FCC Test Report

Product Name	zoomBox
Model No.	ZB-DM-001
FCC ID.	2AJ4QZBP802C1G04GC0

Applicant	DIGIT MOBILE INC.
Address	5F, No. 550, Ruei Guang Rd., Nei Hu Dist., Taipei City 114, Taiwan

Date of Receipt	Oct. 13, 2016
Issued Date	Nov. 04, 2016
Report No.	16A0226R-RFUSP01V00-A
Report Version	V1.0

Testing Laboratory
3023

Test Report

Issued Date: Nov. 04, 2016
Report No.: 16A0226R-RFUSP01V00-A

Product Name	zoomBox
Applicant	DIGIT MOBILE INC.
Address	5F, No. 550, Ruei Guang Rd., Nei Hu Dist., Taipei City 114, Taiwan
Manufacturer	ZINWELL CORPORATION
Model No.	ZB-DM-001
FCC ID.	2AJ4QZBP802C1G04GC0
EUT Rated Voltage	DC 5V, 2A
EUT Test Voltage	AC 120V/60Hz
Trade Name	zoomBox
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2015 ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By : Anita Chou

(Senior Engineering Adm. Specialist / Anita Chou)

Tested By : Tom chiu

(Engineer / Tom Chiu)

Approved By :

(Director / Vincent Lin)

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	zoomBox
Trade Name	zoomBox
Model No.	ZB-DM-001
FCC ID.	2AJ4QZBP802C1G04GC0
Frequency Range	2402-2480MHz
Channel Number	79
Type of Modulation	FHSS: GFSK(1Mbps) / π /4DQPSK(2Mbps) / 8DPSK(3Mbps)
Antenna Type	PIFA Antenna
Channel Control	Auto
Antenna Gain	Refer to the table “Antenna List”
HDMI Cable	Non-shielded, 1.5m
Bluetooth Speaker	Trade :Jabra Model :PHS002W (FCC ID:BCE-PHS002W)
Power Adapter	MFR: APD, M/N: WE-10E05FU Input: AC 100-240V ~ 50-60Hz Output: DC 5V, 2A
Contain Module	AMPAK/AP6212

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	zoomBox	I30	PIFA Antenna	3.1dBi for 2.4 GHz

Note: The antenna of EUT conforms to FCC 15.203.

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 zoomBox with a built-in WLAN、Bluetooth V3.0, V2.1+EDR,V4.0 transceiver, this report for Bluetooth V3.0, V2.1+EDR.
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.
5. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

Test Mode	Mode 1: Transmit - 1Mbps (GFSK) Mode 2: Transmit - 3Mbps (8DPSK)

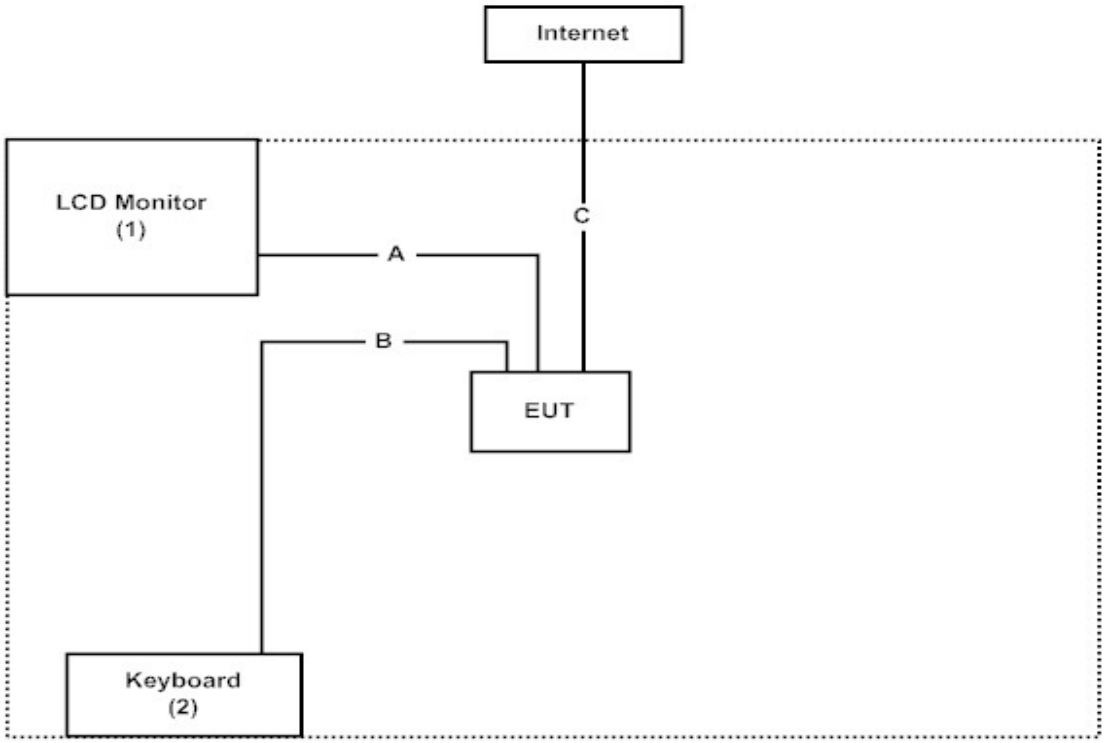
1.3. Tested System Details

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	LCD Monitor	ASUS	VS229HA	F4LMQS135395	Non-Shielded, 1.8m
2	Keyboard	DELL	SK-8115	MY-0DJ325-71619-6A3-1913	N/A

Signal Cable Type		Signal cable Description
A	HDMI Cable	Non-shielded, 1.5m
B	USB Cable	Shielded, 1.0m, with one ferrite core bonded.
C	LAN Cable	Non-shielded, 2.5m

1.4. Configuration of Tested System



1.5. EUT Exercise Software

1. Setup the EUT as shown in Section 1.4.
2. Execute software “RF TestTool V5.5” 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	30-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from QuieTek Corporation's Web Site: http://www.quietek.com/chinese/about/certificates.aspx?bval=5
The address and introduction of QuieTek Corporation's laboratories can be founded in our Web site: http://www.quietek.com/

Site Description: File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Registration Number: 92195

Site Name: Quietek Corporation
Site Address: No.5-22, Ruishukeng,
Linkou Dist. New Taipei City 24451,
Taiwan, R.O.C.
TEL: 886-2-8601-3788 / FAX : 886-2-8601-3789
E-Mail : service@quietek.com

FCC Accreditation Number: TW1014

1.7. List of Test Equipment

For Conducted measurements /CB3/SR8

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Spectrum Analyzer	Agilent	N9010A	MY48030495	2016/7/22	2017/7/21
X	Power Meter	Anritsu	ML2495A	6K00003357	2016/6/23	2017/6/22
X	EMI Test Receiver	R&S	ESCS 30	100369	2016/10/13	2017/10/12
X	LISN	R&S	ESH3-Z5	836679/017	2016/1/7	2017/1/6
X	LISN	R&S	ENV216	100097	2016/1/7	2017/1/6
X	Coaxial Cable	QTK(Arnist)	RG 400	LC018-RG	2016/6/25	2017/6/24

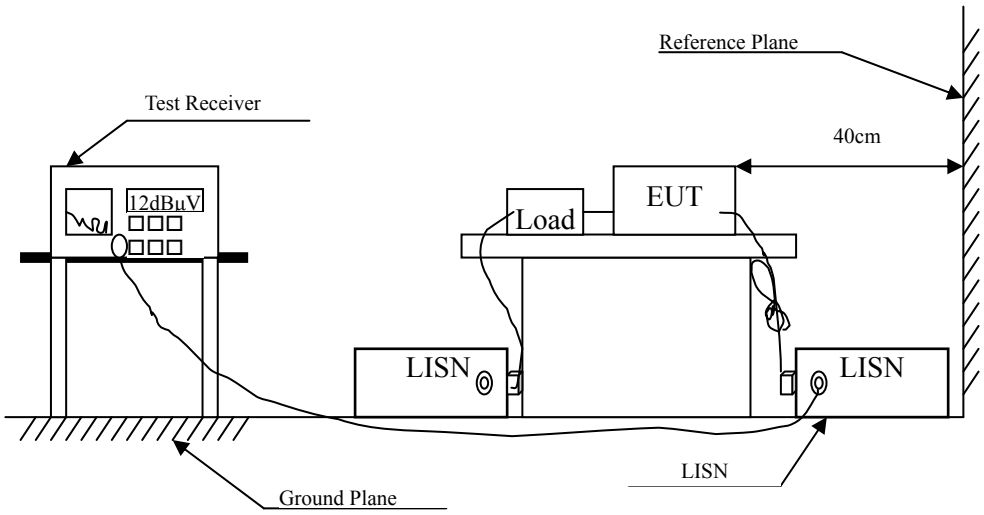
For Radiated measurements /Site3/CB8

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Spectrum Analyzer	R&S	FSP40	100170	2016/1/5	2017/1/4
X	Bi-Log Antenna	Schaffner Chase	CBL6112B	2707	2016/9/10	2017/9/9
X	Horn Antenna	ETS-Lindgren	3117	00135205	2016/4/6	2017/4/5
	Horn Antenna	Schwarzbeck	BBHA9170	9170430	2016/1/11	2017/1/10
X	Pre-Amplifier	QTK	AP/0100A	CHM/0901069	2016/6/28	2017/6/27
X	Pre-Amplifier	EMCI	EMC012630SE	980210	2016/1/27	2017/1/26
	Pre-Amplifier	NARDA WE	DBL-1840N506	013	2016/9/30	2017/9/29
X	Filter	MicroTRON	BRM50701	019	2016/10/20	2017/10/19
	Filter	Microwave Circuits	N0257881	36681	2015/12/7	2016/12/6
X	EMI Test Receiver	R&S	ESR26	101385	2016/9/29	2017/9/28
X	Coaxial Cable	QTK(Arnist)	SUCOFLEX 106	L1606-015C	2016/6/25	2017/6/24
X	EMI Test Receiver	R&S	ESCS 30	838251/001	2016/7/21	2017/7/20
X	Coaxial Cable	QTK(Arnist)	RG 214	LC003-RG	2016/6/21	2017/6/20
X	Coaxial signal switch	Anritsu	MP59B	6201415889	2016/6/16	2017/6/15

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

± 2.26 dB

2.5. Test Result of Conducted Emission

Product : zoomBox
Test Item : Conducted Emission Test
Power Line : Line 1
Test date : 2016/10/20
Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2441MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV	dB	dBµV
LINE 1					
Quasi-Peak					
0.196	9.676	20.690	30.366	-34.320	64.686
0.286	9.677	22.250	31.926	-30.188	62.114
1.356	9.713	12.910	22.623	-33.377	56.000
4.306	9.779	10.620	20.399	-35.601	56.000
5.726	9.808	11.690	21.498	-38.502	60.000
19.806	10.030	8.150	18.180	-41.820	60.000
Average					
0.196	9.676	11.070	20.746	-33.940	54.686
0.286	9.677	18.280	27.956	-24.158	52.114
1.356	9.713	8.200	17.913	-28.087	46.000
4.306	9.779	3.900	13.679	-32.321	46.000
5.726	9.808	5.280	15.088	-34.912	50.000
19.806	10.030	1.530	11.560	-38.440	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 : zoomBox
Test Item : Conducted Emission Test
Power Line : Line 2
Test date : 2016/10/20
Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2441MHz)

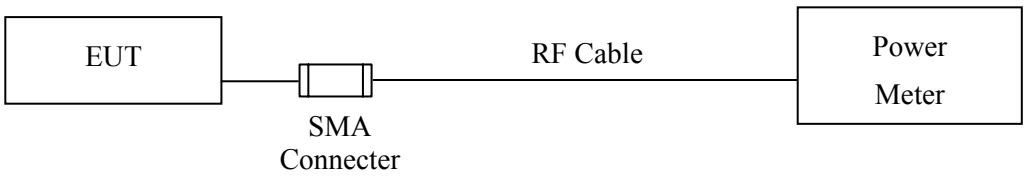
Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV	dB	dBµV
LINE 2					
Quasi-Peak					
0.167	9.735	23.880	33.615	-31.899	65.514
0.267	9.738	19.780	29.518	-33.139	62.657
0.767	9.754	9.670	19.424	-36.576	56.000
4.767	9.865	9.280	19.145	-36.855	56.000
6.867	9.914	6.670	16.584	-43.416	60.000
29.567	10.637	11.740	22.377	-37.623	60.000
Average					
0.167	9.735	9.660	19.395	-36.119	55.514
0.267	9.738	11.140	20.878	-31.779	52.657
0.767	9.754	2.370	12.124	-33.876	46.000
4.767	9.865	3.030	12.895	-33.105	46.000
6.867	9.914	1.660	11.574	-38.426	50.000
29.567	10.637	4.240	14.877	-35.123	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

± 1.19 dB

3.5. Test Result of Peak Power Output

Product : zoomBox
Test Item : Peak Power Output
Test Site : No.3 OATS
Test date : 2016/10/19
Test Mode : Mode 1: Transmit - 1Mbps (GFSK)

Channel No.	Frequency (MHz)	Measurement (dBm)	Required Limit	Result
Channel 00	2402.00	11.20	1 Watt= 30 dBm	Pass
Channel 39	2441.00	11.48	1 Watt= 30 dBm	Pass
Channel 78	2480.00	10.20	1 Watt= 30 dBm	Pass

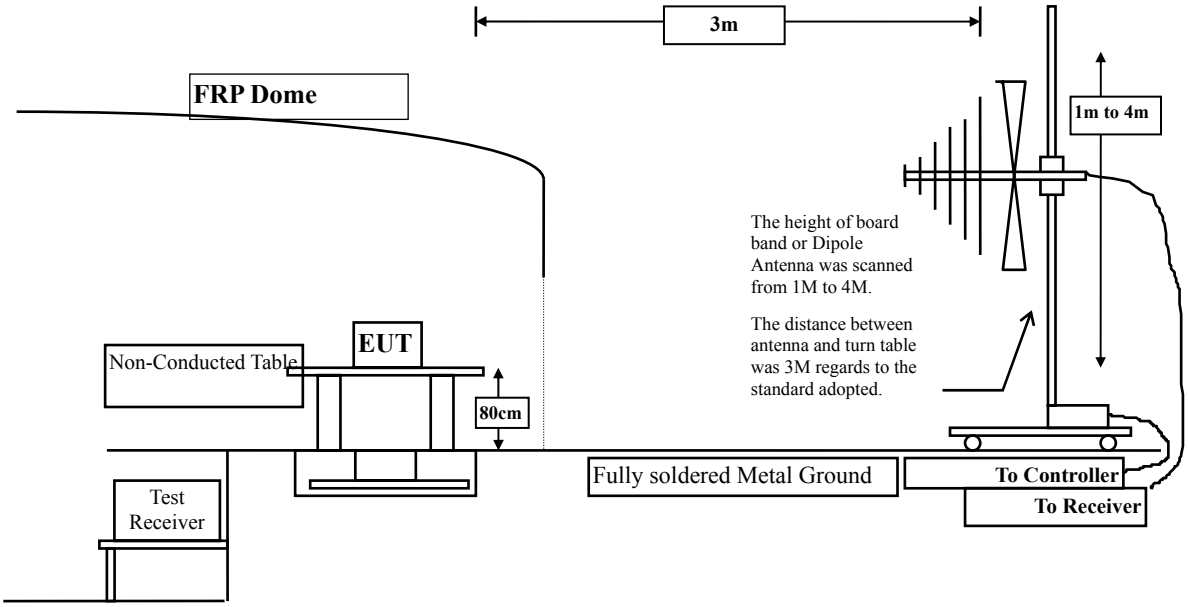
Product : zoomBox
Test Item : Peak Power Output
Test Site : No.3 OATS
Test date : 2016/10/19
Test Mode : Mode 2: Transmit - 3Mbps (8DPSK)

Channel No.	Frequency (MHz)	Measurement (dBm)	Required Limit	Result
Channel 00	2402.00	9.35	1 Watt= 30 dBm	Pass
Channel 39	2441.00	9.58	1 Watt= 30 dBm	Pass
Channel 78	2480.00	7.43	1 Watt= 30 dBm	Pass

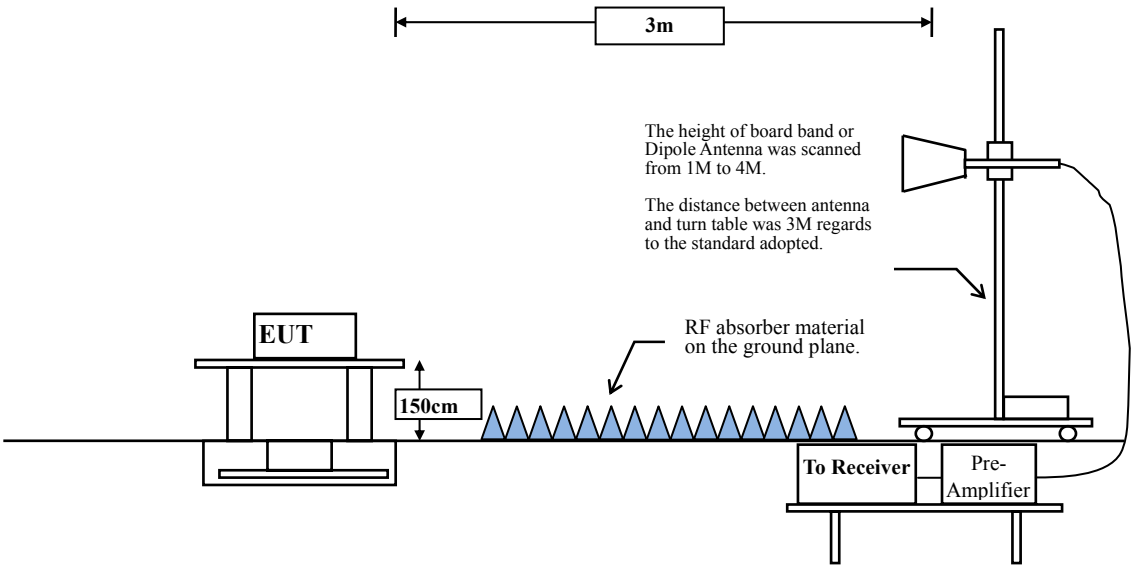
4. Radiated Emission

4.1. Test Setup

Below 1GHz



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	uV/m @3m	dBμV/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

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

4.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested compliance to FCC 47CFR 15.249 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 worst radiated emission is measured in the Open Area Test Site on the Final Measurement.

