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WLAN TEST REPORT

Report Number: 101968322LEX-001

Project Number: G101968322

Report Issue Date: 4/13/2015

Product Name: GE Wi-Fi Connected Appliance Transciever

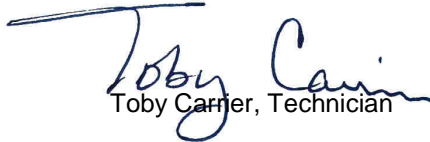
FCC Standards: Title 47 CFR 15 Subpart B and C

Industry Canada Standards: RSS-210 Issue 8 & RSS-GEN Issue 4

Tested by:
Intertek Testing Services NA, Inc.
731 Enterprise Drive
Lexington, KY 40510

Client:
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Louisville, KY 40225

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1 Introduction and Conclusion

The tests indicated in section 2 were performed on the product constructed as described in section 3. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test method, a list of the actual test equipment used, documentation photos, results and raw data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested complied with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

The INTERTEK-Lexington is located at 731 Enterprise Drive, Lexington Kentucky, 40510. The radiated emission test site is a 10-meter semi-anechoic chamber. The chamber meets the characteristics of CISPR 16-1 and ANSI C63.4. For measurements, a remotely controlled flush-mount metal-top turntable is used to rotate the EUT a full 360 degrees. A remote controlled non-conductive antenna mast is used to scan the antenna height from one to four meters. The test site is listed with the FCC under registration number 485103. The test site is listed with Industry Canada under site number IC 2042M-1.

2 Test Summary

Page	Test full name	FCC Reference	IC Reference	Result
6	Peak Conducted Power	§ 15.247(b)(3)(4)	RSS-210 (A8.4)	Pass
8	Occupied Bandwidth	§ 15.247(a)(2)	RSS-210 (A8.2), RSS-GEN (6.6)	Pass
15	Conducted Spurious Emissions	§ 15.247(d)	RSS-210 (A8.5)	Pass
19	Power Spectral Density	§ 15.247(e)	RSS-210 A8.2(B)	Pass
25	Radiated Spurious Emissions (Transmitter)	§ 15.247(d), § 15.209, and § 15.205	RSS-210 (2.2)	Pass
33	Radiated Spurious Emissions (Receiver)	§ 15.109	RSS-Gen (7.1)	Pass
35	AC Powerline Conducted Emissions	§ 15.107, § 15.207	RSS-Gen (8.8)	Pass
44	Antenna Requirement per FCC Part 15.203	§ 15.203	RSS-Gen (6.7)	Pass

3 Description of Equipment Under Test

Equipment Under Test	
Manufacturer	GE Digital Energy
Model Number	WCATA003
Serial Number	DC0001
Receive Date	1/19/2015
Test Start Date	1/19/2015
Test End Date	1/26/2015
Device Received Condition	Good
Test Sample Type	Production
Frequency Band	2412MHz – 2462MHz
Mode(s) of Operation	802.11 b/g/n
Modulation Type	BPSK, QPSK, CCK, OFDM
Duty Cycle	100%
Transmission Control	Test Commands
Maximum Output Power	24.41 dbm
Test Channels	1, 6, 11
Antenna Type (15.203)	PCB Antenna
Operating Voltage	USB Powered

Description of Equipment Under Test
WiFi Module

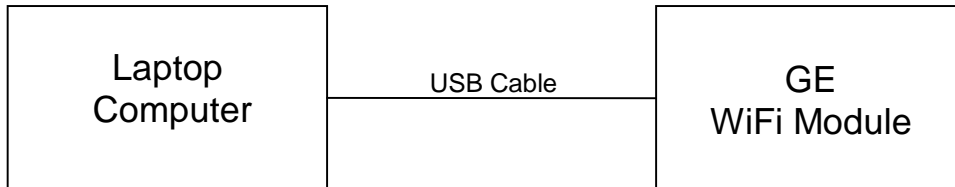
Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	Transmitting 802.11 b, g or n on low, mid or high channels.
2	Receive mode/ Idle mode.

3.1 System setup including cable interconnection details, support equipment and simplified block diagram

3.2 EUT Block Diagram:

The test sample was tested in stand alone mode and was not connected to any support equipment during the evaluation.



3.3 Cables:

Cables					
Description	Length	Shielding	Ferrites	Connection	
				From	To
USB Cable	4ft	None	None	EUT	Laptop

3.4 Support Equipment:

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
Laptop	Gateway	LT2802u	11906695725

4 Peak Conducted Power

4.1 Test Limits

§ 15.247(b)(3): For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the *maximum conducted output power* is the highest total transmit power occurring in any mode.

§ 15.247(b)(4): The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.2 Test Procedure

ANSI C63.10: 2009 and KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247). The peak output power was measured using a power meter.

4.3 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
Wideband Power Sensor	4022	Rohde & Schwarz	NRP-Z81	9/16/2014	9/16/2015

4.4 Results:

802.11 b Mode

Mode	Frequency (MHz)	Channel Number	Conducted Power (dBm)			
			Data Rate (Mbps)			
			1	2	5.5	11
802.11b	2412	1	20.91	20.94	20.85	20.89
	2437	6	20.55	20.76	20.74	20.84
	2462	11	20.72	20.62	20.7	20.56

802.11g Mode

Mode	Frequency (MHz)	Channel Number	Conducted Power (dBm)							
			Data Rate (Mbps)							
			6	9	12	18	24	36	48	54
802.11g	2412	1	24.25	24.23	24.01	24.06	24.05	24.27	24.15	24.08
	2437	6	24.39	24.41	23.8	23.89	23.88	24.19	24.13	23.84
	2462	11	23.96	24.1	24.05	23.72	23.83	24.17	23.9	23.65

802.11n Mode (20MHz)

Mode	Frequency (MHz)	Channel Number	Conducted Power (dBm)							
			MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
802.11n (20MHz)	2412	1	22.96	24.1	23.51	23.65	23.6	23.97	23.48	23.72
	2437	6	23.77	23.29	22.98	23.3	23.36	23.57	23.59	23.56
	2462	11	23.34	23.66	23.34	22.93	23.15	22.99	23.57	23.58

5 Occupied Bandwidth

5.1 Test Limits

§ 15.247(a)(2): For digital modulation systems, the minimum 6dB bandwidth shall be at least 500kHz.

5.2 Test Procedure

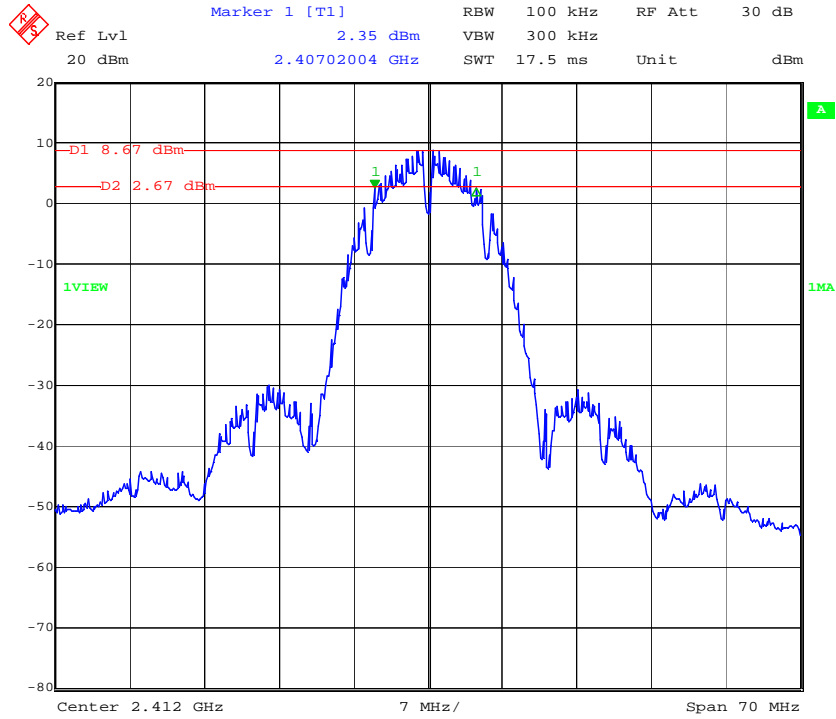
ANSI C63.10: 2009 and KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247)

5.3 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
Spectrum Analyzer	3720	Rohde & Schwarz	FSEK30	9/15/2014	9/15/2015

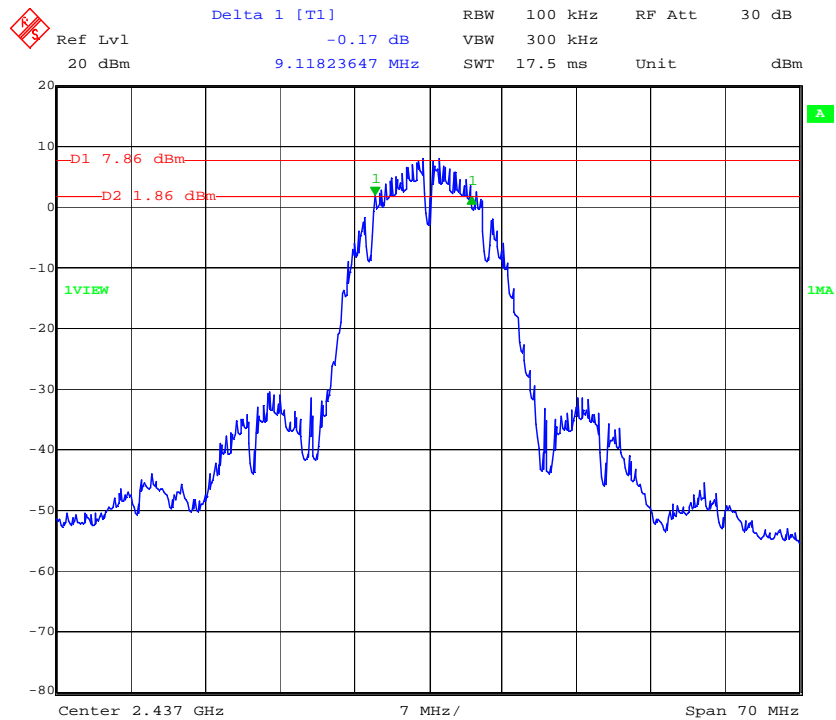
5.4 Results:

Mode	Channel Number	Frequency (MHz)	6dB Bandwidth	99% Power Bandwidth	Result
802.11b	1	2412	9.53MHz	---	Pass
802.11b	6	2437	9.11MHz	13.89MHz	Pass
802.11b	11	2462	9.48MHz	---	Pass
802.11g	1	2412	15.99MHz	---	Pass
802.11g	6	2437	15.99MHz	16.41MHz	Pass
802.11g	11	2462	16.41MHz	---	Pass
802.11n	1	2412	16.97MHz	---	Pass
802.11n	6	2437	17.39MHz	17.54MHz	Pass
802.11n	11	2462	17.25MHz	---	Pass



Date: 22.JAN.2015 10:56:07

6dB Bandwidth Plot (Channel 1) – 802.11b mode



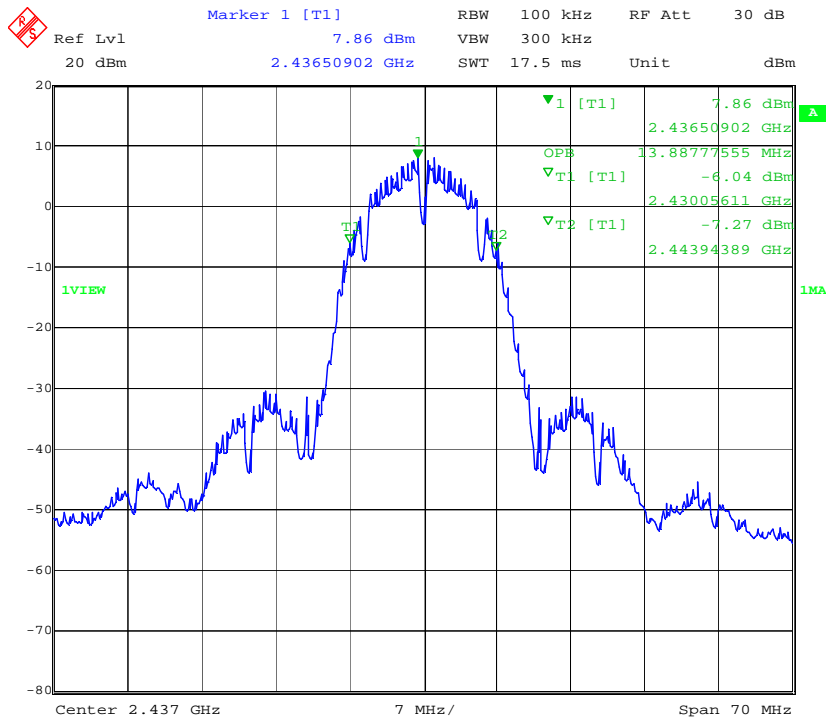
Date: 22.JAN.2015 10:59:26

6dB Bandwidth Plot (Channel 6) – 802.11b mode



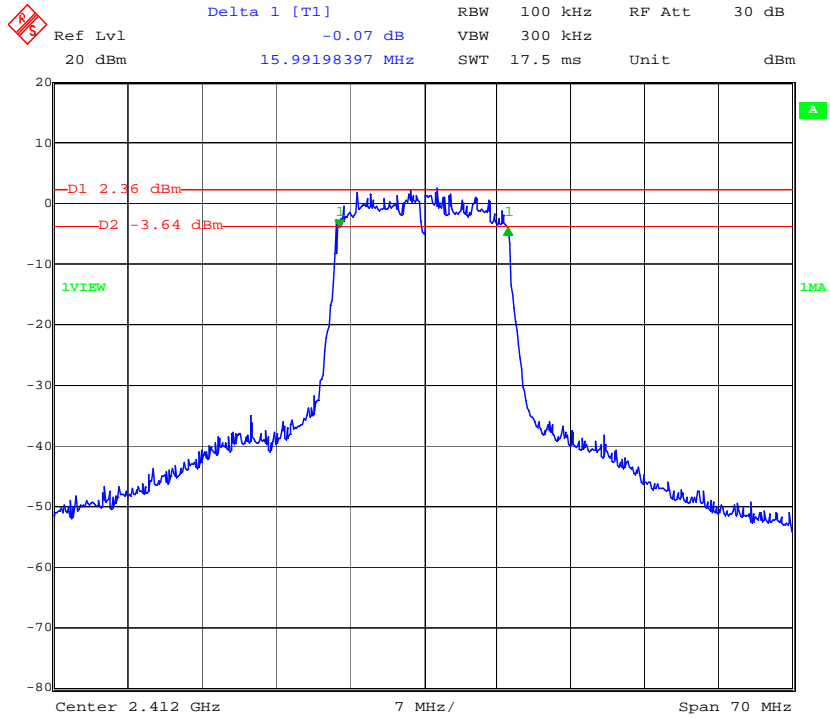
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6dB Bandwidth Plot (Channel 11) – 802.11b mode



