FCC Test Report

Product Name	Bluetooth Speaker
Model No.	KATCH
FCC ID.	2AJAAKATCH

Applicant	DONGGUAN MEILOON ACOUSTIC EQUIPMENTS CO., LTD.
Address	77, Yuanlin Road, Fenghuanggang Ind. Estate,Tangxia Town, Guangdong Province,Dongguan City, 523727, China

Date of Receipt	Mar. 23, 2017
Issued Date	May 10, 2017
Report No.	1730382R-RFUSP23V00
Report Version	V1.0

Testing Laboratory
3023

Test Report

Issued Date: May 10, 2017
Report No.: 1730382R-RFUSP23V00

Product Name	Bluetooth Speaker
Applicant	DONGGUAN MEILOON ACOUSTIC EQUIPMENTS CO., LTD.
Address	77, Yuanlin Road, Fenghuanggang Ind. Estate,Tangxia Town, Guangdong Province,Dongguan City, 523727, China
Manufacturer	DALI A/S
Model No.	KATCH
FCC ID.	2AJAAKATCH
EUT Rated Voltage	AC 100-240V, 50/60Hz
EUT Test Voltage	AC 120V/60Hz
Trade Name	DALI
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2015 ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By : Jinn Chen

(Senior Adm. Specialist / Jinn Chen)

Tested By : Bill Lin

(Engineer / Bill Lin)

Approved By :

(Director / Vincent Lin)

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Bluetooth Speaker
Trade Name	DALI
Model No.	KATCH
FCC ID.	2AJAAKATCH
Frequency Range	2402 – 2480MHz
Channel Number	79
Type of Modulation	FHSS: GFSK(1Mbps) / π /4DQPSK(2Mbps) / 8DPSK(3Mbps)
Antenna Type	Internal Antenna
Channel Control	Auto
Antenna Gain	Refer to the table “Antenna List”
Power Adapter	MFR: DYS, M/N: DYS650-150280W-K Input: 100-240V~ 50/60Hz, 1.3A MAX Output: 15.0V⎓2.83A Cable Out: Non-Shielded, 1.8m

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	Meiloon	EO/2011/90032	Internal Antenna	2.03 dBi for 2.4 GHz

Note:

1. The antenna of EUT conforms to FCC 15.203.

2. Only the higher gain antenna was tested and recorded in this report.

Center Frequency of Each Channel:

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

Note:

1. The EUT is a Bluetooth Speaker with a built-in Bluetooth transceiver.
2. These tests were conducted on a sample for the purpose of demonstrating compliance of Bluetooth transmitter with Part 15 Subpart C Paragraph 15.247 for spread spectrum devices.
3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
4. Bluetooth operation was evaluated at both 1Mb/s and 3Mb/s data rates. 2Mb/s data rate was found, through pre-testing, to produce emissions similar to those for 3Mb/s.

Test Mode	Mode 1: Transmit - 1Mbps Mode 2: Transmit - 3Mbps

1.3. Tested System Details

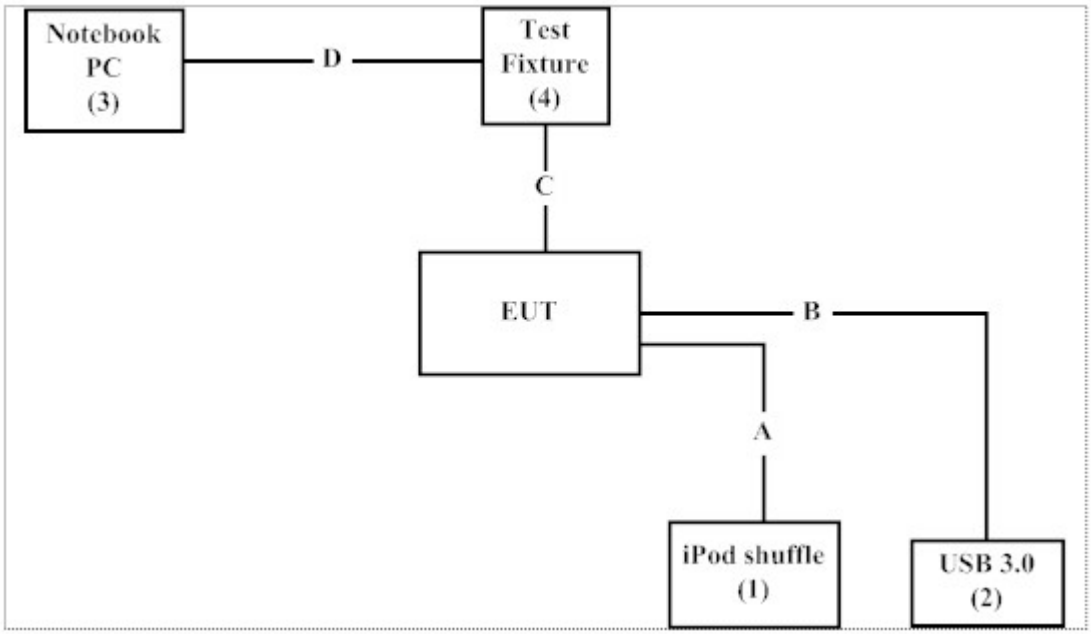
The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product		Manufacturer	Model No.	Serial No.	Power Cord
1	iPod shuffle	APPLE	A1373	CC4PW26LF4RY	N/A
2	USB 3.0	WD	WDBUZG0010BBK-PESN	WXK1AC50J31A	N/A
3	Notebook PC	DELL	P62G	CY9FJC2	Non-Shielded, 0.8m
4	CSR Test Fixture	USB_SPI_TOOLS	N/A	N/A	N/A

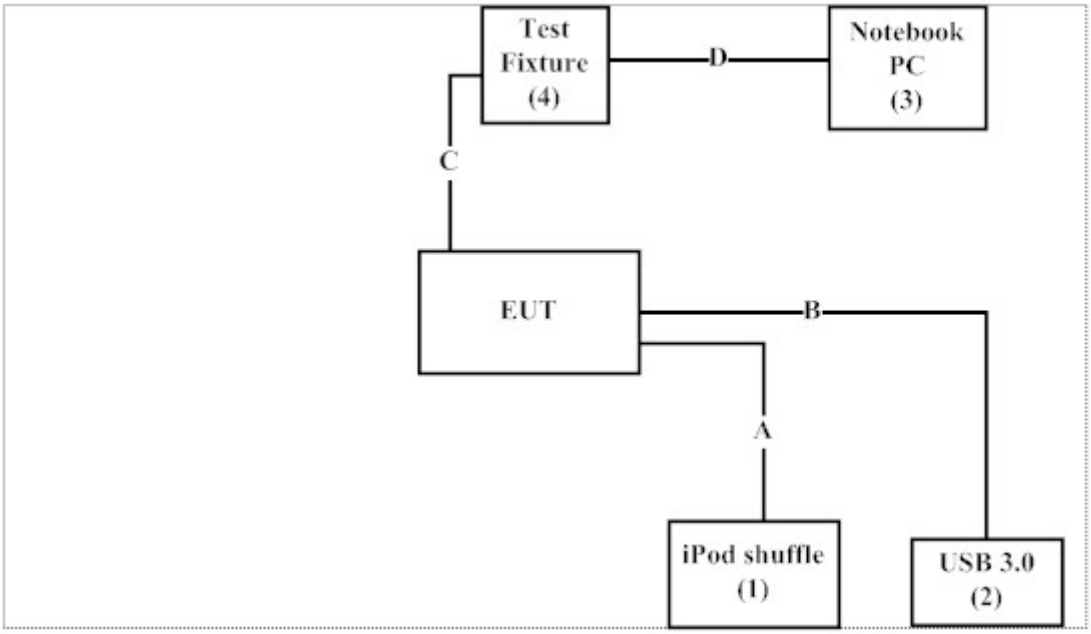
Signal Cable Type		Signal cable Description
A	3.5mm Audio Cable	Shielded, 1.8m
B	USB 3.0 Cable	Shielded, 0.5m
C	USB 2.0 Cable	Shielded, 1.8m
D	Signal Cable	Non-Shielded, 0.2m

1.4. Configuration of Tested System

Conducted



Radiated



1.5. EUT Exercise Software

1. Setup the EUT as shown in Section 1.4.
2. Execute software “CSR BlueSuite 2.6.2” on the EUT.
3. Configure the test mode, the test channel, and the data rate.
4. Press “OK” to start the continuous Transmit.
5. Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

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

The related certificate for our laboratories about the test site and management system can be downloaded from DEKRA Testing and Certification Co., Ltd. Web Site:
http://www.dekra.com.tw/english/about/certificates.aspx?bval=5
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New Taipei City 24457, Taiwan.
TEL: 886-2-2602-7968 / FAX : 866-2-2602-3286
E-Mail : info.tw@dekra.com

FCC Accreditation Number: TW1014

1.7. List of Test Equipment

For Conduction measurements /ASR1

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	EMI Test Receiver	R&S	ESR7	161601	2017.01.06	2018.01.05
X	Two-Line V-Network	R&S	ENV216	101306	2017.02.16	2018.02.15
X	Two-Line V-Network	R&S	ENV216	101307	2017.03.17	2018.03.16
X	Coaxial Cable	Quietek	RG400_BNC	RF001	2016.05.25	2017.05.24

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

For Conducted measurements /ASR4

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

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

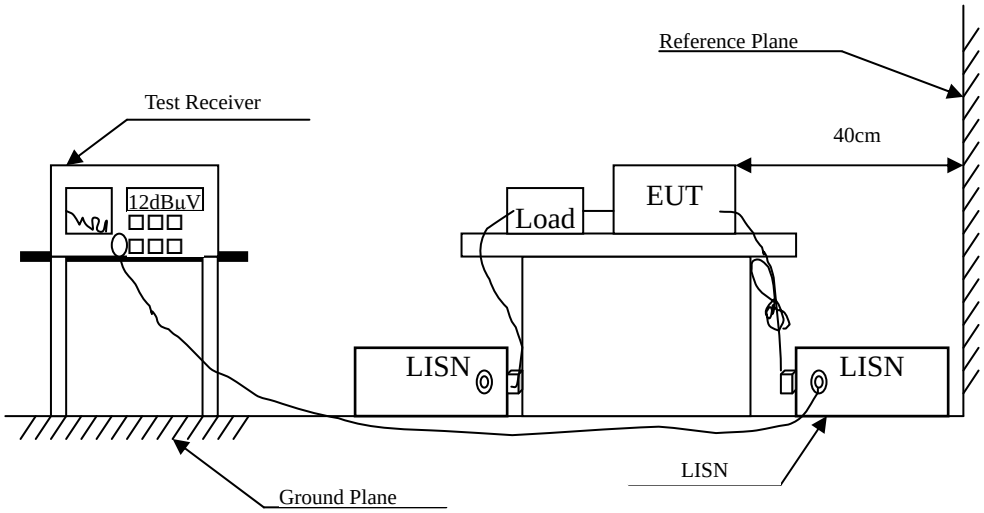
For Radiated measurements /ACB1

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Loop Antenna	A.H.	SAS-562B	272	2016.07.21	2017.07.20
X	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-674	2017.02.09	2018.02.08
X	Horn Antenna	ETS-Lindgren	3117	00203800	2016.10.13	2017.10.12
X	Horn Antenna	Com-Power	AH-840	101087	2017.05.03	2018.05.02
X	Pre-Amplifier	EMCI	EMC001330	980316	2017.04.27	2018.04.26
X	Pre-Amplifier	EMCI	EMC051835SE	980311	2017.04.27	2018.04.26
X	Pre-Amplifier	EMCI	EMC05820SE	980310	2017.04.28	2018.04.27
X	Pre-Amplifier	EMCI	EMC184045SE	980314	2016.05.12	2017.05.11
X	Filter	MICRO TRONICS	BRM50702	G251	2016.08.11	2017.08.10
	Filter	MICRO TRONICS	BRM50716	G188	2016.08.11	2017.08.10
X	EMI Test Receiver	R&S	ESR7	101602	2016.12.15	2017.12.14
X	Spectrum Analyzer	R&S	FSV40	101149	2016.12.14	2017.12.13
X	Coaxial Cable	SUHNER	SUCOFLEX 106	RF002	2016.05.25	2017.05.24
X	Mircoflex Cable	HUBER SUHNER	SUCOFLEX 102	MY3381/2	2016.08.11	2017.08.10

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

2. Conducted Emission

2.1. Test Setup



2.2. Limits

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

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

2.3. Test Procedure

The EUT and Peripherals are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

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

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

2.4. Uncertainty

±2.35dB

2.5. Test Result of Conducted Emission

Product : Bluetooth Speaker
Test Item : Conducted Emission Test
Power Line : Line 1
Test Mode : Mode 2: Transmit - 3Mbps (2441MHz)
Test Date : 2017/03/29

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV	dB	dBµV
LINE 1					
Quasi-Peak					
0.190	9.560	38.704	48.264	-16.593	64.857
0.250	9.563	19.776	29.339	-33.804	63.143
0.410	9.574	26.758	36.332	-22.239	58.571
2.300	9.583	26.333	35.916	-20.084	56.000
5.000	9.610	23.669	33.279	-22.721	56.000
14.000	9.673	21.383	31.056	-28.944	60.000
Average					
0.190	9.560	14.837	24.397	-30.460	54.857
0.250	9.563	15.447	25.010	-28.133	53.143
0.410	9.574	7.748	17.322	-31.249	48.571
2.300	9.583	18.687	28.270	-17.730	46.000
5.000	9.610	10.982	20.592	-25.408	46.000
14.000	9.673	5.586	15.259	-34.741	50.000

Note:

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

Product : Bluetooth Speaker
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 2: Transmit - 3Mbps (2441MHz)
Test Date : 2017/03/29

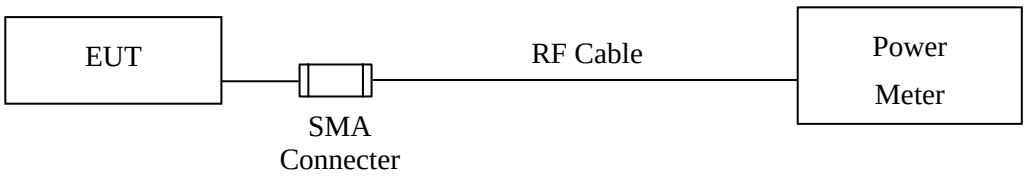
Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV	dB	dBµV
LINE 2					
Quasi-Peak					
0.191	9.558	26.228	35.787	-29.042	64.829
0.250	9.562	28.244	37.806	-25.337	63.143
0.320	9.564	22.081	31.645	-29.498	61.143
3.000	9.590	26.648	36.238	-19.762	56.000
5.400	9.614	24.510	34.124	-25.876	60.000
13.000	9.673	24.566	34.239	-25.761	60.000
Average					
0.191	9.558	10.598	20.157	-34.672	54.829
0.250	9.562	9.567	19.129	-34.014	53.143
0.320	9.564	3.315	12.879	-38.264	51.143
3.000	9.590	18.555	28.145	-17.855	46.000
5.400	9.614	7.124	16.738	-33.262	50.000
13.000	9.673	7.787	17.460	-32.540	50.000

Note:

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

3. Peak Power Output

3.1. Test Setup



3.2. Limit

The maximum peak power shall be less 1Watt.

3.3. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

3.4. Uncertainty

±0.86 dB

3.5. Test Result of Peak Power Output

Product : Bluetooth Speaker
Test Item : Peak Power Output
Test Mode : Mode 1: Transmit - 1Mbps
Test Date : 2017/04/06

Channel No.	Frequency (MHz)	Measurement (dBm)	Required Limit	Result
Channel 00	2402.00	9.28	1 Watt= 30 dBm	Pass
Channel 39	2441.00	9.69	1 Watt= 30 dBm	Pass
Channel 78	2480.00	10.05	1 Watt= 30 dBm	Pass

Product : Bluetooth Speaker
Test Item : Peak Power Output
Test Mode : **錯誤! 找不到參照來源。**
Test Date : 2017/04/06

Channel No.	Frequency (MHz)	Measurement (dBm)	Required Limit	Result
Channel 00	2402.00	8.62	1 Watt= 30 dBm	Pass
Channel 39	2441.00	9.28	1 Watt= 30 dBm	Pass
Channel 78	2480.00	9.56	1 Watt= 30 dBm	Pass

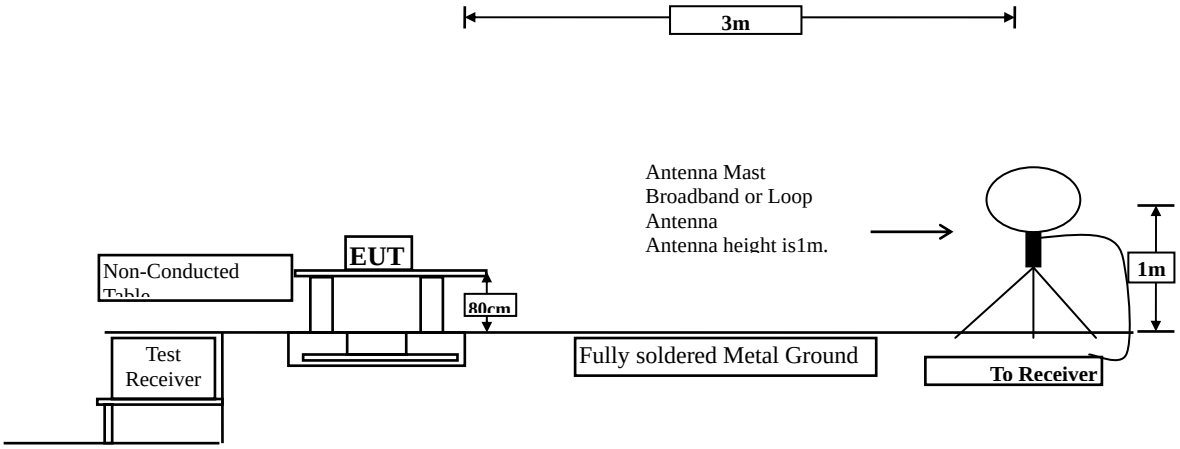
Product : Bluetooth Speaker
Test Item : Peak Power Output
Test Mode : Mode 2: Transmit - 3Mbps
Test Date : 2017/04/06

Channel No.	Frequency (MHz)	Measurement (dBm)	Required Limit	Result
Channel 00	2402.00	3.83	1 Watt= 30 dBm	Pass
Channel 39	2441.00	4.92	1 Watt= 30 dBm	Pass
Channel 78	2480.00	5.27	1 Watt= 30 dBm	Pass

