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TESTING  
CNAS L5313



# Test Report

## FCC Part15 Subpart C& Industry Canada RSS-247 Issue 1

Product Name : BLUETOOTH HEADPHONE

Model No. : LTP300

FCC ID : Y2SLTP300

IC : 9452A-LTP300

Applicant : Libratone A/S

Address : Sundkaj 9,DK-2150 Nordhavn,Denmark

Date of Receipt : Jun. 15, 2016

Test Date : Jun. 15, 2016~ Jun. 29, 2016

Issued Date : Jul. 22, 2016

Report No. : 1662056R -RF-US-P06V01

Report Version : V 1.1

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 of the equipment and evaluated measurement uncertainty herein.

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# Test Report Certification

Issued Date : Jul. 22, 2016

Report No. : 1662056R-RF-US-P06V01



Product Name : BLUETOOTH HEADPHONE  
Applicant : Libratone A/S  
Address : Sundkaj 9, DK-2150 Nordhavn, Denmark  
Manufacturer : Libratone A/S  
Address : Sundkaj 9, DK-2150 Nordhavn, Denmark  
Model No. : LTP300  
FCC ID : Y2SLTP300  
IC : 9452A-LTP300  
EUT Voltage : DC 3.7V  
Brand Name : LIBRATONE  
Applicable Standard : FCC CFR Title 47 Part 15 Subpart C: 2015  
ANSI C63.4: 2014; ANSI C63.10: 2013  
Industry Canada RSS-Gen Issue 4/RSS-247 Issue 1  
Test Result : Complied  
Performed Location : Quietek Corporation - Suzhou EMC Laboratory  
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FCC Registration Number: 800392; IC Lab Code: 4075B

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## Laboratory Information

We, **Quietek Corporation**, are an independent EMC and safety consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted(audited or listed) by the following related bodies in compliance with ISO 17025, EN 45001 and specified testing scope:

<b>Taiwan R.O.C.</b>	<b>:</b>	<b>BSMI, NCC, TAF</b>
<b>USA</b>	<b>:</b>	<b>FCC</b>
<b>Japan</b>	<b>:</b>	<b>VCCI</b>
<b>China</b>	<b>:</b>	<b>CNAS</b>

The related certificate for our laboratories about the test site and management system can be downloaded from Quietek Corporation's Web Site : <http://www.quietek.com/english/about/certificates.aspx?bval=5>  
The address and introduction of Quietek Corporation's laboratories can be founded in our Web site : [http://www.quietek.com/index\\_en.aspx](http://www.quietek.com/index_en.aspx)

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## History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
1662056R-RF-US-P06V01	V1.0	Initial Issued Report	Jul. 04, 2016
1662056R-RF-US-P06V01	V1.1	1. Added Hopping mode for Emissions in non-restricted frequency bands at P77. 2. Modified the diagram of conducted emission at P11.	Jul. 22, 2016

## 1. General Information

### 1.1. EUT Description

Product Name	BLUETOOTH HEADPHONE
Model No.	LTP300
Working Voltage	DC 3.7V
<b>Bluetooth Version:V3.0+V4.0</b>	
Bluetooth Specification	V3.0+V4.0
Frequency Range	2402- 2480 MHz
Channel Number	V3.0: 79 V4.0: 40
Channel Separation	V3.0: 1MHz V4.0: 2MHz
Type of Modulation	V3.0: GFSK, Pi/4 DQPSK, 8DPSK V4.0:GFSK
Data Rate	V3.0: 1Mbps(GFSK), 2Mbps(Pi/4 DQPSK), 3Mbps(8DPSK) V4.0: 1Mbps(GFSK)
Antenna Type	Reference to Antenna List
Peak Antenna Gain	Reference to Antenna List

Bluetooth Working Frequency of Each Channel: (For V3.0)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
00	2402 MHz	01	2403 MHz	02	2404 MHz	03	2405 MHz
04	2406 MHz	05	2407 MHz	06	2408 MHz	07	2409 MHz
08	2410 MHz	09	2411 MHz	10	2412 MHz	11	2413 MHz
12	2414 MHz	13	2415 MHz	14	2416 MHz	15	2417 MHz
16	2418 MHz	17	2419 MHz	18	2420 MHz	19	2421 MHz
20	2422 MHz	21	2423 MHz	22	2424 MHz	23	2425 MHz
24	2426 MHz	25	2427 MHz	26	2428 MHz	27	2429 MHz
28	2430 MHz	29	2431 MHz	30	2432 MHz	31	2433 MHz
32	2434 MHz	33	2435 MHz	34	2436 MHz	35	2437 MHz
36	2438 MHz	37	2439 MHz	38	2440 MHz	39	2441 MHz
40	2442 MHz	41	2443 MHz	42	2444 MHz	43	2445 MHz
44	2446 MHz	45	2447 MHz	46	2448 MHz	47	2449 MHz
48	2450 MHz	49	2451 MHz	50	2452 MHz	51	2453 MHz
52	2454 MHz	53	2455 MHz	54	2456 MHz	55	2457 MHz
56	2458 MHz	57	2459 MHz	58	2460 MHz	59	2461 MHz
60	2462 MHz	61	2463 MHz	62	2464 MHz	63	2465 MHz
64	2466 MHz	65	2467 MHz	66	2468 MHz	67	2469 MHz
68	2470 MHz	69	2471 MHz	70	2472 MHz	71	2473 MHz
72	2474 MHz	73	2475 MHz	74	2476 MHz	75	2477 MHz
76	2478 MHz	77	2479 MHz	78	2480 MHz	N/A	N/A

#### Bluetooth Antenna List

Antenna	Manufacturer	Model No.	Peak Gain
PCB Antenna	N/A	N/A	2dBi for 2.4GHz



## 1.2 Mode of Operation

QuieTek has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode
Mode 1: Transmitter-1Mbps(GFSK_DH5)
Mode 2: Transmitter-2Mbps(Pi/4 DQPSK_DH5)
Mode 3: Transmitter-3Mbps(8DPSK_DH5)
Mode 4: Transmitter-Hopping mode

Note:

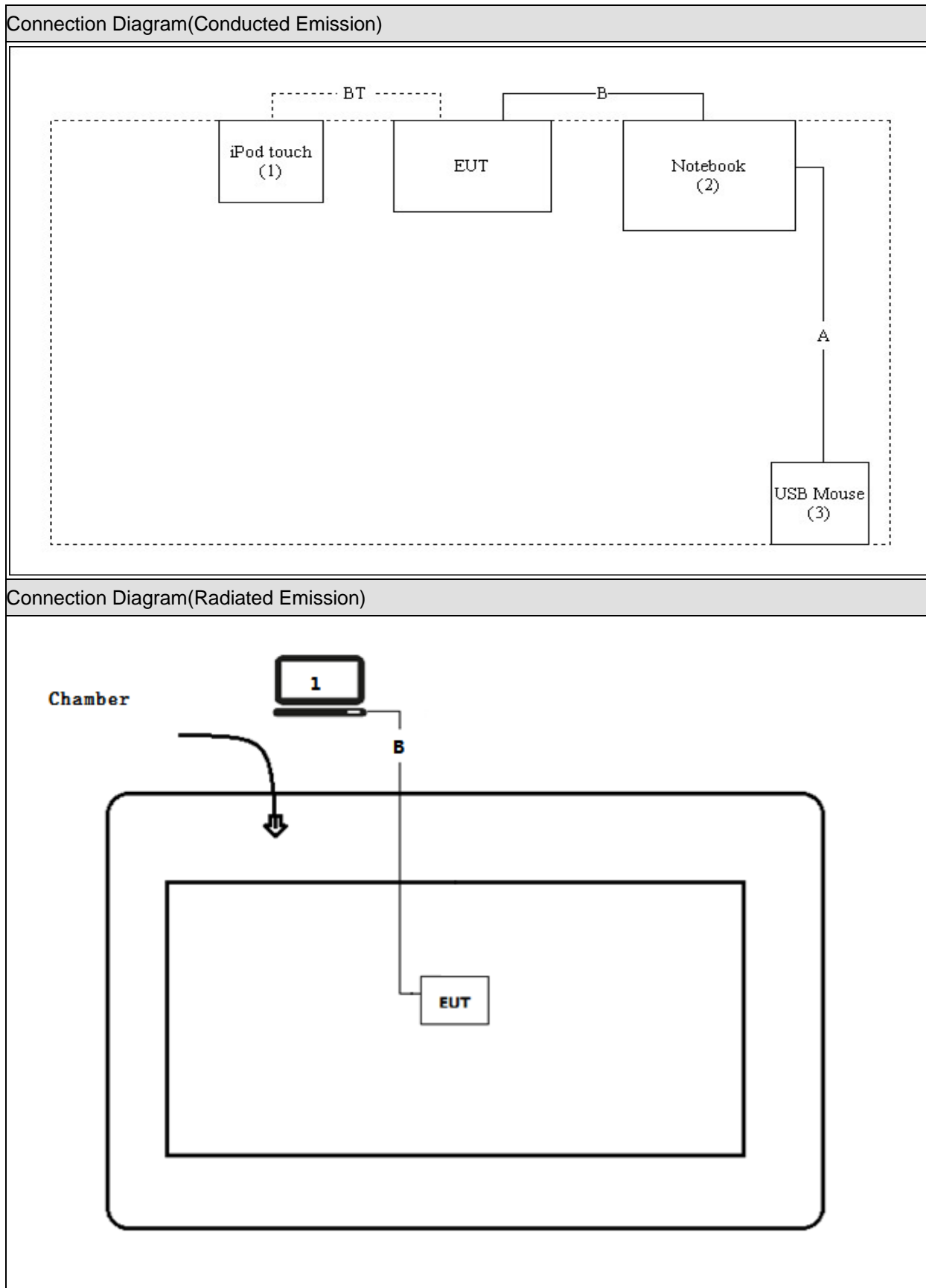
1. For portable device, radiated spurious emission was verified over X, Y, Z Axis, and shown the worst case on this report.
2. Regards to the frequency band operation for systems using FHSS modulation: normal operation (hopping) was selected to test for conducted, and the lowest, highest frequency channel for radiation spurious test.
3. The extreme test condition for voltage and temperature were declared by the manufacturer.
4. The reading values of all the test items contain cable loss.

### 1.3 Tested System Details

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

Product		Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook	Think Pad	2526	LV-A3285	Power by adapter

## 1.4 Configuration of Tested System



Signal Cable Type		Signal cable Description
A	USB Control Cable	Shielded, 70cm
B	USB Cable	Non-Shielded, 1.0m
C	Audio Cable	Non-Shielded, 1.2m

## 1.5 EUT Exercise Software

1	Setup the EUT and simulators as shown on above.
2	Turn on the power of all equipment.
3	Run the RF test software, and set the test mode and channel, then press OK to start continue Transmit.

## 2. Technical Test

### 2.1. Summary of Test Result

- ☒ No deviations from the test standards
- ☐ Deviations from the test standards as below description:

#### For FCC

Performed Test Item	Normative References	Test Performed	Deviation
Conducted Emission	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.207	Yes	No
Emissions in restricted frequency bands	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.209	Yes	No
20dB Bandwidth	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.247(a)(1)	Yes	No
Carrier Frequency Separation	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.247(a)(1)	Yes	No
Number of Hopping Frequencies	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.247(a)(1)(iii)	Yes	No
Time of Occupancy (Dwell Time)	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.247(a)(1)(iii)	Yes	No
Peak Output Power	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.247(b)(1)	Yes	No
Emissions in non-restricted frequency bands	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.215(c), 15.247(d)	Yes	No
Radiated Emission Band Edge	FCC CFR Title 47 Part 15 Subpart C: 2015 15.247(d)	Yes	No

# For IC

Performed Test Item	Normative References	Test Performed	Deviation
Conducted Emission	RSS-Gen Issue 4 Section 8.8	Yes	No
Radiated Emission	RSS-Gen Issue 4 Section 8.9	Yes	No
20dB Bandwidth	RSS-247 Issue 1 Section 5.1	Yes	No
Carrier Frequency Separation	RSS-247 Issue 1 Section 5.1	Yes	No
Number of Hopping Frequencies	RSS-247 Issue 1 Section 5.1	Yes	No
Time of Occupancy (Dwell Time)	RSS-247 Issue 1 Section 5.1	Yes	No
Peak Output Power	RSS-247 Issue 1 Section 5.4	Yes	No
Emissions in non-restricted frequency bands	RSS-247 Issue 1 Section 5.5	Yes	No
Radiated Emission Band Edge	RSS-Gen Issue 4 Section 8.10	Yes	No

## 2.2. Test Environment

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	21
Humidity (%RH)	25-75	50
Barometric pressure (mbar)	860-1060	950-1000



### 3. Conducted Emission

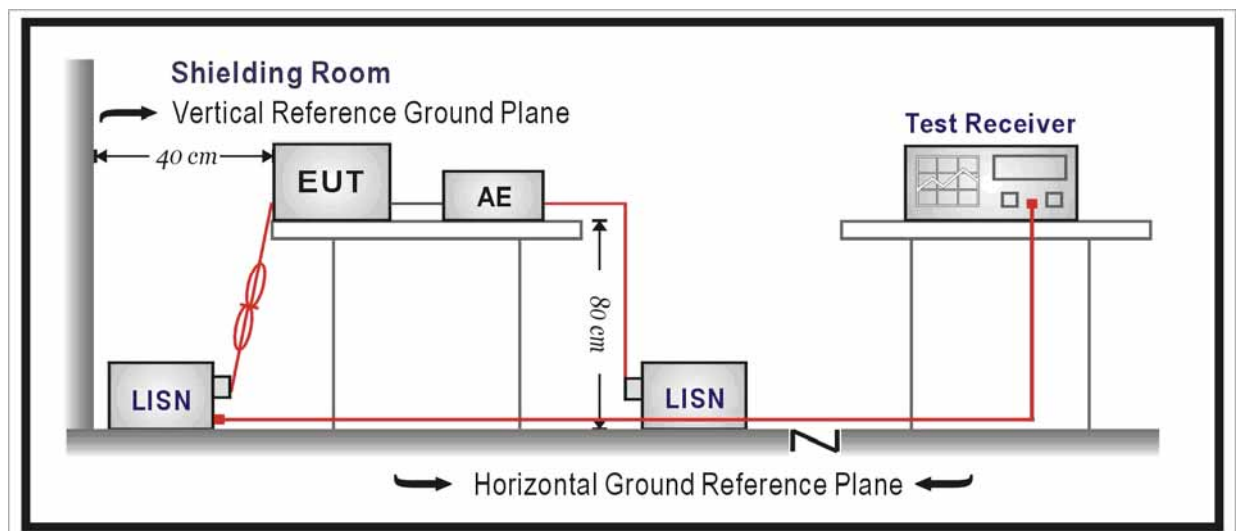
#### 3.1. Test Equipment

Conducted Emission / TR-1

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
EMI Test Receiver	R&S	ESCI	100726	2017.03.05
Two-Line V-Network	R&S	ENV216	100043	2017.03.05
Two-Line V-Network	R&S	ENV216	100044	2016.09.16
50ohm Coaxial Switch	Anritsu	MP59B	6200464462	2017.03.01
50ohm Termination	SHX	TF2	07081401	2016.09.16
Temperature/Humidity Meter	zhicheng	ZC1-2	TR1-TH	2017.01.04

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

#### 3.2. Test Setup



### 3.3. Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

### 3.4. Test Procedure

According to FCC ANSI C63.4: 2014 & ANSI C63.10: 2013.

The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)

Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

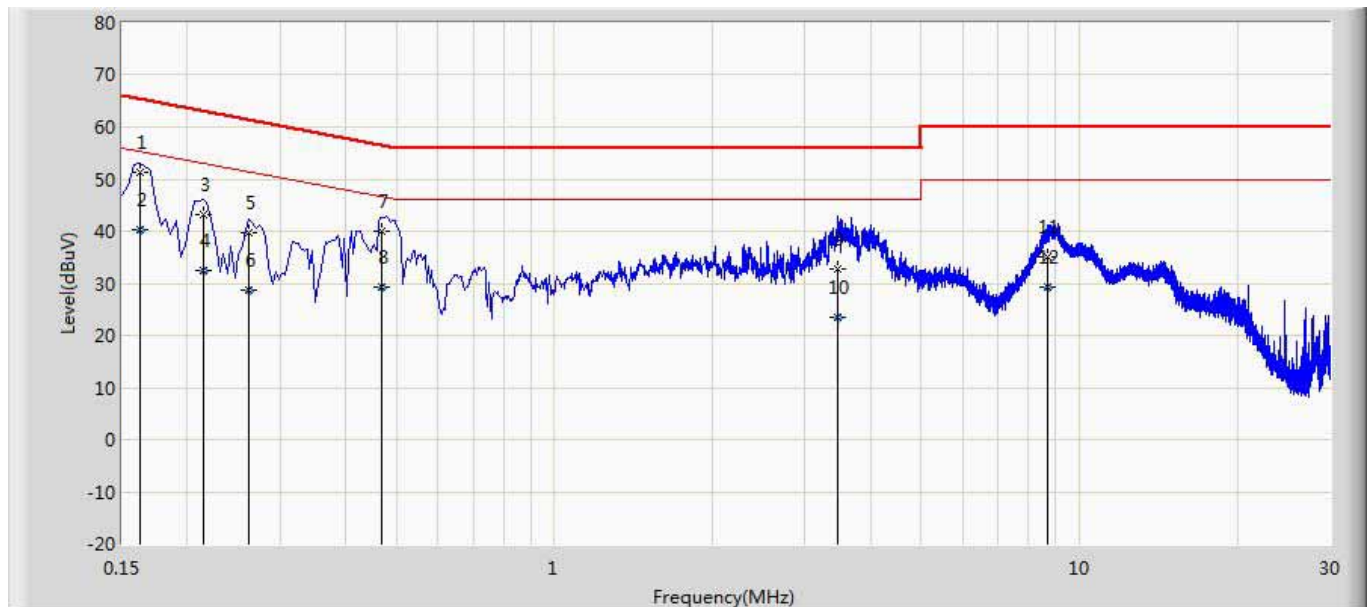
Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

### 3.5. Uncertainty

The measurement uncertainty is defined as  $\pm 2.02$  dB

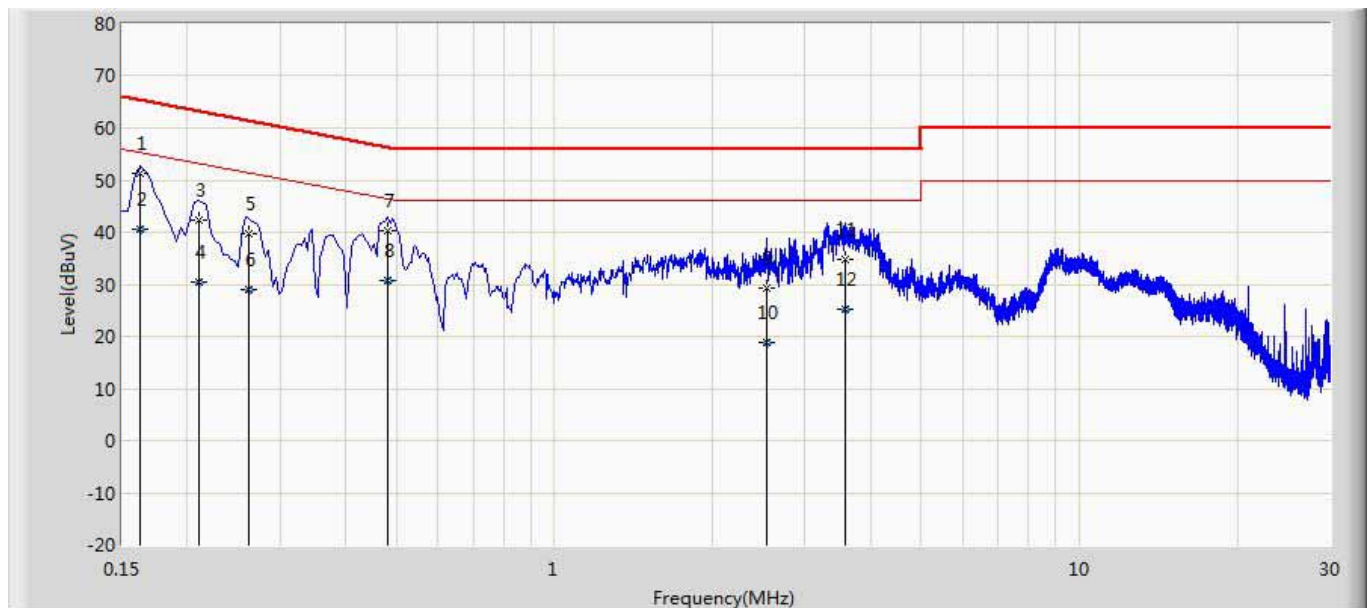
### 3.6. Test Result

Engineer: Derrick	
Site: TR1	Time: 2016/06/19 - 10:13
Limit: FCC_Part15.207_CE_AC Power_ClassB	Margin: 0
Probe: ENV216_101190(0.009-30MHz)	Polarity: Line
EUT: BLUETOOTH HEADPHONEBLUETOOTH HEADPHONE	Power: 120V/60HzAC 120V/60Hz
Note: Mode 1	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1	*	0.162	51.423	41.793	-13.938	65.361	9.630	QP
2		0.162	40.194	30.564	-15.167	55.361	9.630	AV
3		0.214	43.325	33.692	-19.723	63.049	9.632	QP
4		0.214	32.566	22.933	-20.483	53.049	9.632	AV
5		0.262	39.641	30.009	-21.727	61.368	9.632	QP
6		0.262	28.608	18.976	-22.760	51.368	9.632	AV
7		0.470	40.143	30.501	-16.371	56.514	9.643	QP
8		0.470	29.324	19.682	-17.190	46.514	9.643	AV
9		3.454	32.873	23.119	-23.127	56.000	9.755	QP
10		3.454	23.434	13.680	-22.566	46.000	9.755	AV
11		8.706	34.968	25.037	-25.032	60.000	9.930	QP
12		8.706	29.295	19.365	-20.705	50.000	9.930	AV

Engineer: Derrick	
Site: TR1	Time: 2016/06/19 - 10:45
Limit: FCC_Part15.207_CE_AC Power_ClassB	Margin: 0
Probe: ENV216_101190(0.009-30MHz)	Polarity: Neutral
EUT: BLUETOOTH HEADPHONEBLUETOOTH HEADPHONE	Power: 120V/60HzAC 120V/60Hz
Note: Mode 1	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1	*	0.162	51.226	41.611	-14.135	65.361	9.616	QP
2		0.162	40.589	30.974	-14.772	55.361	9.616	AV
3		0.210	42.198	32.567	-21.007	63.205	9.632	QP
4		0.210	30.450	20.818	-22.755	53.205	9.632	AV
5		0.262	39.768	30.139	-21.599	61.368	9.630	QP
6		0.262	28.935	19.306	-22.433	51.368	9.630	AV
7		0.482	40.401	30.768	-15.904	56.305	9.632	QP
8		0.482	30.853	21.220	-15.452	46.305	9.632	AV
9		2.542	29.390	19.670	-26.610	56.000	9.720	QP
10		2.542	18.744	9.023	-27.256	46.000	9.720	AV
11		3.570	34.735	24.979	-21.265	56.000	9.756	QP
12		3.570	25.133	15.377	-20.867	46.000	9.756	AV

Note:

1. " \* ", means this data is the worst emission level.

2. Measurement Level = Reading Level + Factor(Probe+Cable-Amp).

Note: All the low ,middle and high channels of all different modes are investigated, and only report

the worst case.

## 4. Emissions in restricted frequency bands

### 4.1. Test Equipment

#### Emissions in restricted frequency bands / AC-2

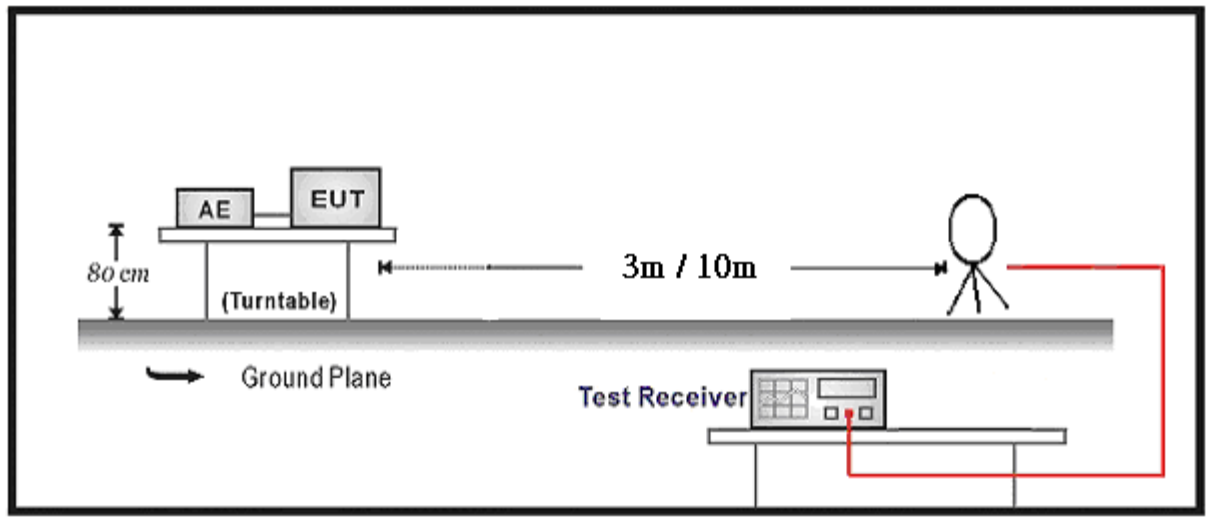
Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
EMI Test Receiver	R&S	ESCI	100573	2017.03.05
Loop Antenna	R&S	HFH2-Z2	833799/003	2016.11.25
Bilog Antenna	Teseq GmbH	CBL6112D	27611	2016.10.10
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC2-C	2017.02.28
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC2-TH	2017.01.04

#### Emissions in restricted frequency bands / AC-5

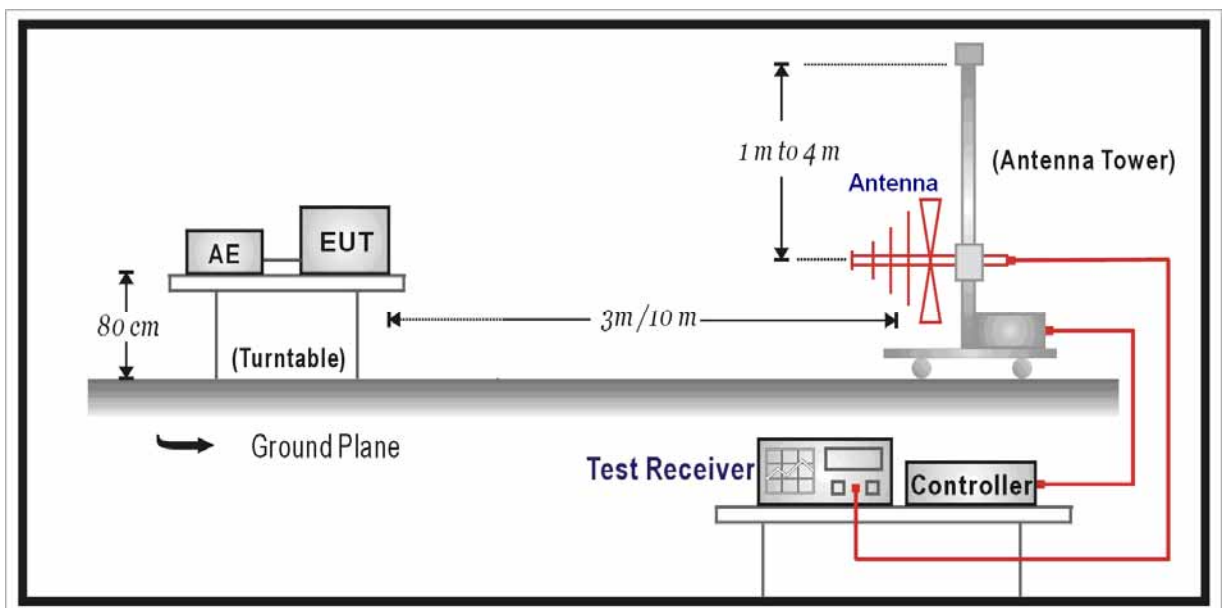
Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2017.02.04
Preamplifier	Miteq	NSP1800-25	1364185	2017.05.03
Preamplifier	QuieTek	AP-040G	CHM-0906001	2017.05.03
Bilog Antenna	Teseq GmbH	CBL6112D	27612	2016.10.15
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	499	2017.03.06
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2016.09.18
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C1	2017.02.28
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2017.02.28
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	AC5-C3	2017.02.28
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC5-TH	2017.01.04

## 4.2. Test Setup

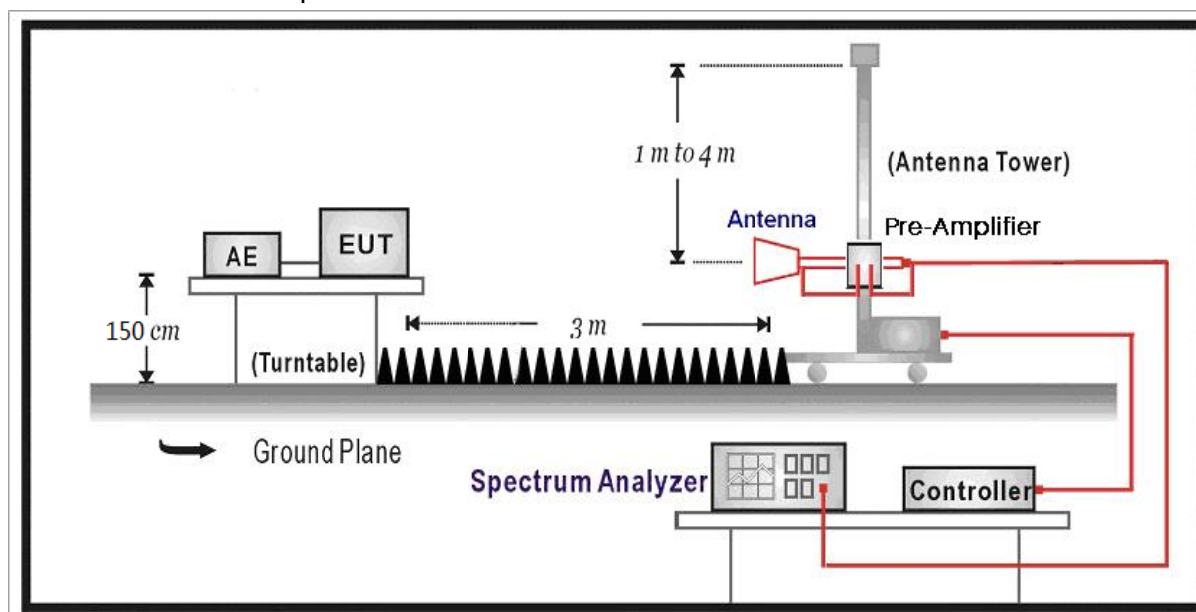
Below 30MHz Test Setup:



Below 1GHz Test Setup:



#### Above 1GHz Test Setup:



#### 4.3. Limit

FCC Part 15 Subpart C Paragraph 15.209		
Frequency (MHz)	Distance (m)	Level (dBuV/m)
30 - 88	3	40
88 - 216	3	43.5
216 - 960	3	46
Above 960	3	54

Note 1: The lower limit shall apply at the transition frequency.

Note 2: Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

Note 3: E field strength (dBuV/m) = 20 log E field strength (uV/m)

#### 4.4. Test Procedure

According to ANSI C63.4: 2014; ANSI C63.10: 2013.

The EUT is placed on a turn table which is 1.5 meter for above 1G and 0.8 meter for below 1G 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 C63.4: 2014 on radiated measurement.

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

The frequency range from 30MHz to 10th harmonic is checked.

Note: When doing emission measurement above 1GHz, the horn antenna will be bended down a little (as horn antenna has the narrow beamwidth) in order to keeping the antenna in the “cone of radiation” of EUT. The 3dB beamwidth is 60~10 degrees for H-plane and 90~10 degrees for E-plane.

According to ANSI C63.10: 2013& ANSI C63.4: 2014

This test is required for any spurious emission or modulation product that falls in a Restricted Band, as defined in Section 15.205 of FCC part 15. It must be performed with the highest gain of each type of antenna proposed for use with the EUT. Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for  $f \geq 1$  GHz, 100 kHz for  $f < 1$  GHz

VBW  $\geq$  RBW

Sweep = auto

Detector function = peak

Trace = max hold

Follow the guidelines in ANSI C63.4 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization, etc. A pre-amp and a high pass filter are required for this test, in order to provide the measuring system with sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, which must comply with the limit specified in Section 15.35(b) of FCC part 15.

Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209 of FCC Part 15. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from  $20\log(\text{dwell time}/100 \text{ ms})$ , in an effort to demonstrate compliance with the 15.209 limit of FCC part 15.

If the emission on which a radiated measurement must be made is located at the edge of the authorized band of operation, then the alternative “marker-delta” method may be employed.

#### 4.5. Uncertainty

The measurement uncertainty above 1G is defined as  $\pm 3.9$  dB

below 1G is defined as  $\pm 3.8$  dB

#### 4.6. Test Result

Mode 1: Transmitter-1Mbps(GFSK\_DH5)

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
0	H	4804.0	36.836	5.765	42.601	54(Note3)	11.399	PK
	H	7206.0	35.023	9.499	44.523	54(Note3)	9.477	PK
	H	9608.0	32.991	12.942	45.933	54(Note3)	8.067	PK
	V	4804.0	36.038	5.765	41.803	54(Note3)	12.197	PK
	V	7206.0	34.426	9.499	43.926	54(Note3)	10.074	PK
	V	9608.0	32.995	12.942	45.937	54(Note3)	8.063	PK
39	H	4882.0	38.002	5.755	43.758	54(Note3)	10.242	PK
	H	7324.0	34.078	9.683	43.761	54(Note3)	10.239	PK
	H	9764.0	31.304	13.139	44.443	54(Note3)	9.557	PK
	V	4882.0	38.559	5.755	44.315	54(Note3)	9.685	PK
	V	7324.0	33.348	9.683	43.031	54(Note3)	10.969	PK
	V	9764.0	31.771	13.139	44.910	54(Note3)	9.090	PK
78	H	4960.0	37.103	6.227	43.331	54(Note3)	10.669	PK
	H	7440.0	33.547	9.697	43.244	54(Note3)	10.756	PK
	H	9920.0	31.440	13.226	44.666	54(Note3)	9.334	PK
	V	4960.0	38.085	6.227	44.313	54(Note3)	9.687	PK
	V	7440.0	32.758	9.697	42.455	54(Note3)	11.545	PK
	V	9920.0	31.772	13.226	44.998	54(Note3)	9.002	PK

Note 1: The test frequency range, 9kHz~30MHz, 18GHz~25GHz, both of the worst case are at least 6dB below the limits, therefore no data appear in the report.

2: This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

3: Measure Level = Reading Level + Factor.

Mode 2: Transmitter-2Mbps(Pi/4 DQPSK \_DH5)

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
0	H	4804.0	38.757	5.765	44.522	54(Note3)	9.478	PK
	H	7206.0	35.877	9.499	45.377	54(Note3)	8.623	PK
	H	9608.0	35.055	12.942	47.997	54(Note3)	6.003	PK
	V	4804.0	38.630	5.765	44.395	54(Note3)	9.605	PK
	V	7206.0	35.017	9.499	44.517	54(Note3)	9.483	PK
	V	9608.0	33.242	12.942	46.184	54(Note3)	7.816	PK
39	H	4882.0	38.914	5.755	44.670	54(Note3)	9.33	PK
	H	7324.0	36.098	9.683	45.781	54(Note3)	8.219	PK
	H	9764.0	35.100	13.139	48.239	54(Note3)	5.761	PK
	V	4882.0	38.748	5.755	44.504	54(Note3)	9.496	PK
	V	7324.0	35.535	9.683	45.218	54(Note3)	8.782	PK
	V	9764.0	36.248	13.139	49.387	54(Note3)	4.613	PK
78	H	4960.0	37.680	6.227	43.908	54(Note3)	10.092	PK
	H	7440.0	36.371	9.697	46.068	54(Note3)	7.932	PK
	H	9920.0	35.320	13.226	48.546	54(Note3)	5.454	PK
	V	4960.0	38.516	6.227	44.744	54(Note3)	9.256	PK
	V	7440.0	35.922	9.697	45.619	54(Note3)	8.381	PK
	V	9920.0	35.339	13.226	48.565	54(Note3)	5.435	PK

Note 1: The test frequency range, 9kHz~30MHz, 18GHz~25GHz, both of the worst case are at least 6dB below the limits, therefore no data appear in the report.

2: This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

3: Measure Level = Reading Level + Factor.

Mode 3: Transmitter-3Mbps(8DPSK\_DH5)

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
0	H	4804.0	39.407	5.765	45.172	54(Note3)	8.828	PK
	H	7206.0	36.505	9.499	46.005	54(Note3)	7.995	PK
	H	9608.0	35.441	12.942	48.383	54(Note3)	5.617	PK
	V	4804.0	39.464	5.765	45.229	54(Note3)	8.771	PK
	V	7206.0	36.495	9.499	45.995	54(Note3)	8.005	PK
	V	9608.0	35.452	12.942	48.394	54(Note3)	5.606	PK
39	H	4882.0	38.220	5.755	43.976	54(Note3)	10.024	PK
	H	7324.0	35.959	9.683	45.642	54(Note3)	8.358	PK
	H	9764.0	35.365	13.139	48.504	54(Note3)	5.496	PK
	V	4882.0	39.088	5.755	44.844	54(Note3)	9.156	PK
	V	7324.0	36.507	9.683	46.190	54(Note3)	7.81	PK
	V	9764.0	34.771	13.139	47.910	54(Note3)	6.09	PK
78	H	4960.0	38.726	6.227	44.954	54(Note3)	9.046	PK
	H	7440.0	36.896	9.697	46.593	54(Note3)	7.407	PK
	H	9920.0	35.631	13.226	48.857	54(Note3)	5.143	PK
	V	4960.0	37.507	6.227	43.735	54(Note3)	10.265	PK
	V	7440.0	36.570	9.697	46.267	54(Note3)	7.733	PK
	V	9920.0	34.849	13.226	48.075	54(Note3)	5.925	PK

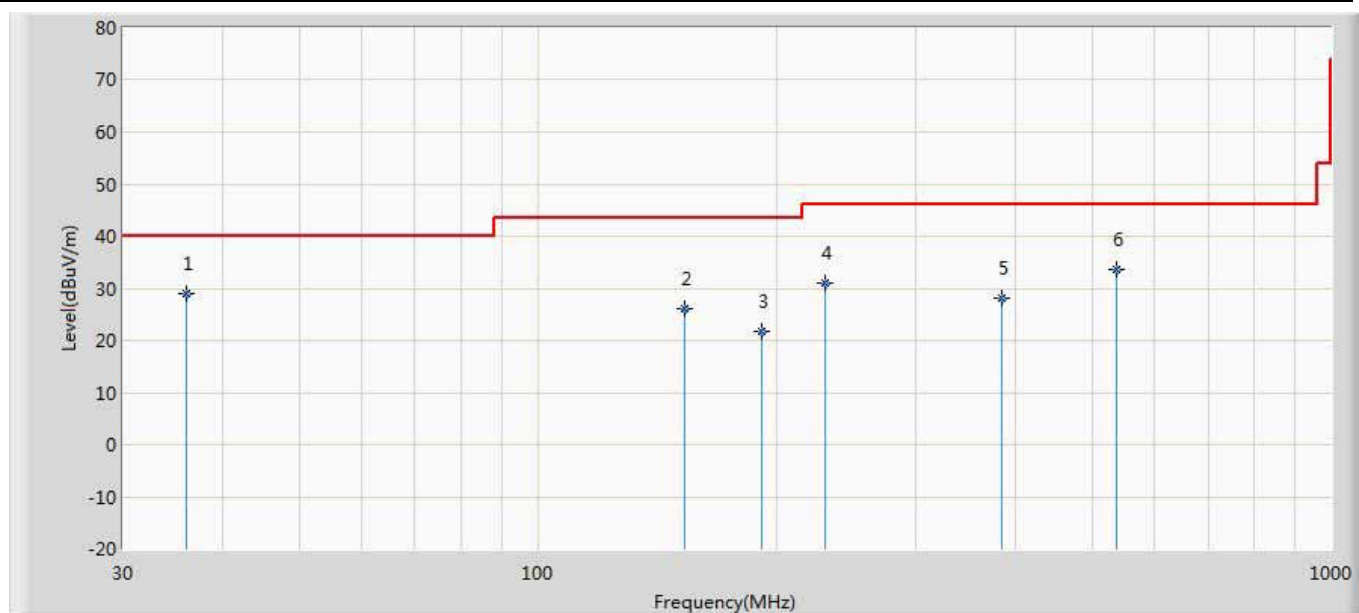
Note 1: The test frequency range, 9kHz~30MHz, 18GHz~25GHz, both of the worst case are at least 6dB below the limits, therefore no data appear in the report.

2: This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

3: Measure Level = Reading Level + Factor.

## The worst case of Radiated Emission below 1GHz:

Engineer: Derrick	
Site: AC2	Time: 2016/06/30 - 16:19
Limit: FCC_Part15.209_RE(3m)_ClassB	Margin: 0
Probe: AC2_3M(30-1000M)	Polarity: Horizontal
EUT: BLUETOOTH HEADPHONEBLUETOOTH HEADPHONE	Power: 120V/60HzAC 120V/60Hz
Note: Mode 1	

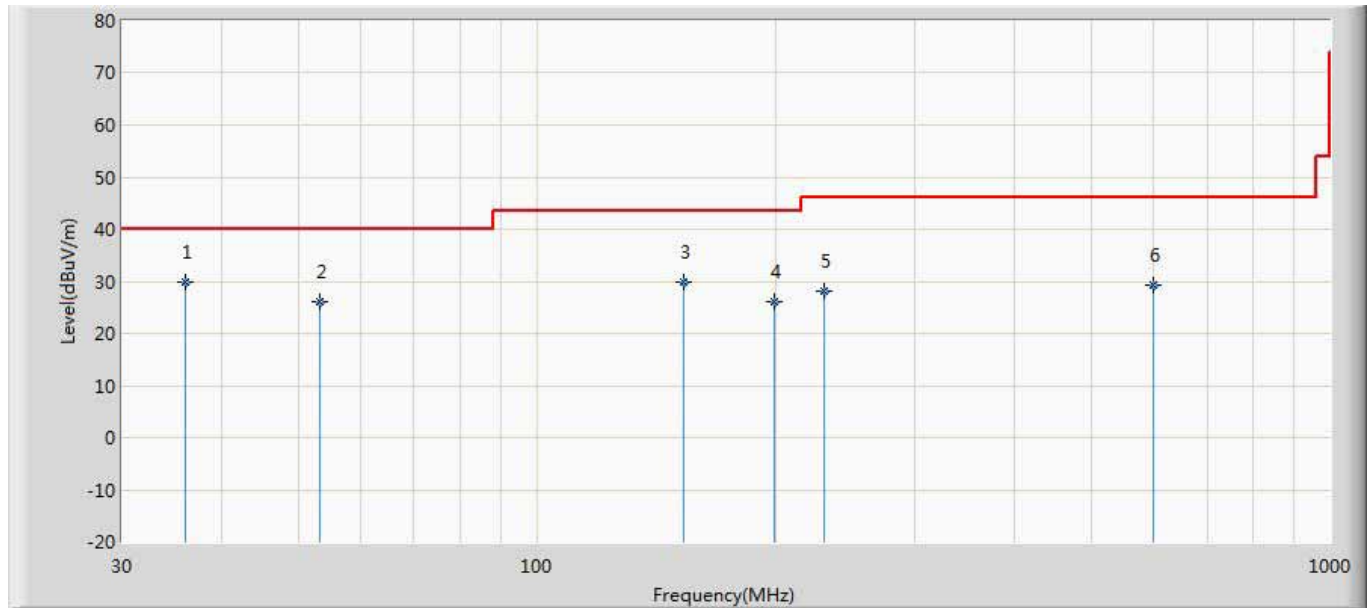


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	36.051	28.899	2.600	-11.101	40.000	26.298	QP
2		153.317	26.058	9.000	-17.442	43.500	17.058	QP
3		191.950	21.668	4.300	-21.832	43.500	17.368	QP
4		229.946	31.041	12.800	-14.959	46.000	18.242	QP
5		385.001	28.071	3.200	-17.929	46.000	24.871	QP
6		536.535	33.554	5.600	-12.446	46.000	27.954	QP

### Note:

1. " \* ", means this data is the worst emission level.
2. Measurement Level = Reading Level + Factor(Probe+Cable-Amp).

Engineer: Derrick	
Site: AC2	Time: 2016/06/30 - 16:19
Limit: FCC_Part15.209_RE(3m)_ClassB	Margin: 0
Probe: AC2_3M(30-1000M)	Polarity: Vertical
EUT: BLUETOOTH HEADPHONEBLUETOOTH HEADPHONE	Power: 120V/60HzAC 120V/60Hz
Note: Mode 1	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	36.051	29.726	7.600	-10.274	40.000	22.125	QP
2		53.292	26.173	7.900	-13.827	40.000	18.273	QP
3		153.316	29.784	11.400	-13.716	43.500	18.384	QP
4		199.133	26.085	2.700	-17.415	43.500	23.385	QP
5		229.948	28.048	5.400	-17.952	46.000	22.648	QP
6		598.626	29.258	1.563	-16.742	46.000	27.695	QP

Note:

1. " \* ", means this data is the worst emission level.
2. Measurement Level = Reading Level + Factor(Probe+Cable-Amp).

## 5. 20dB Bandwidth

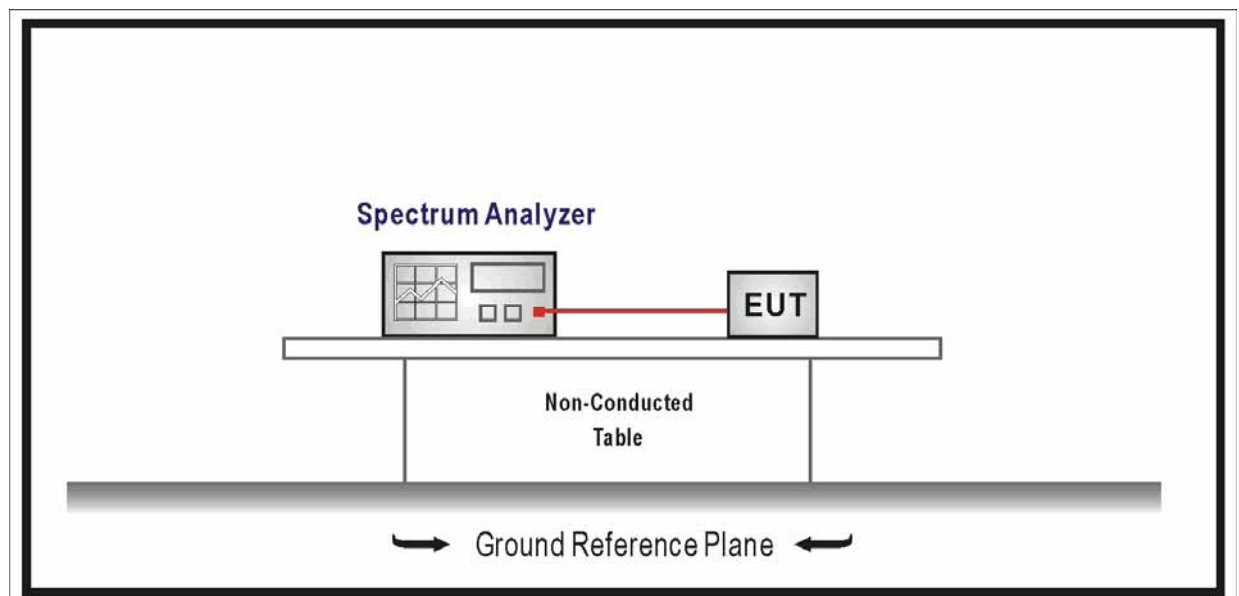
### 5.1 Test Equipment

20dB Bandwidth / TR8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2017.02.04
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2017.04.03

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

### 5.2 Test Setup



### 5.3 Limit

- For frequency hopping systems operating in 2400-2483.5 MHz band, no limitation.
- For frequency hopping systems operating in 902-928 MHz band, the maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.
- For frequency hopping systems operating in 5725-5850 MHz band, the maximum 20 dB bandwidth of the hopping channel is 1 MHz.



## 5.4 Test Procedure

According to ANSI C63.10: 2013& ANSI C63.4: 2014

Use the following spectrum analyzer settings:

Span = approximately 2 to 3 times the 20dB bandwidth, centered on a hopping channel

RBW  $\geq$  1% of the 20dB bandwidth

VBW  $\geq$  RBW

Sweep = auto

Detector function = peak

Trace = max hold

The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize.

Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation.

## 5.5 Uncertainty

The measurement uncertainty is defined as  $\pm 1$  kHz

## 5.6 Test Result

Product	:	BLUETOOTH HEADPHONE
Test Item	:	Occupied Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmitter-1Mbps (GFSK_DH5)

Channel No.	Frequency (MHz)	20dB Bandwidth (kHz)	99% Bandwidth (kHz)
00	2402	882.30	828.67
39	2441	879.60	852.32
78	2480	880.40	860.06

Channel 00 (2402MHz)



### Channel 39 (2441MHz)



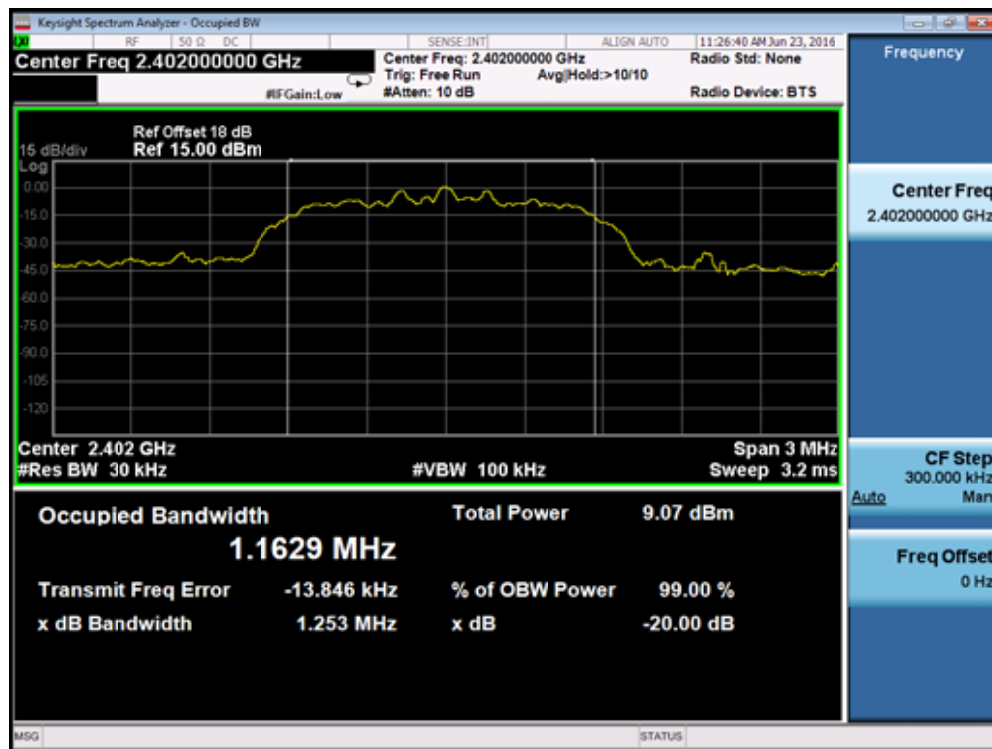
### Channel 78 (2480MHz)



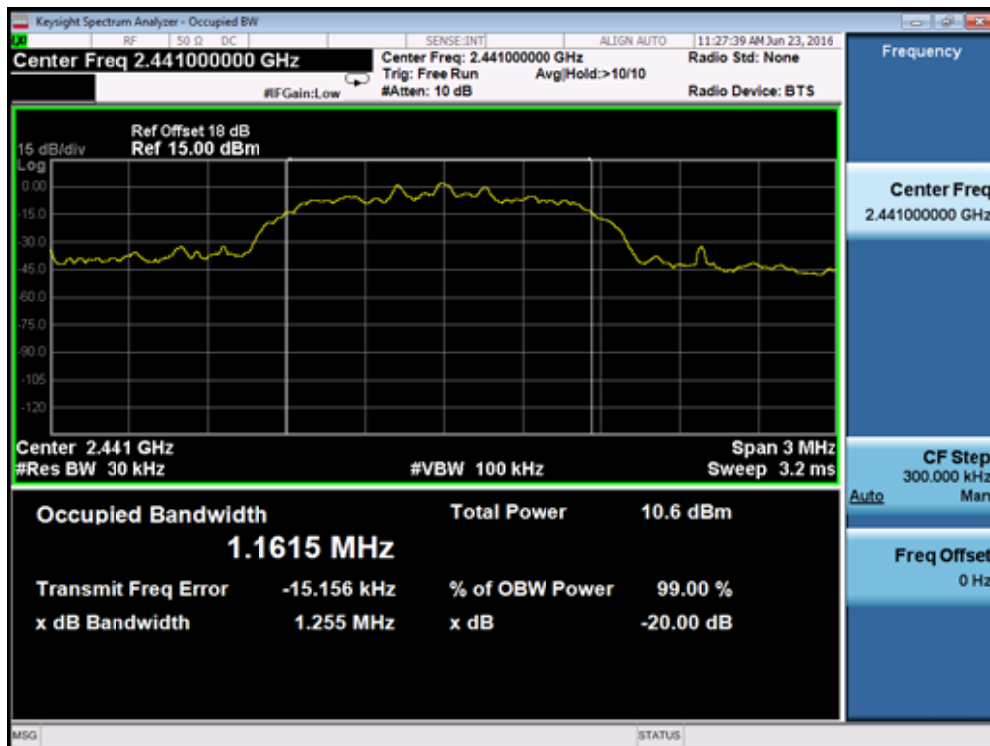
Product	:	BLUETOOTH HEADPHONE
Test Item	:	Occupied Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 2: Transmitter-2Mbps (Pi/4 DQPSK_DH5)

Channel No.	Frequency (MHz)	20dB Bandwidth (kHz)	99% Bandwidth (kHz)
00	2402	1253	1162.9
39	2441	1255	1161.5
78	2480	1248	1163.9

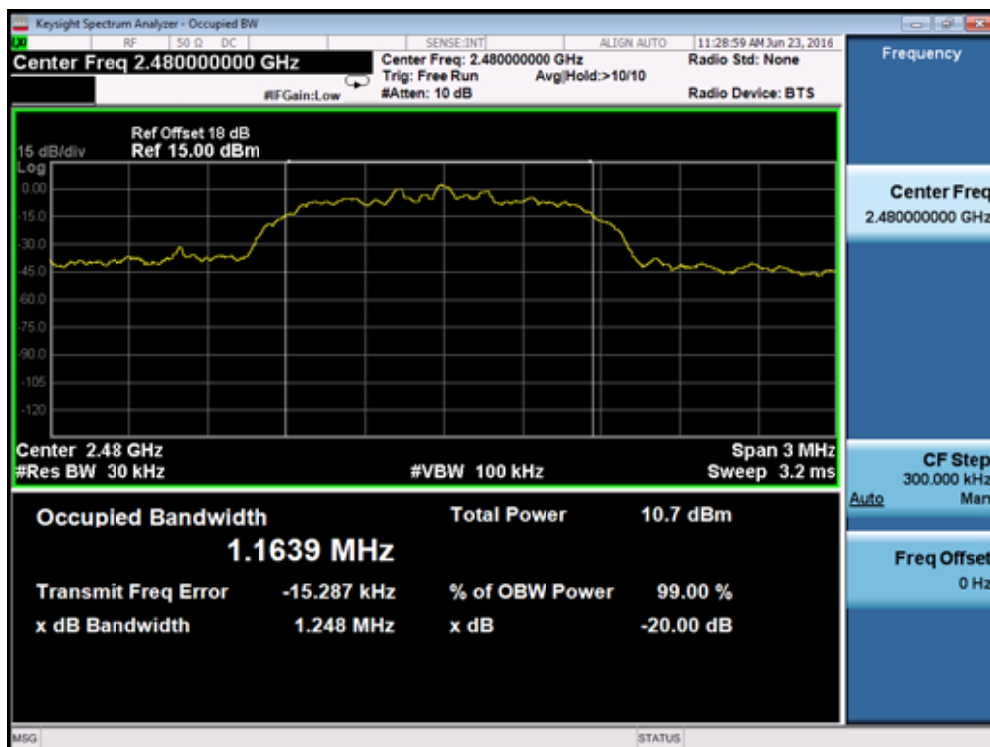
### Channel 00 (2402MHz)



### Channel 39 (2441MHz)



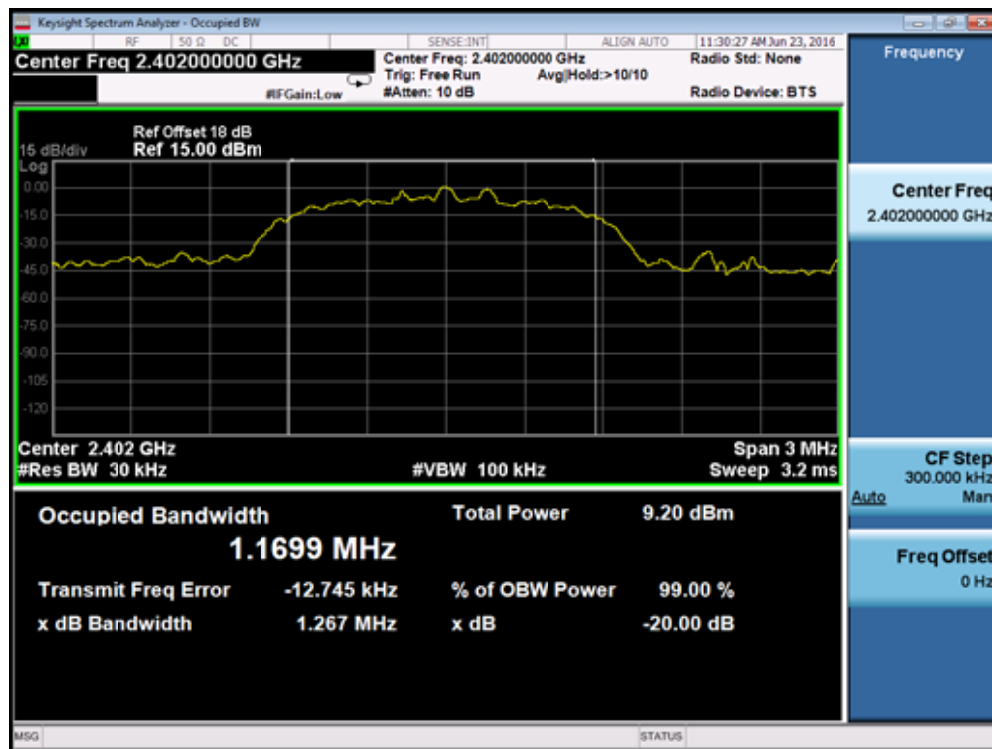
### Channel 78 (2480MHz)



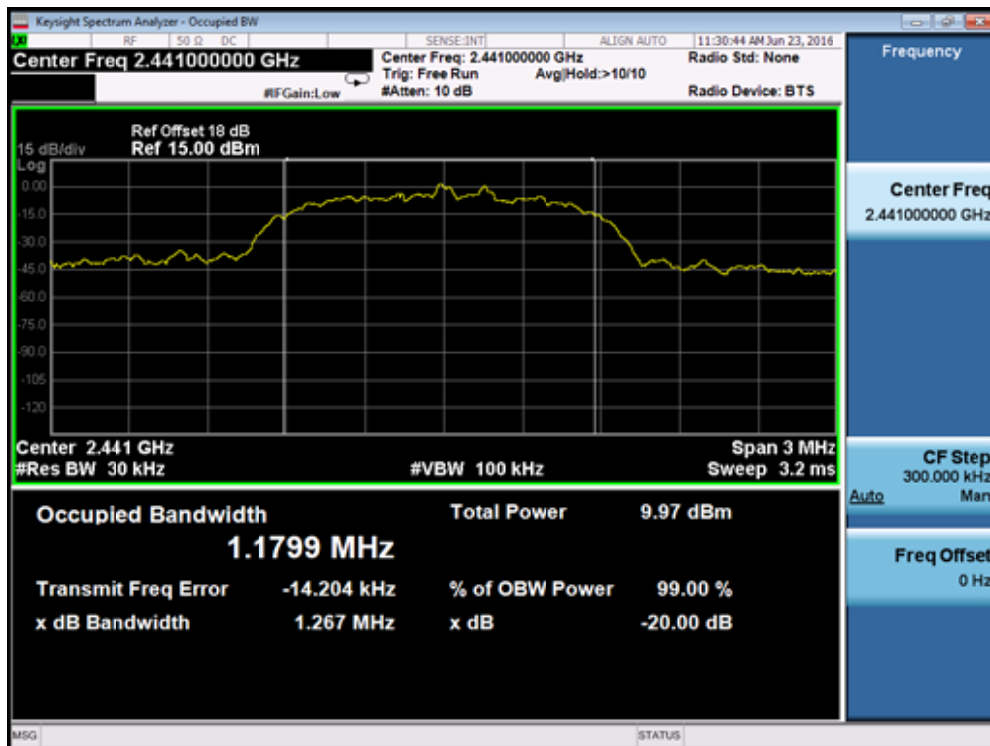
Product	:	BLUETOOTH HEADPHONE
Test Item	:	Occupied Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 3: Transmitter-3Mbps (8DPSK_DH5)

Channel No.	Frequency (MHz)	20dB Bandwidth (kHz)	99% Bandwidth (kHz)
00	2402	1267	1169.9
39	2441	1267	1179.9
78	2480	1266	1176.3

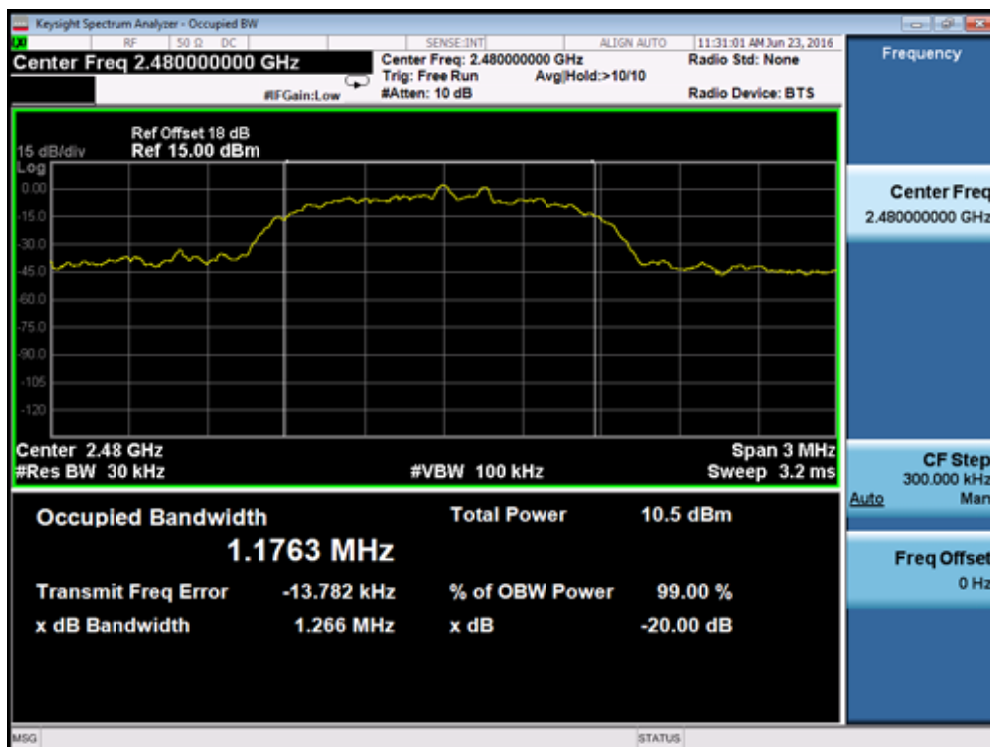
### Channel 00 (2402MHz)



### Channel 39 (2441MHz)



### Channel 78 (2480MHz)



## 6. Carrier Frequency Separation

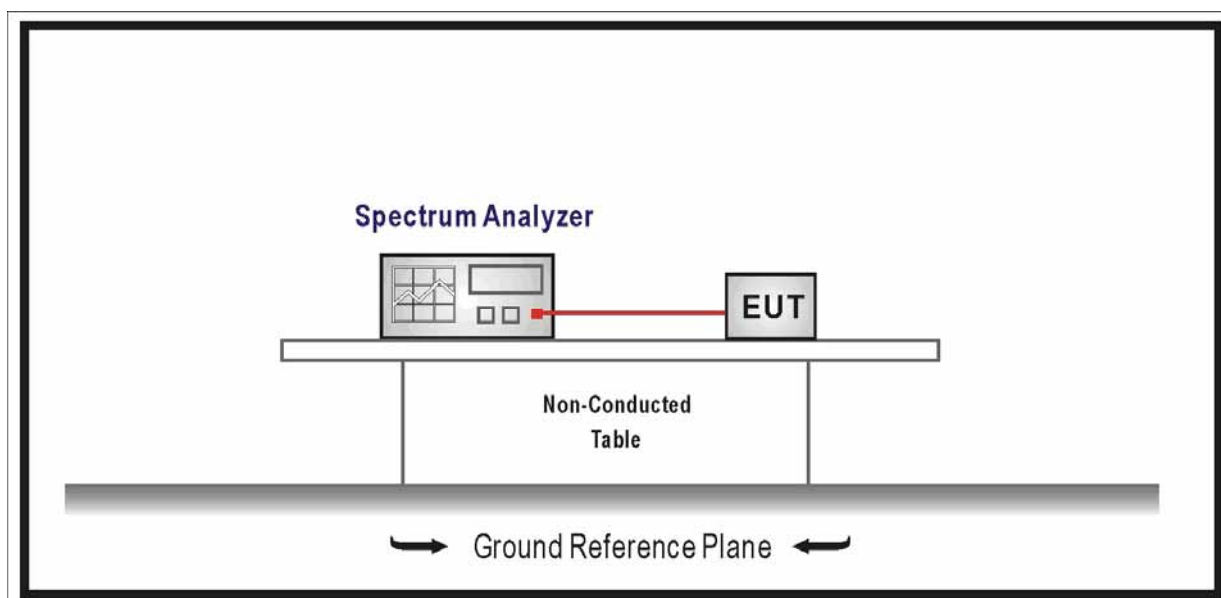
### 6.1. Test Equipment

Carrier Frequency Separation / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2017.02.04
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2017.04.03

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

### 6.2. Test Setup



### 6.3. Limit

- 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 125mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping



channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

- For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; If the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.
- Frequency hopping systems operating in the 5725-5850 MHz band shall use at least 75 hopping frequencies. The maximum 20 dB bandwidth of the hopping channel is 1 MHz. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

#### 6.4. Test Procedure

According to ANSI C63.10: 2013& ANSI C63.4: 2014

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Span = wide enough to capture the peaks of two adjacent channels

Resolution (or IF) Bandwidth (RBW)  $\geq$  1% of the span

Video (or Average) Bandwidth VBW  $\geq$  RBW

Sweep = auto

Detector function = peak

Trace = max hold

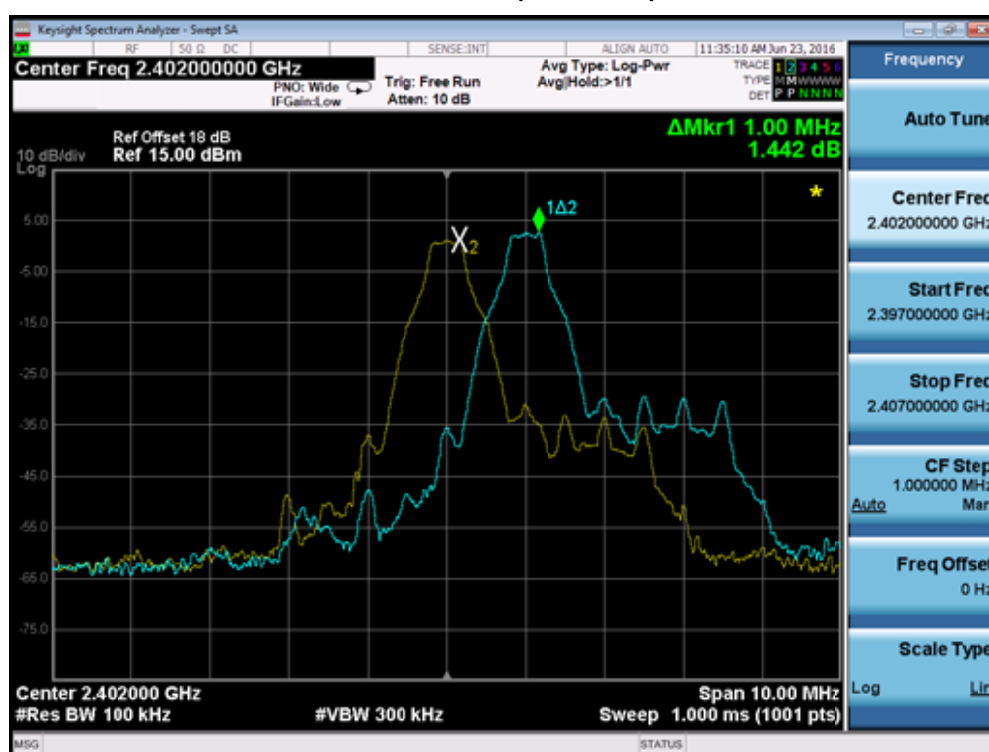
Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

#### 6.5. Uncertainty

The measurement uncertainty is defined as  $\pm 1$  kHz

Product	:	BLUETOOTH HEADPHONE
Test Item	:	Carrier Frequency Separation
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmitter-1Mbps (GFSK_DH5)

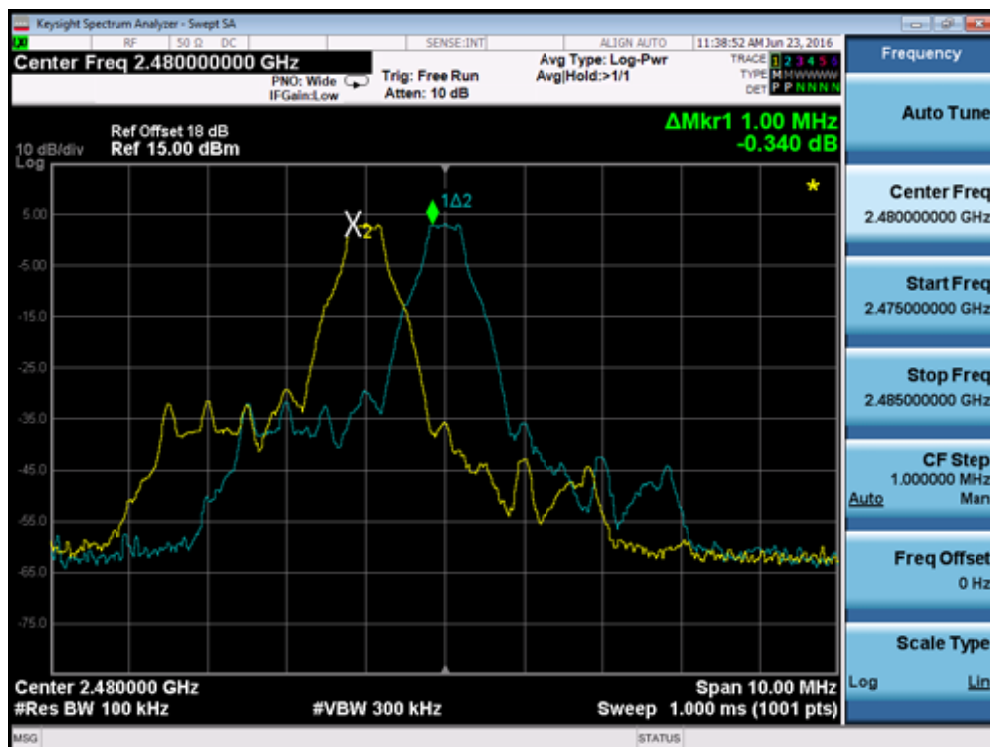
Channel No.	Frequency (MHz)	Carrier Frequency Separation (kHz)	Limit (kHz)	Result
00	2402	1000	>25 kHz or 2/3 of 20 dB BW	Pass
39	2441	1000	>25 kHz or 2/3 of 20 dB BW	Pass
78	2480	1000	>25 kHz or 2/3 of 20 dB BW	Pass



### Channel 39 (2441MHz)



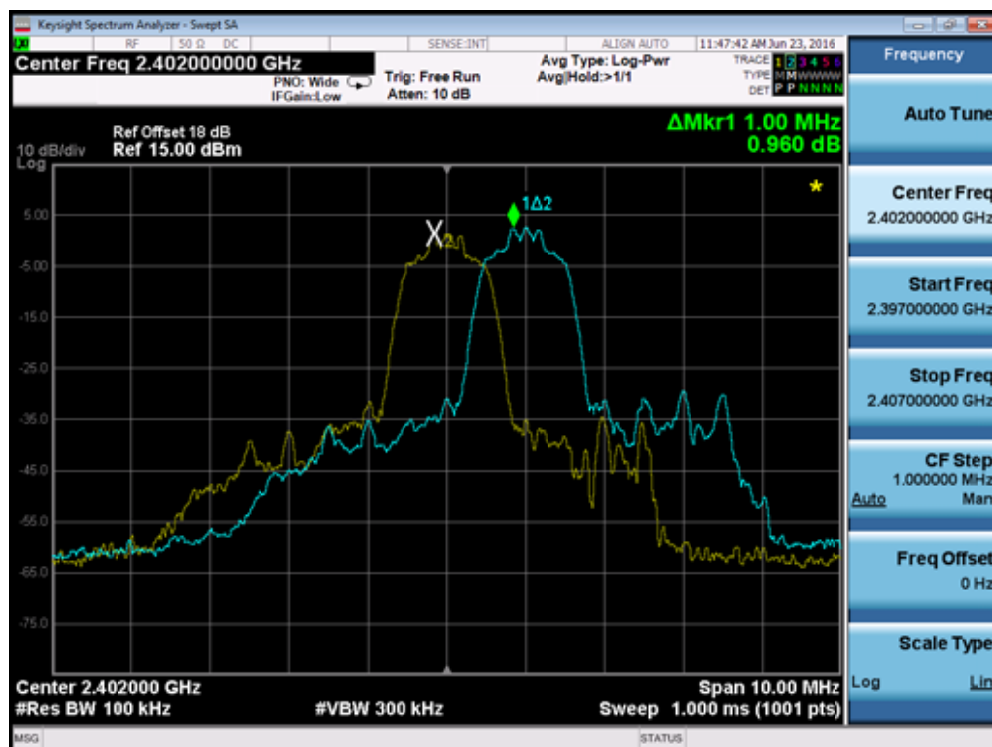
### Channel 78 (2480MHz)



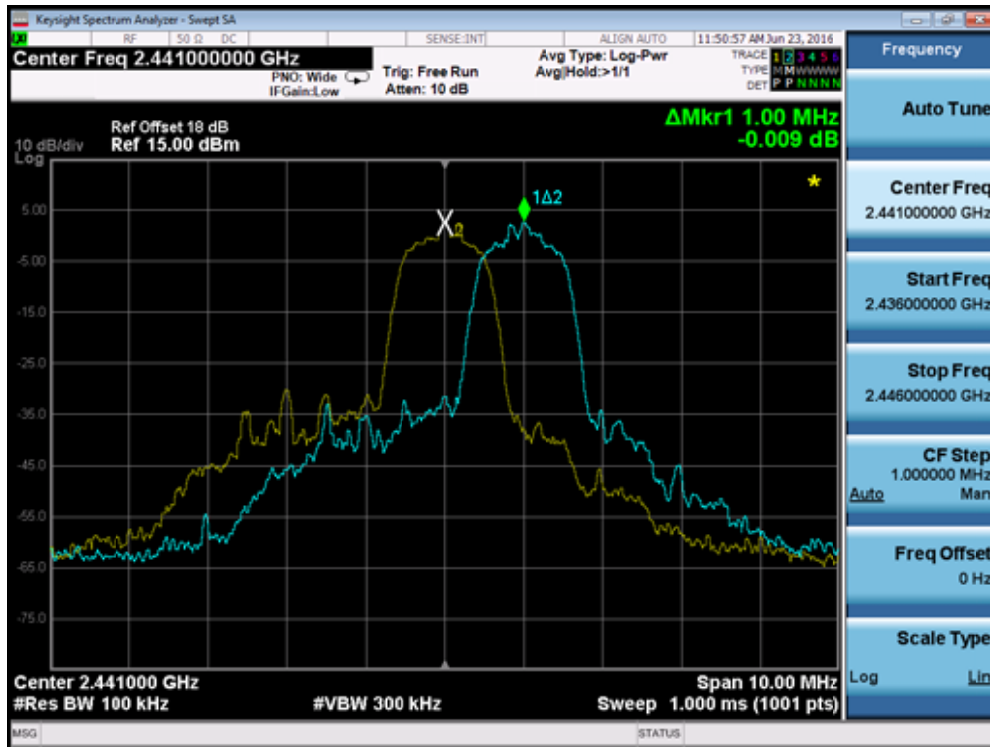
Product	:	BLUETOOTH HEADPHONE
Test Item	:	Carrier Frequency Separation
Test Site	:	TR-8
Test Mode	:	Mode 2: Transmitter-2Mbps (Pi/4 DQPSK_DH5)

Channel No.	Frequency (MHz)	Carrier Frequency Separation (kHz)	Limit (kHz)	Result
00	2402	1000	>25 kHz or 2/3 of 20 dB BW	Pass
39	2441	1000	>25 kHz or 2/3 of 20 dB BW	Pass
78	2480	1000	>25 kHz or 2/3 of 20 dB BW	Pass

### Channel 00 (2402MHz)



### Channel 39 (2441MHz)



### Channel 78 (2480MHz)



Product	:	BLUETOOTH HEADPHONE
Test Item	:	Carrier Frequency Separation
Test Site	:	TR-8
Test Mode	:	Mode 3: Transmitter-3Mbps (8DPSK_DH5)

Channel No.	Frequency (MHz)	Carrier Frequency Separation (kHz)	Limit (kHz)	Result
00	2402	1000	>25 kHz or 2/3 of 20 dB BW	Pass
39	2441	1000	>25 kHz or 2/3 of 20 dB BW	Pass
78	2480	1000	>25 kHz or 2/3 of 20 dB BW	Pass

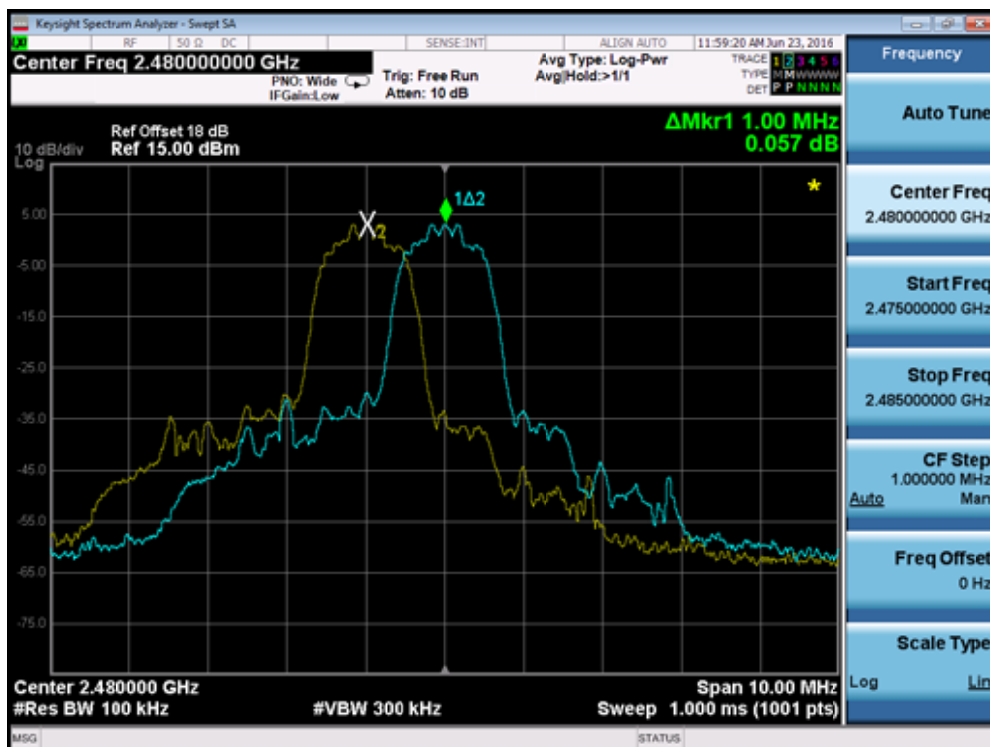
### Channel 00 (2402MHz)



### Channel 39 (2441MHz)



### Channel 78 (2480MHz)



## 7. Number of Hopping Frequencies

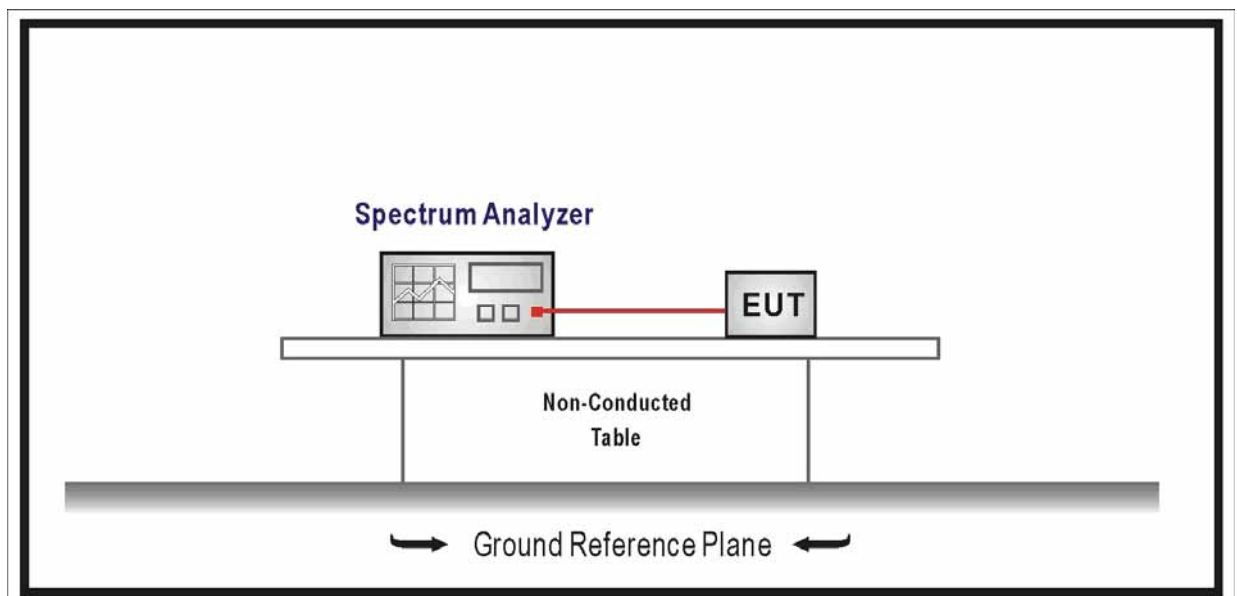
### 7.1. Test Equipment

Number of Hopping Frequencies / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2017.02.04
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2017.04.03

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

### 7.2. Test Setup



### 7.3. Limit

- For frequency hopping systems operating in the 2400-2483.5 MHz band shall use at least 15 hopping frequencies.
- For frequency hopping systems operating in 902-928 MHz band shall use at least 50 hopping frequencies.
- For frequency hopping systems operating in the 5725-5850 MHz band shall use at least 75 hopping frequencies.



## 7.4. Test Procedure

According to ANSI C63.10: 2013& ANSI C63.4: 2014

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Span = the frequency band of operation

RBW  $\geq$  1% of the span

VBW  $\geq$  RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize. It may prove necessary to bread the span up to sections, in order to clearly show all of the hopping frequencies.

## 7.5. Uncertainty

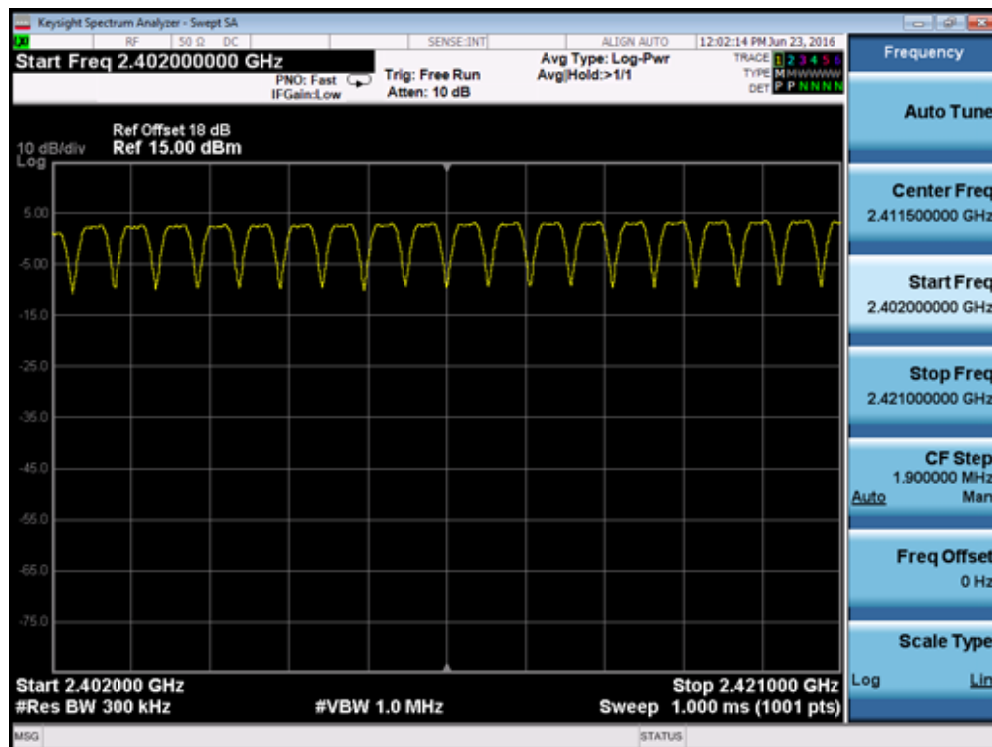
The measurement uncertainty is defined as  $\pm 1$  kHz

## 7.6. Test Result

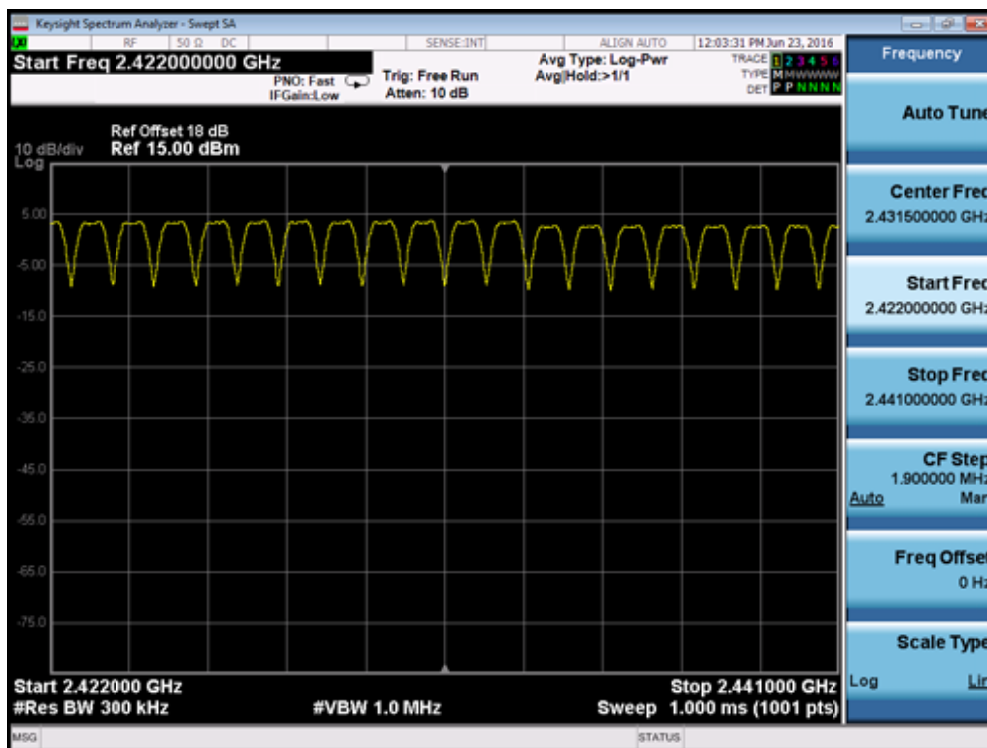
Product	:	BLUETOOTH HEADPHONE
Test Item	:	Number of Hopping Frequencies
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmitter-1Mbps (GFSK_DH5)

Frequency Band (MHz)	Number of Hopping Frequencies	Limit	Result
2400 - 2483.5	79	>15	Pass

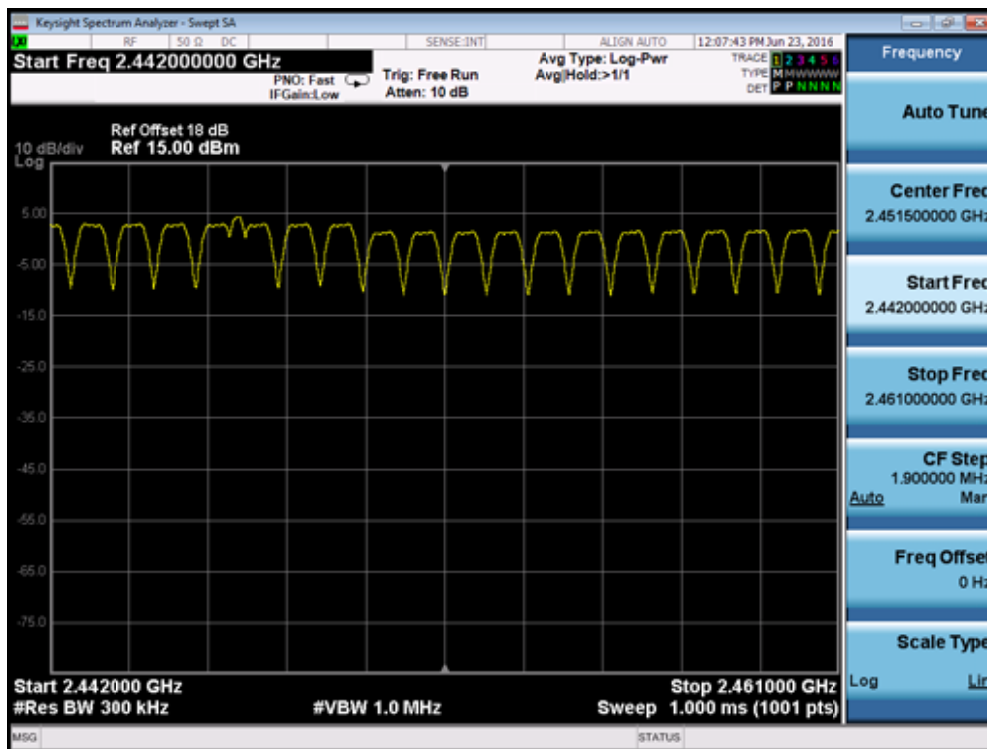
### 2402 - 2421 MHz



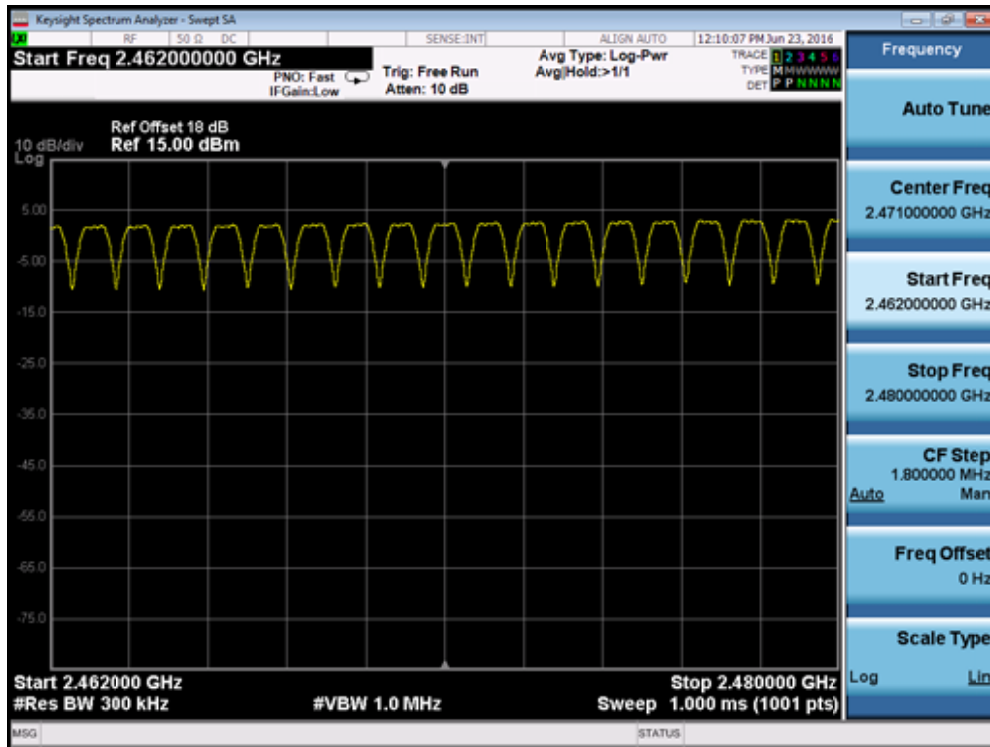
## 2422 - 2441 MHz



## 2442- 2461 MHz



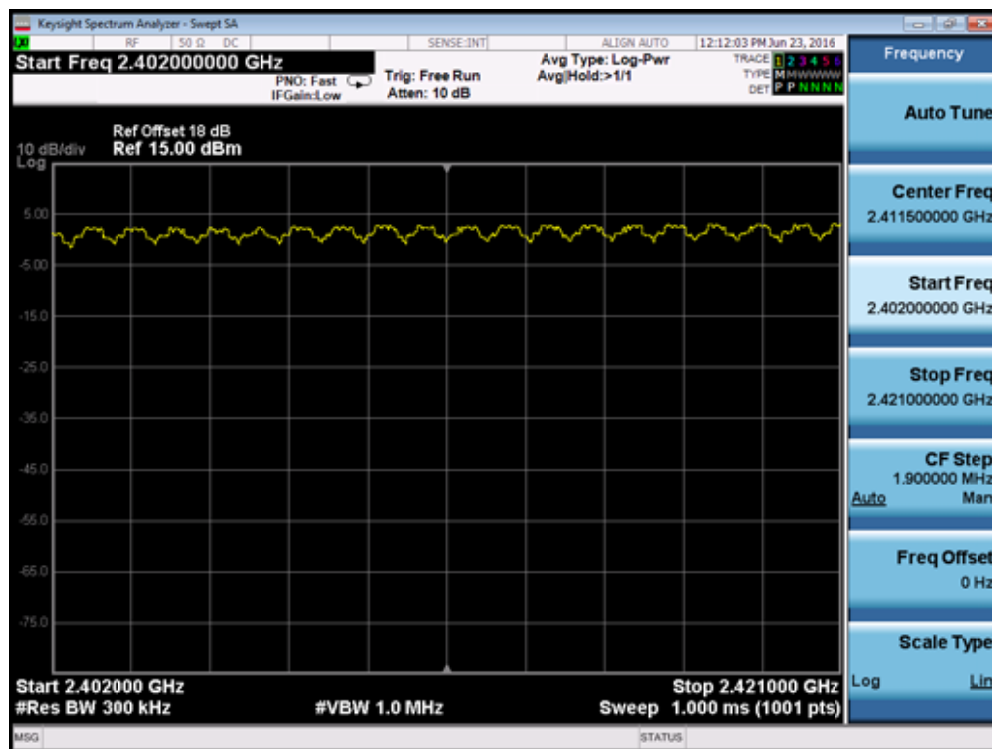
## 2462 - 2480 MHz



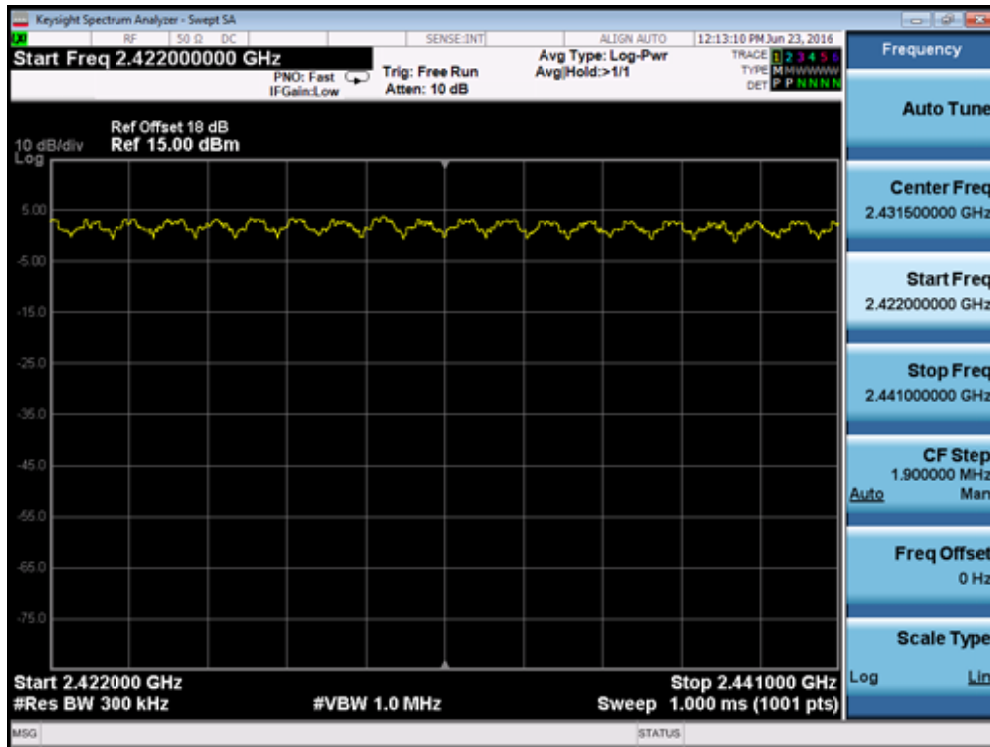
Product	:	BLUETOOTH HEADPHONE
Test Item	:	Number of Hopping Frequencies
Test Site	:	TR-8
Test Mode	:	Mode 2: Transmitter-2Mbps (Pi/4 DQPSK_DH5)

Frequency Band (MHz)	Number of Hopping Frequencies	Limit	Result
2400 - 2483.5	79	>15	Pass

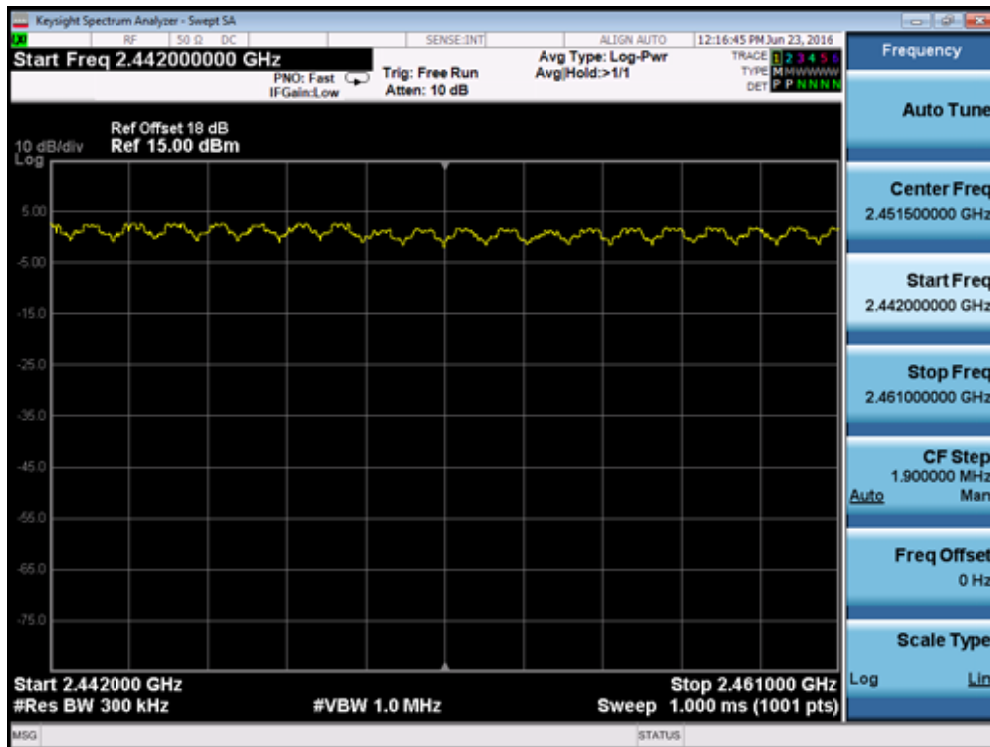
### 2402 - 2421 MHz



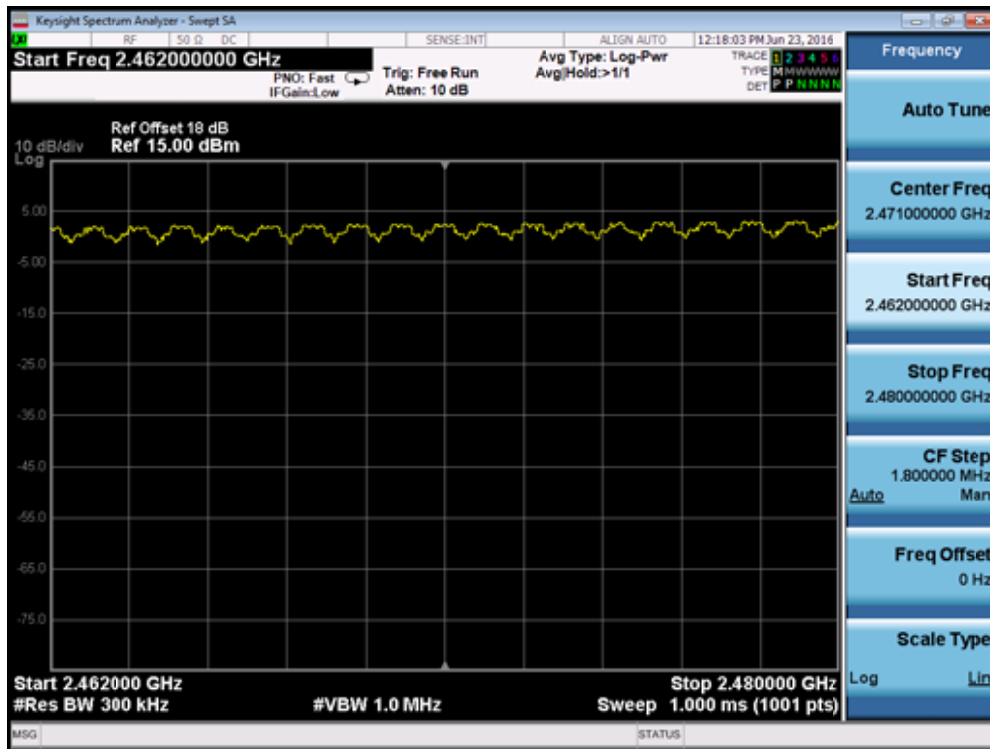
## 2422 - 2441MHz



## 2442 - 2461MHz



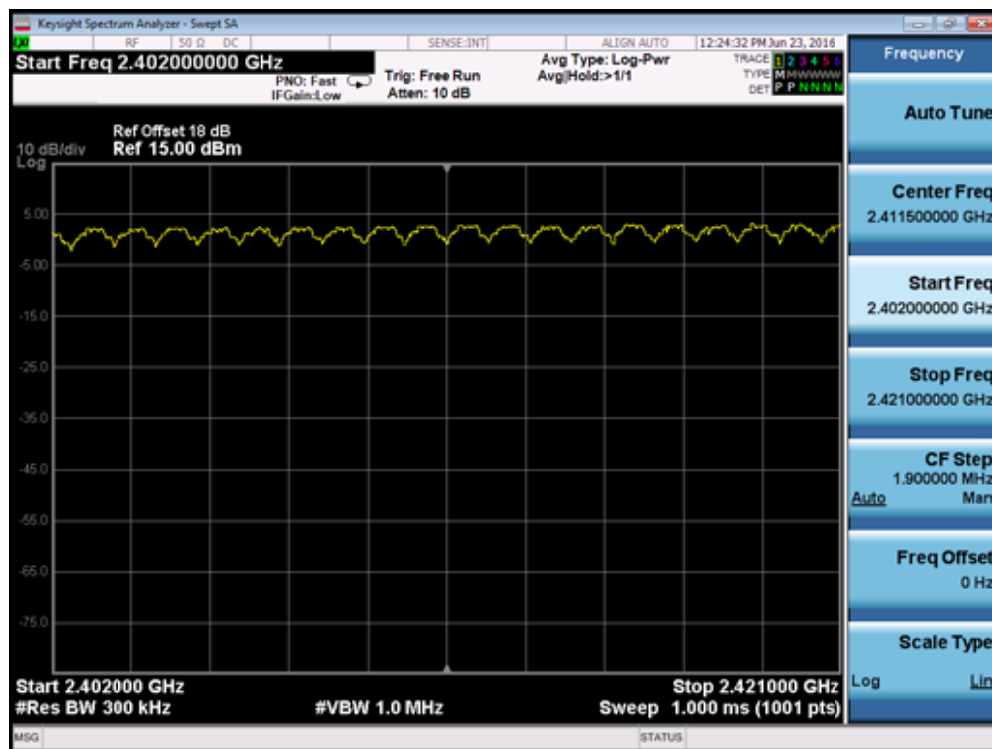
## 2462 - 2480MHz



Product	:	BLUETOOTH HEADPHONE
Test Item	:	Number of Hopping Frequencies
Test Site	:	TR-8
Test Mode	:	Mode 3: Transmitter-3Mbps (8DPSK_DH5)

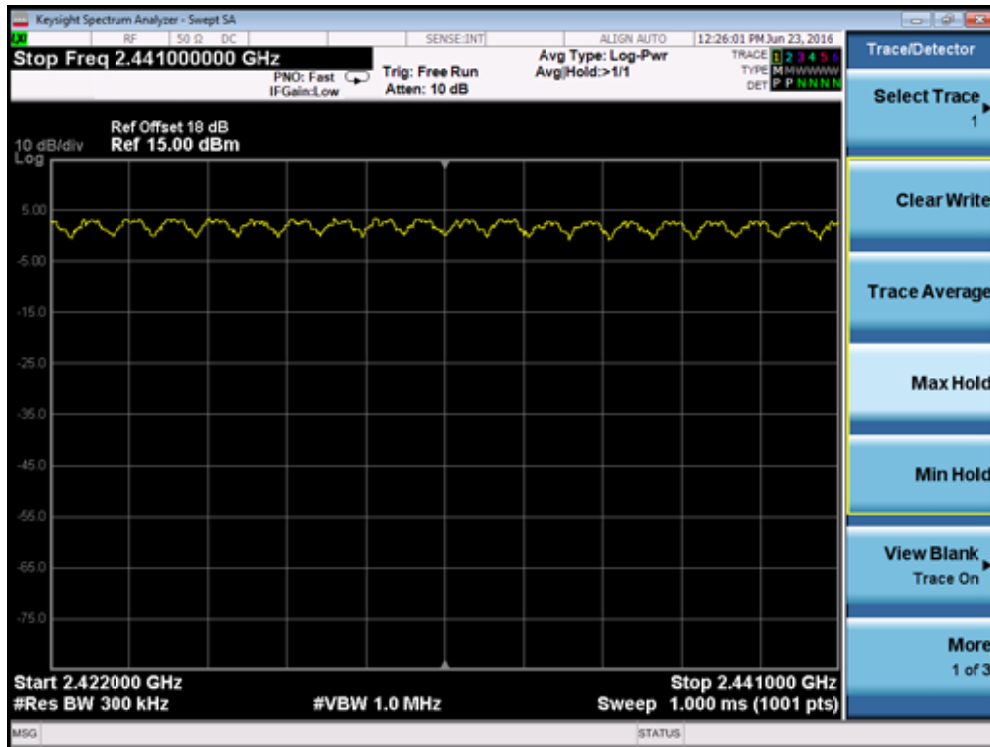
Frequency Band (MHz)	Number of Hopping Frequencies	Limit	Result
2400 - 2483.5	79	>15	Pass

### 2402 - 2421 MHz

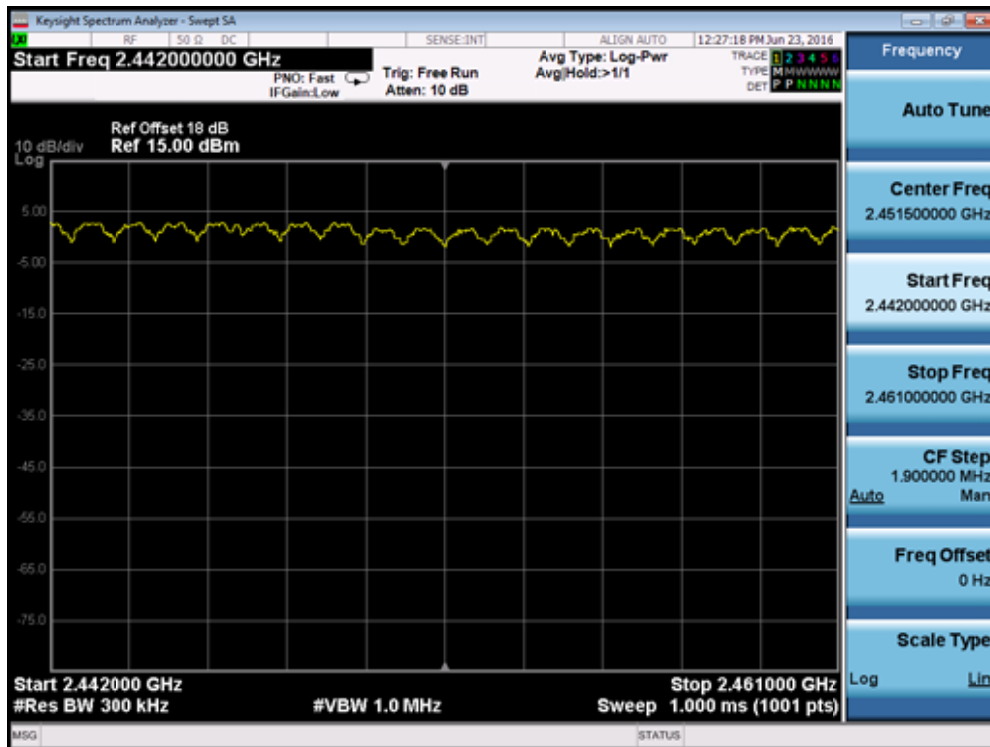




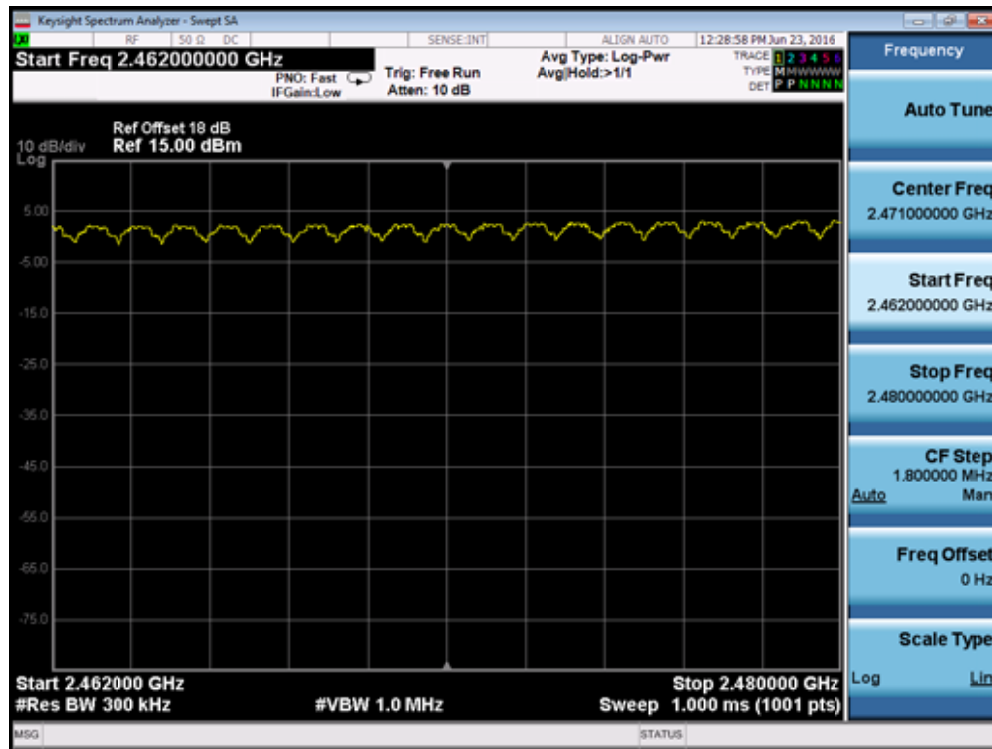
## 2422 - 2441 MHz



## 2442 - 2461 MHz



**2462 - 2480MHz**



## 8. Time of Occupancy (Dwell Time)

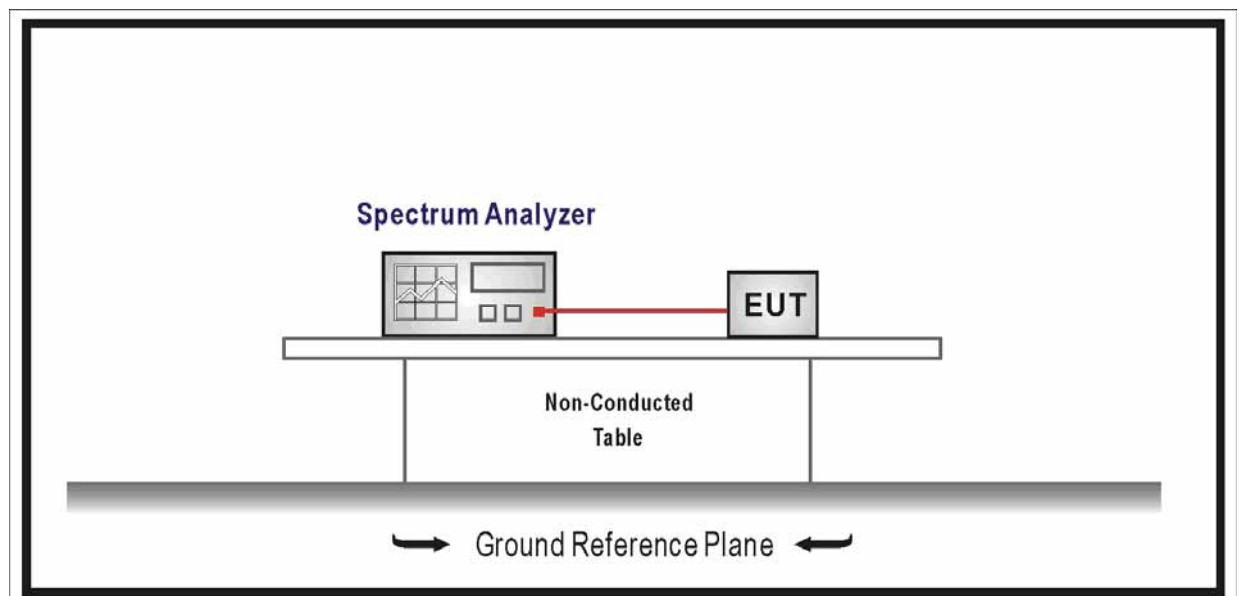
### 8.1. Test Equipment

Time of Occupancy (Dwell Time) / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2017.02.04
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2017.04.03

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

### 8.2. Test Setup



### 8.3. Limit

- For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; If the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.
- Frequency hopping systems operating in the 5725-5850 MHz band shall use at least 75

hopping frequencies. The maximum 20 dB bandwidth of the hopping channel is 1 MHz. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

- 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.

#### 8.4. Test Procedure

According to ANSI C63.10: 2013& ANSI C63.4: 2014

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Span = zero span, centered on a hopping channel

RBW = 1MHz

VBW  $\geq$  RBW

Sweep = as necessary to capture the entire dwell time per hopping channel

Detector function = peak

Trace = max hold

If possible, use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation.

#### 8.5. Uncertainty

The measurement uncertainty is defined as  $\pm 0.1$  us

## 8.6. Test Result

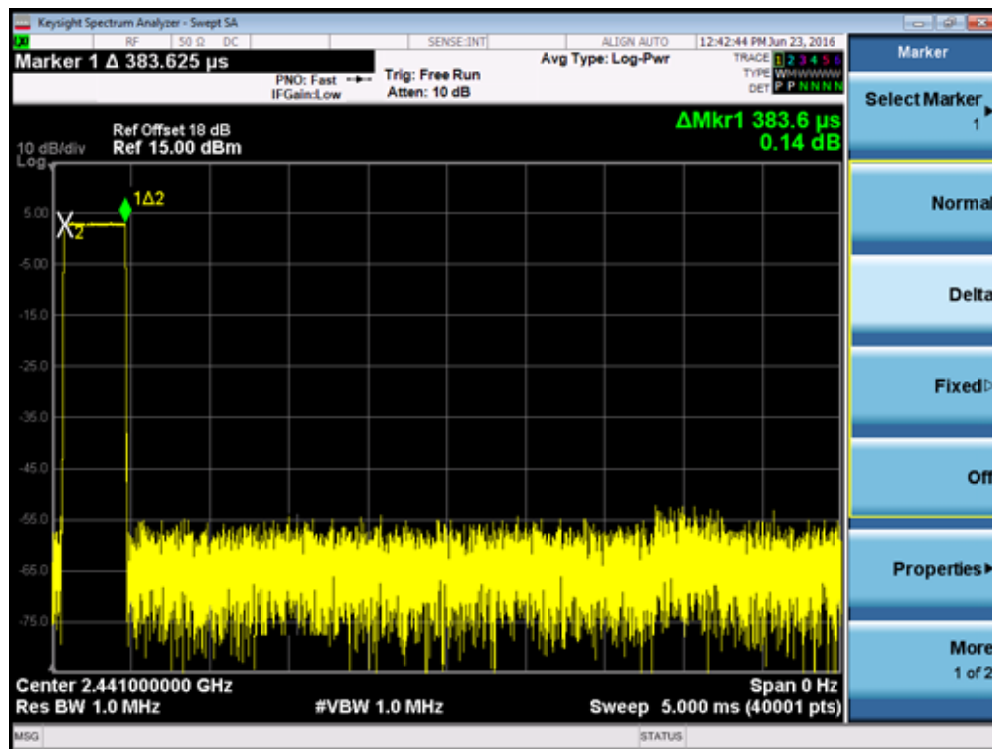
Product	:	BLUETOOTH HEADPHONE
Test Item	:	Time of Occupancy (Dwell Time)
Test Site	:	TR-8
Test Mode	:	Transmitter-1Mbps (GFSK_DH1)

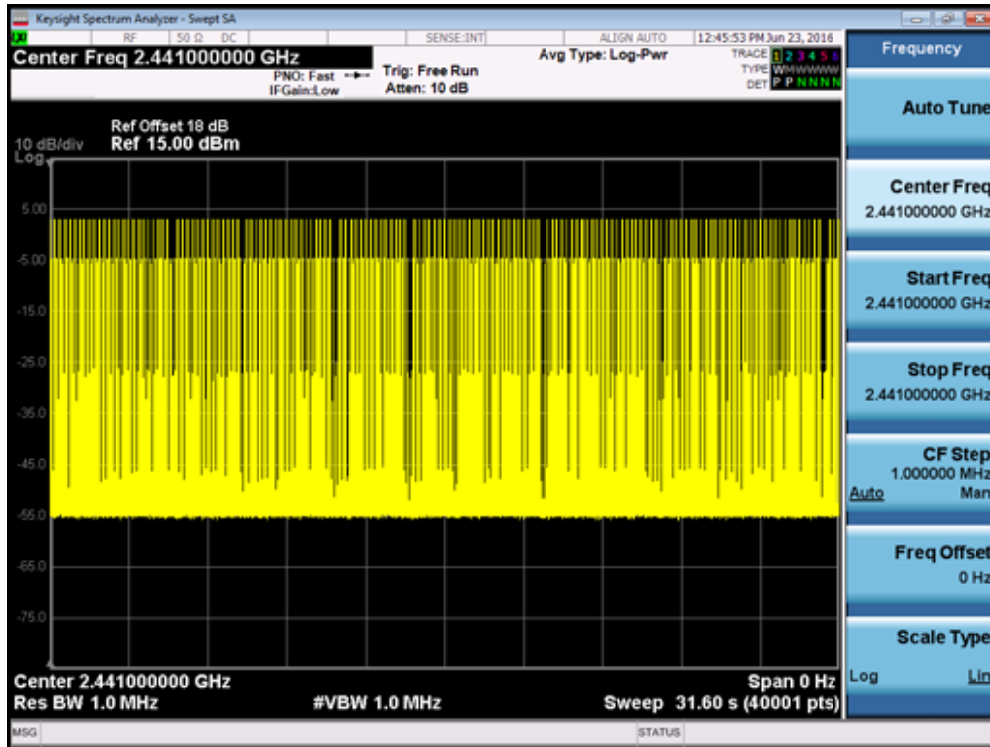
Channel No.	Frequency (MHz)	Time of Occupancy (ms)	Limit (ms)	Result
39	2441	124.032	< 400	Pass

Test Time Period:  $0.4 \times 79 = 31.6 \text{ sec}$ .

- 2441MHz, The Maximum Occupancy Time Within 31.6sec:  $0.384 \text{ ms} \times 323 = 124.032 \text{ msec}$

### Channel 39 (2441MHz)-(DH1)





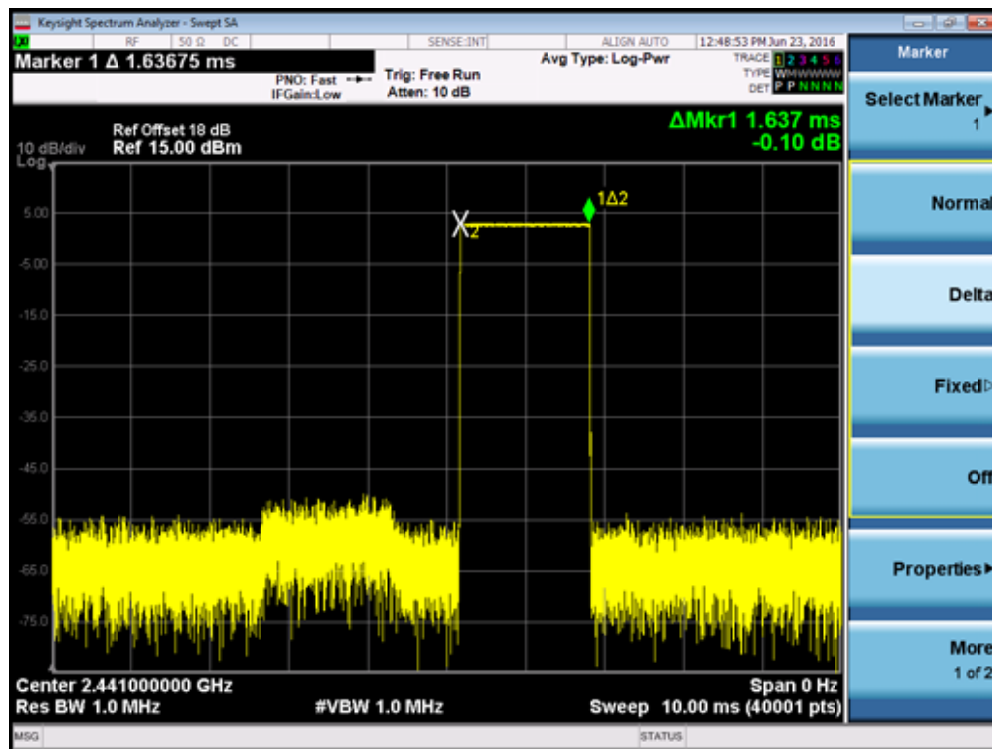
Product	:	BLUETOOTH HEADPHONE
Test Item	:	Time of Occupancy (Dwell Time)
Test Site	:	TR-8
Test Mode	:	Transmitter-1Mbps (GFSK_DH3)

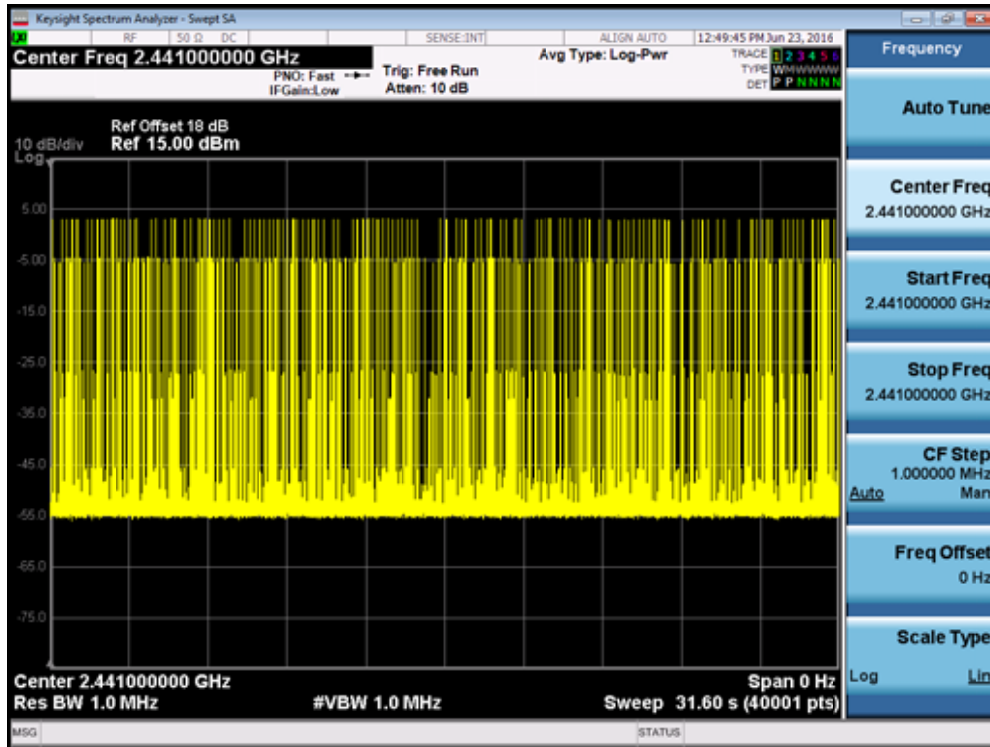
Channel No.	Frequency (MHz)	Time of Occupancy (ms)	Limit (ms)	Result
39	2441	314.304	< 400	Pass

Test Time Period:  $0.4 \times 79 = 31.6 \text{ sec}$ .

- 2441MHz, The Maximum Occupancy Time Within 31.6sec:  $1.637 \text{ ms} \times 192 = 314.304 \text{ msec}$

### Channel 39 (2441MHz) - (DH3)







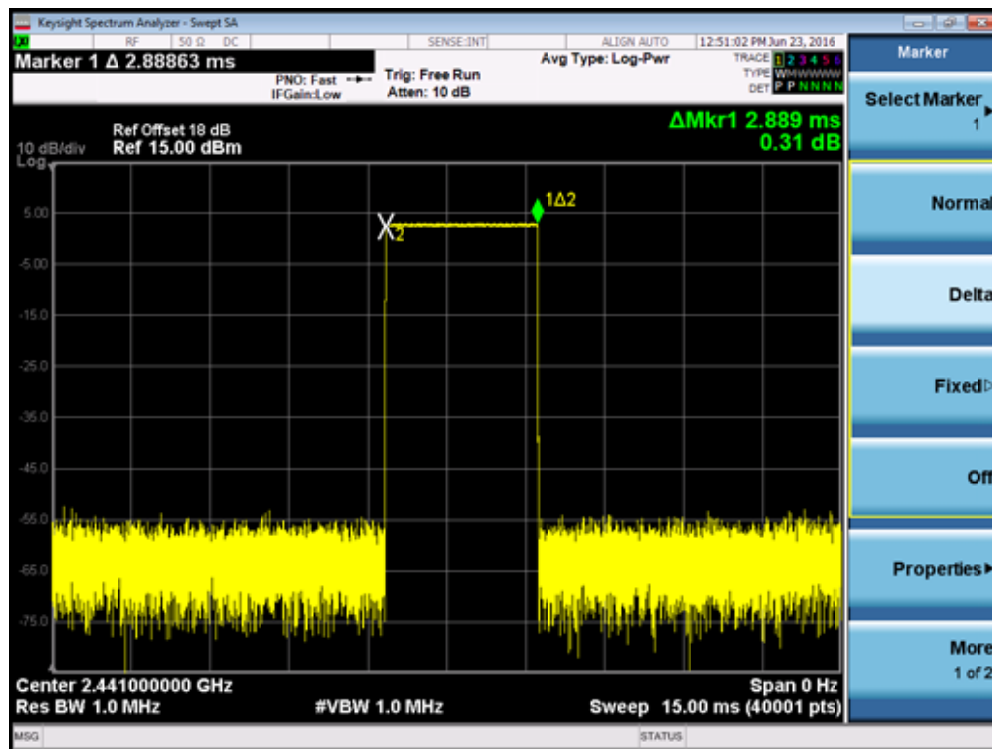
Product	:	BLUETOOTH HEADPHONE
Test Item	:	Time of Occupancy (Dwell Time)
Test Site	:	TR-8
Test Mode	:	Transmitter-1Mbps (GFSK_DH5)

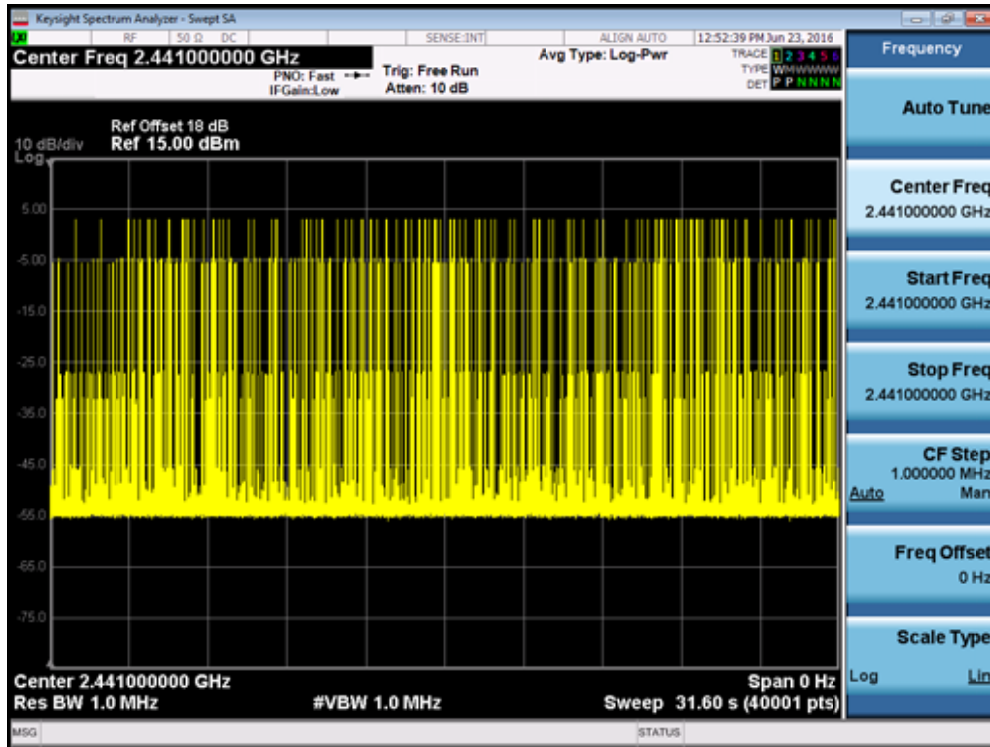
Channel No.	Frequency (MHz)	Time of Occupancy (ms)	Limit (ms)	Result
39	2441	369.792	< 400	Pass

Test Time Period:  $0.4 \times 79 = 31.6 \text{ sec}$ .

- 2441MHz, The Maximum Occupancy Time Within 31.6sec:  $2.889 \text{ ms} \times 128 = 369.792 \text{ msec}$

### Channel 39 (2441MHz) - (DH5)





## 9. Peak Output Power

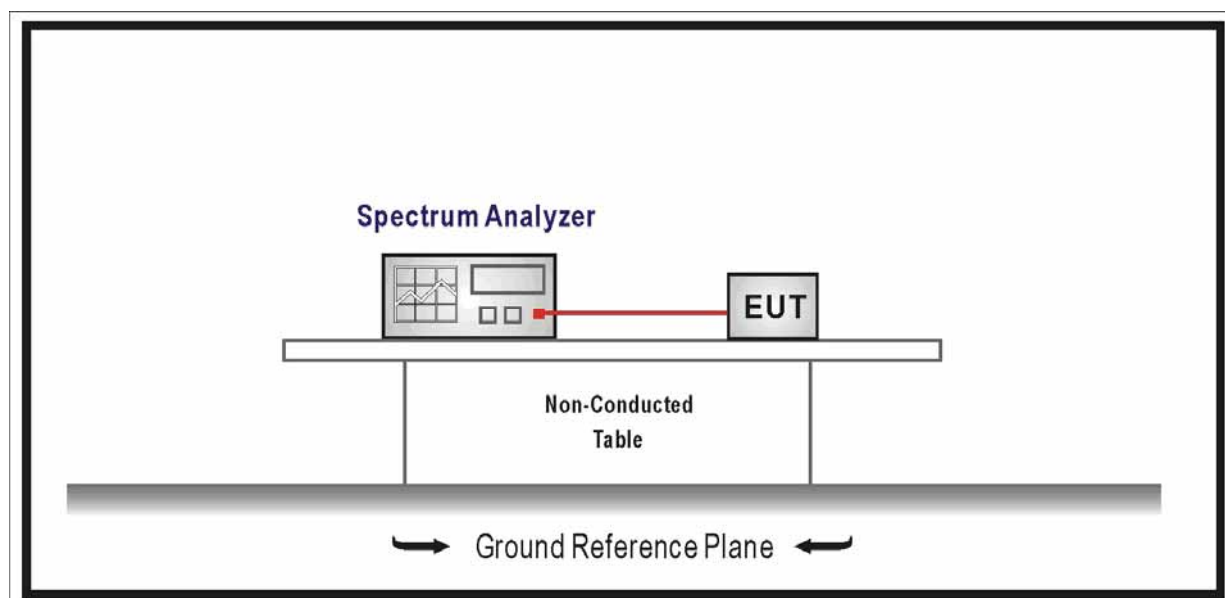
### 9.1. Test Equipment

Peak Output Power / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2017.02.04
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2017.04.03

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

### 9.2. Test Setup



### 9.3. Limit

- 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.
- For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels.

Note: the conducted output power limit specified above is based on the use the antennas with

directional gains that do not exceed 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values above, as appropriate, by the amount in dB that the directional gain of antenna exceeds 6 dBi.

#### 9.4. Test Procedure

According to ANSI C63.10: 2013& ANSI C63.4: 2014

Use the following spectrum analyzer settings:

Span = approximately 5 times the 20dB bandwidth, centered on a hopping channel

RBW > the 20 dB bandwidth of the emission being measured.

VBW  $\geq$  RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power (don't forget added the external attenuation and cable loss).

#### 9.5. Uncertainty

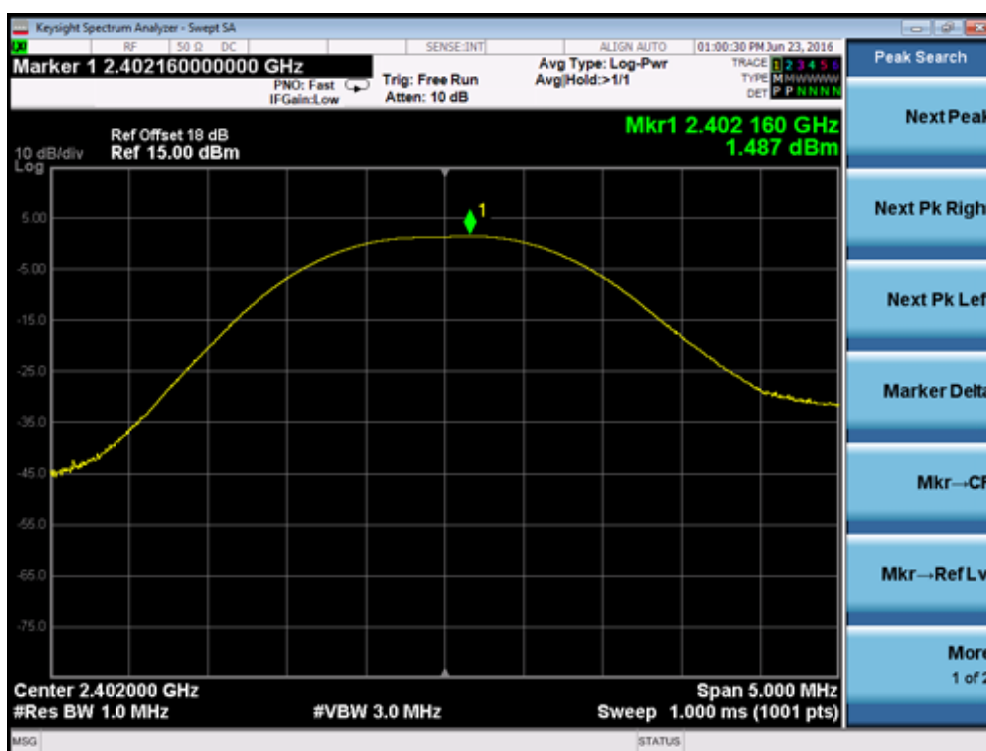
The measurement uncertainty is defined as  $\pm 1.0$  dB

## 9.6. Test Result

Product	:	BLUETOOTH HEADPHONE
Test Item	:	Power Output
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmitter-1Mbps (GFSK_DH5)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
0	2402	1.487	30.00	Pass
39	2441	3.212	30.00	Pass
78	2480	3.404	30.00	Pass

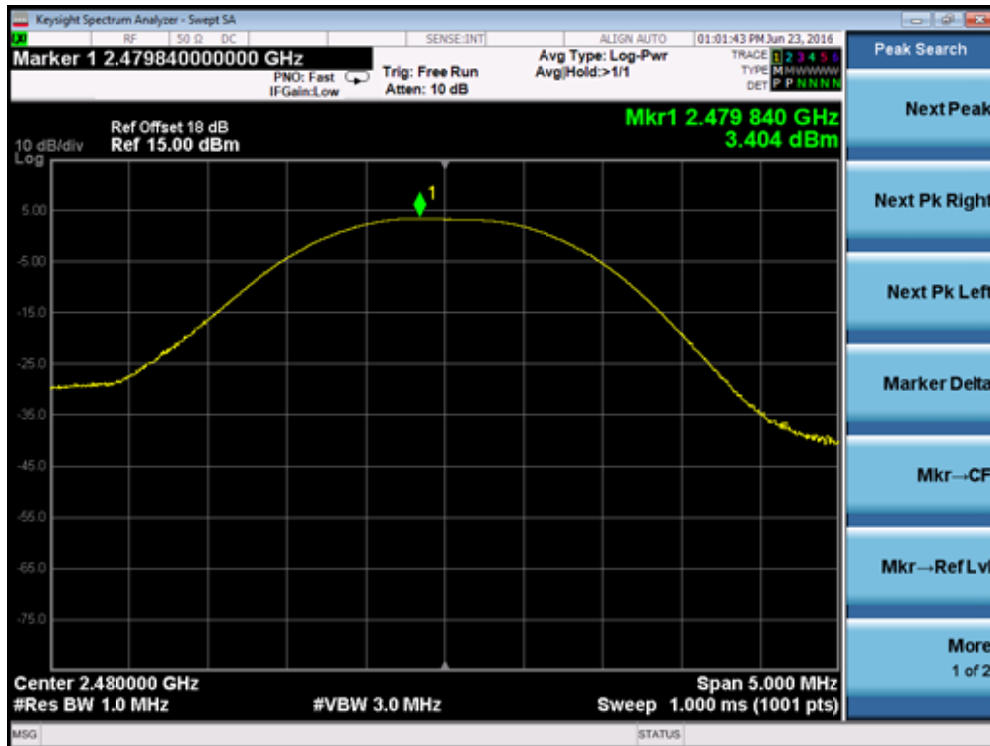
### DH5 2402MHz



### DH5 2441MHz



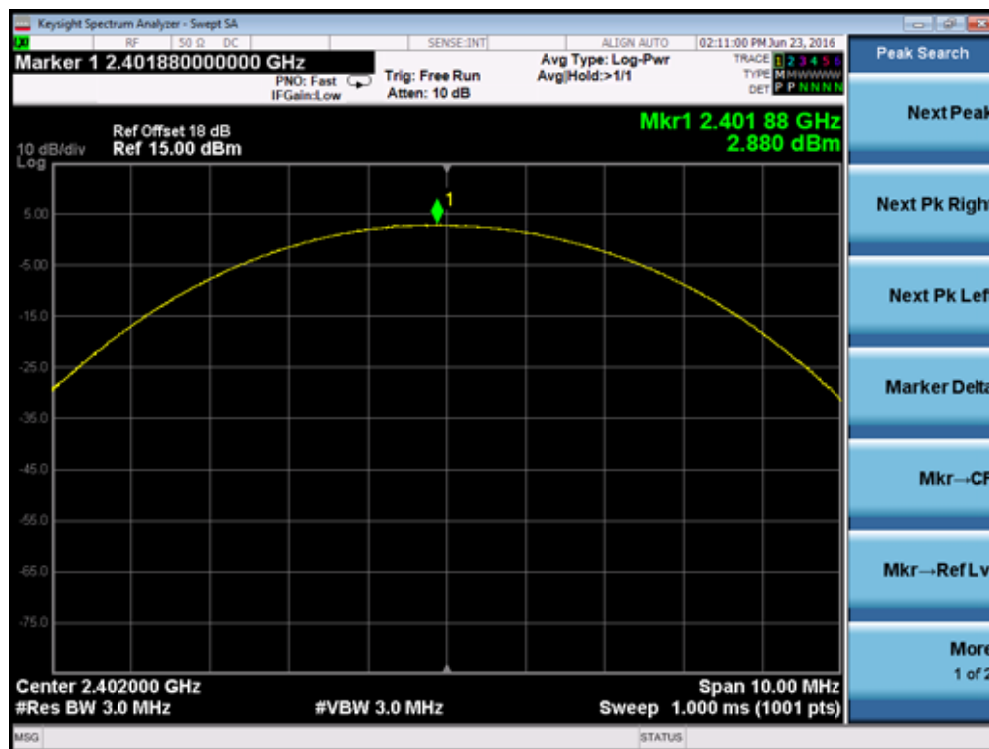
### DH5 2480MHz



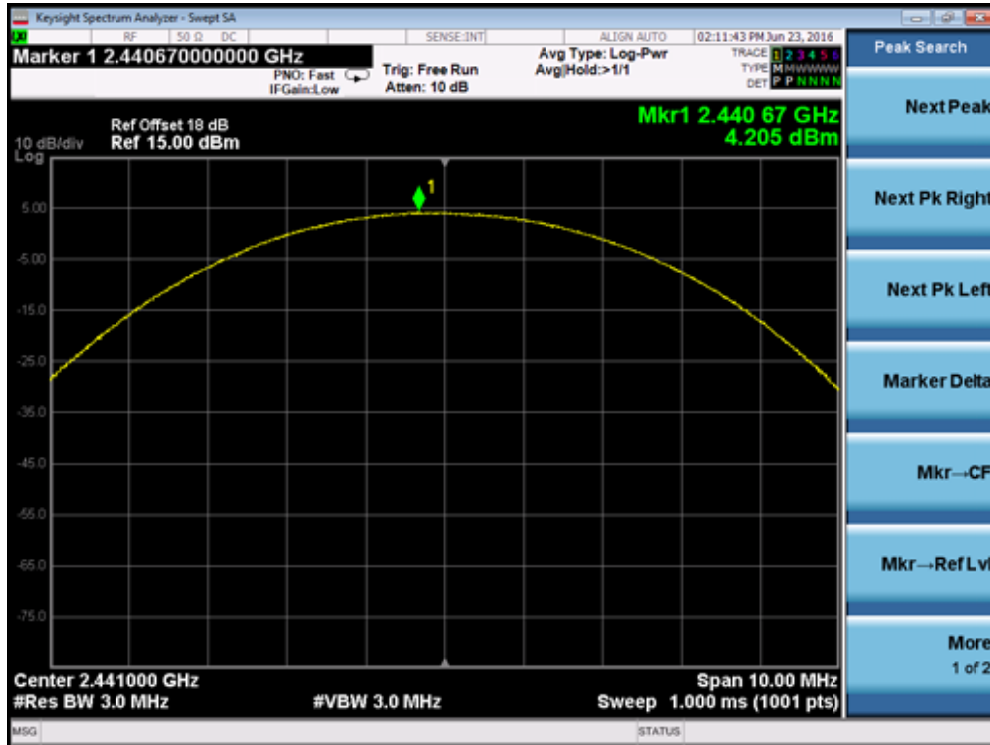
Product	:	BLUETOOTH HEADPHONE
Test Item	:	Power Output
Test Site	:	TR-8
Test Mode	:	Mode 2: Transmitter-2Mbps (Pi/4 DQPSK_DH5)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
0	2402	2.880	30.00	Pass
39	2441	4.205	30.00	Pass
78	2480	4.653	30.00	Pass

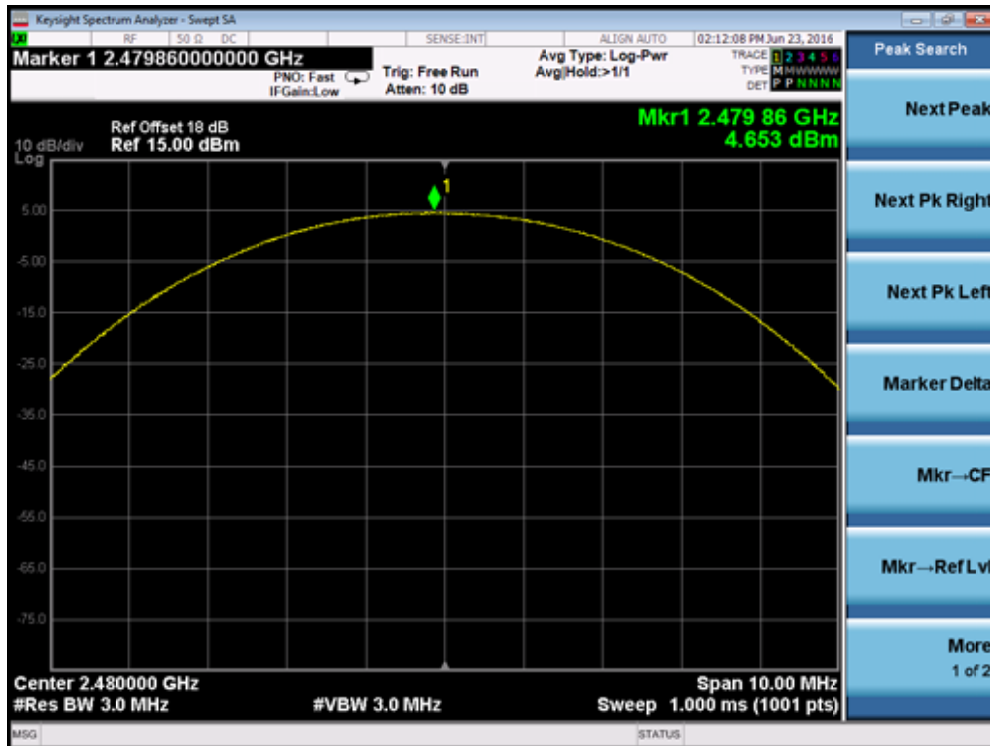
### 2DH5 2402MHz



## 2DH5 2441MHz



## 2DH5 2480MHz

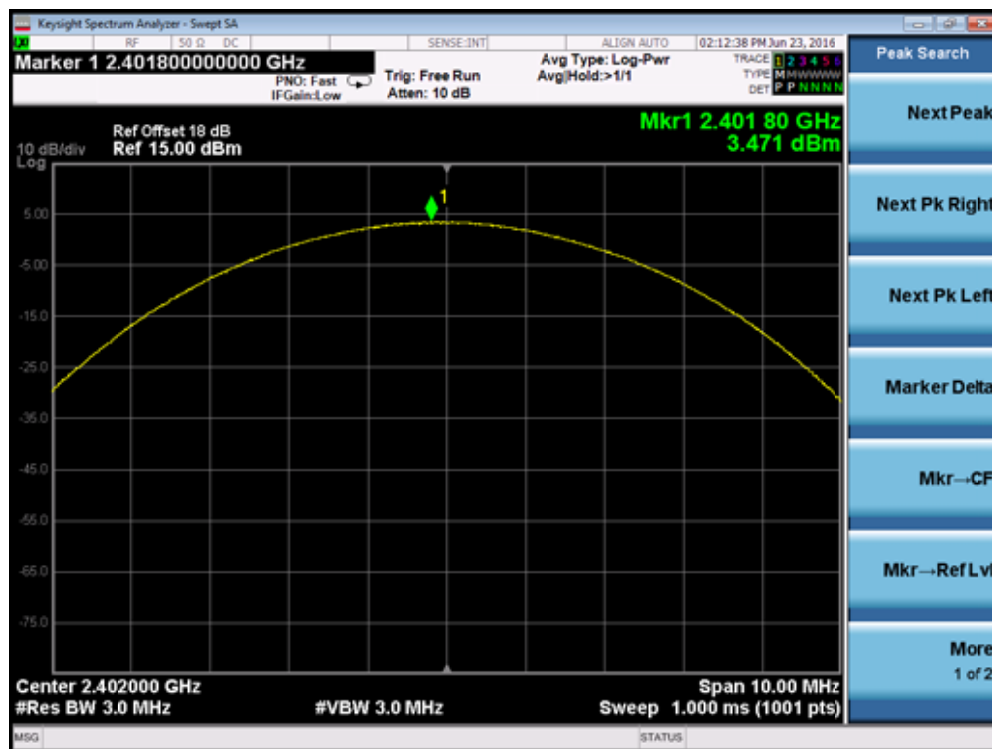




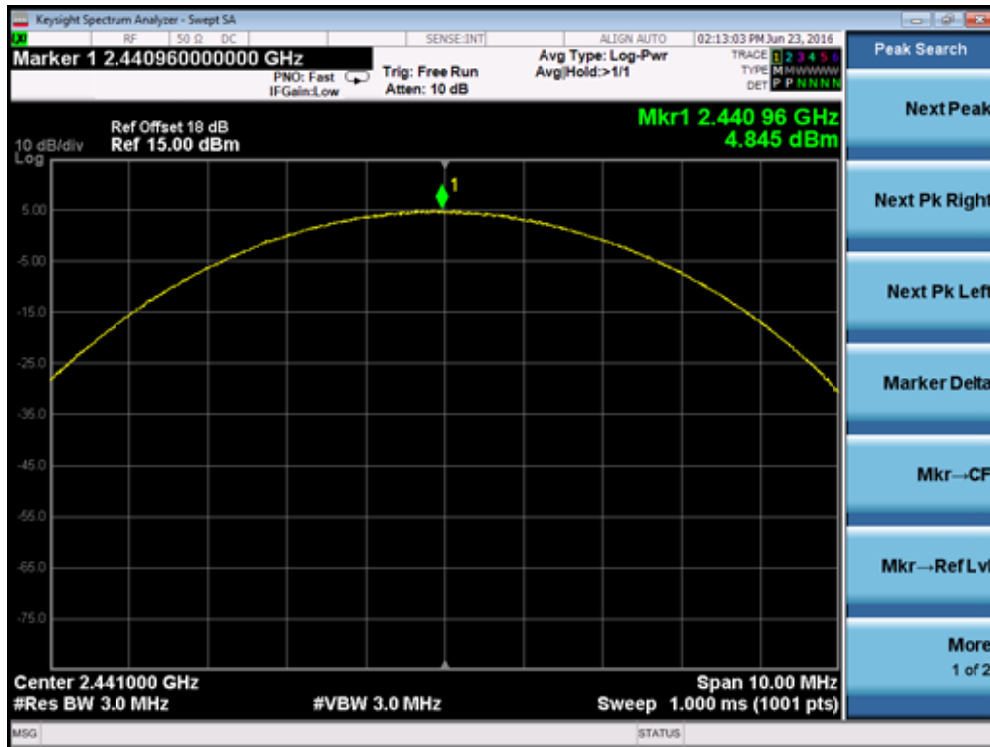
Product	:	BLUETOOTH HEADPHONE
Test Item	:	Power Output
Test Site	:	TR-8
Test Mode	:	Mode 3: Transmitter-3Mbps (8DPSK_DH5)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
0	2402	3.471	30.00	Pass
39	2441	4.845	30.00	Pass
78	2480	5.228	30.00	Pass

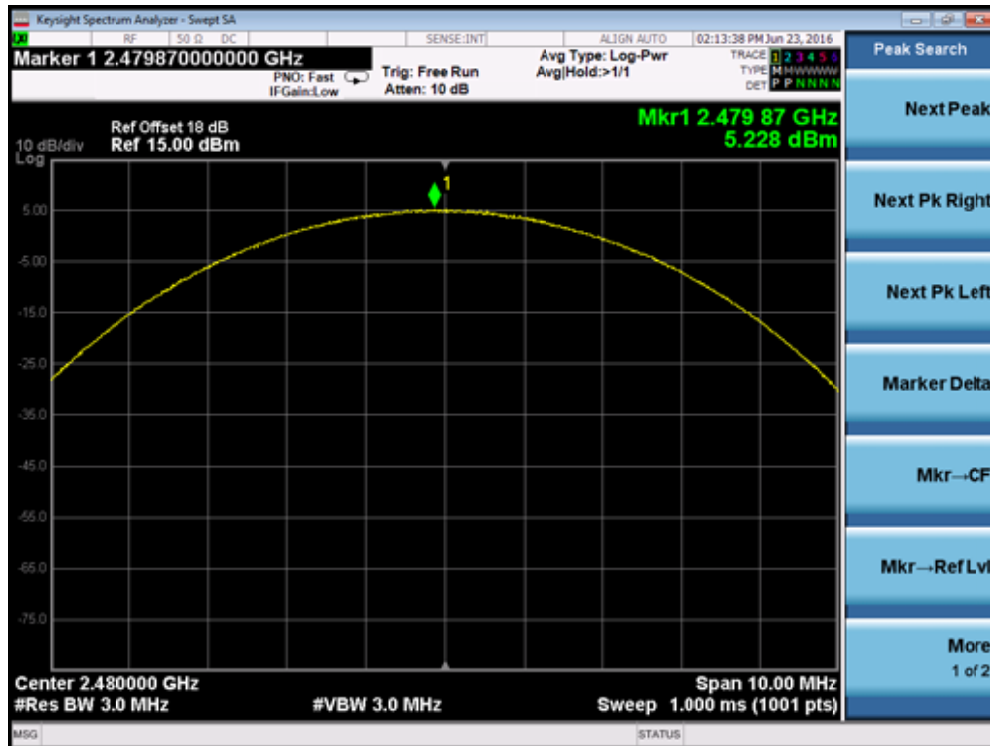
### 3DH5 2402MHz



### 3DH5 2441MHz



### 3DH5 2480MHz



## 10. Emissions in non-restricted frequency bands

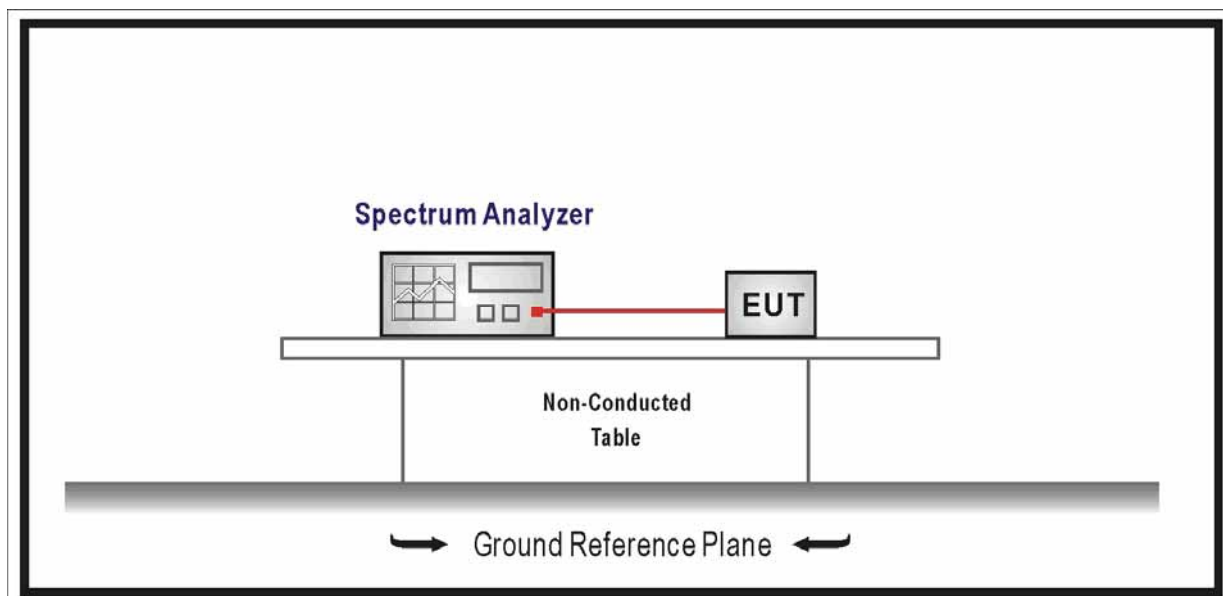
### 10.1. Test Equipment

Emissions in non-restricted frequency bands / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2017.02.04
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2017.04.03

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

### 10.2. Test Setup



### 10.3. Limit

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 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, 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) of FCC part 15 is not required.

