MET Laboratories, Inc. *Safety Certification - EMI - Telecom Environmental Simulation*
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33439 WESTERN AVENUE ● UNION CITY, CALIFORNIA 94587 ● PHONE (510) 489-6300 ● FAX (510) 489-6372
3162 BELICK STREET ● SANTA CLARA, CALIFORNIA 95054 ● PHONE (408 748-3585 ● FAX (510) 489-6372

March 23, 2011

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

Dear Steve Gu,

Enclosed is the EMC Wireless test report for compliance testing of the Firetide, Inc., Firetide Indoor and Outdoor MIMO Access Points as tested to the requirements of Title 47 of the CFR, Ch. 1 (10-1-06 ed.), Part 15, Subpart B, ICES-003, Issue 4 February 2004 for a Class A Digital Device and FCC Part 15 Subpart C, 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.\EMCS82646-FCC247 Rev. 2)

Electromagnetic Compatibility Criteria
Test Report

for the

Firetide, Inc.
Firetide Indoor and Outdoor MIMO Access Points

Tested under
the FCC Certification Rules
contained in
Title 47 of the CFR, Parts 15 Subpart B & ICES-003
for Class A Digital Devices
&
15.247 Subpart C & RSS-210, Issue 7, June 2007
for Intentional Radiators

MET Report: EMCS82646-FCC247 Rev. 2

March 23, 2011

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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15.247 Subpart C & 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 the FCC Rules Parts 15B, 15.247 and Industry Canada standards ICES-003, Issue 4 February 2004, RSS-210, Issue 7, June 2007 under normal use and maintenance.

Shawn McMillen,
Wireless Manager, Electromagnetic Compatibility Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
0	February 17, 2011	Initial issue.
1	March 16, 2011	Revised to reflect engineer corrections.
2	March 23, 2011	Editorial corrections.

Table of Contents

List of Tables

List of Figures

List of Photographs

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

I. Executive Summary

A. Purpose of Test

An EMC evaluation was performed to determine compliance of the Firetide, Inc. Firetide Indoor and Outdoor MIMO Access Points, 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 Firetide Indoor and Outdoor MIMO Access Points. 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 Firetide Indoor and Outdoor MIMO Access Points, 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 Firetide, Inc., purchase order number 2790. All tests were conducted using measurement procedure ANSI C63.4-2003.

FCC Reference	IC Reference	Description	Compliance
47 CFR Part 15.247:2005	RSS-210 Issue 7: 2007	Applicable Standard	Compliant
47 CFR Part 15.107 (a)	RSS-210 Issue 7: 2007	Conducted Emission Limits for a Class A Digital Device	Compliant
47 CFR Part 15.109 (a)	RSS-210 Issue 7: 2007	Radiated Emission Limits for a Class A 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-210(7.2.2)	Conducted Emission Voltage	Compliant
Title 47 of the CFR, Part 15 §15.247(a)(1)	RSS-210(A8.1)	Occupied Bandwidth	Compliant
Title 47 of the CFR, Part 15 §15.247(b)	RSS-210(A8.4)	RF Output Power	Compliant
Title 47 of the CFR, Part 15 §15.209, §15.247(d)	RSS-210(A8.5)	Radiated Spurious Emissions	Compliant
Title 47 of the CFR, Part 15 §15.205	RSS-210(A8.5)	Emissions at Restricted Band	Compliant
Title 47 of the CFR, Part 15 §15.209, §15.247(d)	RSS-210(A8.5)	Conducted Spurious Emissions	Compliant
Title 47 of the CFR, Part 15; §15.247(e)	RSS-210(A8.3)	Power Spectral Density	Compliant
Title 47 of the CFR, Part 15 §15.247(i)	RSS-Gen(5.5)	Maximum Permissible Exposure	Compliant
N/A	RSS-Gen(4.8)	Receiver Spurious Emissions	Compliant

Table 1. Executive Summary of EMC Part 15.247 ComplianceTesting

II. Equipment Configuration

A. Overview

MET Laboratories, Inc. was contracted by Firetide, Inc. to perform testing on the Firetide Indoor and Outdoor MIMO Access Points, under Firetide, Inc.'s purchase order number 2790.

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., Firetide Indoor and Outdoor MIMO Access Points.

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

Model(s) Tested:	FWB-205	
Model(s) Covered:	FWB-205	
EUT Specifications:	Primary Power: 115 VAC	
	FCC ID: REP-F205-1 IC: 4988A-F205	
	Type of Modulations:	OFDM (Orthogonal Frequency Division multiplexing)
	Emission Designator:	**5 GHz** 802.11a: 16M2D7D
	Equipment Code:	DTS
	Peak RF Output Power:	**5 GHz** 802.11a: 29.62dBm
	EUT Frequency Ranges:	5745MHz – 5825MHz; 5755MHz – 5795MHz
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):	March 23, 2011	

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
RSS-210, Issue 7, June 2007	Low-power License-exempt Radiocommunications Devices (All Frequency Bands): Category I Equipment
CFR 47, Part 15, Subpart B	Electromagnetic Compatibility: Criteria for Radio Frequency Devices
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
ANSI C63.10-2009	American National Standard for Testing Unlicensed Wireless Devices

Table 3. References

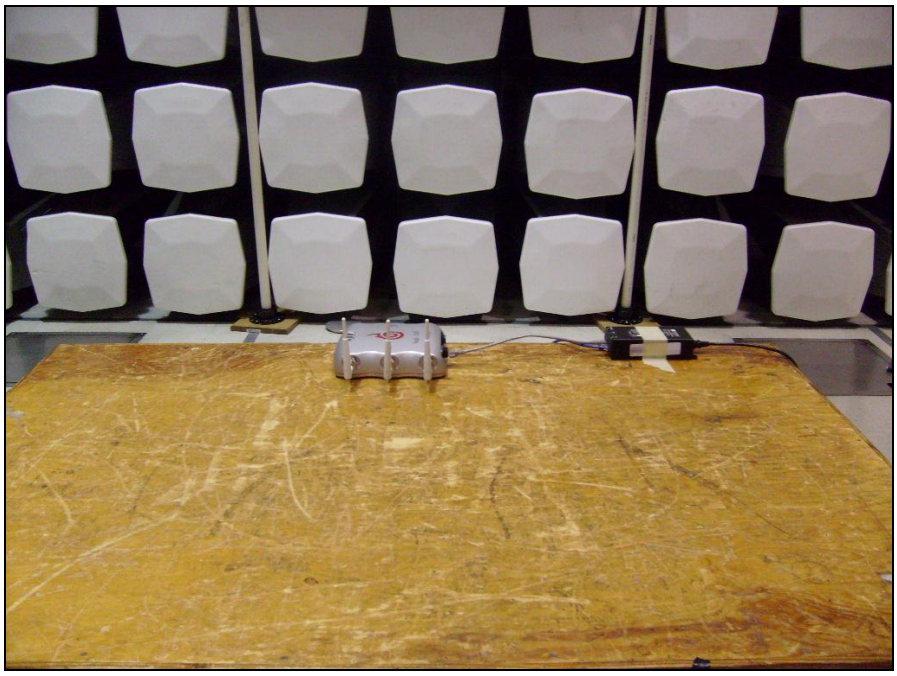
C. Test Site

All testing was performed at MET Laboratories, Inc., 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.

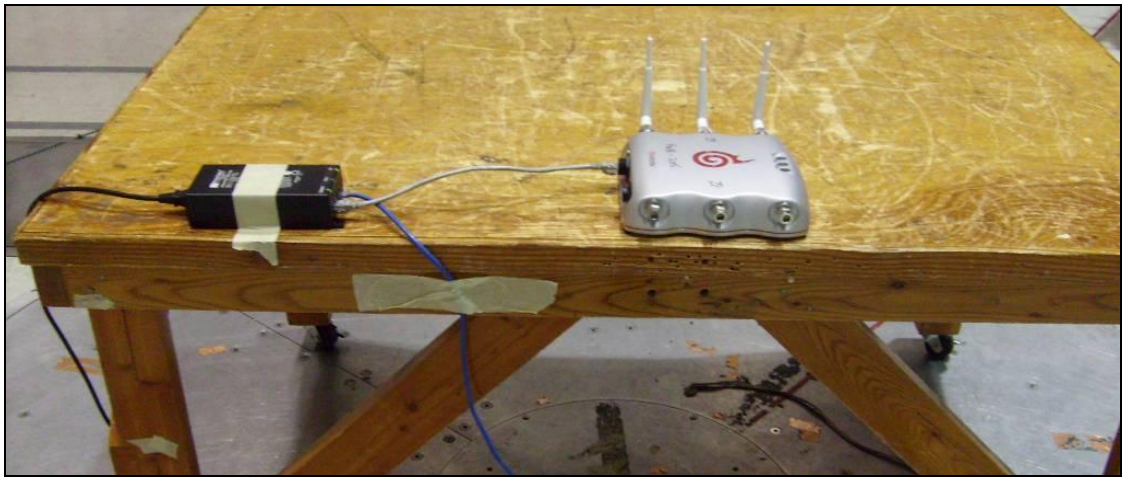
Radiated Emissions measurements were performed in a 5 meter semi-anechoic chamber (equivalent to an Open Area Test Site). In accordance with §2.948(a)(3), a complete site description is contained at MET Laboratories.

D. Description of Test Sample

The Firetide, Inc. Firetide Indoor and Outdoor MIMO Access Points, Equipment Under Test (EUT), is an Outdoor MIMO Point to Point Link using Wistron DNMA-H5 mini PCI radios.



Photograph 1. Firetide, Inc. Firetide Indoor and Outdoor MIMO Access Points, Front View



Photograph 2. Firetide, Inc. Firetide Indoor and Outdoor MIMO Access Points, Rear View

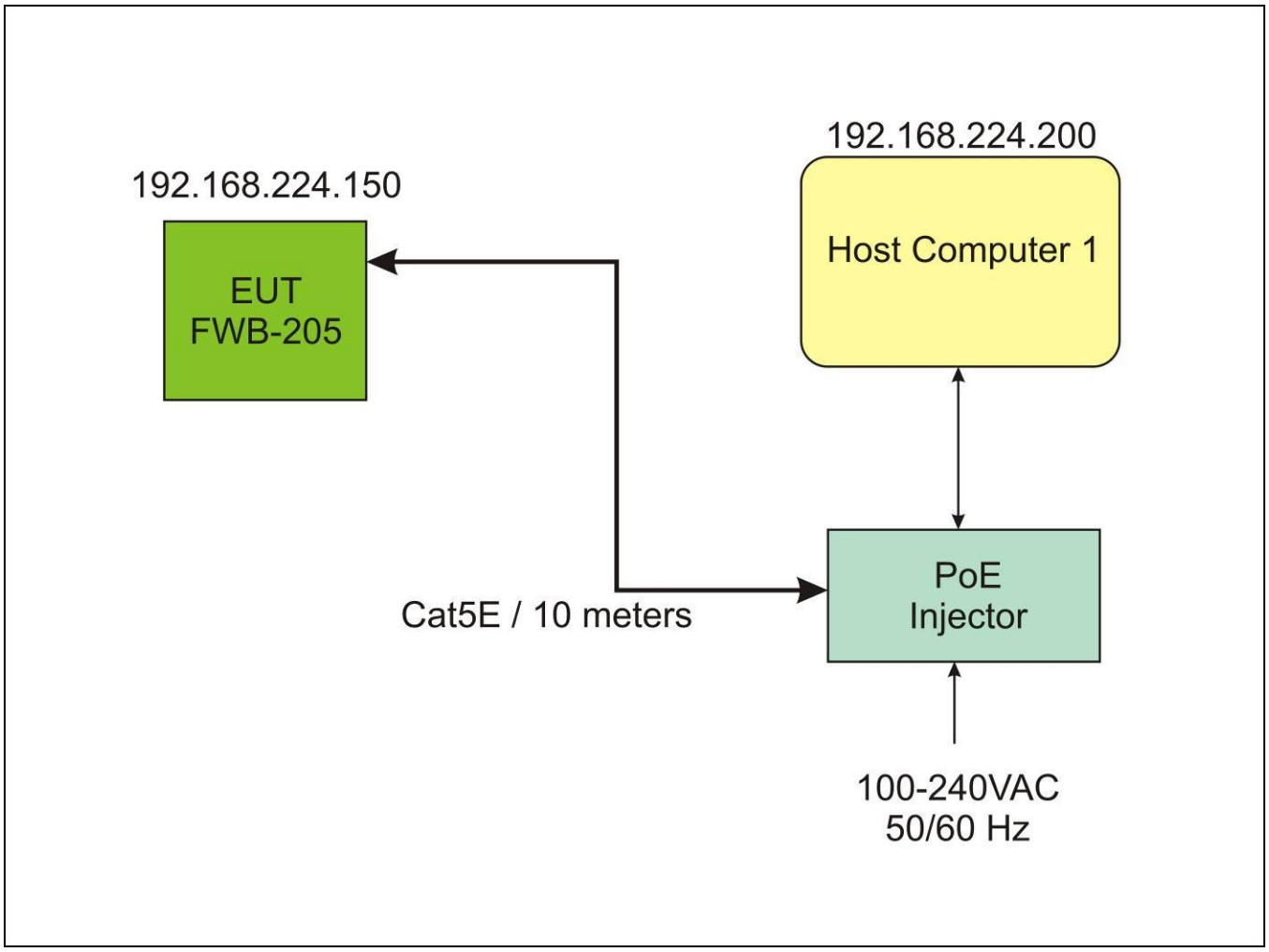


Figure 1. Block Diagram of Test Configuration

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	Name / Description	Model Number	Part Number	Serial Number	Rev. #
A	Firetide PtP Node	FWB-205	FWB-205	WEC071034500414	02
	PoE Injector	Phihong	PoE30U56	P71300187B1	N/A
	DC Adapter	DR-30-15	DR-30-15	RA75144734	N/A

Table 4. Equipment Configuration

F. Support Equipment

Support equipment necessary for the operation and testing of the EUT is included in the following list.

Ref. ID	Name / Description	Manufacturer	Model Number	Customer Supplied Calibration Data
	Laptop computer	Dell	Vostro 1000	N/A

Table 5. Support Equipment

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
1	DC Power	DC power input	1	1	N	110-230VAC
2	POE Ethernet IN	IP connection	1	10	N	host computer
3	POE Ethernet OUT	IP connection	1	10	N	FWB-205 Ethernet Port

Table 6. Ports and Cabling Information

H. Mode of Operation

Operation can be monitored using by pinging the EUT or running ART.

I. Method of Monitoring EUT Operation

IP connectivity is maintained with the EUT. If IP connectivity is lost, EUT connectivity shall be re-established upon power up or re-boot.

J. Modifications

a) Modifications to EUT

Change decoupling capacitor C421 to 0.12 uF.

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.

15.207(a), Except as shown in paragraphs (b) and (c) of this section*, charging, AC adapters or battery eliminators the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the Table 7, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

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

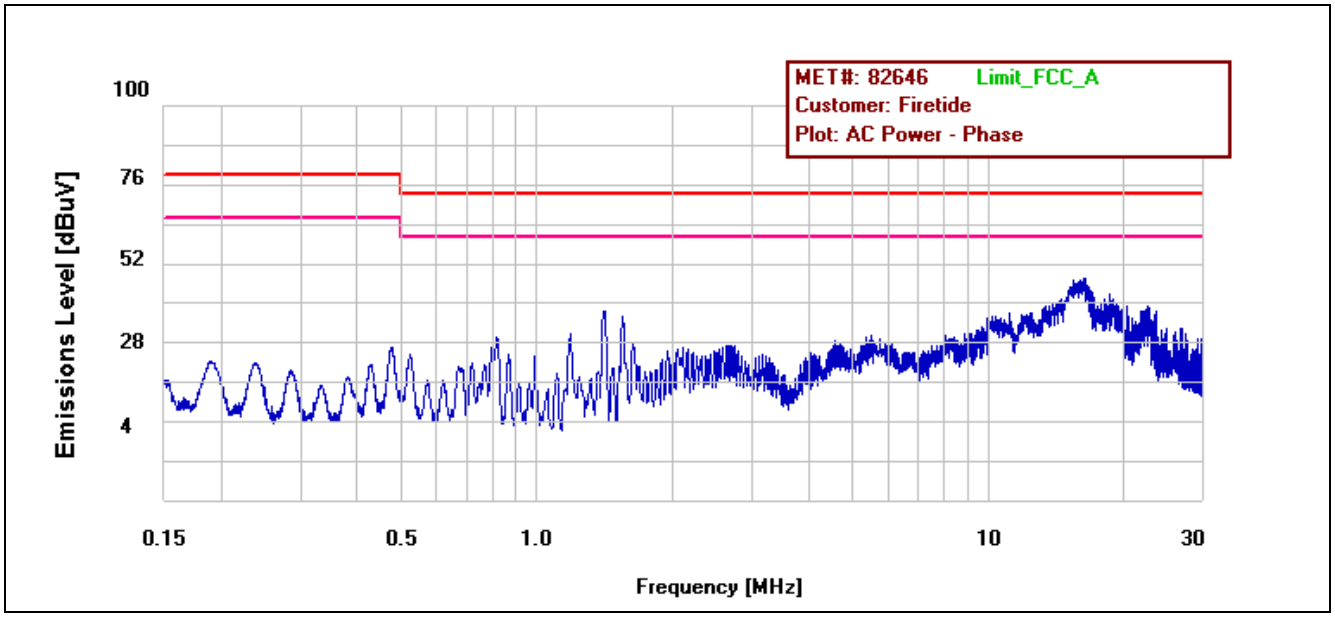
Test Engineer(s): Kenshi Chung

Test Date(s): 09/03/10

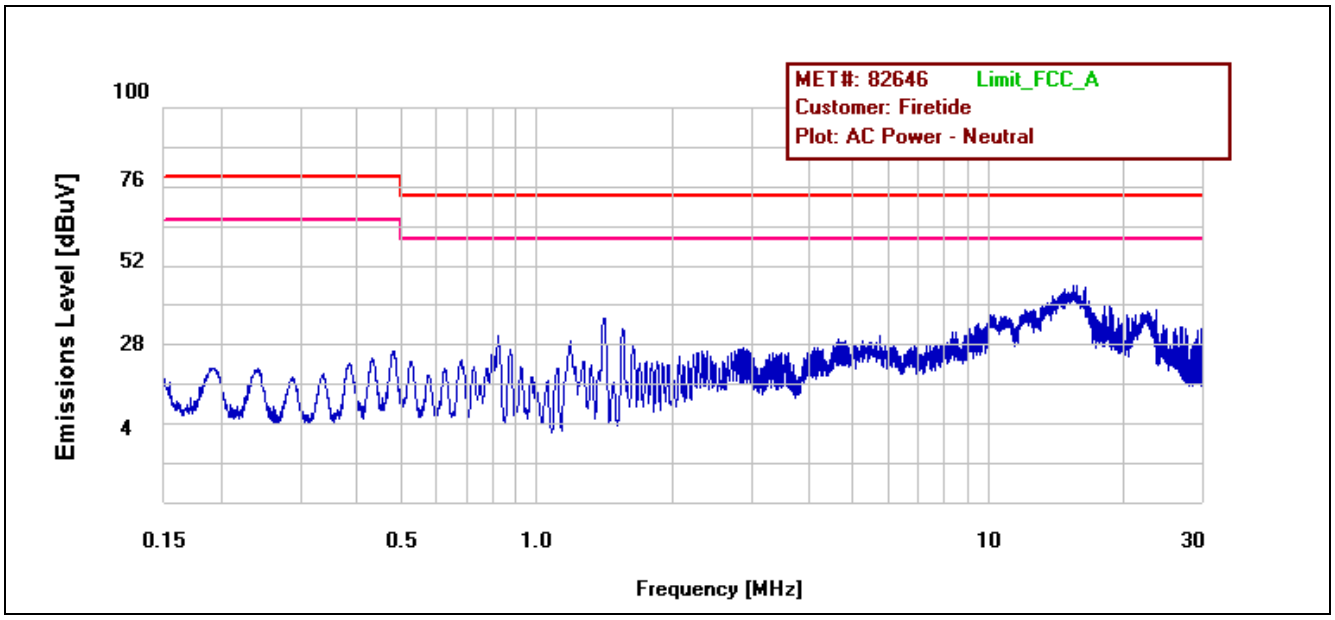
Conducted Emissions - Voltage, AC Power, (120VAC)

Line	Freq (MHz)	QP Amplitude	QP Limit	Delta	Pass	Average Amplitude	Average Limit	Delta	Pass
AC Power - Phase	0.4800	26.58	79	-52.42	Pass	23.06	66	-42.94	Pass
AC Power - Phase	0.8120	24.41	73	-48.59	Pass	19.2	60	-40.8	Pass
AC Power - Phase	1.372	34.07	73	-38.93	Pass	29.34	60	-30.66	Pass
AC Power - Phase	1.5000	32.49	73	-40.51	Pass	27.82	60	-32.18	Pass
AC Power - Phase	16.228	40.19	73	-32.81	Pass	36.03	60	-23.97	Pass
AC Power - Phase	16.168	39.2	73	-33.8	Pass	34.89	60	-25.11	Pass
AC Power - Neutral	0.484	26.1	79	-52.9	Pass	24.77	66	-41.23	Pass
AC Power - Neutral	0.8120	23.81	73	-49.19	Pass	21.34	60	-38.66	Pass
AC Power - Neutral	1.372	34.63	73	-38.37	Pass	30.54	60	-29.46	Pass
AC Power - Neutral	1.5000	32.79	73	-40.21	Pass	29.81	60	-30.19	Pass
AC Power - Neutral	16.228	40.54	73	-32.46	Pass	37.43	60	-22.57	Pass
AC Power - Neutral	15.376	37.89	73	-35.11	Pass	30.15	60	-29.85	Pass

Table 8. Conducted Emissions - Voltage, AC Power, (120VAC)



Plot 1. Conducted Emission, Phase Line Plot



Plot 2. Conducted Emission, Neutral Line Plot

Conducted Emission Limits Test Setup

Photograph 3. Conducted Emissions, Test Setup 1

Photograph 4. Conducted Emissions, Test Setup 2

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 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 3m 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 A requirement(s) of this section. Measured emissions were below applicable limits.

