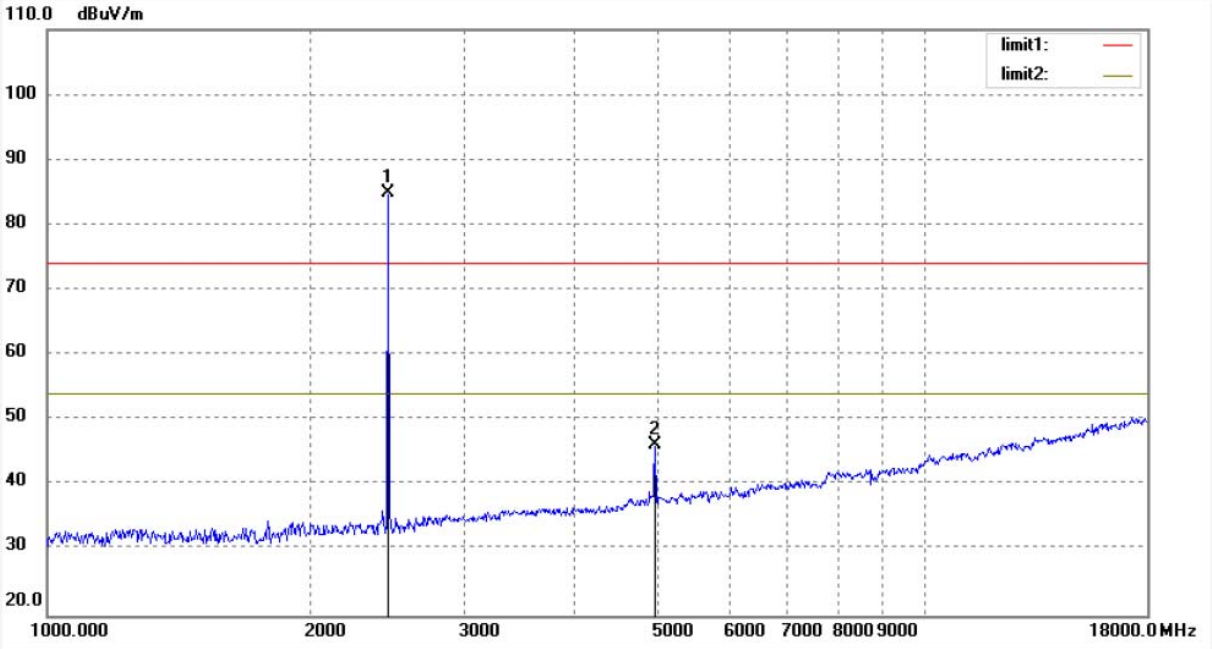
Job No.: FRANK2019-W #478
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Bluetooth earphone
Mode: TX2480MHz
Model: X3
Manufacturer: Dongguan Luxun Electronic Technology Co., Ltd.

Polarization: Horizontal
Power Source: DC3.7V
Date: 19/11/11/
Time: 13/55/12
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20191640



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.000	91.02	-6.04	84.98			peak	200	309	
2	4960.000	44.64	1.62	46.26	74.00	-27.74	peak	200	111	

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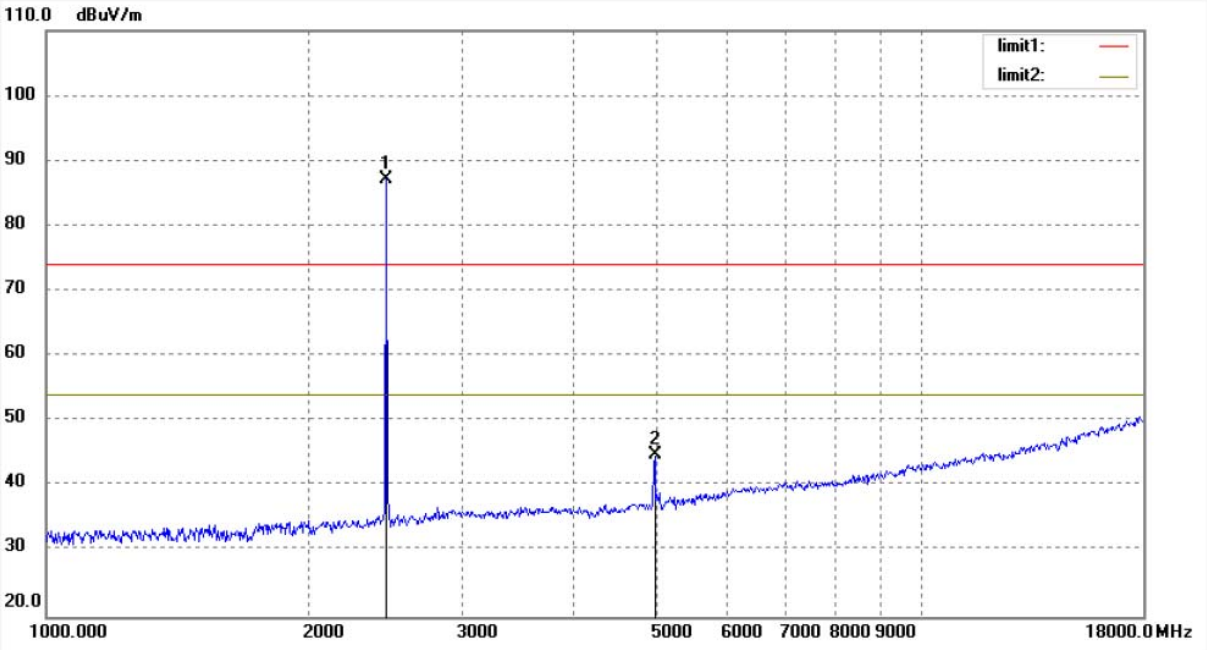
Job No.: FRANK2019-W #479	Polarization: Vertical
Standard: FCC PK	Power Source: DC3.7V
Test item: Radiation Test	Date: 19/11/11/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 13/57/21
EUT: Bluetooth earphone	Engineer Signature:
Mode: TX2480MHz	Distance: 3m
Model: X3	
Manufacturer: Dongguan Luxun Electronic Technology Co., Ltd.	

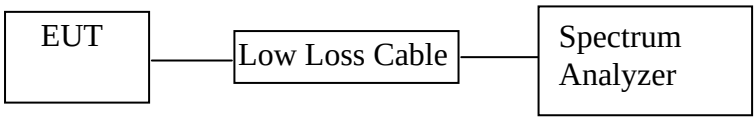
Note: Report NO.:ATE20191640



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.000	93.21	-6.04	87.17			peak	150	210	
2	4960.000	43.10	1.75	44.85	74.00	-29.15	peak	150	119	

11.BAND EDGE COMPLIANCE TEST

11.1.Block Diagram of Test Setup



11.2.The Requirement For Section 15.247(d)

Section 15.247(d): 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 (b)(3) of this section, the attenuation required under this paragraph 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).

11.3.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.

11.4.Operating Condition of EUT

11.4.1.Setup the EUT and simulator as shown as Section 11.1.

11.4.2.Turn on the power of all equipment.

11.4.3.Let the EUT work in TX (Hopping off, Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2480MHz TX frequency to transmit.