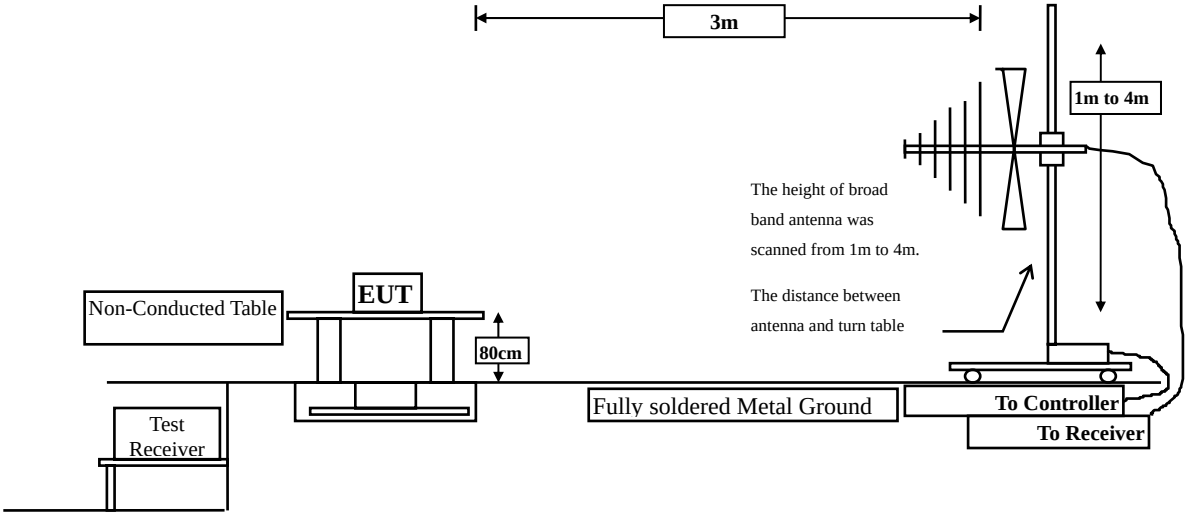
4. Radiated Emission

4.1. Test Setup

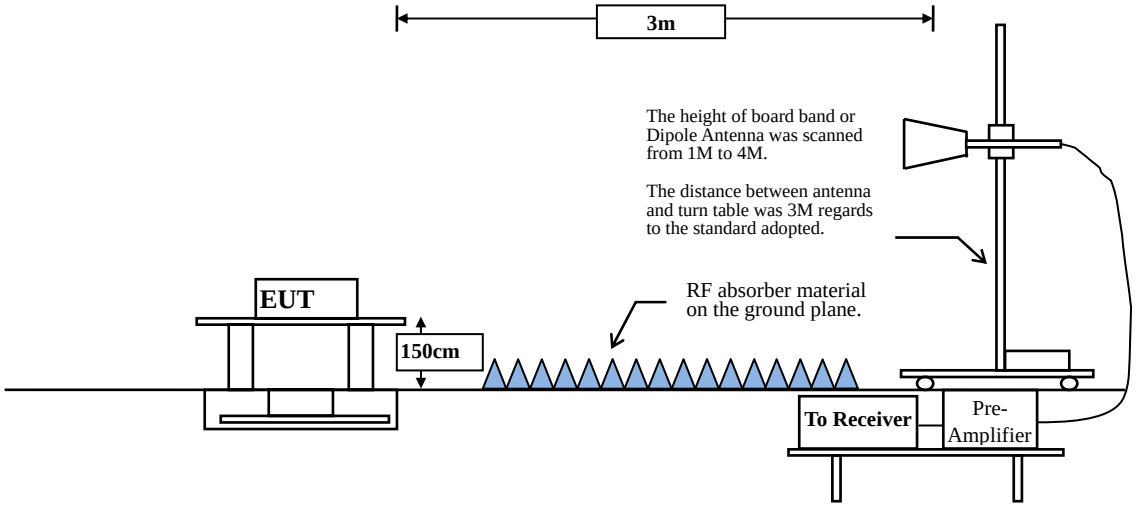
Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



4.2. Limits

➢ General Radiated Emission Limits

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

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

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

4.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested compliance to FCC 47CFR 15.247 requirements.

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

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

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

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

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

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

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

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

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

4.4. Uncertainty

Horizontal polarization：

30-300MHz: ±4.08dB；300M-1GHz: ±3.86dB；1-18GHz: ±3.77dB；18-40GHz: ±3.98dB

Vertical polarization：

30-300MHz: ±4.81dB；300M-1GHz: ±3.87dB；1-18GHz：±3.83dB；18-40GHz: ±3.98dB

4.5. Test Result of Radiated Emission

Product : Bluetooth Speaker
Test Item : Harmonic Radiated Emission
Test Mode : Mode 1: Transmit - 1Mbps(2402MHz)
Test Date : 2017/03/31

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4804.000	-3.773	54.440	50.667	-23.333	74.000
7206.000	-0.784	53.480	52.695	-21.305	74.000
9608.000	1.052	43.640	44.693	-29.307	74.000
Average					
Detector:					
--					54.000
Vertical					
Peak Detector:					
4804.000	-3.773	54.380	50.607	-23.393	74.000
7206.000	-0.784	53.310	52.525	-21.475	74.000
9608.000	1.052	43.670	44.723	-29.277	74.000
Average					
Detector:					
--					54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Bluetooth Speaker
Test Item : Harmonic Radiated Emission
Test Mode : Mode 1: Transmit - 1Mbps(2441MHz)
Test Date : 2017/03/31

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4882.000	-3.770	55.780	52.010	-21.990	74.000
7323.000	-0.712	53.390	52.678	-21.322	74.000
9764.000	1.371	44.480	45.852	-28.148	74.000
Average					
Detector:					
--					54.000
Vertical					
Peak Detector:					
4882.000	-3.770	51.630	47.860	-26.140	74.000
7323.000	-0.712	52.140	51.428	-22.572	74.000
9764.000	1.371	44.200	45.572	-28.428	74.000
Average					
Detector:					
--					54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Bluetooth Speaker
Test Item : Harmonic Radiated Emission
Test Mode : Mode 1: Transmit - 1Mbps(2480MHz)
Test Date : 2017/03/31

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4960.000	-3.732	56.230	52.498	-21.502	74.000
7440.000	-0.646	52.380	51.733	-22.267	74.000
9920.000	1.687	43.630	45.317	-28.683	74.000
Average					
Detector:					
--					54.000
Vertical					
Peak Detector:					
4960.000	-3.732	55.250	51.518	-22.482	74.000
7440.000	-0.646	48.890	48.243	-25.757	74.000
9920.000	1.687	44.420	46.107	-27.893	74.000
Average					
Detector:					
--					54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Bluetooth Speaker
Test Item : Harmonic Radiated Emission
Test Mode : Mode 2: Transmit - 3Mbps(2402MHz)
Test Date : 2017/03/31

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV/m	dB	dBµV/m
Horizontal					
Peak Detector:					
4804.000	-3.773	52.690	48.917	-25.083	74.000
7206.000	-0.784	51.700	50.915	-23.085	74.000
9608.000	1.052	43.480	44.533	-29.467	74.000
Average					
Detector:					
--					54.000
Vertical					
Peak Detector:					
4804.000	-3.773	53.360	49.587	-24.413	74.000
7206.000	-0.784	50.080	49.295	-24.705	74.000
9608.000	1.052	43.260	44.313	-29.687	74.000
Average					
Detector:					
--					54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Bluetooth Speaker
Test Item : Harmonic Radiated Emission
Test Mode : Mode 2: Transmit - 3Mbps (2441MHz)
Test Date : 2017/03/31

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4882.000	-3.770	54.900	51.130	-22.870	74.000
7323.000	-0.712	50.900	50.188	-23.812	74.000
9764.000	1.371	44.300	45.672	-28.328	74.000
Average					
Detector:					
--					54.000
Vertical					
Peak Detector:					
4882.000	-3.770	53.330	49.560	-24.440	74.000
7323.000	-0.712	49.110	48.398	-25.602	74.000
9764.000	1.371	43.910	45.282	-28.718	74.000
Average					
Detector:					
--					54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Bluetooth Speaker
Test Item : Harmonic Radiated Emission
Test Mode : Mode 2: Transmit - 3Mbps (2480MHz)
Test Date : 2017/03/31

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV/m	dB	dBµV/m
Horizontal					
Peak Detector:					
4960.000	-3.732	54.940	51.208	-22.792	74.000
7440.000	-0.646	49.420	48.773	-25.227	74.000
9920.000	1.687	44.430	46.117	-27.883	74.000
Average					
Detector:					
--					54.000
Vertical					
Peak Detector:					
4960.000	-3.732	53.970	50.238	-23.762	74.000
7440.000	-0.646	46.940	46.293	-27.707	74.000
9920.000	1.687	43.530	45.217	-28.783	74.000
Average					
Detector:					
--					54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Bluetooth Speaker
Test Item : General Radiated Emission
Test Mode : Mode 1: Transmit - 1Mbps (2441MHz)
Test Date : 2017/04/05

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
107.319	-14.849	52.585	37.736	-5.764	43.500
169.174	-11.185	46.457	35.272	-8.228	43.500
256.333	-12.036	47.461	35.425	-10.575	46.000
382.855	-8.465	41.599	33.134	-12.866	46.000
552.957	-5.169	37.958	32.789	-13.211	46.000
745.551	-2.169	36.300	34.131	-11.869	46.000
Vertical					
170.580	-11.295	41.839	30.543	-12.957	43.500
257.739	-12.018	43.973	31.956	-14.044	46.000
422.217	-7.529	40.780	33.251	-12.749	46.000
631.681	-3.863	36.138	32.275	-13.725	46.000
790.536	-1.790	35.992	34.203	-11.797	46.000
938.145	0.091	33.897	33.988	-12.012	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : Bluetooth Speaker
Test Item : General Radiated Emission
Test Mode : Mode 2: Transmit - 3Mbps (2441MHz)
Test Date : 2017/04/05

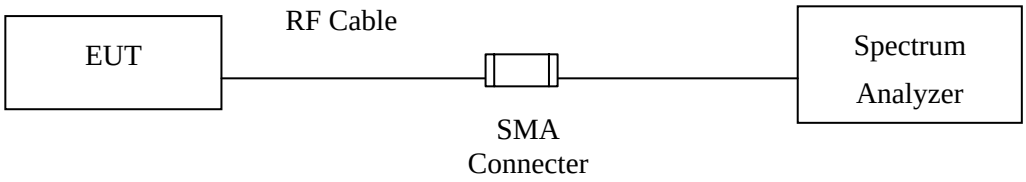
Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV/m	dB	dBµV/m
Horizontal					
105.913	-15.095	50.446	35.351	-8.149	43.500
160.739	-10.884	43.232	32.349	-11.151	43.500
304.130	-10.263	41.938	31.675	-14.325	46.000
440.493	-7.085	38.937	31.852	-14.148	46.000
644.333	-3.786	36.526	32.740	-13.260	46.000
790.536	-1.790	36.264	34.475	-11.525	46.000
Vertical					
148.087	-11.165	42.408	31.243	-12.257	43.500
287.261	-10.752	43.795	33.043	-12.957	46.000
462.986	-6.633	38.039	31.406	-14.594	46.000
609.188	-3.999	35.969	31.970	-14.030	46.000
734.304	-2.387	36.893	34.506	-11.494	46.000
915.652	-0.152	35.064	34.913	-11.087	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

5. RF Antenna Conducted Test

5.1. Test Setup



5.2. Limits

According to FCC Section 15.247(d). In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

5.3. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

5.4. Uncertainty

±1.23dB

5.5. Test Result of RF Antenna Conducted Test

Product	:	Bluetooth Speaker
Test Item	:	RF Antenna Conducted Test
Test Mode	:	Mode 1: Transmit - 1Mbps
Test Date	:	2017/04/06

Figure Channel 00:

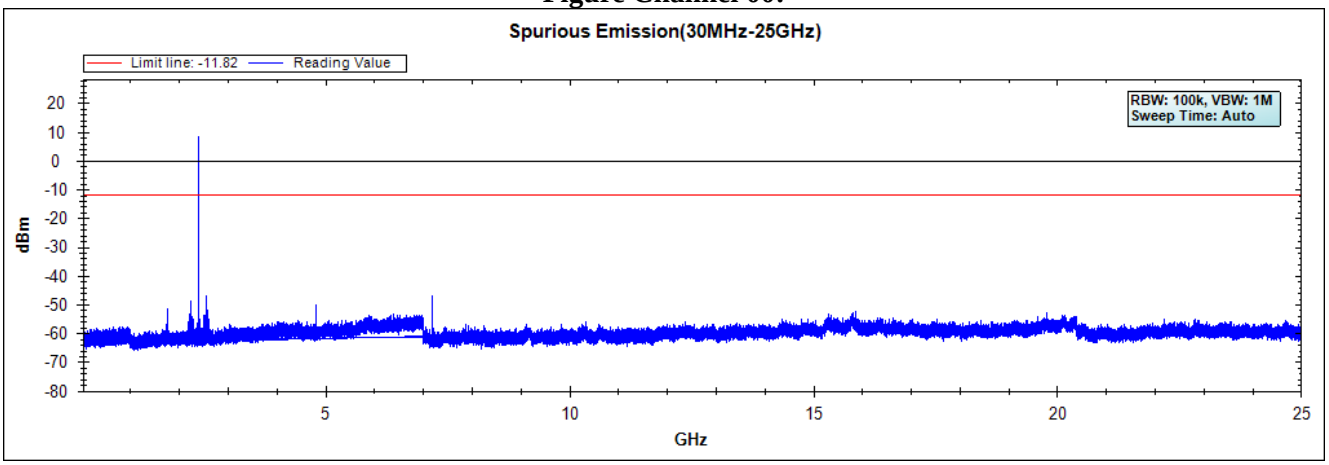


Figure Channel 39:

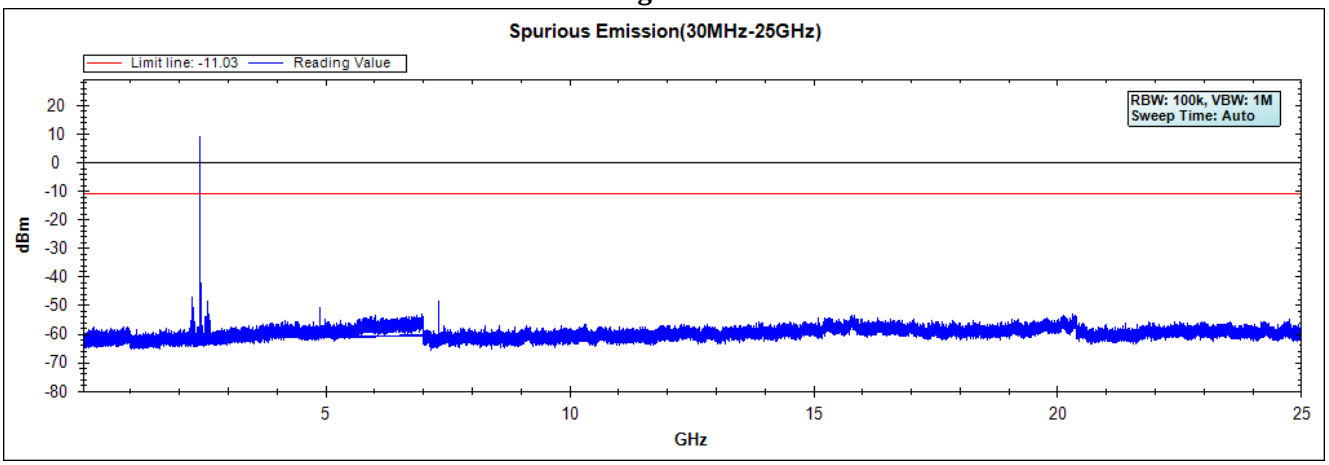
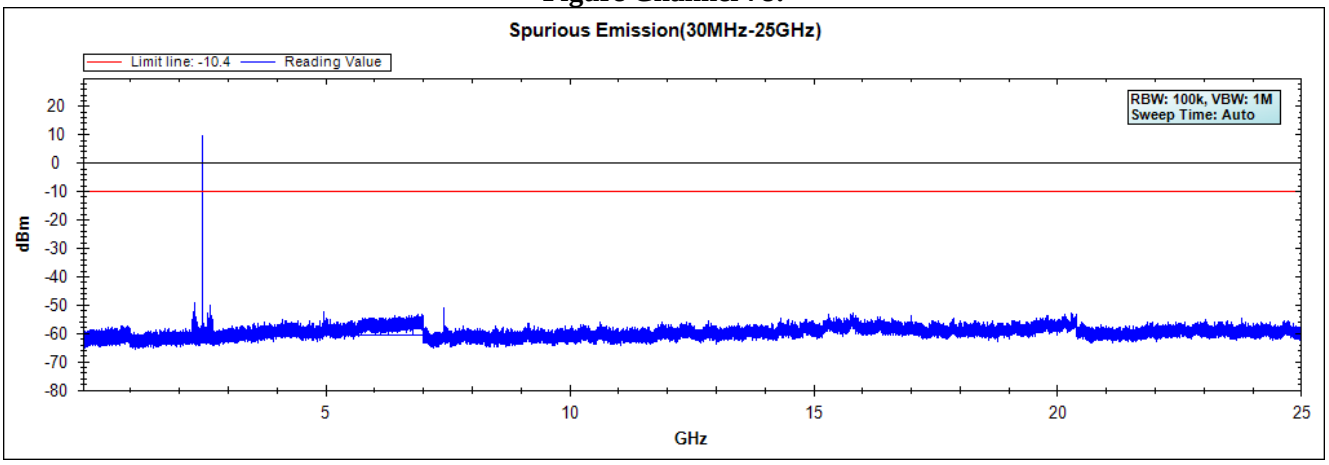


Figure Channel 78:



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

Product	:	Bluetooth Speaker
Test Item	:	RF Antenna Conducted Test
Test Mode	:	Mode 2: Transmit - 3Mbps
Test Date	:	2017/04/06

Figure Channel 00:

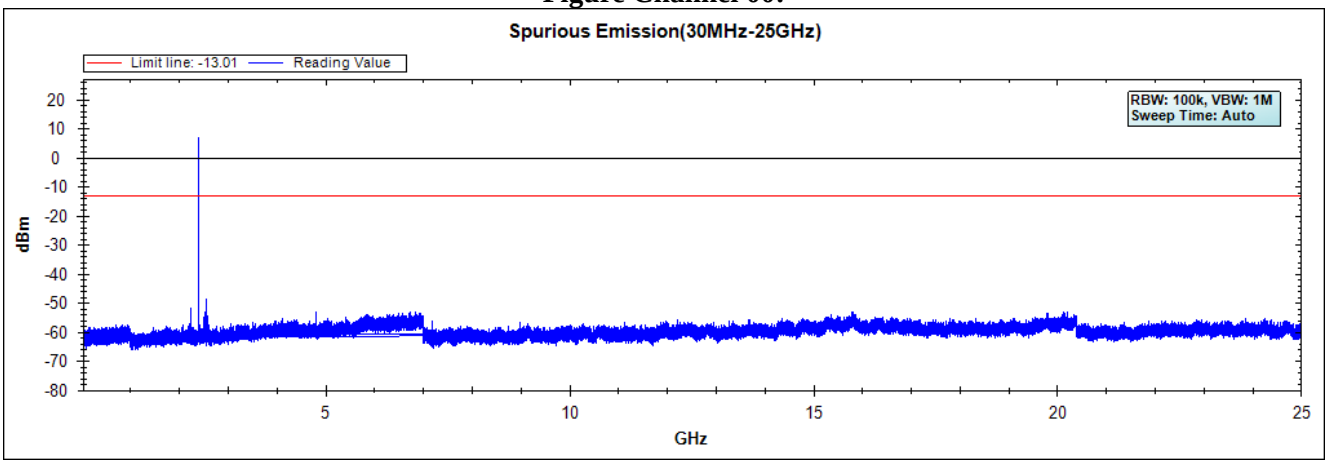


Figure Channel 39:

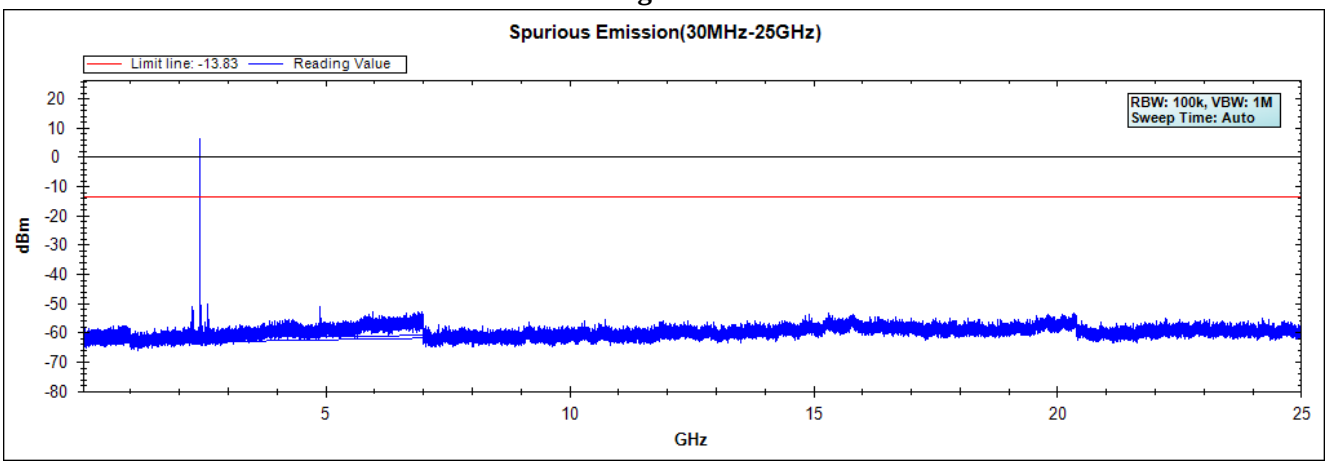
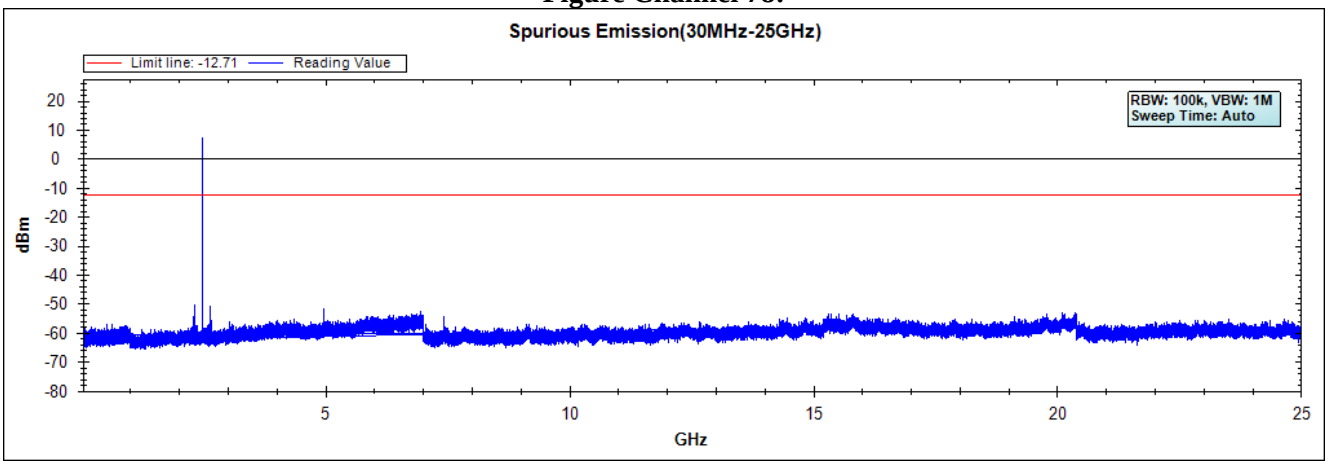


Figure Channel 78:

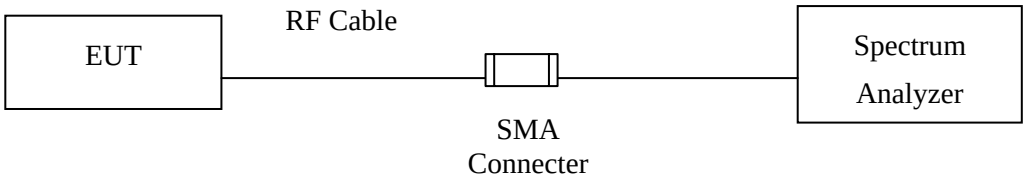


Note: The above test pattern is synthesized by multiple of the frequency range.

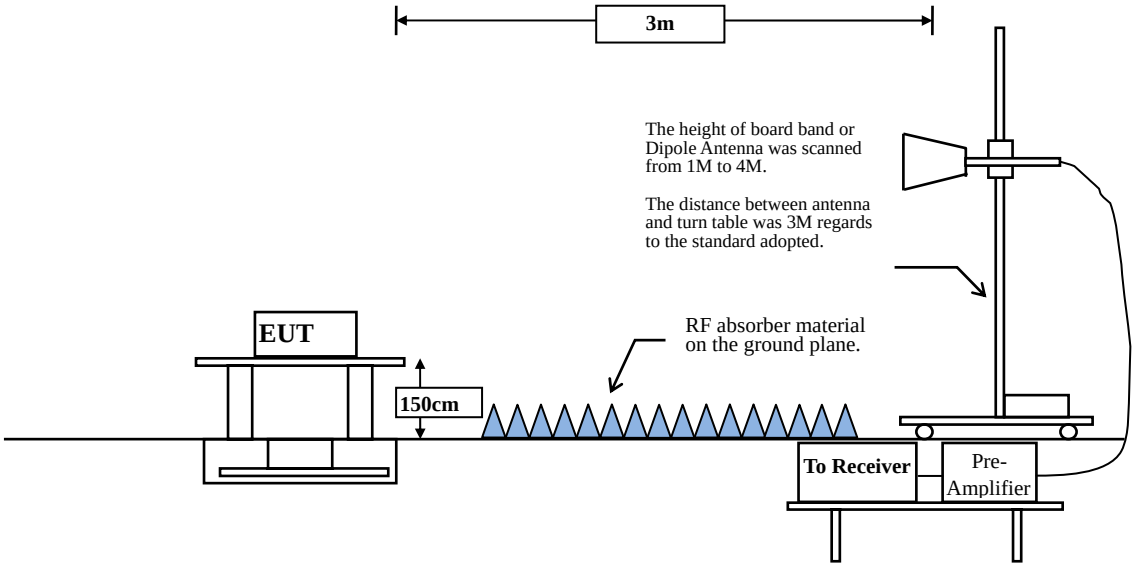
6. Band Edge

6.1. Test Setup

RF Conducted Measurement



RF Radiated Measurement:



6.2. Limit

According to FCC Section 15.247(d). In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

6.3. Test Procedure

The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.
The bandwidth setting below 1GHz and above 1GHz on the field strength meter is 120 kHz and 1MHz, respectively.

6.4. Uncertainty

Conducted: ±1.23dB
Radiated:
Horizontal polarization：1-18GHz: ±3.77dB
Vertical polarization：1-18GHz : ±3.83dB

6.5. Test Result of Band Edge

Product : Bluetooth Speaker
Test Item : Band Edge
Test Mode : Mode 1: Transmit - 1Mbps (2402MHz)
Test Date : 2017/03/30

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Arerage Limit (dBμV/m)	Result
00 (Peak)	2375.797	11.514	38.445	49.959	74.00	54.00	Pass
00 (Peak)	2390.000	11.556	36.858	48.414	74.00	54.00	Pass
00 (Peak)	2400.000	11.579	60.819	72.398	--	--	--
00 (Peak)	2402.174	11.584	94.280	105.864	--	--	--
00 (Average)	2375.797	11.514	25.333	36.847	74.00	54.00	Pass
00 (Average)	2390.000	11.556	24.216	35.772	74.00	54.00	Pass
00 (Average)	2400.000	11.579	47.025	58.604	--	--	--
00 (Average)	2402.029	11.584	79.243	90.827	--	--	--

Figure Channel 00: Horizontal (Peak)

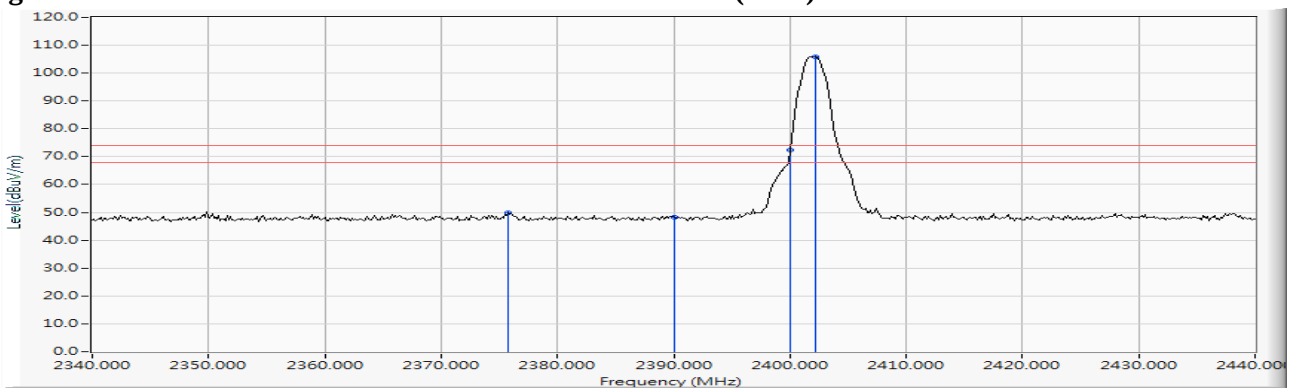
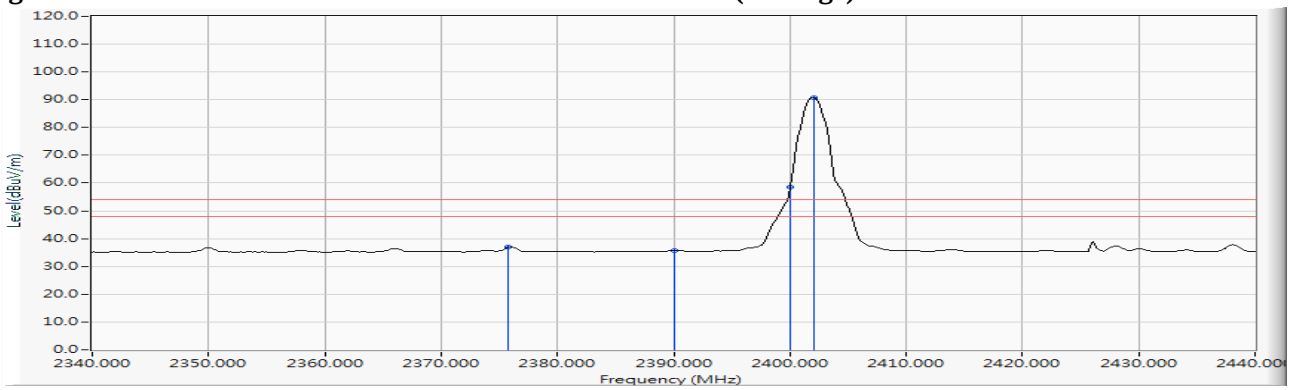


Figure Channel 00: Horizontal (Average)



Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correction Factor.
6. The average measurement was not performed when the peak measured data is under the limit of average detection.

Product : Bluetooth Speaker
Test Item : Band Edge
Test Mode : Mode 1: Transmit - 1Mbps (2402MHz)
Test Date : 2017/03/30

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Arerage Limit (dBμV/m)	Result
00 (Peak)	2377.681	11.521	38.513	50.034	74.00	54.00	Pass
00 (Peak)	2390.000	11.556	36.476	48.032	74.00	54.00	Pass
00 (Peak)	2400.000	11.579	56.286	67.865	--	--	--
00 (Peak)	2402.174	11.584	89.906	101.490	--	--	--
00 (Average)	2375.652	11.514	24.289	35.803	74.00	54.00	Pass
00 (Average)	2390.000	11.556	23.950	35.506	74.00	54.00	Pass
00 (Average)	2400.000	11.579	43.479	55.058	--	--	--
00 (Average)	2402.029	11.584	75.842	87.426	--	--	--

Figure Channel 00: VERTICAL (Peak)

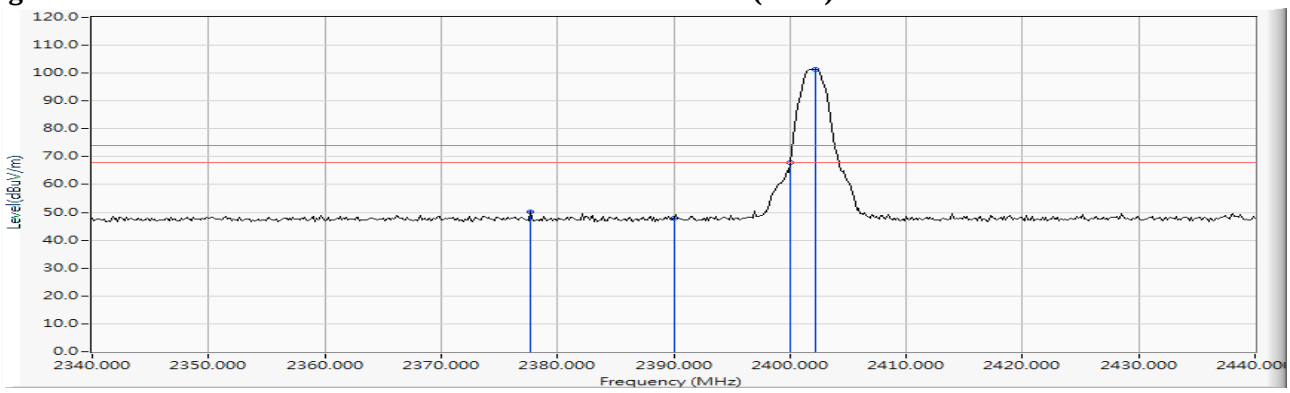
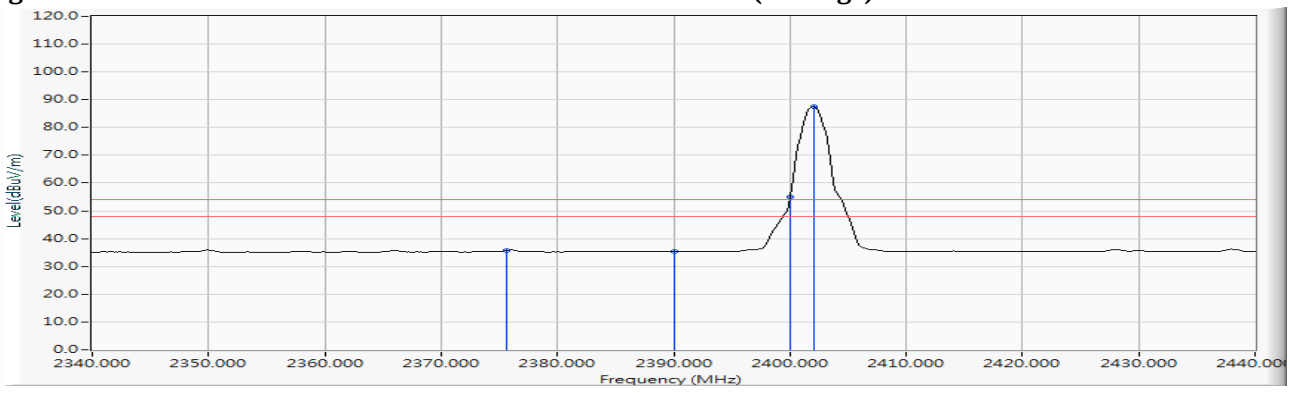


Figure Channel 00: VERTICAL (Average)



Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correction Factor.
6. The average measurement was not performed when the peak measured data is under the limit of average detection.

Product : Bluetooth Speaker
Test Item : Band Edge
Test Mode : Mode 1: Transmit - 1Mbps (2480MHz)
Test Date : 2017/03/30

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Arerage Limit (dBμV/m)	Result
78 (Peak)	2479.732	11.791	93.568	105.359	--	--	Pass
78 (Peak)	2483.500	11.800	46.911	58.711	74.00	54.00	Pass
78 (Average)	2480.022	11.791	78.752	90.543	--	--	Pass
78 (Average)	2483.500	11.800	32.679	44.479	74.00	54.00	Pass

Figure Channel 78: Horizontal (Peak)

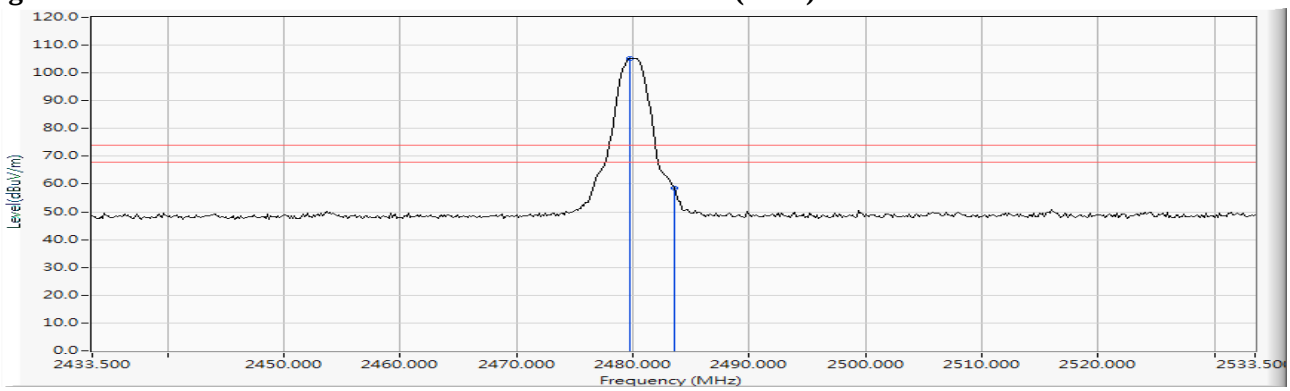
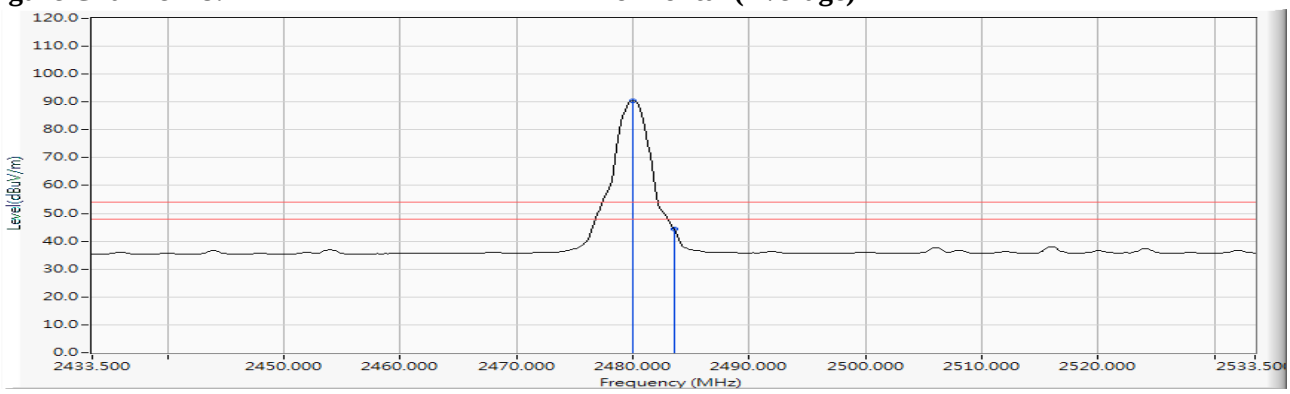


Figure Channel 78: Horizontal (Average)



Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correction Factor.
6. The average measurement was not performed when the peak measured data is under the limit of average detection.