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

4.4. Uncertainty

± 4.08 dB above 1GHz

± 4.22 dB below 1GHz

4.5. Test Result of Radiated Emission

Product : zoomBox
Test Item : Harmonic Radiated Emission
Test Site : No.3 OATS
Test date : 2016/10/24
Test Mode : Mode 1: Transmit - 1Mbps (GFSK) (2402MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4804.000	0.269	39.443	39.712	-34.288	74.000
7206.000	5.710	38.040	43.750	-30.250	74.000
9608.000	11.093	37.299	48.392	-25.608	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4804.000	0.269	38.970	39.239	-34.761	74.000
7206.000	5.710	37.774	43.484	-30.516	74.000
9608.000	11.093	37.593	48.686	-25.314	74.000
Average Detector:					
--					

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 : zoomBox
Test Item : Harmonic Radiated Emission
Test Site : No.3 OATS
Test date : 2016/10/24
Test Mode : Mode 1: Transmit - 1Mbps (GFSK) (2441MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4882.000	0.147	39.318	39.464	-34.536	74.000
7323.000	5.882	38.840	44.722	-29.278	74.000
9764.000	12.070	37.559	49.628	-24.372	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4882.000	0.147	39.202	39.348	-34.652	74.000
7323.000	5.882	38.607	44.489	-29.511	74.000
9764.000	12.070	36.267	48.336	-25.664	74.000
Average Detector:					
--					

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 : zoomBox
Test Item : Harmonic Radiated Emission
Test Site : No.3 OATS
Test date : 2016/10/24
Test Mode : Mode 1: Transmit - 1Mbps (GFSK) (2480MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4960.000	0.391	59.604	59.995	-14.005	74.000
7440.000	7.348	47.011	54.358	-19.642	74.000
9920.000	12.903	36.826	49.730	-24.270	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4960.000	0.391	46.073	46.464	-27.536	74.000
7440.000	7.348	37.815	45.162	-28.838	74.000
9920.000	12.903	37.480	50.384	-23.616	74.000
Average Detector:					
--					

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 : zoomBox
Test Item : Harmonic Radiated Emission
Test Site : No.3 OATS
Test date : 2016/10/24
Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2402MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4804.000	0.269	39.253	39.522	-34.478	74.000
7206.000	5.710	37.339	43.049	-30.951	74.000
9608.000	11.093	37.261	48.354	-25.646	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4804.000	0.269	39.319	39.588	-34.412	74.000
7206.000	5.710	37.561	43.271	-30.729	74.000
9608.000	11.093	36.702	47.795	-26.205	74.000
Average Detector:					
--					

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 : zoomBox
Test Item : Harmonic Radiated Emission
Test Site : No.3 OATS
Test date : 2016/10/24
Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2441MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4882.000	0.147	39.676	39.822	-34.178	74.000
7323.000	5.882	37.102	42.984	-31.016	74.000
9764.000	12.070	36.665	48.734	-25.266	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4882.000	0.147	39.941	40.087	-33.913	74.000
7323.000	5.882	37.222	43.104	-30.896	74.000
9764.000	12.070	36.570	48.639	-25.361	74.000
Average Detector:					
--					

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 : zoomBox
Test Item : Harmonic Radiated Emission
Test Site : No.3 OATS
Test date : 2016/10/24
Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2480MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4960.000	0.391	39.374	39.765	-34.235	74.000
7440.000	7.348	37.246	44.593	-29.407	74.000
9920.000	12.903	36.779	49.683	-24.317	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4960.000	0.391	39.014	39.405	-34.595	74.000
7440.000	7.348	37.162	44.509	-29.491	74.000
9920.000	12.903	36.977	49.881	-24.119	74.000
Average Detector:					
--					

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 : zoomBox
Test Item : General Radiated Emission
Test Site : No.3 OATS
Test date : 2016/10/20
Test Mode : Mode 1: Transmit - 1Mbps (GFSK) (2441MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
233.700	-8.528	32.749	24.221	-21.779	46.000
405.390	0.794	31.440	32.234	-13.766	46.000
553.800	3.147	26.239	29.386	-16.614	46.000
696.390	3.367	41.781	45.148	-0.852	46.000
749.740	3.963	29.757	33.720	-12.280	46.000
864.200	6.329	28.556	34.885	-11.115	46.000
Vertical					
233.700	-6.798	32.749	25.951	-20.049	46.000
339.430	-1.468	24.801	23.333	-22.667	46.000
393.750	-1.468	26.517	25.049	-20.951	46.000
551.860	-1.200	31.417	30.217	-15.783	46.000
696.390	1.047	39.979	41.026	-4.974	46.000
823.460	3.081	28.567	31.648	-14.352	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 : zoomBox
Test Item : General Radiated Emission
Test Site : No.3 OATS
Test date : 2016/10/20
Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2441MHz)

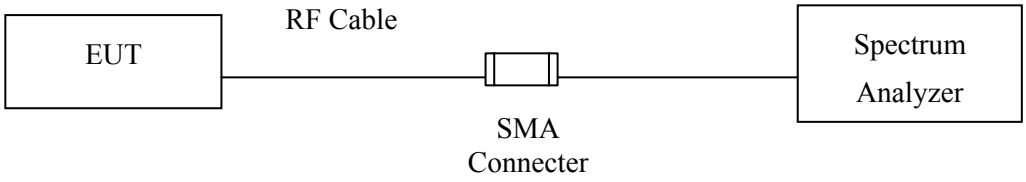
Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
288.020	-5.557	27.918	22.361	-23.639	46.000
405.390	0.794	31.440	32.234	-13.766	46.000
557.680	2.511	28.549	31.059	-14.941	46.000
696.390	3.367	42.119	45.486	-0.514	46.000
864.200	6.329	28.556	34.885	-11.115	46.000
959.260	6.640	28.426	35.066	-10.934	46.000
Vertical					
181.320	-1.910	26.225	24.315	-19.185	43.500
288.020	-5.487	27.918	22.431	-23.569	46.000
348.160	-0.890	28.694	27.804	-18.196	46.000
503.360	-0.086	34.364	34.278	-11.722	46.000
696.390	1.047	40.231	41.278	-4.722	46.000
782.720	2.757	32.184	34.941	-11.059	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

± 1.20dB

5.5. Test Result of RF Antenna Conducted Test

Product	:	zoomBox
Test Item	:	RF Antenna Conducted Test
Test Site	:	No.3 OATS
Test date	:	2016/10/20
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)

Figure Channel 00:

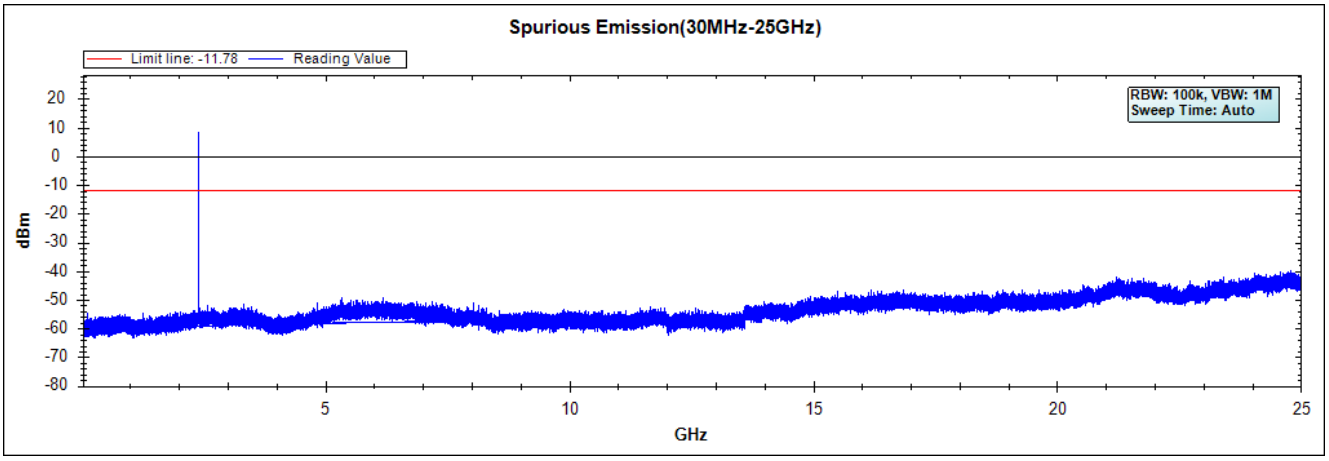


Figure Channel 39:

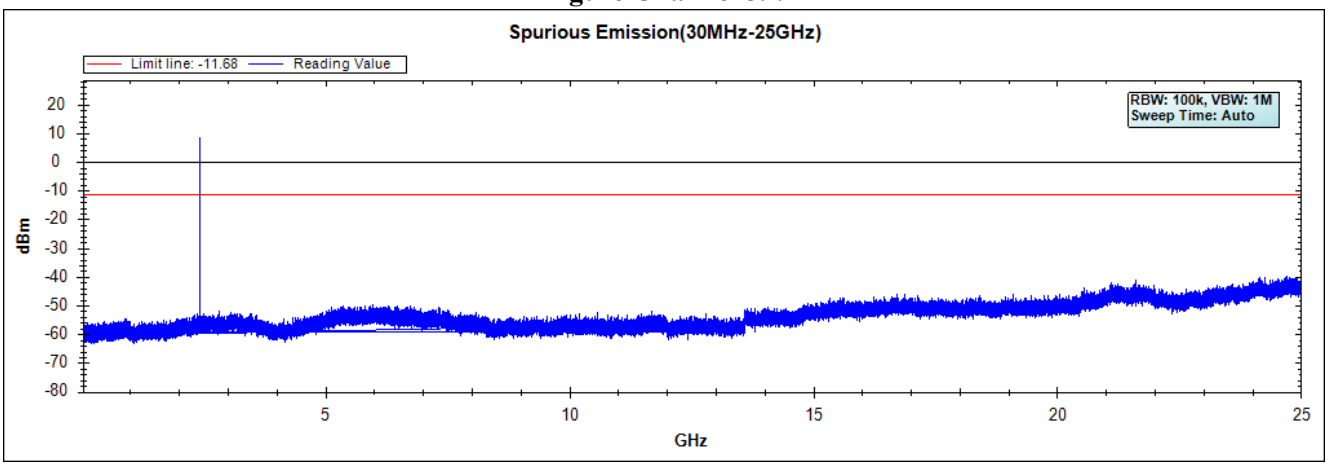
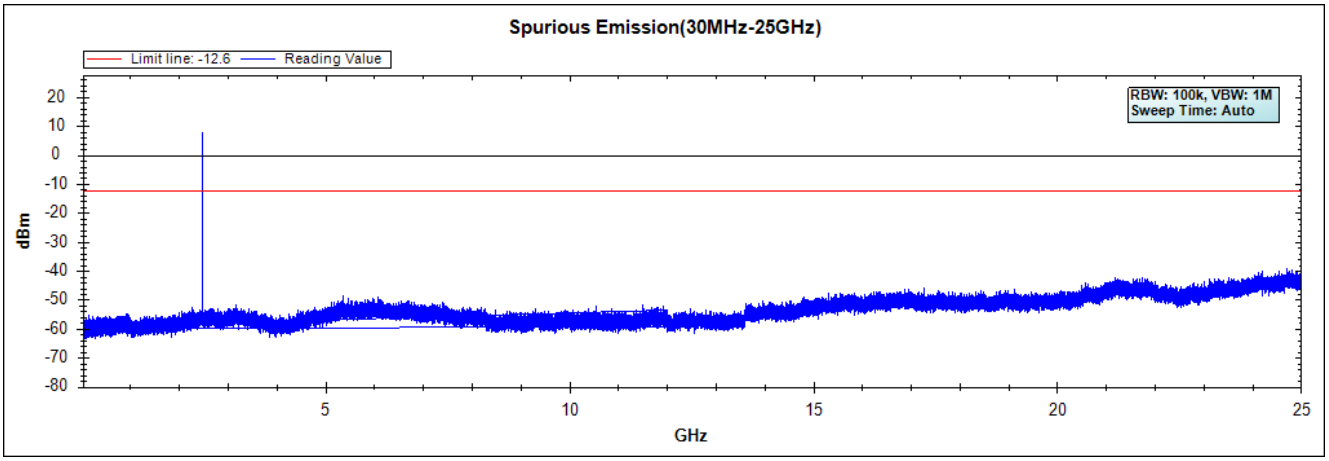


Figure Channel 78:



Product	:	zoomBox
Test Item	:	RF Antenna Conducted Test
Test Site	:	No.3 OATS
Test date	:	2016/10/20
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK)

Figure Channel 00:

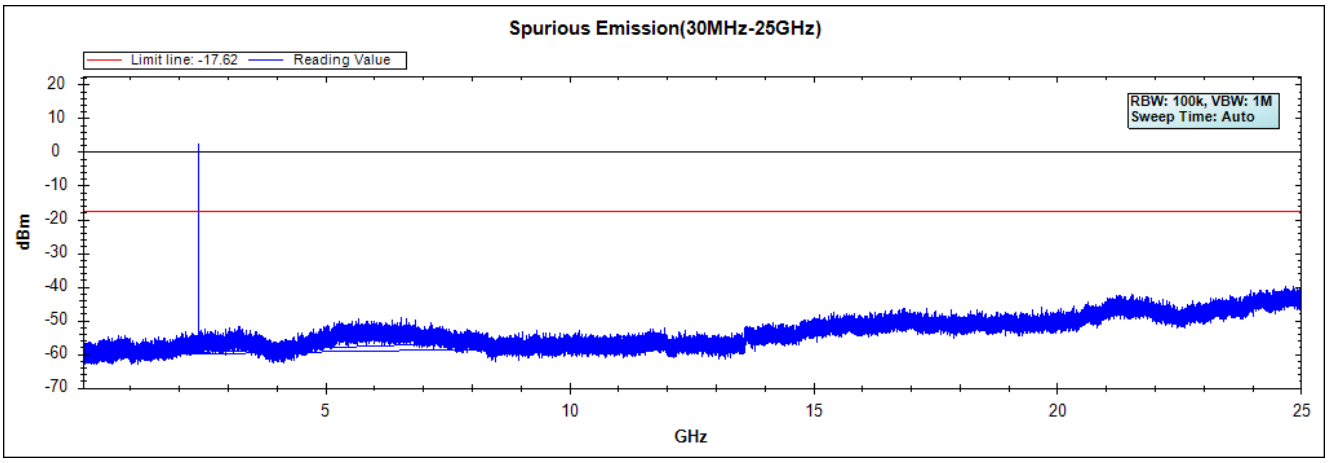


Figure Channel 39:

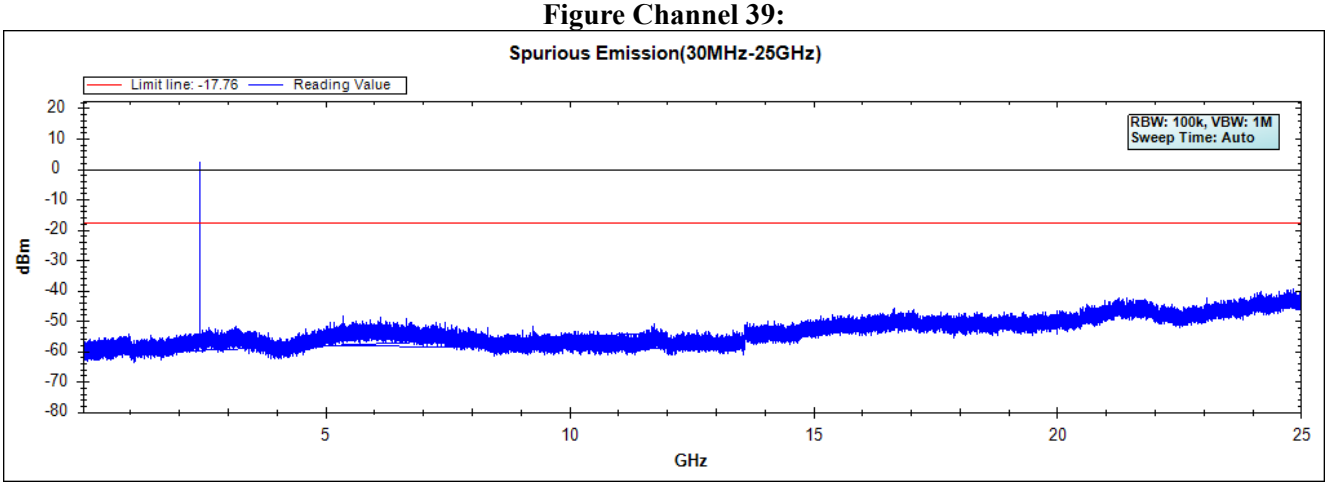
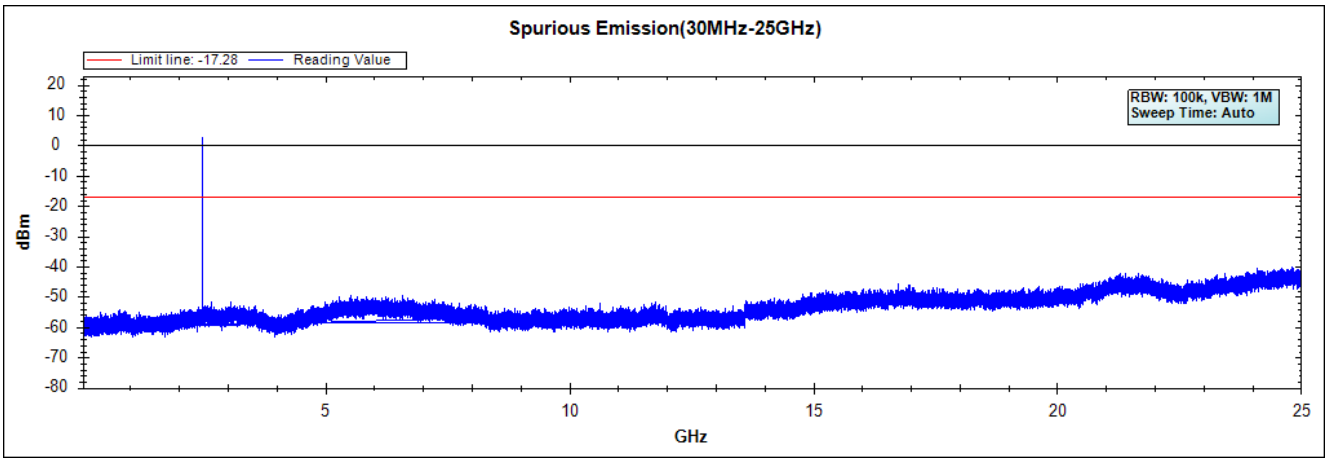


Figure Channel 78:



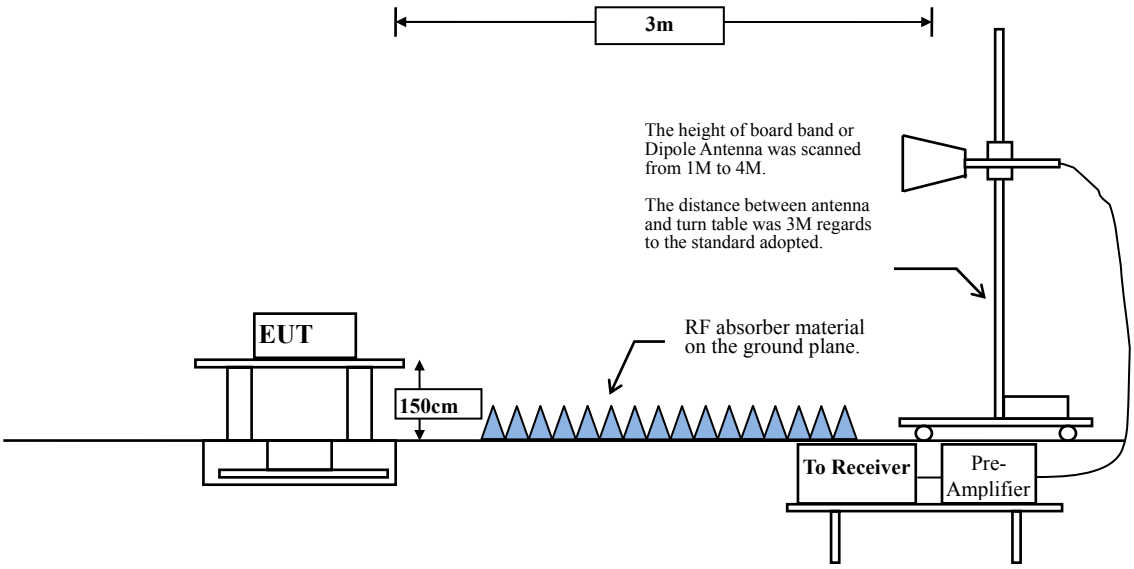
Note: The above test pattern is synthesized by multiple of the frequency range.