#### 10.4. Test Procedure

According to ANSI C63.10: 2013.

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10<sup>th</sup> harmonic. Typically, several plots are required to cover this entire span.

RBW = 100 kHz

VBW  $\geq$  RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded.

The level displayed must comply with the limit specified in this section.

#### 10.5. Uncertainty

The measurement uncertainty is defined as  $\pm 1.0$  dB

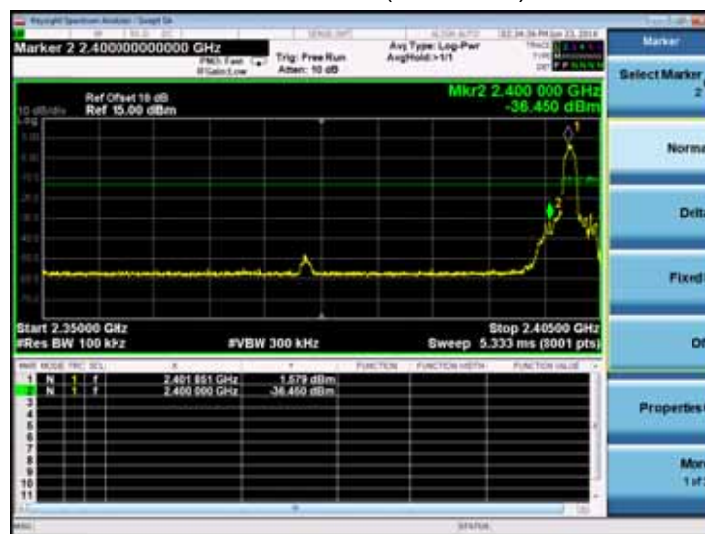
## 10.6. Test Result

Product	:	BLUETOOTH HEADPHONE
Test Item	:	Emissions in non-restricted frequency bands
Test Site	:	TR-8

Mode	Channel	Test Frequency (MHz)	In-Band PSD[a] (dBm/100kHz)	Frequency (MHz)	Out-Band PSD[b] (dBm/100kHz)	[a]-[b] (dB)	Limit (dB)	Result
1	00	2402	1.339	2400.00	-47.789	46.450	>20	Pass
1	78	2480	3.269	2483.50	-48.673	45.404	>20	Pass
2	00	2402	1.579	2400.00	-36.450	34.871	>20	Pass
2	78	2480	3.168	2483.50	-48.546	45.378	>20	Pass
3	00	2402	1.388	2400.00	-37.033	35.645	>20	Pass
3	78	2480	3.119	2483.50	-48.974	45.855	>20	Pass
4	00~78	00~78	2.801	2400.00	-54.060	56.861	>20	Pass
			2.801	2483.50	-50.450	53.251	>20	Pass

Note: The worst case of Emissions in non-restricted frequency bands as below:

Mode 2 CH00 (2402MHz)



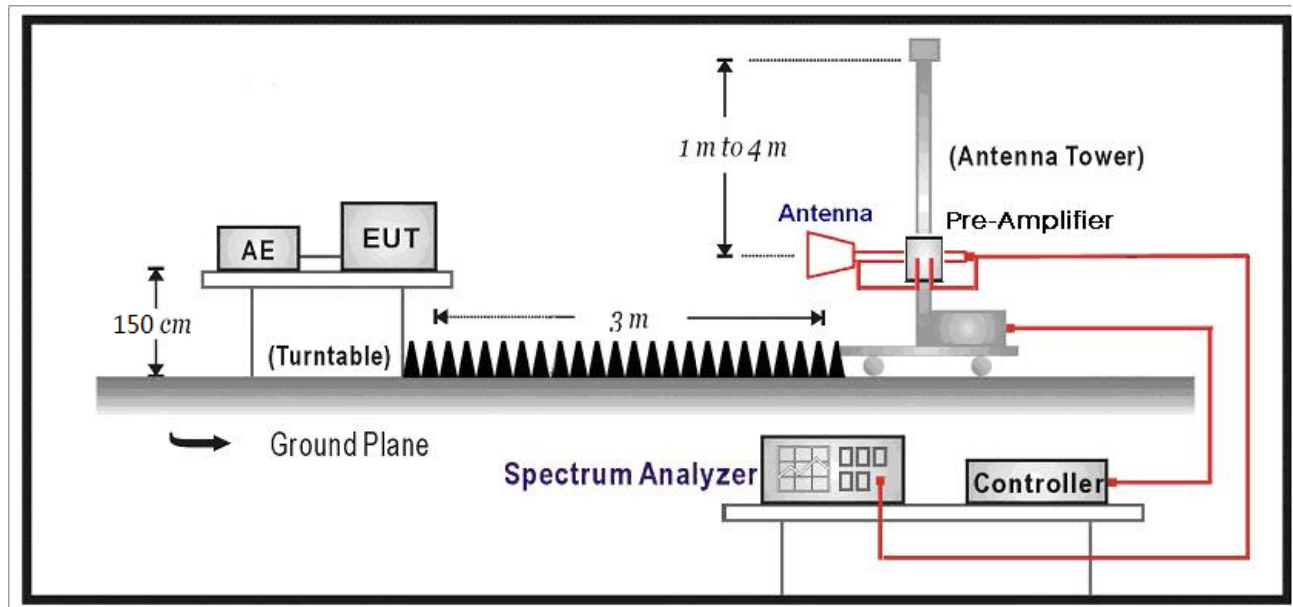
## 11. Radiated Emission Band Edge

### 11.1. Test Equipment

☒ Radiated Emission Band Edge / AC-5

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2017.02.04
Preamplifier	Miteq	NSP1800-25	1364185	2017.05.03
Preamplifier	QuieTek	AP-040G	CHM-0906001	2017.05.03
Bilog Antenna	Teseq GmbH	CBL6112D	27612	2016.10.15
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	733	2017.02.26
DRG Horn	ETS-Lindgren	3117	00167055	2016.07.16
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2017.03.01
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C1	2017.03.01
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2017.03.01
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	AC5-C3	2016.08.07
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC5-TH	2017.01.04

## 11.2. Test Setup



## 11.3. Limit

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a) of FCC part 15.

## 11.4. Test Procedure

According to ANSI C63.10: 2013& ANSI C63.4: 2014

This test is required for any spurious emission or modulation product that falls in a Restricted Band, as defined in Section 15.205 of FCC part 15. It must be performed with the highest gain of each type of antenna proposed for use with the EUT. Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for  $f \geq 1$  GHz, 100 kHz for  $f < 1$  GHz

VBW  $\geq$  RBW

Sweep = auto

Detector function = peak

Trace = max hold

Follow the guidelines in ANSI C63.4 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization, etc. A pre-amp and a high pass filter are required for this test, in order to provide the measuring system with

sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, which must comply with the limit specified in Section 15.35(b) of FCC part 15.

Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209 of FCC Part 15. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from  $20\log(\text{dwell time}/100 \text{ ms})$ , in an effort to demonstrate compliance with the 15.209 limit of FCC part 15.

If the emission on which a radiated measurement must be made is located at the edge of the authorized band of operation, then the alternative “marker-delta” method may be employed.

### 11.5. Uncertainty

The measurement uncertainty above 1G is defined as  $\pm 3.9 \text{ dB}$

below 1G is defined as  $\pm 3.8 \text{ dB}$



## 11.6. Test Result

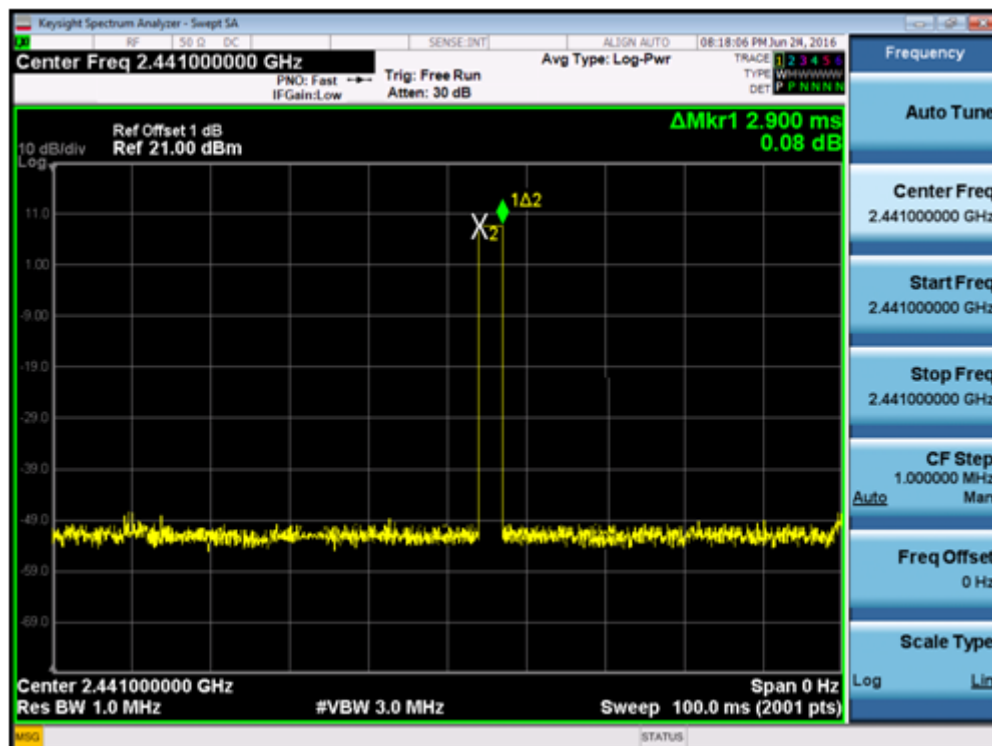
All of the test result shown indicates the worst case, and spectrum analyzer parameters setting as shown below:

Peak detector: RBW = 1MHz, VBW = 3MHz, sweep time = 200ms;

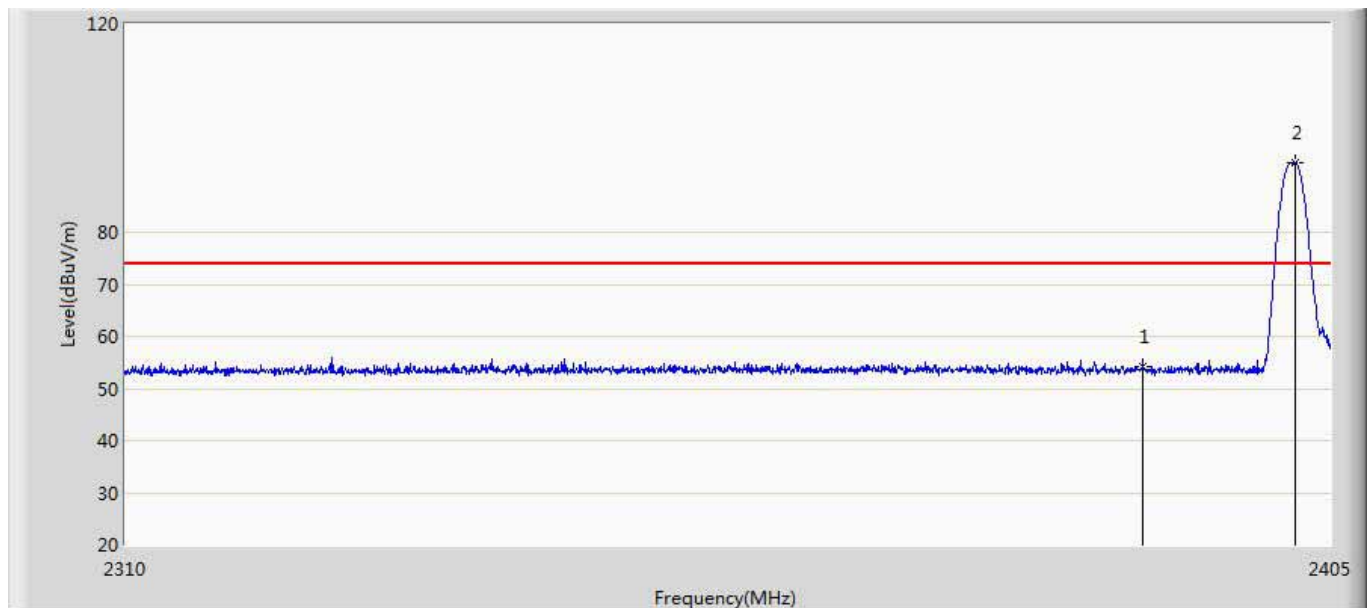
Average = Peak Measure Level+ Duty Factor

Duty Factor=  $20 \cdot \text{LOG}(\text{Pulse Number} \cdot \text{On Time} / 100) = -30.75\text{dB}$  in worst condition in normal use.

Pulse Number



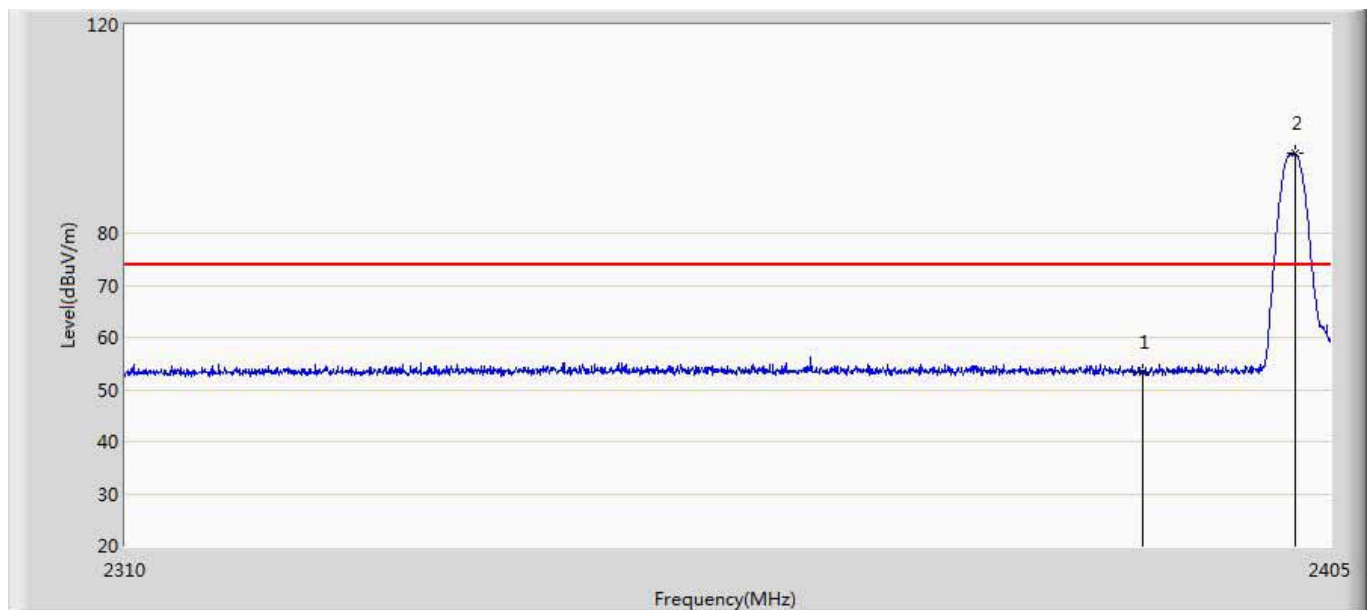
Engineer: Scott	
Site: AC5	Time: 2016/06/27 - 10:52
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: BLUETOOTH HEADPHONE	Power: 120V/60Hz
Note: Mode 1:Transmit at CH2402Mhz by DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	54.330	18.257	-19.670	74.000	36.073	PK
2	*	2402.150	93.473	57.395	N/A	N/A	36.079	PK

No	Mark	Frequency (MHz)	Peak Level (dBuV/m)	AV Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Duty Factor (dB)	Type
1		2390.000	54.330	23.58	-30.42	54.000	-30.75	AV
2		2402.008	93.473	62.723	N/A	N/A	-30.75	AV

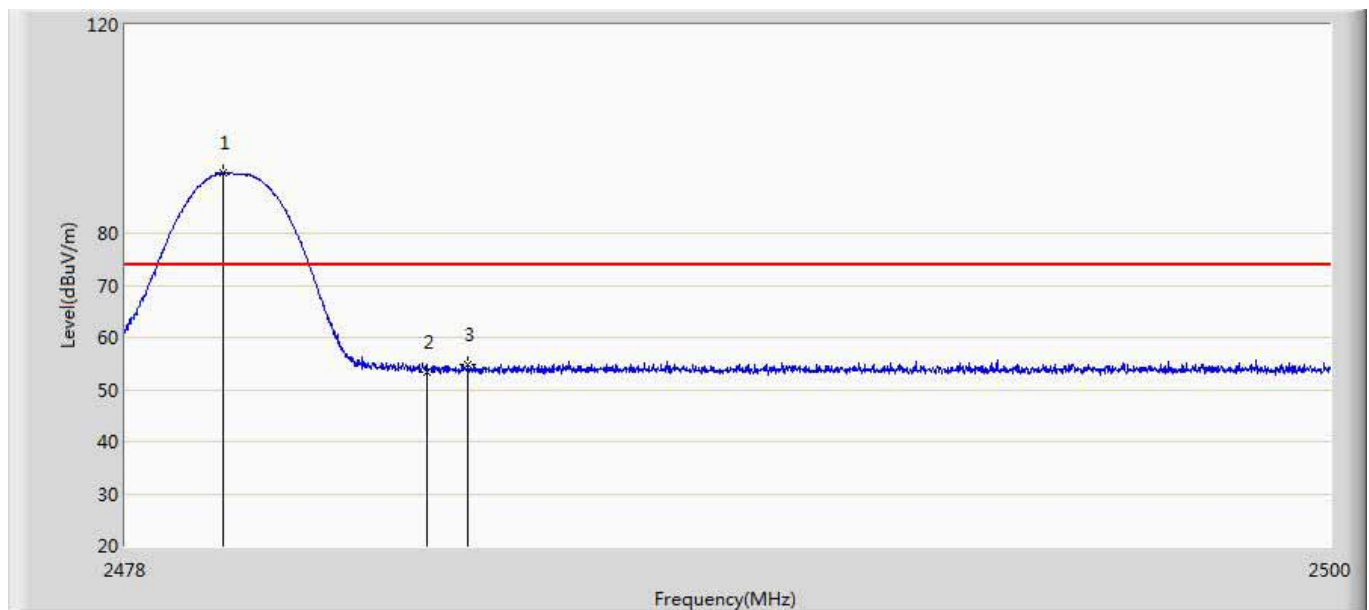
Engineer: Scott	
Site: AC5	Time: 2016/06/27 - 10:53
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: BLUETOOTH HEADPHONE	Power: 120V/60Hz
Note: Mode 1:Transmit at CH2402Mhz by DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	53.343	17.270	-20.657	74.000	36.073	PK
2	*	2402.198	95.343	59.265	N/A	N/A	36.079	PK

No	Mark	Frequency (MHz)	Peak Level (dBuV/m)	AV Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Duty Factor (dB)	Type
1		2390.000	53.343	22.593	-31.407	74.000	-30.75	PK
2	*	2402.198	95.343	64.593	N/A	N/A	-30.75	PK

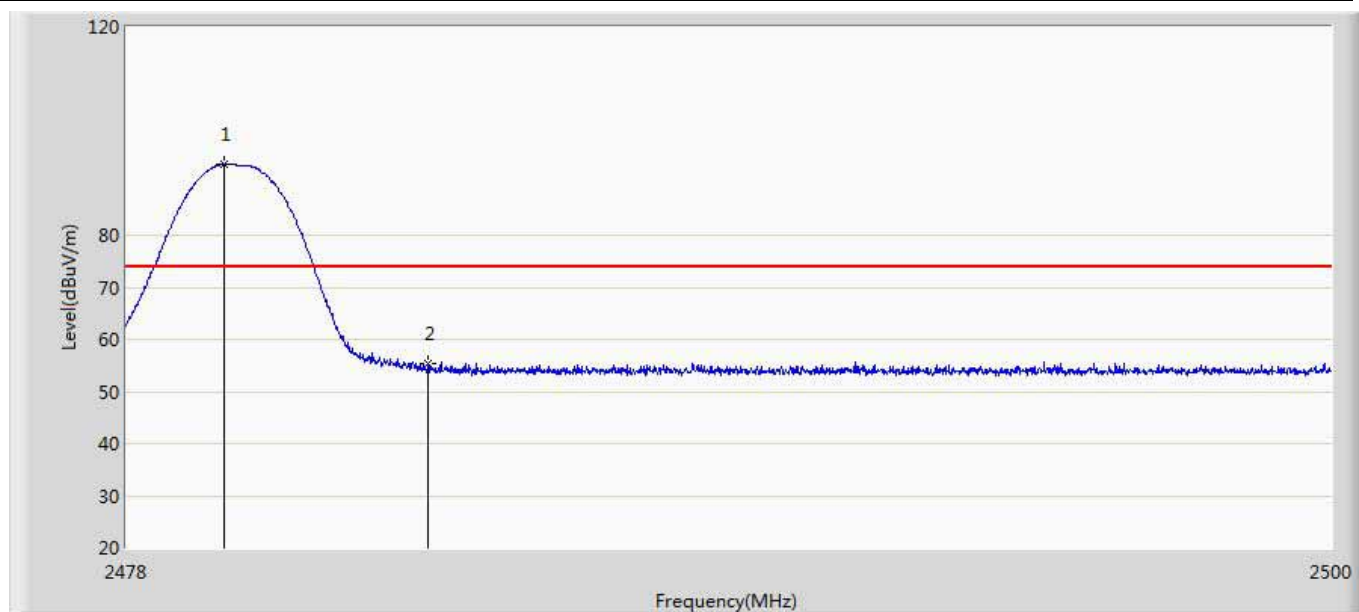
Engineer: Scott	
Site: AC5	Time: 2016/06/27 - 10:54
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: BLUETOOTH HEADPHONE	Power: 120V/60Hz
Note: Mode 1:Transmit at CH2480Mhz by DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2479.771	91.534	55.125	N/A	N/A	36.409	PK
2		2483.500	53.266	16.871	-20.734	74.000	36.395	PK
3		2484.248	54.655	18.263	-19.345	74.000	36.392	PK

No	Mark	Frequency (MHz)	Peak Level (dBuV/m)	AV Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Duty Factor (dB)	Type
1	*	2479.771	91.534	60.784	N/A	N/A	-30.75	PK
2		2483.500	53.266	22.516	-31.484	74.000	-30.75	PK
3		2484.248	54.655	23.905	-30.095	74.000	-30.75	PK

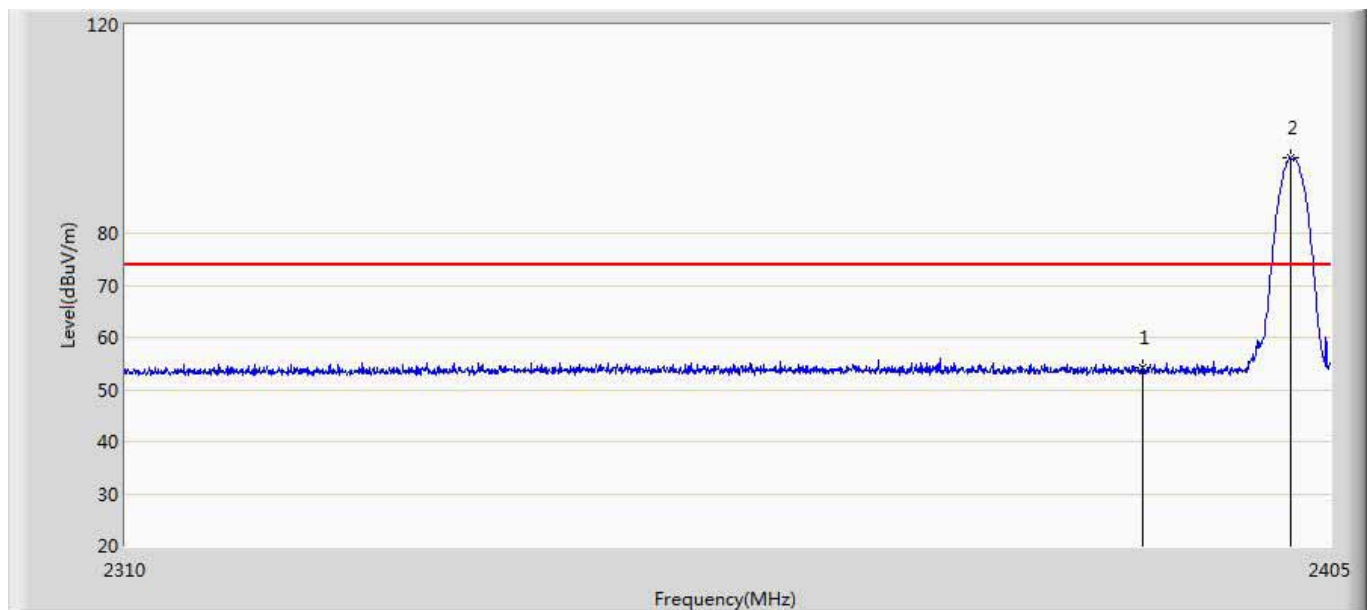
Engineer: Scott	
Site: AC5	Time: 2016/06/27 - 10:58
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: BLUETOOTH HEADPHONE	Power: 120V/60Hz
Note: Mode 1:Transmit at CH2480Mhz by DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2479.771	93.592	57.183	N/A	N/A	36.409	PK
2		2483.500	55.487	19.092	-18.513	74.000	36.395	PK