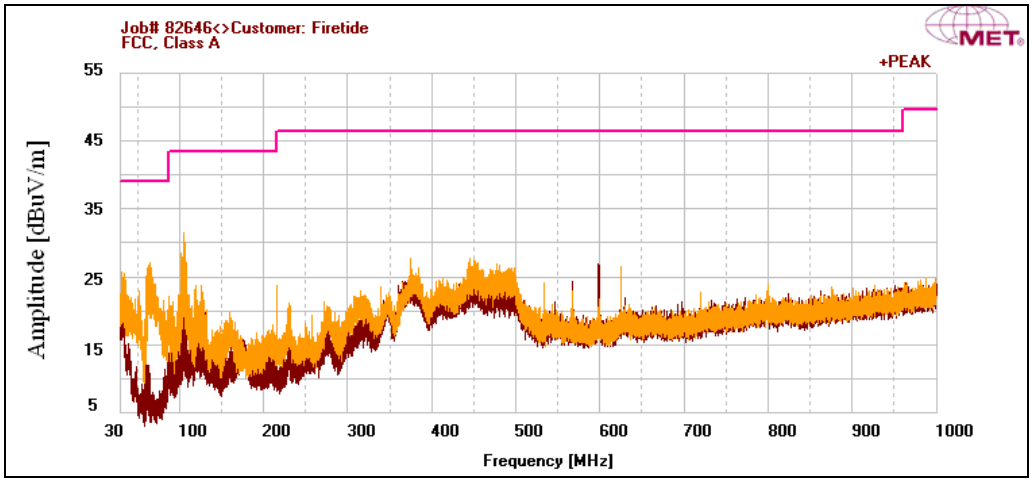
Test Engineer(s): Lionel Gabrillo

Test Date(s): 08/31/10

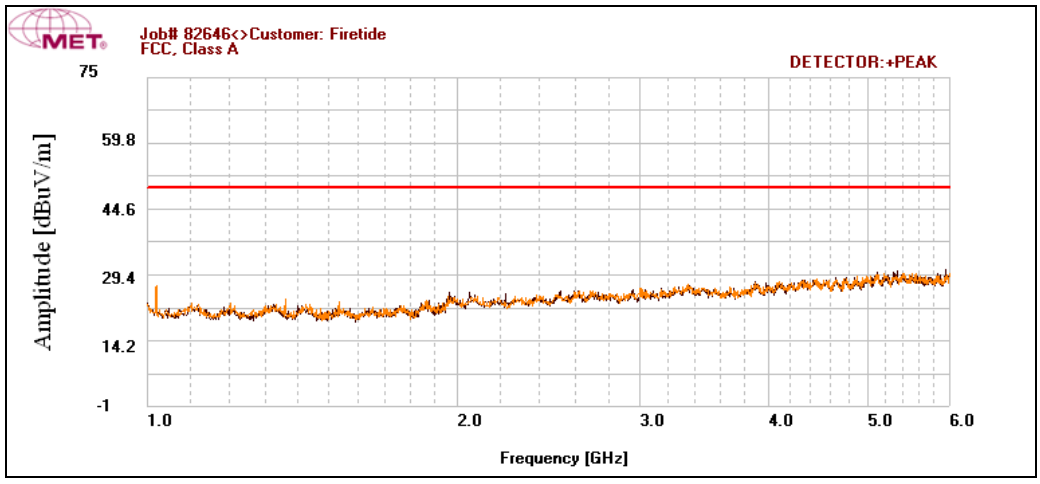
Radiated Emissions Limits Test Results, Class A

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)
64.76	V	95.7	255.4	60.47	6.3	40	1.239	0	28.009	39	-10.991
106.68	V	143.9	131.9	55.34	11.936	40	1.666	0	28.942	43.5	-14.558
36.12	V	63.4	100.0	42.37	15.152	40	0.955	0	18.477	39	-20.523
447.24	V	190.3	367.1	42.46	16.634	40	3.526	0	22.62	46.4	-23.78
625	V	37.5	100.0	41.44	19.2	40	4.192	0	24.832	46.4	-21.568
600	H	321.1	151.8	43.53	18.4	40	4.061	0	25.991	46.4	-20.409

Table 10. Radiated Emissions Limits, Test Results, FCC Limits



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



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

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)
36.12	V	63.4	100.0	42.37	15.152	40	0.955	0	18.477	40	-21.523
64.76	V	95.7	255.4	60.47	6.3	40	1.239	0	28.009	40	-11.991
106.68	V	143.9	131.9	55.34	11.936	40	1.666	0	28.942	40	-11.058
447.24	V	190.3	367.1	42.46	16.634	40	3.526	0	22.62	47	-24.38
600	H	321.1	151.8	43.53	18.4	40	4.061	0	25.991	47	-21.009
625	V	37.5	100.0	41.44	19.2	40	4.192	0	24.832	47	-22.168

Table 11. Radiated Emissions Limits, Test Results, ICES-003 Limits

Radiated Emission Limits Test Setup

Photograph 5. Radiated Emission, Test Setup, 30 MHz – 1 GHz

Photograph 6. 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 as tested is compliant the criteria of §15.203. The unit will be professionally installed.

Test Engineer(s): Minh Ly

Test Date(s): 08/11/09

Gain/Type	Model	Manufacturer
5dBi Omni	C812-510012-A	Wha Yu Industrial Co. Ltd
19dBi Panel (5GHz)	MA-WA55-MIMO	MARS ANTENNAS & RF Systems LTD

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 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 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 C63.4-2003 "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.

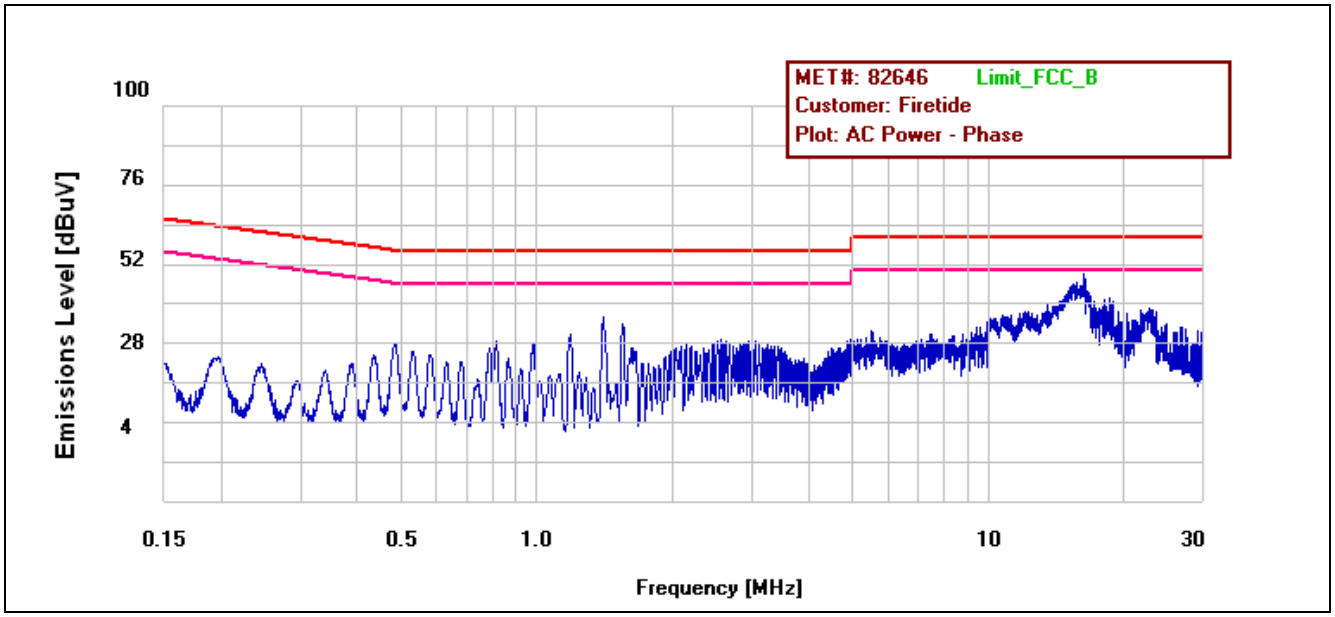
Test Results: The EUT was compliant with this requirement.

Test Engineer(s): Kenshi Chung

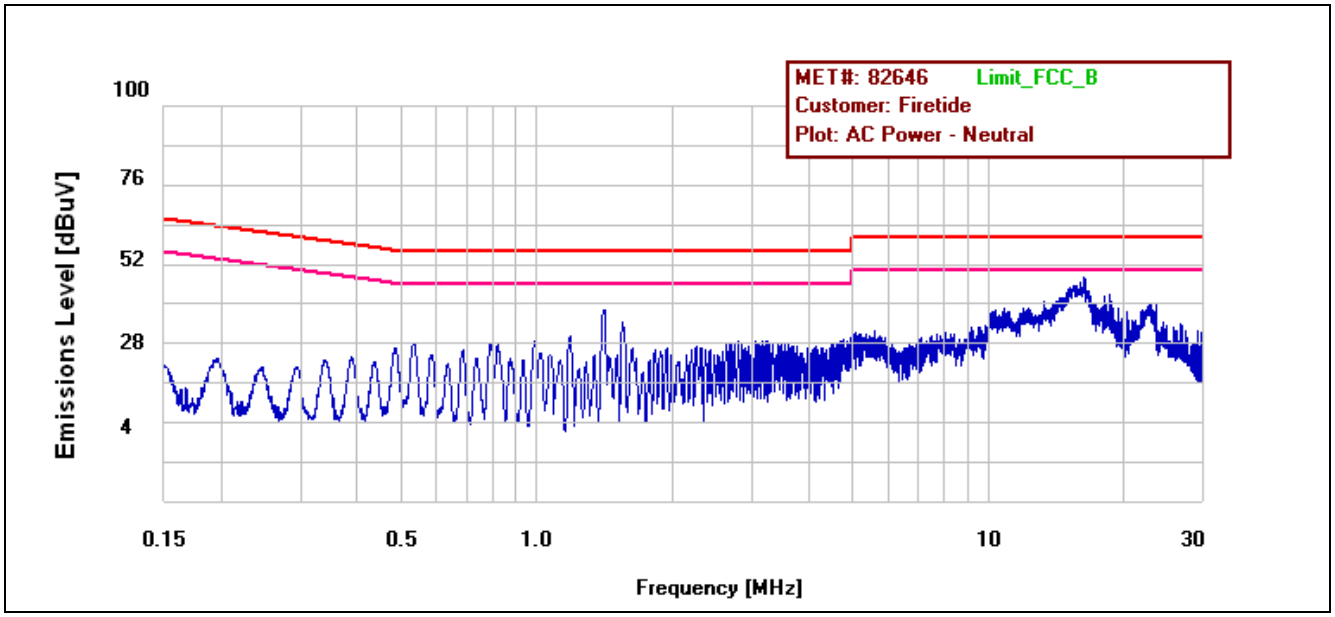
Test Date(s): 09/03/10

Line	Freq (MHz)	QP Amplitude	QP Limit	Delta	Pass	Average Amplitude	Average Limit	Delta	Pass
AC Power - Phase	0.488	27.31	56.208	-28.898	Pass	24.03	46.208	-22.178	Pass
AC Power - Phase	1.168	30.53	56	-25.47	Pass	23.29	46	-22.71	Pass
AC Power - Phase	1.500	32.02	56	-23.98	Pass	27.21	46	-18.79	Pass
AC Power - Phase	1.368	34.87	56	-21.13	Pass	28.63	46	-17.37	Pass
AC Power - Phase	16.228	39.75	60	-20.25	Pass	35.56	50	-14.44	Pass
AC Power - Phase	16.168	38.65	60	-21.35	Pass	34.53	50	-15.47	Pass
AC Power - Neutral	0.536	26.83	56	-29.17	Pass	25.84	46	-20.16	Pass
AC Power - Neutral	1.172	28.65	56	-27.35	Pass	25.03	46	-20.97	Pass
AC Power - Neutral	1.368	36.28	56	-19.72	Pass	31.04	46	-14.96	Pass
AC Power - Neutral	1.5000	32.4	56	-23.6	Pass	29.45	46	-16.55	Pass
AC Power - Neutral	16.168	38.78	60	-21.22	Pass	35.6	50	-14.4	Pass
AC Power - Neutral	16.228	40.65	60	-19.35	Pass	37.32	50	-12.68	Pass

Table 13. Conducted Emissions, 15.207, Test Results



Plot 5. Conducted Emissions, Phase Line



Plot 6. Conducted Emissions, Neutral Line

Photograph 7. Conducted Emissions, 15.207, Test Setup

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(a) 6 dB and 99% Bandwidth

Test Requirements: **§ 15.247(a):** 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).

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

Test Engineer(s): Minh Ly

Test Date(s): 08/17/09

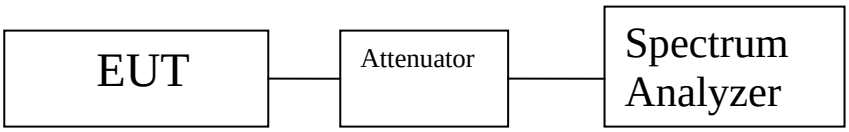


Figure 2. Block Diagram, Occupied Bandwidth Test Setup

Occupied Bandwidth (5 GHz), Port 1			
Mode	**Carrier Channel**	**Frequency (MHz)**	**Measured 6 dB Bandwidth (MHz)**
802.11a	Low	5745	16.314
	Mid	5785	16.294
	High	5825	16.080
802.11n (20MHz)	Low	5745	17.449
	Mid	5785	17.655
	High	5825	17.353
802.11n (40MHz)	Low	5755	36.330
	High	5795	36.322

Table 14. 6 dB Occupied Bandwidth, Test Results, 5 GHz, Port 1

Occupied Bandwidth (5 GHz), Port 2			
Mode	**Carrier Channel**	**Frequency (MHz)**	**Measured 6 dB Bandwidth (MHz)**
802.11n (20MHz)	Low	5745	17.466
	Mid	5785	12.185
	High	5825	17.041
802.11n (40MHz)	Low	5755	36.495
	High	5795	36.419

Table 15. 6 dB Occupied Bandwidth, Test Results, 5 GHz, Port 2

Occupied Bandwidth (5 GHz), Port 3			
Mode	**Carrier Channel**	**Frequency (MHz)**	**Measured 6 dB Bandwidth (MHz)**
802.11n (20MHz)	Low	5745	17.444
	Mid	5785	17.559
	High	5825	17.754
802.11n (40MHz)	Low	5755	27.892
	High	5795	35.635

Table 16. 6 dB Occupied Bandwidth, Test Results, 5 GHz, Port 3

Occupied Bandwidth (5 GHz), Port 1			
Mode	**Carrier Channel**	**Frequency (MHz)**	**Measured 99% Bandwidth (MHz)**
802.11a	Low	5745	16.5735
	Mid	5785	16.4562
	High	5825	16.5608
802.11n (20MHz)	Low	5745	17.7041
	Mid	5785	17.8106
	High	5825	17.7358
802.11n (40MHz)	Low	5755	36.6300
	High	5795	35.8859

Table 17. 99% Occupied Bandwidth, Test Results, 5 GHz, Port 1

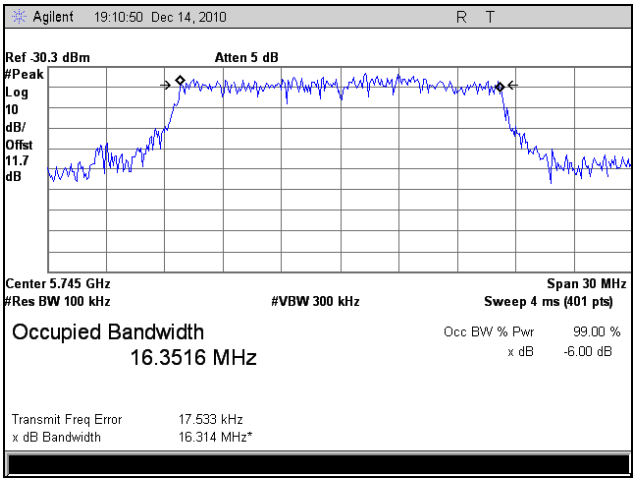
Occupied Bandwidth (5 GHz), Port 2			
Mode	**Carrier Channel**	**Frequency (MHz)**	**Measured 99% Bandwidth (MHz)**
802.11n (20MHz)	Low	5745	17.6496
	Mid	5785	17.7215
	High	5825	17.6999
802.11n (40MHz)	Low	5755	36.9185
	High	5795	36.4790

Table 18. 99% Occupied Bandwidth, Test Results, 5 GHz, Port 2

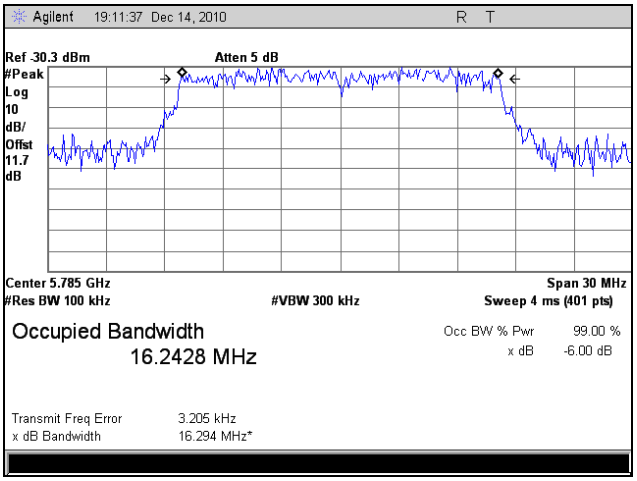
Occupied Bandwidth (5 GHz), Port 3			
Mode	**Carrier Channel**	**Frequency (MHz)**	**Measured 99% Bandwidth (MHz)**
802.11n (20MHz)	Low	5745	17.5725
	Mid	5785	17.7446
	High	5825	17.6767
802.11n (40MHz)	Low	5755	36.5564
	High	5795	36.3996

Table 19. 99% Occupied Bandwidth, Test Results, 5 GHz, Port 3

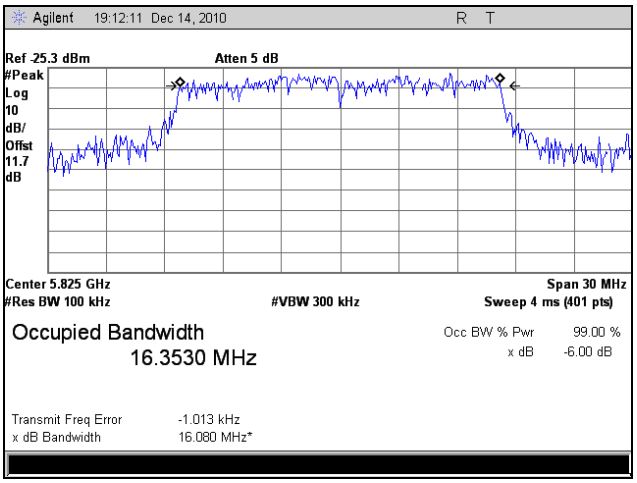
6 dB Occupied Bandwidth, 5 GHz, Port 1



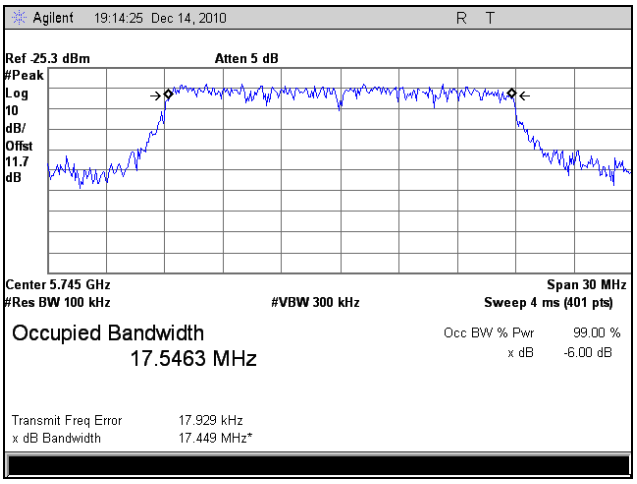
Plot 7. 6dB Occupied Band Width, Low Channel, 5 GHz, Port 1, 802.11a



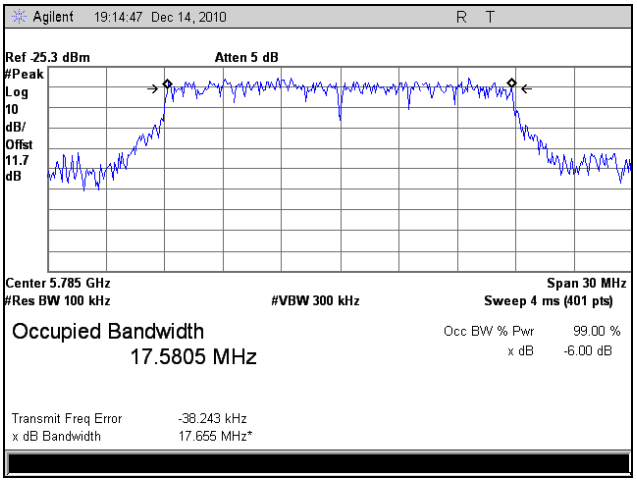
Plot 8. 6dB Occupied Band Width, Mid Channel, 5 GHz, Port 1, 802.11a



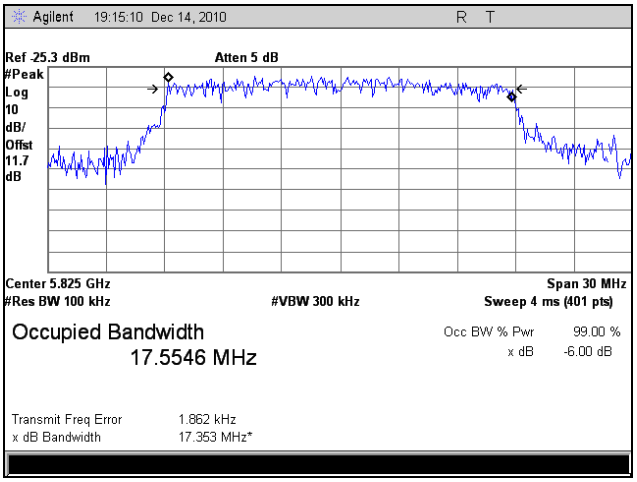
Plot 9. 6dB Occupied Band Width, High Channel, 5 GHz, Port 1, 802.11a



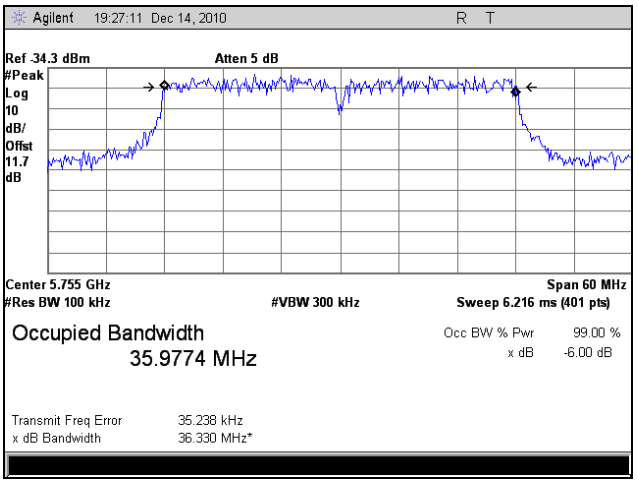
Plot 10. 6dB Occupied Band Width, Low Channel, 5 GHz, Port 1, 802.11n 20MHz



