FCC RADIO TEST REPORT

FCC ID: 2AHU7NV-05020

Applicant : MAX SALES GROUP

Address : 2331 S. Tubeway Ave. Commerce CA 90040

Equipment Under Test (EUT):

Name : Bluetooth speaker

Model : NV-05020, NV-05021, NV-05022, NV-05023, NV-05024, A80, A90, A50, A48, A36, A52, A92, A96, A98, A88, A86, A82, A76, A72, A78, A68, A66, A60, A58, A56

Standards : FCC PART 15, SUBPART C : 2014 (Section 15.247)

Report No : CTB160616001E

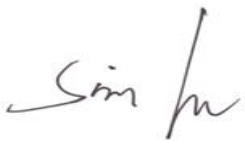
Date of Test : June 16-26, 2016

Date of Issue : July 01, 2016

Tset Result : **PASS**

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

Authorized Signature



(Simon Lee)

General Manager

Contents

1. General Information

1.1. Description of Device (EUT)

EUT	:	Bluetooth speaker
Model No.	:	NV-05020, NV-05021, NV-05022, NV-05023, NV-05024, A80, A90, A50, A48, A36, A52, A92, A96, A98, A88, A86, A82, A76, A72, A78, A68, A66, A60, A58, A56
DIFF		All model's the function, software and electric circuit are the same. so all the test were performed on the model NV-05020
Trademark		N/A
Power supply	:	DC 5V From USB For Charge or DC 3.7V From lithium battery.
Radio Technology	:	Bluetooth 2.1+EDR
Operation frequency	:	2402-2480MHz
Modulation	:	GFSK, π/4 DQPSK, 8- DPSK
Antenna Type	:	PCB Antenna, max gain 0dBi.
Applicant	:	MAX SALES GROUP
Address	:	2331 S. Tubeway Ave. Commerce CA 90040
Manufacturer	:	Liontronic(Shenzhen)Electronics Co., Ltd
Address	:	5E, Block B, Baoyunda logistic Center, Xixiang Town, Bao'an District, Shenzhen

1.2. Accessories of device (EUT)

Accessories 1 : NULL

Type : NULL

1.3. Test Lab information

Shenzhen CTB Testing Technology Co., Ltd.

10th floor, West Logistics Information Center Building, Fuyong Town , Bao'an District, Shenzhen City, P.R.C

FCC Registered No.: 671575

2. Summary of test

2.1. Summary of test result

Description of Test Item	Standard	Results
Maximum Peak Output Power	FCC Part 15: 15.247(b)(1) ANSI C63.4 :2014	PASS
Bandwidth	FCC Part 15: 15.215 ANSI C63.4 :2014	PASS
Carrier Frequency Separation	FCC Part 15: 15.247(a)(1) ANSI C63.4 :2014	PASS
Number Of Hopping Channel	FCC Part 15: 15.247(a)(1)(iii) ANSI C63.4 :2014	PASS
Dwell Time	FCC Part 15: 15.247(a)(1)(iii) ANSI C63.4 :2014	PASS
Radiated Emission	FCC Part 15: 15.209 FCC Part 15: 15.247(d) ANSI C63.4 :2014	PASS
Band Edge Compliance	FCC Part 15: 15.247(d) ANSI C63.4 :2014	PASS
Power Line Conducted Emissions	FCC Part 15: 15.207 ANSI C63.4 :2014	PASS
Antenna requirement	FCC Part 15: 15.203	PASS
Note: Test with the test procedure Bluetool. Test according to ANSI C63.10:2013		

2.2. Assistant equipment used for test

Description	:	Notebook
Manufacturer	:	ACER
Model No.	:	E5
Remark	:	FCC DOC Approved

2.3. Block Diagram

1, For radiated emissions test: EUT was placed on a turn table, which is 0.8 meter high above ground. EUT was be set into BT test mode by adb.exe software before test.

2.4. Test mode

The test software "AppoTech RF Control Kit V3.62" was used to control EUT work in Continuous TX mode, and select test channel, wireless mode.

Tested mode, channel, and data rate information		
Mode	Channel	Frequency (MHz)
GFSK	Low :CH1	2402
	Middle: CH40	2441
	High: CH79	2480

Tested mode, channel, and data rate information		
Mode	Channel	Frequency (MHz)
π /4 DQPSK	Low :CH1	2402
	Middle: CH40	2441
	High: CH79	2480

Tested mode, channel, and data rate information		
Mode	Channel	Frequency (MHz)
8- DPSK	Low :CH1	2402
	Middle: CH40	2441
	High: CH79	2480

2.5. Test Conditions

Temperature range	21-25℃
Humidity range	40-75%
Pressure range	86-106kPa

2.6. Measurement Uncertainty (95% confidence levels, k=2)

Item	MU	Remark
Uncertainty for Power point Conducted Emissions Test	2.40dB	
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	2.15 dB	Polarize: V
	2.56dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.54dB	Polarize: V
	4.2dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	2.12dB	Polarize: H
	2.52dB	Polarize: V
Uncertainty for radio frequency	1×10-9	
Uncertainty for conducted RF Power	0.66dB	
Uncertainty for temperature	0.2℃	
Uncertainty for humidity	1%	
Uncertainty for DC and low frequency voltages	0.05%	

2.7. Test Equipment

Equipment	Manufacture	Model No.	Serial No.	Last Cal	Cal Interval
3m Semi-Anechoic Chamber	Frankonia	N/A	N/A	2016.04.09	1Year
EMI Test receiver	Rohde&Schwarz	ESCS30	100085	2016.04.09	1Year
Spectrum Analyzer	Agilent	E4407B	MY49600138	2015. 08.15	1 Year
Signal Analyzer	Agilent	N9010A	MY48030494	2015. 08.15	1 Year
Bilog Antenna	SCHAFFNER CHASE	CBL6143	N/A	2016.04.09	1Year
Horn Antenna	SCHAFFNER CHASE	BBHA 9120D	BBHA 9120 D(1206)	2016.04.09	1Year
Amplifier	EM	EM-30180	060568	2016.04.09	1Year
Power Meter	Anritsu	ML2487A	6K00001491	2015. 08.15	1Year
Power sensor	Anritsu	ML2491A	32516	2015. 08.15	1Year
Coaxial Cable	SZHTW	N/A	C-01	2016.04.09	1Year
Coaxial Cable	SZHTW	N/A	C-02	2016.04.09	1Year
Coaxial Cable	SZHTW	N/A	C-03	2016.04.09	1Year
Test Receiver	Rohde&Schwarz	ESCS30	100086	2016.04.09	1 Year
L.I.S.N.	Schwarzbeck	NSLK8126	8126466	2016.04.09	1 Year
50 Ω Coaxial Switch	Anritsu	MP59B	6200264326	2016.04.09	1 Year

3. Maximum Output power

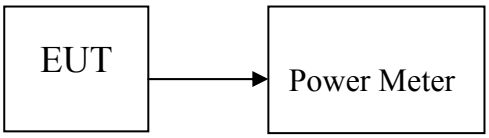
3.1. Limit

Please refer section15.247.
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, the e.i.r.p shall not exceed 4W

3.2. Test Procedure

The transmitter output is connected to the RF Power Meter. The RF Power Meter is set to the Peak power detection.

3.3. Test Setup



3.4. Test Result

EUT:Bluetooth speaker		M/N: NV-05020			
Test date: 2016-06-19		Test site: RF site		Tested by: Mason	
Mode	Freq (MHz)	PEAK Output Power (dBm)	PEAK Output Power (mW)	Limit (dBm)	Margin (dB)
GFSK	2402	2.08	1.61	21	18.92
	2441	2.10	1.62	21	18.90
	2480	1.99	1.58	21	19.01
π /4 DQPSK,	2402	1.88	1.54	30	28.13
	2441	1.85	1.53	30	28.15
	2480	1.90	1.55	30	28.10
8- DPSK	2402	1.63	1.46	30	28.37
	2441	1.60	1.45	30	28.40
	2480	1.58	1.44	30	28.42
Conclusion: PASS					

4. Bandwidth

4.1. Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

4.2. Test Procedure

The transmitter output was coupled to a spectrum analyzer via a antenna. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30kHz RBW and 100kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB. Peak detector is used .

4.3. Test Result

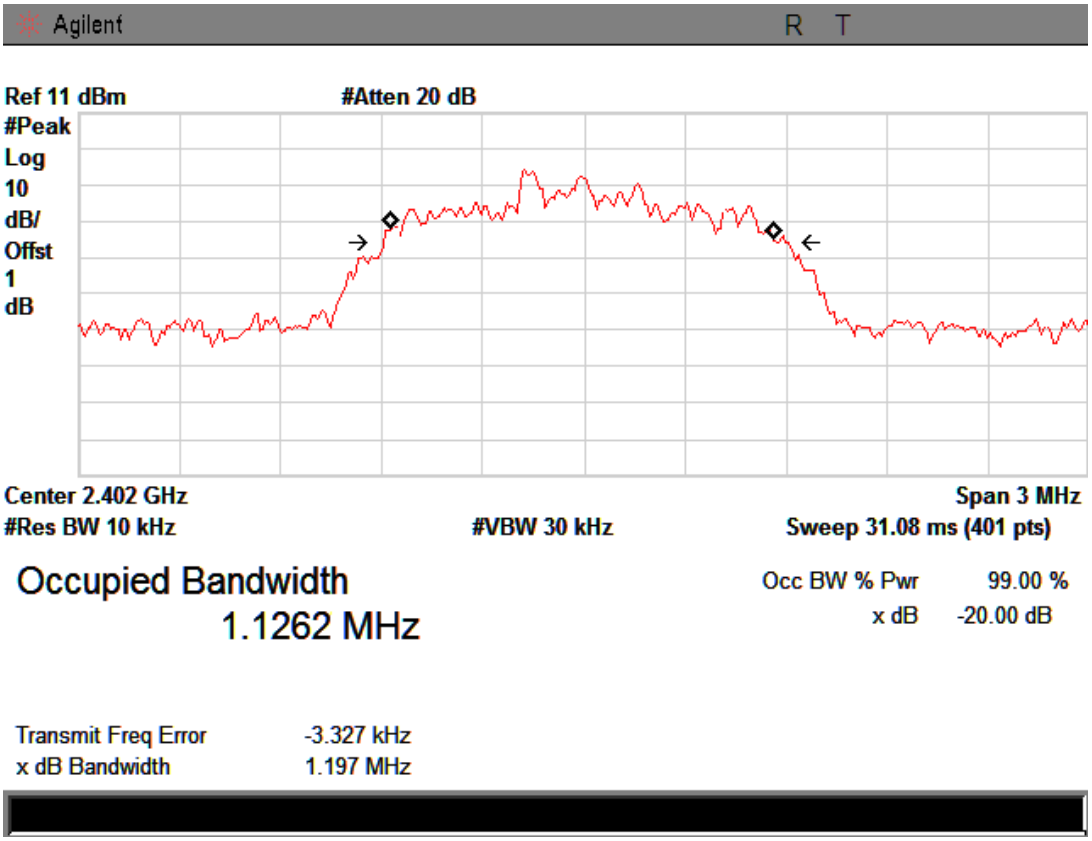
EUT: Bluetooth speaker		M/N: NV-05020		
Test date: 2016-06-19		Test site: RF site		Tested by: Mason
Mode	Freq (MHz)	20dB Bandwidth (MHz)	Limit (kHz)	Conclusion
GFSK	2402	0.826	/	PASS
	2441	0.820	/	PASS
	2480	0.843	/	PASS
π /4 DQPSK	2402	1.153	/	PASS
	2441	1.161	/	PASS
	2480	1.155	/	PASS
8- DPSK	2402	1.197	/	PASS
	2441	1.191	/	PASS
	2480	1.186	/	PASS

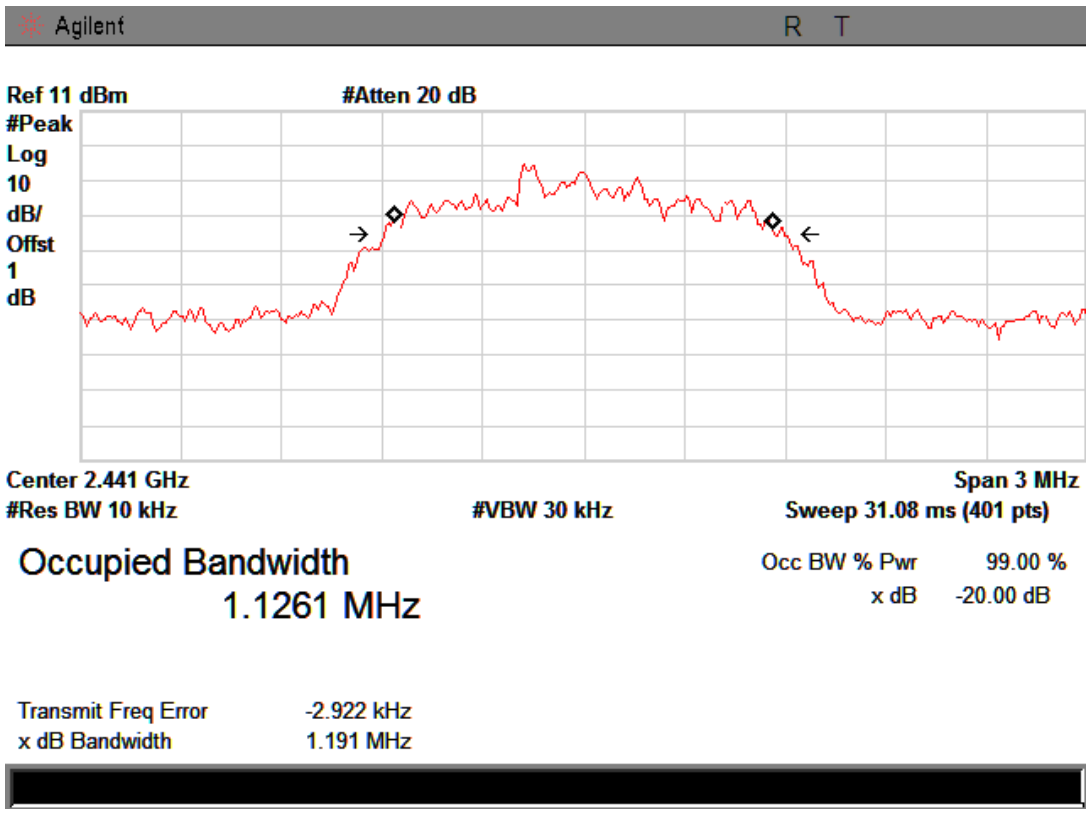
Test plot as follows:

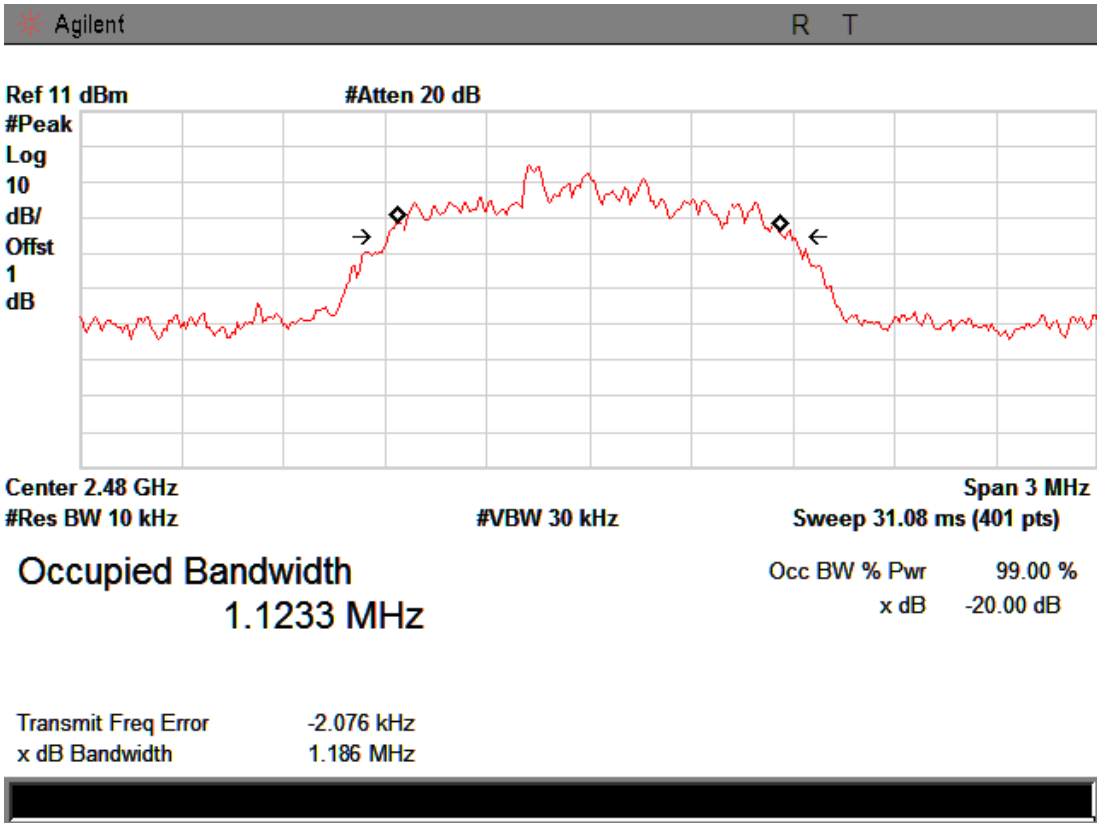
The test plot only show the worst mode.

Orginal Test data For 20dB bandwidth

8- DPSK






Agilent
R T
Ref 11 dBm
#Atten 20 dB
#Peak
Log
10
dB/
Offst
1
dB
Center 2.48 GHz
Span 3 MHz
#Res BW 10 kHz
#VBW 30 kHz
Sweep 31.08 ms (401 pts)
Occupied Bandwidth
1.1233 MHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error -2.076 kHz
x dB Bandwidth 1.186 MHz

5. Carrier Frequency Separation

5.1. 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 125 mW

5.2. Test Procedure

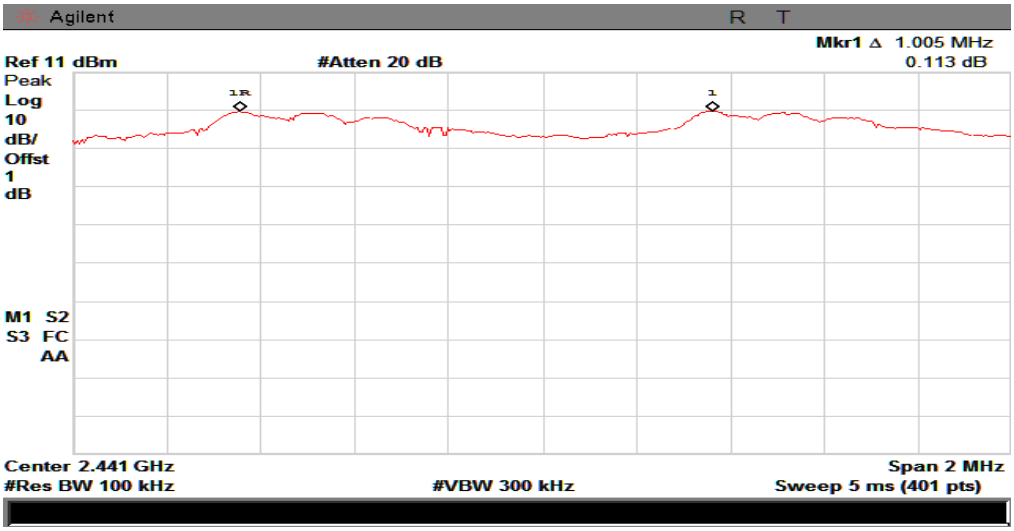
The transmitter output was coupled to a spectrum analyzer via a antenna. The carrier frequency was measured by spectrum analyzer with 100kHz RBW and 300kHz VBW.

5.3. Test Result

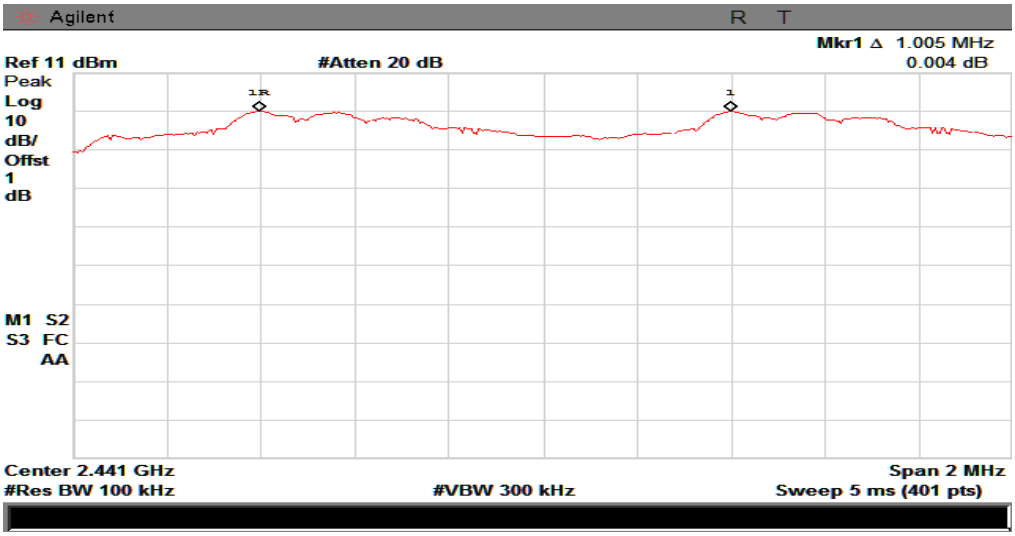
EUT: Bluetooth speaker		M/N: NV-05020		
Test date: 2016-06-19		Test site: RF site		Tested by: Mason
Mode/Channel	Channel separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz) 2/3 20dB bandwidth	Conclusion
GFSK	1.005	0.843	0.562	PASS
π /4 DQPSK	1.005	1.161	0.774	PASS
8- DPSK	1.010	1.197	0.798	PASS

Orginal test data for channel separation

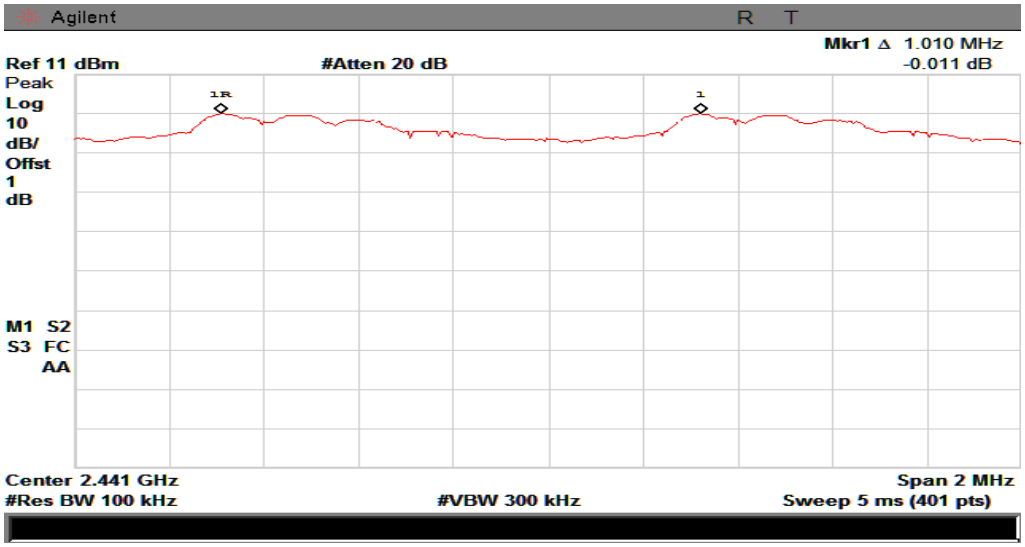
GFSK



π /4 DQPSK



8- DPSK



6. Number Of Hopping Channel

6.1. Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels

6.2. Test Procedure

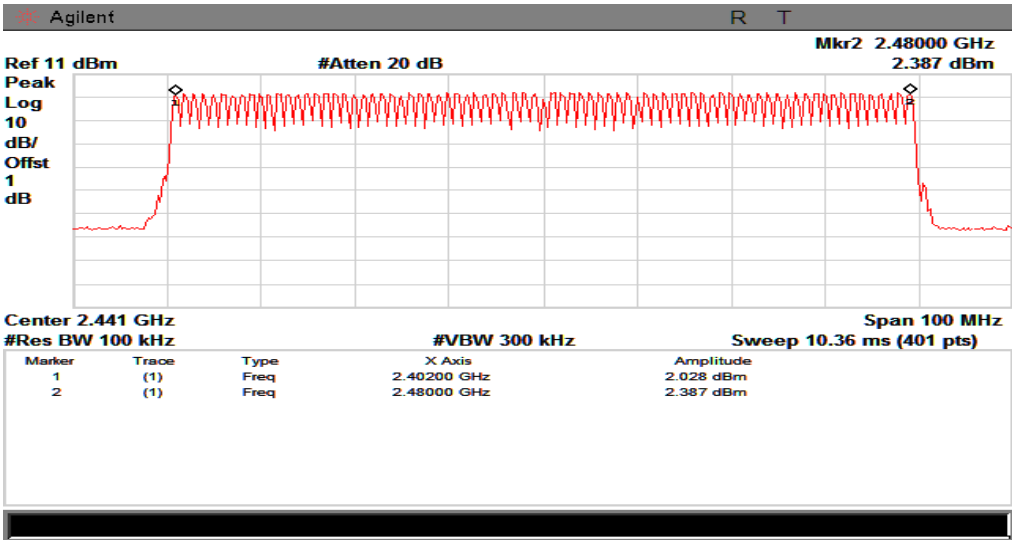
The transmitter output was coupled to a spectrum analyzer via a antenna. The number of hopping channel was measured by spectrum analyzer with 100kHz RBW and 300kHz VBW.

