



Radio Intentional EMC Test Report: EDCS - 1261389

For

2.4GHz WLAN Radio 802.1 b/g

M/N : 73-15453-03

To be installed in Cisco ASR 901S Series Aggregation Services Routers

Against the following Specifications :

47 CFR 15.247

RSS-210

RSS-102

Cisco Systems

EMC Laboratory

170 West Tasman Drive

San Jose, CA 95134



Testing - Certificate Number : 1178-01

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Title: Manager

This report replaces any previously entered test report under EDCS - **1261389**

Radio Intentional Test Report No: **EDCS - 1261389**

FCC ID: LDKAGORA0916

IC ID : 2461B-AGORA0916





This test report has been electronically authorized and archived using the CISCO Engineering Document Control system.

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Section 1: Overview

Test Summary

The samples were assessed against the tests detailed in section 3 under the requirements of the following standards:

Emissions:

CFR47 Part 15.247

RSS-210

RSS102

Section 2: Assessment Information

2.1 General

This report must not be used to claim product certification, approval, or endorsement by A2LA, NIST, or any agency of the federal Government.

With regard to this assessment, the following points should be noted:

- a) The results contained in this report relate only to the items tested and were obtained in the period between the date of the initial assessment and the date of issue of the report. Manufactured products will not necessarily give identical results, due to production tolerances and measurement uncertainties.
- b) The apparatus was set up and exercised using the configuration and modes of operation defined in this report only.
- c) Where relevant, the apparatus was only assessed using the susceptibility criteria defined in this report and the Test Assessment Plan (TAP).
- d) All testing was performed under the following environmental conditions:

Temperature	15°C to 35°C (54°F to 95°F)
Atmospheric Pressure	860mbar to 1060mbar (25.4" to 31.3")
Humidity	10% to 75*%
- e) All AC testing was performed at one or more of the following supply voltages:

110V (+/-10%) 60Hz

- f) Cisco Systems, Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). The scope of accreditation, certificate number 1178-01 is referenced in appendix E, along with further details.

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2.2 Start Date of Testing

September 06, 2013

2.3 Report Issue Date

Cisco Systems, Inc. uses an electronic system to issue, store and control the revision of test reports. This system is called the Engineering Document Control System (EDCS). The actual report issue date is embedded into the original file on EDCS. Any copies of this report, either electronic or paper, that are not on EDCS must be considered uncontrolled

2.4 Testing facilities

This assessment was performed by:

Testing Laboratory

Cisco Systems, Inc.,
170 West Tasman Drive
San Jose, CA 95134,
USA

Registration Numbers for Industry Canada

Cisco System Site	Site Identifier
Building P, 10m Chamber	Company #: 2461N-2
Building P, 5m Chamber	Company #: 2461N-1
Building I, 5m Chamber	Company #: 2461M-1

Test Engineers

Jose Aguirre

2.5 Equipment Assessed (EUT)

2.4GHz WLAN Radio PCIe card, 802.11 b/g
M/N: 73-15453-03

2.6 EUT Description

A 2.4GHz WLAN mini PCIe card operating in IEEE 802.11 b/g. (Not a PC peripheral)

This will be installed in ASR901 series router models to support wireless local management port.

A901S-4SG-F-D

A901S-3SG-F-D

A901S-2SG-D

A901S-3SG-F-AH

A901S-2SG-F-AH

The modes are further defined in the radio Theory of operation. The modes included in this report represent the worst case data for all mode.

Legacy 802.11B, 1-11Mbps (1Mbps worst Case)

Legacy 802.11G, 6-54Mbps (6Mbps worst case)

The following Antenna(s) are supported by this product

Frequency	Part number	Antenna Type	Antenna Gain (dBi)
2400-2483.5MHz	07-1278-01	Omnidirectional	3.4

2.7 Scope of Assessment

Tests have been performed in accordance with the relevant Test and Assessment Plan (TAP), a copy of which is contained in Appendix D of this report, and the relevant Cisco Systems, Inc. radio test procedures (EDCS-420238). This test report may not cover all of the tests highlighted in the test plan.

2.8 Units of Measurement

The units of measurements defined in the appendices are reported in specific terms, which are test dependent. Where radiated measurements are concerned these are defined at a particular distance. Basic voltage measurements are defined in units of [dBuV]

As an example, the basic calculation for all measurements is as follows:

Emission level [dBuV] = Indicated voltage level [dBuV] + Cable Loss [dB] + Other correction factors [dB]

The combinations of correction factors are dependent upon the exact test configurations [see test equipment lists for further details] and may include:-

Antenna Factors, Pre Amplifier Gain, LISN Loss, Pulse Limiter Loss and Filter Insertion Loss..

Note: to convert the results from dBuV/m to uV/m use the following formula:-

Level in uV/m = Common Antilogarithm [(X dBuV/m)/20] = Y uV/m

Average detection—Average detection with a spectrum analyzer is obtained by reducing the video bandwidth until no further smoothing of the displayed signal is observed. The sweep time must be increased with reductions in video bandwidth to maintain amplitude calibration. For measurements in accordance with CISPR 16-1-1:2006 the video bandwidth shall be set to a 10 Hz value to ensure that the proper integration time is realized. For such



measurements, the instrument shall be used in the linear mode of the detector. After linear detection is made, the signal may be processed logarithmically for display, in which case the value is corrected even though it is the logarithm of the linearly detected signal.

2.9 Report Template Control No.

EDCS#: 703456

Section 3: Result Summary

3.1 Results Summary Table

Conducted emissions

Basic Standard	Test Procedure	Test Details / Comments	Result
Power Spectral Density	ANSI C63.10 KDB 558074	15.247: For digitally modulated systems, the peak 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. (RSS-210 A8.2)	Pass
Peak Output Power	ANSI C63.10 KDB 558074	15.247: The maximum conducted output power of the intentional radiator for systems using digital modulation in the 2400-2483.5MHz band shall not exceed 1 Watt (30dBm). If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. (RSS-210 A8.4)	Pass
6dB Bandwidth	ANSI C63.10 KDB 558074	15.247: Systems using digital modulation techniques may operate in the 5725-5850MHz band. The minimum 6 dB bandwidth shall be at least 500 kHz. (RSS-210 A8.2)	Pass
Conducted Spurious Emissions	ANSI C63.10 KDB 558074	15.247: In any 100 kHz bandwidth outside the frequency band in which the digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.(RSS-210 A8.5)	Pass
Band Edge Measurements	ANSI C63.10 KDB 558074	Emissions which fall in the restricted bands, as defined in Sec. 15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a). (RSS-210 Sec2.7)	Pass



Radiated emissions

Basic Standard	Test Procedure	Test Details / Comments	Result
Radiated Spurious and Harmonic Emissions	ANSI C63.10 KDB 558074	Radiated emissions which fall in the restricted bands, as defined in Sec. 15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a). (<i>RSS-210 Sec2.7</i>)	Pass

* MPE measurements reported in separate report. (see EDCS #: 1297610)



Section 4: Sample Details

Note: Each sample was evaluated to ensure that its condition was suitable to be used as a test sample prior to the commencement of testing. Please also refer to the “Justification for worst Case test Configuration” section of this report for further details on the selection of EUT samples.

4.1 Sample Details

Sample No.	Equipment Details	Part Number	Manufacturer	Serial Number
S01	2.4GHz WLAN Radio	73-15453-03	Cisco Systems	FOC1733N70F
S02	Test Jig PCIe extender	KZ-B22	BPlusTech	588072366
S03	Laptop PC	59359084	Lenovo	CB20498629

4.2 System Details

System #	Description	Samples
1	2.4GHz WLAN radio	S01
2	Support Host	S02, S03

4.3 Mode of Operation Details

Description	Comments
802.11b	1Mbps – 11Mbps rate (worst case mode 1Mbps)
802.11g	6Mbps – 54Mbps rate (worst case mode 6Mbps)

4.4 Antenna(s) supported

Frequency	Part Number	Antenna Type	Antenna Gain (dBi)
2.4 GHz	07-1278-01	Omni	3.4dBi



Section 5: Modifications

5.1 Sample Modifications Performed During Assessment

No modifications were performed during assessment.



Appendix A: Formal Test Results**Target Maximum Channel Power**

The following Table details the maximum supported total channel power for all operating modes

Operating modes	Maximum Channel Power (dBm)		
	Frequency (MHz)		
	2412	2437	2462
IEEE 802.11 b (1-11Mbps)	13	13	13
IEEE 802.11 g (6-54Mbps)	10	13	10

**6 dB Bandwidth**

The minimum 6 dB bandwidth shall be at least 500 kHz.

Connect the antenna port(s) to the spectrum analyzer input. Using the spectrum analyzer Channel Bandwidth mode, configure the spectrum analyzer as shown below (enter all losses between the transmitter output and the spectrum analyzer).

Center Frequency:	Frequency from table below
Span:	2 x Nominal Bandwidth (e.g. 40MHz for a 20MHz channel)
Reference Level:	20 dBm
Attenuation:	10 dB
Sweep Time:	5 s
Resolution Bandwidth:	100 kHz
Video Bandwidth:	100 kHz
X dB Bandwidth:	6 dB
Detector:	Peak
Trace:	Single

Place the radio in continuous transmit mode. View the transmitter waveform on the spectrum analyzer, and record the pertinent measurements:

Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (MHz)	Limit (MHz)	Margin (kHz)
2412	1	10.074	0.5	-9.574
2437	1	10.073	0.5	-9.573
2462	1	10.050	0.5	-9.55
2412	6	16.559	0.5	-16.059
2437	6	16.562	0.5	-16.062
2462	6	16.586	0.5	-16.086

26dB Bandwidth & 99% Bandwidth

Connect the antenna port(s) to the spectrum analyzer input. Using the spectrum analyzer Channel Bandwidth mode, configure the spectrum analyzer as shown below (enter all losses between the transmitter output and the spectrum analyzer).

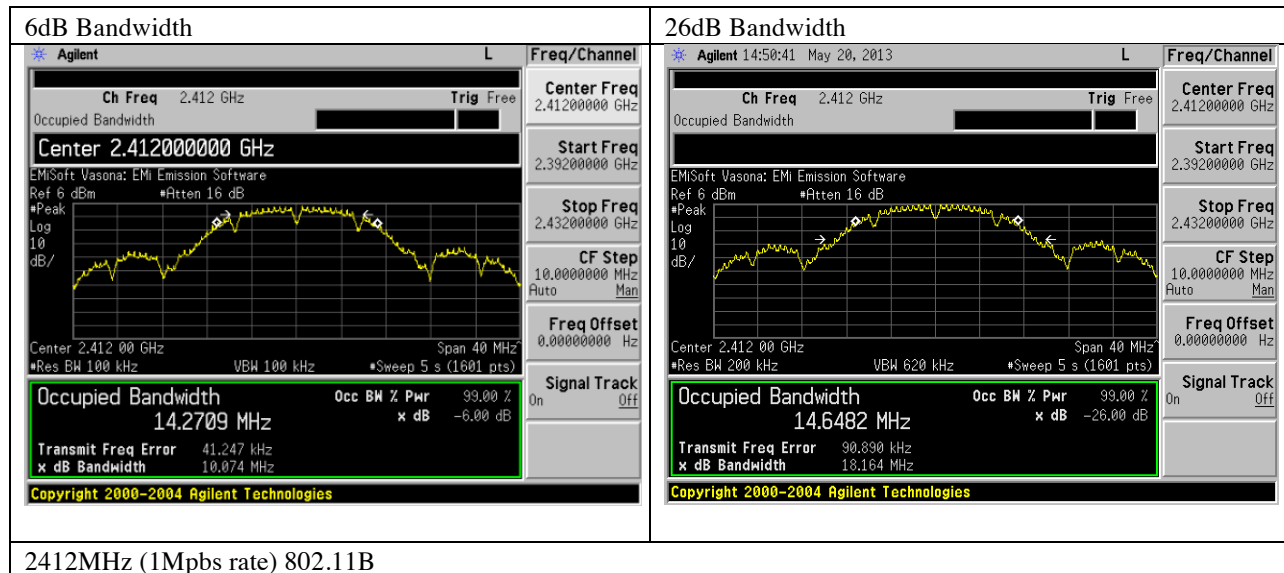
Center Frequency:	Frequency from table below
Span:	2 x Nominal Bandwidth (e.g. 40MHz for a 20MHz channel)
Reference Level:	10 dBm
Attenuation:	10 dB
Sweep Time:	5 s
Resolution Bandwidth:	1% - 3% of 26dB Bandwidth
Video Bandwidth:	≥ Resolution Bandwidth
X dB Bandwidth:	26 dB
Occ BW % :	99%
Detector:	Peak

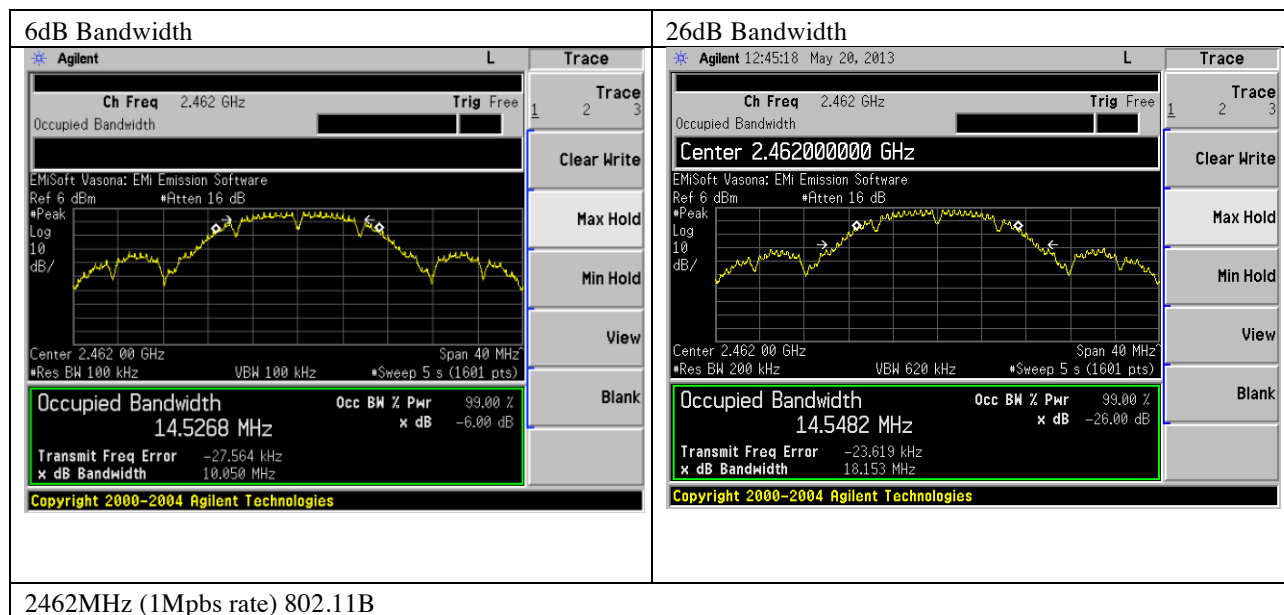
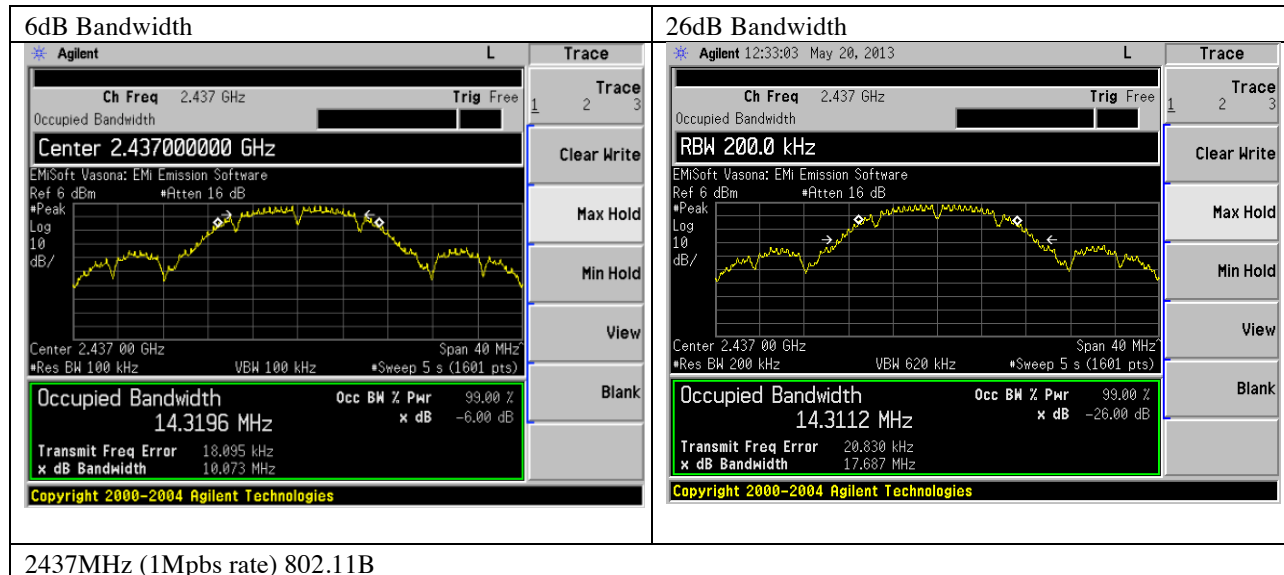


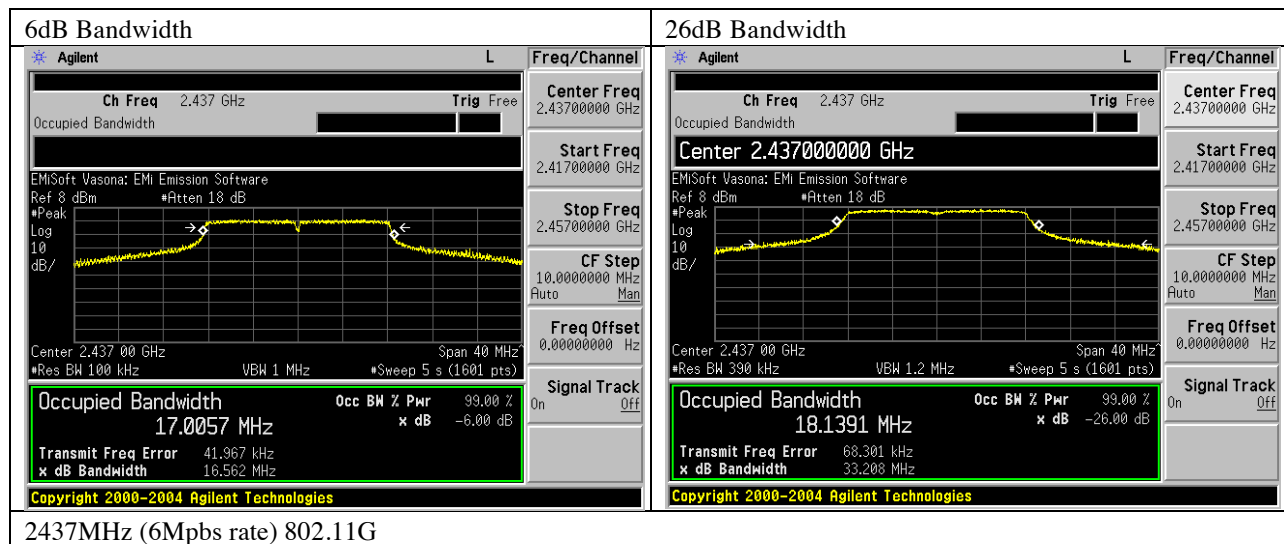
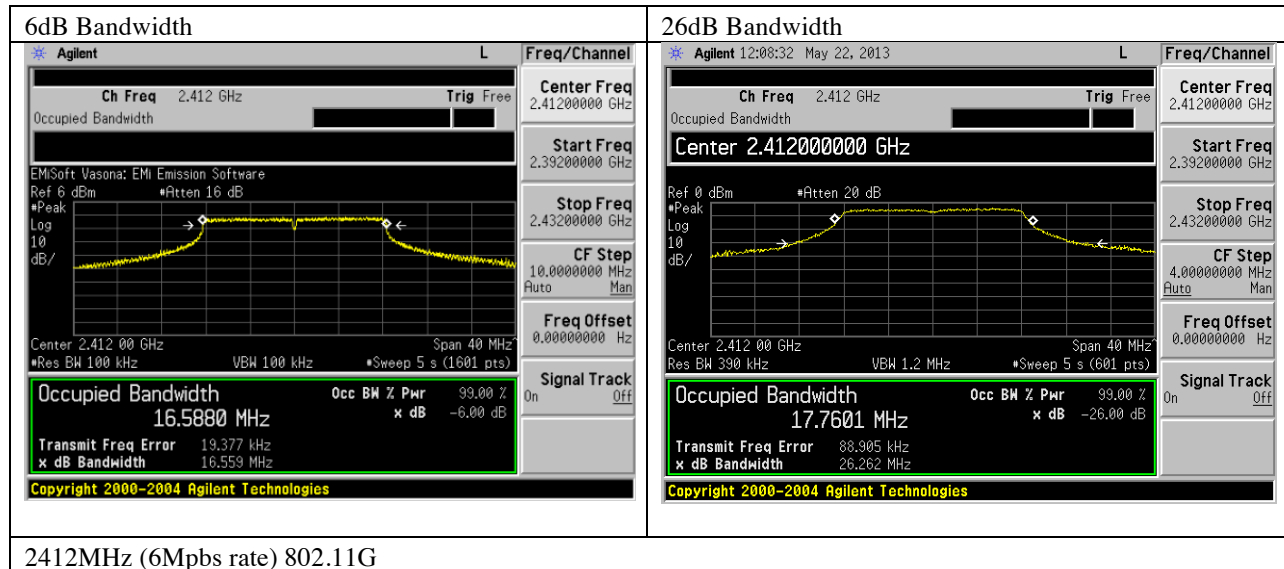
Trace: Single Max Hold

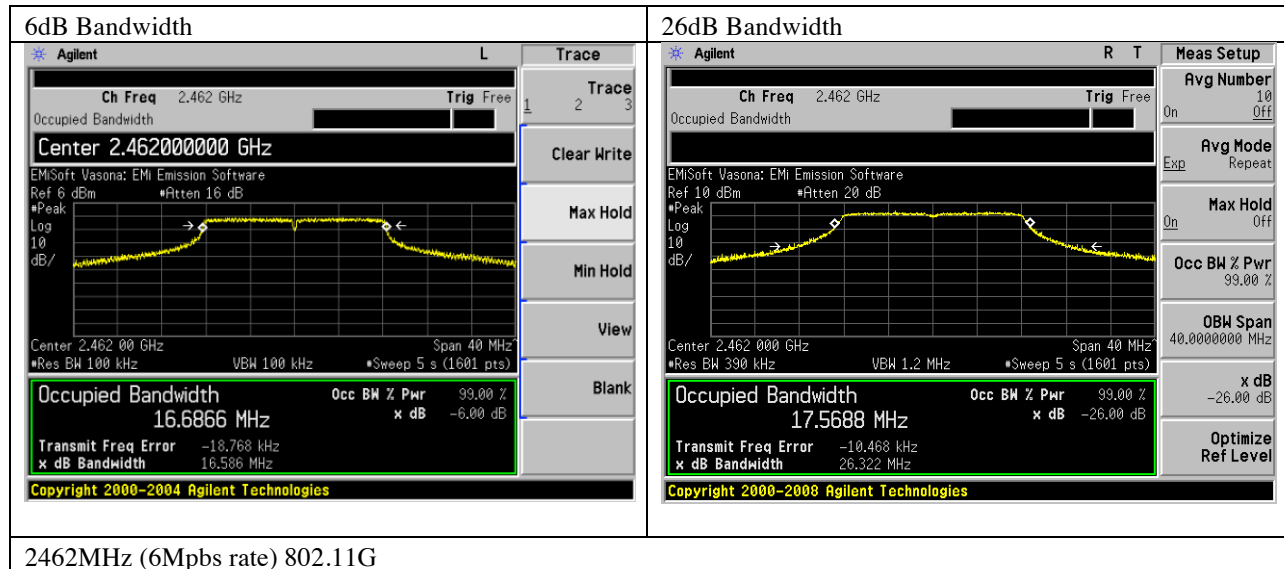
Place the radio in continuous transmit mode. View the transmitter waveform on the spectrum analyzer, and record the pertinent measurements:

Frequency (MHz)	Data Rate (Mbps)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
2412	1	18.164	14.6482
2437	1	17.687	14.3112
2462	1	18.153	14.5482
2412	6	26.262	17.7661
2437	6	33.208	18.1391
2462	6	26.322	17.568

Graphical Test Results







**Peak Output Power****15.247 & RSS-210 A8.4:**

The maximum conducted output power of the intentional radiator for systems using digital modulation in the 2400-2483.5MHz band shall not exceed 1 Watt (30dBm). If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum supported antenna gain is 3.4dBi.

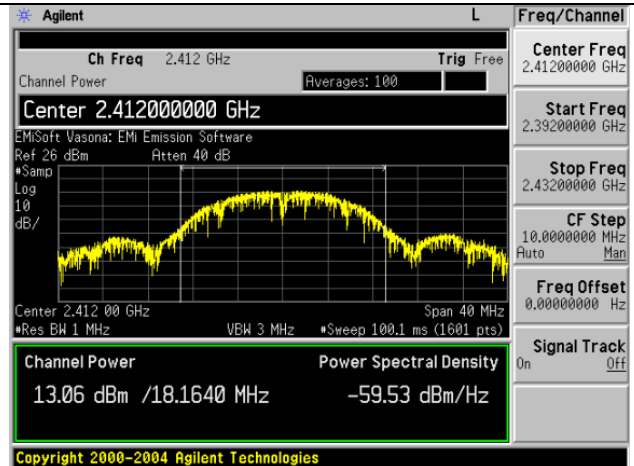
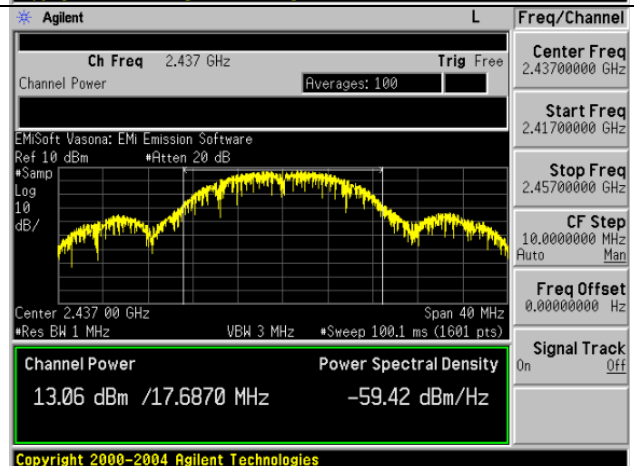
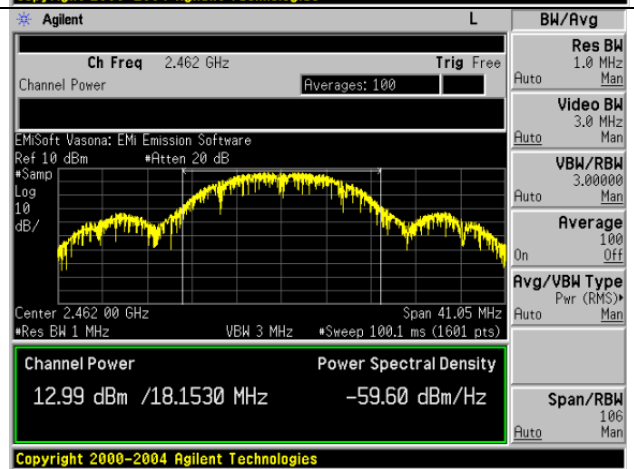
Connect the antenna port(s) to the spectrum analyzer input. Place the radio in continuous transmit mode. Configure the spectrum analyzer as shown below.

Enable "Channel Power" function of analyzer
Center Frequency: Frequency from table below
Span: 20 MHz (must be greater than 26dB bandwidth, adjust as necessary)
Ref Level Offset: Correct for attenuator and cable loss.
Reference Level: 20 dBm
Attenuation: 20 dB
Sweep Time: 100ms, Single sweep
Resolution Bandwidth: 1 MHz
Video Bandwidth: 3 MHz
Detector: Sample
Trace: Trace Average 100 traces in Power Averaging Mode
Integration BW: =26 dB BW from 26 dB Bandwidth Data

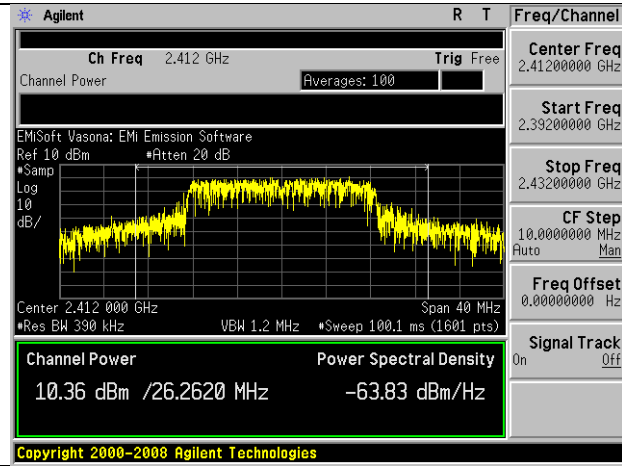
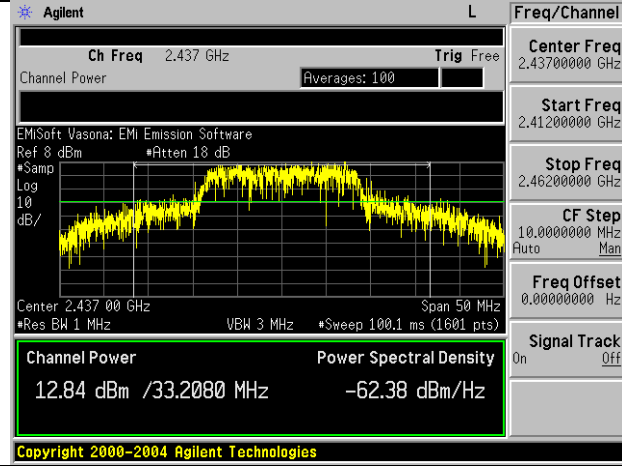
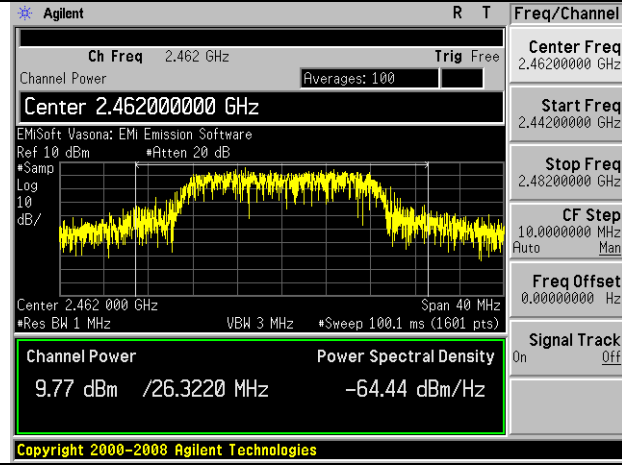
After averaging 100 traces of the transmitter waveform on the spectrum analyzer, record the spectrum analyzer Channel Power.

Frequency (MHz)	Data Rate (Mbps)	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
2412	1	13.06	30	-16.94
2437	1	13.06	30	-16.94
2462	1	12.99	30	-17.01
2412	6	10.36	30	-19.64
2437	6	12.84	30	-17.16
2462	6	9.77	30	-20.23



Output Power 2412MHz (1Mbps rate) 802.11B	
Output Power 2437MHz (1Mbps rate) 802.11B	
Output Power 2462MHz (1Mbps rate) 802.11B	



Output power 2412MHz (6Mbps rate) 802.11G	
Output power 2437MHz (6Mbps rate) 802.11G	
Output power 2462MHz (6Mbps rate) 802.11G	

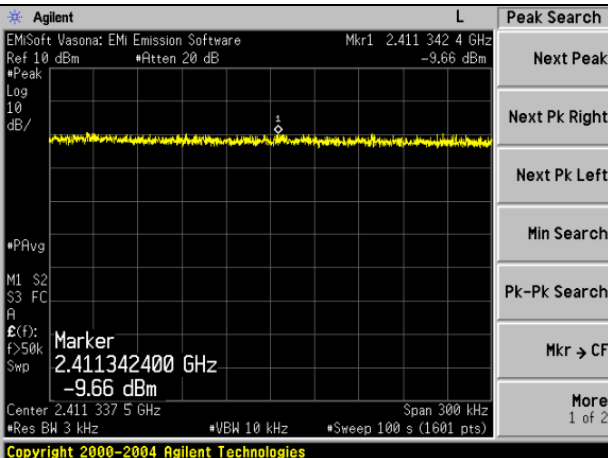
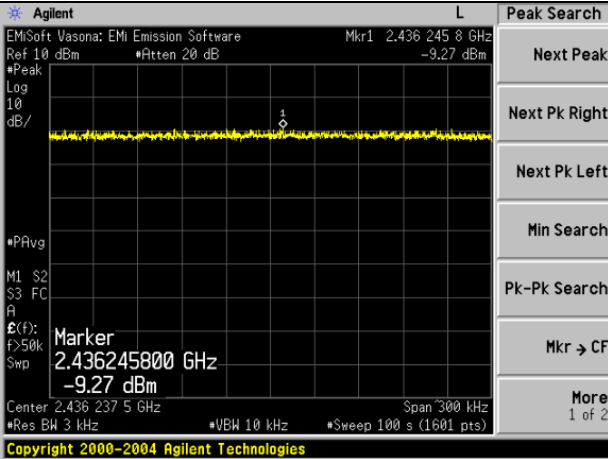
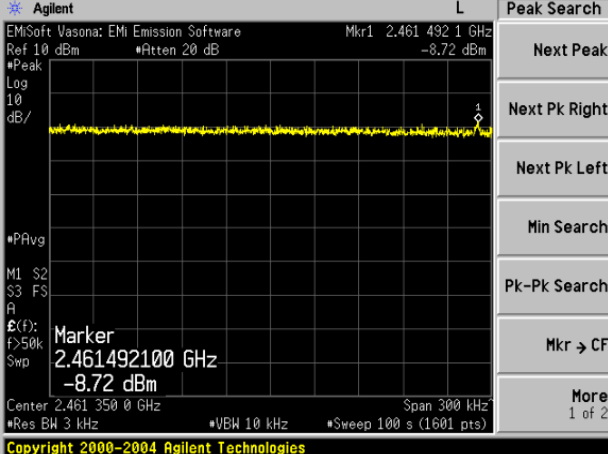


Power Spectral Density**15.247 & RSS-210 A8.2:**

For digitally modulated systems, the peak 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

Frequency (MHz)	Data Rate (Mbps)	Peak Power Spectral Density (dBm/3kHz)	Limit (dBm)	Margin (dB)
2412	1	-9.66	8	-17.66
2437	1	-9.27	8	-17.27
2462	1	-8.72	8	-16.72
2412	6	-15.59	8	-23.59
2437	6	-10.51	8	-18.51
2462	6	-15.73	8	-23.73

**Graphical Test Results**

PSD 2412MHz (1Mbps rate) 802.11B	
PSD 2437MHz (1Mbps rate) 802.11B	
PSD 2462MHz (1Mbps rate) 802.11B	



PSD 2412MHz (6Mbps rate) 802.11G	
PSD 2437MHz (6Mbps rate) 802.11G	
PSD 2462MHz (6Mbps rate) 802.11G	

**Conducted Spurious emissions****15.247 & RSS-210 A8.5:**

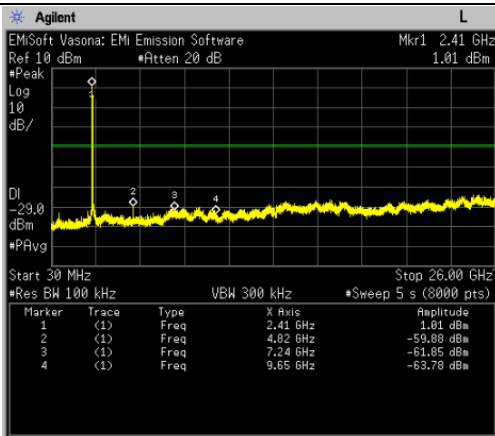
In any 100 kHz bandwidth outside the frequency band in which the digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

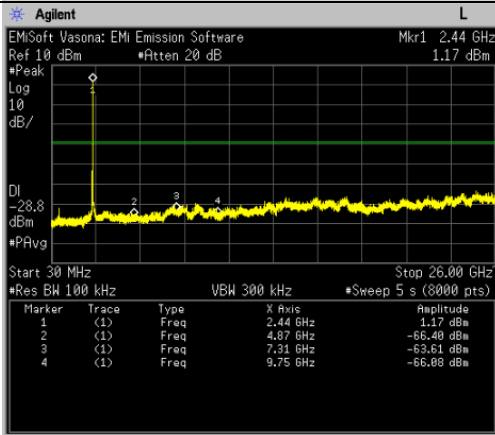
KDB : 558074 D01 DTS Meas Guidance v03r01 section 12.2.2 © add the max antenna gain + ground reflection factor (4.7 dB for frequencies between 30 MHz and 1000 MHz, and 0 dB for frequencies > 1000 MHz).

The maximum supported antenna gain is 3.4dBi.

All measurements are greater than -20dB below the limit. By visual inspection, transmitter complies

Test Results

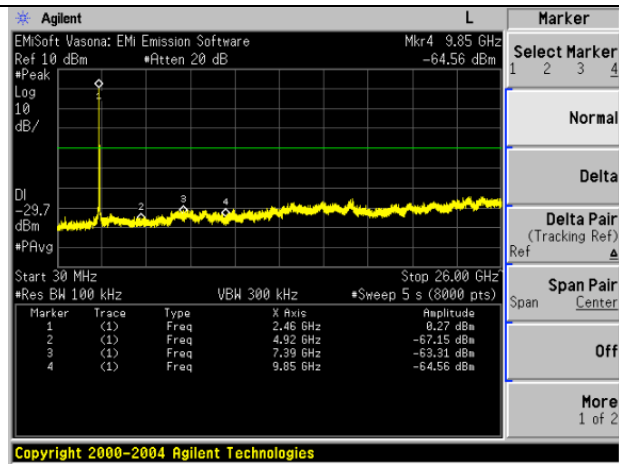
CSE	 <table><tr><th>Marker</th><th>Trace</th><th>Type</th><th>X Axis</th><th>Amplitude</th></tr><tr><td>1</td><td>(1)</td><td>Freq</td><td>2.41 GHz</td><td>1.01 dBm</td></tr><tr><td>2</td><td>(1)</td><td>Freq</td><td>4.82 GHz</td><td>-59.88 dBm</td></tr><tr><td>3</td><td>(1)</td><td>Freq</td><td>7.24 GHz</td><td>-61.85 dBm</td></tr><tr><td>4</td><td>(1)</td><td>Freq</td><td>9.65 GHz</td><td>-63.78 dBm</td></tr></table> Copyright 2000-2004 Agilent Technologies	Marker	Trace	Type	X Axis	Amplitude	1	(1)	Freq	2.41 GHz	1.01 dBm	2	(1)	Freq	4.82 GHz	-59.88 dBm	3	(1)	Freq	7.24 GHz	-61.85 dBm	4	(1)	Freq	9.65 GHz	-63.78 dBm	Display Full Screen Display Line -28.99 dBm On Off Limits Active Fctn Position: Bottom Title Preferences
Marker	Trace	Type	X Axis	Amplitude																							
1	(1)	Freq	2.41 GHz	1.01 dBm																							
2	(1)	Freq	4.82 GHz	-59.88 dBm																							
3	(1)	Freq	7.24 GHz	-61.85 dBm																							
4	(1)	Freq	9.65 GHz	-63.78 dBm																							
2412MHz (1Mbps rate) 802.11B																											

CSE	 <table><tr><th>Marker</th><th>Trace</th><th>Type</th><th>X Axis</th><th>Amplitude</th></tr><tr><td>1</td><td>(1)</td><td>Freq</td><td>2.44 GHz</td><td>1.17 dBm</td></tr><tr><td>2</td><td>(1)</td><td>Freq</td><td>4.87 GHz</td><td>-66.40 dBm</td></tr><tr><td>3</td><td>(1)</td><td>Freq</td><td>7.31 GHz</td><td>-63.61 dBm</td></tr><tr><td>4</td><td>(1)</td><td>Freq</td><td>9.75 GHz</td><td>-66.08 dBm</td></tr></table> Copyright 2000-2004 Agilent Technologies	Marker	Trace	Type	X Axis	Amplitude	1	(1)	Freq	2.44 GHz	1.17 dBm	2	(1)	Freq	4.87 GHz	-66.40 dBm	3	(1)	Freq	7.31 GHz	-63.61 dBm	4	(1)	Freq	9.75 GHz	-66.08 dBm	Display Full Screen Display Line -28.83 dBm On Off Limits Active Fctn Position: Bottom Title Preferences
Marker	Trace	Type	X Axis	Amplitude																							
1	(1)	Freq	2.44 GHz	1.17 dBm																							
2	(1)	Freq	4.87 GHz	-66.40 dBm																							
3	(1)	Freq	7.31 GHz	-63.61 dBm																							
4	(1)	Freq	9.75 GHz	-66.08 dBm																							
2437MHz (1Mbps rate) 802.11B																											

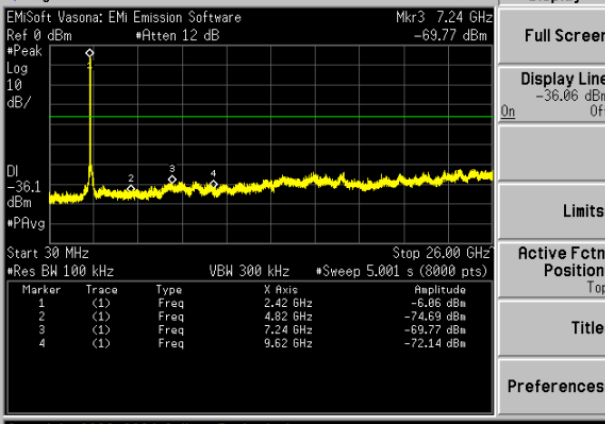
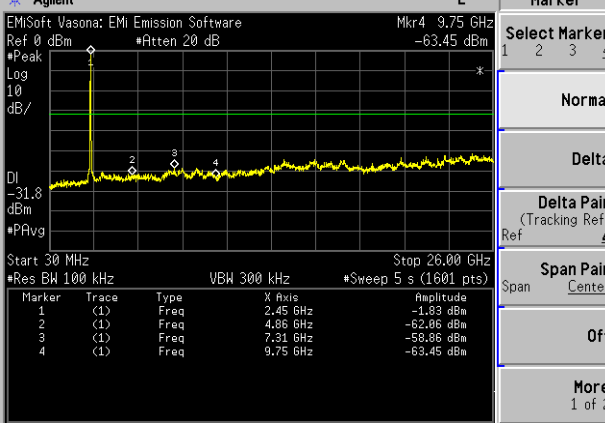
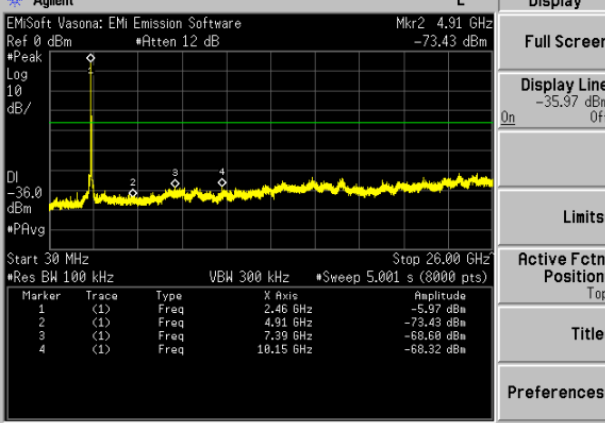


CSE

2462MHz (1Mbps rate) 802.11B





CSE 2412MHz (6Mbps rate) 802.11G	 Copyright 2000-2004 Agilent Technologies
CSE 2437MHz (6Mbps rate) 802.11G	 Copyright 2000-2004 Agilent Technologies
CSE 2462MHz (6Mbps rate) 802.11G	 Copyright 2000-2004 Agilent Technologies

**Band Edge Measurements****15.205 & RSS-210 sec2.7:**

Conducted emissions which fall in the restricted bands, as defined in Sec. 15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a).

Use to substitute conducted measurements in place of radiated measurements.

Connect the antenna port(s) to the spectrum analyzer input. Place the radio in continuous transmit mode. Be sure to enter all losses between the transmitter output and the spectrum analyzer.

KDB : 558074 D01 DTS Meas Guidance v03r01 section 12.2.2 © add the max antenna gain + ground reflection factor (0 dB for frequencies > 1000 MHz)

Average Plot, Limit= -41.25 dBm eirp (54dBuV/m @3m) -3.4dBi (max ant gain) - 0 (Ground reflection) = -44.65dBm eirp

Peak plot, Limit = -21.25 dBm eirp (74dBuV/m @3m)) -3.4dBi (max ant gain) - 0 (Ground reflection) = -24.65dBm eirp

Reference Level: 20 dBm
Attenuation: 30 dB
Sweep Time: Coupled
Resolution Bandwidth: 1MHz
Video Bandwidth: 1 MHz for peak, 10 Hz for average
Detector: Peak

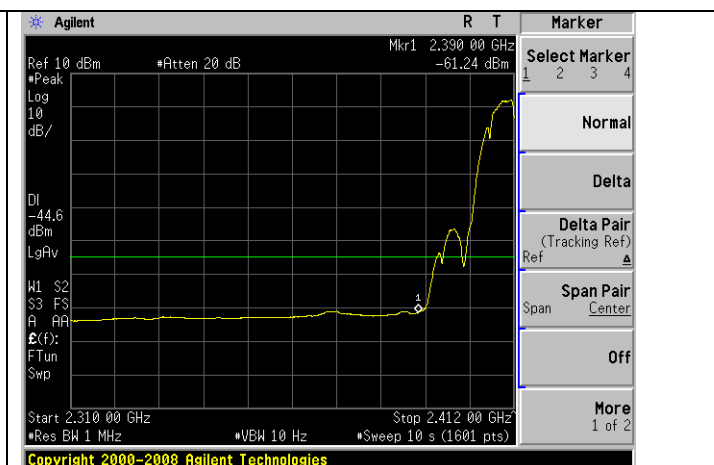
Place a marker at the end of the restricted band closest to the transmit frequency to show compliance.

Also measure any emissions in the restricted bands.

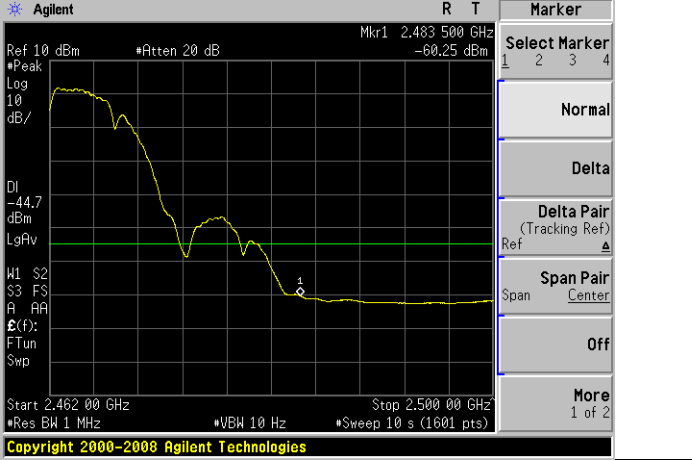
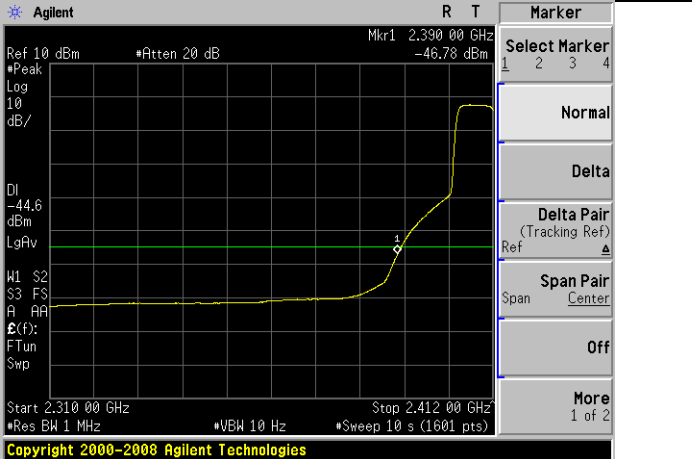
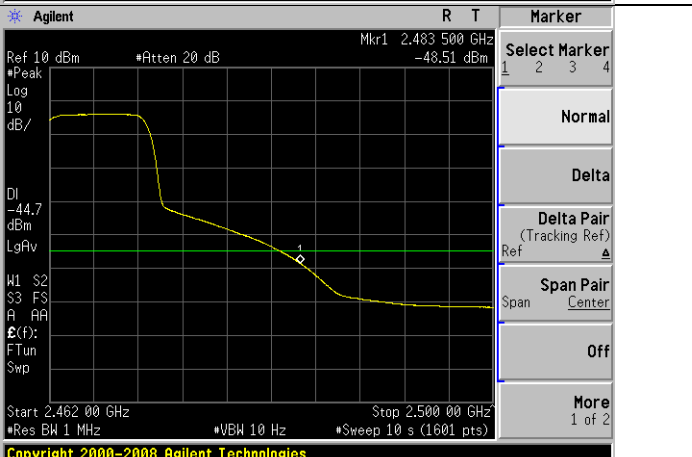
NOTE: ALL Modes were evaluated but ONLY worse case was reported.

Band Edge (Average measurements)

802.11B 13dBm, 1Mbps channel 1 (Average)





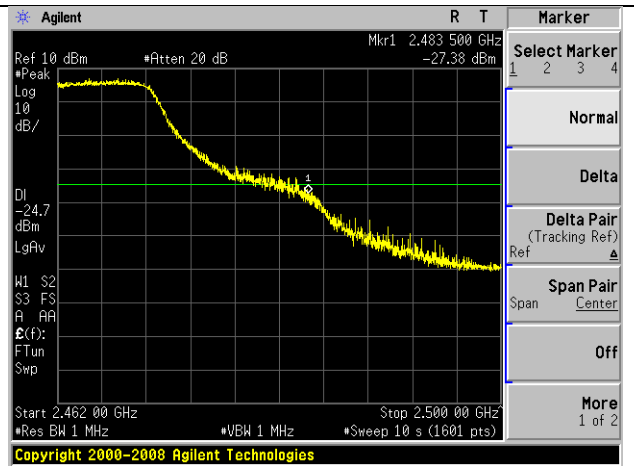
802.11B 13dBm, 1Mbps channel 11 (Average)	
802.11G, 10dBm , 6Mbps channel 1 (Average)	
802.11G, 10dBm , 6Mbps channel 11 (Average)	

**Band Edge (Peak measurements)**

802.11B 13dBm, 1Mbps channel 1 (peak)	
802.11B 13dBm, 1Mbps channel 11 (Peak)	
802.11G, 10dBm ,6Mbps channel 1(peak)	



802.11G, 10dBm , 6Mbps channel 11 (Peak)





Radiated Spurious and Harmonics Emissions

15.205 & RSS-210 sec2.7:

Radiated emissions which fall in the restricted bands, as defined in Sec. 15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a).

Note 1: All 3-axis (X,Y, Z) were evaluated during preliminary testing and the worst case orientation was for all formal testing shown below.

Using Vasona, configure the spectrum analyzer as shown below (be sure to enter all losses between the transmitter output and the spectrum analyzer). Place the radio in continuous transmit mode.

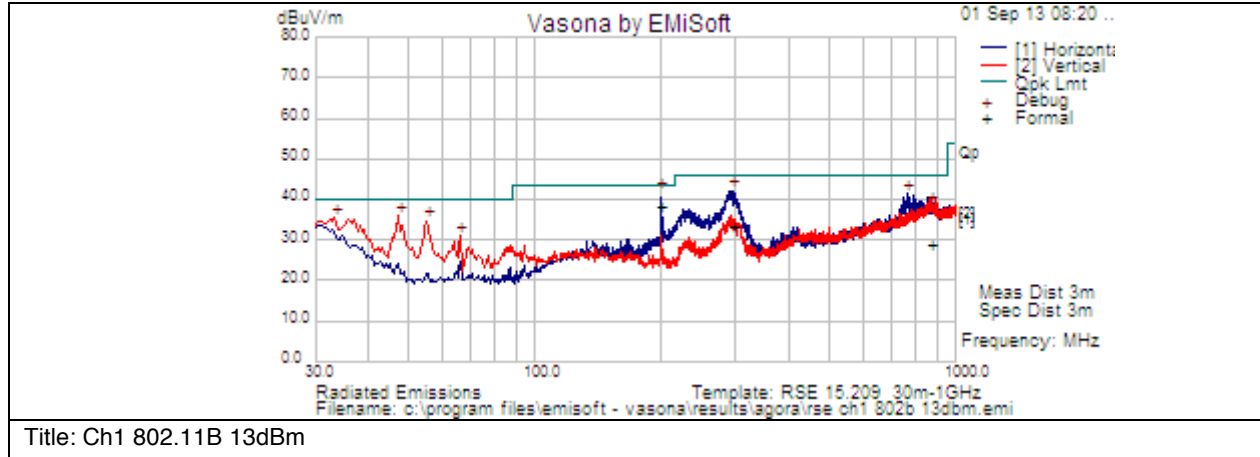
Span:	1GHz – 18 GHz
Reference Level:	80 dBuV
Attenuation:	10 dB
Sweep Time:	Coupled
Resolution Bandwidth:	1MHz
Video Bandwidth:	1 MHz for peak, 10Hz for average
Detector:	Peak

Terminate the access Point RF ports with 50 ohm loads.

Maximize Turntable (find worst case table angle), Maximize Antenna (find worst case height)

Save 2 plots: 1) Average Plot (Vertical and Horizontal), Limit= 54dBuV/m @3m
 2) Peak plot (Vertical and Horizontal), Limit = 74dBuV/m @3m

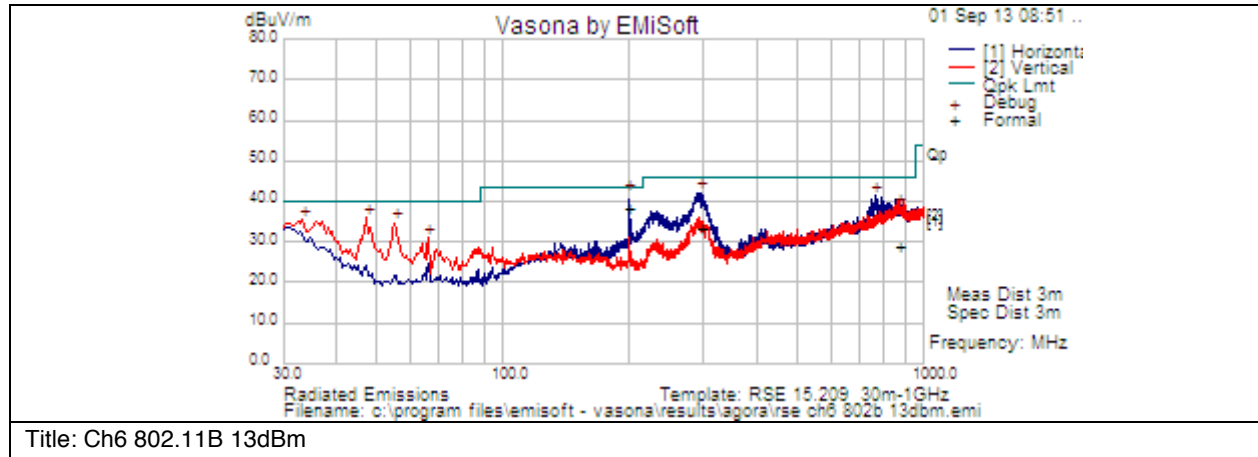
This report represents the worst case data for all supported operating modes and antennas. System was evaluated up to 40GHz but there were no measurable emissions above 15 GHz.

**Transmitter Spurious Emissions 30MHz to 1GHz, Channel 1 , 802.11 B (1Mbps) at 13dBm****Test Results Table**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measureme nt Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
199.199	25	1.2	12.1	38.4	Qp	H	141	27	43.5	-5.1	Pass	
293.355	18.4	1.5	13.3	33.2	Qp	H	109	348	46	-12.8	Pass	
875.895	4.3	2.6	21.9	28.8	Qp	V	254	71	46	-17.2	Pass	

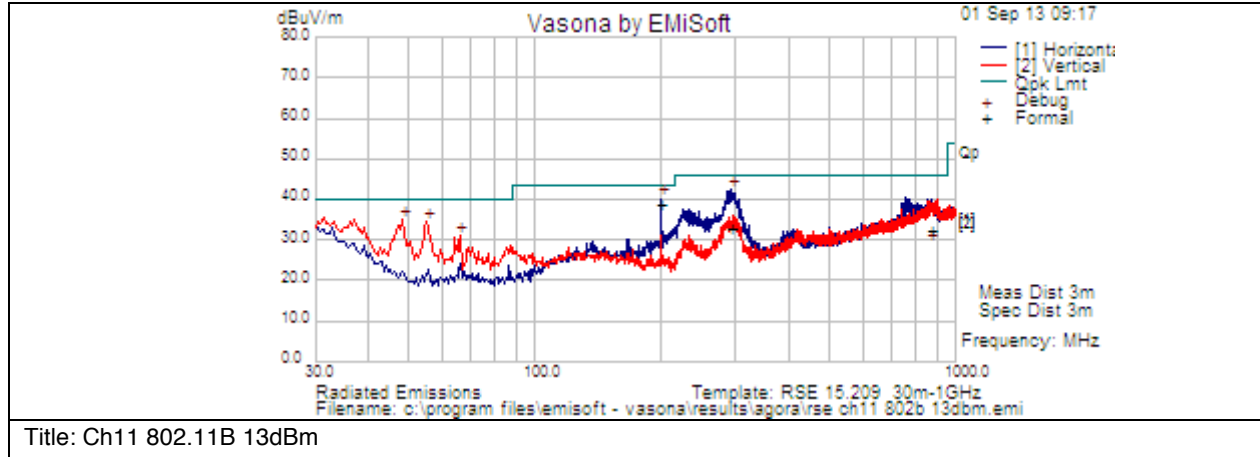


Transmitter Spurious Emissions 30MHz to 1GHz, Channel 6 , 802.11 B (1Mbps) at 13dBm

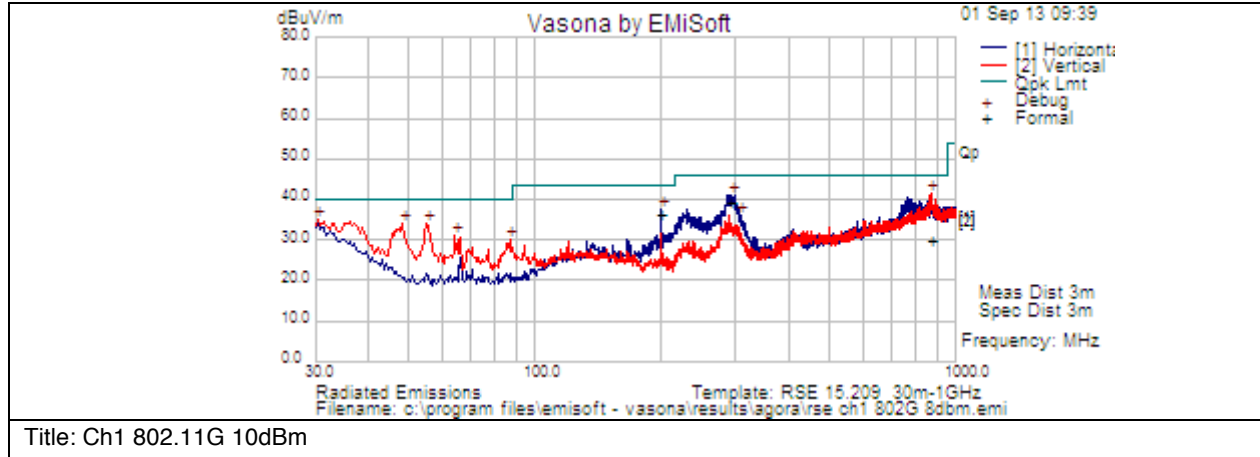


Test Results Table

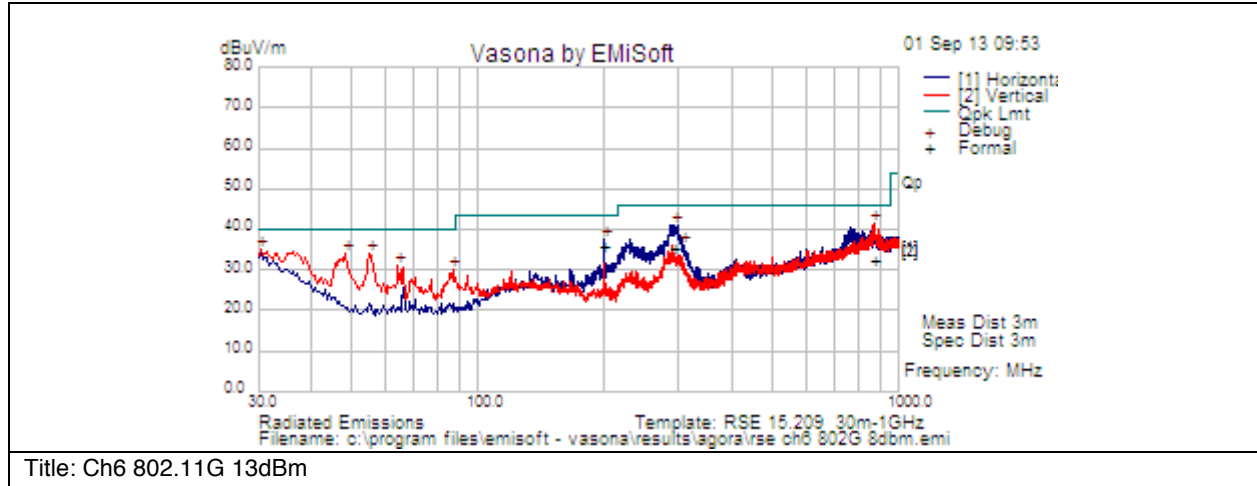
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measureme nt Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
199.199	23.7	1.2	12.1	37.1	Qp	H	190	145	43.5	-6.4	Pass	
291.195	21.3	1.5	13.3	36.1	Qp	H	129	361	46	-9.9	Pass	
873.725	8.2	2.6	21.9	32.8	Qp	V	141	75	46	-13.2	Pass	

**Transmitter Spurious Emissions 30MHz to 1GHz, Channel 11 , 802.11 B (1Mbps) at 13dBm****Test Results Table**

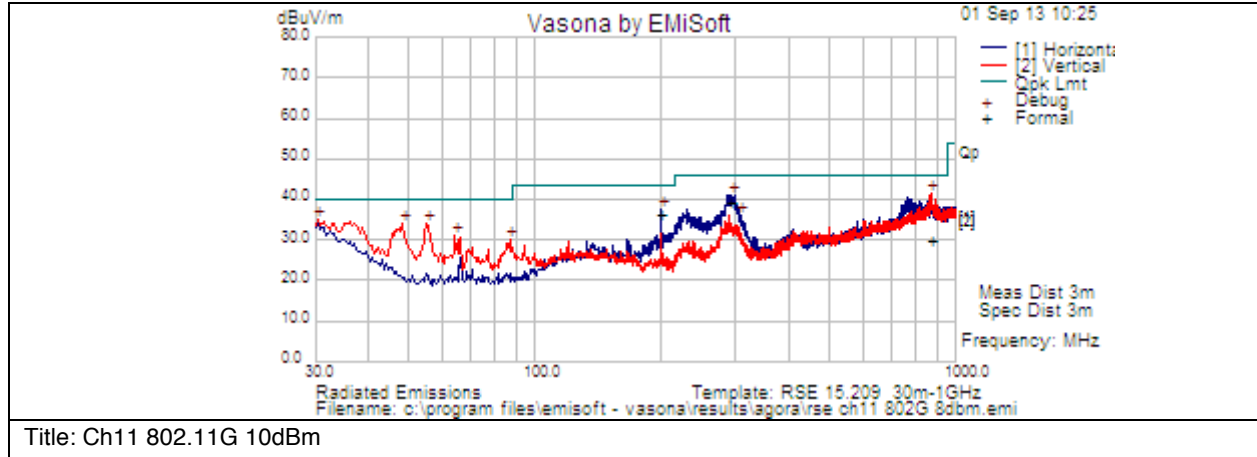
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
199.199	25.3	1.2	12.1	38.7	Qp	H	138	0	43.5	-4.8	Pass	
291.195	18.2	1.5	13.3	33	Qp	H	107	341	46	-13	Pass	
874.278	8	2.6	21.9	32.6	Qp	V	148	127	46	-13.4	Pass	

**Transmitter Spurious Emissions 30MHz to 1GHz, Channel 1 , 802.11 G (6 Mbps) at 10dBm****Test Results Table**

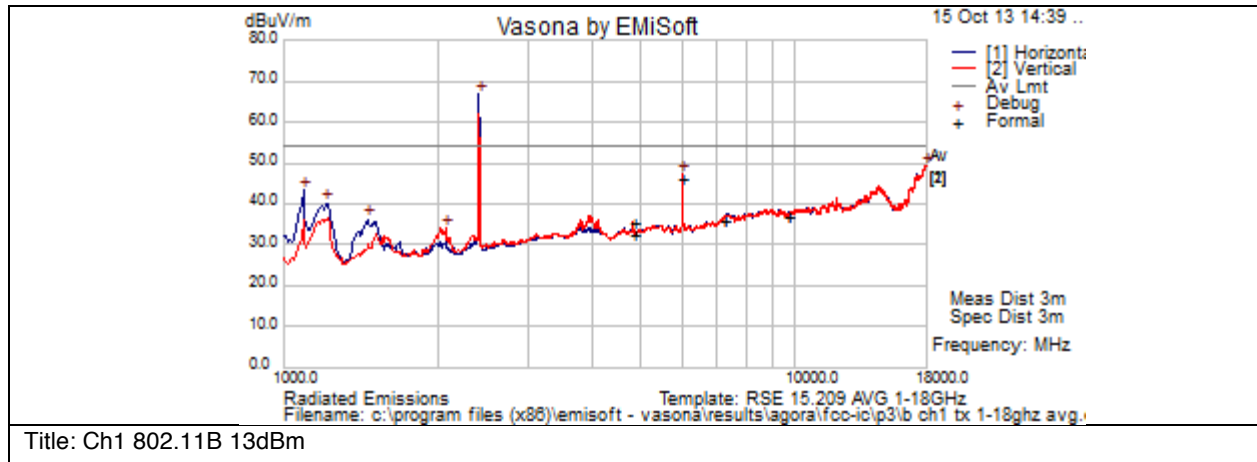
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measureme nt Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
875.355	8.1	2.6	21.9	32.6	Qp	V	142	337	46	-13.4	Pass	
199.2	25	1.2	12.1	38.4	Qp	H	127	360	43.5	-5.1	Pass	
292.87	20.7	1.5	13.3	35.5	Qp	H	130	355	46	-10.5	Pass	

**Transmitter Spurious Emissions 30MHz to 1GHz, Channel 6 , 802.11 G (6 Mbps) at 13dBm****Test Results Table**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measureme nt Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
199.195	22.4	1.2	12.1	35.8	Qp	H	109	134	43.5	-7.7	Pass	
291.088	20.4	1.5	13.3	35.2	Qp	H	122	11	46	-10.8	Pass	
875.665	7.7	2.6	21.9	32.2	Qp	V	150	333	46	-13.8	Pass	

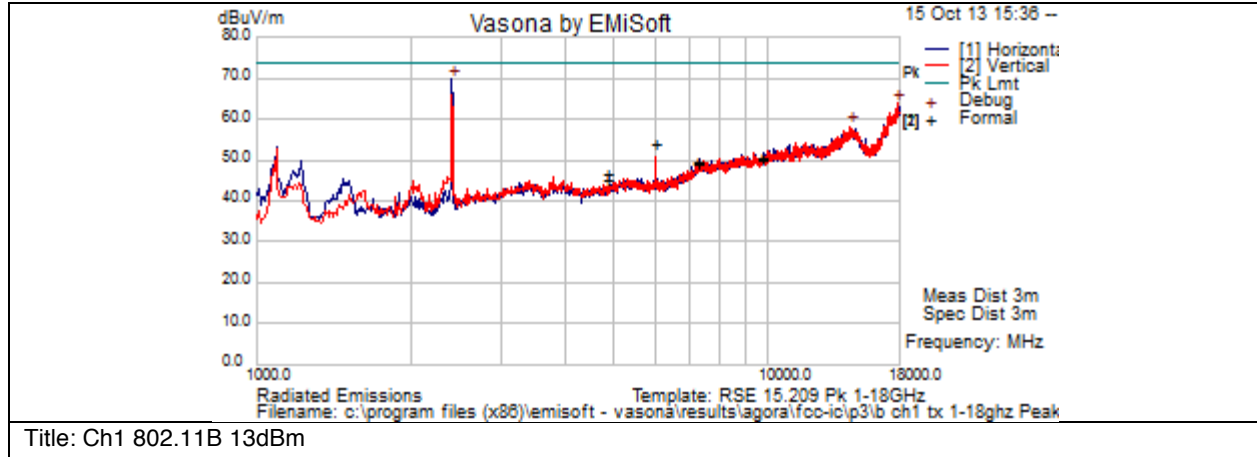
**Transmitter Spurious Emissions 30MHz to 1GHz, Channel 11 , 802.11 G (6 Mbps) at 10dBm****Test Results Table**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
199.18	23.1	1.2	12.1	36.5	Qp	H	167	355	43.5	-7	Pass	
291.176	24.6	1.5	13.3	39.4	Qp	H	117	11	46	-6.6	Pass	
875.602	5.4	2.6	21.9	30	Qp	V	135	211	46	-16	Pass	

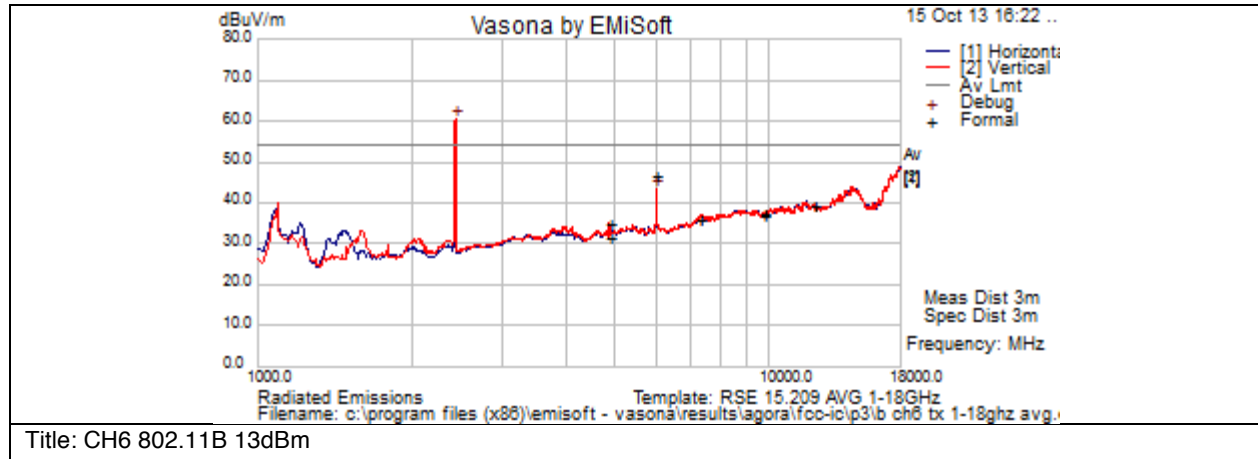
**Transmitter Spurious Emissions 1-18GHz, Channel 1 , 802.11 B (1 Mbps) at 13dBm (Average measurement)**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
6000.063	37.67	7.73	0.67	46.08	Average Max	V	118	141	54	-7.92	Pass	6000.063
9649.173	20.77	10.22	5.88	36.86	Average Max	H	183	270	54	-17.14	Pass	9649.173
9649.173	20.73	10.22	5.88	36.83	Average Max	V	116	80	54	-17.17	Pass	9649.173
7234.936	22.77	8.54	4.52	35.83	Average Max	H	196	296	54	-18.17	Pass	7234.936
7234.936	22.78	8.54	4.52	35.84	Average Max	V	184	74	54	-18.16	Pass	7234.936
4823.943	27.98	6.84	0.41	35.23	Average Max	V	155	330	54	-18.77	Pass	4823.943
4823.943	25.2	6.84	0.41	32.46	Average Max	H	110	84	54	-21.54	Pass	4823.943

No measureable emissions above 15GHz

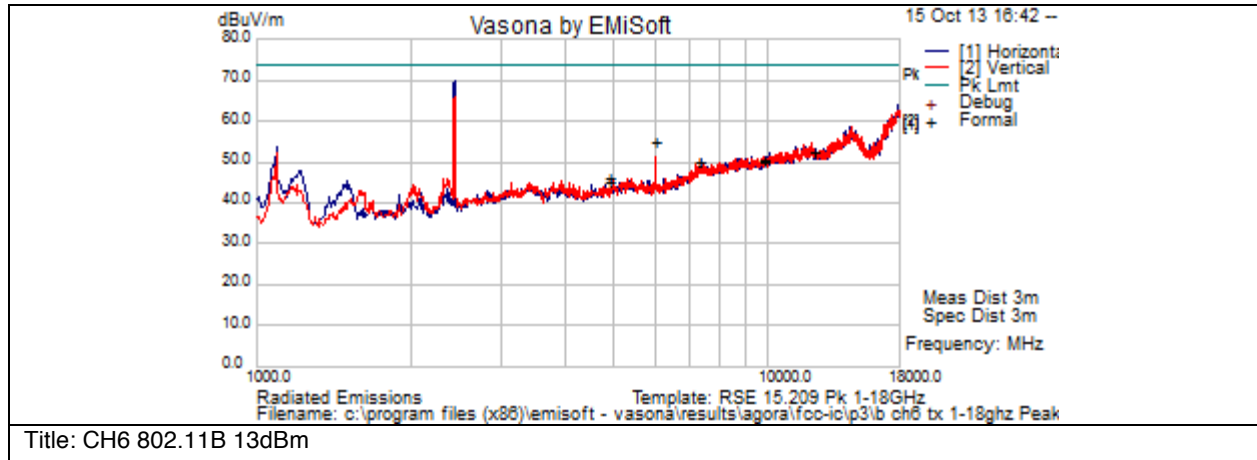
**Transmitter Spurious Emissions 1-18GHz, Channel 1 , 802.11 B (1 Mbps) at 13dBm (Peak Measurement)**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
6000.063	45.44	7.73	0.67	53.84	Peak Max	V	117	141	74	-20.16	Pass	Host PC
9649.173	34.41	10.22	5.88	50.51	Peak Max	H	182	270	74	-23.49	Pass	
9649.173	34.09	10.22	5.88	50.18	Peak Max	V	118	80	74	-23.82	Pass	
7234.936	35.92	8.54	4.52	48.98	Peak Max	V	184	74	74	-25.02	Pass	
7234.936	36.61	8.54	4.52	49.67	Peak Max	H	195	296	74	-24.33	Pass	
4823.943	39.32	6.84	0.41	46.57	Peak Max	V	156	330	74	-27.43	Pass	
4823.943	37.91	6.84	0.41	45.16	Peak Max	H	111	84	74	-28.84	Pass	

**Transmitter Spurious Emissions 1-18GHz, Channel 6 , 802.11 B (1 Mbps) at 13dBm (Average Measurement)**

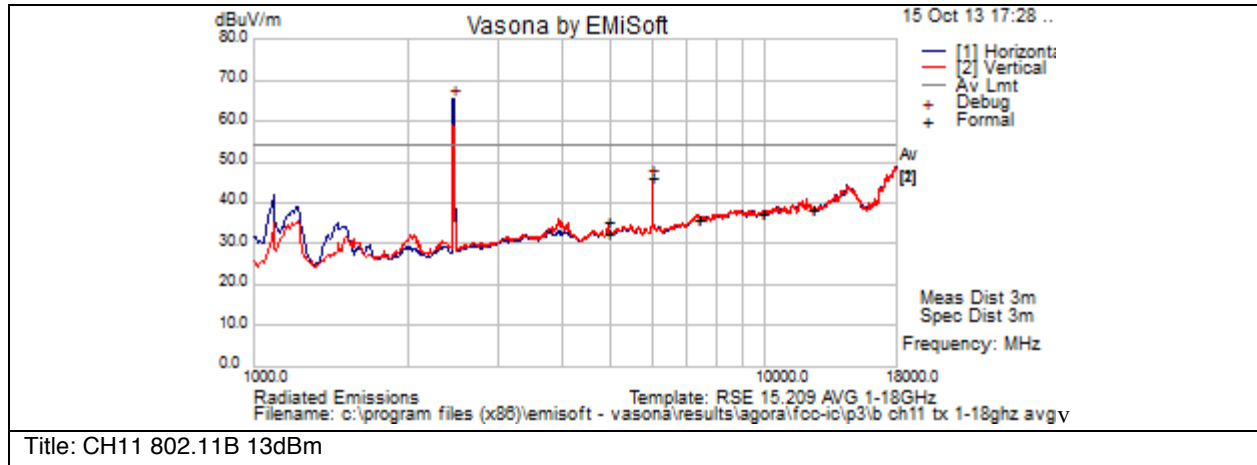
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
4873.9	27.55	6.89	0.58	35.02	Average Max	V	157	14	54	-18.98	Pass	
4873.9	24.06	6.89	0.58	31.53	Average Max	H	125	232	54	-22.47	Pass	
6000.006	38.42	7.73	0.67	46.82	Average Max	V	116	146	54	-7.18	Pass	
7310.92	22.38	8.58	5.03	35.98	Average Max	V	157	282	54	-18.02	Pass	
7310.92	22.36	8.58	5.03	35.97	Average Max	H	173	0	54	-18.03	Pass	
9748.145	20.39	10.29	6.36	37.04	Average Max	V	188	245	54	-16.96	Pass	
9748.145	20.36	10.29	6.36	37.01	Average Max	H	114	304	54	-16.99	Pass	
12184.939	20.78	11.81	6.62	39.21	Average Max	V	126	280	54	-14.79	Pass	
12184.939	20.78	11.81	6.62	39.21	Average Max	H	121	12	54	-14.79	Pass	

No measureable emissions above 15GHz

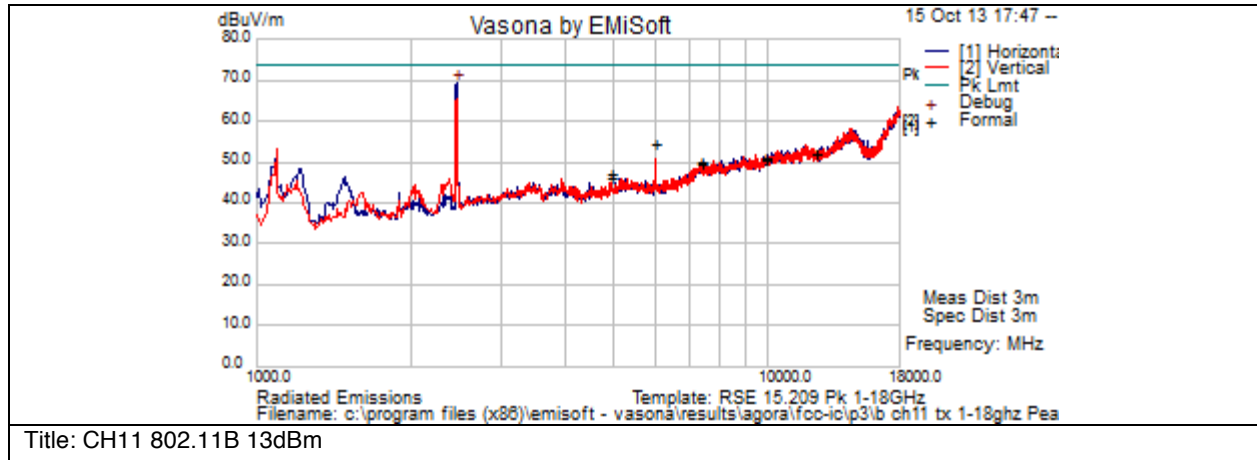
**Transmitter Spurious Emissions 1-18GHz, Channel 6 , 802.11 B (1 Mbps) at 13dBm (Peak Measurement)**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
6000.006	46.5	7.73	0.67	54.91	Peak Max	V	114	146	74	-19.09	Pass	
12184.94	34.05	11.81	6.62	52.48	Peak Max	V	126	280	74	-21.52	Pass	
12184.94	34.15	11.81	6.62	52.58	Peak Max	H	121	12	74	-21.42	Pass	
9748.145	33.8	10.29	6.36	50.45	Peak Max	V	188	245	74	-23.55	Pass	
9748.145	33.58	10.29	6.36	50.23	Peak Max	H	115	304	74	-23.77	Pass	
7310.92	36.35	8.58	5.03	49.96	Peak Max	V	157	282	74	-24.04	Pass	
7310.92	36.31	8.58	5.03	49.92	Peak Max	H	172	0	74	-24.08	Pass	
4873.9	38.8	6.89	0.58	46.27	Peak Max	V	158	14	74	-27.73	Pass	
4873.9	37.51	6.89	0.58	44.99	Peak Max	H	126	232	74	-29.01	Pass	

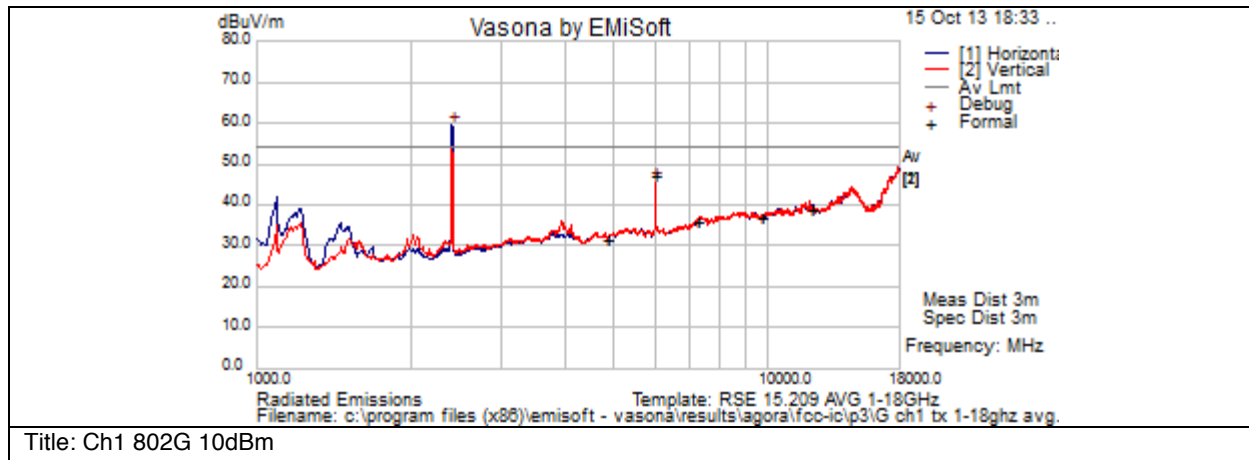
No measureable emissions above 15GHz

**Transmitter Spurious Emissions 1-18GHz, Channel 11 , 802.11 B (1 Mbps) at 13dBm (Average Measurement)**

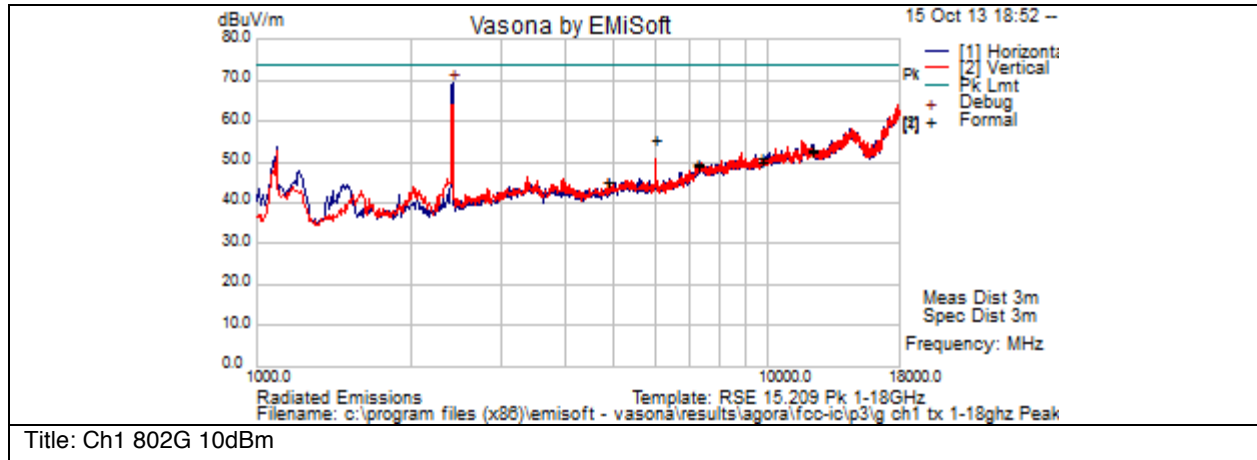
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
4924.031	24.81	6.93	0.57	32.31	Average Max	H	103	190	54	-21.69	Pass	
4924.031	27.87	6.93	0.57	35.36	Average Max	V	200	130	54	-18.64	Pass	
6000.088	37.91	7.73	0.67	46.32	Average Max	V	103	142	54	-7.68	Pass	Host PC
7386.233	22.12	8.6	5.29	36.02	Average Max	H	128	228	54	-17.98	Pass	
7386.233	22.15	8.6	5.29	36.05	Average Max	V	185	152	54	-17.95	Pass	
9848.421	20.32	10.35	6.63	37.3	Average Max	H	143	60	54	-16.7	Pass	
9848.421	20.31	10.35	6.63	37.29	Average Max	V	108	206	54	-16.71	Pass	
12309.93	20.43	11.92	6.02	38.36	Average Max	H	130	263	54	-15.64	Pass	
12309.93	20.43	11.92	6.02	38.37	Average Max	V	115	318	54	-15.63	Pass	

**Transmitter Spurious Emissions 1-18GHz, Channel 11 , 802.11 B (1 Mbps) at 13dBm (Peak Measurement)**

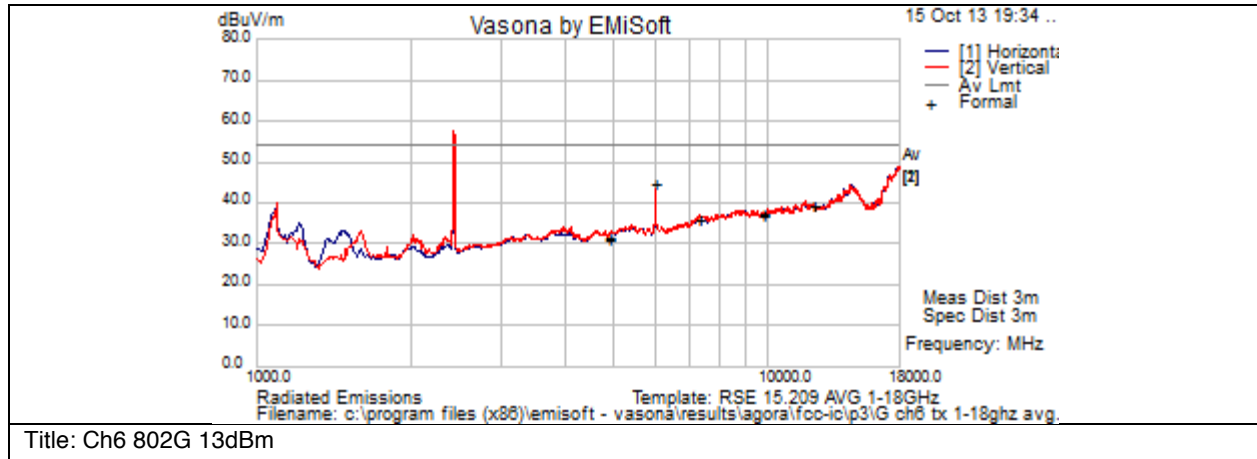
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
6000.088	46.04	7.73	0.67	54.45	Peak Max	V	102	142	74	-19.55	Pass	Host PC
12309.93	34.26	11.92	6.02	52.19	Peak Max	V	114	318	74	-21.81	Pass	
12309.93	34	11.92	6.02	51.94	Peak Max	H	129	263	74	-22.06	Pass	
9848.421	34	10.35	6.63	50.98	Peak Max	H	142	60	74	-23.02	Pass	
9848.421	33.63	10.35	6.63	50.61	Peak Max	V	109	206	74	-23.39	Pass	
7386.233	35.89	8.6	5.29	49.79	Peak Max	V	184	152	74	-24.21	Pass	
7386.233	35.74	8.6	5.29	49.64	Peak Max	H	129	228	74	-24.36	Pass	
4924.031	39.46	6.93	0.57	46.95	Peak Max	V	198	130	74	-27.05	Pass	
4924.031	38.36	6.93	0.57	45.86	Peak Max	H	104	190	74	-28.14	Pass	


Transmitter Spurious Emissions 1-18GHz, Channel 1 , 802.11 G (6 Mbps) at 10dBm (Average Measurement)


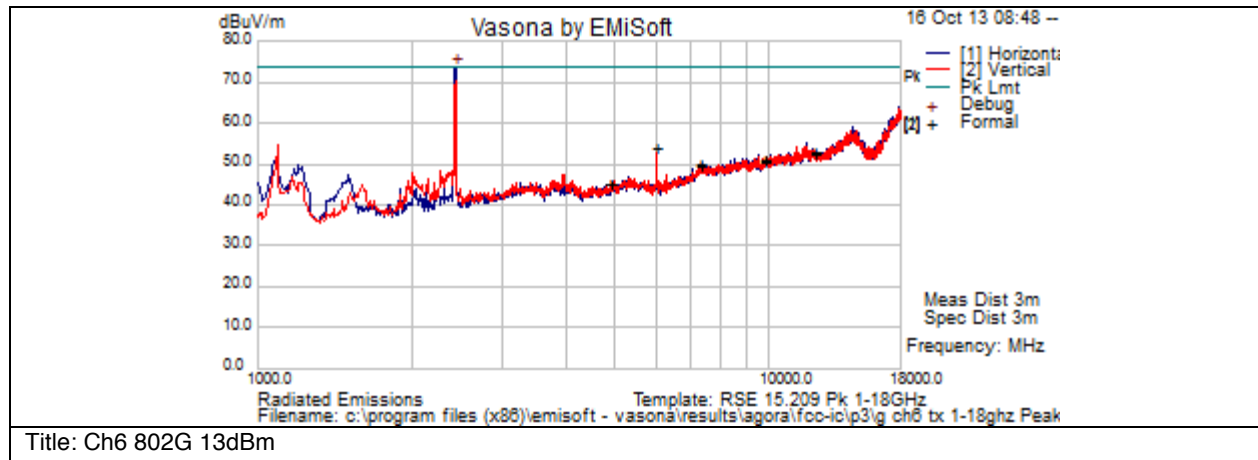
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
4825.294	23.97	6.84	0.41	31.23	Average Max	H	191	167	54	-22.77	Pass	
4825.294	24.05	6.84	0.41	31.31	Average Max	V	188	132	54	-22.69	Pass	
5999.975	38.5	7.73	0.67	46.91	Average Max	V	103	145	54	-7.09	Pass	Host PC
7236.17	22.6	8.54	4.52	35.66	Average Max	H	179	86	54	-18.34	Pass	
7236.17	22.64	8.54	4.52	35.7	Average Max	V	161	178	54	-18.3	Pass	
9648.058	20.69	10.21	5.87	36.77	Average Max	V	113	118	54	-17.23	Pass	
12060.06	20.62	11.72	6.56	38.89	Average Max	V	169	213	54	-15.11	Pass	
9648.058	20.74	10.21	5.87	36.82	Average Max	H	180	14	54	-17.18	Pass	
12060.06	20.62	11.72	6.56	38.89	Average Max	H	132	237	54	-15.11	Pass	

**Transmitter Spurious Emissions 1-18GHz, Channel 1 , 802.11 G (6 Mbps) at 10dBm (Peak Measurement)**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5999.975	46.77	7.73	0.67	55.17	Peak Max	V	101	145	74	-18.83	Pass	Host PC
12060.06	34.22	11.72	6.56	52.49	Peak Max	H	131	237	74	-21.51	Pass	
12060.06	34.66	11.72	6.56	52.93	Peak Max	V	167	213	74	-21.07	Pass	
9648.058	34.91	10.21	5.87	50.99	Peak Max	H	179	14	74	-23.01	Pass	
9648.058	33.99	10.21	5.87	50.08	Peak Max	V	113	118	74	-23.92	Pass	
7236.17	36.23	8.54	4.52	49.29	Peak Max	V	160	178	74	-24.71	Pass	
7236.17	35.82	8.54	4.52	48.88	Peak Max	H	178	86	74	-25.12	Pass	
4825.294	37.71	6.84	0.41	44.96	Peak Max	V	186	132	74	-29.04	Pass	
4825.294	37.67	6.84	0.41	44.93	Peak Max	H	189	167	74	-29.07	Pass	

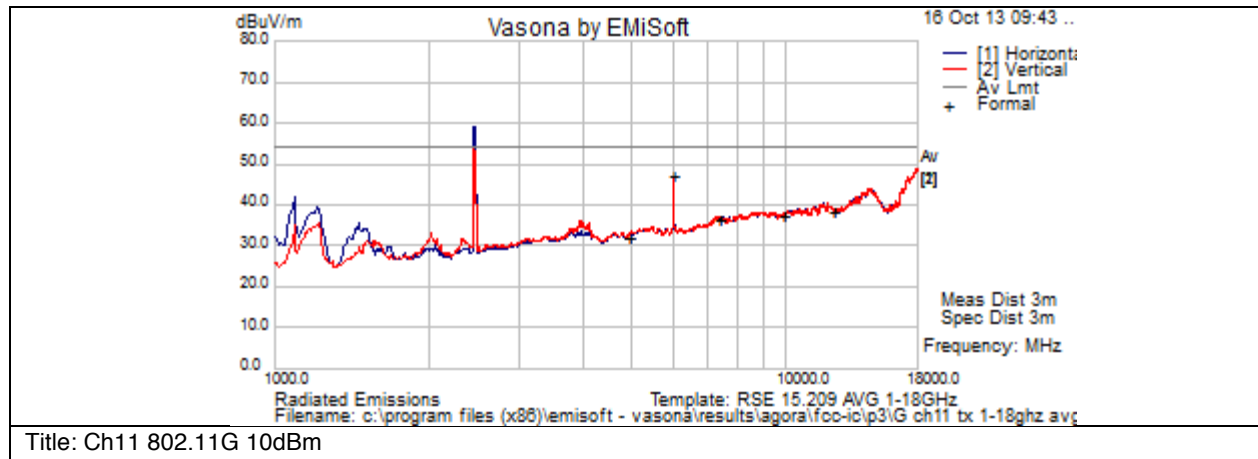
**Transmitter Spurious Emissions 1-18GHz, Channel 6 , 802.11 G (6 Mbps) at 13dBm (Average Measurement)**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
4874	23.45	6.89	0.58	30.92	Average Max	H	160	218	54	-23.08	Pass	
4874	23.85	6.89	0.58	31.32	Average Max	V	164	347	54	-22.68	Pass	
6000.013	36.46	7.73	0.67	44.86	Average Max	V	102	242	54	-9.14	Pass	Host PC
7311	22.31	8.58	5.03	35.92	Average Max	V	123	258	54	-18.08	Pass	
7311	22.33	8.58	5.03	35.94	Average Max	H	184	238	54	-18.06	Pass	
9748	20.39	10.29	6.36	37.03	Average Max	V	179	339	54	-16.97	Pass	
9748	20.3	10.29	6.36	36.94	Average Max	H	116	246	54	-17.06	Pass	
12185	20.83	11.81	6.62	39.26	Average Max	V	125	158	54	-14.74	Pass	
12185	20.83	11.81	6.62	39.26	Average Max	H	114	360	54	-14.74	Pass	

**Transmitter Spurious Emissions 1-18GHz, Channel 6 , 802.11 G (6 Mbps) at 13dBm (Peak Measurement)**

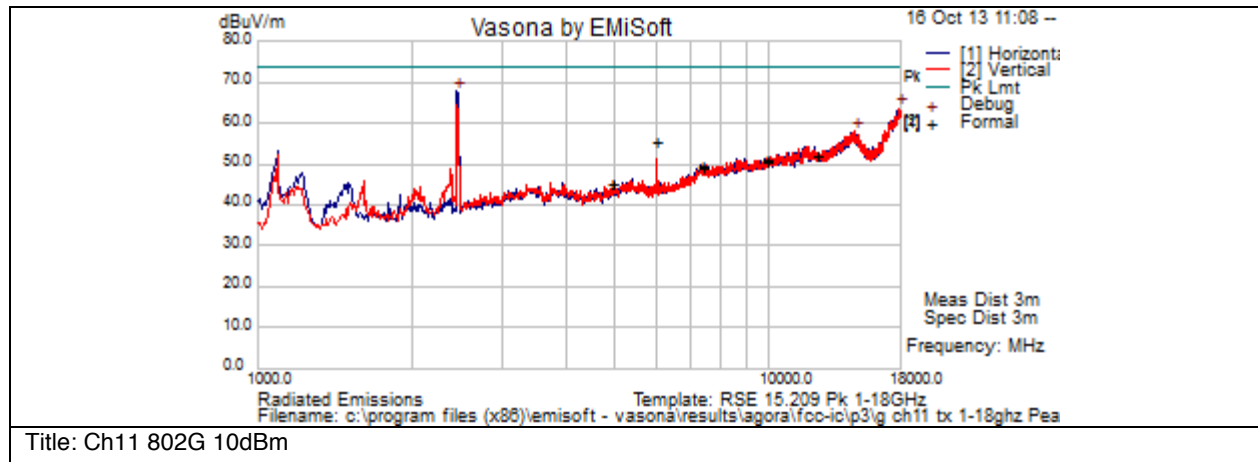
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
6000.013	45.4	7.73	0.67	53.8	Peak Max	V	101	242	74	-20.2	Pass	Host PC
12185	34.49	11.81	6.62	52.93	Peak Max	V	123	158	74	-21.07	Pass	
12185	34.06	11.81	6.62	52.5	Peak Max	H	115	360	74	-21.5	Pass	
9748	34.13	10.29	6.36	50.78	Peak Max	V	177	339	74	-23.22	Pass	
9748	34.04	10.29	6.36	50.69	Peak Max	H	117	246	74	-23.31	Pass	
7311	36.18	8.58	5.03	49.79	Peak Max	H	183	238	74	-24.21	Pass	
7311	35.83	8.58	5.03	49.44	Peak Max	V	124	258	74	-24.56	Pass	
4874	37.75	6.89	0.58	45.22	Peak Max	V	163	347	74	-28.78	Pass	
4874	37.64	6.89	0.58	45.12	Peak Max	H	161	218	74	-28.88	Pass	

No measureable emissions seen above 15GHz

**Transmitter Spurious Emissions 1-18GHz, Channel 11 , 802.11 G (6 Mbps) at 10dBm (Average Measurement)**

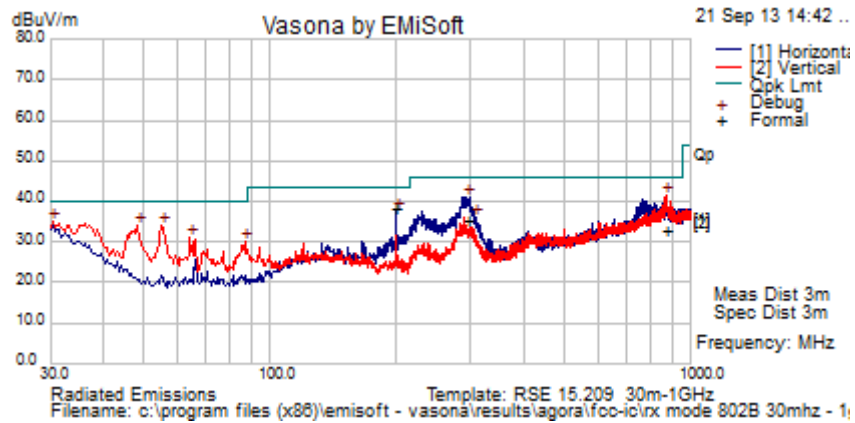
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
4924	24.41	6.93	0.57	31.9	Average Max	H	196	186	54	-22.1	Pass	
4924	24.42	6.93	0.57	31.91	Average Max	V	161	280	54	-22.09	Pass	
6000.013	38.84	7.73	0.67	47.24	Average Max	V	103	142	54	-6.76	Pass	
7386	22.25	8.6	5.29	36.15	Average Max	H	172	289	54	-17.85	Pass	
7386	22.24	8.6	5.29	36.14	Average Max	V	169	22	54	-17.86	Pass	
9848	20.43	10.35	6.63	37.41	Average Max	H	161	142	54	-16.59	Pass	
9848	20.47	10.35	6.63	37.44	Average Max	V	176	316	54	-16.56	Pass	
12310	20.46	11.92	6.01	38.39	Average Max	H	155	174	54	-15.61	Pass	
12310	20.47	11.92	6.01	38.4	Average Max	V	162	65	54	-15.6	Pass	

No measureable emissions seen above 15GHz

**Transmitter Spurious Emissions 1-18GHz, Channel 11 , 802.11 G (6 Mbps) at 10dBm (Peak Measurement)**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
6000.013	46.79	7.73	0.67	55.2	Peak Max	V	101	142	74	-18.8	Pass	
12310	33.8	11.92	6.01	51.73	Peak Max	V	161	65	74	-22.27	Pass	
12310	33.97	11.92	6.01	51.9	Peak Max	H	157	174	74	-22.1	Pass	
9848	33.77	10.35	6.63	50.75	Peak Max	V	176	316	74	-23.25	Pass	
9848	33.93	10.35	6.63	50.91	Peak Max	H	162	142	74	-23.09	Pass	
7386	35.81	8.6	5.29	49.71	Peak Max	H	170	289	74	-24.29	Pass	
7386	35.38	8.6	5.29	49.27	Peak Max	V	170	22	74	-24.73	Pass	
4924	37.41	6.93	0.57	44.91	Peak Max	V	161	280	74	-29.09	Pass	
4924	37.73	6.93	0.57	45.23	Peak Max	H	194	186	74	-28.77	Pass	

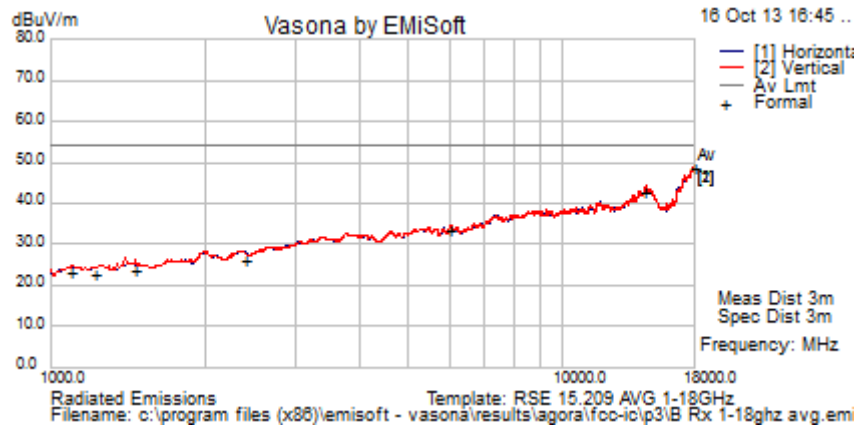
No measureable emissions seen above 15GHz

**Receiver Spurious emissions 802.11B mode , 30MHz to 1GHz**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
199.222	22.39	1.25	12.14	35.78	Quasi Max	H	153	12	43.5	-7.72	Pass	
291.333	26.21	1.51	13.3	41.02	Quasi Max	H	125	345	46	-4.98	Pass	
875.499	5.76	2.65	21.9	30.31	Quasi Max	V	178	144	46	-15.69	Pass	
30.112	14.04	0.47	20.71	35.22	Quasi Max	V	166	145	40	-4.78	Pass	
49.002	25	0.59	8.18	33.77	Quasi Max	V	122	66	40	-6.23	Pass	
54.889	25.95	0.68	6.82	33.45	Quasi Max	V	112	22	40	-6.55	Pass	
306.088	20.19	1.55	13.6	35.34	Quasi Max	H	186	317	46	-10.66	Pass	



Receiver Spurious emissions 802.11B mode , 1GHz to 18GHz range , Average measurements

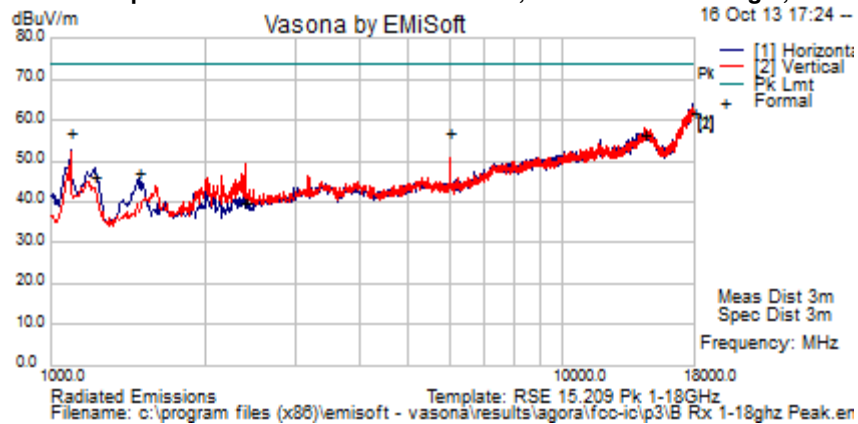


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
17921.33	21.55	14.88	12.05	48.48	Average Max	H	117	134	54	-5.52	Pass	
14388.97	20.37	12.91	9.56	42.84	Average Max	V	141	142	54	-11.16	Pass	
5999.005	24.77	7.73	0.67	33.17	Average Max	V	110	117	54	-20.83	Pass	
2391.02	23.35	4.62	-1.78	26.19	Average Max	V	149	156	54	-27.81	Pass	
1464.97	23.47	3.54	-3.6	23.41	Average Max	V	103	111	54	-30.59	Pass	
1091.35	24.47	3.02	-4.27	23.22	Average Max	H	112	176	54	-30.78	Pass	
1219.789	23.68	3.2	-4.13	22.75	Average Max	H	111	90	54	-31.25	Pass	

No measureable emissions seen above 15GHz

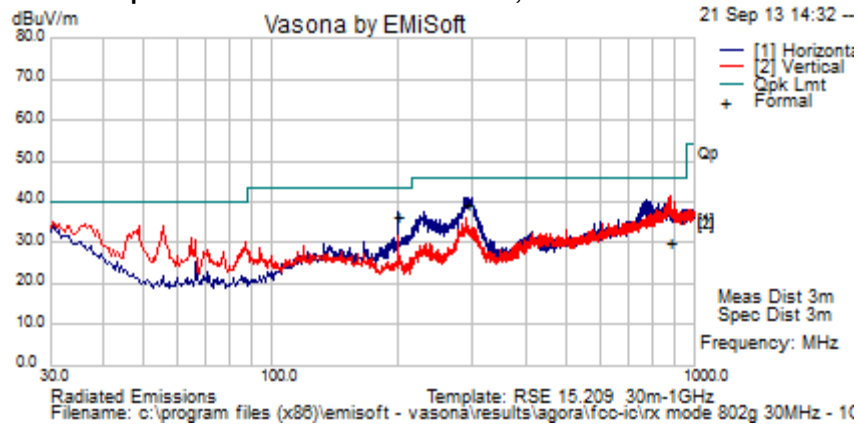


Receiver Spurious emissions 802.11B mode , 1GHz to 18GHz range , Peak measurements

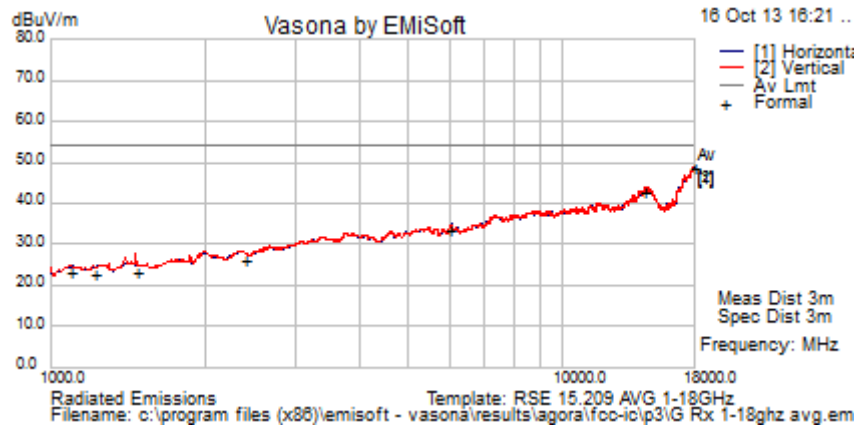


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
1093.728	58.2	3	-4.3	57	Peak.	H	198	160	74	-17	Pass	
1219.843	47	3.2	-4.1	46.1	Peak.	H	118	95	74	-27.9	Pass	
1484.799	47	3.6	-3.6	47	Peak.	H	151	156	74	-27	Pass	
2391.066	36.86	4.62	-1.78	39.7	Peak.	V	119	166	74	-34.3	Pass	
5999.169	48.6	7.7	0.7	57	Peak.	V	107	96	74	-17	Pass	
14389.47	33.76	12.91	9.55	56.22	Peak.	V	149	158	74	-17.78	Pass	
17924.39	34.7	14.88	12.06	61.63	Peak.	H	185	177	74	-12.37	Pass	

No measureable emissions above 15GHz

**Receiver Spurious Emissions 802.11G mode, 30MHz to 1GHz**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
199.28	22.09	1.25	12.14	35.48	Quasi Max	H	153	12	43.5	-8.02	Pass	
291.235	25.74	1.51	13.3	40.55	Quasi Max	H	125	345	46	-5.45	Pass	
875.622	4.57	2.65	21.9	29.12	Quasi Max	V	178	144	46	-16.88	Pass	

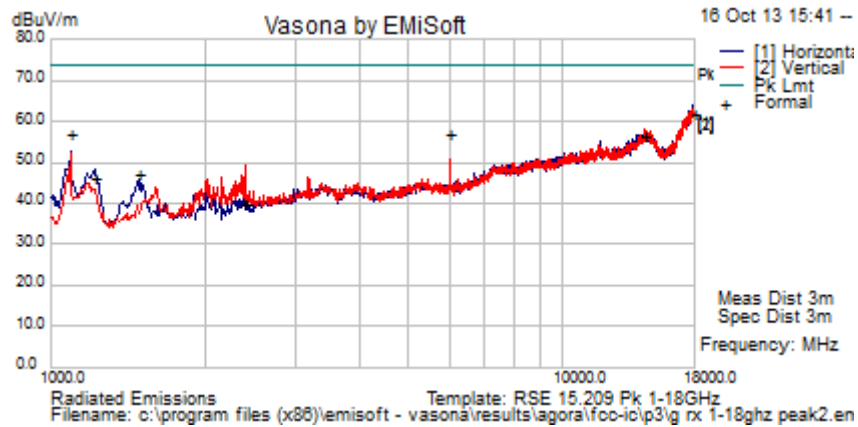
**Receiver Spurious emissions 802.11G mode , 1GHz to 18GHz range , average measurements**

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
17923.5	21.52	14.88	12.05	48.45	Average Max	H	195	168	54	-5.55	Pass	
14387.5	20.27	12.91	9.56	42.75	Average Max	V	200	107	54	-11.25	Pass	
1466.97	23.3	3.54	-3.62	23.22	Average Max	V	116	58	54	-30.78	Pass	
6000.013	24.81	7.73	0.67	33.21	Average Max	V	195	74	54	-20.79	Pass	
2392.96	23.25	4.62	-1.79	26.08	Average Max	V	190	119	54	-27.92	Pass	
1219.055	23.62	3.2	-4.13	22.68	Average Max	H	111	18	54	-31.32	Pass	
1093.25	24.39	3.03	-4.26	23.15	Average Max	H	125	68	54	-30.85	Pass	

No measurable emissions above 15GHz



Receiver Spurious emissions 802.11G mode , 1GHz to 18GHz range , Peak measurements



Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
1093.25	56.4	3	-4.3	55.2	Peak Max	H	198	160	74	-18.8	Pass	
1219.055	45.9	3.2	-4.1	45	Peak Max	H	118	95	74	-29	Pass	
1483.071	47	3.6	-3.6	47	Peak Max	H	151	156	74	-27	Pass	
2392.96	36.86	4.62	-1.78	39.7	Peak Max	V	119	166	74	-34.3	Pass	
6000.013	47.6	7.7	0.7	56	Peak Max	V	107	96	74	-18	Pass	
14387.5	33.76	12.91	9.55	56.22	Peak Max	V	149	158	74	-17.78	Pass	
17923.5	34.7	14.88	12.06	61.63	Peak Max	H	185	177	74	-12.37	Pass	

No measureable emissions above 15GHz

**AC Mains Conducted Spurious Emissions****15.207 & RSS GEN sec 7.2.4**

(a) 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 μ H/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.

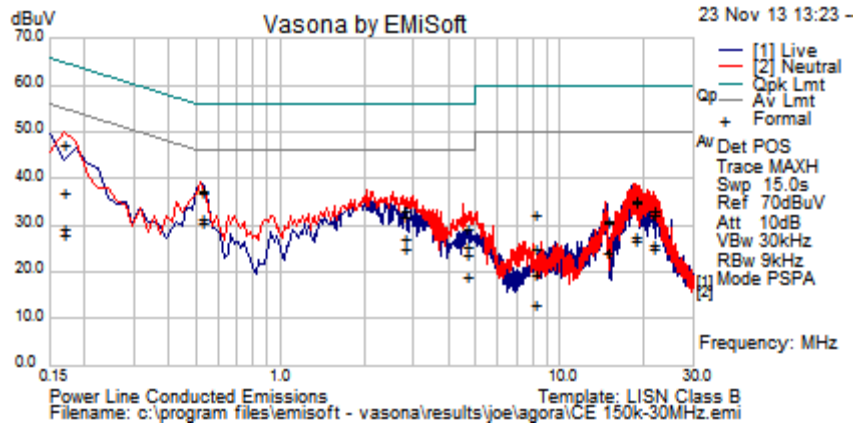
Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

Using Vasona, configure the spectrum analyzer as shown below (be sure to enter all losses between the transmitter output and the spectrum analyzer). Place the radio in continuous transmit mode.

Span:	150kHz – 30Hz
Reference Level:	70 dBuV
Attenuation:	10 dB
Sweep Time:	Auto
Resolution Bandwidth:	9Hz
Video Bandwidth:	30kHz
Detector:	Quasi-Peak

This report represents the worst case data for all supported operating modes and antennas.



Frequency MHz	Raw dBuV	Cable Loss	Factors dB	Level dBuV	Measurement Type	Line	Limit dBuV	Margin dB	Pass /Fail	Comments
0.5224	16.73	20.07	0.03	36.83	Quasi Peak	Live	56	-19.17	Pass	
0.169	15.76	21.01	0.05	36.83	Quasi Peak	Live	65.01	-28.18	Pass	
21.3969	12.3	20.51	0.16	32.97	Quasi Peak	Live	60	-27.03	Pass	
14.6746	9.97	20.31	0.17	30.45	Quasi Peak	Live	60	-29.55	Pass	
8.144	4.45	20.16	0.14	24.75	Quasi Peak	Live	60	-35.25	Pass	
2.7942	13.18	20.02	0.04	33.24	Quasi Peak	Live	56	-22.76	Pass	
18.4548	14.15	20.4	0.14	34.69	Quasi Peak	Live	60	-25.31	Pass	
4.6377	9.07	20.07	0.05	29.19	Quasi Peak	Live	56	-26.81	Pass	
0.169	26.26	21.01	0.05	47.32	Quasi Peak	Neutral	65.01	-17.69	Pass	
2.7942	11.81	20.02	0.04	31.87	Quasi Peak	Neutral	56	-24.13	Pass	
18.4548	14.47	20.4	0.14	35.01	Quasi Peak	Neutral	60	-24.99	Pass	
4.6377	5.34	20.07	0.05	25.46	Quasi Peak	Neutral	56	-30.54	Pass	
14.6746	10.26	20.31	0.17	30.73	Quasi Peak	Neutral	60	-29.27	Pass	
0.5224	17.06	20.07	0.03	37.16	Quasi Peak	Neutral	56	-18.84	Pass	
21.3969	11.55	20.51	0.16	32.23	Quasi Peak	Neutral	60	-27.77	Pass	
8.144	11.93	20.16	0.14	32.23	Quasi Peak	Neutral	60	-27.77	Pass	
0.5224	10.56	20.07	0.03	30.66	Average	Live	46	-15.34	Pass	
0.169	8.29	21.01	0.05	29.35	Average	Live	55.01	-25.66	Pass	
21.3969	5.1	20.51	0.16	25.78	Average	Live	50	-24.22	Pass	
14.6746	3.56	20.31	0.17	24.03	Average	Live	50	-25.97	Pass	
8.144	-0.92	20.16	0.14	19.38	Average	Live	50	-30.62	Pass	
2.7942	7.1	20.02	0.04	27.16	Average	Live	46	-18.84	Pass	
18.4548	6.9	20.4	0.14	27.44	Average	Live	50	-22.56	Pass	
4.6377	3.42	20.07	0.05	23.54	Average	Live	46	-22.46	Pass	
0.169	6.73	21.01	0.05	27.8	Average	Neutral	55.01	-27.21	Pass	
2.7942	4.97	20.02	0.04	25.03	Average	Neutral	46	-20.97	Pass	
18.4548	6.23	20.4	0.14	26.77	Average	Neutral	50	-23.23	Pass	
4.6377	-1.12	20.07	0.05	19	Average	Neutral	46	-27	Pass	
14.6746	3.38	20.31	0.17	23.86	Average	Neutral	50	-26.14	Pass	



0.5224	11.08	20.07	0.03	31.18	Average	Neutral	46	-14.82	Pass	
21.3969	4.09	20.51	0.16	24.77	Average	Neutral	50	-25.23	Pass	
8.144	-7.6	20.16	0.14	12.7	Average	Neutral	50	-37.3	Pass	



Appendix B: Abbreviation Key and Definitions

The following table defines abbreviations used within this test report.

Abbreviation	Description	Abbreviation	Description
EMC	Electro Magnetic Compatibility	°F	Degrees Fahrenheit
EMI	Electro Magnetic Interference	°C	Degrees Celsius
EUT	Equipment Under Test	Temp	Temperature
ITE	Information Technology Equipment	S/N	Serial Number
TAP	Test Assessment Schedule	Qty	Quantity
ESD	Electro Static Discharge	emf	Electromotive force
EFT	Electric Fast Transient	RMS	Root mean square
EDCS	Engineering Document Control System	Qp	Quasi Peak
Config	Configuration	Av	Average
CIS#	Cisco Number (unique identification number for Cisco test equipment)	Pk	Peak
Cal	Calibration	kHz	Kilohertz (1×10^3)
EN	European Norm	MHz	MegaHertz (1×10^6)
IEC	International Electro technical Commission	GHz	Gigahertz (1×10^9)
CISPR	International Special Committee on Radio Interference	H	Horizontal
CDN	Coupling/Decoupling Network	V	Vertical
LISN	Line Impedance Stabilization Network	dB	decibel
PE	Protective Earth	V	Volt
GND	Ground	kV	Kilovolt (1×10^3)
L1	Line 1	μV	Microvolt (1×10^{-6})
L2	Line2	A	Amp
L3	Line 3	μA	Micro Amp (1×10^{-6})
DC	Direct Current	mS	Milli Second (1×10^{-3})
RAW	Uncorrected measurement value, as indicated by the measuring device	μS	Micro Second (1×10^{-6})
RF	Radio Frequency	μS	Micro Second (1×10^{-6})
SLCE	Signal Line Conducted Emissions	m	Meter
Meas dist	Measurement distance	Spec dist	Specification distance
N/A or NA	Not Applicable	SL	Signal Line (or Telecom Line)
P	Power Line	L	Live Line
N	Neutral Line	R	Return



S	Supply	AC	Alternating Current
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Appendix C: Test Equipment Used to perform the test

Equip#	Manufacturer/ Model	Description	Cal Due
001708	Fluke/87	RMS Digital Multimeter	05-DEC-13
001937	Cisco/ NSA 5m Chamber	NSA 5m Chamber	15-FEB-14
003003	HP/83731B	Synthesized Signal Generator	26-MAR-14
004883	EMC Test Systems/ 3115	Double Ridged Guide Horn Antenna	N/A
006088	HP/8447D	PreAmplifier (.1-1GHz)	01-FEB-14
006335	Lufft/5063-33W	Thermo-Hydrometer	09-NOV-13
006662	Fluke/30	Clamp Meter	06-AUG-14
008022	Huber + Suhner/ SF106A	1 meter Sucoflex cable	12-DEC-13
008024	Huber + Suhner/ SF106A	3 meter Sucoflex cable	05-NOV-13
008166	HP/8491B Opt 010	10dB Attenuator	08-FEB-14
008447	Cisco/NSA 10m Chamber	NSA 10m Chamber	16-OCT-13
008448	Cisco/NSA 5m Chamber	NSA 5m Chamber	09-OCT-13
018314	EMC Test Systems/ 3115	Double Ridged Guide Horn Antenna	N/A
021117	Micro-Coax/ UFB311A-0-2484-520520	RF Coaxial Cable, to 18GHz, 248.4 in	24-AUG-14
024998	Micro-Coax/ UFB197C-1-0240-504504	RF Coaxial Cable, to 18GHz, 24 in	01-MAR-14
025658	Micro-Coax/ UFB311A-1-0840-504504	RF Coaxial Cable, to 18GHz, 84 in	13-FEB-14
027235	York/ CNE V	Comparison Noise Emitter	N/A
030443	Micro-Coax/ UFB311A-0-1560-520520	RF Coaxial Cable, to 18GHz, 156 In.	05-NOV-13
030654	Sunol Sciences/ JB1	Combination Antenna, 30MHz-2GHz	16-OCT-13
033602	Midwest Microwave/ CSY-NMNM-80-273001	RF Coaxial Cable, 27ft. to 18GHz	05-NOV-13
034074	Schaffner/ RSG 2000	Reference Spectrum Generator, 1-18GHz	N/A



034075	Schaffner/ RSG 2000	Reference Spectrum Generator, 1-18GHz	N/A
035244	Klein Tools/ 926-8ME	8 Meter Tape Measure	30-APR-14
035619	TestEquity/ 105A	Half Cube Temperature Chamber	08-MAY-14
037235	JFW/ 50CB-015	GPIO Control Box	N/A
037581	ETS-Lindgren/ 3117	Double Ridged Waveguide Horn Antenna	19-JUL-14
039130	Cisco/ TH0118-PS	Power Supply for TH0118 1-18GHz Preamplifier	06-MAY-14
040503	Agilent/ E4440A	Precision Spectrum Analyzer	30-JAN-14
040523	Rohde & Schwarz/ ESCI	EMI Test Receiver	05-JUL-14
040603	Agilent/ E4440A	Spectrum Analyzer	31-OCT-13
040641	Rohde & Schwarz/ ESU26	EMI Test Receiver	14-JUN-14
041202	ETS-Lindgren/ 3117	Double Ridged Horn Antenna	28-AUG-14
041935	Newport/ iBTHP-5-DB9	5 inch Temp/RH/Press Sensor w/20ft cable	25-MAR-14
041979	Cisco/ 1840	18-40GHz EMI Test Head/Verification Fixture	12-JUL-14
041986	Murata Electronics/ MXGS83RK3000	Special Radio Test Adaptor Cable	31-MAY-14
041991	Cisco/ TH0118	Mast Mount Preamplifier Array, 1-18GHz	06-MAY-14
041995	Mini-Circuits/ BW-S6W2	6dB Attenuator	31-MAY-14
042000	Agilent/ E4440A	Spectrum Analyzer	29-JUN-14
044940	Rohde & Schwarz/ ESU40	EMI Test Receiver, 20Hz-40GHz	15-MAY-14
045588	Sunol Sciences/ JB1	Combination Antenna, 30MHz-2GHz	08-JAN-14
045723	Cisco/ TH0118	Mast Mount Preamplifier Array, 1-18GHz	02-APR-14
046076	Newport/ iBTHP-5-DB9	5 inch Temp/RH/Press Sensor w/20ft cable	19-OCT-14
046708	Stanley/ 33-428	8 Meter Tape Measure	19-NOV-13
048720	Huber+Suhner/ Sucoflex 106PA	N type cable 18GHz	20-AUG-14
049413	Newport/ iBTHP-5-DB9	5 inch Temp/RH/Press Sensor w/20ft cable	12-DEC-13
049524	Cristek/ MK-AMS-L16-AMS-A060	SMA 5ft cable	08-APR-14



Appendix D: Test Procedures

Measurements were made in accordance with

- FCC docket #:DA 00-0705,
- ET docket 96-8, KDB Publication No. 558074
- measurement method of spurious emission tolerance to the International Telecommunication Union (ITU) Recommendation SM329.
- ANSI C63.10
- ANSI C63.4

Test procedures are summarized below

Document Reference	Scope of Document
EDCS #: 420238	Internal Radio Test Procedures
ERAT Job Number: 5965	Test Plan



Appendix E: Scope of Accreditation: A2LA certificate number 1178-01

The scope of accreditation of Cisco Systems, Inc. can be found on the A2LA web page at:

<http://www.a2la.org/scopepdf/1178-01.pdf>

Previous versions of the scope of accreditation are archived under EDCS 1010411. The actual scope of accreditation that was current at the time of testing performed under this report can be obtained upon request.