Product : Bluetooth Speaker
Test Item : Band Edge
Test Mode : Mode 1: Transmit - 1Mbps (2480MHz)
Test Date : 2017/03/30

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Arerage Limit (dBμV/m)	Result
78 (Peak)	2479.732	11.791	87.746	99.537	--	--	Pass
78 (Peak)	2483.500	11.800	41.762	53.562	74.00	54.00	Pass
78 (Average)	2480.022	11.791	74.142	85.933	--	--	Pass
78 (Average)	2483.500	11.800	29.249	41.049	74.00	54.00	Pass

Figure Channel 78: VERTICAL (Peak)

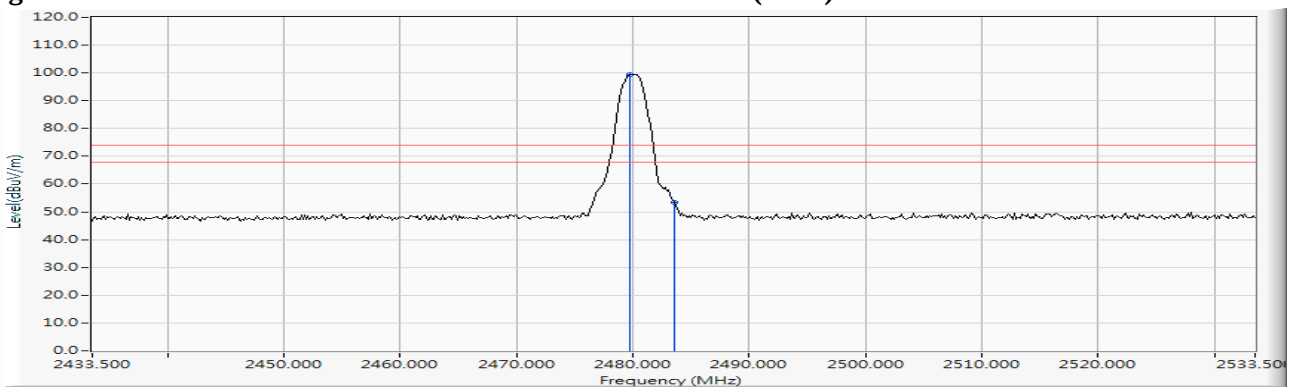
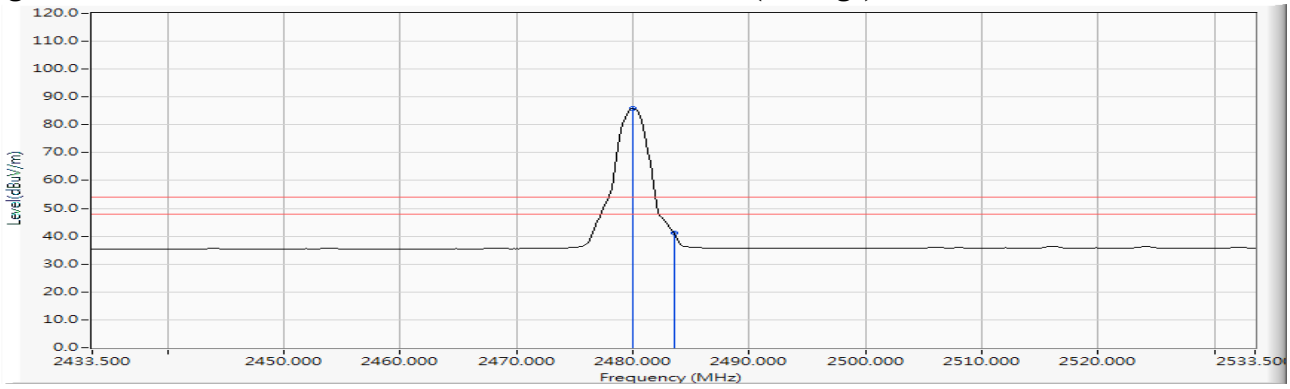


Figure Channel 78: VERTICAL (Average)



Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correction Factor.
6. The average measurement was not performed when the peak measured data is under the limit of average detection.

Product : Bluetooth Speaker
Test Item : Band Edge
Test Mode : Mode 2: Transmit - 3Mbps (2402MHz)
Test Date : 2017/03/30

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Arerage Limit (dBμV/m)	Result
00 (Peak)	2366.232	11.481	37.939	49.420	74.00	54.00	Pass
00 (Peak)	2390.000	11.556	36.383	47.939	74.00	54.00	Pass
00 (Peak)	2400.000	11.579	69.209	80.788	--	--	--
00 (Peak)	2402.029	11.584	92.065	103.649	--	--	--
00 (Average)	2376.377	11.516	24.273	35.789	74.00	54.00	Pass
00 (Average)	2390.000	11.556	23.920	35.476	74.00	54.00	Pass
00 (Average)	2400.000	11.579	49.352	60.931	--	--	--
00 (Average)	2402.029	11.584	75.657	87.241	--	--	--

Figure Channel 00: Horizontal (Peak)

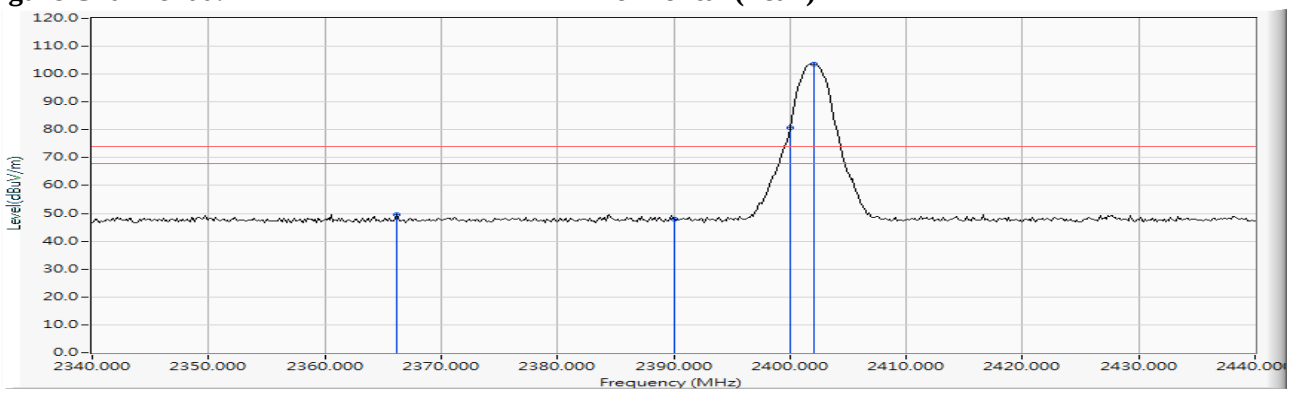
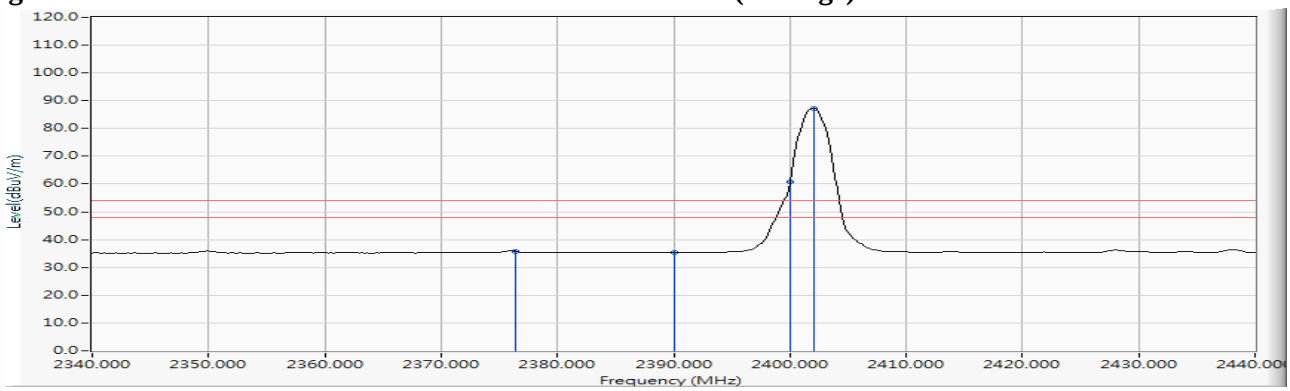


Figure Channel 00: Horizontal (Average)



Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correction Factor.
6. The average measurement was not performed when the peak measured data is under the limit of average detection.

Product : Bluetooth Speaker
Test Item : Band Edge
Test Mode : Mode 2: Transmit - 3Mbps (2402MHz)
Test Date : 2017/03/30

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Arerage Limit (dBμV/m)	Result
00 (Peak)	2382.609	11.537	37.806	49.343	74.00	54.00	Pass
00 (Peak)	2390.000	11.556	36.313	47.869	74.00	54.00	Pass
00 (Peak)	2400.000	11.579	64.086	75.665	--	--	--
00 (Peak)	2402.029	11.584	86.979	98.563	--	--	--
00 (Average)	2375.507	11.514	23.814	35.327	74.00	54.00	Pass
00 (Average)	2390.000	11.556	23.719	35.275	74.00	54.00	Pass
00 (Average)	2400.000	11.579	45.173	56.752	--	--	--
00 (Average)	2402.029	11.584	71.591	83.175	--	--	--

Figure Channel 00: VERTICAL (Peak)

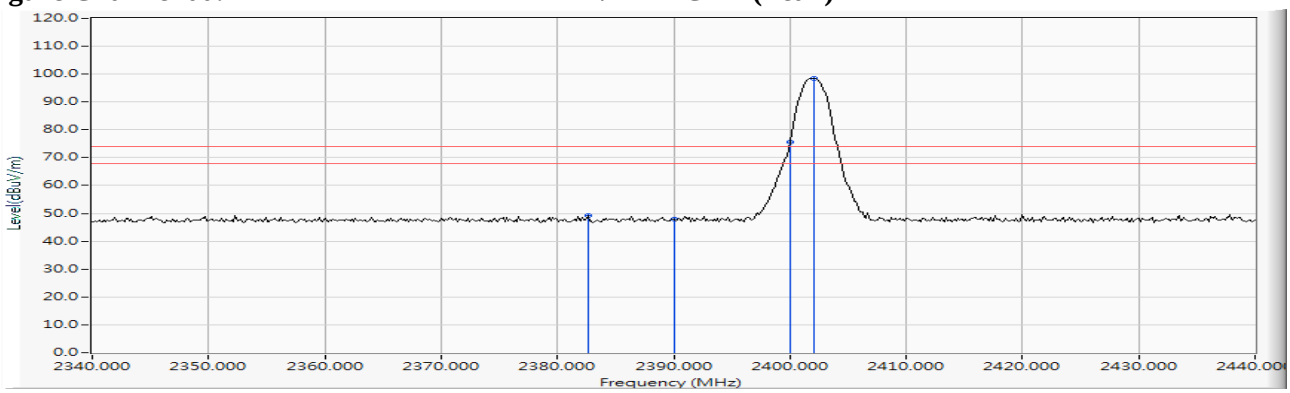
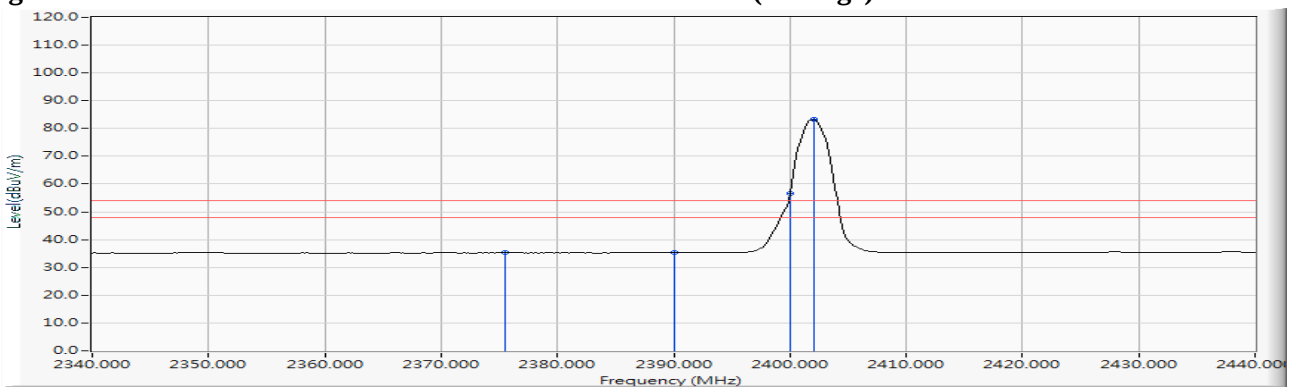


Figure Channel 00: VERTICAL (Average)



Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correction Factor.
6. The average measurement was not performed when the peak measured data is under the limit of average detection.

Product : Bluetooth Speaker
Test Item : Band Edge
Test Mode : Mode 2: Transmit - 3Mbps (2480MHz)
Test Date : 2017/03/30

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Arerage Limit (dBμV/m)	Result
78 (Peak)	2480.022	11.791	92.496	104.287	--	--	Pass
78 (Peak)	2483.500	11.800	49.173	60.973	74.00	54.00	Pass
78 (Average)	2480.022	11.791	76.047	87.838	--	--	Pass
78 (Average)	2483.500	11.800	29.019	40.819	74.00	54.00	Pass

Figure Channel 00: Horizontal (Peak)

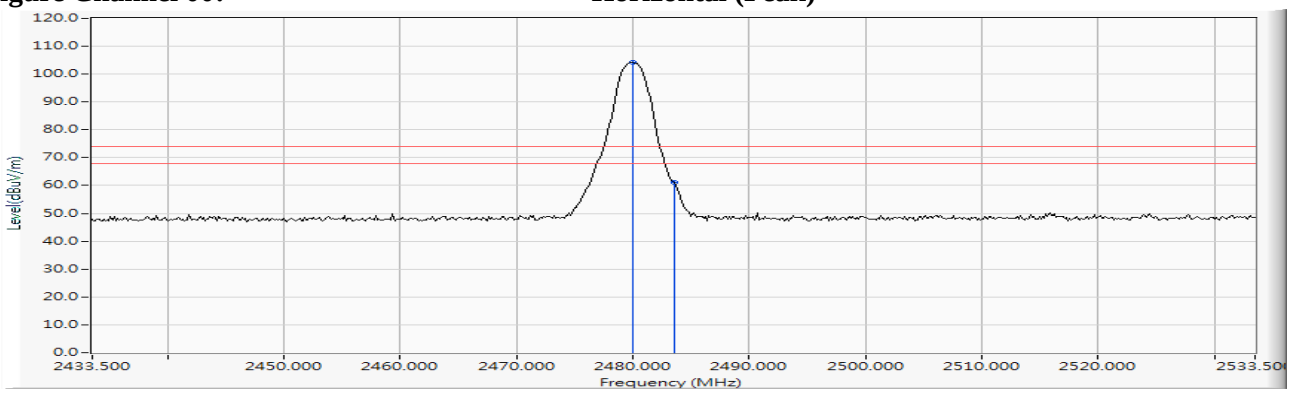
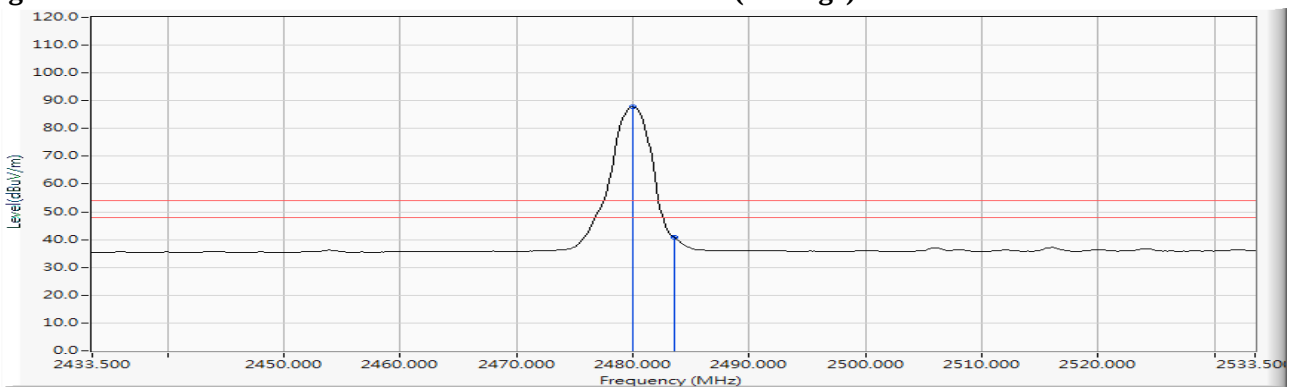


Figure Channel 00: Horizontal (Average)



Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correction Factor.
6. The average measurement was not performed when the peak measured data is under the limit of average detection.