11.5.Test Procedure

11.5.1.The transmitter output was connected to the spectrum analyzer via a low loss cable.

11.5.2.Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz with convenient frequency span including 100 kHz bandwidth from band edge.

11.5.3.The band edges was measured and recorded.

11.6.Test Result

Test Lab: Shielding room

Note: Both hopping-on mode and hopping-off mode had been pre-tested, and only the Worse case was recorded in the test report.

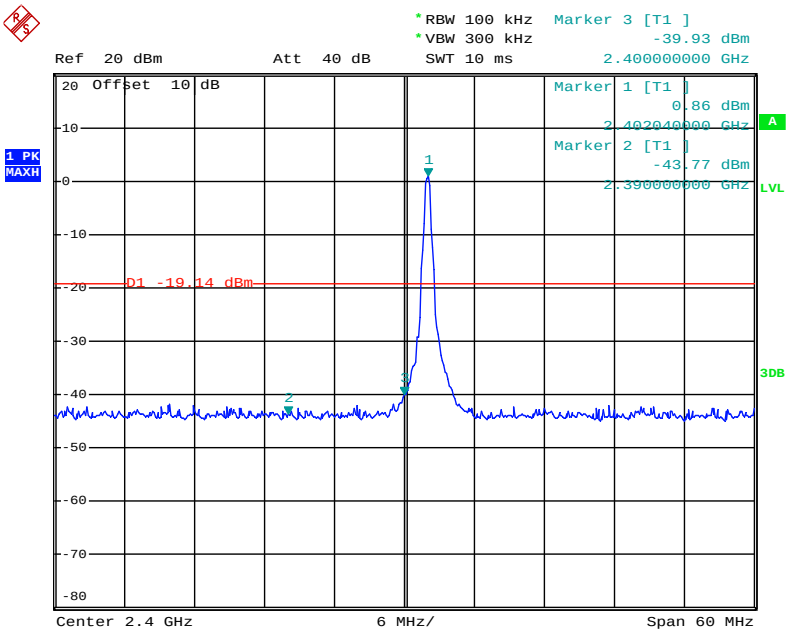
Conducted Band Edge Result

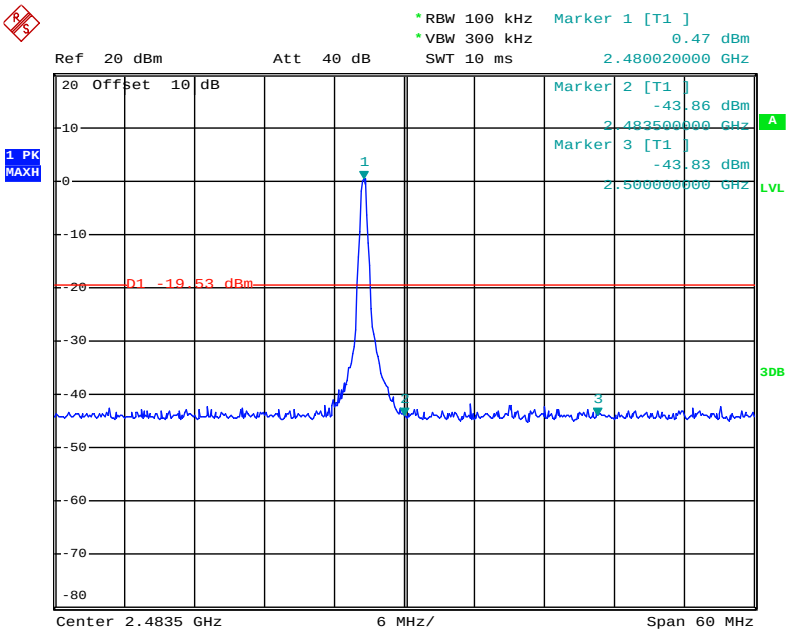
Non-hopping mode

Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)	Result
GFSK Mode			
2400.00	39.07	> 20dBc	Pass
2483.50	43.39	> 20dBc	Pass
Π/4-DQPSK Mode			
2400.00	38.35	> 20dBc	Pass
2483.50	43.71	> 20dBc	Pass
8DPSK Mode			
2400.00	38.57	> 20dBc	Pass
2483.50	42.72	> 20dBc	Pass

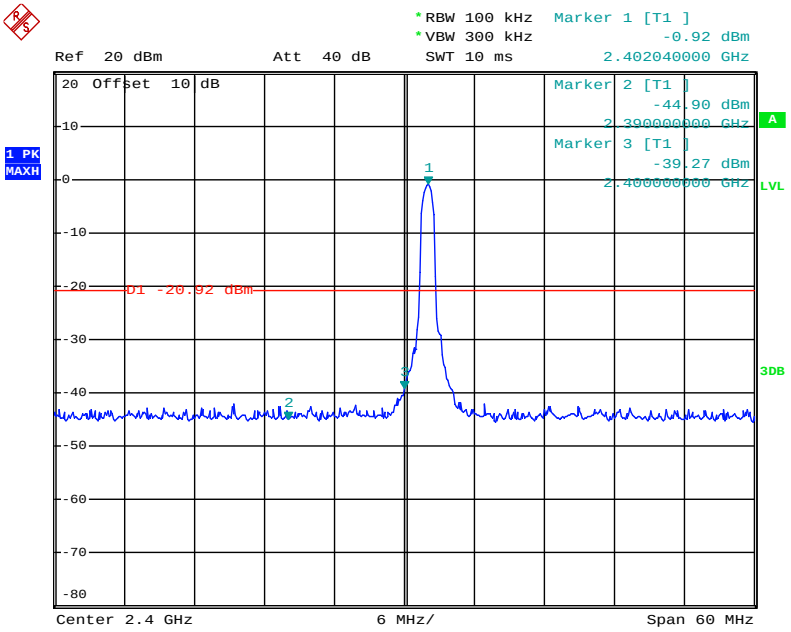
The spectrum analyzer plots are attached as below.

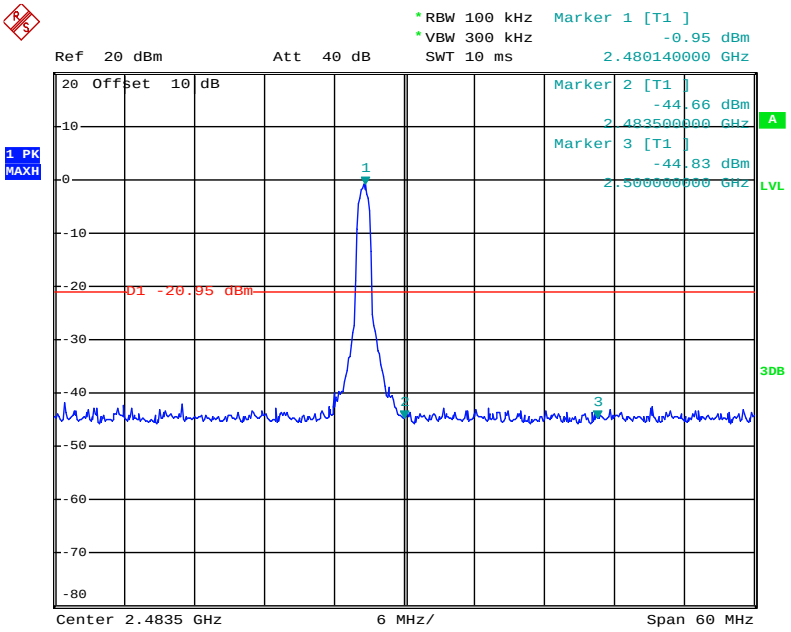
GFSK Mode


RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 3 [T1]
-39.93 dBm
2.400000000 GHz
Ref 20 dBm
Att 40 dB
20 Offset 10 dB
Marker 1 [T1]
0.86 dBm
2.402040000 GHz
Marker 2 [T1]
-43.77 dBm
2.390000000 GHz
1 PK
MAXH
A
LVL
3DB
D1 -19.14 dBm
Center 2.4 GHz
6 MHz/
Span 60 MHz

