APPLICATION CERTIFICATION FCC Part 15C
On Behalf of
SHENZHEN KINGVIE TECHNOLOGY CO., LIMITED

Wireless earphones
Model No.: X10, S43, X5S, X6G, P03, X3, S40, X7, Suenos, PD-BN500, AUSDOM S6, Mixcder S6, Flaro Vibe 3D, HiFuture Necklace, SBT900, BSHP900, X10 3D, Ubeats, Ubeats Pro, Ubeats Lite, X10S

FCC ID: 2AMN3-X10

Prepared for	:	SHENZHEN KINGVIE TECHNOLOGY CO., LIMITED
Address	:	NO.240, Fuqian Rd., Xintang, Guanlan Town, Longhua New District, Shenzhen, China
Prepared by	:	Shenzhen Accurate Technology Co., Ltd.
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Report No.	:	ATE20190780
Date of Test	:	May 29-June 5, 2019
Date of Report	:	June 6, 2019

TABLE OF CONTENTS

Description Page

Test Report Certification

Applicant	:	SHENZHEN KINGVIE TECHNOLOGY CO., LIMITED
Manufacturer	:	SHENZHEN KINGVIE TECHNOLOGY CO., LIMITED
EUT Description	:	Wireless earphones
Model No.	:	X10, S43, X5S, X6G, P03, X3, S40, X7, Suenos, PD-BN500, AUSDOM S6, Mixcder S6, Flaro Vibe 3D, HiFuture Necklace, SBT900, BSHP900, X10 3D, Ubeats, Ubeats Pro, Ubeats Lite, X10S
Brand Name	:	n.a.

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247: 2018
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 :	May 29-June 5, 2019
Date of Report :	June 6, 2019
Test Engineer :	(Frank, Engineer)
Prepared by :	(Bob Wang, Engineer)
Approved & Authorized Signer :	(Sean Liu, Manager)

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

Model Number	:	X10, S43, X5S, X6G, P03, X3, S40, X7, Suenos, PD-BN500, AUSDOM S6, Mixcder S6, Flaro Vibe 3D, HiFuture Necklace, SBT900, BSHP900, X10 3D, Ubeats, Ubeats Pro, Ubeats Lite, X10S (Note: These samples are same except their appearance color is different. So we prepare X10 for test only.)
Bluetooth version	:	V 5.0
Frequency Range	:	2402MHz-2480MHz
Number of Channels	:	79
Antenna Gain(Max)	:	1.05dBi
Antenna type	:	Integral Antenna
Adapter Input Voltage	:	DC 3.7V (Powered by Lithium battery) or DC 5V (Powered by USB port)
Modulation mode	:	GFSK, π/4 DQPSK, 8DPSK
Hardware version	:	V1.0
Software version	:	V1.0
Applicant	:	SHENZHEN KINGVIE TECHNOLOGY CO., LIMITED
Address	:	NO.240, Fuqian Rd., Xintang, Guanlan Town, Longhua New District, Shenzhen, China
Manufacturer	:	SHENZHEN KINGVIE TECHNOLOGY CO., LIMITED
Address	:	NO.240, Fuqian Rd., Xintang, Guanlan Town, Longhua New District, Shenzhen, China

1.2.Accessory and Auxiliary Equipment

Adapter:	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	ESPI3	101526/003	Jan. 05, 2019	1 Year
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 05, 2019	1 Year
Pre-Amplifier	Rohde&Schwarz	CBLU1183540-01	3791	Jan. 05, 2019	1 Year
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 05, 2019	1 Year
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 05, 2019	1 Year
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 05, 2019	1 Year
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 05, 2019	1 Year
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 05, 2019	1 Year
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 05, 2019	1 Year
Highpass Filter	Wainwright Instruments	WHKX3.6/18G-10SS	N/A	Jan. 05, 2019	1 Year
Band Reject Filter	Wainwright Instruments	WRCG2400/2485-2375/2510-60/11SS	N/A	Jan. 05, 2019	1 Year
RF COAXIAL CABLE	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	March 20, 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

Note: The equipment under test (EUT) was tested under fully-charged battery.
The Bluetooth has been tested under continuous transmission mode.

3.2.Configuration and peripherals

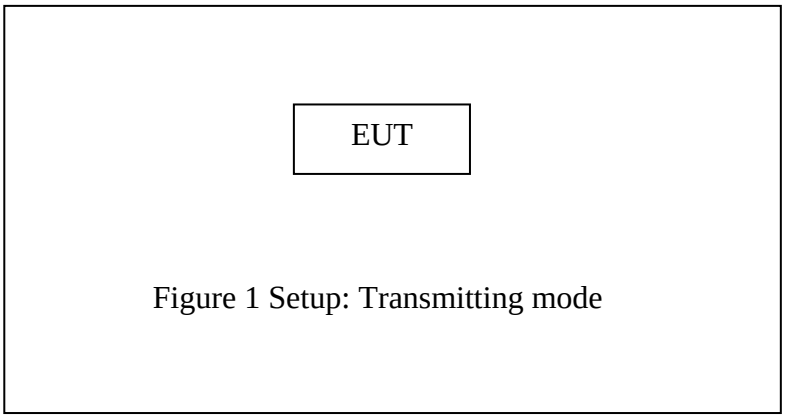


Figure 1 Setup: Transmitting mode

4. FREQUENCY HOPPING SYSTEM REQUIREMENTS

4.1.Standard and Limit

According to FCC Part 15.247(a)(1), 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.

(g) Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

(h) The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hop sets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

4.2.EUT Pseudorandom Frequency Hopping Sequence

Pseudorandom Frequency Hopping Sequence Table as below:
Channel: 08, 24, 40, 56, 34, 51, 72, 09, 01, 64, 22, 33, 41, 32, 47, 65, 73, 53, 69, 06, 17, 04, 20, 36, 52, 38, 66, 70, 78, 68, 76, 21, 29, 10, 26, 49, 00, 58, 44, 59, 75, 13, 03, 14, 11, 35, 43, 37, 50, 61, 77, 55, 71, 02, 23, 07, 27, 39, 54, 46, 48, 15, 63, 62, 67, 25, 31, 12, 28, 19, 60, 42, 57, 74, 16, 05, 18, 30, 45, etc.

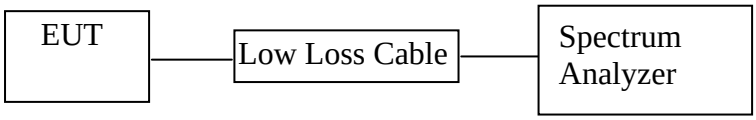
The system receiving have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.

5. TEST PROCEDURES AND RESULTS

FCC Rules	Description of Test	Result
Section 15.207	Conducted Emission Test	Compliant
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 15.203	Antenna Requirement	Compliant

6. 20DB BANDWIDTH TEST

6.1.Block Diagram of Test Setup



(EUT: Wireless earphones)

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.

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 5.1.

6.4.2.Turn on the power of all equipment.

6.4.3.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.

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.

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

6.6.Test Result

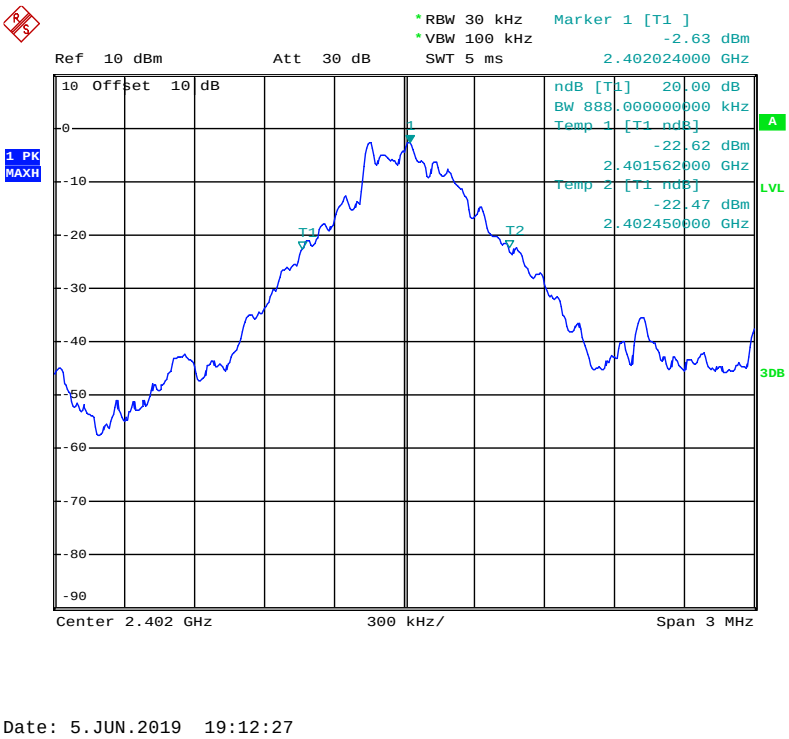
Test Lab: Shielding room
Test Engineer: Frank

Channel	Frequency (MHz)	GFSK 20dB Bandwidth (MHz)	Π/4-DQPSK 20dB Bandwidth (MHz)	8DPSK 20dB Bandwidth (MHz)	Result
Low	2402	0.888	1.224	1.212	Pass
Middle	2441	0.888	1.224	1.212	Pass
High	2480	0.888	1.218	1.212	Pass

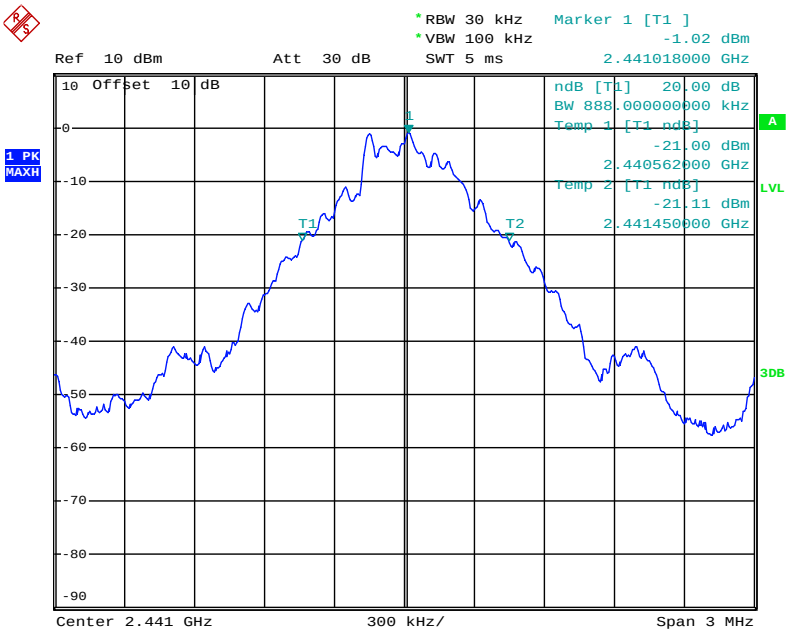
The spectrum analyzer plots are attached as below.

GFSK Mode

Low channel



Middle channel



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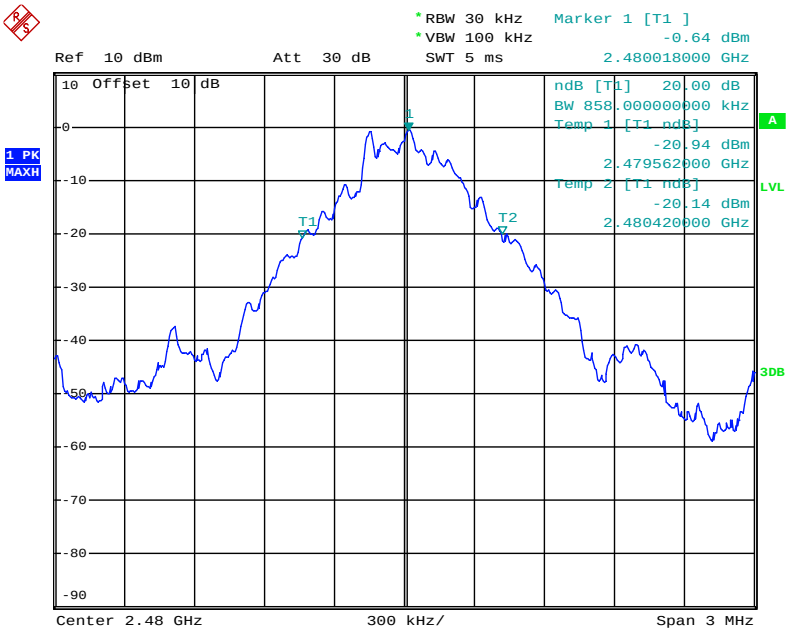
High channel



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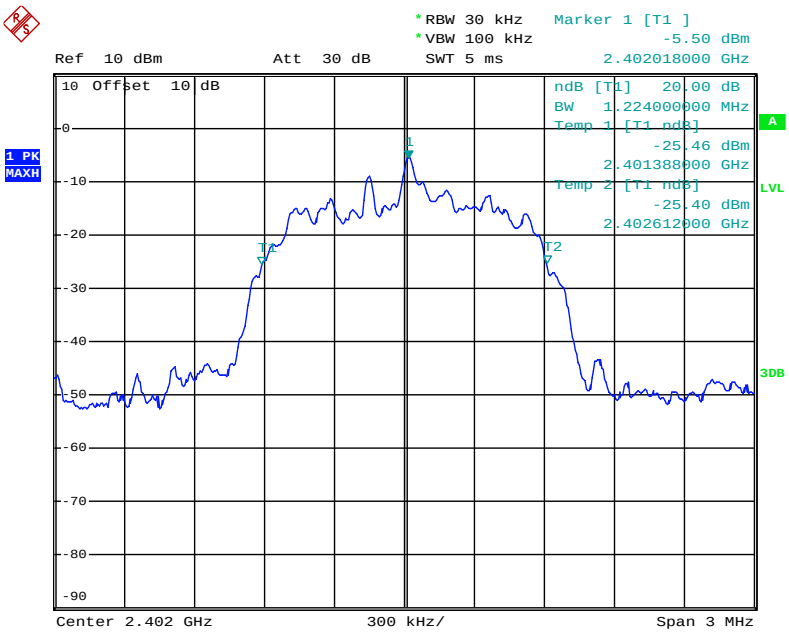
Π/4-DQPSK Mode

Low channel



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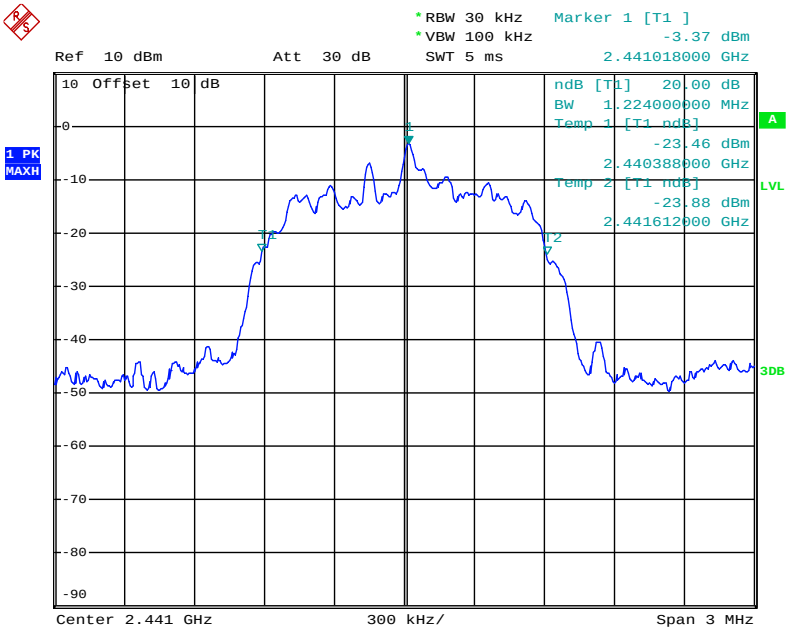
Middle channel



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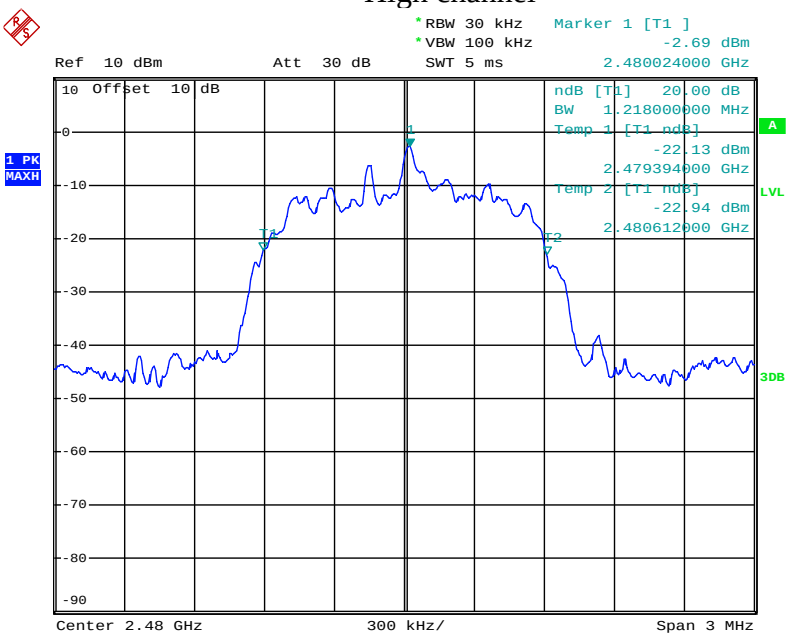
High channel



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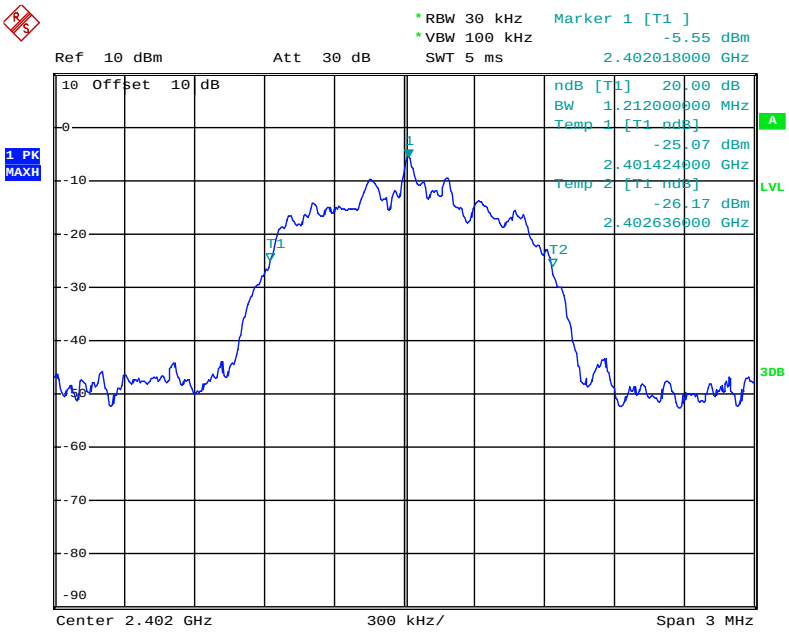
8DPSK Mode

Low channel



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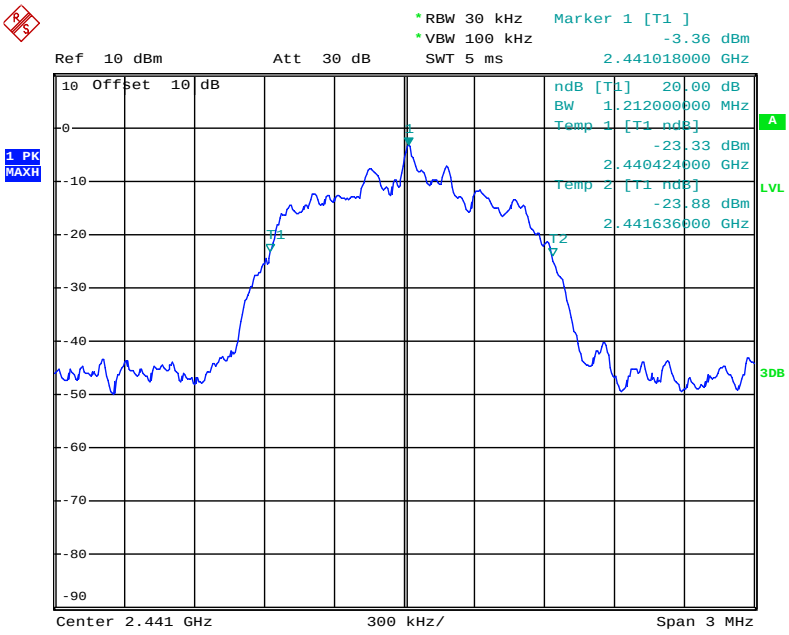
Middle channel



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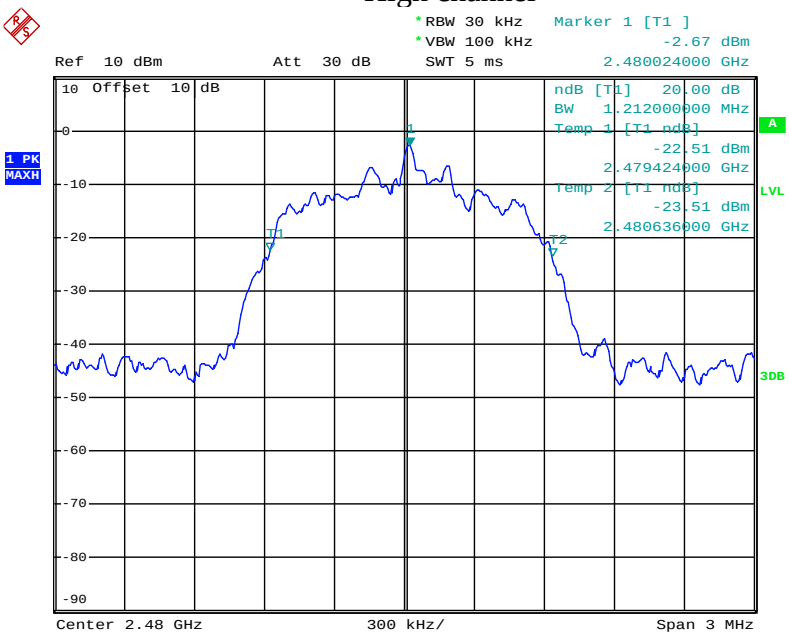
High channel



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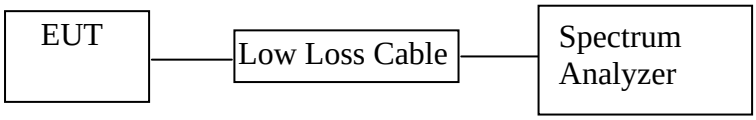
7. CARRIER FREQUENCY SEPARATION TEST

7.1.Block Diagram of Test Setup



(EUT: Wireless earphones)

7.2.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 pseudorandomly 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.

