FCC Test Report

Product Name	MOBILE DATA TERMINAL
Model No	MT7010
FCC ID.	2ABTU-MT7010

Applicant	RuggON Corporation
Address	4F, No. 298, Yang Guang St. Neihu Dist., Taipei City, Taiwan

Date of Receipt	Aug. 29, 2017
Issue Date	Oct. 23, 2017
Report No.	1780508R-RFUSP12V00-B
Report Version	V1.0

Testing Laboratory
3023

Test Report

Issue Date: Oct. 23, 2017
Report No.: 1780508R-RFUSP12V00-B

Product Name	MOBILE DATA TERMINAL
Applicant	RuggON Corporation
Address	4F, No. 298, Yang Guang St. Neihu Dist., Taipei City, Taiwan
Manufacturer	RuggON Corporation
Model No.	MT7010
FCC ID.	2ABTU-MT7010
EUT Rated Voltage	DC 9-36V
EUT Test Voltage	DC 12V
Trade Name	RuggON
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2016 ANSI C63.4: 2014, ANSI C63.10: 2013 KDB 558074 D01 DTS Meas Guidance v04
Test Result	Complied

Documented By :

(Senior Adm. Specialist / Joanne Lin)

Tested By :

(Engineer / Anson Lu)

Approved By :

(Director / Vincent Lin)

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	MOBILE DATA TERMINAL
Trade Name	RuggON
Model No.	MT7010
FCC ID.	2ABTU-MT7010
Frequency Range	2412-2462MHz for 802.11b/g/n-20BW
Number of Channels	802.11b/g/n-20MHz: 11
Data Speed	802.11b: 1-11Mbps, 802.11g: 6-54Mbps, 802.11n: up to 72.2Mbps
Type of Modulation	802.11b:DSSS (DBPSK, DQPSK, CCK) 802.11g/n:OFDM (BPSK, QPSK, 16QAM, 64QAM)
Antenna Type	PIFA Antenna
Antenna Gain	Refer to the table “Antenna List”
Channel Control	Auto

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	Anjie	MT7010	PIFA Antenna	2.14dBi 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

802.11b/g/n-20MHz Center Frequency of Each Channel:

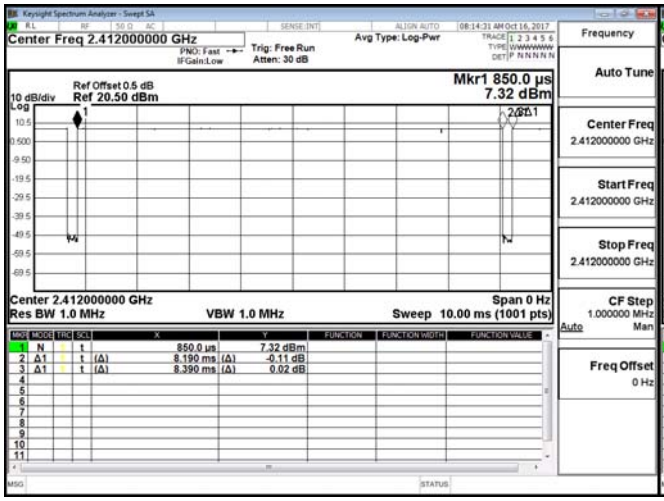
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 01:	2412 MHz	Channel 02:	2417 MHz	Channel 03:	2422 MHz	Channel 04:	2427 MHz
Channel 05:	2432 MHz	Channel 06:	2437 MHz	Channel 07:	2442 MHz	Channel 08:	2447 MHz
Channel 09:	2452 MHz	Channel 10:	2457 MHz	Channel 11:	2462 MHz		

Duty Cycle:

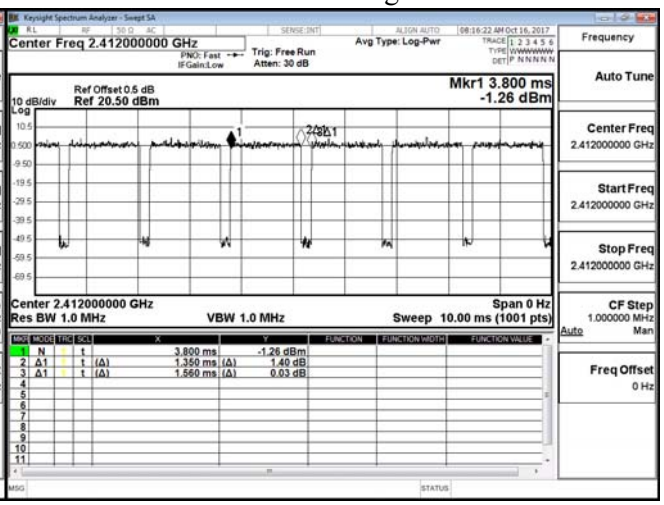
802.11b	0.976
802.11g	0.865
802.11n-20	0.857

*Duty cycle = Ton / (Ton + Toff)

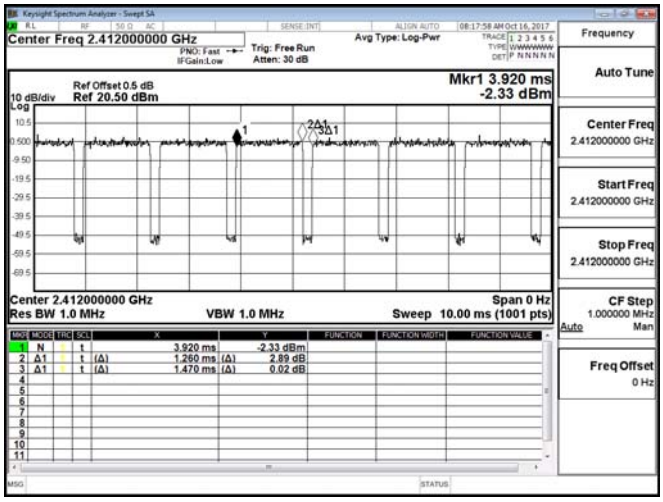
802.11b:



802.11g:



802.11n20:



Note:

1. The EUT is a MOBILE DATA TERMINAL with a built-in WLAN and Bluetooth transceiver, this report for 2.4GHz WLAN.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. At result of pretests, module supports dual-channel transmission, only the worst case is shown in the report.
4. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report. (802.11b is 1Mbps、802.11g is 6Mbps、802.11n(20M-BW) is 7.2Mbps)
5. These tests are conducted on a sample for the purpose of demonstrating compliance of 802.11b/g/n transmitter with Part 15 Subpart C Paragraph 15.247 of spread spectrum devices.
6. 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 (802.11b 1Mbps)
	Mode 2: Transmit (802.11g 6Mbps)
	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

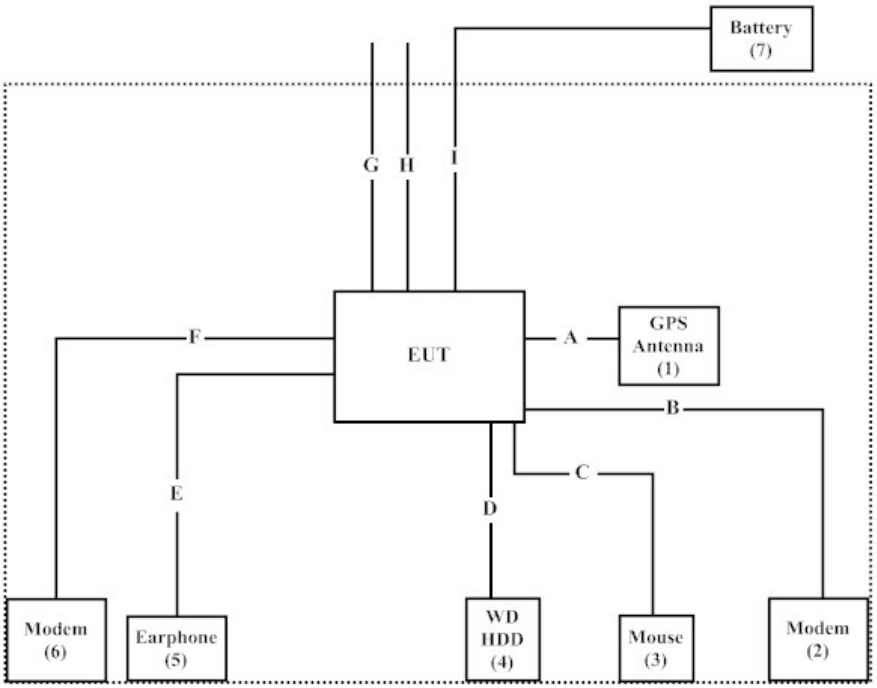
1.3. Tested System Details

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	GPS Antenna	N/A	N/A	N/A	N/A
2	Modem	ACEEX	DM-1414	0102027550	Non-Shielded, 1.8m
3	Mouse	Logitech	M-SBM96B	810-000439	N/A
4	WD HDD 2.5	Western Digital	WD1200BEVS	WXE108L30036	Non-Shielded, 1.8m With Core*1
5	Earphone	Dr.AV	CD-806B	N/A	N/A
6	Modem	ACEEX	DM-1414	0102027533	Non-Shielded, 1.8m
7	DC 12V Battery	TRANE	12B50PE	N/A	N/A

Signal Cable Type		Signal cable Description
A	Signal Cable	Non-Shielded, 1.3m
B	Signal Cable	Non-Shielded, 1.2m
C	Signal Cable	Non-Shielded, 1.8m
D	USB Cable	Non-Shielded, 0.4m
E	Signal Cable	Non-Shielded, 1.8m
F	Signal Cable	Non-Shielded, 1.2m
G	Signal Cable	Non-Shielded, 0.7m
H	Network Cable	Non-Shielded, 1.8m
I	Signal Cable	Non-Shielded, 1.5m

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 Test V3.10.49” 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
The address and introduction of DEKRA Testing and Certification Co., Ltd. laboratories can be founded in our Web site: http://www.dekra.com.tw/index_en.aspx

Site Description: Accredited by TAF
Accredited Number: 3023

Site Name: DEKRA Testing and Certification Co., Ltd
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 : info.tw@dekra.com

FCC Accreditation Number: TW3023

1.7. List of Test Equipment

For Conducted measurements /CB3/SR8

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
	Temperature Chamber	WIT GROUP	TH-1S-B	EQ-201-00146	2016/11/28	2017/11/27
X	Spectrum Analyzer	Agilent	N9010A	MY48030495	2017/7/22	2018/7/21
X	Power Meter	Anritsu	ML2495A	6K00003357	2017/6/23	2018/6/22
X	Pulse power sensor	Anritsu	MA2411B	0846193	2017/6/23	2018/6/22
X	EMI Test Receiver	R&S	ESCS 30	100369	2017/10/13	2018/10/12
X	LISN	R&S	ESH3-Z5	836679/017	2017/1/18	2018/1/17
X	LISN	R&S	ENV216	100097	2017/1/18	2018/1/17
X	Coaxial Cable	QTK(Arnist)	RG 400	LC018-RG	2017/6/25	2018/6/24

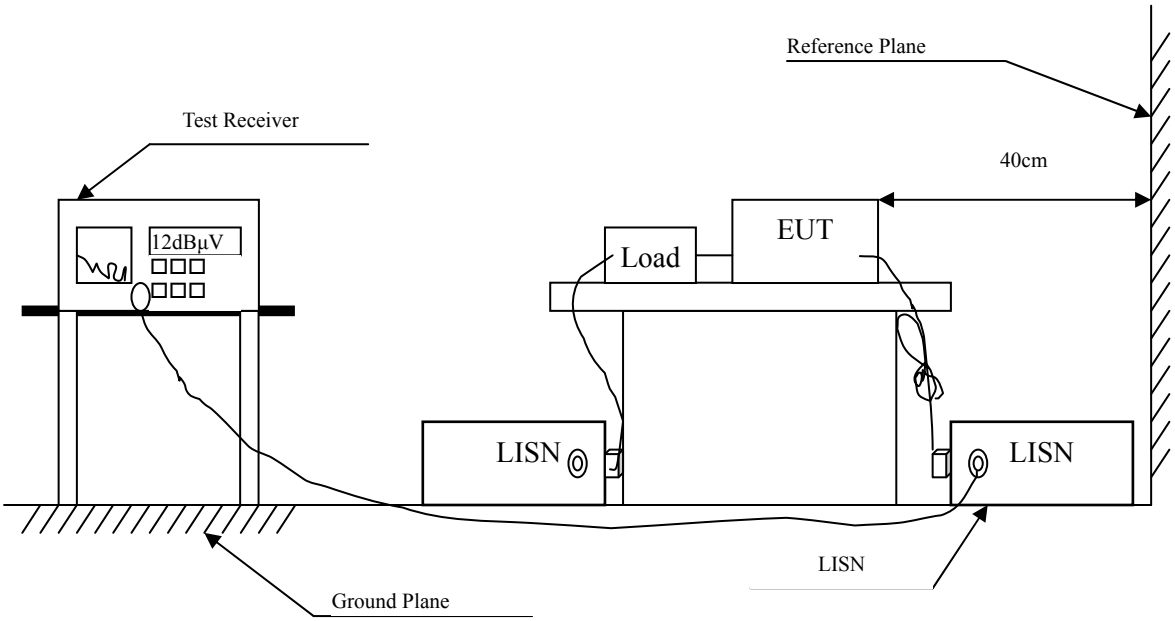
For Radiated measurements /Site3/CB8

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
X	Spectrum Analyzer	R&S	FSP40	100170	2017/1/18	2018/1/17
X	Loop Antenna	Teseq	HLA6121	37133	2017/3/18	2018/3/17
X	Bi-Log Antenna	Schaffner Chase	CBL6112B	2707	2017/6/11	2018/6/10
X	Horn Antenna	ETS-Lindgren	3117	00135205	2017/4/6	2018/4/5
X	Horn Antenna	Schwarzbeck	BBHA9170	9170430	2017/4/14	2018/4/13
X	Pre-Amplifier	QTK	AP/0100A	CHM/0901069	2017/6/23	2018/6/22
X	Pre-Amplifier	EMCI	EMC012630SE	980210	2017/1/26	2018/1/24
X	Pre-Amplifier	NARDA WE	DBL-1840N506	013	2017/9/30	2018/9/29
X	Filter	MicroTRON	BRM50701	019	2016/11/2	2017/11/1
X	Filter	Microwave Circuits	N0257881	36681	2017/1/3	2018/1/2
X	EMI Test Receiver	R&S	ESR26	101385	2017/9/29	2018/9/28
X	Coaxial Cable	QTK(Arnist)	SUCOFLEX 106	L1606-015C	2017/6/23	2018/6/22
X	EMI Test Receiver	R&S	ESCS 30	838251/001	2017/7/21	2018/7/20
X	Coaxial Cable	QTK(Arnist)	RG 214	LC003-RG	2017/6/16	2018/6/15
X	Coaxial signal switch	Anritsu	MP59B	6201415889	2017/6/16	2018/6/15

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	AVG
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

2.3. Test Procedure

The EUT and simulators 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 refers 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 of 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.

2.4. Uncertainty

± 2.26 dB

2.5. Test Result of Conducted Emission

Owing to the DC operation of EUT, this test item is not performed.

3. Peak Power Output

3.1. Test Setup

3.2. Limits

The maximum peak power shall be less 1 Watt.

3.3. Test Procedure

Tested according to DTS test procedure of KDB 558074 for compliance to FCC 47CFR 15.247 requirements. The maximum peak conducted output power using KDB 558074 section 9.1.3 PKPM1 Peak power meter method.

3.4. Uncertainty

± 1.19 dB

3.5. Test Result of Peak Power Output

Product : MOBILE DATA TERMINAL
Test Item : Peak Power Output Data
Test Site : No.3 OATS
Test Date : 2017/10/05
Test Mode : Mode 1: Transmit (802.11b 1Mbps)

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)				Peak Power	Required Limit	Result
		1	2	5.5	11	1		
		Measurement Level (dBm)						
01	2412	13.01	--	--	--	15.97	<30dBm	Pass
06	2437	13.93	13.85	13.78	13.72	16.64	<30dBm	Pass
11	2462	14.51	--	--	--	17.16	<30dBm	Pass

Note: Peak Power Output Value =Reading value on power meter + cable loss

Product : MOBILE DATA TERMINAL
Test Item : Peak Power Output Data
Test Site : No.3 OATS
Test Date : 2017/10/05
Test Mode : Mode 2: Transmit (802.11g 6Mbps)

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power	Required Limit	Result
		6	9	12	18	24	36	48	54	6		
		Measurement Level (dBm)										
01	2412	12.35	--	--	--	--	--	--	--	18.29	<30dBm	Pass
06	2437	13.12	13.05	12.98	12.92	12.85	12.78	12.71	12.63	18.55	<30dBm	Pass
11	2462	12.38	--	--	--	--	--	--	--	17.62	<30dBm	Pass

Note: Peak Power Output Value =Reading value on power meter + cable loss

Product : MOBILE DATA TERMINAL
Test Item : Peak Power Output Data
Test Site : No.3 OATS
Test Date : 2017/10/05
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

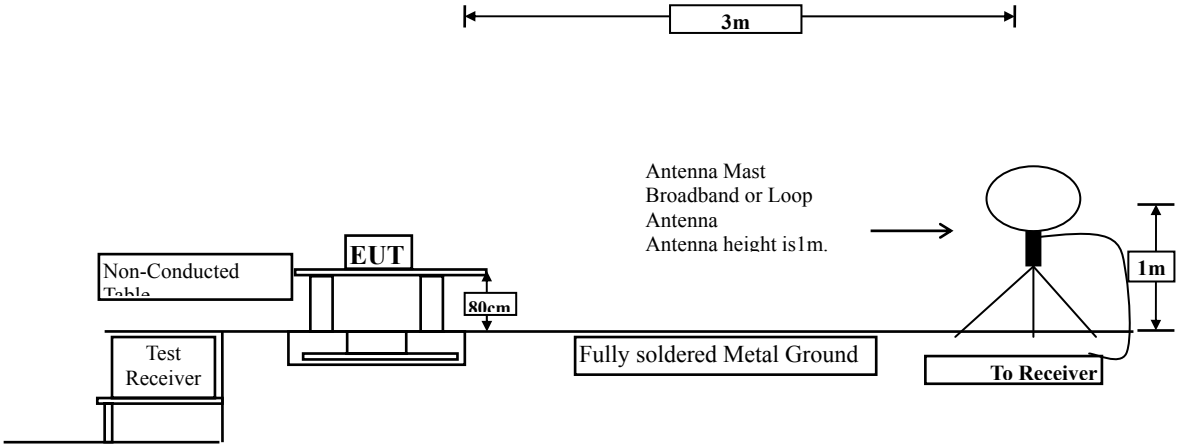
Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power	Required Limit	Result
		7.2	14.4	21.7	28.9	43.3	57.8	65	72.2	7.2		
		Measurement Level (dBm)										
01	2412	11.79	--	--	--	--	--	--	--	17.98	<30dBm	Pass
06	2437	13.07	13.01	12.93	12.85	12.78	12.71	12.62	12.55	18.49	<30dBm	Pass
11	2462	12.81	--	--	--	--	--	--	--	18.34	<30dBm	Pass