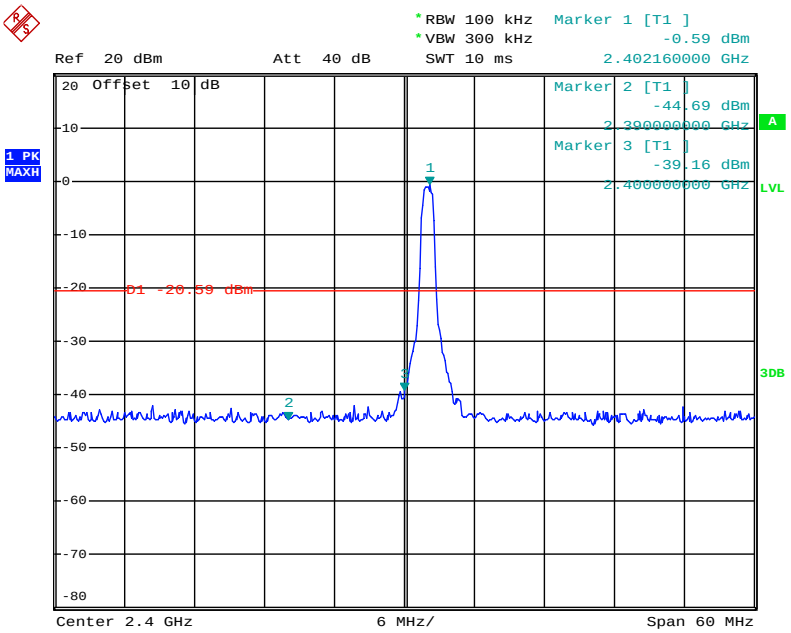

RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
0.47 dBm
2.480020000 GHz
Ref 20 dBm
Att 40 dB
20 Offset 10 dB
Marker 2 [T1]
-43.86 dBm
2.483500000 GHz
Marker 3 [T1]
-43.83 dBm
2.500000000 GHz
1 PK
MAXH
A
LVL
3DB
D1 -19.53 dBm
Center 2.4835 GHz
6 MHz/
Span 60 MHz

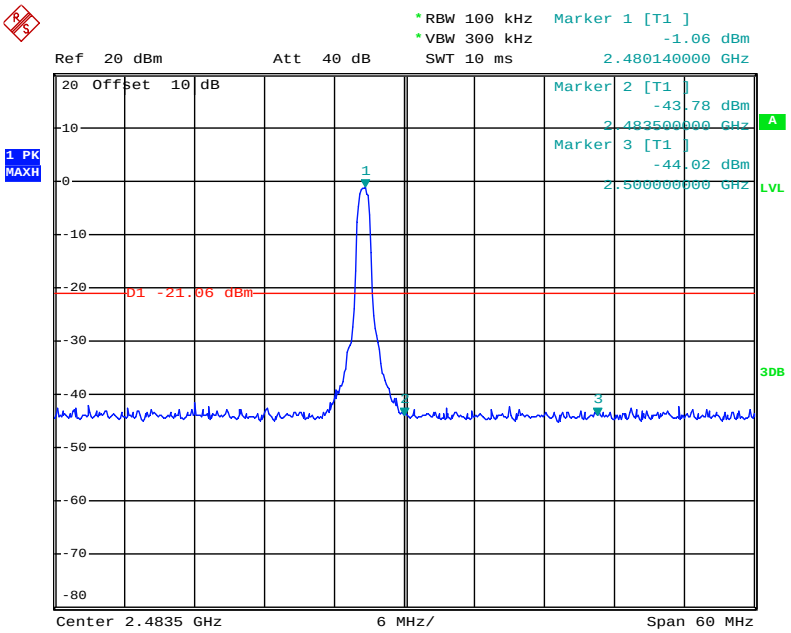
Π/4-DQPSK Mode





8DPSK Mode


RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
-0.59 dBm
2.402160000 GHz
Ref 20 dBm
Att 40 dB
20 Offset 10 dB
Marker 2 [T1]
-44.69 dBm
2.390000000 GHz
Marker 3 [T1]
-39.16 dBm
2.400000000 GHz
1 PK
MAXH
D1 -20.59 dBm
A
LVL
3DB
Center 2.4 GHz
6 MHz/
Span 60 MHz


RBW 100 kHz
VBW 300 kHz
SWT 10 ms
Marker 1 [T1]
-1.06 dBm
2.480140000 GHz
Ref 20 dBm
Att 40 dB
20 Offset 10 dB
Marker 2 [T1]
-43.78 dBm
2.483500000 GHz
Marker 3 [T1]
-44.02 dBm
2.500000000 GHz
1 PK
MAXH
D1 -21.06 dBm
A
LVL
3DB
Center 2.4835 GHz
6 MHz/
Span 60 MHz

Radiated Band Edge Result

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.

Test Procedure:

The EUT and its simulators are placed on a turntable, which is 1.5 meter high above ground(Above 1GHz). 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 bi-log 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 EUT location must be manipulated according to ANSI C63.10:2013 on radiated emission measurement. The EUT was tested in 3 orthogonal planes.

Let the EUT work in TX (Hopping off, Hopping on) modes measure it.
We select 2402MHz, 2480MHz TX frequency to transmit(Hopping off mode).
We select 2402-2480MHz TX frequency to transmit(Hopping on mode).

During the radiated emission test, the spectrum analyzer was set with the following configurations:
1.The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz.
2.The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
3.All modes of operation were investigated and the worse case (GFSK Mode) emissions are reported.

Test Lab: 3m Anechoic chamber

The spectrum analyzer plots are attached as below.

