

# FCC Test Report

Product Name	Wireless Headphones
Model No.	ATH-ANC900BT
FCC ID.	JFZANC900BT

Applicant	Audio-Technica Corporation
Address	2-46-1 Nishi-naruse, Machida, Tokyo, 194-8666, Japan

Date of Receipt	Oct. 24, 2018
Issued Date	Nov. 08, 2018
Report No.	18A0319R-RFUSP01V00-A
Report Version	V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

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# Test Report

Issued Date: Nov. 08, 2018

Report No.: 18A0319R-RFUSP01V00-A



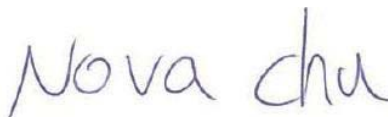
Product Name	Wireless Headphones
Applicant	Audio-Technica Corporation
Address	2-46-1 Nishi-naruse, Machida, Tokyo, 194-8666, Japan
Manufacturer	Audio-Technica Corporation
Model No.	ATH-ANC900BT
FCC ID.	JFZANC900BT
EUT Rated Voltage	DC 3.8V (Power by Battery)
EUT Test Voltage	DC 3.8V (Power by Battery)
Trade Name	Audio-Technica Corporation
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2017 ANSI C63.4: 2014, ANSI C63.10: 2013 KDB 558074 D01 15.247 Meas Guidance v05
Test Result	Complied

Documented By :



( Senior Adm. Specialist / Joanne Lin )

Tested By :



( Engineer / Nova Chu )

Approved By :



( Director / Vincent Lin )

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## 1. GENERAL INFORMATION

### 1.1. EUT Description

Product Name	Wireless Headphones
Trade Name	Audio-Technica Corporation
Model No.	ATH-ANC900BT
FCC ID.	JFZANC900BT
Frequency Range	2402 – 2480MHz
Channel Number	40CH
Type of Modulation	GFSK(1Mbps)
Antenna Type	Chip Antenna
Channel Control	Auto
Antenna Gain	Refer to the table “Antenna List”

#### Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	mitsubishi	AM03DP-ST01	Chip Antenna	1.2 dBi for 2.4 GHz

Note: The antenna of EUT is conforming to FCC 15.203.

#### Center Frequency of Each Channel: (For V4.1)

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 00:	2402 MHz	Channel 01:	2404 MHz	Channel 02:	2406 MHz	Channel 03:	2408 MHz
Channel 04:	2410 MHz	Channel 05:	2412 MHz	Channel 06:	2414 MHz	Channel 07:	2416 MHz
Channel 08:	2418 MHz	Channel 09:	2420 MHz	Channel 10:	2422 MHz	Channel 11:	2424 MHz
Channel 12:	2426 MHz	Channel 13:	2428 MHz	Channel 14:	2430 MHz	Channel 15:	2432 MHz
Channel 16:	2434 MHz	Channel 17:	2436 MHz	Channel 18:	2438 MHz	Channel 19:	2440 MHz
Channel 20:	2442 MHz	Channel 21:	2444 MHz	Channel 22:	2446 MHz	Channel 23:	2448 MHz
Channel 24:	2450 MHz	Channel 25:	2452 MHz	Channel 26:	2454 MHz	Channel 27:	2456 MHz
Channel 28:	2458 MHz	Channel 29:	2460 MHz	Channel 30:	2462 MHz	Channel 31:	2464 MHz
Channel 32:	2466 MHz	Channel 33:	2468 MHz	Channel 34:	2470 MHz	Channel 35:	2472 MHz
Channel 36:	2474 MHz	Channel 37:	2476 MHz	Channel 38:	2478 MHz	Channel 39:	2480 MHz

Note:

1. The EUT is a Wireless Headphones with built-in Bluetooth V4.1 、V2.1+EDR transceiver, this report for Bluetooth V4.1.
2. These tests were conducted on a sample for the purpose of demonstrating compliance of Bluetooth V4.1 transmitter with Part 15 Subpart C Paragraph 15.247 for spread spectrum devices.
3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
4. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

Test Mode	Mode 1: Transmit - BLE
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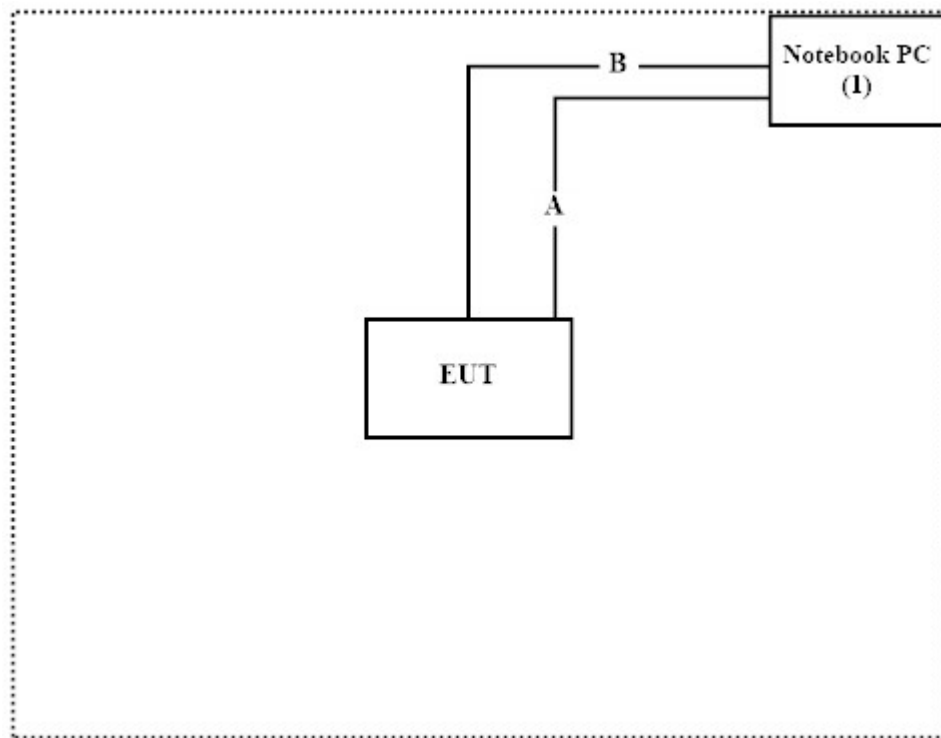
### 1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product		Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook PC	DELL	P62G	229FJC2	N/A

Signal Cable Type		Signal cable Description
A	USB Cable	Non-Shielded, 0.9m
B	Audio Cable	Non-Shielded, 1.2m

### 1.4. Configuration of Tested System



### 1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4.
- (2) Execute software “Blue Test 3 v2.6.2” on the Notebook PC.
- (3) Configure the test mode, the test channel, and the data rate.
- (4) Press “OK” to start the continuous Transmit.
- (5) Verify that the EUT works properly.

## 1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from DEKRA Testing and Certification Co., Ltd. Web Site:

<http://www.dekra.com.tw/english/about/certificates.aspx?bval=5>

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FCC Accreditation Number: TW0023

## 1.7. List of Test Equipment

### For Conduction measurements /ASR1

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	EMI Test Receiver	R&S	ESR7	101601	2017.01.06	2018.01.05
X	Two-Line V-Network	R&S	ENV216	101306	2017.02.16	2018.02.15
X	Two-Line V-Network	R&S	ENV216	101307	2017.03.17	2018.03.16
X	Coaxial Cable	Quietek	RG400_BNC	RF001	2017.05.24	2018.05.23

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with “X” are used to measure the final test results.
3. Test Software version : QuieTek EMI 2.0 V2.1.113

### For Conducted measurements /ASR4

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Spectrum Analyzer	R&S	FSV30	103464	2017.01.09	2018.01.08
X	Power Meter	Anritsu	ML2496A	1548003	2016.12.15	2017.12.14
X	Power Sensor	Anritsu	MA2411B	1531024	2016.12.15	2017.12.14
X	Power Sensor	Anritsu	MA2411B	1531025	2016.12.15	2017.12.14
	Bluetooth Tester	R&S	CBT	101238	2017.01.03	2018.01.02

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with “X” are used to measure the final test results.
3. Test Software version : QuieTek Conduction Test System V8.0.110