Product : Bluetooth Speaker
Test Item : Band Edge
Test Mode : Mode 2: Transmit - 3Mbps (2480MHz)
Test Date : 2017/03/30

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Arerage Limit (dBμV/m)	Result
78 (Peak)	2480.022	11.791	86.490	98.281	--	--	Pass
78 (Peak)	2483.500	11.800	43.582	55.382	74.00	54.00	Pass
78 (Average)	2479.877	11.791	71.227	83.018	--	--	Pass
78 (Average)	2483.500	11.800	26.288	38.088	74.00	54.00	Pass

Figure Channel 78: VERTICAL (Peak)

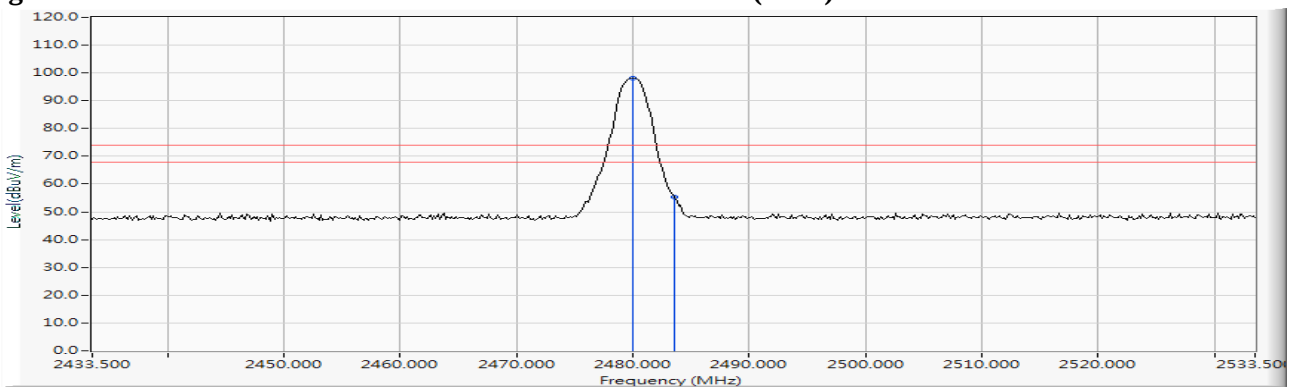
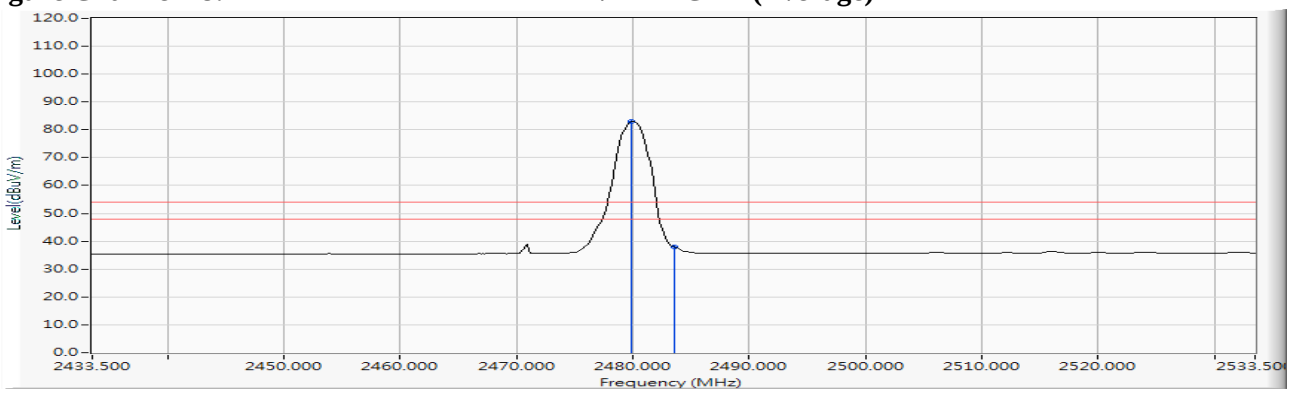


Figure Channel 78: VERTICAL (Average)



Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correction Factor.
6. The average measurement was not performed when the peak measured data is under the limit of average detection.

Product : Bluetooth Speaker
Test Item : Band Edge
Test Mode : Mode 1: Transmit - 1Mbps(Hopping off)
Test Date : 2017/04/06

Measurement Level Δ (dB)	Result
> 20	PASS

Figure Channel 00:

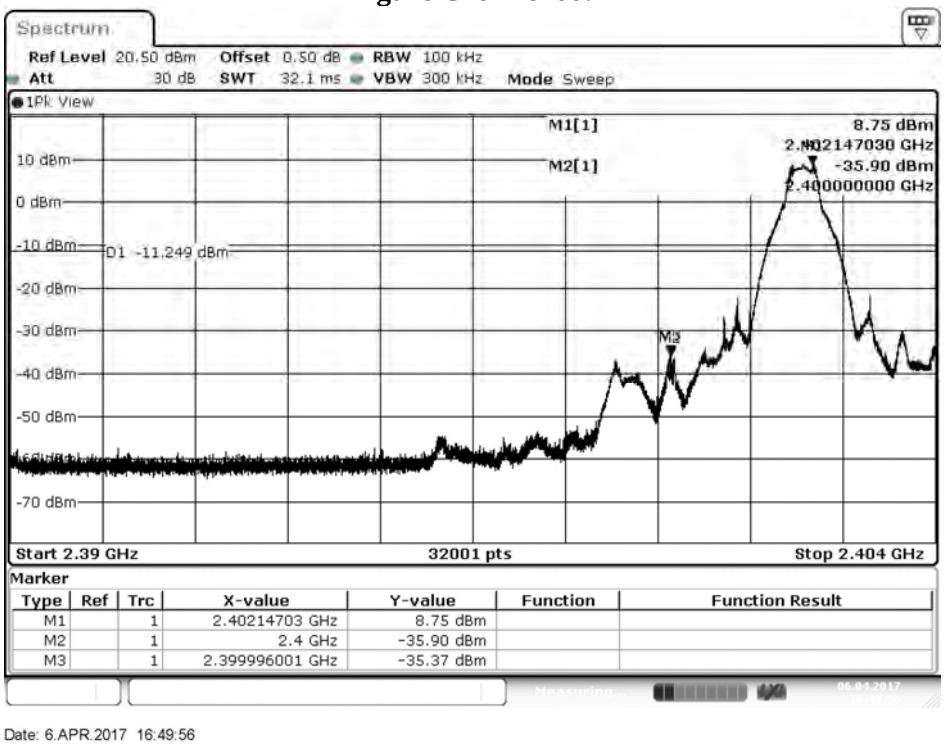
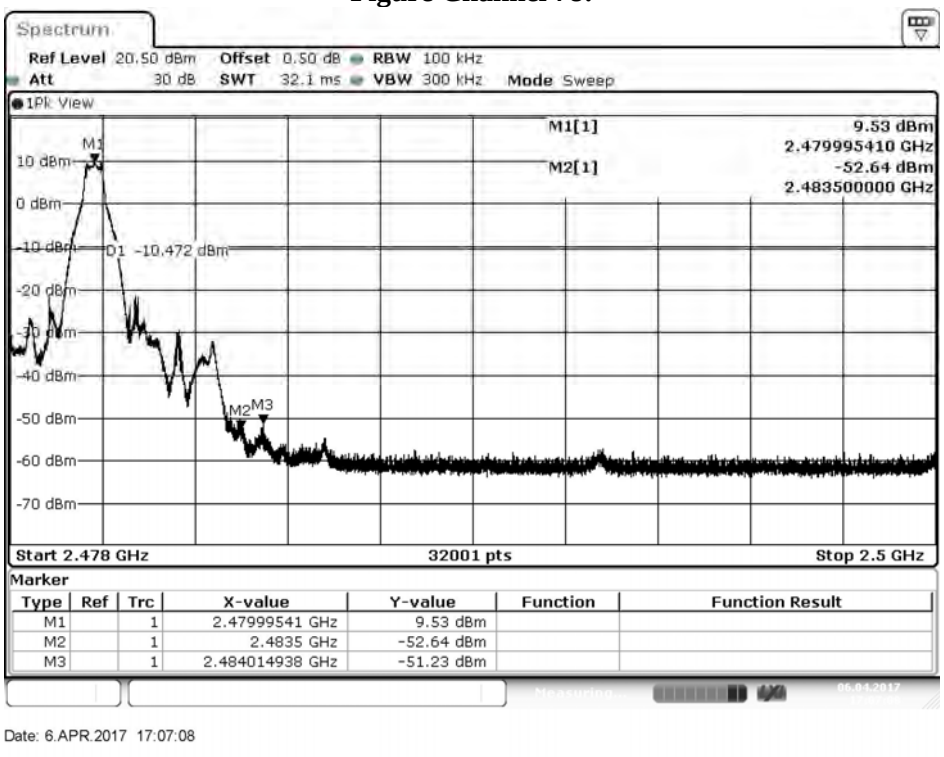


Figure Channel 78:



Product : Bluetooth Speaker
Test Item : Band Edge
Test Mode : Mode 2: Transmit - 3Mbps (Hopping off)
Test Date : 2017/04/06

Measurement Level Δ (dB)	Result
> 20	PASS

Figure Channel 00:

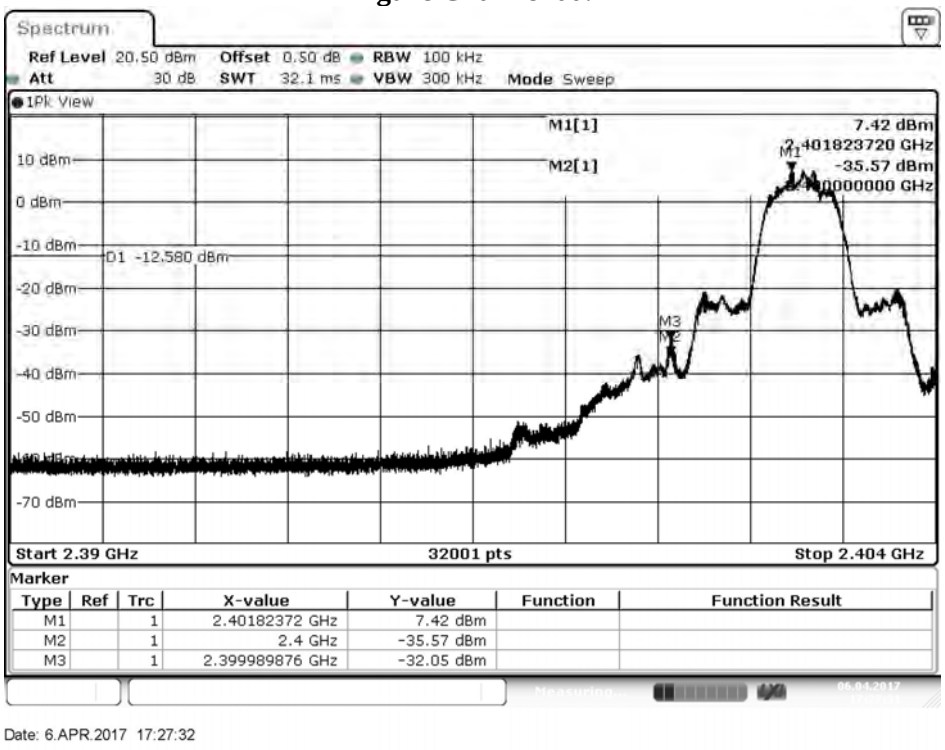
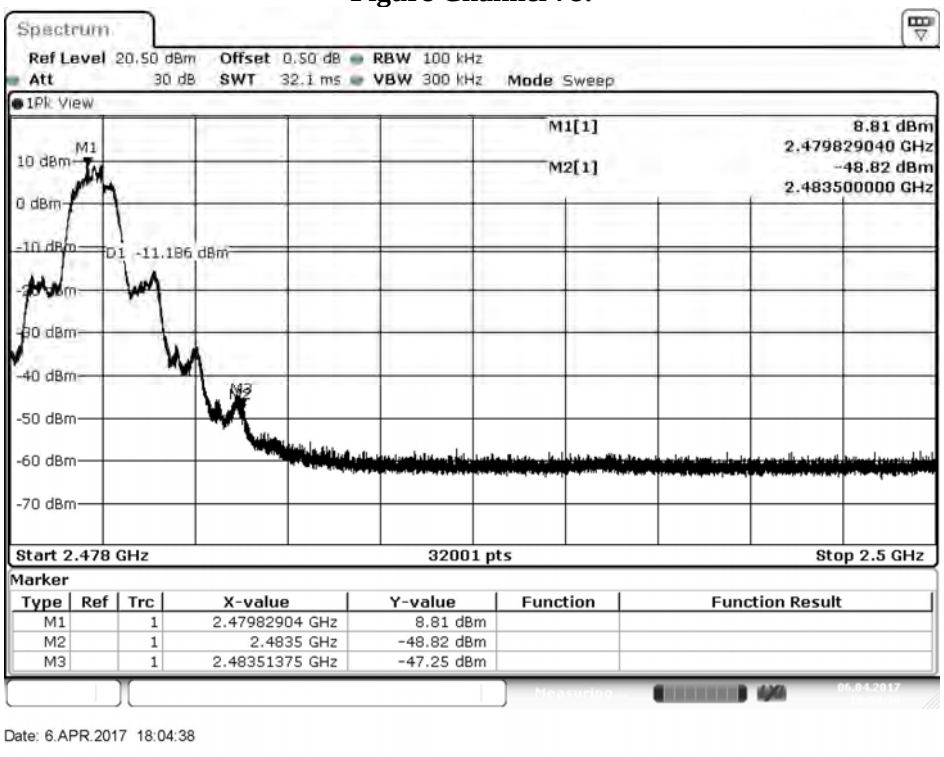


Figure Channel 78:



Product : Bluetooth Speaker
Test Item : Band Edge
Test Mode : Mode 1: Transmit - 1Mbps(Hopping on)
Test Date : 2017/04/06

Measurement Level Δ (dB)	Result
> 20	PASS

Figure Channel Hopping:

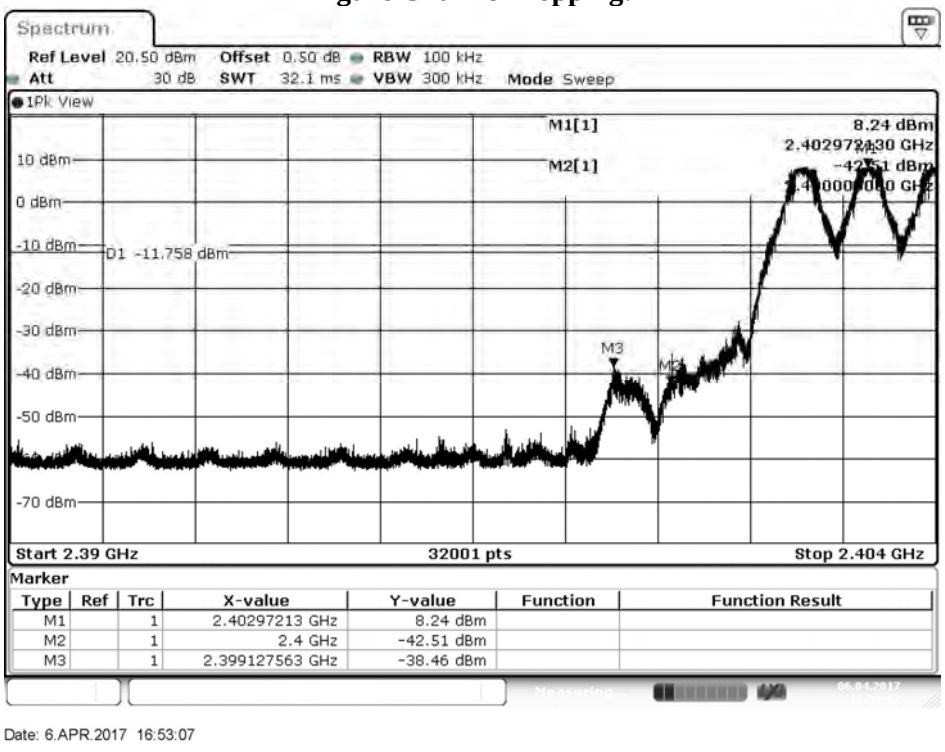
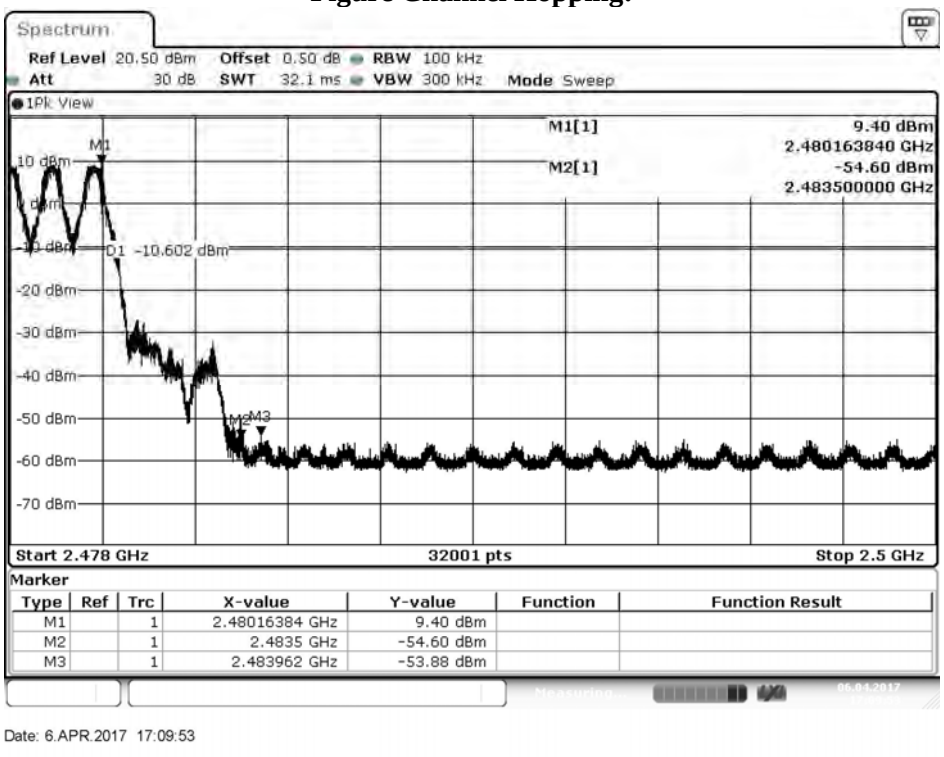


Figure Channel Hopping:



Product : Bluetooth Speaker
Test Item : Band Edge
Test Mode : Mode 2: Transmit - 3Mbps (Hopping on)
Test Date : 2017/04/06

Measurement Level Δ (dB)	Result
> 20	PASS

Figure Channel Hopping:

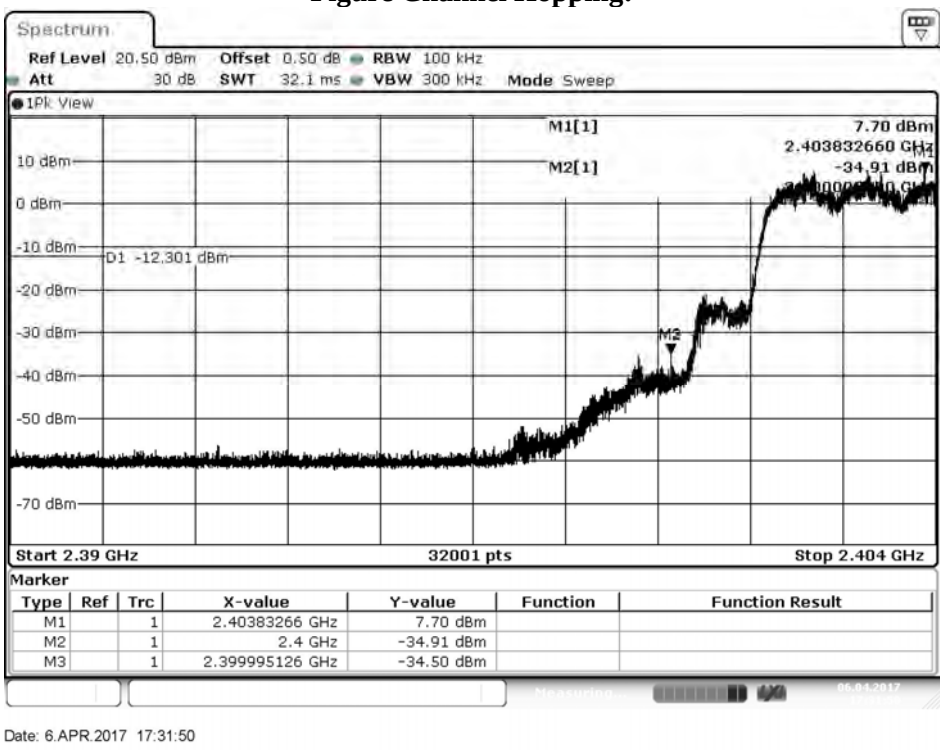
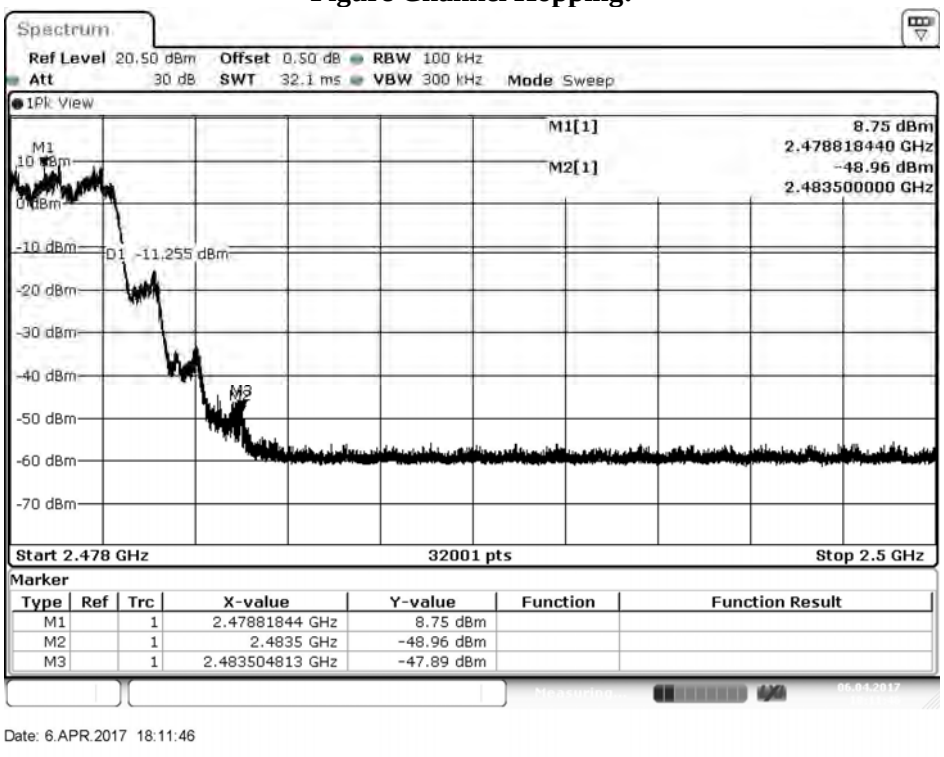
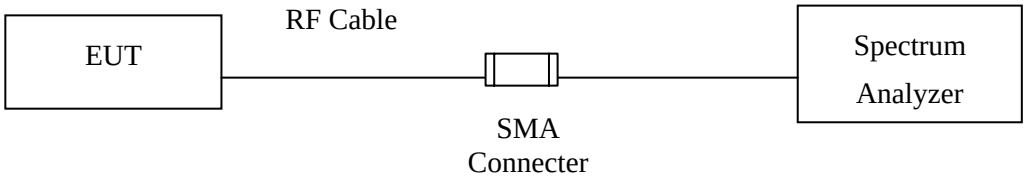


Figure Channel Hopping:



7. Channel Number

7.1. Test Setup



7.2. Limit

Frequency hopping systems operating in the 2400-2483.5 MHz bands shall use at least 75 hopping frequencies.

7.3. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

7.4. Uncertainty

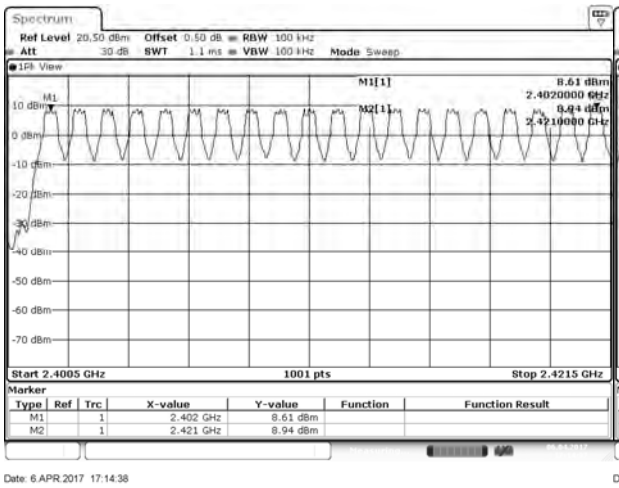
N/A

7.5. Test Result of Channel Number

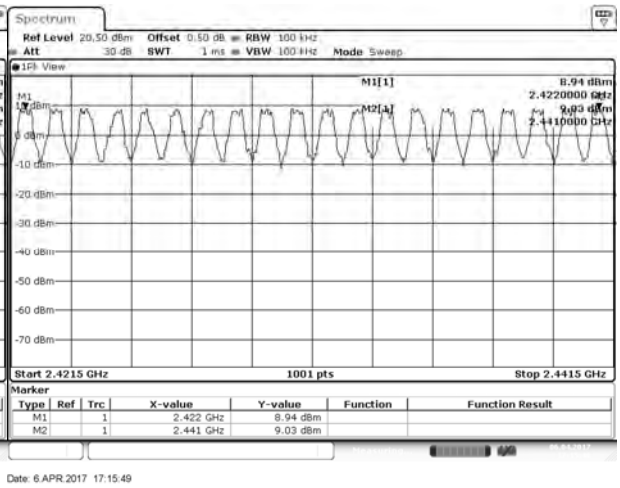
Product : Bluetooth Speaker
Test Item : Channel Number
Test Mode : Mode 1: Transmit - 1Mbps
Test Date : 2017/04/06

Frequency Range (MHz)	Measurement (Hopping Channel)	Required Limit (Hopping Channel)	Result
2402 ~ 2480	79	>75	Pass

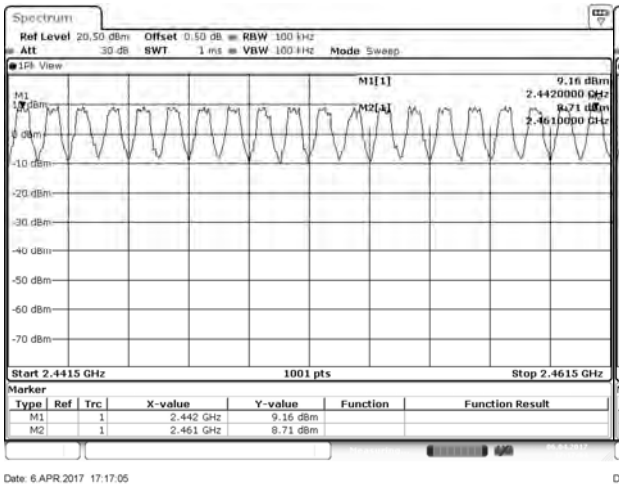
2402-2421MHz



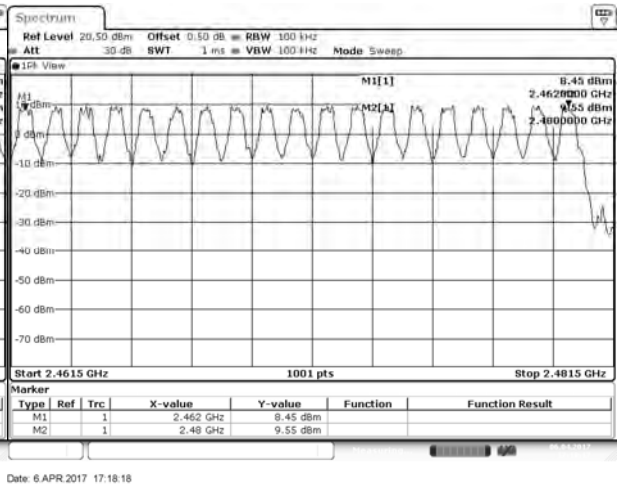
2422-2441MHz



2442-2461MHz



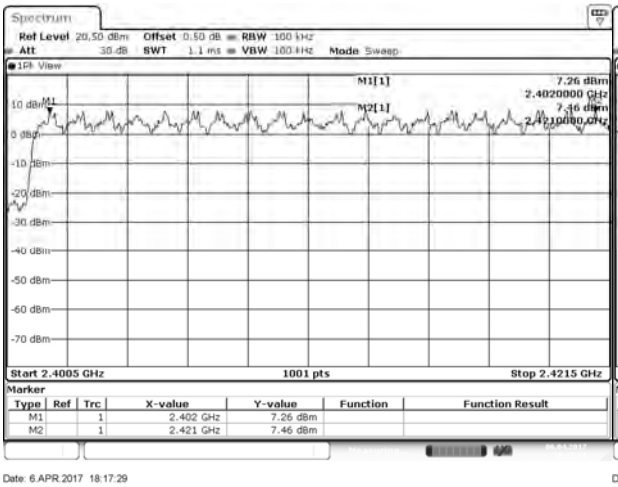
2462-2480MHz



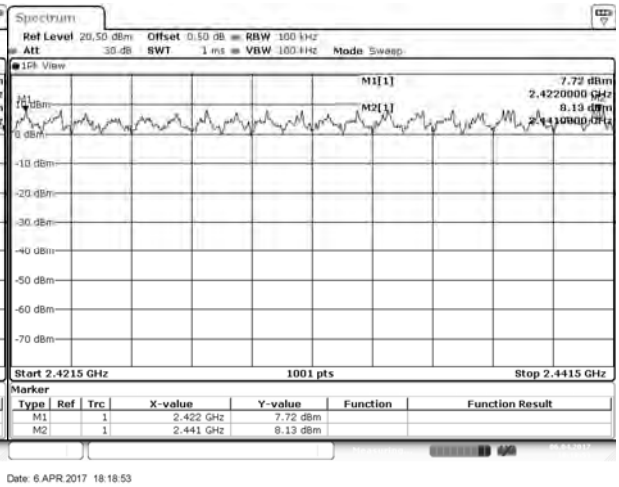
Product : Bluetooth Speaker
Test Item : Channel Number
Test Mode : Mode 2: Transmit - 3Mbps
Test Date : 2017/04/06

Frequency Range (MHz)	Measurement (Hopping Channel)	Required Limit (Hopping Channel)	Result
2402 ~ 2480	79	>75	Pass

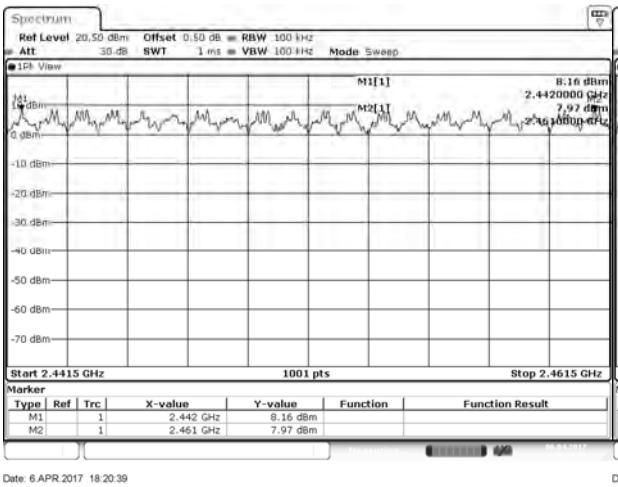
2402-2421MHz



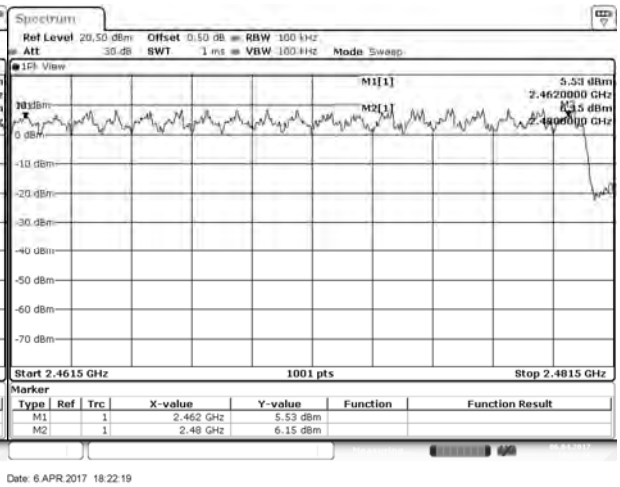
2422-2441MHz



2442-2461MHz

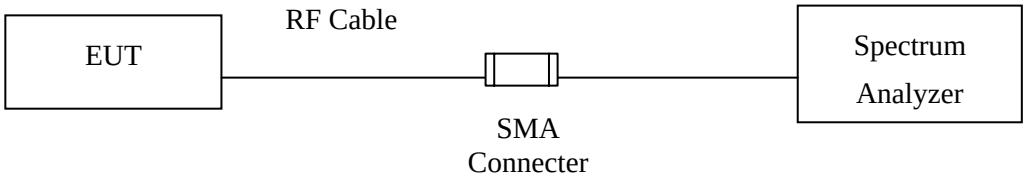


2462-2480MHz



8. Channel Separation

8.1. Test Setup



8.2. 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.

8.3. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

8.4. Uncertainty

±279.2Hz

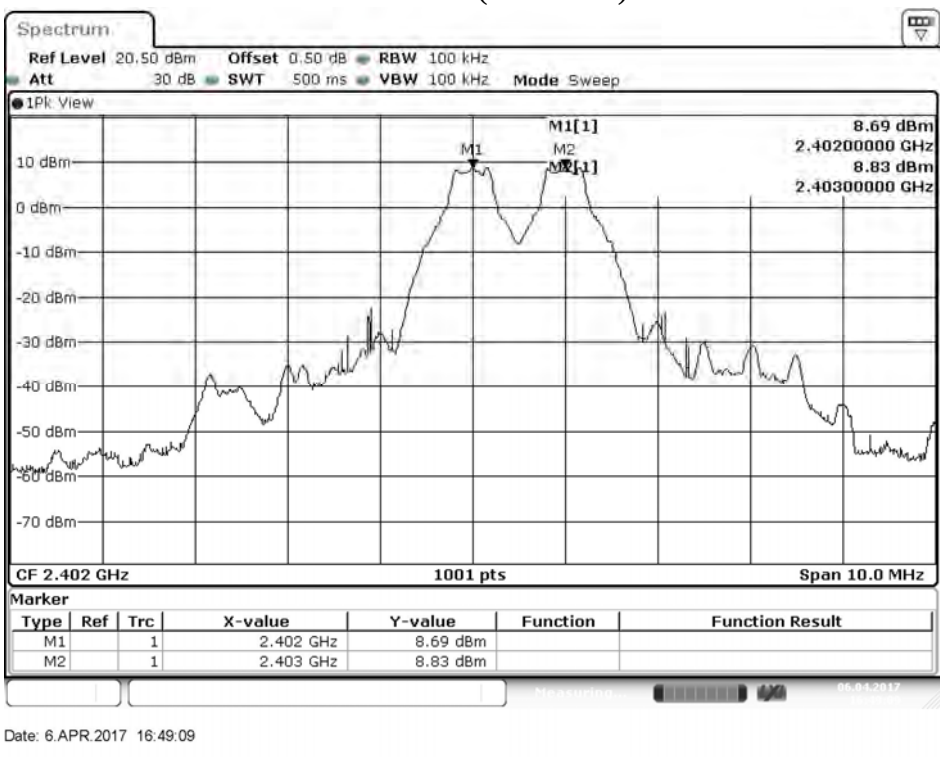
8.5. Test Result of Channel Separation

Product : Bluetooth Speaker
Test Item : Channel Separation
Test Mode : Mode 1: Transmit - 1Mbps
Test Date : 2017/04/06

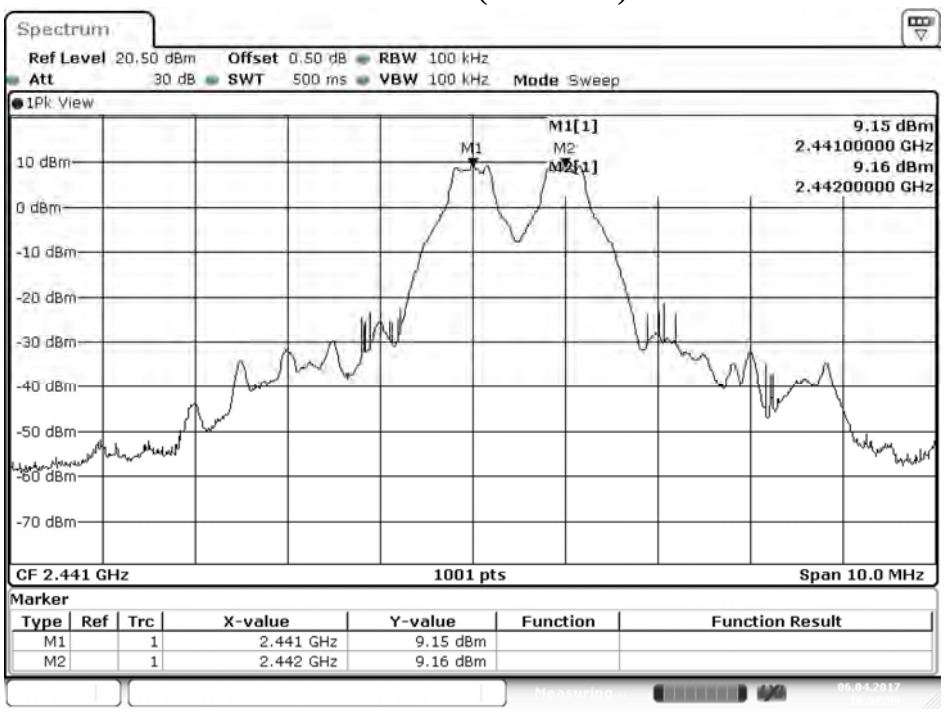
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Limit (kHz)	Limit of (2/3)*20dB Bandwidth (kHz)	Result
00	2402	1000	>25 kHz	632.0	Pass
39	2441	1000	>25 kHz	632.0	Pass
78	2480	1000	>25 kHz	630.0	Pass

NOTE: The 20dB Bandwidth is refer to section 10.