Note: Peak Power Output Value =Reading value on power meter + cable loss

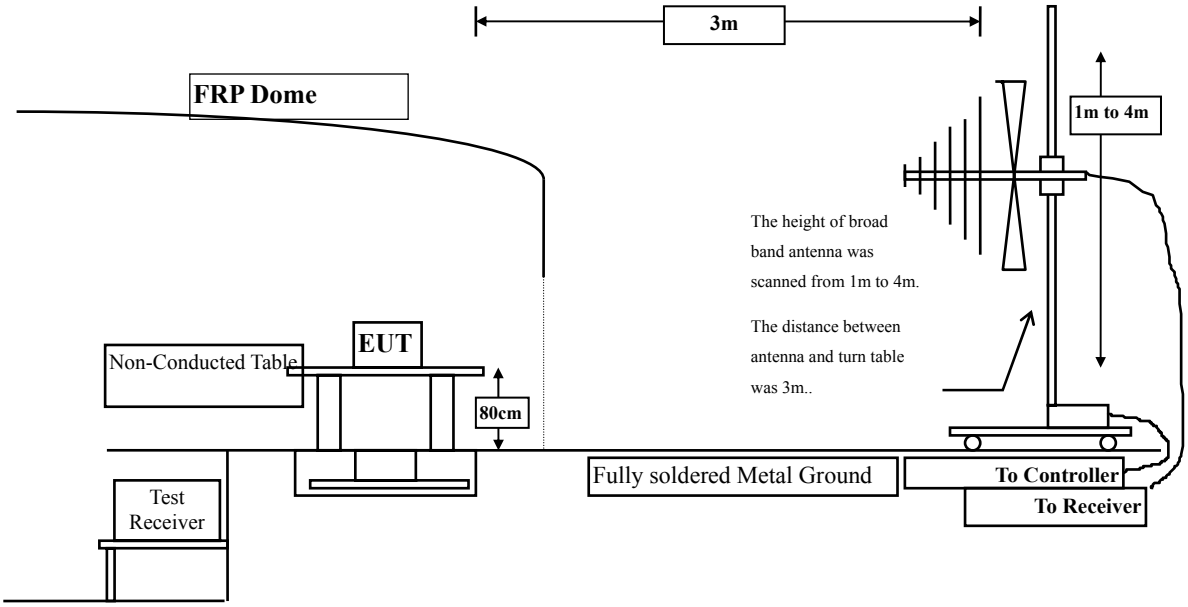
4. Radiated Emission

4.1. Test Setup

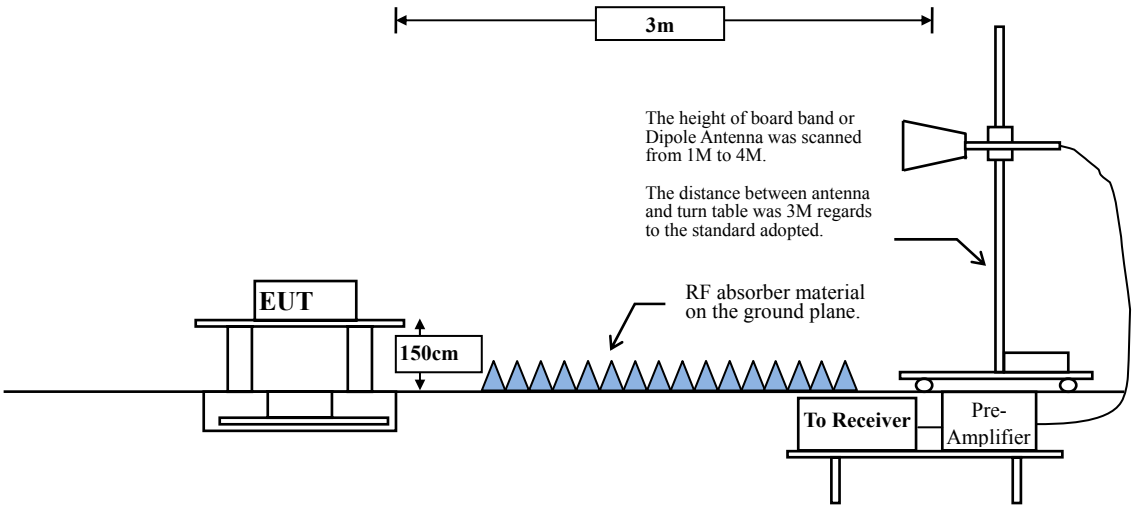
Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



4.2. 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(a) 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: E field strength (dBμV/m) = 20 log E field strength (uV/m)

4.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.
Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground,when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.
The turn table is rotated 360 degrees to determine the position of the maximum emission level.
The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 on radiated measurement.
The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.
Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.
The measurement is divided into the Preliminary Measurement and the Final Measurement.
The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.
The 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.

The average measurement tested according to KDB 558074 section 12.2.5.3. Reduced VBW averaging across on- and off-times of the EUT transmissions with max hold.
VBW ≥ 1/T:

Mode	Duty Cycle	T	1/T	VBW Setting
802.11b	0.976	8.19	122	120 Hz
802.11g	0.865	1.35	741	1kHz
802.11n20	0.857	1.26	794	1kHz

4.4. Uncertainty

± 4.08 dB above 1GHz

± 4.22 dB below 1GHz

4.5. Test Result of Radiated Emission

Product : MOBILE DATA TERMINAL
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2017/10/13
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4824.000	2.428	40.202	42.631	-31.369	74.000
7236.000	9.177	38.191	47.368	-26.632	74.000
9648.000	10.019	37.882	47.902	-26.098	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4824.000	2.836	40.051	42.888	-31.112	74.000
7236.000	9.676	38.556	48.232	-25.768	74.000
9648.000	10.556	37.502	48.059	-25.941	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 = 120 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	:	MOBILE DATA TERMINAL
Test Item	:	Harmonic Radiated Emission Data
Test Site	:	No.3 OATS
Test Date	:	2017/10/13
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2437 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4874.000	2.076	39.901	41.978	-32.022	74.000
7311.000	9.512	37.359	46.871	-27.129	74.000
9748.000	9.630	38.784	48.414	-25.586	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4874.000	2.532	39.518	42.050	-31.950	74.000
7311.000	10.089	37.651	47.740	-26.260	74.000
9748.000	10.266	38.931	49.198	-24.802	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 = 120 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 : MOBILE DATA TERMINAL
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2017/10/13
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4924.000	2.191	39.859	42.050	-31.950	74.000
7386.000	10.373	37.314	47.688	-26.312	74.000
9848.000	9.964	38.720	48.684	-25.316	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4924.000	2.805	39.878	42.683	-31.317	74.000
7386.000	11.180	37.236	48.416	-25.584	74.000
9848.000	10.801	38.372	49.173	-24.827	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 = 120 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 : MOBILE DATA TERMINAL
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2017/10/13
Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4824.000	2.428	39.821	42.250	-31.750	74.000
7236.000	9.177	37.922	47.099	-26.901	74.000
9648.000	10.019	37.793	47.813	-26.187	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4824.000	2.836	40.448	43.285	-30.715	74.000
7236.000	9.676	38.335	48.011	-25.989	74.000
9648.000	10.556	37.234	47.791	-26.209	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 = 1k 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	:	MOBILE DATA TERMINAL
Test Item	:	Harmonic Radiated Emission Data
Test Site	:	No.3 OATS
Test Date	:	2017/10/13
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2437 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4874.000	2.076	39.403	41.480	-32.520	74.000
7311.000	9.512	37.467	46.979	-27.021	74.000
9748.000	9.630	38.787	48.417	-25.583	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4874.000	2.532	39.496	42.028	-31.972	74.000
7311.000	10.089	37.762	47.851	-26.149	74.000
9748.000	10.266	38.933	49.200	-24.800	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 = 1k 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 : MOBILE DATA TERMINAL
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2017/10/13
Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4924.000	2.191	39.316	41.507	-32.493	74.000
7386.000	10.373	37.301	47.675	-26.325	74.000
9848.000	9.964	37.987	47.951	-26.049	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4924.000	2.805	37.447	40.252	-33.748	74.000
7386.000	11.180	37.317	48.497	-25.503	74.000
9848.000	10.801	38.379	49.180	-24.820	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 = 1k 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 : MOBILE DATA TERMINAL
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2017/10/13
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)(2412MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4824.000	2.428	40.113	42.542	-31.458	74.000
7236.000	9.177	37.157	46.334	-27.666	74.000
9648.000	10.019	37.647	47.667	-26.333	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4824.000	2.836	39.813	42.650	-31.350	74.000
7236.000	9.676	37.405	47.081	-26.919	74.000
9648.000	10.556	37.262	47.819	-26.181	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 = 1k 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	:	MOBILE DATA TERMINAL
Test Item	:	Harmonic Radiated Emission Data
Test Site	:	No.3 OATS
Test Date	:	2017/10/13
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2437 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV/m	dB	dBµV/m
Horizontal					
Peak Detector:					
4874.000	2.076	40.206	42.283	-31.717	74.000
7311.000	9.512	37.398	46.910	-27.090	74.000
9748.000	9.630	38.528	48.158	-25.842	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4874.000	2.532	39.348	41.880	-32.120	74.000
7311.000	10.089	37.964	48.053	-25.947	74.000
9748.000	10.266	38.715	48.982	-25.018	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 = 1k 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 : MOBILE DATA TERMINAL
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2017/10/13
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4924.000	2.191	39.673	41.864	-32.136	74.000
7386.000	11.180	37.841	49.021	-24.979	74.000
9848.000	10.801	38.191	48.992	-25.008	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4924.000	2.805	40.028	42.833	-31.167	74.000
7386.000	11.180	37.082	48.262	-25.738	74.000
9848.000	10.801	37.855	48.656	-25.344	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 = 1k 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	:	MOBILE DATA TERMINAL
Test Item	:	General Radiated Emission Data
Test Site	:	No.3 OATS
Test Date	:	2017/10/13
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps) (2437 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV/m	dB	dBµV/m
Horizontal					
120.210	-7.275	41.957	34.682	-8.818	43.500
268.620	-5.522	36.461	30.939	-15.061	46.000
410.240	-0.122	38.640	38.519	-7.481	46.000
614.910	2.991	34.604	37.595	-8.405	46.000
800.180	6.417	33.950	40.367	-5.633	46.000
984.480	8.098	33.472	41.570	-12.430	54.000
Vertical					
144.460	-5.503	41.349	35.846	-7.654	43.500
246.310	-5.733	40.389	34.656	-11.344	46.000
409.270	-4.434	36.294	31.860	-14.140	46.000
613.940	1.782	35.827	37.609	-8.391	46.000
819.580	3.001	35.378	38.379	-7.621	46.000
967.990	3.907	33.814	37.721	-16.279	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.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product	:	MOBILE DATA TERMINAL
Test Item	:	General Radiated Emission Data
Test Site	:	No.3 OATS
Test Date	:	2017/10/13
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2437 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
102.750	-8.666	42.848	34.182	-9.318	43.500
409.270	0.046	39.353	39.399	-6.601	46.000
512.090	3.184	38.886	42.070	-3.930	46.000
692.510	3.667	34.011	37.678	-8.322	46.000
909.790	6.418	33.552	39.970	-6.030	46.000
983.510	7.887	34.060	41.947	-12.053	54.000
Vertical					
157.070	-5.195	39.088	33.893	-9.607	43.500
377.260	0.647	34.105	34.752	-11.248	46.000
614.910	1.701	34.999	36.700	-9.300	46.000
716.760	-1.321	37.391	36.070	-9.930	46.000
818.610	2.979	34.580	37.559	-8.441	46.000
935.010	2.763	34.157	36.920	-9.080	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 = 1k 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 : MOBILE DATA TERMINAL
Test Item : General Radiated Emission Data
Test Site : No.3 OATS
Test Date : 2017/10/13
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2437 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
144.460	-7.703	38.300	30.597	-12.903	43.500
409.270	0.046	39.257	39.303	-6.697	46.000
545.070	4.555	33.368	37.923	-8.077	46.000
716.760	3.809	37.968	41.777	-4.223	46.000
874.870	5.765	33.190	38.955	-7.045	46.000
1000.000	9.564	32.483	42.047	-11.953	54.000
Vertical					
143.490	-5.525	40.143	34.618	-8.882	43.500
291.900	-5.272	42.790	37.518	-8.482	46.000
512.090	0.604	34.932	35.536	-10.464	46.000
691.540	2.092	33.884	35.976	-10.024	46.000
818.610	2.979	34.076	37.055	-8.945	46.000
930.160	3.830	34.115	37.945	-8.055	46.000

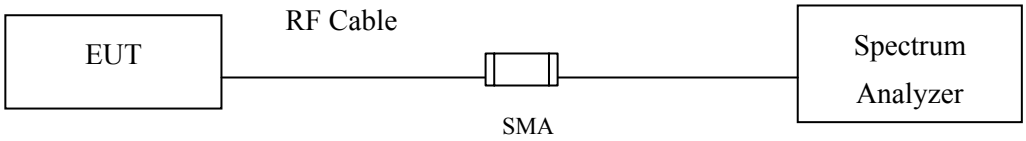
Note:

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 = 1k 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

RF antenna Conducted Measurement:



5.2. Limits

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)).

5.3. Test Procedure

The EUT was tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.
Set RBW = 100 kHz, Set VBW> RBW, scan up through 10th harmonic.

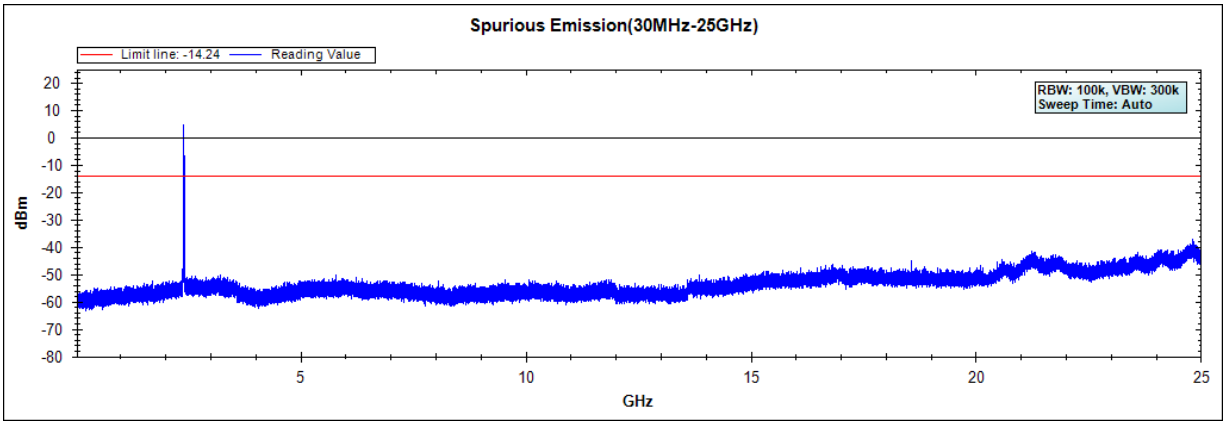
5.4. Uncertainty

The measurement uncertainty
Conducted is defined as ± 1.20dB

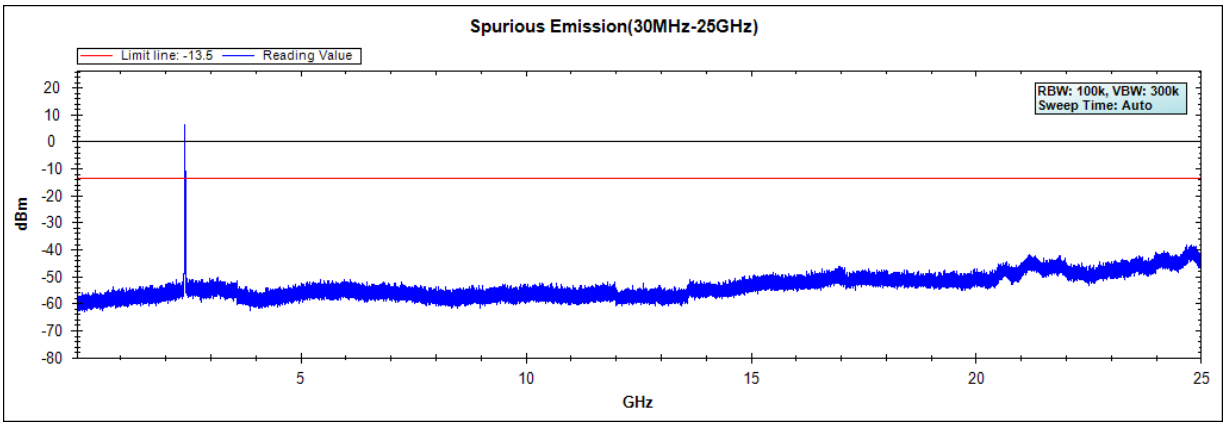
5.5. Test Result of RF antenna conducted test

Product	:	MOBILE DATA TERMINAL
Test Item	:	RF antenna conducted test
Test Site	:	No.3 OATS
Test Date	:	2017/10/05
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps)

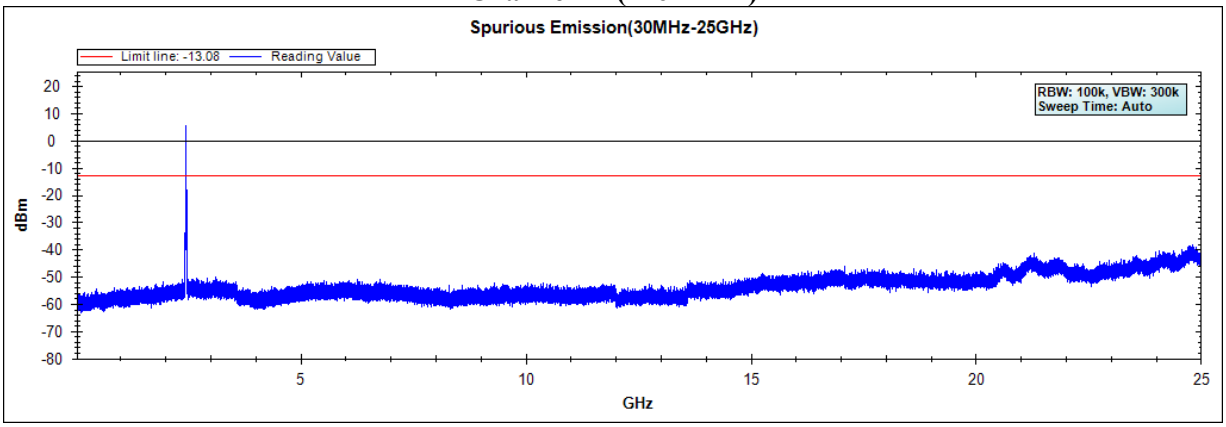
Channel 01 (2412MHz)