Non-hopping mode

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
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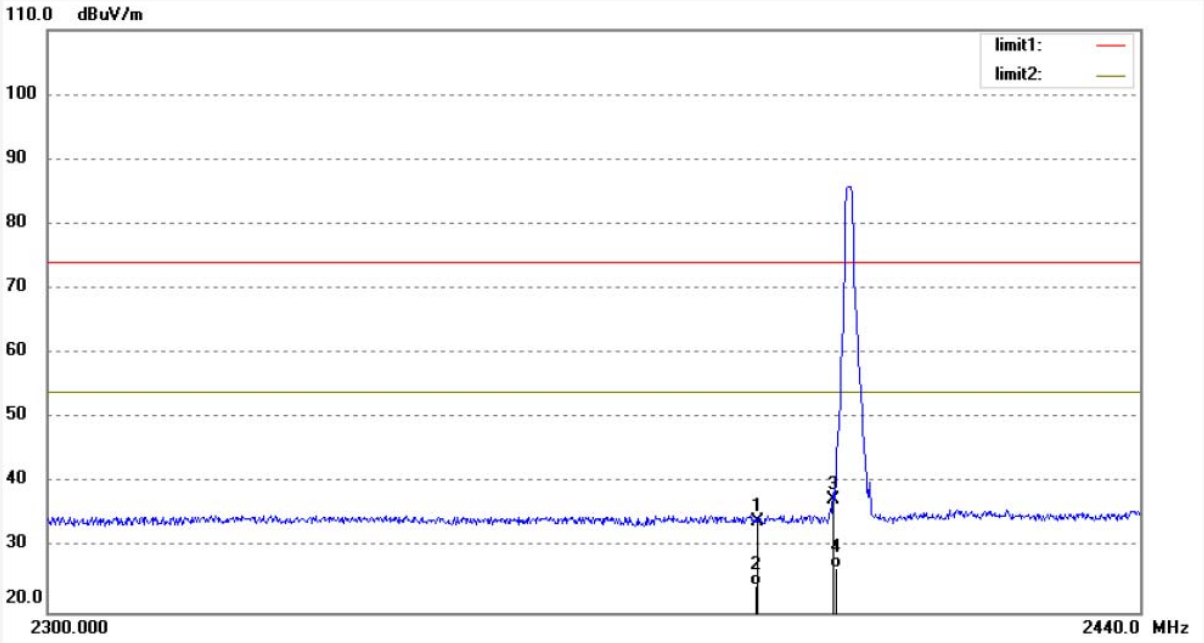
Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2019-W #483	Polarization: Vertical
Standard: FCC PK	Power Source: DC3.7V
Test item: Radiation Test	Date: 19/11/11/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 14/10/14
EUT: Bluetooth earphone	Engineer Signature:
Mode: TX2402MHz	Distance: 3m
Model: X3	
Manufacturer: Dongguan Luxun Electronic Technology Co., Ltd.	

Note: Report NO.:ATE20191640



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	40.32	-6.32	34.00	74.00	-40.00	peak	150	221	
2	2390.000	30.45	-6.32	24.13	54.00	-29.87	AVG	150	300	
3	2400.000	43.75	-6.27	37.48	74.00	-36.52	peak	150	136	
4	2400.000	33.15	-6.27	26.88	54.00	-27.12	AVG	150	103	

Note: Average measurement with peak detection at No.2&4

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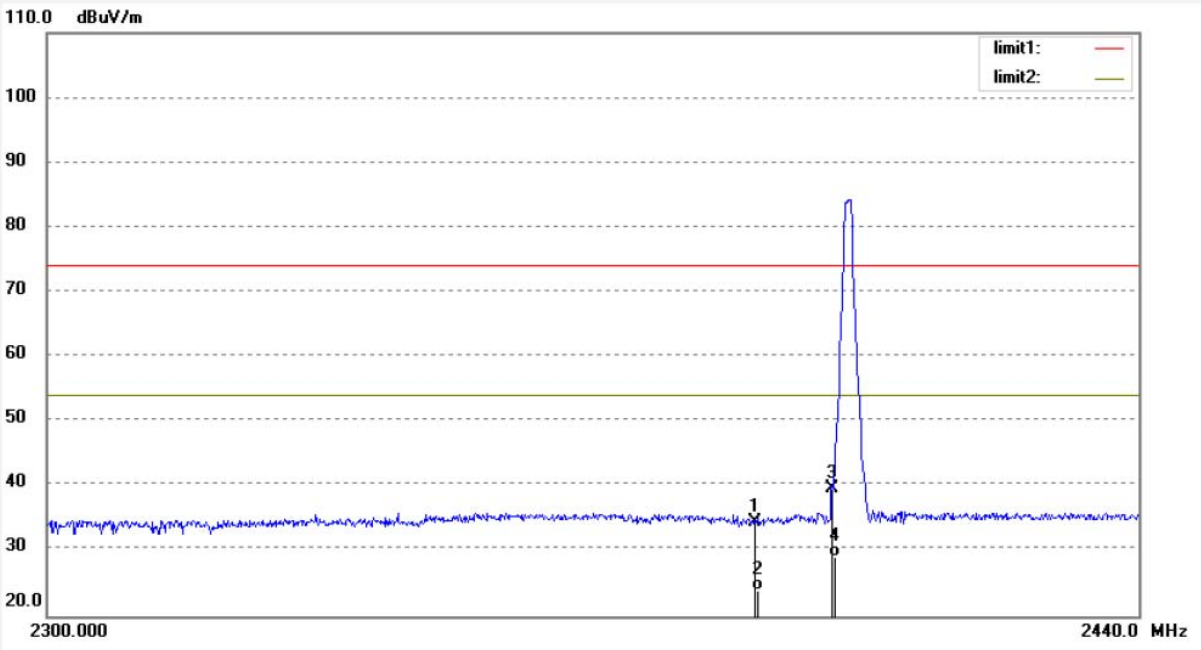
Fax:+86-0755-26503396

Job No.: FRANK2019-W #482	Polarization: Horizontal
Standard: FCC PK	Power Source: DC3.7V
Test item: Radiation Test	Date: 19/11/11/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 14/07/28
EUT: Bluetooth earphone	Engineer Signature:
Mode: TX2402MHz	Distance: 3m
Model: X3	
Manufacturer: Dongguan Luxun Electronic Technology Co., Ltd.	

Note: Report NO.:ATE20191640



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	40.80	-6.32	34.48	74.00	-39.52	peak	200	211	
2	2390.000	30.16	-6.32	23.84	54.00	-30.16	AVG	200	246	
3	2400.000	46.03	-6.27	39.76	74.00	-34.24	peak	200	321	
4	2400.000	35.48	-6.27	29.21	54.00	-24.79	AVG	200	109	