6.3. Test Result

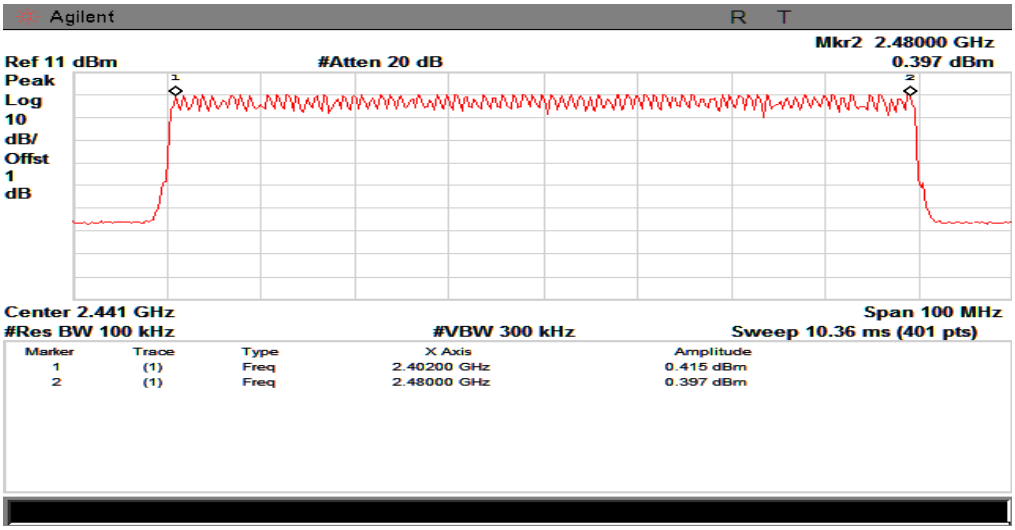
EUT: Bluetooth speaker		M/N: NV-05020	
Test date: 2016-06-19	Test site: RF site		Tested by: Mason
Mode	Number of hopping channel	Limit	Conclusion
GFSK	79	>15	PASS
π /4 DQPSK	79	>15	PASS
8- DPSK	79	>15	PASS

Original test data for hopping channel number

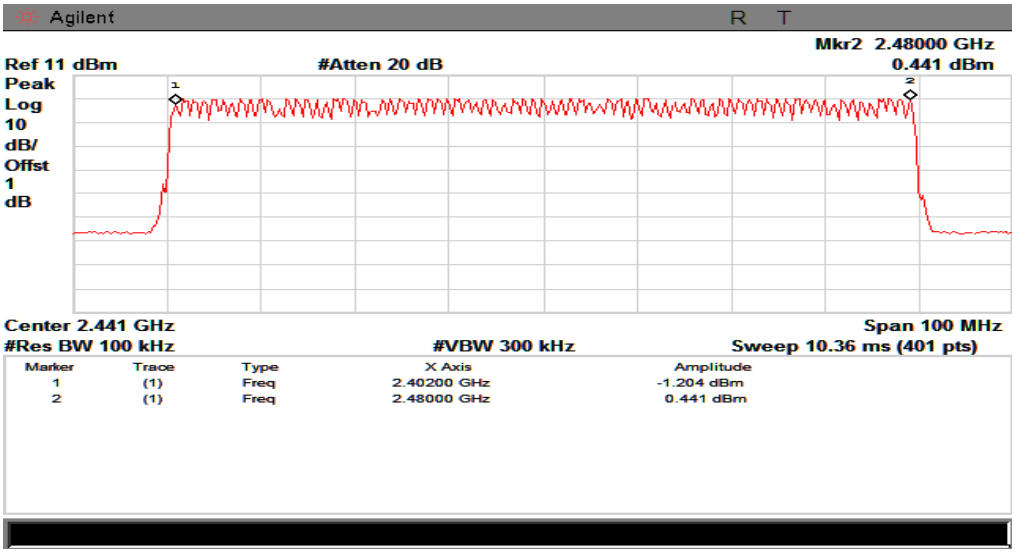
GFSK



π /4 DQPSK



8- DPSK



7. Dwell Time

7.1. Test limit

Please refer section15.247

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz. The average time of occupancy on any frequency shall not greater than 0.4 s within period of 0.4 sec- onds multiplied by the number of hopping channel employed.

7.2. Test Procedure

7.2.1. Place the EUT on the table and set it in transmitting mode.

7.2.2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

7.2.3. Set center frequency of spectrum analyzer = operating frequency.

7.2.4. Set the spectrum analyzer as RBW, VBW=1MHz, Span = 0Hz, Sweep = auto.

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

7.3. Test Results

PASS.

Detailed information please see the following page.

EUT: Bluetooth speaker		M/N: NV-05020				
Test date: 2016-06-19		Test site: RF site		Tested by: Mason		
Mode	Data Packet	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (s)	Limit (s)	Conclusion
GFSK	DH1	2441	0.470	0.301	<0.4	PASS
	DH3	2441	1.730	0.369	<0.4	PASS
	DH5	2441	2.930	0.375	<0.4	PASS
π /4 DQPSK	DH1	2441	0.470	0.301	<0.4	PASS
	DH3	2441	1.720	0.367	<0.4	PASS
	DH5	2441	2.940	0.376	<0.4	PASS
8- DPSK	DH1	2441	0.460	0.294	<0.4	PASS
	DH3	2441	1.720	0.367	<0.4	PASS
	DH5	2441	2.990	0.383	<0.4	PASS

Note: 1, A period time = 0.4 (s) * 79 = 31.6(s)

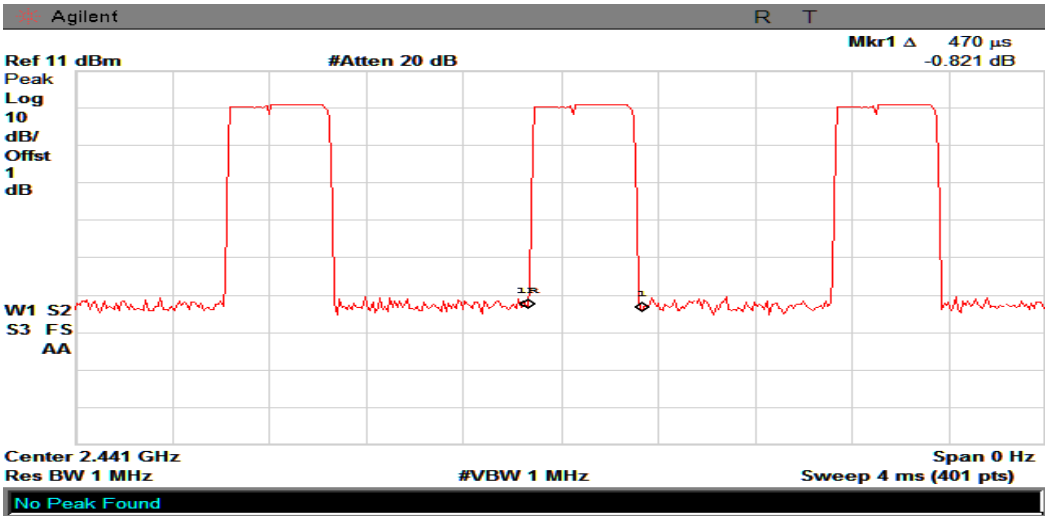
2, DH1 time slot = Pulse Duration * (1600/(1*79)) * A period time

DH3 time slot = Pulse Duration * (1600/(3*79)) * A period time

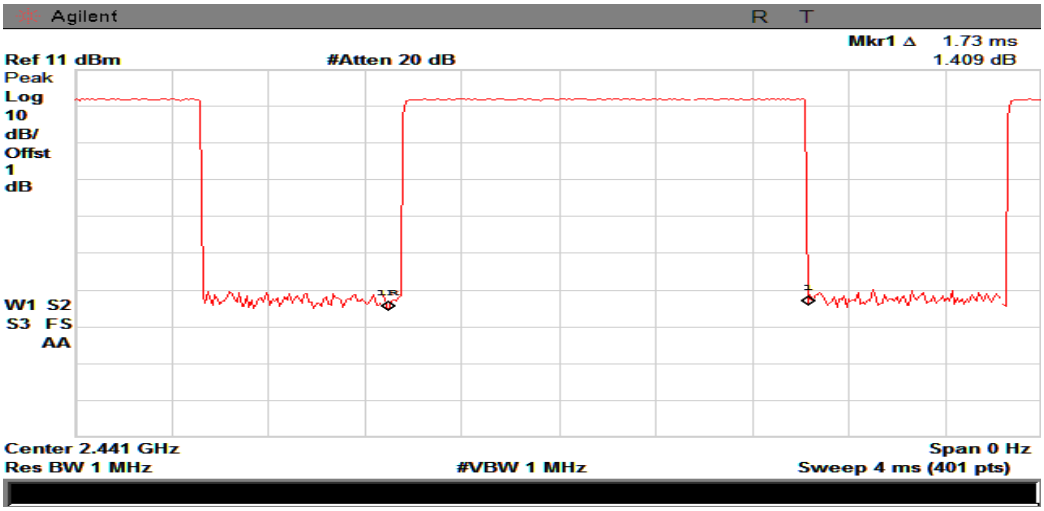
DH5 time slot = Pulse Duration * (1600/(5*79)) * A period time

GFSK

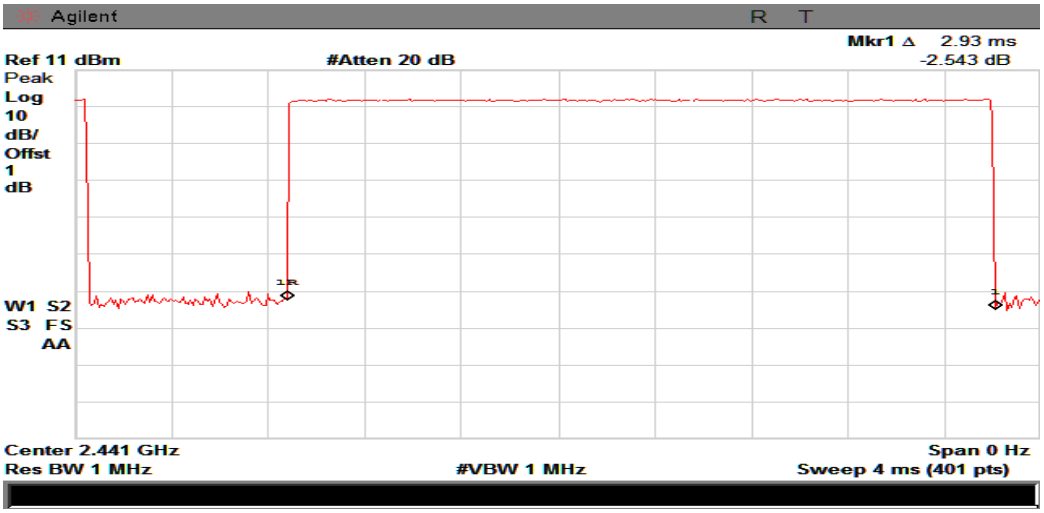
DH1:



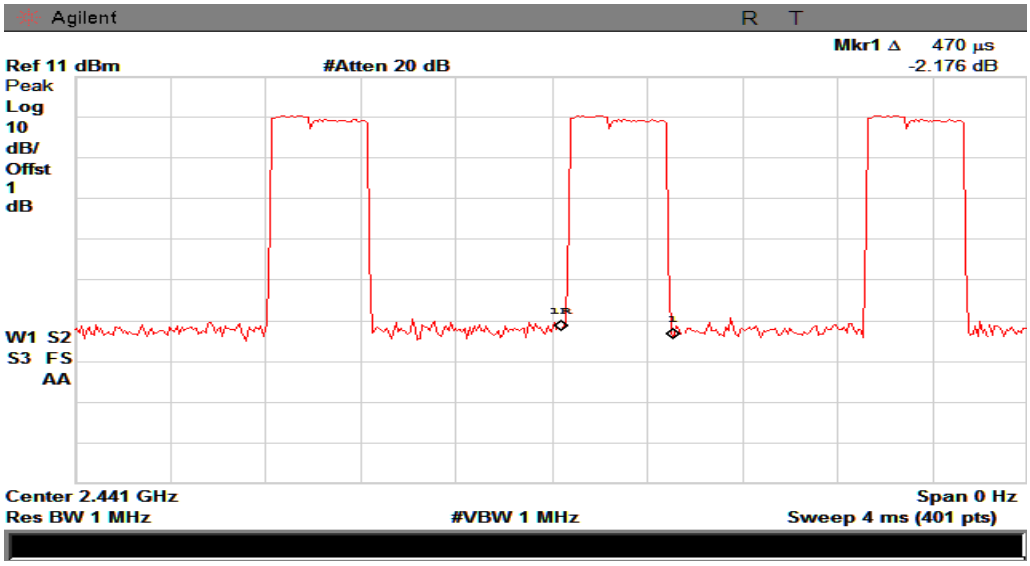
DH3:



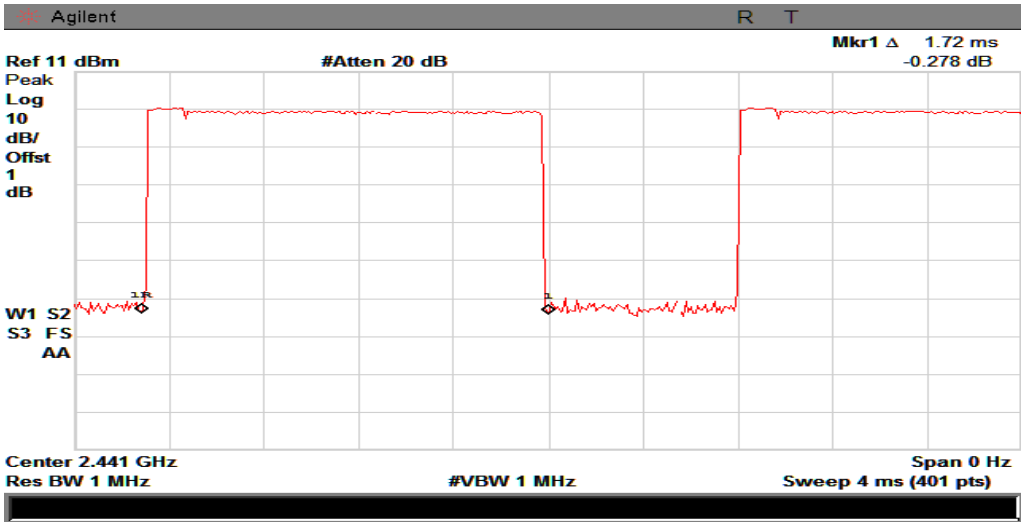
DH5



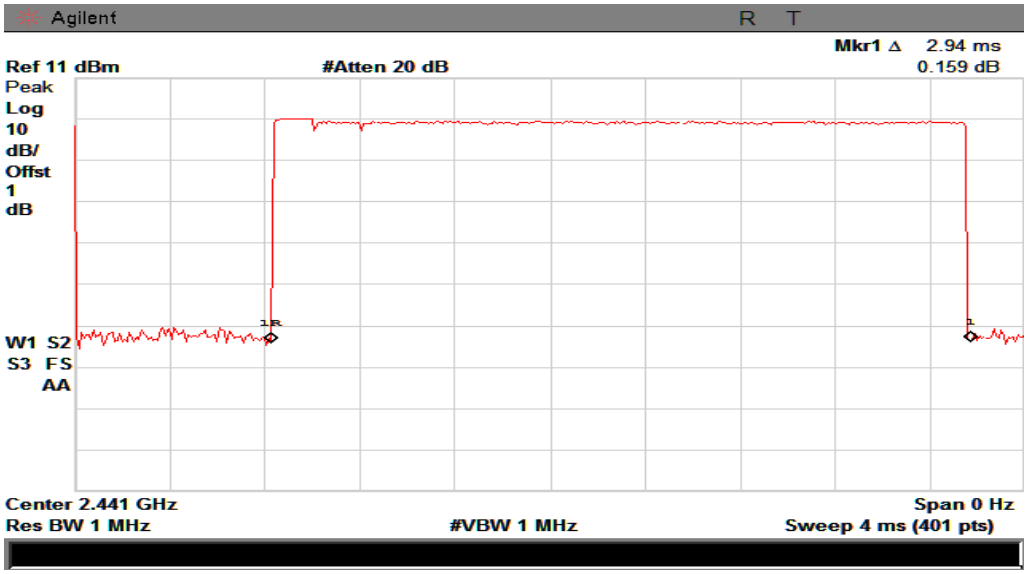
π /4 DQPSK
2DH1



2DH3

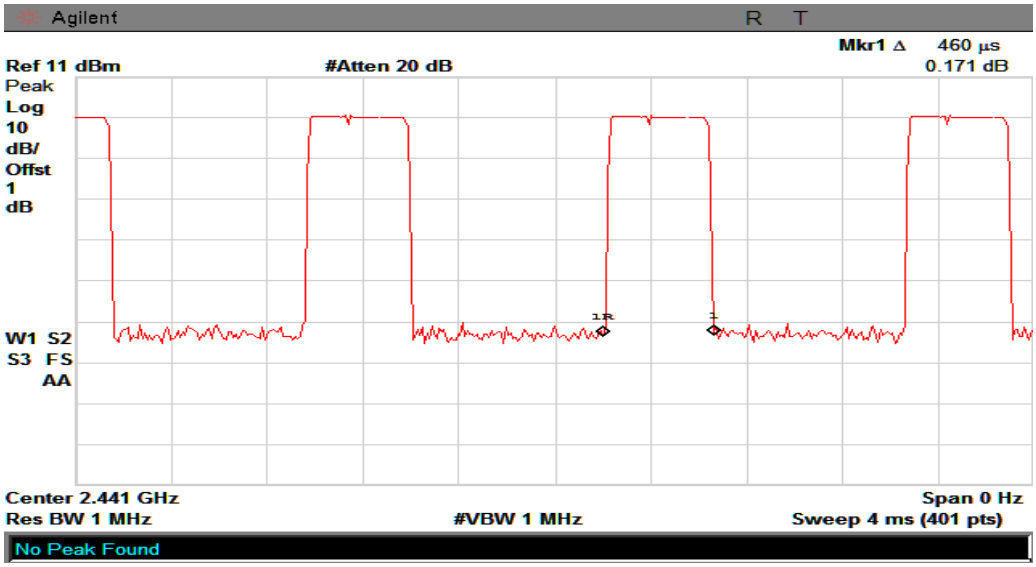


2DH5

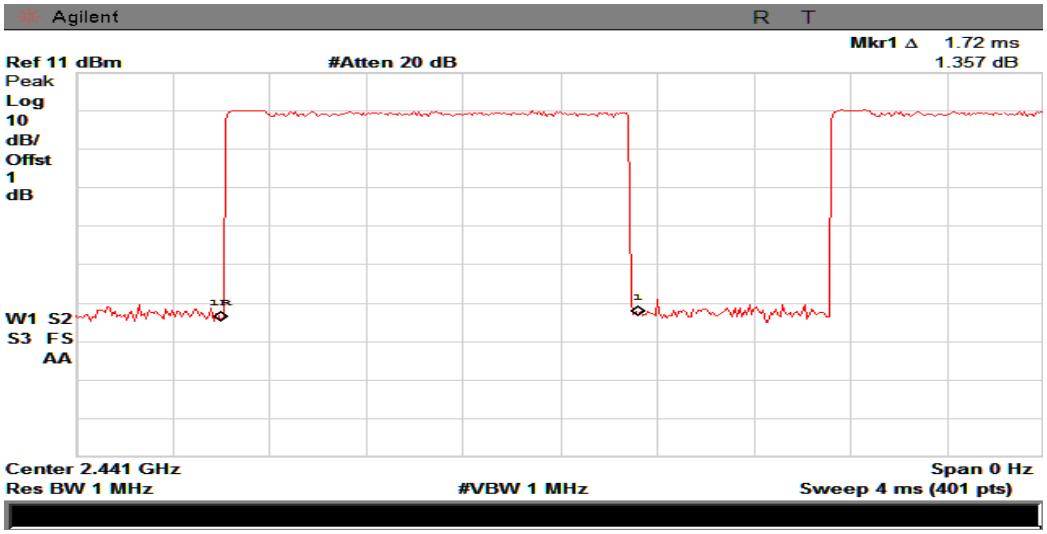


8- DPSK

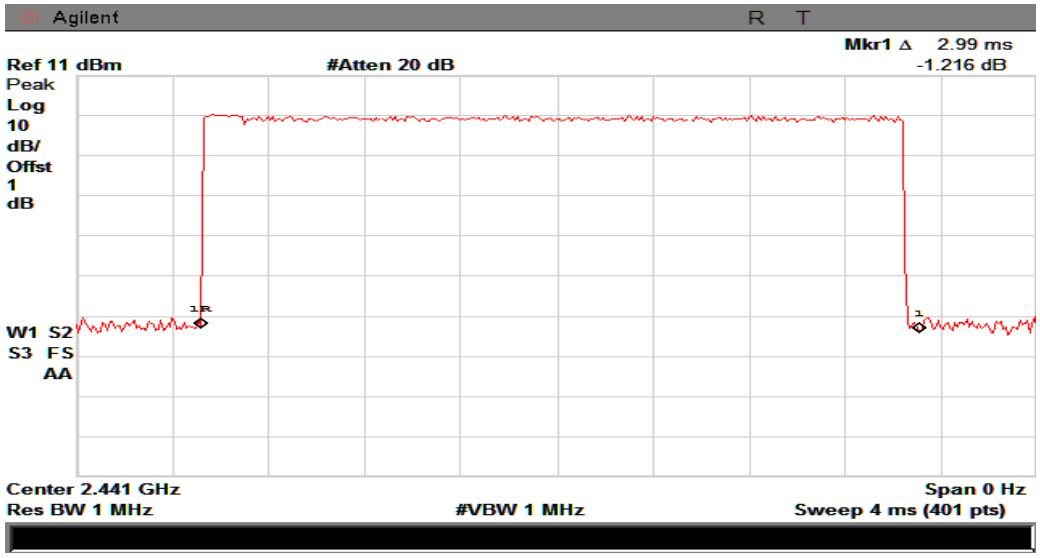
3DH1



3DH3



3DH5



8. Radiated emissions

8.1. Limit

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

15.205 Restricted frequency band

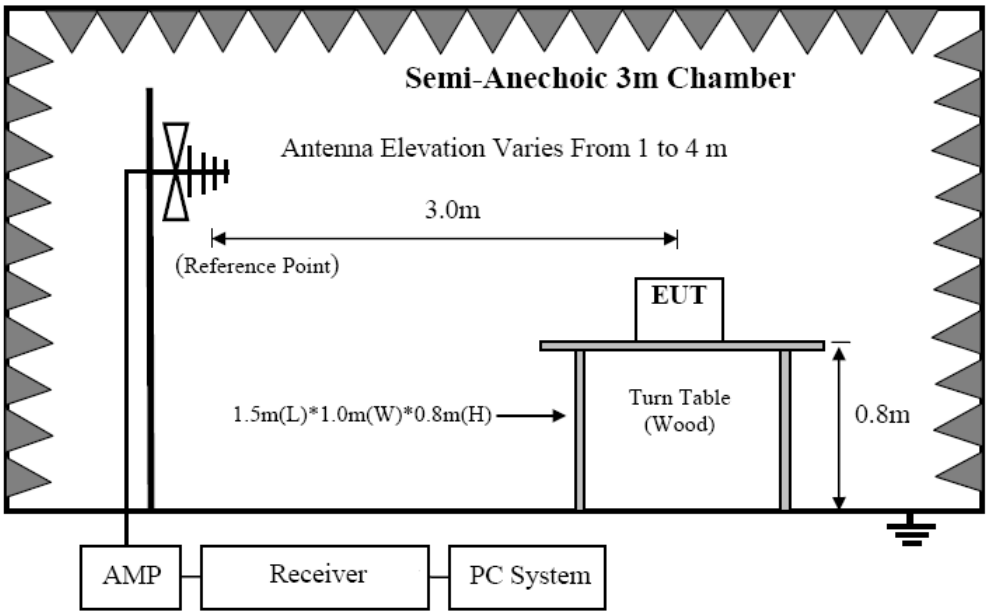
MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])

15.209 Limit

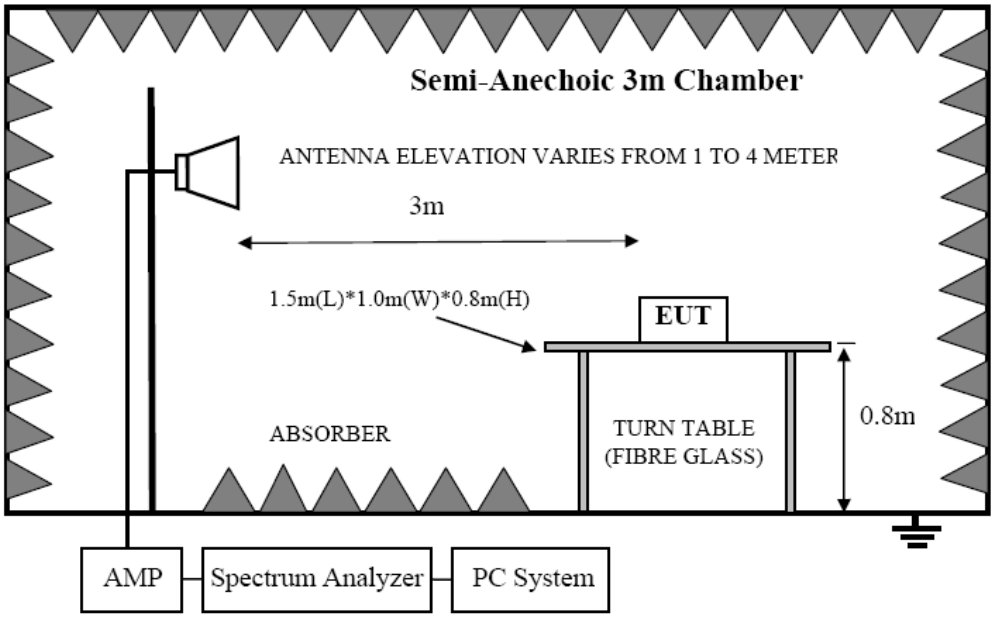
FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
0.009-0.490	300	2400/F(KHz)	/
0.490-1.705	30	24000/F(KHz)	/
1.705-30	30	30	29.5
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

8.2. Block Diagram of Test setup

8.2.1. In 3m Anechoic Chamber Test Setup Diagram for below 1GHz



8.2.2. In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz



Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

8.3. Test Procedure

(1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber.