6. Band Edge

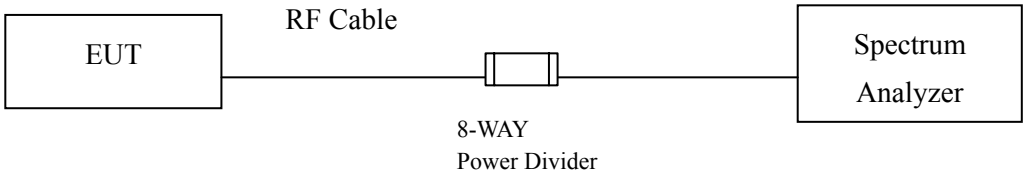
6.1. Test Setup

RF Radiated Measurement:

Above 1GHz



RF Conducted Measurement



6.2. Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. 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

± 4.08 dB above 1GHz
± 4.22 dB below 1GHz

6.5. Test Result of Band Edge

Product : zoomBox
Test Item : Band Edge
Test Site : No.3 OATS
Test date : 2016/10/21
Test Mode : Mode 1: Transmit - 1Mbps (GFSK) (2402MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
00 (Peak)	2390.000	5.881	39.584	45.466	74.000	54.000	Pass
00 (Peak)	2400.000	6.035	63.806	69.841	74.000	54.000	Pass
00 (Peak)	2402.000	6.065	96.916	102.981	--	--	--
00 (Average)	2390.000	5.881	28.596	34.478	74.000	54.000	Pass
00 (Average)	2400.000	6.035	43.780	49.815	74.000	54.000	Pass
00 (Average)	2402.000	6.065	82.310	88.375	--	--	--

Figure Channel 00: Horizontal (Peak)

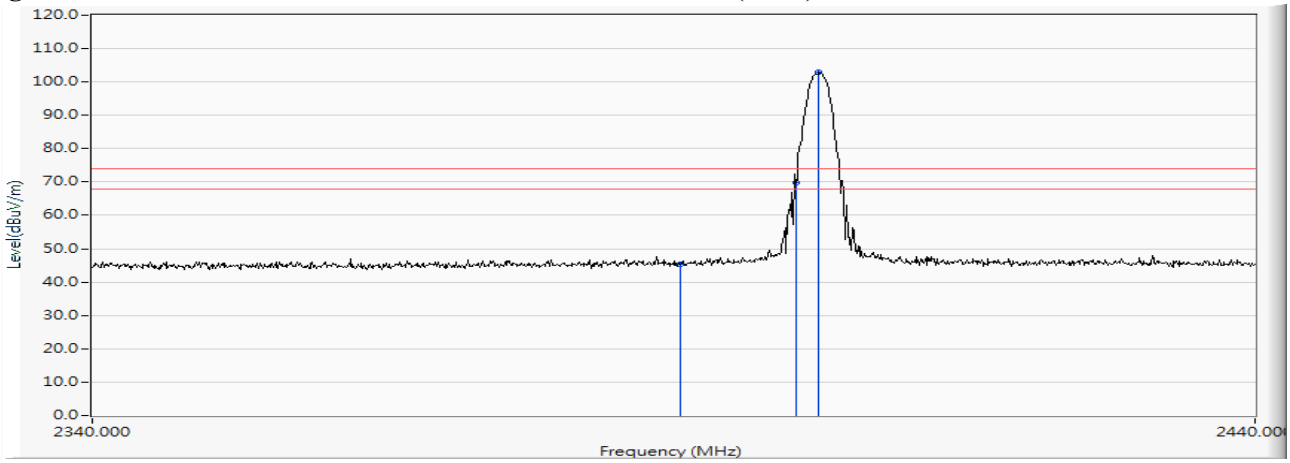
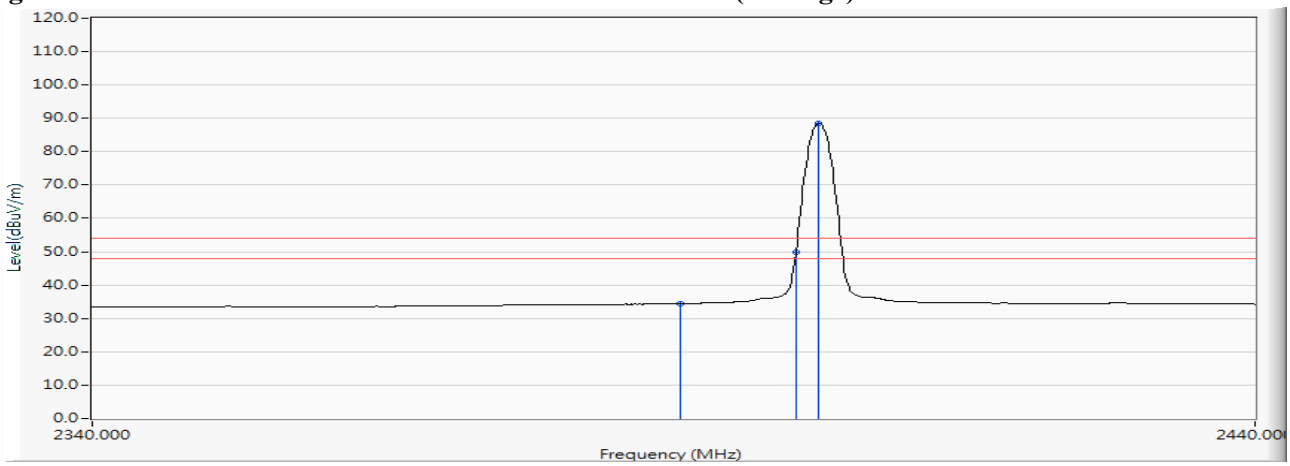


Figure Channel 00: Horizontal (Average)



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 : zoomBox
Test Item : Band Edge
Test Site : No.3 OATS
Test date : 2016/10/21
Test Mode : Mode 1: Transmit - 1Mbps (GFSK) (2402MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
00 (Peak)	2390.000	5.881	39.106	44.988	74.000	54.000	Pass
00 (Peak)	2400.000	6.035	61.623	67.658	74.000	54.000	Pass
00 (Peak)	2402.000	6.065	90.217	96.282	--	--	--
00 (Average)	2390.000	5.881	28.360	34.242	74.000	54.000	Pass
00 (Average)	2400.000	6.035	39.071	45.106	74.000	54.000	Pass
00 (Average)	2402.000	6.065	76.945	83.010	--	--	--

Figure Channel 00: VERTICAL (Peak)

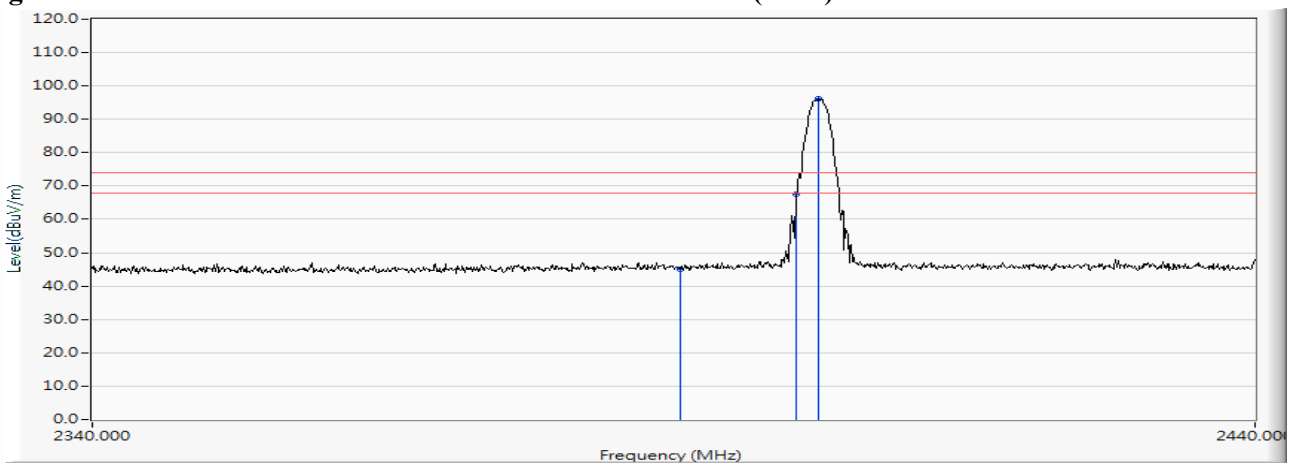
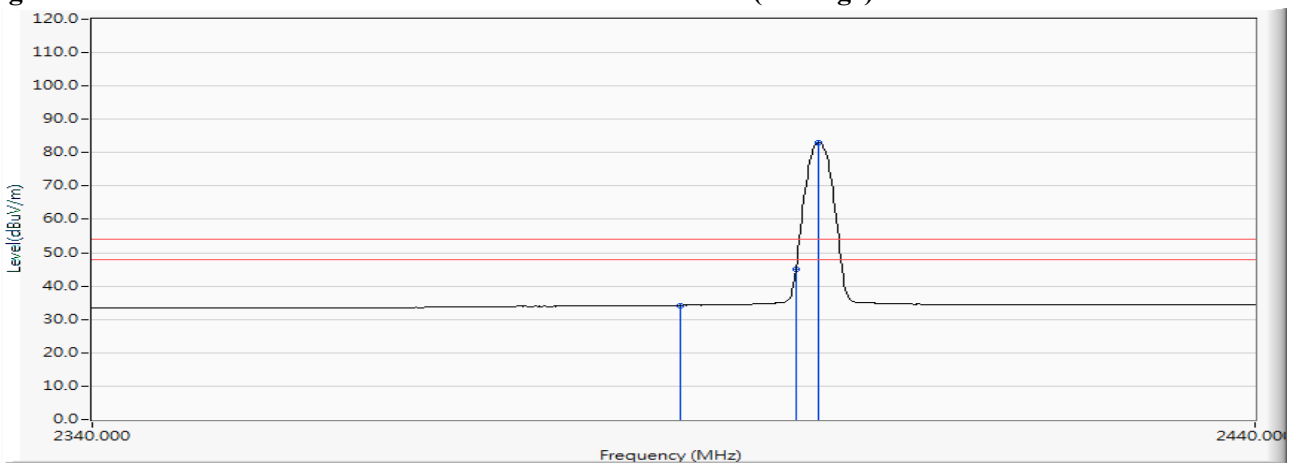


Figure Channel 00: VERTICAL (Average)



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 : zoomBox
Test Item : Band Edge
Test Site : No.3 OATS
Test date : 2016/10/21
Test Mode : Mode 1: Transmit - 1Mbps (GFSK) (2480MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
78 (Peak)	2480.000	5.806	94.394	100.201	--	--	--
78 (Peak)	2483.500	5.845	46.954	52.799	74.000	54.000	Pass
78 (Average)	2480.000	5.806	80.097	85.904	--	--	--
78 (Average)	2483.500	5.845	29.486	35.331	74.000	54.000	Pass

Figure Channel 78: Horizontal (Peak)

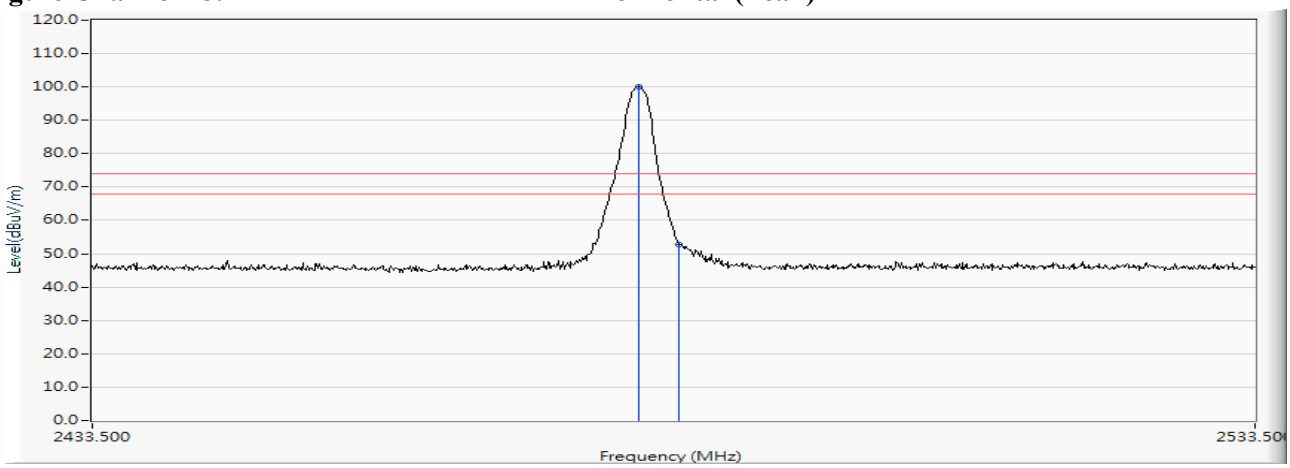
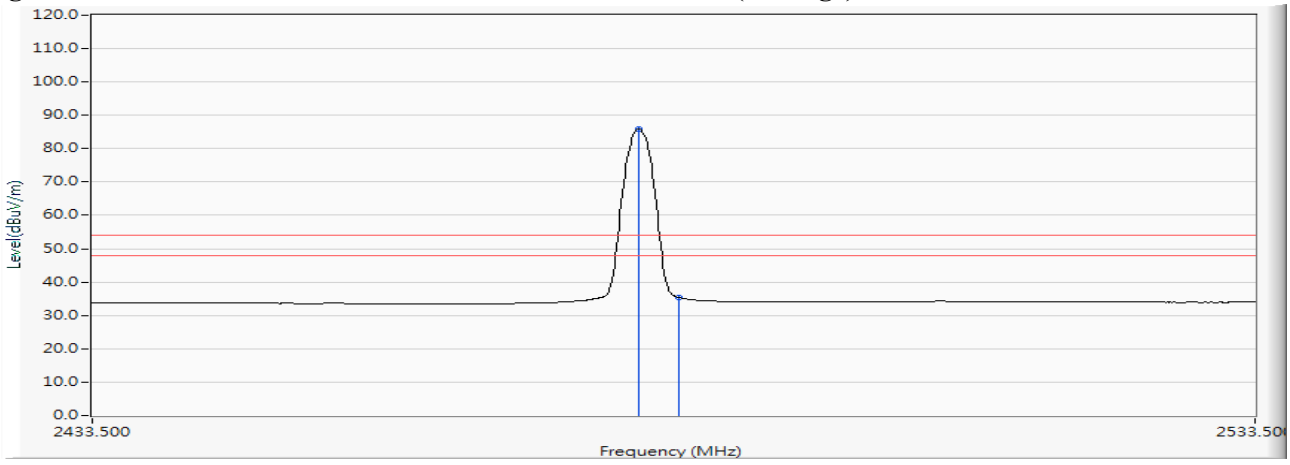


Figure Channel 78: Horizontal (Average)



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 : zoomBox
Test Item : Band Edge
Test Site : No.3 OATS
Test date : 2016/10/21
Test Mode : Mode 1: Transmit - 1Mbps (GFSK) (2480MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
78 (Peak)	2479.900	5.806	86.590	92.396	--	--	--
78 (Peak)	2483.500	5.845	41.062	46.907	74.000	54.000	Pass
78 (Average)	2480.000	5.806	73.370	79.177	--	--	--
78 (Average)	2483.500	5.845	28.031	33.876	74.000	54.000	Pass

Figure Channel 78: VERTICAL (Peak)

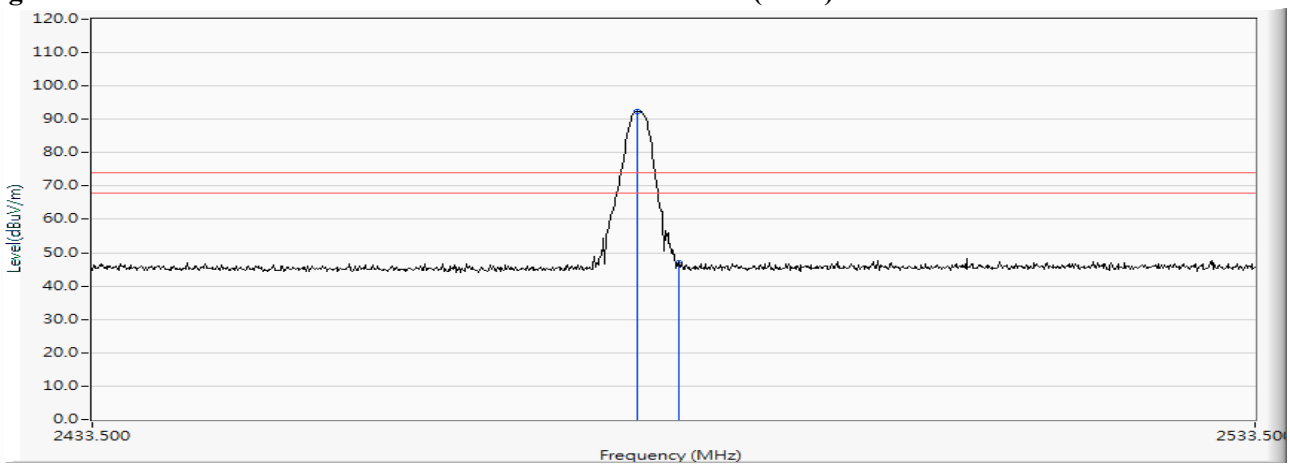
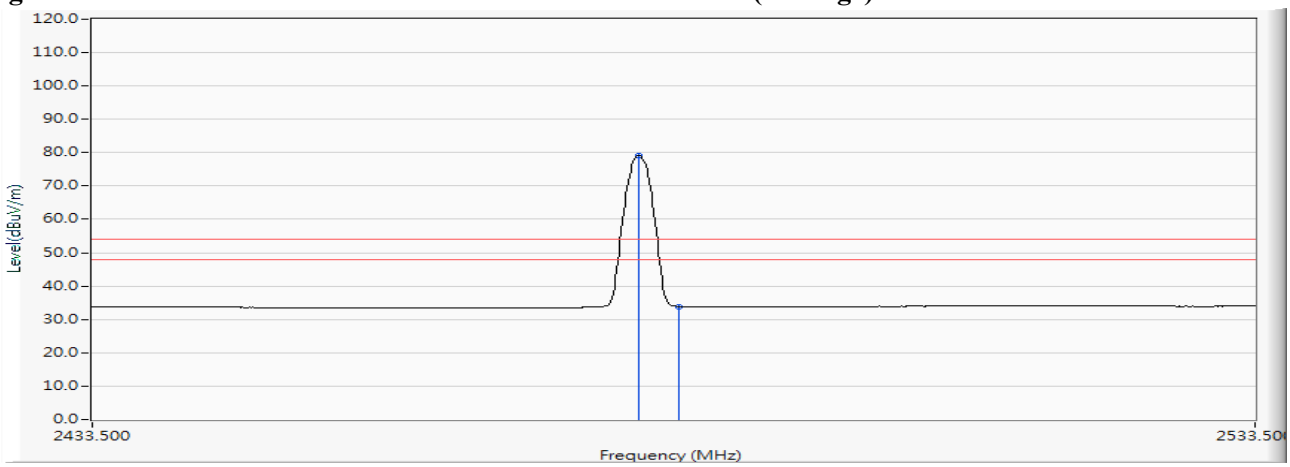