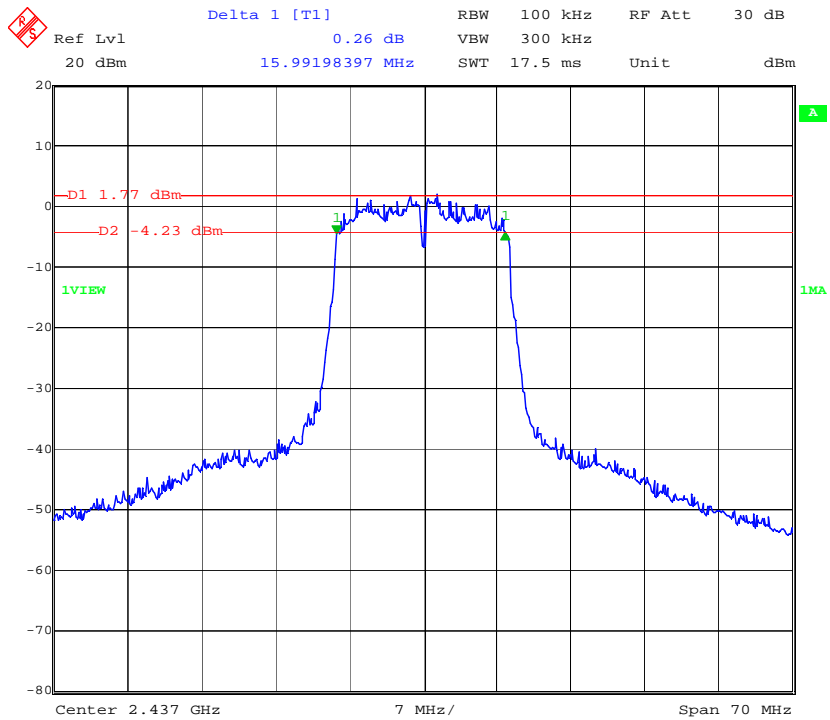
Date: 22.JAN.2015 11:00:56

99% Power Bandwidth Plot (Channel 6) – 802.11b mode



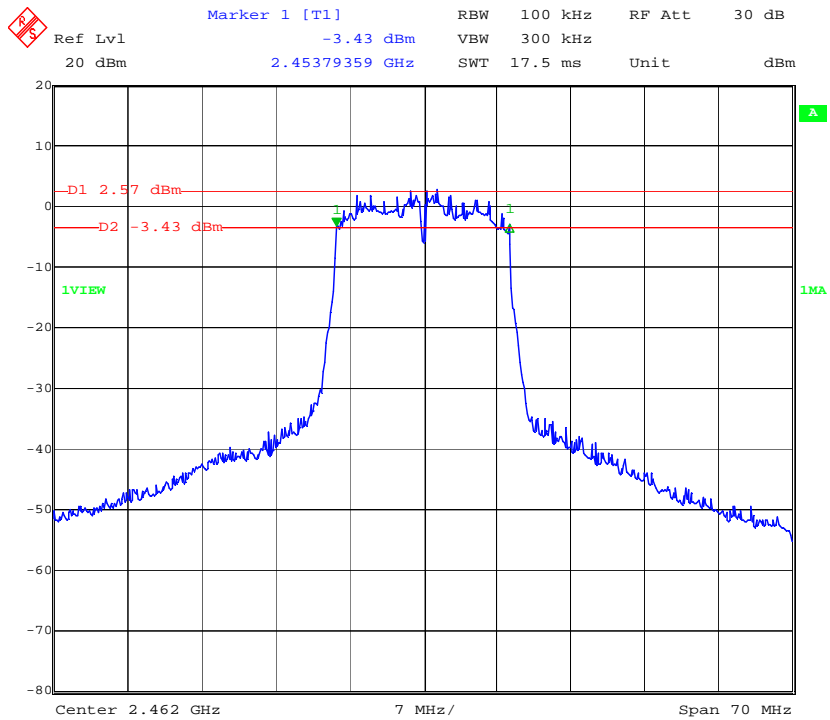
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6dB Bandwidth Plot (Channel 1) – 802.11g mode



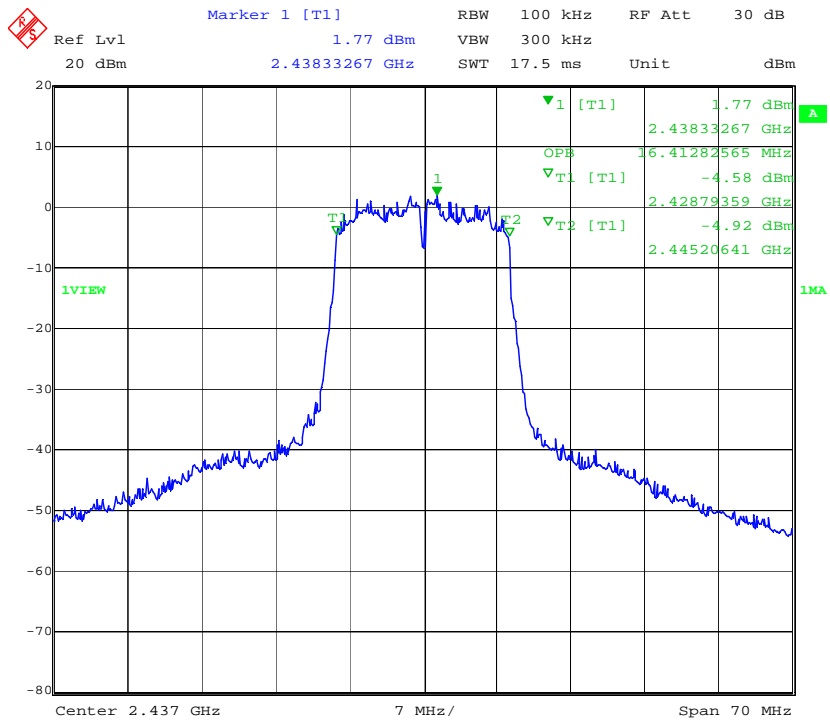
Date: 22.JAN.2015 11:09:09

6dB Bandwidth Plot (Channel 6) – 802.11g mode



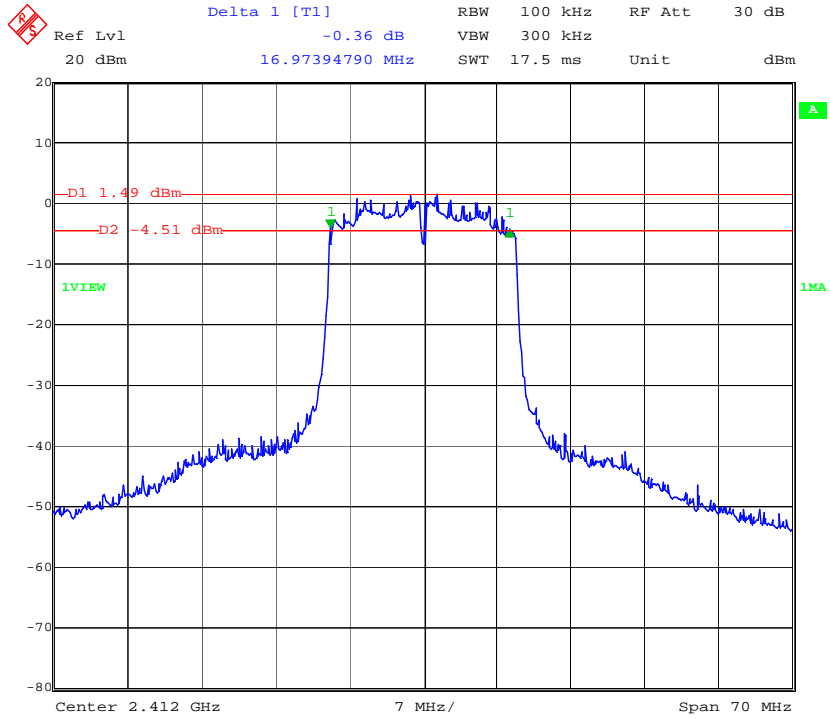
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6dB Bandwidth Plot (Channel 11) - 802.11g mode



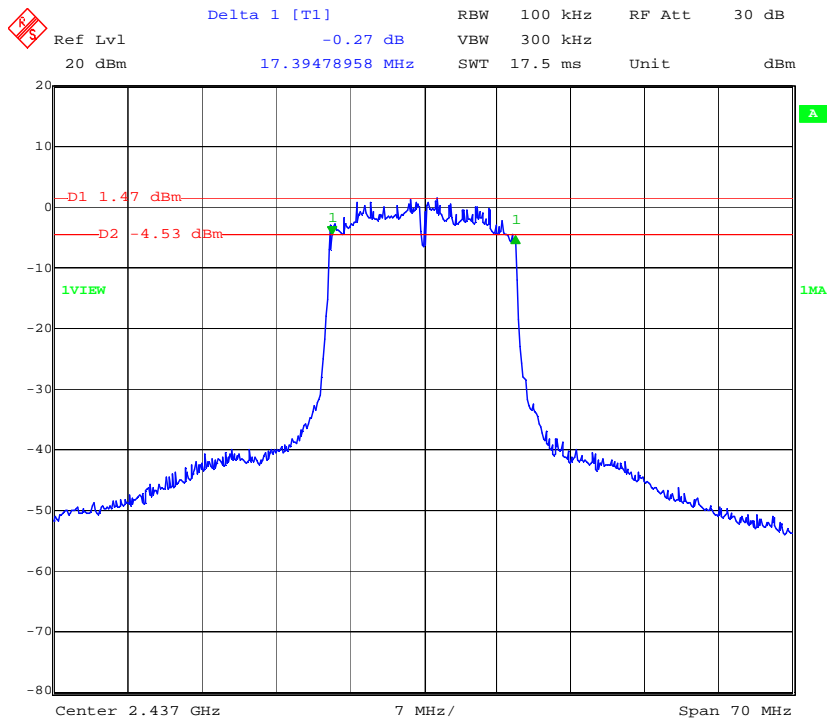
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99% Power Bandwidth Plot (Channel 6) - 802.11g mode



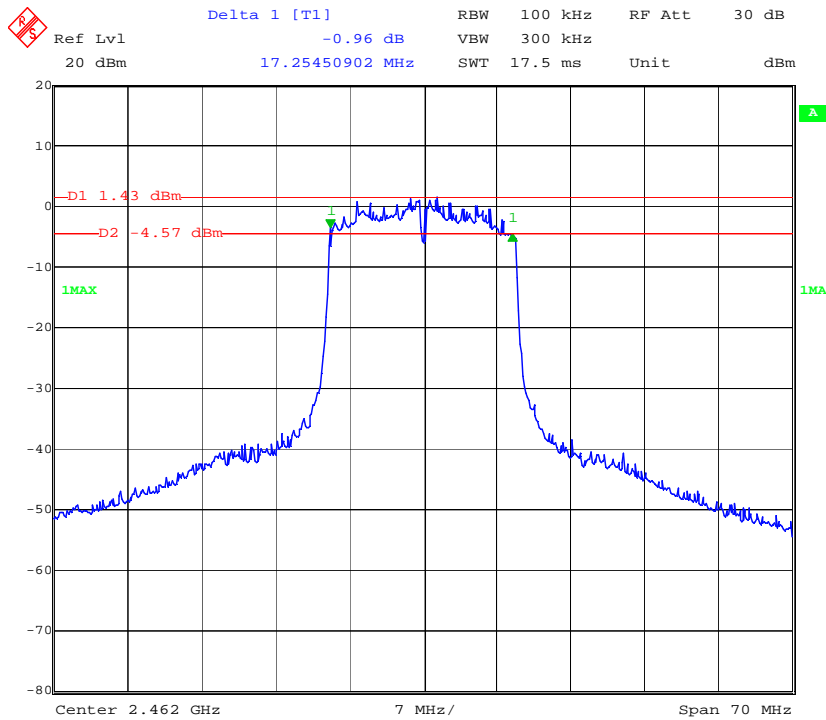
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6dB Bandwidth Plot (Channel 1) – 802.11n mode



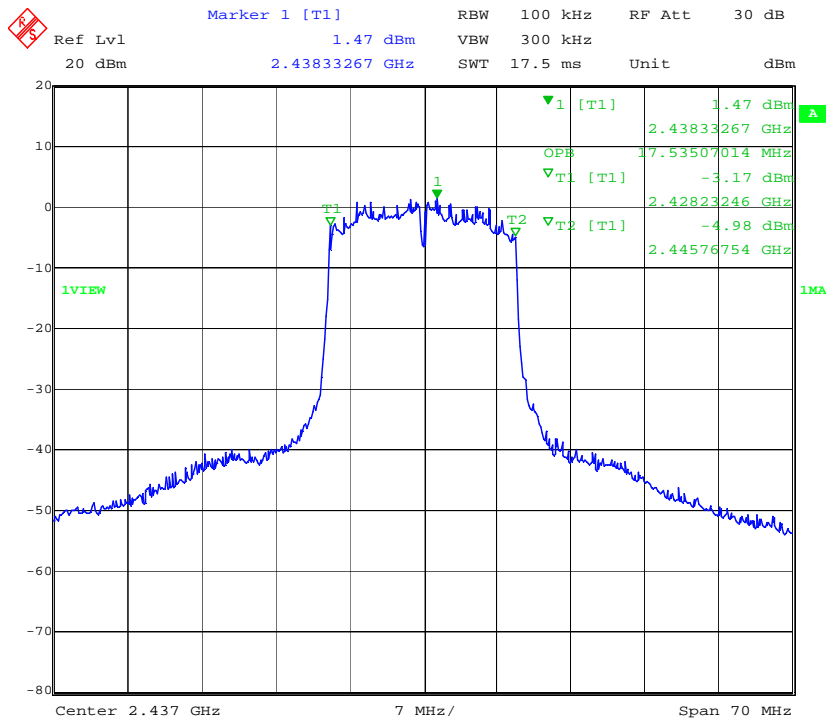
Date: 22.JAN.2015 11:20:01

6dB Bandwidth Plot (Channel 6) – 802.11n mode



Date: 22.JAN.2015 11:23:27

6dB Bandwidth Plot (Channel 11) - 802.11n mode



Date: 22.JAN.2015 11:20:40

99% Power Bandwidth Plot (Channel 6) - 802.11n mode

6 Conducted Spurious Emissions

6.1 Test Limits

§ 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 a radiated 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, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

6.2 Test Procedure

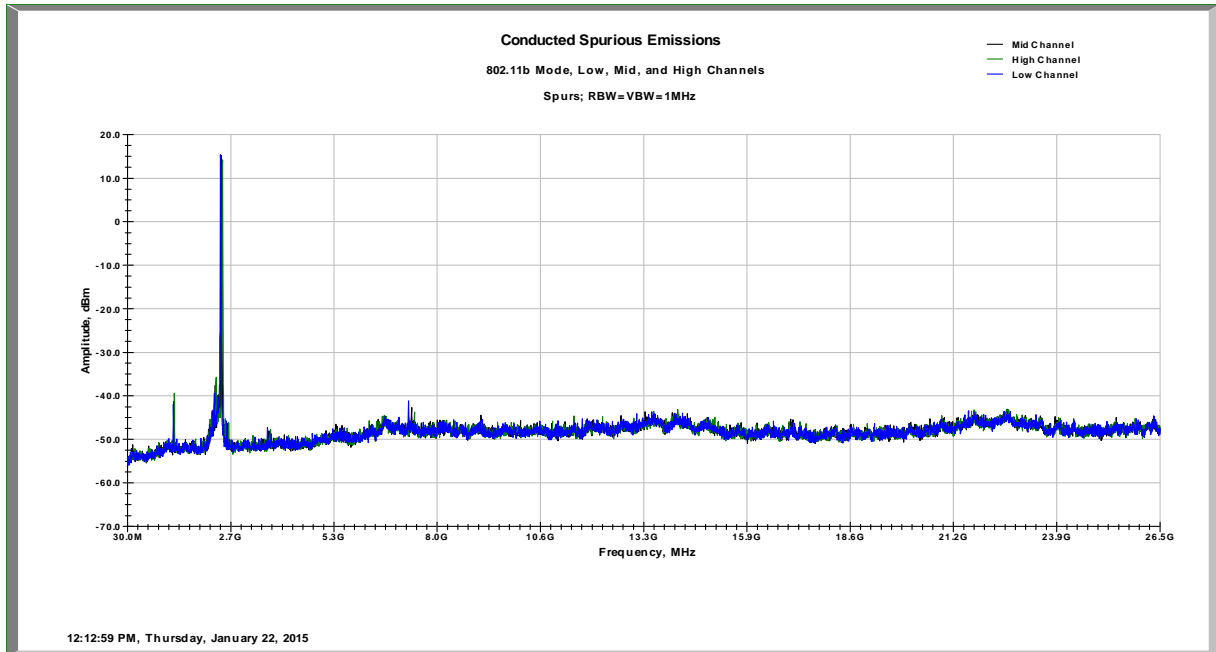
ANSI C63.10: 2009 and KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247)

6.3 Test Equipment Used:

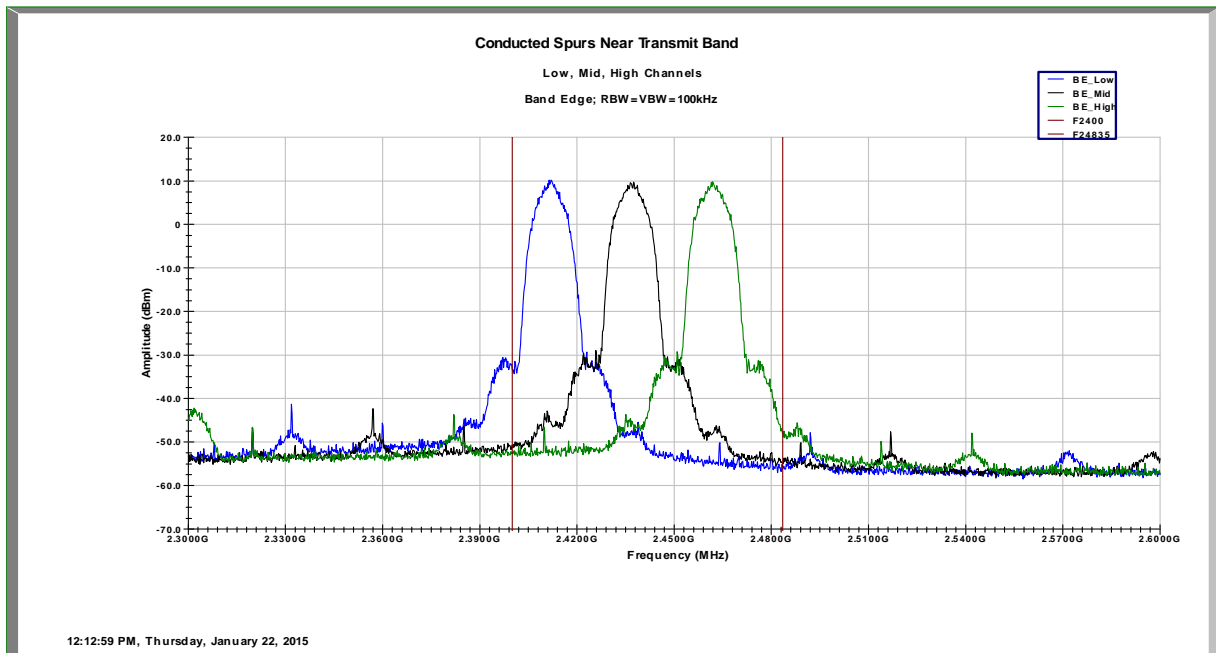
Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
Spectrum Analyzer	3720	Rohde & Schwarz	FSEK30	9/15/2014	9/15/2015

6.4 Results:

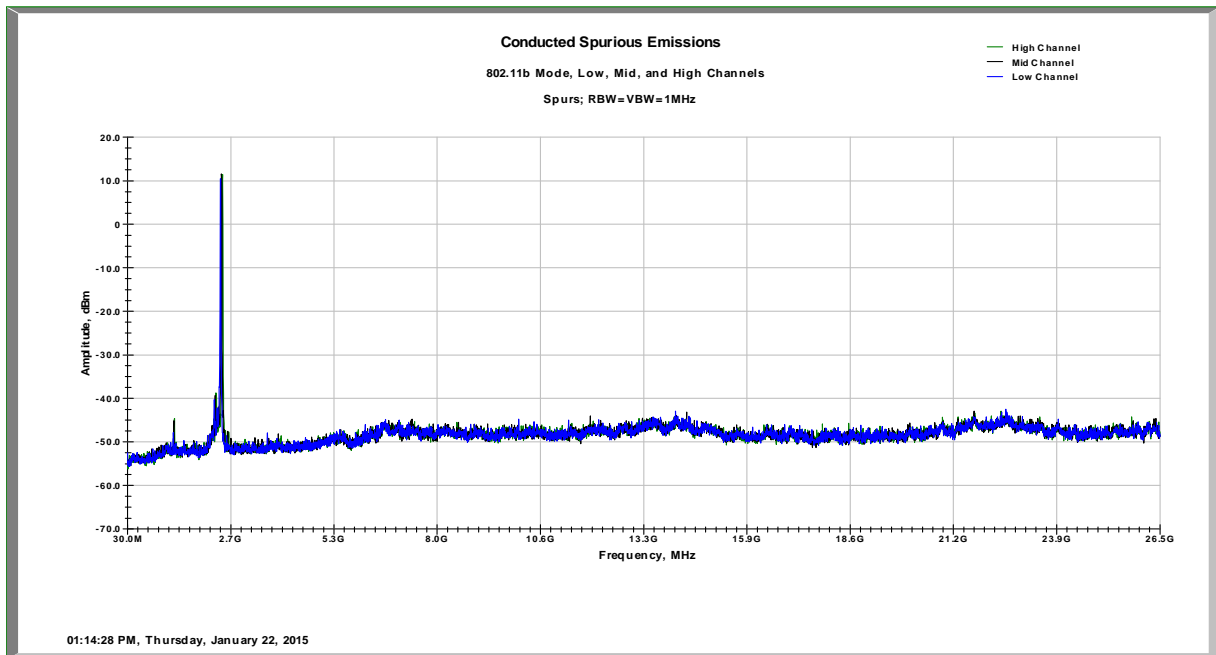
The following plots show that there are no conducted spurious emissions exceeding the 20dB down criteria.



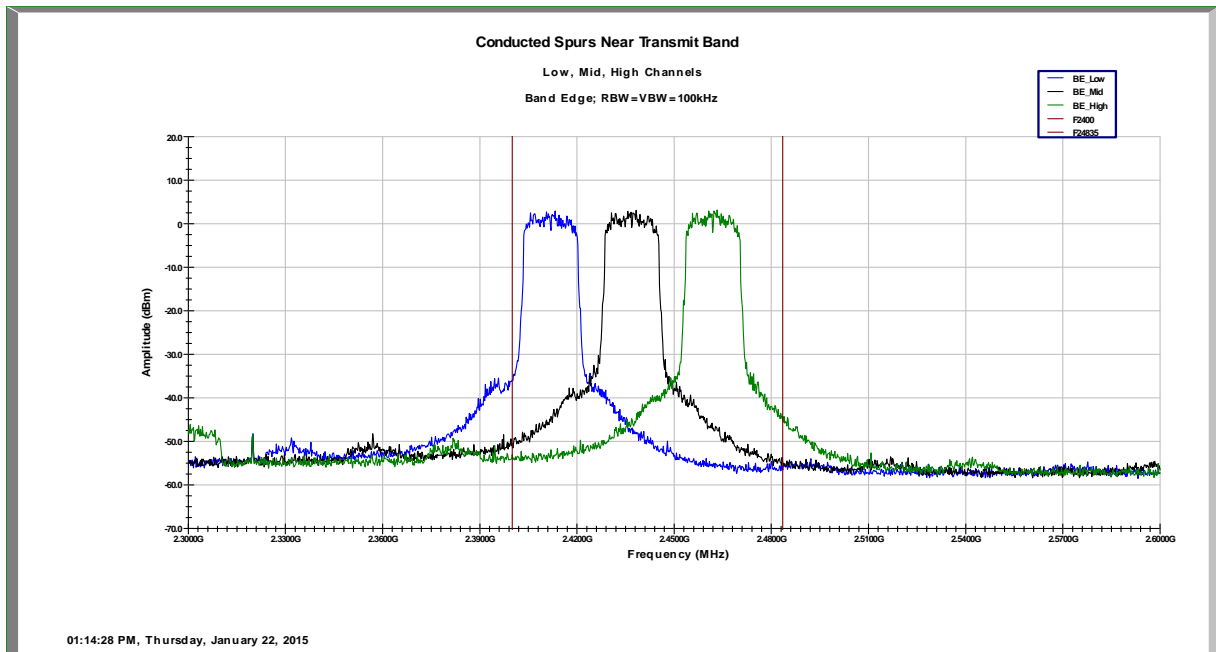
Conducted Spurious Emissions - 802.11b Mode Low, Mid, High Channels



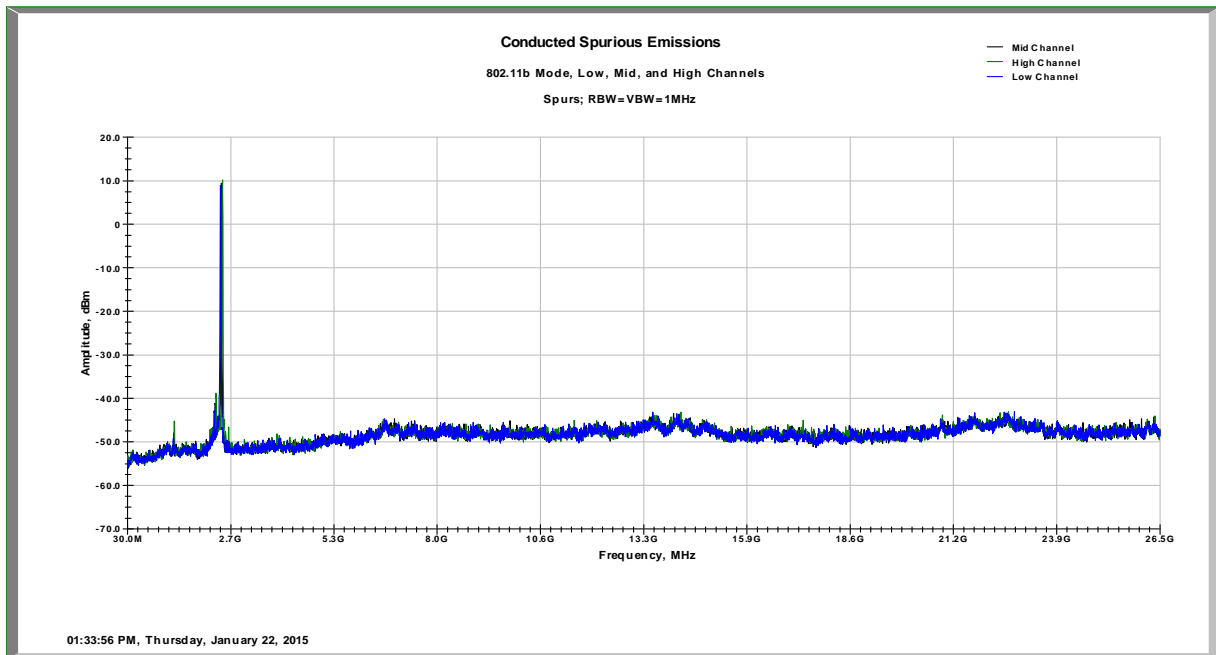
Emissions Close to Band Edge - 802.11b Mode Low, Mid, High Channels



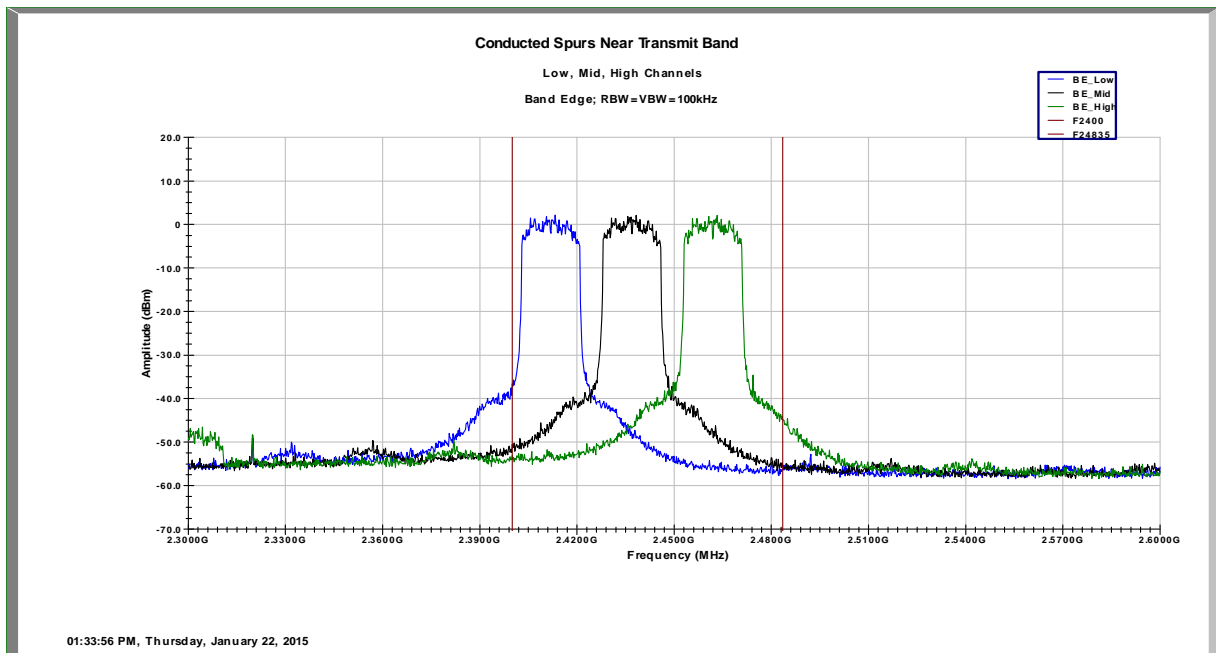
Conducted Spurious Emissions - 802.11g Mode Low, Mid, High Channels



Emissions Close to Band Edge - 802.11g Mode Low, Mid, High Channels



Conducted Spurious Emissions - 802.11n (20MHz) Mode Low, Mid, High Channels



Emissions Close to Band Edge - 802.11n (20MHz) Mode Low, Mid, High Channels

7 Power Spectral Density

7.1 Test Limits

§ 15.247(e): For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

7.2 Test Procedure

ANSI C63.10: 2009 and KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247)

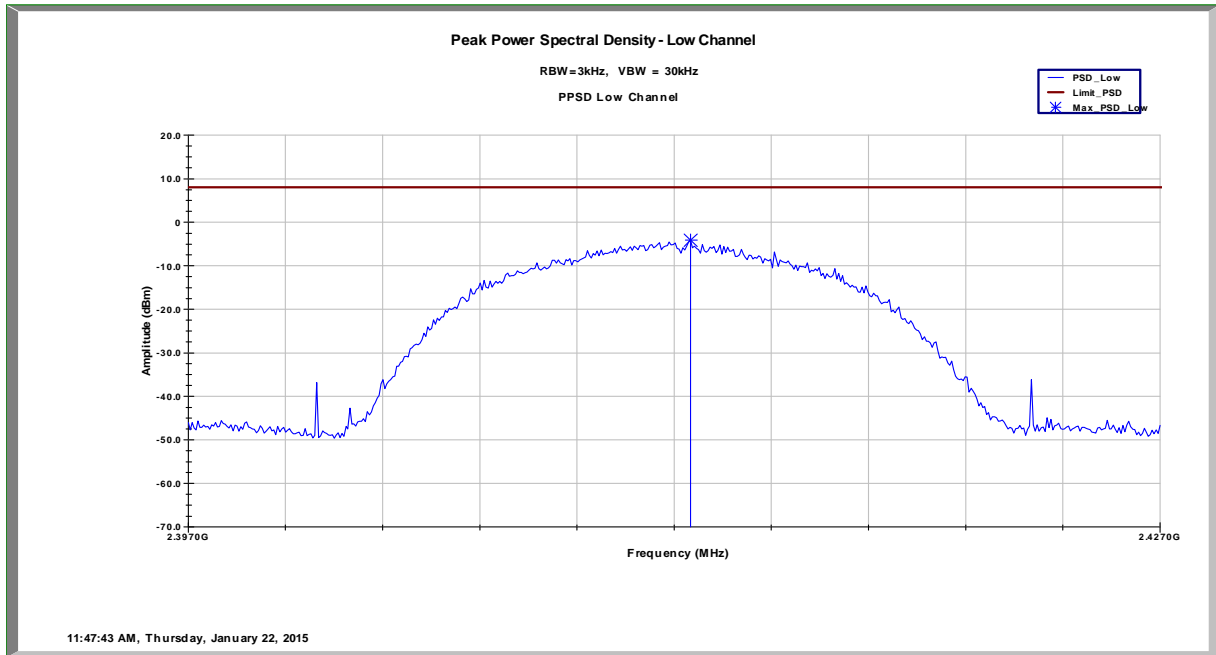
7.3 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
Spectrum Analyzer	3720	Rohde & Schwarz	FSEK30	9/15/2014	9/15/2015

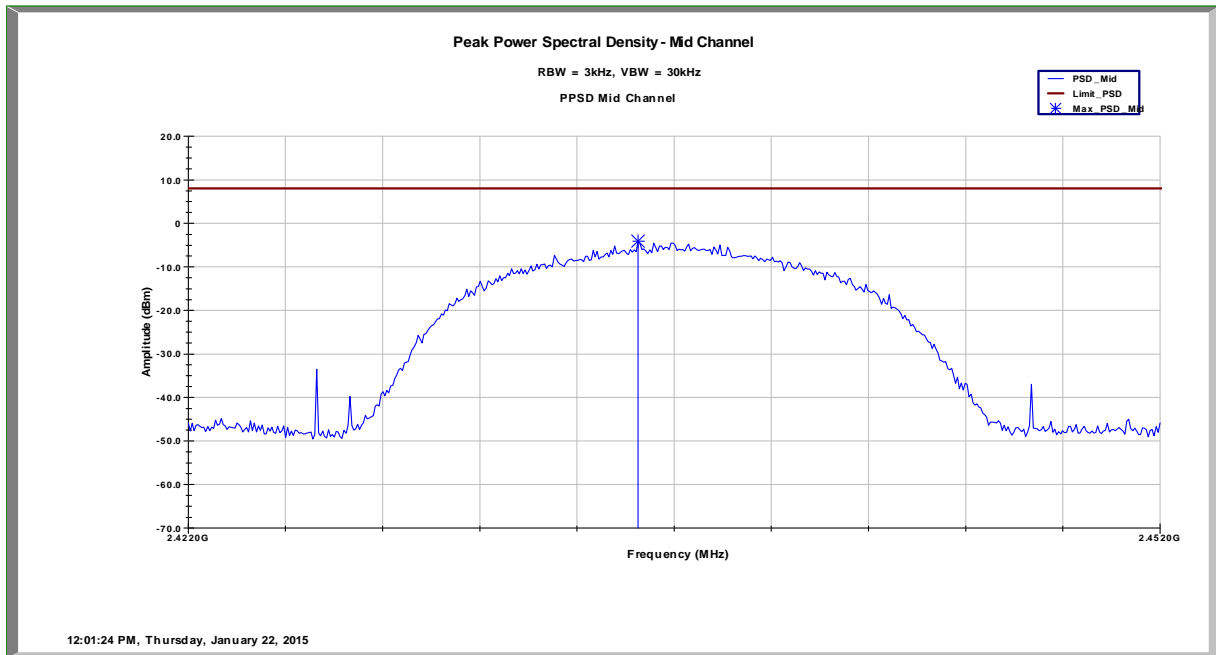
7.4 Results:

*PSD Option 1 Method

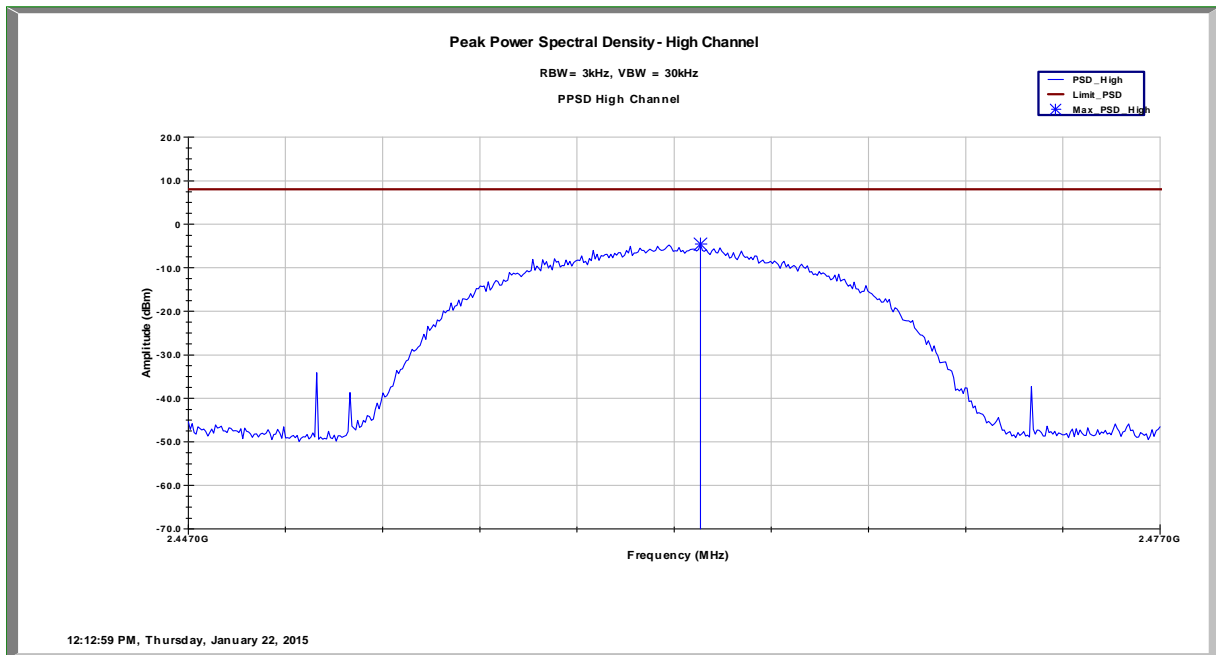
Mode	Channel Number	Frequency (MHz)	PSD in 3kHz BW (dBm)	Limit (dBm)	Margin (dBm)	Result
802.11b	1	2412	-4.141	8.0	12.141	Pass
802.11b	6	2437	-4.070	8.0	12.070	Pass
802.11b	11	2462	-4.569	8.0	12.569	Pass
802.11g	1	2412	-10.377	8.0	18.377	Pass
802.11g	6	2437	-9.651	8.0	17.651	Pass
802.11g	11	2462	-10.045	8.0	18.045	Pass
802.11n	1	2412	-11.174	8.0	19.174	Pass
802.11n	6	2437	-11.469	8.0	19.469	Pass
802.11n	11	2462	-10.686	8.0	18.686	Pass



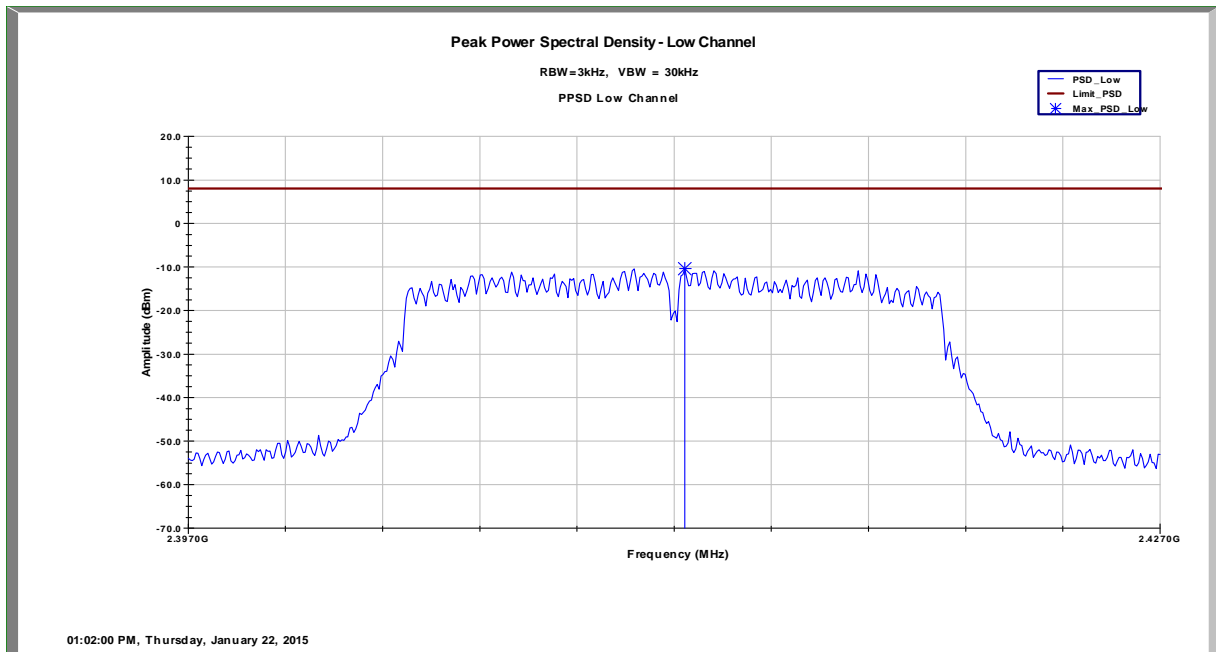
Power Spectral Density – Channel 1 802.11b mode



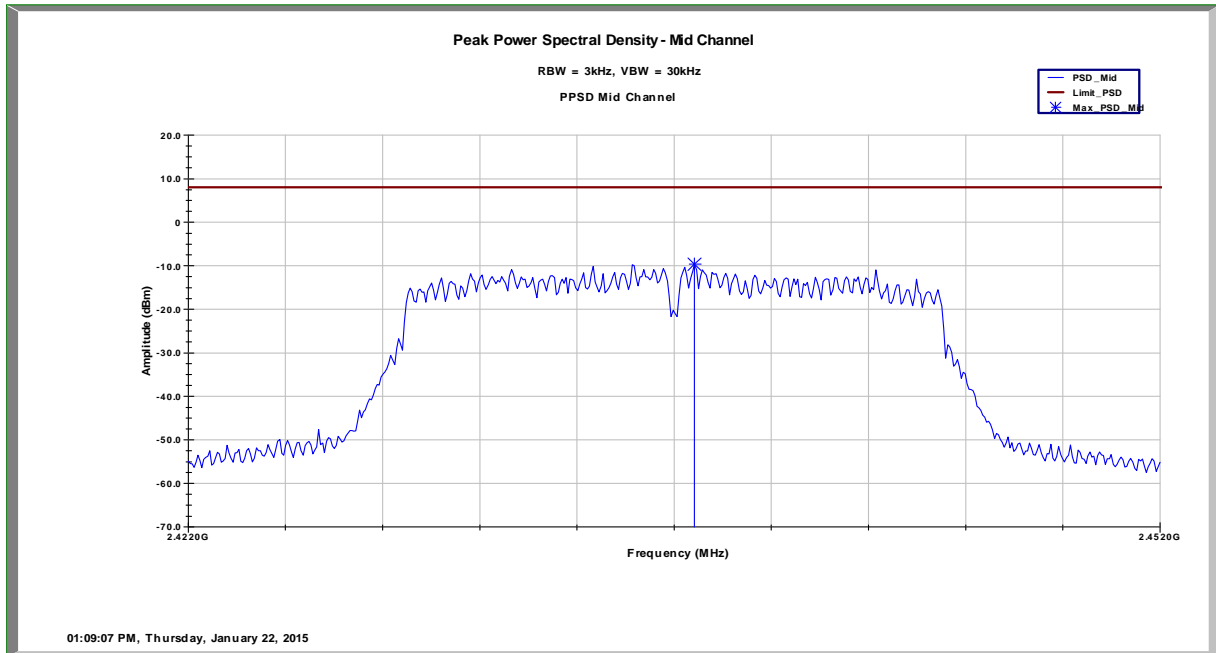
Power Spectral Density – Channel 6 802.11b mode



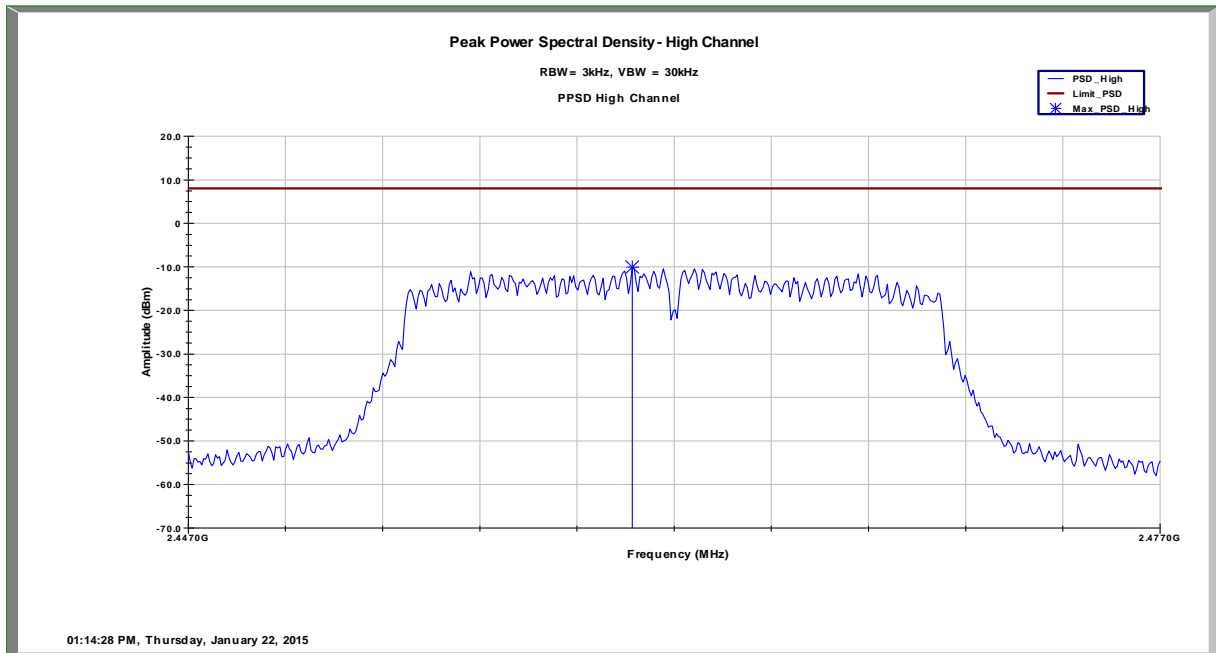
Power Spectral Density – Channel 11 802.11b mode



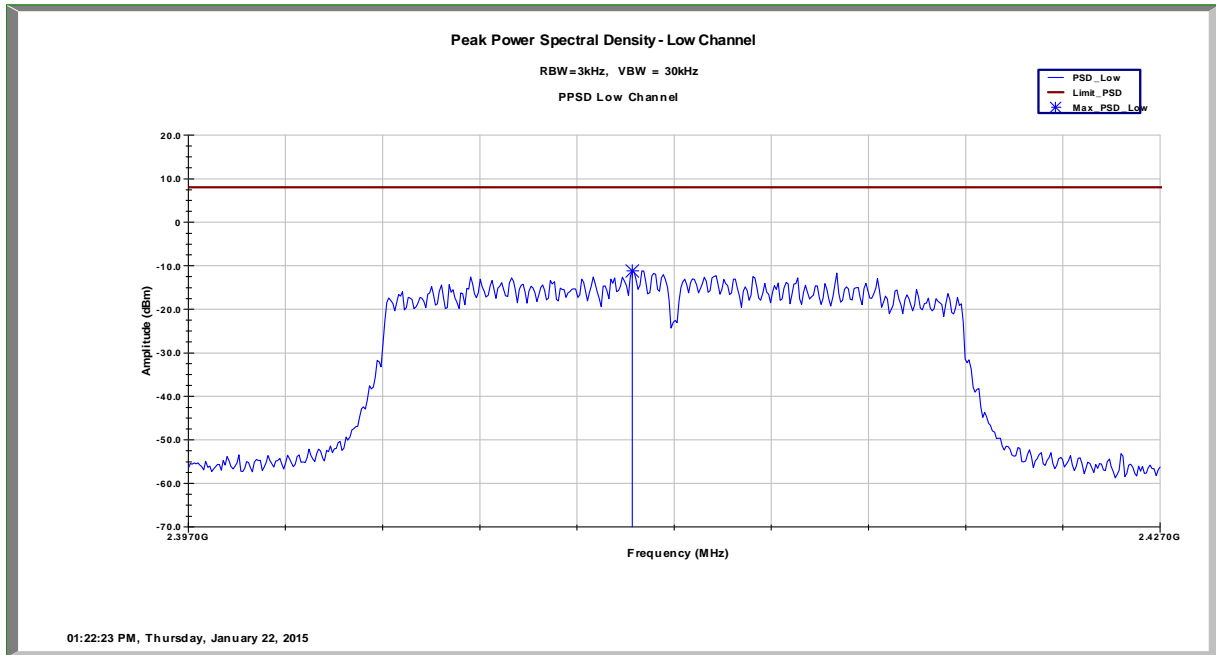
Power Spectral Density – Channel 1 802.11g mode



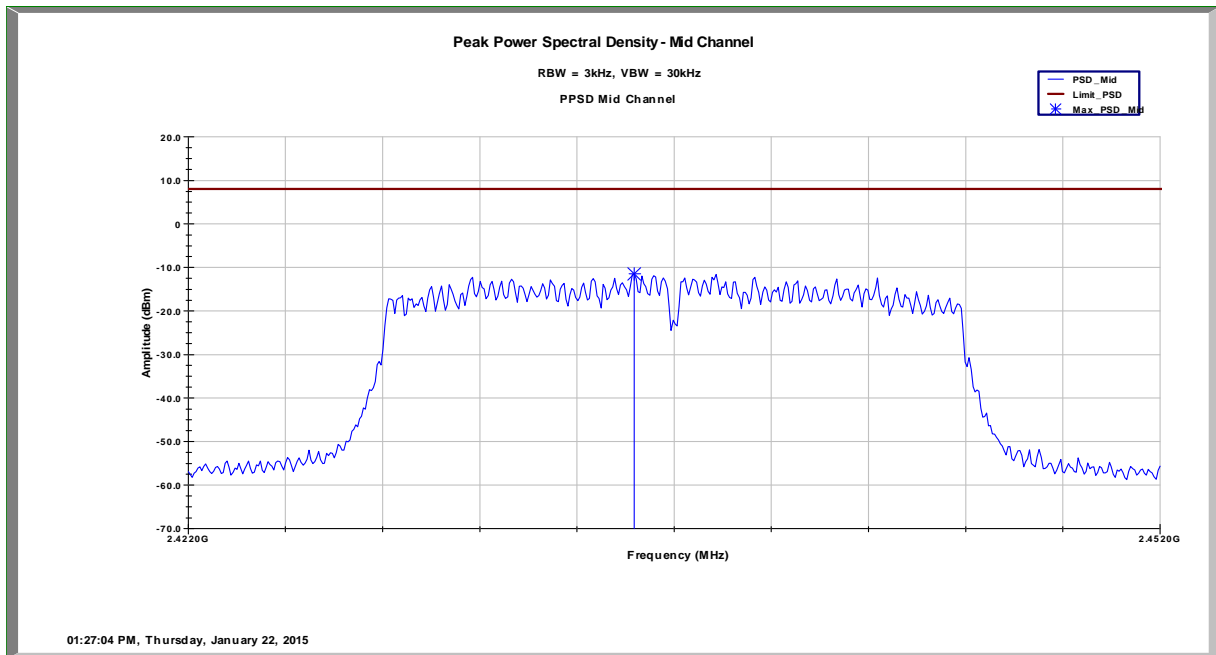
Power Spectral Density – Channel 6 802.11g mode



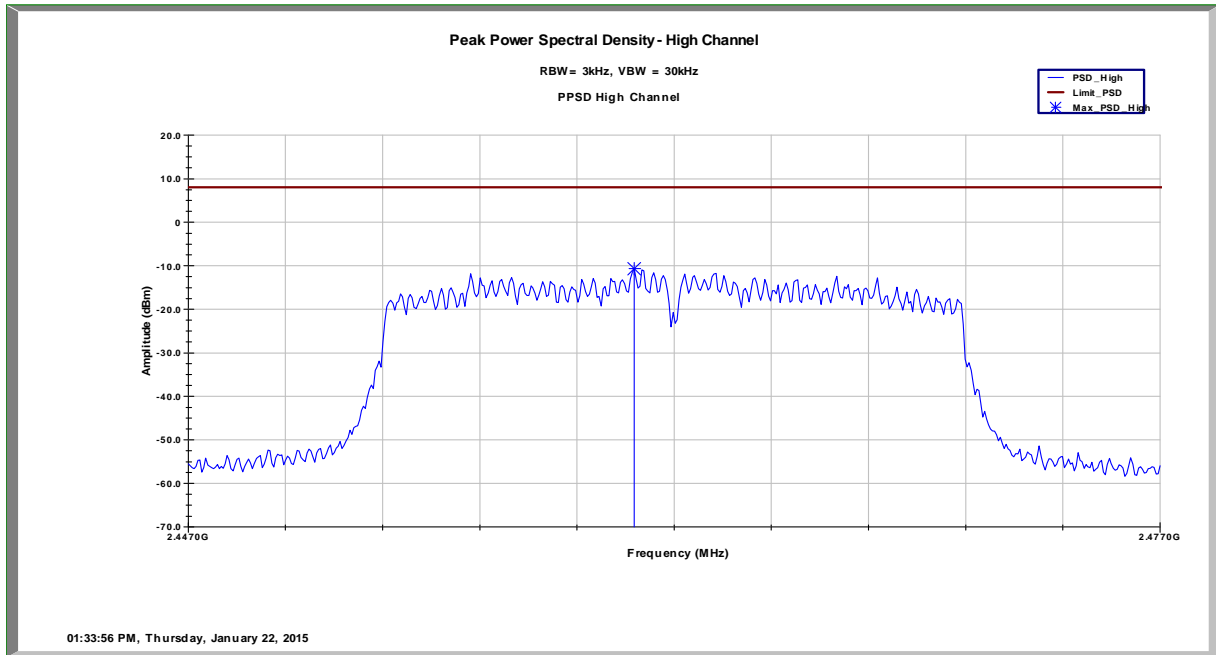
Power Spectral Density – Channel 11 802.11g mode



Power Spectral Density – Channel 1 802.11n mode



Power Spectral Density – Channel 6 802.11n mode



Power Spectral Density – Channel 11 802.11n mode

8 Radiated Spurious Emissions (Transmitter)

8.1 Test Limits

§ 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 a radiated 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, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Part 15.205(a): Restricted Bands of Operations

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(²)
13.36-13.41			

¹Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

²Above 38.6

Part 15.209(a): Field Strength Limits for Restricted Bands of Operation

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 - 0.490	2,400 / F (kHz)	300
0.490 - 1.705	24,000 / F (kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

8.2 Test Procedure

ANSI C63.10: 2009 and KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247)

8.3 Example of Field Strength Calculation Method:

The measured field strength was calculated by summing the readings taken from the spectrum analyzer with the appropriate correction factors associated with the antenna losses and cable losses. The calculation formula and sample calculations are listed below:

Formula:

$$FS = RA + AF + CF$$

FS = Field Strength in dB μ V/m

RA = Receiver Amplitude in dB μ V

AF = Antenna Factor in dB

CF = Cable Attenuation Factor in dB (Including preamplifier and filter attenuation)

Example Calculation:

$$RA = 19.48 \text{ dB}\mu\text{V}$$

$$AF = 18.52 \text{ dB}$$

$$CF = 0.78 \text{ dB}$$

$$FS = 19.48 + 18.52 + 0.78 = 38.78 \text{ dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(38.78 \text{ dB}\mu\text{V/m})/20] = 86.89 \mu\text{V/m}$$

8.4 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMI Test Receiver	1302.6005.40	Rohde & Schwarz	ESU40	9/17/2014	9/17/2015
Preamplifier	122005	Rohde&Schwarz	TS-PR18	11/26/2014	11/26/2015
Bilog Antenna	2564	Schaffner	CBL6111C	4/21/2014	4/21/2015
Horn Antenna	00156319	ETS	3117	5/2/2014	5/2/2015
System Controller	121701-1	Sunol Sciences	SC99V	Time of Use	Time of Use
EMC Software	Version 9.15.02	Rohde&Schwarz	EMC32	Time of Use	Time of Use

8.5 Results:

All spurious emissions were attenuated by at least 20dB below the level of the fundamental as required by Part 15.247(d). Additionally, all emissions falling within restricted bands of operation and at the band edges were found to be below the limit specified in Part 15.209(a). The spurious emissions listed in the following tables are the worst case emissions. Radiated emissions was investigated up to the tenth harmonic of the transmit frequency. Emissions were investigated with the test sample positioned in 3 orthogonal axis and the worst case reported.

Worst Case Spurious Measurements (802.11b Mode)

Frequency (MHz)	Average (dB μ V/m)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
4823.800000	---	44.41	74.00	29.59	1000.000	301.0	V	131.0	7.5
4823.800000	35.65	---	54.00	18.35	1000.000	301.0	V	131.0	7.5
7237.000000	33.52	---	54.00	20.48	1000.000	410.0	H	253.0	10.4
7237.000000	---	43.60	74.00	30.40	1000.000	410.0	H	253.0	10.4
9648.200000	33.81	---	54.00	20.19	1000.000	401.0	H	290.0	13.6
9648.200000	---	45.14	74.00	28.86	1000.000	401.0	H	290.0	13.6
12059.000000	---	48.21	74.00	25.79	1000.000	407.0	V	167.0	17.4
12059.000000	37.04	---	54.00	16.96	1000.000	407.0	V	167.0	17.4
14473.000000	---	47.46	74.00	26.54	1000.000	393.0	V	162.0	17.2
14473.000000	36.19	---	54.00	17.81	1000.000	393.0	V	162.0	17.2
16840.800000	40.93	---	54.00	13.07	1000.000	351.0	H	296.0	21.6
16840.800000	---	52.35	74.00	21.65	1000.000	351.0	H	296.0	21.6
16884.200000	40.72	---	54.00	13.28	1000.000	367.0	H	212.0	21.7
16884.200000	---	51.04	74.00	22.96	1000.000	367.0	H	212.0	21.7

802.11b Channel 1 Radiated Spurs

Frequency (MHz)	Average (dB μ V/m)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
4874.200000	30.42	---	54.00	23.58	1000.000	315.0	V	216.0	7.4
4874.200000	---	41.03	74.00	32.97	1000.000	315.0	V	216.0	7.4
7310.800000	33.08	---	54.00	20.92	1000.000	351.0	V	135.0	10.5
7310.800000	---	44.20	74.00	29.80	1000.000	351.0	V	135.0	10.5
9747.400000	---	44.44	74.00	29.56	1000.000	236.0	H	168.0	13.7
9747.400000	33.66	---	54.00	20.34	1000.000	236.0	H	168.0	13.7
12185.200000	36.77	---	54.00	17.23	1000.000	234.0	V	170.0	17.2
12185.200000	---	47.67	74.00	26.33	1000.000	234.0	V	170.0	17.2
14622.600000	36.35	---	54.00	17.65	1000.000	397.0	H	168.0	17.3
14622.600000	---	48.00	74.00	26.00	1000.000	397.0	H	168.0	17.3
17058.800000	40.42	---	54.00	13.58	1000.000	343.0	V	202.0	21.4
17058.800000	---	50.40	74.00	23.60	1000.000	343.0	V	202.0	21.4
17206.800000	40.00	---	54.00	14.00	1000.000	407.0	H	282.0	21.0
17206.800000	---	50.34	74.00	23.66	1000.000	407.0	H	282.0	21.0

802.11b Channel 6 Radiated Spurs

Frequency (MHz)	Average (dB μ V/m)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
4924.200000	31.77	---	54.00	22.23	1000.000	373.0	V	135.0	7.3
4924.200000	---	40.92	74.00	33.08	1000.000	373.0	V	135.0	7.3
7385.400000	---	42.65	74.00	31.35	1000.000	408.0	H	134.0	10.7
7385.400000	32.05	---	54.00	21.95	1000.000	408.0	H	134.0	10.7
9848.200000	33.81	---	54.00	20.19	1000.000	291.0	V	170.0	14.0
9848.200000	---	44.69	74.00	29.31	1000.000	291.0	V	170.0	14.0
12309.800000	37.25	---	54.00	16.75	1000.000	386.0	V	146.0	17.1
12309.800000	---	48.37	74.00	25.63	1000.000	386.0	V	146.0	17.1
14771.400000	37.08	---	54.00	16.92	1000.000	280.0	V	267.0	17.7
14771.400000	---	47.89	74.00	26.11	1000.000	280.0	V	267.0	17.7
16822.800000	---	51.64	74.00	22.36	1000.000	298.0	H	212.0	21.5
16822.800000	40.90	---	54.00	13.10	1000.000	298.0	H	212.0	21.5
17233.800000	---	50.83	74.00	23.17	1000.000	220.0	H	318.0	21.0
17233.800000	39.87	---	54.00	14.13	1000.000	220.0	H	318.0	21.0

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802.11b Channel 11 Radiated Spurs

Frequency (MHz)	Average (dB μ V/m)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2390.000000	---	52.55	74.00	21.45	1000.000	276.0	V	182.0	37.7
2390.000000	42.18	---	54.00	11.82	1000.000	276.0	V	182.0	37.7

802.11b Low Band Edge

Frequency (MHz)	Average (dB μ V/m)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2483.500000	---	52.80	74.00	21.20	1000.000	380.0	V	182.0	37.8
2483.500000	42.54	---	54.00	11.46	1000.000	380.0	V	182.0	37.8

802.11b High Band Edge

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Frequency (MHz)	Average (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
4824.600000	30.13	---	54.00	23.87	1000.000	348.0	V	133.0	7.5
4824.600000	---	40.75	74.00	33.25	1000.000	348.0	V	133.0	7.5
7237.000000	31.74	---	54.00	22.26	1000.000	238.0	H	137.0	10.4
7237.000000	---	42.54	74.00	31.46	1000.000	238.0	H	137.0	10.4
9648.200000	33.69	---	54.00	20.31	1000.000	405.0	H	344.0	13.6
9648.200000	---	45.44	74.00	28.56	1000.000	405.0	H	344.0	13.6
12060.600000	37.11	---	54.00	16.89	1000.000	362.0	V	246.0	17.4
12060.600000	---	48.43	74.00	25.57	1000.000	362.0	V	246.0	17.4
14471.400000	36.15	---	54.00	17.85	1000.000	381.0	H	200.0	17.2
14471.400000	---	47.12	74.00	26.88	1000.000	381.0	H	200.0	17.2
16002.000000	40.13	---	54.00	13.87	1000.000	402.0	H	328.0	20.8
16002.000000	---	51.14	74.00	22.86	1000.000	402.0	H	328.0	20.8
16884.200000	---	51.59	74.00	22.41	1000.000	382.0	V	125.0	21.7
16884.200000	40.52	---	54.00	13.48	1000.000	382.0	V	125.0	21.7

802.11g Channel 1 Radiated Spurs

Frequency (MHz)	Average (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
4873.000000	30.22	---	54.00	23.78	1000.000	327.0	V	131.0	7.4
4873.000000	---	41.04	74.00	32.96	1000.000	327.0	V	131.0	7.4
7310.800000	---	42.89	74.00	31.11	1000.000	343.0	V	134.0	10.5
7310.800000	32.07	---	54.00	21.93	1000.000	343.0	V	134.0	10.5
9747.400000	33.56	---	54.00	20.44	1000.000	408.0	H	165.0	13.7
9747.400000	---	44.75	74.00	29.25	1000.000	408.0	H	165.0	13.7
12186.000000	36.93	---	54.00	17.07	1000.000	393.0	H	260.0	17.2
12186.000000	---	48.98	74.00	25.02	1000.000	393.0	H	260.0	17.2
14622.600000	36.39	---	54.00	17.61	1000.000	370.0	H	326.0	17.3
14622.600000	---	47.76	74.00	26.24	1000.000	370.0	H	326.0	17.3
16133.600000	---	50.24	74.00	23.76	1000.000	233.0	H	336.0	20.6
16133.600000	39.84	---	54.00	14.16	1000.000	233.0	H	336.0	20.6
17060.000000	---	51.20	74.00	22.80	1000.000	300.0	H	272.0	21.4
17060.000000	40.14	---	54.00	13.86	1000.000	300.0	H	272.0	21.4

802.11g Channel 6 Radiated Spurs

Frequency (MHz)	Average (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
4924.200000	28.83	---	54.00	25.17	1000.000	223.0	V	347.0	7.3
4924.200000	---	39.90	74.00	34.10	1000.000	223.0	V	347.0	7.3
7386.200000	31.53	---	54.00	22.47	1000.000	233.0	H	137.0	10.7
7386.200000	---	41.46	74.00	32.54	1000.000	233.0	H	137.0	10.7
9847.000000	33.94	---	54.00	20.06	1000.000	222.0	H	156.0	14.0
9847.000000	---	44.52	74.00	29.48	1000.000	222.0	H	156.0	14.0
12309.400000	36.82	---	54.00	17.18	1000.000	379.0	V	262.0	17.1
12309.400000	---	47.06	74.00	26.94	1000.000	379.0	V	262.0	17.1
14772.200000	36.73	---	54.00	17.27	1000.000	397.0	H	310.0	17.7
14772.200000	---	47.84	74.00	26.16	1000.000	397.0	H	310.0	17.7
16157.000000	40.04	---	54.00	13.96	1000.000	318.0	H	206.0	20.6
16157.000000	---	50.53	74.00	23.47	1000.000	318.0	H	206.0	20.6
17234.600000	---	50.79	74.00	23.21	1000.000	279.0	V	218.0	21.0
17234.600000	39.82	---	54.00	14.18	1000.000	279.0	V	218.0	21.0

802.11g Channel 11 Radiated Spurs

Worst Case Spurious Measurements (802.11g Mode)

Frequency (MHz)	Average (dBμV/m)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2390.000000	---	58.93	74.00	15.07	1000.000	410.0	V	180.0	37.7
2390.000000	43.49	---	54.00	10.51	1000.000	410.0	V	180.0	37.7

802.11g Low Band Edge

Frequency (MHz)	Average (dBμV/m)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2483.500000	---	54.94	74.00	19.06	1000.000	386.0	V	177.0	37.8
2483.500000	43.38	---	54.00	10.62	1000.000	386.0	V	177.0	37.8

802.11g High Band Edge

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Frequency (MHz)	Average (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
4823.400000	30.25	---	54.00	23.75	1000.000	401.0	V	0.0	7.5
4823.400000	---	41.07	74.00	32.93	1000.000	401.0	V	0.0	7.5
7235.400000	---	41.85	74.00	32.15	1000.000	256.0	H	134.0	10.4
7235.400000	31.44	---	54.00	22.56	1000.000	256.0	H	134.0	10.4
9648.600000	---	44.37	74.00	29.63	1000.000	221.0	H	304.0	13.6
9648.600000	33.74	---	54.00	20.26	1000.000	221.0	H	304.0	13.6
12060.200000	---	48.06	74.00	25.94	1000.000	212.0	V	247.0	17.4
12060.200000	37.01	---	54.00	16.99	1000.000	212.0	V	247.0	17.4
14472.200000	36.32	---	54.00	17.68	1000.000	369.0	V	157.0	17.2
14472.200000	---	46.79	74.00	27.21	1000.000	369.0	V	157.0	17.2
16884.200000	40.63	---	54.00	13.37	1000.000	312.0	V	215.0	21.7
16884.200000	---	50.54	74.00	23.46	1000.000	312.0	V	215.0	21.7
17924.400000	41.09	---	54.00	12.91	1000.000	226.0	H	194.0	22.2
17924.400000	---	51.93	74.00	22.07	1000.000	226.0	H	194.0	22.2

802.11n Channel 1 Radiated Spurs

Frequency (MHz)	Average (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
4874.200000	---	40.92	74.00	33.08	1000.000	236.0	V	0.0	7.4
4874.200000	29.83	---	54.00	24.17	1000.000	236.0	V	0.0	7.4
7310.400000	31.43	---	54.00	22.57	1000.000	223.0	H	140.0	10.5
7310.400000	---	41.91	74.00	32.09	1000.000	223.0	H	140.0	10.5
9747.400000	---	44.18	74.00	29.82	1000.000	246.0	V	311.0	13.7
9747.400000	33.76	---	54.00	20.24	1000.000	246.0	V	311.0	13.7
12186.000000	37.07	---	54.00	16.93	1000.000	274.0	V	131.0	17.2
12186.000000	---	48.97	74.00	25.03	1000.000	274.0	V	131.0	17.2
14622.200000	36.28	---	54.00	17.72	1000.000	218.0	V	186.0	17.3
14622.200000	---	47.00	74.00	27.00	1000.000	218.0	V	186.0	17.3
16264.600000	40.28	---	54.00	13.72	1000.000	98.0	V	156.0	20.7
16264.600000	---	51.78	74.00	22.22	1000.000	98.0	V	156.0	20.7
17059.600000	---	51.24	74.00	22.76	1000.000	297.0	H	248.0	21.4
17059.600000	40.19	---	54.00	13.81	1000.000	297.0	H	248.0	21.4

802.11n Channel 6 Radiated Spurs

Frequency (MHz)	Average (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
4923.400000	---	38.88	74.00	35.12	1000.000	306.0	V	224.0	7.3
4923.400000	28.74	---	54.00	25.26	1000.000	306.0	V	224.0	7.3
7385.000000	---	43.04	74.00	30.96	1000.000	336.0	V	176.0	10.7
7385.000000	31.19	---	54.00	22.81	1000.000	336.0	V	176.0	10.7
9847.400000	---	46.05	74.00	27.95	1000.000	259.0	V	218.0	14.0
9847.400000	34.16	---	54.00	19.84	1000.000	259.0	V	218.0	14.0
12309.800000	---	47.63	74.00	26.37	1000.000	341.0	V	251.0	17.1
12309.800000	37.01	---	54.00	16.99	1000.000	341.0	V	251.0	17.1
14771.800000	---	48.15	74.00	25.85	1000.000	373.0	V	0.0	17.7
14771.800000	37.09	---	54.00	16.91	1000.000	373.0	V	0.0	17.7
16805.200000	---	51.42	74.00	22.58	1000.000	245.0	V	201.0	21.5
16805.200000	40.81	---	54.00	13.19	1000.000	245.0	V	201.0	21.5
17233.000000	---	50.44	74.00	23.56	1000.000	402.0	V	214.0	21.0
17233.000000	39.63	---	54.00	14.37	1000.000	402.0	V	214.0	21.0

802.11n Channel 11 Radiated Spurs

Worst Case Spurious Measurements (802.11n Mode)

Frequency (MHz)	Average (dBμV/m)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2390.000000	---	55.06	74.00	18.94	1000.000	407.0	V	184.0	37.7
2390.000000	43.56	---	54.00	10.44	1000.000	407.0	V	184.0	37.7

802.11n Low Band Edge

Frequency (MHz)	Average (dBμV/m)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2483.500000	42.22	---	54.00	11.78	1000.000	400.0	H	284.0	37.8
2483.500000	---	53.03	74.00	20.97	1000.000	400.0	H	284.0	37.8

802.11n High Band Edge

9 Radiated Spurious Emissions (Receiver)

9.1 Test Limits

§ 15.109: Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of emission (MHz)	Field strength (microvolts/meter)	Field strength (dBuV/m)
30–88	100	40
88–216	150	43.5
216–960	200	46
Above 960	500	54

These limits are identical to those in RSS-GEN

9.2 Test Procedure

ANSI C63.4: 2009

9.3 Example of Field Strength Calculation Method:

The measured field strength was calculated by summing the readings taken from the spectrum analyzer with the appropriate correction factors associated with the antenna losses and cable losses. The calculation formula and sample calculations are listed below:

Formula:

$$FS = RA + AF + CF$$

FS = Field Strength in dBμV/m

RA = Receiver Amplitude in dBμV

AF = Antenna Factor in dB

CF = Cable Attenuation Factor in dB (Including preamplifier and filter attenuation)

Example Calculation:

$$RA = 19.48 \text{ dB}\mu\text{V}$$

$$AF = 18.52 \text{ dB}$$

$$CF = 0.78 \text{ dB}$$

$$FS = 19.48 + 18.52 + 0.78 = 38.78 \text{ dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(38.78 \text{ dB}\mu\text{V/m})/20] = 86.89 \mu\text{V/m}$$

9.4 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMI Test Receiver	1302.6005.40	Rohde & Schwarz	ESU40	9/17/2014	9/17/2015
Preamplifier	122005	Rohde&Schwarz	TS-PR18	11/26/2014	11/26/2015
Bilog Antenna	2564	Schaffner	CBL6111C	4/21/2014	4/21/2015
Horn Antenna	00156319	ETS	3117	5/2/2014	5/2/2015
System Controller	121701-1	Sunol Sciences	SC99V	Time of Use	Time of Use
EMC Software	Version 9.15.02	Rohde&Schwarz	EMC32	Time of Use	Time of Use

9.5 Results:

All spurious emissions with the test sample in receive mode were below the limits specified in Part 15.109 for a class B digital device and RSS-GEN Section 6.1. All peak detected emissions were at least 12dB below the limit.

Frequency (MHz)	Average (dB μ V/m)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
4823.400000	---	41.79	74.00	32.21	1000.000	376.0	V	0.0	7.5
4823.400000	30.37	---	54.00	23.63	1000.000	376.0	V	0.0	7.5
7235.800000	---	42.70	74.00	31.30	1000.000	268.0	V	143.0	10.4
7235.800000	31.50	---	54.00	22.50	1000.000	268.0	V	143.0	10.4
9648.200000	33.81	---	54.00	20.19	1000.000	238.0	V	230.0	13.6
9648.200000	---	44.36	74.00	29.64	1000.000	238.0	V	230.0	13.6
12061.000000	---	47.78	74.00	26.22	1000.000	230.0	V	144.0	17.4
12061.000000	37.32	---	54.00	16.68	1000.000	230.0	V	144.0	17.4
14471.000000	---	48.14	74.00	25.86	1000.000	211.0	H	256.0	17.2
14471.000000	36.10	---	54.00	17.90	1000.000	211.0	H	256.0	17.2
16884.200000	40.53	---	54.00	13.47	1000.000	384.0	H	230.0	21.7
16884.200000	---	50.74	74.00	23.26	1000.000	384.0	H	230.0	21.7
17999.400000	---	51.89	74.00	22.11	1000.000	406.0	V	194.0	23.0
17999.400000	41.67	---	54.00	12.33	1000.000	406.0	V	194.0	23.0

802.11rx Channel 1 Radiated Spurs

10 AC Powerline Conducted Emissions

10.1 Test Limits

§ 15.107(e): Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission (MHz)	Conducted limit (dBµV)	
	Quasi-peak	Average
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

*Decreases with the logarithm of the frequency.

10.2 Test Procedure

ANSI C63.4: 2009

10.3 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMI Test Receiver	10887490.26	Rohde & Schwarz	ESI26	8/22/2014	8/22/2015
LISN	3333	Teseq	NNB52	3/12/2014	3/12/2015

10.4 Results:

Quasi-Peak and Average Measurements (802.11b,g,n Mode)

Mode: 802.11b

Conducted Voltage Emissions on Power Lines								
Test Engineer:	Carmen Davis		Start Date:	1.21.2015		End Date:	1.21.2015	
Temperature:	21.9C		Humidity:	27.50%		Pressure:	968.51	
Specification:	FCC Part 15		Test Limit:	Class B		RBW:	9kHz	
Notes:	802.11b scans							
Line	Frequency (MHz)	Quasi-Peak (dBuV)	Quasi-Peak Limit (dBuV)	Quasi-Peak Delta (dB)	Average (dBuV)	Average Limit (dBuV)	Average Delta (dB)	Results
Line	150.500 KHz	45.352	65.986	-20.634	21.824	55.986	-34.162	Compliant
Line	171.000 KHz	42.382	65.4	-23.018	17.807	55.4	-37.593	Compliant
Line	197.600 KHz	49.015	64.64	-15.625	33.207	54.64	-21.433	Compliant
Line	219.500 KHz	36.145	64.014	-27.87	15.362	54.014	-38.652	Compliant
Line	235.800 KHz	34.853	63.549	-28.696	14.472	53.549	-39.077	Compliant
Line	253.100 KHz	37.683	63.054	-25.372	20.471	53.054	-32.583	Compliant
Line	264.700 KHz	39.739	62.723	-22.984	24.347	52.723	-28.376	Compliant
Line	292.300 KHz	30.808	61.934	-31.126	12.002	51.934	-39.932	Compliant
Line	332.200 KHz	36.874	60.794	-23.92	21.311	50.794	-29.483	Compliant
Line	15.495 MHz	26.438	60	-33.562	20.67	50	-29.33	Compliant
Neutral	151.200 KHz	54.755	65.966	-11.211	36.214	55.966	-19.752	Compliant
Neutral	344.200 KHz	31.342	60.451	-29.11	13.359	50.451	-37.093	Compliant
Neutral	355.800 KHz	31.879	60.12	-28.241	16.59	50.12	-33.53	Compliant
Neutral	382.400 KHz	31.423	59.36	-27.937	15.722	49.36	-33.638	Compliant
Neutral	405.000 KHz	28.848	58.714	-29.867	12.853	48.714	-35.861	Compliant
Neutral	449.200 KHz	26.78	57.451	-30.671	11.48	47.451	-35.971	Compliant
Neutral	465.800 KHz	27.849	56.977	-29.128	11.61	46.977	-35.367	Compliant
Neutral	526.700 KHz	22.237	56	-33.763	10.419	46	-35.581	Compliant
Neutral	540.500 KHz	22.01	56	-33.99	8.591	46	-37.409	Compliant
Neutral	10.620 MHz	11.316	60	-48.684	7.262	50	-42.738	Compliant

Mode: 802.11g

Conducted Voltage Emissions on Power Lines											
Test Engineer:		Carmen Davis		Start Date:		1.21.2015		End Date:		1.21.2015	
Temperature:		21.9C		Humidity:		27.50%		Pressure:		968.51	
Specification:		FCC Part 15		Test Limit:		Class B		RBW:		9kHz	
Notes:		802.11g scans									
Line	Frequency (MHz)	Quasi-Peak (dBuV)	Quasi-Peak Limit (dBuV)	Quasi-Peak Delta (dB)	Average (dBuV)	Average Limit (dBuV)	Average Delta (dB)	Results			
Line	161.700 KHz	54.514	65.666	-11.151	39.435	55.666	-16.231	Compliant			
Line	235.700 KHz	42.598	63.551	-20.953	18.775	53.551	-34.777	Compliant			
Line	247.800 KHz	41.558	63.206	-21.648	26.175	53.206	-27.03	Compliant			
Line	373.800 KHz	34.009	59.606	-25.597	17.299	49.606	-32.307	Compliant			
Line	378.000 KHz	33.892	59.486	-25.593	12.933	49.486	-36.552	Compliant			
Line	656.000 KHz	22.471	56	-33.529	7.441	46	-38.559	Compliant			
Line	13.334 MHz	18.532	60	-41.468	12.142	50	-37.858	Compliant			
Line	14.852 MHz	25.514	60	-34.486	17.218	50	-32.782	Compliant			
Line	15.053 MHz	25.517	60	-34.483	17.531	50	-32.469	Compliant			
Line	15.483 MHz	24.39	60	-35.61	17.148	50	-32.852	Compliant			
Neutral	151.100 KHz	46.913	65.969	-19.055	36.563	55.969	-19.406	Compliant			
Neutral	166.900 KHz	51.808	65.517	-13.709	34.884	55.517	-20.633	Compliant			
Neutral	188.400 KHz	44.975	64.903	-19.928	24.845	54.903	-30.058	Compliant			
Neutral	195.900 KHz	47.56	64.689	-17.128	31.678	54.689	-23.011	Compliant			
Neutral	262.900 KHz	34.534	62.774	-28.24	15.731	52.774	-37.043	Compliant			
Neutral	279.100 KHz	35.733	62.311	-26.578	20.599	52.311	-31.712	Compliant			
Neutral	290.300 KHz	32.585	61.991	-29.406	16.457	51.991	-35.534	Compliant			
Neutral	303.500 KHz	32.689	61.614	-28.926	16.237	51.614	-35.378	Compliant			
Neutral	305.600 KHz	33.402	61.554	-28.152	19.191	51.554	-32.363	Compliant			

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Issued: 4/13/2015

Mode: 802.11n

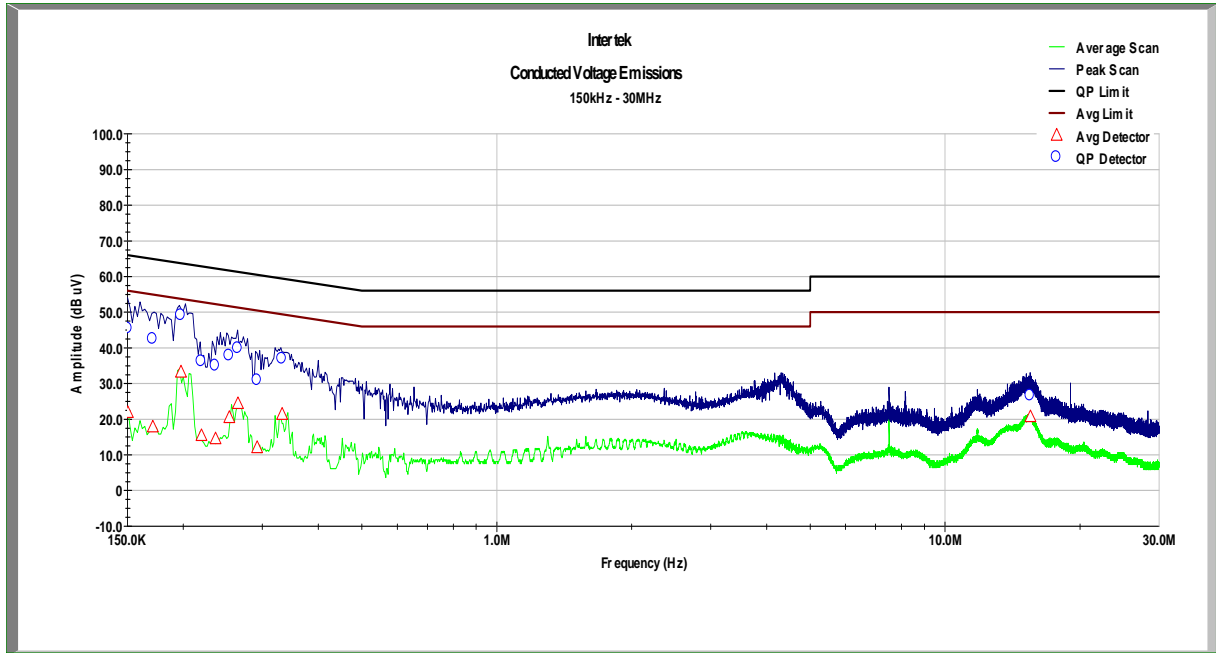
Conducted Voltage Emissions on Power Lines								
Test Engineer:	Carmen Davis		Start Date:	1.21.2015		End Date:	1.21.2015	
Temperature:	21.9C		Humidity:	27.50%		Pressure:	968.51	
Specification:	FCC Part 15		Test Limit:	Class B		RBW:	9kHz	
Notes:	802.11n scans							
Line	Frequency (MHz)	Quasi-Peak (dBuV)	Quasi-Peak Limit (dBuV)	Quasi-Peak Delta (dB)	Average (dBuV)	Average Limit (dBuV)	Average Delta (dB)	Results
Line	150.400 KHz	54.583	65.989	-11.406	32.563	55.989	-23.426	Compliant
Line	264.600 KHz	35.038	62.726	-27.688	15.346	52.726	-37.379	Compliant
Line	285.000 KHz	35.04	62.143	-27.102	20.123	52.143	-32.02	Compliant
Line	351.800 KHz	29.695	60.234	-30.539	13.792	50.234	-36.443	Compliant
Line	361.400 KHz	31.224	59.96	-28.736	16.128	49.96	-33.832	Compliant
Line	14.955 MHz	23.818	60	-36.182	16.693	50	-33.307	Compliant
Line	15.033 MHz	23.719	60	-36.281	16.879	50	-33.121	Compliant
Line	15.198 MHz	23.916	60	-36.084	16.581	50	-33.419	Compliant
Line	15.355 MHz	23.414	60	-36.586	16.505	50	-33.495	Compliant
Line	18.577 MHz	16.291	60	-43.709	11.02	50	-38.98	Compliant
Neutral	155.000 KHz	50.221	65.857	-15.636	30.57	55.857	-25.287	Compliant
Neutral	156.000 KHz	46.756	65.829	-19.073	24.032	55.829	-31.796	Compliant
Neutral	166.400 KHz	52.231	65.531	-13.301	34.969	55.531	-20.563	Compliant
Neutral	257.500 KHz	36.482	62.929	-26.446	20.072	52.929	-32.857	Compliant
Neutral	276.500 KHz	35.874	62.386	-26.511	20.404	52.386	-31.981	Compliant
Neutral	289.500 KHz	31.947	62.014	-30.068	15.574	52.014	-36.44	Compliant
Neutral	304.900 KHz	33.857	61.574	-27.717	18.67	51.574	-32.904	Compliant
Neutral	316.800 KHz	30.425	61.234	-30.81	15.475	51.234	-35.759	Compliant
Neutral	318.400 KHz	30.066	61.189	-31.122	17.11	51.189	-34.078	Compliant
Neutral	386.700 KHz	30.604	59.237	-28.634	14.277	49.237	-34.96	Compliant

Quasi-Peak and Average Measurements (Receive Mode)

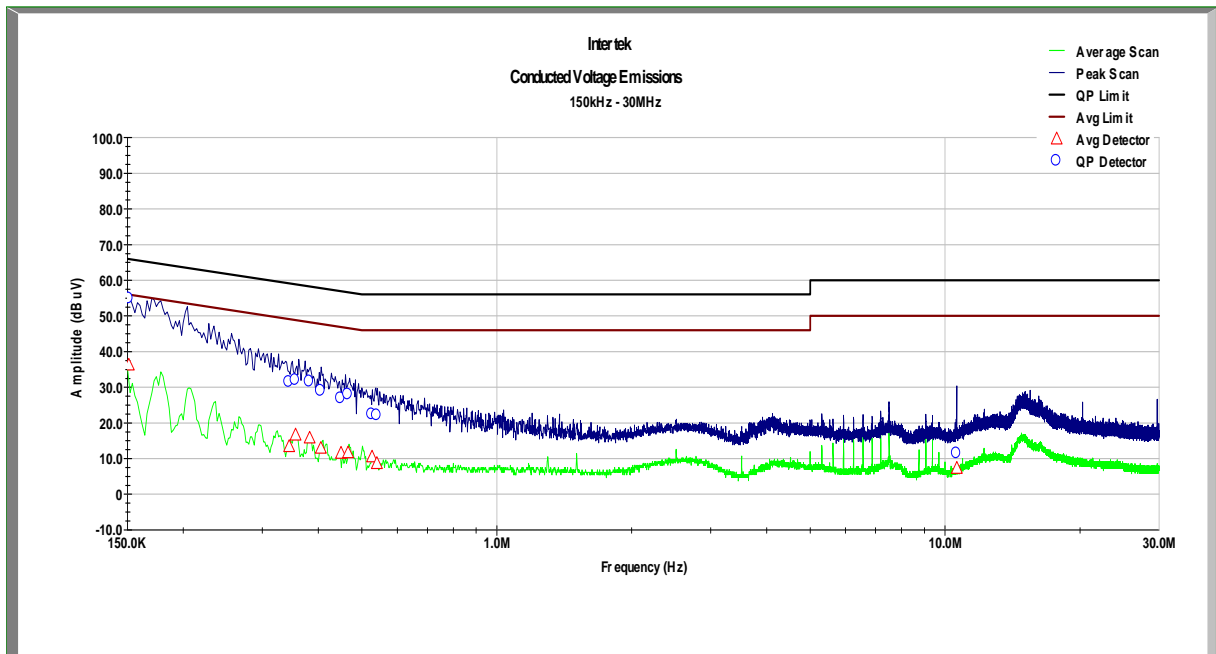
Mode: 802.11 receive

Conducted Voltage Emissions on Power Lines								
Test Engineer:	Carmen Davis		Start Date:	1.21.2015		End Date:	1.21.2015	
Temperature:	21.9C		Humidity:	27.50%		Pressure:	968.51	
Specification:	FCC Part 15		Test Limit:	Class B		RBW:	9kHz	
Notes:	802.11 rx scans							
Line	Frequency (MHz)	Quasi-Peak (dBuV)	Quasi-Peak Limit (dBuV)	Quasi-Peak Delta (dB)	Average (dBuV)	Average Limit (dBuV)	Average Delta (dB)	Results
Line	153.600 KHz	53.839	65.897	-12.058	37.768	55.897	-18.129	Compliant
Line	264.100 KHz	36.505	62.74	-26.235	17.582	52.74	-35.158	Compliant
Line	275.400 KHz	35.851	62.417	-26.566	19.013	52.417	-33.404	Compliant
Line	326.200 KHz	32.204	60.966	-28.762	16.533	50.966	-34.433	Compliant
Line	332.100 KHz	33.087	60.797	-27.71	18.237	50.797	-32.56	Compliant
Line	378.800 KHz	30.117	59.463	-29.346	14.462	49.463	-35.001	Compliant
Line	388.800 KHz	29.887	59.177	-29.29	16.187	49.177	-32.99	Compliant
Line	458.200 KHz	28.584	57.194	-28.61	13.419	47.194	-33.775	Compliant
Line	464.200 KHz	28.253	57.023	-28.77	13.923	47.023	-33.099	Compliant
Line	13.047 MHz	16.945	60	-43.055	11.104	50	-38.896	Compliant
Neutral	150.600 KHz	54.18	65.983	-11.802	37.813	55.983	-18.17	Compliant
Neutral	170.100 KHz	45.918	65.426	-19.508	24.814	55.426	-30.612	Compliant
Neutral	178.600 KHz	50.756	65.183	-14.426	34.452	55.183	-20.73	Compliant
Neutral	306.700 KHz	34.593	61.523	-26.93	20.76	51.523	-30.763	Compliant
Neutral	330.000 KHz	32.792	60.857	-28.065	17.888	50.857	-32.969	Compliant
Neutral	356.200 KHz	32.135	60.109	-27.974	18.98	50.109	-31.129	Compliant
Neutral	382.300 KHz	31.345	59.363	-28.018	17.969	49.363	-31.394	Compliant
Neutral	429.000 KHz	25.561	58.029	-32.467	12.631	48.029	-35.398	Compliant
Neutral	458.700 KHz	29.892	57.18	-27.288	16.489	47.18	-30.691	Compliant

Peak Scan (Line 1 and 2) – 802.11b Mode

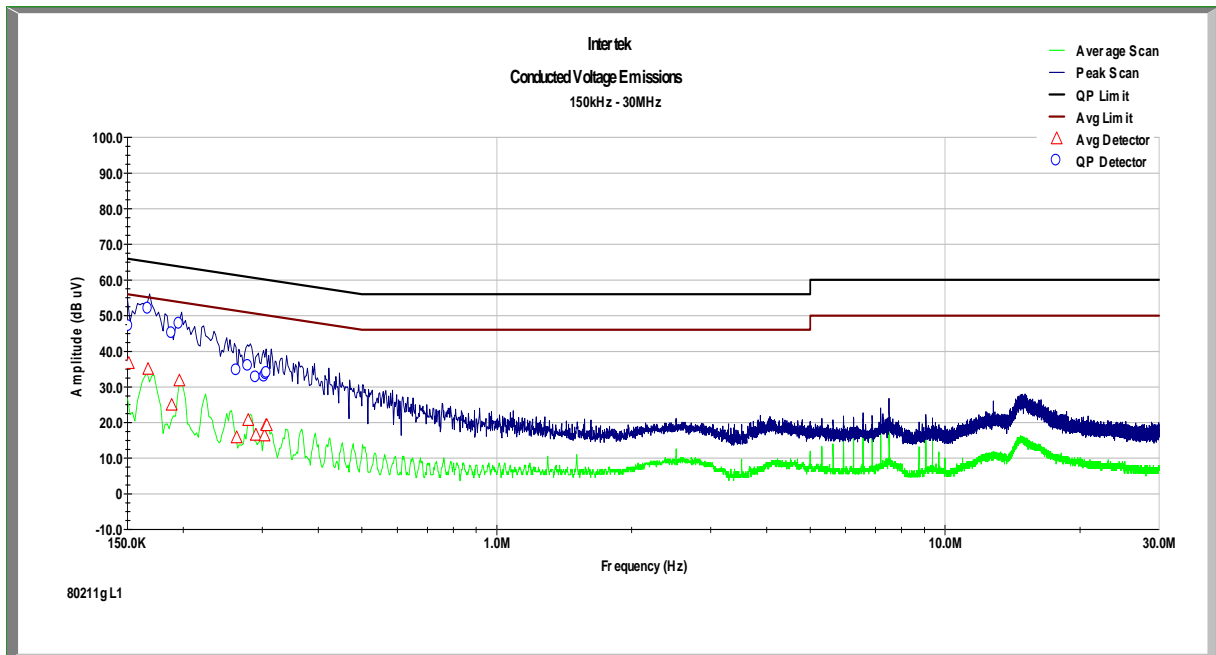


Line 1

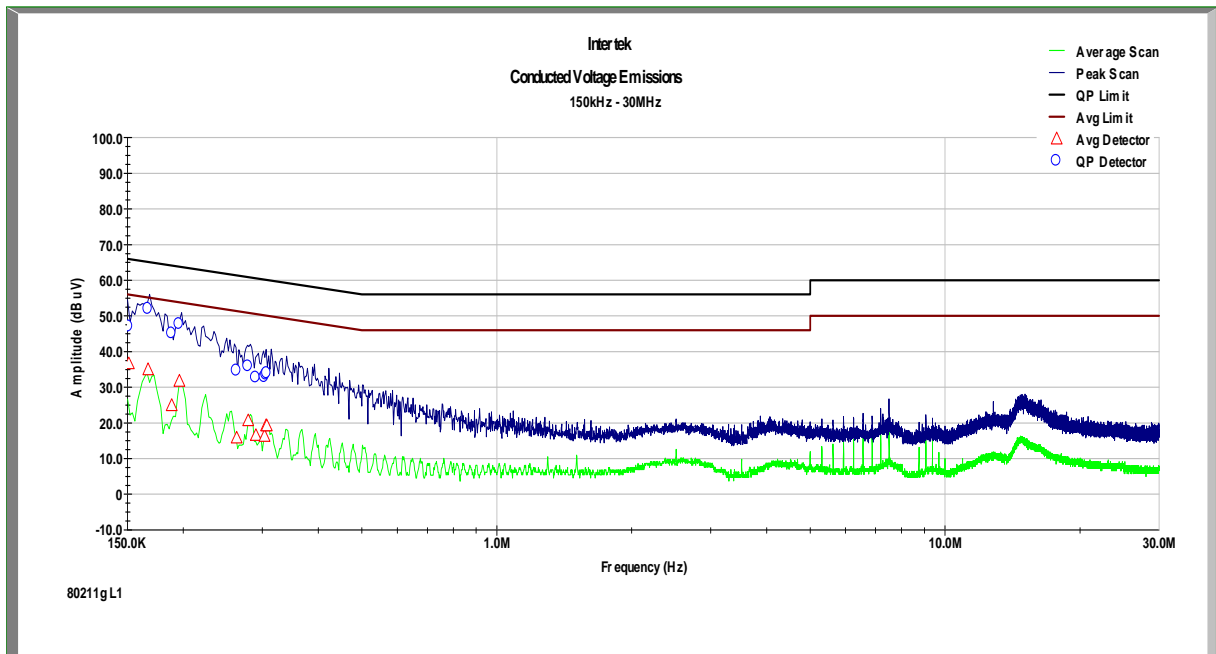


Neutral

Peak Scan (Line 1 and 2) – 802.11g Mode

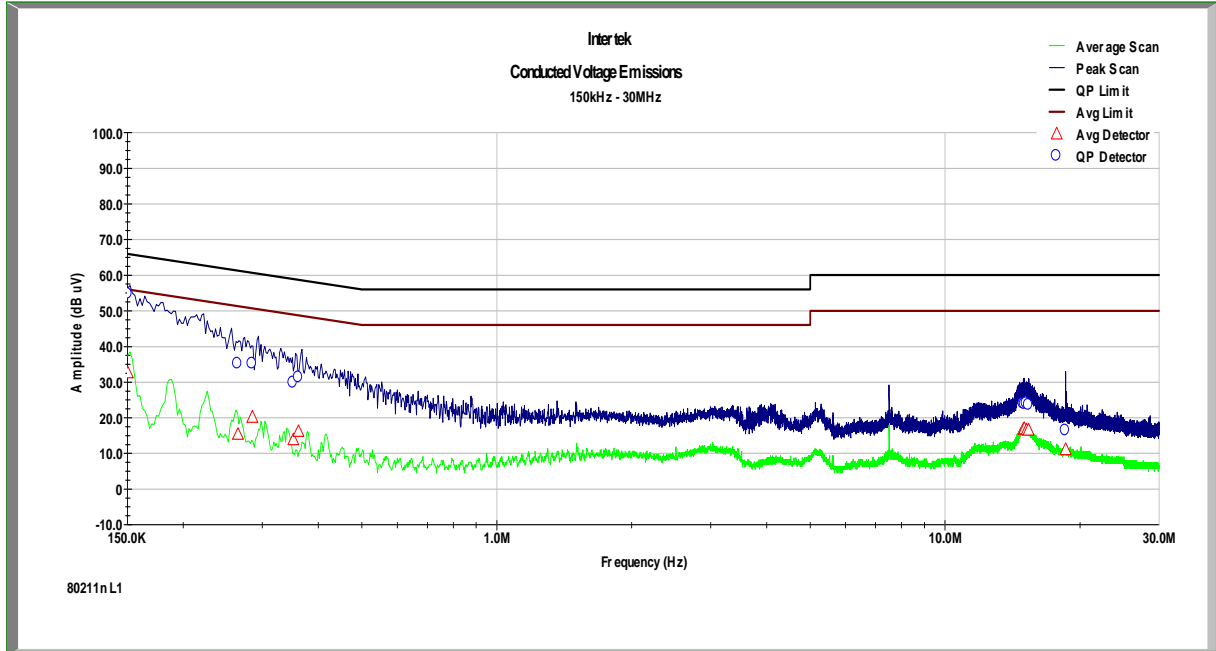


Line 1

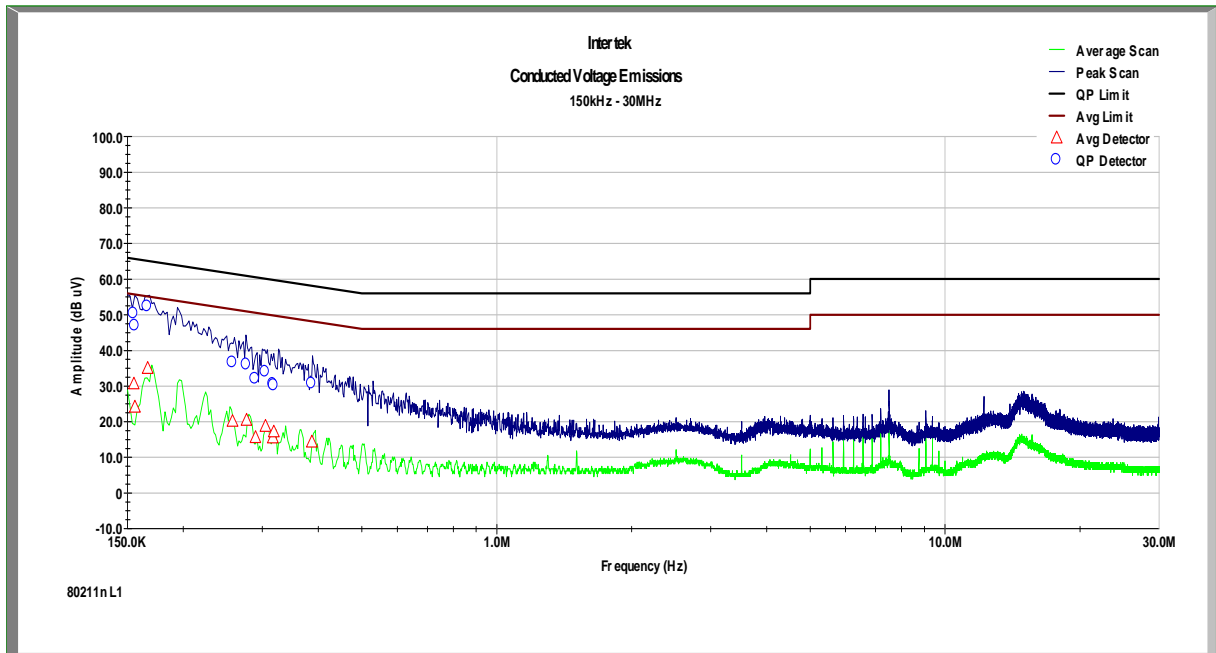


Neutral

Peak Scan (Line 1 and 2) – 802.11n Mode

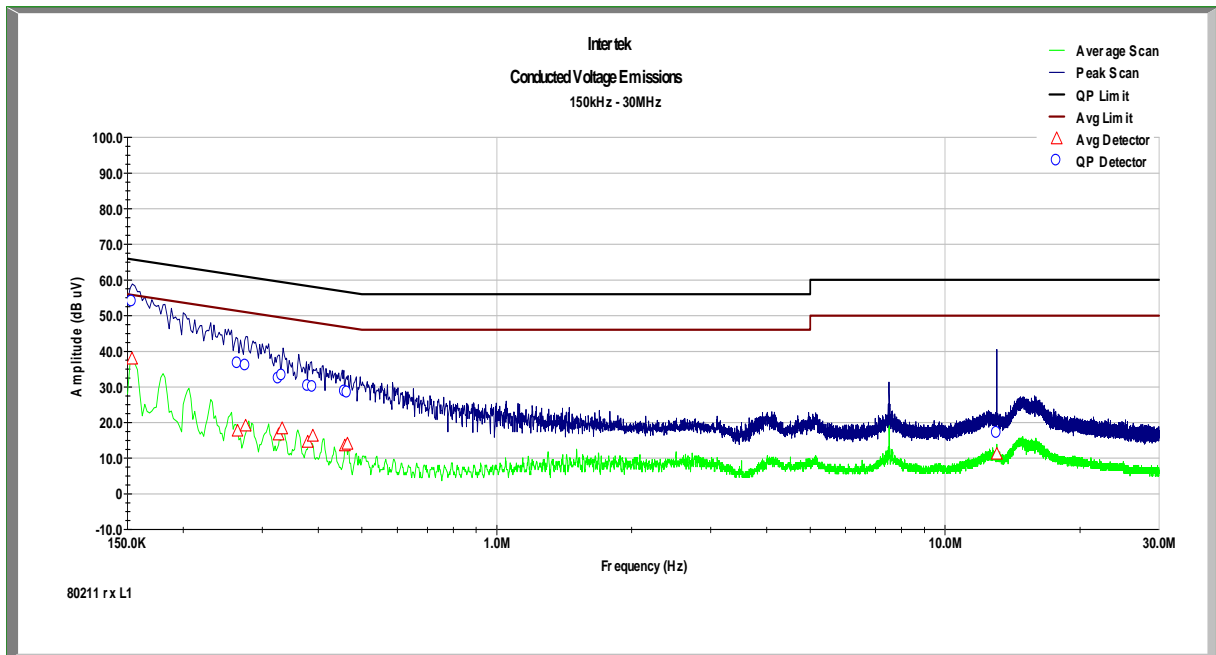


Line 1

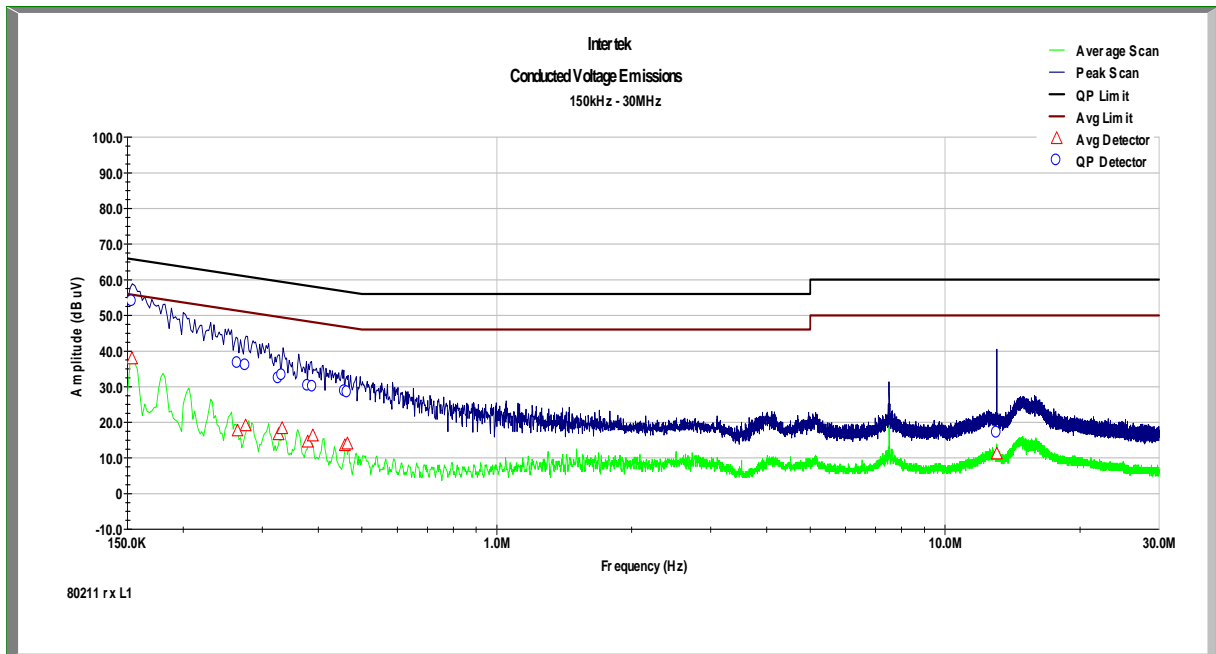


Neutral

Peak Scan (Line 1 and 2) – Receive Mode



Line 1



Neutral

11 Antenna Requirement per FCC Part 15.203

11.1 Test Limits

§ 15.203: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

11.2 Results:

The sample tested met the antenna requirement. The antenna used was permanently attached and integral to the PCB.

12 Measurement Uncertainty

The measured value related to the corresponding limit will be used to decide whether the equipment meets the requirements.

The measurement uncertainty figures were calculated and correspond to a coverage factor of $k = 2$, providing a confidence level of respectively 95.45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian).

Measurement uncertainty Table

Parameter	Uncertainty	Notes
Radiated emissions, 30 to 1000 MHz	<u>+3.9dB</u>	
Radiated emissions, 1 to 18 GHz	<u>+4.2dB</u>	
Radiated emissions, 18 to 40 GHz	<u>+4.3dB</u>	
Power Port Conducted emissions, 150kHz to 30 MHz	<u>+2.8dB</u>	

Intertek

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13 Revision History

Revision Level	Date	Report Number	Notes
0	4/13/2015	101968322LEX-001	Original Issue