### For Radiated measurements /ACB1

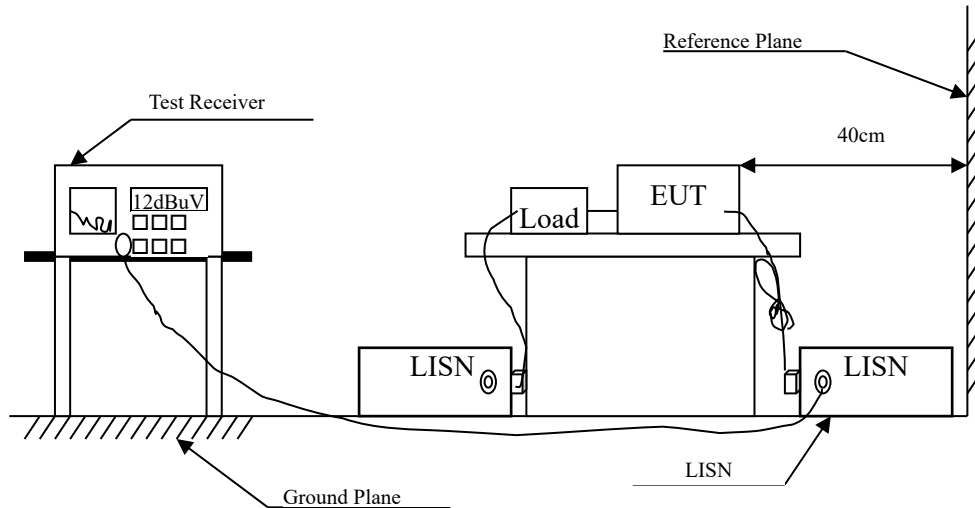
	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Loop Antenna	TESEQ	HLA6121	37133	2016.03.18	2018.03.17
X	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-674	2017.02.13	2018.02.12
X	Horn Antenna	ETS-Lindgren	3117	00203800	2016.10.13	2017.10.12
X	Horn Antenna	Com-Power	AH-840	101087	2017.05.24	2018.05.23
X	Pre-Amplifier	EMCI	EMC001330	980316	2017.05.16	2018.05.15
X	Pre-Amplifier	EMCI	EMC051835SE	980311	2017.05.17	2018.05.16
X	Pre-Amplifier	EMCI	EMC05820SE	980310	2017.05.17	2018.05.16
X	Pre-Amplifier	EMCI	EMC184045SE	980314	2017.05.17	2018.05.16
X	Filter	MICRO TRONICS	BRM50702	G249	2017.08.11	2018.08.10
	Filter	MICRO TRONICS	BRM50716	G187	2017.08.16	2018.08.15
X	EMI Test Receiver	R&S	ESR7	101602	2016.12.15	2017.12.14
X	Spectrum Analyzer	R&S	FSV40	101148	2017.01.24	2018.01.23
X	Coaxial Cable	SUHNER	SUCOFLEX 106	RF002	2017.05.25	2018.05.24
X	Mircoflex Cable	HUBER SUHNER	SUCOFLEX 102	MY3381/2	2017.08.11	2018.08.10

Note:

1. Loop Antenna is calibrated every two year, the other equipments are calibrated every one year.
2. The test instruments marked with “X” are used to measure the final test results.
3. Test Software version : QuieTek EMI 2.0 V2.1.113

## 2. Conducted Emission

### 2.1. Test Setup



### 2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dB $\mu$ V) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges.

### **2.3. Test Procedure**

The EUT and Peripherals are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. 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.)

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 the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

The EUT was setup to ANSI C63.4, 2014; tested to DTS test procedure of FCC KDB-558074 for compliance to FCC 47CFR Subpart C requirements.

### **2.4. Uncertainty**

$\pm 2.35\text{dB}$

## 2.5. Test Result of Conducted Emission

Product : Wireless Headphones  
 Test Item : Conducted Emission Test  
 Power Line : Line 1  
 Test Mode : Mode 1: Transmit - BLE (2440MHz)  
 Test Date : 2018/10/30

Frequency MHz	Correct Factor dB	Reading Level dB $\mu$ V	Measurement Level dB $\mu$ V	Margin dB	Limit dB $\mu$ V
<b>LINE 1</b>					
<b>Quasi-Peak</b>					
0.168	9.610	38.247	47.857	-17.629	65.486
0.346	9.619	29.691	39.311	-21.089	60.400
0.445	9.626	29.925	39.552	-18.019	57.571
0.539	9.630	27.779	37.409	-18.591	56.000
3.615	9.706	21.409	31.115	-24.885	56.000
14.917	9.919	25.233	35.152	-24.848	60.000
<b>Average</b>					
0.168	9.610	25.593	35.203	-20.283	55.486
0.346	9.619	21.675	31.294	-19.106	50.400
0.445	9.626	16.124	25.750	-21.821	47.571
0.539	9.630	14.935	24.565	-21.435	46.000
3.615	9.706	14.881	24.587	-21.413	46.000
14.917	9.919	13.271	23.190	-26.810	50.000

### Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Wireless Headphones  
 Test Item : Conducted Emission Test  
 Power Line : Line 2  
 Test Mode : Mode 1: Transmit - BLE (2440MHz)  
 Test Date : 2018/10/30

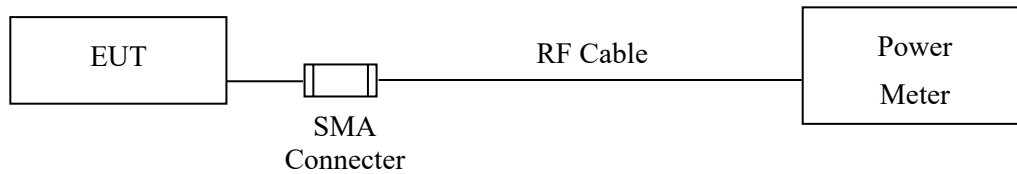
Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dB $\mu$ V	dB $\mu$ V	dB	dB $\mu$ V
<b>LINE 2</b>					
<b>Quasi-Peak</b>					
0.166	9.603	36.668	46.271	-19.272	65.543
0.415	9.618	28.327	37.945	-20.484	58.429
0.661	9.628	21.793	31.420	-24.580	56.000
5.017	9.740	18.371	28.111	-31.889	60.000
13.430	9.895	26.241	36.136	-23.864	60.000
15.819	9.942	22.594	32.536	-27.464	60.000
<b>Average</b>					
0.166	9.603	19.346	28.949	-26.594	55.543
0.415	9.618	18.851	28.469	-19.960	48.429
0.661	9.628	10.387	20.015	-25.985	46.000
5.017	9.740	12.643	22.383	-27.617	50.000
13.430	9.895	19.908	29.803	-20.197	50.000
15.819	9.942	13.528	23.470	-26.530	50.000

## Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

### 3. Peak Power Output

#### 3.1. Test Setup



#### 3.2. Limit

The maximum peak power shall be less 1Watt.

#### 3.3. Test Procedure

Tested according to DTS test procedure of KDB 558074 for compliance to FCC 47CFR 15.247 requirements. The maximum peak conducted output power using KDB 558074 section 8.3.1.3 PKPM1 Peak power meter method.

#### 3.4. Uncertainty

$\pm 0.86$  dB

### 3.5. Test Result of Peak Power Output

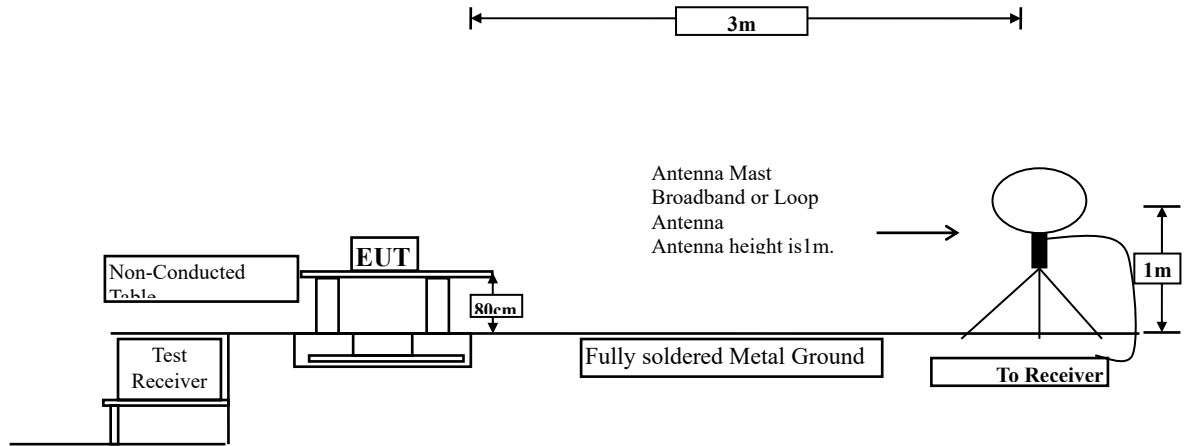
Product : Wireless Headphones  
Test Item : Peak Power Output  
Test Mode : Mode 1: Transmit - BLE  
Test Date : 2018/10/30

Channel No.	Frequency (MHz)	Measurement (dBm)	Required Limit	Result
Channel 00	2402.00	2.46	1 Watt= 30 dBm	Pass
Channel 19	2440.00	2.19	1 Watt= 30 dBm	Pass
Channel 39	2480.00	1.39	1 Watt= 30 dBm	Pass