Figure Channel 78: VERTICAL (Average)



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 : zoomBox
Test Item : Band Edge
Test Site : No.3 OATS
Test date : 2016/10/21
Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2402MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
00 (Peak)	2390.000	5.881	39.756	45.638	74.000	54.000	Pass
00 (Peak)	2400.000	6.035	64.739	70.774	74.000	54.000	Pass
00 (Peak)	2402.000	6.065	94.249	100.314	--	--	--
00 (Average)	2390.000	5.881	28.404	34.286	74.000	54.000	Pass
00 (Average)	2400.000	6.035	47.340	53.375	74.000	54.000	Pass
00 (Average)	2402.000	6.065	78.078	84.143	--	--	--

Figure Channel 00: Horizontal (Peak)

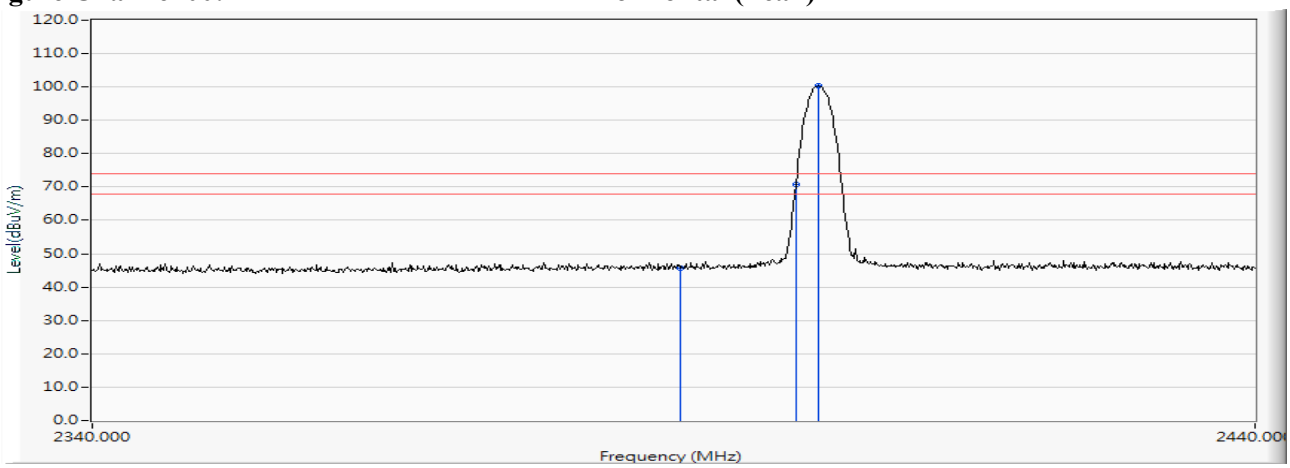
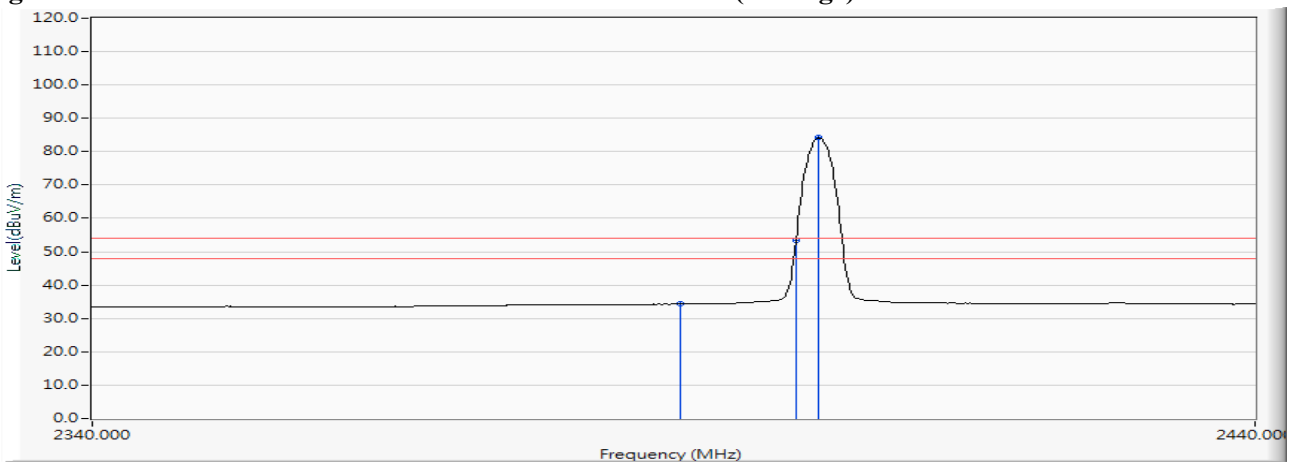


Figure Channel 00: Horizontal (Average)



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 : zoomBox
Test Item : Band Edge
Test Site : No.3 OATS
Test date : 2016/10/21
Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2402MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
00 (Peak)	2390.000	5.881	38.513	44.395	74.000	54.000	Pass
00 (Peak)	2400.000	6.035	57.874	63.909	74.000	54.000	Pass
00 (Peak)	2402.000	6.065	87.403	93.468	--	--	--
00 (Average)	2390.000	5.881	28.294	34.176	74.000	54.000	Pass
00 (Average)	2400.000	6.035	42.378	48.413	74.000	54.000	Pass
00 (Average)	2402.000	6.065	72.601	78.666	--	--	--

Figure Channel 00: VERTICAL (Peak)

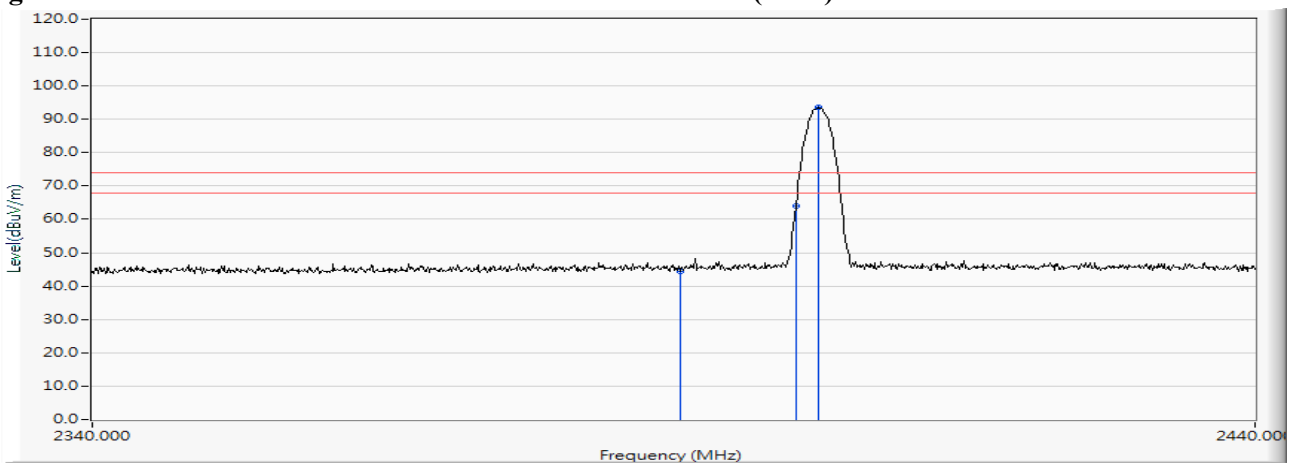
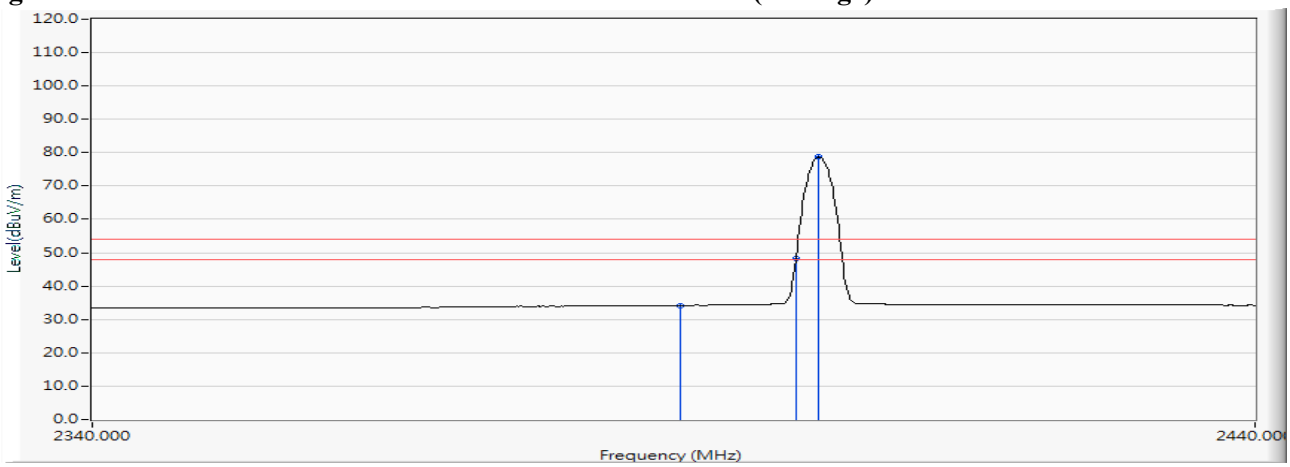


Figure Channel 00: VERTICAL (Average)



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 : zoomBox
Test Item : Band Edge
Test Site : No.3 OATS
Test date : 2016/10/21
Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2480MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
78 (Peak)	2479.900	5.806	92.369	98.175	--	--	--
78 (Peak)	2483.500	5.845	41.666	47.511	74.000	54.000	Pass
78 (Average)	2480.000	5.806	76.832	82.639	--	--	--
78 (Average)	2483.500	5.845	29.294	35.139	74.000	54.000	Pass

Figure Channel 00: Horizontal (Peak)

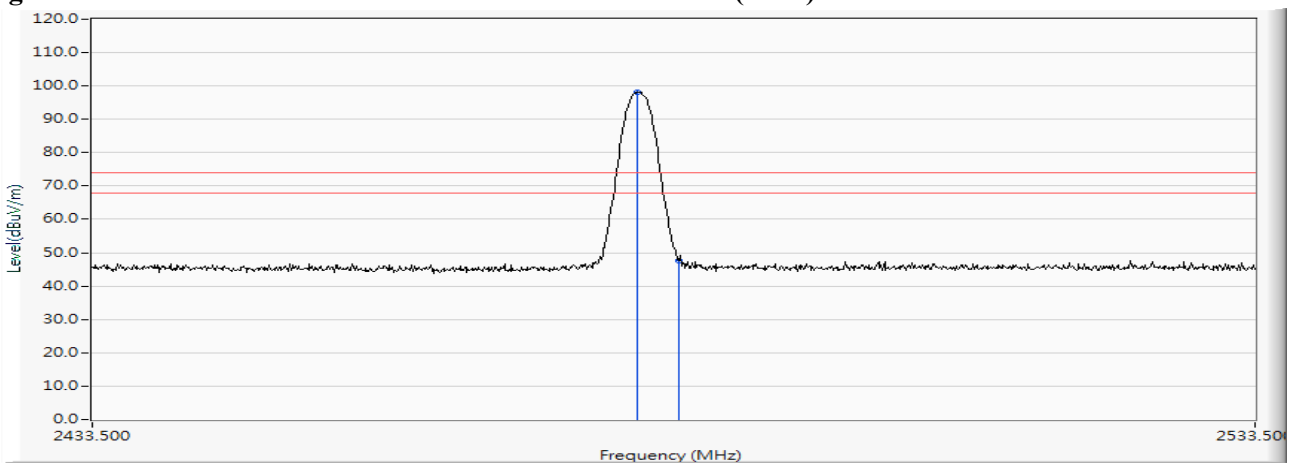
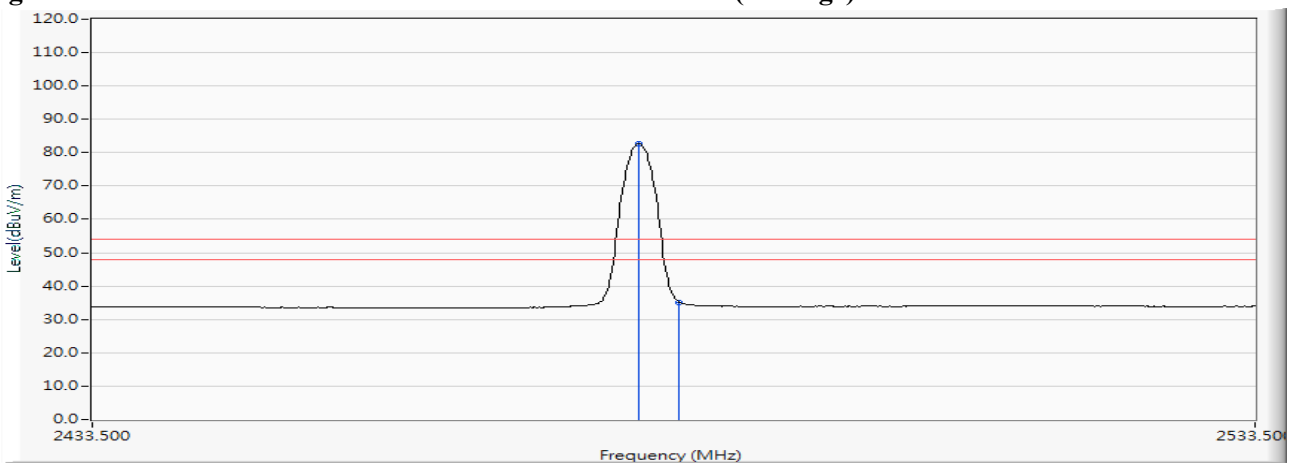


Figure Channel 00: Horizontal (Average)



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 : zoomBox
Test Item : Band Edge
Test Site : No.3 OATS
Test date : 2016/10/21
Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2480MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
78 (Peak)	2479.900	5.806	84.800	90.606	--	--	--
78 (Peak)	2483.500	5.845	38.298	44.143	74.000	54.000	Pass
78 (Average)	2480.000	5.806	70.745	76.552	--	--	--
78 (Average)	2483.500	5.845	28.088	33.933	74.000	54.000	Pass

Figure Channel 78: VERTICAL (Peak)

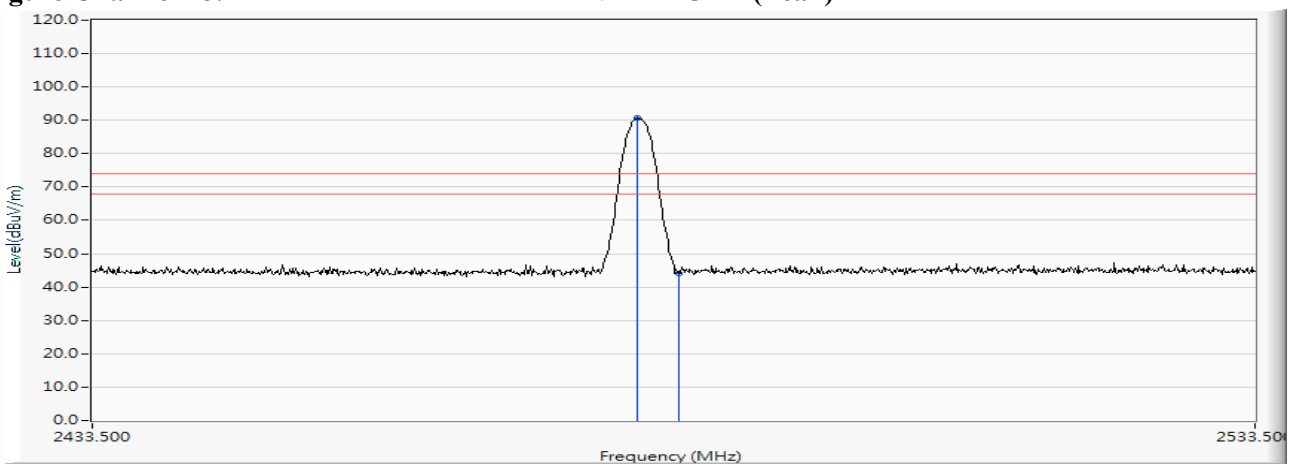
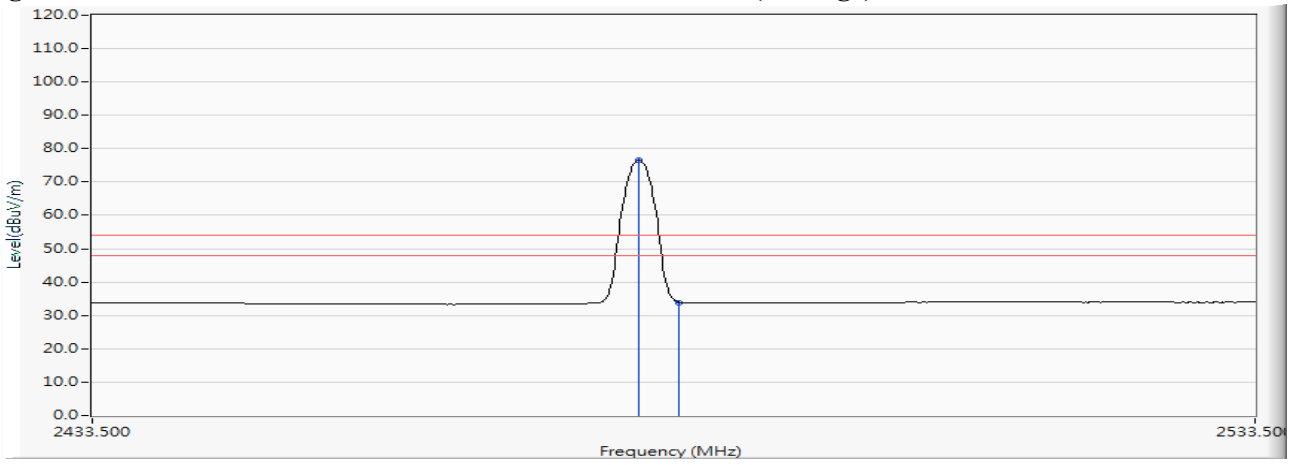


Figure Channel 78: VERTICAL (Average)



