



TEST Report

Applicant: OVC Intelligence Technology Co., Ltd.

Address of Applicant: Room 1812 A, No.501 Qinhaidong road, Hengqin district, Zhuhai city, P.R.C.

Manufacturer : OVC Intelligence Technology Co., Ltd.

Address of Manufacturer : Room 1812 A, No.501 Qinhaidong road, Hengqin district, Zhuhai city, P.R.C.

Equipment Under Test (EUT)

Product Name: True wireless earbuds

Model No.: ZIIM HEART #001

Series model: N/A

Trade Mark: ZIIM

FCC ID: 2A64D-HEART001

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247

Date of sample receipt: May 19,2022

Date of Test: May 19,2022- May 31,2022

Date of report issued: May 31,2022

Test Result : PASS *

* In the configuration tested, the EUT complied with the standards specified above.



Report No.: HTT202205296F02

1. Version

Version No.	Date	Description
00	May 31,2022	Original

Tested/ Prepared By Ervin Xu Date: May 31,2022
Project Engineer

Check By: Bruce Zhu Date: May 31,2022
Reviewer

Approved By : Kevin Yang Date: May 31,2022
Authorized Signature



2. Contents

Page

1. VERSION.....	2
2. CONTENTS.....	3
3. TEST SUMMARY.....	4
4. GENERAL INFORMATION.....	5
4.1. GENERAL DESCRIPTION OF EUT	5
4.2. TEST MODE	7
4.3. DESCRIPTION OF SUPPORT UNITS	7
4.4. DEVIATION FROM STANDARDS	7
4.5. ABNORMALITIES FROM STANDARD CONDITIONS	7
4.6. TEST FACILITY	7
4.7. TEST LOCATION	7
4.8. ADDITIONAL INSTRUCTIONS	7
5. TEST INSTRUMENTS LIST.....	8
6. TEST RESULTS AND MEASUREMENT DATA	9
6.1. CONDUCTED EMISSIONS	9
6.2. CONDUCTED OUTPUT POWER	12
6.3. CHANNEL BANDWIDTH.....	16
6.4. POWER SPECTRAL DENSITY	20
6.5. BAND EDGES	24
6.5.1. Conducted Emission Method.....	24
6.5.2. Radiated Emission Method.....	27
6.6. SPURIOUS EMISSION.....	34
6.6.1. Conducted Emission Method.....	34
6.6.2. Radiated Emission Method.....	37
7. TEST SETUP PHOTO.....	50
8. EUT CONSTRUCTIONAL DETAILS.....	50



3. Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Output Power	15.247 (b)(3)	Pass
Channel Bandwidth	15.247 (a)(2)	Pass
Power Spectral Density	15.247 (e)	Pass
Band Edge	15.247(d)	Pass
Spurious Emission	15.205/15.209	Pass

Remarks:

1. Pass: The EUT complies with the essential requirements in the standard.
2. Test according to ANSI C63.10:2013

Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9k~30MHz	3.17 dB	(1)
Radiated Emission	30~1000MHz	3.45 dB	(1)
Radiated Emission	1~6GHz	3.54 dB	(1)
Radiated Emission	>6GHz	4.89dB	(1)
Conducted Disturbance	0.15~30MHz	2.66 dB	(1)
RF power, conducted	/	0.16 dB	(1)
Spurious emissions, conducted	/	0.21dB	(1)

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.



4. General Information

4.1. General Description of EUT

Product Name:	True wireless earbuds
Model No.:	ZIIM HEART #001
Series model:	N/A
Model Difference	N/A
Operation frequency	2402~2480 MHz
Number of Channels	40
Modulation Type	GFSK
Bit Rate of Transmitter	1Mbps/2Mbps
Channel separation	2MHz
Antenna Type:	FPCB Antenna
Antenna Gain:	2.42dBi
Power Supply:	DC 3.7V/40mAh Form Battery and DC 5V From External Circuit
Battery	DC 3.7V 40mAh



Channel	Frequency(MHz)	Channel	Frequency(MHz)
0	2402	20	2442
1	2404	21	2444
2	2406	22	2446
3	2408	23	2448
4	2410	24	2450
5	2412	25	2452
6	2414	26	2454
7	2416	27	2456
8	2418	28	2458
9	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
19	2440	39	2480

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	2402MHz
The middle channel	2440MHz
The Highest channel	2480MHz



4.2. Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode.
<i>Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.</i>	

4.3. Description of Support Units

None.

4.4. Deviation from Standards

None.

4.5. Abnormalities from Standard Conditions

None.

4.6. Test Facility

The test facility is recognized, certified, or accredited by the following organizations: FCC-Registration No.: 779513 Designation Number: CN1319 Shenzhen HTT Technology Co.,Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements. A2LA-Lab Cert. No.: 6435.01 Shenzhen HTT Technology Co.,Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement. The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010.

4.7. Test Location

All tests were performed at:
Shenzhen HTT Technology Co.,Ltd. 1F, Building B, Huafeng International Robotics Industrial Park, Hangcheng Road,Nanchang Community, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China Tel: 0755-23595200 Fax: 0755-23595201

4.8. Additional Instructions

Test Software	Special AT test command provided by manufacturer to Keep the EUT in continuously transmitting mode and hopping mode
Power level setup	Default

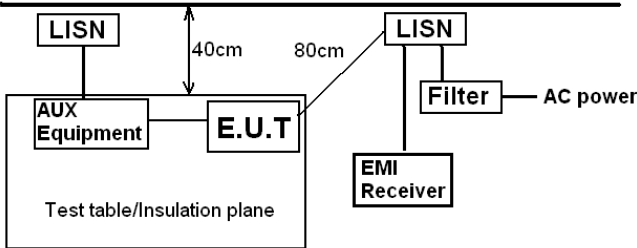


5. Test Instruments list

Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	Shenzhen C.R.T technology co., LTD	9*6*6	HTT-E028	Aug. 10 2020	Aug. 09 2024
2	Control Room	Shenzhen C.R.T technology co., LTD	4.8*3.5*3.0	HTT-E030	Aug. 10 2020	Aug. 09 2024
3	EMI Test Receiver	Rohde&Schwar	ESCI7	HTT-E022	May 21 2022	May 20 2023
4	Spectrum Analyzer	Rohde&Schwar	FSP	HTT-E037	May 21 2022	May 20 2023
5	Coaxial Cable	ZDecl	ZT26-NJ-NJ-0.6M	HTT-E018	May 21 2022	May 20 2023
6	Coaxial Cable	ZDecl	ZT26-NJ-SMAJ-2M	HTT-E019	May 21 2022	May 20 2023
7	Coaxial Cable	ZDecl	ZT26-NJ-SMAJ-0.6M	HTT-E020	May 21 2022	May 20 2023
8	Coaxial Cable	ZDecl	ZT26-NJ-SMAJ-8.5M	HTT-E021	May 21 2022	May 20 2023
9	Composite logarithmic antenna	Schwarzbeck	VULB 9168	HTT-E017	Aug. 22 2021	Aug. 21 2022
10	Horn Antenna	Schwarzbeck	BBHA9120D	HTT-E016	Aug. 22 2021	Aug. 21 2022
11	Loop Antenna	Zhinan	ZN30900C	HTT-E039	Aug. 22 2021	Aug. 21 2022
12	Horn Antenna	Beijing Hangwei Dayang	OBH100400	HTT-E040	Aug. 22 2021	Aug. 21 2022
13	low frequency Amplifier	Sonoma Instrument	310	HTT-E015	May 21 2022	May 20 2023
14	high-frequency Amplifier	HP	8449B	HTT-E014	May 21 2022	May 20 2023
15	Variable frequency power supply	Shenzhen Anbiao Instrument Co., Ltd	ANB-10VA	HTT-082	May 21 2022	May 20 2023
16	EMI Test Receiver	Rohde & Schwarz	ESCS30	HTT-E004	May 21 2022	May 20 2023
17	Artificial Mains	Rohde & Schwarz	ESH3-Z5	HTT-E006	May 21 2022	May 20 2023
18	Artificial Mains	Rohde & Schwarz	ENV-216	HTT-E038	May 21 2022	May 20 2023
19	Cable Line	Robinson	Z302S-NJ-BNCJ-1.5M	HTT-E001	May 21 2022	May 20 2023
20	Attenuator	Robinson	6810.17A	HTT-E007	May 21 2022	May 20 2023
21	Variable frequency power supply	Shenzhen Yanghong Electric Co., Ltd	YF-650 (5KVA)	HTT-E032	May 21 2022	May 20 2023
22	Control Room	Shenzhen C.R.T technology co., LTD	8*4*3.5	HTT-E029	May 21 2022	May 20 2023
23	DC power supply	Agilent	E3632A	HTT-E023	May 21 2022	May 20 2023
24	EMI Test Receiver	Agilent	N9020A	HTT-E024	May 21 2022	May 20 2023
25	Analog signal generator	Agilent	N5181A	HTT-E025	May 21 2022	May 20 2023
26	Vector signal generator	Agilent	N5182A	HTT-E026	May 21 2022	May 20 2023
27	Power sensor	Keysight	U2021XA	HTT-E027	May 21 2022	May 20 2023
28	Temperature and humidity meter	Shenzhen Anbiao Instrument Co., Ltd	TH10R	HTT-074	May 21 2022	May 20 2023

6. Test results and Measurement Data

6.1. Conducted Emissions

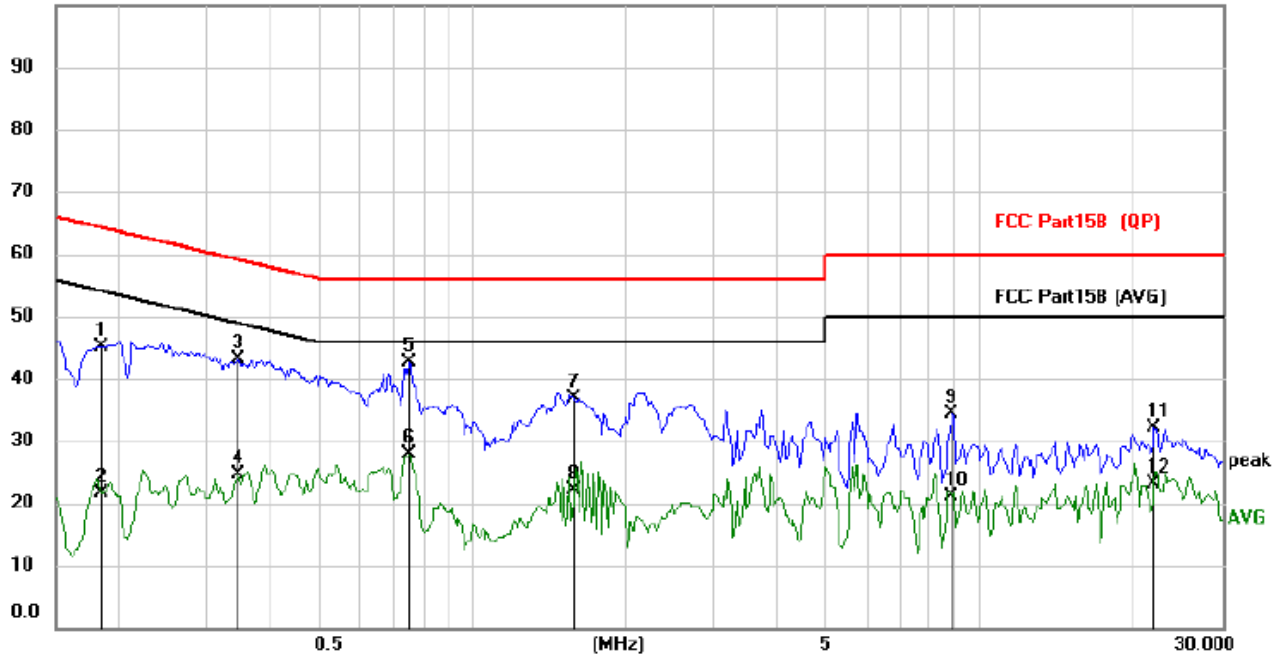
Test Requirement:	FCC Part15 C Section 15.207						
Test Method:	ANSI C63.10:2013						
Test Frequency Range:	150KHz to 30MHz						
Class / Severity:	Class B						
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto						
Limit:	Frequency range (MHz)		Limit (dBuV)				
			Quasi-peak		Average		
	0.15-0.5		66 to 56*		56 to 46*		
	0.5-5		56		46		
	5-30		60		50		
* Decreases with the logarithm of the frequency.							
Test setup:	Reference Plane  Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m						
Test procedure:	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.						
Test Instruments:	Refer to section 6.0 for details						
Test mode:	Refer to section 5.2 for details						
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar	
Test voltage:	AC 120V, 60Hz						
Test results:	Pass						

Remark: Both high and low voltages have been tested to show only the worst low voltage test data.