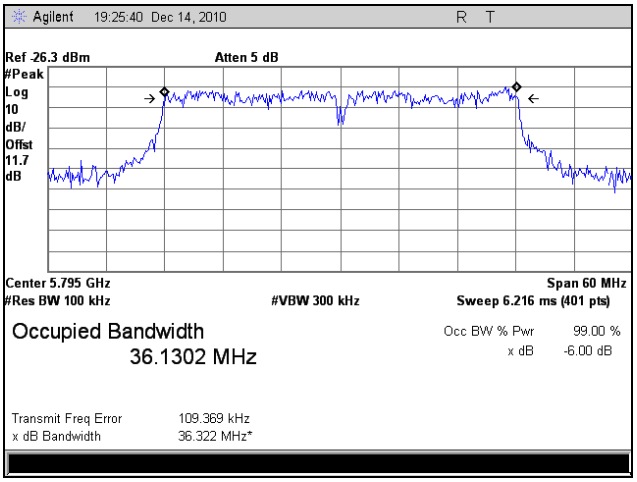
Plot 11. 6dB Occupied Band Width, Mid Channel, 5 GHz, Port 1, 802.11n 20MHz



Plot 12. 6dB Occupied Band Width, High Channel, 5 GHz, Port 1, 802.11n 20MHz

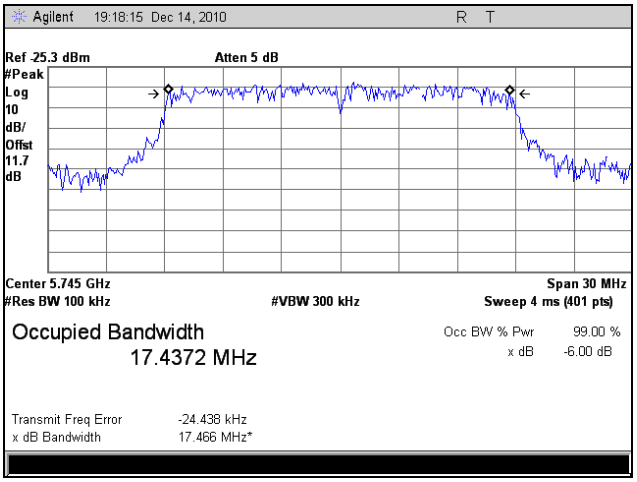


Plot 13. 6dB Occupied Band Width, Low Channel, 5 GHz, Port 1, 802.11n 40MHz

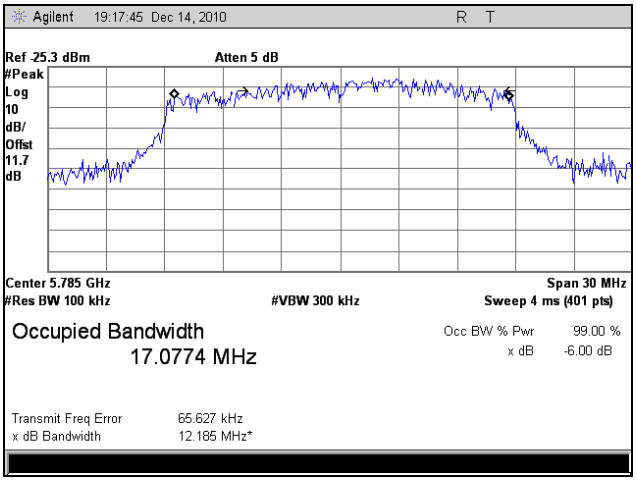


Plot 14. 6dB Occupied Band Width, High Channel, 5 GHz, Port 1, 802.11n 40MHz

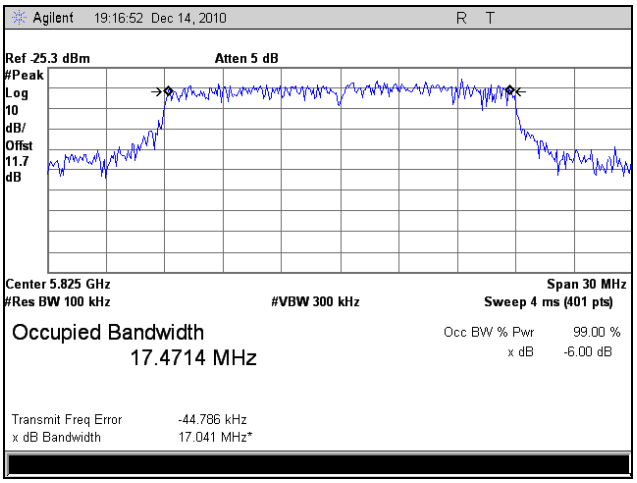
6 dB Occupied Bandwidth, 5 GHz, Port 2



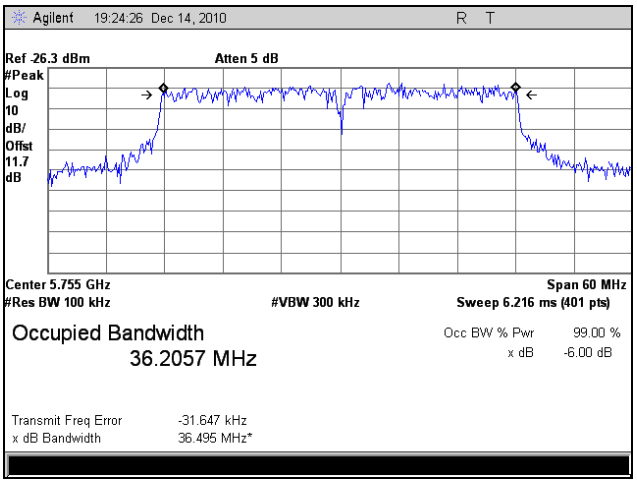
Plot 15. 6dB Occupied Band Width, Low Channel, 5 GHz, Port 2, 802.11n 20MHz



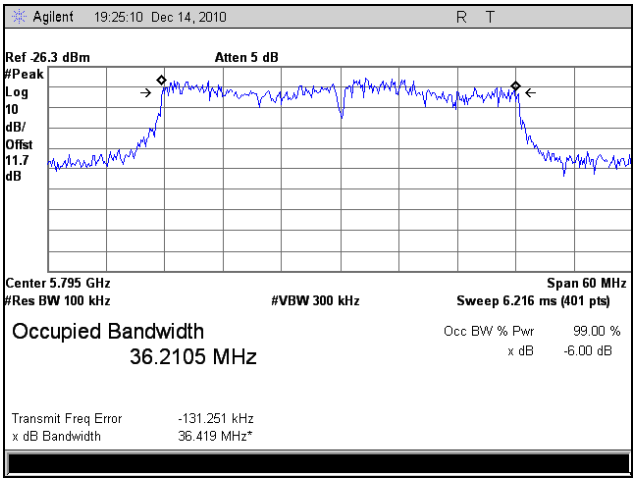
Plot 16. 6dB Occupied Band Width, Mid Channel, 5 GHz, Port 2, 802.11n 20MHz



Plot 17. 6dB Occupied Band Width, High Channel, 5 GHz, Port 2, 802.11n 20MHz

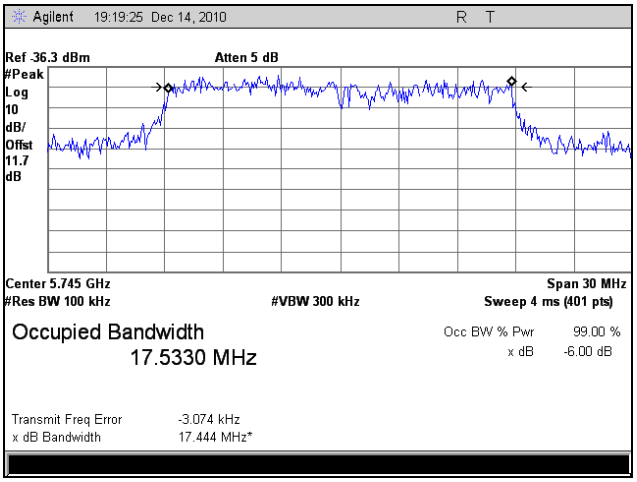


Plot 18. 6dB Occupied Band Width, Low Channel, 5 GHz, Port 2, 802.11n 40MHz

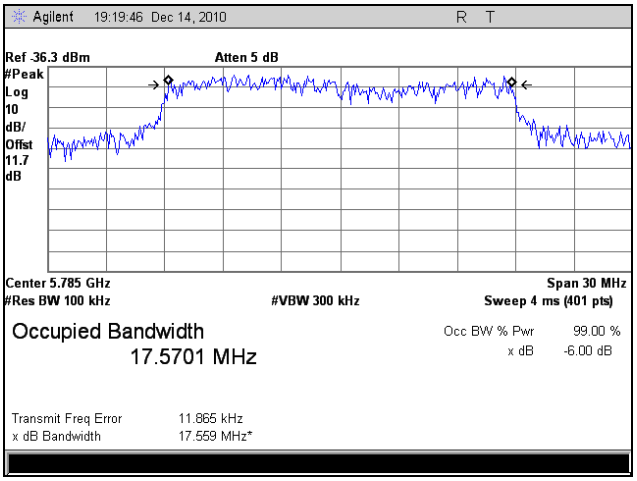


Plot 19. 6dB Occupied Band Width, High Channel, 5 GHz, Port 2, 802.11n 40MHz

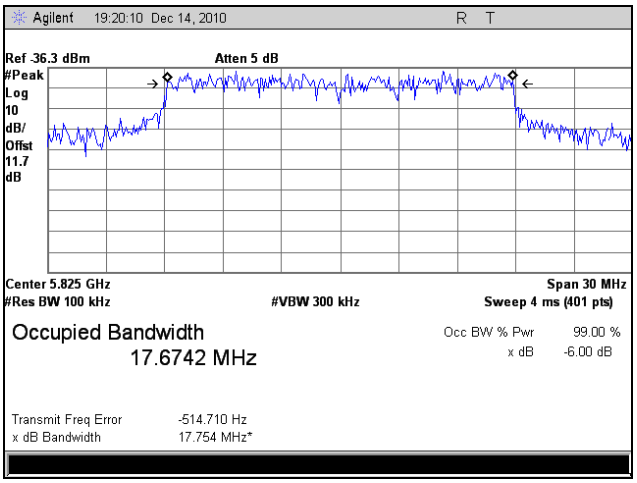
6 dB Occupied Bandwidth, 5 GHz, Port 3



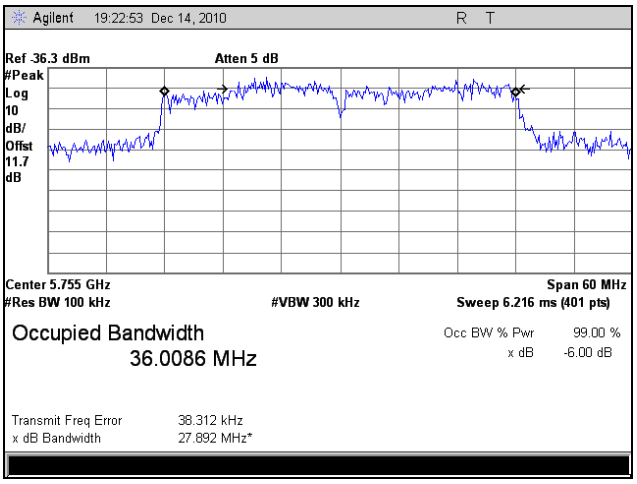
Plot 20. 6dB Occupied Band Width, Low Channel, 5 GHz, Port 3, 802.11n 20MHz



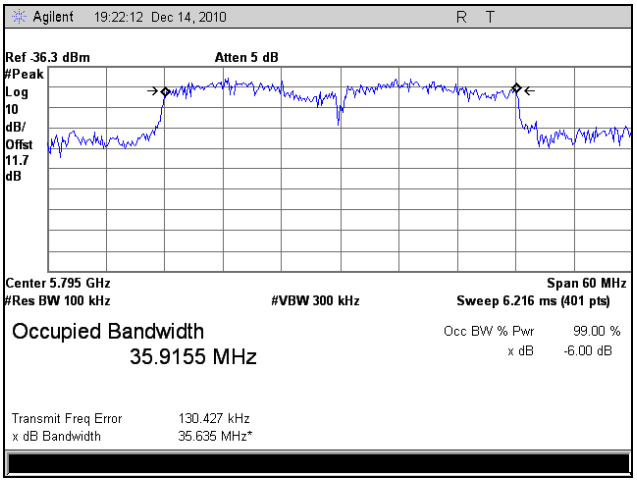
Plot 21. 6dB Occupied Band Width, Mid Channel, 5 GHz, Port 3, 802.11n 20MHz



Plot 22. 6dB Occupied Band Width, High Channel, 5 GHz, Port 3, 802.11n 20MHz

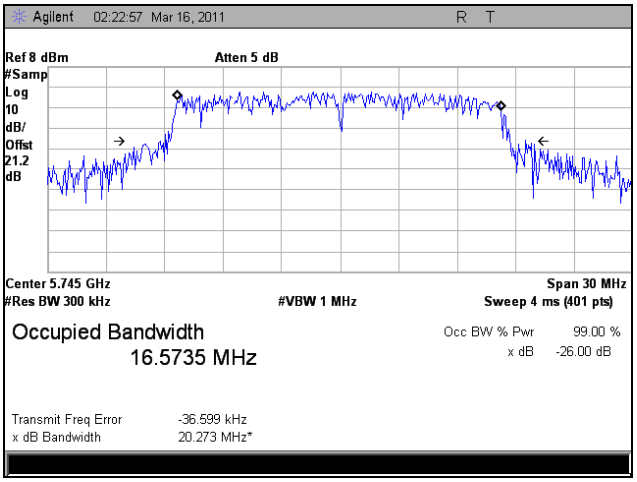


Plot 23. 6dB Occupied Band Width, Low Channel, 5 GHz, Port 3, 802.11n 40MHz

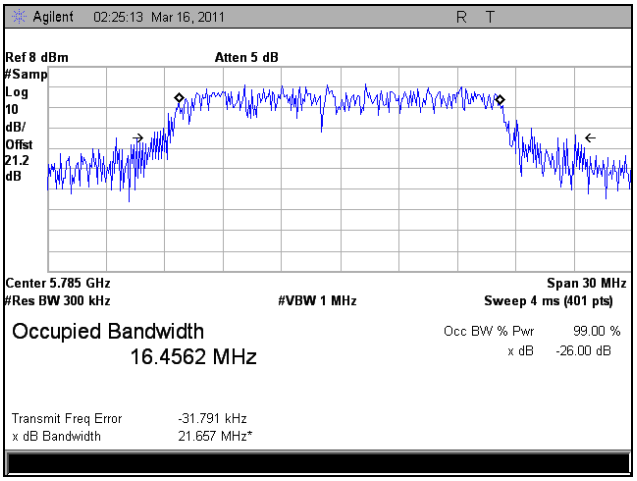


Plot 24. 6dB Occupied Band Width, High Channel, 5 GHz, Port 3, 802.11n 40MHz

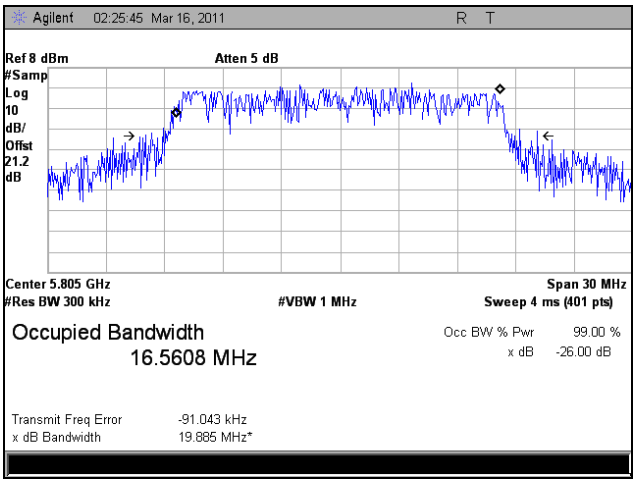
99% Occupied Bandwidth, 5 GHz, Port 1



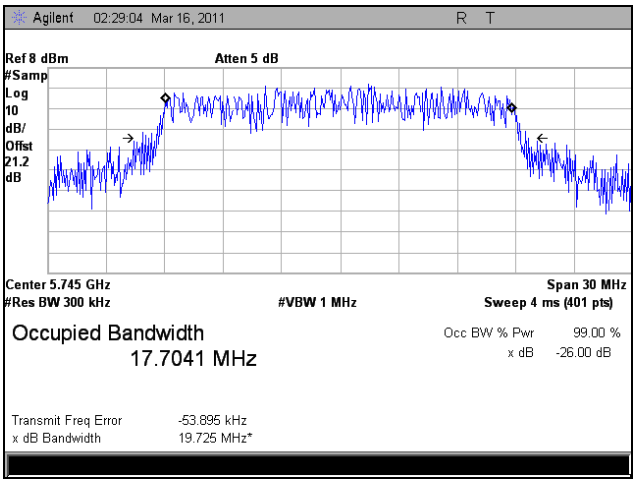
Plot 25. 99% Occupied Band Width, Low Channel, 5 GHz, Port 1, 802.11a



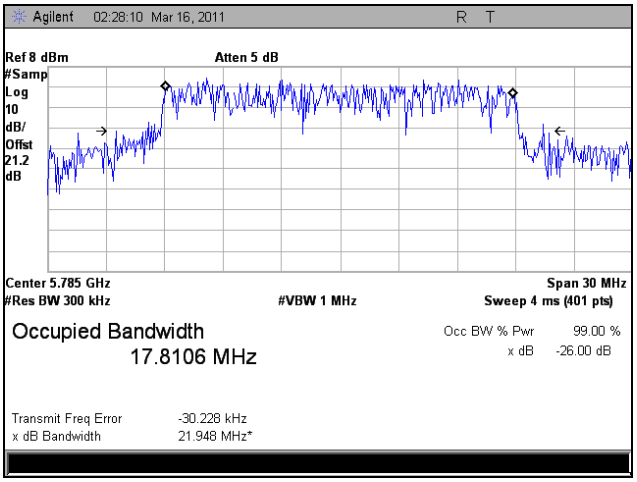
Plot 26. 99% Occupied Band Width, Mid Channel, 5 GHz, Port 1, 802.11a



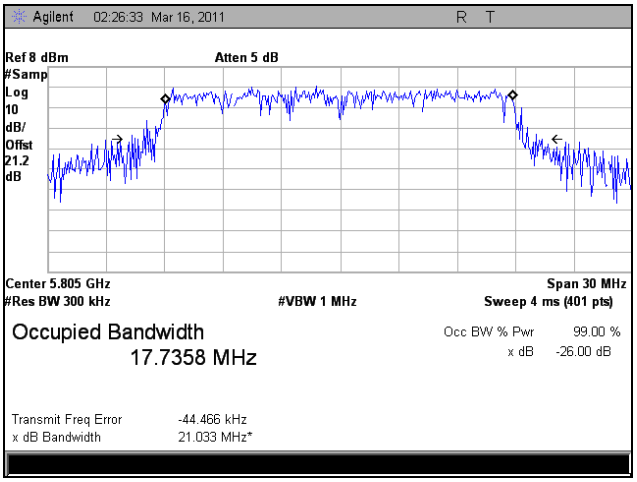
Plot 27. 99% Occupied Band Width, High Channel, 5 GHz, Port 1, 802.11a



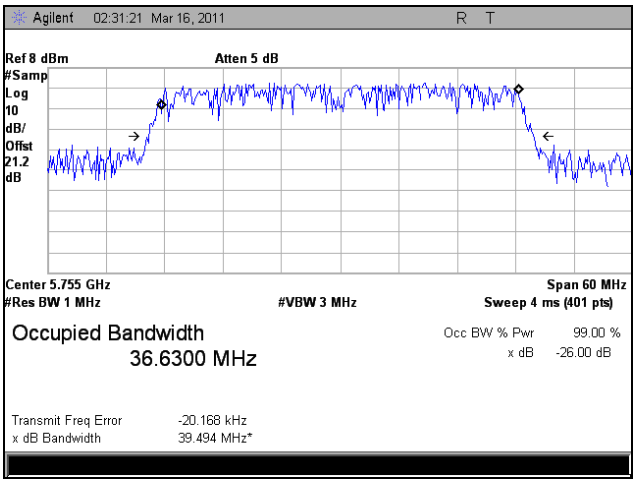
Plot 28. 99% Occupied Band Width, Low Channel, 5 GHz, Port 1, 802.11n 20MHz



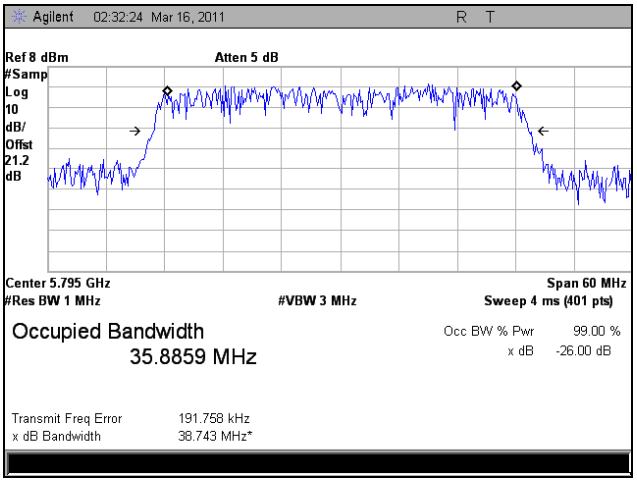
Plot 29. 99% Occupied Band Width, Mid Channel, 5 GHz, Port 1, 802.11n 20MHz