Channel 06 (2437MHz)



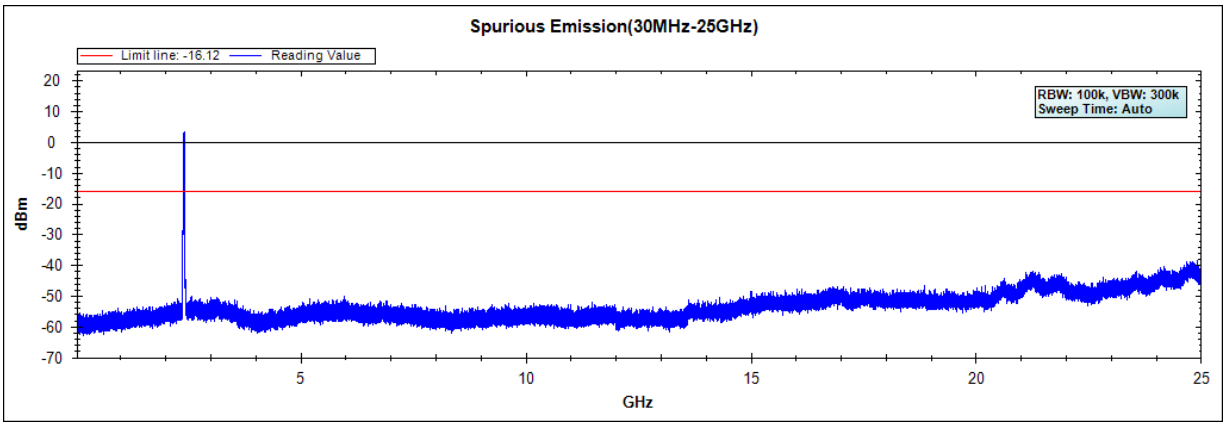
Channel 11 (2462MHz)



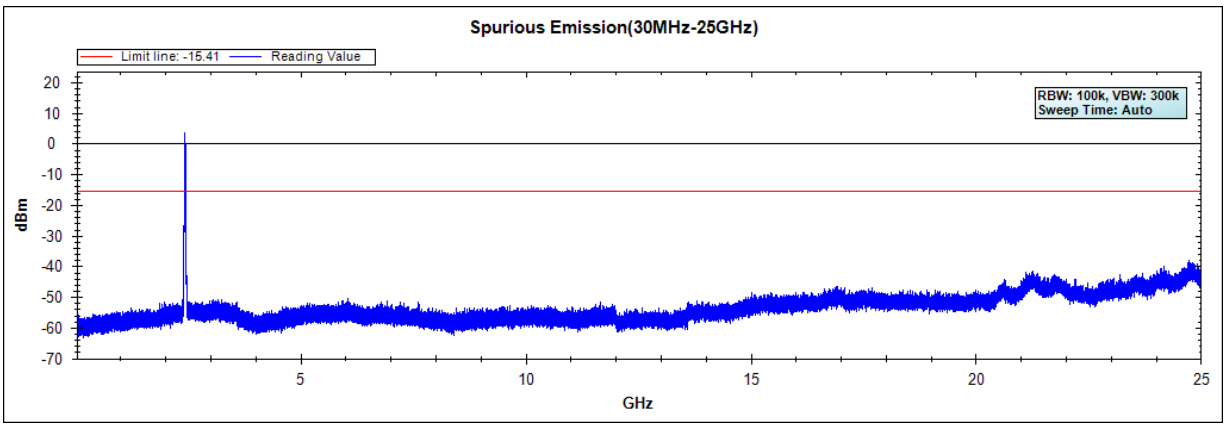
Note: The above test pattern is synthesized by multiple of the frequency range.

Product	:	MOBILE DATA TERMINAL
Test Item	:	RF Antenna Conducted Spurious
Test Site	:	No.3 OATS
Test Date	:	2017/10/05
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps)

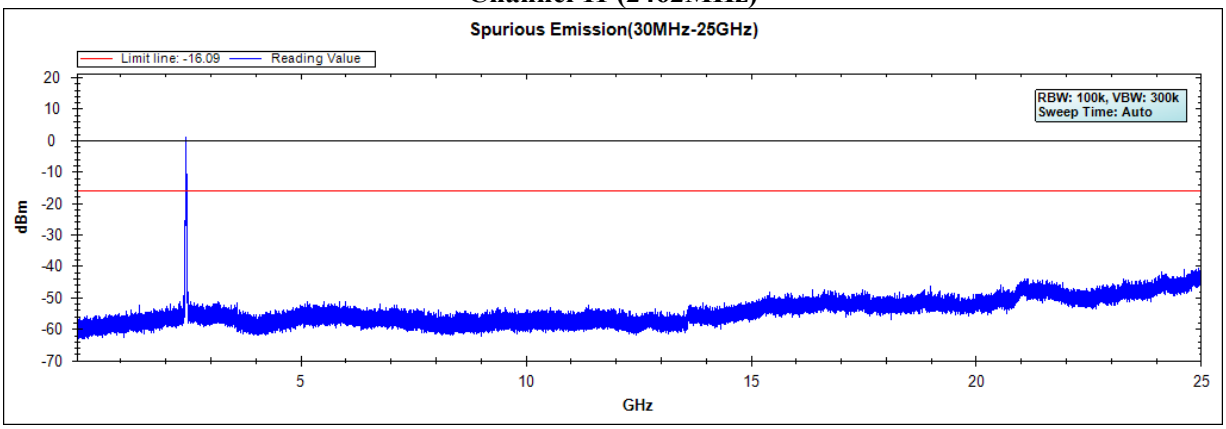
Channel 01 (2412MHz)



Channel 06 (2437MHz)



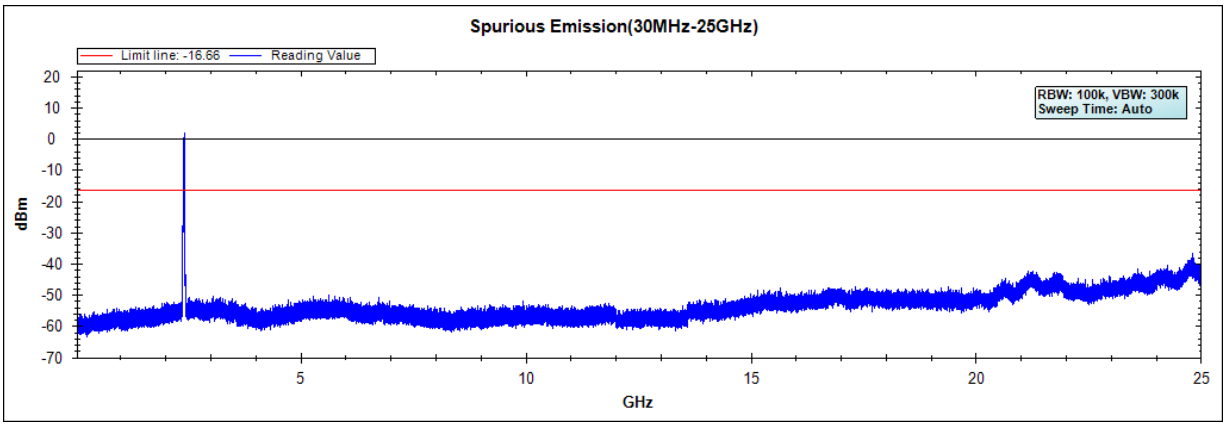
Channel 11 (2462MHz)



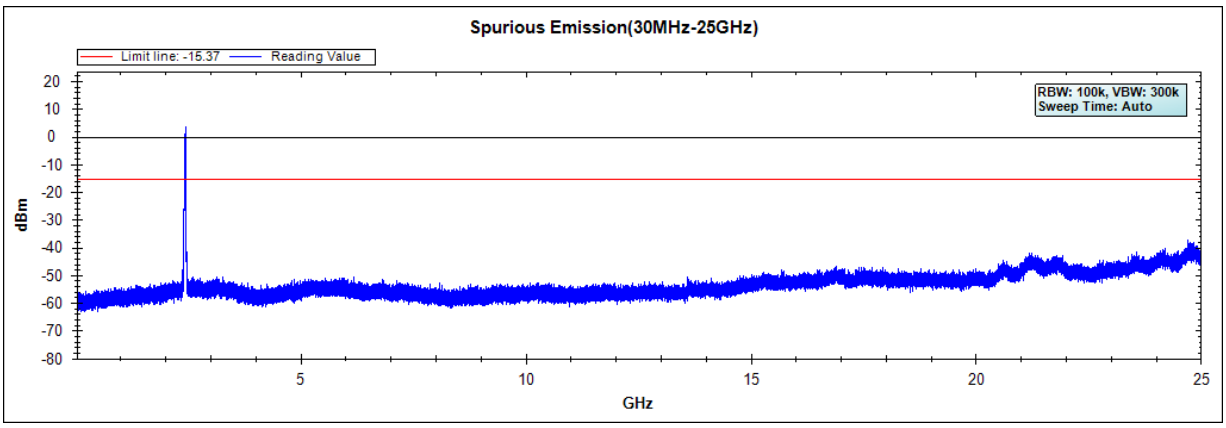
Note: The above test pattern is synthesized by multiple of the frequency range.

Product	:	MOBILE DATA TERMINAL
Test Item	:	RF Antenna Conducted Spurious
Test Site	:	No.3 OATS
Test Date	:	2017/10/05
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

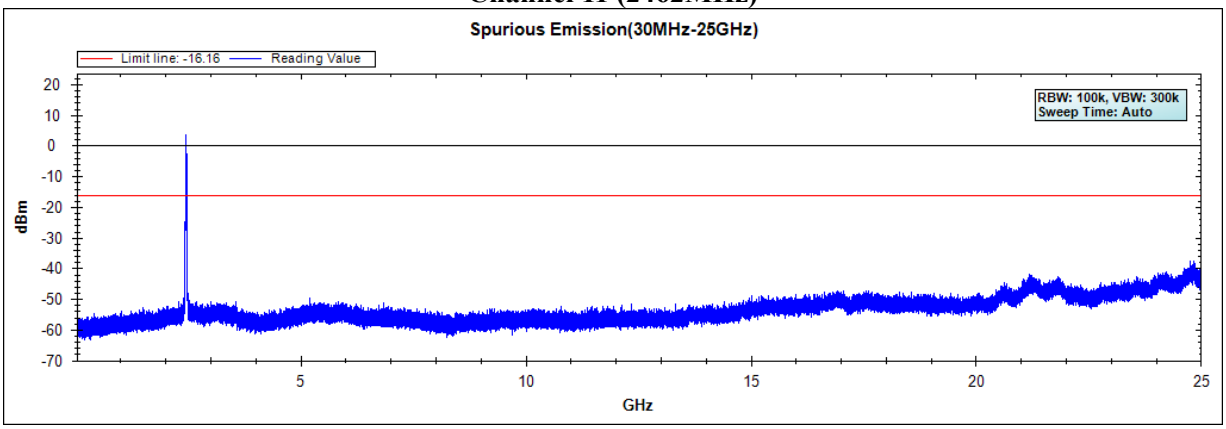
Channel 01 (2412MHz)



Channel 06 (2437MHz)



Channel 11 (2462MHz)

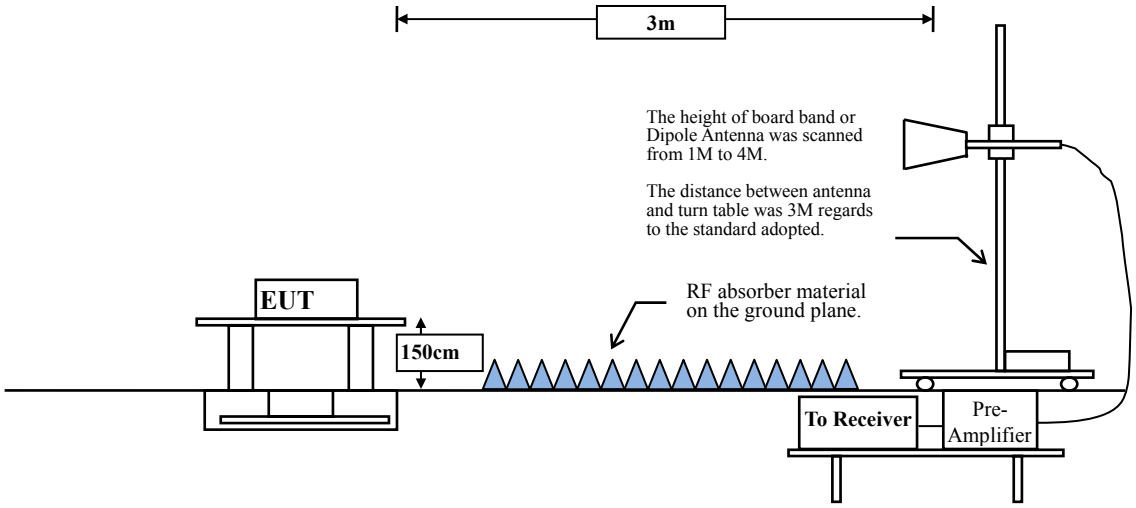


Note: The above test pattern is synthesized by multiple of the frequency range.

6. Band Edge

6.1. Test Setup

RF Radiated Measurement:



6.2. 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.

6.3. Test Procedure

The EUT was setup according to ANSI C63.10:2013 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.
The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.

The average measurement tested according to KDB 558074 section 12.2.5.3. Reduced VBW averaging across on- and off-times of the EUT transmissions with max hold.
VBW ≥ 1/T:

Mode	Duty Cycle	T	1/T	VBW Setting
802.11 b	0.976	8.19	122	120 Hz
802.11 g	0.865	1.35	741	1k Hz
802.11 n20	0.857	1.26	794	1k Hz

6.4. Uncertainty

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

6.5. Test Result of Band Edge

Product : MOBILE DATA TERMINAL
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Date : 2017/10/16
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
01 (Peak)	2387.100	-2.699	47.790	45.090	74.00	54.00	Pass
01 (Peak)	2390.000	-2.687	44.425	41.738	74.00	54.00	Pass
01 (Peak)	2398.200	-2.663	63.112	60.449	74.00	54.00	Pass
01 (Peak)	2400.000	-2.660	56.547	53.887	--	--	--
01 (Peak)	2411.000	-2.644	97.100	94.456	--	--	--
01 (Average)	2386.700	-2.701	39.843	37.142	74.00	54.00	Pass
01 (Average)	2390.000	-2.687	34.244	31.557	74.00	54.00	Pass
01 (Average)	2397.300	-2.664	59.609	56.945	74.00	54.00	Pass
01 (Average)	2400.000	-2.660	51.558	48.898	--	--	--
01 (Average)	2411.200	-2.643	94.479	91.836	--	--	--

Figure Channel 01: Horizontal (Peak)

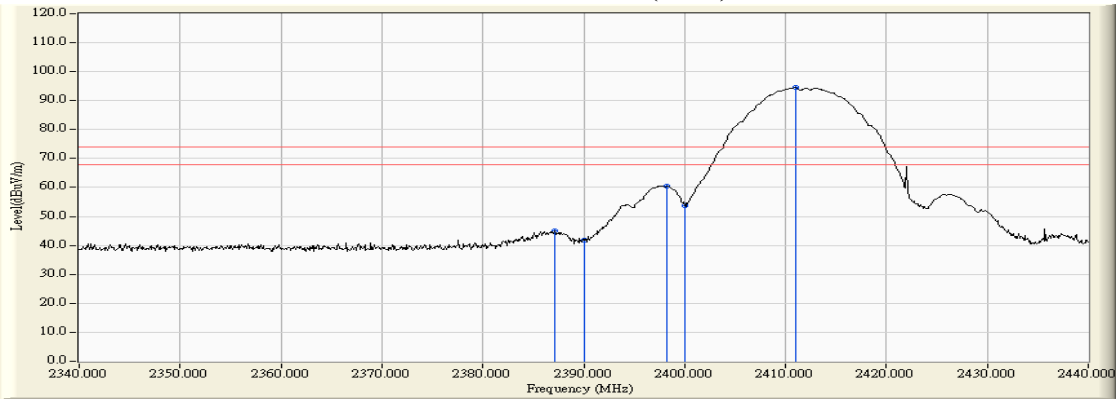
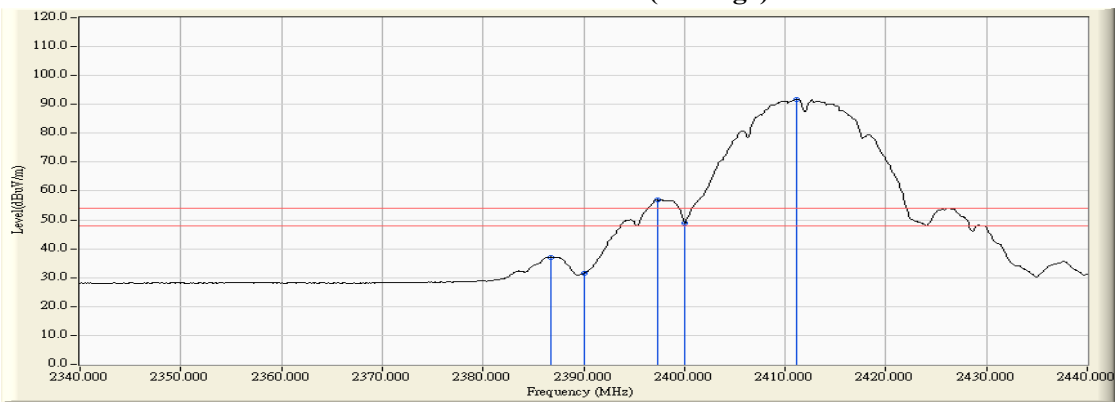


Figure Channel 01: Horizontal (Average)



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 = 120 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : MOBILE DATA TERMINAL
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Date : 2017/10/16
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
01 (Peak)	2359.600	-4.054	45.715	41.662	74.00	54.00	Pass
01 (Peak)	2390.000	-4.159	41.318	37.159	74.00	54.00	Pass
01 (Peak)	2397.700	-4.171	55.039	50.868	74.00	54.00	Pass
01 (Peak)	2400.000	-4.171	48.983	44.812	--	--	--
01 (Peak)	2410.900	-4.169	87.470	83.301	--	--	--
01 (Average)	2387.500	-4.150	33.128	28.978	74.00	54.00	Pass
01 (Average)	2390.000	-4.159	31.138	26.979	74.00	54.00	Pass
01 (Average)	2397.600	-4.171	50.558	46.387	74.00	54.00	Pass
01 (Average)	2400.000	-4.171	42.936	38.765	--	--	--
01 (Average)	2411.300	-4.167	84.785	80.617	--	--	--

Figure Channel 01: VERTICAL (Peak)