Measurement data:

Line:

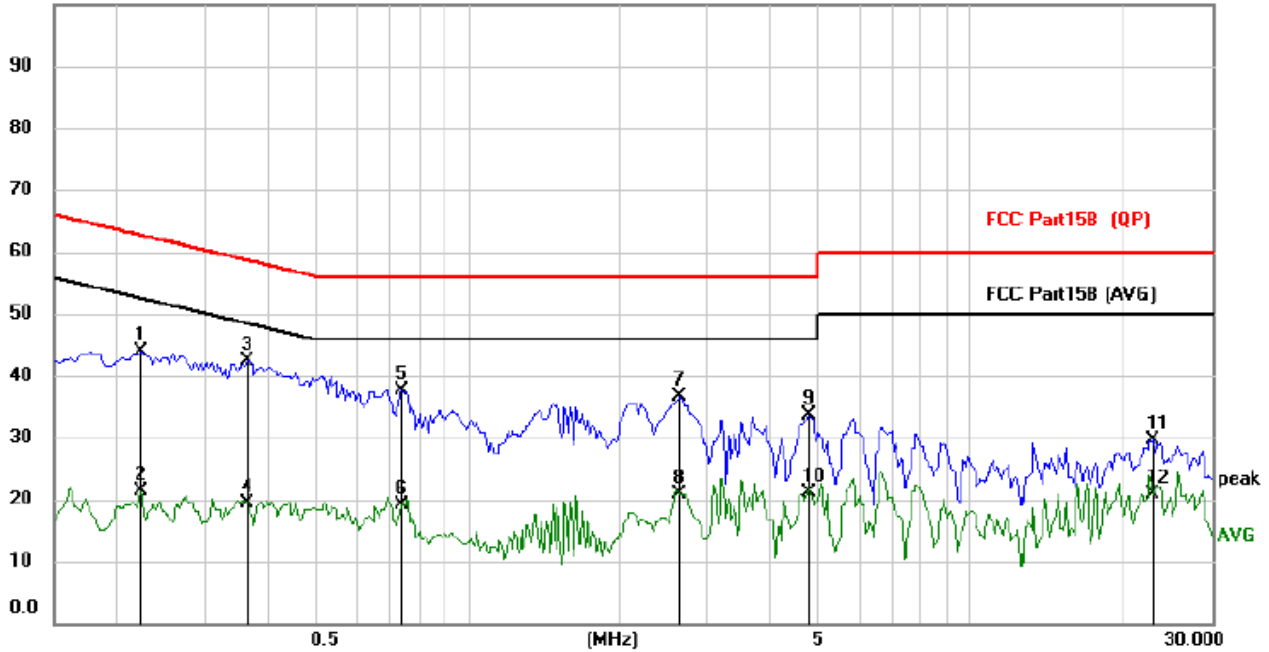
100.0 dBuV



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1850	34.80	10.39	45.19	64.26	-19.07	QP
2		0.1850	11.30	10.39	21.69	54.26	-32.57	AVG
3		0.3450	32.77	10.42	43.19	59.08	-15.89	QP
4		0.3450	14.13	10.42	24.55	49.08	-24.53	AVG
5	*	0.7506	31.74	10.77	42.51	56.00	-13.49	QP
6		0.7506	17.01	10.77	27.78	46.00	-18.22	AVG
7		1.5851	25.95	10.85	36.80	56.00	-19.20	QP
8		1.5851	11.19	10.85	22.04	46.00	-23.96	AVG
9		8.8227	22.94	11.47	34.41	60.00	-25.59	QP
10		8.8227	9.64	11.47	21.11	50.00	-28.89	AVG
11		22.0554	19.60	12.48	32.08	60.00	-27.92	QP
12		22.0554	10.64	12.48	23.12	50.00	-26.88	AVG

Neutral:

100.0 dBuV

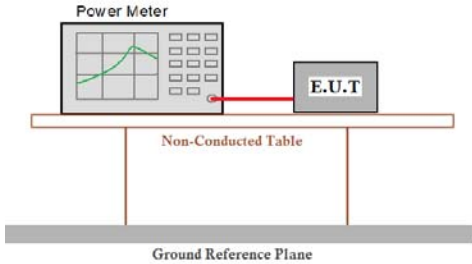


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
		MHz	Level	Factor	ment			Detector
			dBuV	dB	dBuV	dBuV	dB	
1		0.2241	33.65	10.21	43.86	62.67	-18.81	QP
2		0.2241	11.08	10.21	21.29	52.67	-31.38	AVG
3	*	0.3645	32.18	10.28	42.46	58.63	-16.17	QP
4		0.3645	9.18	10.28	19.46	48.63	-29.17	AVG
5		0.7389	26.85	10.67	37.52	56.00	-18.48	QP
6		0.7389	8.41	10.67	19.08	46.00	-26.92	AVG
7		2.6421	25.85	10.84	36.69	56.00	-19.31	QP
8		2.6421	10.09	10.84	20.93	46.00	-25.07	AVG
9		4.7628	22.79	10.88	33.67	56.00	-22.33	QP
10		4.7628	10.15	10.88	21.03	46.00	-24.97	AVG
11		22.8315	17.09	12.55	29.64	60.00	-30.36	QP
12		22.8315	8.44	12.55	20.99	50.00	-29.01	AVG

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.

6.2. Conducted Output Power

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)					
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V05r02					
Limit:	30dBm					
Test setup:						
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test results:	Pass					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar

**Measurement Data****Right Earbuds**

Mode	Test channel	Peak Output Power (dBm)	Limit(dBm)	Result
1M	Lowest	0.507	30.00	Pass
	Middle	0.841		
	Highest	1.248		
2M	Lowest	0.521	30.00	Pass
	Middle	0.851		
	Highest	1.269		

Left Earbuds

Mode	Test channel	Peak Output Power (dBm)	Limit(dBm)	Result
1M	Lowest	0.928	30.00	Pass
	Middle	0.976		
	Highest	1.248		
2M	Lowest	0.677	30.00	Pass
	Middle	0.998		
	Highest	1.014		

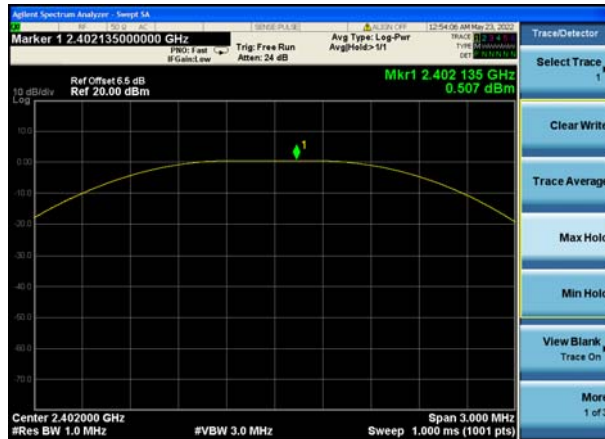


Report No.: HTT202205296F02

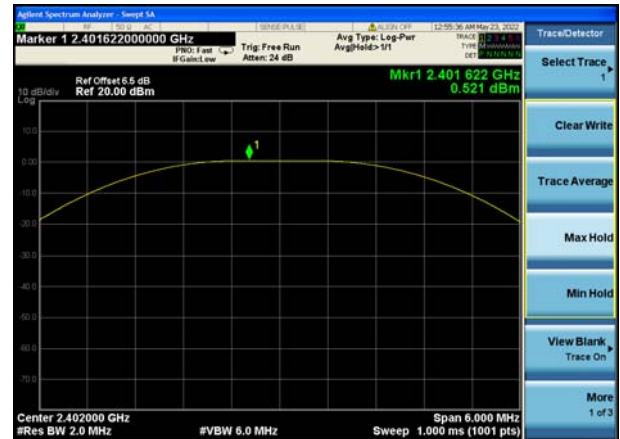
Right Earbuds

Test plot as follows:

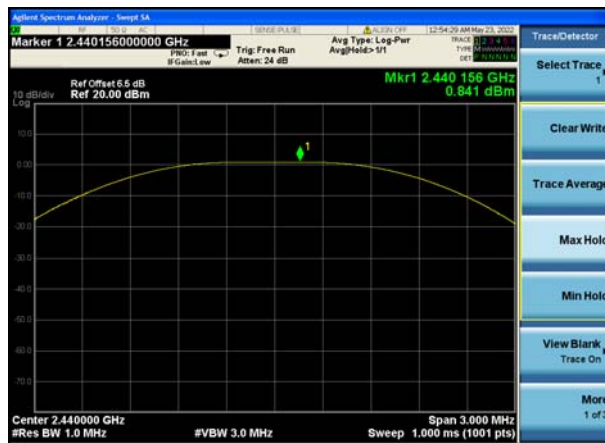
1M



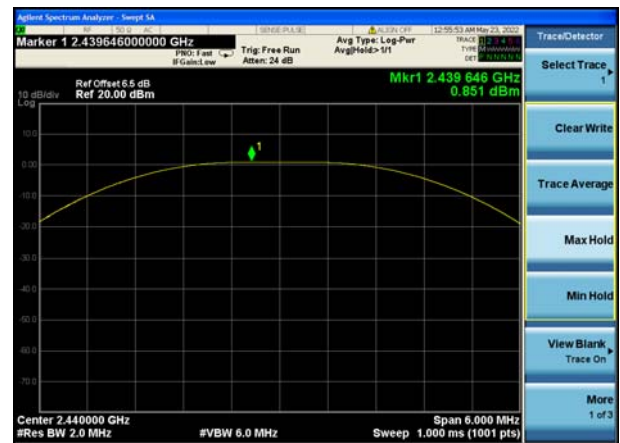
2M



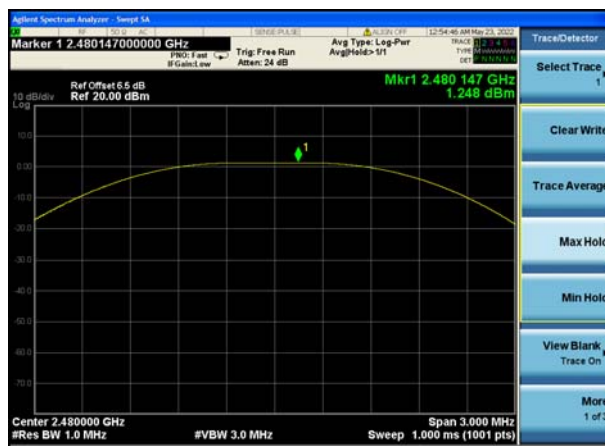
Lowest channel



Lowest channel



Middle channel



Middle channel



Highest channel

Highest channel



Report No.: HTT202205296F02

Left Earbuds

Test plot as follows:

1M



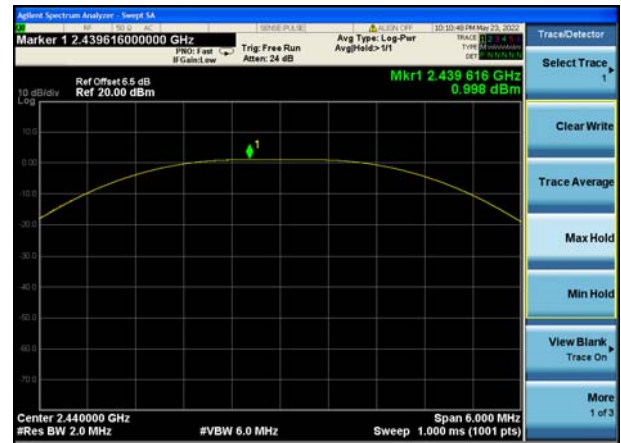
2M



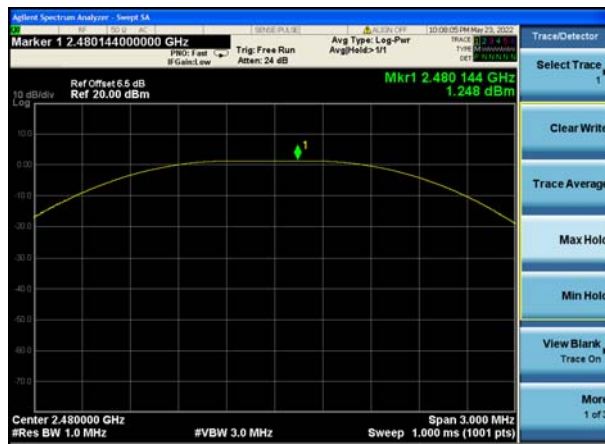
Lowest channel



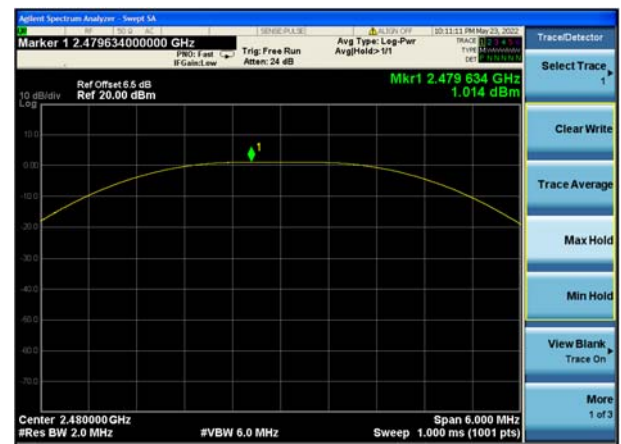
Lowest channel



Middle channel



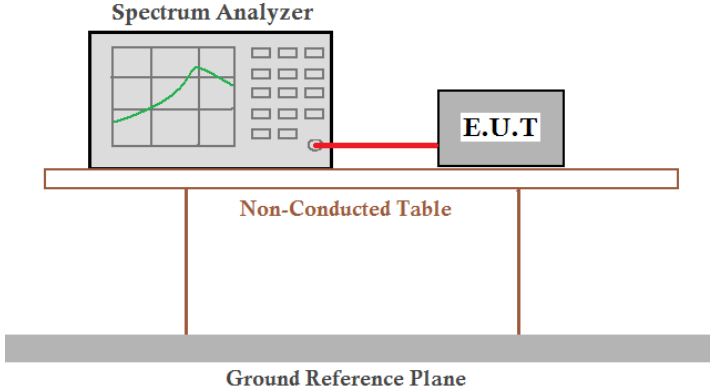
Middle channel



Highest channel

Highest channel

6.3. Channel Bandwidth

Test Requirement:	FCC Part15 C Section 15.247 (a)(2)					
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V05r02					
Limit:	>500KHz					
Test setup:						
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test results:	Pass					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar



Report No.: HTT202205296F02

Measurement Data

Right Earbuds

Mode	Test channel	Channel Bandwidth (MHz)	Limit(KHz)	Result
1M	Lowest	0.720	>500	Pass
	Middle	0.718		
	Highest	0.721		
2M	Lowest	1.269	>500	Pass
	Middle	1.266		
	Highest	1.267		

Left Earbuds

Mode	Test channel	Channel Bandwidth (MHz)	Limit(KHz)	Result
1M	Lowest	0.720	>500	Pass
	Middle	0.720		
	Highest	0.718		
2M	Lowest	1.269	>500	Pass
	Middle	1.268		
	Highest	1.268		



Report No.: HTT202205296F02

Right Earbuds

Test plot as follows:

1M



2M



Lowest channel



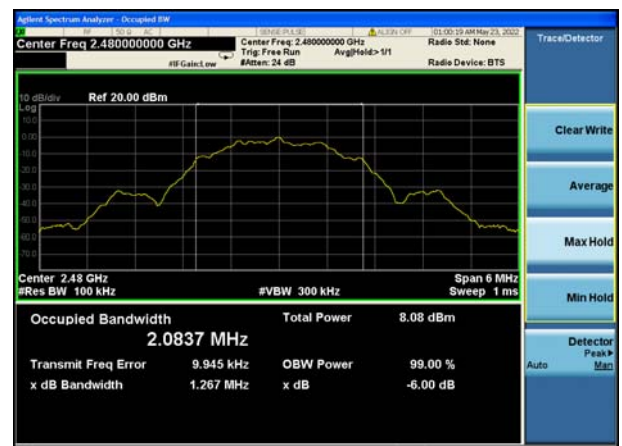
Lowest channel



Middle channel



Middle channel



Highest channel

Highest channel



Report No.: HTT202205296F02

Left Earbuds

1M



2M



Lowest channel



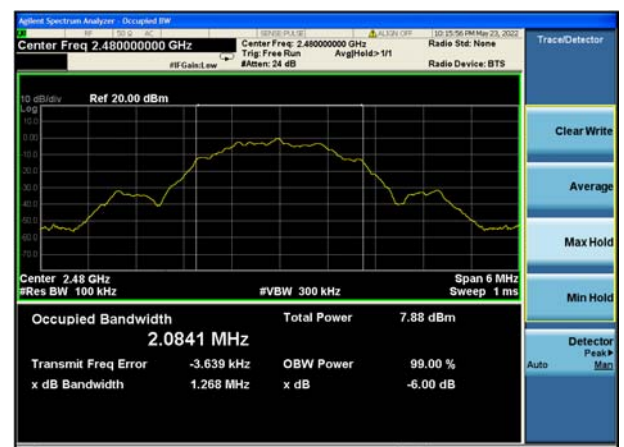
Lowest channel



Middle channel



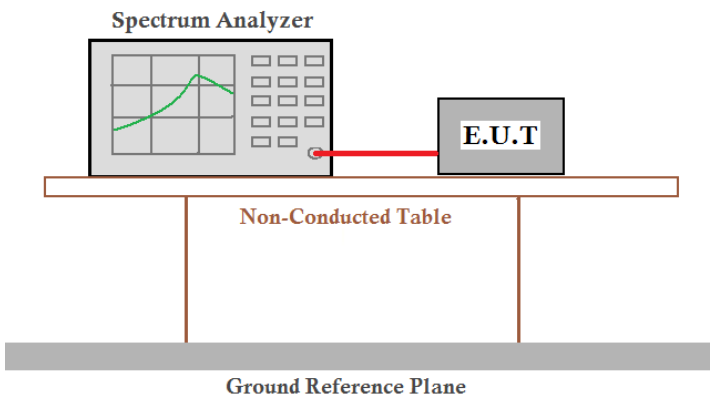
Middle channel



Highest channel

Highest channel

6.4. Power Spectral Density

Test Requirement:	FCC Part15 C Section 15.247 (e)					
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V05r02					
Limit:	8dBm/3kHz					
Test setup:						
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test results:	Pass					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar

**Measurement Data****Right Earbuds**

Mode	Test channel	Power Spectral Density (dBm/3kHz)	Limit(dBm/3kHz)	Result
1M	Lowest	-14.906	8.00	Pass
	Middle	-14.639		
	Highest	-14.423		
2M	Lowest	-17.148	8.00	Pass
	Middle	-16.789		
	Highest	-16.673		

Left Earbuds

Mode	Test channel	Power Spectral Density (dBm/3kHz)	Limit(dBm/3kHz)	Result
1M	Lowest	-14.596	8.00	Pass
	Middle	-14.298		
	Highest	-14.020		
2M	Lowest	-16.930	8.00	Pass
	Middle	-16.584		
	Highest	-16.261		



Report No.: HTT202205296F02

Right Earbuds

Test plot as follows:

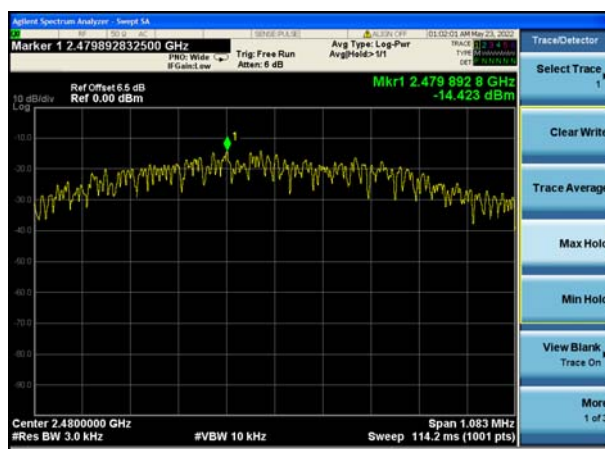
1M



Lowest channel

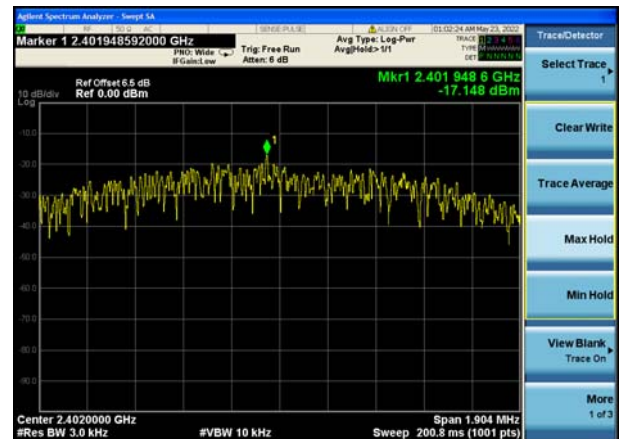


Middle channel

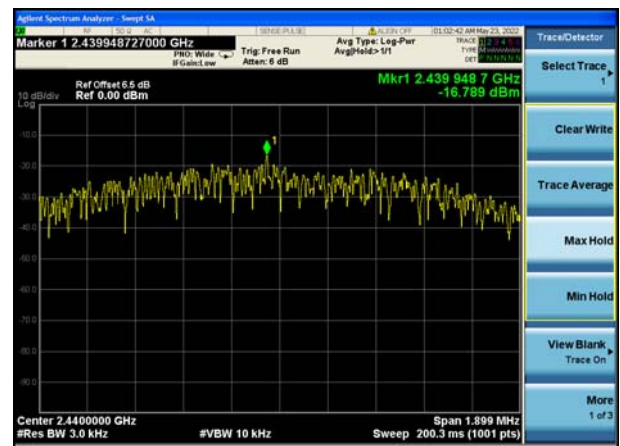


Highest channel

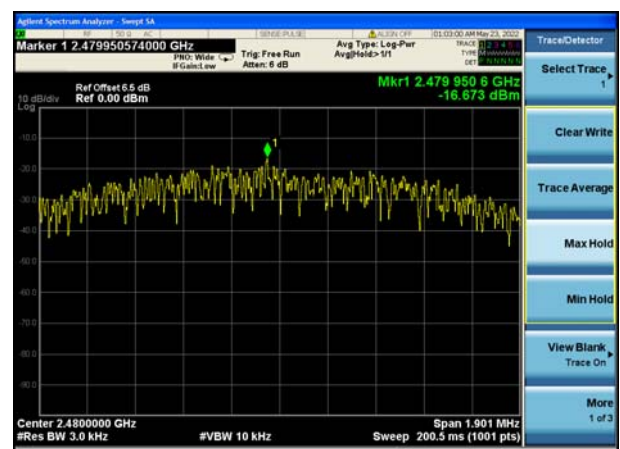
2M



Lowest channel



Middle channel



Highest channel

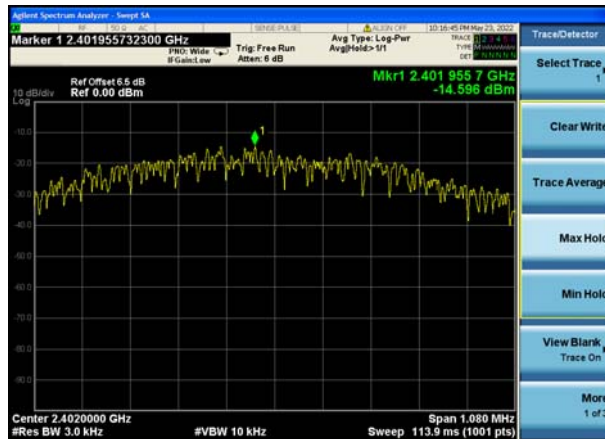


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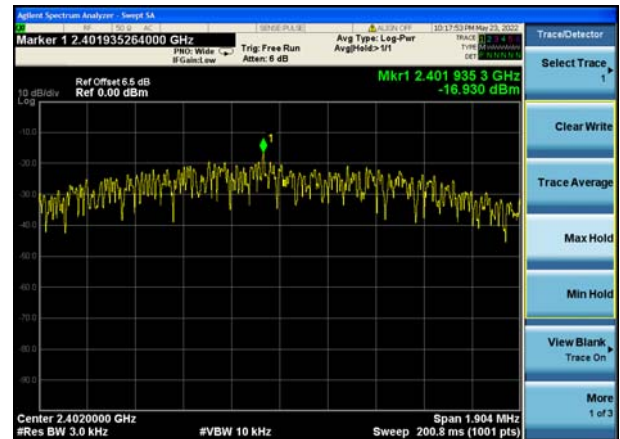
Left Earbuds

Test plot as follows:

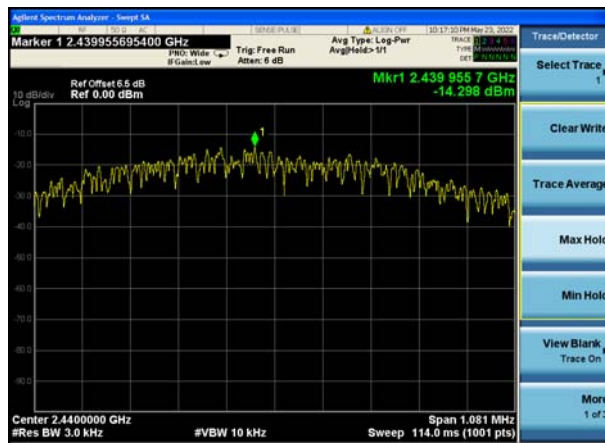
1M



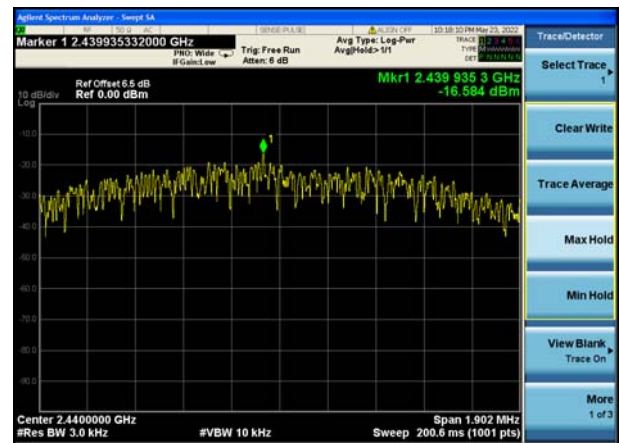
2M



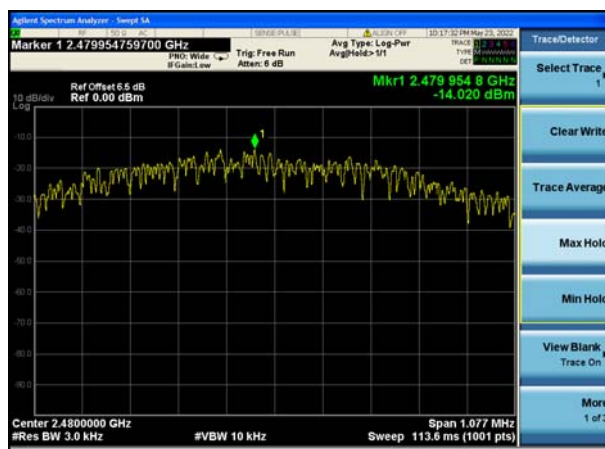
Lowest channel



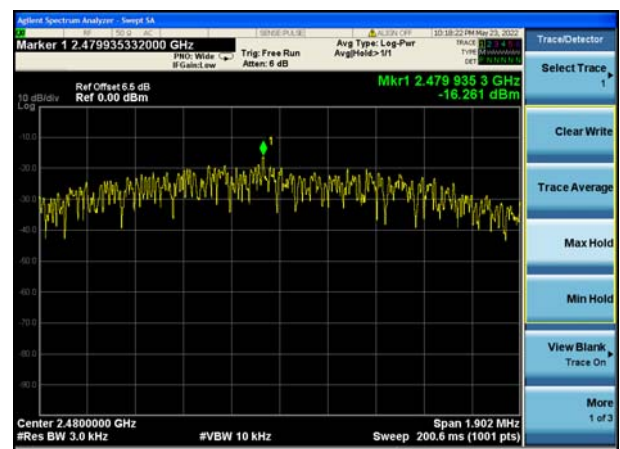
Lowest channel



Middle channel



Middle channel

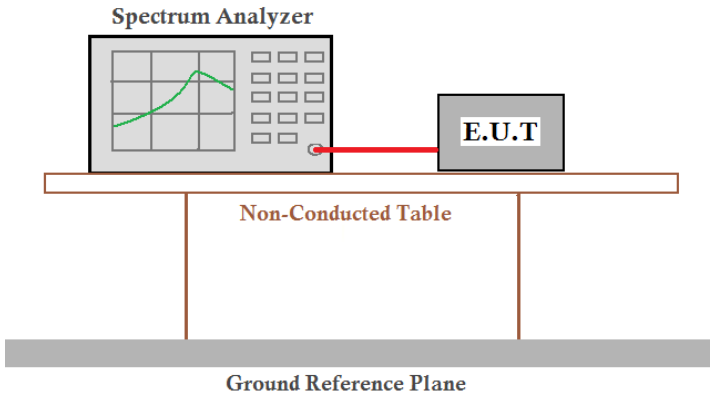


Highest channel

Highest channel

6.5. Band edges

6.5.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)					
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V05r02					
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.					
Test setup:	 The diagram illustrates the test setup for conducted emission measurement. A Spectrum Analyzer is connected via a red cable to an E.U.T (Equipment Under Test). Both are placed on a Non-Conducted Table, which is supported by a Ground Reference Plane.					
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test results:	Pass					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar

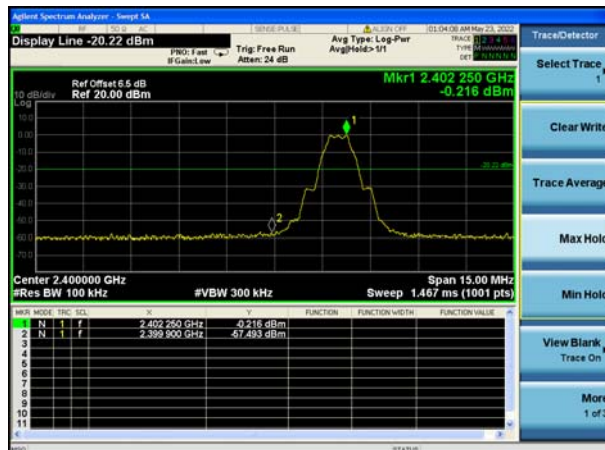


Right Earbuds

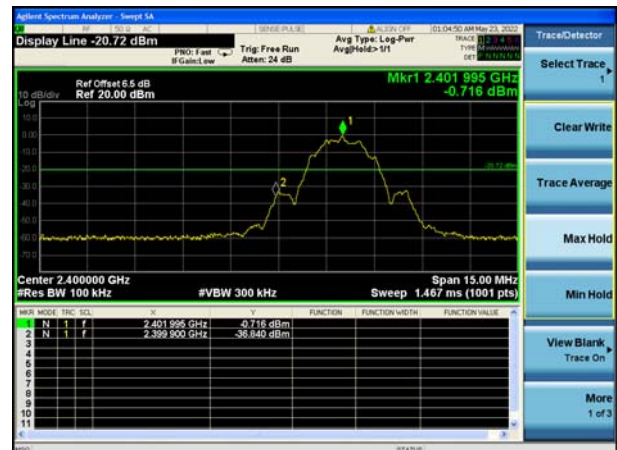
Frequency Band	Delta Peak to band emission (dBc)	>Limit (dBc)	Result
1M			
2400	57.28	20	Pass
2483.5	59.58	20	Pass
2M			
2400	36.12	20	Pass
2483.5	57.59	20	Pass

Test plot as follows:

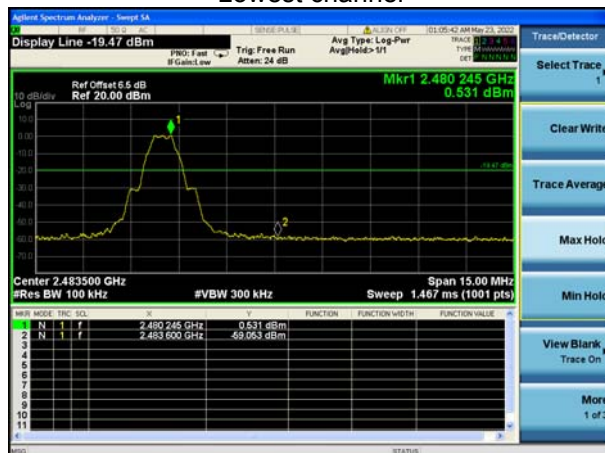
1M



2M



Lowest channel



Highest channel

Lowest channel



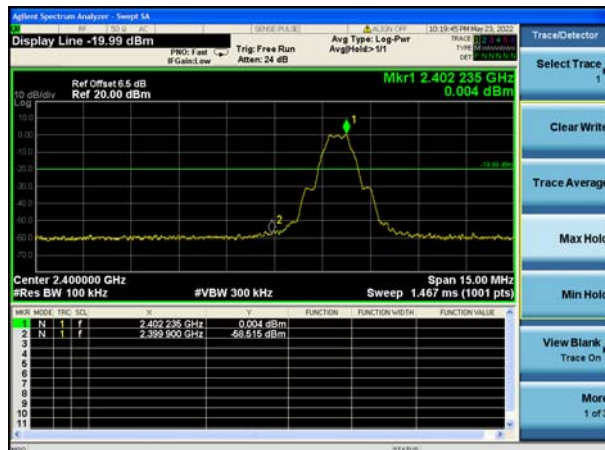
Highest channel

Left Earbuds

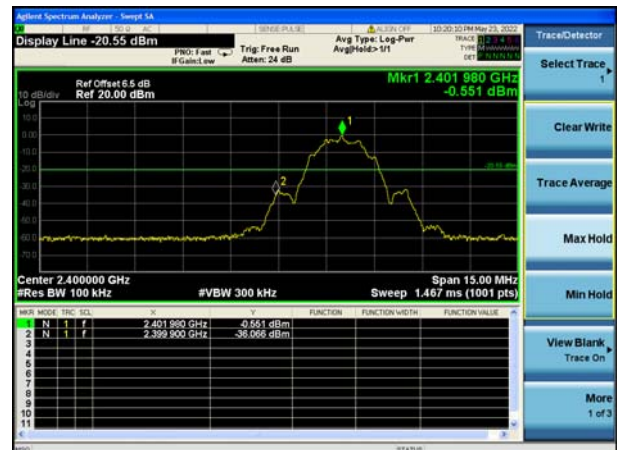
Frequency Band	Delta Peak to band emission (dBc)	>Limit (dBc)	Result
1M			
2400	58.52	20	Pass
2483.5	59.89	20	Pass
2M			
2400	35.52	20	Pass
2483.5	58.26	20	Pass

Test plot as follows:

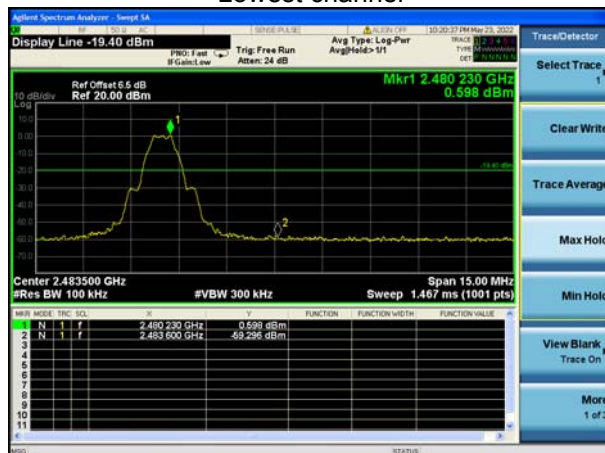
1M



2M



Lowest channel



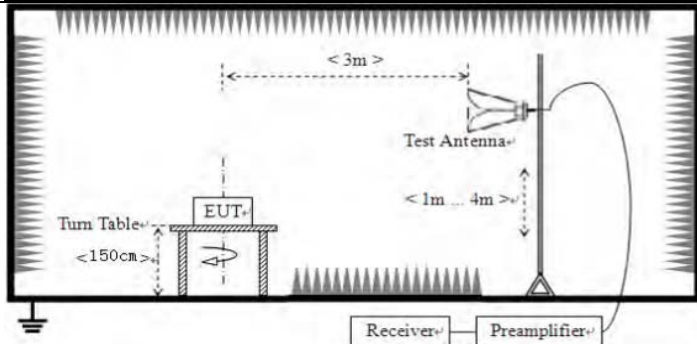
Lowest channel



Highest channel

Highest channel

6.5.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209 and 15.205					
Test Method:	ANSI C63.10:2013					
Test Frequency Range:	All of the restrict bands were tested, only the worst band's (2310MHz to 2500MHz) data was showed.					
Test site:	Measurement Distance: 3m					
Receiver setup:	Frequency	Detector	RBW	VBW	Value	
	Above 1GHz	Peak	1MHz	3MHz	Peak	
		RMS	1MHz	3MHz	Average	
Limit:	Frequency		Limit (dBuV/m @3m)		Value	
	Above 1GHz		54.00		Average	
			74.00		Peak	
Test setup:						
Test Procedure:	1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. 7. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.					
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test results:	Pass					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar

**Measurement Data**

Remark: 1M and 2M all have been tested, only worse case 1M is reported.

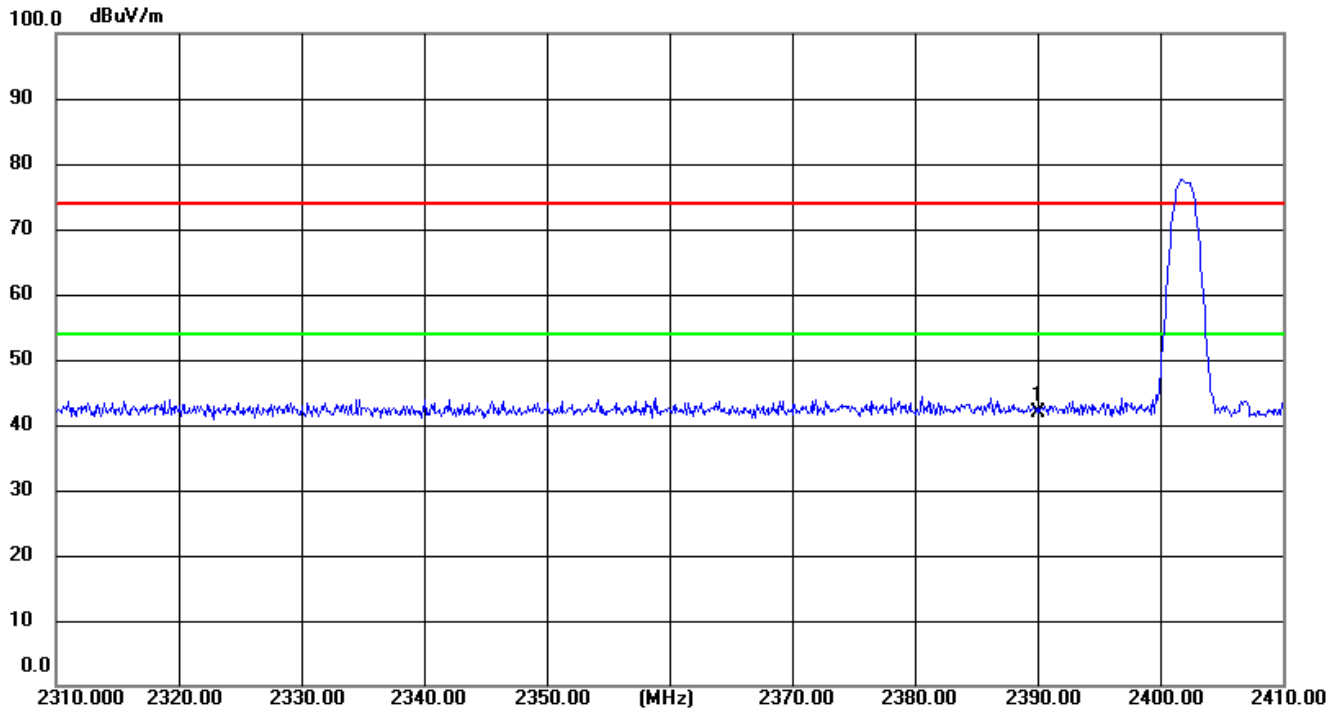
Operation Mode: GFSK TX

Right Earbuds-1M

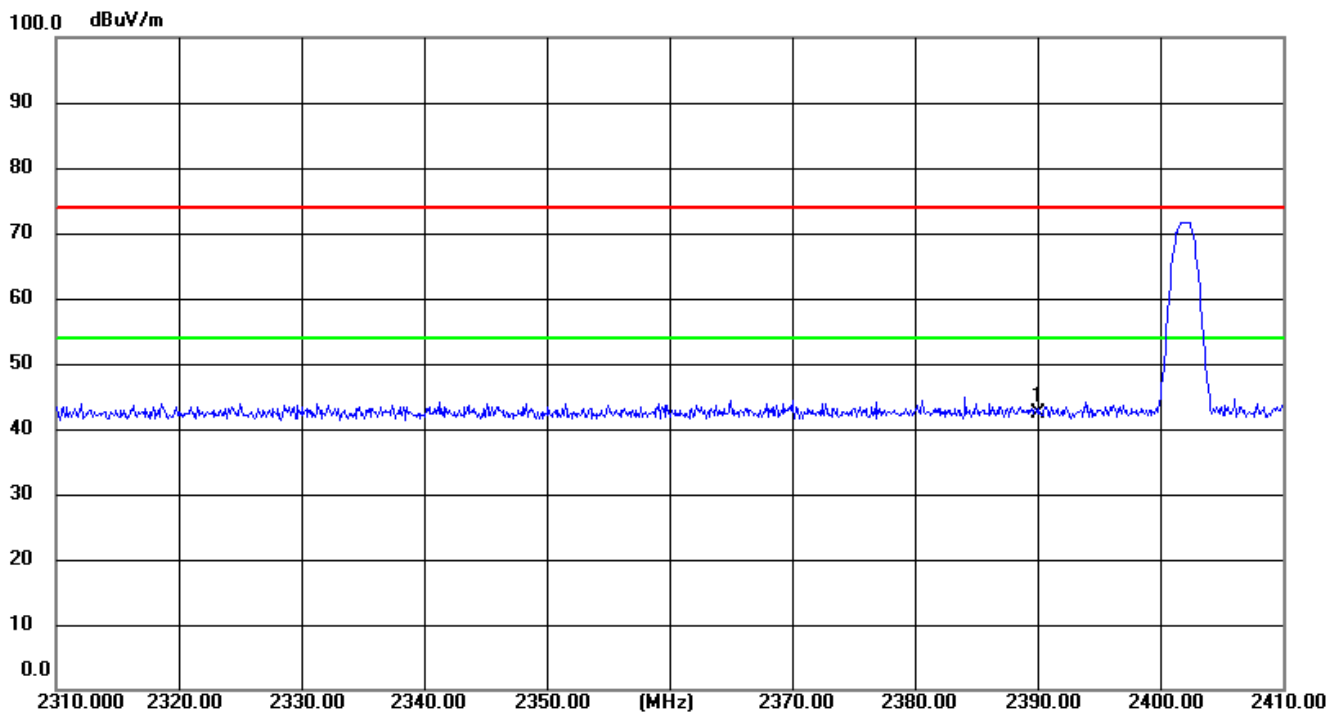
Freq. (MHz)	Ant.Pol. H/V	Reading		Ant/CF CF(dB)	Act		Limit		Note
		Peak (dBuv)	AV (dBuv)		Peak (dBuv/m)	AV (dBuv/m)	Peak (dBuv/m)	AV (dBuv/m)	
2390.00	H	47.64	--	-5.79	41.85	--	74.00	54.00	CH00
2390.00	V	48.29	--	-5.79	42.50	--	74.00	54.00	CH00
2483.50	H	47.85	--	-4.98	42.87	--	74.00	54.00	CH39
2483.50	V	47.31	--	-4.98	42.33	--	74.00	54.00	CH39



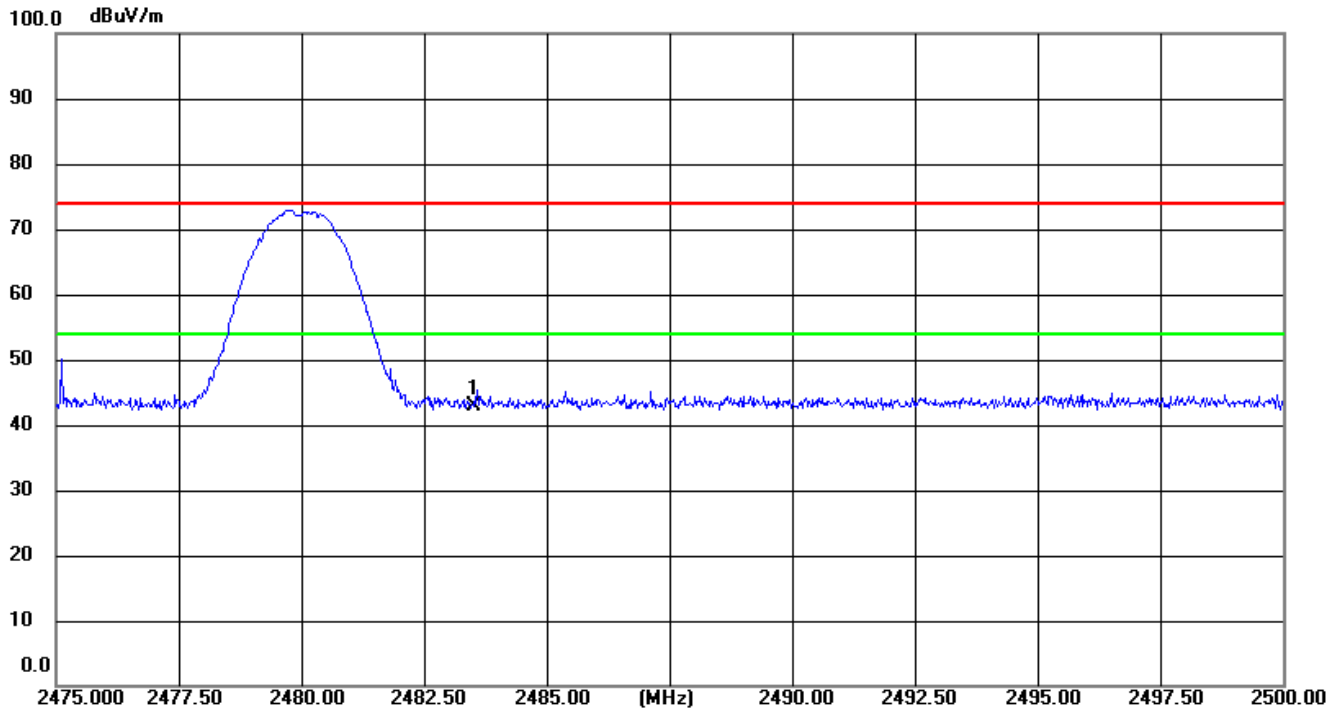
Horizontal



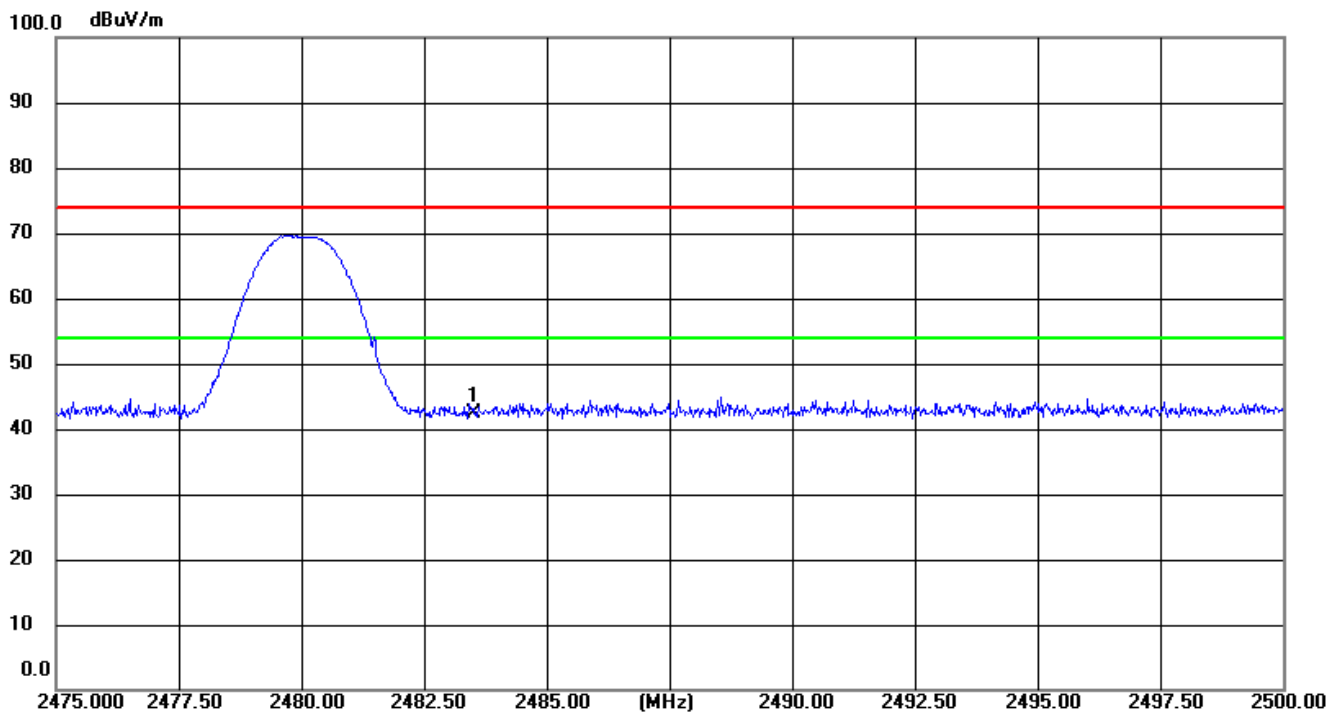
Vertical



Horizontal



Vertical





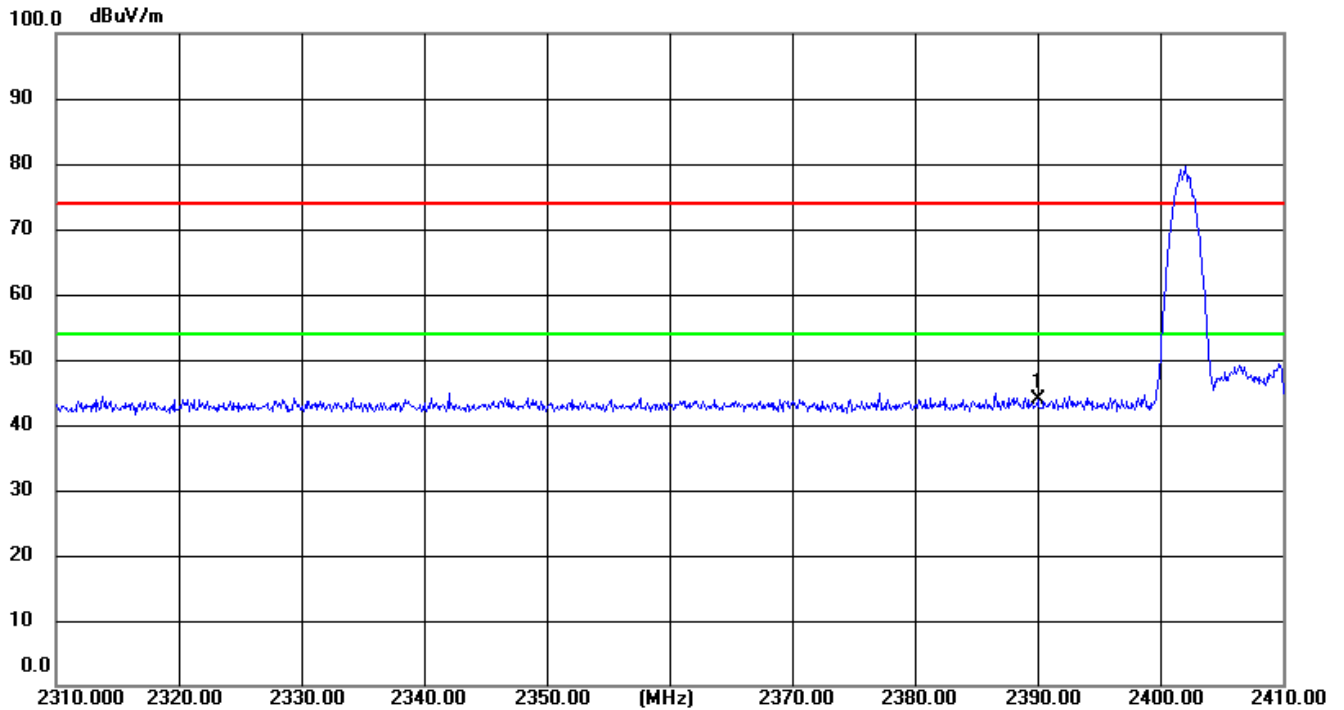
Report No.: HTT202205296F02

Left Earbuds-1M

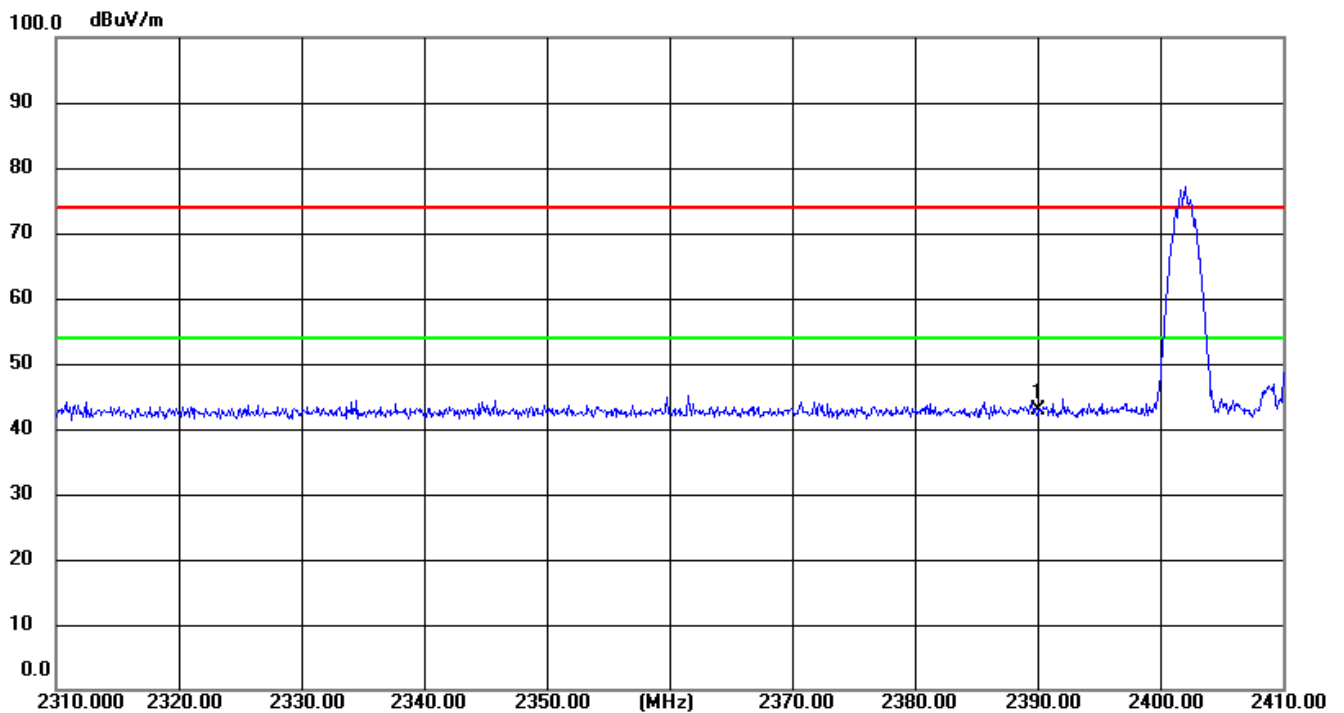
Freq. (MHz)	Ant.Pol. H/V	Reading		Ant/CF CF(dB)	Act		Limit		Note
		Peak (dBuv)	AV (dBuv)		Peak (dBuv/m)	AV (dBuv/m)	Peak (dBuv/m)	AV (dBuv/m)	
2390.00	H	49.68	--	-5.79	43.89	--	74.00	54.00	CH00
2390.00	V	48.66	--	-5.79	42.87	--	74.00	54.00	CH00
2483.50	H	48.60	--	-4.98	43.62	--	74.00	54.00	CH39
2483.50	V	48.15	--	-4.98	43.17	--	74.00	54.00	CH39



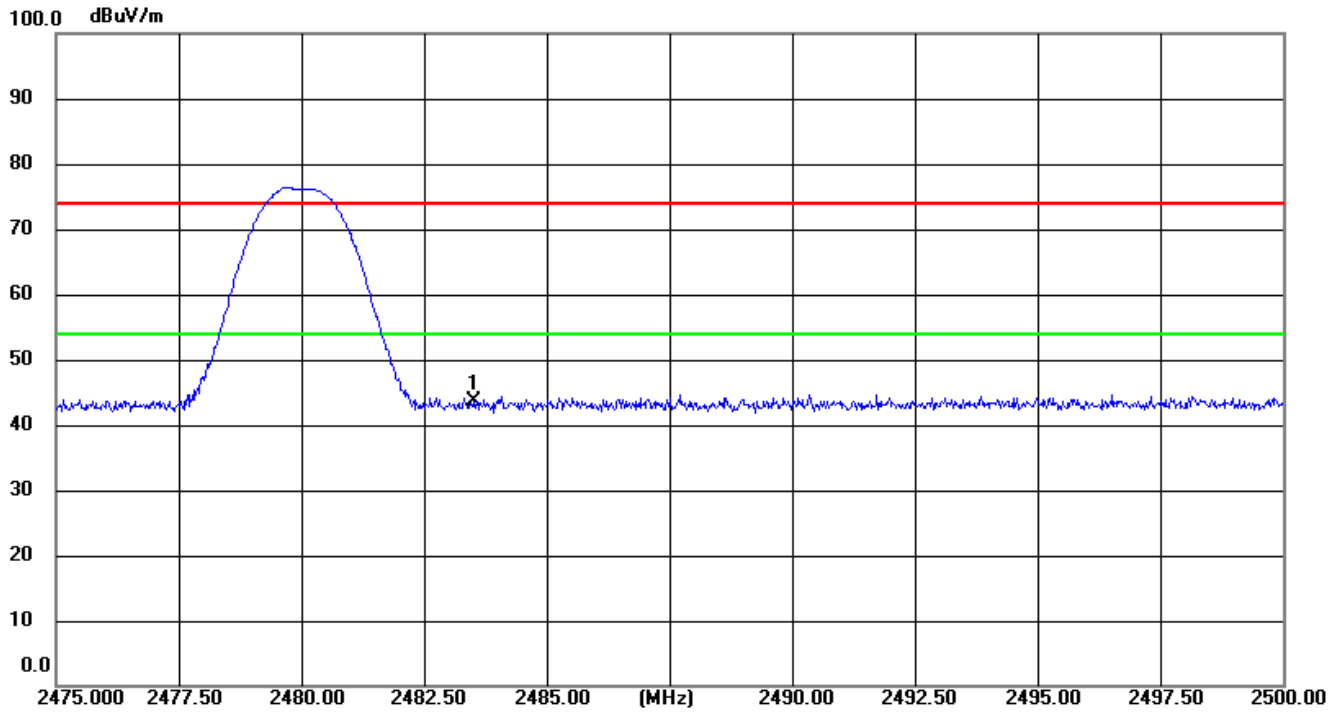
Horizontal



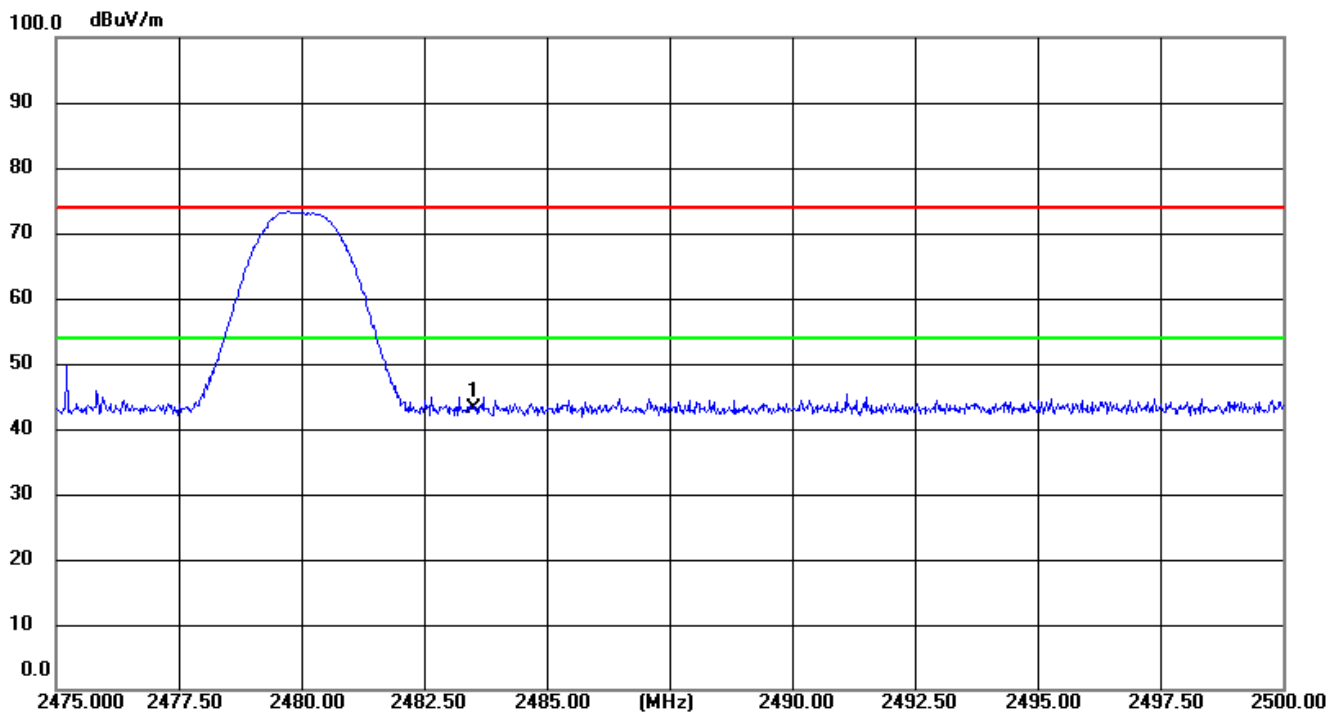
Vertical



Horizontal

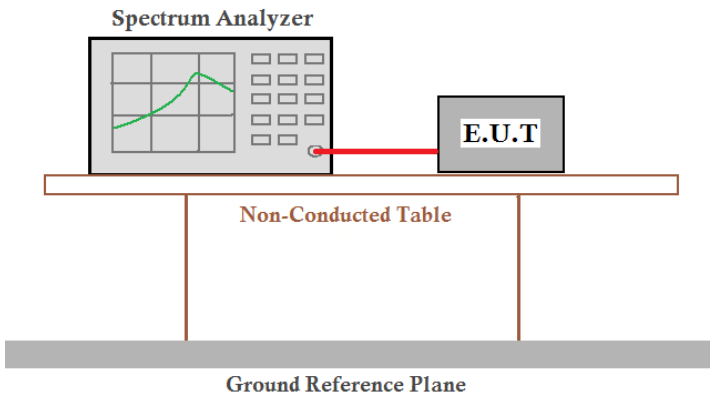


Vertical



6.6. Spurious Emission

6.6.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)					
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V05r02					
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.					
Test setup:	 The diagram illustrates the test setup for conducted emission measurement. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table, which is supported by a Ground Reference Plane.					
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test results:	Pass					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar

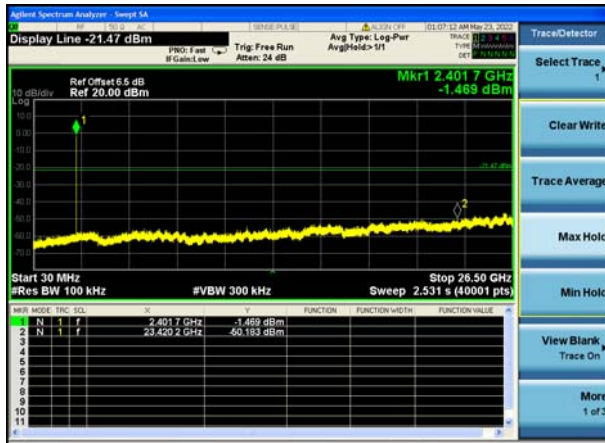


Report No.: HTT202205296F02

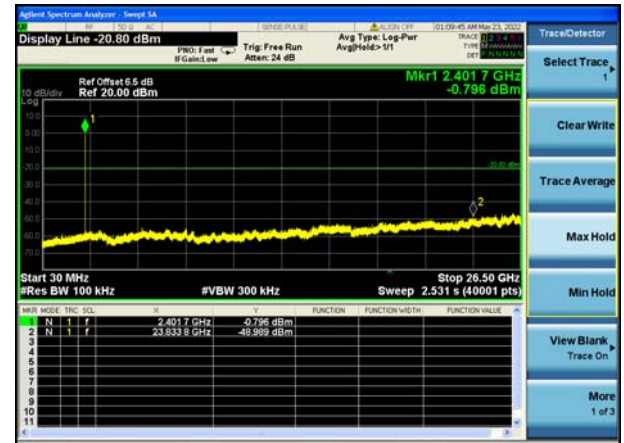
Test plot as follows:

Right Earbuds

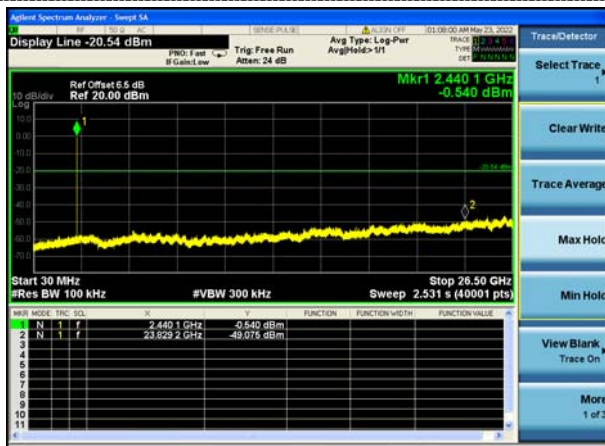
GFSK-1M



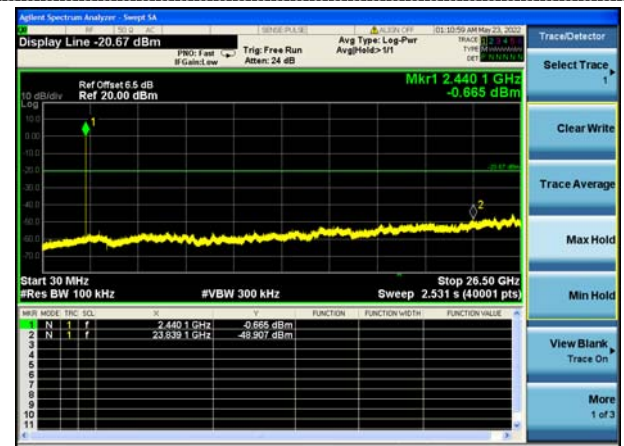
GFSK-2M



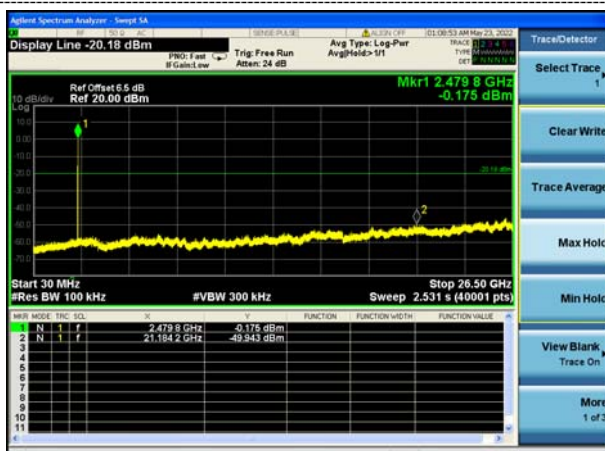
Low Channel



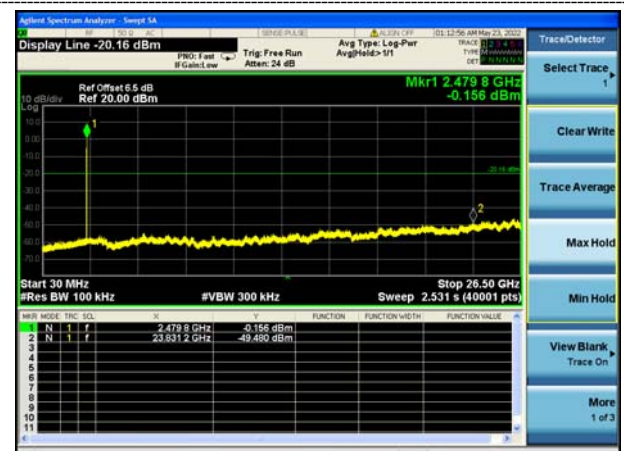
Low Channel



Mid Channel



Mid Channel



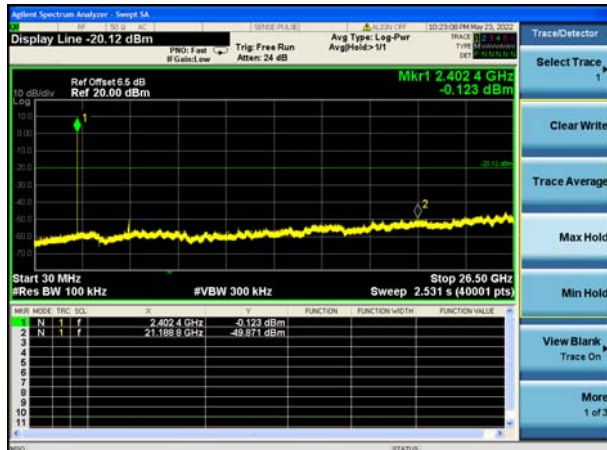
High Channel

High Channel

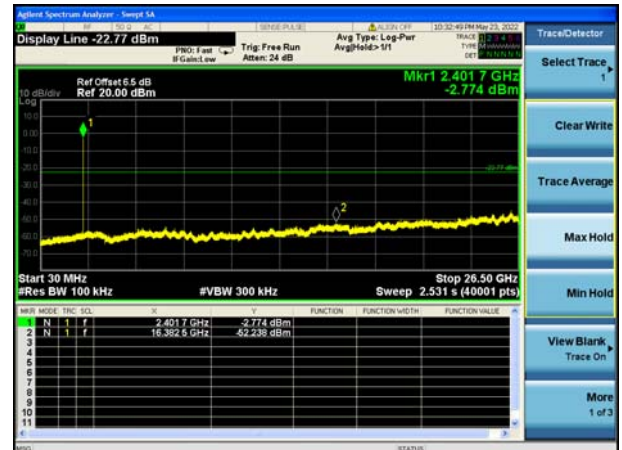


Left Earbuds

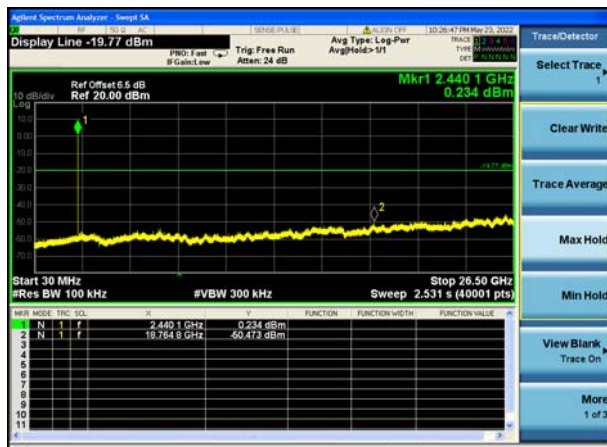
GFSK-1M



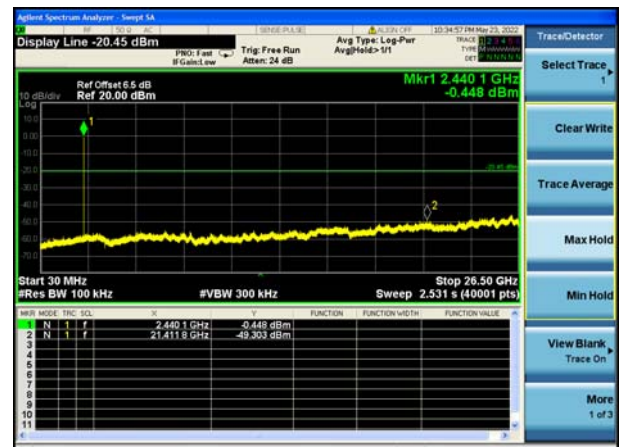
GFSK-2M



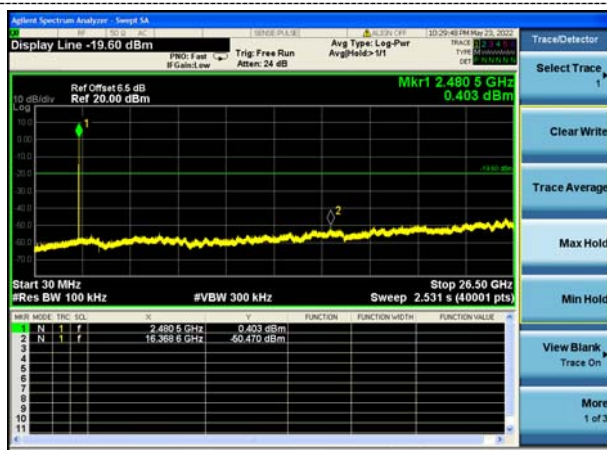
Low Channel



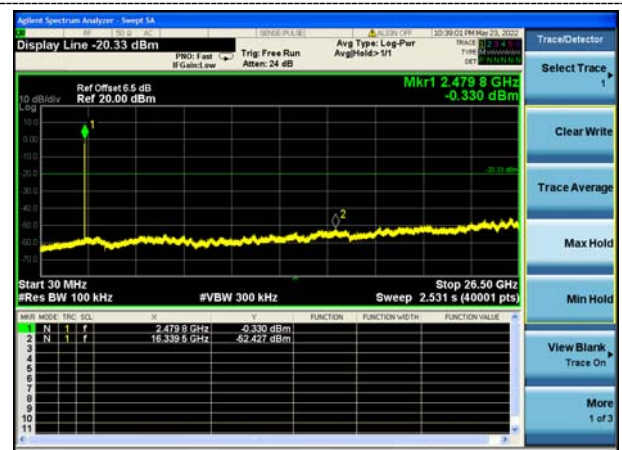
Low Channel



Mid Channel



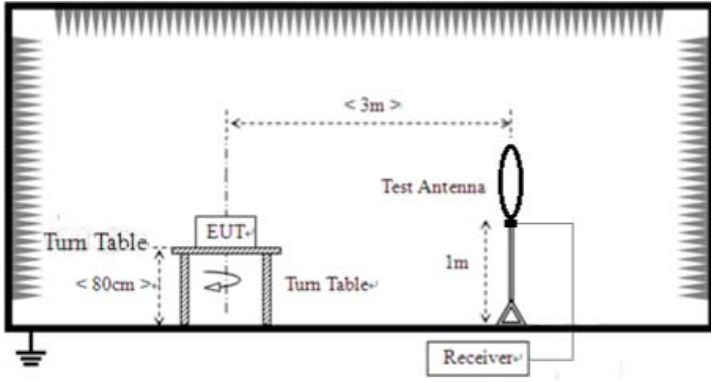
Mid Channel

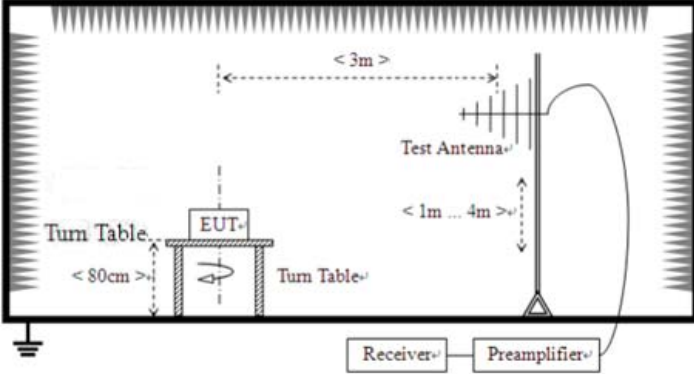
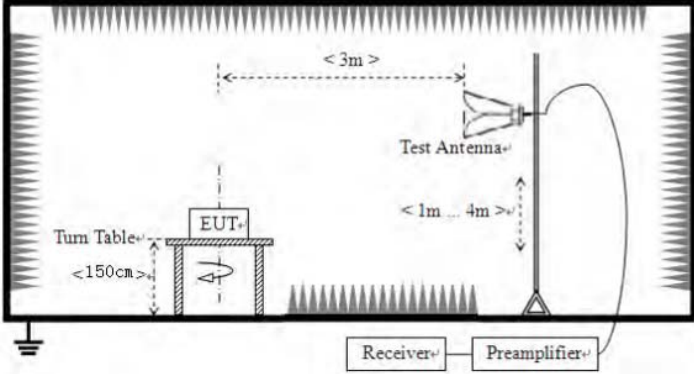