Channel 00 (2402MHz)

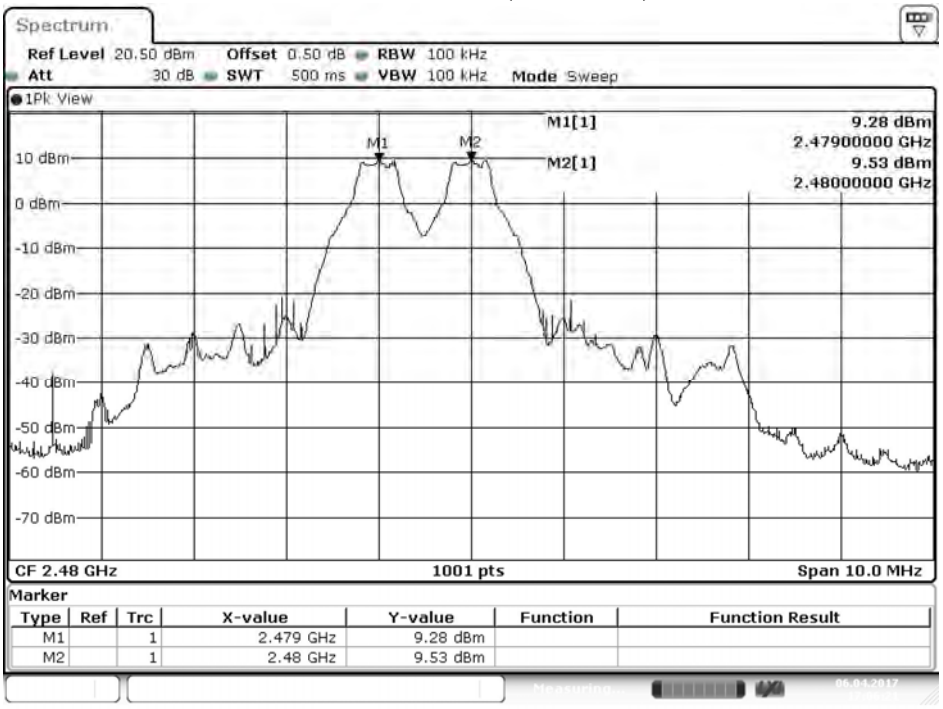


Channel 39 (2441MHz)



Date: 6.APR.2017 16:59:08

Channel 78 (2480MHz)



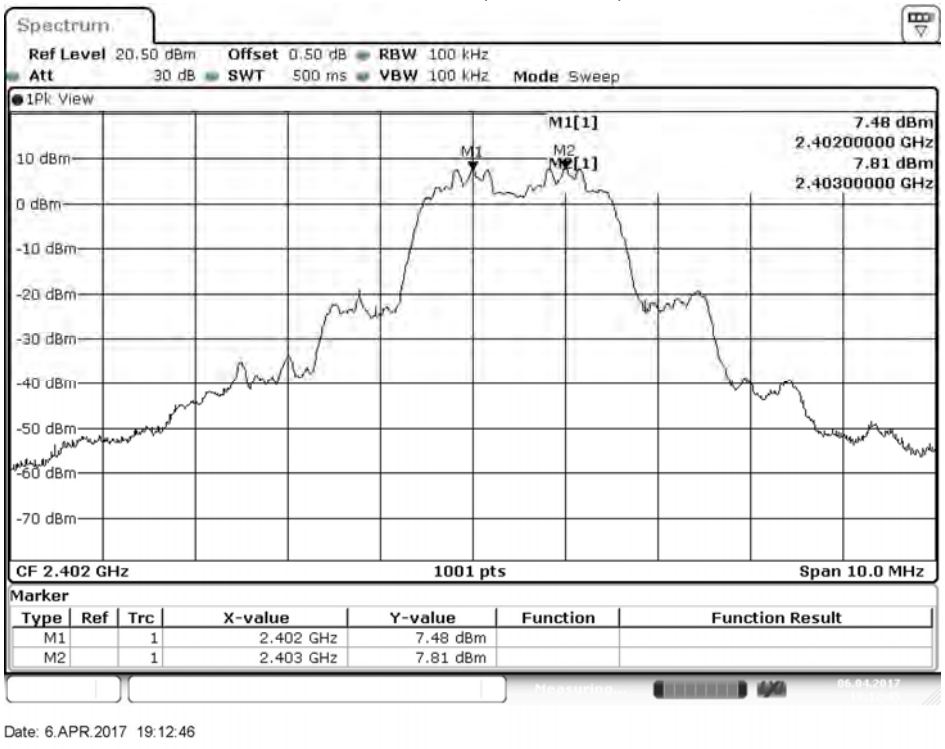
Date: 6.APR.2017 17:06:21

Product : Bluetooth Speaker
Test Item : Channel Separation
Test Mode : Mode 2: Transmit - 3Mbps
Test Date : 2017/04/06

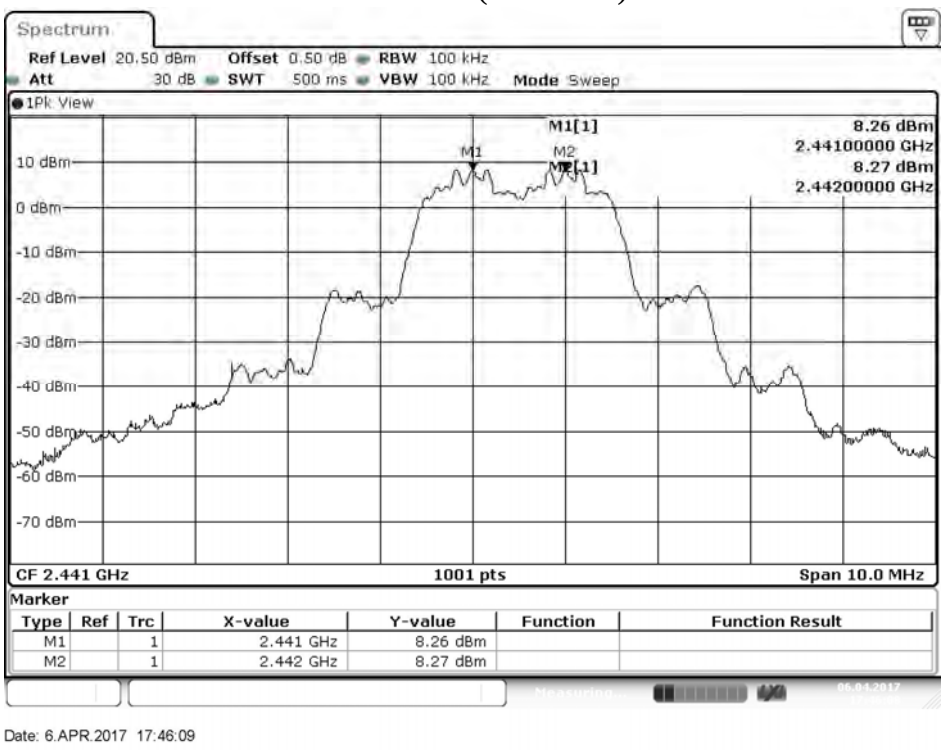
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Limit (kHz)	Limit of (2/3)*20dB Bandwidth (kHz)	Result
00	2402	1000	>25 kHz	844.0	Pass
39	2441	1000	>25 kHz	854.0	Pass
78	2480	1000	>25 kHz	850.0	Pass

NOTE: The 20dB Bandwidth is refer to section 10.

Channel 00 (2402MHz)

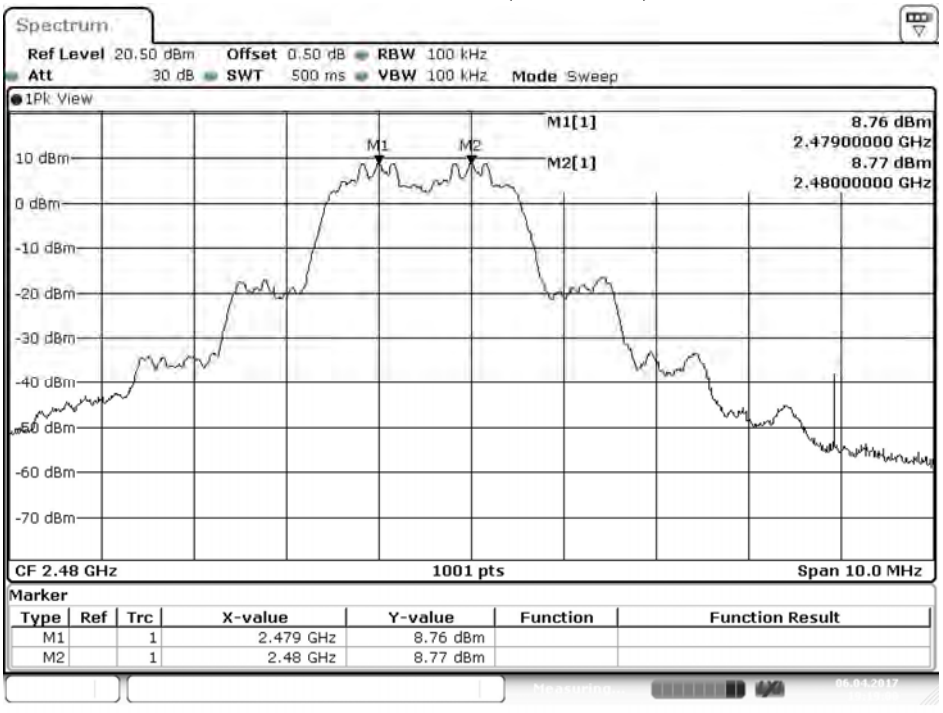


Channel 39 (2441MHz)



Date: 6.APR.2017 17:46:09

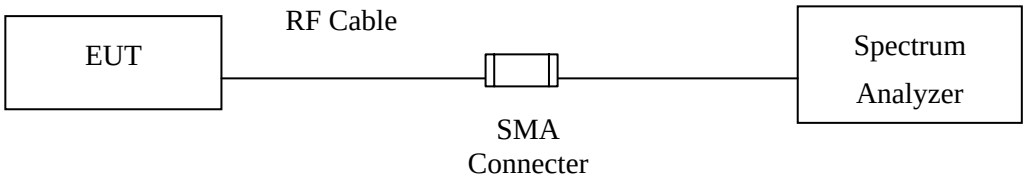
Channel 78 (2480MHz)



Date: 6.APR.2017 19:19:01

9. Dwell Time

9.1. Test Setup



9.2. Limit

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.

9.3. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

9.4. Uncertainty

±2.31msec

9.5. Test Result of Dwell Time

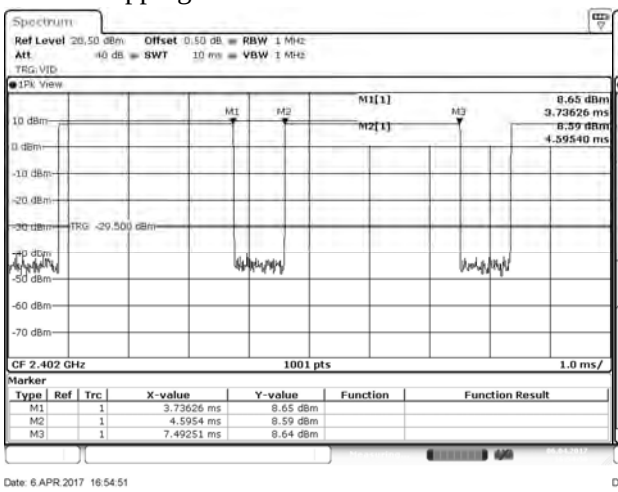
Product : Bluetooth Speaker
Test Item : Dwell Time
Test Mode : Mode 1: Transmit - 1Mbps (Channel 00,39,78)
Test Date : 2017/04/06

Frequency (MHz)	Time slot length (ms)	Hopping of Number	Sweep time (ms)	Duty cycle	Dwell Time (Sec)	Limit (Sec)	Result
2402	2.897	13	50	0.75	0.301	0.4	Pass
2441	2.897	13	50	0.75	0.301	0.4	Pass
2480	2.907	13	50	0.76	0.302	0.4	Pass

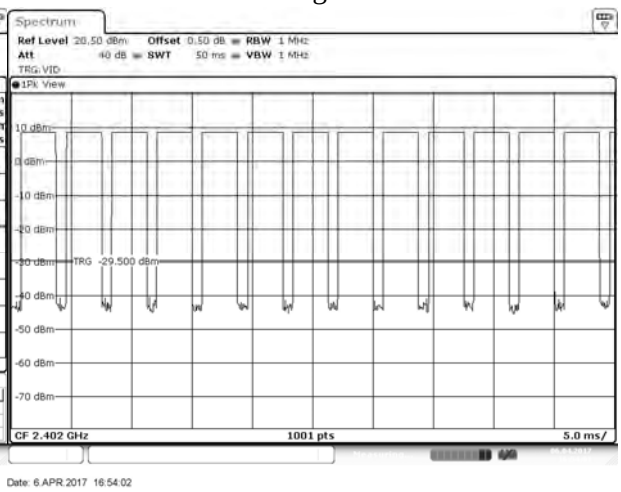
Duty cycle = ((Time slot length(ms)*Hopping of Number) / Sweep time (ms)

Dwell time = (Duty cycle /79) * (79*0.4)

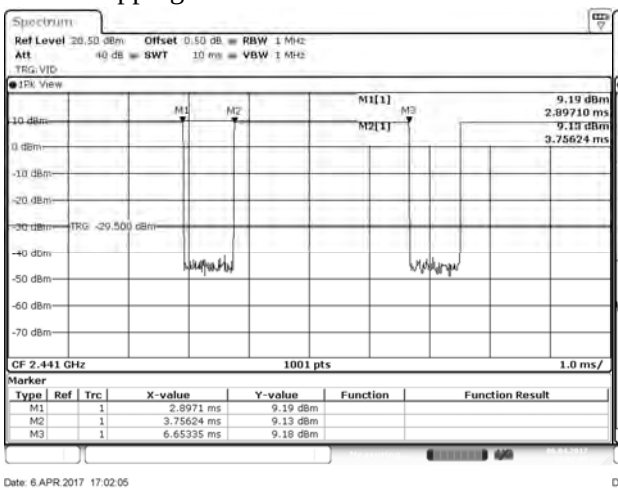
CH 00 Hopping of Number



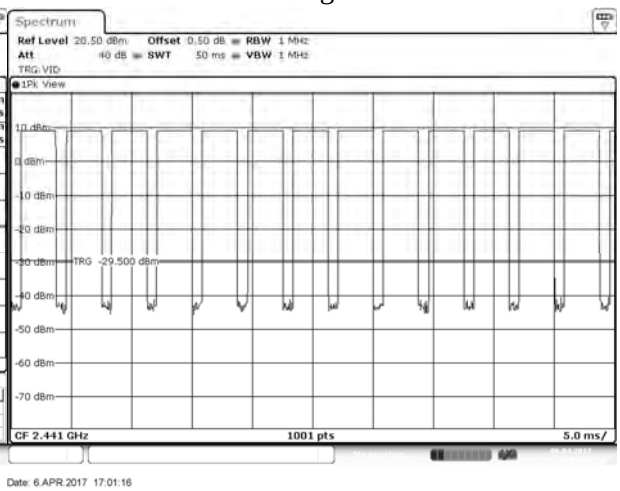
CH 00 Time slot length



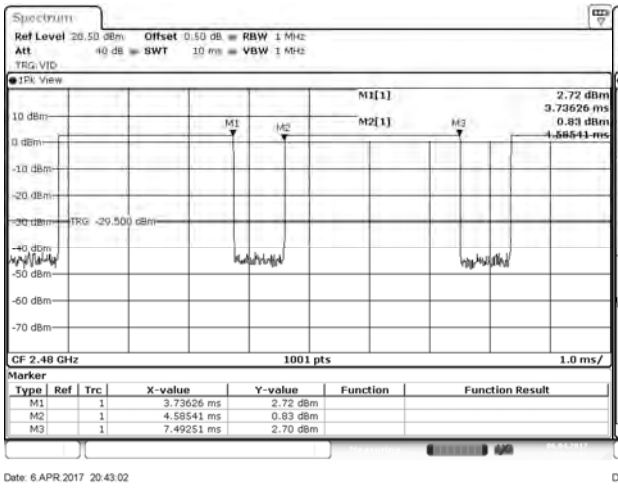
CH39 Hopping of Number



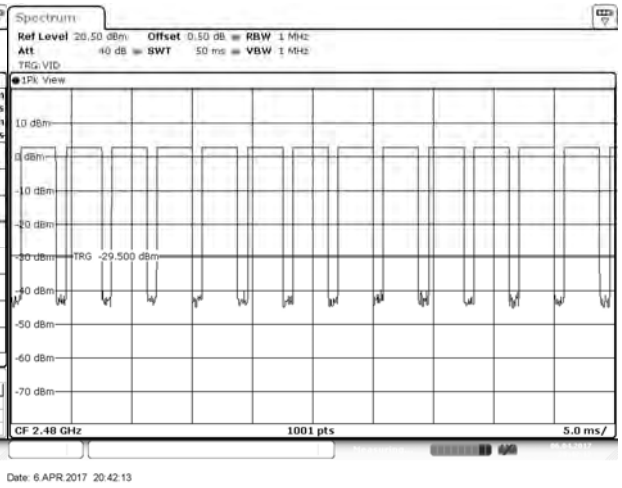
CH 39 Time slot length



CH 78 Hopping of Number



CH 78 Time slot length



Note:

The dwell times of the packet type of DH1, DH3, and DH5 are tested. Only the worst case is shown on the report.