Note: Average measurement with peak detection at No.2&4

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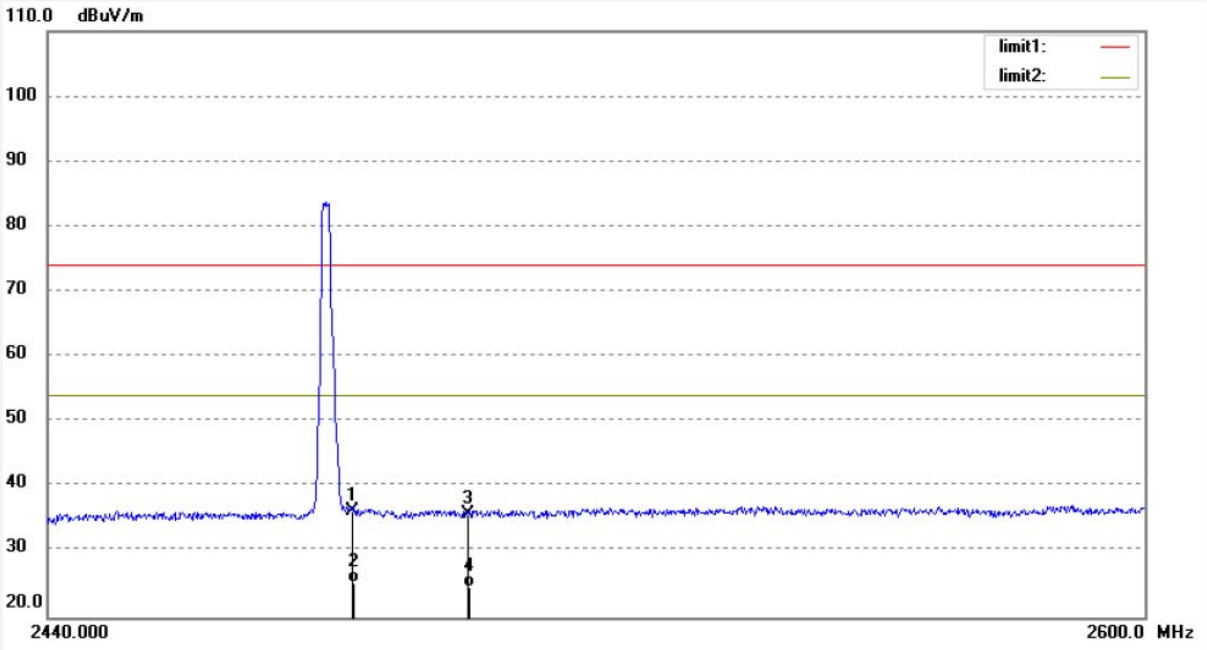
Job No.: FRANK2019-W #481	Polarization: Horizontal
Standard: FCC PK	Power Source: DC3.7V
Test item: Radiation Test	Date: 19/11/11/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 14/04/27
EUT: Bluetooth earphone	Engineer Signature:
Mode: TX2480MHz	Distance: 3m
Model: X3	
Manufacturer: Dongguan Luxun Electronic Technology Co., Ltd.	

Note: Report NO.:ATE20191640



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	42.14	-5.89	36.25	74.00	-37.75	peak	200	193	
2	2483.500	31.15	-5.89	25.26	54.00	-28.74	AVG	200	116	
3	2500.000	41.68	-5.81	35.87	74.00	-38.13	peak	200	63	
4	2500.000	30.48	-5.81	24.67	54.00	-29.33	AVG	200	110	

Note: Average measurement with peak detection at No.2&4

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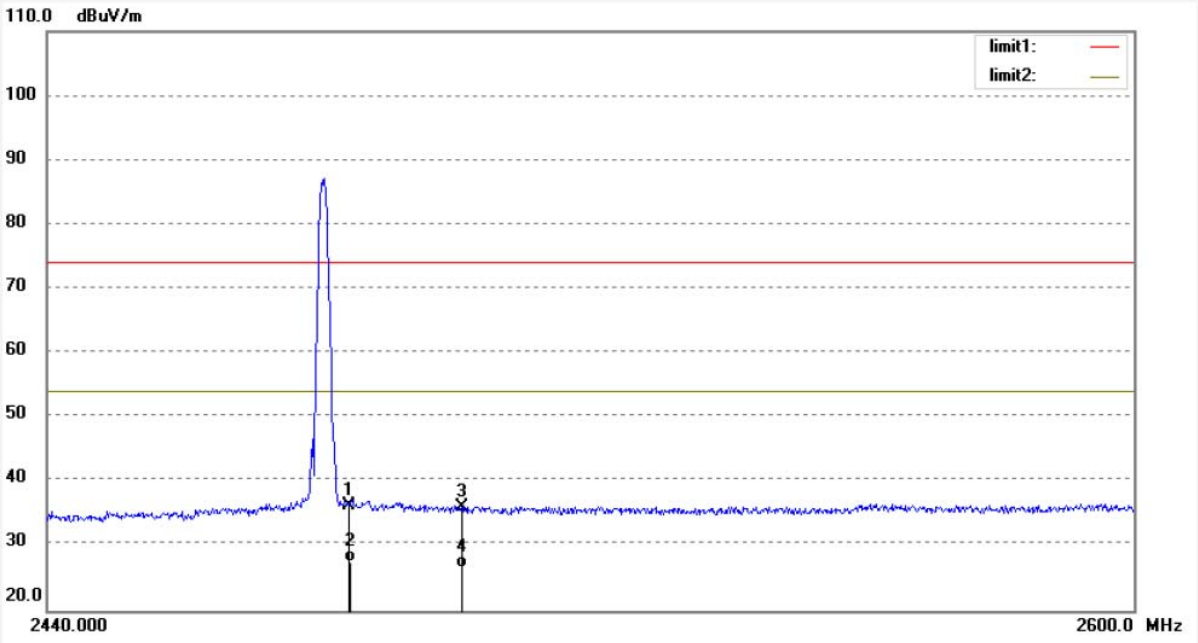
Job No.: FRANK2019-W #480	Polarization: Vertical
Standard: FCC PK	Power Source: DC3.7V
Test item: Radiation Test	Date: 19/11/11/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 14/01/27
EUT: Bluetooth earphone	Engineer Signature:
Mode: TX2480MHz	Distance: 3m
Model: X3	
Manufacturer: Dongguan Luxun Electronic Technology Co., Ltd.	

Note: Report NO.:ATE20191640



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	42.26	-5.89	36.37	74.00	-37.63	peak	150	201	
2	2483.500	33.45	-5.89	27.56	54.00	-26.44	AVG	150	33	
3	2500.000	41.84	-5.81	36.03	74.00	-37.97	peak	150	112	
4	2500.000	32.45	-5.81	26.64	54.00	-27.36	AVG	150	93	

Note: Average measurement with peak detection at No.2&4

Hopping mode

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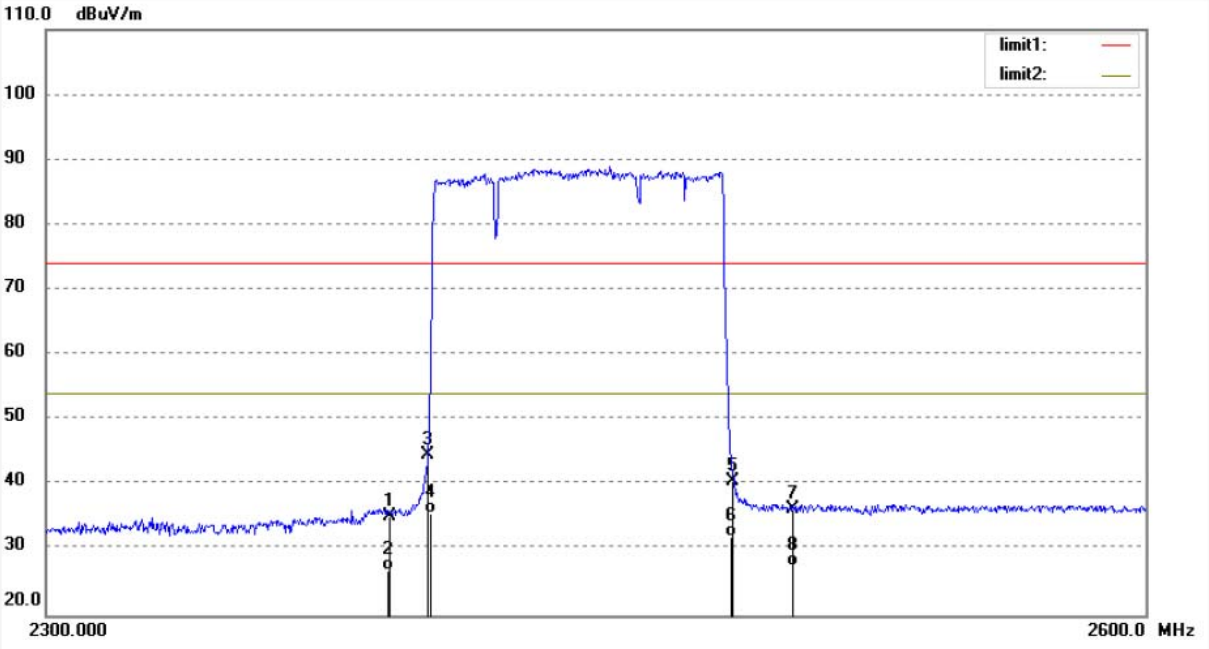
Job No.: FRANK2019-W #502	Polarization: Vertical
Standard: FCC PK	Power Source: DC 3.7V
Test item: Radiation Test	Date: 19/11/11/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 16/31/13
EUT: Bluetooth earphone	Engineer Signature:
Mode: HOPPING(GFSK)	Distance: 3m
Model: X3	
Manufacturer: Dongguan Luxun Electronic Technology Co., Ltd.	