Plot 30. 99% Occupied Band Width, High Channel, 5 GHz, Port 1, 802.11n 20MHz

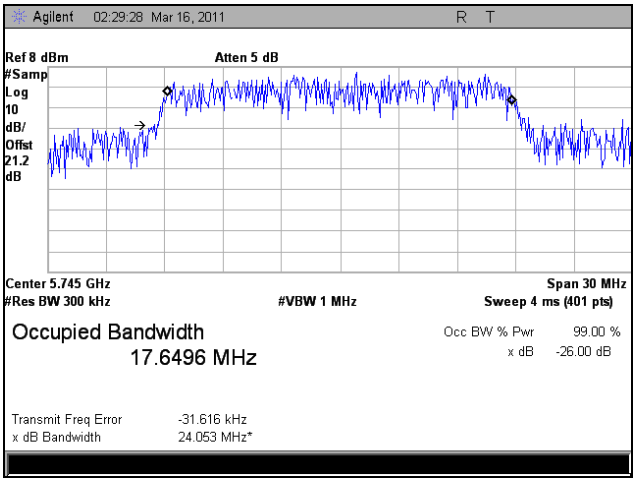


Plot 31. 99% Occupied Band Width, Low Channel, 5 GHz, Port 1, 802.11n 40MHz

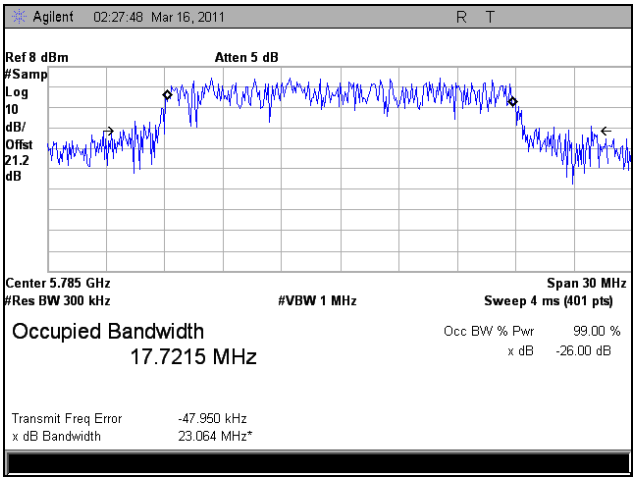


Plot 32. 99% Occupied Band Width, High Channel, 5 GHz, Port 1, 802.11n 40MHz

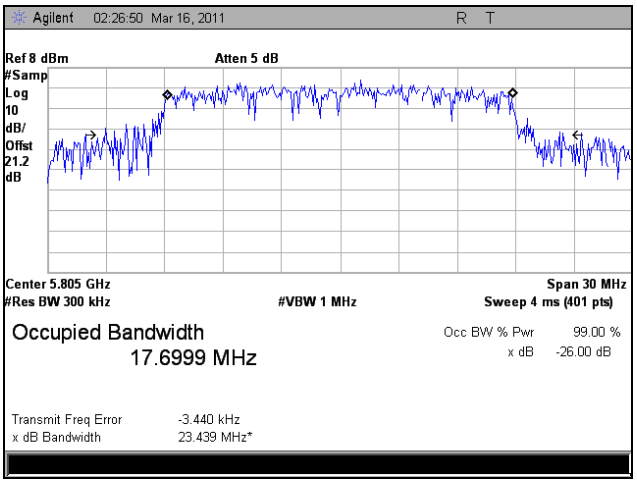
99% Occupied Bandwidth, 5 GHz, Port 2



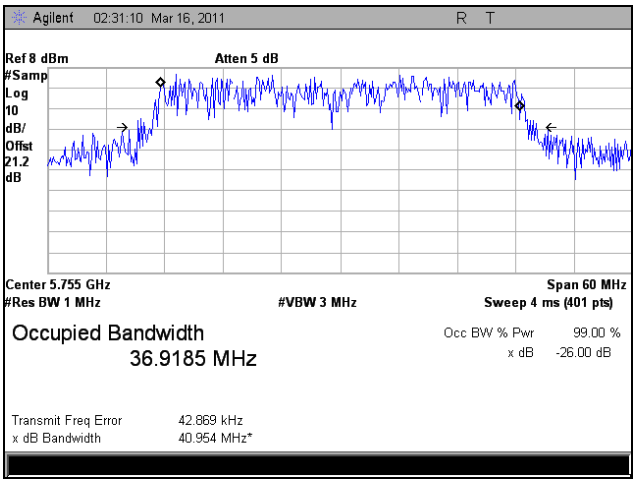
Plot 33. 99% Occupied Band Width, Low Channel, 5 GHz, Port 2, 802.11n 20MHz



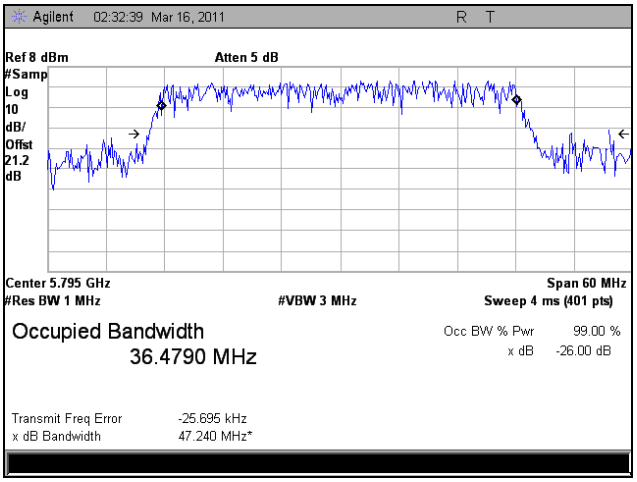
Plot 34. 99% Occupied Band Width, Mid Channel, 5 GHz, Port 2, 802.11n 20MHz



Plot 35. 99% Occupied Band Width, High Channel, 5 GHz, Port 2, 802.11n 20MHz

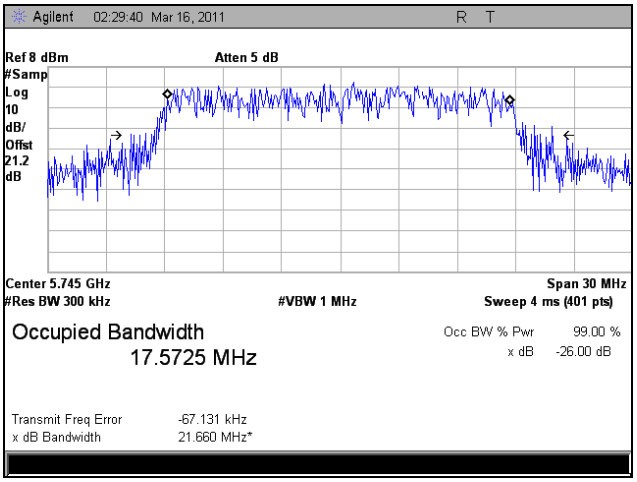


Plot 36. 99% Occupied Band Width, Low Channel, 5 GHz, Port 2, 802.11n 40MHz

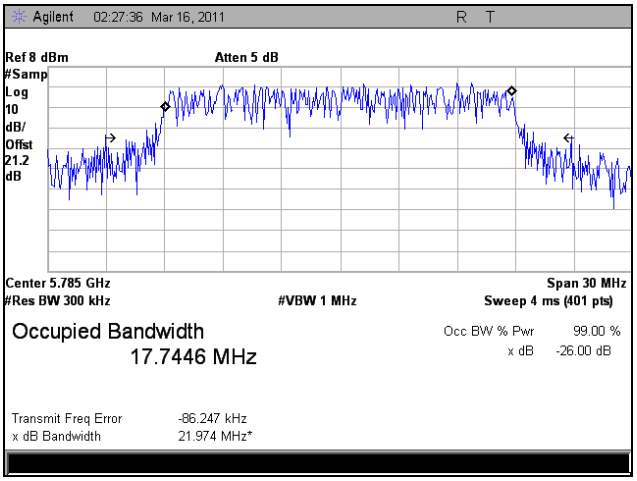


Plot 37. 99% Occupied Band Width, High Channel, 5 GHz, Port 2, 802.11n 40MHz

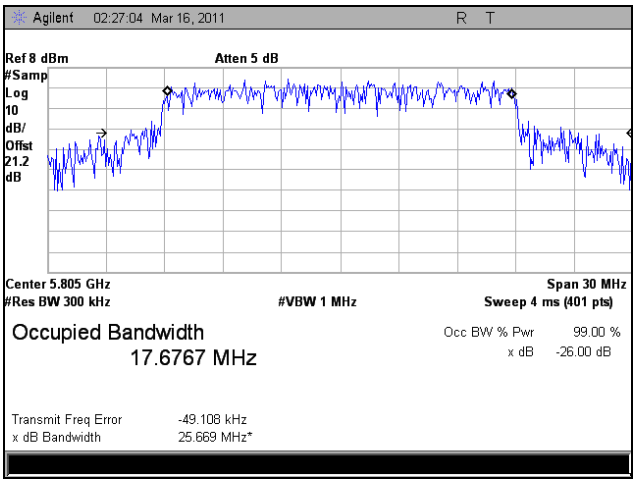
99% Occupied Bandwidth, 5 GHz, Port 3



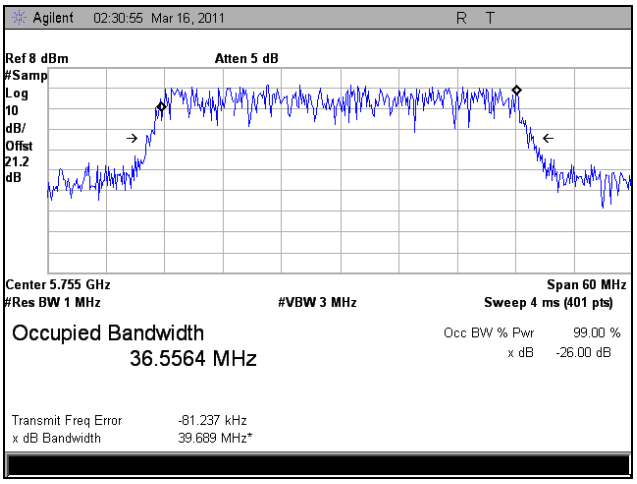
Plot 38. 99% Occupied Band Width, Low Channel, 5 GHz, Port 3, 802.11n 20MHz



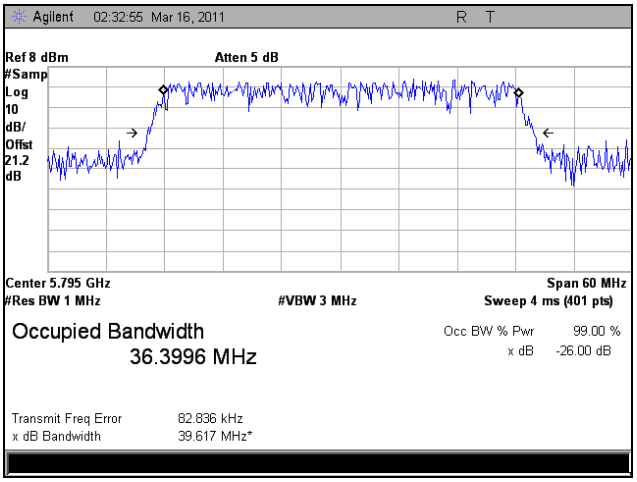
Plot 39. 99% Occupied Band Width, Mid Channel, 5 GHz, Port 3, 802.11n 20MHz



Plot 40. 99% Occupied Band Width, High Channel, 5 GHz, Port 3, 802.11n 20MHz



Plot 41. 99% Occupied Band Width, Low Channel, 5 GHz, Port 3, 802.11n 40MHz



Plot 42. 99% Occupied Band Width, High Channel, 5 GHz, Port 3, 802.11n 40MHz

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(b) Peak Power Output and RF Exposure

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 20. Output Power Requirements from §15.247

§15.247(c): if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in the Table 20, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Systems operating in the 2400 – 2483.5 MHz band may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

Systems operating in the 5725 – 5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter peak output power.

Fixed, point-to-point operation excludes the use of point-to-multipoint systems, Omni-directional applications, and multiple co-located intentional radiators transmitting the same information. The operator of the spread spectrum intentional radiator or, if the equipment is professionally installed, the installer is responsible for ensuring that the system is used exclusively for fixed, point-to-point operations. The instruction manual furnished with the intentional radiator shall contain language in the installation instructions informing the operator and the installer of this responsibility.

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): Minh Ly

Test Date(s): 08/17/09

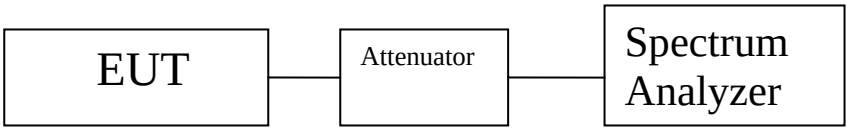


Figure 3. Block Diagram, Peak Power Output Test Setup

Peak Conducted Output Power, 5 GHz, Port 1			
Mode	**Carrier Channel**	**Frequency (MHz)**	**Measured Peak Output Power dBm**
802.11a	Low	5745	29.20
	Mid	5785	29.62
	High	5825	28.53
802.11n 20MHz	Low	5745	21.70
	Mid	5785	21.59
	High	5825	21.94
802.11n 40MHz	Low	5755	21.05
	High	5795	20.79

Table 21. Peak Output Power, Test Results, 5 GHz, Port 1

Peak Conducted Output Power, 5 GHz, Port 2			
Mode	**Carrier Channel**	**Frequency (MHz)**	**Measured Peak Output Power dBm**
802.11n 20MHz	Low	5745	21.86
	Mid	5785	21.27
	High	5825	21.68
802.11n 40MHz	Low	5755	21.79
	High	5795	21.36

Table 22. Peak Output Power, Test Results, 5 GHz, Port 2

Peak Conducted Output Power, 5 GHz, Port 3			
Mode	**Carrier Channel**	**Frequency (MHz)**	**Measured Peak Output Power dBm**
802.11n 20MHz	Low	5745	21.85
	Mid	5785	21.90
	High	5825	21.41
802.11n 40MHz	Low	5755	21.68
	High	5795	21.33

Table 23. Peak Output Power, Test Results, 5 GHz, Port 3

802.11n mode (20MHz)						
Carrier Channel	**Frequency (MHz)**	**Port 1 (dBm)**	**Port 2 (dBm)**	**Port 3 (dBm)**	**Total (dBm)**	**Total (W)**
Low	5745	21.70	21.86	21.85	26.57	0.454
Mid	5785	21.59	21.27	21.90	26.36	0.433
High	5825	21.94	21.68	21.41	26.45	0.442

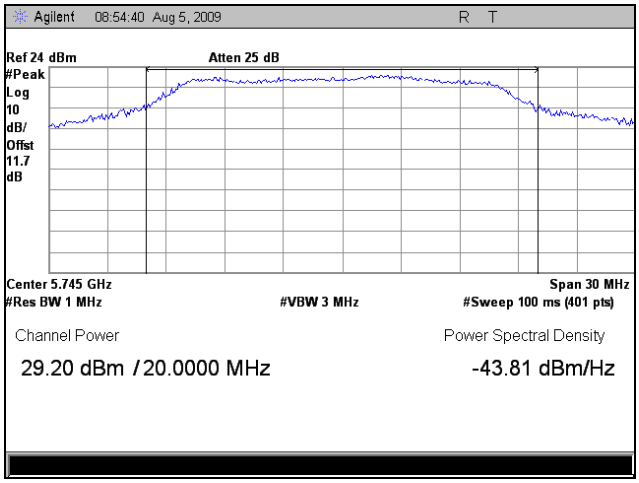
Table 24. RF Output Power Results – All Ports, 802.11n Mode (20MHz)

802.11n mode (40MHz)						
Carrier Channel	**Frequency (MHz)**	**Port 1 (dBm)**	**Port 2 (dBm)**	**Port 3 (dBm)**	**Total (dBm)**	**Total (W)**
Low	5755	21.05	21.79	21.68	26.28	0.425
High	5795	20.79	21.36	21.33	25.94	0.393

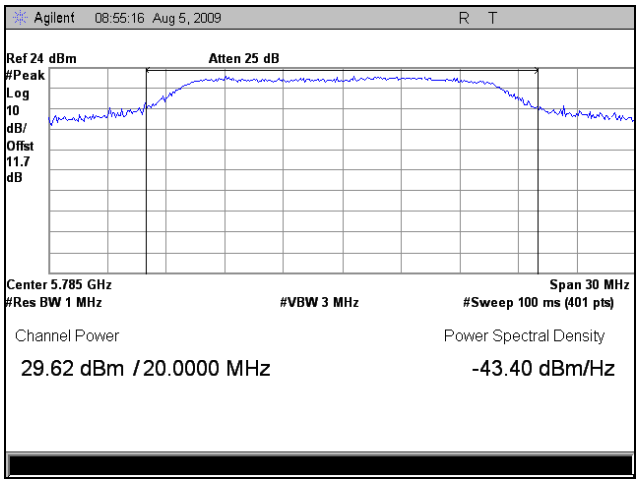
Table 25. RF Output Power Results – All Ports, 802.11n mode (40MHz)

Note: Total Output Power=Port 1 (10^(Output Power/10)/1000) + Port 2 (10^(Output Power/10)/1000) + Port 3 (10^(Output Power/10)/1000)

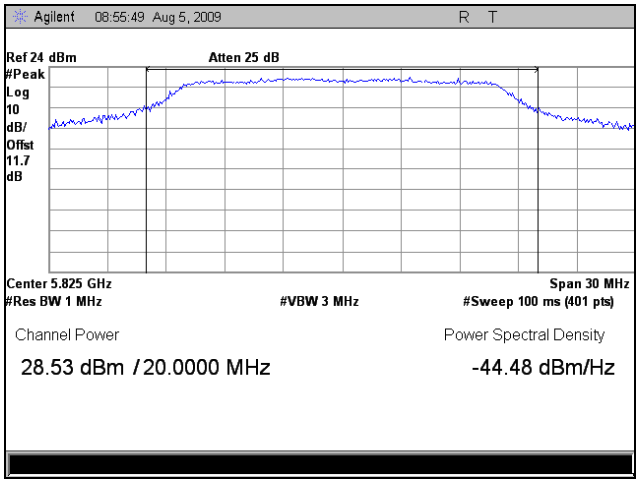
Peak Power Output, 5 GHz, Port 1



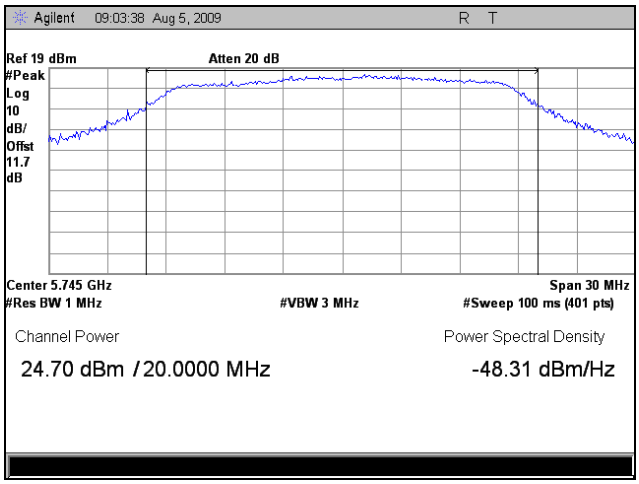
Plot 43. Peak Output Power, Low Channel, 5 GHz, Port 1, 802.11a



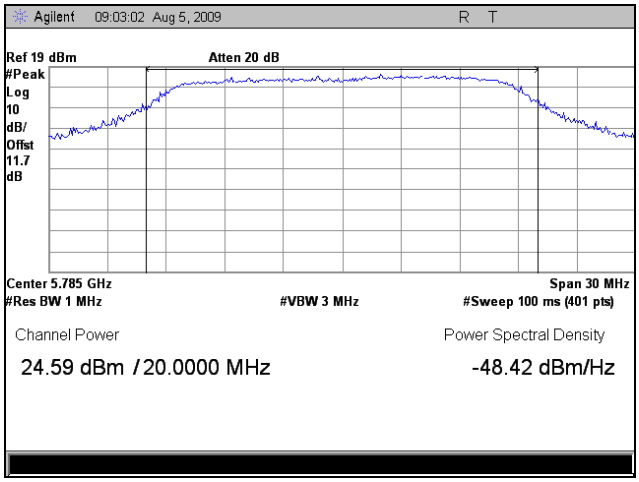
Plot 44. Peak Output Power, Mid Channel, 5 GHz, Port 1, 802.11a



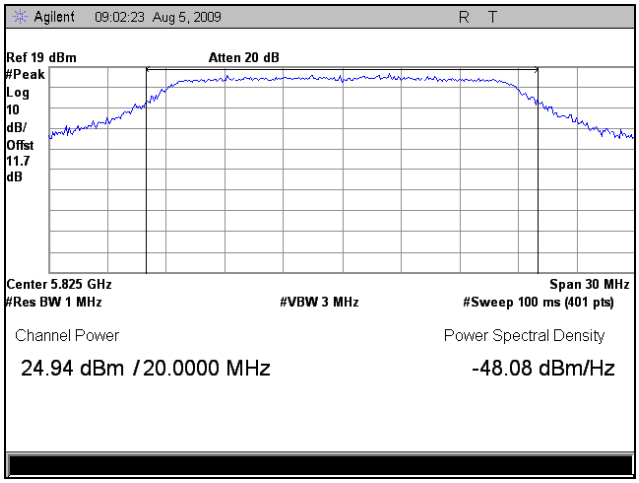
Plot 45. Peak Output Power, High Channel, 5 GHz, Port 1, 802.11a



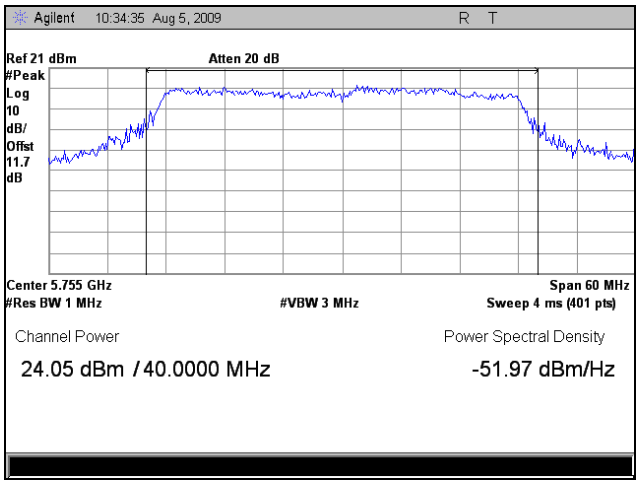
Plot 46. Peak Output Power, Low Channel, 5 GHz, Port 1, 802.11n 20MHz



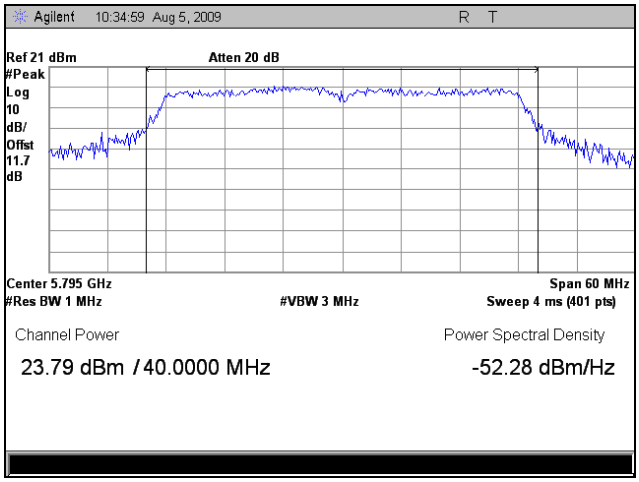
Plot 47. Peak Output Power, Mid Channel, 5 GHz, Port 1, 802.11n 20MHz