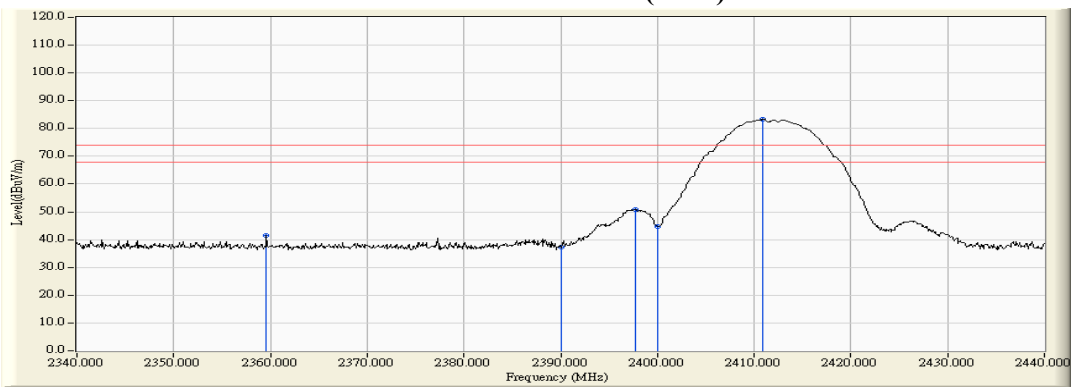
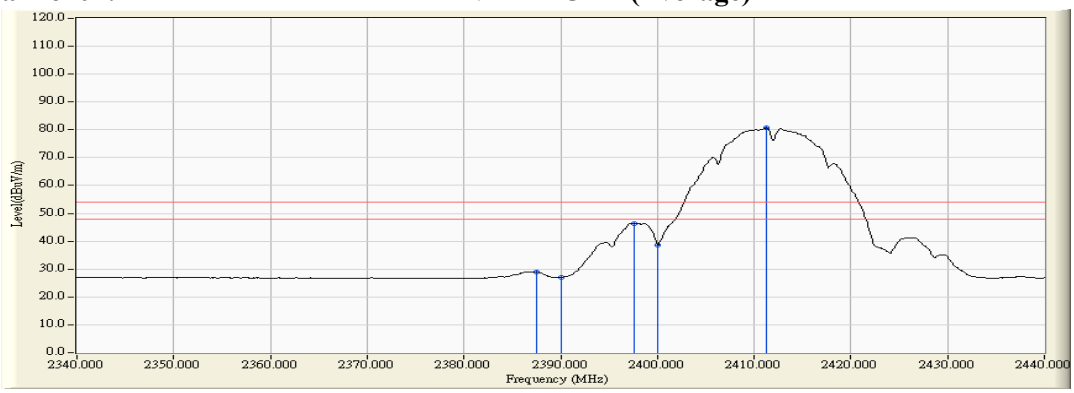


Figure Channel 01: VERTICAL (Average)



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 = 120 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : MOBILE DATA TERMINAL
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Date : 2017/10/16
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
11 (Peak)	2460.900	-2.623	95.344	92.721	--	--	--
11 (Peak)	2483.500	-2.601	45.311	42.709	74.00	54.00	Pass
11 (Peak)	2487.200	-2.599	47.888	45.290	74.00	54.00	Pass
11 (Average)	2461.200	-2.623	92.770	90.147	--	--	--
11 (Average)	2483.500	-2.601	37.949	35.347	74.00	54.00	Pass
11 (Average)	2487.600	-2.598	40.428	37.830	74.00	54.00	Pass

Figure Channel 11: Horizontal (Peak)

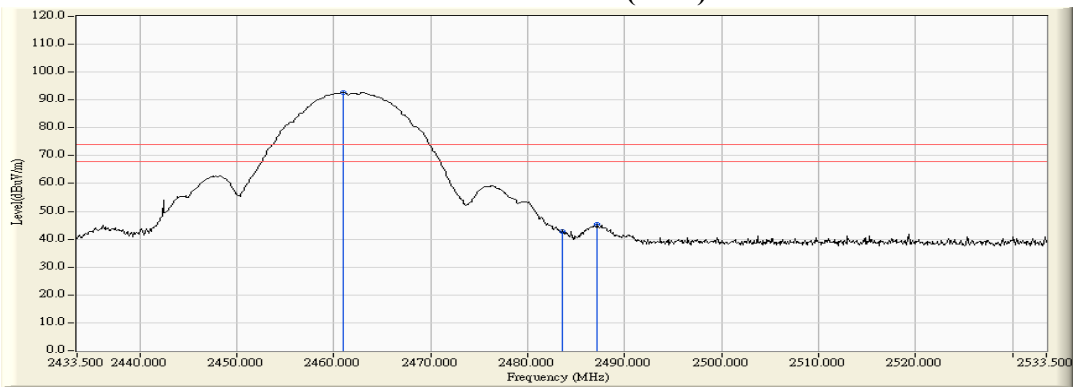
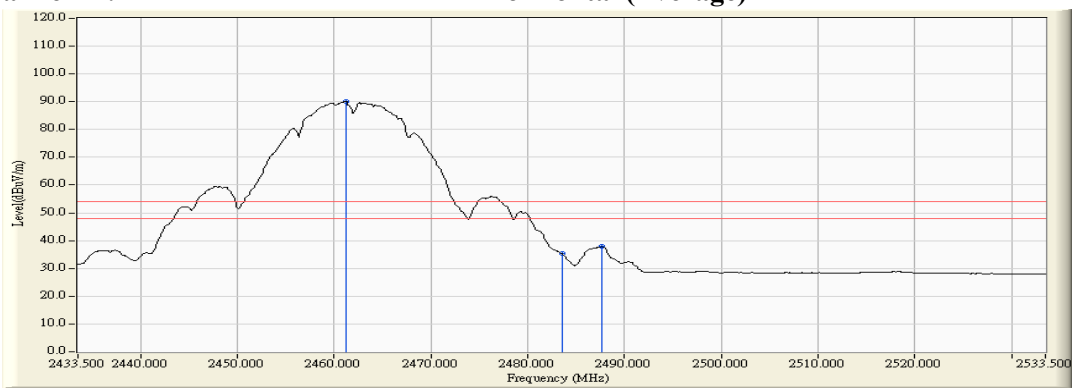


Figure Channel 11: Horizontal (Average)



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 = 120 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : MOBILE DATA TERMINAL
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Date : 2017/10/16
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
11 (Peak)	2460.900	-4.037	86.080	82.042	--	--	--
11 (Peak)	2483.500	-3.966	41.812	37.845	74.00	54.00	Pass
11 (Peak)	2489.100	-3.949	43.511	39.562	74.00	54.00	Pass
11 (Average)	2461.200	-4.036	83.507	79.470	--	--	--
11 (Average)	2483.500	-3.966	31.742	27.775	74.00	54.00	Pass
11 (Average)	2487.000	-3.956	32.395	28.439	74.00	54.00	Pass

Figure Channel 11: VERTICAL (Peak)

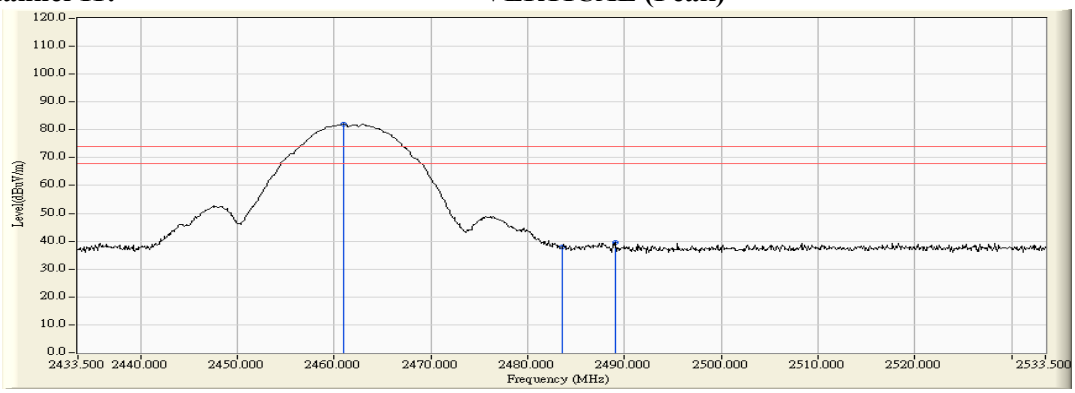
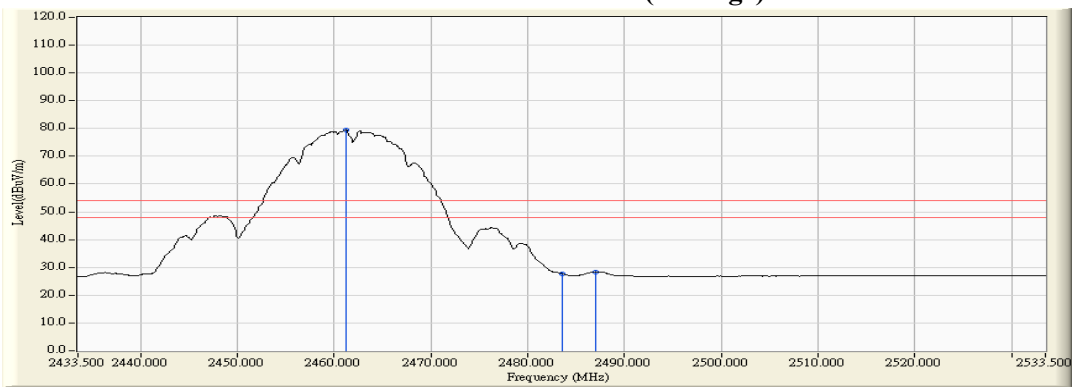


Figure Channel 11: VERTICAL (Average)



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 = 120 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : MOBILE DATA TERMINAL
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Date : 2017/10/18
Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
01 (Peak)	2390.000	-2.687	74.116	71.429	74.00	54.00	Pass
01 (Peak)	2400.000	-2.660	82.558	79.898	--	--	--
01 (Peak)	2406.800	-2.650	99.441	96.791	--	--	--
01 (Average)	2390.000	-2.687	52.568	49.881	74.00	54.00	Pass
01 (Average)	2400.000	-2.660	65.779	63.119	--	--	--
01 (Average)	2404.900	-2.653	88.646	85.993	--	--	--

Figure Channel 01: Horizontal (Peak)

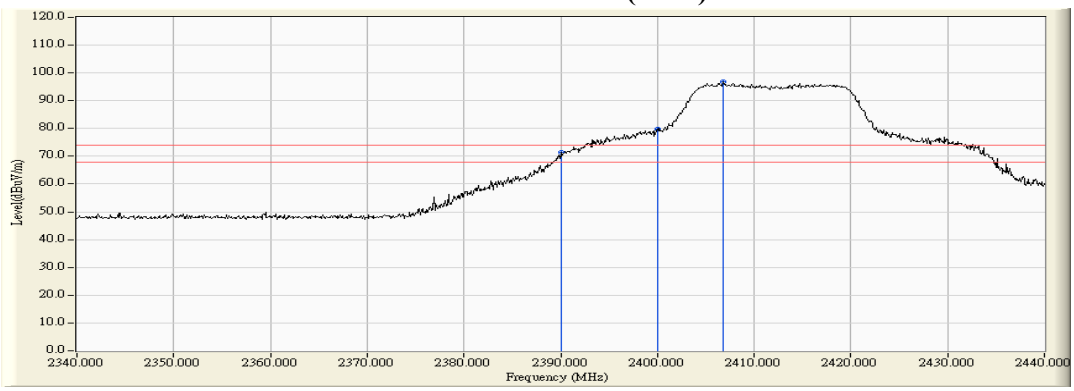
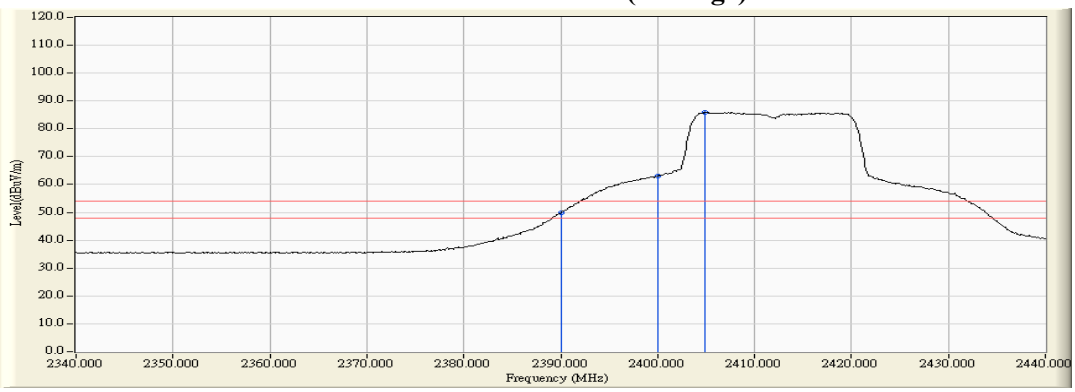


Figure Channel 01: Horizontal (Average)



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 = 1k Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : MOBILE DATA TERMINAL
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Date : 2017/10/18
Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
01 (Peak)	2390.000	-4.159	66.542	62.383	74.00	54.00	Pass
01 (Peak)	2397.400	-4.171	75.186	71.014	74.00	54.00	Pass
01 (Peak)	2400.000	-4.171	74.854	70.683	--	--	--
01 (Peak)	2417.700	-4.152	93.298	89.145	--	--	--
01 (Average)	2390.000	-4.159	46.349	42.190	74.00	54.00	Pass
01 (Average)	2400.000	-4.171	59.046	54.875	--	--	--
01 (Average)	2419.000	-4.150	82.427	78.278	--	--	--

Figure Channel 01: VERTICAL (Peak)

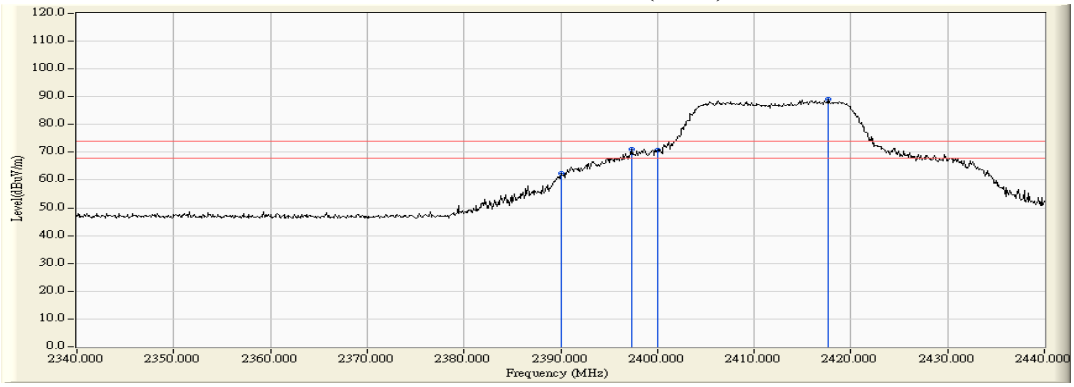
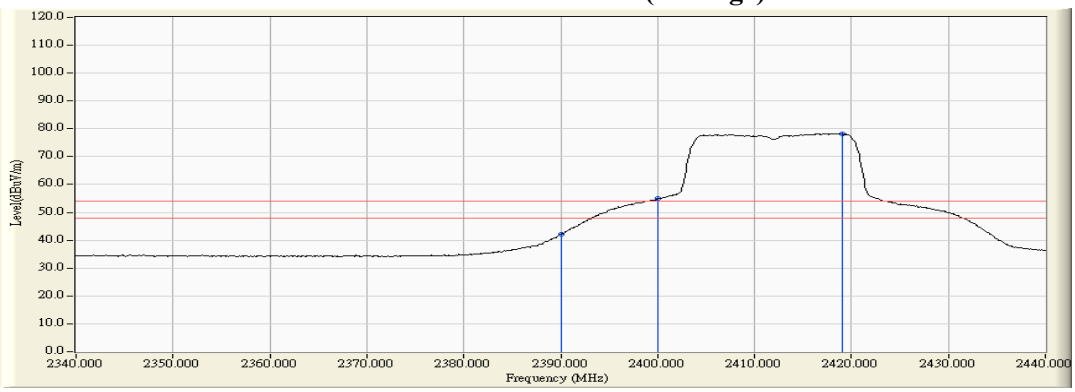


Figure Channel 01: VERTICAL (Average)



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 = 1k Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	MOBILE DATA TERMINAL
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Date	:	2016/09/01
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2462MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
11 (Peak)	2454.900	-2.628	99.322	96.694	--	--	--
11 (Peak)	2483.500	-2.601	73.608	71.006	74.00	54.00	Pass
11 (Average)	2455.800	-2.627	88.956	86.329	--	--	--
11 (Average)	2483.500	-2.601	53.501	50.899	74.00	54.00	Pass

Figure Channel 11: Horizontal (Peak)

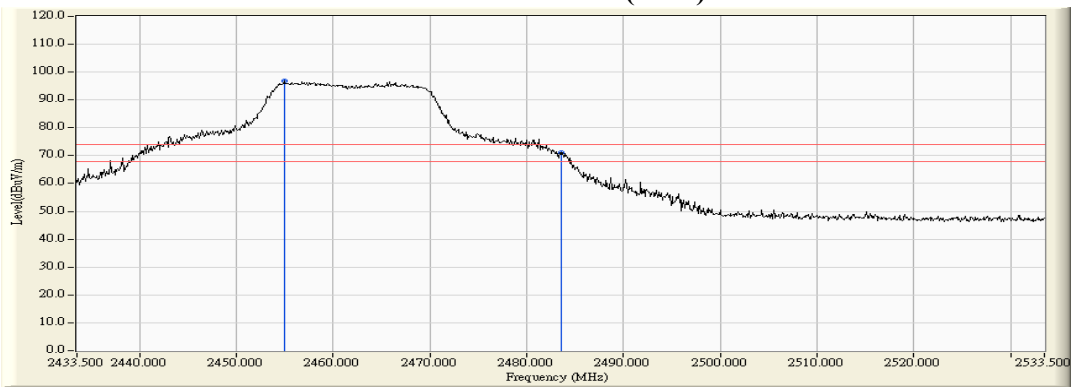
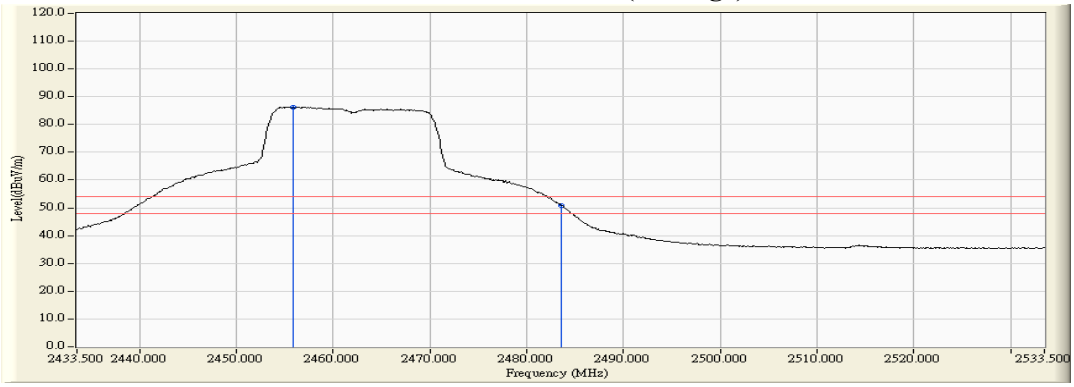