High Channel

High Channel

6.6.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	9kHz to 25GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
	150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz	Average
Limit:	Frequency	Limit (uV/m)	Value	Measurement Distance	
	0.009MHz-0.490MHz	2400/F(KHz)	QP	300m	
	0.490MHz-1.705MHz	24000/F(KHz)	QP	30m	
	1.705MHz-30MHz	30	QP	30m	
	30MHz-88MHz	100	QP	3m	
	88MHz-216MHz	150	QP		
	216MHz-960MHz	200	QP		
	960MHz-1GHz	500	QP		
	Above 1GHz	500	Average		
		5000	Peak		
Test setup:	For radiated emissions from 9kHz to 30MHz				
					

	For radiated emissions from 30MHz to 1GHz  For radiated emissions above 1GHz 
Test Procedure:	1. The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details



Report No.: HTT202205296F02

Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test voltage:	DC3.7V					
Test results:	Pass					

Measurement data:

Remark:

Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.

■ 9kHz~30MHz

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

Right Earbuds

Below 1GHz

Horizontal



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
		MHz	Level	Factor	ment			Detector
			dBuV	dB	dBuV/m	dB/m	dB	
1		31.2893	37.15	-18.45	18.70	40.00	-21.30	QP
2		46.0162	34.64	-17.21	17.43	40.00	-22.57	QP
3		69.6003	34.69	-19.89	14.80	40.00	-25.20	QP
4		150.0107	35.51	-17.80	17.71	43.50	-25.79	QP
5		408.9460	37.45	-14.11	23.34	46.00	-22.66	QP
6	*	827.4932	35.14	-6.26	28.88	46.00	-17.12	QP



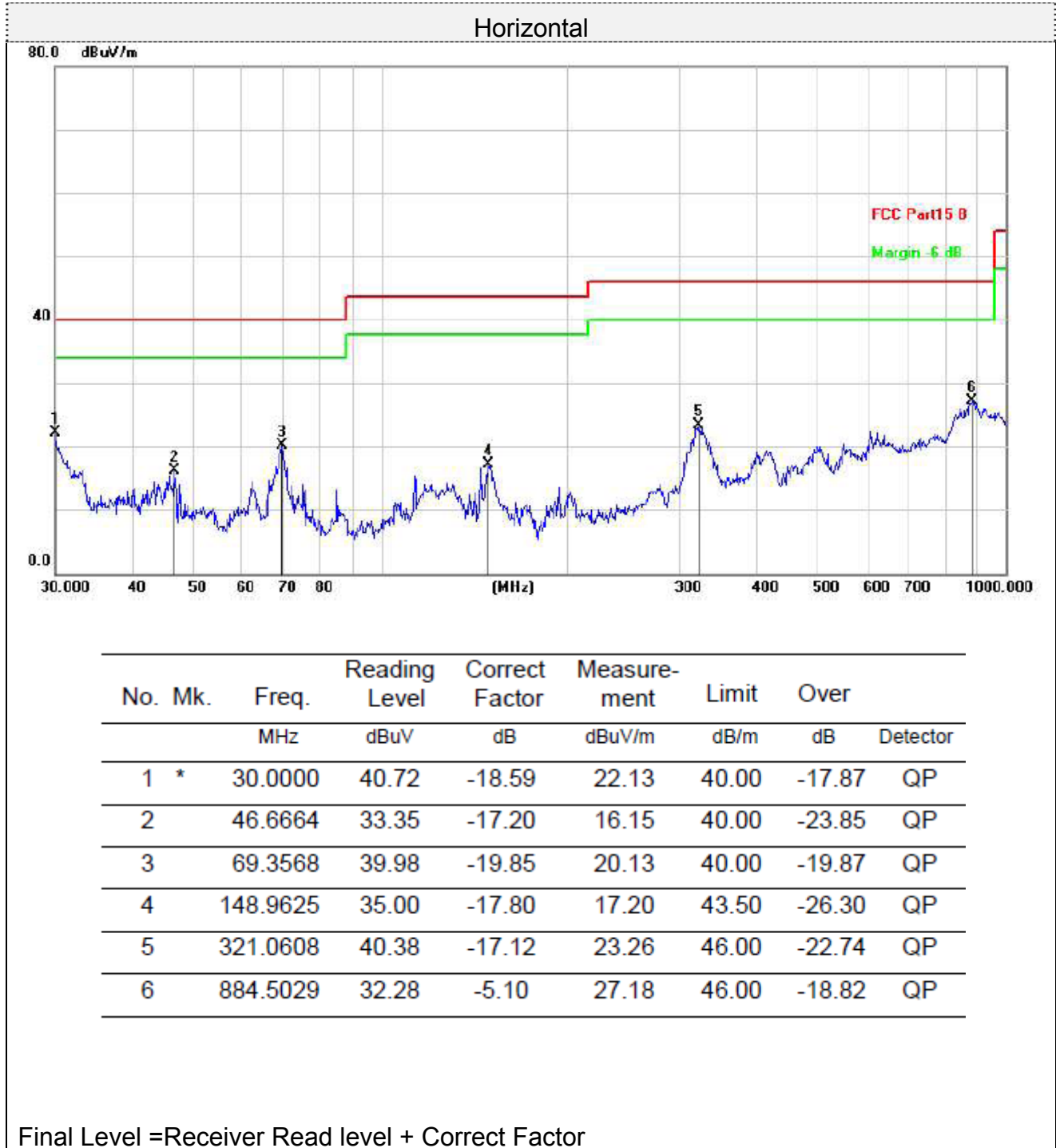
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1	*	33.9174	45.44	-18.18	27.26	40.00	-12.74	QP
2		48.1625	44.02	-17.27	26.75	40.00	-13.25	QP
3		86.5027	44.73	-21.94	22.79	40.00	-17.21	QP
4		118.1860	42.15	-19.40	22.75	43.50	-20.75	QP
5		554.8251	37.67	-10.24	27.43	46.00	-18.57	QP
6		925.7563	30.44	-4.89	25.55	46.00	-20.45	QP

Left Earbuds

For 30MHz-1GHz



Vertical



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
		MHz	Level	Factor	ment			
			dBuV	dB	dBuV/m	dB/m	dB	Detector
1	*	30.5306	50.24	-18.54	31.70	40.00	-8.30	QP
2		47.4918	48.61	-17.30	31.31	40.00	-8.69	QP
3		69.8450	43.31	-19.94	23.37	40.00	-16.63	QP
4		109.7960	41.29	-20.89	20.40	43.50	-23.10	QP
5		144.3348	35.59	-17.85	17.74	43.50	-25.76	QP
6		485.6093	41.81	-13.96	27.85	46.00	-18.15	QP

Final Level =Receiver Read level + Correct Factor



■ Above 1GHz

Right Earbuds

Remark: For test above 1GHz 1M and 2M were test at Low, Middle, and High channel; only the worst result of 1M was reported as below:

CH Low (2402MHz)

Horizontal:

Frequency	Meter Reading	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4804	46.52	31.40	8.18	32.10	54.00	74.00	-20.00	peak
4804	29.18	31.40	8.18	32.10	36.66	54.00	-17.34	AVG
7206	42.84	35.80	10.83	31.40	58.07	74.00	-15.93	peak
7206	27.02	35.80	10.83	31.40	42.25	54.00	-11.75	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency	Meter Reading	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4804	44.78	31.40	8.18	32.10	52.26	74.00	-21.74	peak
4804	28.12	31.40	8.18	32.10	35.60	54.00	-18.40	AVG
7206	42.03	35.80	10.83	31.40	57.26	74.00	-16.74	peak
7206	29.12	35.80	10.83	31.40	44.35	54.00	-9.65	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.



CH Middle (2440MHz)

Horizontal:

Frequency	Meter Reading	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4880	48.02	31.40	9.17	32.10	56.49	74.00	-17.51	peak
4880	30.95	31.40	9.17	32.10	39.42	54.00	-14.58	AVG
7320	43.12	35.80	10.83	31.40	58.35	74.00	-15.65	peak
7320	28.98	35.80	10.83	31.40	44.21	54.00	-9.79	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency	Meter Reading	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4880	47.02	31.40	9.17	32.10	55.49	74.00	-18.51	peak
4880	30.95	31.40	9.17	32.10	39.42	54.00	-14.58	AVG
7320	42.66	35.80	10.83	31.40	57.89	74.00	-16.11	peak
7320	27.11	35.80	10.83	31.40	42.34	54.00	-11.66	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.



CH High (2480MHz)

Horizontal:

Frequency	Meter Reading	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4960	48.62	31.40	9.17	32.10	57.09	74.00	-16.91	peak
4960	32.13	31.40	9.17	32.10	40.60	54.00	-13.40	AVG
7440	44.02	35.80	10.83	31.40	59.25	74.00	-14.75	peak
7440	29.15	35.80	10.83	31.40	44.38	54.00	-9.62	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency	Meter Reading	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4960	45.12	31.40	9.17	32.10	53.59	74.00	-20.41	peak
4960	32.02	31.40	9.17	32.10	40.49	54.00	-13.51	AVG
7440	43.15	35.80	10.83	31.40	58.38	74.00	-15.62	peak
7440	26.32	35.80	10.83	31.40	41.55	54.00	-12.45	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Remark:

(1) Data of measurement within this frequency range shown “--- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(2) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed.

**Left Earbuds**

Remark: For test above 1GHz 1M and 2M were test at Low, Middle, and High channel; only the worst result of 1M was reported as below:

CH Low (2402MHz)**Horizontal:**

Frequency	Meter Reading	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4804	46.52	31.40	8.18	32.10	54.00	74.00	-20.00	peak
4804	30.20	31.40	8.18	32.10	37.68	54.00	-16.32	AVG
7206	43.25	35.80	10.83	31.40	58.48	74.00	-15.52	peak
7206	28.11	35.80	10.83	31.40	43.34	54.00	-10.66	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency	Meter Reading	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4804	46.32	31.40	8.18	32.10	53.80	74.00	-20.20	peak
4804	29.23	31.40	8.18	32.10	36.71	54.00	-17.29	AVG
7206	43.25	35.80	10.83	31.40	58.48	74.00	-15.52	peak
7206	28.87	35.80	10.83	31.40	44.10	54.00	-9.90	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.



CH Middle (2440MHz)

Horizontal:

Frequency	Meter Reading	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4880	48.02	31.40	9.17	32.10	56.49	74.00	-17.51	peak
4880	31.02	31.40	9.17	32.10	39.49	54.00	-14.51	AVG
7320	43.56	35.80	10.83	31.40	58.79	74.00	-15.21	peak
7320	28.65	35.80	10.83	31.40	43.88	54.00	-10.12	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency	Meter Reading	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4880	46.85	31.40	9.17	32.10	55.32	74.00	-18.68	peak
4880	31.25	31.40	9.17	32.10	39.72	54.00	-14.28	AVG
7320	43.03	35.80	10.83	31.40	58.26	74.00	-15.74	peak
7320	28.74	35.80	10.83	31.40	43.97	54.00	-10.03	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.



CH High (2480MHz)

Horizontal:

Frequency	Meter Reading	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4960	47.98	31.40	9.17	32.10	56.45	74.00	-17.55	peak
4960	30.27	31.40	9.17	32.10	38.74	54.00	-15.26	AVG
7440	44.02	35.80	10.83	31.40	59.25	74.00	-14.75	peak
7440	29.63	35.80	10.83	31.40	44.86	54.00	-9.14	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency	Meter Reading	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4960	46.12	31.40	9.17	32.10	54.59	74.00	-19.41	peak
4960	31.47	31.40	9.17	32.10	39.94	54.00	-14.06	AVG
7440	42.33	35.80	10.83	31.40	57.56	74.00	-16.44	peak
7440	28.36	35.80	10.83	31.40	43.59	54.00	-10.41	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Remark:

- (1) Data of measurement within this frequency range shown “--- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (2) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed.



7. Test Setup Photo

Reference to the **appendix I** for details.

8. EUT Constructional Details

Reference to the **appendix II** for details.

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