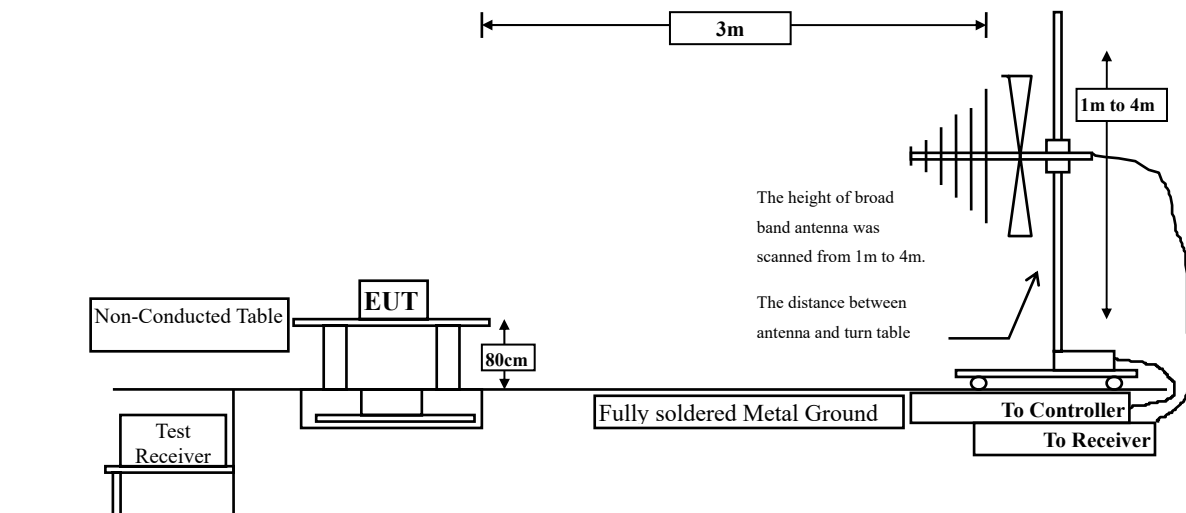
## 4. Radiated Emission

### 4.1. Test Setup

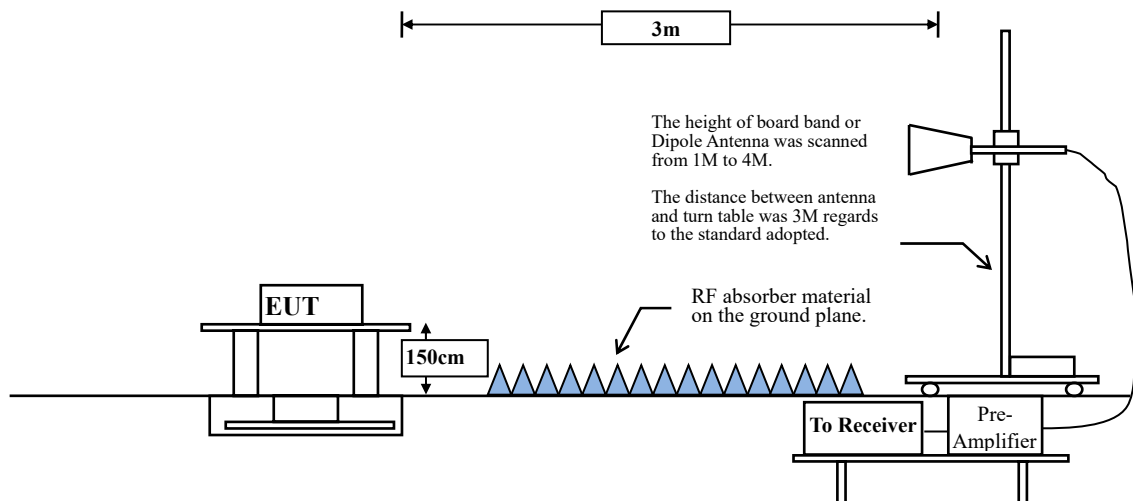
Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



## 4.2. Limits

### ➤ General Radiated Emission Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

- Remarks:
1. RF Voltage (dBμV) = 20 log RF Voltage (uV)
  2. In the Above Table, the tighter limit applies at the band edges.
  3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

### 4.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground, when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

The turn table is rotated 360 degrees to determine the position of the maximum emission level.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The measurement frequency range from 9kHz - 10th Harmonic of fundamental was investigated.

**RBW and VBW Parameter setting:**

According to KDB 558074 Peak power measurement procedure

RBW = as specified in Table 1.

$VBW \geq 3 \times RBW$ .

**Table 1 —RBW as a function of frequency**

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

According to KDB 558074 Average power measurement procedure

RBW = 1MHz.

VBW = 10Hz, when duty cycle  $\geq 98 \%$

$VBW \geq 1/T$ , when duty cycle  $< 98 \%$

( T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
BLE	70.12	0.4420	2262	3000

Note: Duty Cycle Refer to Section 9

**4.4. Uncertainty**

Horizontal polarization :

30-300MHz:  $\pm 4.08\text{dB}$  ; 300M-1GHz:  $\pm 3.86\text{dB}$  ; 1-18GHz:  $\pm 3.77\text{dB}$  ; 18-40GHz:  $\pm 3.98\text{dB}$

Vertical polarization :

30-300MHz:  $\pm 4.81\text{dB}$  ; 300M-1GHz:  $\pm 3.87\text{dB}$  ; 1-18GHz:  $\pm 3.83\text{dB}$  ; 18-40GHz:  $\pm 3.98\text{dB}$

#### 4.5. Test Result of Radiated Emission

Product : Wireless Headphones  
 Test Item : Harmonic Radiated Emission  
 Test Mode : Mode 1: Transmit - BLE (2402MHz)  
 Test Date : 2018/10/31

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dB $\mu$ V	dB $\mu$ V/m	dB	dB $\mu$ V/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
4804.000	-6.081	54.670	48.589	-25.411	74.000
7206.000	-3.033	51.330	48.297	-25.703	74.000
9608.000	-0.774	39.010	38.237	-35.763	74.000
<b>Average</b>					
<b>Detector:</b>					
--					54.000
<b>Vertical</b>					
<b>Peak Detector:</b>					
4804.000	-6.081	49.960	43.879	-30.121	74.000
7206.000	-3.033	51.630	48.597	-25.403	74.000
9608.000	-0.774	38.880	38.107	-35.893	74.000
<b>Average</b>					
<b>Detector:</b>					
--					54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Wireless Headphones  
 Test Item : Harmonic Radiated Emission  
 Test Mode : Mode 1: Transmit - BLE (2440MHz)  
 Test Date : 2018/10/31

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dB $\mu$ V	dB $\mu$ V/m	dB	dB $\mu$ V/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
4880.000	-6.045	54.210	48.165	-25.835	74.000
7320.000	-2.959	46.380	43.421	-30.579	74.000
9760.000	-0.492	41.410	40.918	-33.082	74.000
<b>Average</b>					
<b>Detector:</b>					
--					54.000
<b>Vertical</b>					
<b>Peak Detector:</b>					
4880.000	-6.045	50.410	44.365	-29.635	74.000
7320.000	-2.959	45.990	43.031	-30.969	74.000
9760.000	-0.492	41.510	41.018	-32.982	74.000
<b>Average</b>					
<b>Detector:</b>					
--					54.000

## Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Wireless Headphones  
 Test Item : Harmonic Radiated Emission  
 Test Mode : Mode 1: Transmit - BLE (2480MHz)  
 Test Date : 2018/10/31

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dB $\mu$ V	dB $\mu$ V/m	dB	dB $\mu$ V/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
4960.000	-6.041	52.650	46.609	-27.391	74.000
7440.000	-2.805	50.850	48.045	-25.955	74.000
9920.000	-0.260	41.190	40.930	-33.070	74.000
<b>Average</b>					
<b>Detector:</b>					
--					54.000
<b>Vertical</b>					
<b>Peak Detector:</b>					
4960.000	-6.041	50.980	44.939	-29.061	74.000
7440.000	-2.805	53.450	50.645	-23.355	74.000
9920.000	-0.260	40.950	40.690	-33.310	74.000
<b>Average</b>					
<b>Detector:</b>					
--					54.000

## Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Wireless Headphones  
 Test Item : General Radiated Emission  
 Test Mode : Mode 1: Transmit - BLE (2440MHz)  
 Test Date : 2018/11/01

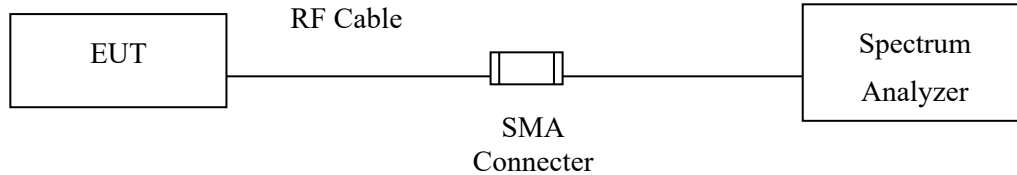
Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dB $\mu$ V	dB $\mu$ V/m	dB	dB $\mu$ V/m
<b>Horizontal</b>					
128.406	-12.547	37.554	25.006	-18.494	43.500
295.696	-10.481	31.960	21.479	-24.521	46.000
444.710	-6.928	32.124	25.196	-20.804	46.000
603.565	-3.982	28.981	24.999	-21.001	46.000
787.725	-1.752	32.114	30.362	-15.638	46.000
997.188	0.970	30.149	31.119	-22.881	54.000
<b>Vertical</b>					
148.087	-11.146	33.084	21.938	-21.562	43.500
306.942	-10.176	31.714	21.538	-24.462	46.000
460.174	-6.621	31.886	25.265	-20.735	46.000
610.594	-3.940	30.110	26.170	-19.830	46.000
765.232	-1.915	31.508	29.593	-16.407	46.000
991.565	0.897	30.576	31.473	-22.527	54.000

## Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

## 5. RF Antenna Conducted Test

### 5.1. Test Setup



### 5.2. Limits

According to FCC 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 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, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

### 5.3. Test Procedure

The EUT was tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 100 kHz, Set VBW > RBW, scan up through 10th harmonic.