Note: Report NO.:ATE20191640



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	41.62	-6.32	35.30	74.00	-38.70	peak	150	302	
2	2390.000	33.16	-6.32	26.84	54.00	-27.16	AVG	150	82	
3	2400.000	50.90	-6.27	44.63	74.00	-29.37	peak	150	112	
4	2400.000	41.97	-6.27	35.70	54.00	-18.30	AVG	150	301	
5	2483.500	46.46	-5.89	40.57	74.00	-33.43	peak	150	225	
6	2483.500	37.98	-5.89	32.09	54.00	-21.91	AVG	150	163	
7	2500.000	42.07	-5.81	36.26	74.00	-37.74	peak	150	201	
8	2500.000	33.42	-5.81	27.61	54.00	-26.39	AVG	150	331	

Note: Average measurement with peak detection at No.2&4&6&8

ACCURATE TECHNOLOGY CO., LTD.
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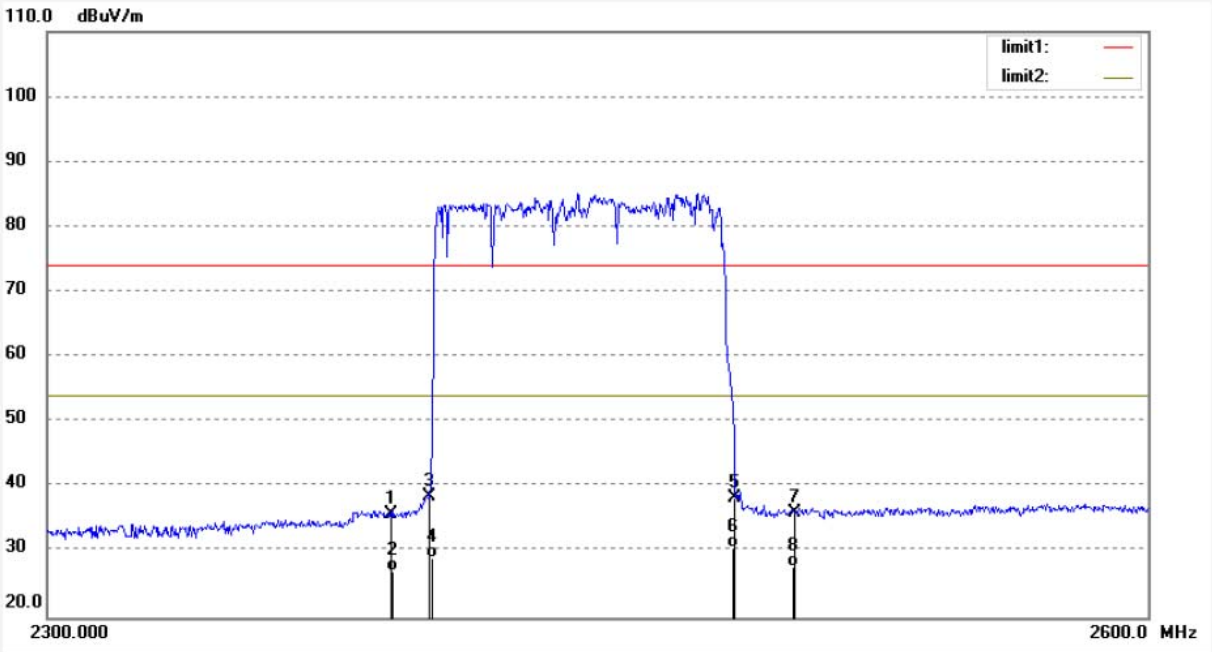
Fax:+86-0755-26503396

Job No.: FRANK2019-W #503
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Bluetooth earphone
Mode: HOPPING(GFSK)
Model: X3
Manufacturer: Dongguan Luxun Electronic Technology Co., Ltd.

Polarization: Horizontal
Power Source: DC 3.7V
Date: 19/11/11/
Time: 16/33/54
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20191640



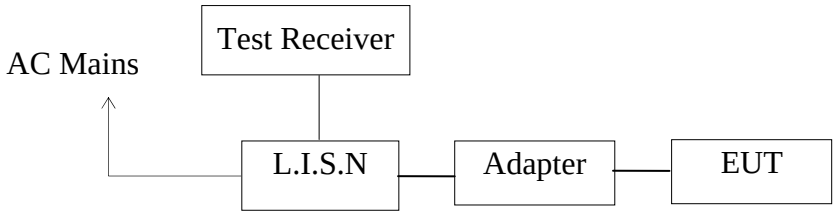
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	42.28	-6.32	35.96	74.00	-38.04	peak	200	89	
2	2390.000	33.45	-6.32	27.13	54.00	-26.87	AVG	200	201	
3	2400.000	44.88	-6.27	38.61	74.00	-35.39	peak	200	210	
4	2400.000	35.48	-6.27	29.21	54.00	-24.79	AVG	200	332	
5	2483.500	44.18	-5.89	38.29	74.00	-35.71	peak	200	93	
6	2483.500	36.48	-5.89	30.59	54.00	-23.41	AVG	200	211	
7	2500.000	41.89	-5.81	36.08	74.00	-37.92	peak	200	52	
8	2500.000	33.49	-5.81	27.68	54.00	-26.32	AVG	200	146	

Note: Average measurement with peak detection at No.2&4&6&8

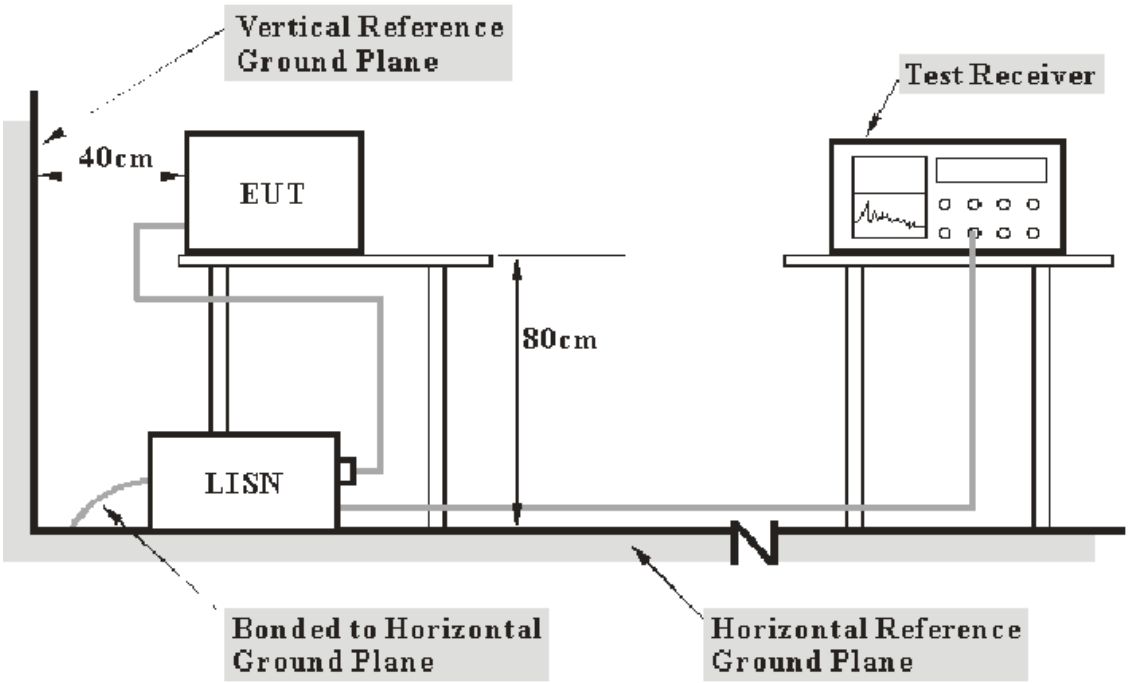
12. AC POWER LINE CONDUCTED EMISSION TEST

12.1. Block Diagram of Test Setup

12.1.1. Block diagram of connection between the EUT and simulators



12.1.2. Test System Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

12.2.Power Line Conducted Emission Measurement Limits

Frequency (MHz)	Limit dB(μV)	
	Quasi-peak Level	Average Level
0.15 - 0.50	66.0 – 56.0 *	56.0 – 46.0 *
0.50 - 5.00	56.0	46.0
5.00 - 30.00	60.0	50.0
NOTE1: The lower limit shall apply at the transition frequencies. NOTE2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.		

12.3.Configuration of EUT on Measurement

The equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner, which tends to maximize its emission characteristics in a normal application.

12.4.Operating Condition of EUT

12.4.1.Setup the EUT and simulator as shown as Section 12.1.

12.4.2.Turn on the power of all equipment.

12.4.3.Let the EUT work in test mode and measure it.

12.5.Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.10: 2013 on Conducted Emission Measurement.

The bandwidth of test receiver is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

12.6.Data Sample

Frequency (MHz)	Transducer value (dB)	QuasiPeak Level (dBμV)	Average Level (dBμV)	QuasiPeak Limit (dBμV)	Average Limit (dBμV)	QuasiPeak Margin (dB)	Average Margin (dB)	Remark (Pass/Fail)
X.XX	10.6	25.3	17.0	59.0	49.0	33.4	31.7	Pass

Frequency(MHz) = Emission frequency in MHz
Transducer value(dB) = Insertion loss of LISN + Cable Loss
Level(dBμV) = Quasi-peak Reading/Average Reading + Transducer value
Limit (dBμV) = Limit stated in standard
Margin = Limit (dBμV) - Level (dBμV)

Calculation Formula:
Margin = Limit (dBμV) - Level (dBμV)

12.7.Test Results

Pass.
Test Lab: 3m Anechoic chamber

The frequency range from 150kHz to 30MHz is checked.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.
Emissions attenuated more than 20 dB below the permissible value are not reported.

All data was recorded in the Quasi-peak and average detection mode.

The spectral diagrams are attached as below.

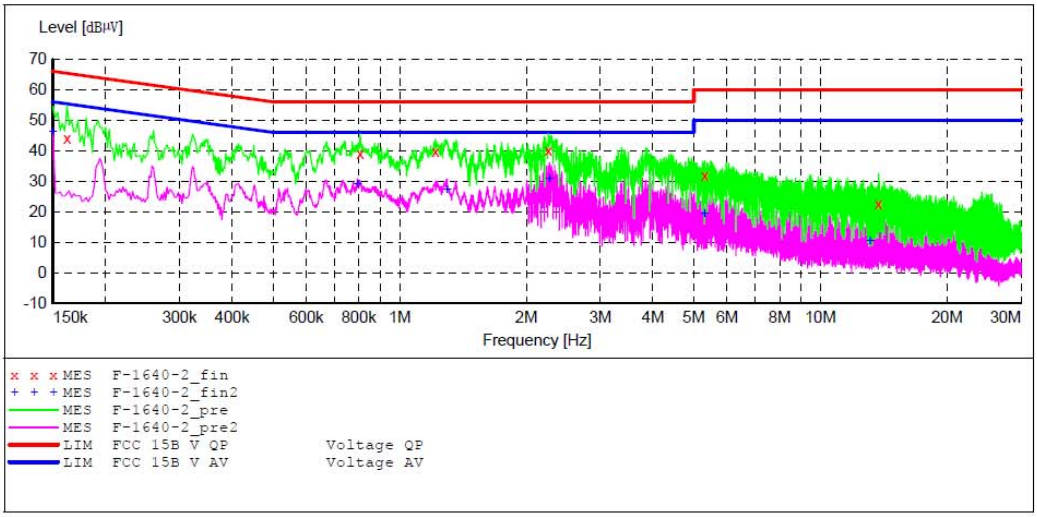
ACCURATE TECHNOLOGY CO.,LTD

CONDUCTED EMISSION STANDARD FCC PART 15B

```
EUT:                  Bluetooth earphone M/N:X3
Manufacturer:         Dongguan Luxun Electronic Technology Co.,Ltd
Operating Condition:  BT Communication
Test Site:            2#Shielding Room
Operator:             Frank
Test Specification:   N   120V/60Hz
Comment:              Report NO.:ATE20191640
Start of Test:        2019-11-11 / 9:36:39
```

SCAN TABLE: "V 150K-30MHz fin"

```
Short Description:            _SUB_STD_VTERM2 1.70
Start      Stop       Step       Detector  Meas.     IF      Transducer
Frequency  Frequency  Width                Time      Bandw.
150.0 kHz  30.0 MHz   4.5 kHz    QuasiPeak 1.0 s     9 kHz   NSLK8126 2008
                                 Average
```



MEASUREMENT RESULT: "F-1640-2_fin"

