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March 26, 2014

ARRIS Group, Inc.
3871 Lakefield Drive, Suite 300
Suwanee, GA 30024

Dear Ed Champion,

Enclosed is the EMC Wireless test report for compliance testing of the ARRIS Group, Inc., SGB6700 AC as tested to the requirements of Title 47 of the CFR, Ch. 1 (10-1-06 ed.), Part 15, Subpart B and ICES-003, Issue 5 August 2012 for a Class B Digital Device, and FCC Part 15 Subpart C and RSS-210, Issue 8, Dec. 2010 for Intentional Radiators.

Thank you for using the services of MET Laboratories, Inc. If you have any questions regarding these results or if MET can be of further service to you, please feel free to contact me.

Sincerely yours,
MET LABORATORIES, INC.

Jennifer Warnell
Documentation Department

Reference: (\ARRIS Group, Inc.\EMC41043A-FCC247 Rev. 4)

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Electromagnetic Compatibility Criteria
Test Report

for the

ARRIS Group, Inc.
SGB6700 AC

Tested under
the FCC Certification Rules
contained in
Title 47 of the CFR, Parts 15 Subpart B & ICES-003
for Class B Digital Devices
&
15.247 Subpart C & RSS-210, Issue 8, Dec. 2010
for Intentional Radiators

MET Report: EMC41043A-FCC247 Rev. 4

March 26, 2014

Prepared For:

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Electromagnetic Compatibility Criteria
Test Report

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SGB6700 AC

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Title 47 of the CFR, Parts 15 Subpart B & ICES-003
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&
15.247 Subpart C & RSS-210, Issue 8, Dec. 2010
for Intentional Radiators

Surinder Singh, Project Engineer
Electromagnetic Compatibility Lab

Jennifer Warnell
Documentation Department

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules Parts 15B, 15.247 and Industry Canada standards ICES-003, Issue 5 August 2012, RSS-210, Issue 8, Dec. 2010 under normal use and maintenance.

Asad Bajwa,
Director, Electromagnetic Compatibility Lab

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Report Status Sheet

Revision	Report Date	Reason for Revision
∅	March 7, 2014	Initial Issue.
1	March 18, 2014	Editorial correction.
2	March 21, 2014	Revised to reflect engineer corrections.
3	March 25, 2014	Editorial correction.
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Figure 4. Block Diagram, Peak Power Spectral Density Test Setup 199

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List of Terms and Abbreviations

AC	**A**lternating **C**urrent
ACF	**A**ntenna **C**orrection **F**actor
Cal	**Cal**ibration
d	**M**easurement **D**istance
dB	**D**eci**b**els
dBµA	**D**eci**b**els above one **micro**amp
dBµV	**D**eci**b**els above one **micro**volt
dBµA/m	**D**eci**b**els above one **micro**amp **per m**eter
dBµV/m	**D**eci**b**els above one **micro**volt **per m**eter
DC	**D**irect **C**urrent
E	**E**lectric Field
DSL	**D**igital **S**ubscriber **L**ine
ESD	**E**lectro**s**tatic **D**ischarge
EUT	**E**quipment **U**nder **T**est
f	**F**requency
FCC	**F**ederal **C**ommunications **C**ommission
GRP	**G**round **R**eference **P**lane
H	Magnetic Field
HCP	**H**orizontal **C**oupling **P**lane
Hz	**H**ert**z**
IEC	**I**nternational **E**lectrotechnical **C**ommission
kHz	**k**ilo**h**ert**z**
kPa	**k**ilo**pa**scal
kV	**k**ilo**v**olt
LISN	**L**ine **I**mpedance **S**tabilization **N**etwork
MHz	**M**ega**h**ertz
µH	**microh**enry
µ	**microf**arad
µs	**micros**econds
NEBS	**N**etwork **E**quipment-**B**uilding **S**ystem
PRF	**P**ulse **R**epetition **F**requency
RF	**R**adio **F**requency
RMS	**R**oot-**M**ean-**S**quare
TWT	**T**raveling **W**ave **T**ube
V/m	**V**olts **per m**eter
VCP	**V**ertical **C**oupling **P**lane

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I. Executive Summary

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A. Purpose of Test

An EMC evaluation was performed to determine compliance of the ARRIS Group, Inc. SGB6700 AC, with the requirements of Part 15, §15.247. All references are to the most current version of Title 47 of the Code of Federal Regulations in effect. In accordance with §2.1033, the following data is presented in support of the Certification of the SGB6700 AC. ARRIS Group, Inc. should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the SGB6700 AC, has been **permanently** discontinued.

B. Executive Summary

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, §15.247, in accordance with ARRIS Group, Inc., purchase order number 0008075143. All tests were conducted using measurement procedure ANSI C63.4-2003.

FCC Reference 47 CFR Part 15.247:2005	IC Reference RSS-210 Issue 8: 2010; RSS-GEN Issue 3: 2010	Description	Compliance
47 CFR Part 15.107 (a)	ICES-003 Issue 5 August 2012	Conducted Emission Limits for a Class B Digital Device	Compliant
47 CFR Part 15.109 (a)	ICES-003 Issue 5 August 2012	Radiated Emission Limits for a Class B Digital Device	Compliant
Title 47 of the CFR, Part 15 §15.203	N/A	Antenna Requirement	Compliant
Title 47 of the CFR, Part 15 §15.207(a)	RSS-GEN (7.2.4)	Conducted Emission Limits	Compliant
Title 47 of the CFR, Part 15 §15.247(a)(2)	RSS-Gen(4.6)	6dB Occupied Bandwidth	Compliant
		99% Occupied Bandwidth	Compliant
Title 47 of the CFR, Part 15 §15.247(b)	RSS-210(A8.4)	Peak Power Output	Compliant
Title 47 of the CFR, Part 15 §15.247(d); §15.209; §15.205	RSS-210(A8.5)	Radiated Spurious Emissions Requirements	Compliant
Title 47 of the CFR, Part 15 §15.247(d)	RSS-210(A8.5)	RF Conducted Spurious Emissions Requirements	Compliant
Title 47 of the CFR, Part 15 §15.247(d)	RSS-210(A8.5)	RF Conducted Band Edge	Compliant
Title 47 of the CFR, Part 15; §15.247(e)	RSS-210(A8.2)	Peak Power Spectral Density	Compliant
Title 47 of the CFR, Part 15 §15.247(i)	RSS-Gen(5.6)	Maximum Permissible Exposure (MPE)	Compliant

Table 1. Executive Summary of EMC Part 15.247 ComplianceTesting

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II. Equipment Configuration

A. Overview

MET Laboratories, Inc. was contracted by ARRIS Group, Inc. to perform testing on the SGB6700 AC, under ARRIS Group, Inc.'s purchase order number 0008075143.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the ARRIS Group, Inc., SGB6700 AC.

The results obtained relate only to the item(s) tested.

Model(s) Tested:	SGB6700 AC	
Model(s) Covered:	SGB6700 AC	
EUT Specifications:	Primary Power: 120 VAC, 60 Hz	
	FCC ID: UIDSBG6700 IC: 6670A-SbG6700	
	Type of Modulations:	CCK, OFDM, MCS
	Equipment Code:	DTS
	Peak RF Output Power:	29.72
	EUT Frequency Ranges:	2412-2462 MHz
Analysis:	The results obtained relate only to the item(s) tested.	
Environmental Test Conditions:	Temperature: 15-35º C	
	Relative Humidity: 30-60%	
	Barometric Pressure: 860-1060 mbar	
Evaluated by:	Surinder Singh	
Report Date(s):	March 26, 2014	

Table 2. EUT Summary Table

B. References

CFR 47, Part 15, Subpart C	Federal Communication Commission, Code of Federal Regulations, Title 47, Part 15: General Rules and Regulations, Allocation, Assignment, and Use of Radio Frequencies
CFR 47, Part 15, Subpart B	Electromagnetic Compatibility: Criteria for Radio Frequency Devices
RSS-210, Issue 8, Dec. 2010	Low-power Licence-exempt Radiocommunications Devices (All Frequency Bands): Category I Equipment
RSS-GEN, Issue 3, Dec. 2010	General Requirements and Information for the Certification of Radio Apparatus
ICES-003, Issue 5 August 2012	Information Technology Equipment (ITE) — Limits and methods of measurement
ANSI C63.4:2003	Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical And Electronic Equipment in the Range of 9 kHz to 40 GHz
ISO/IEC 17025:2005	General Requirements for the Competence of Testing and Calibration Laboratories
ANSI C63.10-2009	American National Standard for Testing Unlicensed Wireless Devices

Table 3. References

C. Test Site

All testing was performed at MET Laboratories, Inc., 914 W. Patapsco Ave., Baltimore, MD 21230. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology.

Radiated Emissions measurements were performed in a 3 meter semi-anechoic chamber (equivalent to an Open Area Test Site). In accordance with §2.948(a)(3), a complete site description is contained at MET Laboratories.

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D. Description of Test Sample

The ARRIS Group, Inc. SGB6700 AC, Equipment Under Test (EUT), is an indoor2.4/5GHz indoor data gateway. The EUT has two radios. One is a 2x2 MIMO 2.4 GHz radio and the other is a 3x3 MIMO 5 GHz radio.

E. Equipment Configuration

Ref. ID	Name / Description	Model Number	Part Number	Serial Number	Revision
--	SBG6700-ac	SBG6700-ac	--	--	--

Table 4. Equipment Configuration

F. Support Equipment

Ref. ID	Name / Description	Manufacturer	Model Number
--	Laptop	Dell	Vostro
--	Laptop Mouse	Logitech	--
--	RF Cable	--	--
--	Ethernet	--	--
--	12 Vdc PS	--	--

Table 5. Support Equipment

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G. Ports and Cabling Information

Ref. ID	Port Name on EUT	Cable Description	Qty.	Length (m)	Shielded (Y/N)	Termination Point
1	Data	RG6 Coax	1	8	Yes	B. TX
2	12 Vdc	DC Connector	1	2	No	(230v/50hz)
	Ethernet	Ethernet	1	2	No	--

Table 6. Ports and Cabling Information

H. Mode of Operation

The provided test tool will configure the SBG6700 for operation at each required test mode. Test modes have been previously supplied for quote.

I. Method of Monitoring EUT Operation

The measured emission value is over the specified FCC/IC limits.

J. Modifications

a) Modifications to EUT

No modifications were made to the EUT.

b) Modifications to Test Standard

No modifications were made to the test standard.

K. Disposition of EUT

The test sample including all support equipment submitted to the Electro-Magnetic Compatibility Lab for testing was returned to ARRIS Group, Inc. upon completion of testing.

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III. Electromagnetic Compatibility Criteria for Unintentional Radiators

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Electromagnetic Compatibility Criteria

§ 15.107 Conducted Emissions Limits

Test Requirement(s):

15.107 (a) Except for Class A digital devices, for equipment 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 Table 7. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.

15.107 (b) For a Class A digital device 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 Table 7. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals. The lower limit applies at the band edges.

Frequency range (MHz)	Class A Conducted Limits (dBµV)		*Class B Conducted Limits (dBµV)	
	Quasi-Peak	Average	Quasi-Peak	Average
* 0.15- 0.45	79	66	66 - 56	56 - 46
0.45 - 0.5	79	66	56	46
0.5 - 30	73	60	60	50
Note 1 — The lower limit shall apply at the transition frequencies. Note 2 — The limit decreases linearly with the logarithm if the frequency in the range 0.15 MHz to 0.5 MHz.				

Table 7. Conducted Limits for Radio Frequency Devices calculated from FCC Part 15 Subsections 15.107(a) (b)

Test Procedures:

The EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber. The method of testing, test conditions, and test procedures of ANSI C63.4 were used. The EUT was powered through a 50Ω/50µH LISN. An EMI receiver, connected to the measurement port of the LISN, scanned the frequency range from 150 kHz to 30 MHz in order to find the peak conducted emissions. All peak emissions within 6 dB of the limit were re-measured using a quasi-peak and/or average detector as appropriate.

Test Results:

The EUT was compliant with the Class B requirement(s) of this section. Measured emissions were below applicable limits.

Test Engineer(s): Djed Mouada

Test Date(s): 01/31/14

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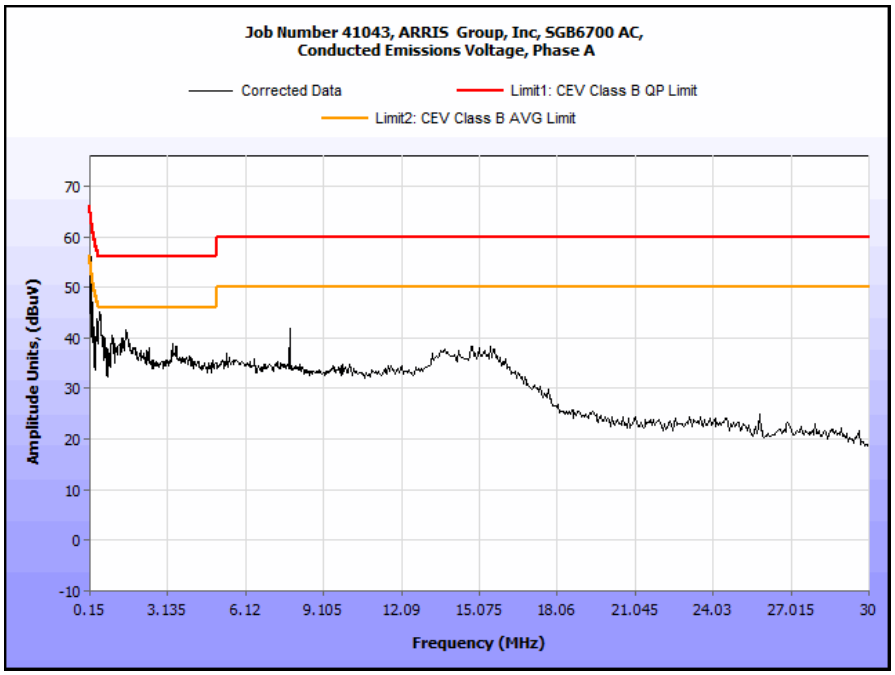
Conducted Emissions - Voltage, AC Power, Phase Line (120 VAC, 60 Hz)

Frequency (MHz)	Uncorrected Meter Reading (dBµV) QP	Cable Loss (dB)	Corrected Measurement (dBµV) QP	Limit (dBµV) QP	Margin (dB) QP	Uncorrected Meter Reading (dBµV) Avg.	Cable Loss (dB)	Corrected Measurement (dBµV) AVG	Limit (dBµV) AVG	Margin (dB) AVG
0.187	50.89	0	50.89	64.17	-13.28	35.74	0	35.74	54.17	-18.43
0.494	40.22	0	40.22	56.1	-15.88	26.89	0	26.89	46.1	-19.21
0.792	31.71	0	31.71	56	-24.29	19.35	0	19.35	46	-26.65
1.518	37.59	0	37.59	56	-18.41	24.69	0	24.69	46	-21.31
13.8	31.8	0	31.8	60	-28.2	25.79	0	25.79	50	-24.21
22.48	18.34	0	18.34	60	-41.66	12.35	0	12.35	50	-37.65

Table 8. Conducted Emissions - Voltage, AC Power, Phase Line (120 VAC, 60 Hz)

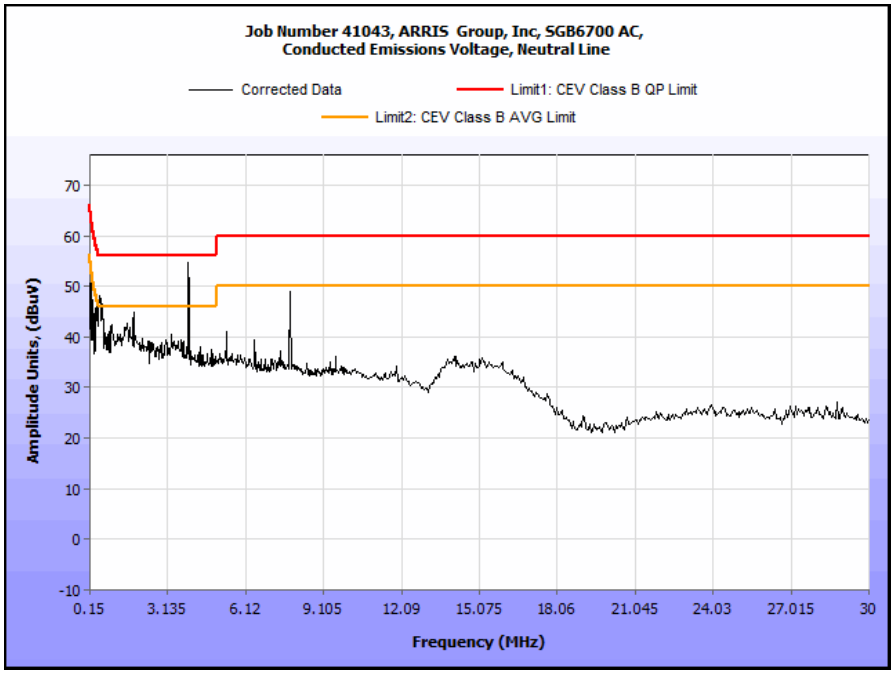


Plot 1. Conducted Emissions, Phase Line Plot

Conducted Emissions - Voltage, AC Power, Neutral Line (120 VAC, 60 Hz)

Frequency (MHz)	Uncorrected Meter Reading (dBµV) QP	Cable Loss (dB)	Corrected Measurement (dBµV) QP	Limit (dBµV) QP	Margin (dB) QP	Uncorrected Meter Reading (dBµV) Avg.	Cable Loss (dB)	Corrected Measurement (dBµV) AVG	Limit (dBµV) AVG	Margin (dB) AVG
0.151	44.1	0	44.1	65.95	-21.85	28.82	0	28.82	55.95	-27.13
0.419	46.5	0	46.5	57.47	-10.97	31.35	0	31.35	47.47	-16.12
0.545	45.82	0	45.82	56	-10.18	34.74	0	34.74	46	-11.26
1.455	35.7	0	35.7	56	-20.3	25.08	0	25.08	46	-20.92
11.3	27.84	0	27.84	60	-32.16	21.47	0	21.47	50	-28.53
29.69	1.877	0	1.877	60	-58.123	13.44	0	13.44	50	-36.56

Table 9. Conducted Emissions - Voltage, AC Power, Neutral Line (120 VAC, 60 Hz)



Plot 2. Conducted Emissions, Neutral Line Plot

Radiated Emission Limits

§ 15.109 Radiated Emissions Limits

Test Requirement(s): **15.109 (a)** 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 Class B limits expressed in Table 10.

15.109 (b) The field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the Class A limits expressed in Table 10.

Frequency (MHz)	Field Strength (dBµV/m)	
	§15.109 (b), Class A Limit (dBµV) @ 10m	§15.109 (a),Class B Limit (dBµV) @ 3m
30 - 88	39.00	40.00
88 - 216	43.50	43.50
216 - 960	46.40	46.00
Above 960	49.50	54.00

Table 10. Radiated Emissions Limits calculated from FCC Part 15, §15.109 (a) (b)

Test Procedures: The EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber. The method of testing and test conditions of ANSI C63.4 were used. An antenna was located 3 m from the EUT on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1 m and 4 m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. Unless otherwise specified, measurements were made using a quasi-peak detector with a 120 kHz bandwidth.

Test Results: The EUT was compliant with the Class B requirement(s) of this section. Measured emissions were below applicable limits.

Test Engineer(s): Surinder Singh

Test Date(s): 02/08/14

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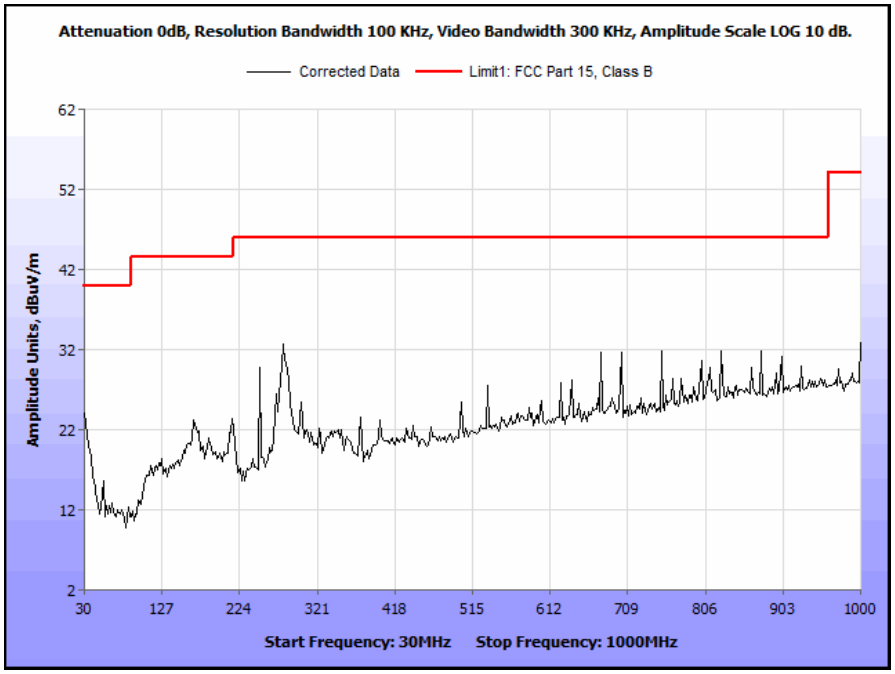
Radiated Emissions Limits Test Results, Class B

Frequency (MHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna HEIGHT (m)	Uncorrected Amplitude (dBµV)	Antenna Correction Factor (dB) (+)	Cable Loss (dB) (+)	Distance Correction Factor (dB) (-)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
166.34	34	H	1.05	14.89	12.37	0.94	0.00	28.20	43.50	-15.30
166.34	83	V	1.09	16.93	12.37	0.94	0.00	30.24	43.50	-13.26
278.47	129	H	1.18	12.04	13.80	1.42	0.00	27.26	46.00	-18.74
278.47	16	V	1.12	13.25	13.80	1.42	0.00	28.47	46.00	-17.53
503.27	19	H	1.05	11.95	18.10	1.88	0.00	31.93	46.00	-14.07
503.27	289	V	1.12	11.99	18.10	1.88	0.00	31.97	46.00	-14.03
675.39	229	H	1.19	10.30	20.60	2.15	0.00	33.05	46.00	-12.95
675.39	12	V	1.09	10.40	20.60	2.15	0.00	33.15	46.00	-12.85
751.39	198	H	1.03	8.37	21.23	2.41	0.00	32.01	46.00	-13.99
751.39	210	V	1.08	8.49	21.23	2.41	0.00	32.13	46.00	-13.87
926.38	118	H	1.12	7.21	23.13	2.85	0.00	33.19	46.00	-12.81
926.38	293	V	1.11	7.22	23.13	2.85	0.00	33.20	46.00	-12.80

Table 11. Radiated Emissions Limits, Test Results, 30 MHz – 1 GHz



Plot 3. Radiated Emissions, 30 MHz - 1 GHz

IV. Electromagnetic Compatibility Criteria for Intentional Radiators

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Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.203 Antenna Requirement

Test Requirement: **§ 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.

The structure and application of the EUT were analyzed to determine compliance with Section 15.203 of the Rules. Section 15.203 states that the subject device must meet at least one of the following criteria:

a.) Antenna must be permanently attached to the unit.

b.) Antenna must use a unique type of connector to attach to the EUT.

c.) Unit must be professionally installed. Installer shall be responsible for verifying that the correct antenna is employed with the unit.

Results: The EUT as tested is compliant the criteria of §15.203. The EUT has an integral antenna.

Test Engineer(s): Surinder Singh

Test Date(s): 02/10/14

Antennas	Peak Gain (over 2.4 GHz band)
Chain A0	1.66
Chain A1	3.35
2Tx Composite	5.56

The 2Tx Composite gain was calculated based upon the formula given in KDB 662911 D01 Multiple Transmitter Output v02r01 for antenna gains that are not equal and each transmit antenna is driven by only one spatial stream.

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Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.207(a) Conducted Emissions Limits

Test Requirement(s): **§ 15.207 (a):** 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 30MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 Σ 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 range (MHz)	§ 15.207(a), Conducted Limit (dBμV)	
	Quasi-Peak	Average
* 0.15- 0.45	66 - 56	56 - 46
0.45 - 0.5	56	46
0.5 - 30	60	50

Table 12. Conducted Limits for Intentional Radiators from FCC Part 15 § 15.207(a)

Test Procedure: The EUT was placed on a 0.8 m-high wooden table inside a screen room. The EUT was situated such that the back of the EUT was 0.4 m from one wall of the vertical ground plane, and the remaining sides of the EUT were no closer than 0.8 m from any other conductive surface. The EUT was powered from a 50 Ω/50 μH Line Impedance Stabilization Network (LISN). The EMC receiver scanned the frequency range from 150 kHz to 30 MHz. Conducted Emissions measurements were made in accordance with *ANSI C63.4-2003 "Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40 GHz"*. The measurements were performed over the frequency range of 0.15 MHz to 30 MHz using a 50 Ω/50 μH LISN as the input transducer to an EMC/field intensity meter. For the purpose of this testing, the transmitter was turned on. Scans were performed with the transmitter on.

Test Results: The EUT was compliant with this requirement.

Test Engineer(s): Djed Mouada

Test Date(s): 01/31/14

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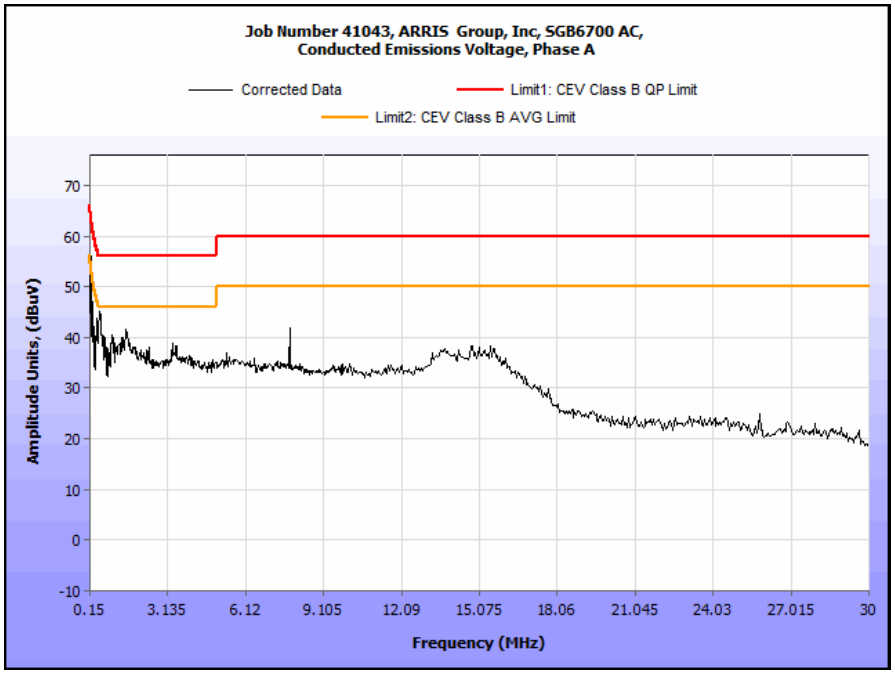
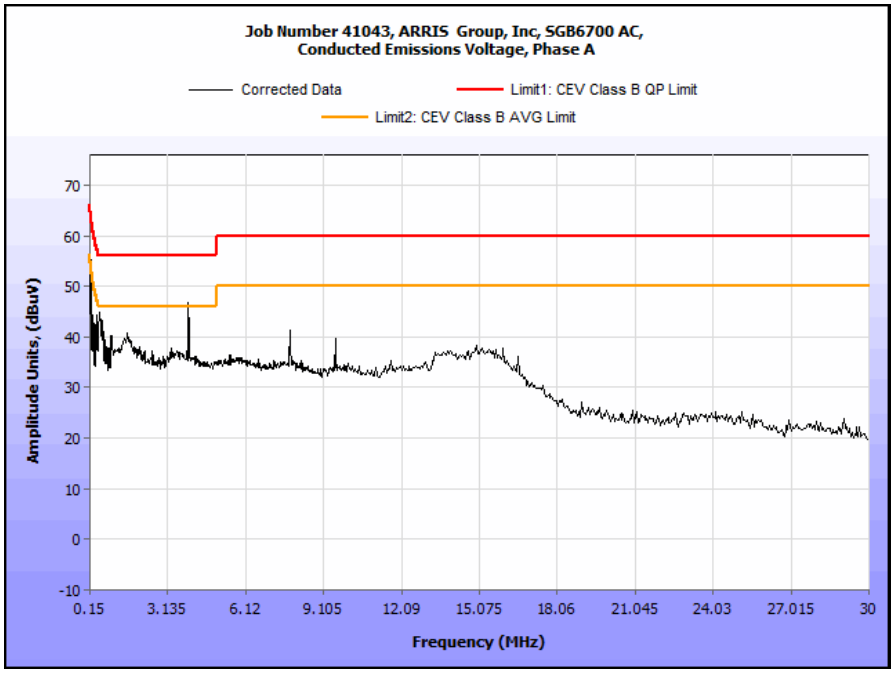
15.207(a) Conducted Emissions Test Results

Frequency (MHz)	Uncorrected Meter Reading (dBµV) QP	Cable Loss (dB)	Corrected Measurement (dBµV) QP	Limit (dBµV) QP	Margin (dB) QP	Uncorrected Meter Reading (dBµV) Avg.	Cable Loss (dB)	Corrected Measurement (dBµV) AVG	Limit (dBµV) AVG	Margin (dB) AVG
0.187	50.89	0	50.89	64.17	-13.28	35.74	0	35.74	54.17	-18.43
0.494	40.22	0	40.22	56.1	-15.88	26.89	0	26.89	46.1	-19.21
0.792	31.71	0	31.71	56	-24.29	19.35	0	19.35	46	-26.65
1.518	37.59	0	37.59	56	-18.41	24.69	0	24.69	46	-21.31
13.8	31.8	0	31.8	60	-28.2	25.79	0	25.79	50	-24.21
22.48	18.34	0	18.34	60	-41.66	12.35	0	12.35	50	-37.65

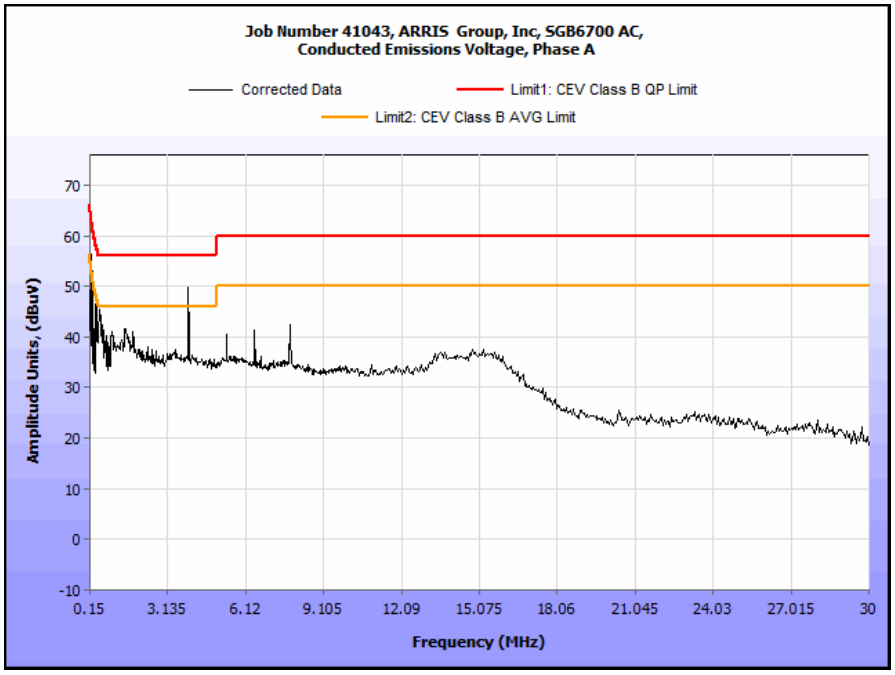
Table 13. Conducted Emissions, 15.207(a), Phase Line, Test Results



Plot 4. Conducted Emissions, 15.207(a), Phase Line, Low Channel



Plot 5. Conducted Emissions, 15.207(a), Phase Line, Mid Channel



Plot 6. Conducted Emissions, 15.207(a), Phase Line, High Channel

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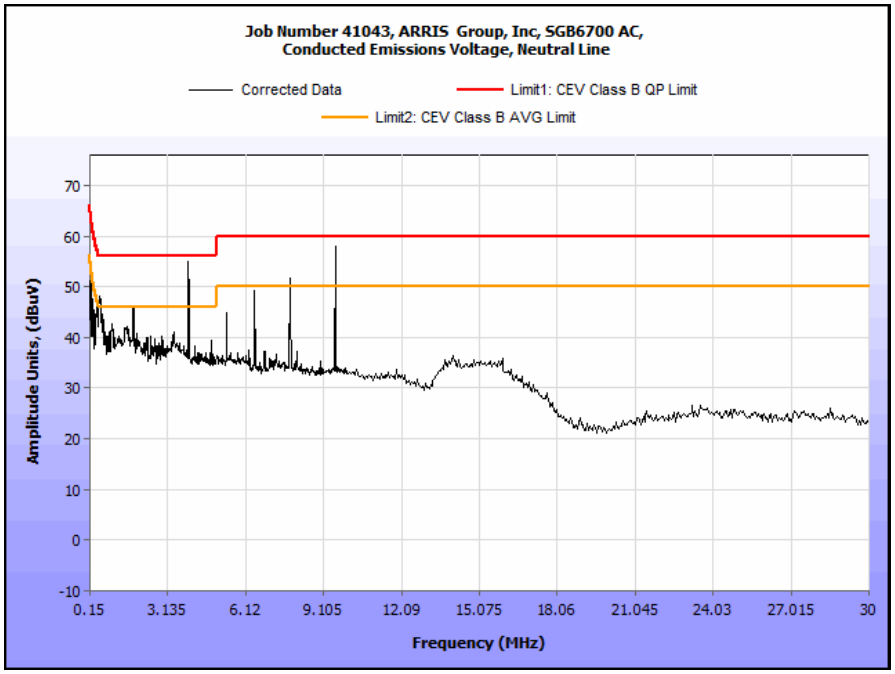
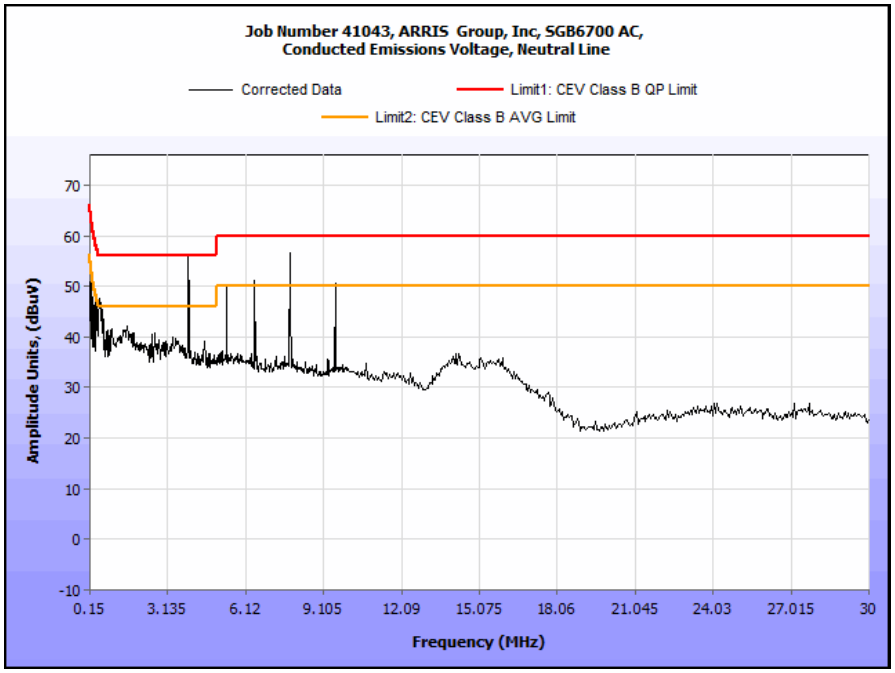
15.207(a) Conducted Emissions Test Results

Frequency (MHz)	Uncorrected Meter Reading (dBµV) QP	Cable Loss (dB)	Corrected Measurement (dBµV) QP	Limit (dBµV) QP	Margin (dB) QP	Uncorrected Meter Reading (dBµV) Avg.	Cable Loss (dB)	Corrected Measurement (dBµV) AVG	Limit (dBµV) AVG	Margin (dB) AVG
0.151	44.1	0	44.1	65.95	-21.85	28.82	0	28.82	55.95	-27.13
0.419	46.5	0	46.5	57.47	-10.97	31.35	0	31.35	47.47	-16.12
0.545	45.82	0	45.82	56	-10.18	34.74	0	34.74	46	-11.26
1.455	35.7	0	35.7	56	-20.3	25.08	0	25.08	46	-20.92
11.3	27.84	0	27.84	60	-32.16	21.47	0	21.47	50	-28.53
29.69	1.877	0	1.877	60	-58.123	13.44	0	13.44	50	-36.56

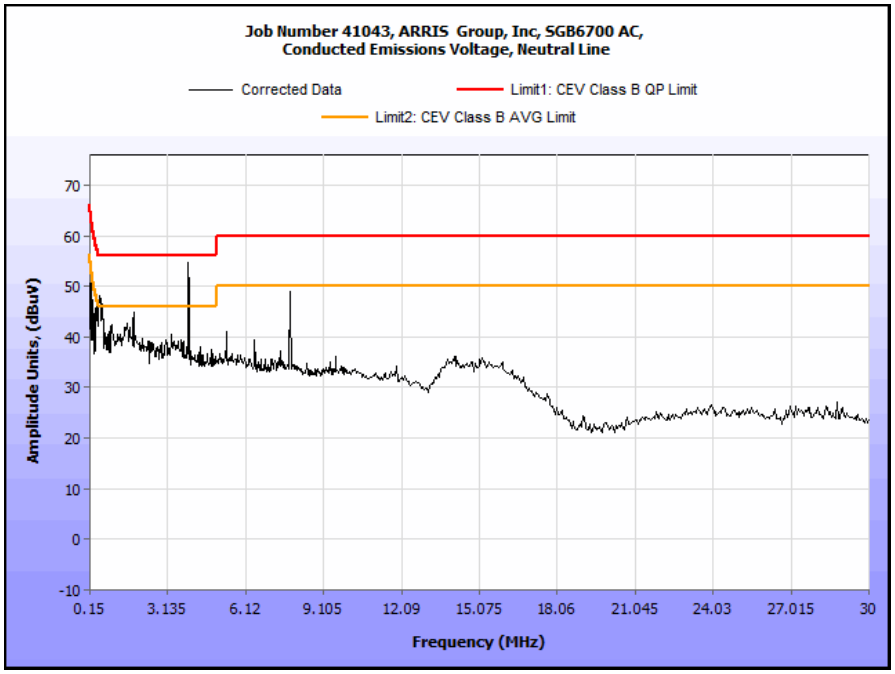
Table 14. Conducted Emissions, 15.207(a), Neutral Line, Test Results



Plot 7. Conducted Emissions, 15.207(a), Neutral Line, Low Channel



Plot 8. Conducted Emissions, 15.207(a), Neutral Line, Mid Channel



Plot 9. Conducted Emissions, 15.207(a), Neutral Line, High Channel

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Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(a)(2) 6 dB and 99% Bandwidth

Test Requirements: **§ 15.247(a)(2):** Operation under the provisions of this section is limited to frequency hopping and digitally modulated intentional radiators that comply with the following provisions:

For systems using digital modulation techniques, the EUT may operate in the 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz bands. The minimum 6dB bandwidth shall be at least 500 kHz.

Test Procedure: The transmitter was on and transmitting at the highest output power. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using a RBW approximately 1% of the total emission bandwidth, VBW > RBW. The 6 dB Bandwidth was measured and recorded. The measurements were performed on the low, mid and high channels.

Test Results The EUT was compliant with § 15.247 (a)(2).

The 6 dB and 99% Bandwidth was determined from the plots on the following pages.

Test Engineer(s): Surinder Singh

Test Date(s): 02/08/14

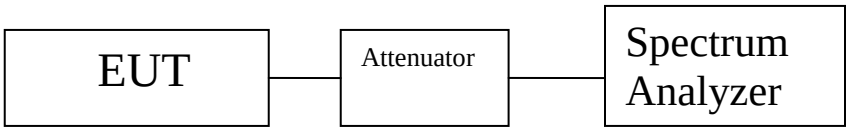

Figure 1. Block Diagram, Occupied Bandwidth Test Setup

Occupied Bandwidth Test Results

Occupied Bandwidth		
Carrier Channel	**Frequency (MHz)**	**Measured 6 dB Bandwidth (MHz)**
Channel 1	2412	9.034
Channel 6	2437	9.572
Channel 11	2462	8.618

Table 15. 6 dB Occupied Bandwidth, Test Results, 802.11b, Ant. 0

Occupied Bandwidth		
Carrier Channel	**Frequency (MHz)**	**Measured 6 dB Bandwidth (MHz)**
Channel 1	2412	9.041
Channel 6	2437	9.580
Channel 11	2462	9.079

Table 16. 6 dB Occupied Bandwidth, Test Results, 802.11b, Ant. 1

Occupied Bandwidth		
Carrier Channel	**Frequency (MHz)**	**Measured 6 dB Bandwidth (MHz)**
Channel 1	2412	15.743
Channel 6	2437	15.098
Channel 11	2462	14.676

Table 17. 6 dB Occupied Bandwidth, Test Results, 802.11g, Ant. 0

Occupied Bandwidth		
Carrier Channel	**Frequency (MHz)**	**Measured 6 dB Bandwidth (MHz)**
Channel 1	2412	16.165
Channel 6	2437	15.141
Channel 11	2462	15.086

Table 18. 6 dB Occupied Bandwidth, Test Results, 802.11g, Ant. 1

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Occupied Bandwidth		
Carrier Channel	**Frequency (MHz)**	**Measured 6 dB Bandwidth (MHz)**
Channel 1	2412	15.914
Channel 6	2437	15.951
Channel 11	2462	15.073

Table 19. 6 dB Occupied Bandwidth, Test Results, 802.11n 20 MHz, Ant. 0

Occupied Bandwidth		
Carrier Channel	**Frequency (MHz)**	**Measured 6 dB Bandwidth (MHz)**
Channel 1	2412	15.091
Channel 6	2437	15.173
Channel 11	2462	15.117

Table 20. 6 dB Occupied Bandwidth, Test Results, 802.11n 20 MHz, Ant. 1

Occupied Bandwidth		
Carrier Channel	**Frequency (MHz)**	**Measured 6 dB Bandwidth (MHz)**
Channel 1	2422	35.116
Channel 6	2437	35.683
Channel 11	2452	35.756

Table 21. 6 dB Occupied Bandwidth, Test Results, 802.11n 40 MHz, Ant. 0

Occupied Bandwidth		
Carrier Channel	**Frequency (MHz)**	**Measured 6 dB Bandwidth (MHz)**
Channel 1	2422	35.670
Channel 6	2437	35.701
Channel 11	2452	35.763

Table 22. 6 dB Occupied Bandwidth, Test Results, 802.11n 40 MHz, Ant. 1

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Occupied Bandwidth		
Carrier Channel	**Frequency (MHz)**	**Measured 99% Bandwidth (MHz)**
Channel 1	2412	13.9998
Channel 6	2437	15.2355
Channel 11	2462	13.7568

Table 23. 99% Occupied Bandwidth, Test Results, 802.11b, Ant. 0

Occupied Bandwidth		
Carrier Channel	**Frequency (MHz)**	**Measured 99% Bandwidth (MHz)**
Channel 1	2412	14.0544
Channel 6	2437	15.5978
Channel 11	2462	13.5731

Table 24. 99% Occupied Bandwidth, Test Results, 802.11b, Ant. 1

Occupied Bandwidth		
Carrier Channel	**Frequency (MHz)**	**Measured 99% Bandwidth (MHz)**
Channel 1	2412	18.3315
Channel 6	2437	19.6900
Channel 11	2462	18.2870

Table 25. 99% Occupied Bandwidth, Test Results, 802.11g, Ant. 0

Occupied Bandwidth		
Carrier Channel	**Frequency (MHz)**	**Measured 99% Bandwidth (MHz)**
Channel 1	2412	18.7429
Channel 6	2437	19.5906
Channel 11	2462	18.9699

Table 26. 99% Occupied Bandwidth, Test Results, 802.11g, Ant. 1

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Occupied Bandwidth		
Carrier Channel	**Frequency (MHz)**	**Measured 99% Bandwidth (MHz)**
Channel 1	2412	18.6882
Channel 6	2437	19.3818
Channel 11	2462	18.4341

Table 27. 99% Occupied Bandwidth, Test Results, 802.11n 20 MHz, Ant. 0

Occupied Bandwidth		
Carrier Channel	**Frequency (MHz)**	**Measured 99% Bandwidth (MHz)**
Channel 1	2412	18.5542
Channel 6	2437	19.3620
Channel 11	2462	19.0987

Table 28. 99% Occupied Bandwidth, Test Results, 802.11n 20 MHz, Ant. 1

Occupied Bandwidth		
Carrier Channel	**Frequency (MHz)**	**Measured 99% Bandwidth (MHz)**
Channel 1	2422	38.1003
Channel 6	2437	38.9352
Channel 11	2452	39.6940

Table 29. 99% Occupied Bandwidth, Test Results, 802.11n 40 MHz, Ant. 0

Occupied Bandwidth		
Carrier Channel	**Frequency (MHz)**	**Measured 99% Bandwidth (MHz)**
Channel 1	2422	37.5220
Channel 6	2437	37.0964
Channel 11	2452	39.6698

Table 30. 99% Occupied Bandwidth, Test Results, 802.11n 40 MHz, Ant. 1

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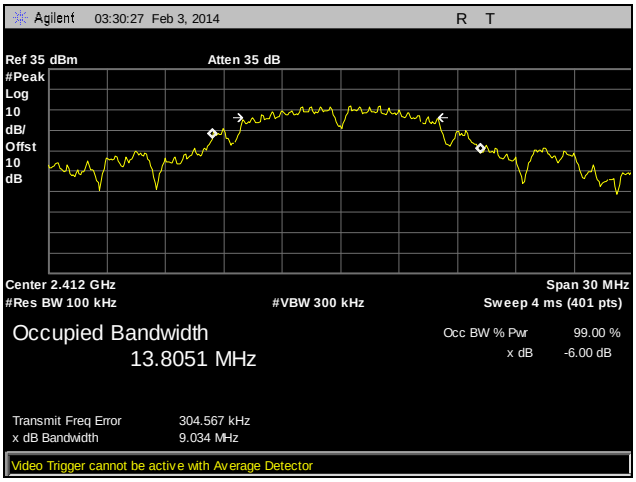
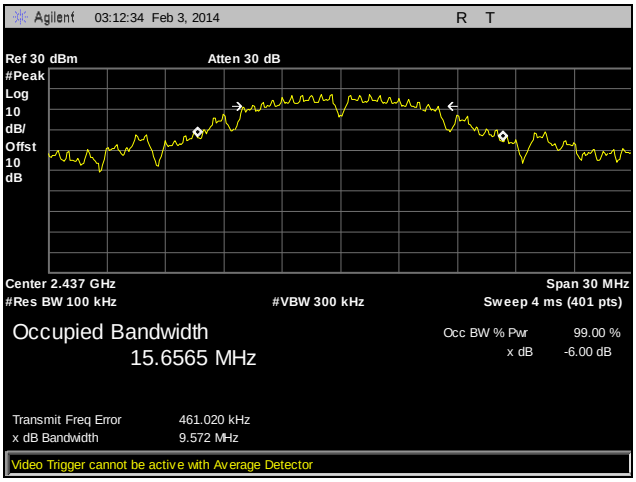
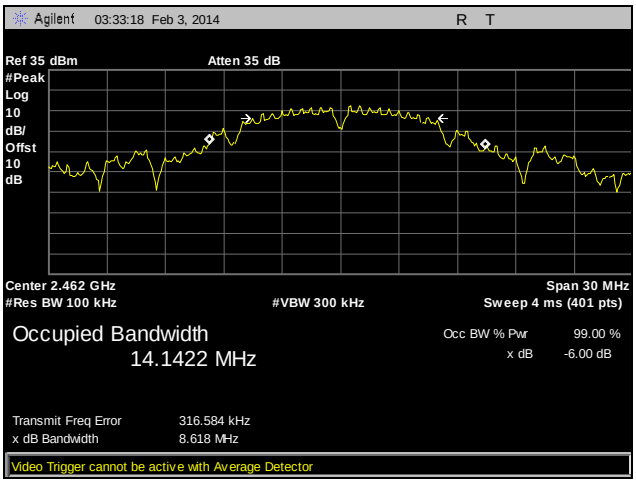
6 dB Occupied Bandwidth Test Results, 802.11b



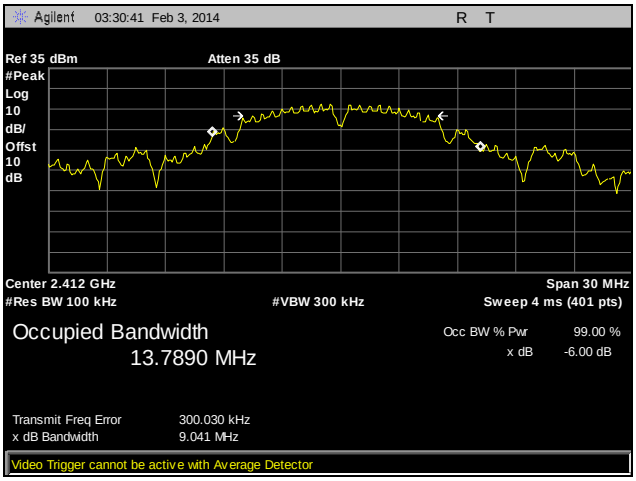
Plot 10. 6 dB Occupied Bandwidth, Channel 1, 802.11b, Ant. 0



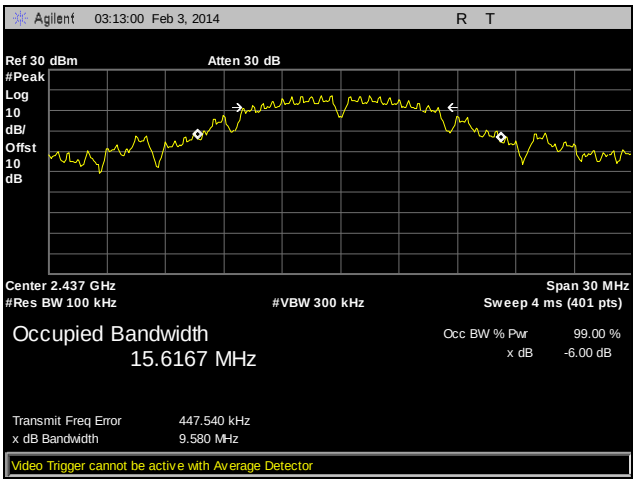
Plot 11. 6 dB Occupied Bandwidth, Channel 6, 802.11b, Ant. 0



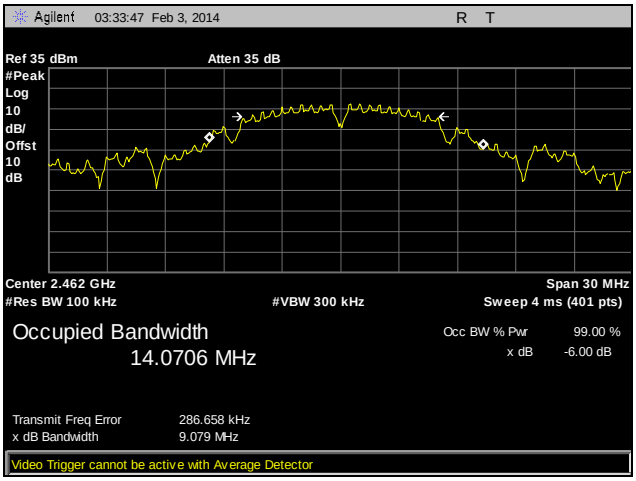
Plot 12. 6 dB Occupied Bandwidth, Channel 11, 802.11b, Ant. 0



Plot 13. 6 dB Occupied Bandwidth, Channel 1, 802.11b, Ant. 1

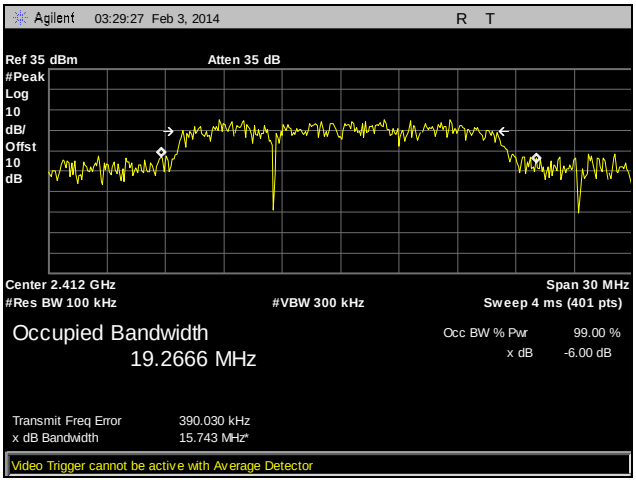


Plot 14. 6 dB Occupied Bandwidth, Channel 6, 802.11b, Ant. 1

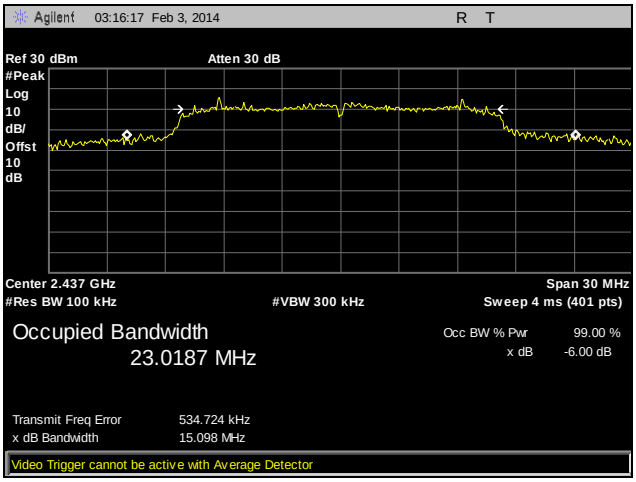


Plot 15. 6 dB Occupied Bandwidth, Channel 11, 802.11b, Ant. 1

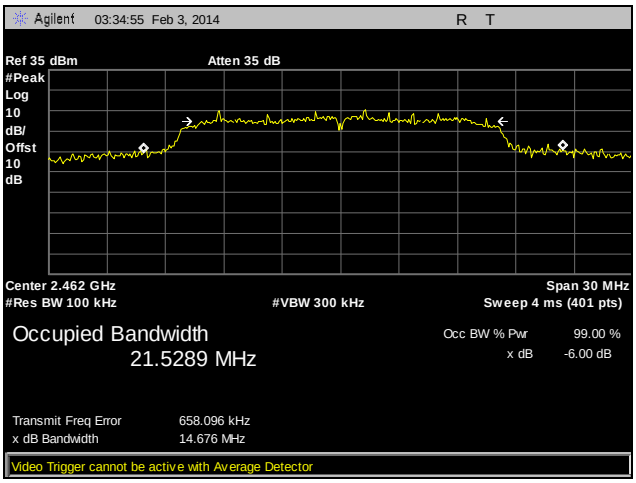
6 dB Occupied Bandwidth Test Results, 802.11g



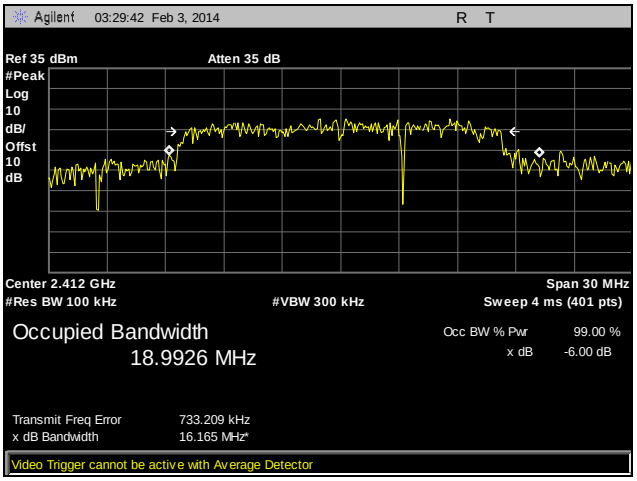
Plot 16. 6 dB Occupied Bandwidth, Channel 1, 802.11g, Ant. 0



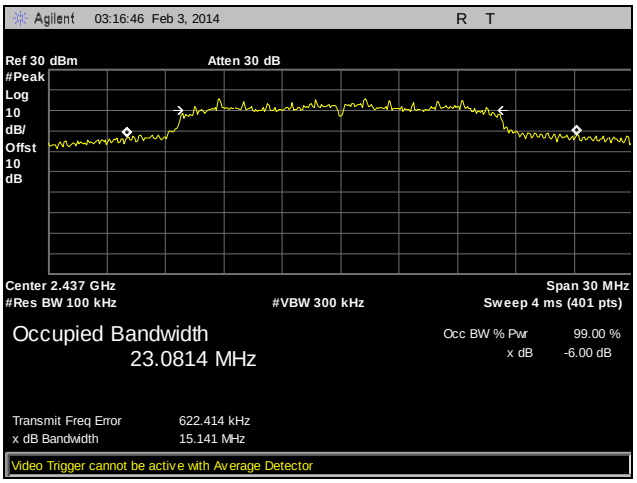
Plot 17. 6 dB Occupied Bandwidth, Channel 6, 802.11g, Ant. 0



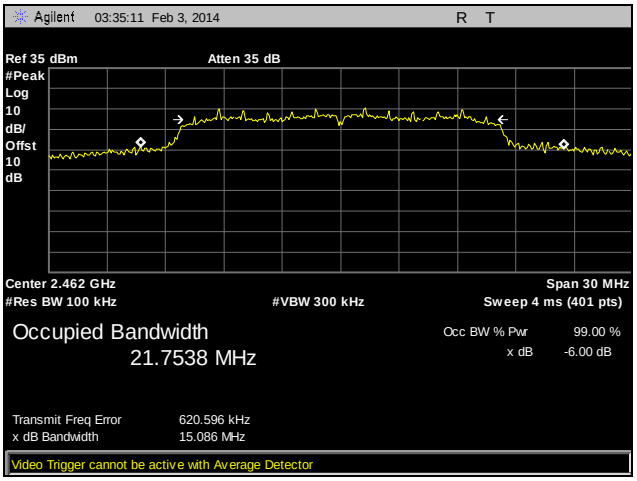
Plot 18. 6 dB Occupied Bandwidth, Channel 11, 802.11g, Ant. 0



Plot 19. 6 dB Occupied Bandwidth, Channel 1, 802.11g, Ant. 1

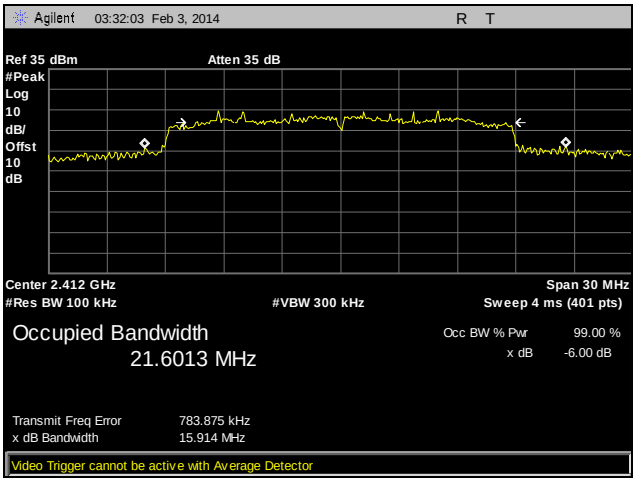


Plot 20. 6 dB Occupied Bandwidth, Channel 6, 802.11g, Ant. 1

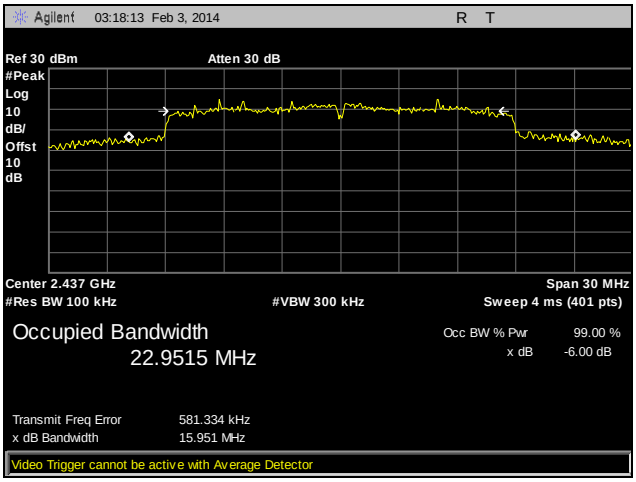


Plot 21. 6 dB Occupied Bandwidth, Channel 11, 802.11g, Ant. 1

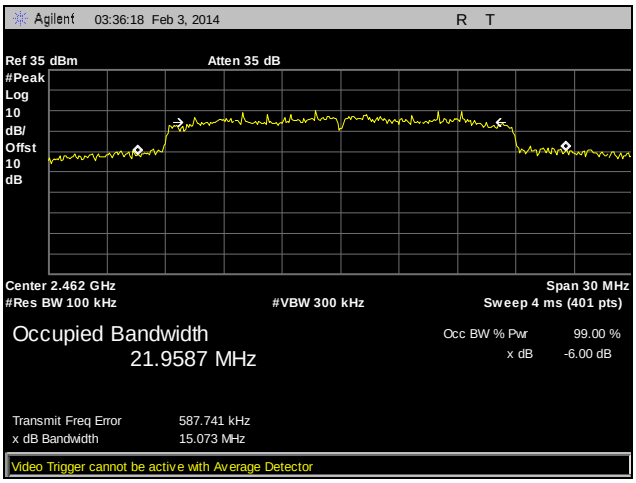
6 dB Occupied Bandwidth Test Results, 802.11n 20 MHz



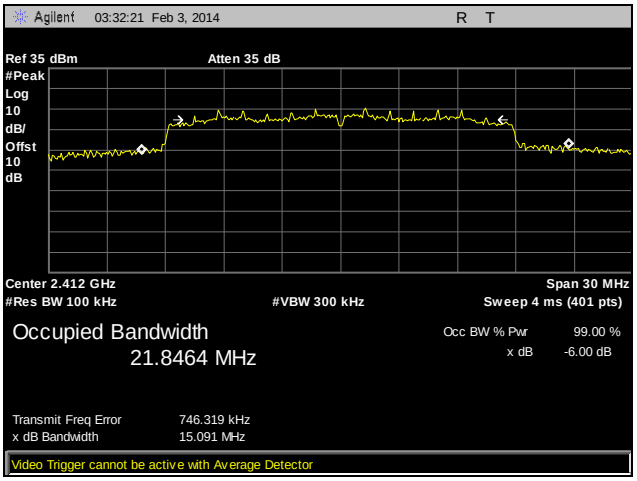
Plot 22. 6 dB Occupied Bandwidth, Channel 1, 802.11n 20 MHz, Ant. 0



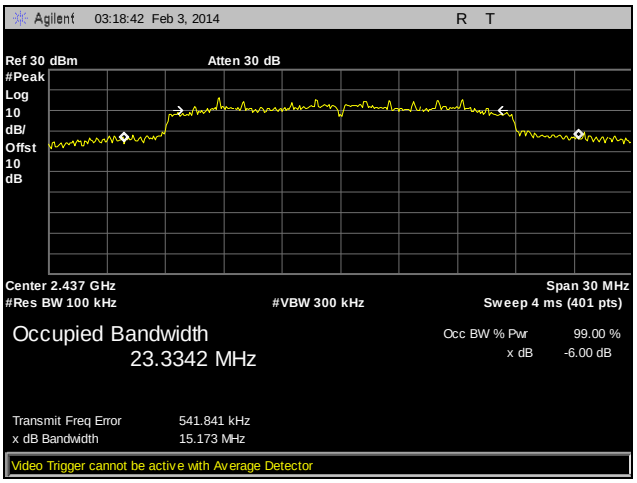
Plot 23. 6 dB Occupied Bandwidth, Channel 6, 802.11n 20 MHz, Ant. 0



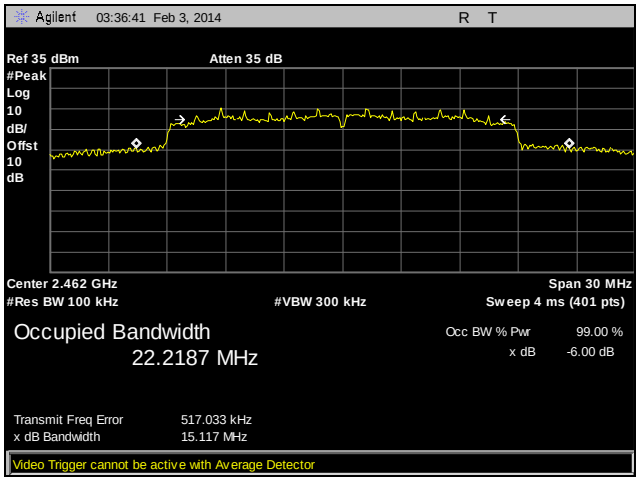
Plot 24. 6 dB Occupied Bandwidth, Channel 11, 802.11n 20 MHz, Ant. 0



Plot 25. 6 dB Occupied Bandwidth, Channel 1, 802.11n 20 MHz, Ant. 1

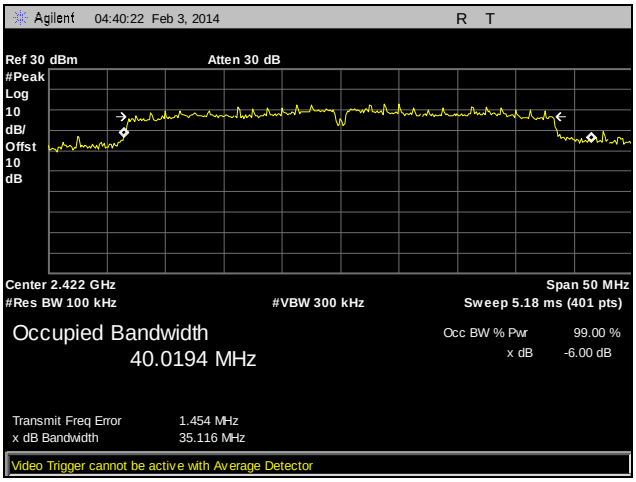


Plot 26. 6 dB Occupied Bandwidth, Channel 6, 802.11n 20 MHz, Ant. 1

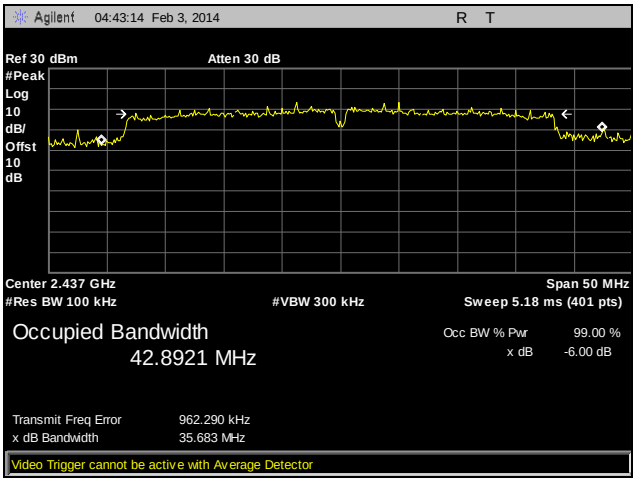


Plot 27. 6 dB Occupied Bandwidth, Channel 11, 802.11n 20 MHz, Ant. 1

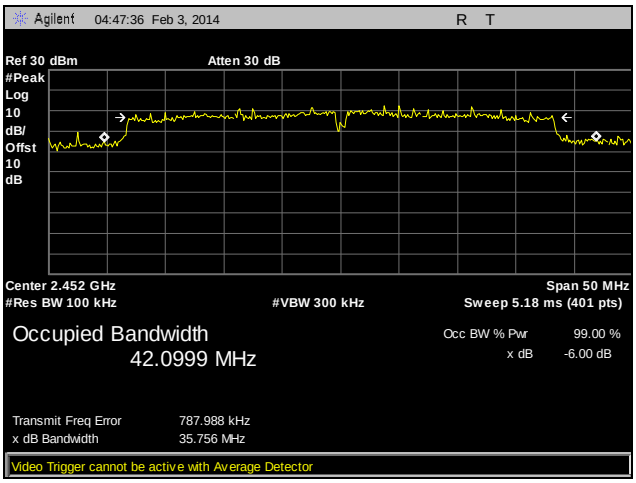
6 dB Occupied Bandwidth Test Results, 802.11n 40 MHz



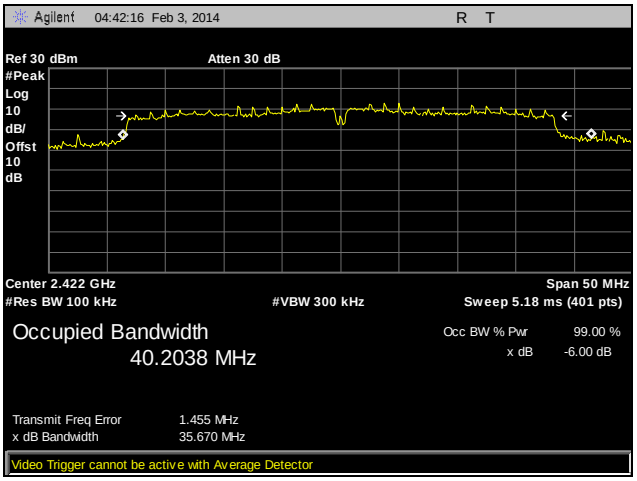
Plot 28. 6 dB Occupied Bandwidth, Channel 1, 802.11n 40 MHz, Ant. 0



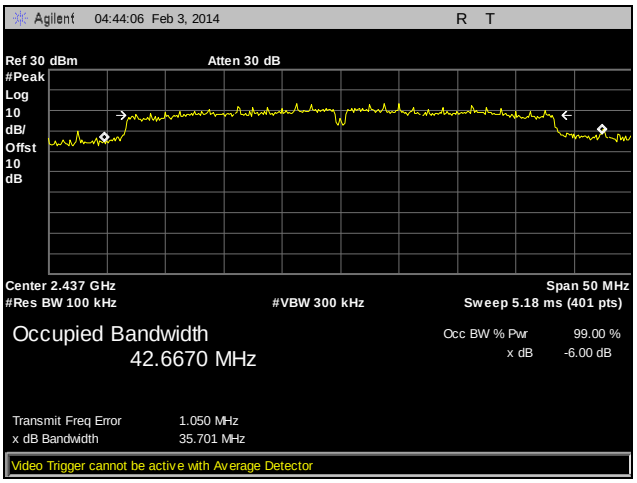
Plot 29. 6 dB Occupied Bandwidth, Channel 6, 802.11n 40 MHz, Ant. 0



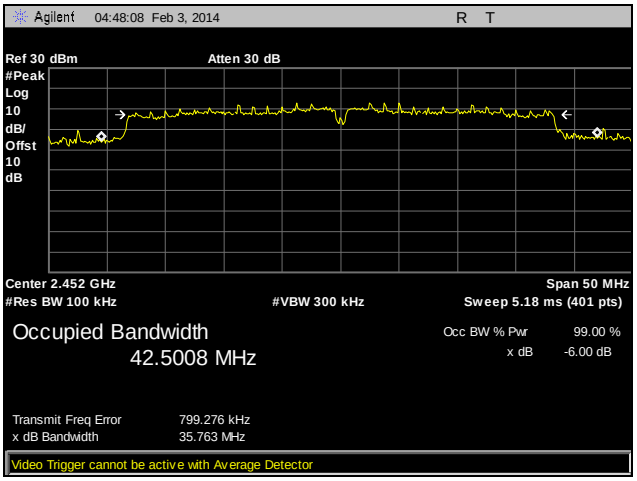
Plot 30. 6 dB Occupied Bandwidth, Channel 11, 802.11n 40 MHz, Ant. 0



Plot 31. 6 dB Occupied Bandwidth, Channel 1, 802.11n 40 MHz, Ant. 1

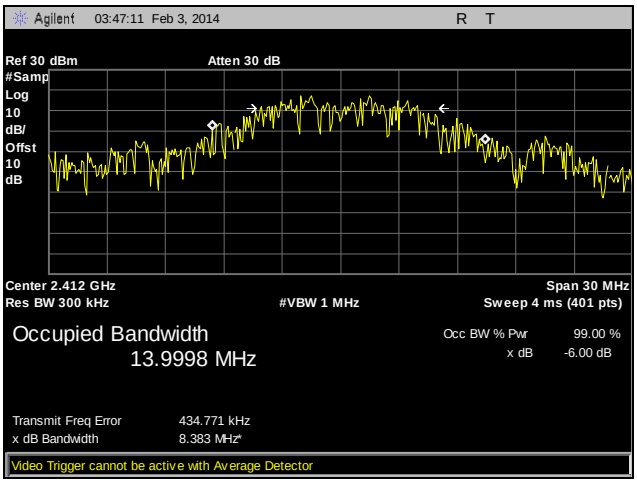


Plot 32. 6 dB Occupied Bandwidth, Channel 6, 802.11n 40 MHz, Ant. 1

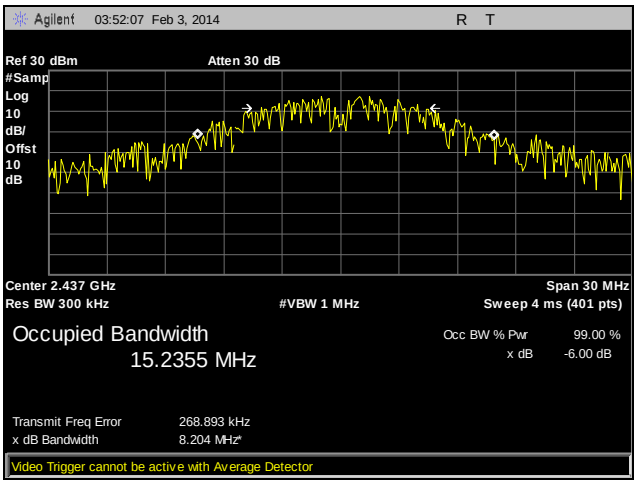


Plot 33. 6 dB Occupied Bandwidth, Channel 11, 802.11n 40 MHz, Ant. 1

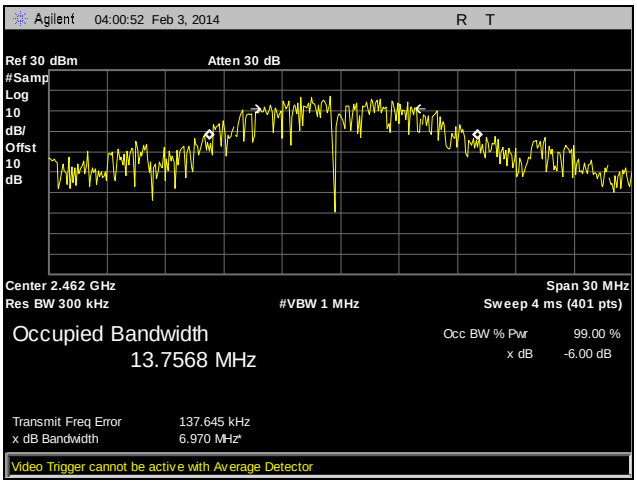
99% Occupied Bandwidth Test Results, 802.11b



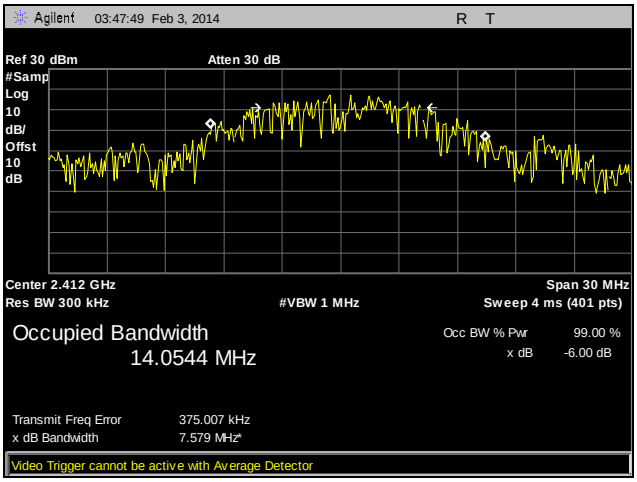
Plot 34. 99% Occupied Bandwidth, Channel 1, 802.11b, Ant. 0



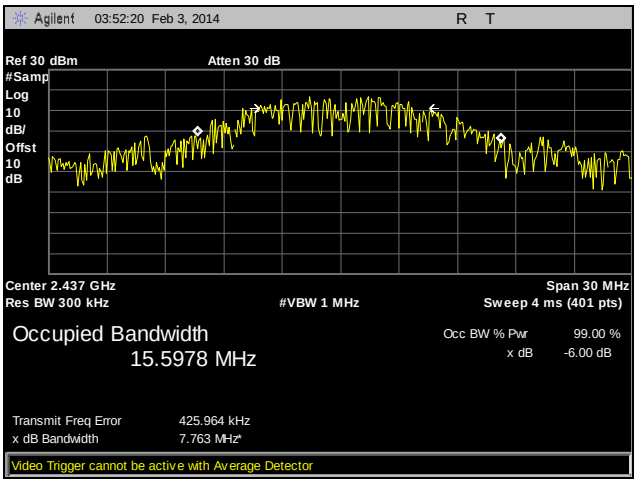
Plot 35. 99% Occupied Bandwidth, Channel 6, 802.11b, Ant. 0



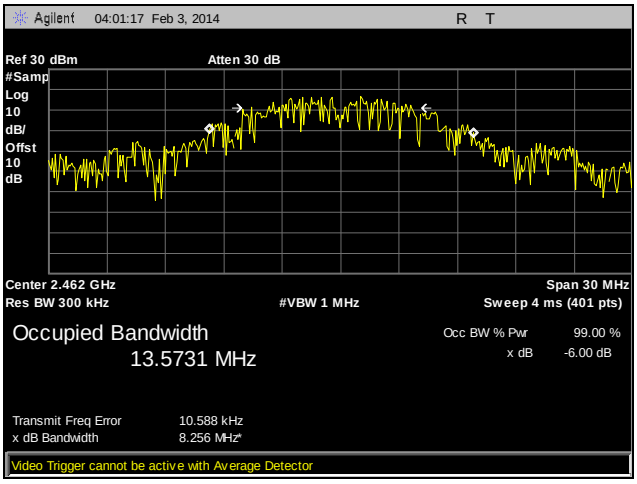
Plot 36. 99% Occupied Bandwidth, Channel 11, 802.11b, Ant. 0