Plot 48. Peak Output Power, High Channel, 5 GHz, Port 1, 802.11n 20MHz

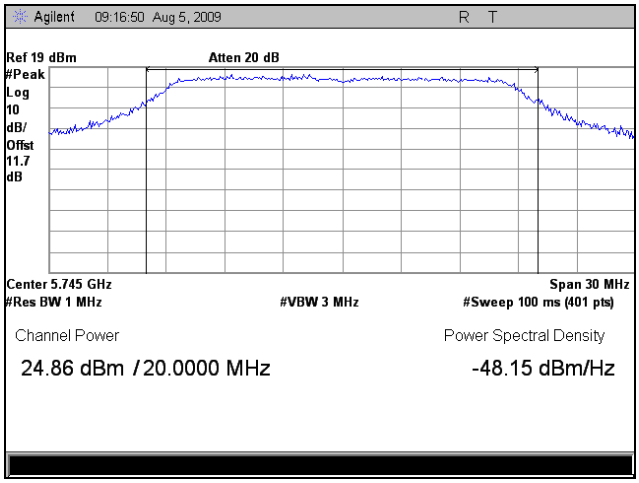


Plot 49. Peak Output Power, Low Channel, 5 GHz, Port 1, 802.11n 40MHz

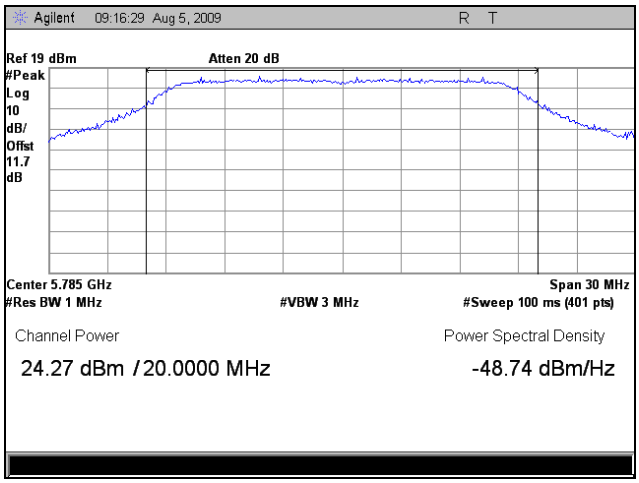


Plot 50. Peak Output Power, High Channel, 5 GHz, Port 1, 802.11n 40MHz

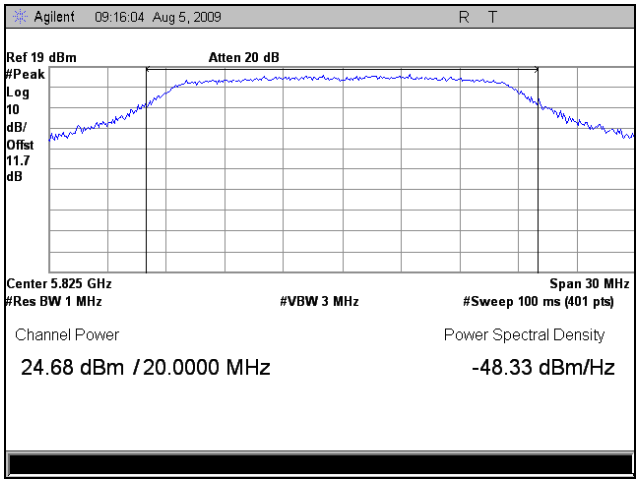
Peak Power Output, 5 GHz, Port 2



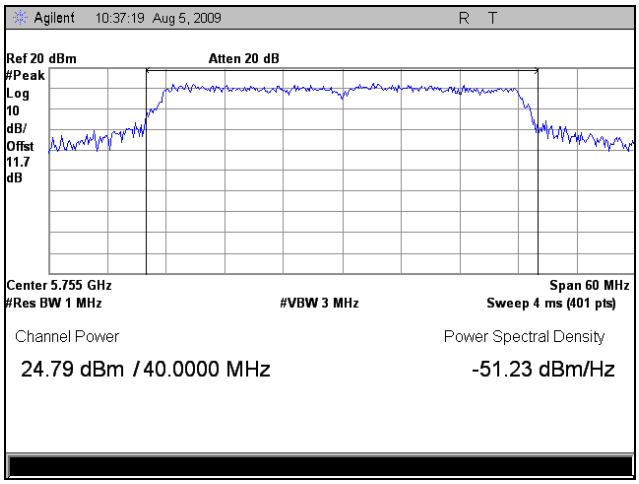
Plot 51. Peak Output Power, Low Channel, 5 GHz, Port 2, 802.11n 20MHz



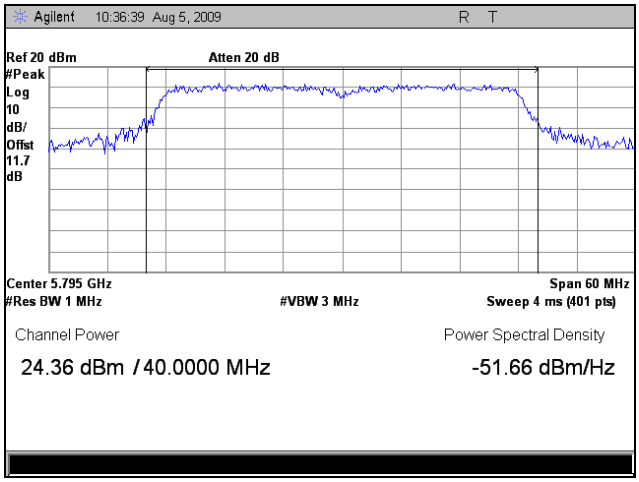
Plot 52. Peak Output Power, Mid Channel, 5 GHz, Port 2, 802.11n 20MHz



Plot 53. Peak Output Power, High Channel, 5 GHz, Port 2, 802.11n 20MHz

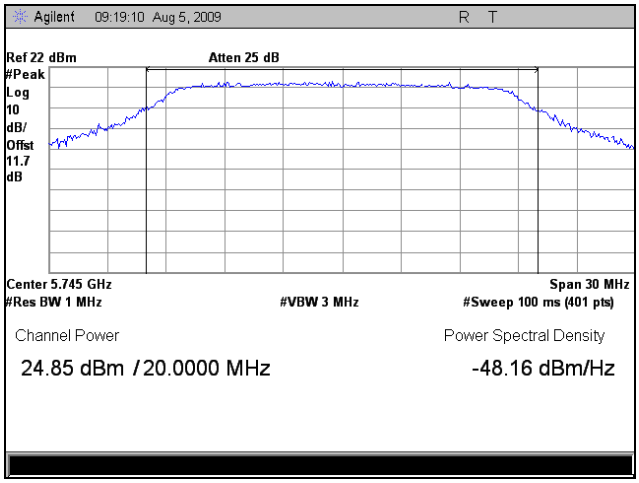


Plot 54. Peak Output Power, Low Channel, 5 GHz, Port 2, 802.11n 40MHz

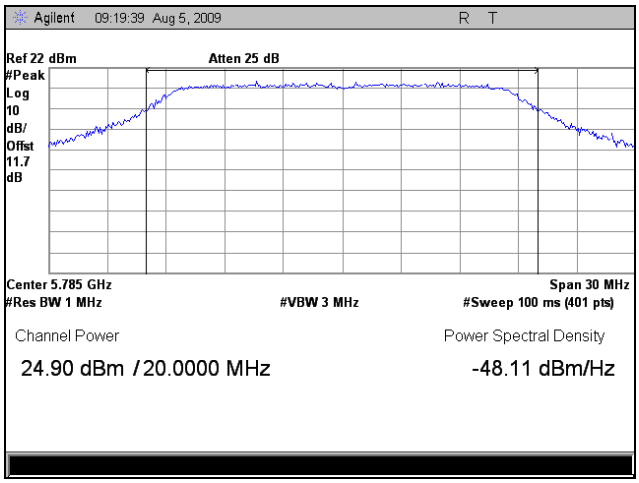


Plot 55. Peak Output Power, High Channel, 5 GHz, Port 2, 802.11n 40MHz

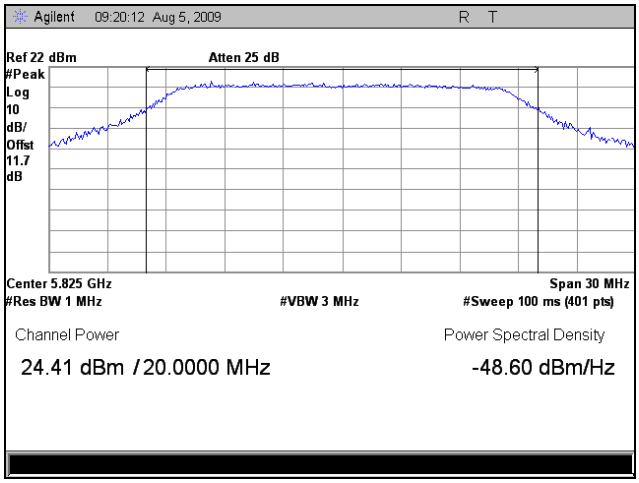
Peak Power Output, 5 GHz, Port 3



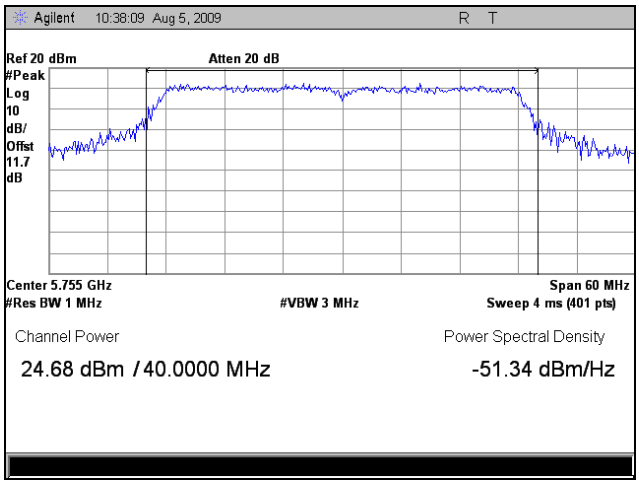
Plot 56. Peak Output Power, Low Channel, 5 GHz, Port 3, 802.11n 20MHz



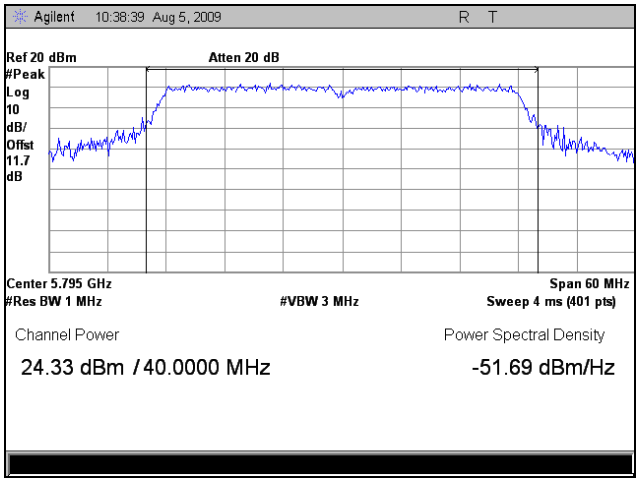
Plot 57. Peak Output Power, Mid Channel, 5 GHz, Port 3, 802.11n 20MHz



Plot 58. Peak Output Power, High Channel, 5 GHz, Port 3, 802.11n 20MHz



Plot 59. Peak Output Power, Low Channel, 5 GHz, Port 3, 802.11n 40MHz



Plot 60. Peak Output Power, High Channel, 5 GHz, Port 3, 802.11n 40MHz

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(b) 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 @ 5745-5825 MHz; highest conducted power = *29.57dBm* (peak) therefore, **Limit for Uncontrolled exposure: 1 mW/cm^2 or 10 W/m^2**

EUT maximum antenna gain = **19dBi Panel.**

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

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

where, S = Power Density (1 mW/cm^2)
P = Power Input to antenna (905.73mW)
G = Antenna Gain (79.432 numeric)

$R = (905.73*79.432 / 4*3.14*1.0)^{1/2} = (71944.9/ 12.56)^{1/2}$ = **75.68cm**

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 26. 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 27.

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

Test Procedures: The transmitter was set to the mid channel at the highest output power and placed on a 0.8 m high wooden table inside in a semi-anechoic chamber. Measurements were performed with the EUT rotated 360 degrees and varying the adjustable antenna mast with 1 m to 4 m height to determine worst case orientation for maximum emissions. Measurement were repeated the measurement at the low and highest channels.

For frequencies from 30 MHz to 1 GHz, measurements were made using a quasi-peak detector with a 120 kHz bandwidth.

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.

In accordance with §15.35(b) the limit on the radio frequency emissions as measured using instrumentation with a peak detector function shall be 20 dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

EUT Field Strength Final Amplitude = Raw Amplitude – Preamp gain + Antenna Factor + Cable Loss

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

Test Engineer(s): Minh Ly

Test Date(s): 08/17/09

Harmonic Emissions Requirements – Radiated, 5 GHz, Combined Ports

Frequency (MHz)	Antenna Polarity (H/V)	Raw Amp. @ 3m	Pre Amp (dB)	Ant. Cor. Factor (dB)	Cable Loss (dB)	EUT Field Strength Final Amp. (dBµV/m)	Limit Detector Peak / Avg	Limit @ 3m (dBµV/m)	Margin (dB)
11.49	V	47.16	34.86	39.79	7.68	59.77	Peak	74	-14.23
11.49	V	35.37	34.86	39.79	7.68	47.98	Avg.	54	-6.02
17.235	V	45.14	34.01	42.82	9.25	63.20	Peak	74	-10.80
17.235	V	30.95	34.01	42.82	9.25	49.01	Avg.	54	-4.99

Table 28. Radiated Harmonic Emissions, Low Channel, 5 GHz, Combined Ports, 802.11a, Omni

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

Frequency (MHz)	Antenna Polarity (H/V)	Raw Amp. @ 3m	Pre Amp (dB)	Ant. Cor. Factor (dB)	Cable Loss (dB)	EUT Field Strength Final Amp. (dBµV/m)	Limit Detector Peak / Avg	Limit @ 3m (dBµV/m)	Margin (dB)
11.57	V	47.21	34.91	39.88	7.55	59.73	Peak	74	-14.27
11.57	V	35.5	34.91	39.88	7.55	48.02	Avg.	54	-5.98
17.355	V	42.66	33.93	43.15	9.58	61.46	Peak	74	-12.54
17.355	V	30.89	33.93	43.15	9.58	49.69	Avg.	54	-4.31

Table 29. Radiated Harmonic Emissions, Mid Channel, 5 GHz, Combined Ports, 802.11a, Omni

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

Frequency (MHz)	Antenna Polarity (H/V)	Raw Amp. @ 3m	Pre Amp (dB)	Ant. Cor. Factor (dB)	Cable Loss (dB)	EUT Field Strength Final Amp. (dBµV/m)	Limit Detector Peak / Avg	Limit @ 3m (dBµV/m)	Margin (dB)
11.65	V	48.87	34.96	39.94	7.23	61.08	Peak	74	-12.92
11.65	V	37.06	34.96	39.94	7.23	49.27	Avg.	54	-4.73
17.475	V	43.1	33.89	43.59	10.28	63.07	Peak	74	-10.93
17.475	V	30.71	33.89	43.59	10.28	50.68	Avg.	54	-3.32

Table 30. Radiated Harmonic Emissions, High Channel, 5 GHz, Combined Ports, 802.11a, Omni

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

Frequency (MHz)	Antenna Polarity (H/V)	Raw Amp. @ 3m	Pre Amp (dB)	Ant. Cor. Factor (dB)	Cable Loss (dB)	EUT Field Strength Final Amp. (dBµV/m)	Limit Detector Peak / Avg	Limit @ 3m (dBµV/m)	Margin (dB)
11.49	V	45.7	34.86	39.79	7.68	58.31	Peak	74	-15.69
11.49	V	33.91	34.86	39.79	7.68	46.52	Avg.	54	-7.48
17.235	V	42.03	34.01	42.82	9.25	60.09	Peak	74	-13.91
17.235	V	31.78	34.01	42.82	9.25	49.84	Avg.	54	-4.16

Table 31. Radiated Harmonic Emissions, Low Channel, 5 GHz, Combined Ports, 802.11a, 19 dBi Panel

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

Frequency (MHz)	Antenna Polarity (H/V)	Raw Amp. @ 3m	Pre Amp (dB)	Ant. Cor. Factor (dB)	Cable Loss (dB)	EUT Field Strength Final Amp. (dBµV/m)	Limit Detector Peak / Avg	Limit @ 3m (dBµV/m)	Margin (dB)
11.57	V	47.69	34.91	39.88	7.55	60.21	Peak	74	-13.79
11.57	V	33.45	34.91	39.88	7.55	45.97	Avg.	54	-8.03
17.355	V	42.95	33.93	43.15	9.58	61.75	Peak	74	-12.25
17.355	V	30.57	33.93	43.15	9.58	49.37	Avg.	54	-4.63

Table 32. Radiated Harmonic Emissions, Mid Channel, 5 GHz, Combined Ports, 802.11a, 19 dBi Panel

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

Frequency (MHz)	Antenna Polarity (H/V)	Raw Amp. @ 3m	Pre Amp (dB)	Ant. Cor. Factor (dB)	Cable Loss (dB)	EUT Field Strength Final Amp. (dBµV/m)	Limit Detector Peak / Avg	Limit @ 3m (dBµV/m)	Margin (dB)
11.65	V	47.62	34.96	39.94	7.23	59.83	Peak	74	-14.17
11.65	V	32.17	34.96	39.94	7.23	44.38	Avg.	54	-9.62
17.475	V	42.72	33.89	43.59	10.28	62.69	Peak	74	-11.31
17.475	V	30.58	33.89	43.59	10.28	50.55	Avg.	54	-3.45

Table 33. Radiated Harmonic Emissions, High Channel, 5 GHz, Combined Ports, 802.11a, 19 dBi Panel

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

Frequency (MHz)	Antenna Polarity (H/V)	Raw Amp. @ 3m	Pre Amp (dB)	Ant. Cor. Factor (dB)	Cable Loss (dB)	EUT Field Strength Final Amp. (dBµV/m)	Limit Detector Peak / Avg	Limit @ 3m (dBµV/m)	Margin (dB)
11.49	V	46.11	34.86	39.79	7.68	58.72	Peak	74	-15.28
11.49	V	33.34	34.86	39.79	7.68	45.95	Avg.	54	-8.05
17.235	V	43.12	34.01	42.82	9.25	61.18	Peak	74	-12.82
17.235	V	30.88	34.01	42.82	9.25	48.94	Avg.	54	-5.06

Table 34. Radiated Harmonic Emissions, Low Channel, 5 GHz, Combined Ports, 802.11n 20MHz, Omni

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

Frequency (MHz)	Antenna Polarity (H/V)	Raw Amp. @ 3m	Pre Amp (dB)	Ant. Cor. Factor (dB)	Cable Loss (dB)	EUT Field Strength Final Amp. (dBµV/m)	Limit Detector Peak / Avg	Limit @ 3m (dBµV/m)	Margin (dB)
11.57	V	46.84	34.91	39.88	7.55	59.36	Peak	74	-14.64
11.57	V	33.43	34.91	39.88	7.55	45.95	Avg.	54	-8.05
17.355	V	43.2	33.93	43.15	9.58	62.00	Peak	74	-12.00
17.355	V	30.9	33.93	43.15	9.58	49.70	Avg.	54	-4.30

Table 35. Radiated Harmonic Emissions, Mid Channel, 5 GHz, Combined Ports, 802.11n 20MHz, Omni

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

Frequency (MHz)	Antenna Polarity (H/V)	Raw Amp. @ 3m	Pre Amp (dB)	Ant. Cor. Factor (dB)	Cable Loss (dB)	EUT Field Strength Final Amp. (dBµV/m)	Limit Detector Peak / Avg	Limit @ 3m (dBµV/m)	Margin (dB)
11.65	V	48.68	34.96	39.94	7.23	60.89	Peak	74	-13.11
11.65	V	36.29	34.96	39.94	7.23	48.50	Avg.	54	-5.50
17.475	V	42.84	33.89	43.59	10.28	62.81	Peak	74	-11.19
17.475	V	30.82	33.89	43.59	10.28	50.79	Avg.	54	-3.21

Table 36. Radiated Harmonic Emissions, High Channel, 5 GHz, Combined Ports, 802.11n 20MHz, Omni

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

Frequency (MHz)	Antenna Polarity (H/V)	Raw Amp. @ 3m	Pre Amp (dB)	Ant. Cor. Factor (dB)	Cable Loss (dB)	EUT Field Strength Final Amp. (dBµV/m)	Limit Detector Peak / Avg	Limit @ 3m (dBµV/m)	Margin (dB)
11.49	V	45.62	34.86	39.79	7.68	58.23	Peak	74	-15.77
11.49	V	34.17	34.86	39.79	7.68	46.78	Avg.	54	-7.22
17.235	V	42.83	34.01	42.82	9.25	60.89	Peak	74	-13.11
17.235	V	30.9	34.01	42.82	9.25	48.96	Avg.	54	-5.04

Table 37. Radiated Harmonic Emissions, Low Channel, 5 GHz, Combined Ports, 802.11n 20MHz, 19 dBi Panel

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

Frequency (MHz)	Antenna Polarity (H/V)	Raw Amp. @ 3m	Pre Amp (dB)	Ant. Cor. Factor (dB)	Cable Loss (dB)	EUT Field Strength Final Amp. (dBµV/m)	Limit Detector Peak / Avg	Limit @ 3m (dBµV/m)	Margin (dB)
11.57	V	46.26	34.91	39.88	7.55	58.78	Peak	74	-15.22
11.57	V	34.38	34.91	39.88	7.55	46.90	Avg.	54	-7.10
17.355	V	42.22	33.93	43.15	9.58	61.02	Peak	74	-12.98
17.355	V	31.45	33.93	43.15	9.58	50.25	Avg.	54	-3.75

Table 38. Radiated Harmonic Emissions, Mid Channel, 5 GHz, Combined Ports, 802.11n 20MHz, 19 dBi Panel

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

Frequency (MHz)	Antenna Polarity (H/V)	Raw Amp. @ 3m	Pre Amp (dB)	Ant. Cor. Factor (dB)	Cable Loss (dB)	EUT Field Strength Final Amp. (dBµV/m)	Limit Detector Peak / Avg	Limit @ 3m (dBµV/m)	Margin (dB)
11.65	V	46.17	34.96	39.94	7.23	58.38	Peak	74	-15.62
11.65	V	36.17	34.96	39.94	7.23	48.38	Avg.	54	-5.62
17.475	V	43.23	33.89	43.59	10.28	63.20	Peak	74	-10.80
17.475	V	30.65	33.89	43.59	10.28	50.62	Avg.	54	-3.38

Table 39. Radiated Harmonic Emissions, High Channel, 5 GHz, Combined Ports, 802.11n 20MHz, 19 dBi Panel

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

Frequency (MHz)	Antenna Polarity (H/V)	Raw Amp. @ 3m	Pre Amp (dB)	Ant. Cor. Factor (dB)	Cable Loss (dB)	EUT Field Strength Final Amp. (dBµV/m)	Limit Detector Peak / Avg	Limit @ 3m (dBµV/m)	Margin (dB)
11.51	V	42.42	34.88	39.81	7.67	55.03	Peak	74	-18.97
11.51	V	30.26	34.88	39.81	7.67	42.87	Avg.	54	-11.13
17.265	V	42.11	33.98	42.90	9.30	60.32	Peak	74	-13.68
17.265	V	30.58	33.98	42.90	9.30	48.79	Avg.	54	-5.21

Table 40. Radiated Harmonic Emissions, Low Channel, 5 GHz, Combined Ports, 802.11n 40MHz, Omni

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

Frequency (MHz)	Antenna Polarity (H/V)	Raw Amp. @ 3m	Pre Amp (dB)	Ant. Cor. Factor (dB)	Cable Loss (dB)	EUT Field Strength Final Amp. (dBµV/m)	Limit Detector Peak / Avg	Limit @ 3m (dBµV/m)	Margin (dB)
11.59	V	45.59	34.92	39.89	7.49	58.05	Peak	74	-15.95
11.59	V	33.72	34.92	39.89	7.49	46.18	Avg.	54	-7.82
17.385	V	42.79	33.92	43.24	9.72	61.84	Peak	74	-12.16
17.385	V	30.98	33.92	43.24	9.72	50.03	Avg.	54	-3.97

Table 41. Radiated Harmonic Emissions, High Channel, 5 GHz, Combined Ports, 802.11n 40MHz, 5 dBi Omni

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

Frequency (MHz)	Antenna Polarity (H/V)	Raw Amp. @ 3m	Pre Amp (dB)	Ant. Cor. Factor (dB)	Cable Loss (dB)	EUT Field Strength Final Amp. (dBµV/m)	Limit Detector Peak / Avg	Limit @ 3m (dBµV/m)	Margin (dB)
11.51	V	44.91	34.88	39.81	7.67	57.52	Peak	74	-16.48
11.51	V	33.54	34.88	39.81	7.67	46.15	Avg.	54	-7.85
17.265	V	43.5	33.98	42.90	9.30	61.71	Peak	74	-12.29
17.265	V	30.64	33.98	42.90	9.30	48.85	Avg.	54	-5.15

Table 42. Radiated Harmonic Emissions, Low Channel, 5 GHz, Combined Ports, 802.11n 40MHz, 19 dBi Panel

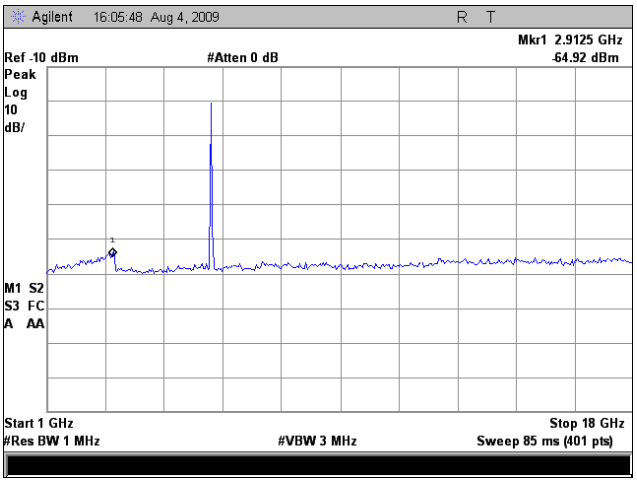
Note: All other emissions were measured at the noise floor of the spectrum analyzer.

Frequency (MHz)	Antenna Polarity (H/V)	Raw Amp. @ 3m	Pre Amp (dB)	Ant. Cor. Factor (dB)	Cable Loss (dB)	Dist. Cor. Factor (dB)	EUT Field Strength Final Amp. (dBµV/m)	Limit @ 3m (dBµV/m)	Margin (dB)
11.59	V	45.05	34.92	39.89	7.49	57.51	Peak	74	-16.49
11.59	V	31.98	34.92	39.89	7.49	44.44	Avg.	54	-9.56
17.385	V	43.87	33.92	43.24	9.72	62.92	Peak	74	-11.08
17.385	V	30.7	33.92	43.24	9.72	49.75	Avg.	54	-4.25

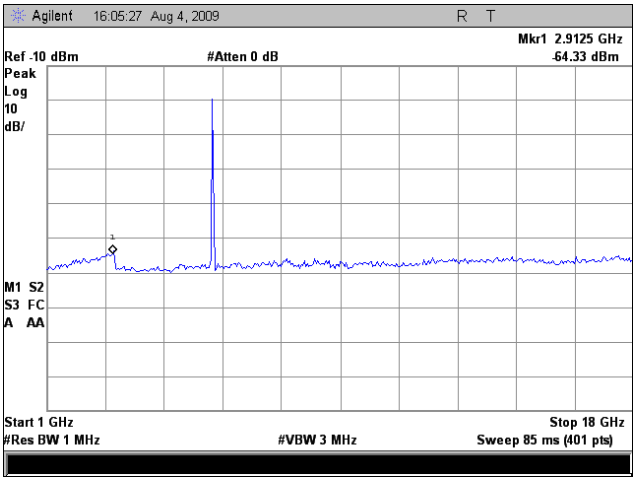
Table 43. Radiated Harmonic Emissions, High Channel, 5 GHz, Combined Ports, 802.11n 40MHz, 19 dBi Panel

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

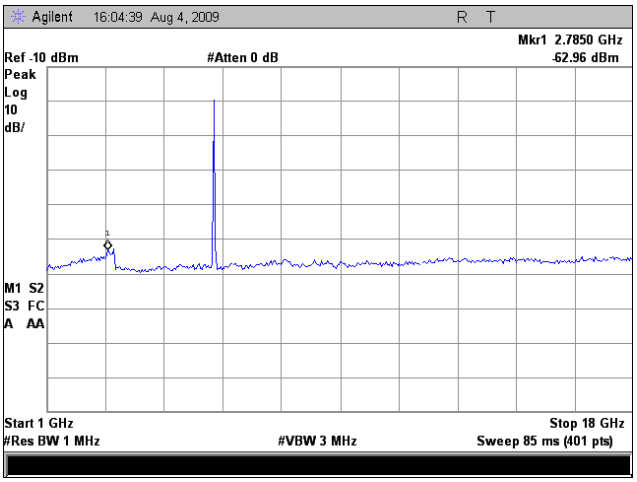
Radiated Spurious Emissions, 5 GHz, Combined Ports



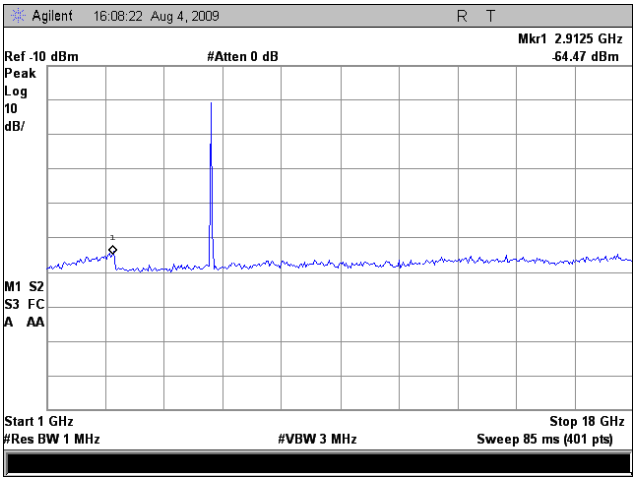
Plot 61. Radiated Spurious Emissions, Low Channel, 5 GHz, 802.11a 20MHz, 5 dBi Omni



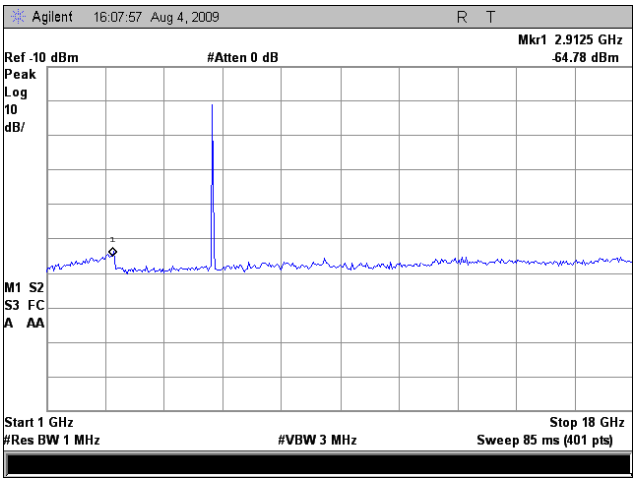
Plot 62. Radiated Spurious Emissions, Mid Channel, 5 GHz, 802.11a 20MHz, 5 dBi Omni



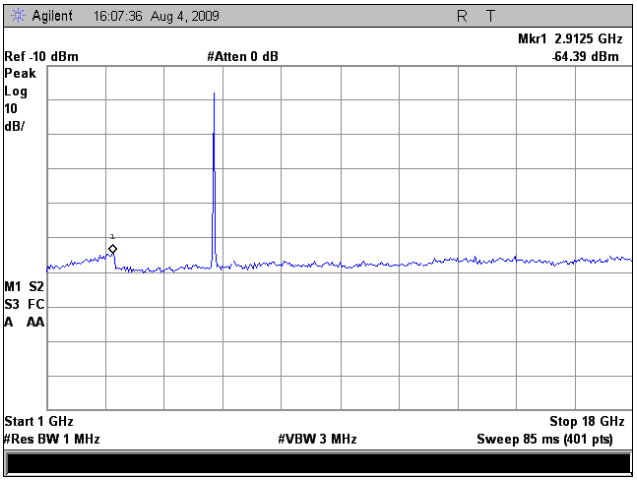
Plot 63. Radiated Spurious Emissions, High Channel, 5 GHz, 802.11a 20MHz, 5 dBi Omni



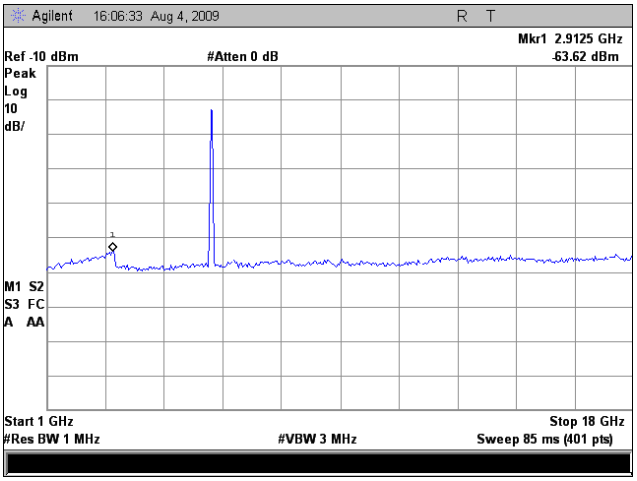
Plot 64. Radiated Spurious Emissions, Low Channel, 5 GHz, Combined Ports, 802.11n 20MHz, 5 dBi Omni



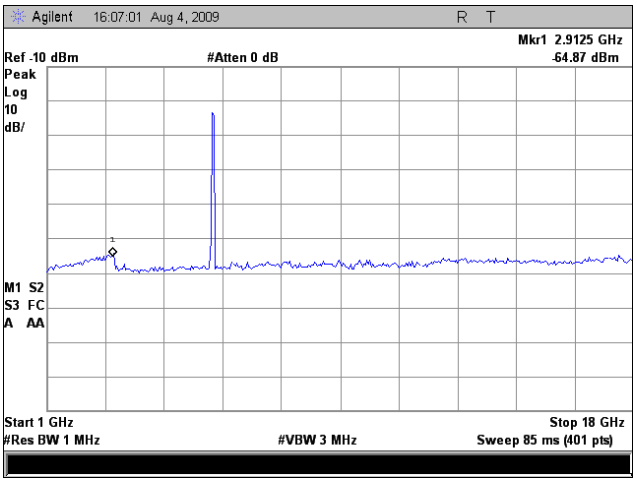
Plot 65. Radiated Spurious Emissions, Mid Channel, 5 GHz, Combined Ports, 802.11n 20MHz, 5 dBi Omni



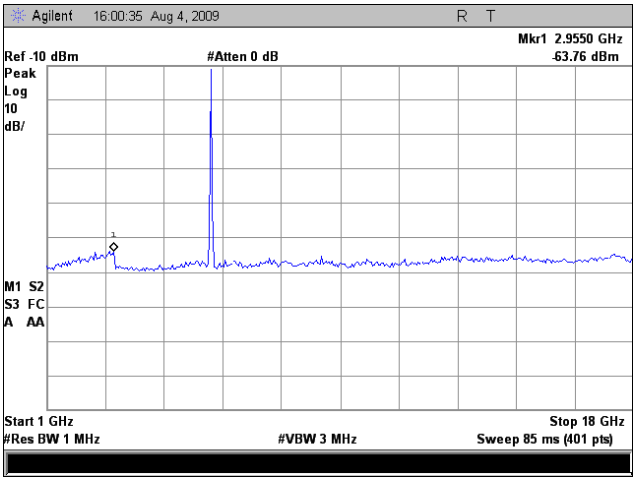
Plot 66. Radiated Spurious Emissions, High Channel, 5 GHz, Combined Ports, 802.11n 20MHz, 5dBi Omni



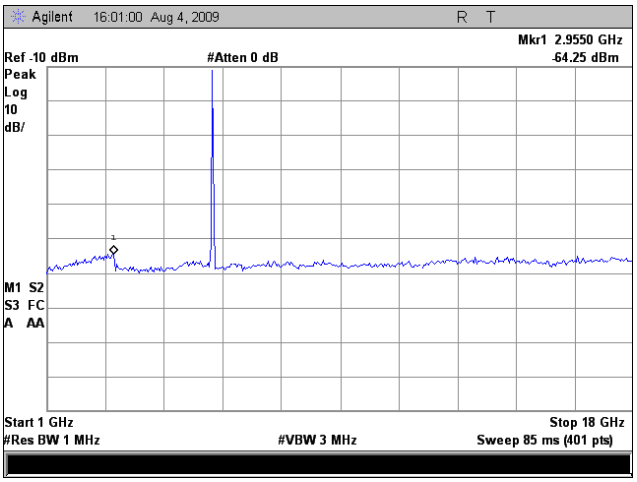
Plot 67. Radiated Spurious Emissions, Low Channel, 5 GHz, Combined Ports, 802.11n 40MHz, 5dBi Omni



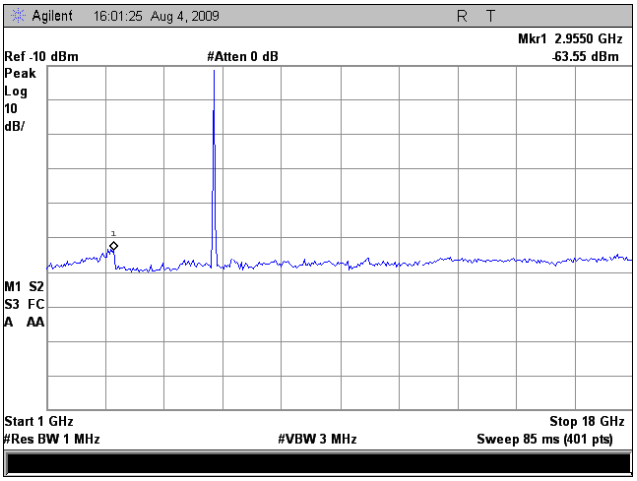
Plot 68. Radiated Spurious Emissions, High Channel, 5 GHz, Combined Ports, 802.11n 40MHz, 5dBi Omni



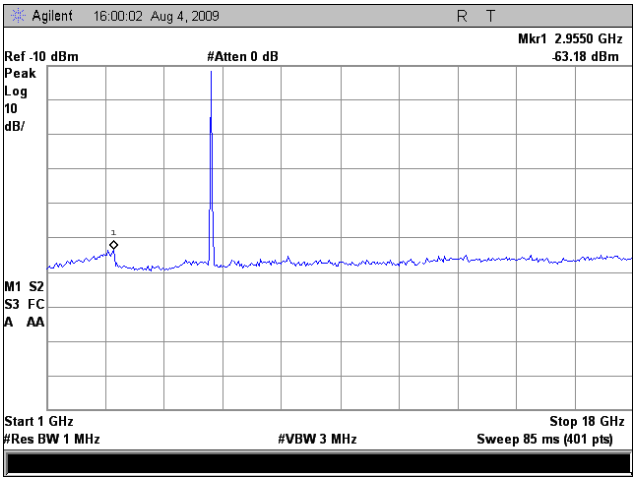
Plot 69. Radiated Spurious Emissions, Low Channel, 5 GHz, 802.11a 20MHz, 19 dBi Panel



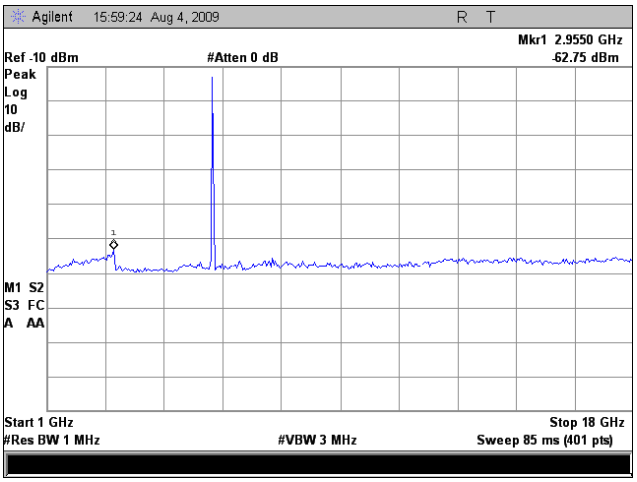
Plot 70. Radiated Spurious Emissions, Mid Channel, 5 GHz, 802.11a 20MHz, 19 dBi Panel



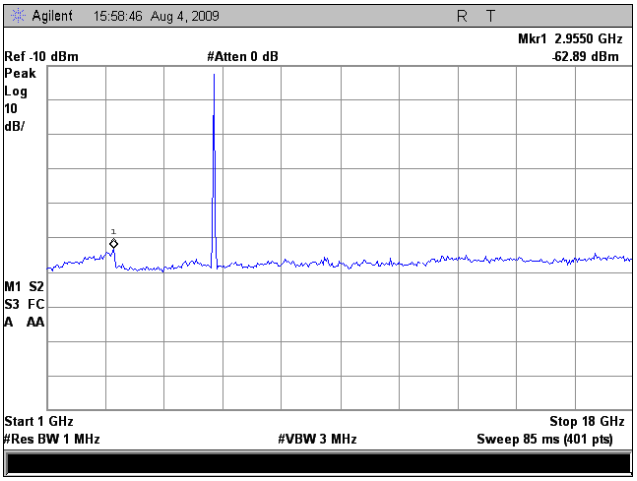
Plot 71. Radiated Spurious Emissions, High Channel, 5 GHz, 802.11a 20MHz, 19 dBi Panel



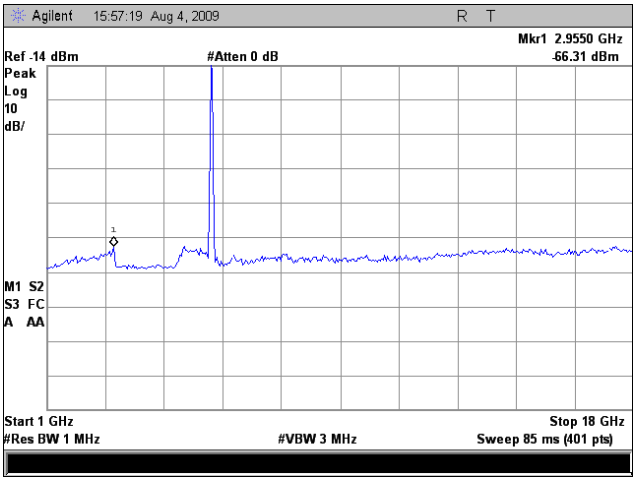
Plot 72. Radiated Spurious Emissions, Low Channel, 5 GHz, Combined Ports, 802.11n 20MHz, 19 dBi Panel



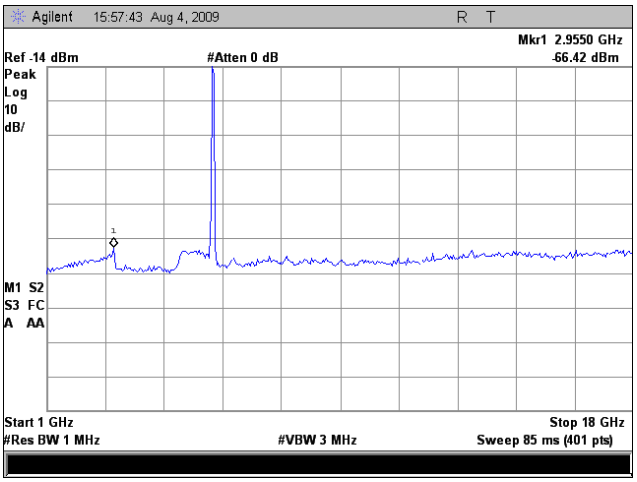
Plot 73. Radiated Spurious Emissions, Mid Channel, 5 GHz, Combined Ports, 802.11n 20MHz, 19 dBi Panel



Plot 74. Radiated Spurious Emissions, High Channel, 5 GHz, Combined Ports, 802.11n 20MHz, 19 dBi Panel

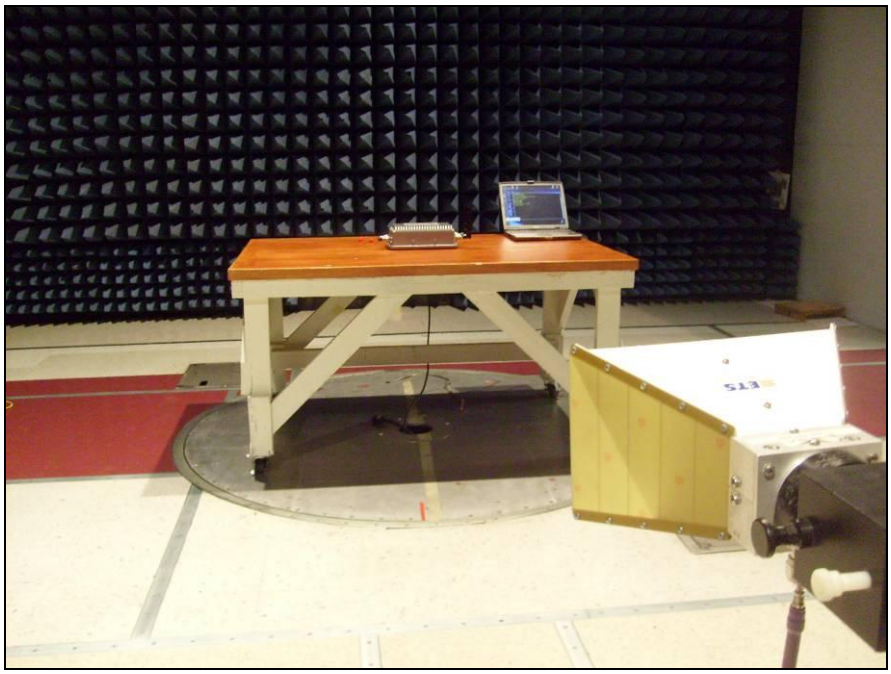


Plot 75. Radiated Spurious Emissions, Low Channel, 5 GHz, Combined Ports, 802.11n 40MHz, 19 dBi Panel



Plot 76. Radiated Spurious Emissions, High Channel, 5 GHz, Combined Ports, 802.11n 40MHz, 19 dBi Panel

Radiated Spurious Emissions – Test Setup Photographs



Photograph 8. Test Equipment and Setup for Various Radiated Measurements – 5 dBi Omni

Photograph 9. Test Equipment and Setup for Various Radiated Measurements – 19 dBi Panel

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.

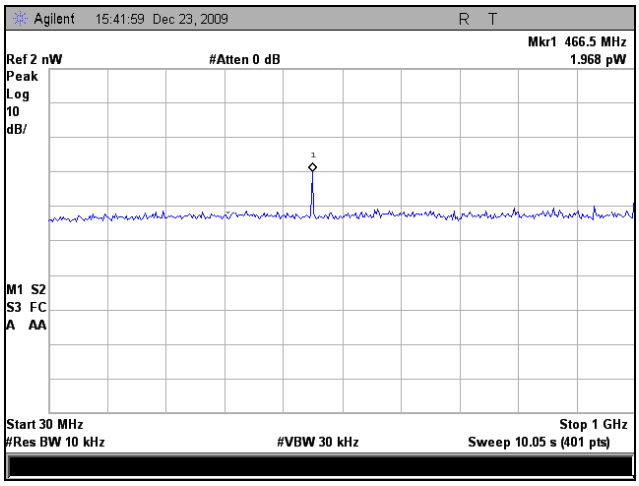
See following pages for detailed test results with RF Conducted Spurious Emissions.

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

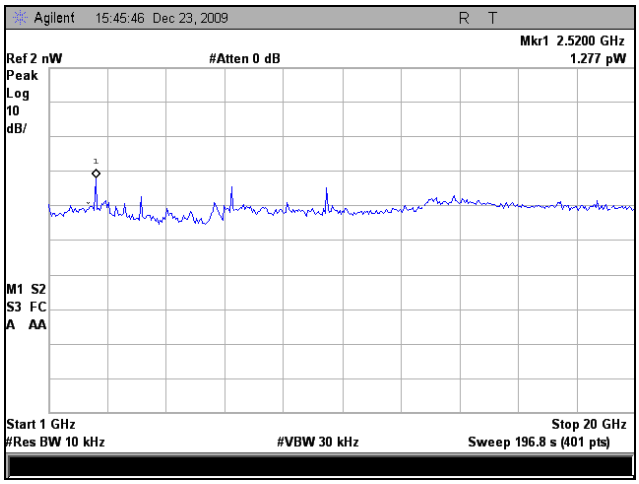
Test Engineer(s): Minh Ly

Test Date(s): 08/17/09

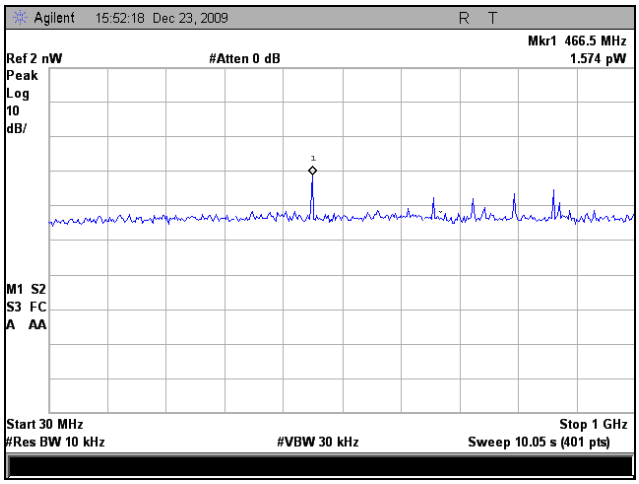
Receiver Spurious Emissions



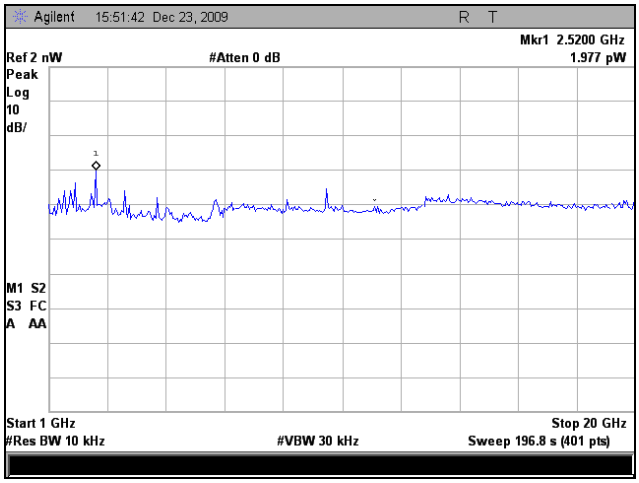
Plot 77. Conducted Spurious Emissions, Port 1, 30 MHz – 1 GHz



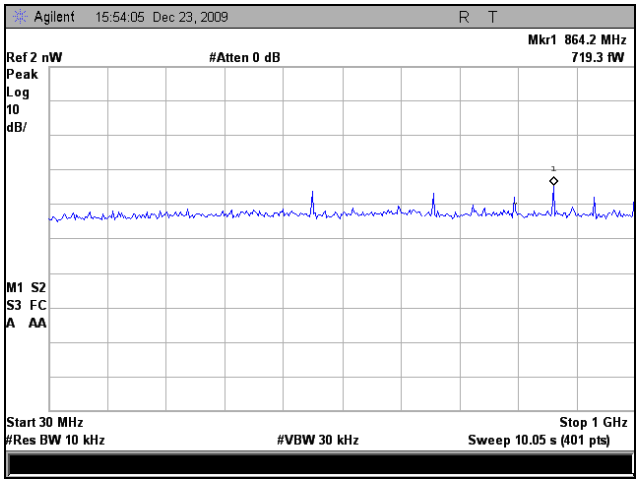
Plot 78. Conducted Spurious Emissions, Port 1, 1 GHz – 20 GHz



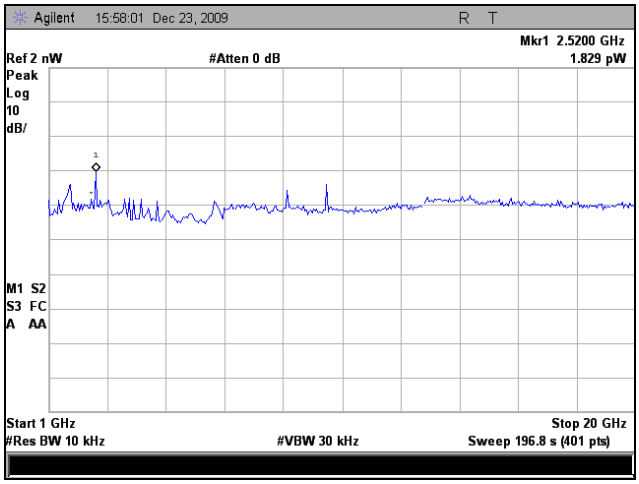
Plot 79. Conducted Spurious Emissions, Port 2, 30 MHz – 1 GHz



Plot 80. Conducted Spurious Emissions, Port 2, 1 GHz – 20 GHz

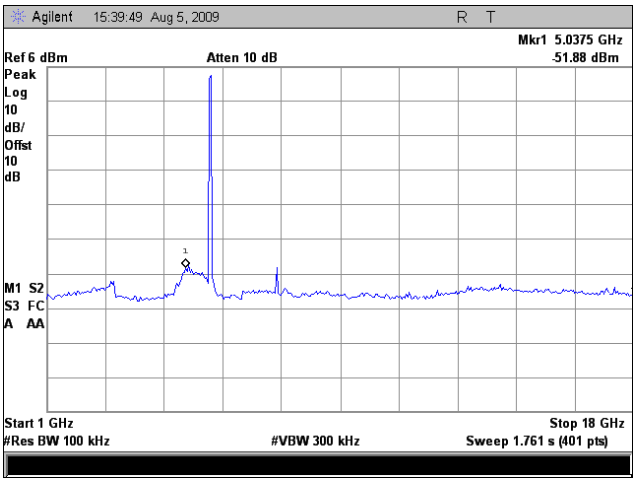


Plot 81. Conducted Spurious Emissions, Port 3, 30 MHz – 1 GHz

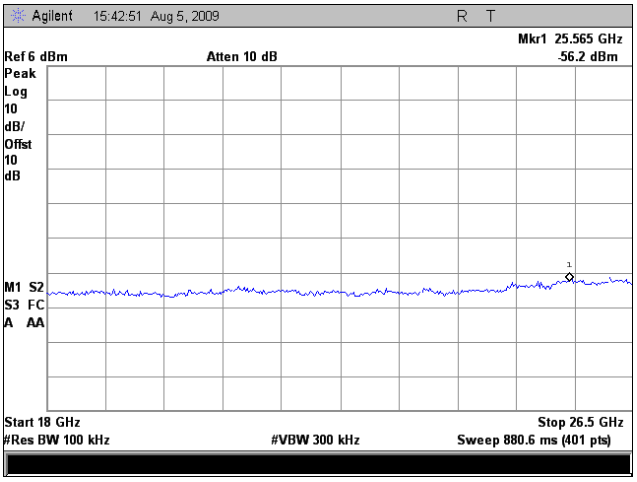


Plot 82. Conducted Spurious Emissions, Port 3, 1 GHz – 20 GHz

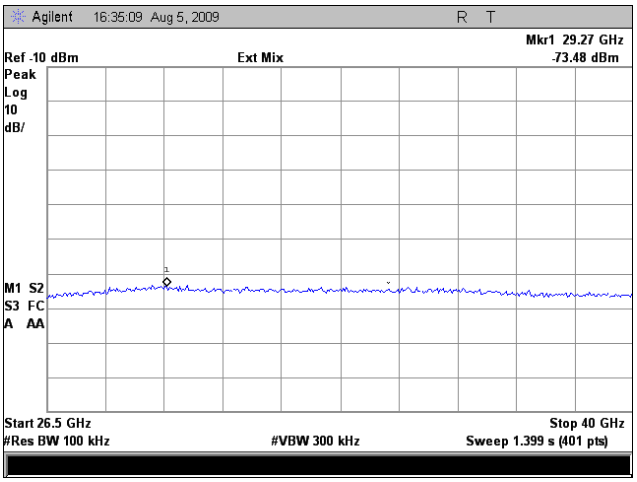
RF Conducted Spurious Emissions Requirements, 5 GHz, Port 1



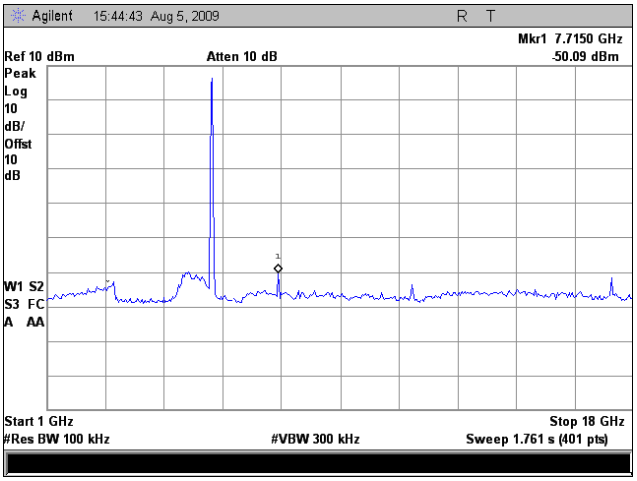
Plot 83. Conducted Emissions, Low Channel, 5 GHz, Port 1, 802.11a, 1 GHz – 18 GHz



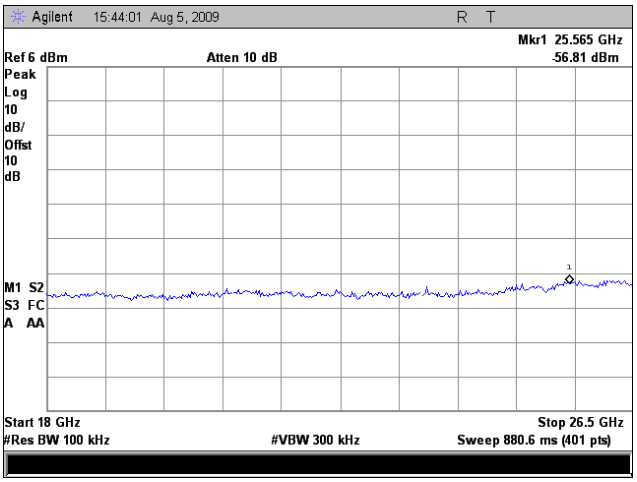
Plot 84. Conducted Emissions, Low Channel, 5 GHz, Port 1, 802.11a, 18 GHz – 26.5 GHz



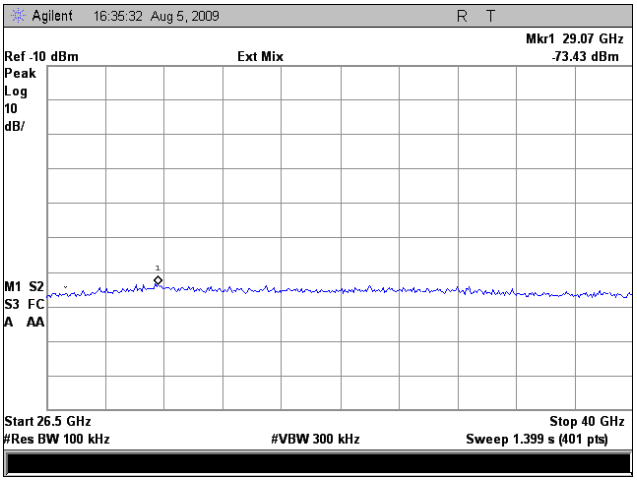
Plot 85. Conducted Emissions, Low Channel, 5 GHz, Port 1, 802.11a, 26.5 GHz – 40 GHz



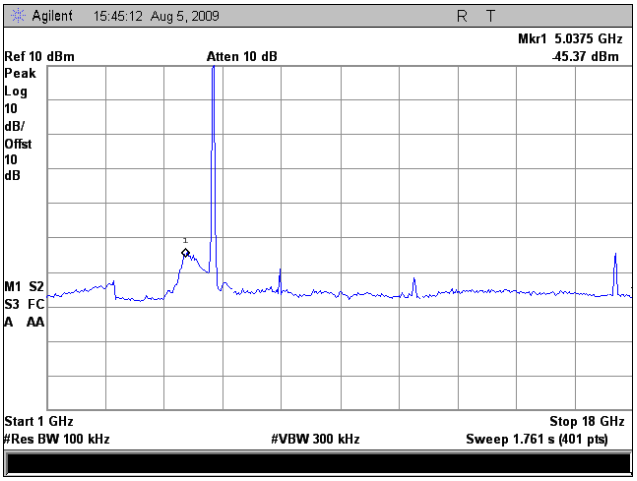
Plot 86. Conducted Emissions, Mid Channel, 5 GHz, Port 1, 802.11a, 1 GHz – 18 GHz



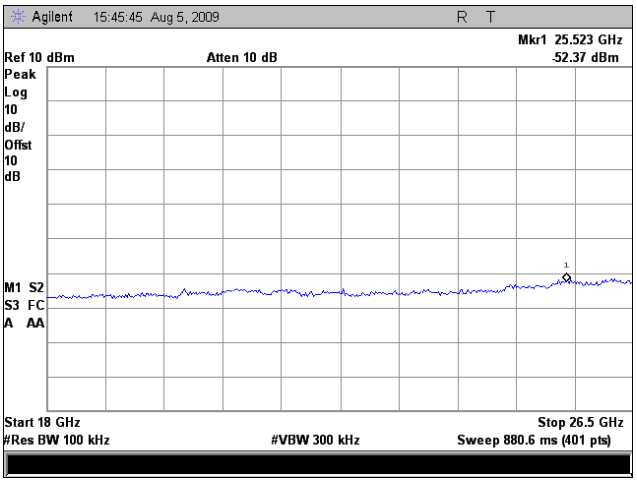
Plot 87. Conducted Emissions, Mid Channel, 5 GHz, Port 1, 802.11a, 18 GHz – 26 GHz



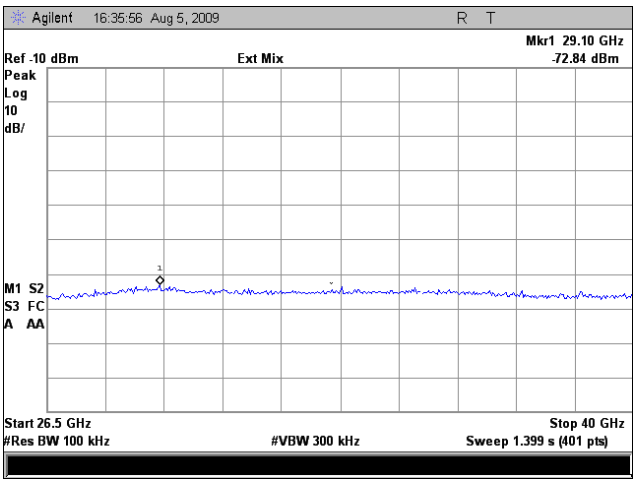
Plot 88. Conducted Emissions, Mid Channel, 5 GHz, Port 1, 802.11a, 26 GHz – 40 GHz



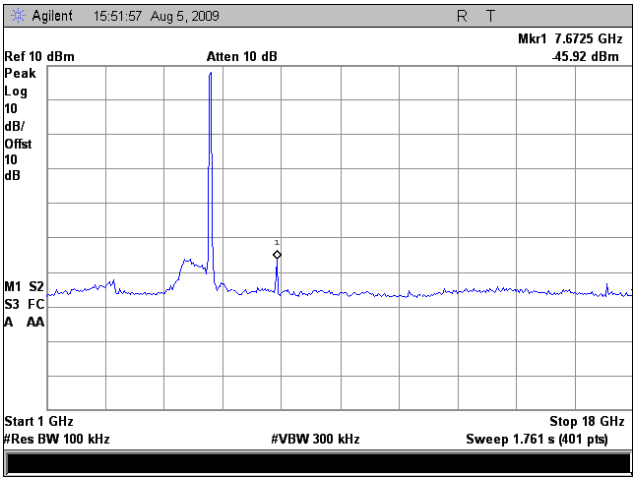
Plot 89. Conducted Emissions, High Channel, 5 GHz, Port 1, 802.11a, 1 GHz – 18 GHz



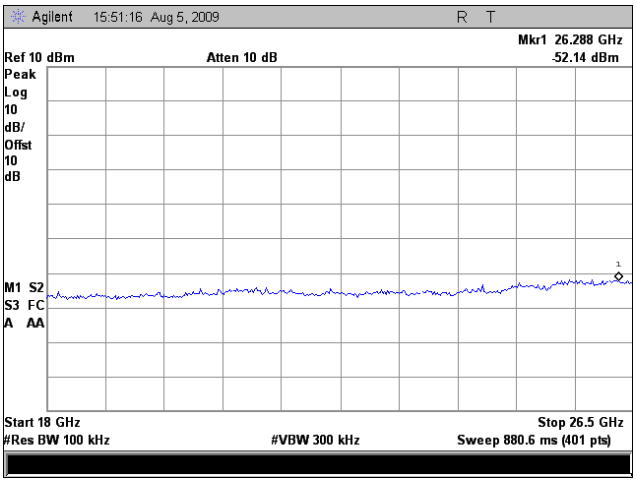
Plot 90. Conducted Emissions, High Channel, 5 GHz, Port 1, 802.11a, 18 GHz – 26 GHz



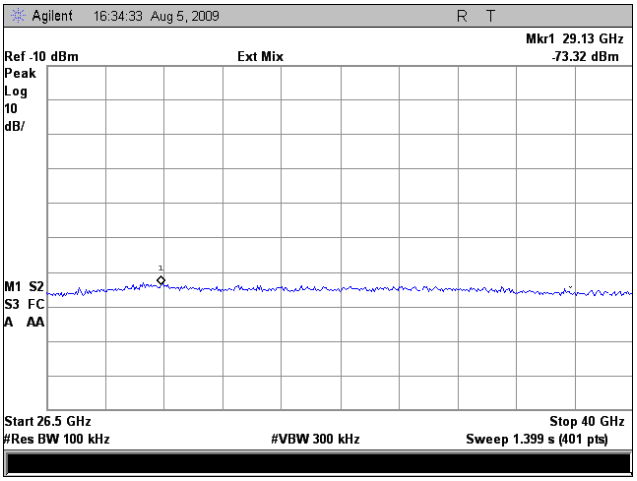
Plot 91. Conducted Emissions, High Channel, 5 GHz, Port 1, 802.11a, 26 GHz – 40 GHz



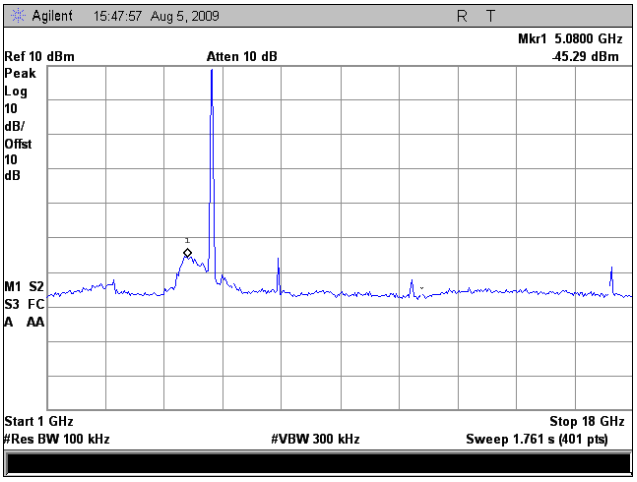
Plot 92. Conducted Emissions, Low Channel, 5 GHz, Port 1, 802.11n 20MHz, 1 GHz – 18 GHz



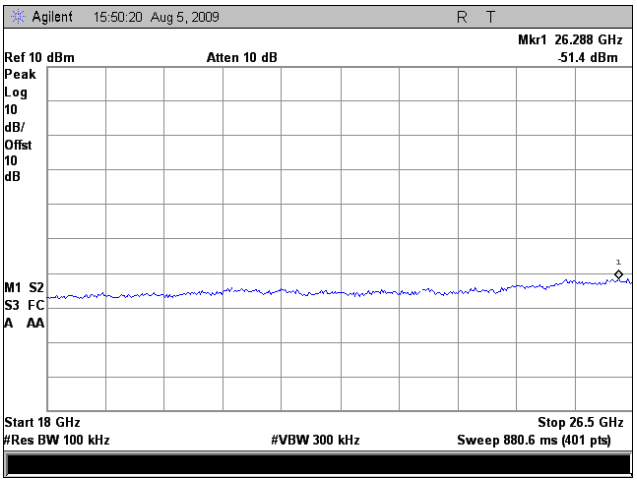
Plot 93. Conducted Emissions, Low Channel, 5 GHz, Port 1, 802.11n 20MHz, 18 GHz – 26.5 GHz



