FCC Test Report

Product Name	Network Appliance
Model No	BNHW030
FCC ID.	2AHVQ-BNHW030

Applicant	Barracuda Networks Inc.
Address	5710 Fontanoso Way, San Jose, CA 95138,United States

Date of Receipt	Dec. 01, 2017
Issue Date	Feb. 07, 2018
Report No.	17C0009R-RFUSP34V00
Report Version	V1.0

Testing Laboratory
3023

The test results relate only to the samples tested.
The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.
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Test Report

Issue Date: Feb. 07, 2018
Report No.: 17C0009R-RFUSP34V00

Product Name	Network Appliance
Applicant	Barracuda Networks Inc.
Address	5710 Fontanoso Way, San Jose, CA 95138,United States
Manufacturer	Barracuda Networks Inc.
Model No.	BNHW030
FCC ID.	2AHVQ-BNHW030
EUT Rated Voltage	DC 12V
EUT Test Voltage	DC 12V
Trade Name	Barracuda
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 : Jinn Chen

(Senior Adm. Specialist / Jinn Chen)

Tested By : Ivan Chuang

(Senior Engineer / Ivan Chuang)

Approved By :

(Director / Vincent Lin)

TABLE OF CONTENTS

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Network Appliance
Trade Name	Barracuda
Model No.	BNHW030
FCC ID.	2AHVQ-BNHW030
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 144.4Mbps
Channel separation	802.11b/g/n: 5 MHz
Type of Modulation	802.11b:DSSS (DBPSK, DQPSK, CCK) 802.11g/n:OFDM (BPSK, QPSK, 16QAM, 64QAM)
Antenna Type	Dipole Antenna
Antenna Gain	Refer to the table “Antenna List”
Channel Control	Auto
Contain Module	AMPAK/AP6354

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	HSIEN JINN	KO-EX-2450-D-006-RSM	Dipole Antenna	1.10 dBi for 2.4 GHz

Note: The antenna of EUT is conforming to FCC 15.203.

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		

Note:

1. The EUT is a Network Appliance with a built-in WLAN 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. 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 14.4Mbps
4. 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.
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 (802.11b 1Mbps)
	Mode 2: Transmit (802.11g 6Mbps)
	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

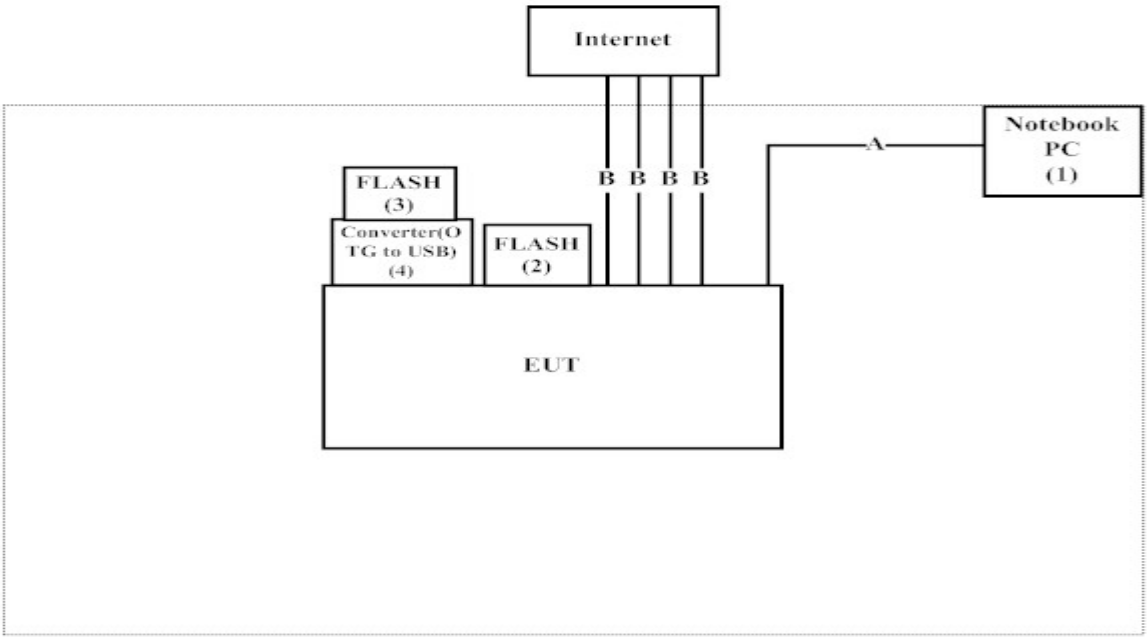
1.3. Tested System Details

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	Notebook PC	DELL	Inspiron 15 3000	GT5JPJ2	N/A
2	FLASH	Transcend	USB 3.0 16GB	N/A	N/A
3	FLASH	Transcend	USB 3.0 16GB	N/A	N/A
4	Converter(OTG to USB)	L-CUBIC	N/A	N/A	N/A

Signal Cable Type		Signal cable Description
A	USB Signal Cable	Non-shielded, 0.98m
B	LAN Cable	Non-shielded, 1.8m, four PCS.

1.4. Configuration of Tested System



1.5. EUT Exercise Software

1. Setup the EUT as shown in Section 1.4.
2. Execute software “PuTTV 0.63” 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

Site Description: Accredited by TAF
Accredited Number: 3023

Site Name: DEKRA Testing and Certification Co., Ltd.
Site Address: No.159, Sec. 2, Wenhua 1st Rd., Linkou Dist.,
New Taipei City 24457, Taiwan.
TEL: 886-2-2602-7968 / FAX : 866-2-2602-3286
E-Mail : info.tw@dekra.com

FCC Accreditation Number: TW3023

1.7. List of Test Item and Equipment

For Conducted measurements /ASR4

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Spectrum Analyzer	R&S	FSV30	103464	2018.01.23	2019.01.22
X	Power Meter	Anritsu	ML2496A	1548003	2017.12.11	2018.12.10
X	Power Sensor	Anritsu	MA2411B	1531024	2017.12.11	2018.12.10
X	Power Sensor	Anritsu	MA2411B	1531025	2017.12.11	2018.12.10
	Bluetooth Tester	R&S	CBT	101238	2018.01.18	2019.01.17

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

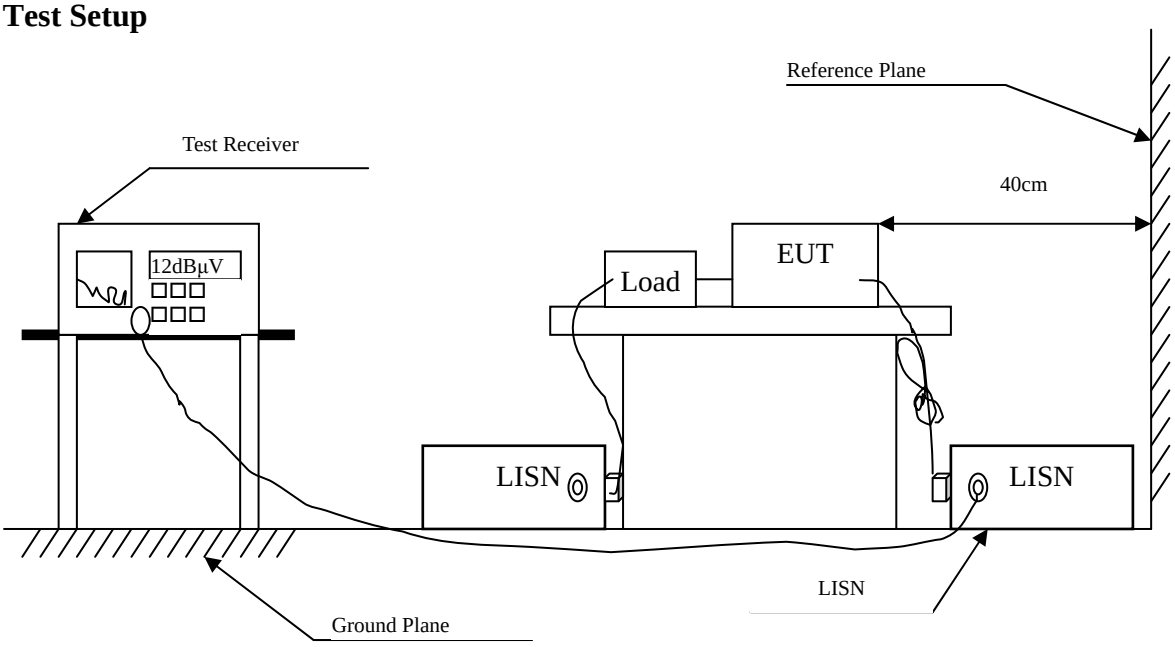
For Radiated measurements /ACB1

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Loop Antenna	TESEQ	HLA6121	37133	2016.03.18	2018.03.17
X	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-674	2017.02.13	2018.02.12
X	Horn Antenna	ETS-Lindgren	3117	00203800	2017.11.10	2018.11.09
X	Horn Antenna	Com-Power	AH-840	101087	2017.05.24	2018.05.23
X	Pre-Amplifier	EMCI	EMC001330	980316	2017.05.16	2018.05.15
X	Pre-Amplifier	EMCI	EMC051835SE	980311	2017.05.17	2018.05.16
X	Pre-Amplifier	EMCI	EMC05820SE	980310	2017.05.17	2018.05.16
X	Pre-Amplifier	EMCI	EMC184045SE	980314	2017.05.17	2018.05.16
X	Filter	MICRO TRONICS	BRM50702	G251	2017.08.30	2018.08.29
	Filter	MICRO TRONICS	BRM50716	G188	2017.08.30	2018.08.29
X	EMI Test Receiver	R&S	ESR7	101602	2017.12.11	2018.12.10
X	Spectrum Analyzer	R&S	FSV40	101147	2018.01.11	2019.01.10
X	Coaxial Cable	SUHNER	SUCOFLEX 106	RF002	2017.05.25	2018.05.24
X	Mircoflex Cable	HUBER SUHNER	SUCOFLEX 102	MY3381/2	2017.08.11	2018.08.10

Note:
1. Loop Antenna is calibrated every two year, the other 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

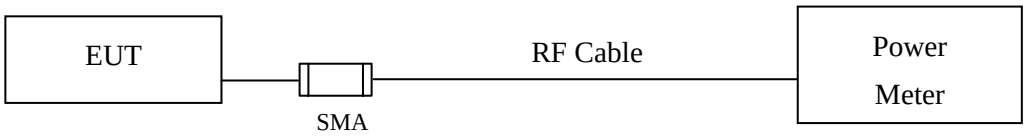
± 2.35 dB

2.5. Test Result of Conducted Emission

Owing to the EUT use DC supply voltage, 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. The maximum average conducted output power using KDB 558074 section 9.2.3.2 Method AVGPM-G (Measurement using a gated RF average-reading power meter)

3.4. Uncertainty

±0.86 dB

3.5. Test Result of Peak Power Output

Product : Network Appliance
Test Item : Peak Power Output Data
Test Mode : Mode 1: Transmit (802.11b 1Mbps)
Test Date : 2018/01/15

Chain A

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	15.26	--	--	--	18.45	<30dBm	Pass
06	2437	15.65	15.61	15.58	15.55	18.71	<30dBm	Pass
11	2462	15.74	--	--	--	18.8	<30dBm	Pass

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

Chain B

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	15.18	--	--	--	18.44	<30dBm	Pass
06	2437	15.01	14.98	14.92	14.88	18.3	<30dBm	Pass
11	2462	15.24	--	--	--	18.54	<30dBm	Pass

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

Chain A+B

Channel	Frequency (MHz)	Data Rata (Mbps)	Chain A Power (dBm)	Chain B Power (dBm)	Chain A+B Power (dBm)	Limit (dBm)	Result
01	2412	1	18.45	18.44	21.46	<30dBm	Pass
06	2437	1	18.71	18.30	21.52	<30dBm	Pass
11	2462	1	18.80	18.54	21.68	<30dBm	Pass

Note: Peak Power Output Value (dBm) = 10*LOG (Chain A (mW)+ Chain B (mW))

Product : Network Appliance
Test Item : Peak Power Output Data
Test Mode : Mode 2: Transmit (802.11g 6Mbps)
Test Date : 2018/01/15

Chain A

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	12.46	--	--	--	--	--	--	--	18.64	<30dBm	Pass
06	2437	13.79	13.75	13.69	13.65	13.58	13.51	13.46	13.44	19.36	<30dBm	Pass
11	2462	12.03	--	--	--	--	--	--	--	18.32	<30dBm	Pass

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

Chain B

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	12.25	--	--	--	--	--	--	--	18.41	<30dBm	Pass
06	2437	13.63	13.61	13.58	13.52	13.49	13.45	13.37	13.33	19.41	<30dBm	Pass
11	2462	11.81	--	--	--	--	--	--	--	18.05	<30dBm	Pass

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

Chain A+B

Channel	Frequency (MHz)	Data Rata (Mbps)	Chain A Power (dBm)	Chain B Power (dBm)	Chain A+B Power (dBm)	Limit (dBm)	Result
01	2412	6	18.64	18.41	21.54	<30dBm	Pass
06	2437	6	19.36	19.41	22.40	<30dBm	Pass
11	2462	6	18.32	18.05	21.20	<30dBm	Pass

Note: Peak Power Output Value (dBm) = 10*LOG (Chain A (mW)+ Chain B (mW))

Product : Network Appliance
Test Item : Peak Power Output Data
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)
Test Date : 2018/01/15

Chain A

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	10.87	--	--	--	--	--	--	--	17.28	<30dBm	Pass
06	2437	12.94	12.91	12.88	12.83	12.76	12.74	12.65	12.61	18.54	<30dBm	Pass
11	2462	11.83	--	--	--	--	--	--	--	18.11	<30dBm	Pass

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

Chain B

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	10.26	--	--	--	--	--	--	--	16.74	<30dBm	Pass
06	2437	12.43	12.41	12.39	12.34	12.28	12.22	12.17	12.13	18.63	<30dBm	Pass
11	2462	11.54	--	--	--	--	--	--	--	18.02	<30dBm	Pass

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

Chain A+B

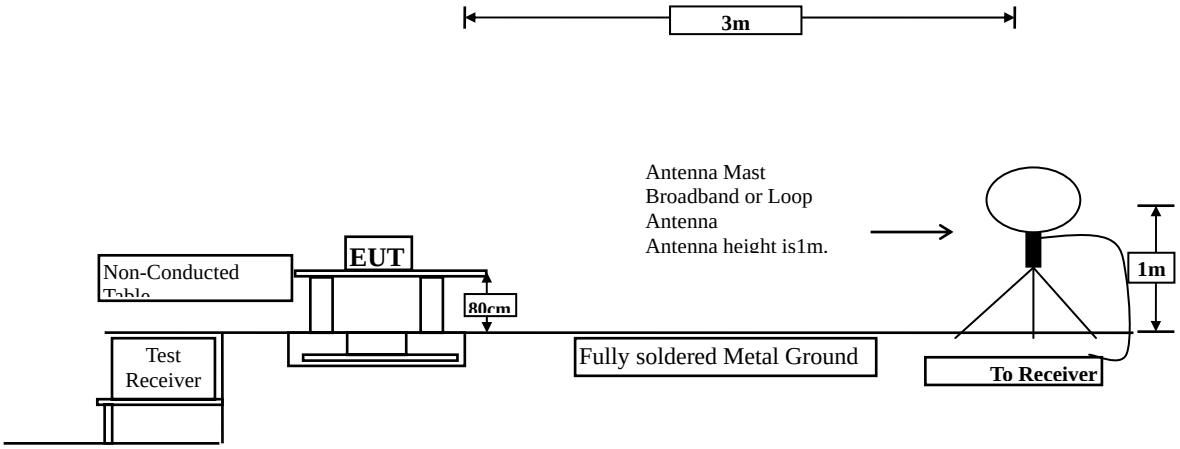
Channel	Frequency (MHz)	Data Rata (Mbps)	Chain A Power (dBm)	Chain B Power (dBm)	Chain A+B Power (dBm)	Limit (dBm)	Result
01	2412	HT8	17.28	16.74	20.03	<30dBm	Pass
06	2437	HT8	18.54	18.63	21.60	<30dBm	Pass
11	2462	HT8	18.11	18.02	21.08	<30dBm	Pass

Note: Peak Power Output Value (dBm) = 10*LOG (Chain A (mW)+ Chain B (mW))

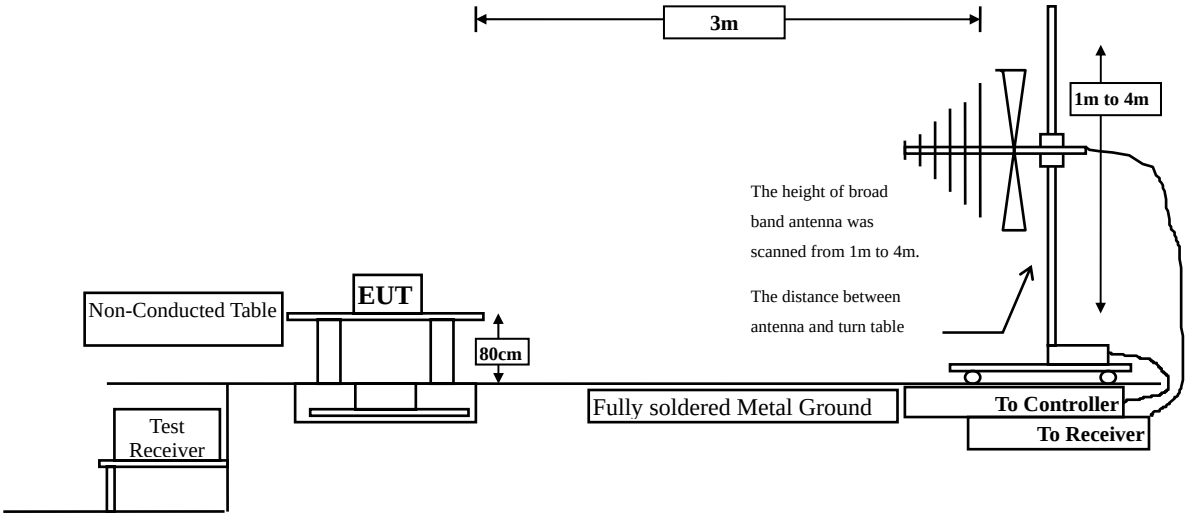
4. Radiated Emission

4.1. Test Setup

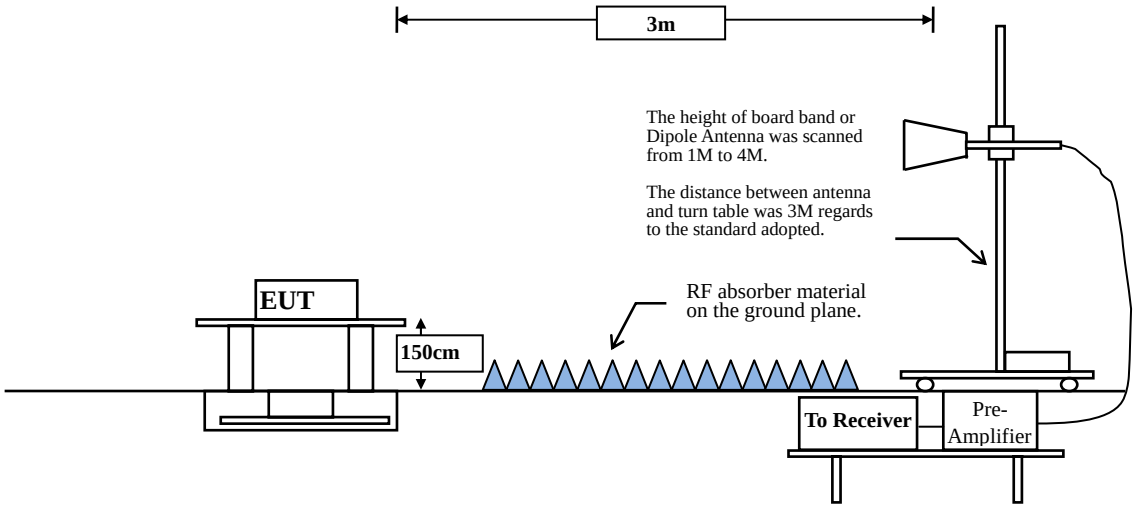
Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



4.2. Limits

➢ **General Radiated Emission Limits**

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

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

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

4.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested 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 measurement frequency range form 9kHz - 10th Harmonic of fundamental was investigated.

RBW and VBW Parameter setting:

According to KDB 558074 section 12.2.4. Peak power measurement procedure

RBW = as specified in Table 1.

VBW ≥ 3 x RBW.

Table 1 —RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

According to KDB 558074 section 12.2.5. Average power measurement procedure

RBW = 1MHz.

VBW = 10Hz, when duty cycle ≥ 98 %

VBW ≥ 1/T, when duty cycle < 98 %

(T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11b	100.00	--	--	10
802.11g	97.23	2.0362	491	500
802.11n20	94.29	0.9565	1045	2k

Note: Duty Cycle Refer to Section 9

4.4. Uncertainty

Horizontal polarization：

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

Vertical polarization：

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

4.5. Test Result of Radiated Emission

Product : Network Appliance
Test Item : Harmonic Radiated Emission Data
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)
Test Date : 2018/01/12

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4824.000	-6.117	56.640	50.523	-23.477	74.000
7236.000	-3.110	46.770	43.660	-30.340	74.000
9648.000	-0.709	47.660	46.951	-27.049	74.000
Average Detector:					
--	--	--	--	--	54.000
Vertical					
Peak Detector:					
4824.000	-6.117	51.260	45.143	-28.857	74.000
7236.000	-3.110	46.770	43.660	-30.340	74.000
9648.000	-0.709	46.740	46.031	-27.969	74.000
Average Detector:					
--	--	--	--	--	54.000

Note:

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

Product : Network Appliance
Test Item : Harmonic Radiated Emission Data
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2437 MHz)
Test Date : 2018/01/12

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4874.000	-6.080	57.940	51.860	-22.140	74.000
7311.000	-3.045	46.790	43.746	-30.254	74.000
9748.000	-0.536	46.270	45.733	-28.267	74.000
Average Detector:					
--	--	--	--	--	54.000
Vertical					
Peak Detector:					
4874.000	-6.080	51.940	45.860	-28.140	74.000
7311.000	-3.045	49.310	46.266	-27.734	74.000
9748.000	-0.536	46.600	46.063	-27.937	74.000
Average Detector:					
--	--	--	--	--	54.000

Note:

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

Product : Network Appliance
Test Item : Harmonic Radiated Emission Data
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462 MHz)
Test Date : 2018/01/12

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV/m	dB	dBµV/m
Horizontal					
Peak Detector:					
4924.000	-6.060	58.180	52.120	-21.880	74.000
7386.000	-2.923	47.380	44.457	-29.543	74.000
9848.000	-0.441	46.790	46.350	-27.650	74.000
Average Detector:					
--	--	--	--	--	54.000
Vertical					
Peak Detector:					
4924.000	-6.060	52.770	46.710	-27.290	74.000
7386.000	-2.923	47.460	44.537	-29.463	74.000
9848.000	-0.441	46.980	46.540	-27.460	74.000
Average Detector:					
--	--	--	--	--	54.000

Note:

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

Product : Network Appliance
Test Item : Harmonic Radiated Emission Data
Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)
Test Date : 2018/01/12

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4824.000	-6.117	54.880	48.763	-25.237	74.000
7236.000	-3.110	47.590	44.480	-29.520	74.000
9648.000	-0.709	47.350	46.641	-27.359	74.000
Average Detector:					
--	--	--	--	--	54.000
Vertical					
Peak Detector:					
4824.000	-6.117	49.420	43.303	-30.697	74.000
7236.000	-3.110	47.010	43.900	-30.100	74.000
9648.000	-0.709	47.360	46.651	-27.349	74.000
Average Detector:					
--	--	--	--	--	54.000

Note:

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

Product : Network Appliance
Test Item : Harmonic Radiated Emission Data
Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2437 MHz)
Test Date : 2018/01/12

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4874.000	-6.080	56.900	50.820	-23.180	74.000
7311.000	-3.045	47.070	44.026	-29.974	74.000
9748.000	-0.536	46.610	46.073	-27.927	74.000
Average Detector:					
--	--	--	--	--	54.000
Vertical					
Peak Detector:					
4874.000	-6.080	51.030	44.950	-29.050	74.000
7311.000	-3.045	48.610	45.566	-28.434	74.000
9748.000	-0.536	46.240	45.703	-28.297	74.000
Average Detector:					
--	--	--	--	--	54.000

Note:

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

Product : Network Appliance
Test Item : Harmonic Radiated Emission Data
Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462 MHz)
Test Date : 2018/01/12

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV/m	dB	dBµV/m
Horizontal					
Peak Detector:					
4924.000	-6.060	54.490	48.430	-25.570	74.000
7386.000	-2.923	47.400	44.477	-29.523	74.000
9848.000	-0.441	47.100	46.660	-27.340	74.000
Average Detector:					
--	--	--	--	--	54.000
Vertical					
Peak Detector:					
4924.000	-6.060	49.750	43.690	-30.310	74.000
7386.000	-2.923	47.750	44.827	-29.173	74.000
9848.000	-0.441	46.990	46.550	-27.450	74.000
Average Detector:					
--	--	--	--	--	54.000

Note:

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

Product : Network Appliance
Test Item : Harmonic Radiated Emission Data
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)(2412MHz)
Test Date : 2018/01/12

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV/m	dB	dBµV/m
Horizontal					
Peak Detector:					
4824.000	-6.117	51.260	45.143	-28.857	74.000
7236.000	-3.110	47.180	44.070	-29.930	74.000
9648.000	-0.709	47.460	46.751	-27.249	74.000
Average Detector:					
--	--	--	--	--	54.000
Vertical					
Peak Detector:					
4824.000	-6.117	49.230	43.113	-30.887	74.000
7236.000	-3.110	46.640	43.530	-30.470	74.000
9648.000	-0.709	47.510	46.801	-27.199	74.000
Average Detector:					
--	--	--	--	--	54.000

Note:

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

Product : Network Appliance
Test Item : Harmonic Radiated Emission Data
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2437 MHz)
Test Date : 2018/01/12

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4871.000	-6.086	53.350	47.265	-26.735	74.000
7311.000	-3.045	47.130	44.086	-29.914	74.000
9748.000	-0.536	46.690	46.153	-27.847	74.000
Average Detector:					
--	--	--	--	--	54.000
Vertical					
Peak Detector:					
4874.000	-6.080	49.800	43.720	-30.280	74.000
7311.000	-3.045	48.610	45.566	-28.434	74.000
9748.000	-0.536	46.380	45.843	-28.157	74.000
Average Detector:					
--	--	--	--	--	54.000

Note:

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

Product : Network Appliance
Test Item : Harmonic Radiated Emission Data
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462 MHz)
Test Date : 2018/01/12

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV/m	dB	dBµV/m
Horizontal					
Peak Detector:					
4924.000	-6.060	53.230	47.170	-26.830	74.000
7386.000	-2.923	47.730	44.807	-29.193	74.000
9848.000	-0.441	47.270	46.830	-27.170	74.000
Average Detector:					
--	--	--	--	--	54.000
Vertical					
Peak Detector:					
4924.000	-6.060	50.300	44.240	-29.760	74.000
7386.000	-2.923	47.200	44.277	-29.723	74.000
9848.000	-0.441	46.420	45.980	-28.020	74.000
Average Detector:					
--	--	--	--	--	54.000

Note:

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

Product : Network Appliance
Test Item : General Radiated Emission Data
Test Mode : Mode 1: Transmit (802.11b 1Mbps)(2437 MHz)
Test Date : 2018/02/01

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV/m	dB	dBµV/m
Horizontal					
107.319	-14.581	56.812	42.231	-1.269	43.500
249.304	-11.645	56.637	44.992	-1.008	46.000
263.362	-11.221	56.297	45.076	-0.924	46.000
299.913	-9.902	55.296	45.394	-0.606	46.000
649.957	-2.629	48.155	45.526	-0.474	46.000
800.377	-0.321	45.414	45.094	-0.906	46.000
Vertical					
52.493	-11.075	48.501	37.425	-2.575	40.000
84.826	-16.228	52.130	35.902	-4.098	40.000
374.420	-8.063	50.864	42.801	-3.199	46.000
624.652	-2.848	45.976	43.128	-2.872	46.000
649.957	-2.629	48.198	45.569	-0.431	46.000
900.188	0.934	43.861	44.795	-1.205	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product : Network Appliance
Test Item : General Radiated Emission Data
Test Mode : Mode 2: Transmit (802.11g 6Mbps)(2437 MHz)
Test Date : 2018/02/02

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
167.768	-10.766	52.911	42.145	-1.355	43.500
249.304	-11.645	55.520	43.875	-2.125	46.000
299.913	-9.902	54.324	44.422	-1.578	46.000
649.957	-2.629	47.555	44.926	-1.074	46.000
800.377	-0.321	45.139	44.819	-1.181	46.000
850.986	0.328	43.616	43.945	-2.055	46.000
Vertical					
63.739	-12.434	51.132	38.698	-1.302	40.000
374.420	-8.063	51.227	43.164	-2.836	46.000
450.333	-6.163	45.635	39.472	-6.528	46.000
624.652	-2.848	45.421	42.573	-3.427	46.000
649.957	-2.629	46.991	44.362	-1.638	46.000
900.188	0.934	43.767	44.701	-1.299	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product : Network Appliance
Test Item : General Radiated Emission Data
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)(2437 MHz)
Test Date : 2018/02/02

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV/m	dB	dBµV/m
Horizontal					
105.913	-14.830	57.021	42.191	-1.309	43.500
167.768	-10.766	52.884	42.118	-1.382	43.500
249.304	-11.645	55.252	43.607	-2.393	46.000
299.913	-9.902	54.903	45.001	-0.999	46.000
649.957	-2.629	47.405	44.776	-1.224	46.000
850.986	0.328	43.245	43.574	-2.426	46.000
Vertical					
74.986	-14.362	50.074	35.712	-4.288	40.000
374.420	-8.063	51.043	42.980	-3.020	46.000
624.652	-2.848	45.535	42.687	-3.313	46.000
649.957	-2.629	47.268	44.639	-1.361	46.000
850.986	0.328	40.348	40.677	-5.323	46.000
900.188	0.934	43.433	44.367	-1.633	46.000

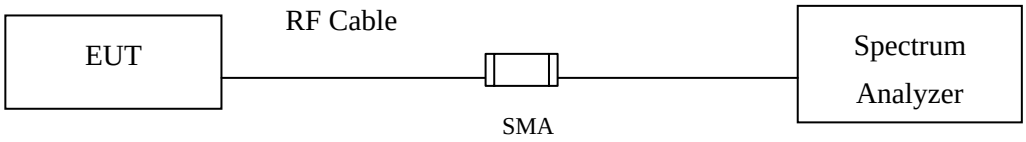
Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. 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.

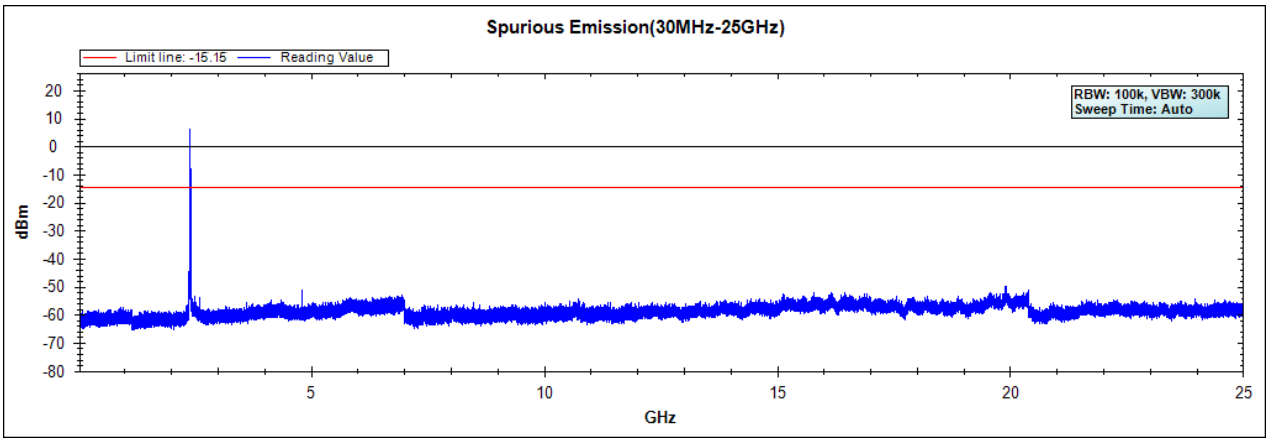
5.4. Uncertainty

±1.23dB

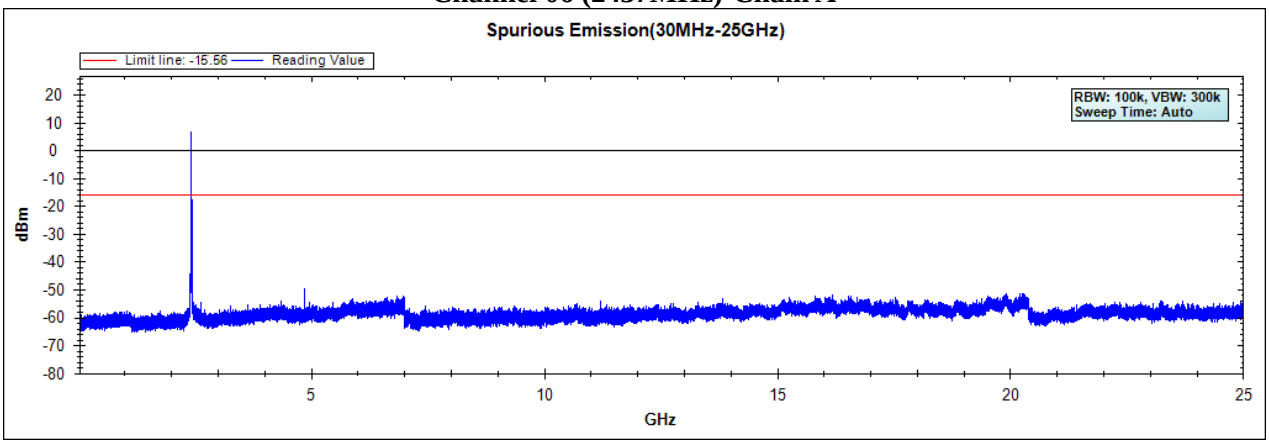
5.5. Test Result of RF antenna conducted test

Product	:	Network Appliance
Test Item	:	RF antenna conducted test
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps)
Test Date	:	2018/02/7

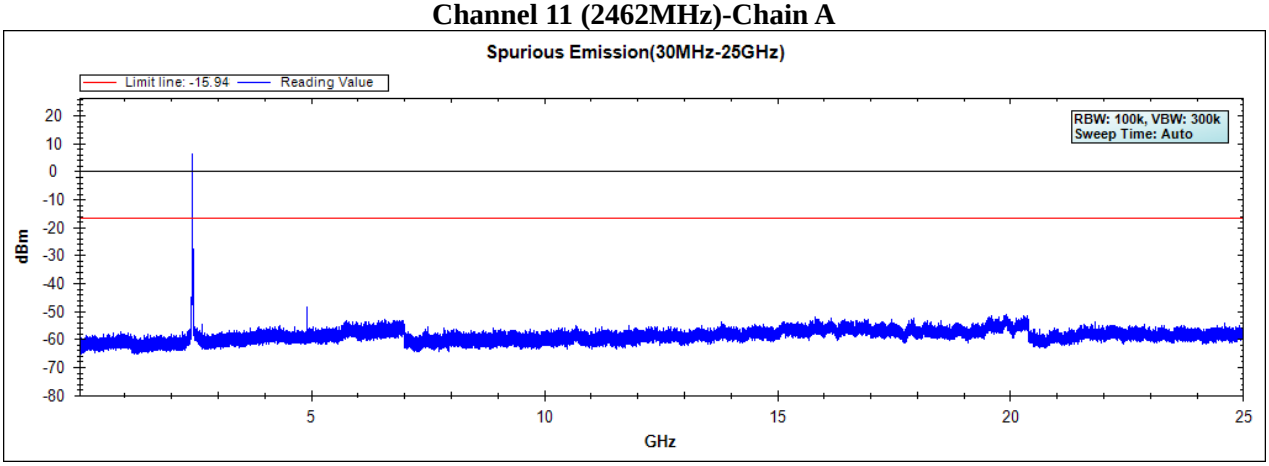
Channel 01 (2412MHz)-Chain A



Channel 06 (2437MHz)-Chain A



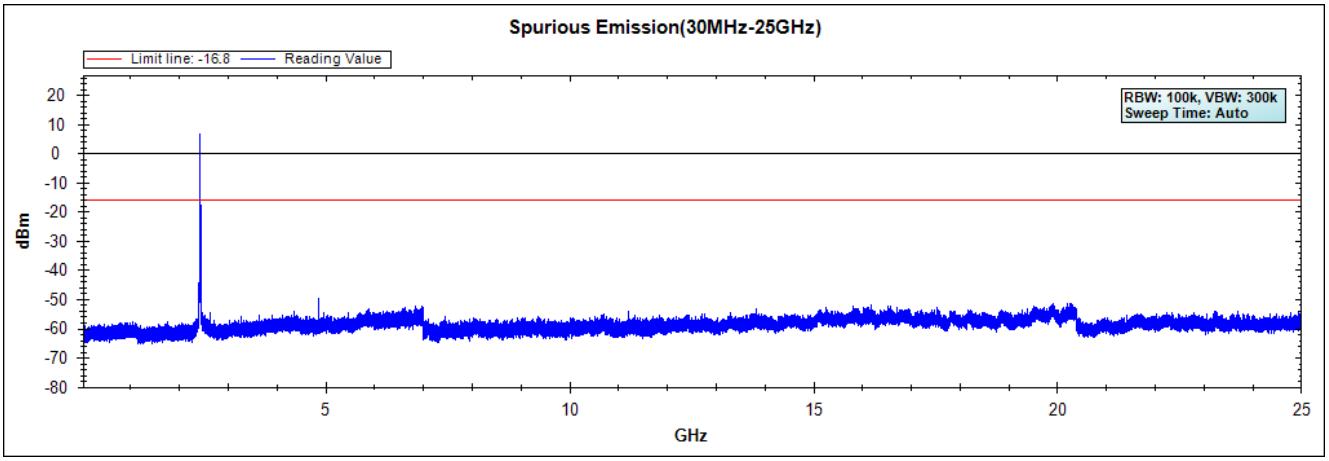
Channel 11 (2462MHz)-Chain A



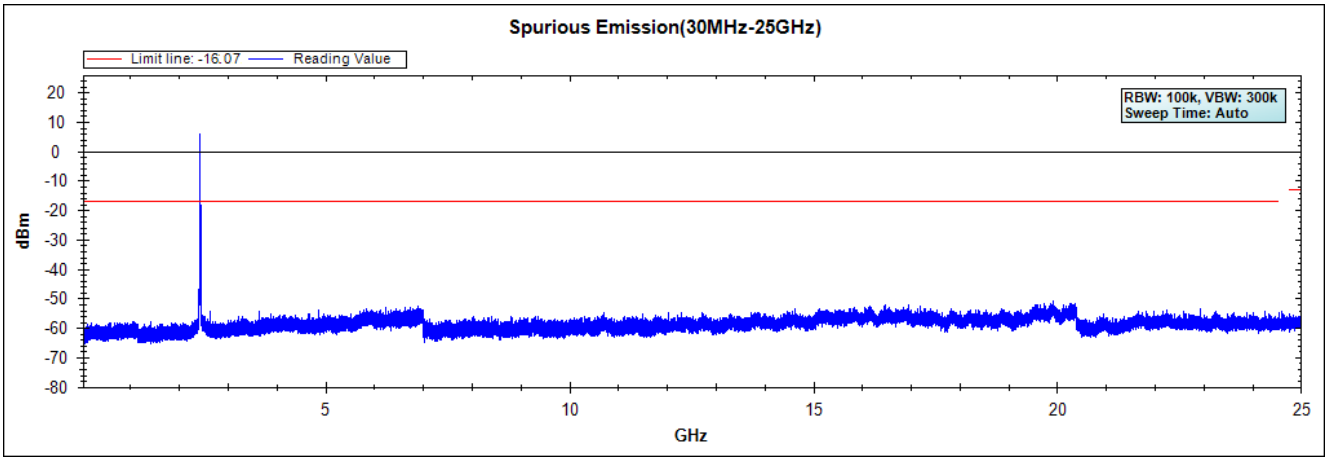
Note: The above test pattern is synthesized by multiple of the frequency range.

Product	:	Network Appliance
Test Item	:	RF antenna conducted test
Test Mode	:	Mode 1: Transmit (802.11b 1Mbps)
Test Date	:	2018/02/7

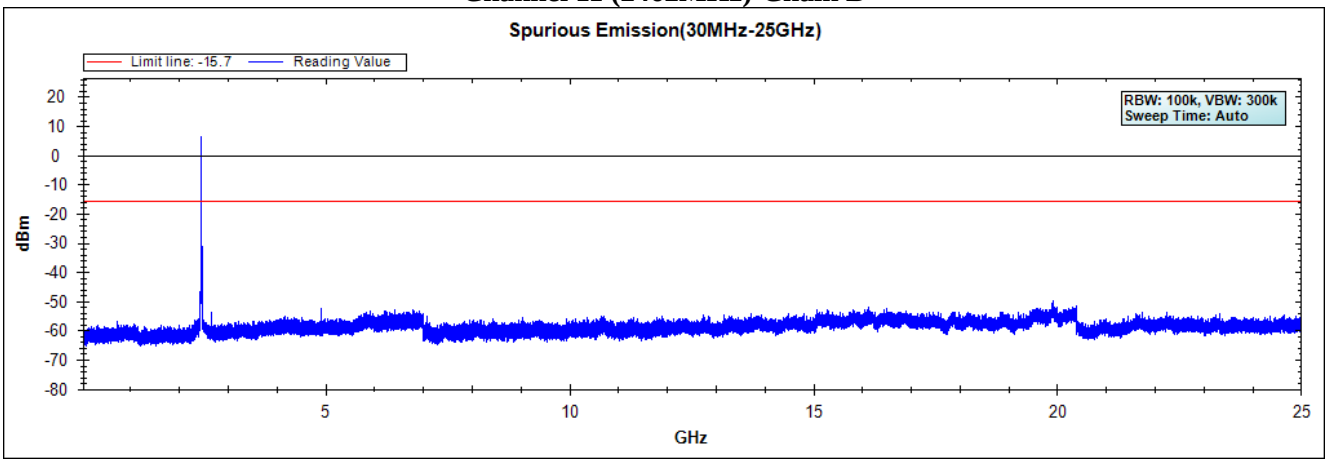
Channel 01 (2412MHz)-Chain B



Channel 06 (2437MHz)-Chain B



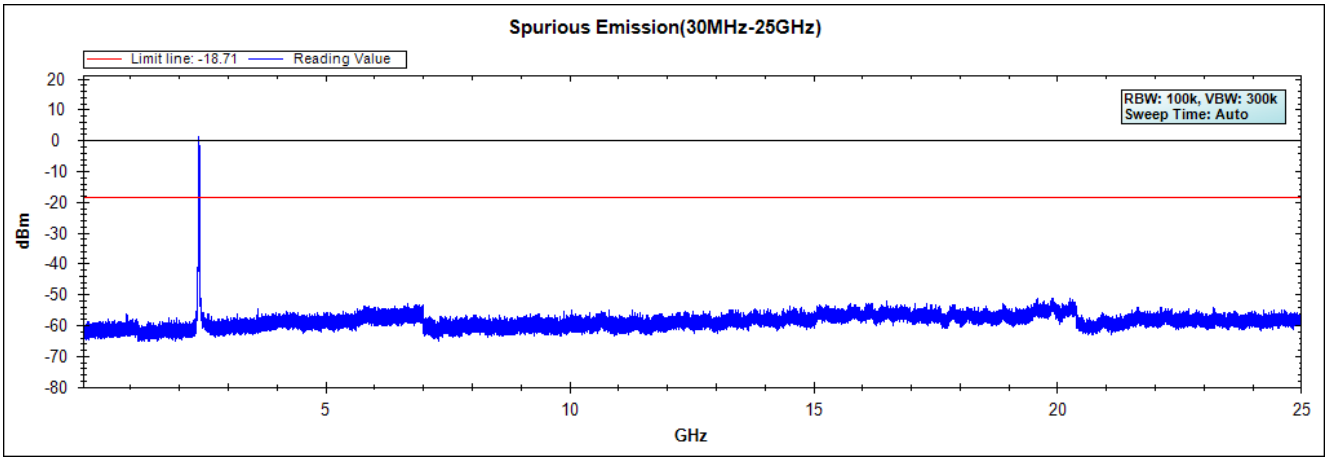
Channel 11 (2462MHz)-Chain B



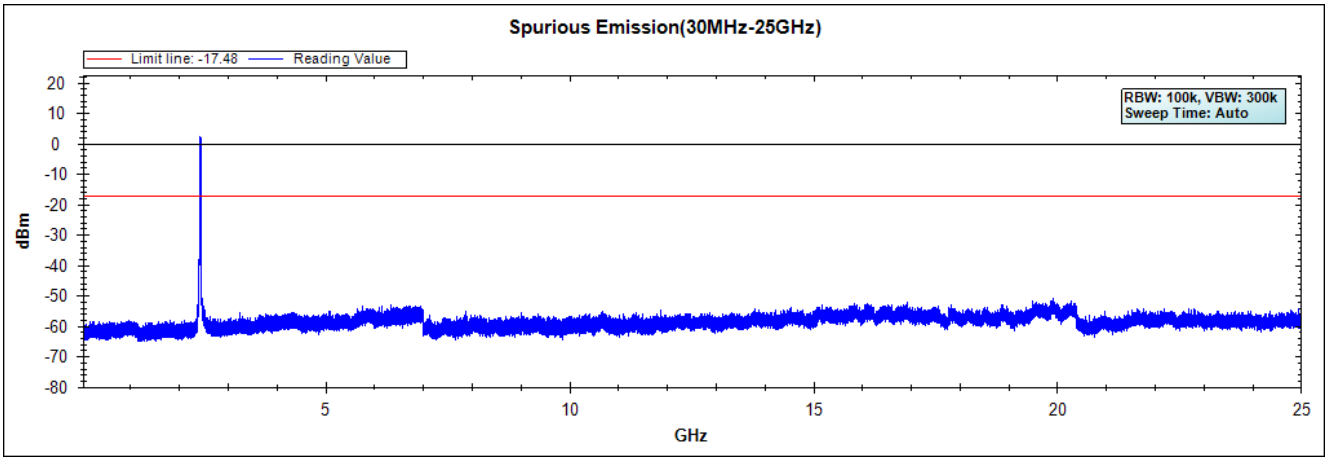
Note: The above test pattern is synthesized by multiple of the frequency range.

Product	:	Network Appliance
Test Item	:	RF Antenna Conducted Spurious
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps)
Test Date	:	2018/01/08

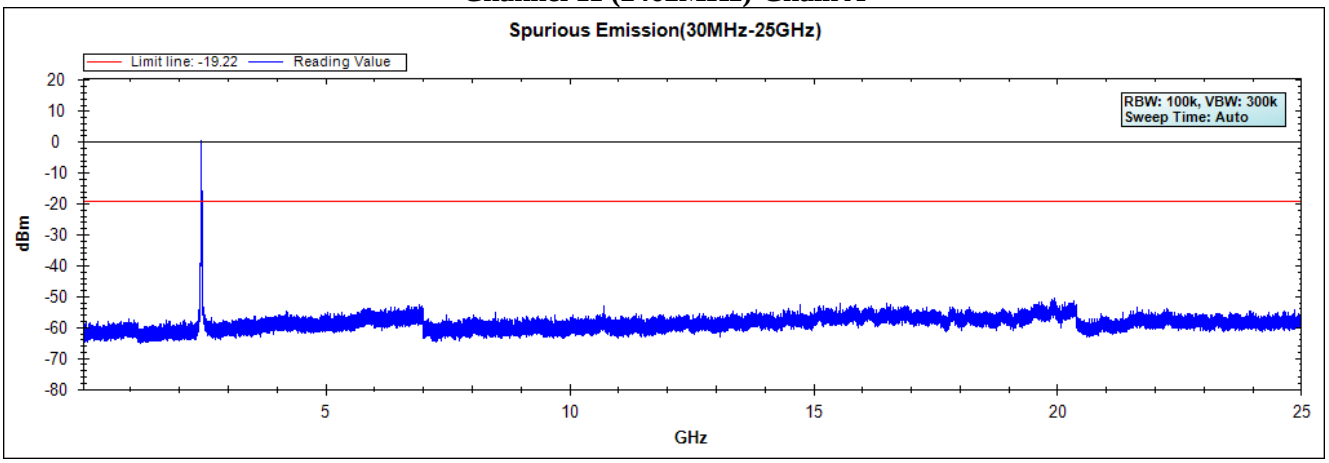
Channel 01 (2412MHz)-Chain A



Channel 06 (2437MHz)-Chain A



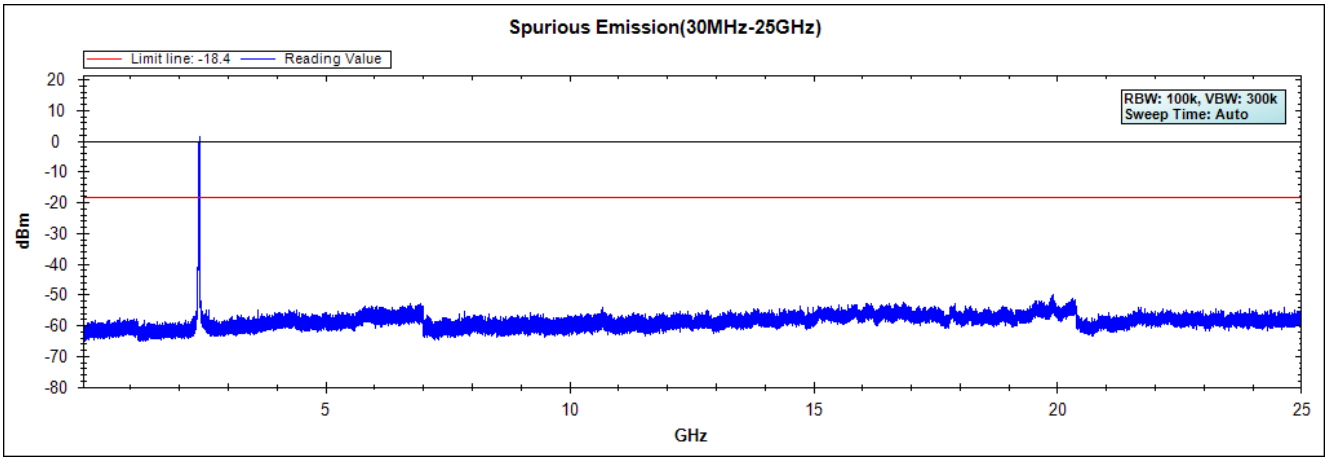
Channel 11 (2462MHz)-Chain A



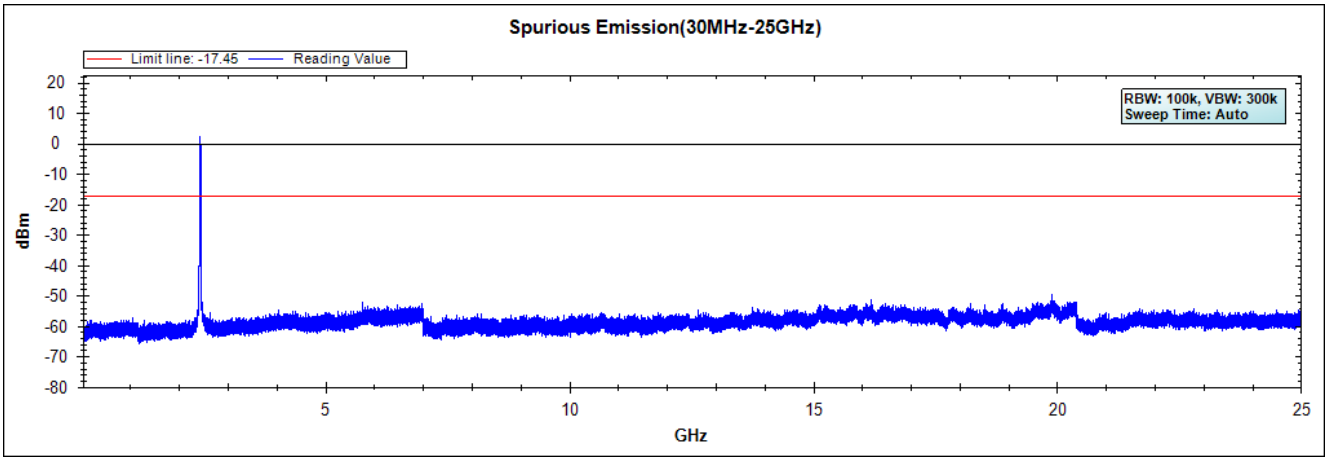
Note: The above test pattern is synthesized by multiple of the frequency range.

Product	:	Network Appliance
Test Item	:	RF Antenna Conducted Spurious
Test Mode	:	Mode 2: Transmit (802.11g 6Mbps)
Test Date	:	2018/01/08

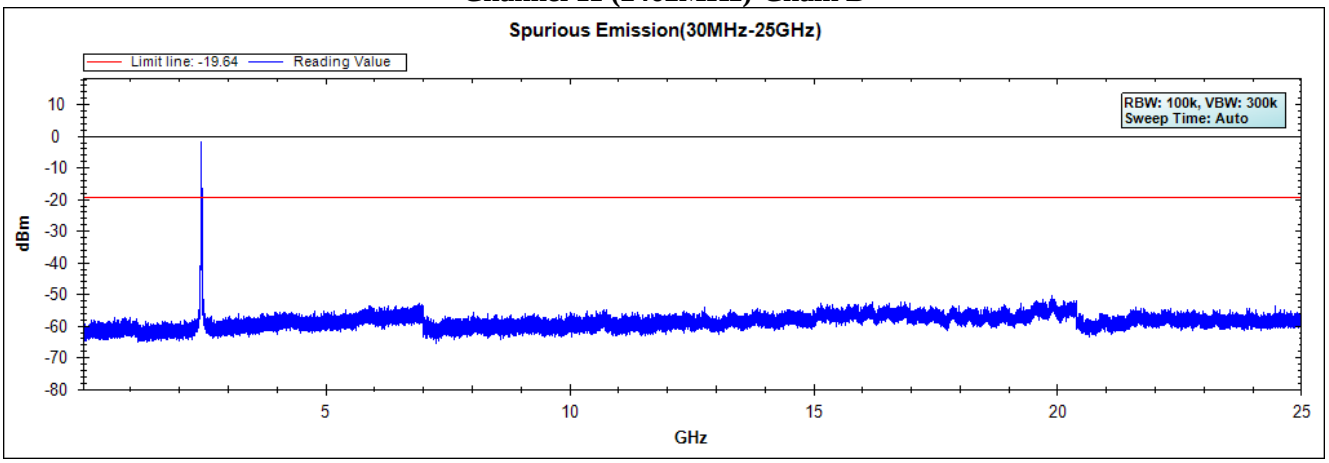
Channel 01 (2412MHz)-Chain B



Channel 06 (2437MHz)-Chain B



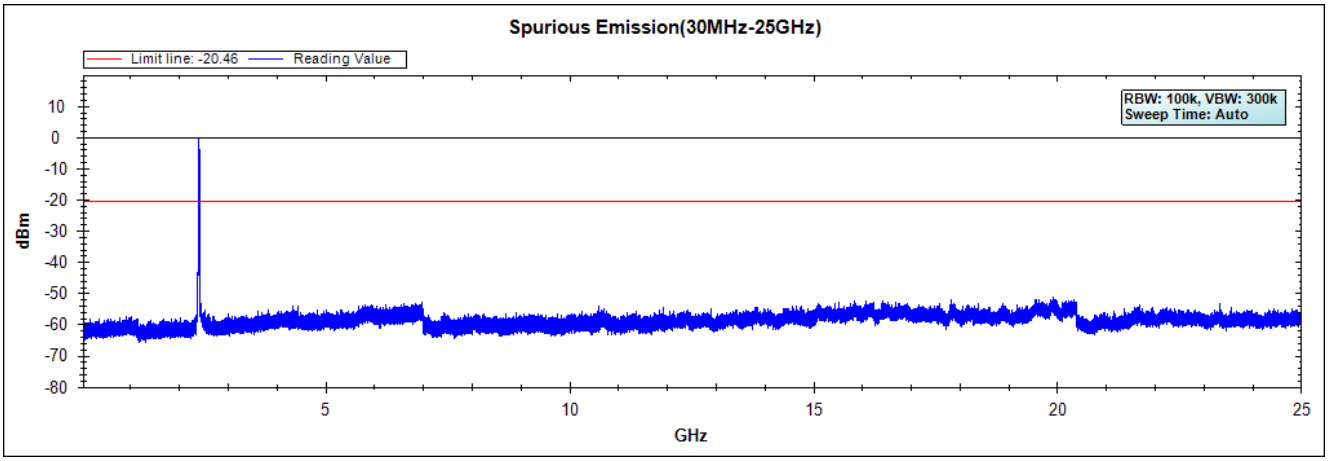
Channel 11 (2462MHz)-Chain B



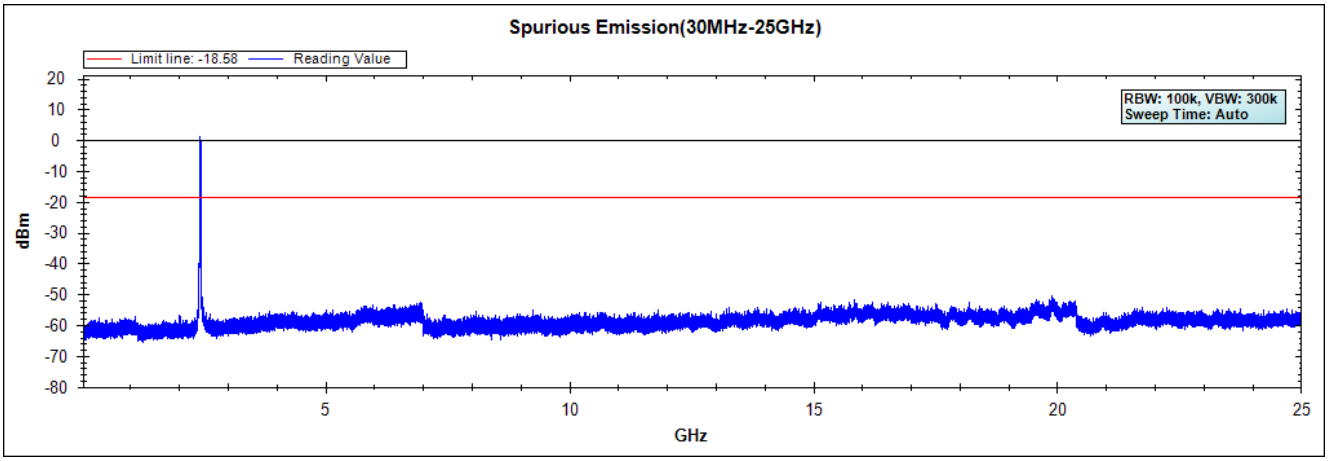
Note: The above test pattern is synthesized by multiple of the frequency range.

Product	:	Network Appliance
Test Item	:	RF Antenna Conducted Spurious
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)
Test Date	:	2018/01/08

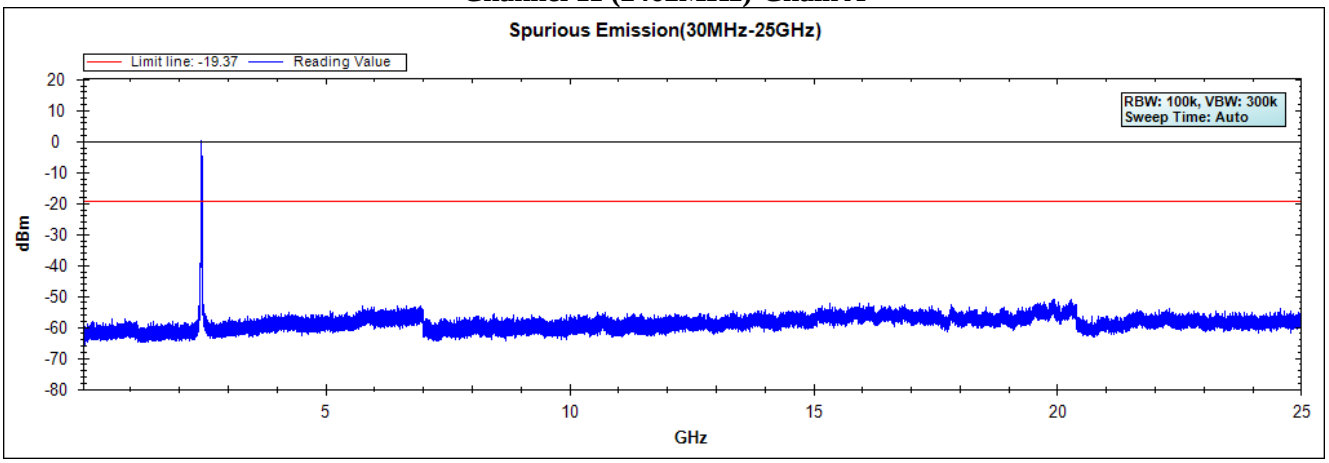
Channel 01 (2412MHz)-Chain A



Channel 06 (2437MHz)-Chain A



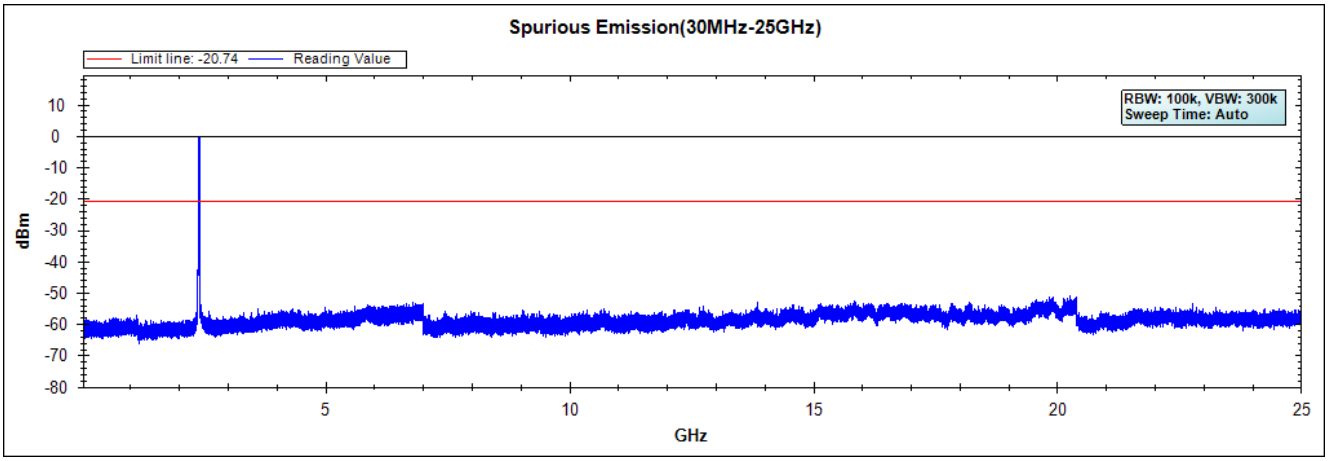
Channel 11 (2462MHz)-Chain A



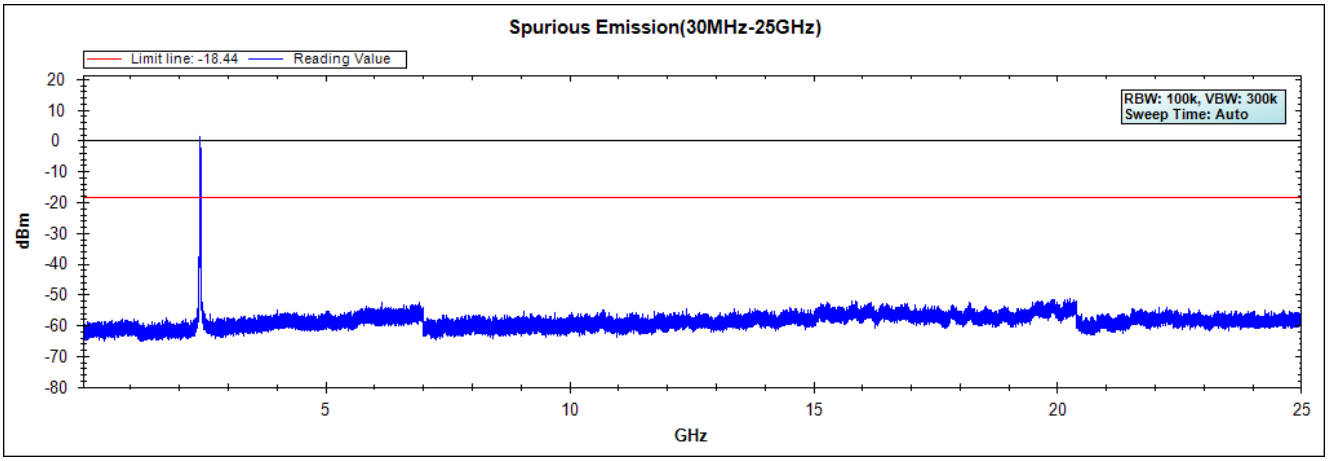
Note: The above test pattern is synthesized by multiple of the frequency range.

Product	:	Network Appliance
Test Item	:	RF Antenna Conducted Spurious
Test Mode	:	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)
Test Date	:	2018/01/08

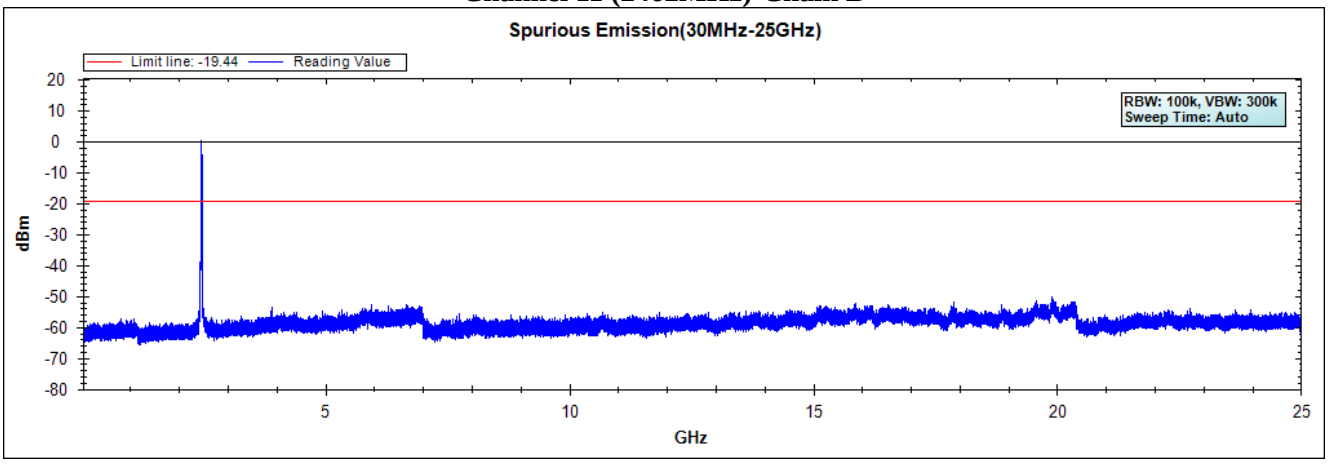
Channel 01 (2412MHz)-Chain B



Channel 06 (2437MHz)-Chain B



Channel 11 (2462MHz)-Chain B

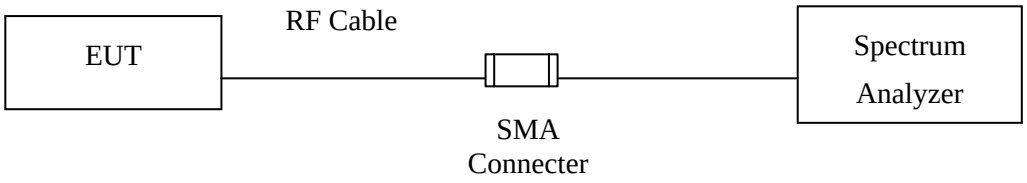


Note: The above test pattern is synthesized by multiple of the frequency range.

6. Band Edge

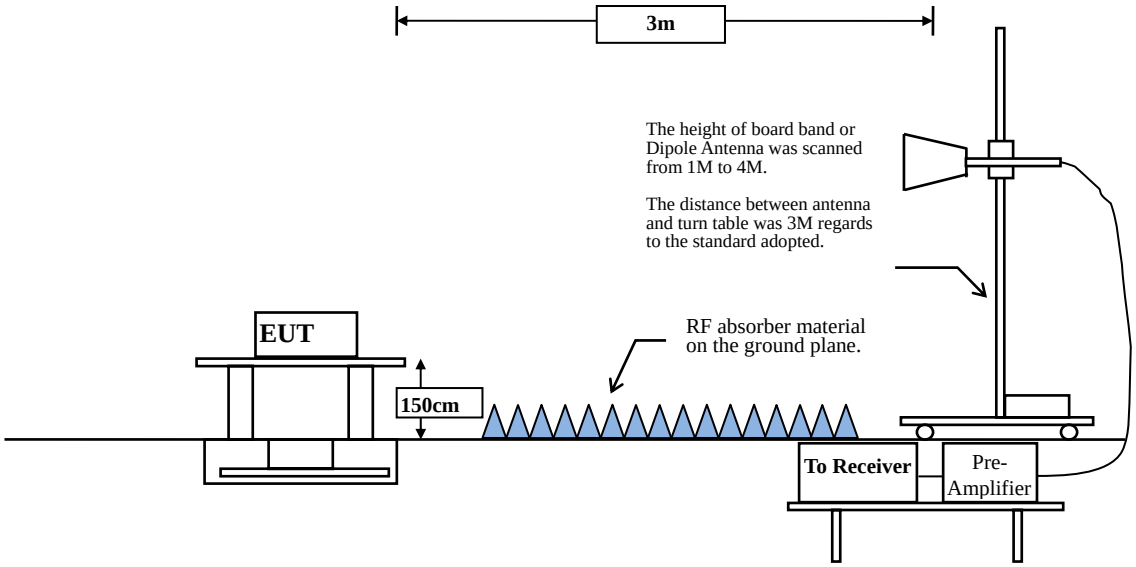
6.1. Test Setup

RF Conducted Measurement



RF Radiated Measurement:

Above 1GHz



6.2. 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. 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 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.

RBW and VBW Parameter setting:

According to KDB 558074 section 12.2.4. Peak power measurement procedure

RBW = as specified in Table 1.

VBW ≥ 3 x RBW.

Table 1 —RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

According to KDB 558074 section 12.2.5. Average power measurement procedure

RBW = 1MHz.

VBW = 10Hz, when duty cycle ≥ 98 %

VBW ≥ 1/T, when duty cycle < 98 %

(T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11b	100.00	--	--	10
802.11g	97.23	2.0362	491	500
802.11n20	94.29	0.9565	1045	2k

Note: Duty Cycle Refer to Section 9

6.4. Uncertainty

Conducted: ±1.23dB

Radiated:

Horizontal polarization：1-18GHz: ±3.77dB

Vertical polarization：1-18GHz : ±3.83dB

6.5. Test Result of Band Edge

Product : Network Appliance
Test Item : Band Edge Data
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)
Test Date : 2018/01/05

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)	2386.377	12.138	37.961	50.099	74.00	54.00	Pass
01 (Peak)	2390.000	12.148	37.418	49.566	74.00	54.00	Pass
01 (Peak)	2398.551	12.172	50.518	62.690	--	--	--
01 (Peak)	2400.000	12.176	48.863	61.039	--	--	--
01 (Peak)	2410.870	12.201	91.287	103.488	--	--	--
01 (Average)	2387.102	12.139	30.651	42.791	74.00	54.00	Pass
01 (Average)	2390.000	12.148	29.161	41.309	74.00	54.00	Pass
01 (Average)	2398.986	12.174	45.724	57.897	--	--	--
01 (Average)	2400.000	12.176	39.418	51.594	--	--	--
01 (Average)	2411.159	12.201	87.964	100.165	--	--	--

Figure Channel 01: Horizontal (Peak)

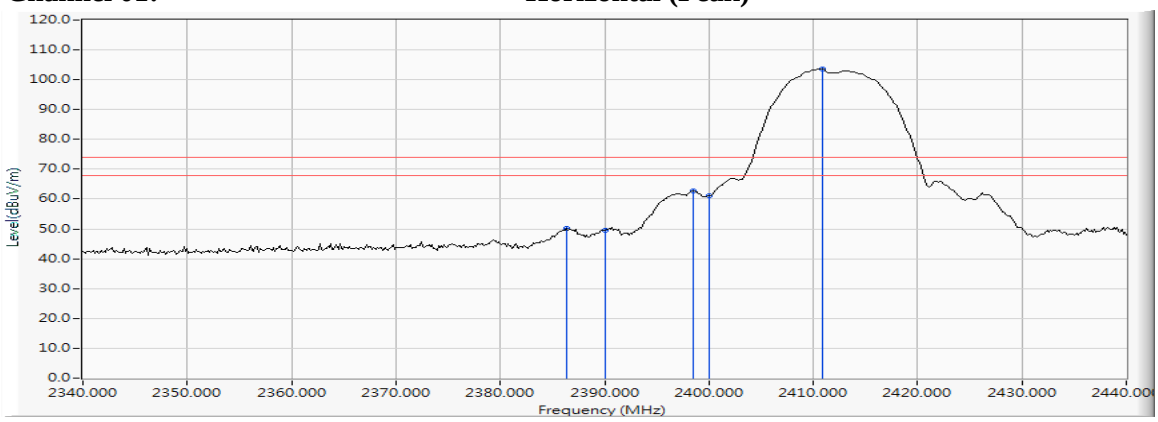
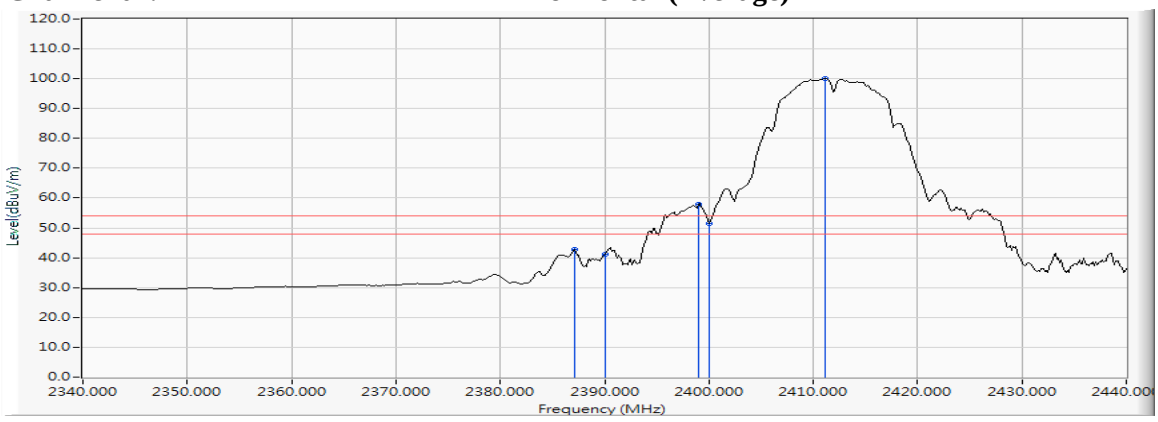


Figure Channel 01: Horizontal (Average)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Network Appliance
Test Item : Band Edge Data
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)
Test Date : 2018/01/05

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	12.148	46.894	59.042	74.00	54.00	Pass
01 (Peak)	2398.406	12.172	58.410	70.581	74.00	54.00	Pass
01 (Peak)	2400.000	12.176	55.683	67.859	--	--	--
01 (Peak)	2413.043	12.206	96.952	109.158	--	--	--
01 (Average)	2387.101	12.139	38.612	50.752	74.00	54.00	Pass
01 (Average)	2390.000	12.148	38.026	50.174	74.00	54.00	Pass
01 (Average)	2398.551	12.172	53.569	65.741	--	--	--
01 (Average)	2400.000	12.176	47.398	59.574	--	--	--
01 (Average)	2411.159	12.201	93.506	105.707	--	--	--

Figure Channel 01: Vertical (Peak)

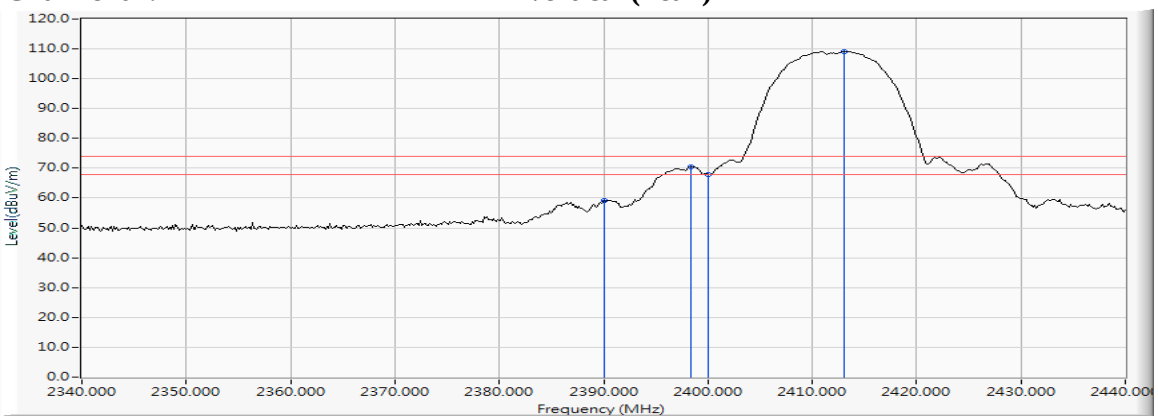
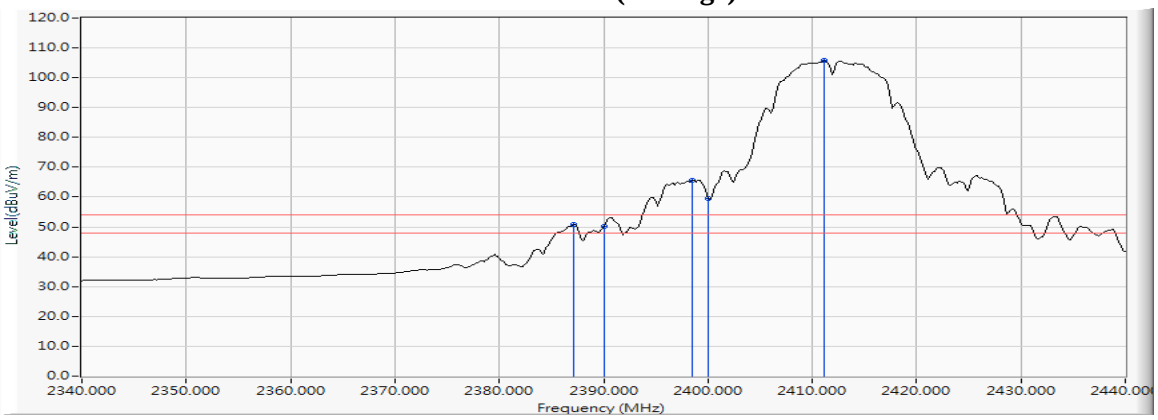


Figure Channel 01: Vertical (Average)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Network Appliance
Test Item : Band Edge Data
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462MHz)
Test Date : 2018/01/06

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)	2460.891	12.337	92.437	104.775	--	--	--
11 (Peak)	2483.500	12.403	40.475	52.878	74.00	54.00	Pass
11 (Peak)	2483.790	12.403	40.934	53.337	74.00	54.00	Pass
11 (Average)	2461.036	12.339	89.347	101.686	--	--	--
11 (Average)	2483.500	12.403	25.860	38.263	74.00	54.00	Pass
11 (Average)	2485.819	12.409	28.910	41.319	74.00	54.00	Pass

Figure Channel 11: Horizontal (Peak)

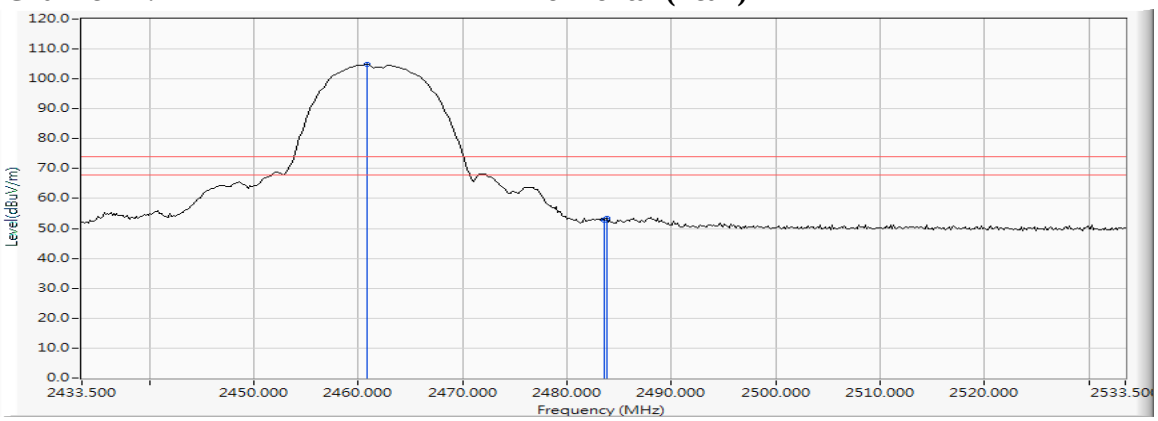
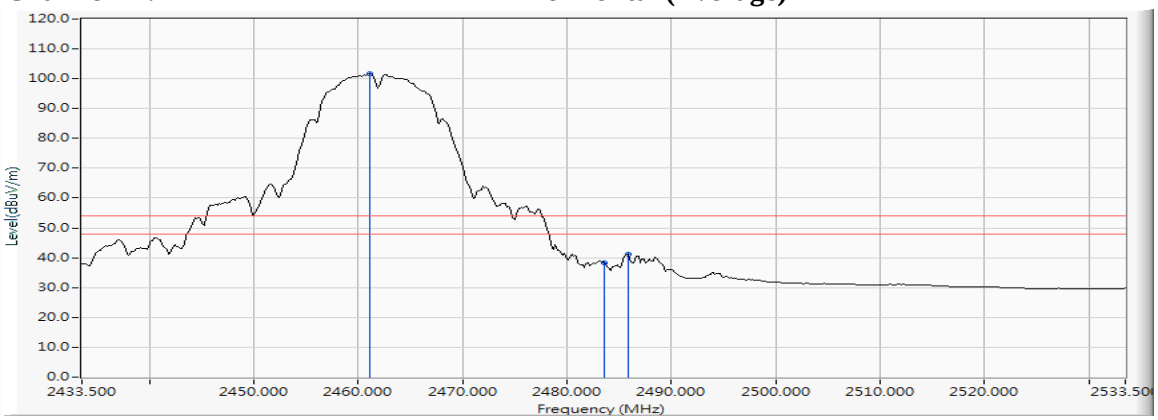


Figure Channel 11: Horizontal (Average)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Network Appliance
Test Item : Band Edge Data
Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462MHz)
Test Date : 2018/01/06

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)	2460.891	12.337	99.756	112.094	--	--	--
11 (Peak)	2483.500	12.403	46.732	59.135	74.00	54.00	Pass
11 (Peak)	2483.790	12.403	47.117	59.520	74.00	54.00	Pass
11 (Average)	2462.630	12.343	95.933	108.276	--	--	--
11 (Average)	2483.500	12.403	39.261	51.664	74.00	54.00	Pass

Figure Channel 11: Vertical (Peak)

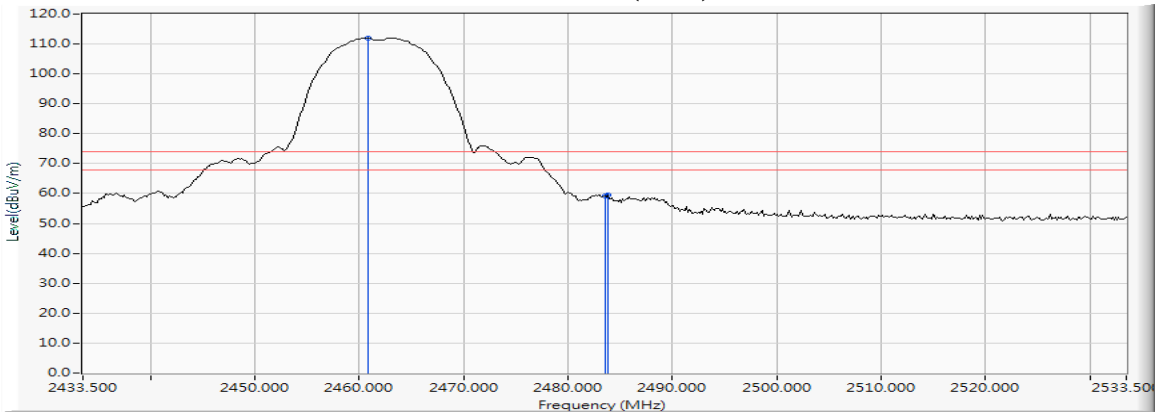
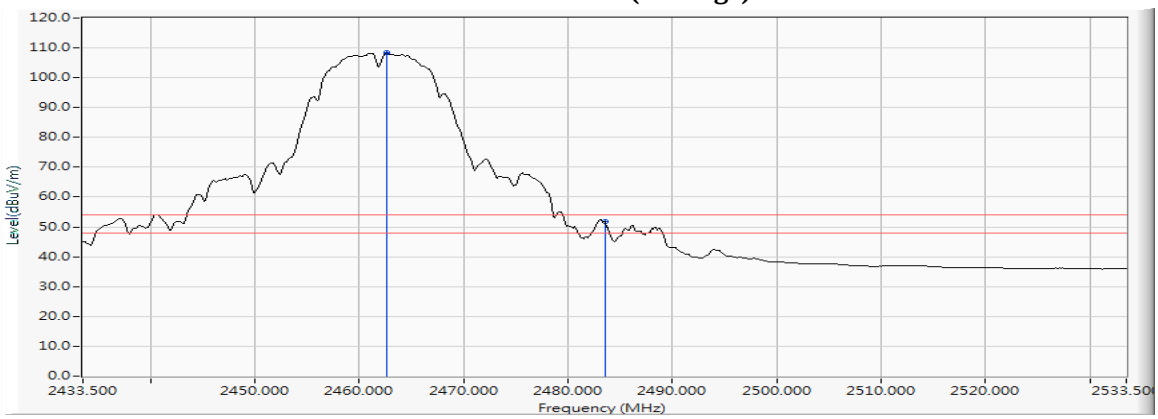


Figure Channel 11: Vertical (Average)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Network Appliance
Test Item : Band Edge Data
Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)
Test Date : 2018/01/06

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)	2389.130	12.146	53.081	65.227	74.00	54.00	Pass
01 (Peak)	2390.000	12.148	50.469	62.617	74.00	54.00	Pass
01 (Peak)	2400.000	12.176	59.491	71.667	--	--	--
01 (Peak)	2418.841	12.219	92.315	104.534	--	--	--
01 (Average)	2389.420	12.147	35.442	47.588	74.00	54.00	Pass
01 (Average)	2390.000	12.148	34.879	47.027	74.00	54.00	Pass
01 (Average)	2399.420	12.174	44.873	57.047	--	--	--
01 (Average)	2400.000	12.176	44.083	56.259	--	--	--
01 (Average)	2418.406	12.218	81.788	94.006	--	--	--

Figure Channel 01: Horizontal (Peak)

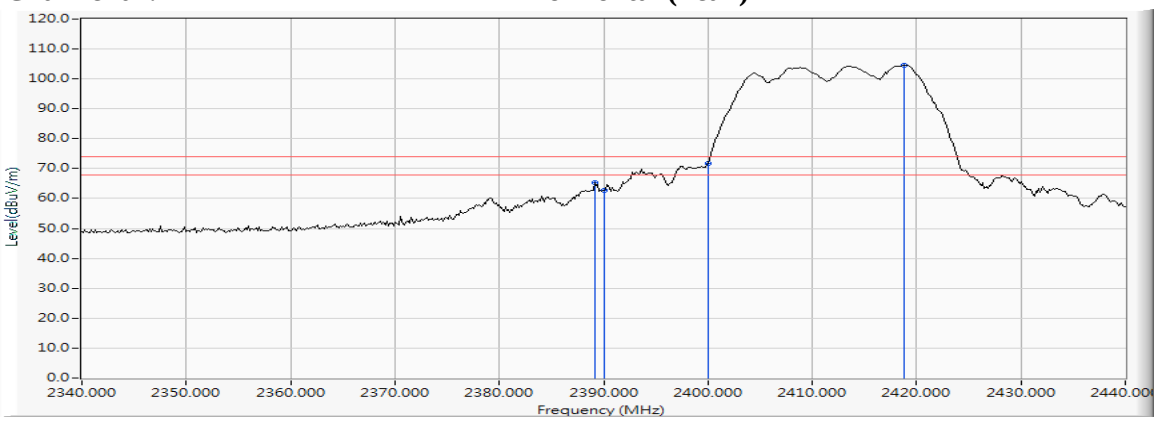
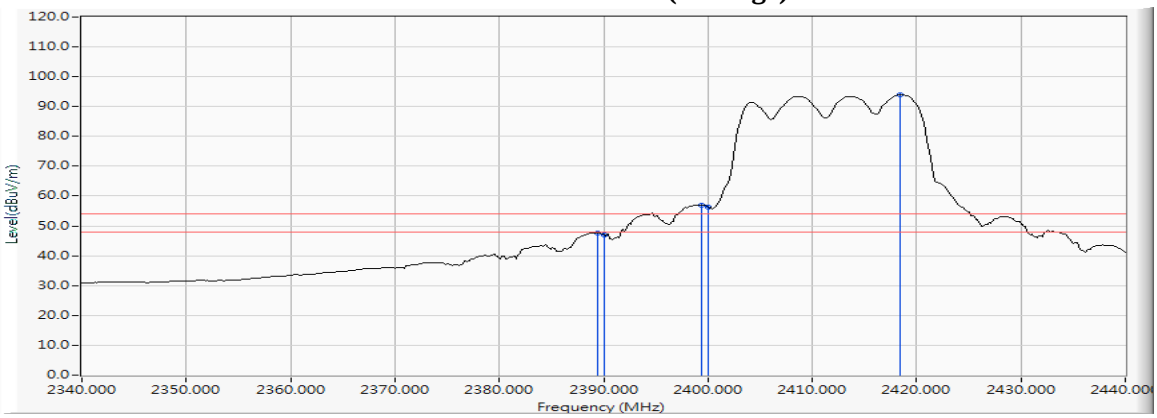


Figure Channel 01: Horizontal (Average)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Network Appliance
Test Item : Band Edge Data
Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)
Test Date : 2018/01/06

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)	2388.986	12.145	58.951	71.096	74.00	54.00	Pass
01 (Peak)	2390.000	12.148	55.229	67.377	74.00	54.00	Pass
01 (Peak)	2397.391	12.169	65.812	77.981	--	--	--
01 (Peak)	2400.000	12.176	64.138	76.314	--	--	--
01 (Peak)	2407.681	12.194	96.965	109.159	--	--	--
01 (Average)	2388.406	12.144	40.186	52.330	74.00	54.00	Pass
01 (Average)	2390.000	12.148	37.343	49.491	74.00	54.00	Pass
01 (Average)	2398.261	12.172	50.005	62.176	--	--	--
01 (Average)	2400.000	12.176	46.094	58.270	--	--	--
01 (Average)	2408.116	12.194	85.613	97.808	--	--	--

Figure Channel 01: Vertical (Peak)

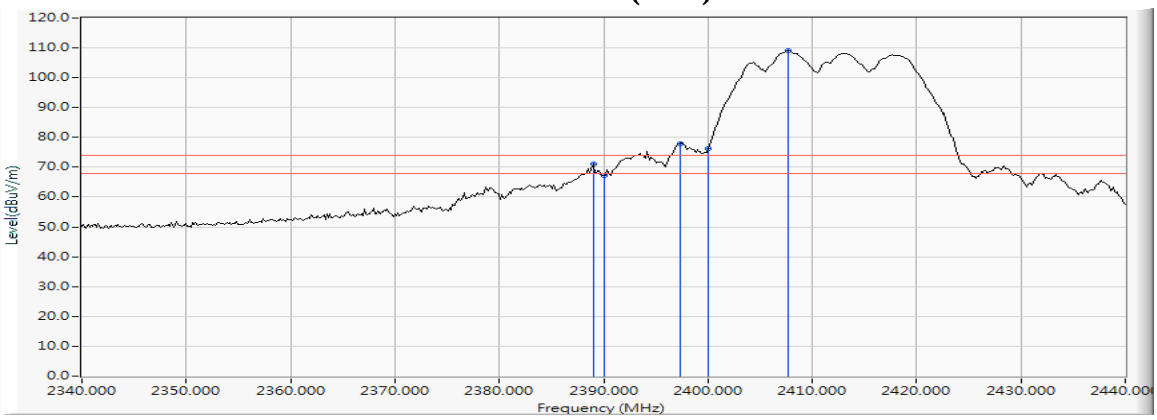
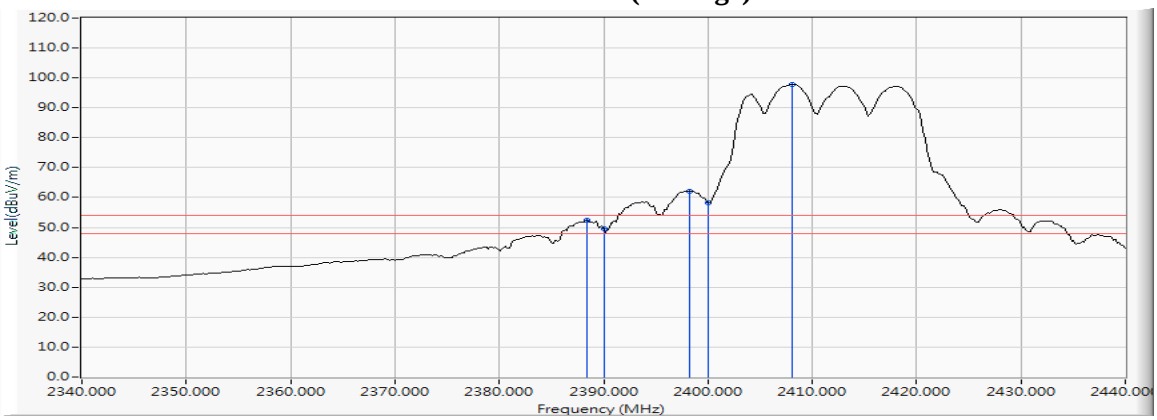


Figure Channel 01: Vertical (Average)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Network Appliance
Test Item : Band Edge Data
Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462MHz)
Test Date : 2018/01/06

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)	2459.152	12.334	91.238	103.571	--	--	--
11 (Peak)	2483.500	12.403	47.383	59.786	74.00	54.00	Pass
11 (Average)	2458.862	12.333	80.880	93.213	--	--	--
11 (Average)	2483.500	12.403	31.661	44.064	74.00	54.00	Pass

Figure Channel 11: Horizontal (Peak)

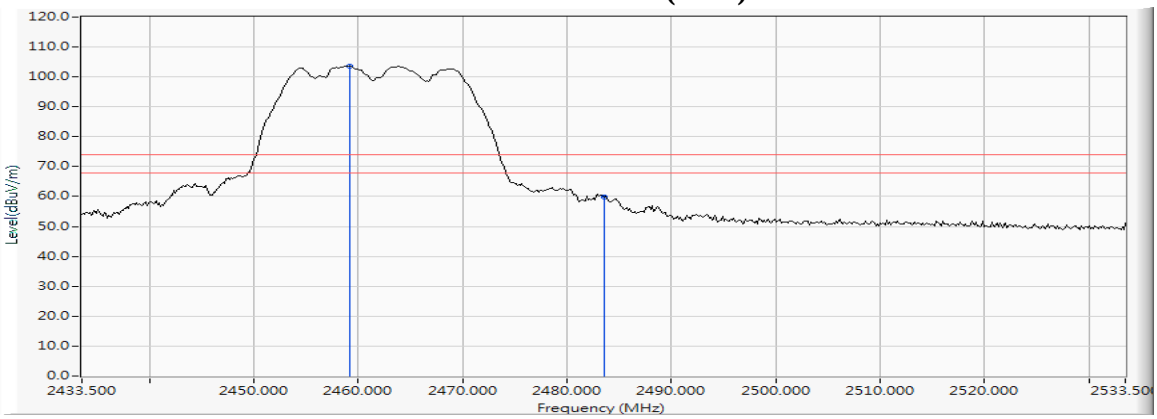
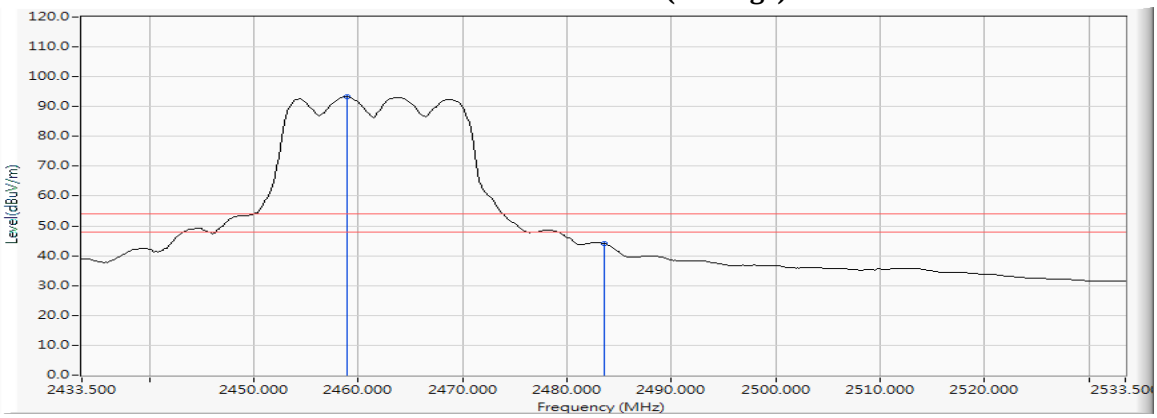


Figure Channel 11: Horizontal (Average)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Network Appliance
Test Item : Band Edge Data
Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462MHz)
Test Date : 2018/01/06

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)	2457.703	12.329	97.182	109.511	--	--	--
11 (Peak)	2483.500	12.403	54.785	67.188	74.00	54.00	Pass
11 (Average)	2463.210	12.345	86.604	98.949	--	--	--
11 (Average)	2483.500	12.403	38.514	50.917	74.00	54.00	Pass

Figure Channel 11: Vertical (Peak)

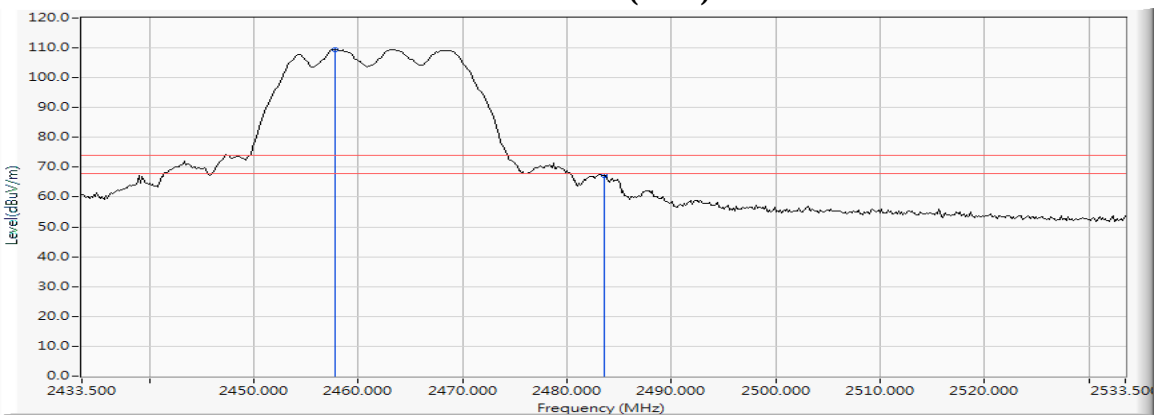
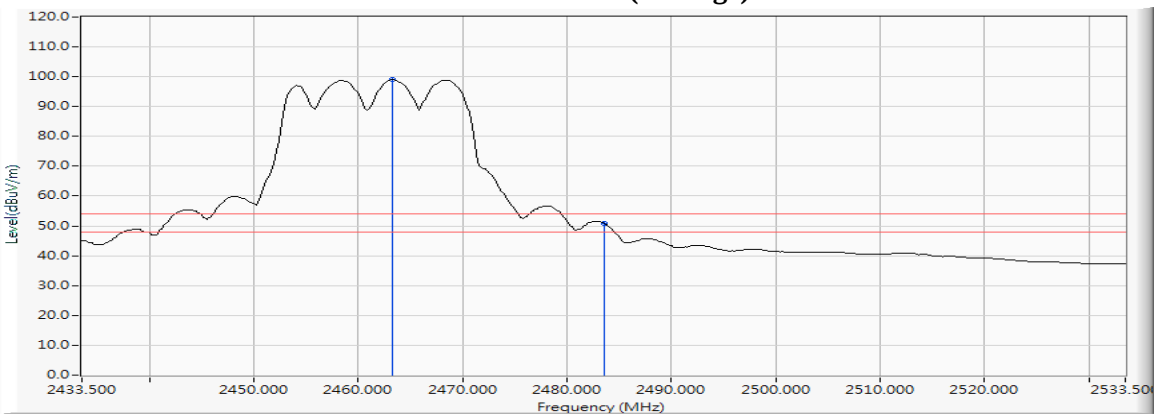


Figure Channel 11: Vertical (Average)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Network Appliance
Test Item : Band Edge Data
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2412MHz)
Test Date : 2018/01/06

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)	2388.261	12.144	51.871	64.014	74.00	54.00	Pass
01 (Peak)	2390.000	12.148	51.155	63.303	74.00	54.00	Pass
01 (Peak)	2400.000	12.176	59.651	71.827	--	--	--
01 (Peak)	2409.710	12.198	90.564	102.762	--	--	--
01 (Average)	2390.000	12.148	35.229	47.377	74.00	54.00	Pass
01 (Average)	2400.000	12.176	44.223	56.399	--	--	--
01 (Average)	2417.246	12.215	79.376	91.592	--	--	--

Figure Channel 01: Horizontal (Peak)

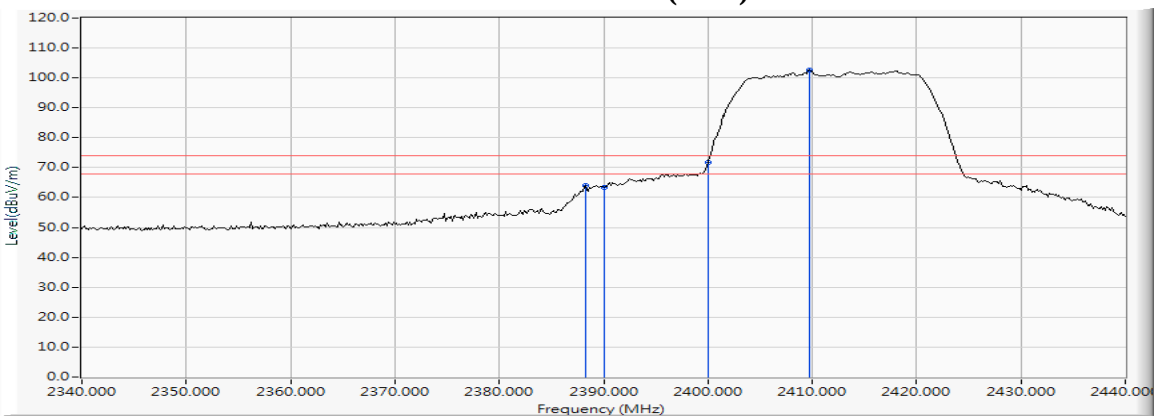
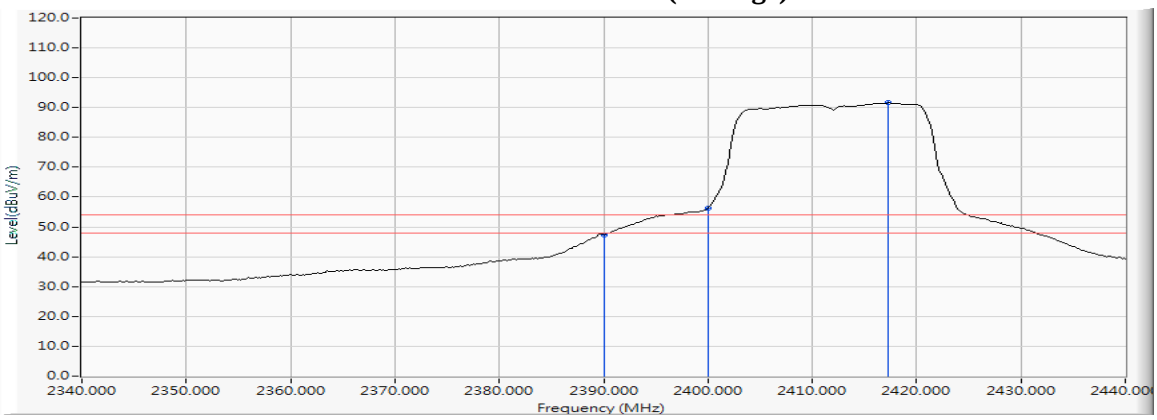


Figure Channel 01: Horizontal (Average)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Network Appliance
Test Item : Band Edge Data
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2412MHz)
Test Date : 2018/01/06

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	12.148	56.936	69.084	74.00	54.00	Pass
01 (Peak)	2400.000	12.176	64.723	76.899	--	--	--
01 (Peak)	2405.652	12.190	95.264	107.453	--	--	--
01 (Average)	2390.000	12.148	41.522	53.670	74.00	54.00	Pass
01 (Average)	2400.000	12.176	50.154	62.330	--	--	--
01 (Average)	2409.855	12.198	83.591	95.790	--	--	--

Figure Channel 01: Vertical (Peak)

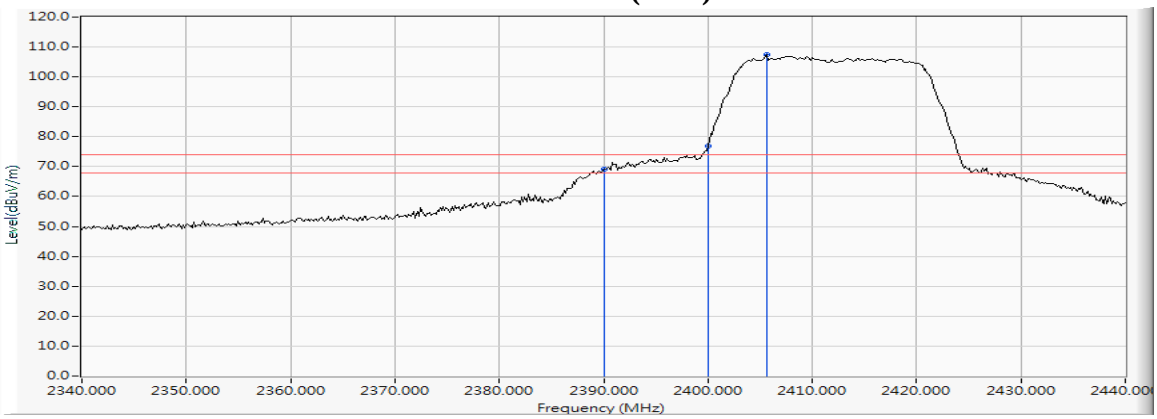
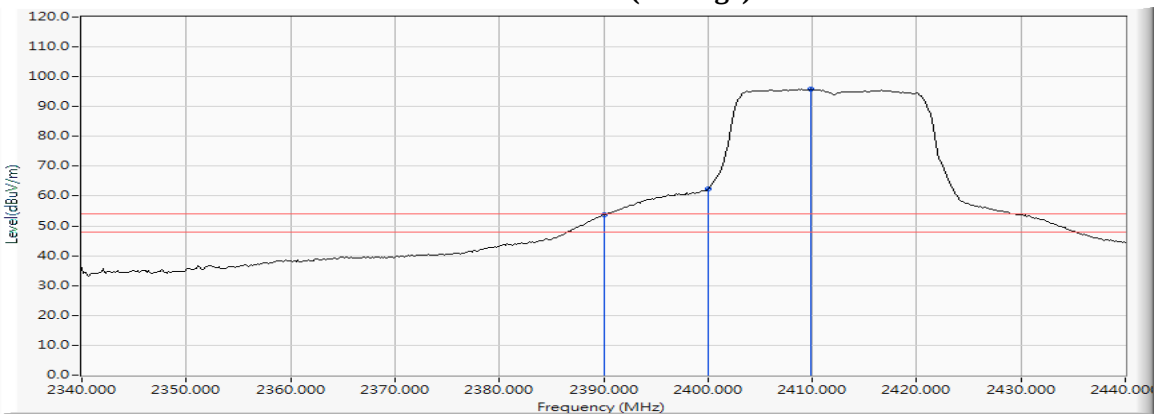


Figure Channel 01: Vertical (Average)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Network Appliance
Test Item : Band Edge Data
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462MHz)
Test Date : 2018/01/06

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)	2463.355	12.345	90.589	102.934	--	--	--
11 (Peak)	2483.500	12.403	47.648	60.051	74.00	54.00	Pass
11 (Peak)	2484.659	12.406	48.456	60.862	74.00	54.00	Pass
11 (Average)	2460.746	12.337	80.204	92.542	--	--	--
11 (Average)	2483.500	12.403	33.163	45.566	74.00	54.00	Pass

Figure Channel 11: Horizontal (Peak)

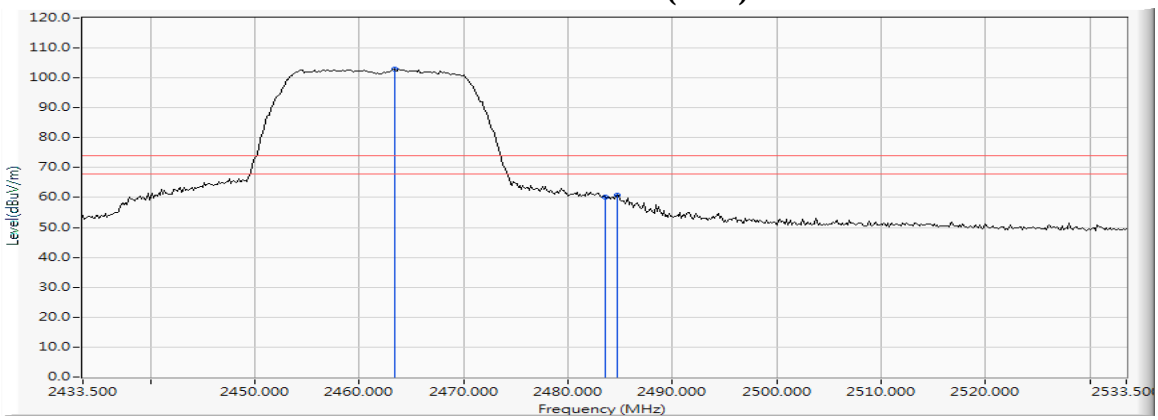
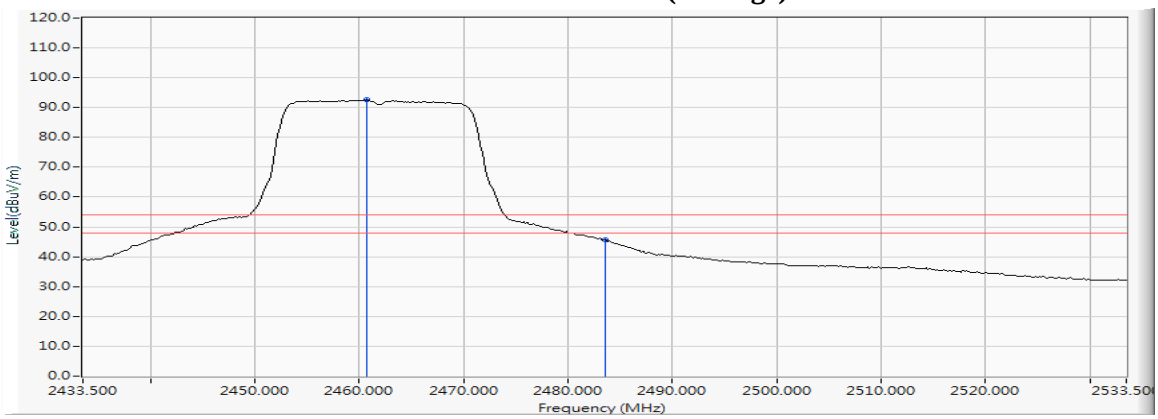


Figure Channel 11: Horizontal (Average)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Network Appliance
Test Item : Band Edge Data
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462MHz)
Test Date : 2018/01/06

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)	2459.732	12.335	97.353	109.688	--	--	--
11 (Peak)	2483.500	12.403	54.308	66.711	74.00	54.00	Pass
11 (Peak)	2483.790	12.403	54.615	67.018	74.00	54.00	Pass
11 (Average)	2467.268	12.356	85.535	97.891	--	--	--
11 (Average)	2483.500	12.403	39.773	52.176	74.00	54.00	Pass

Figure Channel 11: Vertical (Peak)

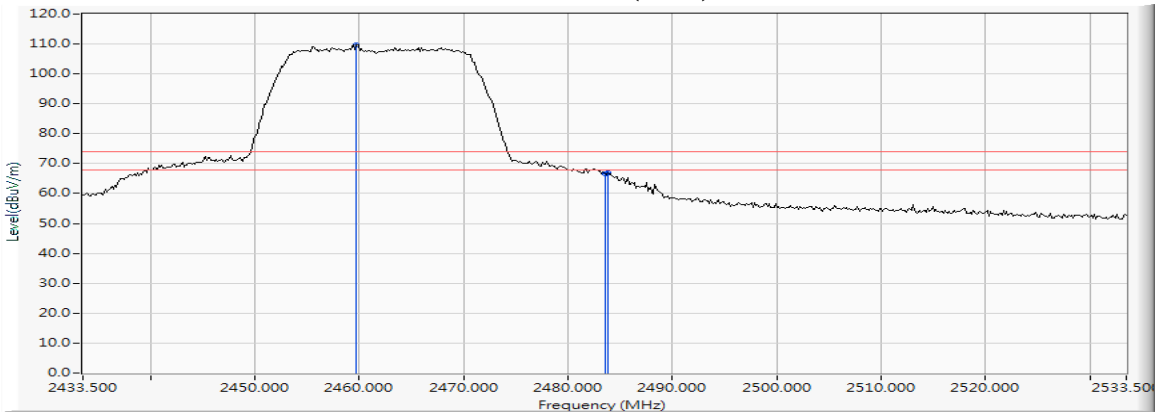
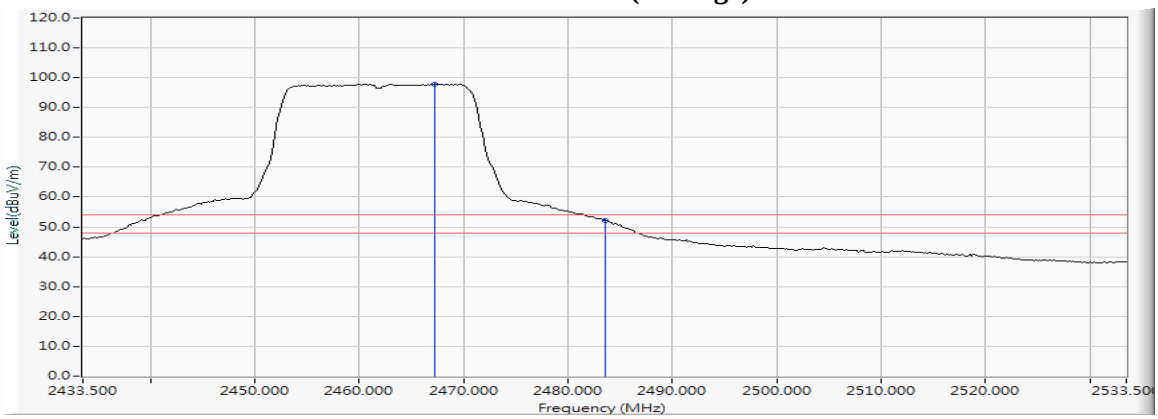


Figure Channel 11: Vertical (Average)

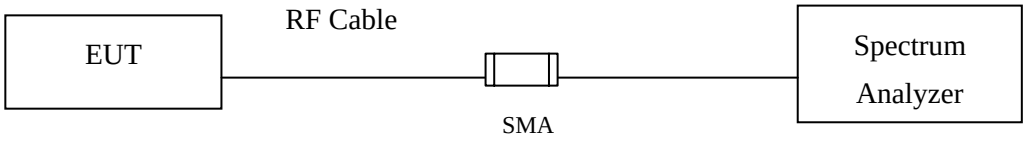


Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

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

± 279.2Hz

7.5. Test Result of 6dB Bandwidth

Product : Network Appliance
Test Item : 6dB Bandwidth Data
Test Mode : Mode 1: Transmit (802.11b 1Mbps)

Chain A

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	9100	>500	Pass
06	2437	9150	>500	Pass
11	2462	8600	>500	Pass

Figure Channel 01: (Chain A)

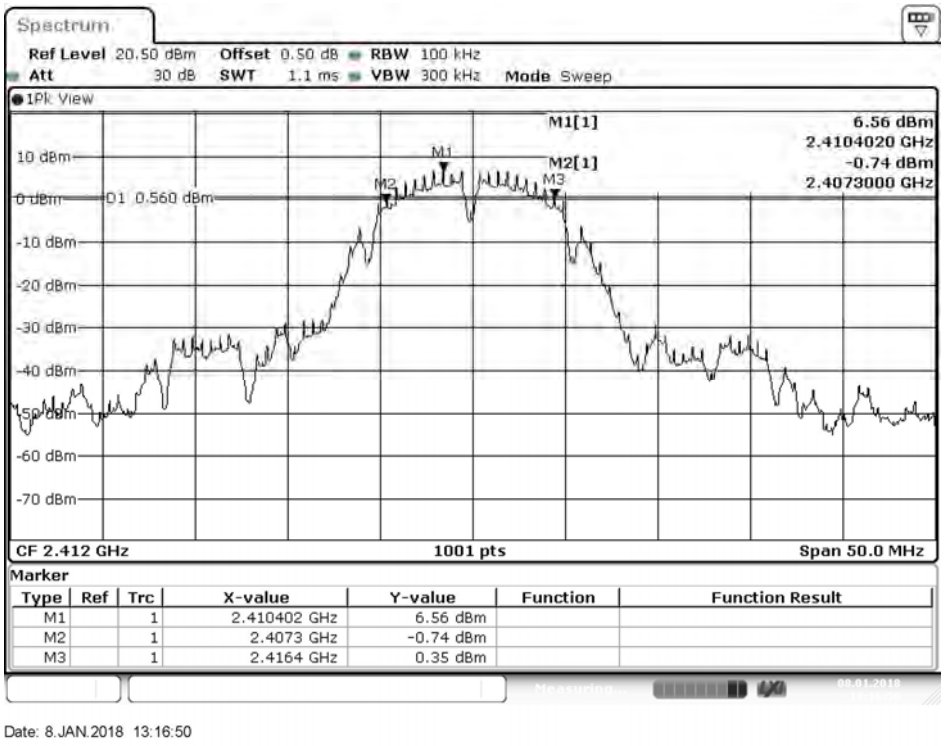
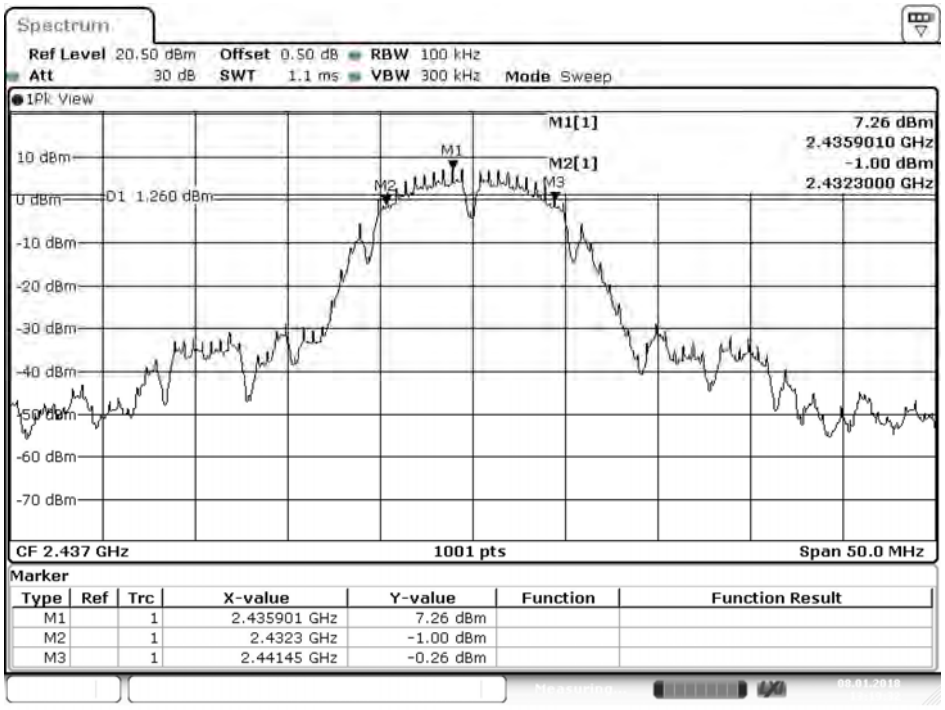
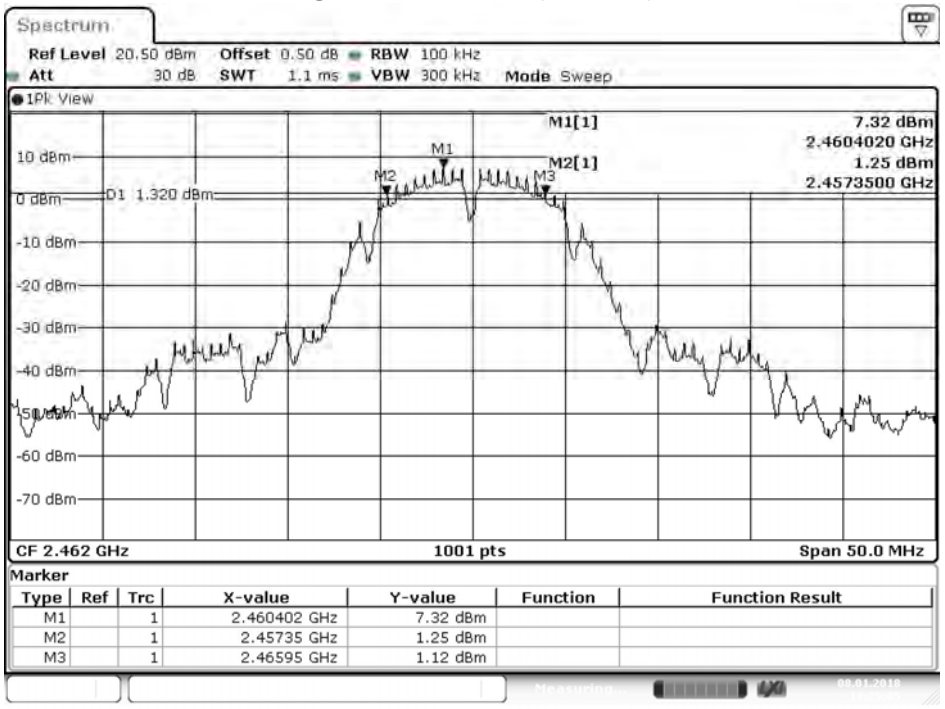


Figure Channel 06: (Chain A)



Date: 8.JAN.2018 13:19:33

Figure Channel 11: (Chain A)



Date: 8.JAN.2018 13:25:05

Product : Network Appliance
Test Item : 6dB Bandwidth Data
Test Mode : Mode 1: Transmit (802.11b 1Mbps)

Chain B

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	9150	>500	Pass
06	2437	9150	>500	Pass
11	2462	9200	>500	Pass

Figure Channel 01: (Chain B)

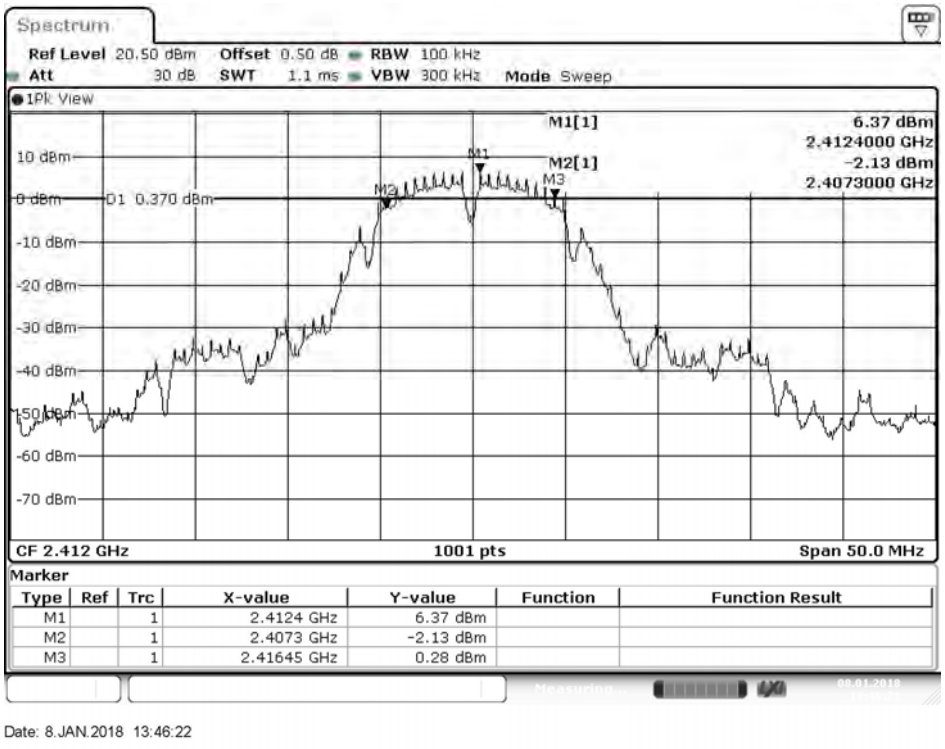
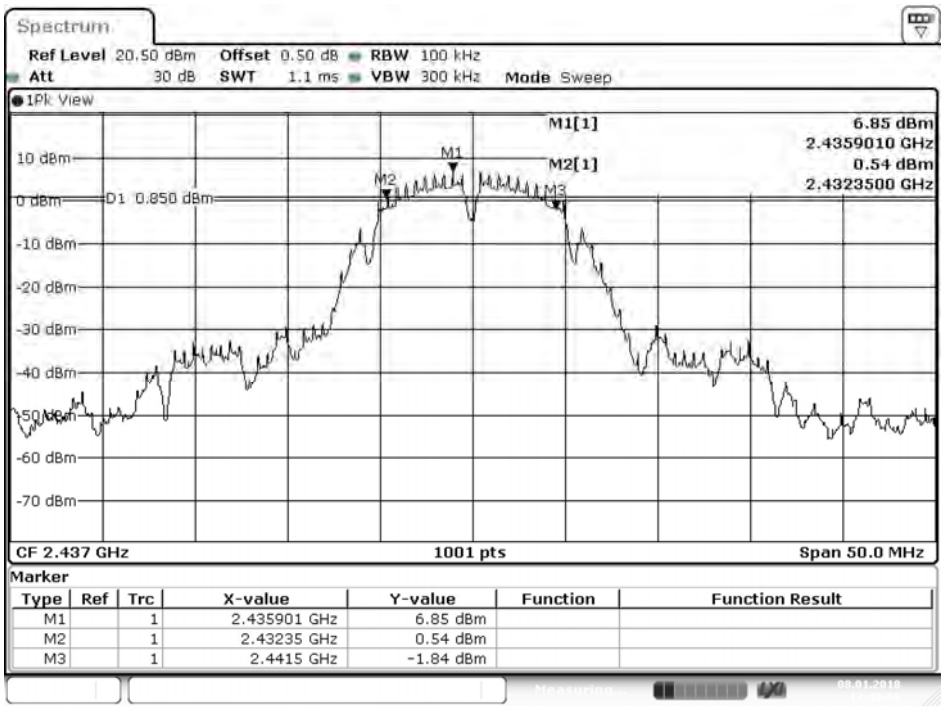
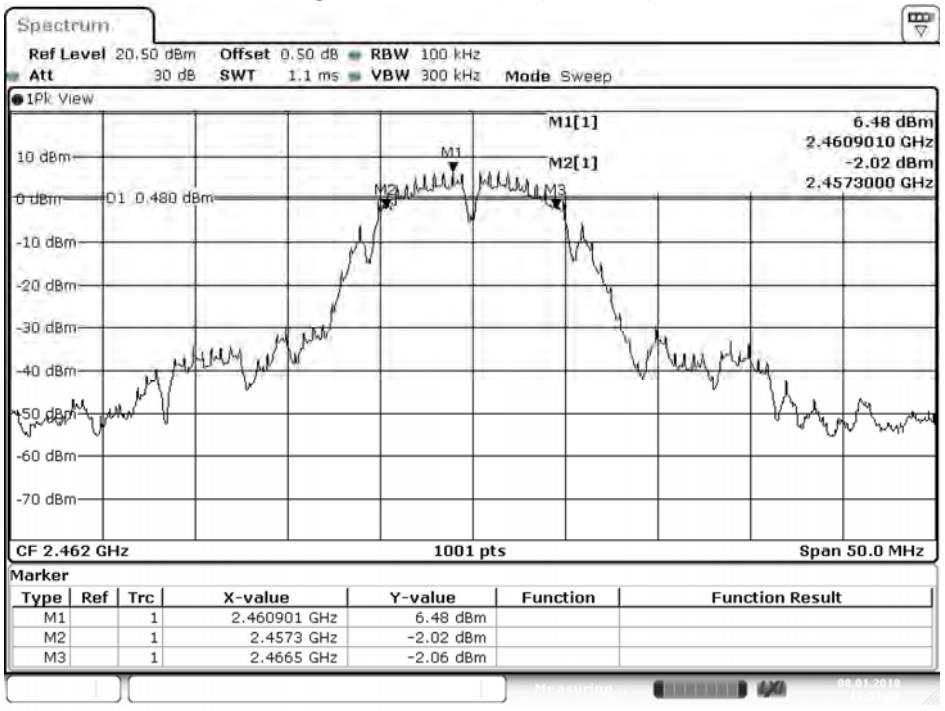


Figure Channel 06: (Chain B)



Date: 8.JAN.2018 13:48:56

Figure Channel 11: (Chain B)



Date: 8.JAN.2018 13:51:27

Product : Network Appliance
Test Item : 6dB Bandwidth Data
Test Mode : Mode 2: Transmit (802.11g 6Mbps)

Chain A

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	16400	>500	Pass
06	2437	16450	>500	Pass
11	2462	16450	>500	Pass

Figure Channel 01: (Chain A)

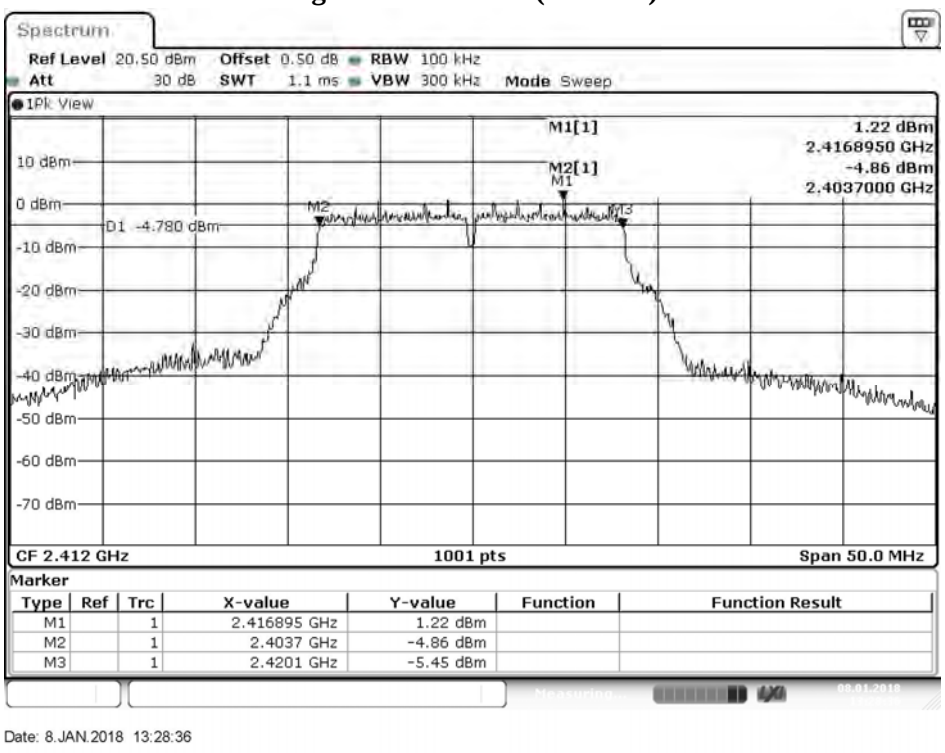
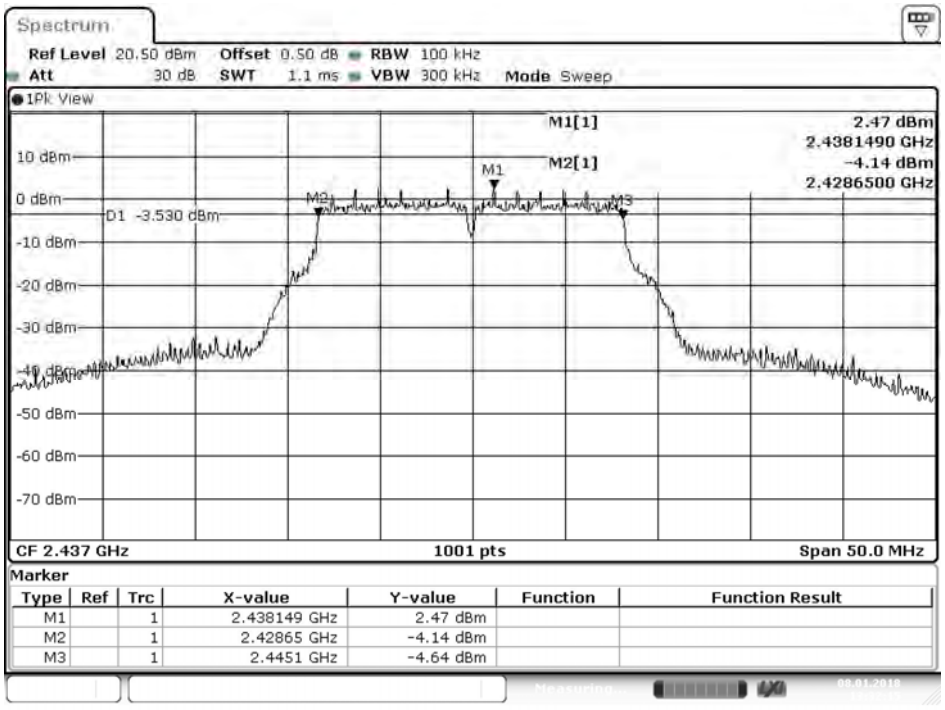
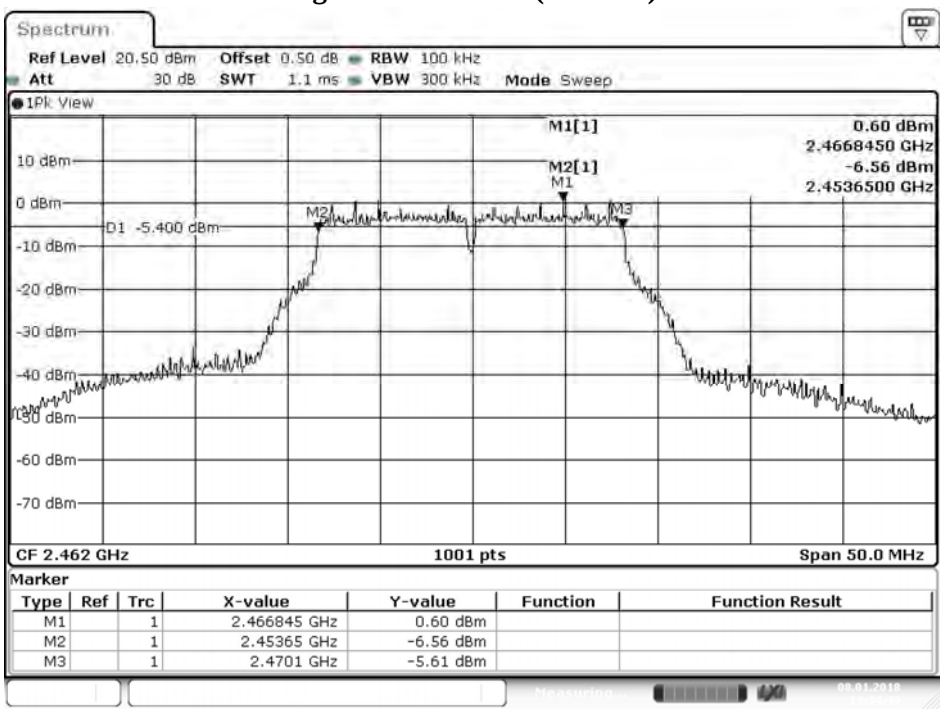


Figure Channel 06: (Chain A)



Date: 8.JAN.2018 13:32:15

Figure Channel 11: (Chain A)



Date: 8.JAN.2018 13:34:49

Product : Network Appliance
Test Item : 6dB Bandwidth Data
Test Mode : Mode 2: Transmit (802.11g 6Mbps)

Chain B

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: (Chain B)

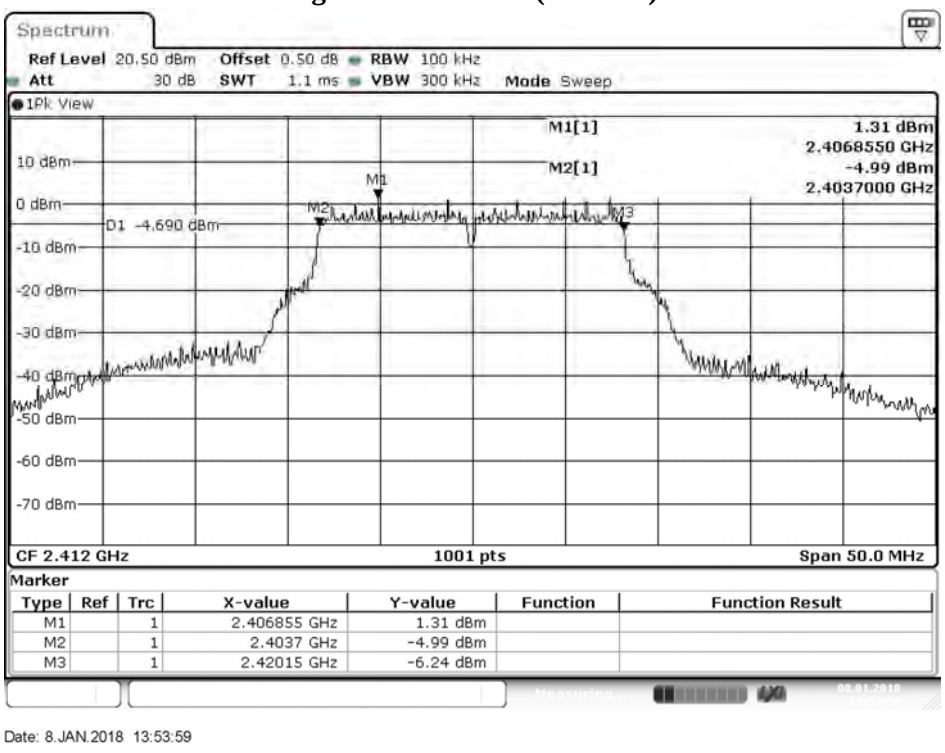
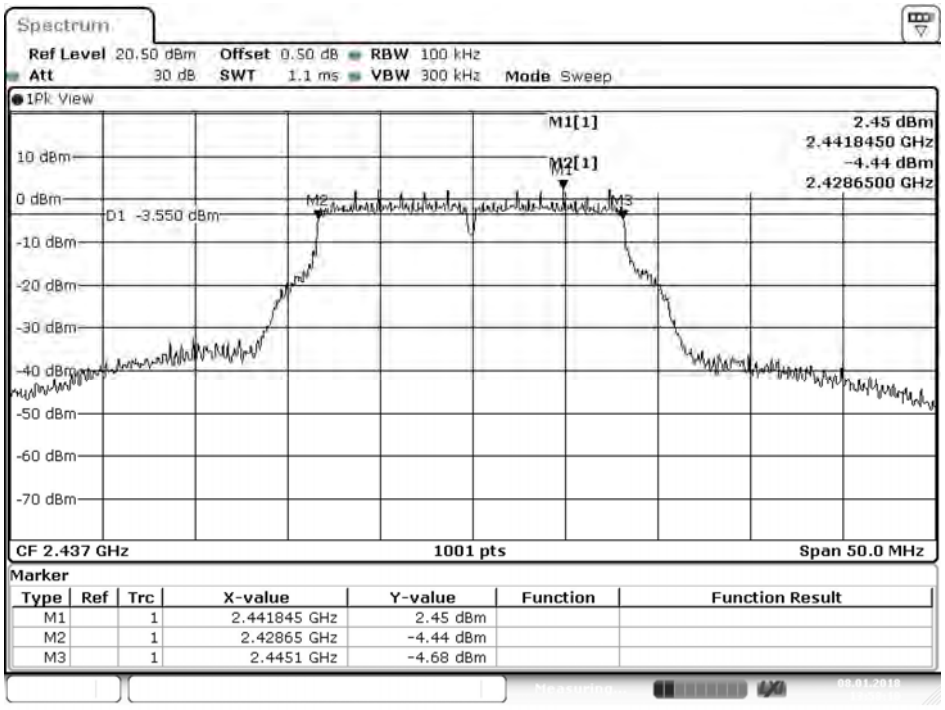
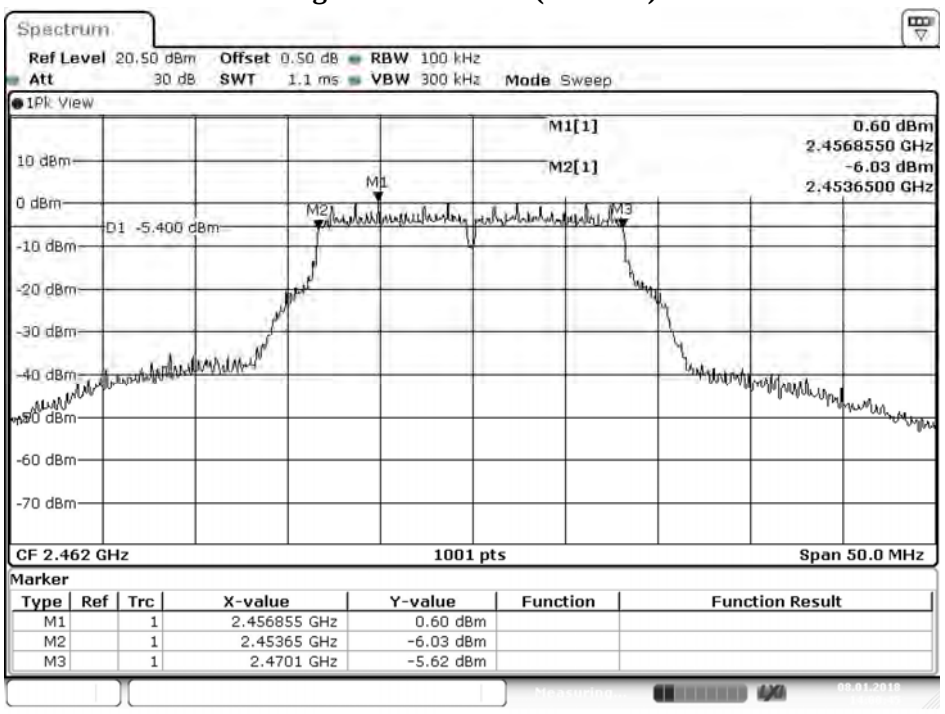


Figure Channel 06: (Chain B)



Date: 8.JAN.2018 13:58:11

Figure Channel 11: (Chain B)



Date: 8.JAN.2018 14:00:45

Product : Network Appliance
Test Item : 6dB Bandwidth Data
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

Chain A

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

Figure Channel 01: (Chain A)

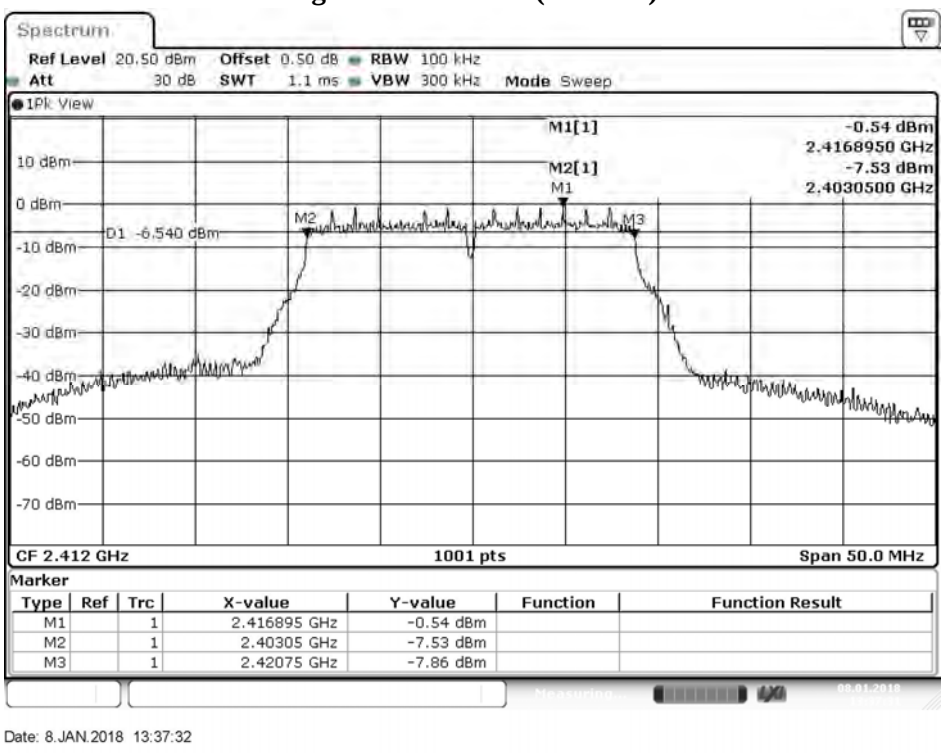
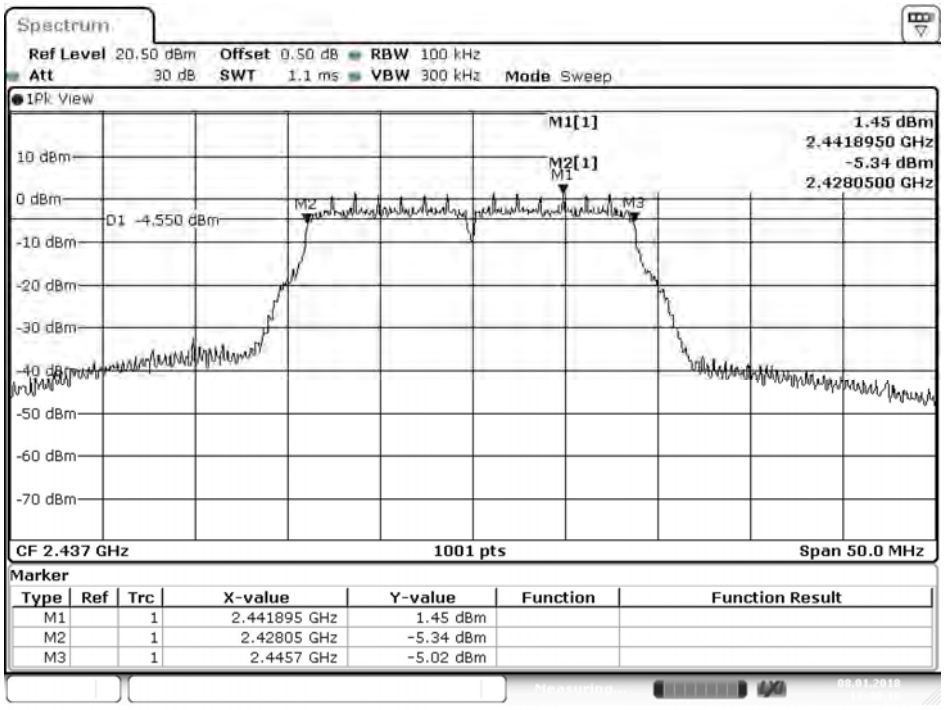
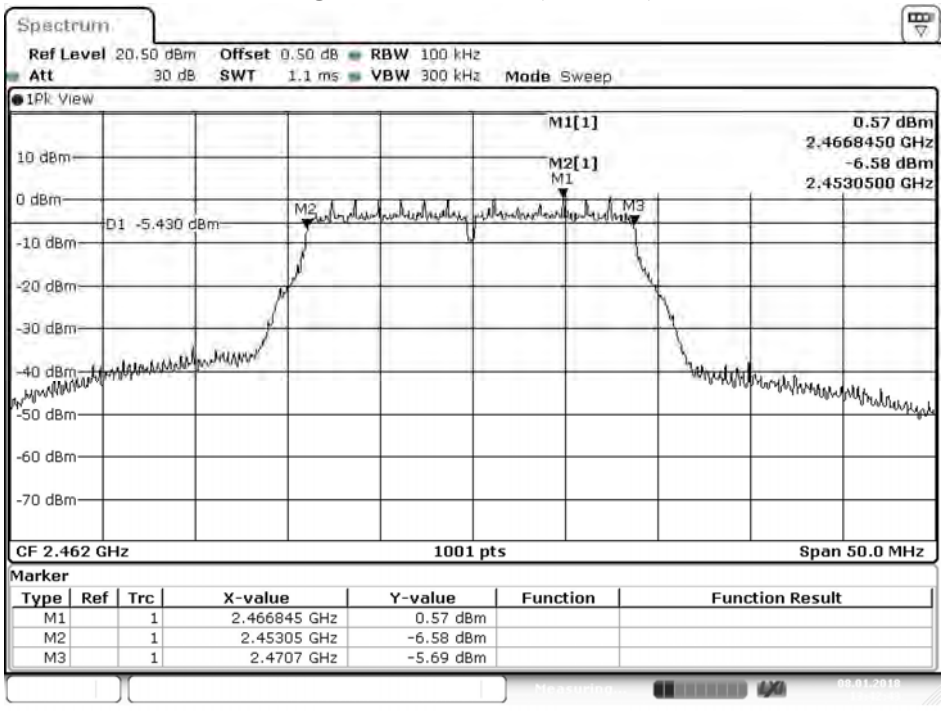


Figure Channel 06: (Chain A)



Date: 8.JAN.2018 13:40:10

Figure Channel 11: (Chain A)



Date: 8.JAN.2018 13:42:44

Product : Network Appliance
Test Item : 6dB Bandwidth Data
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

Chain B

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	17700	>500	Pass
06	2437	17750	>500	Pass
11	2462	17700	>500	Pass

Figure Channel 01: (Chain B)

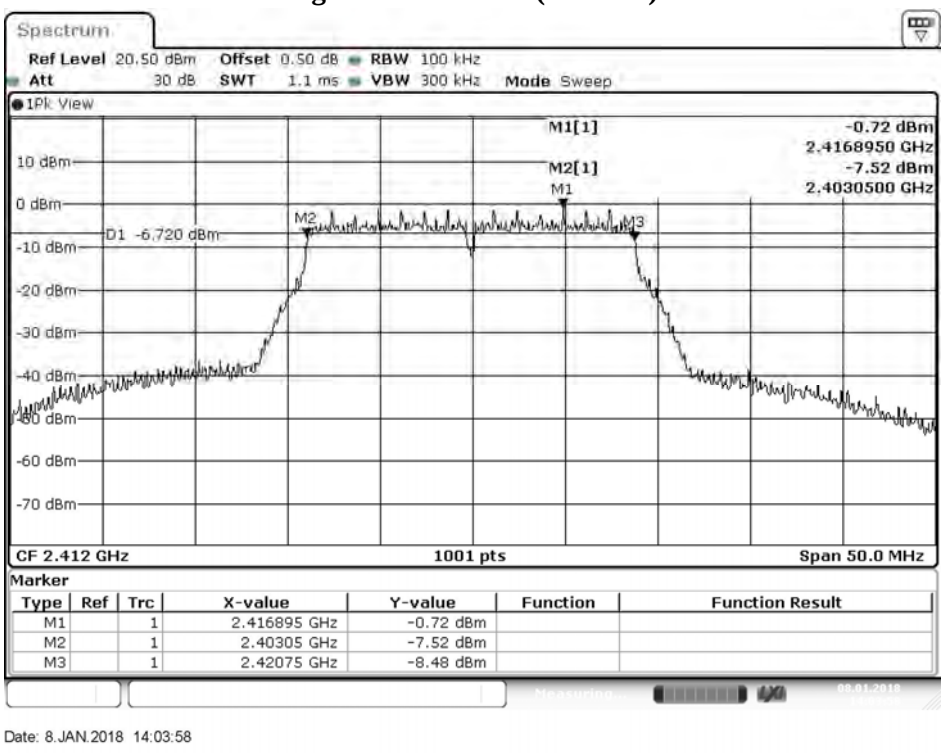
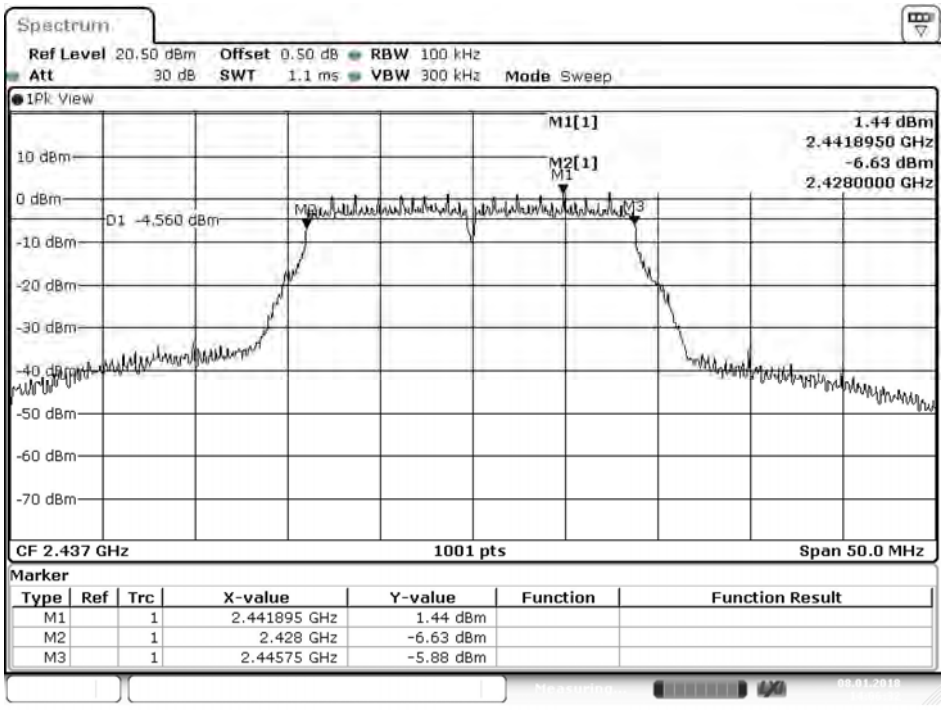
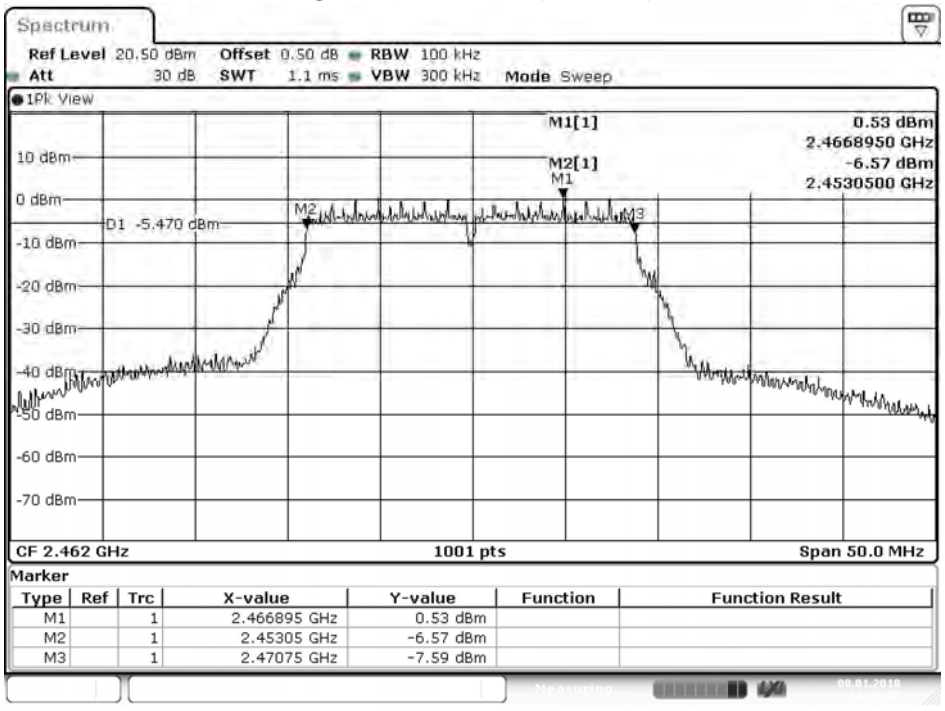


Figure Channel 06: (Chain B)



Date: 8.JAN.2018 14:06:33

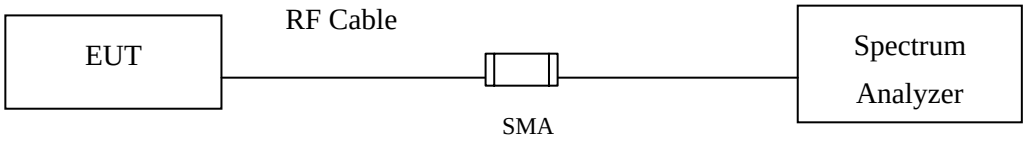
Figure Channel 11: (Chain B)



Date: 8.JAN.2018 14:09:08

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

± 1.23 dB

8.5. Test Result of Power Density

Product : Network Appliance
Test Item : Power Density Data
Test Mode : Mode 1: Transmit (802.11b 1Mbps)

Channel No.	Frequency (MHz)	Chain	PPSD/MHz (dBm)	Total PPSD/MHz (dBm)	Limit (dBm)	Result
01	2412.000	A	4.850	7.860	≦8dBm	Pass
		B	3.200	6.210	≦8dBm	Pass
06	2437.000	A	4.440	7.450	≦8dBm	Pass
		B	3.930	6.940	≦8dBm	Pass
11	2462.000	A	4.060	7.070	≦8dBm	Pass
		B	4.300	7.310	≦8dBm	Pass

Note 1: The quantity 10*log 2 (two antennas) is added to the spectrum peak value according to document 662911 D01.

Figure Channel 1: (Chain A)

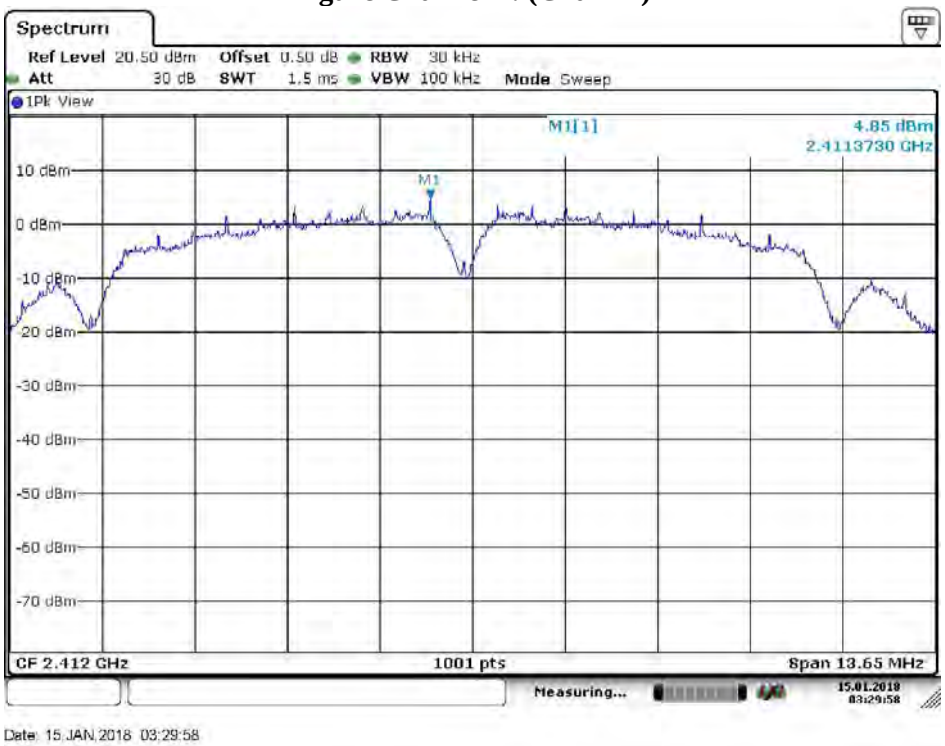
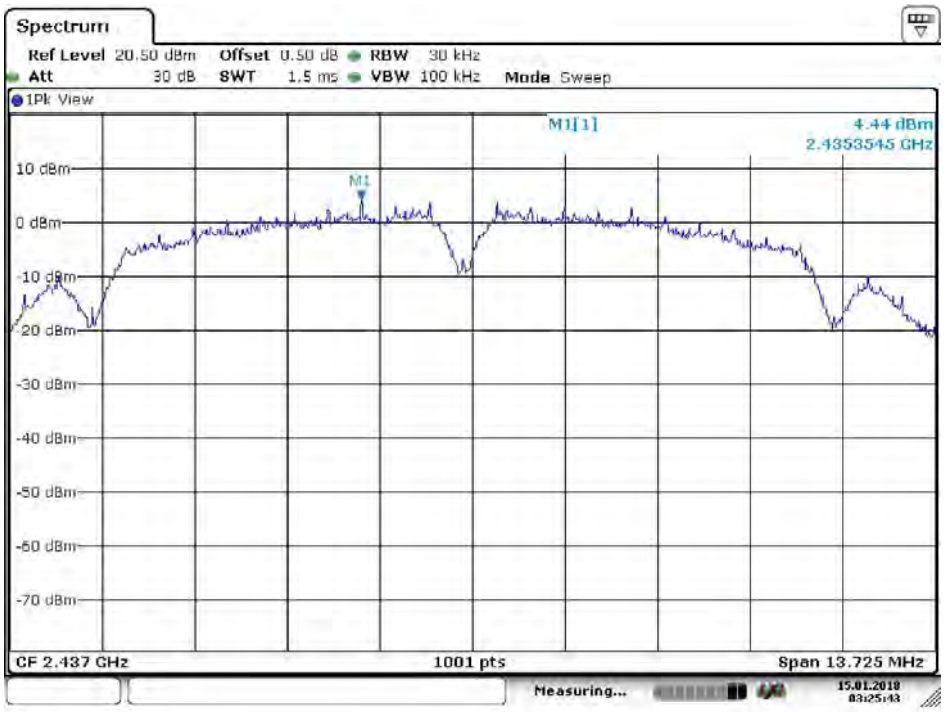
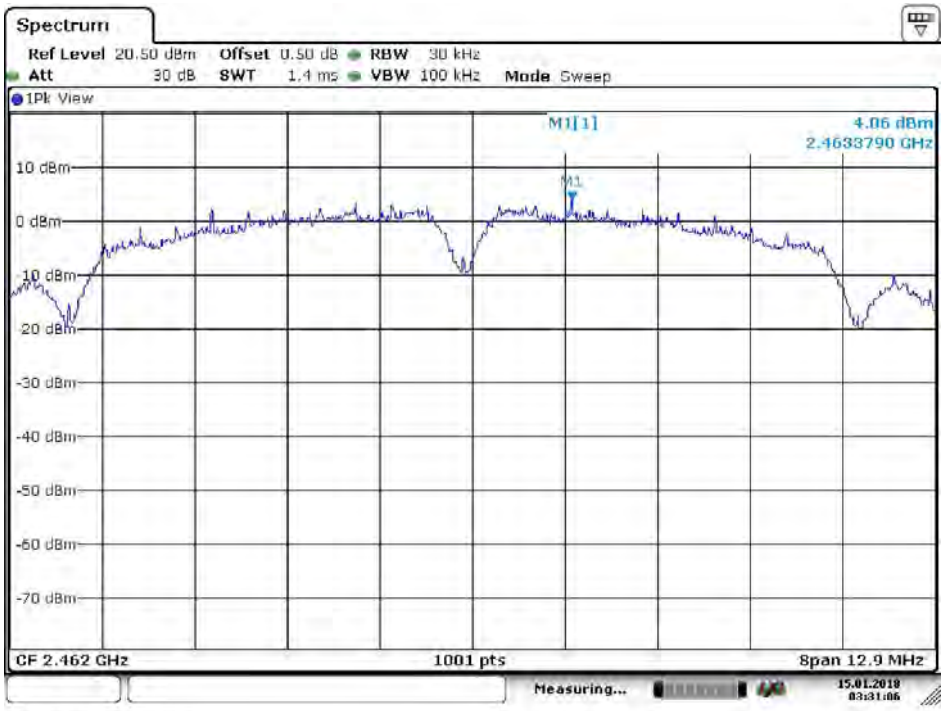


Figure Channel 6: (Chain A)



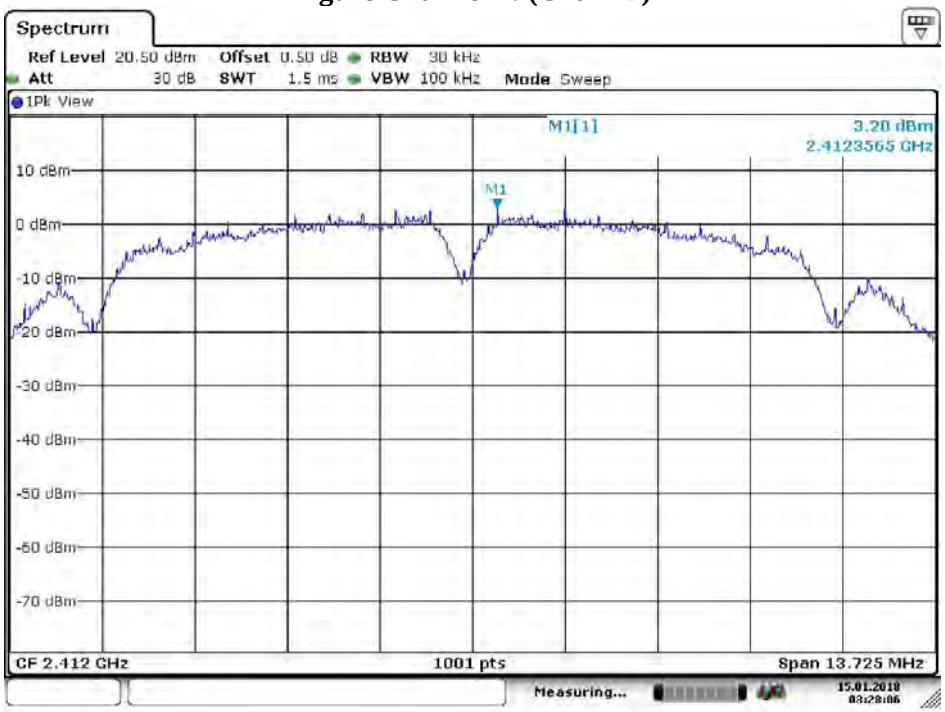
Date: 15.JAN.2018 03:25:43

Figure Channel 11: (Chain A)



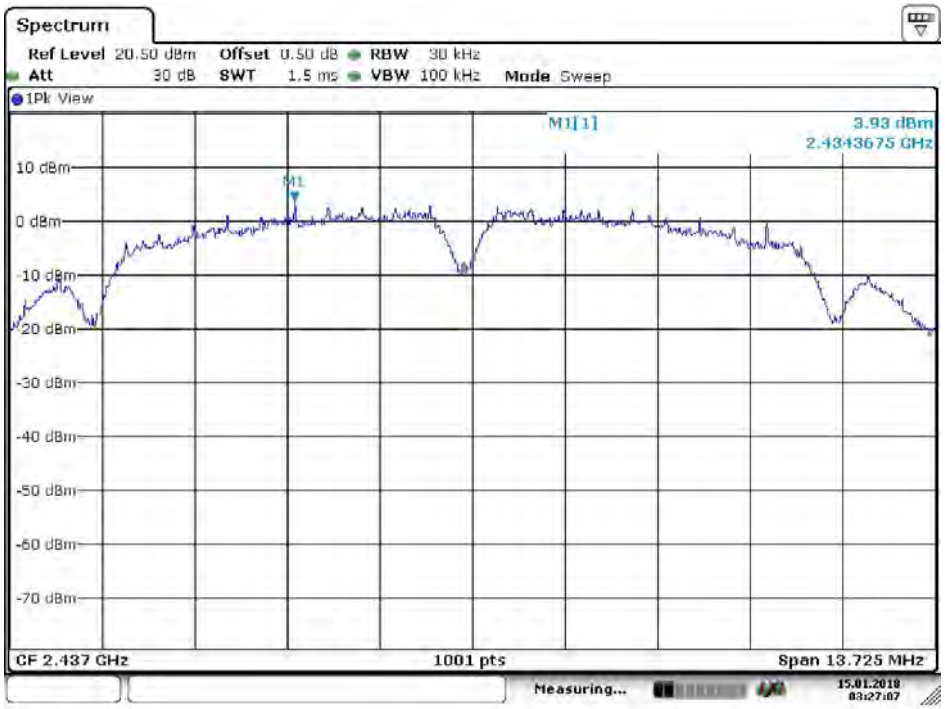
Date: 15.JAN.2018 03:31:07

Figure Channel 1: (Chain B)



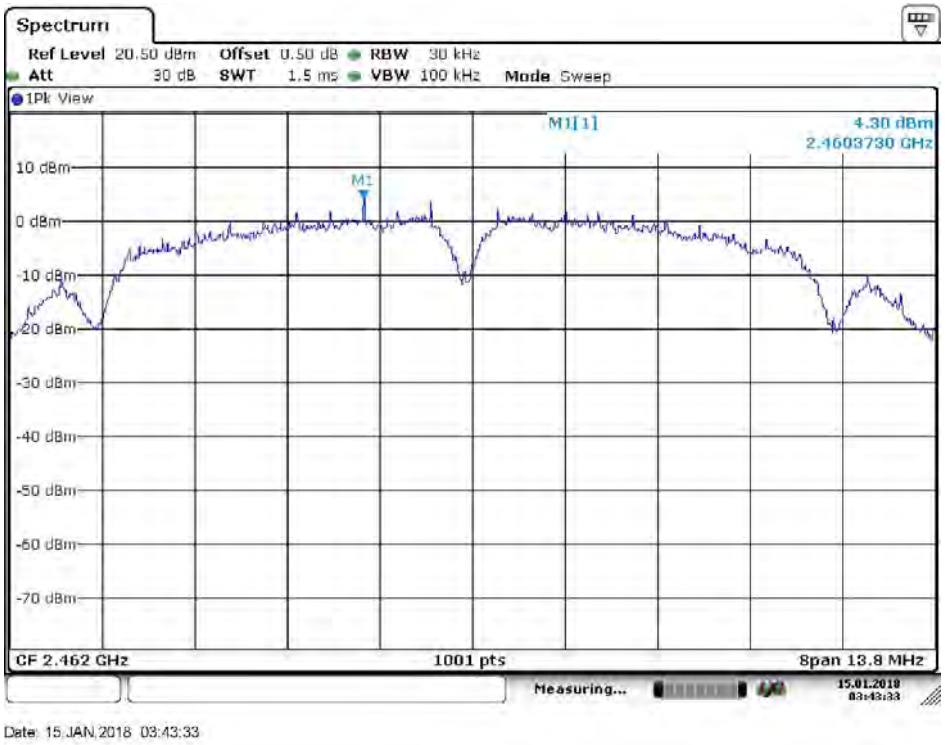
Date: 15.JAN.2018 03:28:07

Figure Channel 6: (Chain B)



Date: 15.JAN.2018 03:27:07

Figure Channel 11: (Chain B)



Product : Network Appliance
Test Item : Power Density Data
Test Mode : Mode 2: Transmit (802.11g 6Mbps)

Channel No.	Frequency (MHz)	Chain	PPSD/MHz (dBm)	Total PPSD/MHz (dBm)	Limit (dBm)	Result
01	2412.000	A	1.290	4.300	≦8dBm	Pass
		B	1.600	4.610	≦8dBm	Pass
06	2437.000	A	2.520	5.530	≦8dBm	Pass
		B	2.550	5.560	≦8dBm	Pass
11	2462.000	A	0.780	3.790	≦8dBm	Pass
		B	0.360	3.370	≦8dBm	Pass

Note 1: The quantity 10*log 2 (two antennas) is added to the spectrum peak value according to document 662911 D01.

Figure Channel 1: (Chain A)

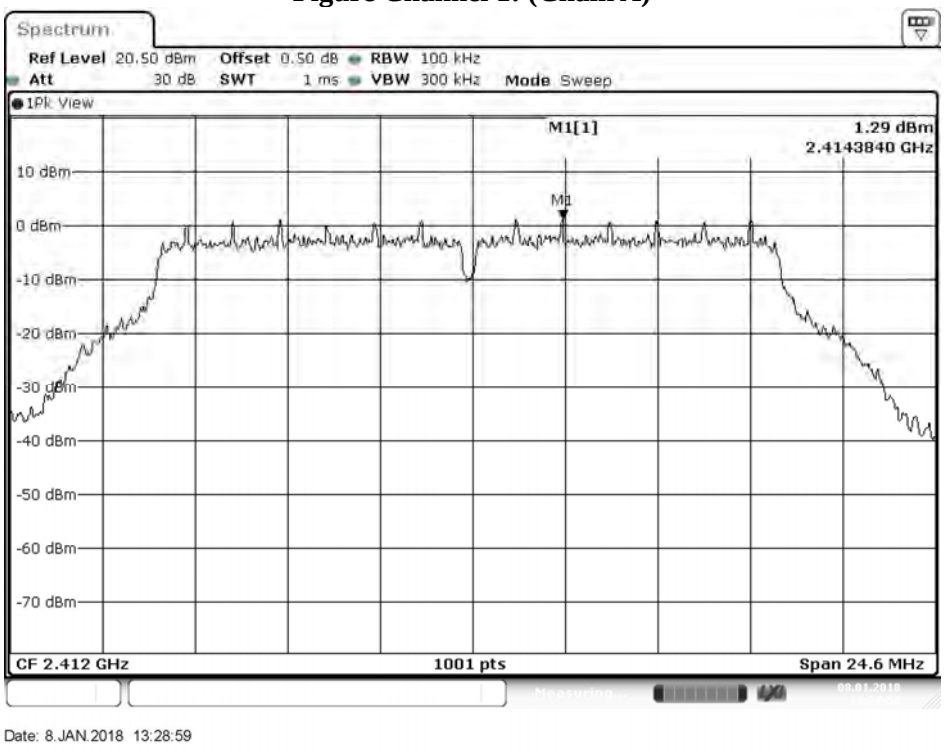
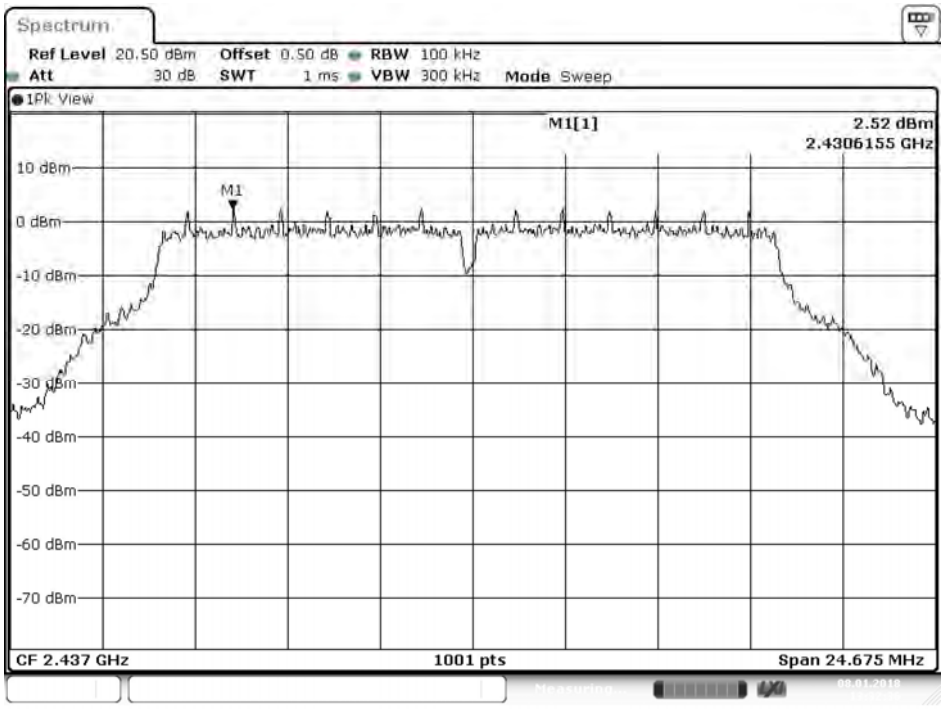
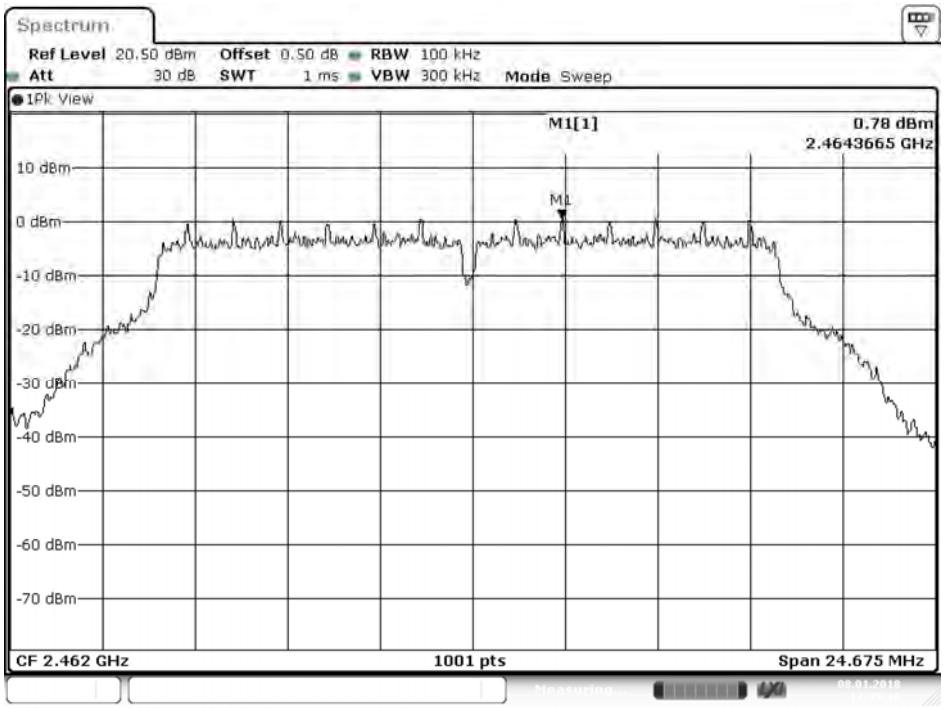


Figure Channel 6: (Chain A)



Date: 8.JAN.2018 13:32:37

Figure Channel 11: (Chain A)



Date: 8.JAN.2018 13:35:11

Figure Channel 1: (Chain B)

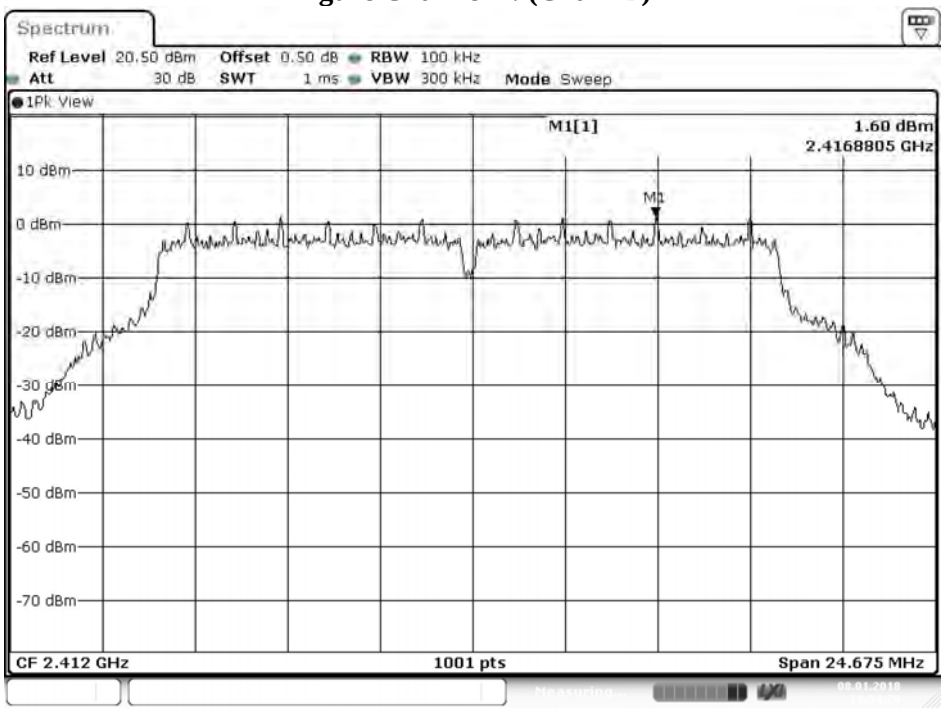


Figure Channel 6: (Chain B)

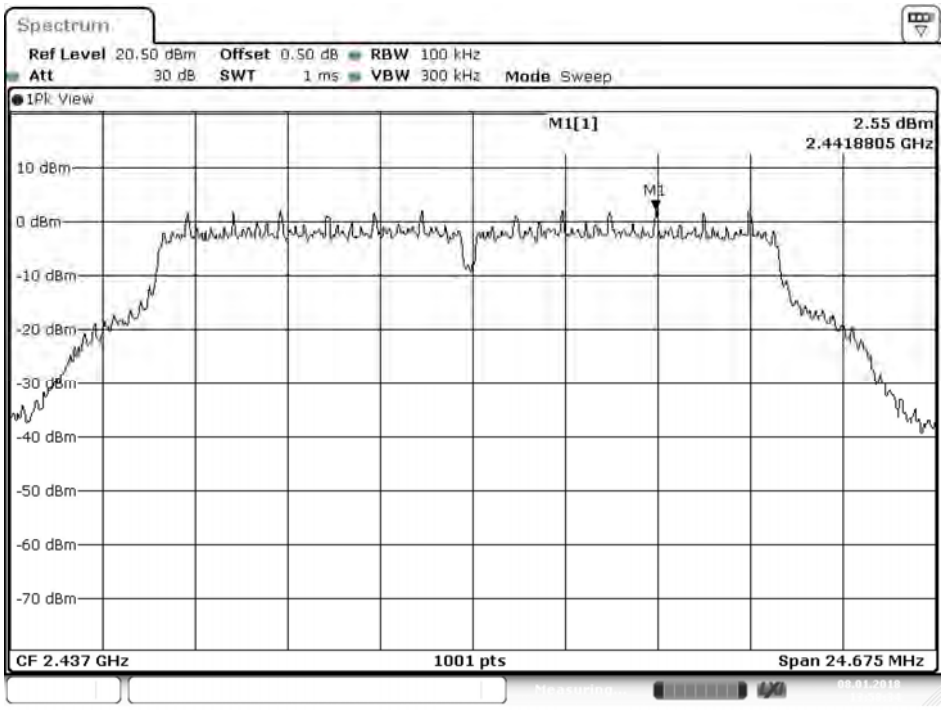
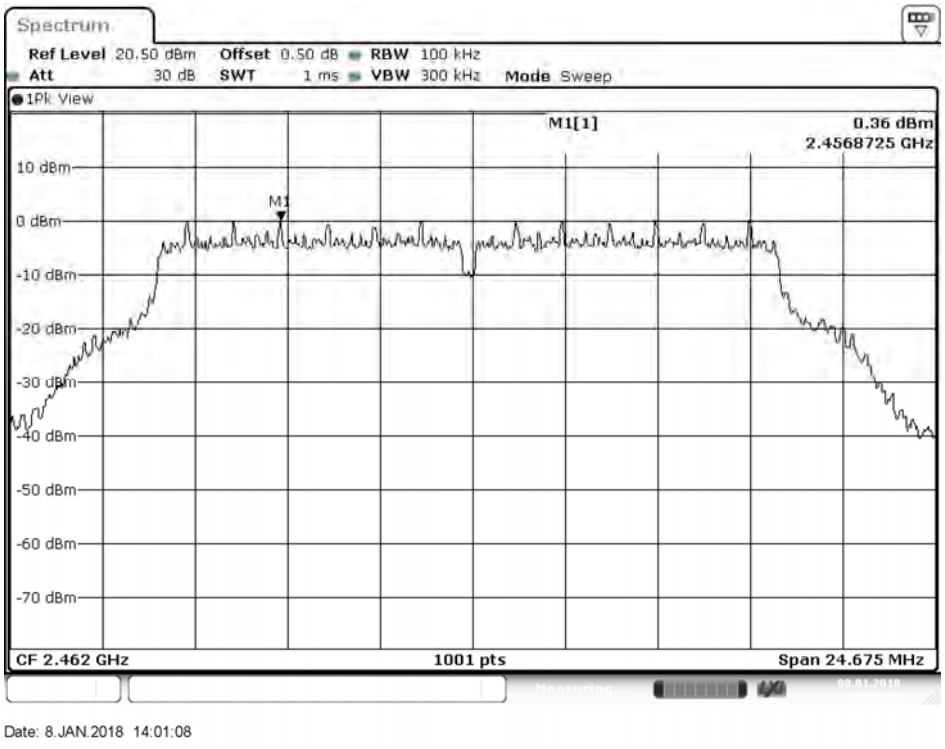


Figure Channel 11: (Chain B)



Product : Network Appliance
Test Item : Power Density Data
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

Channel No.	Frequency (MHz)	Chain	PPSD/MHz (dBm)	Total PPSD/MHz (dBm)	Limit (dBm)	Result
01	2412.000	A	-0.460	2.550	≦8dBm	Pass
		B	-0.740	2.270	≦8dBm	Pass
06	2437.000	A	1.420	4.430	≦8dBm	Pass
		B	1.560	4.570	≦8dBm	Pass
11	2462.000	A	0.630	3.640	≦8dBm	Pass
		B	0.560	3.570	≦8dBm	Pass

Note 1: The quantity 10*log 2 (two antennas) is added to the spectrum peak value according to document 662911 D01.

Figure Channel 1: (Chain A)

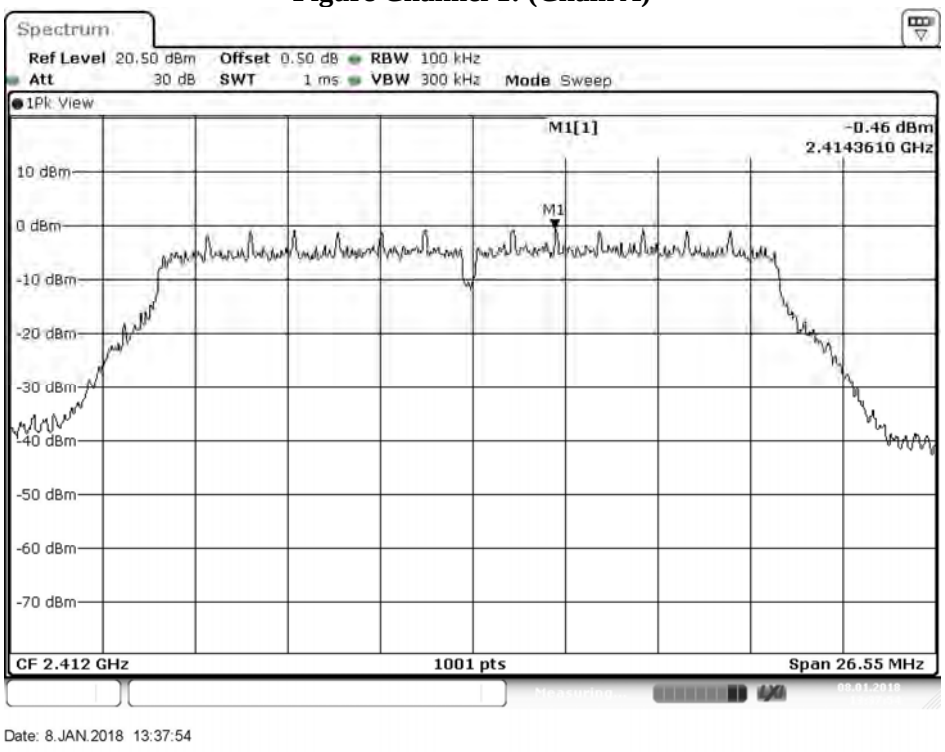
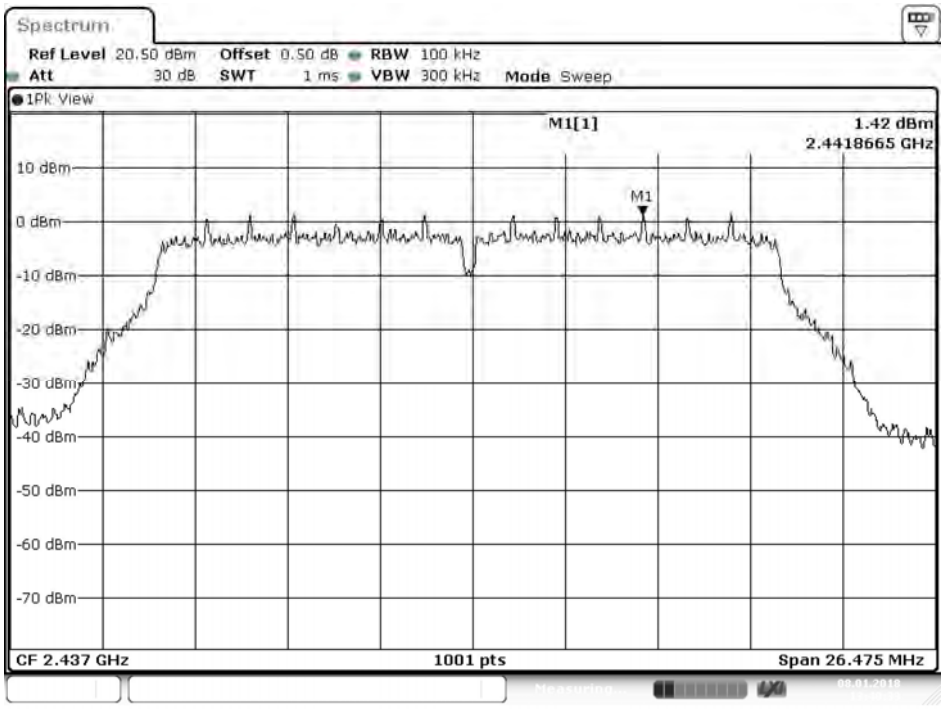
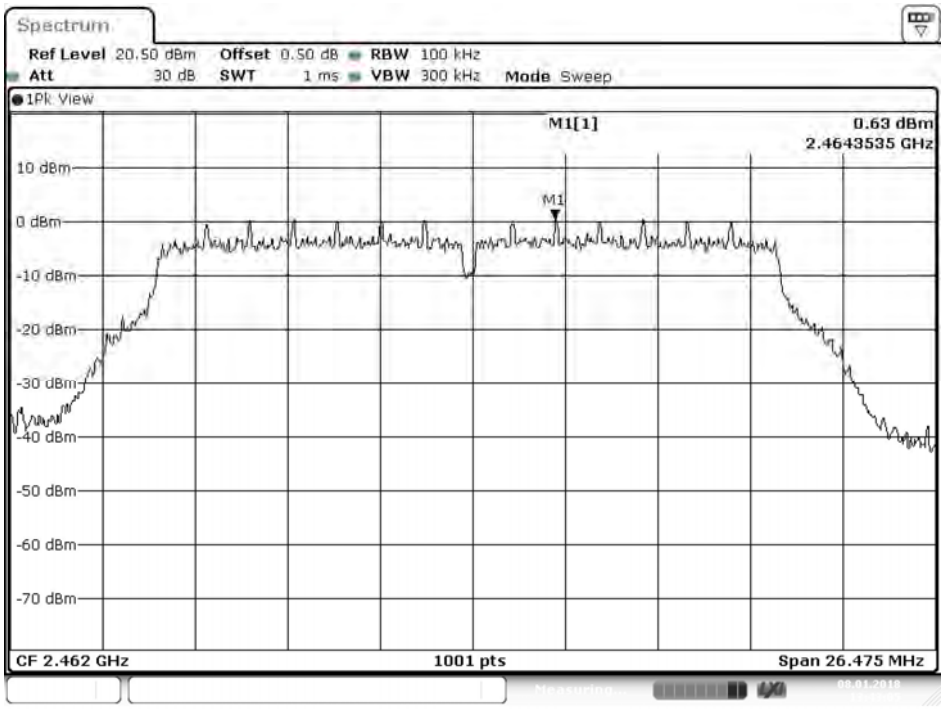


Figure Channel 6: (Chain A)



Date: 8.JAN.2018 13:40:33

Figure Channel 11: (Chain A)



Date: 8.JAN.2018 13:43:05

Figure Channel 1: (Chain B)

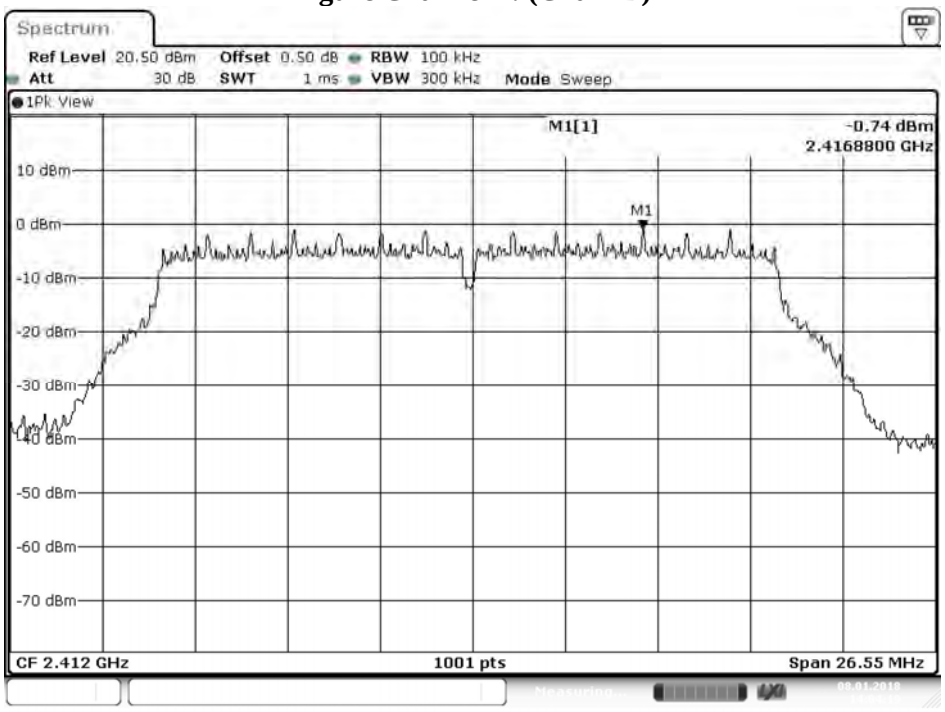


Figure Channel 6: (Chain B)

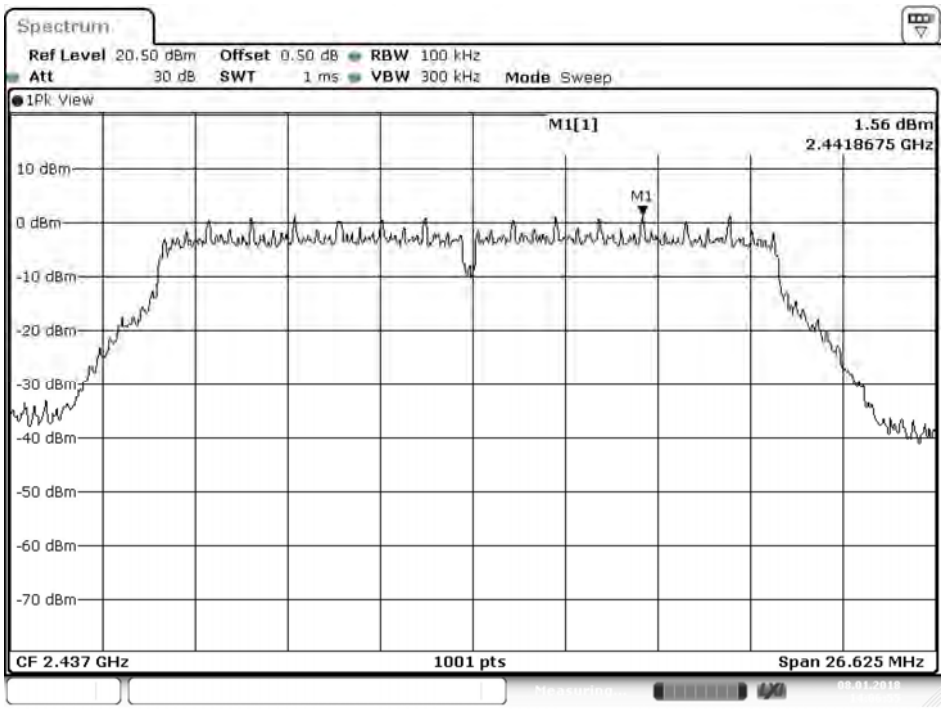
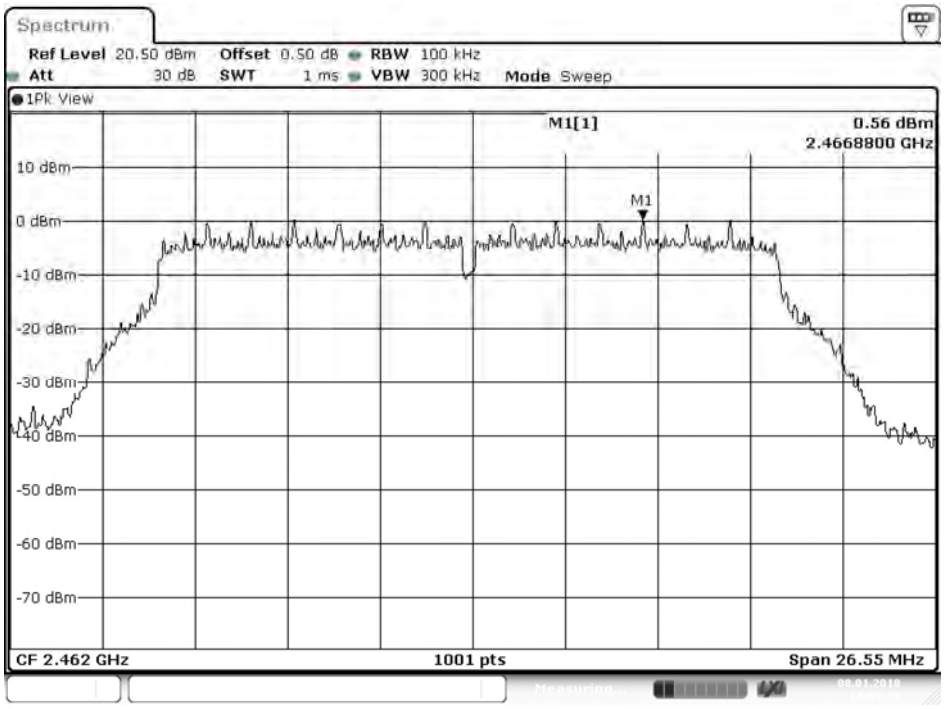
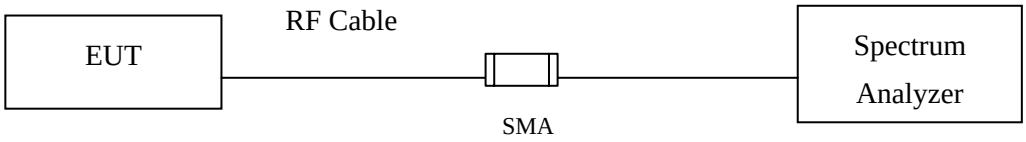


Figure Channel 11: (Chain B)



9. Duty Cycle

9.1. Test Setup



9.2. Test Procedure

The EUT was setup according to ANSI C63.10 2013; tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

9.3. Uncertainty

± 2.31msec

9.4. Test Result of Duty Cycle

Product : Network Appliance
Test Item : Duty Cycle
Test Mode : Transmit

Duty Cycle Formula:

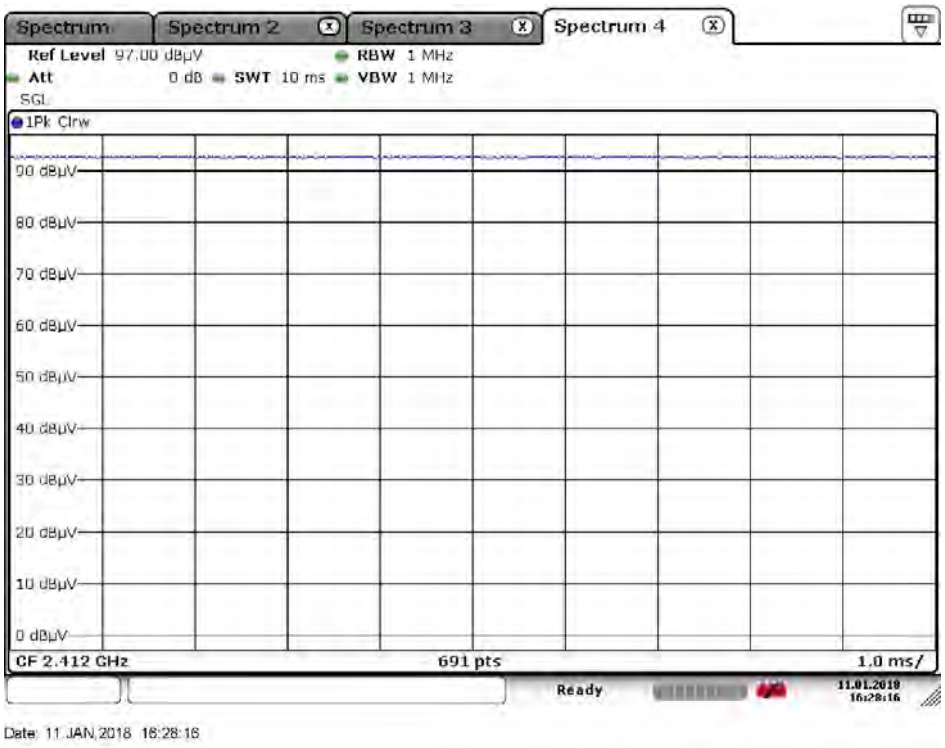
Duty Cycle = Ton / (Ton + Toff)

Duty Factor = 10 Log (1/Duty Cycle)

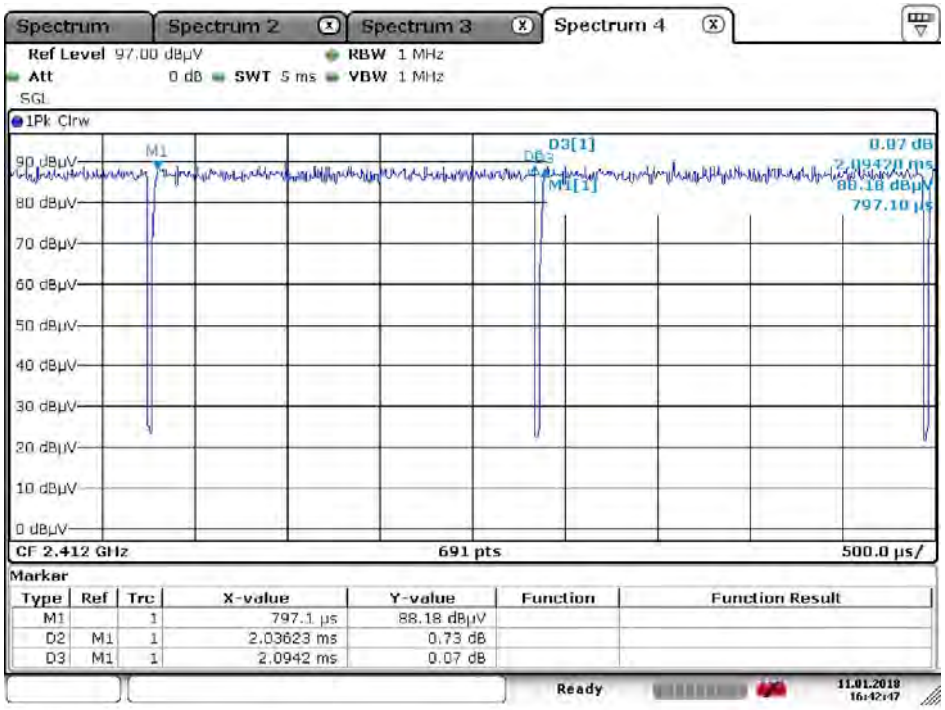
Results:

2.4GHz band	Ton (ms)	Ton + Toff (ms)	Duty Cycle (%)	Duty Factor (dB)
802.11b	--	--	100.00	0.00
802.11g	2.0362	2.0942	97.23	0.12
802.11n20	0.9565	1.0144	94.29	0.26

802.11b



802.11g



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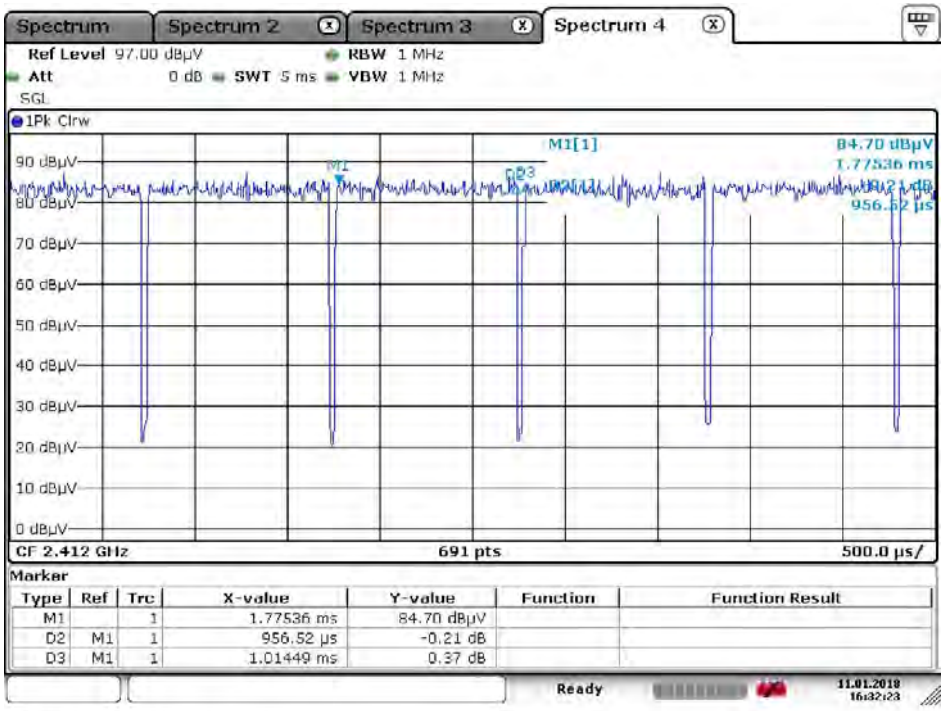
802.11n20



Date: 11.JAN.2018 16:32:24

10. EMI Reduction Method During Compliance Testing

No modification was made during testing.