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 6.1.

7.4.2.Turn on the power of all equipment.

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

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 RBW of spectrum analyzer to 30 kHz and VBW to 100 kHz. Adjust Span to 2MHz.

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

7.5.4.Measurement the channel separation

7.6.Test Result

Test Lab: Shielding room
Test Engineer: Frank

GFSK

Channel	Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result
Low	2402	1.008	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

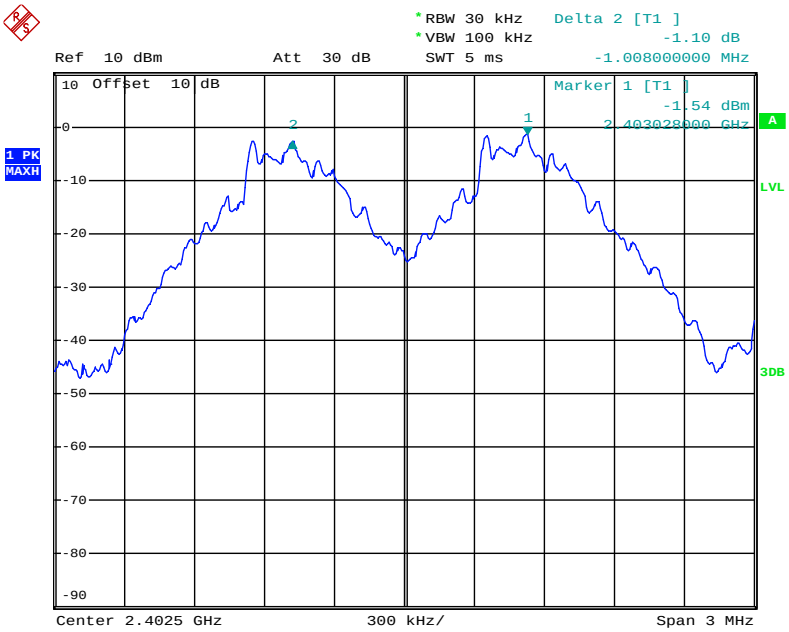
Channel	Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result
Low	2402	1.002	25KHz or 2/3*20dB bandwidth	PASS
	2403			
Middle	2440	1.002	25KHz or 2/3*20dB bandwidth	PASS
	2441			
High	2479	1.002	25KHz or 2/3*20dB bandwidth	PASS
	2480			

8DPSK

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

GFSK Mode

Low channel



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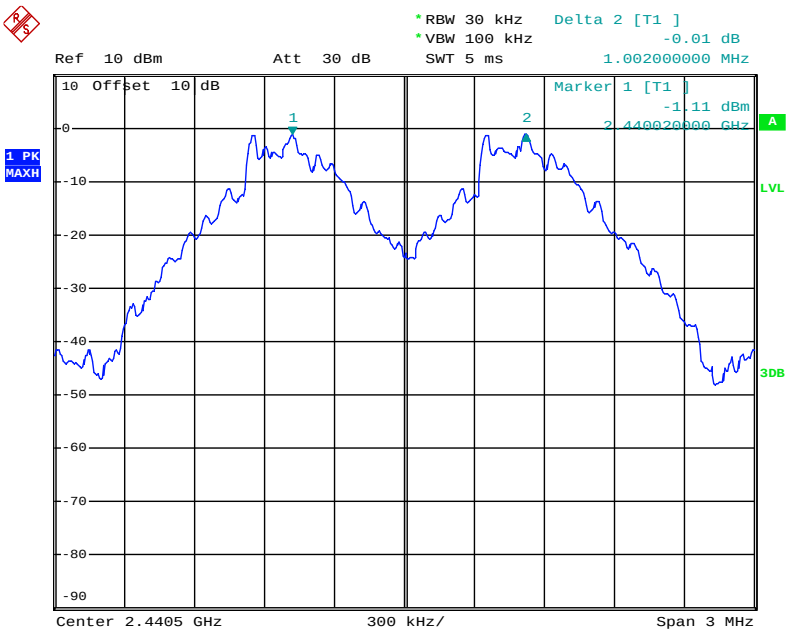
Middle channel



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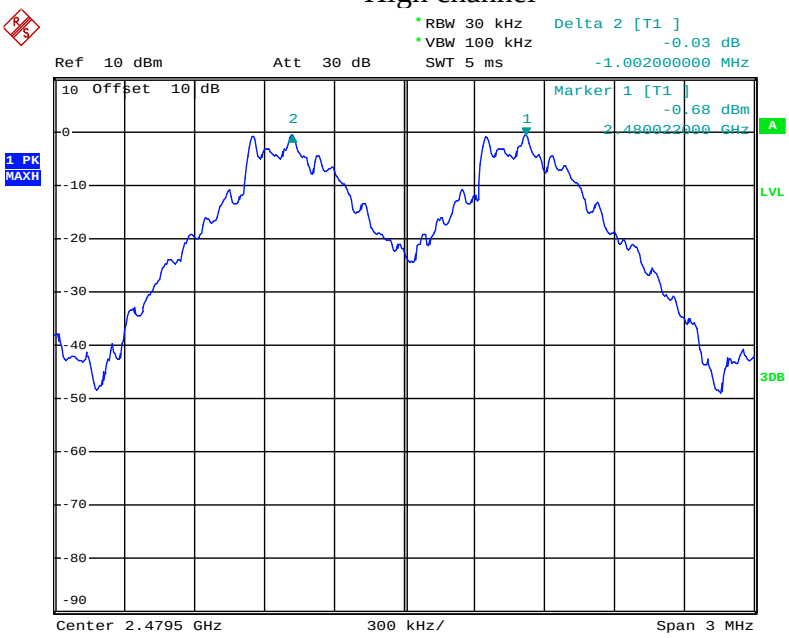
High channel



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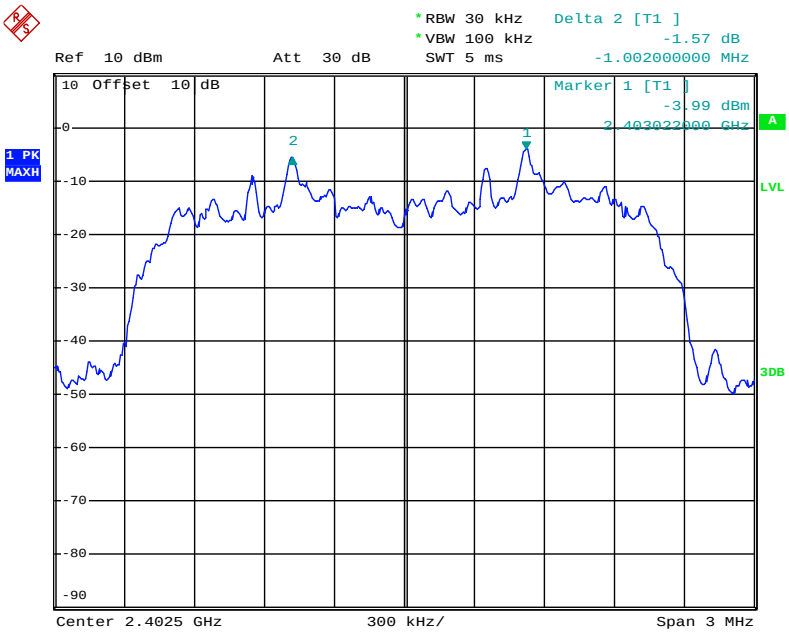
Π/4-DQPSK Mode

Low channel



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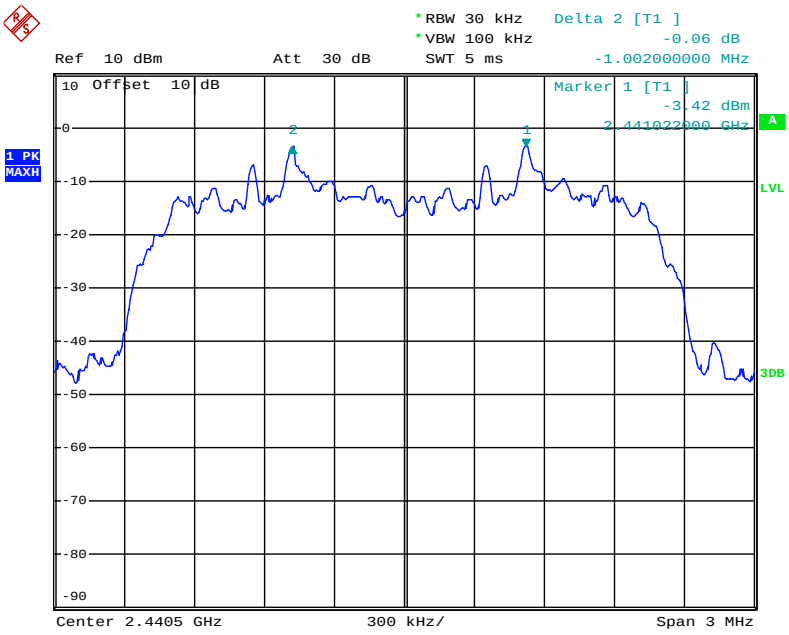
Middle channel



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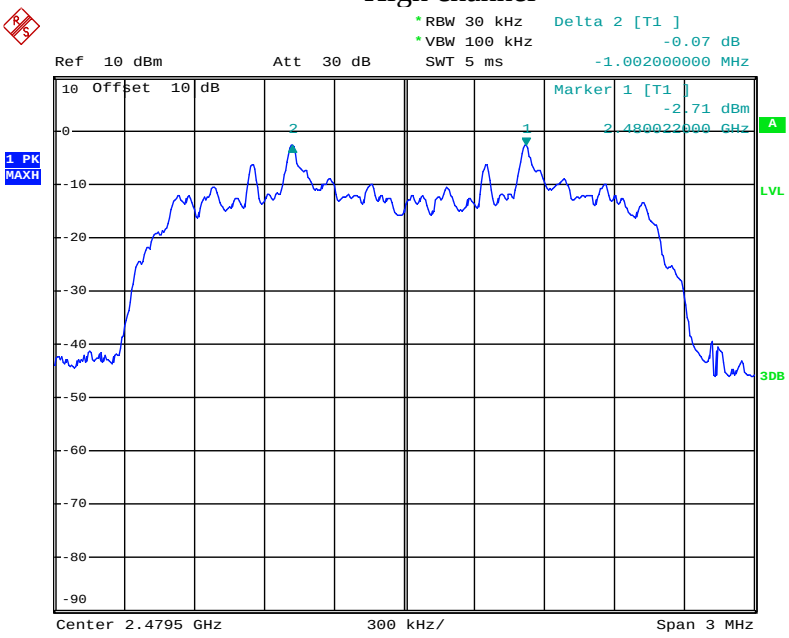
High channel



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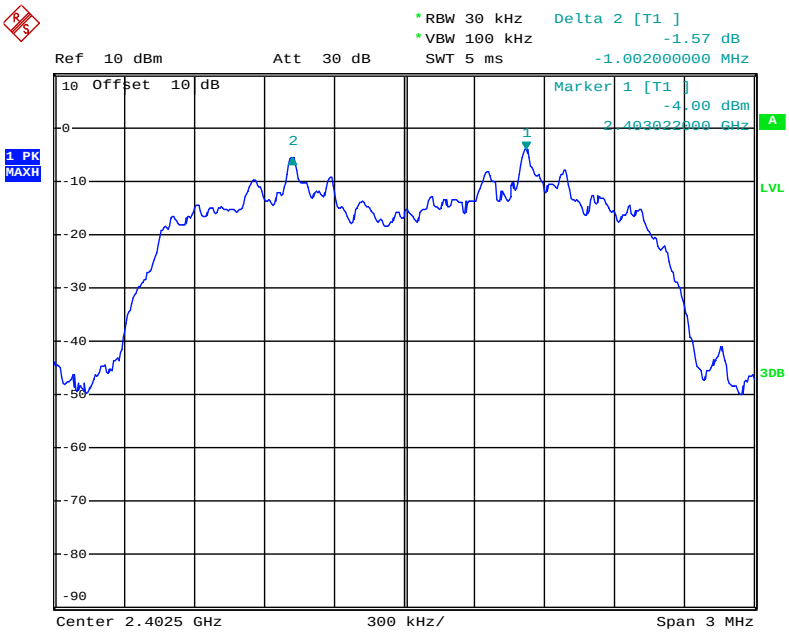
8DPSK Mode

Low channel



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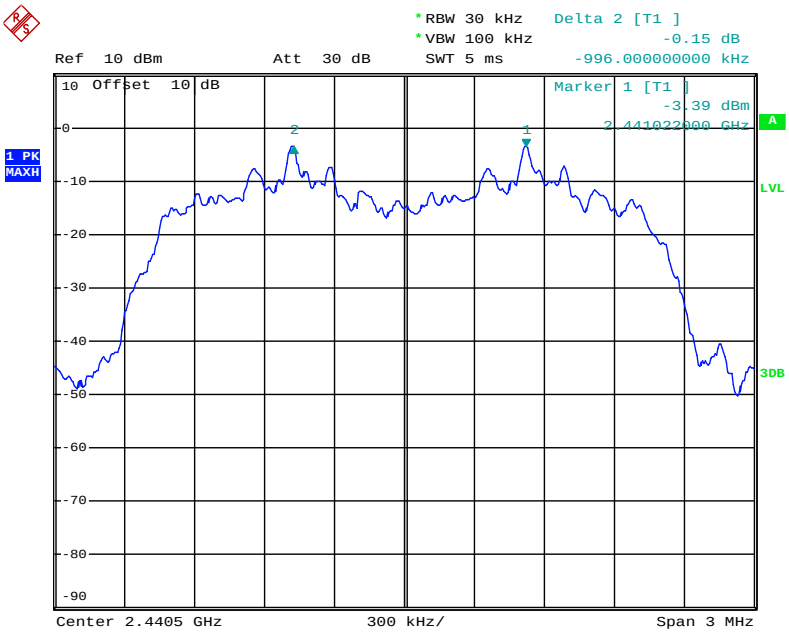
Middle channel



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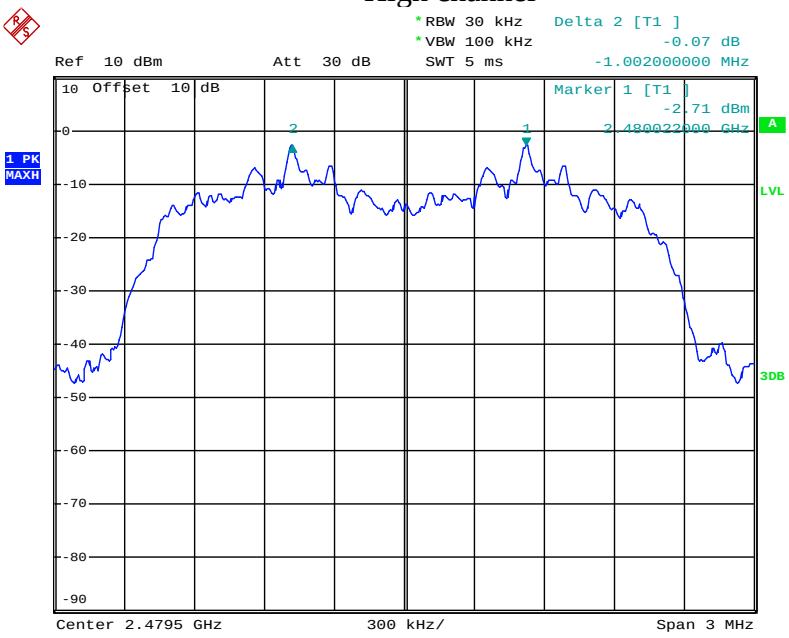
High channel



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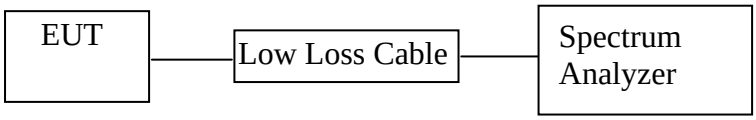
8. NUMBER OF HOPPING FREQUENCY TEST

8.1.Block Diagram of Test Setup



(EUT: Wireless earphones)

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.

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 7.1.

8.4.2.Turn on the power of all equipment.

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

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

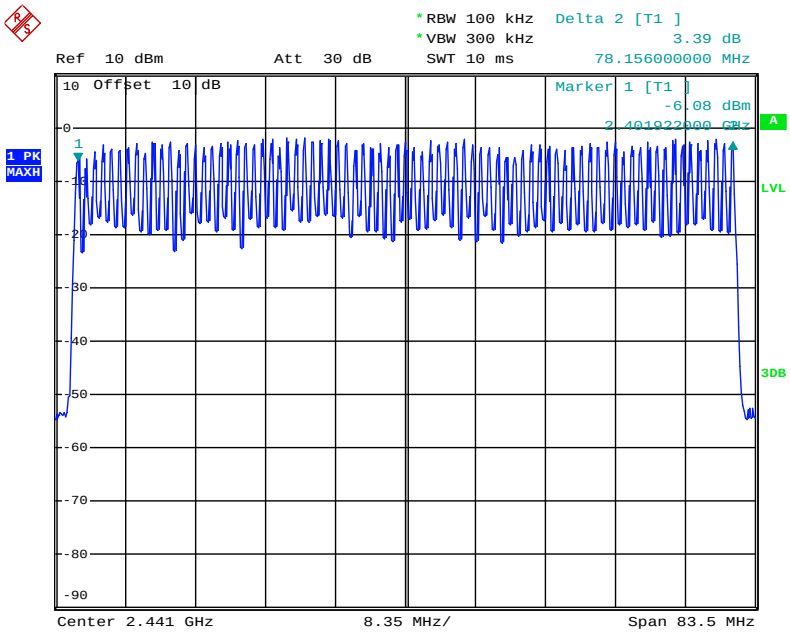
8.5.3.Max hold, view and count how many channel in the band.

8.6.Test Result

Test Lab: Shielding room
Test Engineer: Frank

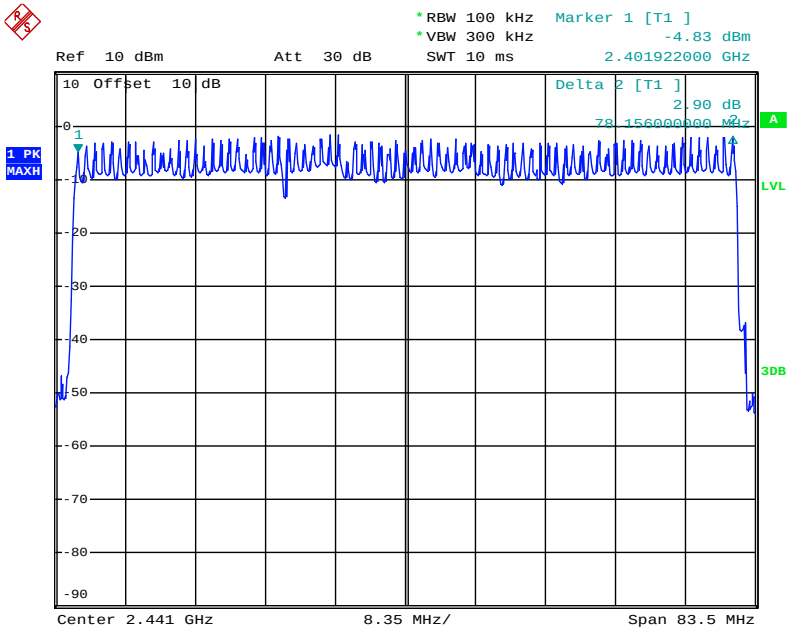
Total number of hopping channel	Measurement result(CH)	Limit(CH)
	79	⩾15

Number of hopping channels(GFSK)



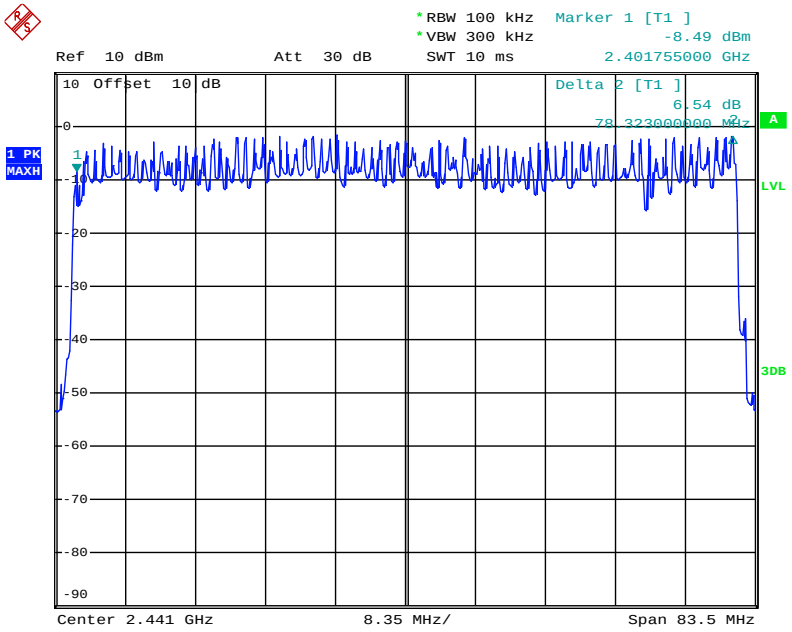
Date: 5.JUN.2019 19:38:03

Number of hopping channels(Π/4-DQPSK)



Date: 5.JUN.2019 19:36:45

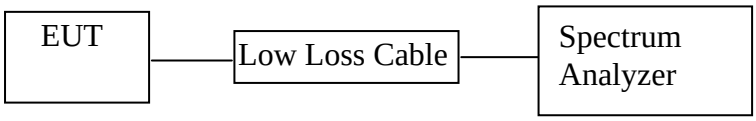
Number of hopping channels(8DPSK)



Date: 5.JUN.2019 19:33:54

9. DWELL TIME TEST

9.1.Block Diagram of Test Setup



(EUT: Wireless earphones)

9.2.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.

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 8.1.

9.4.2.Turn on the power of all equipment.

9.4.3.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.

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 center frequency of spectrum analyzer = operating frequency.

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

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

9.6.Test Result

Test Lab: Shielding room
Test Engineer: Frank

GFSK Mode (Worst case)

Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2441	0.44	140.8	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	2.98	317.9	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(6*79))×31.6				

Π/4-DQPSK (Worst case)

Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2441	0.44	140.8	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	2.95	314.7	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(6*79))×31.6				

8DPSK (Worst case)

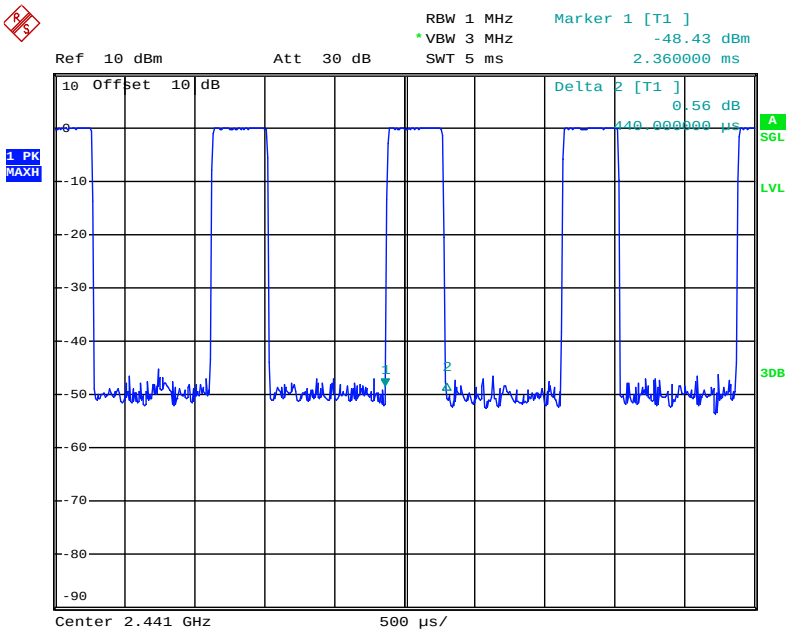
Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2441	0.44	140.80	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(2*79))×31.6				
DH3	2441	1.72	275.2	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(4*79))×31.6				
DH5	2441	3.00	320.0	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 worst case data for all test mode.

The spectrum analyzer plots are attached as below.

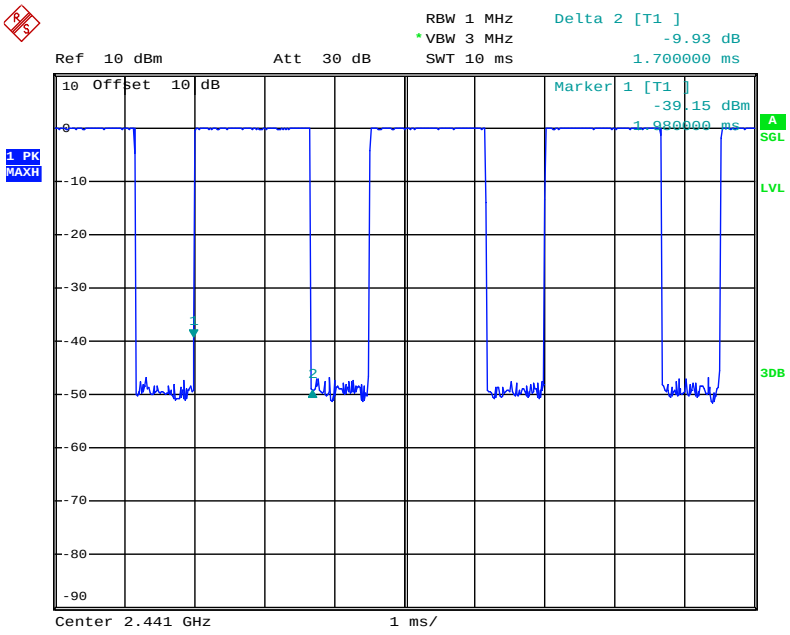
GFSK Mode

DH1 Middle channel



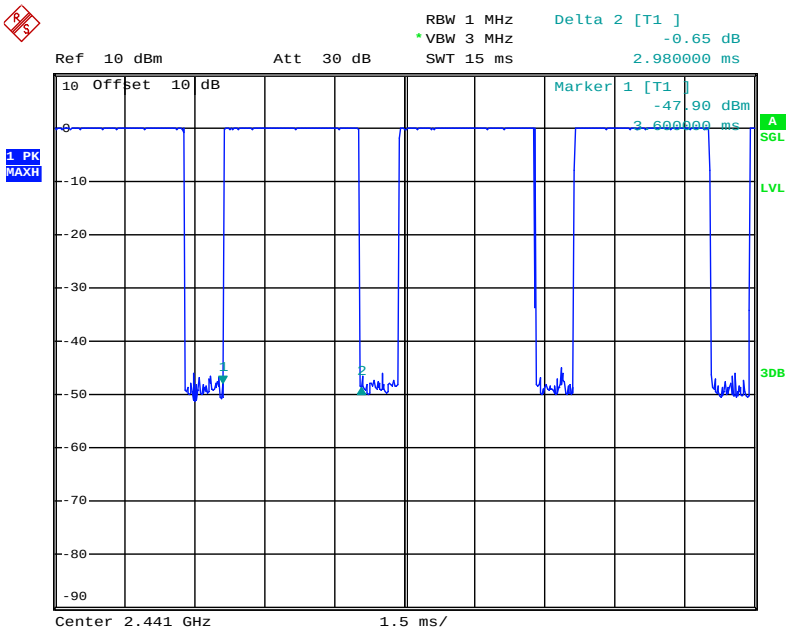
Date: 5.JUN.2019 20:04:27

DH3 Middle channel



Date: 5.JUN.2019 20:03:56

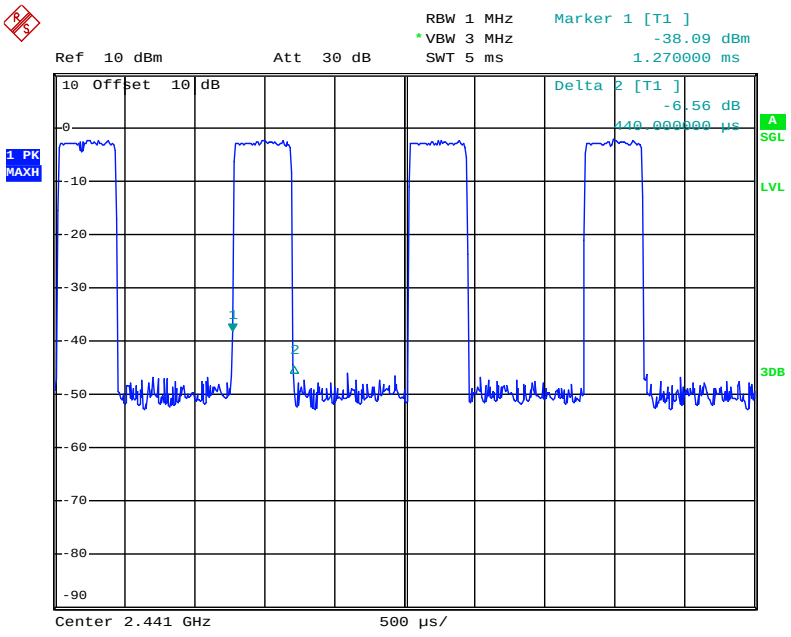
DH5 Middle channel



Date: 5.JUN.2019 20:03:23

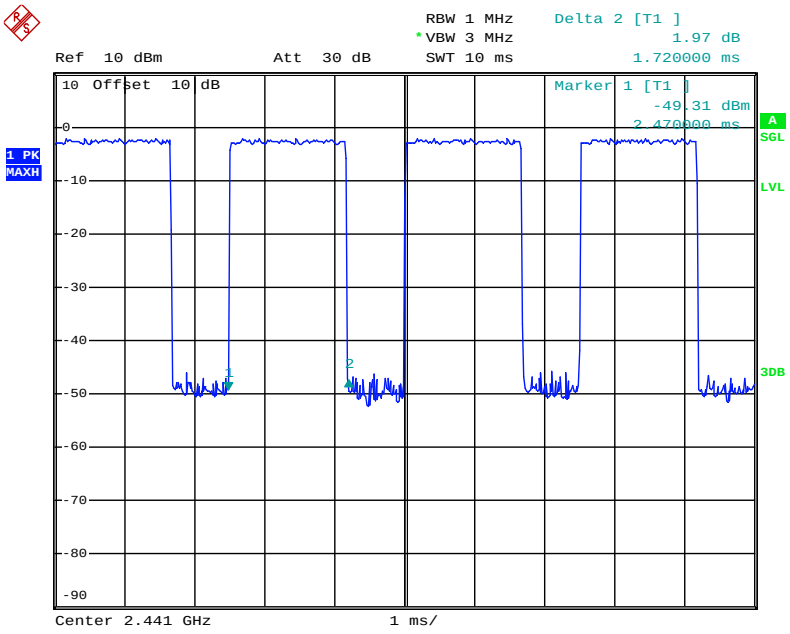
Π/4-DQPSK

2DH1 Middle channel



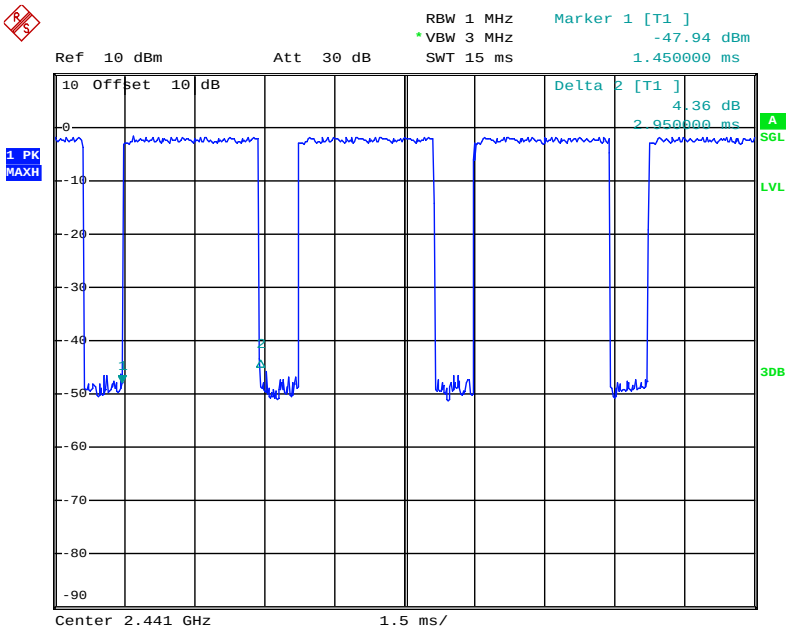
Date: 5.JUN.2019 20:10:51

2DH3 Middle channel



Date: 5.JUN.2019 20:11:27

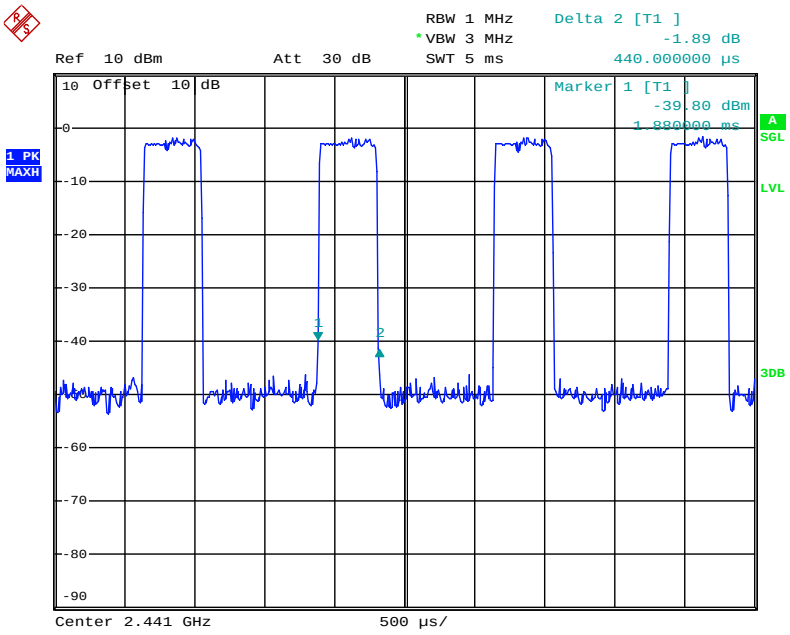
2DH5 Middle channel



Date: 5.JUN.2019 20:12:54

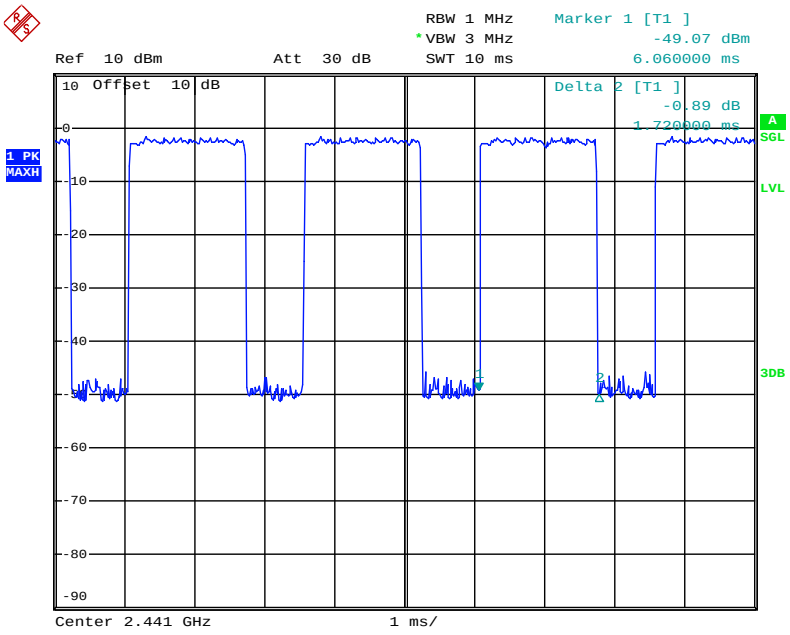
8DPSK

3DH1 Middle channel



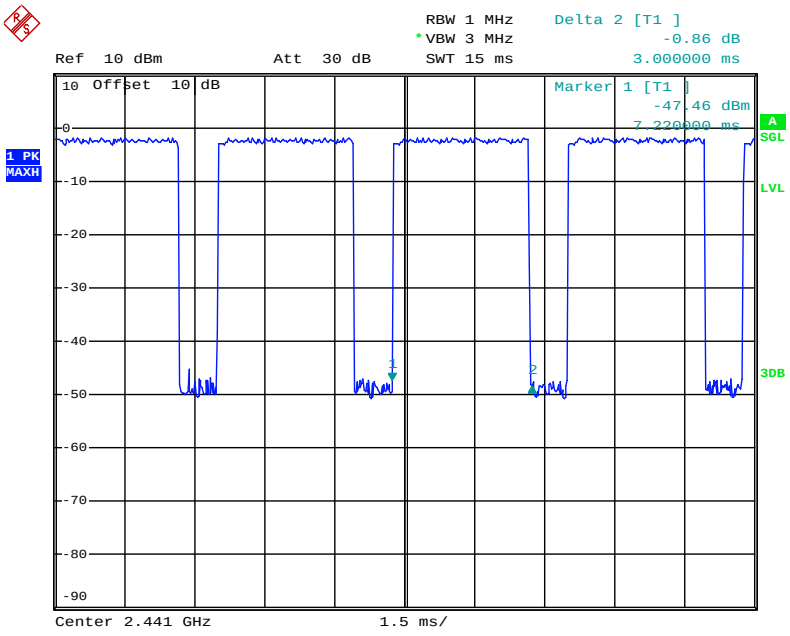
Date: 5.JUN.2019 20:18:25

3DH3 Middle channel



Date: 5.JUN.2019 20:17:54

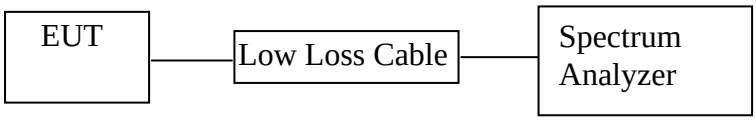
3DH5 Middle channel



Date: 5.JUN.2019 20:17:19

10.MAXIMUM PEAK OUTPUT POWER TEST

10.1.Block Diagram of Test Setup



(EUT: Wireless earphones)

10.2.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.

10.3.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.

10.4.Operating Condition of EUT

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

10.4.2.Turn on the power of all equipment.

10.4.3.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.

10.5.Test Procedure

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

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

10.5.3.Measurement the maximum peak output power.

10.6.Test Result

Test Lab: Shielding room
Test Engineer: Frank

GFSK Mode

Channel	Frequency (MHz)	Peak Output Power (dBm/W)	Limits dBm / W
Low	2402	-1.29/0.0007	21 / 0.125
Middle	2441	0.08/0.0010	21 / 0.125
High	2480	0.36/0.0011	21 / 0.125

Π/4-DQPSK Mode

Channel	Frequency (MHz)	Peak Output Power (dBm/W)	Limits dBm / W
Low	2402	-3.56/0.0004	21 / 0.125
Middle	2441	-1.51/0.0007	21 / 0.125
High	2480	-0.87/0.0008	21 / 0.125

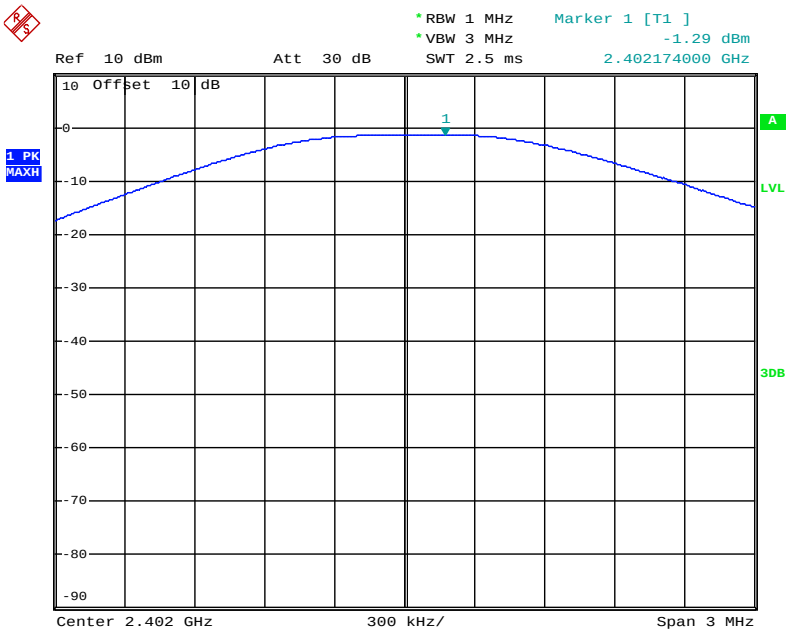
8DPSK

Channel	Frequency (MHz)	Peak Output Power (dBm/W)	Limits dBm / W
Low	2402	-3.04/0.0005	21 / 0.125
Middle	2441	-1.02/0.0008	21 / 0.125
High	2480	-0.47/0.0009	21 / 0.125

The spectrum analyzer plots are attached as below.

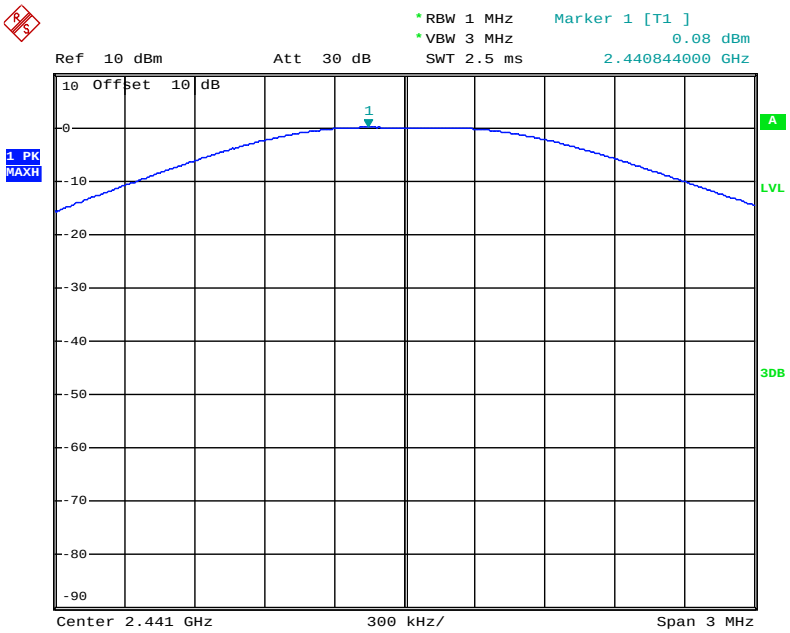
GFSK Mode

Low channel



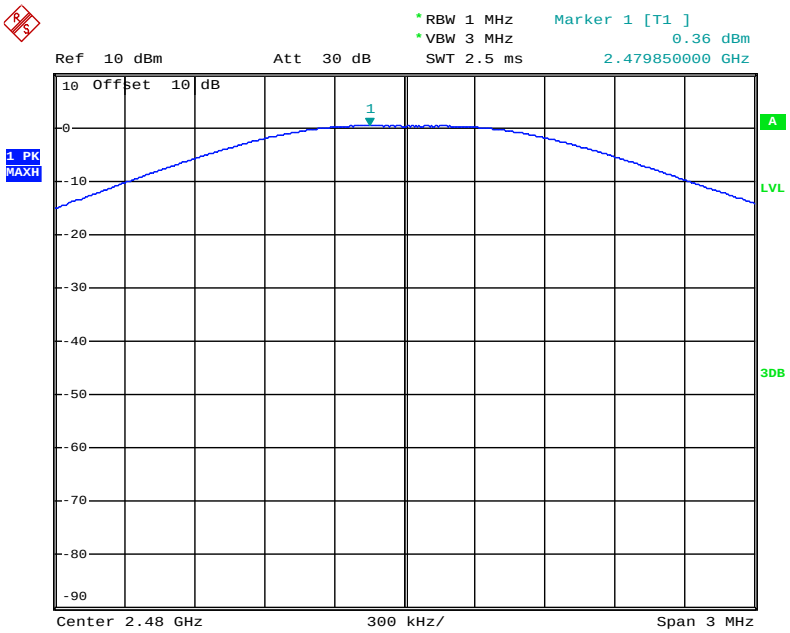
Date: 5.JUN.2019 19:25:42

Middle channel



Date: 5.JUN.2019 19:26:10

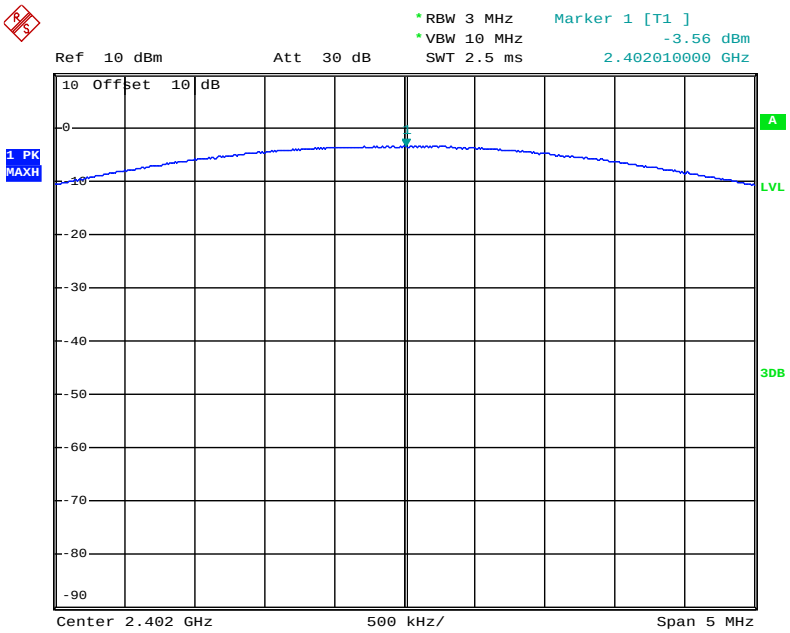
High channel



Date: 5.JUN.2019 19:26:32

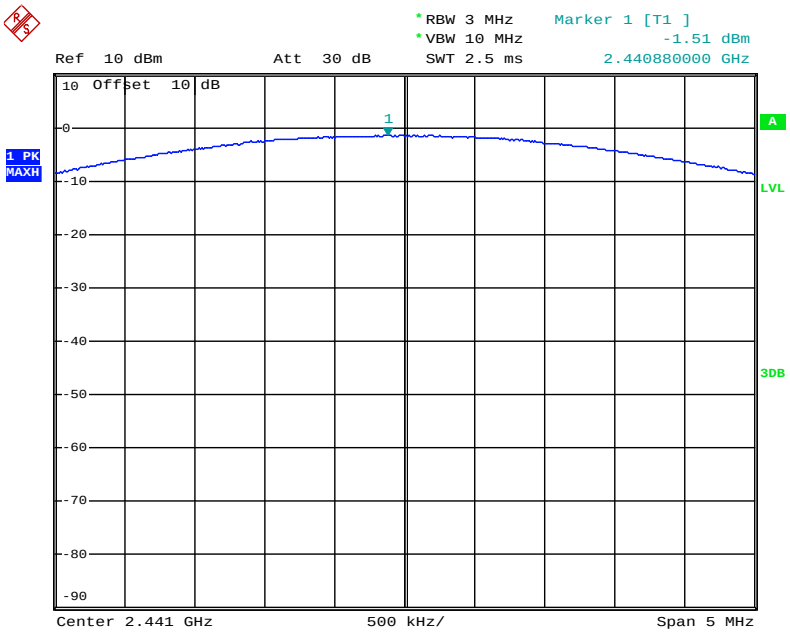
Π/4-DQPSK Mode

Low channel



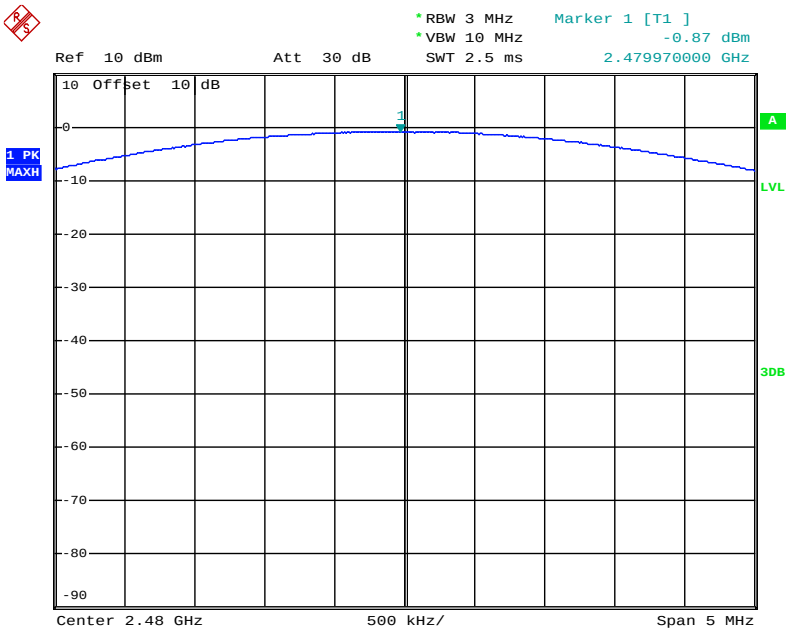
Date: 5.JUN.2019 19:28:11

Middle channel



Date: 5.JUN.2019 19:27:46

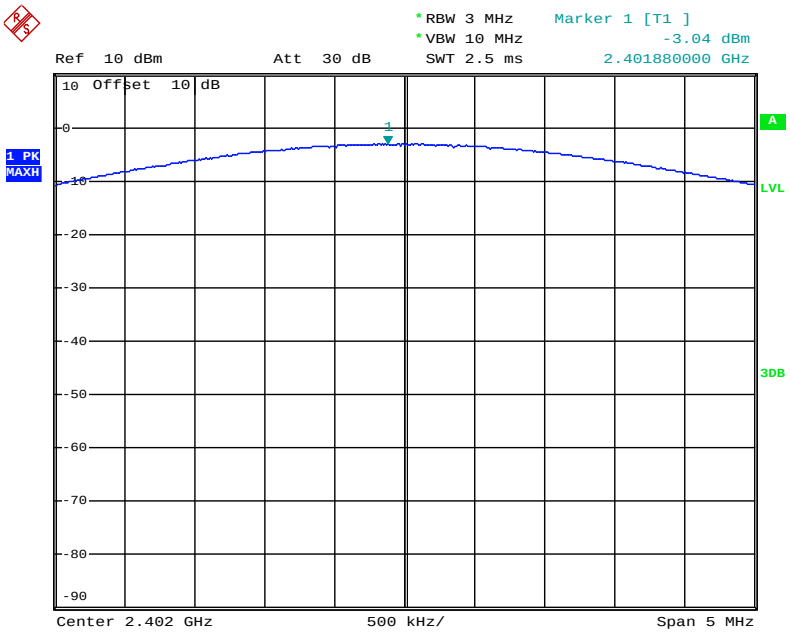
High channel



Date: 5.JUN.2019 19:27:23

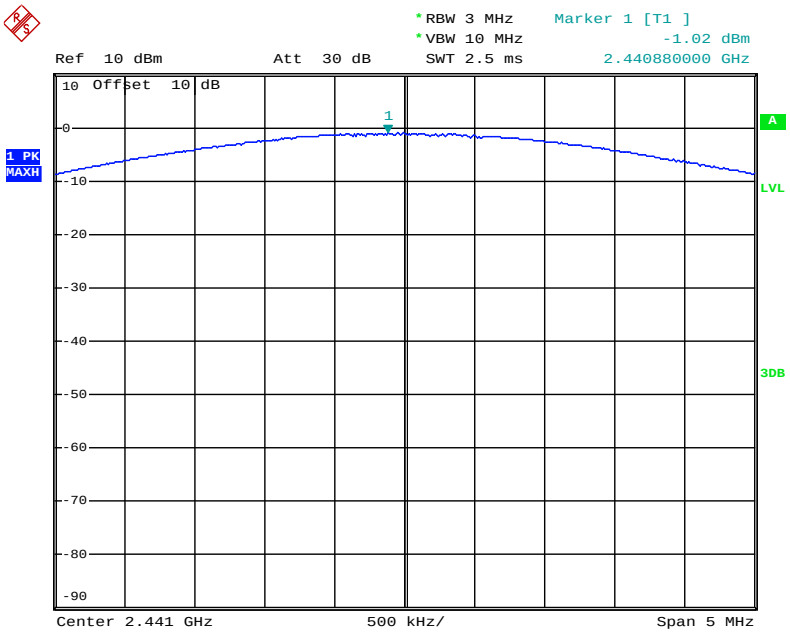
8DPSK Mode

Low channel



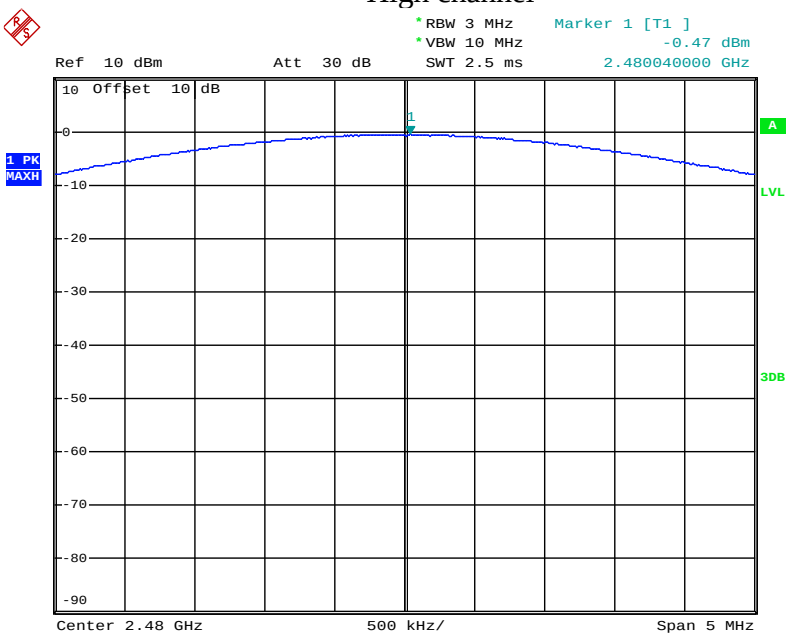
Date: 5.JUN.2019 19:31:13

Middle channel



Date: 5.JUN.2019 19:31:47

High channel



11.RADIATED EMISSION TEST

11.1.Block Diagram of Test Setup

11.1.1.Block diagram of connection between the EUT and peripherals

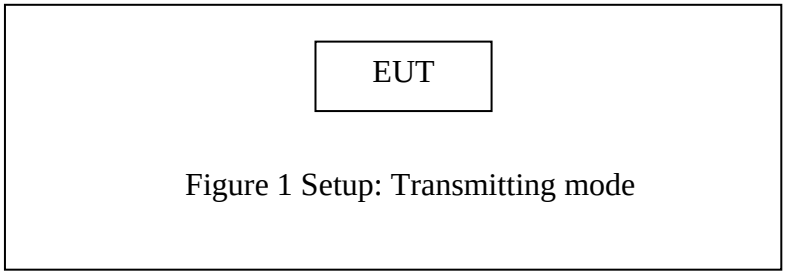
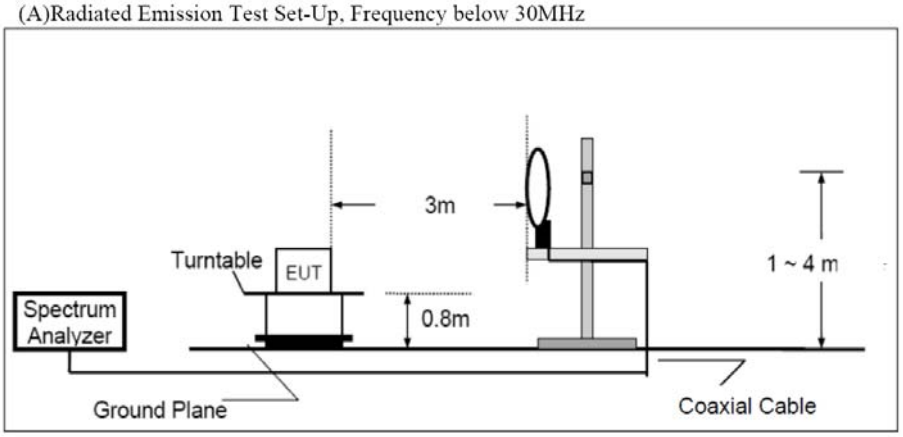


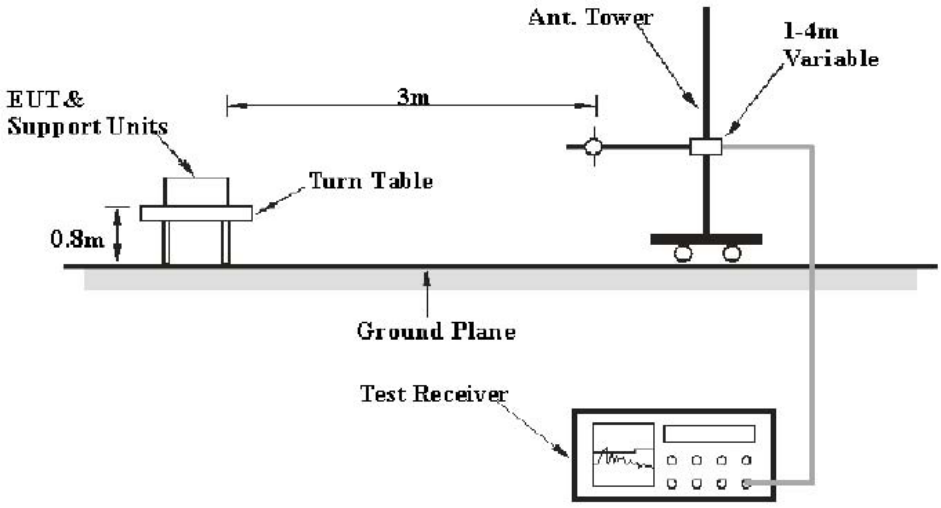
Figure 1 Setup: Transmitting mode

11.1.2.Semi-Anechoic Chamber Test Setup Diagram

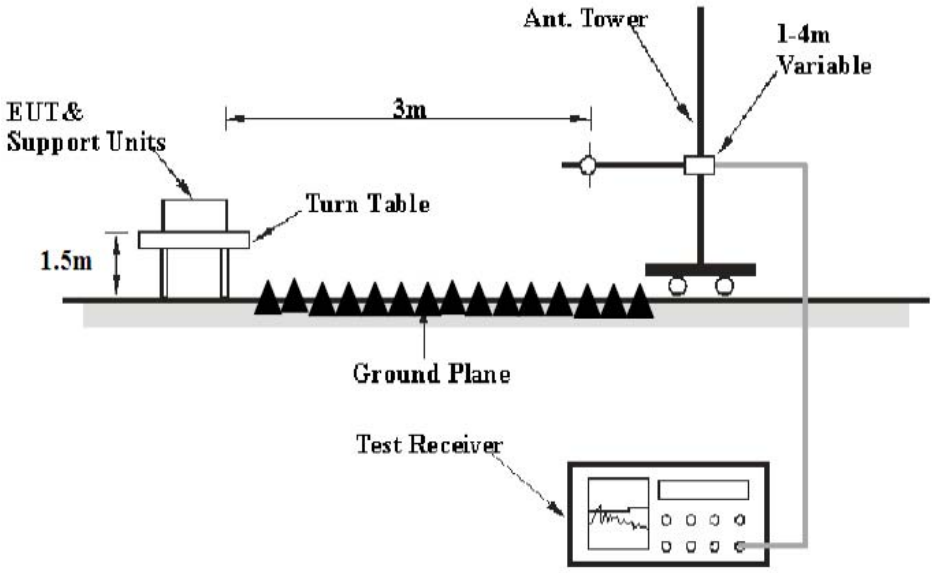
(A)Radiated Emission Test Set-Up, Frequency below 30MHz



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



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



11.2.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).

11.3.Restricted bands of operation

11.3.1.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.

11.4.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.

11.5. Operating Condition of EUT

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

11.5.2. Turn on the power of all equipment.

11.5.3. 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.

11.6. 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 worst 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.

11.7.Data Sample

Frequency (MHz)	Reading (dBμv)	Factor (dB/m)	Result (dBμv/m)	Limit (dBμv/m)	Margin (dB)	Remark
X.XX	48.69	-13.35	35.34	46	-10.66	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.

11.8.The Field Strength of Radiation Emission Measurement Results

PASS.
Test Lab: 3m Anechoic chamber
Test Engineer: Frank

Note: 1.We tested GFSK mode, Π/4-DQPSK & 8DPSK Mode and recorded the worst 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.

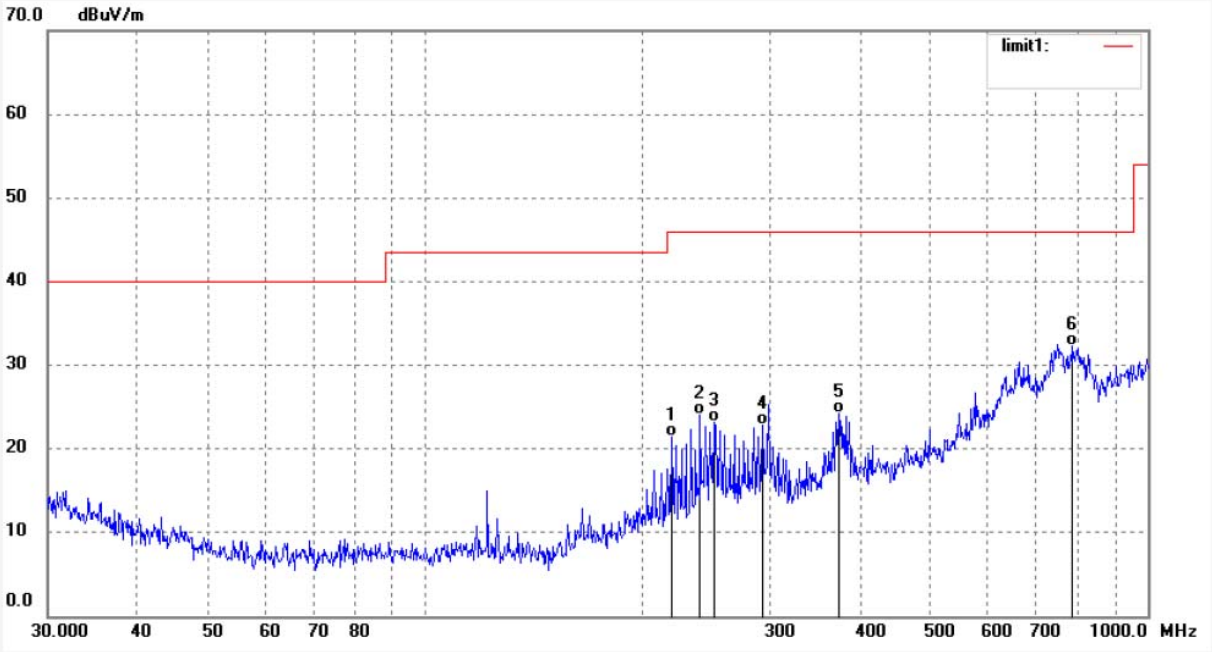
Below 1GHz

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2019-BT #46
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Wireless earphones
Mode: TX2402MHz
Model: X10
Manufacturer: SHENZHEN KINGVIE TECHNOLOGY CO., LIMITED

Polarization: Vertical
Power Source: DC 3.7V
Date: 19/05/30/
Time: 9/24/48
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20190780



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	219.1785	45.46	-24.02	21.44	46.00	-24.56	QP	100	22	
2	240.1442	47.73	-23.72	24.01	46.00	-21.99	QP	100	201	
3	251.3676	46.77	-23.55	23.22	46.00	-22.78	QP	100	331	
4	293.3933	44.43	-21.51	22.92	46.00	-23.08	QP	100	96	
5	373.8861	43.00	-18.71	24.29	46.00	-21.71	QP	100	229	
6	787.4749	41.62	-9.33	32.29	46.00	-13.71	QP	100	103	

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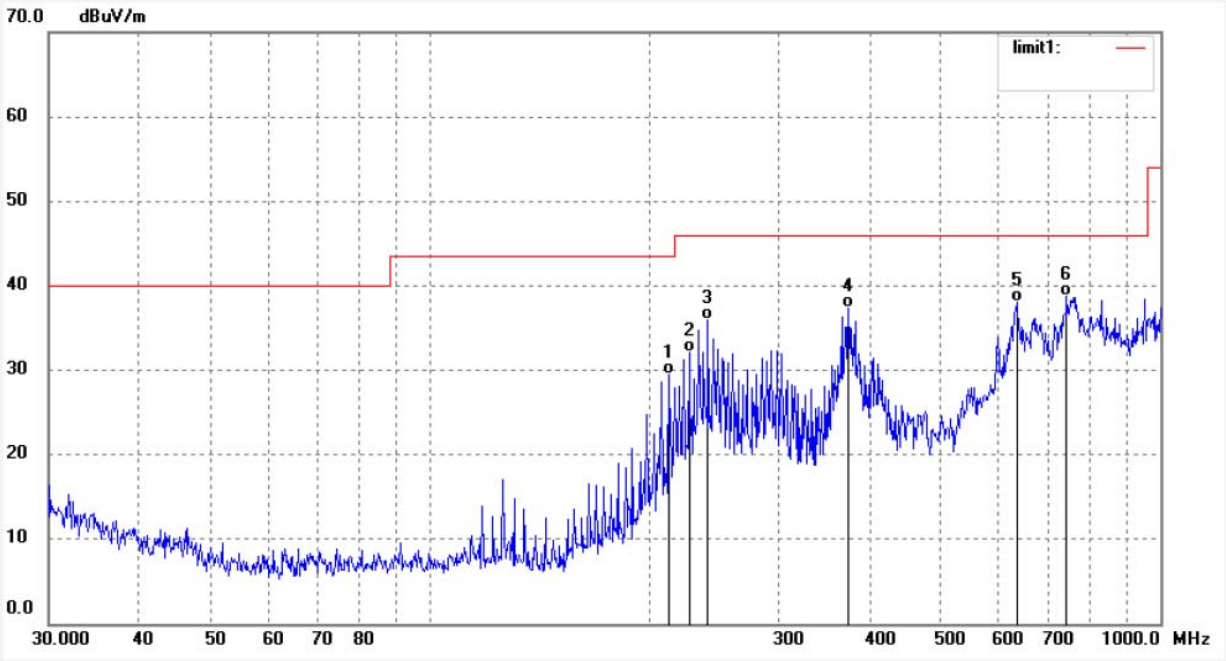
Job No.: FRANK2019-BT #45
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Wireless earphones
Mode: TX2402MHz
Model: X10
Manufacturer: SHENZHEN KINGVIE TECHNOLOGY CO., LIMITED

Polarization: Horizontal
Power Source: DC 3.7V
Date: 19/05/30/
Time: 9/23/46
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20190780



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	212.3559	53.59	-24.09	29.50	43.50	-14.00	QP	200	103	
2	226.2202	56.02	-23.93	32.09	46.00	-13.91	QP	200	22	
3	240.1442	59.76	-23.72	36.04	46.00	-9.96	QP	200	93	
4	373.8861	56.10	-18.71	37.39	46.00	-8.61	QP	200	211	
5	635.5576	50.94	-12.96	37.98	46.00	-8.02	QP	200	65	
6	744.4265	49.16	-10.46	38.70	46.00	-7.30	QP	200	301	

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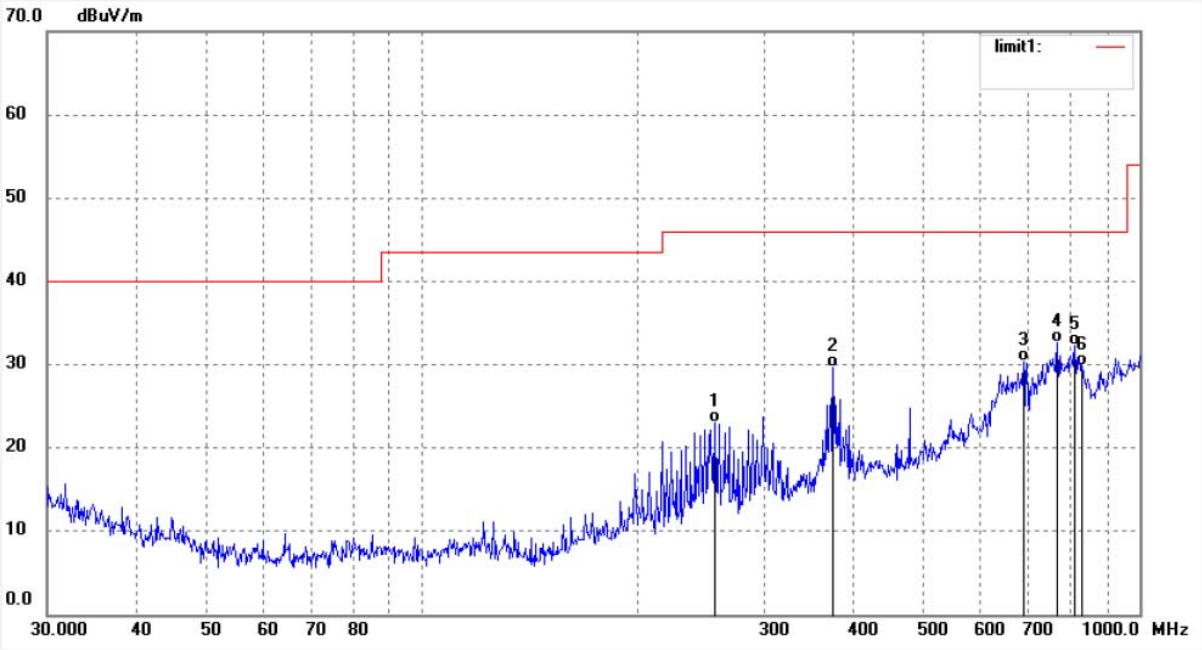
Job No.: FRANK2019-BT #47
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Wireless earphones
Mode: TX2441MHz
Model: X10
Manufacturer: SHENZHEN KINGVIE TECHNOLOGY CO., LIMITED

Polarization: Vertical
Power Source: DC 3.7V
Date: 19/05/30/
Time: 9/25/38
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20190780



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	255.8225	46.33	-23.30	23.03	46.00	-22.97	QP	100	103	
2	373.8861	48.39	-18.71	29.68	46.00	-16.32	QP	100	92	
3	689.0510	42.05	-11.72	30.33	46.00	-15.67	QP	100	332	
4	768.3431	42.50	-9.84	32.66	46.00	-13.34	QP	100	201	
5	812.7744	40.91	-8.71	32.20	46.00	-13.80	QP	100	119	
6	833.0126	38.10	-8.33	29.77	46.00	-16.23	QP	100	32	

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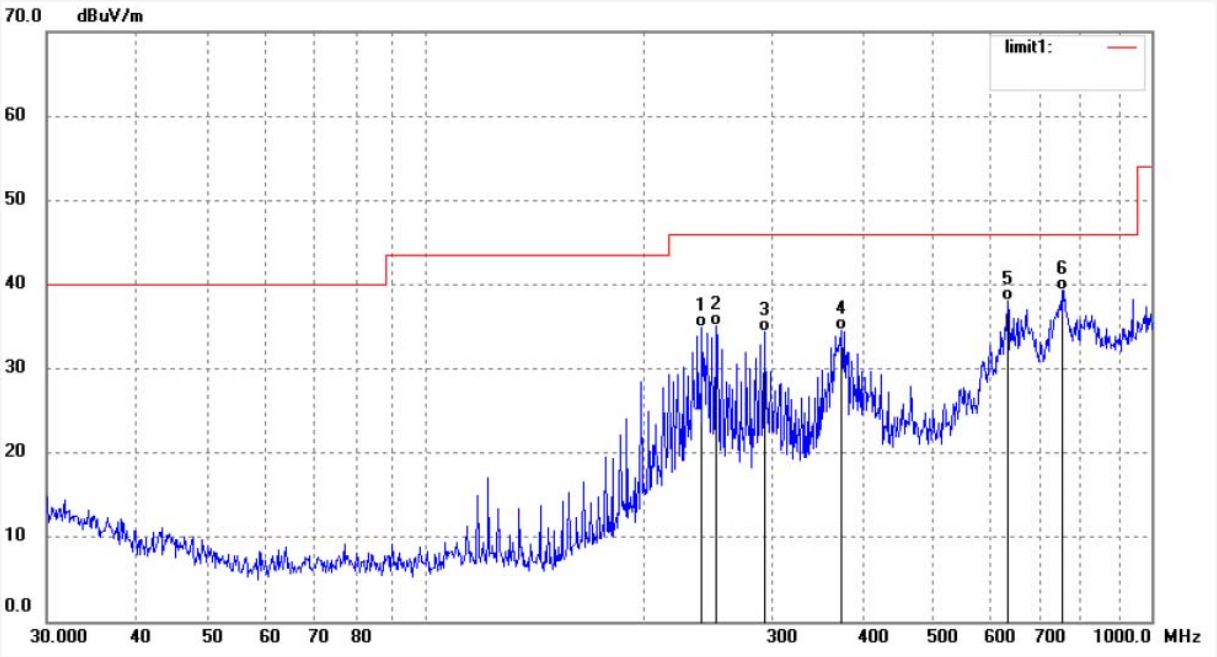
Job No.: FRANK2019-BT #48
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Wireless earphones
Mode: TX2441MHz
Model: X10
Manufacturer: SHENZHEN KINGVIE TECHNOLOGY CO., LIMITED

Polarization: Horizontal
Power Source: DC 3.7V
Date: 19/05/30/
Time: 9/26/32
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20190780



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	240.1442	58.66	-23.72	34.94	46.00	-11.06	QP	200	302	
2	251.3676	58.60	-23.55	35.05	46.00	-10.95	QP	200	200	
3	293.3933	55.85	-21.51	34.34	46.00	-11.66	QP	200	221	
4	373.8861	53.28	-18.71	34.57	46.00	-11.43	QP	200	51	
5	633.3284	50.99	-13.00	37.99	46.00	-8.01	QP	200	66	
6	752.3147	49.65	-10.28	39.37	46.00	-6.63	QP	200	103	

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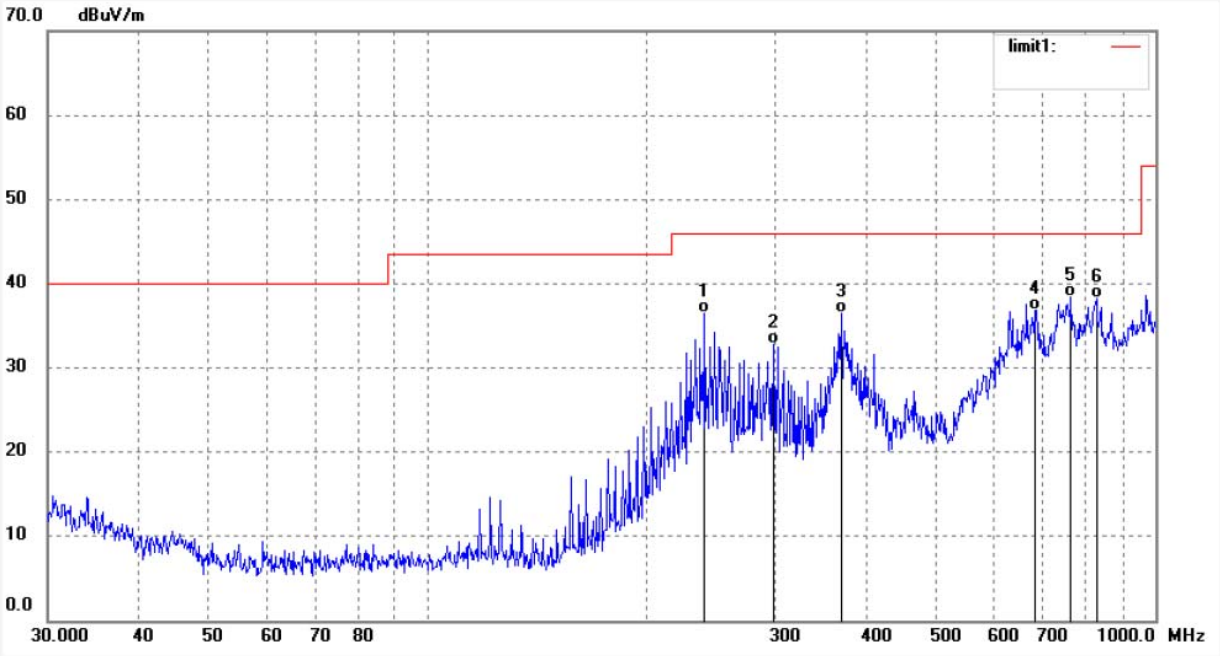
Job No.: FRANK2019-BT #49
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Wireless earphones
Mode: TX2480MHz
Model: X10
Manufacturer: SHENZHEN KINGVIE TECHNOLOGY CO., LIMITED

Polarization: Horizontal
Power Source: DC 3.7V
Date: 19/05/30/
Time: 9/27/17
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20190780



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	240.1442	60.16	-23.72	36.44	46.00	-9.56	QP	200	103	
2	298.5932	54.11	-21.28	32.83	46.00	-13.17	QP	200	163	
3	369.9658	55.32	-18.77	36.55	46.00	-9.45	QP	200	201	
4	681.8260	48.68	-11.89	36.79	46.00	-9.21	QP	200	229	
5	765.6481	48.38	-9.89	38.49	46.00	-7.51	QP	200	93	
6	830.0909	46.61	-8.39	38.22	46.00	-7.78	QP	200	331	

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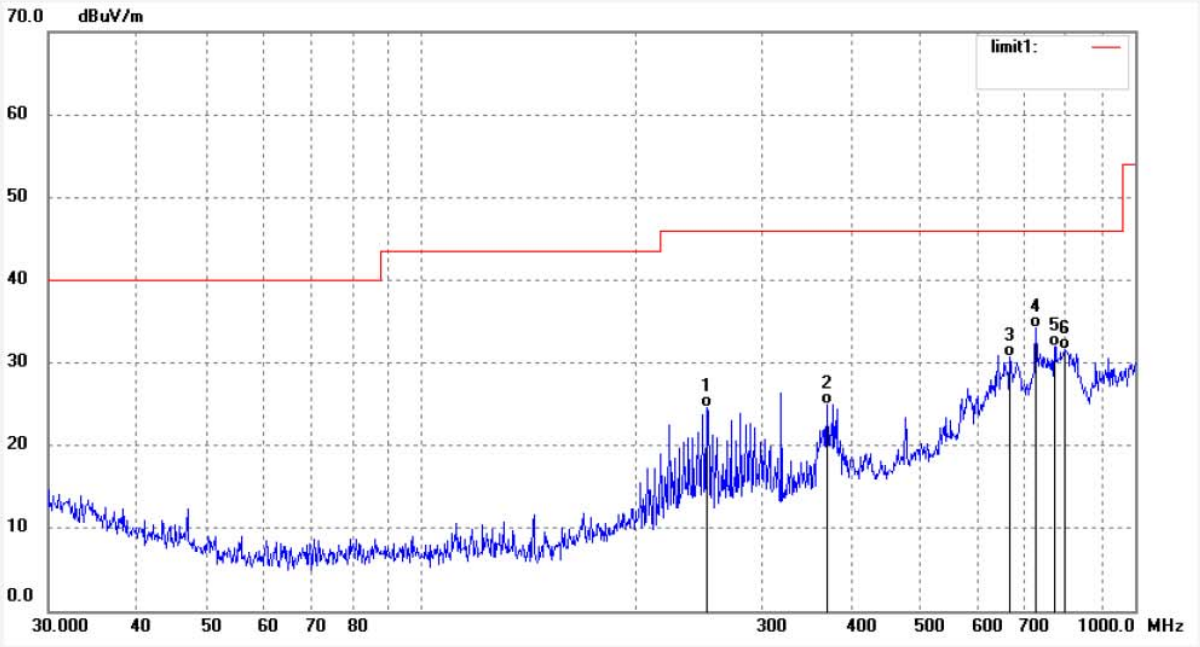
Job No.: FRANK2019-BT #50
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Wireless earphones
Mode: TX2480MHz
Model: X10
Manufacturer: SHENZHEN KINGVIE TECHNOLOGY CO., LIMITED

Polarization: Vertical
Power Source: DC 3.7V
Date: 19/05/30/
Time: 9/28/14
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20190780



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	251.3676	48.14	-23.55	24.59	46.00	-21.41	QP	100	221	
2	369.9658	43.75	-18.77	24.98	46.00	-21.02	QP	100	201	
3	667.6024	42.88	-12.21	30.67	46.00	-15.33	QP	100	331	
4	726.3405	45.07	-10.86	34.21	46.00	-11.79	QP	100	96	
5	771.0475	41.77	-9.78	31.99	46.00	-14.01	QP	100	224	
6	795.8192	40.68	-9.09	31.59	46.00	-14.41	QP	100	103	

Above 1GHz

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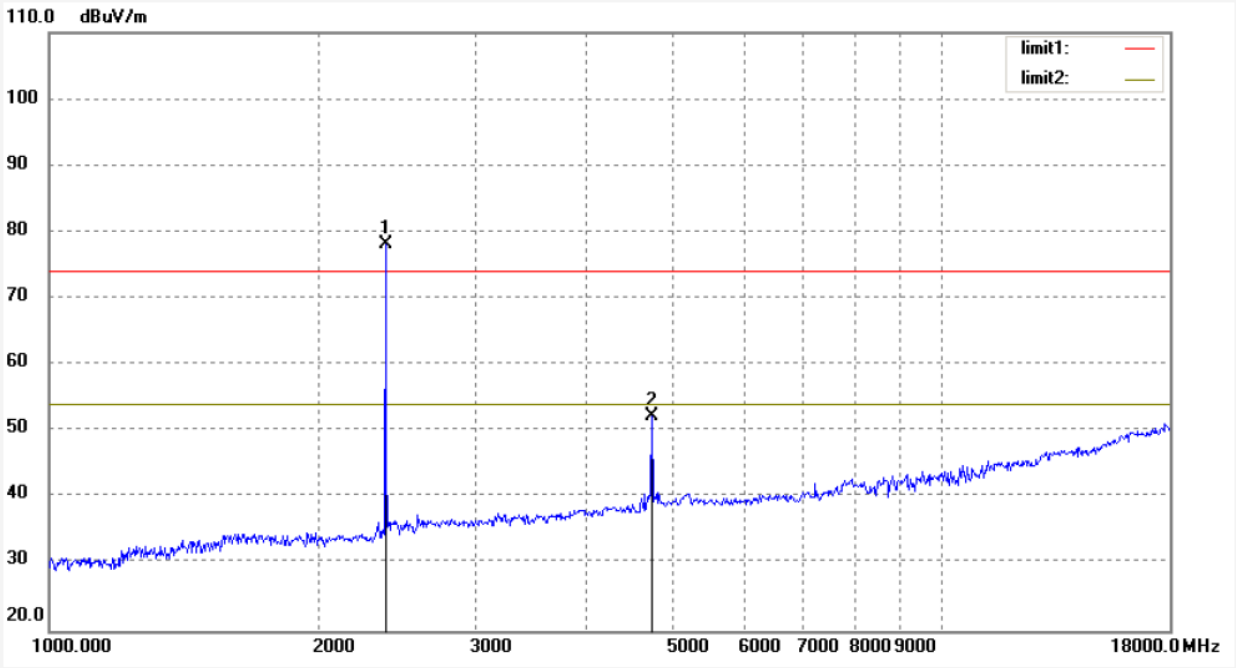
Job No.: FRANK2019-BT #77	Polarization: Horizontal
Standard: FCC PK	Power Source: DC 3.7V
Test item: Radiation Test	Date: 2019/06/04
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 16:58:43
EUT: Wireless earphones	Engineer Signature: Frank
Mode: TX2402MHz	Distance: 3m
Model: X10	
Manufacturer: SHENZHEN KINGVIE TECHNOLOGY CO., LIMITED	

Note: Report NO.:ATE20190780



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	84.60	-6.37	78.23			peak	200	95	
2	4804.000	51.54	0.70	52.24	74.00	-21.76	peak	200	103	

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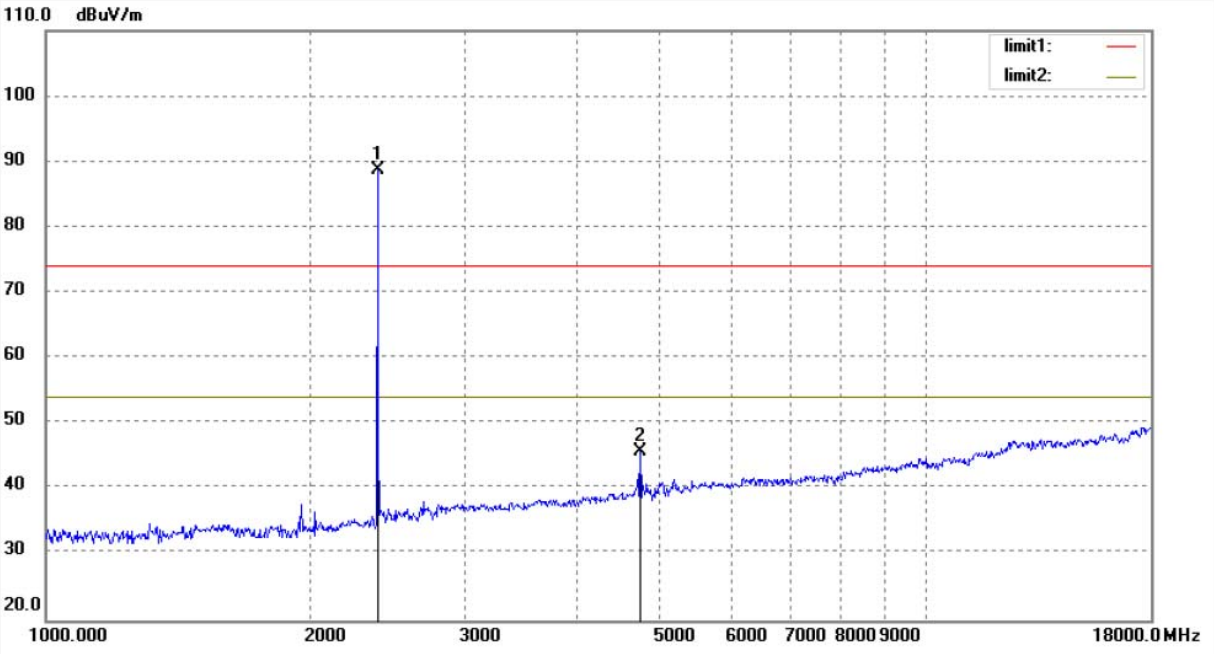
Job No.: FRANK2019-BT #78
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Wireless earphones
Mode: TX2402MHz
Model: X10
Manufacturer: SHENZHEN KINGVIE TECHNOLOGY CO., LIMITED

Polarization: Vertical
Power Source: DC 3.7V
Date: 2019/06/04
Time: 17:00:22
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20190780



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	95.01	-6.37	88.64			peak	150	99	
2	4804.000	45.07	0.70	45.77	74.00	-28.23	peak	150	106	

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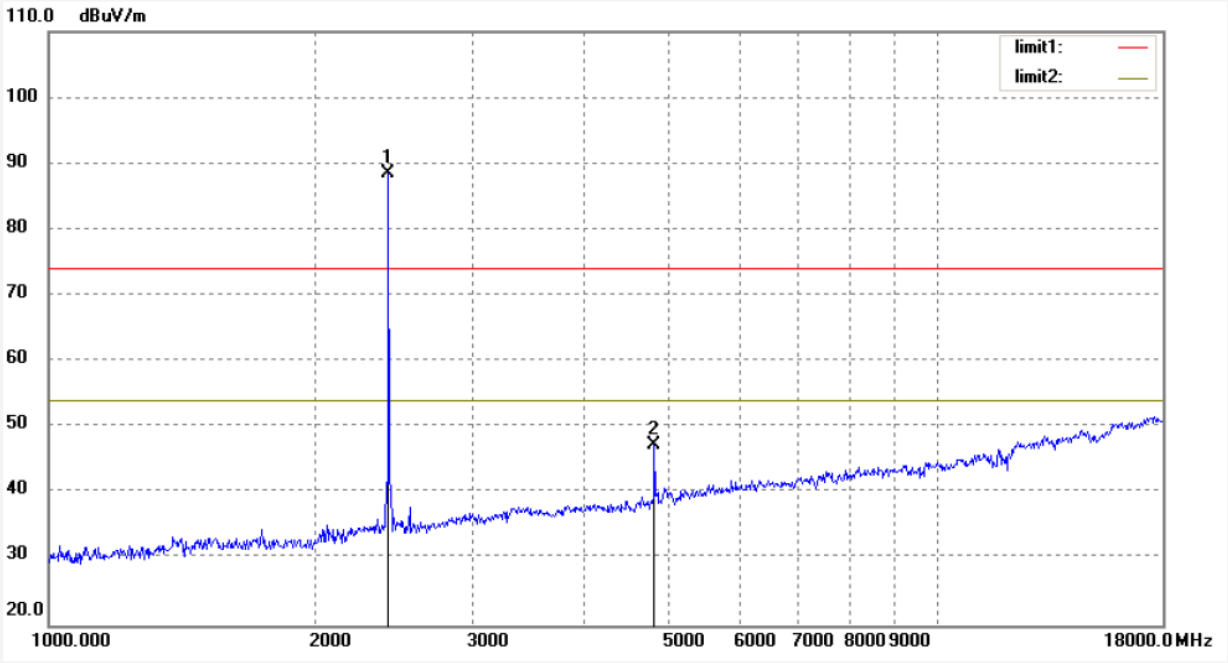
Job No.: FRANK2019-BT #79
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Wireless earphones
Mode: TX2441MHz
Model: X10
Manufacturer: SHENZHEN KINGVIE TECHNOLOGY CO., LIMITED

Polarization: Vertical
Power Source: DC 3.7V
Date: 2019/06/04
Time: 17:01:22
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20190780



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	94.76	-6.20	88.56			peak	150	92	
2	4882.000	46.33	1.07	47.40	74.00	-26.60	peak	150	103	

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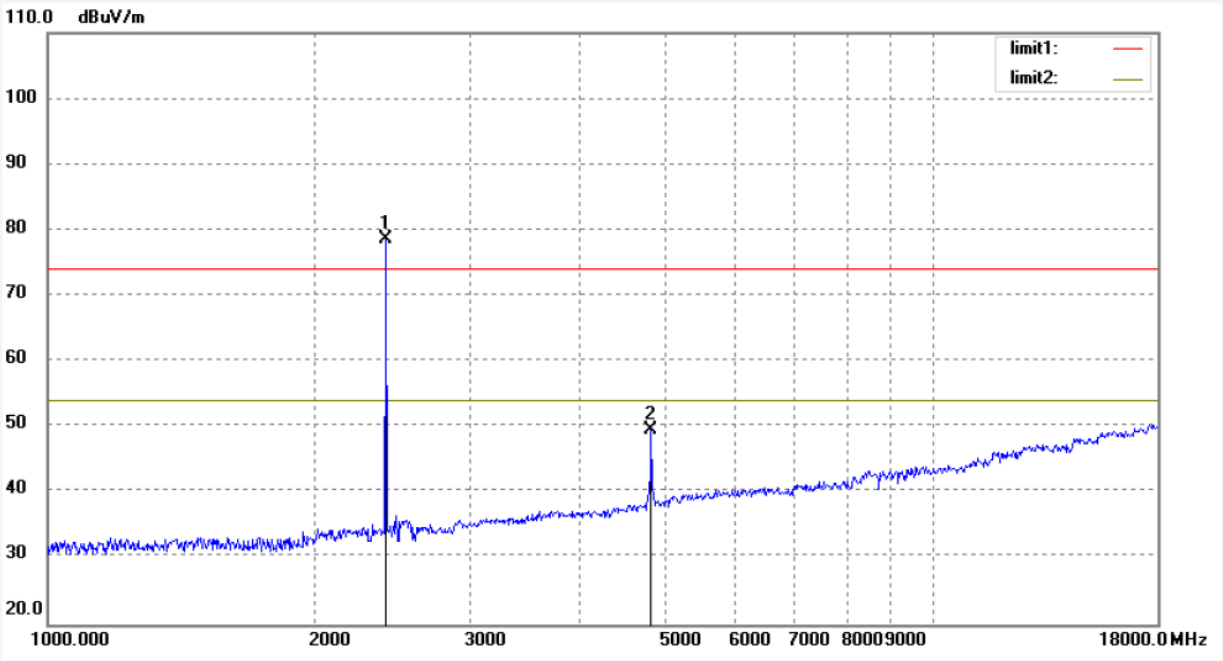
Job No.: FRANK2019-BT #80
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Wireless earphones
Mode: TX2441MHz
Model: X10
Manufacturer: SHENZHEN KINGVIE TECHNOLOGY CO., LIMITED

Polarization: Horizontal
Power Source: DC 3.7V
Date: 2019/06/04
Time: 17:02:15
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20190780



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	84.80	-6.20	78.60			peak	200	26	
2	4882.000	48.52	1.07	49.59	74.00	-24.41	peak	200	107	

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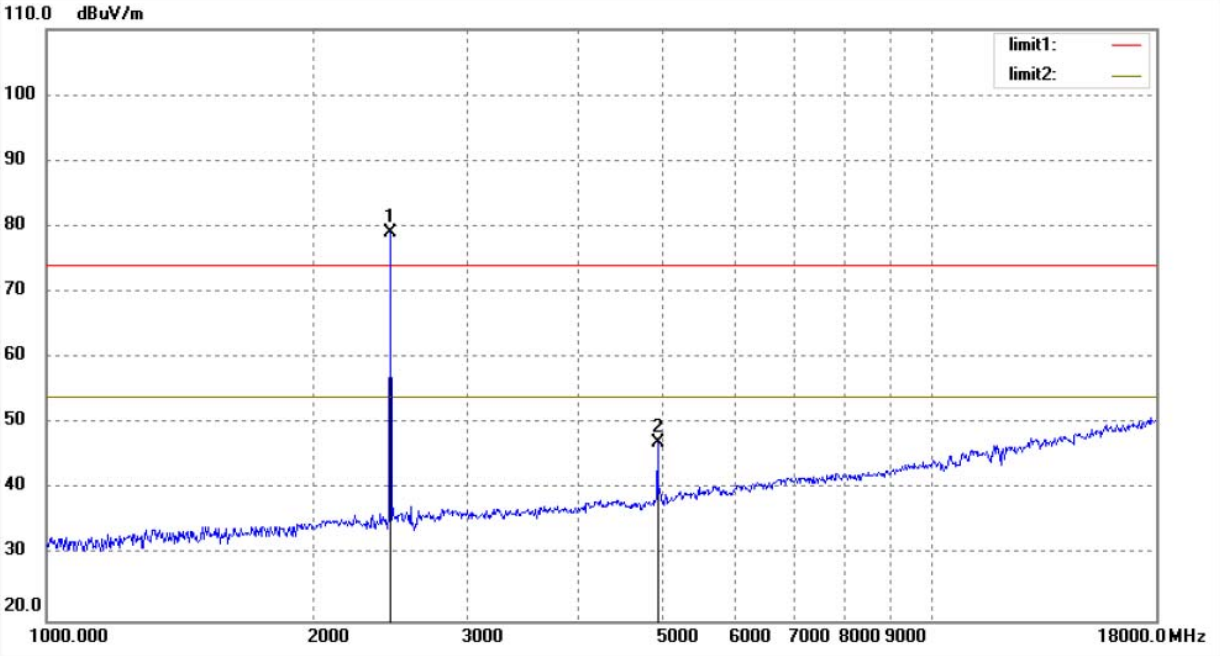
Job No.: FRANK2019-BT #81
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Wireless earphones
Mode: TX2480MHz
Model: X10
Manufacturer: SHENZHEN KINGVIE TECHNOLOGY CO., LIMITED

Polarization: Horizontal
Power Source: DC 3.7V
Date: 2019/06/04
Time: 17:03:30
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20190780



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	85.06	-6.04	79.02			peak	200	224	
2	4960.000	45.55	1.50	47.05	74.00	-26.95	peak	200	163	

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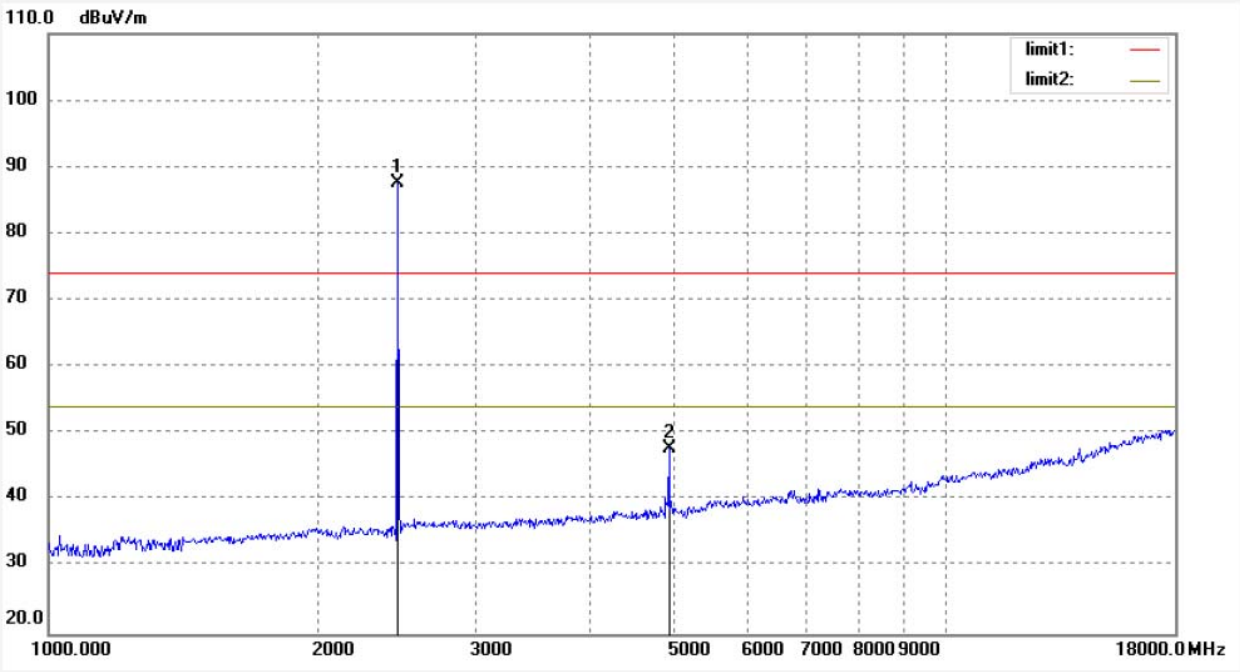
Job No.: FRANK2019-BT #82
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Wireless earphones
Mode: TX2480MHz
Model: X10
Manufacturer: SHENZHEN KINGVIE TECHNOLOGY CO., LIMITED

Polarization: Vertical
Power Source: DC 3.7V
Date: 2019/06/04
Time: 17:04:49
Engineer Signature: Frank
Distance: 3m

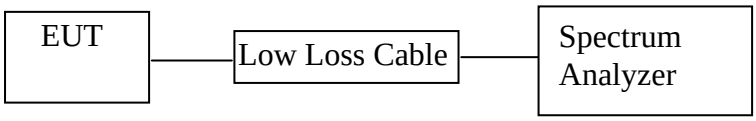
Note: Report NO.:ATE20190780



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.00	93.72	-6.04	87.68			peak	150	332	
2	4960.000	46.37	1.50	47.87	74.00	-26.13	peak	150	163	

12.BAND EDGE COMPLIANCE TEST

12.1.Block Diagram of Test Setup



(EUT: Wireless earphones)

12.2.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).

12.3.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.

12.4.Operating Condition of EUT

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

12.4.2.Turn on the power of all equipment.

12.4.3.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.

12.5.Test Procedure

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

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

12.5.3.The band edges was measured and recorded.

12.6.Test Result

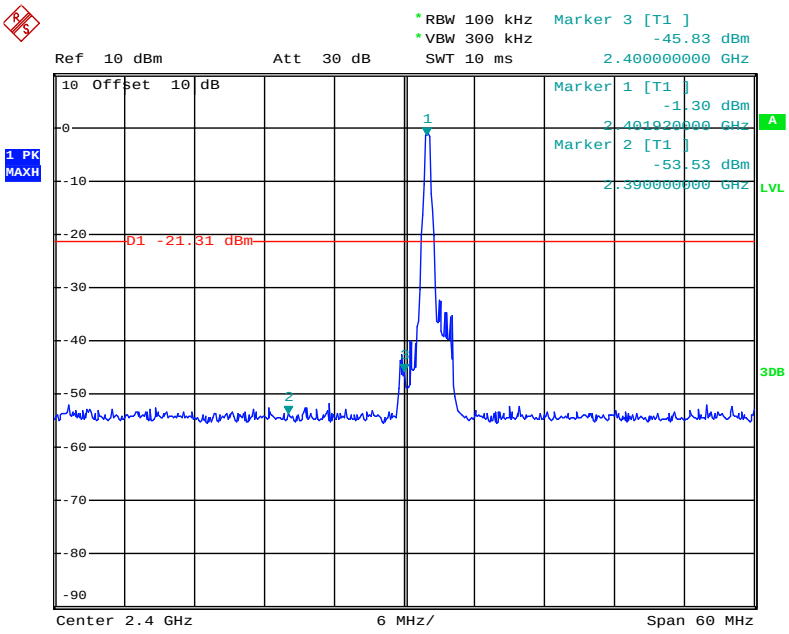
Test Lab: Shielding room
Test Engineer: Frank

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

Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
GFSK Mode		
2400.00	44.53	> 20dBc
2483.50	52.10	> 20dBc
Π/4-DQPSK Mode		
2400.00	40.53	> 20dBc
2483.50	53.22	> 20dBc
8DPSK Mode		
2400.00	39.70	> 20dBc
2483.50	52.27	> 20dBc

The spectrum analyzer plots are attached as below.

GFSK Mode



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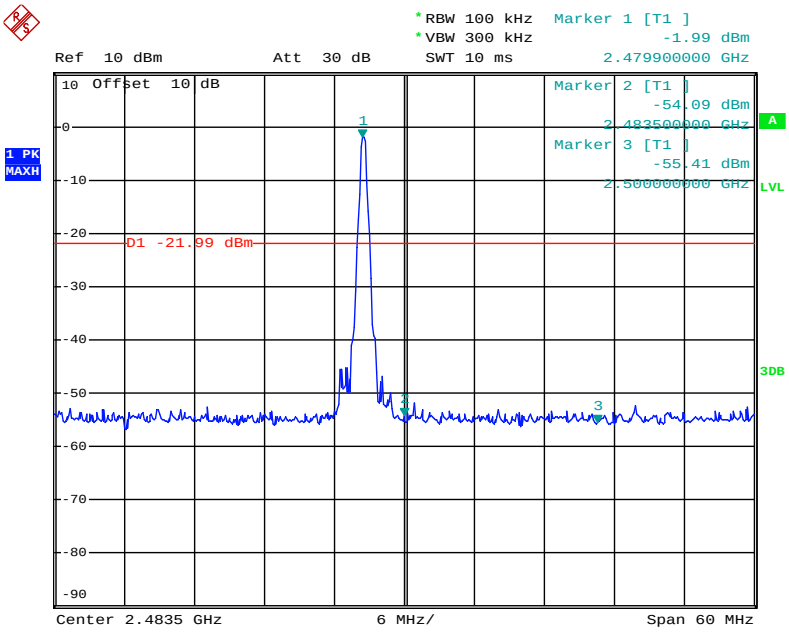
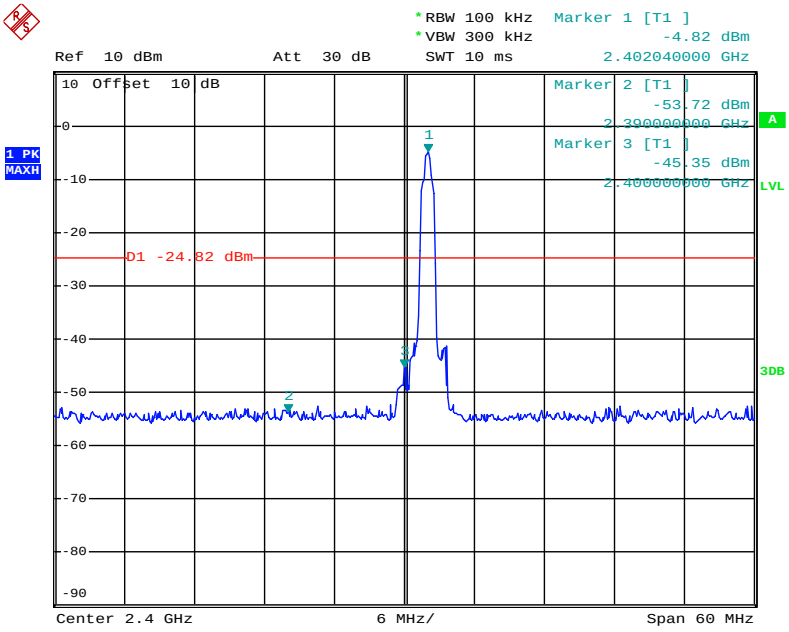
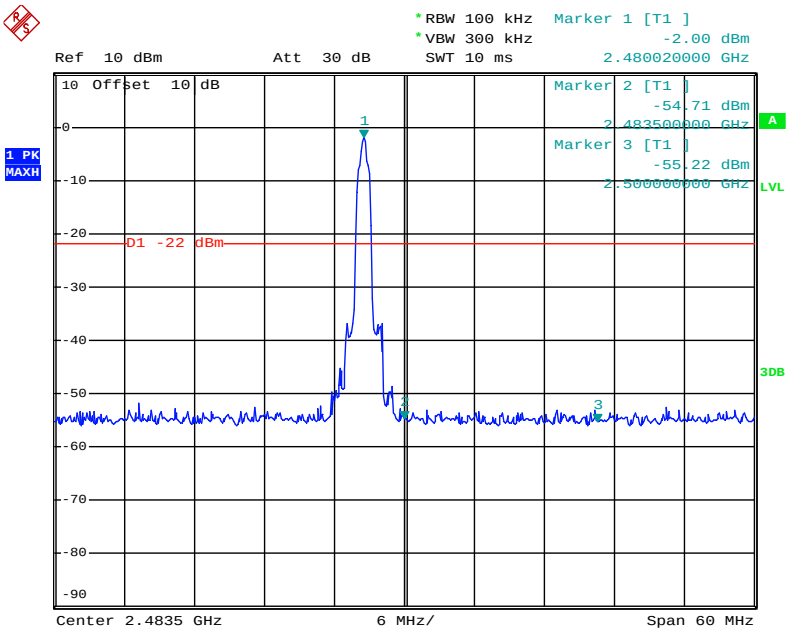


Date: 5.JUN.2019 19:53:47

Π/4-DQPSK Mode

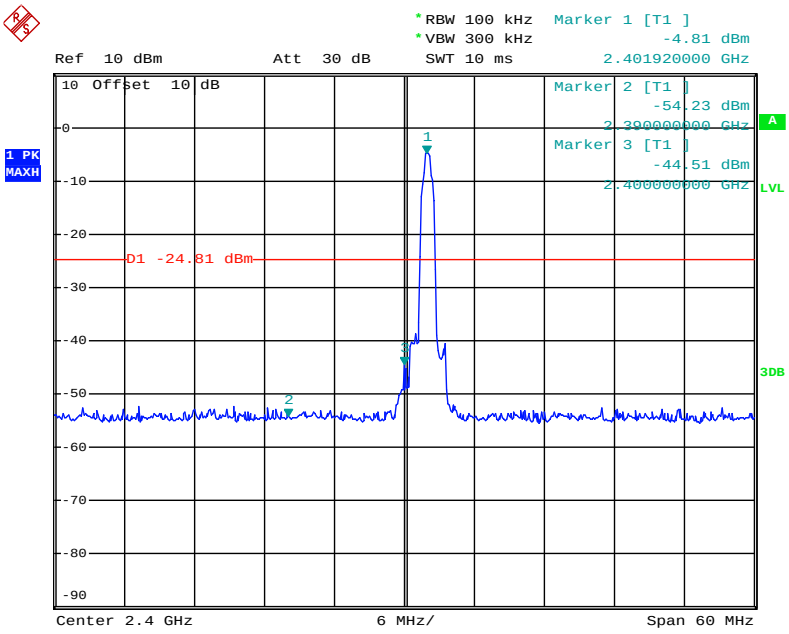


Date: 5.JUN.2019 19:49:55

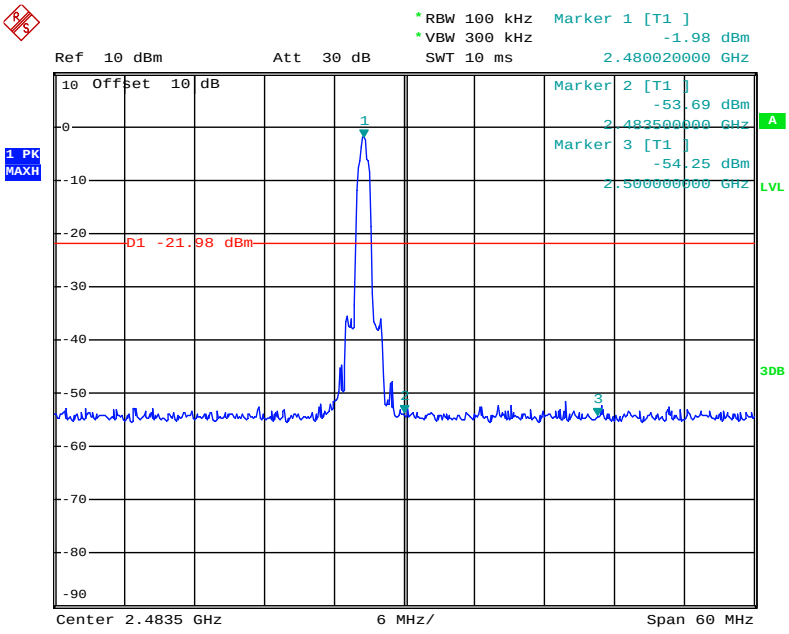


Date: 5.JUN.2019 19:53:12

8DPSK Mode



Date: 5.JUN.2019 19:51:50



Date: 5.JUN.2019 19:52:45

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 worst case (GFSK mode) emissions are reported.

Test Lab: 3m Anechoic chamber
Test Engineer: Frank

Non-hopping mode

ACCURATE TECHNOLOGY CO., LTD.
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Site: 1# Chamber
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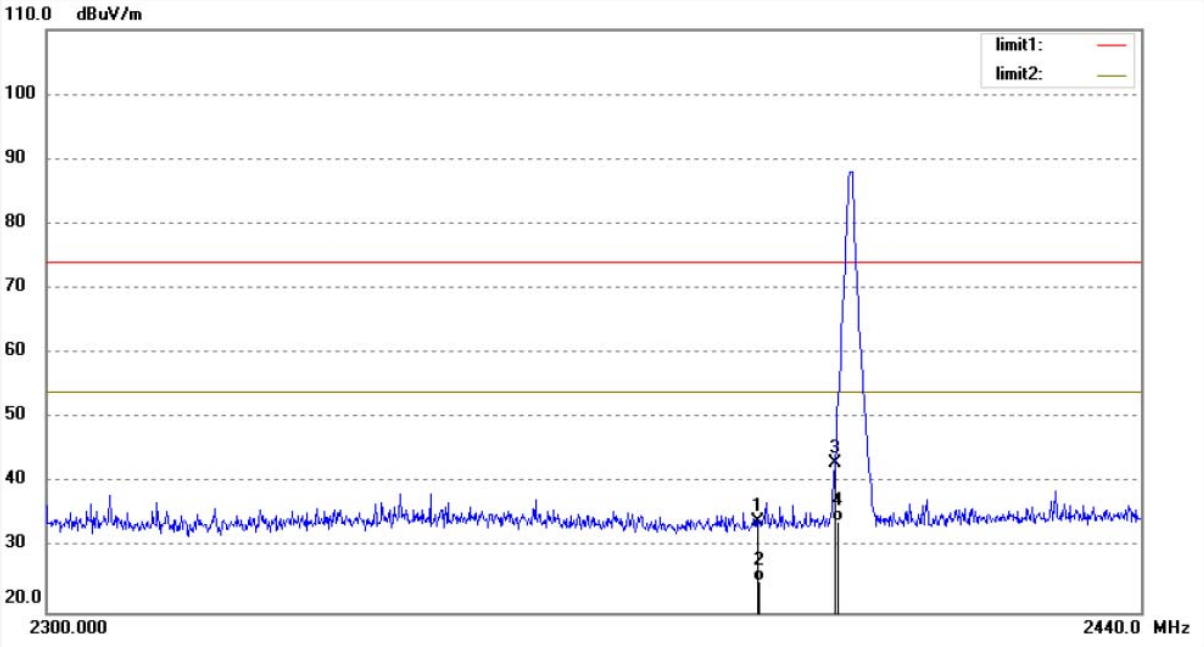
Job No.: FRANK2019-BT #94
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Wireless earphones
Mode: TX2402MHz(GFSK)
Model: X10
Manufacturer: SHENZHEN KINGVIE TECHNOLOGY CO., LIMITED

Polarization: Vertical
Power Source: DC 3.7V
Date: 2019/06/04
Time: 17:21:11
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20190780



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	40.29	-6.32	33.97	74.00	-40.03	peak	150	96	
2	2390.000	31.22	-6.32	24.90	54.00	-29.10	AVG	150	249	
3	2400.000	49.29	-6.27	43.02	74.00	-30.98	peak	150	221	
4	2400.000	40.39	-6.27	34.12	54.00	-19.88	AVG	150	163	

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

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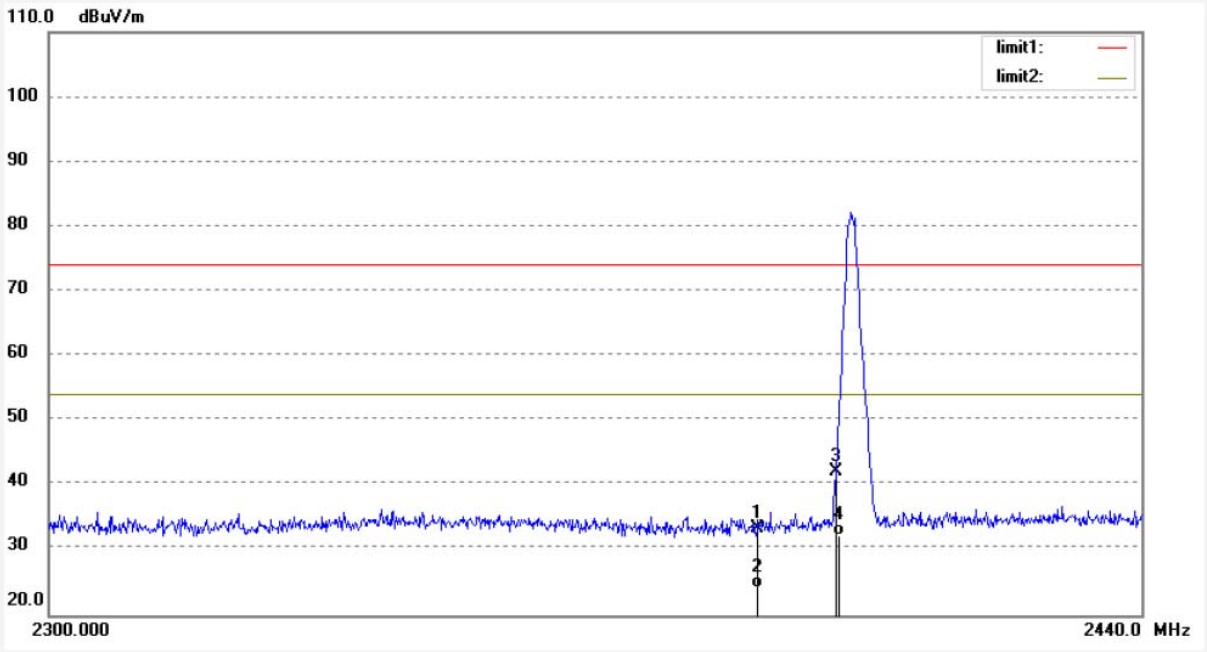
Fax:+86-0755-26503396

Job No.: FRANK2019-BT #93
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Wireless earphones
Mode: TX2402MHz(GFSK)
Model: X10
Manufacturer: SHENZHEN KINGVIE TECHNOLOGY CO., LIMITED

Polarization: Horizontal
Power Source: DC 3.7V
Date: 2019/06/04
Time: 17:20:02
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20190780



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	39.81	-6.32	33.49	74.00	-40.51	peak	200	330	
2	2390.000	30.45	-6.32	24.13	54.00	-29.87	AVG	200	210	
3	2400.000	48.36	-6.27	42.09	74.00	-31.91	peak	200	332	
4	2400.000	38.48	-6.27	32.21	54.00	-21.79	AVG	200	109	

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

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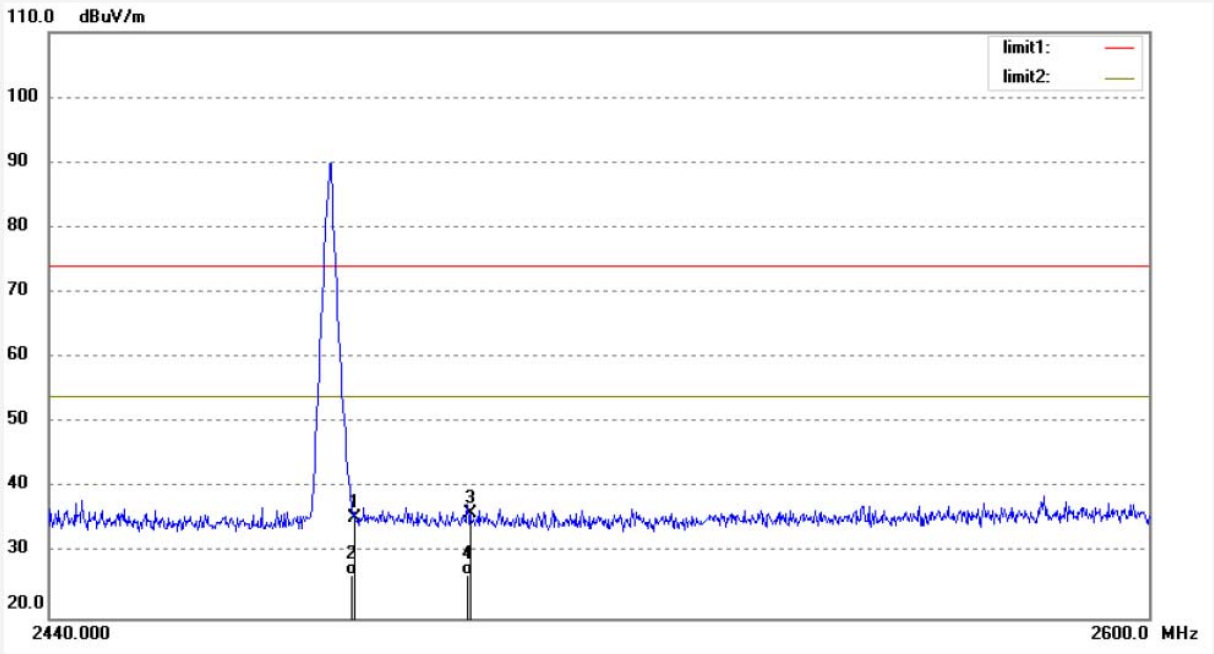
Job No.: FRANK2019-BT #83
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Wireless earphones
Mode: TX2480MHz(GFSK)
Model: X10
Manufacturer: SHENZHEN KINGVIE TECHNOLOGY CO., LIMITED

Polarization: Vertical
Power Source: DC 3.7V
Date: 2019/06/04
Time: 17:06:10
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20190780



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	41.32	-5.89	35.43	74.00	-38.57	peak	150	331	
2	2483.500	32.45	-5.89	26.56	54.00	-27.44	AVG	150	96	
3	2500.000	41.88	-5.81	36.07	74.00	-37.93	peak	150	226	
4	2500.000	32.49	-5.81	26.68	54.00	-27.32	AVG	150	103	

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

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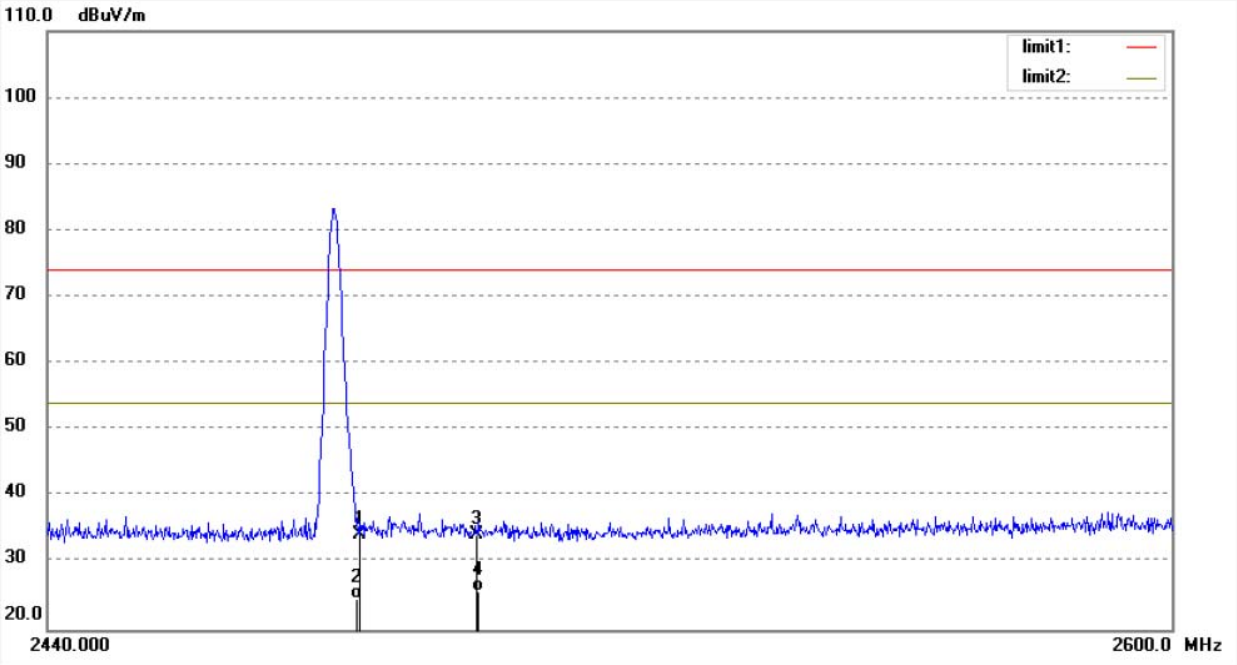
Job No.: FRANK2019-BT #84
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Wireless earphones
Mode: TX2480MHz(GFSK)
Model: X10
Manufacturer: SHENZHEN KINGVIE TECHNOLOGY CO., LIMITED

Polarization: Horizontal
Power Source: DC 3.7V
Date: 2019/06/04
Time: 17:07:29
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20190780



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	40.16	-5.89	34.27	74.00	-39.73	peak	200	132	
2	2483.500	30.48	-5.89	24.59	54.00	-29.41	AVG	200	84	
3	2500.000	40.18	-5.81	34.37	74.00	-39.63	peak	200	44	
4	2500.000	31.45	-5.81	25.64	54.00	-28.36	AVG	200	115	

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

Hopping mode

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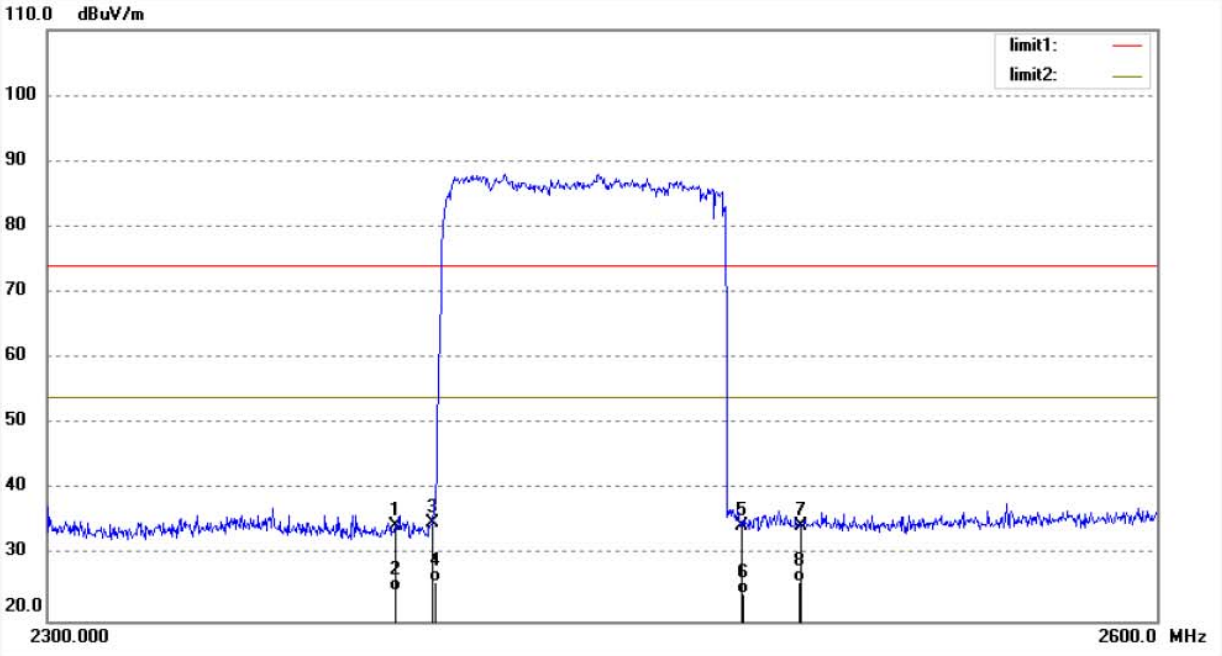
Job No.: FRANK2019-BT #95
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Wireless earphones
Mode: HOPPING(GFSK)
Model: X10
Manufacturer: SHENZHEN KINGVIE TECHNOLOGY CO., LIMITED

Polarization: Vertical
Power Source: DC 3.7V
Date: 2019/06/04
Time: 17:25:19
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20190780



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	40.84	-6.32	34.52	74.00	-39.48	peak	150	103	
2	2390.000	31.02	-6.32	24.70	54.00	-29.30	AVG	150	66	
3	2400.000	41.29	-6.27	35.02	74.00	-38.98	peak	150	96	
4	2400.000	32.16	-6.27	25.89	54.00	-28.11	AVG	150	41	
5	2483.500	40.44	-5.89	34.55	74.00	-39.45	peak	150	103	
6	2483.500	30.16	-5.89	24.27	54.00	-29.73	AVG	150	219	
7	2500.000	40.34	-5.81	34.53	74.00	-39.47	peak	150	66	
8	2500.000	31.66	-5.81	25.85	54.00	-28.15	AVG	150	110	

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

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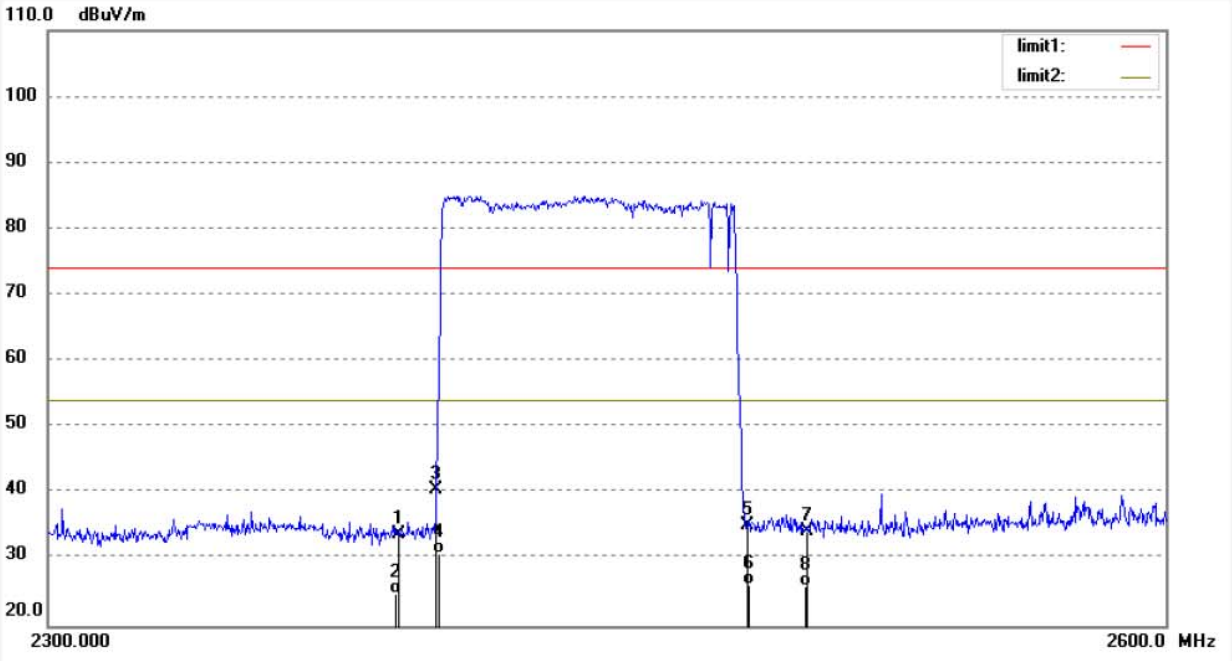
Job No.: FRANK2019-BT #96
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Wireless earphones
Mode: HOPPING(GFSK)
Model: X10
Manufacturer: SHENZHEN KINGVIE TECHNOLOGY CO., LIMITED

Polarization: Horizontal
Power Source: DC 3.7V
Date: 2019/06/04
Time: 17:31:05
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20190780



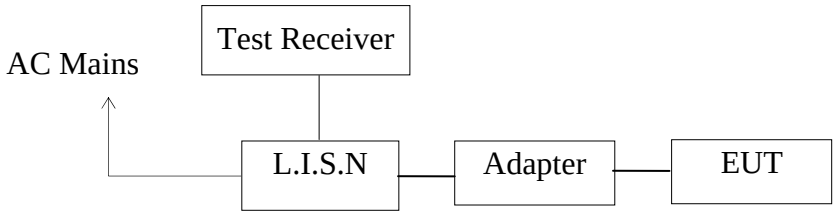
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	40.16	-6.32	33.84	74.00	-40.16	peak	200	103	
2	2390.000	31.05	-6.32	24.73	54.00	-29.27	AVG	200	93	
3	2400.000	46.82	-6.27	40.55	74.00	-33.45	peak	200	221	
4	2400.000	37.16	-6.27	30.89	54.00	-23.11	AVG	200	201	
5	2483.500	41.11	-5.89	35.22	74.00	-38.78	peak	200	33	
6	2483.500	32.03	-5.89	26.14	54.00	-27.86	AVG	200	221	
7	2500.000	40.11	-5.81	34.30	74.00	-39.70	peak	200	93	
8	2500.000	31.66	-5.81	25.85	54.00	-28.15	AVG	200	212	

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

13. AC POWER LINE CONDUCTED EMISSION FOR FCC PART 15 SECTION 15.207(A)

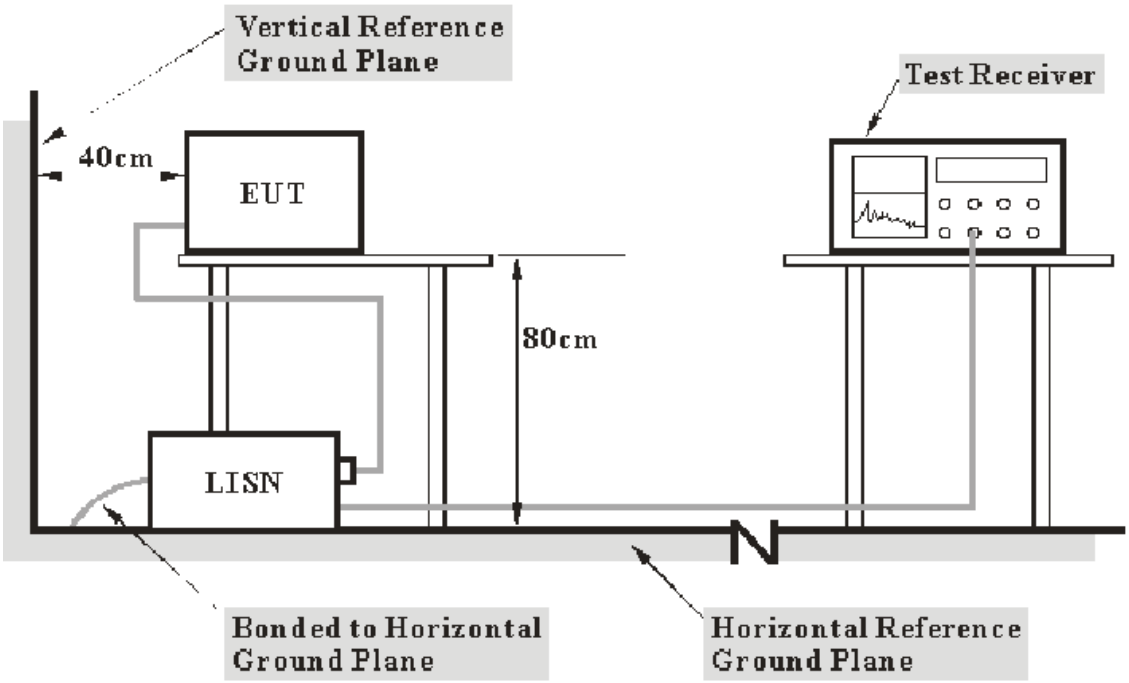
13.1. Block Diagram of Test Setup

13.1.1. Block diagram of connection between the EUT and simulators



(EUT: Wireless earphones)

13.1.2. 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.

13.2.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.		

13.3.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.

13.4.Operating Condition of EUT

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

13.4.2.Turn on the power of all equipment.

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

13.5.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 (R & S ESCS30) is set at 9kHz.

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

13.6.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	10.5	51.1	34.2	56.0	46.0	4.9	11.8	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)

13.7.Power Line Conducted Emission Measurement Results

PASS.
Test Lab: Shielding room
Test Engineer: Frank

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.

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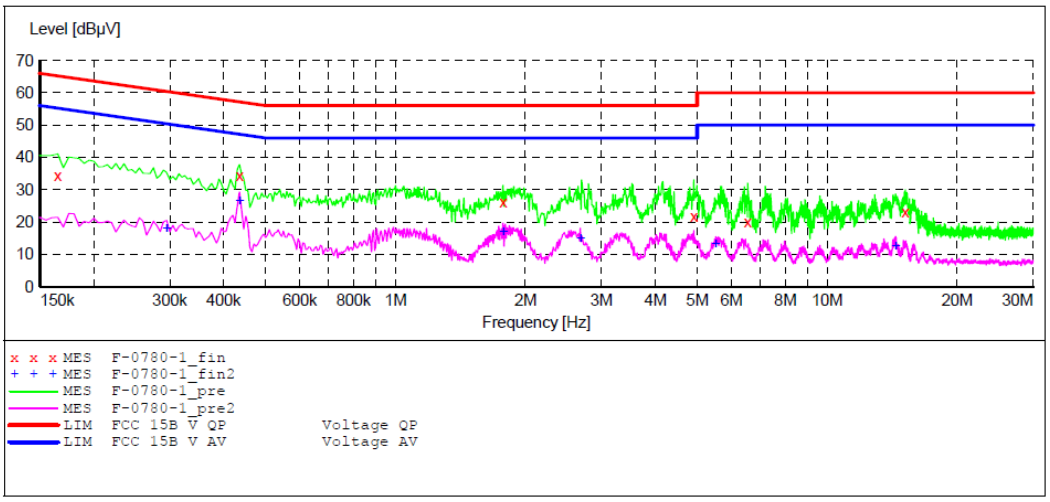
CONDUCTED EMISSION STANDARD FCC PART 15 B

```
EUT:                    Wireless earphones  M/N:X10
Manufacturer:           Shenzhen Kingvie Technology Co.,Limited
Operating Condition:    Charging and operating
Test Site:              1#Shielding Room
Operator:               Frank
Test Specification:     N   120V/60Hz
Comment:                Report NO.:ATE20190780
Start of Test:          5/29/2019 / 9:05:44AM
```

SCAN TABLE: "V 9K-30MHz fin"

Short Description: _SUB_STD_VTERM2 1.70

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak Average	1.0 s	200 Hz	NSLK8126 2008
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak Average	1.0 s	9 kHz	NSLK8126 2008



MEASUREMENT RESULT: "F-0780-1_fin"

5/29/2019 9:09AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.165000	34.40	10.5	65	30.8	QP	N	GND
0.435000	34.30	10.7	57	22.9	QP	N	GND
1.775000	26.00	11.0	56	30.0	QP	N	GND
4.910000	21.70	11.2	56	34.3	QP	N	GND
6.550000	20.10	11.2	60	39.9	QP	N	GND
15.175000	23.20	11.4	60	36.8	QP	N	GND

MEASUREMENT RESULT: "F-0780-1_fin2"

5/29/2019 9:09AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.295000	17.90	10.6	50	32.5	AV	N	GND
0.435000	26.60	10.7	47	20.6	AV	N	GND
1.775000	17.00	11.0	46	29.0	AV	N	GND
2.680000	14.90	11.0	46	31.1	AV	N	GND
5.520000	13.30	11.2	50	36.7	AV	N	GND
14.410000	12.60	11.4	50	37.4	AV	N	GND

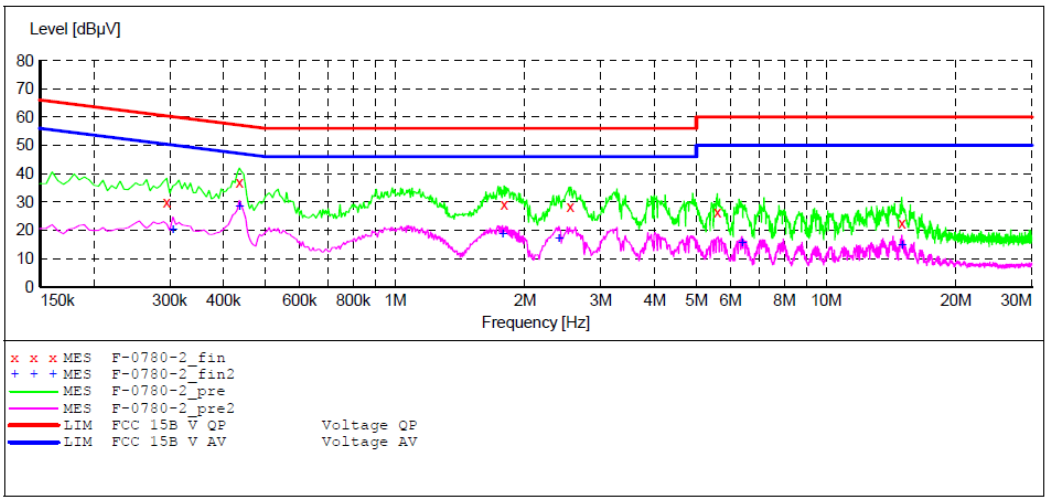
ACCURATE TECHNOLOGY CO.,LTD

CONDUCTED EMISSION STANDARD FCC PART 15 B

```
EUT:                  Wireless earphones  M/N:X10
Manufacturer:         Shenzhen Kingvie Technology Co.,Limited
Operating Condition:  Charging and operating
Test Site:            1#Shielding Room
Operator:             Frank
Test Specification:   L   120V/60Hz
Comment:              Report NO.:ATE20190780
Start of Test:        5/29/2019 / 9:11:07AM
```

SCAN TABLE: "V 9K-30MHz fin"

```
  Short Description:            _SUB_STD_VTERM2 1.70
  Start      Stop       Step      Detector  Meas.     IF      Transducer
  Frequency  Frequency  Width               Time      Bandw.
  9.0 kHz    150.0 kHz  100.0 Hz  QuasiPeak 1.0 s     200 Hz  NSLK8126 2008
                                  Average
  150.0 kHz  30.0 MHz   5.0 kHz   QuasiPeak 1.0 s     9 kHz   NSLK8126 2008
                                  Average
```



MEASUREMENT RESULT: "F-0780-2_fin"

5/29/2019 9:14AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.295000	29.90	10.6	60	30.5	QP	L1	GND
0.435000	37.00	10.7	57	20.2	QP	L1	GND
1.790000	29.10	11.0	56	26.9	QP	L1	GND
2.550000	28.20	11.0	56	27.8	QP	L1	GND
5.590000	26.30	11.2	60	33.7	QP	L1	GND
14.980000	22.50	11.4	60	37.5	QP	L1	GND

MEASUREMENT RESULT: "F-0780-2_fin2"

5/29/2019 9:14AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.305000	20.30	10.6	50	29.8	AV	L1	GND
0.435000	28.20	10.7	47	19.0	AV	L1	GND
1.775000	18.40	11.0	46	27.6	AV	L1	GND
2.400000	17.00	11.0	46	29.0	AV	L1	GND
6.380000	15.50	11.2	50	34.5	AV	L1	GND
14.995000	14.70	11.4	50	35.3	AV	L1	GND

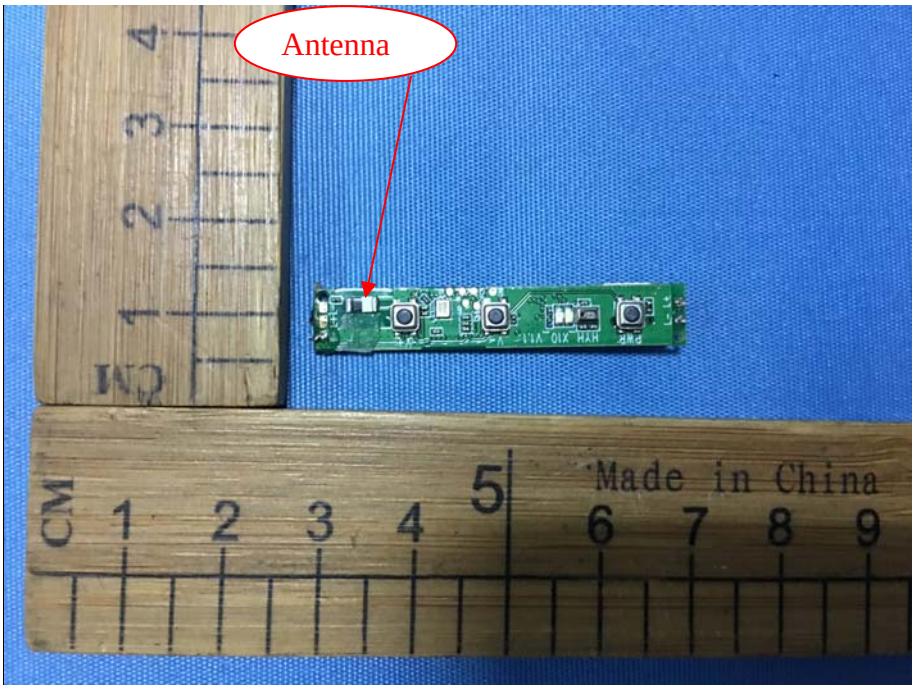
14. ANTENNA REQUIREMENT

14.1. 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.

14.2. Antenna Construction

Device is equipped with permanent attached antenna, which isn't displaced by other antenna. The Max Antenna gain of EUT is 1.05dBi. Therefore, the equipment complies with the antenna requirement of Section 15.203.



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