Plot 37. 99% Occupied Bandwidth, Channel 1, 802.11b, Ant. 1

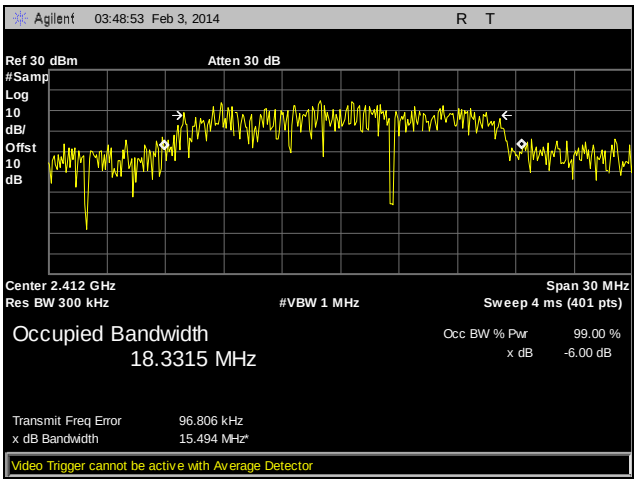


Plot 38. 99% Occupied Bandwidth, Channel 6, 802.11b, Ant. 1

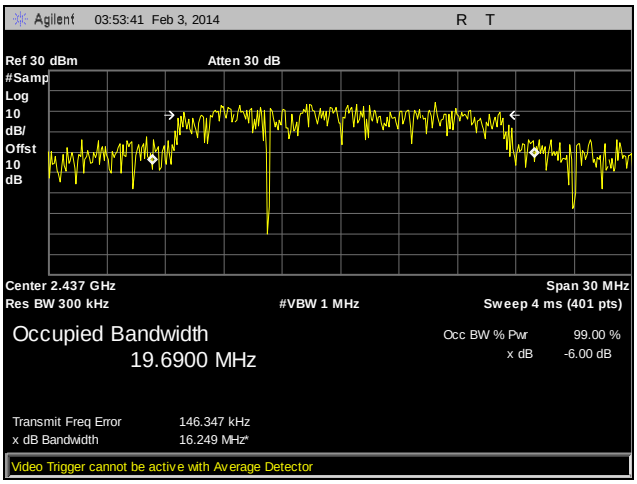


Plot 39. 99% Occupied Bandwidth, Channel 11, 802.11b, Ant. 1

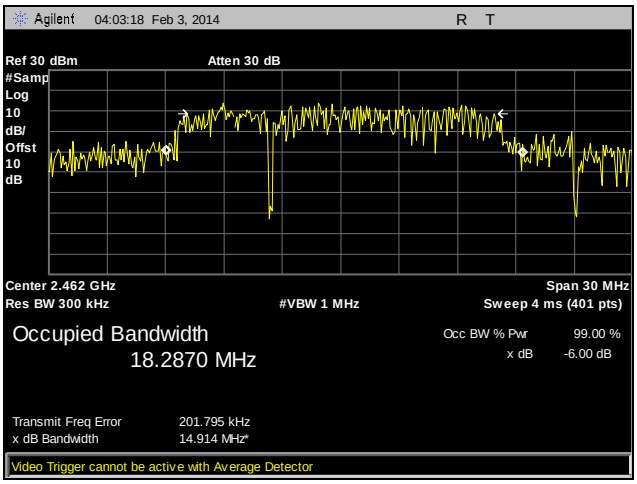
99% Occupied Bandwidth Test Results, 802.11g



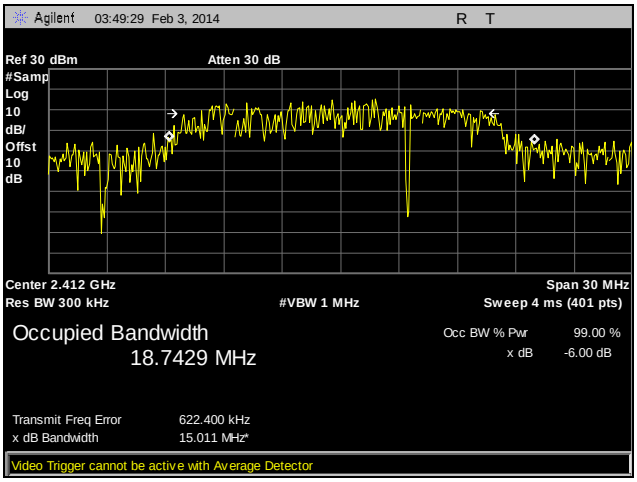
Plot 40. 99% Occupied Bandwidth, Channel 1, 802.11g, Ant. 0



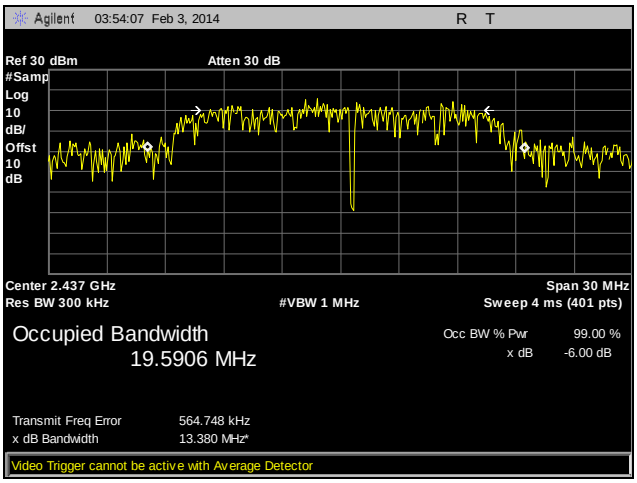
Plot 41. 99% Occupied Bandwidth, Channel 6, 802.11g, Ant. 0



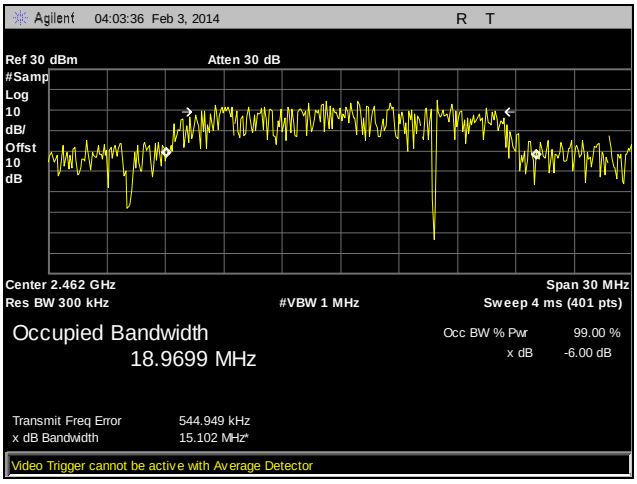
Plot 42. 99% Occupied Bandwidth, Channel 11, 802.11g, Ant. 0



Plot 43. 99% Occupied Bandwidth, Channel 1, 802.11g, Ant. 1

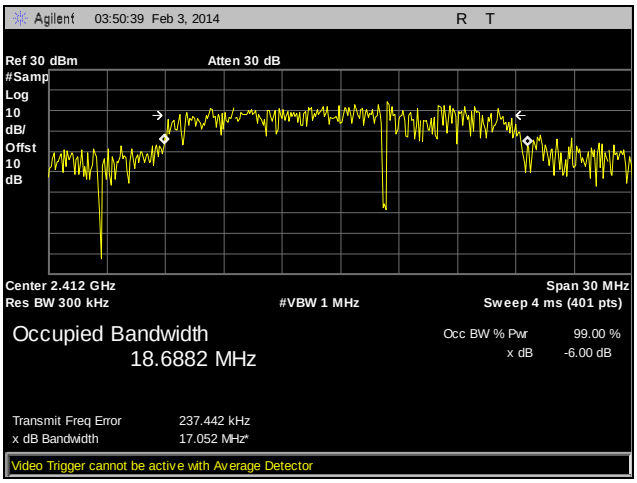


Plot 44. 99% Occupied Bandwidth, Channel 6, 802.11g, Ant. 1

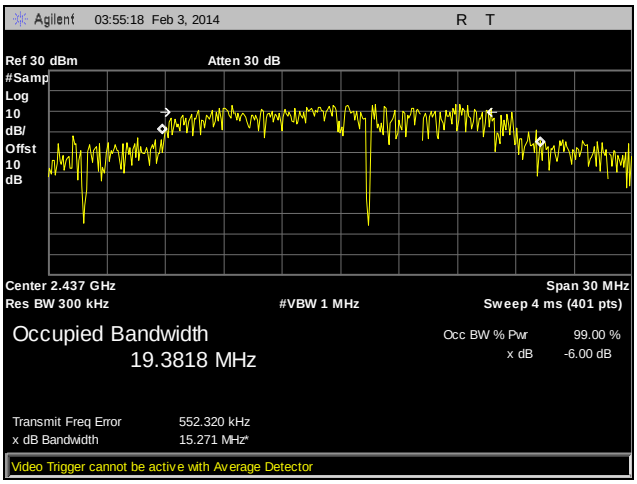


Plot 45. 99% Occupied Bandwidth, Channel 11, 802.11g, Ant. 1

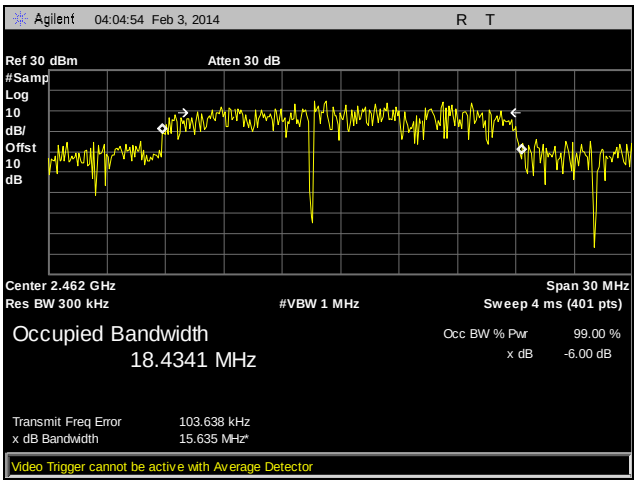
99% Occupied Bandwidth Test Results, 802.11n 20 MHz



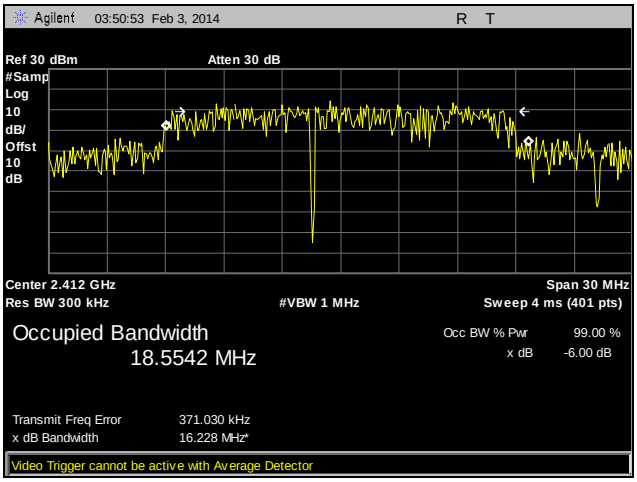
Plot 46. 99% Occupied Bandwidth, Channel 1, 802.11n 20 MHz, Ant. 0



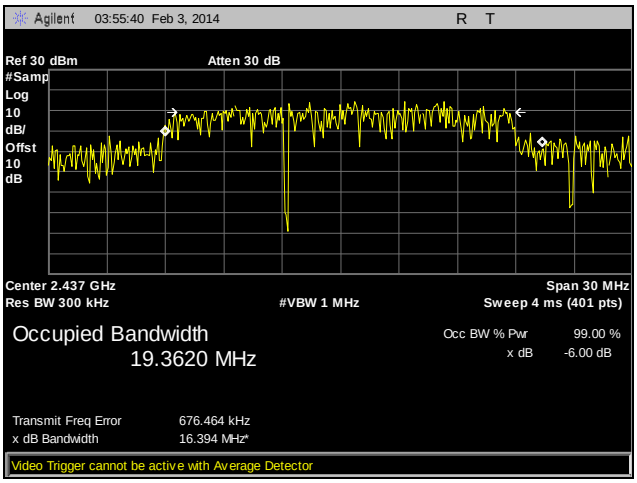
Plot 47. 99% Occupied Bandwidth, Channel 6, 802.11n 20 MHz, Ant. 0



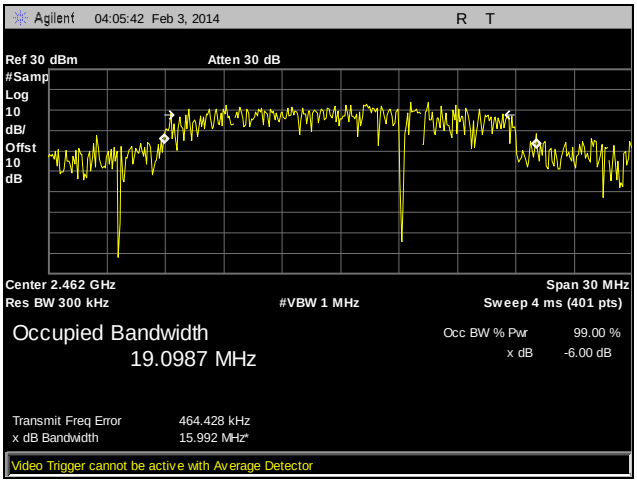
Plot 48. 99% Occupied Bandwidth, Channel 11, 802.11n 20 MHz, Ant. 0



Plot 49. 99% Occupied Bandwidth, Channel 1, 802.11n 20 MHz, Ant. 1

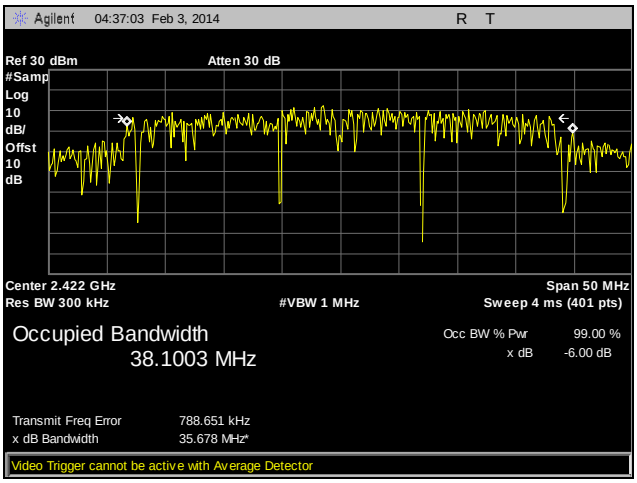


Plot 50. 99% Occupied Bandwidth, Channel 6, 802.11n 20 MHz, Ant. 1

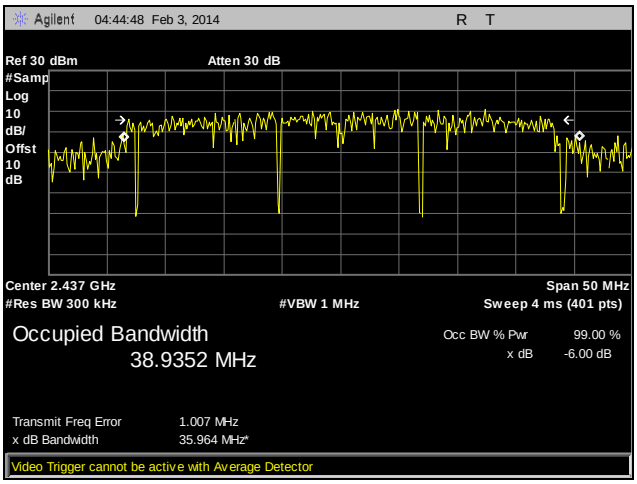


Plot 51. 99% Occupied Bandwidth, Channel 11, 802.11n 20 MHz, Ant. 1

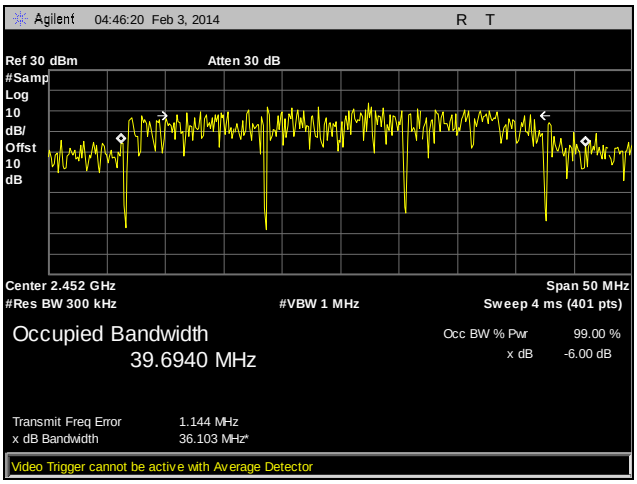
99% Occupied Bandwidth Test Results, 802.11n 40 MHz



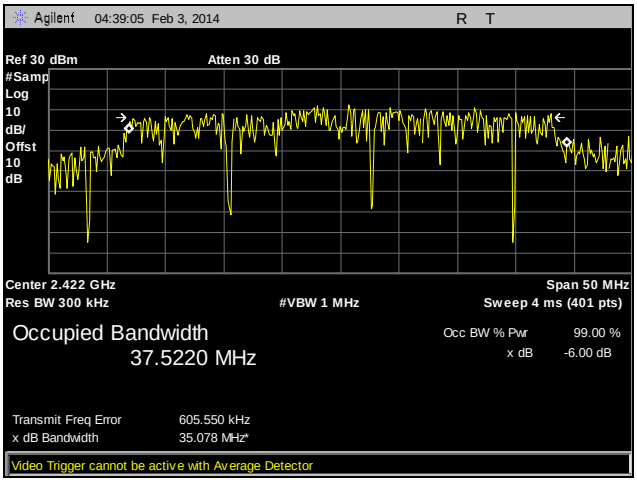
Plot 52. 99% Occupied Bandwidth, Channel 1, 802.11n 40 MHz, Ant. 0



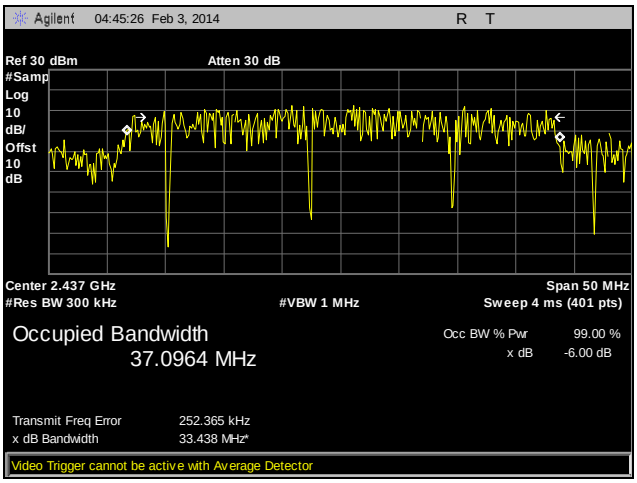
Plot 53. 99% Occupied Bandwidth, Channel 6, 802.11n 40 MHz, Ant. 0



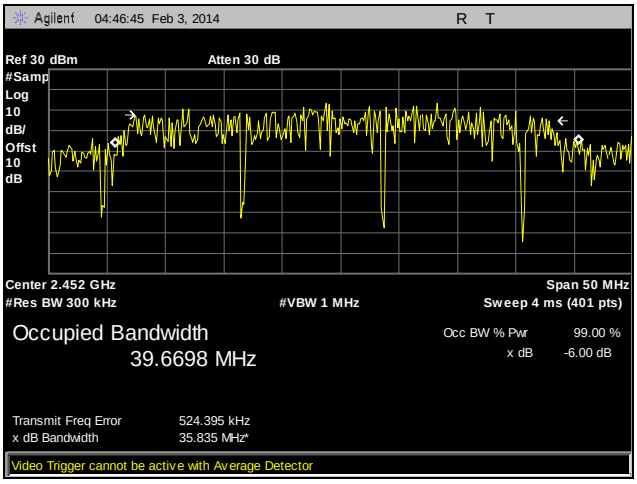
Plot 54. 99% Occupied Bandwidth, Channel 11, 802.11n 40 MHz, Ant. 0



Plot 55. 99% Occupied Bandwidth, Channel 1, 802.11n 40 MHz, Ant. 1



Plot 56. 99% Occupied Bandwidth, Channel 6, 802.11n 40 MHz, Ant. 1



Plot 57. 99% Occupied Bandwidth, Channel 11, 802.11n 40 MHz, Ant. 1

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(b) Peak Power Output

Test Requirements: **§15.247(b):** The maximum peak output power of the intentional radiator shall not exceed the following:

Digital Transmission Systems (MHz)	Output Limit (Watts)
902-928	1.000
2400–2483.5	1.000
5725– 5850	1.000

Table 31. Output Power Requirements from §15.247(b)

§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.

Test Procedure: The transmitter was connected to a calibrated spectrum analyzer. The EUT was measured at the low, mid and high channels of each band at the maximum power level.

Test Results: The EUT was compliant with the Peak Power Output limits of **§15.247(b)**.

Test Engineer(s): Surinder Singh

Test Date(s): 02/08/14

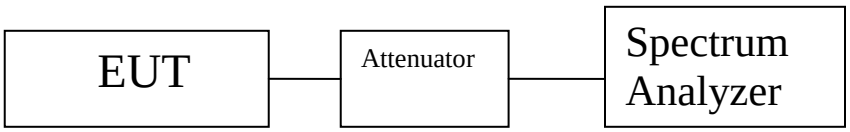


Figure 2. Peak Power Output Test Setup

Peak Power Output Test Results

Peak Conducted Output Power		
Carrier Channel	**Frequency (MHz)**	**Measured Peak Output Power dBm**
Channel 1	2412	24.22
Channel 2	2417	26.24
Channel 3	2422	28.01
Channel 4	2427	29.15
Channel 5	2432	29.40
Channel 6	2437	29.29
Channel 7	2442	29.52
Channel 8	2447	29.43
Channel 9	2452	28.14
Channel 10	2457	26.54
Channel 11	2462	24.62

Table 32. Peak Power Output, Test Results, 802.11b (legacy), Ant. 0

Peak Conducted Output Power		
Carrier Channel	**Frequency (MHz)**	**Measured Peak Output Power dBm**
Channel 1	2412	24.35
Channel 2	2417	26.58
Channel 3	2422	27.25
Channel 4	2427	28.31
Channel 5	2432	29.57
Channel 6	2437	29.58
Channel 7	2442	29.27
Channel 8	2447	28.14
Channel 9	2452	27.00
Channel 10	2457	26.09
Channel 11	2462	24.75

Table 33. Peak Power Output, Test Results, 802.11b(legacy), Ant. 1

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Peak Conducted Output Power		
Carrier Channel	**Frequency (MHz)**	**Measured Peak Output Power dBm**
Channel 1	2412	23.22
Channel 2	2417	24.72
Channel 3	2422	26.19
Channel 4	2427	27.14
Channel 5	2432	28.08
Channel 6	2437	29.45
Channel 7	2442	29.72
Channel 8	2447	28.35
Channel 9	2452	27.28
Channel 10	2457	25.56
Channel 11	2462	23.49

Table 34. Peak Power Output, Test Results, 802.11g(legacy), Ant. 0

Peak Conducted Output Power		
Carrier Channel	**Frequency (MHz)**	**Measured Peak Output Power dBm**
Channel 1	2412	23.60
Channel 2	2417	24.28
Channel 3	2422	25.55
Channel 4	2427	26.48
Channel 5	2432	27.75
Channel 6	2437	28.64
Channel 7	2442	28.67
Channel 8	2447	27.52
Channel 9	2452	25.69
Channel 10	2457	24.36
Channel 11	2462	23.98

Table 35. Peak Power Output, Test Results, 802.11g(legacy), Ant. 1

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Peak Conducted Output Power		
Carrier Channel	**Frequency (MHz)**	**Measured Peak Output Power dBm**
Channel 1	2412	23.28
Channel 2	2417	24.73
Channel 3	2422	25.42
Channel 4	2427	26.56
Channel 5	2432	27.20
Channel 6	2437	29.45
Channel 7	2442	28.49
Channel 8	2447	27.39
Channel 9	2452	25.95
Channel 10	2457	24.36
Channel 11	2462	22.96

Table 36. Peak Power Output, Test Results, 802.11n 20 MHz(legacy), Ant. 0

Peak Conducted Output Power		
Carrier Channel	**Frequency (MHz)**	**Measured Peak Output Power dBm**
Channel 1	2412	22.59
Channel 2	2417	24.45
Channel 3	2422	25.17
Channel 4	2427	25.99
Channel 5	2432	27.76
Channel 6	2437	28.77
Channel 7	2442	28.59
Channel 8	2447	27.14
Channel 9	2452	25.75
Channel 10	2457	23.96
Channel 11	2462	22.46

Table 37. Peak Power Output, Test Results, 802.11n 20 MHz(legacy), Ant. 1

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Peak Conducted Output Power		
Carrier Channel	**Frequency (MHz)**	**Measured Peak Output Power dBm**
Channel 1	2422	20.69
Channel 2	2427	20.43
Channel 3	2432	22.50
Channel 4	2437	23.92
Channel 5	2442	23.97
Channel 6	2447	22.84
Channel 7	2452	21.84
Channel 8	2457	20.78
Channel 9	2462	15.51

Table 38. Peak Power Output, Test Results, 802.11n 40 MHz(legacy), Ant. 0

Peak Conducted Output Power		
Carrier Channel	**Frequency (MHz)**	**Measured Peak Output Power dBm**
Channel 1	2422	19.29
Channel 2	2427	19.21
Channel 3	2432	20.78
Channel 4	2437	23.04
Channel 5	2442	21.68
Channel 6	2447	20.35
Channel 7	2452	20.46
Channel 8	2457	19.18
Channel 9	2462	13.40

Table 39. Peak Power Output, Test Results, 802.11n 40 MHz(legacy), Ant. 1

Peak Conducted Output Power				
Carrier Channel	**Frequency (MHz)**	**Measured Peak Output Power (dBm)**	**Measured Peak Output Power (dBm)**	**Total Power (dBm)**
Channel 1	2422	19.79	20.27	23.04
Channel 2	2427	20.09	19.91	23.01
Channel 3	2432	20.57	20.77	23.68
Channel 4	2437	21.27	21.06	24.17
Channel 5	2442	20.4	20.84	23.63
Channel 6	2447	19.37	19.69	22.54
Channel 7	2452	19.3	19.5	22.41
Channel 8	2457	18.61	18.83	21.73
Channel 9	2462	12.88	13.27	16.08

Table 40. Peak Power Output, Test Results, 802.11n 40 MHz MIMO

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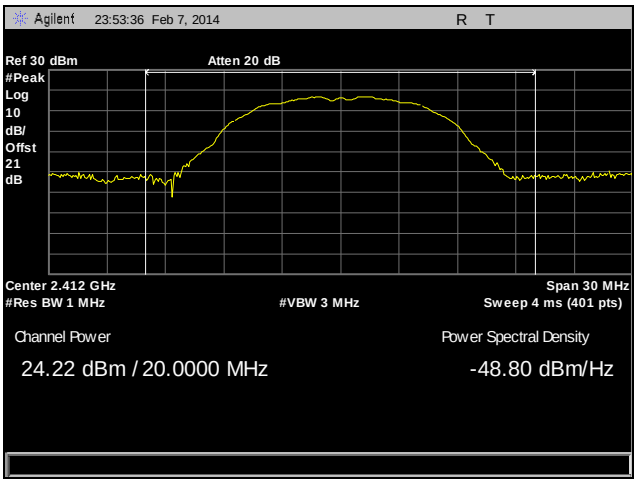
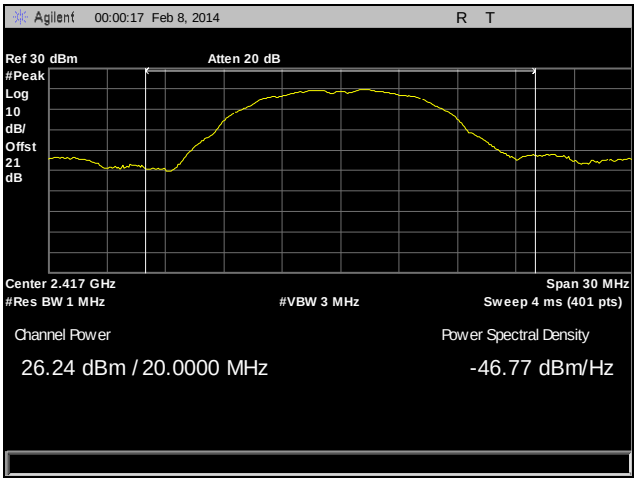
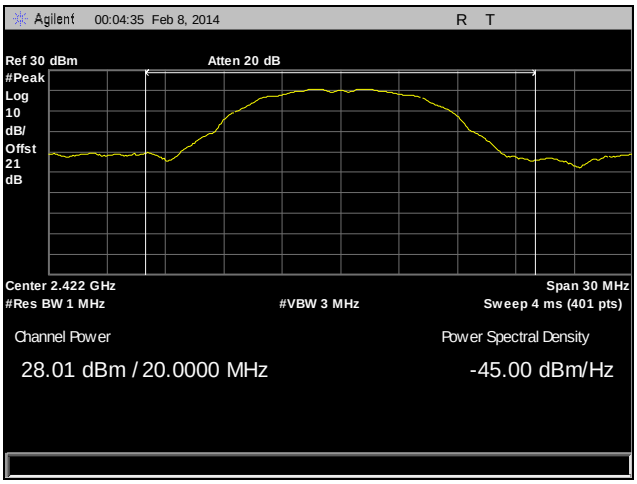
Peak Power Output Test Results, 802.11b



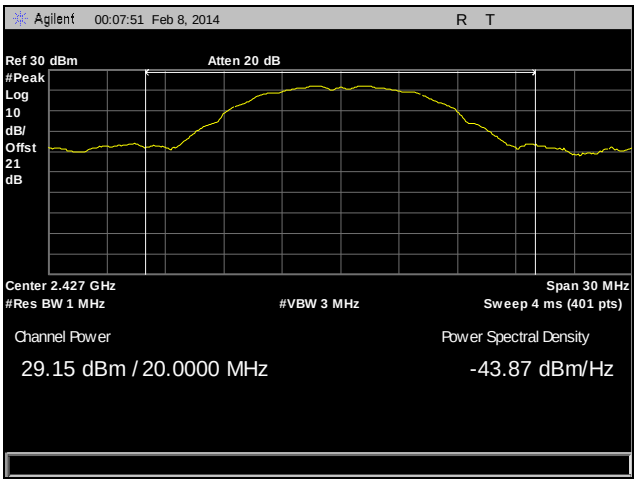
Plot 58. Peak Power Output, Channel 1, 802.11b, Ant. 0



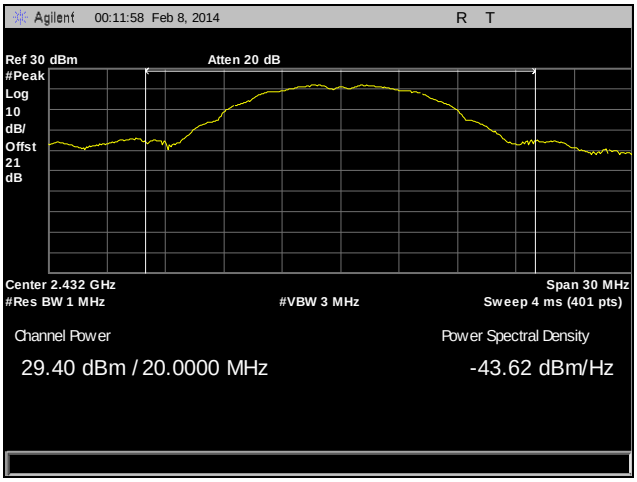
Plot 59. Peak Power Output, Channel 2, 802.11b, Ant. 0



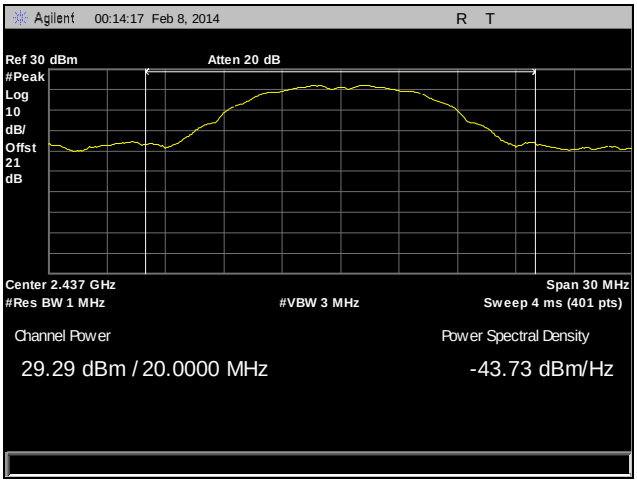
Plot 60. Peak Power Output, Channel 3, 802.11b, Ant. 0



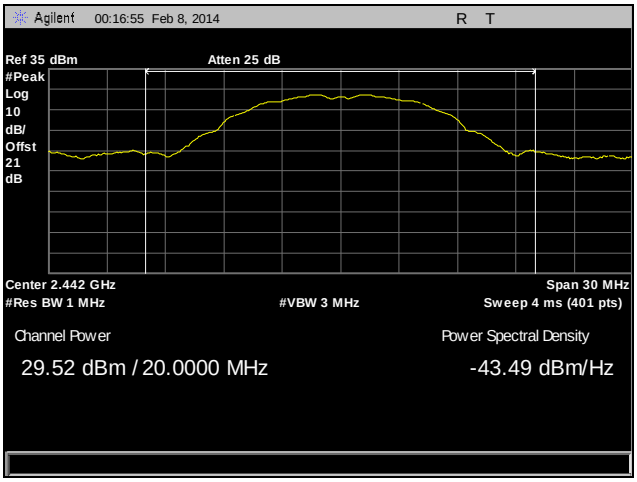
Plot 61. Peak Power Output, Channel 4, 802.11b, Ant. 0



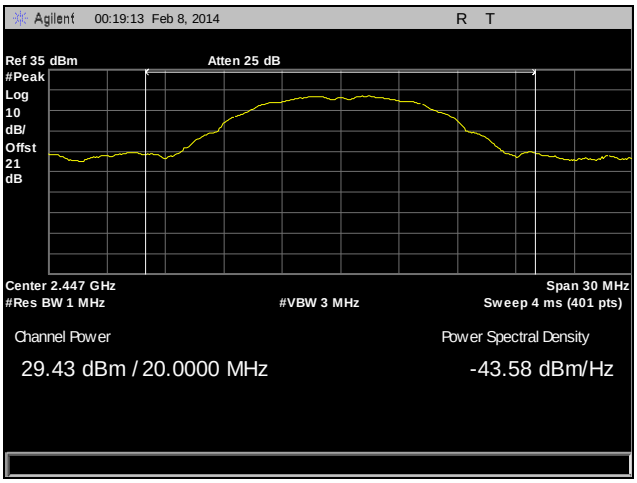
Plot 62. Peak Power Output, Channel 5, 802.11b, Ant. 0



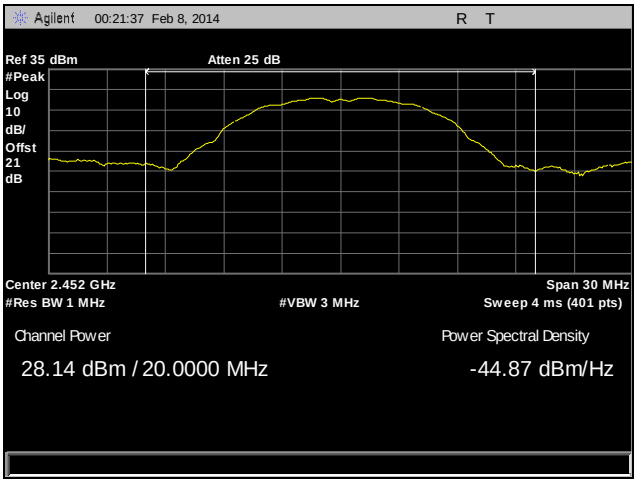
Plot 63. Peak Power Output, Channel 6, 802.11b, Ant. 0



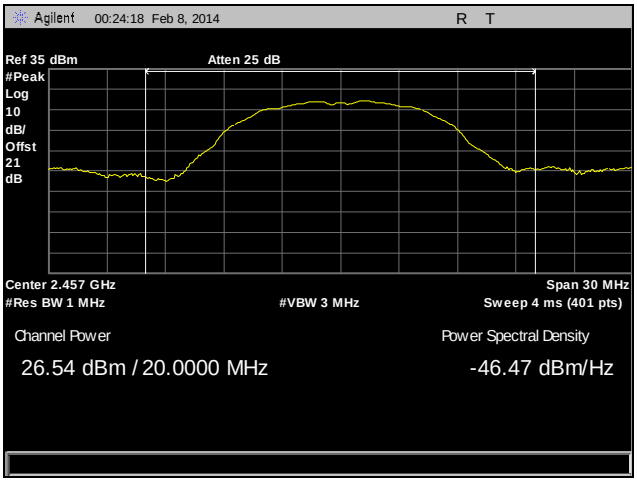
Plot 64. Peak Power Output, Channel 7, 802.11b, Ant. 0



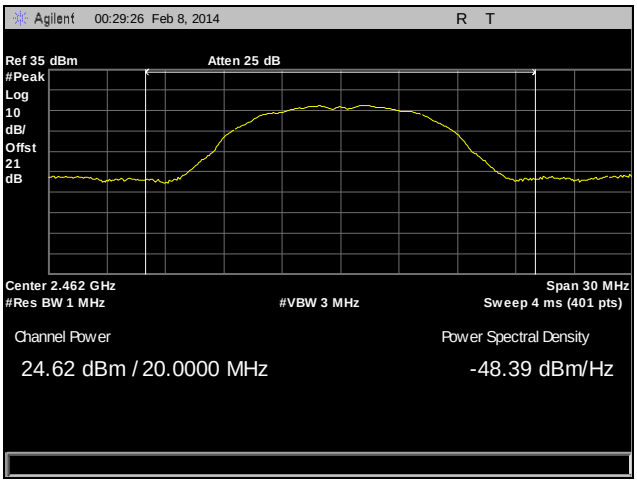
Plot 65. Peak Power Output, Channel 8, 802.11b, Ant. 0



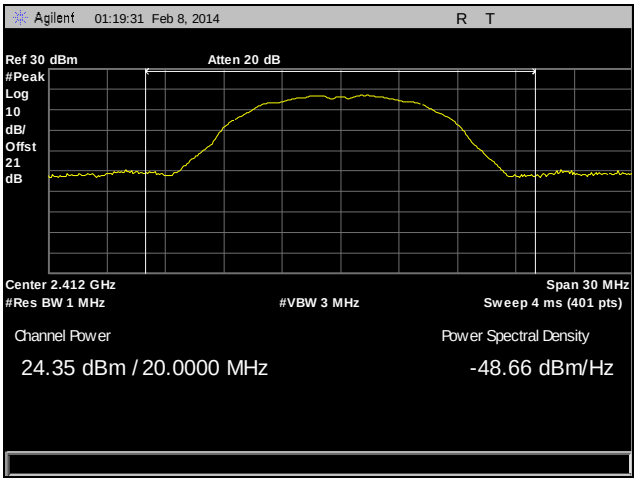
Plot 66. Peak Power Output, Channel 9, 802.11b, Ant. 0



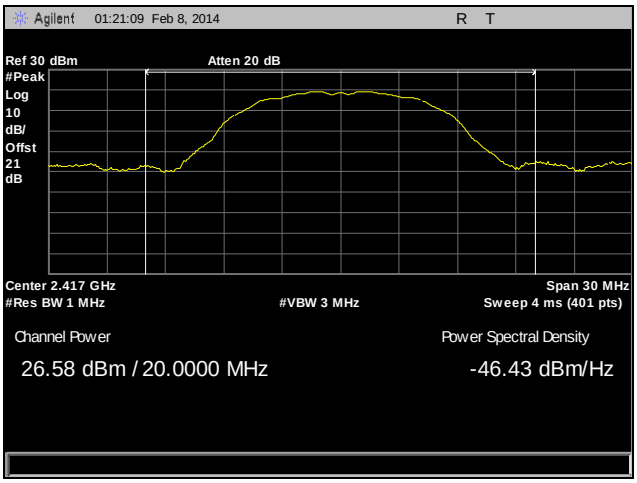
Plot 67. Peak Power Output, Channel 10, 802.11b, Ant. 0



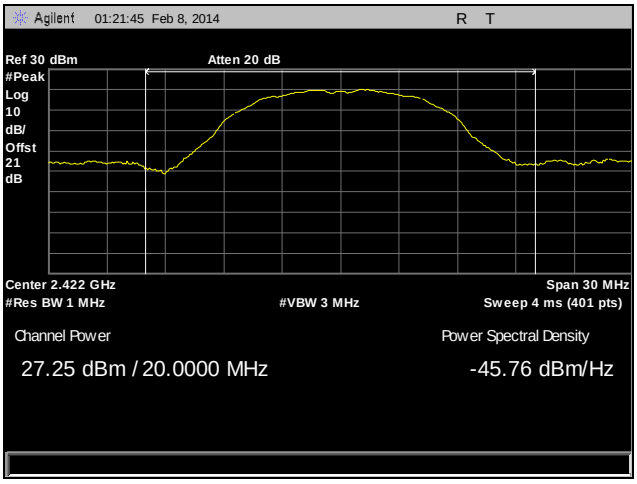
Plot 68. Peak Power Output, Channel 11, 802.11b, Ant. 0



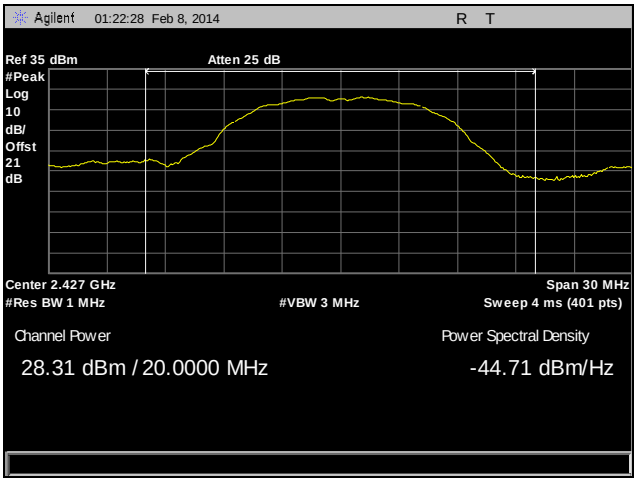
Plot 69. Peak Power Output, Channel 1, 802.11b, Ant. 1



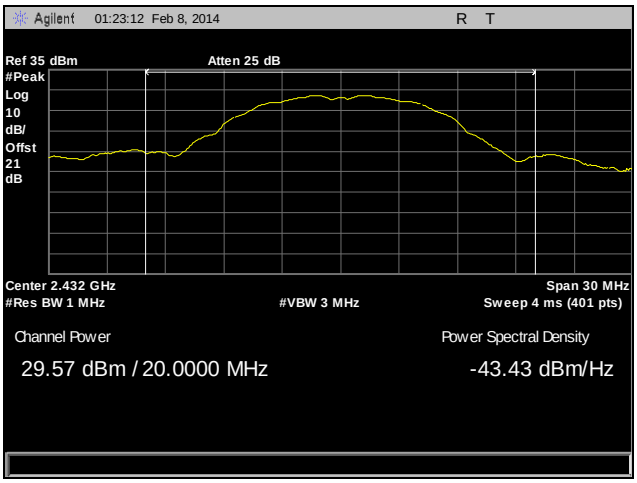
Plot 70. Peak Power Output, Channel 2, 802.11b, Ant. 1



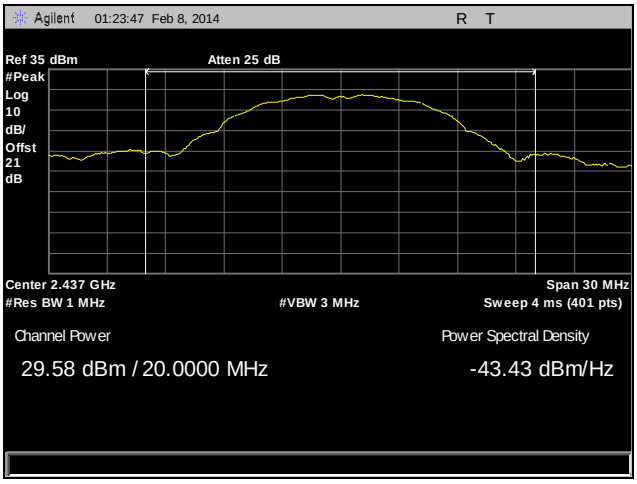
Plot 71. Peak Power Output, Channel 3, 802.11b, Ant. 1



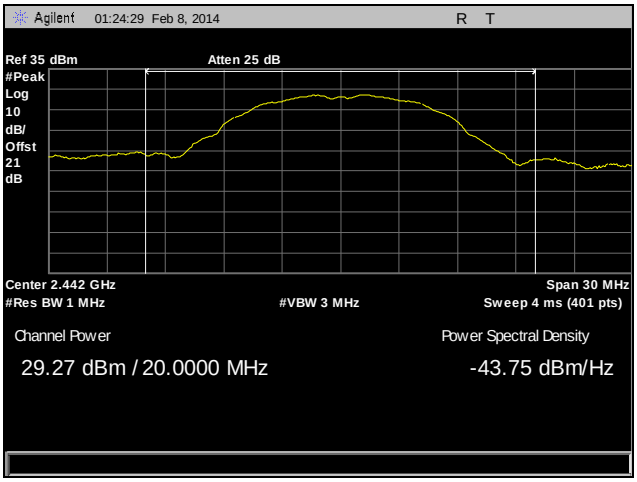
Plot 72. Peak Power Output, Channel 4, 802.11b, Ant. 1



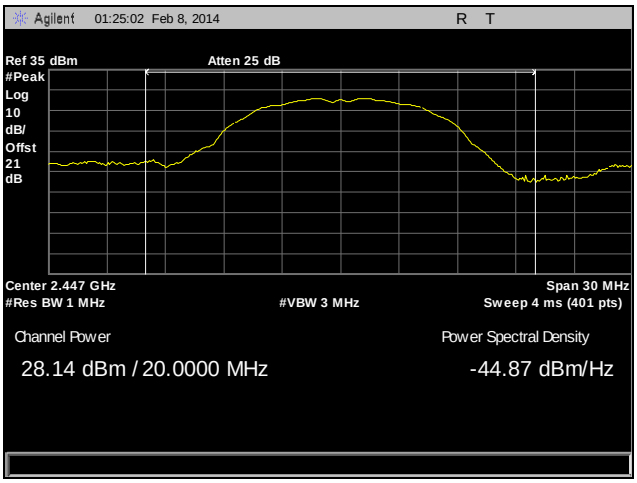
Plot 73. Peak Power Output, Channel 5, 802.11b, Ant. 1



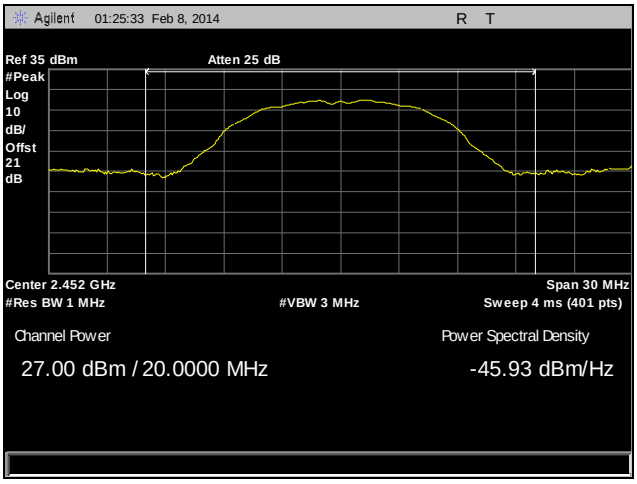
Plot 74. Peak Power Output, Channel 6, 802.11b, Ant. 1



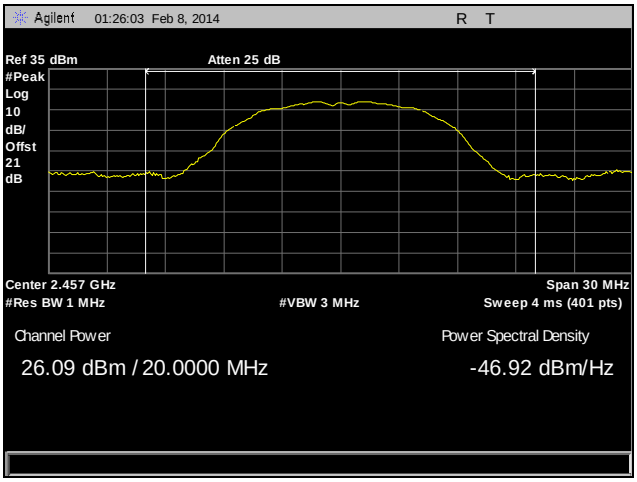
Plot 75. Peak Power Output, Channel 7, 802.11b, Ant. 1



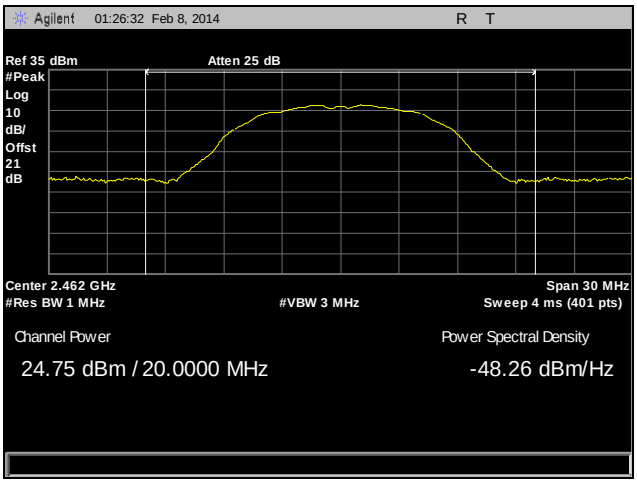
Plot 76. Peak Power Output, Channel 8, 802.11b, Ant. 1



Plot 77. Peak Power Output, Channel 9, 802.11b, Ant. 1

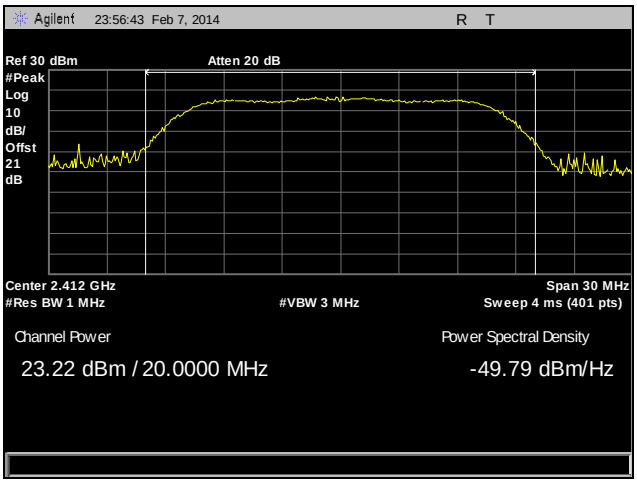


Plot 78. Peak Power Output, Channel 10, 802.11b, Ant. 1

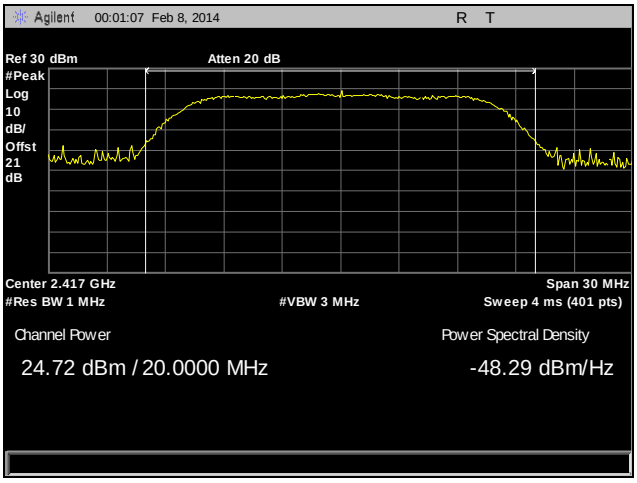


Plot 79. Peak Power Output, Channel 11, 802.11b, Ant. 1

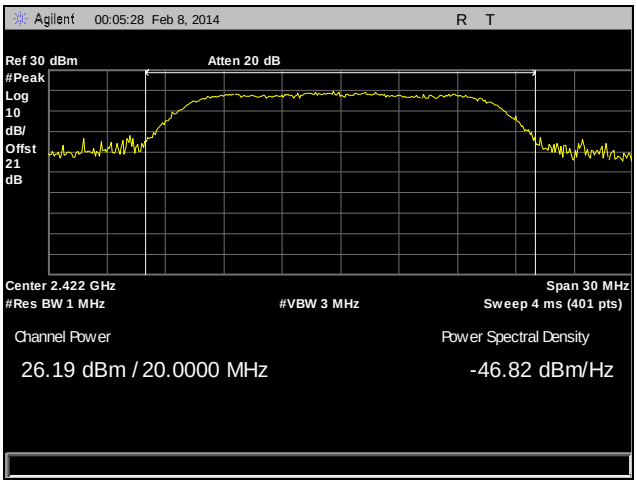
Peak Power Output Test Results, 802.11g



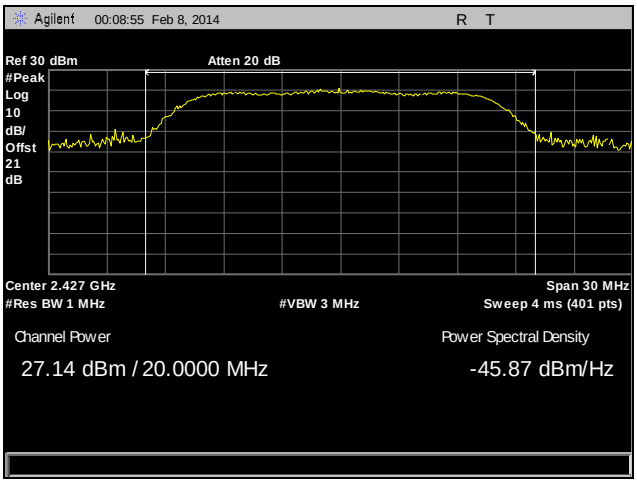
Plot 80. Peak Power Output, Channel 1, 802.11g, Ant. 0



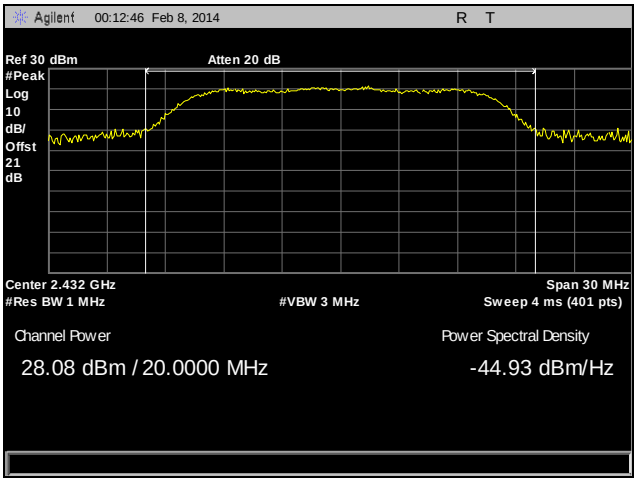
Plot 81. Peak Power Output, Channel 2, 802.11g, Ant. 0



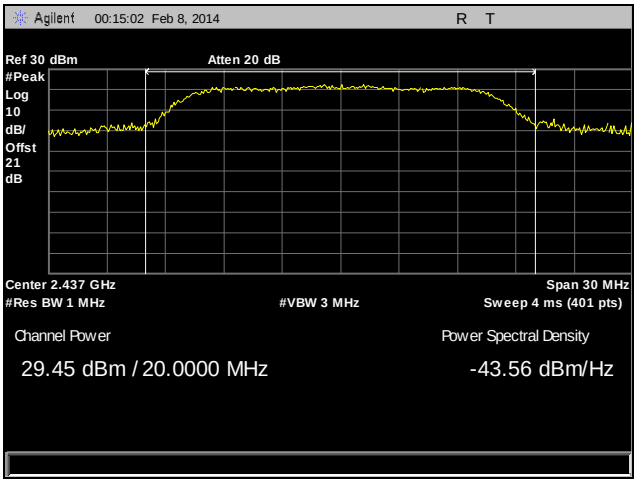
Plot 82. Peak Power Output, Channel 3, 802.11g, Ant. 0



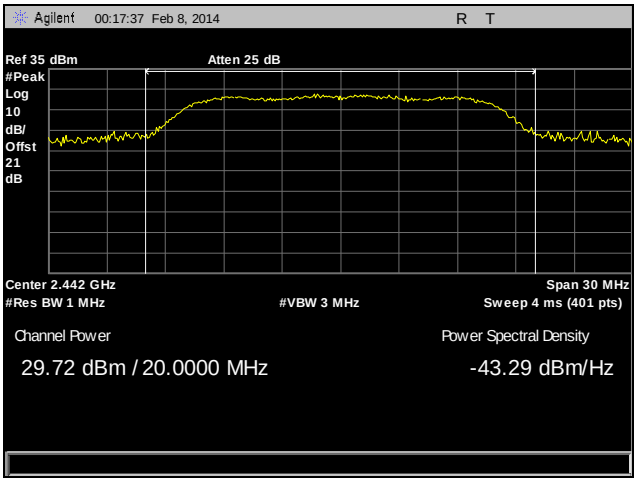
Plot 83. Peak Power Output, Channel 4, 802.11g, Ant. 0



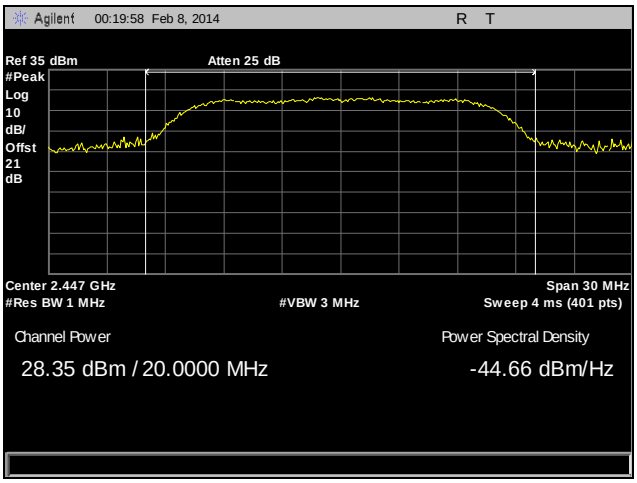
Plot 84. Peak Power Output, Channel 5, 802.11g, Ant. 0



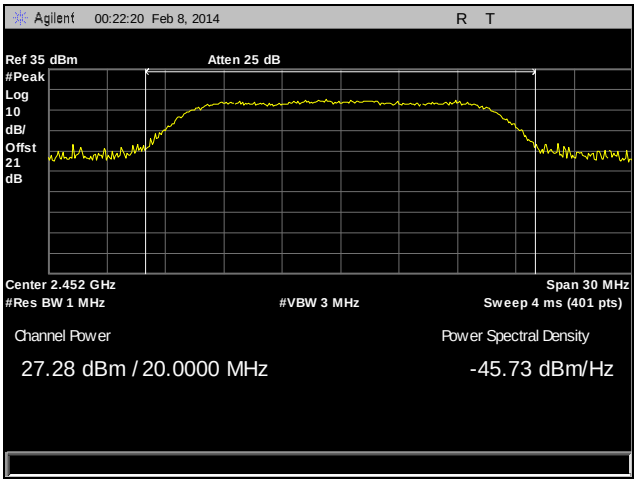
Plot 85. Peak Power Output, Channel 6, 802.11g, Ant. 0



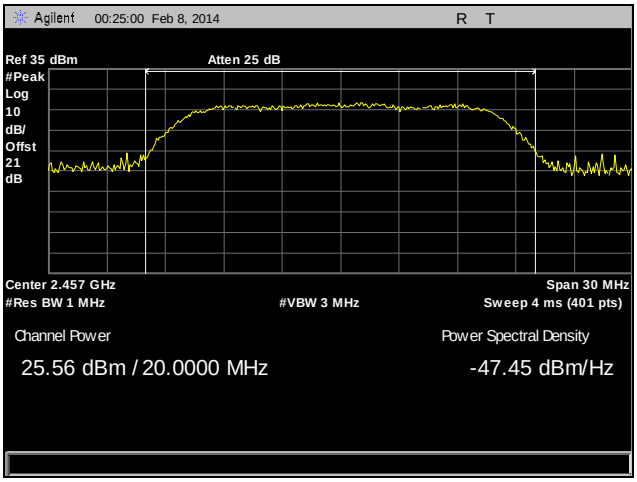
Plot 86. Peak Power Output, Channel 7, 802.11g, Ant. 0



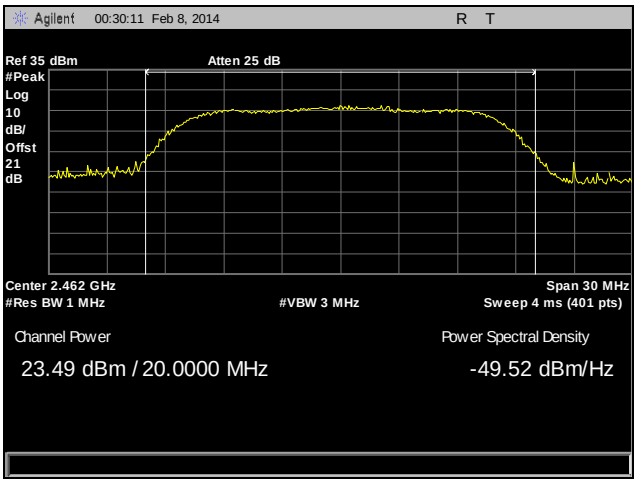
Plot 87. Peak Power Output, Channel 8, 802.11g, Ant. 0



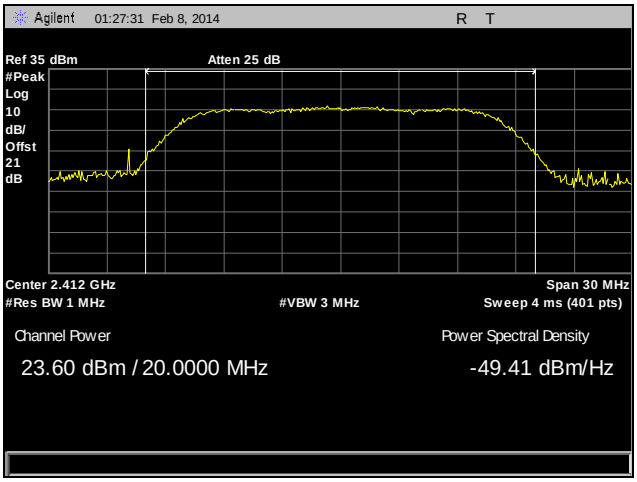
Plot 88. Peak Power Output, Channel 9, 802.11g, Ant. 0



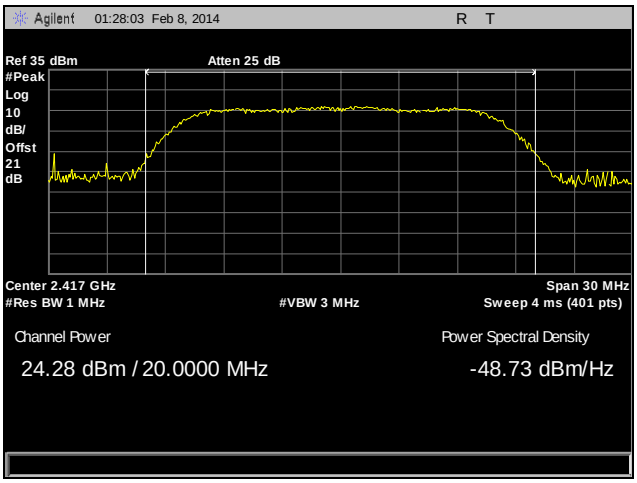
Plot 89. Peak Power Output, Channel 10, 802.11g, Ant. 0



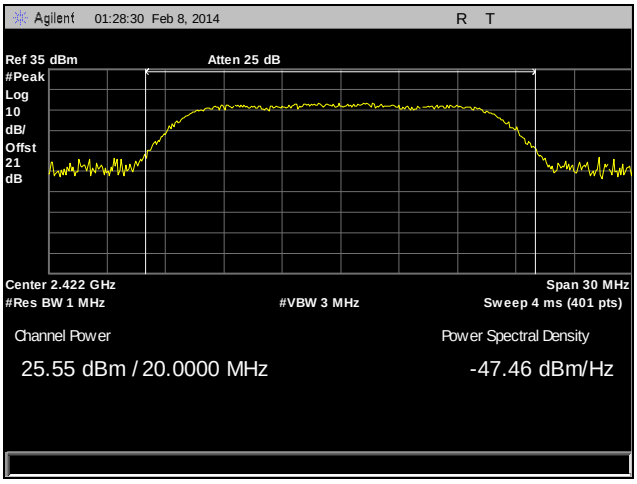
Plot 90. Peak Power Output, Channel 11, 802.11g, Ant. 0



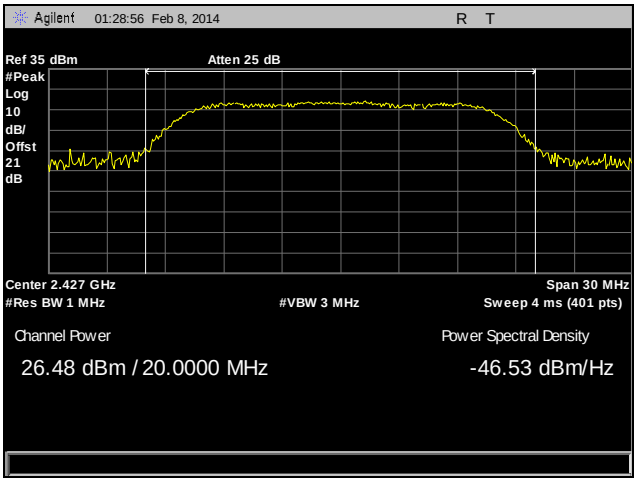
Plot 91. Peak Power Output, Channel 1, 802.11g, Ant. 1



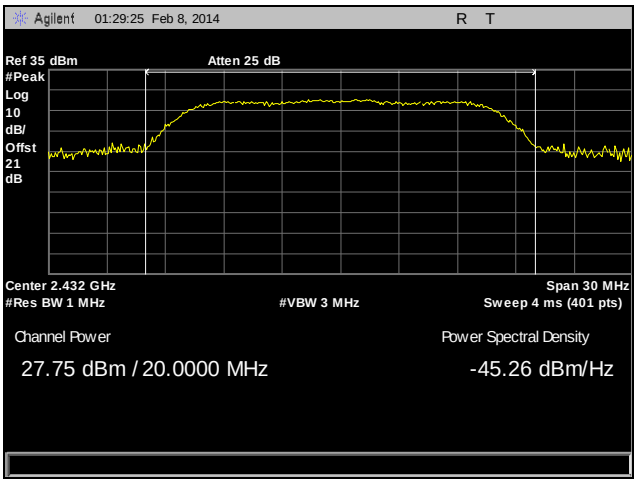
Plot 92. Peak Power Output, Channel 2, 802.11g, Ant. 1



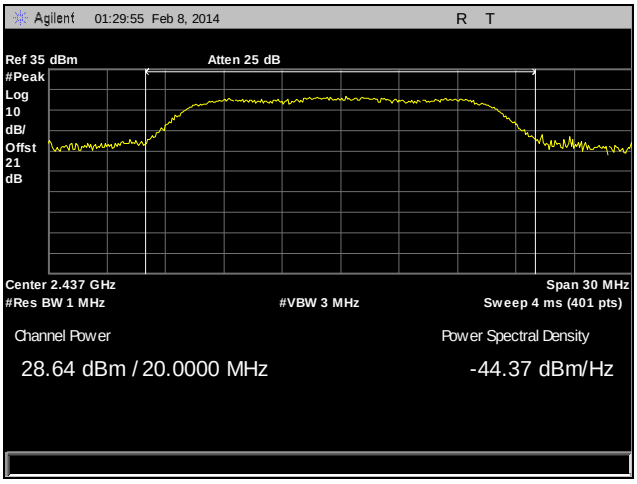
Plot 93. Peak Power Output, Channel 3, 802.11g, Ant. 1



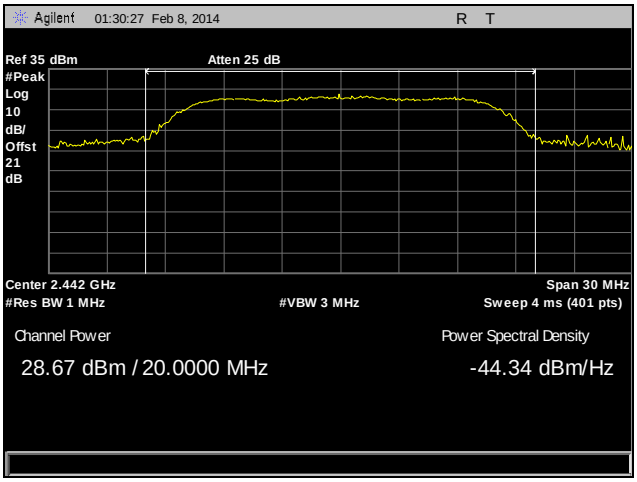
Plot 94. Peak Power Output, Channel 4, 802.11g, Ant. 1



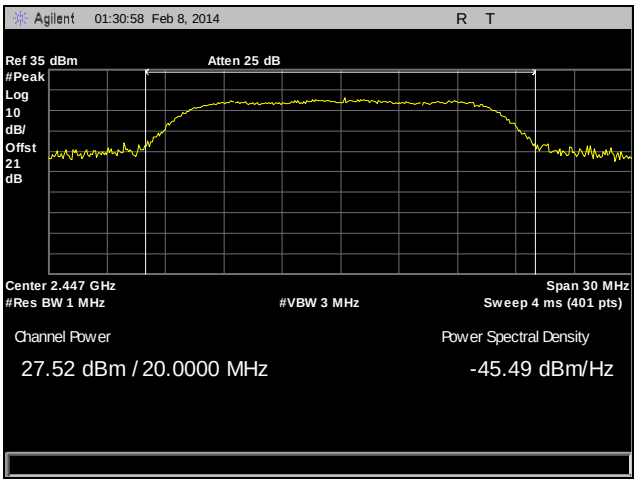
Plot 95. Peak Power Output, Channel 5, 802.11g, Ant. 1



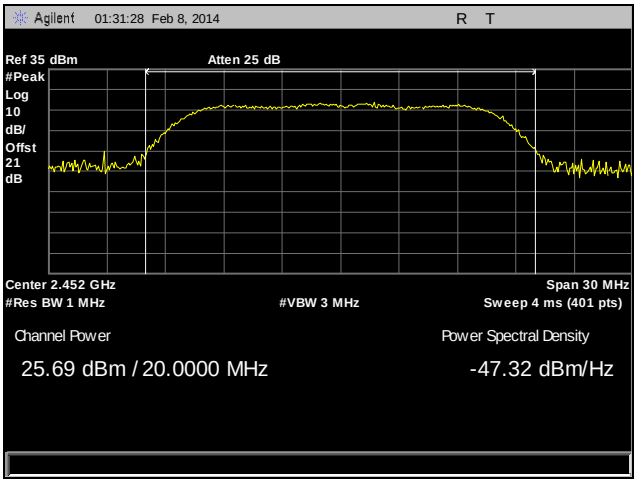
Plot 96. Peak Power Output, Channel 6, 802.11g, Ant. 1



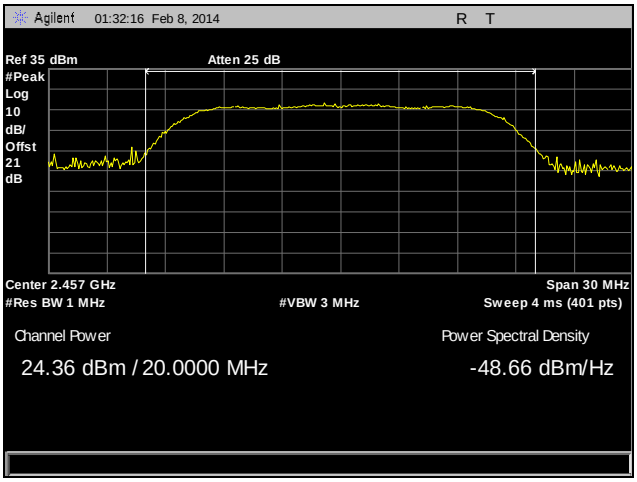
Plot 97. Peak Power Output, Channel 7, 802.11g, Ant. 1



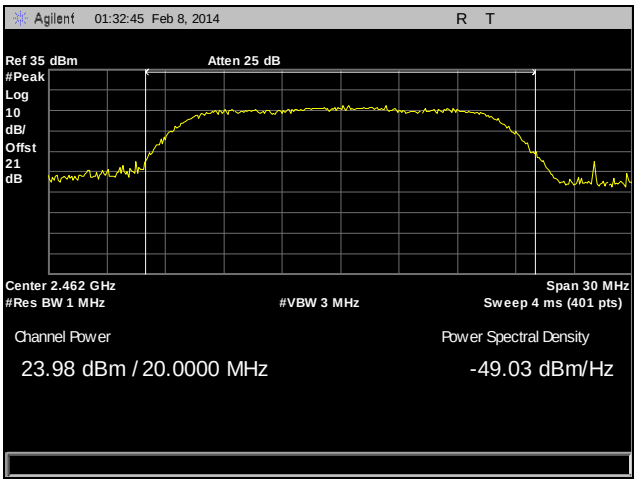
Plot 98. Peak Power Output, Channel 8, 802.11g, Ant. 1



Plot 99. Peak Power Output, Channel 9, 802.11g, Ant. 1

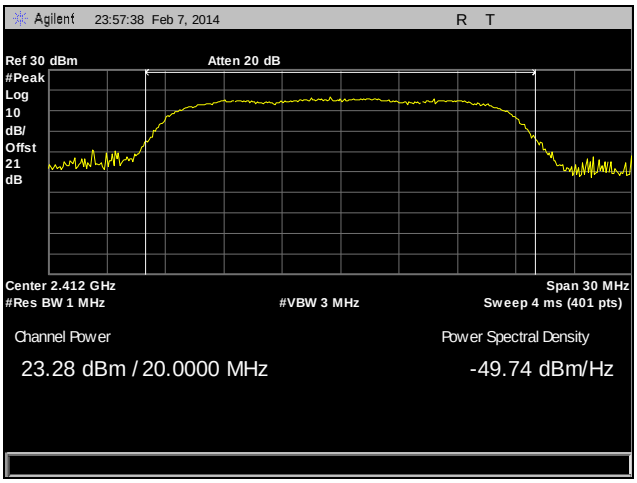


Plot 100. Peak Power Output, Channel 10, 802.11g, Ant. 1

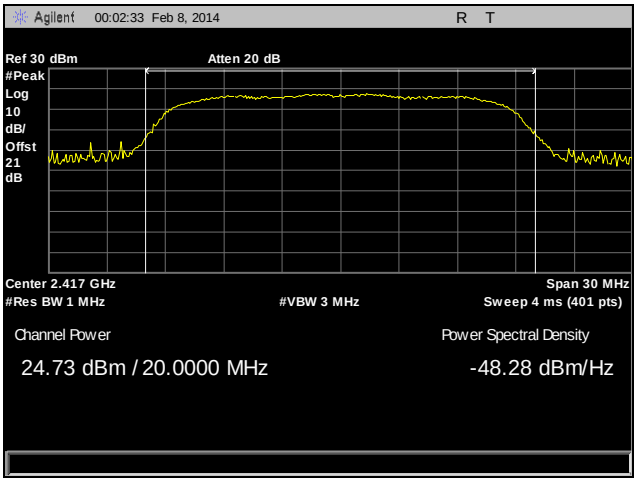


Plot 101. Peak Power Output, Channel 11, 802.11g, Ant. 1

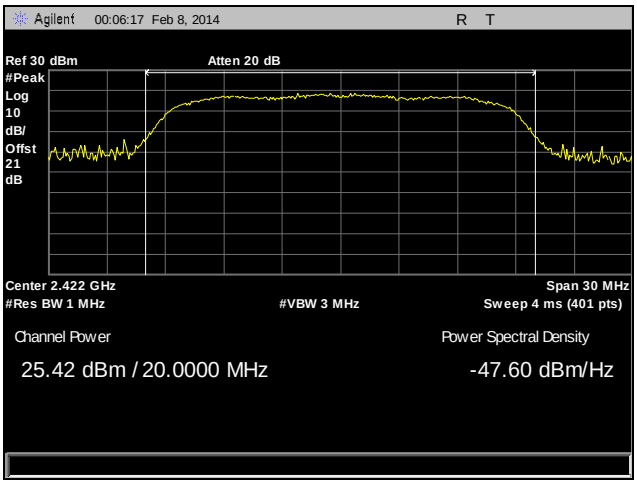
Peak Power Output Test Results, 802.11n 20 MHz



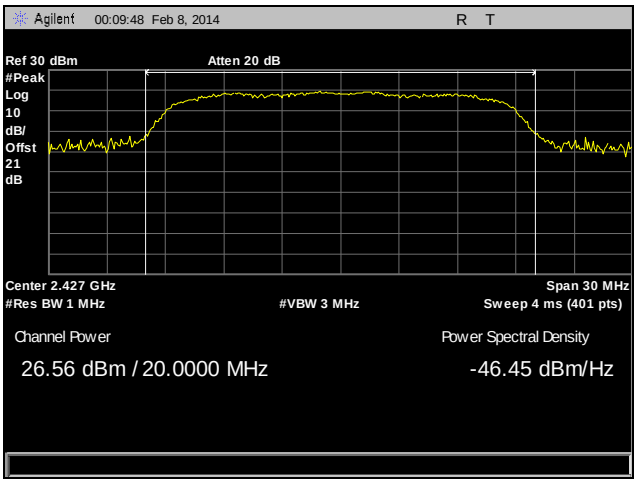
Plot 102. Peak Power Output, Channel 1, 802.11n 20 MHz, Ant. 0



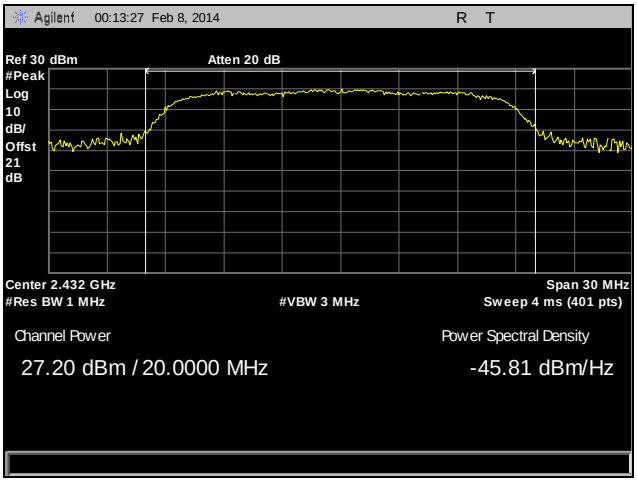
Plot 103. Peak Power Output, Channel 2, 802.11n 20 MHz, Ant. 0



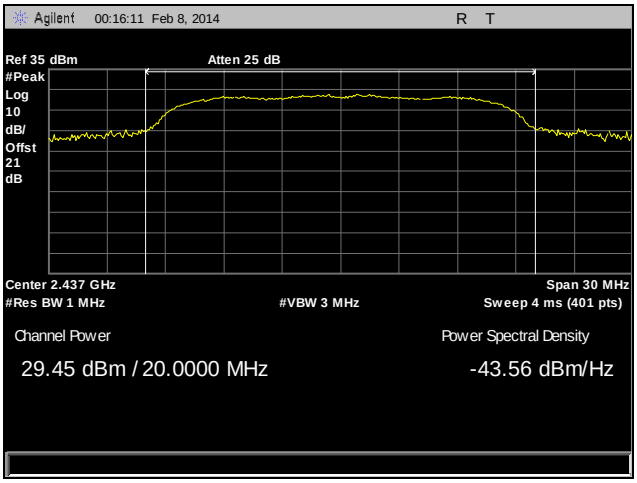
Plot 104. Peak Power Output, Channel 3, 802.11n 20 MHz, Ant. 0



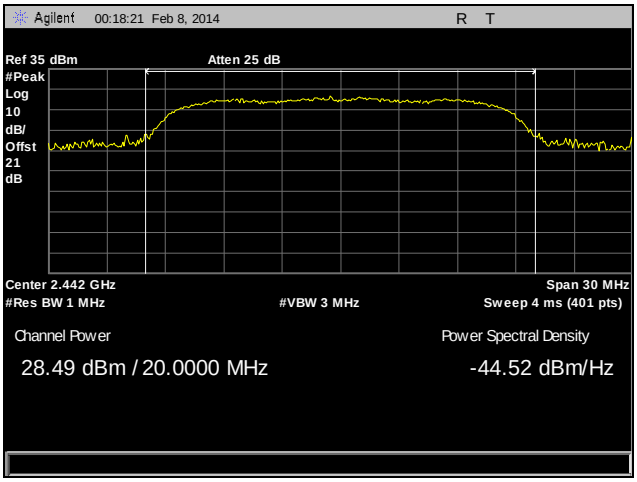
Plot 105. Peak Power Output, Channel 4, 802.11n 20 MHz, Ant. 0