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 : zoomBox
Test Item : Band Edge
Test Site : No.3 OATS
Test date : 2016/10/19
Test Mode : Mode 1: Transmit - 1Mbps (GFSK)(Hopping off)

Measurement Level Δ (dB)	Result
> 20	PASS

Figure Channel 00:

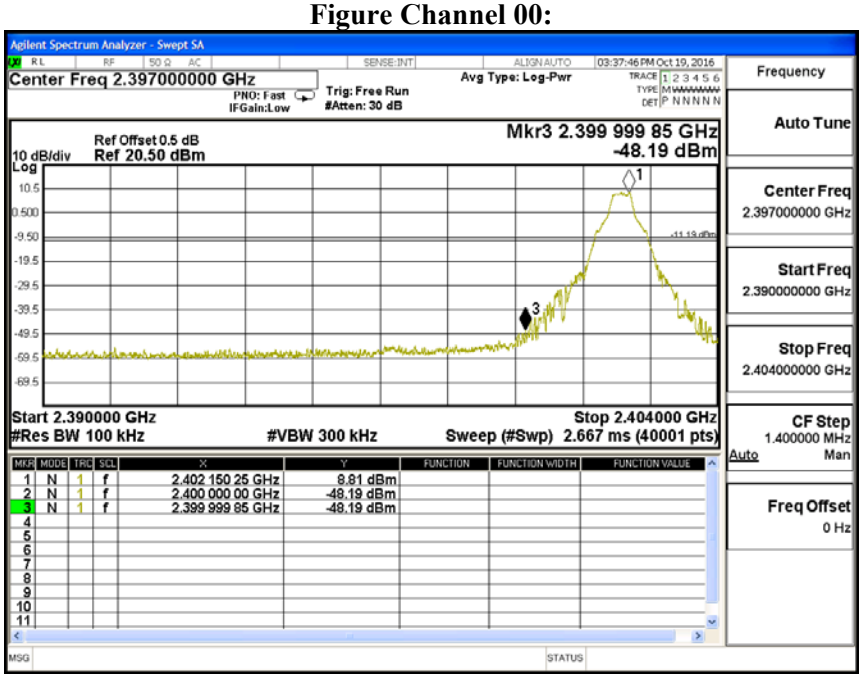
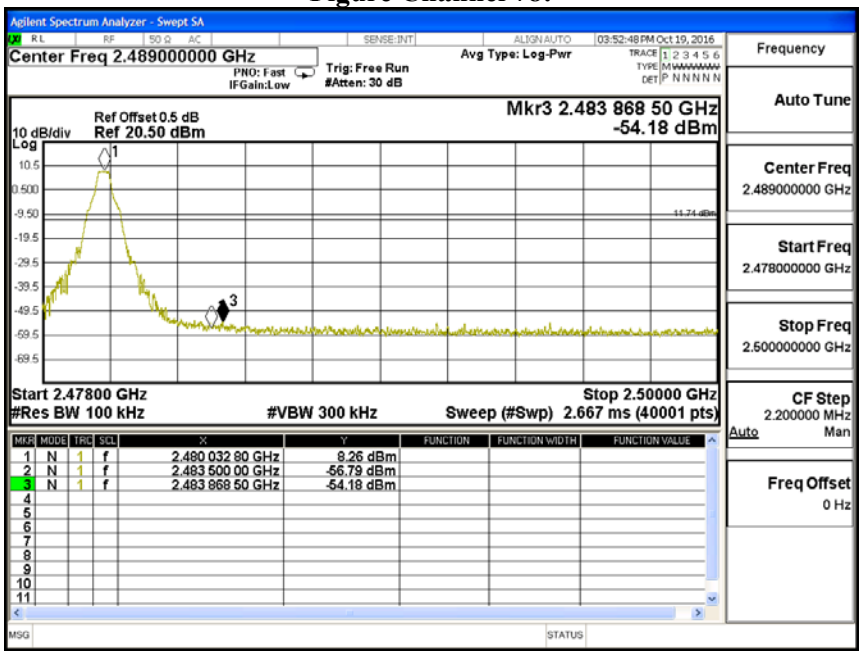


Figure Channel 78:



Product : zoomBox
Test Item : Band Edge
Test Site : No.3 OATS
Test date : 2016/10/19
Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (Hopping off)

Measurement Level Δ (dB)	Result
> 20	PASS

Figure Channel 00:

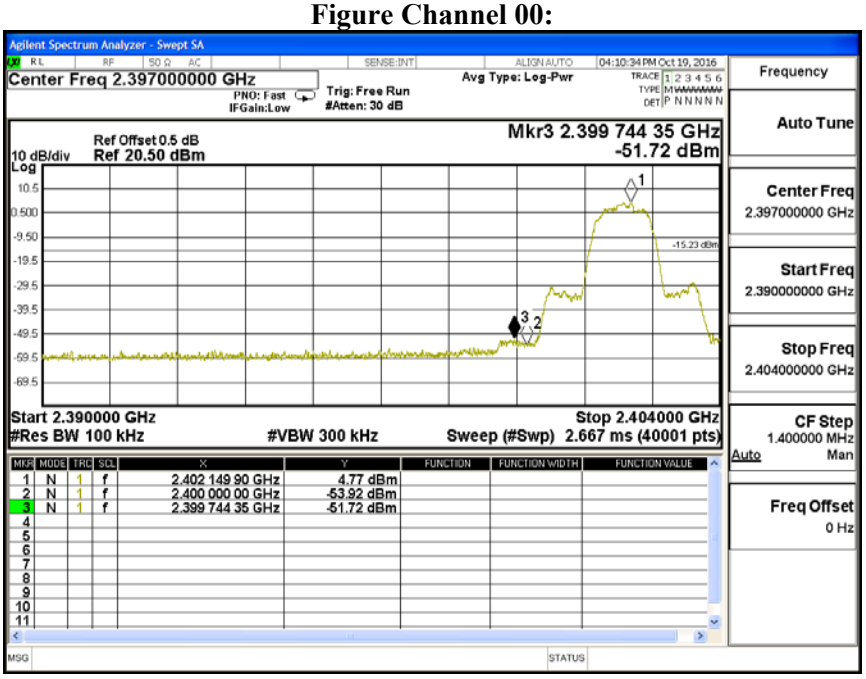
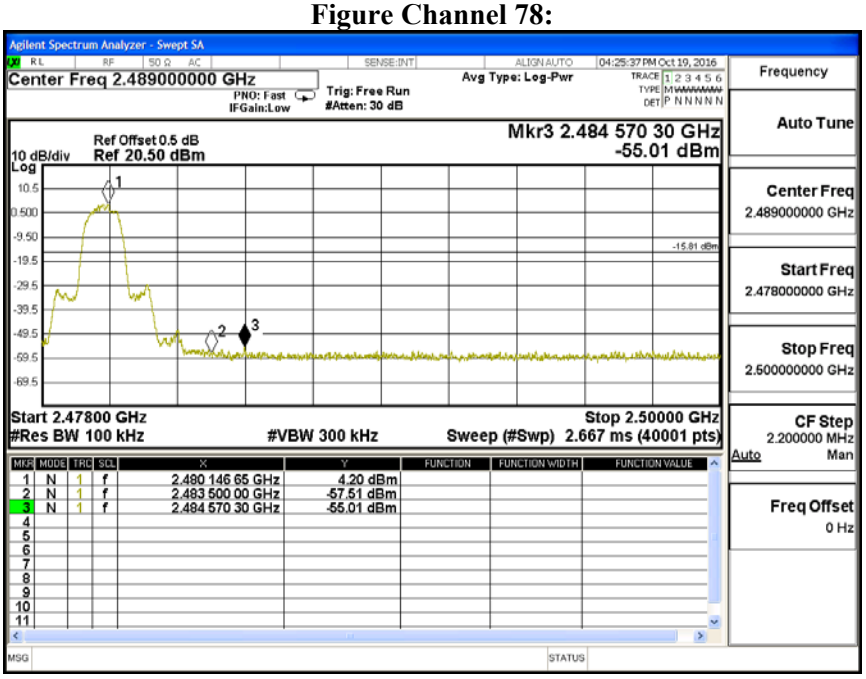


Figure Channel 78:



Product : zoomBox
Test Item : Band Edge
Test Site : No.3 OATS
Test date : 2016/10/19
Test Mode : Mode 1: Transmit - 1Mbps (GFSK) (Hopping on)

Measurement Level Δ (dB)	Result
> 20	PASS

Figure Channel Hopping:

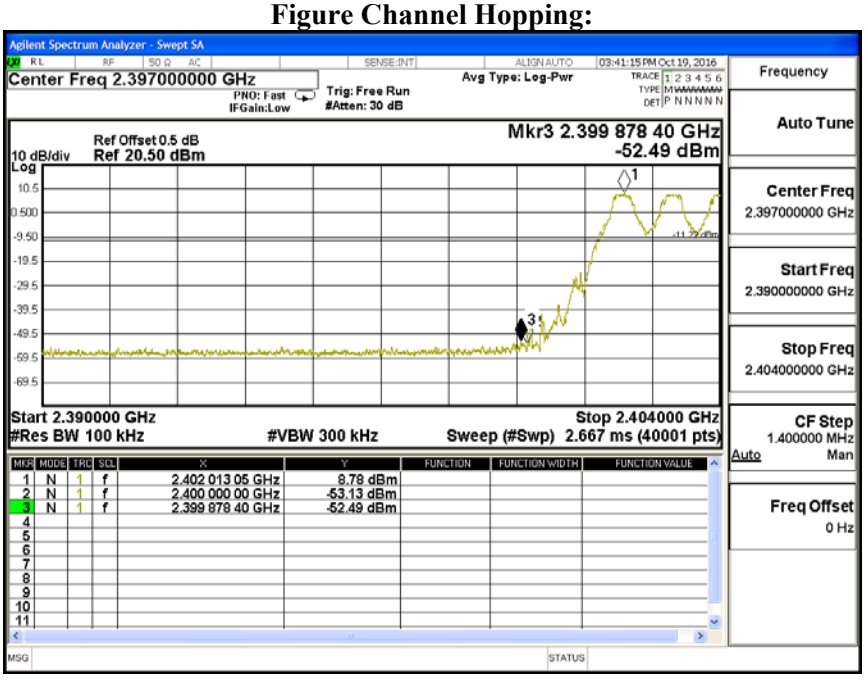
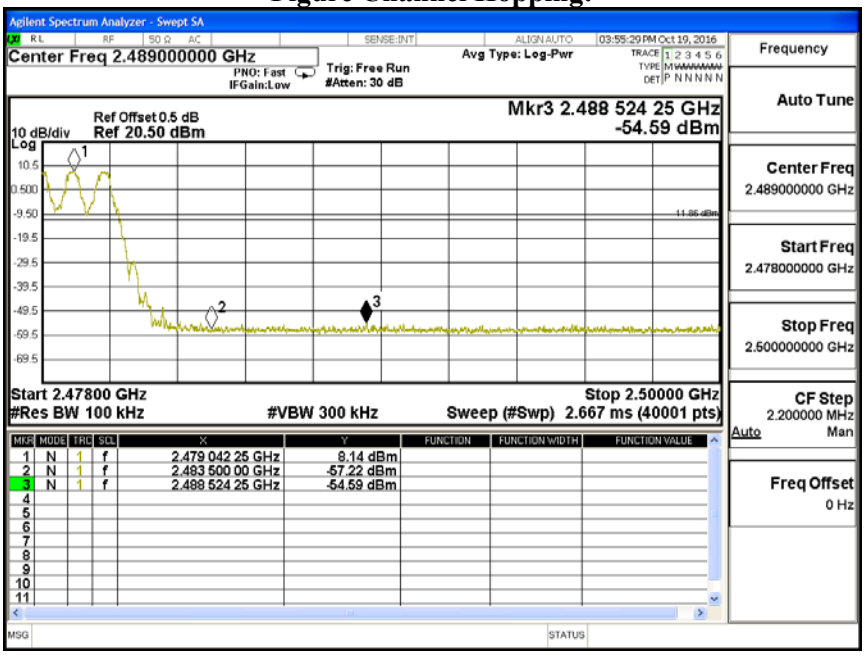


Figure Channel Hopping:



Product : zoomBox
Test Item : Band Edge
Test Site : No.3 OATS
Test date : 2016/10/19
Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (Hopping on)

Measurement Level Δ (dB)	Result
> 20	PASS

Figure Channel Hopping:

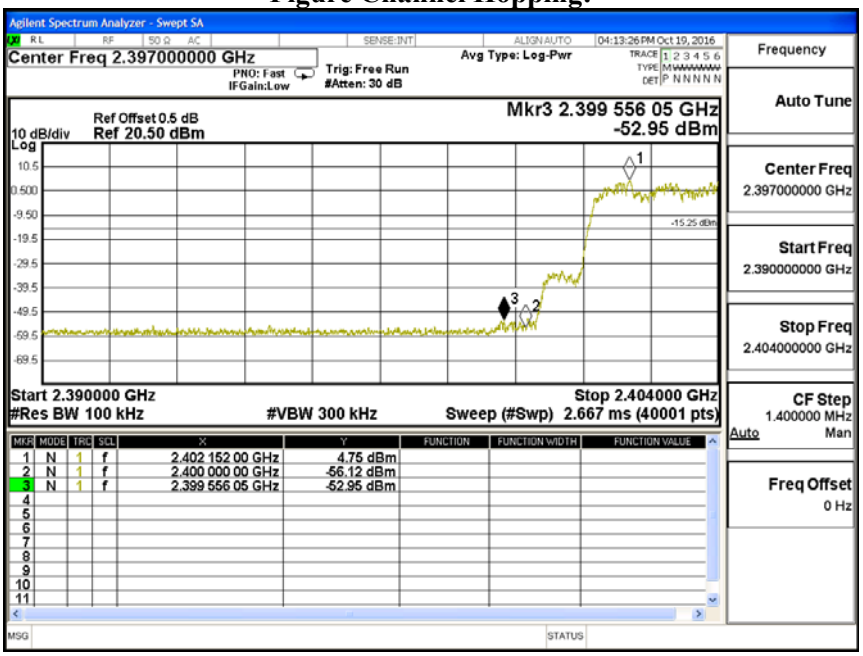
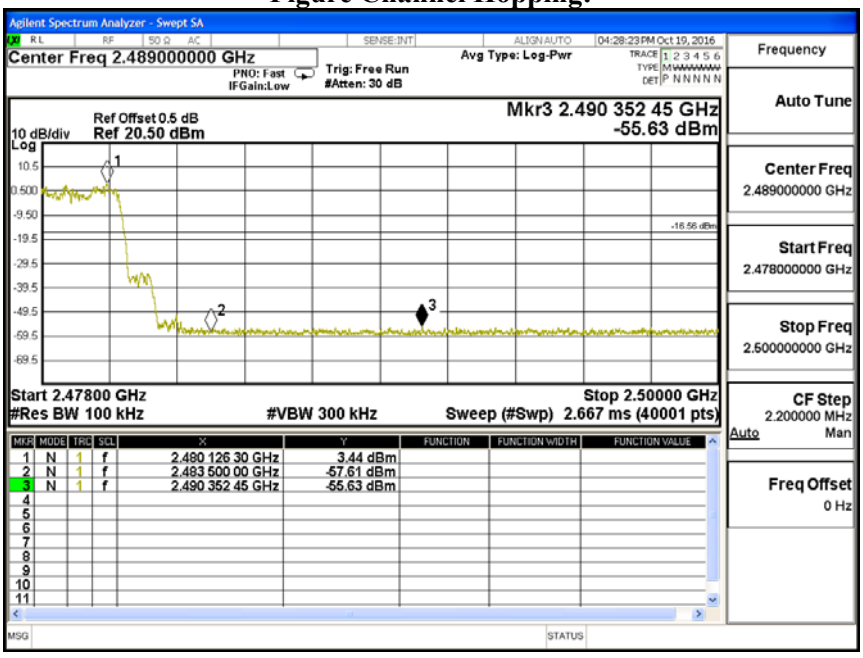
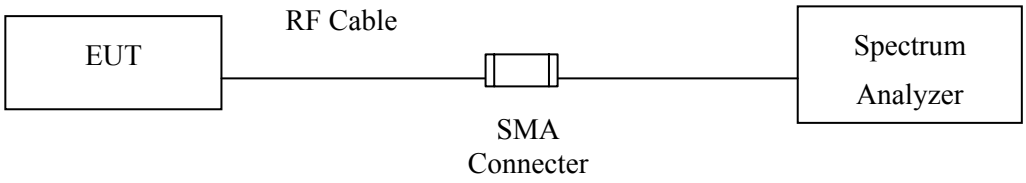


Figure Channel Hopping:



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

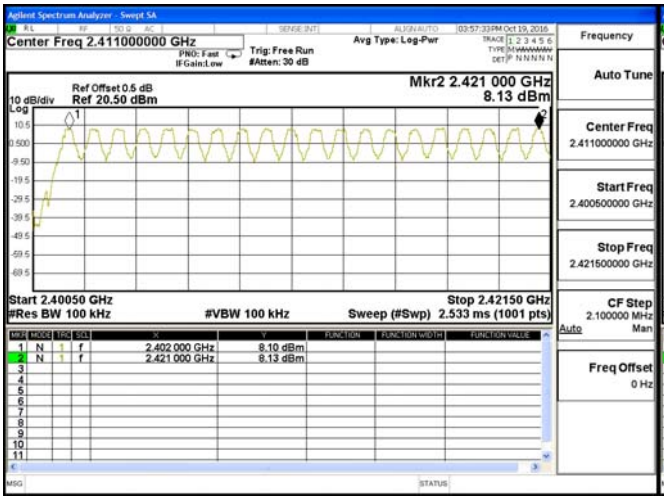
N/A

7.5. Test Result of Channel Number

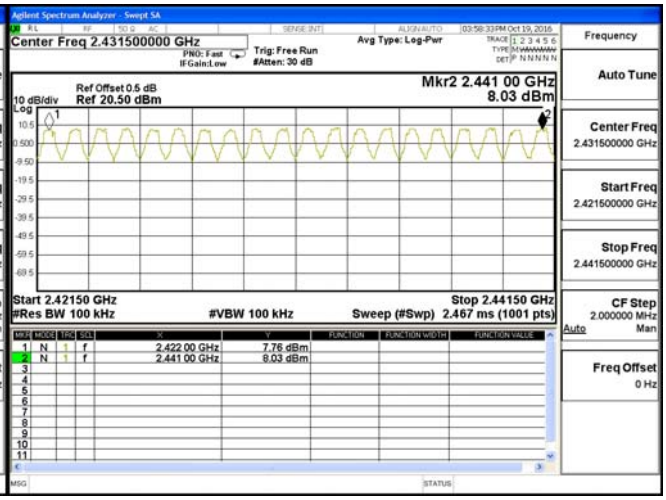
Product : zoomBox
Test Item : Channel Number
Test Site : No.3 OATS
Test date : 2016/10/19
Test Mode : Mode 1: Transmit - 1Mbps (GFSK)