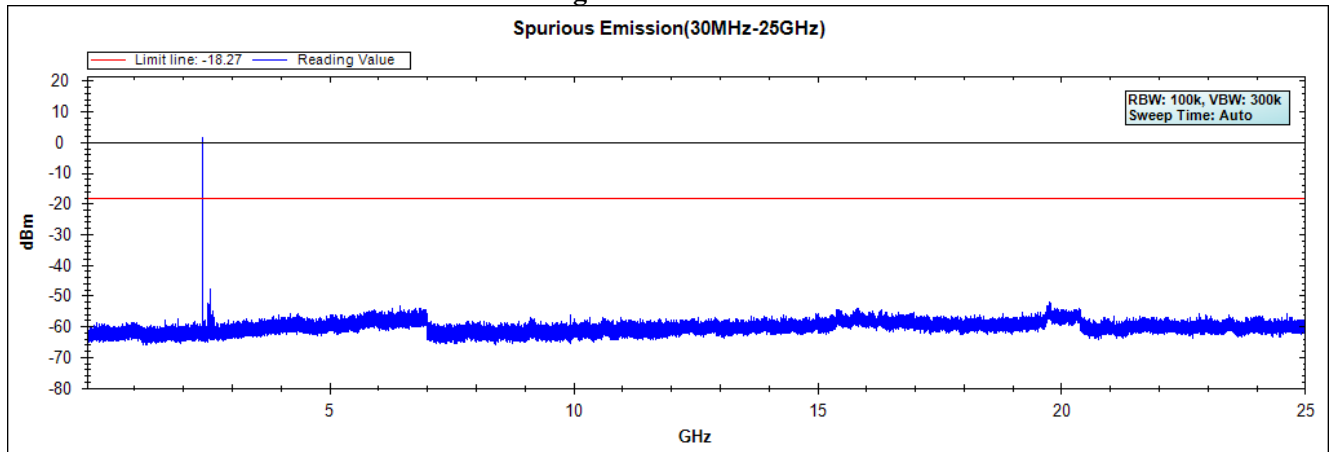
### 5.4. Uncertainty

±1.23dB

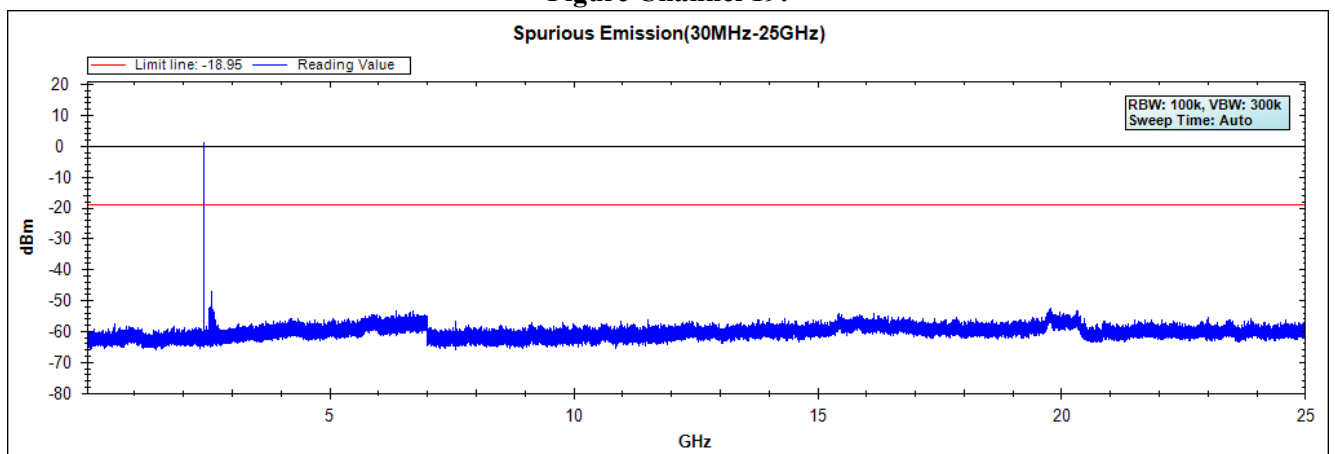
## 5.5. Test Result of RF Antenna Conducted Test

Product : Wireless Headphones  
Test Item : RF Antenna Conducted Test  
Test Mode : Mode 1: Transmit - BLE  
Test Date : 2018/10/30

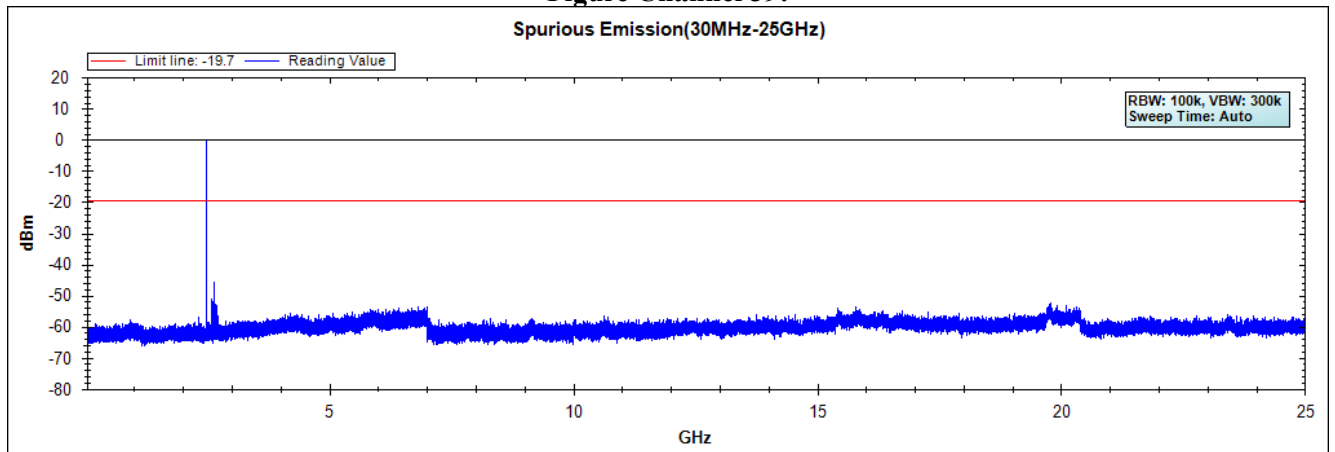
**Figure Channel 00:**



**Figure Channel 19:**



**Figure Channel 39:**

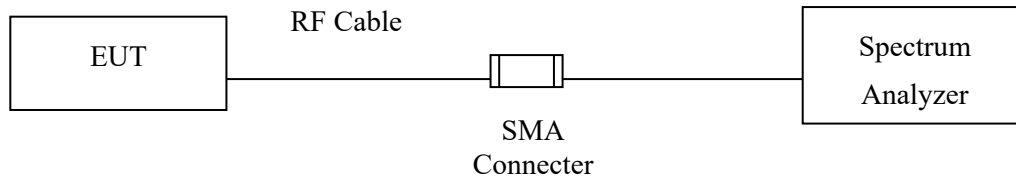


Note: The above test pattern is synthesized by multiple of the frequency range.

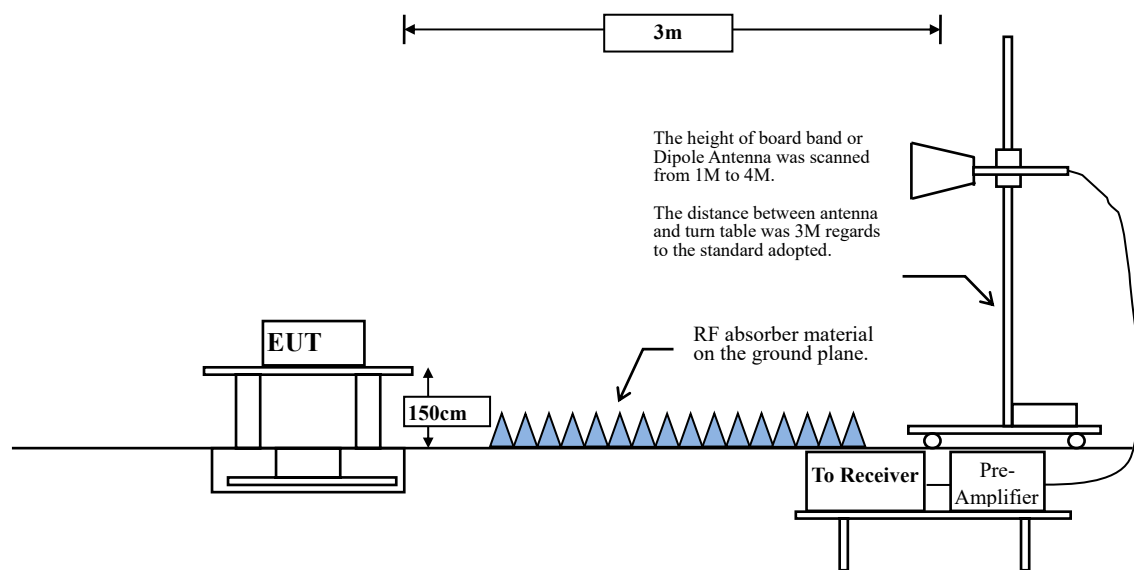
## 6. Band Edge

### 6.1. Test Setup

#### RF Conducted Measurement



#### RF Radiated Measurement:



## **6.2. Limit**

According to FCC 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 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, 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) (see Section 15.205(c)).