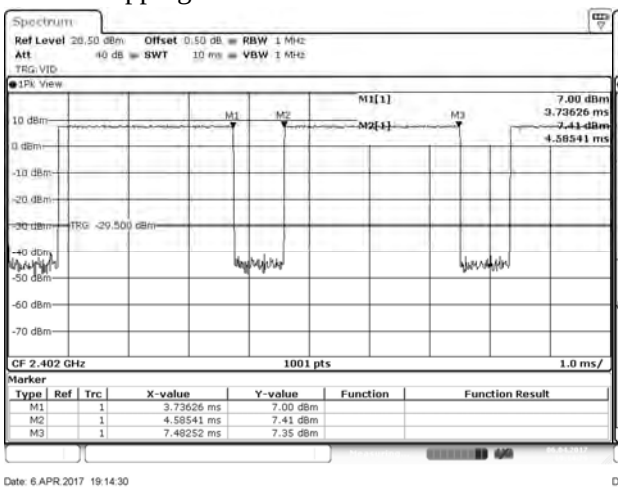
Product : Bluetooth Speaker
Test Item : Dwell Time
Test Mode : Mode 2: Transmit - 3Mbps (Channel 00,39,78)
Test Date : 2017/04/06

Frequency (MHz)	Time slot length (ms)	Hopping of Number	Sweep time (ms)	Duty cycle	Dwell Time (Sec)	Limit (Sec)	Result
2402	2.897	13	50	0.75	0.301	0.4	Pass
2441	2.907	13	50	0.76	0.302	0.4	Pass
2480	2.907	13	50	0.76	0.302	0.4	Pass

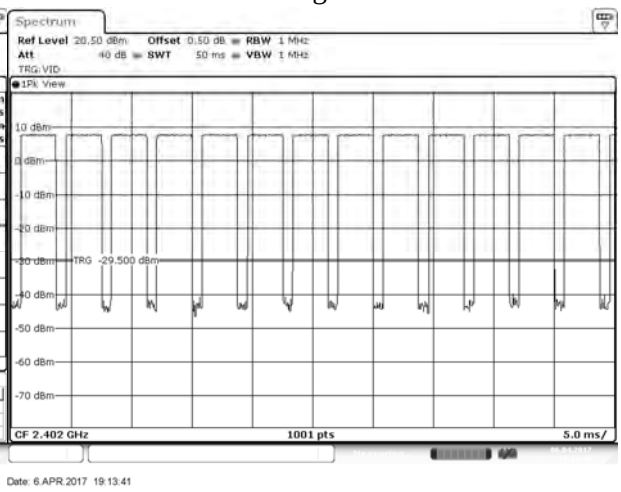
Duty cycle =((Time slot length(ms)*Hopping of Number) / Sweep time (ms)

Dwell time = (Duty cycle /79) * (79*0.4)

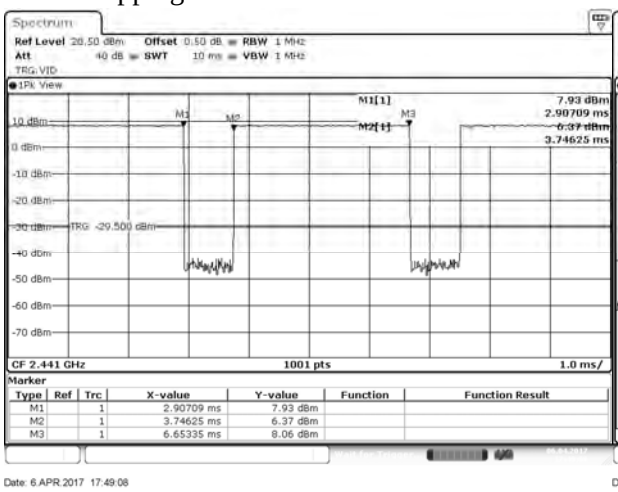
CH 00 Hopping of Number



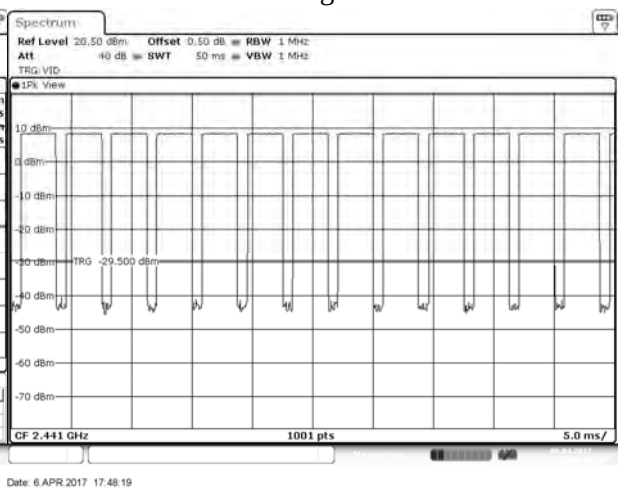
CH 00 Time slot length



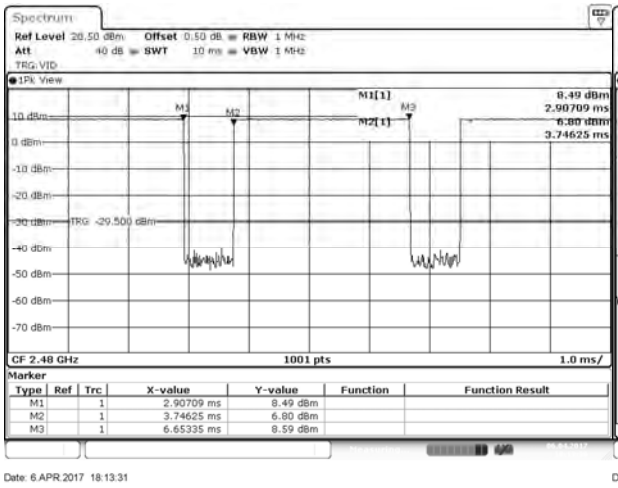
CH39 Hopping of Number



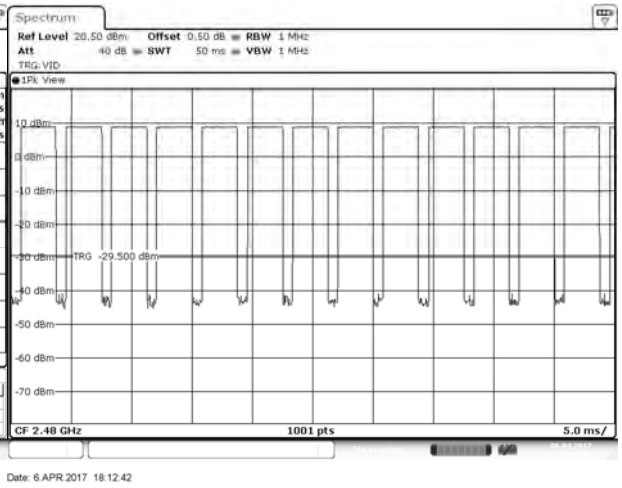
CH 39 Time slot length



CH 78 Hopping of Number



CH 78 Time slot length

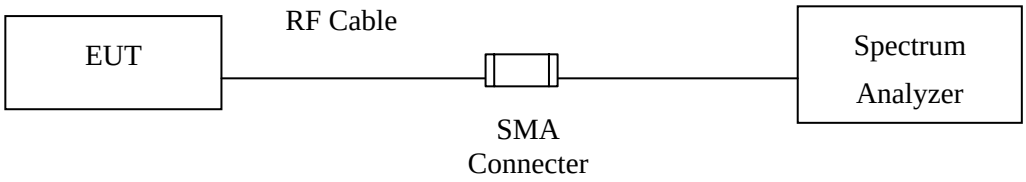


Note:

The dwell times of the packet type of DH1, DH3, and DH5 are tested. Only the worst case is shown on the report.

10. Occupied Bandwidth

10.1. Test Setup



10.2. Limits

N/A

10.3. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

10.4. Uncertainty

±279.2Hz

10.5. Test Result of Occupied Bandwidth

Product : Bluetooth Speaker
Test Item : Occupied Bandwidth Data
Test Mode : Mode 1: Transmit - 1Mbps
Test Date : 2017/04/06

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	948	--	NA
39	2441	948	--	NA
78	2480	945	--	NA

Figure Channel 00:

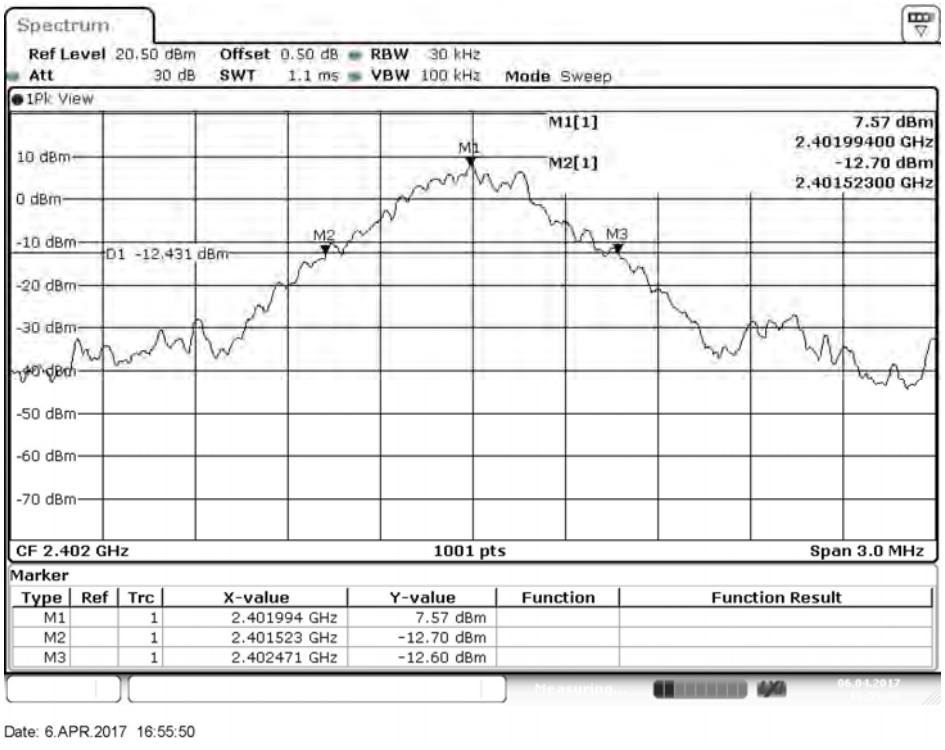
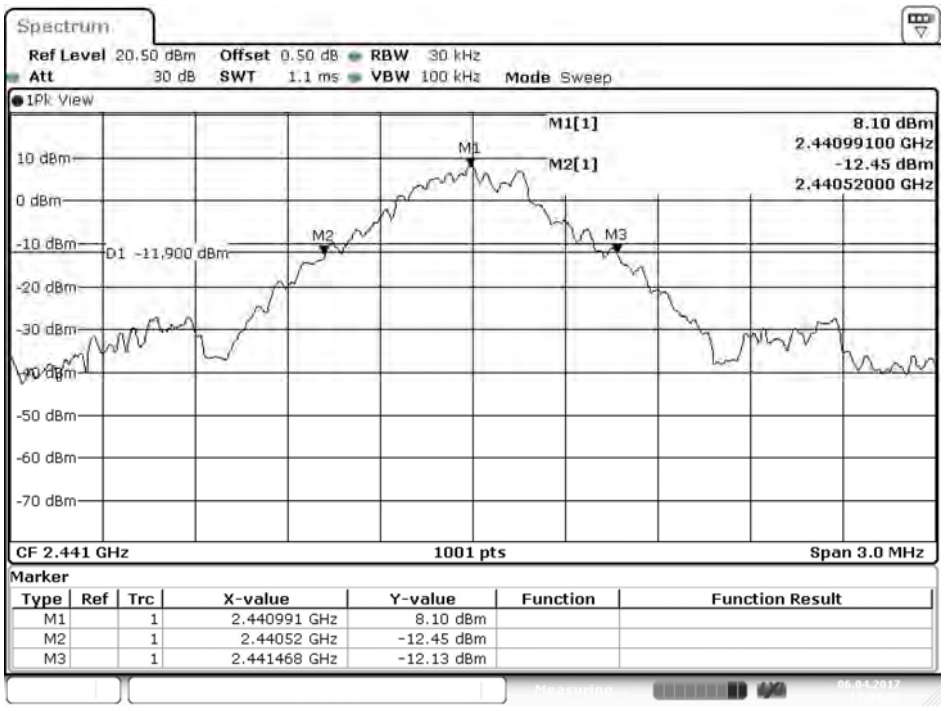
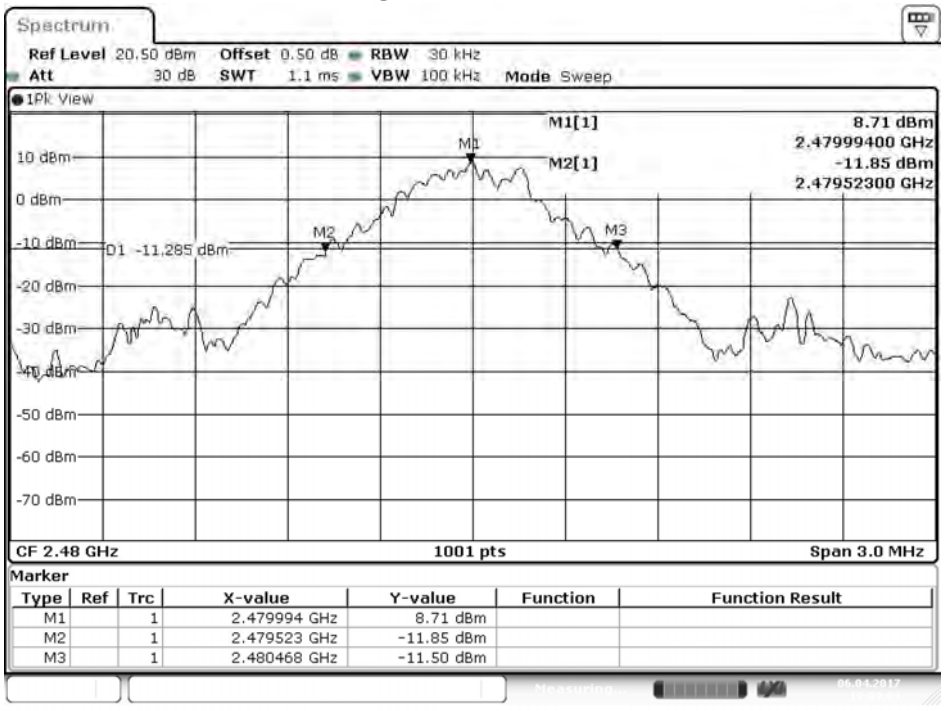


Figure Channel 39:



Date: 6.APR.2017 17:03:05

Figure Channel 78:



Date: 6.APR.2017 19:09:04

Product : Bluetooth Speaker
Test Item : Occupied Bandwidth Data
Test Mode : Mode 2: Transmit - 3Mbps (2402MHz)
Test Date : 2017/04/06

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	1266	--	NA
39	2441	1281	--	NA
78	2480	1275	--	NA

Figure Channel 00:

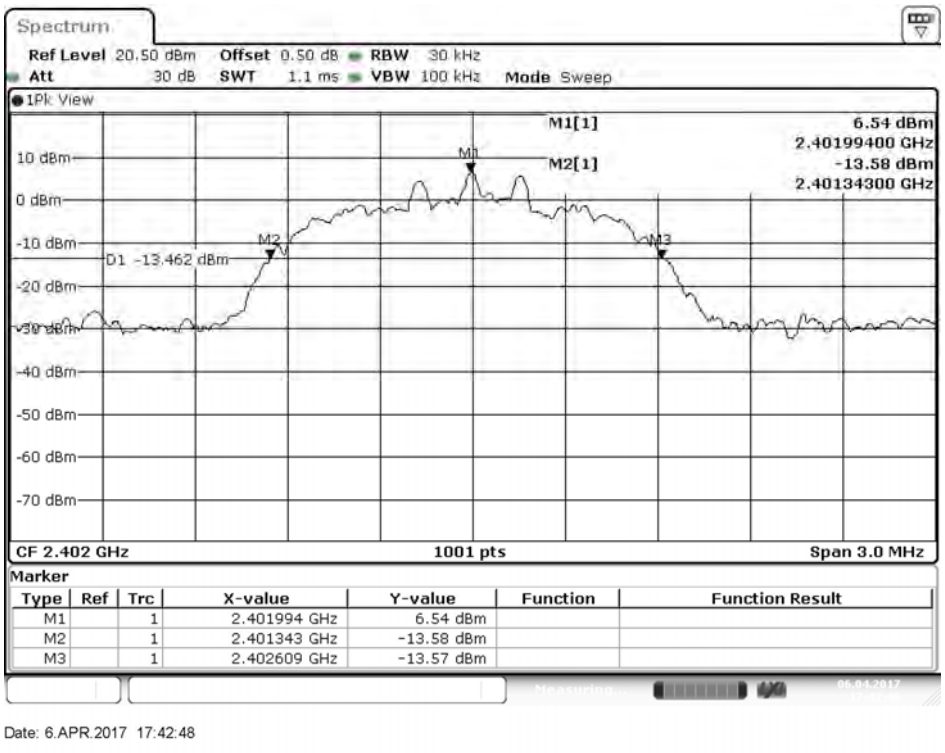
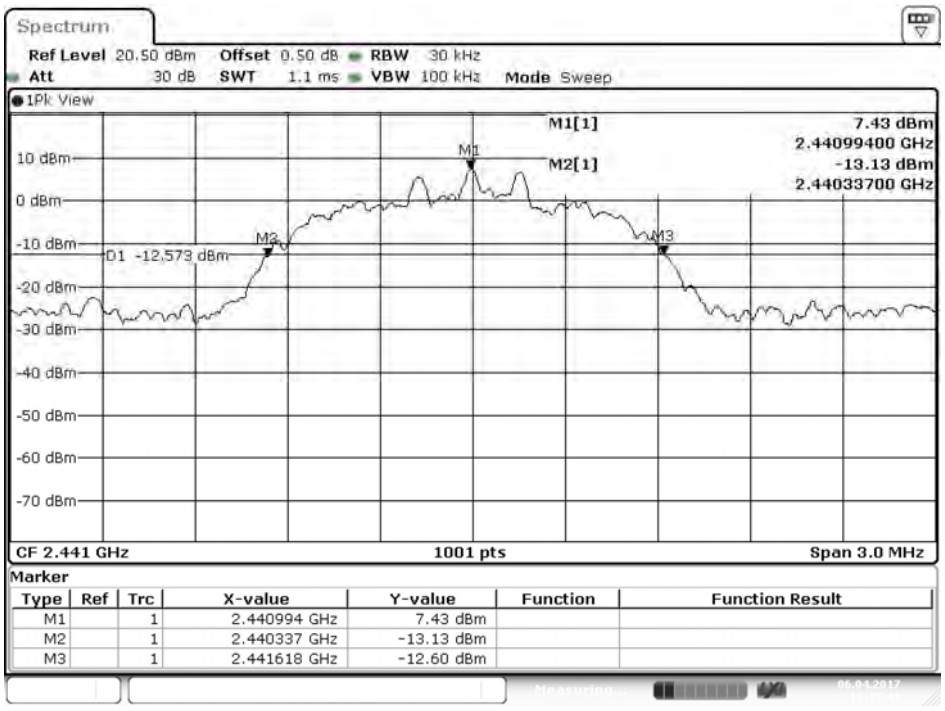
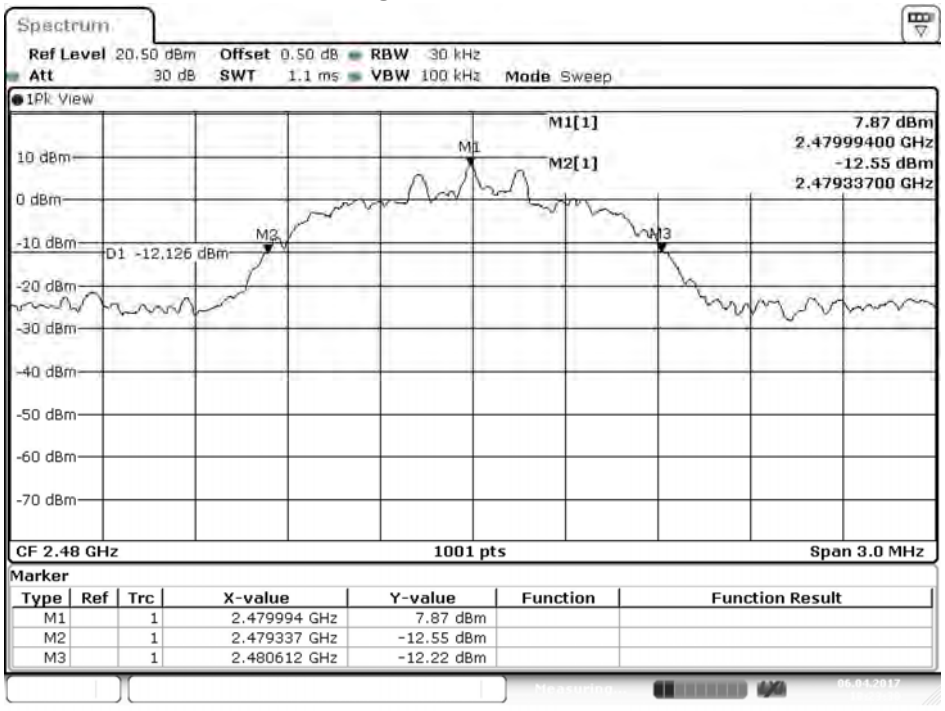


Figure Channel 39:



Date: 6.APR.2017 19:15:42

Figure Channel 78:



Date: 6.APR.2017 18:23:31

11. EMI Reduction Method During Compliance Testing

No modification was made during testing.