Figure Channel 11: Horizontal (Average)



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 = 1k Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	MOBILE DATA TERMINAL
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Date	:	2017/10/18
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps) (2462MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
11 (Peak)	2457.900	-4.047	89.086	85.039	--	--	--
11 (Peak)	2483.500	-3.966	63.317	59.350	74.00	54.00	Pass
11 (Average)	2455.100	-4.057	79.046	74.990	--	--	--
11 (Average)	2483.500	-3.966	44.023	40.056	74.00	54.00	Pass

Figure Channel 11: VERTICAL (Peak)

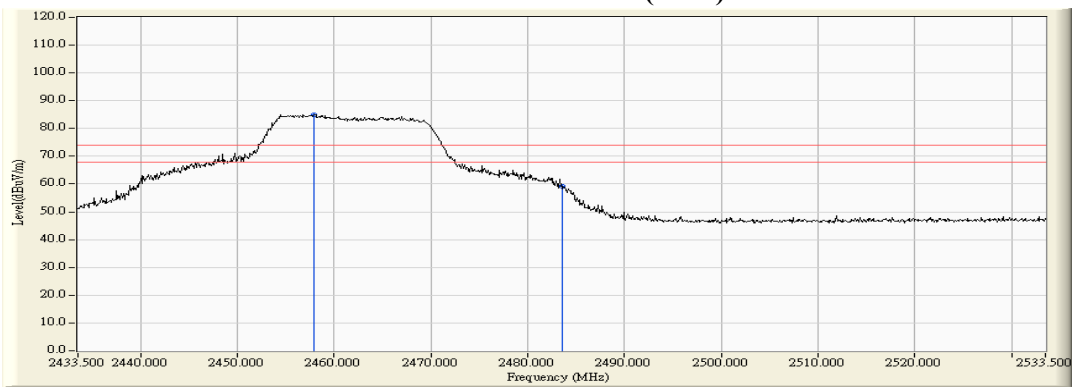
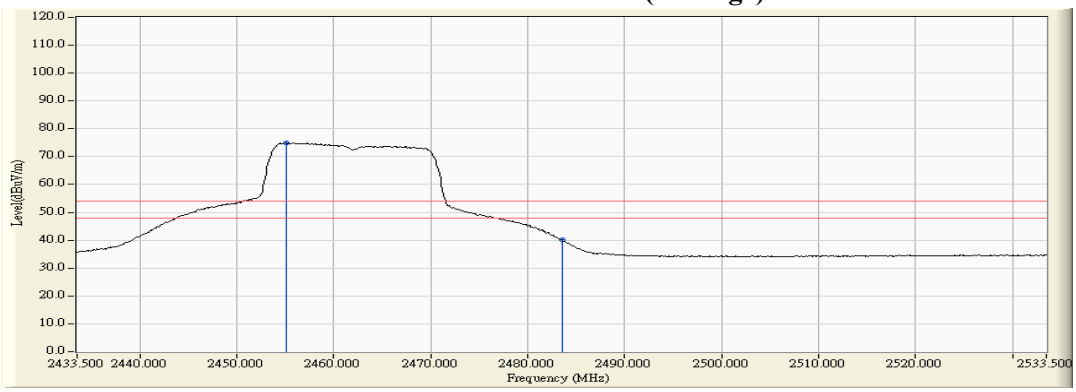


Figure Channel 11: VERTICAL (Average)



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 = 1k Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : MOBILE DATA TERMINAL
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Date : 2017/10/18
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2412MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
01 (Peak)	2389.100	-2.690	75.114	72.423	74.00	54.00	Pass
01 (Peak)	2390.000	-2.687	74.904	72.217	74.00	54.00	Pass
01 (Peak)	2400.000	-2.660	83.998	81.338	--	--	--
01 (Peak)	2407.900	-2.648	99.041	96.393	--	--	--
01 (Average)	2390.000	-2.687	55.769	53.082	74.00	54.00	Pass
01 (Average)	2400.000	-2.660	66.137	63.477	--	--	--
01 (Average)	2419.800	-2.641	87.963	85.322	--	--	--

Figure Channel 01: Horizontal (Peak)

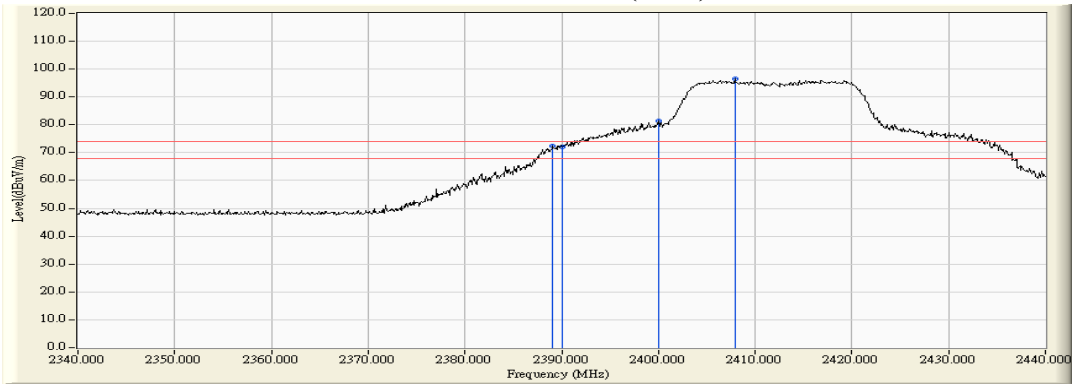
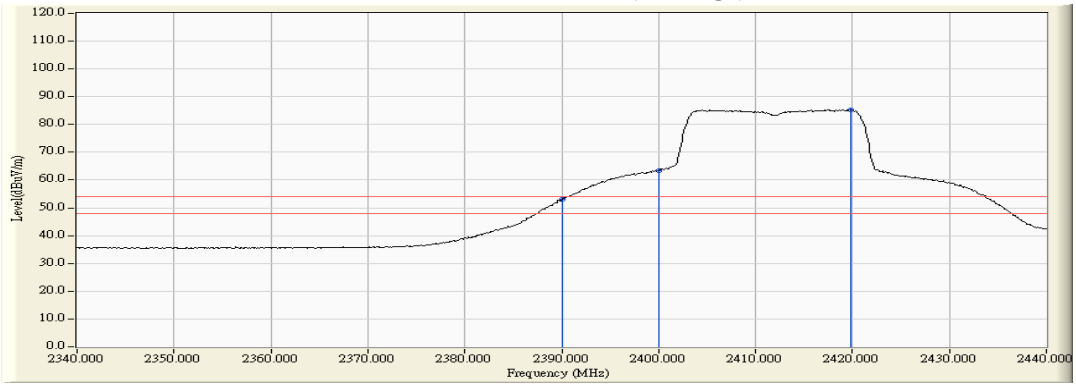


Figure Channel 01: Horizontal (Average)



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 = 1k Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : MOBILE DATA TERMINAL
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Date : 2017/10/18
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2412MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
01 (Peak)	2389.700	-4.157	69.153	64.995	74.00	54.00	Pass
01 (Peak)	2390.000	-4.159	67.899	63.740	74.00	54.00	Pass
01 (Peak)	2397.800	-4.171	76.877	72.706	74.00	54.00	Pass
01 (Peak)	2400.000	-4.171	75.799	71.628	--	--	--
01 (Peak)	2405.400	-4.170	92.833	88.663	--	--	--
01 (Average)	2390.000	-4.159	50.406	46.247	74.00	54.00	Pass
01 (Average)	2400.000	-4.171	60.717	56.546	--	--	--
01 (Average)	2404.300	-4.171	82.579	78.409	--	--	--

Figure Channel 01: VERTICAL (Peak)

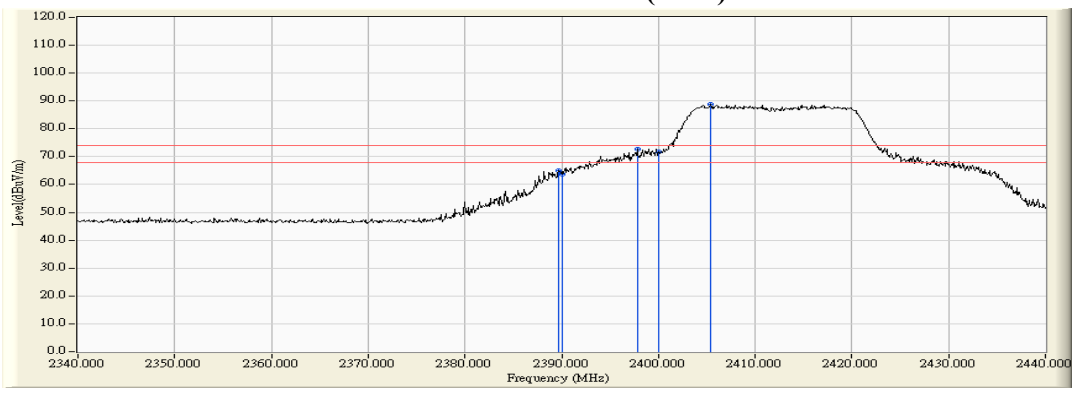
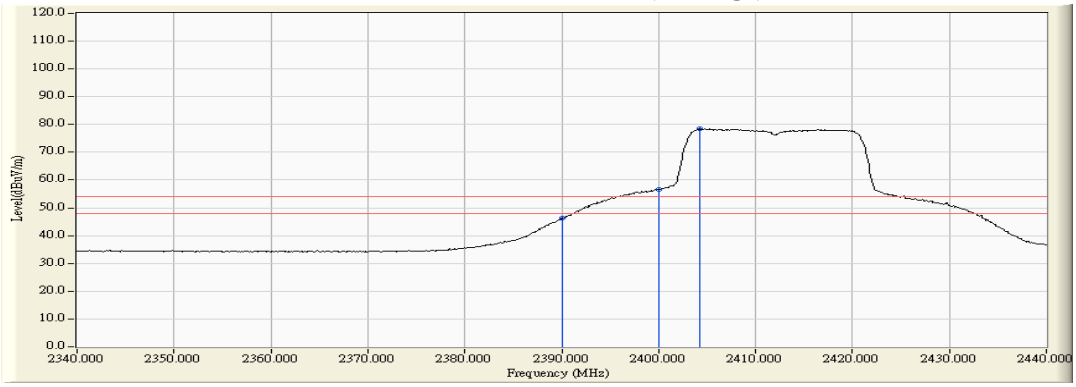


Figure Channel 01: VERTICAL (Average)



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 = 1k Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : MOBILE DATA TERMINAL
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Date : 2017/10/18
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
11 (Peak)	2455.000	-2.628	97.720	95.092	--	--	--
11 (Peak)	2483.500	-2.601	70.675	68.073	74.00	54.00	Pass
11 (Peak)	2484.100	-2.602	71.382	68.781	74.00	54.00	Pass
11 (Average)	2454.500	-2.628	86.691	84.063	--	--	--
11 (Average)	2483.500	-2.601	50.684	48.082	74.00	54.00	Pass

Figure Channel 11: Horizontal (Peak)

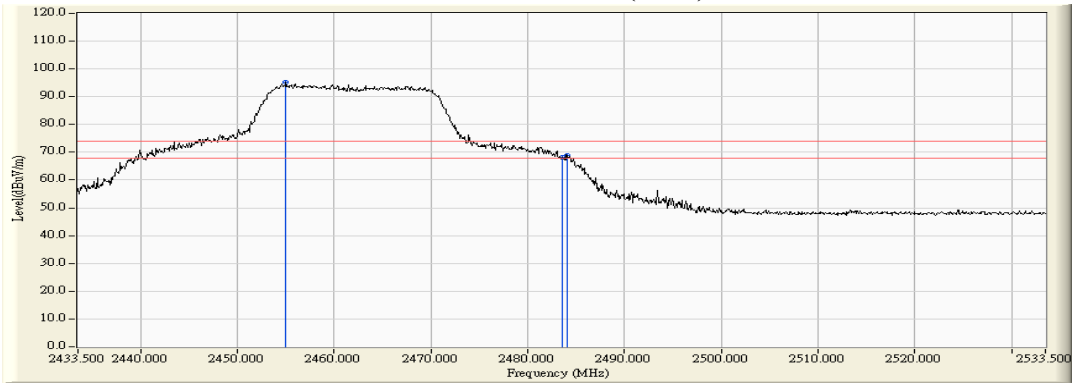
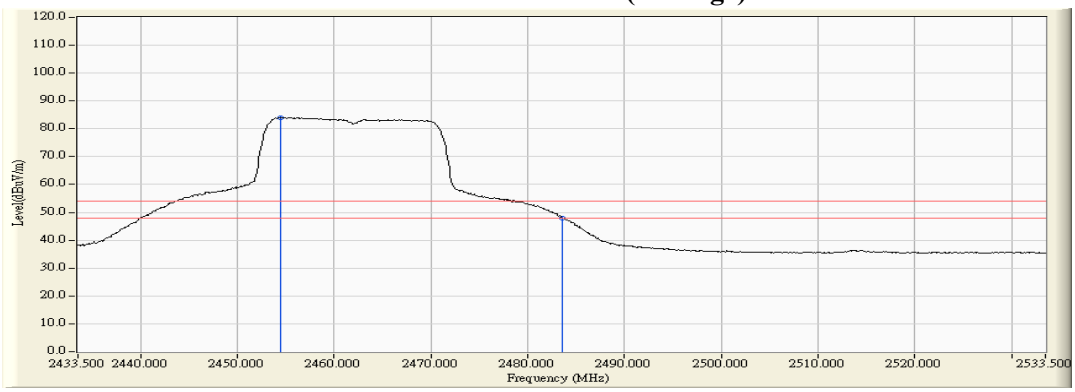


Figure Channel 11: Horizontal (Average)



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 = 1k Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : MOBILE DATA TERMINAL
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Date : 2017/10/18
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
11 (Peak)	2455.500	-4.054	87.065	83.011	--	--	--
11 (Peak)	2483.500	-3.966	60.566	56.599	74.00	54.00	Pass
11 (Average)	2454.900	-4.056	75.271	71.215	--	--	--
11 (Average)	2483.500	-3.966	40.604	36.637	74.00	54.00	Pass

Figure Channel 11: VERTICAL (Peak)

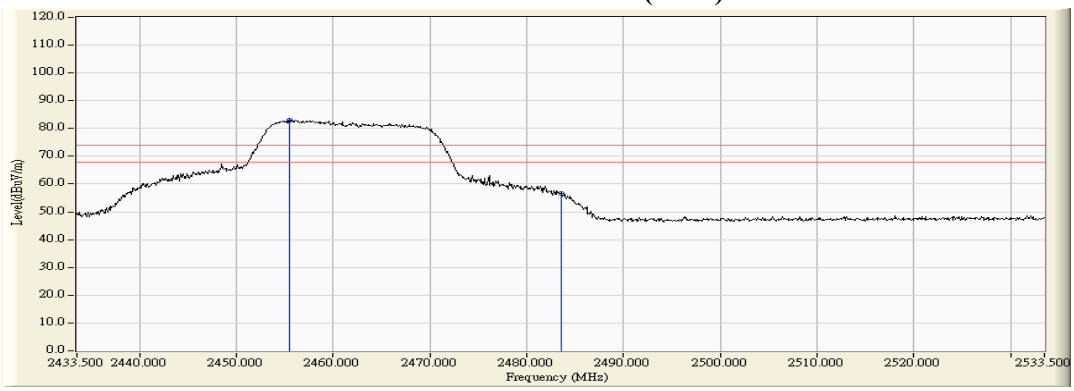
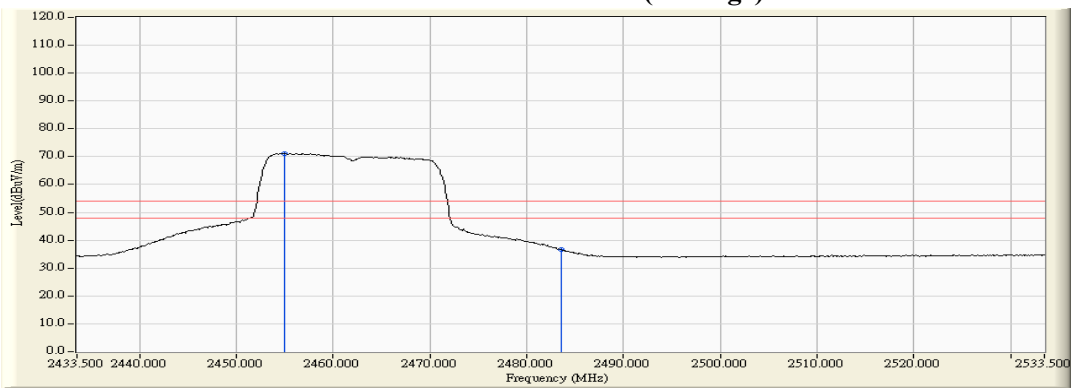


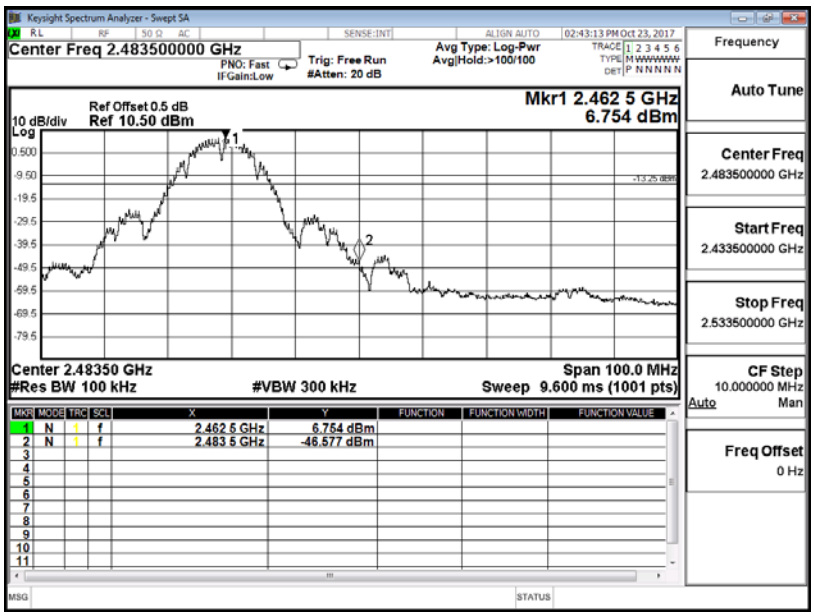
Figure Channel 11: VERTICAL (Average)