(2) Setup EUT and simulator as shown in section 1.4 and 6.1

(3) Test antenna was located 3m from the EUT on an adjustable mast. Below pre-scan procedure was first performed in order to find prominent radiated emissions.
(a) Change work frequency or channel of device if practicable.
(b) Change modulation type of device if practicable.
(c) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions
(4) Spectrum frequency from 9KHz to 25GHz (tenth harmonic of fundamental frequency) was investigated
(5) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4 2009 on Radiated Emission test.
(6) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure; RBW is set at 1MHz, VBW is set at 10Hz for Average measure.

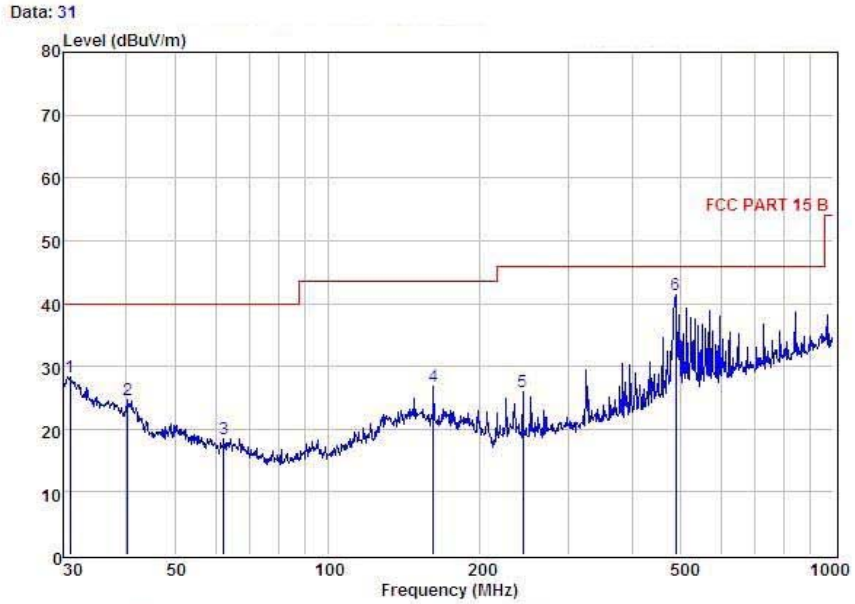
8.4. Test Result

We have scanned the 10th harmonic from 9KHz to the EUT.
Detailed information please see the following page.

From 9KHz to 30MHz: Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

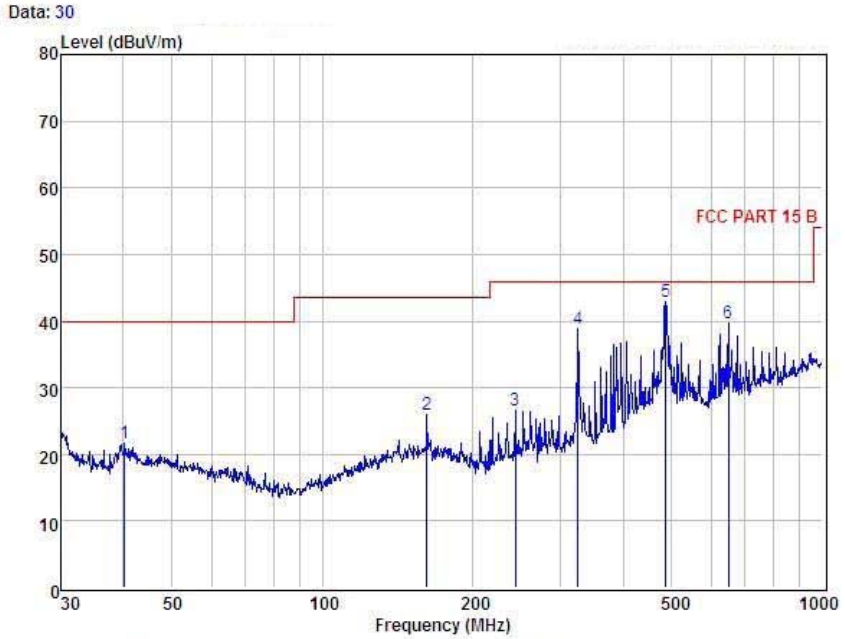
From 30MHz to 1000MHz: Conclusion: PASS
Remark: All modes have been tested, and only worst data of GFSK mode, Channel 2402MHz was listed in this report.



Condition : FCC PART 15 B 3m POL: VERTICAL

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	30.96	46.01	13.28	30.98	0.07	28.38	40.00	-11.62	Peak
2	40.28	41.24	14.07	30.85	0.18	24.64	40.00	-15.36	Peak
3	62.21	36.67	12.36	30.72	0.19	18.50	40.00	-21.50	Peak
4	162.04	41.46	13.95	29.16	0.46	26.71	43.50	-16.79	Peak
5	243.38	42.34	11.50	28.25	0.45	26.04	46.00	-19.96	Peak
6	487.32	51.36	16.35	27.19	0.94	41.46	46.00	-4.54	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss



Condition : FCC PART 15 B 3m POL: HORIZONTAL

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	40.28	38.23	14.07	30.85	0.18	21.63	40.00	-18.37	Peak
2	162.04	40.72	13.95	29.16	0.46	25.97	43.50	-17.53	Peak
3	243.38	42.90	11.50	28.25	0.45	26.60	46.00	-19.40	Peak
4	324.46	52.48	13.43	27.86	0.74	38.79	46.00	-7.21	Peak
5	485.61	52.74	16.33	27.19	0.98	42.86	46.00	-3.14	Peak
6	649.66	44.75	19.09	25.45	1.25	39.64	46.00	-6.36	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

Above 1GHz：PASS

Remark: All modes have been tested, and only reported worst data of GFSK mode.

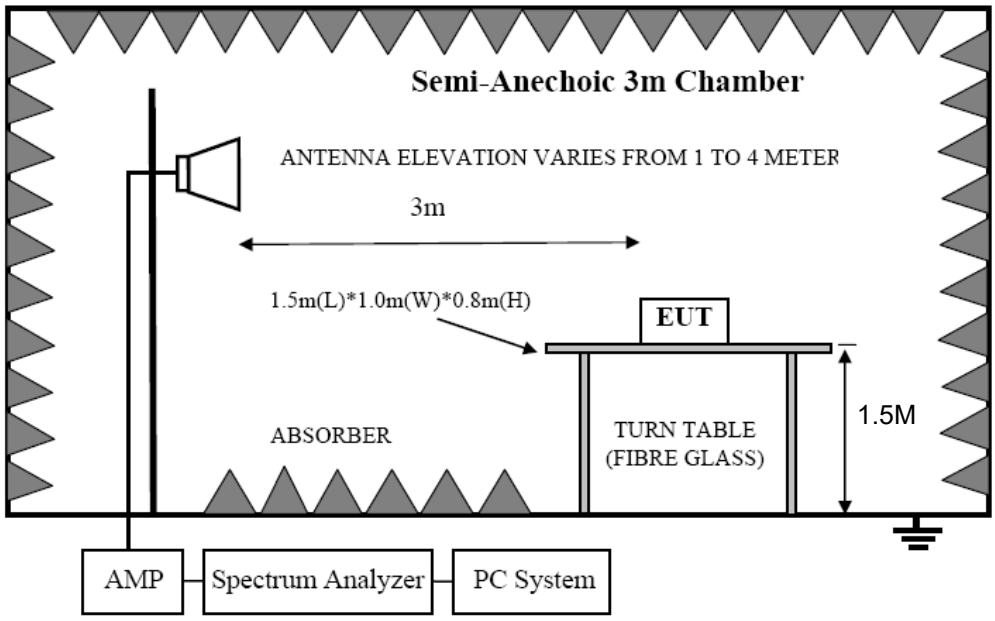
1GHz—25GHz Radiated emissison Test result									
EUT: Bluetooth speaker M/N: NV-05020									
Power: DC 3.7V From lithium battery									
Test date: 2016-06-20 Test site: 3m Chamber Tested by: Mason									
Test mode: GFSK Tx CH1 2402MHz									
Antenna polarity: Vertical									
No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss (dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804	44.99	33.95	10.18	34.26	54.86	74	19.14	PK
2	4804	35.20	33.95	10.18	34.24	45.07	54	8.93	AV
3	7206	/							
4	9608	/							
5	12010	/							
Antenna Polarity: Horizontal									
1	4804	45.11	33.95	10.18	34.26	54.98	74	19.02	PK
2	4804	36.60	33.95	10.18	34.26	46.47	54	7.53	AV
3	7206	/							
4	9608	/							
5	12010	/							
Note: 1, Measuring frequency from 1GHz to 25GHz 2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK 3, Result = Read level + Antenna factor + cable loss-Amp factor 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.									

1GHz—25GHz Radiated emissison Test result									
EUT: Bluetooth speaker M/N: NV-05020									
Power: DC 3.7V From lithium battery									
Test date: 2016-06-20 Test site: 3m Chamber Tested by: Mason									
Test mode: GFSK Tx CH40 2441MHz									
Antenna polarity: Vertical									
No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882	43.78	33.93	10.2	34.29	53.71	74	20.29	PK
2	4882	34.29	33.93	10.2	34.29	44.13	54	9.87	AV
3	7323	/							
4	9764	/							
5	12205	/							
Antenna Polarity: Horizontal									
1	4882	45.12	33.93	10.2	34.29	54.96	74	19.04	PK
2	4882	35.82	33.93	10.2	34.29	45.66	54	8.34	AV
3	7323	/							
4	9764	/							
5	12205	/							
Note: 1, Measuring frequency from 1GHz to 25GHz 2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK 3, Result = Read level + Antenna factor + cable loss-Amp factor 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.									

1GHz—25GHz Radiated emissison Test result									
EUT: Bluetooth speaker M/N: NV-05020									
Power: DC 3.7V From lithium battery									
Test date: 2016-06-20 Test site: 3m Chamber Tested by: Mason									
Test mode: GFSK Tx CH79 2480MHz									
Antenna polarity: Vertical									
No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960	46.31	33.98	10.22	34.25	56.26	74	17.74	PK
2	4960	35.22	33.98	10.22	34.25	45.17	54	8.83	AV
3	7440	/							
4	9920	/							
5	12400	/							
Antenna Polarity: Horizontal									
1	4960	45.64	33.98	10.22	34.25	55.59	74	18.41	PK
2	4960	35.48	33.98	10.22	34.25	45.43	54	8.57	AV
3	7440	/							
4	9920	/							
5	12400	/							
Note: 1, Measuring frequency from 1GHz to 25GHz 2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK 3, Result = Read level + Antenna factor + cable loss-Amp factor 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.									

9. Band Edge Compliance

9.1. Block Diagram of Test Setup



9.2. Limit

All the lower and upper band-edges emissions appearing within restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation shall be at least 30dB below the fundamental emissions, or comply with 15.209 limits.

9.3. Test Procedure

All restriction band and non- restriction band have been tested ， only worse case is reported.

9.4. Test Result

PASS. (See below detailed test data)

Remark: All modes have been tested, and only reported worst data of GFSK mode.

Radiated Method

GFSK (CH Low)

Band Edge Test result								
EUT: Bluetooth speaker M/N: NV-05020								
Power: DC 3.7V From lithium battery								
Test date: 2016-06-20 Test site: 3m Chamber Tested by: Mason								
Test mode: Tx CH Low 2402MHz								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390	46.39	27.62	3.92	34.97	42.96	74	31.04	PK
2390	/	27.62	3.92	34.97	/	54	/	AV
2400	54.87	27.62	3.94	34.97	51.46	74	22.54	PK
2400	/	27.62	3.94	34.97	/	54	/	AV
Antenna Polarity: Horizontal								
2390	47.88	27.62	3.92	34.97	44.45	74	29.55	PK
2390	/	27.62	3.92	34.97	/	54	/	AV
2400	55.79	27.62	3.94	34.97	52.38	74	21.62	PK
2400	/	27.62	3.94	34.97	/	54	/	AV
Note: 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK 3, Result = Read level + Antenna factor + cable loss-Amp factor 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.								

GFSK (CH High)

Band Edge Test result								
EUT: Bluetooth speaker			M/N: NV-05020					
Power: DC 3.7V From lithium battery								
Test date: 2016-06-20 Test site: 3m Chamber Tested by: Mason								
Test mode: Tx CH High 2480MHz								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2483.5	46.53	27.59	4.00	34.97	43.15	74	30.85	PK
2483.5	/	27.59	4.00	34.97	/	54	/	AV
Antenna Polarity: Horizontal								
2483.5	46.37	27.59	4.00	34.97	42.99	74	31.01	PK
2483.5	/	27.59	4.00	34.97	/	54	/	AV

Note:
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

GFSK (Hopping Low)

Band Edge Test result								
EUT: Bluetooth speaker			M/N: NV-05020					
Power: DC 3.7V From lithium battery								
Test date: 2016-06-20	Test site: 3m Chamber					Tested by: Mason		
Test mode: Tx CH Low 2402MHz								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390	46.80	27.62	3.92	34.97	43.37	74	30.63	PK
2390	/	27.62	3.92	34.97	/	54	/	AV
2400	55.42	27.62	3.94	34.97	52.01	74	21.99	PK
2400	/	27.62	3.94	34.97	/	54	/	AV
Antenna Polarity: Horizontal								
2390	45.09	27.62	3.92	34.97	41.66	74	32.34	PK
2390	/	27.62	3.92	34.97	/	54	/	AV
2400	54.17	27.62	3.94	34.97	50.76	74	23.24	PK
2400	/	27.62	3.94	34.97	/	54	/	AV
Note: 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK 3, Result = Read level + Antenna factor + cable loss-Amp factor 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.								

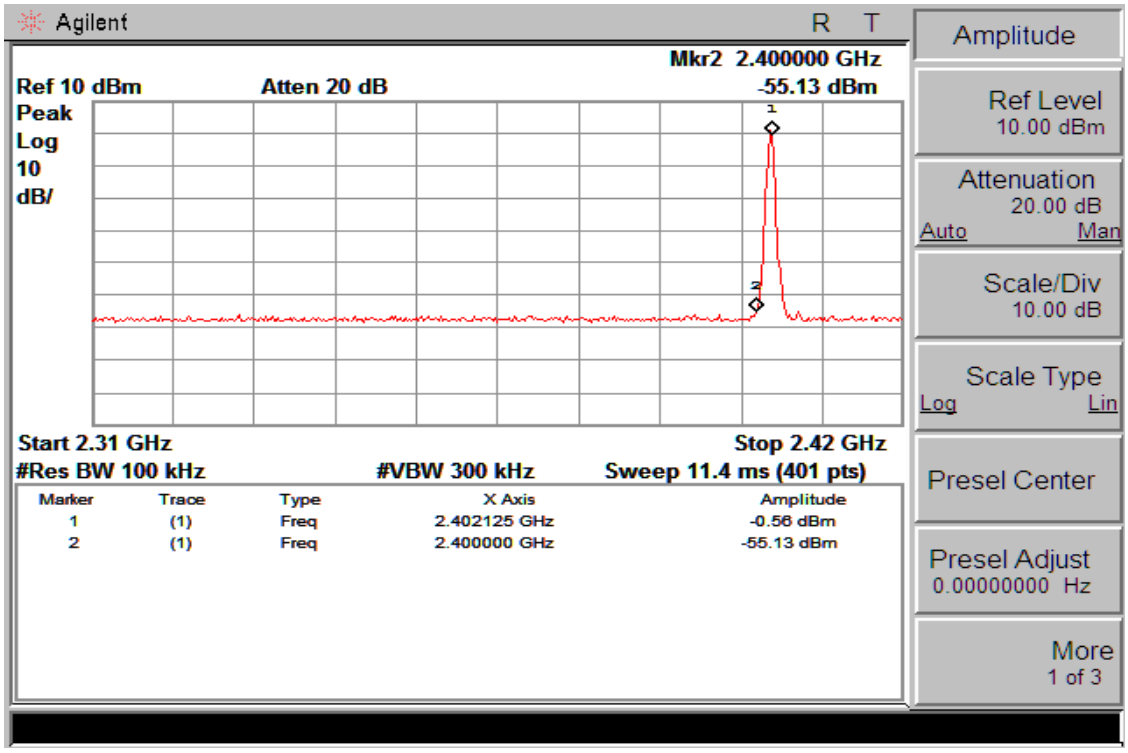
GFSK (Hopping High)

Band Edge Test result								
EUT: Bluetooth speaker M/N: NV-05020								
Power: DC 3.7V From lithium battery								
Test date: 2016-06-20 Test site: 3m Chamber Tested by: Mason								
Test mode: Tx CH High 2480MHz								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2483.5	46.20	27.59	4.00	34.97	42.82	74	31.18	PK
2483.5	/	27.59	4.00	34.97	/	54	/	AV
Antenna Polarity: Horizontal								
2483.5	47.05	27.59	4.00	34.97	43.67	74	30.33	PK
2483.5	/	27.59	4.00	34.97	/	54	/	AV
Note: 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK 3, Result = Read level + Antenna factor + cable loss-Amp factor 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.								

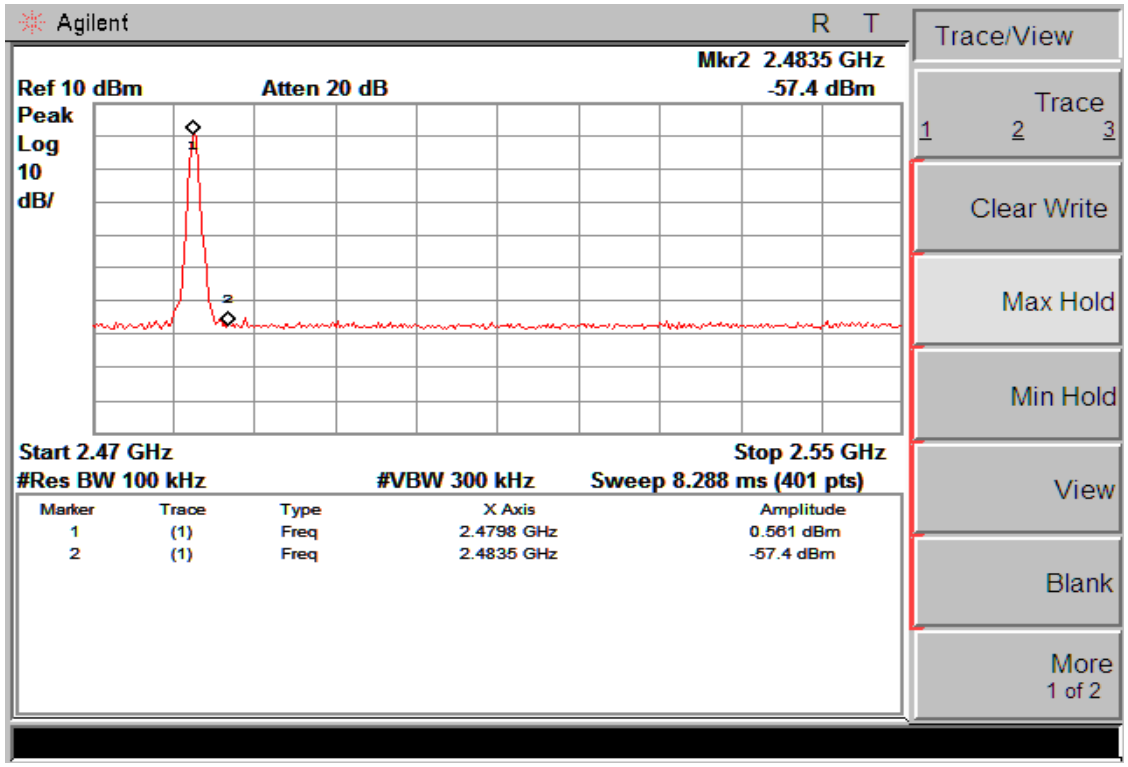
Conducted Method

GFSK

CH LOW :

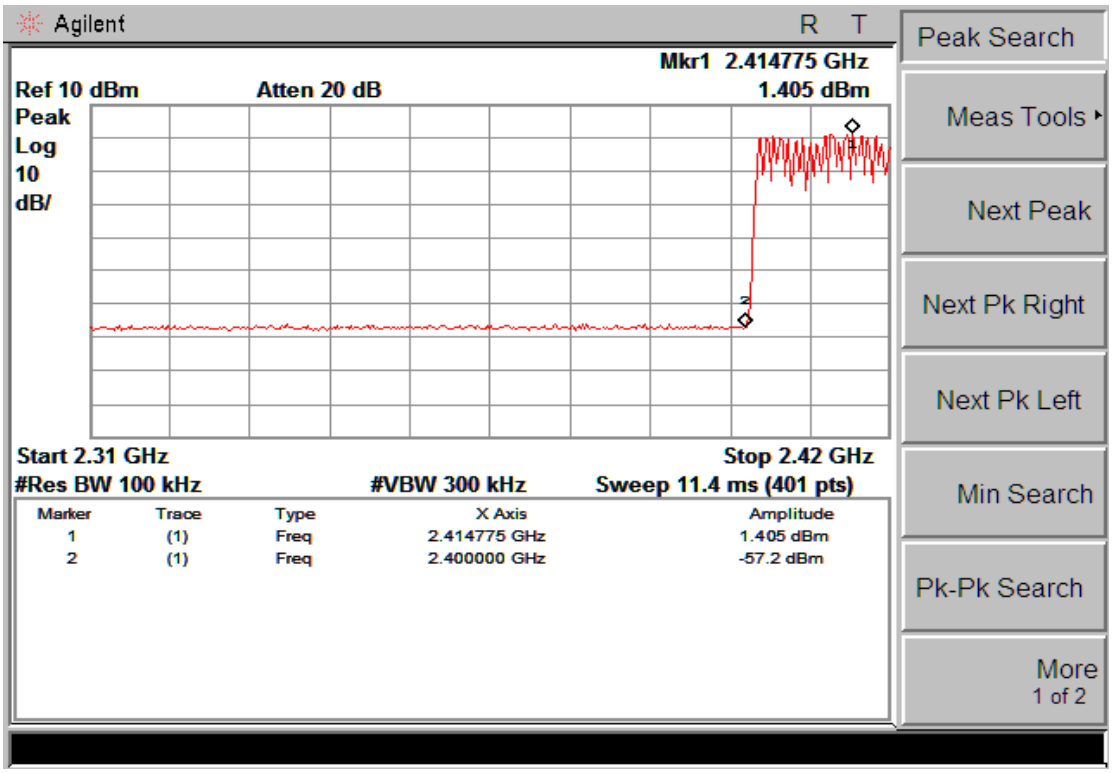


CH High :

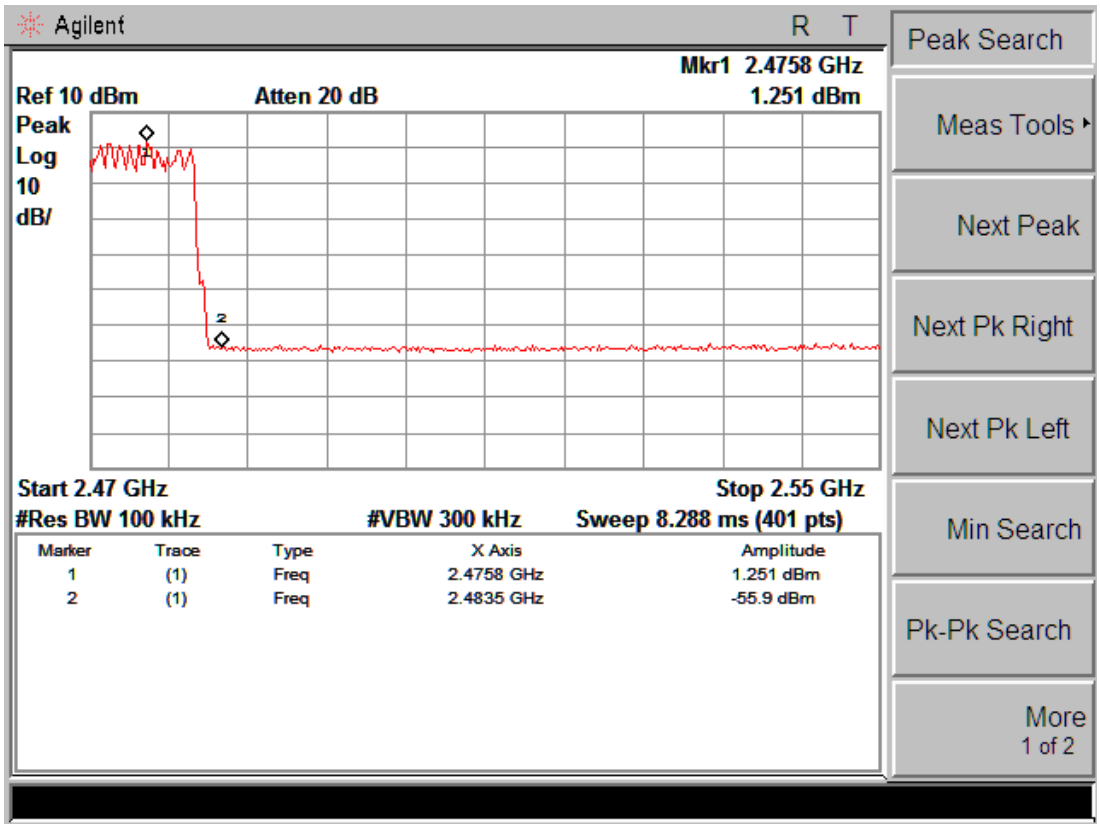


Hopping

Low

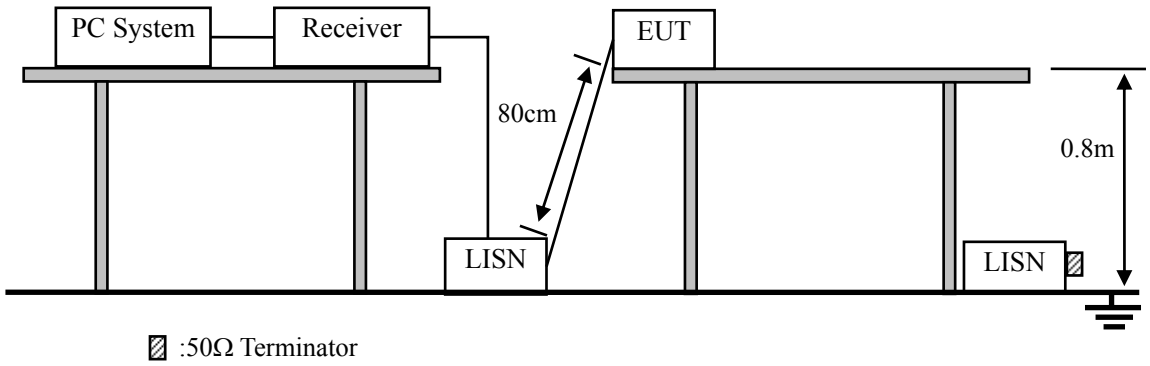


High



10. Power Line Conducted Emissions

10.1. Block Diagram of Test Setup



:50Ω Terminator

10.2. Limit

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

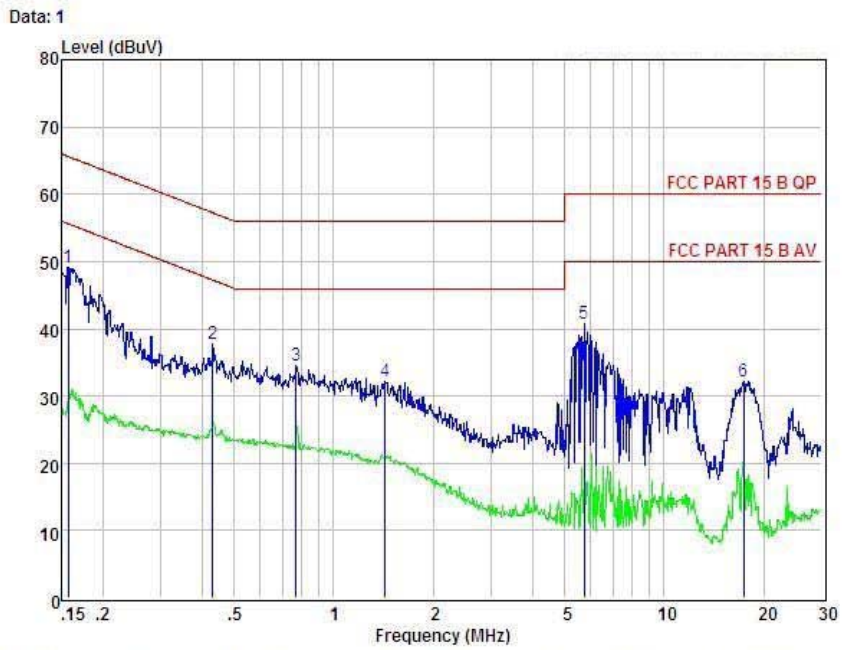
Notes: 1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

10.3. Test Procedure

(1) The EUT was placed on a non-metallic table, 80cm above the ground plane.
(2) Setup the EUT and simulator as shown in 10.1
(3) The EUT Power connected to the power mains through a power adapter and a line impedance stabilization network (L.I.S.N1). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N2), this provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4 2009 on conducted Emission test.
(4) The bandwidth of test receiver is set at 10KHz.
(5) The frequency range from 150 KHz to 30MHz is checked.

10.4. Test Result

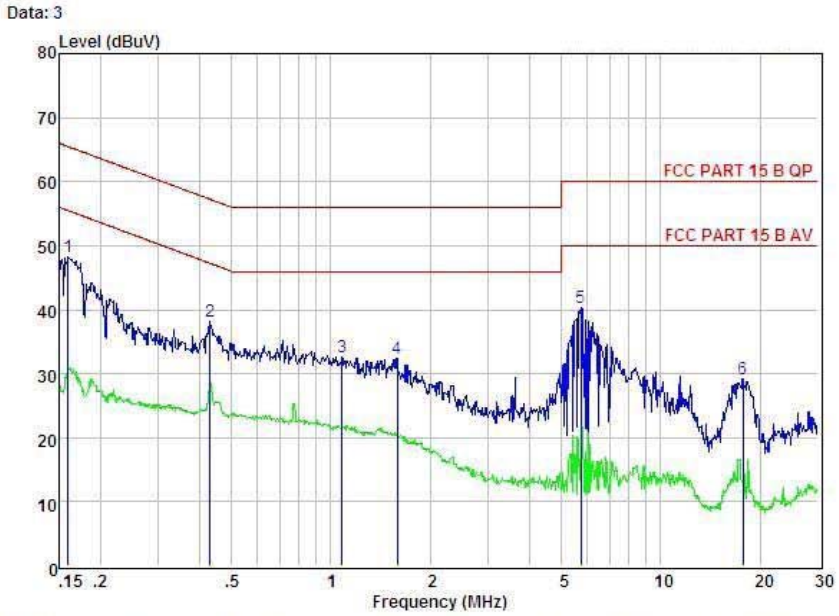
PASS. (See below detailed test data)



Condition : FCC PART 15 B QP POL: LINE Temp: 24.1 ℃ Hum: 51 %

Item	Freq	Read Level	LISN Factor	Attenuator Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	0.157	39.52	0.03	-9.52	0.10	49.17	65.60	-16.43	Peak
2	0.431	27.97	0.03	-9.57	0.10	37.67	57.24	-19.57	Peak
3	0.771	24.79	0.04	-9.60	0.10	34.53	56.00	-21.47	Peak
4	1.433	22.31	0.05	-9.66	0.10	32.12	56.00	-23.88	Peak
5	5.744	30.53	0.10	-9.96	0.13	40.72	60.00	-19.28	Peak
6	17.383	21.77	0.28	-9.82	0.30	32.17	60.00	-27.83	Peak

Remark: Level = Read Level + LISN Factor - Attenuator Factor + Cable loss



Condition : FCC PART 15 B QP POL: NEUTRAL Temp: 24.1 ℃ Hum: 51 %

Item	Freq	Read Level	LISN Factor	Attenuator Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	0.160	38.68	0.03	-9.52	0.10	48.33	65.47	-17.14	Peak
2	0.431	28.56	0.03	-9.57	0.10	38.26	57.24	-18.98	Peak
3	1.082	22.74	0.04	-9.64	0.10	32.52	56.00	-23.48	Peak
4	1.593	22.52	0.05	-9.69	0.10	32.36	56.00	-23.64	Peak
5	5.744	30.13	0.10	-9.96	0.13	40.32	60.00	-19.68	Peak
6	17.755	18.67	0.29	-9.82	0.31	29.09	60.00	-30.91	Peak

Remark: Level = Read Level + LISN Factor - Attenuator Factor + Cable loss

Note: If QP Result comply with AV limit, AV Result is deemed to comply with AV limit

11. Antenna Requirements

11.1. Limit

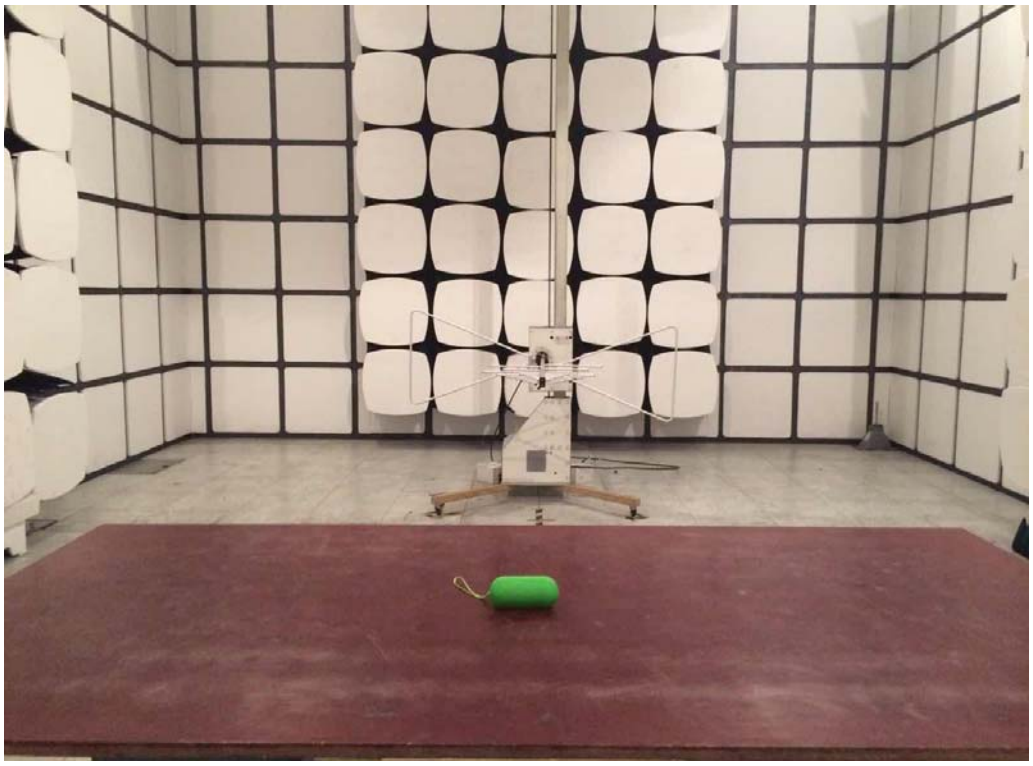
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

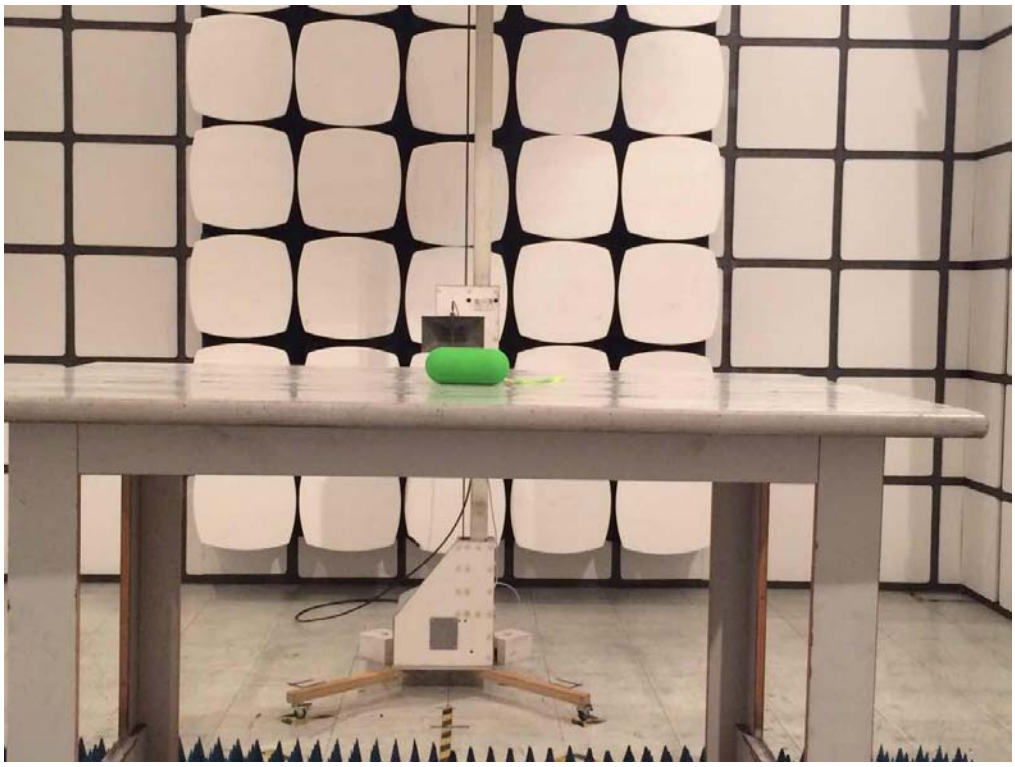
11.2. Result

The antennas used for this product are PCB Antenna for Bluetooth, no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 0dBi for Bluetooth.

12. Test setup photo

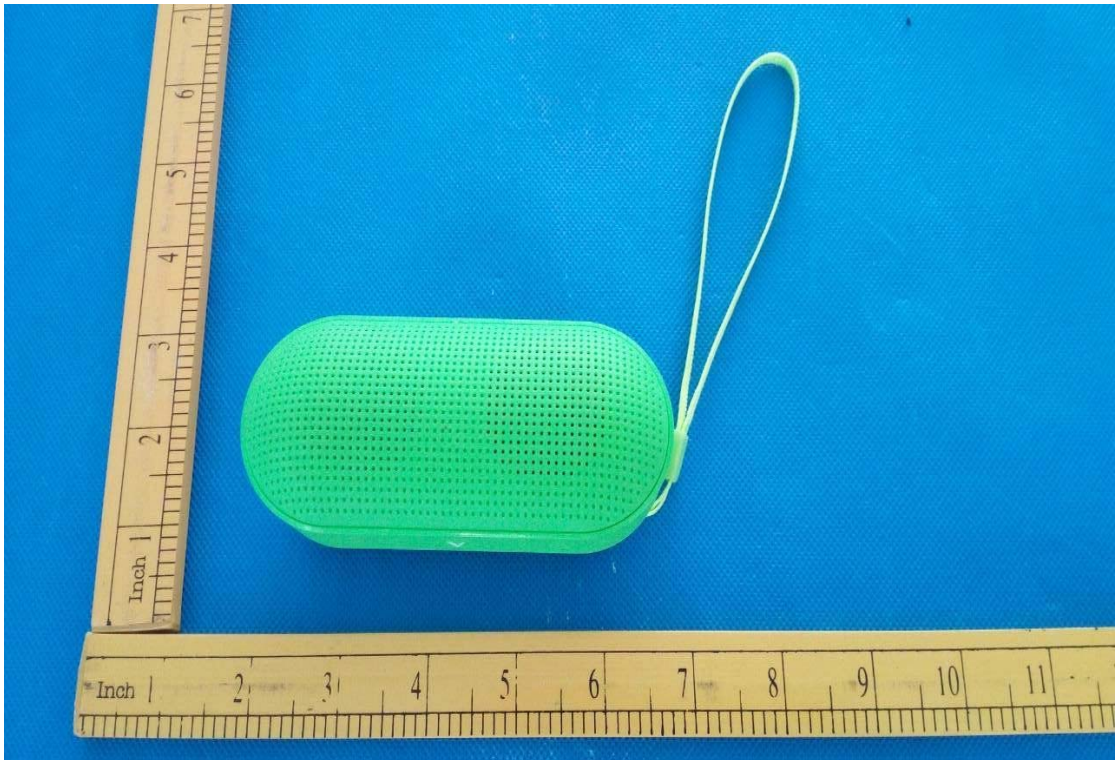
12.1. Photos of Radiated emission





12.2.Photos of Conducted Emission test

13. Photos of EUT

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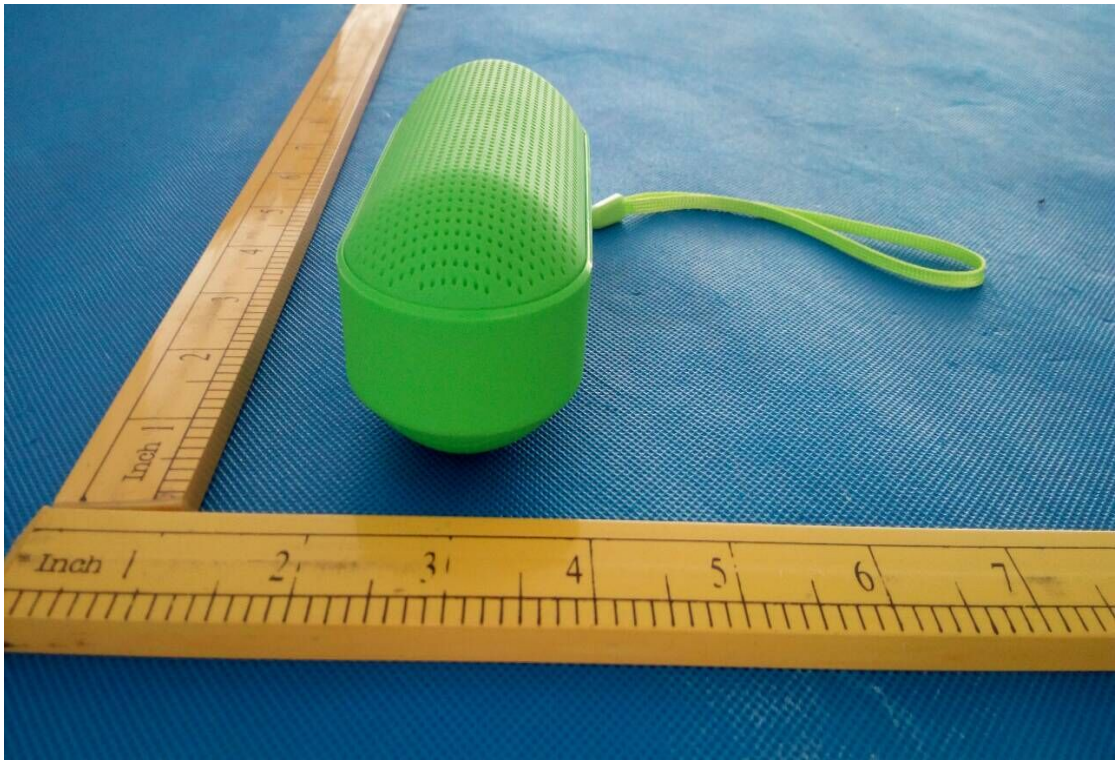
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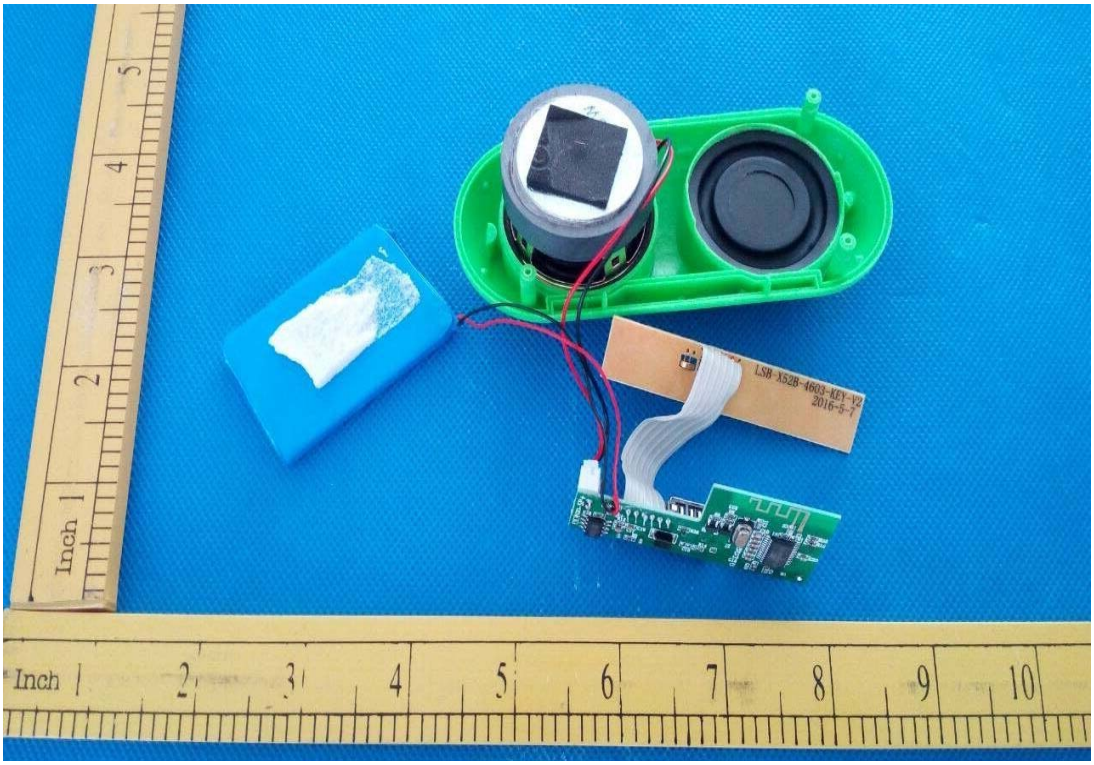
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2016-5-7
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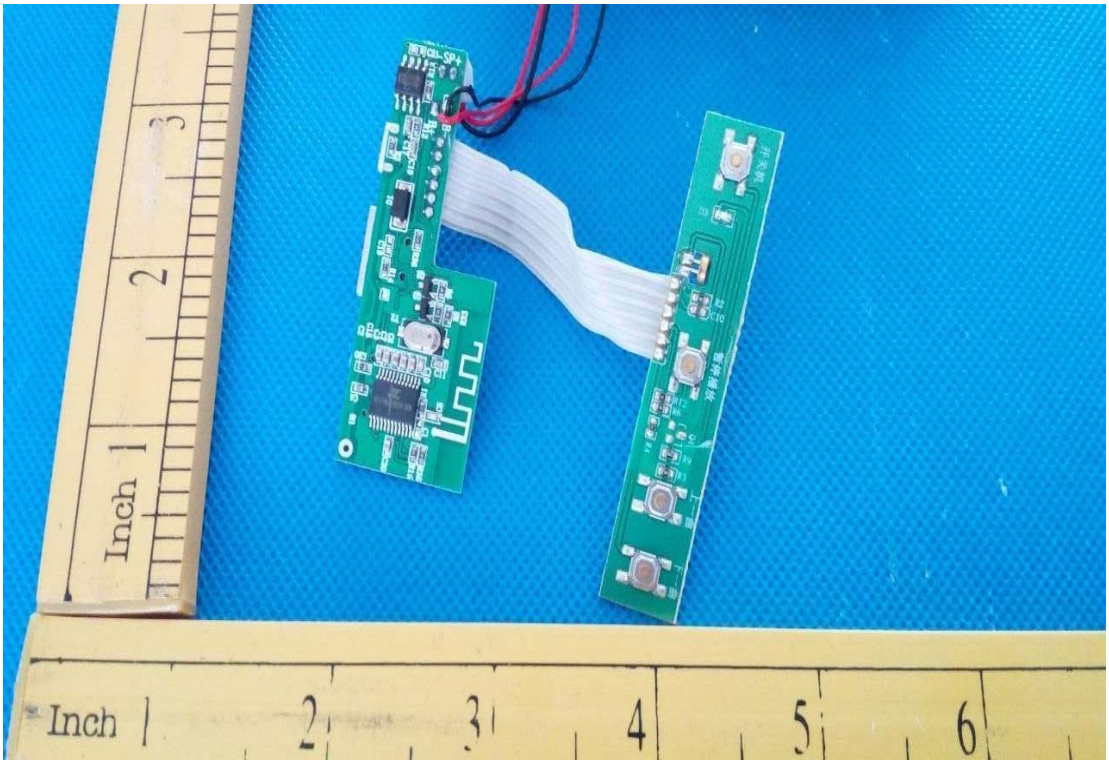

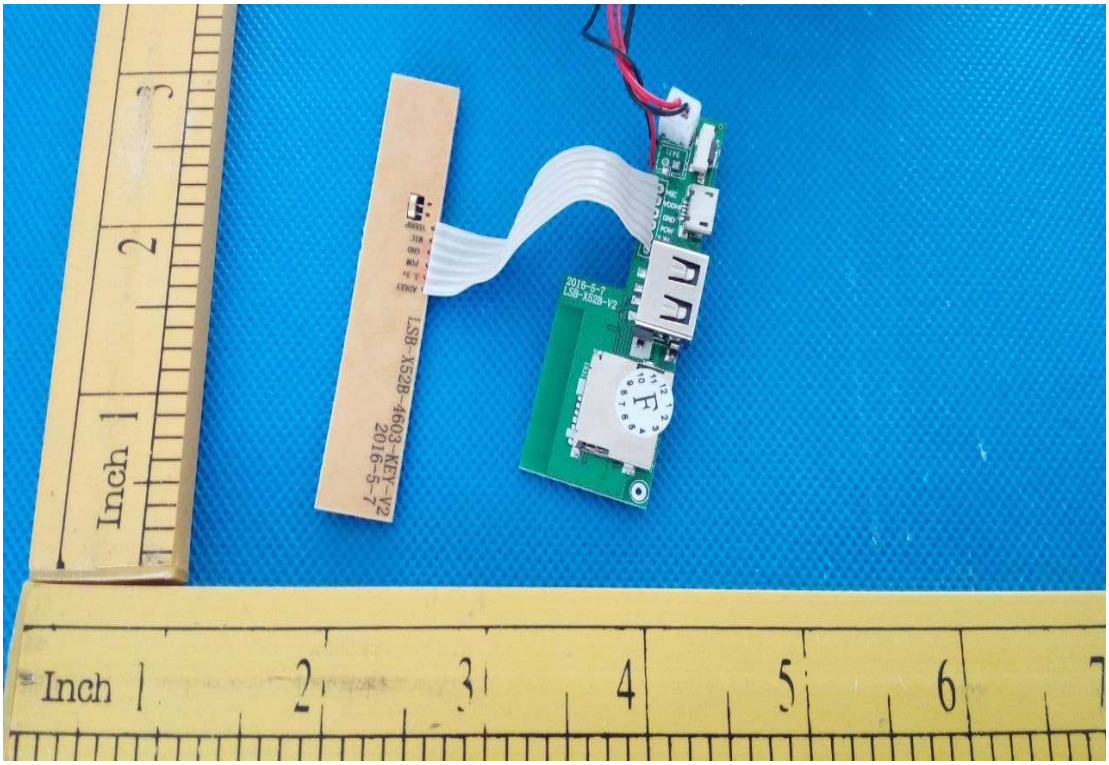

---------END OF THE REPORT-------