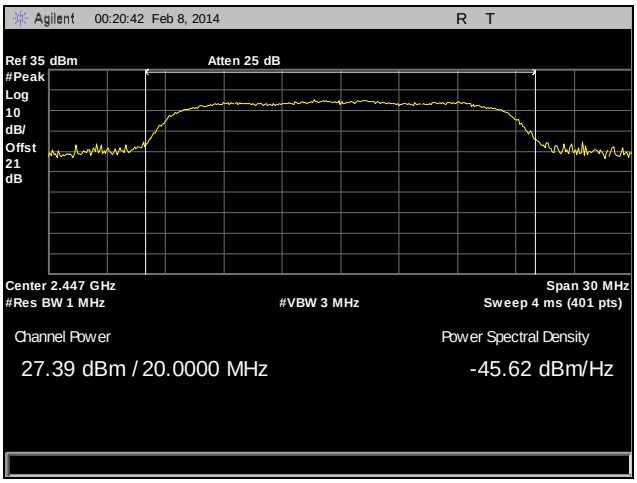
Plot 106. Peak Power Output, Channel 5, 802.11n 20 MHz, Ant. 0



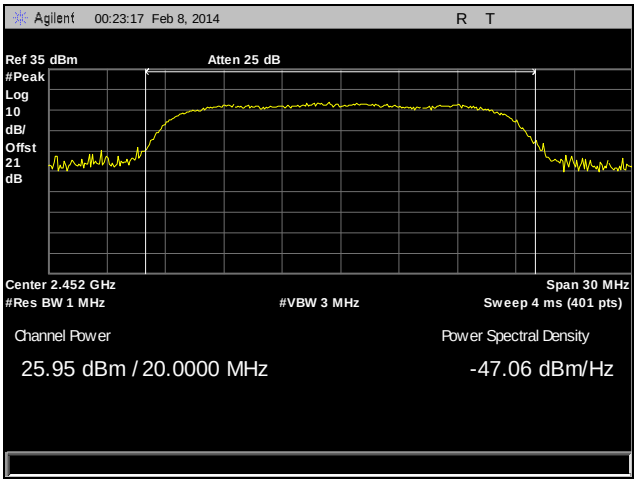
Plot 107. Peak Power Output, Channel 6, 802.11n 20 MHz, Ant. 0



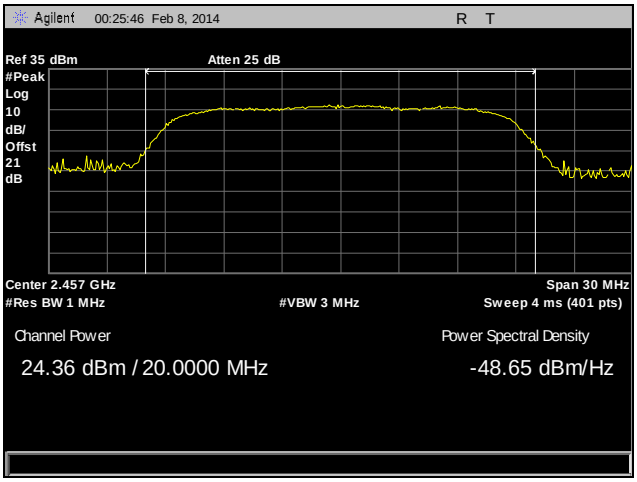
Plot 108. Peak Power Output, Channel 7, 802.11n 20 MHz, Ant. 0



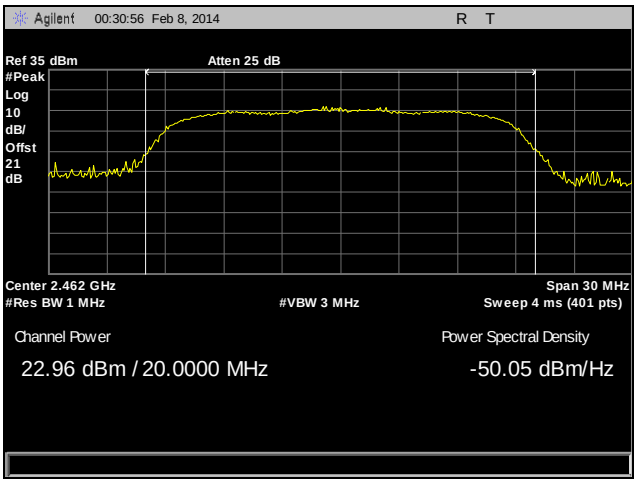
Plot 109. Peak Power Output, Channel 8, 802.11n 20 MHz, Ant. 0



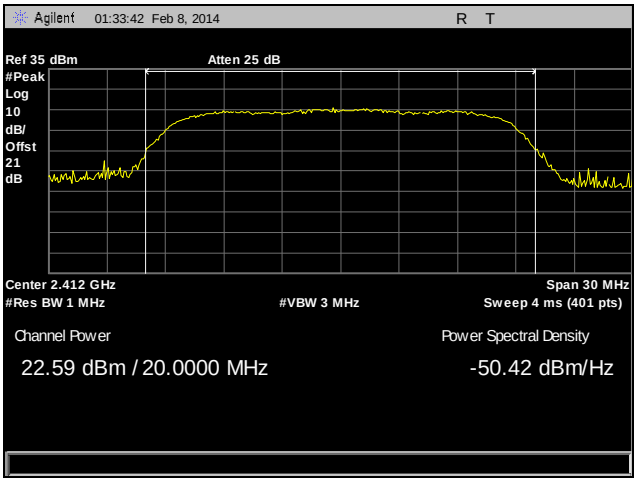
Plot 110. Peak Power Output, Channel 9, 802.11n 20 MHz, Ant. 0



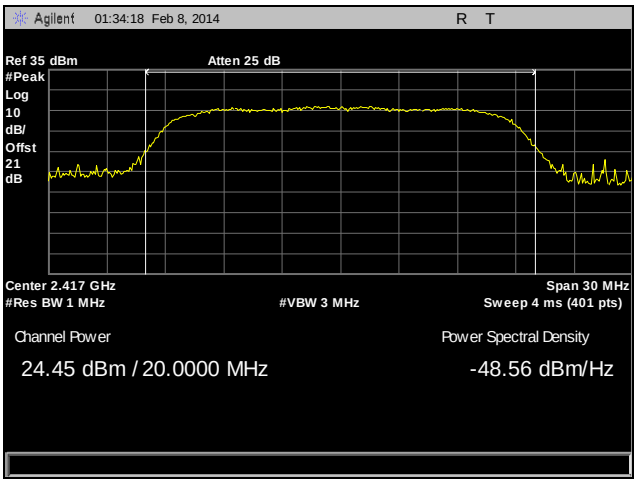
Plot 111. Peak Power Output, Channel 10, 802.11n 20 MHz, Ant. 0



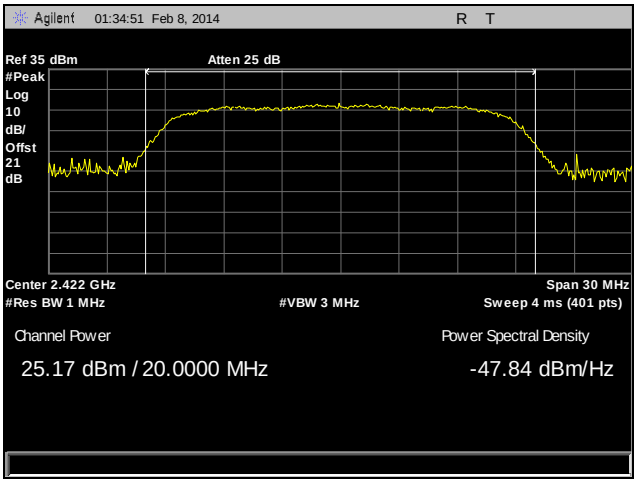
Plot 112. Peak Power Output, Channel 11, 802.11n 20 MHz, Ant. 0



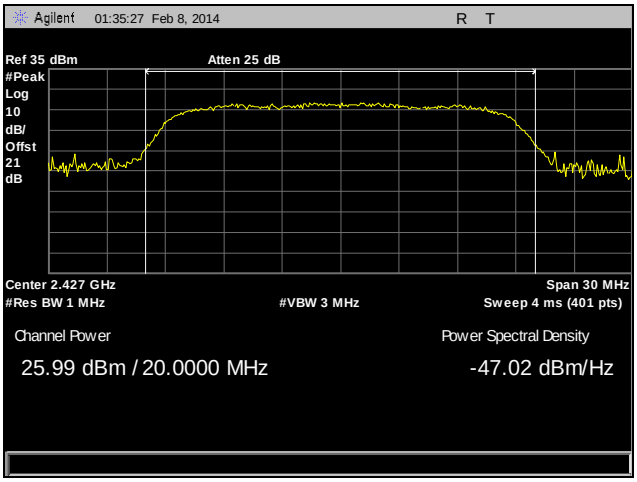
Plot 113. Peak Power Output, Channel 1, 802.11n 20 MHz, Ant. 1



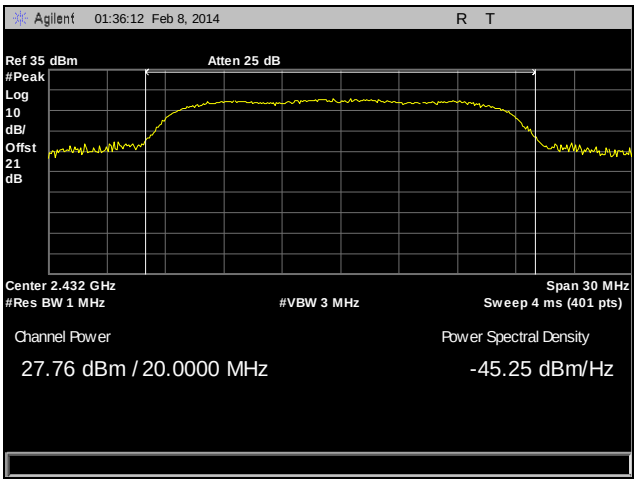
Plot 114. Peak Power Output, Channel 2, 802.11n 20 MHz, Ant. 1



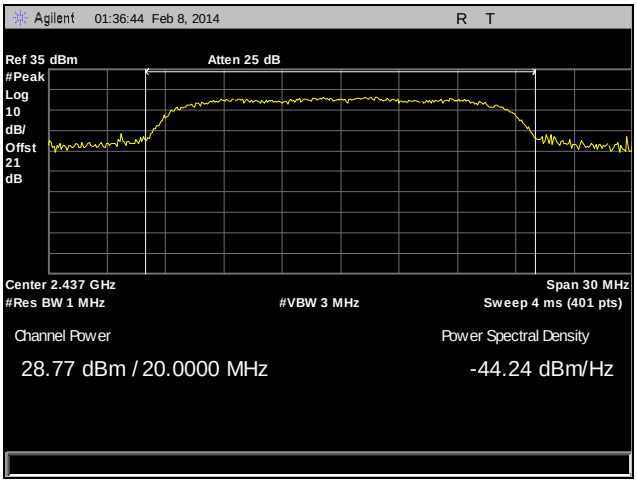
Plot 115. Peak Power Output, Channel 3, 802.11n 20 MHz, Ant. 1



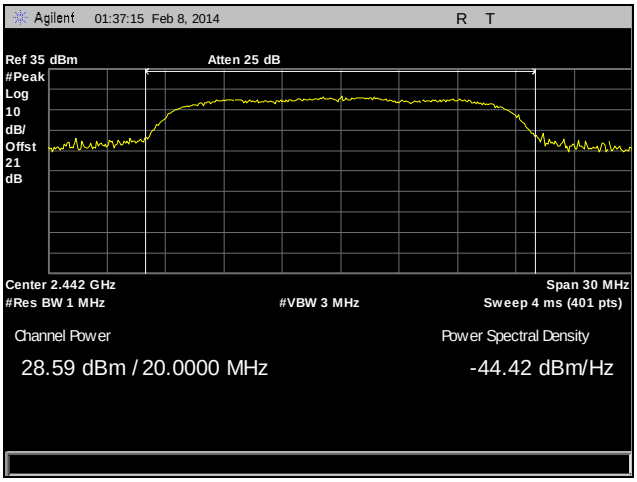
Plot 116. Peak Power Output, Channel 4, 802.11n 20 MHz, Ant. 1



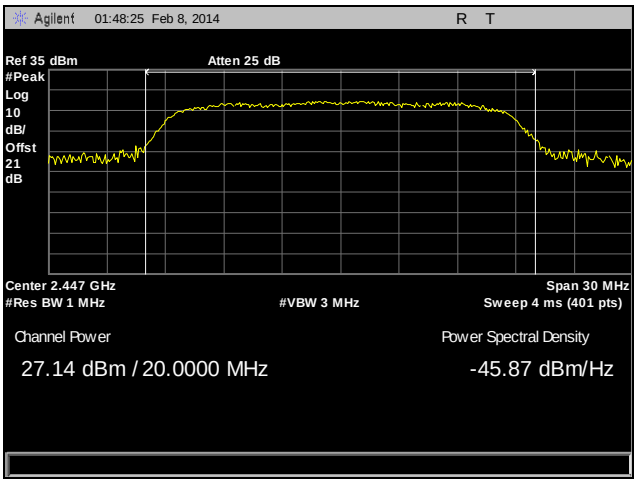
Plot 117. Peak Power Output, Channel 5, 802.11n 20 MHz, Ant. 1



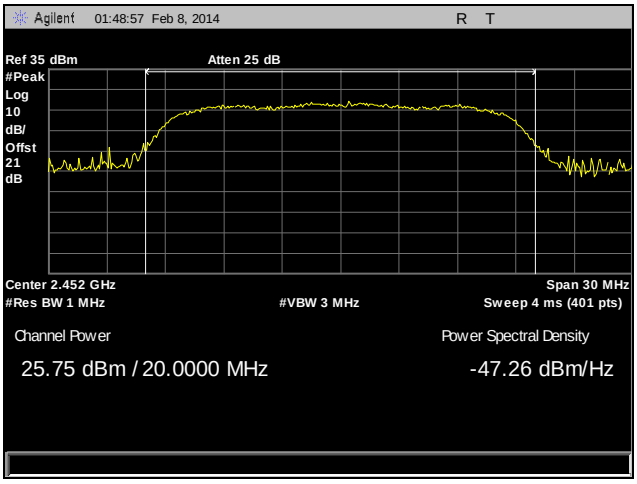
Plot 118. Peak Power Output, Channel 6, 802.11n 20 MHz, Ant. 1



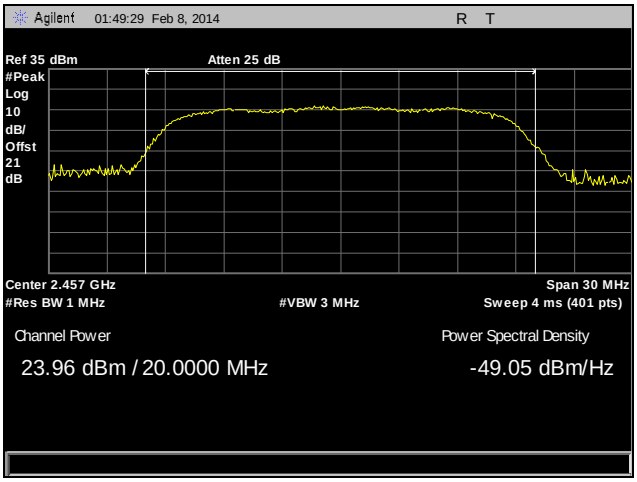
Plot 119. Peak Power Output, Channel 7, 802.11n 20 MHz, Ant. 1



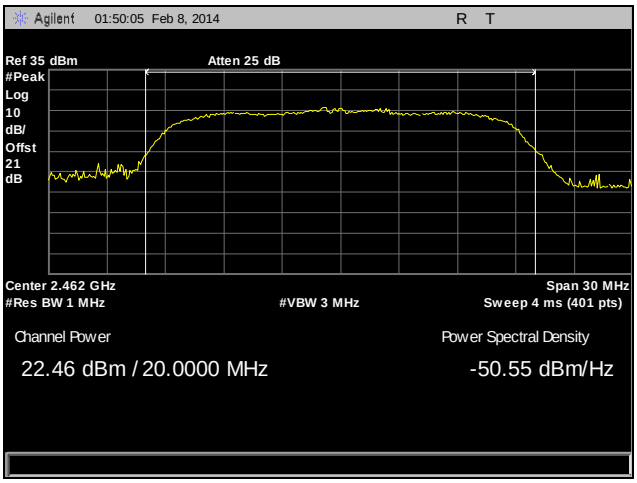
Plot 120. Peak Power Output, Channel 8, 802.11n 20 MHz, Ant. 1



Plot 121. Peak Power Output, Channel 9, 802.11n 20 MHz, Ant. 1

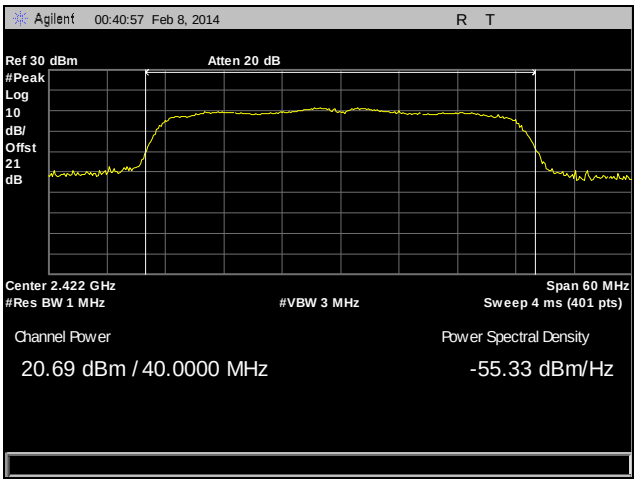


Plot 122. Peak Power Output, Channel 10, 802.11n 20 MHz, Ant. 1

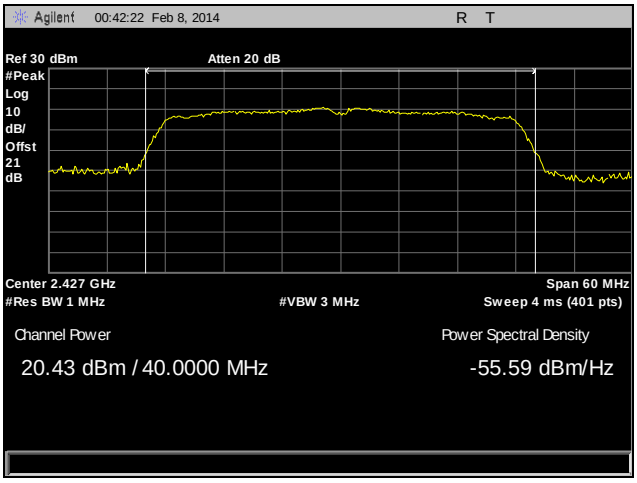


Plot 123. Peak Power Output, Channel 11, 802.11n 20 MHz, Ant. 1

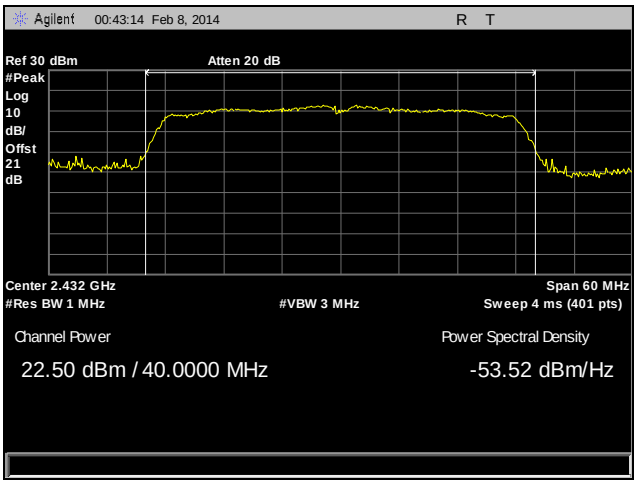
Peak Power Output Test Results, 802.11n 40 MHz



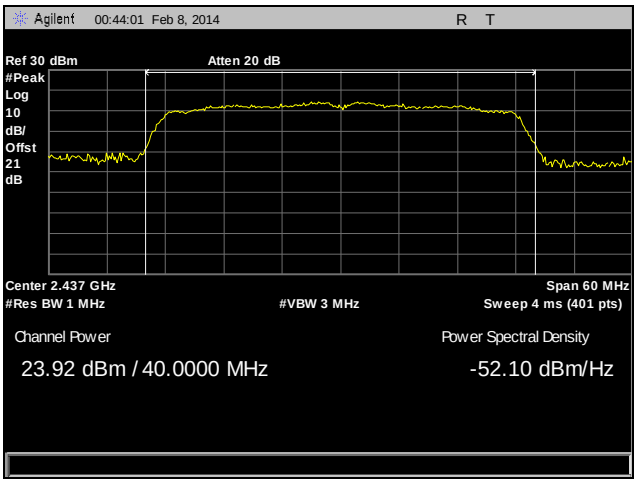
Plot 124. Peak Power Output, Channel 1, 802.11n 40 MHz, Ant. 0



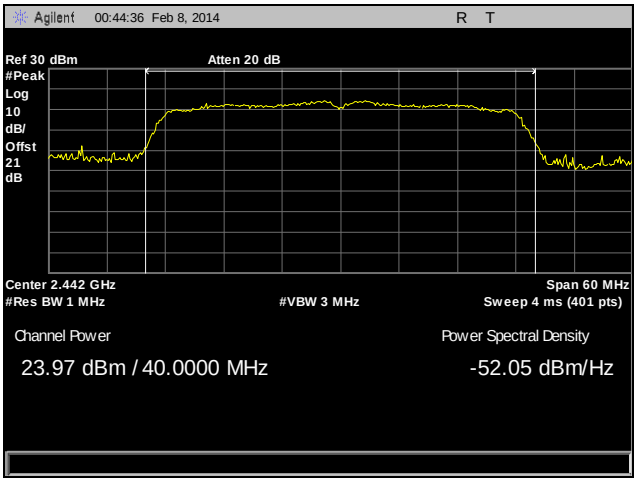
Plot 125. Peak Power Output, Channel 2, 802.11n 40 MHz, Ant. 0



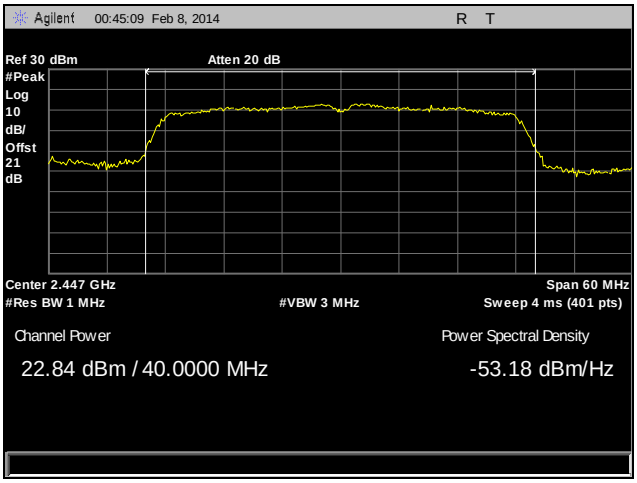
Plot 126. Peak Power Output, Channel 3, 802.11n 40 MHz, Ant. 0



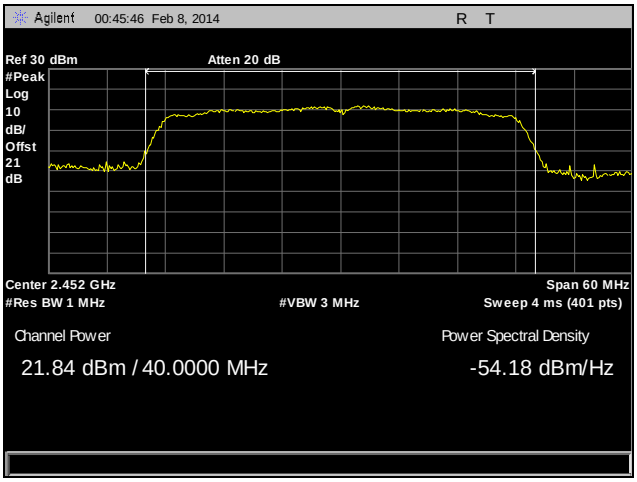
Plot 127. Peak Power Output, Channel 4, 802.11n 40 MHz, Ant. 0



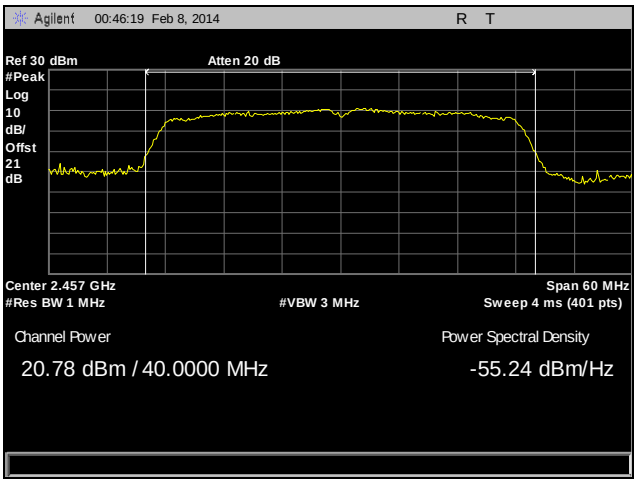
Plot 128. Peak Power Output, Channel 5, 802.11n 40 MHz, Ant. 0



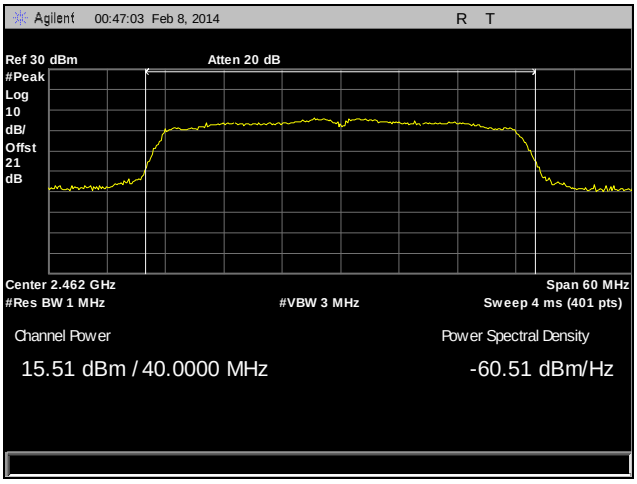
Plot 129. Peak Power Output, Channel 6, 802.11n 40 MHz, Ant. 0



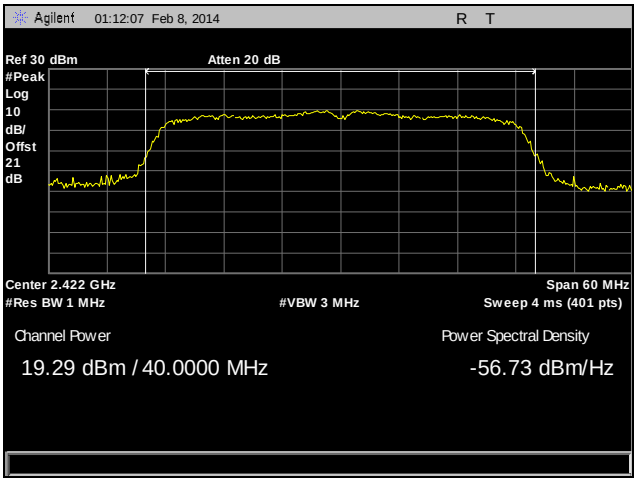
Plot 130. Peak Power Output, Channel 7, 802.11n 40 MHz, Ant. 0



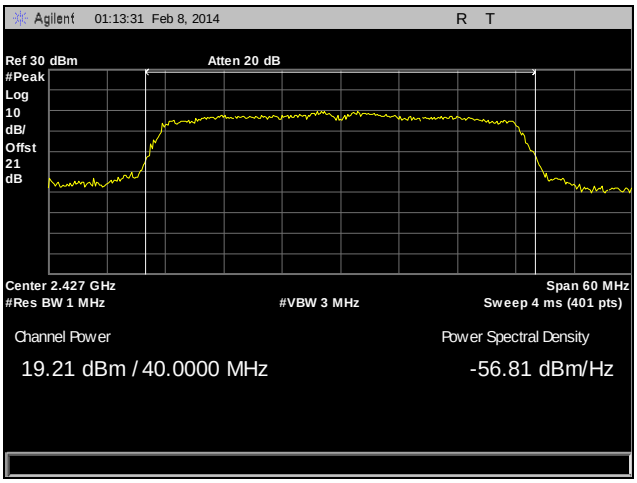
Plot 131. Peak Power Output, Channel 8, 802.11n 40 MHz, Ant. 0



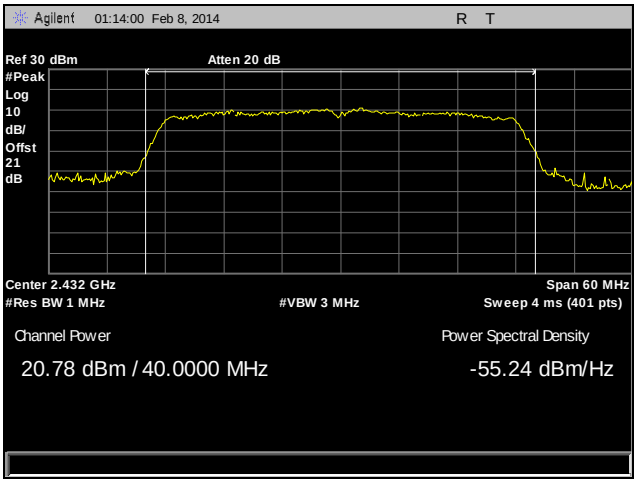
Plot 132. Peak Power Output, Channel 9, 802.11n 40 MHz, Ant. 0



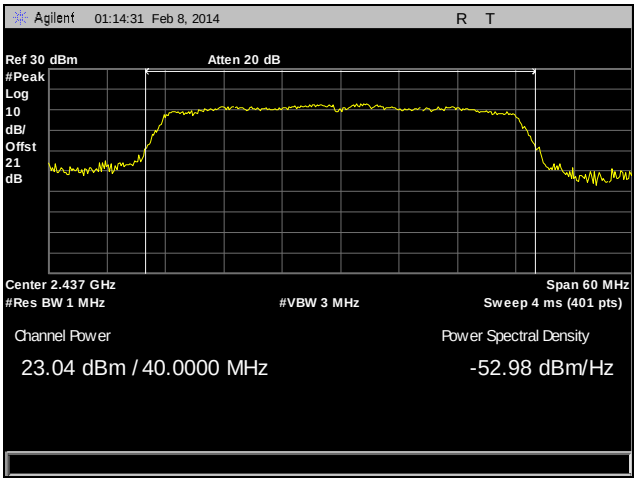
Plot 133. Peak Power Output, Channel 1, 802.11n 40 MHz, Ant. 1



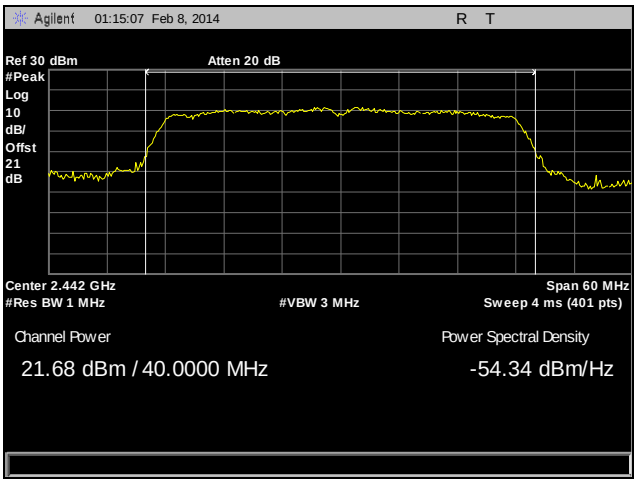
Plot 134. Peak Power Output, Channel 2, 802.11n 40 MHz, Ant. 1



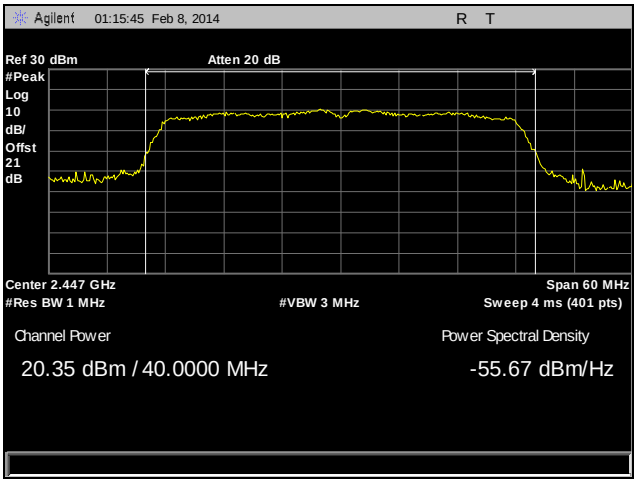
Plot 135. Peak Power Output, Channel 3, 802.11n 40 MHz, Ant. 1



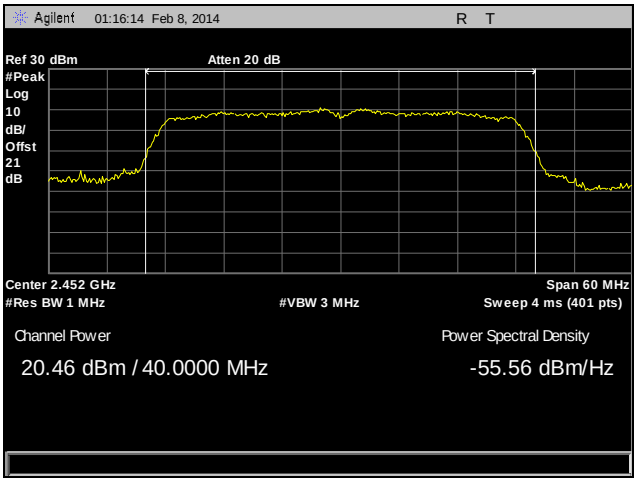
Plot 136. Peak Power Output, Channel 4, 802.11n 40 MHz, Ant. 1



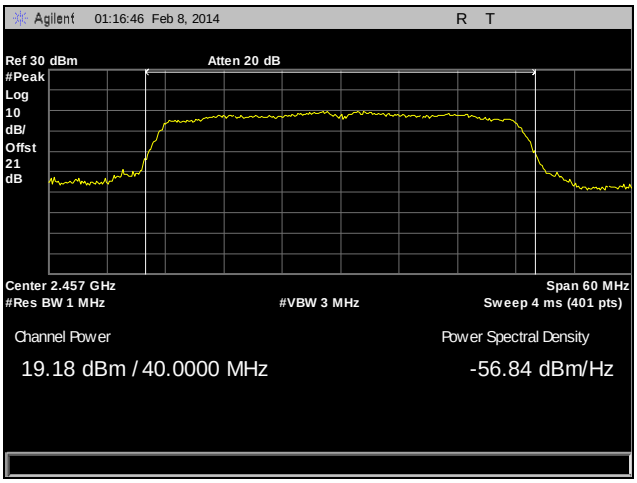
Plot 137. Peak Power Output, Channel 5, 802.11n 40 MHz, Ant. 1



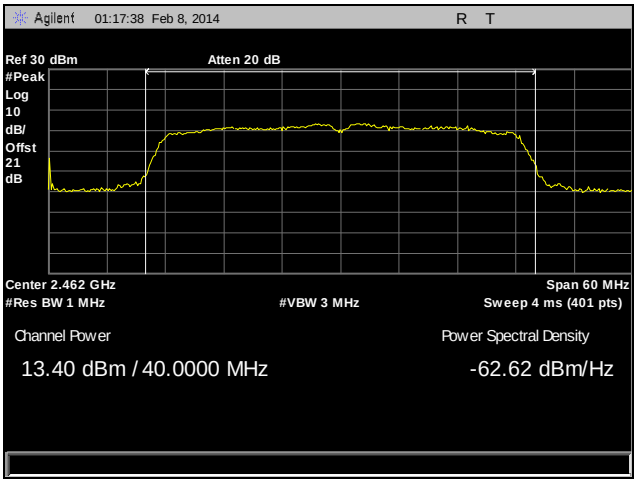
Plot 138. Peak Power Output, Channel 6, 802.11n 40 MHz, Ant. 1



Plot 139. Peak Power Output, Channel 7, 802.11n 40 MHz, Ant. 1

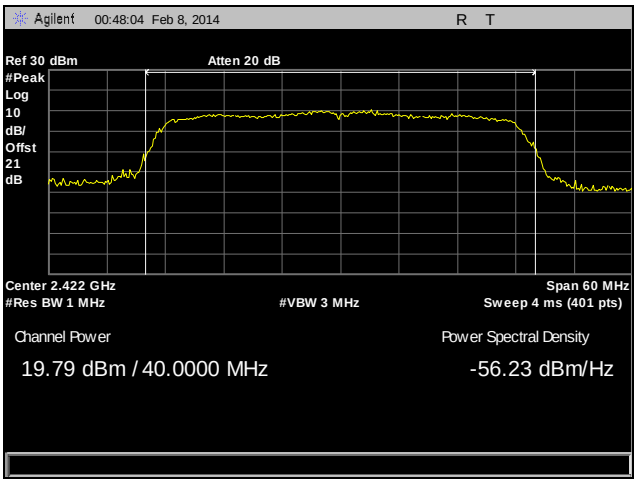


Plot 140. Peak Power Output, Channel 8, 802.11n 40 MHz, Ant. 1

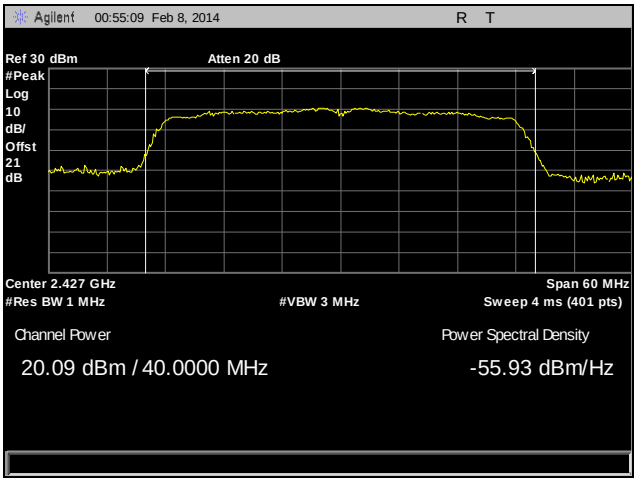


Plot 141. Peak Power Output, Channel 9, 802.11n 40 MHz, Ant. 1

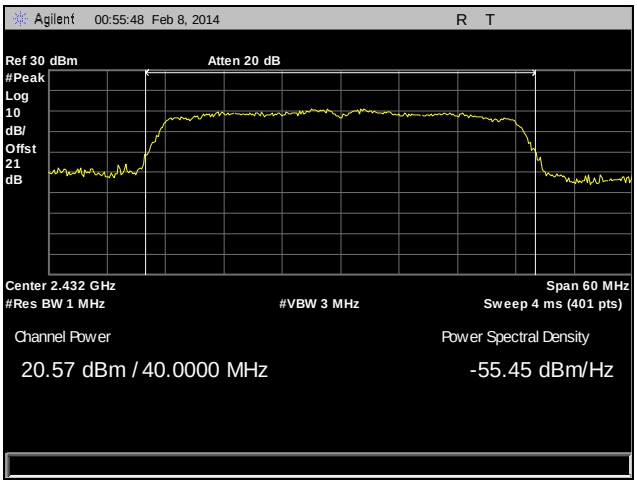
Peak Power Output Test Results, 802.11n 40 MHz, MIMO



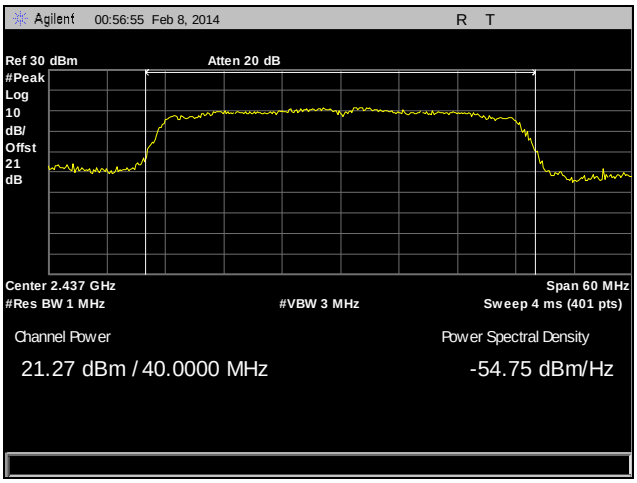
Plot 142. Peak Power Output, Channel 1, 802.11n 40 MHz, Ant. 0, MIMO



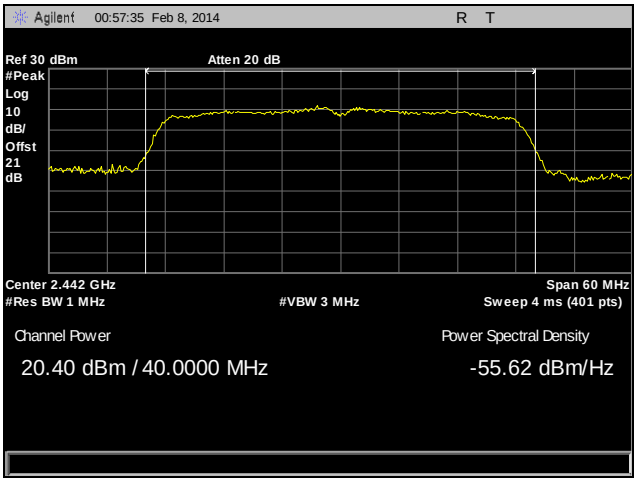
Plot 143. Peak Power Output, Channel 2, 802.11n 40 MHz, Ant. 0, MIMO



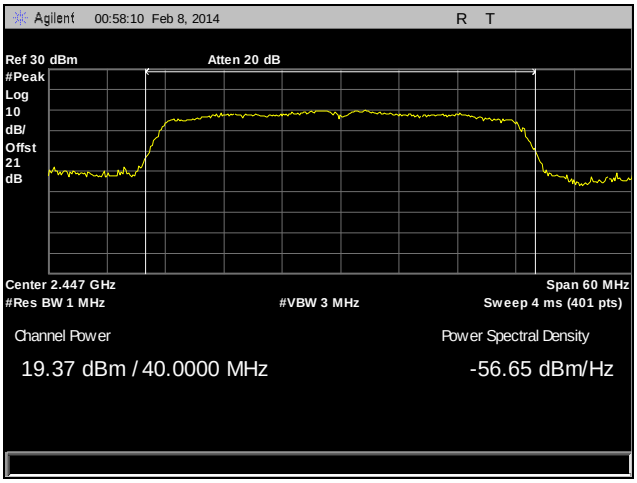
Plot 144. Peak Power Output, Channel 3, 802.11n 40 MHz, Ant. 0, MIMO



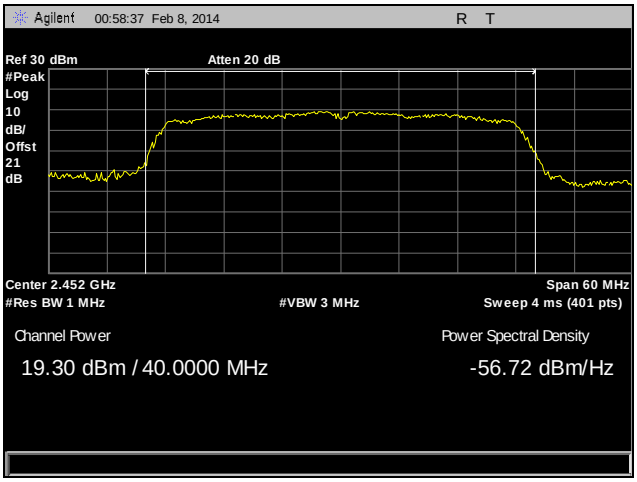
Plot 145. Peak Power Output, Channel 4, 802.11n 40 MHz, Ant. 0, MIMO



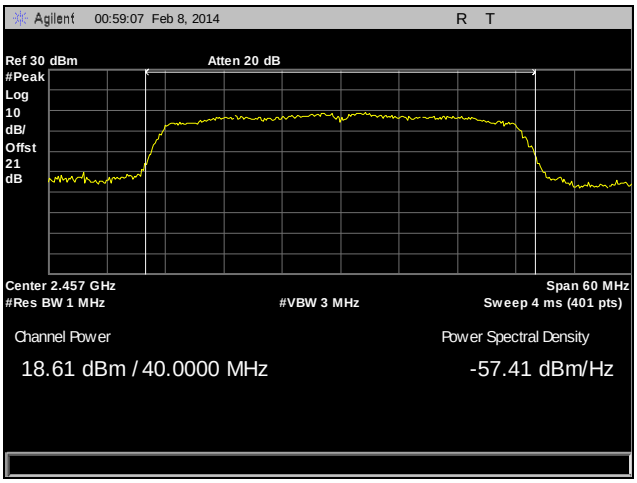
Plot 146. Peak Power Output, Channel 5, 802.11n 40 MHz, Ant. 0, MIMO



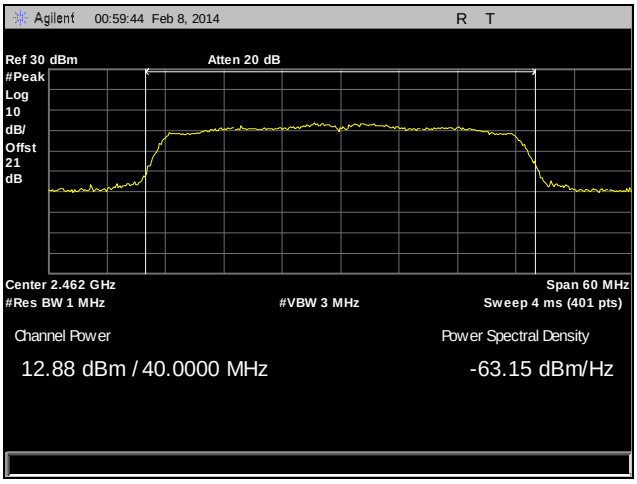
Plot 147. Peak Power Output, Channel 6, 802.11n 40 MHz, Ant. 0, MIMO



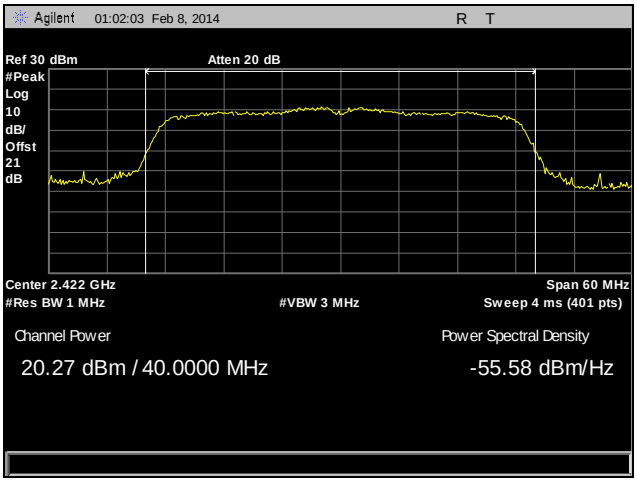
Plot 148. Peak Power Output, Channel 7, 802.11n 40 MHz, Ant. 0, MIMO



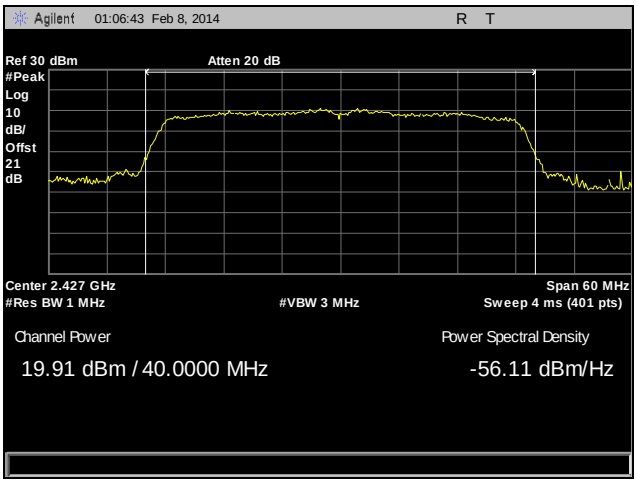
Plot 149. Peak Power Output, Channel 8, 802.11n 40 MHz, Ant. 0, MIMO



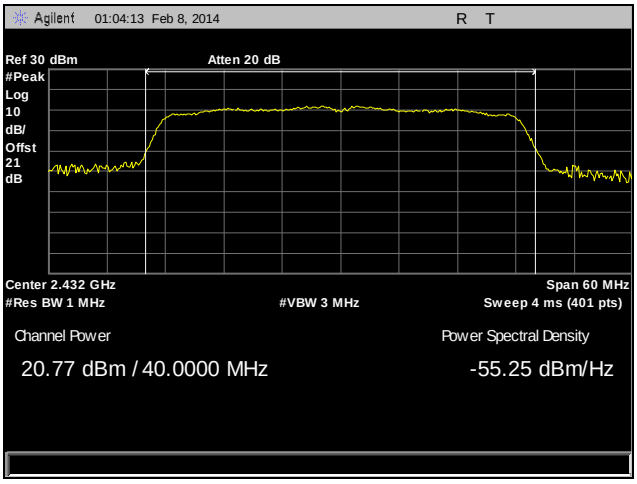
Plot 150. Peak Power Output, Channel 9, 802.11n 40 MHz, Ant. 0, MIMO



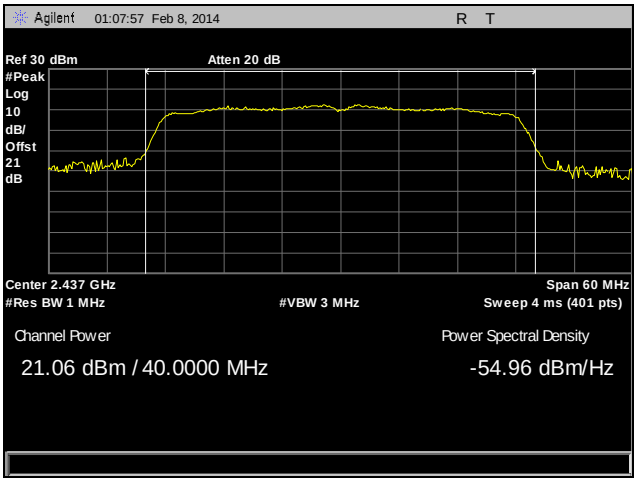
Plot 151. Peak Power Output, Channel 1, 802.11n 40 MHz, Ant. 1, MIMO



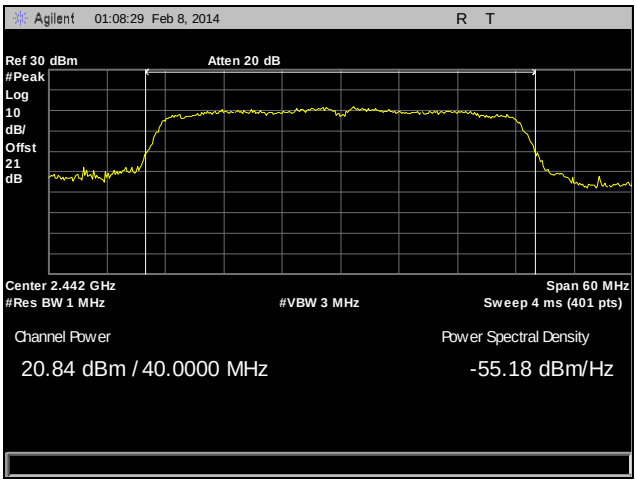
Plot 152. Peak Power Output, Channel 2, 802.11n 40 MHz, Ant. 1, MIMO



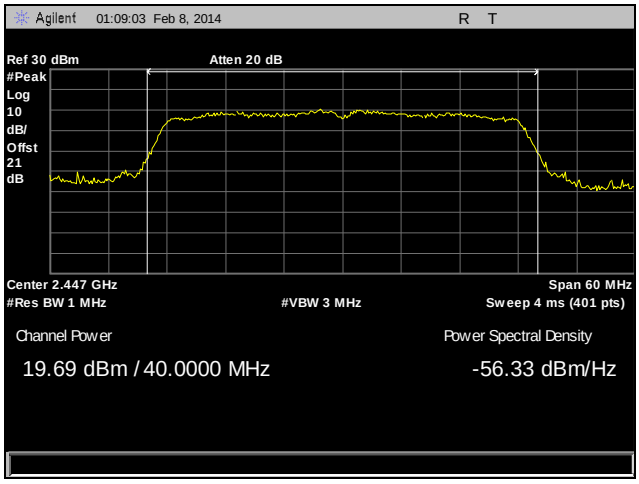
Plot 153. Peak Power Output, Channel 3, 802.11n 40 MHz, Ant. 1, MIMO



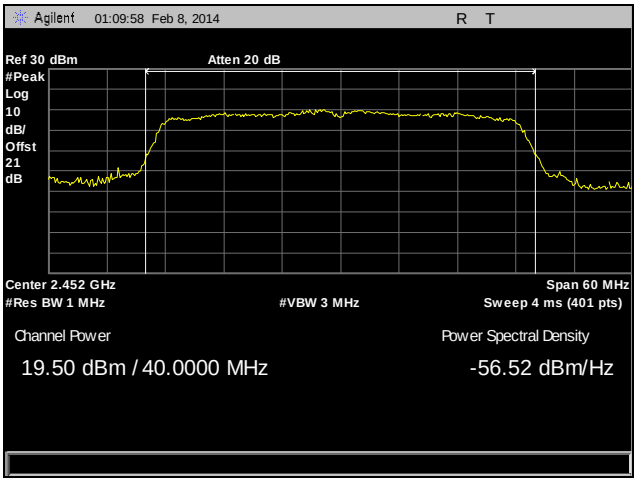
Plot 154. Peak Power Output, Channel 4, 802.11n 40 MHz, Ant. 1, MIMO



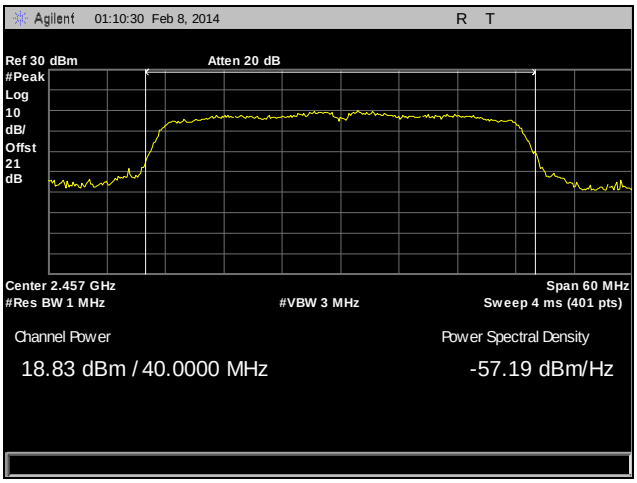
Plot 155. Peak Power Output, Channel 5, 802.11n 40 MHz, Ant. 1, MIMO



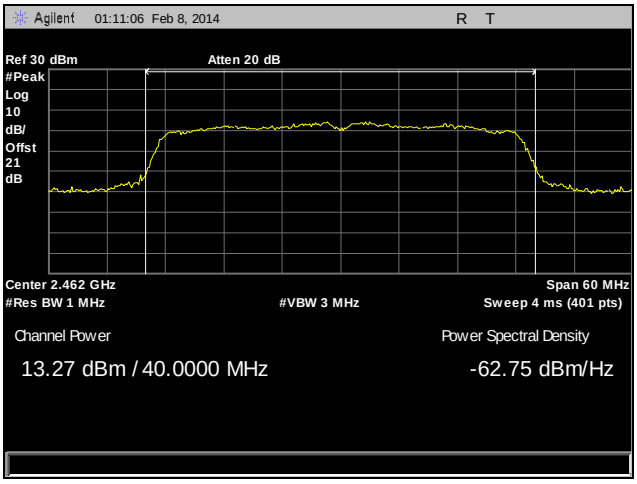
Plot 156. Peak Power Output, Channel 6, 802.11n 40 MHz, Ant. 1, MIMO



Plot 157. Peak Power Output, Channel 7, 802.11n 40 MHz, Ant. 1, MIMO



Plot 158. Peak Power Output, Channel 8, 802.11n 40 MHz, Ant. 1, MIMO



Plot 159. Peak Power Output, Channel 9, 802.11n 40 MHz, Ant. 1, MIMO

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(d) Radiated Spurious Emissions Requirements and Band Edge

Test Requirements: **§15.247(d); §15.205:** Emissions outside the frequency band.

§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. 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).

§15.205(a): Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090–0.110----------	16.42–16.423	399.9–410	4.5–5.15
[1] 0.495–0.505----------	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])

Table 41. Restricted Bands of Operation

[1] Until February 1, 1999, this restricted band shall be 0.490 – 0.510 MHz.
[2] Above 38.6

Test Requirement(s): **§ 15.209 (a):** Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in Table 42.

Frequency (MHz)	§ 15.209(a),Radiated Emission Limits (dBµV) @ 3m
30 - 88	40.00
88 - 216	43.50
216 - 960	46.00
Above 960	54.00

Table 42. Radiated Emissions Limits Calculated from FCC Part 15, § 15.209 (a)

Test Procedures: The transmitter was turned on. Measurements were performed of the low, mid and high Channels. The EUT was rotated orthogonally through all three axes. Plots shown are corrected for both antenna correction factor and distance and compared to a 3 m limit line. Only noise floor was measured above 18 GHz.

Test Results: The EUT was compliant with the Radiated Spurious Emission limits of **§ 15.247(d)**. Due to dual radio in the EUT (2.4GHz and 5GHz radio), in some of the radiated emission plots 5 GHz radio beacon was observed. Arris had no way of turning this off. This is not a spurious emission from the 2.4 GHz radio.

Test Engineer(s): Surinder Singh

Test Date(s): 02/06/14

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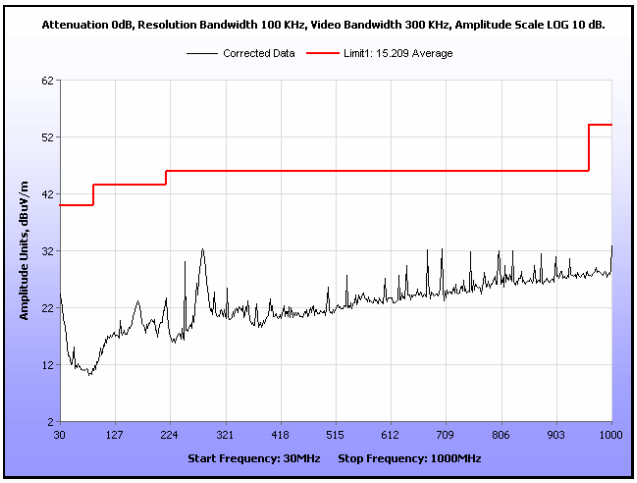
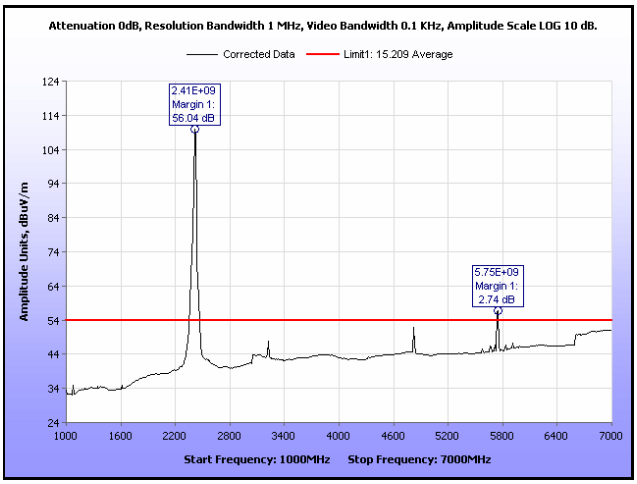
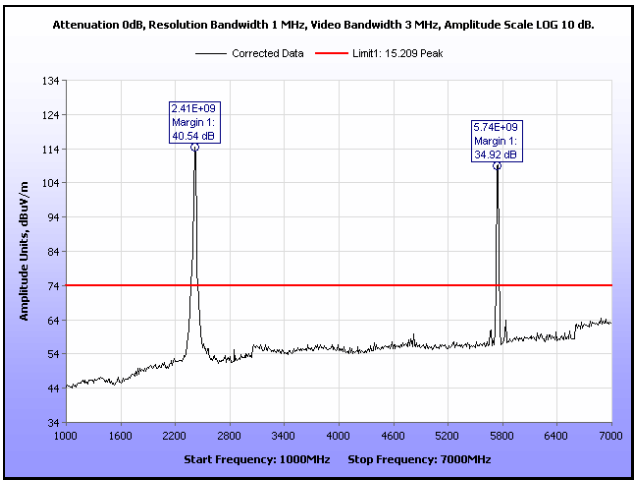
Radiated Spurious Emissions Test Results, 802.11b



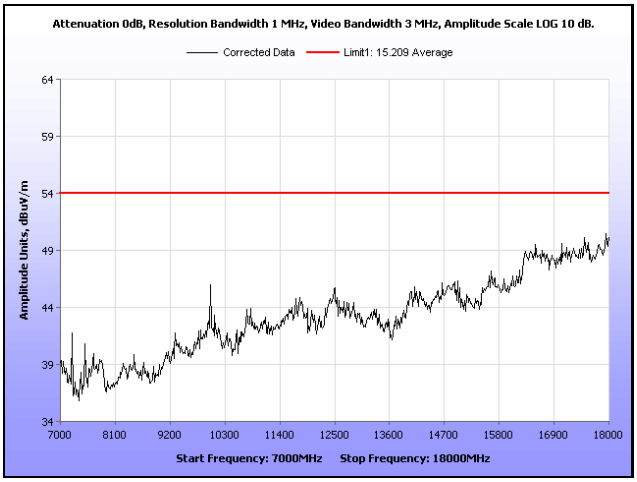
Plot 160. Radiated Spurious Emissions, Low Channel, 802.11b, Ant. 0, 30 MHz – 1 GHz



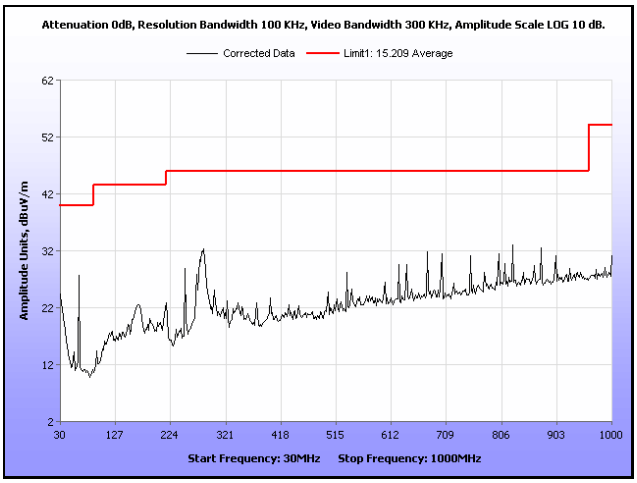
Plot 161. Radiated Spurious Emissions, Low Channel, 802.11b, Ant. 0, 1 GHz – 7 GHz, Average



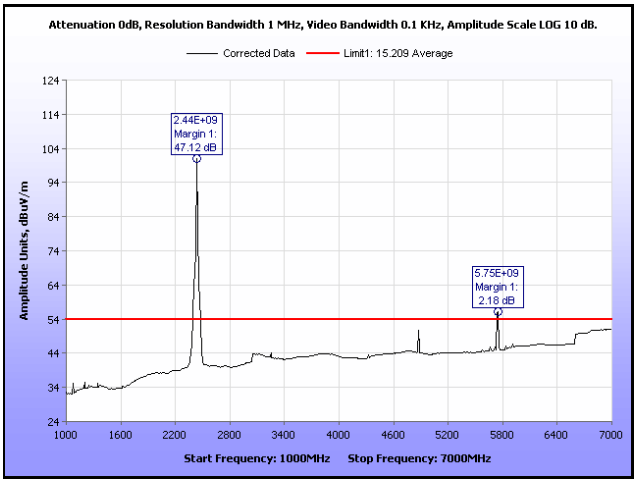
Plot 162. Radiated Spurious Emissions, Low Channel, 802.11b, Ant. 0, 1 GHz – 7 GHz, Peak



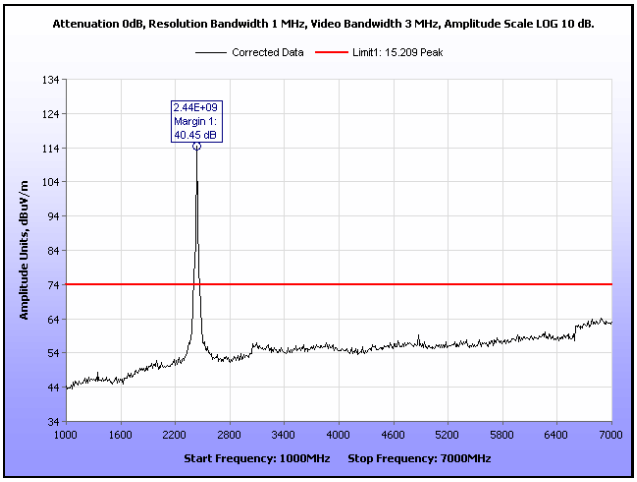
Plot 163. Radiated Spurious Emissions, Low Channel, 802.11b, Ant. 0, 7 GHz – 18 GHz



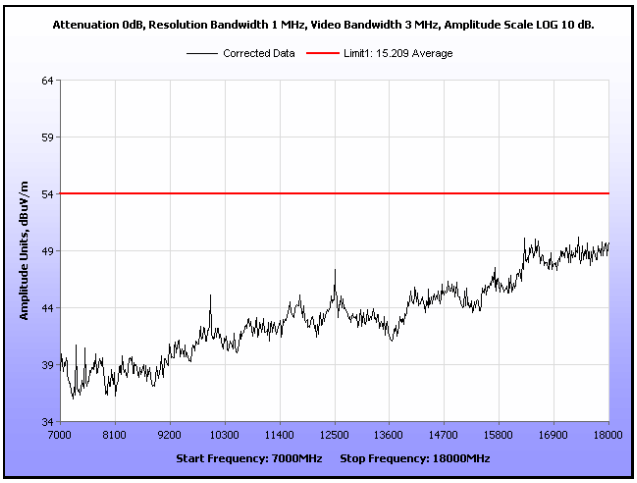
Plot 164. Radiated Spurious Emissions, Mid Channel, 802.11b, Ant. 0, 30 MHz – 1 GHz



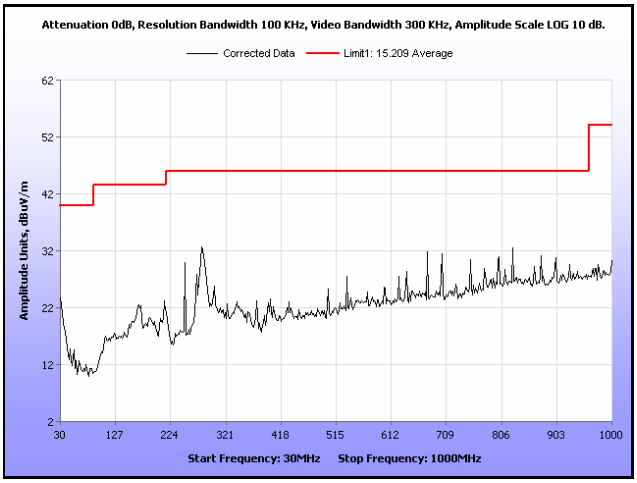
Plot 165. Radiated Spurious Emissions, Mid Channel, 802.11b, Ant. 0, 1 GHz – 7 GHz, Average



Plot 166. Radiated Spurious Emissions, Mid Channel, 802.11b, Ant. 0, 1 GHz – 7 GHz, Peak



Plot 167. Radiated Spurious Emissions, Mid Channel, 802.11b, Ant. 0, 7 GHz – 18 GHz



Plot 168. Radiated Spurious Emissions, High Channel, 802.11b, Ant. 0, 30 MHz – 1 GHz

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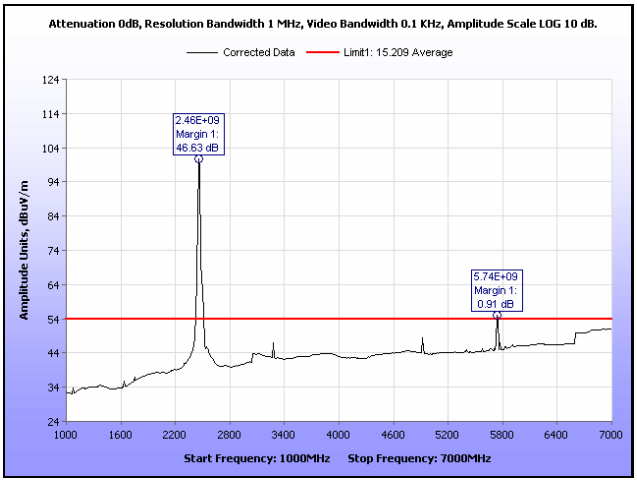
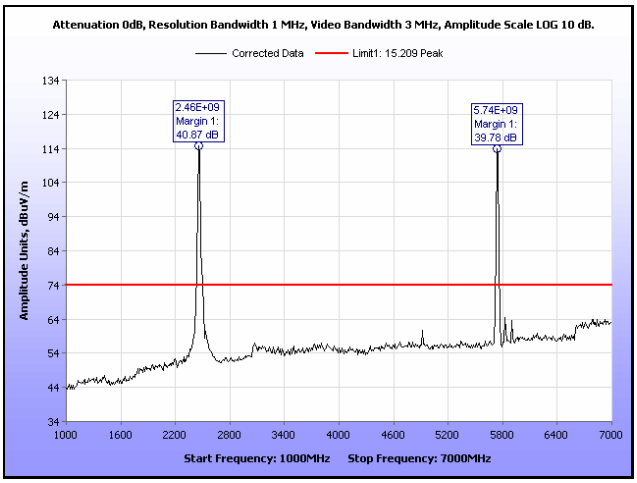
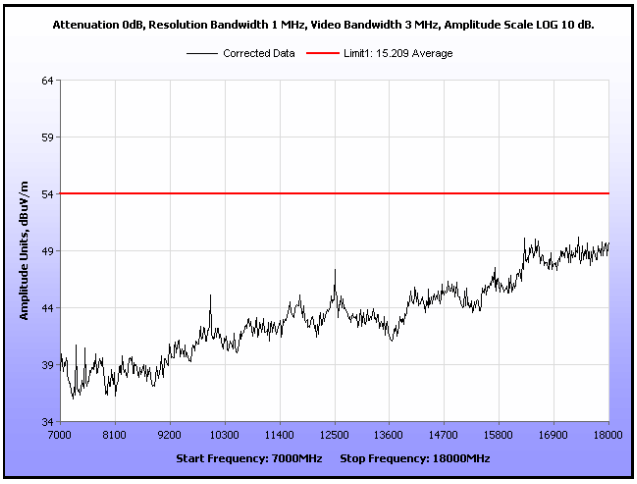


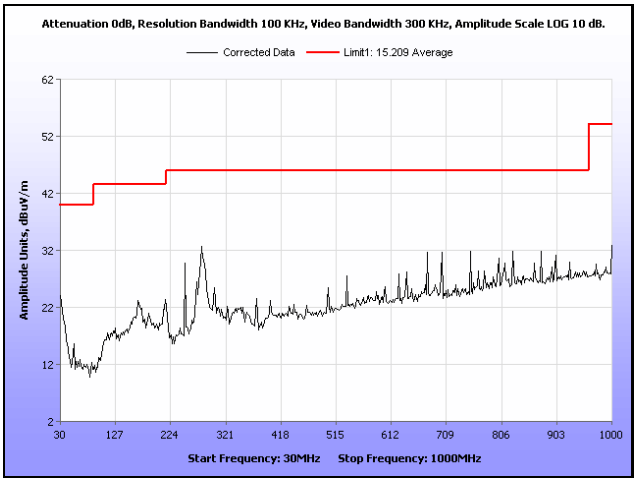
Plot 169. Radiated Spurious Emissions, High Channel, 802.11b, Ant. 0, 1 GHz – 7 GHz, Average



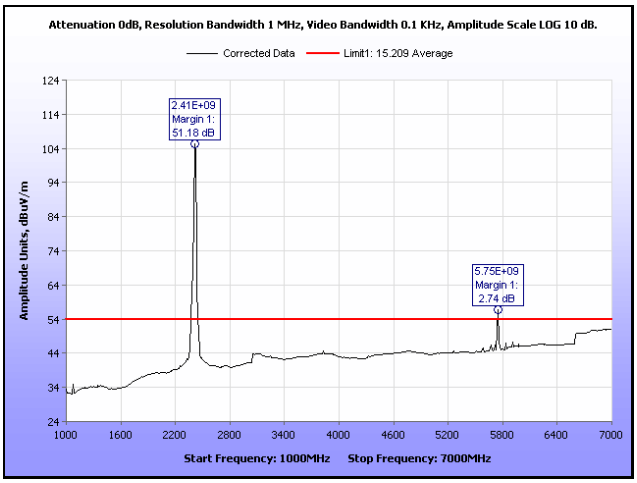
Plot 170. Radiated Spurious Emissions, High Channel, 802.11b, Ant. 0, 1 GHz – 7 GHz, Peak



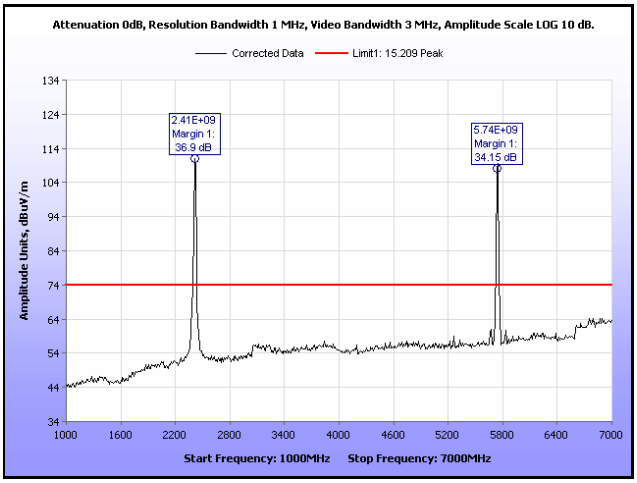
Plot 171. Radiated Spurious Emissions, High Channel, 802.11b, Ant. 0, 7 GHz – 18 GHz



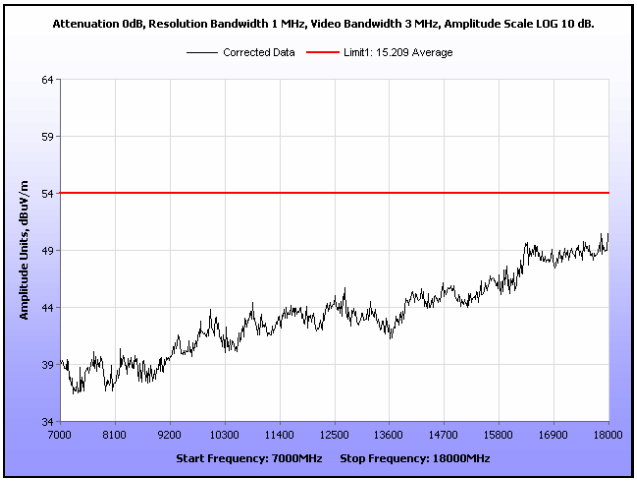
Plot 172. Radiated Spurious Emissions, Low Channel, 802.11b, Ant. 1, 30 MHz – 1 GHz



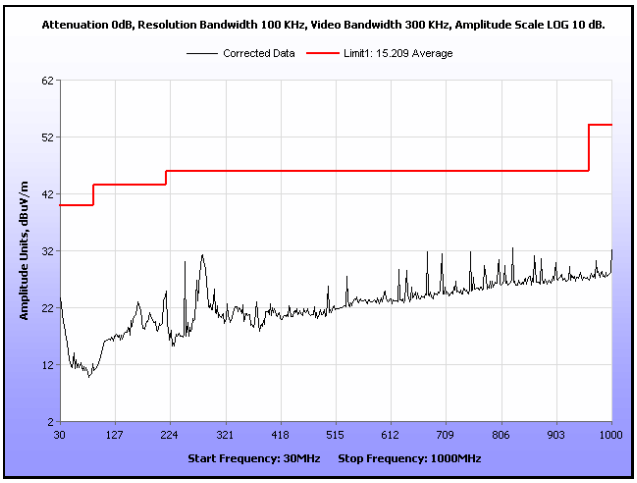
Plot 173. Radiated Spurious Emissions, Low Channel, 802.11b, Ant. 1, 1 GHz – 7 GHz, Average



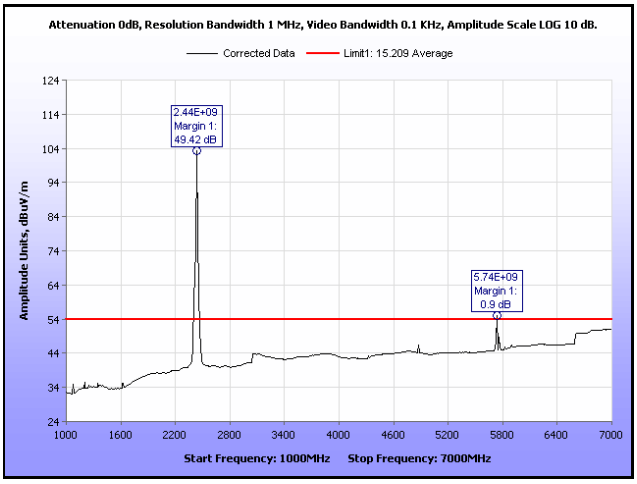
Plot 174. Radiated Spurious Emissions, Low Channel, 802.11b, Ant. 1, 1 GHz – 7 GHz, Peak



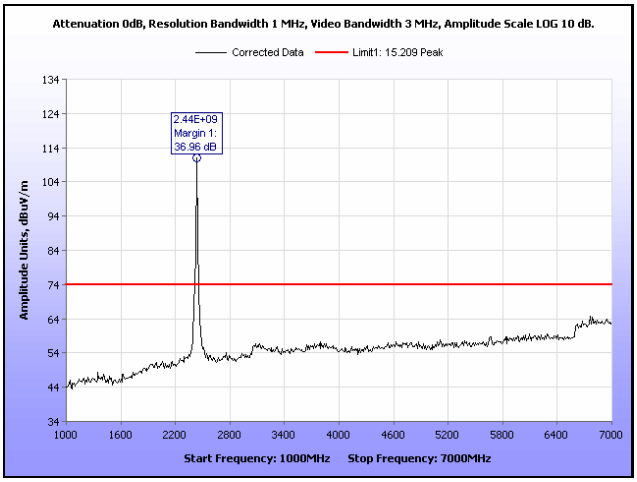
Plot 175. Radiated Spurious Emissions, Low Channel, 802.11b, Ant. 1, 7 GHz – 18 GHz



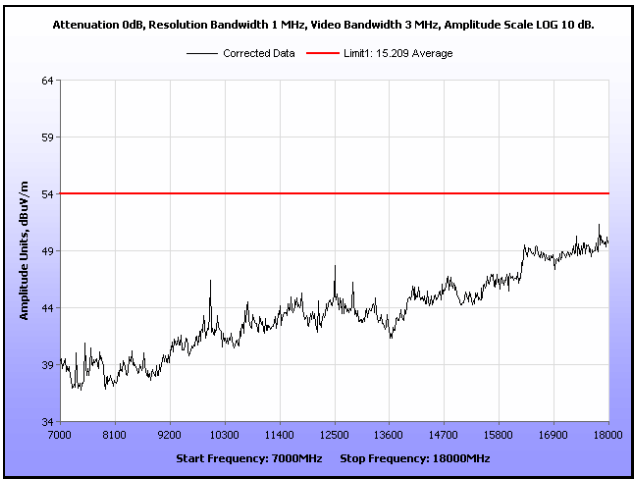
Plot 176. Radiated Spurious Emissions, Mid Channel, 802.11b, Ant. 1, 30 MHz – 1 GHz