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 = 1k Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

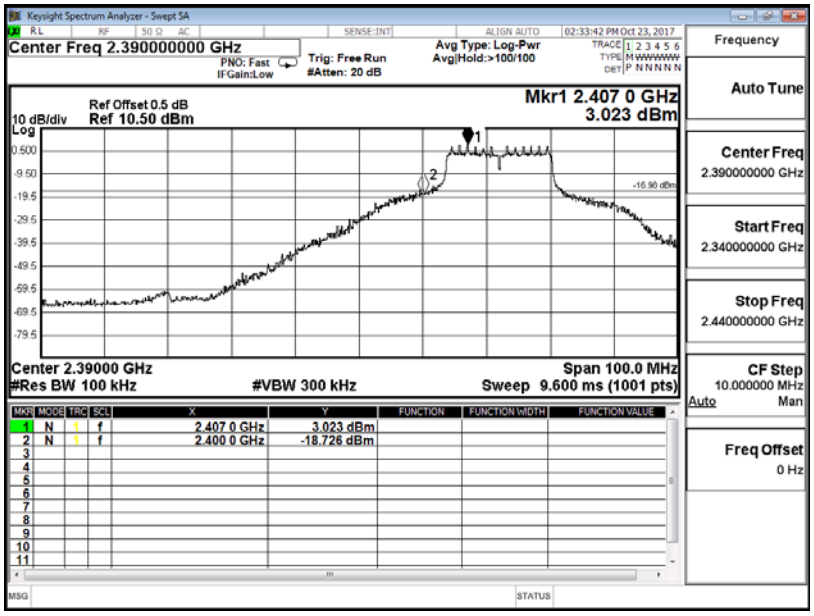
Product : MOBILE DATA TERMINAL
Test Item : Band Edge
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (802.11b 1Mbps)

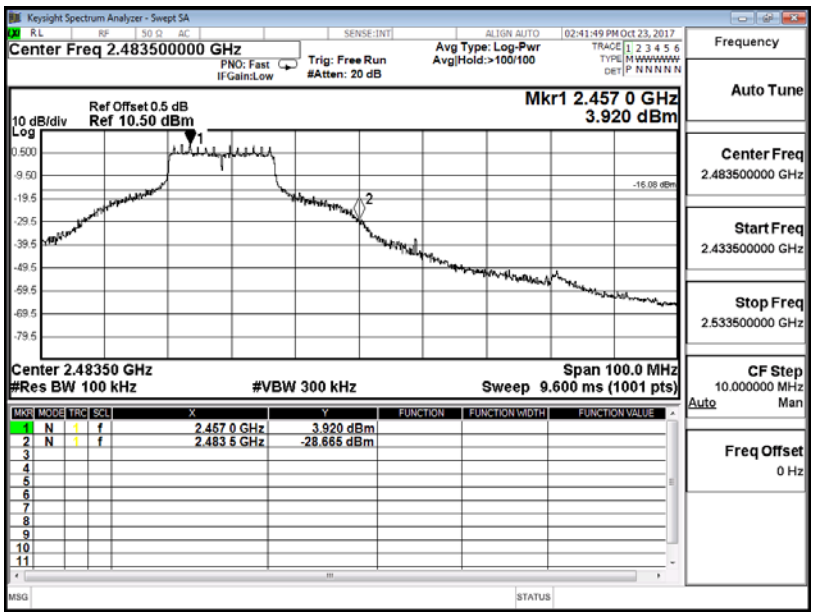
Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
2412	48.618	>20	PASS
2462	53.331	>20	PASS



Product : MOBILE DATA TERMINAL
Test Item : Band Edge
Test Site : No.3 OATS
Test Mode : Mode 2: Transmit (802.11g 6Mbps)

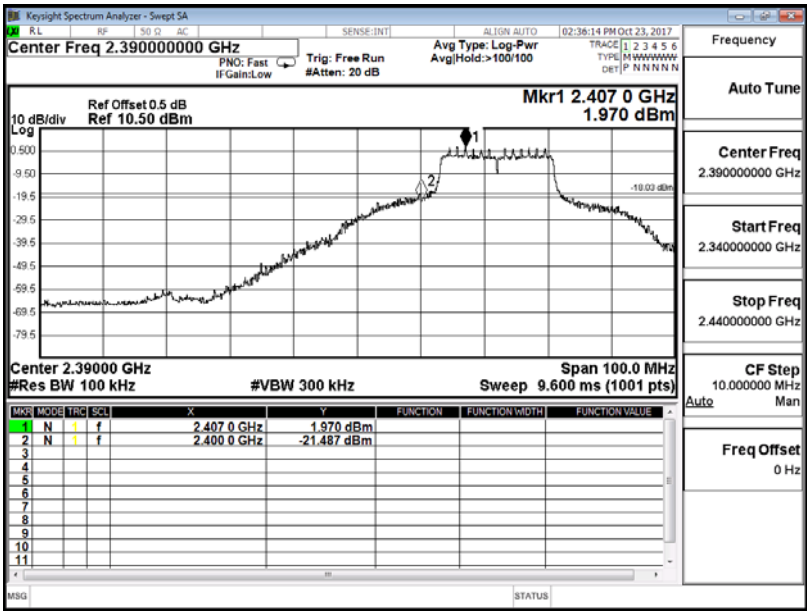
Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
2412	21.749	>20	PASS
2462	32.585	>20	PASS

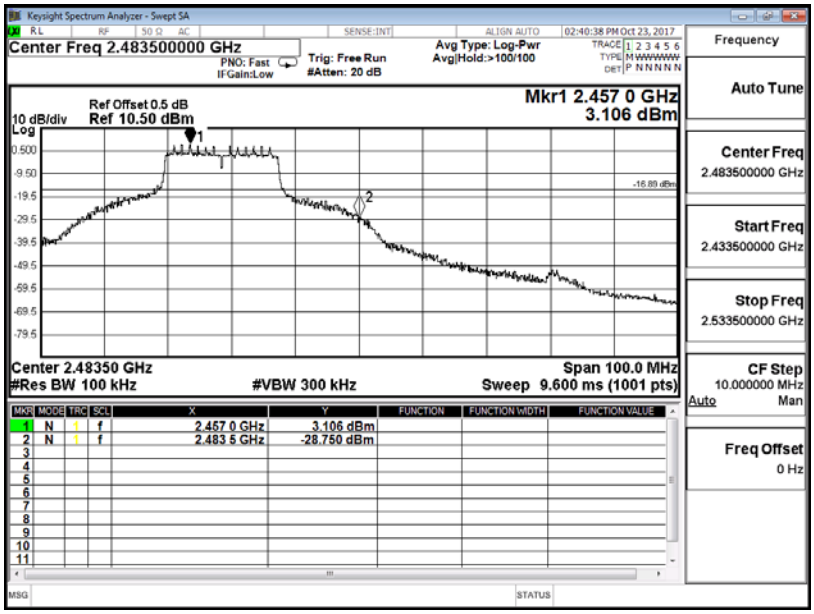




Product : MOBILE DATA TERMINAL
Test Item : Band Edge
Test Site : No.3 OATS
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

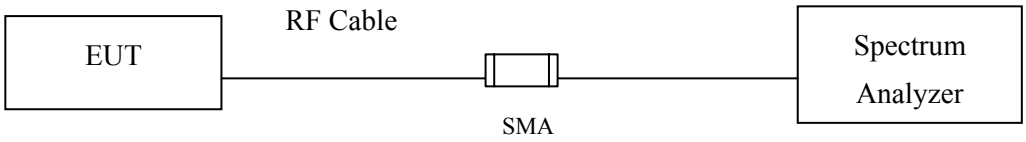
Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
2412	23.457	>20	PASS
2462	31.865	>20	PASS





7. 6dB Bandwidth

7.1. Test Setup



7.2. Limits

The minimum bandwidth shall be at least 500 kHz.

7.3. Test Procedure

The EUT was setup according to ANSI C63.4: 2014; tested according to DTS test procedure of Jan KDB558074 for compliance to FCC 47CFR 15.247 requirements.

7.4. Uncertainty

± 283Hz

7.5. Test Result of 6dB Bandwidth

Product : MOBILE DATA TERMINAL
Test Item : 6dB Bandwidth Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (802.11b 1Mbps)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	8650	>500	Pass
06	2437	8700	>500	Pass
11	2462	8650	>500	Pass

Figure Channel 01:

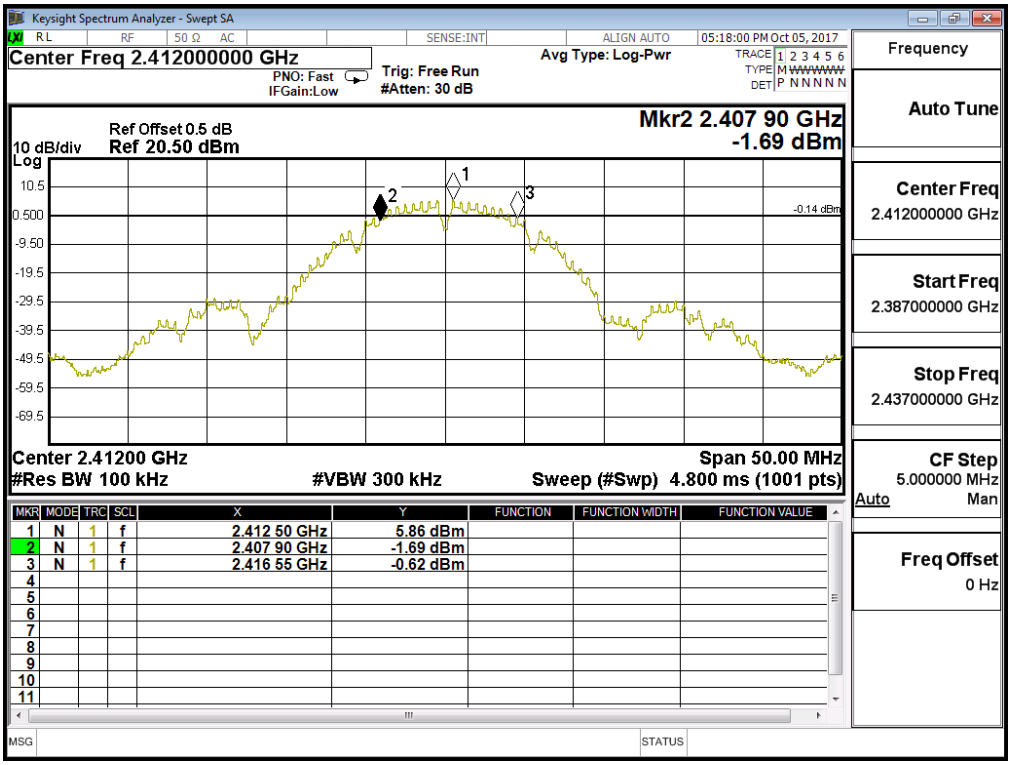


Figure Channel 06:

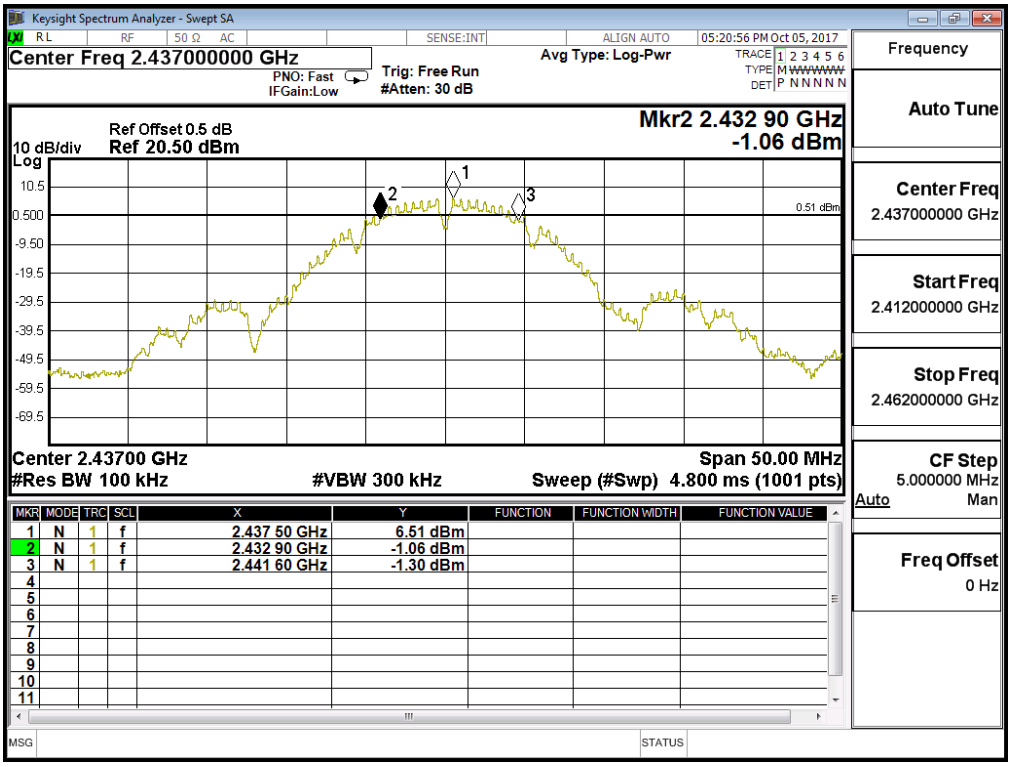
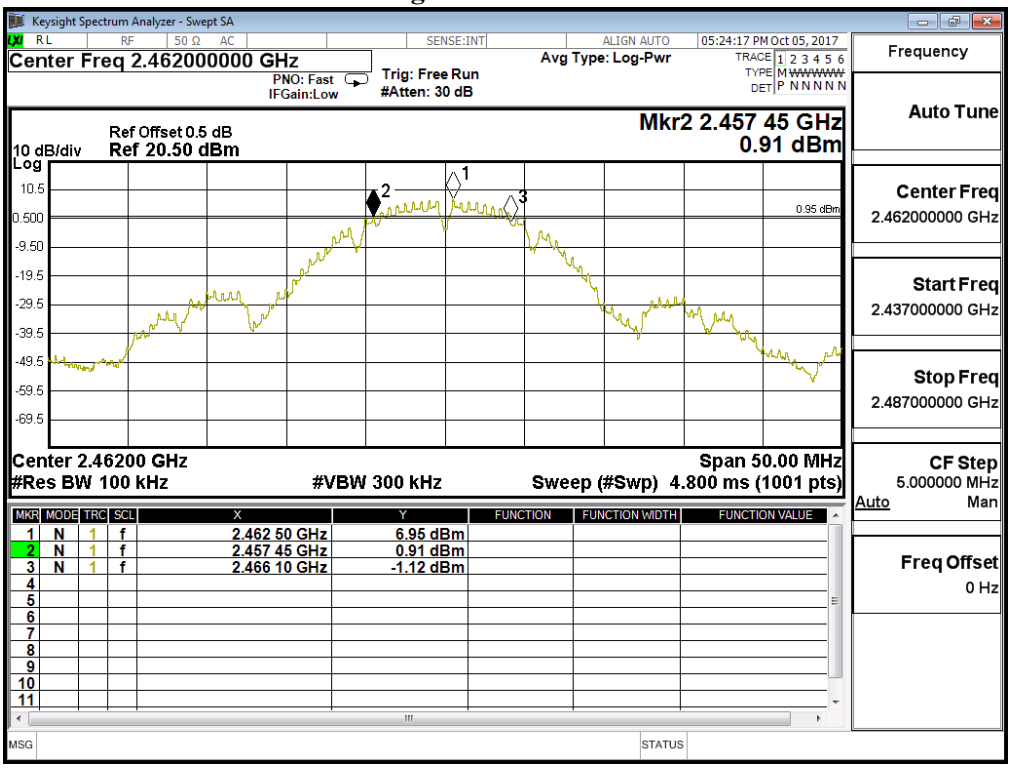


Figure Channel 11:



Product : MOBILE DATA TERMINAL
Test Item : 6dB Bandwidth Data
Test Site : No.3 OATS
Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	16450	>500	Pass
06	2437	16450	>500	Pass
11	2462	16450	>500	Pass

Figure Channel 01:

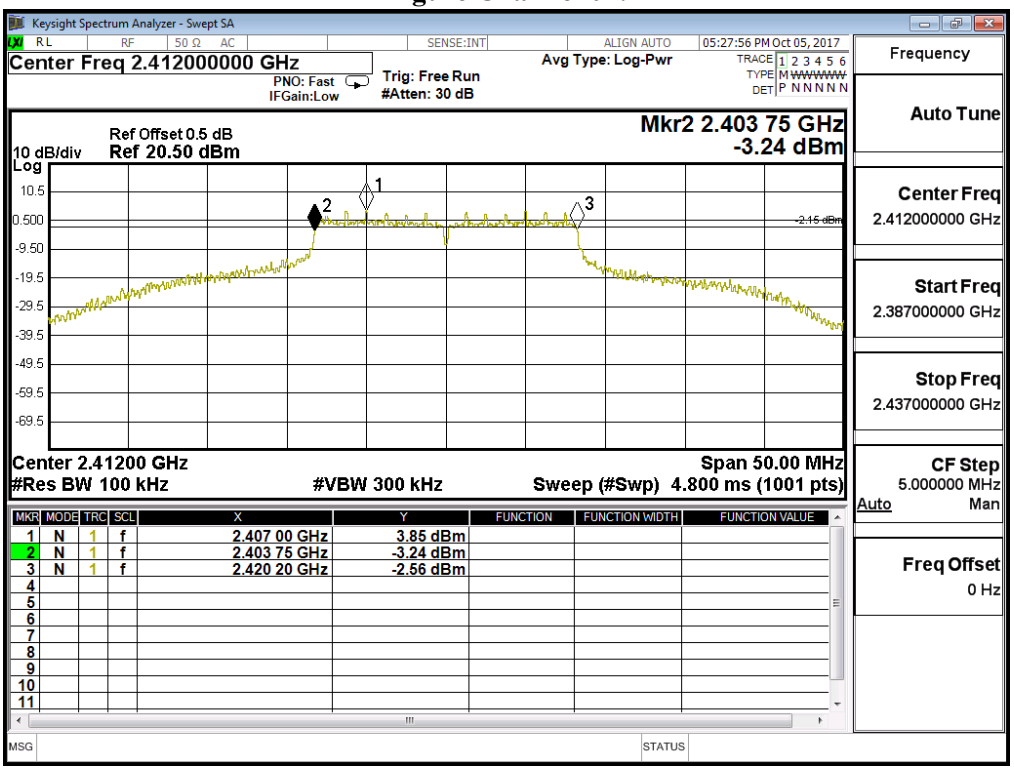


Figure Channel 06:

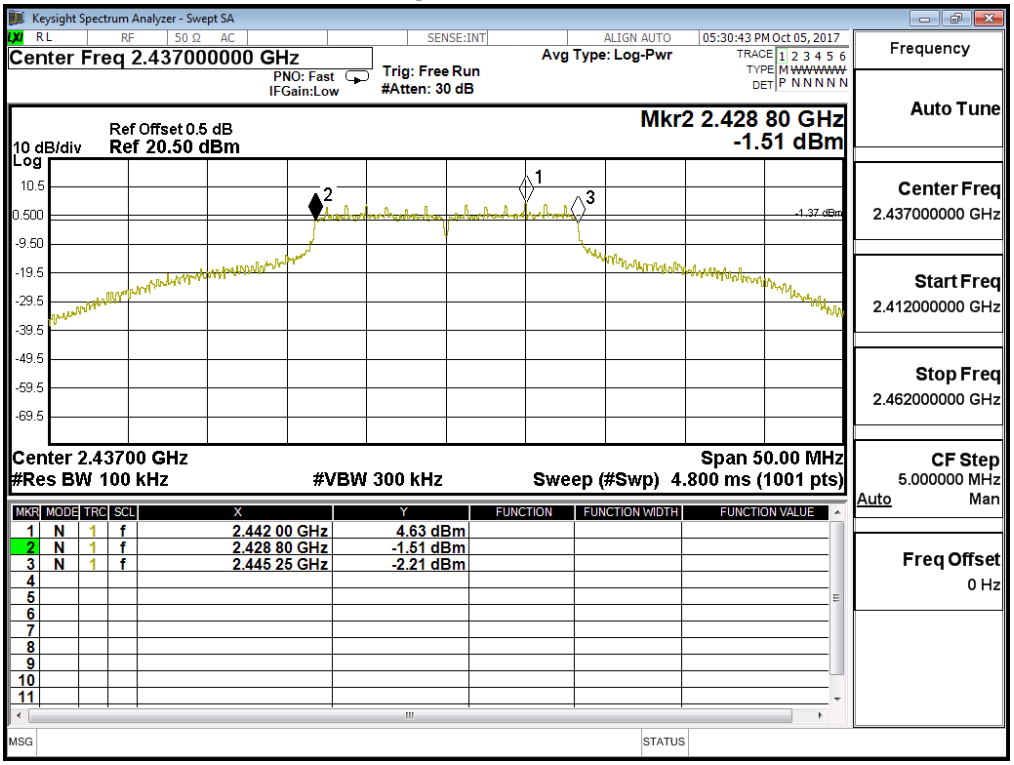
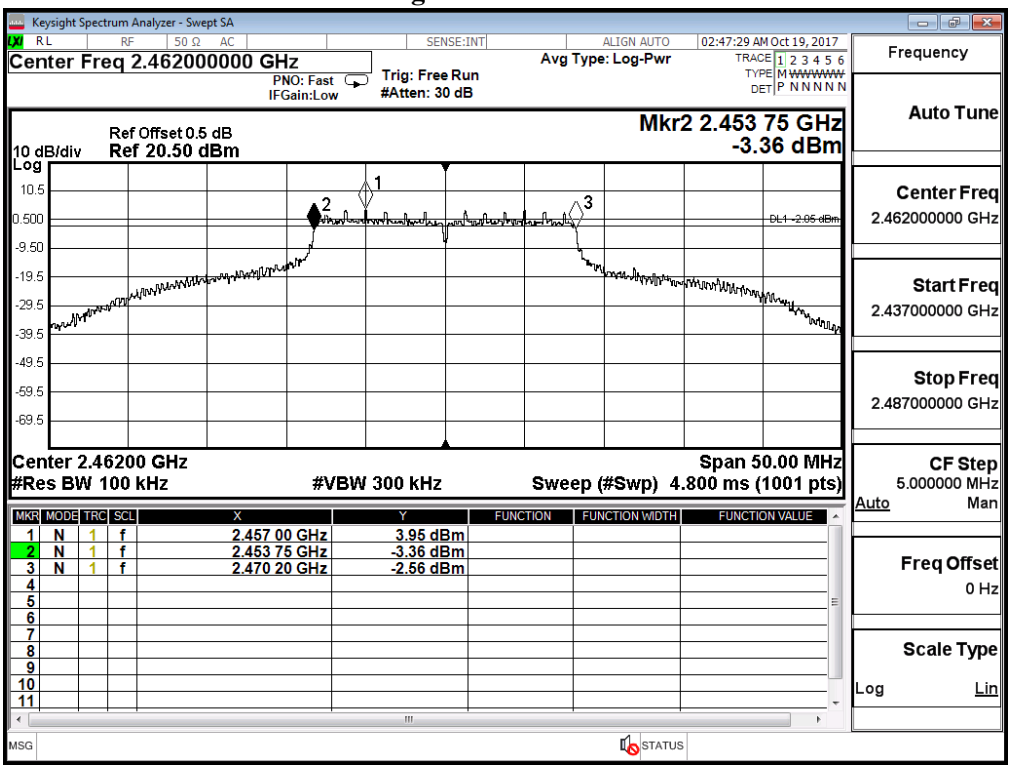


Figure Channel 11:



Product : MOBILE DATA TERMINAL
Test Item : 6dB Bandwidth Data
Test Site : No.3 OATS
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	17650	>500	Pass
06	2437	17700	>500	Pass
11	2462	17400	>500	Pass

Figure Channel 01:

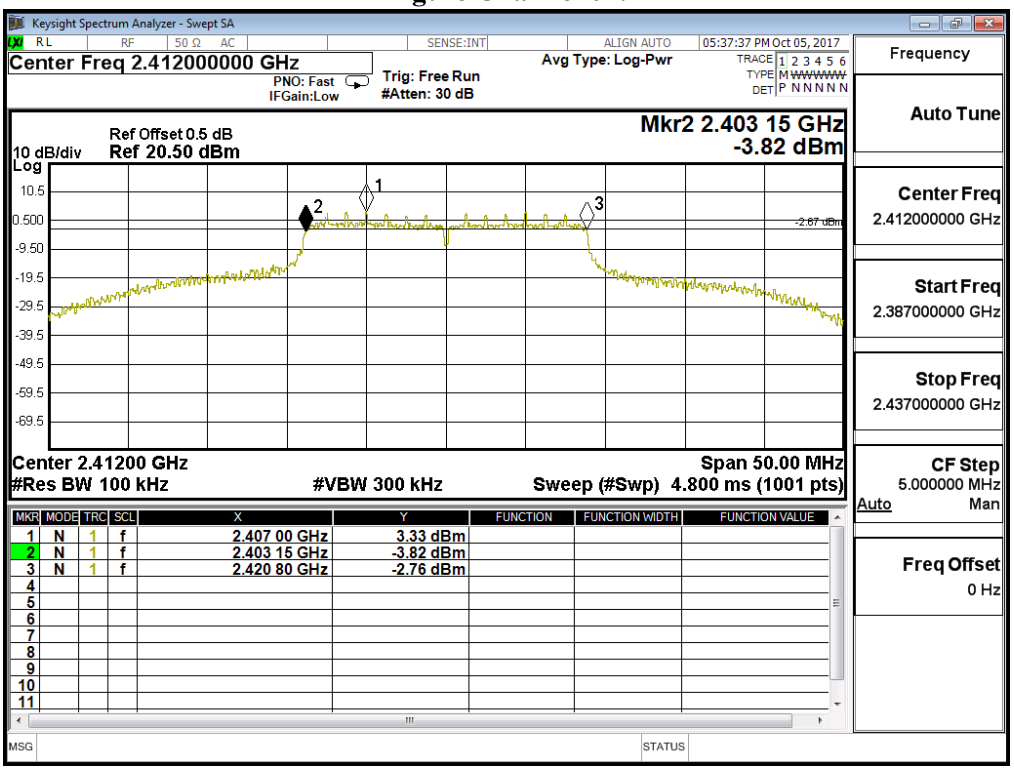


Figure Channel 06:

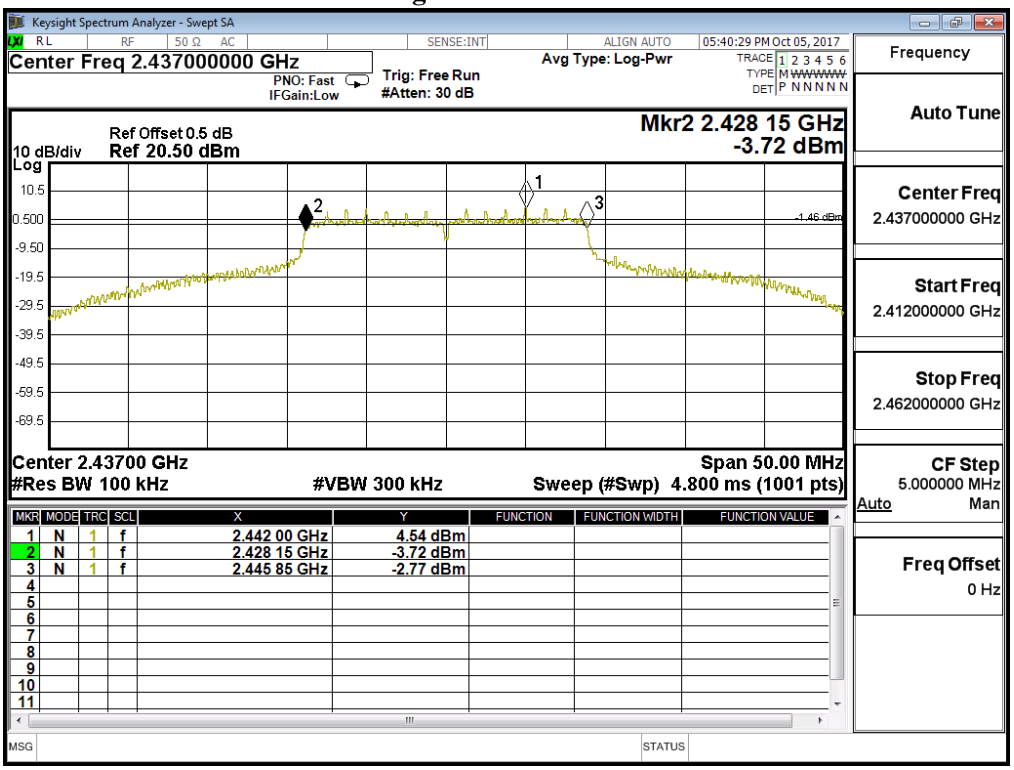
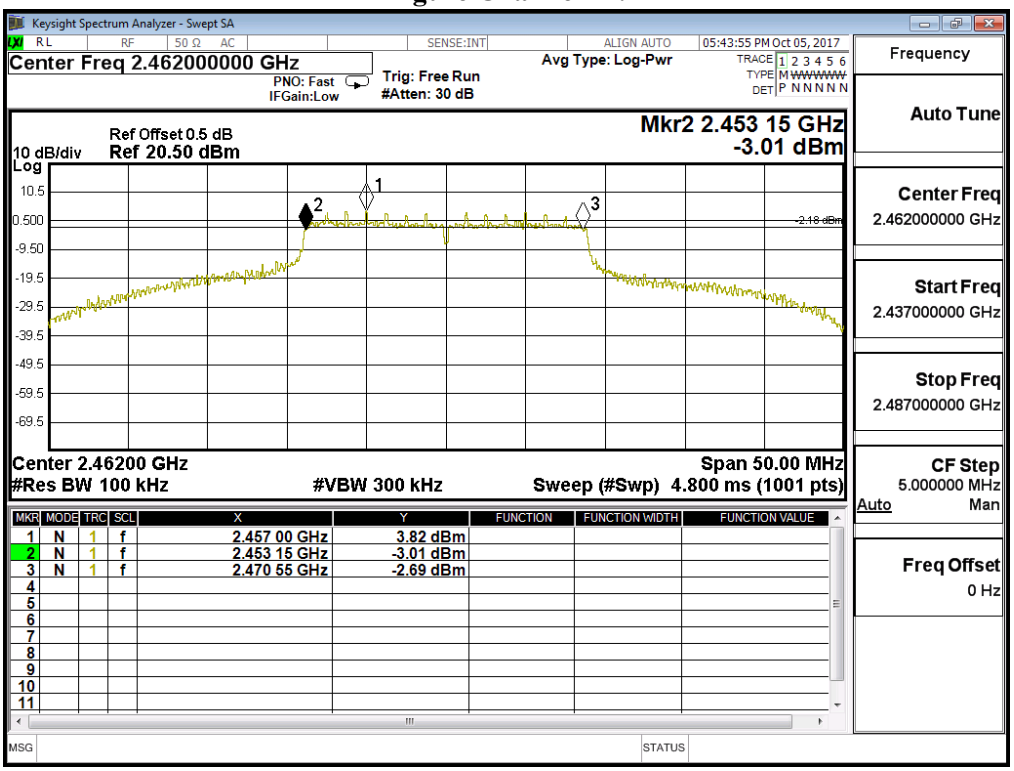
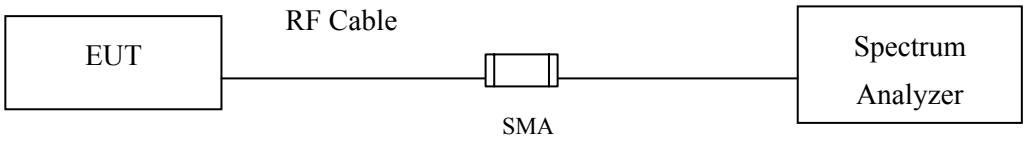


Figure Channel 11:



8. Power Density

8.1. Test Setup



8.2. Limits

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

8.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013; tested according to DTS test procedure of KDB 558074 for compliance to FCC 47CFR 15.247 requirements.
The maximum power spectral density using KDB 558074 section 10.2 PKPSD (peak PSD) method.

8.4. Uncertainty

± 1.20 dB

8.5. Test Result of Power Density

Product : MOBILE DATA TERMINAL
Test Item : Power Density Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (802.11b 1Mbps)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
01	2412	5.760	≦8dBm	Pass
06	2437	6.500	≦8dBm	Pass
11	2462	6.920	≦8dBm	Pass

Figure Channel 01:

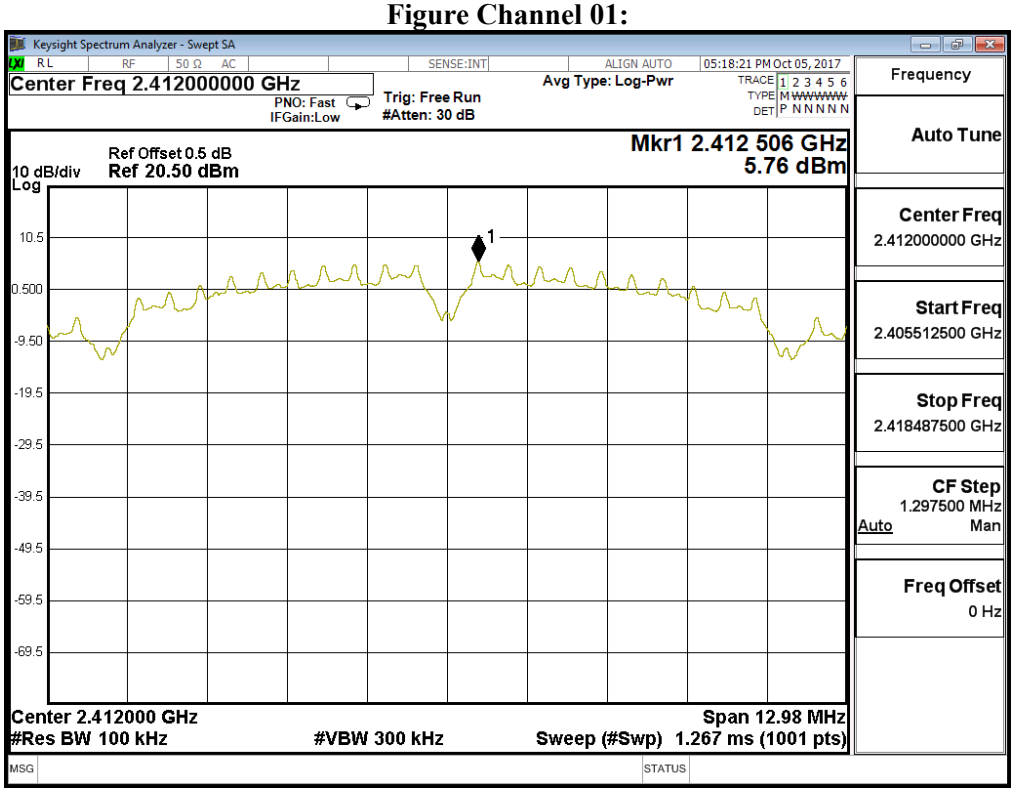


Figure Channel 06:

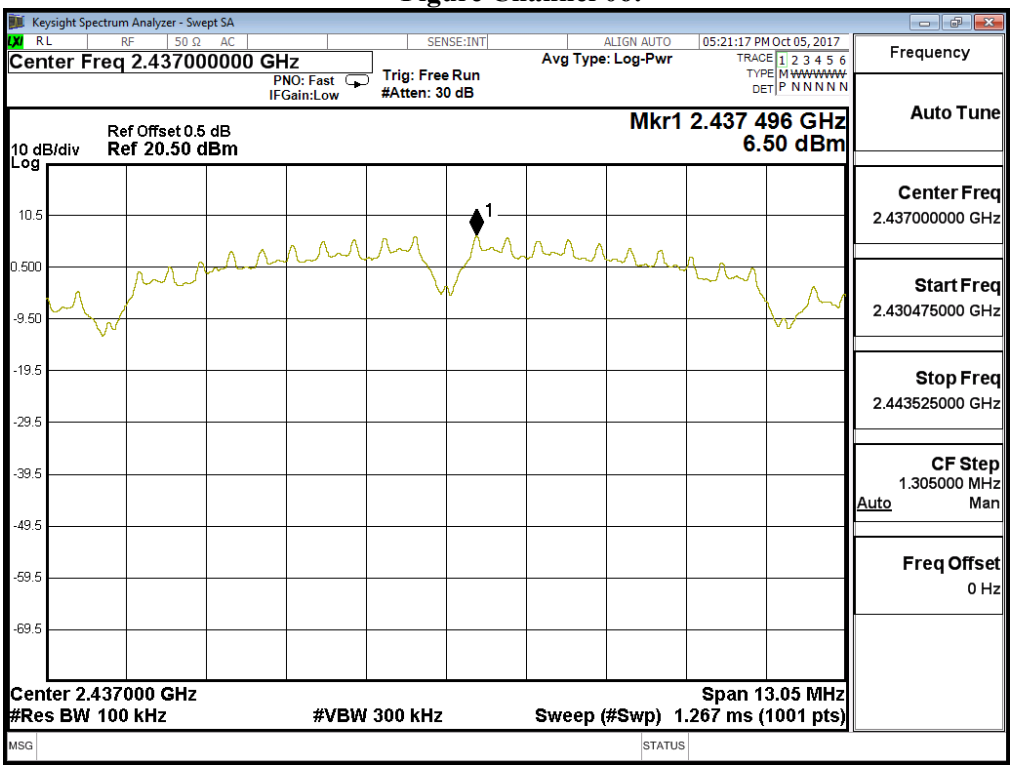
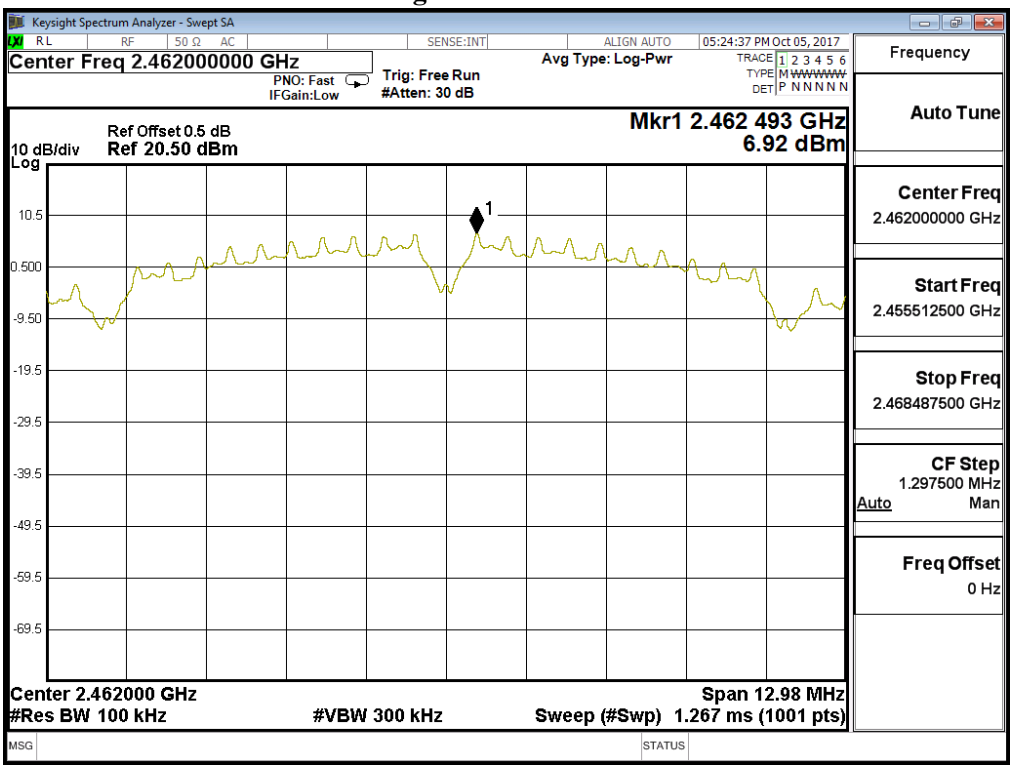


Figure Channel 11:



Product : MOBILE DATA TERMINAL
Test Item : Power Density Data
Test Site : No.3 OATS
Test Mode : Mode 2: Transmit (802.11g 6Mbps)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
01	2412	3.880	≦8dBm	Pass
06	2437	4.590	≦8dBm	Pass
11	2462	3.910	≦8dBm	Pass

Figure Channel 01:

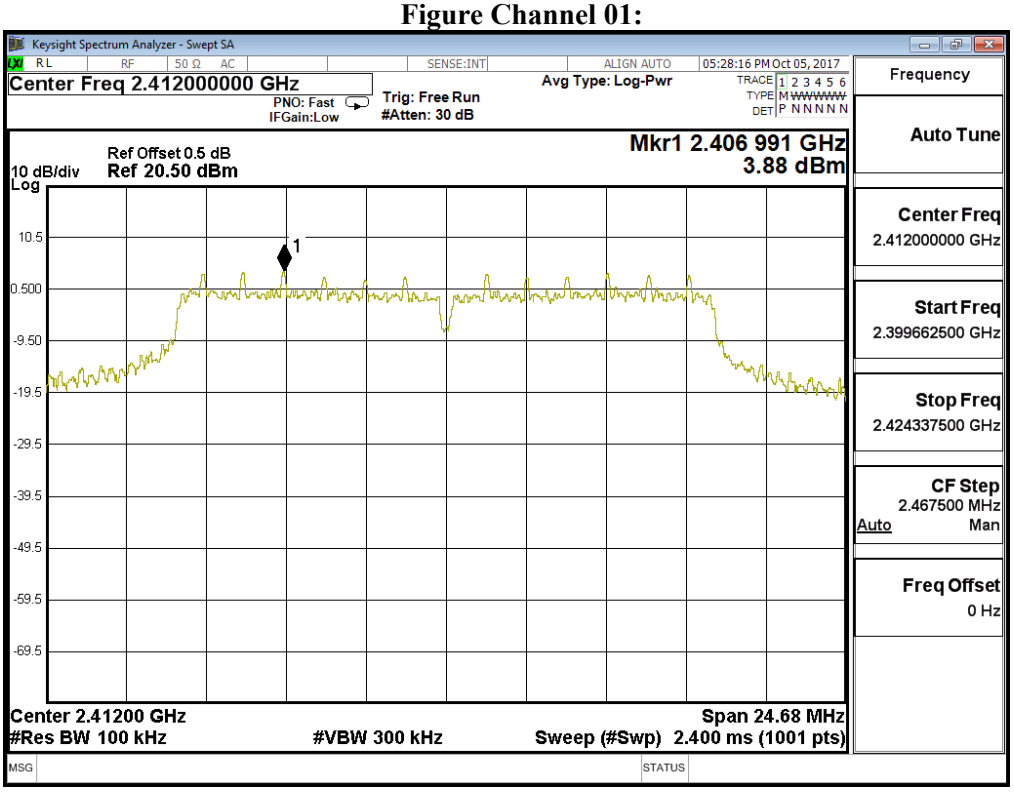


Figure Channel 06:

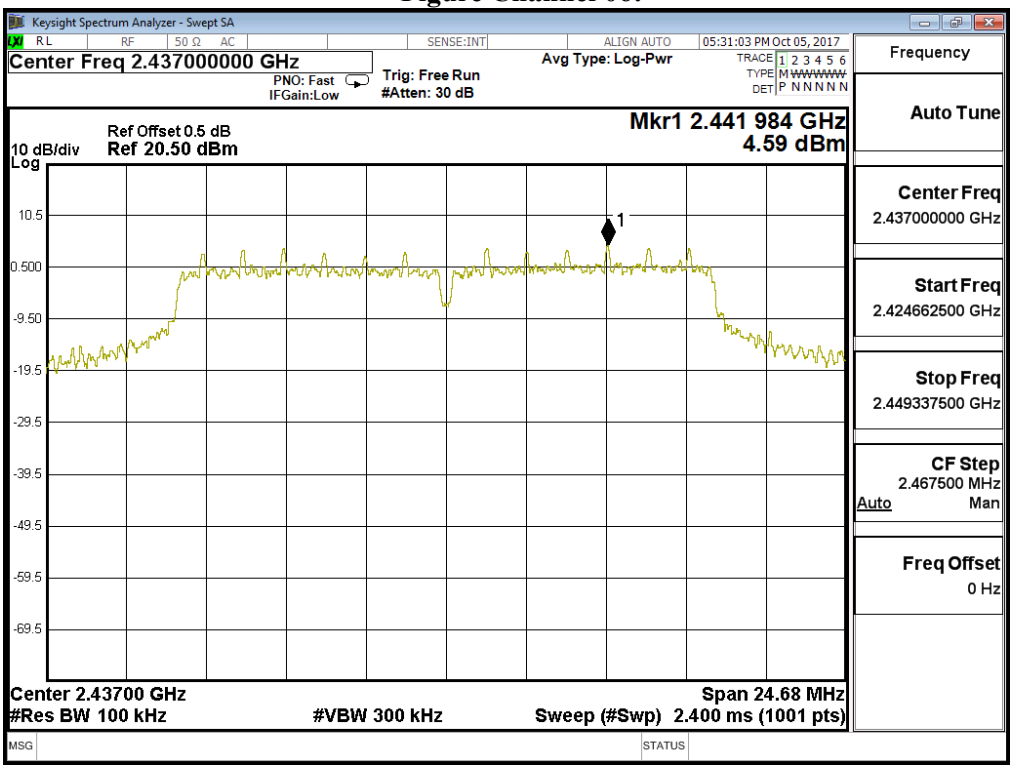
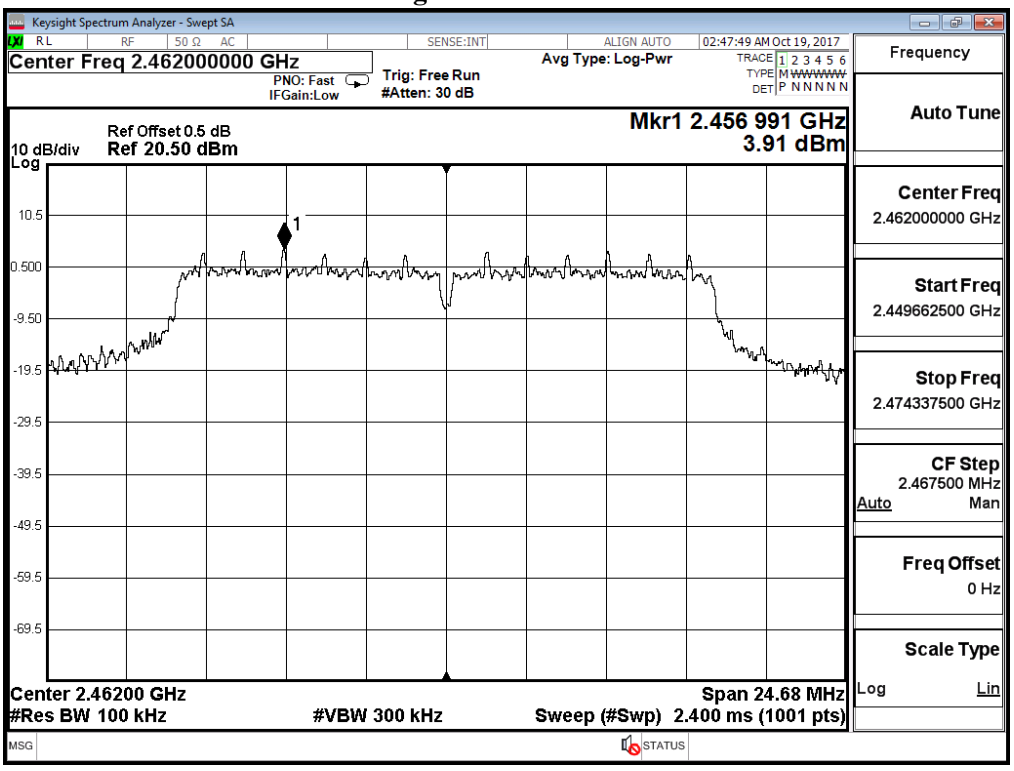


Figure Channel 11:



Product : MOBILE DATA TERMINAL
Test Item : Power Density Data
Test Site : No.3 OATS
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
01	2412	3.340	≦8dBm	Pass
06	2437	4.630	≦8dBm	Pass
11	2462	3.830	≦8dBm	Pass

Figure Channel 01:

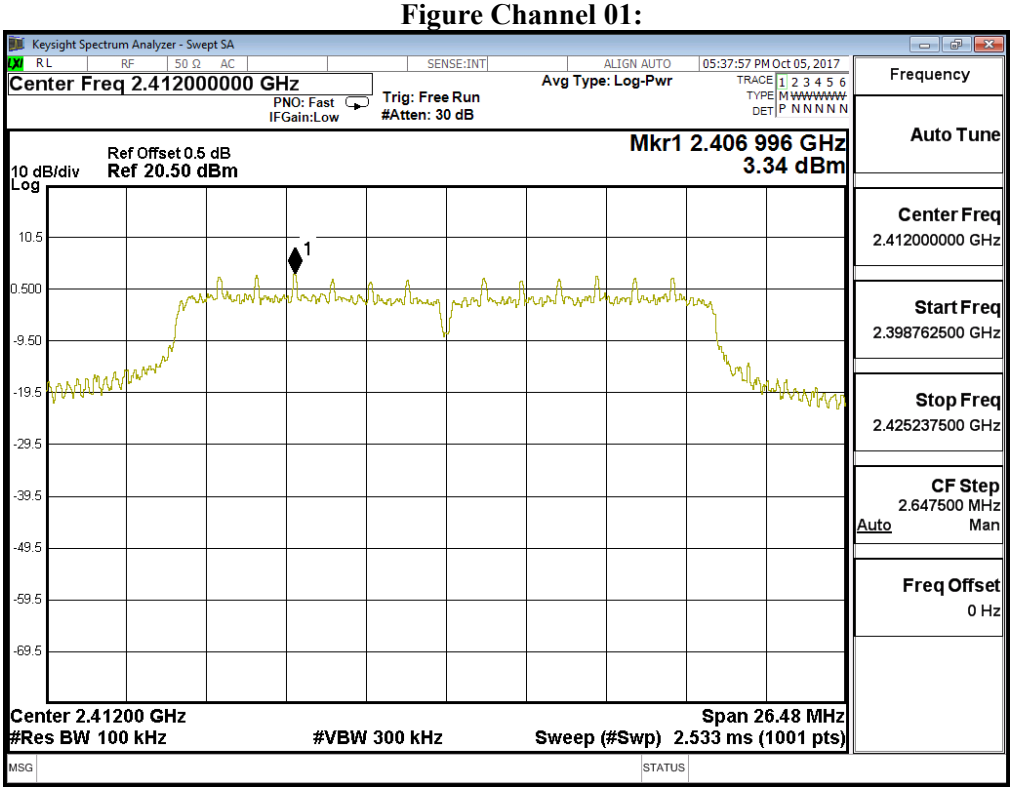


Figure Channel 06:

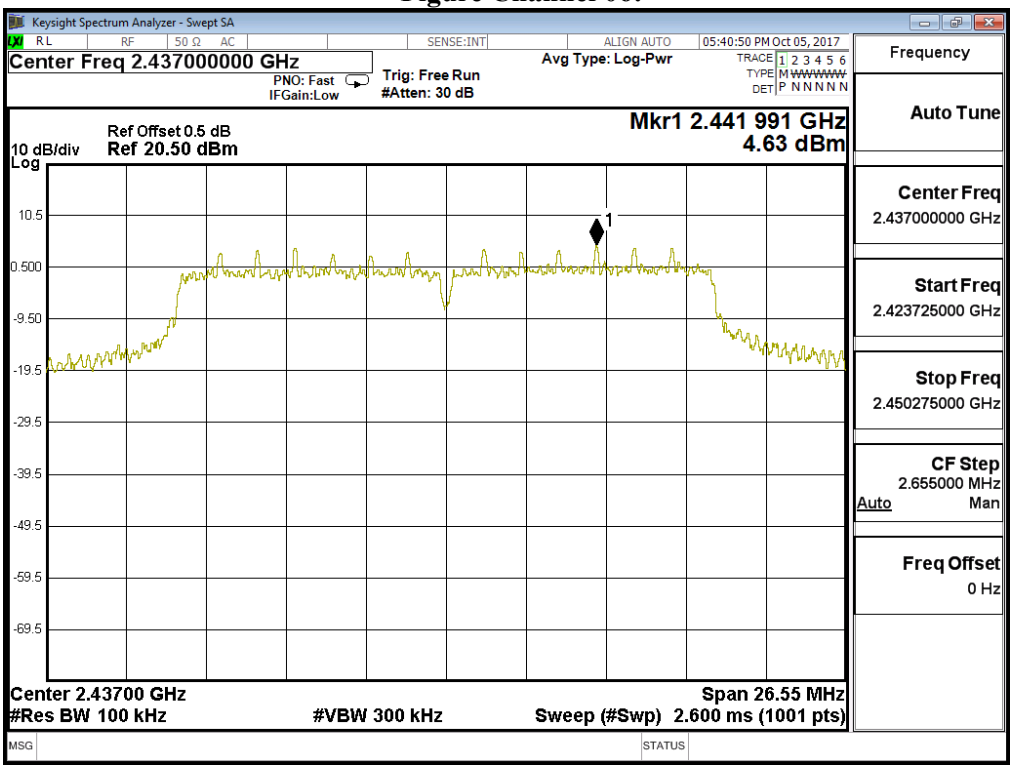
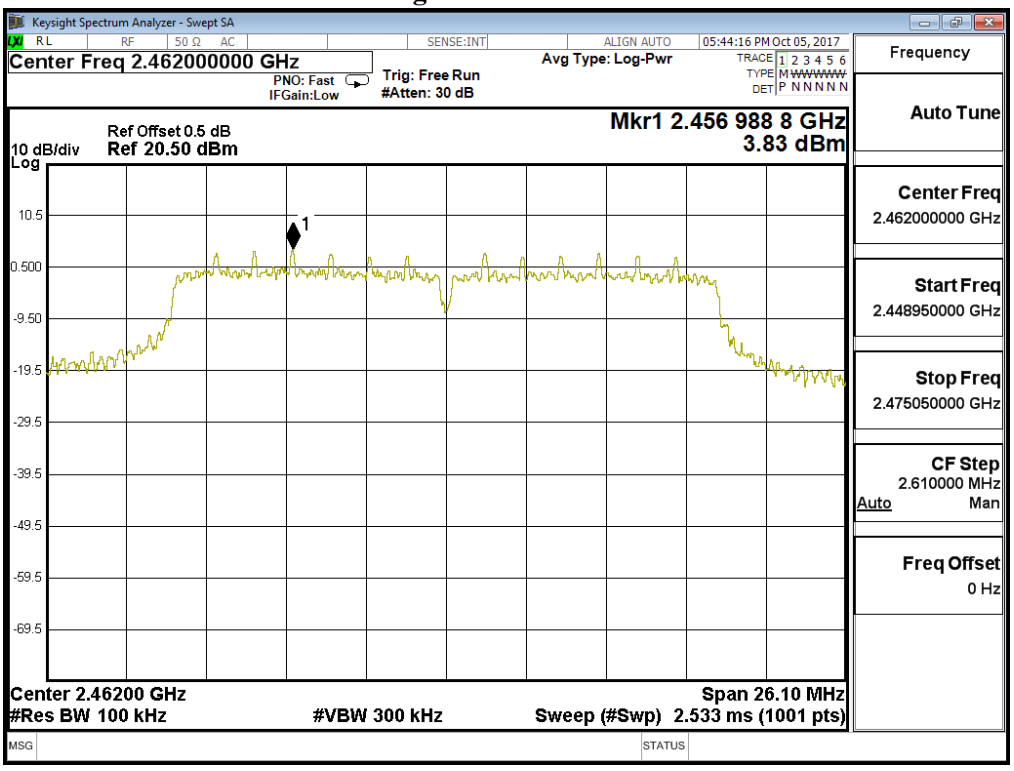


Figure Channel 11:



9. EMI Reduction Method During Compliance Testing

No modification was made during testing.