APPLICATION CERTIFICATION FCC Part 15C
On Behalf of
XIAMEN COMFORT SCIENCE & TECHNOLOGY GROUP CO., LTD

Massage Chair
Model No.: OS-3D Otamic LE, OI-3300C, OI-3310, OI-3320, OI-3330, OI-3340, OI-3350

FCC ID: YMX-OI3300

Prepared for	:	XIAMEN COMFORT SCIENCE & TECHNOLOGY GROUP CO., LTD
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Report No.	:	ATE20200061
Date of Test	:	April 16-May 29, 2020
Date of Report	:	May 29, 2020

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Test Report Certification

Applicant	:	XIAMEN COMFORT SCIENCE & TECHNOLOGY GROUP CO., LTD
Manufacturer	:	XIAMEN OGAWA INTELLIGENT HEALTH EQUIPMENT CO., LTD
Product	:	Massage Chair
Model No.	:	OS-3D Otamic LE, OI-3300C, OI-3310, OI-3320, OI-3330, OI-3340, OI-3350

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 :	April 16-May 29, 2020
Date of Report :	May 29, 2020

Prepared by : Bob Wang

(Bob Wang, Engineer)

Approved & Authorized Signer : Martin Lu

(Martin Lü, Manager)

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

Model Number	:	OS-3D Otamic LE, OI-3300C, OI-3310, OI-3320, OI-3330, OI-3340, OI-3350 (Note: We hereby state that these models are identical in interior structure, electrical circuits and components, just model name is different. Therefore only model OS-3D Otamic LE is for tests.)
Bluetooth version	:	V5.0
Frequency Range	:	2402MHz-2480MHz
Number of Channels	:	79
Antenna Gain(Max)	:	0dBi
Antenna type	:	PCB Antenna
Modulation mode	:	GFSK, π/4 DQPSK, 8DPSK
Trade Mark	:	N/A
Power supply	:	AC 110-120V; 60Hz
Applicant	:	XIAMEN COMFORT SCIENCE & TECHNOLOGY GROUP CO., LTD
Address	:	(5/F) NO.168, QIANPU ROAD, SIMING DISTRICT, XIAMEN, CHINA
Manufacturer	:	XIAMEN OGAWA INTELLIGENT HEALTH EQUIPMENT CO., LTD
Address	:	THREE FLOOR NO 38-40 TIANYANG ROAD JIMEI ZONE XIAMEN T:3521880

1.2.Accessory and Auxiliary Equipment

N/A

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

2. MEASURING DEVICE AND TEST EQUIPMENT

Table 1: List of Test and Measurement Equipment

Kind of equipment	Manufacturer	Type	S/N	Calibrated dates	Cal. Interval
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 04, 2020	One Year
EMI Test Receiver	Rohde&Schwarz	ESR	101817	Jan. 04, 2020	One Year
Spectrum Analyzer	Rohde&Schwarz	FSV-40	101495	Jan. 04, 2020	One Year
Pre-Amplifier (Radiated Emission)	Compliance Direction	RSU-M2	38322	Jan. 04, 2020	One Year
Pre-Amplifier (Radiated Emission)	Agilent	8447D	294A10619	Jan. 04, 2020	One Year
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 04, 2020	One Year
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 04, 2020	One Year
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 04, 2020	One Year
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 04, 2020	One Year
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 04, 2020	One Year
Highpass Filter	Wainwright Instruments	WHKX3.6/18G-10SS	N/A	Jan. 04, 2020	One Year
Band Reject Filter	Wainwright Instruments	WRCG2400/2485-2375/2510-60/11SS	N/A	Jan. 04, 2020	One Year
RF Coaxial Cable (Conducted Emission)	SUHNER	N-2m	No.2	Jan. 04, 2020	One Year
RF Coaxial Cable (Radiated Emission)	SUHNER	N-5m	NO.3	Jan. 04, 2020	One Year
RF Coaxial Cable (Radiated Emission)	SUHNER	N-5m	NO.4	Jan. 04, 2020	One Year
RF Coaxial Cable (Radiated Emission)	SUHNER	N-1m	NO.5	Jan. 04, 2020	One Year
RF Coaxial Cable (Radiated Emission)	SUHNER	N-1m	NO.6	Jan. 04, 2020	One Year
Conducted Emission Measurement Software: ES-K1 V1.71					
Radiated Emission Measurement Software: EZ_EMC V1.1.4.2					

3. OPERATION OF EUT DURING TESTING

3.1.Operating Mode

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

3.2.Configuration and peripherals

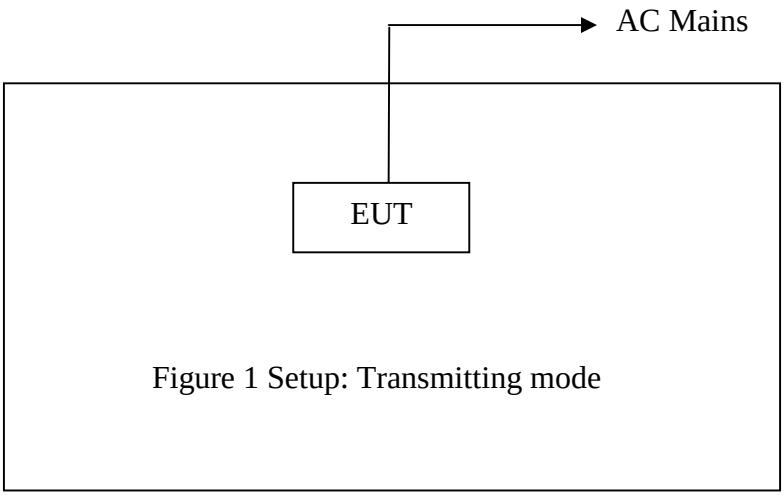


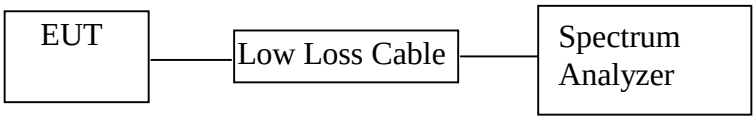
Figure 1 Setup: Transmitting mode

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 Limits 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)

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 Test

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.The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be approximately three times the RBW.

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

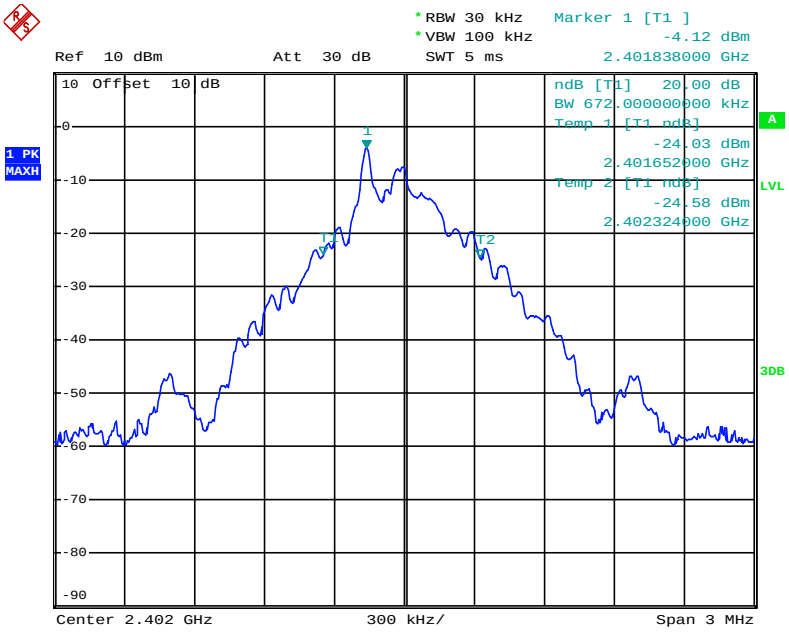
5.6.Test Result

Channel	Frequency (MHz)	GFSK 20dB Bandwidth (MHz)	Π/4-DQPSK 20dB Bandwidth (MHz)	8DPSK 20dB Bandwidth (MHz)	Result
Low	2402	0.672	1.176	1.188	Pass
Middle	2441	0.666	1.176	1.194	Pass
High	2480	0.774	1.188	1.194	Pass

The spectrum analyzer plots are attached as below.

GFSK Mode

Low channel



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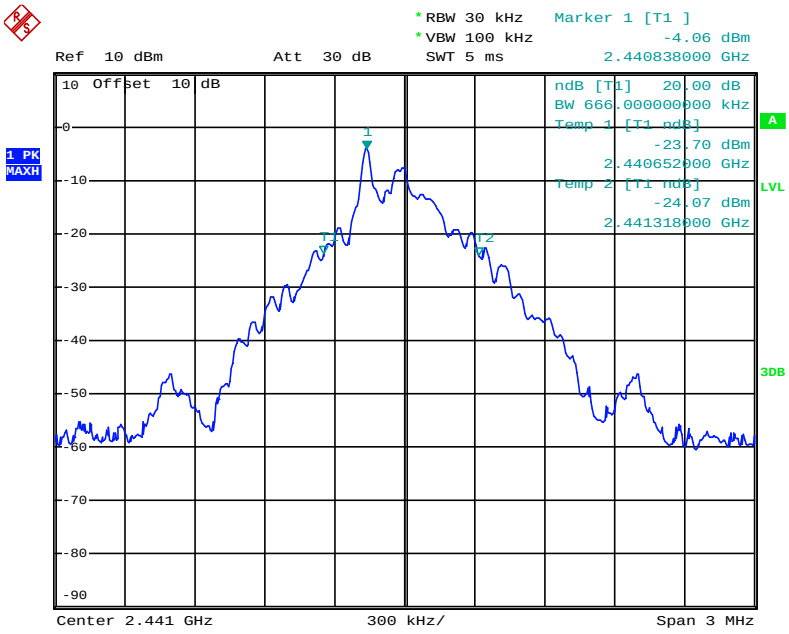
Middle channel



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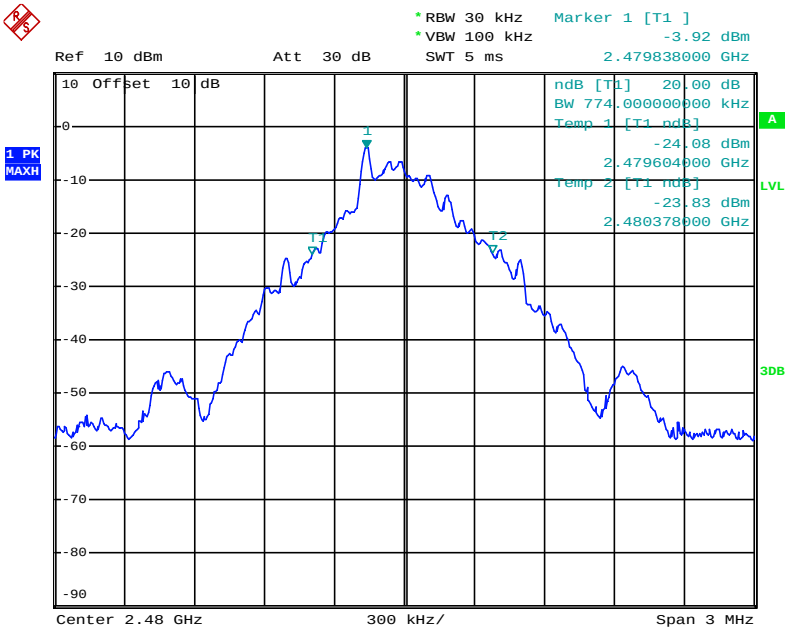
High channel



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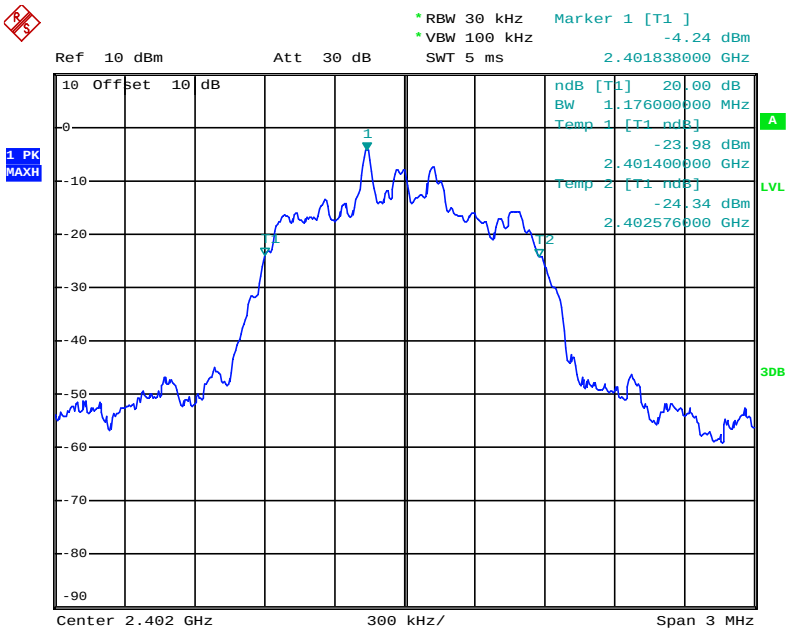
Π/4-DQPSK Mode

Low channel



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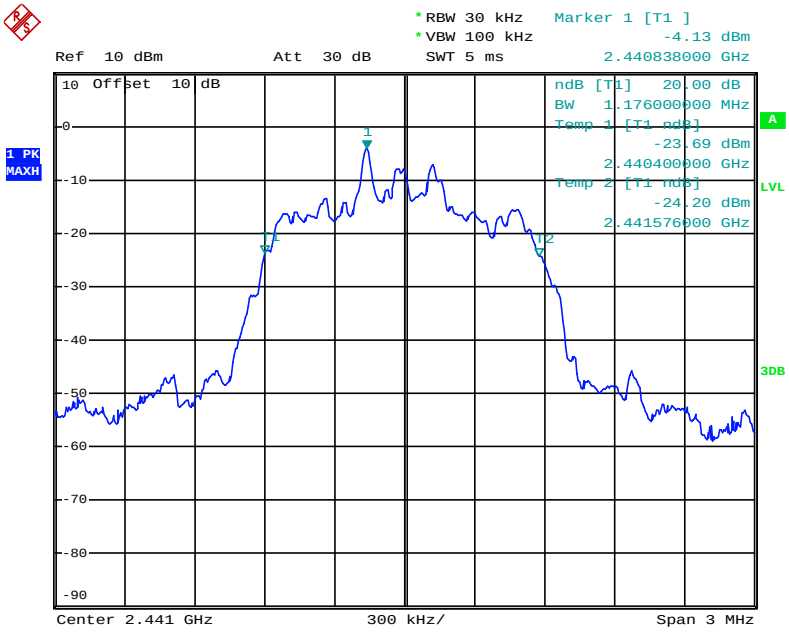
Middle channel



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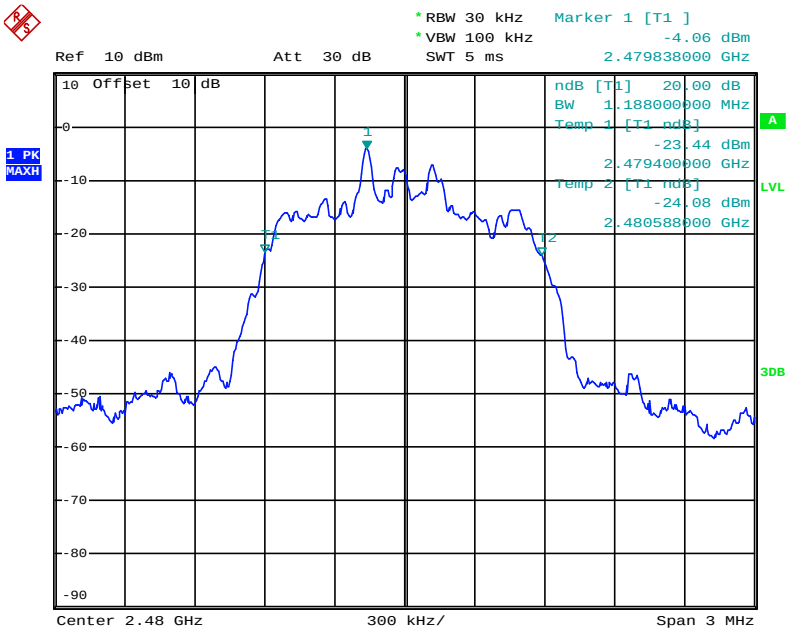
High channel



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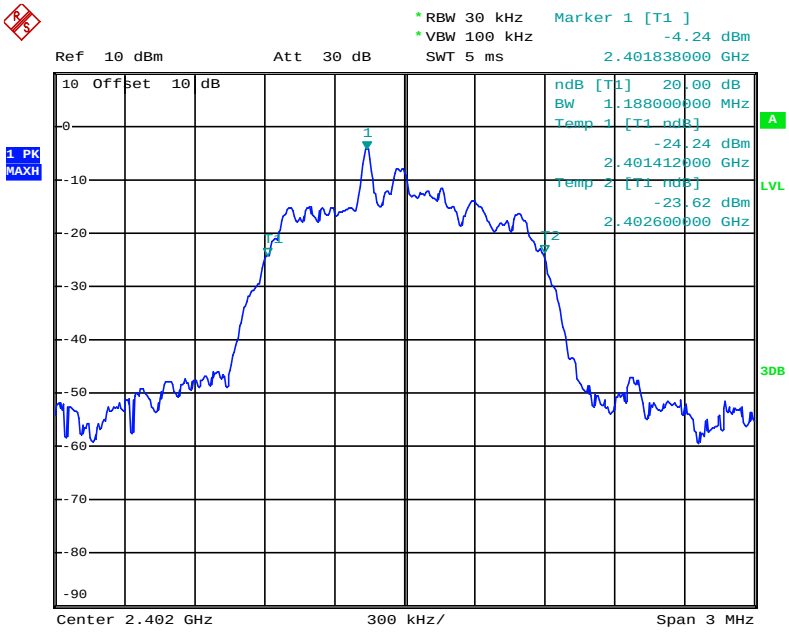
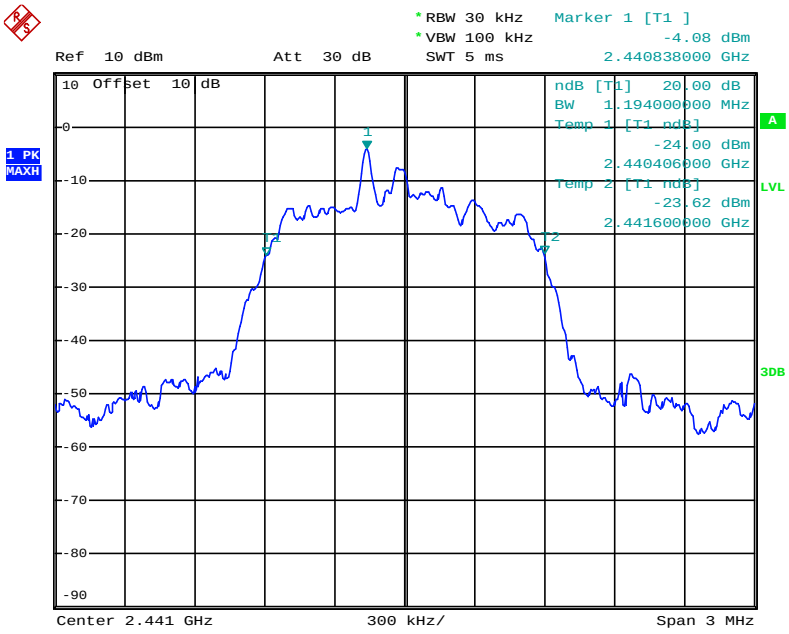
8DPSK Mode

Low channel



Date: 16.APR.2020 14:27:53

Middle channel



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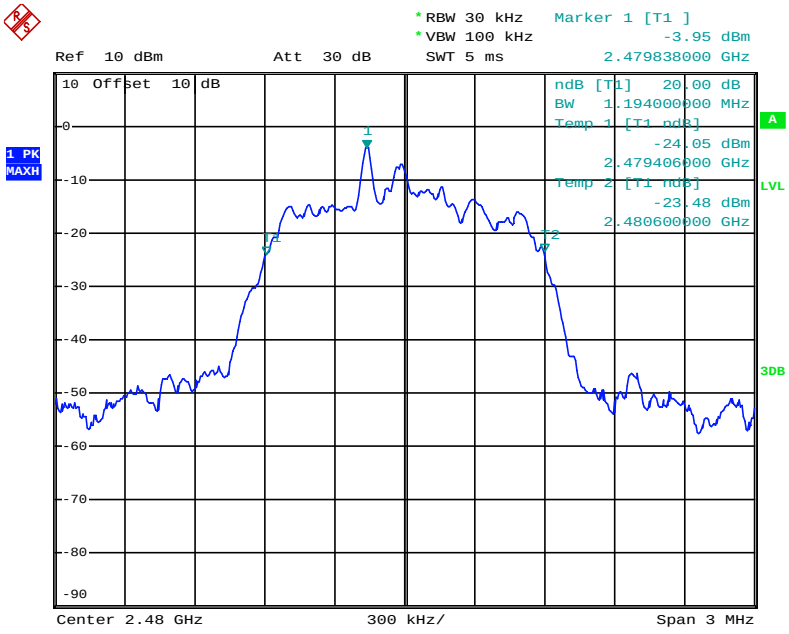
High channel



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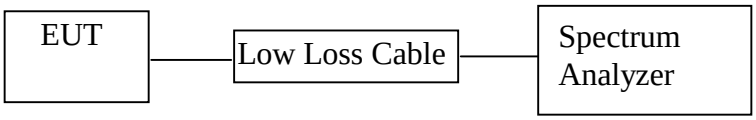
6. CARRIER FREQUENCY SEPARATION TEST

6.1.Block Diagram of Test Setup



6.2.The Requirement For 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 Test

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 3MHz.

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

6.5.4.Measurement the channel separation

6.6.Test Result

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

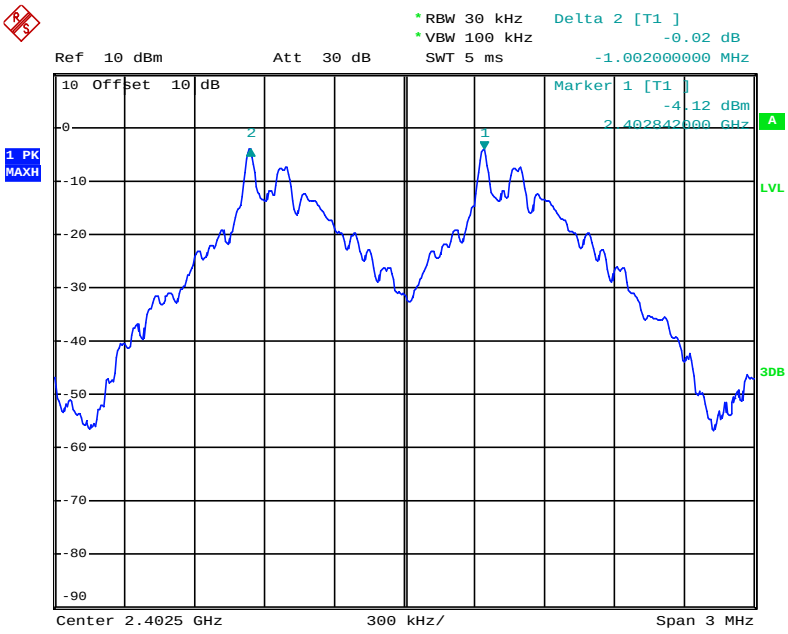
Channel	Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result
Low	2402	1.002	25KHz or 2/3*20dB bandwidth	Pass
	2403			
Middle	2440	0.996	25KHz or 2/3*20dB bandwidth	Pass
	2441			
High	2479	1.002	25KHz or 2/3*20dB bandwidth	Pass
	2480			

8DPSK

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

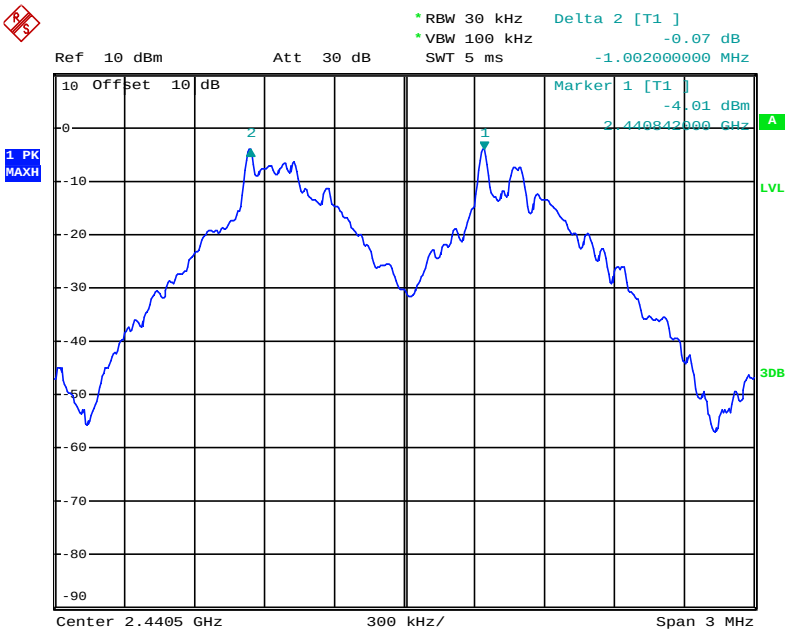
GFSK Mode

Low channel



Date: 16.APR.2020 14:44:15

Middle channel



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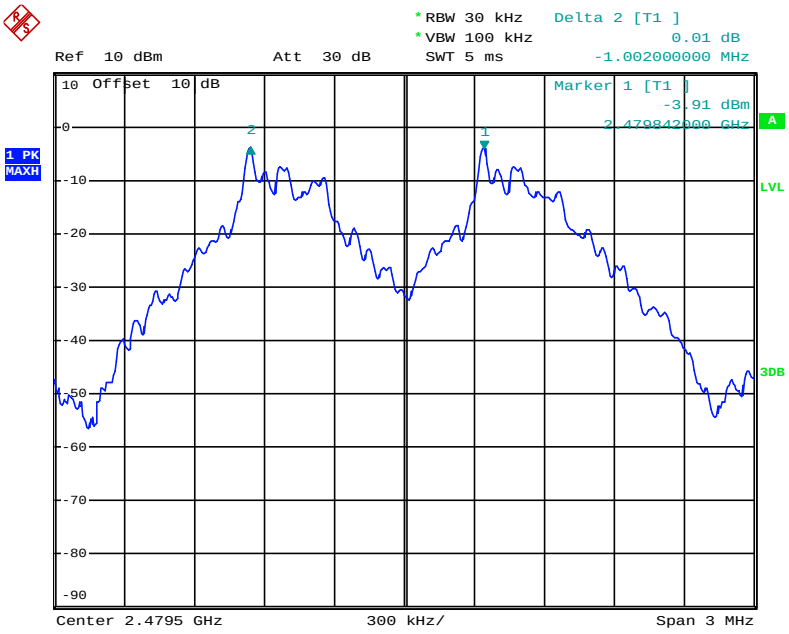
High channel



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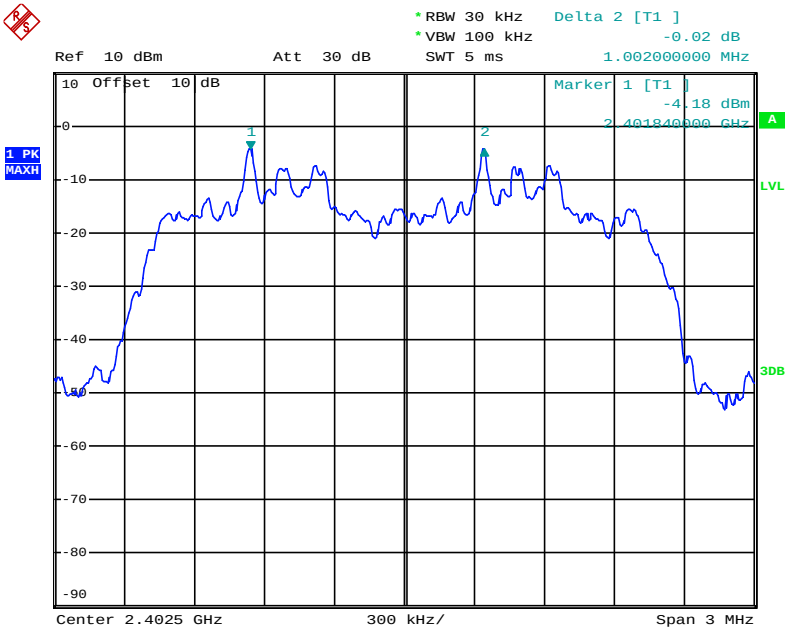
Π/4-DQPSK Mode

Low channel



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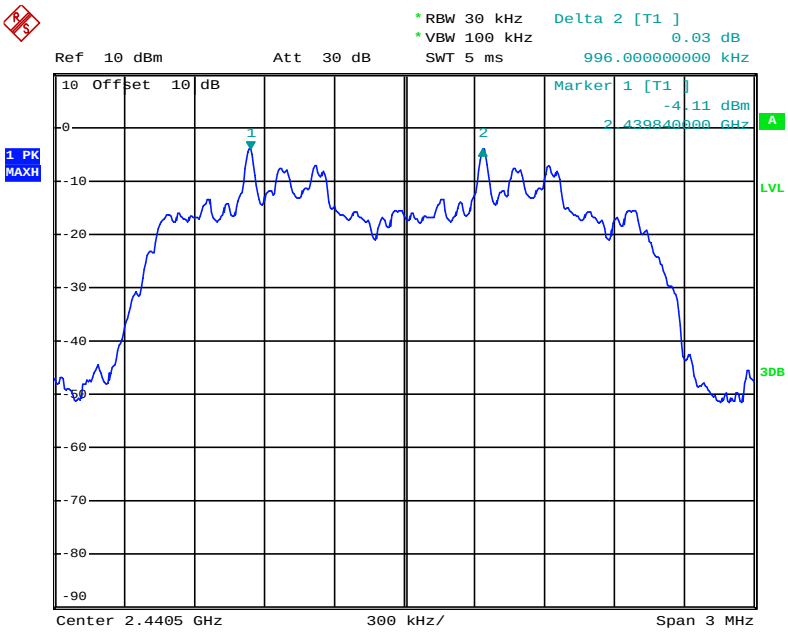
Middle channel



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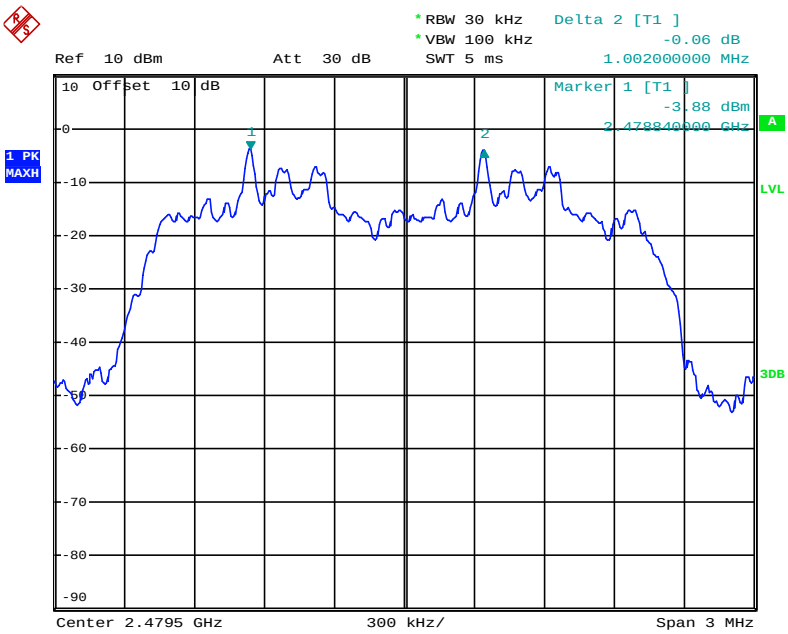
High channel



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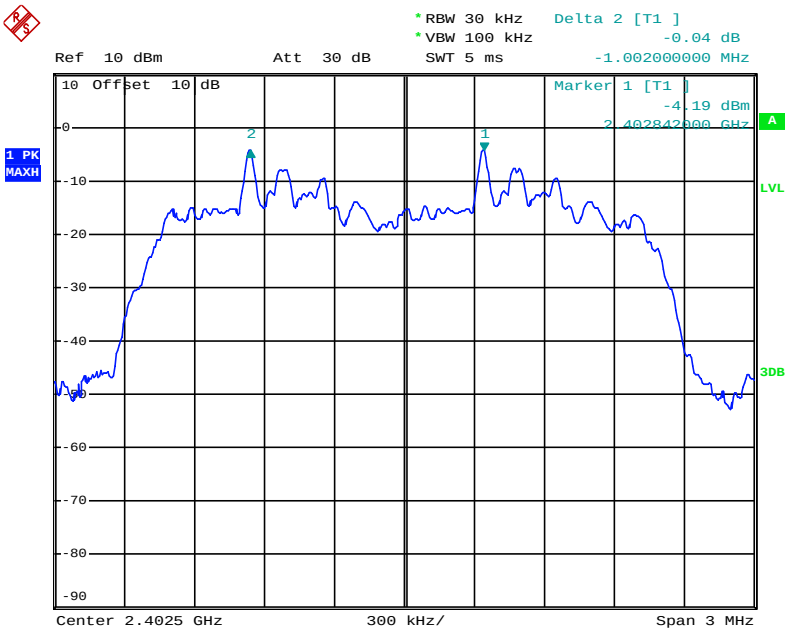
8DPSK Mode

Low channel



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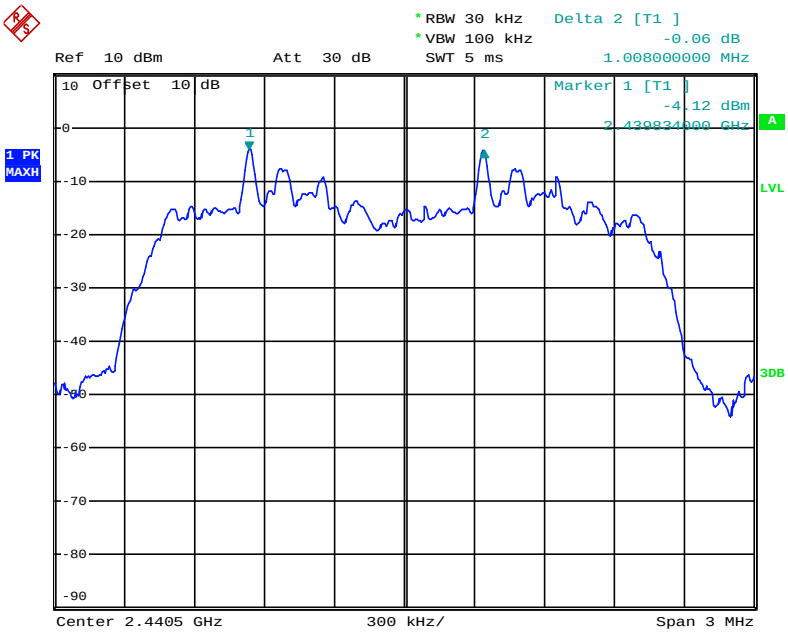
Middle channel



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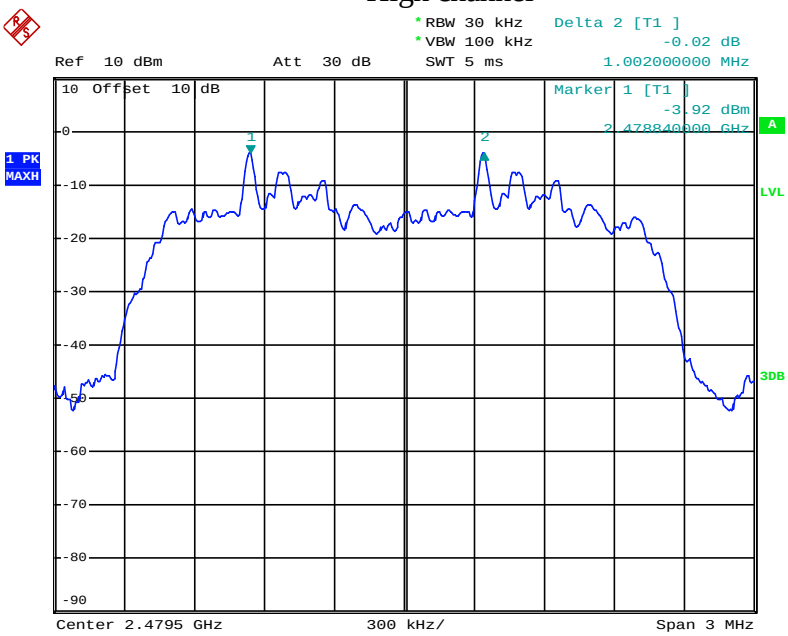
High channel



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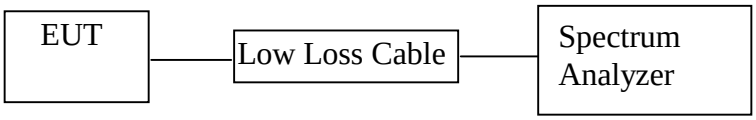
7. NUMBER OF HOPPING FREQUENCY TEST

7.1.Block Diagram of Test Setup



7.2.The Requirement For 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 Test

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.

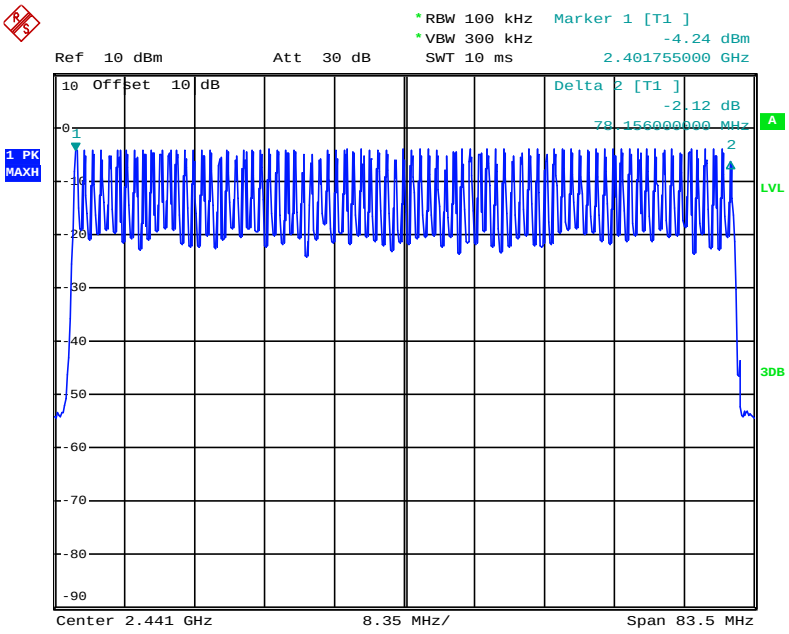
7.5.3.Max hold, view and count how many channel in the band.

7.6.Test Result

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

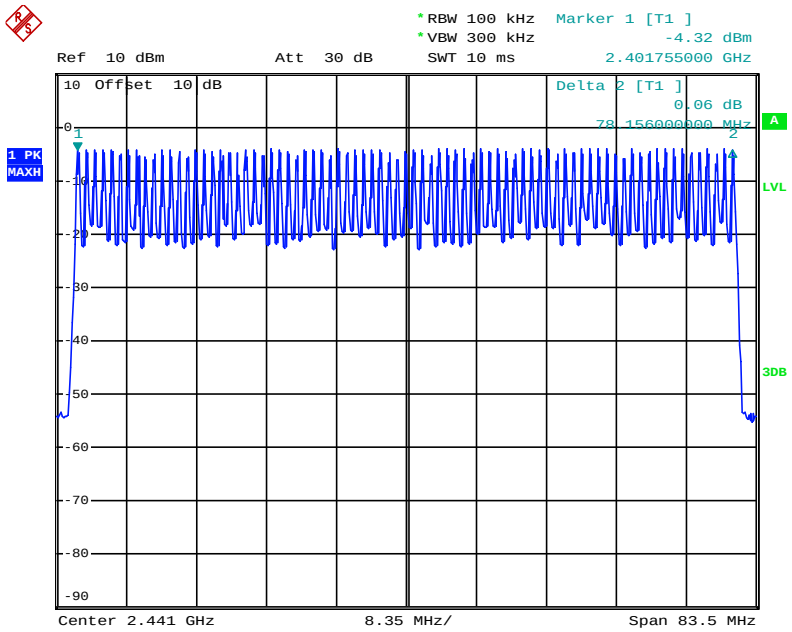
The spectrum analyzer plots are attached as below.

Number of hopping channels (GFSK Mode)



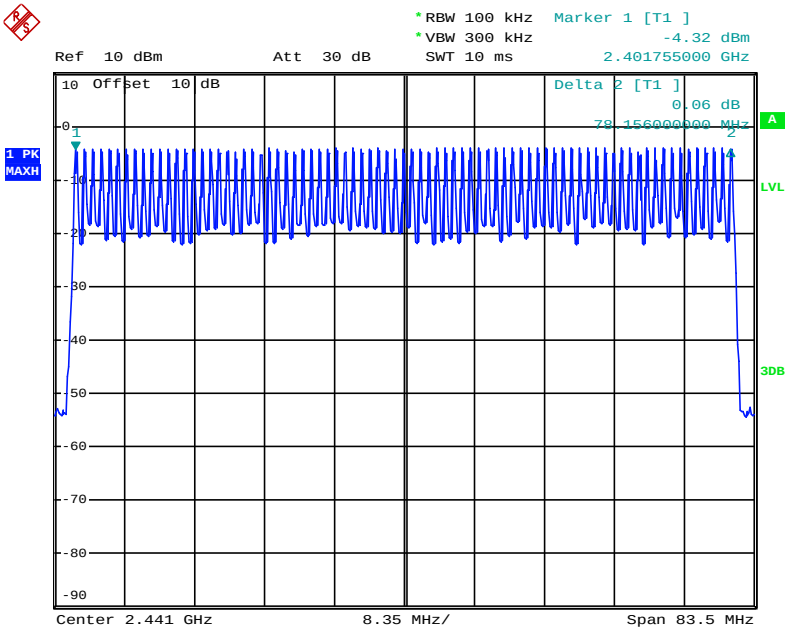
Date: 16.APR.2020 14:57:11

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



Date: 16.APR.2020 14:54:38

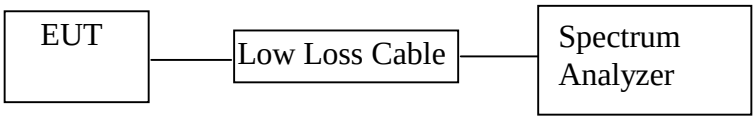
Number of hopping channels (8DPSK Mode)



Date: 16.APR.2020 14:55:28

8. DWELL TIME TEST

8.1.Block Diagram of Test Setup



8.2.The Requirement For 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 Test

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

Pass.

GFSK Mode (Worse case)

Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2441	0.46	147.2	400
A period transmit time = 0.4 Í 79 = 31.6 Dwell time = pulse time Í (1600/(2*79)) Í 31.6				
DH3	2441	1.74	278.4	400
A period transmit time = 0.4 Í 79 = 31.6 Dwell time = pulse time Í (1600/(4*79)) Í 31.6				
DH5	2441	2.99	319.0	400
A period transmit time = 0.4 Í 79 = 31.6 Dwell time = pulse time Í (1600/(6*79)) Í 31.6				

Π/4-DQPSK (Worse case)

Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2441	0.47	150.4	400
A period transmit time = 0.4 Í 79 = 31.6 Dwell time = pulse time Í (1600/(2*79)) Í 31.6				
DH3	2441	1.75	280.0	400
A period transmit time = 0.4 Í 79 = 31.6 Dwell time = pulse time Í (1600/(4*79)) Í 31.6				
DH5	2441	2.98	317.9	400
A period transmit time = 0.4 Í 79 = 31.6 Dwell time = pulse time Í (1600/(6*79)) Í 31.6				

8DPSK Mode (Worse case)

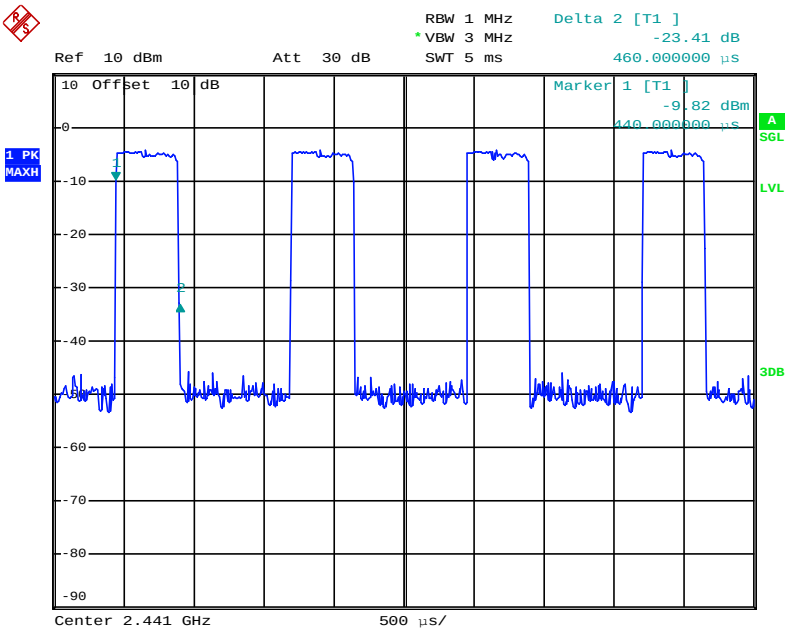
Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2441	0.47	150.4	400
A period transmit time = 0.4 Í 79 = 31.6 Dwell time = pulse time Í (1600/(2*79)) Í 31.6				
DH3	2441	1.75	280.0	400
A period transmit time = 0.4 Í 79 = 31.6 Dwell time = pulse time Í (1600/(4*79)) Í 31.6				
DH5	2441	3.01	321.1	400
A period transmit time = 0.4 Í 79 = 31.6 Dwell time = pulse time Í (1600/(6*79)) Í 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.

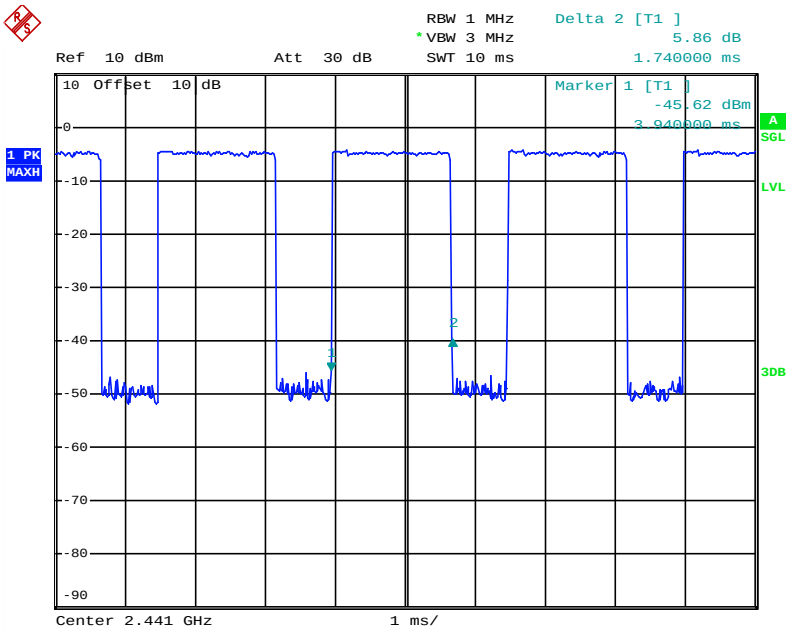
GFSK Mode

DH1 Middle channel



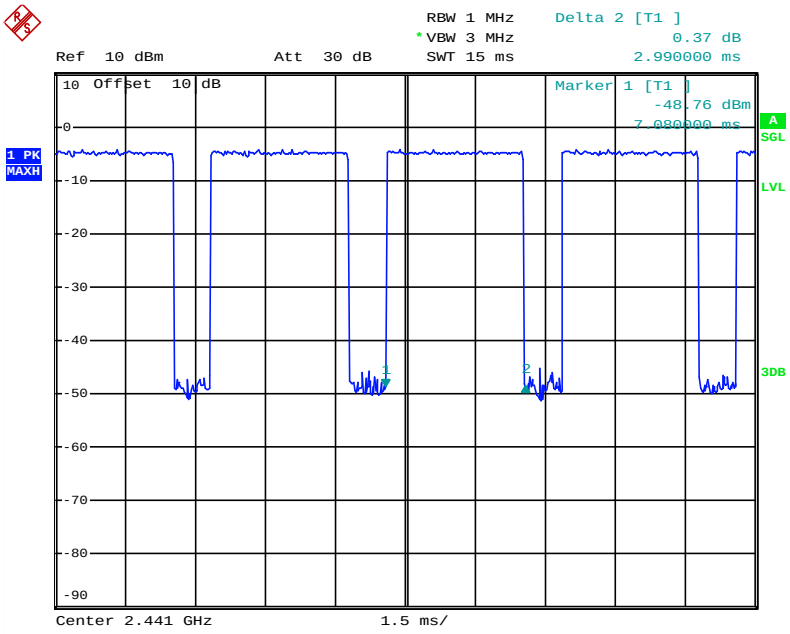
Date: 16.APR.2020 15:09:18

DH3 Middle channel



Date: 16.APR.2020 15:08:35

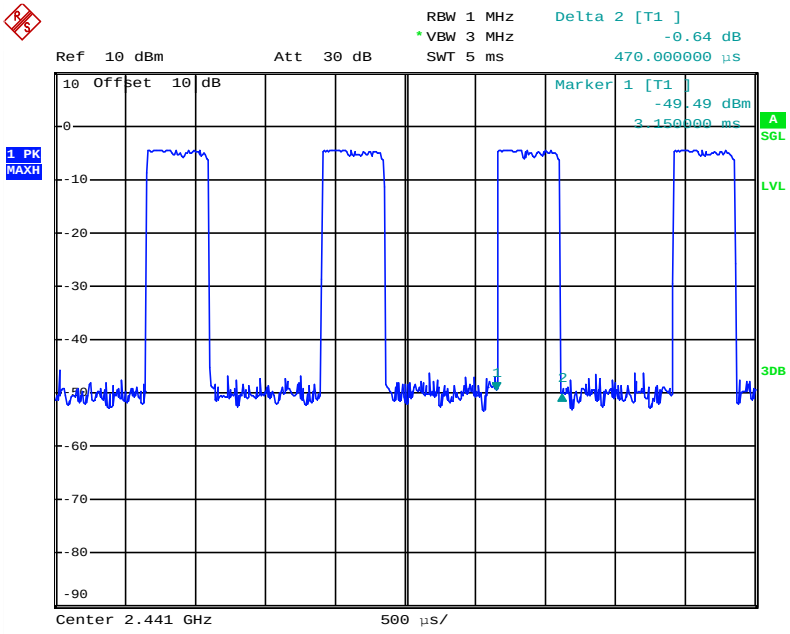
DH5 Middle channel



Date: 16.APR.2020 15:07:23

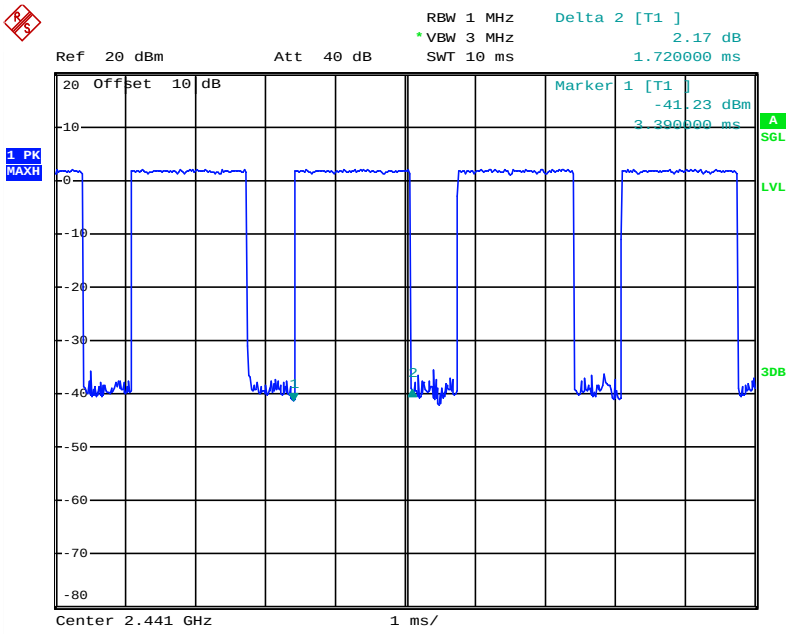
Π/4-DQPSK Mode

2DH1 Middle channel



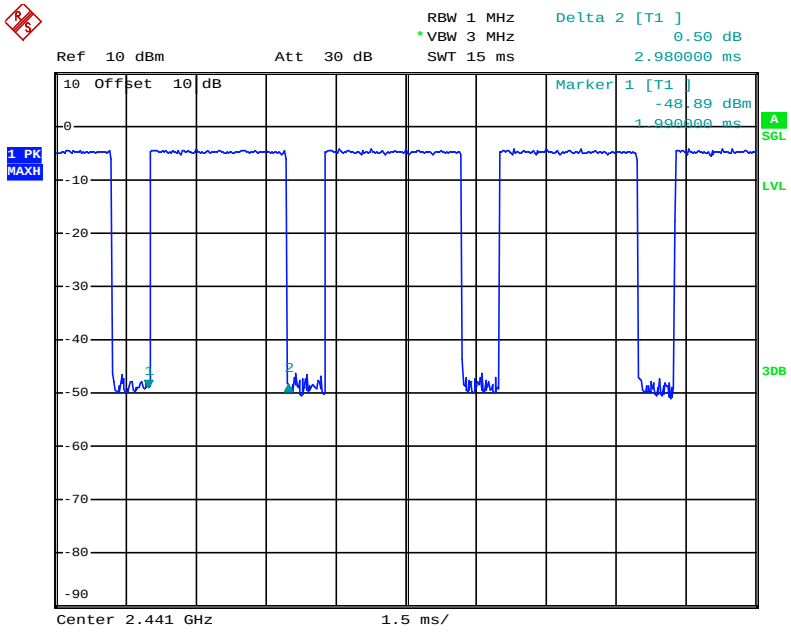
Date: 16.APR.2020 15:15:14

2DH3 Middle channel



Date: 15.AUG.2019 18:18:54

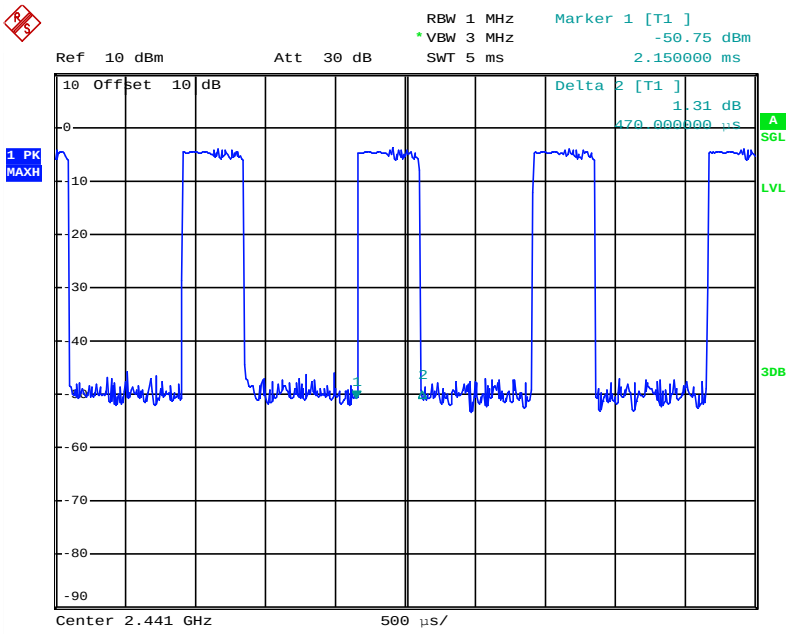
2DH5 Middle channel



Date: 26.JUN.2019 18:36:54

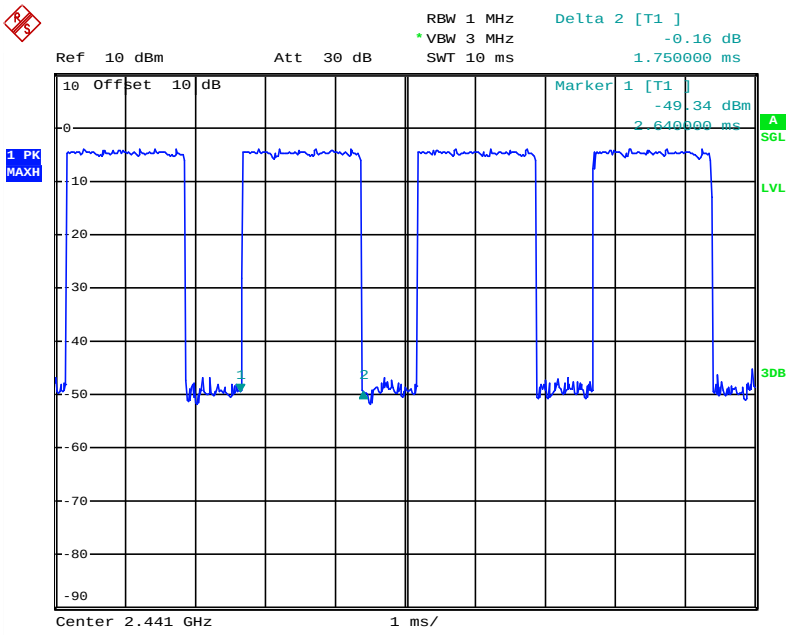
8DPSK Mode

3DH1 Middle channel



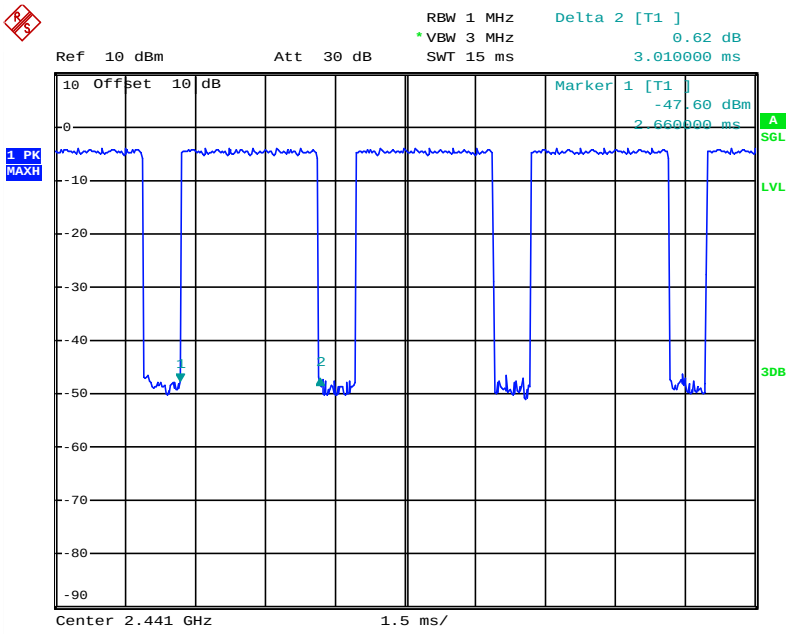
Date: 16.APR.2020 15:23:55

3DH3 Middle channel



Date: 16.APR.2020 15:23:02

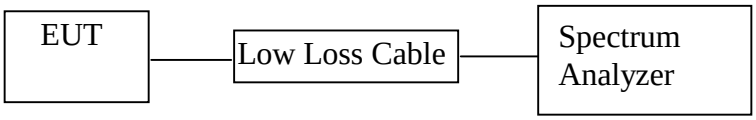
3DH5 Middle channel



Date: 16.APR.2020 15:21:53

9. MAXIMUM PEAK OUTPUT POWER TEST

9.1.Block Diagram of Test Setup



9.2.The Requirement For 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 Test

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

GFSK Mode

Channel	Frequency (MHz)	Peak Output Power (dBm/W)	Limits dBm / W
Low	2402	-4.42/0.0004	21 / 0.125
Middle	2441	-4.29/0.0004	21 / 0.125
High	2480	-4.14/0.0004	21 / 0.125

Π/4-DQPSK Mode

Channel	Frequency (MHz)	Peak Output Power (dBm/W)	Limits dBm / W
Low	2402	-3.76/0.0004	21 / 0.125
Middle	2441	-3.61/0.0004	21 / 0.125
High	2480	-3.43/0.0005	21 / 0.125

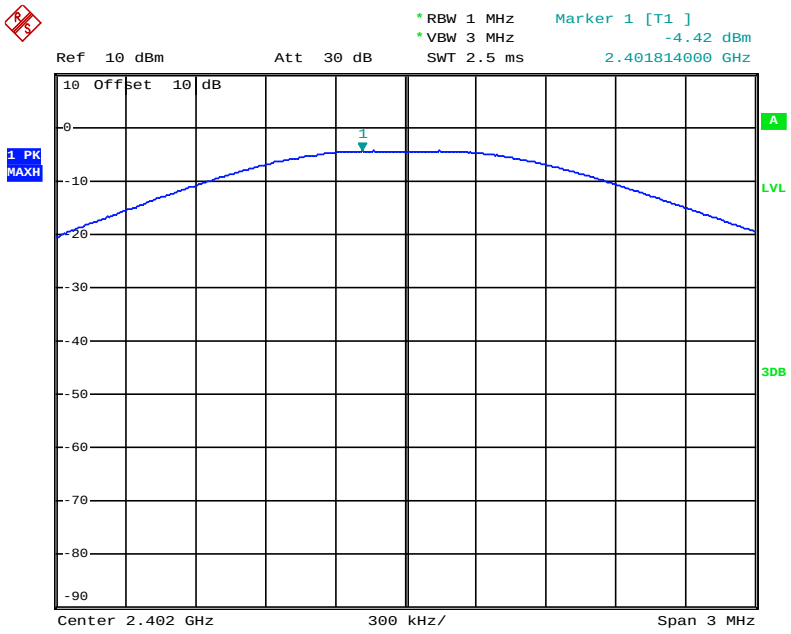
8DPSK Mode

Channel	Frequency (MHz)	Peak Output Power (dBm/W)	Limits dBm / W
Low	2402	-3.22/0.0005	21 / 0.125
Middle	2441	-3.09/0.0005	21 / 0.125
High	2480	-2.85/0.0005	21 / 0.125

The spectrum analyzer plots are attached as below.

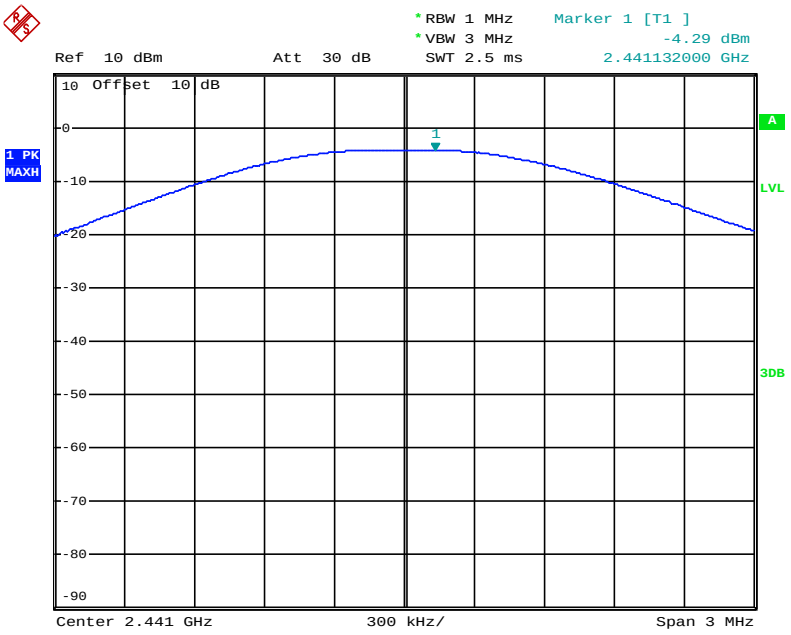
GFSK Mode

Low channel



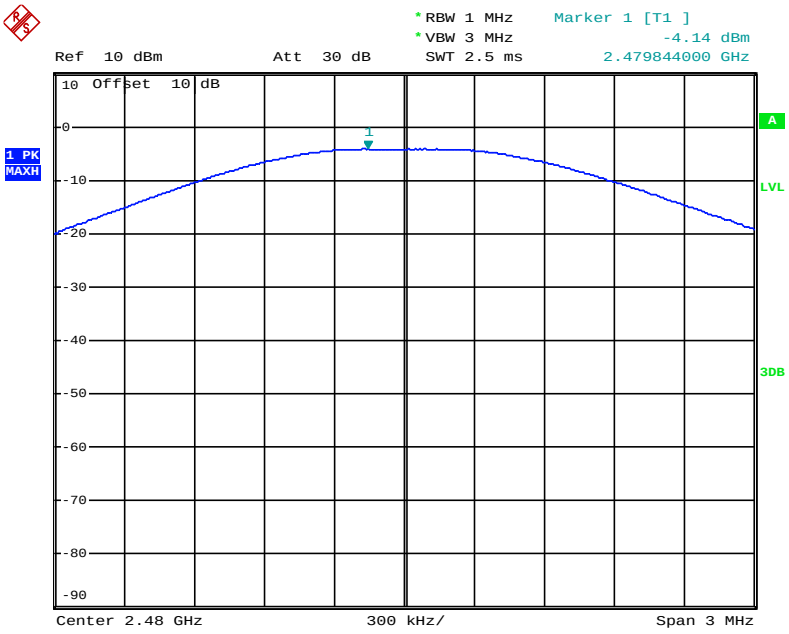
Date: 16.APR.2020 14:58:44

Middle channel



Date: 16.APR.2020 14:58:56

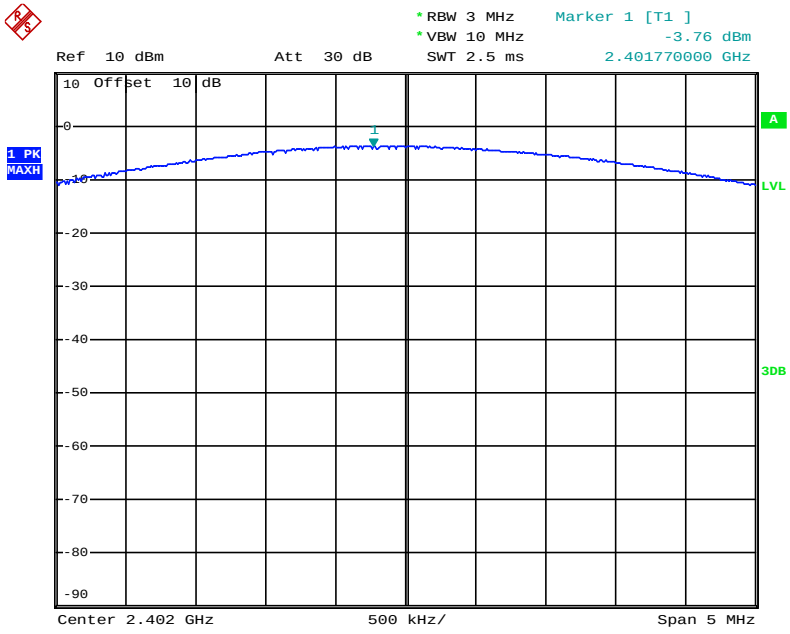
High channel



Date: 16.APR.2020 14:59:31

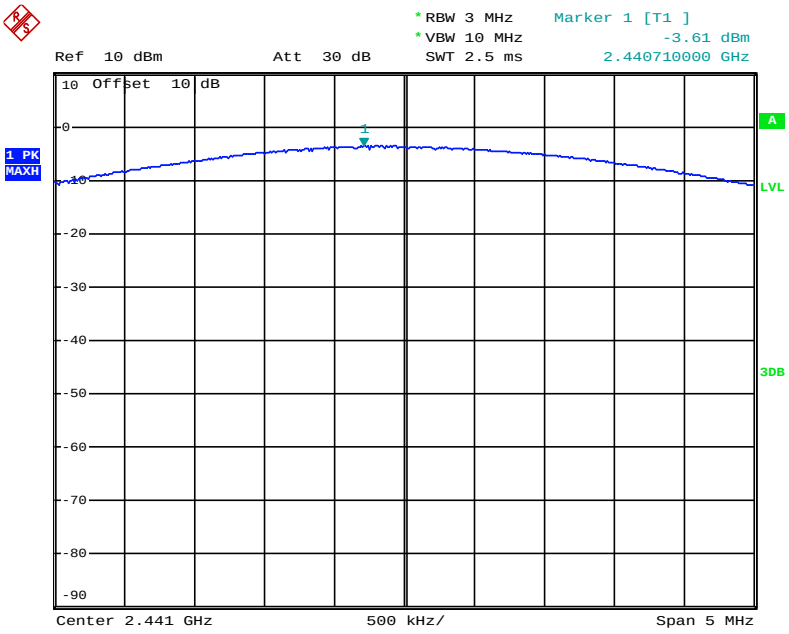
Π/4-DQPSK Mode

Low channel



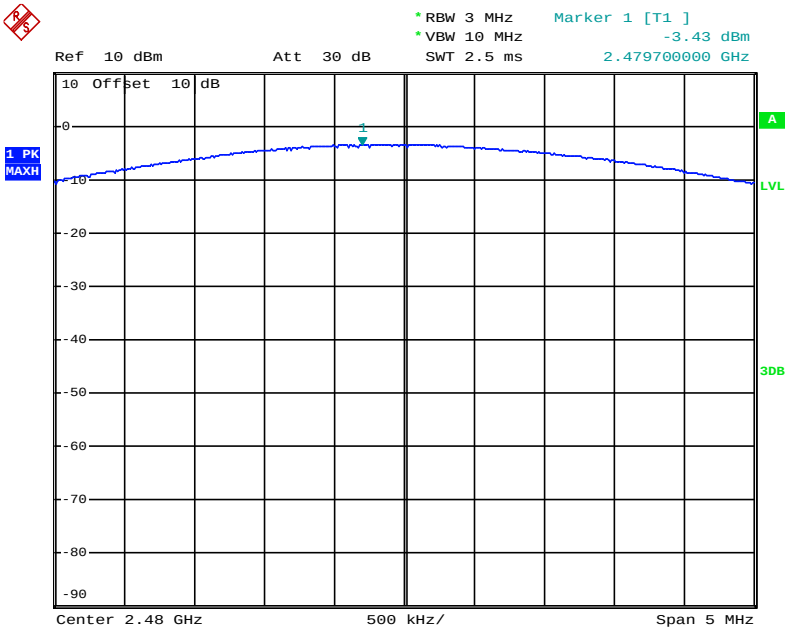
Date: 16.APR.2020 15:01:35

Middle channel



Date: 16.APR.2020 15:00:51

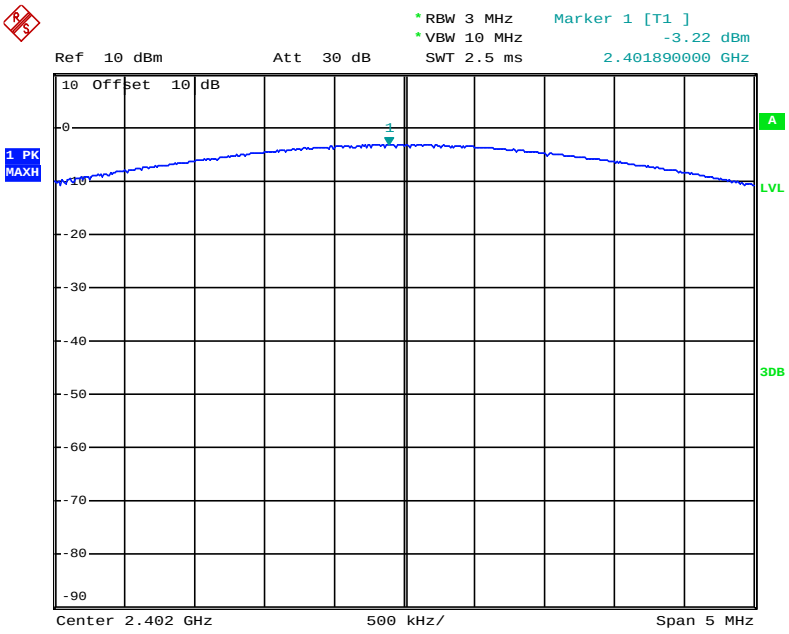
High channel



Date: 16.APR.2020 15:00:13

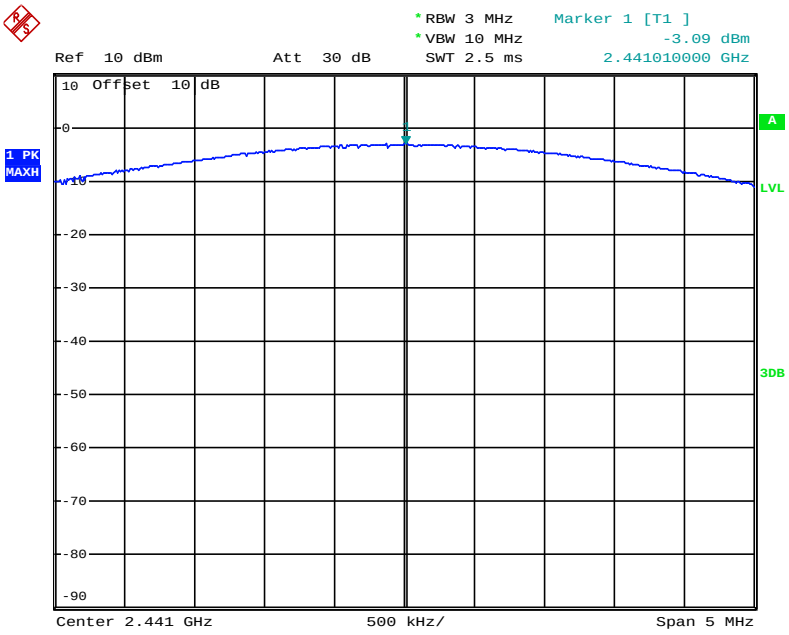
8DPSK Mode

Low channel



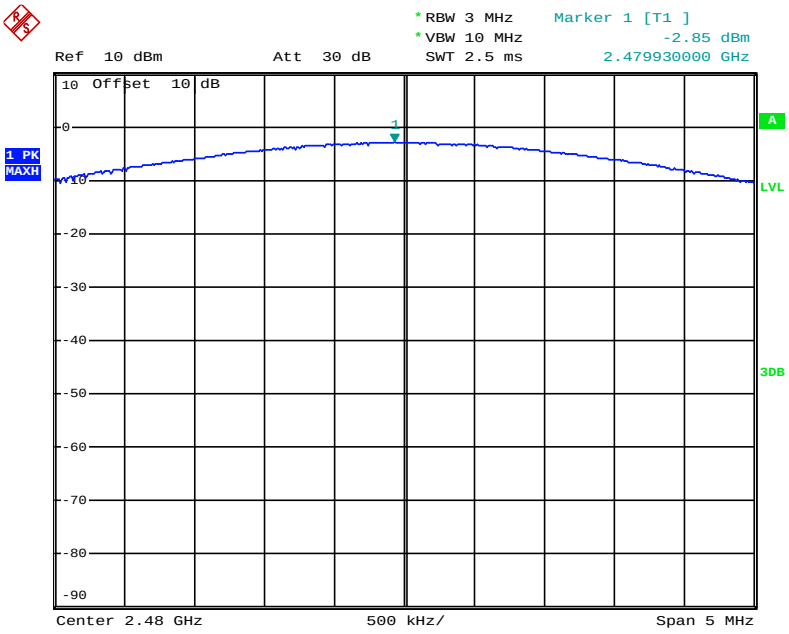
Date: 16.APR.2020 15:02:14

Middle channel



Date: 16.APR.2020 15:02:49

High channel

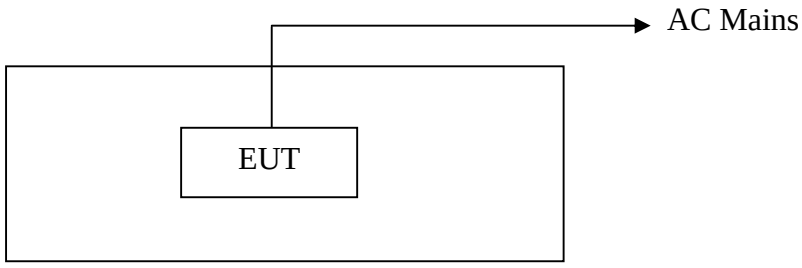


Date: 16.APR.2020 15:03:18

10.RADIATED EMISSION TEST

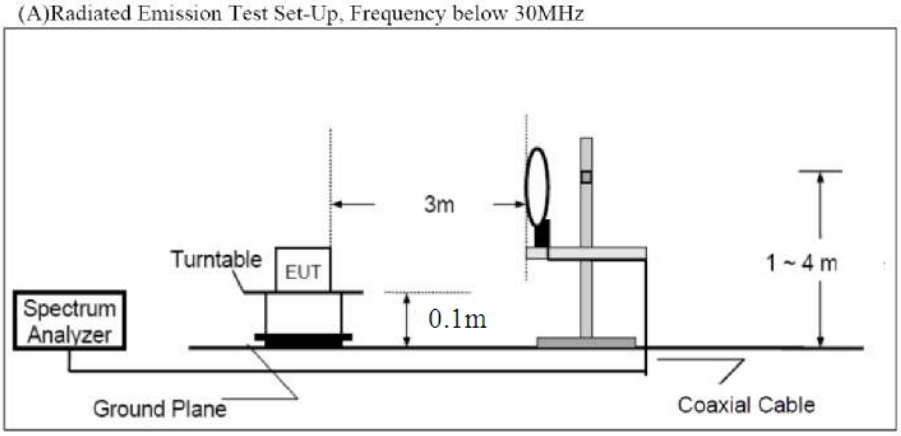
10.1.Block Diagram of Test Setup

10.1.1.Block diagram of connection between the EUT and peripherals

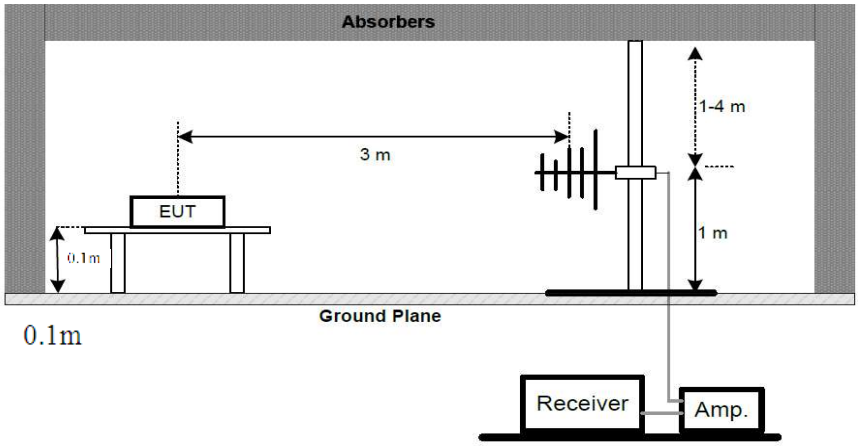


10.1.2.Semi-Anechoic Chamber Test Setup Diagram

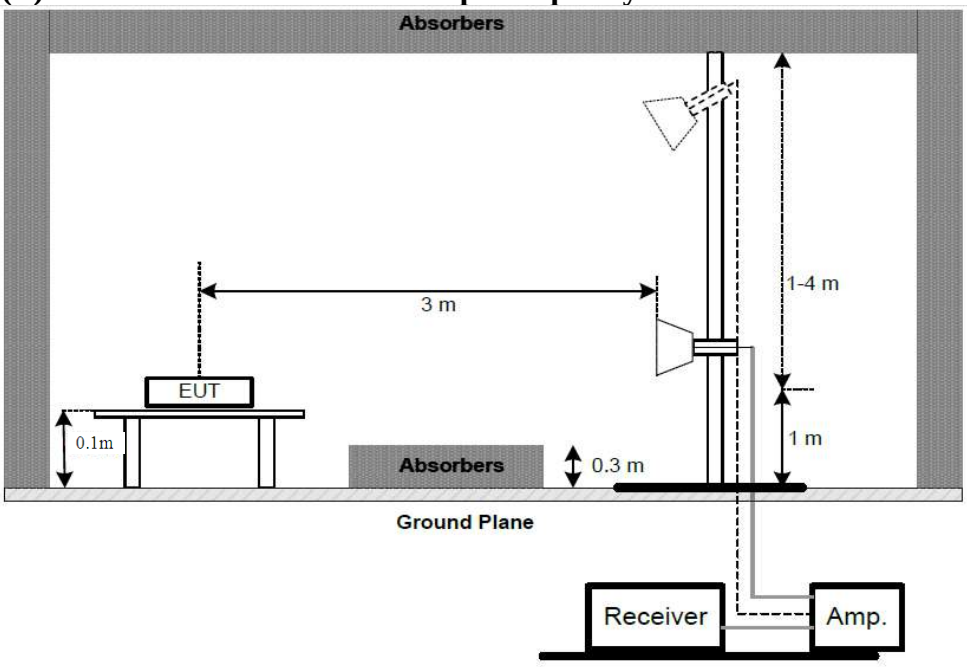
(A)Radiated Emission Test Set-Up, Frequency below 30MHz



(B) Radiated Emission Test Set-Up. Frequency 30-1000 MHz.



(B) Radiated Emission Test Set-Up. Frequency 1000-25000 MHz.



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.EUT Configuration on Test

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 0.1 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated 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 worse case emissions are reported.

10.7.Data Sample

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

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

Calculation Formula:
Margin(dB) = Result (dBmV/m)–Limit(dBmV/m)
Result(dBmV/m)= Reading(dBmV)+ 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.Test Results

Pass.

Note: 1.We tested GFSK mode, Π/4-DQPSK & 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 25GHz.

The spectrum analyzer plots are attached as below.

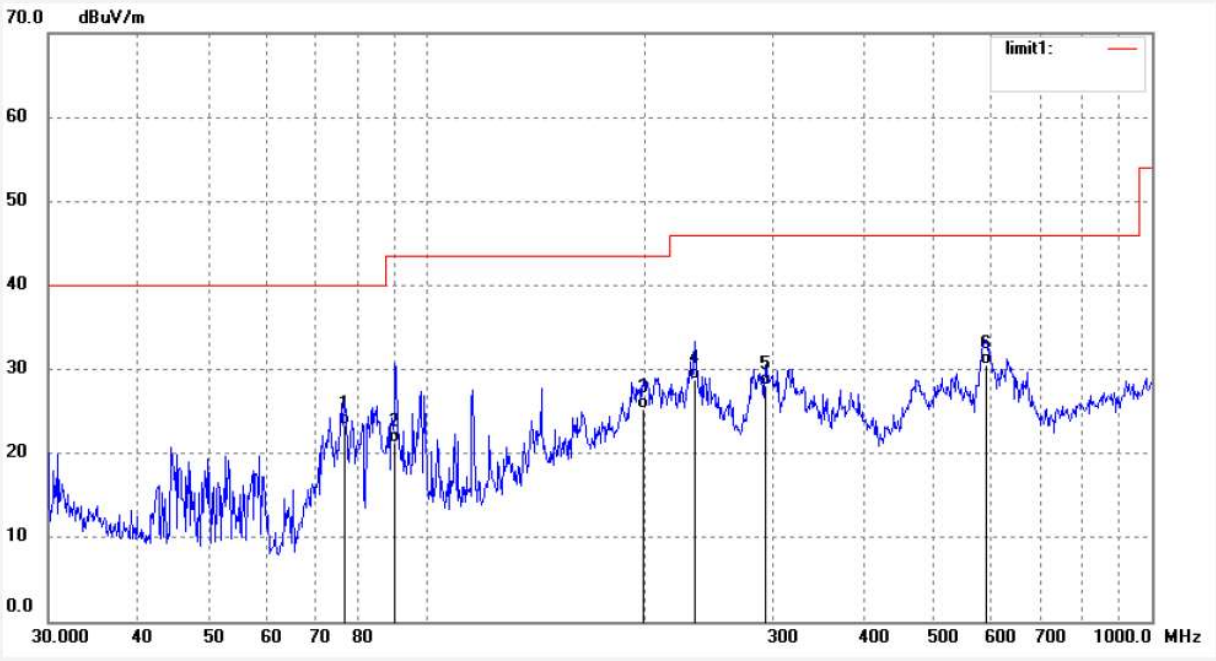
Below 1GHz Worse case data (GFSK mode)

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.: fcc #97
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Massage Chair
Mode: TX2402MHz
Model: OS-3D Otamic LE
Manufacturer: XIAMEN OGAWA INTELLIGENT HEALTH

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 20/05/28/
Time: 9/14/36
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20200061



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	76.9256	50.87	-27.58	23.29	40.00	-16.71	QP	200	16	
2	90.4196	48.65	-27.42	21.23	43.50	-22.27	QP	200	331	
3	198.6424	49.65	-24.44	25.21	43.50	-18.29	QP	200	201	
4	234.3098	52.64	-23.81	28.83	46.00	-17.17	QP	200	106	
5	293.3933	49.68	-21.51	28.17	46.00	-17.83	QP	200	212	
6	590.3510	44.35	-13.88	30.47	46.00	-15.53	QP	200	194	

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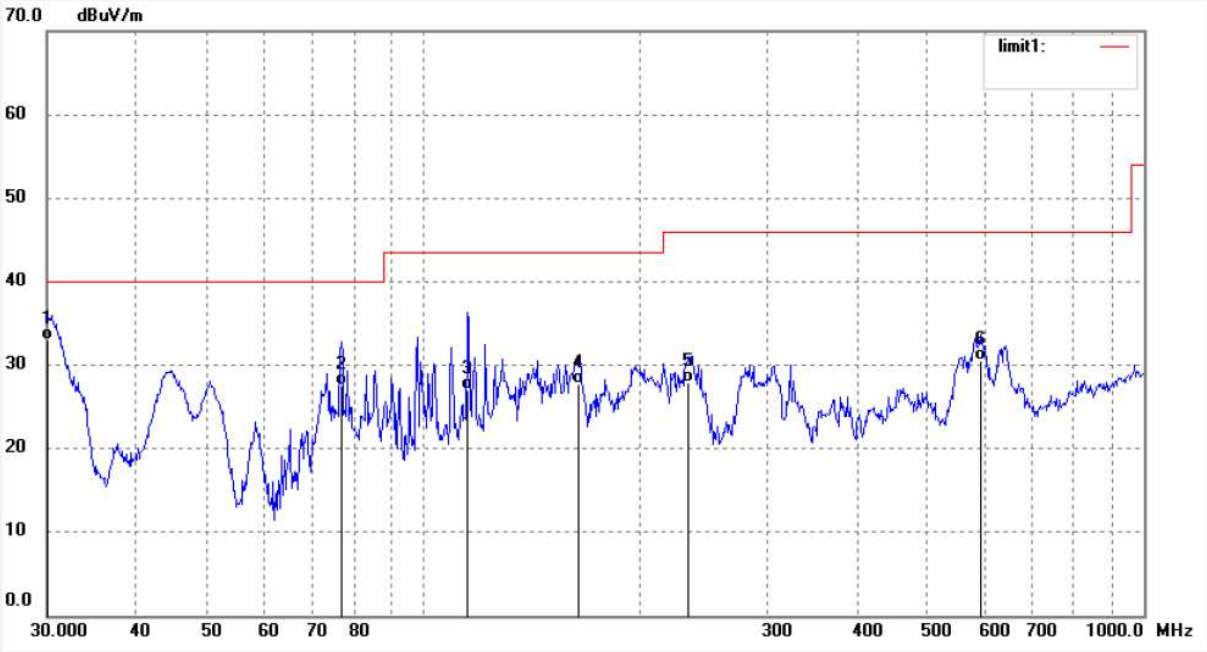
Job No.: fcc #98
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Massage Chair
Mode: TX2402MHz
Model: OS-3D Otamic LE
Manufacturer: XIAMEN OGAWA INTELLIGENT HEALTH

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 20/05/28/
Time: 9/29/04
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20200061



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	30.1055	53.15	-20.23	32.92	40.00	-7.08	QP	100	104	
2	76.9256	55.12	-27.58	27.54	40.00	-12.46	QP	100	48	
3	115.2266	54.35	-27.35	27.00	43.50	-16.50	QP	100	129	
4	164.3129	54.35	-26.61	27.74	43.50	-15.76	QP	100	332	
5	233.4881	51.68	-23.81	27.87	46.00	-18.13	QP	100	201	
6	592.4289	44.37	-13.85	30.52	46.00	-15.48	QP	100	82	

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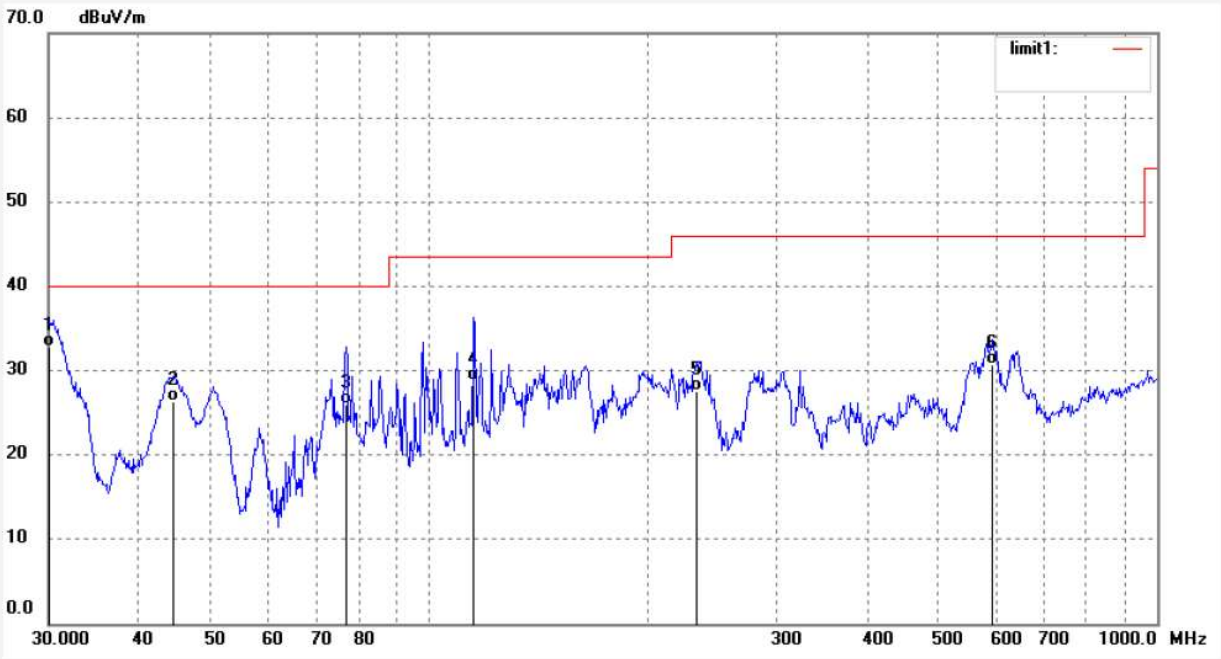
Job No.: fcc #99
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Massage Chair
Mode: TX2441MHz
Model: OS-3D Otamic LE
Manufacturer: XIAMEN OGAWA INTELLIGENT HEALTH

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 20/05/28/
Time: 9/29/11
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20200061



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	30.1055	53.12	-20.23	32.89	40.00	-7.11	QP	100	174	
2	44.4656	50.64	-24.34	26.30	40.00	-13.70	QP	100	52	
3	76.9256	53.54	-27.58	25.96	40.00	-14.04	QP	100	116	
4	115.2266	56.18	-27.35	28.83	43.50	-14.67	QP	100	96	
5	233.4881	51.45	-23.81	27.64	46.00	-18.36	QP	100	311	
6	592.4289	44.65	-13.85	30.80	46.00	-15.20	QP	100	205	

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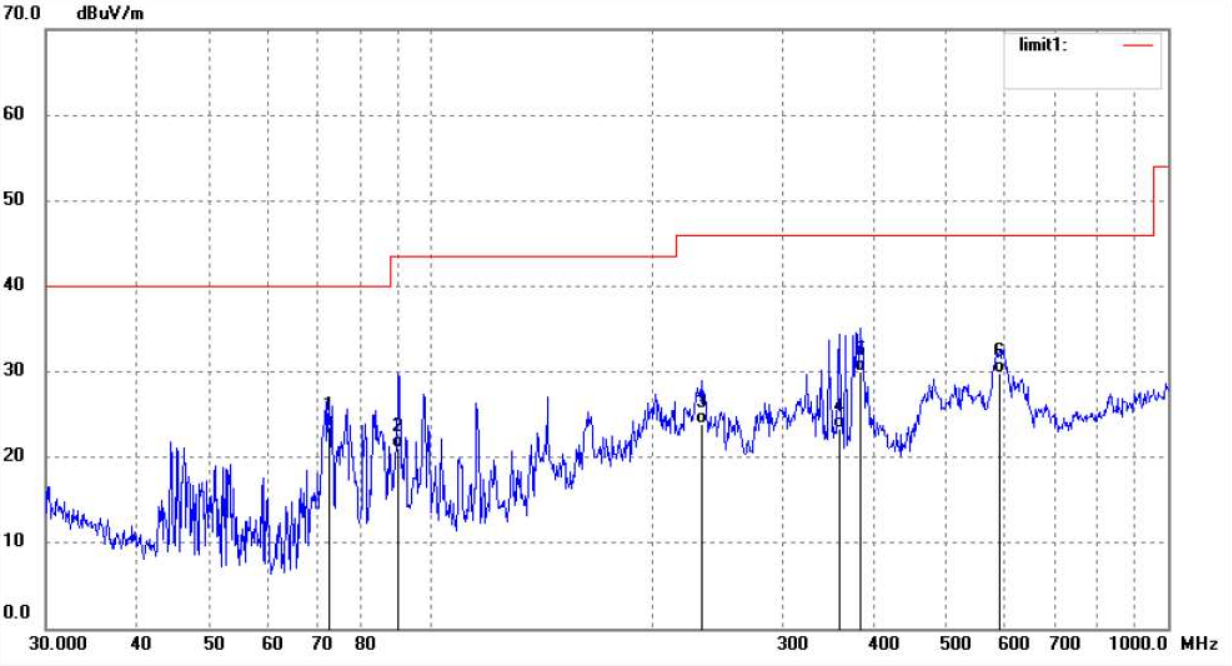
Job No.: fcc #100
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Massage Chair
Mode: TX2441MHz
Model: OS-3D Otamic LE
Manufacturer: XIAMEN OGAWA INTELLIGENT HEALTH

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 20/05/28/
Time: 9/30/10
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20200061



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	72.7202	51.12	-27.60	23.52	40.00	-16.48	QP	200	108	
2	90.4196	48.58	-27.42	21.16	43.50	-22.34	QP	200	82	
3	232.6690	47.68	-23.82	23.86	46.00	-22.14	QP	200	159	
4	358.4497	42.37	-18.98	23.39	46.00	-22.61	QP	200	65	
5	381.8519	48.68	-18.60	30.08	46.00	-15.92	QP	200	210	
6	590.3509	43.68	-13.88	29.80	46.00	-16.20	QP	200	206	

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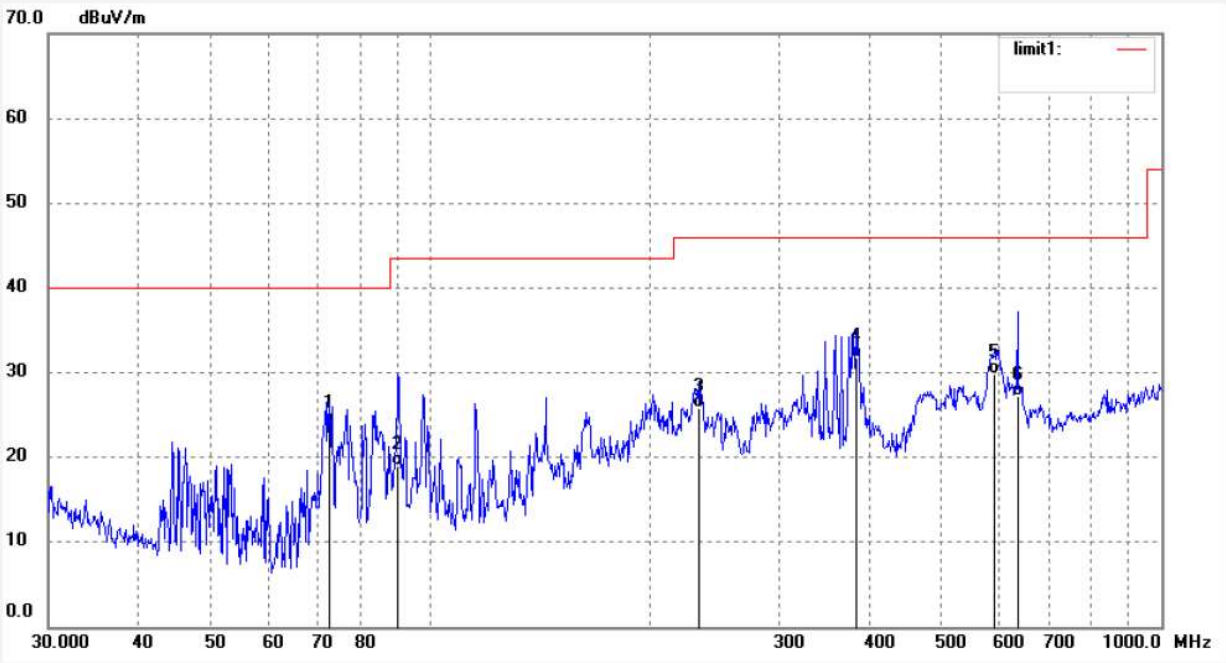
Job No.: fcc #101
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Massage Chair
Mode: TX2480MHz
Model: OS-3D Otamic LE
Manufacturer: XIAMEN OGAWA INTELLIGENT HEALTH

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 20/05/28/
Time: 9/32/21
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20200061



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	72.7202	51.45	-27.60	23.85	40.00	-16.15	QP	200	103	
2	90.4196	46.45	-27.42	19.03	43.50	-24.47	QP	200	62	
3	232.6690	49.68	-23.82	25.86	46.00	-20.14	QP	200	108	
4	381.8519	50.35	-18.60	31.75	46.00	-14.25	QP	200	92	
5	590.3509	43.65	-13.88	29.77	46.00	-16.23	QP	200	112	
6	635.5575	40.12	-12.96	27.16	46.00	-18.84	QP	200	182	

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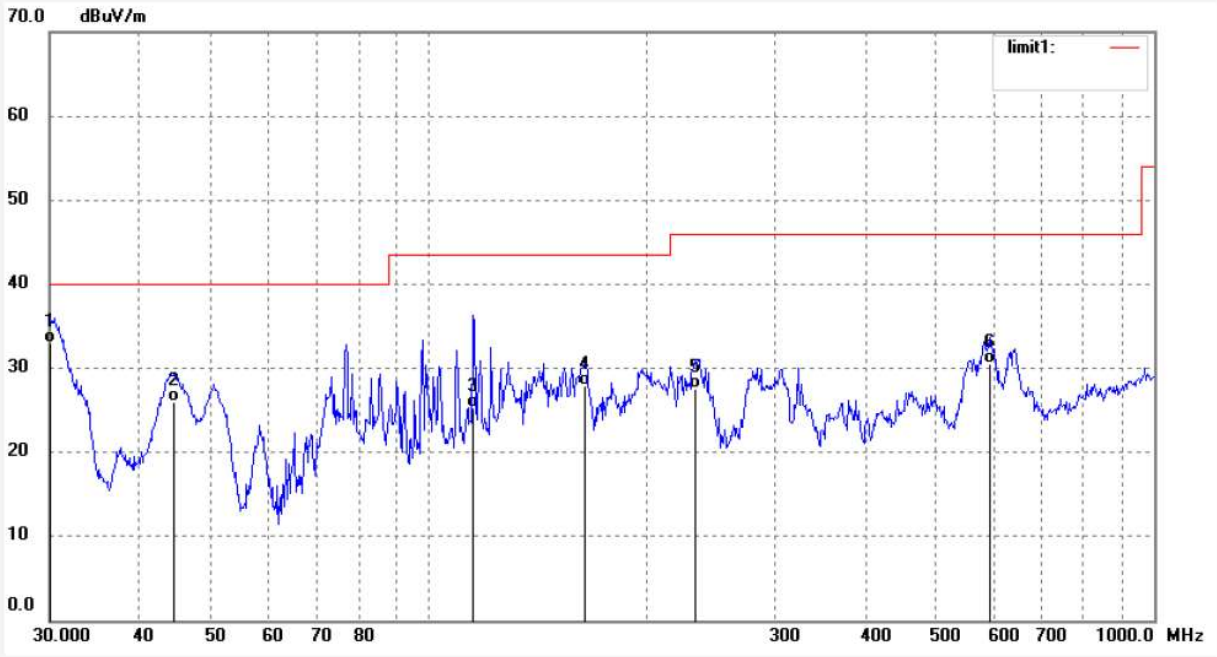
Job No.: fcc #102
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Massage Chair
Mode: TX2480MHz
Model: OS-3D Otamic LE
Manufacturer: XIAMEN OGAWA INTELLIGENT HEALTH

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 20/05/28/
Time: 9/34/11
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20200061



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	30.1053	53.25	-20.23	33.02	40.00	-6.98	QP	100	108	
2	44.4656	50.39	-24.34	26.05	40.00	-13.95	QP	100	96	
3	115.2266	52.65	-27.35	25.30	43.50	-18.20	QP	100	123	
4	164.3129	54.61	-26.61	28.00	43.50	-15.50	QP	100	304	
5	233.4881	51.36	-23.81	27.55	46.00	-18.45	QP	100	156	
6	592.4288	44.35	-13.85	30.50	46.00	-15.50	QP	100	201	

Above 1GHz Worse case data (GFSK mode)

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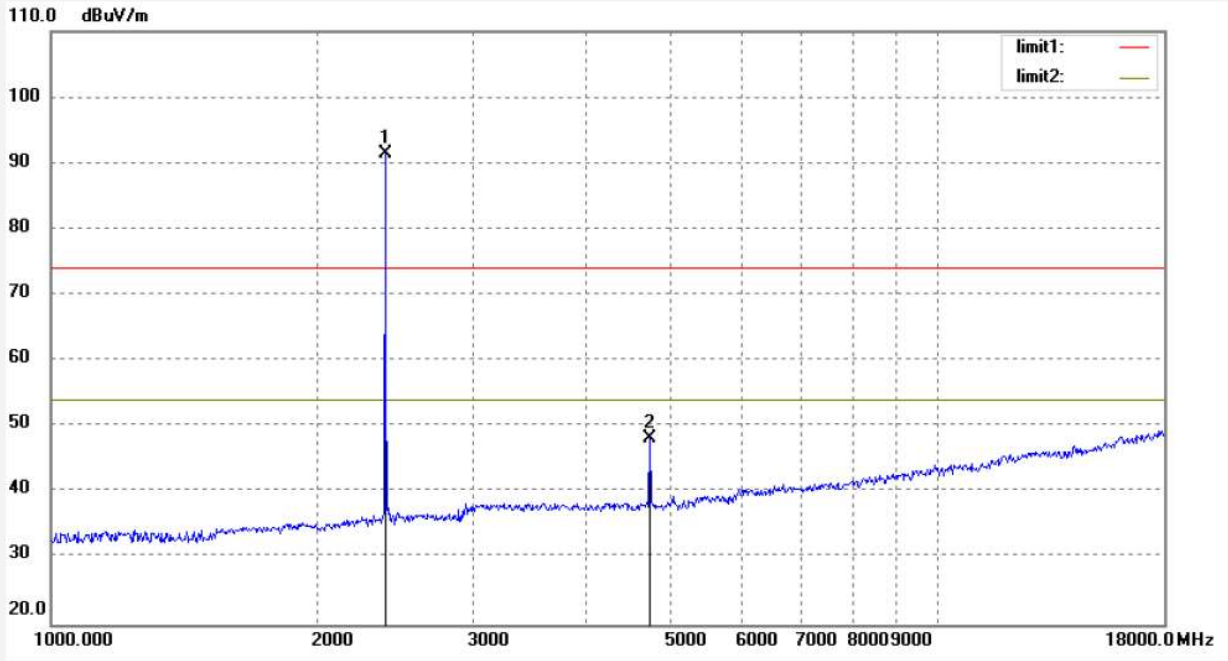
Job No.: fcc #105	Polarization: Horizontal
Standard: FCC PK	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 20/05/29/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 9/05/05
EUT: Massage Chair	Engineer Signature:
Mode: TX 2402MHz(GSFK)	Distance: 3m
Model: OS-3D Otamic LE	
Manufacturer: XIAMEN OGAWA INTELLIGENT HEALTH	

Note: Report NO.:ATE20200061



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	95.70	-4.37	91.33			peak	200	152	
2	4804.000	45.58	2.70	48.28	74.00	-25.72	peak	200	168	

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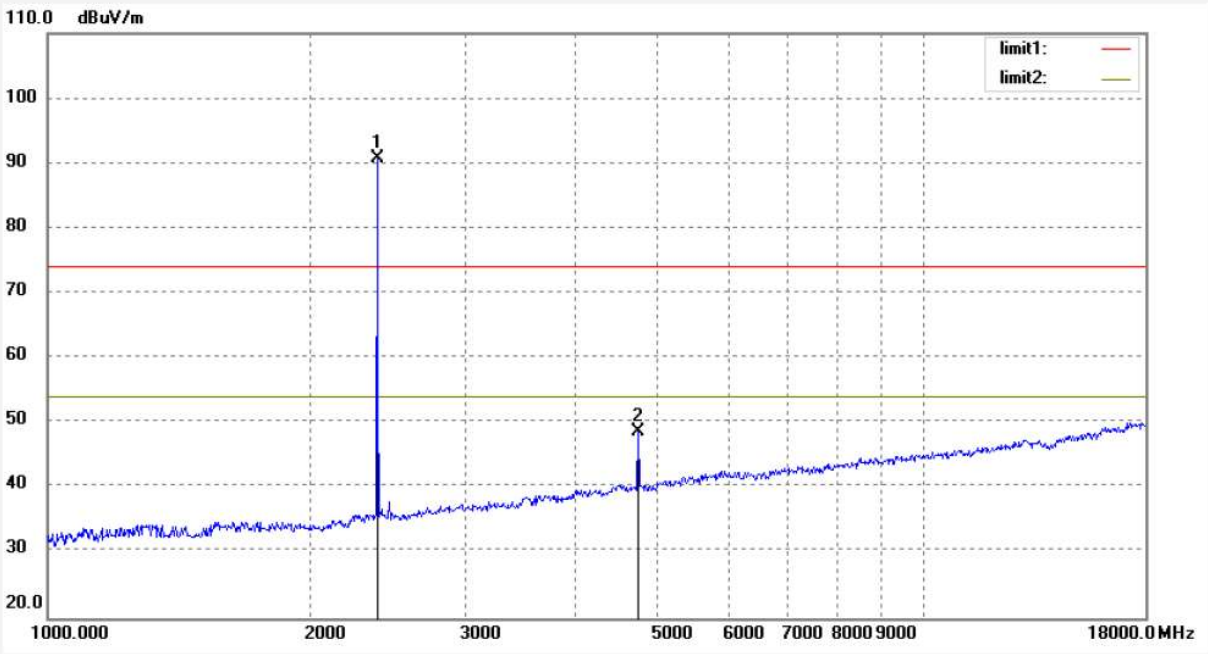
Job No.: fcc #106
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Massage Chair
Mode: TX 2402MHz(GSFK)
Model: OS-3D Otamic LE
Manufacturer: XIAMEN OGAWA INTELLIGENT HEALTH

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 20/05/29/
Time: 9/07/19
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20200061



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	95.21	-4.37	90.84			peak	150	82	
2	4804.000	45.96	2.70	48.66	74.00	-25.34	peak	150	107	

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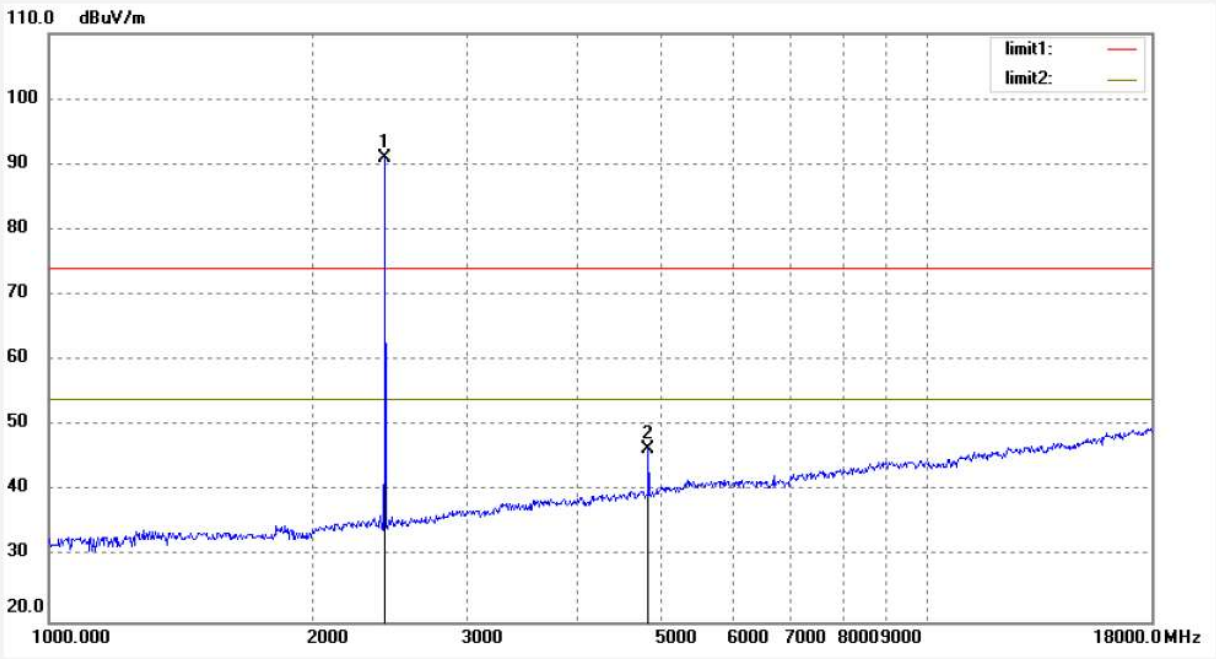
Job No.: fcc #107
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Massage Chair
Mode: TX 2441MHz(GSFK)
Model: OS-3D Otamic LE
Manufacturer: XIAMEN OGAWA INTELLIGENT HEALTH

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 20/05/29/
Time: 9/08/50
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20200061



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	95.18	-4.20	90.98			peak	150	62	
2	4882.000	43.40	3.07	46.47	74.00	-27.53	peak	150	103	

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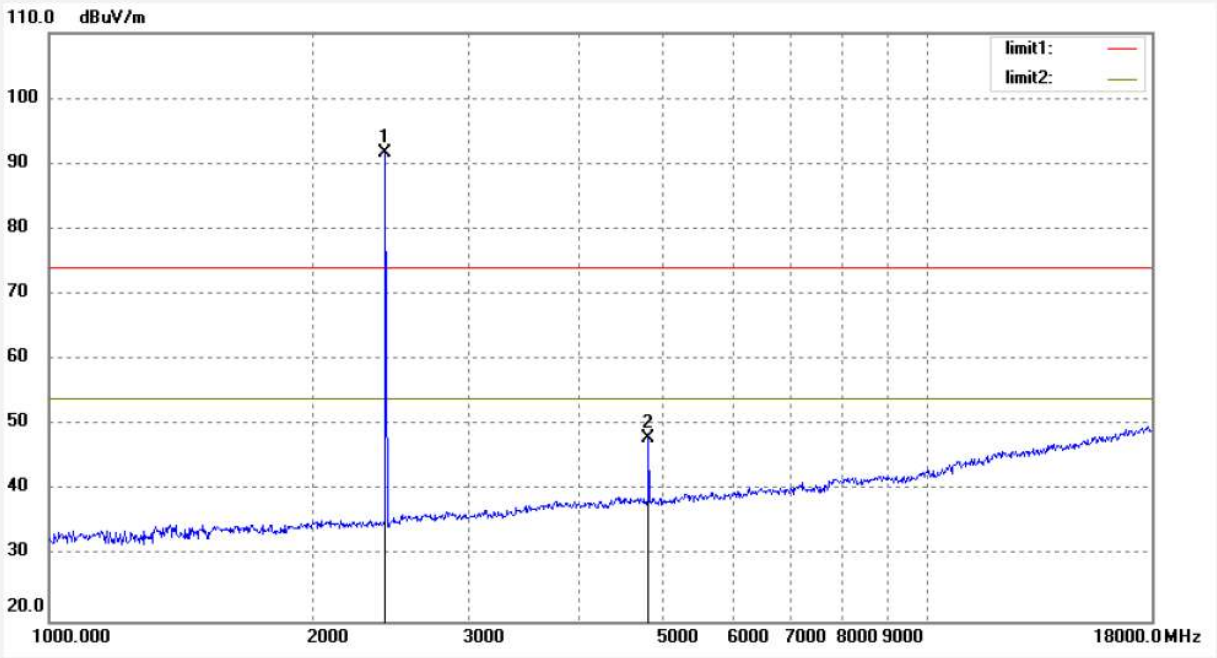
Job No.: fcc #108	Polarization: Horizontal
Standard: FCC PK	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 20/05/29/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 9/09/58
EUT: Massage Chair	Engineer Signature:
Mode: TX 2441MHz(GSFK)	Distance: 3m
Model: OS-3D Otamic LE	
Manufacturer: XIAMEN OGAWA INTELLIGENT HEALTH	

Note: Report NO.:ATE20200061



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	95.79	-4.20	91.59			peak	200	92	
2	4882.000	44.98	3.07	48.05	74.00	-25.95	peak	200	106	

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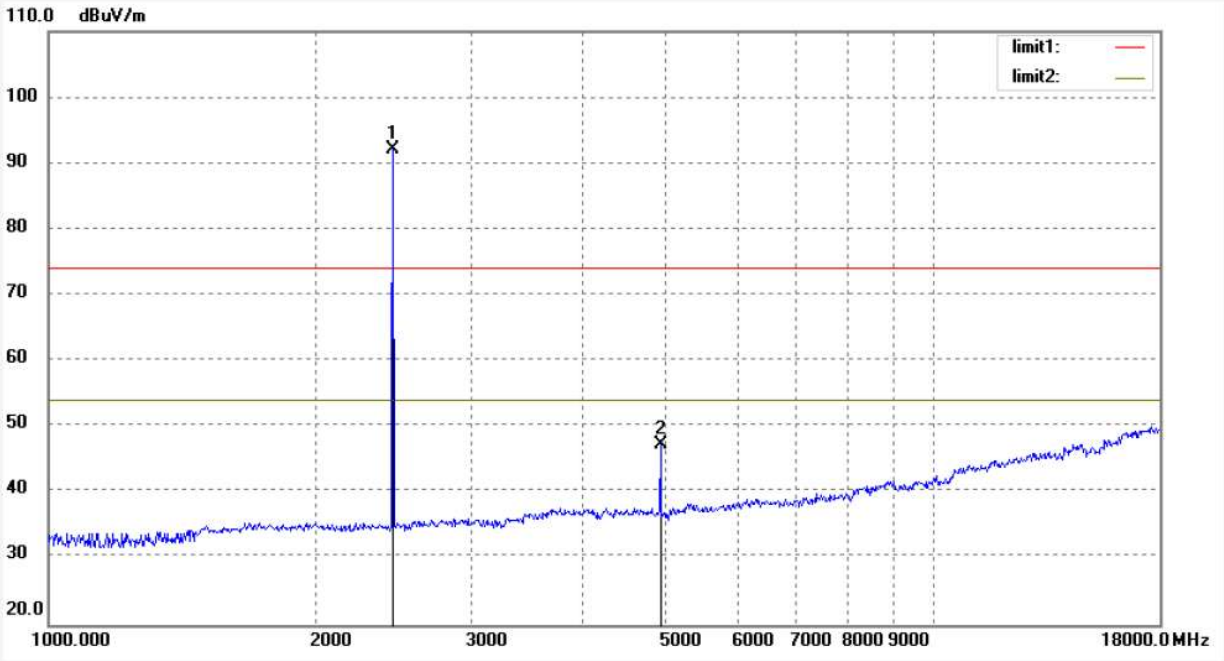
Job No.: fcc #109
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Massage Chair
Mode: TX 2480MHz(GSFK)
Model: OS-3D Otamic LE
Manufacturer: XIAMEN OGAWA INTELLIGENT HEALTH

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 20/05/29/
Time: 9/11/36
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20200061



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	96.18	-4.04	92.14			peak	200	47	
2	4960.000	43.75	3.50	47.25	74.00	-26.75	peak	200	104	

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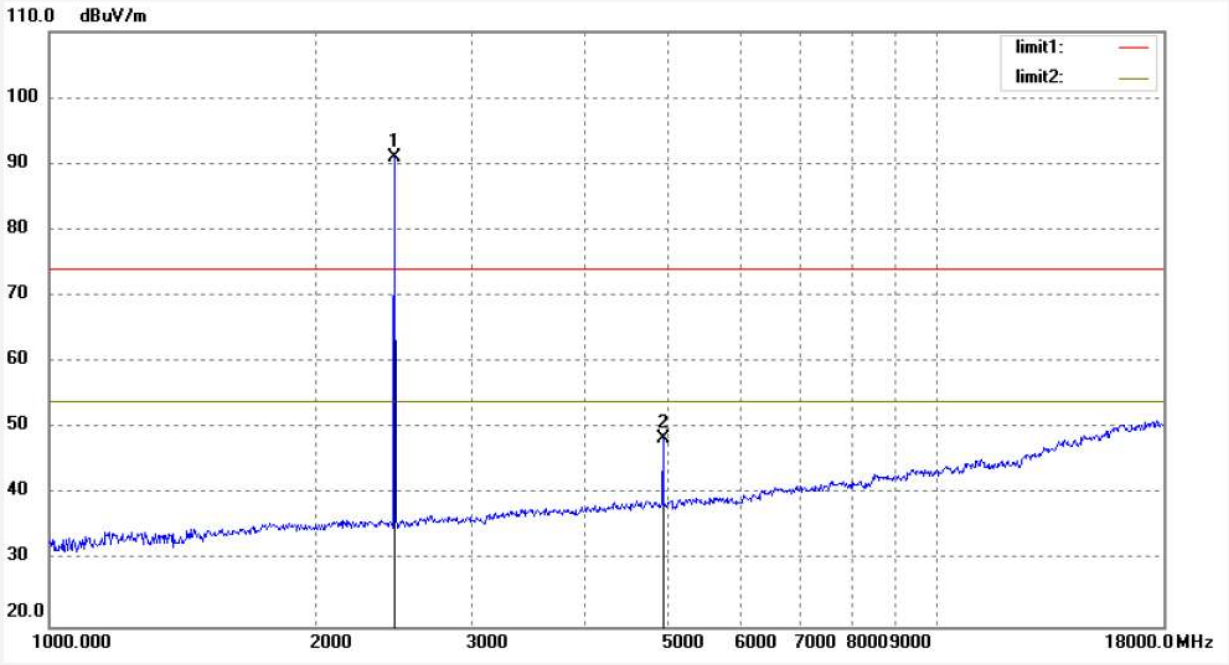
Job No.: fcc #110
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Massage Chair
Mode: TX 2480MHz(GSFK)
Model: OS-3D Otamic LE
Manufacturer: XIAMEN OGAWA INTELLIGENT HEALTH

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 20/05/29/
Time: 9/12/11
Engineer Signature:
Distance: 3m

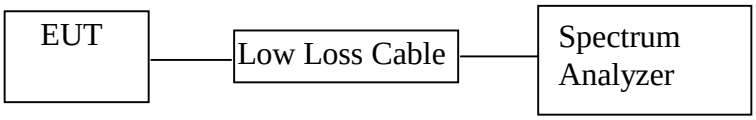
Note: Report NO.:ATE20200061



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	94.96	-4.04	90.92			peak	150	316	
2	4960.000	44.95	3.50	48.45	74.00	-25.55	peak	150	109	

11.BAND EDGE COMPLIANCE TEST

11.1.Block Diagram of Test Setup



11.2.The Requirement For 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 Test

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

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

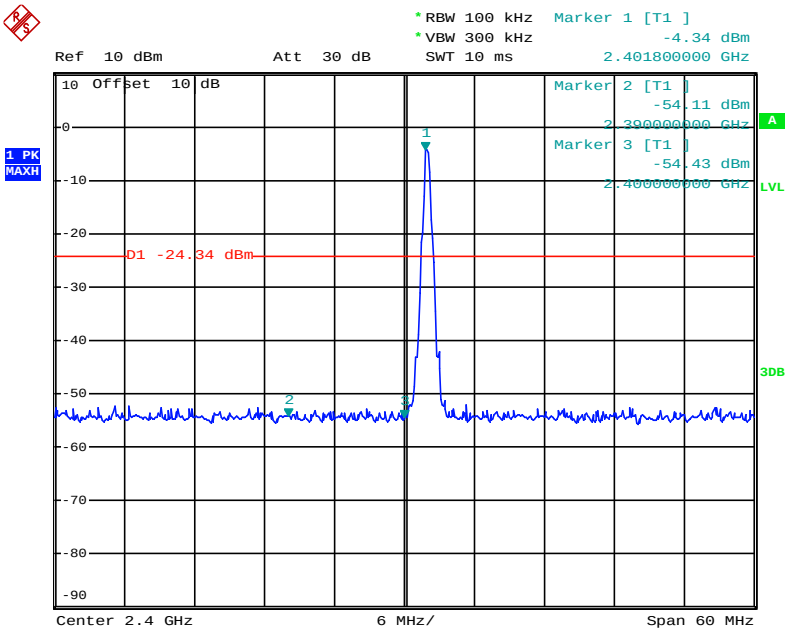
Conducted Band Edge Result

Non-hopping mode

Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)	Result
GFSK Mode			
2400.00	58.77	> 20dBc	Pass
2483.50	58.97	> 20dBc	Pass
Π/4-DQPSK Mode			
2400.00	52.82	> 20dBc	Pass
2483.50	56.91	> 20dBc	Pass
8DPSK Mode			
2400.00	52.49	> 20dBc	Pass
2483.50	57.44	> 20dBc	Pass

The spectrum analyzer plots are attached as below.

GFSK Mode



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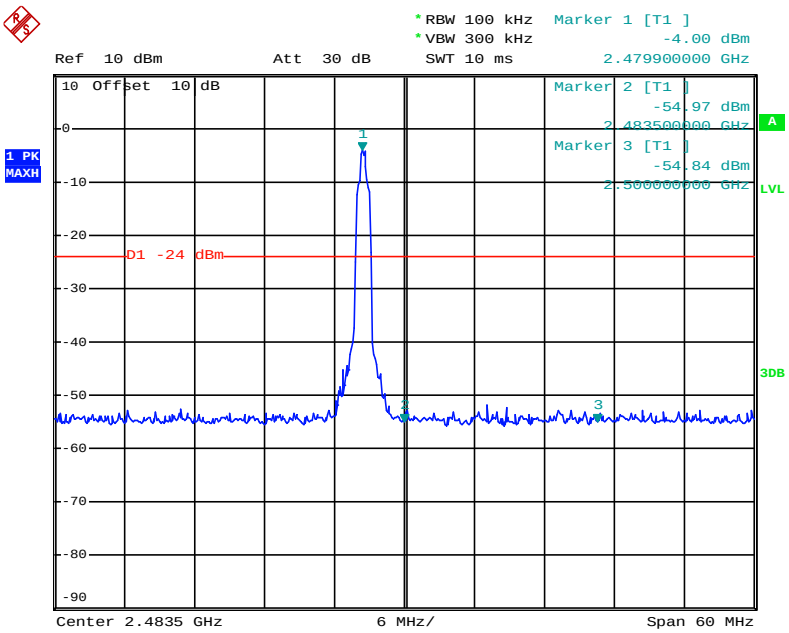

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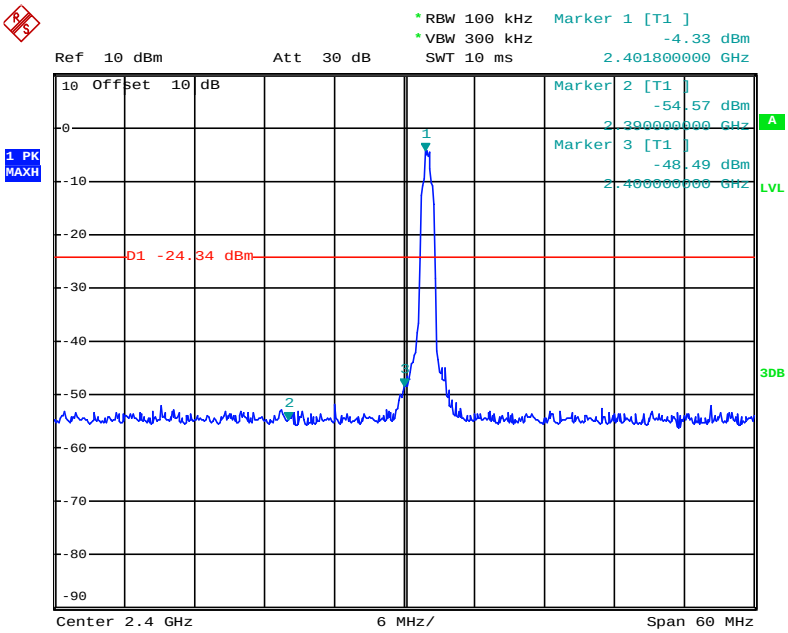
Π/4-DQPSK Mode



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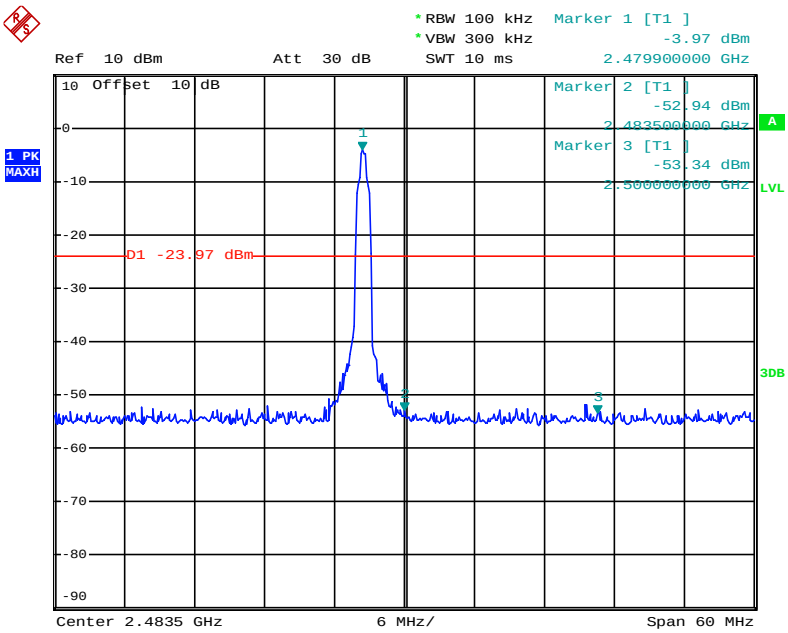
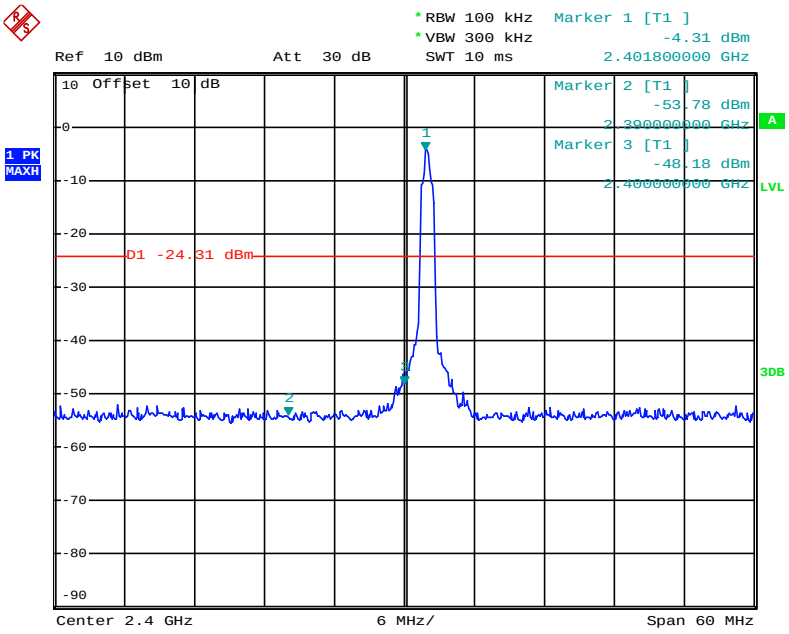
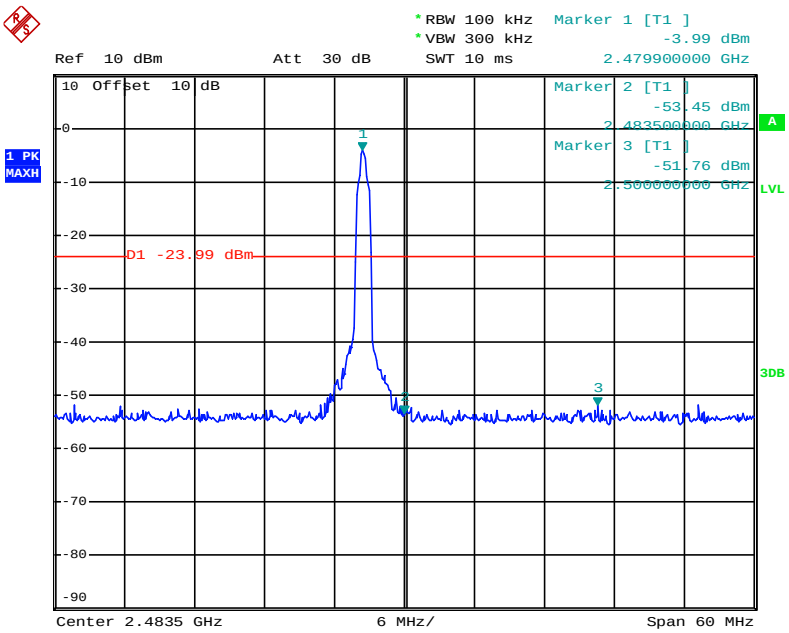


Date: 16.APR.2020 14:39:47

8DPSK Mode



Date: 16.APR.2020 14:38:16



Date: 16.APR.2020 14:39:00

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 0.1 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated 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.

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 Non-hopping mode Worse case (GFSK mode) and hopping mode (All modes) emissions are reported.

The spectrum analyzer plots are attached as below.

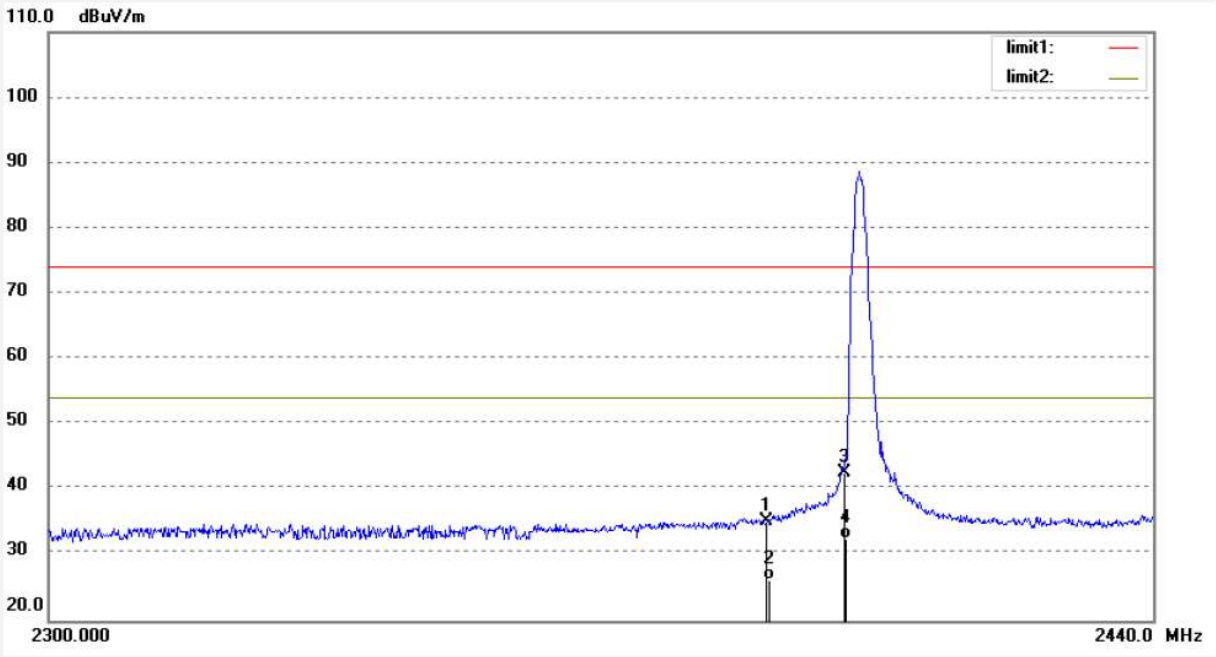
Non-hopping mode Worse case (GFSK mode)

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.: fcc #117
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Massage Chair
Mode: TX 2402MHz(GSFK)
Model: OS-3D Otamic LE
Manufacturer: XIAMEN OGAWA INTELLIGENT HEALTH

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 20/05/29/
Time: 9/32/38
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20200061



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	39.42	-4.32	35.10	74.00	-38.90	peak	250	25	
2	2390.000	30.45	-4.32	26.13	54.00	-27.87	AVG	200	187	
3	2400.000	46.94	-4.27	42.67	74.00	-31.33	peak	250	243	
4	2400.000	36.78	-4.27	32.51	54.00	-21.49	AVG	250	134	

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

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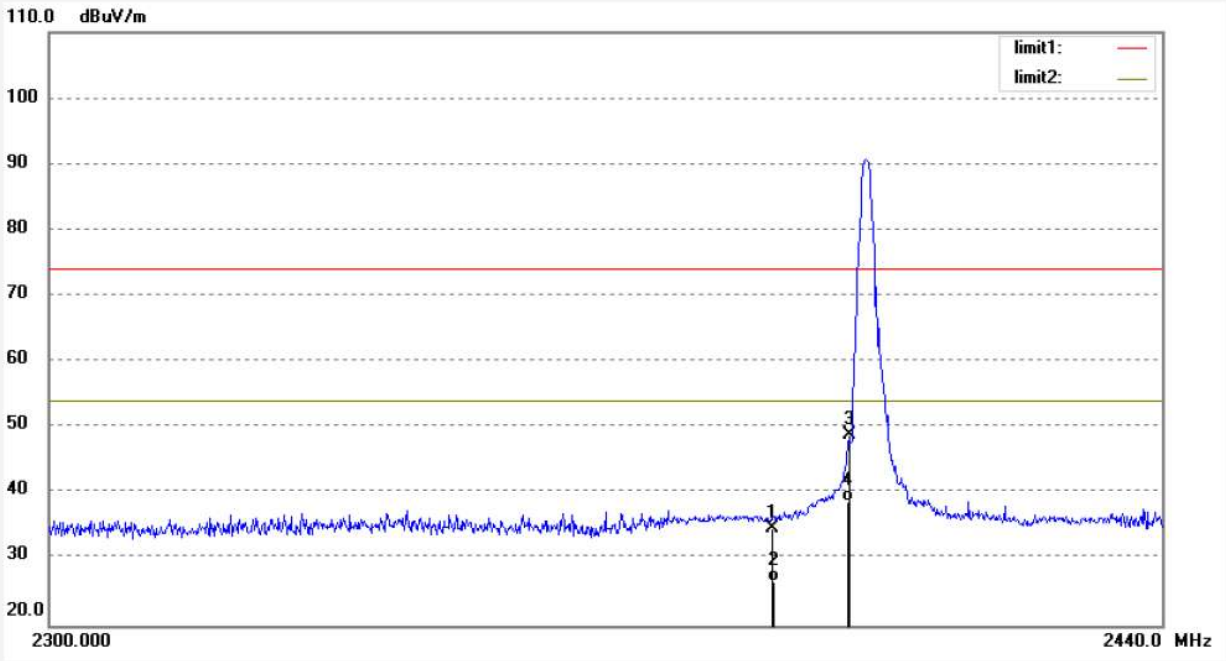
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: fcc #118
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Massage Chair
Mode: TX 2402MHz(GSFK)
Model: OS-3D Otamic LE
Manufacturer: XIAMEN OGAWA INTELLIGENT HEALTH

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 20/05/29/
Time: 9/34/05
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20200061



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	39.15	-4.32	34.83	74.00	-39.17	peak	250	132	
2	2390.000	31.02	-4.32	26.70	54.00	-27.30	AVG	150	122	
3	2400.000	53.13	-4.27	48.86	74.00	-25.14	peak	200	91	
4	2400.000	43.12	-4.27	38.85	54.00	-15.15	AVG	150	157	

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

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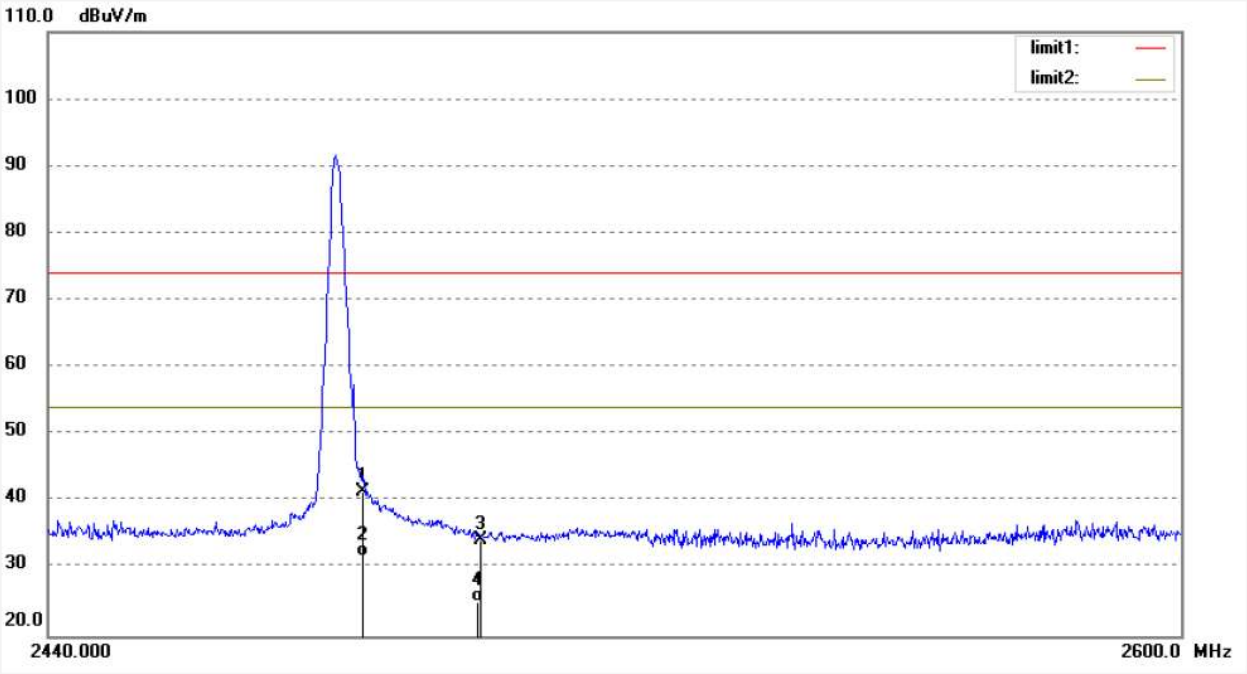
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: fcc #127
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Massage Chair
Mode: TX 2480MHz(GFSK)
Model: OS-3D Otamic LE
Manufacturer: XIAMEN OGAWA INTELLIGENT HEALTH

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 20/05/29/
Time: 9/44/35
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20200061



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	45.36	-3.89	41.47	74.00	-32.53	peak	200	182	
2	2483.500	35.68	-3.89	31.79	54.00	-22.21	AVG	150	248	
3	2500.000	38.15	-3.81	34.34	74.00	-39.66	peak	150	137	
4	2500.000	28.95	-3.81	25.14	54.00	-28.86	AVG	200	45	

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

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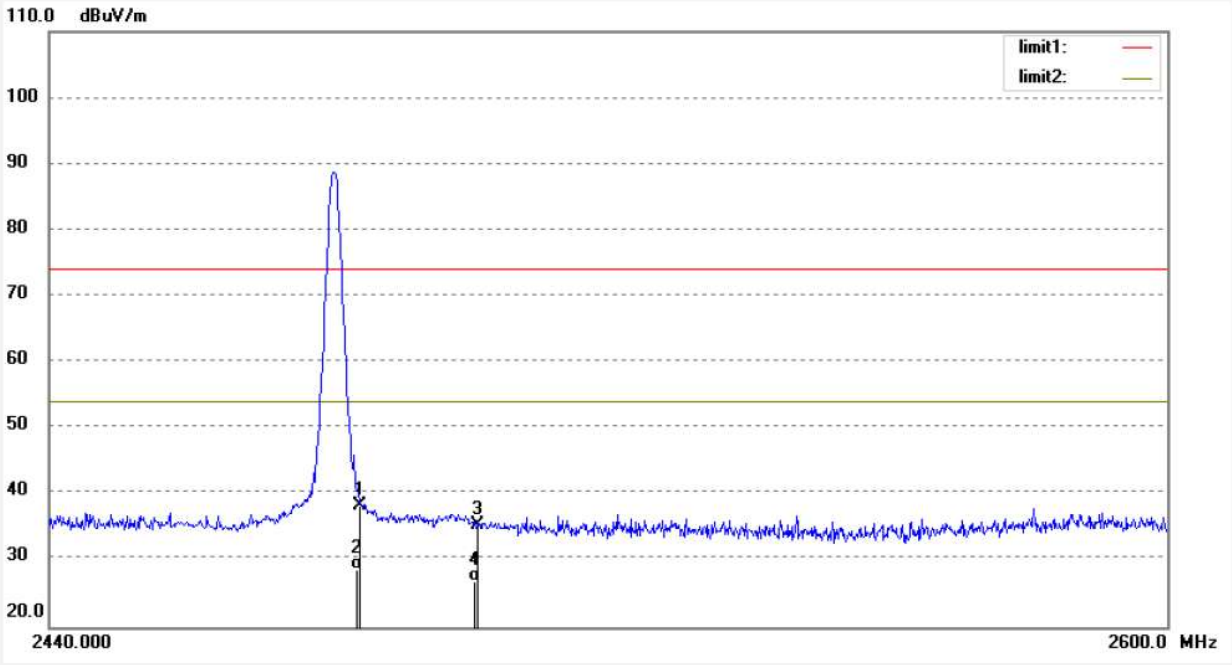
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: fcc #128
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Massage Chair
Mode: TX 2480MHz(GFSK)
Model: OS-3D Otamic LE
Manufacturer: XIAMEN OGAWA INTELLIGENT HEALTH

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 20/05/29/
Time: 9/45/22
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20200061



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	42.12	-3.89	38.23	74.00	-35.77	peak	250	44	
2	2483.500	32.54	-3.89	28.65	54.00	-25.35	AVG	250	123	
3	2500.000	39.24	-3.81	35.43	74.00	-38.57	peak	250	97	
4	2500.000	30.78	-3.81	26.97	54.00	-27.03	AVG	250	158	

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

Hopping mode

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
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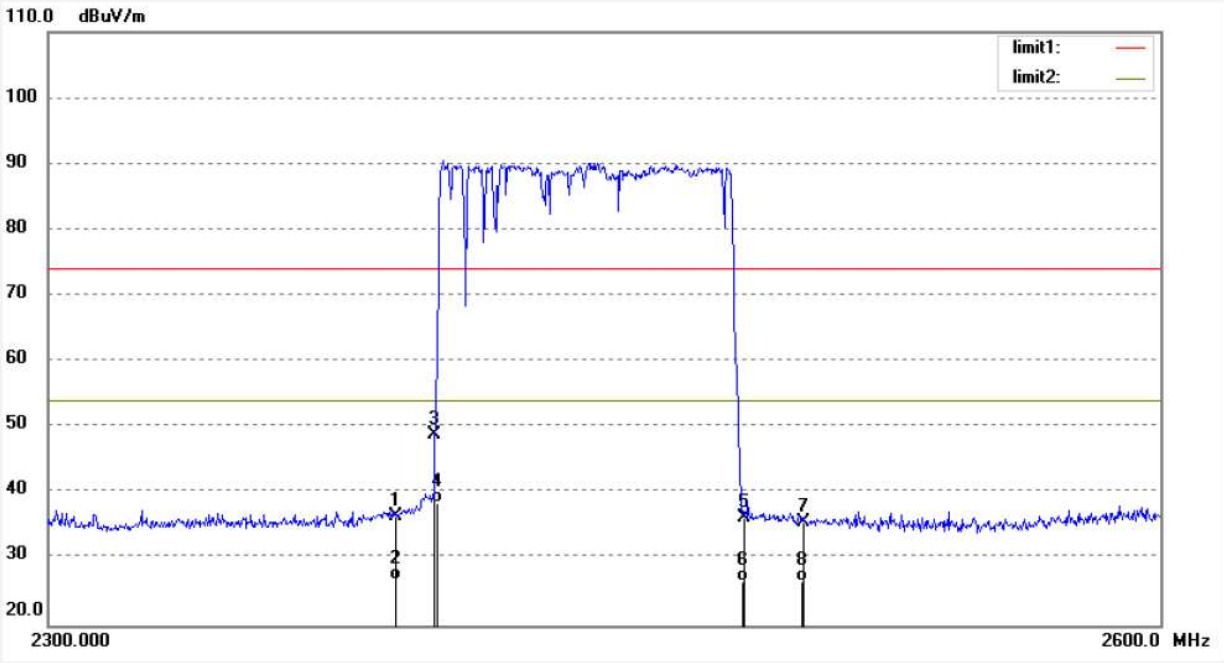
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: fcc #129
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Massage Chair
Mode: Hopping(GFSK)
Model: OS-3D Otamic LE
Manufacturer: XIAMEN OGAWA INTELLIGENT HEALTH

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 20/05/29/
Time: 9/47/59
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20200061



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	40.87	-4.32	36.55	74.00	-37.45	peak	250	123	
2	2390.000	31.25	-4.32	26.93	54.00	-27.07	AVG	250	254	
3	2400.000	53.24	-4.27	48.97	74.00	-25.03	peak	250	198	
4	2400.000	42.88	-4.27	38.61	54.00	-15.39	AVG	250	258	
5	2483.500	40.18	-3.89	36.29	74.00	-37.71	peak	250	94	
6	2483.500	30.48	-3.89	26.59	54.00	-27.41	AVG	200	168	
7	2500.000	39.51	-3.81	35.70	74.00	-38.30	peak	200	101	
8	2500.000	30.48	-3.81	26.67	54.00	-27.33	AVG	200	130	

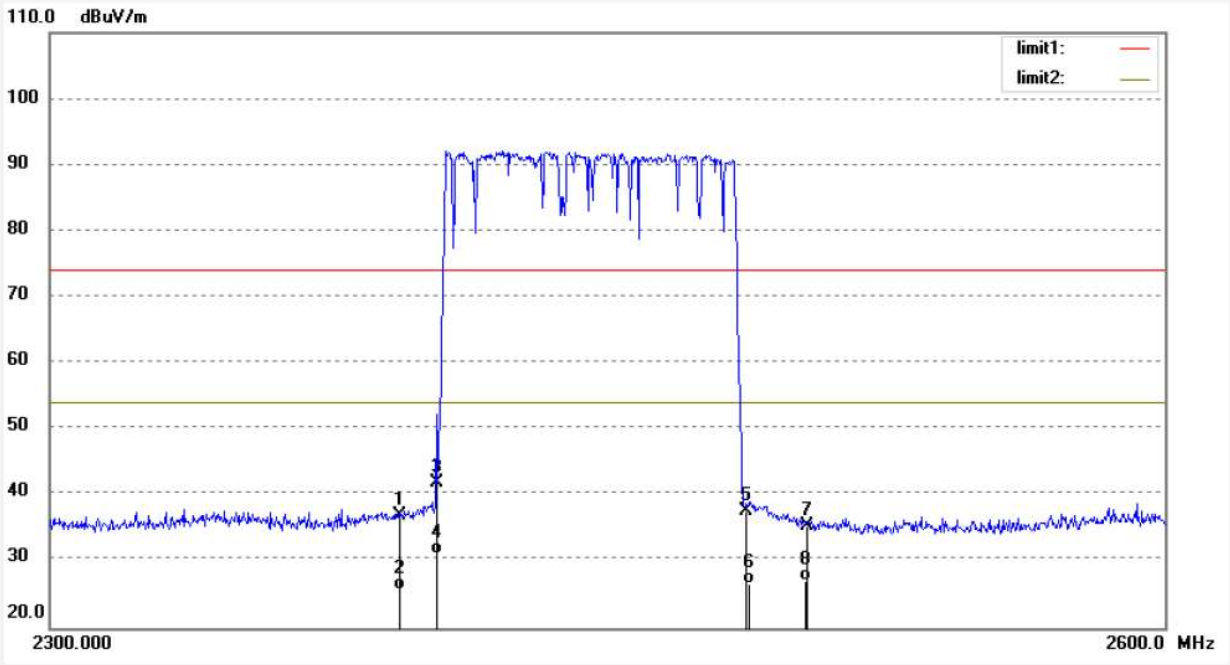
Note: Average measurement with peak detection at No.2&4&6&8

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.: fcc #130
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Massage Chair
Mode: Hopping(GFSK)
Model: OS-3D Otamic LE
Manufacturer: XIAMEN OGAWA INTELLIGENT HEALTH

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 20/05/29/
Time: 9/49/56
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20200061



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	41.28	-4.32	36.96	74.00	-37.04	peak	250	120	
2	2390.000	30.15	-4.32	25.83	54.00	-28.17	AVG	200	139	
3	2400.000	46.19	-4.27	41.92	74.00	-32.08	peak	250	49	
4	2400.000	35.45	-4.27	31.18	54.00	-22.82	AVG	200	65	
5	2483.500	41.63	-3.89	37.74	74.00	-36.26	peak	150	154	
6	2483.500	30.50	-3.89	26.61	54.00	-27.39	AVG	150	197	
7	2500.000	39.12	-3.81	35.31	74.00	-38.69	peak	200	25	
8	2500.000	30.98	-3.81	27.17	54.00	-26.83	AVG	200	167	

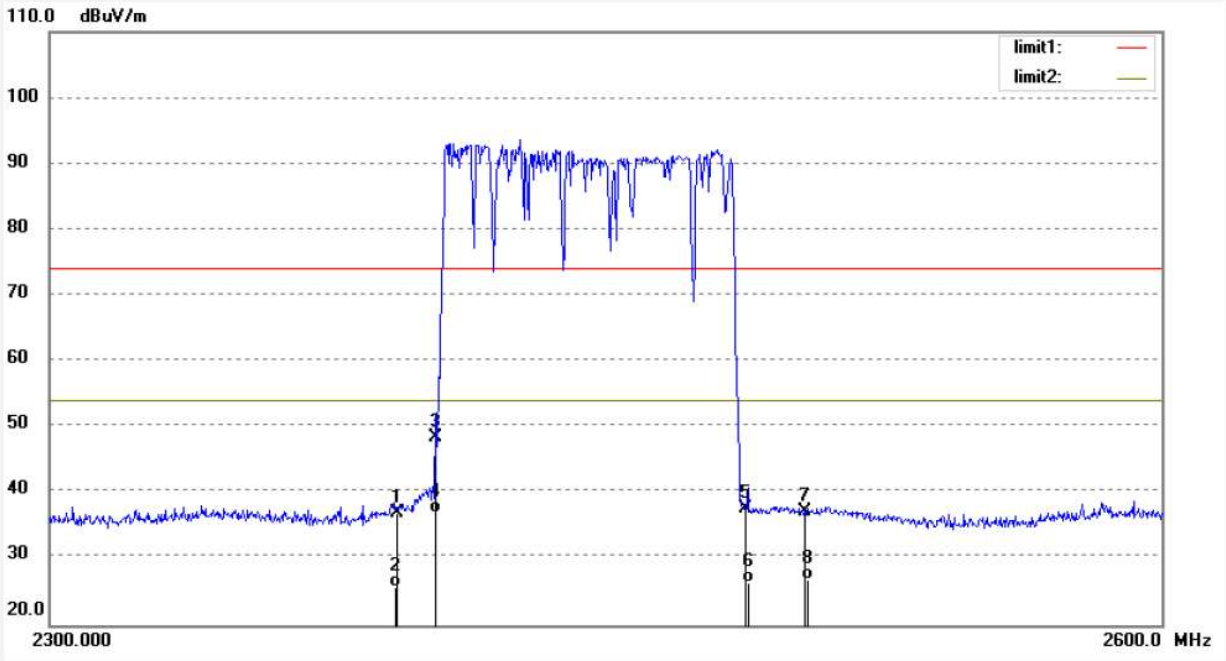
Note: Average measurement with peak detection at No.2&4&6&8

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.: fcc #131
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Massage Chair
Mode: Hopping(π/4 DQPSK)
Model: OS-3D Otamic LE
Manufacturer: XIAMEN OGAWA INTELLIGENT HEALTH

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 20/05/29/
Time: 9/51/46
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20200061



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	41.28	-4.32	36.96	74.00	-37.04	peak	200	132	
2	2390.000	30.15	-4.32	25.83	54.00	-28.17	AVG	200	100	
3	2400.000	52.66	-4.27	48.39	74.00	-25.61	peak	250	97	
4	2400.000	41.35	-4.27	37.08	54.00	-16.92	AVG	250	187	
5	2483.500	41.63	-3.89	37.74	74.00	-36.26	peak	250	154	
6	2483.500	30.41	-3.89	26.52	54.00	-27.48	AVG	200	264	
7	2500.000	40.92	-3.81	37.11	74.00	-36.89	peak	250	350	
8	2500.000	30.57	-3.81	26.76	54.00	-27.24	AVG	150	330	

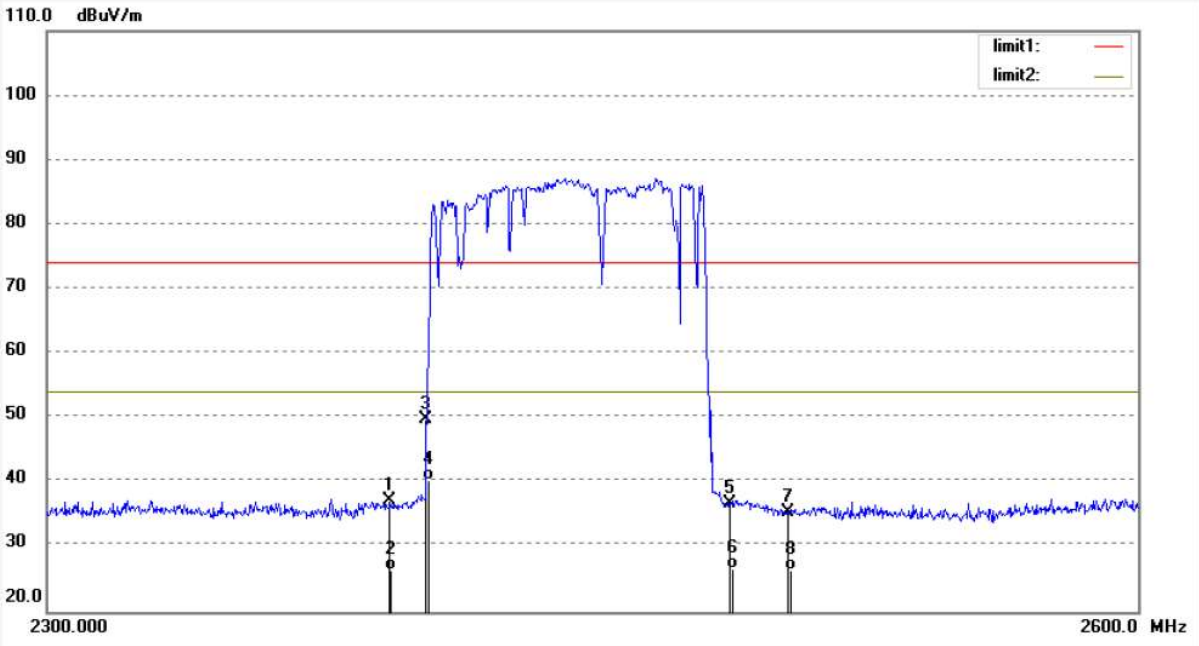
Note: Average measurement with peak detection at No.2&4&6&8

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.: fcc #132
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Massage Chair
Mode: Hopping(π/4 DQPSK)
Model: OS-3D Otamic LE
Manufacturer: XIAMEN OGAWA INTELLIGENT HEALTH

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 20/05/29/
Time: 9/53/31
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20200061



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	41.52	-4.32	37.20	74.00	-36.80	peak	250	120	
2	2390.000	30.65	-4.32	26.33	54.00	-27.67	AVG	300	103	
3	2400.000	54.10	-4.27	49.83	74.00	-24.17	peak	250	92	
4	2400.000	44.55	-4.27	40.28	54.00	-13.72	AVG	250	154	
5	2483.500	40.55	-3.89	36.66	74.00	-37.34	peak	250	193	
6	2483.500	30.64	-3.89	26.75	54.00	-27.25	AVG	250	24	
7	2500.000	39.15	-3.81	35.34	74.00	-38.66	peak	250	164	
8	2500.000	30.12	-3.81	26.31	54.00	-27.69	AVG	200	358	

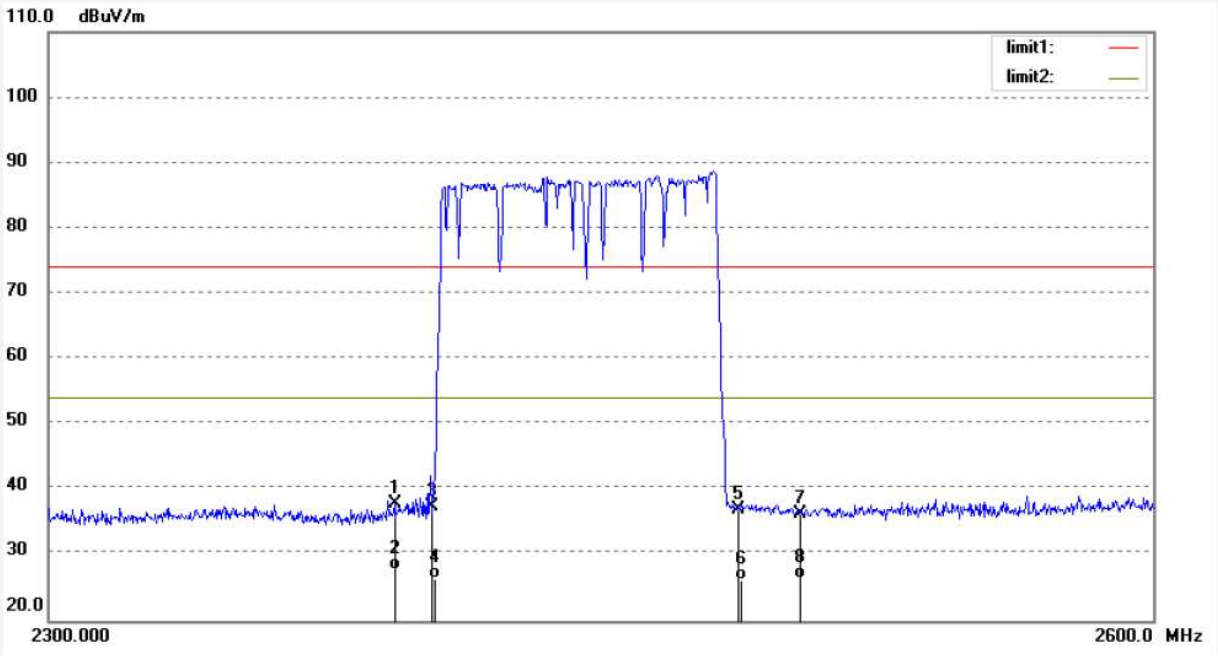
Note: Average measurement with peak detection at No.2&4&6&8

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.: fcc #133
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Massage Chair
Mode: Hopping(8DPSK)
Model: OS-3D Otamic LE
Manufacturer: XIAMEN OGAWA INTELLIGENT HEALTH

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 20/05/29/
Time: 9/55/36
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20200061



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	42.27	-4.32	37.95	74.00	-36.05	peak	250	150	
2	2390.000	31.98	-4.32	27.66	54.00	-26.34	AVG	250	123	
3	2400.000	41.74	-4.27	37.47	74.00	-36.53	peak	250	48	
4	2400.000	30.69	-4.27	26.42	54.00	-27.58	AVG	250	91	
5	2483.500	40.92	-3.89	37.03	74.00	-36.97	peak	250	189	
6	2483.500	29.98	-3.89	26.09	54.00	-27.91	AVG	250	213	
7	2500.000	40.12	-3.81	36.31	74.00	-37.69	peak	250	221	
8	2500.000	30.12	-3.81	26.31	54.00	-27.69	AVG	200	90	

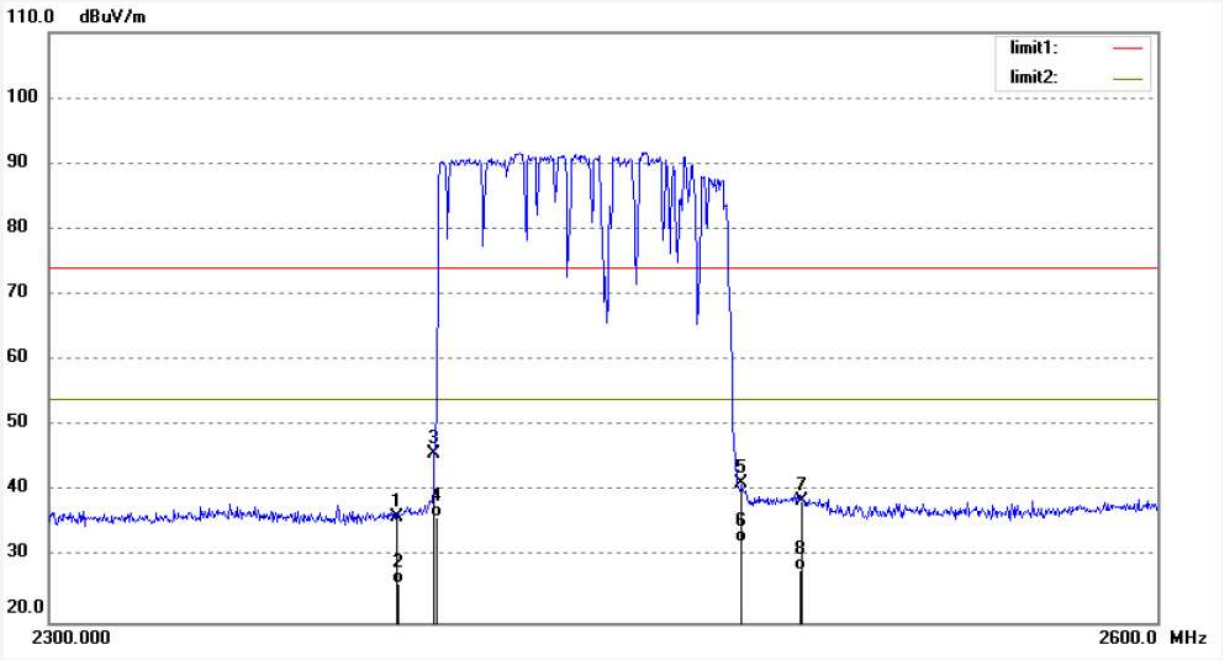
Note: Average measurement with peak detection at No.2&4&6&8

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.: fcc #134
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Massage Chair
Mode: Hopping(8DPSK)
Model: OS-3D Otamic LE
Manufacturer: XIAMEN OGAWA INTELLIGENT HEALTH

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 20/05/29/
Time: 9/58/26
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20200061



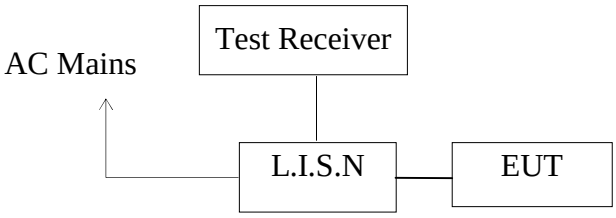
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	40.48	-4.32	36.16	74.00	-37.84	peak	200	119	
2	2390.000	30.19	-4.32	25.87	54.00	-28.13	AVG	250	92	
3	2400.000	50.12	-4.27	45.85	74.00	-28.15	peak	250	152	
4	2400.000	40.34	-4.27	36.07	54.00	-17.93	AVG	200	201	
5	2483.500	45.24	-3.89	41.35	74.00	-32.65	peak	200	145	
6	2483.500	36.18	-3.89	32.29	54.00	-21.71	AVG	250	92	
7	2500.000	42.28	-3.81	38.47	74.00	-35.53	peak	200	310	
8	2500.000	31.90	-3.81	28.09	54.00	-25.91	AVG	250	215	

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

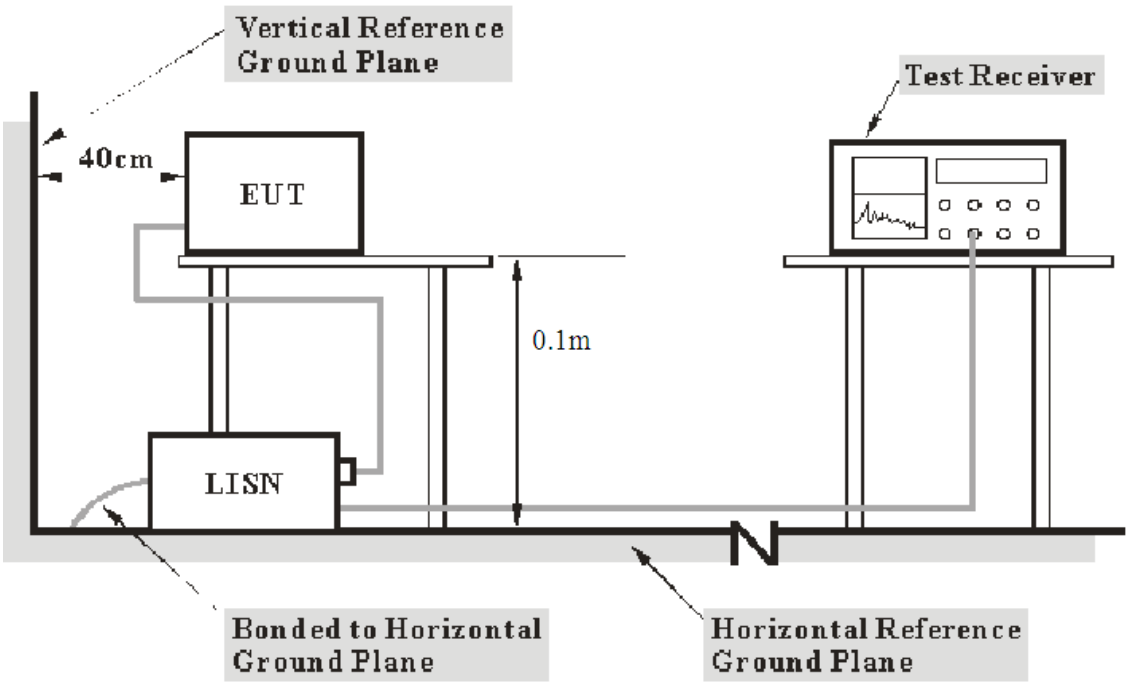
12. AC POWER LINE CONDUCTED EMISSION TEST

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 0.1m from other units and other metal planes support units.

12.2.Power Line Conducted Emission Test Limits

Frequency (MHz)	Conducted Limit dB(mV)	
	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.EUT Configuration on Test

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 0.1m 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.

12.6.Data Sample

Frequency (MHz)	Transducer value (dB)	QuasiPeak Level (dBmV)	Average Level (dBmV)	QuasiPeak Limit (dBmV)	Average Limit (dBmV)	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(dBmV) = Quasi-peak Reading/Average Reading + Transducer value
Limit (dBmV) = Limit stated in standard
Margin = Limit (dBmV) - Level (dBmV)

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

12.7.Test Results

Pass.

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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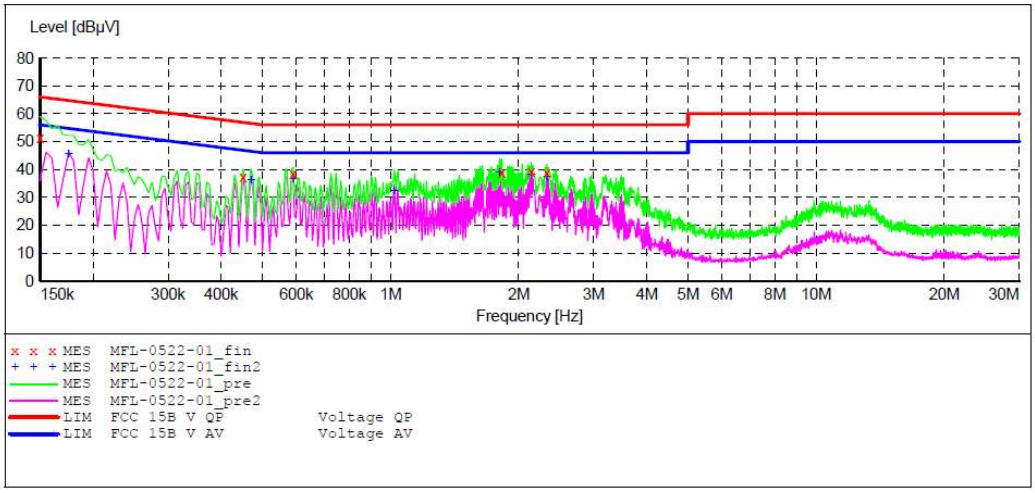
CONDUCTED EMISSION STANDARD FCC PART 15B

```
EUT:                  Massage Chair M/N:OS-3D Otamic LE
Manufacturer:         XIAMEN OGAWA INTELLIGENT HEALTH
Operating Condition:  BT Communication
Test Site:            1#Shielding Room
Operator:             Frank
Test Specification:   N 120V/60Hz
Comment:              Report NO.:ATE20200061
Start of Test:        5/22/2020 / 2:37:53PM
```

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: "MFL-0522-01_fin"

5/22/2020 2:39PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	51.50	10.5	66	14.5	QP	N	GND
0.450000	37.40	10.7	57	19.5	QP	N	GND
0.590000	38.50	10.7	56	17.5	QP	N	GND
1.825000	38.70	11.0	56	17.3	QP	N	GND
2.140000	39.30	11.0	56	16.7	QP	N	GND
2.330000	39.00	11.0	56	17.0	QP	N	GND

MEASUREMENT RESULT: "MFL-0522-01_fin2"

5/22/2020 2:39PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.175000	45.40	10.5	55	9.3	AV	N	GND
0.470000	36.30	10.7	47	10.2	AV	N	GND
0.590000	36.70	10.7	46	9.3	AV	N	GND
1.020000	32.20	10.8	46	13.8	AV	N	GND
1.805000	38.90	11.0	46	7.1	AV	N	GND
2.140000	37.90	11.0	46	8.1	AV	N	GND
2.330000	37.20	11.0	46	8.8	AV	N	GND

ACCURATE TECHNOLOGY CO.,LTD

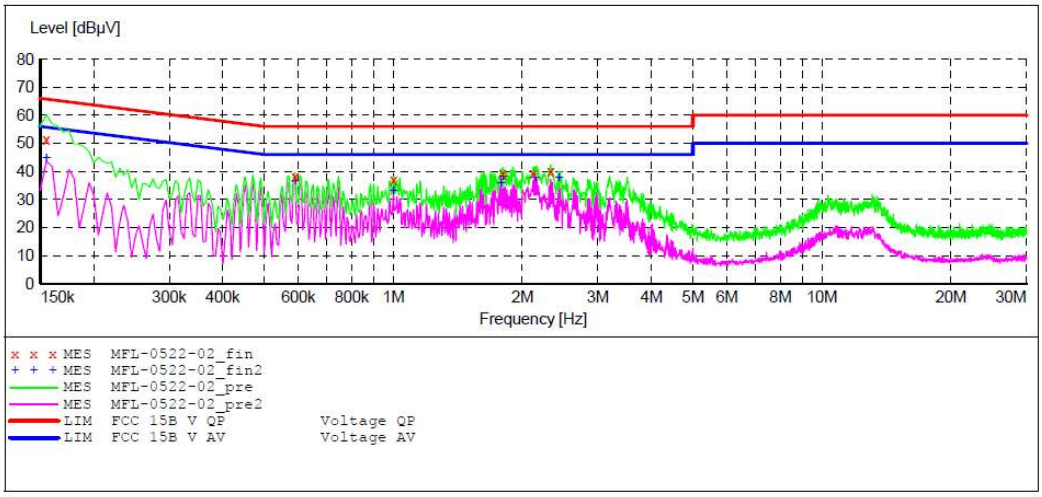
CONDUCTED EMISSION STANDARD FCC PART 15B

```
EUT:                  Massage Chair M/N:OS-3D Otamic LE
Manufacturer:         XIAMEN OGAWA INTELLIGENT HEALTH
Operating Condition:  BT Communication
Test Site:            1#Shielding Room
Operator:             Frank
Test Specification:   L 120V/60Hz
Comment:              Report NO.:ATE20200061
Start of Test:        5/22/2020 / 2:39:58PM
```

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: "MFL-0522-02_fin"

5/22/2020 2:43PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.155000	51.20	10.5	66	14.5	QP	L1	GND
0.590000	38.00	10.7	56	18.0	QP	L1	GND
1.000000	36.80	10.8	56	19.2	QP	L1	GND
1.800000	39.10	11.0	56	16.9	QP	L1	GND
2.120000	39.40	11.0	56	16.6	QP	L1	GND
2.330000	40.10	11.0	56	15.9	QP	L1	GND

MEASUREMENT RESULT: "MFL-0522-02_fin2"

5/22/2020 2:43PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.155000	44.90	10.5	56	10.8	AV	L1	GND
0.590000	36.60	10.7	46	9.4	AV	L1	GND
1.000000	33.00	10.8	46	13.0	AV	L1	GND
1.785000	35.70	11.0	46	10.3	AV	L1	GND
1.805000	38.10	11.0	46	7.9	AV	L1	GND
2.140000	37.80	11.0	46	8.2	AV	L1	GND
2.430000	37.60	11.0	46	8.4	AV	L1	GND

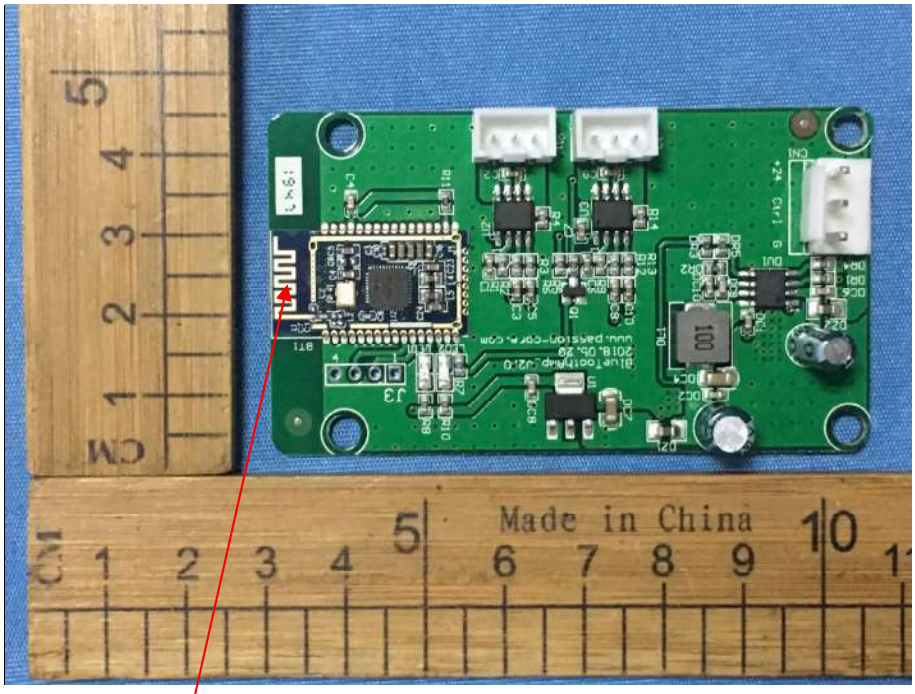
13. ANTENNA REQUIREMENT

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 0dBi. Therefore, the equipment complies with the antenna requirement of Section 15.203.



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