No	Mark	Frequency (MHz)	Peak Level (dBuV/m)	AV Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Duty Factor (dB)	Type
1	*	2479.771	93.592	62.842	N/A	N/A	-30.75	PK
2		2483.500	55.487	24.737	-29.263	74.000	-30.75	PK

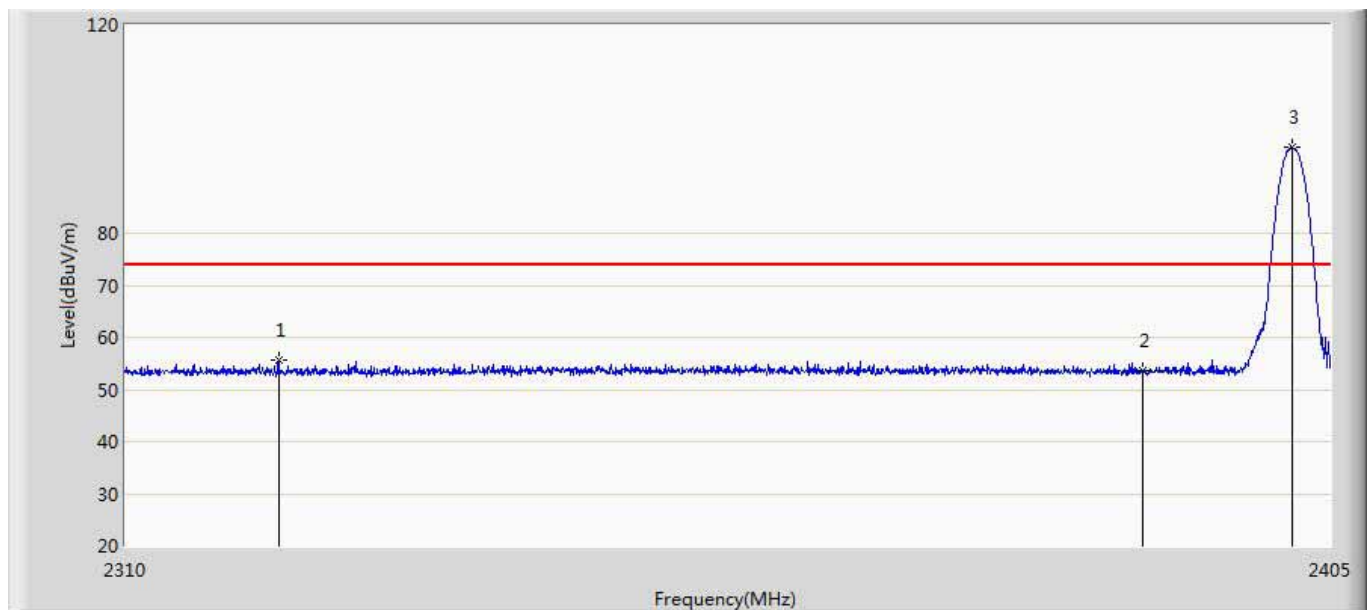
Engineer: Scott	
Site: AC5	Time: 2016/06/27 - 11:01
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: BLUETOOTH HEADPHONE	Power: 120V/60Hz
Note: Mode 2:Transmit at CH2402Mhz by 2DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	54.247	18.174	-19.753	74.000	36.073	PK
2	*	2401.817	94.417	58.339	N/A	N/A	36.078	PK

No	Mark	Frequency (MHz)	Peak Level (dBuV/m)	AV Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Duty Factor (dB)	Type
1	*	2479.771	54.247	23.497	-30.503	74.000	-30.75	PK
2		2483.500	94.417	63.667	N/A	N/A	-30.75	PK

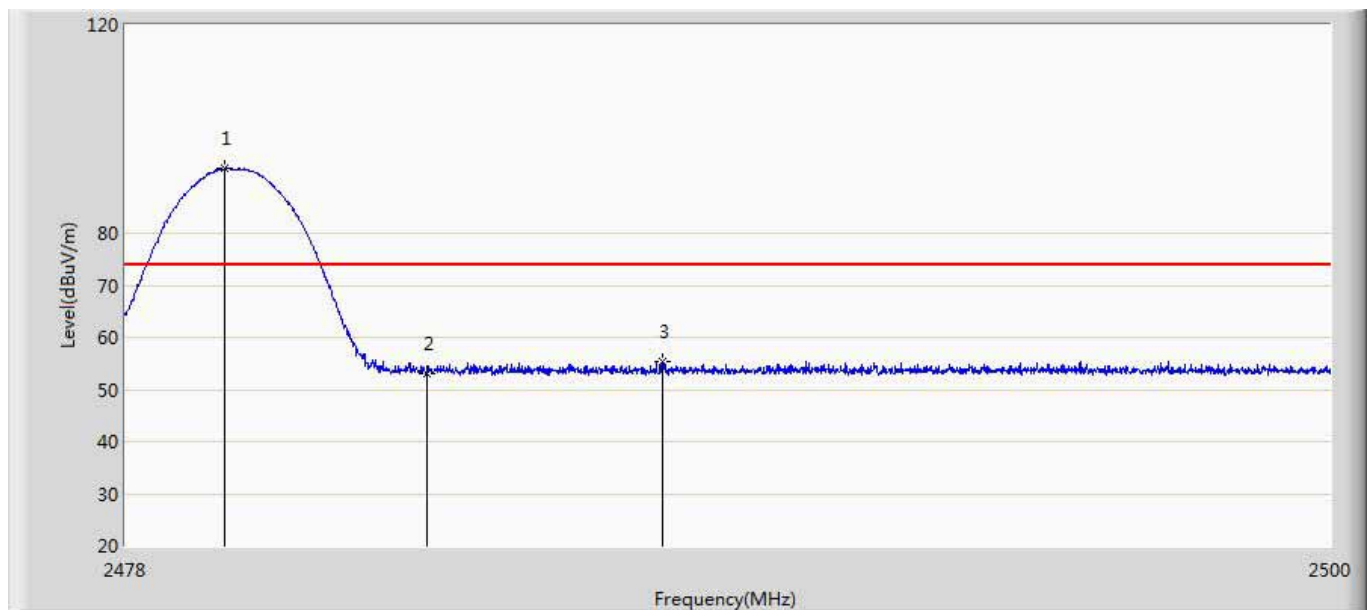
Engineer: Scott	
Site: AC5	Time: 2016/06/27 - 11:04
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: BLUETOOTH HEADPHONE	Power: 120V/60Hz
Note: Mode 2:Transmit at CH2402Mhz by 2DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2321.923	55.555	19.583	-18.445	74.000	35.971	PK
2		2390.000	53.661	17.588	-20.339	74.000	36.073	PK
3	*	2401.913	96.449	60.371	N/A	N/A	36.078	PK

No	Mark	Frequency (MHz)	Peak Level (dBuV/m)	AV Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Duty Factor (dB)	Type
1		2321.923	55.555	24.805	-29.195	74.000	-30.75	PK
2		2390.000	53.661	22.911	-31.089	74.000	-30.75	PK
3	*	2401.913	96.449	65.699	N/A	N/A	-30.75	PK

Engineer: Scott	
Site: AC5	Time: 2016/06/27 - 11:06
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: BLUETOOTH HEADPHONE	Power: 120V/60Hz
Note: Mode 1:Transmit at CH2480Mhz by 2DH5	

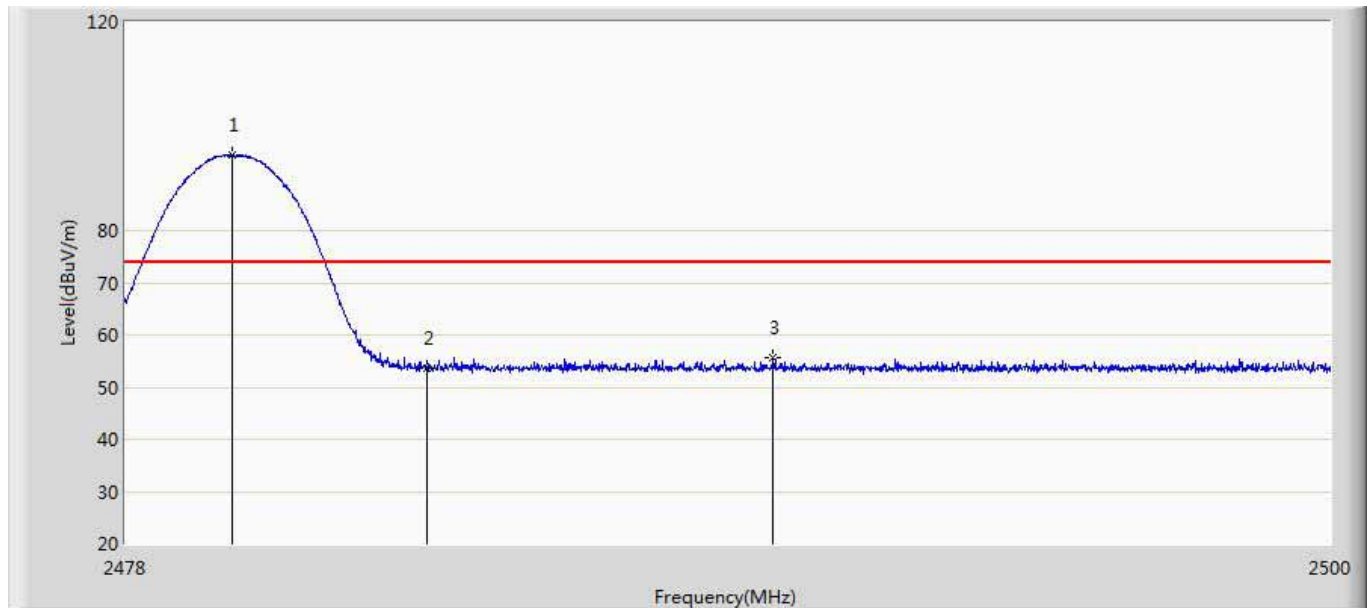


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2479.804	92.526	56.117	N/A	N/A	36.409	PK
2		2483.500	53.155	16.760	-20.845	74.000	36.395	PK
3		2487.779	55.263	18.884	-18.737	74.000	36.379	PK

No	Mark	Frequency (MHz)	Peak Level (dBuV/m)	AV Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Duty Factor (dB)	Type
1	*	2479.804	92.526	61.776	N/A	N/A	-30.75	PK
2		2483.500	53.155	22.405	-31.595	74.000	-30.75	PK
3		2487.779	55.263	24.513	-29.487	74.000	-30.75	PK



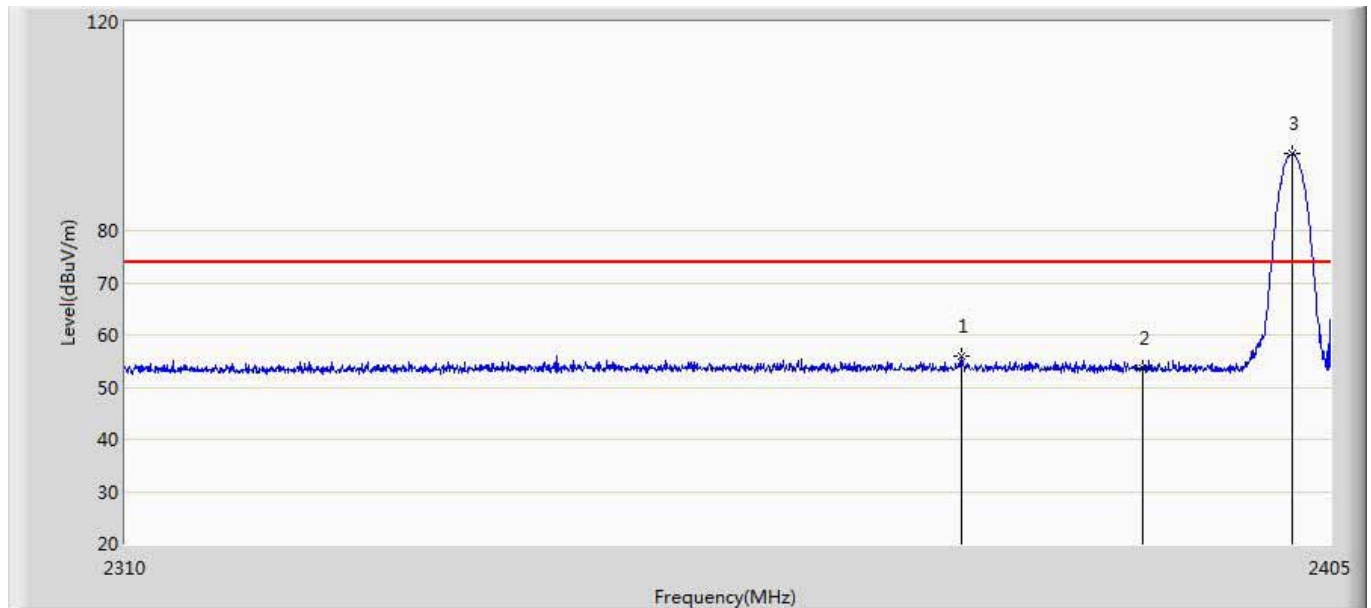
Profile: 1662056R	Page No.: 8
Engineer: Scott	
Site: AC5	Time: 2016/06/27 - 11:08
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: BLUETOOTH HEADPHONE	Power: 120V/60Hz
Note: Mode 1:Transmit at CH2480Mhz by 2DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2479.947	94.453	58.045	N/A	N/A	36.408	PK
2		2483.500	53.656	17.261	-20.344	74.000	36.395	PK
3		2489.803	55.733	19.361	-18.267	74.000	36.372	PK

No	Mark	Frequency (MHz)	Peak Level (dBuV/m)	AV Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Duty Factor (dB)	Type
1	*	2479.804	94.453	63.703	N/A	N/A	-30.75	PK
2		2483.500	53.656	22.906	-31.094	74.000	-30.75	PK
3		2487.779	55.733	24.983	-29.017	74.000	-30.75	PK

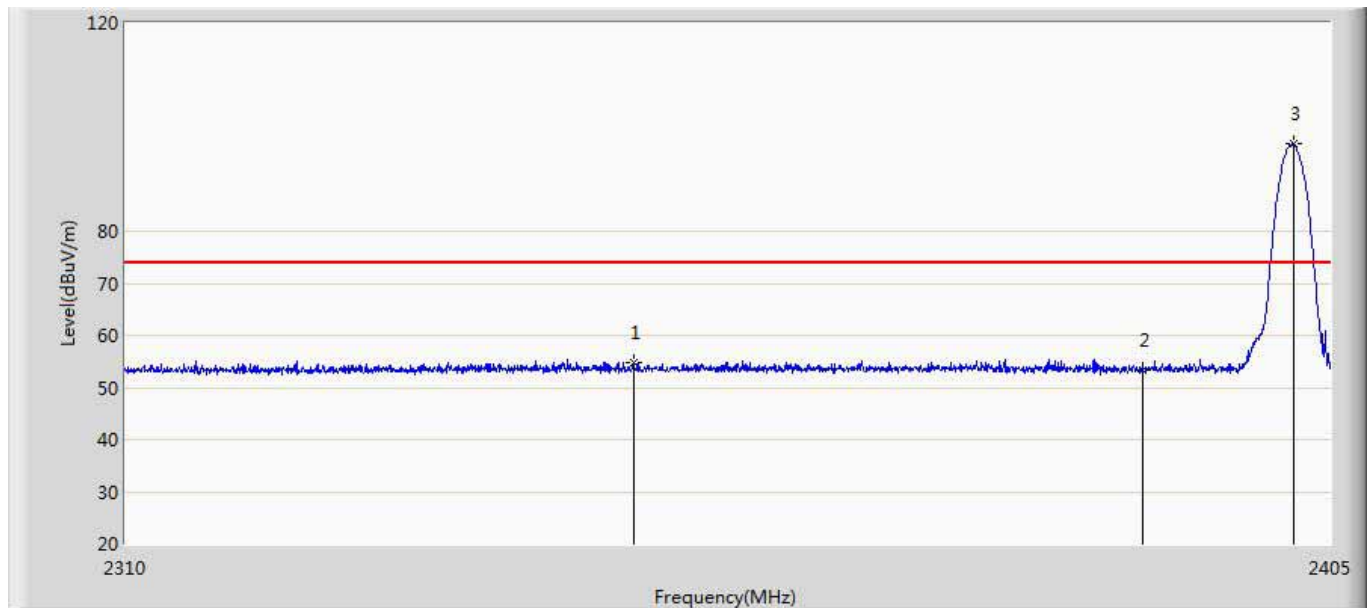
Profile: 1662056R	Page No.: 9
Engineer: Scott	
Site: AC5	Time: 2016/06/27 - 11:10
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: BLUETOOTH HEADPHONE	Power: 120V/60Hz
Note: Mode 3:Transmit at CH2402Mhz by 3DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2375.502	55.888	19.801	-18.112	74.000	36.087	PK
2		2390.000	53.729	17.656	-20.271	74.000	36.073	PK
3	*	2401.913	94.876	58.798	N/A	N/A	36.078	PK

No	Mark	Frequency (MHz)	Peak Level (dBuV/m)	AV Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Duty Factor (dB)	Type
1	*	2479.804	55.888	25.138	-28.862	74.000	-30.75	PK
2		2483.500	53.729	22.979	-31.021	74.000	-30.75	PK
3		2487.779	94.876	64.126	N/A	N/A	-30.75	PK

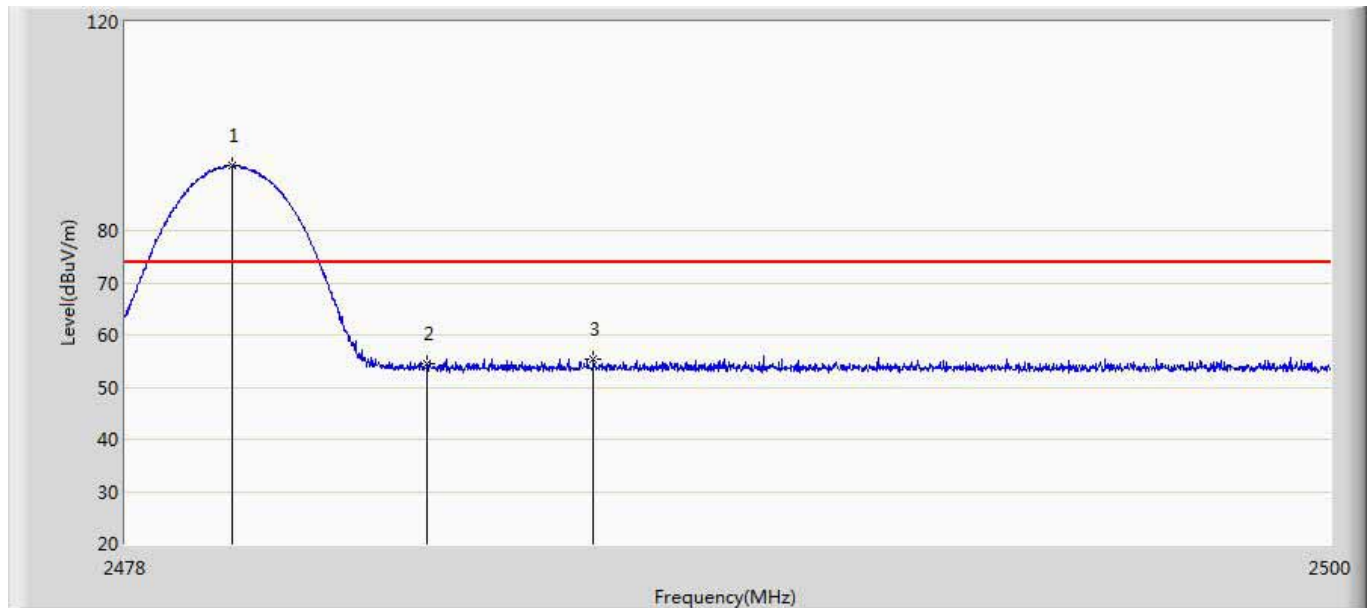
Engineer: Scott	
Site: AC5	Time: 2016/06/27 - 11:13
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: BLUETOOTH HEADPHONE	Power: 120V/60Hz
Note: Mode 3:Transmit at CH2402Mhz by 3DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2349.615	54.658	18.463	-19.342	74.000	36.195	PK
2		2390.000	53.194	17.121	-20.806	74.000	36.073	PK
3	*	2402.055	96.715	60.637	N/A	N/A	36.078	PK

No	Mark	Frequency (MHz)	Peak Level (dBuV/m)	AV Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Duty Factor (dB)	Type
1	*	2479.804	54.658	23.908	-30.092	74.000	-30.75	PK
2		2483.500	53.194	22.444	-31.556	74.000	-30.75	PK
3		2487.779	96.715	65.965	N/A	N/A	-30.75	PK

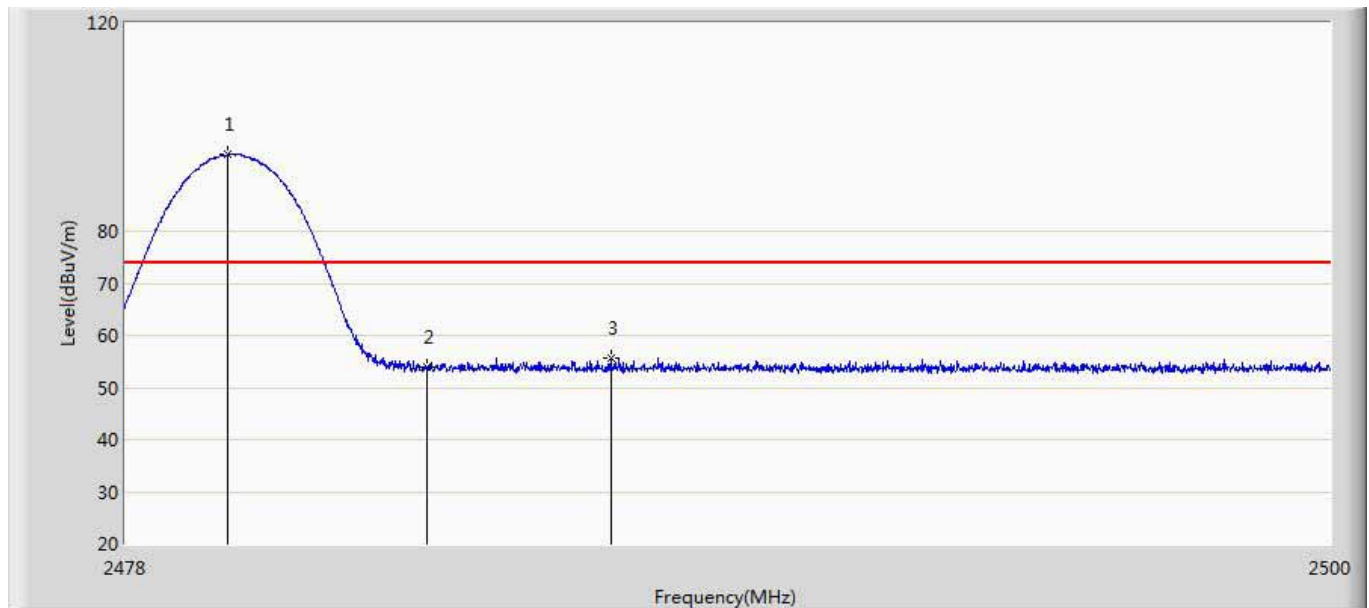
Profile: 1662056R	Page No.: 11
Engineer: Scott	
Site: AC5	Time: 2016/06/27 - 11:15
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: BLUETOOTH HEADPHONE	Power: 120V/60Hz
Note: Mode 3:Transmit at CH2480Mhz by 3DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2479.947	92.561	56.153	N/A	N/A	36.408	PK
2		2483.500	54.431	18.036	-19.569	74.000	36.395	PK
3		2486.536	55.451	19.067	-18.549	74.000	36.384	PK

No	Mark	Frequency (MHz)	Peak Level (dBuV/m)	AV Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Duty Factor (dB)	Type
1	*	2479.804	92.561	61.811	N/A	N/A	-30.75	PK
2		2483.500	54.431	23.681	-30.319	74.000	-30.75	PK
3		2487.779	55.451	24.701	-29.299	74.000	-30.75	PK

Engineer: Scott	
Site: AC5	Time: 2016/06/27 - 11:17
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: BLUETOOTH HEADPHONE	Power: 120V/60Hz
Note: Mode 3:Transmit at CH2480Mhz by 3DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2479.870	94.748	58.340	N/A	N/A	36.408	PK
2		2483.500	53.949	17.554	-20.051	74.000	36.395	PK
3		2486.844	55.639	19.256	-18.361	74.000	36.383	PK

No	Mark	Frequency (MHz)	Peak Level (dBuV/m)	AV Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Duty Factor (dB)	Type
1	*	2479.804	94.748	63.998	N/A	N/A	-30.75	PK
2		2483.500	53.949	23.199	-30.801	74.000	-30.75	PK
3		2487.779	55.639	24.889	-29.111	74.000	-30.75	PK

The End