2019-11-11 9:38

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.162000	44.00	10.8	65	21.4	QP	N	GND
0.806000	39.20	11.1	56	16.8	QP	N	GND
1.216000	39.80	11.2	56	16.2	QP	N	GND
2.255000	40.30	11.3	56	15.7	QP	N	GND
5.310000	32.00	11.4	60	28.0	QP	N	GND
13.750000	22.80	11.6	60	37.2	QP	N	GND

MEASUREMENT RESULT: "F-1640-2_fin2"

2019-11-11 9:38

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	46.20	10.8	56	9.8	AV	N	GND
0.794000	29.20	11.1	46	16.8	AV	N	GND
1.298000	27.40	11.2	46	18.6	AV	N	GND
2.270000	30.70	11.3	46	15.3	AV	N	GND
5.310000	19.40	11.4	50	30.6	AV	N	GND
13.135000	10.60	11.6	50	39.4	AV	N	GND

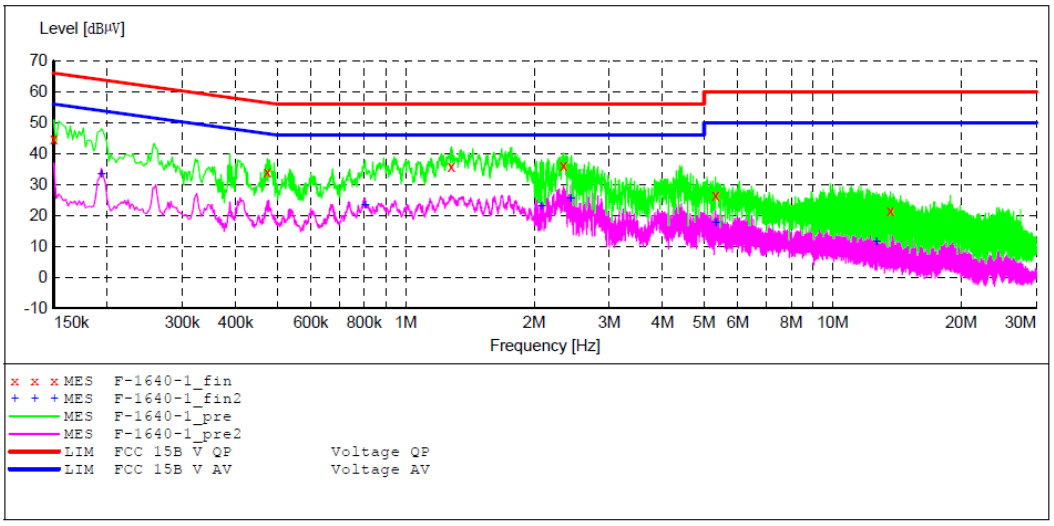
ACCURATE TECHNOLOGY CO.,LTD

CONDUCTED EMISSION STANDARD FCC PART 15B

```
EUT:                    Bluetooth earphone M/N:X3
Manufacturer:           Dongguan Luxun Electronic Technology Co.,Ltd
Operating Condition:    BT Communication
Test Site:              2#Shielding Room
Operator:               Frank
Test Specification:     L   120V/60Hz
Comment:                Report NO.:ATE20191640
Start of Test:          2019-11-11 / 9:33:48
```

SCAN TABLE: "V 150K-30MHz fin"

```
  Short Description:            _SUB_STD_VTERM2 1.70
  Start      Stop       Step       Detector  Meas.     IF      Transducer
  Frequency  Frequency  Width                Time      Bandw.
  150.0 kHz  30.0 MHz   4.5 kHz    QuasiPeak 1.0 s     9 kHz   NSLK8126 2008
                                   Average
```



MEASUREMENT RESULT: "F-1640-1_fin"

2019-11-11 9:35

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	44.80	10.8	66	21.2	QP	L1	GND
0.474000	34.00	11.0	56	22.4	QP	L1	GND
1.280000	35.90	11.2	56	20.1	QP	L1	GND
2.345000	36.40	11.3	56	19.6	QP	L1	GND
5.320000	26.70	11.4	60	33.3	QP	L1	GND
13.670000	21.70	11.6	60	38.3	QP	L1	GND

MEASUREMENT RESULT: "F-1640-1_fin2"

2019-11-11 9:35

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.194000	33.50	10.8	54	20.4	AV	L1	GND
0.804000	23.50	11.1	46	22.5	AV	L1	GND
2.080000	23.10	11.3	46	22.9	AV	L1	GND
2.435000	25.40	11.3	46	20.6	AV	L1	GND
5.320000	17.70	11.4	50	32.3	AV	L1	GND
12.655000	11.60	11.6	50	38.4	AV	L1	GND

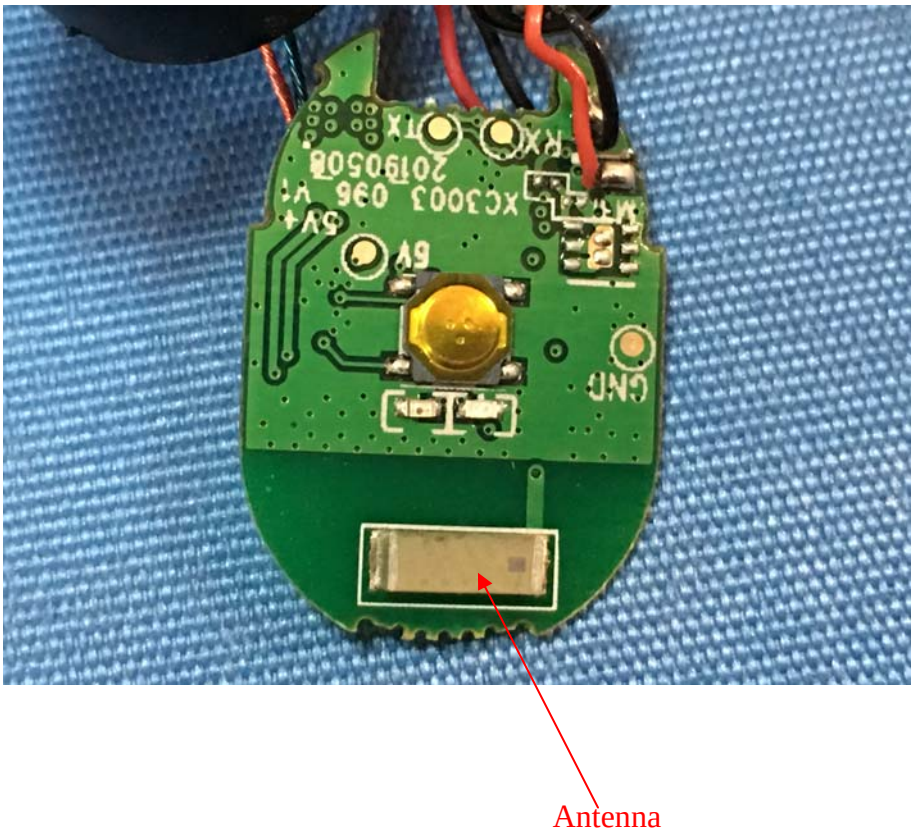
13. ANTENNA REQUIREMENT

13.1. 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.

13.2. Antenna Construction

Device is equipped with permanent attached antenna, which isn't displaced by other antenna. The Max Antenna gain of EUT is 1.0dBi. Therefore, the equipment complies with the antenna requirement of Section 15.203.



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