## **6.3. Test Procedure**

The EUT was setup according to ANSI C63.10, 2013 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.

**RBW and VBW Parameter setting:**

According to KDB 558074 Peak power measurement procedure

RBW = as specified in Table 1.

$VBW \geq 3 \times RBW$ .

**Table 1 —RBW as a function of frequency**

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

According to KDB 558074 Average power measurement procedure

RBW = 1MHz.

VBW = 10Hz, when duty cycle  $\geq 98\%$

$VBW \geq 1/T$ , when duty cycle  $< 98\%$

( T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
BLE	70.12	0.4420	2262	3000

Note: Duty Cycle Refer to Section 9

**6.4. Uncertainty**

Conducted:  $\pm 1.23\text{dB}$

Radiated:

Horizontal polarization : 1-18GHz:  $\pm 3.77\text{dB}$

Vertical polarization : 1-18GHz :  $\pm 3.83\text{dB}$

## 6.5. Test Result of Band Edge

Product : Wireless Headphones  
 Test Item : Band Edge  
 Test Mode : Mode 1: Transmit - BLE (2402MHz)  
 Test Date : 2018/10/29

### RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
00 (Peak)	2390.000	10.262	37.931	48.193	74.00	54.00	Pass
00 (Peak)	2400.000	10.304	56.735	67.038	--	--	--
00 (Peak)	2402.319	10.312	88.418	98.731	--	--	--
00 (Average)	2361.594	10.146	26.693	36.840	74.00	54.00	Pass
00 (Average)	2390.000	10.262	25.847	36.109	74.00	54.00	Pass
00 (Average)	2400.000	10.304	42.668	52.971	--	--	--
00 (Average)	2402.029	10.312	87.715	98.027	--	--	--

Figure Channel 00:

Horizontal (Peak)

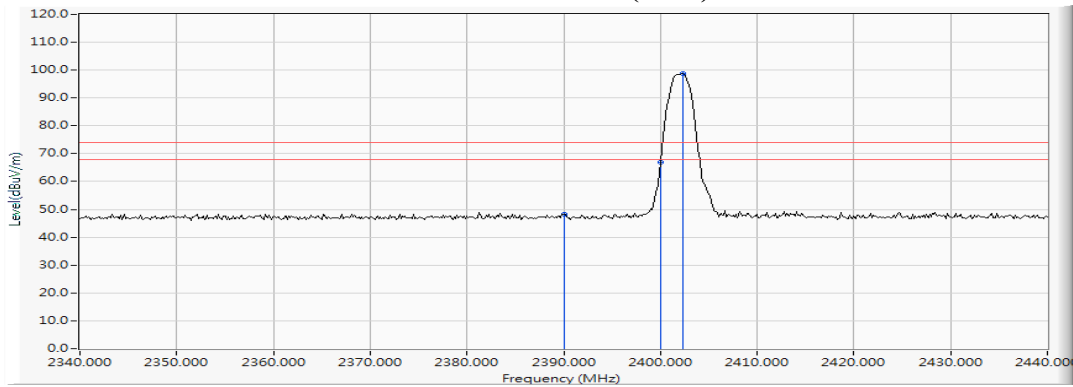
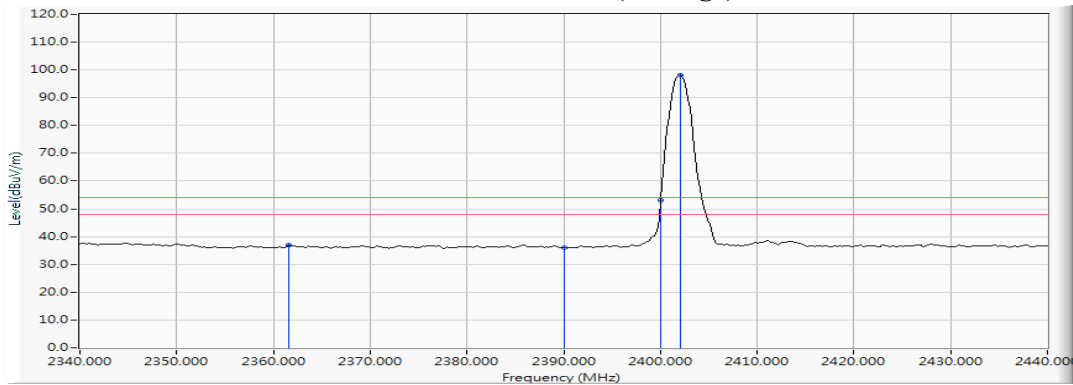


Figure Channel 00:

Horizontal (Average)



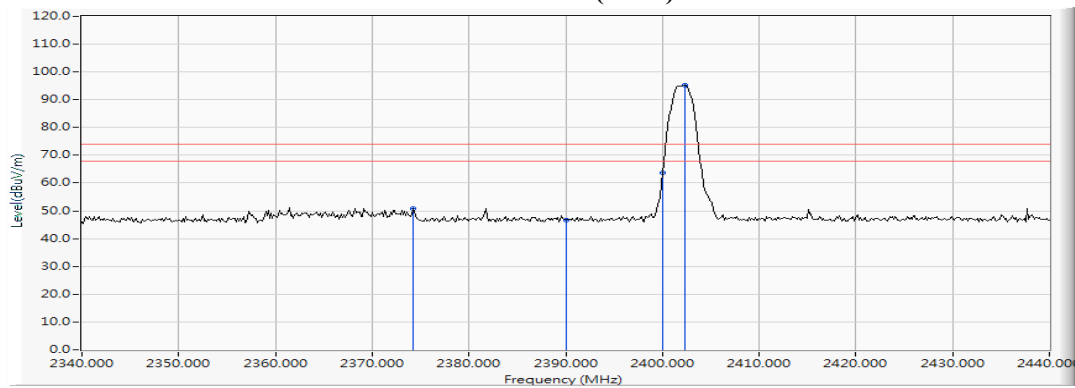
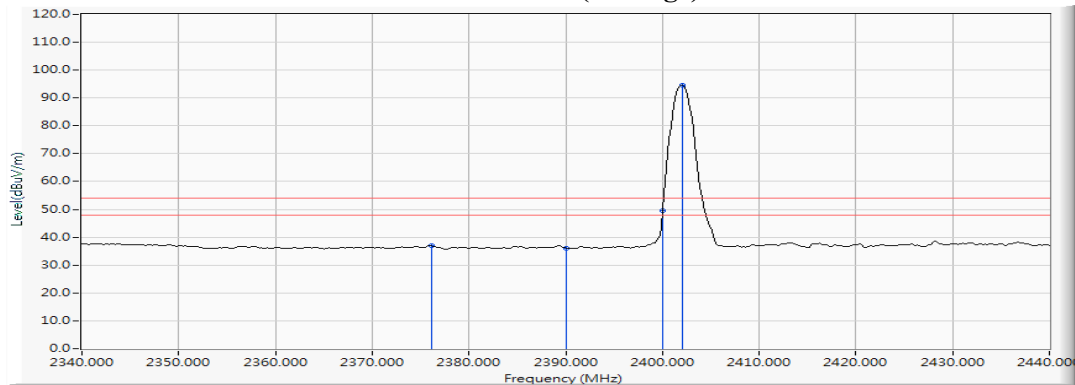
Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wireless Headphones  
 Test Item : Band Edge  
 Test Mode : Mode 1: Transmit - BLE (2402MHz)  
 Test Date : 2018/10/29

**RF Radiated Measurement (Vertical):**

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Result
00 (Peak)	2374.203	10.198	40.518	50.716	74.00	54.00	Pass
00 (Peak)	2390.000	10.262	36.540	46.802	74.00	54.00	Pass
00 (Peak)	2400.000	10.304	53.361	63.664	--	--	--
00 (Peak)	2402.319	10.312	84.964	95.277	--	--	--
00 (Average)	2376.087	10.205	26.667	36.872	74.00	54.00	Pass
00 (Average)	2390.000	10.262	25.804	36.066	74.00	54.00	Pass
00 (Average)	2400.000	10.304	39.361	49.664	--	--	--
00 (Average)	2402.029	10.312	84.245	94.557	--	--	--