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

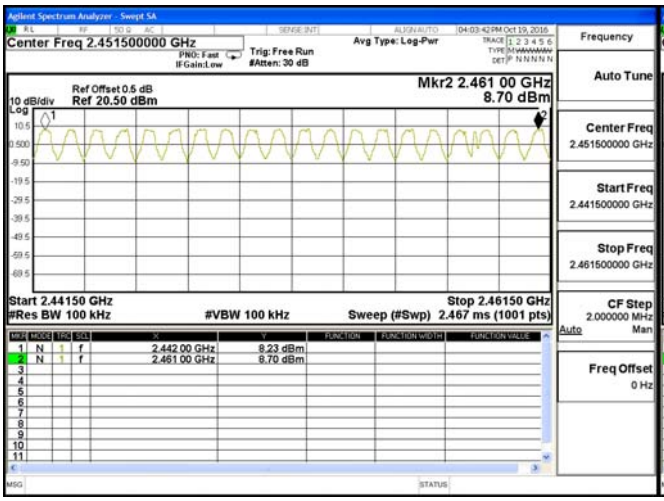
2402-2421MHz



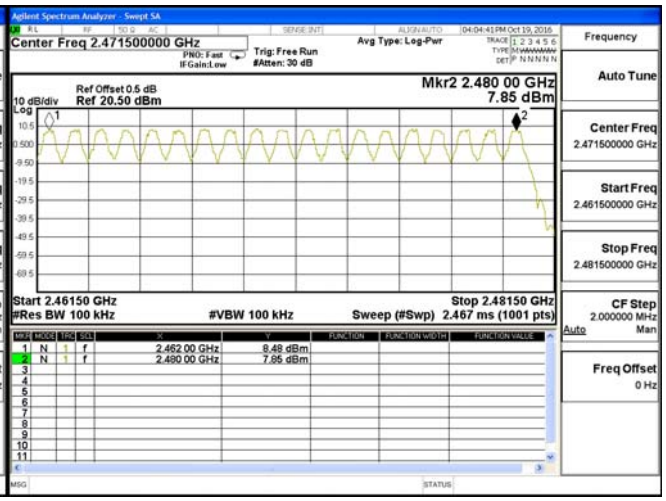
2422-2441MHz



2442-2461MHz



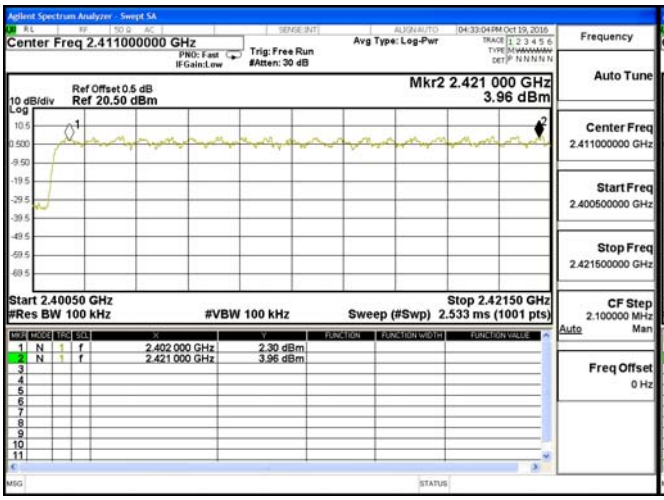
2462-2480MHz



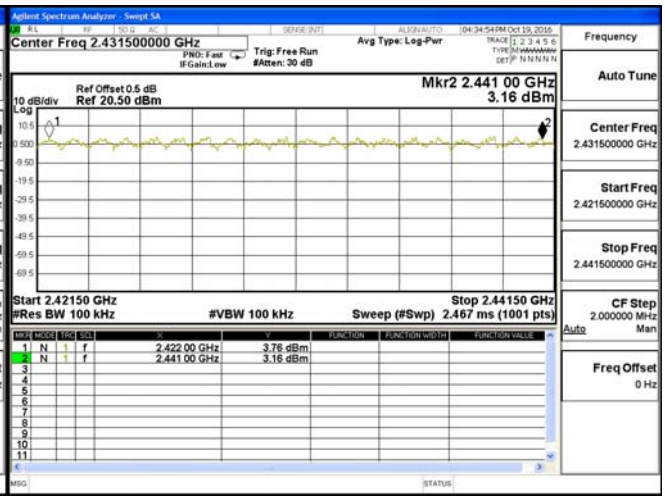
Product : zoomBox
Test Item : Channel Number
Test Site : No.3 OATS
Test date : 2016/10/19
Test Mode : Mode 2: Transmit - 3Mbps (8DPSK)

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

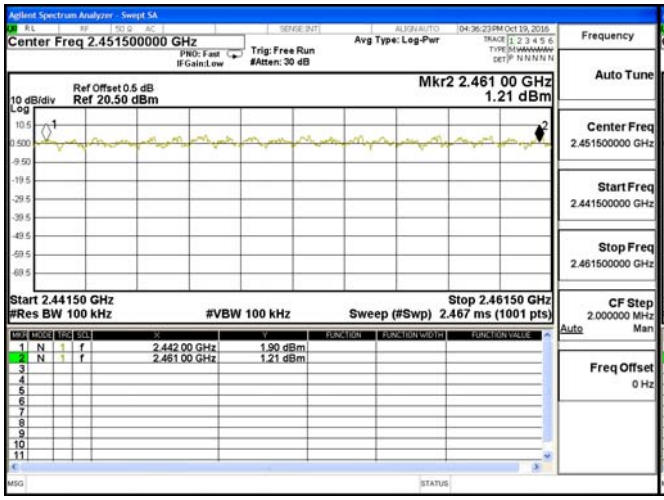
2402-2421MHz



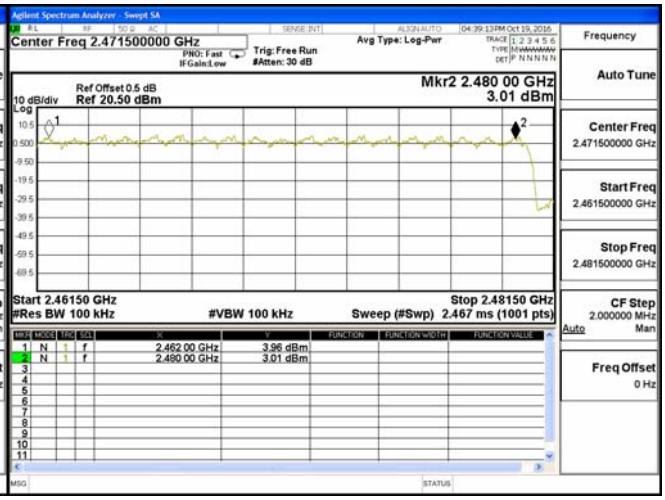
2422-2441MHz



2442-2461MHz

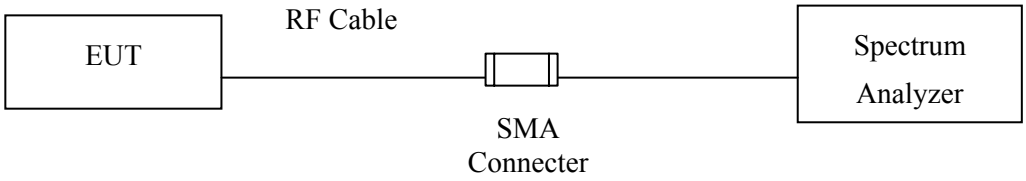


2462-2480MHz



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

± 283Hz

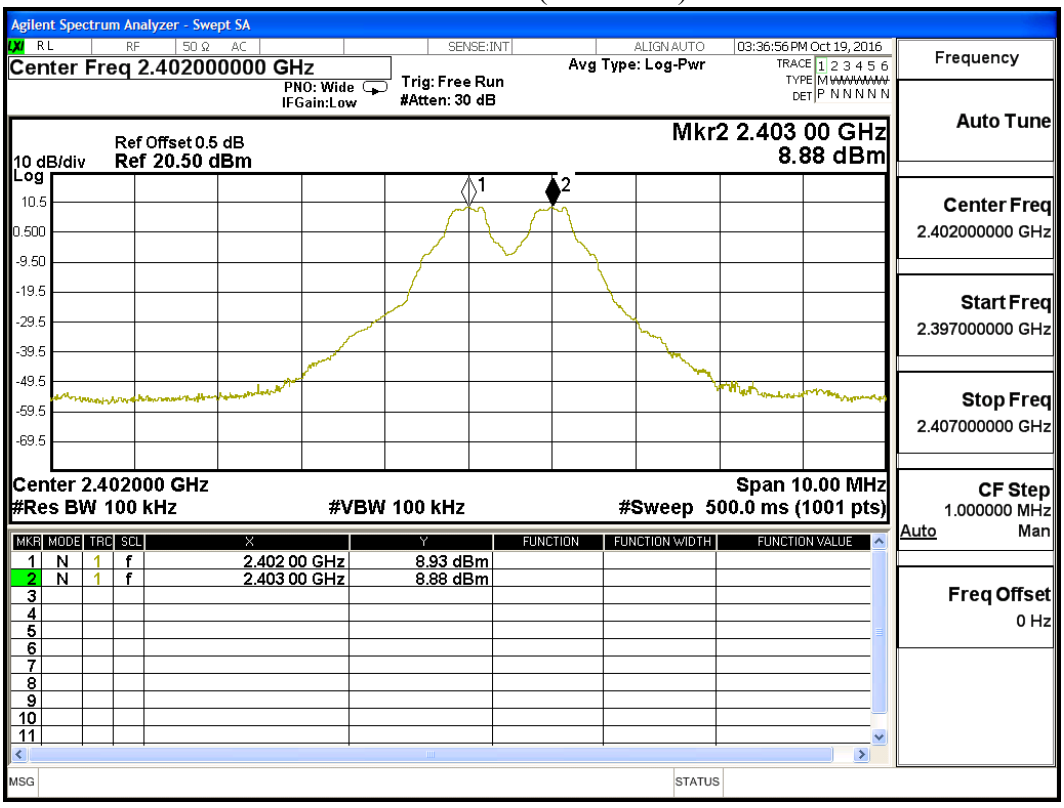
8.5. Test Result of Channel Separation

Product : zoomBox
Test Item : Channel Separation
Test Site : No.3 OATS
Test date : 2016/10/19
Test Mode : Mode 1: Transmit - 1Mbps (GFSK)

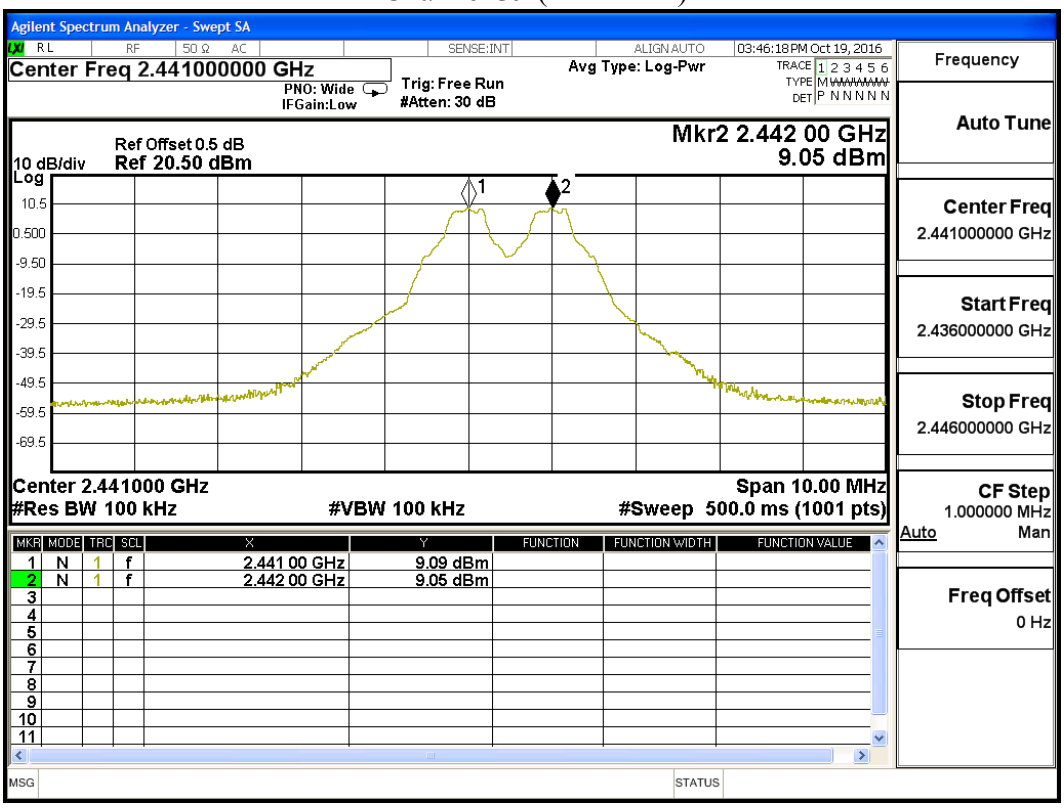
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Limit (kHz)	Limit of (2/3)*20dB Bandwidth (kHz)	Result
00	2402	1000	>25 kHz	680.0	Pass
39	2441	1000	>25 kHz	678.0	Pass
78	2480	1000	>25 kHz	682.0	Pass

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

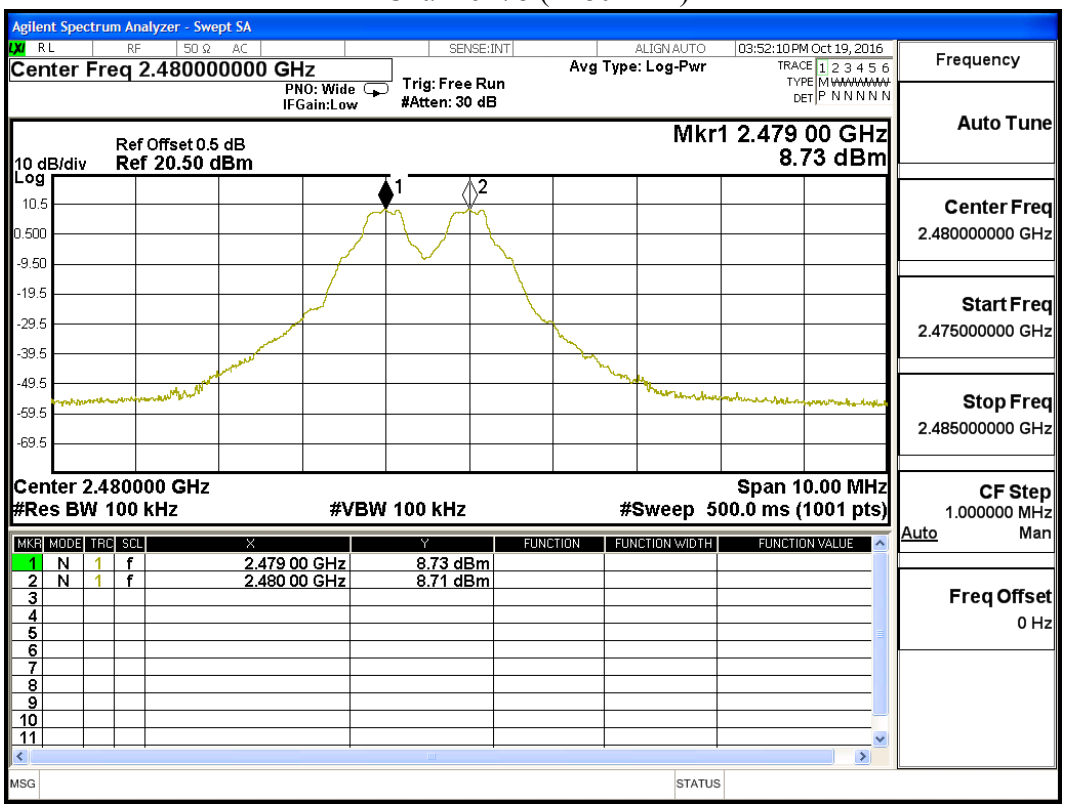
Channel 00 (2402MHz)



Channel 39 (2441MHz)



Channel 78 (2480MHz)

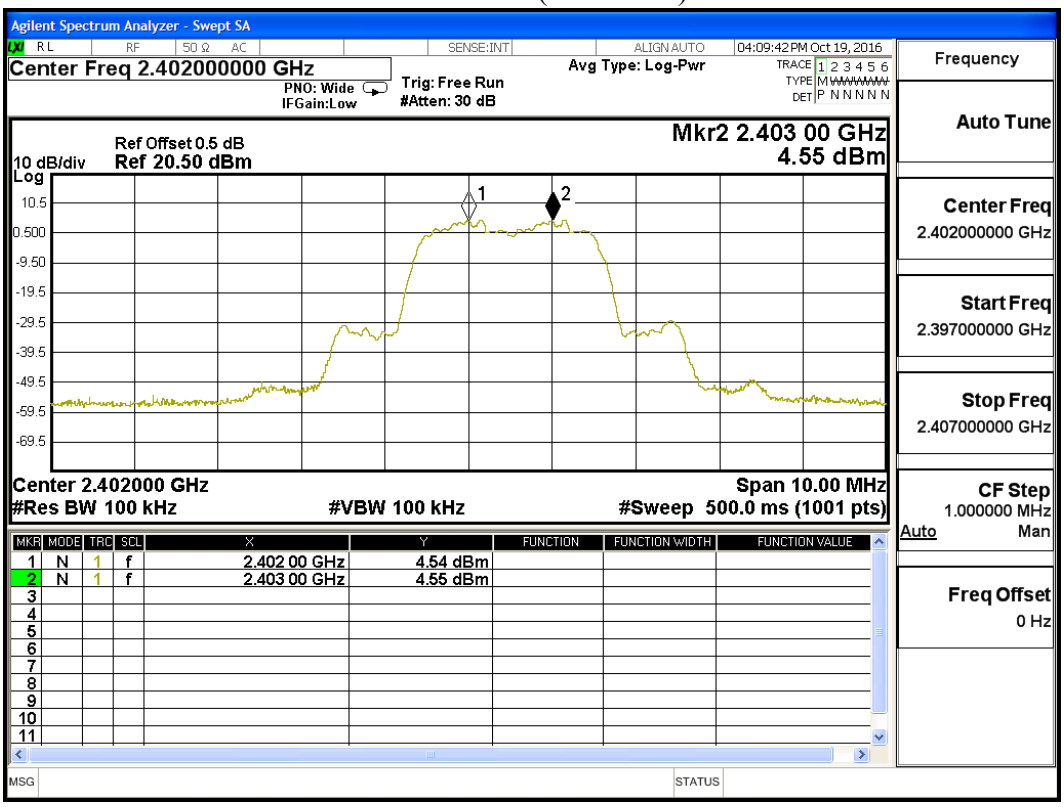


Product : zoomBox
Test Item : Channel Separation
Test Site : No.3 OATS
Test date : 2016/10/19
Test Mode : Mode 2: Transmit - 3Mbps (8DPSK)