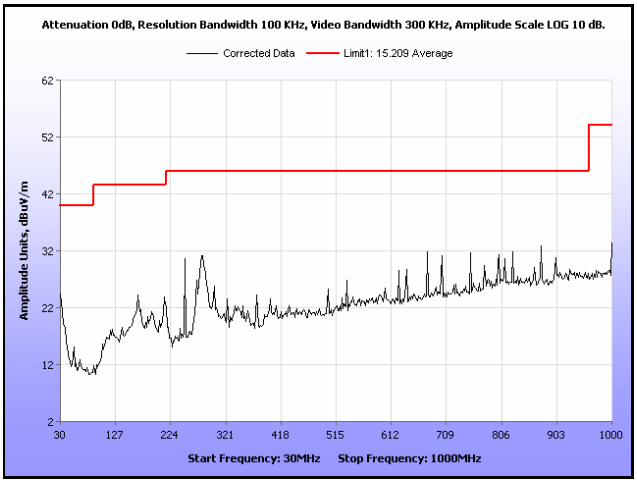
Plot 177. Radiated Spurious Emissions, Mid Channel, 802.11b, Ant. 1, 1 GHz – 7 GHz, Average



Plot 178. Radiated Spurious Emissions, Mid Channel, 802.11b, Ant. 1, 1 GHz – 7 GHz, Peak



Plot 179. Radiated Spurious Emissions, Mid Channel, 802.11b, Ant. 1, 7 GHz – 18 GHz



Plot 180. Radiated Spurious Emissions, High Channel, 802.11b, Ant. 1, 30 MHz – 1 GHz

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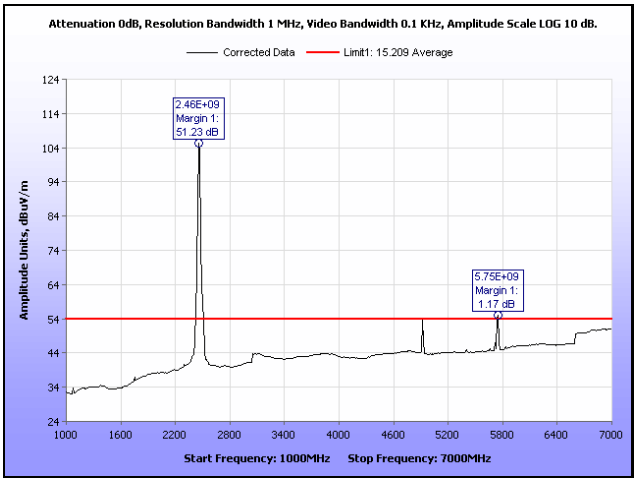
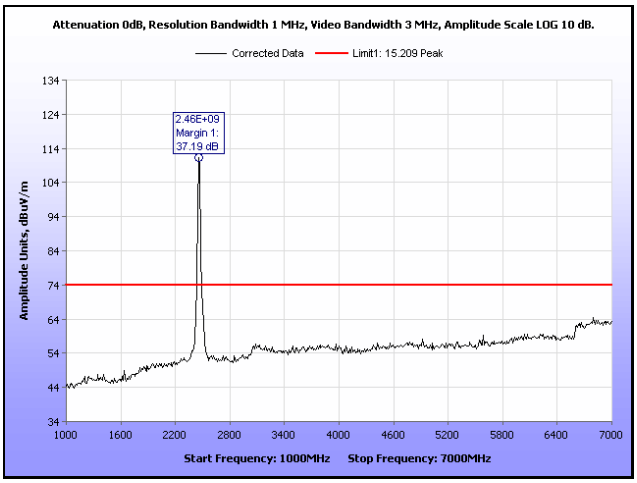
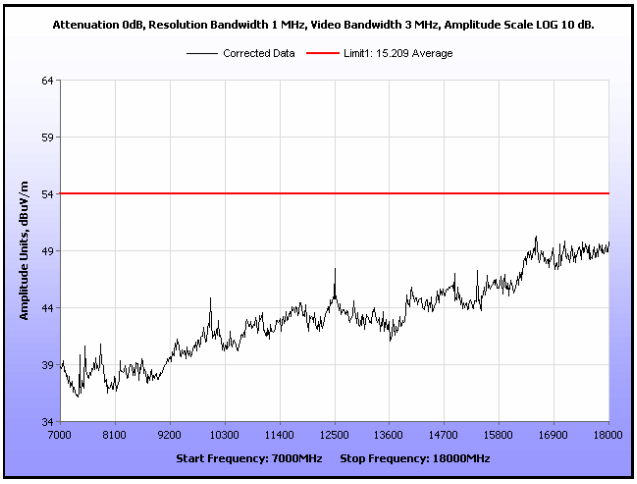


Plot 181. Radiated Spurious Emissions, High Channel, 802.11b, Ant. 1, 1 GHz – 7 GHz, Average

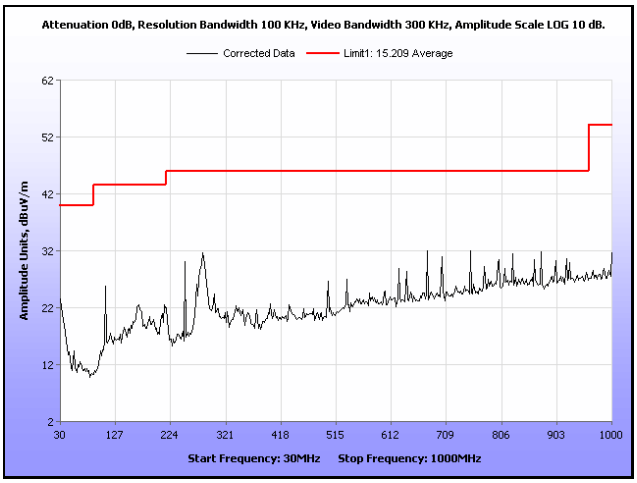


Plot 182. Radiated Spurious Emissions, High Channel, 802.11b, Ant. 1, 1 GHz – 7 GHz, Peak

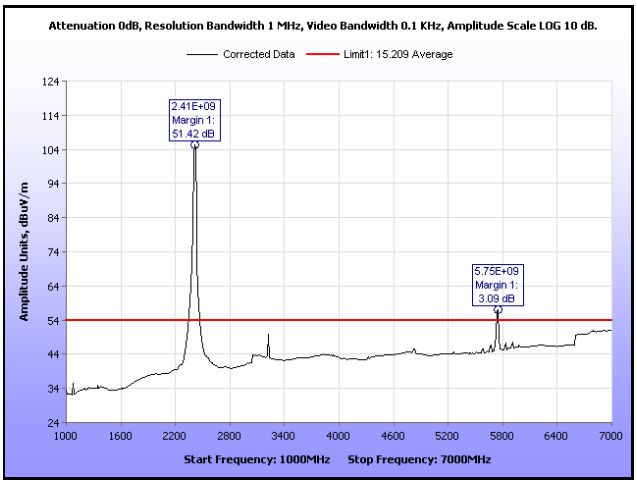


Plot 183. Radiated Spurious Emissions, High Channel, 802.11b, Ant. 1, 7 GHz – 18 GHz

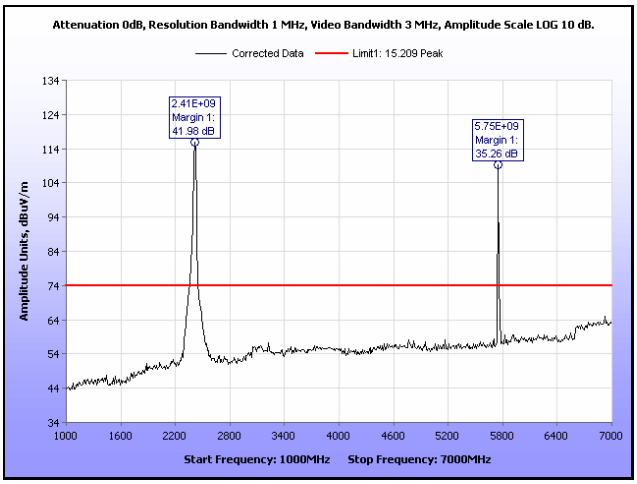
Radiated Spurious Emissions Test Results, 802.11g



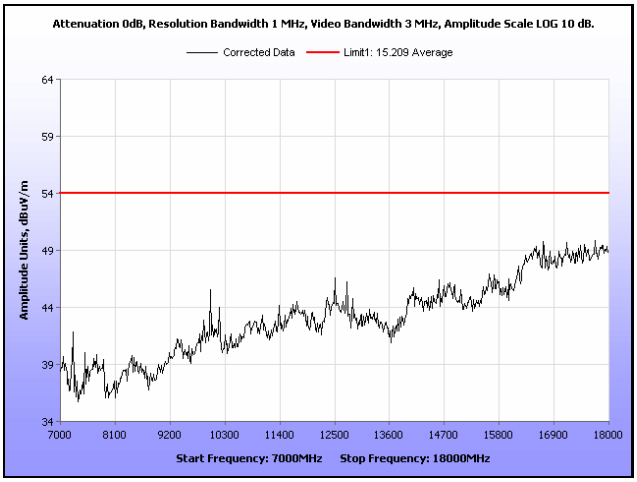
Plot 184. Radiated Spurious Emissions, Low Channel, 802.11g, Ant. 0, 30 MHz – 1 GHz



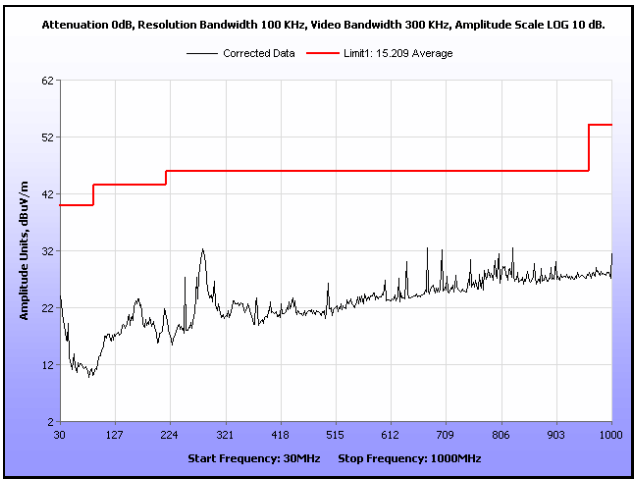
Plot 185. Radiated Spurious Emissions, Low Channel, 802.11g, Ant. 0, 1 GHz – 7 GHz, Average



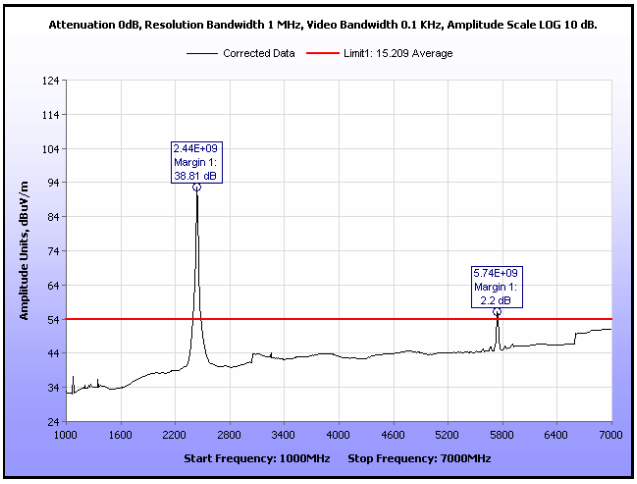
Plot 186. Radiated Spurious Emissions, Low Channel, 802.11g, Ant. 0, 1 GHz – 7 GHz, Peak



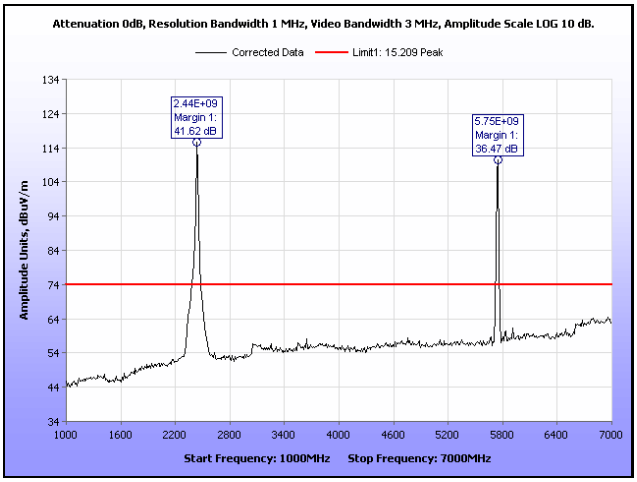
Plot 187. Radiated Spurious Emissions, Low Channel, 802.11g, Ant. 0, 7 GHz – 18 GHz



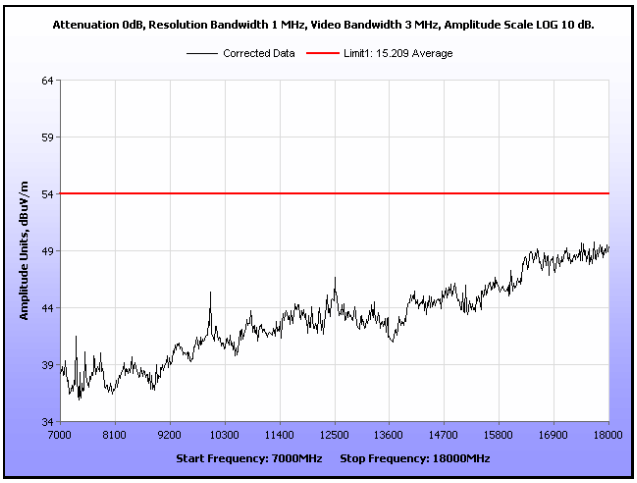
Plot 188. Radiated Spurious Emissions, Mid Channel, 802.11g, Ant. 0, 30 MHz – 1 GHz



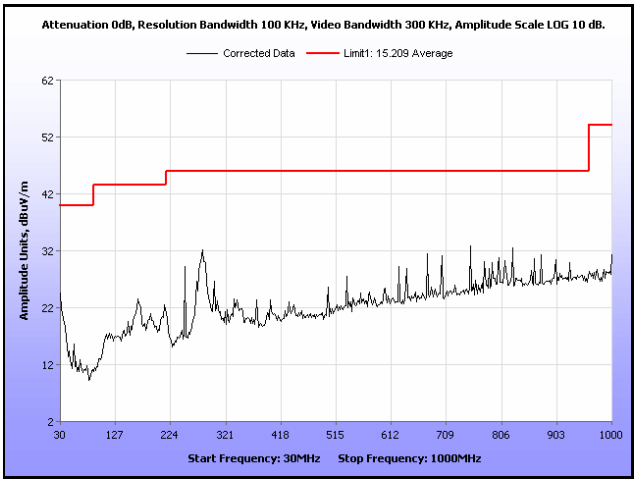
Plot 189. Radiated Spurious Emissions, Mid Channel, 802.11g, Ant. 0, 1 GHz – 7 GHz, Average



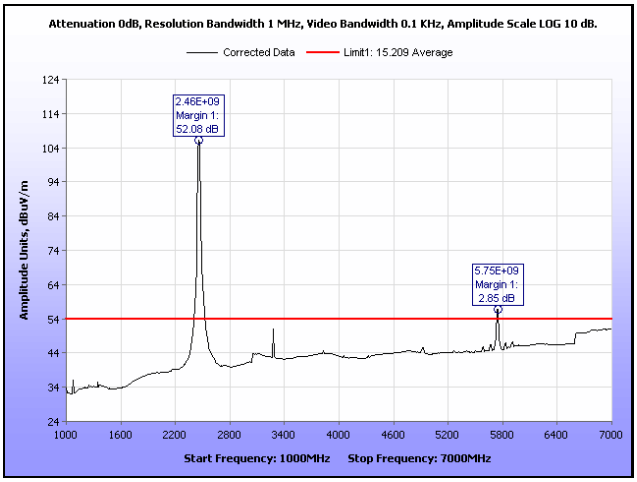
Plot 190. Radiated Spurious Emissions, Mid Channel, 802.11g, Ant. 0, 1 GHz – 7 GHz, Peak



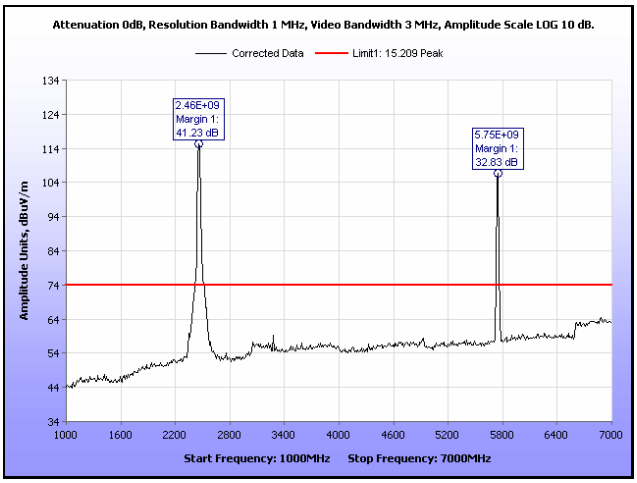
Plot 191. Radiated Spurious Emissions, Mid Channel, 802.11g, Ant. 0, 7 GHz – 18 GHz



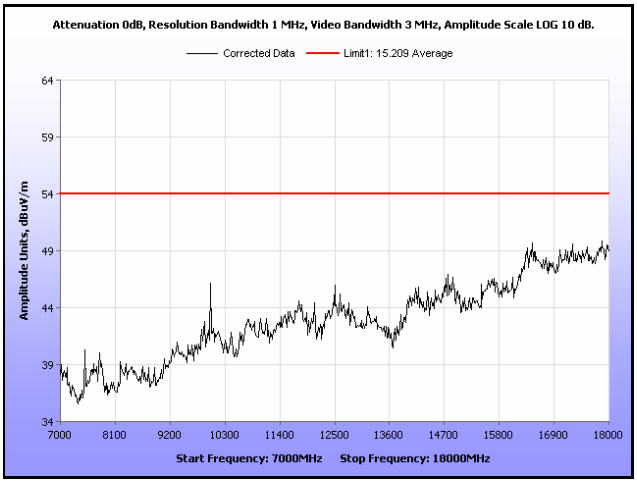
Plot 192. Radiated Spurious Emissions, High Channel, 802.11g, Ant. 0, 30 MHz – 1 GHz



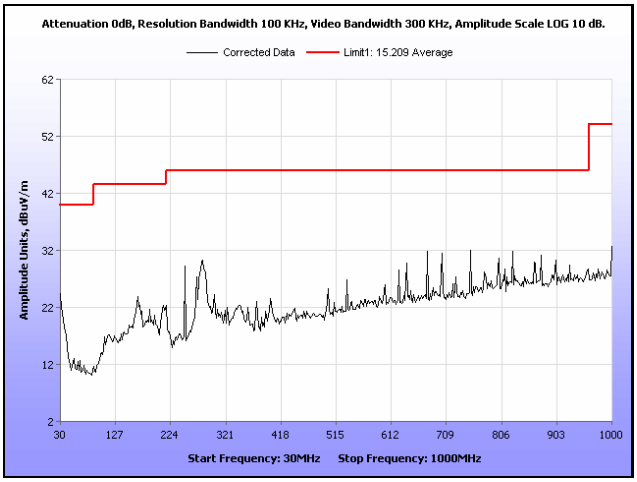
Plot 193. Radiated Spurious Emissions, High Channel, 802.11g, Ant. 0, 1 GHz – 7 GHz, Average



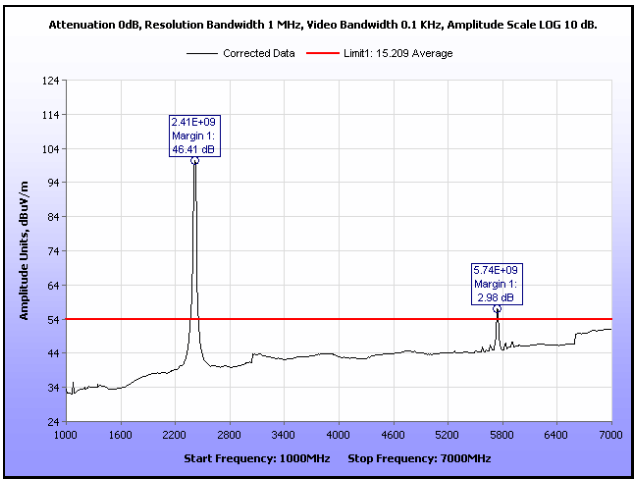
Plot 194. Radiated Spurious Emissions, High Channel, 802.11g, Ant. 0, 1 GHz – 7 GHz, Peak



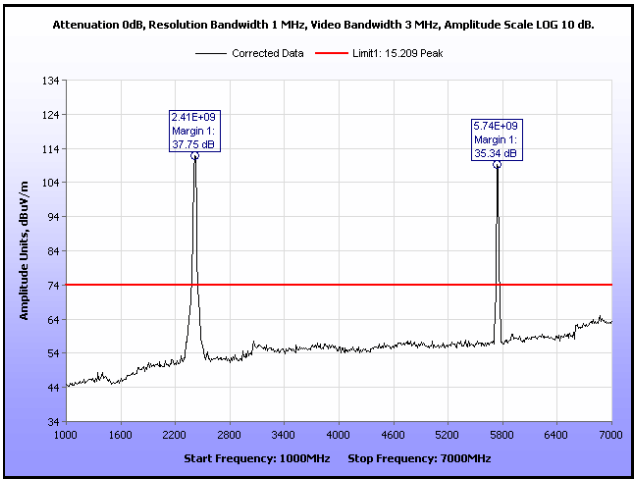
Plot 195. Radiated Spurious Emissions, High Channel, 802.11g, Ant. 0, 7 GHz – 18 GHz



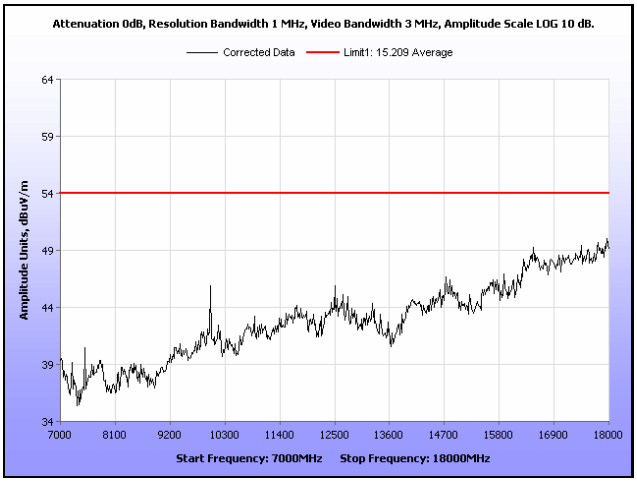
Plot 196. Radiated Spurious Emissions, Low Channel, 802.11g, Ant. 1, 30 MHz – 1 GHz



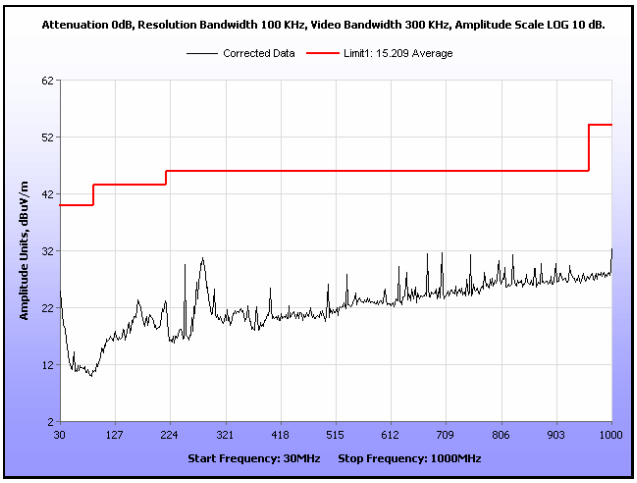
Plot 197. Radiated Spurious Emissions, Low Channel, 802.11g, Ant. 1, 1 GHz – 7 GHz, Average



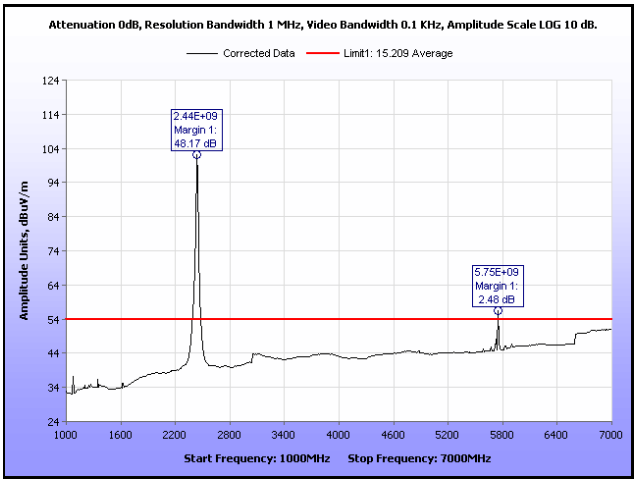
Plot 198. Radiated Spurious Emissions, Low Channel, 802.11g, Ant. 1, 1 GHz – 7 GHz, Peak



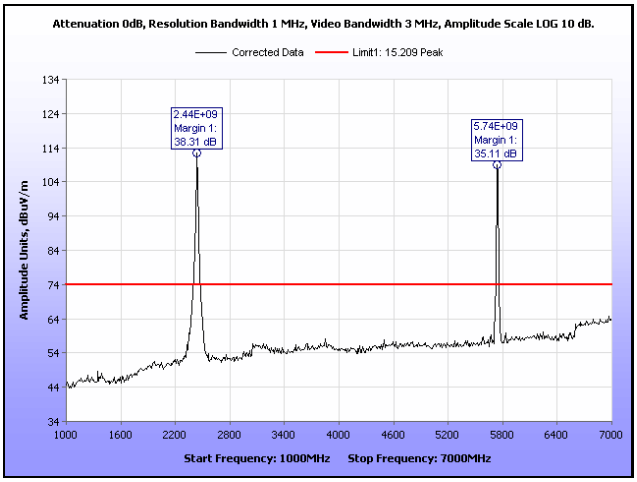
Plot 199. Radiated Spurious Emissions, Low Channel, 802.11g, Ant. 1, 7 GHz – 18 GHz



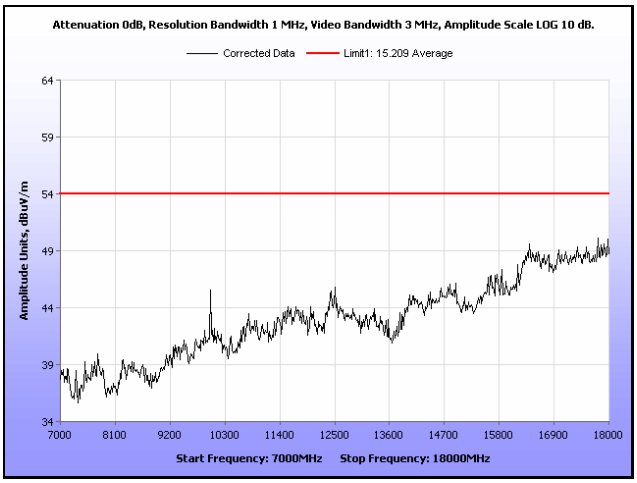
Plot 200. Radiated Spurious Emissions, Mid Channel, 802.11g, Ant. 1, 30 MHz – 1 GHz



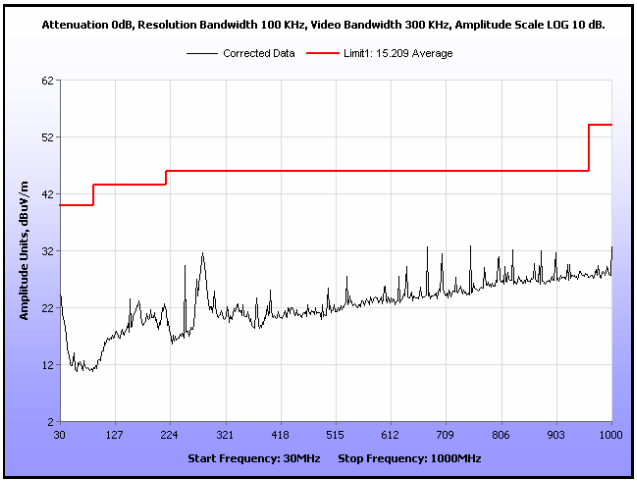
Plot 201. Radiated Spurious Emissions, Mid Channel, 802.11g, Ant. 1, 1 GHz – 7 GHz, Average



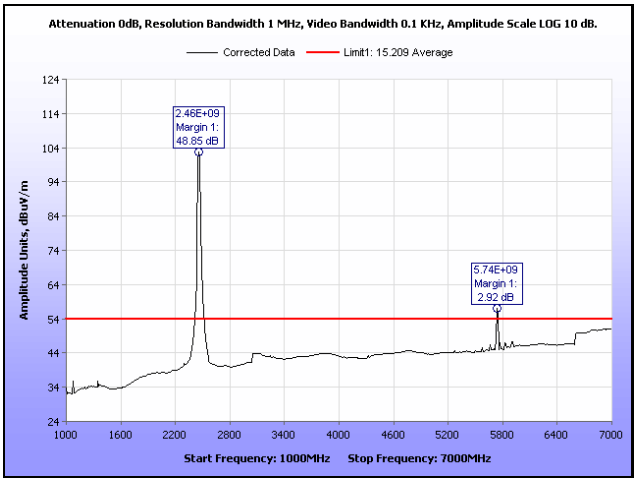
Plot 202. Radiated Spurious Emissions, Mid Channel, 802.11g, Ant. 1, 1 GHz – 7 GHz, Peak



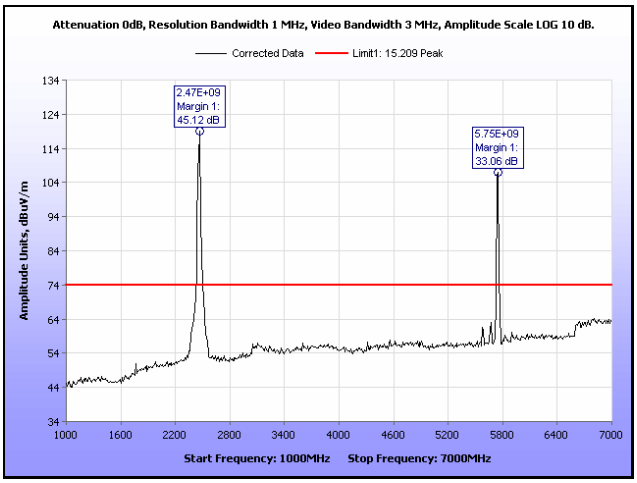
Plot 203. Radiated Spurious Emissions, Mid Channel, 802.11g, Ant. 1, 7 GHz – 18 GHz



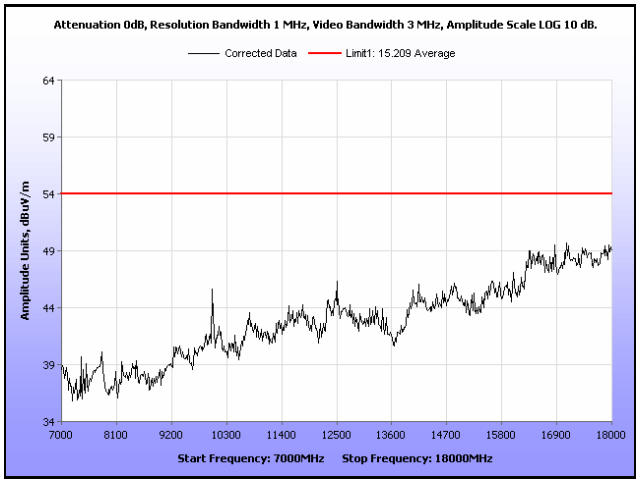
Plot 204. Radiated Spurious Emissions, High Channel, 802.11g, Ant. 1, 30 MHz – 1 GHz



Plot 205. Radiated Spurious Emissions, High Channel, 802.11g, Ant. 1, 1 GHz – 7 GHz, Average

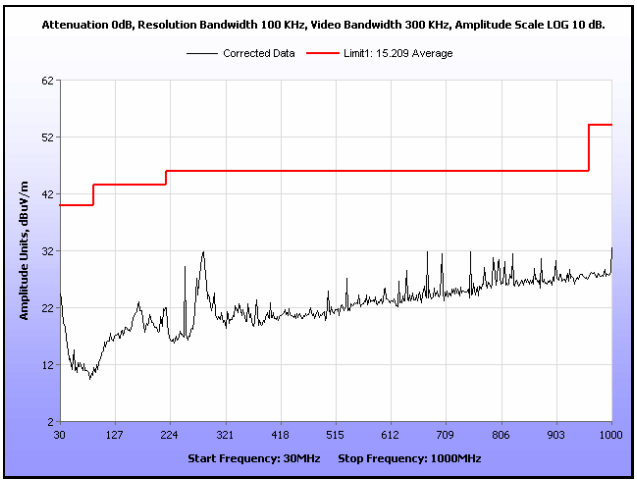


Plot 206. Radiated Spurious Emissions, High Channel, 802.11g, Ant. 1, 1 GHz – 7 GHz, Peak

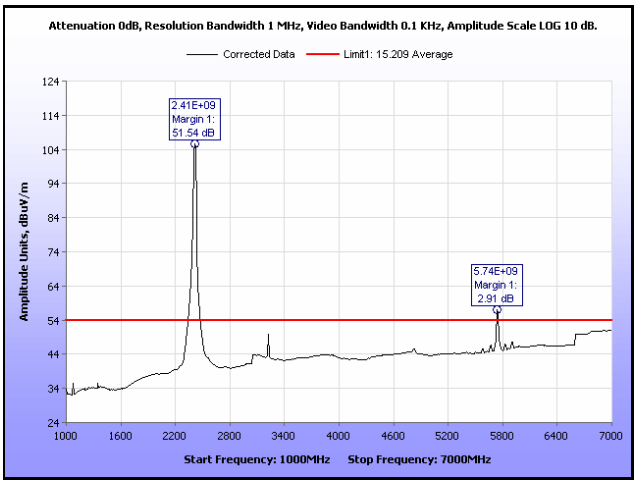


Plot 207. Radiated Spurious Emissions, High Channel, 802.11g, Ant. 1, 7 GHz – 18 GHz

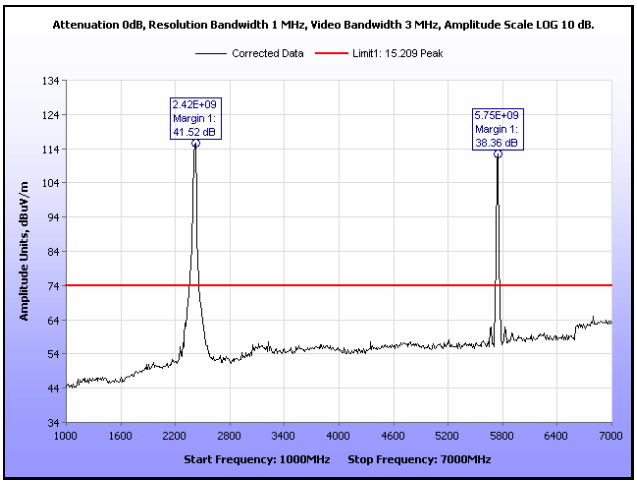
Radiated Spurious Emissions Test Results, 802.11n 20 MHz



Plot 208. Radiated Spurious Emissions, Low Channel, 802.11n 20 MHz, Ant. 0, 30 MHz – 1 GHz



Plot 209. Radiated Spurious Emissions, Low Channel, 802.11n 20 MHz, Ant. 0, 1 GHz – 7 GHz, Average



Plot 210. Radiated Spurious Emissions, Low Channel, 802.11n 20 MHz, Ant. 0, 1 GHz – 7 GHz, Peak

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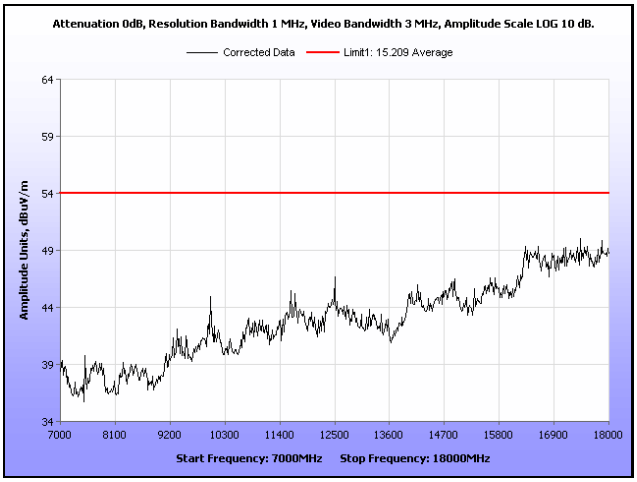
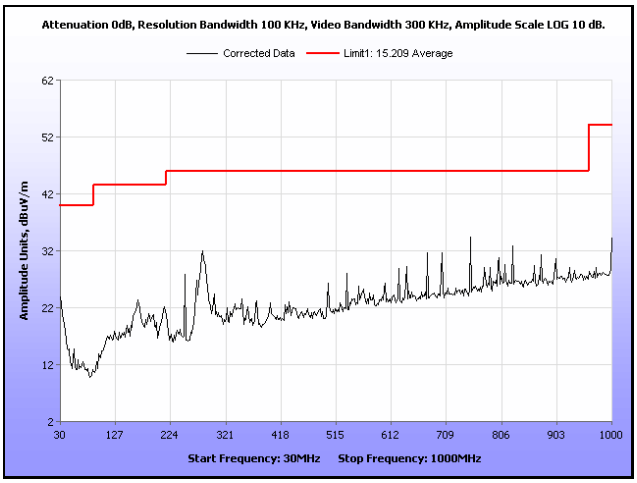
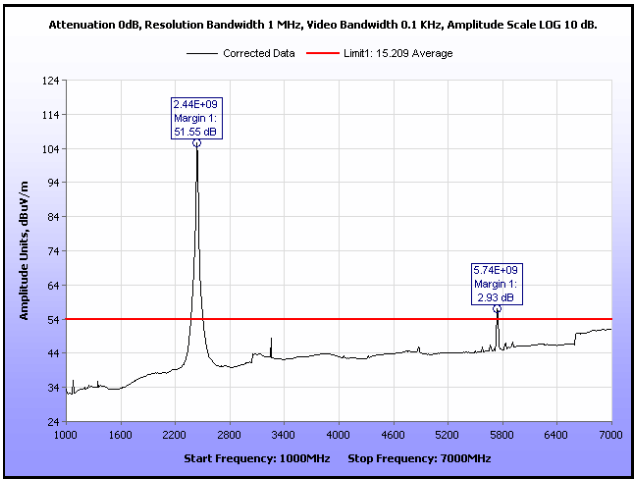


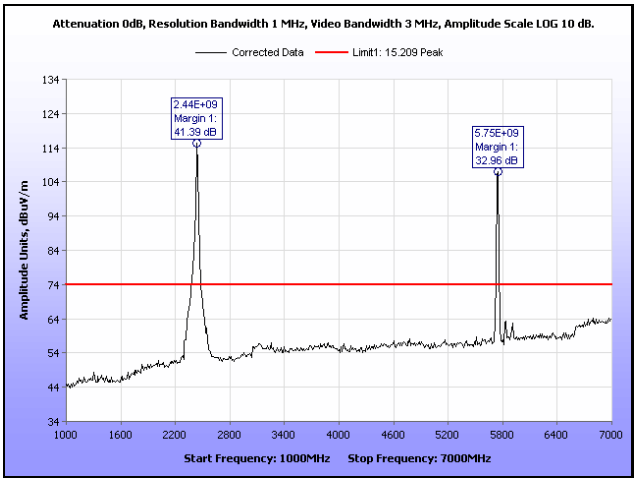
Plot 211. Radiated Spurious Emissions, Low Channel, 802.11n 20 MHz, Ant. 0, 7 GHz – 18 GHz



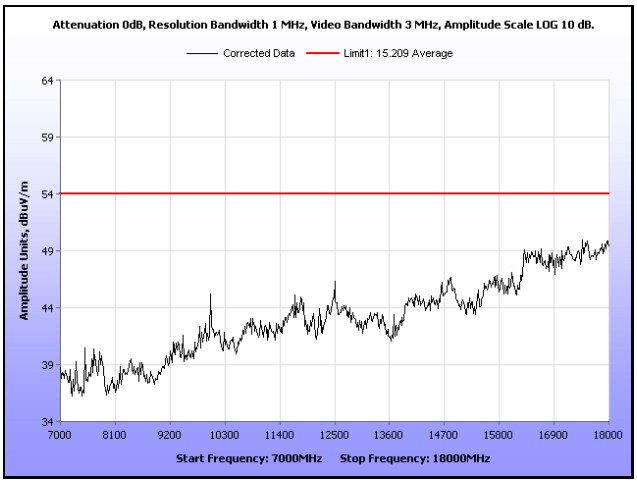
Plot 212. Radiated Spurious Emissions, Mid Channel, 802.11n 20 MHz, Ant. 0, 30 MHz – 1 GHz



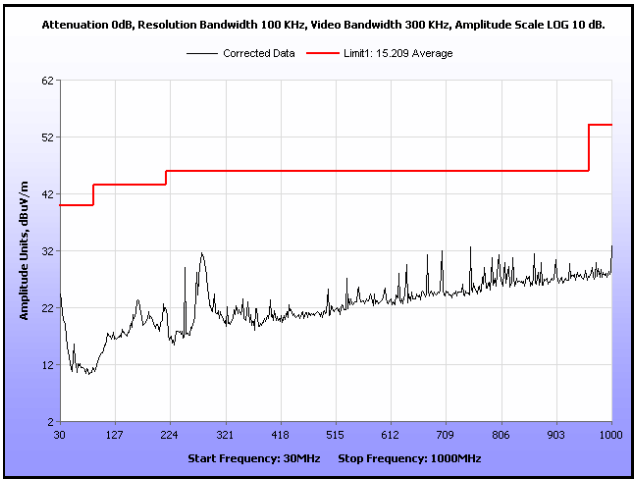
Plot 213. Radiated Spurious Emissions, Mid Channel, 802.11n 20 MHz, Ant. 0, 1 GHz – 7 GHz, Average



Plot 214. Radiated Spurious Emissions, Mid Channel, 802.11n 20 MHz, Ant. 0, 1 GHz – 7 GHz, Peak



Plot 215. Radiated Spurious Emissions, Mid Channel, 802.11n 20 MHz, Ant. 0, 7 GHz – 18 GHz



Plot 216. Radiated Spurious Emissions, High Channel, 802.11n 20 MHz, Ant. 0, 30 MHz – 1 GHz

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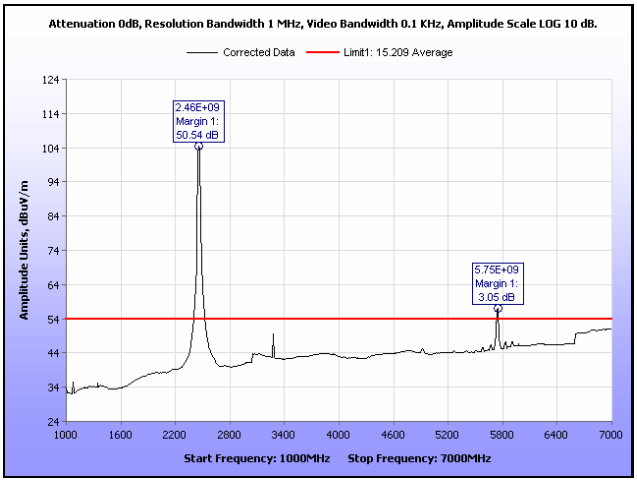
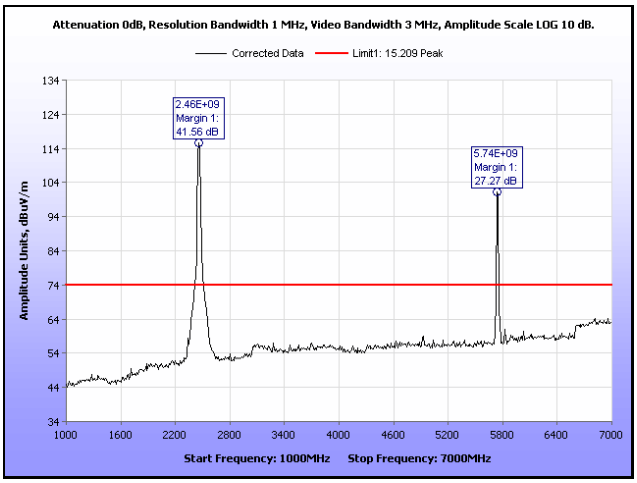
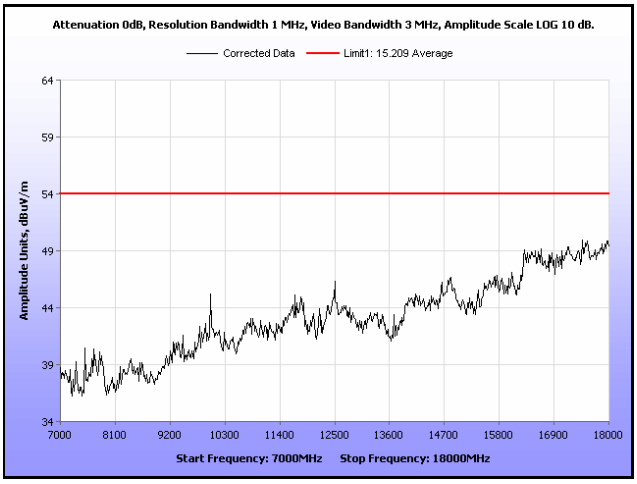


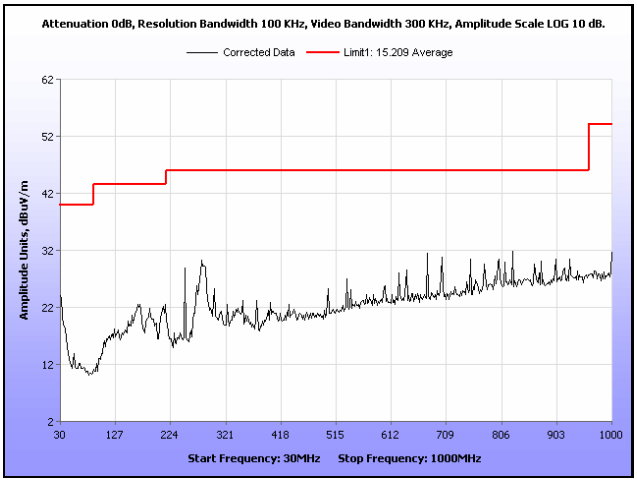
Plot 217. Radiated Spurious Emissions, High Channel, 802.11n 20 MHz, Ant. 0, 1 GHz – 7 GHz, Average



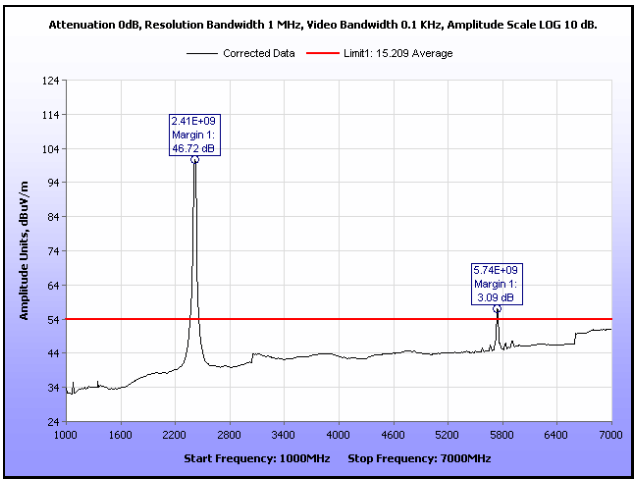
Plot 218. Radiated Spurious Emissions, High Channel, 802.11n 20 MHz, Ant. 0, 1 GHz – 7 GHz, Peak



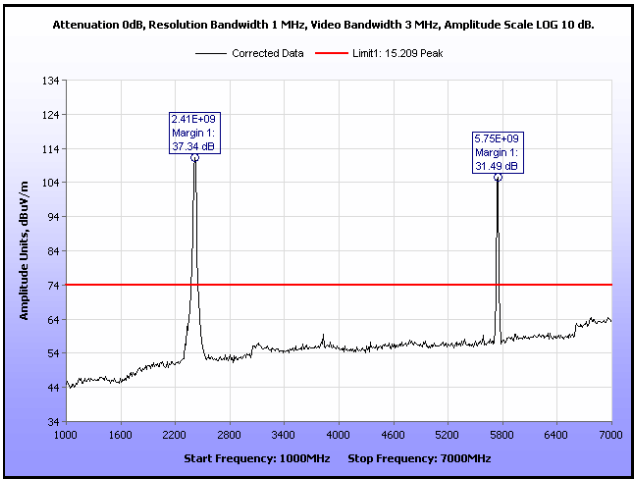
Plot 219. Radiated Spurious Emissions, High Channel, 802.11n 20 MHz, Ant. 0, 7 GHz – 18 GHz



Plot 220. Radiated Spurious Emissions, Low Channel, 802.11n 20 MHz, Ant. 1, 30 MHz – 1 GHz



Plot 221. Radiated Spurious Emissions, Low Channel, 802.11n 20 MHz, Ant. 1, 1 GHz – 7 GHz, Average



Plot 222. Radiated Spurious Emissions, Low Channel, 802.11n 20 MHz, Ant. 1, 1 GHz – 7 GHz, Peak

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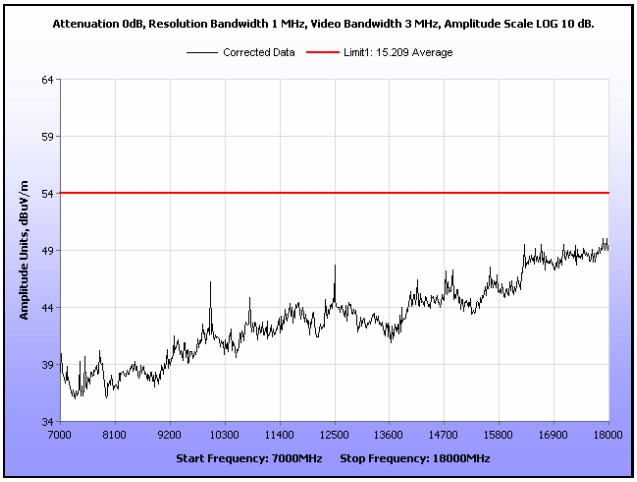
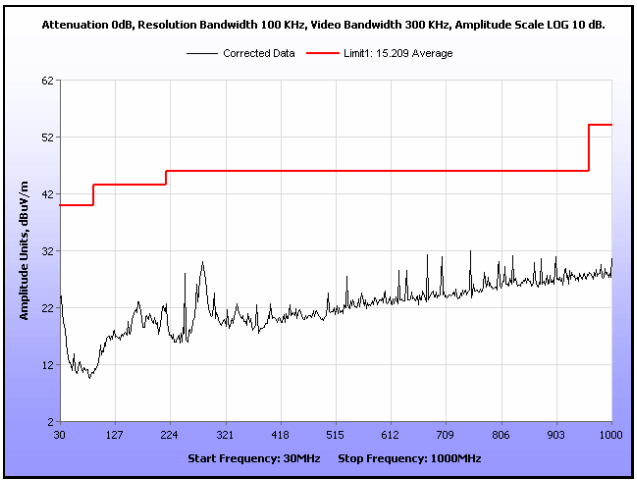
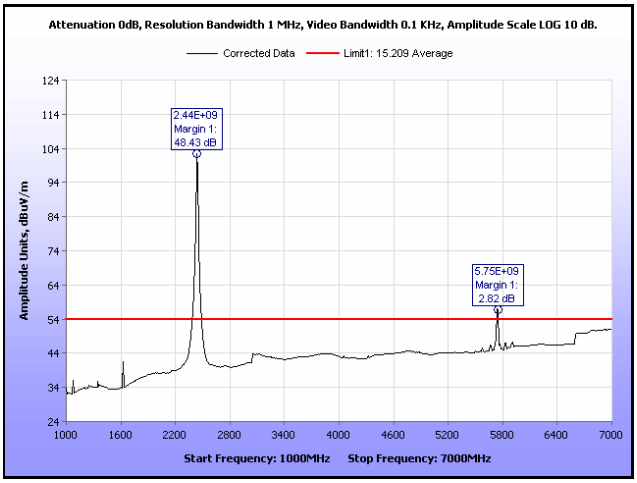


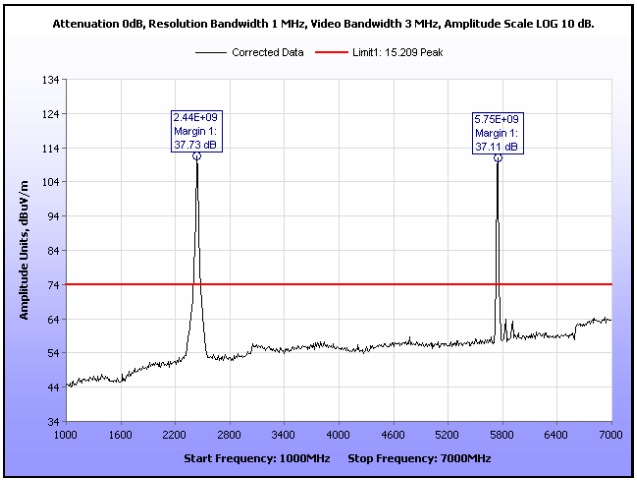
Plot 223. Radiated Spurious Emissions, Low Channel, 802.11n 20 MHz, Ant. 1, 7 GHz – 18 GHz



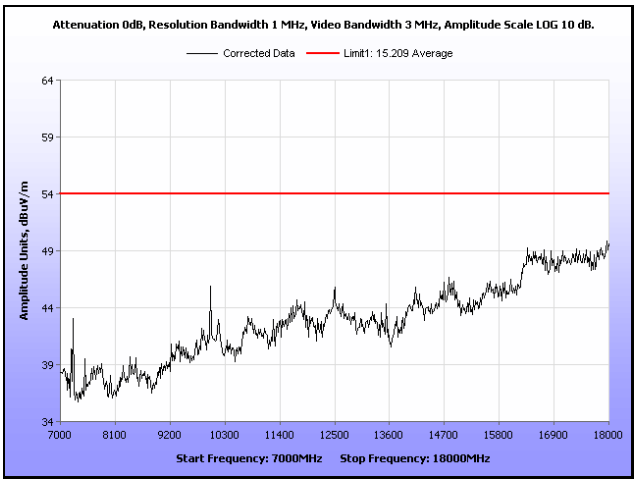
Plot 224. Radiated Spurious Emissions, Mid Channel, 802.11n 20 MHz, Ant. 1, 30 MHz – 1 GHz



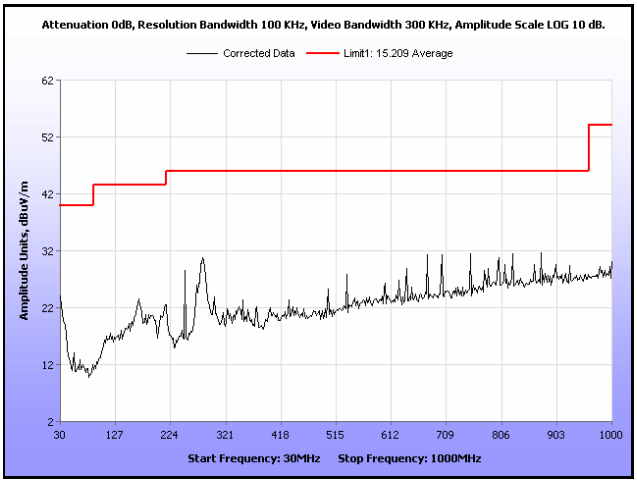
Plot 225. Radiated Spurious Emissions, Mid Channel, 802.11n 20 MHz, Ant. 1, 1 GHz – 7 GHz, Average



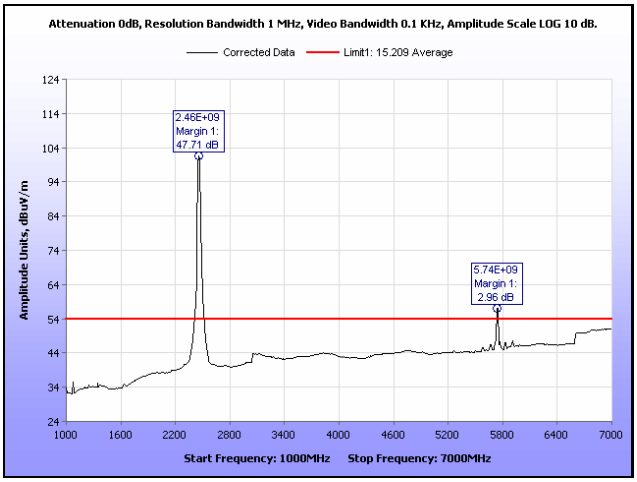
Plot 226. Radiated Spurious Emissions, Mid Channel, 802.11n 20 MHz, Ant. 1, 1 GHz – 7 GHz, Peak



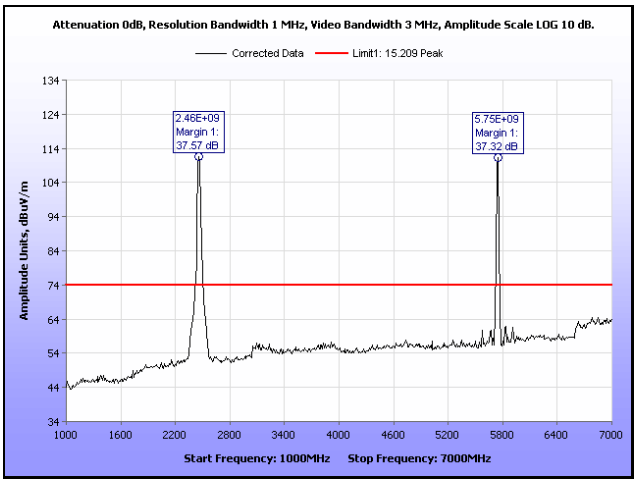
Plot 227. Radiated Spurious Emissions, Mid Channel, 802.11n 20 MHz, Ant. 1, 7 GHz – 18 GHz



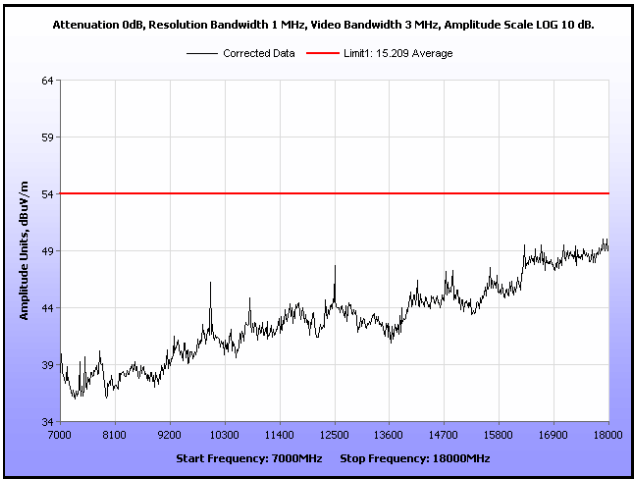
Plot 228. Radiated Spurious Emissions, High Channel, 802.11n 20 MHz, Ant. 1, 30 MHz – 1 GHz



Plot 229. Radiated Spurious Emissions, High Channel, 802.11n 20 MHz, Ant. 1, 1 GHz – 7 GHz, Average

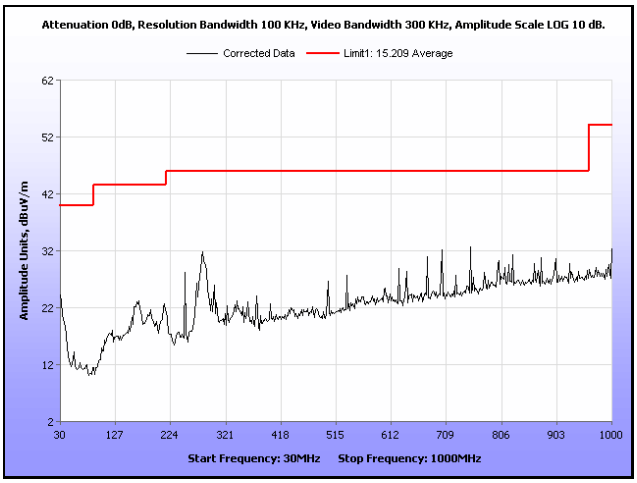


Plot 230. Radiated Spurious Emissions, High Channel, 802.11n 20 MHz, Ant. 1, 1 GHz – 7 GHz, Peak

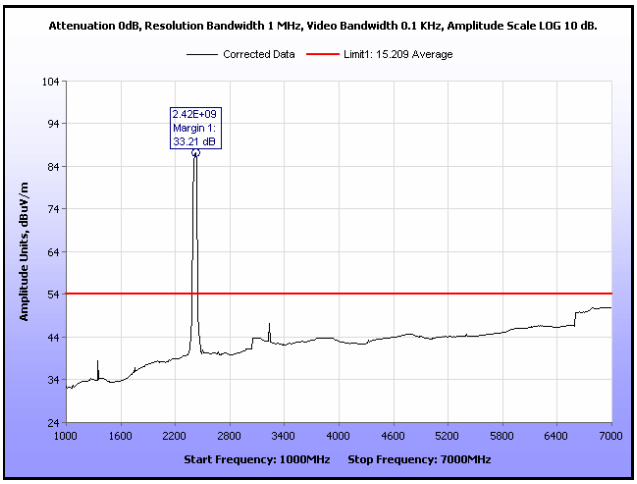


Plot 231. Radiated Spurious Emissions, High Channel, 802.11n 20 MHz, Ant. 1, 7 GHz – 18 GHz

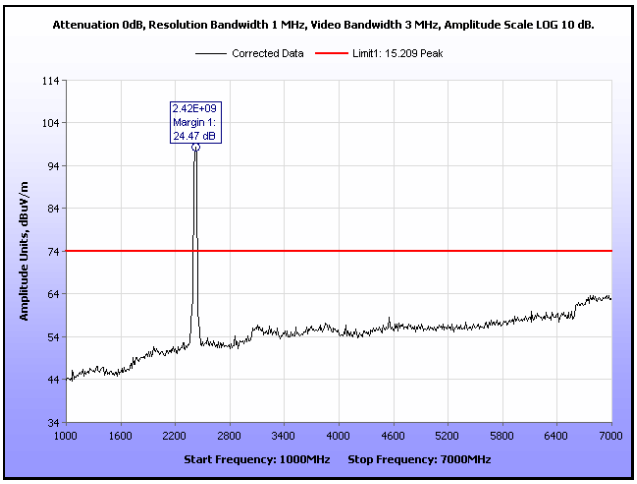
Radiated Spurious Emissions Test Results, 802.11n 40 MHz



Plot 232. Radiated Spurious Emissions, Low Channel, 802.11n 40 MHz, Ant. 0, 30 MHz – 1 GHz



Plot 233. Radiated Spurious Emissions, Low Channel, 802.11n 40 MHz, Ant. 0, 1 GHz – 7 GHz, Average



Plot 234. Radiated Spurious Emissions, Low Channel, 802.11n 40 MHz, Ant. 0, 1 GHz – 7 GHz, Peak

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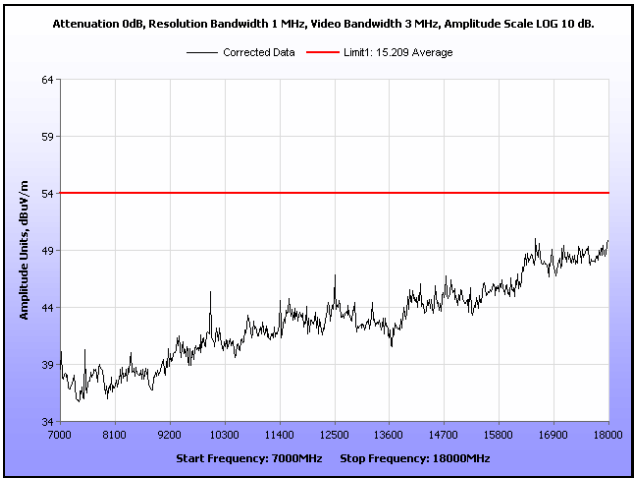
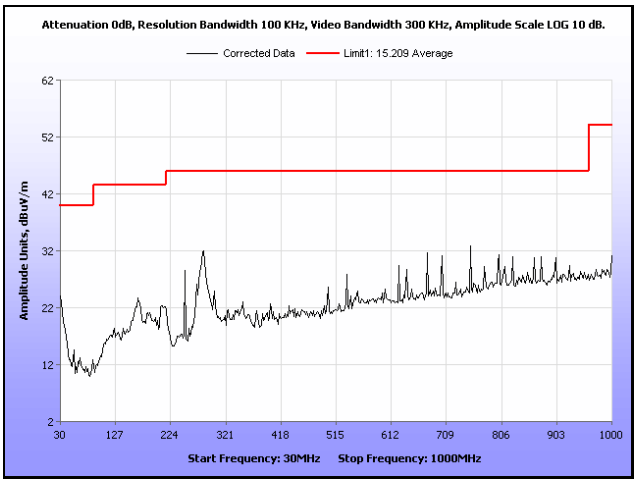
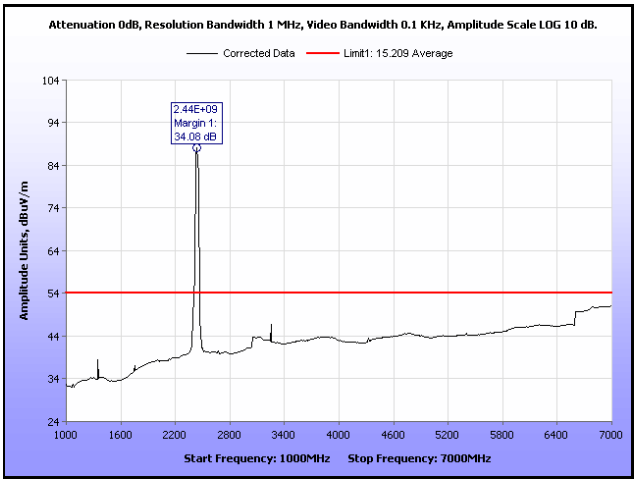


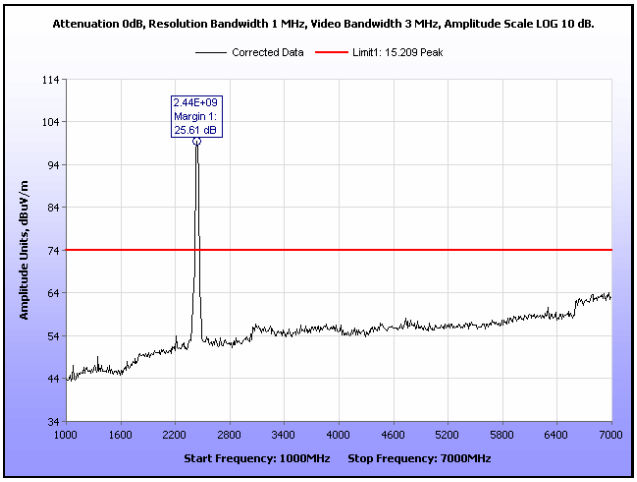
Plot 235. Radiated Spurious Emissions, Low Channel, 802.11n 40 MHz, Ant. 0, 7 GHz – 18 GHz



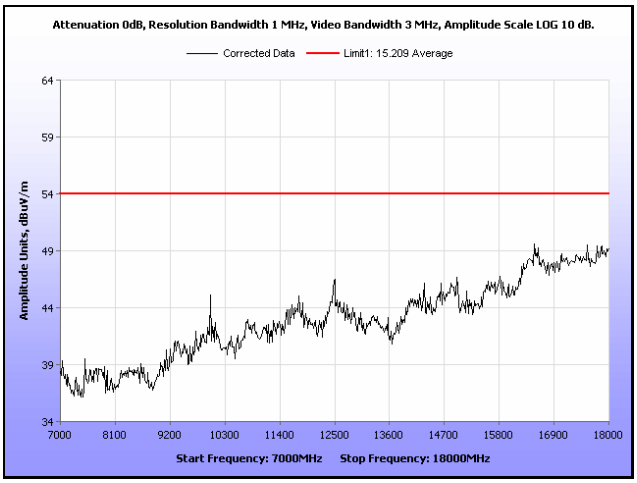
Plot 236. Radiated Spurious Emissions, Mid Channel, 802.11n 40 MHz, Ant. 0, 30 MHz – 1 GHz



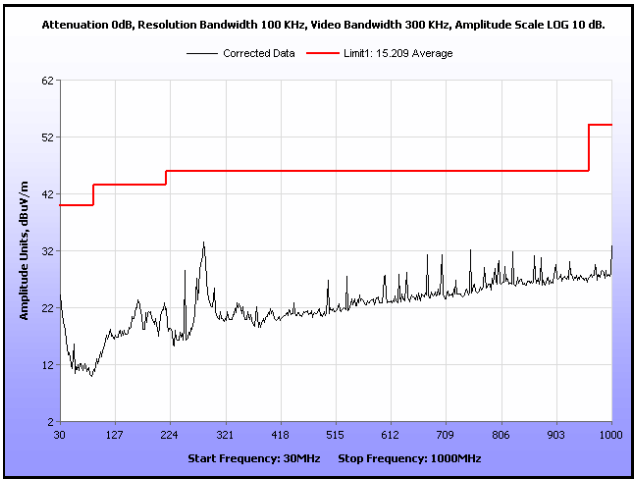
Plot 237. Radiated Spurious Emissions, Mid Channel, 802.11n 40 MHz, Ant. 0, 1 GHz – 7 GHz, Average



Plot 238. Radiated Spurious Emissions, Mid Channel, 802.11n 40 MHz, Ant. 0, 1 GHz – 7 GHz, Peak



Plot 239. Radiated Spurious Emissions, Mid Channel, 802.11n 40 MHz, Ant. 0, 7 GHz – 18 GHz



Plot 240. Radiated Spurious Emissions, High Channel, 802.11n 40 MHz, Ant. 0, 30 MHz – 1 GHz

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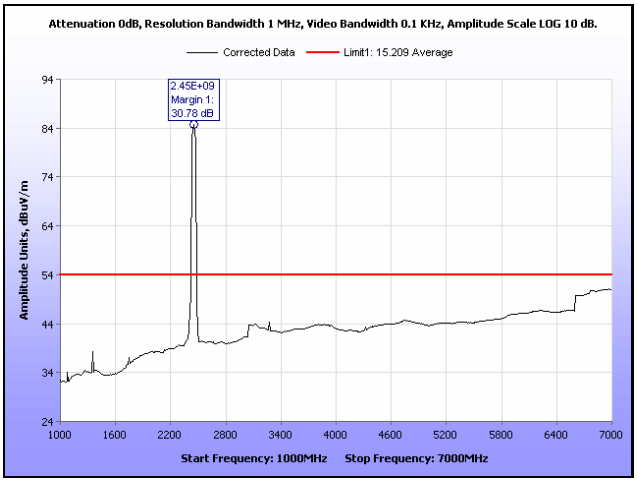
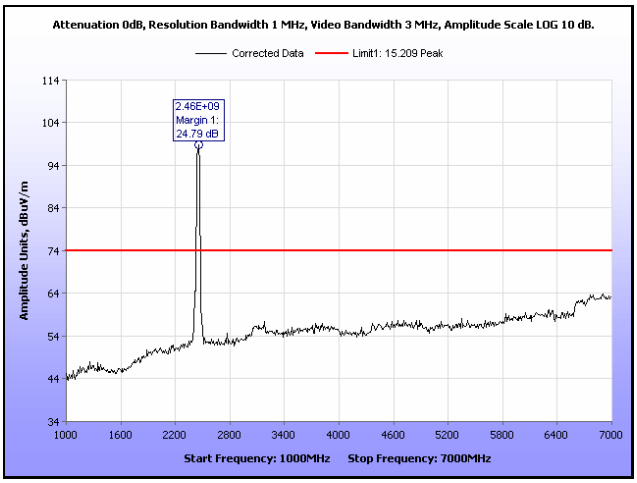
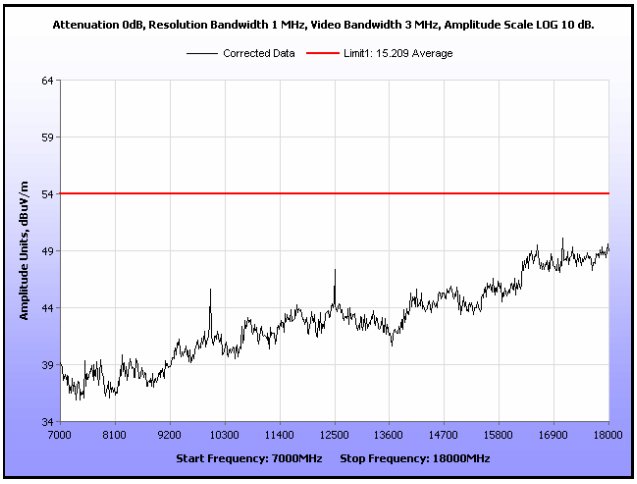


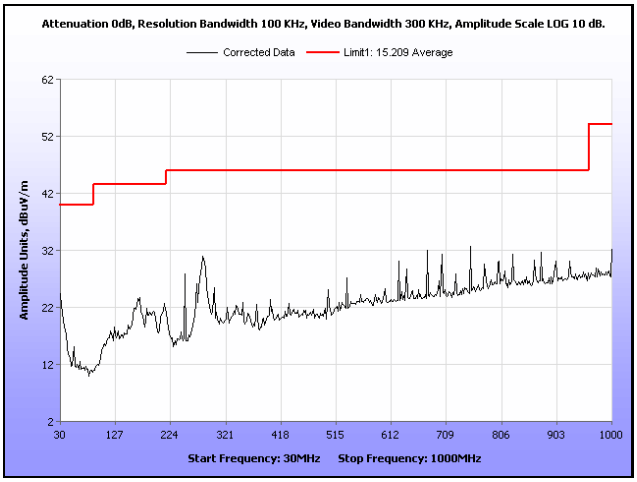
Plot 241. Radiated Spurious Emissions, High Channel, 802.11n 40 MHz, Ant. 0, 1 GHz – 7 GHz, Average



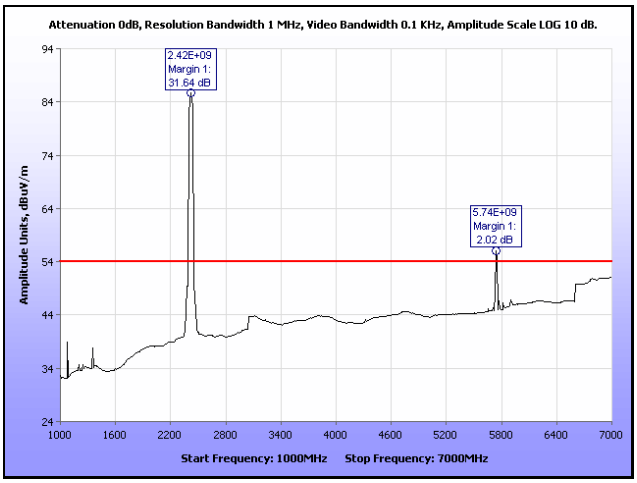
Plot 242. Radiated Spurious Emissions, High Channel, 802.11n 40 MHz, Ant. 0, 1 GHz – 7 GHz, Peak



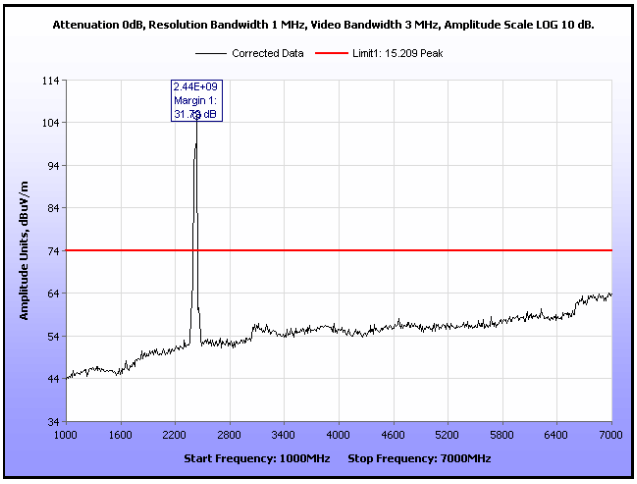
Plot 243. Radiated Spurious Emissions, High Channel, 802.11n 40 MHz, Ant. 0, 7 GHz – 18 GHz



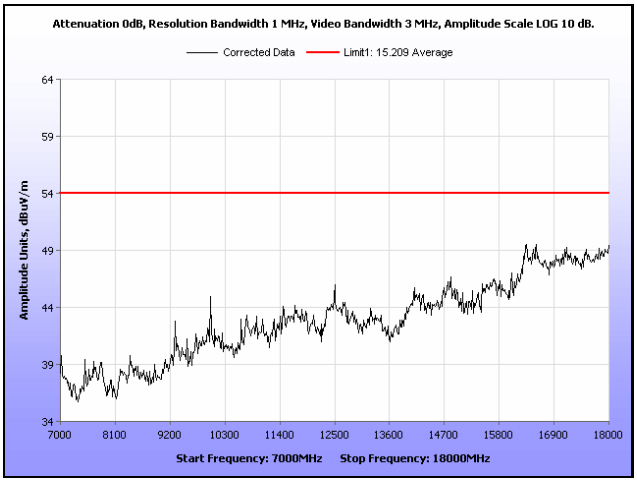
Plot 244. Radiated Spurious Emissions, Low Channel, 802.11n 40 MHz, Ant. 1, 30 MHz – 1 GHz



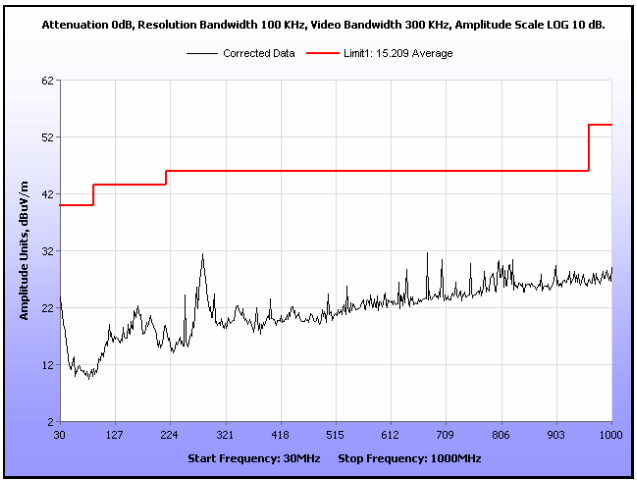
Plot 245. Radiated Spurious Emissions, Low Channel, 802.11n 40 MHz, Ant. 1, 1 GHz – 7 GHz, Average



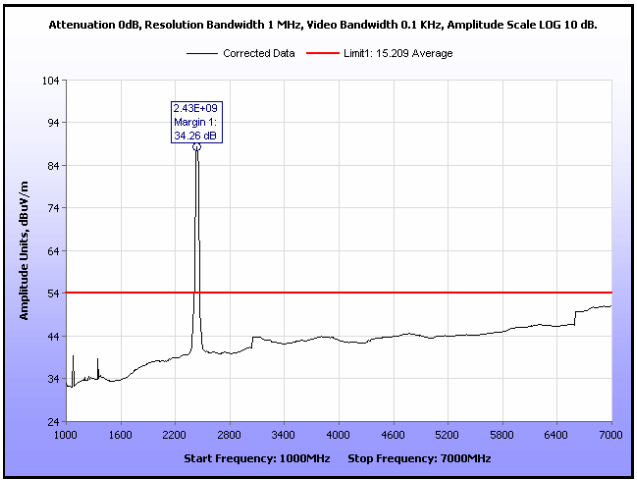
Plot 246. Radiated Spurious Emissions, Low Channel, 802.11n 40 MHz, Ant. 1, 1 GHz – 7 GHz, Peak



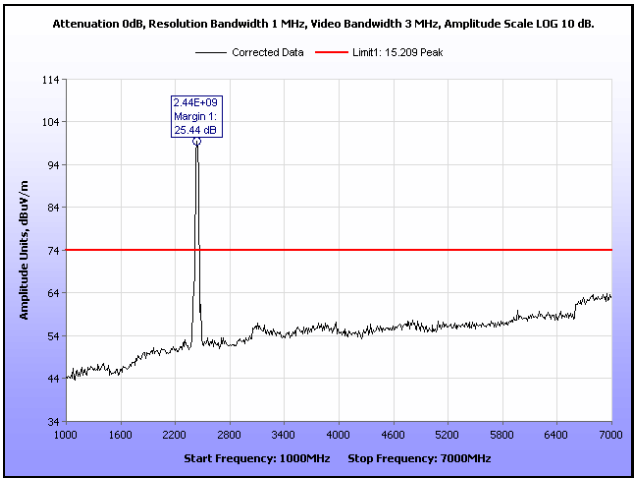
Plot 247. Radiated Spurious Emissions, Low Channel, 802.11n 40 MHz, Ant. 1, 7 GHz – 18 GHz



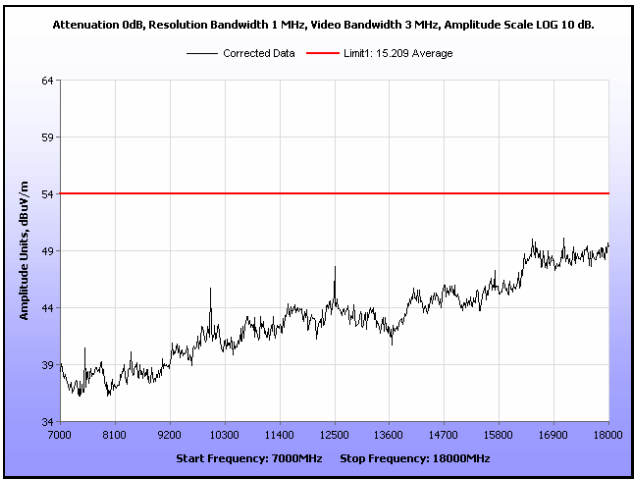
Plot 248. Radiated Spurious Emissions, Mid Channel, 802.11n 40 MHz, Ant. 1, 30 MHz – 1 GHz



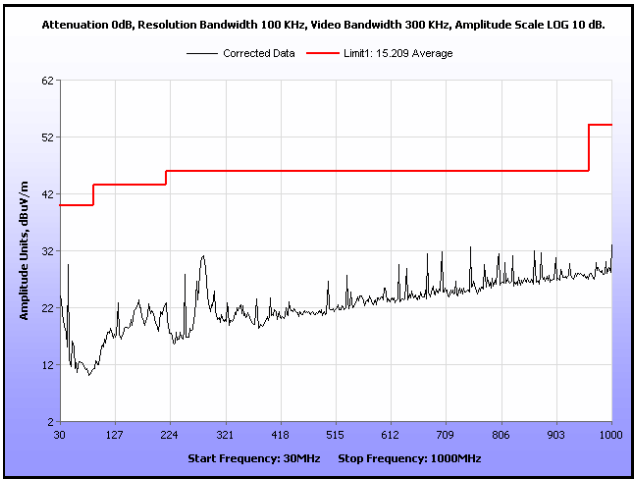
Plot 249. Radiated Spurious Emissions, Mid Channel, 802.11n 40 MHz, Ant. 1, 1 GHz – 7 GHz, Average



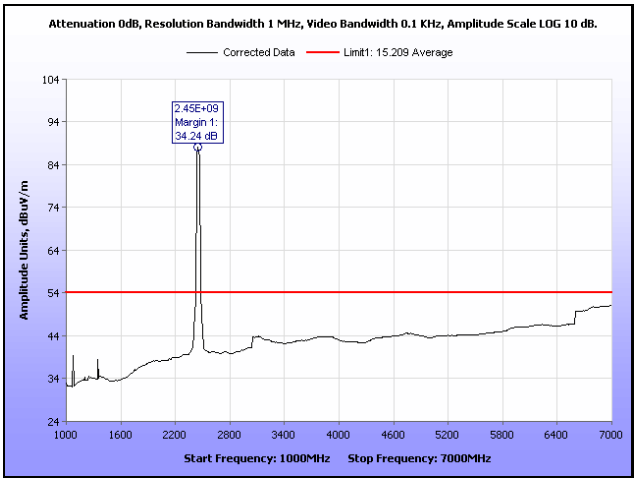
Plot 250. Radiated Spurious Emissions, Mid Channel, 802.11n 40 MHz, Ant. 1, 1 GHz – 7 GHz, Peak



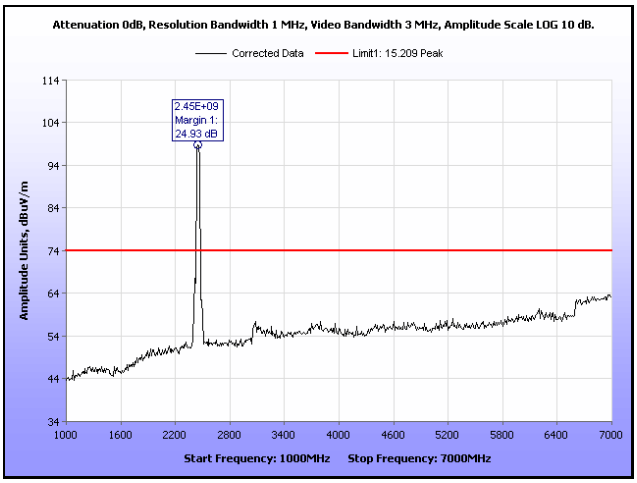
Plot 251. Radiated Spurious Emissions, Mid Channel, 802.11n 40 MHz, Ant. 1, 7 GHz – 18 GHz



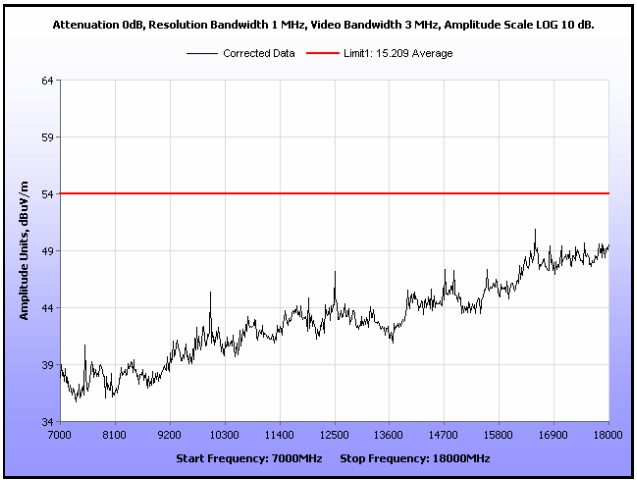
Plot 252. Radiated Spurious Emissions, High Channel, 802.11n 40 MHz, Ant. 1, 30 MHz – 1 GHz



Plot 253. Radiated Spurious Emissions, High Channel, 802.11n 40 MHz, Ant. 1, 1 GHz – 7 GHz, Average

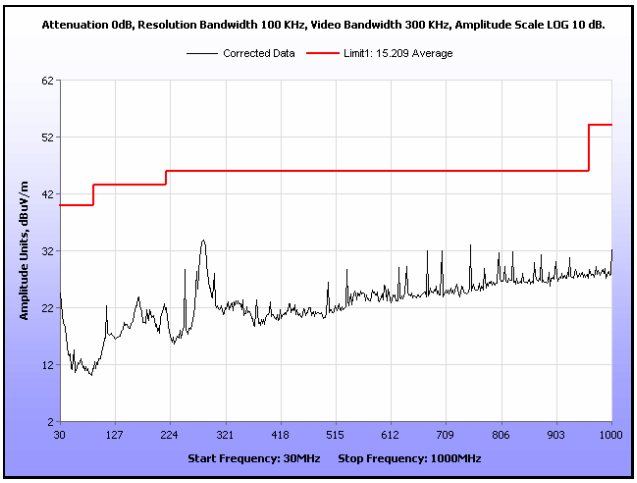


Plot 254. Radiated Spurious Emissions, High Channel, 802.11n 40 MHz, Ant. 1, 1 GHz – 7 GHz, Peak

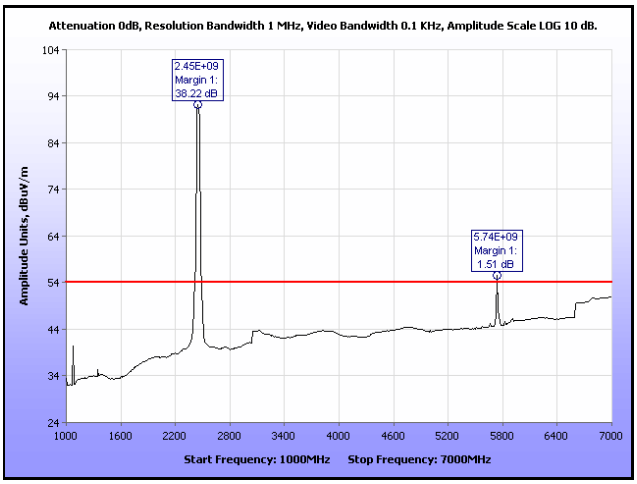


Plot 255. Radiated Spurious Emissions, High Channel, 802.11n 40 MHz, Ant. 1, 7 GHz – 18 GHz

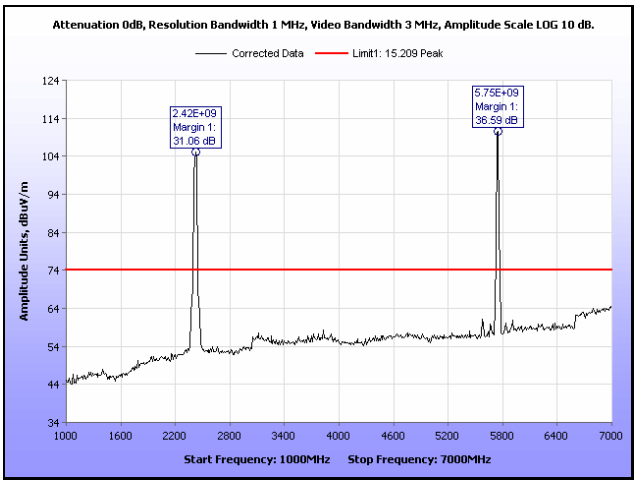
Radiated Spurious Emissions Test Results, 802.11n 40 MHz, MIMO



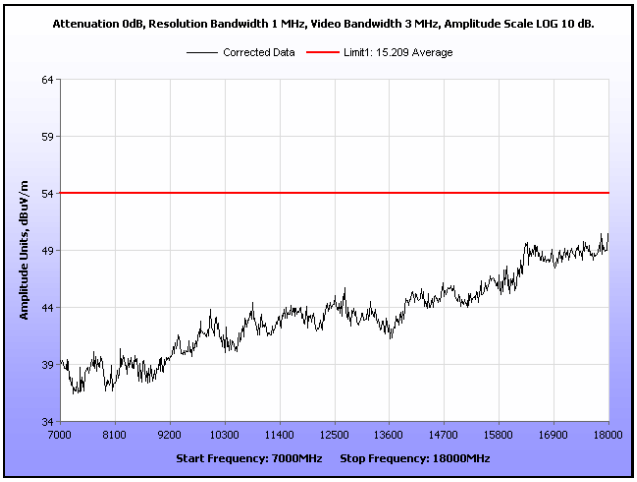
Plot 256. Radiated Spurious Emissions, Low Channel, 802.11n 40 MHz, MIMO, 30 MHz – 1 GHz



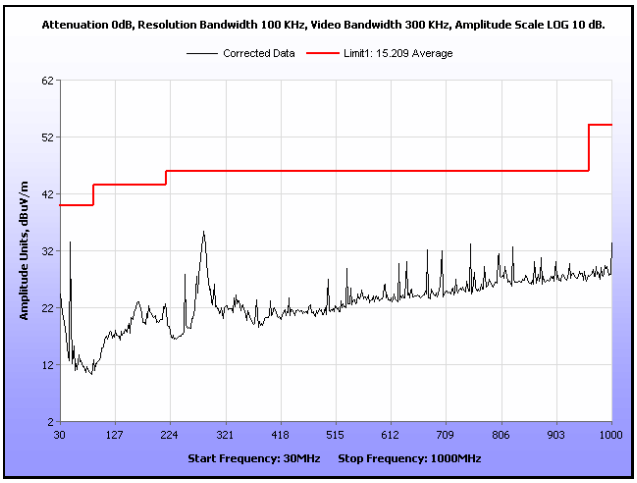
Plot 257. Radiated Spurious Emissions, Low Channel, 802.11n 40 MHz, MIMO, 1 GHz – 7 GHz, Average



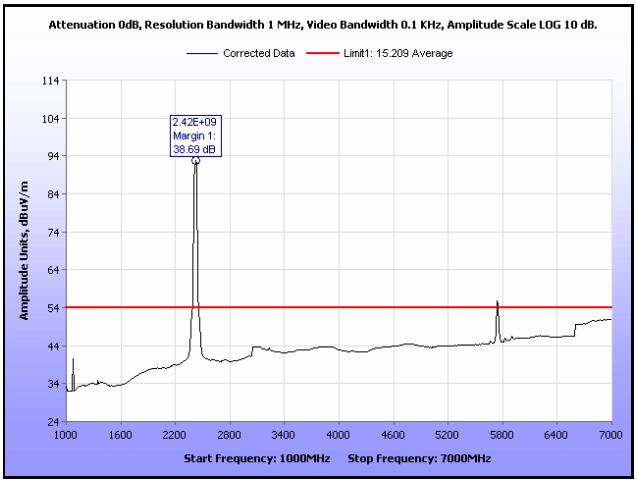
Plot 258. Radiated Spurious Emissions, Low Channel, 802.11n 40 MHz, MIMO, 1 GHz – 7 GHz, Peak



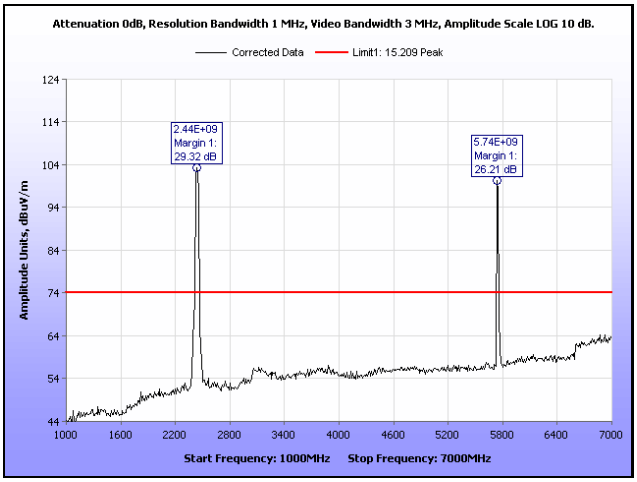
Plot 259. Radiated Spurious Emissions, Low Channel, 802.11n 40 MHz, MIMO, 7 GHz – 18 GHz



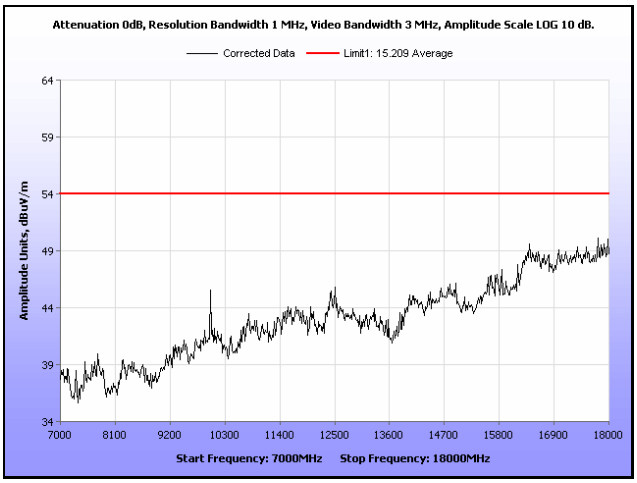
Plot 260. Radiated Spurious Emissions, Mid Channel, 802.11n 40 MHz, MIMO, 30 MHz – 1 GHz



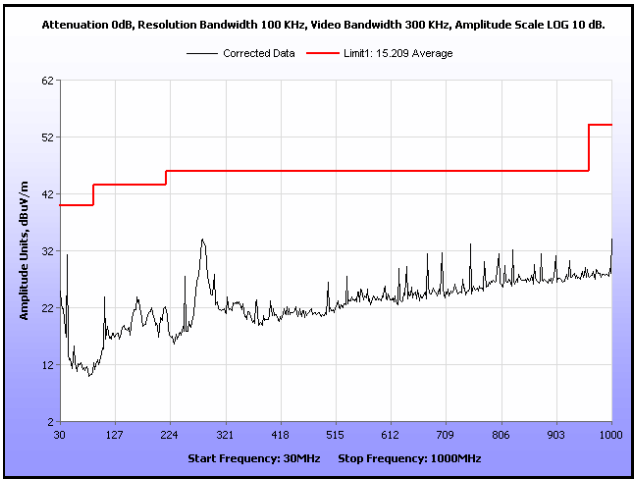
Plot 261. Radiated Spurious Emissions, Mid Channel, 802.11n 40 MHz, MIMO, 1 GHz – 7 GHz, Average



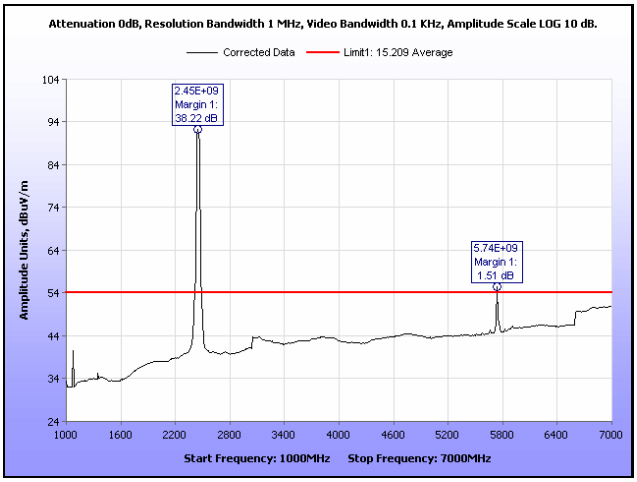
Plot 262. Radiated Spurious Emissions, Mid Channel, 802.11n 40 MHz, MIMO, 1 GHz – 7 GHz, Peak



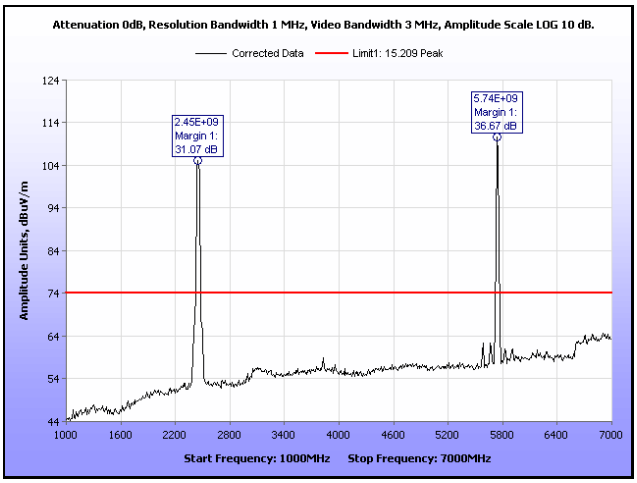
Plot 263. Radiated Spurious Emissions, Mid Channel, 802.11n 40 MHz, MIMO, 7 GHz – 18 GHz



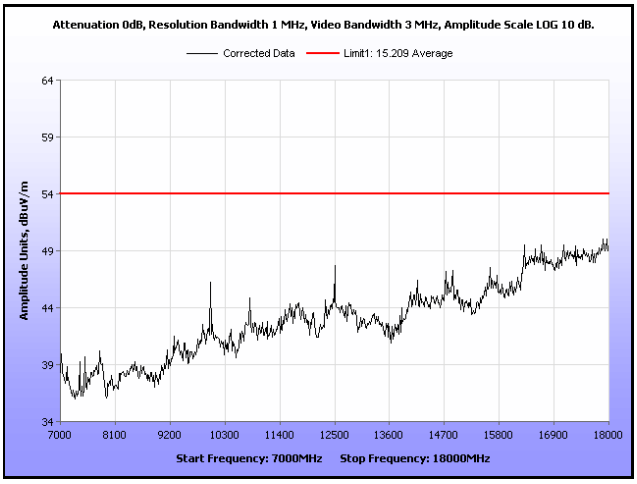
Plot 264. Radiated Spurious Emissions, High Channel, 802.11n 40 MHz, MIMO, 30 MHz – 1 GHz



Plot 265. Radiated Spurious Emissions, High Channel, 802.11n 40 MHz, MIMO, 1 GHz – 7 GHz, Average



Plot 266. Radiated Spurious Emissions, High Channel, 802.11n 40 MHz, MIMO, 1 GHz – 7 GHz, Peak

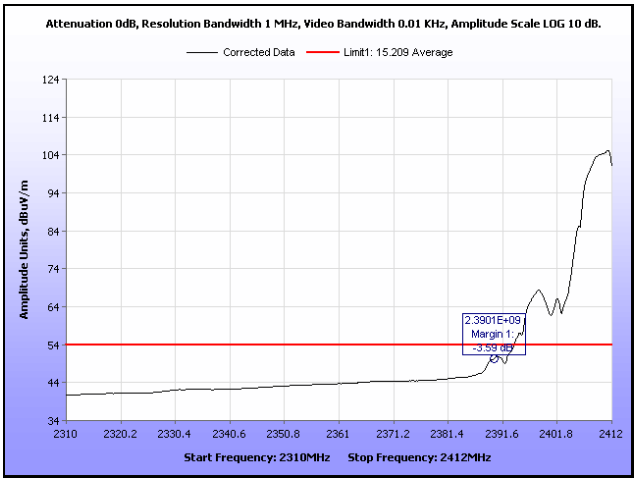


Plot 267. Radiated Spurious Emissions, High Channel, 802.11n 40 MHz, MIMO, 7 GHz – 18 GHz

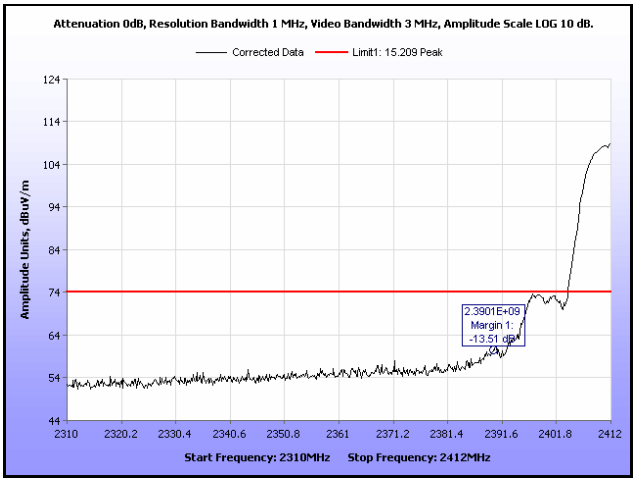
Radiated Band Edge Measurements

Test Procedures: Measurements were performed at all channels where EUT can operate with power level other than maximum allowable by FCC 15.247 in order to pass radiated band edge requirement under FCC 15.209. This thorough investigation of radiated band edge measurement was done because EUT has capability to transmit different level of output power across all operating channels. The software controlled power level at which EUT pass band edge requirement at each channel has been supplied to the manufacturer.

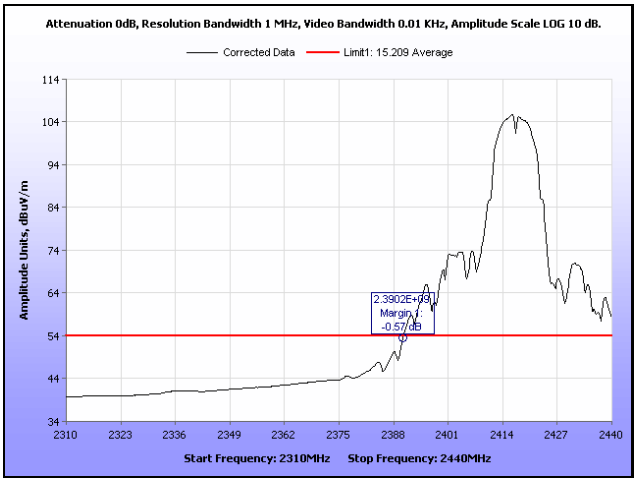
Radiated Band Edge, 802.11b



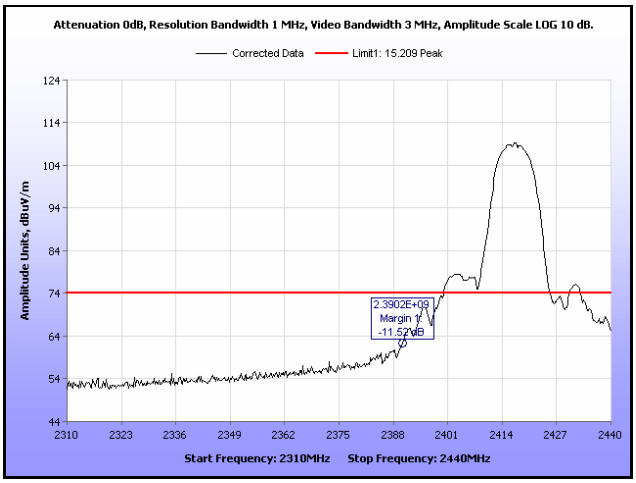
Plot 268. Radiated Restricted Band Edge, Average, Channel 1, 802.11b, Ant. 0



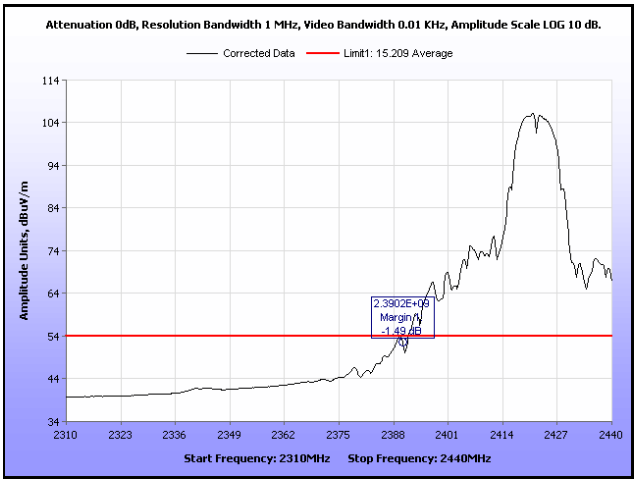
Plot 269. Radiated Restricted Band Edge, Peak, Channel 1, 802.11b, Ant. 0



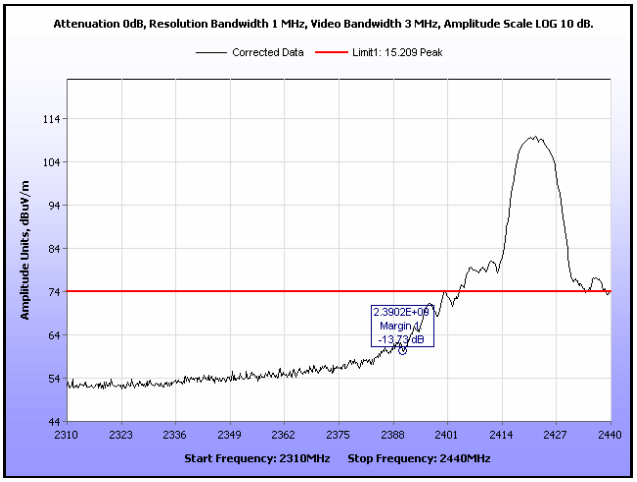
Plot 270. Radiated Restricted Band Edge, Average, Channel 2, 802.11b, Ant. 0



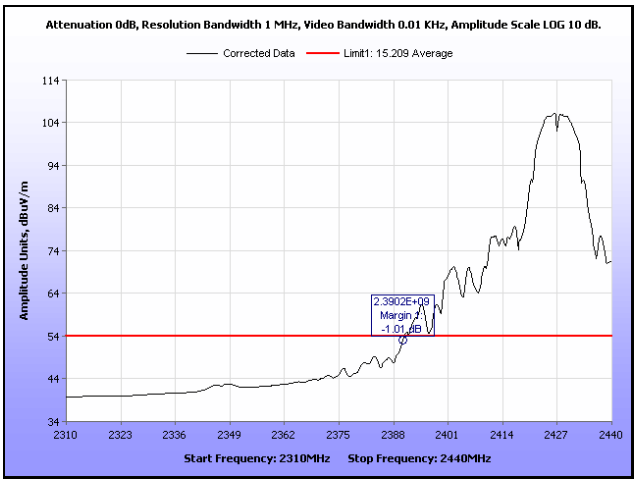
Plot 271. Radiated Restricted Band Edge, Peak, Channel 2, 802.11b, Ant. 0



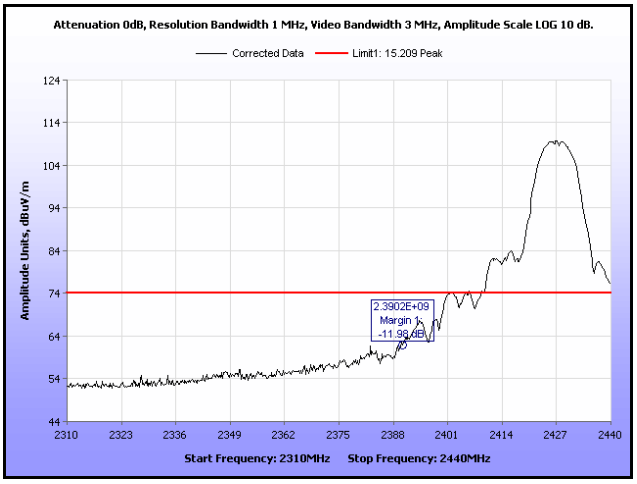
Plot 272. Radiated Restricted Band Edge, Average, Channel 3, 802.11b, Ant. 0



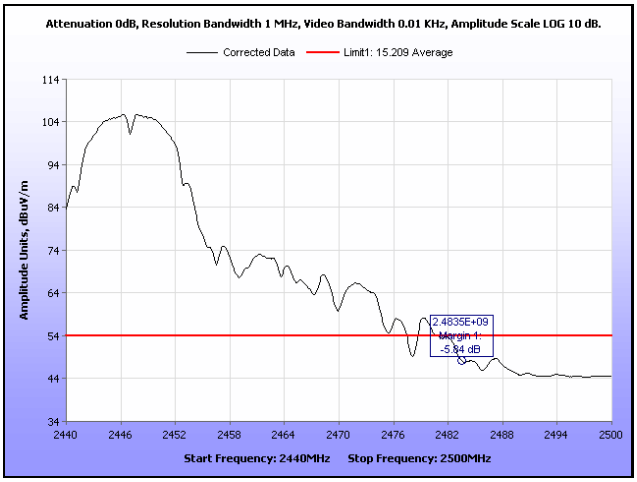
Plot 273. Radiated Restricted Band Edge, Peak, Channel 3, 802.11b, Ant. 0



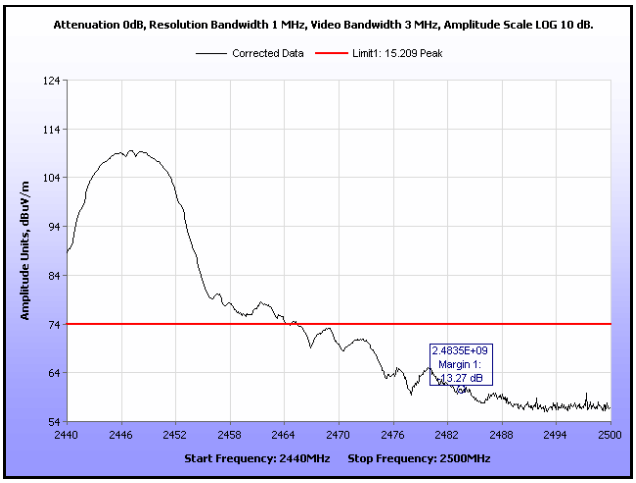
Plot 274. Radiated Restricted Band Edge, Average, Channel 4, 802.11b, Ant. 0



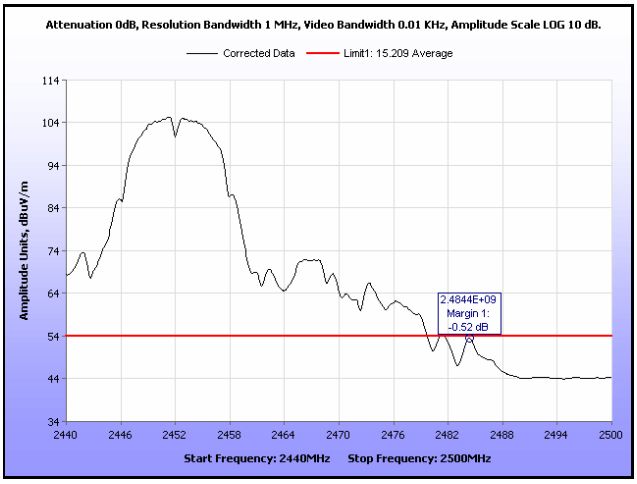
Plot 275. Radiated Restricted Band Edge, Peak, Channel 4, 802.11b, Ant. 0



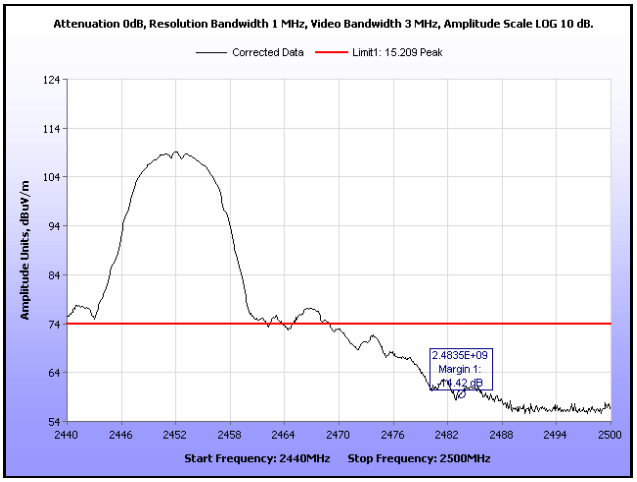
Plot 276. Radiated Restricted Band Edge, Average, Channel 8, 802.11b, Ant. 0



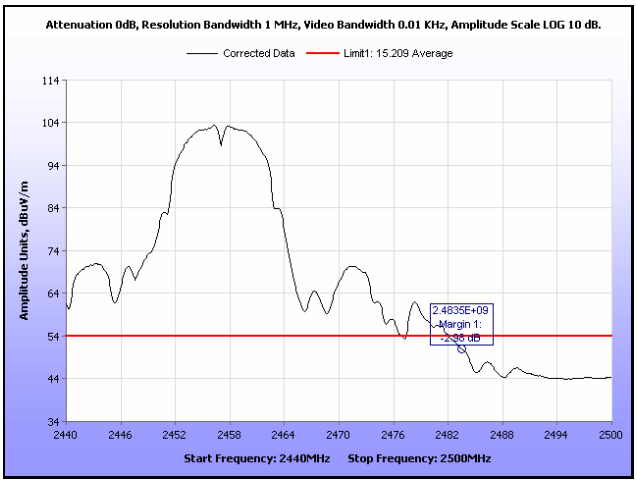
Plot 277. Radiated Restricted Band Edge, Peak, Channel 8, 802.11b, Ant. 0



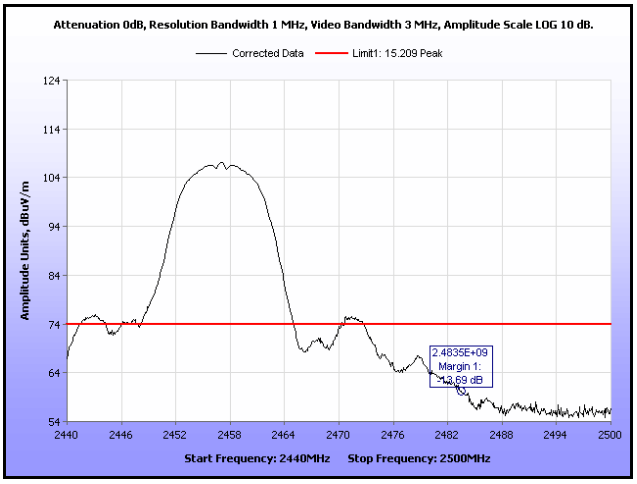
Plot 278. Radiated Restricted Band Edge, Average, Channel 9, 802.11b, Ant. 0



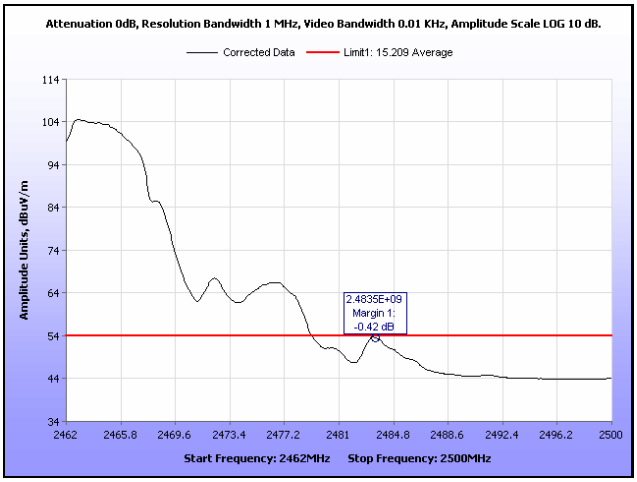
Plot 279. Radiated Restricted Band Edge, Peak, Channel 9, 802.11b, Ant. 0



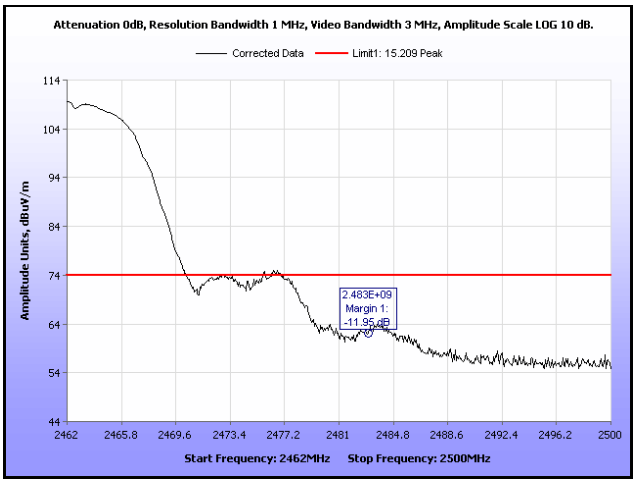
Plot 280. Radiated Restricted Band Edge, Average, Channel 10, 802.11b, Ant. 0



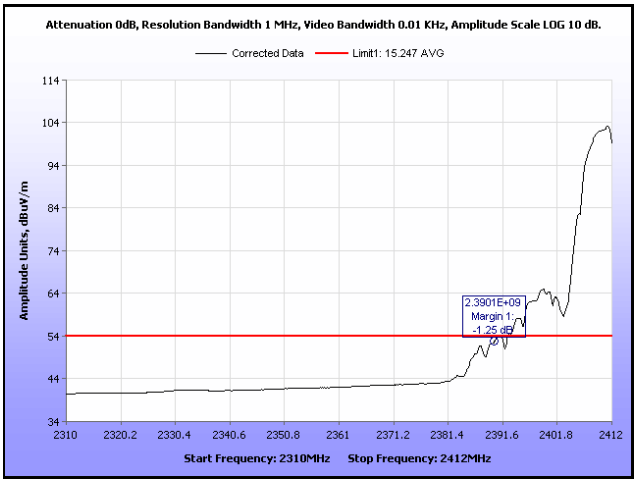
Plot 281. Radiated Restricted Band Edge, Peak, Channel 10, 802.11b, Ant. 0



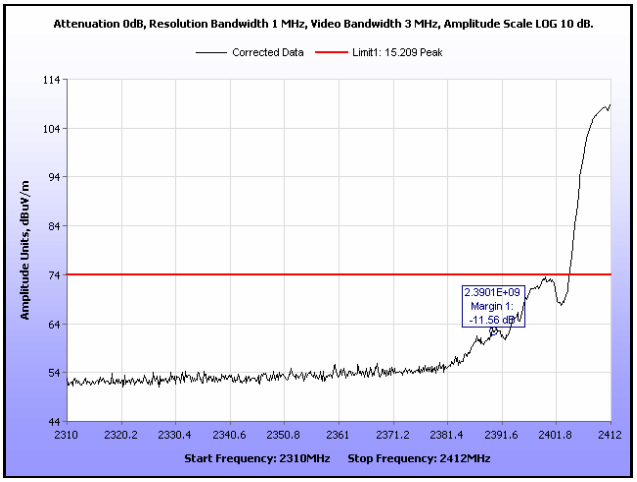
Plot 282. Radiated Restricted Band Edge, Average, Channel 11, 802.11b, Ant. 0



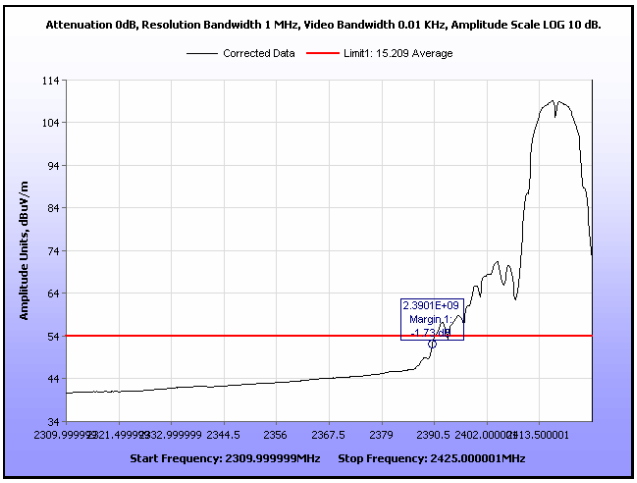
Plot 283. Radiated Restricted Band Edge, Peak, Channel 11, 802.11b, Ant. 0



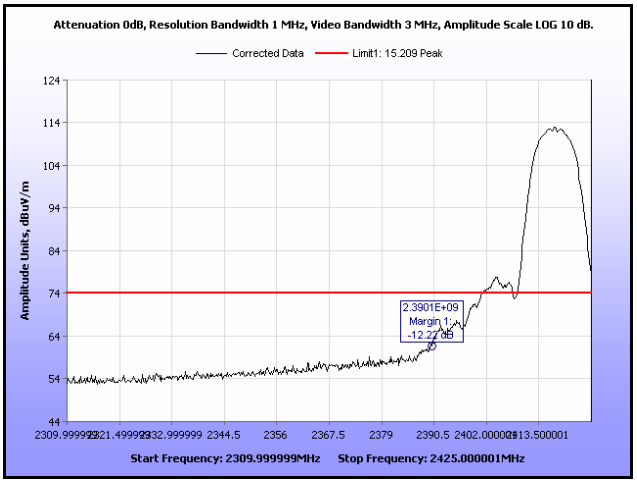
Plot 284. Radiated Restricted Band Edge, Average, Channel 1, 802.11b, Ant. 1



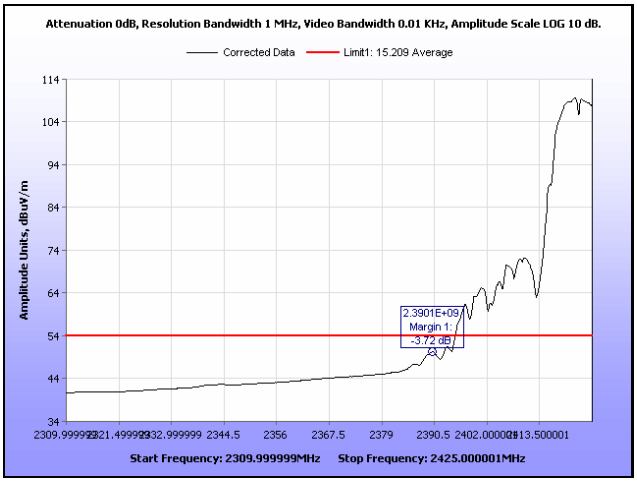
Plot 285. Radiated Restricted Band Edge, Peak, Channel 1, 802.11b, Ant. 1



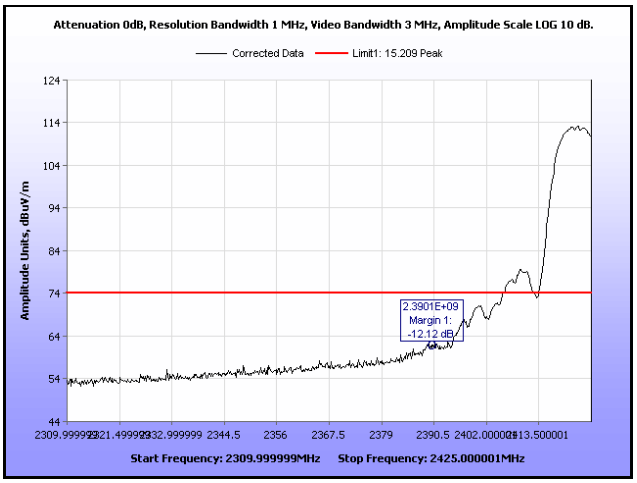
Plot 286. Radiated Restricted Band Edge, Average, Channel 2, 802.11b, Ant. 1



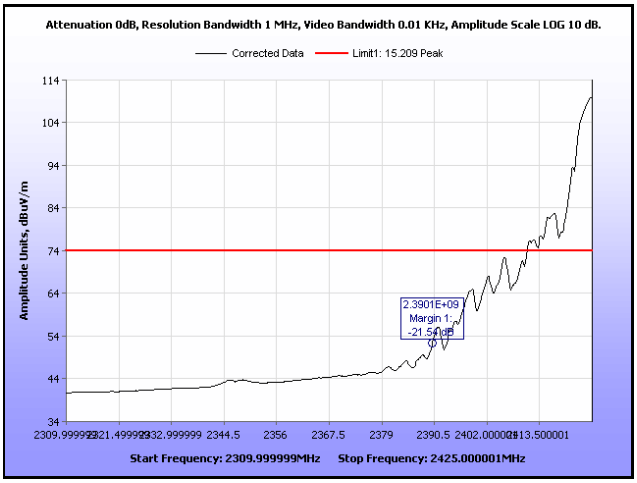
Plot 287. Radiated Restricted Band Edge, Peak, Channel 2, 802.11b, Ant. 1



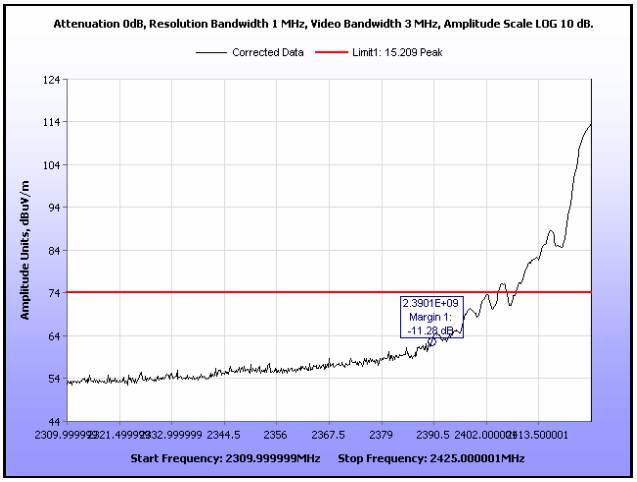
Plot 288. Radiated Restricted Band Edge, Average, Channel 3, 802.11b, Ant. 1



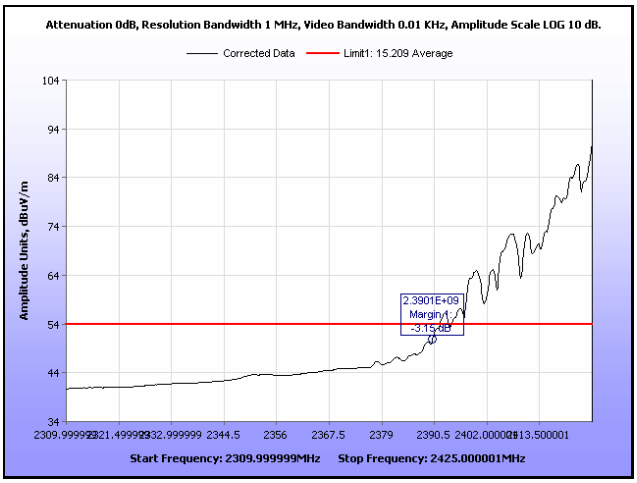
Plot 289. Radiated Restricted Band Edge, Peak, Channel 3, 802.11b, Ant. 1



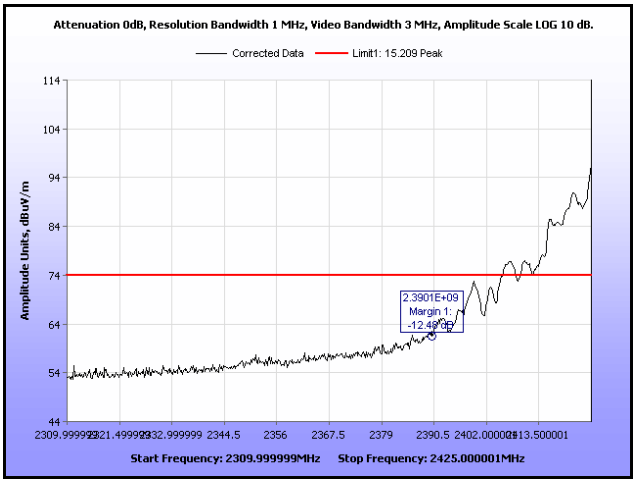
Plot 290. Radiated Restricted Band Edge, Average, Channel 4, 802.11b, Ant. 1



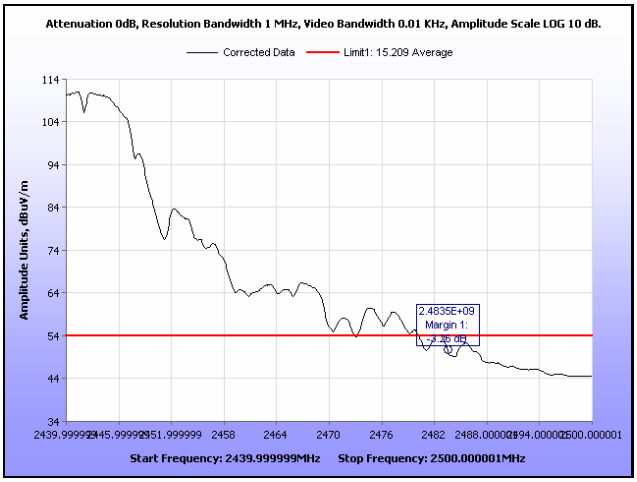
Plot 291. Radiated Restricted Band Edge, Peak, Channel 4, 802.11b, Ant. 1



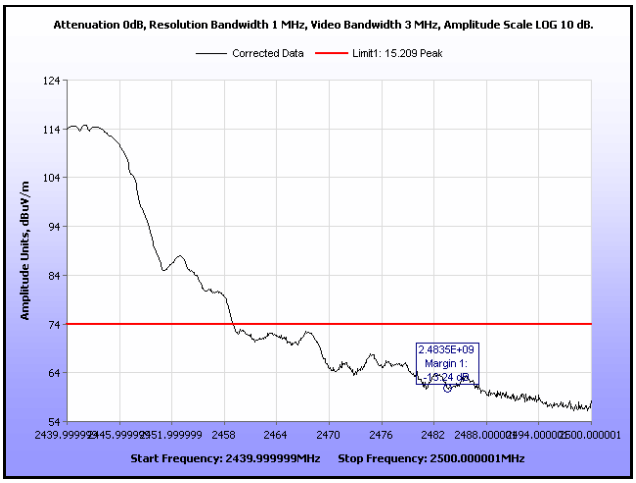
Plot 292. Radiated Restricted Band Edge, Average, Channel 5, 802.11b, Ant. 1



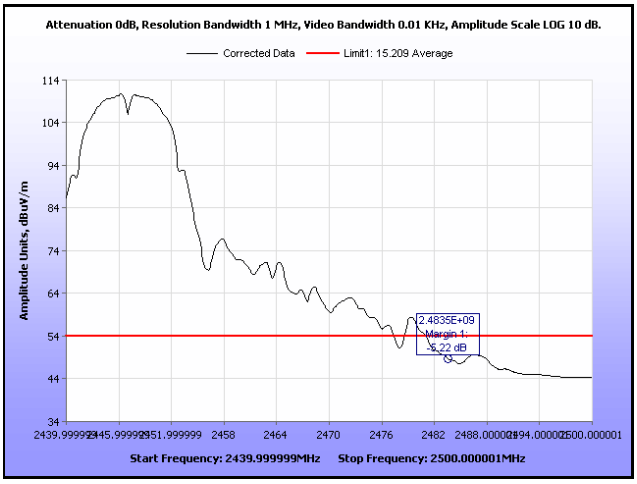
Plot 293. Radiated Restricted Band Edge, Peak, Channel 5, 802.11b, Ant. 1



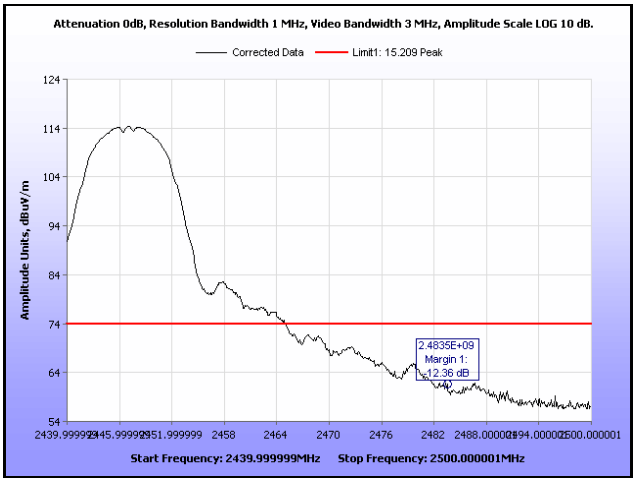
Plot 294. Radiated Restricted Band Edge, Average, Channel 7, 802.11b, Ant. 1



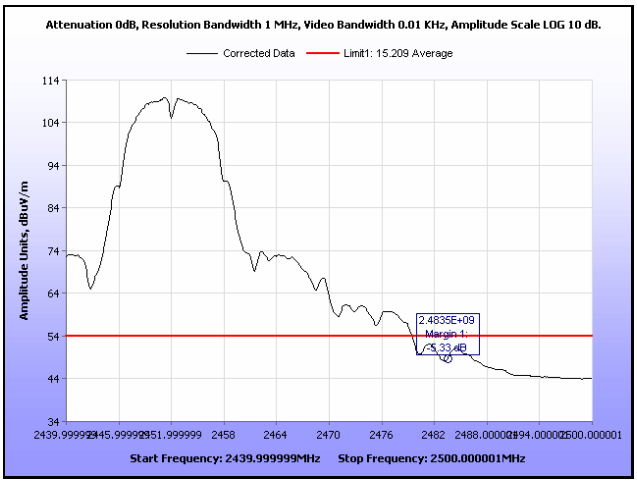
Plot 295. Radiated Restricted Band Edge, Peak, Channel 7, 802.11b, Ant. 1



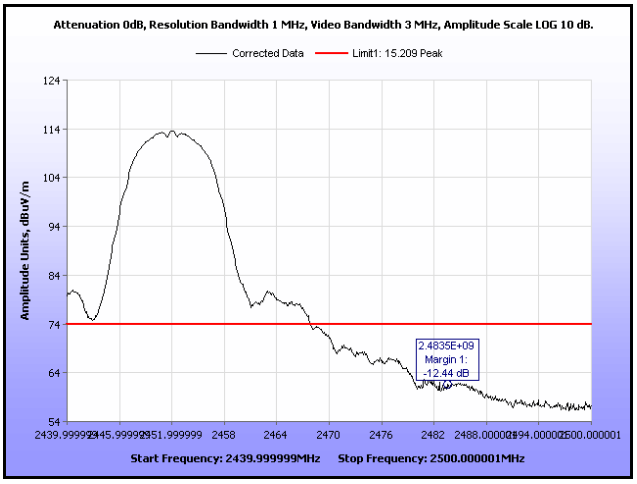
Plot 296. Radiated Restricted Band Edge, Average, Channel 8, 802.11b, Ant. 1



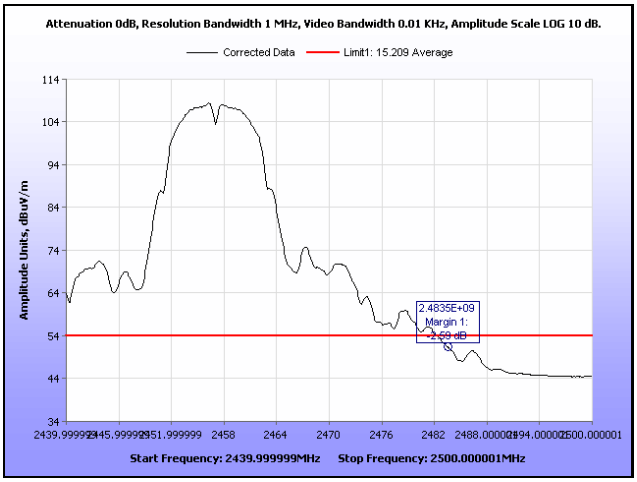
Plot 297. Radiated Restricted Band Edge, Peak, Channel 8, 802.11b, Ant. 1



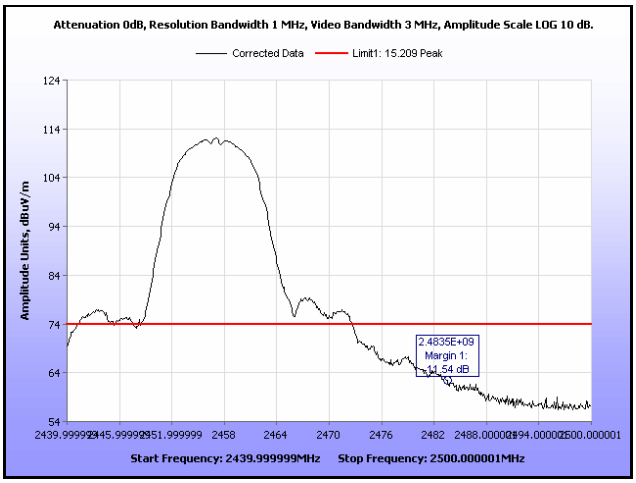
Plot 298. Radiated Restricted Band Edge, Average, Channel 9, 802.11b, Ant. 1



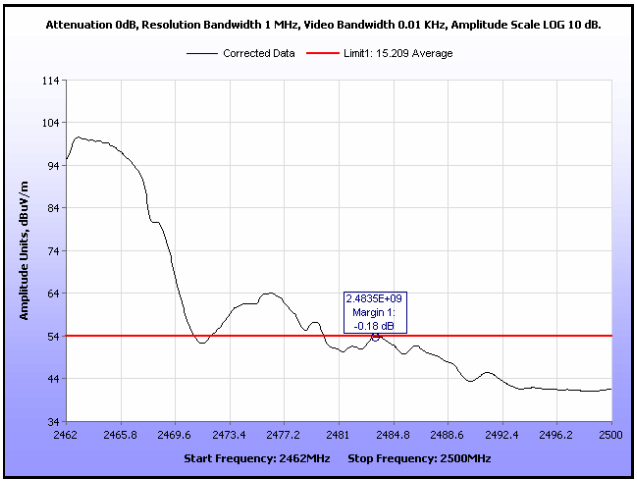
Plot 299. Radiated Restricted Band Edge, Peak, Channel 9, 802.11b, Ant. 1



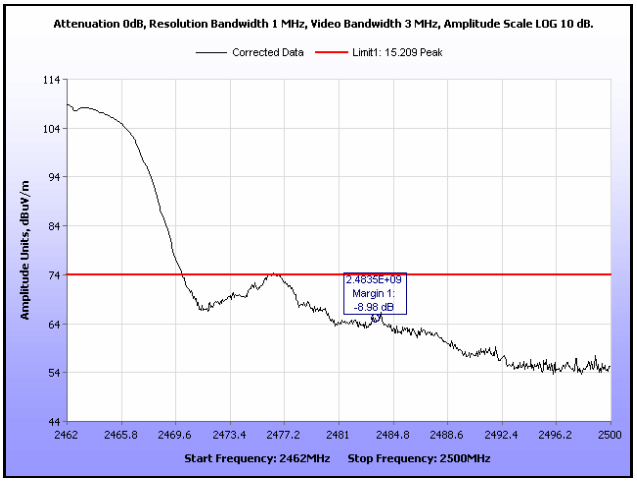
Plot 300. Radiated Restricted Band Edge, Average, Channel 10, 802.11b, Ant. 1



Plot 301. Radiated Restricted Band Edge, Peak, Channel 10, 802.11b, Ant. 1

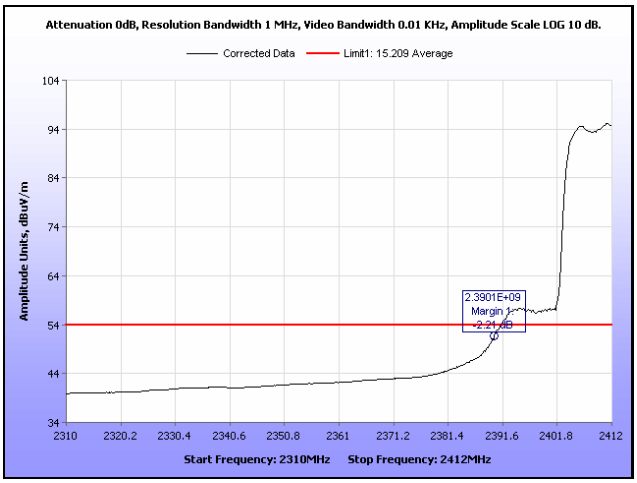


Plot 302. Radiated Restricted Band Edge, Average, Channel 11, 802.11b, Ant. 1

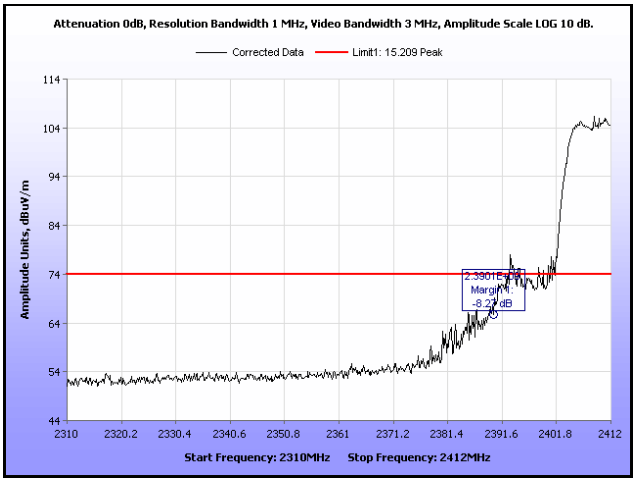


Plot 303. Radiated Restricted Band Edge, Peak, Channel 11, 802.11b, Ant. 1

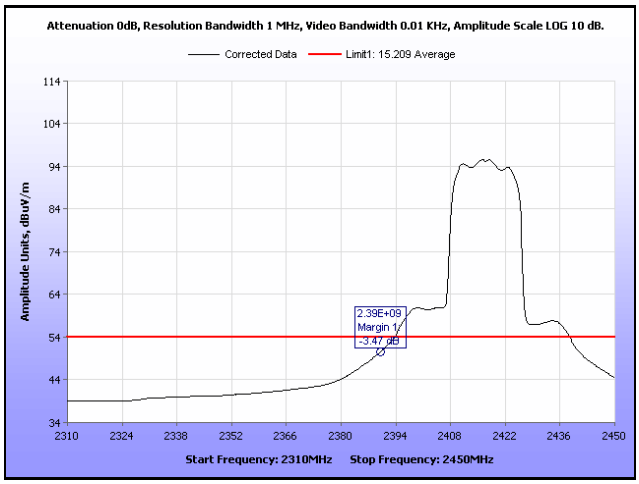
Radiated Band Edge, 802.11g



Plot 304. Radiated Restricted Band Edge, Average, Channel 1, 802.11g, Ant. 0



Plot 305. Radiated Restricted Band Edge, Peak, Channel 1, 802.11g, Ant. 0



Plot 306. Radiated Restricted Band Edge, Average, Channel 2, 802.11g, Ant. 0

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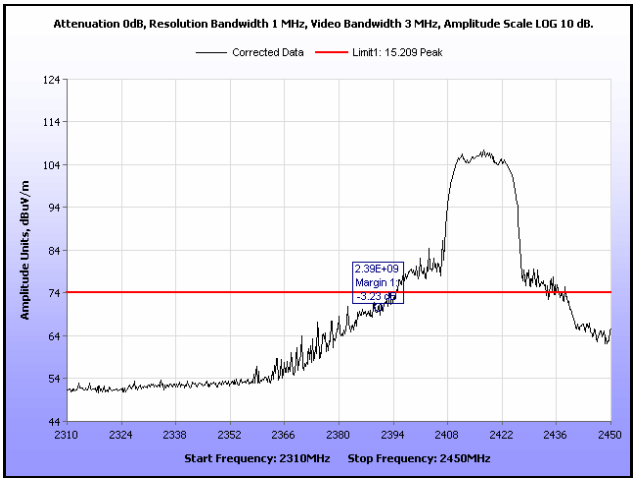
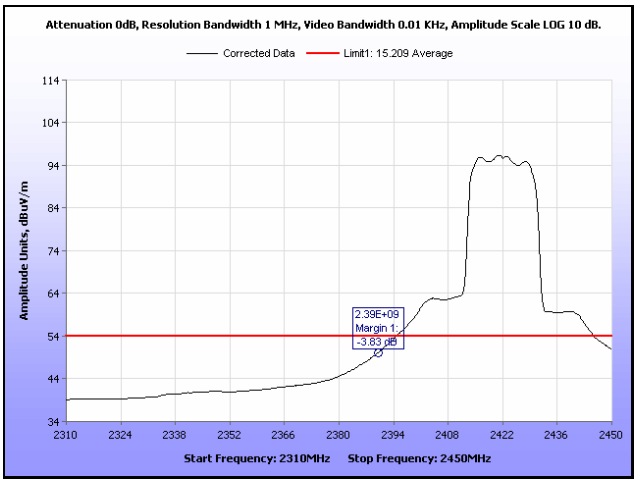
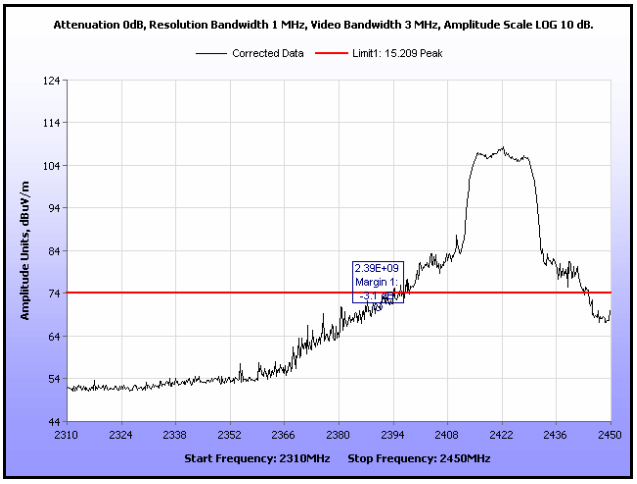


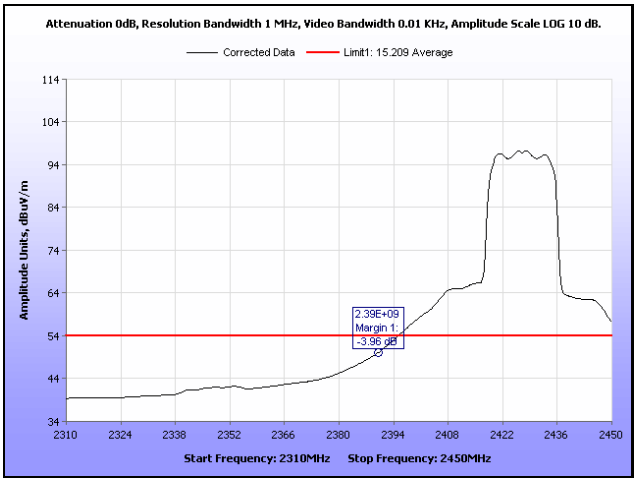
Plot 307. Radiated Restricted Band Edge, Peak, Channel 2, 802.11g, Ant. 0



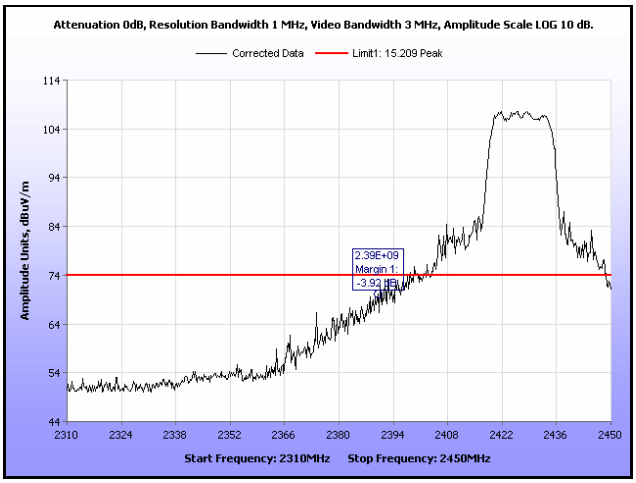
Plot 308. Radiated Restricted Band Edge, Average, Channel 3, 802.11g, Ant. 0



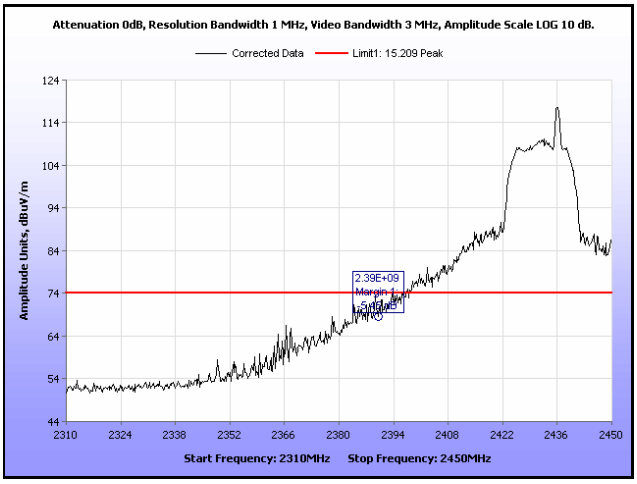
Plot 309. Radiated Restricted Band Edge, Peak, Channel 3, 802.11g, Ant. 0



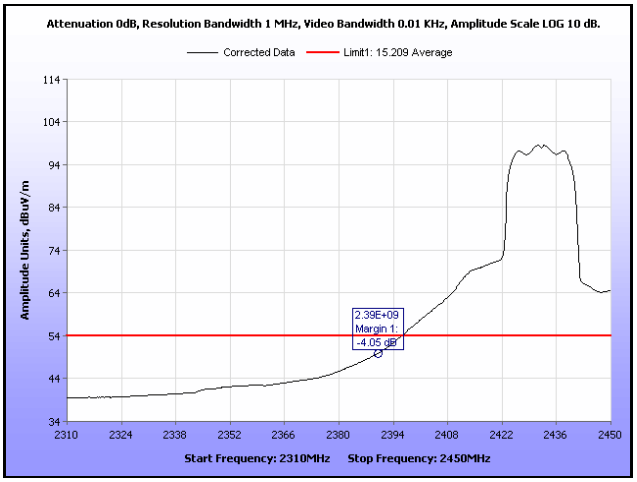
Plot 310. Radiated Restricted Band Edge, Average, Channel 4, 802.11g, Ant. 0



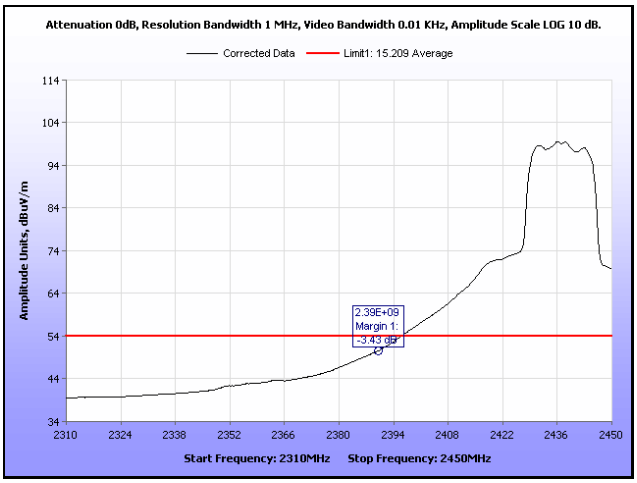
Plot 311. Radiated Restricted Band Edge, Peak, Channel 4, 802.11g, Ant. 0



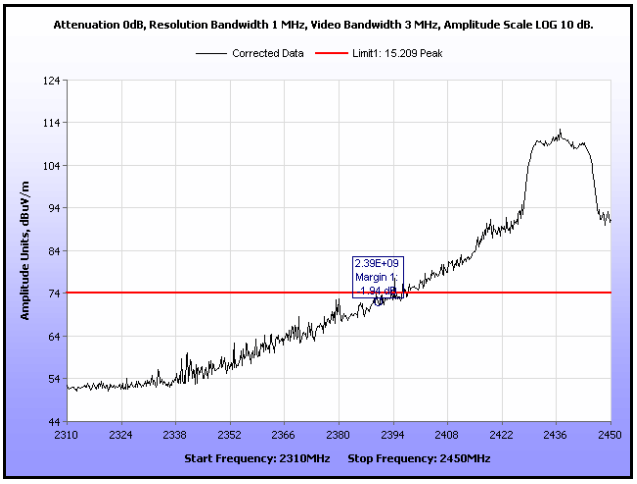
Plot 312. Radiated Restricted Band Edge, Average, Channel 5, 802.11g, Ant. 0



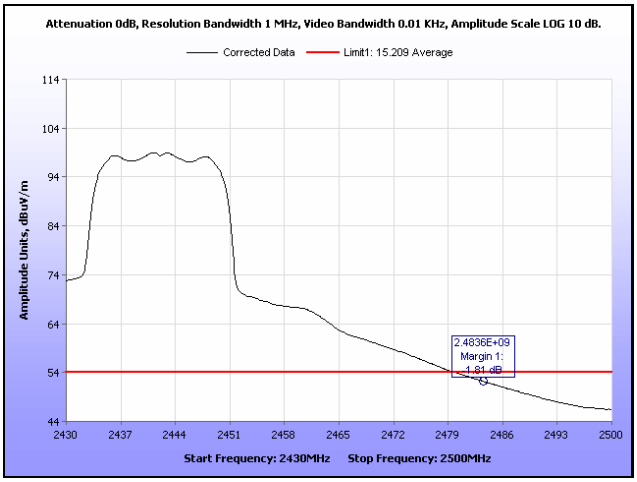
Plot 313. Radiated Restricted Band Edge, Peak, Channel 5, 802.11g, Ant. 0



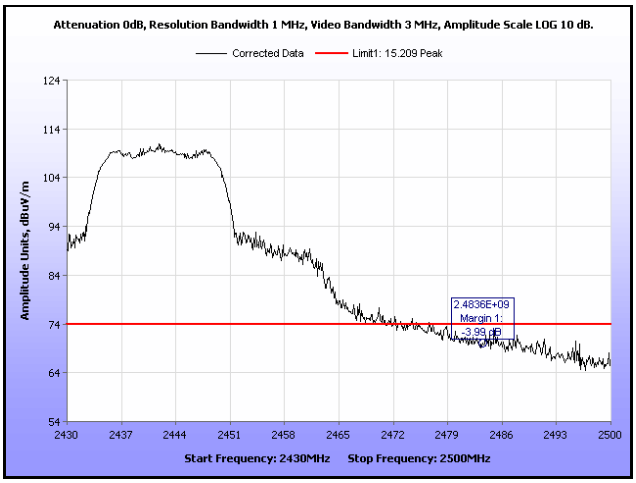
Plot 314. Radiated Restricted Band Edge, Average, Channel 6, 802.11g, Ant. 0



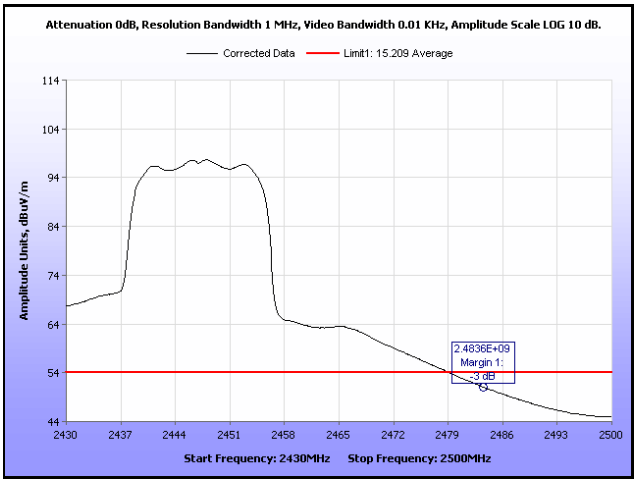
Plot 315. Radiated Restricted Band Edge, Peak, Channel 6, 802.11g, Ant. 0



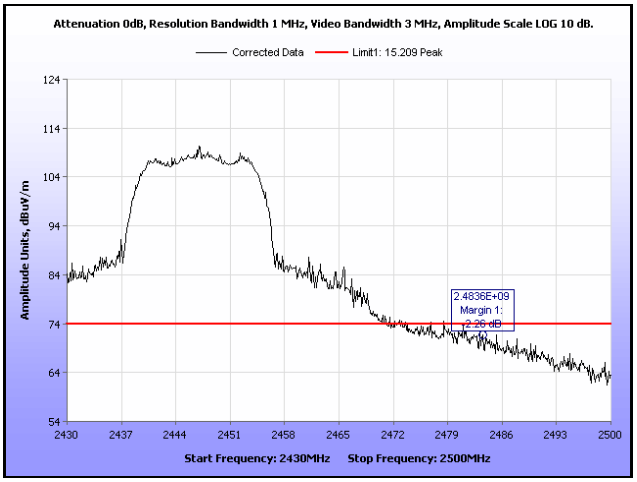
Plot 316. Radiated Restricted Band Edge, Average, Channel 7, 802.11g, Ant. 0



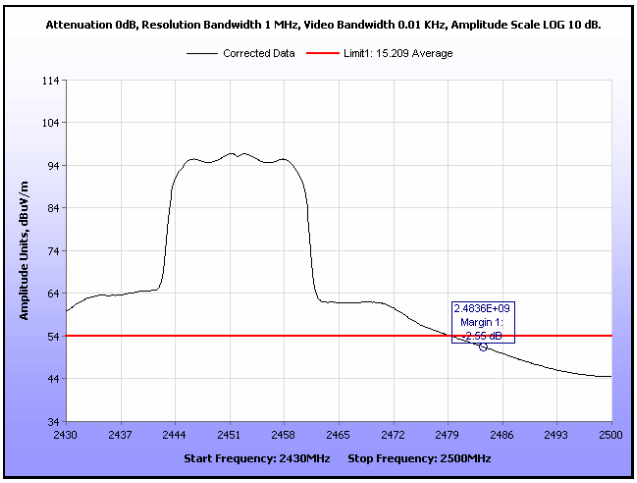
Plot 317. Radiated Restricted Band Edge, Peak, Channel 7, 802.11g, Ant. 0



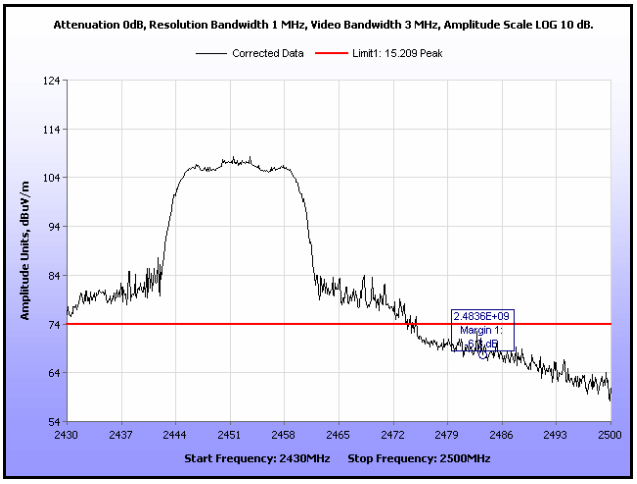
Plot 318. Radiated Restricted Band Edge, Average, Channel 8, 802.11g, Ant. 0



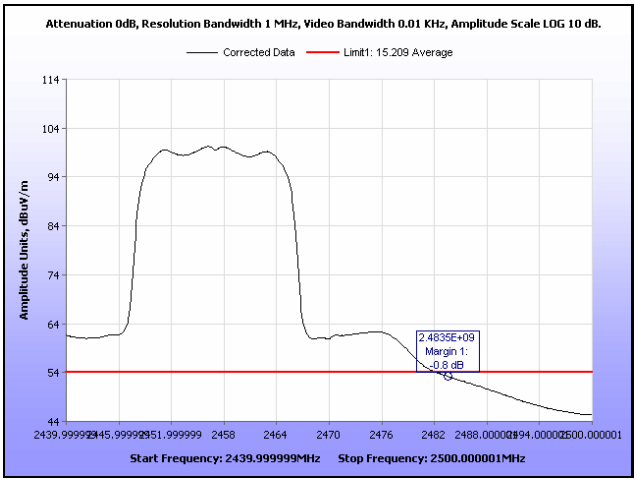
Plot 319. Radiated Restricted Band Edge, Peak, Channel 8, 802.11g, Ant. 0



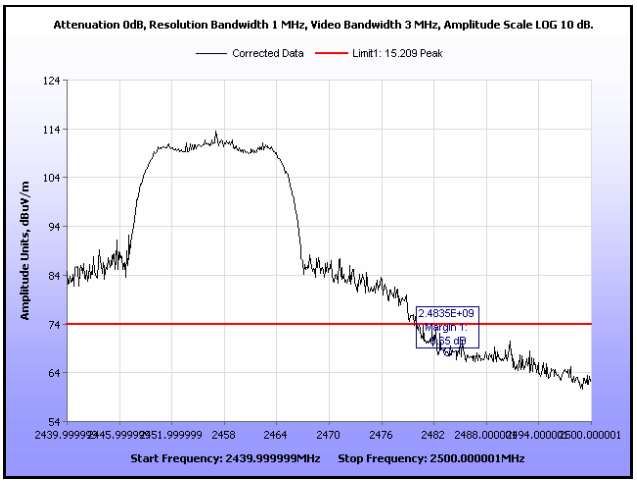
Plot 320. Radiated Restricted Band Edge, Average, Channel 9, 802.11g, Ant. 0



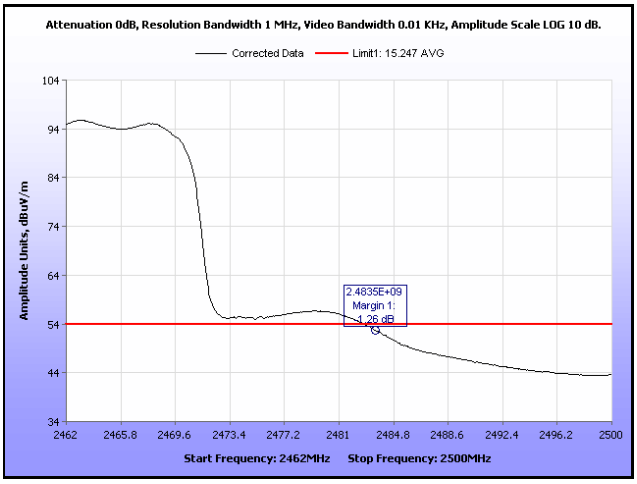
Plot 321. Radiated Restricted Band Edge, Peak, Channel 9, 802.11g, Ant. 0



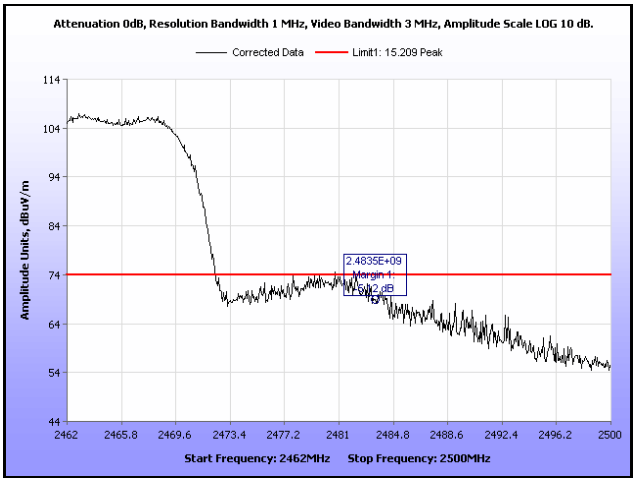
Plot 322. Radiated Restricted Band Edge, Average, Channel 10, 802.11g, Ant. 0



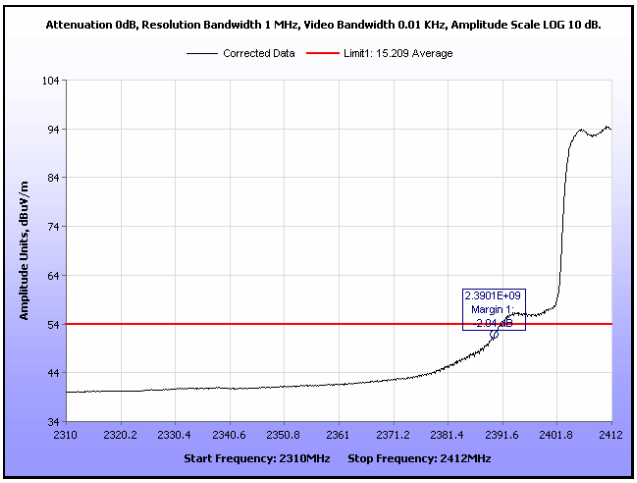
Plot 323. Radiated Restricted Band Edge, Peak, Channel 10, 802.11g, Ant. 0



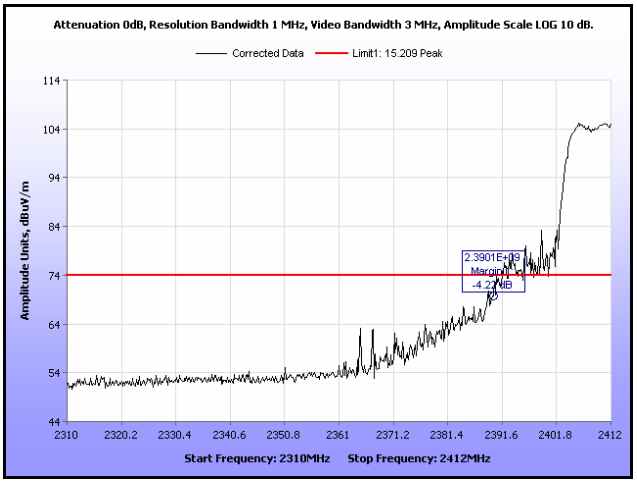
Plot 324. Radiated Restricted Band Edge, Average, Channel 11, 802.11g, Ant. 0



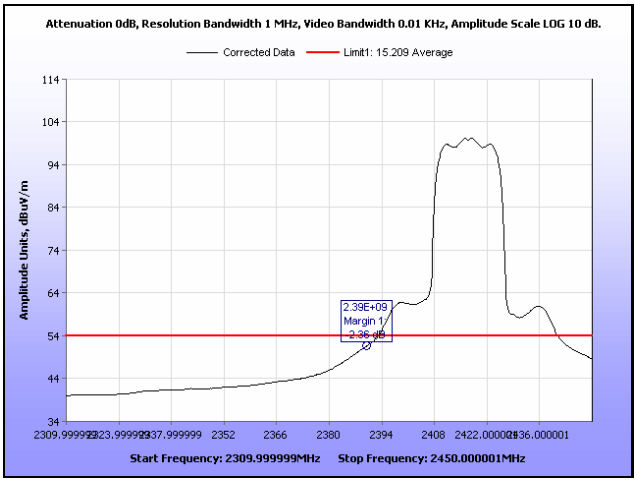
Plot 325. Radiated Restricted Band Edge, Peak, Channel 11, 802.11g, Ant. 0



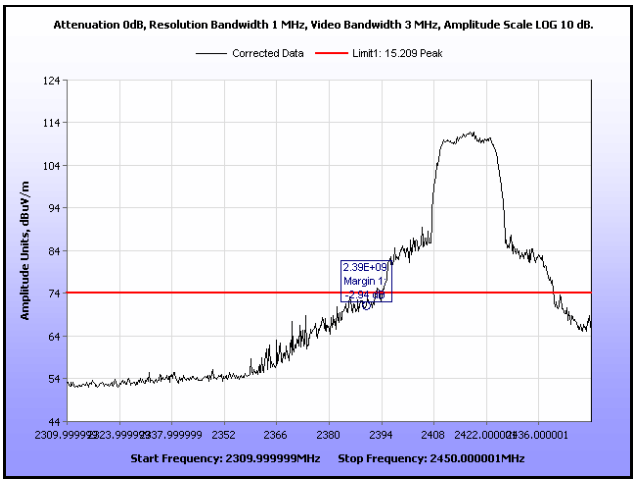
Plot 326. Radiated Restricted Band Edge, Average, Channel 1, 802.11g, Ant. 1



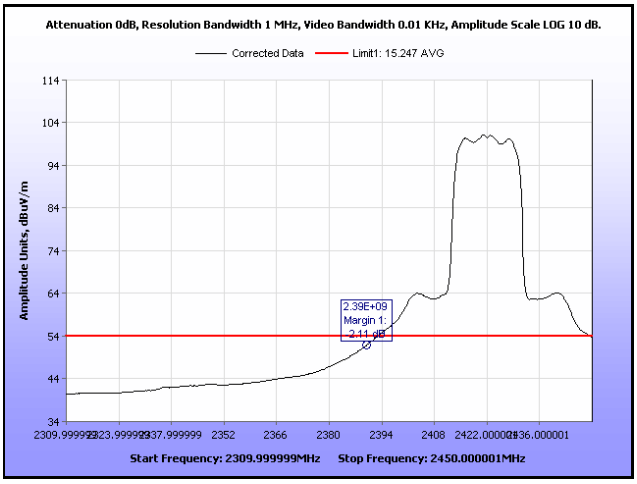
Plot 327. Radiated Restricted Band Edge, Peak, Channel 1, 802.11g, Ant. 1



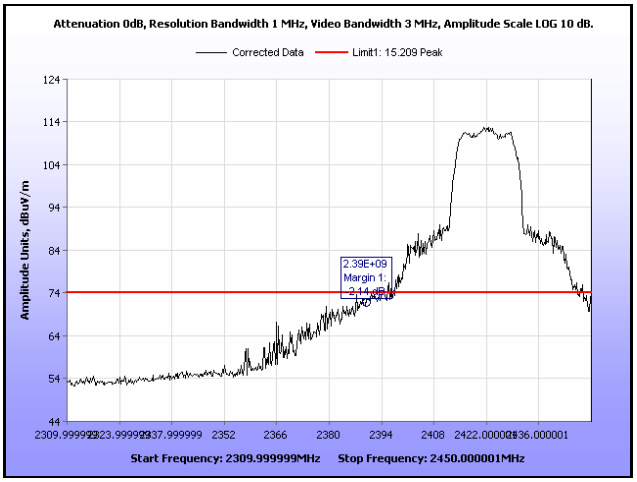
Plot 328. Radiated Restricted Band Edge, Average, Channel 2, 802.11g, Ant. 1



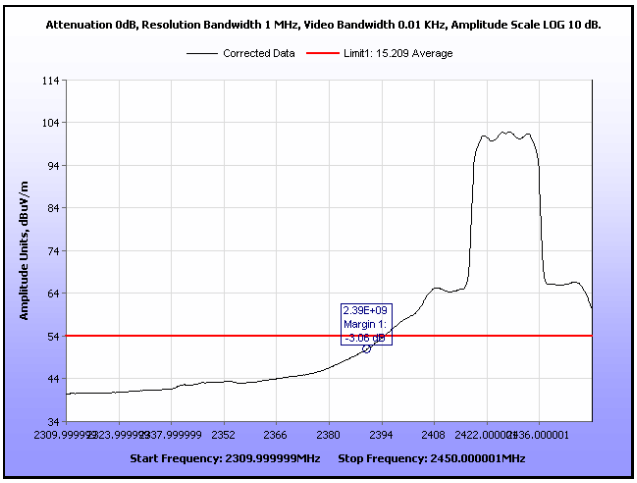
Plot 329. Radiated Restricted Band Edge, Peak, Channel 2, 802.11g, Ant. 1



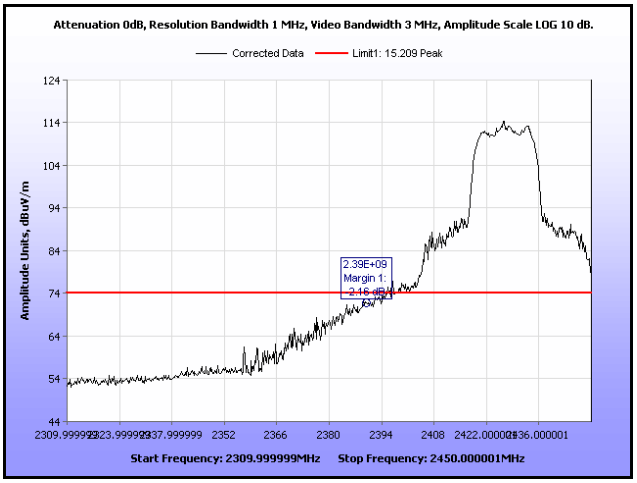
Plot 330. Radiated Restricted Band Edge, Average, Channel 3, 802.11g, Ant. 1



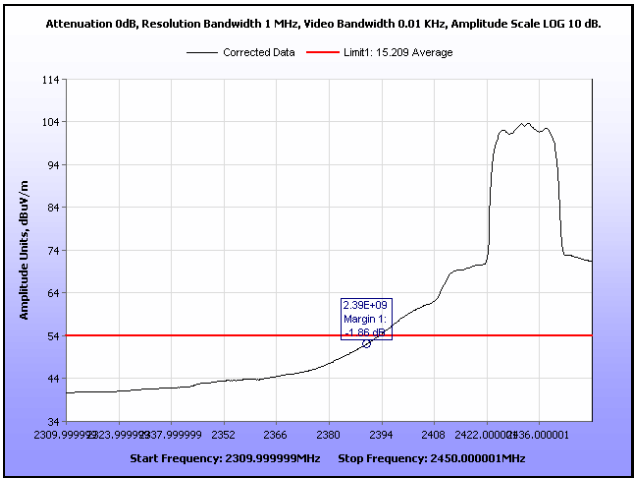
Plot 331. Radiated Restricted Band Edge, Peak, Channel 3, 802.11g, Ant. 1



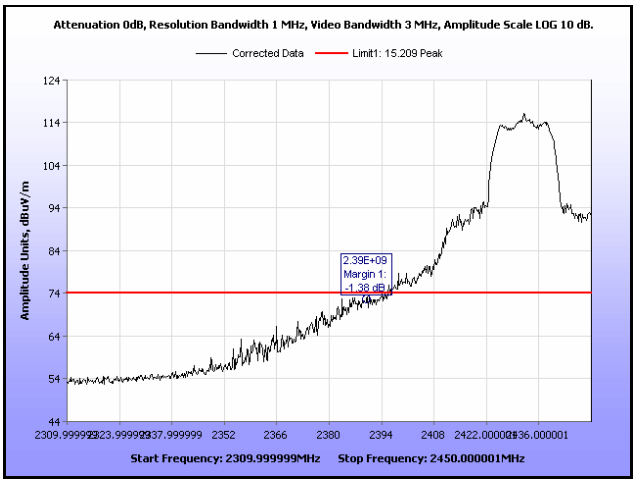
Plot 332. Radiated Restricted Band Edge, Average, Channel 4, 802.11g, Ant. 1



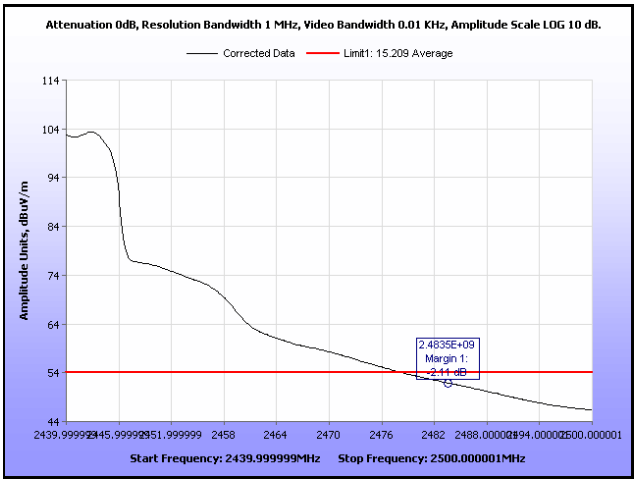
Plot 333. Radiated Restricted Band Edge, Peak, Channel 4, 802.11g, Ant. 1



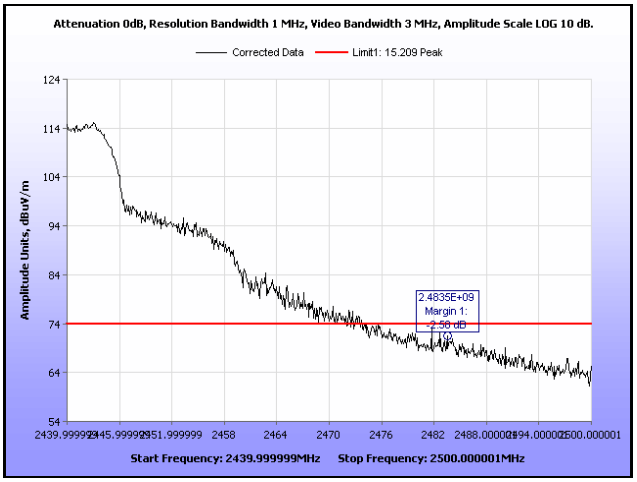
Plot 334. Radiated Restricted Band Edge, Average, Channel 5, 802.11g, Ant. 1



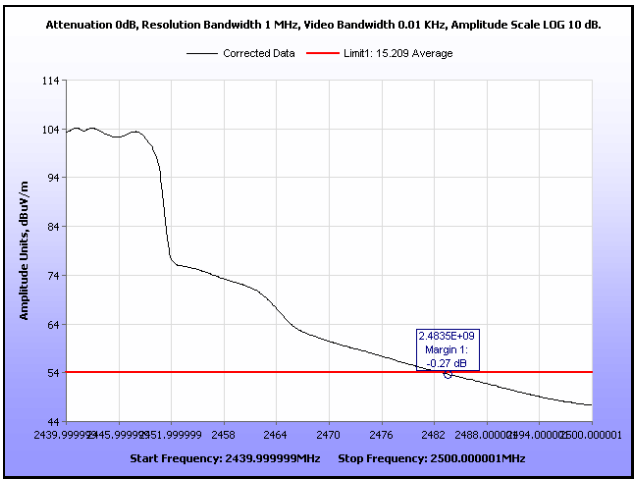
Plot 335. Radiated Restricted Band Edge, Peak, Channel 5, 802.11g, Ant. 1



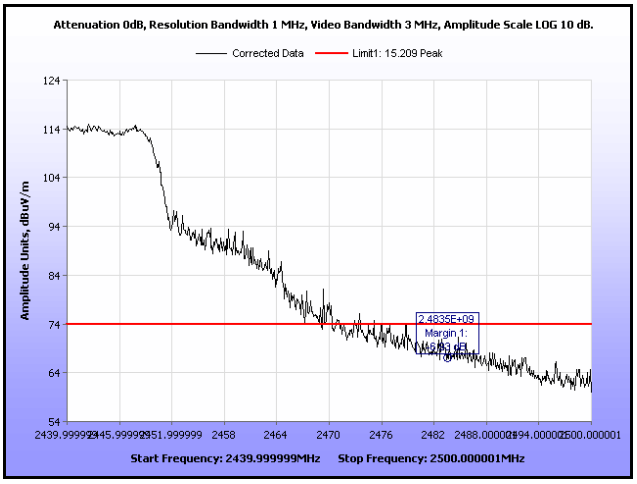
Plot 336. Radiated Restricted Band Edge, Average, Channel 6, 802.11g, Ant. 1



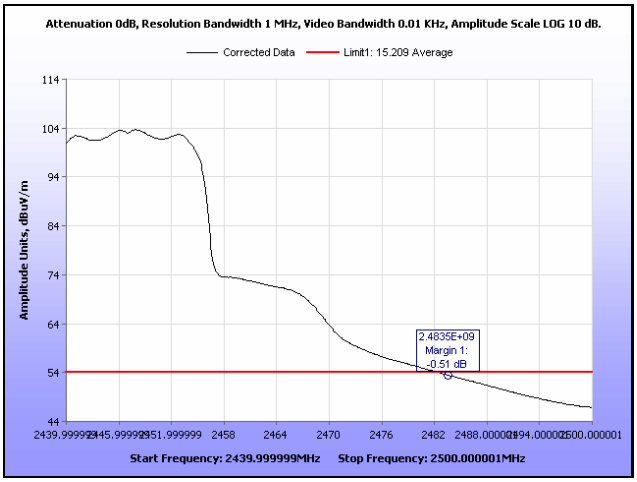
Plot 337. Radiated Restricted Band Edge, Peak, Channel 6, 802.11g, Ant. 1



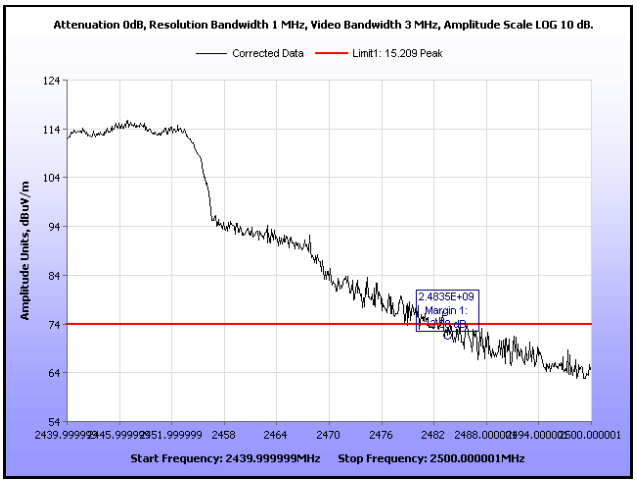
Plot 338. Radiated Restricted Band Edge, Average, Channel 7, 802.11g, Ant. 1



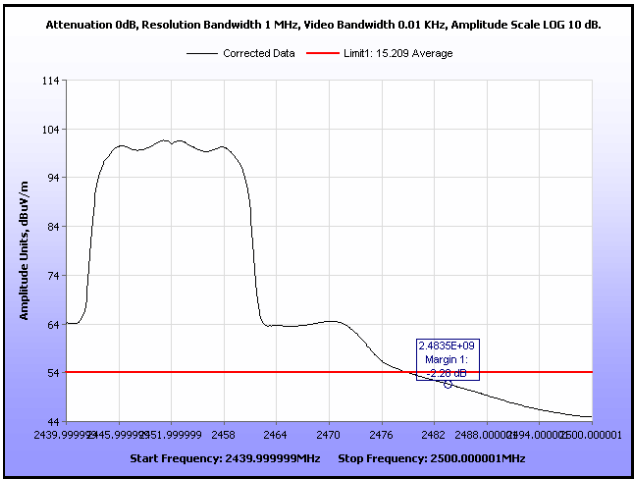
Plot 339. Radiated Restricted Band Edge, Peak, Channel 7, 802.11g, Ant. 1



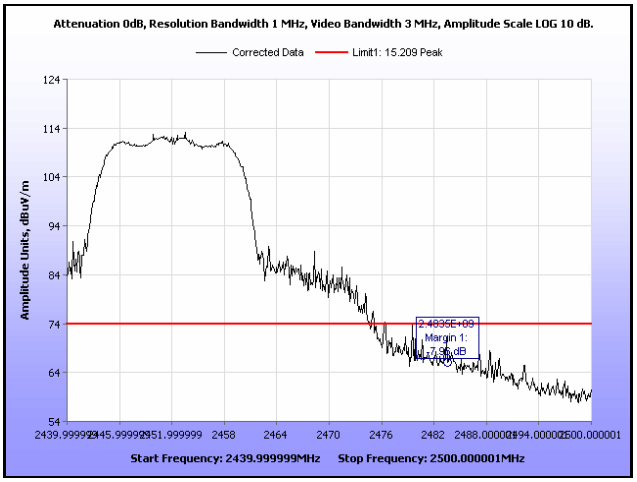
Plot 340. Radiated Restricted Band Edge, Average, Channel 8, 802.11g, Ant. 1



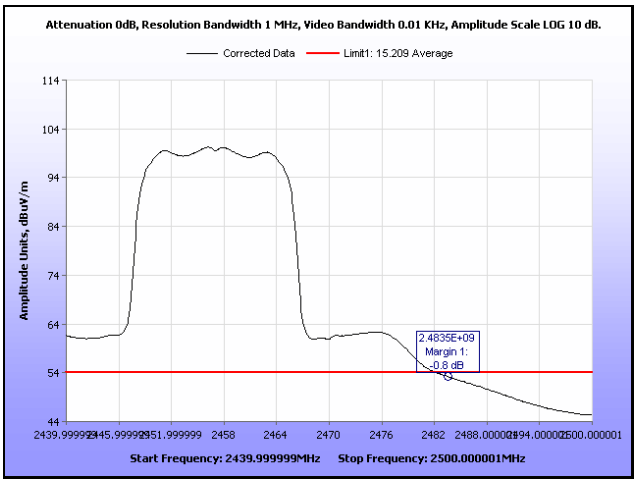
Plot 341. Radiated Restricted Band Edge, Peak, Channel 8, 802.11g, Ant. 1



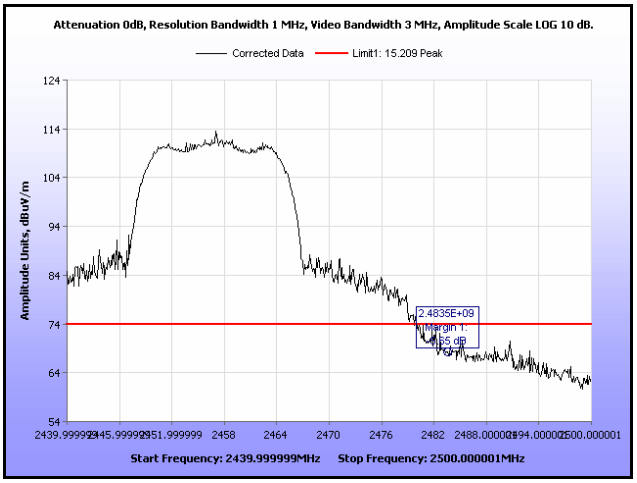
Plot 342. Radiated Restricted Band Edge, Average, Channel 9, 802.11g, Ant. 1



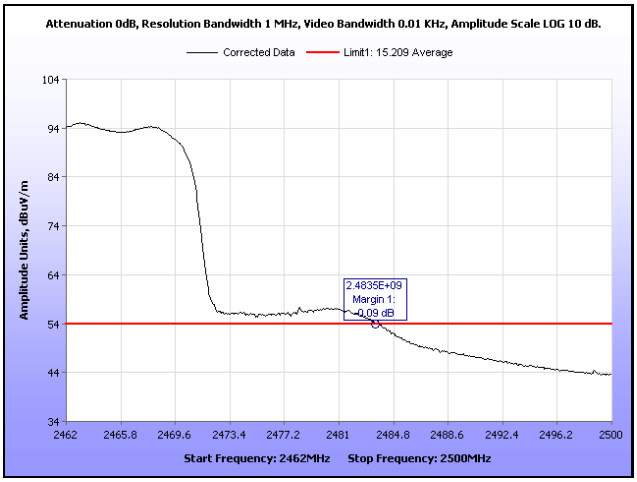
Plot 343. Radiated Restricted Band Edge, Peak, Channel 9, 802.11g, Ant. 1



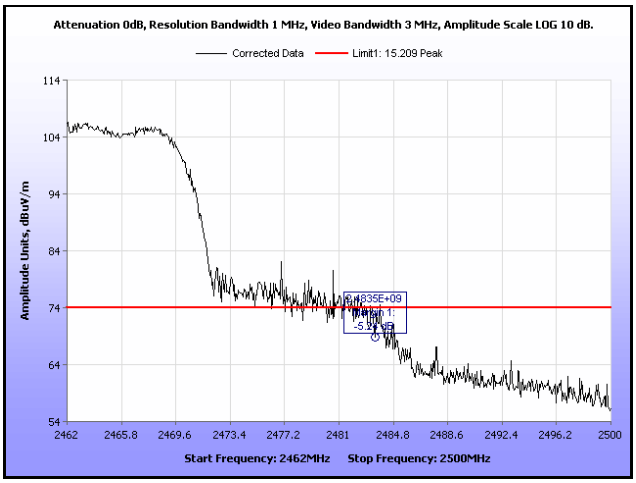
Plot 344. Radiated Restricted Band Edge, Average, Channel 10, 802.11g, Ant. 1



Plot 345. Radiated Restricted Band Edge, Peak, Channel 10, 802.11g, Ant. 1

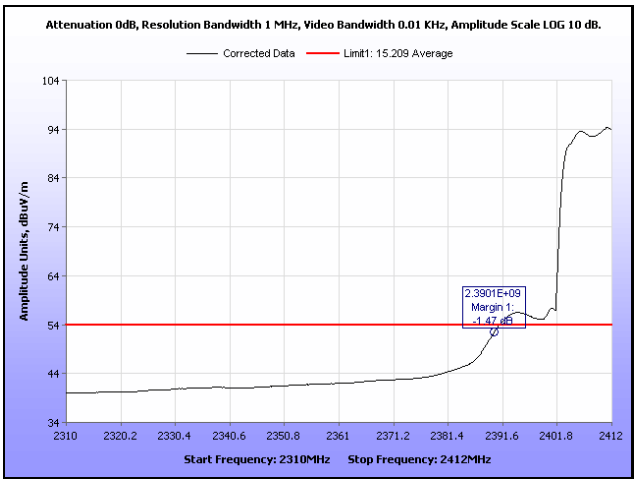


Plot 346. Radiated Restricted Band Edge, Average, Channel 11, 802.11g, Ant. 1

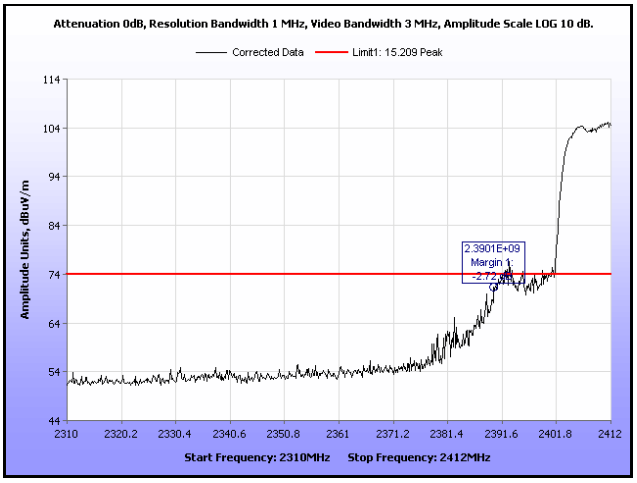


Plot 347. Radiated Restricted Band Edge, Peak, Channel 11, 802.11g, Ant. 1

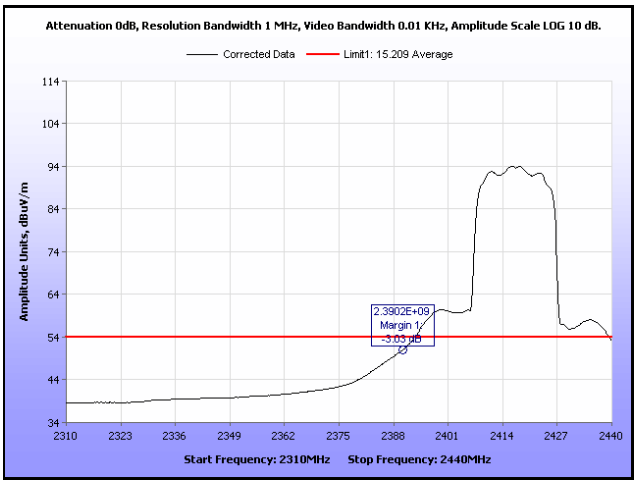
Radiated Band Edge, 802.11n 20 MHz



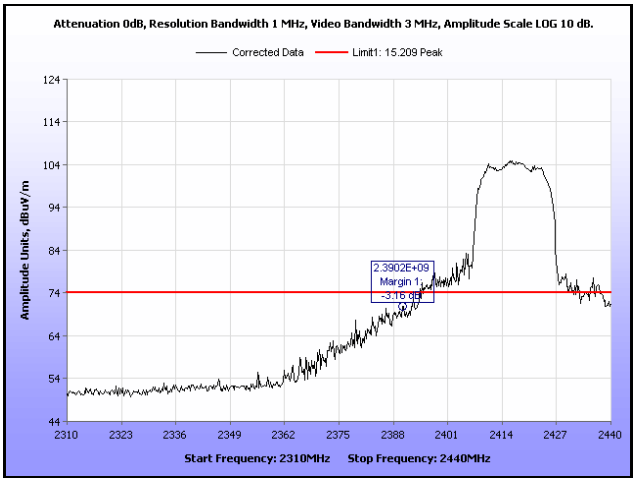
Plot 348. Radiated Restricted Band Edge, Average, Channel 1, 802.11n 20 MHz, Ant. 0



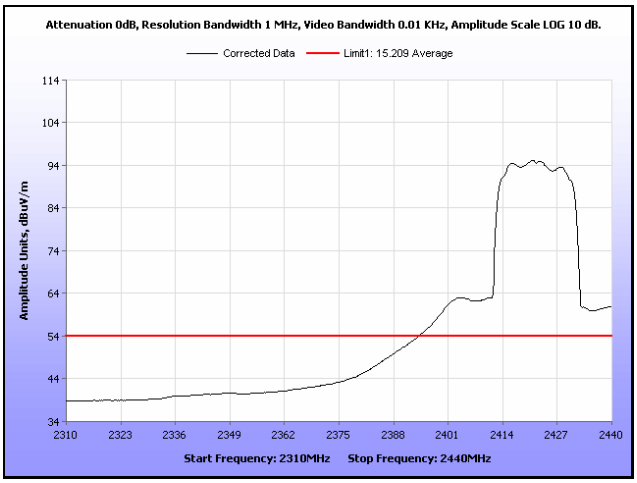
Plot 349. Radiated Restricted Band Edge, Peak, Channel 1, 802.11n 20 MHz, Ant. 0



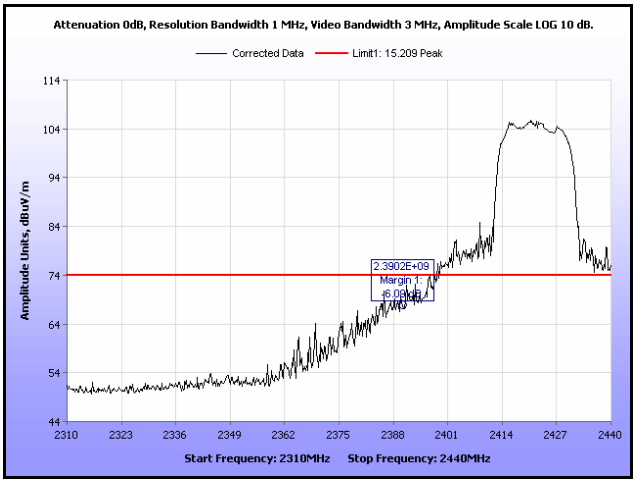
Plot 350. Radiated Restricted Band Edge, Average, Channel 2, 802.11n 20 MHz, Ant. 0



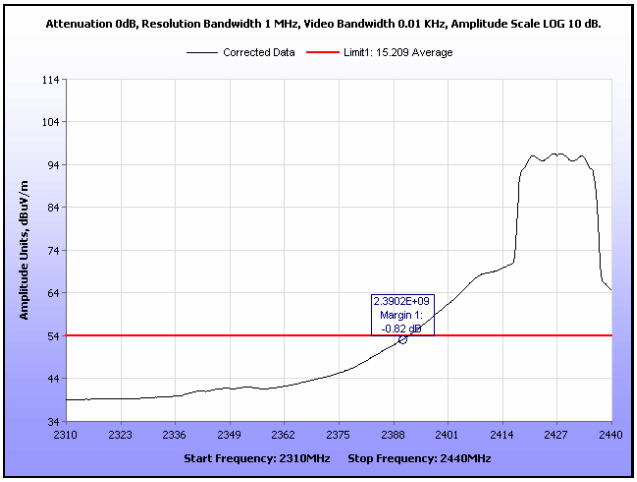
Plot 351. Radiated Restricted Band Edge, Peak, Channel 2, 802.11n 20 MHz, Ant. 0



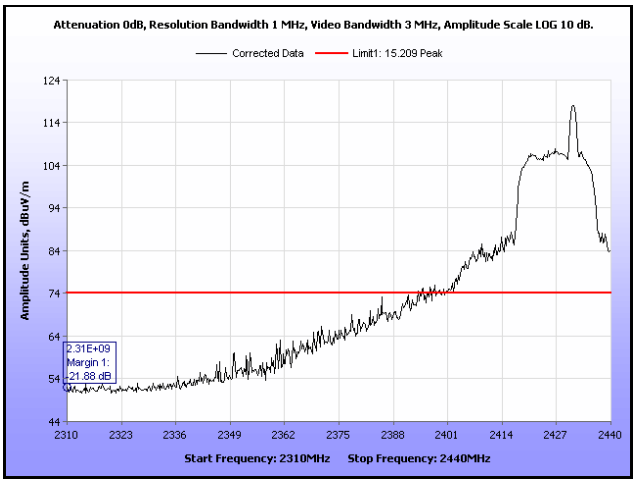
Plot 352. Radiated Restricted Band Edge, Average, Channel 3, 802.11n 20 MHz, Ant. 0



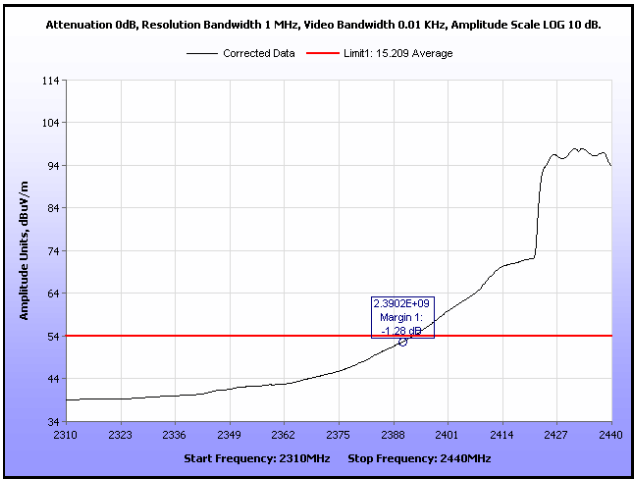
Plot 353. Radiated Restricted Band Edge, Peak, Channel 3, 802.11n 20 MHz, Ant. 0



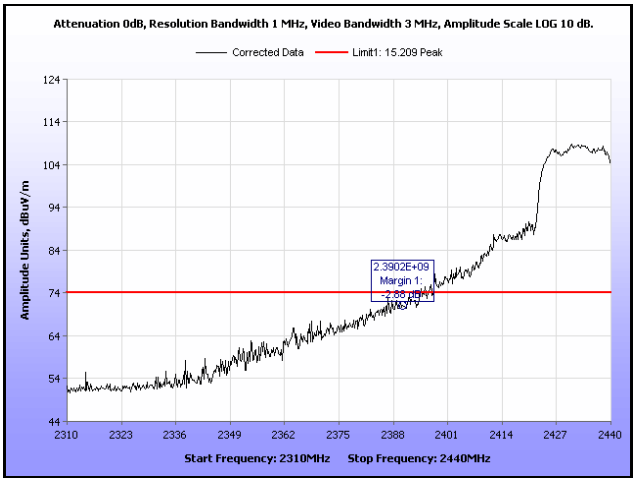
Plot 354. Radiated Restricted Band Edge, Average, Channel 4, 802.11n 20 MHz, Ant. 0



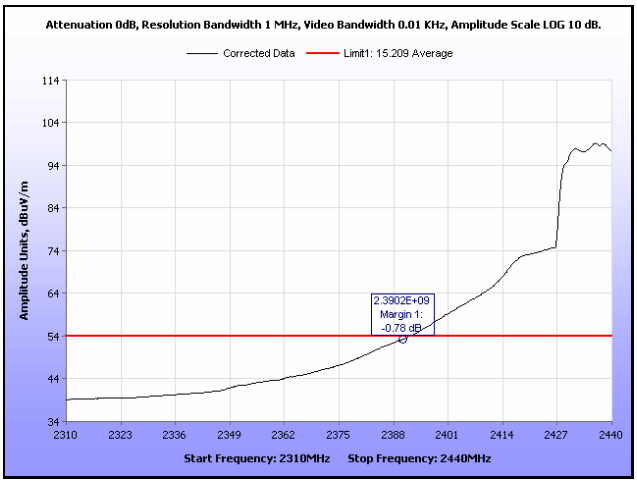
Plot 355. Radiated Restricted Band Edge, Peak, Channel 4, 802.11n 20 MHz, Ant. 0



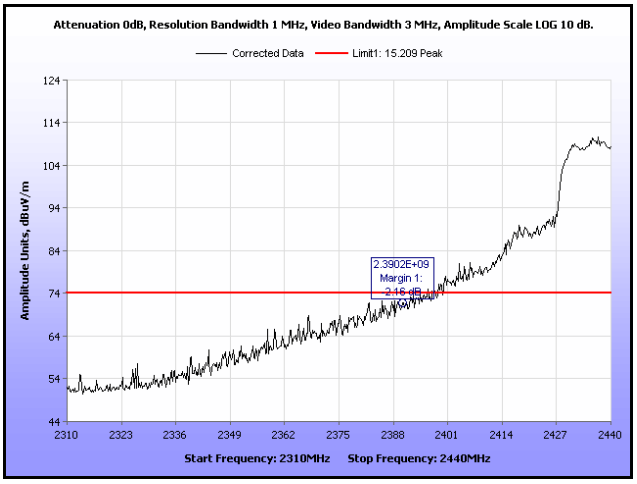
Plot 356. Radiated Restricted Band Edge, Average, Channel 5, 802.11n 20 MHz, Ant. 0



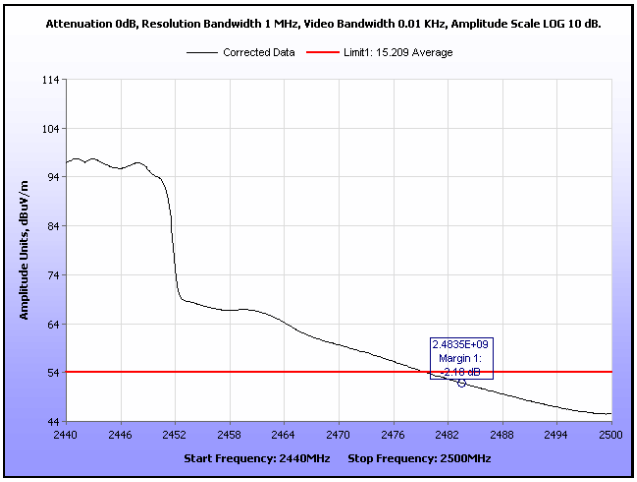
Plot 357. Radiated Restricted Band Edge, Peak, Channel 5, 802.11n 20 MHz, Ant. 0



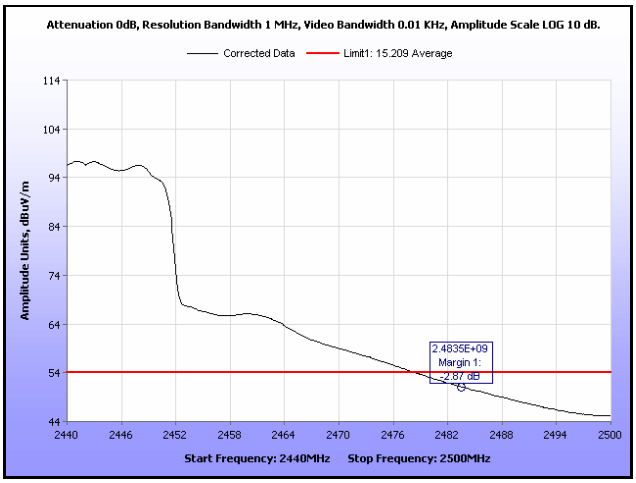
Plot 358. Radiated Restricted Band Edge, Average, Channel 6, 802.11n 20 MHz, Ant. 0



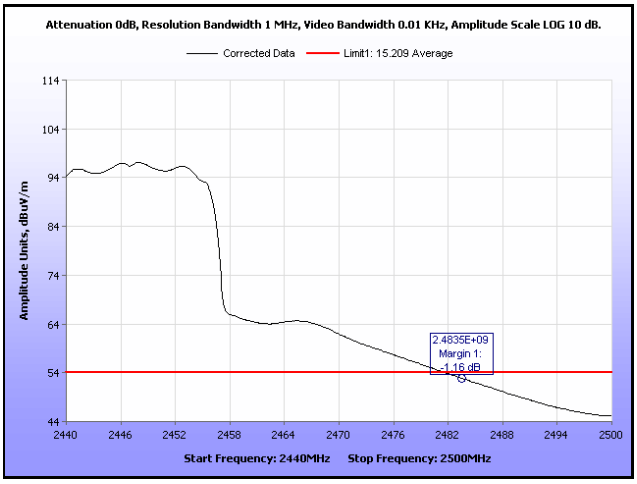
Plot 359. Radiated Restricted Band Edge, Peak, Channel 6, 802.11n 20 MHz, Ant. 0



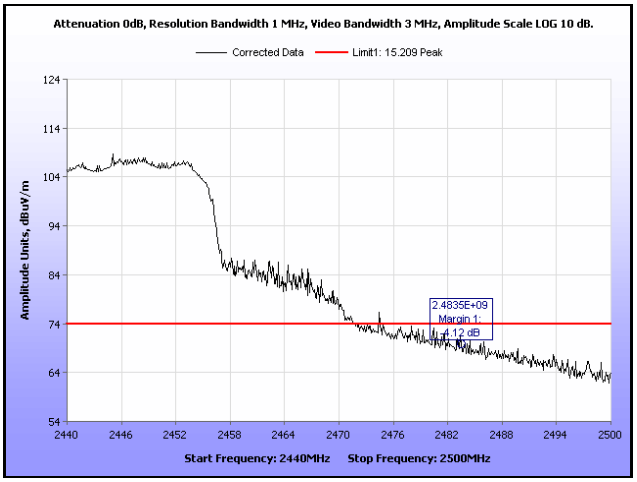
Plot 360. Radiated Restricted Band Edge, Average, Channel 7, 802.11n 20 MHz, Ant. 0



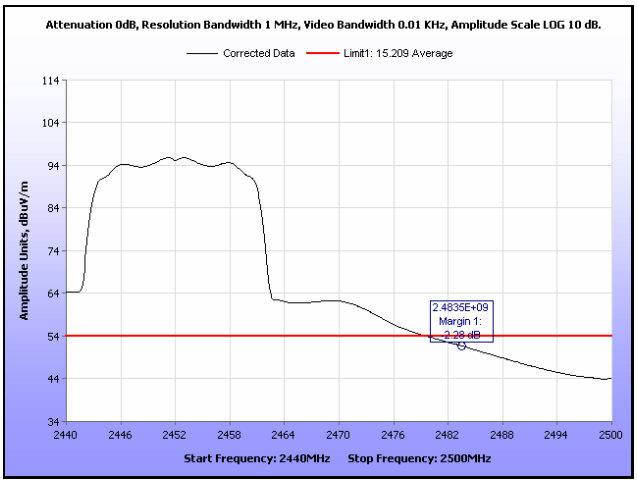
Plot 361. Radiated Restricted Band Edge, Peak, Channel 7, 802.11n 20 MHz, Ant. 0



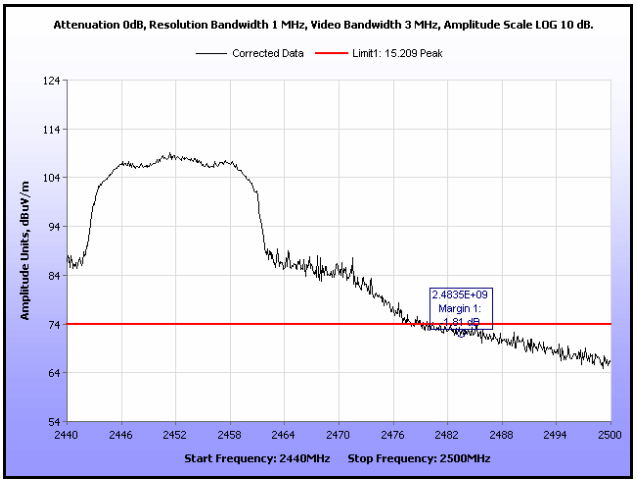
Plot 362. Radiated Restricted Band Edge, Average, Channel 8, 802.11n 20 MHz, Ant. 0



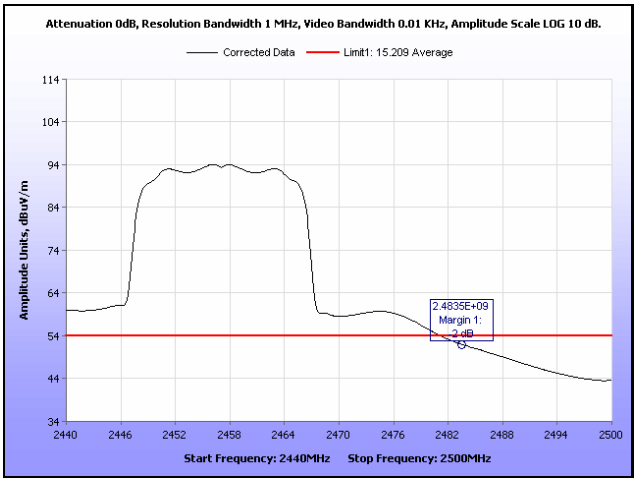
Plot 363. Radiated Restricted Band Edge, Peak, Channel 8, 802.11n 20 MHz, Ant. 0



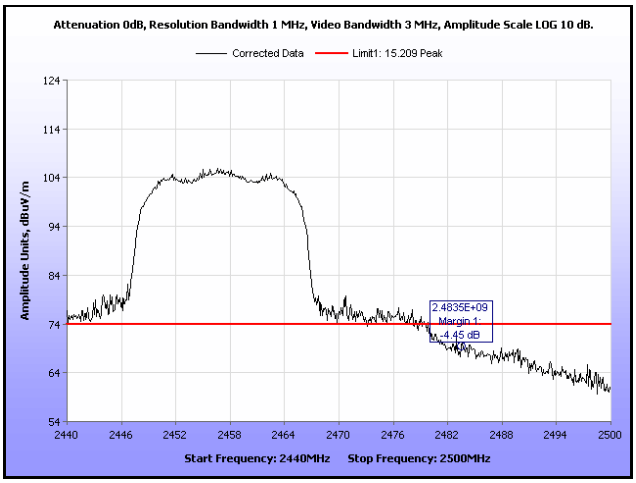
Plot 364. Radiated Restricted Band Edge, Average, Channel 9, 802.11n 20 MHz, Ant. 0



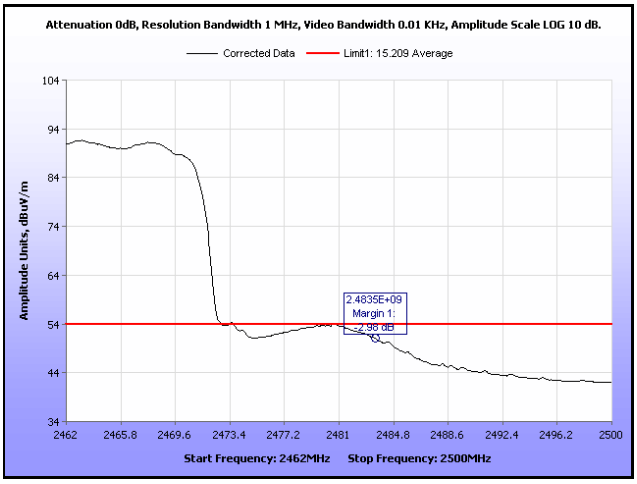
Plot 365. Radiated Restricted Band Edge, Peak, Channel 9, 802.11n 20 MHz, Ant. 0



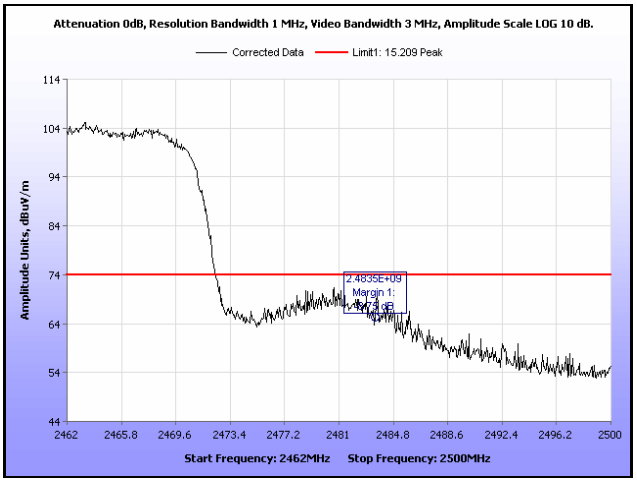
Plot 366. Radiated Restricted Band Edge, Average, Channel 10, 802.11n 20 MHz, Ant. 0



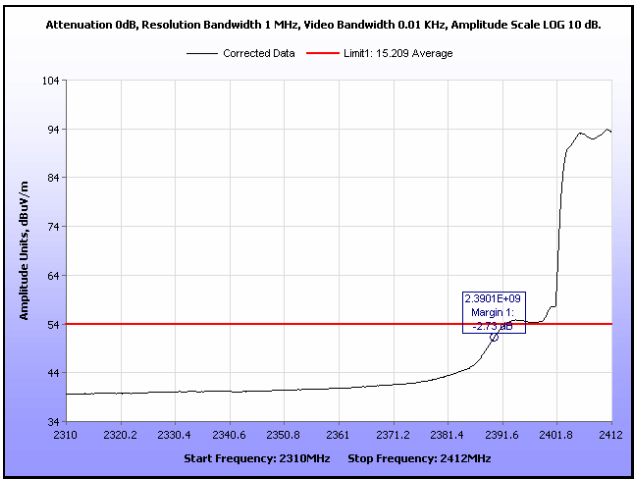
Plot 367. Radiated Restricted Band Edge, Peak, Channel 10, 802.11n 20 MHz, Ant. 0



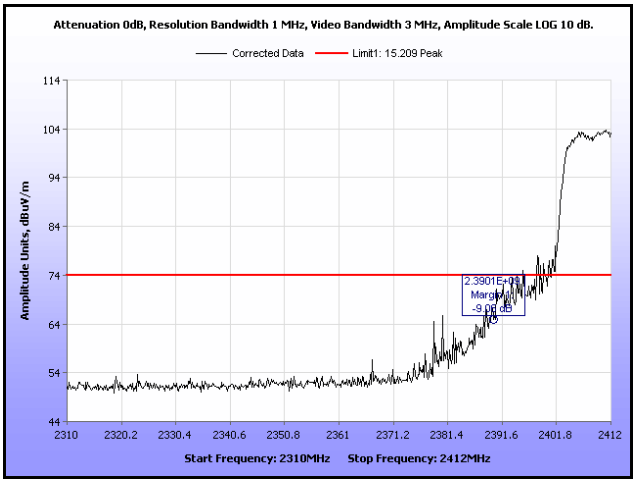
Plot 368. Radiated Restricted Band Edge, Average, Channel 11, 802.11n 20 MHz, Ant. 0



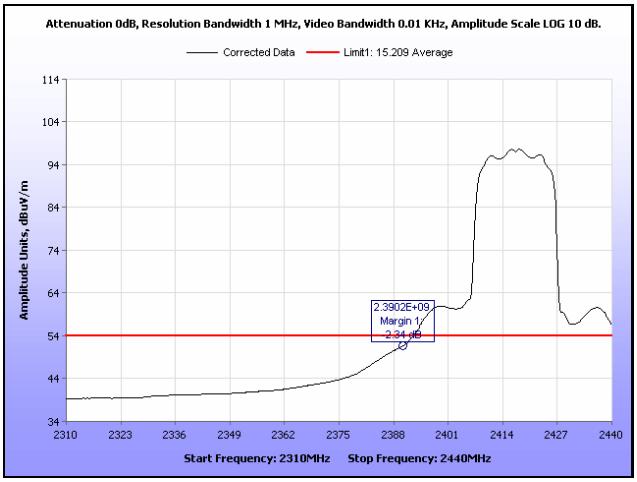
Plot 369. Radiated Restricted Band Edge, Peak, Channel 11, 802.11n 20 MHz, Ant. 0



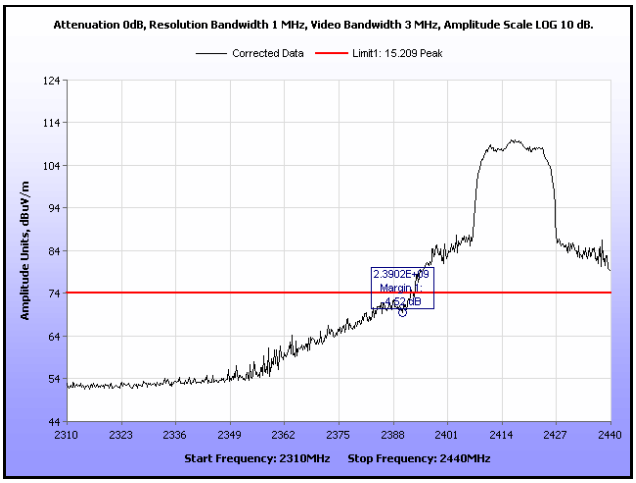
Plot 370. Radiated Restricted Band Edge, Average, Channel 1, 802.11n 20 MHz, Ant. 1



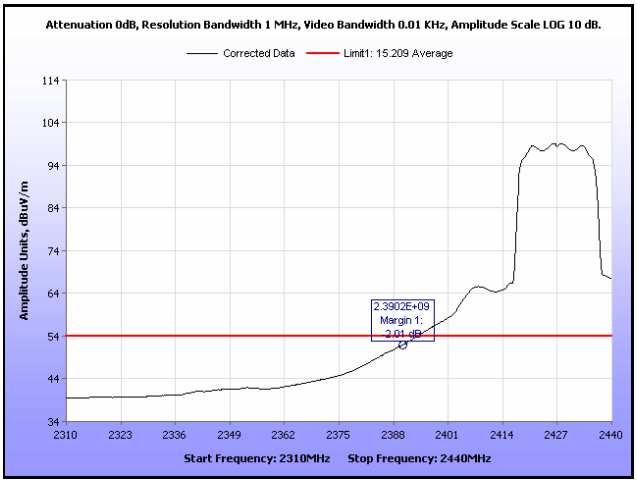
Plot 371. Radiated Restricted Band Edge, Peak, Channel 1, 802.11n 20 MHz, Ant. 1



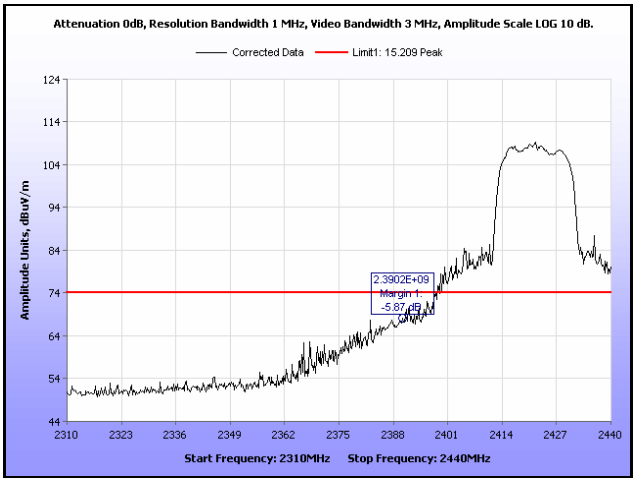
Plot 372. Radiated Restricted Band Edge, Average, Channel 2, 802.11n 20 MHz, Ant. 1



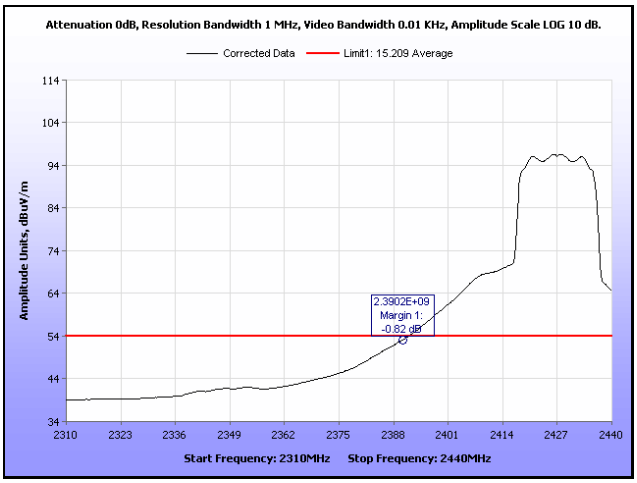
Plot 373. Radiated Restricted Band Edge, Peak, Channel 2, 802.11n 20 MHz, Ant. 1



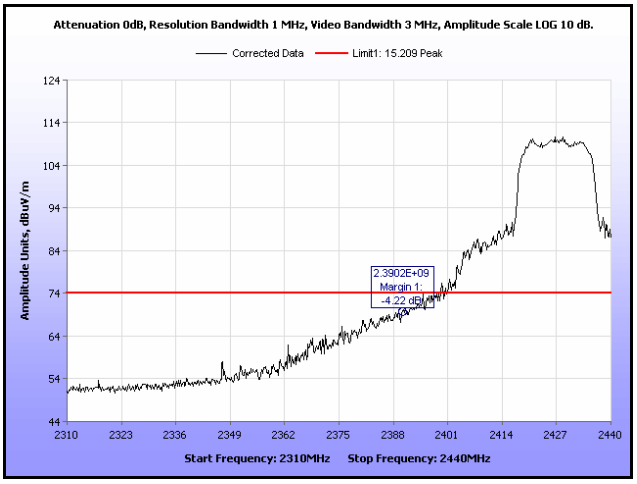
Plot 374. Radiated Restricted Band Edge, Average, Channel 3, 802.11n 20 MHz, Ant. 1



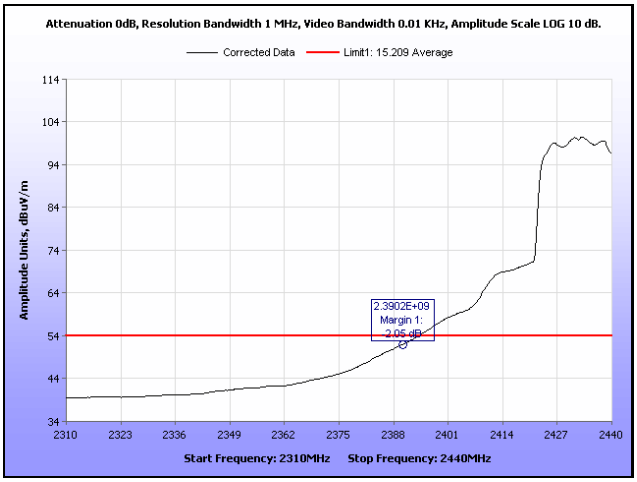
Plot 375. Radiated Restricted Band Edge, Peak, Channel 3, 802.11n 20 MHz, Ant. 1



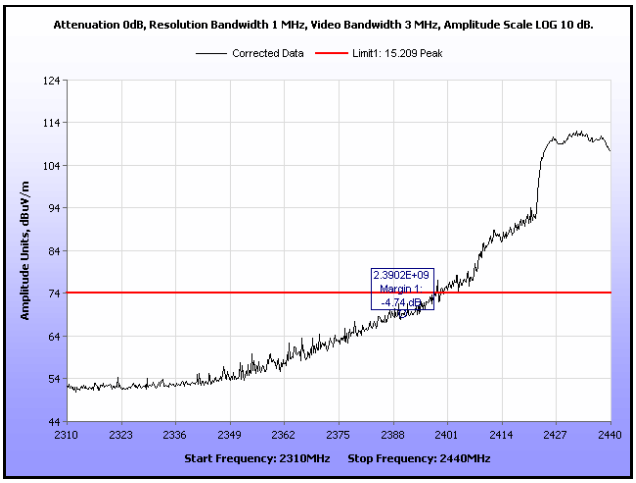
Plot 376. Radiated Restricted Band Edge, Average, Channel 4, 802.11n 20 MHz, Ant. 1



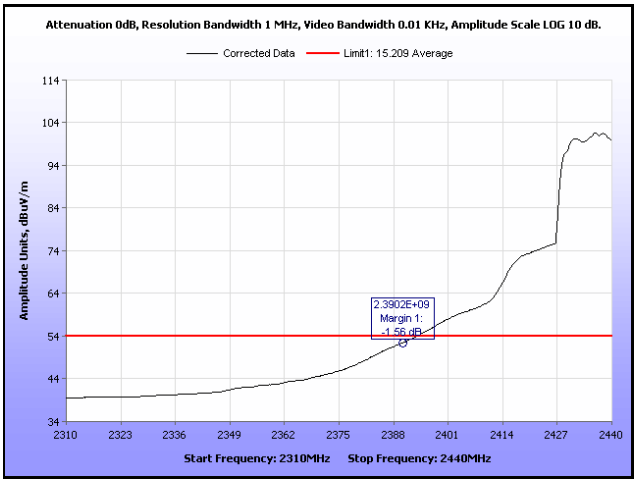
Plot 377. Radiated Restricted Band Edge, Peak, Channel 4, 802.11n 20 MHz, Ant. 1



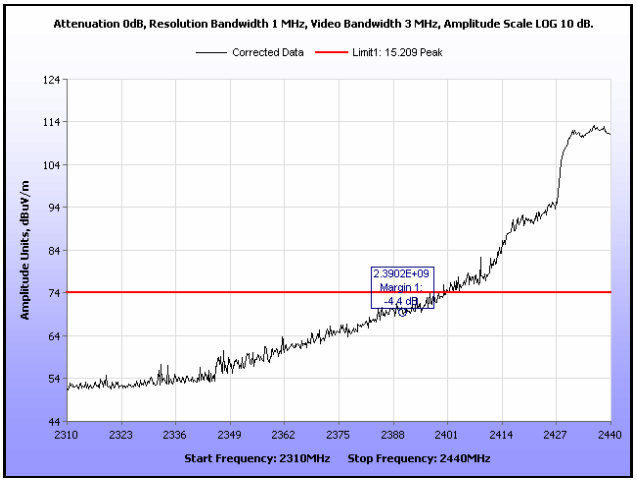
Plot 378. Radiated Restricted Band Edge, Average, Channel 5, 802.11n 20 MHz, Ant. 1



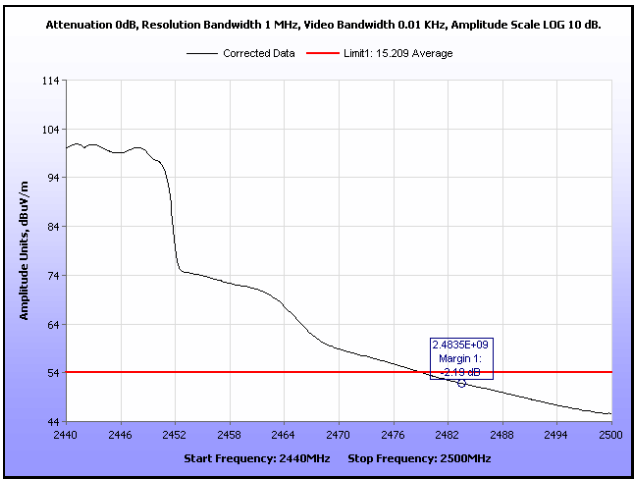
Plot 379. Radiated Restricted Band Edge, Peak, Channel 5, 802.11n 20 MHz, Ant. 1



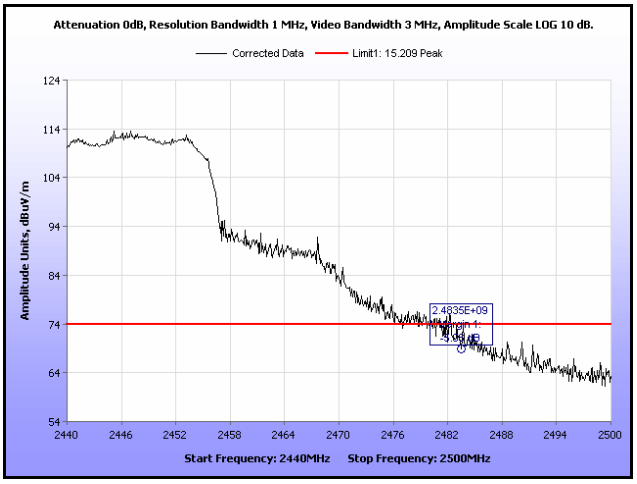
Plot 380. Radiated Restricted Band Edge, Average, Channel 6, 802.11n 20 MHz, Ant. 1



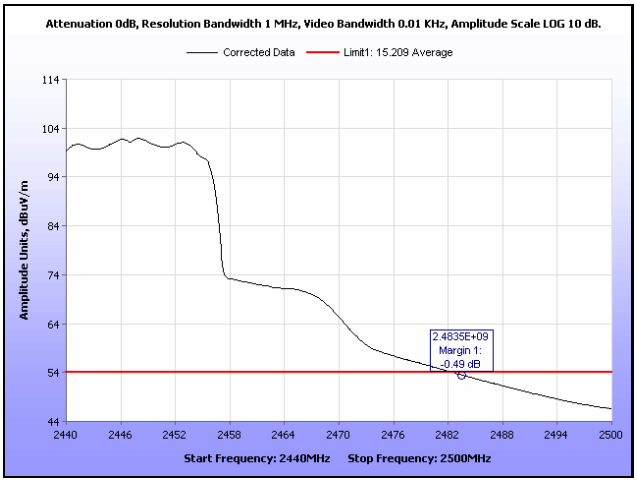
Plot 381. Radiated Restricted Band Edge, Peak, Channel 6, 802.11n 20 MHz, Ant. 1



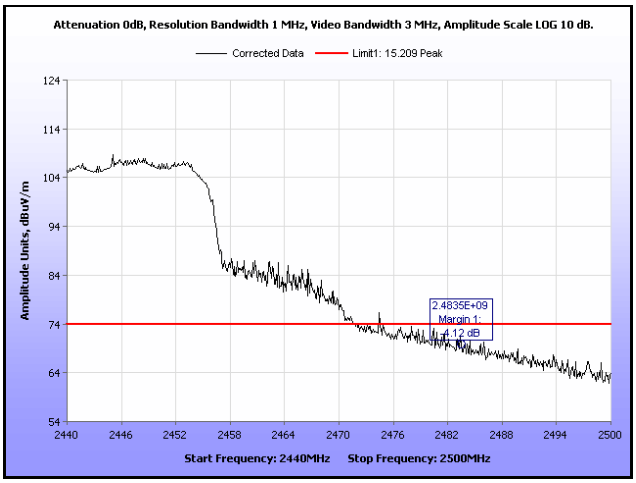
Plot 382. Radiated Restricted Band Edge, Average, Channel 7, 802.11n 20 MHz, Ant. 1



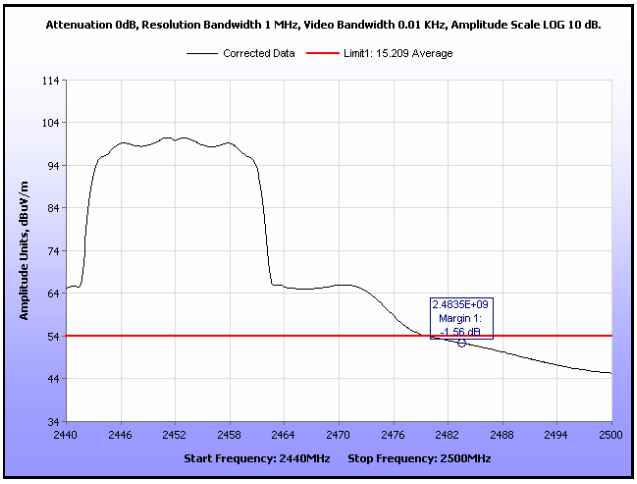
Plot 383. Radiated Restricted Band Edge, Peak, Channel 7, 802.11n 20 MHz, Ant. 1



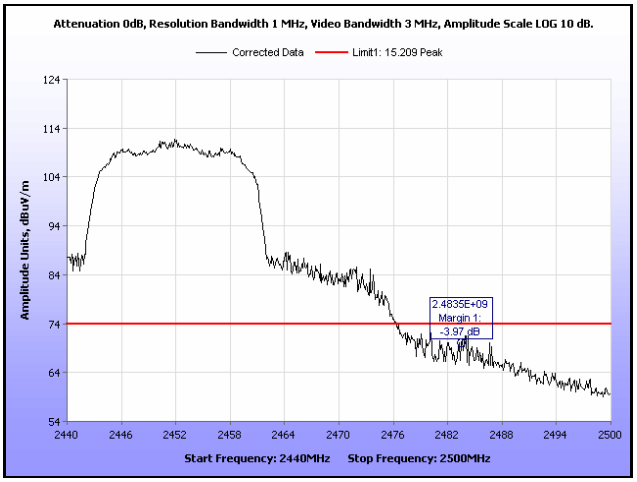
Plot 384. Radiated Restricted Band Edge, Average, Channel 8, 802.11n 20 MHz, Ant. 1



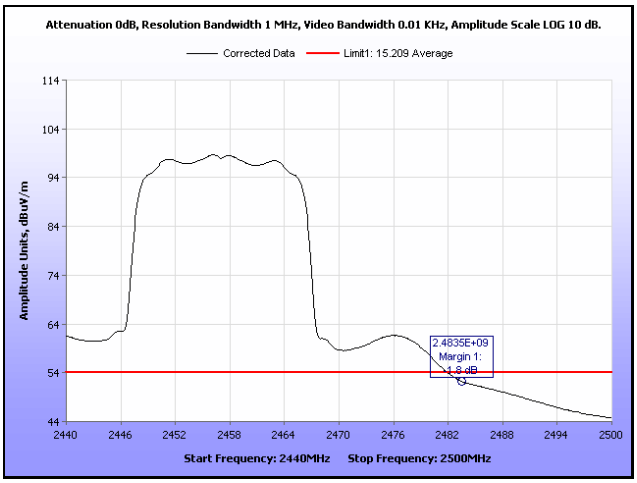
Plot 385. Radiated Restricted Band Edge, Peak, Channel 8, 802.11n 20 MHz, Ant. 1



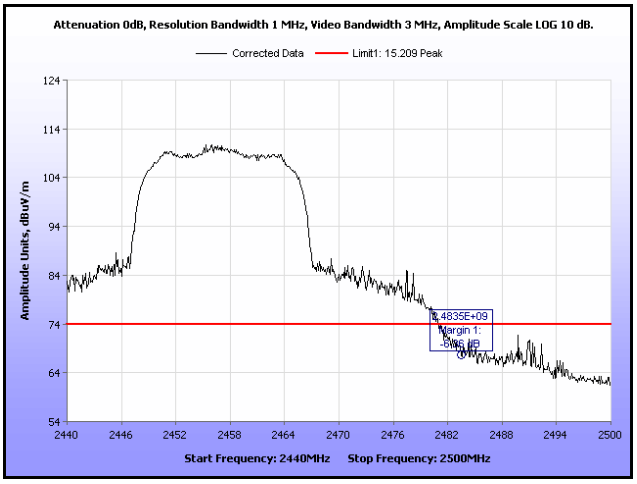
Plot 386. Radiated Restricted Band Edge, Average, Channel 9, 802.11n 20 MHz, Ant. 1



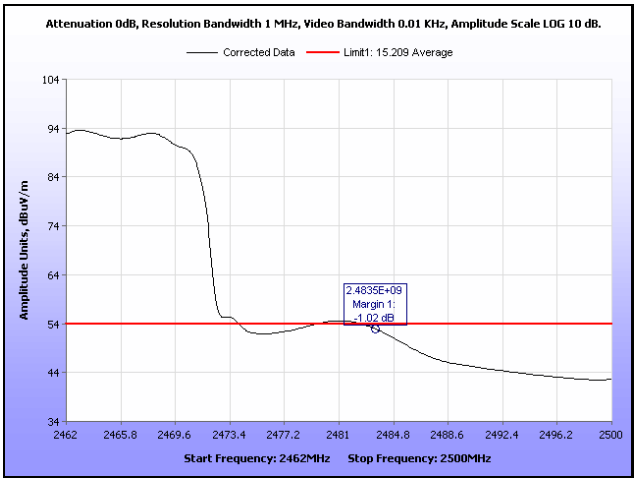
Plot 387. Radiated Restricted Band Edge, Peak, Channel 9, 802.11n 20 MHz, Ant. 1



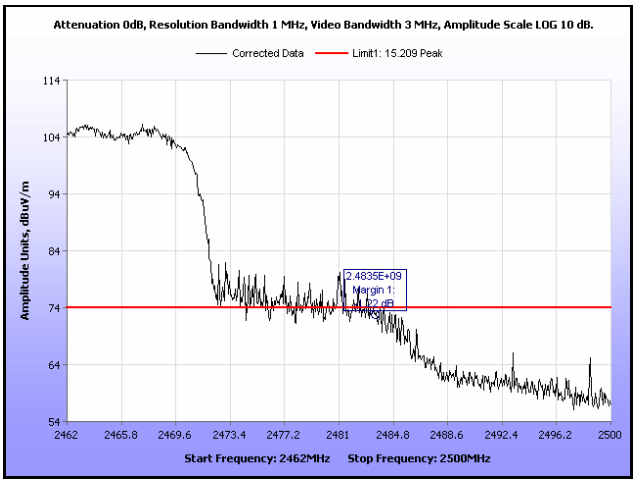
Plot 388. Radiated Restricted Band Edge, Average, Channel 10, 802.11n 20 MHz, Ant. 1



Plot 389. Radiated Restricted Band Edge, Peak, Channel 10, 802.11n 20 MHz, Ant. 1

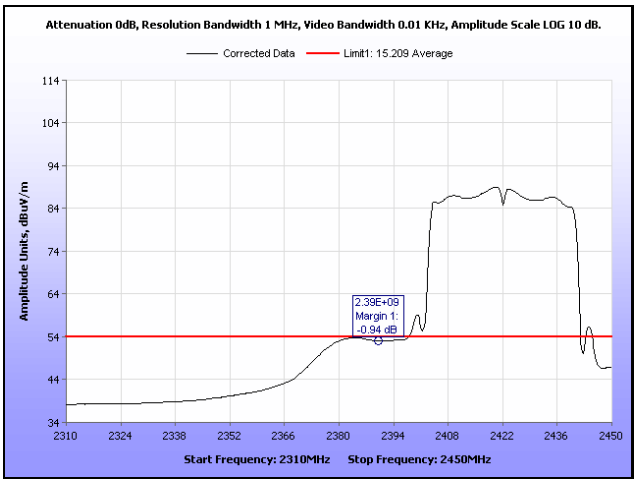


Plot 390. Radiated Restricted Band Edge, Average, Channel 11, 802.11n 20 MHz, Ant. 1

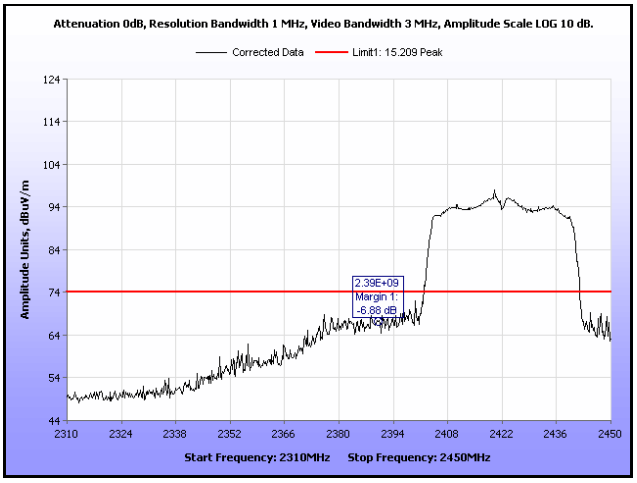


Plot 391. Radiated Restricted Band Edge, Peak, Channel 11, 802.11n 20 MHz, Ant. 1

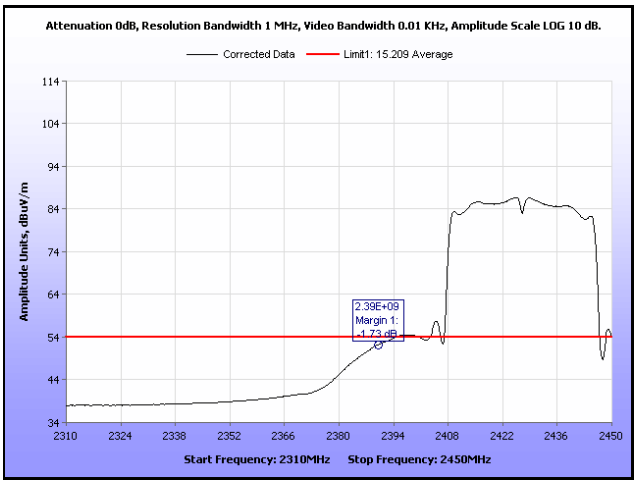
Radiated Band Edge, 802.11n 40 MHz



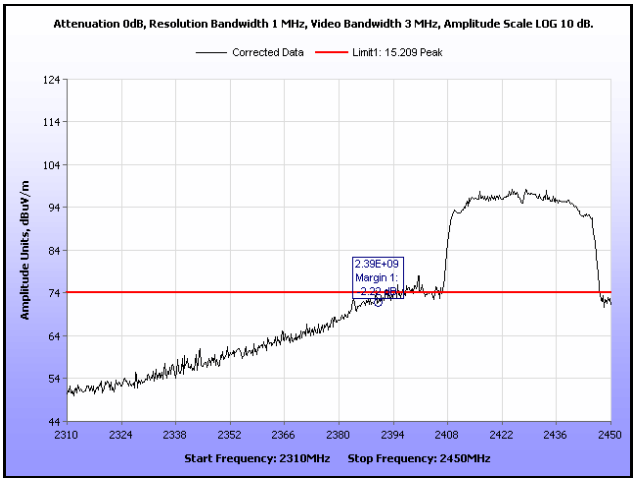
Plot 392. Radiated Restricted Band Edge, Average, Channel 1, 802.11n 40 MHz, Ant. 0



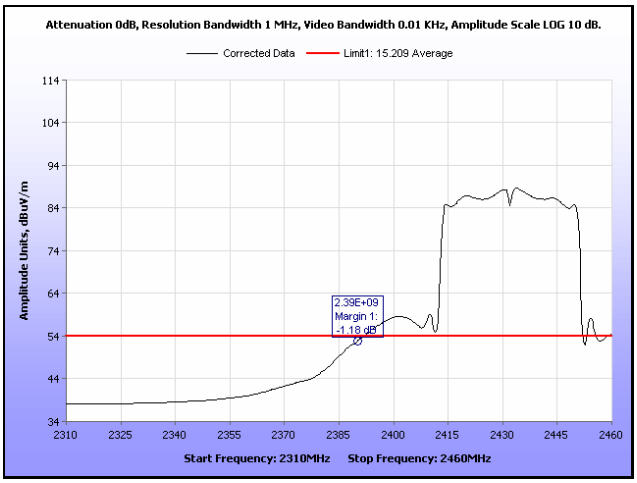
Plot 393. Radiated Restricted Band Edge, Peak, Channel 1, 802.11n 40 MHz, Ant. 0



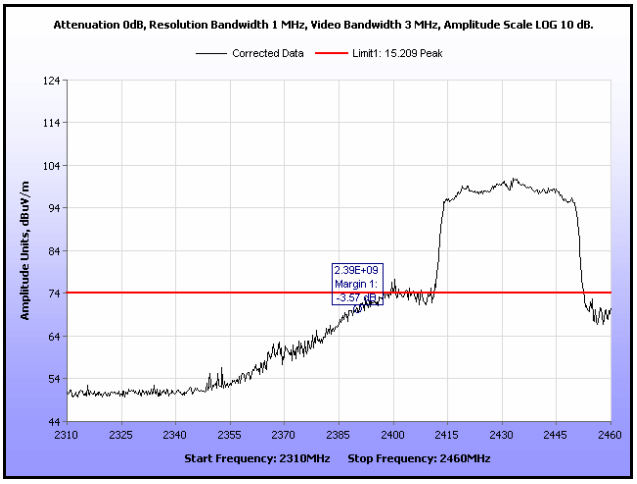
Plot 394. Radiated Restricted Band Edge, Average, Channel 2, 802.11n 40 MHz, Ant. 0



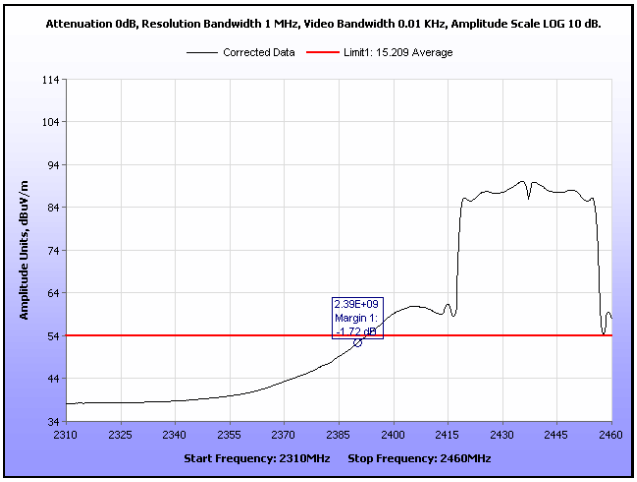
Plot 395. Radiated Restricted Band Edge, Peak, Channel 2, 802.11n 40 MHz, Ant. 0



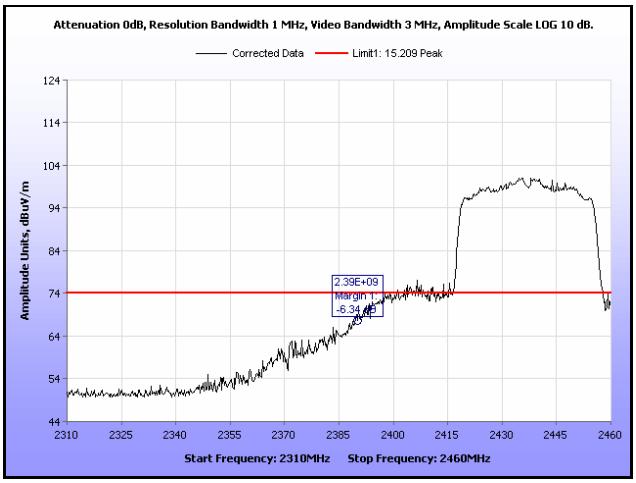
Plot 396. Radiated Restricted Band Edge, Average, Channel 3, 802.11n 40 MHz, Ant. 0



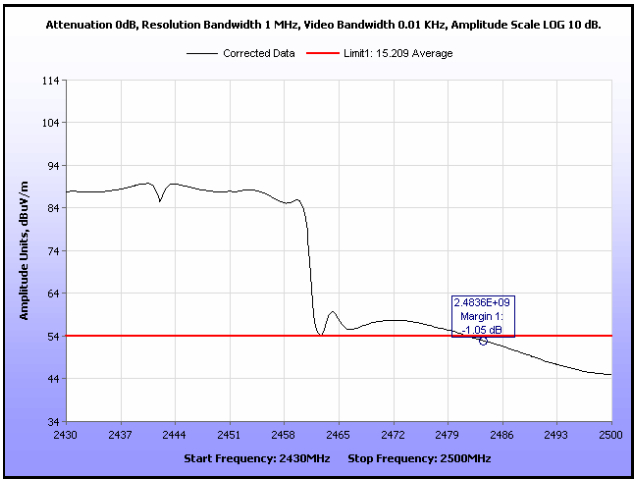
Plot 397. Radiated Restricted Band Edge, Peak, Channel 3, 802.11n 40 MHz, Ant. 0



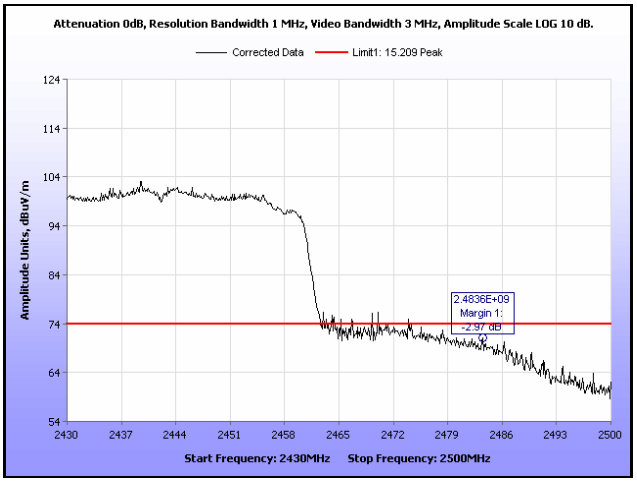
Plot 398. Radiated Restricted Band Edge, Average, Channel 4, 802.11n 40 MHz, Ant. 0



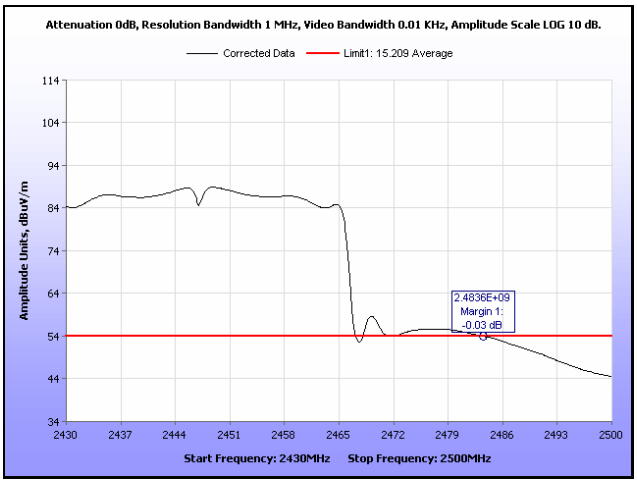
Plot 399. Radiated Restricted Band Edge, Peak, Channel 4, 802.11n 40 MHz, Ant. 0



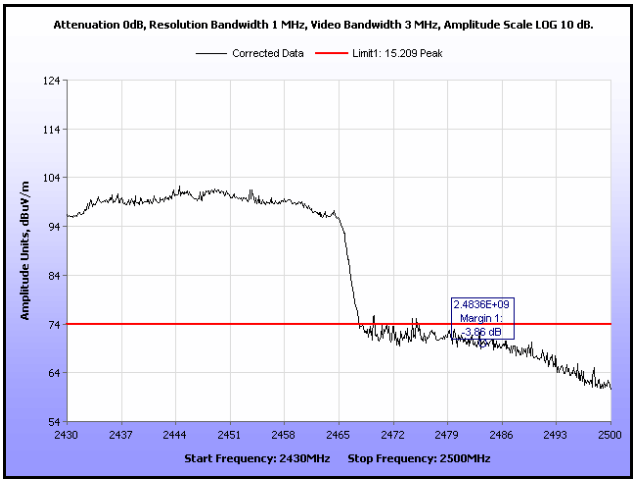
Plot 400. Radiated Restricted Band Edge, Average, Channel 5, 802.11n 40 MHz, Ant. 0



Plot 401. Radiated Restricted Band Edge, Peak, Channel 5, 802.11n 40 MHz, Ant. 0



Plot 402. Radiated Restricted Band Edge, Average, Channel 6, 802.11n 40 MHz, Ant. 0



Plot 403. Radiated Restricted Band Edge, Peak, Channel 6, 802.11n 40 MHz, Ant. 0

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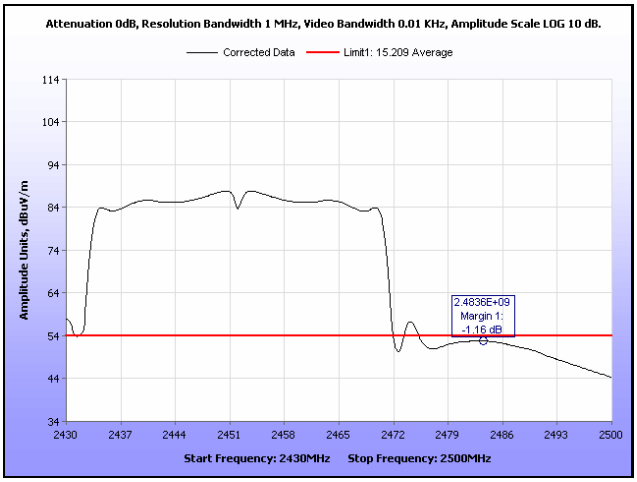
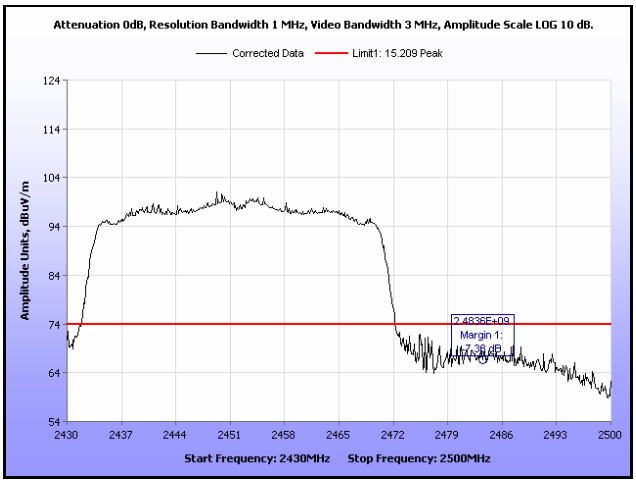
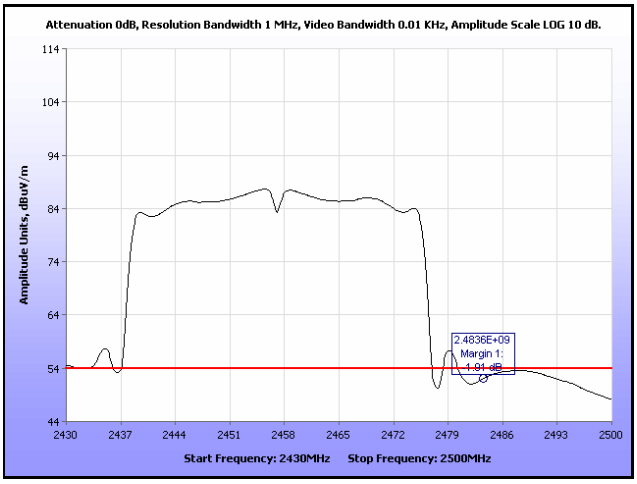


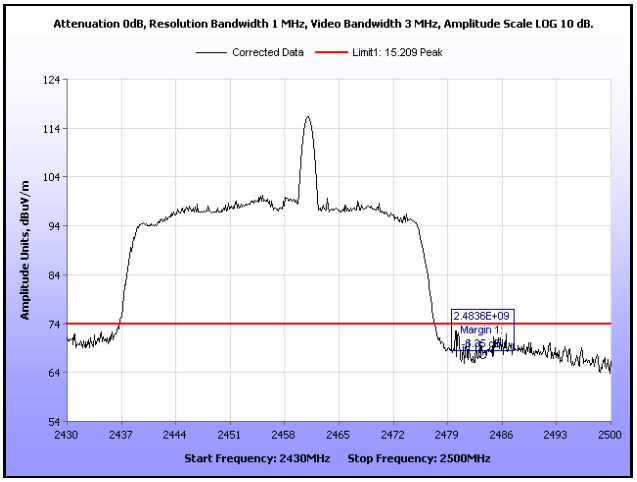
Plot 404. Radiated Restricted Band Edge, Average, Channel 7, 802.11n 40 MHz, Ant. 0



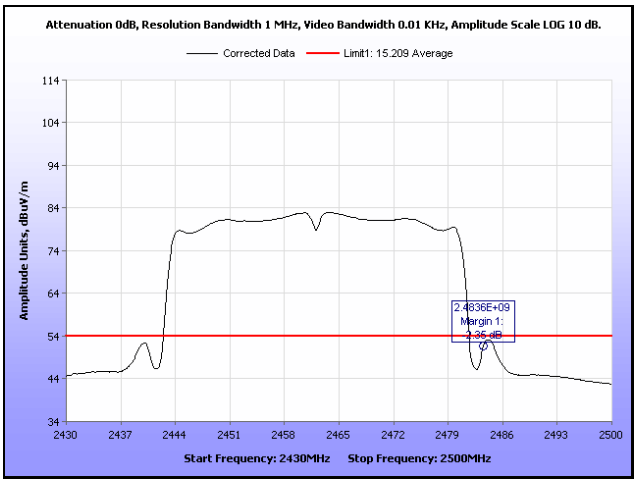
Plot 405. Radiated Restricted Band Edge, Peak, Channel 7, 802.11n 40 MHz, Ant. 0



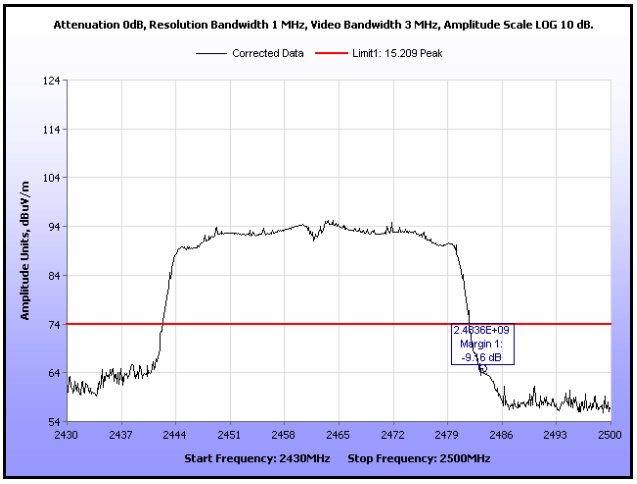
Plot 406. Radiated Restricted Band Edge, Average, Channel 8, 802.11n 40 MHz, Ant. 0



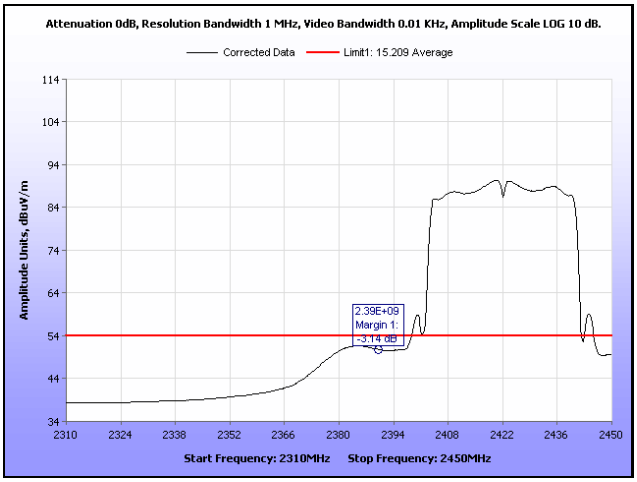
Plot 407. Radiated Restricted Band Edge, Peak, Channel 8, 802.11n 40 MHz, Ant. 0



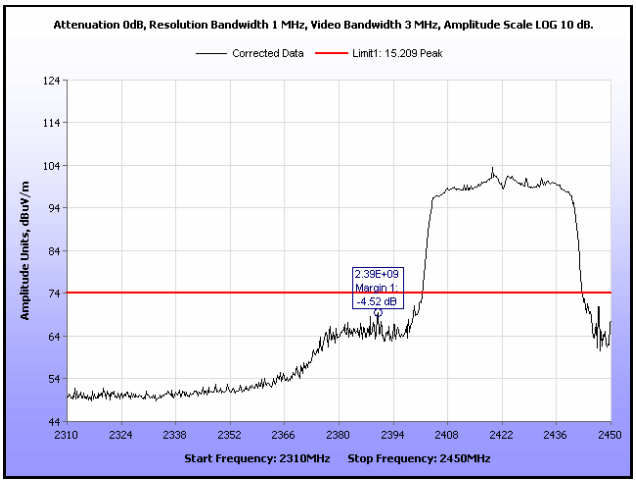
Plot 408. Radiated Restricted Band Edge, Average, Channel 9, 802.11n 40 MHz, Ant. 0



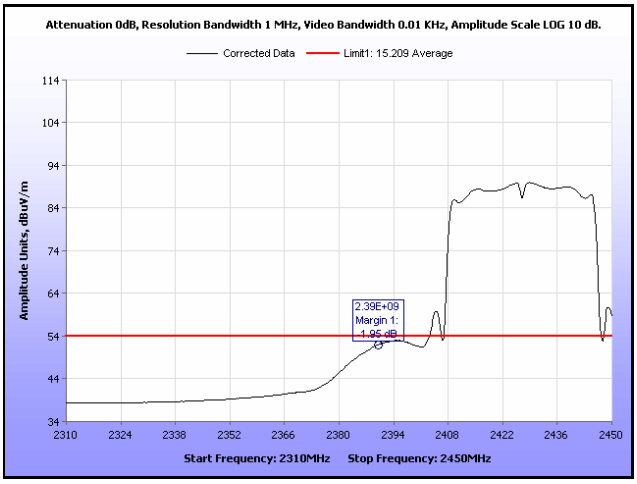
Plot 409. Radiated Restricted Band Edge, Peak, Channel 9, 802.11n 40 MHz, Ant. 0



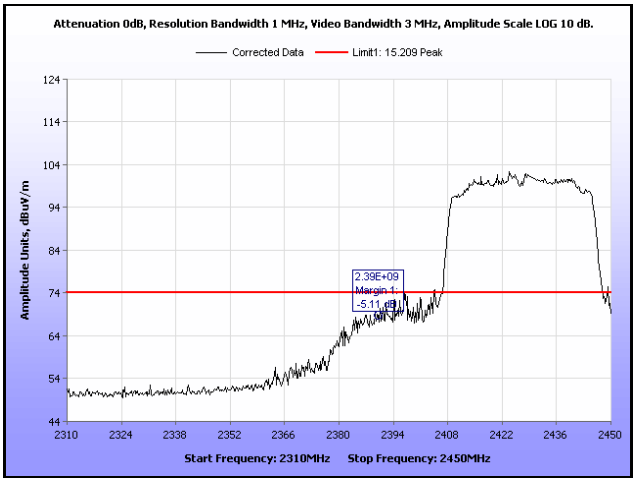
Plot 410. Radiated Restricted Band Edge, Average, Channel 1, 802.11n 40 MHz, Ant. 1



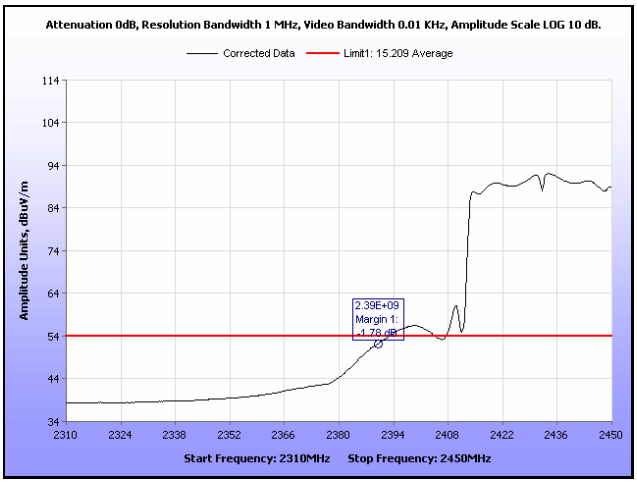
Plot 411. Radiated Restricted Band Edge, Peak, Channel 1, 802.11n 40 MHz, Ant. 1



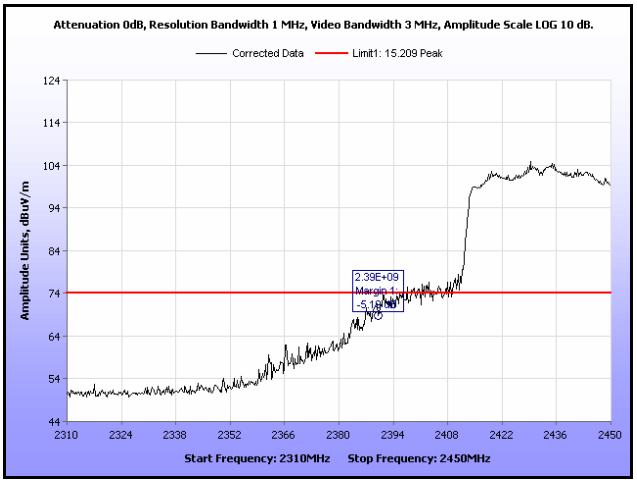
Plot 412. Radiated Restricted Band Edge, Average, Channel 2, 802.11n 40 MHz, Ant. 1



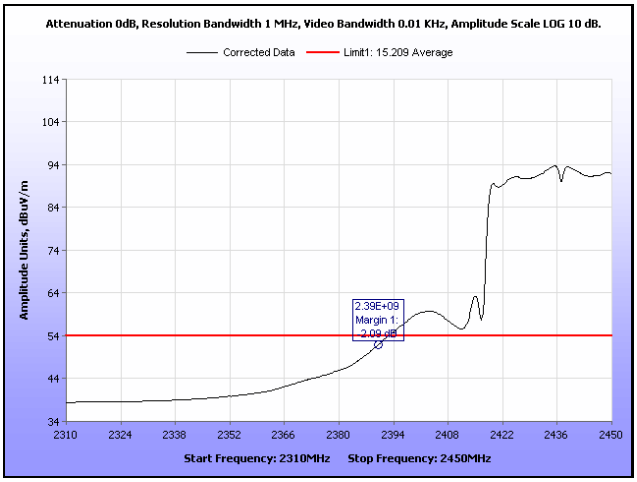
Plot 413. Radiated Restricted Band Edge, Peak, Channel 2, 802.11n 40 MHz, Ant. 1



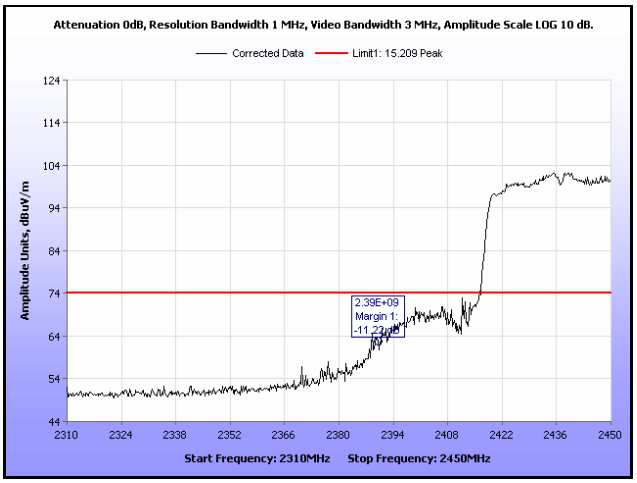
Plot 414. Radiated Restricted Band Edge, Average, Channel 3, 802.11n 40 MHz, Ant. 1



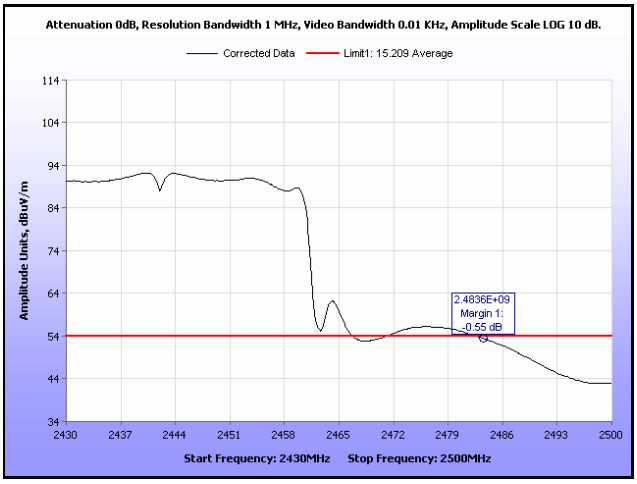
Plot 415. Radiated Restricted Band Edge, Peak, Channel 3, 802.11n 40 MHz, Ant. 1



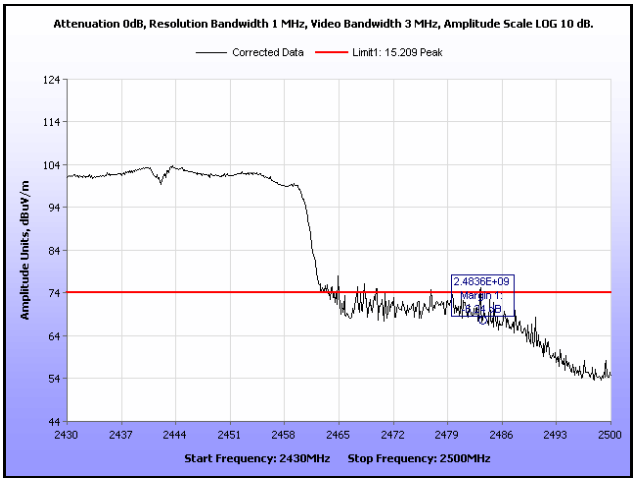
Plot 416. Radiated Restricted Band Edge, Average, Channel 4, 802.11n 40 MHz, Ant. 1



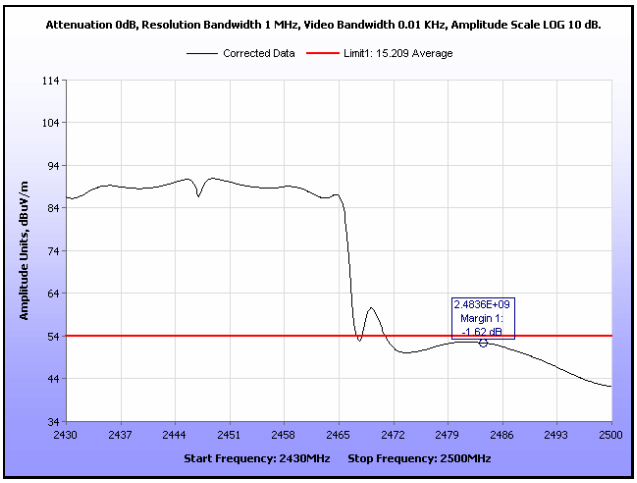
Plot 417. Radiated Restricted Band Edge, Peak, Channel 4, 802.11n 40 MHz, Ant. 1



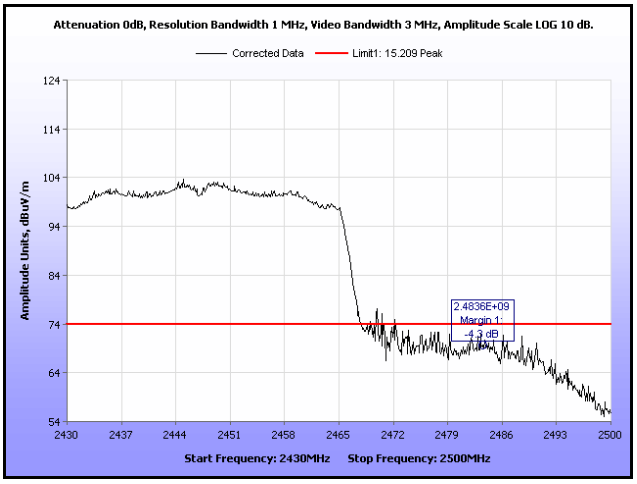
Plot 418. Radiated Restricted Band Edge, Average, Channel 5, 802.11n 40 MHz, Ant. 1



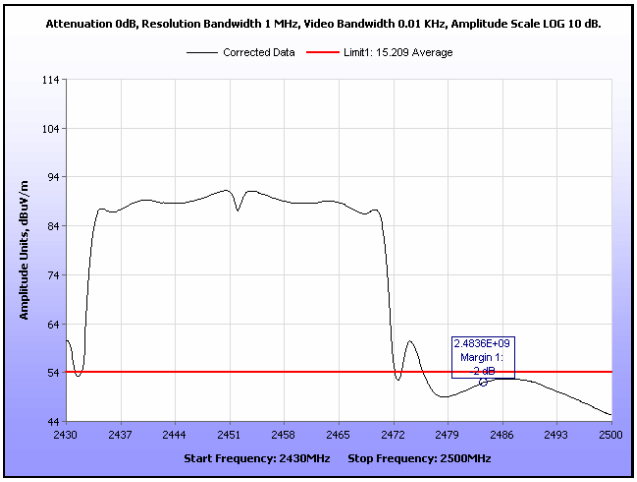
Plot 419. Radiated Restricted Band Edge, Peak, Channel 5, 802.11n 40 MHz, Ant. 1



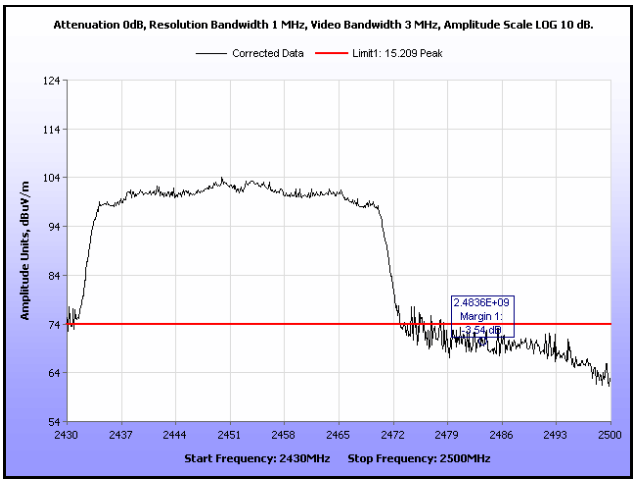
Plot 420. Radiated Restricted Band Edge, Average, Channel 6, 802.11n 40 MHz, Ant. 1



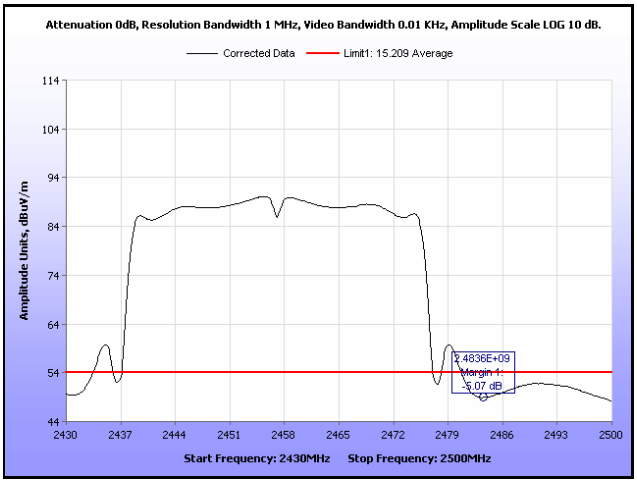
Plot 421. Radiated Restricted Band Edge, Peak, Channel 6, 802.11n 40 MHz, Ant. 1



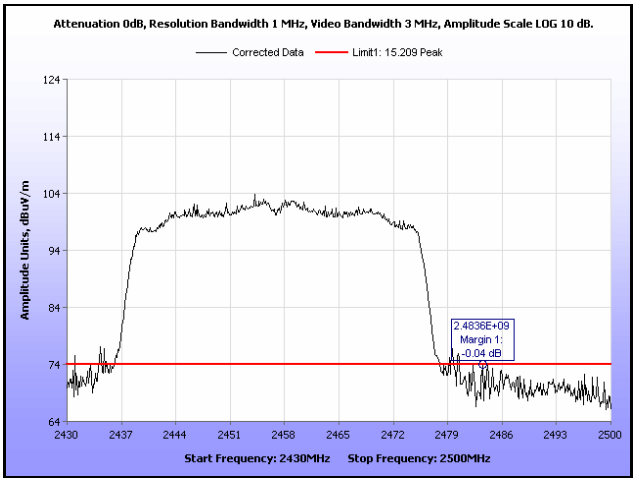
Plot 422. Radiated Restricted Band Edge, Average, Channel 7, 802.11n 40 MHz, Ant. 1



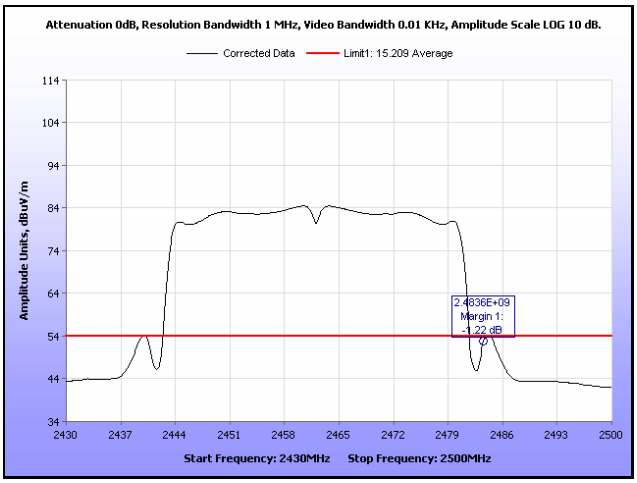
Plot 423. Radiated Restricted Band Edge, Peak, Channel 7, 802.11n 40 MHz, Ant. 1



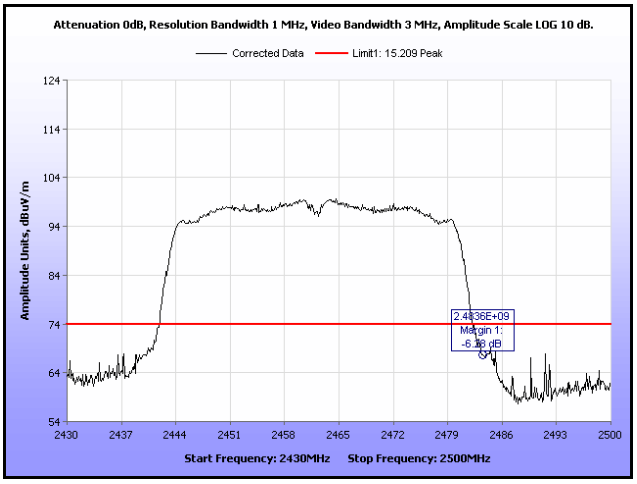
Plot 424. Radiated Restricted Band Edge, Average, Channel 8, 802.11n 40 MHz, Ant. 1



Plot 425. Radiated Restricted Band Edge, Peak, Channel 8, 802.11n 40 MHz, Ant. 1

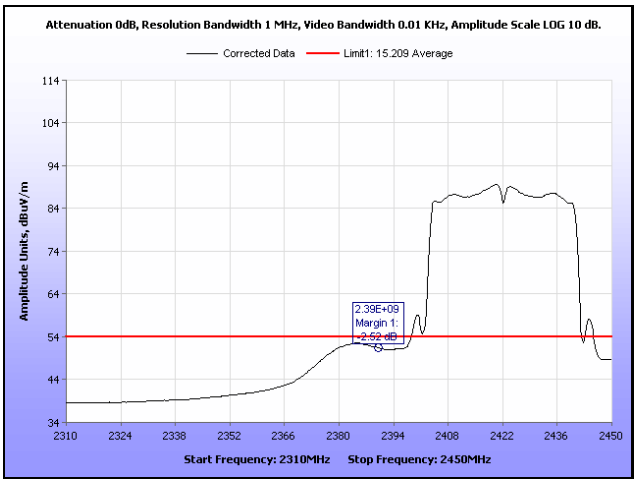


Plot 426. Radiated Restricted Band Edge, Average, Channel 9, 802.11n 40 MHz, Ant. 1

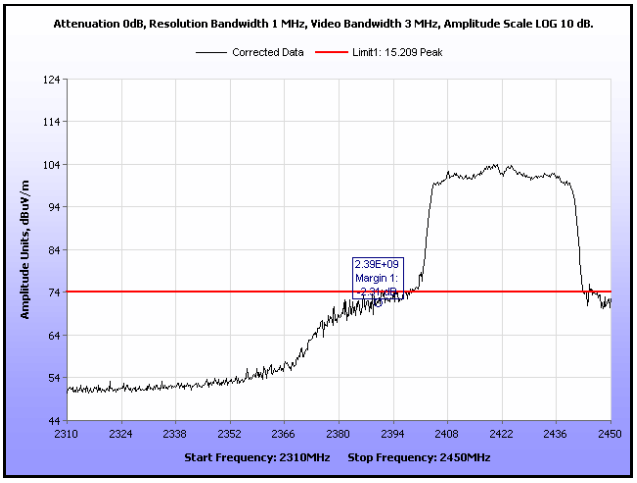


Plot 427. Radiated Restricted Band Edge, Peak, Channel 9, 802.11n 40 MHz, Ant. 1

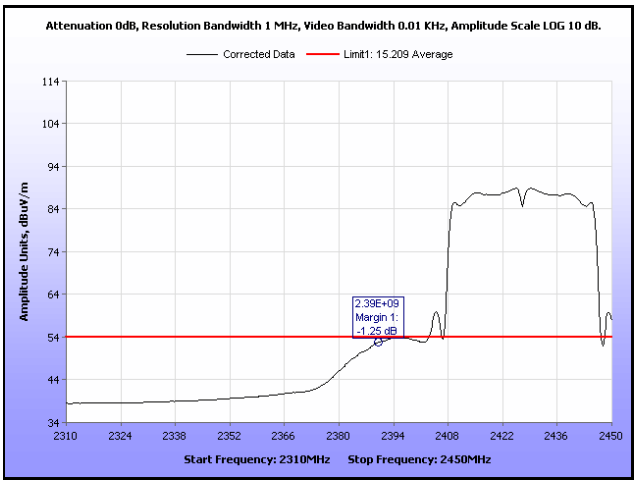
Radiated Band Edge, 802.11n 40 MHz, MIMO



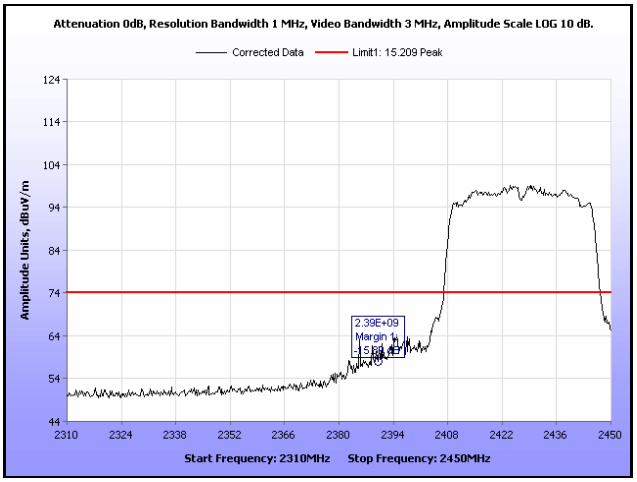
Plot 428. Radiated Restricted Band Edge, Average, Channel 1, 802.11n 40 MHz, MIMO



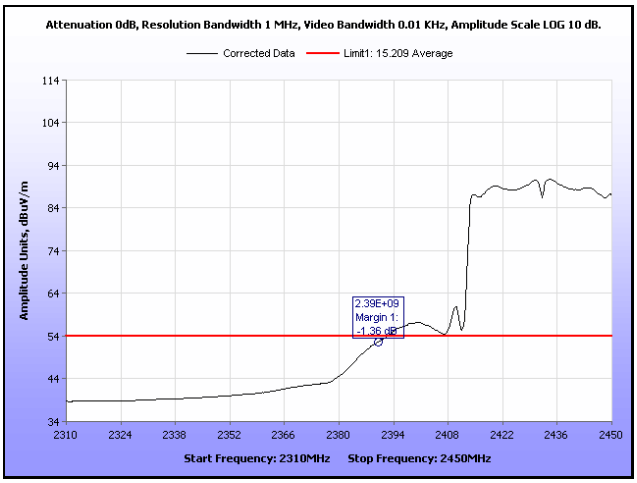
Plot 429. Radiated Restricted Band Edge, Peak, Channel 1, 802.11n 40 MHz, MIMO



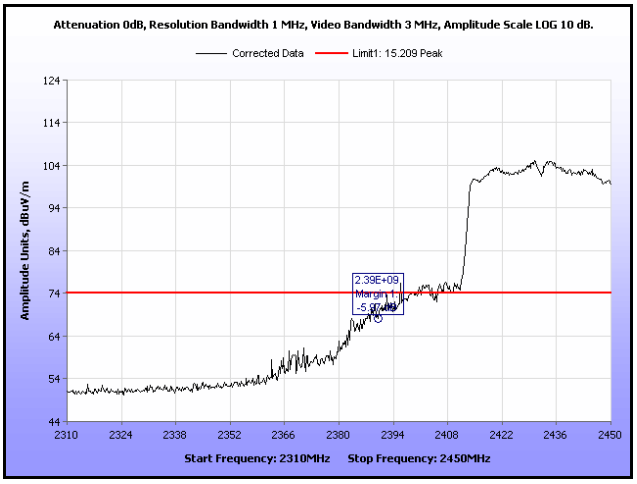
Plot 430. Radiated Restricted Band Edge, Average, Channel 2, 802.11n 40 MHz, MIMO



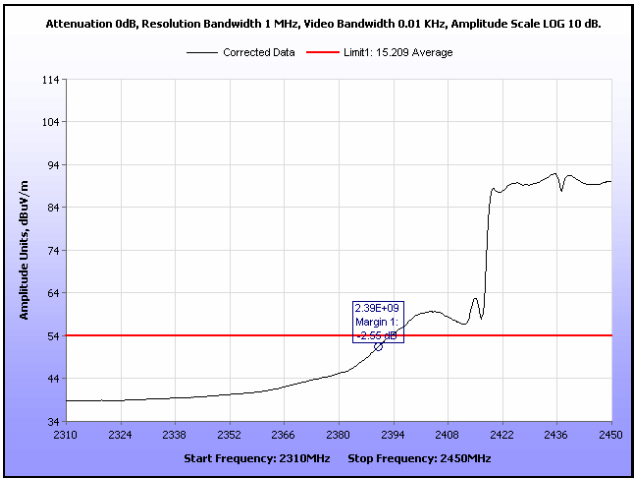
Plot 431. Radiated Restricted Band Edge, Peak, Channel 2, 802.11n 40 MHz, MIMO



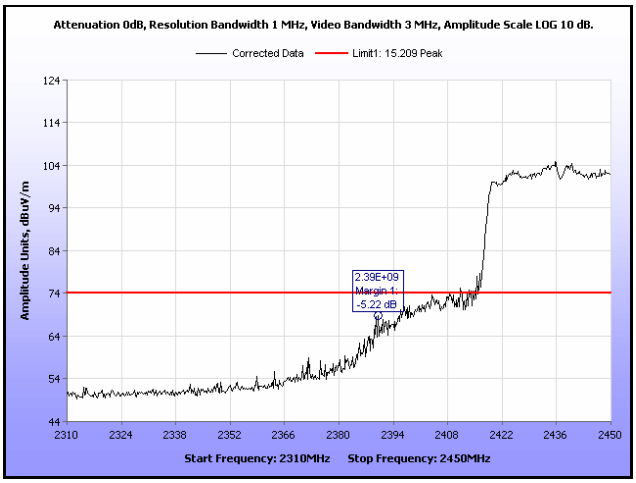
Plot 432. Radiated Restricted Band Edge, Average, Channel 3, 802.11n 40 MHz, MIMO



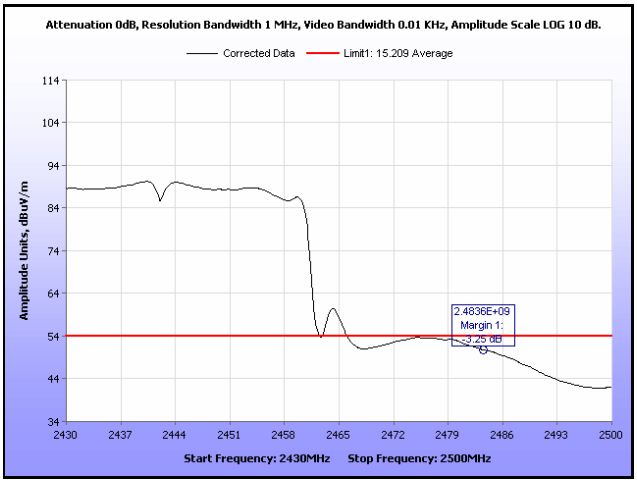
Plot 433. Radiated Restricted Band Edge, Peak, Channel 3, 802.11n 40 MHz, MIMO



Plot 434. Radiated Restricted Band Edge, Average, Channel 4, 802.11n 40 MHz, MIMO



Plot 435. Radiated Restricted Band Edge, Peak, Channel 4, 802.11n 40 MHz, MIMO



Plot 436. Radiated Restricted Band Edge, Average, Channel 5, 802.11n 40 MHz, MIMO

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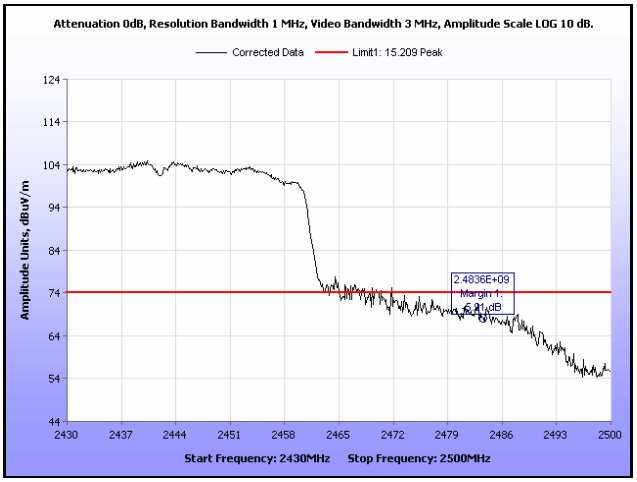
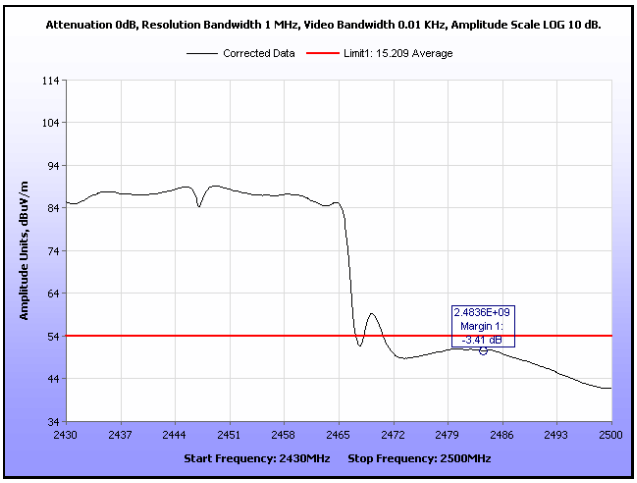
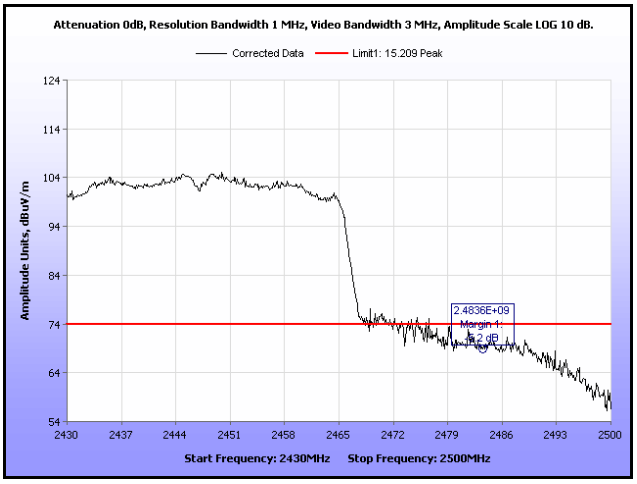


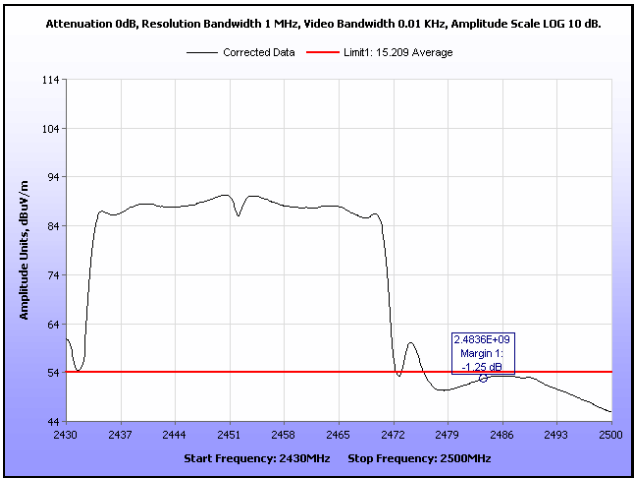
Plot 437. Radiated Restricted Band Edge, Peak, Channel 5, 802.11n 40 MHz, MIMO



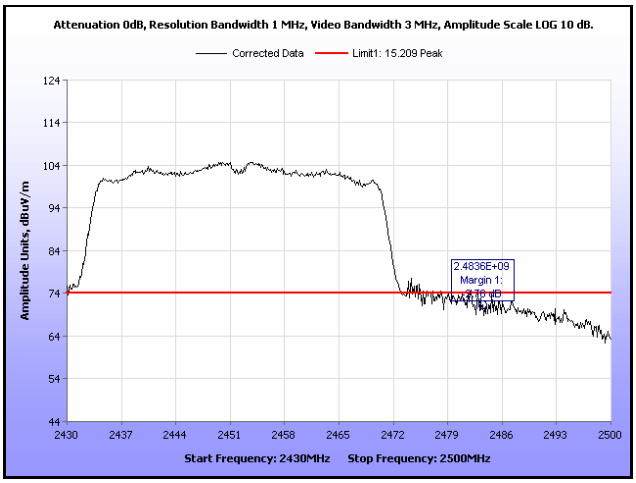
Plot 438. Radiated Restricted Band Edge, Average, Channel 6, 802.11n 40 MHz, MIMO



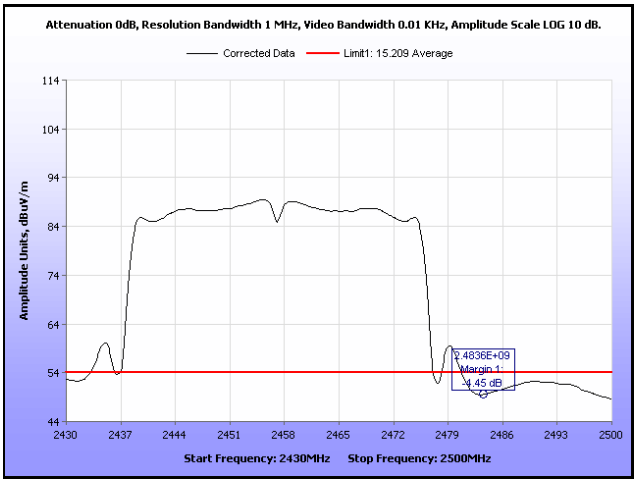
Plot 439. Radiated Restricted Band Edge, Peak, Channel 6, 802.11n 40 MHz, MIMO



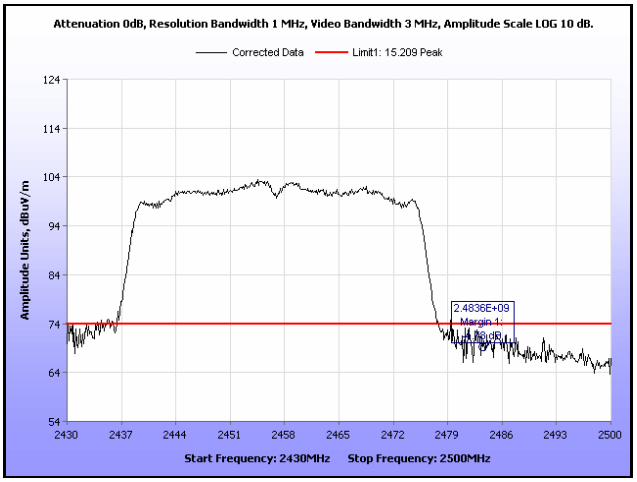
Plot 440. Radiated Restricted Band Edge, Average, Channel 7, 802.11n 40 MHz, MIMO



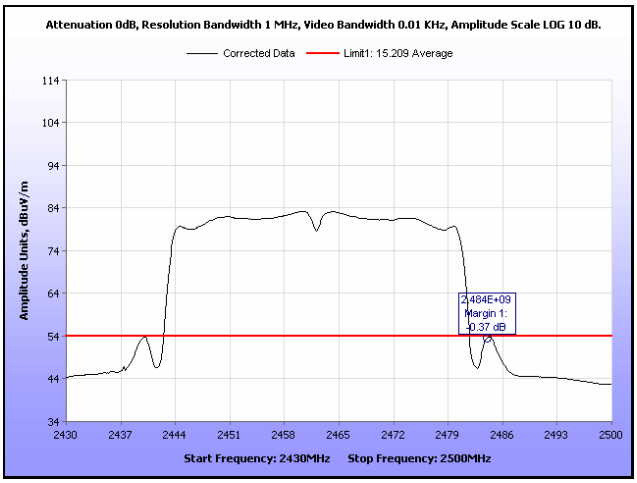
Plot 441. Radiated Restricted Band Edge, Peak, Channel 7, 802.11n 40 MHz, MIMO



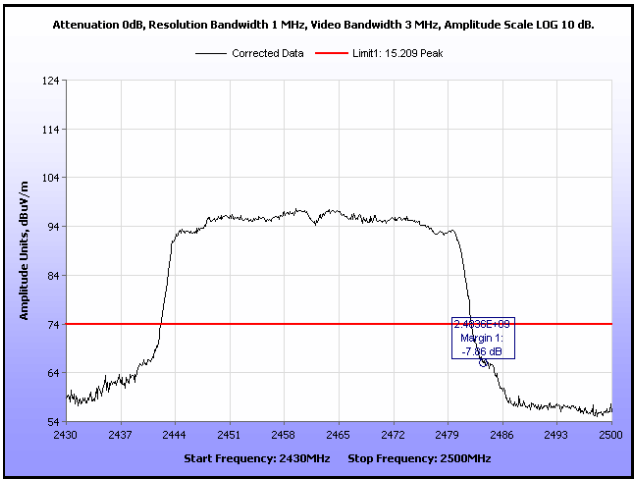
Plot 442. Radiated Restricted Band Edge, Average, Channel 8, 802.11n 40 MHz, MIMO



Plot 443. Radiated Restricted Band Edge, Peak, Channel 8, 802.11n 40 MHz, MIMO



Plot 444. Radiated Restricted Band Edge, Average, Channel 9, 802.11n 40 MHz, MIMO



Plot 445. Radiated Restricted Band Edge, Peak, Channel 9, 802.11n 40 MHz, MIMO

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(d) RF Conducted Spurious Emissions Requirements and Band Edge

Test Requirement: **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.

Test Procedure: For intentional radiators with a digital device portion which operates below 10 GHz, the spectrum was investigated as per §15.33(a)(1) and §15.33(a)(4); i.e., the lowest RF signal generated or used in the device up to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

Since the EUT had an integral antenna, conducted measurements could not be performed. Measurements needed to be taken radiated. An antenna was located 3 m away from the EUT and plots were taken. The EUT was rotated through all three orthogonal axes. The plots were corrected for both antenna correction factor and cable lost.

See following pages for detailed test results with RF Conducted Spurious Emissions.

Test Results: The EUT was compliant with the Conducted Spurious Emission limits of **§15.247(d)**.

Test Engineer(s): Surinder Singh

Test Date(s): 02/08/14

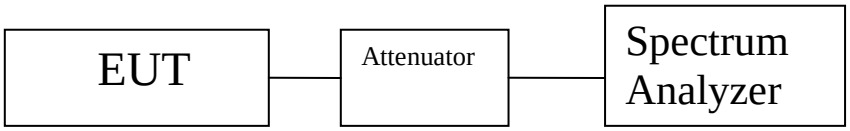


Figure 3. Block Diagram, Conducted Spurious Emissions Test Setup

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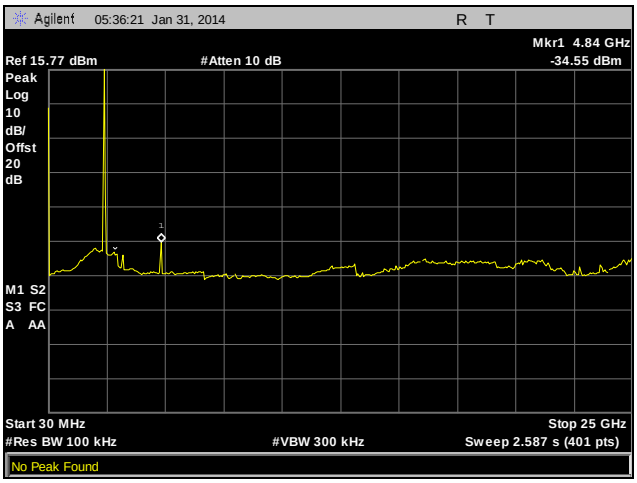
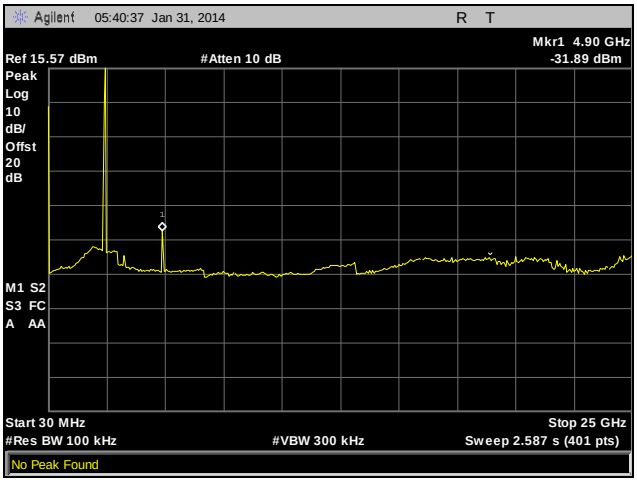
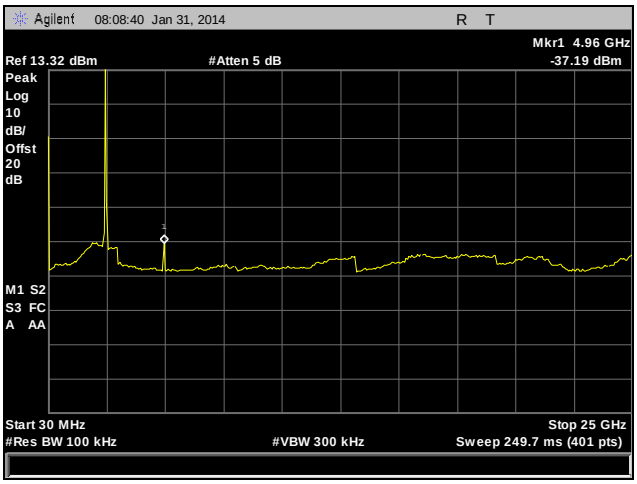
Conducted Spurious Emissions Test Results, 802.11b



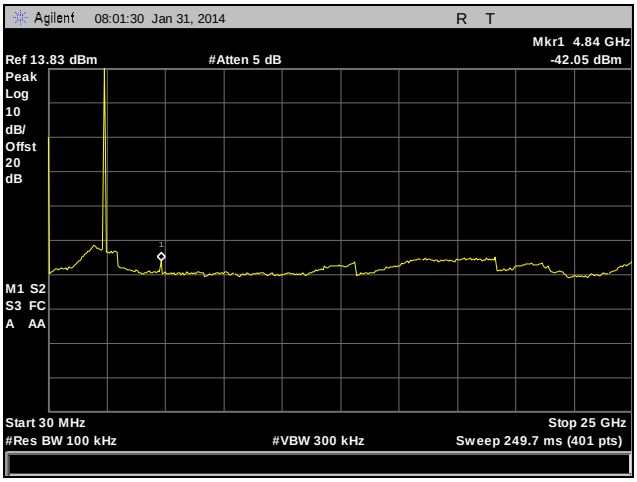
Plot 446. Conducted Spurious Emissions, Low Channel, 802.11b, Ant. 0



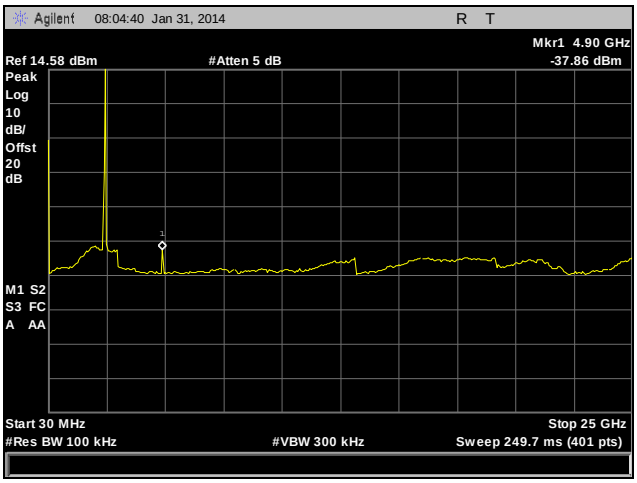
Plot 447. Conducted Spurious Emissions, Mid Channel, 802.11b, Ant. 0



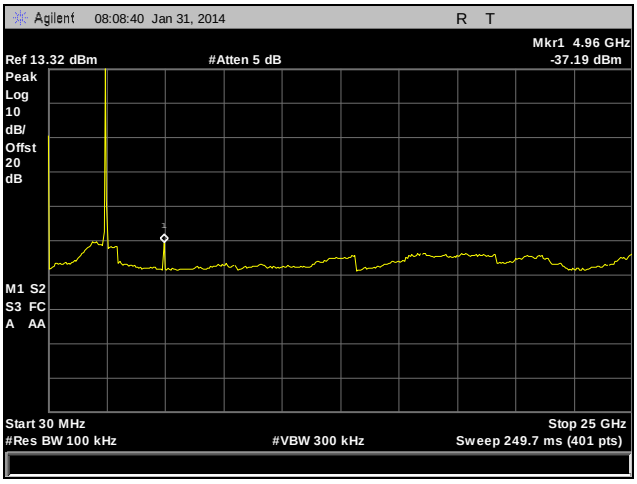
Plot 448. Conducted Spurious Emissions, High Channel, 802.11b, Ant. 0



Plot 449. Conducted Spurious Emissions, Low Channel, 802.11b, Ant. 1

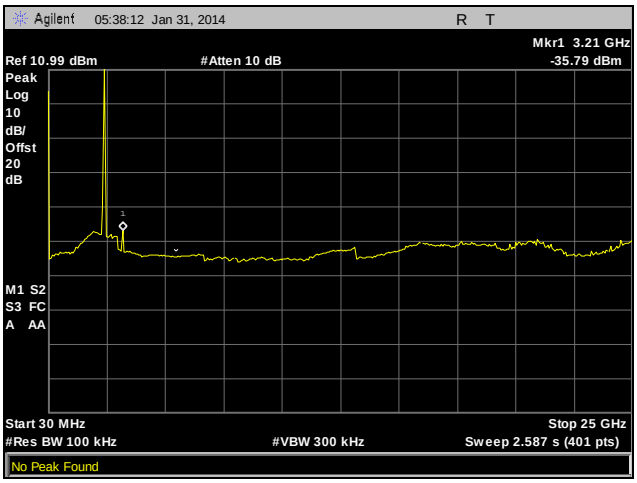


Plot 450. Conducted Spurious Emissions, Mid Channel, 802.11b, Ant. 1

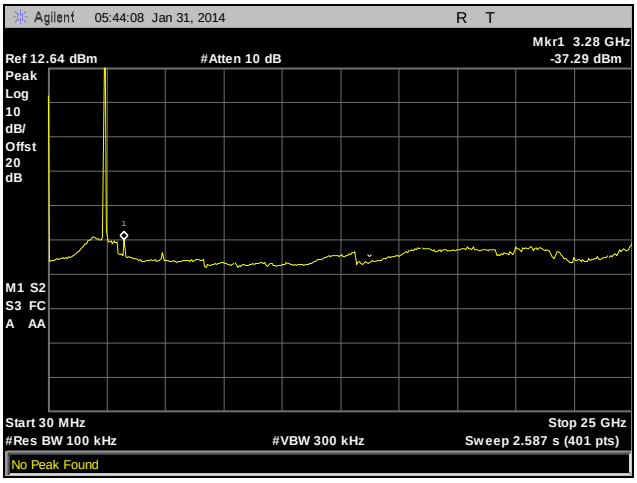


Plot 451. Conducted Spurious Emissions, High Channel, 802.11b, Ant. 1

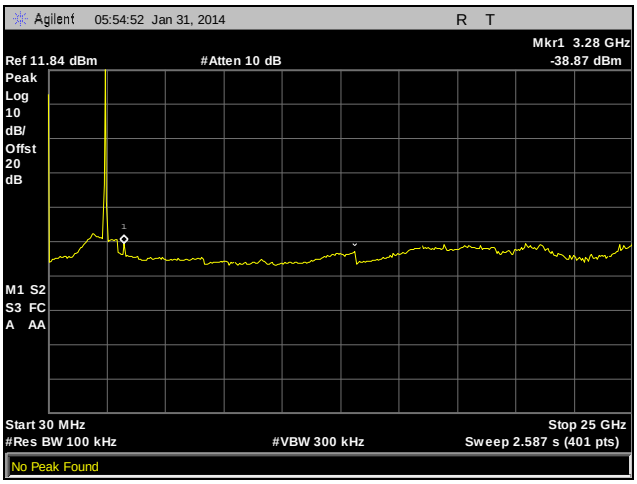
Conducted Spurious Emissions Test Results, 802.11g



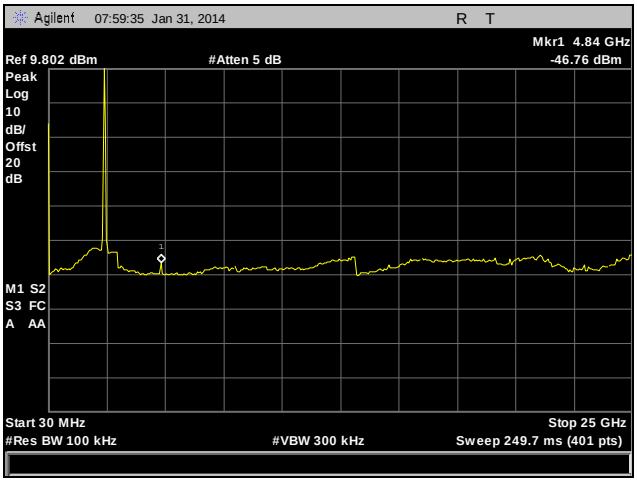
Plot 452. Conducted Spurious Emissions, Low Channel, 802.11g, Ant. 0



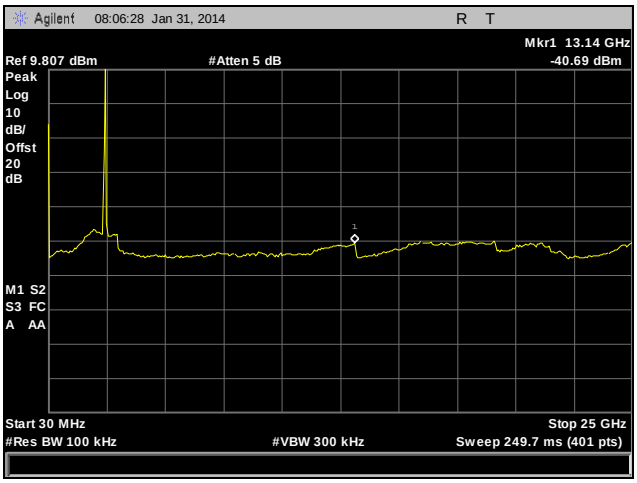
Plot 453. Conducted Spurious Emissions, Mid Channel, 802.11g, Ant. 0



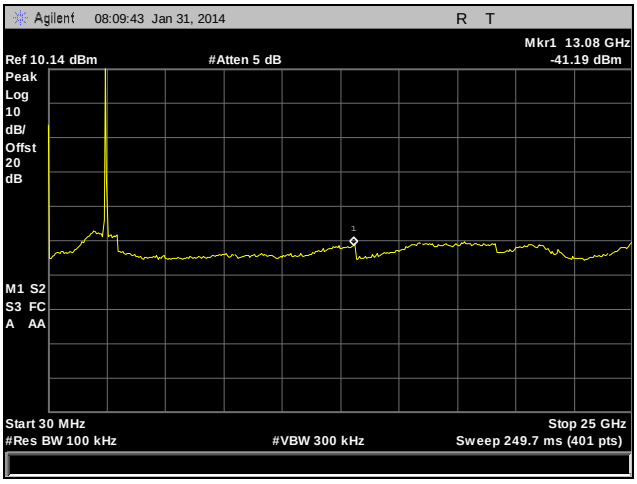
Plot 454. Conducted Spurious Emissions, High Channel, 802.11g, Ant. 0



Plot 455. Conducted Spurious Emissions, Low Channel, 802.11g, Ant. 1

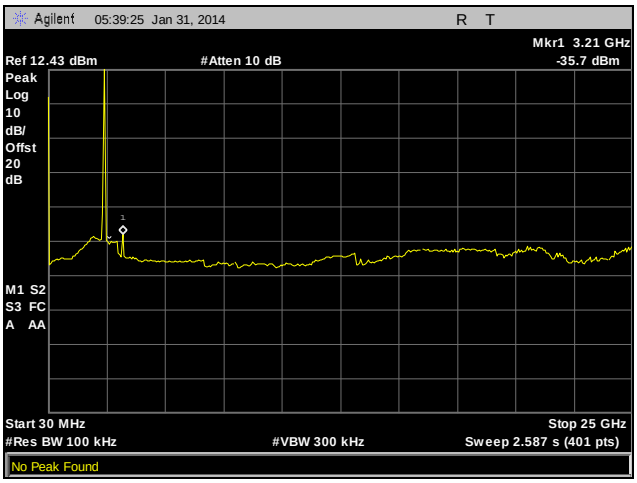


Plot 456. Conducted Spurious Emissions, Mid Channel, 802.11g, Ant. 1

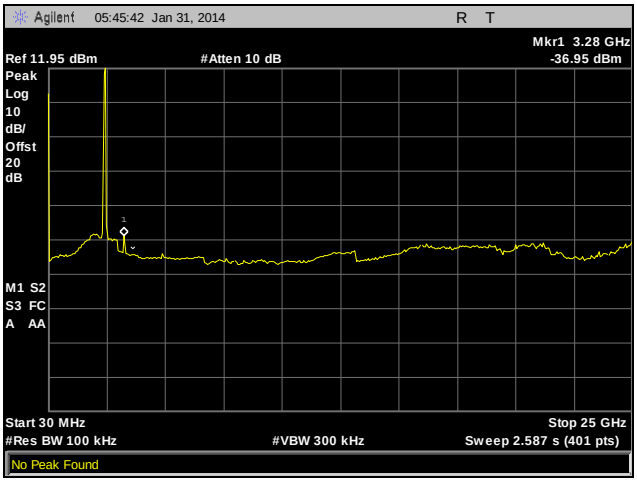


Plot 457. Conducted Spurious Emissions, High Channel, 802.11g, Ant. 1

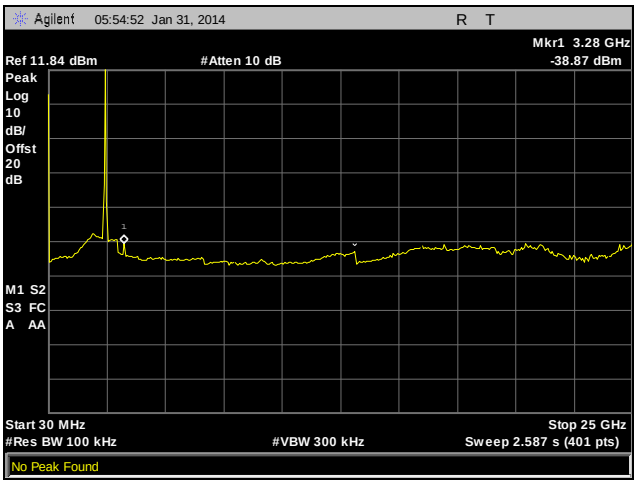
Conducted Spurious Emissions Test Results, 802.11n 20 MHz



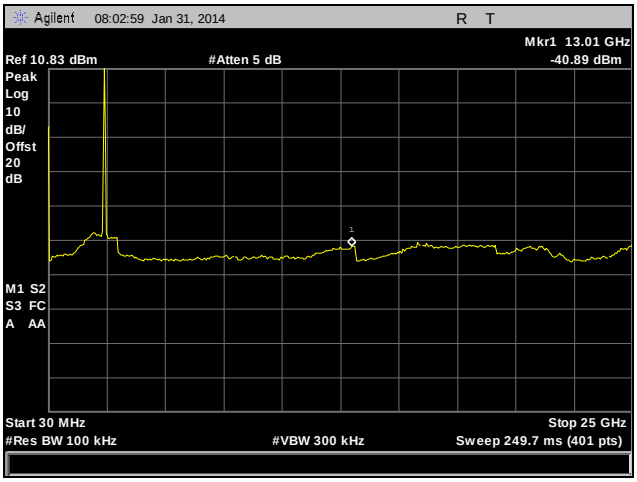
Plot 458. Conducted Spurious Emissions, Low Channel, 802.11n 20 MHz, Ant. 0



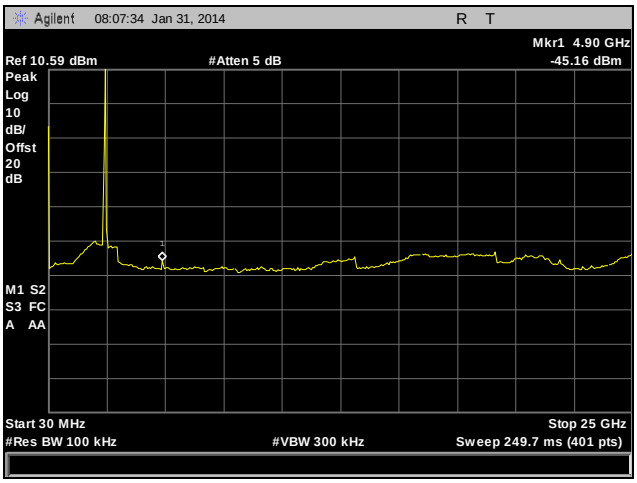
Plot 459. Conducted Spurious Emissions, Mid Channel, 802.11n 20 MHz, Ant. 0



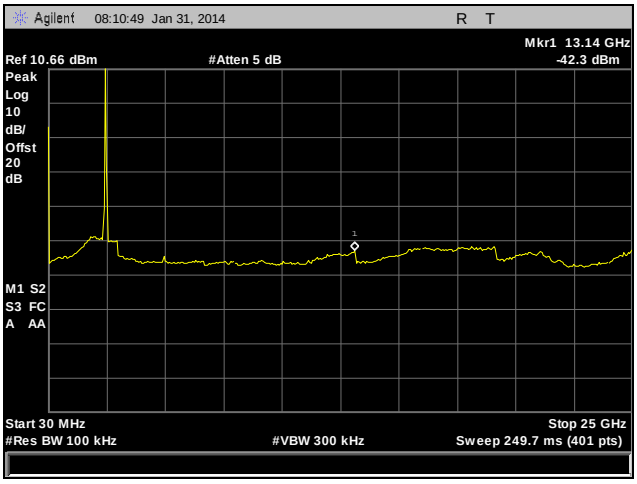
Plot 460. Conducted Spurious Emissions, High Channel, 802.11n 20 MHz, Ant. 0



Plot 461. Conducted Spurious Emissions, Low Channel, 802.11n 20 MHz, Ant. 1

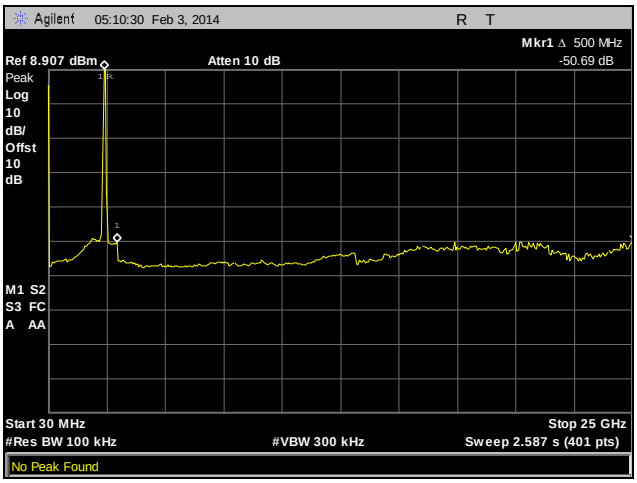


Plot 462. Conducted Spurious Emissions, Mid Channel, 802.11n 20 MHz, Ant. 1

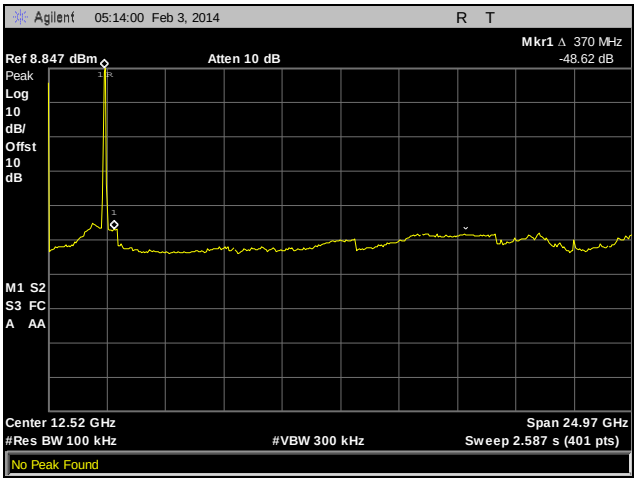


Plot 463. Conducted Spurious Emissions, High Channel, 802.11n 20 MHz, Ant. 1

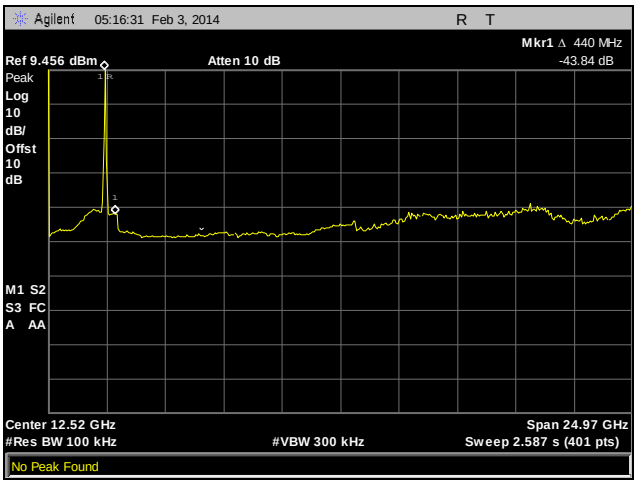
Conducted Spurious Emissions Test Results, 802.11n 40 MHz



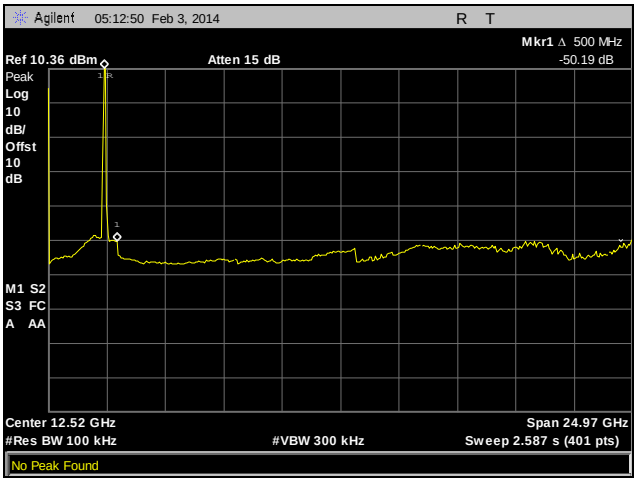
Plot 464. Conducted Spurious Emissions, Low Channel, 802.11n 40 MHz, Ant. 0



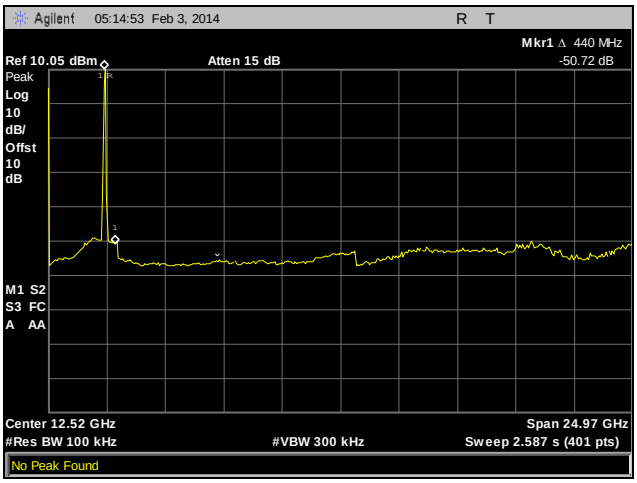
Plot 465. Conducted Spurious Emissions, Mid Channel, 802.11n 40 MHz, Ant. 0



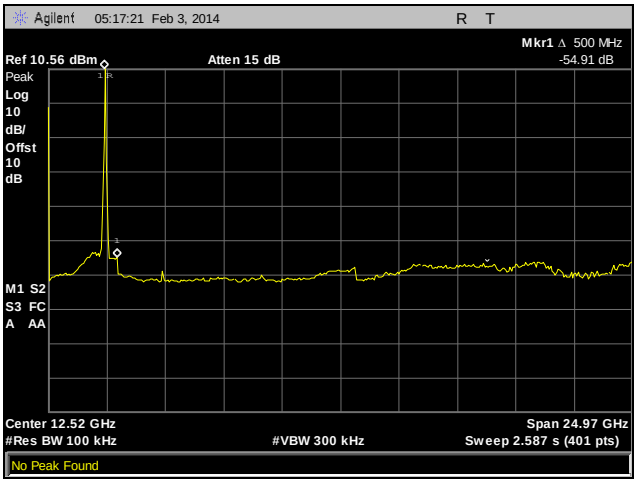
Plot 466. Conducted Spurious Emissions, High Channel, 802.11n 40 MHz, Ant. 0



Plot 467. Conducted Spurious Emissions, Low Channel, 802.11n 40 MHz, Ant. 1

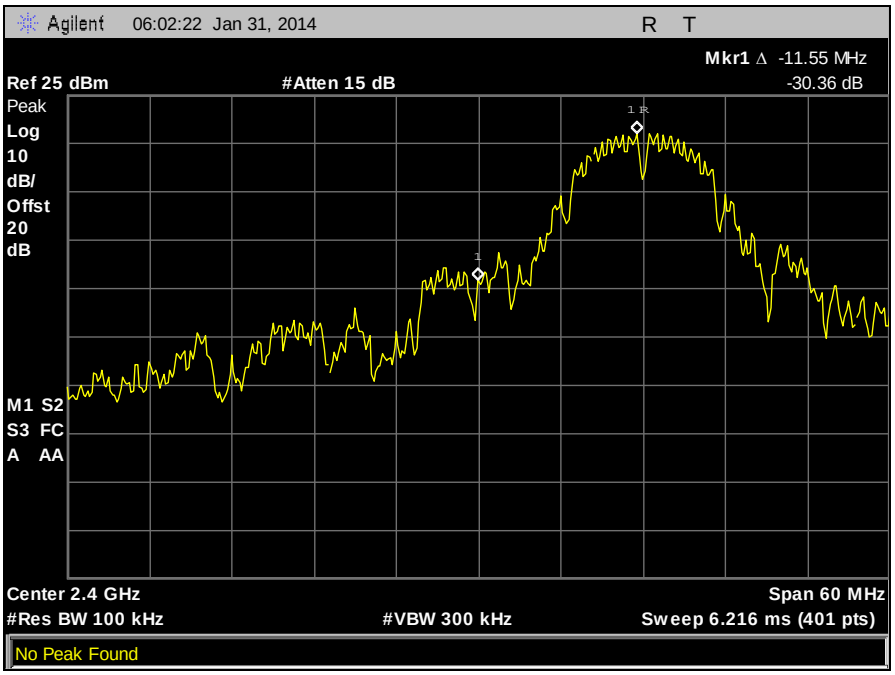


Plot 468. Conducted Spurious Emissions, Mid Channel, 802.11n 40 MHz, Ant. 1

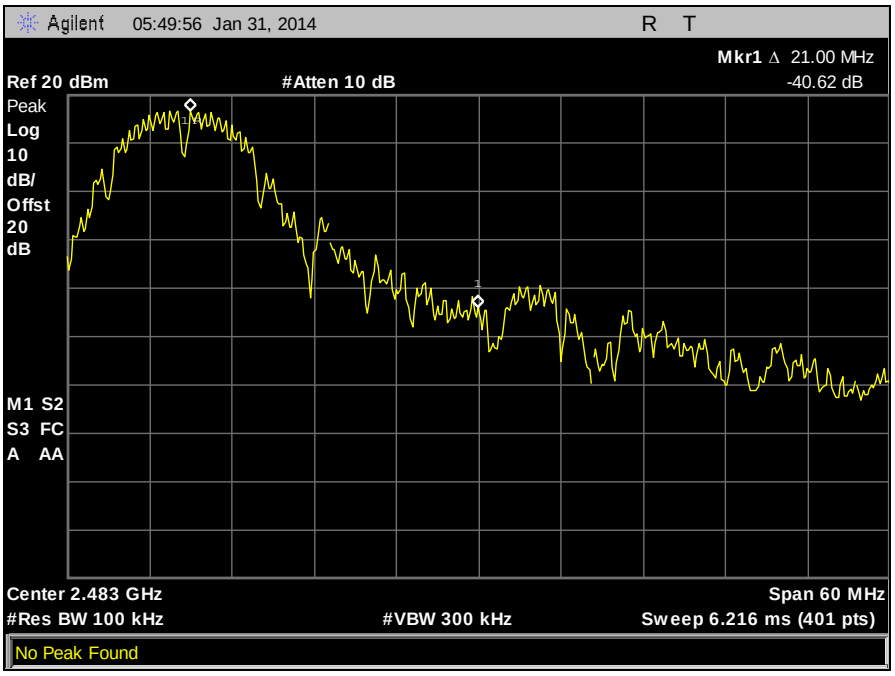


Plot 469. Conducted Spurious Emissions, High Channel, 802.11n 40 MHz, Ant. 1

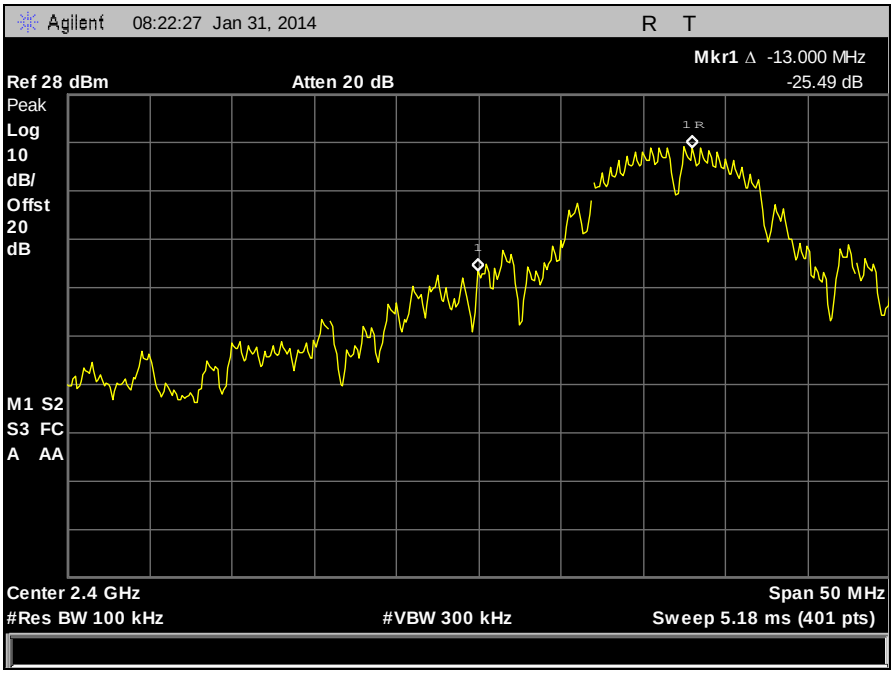
Conducted Band Edge Test Results, 802.11b



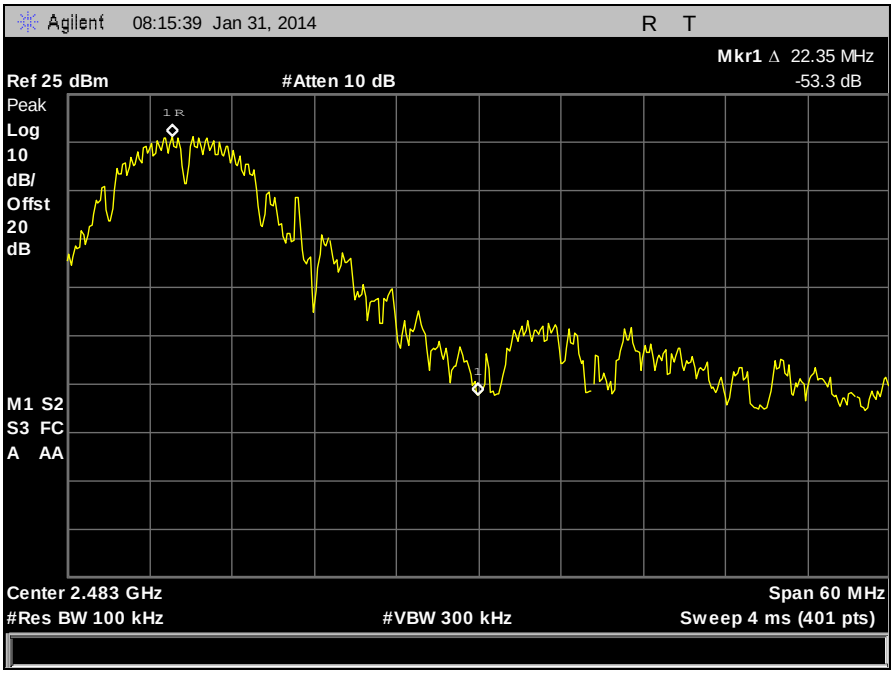
Plot 470. Conducted Band Edge, Low Channel, 802.11b, Ant. 0



Plot 471. Conducted Band Edge, High Channel, 802.11b, Ant. 0



Plot 472. Conducted Band Edge, Low Channel, 802.11b, Ant. 1



Plot 473. Conducted Band Edge, High Channel, 802.11b, Ant. 1

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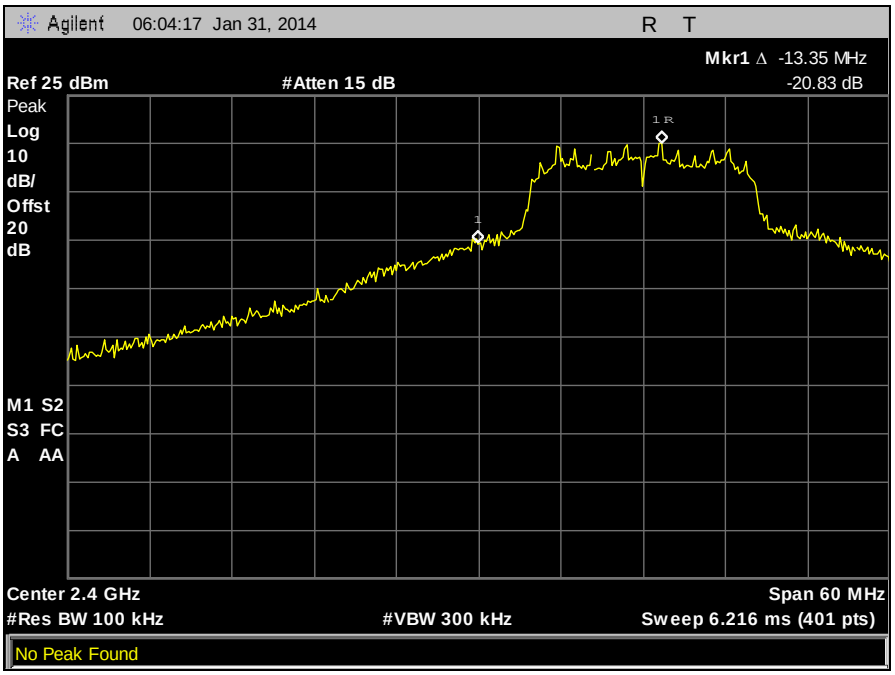
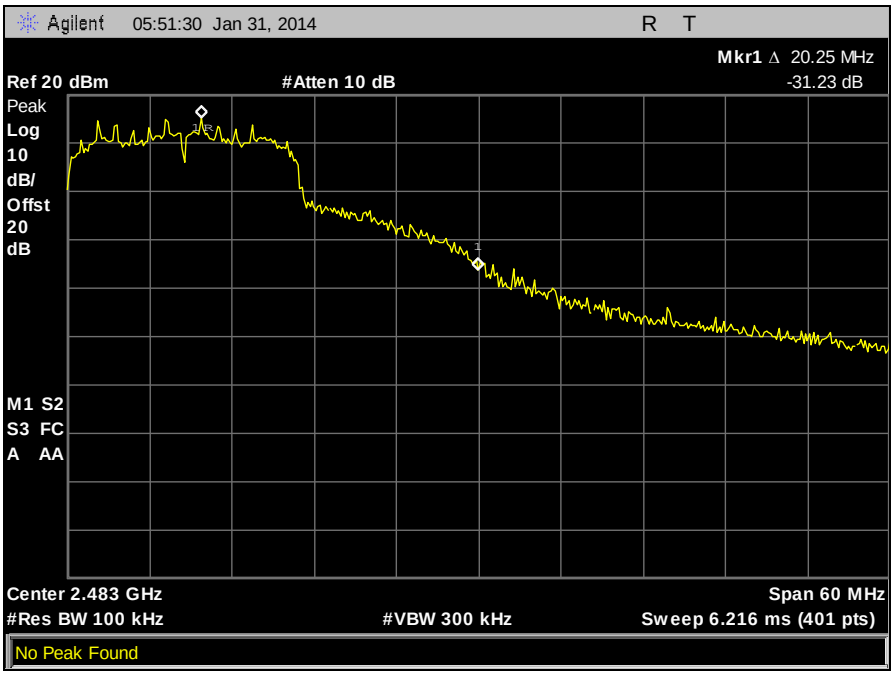
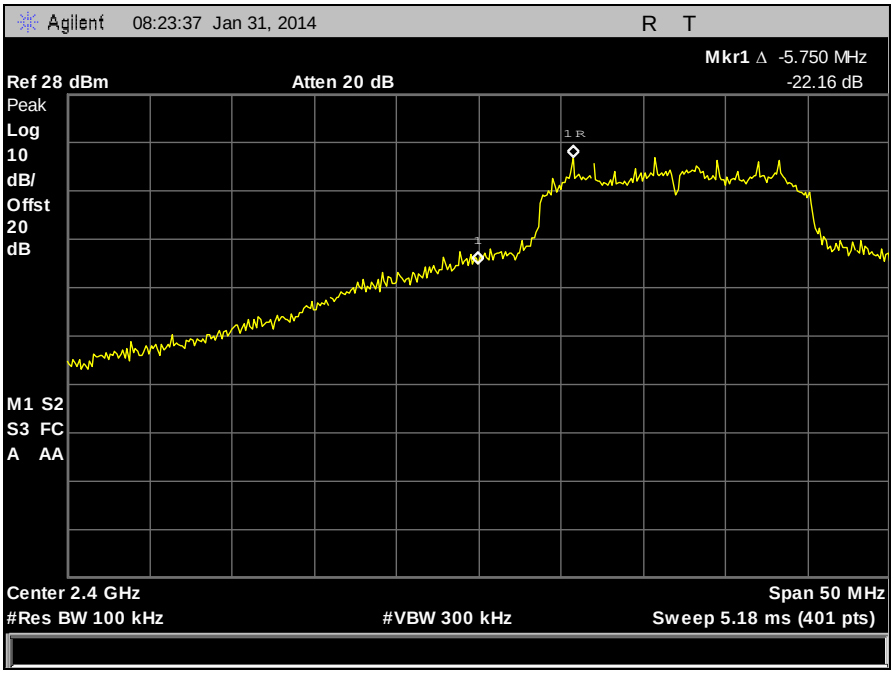
Conducted Band Edge Test Results, 802.11g



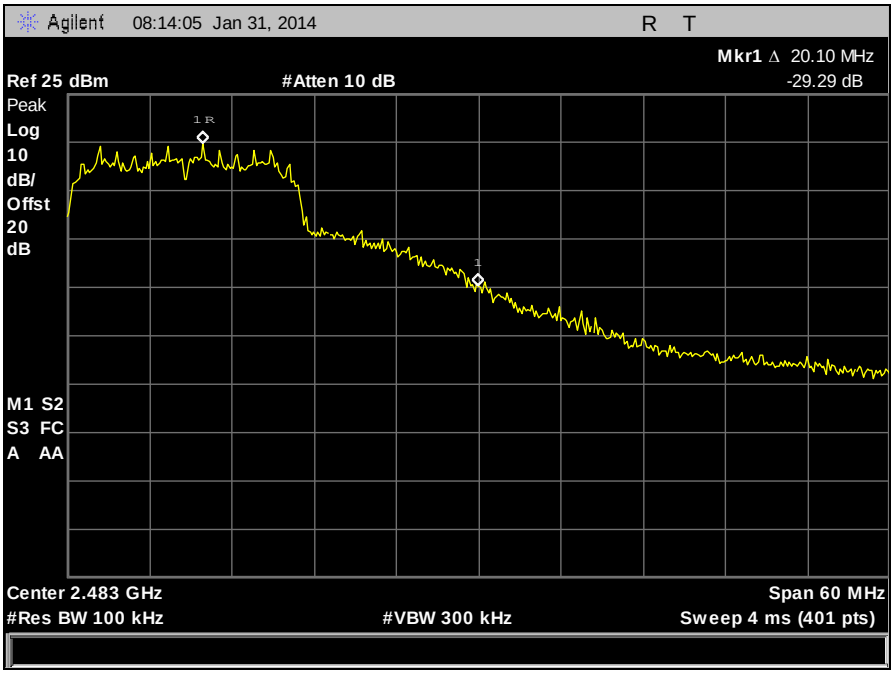
Plot 474. Conducted Band Edge, Low Channel, 802.11g, Ant. 0



Plot 475. Conducted Band Edge, High Channel, 802.11g, Ant. 0

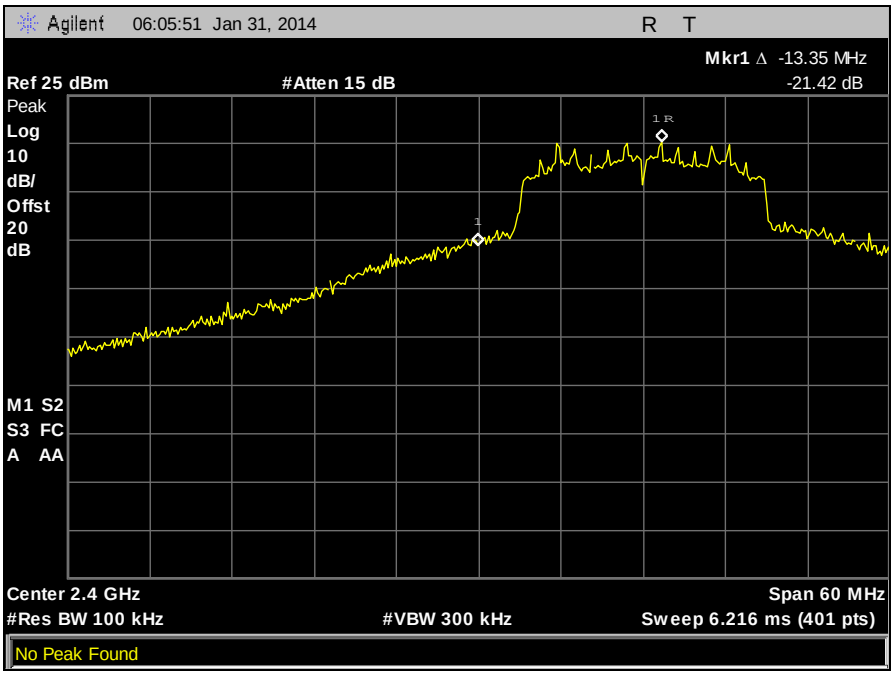


Plot 476. Conducted Band Edge, Low Channel, 802.11g, Ant. 1

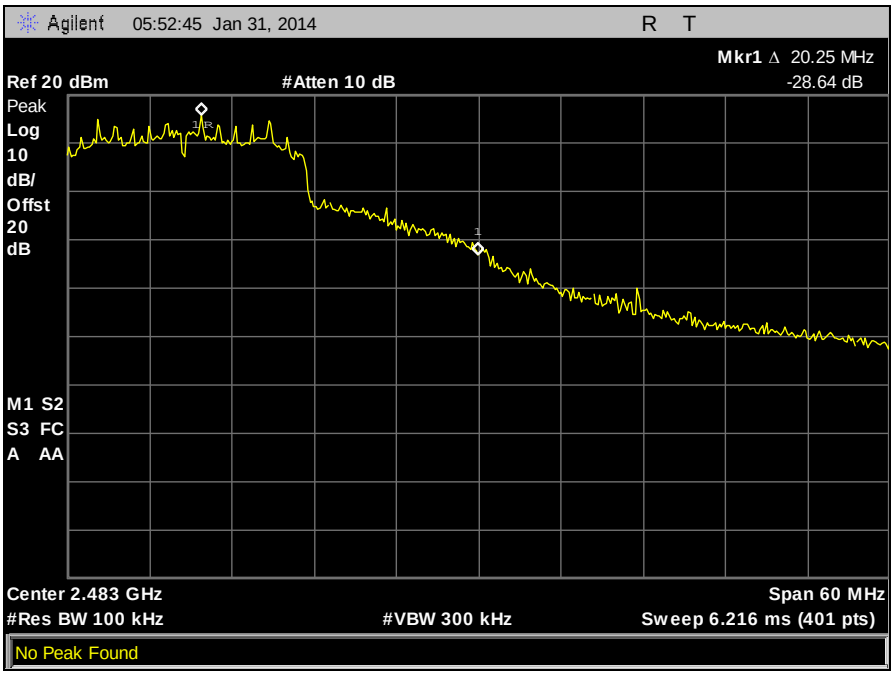


Plot 477. Conducted Band Edge, High Channel, 802.11g, Ant. 1

Conducted Band Edge Test Results, 802.11n 20 MHz



Plot 478. Conducted Band Edge, Low Channel, 802.11n 20 MHz, Ant. 0



Plot 479. Conducted Band Edge, High Channel, 802.11n 20 MHz, Ant. 0

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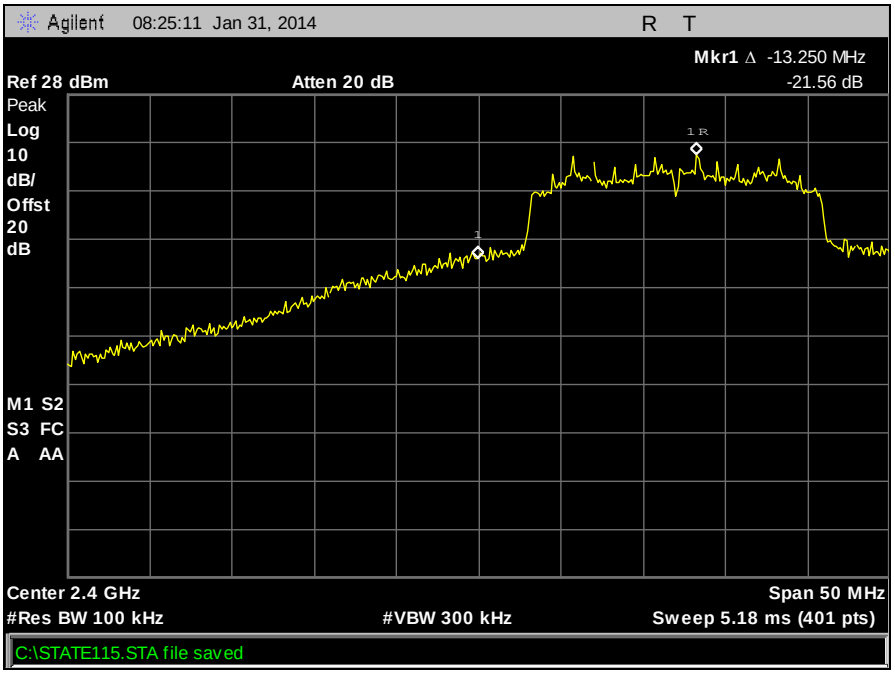
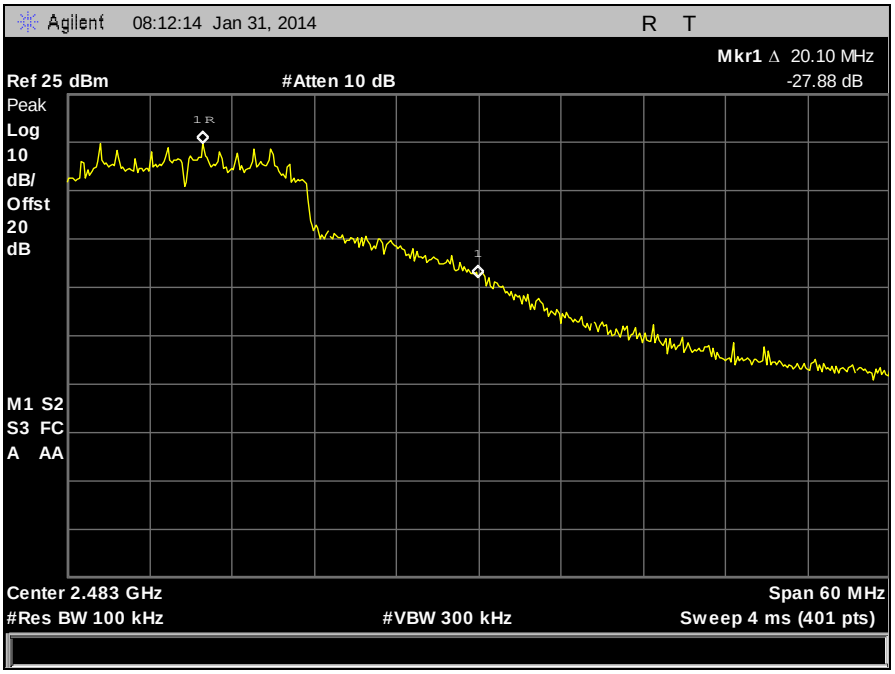
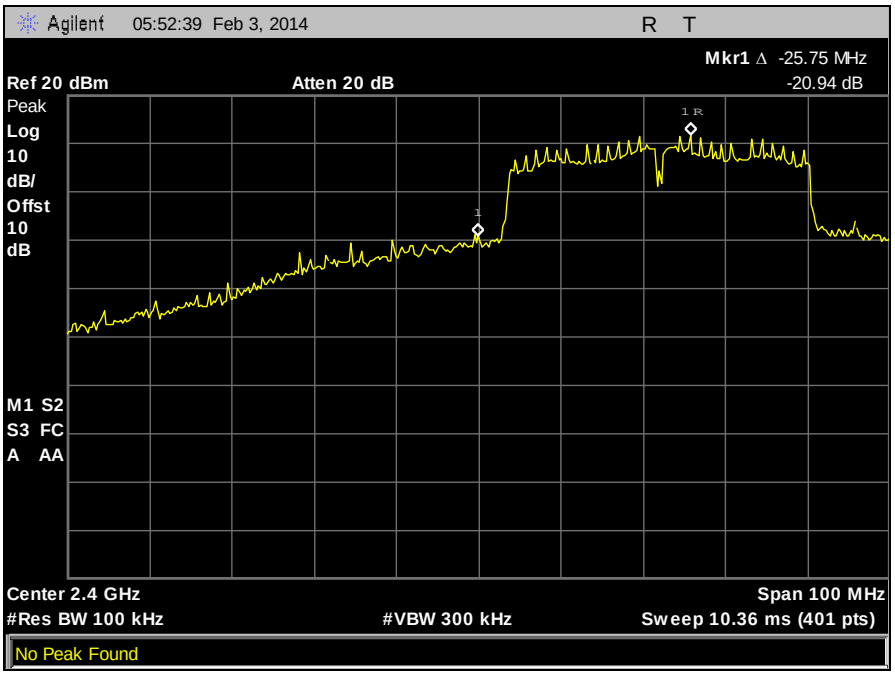


Plot 480. Conducted Band Edge, Low Channel, 802.11n 20 MHz, Ant. 1

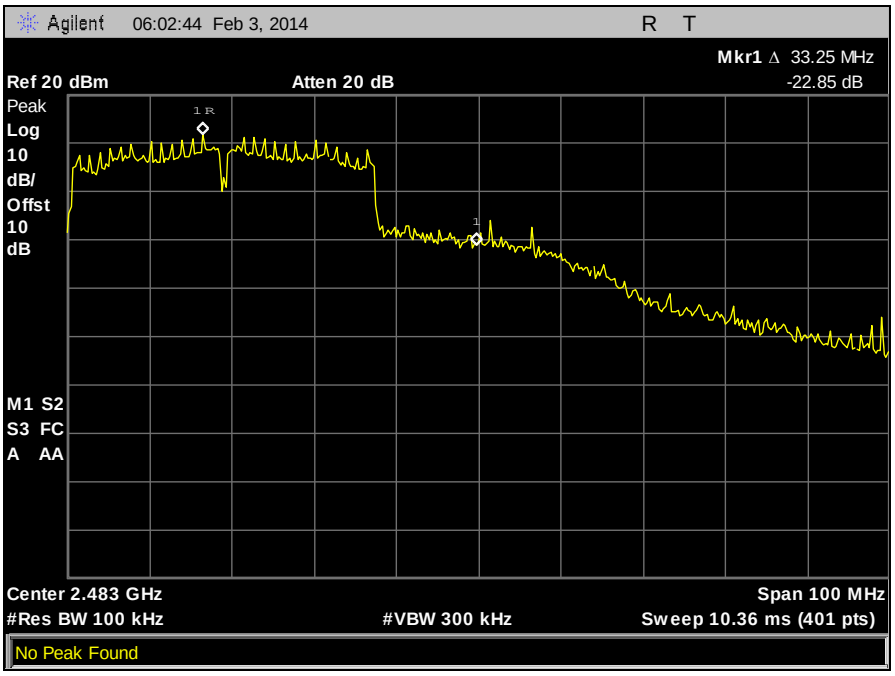


Plot 481. Conducted Band Edge, High Channel, 802.11n 20 MHz, Ant. 1

Conducted Band Edge Test Results, 802.11n 40 MHz



Plot 482. Conducted Band Edge, Low Channel, 802.11n 40 MHz, Ant. 0



Plot 483. Conducted Band Edge, High Channel, 802.11n 40 MHz, Ant. 0

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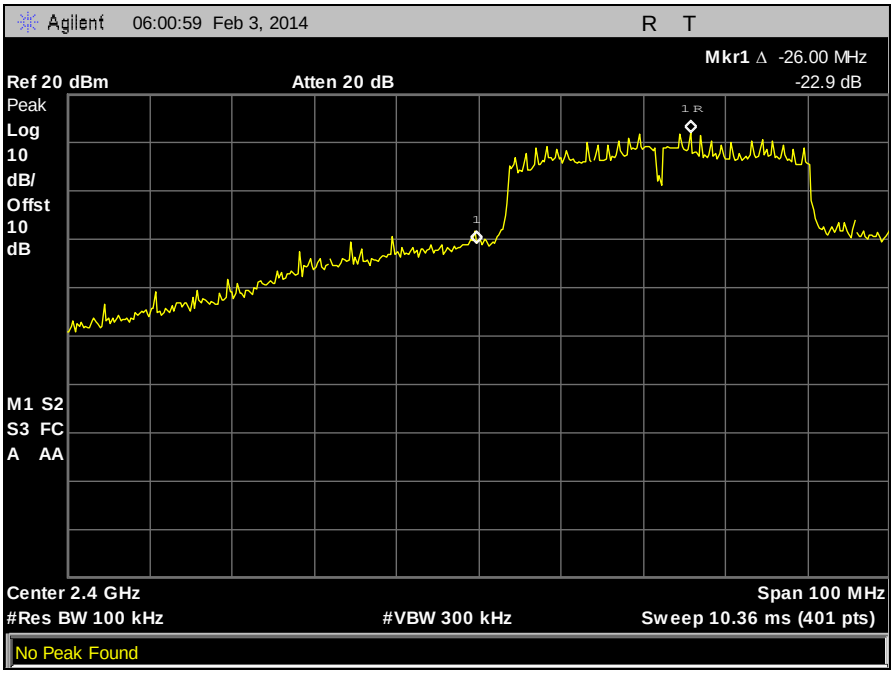
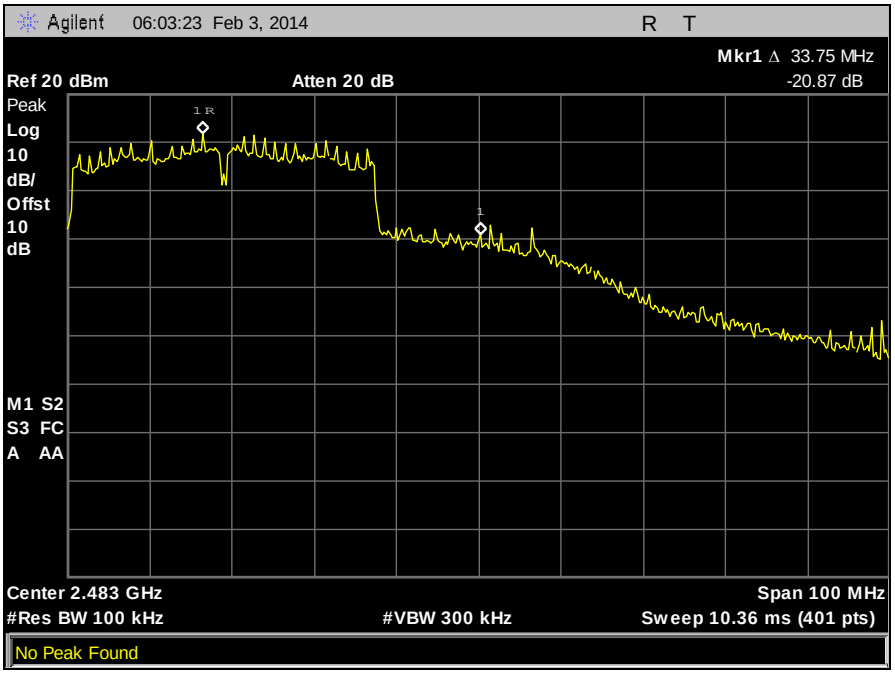


Plot 484. Conducted Band Edge, Low Channel, 802.11n 40 MHz, Ant. 1



Plot 485. Conducted Band Edge, High Channel, 802.11n 40 MHz, Ant. 1

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(e) Peak Power Spectral Density

Test Requirements: **§15.247(e):** For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

Test Procedure: The transmitter was connected directly to a Spectrum Analyzer through an attenuator. The power level was set to the maximum level and trace was allowed to stabilize at max hold. The RBW was set to 3 kHz and a VBW set to 9 kHz or greater. The spectrum analyzer was set to an auto sweep time and a peak detector was used. Measurements were carried out at the low, mid and high channels.

Test Results: The EUT was compliant with the peak power spectral density limits of **§ 15.247 (e)**.

The peak power spectral density was determined from plots on the following page(s).

Test Engineer: Surinder Singh

Test Date: 02/08/14

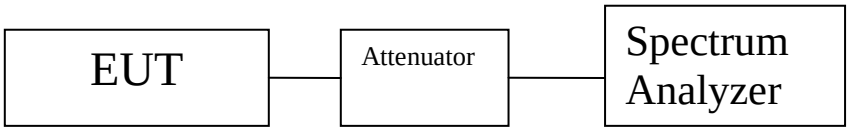


Figure 4. Block Diagram, Peak Power Spectral Density Test Setup

Peak Power Spectral Density Test Results

Peak Power Spectral Density			
Carrier Channel	**Frequency (MHz)**	**Measured PPSD (dBm)**	**Limit (dBm)**
Channel 1	2412	4.248	8
Channel 6	2437	4.471	8
Channel 11	2462	4.937	8

Table 43. Peak Power Spectral Density, Test Results, 802.11b, Ant. 0

Peak Power Spectral Density			
Carrier Channel	**Frequency (MHz)**	**Measured PPSD (dBm)**	**Limit (dBm)**
Channel 1	2412	3.608	8
Channel 6	2437	5.21	8
Channel 11	2462	2.806	8

Table 44. Peak Power Spectral Density, Test Results, 802.11b, Ant. 1

Peak Power Spectral Density			
Carrier Channel	**Frequency (MHz)**	**Measured PPSD (dBm)**	**Limit (dBm)**
Channel 1	2412	2.258	8
Channel 6	2437	0.814	8
Channel 11	2462	0.77	8

Table 45. Peak Power Spectral Density, Test Results, 802.11g, Ant. 0

Peak Power Spectral Density			
Carrier Channel	**Frequency (MHz)**	**Measured PPSD (dBm)**	**Limit (dBm)**
Channel 1	2412	0.257	8
Channel 6	2437	0.761	8
Channel 11	2462	-0.216	8

Table 46. Peak Power Spectral Density, Test Results, 802.11g, Ant. 1

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Peak Power Spectral Density

Carrier Channel	Frequency (MHz)	Measured PPSD (dBm)	Limit (dBm)
Channel 1	2412	1.88	8
Channel 6	2437	1.015	8
Channel 11	2462	0.172	8

Table 47. Peak Power Spectral Density, Test Results, 802.11n 20 MHz, Ant. 0

Peak Power Spectral Density

Carrier Channel	Frequency (MHz)	Measured PPSD (dBm)	Limit (dBm)
Channel 1	2412	0.039	8
Channel 6	2437	0.582	8
Channel 11	2462	-0.032	8

Table 48. Peak Power Spectral Density, Test Results, 802.11n 20 MHz, Ant. 1

Peak Power Spectral Density

Carrier Channel	Frequency (MHz)	Measured PPSD (dBm)	Limit (dBm)
Low	2422	-2.462	8
Mid	2437	-3.789	8
High	2452	-2.158	8

Table 49. Peak Power Spectral Density, Test Results, 802.11n 40 MHz, Ant. 0

Peak Power Spectral Density

Carrier Channel	Frequency (MHz)	Measured PPSD (dBm)	Limit (dBm)
Low	2422	-2.662	8
Mid	2437	-2.137	8
High	2452	-4.307	8

Table 50. Peak Power Spectral Density, Test Results, 802.11n 40 MHz, Ant. 1

Carrier Channel	Frequency (MHz)	Measured PPSD (dBm) Ant 0	Measured PPSD (dBm) Ant 1	Total PPSD (dBm)	Limit
Low	2422	-2.462	-2.662	0.449451	8
Mid	2437	-3.789	-2.137	0.125381	8
High	2452	-2.158	-4.307	-0.09061	8

Table 51. Peak Power Spectral Density, Test Results, 802.11n 40 MHz, MIMO

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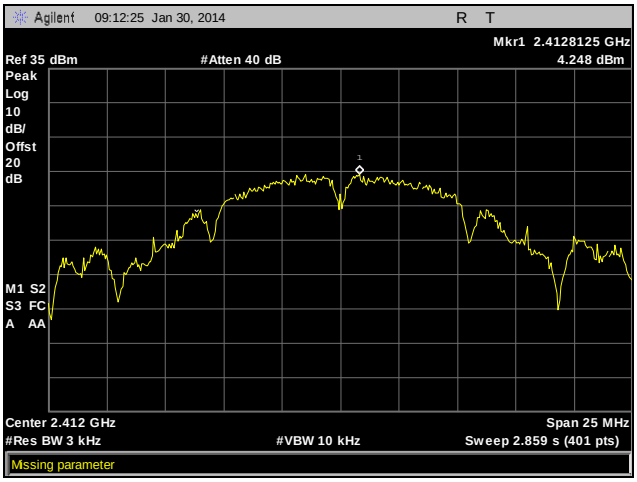
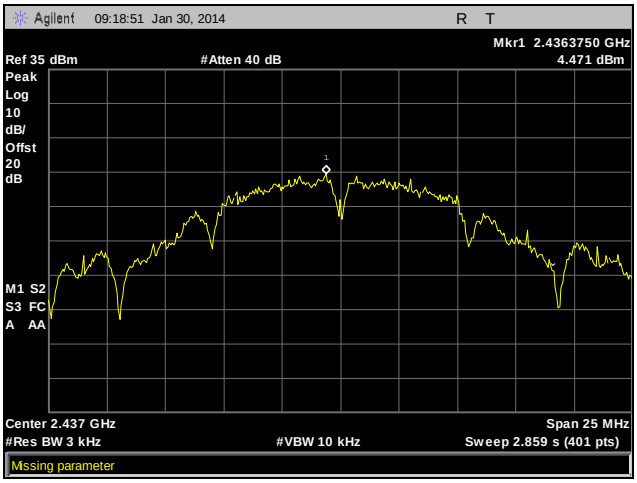
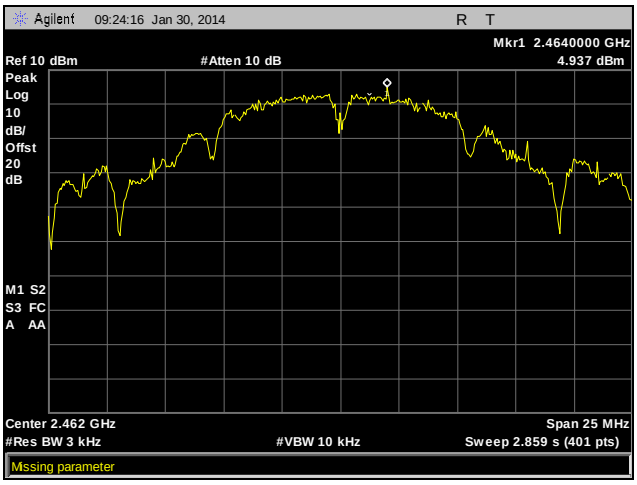
Peak Power Spectral Density, 802.11b



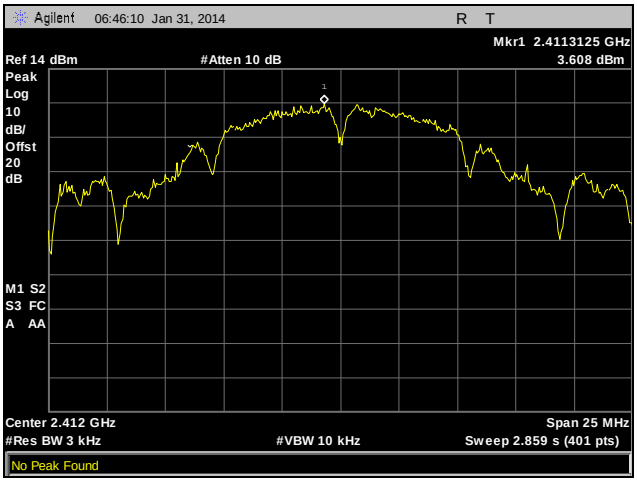
Plot 486. Peak Power Spectral Density, Low Channel, 802.11b, Ant. 0



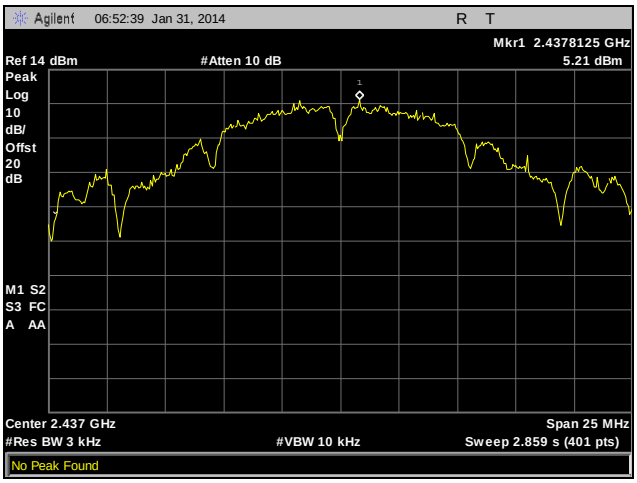
Plot 487. Peak Power Spectral Density, Mid Channel, 802.11b, Ant. 0



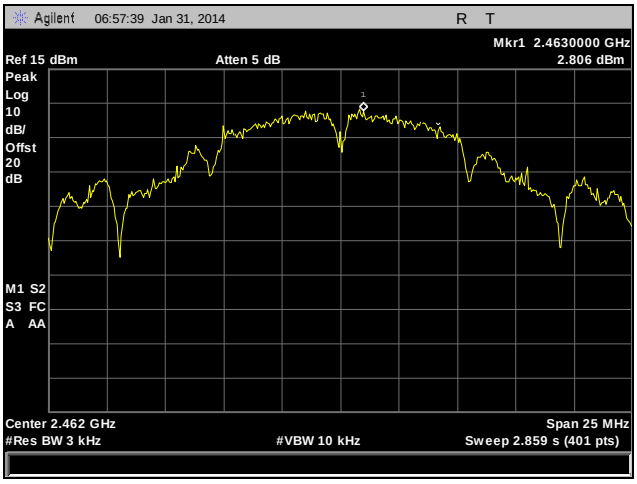
Plot 488. Peak Power Spectral Density, High Channel, 802.11b, Ant. 0



Plot 489. Peak Power Spectral Density, Low Channel, 802.11b, Ant. 1

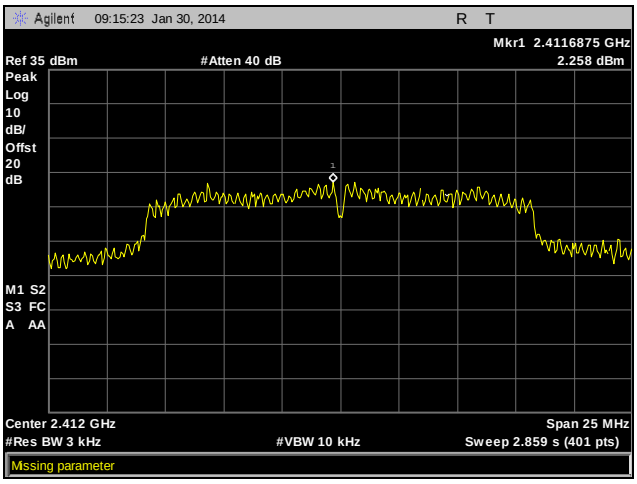


Plot 490. Peak Power Spectral Density, Mid Channel, 802.11b, Ant. 1

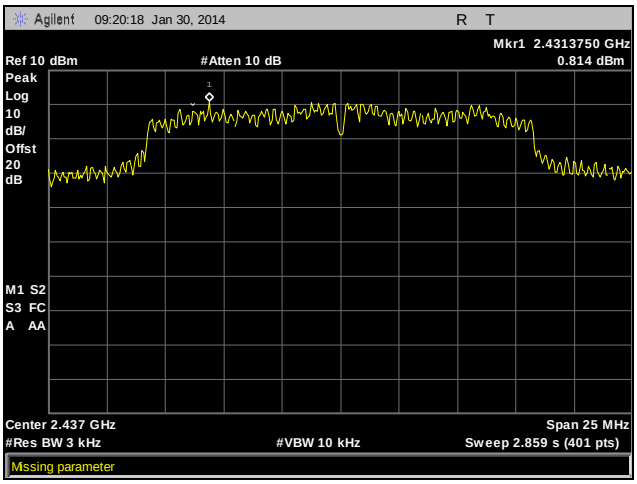


Plot 491. Peak Power Spectral Density, High Channel, 802.11b, Ant. 1

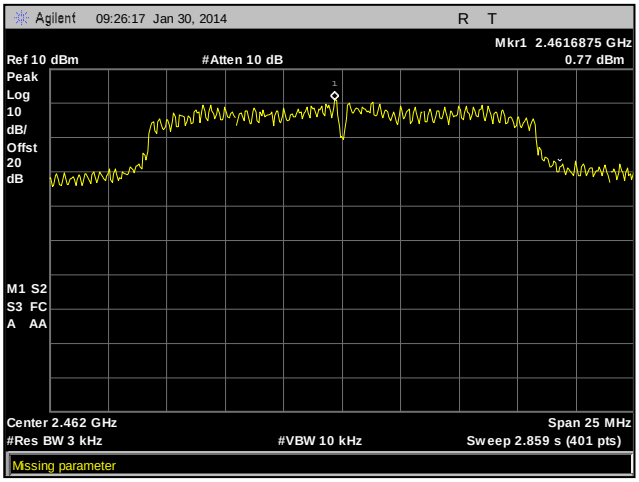
Peak Power Spectral Density, 802.11g



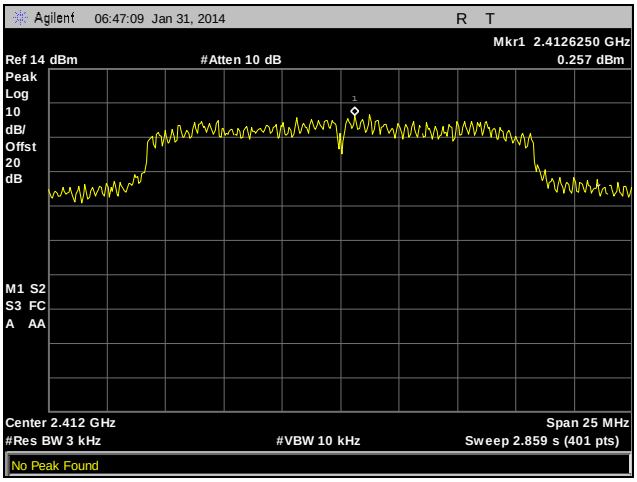
Plot 492. Peak Power Spectral Density, Low Channel, 802.11g, Ant. 0



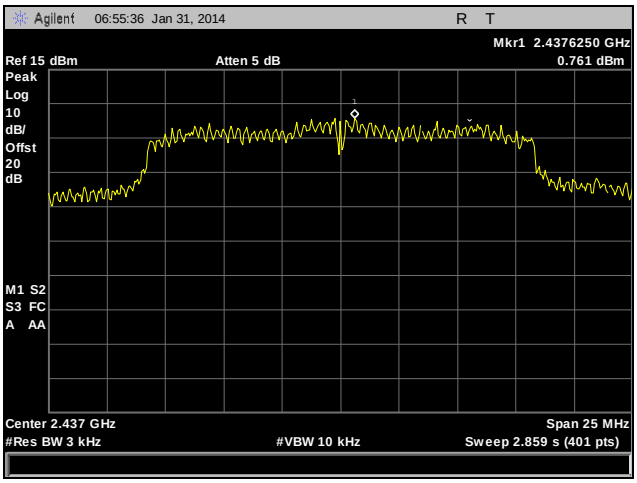
Plot 493. Peak Power Spectral Density, Mid Channel, 802.11g, Ant. 0



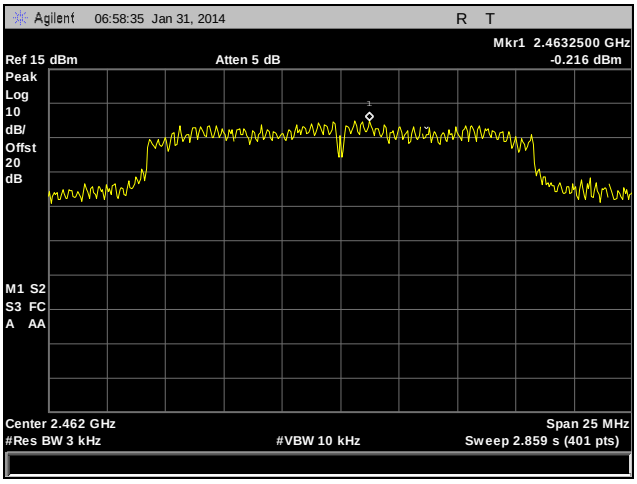
Plot 494. Peak Power Spectral Density, High Channel, 802.11g, Ant. 0



Plot 495. Peak Power Spectral Density, Low Channel, 802.11g, Ant. 1

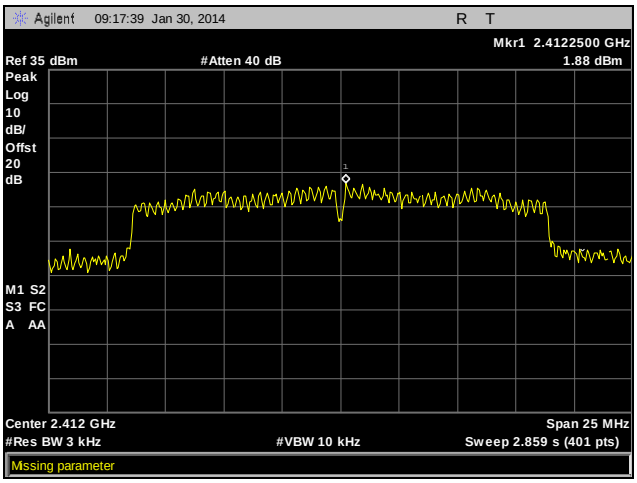


Plot 496. Peak Power Spectral Density, Mid Channel, 802.11g, Ant. 1

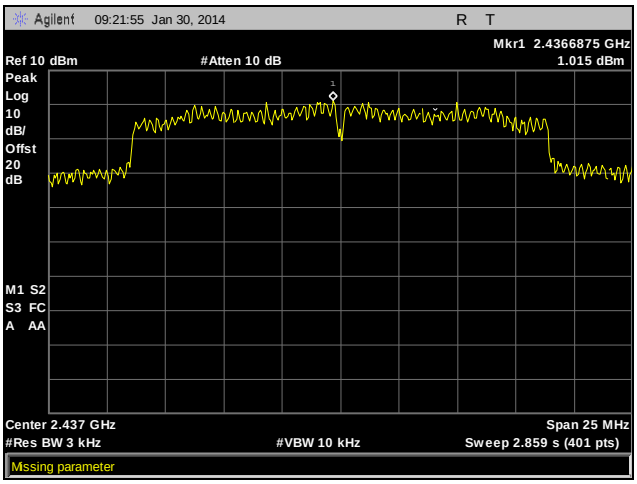


Plot 497. Peak Power Spectral Density, High Channel, 802.11g, Ant. 1

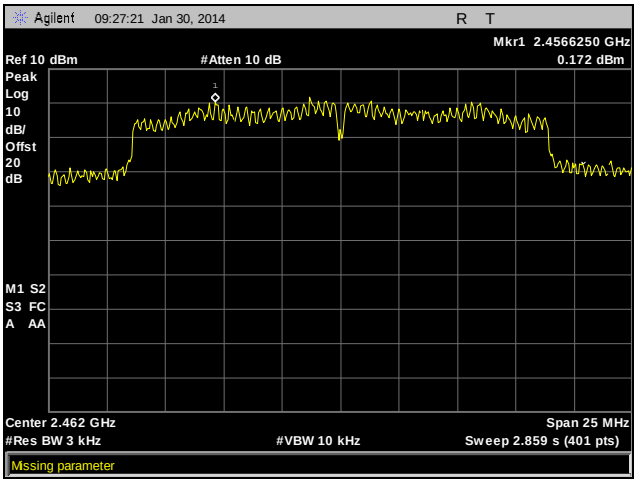
Peak Power Spectral Density, 802.11n 20 MHz



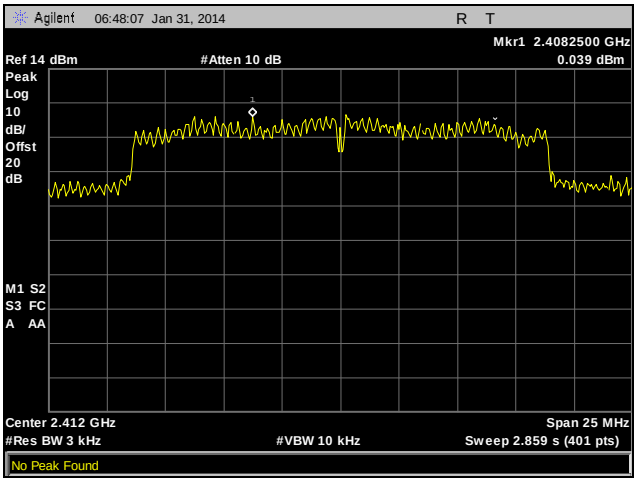
Plot 498. Peak Power Spectral Density, Low Channel, 802.11n 20 MHz, Ant. 0



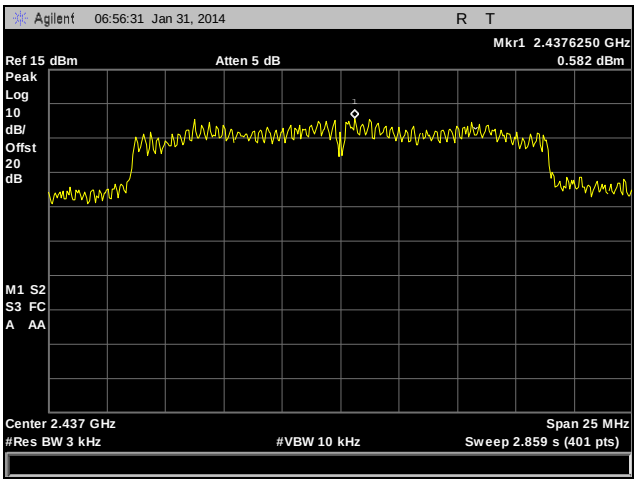
Plot 499. Peak Power Spectral Density, Mid Channel, 802.11n 20 MHz, Ant. 0



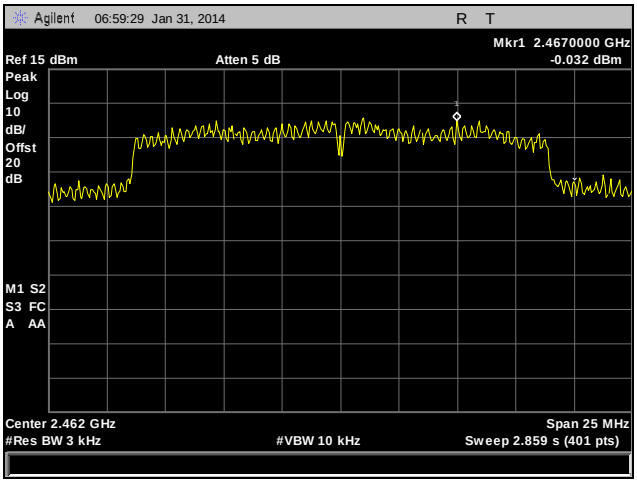
Plot 500. Peak Power Spectral Density, High Channel, 802.11n 20 MHz, Ant. 0



Plot 501. Peak Power Spectral Density, Low Channel, 802.11n 20 MHz, Ant. 1

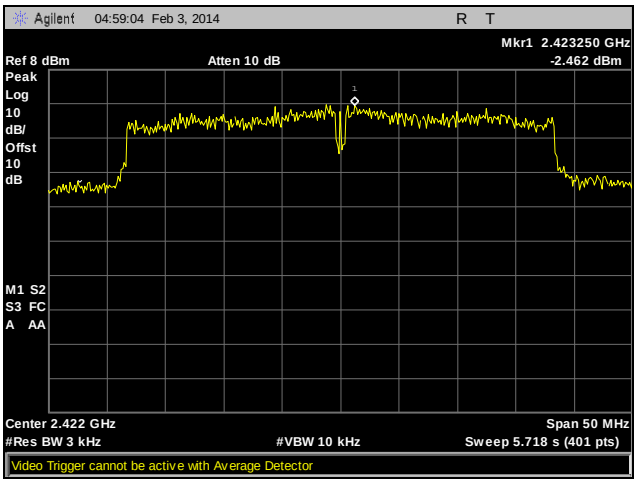


Plot 502. Peak Power Spectral Density, Mid Channel, 802.11n 20 MHz, Ant. 1

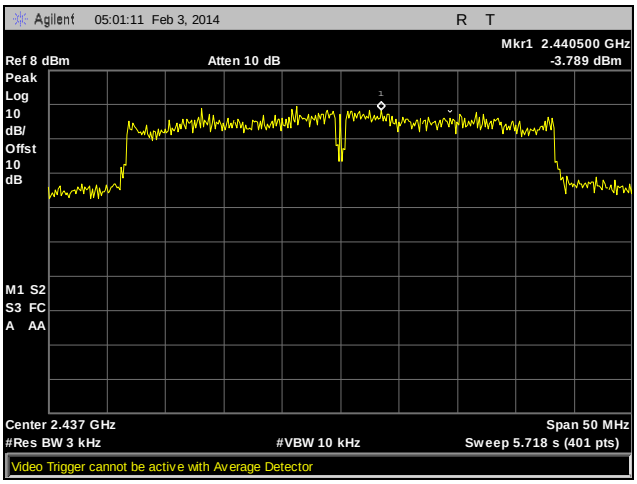


Plot 503. Peak Power Spectral Density, High Channel, 802.11n 20 MHz, Ant. 1

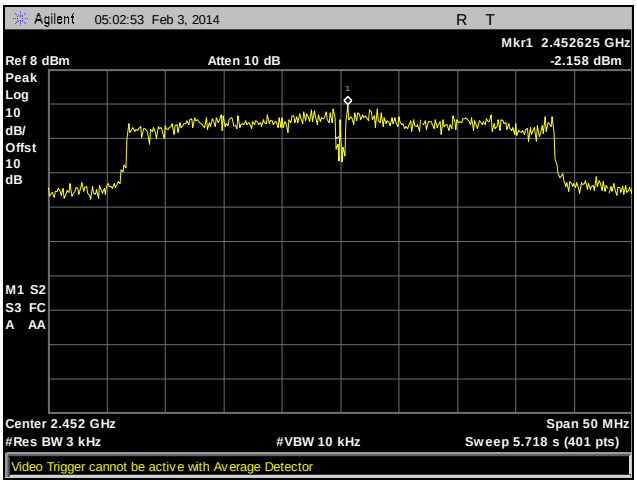
Peak Power Spectral Density, 802.11n 40 MHz



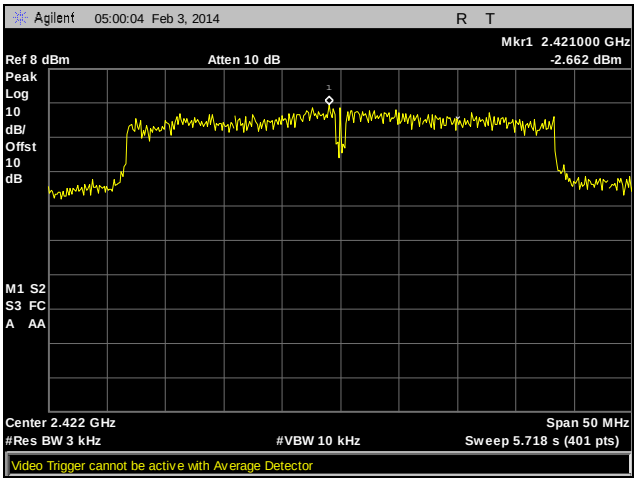
Plot 504. Peak Power Spectral Density, Low Channel, 802.11n 40 MHz, Ant. 0



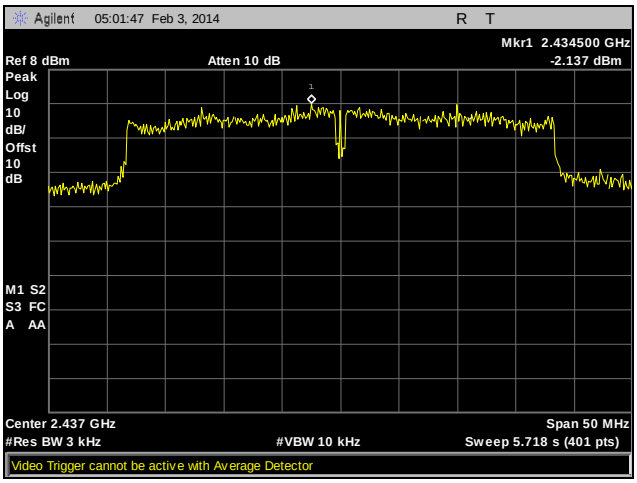
Plot 505. Peak Power Spectral Density, Mid Channel, 802.11n 40 MHz, Ant. 0



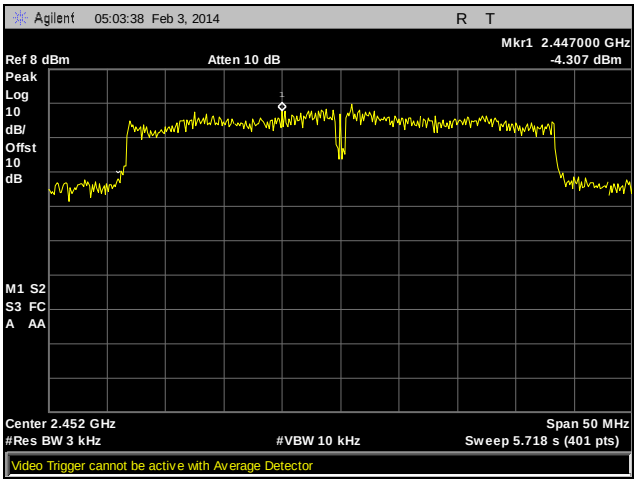
Plot 506. Peak Power Spectral Density, High Channel, 802.11n 40 MHz, Ant. 0



Plot 507. Peak Power Spectral Density, Low Channel, 802.11n 40 MHz, Ant. 1



Plot 508. Peak Power Spectral Density, Mid Channel, 802.11n 40 MHz, Ant. 1



Plot 509. Peak Power Spectral Density, High Channel, 802.11n 40 MHz, Ant. 1

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(i) Maximum Permissible Exposure

RF Exposure Requirements: **§1.1307(b)(1) and §1.1307(b)(2):** Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.

RF Radiation Exposure Limit: **§1.1310:** As specified in this section, the Maximum Permissible Exposure (MPE) Limit shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in Sec. 1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of Sec. 2.1093 of this chapter.

Peak Conducted Power of 3.6dBi antenna= 29.79dBm = 953mW
3.6dBi antenna gain in terms of linear value= 2.3
The limit for maximum RF exposure for 2.4GHz device is 1mW/cm^2
The formula for calculating RF exposure is given as S= $\frac{PG}{4\pi R^2}$
P=953mW, G= 2.3 & R=20cm, then S comes out to be 0.436mW/cm^2 which was under the limit specified in 1.1310

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IV. Test Equipment

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Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2005.

Asset	Equipment	Manufacturer	Model Number	Cal Date	Cal Due
1T4409	EMI RECEIVER	ROHDE & SCHWARZ	ESIB7	7/16/2012	7/16/2014
1T4818	COMB GENERATOR	COM-POWER	CGO-520	SEE NOTE	
1T4787	HYGROMETER / THERMOMETER / BAROMETER / DEW POINT PEN	CONTROL COMPANY	15-078-198, FB70423, 245CD	2/15/2012	2/15/2014
1T4483	ANTENNA; HORN	EMCO	3115	9/5/2012	3/5/2014
1T4300C	SEMI-ANECHOIC 3M CHAMBER # 1 (VCCI)	EMC TEST SYSTEMS	NONE	1/31/2012	1/31/2015
1T4612	SPECTRUM ANALYZER	AGILENT TECHNOLOGIES	E4407B	7/30/2013	7/30/2014

Table 52. Test Equipment List

Note: Functionally tested equipment is verified using calibrated instrumentation at the time of testing.

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V. Certification & User's Manual Information

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Certification & User's Manual Information

A. Certification Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart I — Marketing of Radio frequency devices:

§ 2.801 Radio-frequency device defined.

As used in this part, a radio-frequency device is any device which in its operation is capable of Emitting radio-frequency energy by radiation, conduction, or other means. Radio- frequency devices include, but are not limited to:

(a) The various types of radio communication transmitting devices described throughout this chapter.

(b) The incidental, unintentional and intentional radiators defined in Part 15 of this chapter.

(c) The industrial, scientific, and medical equipment described in Part 18 of this chapter.

(d) Any part or component thereof which in use emits radio-frequency energy by radiation, conduction, or other means.

§ 2.803 Marketing of radio frequency devices prior to equipment authorization.

(a) Except as provided elsewhere in this chapter, no person shall sell or lease, or offer for sale or lease (including advertising for sale or lease), or import, ship or distribute for the purpose of selling or leasing or offering for sale or lease, any radio frequency device unless:

(1) In the case of a device subject to certification, such device has been authorized by the Commission in accordance with the rules in this chapter and is properly identified and labeled as required by §2.925 and other relevant sections in this chapter; or

(2) In the case of a device that is not required to have a grant of equipment authorization issued by the Commission, but which must comply with the specified technical standards prior to use, such device also complies with all applicable administrative (including verification of the equipment or authorization under a Declaration of Conformity, where required), technical, labeling and identification requirements specified in this chapter.

(d) Notwithstanding the provisions of paragraph (a) of this section, the offer for sale solely to business, commercial, industrial, scientific or medical users (but not an offer for sale to other parties or to end users located in a residential environment) of a radio frequency device that is in the conceptual, developmental, design or pre-production stage is permitted prior to equipment authorization or, for devices not subject to the equipment authorization requirements, prior to a determination of compliance with the applicable technical requirements *provided* that the prospective buyer is advised in writing at the time of the offer for sale that the equipment is subject to the FCC rules and that the equipment will comply with the appropriate rules before delivery to the buyer or to centers of distribution.

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(e)(1) Notwithstanding the provisions of paragraph (a) of this section, prior to equipment authorization or determination of compliance with the applicable technical requirements any radio frequency device may be operated, but not marketed, for the following purposes and under the following conditions:

(i) Compliance testing;

(ii) Demonstrations at a trade show provided the notice contained in paragraph (c) of this section is displayed in a conspicuous location on, or immediately adjacent to, the device;

(iii) Demonstrations at an exhibition conducted at a business, commercial, industrial, scientific or medical location, but excluding locations in a residential environment, provided the notice contained in paragraphs (c) or (d) of this section, as appropriate, is displayed in a conspicuous location on, or immediately adjacent to, the device;

(iv) Evaluation of product performance and determination of customer acceptability, provided such operation takes place at the manufacturer's facilities during developmental, design or pre-production states; or

(v) Evaluation of product performance and determination of customer acceptability where customer acceptability of a radio frequency device cannot be determined at the manufacturer's facilities because of size or unique capability of the device, provided the device is operated at a business, commercial, industrial, scientific or medical user's site, but not at a residential site, during the development, design or pre-production stages.

(e)(2) For the purpose of paragraphs (e)(1)(iv) and (e)(1)(v) of this section, the term *manufacturer's facilities* includes the facilities of the party responsible for compliance with the regulations and the manufacturer's premises, as well as the facilities of other entities working under the authorization of the responsible party in connection with the development and manufacture, but not the marketing, of the equipment.

(f) For radio frequency devices subject to verification and sold solely to business, commercial, industrial, scientific and medical users (excluding products sold to other parties or for operation in a residential environment), parties responsible for verification of the devices shall have the option of ensuring compliance with the applicable technical specifications of this chapter at each end user's location after installation, provided that the purchase or lease agreement includes a proviso that such a determination of compliance be made and is the responsibility of the party responsible for verification of the equipment.

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Certification & User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart J — Equipment Authorization Procedures:

§ 2.901 Basis and Purpose

(a) In order to carry out its responsibilities under the Communications Act and the various treaties and international regulations, and in order to promote efficient use of the radio spectrum, the Commission has developed technical standards for radio frequency equipment and parts or components thereof. The technical standards applicable to individual types of equipment are found in that part of the rules governing the service wherein the equipment is to be operated.[1] *In addition to the technical standards provided, the rules governing the service may require that such equipment be verified by the manufacturer or importer*, be authorized under a Declaration of Conformity, or receive an equipment authorization from the Commission by one of the following procedures: certification or registration.

(b) The following sections describe the verification procedure, the procedure for a Declaration of Conformity, and the procedures to be followed in obtaining certification from the Commission and the conditions attendant to such a grant.

§ 2.907 Certification.

(a) Certification is an equipment authorization issued by the Commission, based on representation and test data submitted by the applicant.

(b) Certification attaches to all units subsequently marketed by the grantee which are identical (see Section 2.908) to the sample tested except for permissive changes or other variations authorized by the Commission pursuant to Section 2.1043.

[1] In this case, the equipment is subject to the rules of Part 15. More specifically, the equipment falls under Subpart B (of Part 15), which deals with unintentional radiators.

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Certification & User's Manual Information

§ 2.948 Description of measurement facilities.

(a) Each party making measurements of equipment that is subject to an equipment authorization under Part 15 or Part 18 of this chapter, regardless of whether the measurements are filed with the Commission or kept on file by the party responsible for compliance of equipment marketed within the U.S. or its possessions, shall compile a description of the measurement facilities employed.

(1) If the measured equipment is subject to the verification procedure, the description of the measurement facilities shall be retained by the party responsible for verification of the equipment.

(i) If the equipment is verified through measurements performed by an independent laboratory, it is acceptable for the party responsible for verification of the equipment to rely upon the description of the measurement facilities retained by or placed on file with the Commission by that laboratory. In this situation, the party responsible for the verification of the equipment is not required to retain a duplicate copy of the description of the measurement facilities.

(ii) If the equipment is verified based on measurements performed at the installation site of the equipment, no specific site calibration data is required. It is acceptable to retain the description of the measurement facilities at the site at which the measurements were performed.

(2) If the equipment is to be authorized by the Commission under the certification procedure, the description of the measurement facilities shall be filed with the Commission's Laboratory in Columbia, Maryland. The data describing the measurement facilities need only be filed once but must be updated as changes are made to the measurement facilities or as otherwise described in this section. At least every three years, the organization responsible for filing the data with the Commission shall certify that the data on file is current.

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Certification & User's Manual Information

1. Label and User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart A — General:

§ 15.19 Labeling requirements.

(a) In addition to the requirements in Part 2 of this chapter, a device subject to certification or verification shall be labeled as follows:

(1) Receivers associated with the operation of a licensed radio service, e.g., FM broadcast under Part 73 of this chapter, land mobile operation under Part 90, etc., shall bear the following statement in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

(2) A stand-alone cable input selector switch, shall bear the following statement in a conspicuous location on the device:

This device is verified to comply with Part 15 of the FCC Rules for use with cable television service.

(3) All other devices shall bear the following statement in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

(4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified under paragraph (a) of this section is required to be affixed only to the main control unit.

(5) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

§ 15.21 Information to user.

The user's manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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Verification & User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart B — Unintentional Radiators:

§ 15.105 Information to the user.

(a) For a Class A digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at own expense.

(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

– Reorient or relocate the receiving antenna.

– Increase the separation between the equipment and receiver.

– Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

– Consult the dealer or an experienced radio/TV technician for help.

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ICES-003 Procedural & Labeling Requirements

From the Industry Canada Electromagnetic Compatibility Advisory Bulletin entitled, "Implementation and Interpretation of the Interference-Causing Equipment Standard for Digital Apparatus, ICES-003" (EMCAB-3, Issue 2, July 1995):

> "At present, CISPR 22: 2002 and ICES technical requirements are essentially equivalent. Therefore, if you have CISPR 22: 2002 approval by meeting CISPR Publication 22, the only additional requirements are: to attach a note to the report of the test results for compliance, indicating that these results are deemed satisfactory evidence of compliance with ICES-003 of the Canadian Interference-Causing Equipment Regulations; to maintain these records on file for the requisite five year period; and to provide the device with a notice of compliance in accordance with ICES-003."

Procedural Requirements:

According to Industry Canada's Interference Causing Equipment Standard for Digital Apparatus ICES-003 Issue 5 August 2012:

Section 6.1: A record of the measurements and results, showing the date that the measurements were completed, shall be retained by the manufacturer or importer for a period of at least five years from the date shown in the record and made available for examination on the request of the Minister.

Section 6.2: A written notice indicating compliance must accompany each unit of digital apparatus to the end user. The notice shall be in the form of a label that is affixed to the apparatus. Where because of insufficient space or other constraints it is not feasible to affix a label to the apparatus, the notice may be in the form of a statement in the users' manual.

Labeling Requirements:

The suggested text for the notice, in English and in French, is provided below, from the Annex of ICES-003:

> This Class [2] digital apparatus complies with Canadian ICES-003.
>
> Cet appareil numérique de la classe [1] est conforme à la norme NMB-003 du Canada.

[2] Insert either A or B but not both as appropriate for the equipment requirements.

End of Report

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