**Figure Channel 00: Vertical (Peak)****Figure Channel 00: Vertical (Average)**

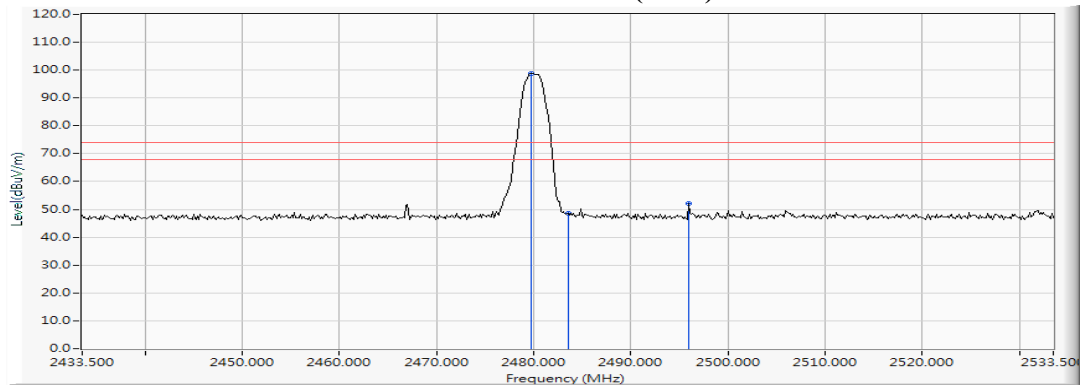
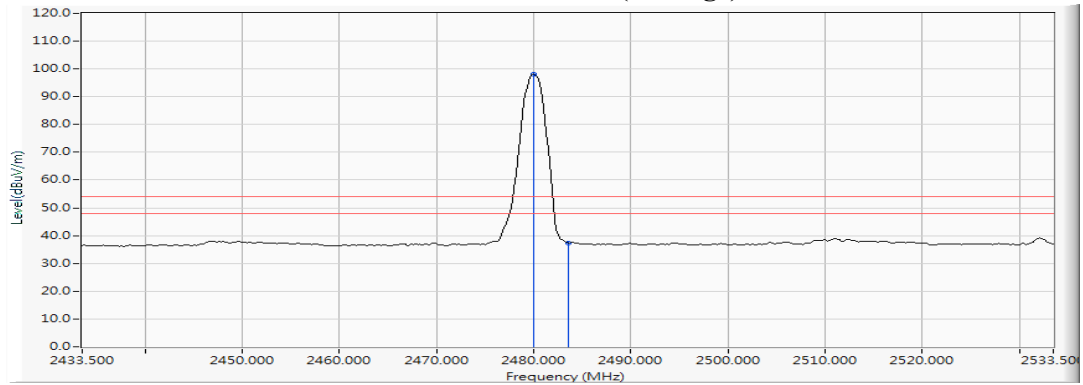
Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wireless Headphones  
 Test Item : Band Edge  
 Test Mode : Mode 1: Transmit - BLE (2480MHz)  
 Test Date : 2018/10/29

**RF Radiated Measurement (Horizontal):**

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Result
39 (Peak)	2479.732	10.627	88.261	98.888	--	--	--
39 (Peak)	2483.500	10.640	37.865	48.506	74.00	54.00	Pass
39 (Peak)	2495.964	10.690	41.326	52.016	74.00	54.00	Pass
39 (Average)	2480.022	10.628	87.494	98.122	--	--	--
39 (Average)	2483.500	10.640	26.671	37.312	74.00	54.00	Pass

**Figure Channel 39: Horizontal (Peak)****Figure Channel 39: Horizontal (Average)**

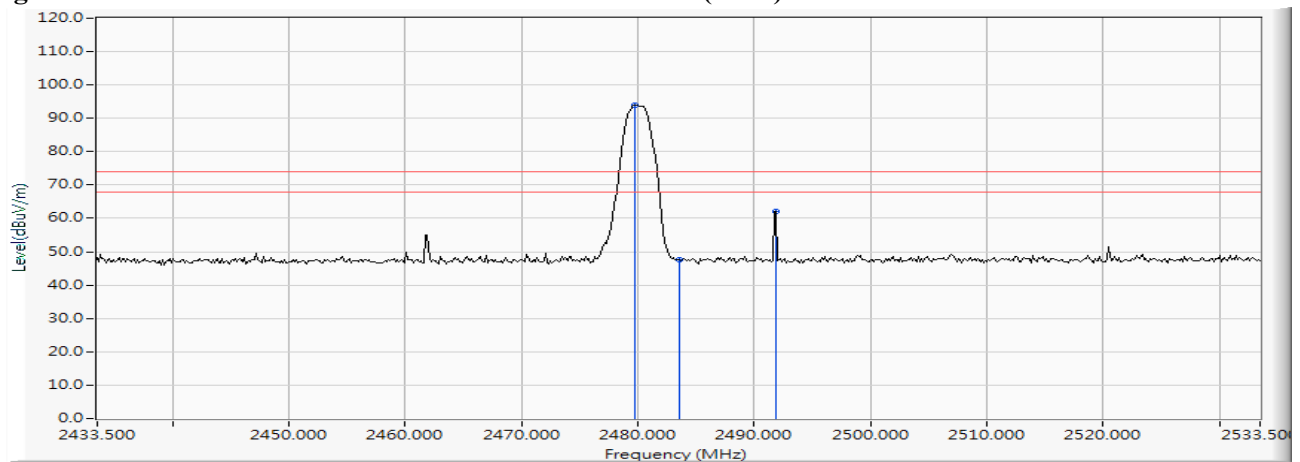
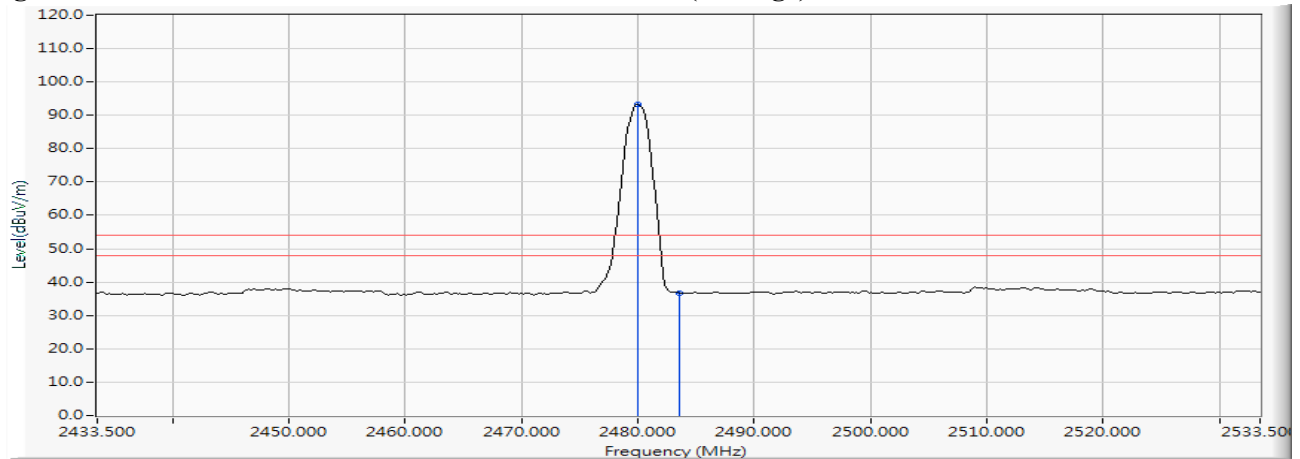
Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wireless Headphones  
 Test Item : Band Edge  
 Test Mode : Mode 1: Transmit - BLE (2480MHz)  
 Test Date : 2018/10/29

**RF Radiated Measurement (Vertical):**

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Average Limit (dB $\mu$ V/m)	Result
39 (Peak)	2479.732	10.627	83.432	94.059	--	--	--
39 (Peak)	2483.500	10.640	36.888	47.529	74.00	54.00	Pass
39 (Peak)	2491.906	10.674	51.433	62.107	74.00	54.00	Pass
39 (Average)	2480.022	10.628	82.641	93.269	--	--	--
39 (Average)	2483.500	10.640	26.180	36.821	74.00	54.00	Pass

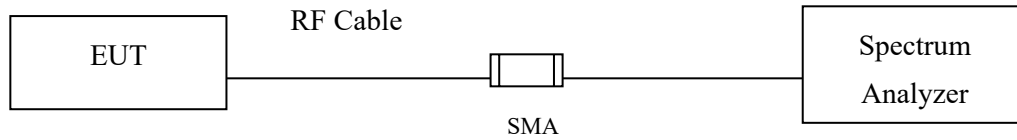
**Figure Channel 39:****Vertical (Peak)****Figure Channel 39:****Vertical (Average)**

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

## 7. 6dB Bandwidth

### 7.1. Test Setup



### 7.2. Limits

The minimum bandwidth shall be at least 500 kHz.