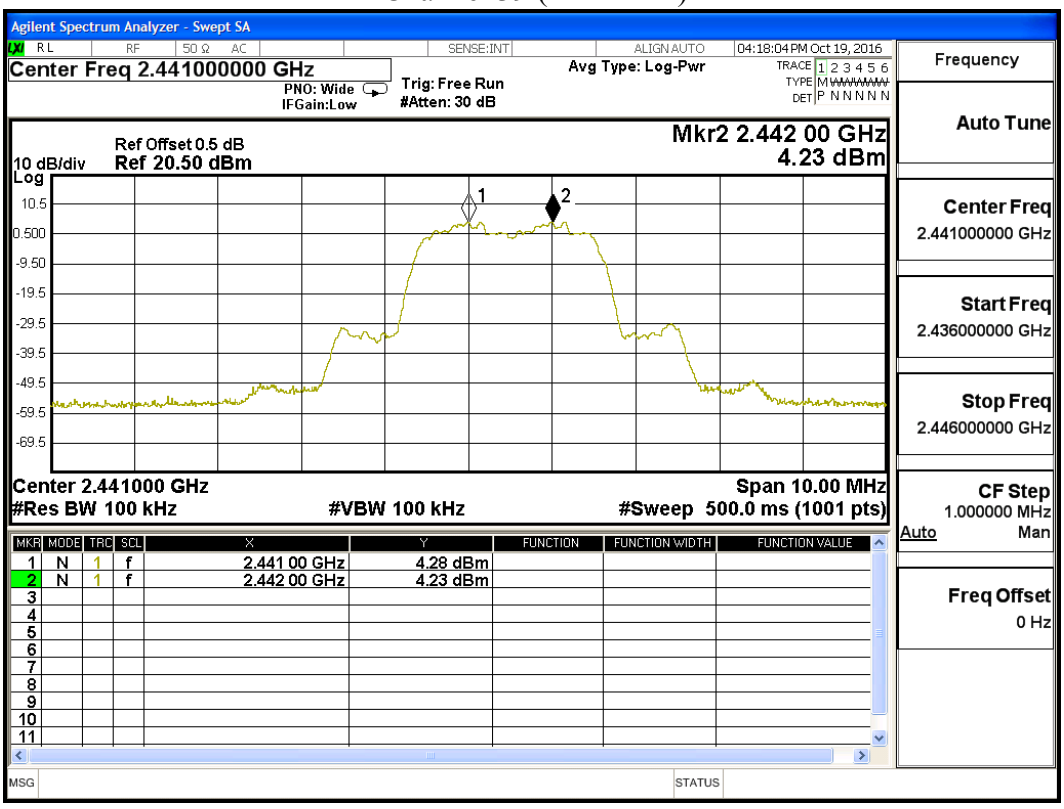
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Limit (kHz)	Limit of (2/3)*20dB Bandwidth (kHz)	Result
00	2402	1000	>25 kHz	880.0	Pass
39	2441	1000	>25 kHz	880.0	Pass
78	2480	1000	>25 kHz	880.0	Pass

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

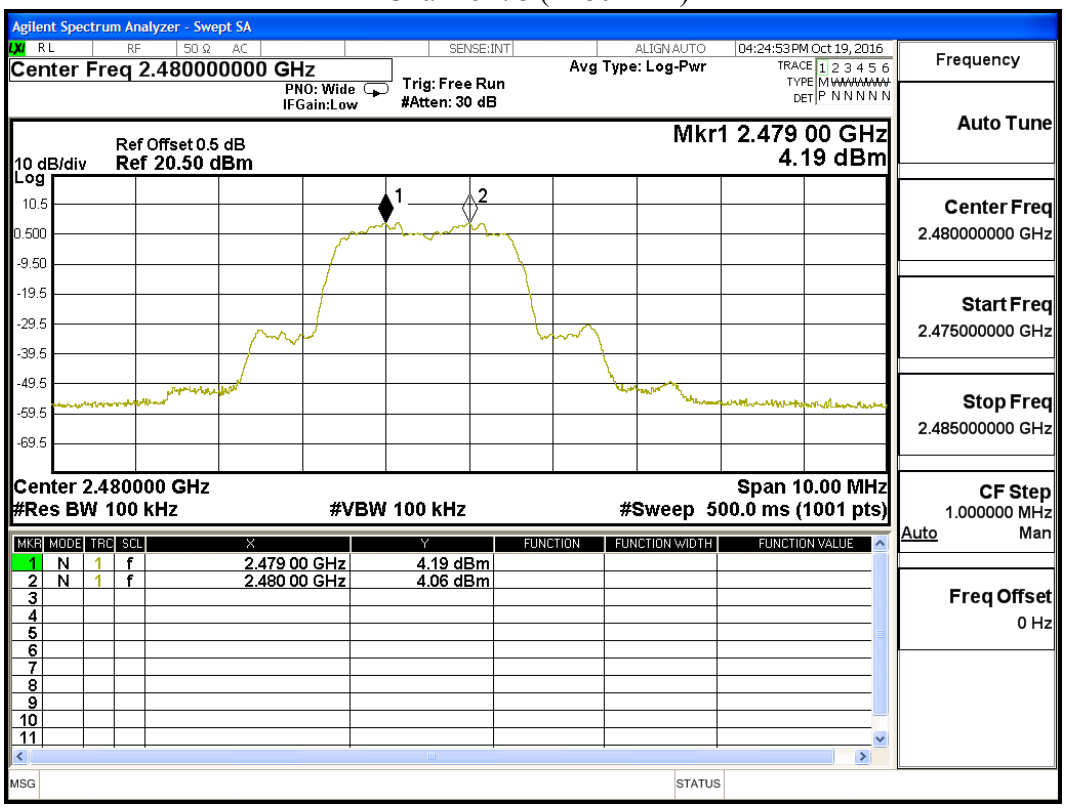
Channel 00 (2402MHz)



Channel 39 (2441MHz)

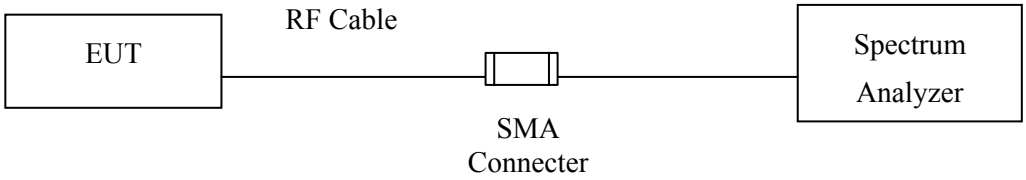


Channel 78 (2480MHz)



9. Dwell Time

9.1. Test Setup



9.2. Limit

The dwell time shall be the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

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

± 25msec

9.5. Test Result of Dwell Time

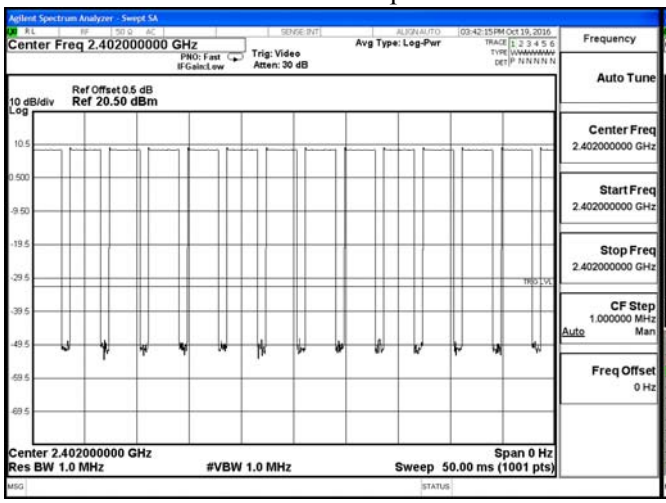
Product : zoomBox
Test Item : Dwell Time
Test Site : No.3 OATS
Test date : 2016/10/19
Test Mode : Mode 1: Transmit - 1Mbps (GFSK) (Channel 00,39,78 –DH5)

Frequency (MHz)	Time slot length (ms)	Hopping of Number	Sweep time (ms)	Duty cycle	Dwell Time (Sec)	Limit (Sec)	Result
2402	2.887	13	50	0.75	0.300	0.4	Pass
2441	2.887	13	50	0.75	0.300	0.4	Pass
2480	2.887	13	50	0.75	0.300	0.4	Pass

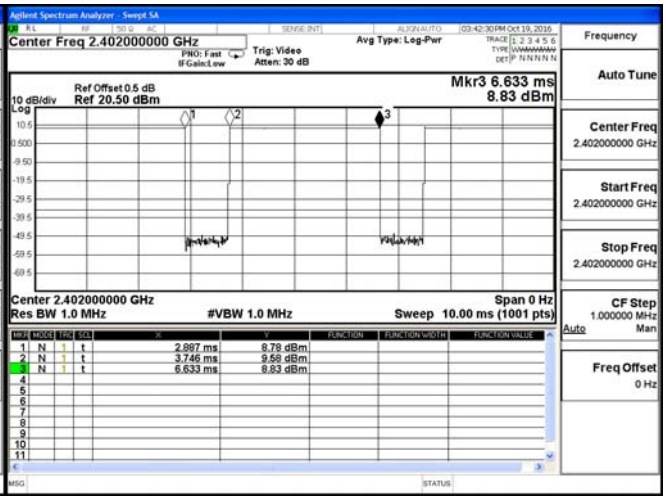
Duty cycle = ((Time slot length(ms)*Hopping of Number) / Sweep time (ms)

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

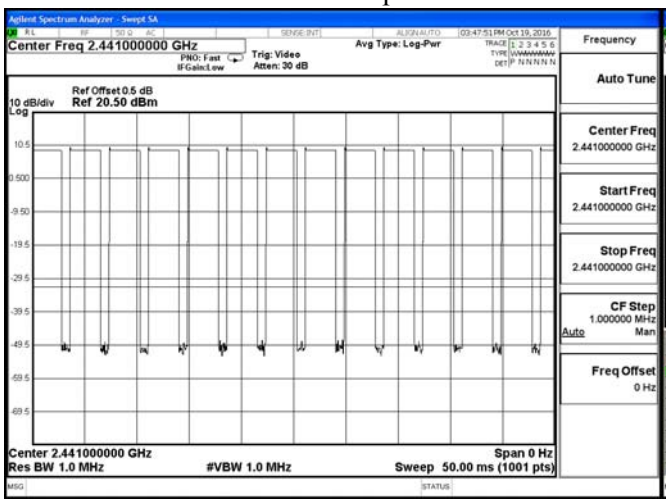
CH 00 Time Interval between hops



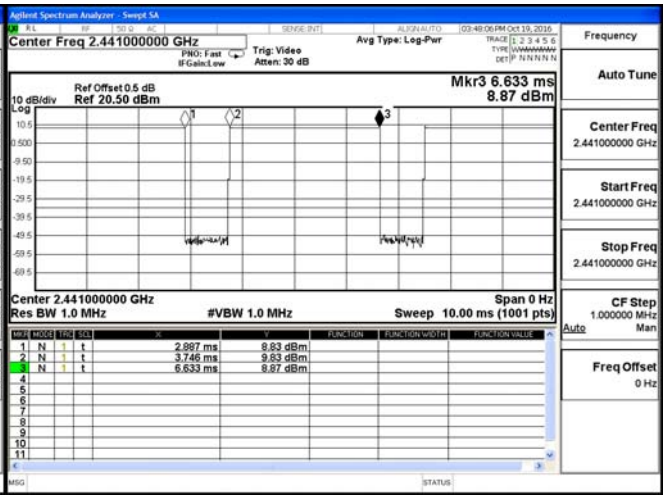
CH 00 Transmission Time



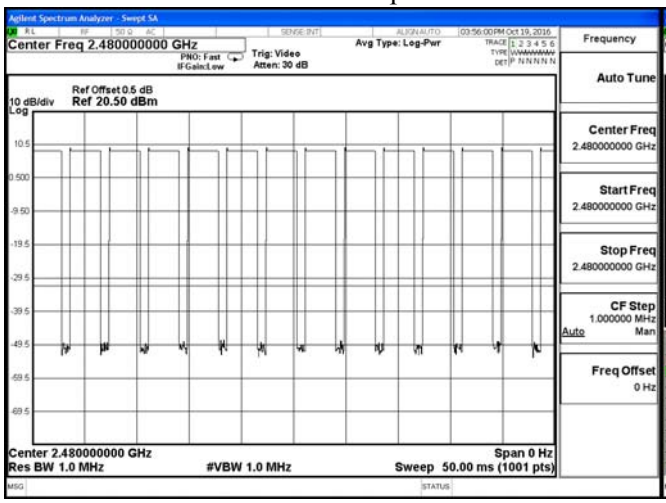
CH39 Time Interval between hops



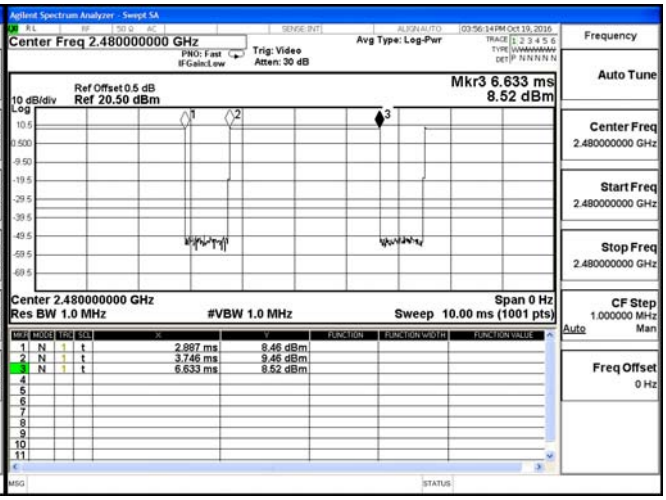
CH 39 Transmission Time



CH 78 Time Interval between hops



CH 78 Transmission Time



Note:

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

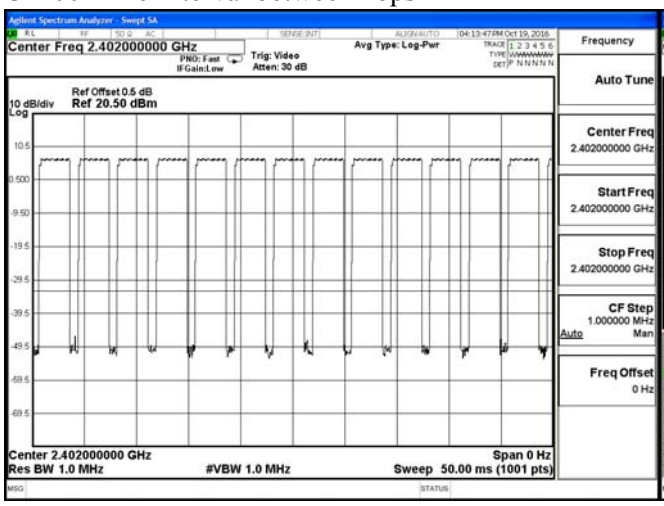
Product : zoomBox
Test Item : Dwell Time
Test Site : No.3 OATS
Test date : 2016/10/19
Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (Channel 00,39,78 –DH5)

Frequency (MHz)	Time slot length (ms)	Hopping of Number	Sweep time (ms)	Duty cycle	Dwell Time (Sec)	Limit (Sec)	Result
2402	2.887	13	50	0.75	0.300	0.4	Pass
2441	2.887	13	50	0.75	0.300	0.4	Pass
2480	2.887	13	50	0.75	0.300	0.4	Pass

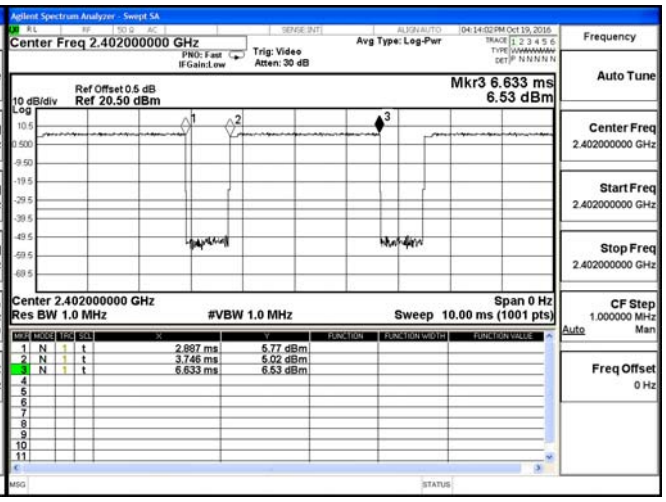
Duty cycle =((Time slot length(ms)*Hopping of Number) / Sweep time (ms)

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

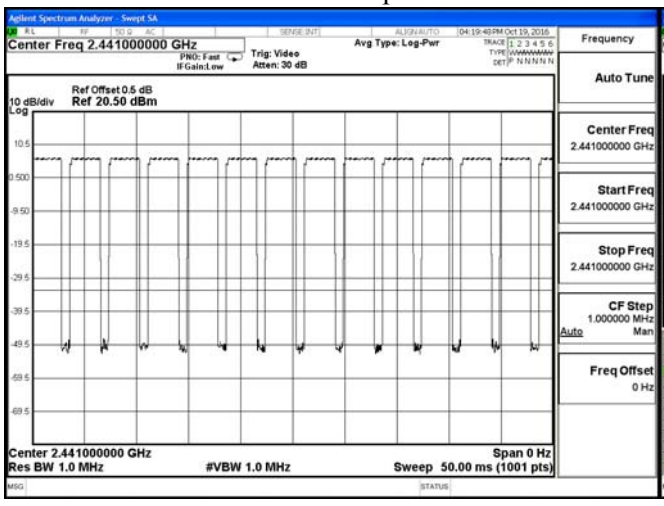
CH 00 Time Interval between hops



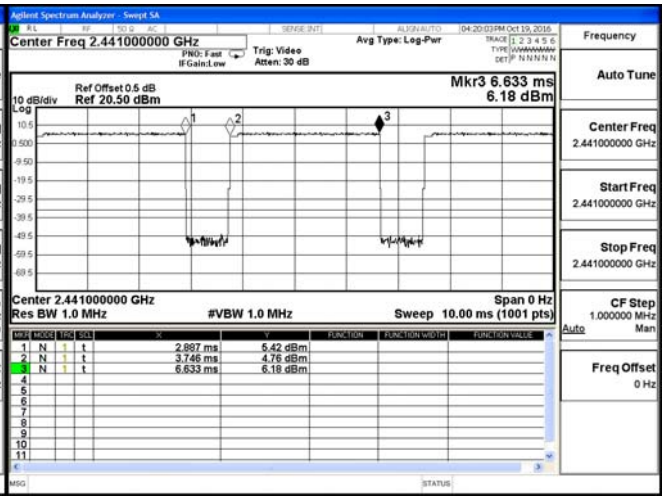
CH 00 Transmission Time



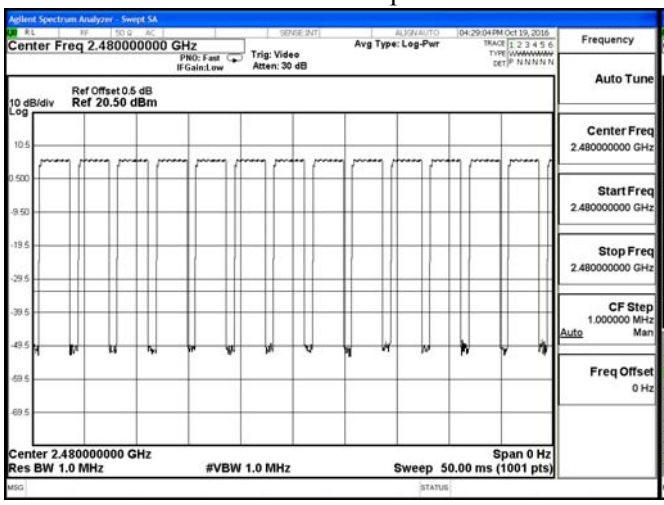
CH39 Time Interval between hops



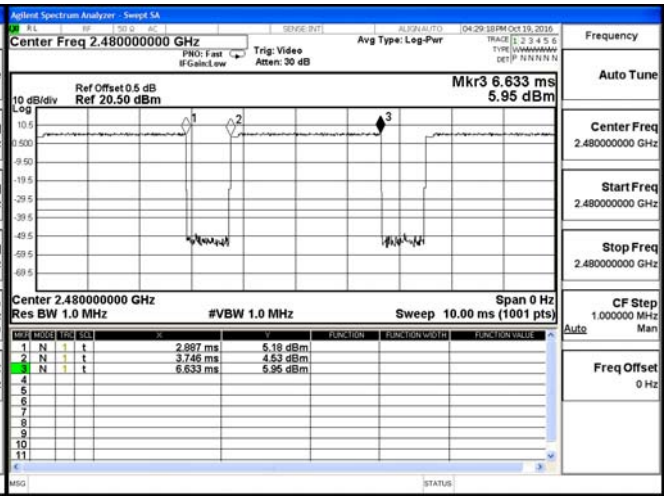
CH 39Transmission Time



CH 78 Time Interval between hops



CH 78 Transmission Time

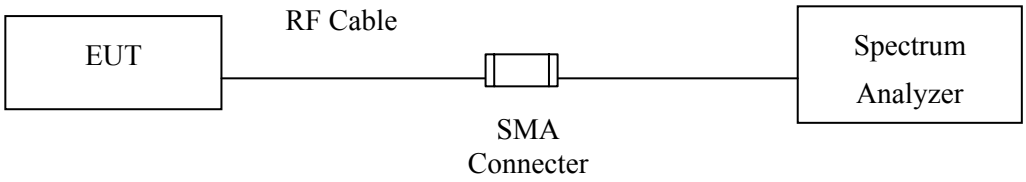


Note:

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

± 283Hz

10.5. Test Result of Occupied Bandwidth

Product : zoomBox
Test Item : Occupied Bandwidth Data
Test Site : No.3 OATS
Test date : 2016/10/19
Test Mode : Mode 1: Transmit - 1Mbps (GFSK)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	1020	--	NA
39	2441	1017	--	NA
78	2480	1023	--	NA

Figure Channel 00:

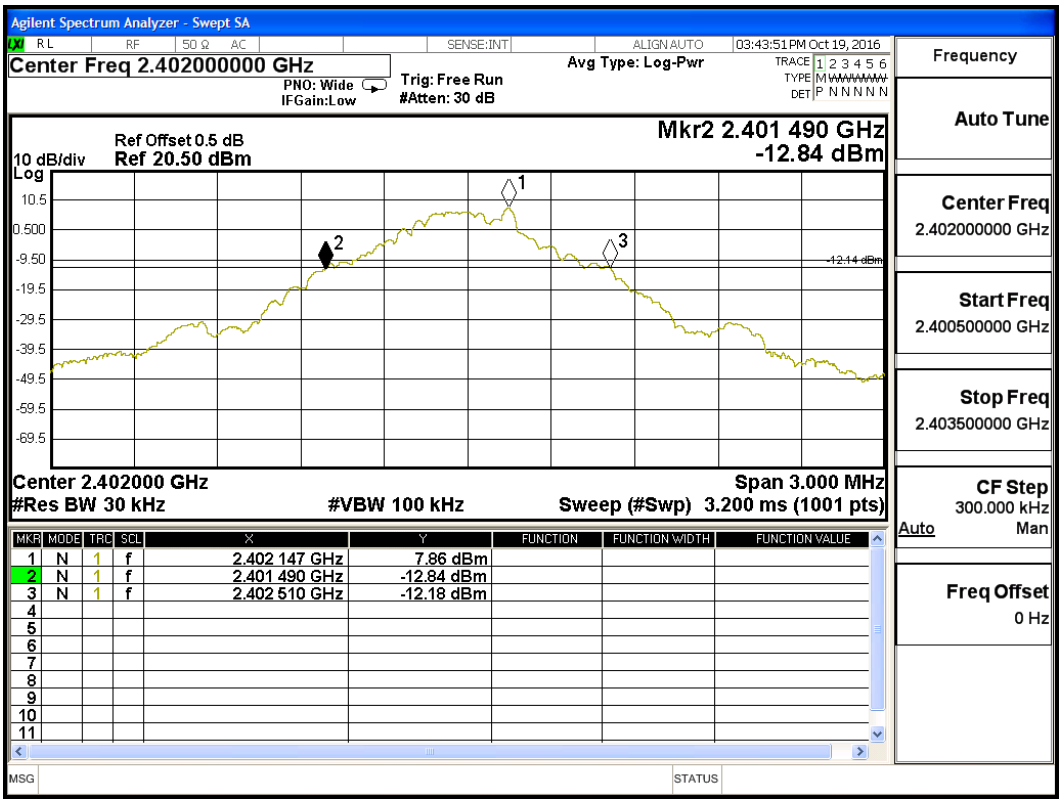


Figure Channel 39:

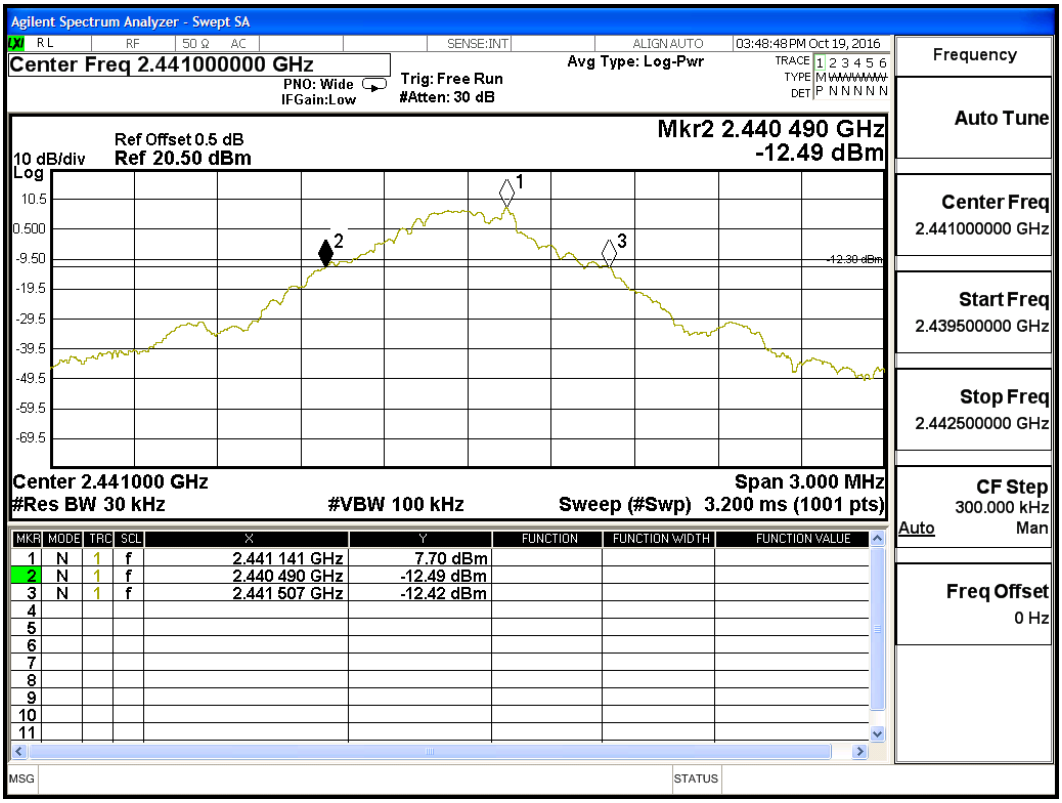
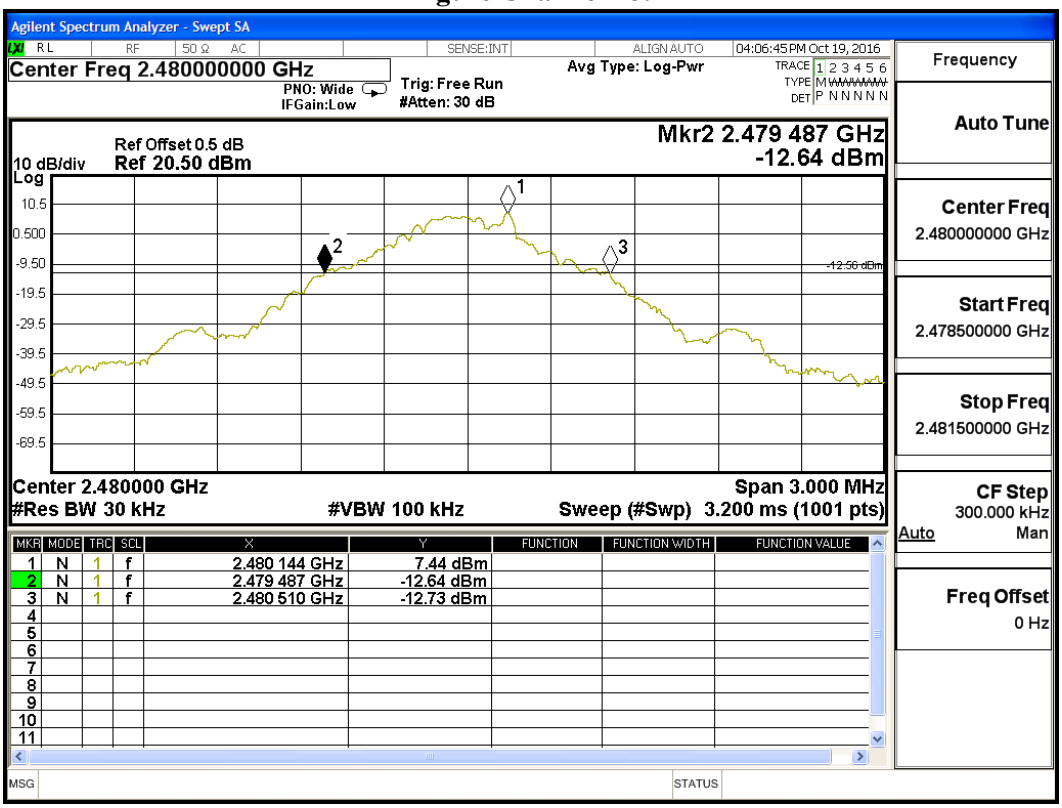


Figure Channel 78:



Product : zoomBox
Test Item : Occupied Bandwidth Data
Test Site : No.3 OATS
Test date : 2016/10/19
Test Mode : Mode 2: Transmit - 3Mbps (8DPSK)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	1320	--	NA
39	2441	1320	--	NA
78	2480	1320	--	NA

Figure Channel 00:

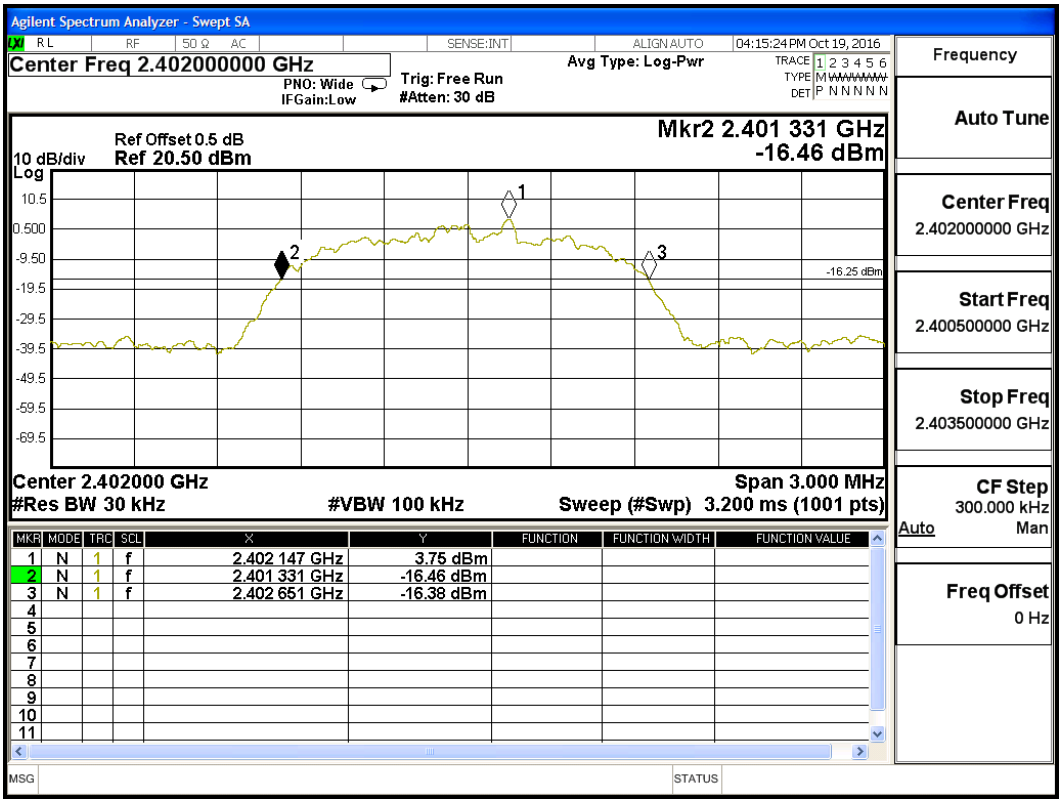


Figure Channel 39:

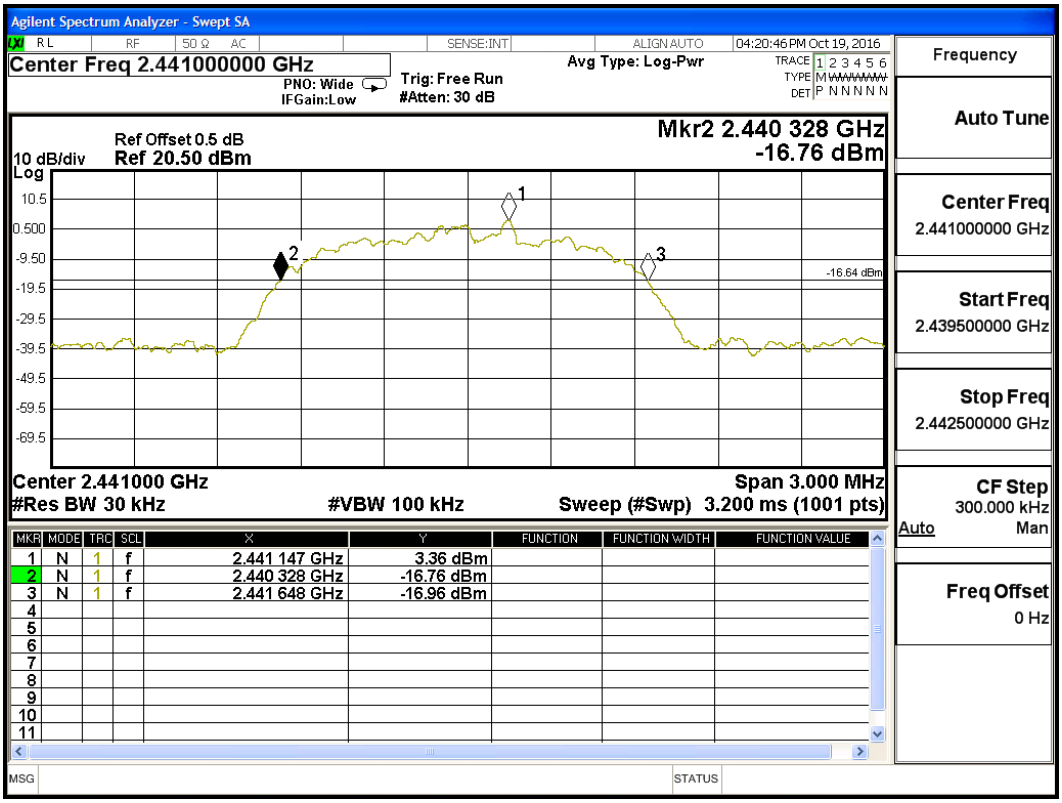
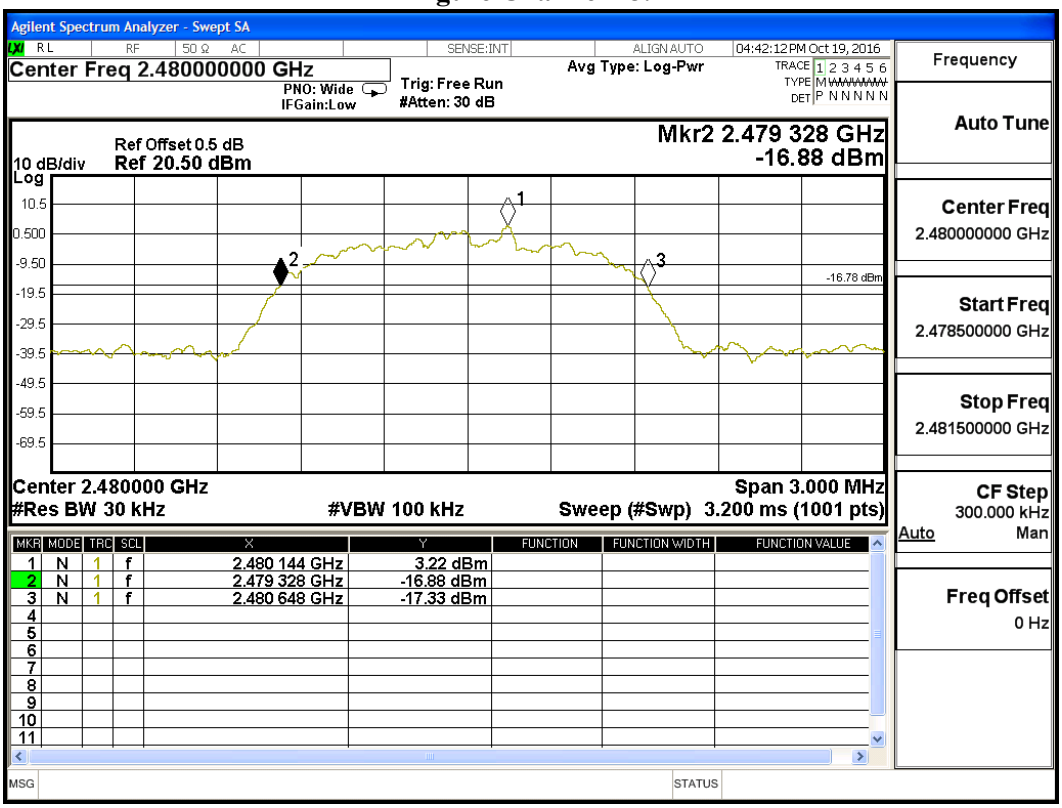


Figure Channel 78:



11. EMI Reduction Method During Compliance Testing

No modification was made during testing.

Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs