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December 30, 2009

Firetide, Inc.
16795 Lark Ave. Suite 200
Los Gatos, CA 95032

Dear Paul Richards,

Enclosed is the EMC Wireless test report for compliance testing of the Firetide, Inc., 7100 Indoor Unit as tested to the requirements of Title 47 of the CFR, Ch. 1 (10-1-06 ed.), Title 47 of the CFR, Part 15, Subpart B, Industry Canada ICES-003 Issue 4 February 2004 for Unintentional Radiators and Part 15.407, Industry Canada RSS-210, Issue 7, June 2007 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: (\Firetide, Inc.\EMCS81748A-FCC407 Rev. 1)

MET Laboratories, Inc. *Safety Certification - EMI - Telecom Environmental Simulation*
33439 WESTERN AVENUE ● UNION CITY, CALIFORNIA 94587-3201 ● PHONE (510) 489-6300 ● FAX (510) 489-6372

Electromagnetic Compatibility Criteria
Test Report

for the

Firetide, Inc.
Model 7100 Indoor Unit

Tested under
the Certification Rules
contained in
Title 47 of the CFR, Part 15, Subpart B and
ICES-003 Issue 4 February 2004
for Unintentional Radiators
and
Title 47 of the CFR, Part 15.407 and
Industry Canada RSS-210, Issue 7, June 2007
for Intentional Radiators

MET Report: EMCS81748A-FCC407 Rev. 1

December 30, 2009

Prepared For:

Firetide, Inc.
16795 Lark Ave. Suite 200
Los Gatos, CA 95032

Prepared By:
MET Laboratories, Inc.
914 W. Patapsco Ave.
Baltimore, MD 21230

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Industry Canada RSS-210, Issue 7, June 2007
for Intentional Radiators

Minh Ly, 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 Parts 15B, 15.407, of the FCC Rules and ICES-003 and RSS-210 of the Industry Canada rules under normal use and maintenance.

Shawn McMillen, Wireless Manager
Electromagnetic Compatibility Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
∅	October 28, 2009	Initial Issue.
1	December 30, 2009	Revised to correct Output Power plots for the 802.11n 40MHz bandwidth.

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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**er**z**
IEC	**I**nternational **E**lectrotechnical **C**ommission
kHz	**k**ilo**h**ert**z**
kPa	**k**ilo**pa**scal
kV	**k**ilovolt
LISN	**L**ine **I**mpedance **S**tabilization **N**etwork
MHz	**M**ega**h**ertz
µH	**microh**enry
µ	**microf**arad
µs	**micros**econds
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

I. Executive Summary

A. Purpose of Test

An EMC evaluation was performed to determine compliance of the Firetide, Inc. 7100 Indoor Unit, with the requirements of Part 15, §15.407. 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 7100 Indoor Unit. Firetide, Inc. should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the 7100 Indoor Unit, 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, §15.407, in accordance with Firetide, Inc., purchase order number 2475. All tests were conducted using measurement procedure ANSI C63.4-2003.

FCC Reference	Industry Canada Reference	Description	Results
15.107	ICES-003 Issue 4 February 2004	Conducted Emissions	Compliant
15.109		Radiated Emissions	Compliant
15.203	RSS-GEN 7.1.4	Antenna Requirements	Compliant
15.205/15.209	2.2	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Compliant
15.207	RSS-GEN 7.2.2; RSS-210 2.2	AC Conducted Emissions 150KHz – 30MHz	Compliant
15.403 (c)	A8.2	26dB Occupied Bandwidth	Compliant
15.407 (a)(1), (2), (3)	A9.2(3)	Conducted Transmitter Output Power	Compliant
15.407 (a)(1), (2), (3), (5)	A9.2(3)	Power Spectral Density	Compliant
15.407 (a)(6)	A8.2	Peak Excursion	Compliant
15.407 (b)(1), (2), (5), (6)	A9.3(4)	Undesirable Emissions	Compliant
15.407(f)	RSS-GEN	RF Exposure	Compliant
15.407(g)	2.1	Frequency Stability	Compliant

Table 1. Executive Summary of EMC Part 15.407 ComplianceTesting

II. Equipment Configuration

A. Overview

MET Laboratories, Inc. was contracted by Firetide, Inc. to perform testing on the 7100 Indoor Unit, under Firetide, Inc.'s purchase order number 2475.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Firetide, Inc. 7100 Indoor Unit.

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

Model(s) Tested:	7100 Indoor Unit		
Model(s) Covered:	7100 Indoor Unit		
EUT Specifications:	Primary Power: 12 VDC		
	FCC ID: REP-7100-1		
	Type of Modulations:	OFDM	
	Emission Designators:	802.11a:	16M6D7D
		802.11n 20MHz:	17M7D7D
		802.11n 40MHz:	36M9D7D
	Equipment Code:	NII	
	Peak RF Output Power:	802.11a:	15.55dBm
		802.11n 20MHz:	12.22dBm
		802.11n 40MHz:	11.97dBm
		MIMO All Ports:	16.57dBm
	EUT Frequency Ranges:	5180 MHz – 5240MHz	
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:	Minh Ly		
Report Date(s):	December 30, 2009		

Table 2. EUT Summary

B. References

CFR 47, Part 15, Subpart B	Electromagnetic Compatibility: Criteria for Radio Frequency Devices
CFR 47, Part 15, Subpart E	Unlicensed National Information Infrastructure Devices (UNII)
RSS-210, Issue 7, June 2007	Low-power Licence-exempt Radiocommunications Devices (All Frequency Bands): Category I Equipment
ICES-003, Issue 4 February 2004	Electromagnetic Compatibility: Criteria for Radio Frequency Devices
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
ANSI/NCSL Z540-1-1994	Calibration Laboratories and Measuring and Test Equipment - General Requirements
ANSI/ISO/IEC 17025:2000	General Requirements for the Competence of Testing and Calibration Laboratories

Table 3. References

C. Test Site

All testing was performed at MET Laboratories, Inc., 3162 Belick Street, Santa Clara, CA 95054. 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 10 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.

D. Description of Test Sample

The Firetide, Inc. 7100 Indoor Unit, is a Dual Radio Wireless Mesh Node.

Photograph 1. Firetide, Inc. 7100 Indoor Unit

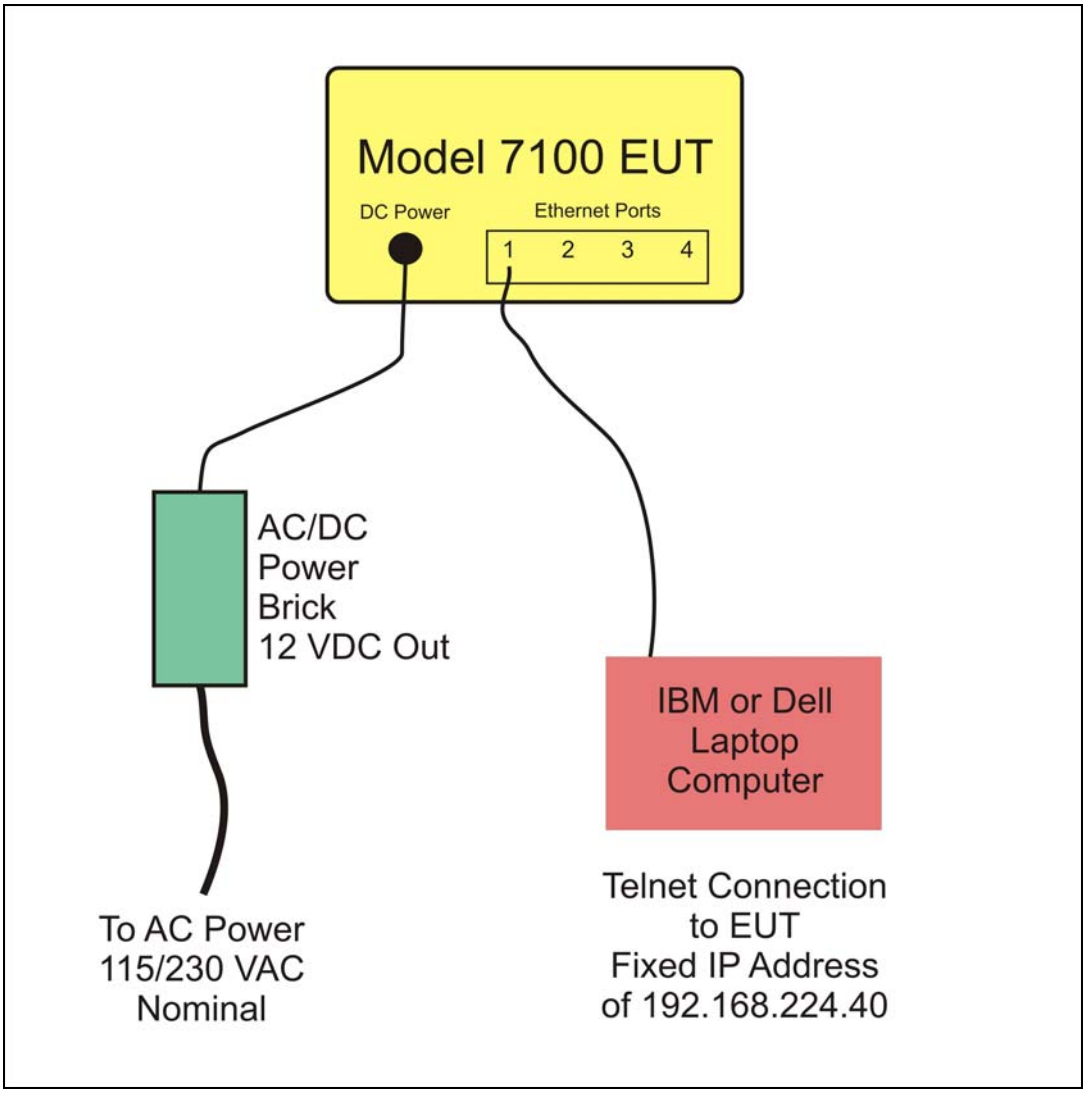


Figure 1. Block Diagram of Test Configuration

E. Equipment Configuration

The EUT was set up as outlined in Figure 1, Block Diagram of Test Setup. All cards, racks, etc., incorporated as part of the EUT is included in the following list.

Ref. ID	Slot #	Name / Description	Model Number	Part Number	Serial Number	Rev. #
N/A	N/A	HOTPORT INDOOR MESH NODE	7100	7100	N/A	1

Table 4. Equipment Configuration

F. Support Equipment

Firetide, Inc. supplied support equipment necessary for the operation and testing of the 7100 Indoor Unit. All support equipment supplied is listed in the following Support Equipment List.

Ref. ID	Name / Description	Manufacturer	Model Number	*Customer Supplied Calibration Data
N/A	LAPTOP COMPUTER	IBM	T42	N/A
N/A	LAPTOP COMPUTER	DELL	N/A	N/A
N/A	AC/DC POWER BRICK	FSP GROUPINC.	FSP040-1ADF03A	N/A

Table 5. Support Equipment

* The 'Customer Supplied Calibration Data' column will be marked as either not applicable, not available, or will contain the calibration date supplied by the customer.

G. Ports and Cabling Information

Ref. ID	Port name on EUT	Cable Description or reason for no cable	Qty.	Length (m)	Shielded (Y/N)	Termination Box ID & Port Name
N/A	PORT 1	ETHERNET	1	1.5	N	LAPTOP
N/A	PORT 2 – 4	NOT CONNECTED; ONLY 1 ETHERNET CONNECTION IS NECESSARY TO COMMUNICATE WITH EUT	N/A	N/A	N/A	N/A
N/A	POWER	DC POWER IN FROM POWER BRICK; 2.1 MM PLUG	1	1	N	N/A
N/A	USB	NOT USED; DISABLED	N/A	N/A	N/A	N/A

Table 6. Ports and Cabling Information

H. Mode of Operation

The UUT has the Atheros Radio Test (ART) software loaded. The UUT can be put into continuous TX or RX using ART. The Mesh Node has a default IP address of 192.168.224.150. An external computer can ping this address to verify the Ethernet PHY and processor are running.

I. Method of Monitoring EUT Operation

An external computer can ping this address to verify the Ethernet PHY and processor are running.

J. Modifications

a) Modifications to EUT

No modification 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 Firetide, Inc. upon completion of testing.

III. Electromagnetic Compatibility Criteria for Unintentional Radiators

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.

* -- Limits per Subsection 15.207(a).

Table 7. Conducted Limits for Radio Frequency Devices calculated from FCC Part 15 Subsections 15.107(a) (b) and 15.207(a)

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

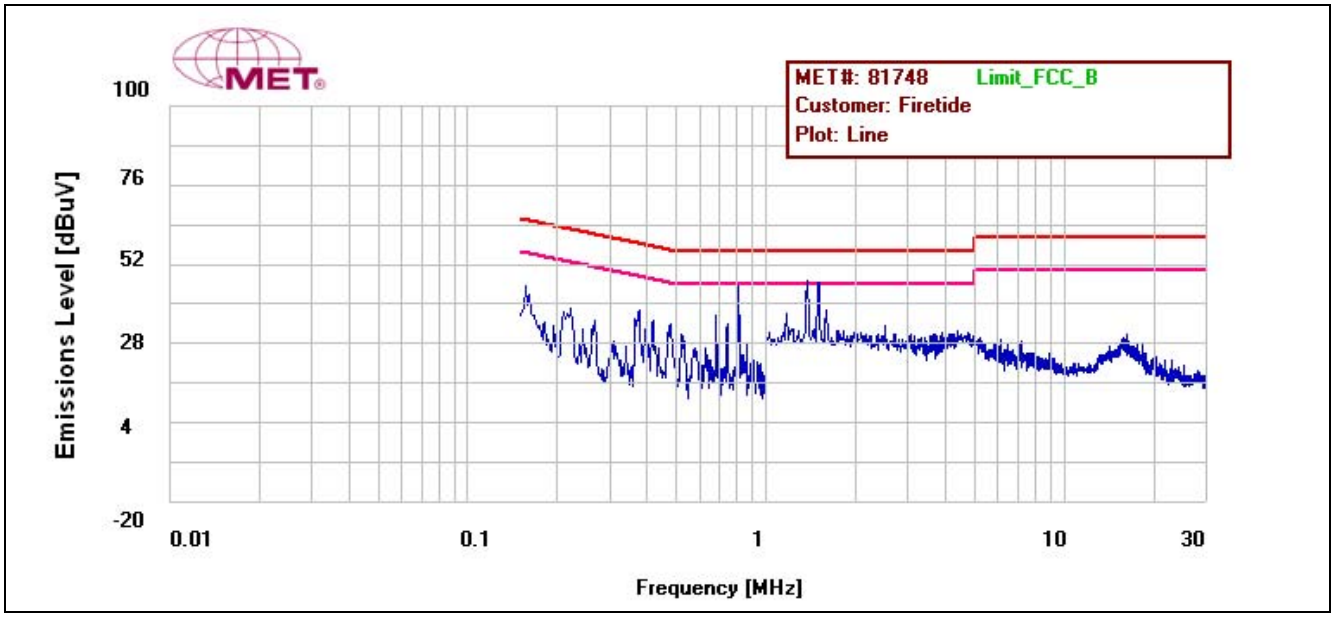
Test Engineer(s): Minh Ly

Test Date(s): 08/06/09

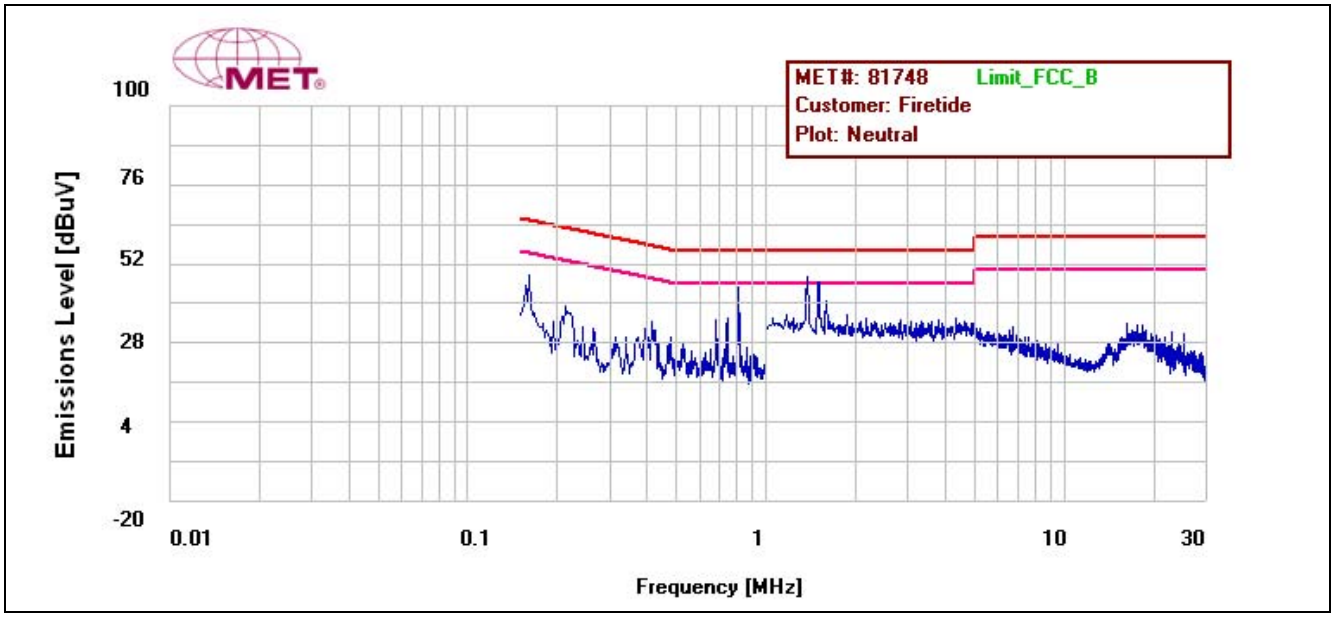
Conducted Emissions - Voltage, AC Power

Line	Freq (MHz)	QP Amplitude	QP Limit	Delta	Pass	Average Amplitude	Average Limit	Delta	Pass
Line	0.809	48.48	56	-7.52	Pass	44.48	46	-1.52	Pass
Line	1.37	45.08	56	-10.92	Pass	41.72	46	-4.28	Pass
Line	1.5	42.8	56	-13.2	Pass	40.39	46	-5.61	Pass
Neutral	0.810	47.88	56	-8.12	Pass	44.88	46	-1.12	Pass
Neutral	1.371	45.01	56	-10.99	Pass	42.16	46	-3.84	Pass
Neutral	1.5	40.76	56	-15.24	Pass	39.93	46	-6.07	Pass

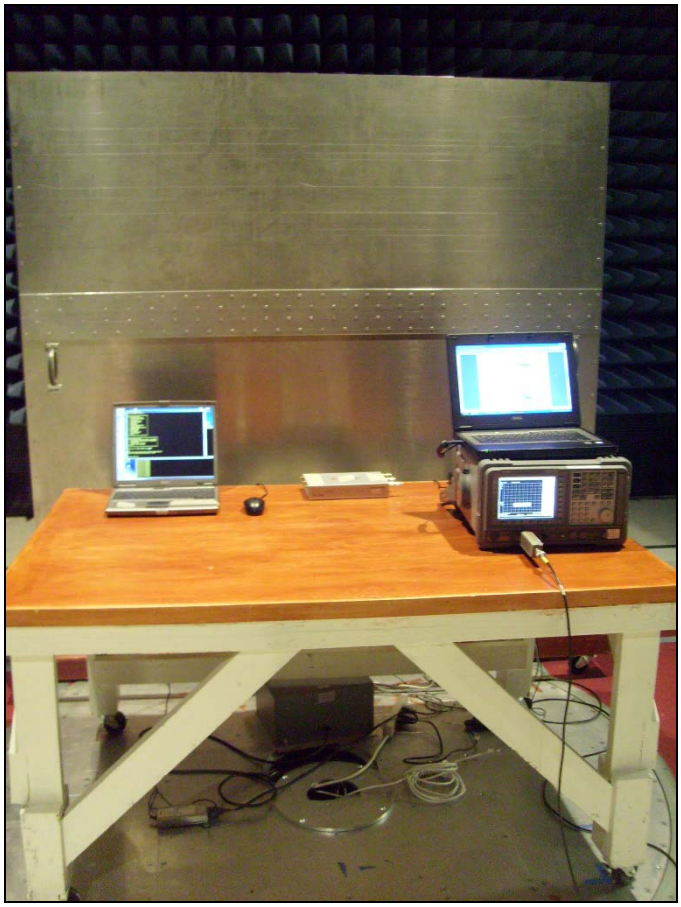
Table 8. Conducted Emissions - Voltage, AC Power, Test Results



Plot 1. Conducted Emission, Phase Line Plot



Plot 2. Conducted Emission, Neutral Line Plot



Photograph 2. Conducted Emissions Test Setup

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 9.

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 9.

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

Test Procedures: The EUT was placed on a 0.8m-high wooden table 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 found to comply with the Class A requirement(s) of this section. Measured emissions were below applicable limits.

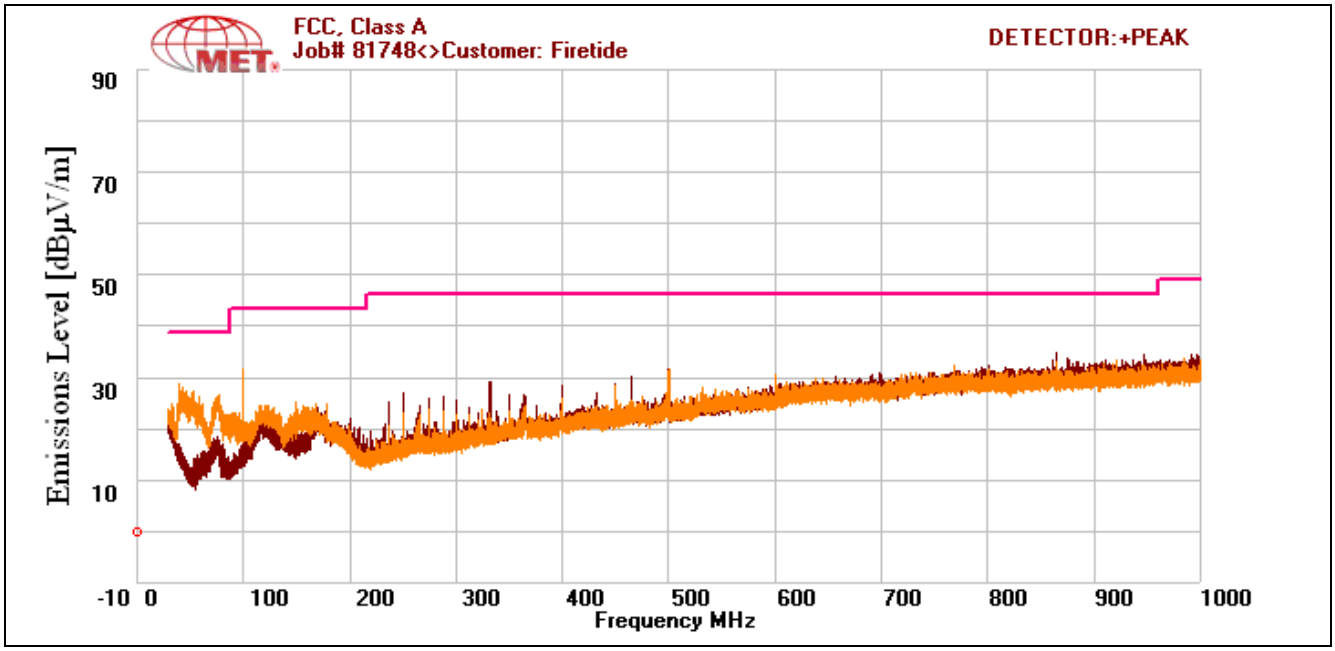
Test Engineer(s): Minh Ly

Test Date(s): 08/10/09

Radiated Emissions Limits Test Results, Class A

Frequency (MHz)	Antenna Polarity	EUT Azimuth (Degrees)	Antenna Height (cm)	Uncorrected Amplitude (dBuV)	ACF (dB/m)	Pre Amp Gain (dB)	CBL (dB)	DCF (dB)	Corrected Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)
100	V	134	100	27.52	12.7	0	2.47	-10.46	32.23	43.5	-11.27
500	V	193	100	19.49	17.6	0	5.74	-10.46	32.37	46.4	-14.03
42.4	V	139	100	25.2	10.7	0	1.565	-10.46	27.005	39	-11.995
100	H	81	253	23.3	11.1	0	2.47	-10.46	26.41	43.5	-17.09
332	H	0	100	18.48	14.74	0	4.636	-10.46	27.396	46.4	-19.004
500	H	197	205	17.8	18	0	5.74	-10.46	31.08	46.4	-15.32

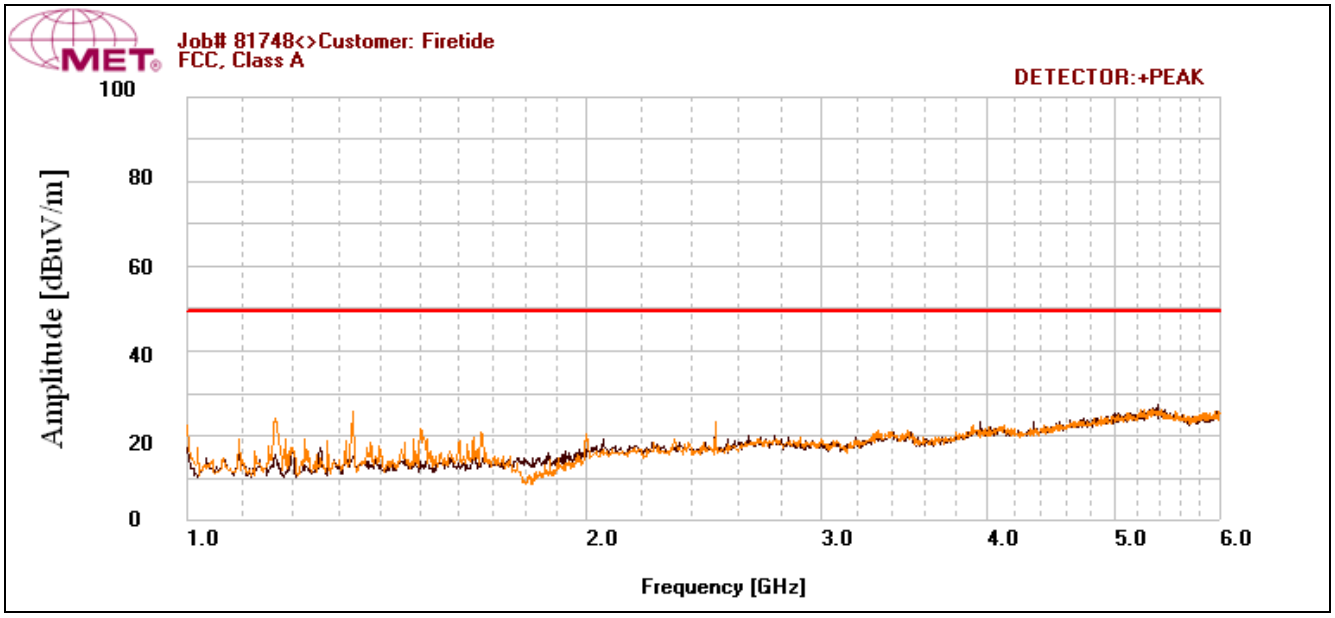
Table 10. Radiated Emissions, Test Results, FCC Limits, 30 MHz – 1 GHz



Plot 3. Radiated Emissions, Pre-Scan, FCC Limits, 30 MHz – 1 GHz

Frequency (MHz)	Antenna Polarity	EUT Azimuth (Degrees)	Antenna Height (cm)	Uncorrected Amplitude (dBuV)	ACF (dB/m)	Pre Amp Gain (dB)	CBL (dB)	DCF (dB)	Corrected Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2250	H	91	100	49.24	1.485	34.555	2.187	-10.46	7.897	49.5	-41.603
5000	H	0	100	44.36	8.299	34.415	4.13	-10.46	11.914	49.5	-37.586
1260	V	29	100	51.53	-1.552	35.258	1.686	-10.46	5.946	49.5	-43.554
1328	V	193	100	59.13	-1.636	35.155	1.724	-10.46	13.603	49.5	-35.897
5000	V	0	100	45.28	8.299	34.415	4.13	-10.46	12.834	49.5	-36.666

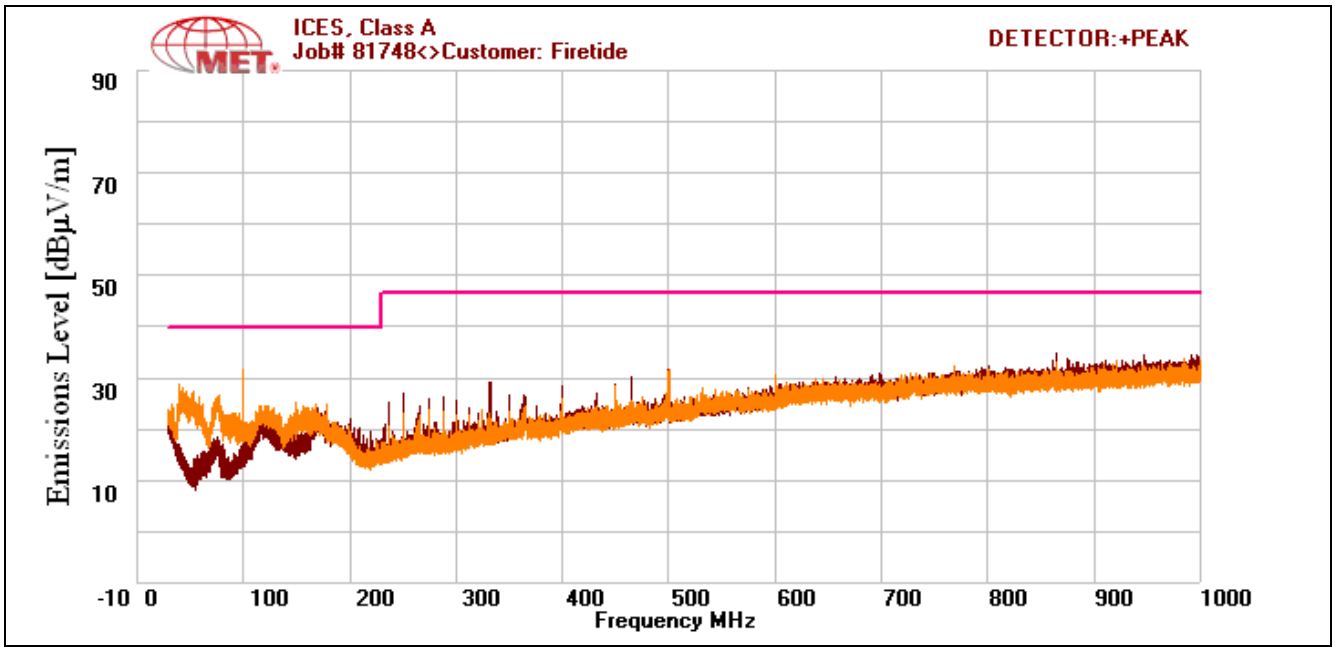
Table 11. Radiated Emissions, Test Results, FCC Limits, 1GHz – 6GHz



Plot 4. Radiated Emissions, Pre-Scan, FCC Limits, 1 GHz – 6 GHz

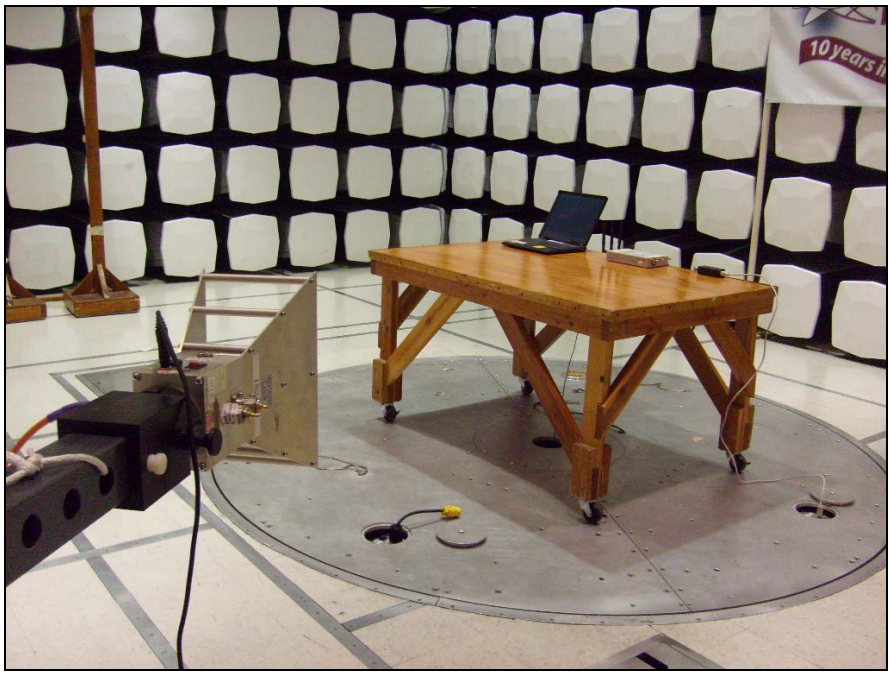
Frequency (MHz)	Antenna Polarity	EUT Azimuth (Degrees)	Antenna Height (cm)	Uncorrected Amplitude (dBuV)	ACF (dB/m)	Pre Amp Gain (dB)	CBL (dB)	DCF (dB)	Corrected Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)
100	V	134	100	27.52	12.7	0	2.47	-10.46	32.23	40	-7.77
500	V	193	100	19.49	17.6	0	5.74	-10.46	32.37	47	-14.63
42.4	V	139	100	25.2	10.7	0	1.565	-10.46	27.005	40	-12.995
100	H	81	253	23.3	11.1	0	2.47	-10.46	26.41	40	-13.59
332	H	0	100	18.48	14.74	0	4.636	-10.46	27.396	47	-19.604

Table 12. Radiated Emissions, Test Results, ICES-003 Limits, 30 MHz – 1 GHz



Plot 5. Radiated Emissions, Pre-Scan, ICES-003 Limits, 30 MHz – 1 GHz

Photograph 3 Radiated Emission Test Setup 30 MHz – 1 GHz



Photograph 4. Radiated Emission Test Setup 1 GHz – 6 GHz

IV. Electromagnetic Compatibility Criteria for Intentional Radiators

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 is compliant with the §15.203 criteria. The 7100 Indoor Unit uses a unique type of connector to attach to the EUT.

Gain/Type	Model	Manufacturer
5dBi Omni (5GHz)	C812-510012-A	Wha Yu

Table 13. Antenna Information

Test Engineer(s): Minh Ly

Test Date(s): 09/02/09

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.207 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 Ω 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 14. 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 semi-anechoic chamber. 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 C63.4-1992 "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.

Test Results: The EUT was found to comply with the requirement(s) of this section. Measured emissions were below applicable limits.

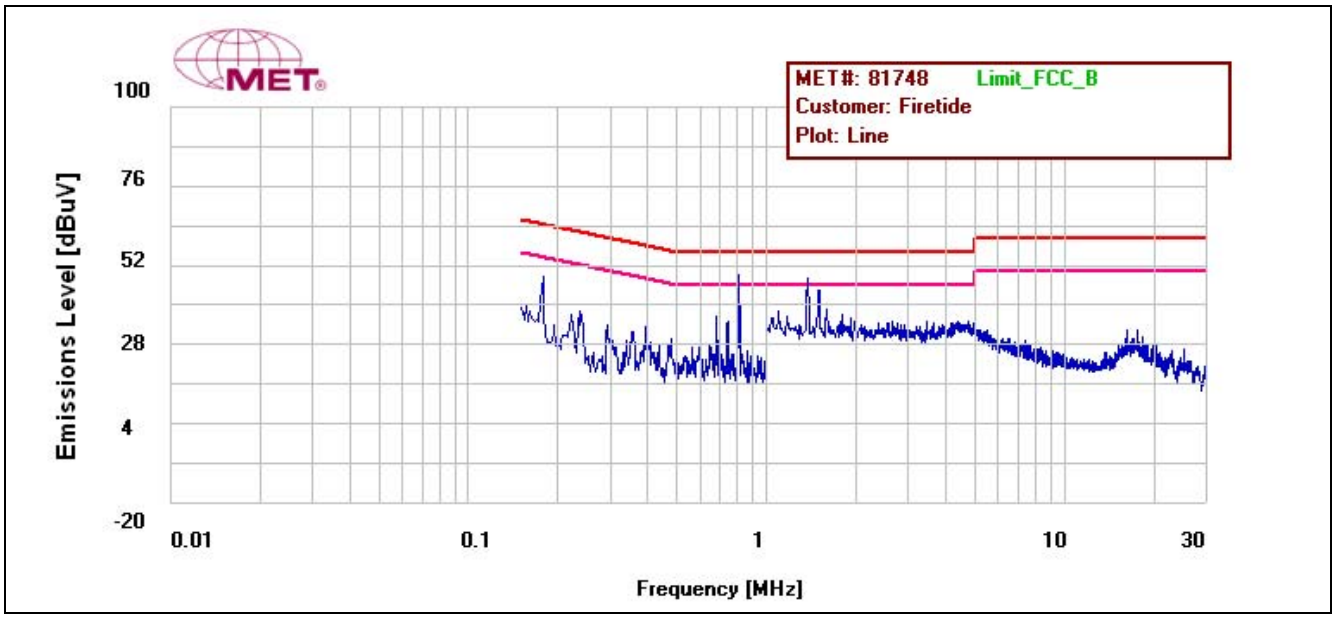
Test Engineer(s): Minh Ly

Test Date(s): 08/06/09

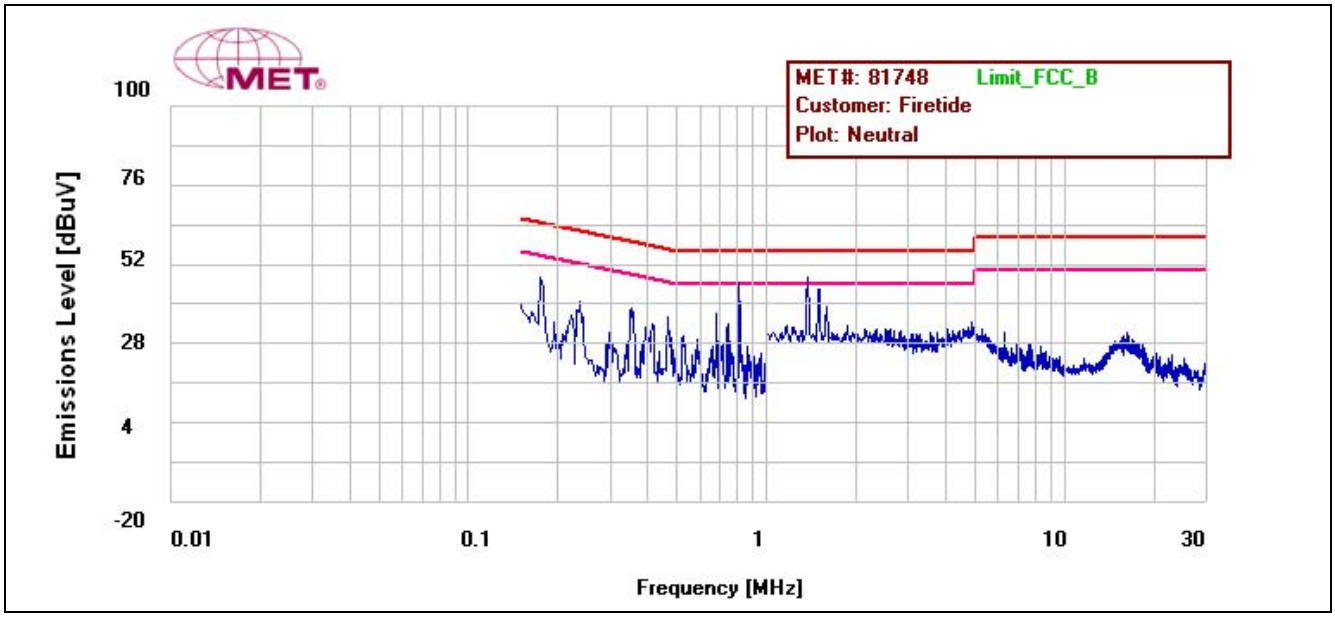
Conducted Emissions - Voltage, AC Power

Line	Freq (MHz)	QP Amplitude	QP Limit	Delta	Pass	Average Amplitude	Average Limit	Delta	Pass
Line	0.81	48.12	56	-7.88	Pass	44.49	46	-1.51	Pass
Line	1.37	45.92	56	-10.08	Pass	41.87	46	-4.13	Pass
Line	1.5	40.81	56	-15.19	Pass	40.63	46	-5.37	Pass
Neutral	0.809	45.55	56	-10.45	Pass	43.78	46	-2.22	Pass
Neutral	1.37	46.16	56	-9.84	Pass	41.91	46	-4.09	Pass
Neutral	1.5	43.79	56	-12.21	Pass	40.02	46	-5.98	Pass

Table 15. Conducted Emissions - Voltage, AC Power, Test Results



Plot 6. §15.207 Conducted Emissions, Phase Line Plot, 7100 Indoor Unit



Plot 7. §15.207 Conducted Emissions, Neutral Line Plot, 7100 Indoor Unit

Photograph 5. Conducted Emissions, Test Setup

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15. 403(c) 26dB Bandwidth

Test Requirements: **§ 15.403 (c):** Operation under the provisions of this section is limited to frequency hopping and digitally modulated intentional radiators that comply with the following provisions:

Test Procedure: The transmitter was set to the mid channel at the highest output power and connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using a RBW approximately equal to 1% of the total emission bandwidth, VBW > RBW. The 26 dB Bandwidth was measured and recorded. The measurements were repeated at the low and high channels.

Test Results Equipment complies with § 15.407 (c). The 26 dB Bandwidth was determined from the plots on the following pages.

Test Engineer(s): Minh Ly

Test Date(s): 07/28/09 – 08/11/09

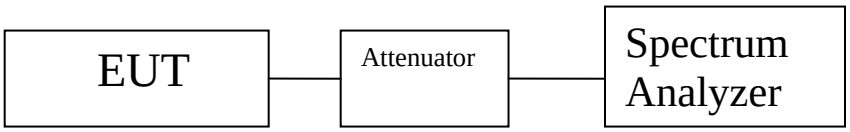


Figure 2. Occupied Bandwidth Test Setup

Occupied Bandwidth, Port 1			
Mode	**Frequency (MHz)**	**99 % Bandwidth (MHz)**	**Measured 26 dB Bandwidth (MHz)**
802.11a	5180	16.4999	23.862
	5240	16.6734	21.189
802.11n 20MHz	5180	17.6727	22.807
	5240	17.7090	23.328
802.11n 40MHz	5190	36.9103	50.761
	5230	36.6544	45.075

Table 16. Occupied Bandwidth, Port 1, Test Results

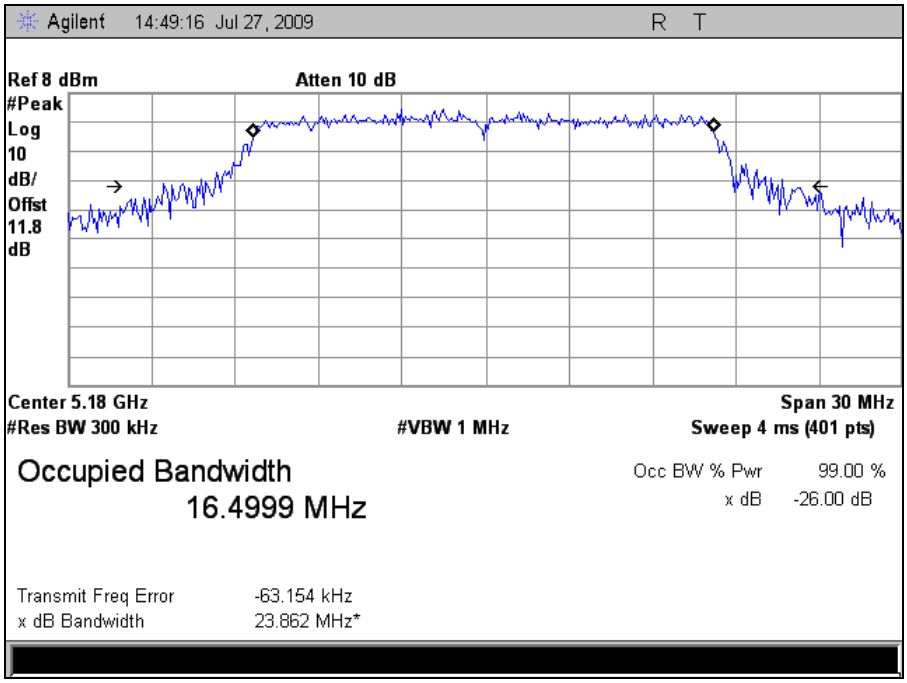
Occupied Bandwidth, Port 2			
Mode	**Frequency (MHz)**	**99 % Bandwidth (MHz)**	**Measured 26 dB Bandwidth (MHz)**
802.11n 20MHz	5180	17.7645	23.516
	5240	17.7915	23.033
802.11n 40MHz	5190	36.6272	46.111
	5230	36.7027	46.245

Table 17. Occupied Bandwidth, Port 2, Test Results

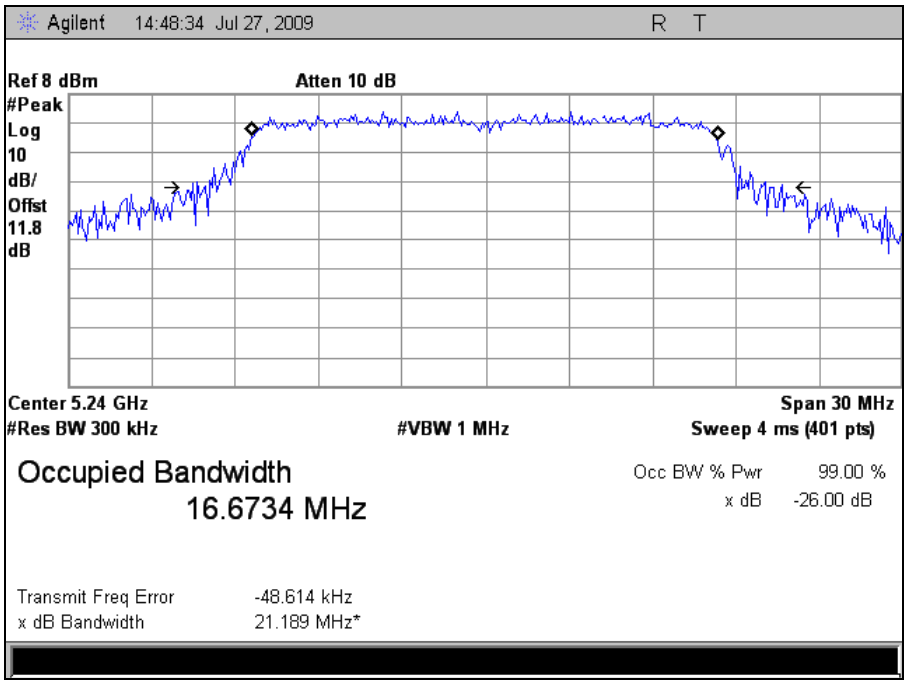
Occupied Bandwidth, Port 3			
Mode	**Frequency (MHz)**	**99 % Bandwidth (MHz)**	**Measured 26 dB Bandwidth (MHz)**
802.11n 20MHz	5180	17.7794	23.976
	5240	17.7421	23.454
802.11n 40MHz	5190	36.7797	46.761
	5230	36.8511	46.801

Table 18. Occupied Bandwidth, Port 3, Test Results

Occupied Bandwidth, Port 1

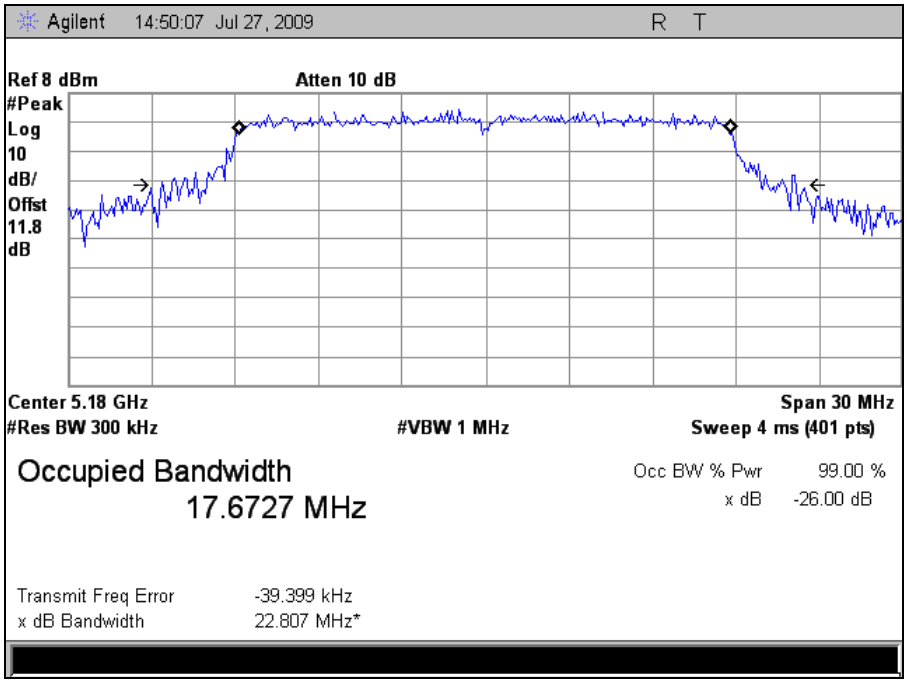


Plot 8. Occupied Bandwidth, Port 1, 802.11a, 5180 MHz

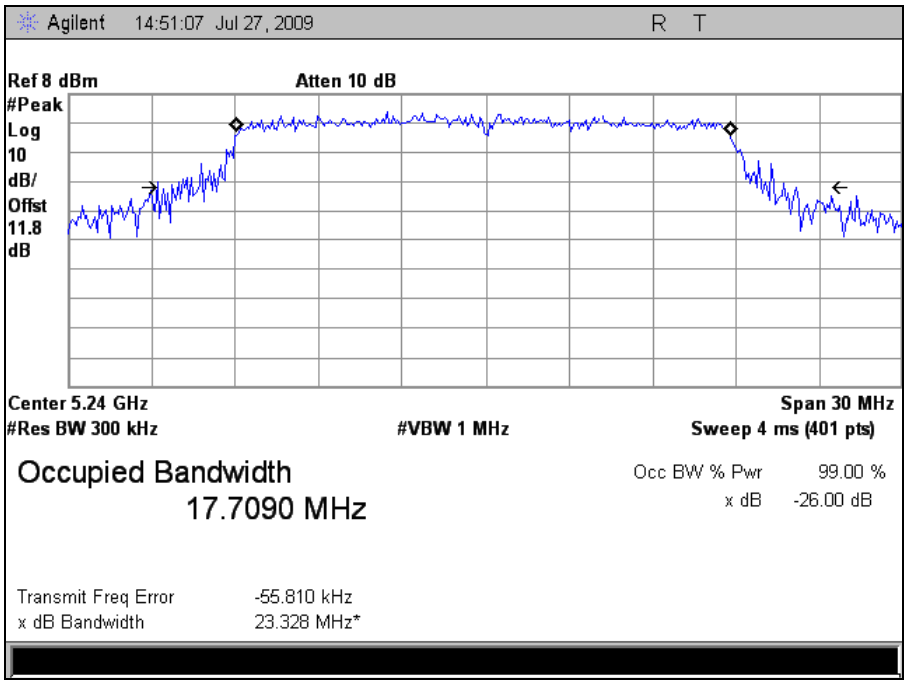


Plot 9. Occupied Bandwidth, Port 1, 802.11a, 5240 MHz

Occupied Bandwidth, Port 1, 802.11n 20MHz

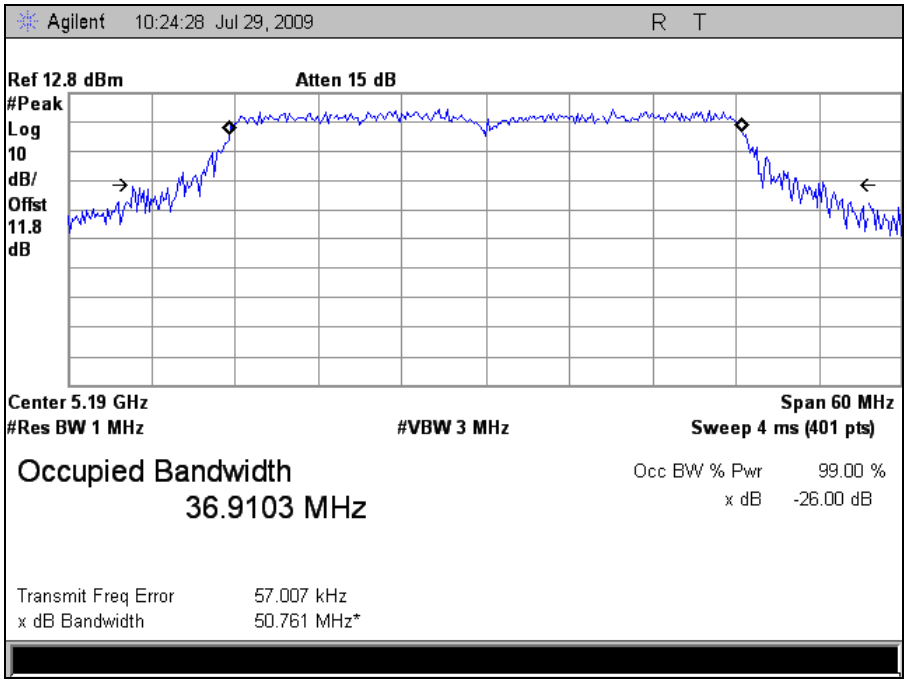


Plot 10. Occupied Bandwidth, Port 1, 802.11n 20MHz, 5180 MHz

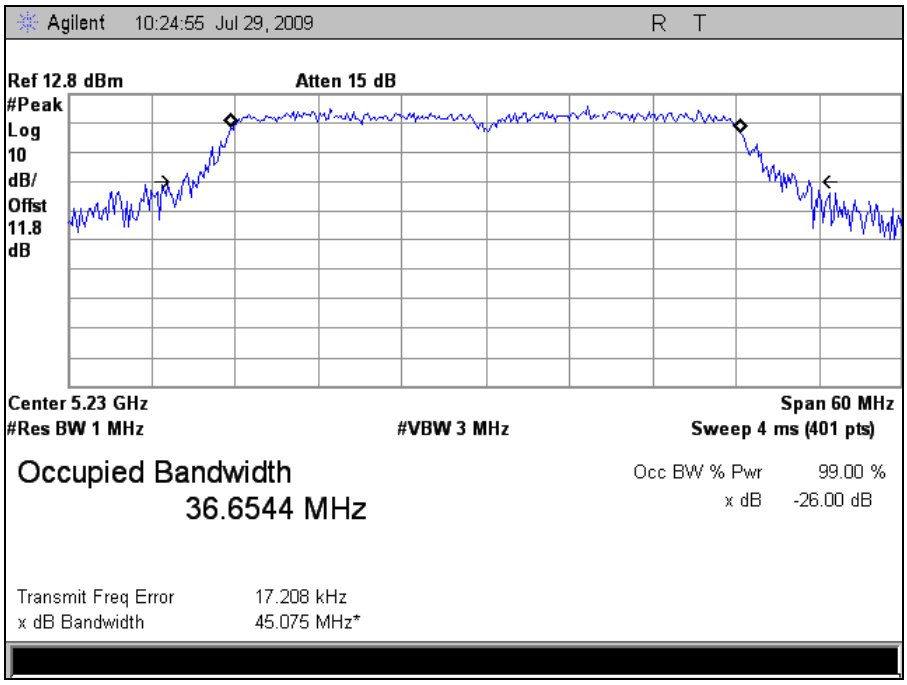


Plot 11. Occupied Bandwidth, Port 1, 802.11n 20MHz, 5240 MHz

Occupied Bandwidth, Port 1, 802.11n 40MHz

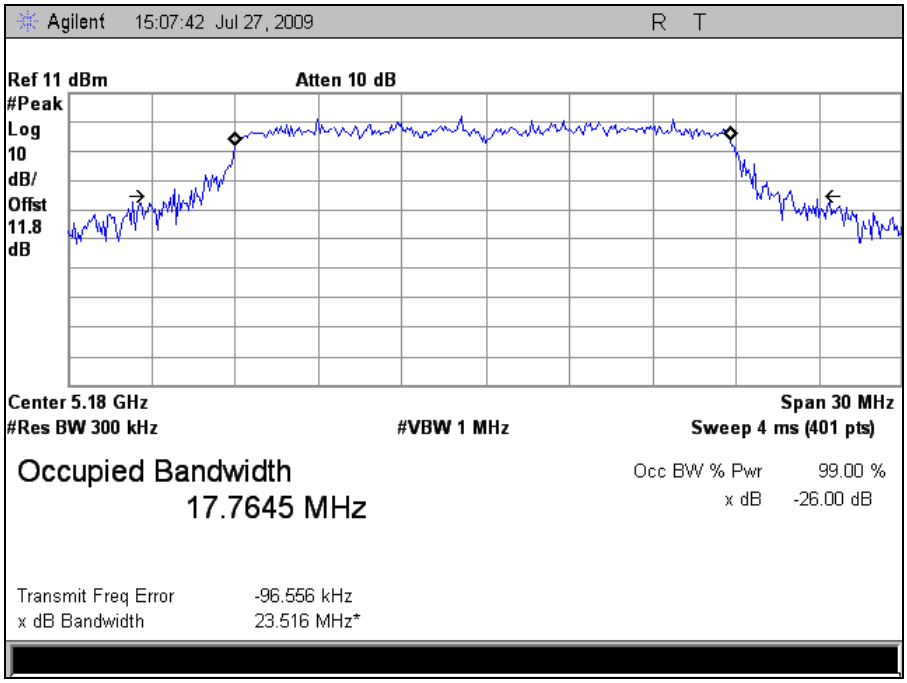


Plot 12. Occupied Bandwidth, Port 1, 802.11n 40MHz, 5190 MHz

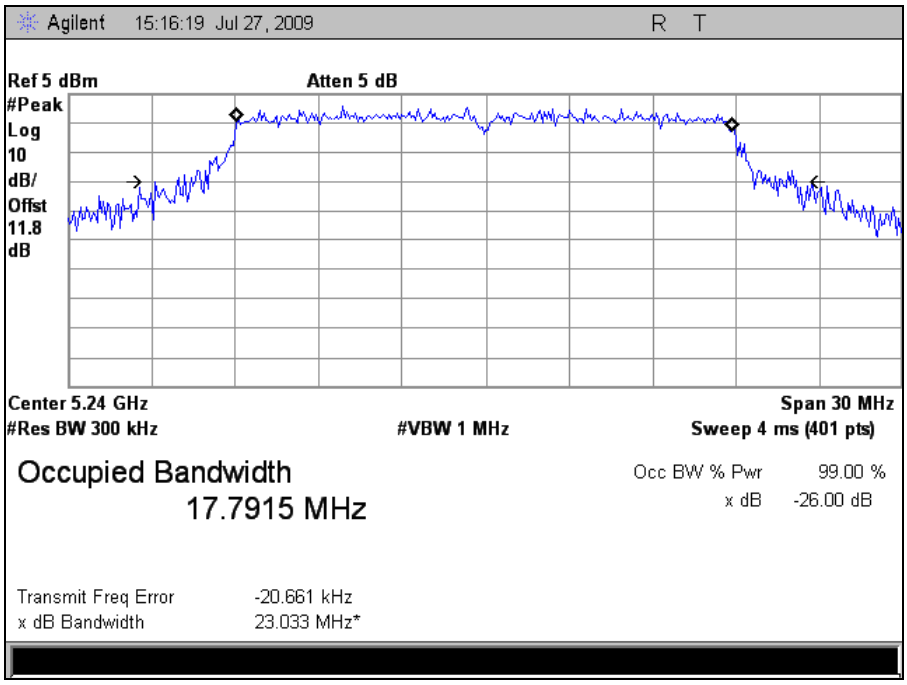


Plot 13. Occupied Bandwidth, Port 1, 802.11n 40MHz, 5230 MHz

Occupied Bandwidth, Port 2, 802.11n 20MHz

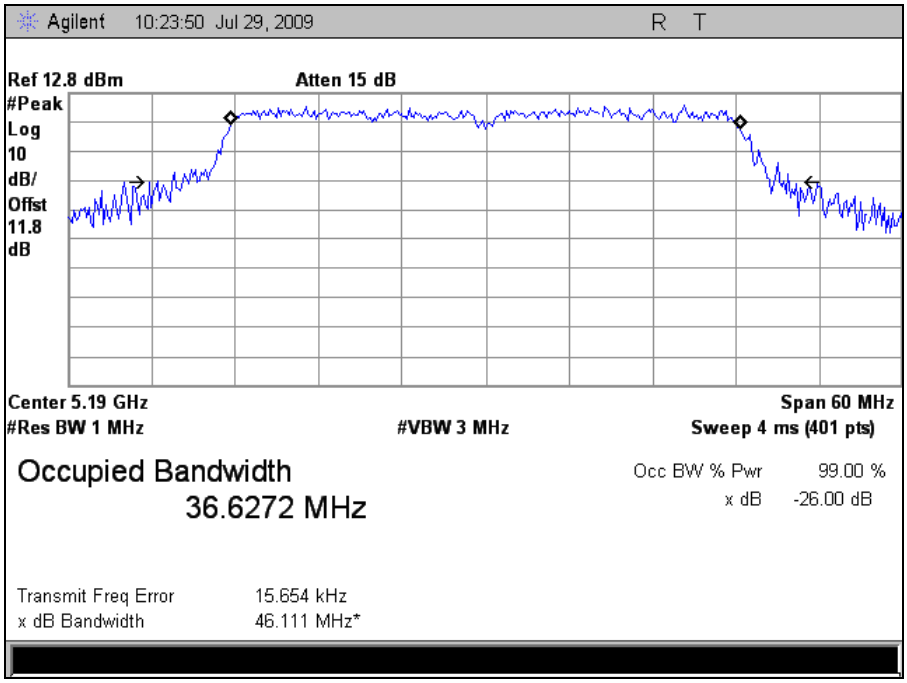


Plot 14. Occupied Bandwidth, Port 2, 802.11n 20MHz, 5180 MHz

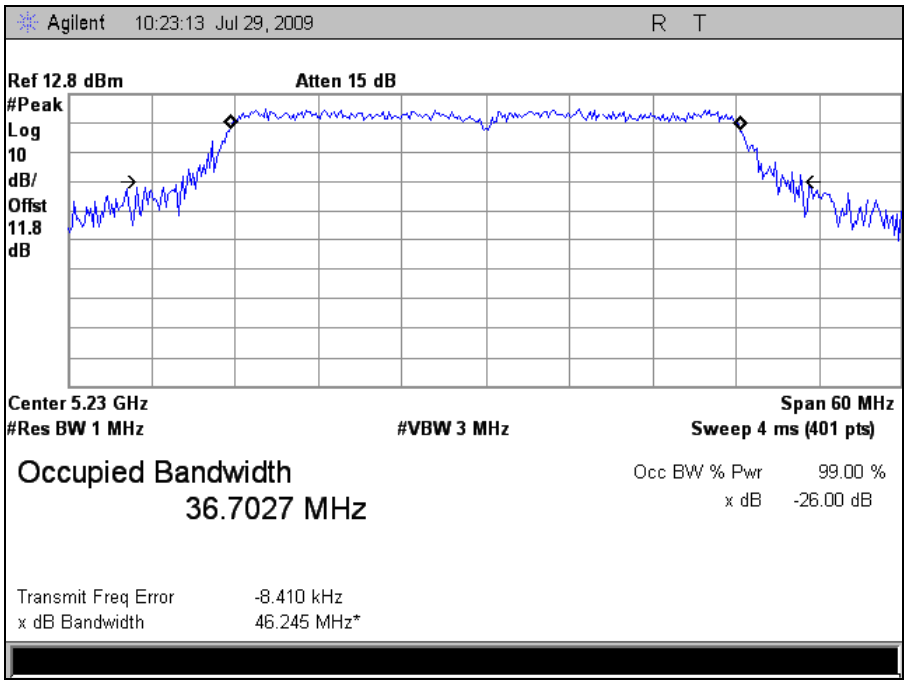


Plot 15. Occupied Bandwidth, Port 2, 802.11n 20MHz, 5240 MHz

Occupied Bandwidth, Port 2, 802.11n 40MHz

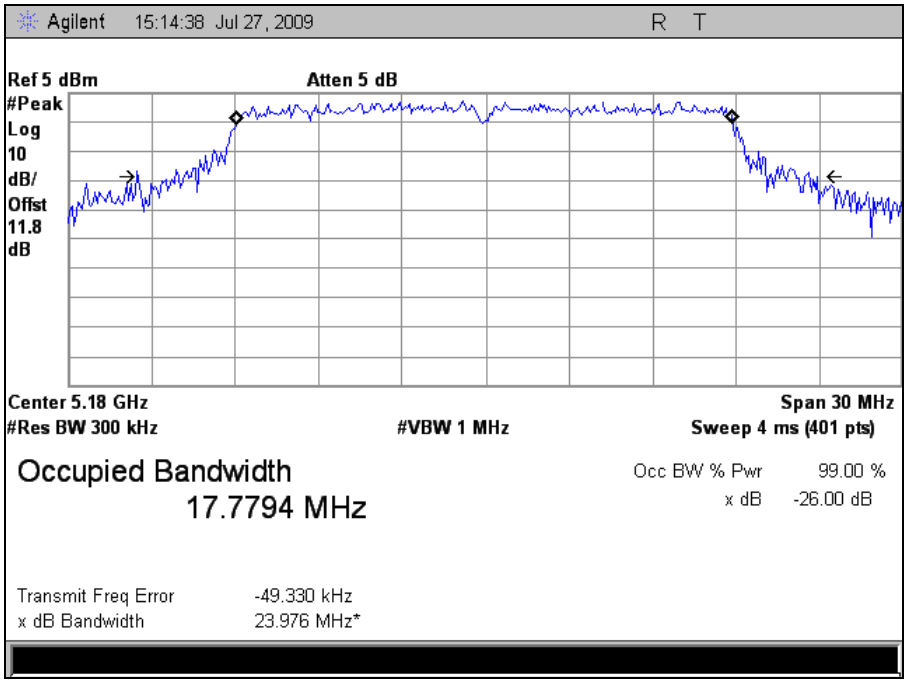


Plot 16. Occupied Bandwidth, Port 2, 802.11n 40MHz, 5190 MHz

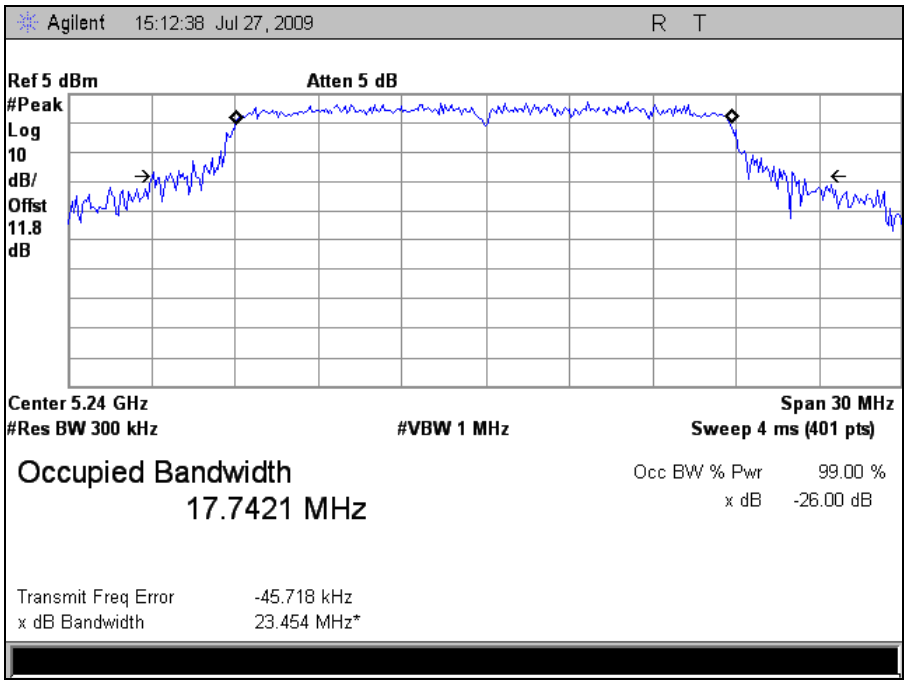


Plot 17. Occupied Bandwidth, Port 2, 802.11n 40MHz, 5230 MHz

Occupied Bandwidth, Port 3, 802.11n 20MHz

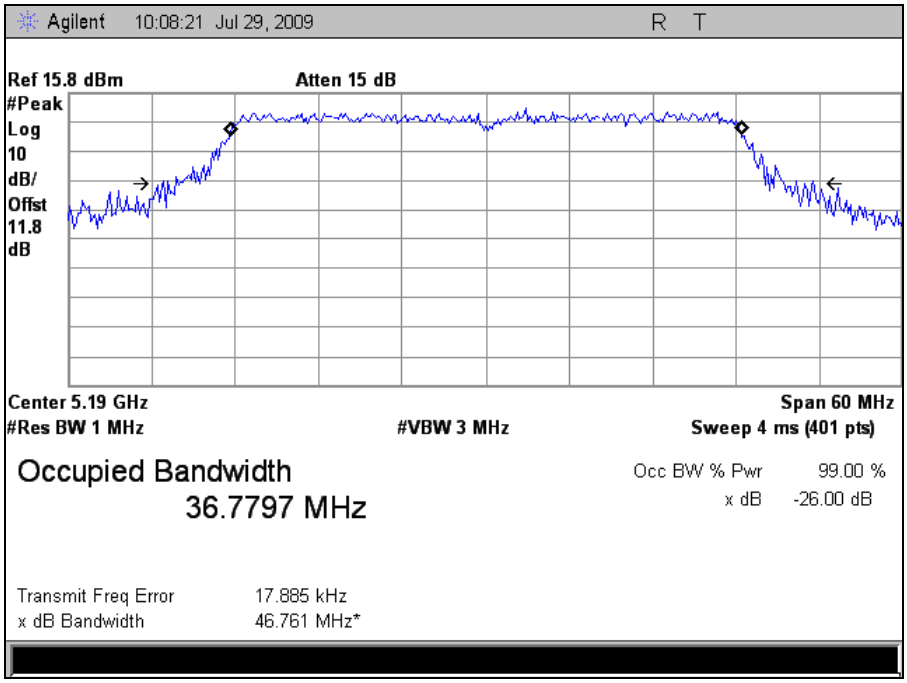


Plot 18. Occupied Bandwidth, Port 3, 802.11n 20MHz, 5180 MHz

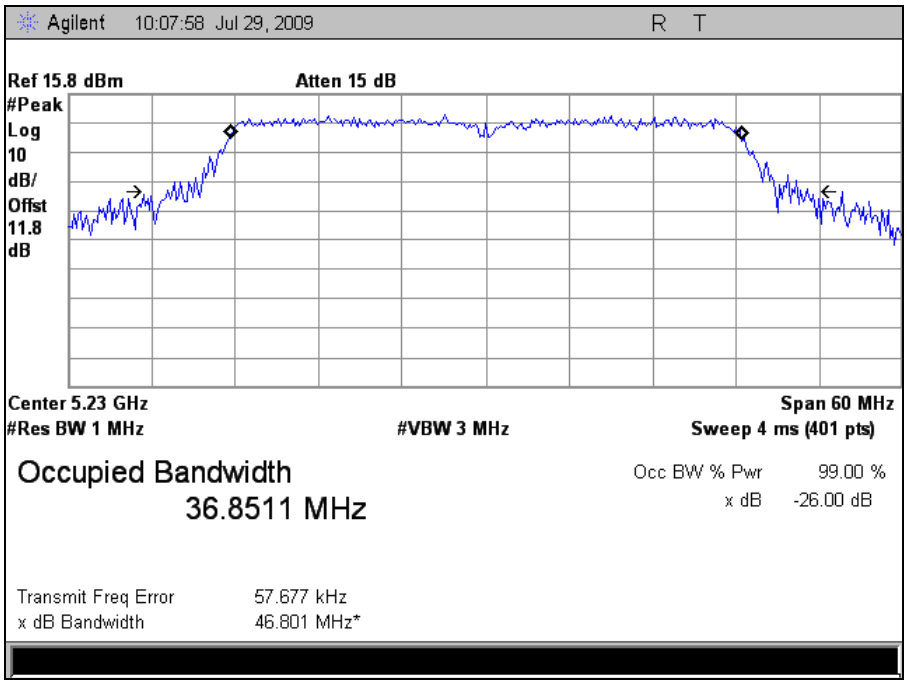


Plot 19. Occupied Bandwidth, Port 3, 802.11n 20MHz, 5240 MHz

Occupied Bandwidth, Port 3, 802.11n 40MHz



Plot 20. Occupied Bandwidth, Port 3, 802.11n 40MHz, 5190 MHz



Plot 21. Occupied Bandwidth, Port 3, 802.11n 40MHz, 5230 MHz

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15. 407(a) (1) RF Power Output

Test Requirements: **§15.407(a) (1):** The maximum output power of the intentional radiator shall not exceed the following:

Digital Transmission Systems (MHz)	Output Limit (mW)
5150-5250	50
5250-5350	250

Table 19. Output Power Requirements from §15.407

§15.407(a) (1): For the band 5.15-5.25 GHz the peak transmit power over the frequency band of operation shall not exceed the lesser 50mW or 4dBm + 10logB, where B is the 26-dB emission bandwidth in MHz.

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 with the data rate that produced the highest output power.

Test Results: Equipment complies with the Peak Power Output limits of **§ 15.401(a) (1).**

Test Engineer(s): Minh Ly

Test Date(s): 07/28/09 - 08/11/09

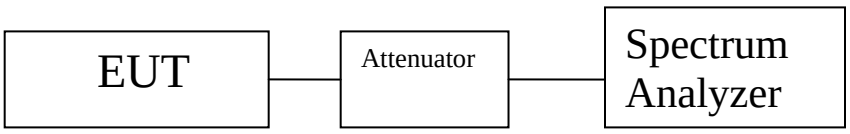


Figure 3. Peak Power Output Test Setup

7100 Indoor, Port 1			
Mode	**Frequency (MHz)**		**Measured Output Power (dBm)**
802.11a	UNII-1	5180	15.55
		5240	14.63
802.11n 20MHz	UNII-1	5180	10.46
		5240	11.90
802.11n 40MHz	UNII-1	5190	11.37
		5230	11.68

Table 20. RF Power Output, Test Results, Port 1

7100 Indoor, Port 2			
Mode	**Frequency (MHz)**		**Measured Output Power (dBm)**
802.11n 20MHz	UNII-1	5180	11.37
		5240	11.22
802.11n 40MHz	UNII-1	5190	11.73
		5230	11.97

Table 21. RF Power Output, Test Results, Port 2

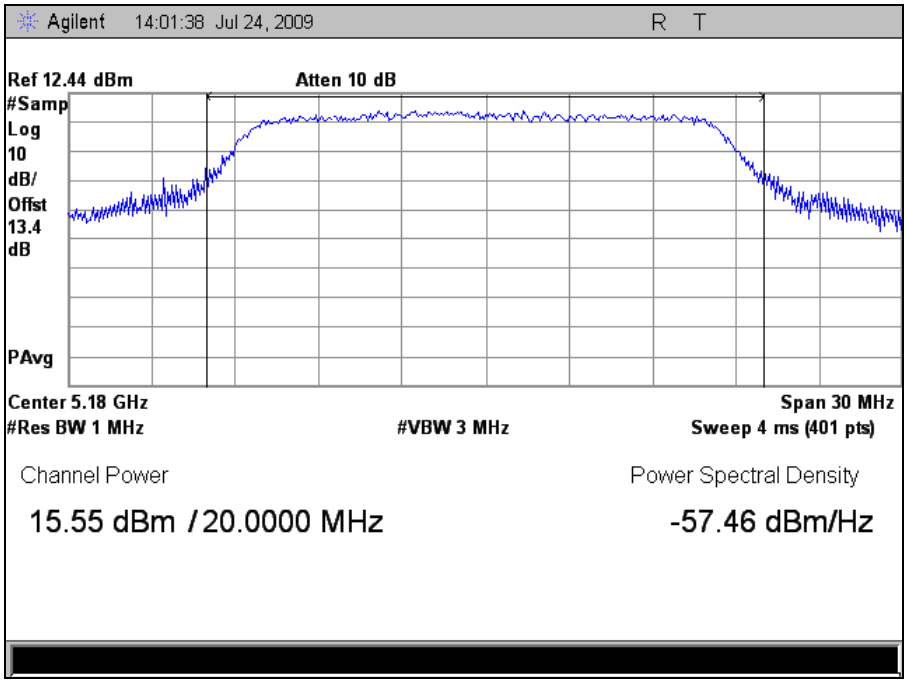
7100 Indoor, Port 3			
Mode	**Frequency (MHz)**		**Measured Output Power (dBm)**
802.11n 20MHz	UNII-1	5180	11.34
		5240	12.22
802.11n 40MHz	UNII-1	5190	11.06
		5230	11.16

Table 22. RF Power Output, Test Results, Port 3

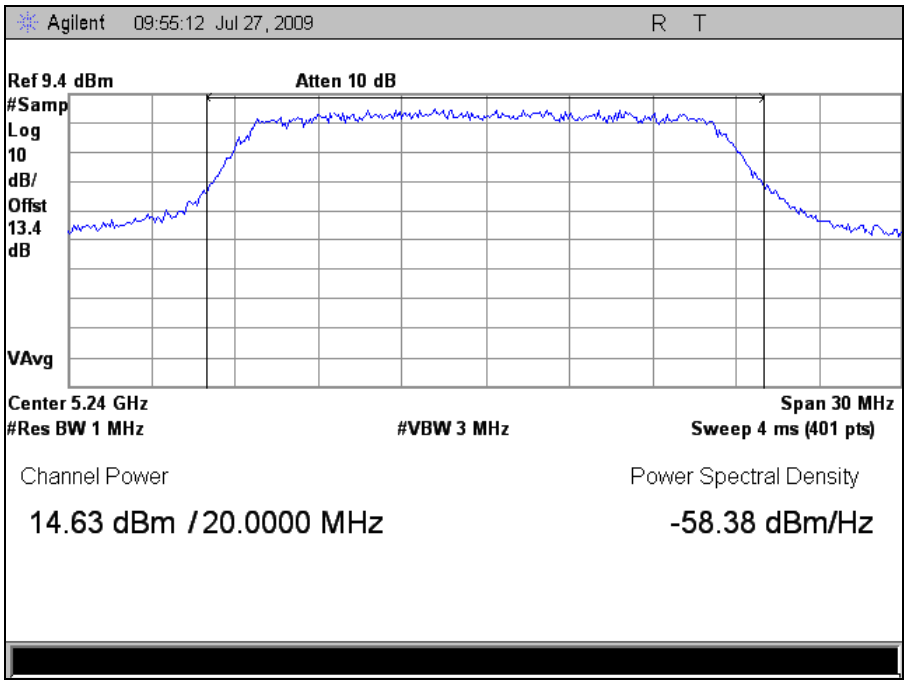
7100 Indoor, Sum Power (n mode)						
Mode	**Frequency (MHz)**		**Port 1**	**Port 2**	**Port 3**	**Sum Power (dBm)**
802.11n 20MHz	UNII-1	5180	10.46	11.37	11.34	15.84
		5240	11.9	11.22	12.22	16.57
802.11n 40MHz	UNII-1	5190	11.37	11.73	11.06	16.16
		5230	11.68	11.97	11.16	16.38

Table 23. RF Power Output, Test Results, Sum Power

RF Power Output, Port 1 802.11a

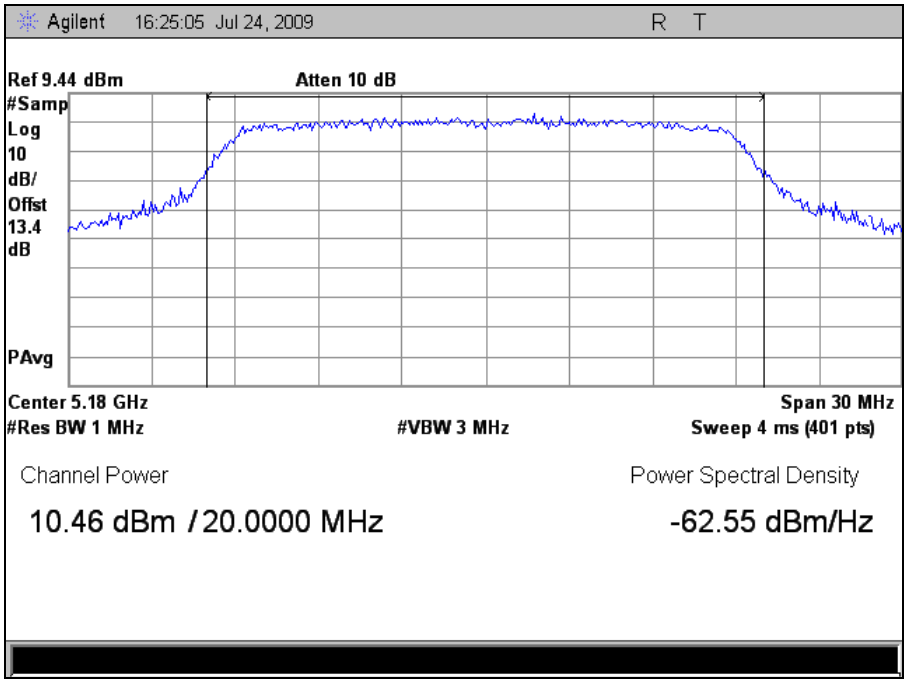


Plot 22. RF Power Output, Port 1, 802.11a, 5180 MHz

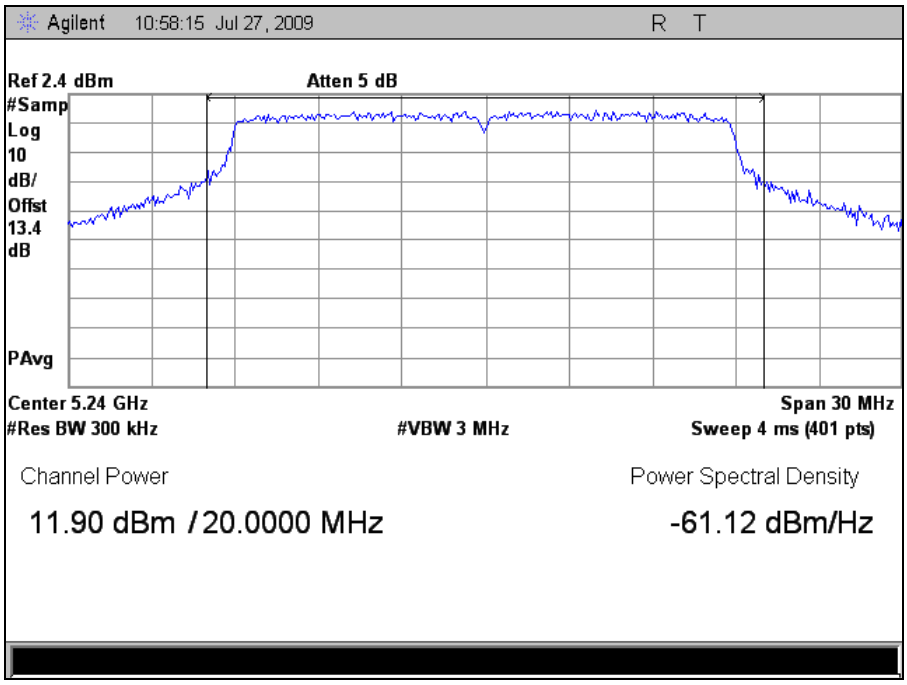


Plot 23. RF Power Output, Port 1, 802.11a, 5240 MHz

RF Power Output, Port 1, 802.11n 20MHz

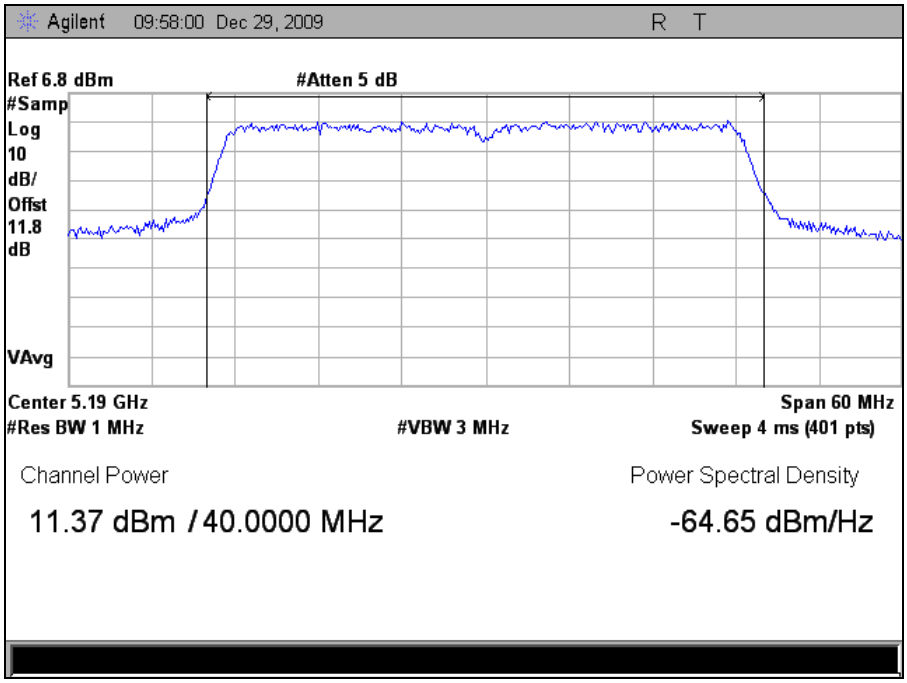


Plot 24. RF Power Output, Port 1, 802.11n 20MHz, 5180 MHz

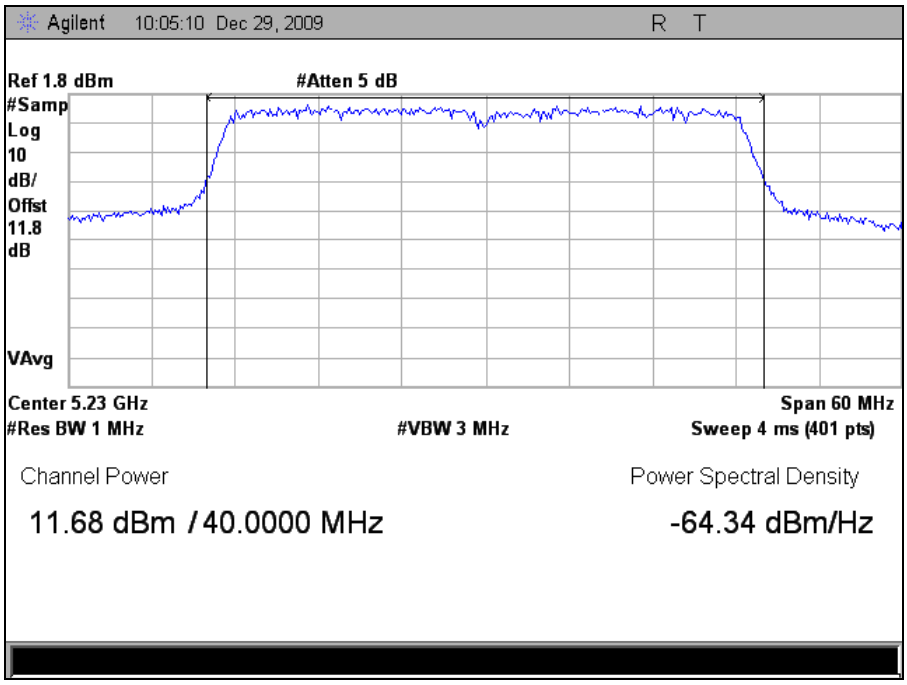


Plot 25. RF Power Output, Port 1, 802.11n 20MHz, 5240 MHz

RF Power Output, Port 1 802.11n 40MHz

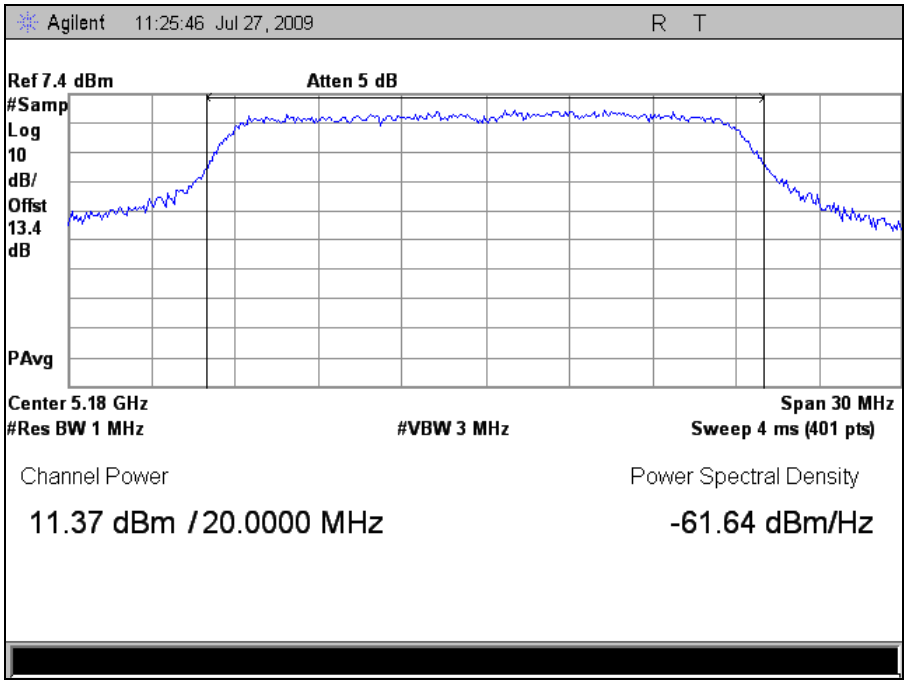


Plot 26. RF Power Output, Port 1, 802.11n 40MHz, 5190 MHz

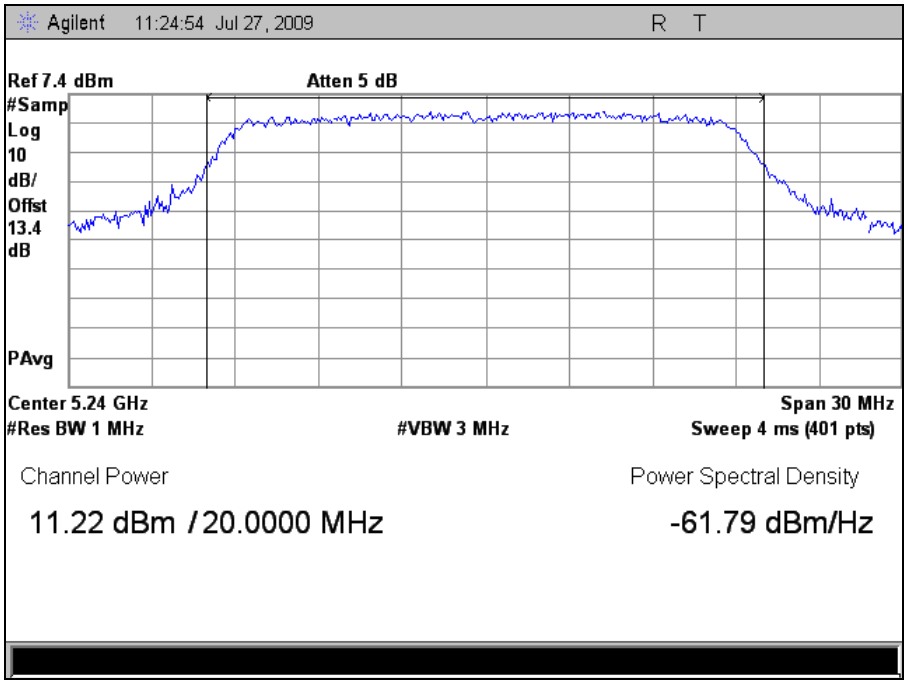


Plot 27. RF Power Output, Port 1, 802.11n 40MHz, 5230 MHz

RF Power Output, Port 2, 802.11n 20MHz

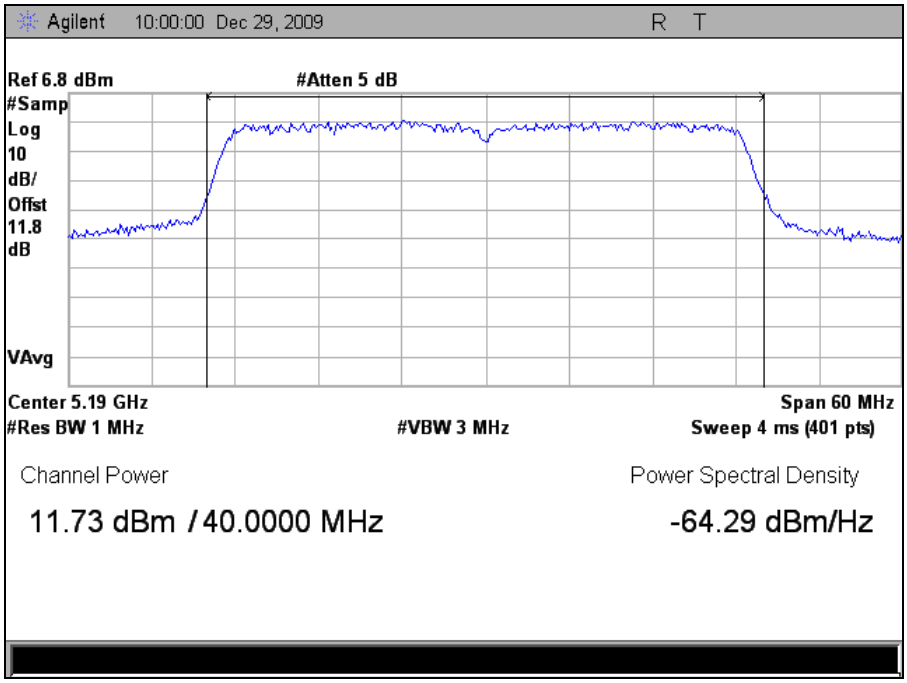


Plot 28. RF Power Output, Port 2, 802.11n 20MHz, 5180 MHz

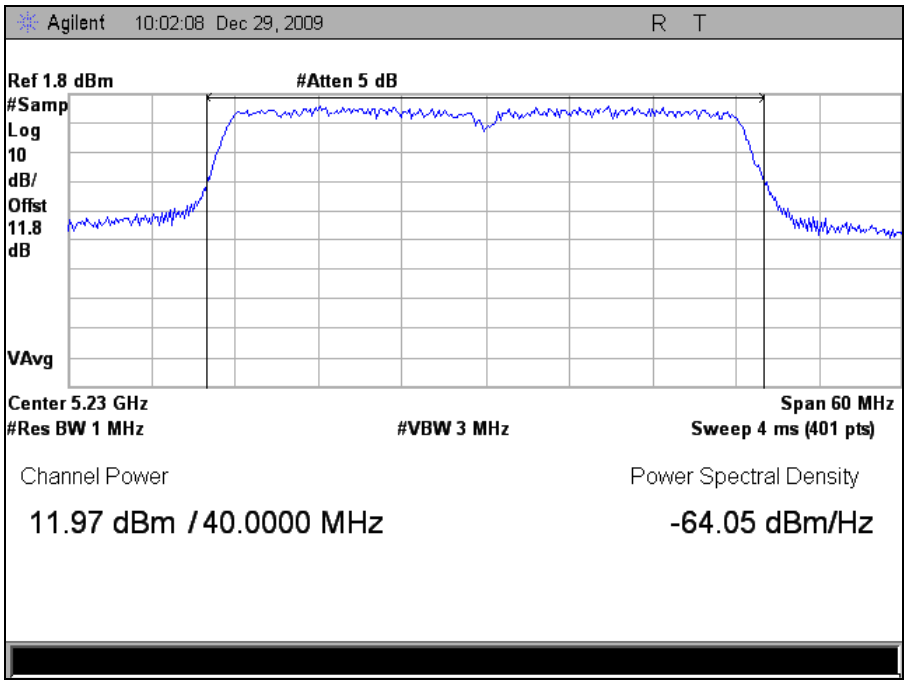


Plot 29. RF Power Output, Port 2, 802.11n 20MHz, 5240 MHz

RF Power Output, Port 2, 802.11n 40MHz

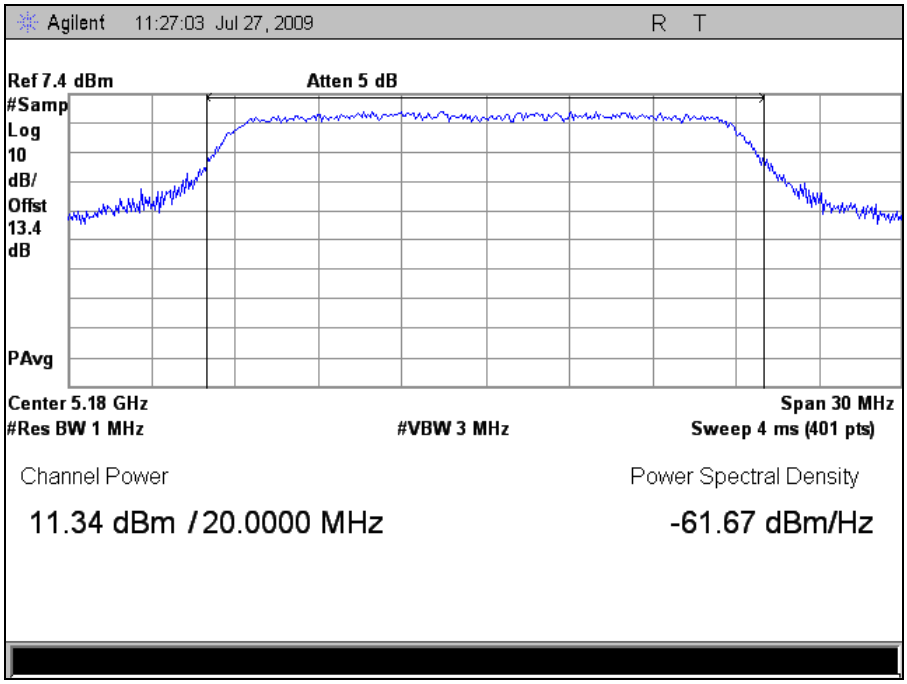


Plot 30. RF Power Output, Port 2, 802.11n 40MHz, 5190 MHz

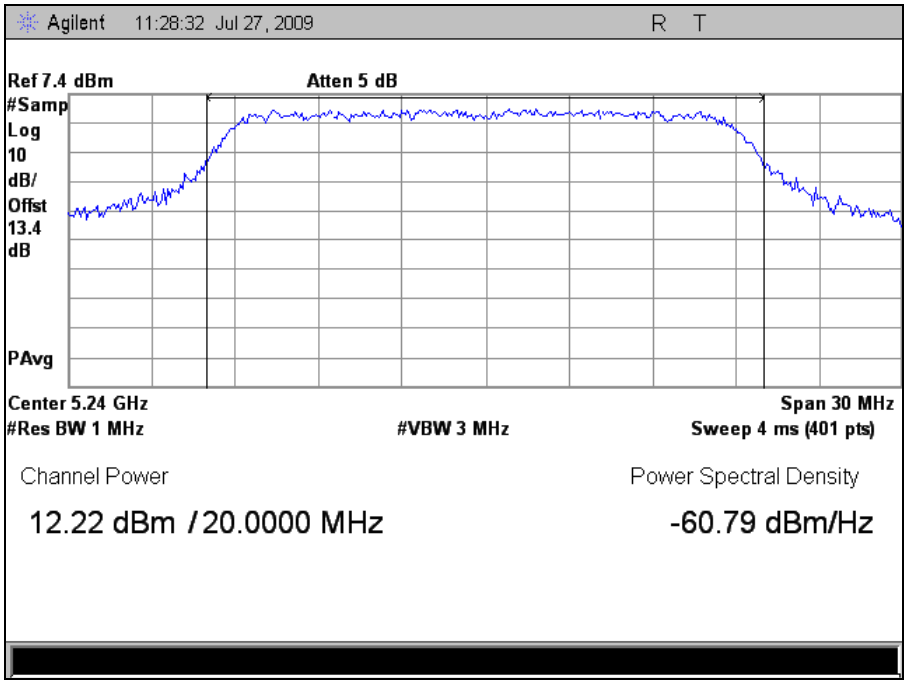


Plot 31. RF Power Output, Port 2, 802.11n 40MHz, 5230 MHz

RF Power Output, Port 3, 802.11n 20MHz

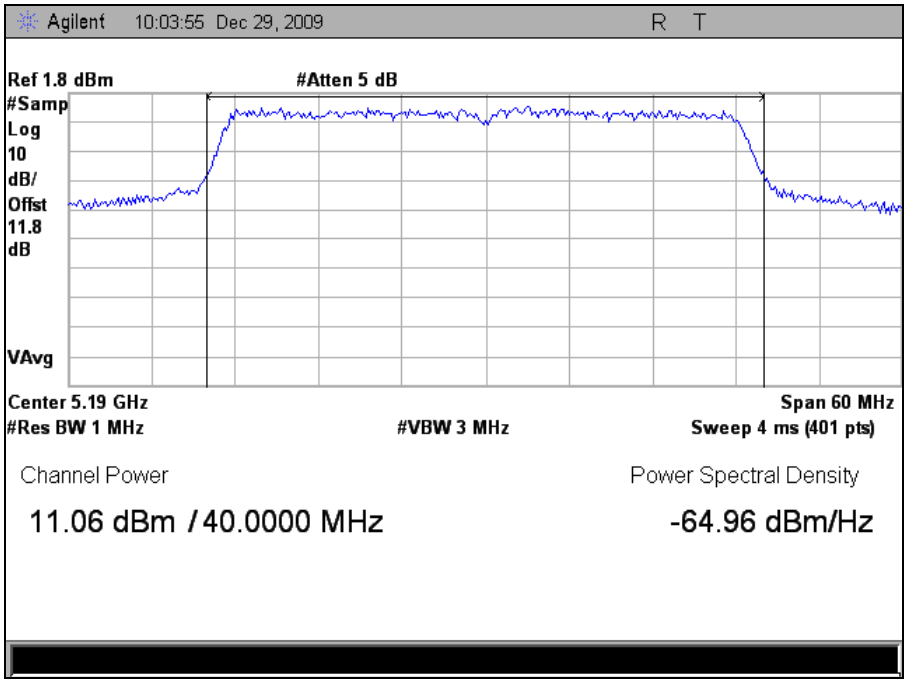


Plot 32. RF Power Output, Port 3, 802.11n 20MHz, 5180 MHz

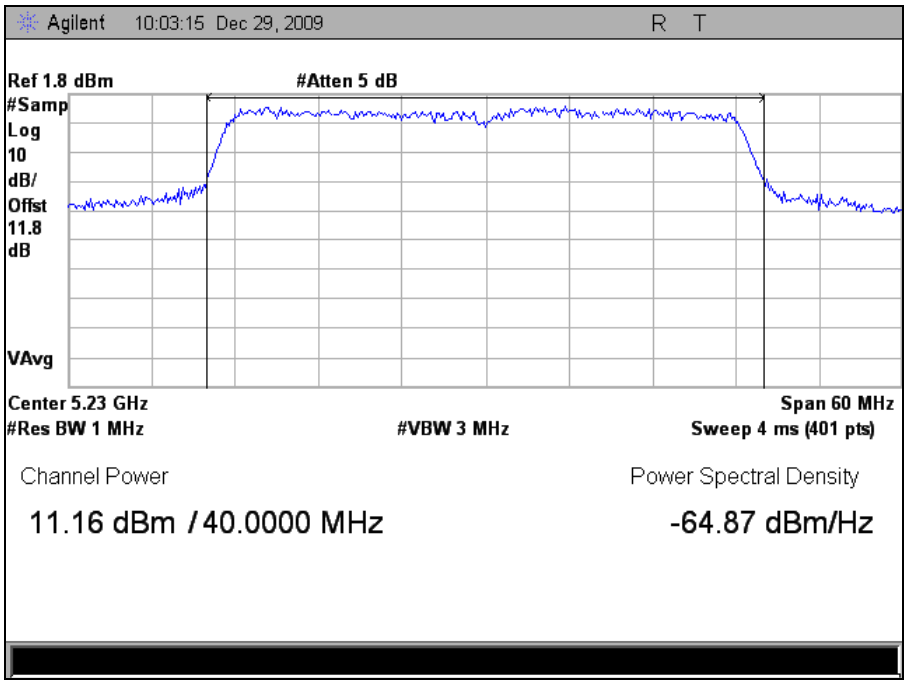


Plot 33. RF Power Output, Port 3, 802.11n 20MHz, 5240 MHz

RF Power Output, Port 3, 802.11n 40MHz



Plot 34. RF Power Output, Port 3, 802.11n 40MHz, 5190 MHz



Plot 35. RF Power Output, Port 3, 802.11n 40MHz, 5230 MHz

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.407(a)(1), (a)(2) Peak Power Spectral Density

Test Requirements: **§ 15.407(a)(1), (a)(2):** For digitally modulated systems, the conducted peak power spectral density from the intentional radiator to the antenna shall not be greater than 4dBm/MHz in the frequency band 5.15-5.25 GHz and 11dBm/MHz in the frequency band 5.25-5.35GHz.

Test Procedure: The transmitter was connected directly to a Spectrum Analyzer through an attenuator. The power level was set to the maximum level on the EUT. The RBW was set to 1MHz and the VBW was set to 3MHz. The method of measurement #2 from the FCC Public Notice CA 02-2138 was used.

Test Results: Equipment complies with the peak power spectral density limits of **§ 15.407(a)(1), (a)(2).** The peak power spectral density was determined from plots on the following page(s).

Test Engineer(s): Minh Ly

Test Date(s): 07/28/09 – 08/11/09

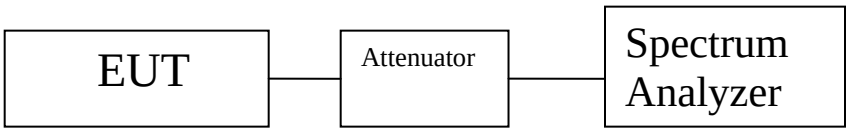


Figure 4. Peak Power Spectral Density Test Setup

7100 Indoor Unit, Port 1				
Mode	**Frequency (MHz)**	**Measured PPSD (dBm)**	**Limit (dBm)**	**Margin (dB)**
802.11a	5180	3.713	4	0.287
	5240	3.614	4	0.386
802.11n 20MHz	5180	-0.955	4	4.955
	5240	-1.047	4	5.047
802.11n 40MHz	5190	-1.033	4	5.033
	5230	-0.996	4	4.996

Table 24. Peak Power Spectral Density, Test Results, Port 1

7100 Indoor Unit, Port 2				
Mode	**Frequency (MHz)**	**Measured PPSD (dBm)**	**Limit (dBm)**	**Margin (dB)**
802.11n 20MHz	5180	-0.913	4	4.913
	5240	-1.1	4	5.1
802.11n 40MHz	5190	-1.095	4	5.095
	5230	-0.834	4	4.834

Table 25. Peak Power Spectral Density, Test Results, Port 2

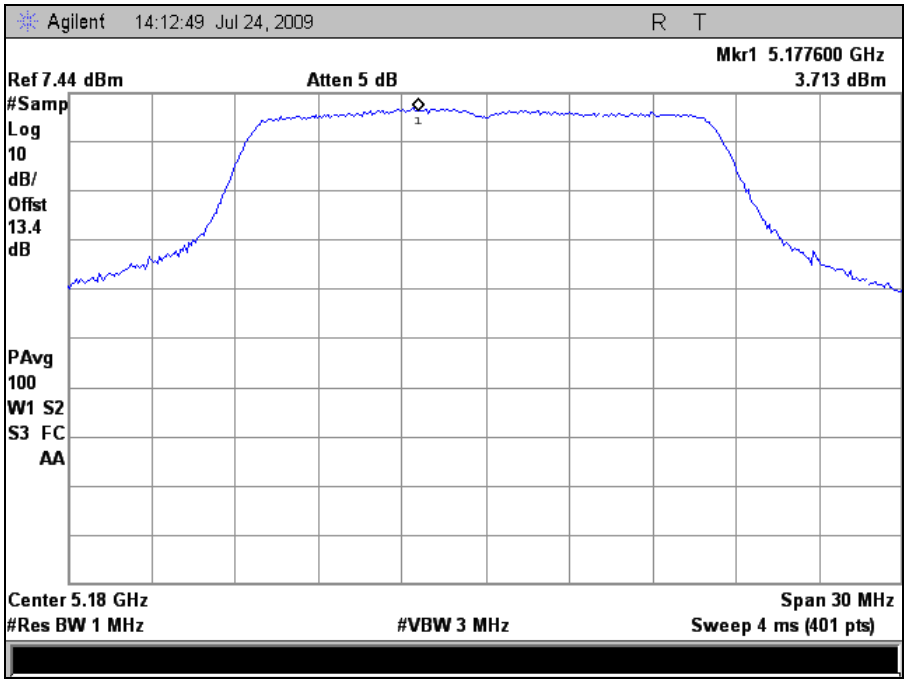
7100 Indoor Unit, Port 3				
Mode	**Frequency (MHz)**	**Measured PPSD (dBm)**	**Limit (dBm)**	**Margin (dB)**
802.11n 20MHz	5180	-1.145	4	5.145
	5240	-0.571	4	4.571
802.11n 40MHz	5190	-0.375	4	4.375
	5230	-0.909	4	4.909

Table 26. Peak Power Spectral Density, Test Results, Port 3

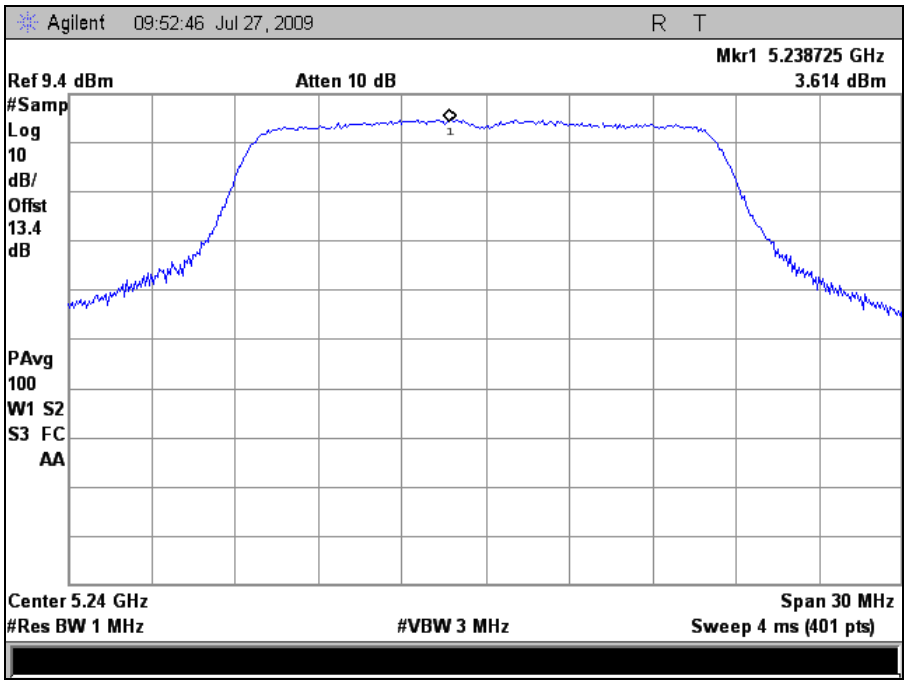
7100 Indoor Unit, Combined Ports				
Mode	**Frequency (MHz)**	**Measured PPSD (dBm)**	**Limit (dBm)**	**Margin (dB)**
802.11n 20MHz	5180	3.861	4	0.139
	5240	3.862	4	0.138
802.11n 40MHz	5190	3.873	4	0.127
	5230	3.649	4	0.351

Table 27. Peak Power Spectral Density, Test Results, Combined Ports

Peak Power Spectral Density, Port 1, 802.11a

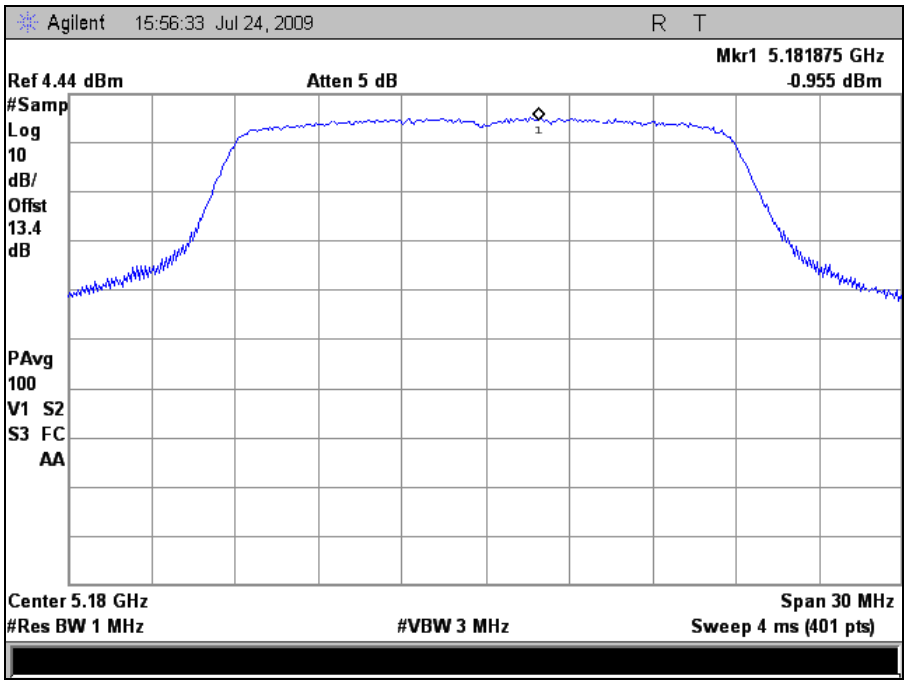


Plot 36. PPSD, Port 1, 802.11a, 5180 MHz

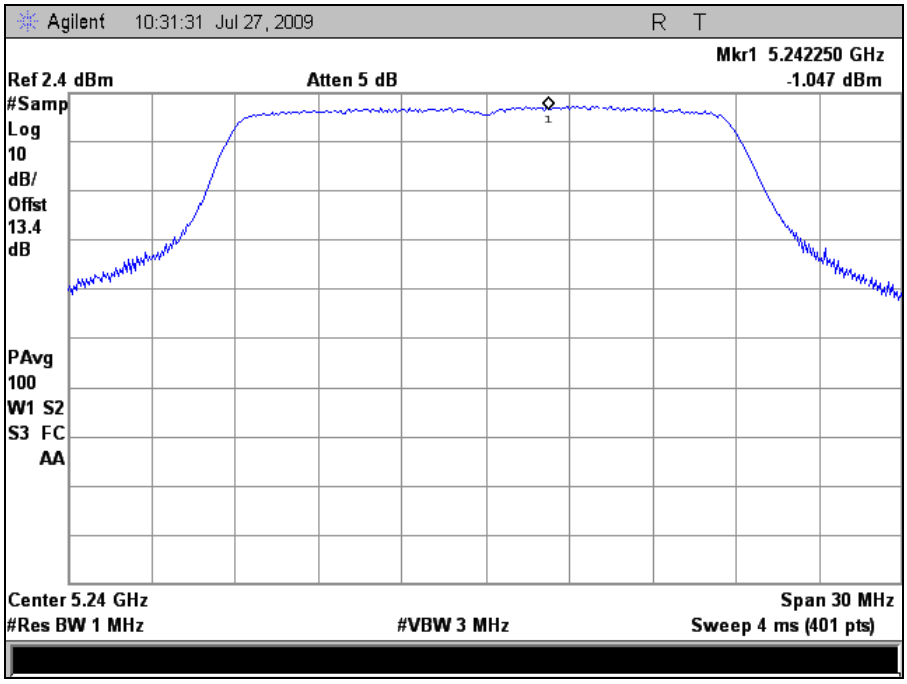


Plot 37. PPSD, Port 1, 802.11a, 5240 MHz

Peak Power Spectral Density, Port 1, 802.11n 20MHz

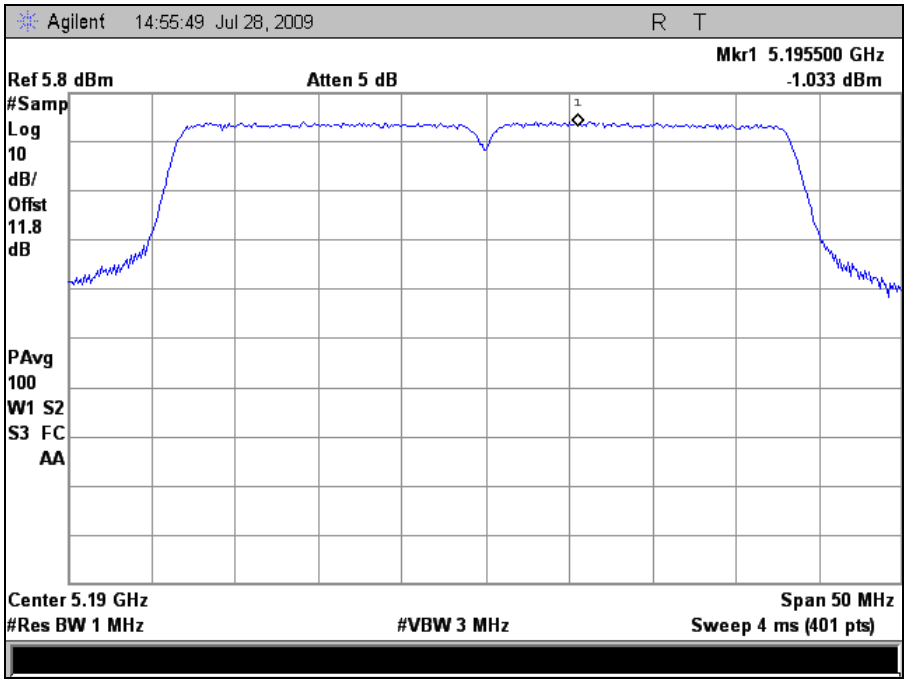


Plot 38. PPSD, \ Port 1, 802.11n 20MHz, 5180 MHz

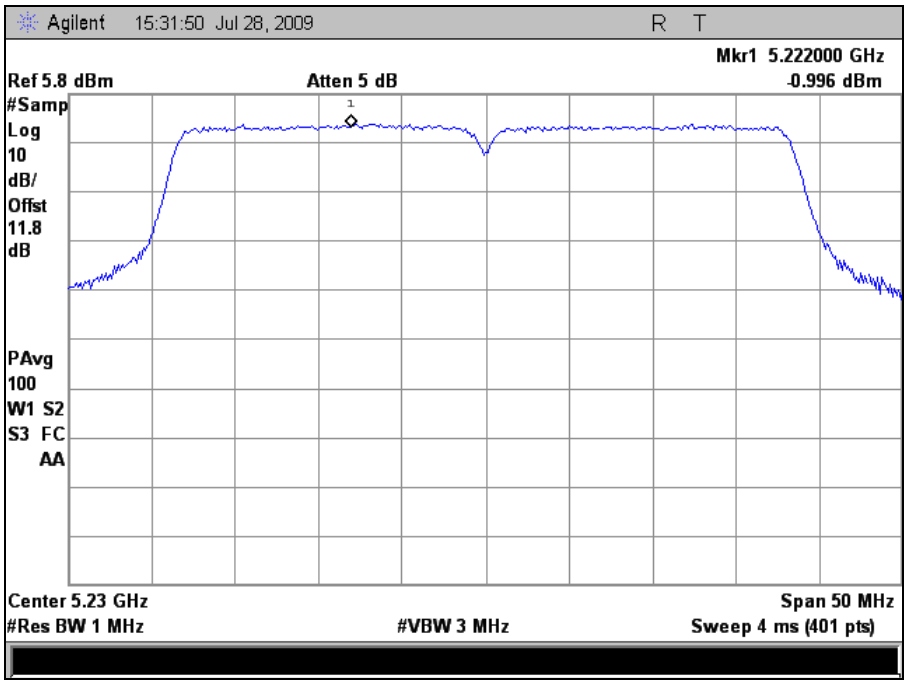


Plot 39. PPSD, Port 1, 802.11n 20MHz, 5240 MHz

Peak Power Spectral Density, Port 1, 802.11n 40MHz

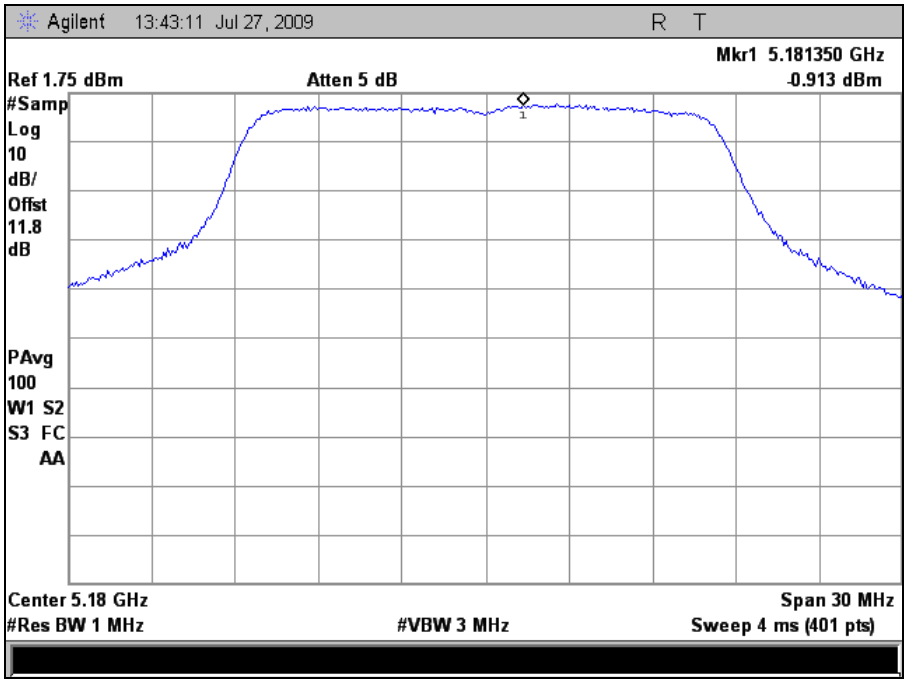


Plot 40. PPSD, Port 1, 802.11n 40MHz, 5190 MHz

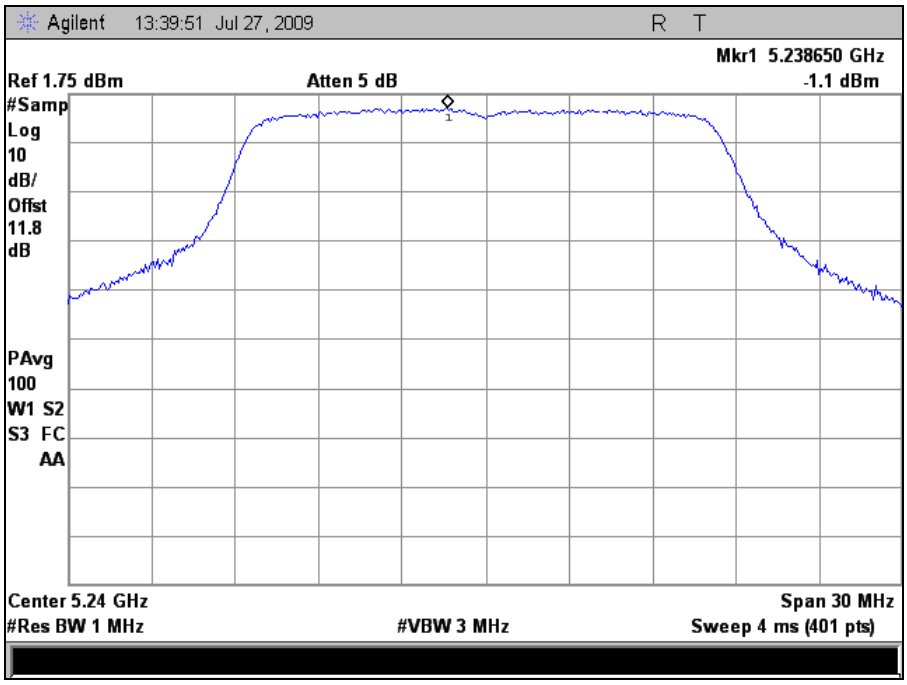


Plot 41. PPSD, Port 1, 802.11n 40MHz, 5230 MHz

Peak Power Spectral Density, Port 2, 802.11n 20MHz

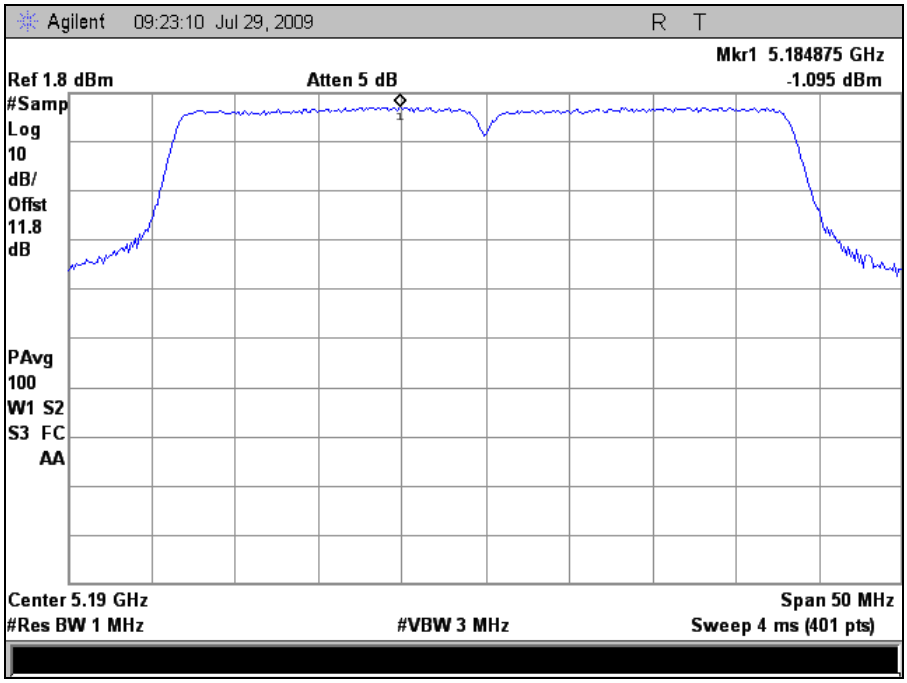


Plot 42. PPSD, Port 2, 802.11n 20MHz, 5180 MHz

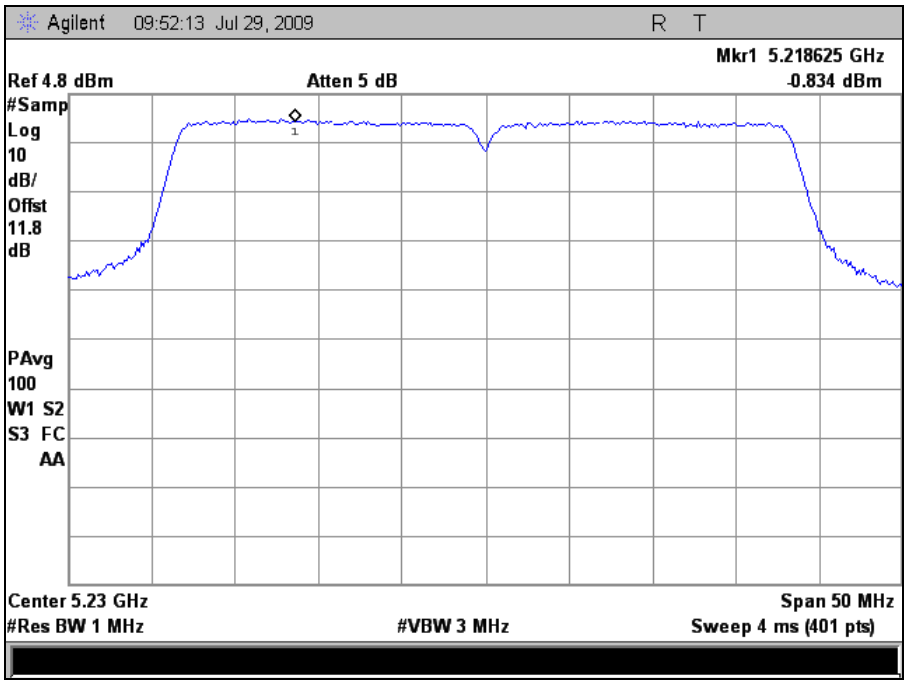


Plot 43. PPSD, Port 2, 802.11n 20MHz, 5240 MHz

Peak Power Spectral Density, Port 2, 802.11n 40MHz

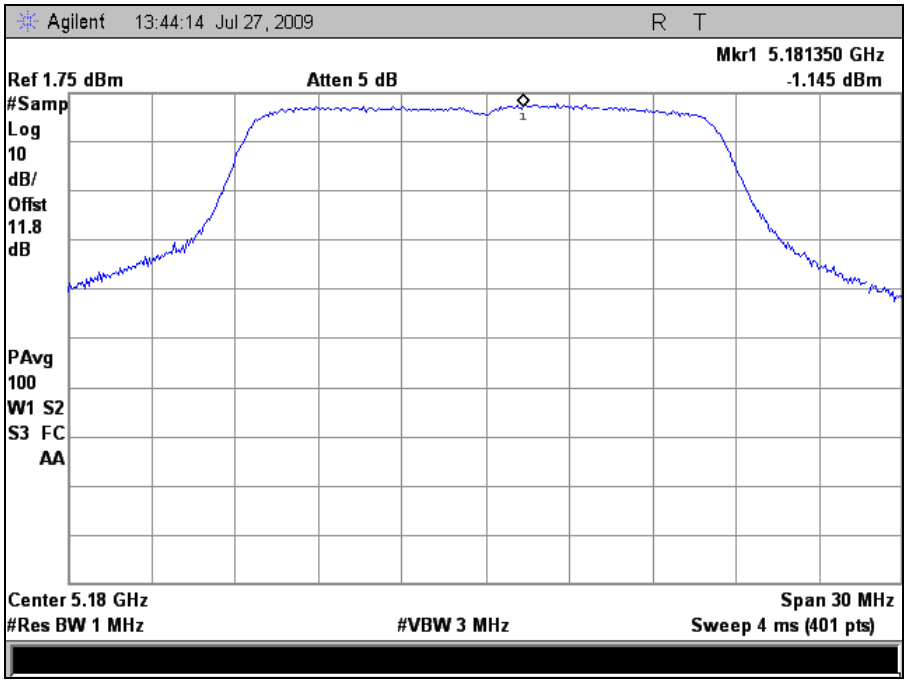


Plot 44. PPSD, Port 2, 802.11n 40MHz, 5190 MHz

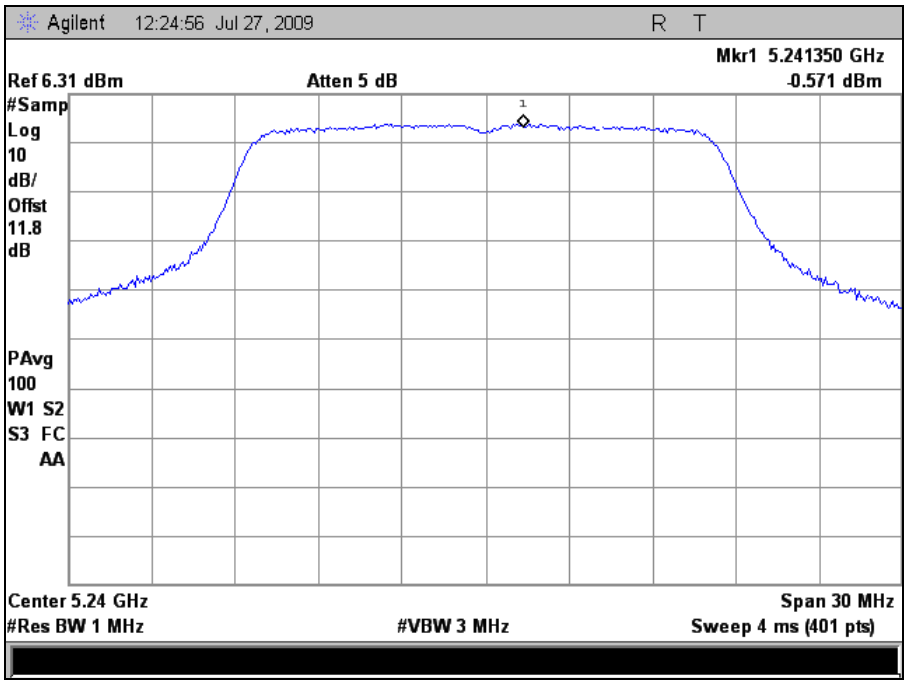


Plot 45. PPSD, Port 2, 802.11n 40MHz, 5230 MHz

Peak Power Spectral Density, Port 3, 802.11n 20MHz

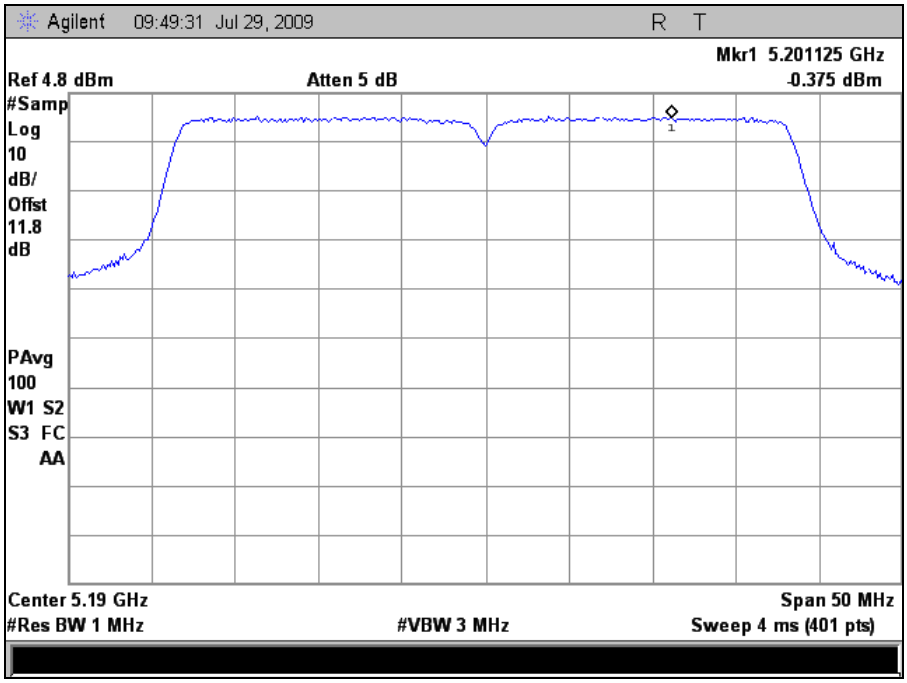


Plot 46. PPSD, Port 3, 802.11n 20MHz, 5180 MHz

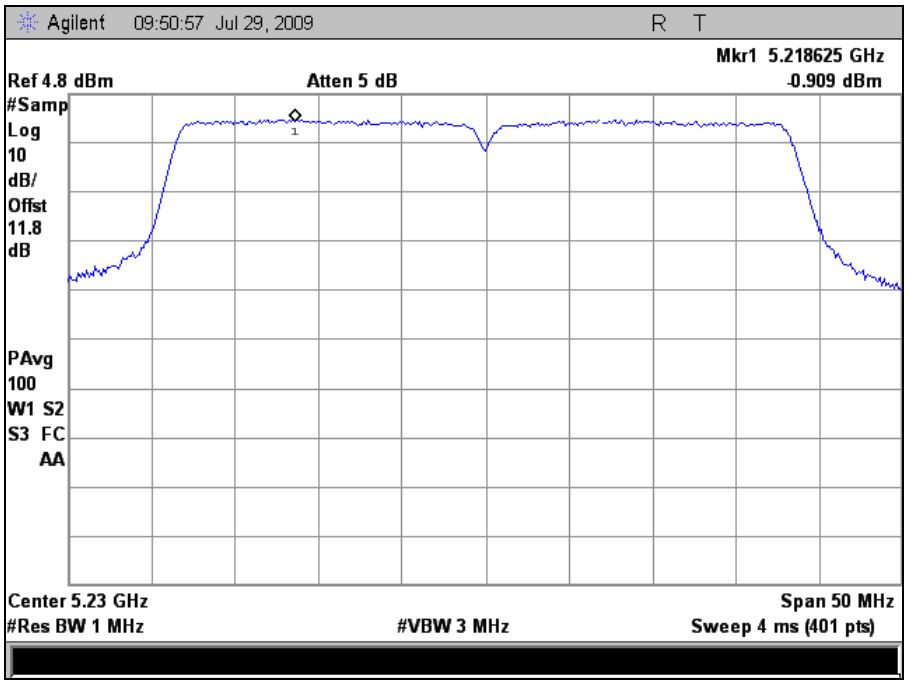


Plot 47. PPSD, Port 3, 802.11n 20MHz, 5240 MHz

Peak Power Spectral Density, Port 3, 802.11n 40MHz

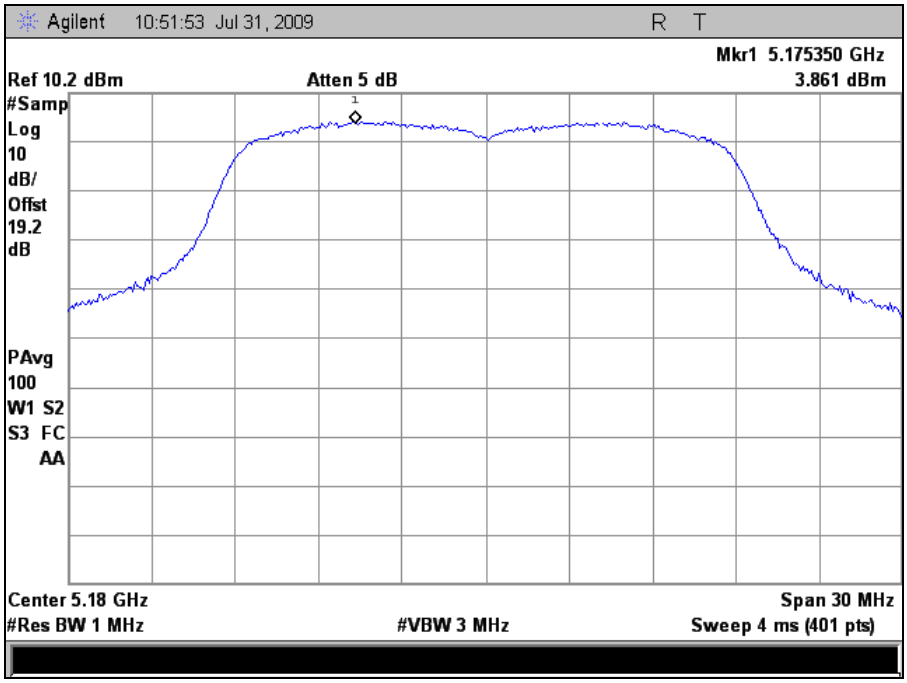


Plot 48. PPSD, Port 3, 802.11n 40MHz, 5190 MHz

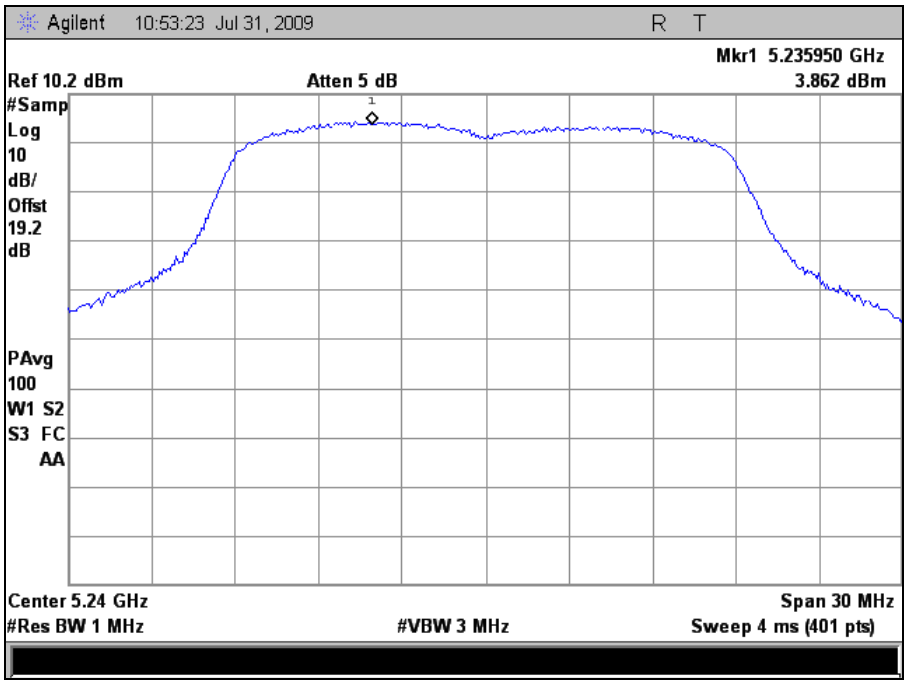


Plot 49. PPSD, Port 3, 802.11n 40MHz, 5230 MHz

Peak Power Spectral Density, Combined Ports, 802.11n 20MHz

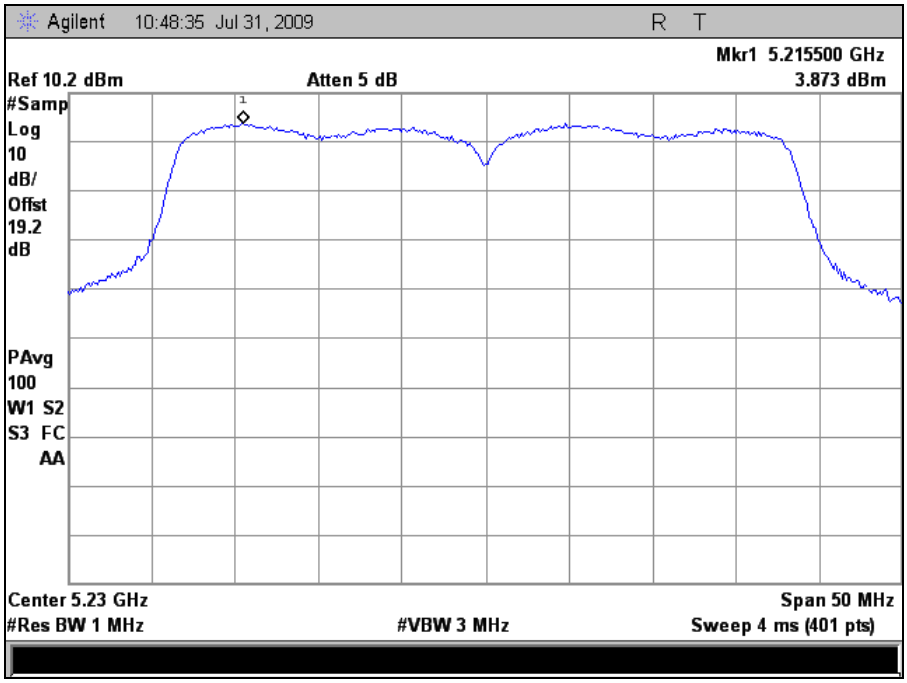


Plot 50. PPSD, Combined Ports, 802.11n 20MHz, 5180 MHz

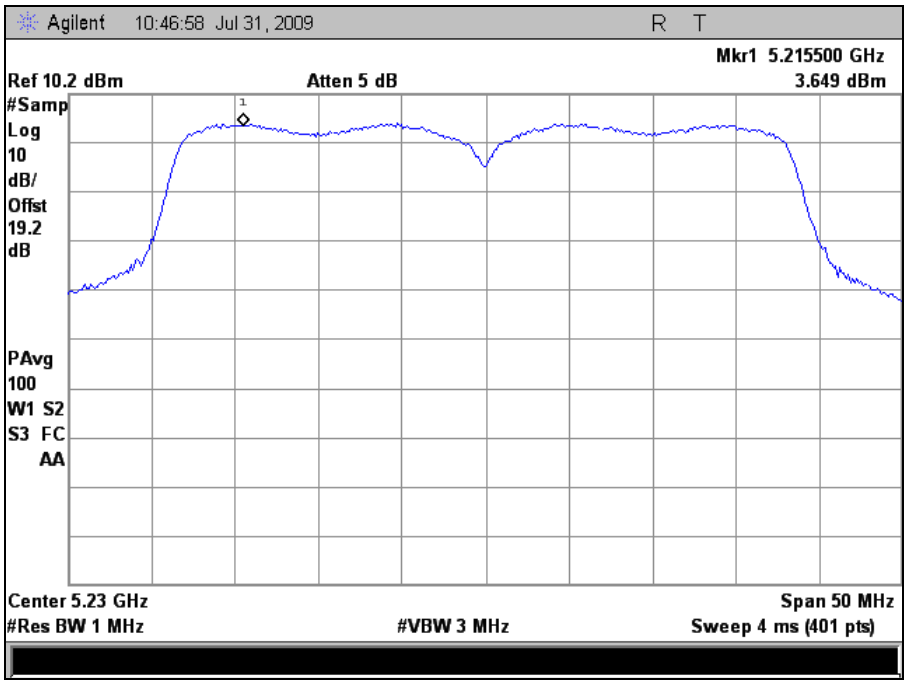


Plot 51. PPSD, Combined Ports, 802.11n 20MHz, 5240 MHz

Peak Power Spectral Density, Combined Ports, 802.11n 40MHz



Plot 52. PPSD, Combined Ports, 802.11n 40MHz, 5190 MHz



Plot 53. PPSD, Combined Ports, 802.11n 40MHz, 5230 MHz

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.407(a)(6) Peak Excursion Ratio

Test Requirements: **§ 15.407(a)(6):** For digitally modulated systems, the peak excursion of the modulation envelope to the peak transmit power shall not exceed 13dB across any 1MHz bandwidth of the emission bandwidth whichever is less.

Test Procedure: The method of measurement #2 from the FCC Public Notice CA 02-2138 was used. The EUT was connected directly to the spectrum analyzer through cabling and attenuation. The 1st trace on the spectrum analyzer was set to RBW=1MHz, VBW=3MHz. The peak detector mode was used and the trace max held. The 2nd trace on the spectrum analyzer was set to a RBW=1MHz, VBW=30 KHz. The detector mode was set to sample detector.

The Peak Excursion Ratio was determined from the difference between the maximum found in each trace.

Test Results: Equipment complies with the peak excursion ratio limits of **§ 15.407(a)(6).** The peak excursion ratio was determined from plots on the following page(s).

Test Engineer(s): Minh Ly

Test Date(s): 07/28/09 - 08/11/09

7100 Indoor Unit, Port 1				
Mode	**Frequency (MHz)**	**Excursion Ratio (dBm)**	**Limit (dBm)**	**Margin (dB)**
802.11a	5180	9.667	13	3.333
	5240	9.006	13	3.994
802.11n 20MHz	5180	11.09	13	1.91
	5240	9.562	13	3.438
802.11n 40MHz	5190	12.72	13	0.28
	5230	11.58	13	1.42

Table 28. Peak Excursion Ration, Test Results, Port 1

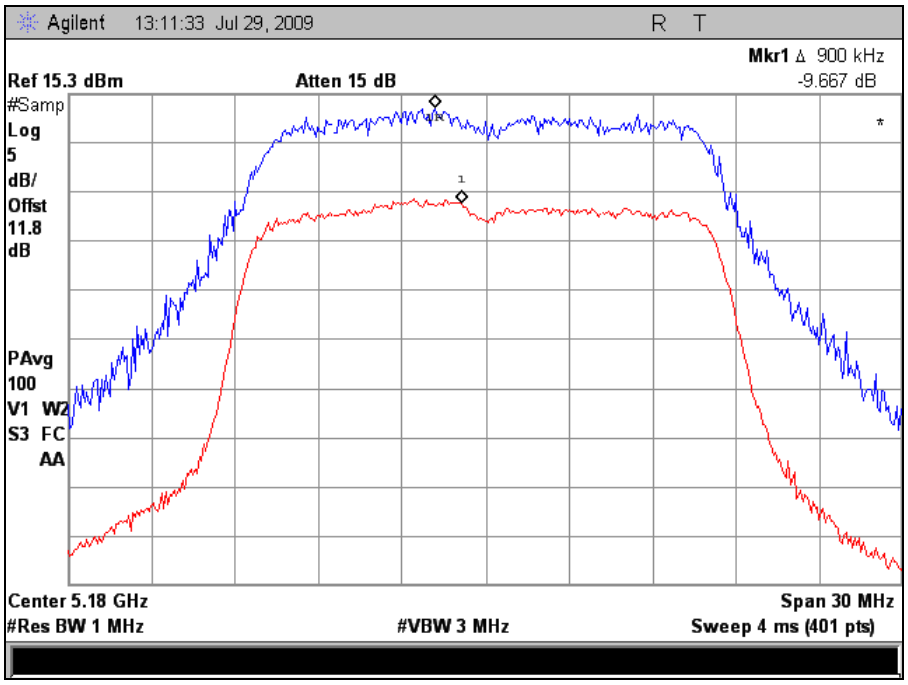
7100 Indoor Unit, Port 2				
Mode	**Frequency (MHz)**	**Excursion Ratio (dBm)**	**Limit (dBm)**	**Margin (dB)**
802.11n 20MHz	5180	10.02	13	2.98
	5240	10.32	13	2.68
802.11n 40MHz	5190	11.83	13	1.17
	5230	12.17	13	0.83

Table 29. Peak Excursion Ration, Test Results, Port 2

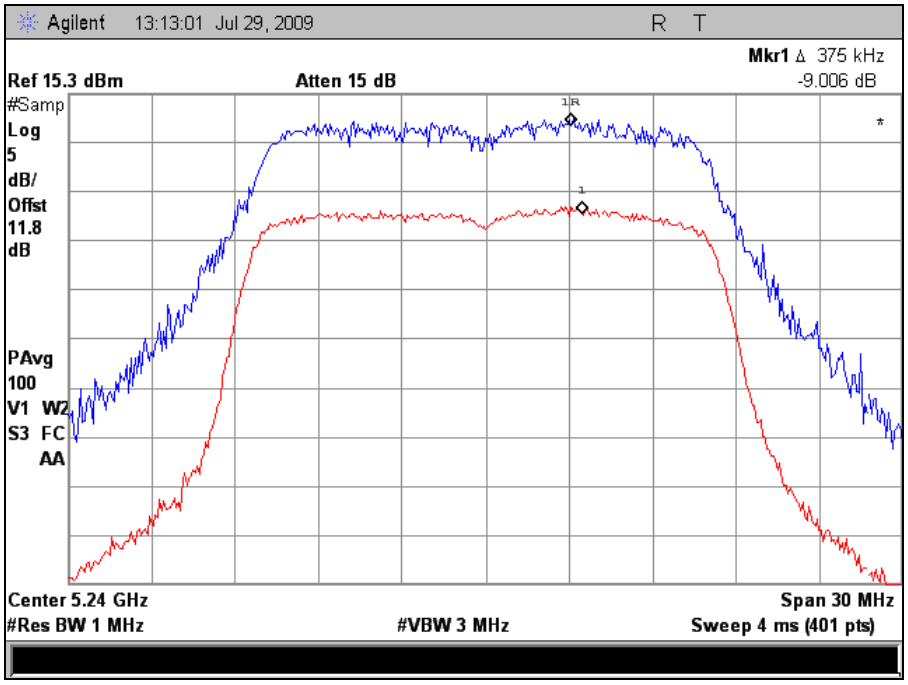
7100 Indoor Unit, Port 3				
Mode	**Frequency (MHz)**	**Excursion Ratio (dBm)**	**Limit (dBm)**	**Margin (dB)**
802.11n 20MHz	5180	9.873	13	3.127
	5240	11.08	13	1.92
802.11n 40MHz	5190	12.22	13	0.78
	5230	12.41	13	0.59

Table 30. Peak Excursion Ration, Test Results, Port 3

Peak Excursion Ratio, Port 1, 802.11a

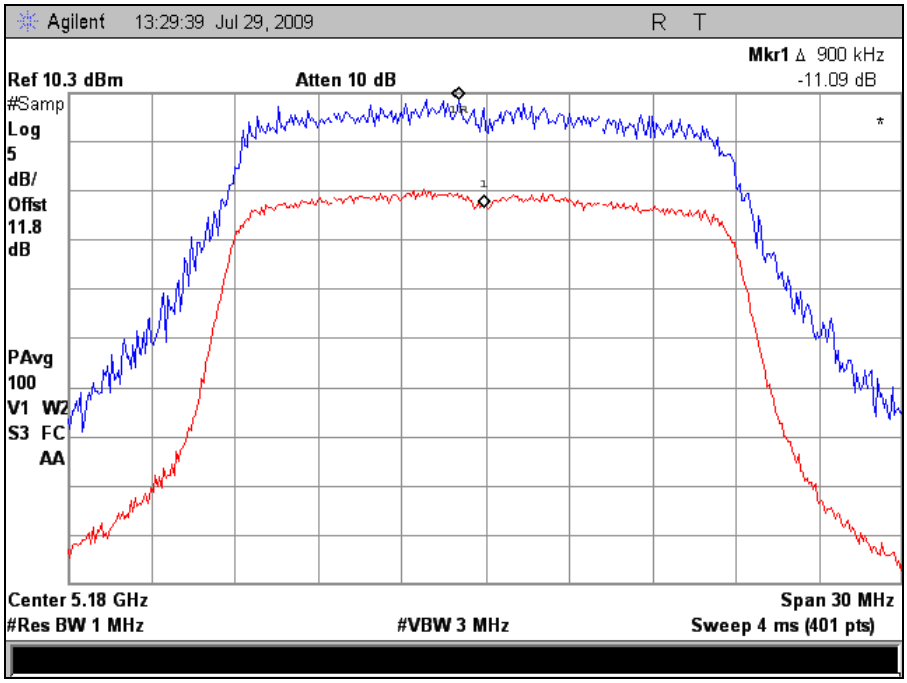


Plot 54. Peak Excursion, Port 1, 802.11a, 5180 MHz

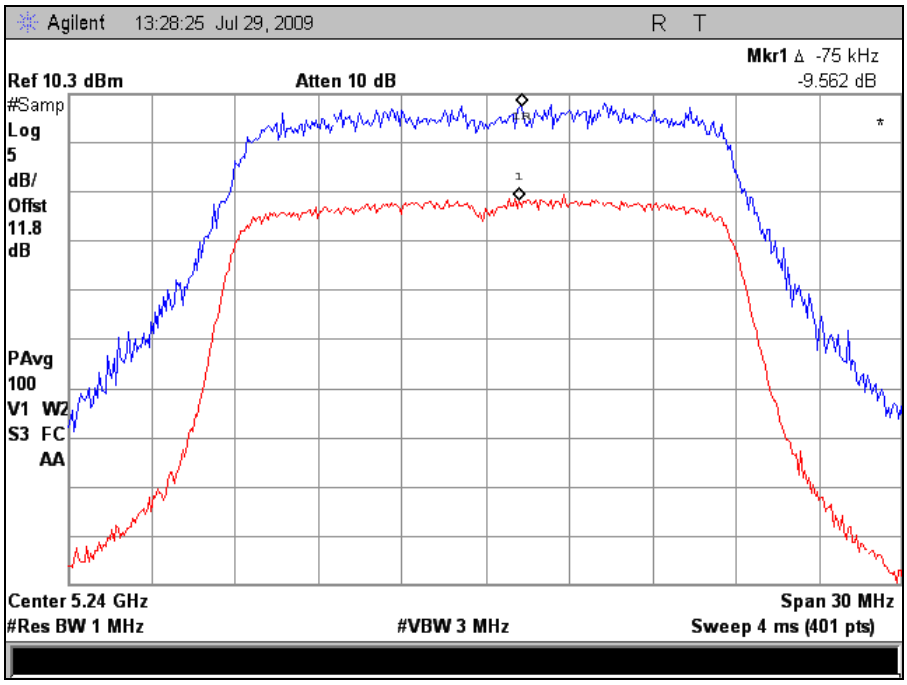


Plot 55. Peak Excursion, Port 1, 802.11a, 5240 MHz

Peak Excursion Ratio, 7100 Indoor, Port 1, 802.11n 20MHz

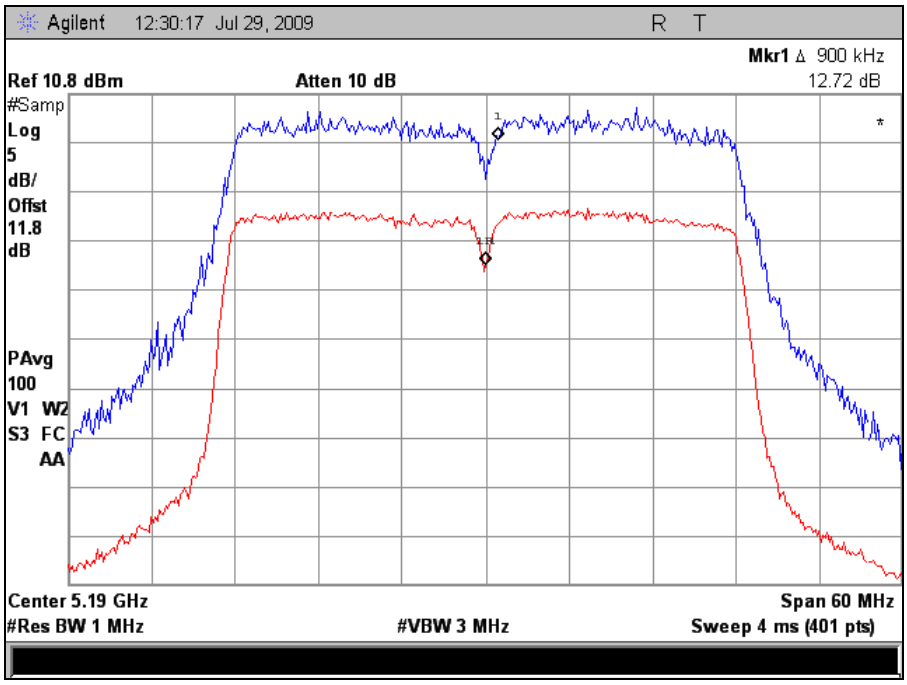


Plot 56. Peak Excursion, Port 1, 802.11n 20MHz, 5180 MHz

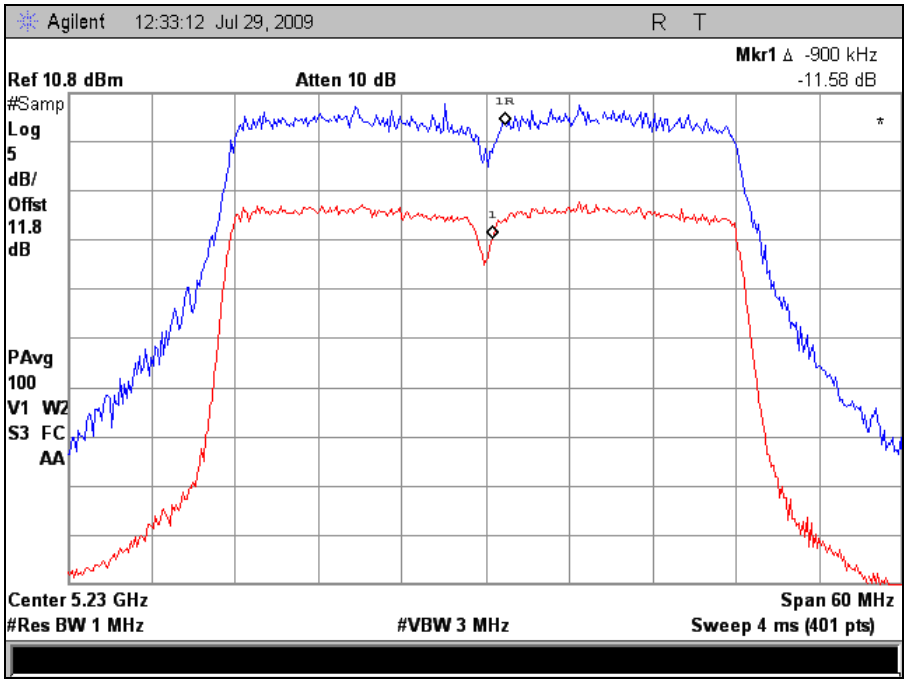


Plot 57. Peak Excursion, Port 1, 802.11n 20MHz, 5240 MHz

Peak Excursion Ratio, Port 1, 802.11n 40MHz

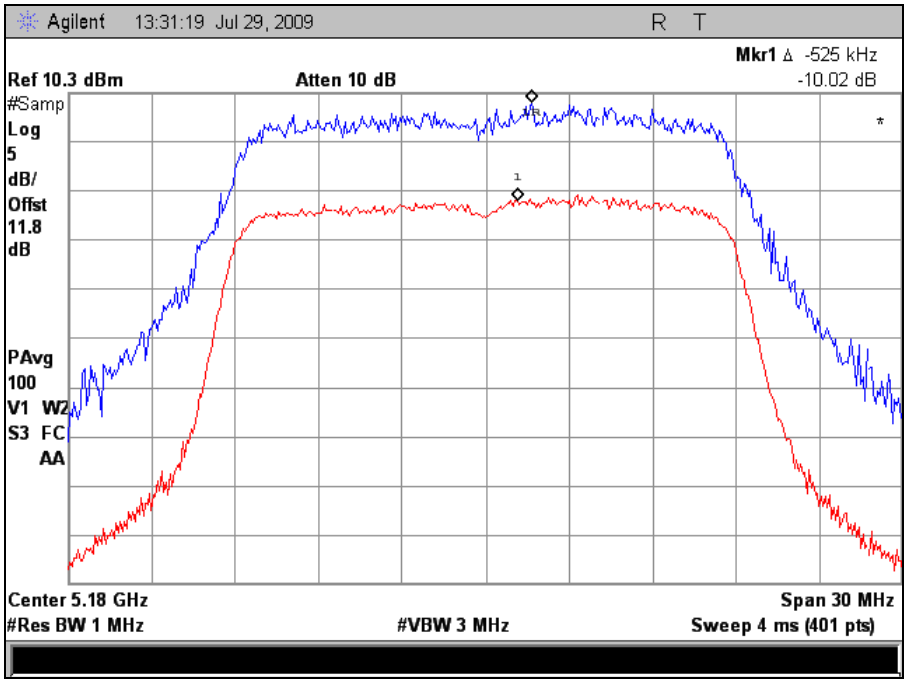


Plot 58. Peak Excursion, Port 1, 802.11n 40MHz, 5190 MHz

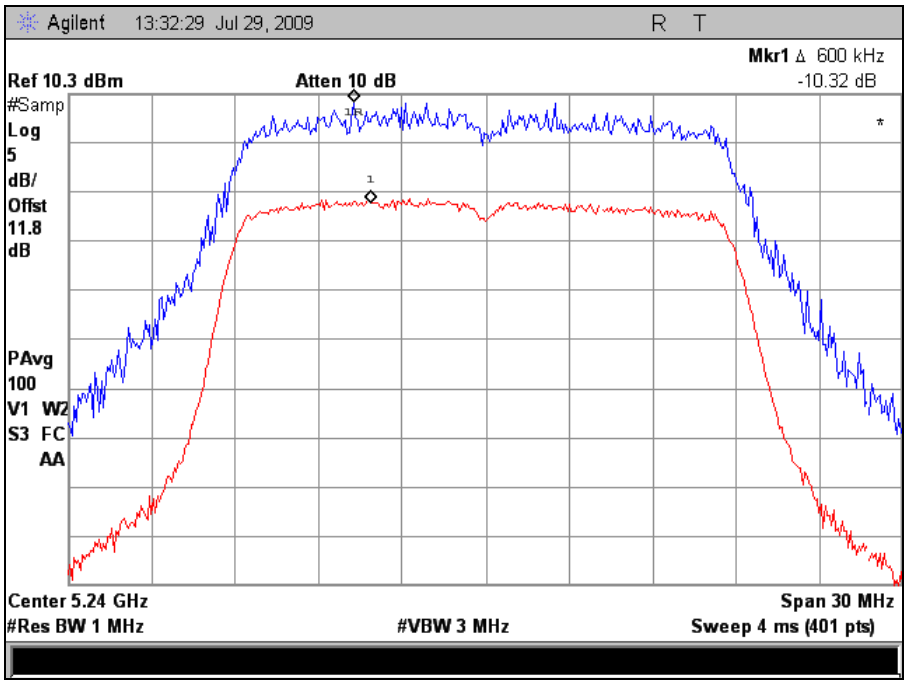


Plot 59. Peak Excursion, Port 1, 802.11n 40MHz, 5230 MHz

Peak Excursion Ratio, Port 2, 802.11n 20MHz

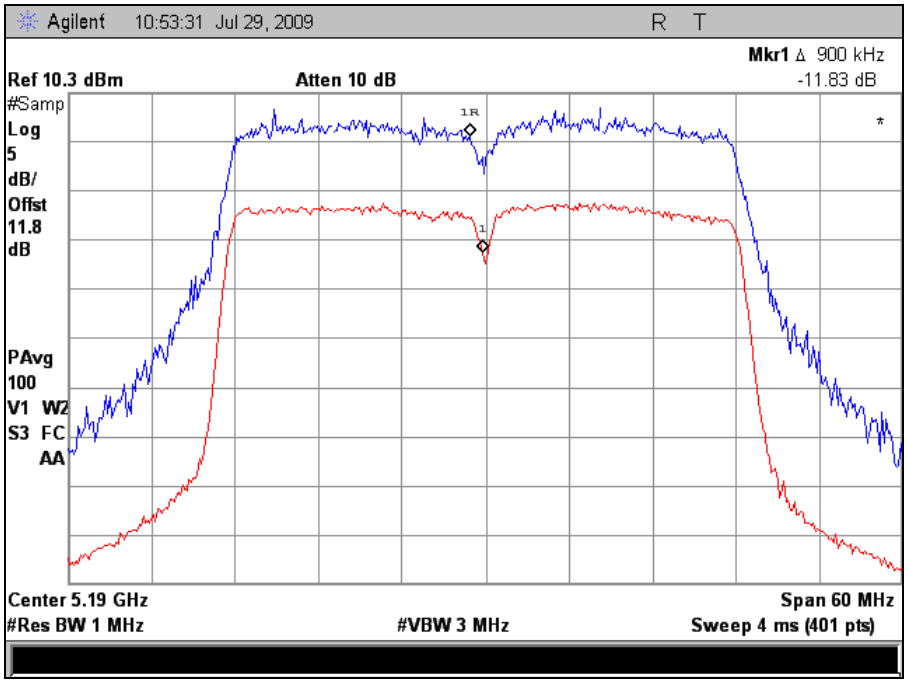


Plot 60. Peak Excursion, Port 2, 802.11n 20MHz, 5180 MHz

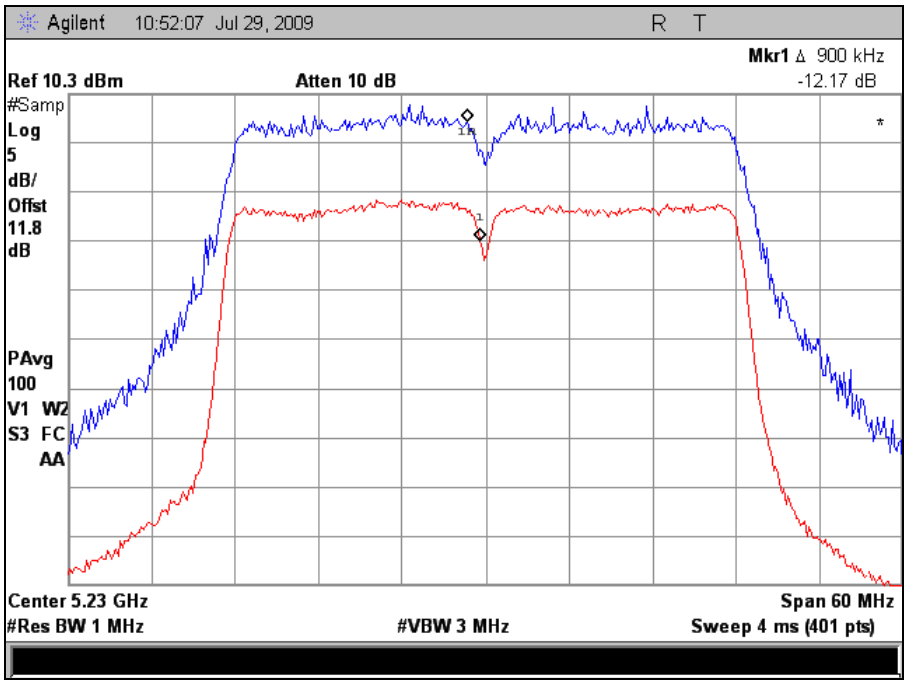


Plot 61. Peak Excursion, Port 2, 802.11n 20MHz, 5240 MHz

Peak Excursion Ratio, Port 2, 802.11n 40MHz

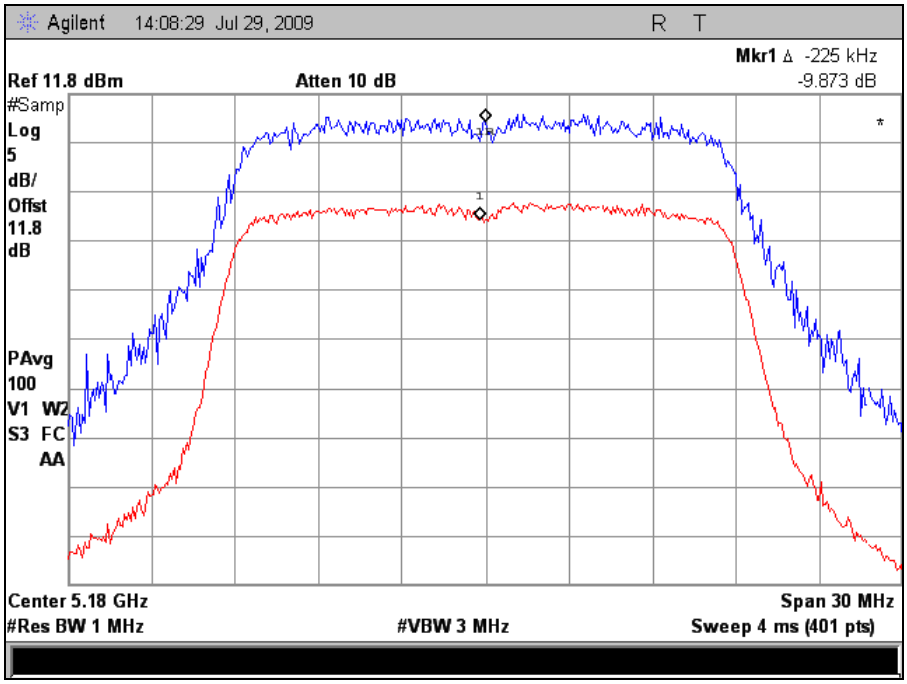


Plot 62. Peak Excursion, Port 2, 802.11n 40MHz, 5190 MHz

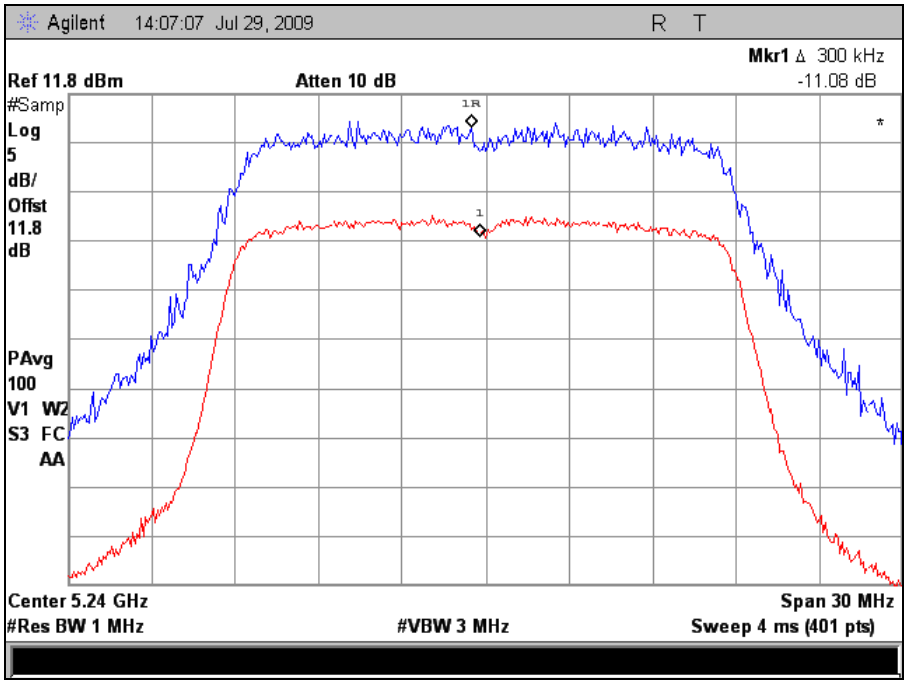


Plot 63. Peak Excursion, Port 2, 802.11n 40MHz, 5230 MHz

Peak Excursion Ratio, Port 3, 802.11n 20MHz

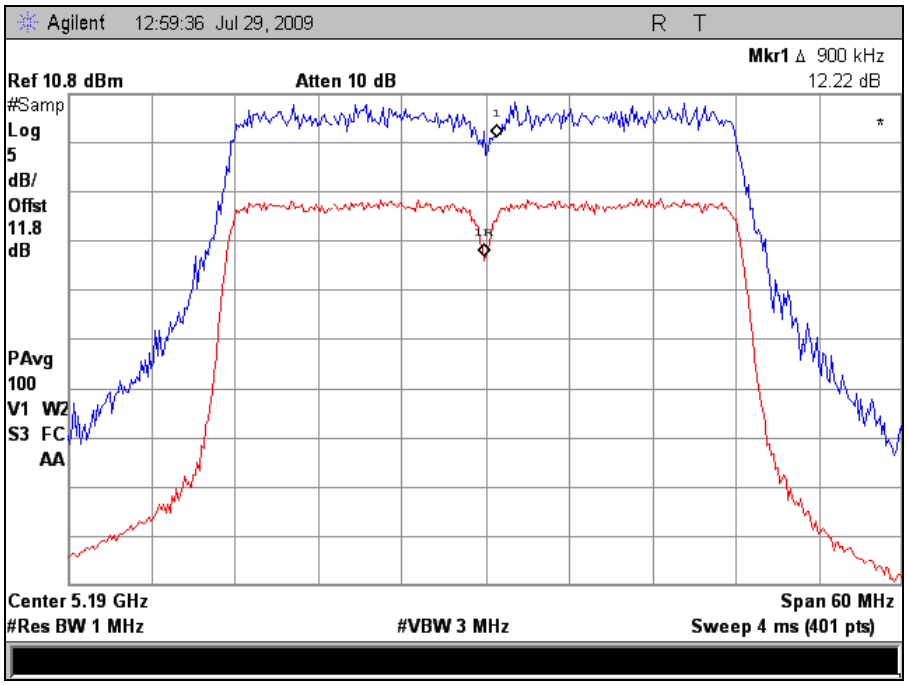


Plot 64. Peak Excursion, Port 3, 802.11n 20MHz, 5180 MHz

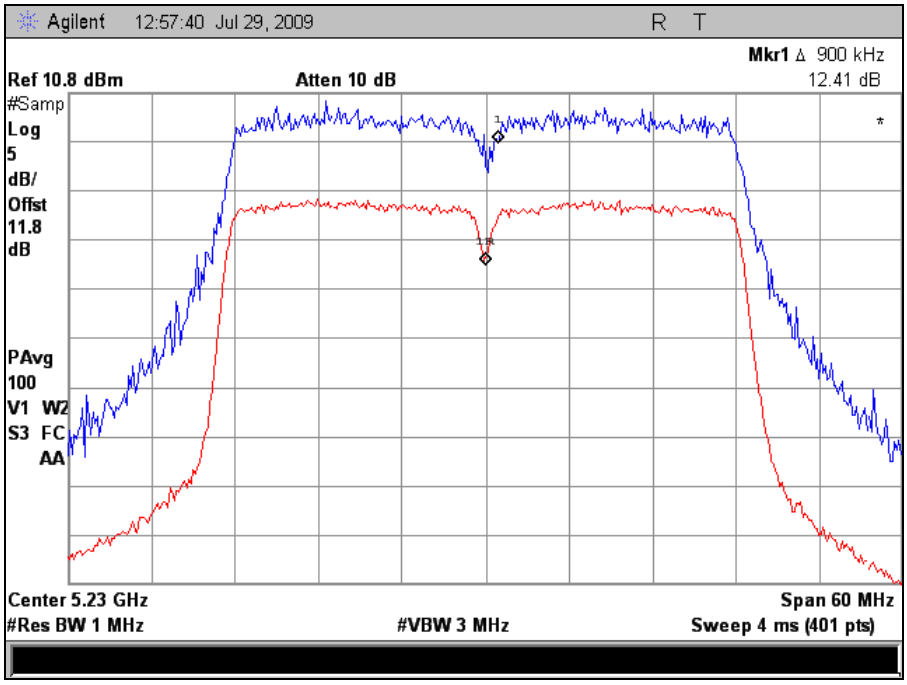


Plot 65. Peak Excursion, Port 3, 802.11n 20MHz, 5240 MHz

Peak Excursion Ratio, Port 3, 802.11n 40MHz



Plot 66. Peak Excursion, Port 3, 802.11n 40MHz, 5190 MHz



Plot 67. Peak Excursion, Port 3, 802.11n 40MHz, 5230 MHz

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.407(b)(1), (6) Undesirable Emissions

Test Requirements: **§ 15.407(b)(1), (6); §15.205:** Emissions outside the frequency band.

§ 15.407(b)(1): In any 1MHz bandwidth outside the frequency band 5.15-5.25GHz in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power shall not exceed -27dBm.

§ 15.407(b)(6): 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 31. Restricted Bands of Operation

Test Procedure: The EUT was installed placed on a 0.8m-high wooden table inside a semi-anechoic chamber. The harmonic frequencies the carriers were recorded for reference for final measurements. A receiving horn antenna was placed 3m away from the EUT. Unless otherwise specified, measurements were made using 1MHz RBW & 1MHz VBW for peak measurements and 1MHz RBW & 10Hz VBW for average measurements on a spectrum analyzer.

For each harmonic of the carrier frequency, the turntable was rotated, the positions of the interface cables were varied, and the antenna height was varied between 1 m and 4 m, in order to find the maximum radiated emissions.

The equipment isotropic radiated power (EIRP) at -27dBm/MHz was converted to field strength at 68.23dBuV/m. At the band edge of each band, the EIRP energy measurement is integrated to show the total power over 1MHz.

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

Test Engineer(s): Minh Ly

Test Date(s): 07/28/09 - 08/11/09

Electromagnetic Compatibility Criteria for Intentional Radiators

Harmonic Emissions Requirements – Radiated (Port 1, 802.11a)

Freq. (GHz)	Antenna Polarity (H/V)	Raw Amp. @ 3 m (Peak) / (Avg.)	P. Amp. (dB)	Ant. Cor. Factor (dB/m)	Cable Loss (dB)	EUT Field Strength Final Amp. (dBuV/m)	Limit Detector Peak / Avg.	Limit @ 3 m (dBuV/m)	Delta (dB)
10.36	V	46.45	35.34	38.18	6.92	56.22	Peak	74	-17.78
10.36	V	31.42	35.34	38.18	6.92	41.19	Avg.	54	-12.81
15.54	V	46.06	34.83	38.08	8.89	58.20	Peak	74	-15.80
15.54	V	31.96	34.83	38.08	8.89	44.10	Avg.	54	-9.90

Table 32. Radiated Harmonics, Port 1, 802.11a, 5 dBi Omni, 5180 MHz

Note: All other emissions were measured at the noise floor of the spectrum analyzer.

Freq. (GHz)	Antenna Polarity (H/V)	Raw Amp. @ 3 m (Peak) / (Avg.)	P. Amp. (dB)	Ant. Cor. Factor (dB/m)	Cable Loss (dB)	EUT Field Strength Final Amp. (dBuV/m)	Limit Detector Peak / Avg.	Limit @ 3 m (dBuV/m)	Delta (dB)
10.48	V	44.55	35.23	38.19	6.85	54.36	Peak	74	-19.64
10.48	V	31.1	35.23	38.19	6.85	40.91	Avg.	54	-13.09
15.72	V	44.02	34.92	37.73	8.88	55.71	Peak	74	-18.29
15.72	V	32.04	34.92	37.73	8.88	43.73	Avg.	54	-10.27

Table 33. Radiated Harmonics, Port 1, 802.11a, 5 dBi Omni, 5240 MHz

Note: All other emissions were measured at the noise floor of the spectrum analyzer.

Harmonic Emissions Requirements – Radiated (802.11n 20MHz)

Freq. (GHz)	Antenna Polarity (H/V)	Raw Amp. @ 3 m (Peak) / (Avg.)	P. Amp. (dB)	Ant. Cor. Factor (dB/m)	Cable Loss (dB)	EUT Field Strength Final Amp. (dBuV/m)	Limit Detector Peak / Avg.	Limit @ 3 m (dBuV/m)	Delta (dB)
10.36	V	45.6	35.34	38.18	6.92	55.37	Peak	74	-18.63
10.36	V	32.12	35.34	38.18	6.92	41.89	Avg.	54	-12.11
15.54	V	45.5	34.83	38.08	8.89	57.64	Peak	74	-16.36
15.54	V	31.7	34.83	38.08	8.89	43.84	Avg.	54	-10.16

Table 34. Radiated Harmonics, 802.11n 20MHz, 5 dBi Omni, 5180 MHz

Note: All other emissions were measured at the noise floor of the spectrum analyzer.

Freq. (GHz)	Antenna Polarity (H/V)	Raw Amp. @ 3 m (Peak) / (Avg.)	P. Amp. (dB)	Ant. Cor. Factor (dB/m)	Cable Loss (dB)	EUT Field Strength Final Amp. (dBuV/m)	Limit Detector Peak / Avg.	Limit @ 3 m (dBuV/m)	Delta (dB)
10.48	V	45.47	35.23	38.19	6.85	55.28	Peak	74	-18.72
10.48	V	31.46	35.23	38.19	6.85	41.27	Avg.	54	-12.73
15.72	V	45.12	34.92	37.73	8.88	56.81	Peak	74	-17.19
15.72	V	31.87	34.92	37.73	8.88	43.56	Avg.	54	-10.44

Table 35. Radiated Harmonics, 802.11n 20MHz, 5 dBi Omni, 5240 MHz

Note: All other emissions were measured at the noise floor of the spectrum analyzer.

Harmonic Emissions Requirements – Radiated (802.11n 40MHz)

Freq. (GHz)	Antenna Polarity (H/V)	Raw Amp. @ 3 m (Peak) / (Avg.)	P. Amp. (dB)	Ant. Cor. Factor (dB/m)	Cable Loss (dB)	EUT Field Strength Final Amp. (dBuV/m)	Limit Detector Peak / Avg.	Limit @ 3 m (dBuV/m)	Delta (dB)
10.38	V	45.49	35.32	38.18	6.91	55.25	Peak	74	-18.75
10.38	V	32.48	35.32	38.18	6.91	42.24	Avg.	54	-11.76
15.57	V	44.48	34.84	38.00	8.89	56.53	Peak	74	-17.47
15.57	V	31.52	34.84	38.00	8.89	43.57	Avg.	54	-10.43

Table 36. Radiated Harmonics, 802.11n 40MHz, 5 dBi Omni, 5190 MHz

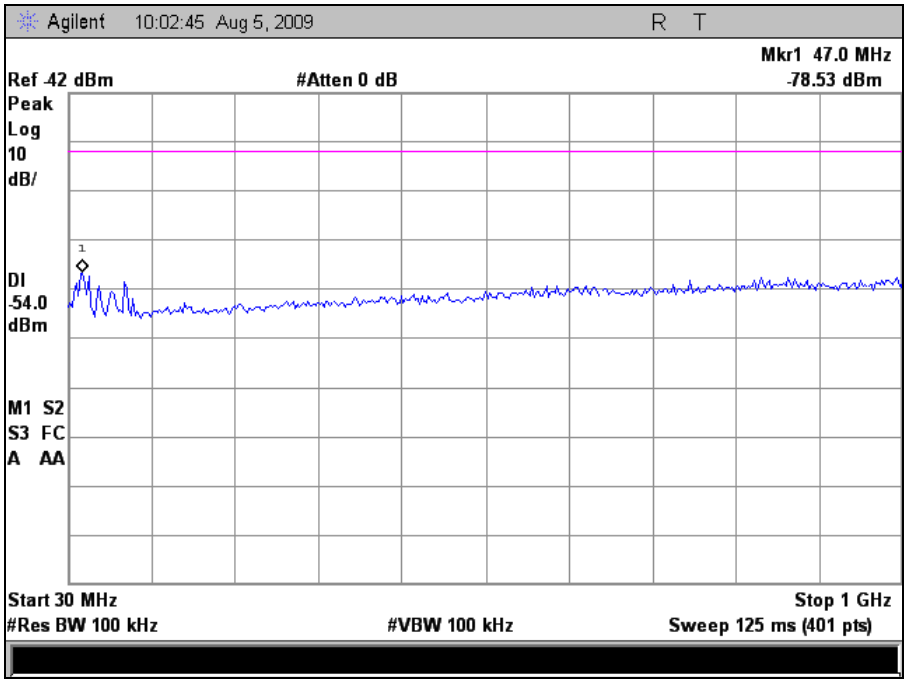
Note: All other emissions were measured at the noise floor of the spectrum analyzer.

Freq. (GHz)	Antenna Polarity (H/V)	Raw Amp. @ 3 m (Peak) / (Avg.)	P. Amp. (dB)	Ant. Cor. Factor (dB/m)	Cable Loss (dB)	EUT Field Strength Final Amp. (dBuV/m)	Limit Detector Peak / Avg.	Limit @ 3 m (dBuV/m)	Delta (dB)
10.46	V	44.03	35.25	38.18	6.85	53.82	Peak	74	-20.18
10.46	V	31.93	35.25	38.18	6.85	41.72	Avg.	54	-12.28
15.69	V	44.84	34.90	37.77	8.88	56.59	Peak	74	-17.41
15.69	V	31.79	34.90	37.77	8.88	43.54	Avg.	54	-10.46

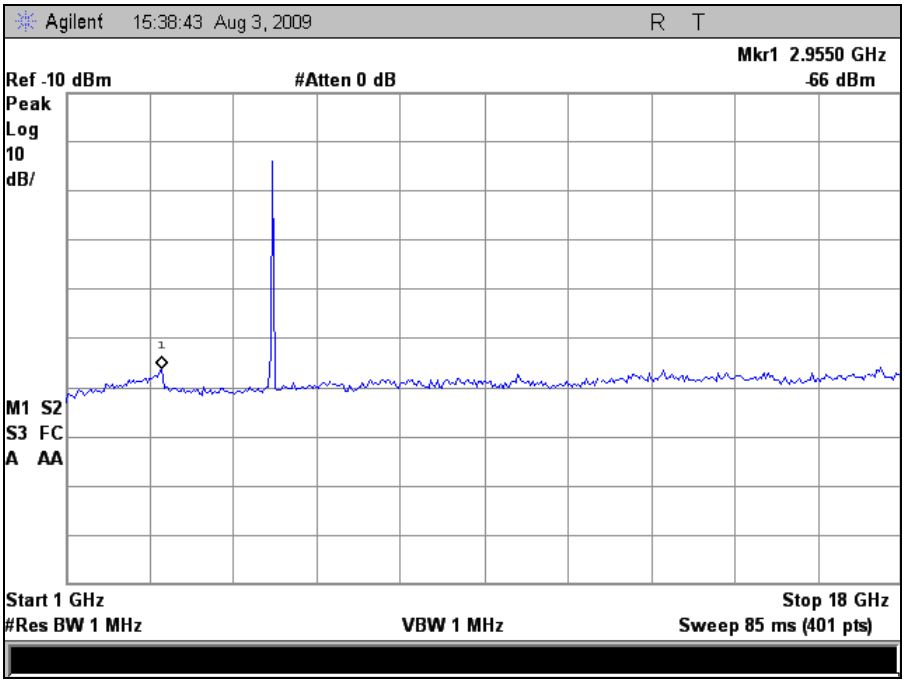
Table 37. Radiated Harmonics, 802.11n 40MHz, 5 dBi Omni, 5230 MHz

Note: All other emissions were measured at the noise floor of the spectrum analyzer.

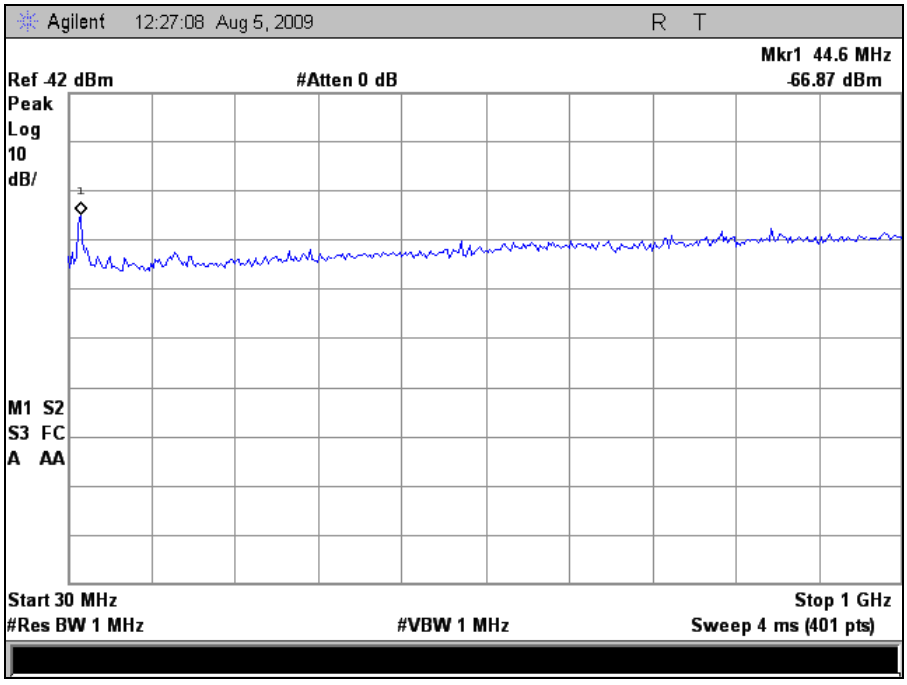
§ 15.209 Radiated Emissions Limits, Port 1, 802.11a



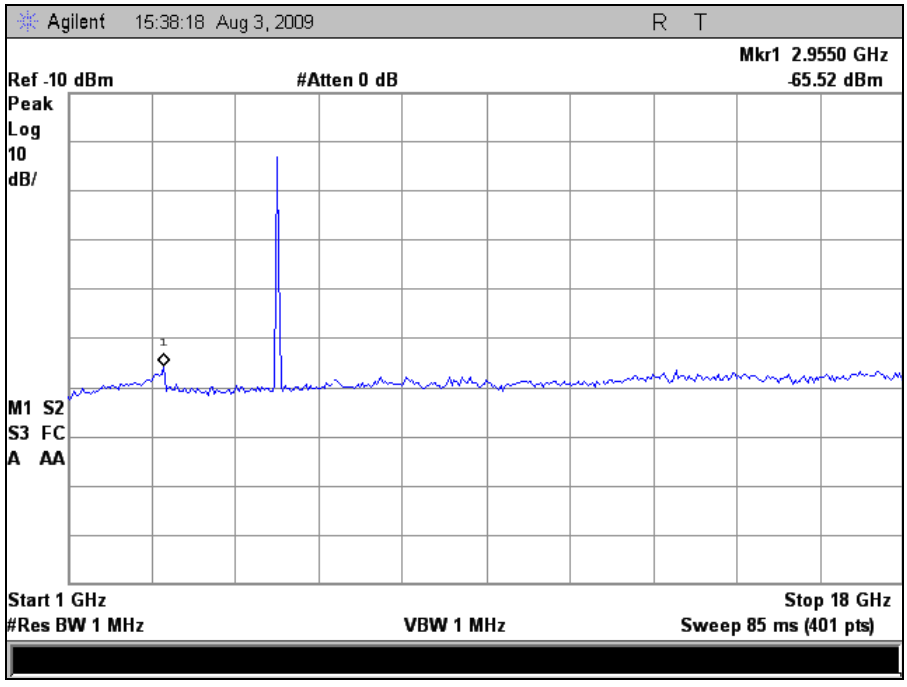
Plot 68. Radiated Spurious, Port 1, 802.11a, 5180 MHz, 30 MHz – 1 GHz



Plot 69. Radiated Spurious, Port 1, 802.11a, 5180 MHz, 1 GHz – 18 GHz

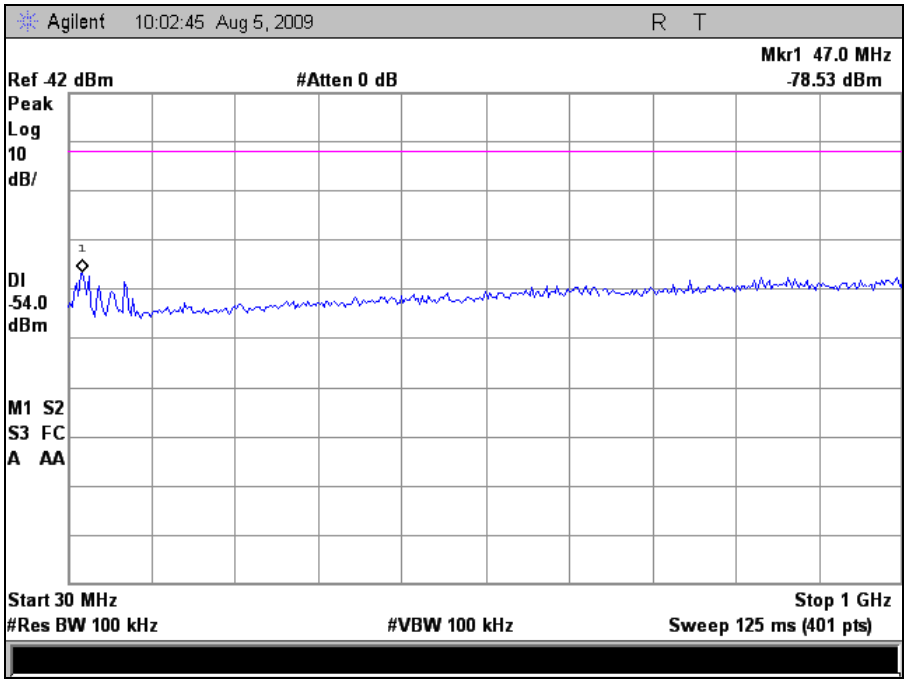


Plot 70. Radiated Spurious, Port 1, 802.11a, 5240 MHz, 30 MHz – 1 GHz

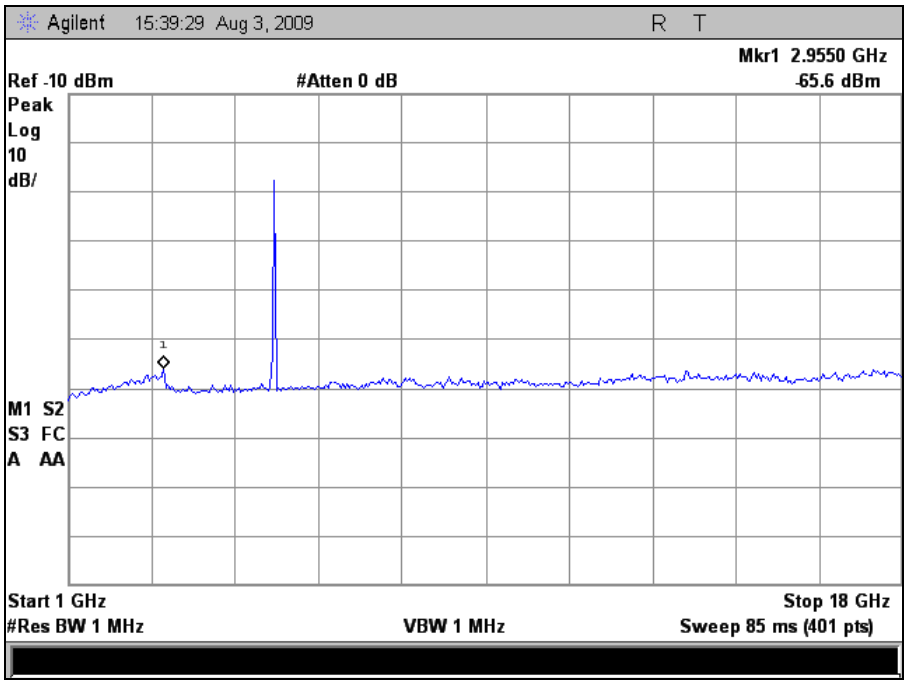


Plot 71. Radiated Spurious, Port 1, 802.11a, 5240 MHz, 1 GHz – 18 GHz

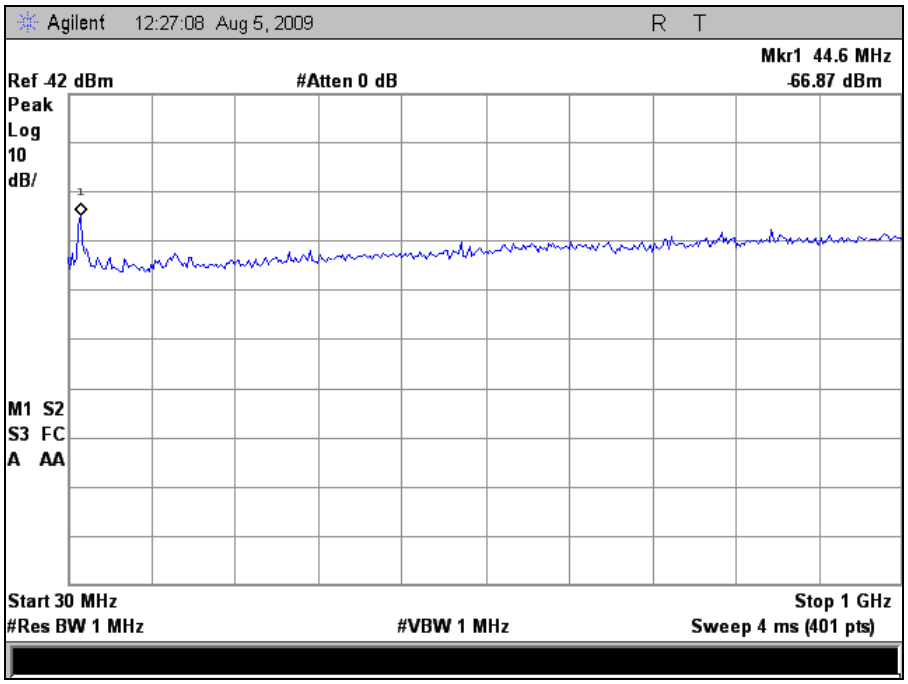
§ 15.209 Radiated Emissions Limits, 802.11n 20MHz



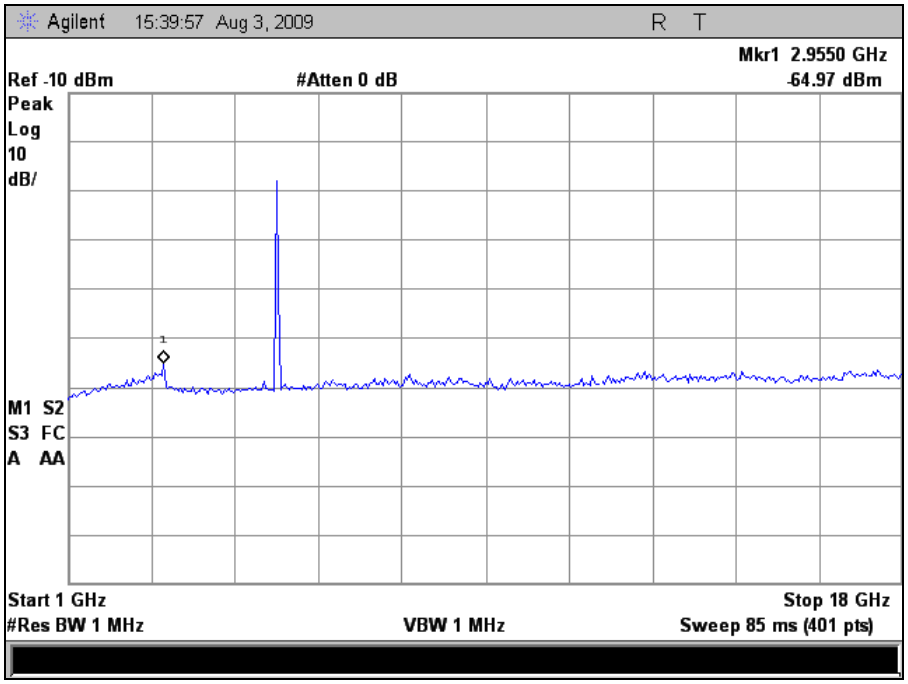
Plot 72. Radiated Spurious, 802.11n 20MHz, 5180 MHz, 30 MHz – 1 GHz



Plot 73. Radiated Spurious, 802.11n 20MHz, 5180 MHz, 1 GHz – 18 GHz

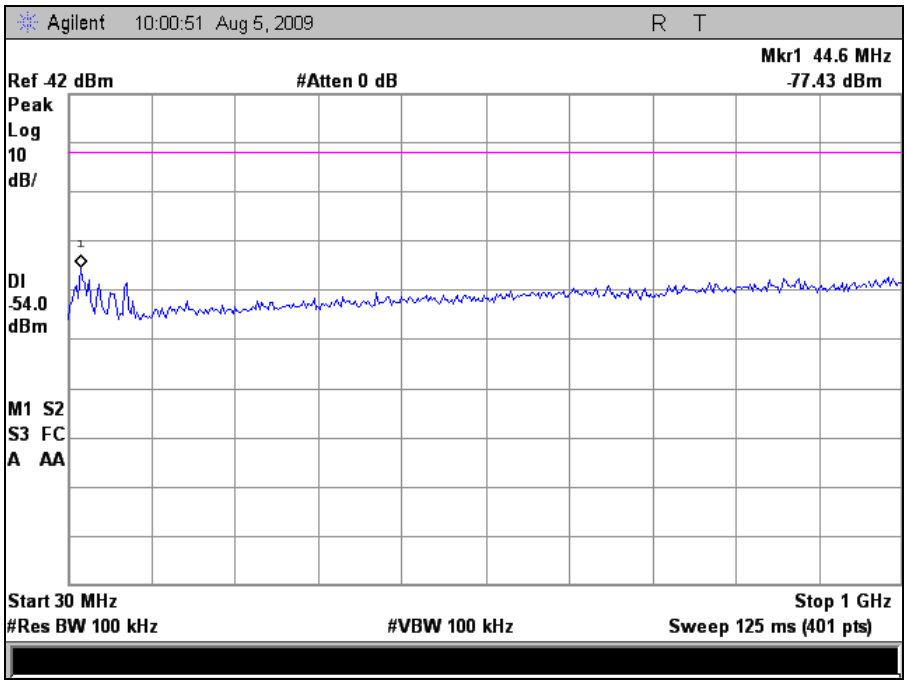


Plot 74. Radiated Spurious, 802.11n 20MHz, 5240 MHz, 30 MHz – 1 GHz

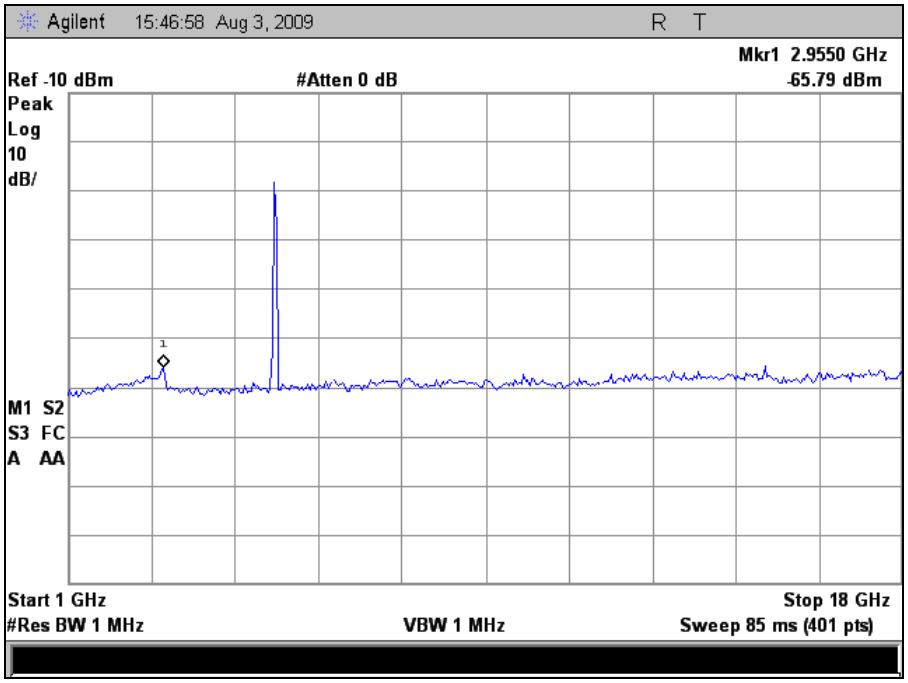


Plot 75. Radiated Spurious, 802.11n 20MHz, 5240 MHz, 1 GHz – 18 GHz

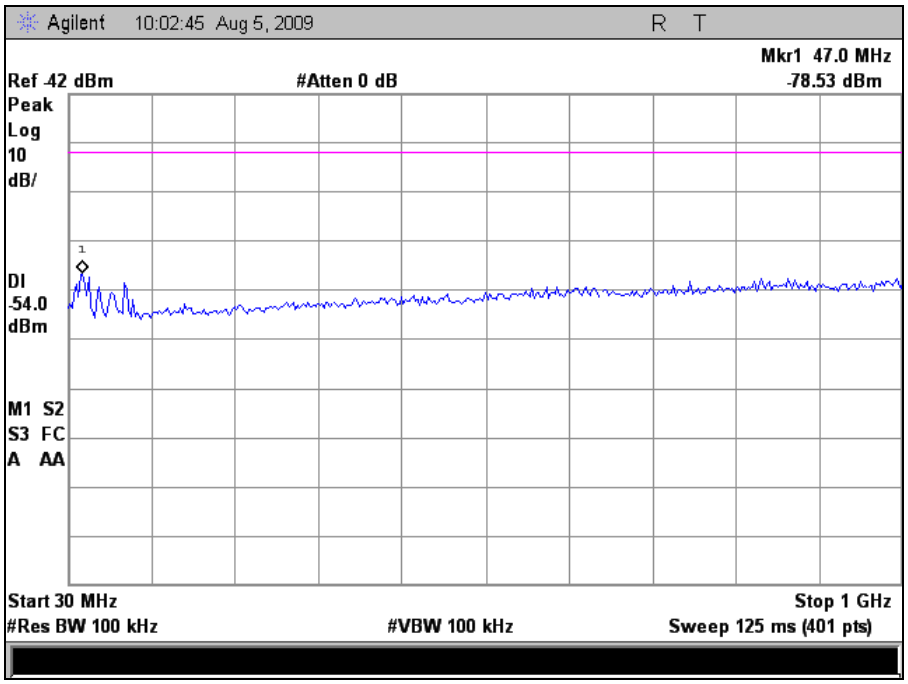
§ 15.209 Radiated Emissions Limits, 802.11n 40MHz



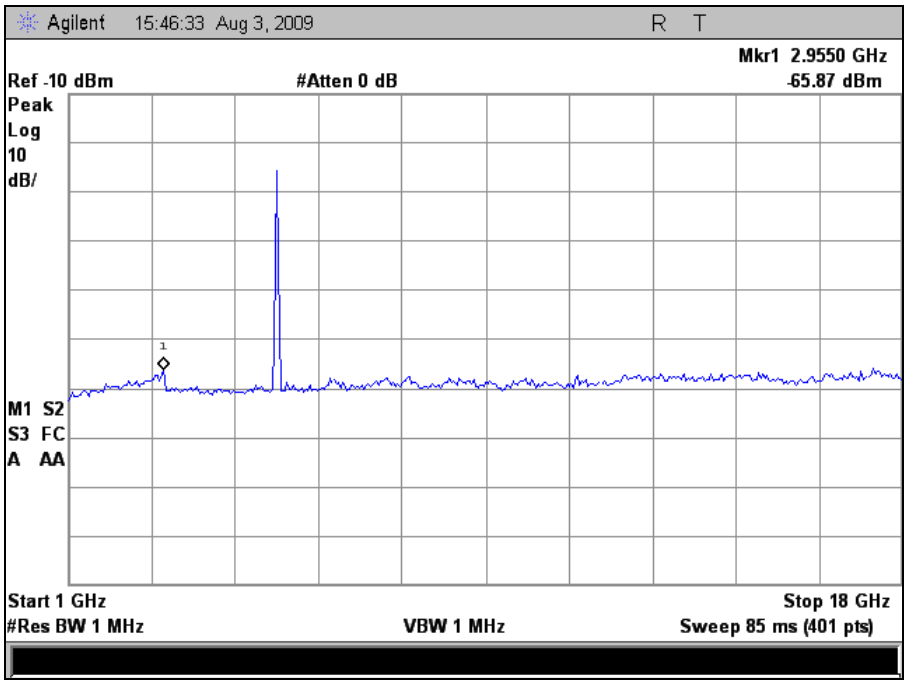
Plot 76. Radiated Spurious, 802.11n 40MHz, 5190 MHz, 30 MHz – 1 GHz



Plot 77. Radiated Spurious, 802.11n 40MHz, 5190 MHz, 1 GHz – 18 GHz



Plot 78. Radiated Spurious, 802.11n 40MHz, 5230 MHz, 30 MHz – 1 GHz



Plot 79. Radiated Spurious, 802.11n 40MHz, 5230 MHz, 1 GHz – 18 GHz

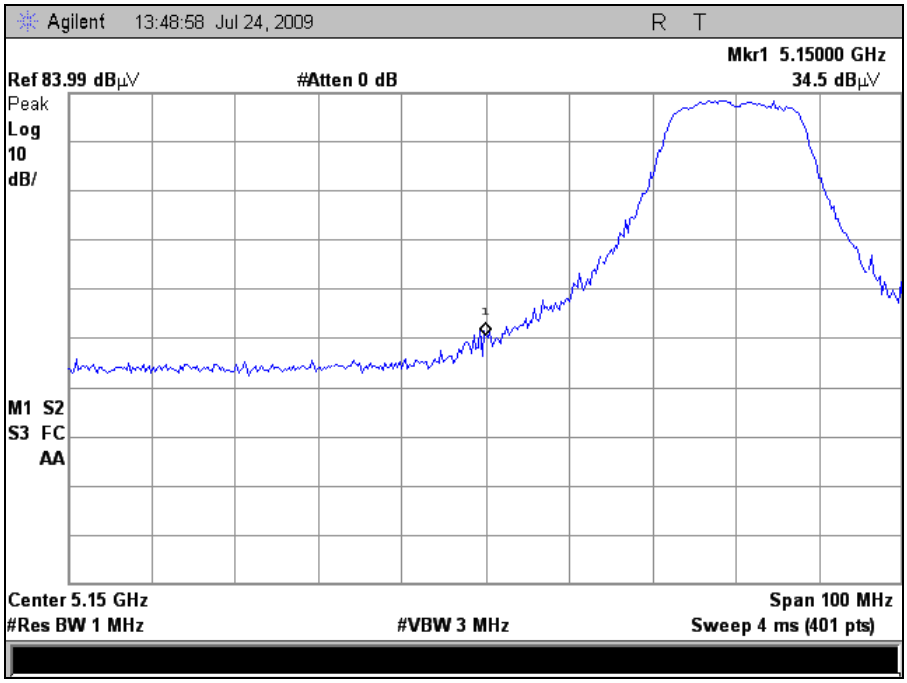
EIRP

5dBi Omni Antenna								
802.11a	**Band Edge Freq**	**Uncorrected Peak (dBuV)**	**Cable Loss**	**ACF**	**DCF**	**Corrected**	**Limit (dBuV/m)**	**Margin**
	5150 MHz	19.28	6.9	35	9.54	51.64	68.23	-16.59
802.11n 20MHz	**Band Edge Freq**	**Uncorrected Peak (dBuV)**	**Cable Lost**	**ACF**	**DCF**	**Corrected**	**Limit (dBuV/m)**	**Margin**
	5150 MHz	34.53	6.9	35	9.54	66.89	68.23	-1.34
802.11n 40MHz	**Band Edge Freq**	**Uncorrected Peak (dBuV)**	**Cable Lost**	**ACF**	**DCF**	**Corrected**	**Limit (dBuV/m))**	**Margin**
	5150 MHz	34.04	6.9	35	9.54	66.4	68.23	-1.83

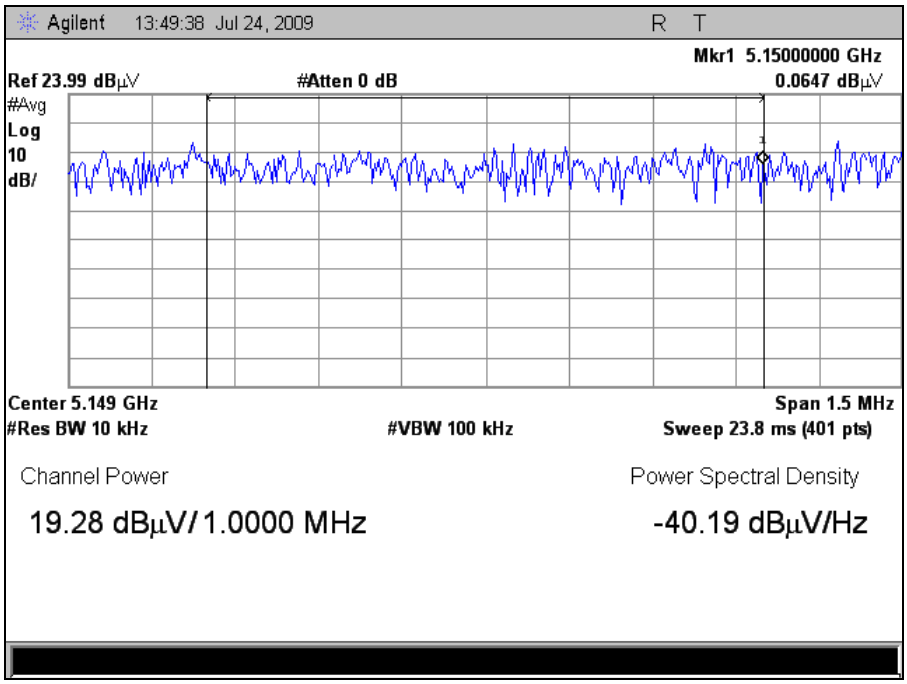
Table 38. EIRP Calculation

Note: EIRP Limit -27dBm/MHz = 68.23dBuV/m

EIRP, Port 1, 802.11a

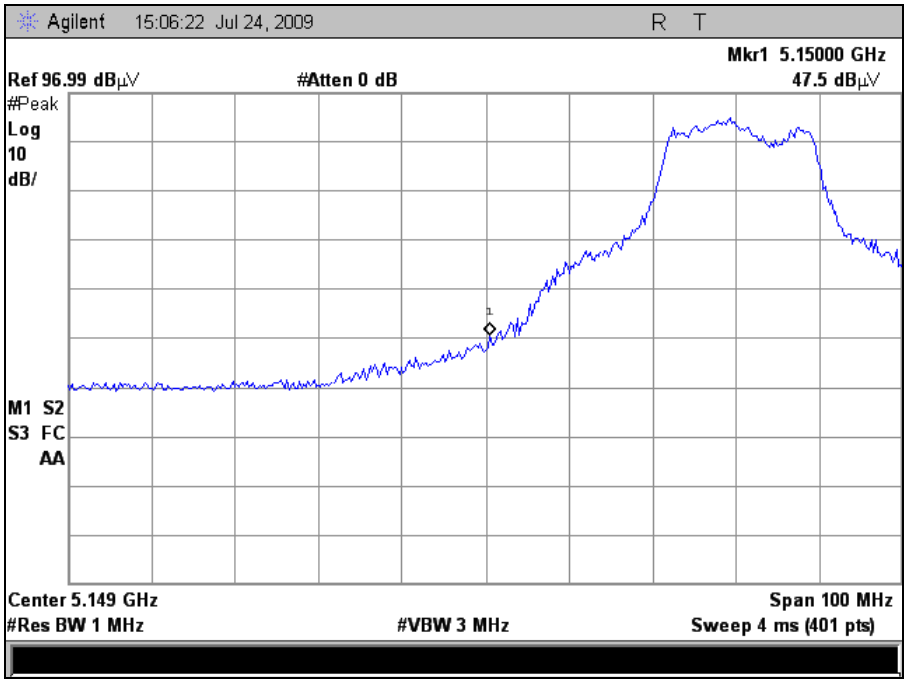


Plot 80. EIRP, Port 1, 802.11a, 5150 MHz Peak

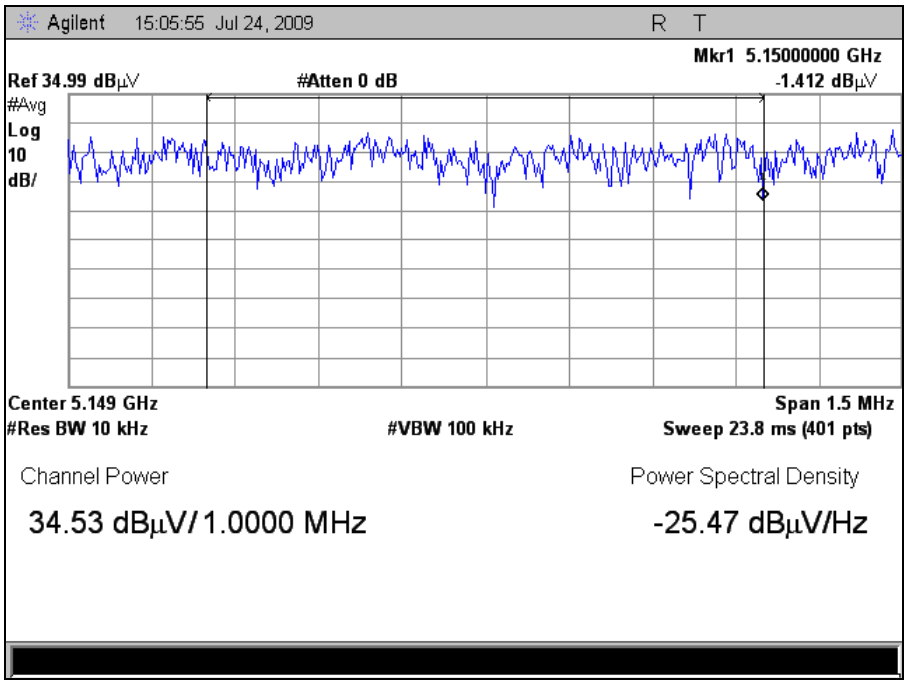


Plot 81. EIRP, Port 1, 802.11a, 5150 MHz Over 1 MHz

EIRP, 802.11n 20MHz

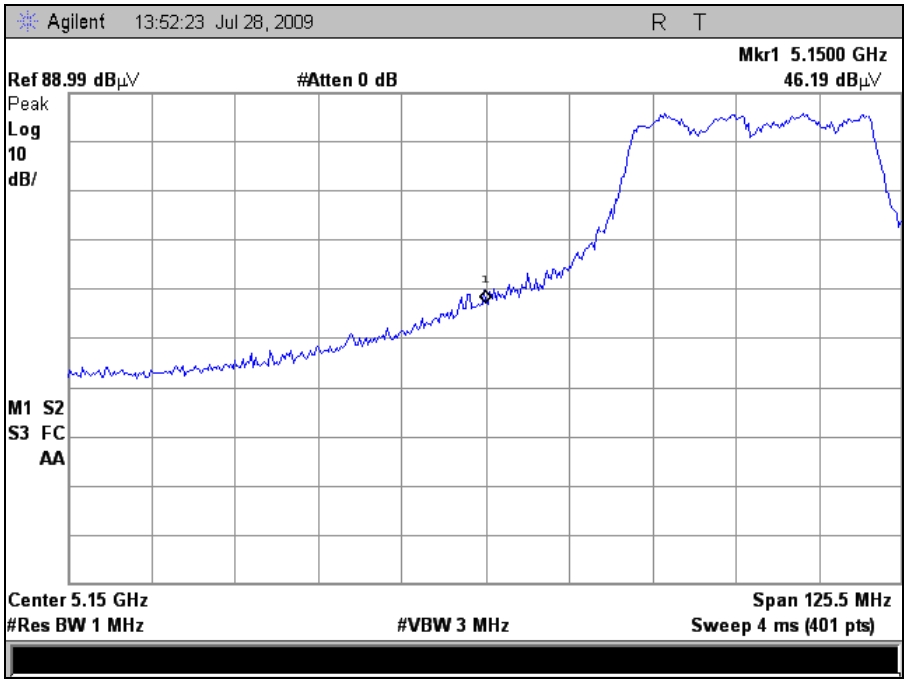


Plot 82. EIRP, 802.11n 20MHz, 5150 MHz Peak

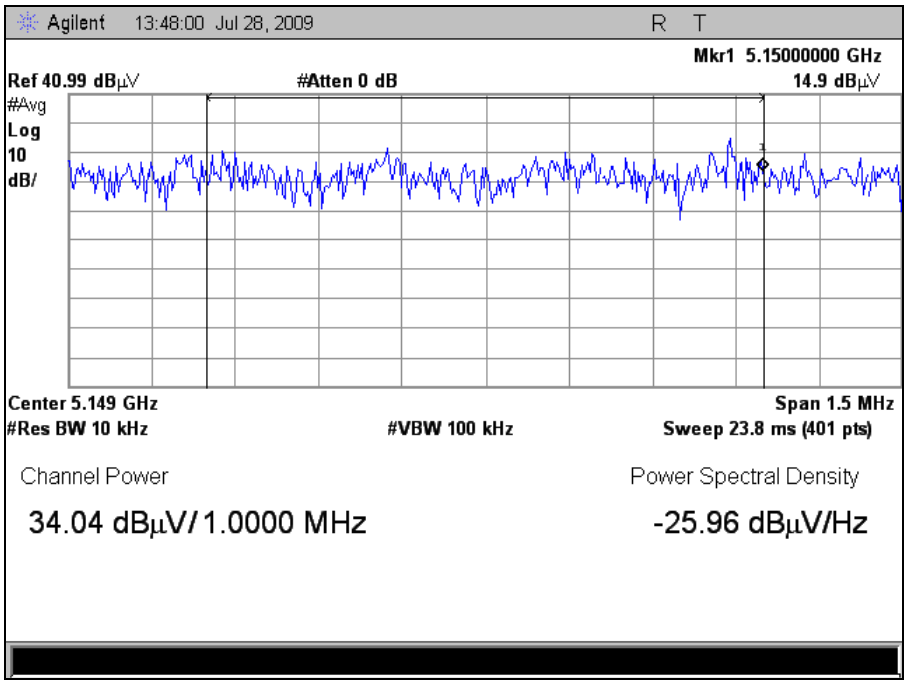


Plot 83. EIRP, 802.11n 20MHz, 5150 MHz Over 1 MHz

EIRP, 802.11n 40MHz



Plot 84. EIRP, 802.11n 40MHz, 5150 MHz Peak



Plot 85. EIRP, 802.11n 40MHz, 5150 MHz Over 1 MHz

Radiated Measurements Test Setup Photograph

Photograph 6. Test Equipment and Setup for Various Radiated Measurements

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.407(f) RF 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.

MPE Limit Calculation: EUT's operating frequencies @ 5150-5250 MHz, highest conducted power = 15.55dBm (peak) (802.11a) ;therefore, **Limit for Uncontrolled exposure: 1 mW/cm^2 or 10 W/m^2**

EUT maximum antenna gain = 5 dBi.

Equation from page 18 of OET 65, Edition 97-01

$S = PG / 4\pi R^2$ or $R = \sqrt{PG / 4\pi S}$

where, S = Power Density (1 mW/cm^2)
P = Power Input to antenna (35.89mW)
G = Antenna Gain (3.16 numeric)

$S = (35.89*3.162 / 4*3.14*20.0^2) = (113.5011 / 5024)$ = **0.022 mW/cm^2**@ 20cm separation

MPE Limit Calculation: EUT's operating frequencies @ 5150-5250 MHz,; highest conducted power = 16.57dBm (peak) (802.11n) ;therefore, **Limit for Uncontrolled exposure: 1 mW/cm^2 or 10 W/m^2**

EUT maximum antenna gain = 5 dBi.

Equation from page 18 of OET 65, Edition 97-01

$S = PG / 4\pi R^2$ or $R = \sqrt{PG / 4\pi S}$

where, S = Power Density (1 mW/cm^2)
P = Power Input to antenna (45.39mW)
G = Antenna Gain (3.16 numeric)

$S = (45.39*3.16 / 4*3.14*20.0^2) = (143.54 / 5024)$ = **0.028 mW/cm^2**@ 20cm separation

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.407(g) Frequency Stability

Test Requirements: **§ 15.407(g):** Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

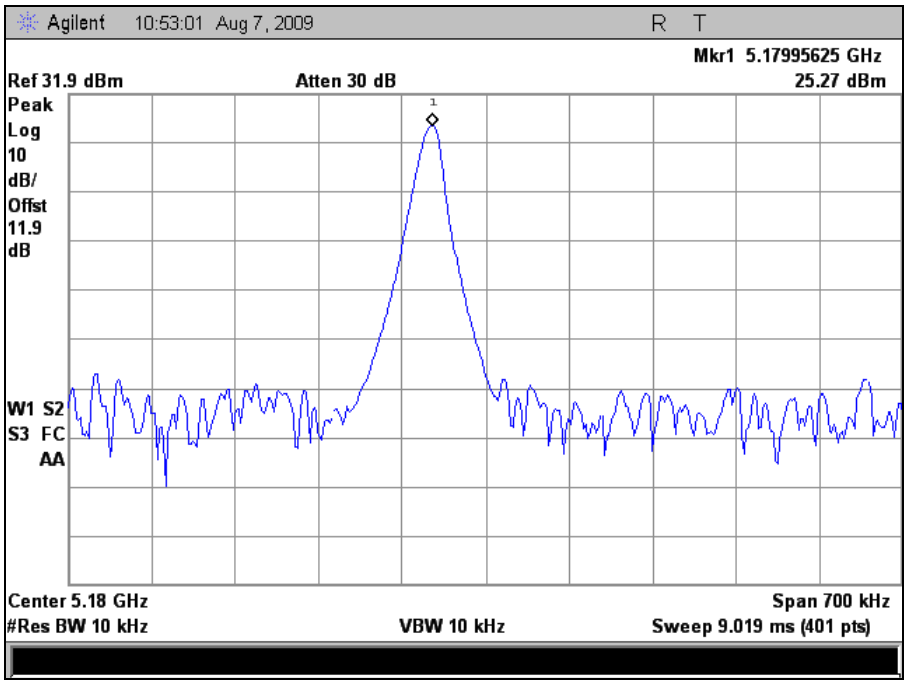
Test Procedure: The EUT was placed in an environmental chamber and the RF port was connected directly to a spectrum analyzer through an attenuator. Depending on which band was being investigated, the EUT was set to transmit at the low, mid, and high with the appropriate power level. If the EUT was capable of transmitting a CW carrier then the spectrum analyzer's frequency counting function was used to measure the actual frequency. If only a modulated carrier was available then the frequency relative to -10dBc above and below the carrier was measured and the carrier frequency was determined using (f1+f2)/2. The frequency of the carrier was measured at normal and extreme conditions. The resulting carrier frequencies were tabulated below with the temperature range of -40°C to +60°C .

Test Results: The EUT was found compliant with the requirements of **§15.407(g)**

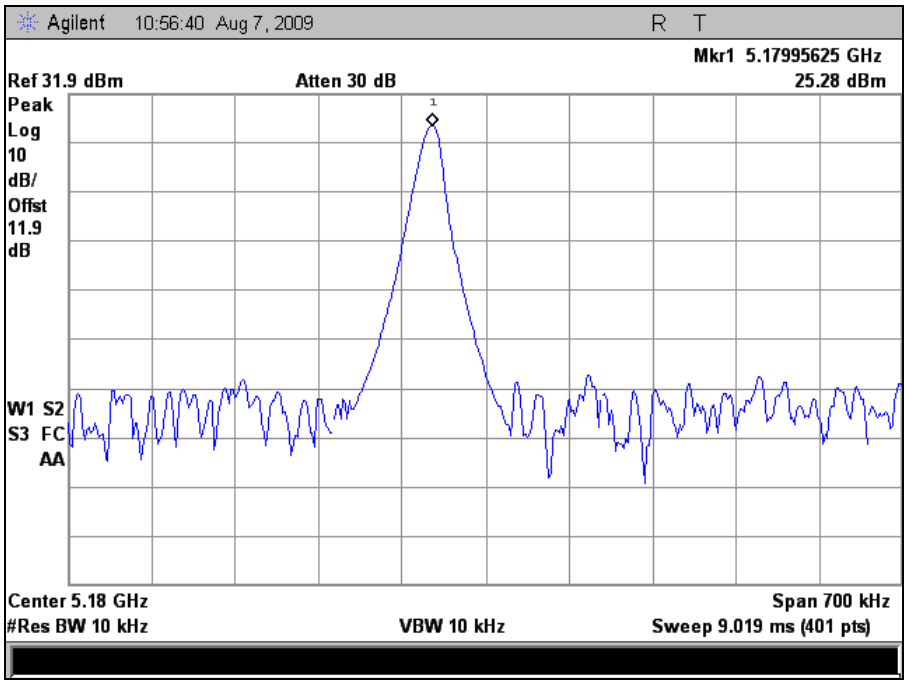
Test Engineer(s): 08/19/09 – 08/20/09

Test Date(s): Anderson Soungpanya

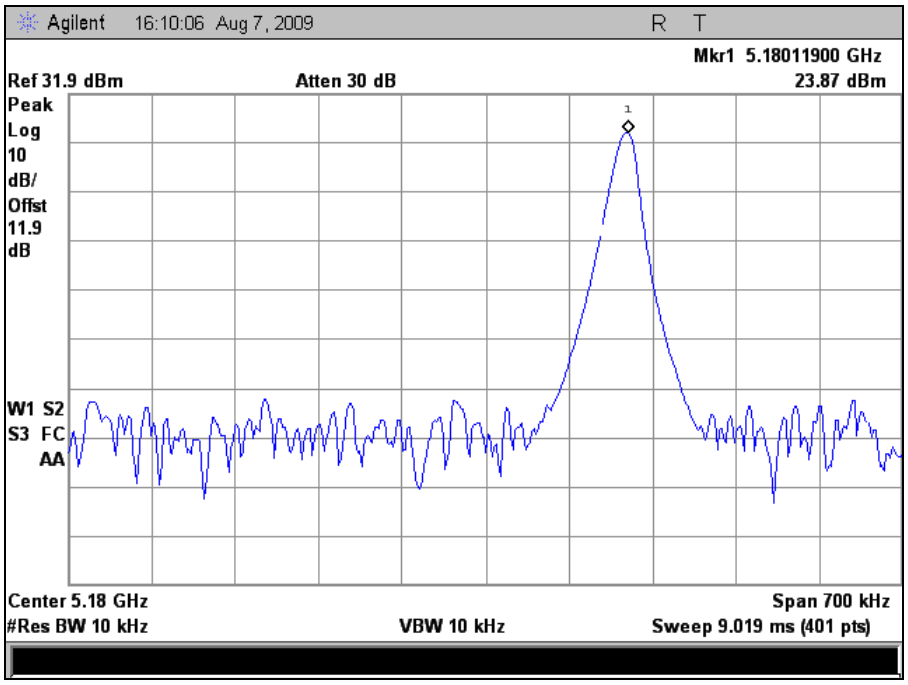
Frequency Stability, Port 1



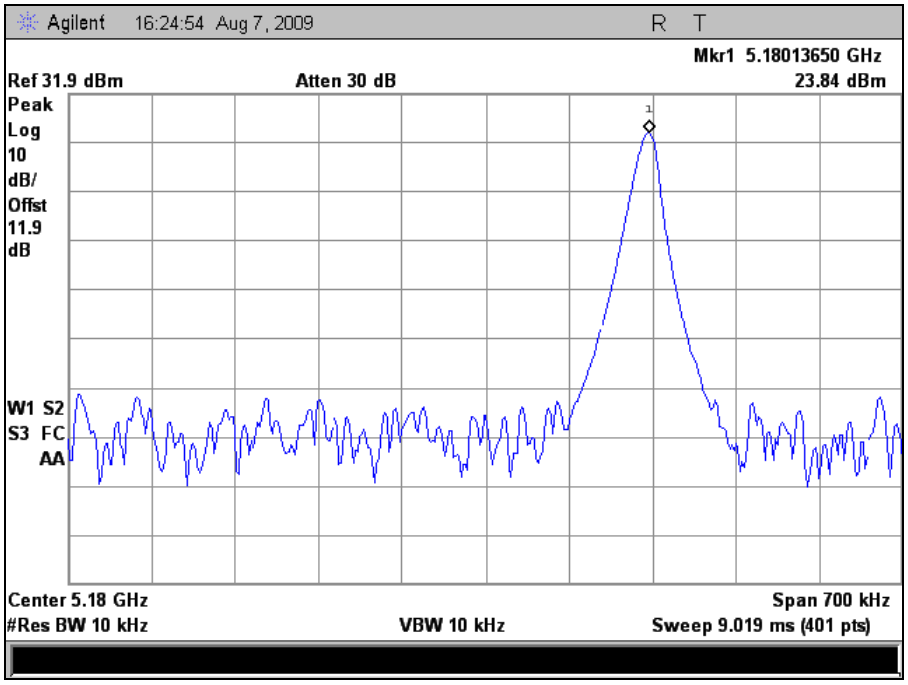
Plot 86. Freq. Stability, Port 1, 5180 MHz @-40C Low Volt.



Plot 87. Freq. Stability, Port 1, 5180 MHz @-40C High Volt.

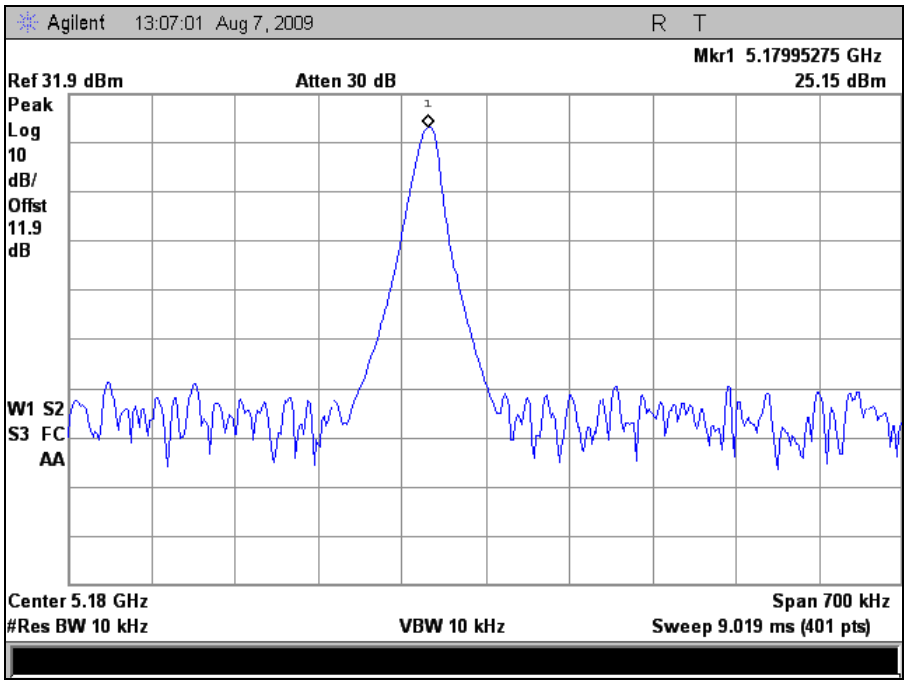


Plot 88. Freq. Stability, Port 1, 5180 MHz @+60C Low Volt.

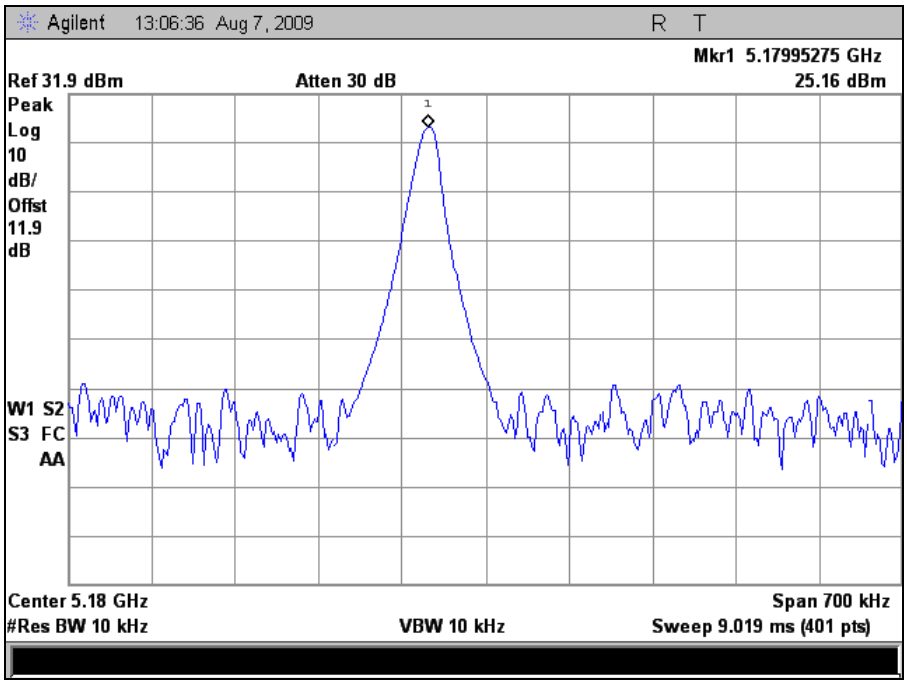


Plot 89. Freq. Stability, Port 1, 5180 MHz @+60C High Volt.

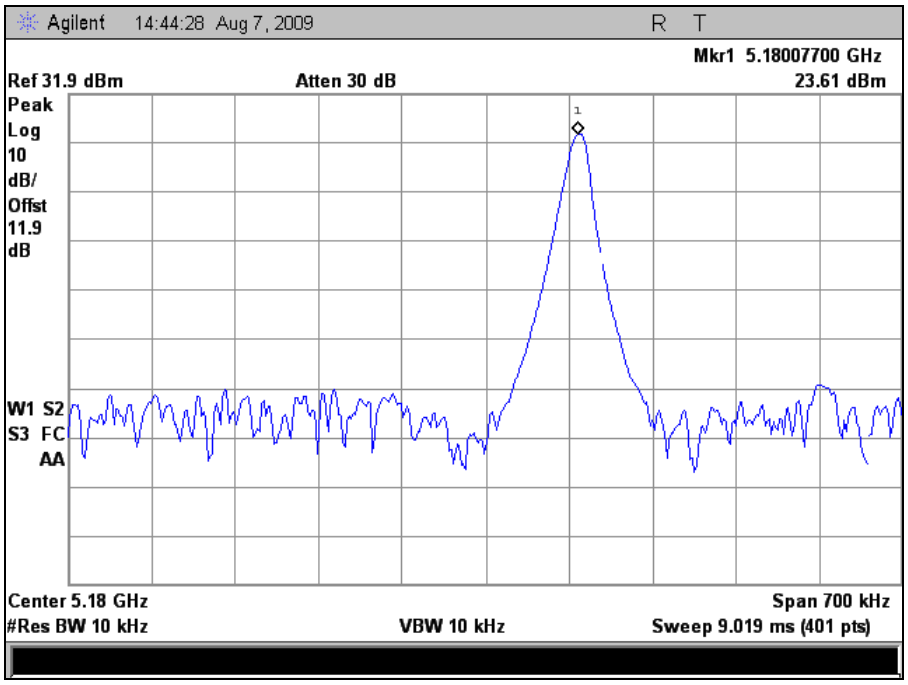
Frequency Stability, Port 2



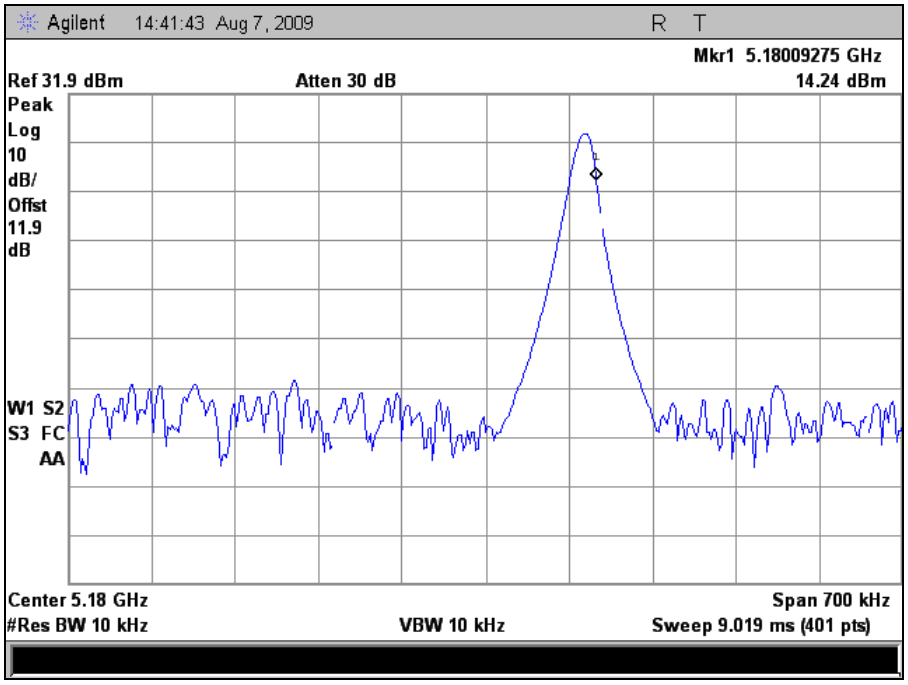
Plot 90. Freq. Stability, Port 2, 5180 MHz @-40C Low Volt.



Plot 91. Freq. Stability, Port 2, 5180 MHz @-40C High Volt.

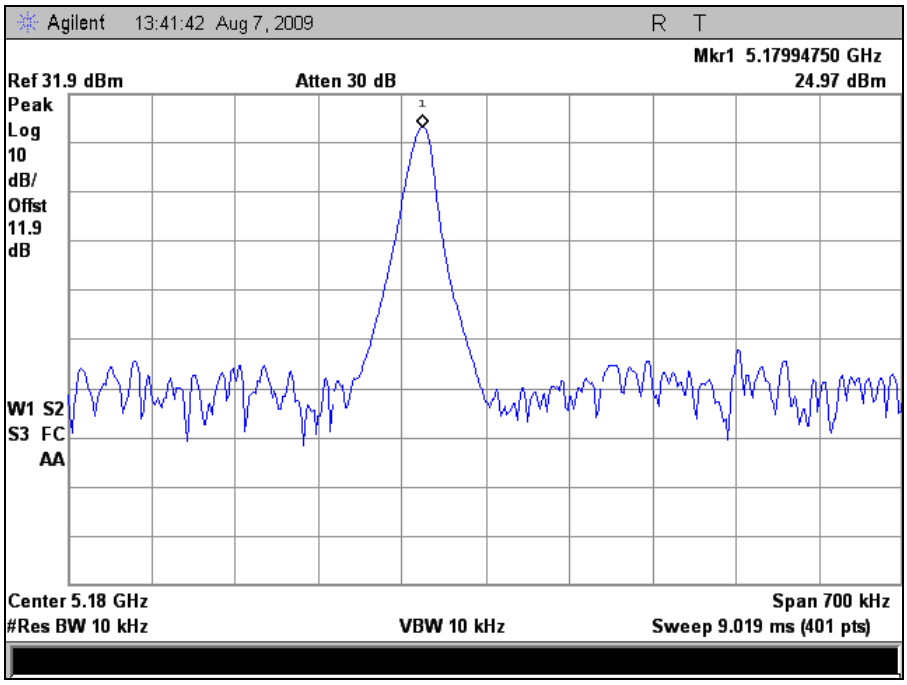


Plot 92. Freq. Stability, Port 2, 5180 MHz @+60C Low Volt.

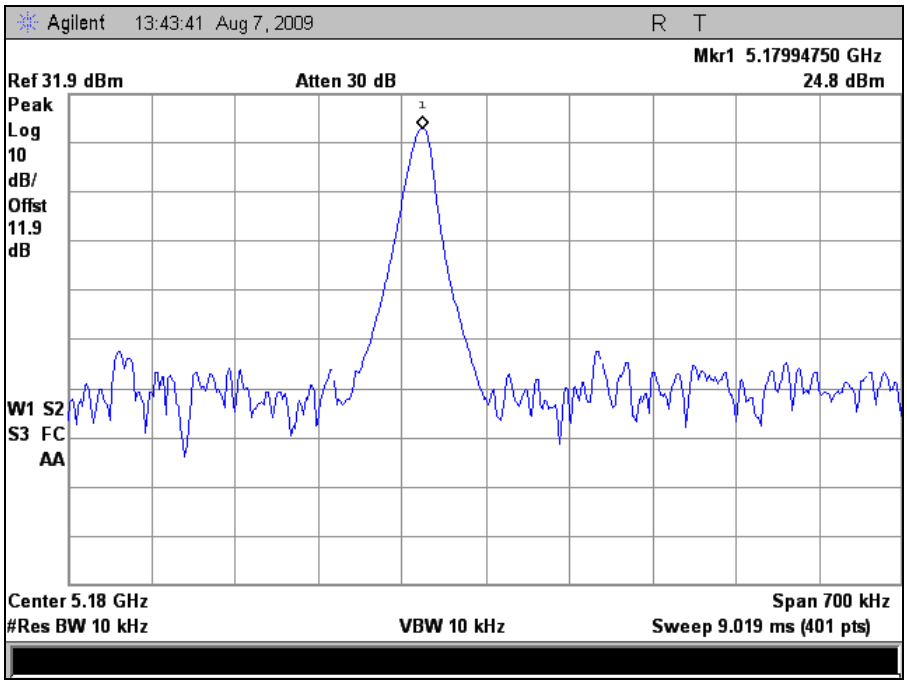


Plot 93. Freq. Stability, Port 2, 5180 MHz @+60C High Volt.

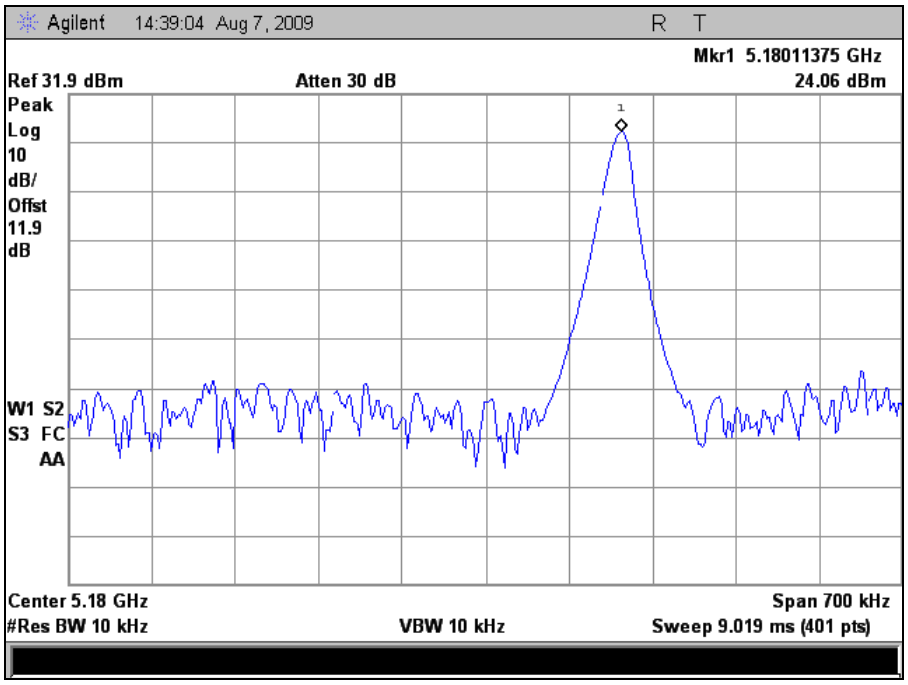
Frequency Stability, Port 3



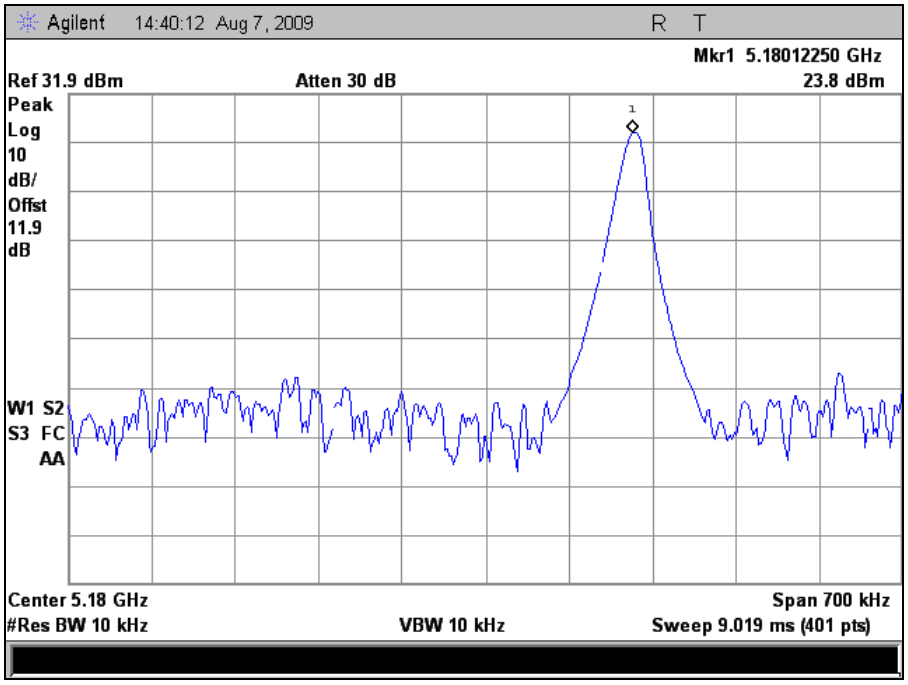
Plot 94. Freq. Stability, Port 3, 5180 MHz @-40C Low Volt.



Plot 95. Freq. Stability, Port 3, 5180 MHz @-40C High Volt.



Plot 96. Freq. Stability, Port 3, 5180 MHz @+60C Low Volt.



Plot 97. Freq. Stability, Port 3, 5180 MHz @+60C High Volt.

IV. Test Equipment

Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ANSI/NCSL Z540-1-1994 and ANSI/ISO/IEC 17025:2000.

MET Asset #	Equipment	Manufacturer	Model	Last Cal Date	Cal Due Date
1S2421	EMI RECEIVER	ROHDE&SCHWARZ	ESIB 7	05/27/2009	05/27/2010
1S2121	PRE-AMPLIFIER	HEWLETT PACKARD	8449B	SEE NOTE	
1S2198	HORN ANTENNA	EMCO	3115	09/10/2008	09/10/2009
1S2202	ANTENNA, HORN, 1 METER	EMCO	3116	04/10/2007	04/10/2010
N/A	HIGH PASS FILTER	MICRO-TRONICS	HPM13146	SEE NOTE	
1S2481	CHAMBER, 10 METER	ETS-LINDGREN	DKE 8X8 DBL	12/26/2008	12/26/2009
1S2041	COUPLER, BI DIRECTIONALCOAXIAL	NARDA	N/A	SEE NOTE	
1S2460	ANALYZER, SPECTRUM 9 KHZ-40GHZ	AGILENT	E4407B	04/14/2009	04/14/2010
1S2034	COUPLER, DIRECTIONAL 1-20 GHZ	KRYTAR	101020020	SEE NOTE	
1S2464	LISN	SOLAR ELECTRONICS	9252-50-R24-BNC	09/26/2008	09/26/2009
1S2512	TRANSIENT LIMITER	AGILENT	11947A	SEE NOTE	
1S2520	THERMO-HYGROMETER	FISHER SCIENTIFIC	11-661-7D	11/14/2007	11/13/2009
1S2482	CHAMBER, 5 METER	PANASHIELD	641431	11/22/2008	11/22/2009
1S2108	RECIEVER, EMI, RF FILTER SECTION	HEWLETT PACKARD	85460A	11/06/2008	11/06/2009
1S2399	TURNTABLE CONTROLLER	SUNOL SCIENCE	SC99V	SEE NOTE	
1S2485	BILOG ANTENNA	TESEQ	CBL6112D	03/20/2009	03/20/2010
N/A	2-6GHZ COMBINER	MINI CIRCUITS	ZN4PD-1-63-S+	SEE NOTE	
1S2108	RF FILTER SECTION	HEWLETT PACKARD	85460A	11/6/08	11/6/09
1S2041	COUPLER, BI DIRECTIONALCOAXIAL	NARDA	N/A	SEE NOTE	
1S2128	HARMONIC MIXER	HEWLETT PACKARD	11970A	11/22/2008	11/22/2010
1S2129	HARMONIC MIXER	HEWLETT PACKARD	11970K	11/22/2008	11/22/2010

Table 39. Test Equipment List

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

V. Certification & User's Manual Information

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.

(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.

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.

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.

Certification & User's Manual Information

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 users 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.

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.

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 4, February 2004:

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 user's 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