### 7.3. Test Procedure

The EUT was setup according to ANSI C63.10 2013; tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 1-5% of the emission bandwidth,  $VBW \geq 3 * RBW$

### 7.4. Uncertainty

$\pm 279.2 \text{ Hz}$

## 7.5. Test Result of 6dB Bandwidth

Product : Wireless Headphones  
 Test Item : 6dB Bandwidth Data  
 Test Mode : Mode 1: Transmit - BLE

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	730	>500	Pass
19	2440	740	>500	Pass
39	2480	730	>500	Pass

Figure Channel 00:

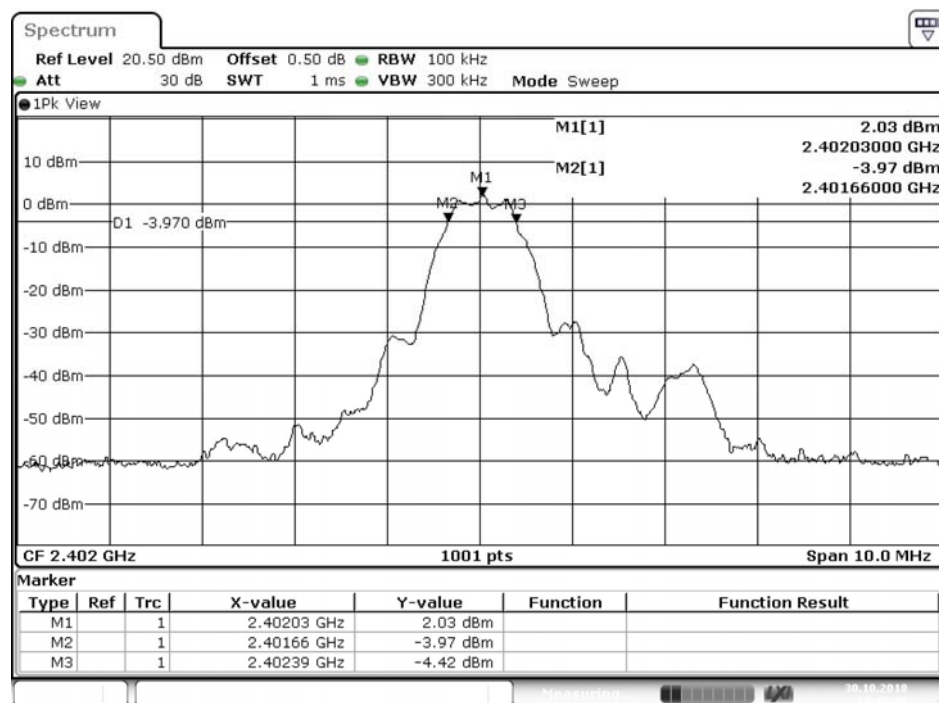
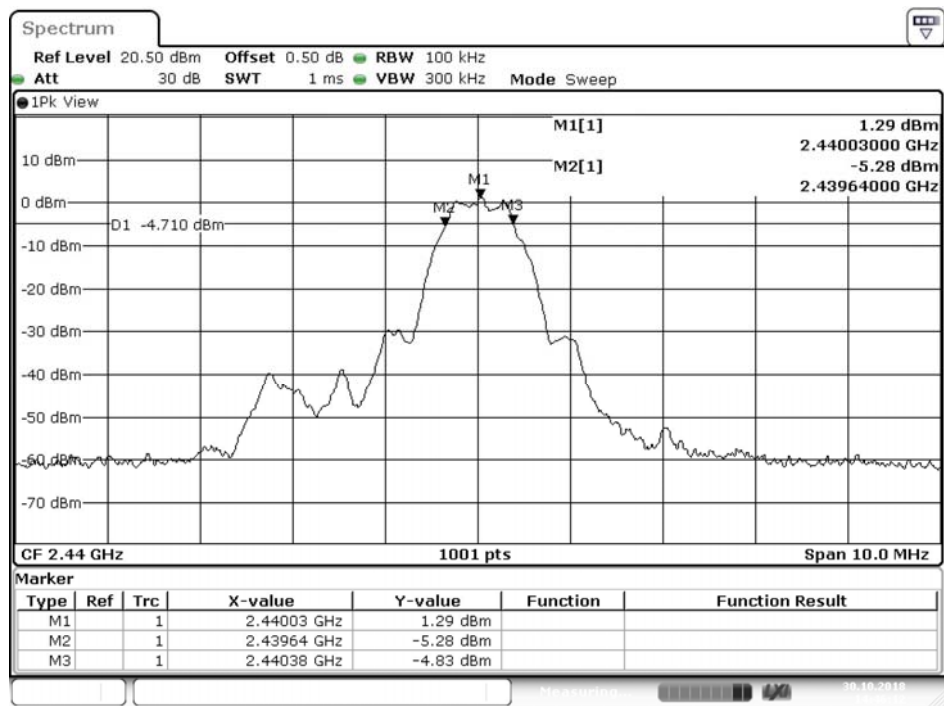
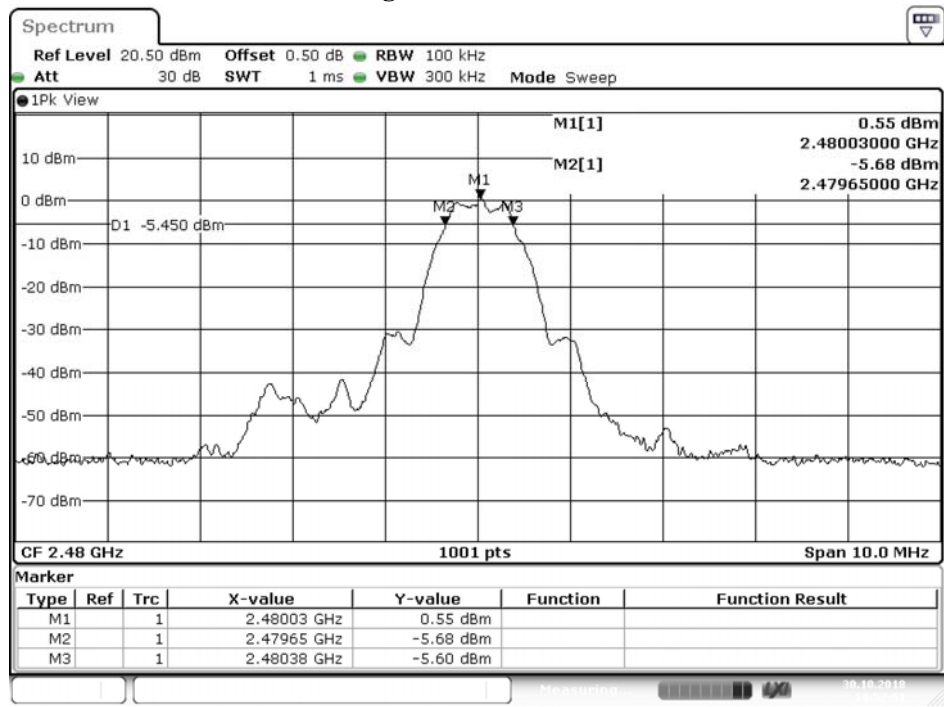


Figure Channel 19:



Date: 30.OCT.2018 14:46:12

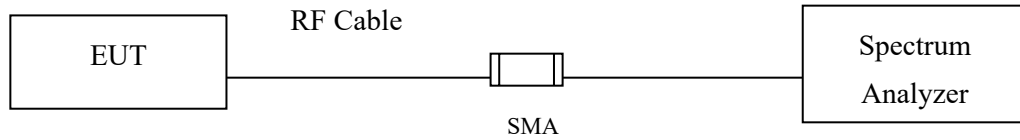
Figure Channel 39:



Date: 30.OCT.2018 14:52:52

## 8. Power Density

### 8.1. Test Setup



### 8.2. Limits

The transmitted power density averaged over any 1 second interval shall not be greater +8dBm in any 3kHz bandwidth.

### 8.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013, the maximum power spectral density using KDB 558074 section 8.4 PKPSD (peak PSD) method.

### 8.4. Uncertainty

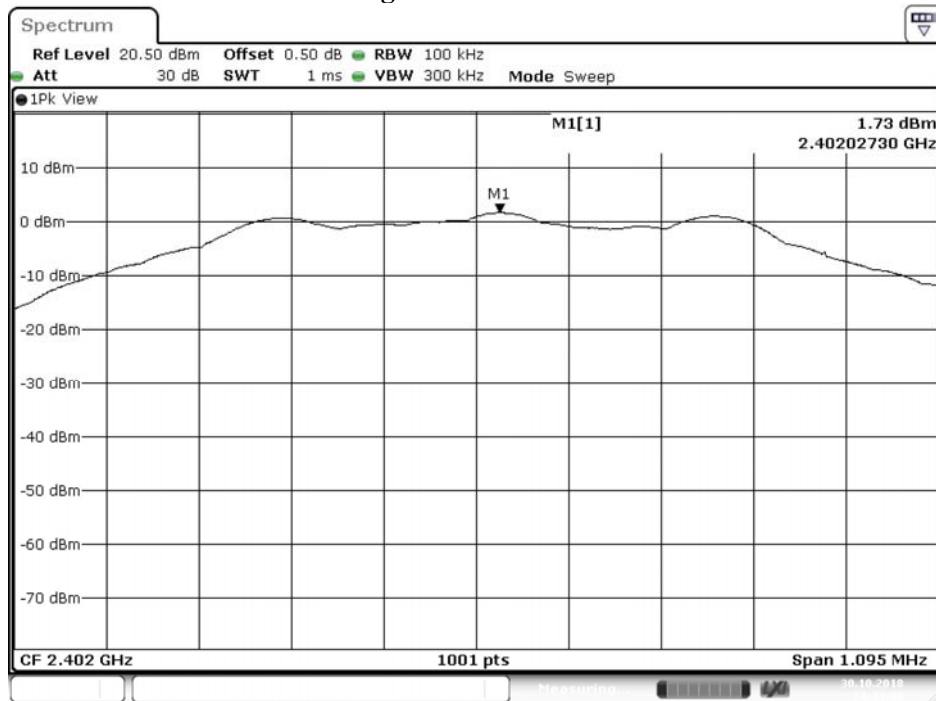
$\pm 1.23\text{dB}$

### 8.5. Test Result of Power Density

Product : Wireless Headphones  
 Test Item : Power Density Data  
 Test Mode : Mode 1: Transmit - BLE

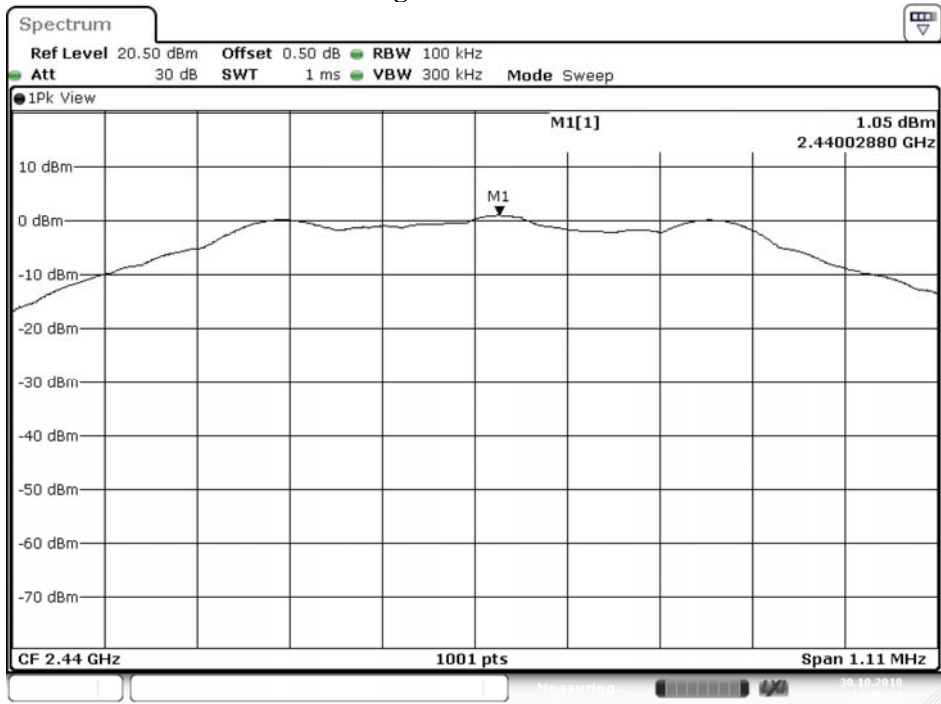
Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
00	2402	1.730	$\leq 8$ dBm	Pass
19	2440	1.050	$\leq 8$ dBm	Pass
39	2480	0.300	$\leq 8$ dBm	Pass

**Figure Channel 00:**



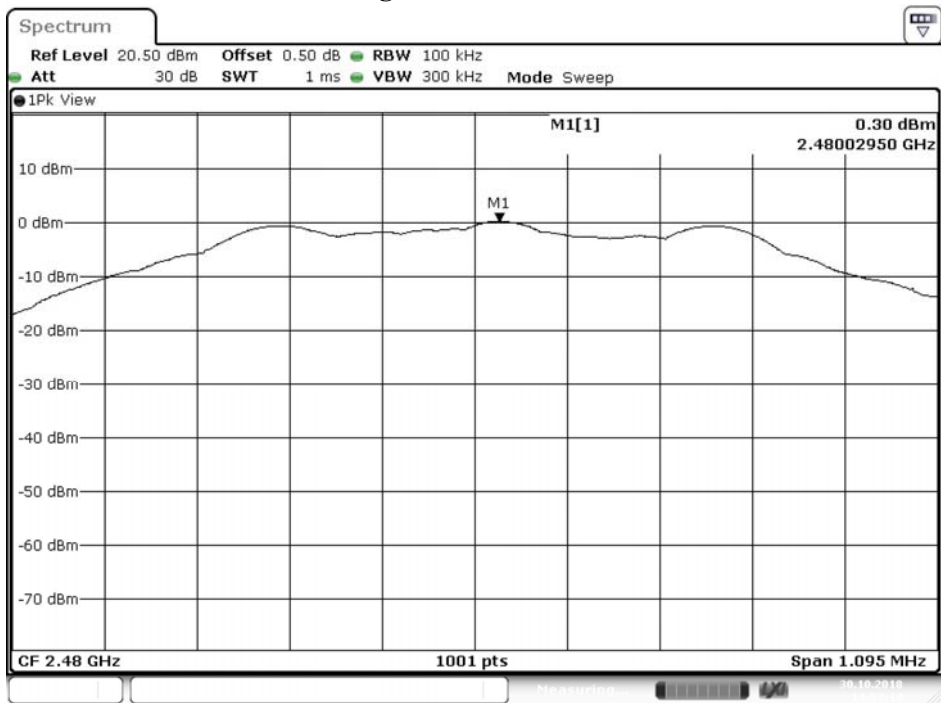
Date: 30.OCT.2018 14:43:06

Figure Channel 19:



Date: 30.OCT.2018 14:46:34

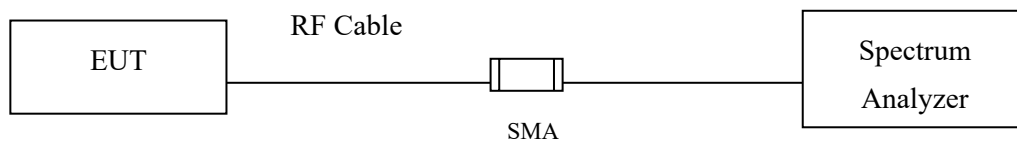
Figure Channel 39:



Date: 30.OCT.2018 14:53:14

## 9. Duty Cycle

### 9.1. Test Setup



### 9.2. Test Procedure

The EUT was setup according to ANSI C63.10 2013; tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

### 9.3. Uncertainty

$\pm 2.31\text{msec}$

#### 9.4. Test Result of Duty Cycle

Product : Wireless Headphones  
 Test Item : Duty Cycle  
 Test Mode : Mode 1: Transmit - BLE

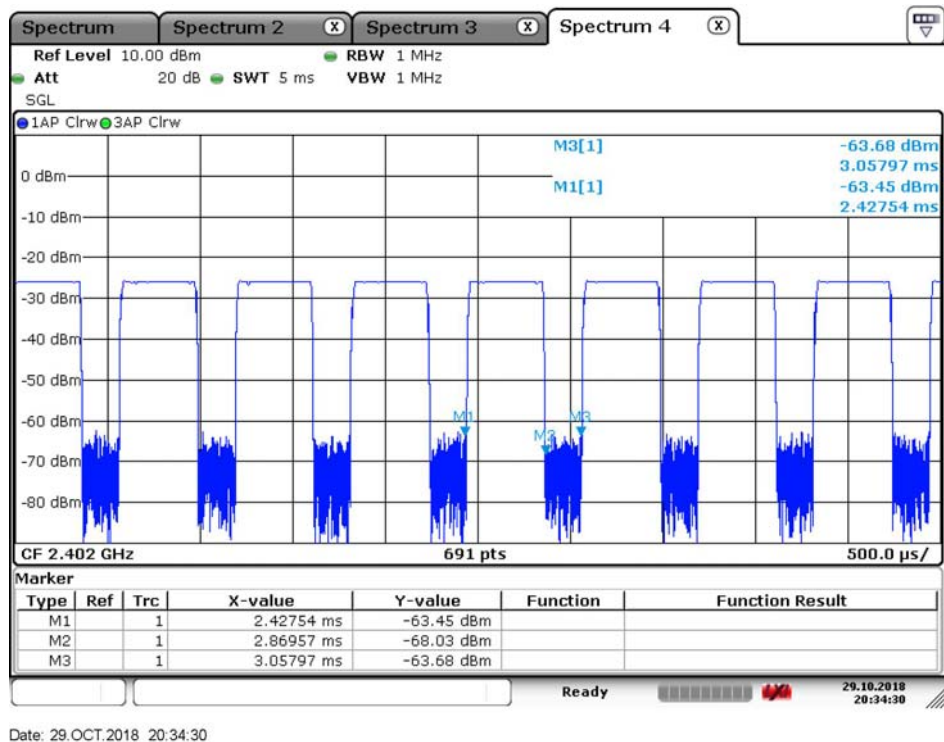
Duty Cycle Formula:

Duty Cycle = Ton / (Ton + Toff)

Duty Factor = 10 Log (1/Duty Cycle)

Results:

2.4GHz band	Ton (ms)	Ton + Toff (ms)	Duty Cycle (%)	Duty Factor (dB)
BLE	0.4420	0.6304	70.12	1.54



Date: 29.OCT.2018 20:34:30

## **10. EMI Reduction Method During Compliance Testing**

No modification was made during testing.