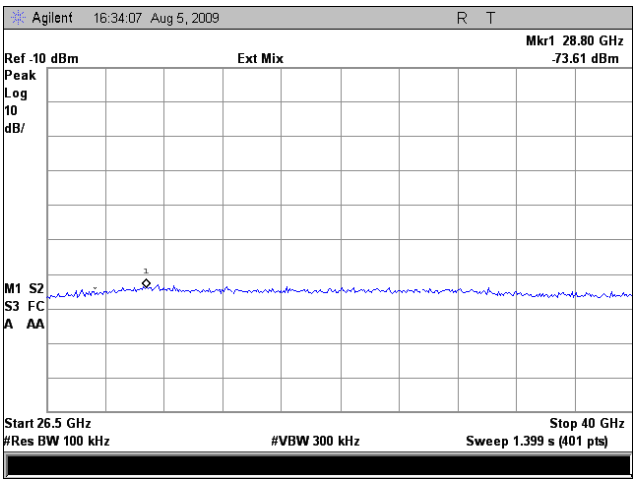
Plot 94. Conducted Emissions, Low Channel, 5 GHz, Port 1, 802.11n 20MHz, 26.5 GHz – 40 GHz



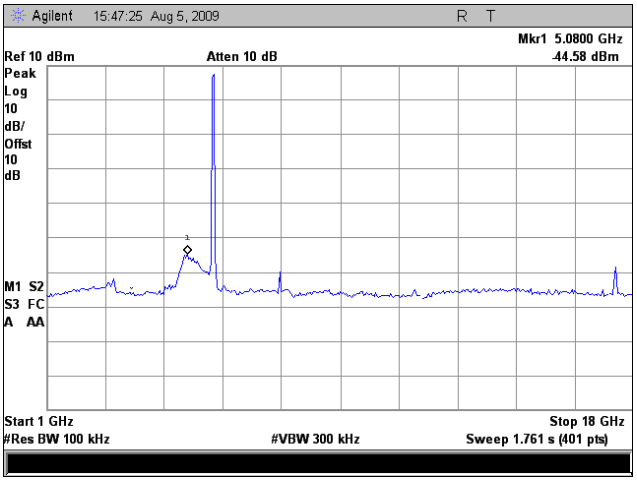
Plot 95. Conducted Emissions, Mid Channel, 5 GHz, Port 1, 802.11n 20MHz, 1 GHz – 18 GHz



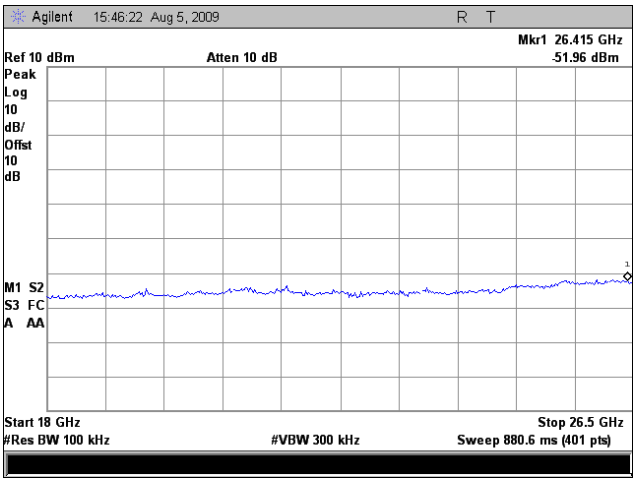
Plot 96. Conducted Emissions, Mid Channel, 5 GHz, Port 1, 802.11n 20MHz, 18 GHz – 26.5 GHz



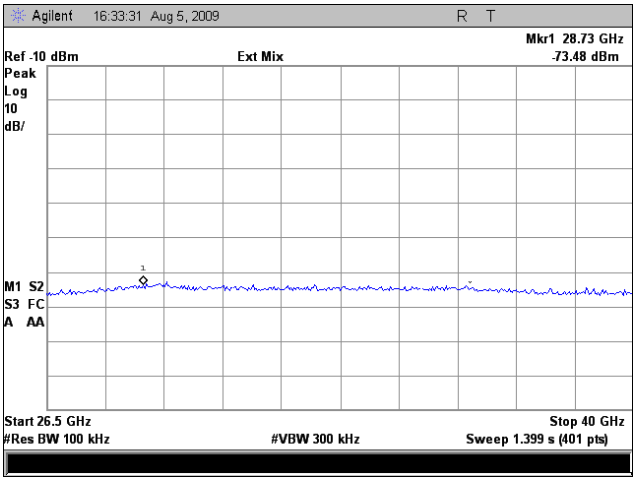
Plot 97. Conducted Emissions, Mid Channel, 5 GHz, Port 1, 802.11n 20MHz, 26.5 GHz – 40 GHz



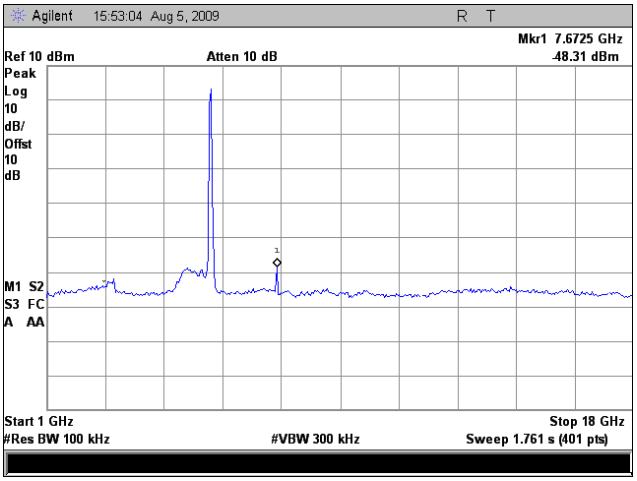
Plot 98. Conducted Emissions, High Channel, 5 GHz, Port 1, 802.11n 20MHz, 1 GHz – 18 GHz



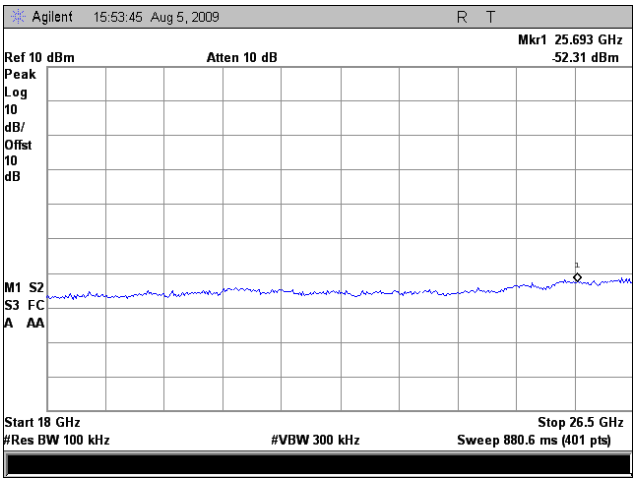
Plot 99. Conducted Emissions, High Channel, 5 GHz, Port 1, 802.11n 20MHz, 18 GHz – 26.5 GHz



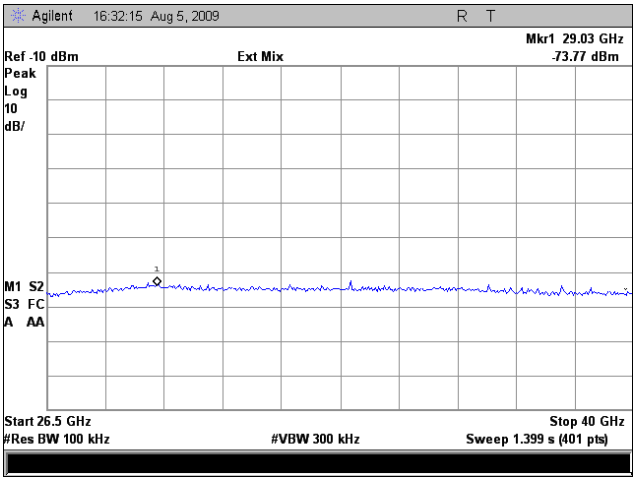
Plot 100. Conducted Emissions, High Channel, 5 GHz, Port 1, 802.11n 20MHz, 26.5 GHz – 40 GHz



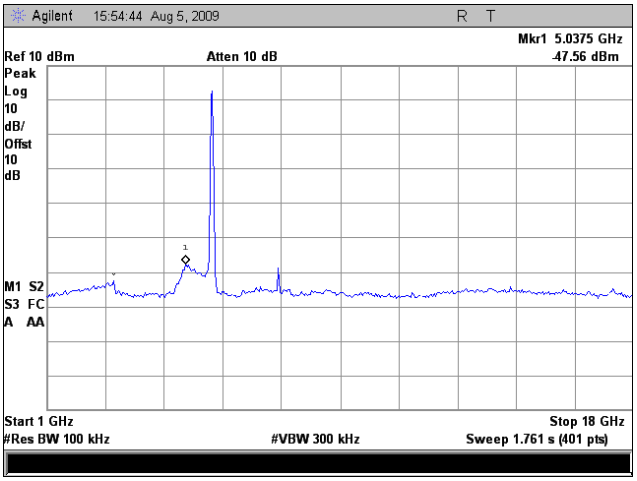
Plot 101. Conducted Emissions, Low Channel, 5 GHz, Port 1, 802.11n 40MHz, 1 GHz – 18 GHz



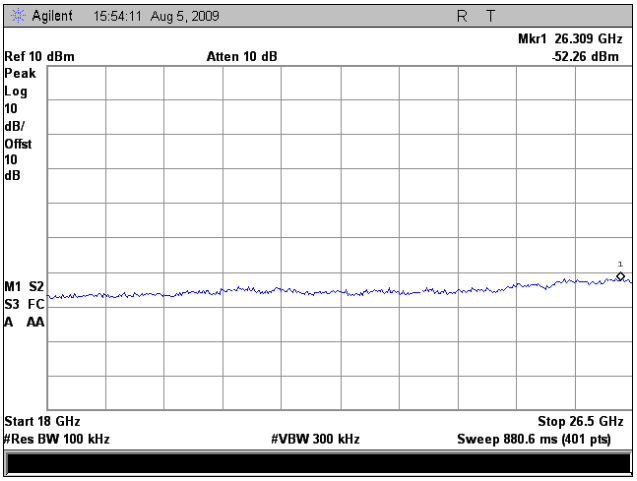
Plot 102. Conducted Emissions, Low Channel, 5 GHz, Port 1, 802.11n 40MHz, 18 GHz – 26.5 GHz



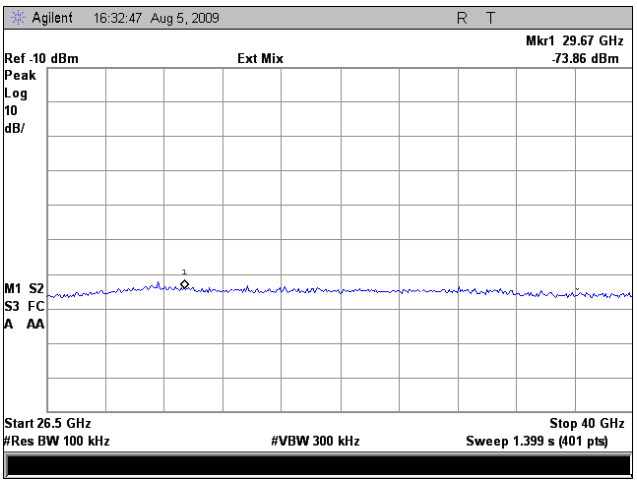
Plot 103. Conducted Emissions, Low Channel, 5 GHz, Port 1, 802.11n 40MHz, 26.5 GHz – 40 GHz



Plot 104. Conducted Emissions, High Channel, 5 GHz, Port 1, 802.11n 40MHz, 1 GHz – 18 GHz

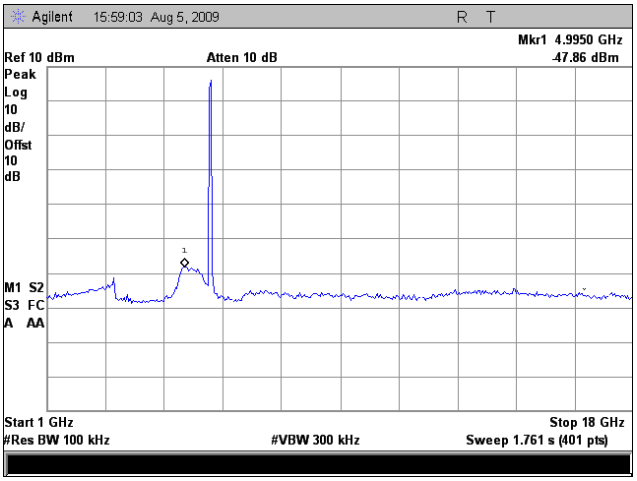


Plot 105. Conducted Emissions, High Channel, 5 GHz, Port 1, 802.11n 40MHz, 18 GHz – 26.5 GHz

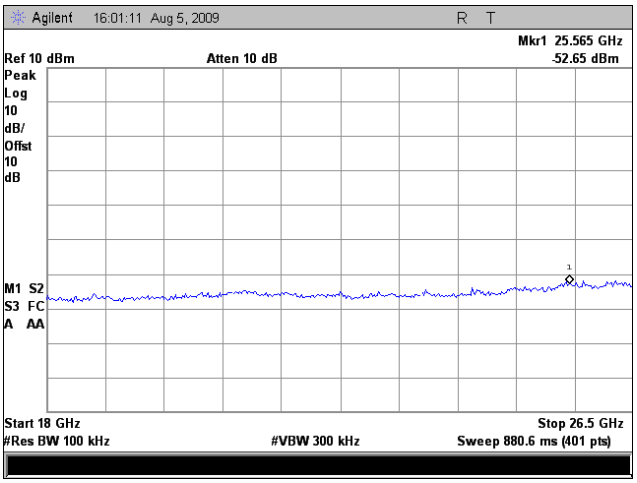


Plot 106. Conducted Emissions, High Channel, 5 GHz, Port 1, 802.11n 40MHz, 26.5 GHz – 40 GHz

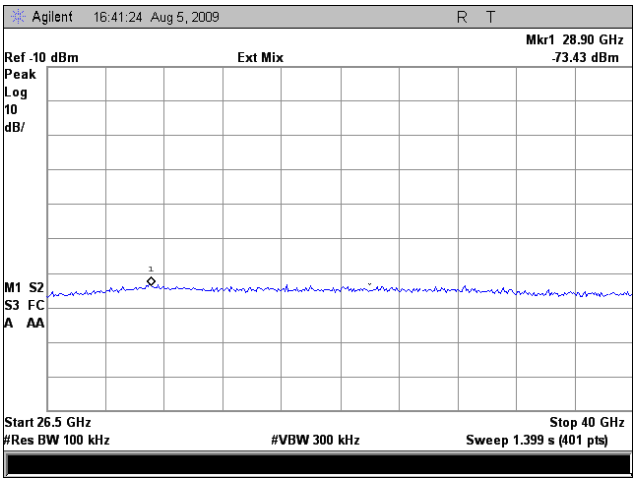
RF Conducted Spurious Emissions Requirements, 5 GHz, Port 2



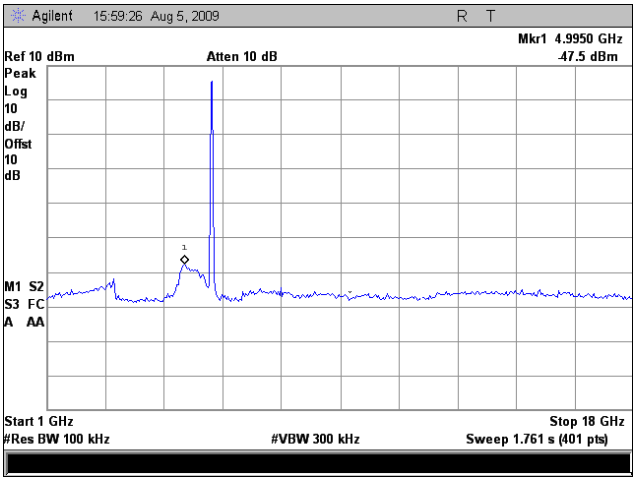
Plot 107. Conducted Emissions, Low Channel, 5 GHz, Port 2, 802.11n 20MHz, 1 GHz – 18 GHz



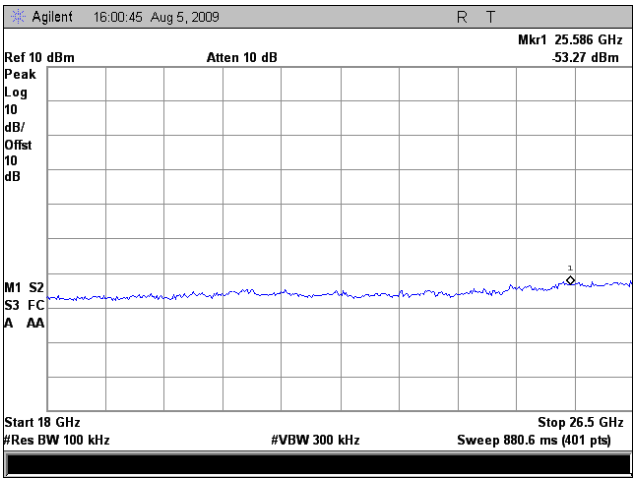
Plot 108. Conducted Emissions, Low Channel, 5 GHz, Port 2, 802.11n 20MHz, 18 GHz – 26.5 GHz



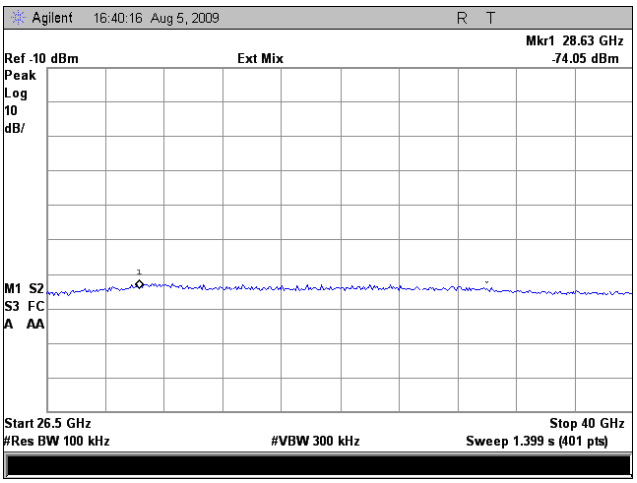
Plot 109. Conducted Emissions, Low Channel, 5 GHz, Port 2, 802.11n 20MHz, 26.5 GHz – 40 GHz



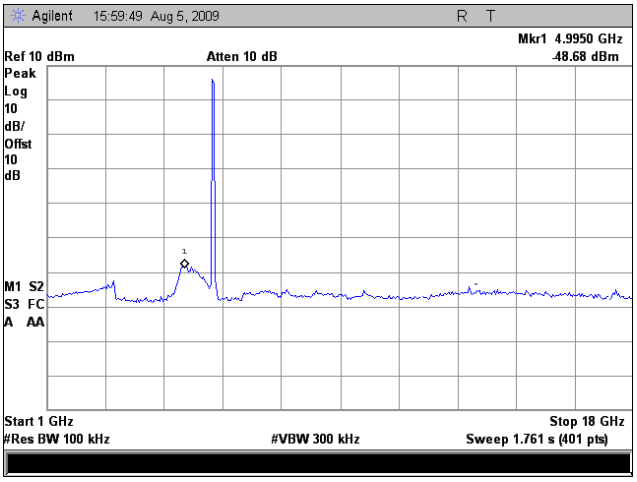
Plot 110. Conducted Emissions, Mid Channel, 5 GHz, Port 2, 802.11n 20MHz, 1 GHz – 18 GHz



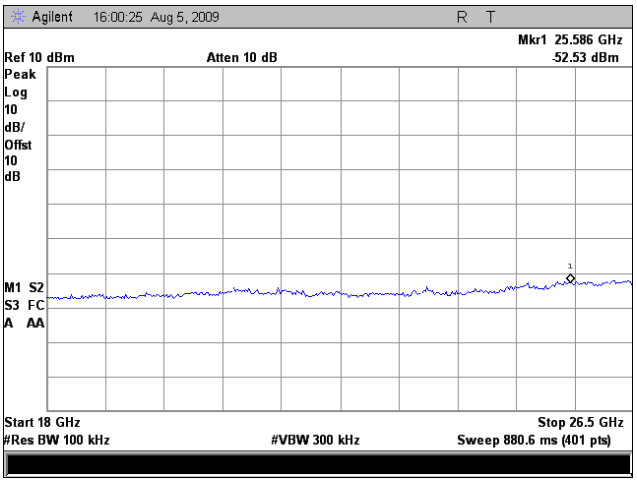
Plot 111. Conducted Emissions, Mid Channel, 5 GHz, Port 2, 802.11n 20MHz, 18 GHz – 26.5 GHz



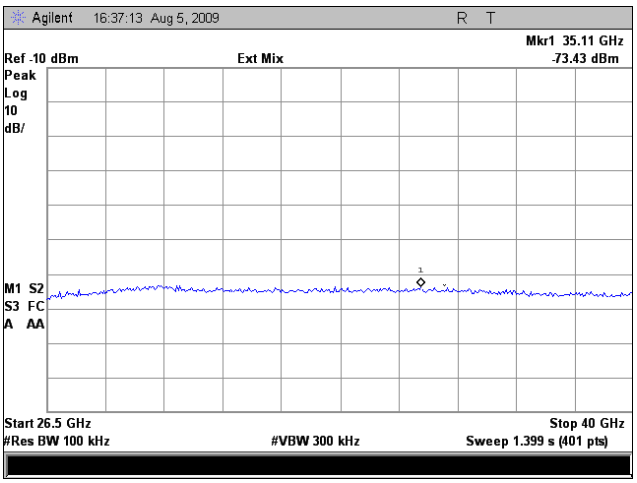
Plot 112. Conducted Emissions, Mid Channel, 5 GHz, Port 2, 802.11n 20MHz, 26.5 GHz – 40 GHz



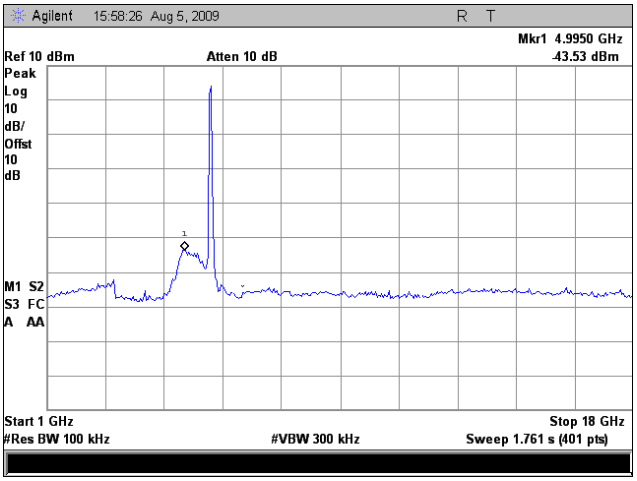
Plot 113. Conducted Emissions, High Channel, 5 GHz, Port 2, 802.11n 20MHz, 1 GHz – 18 GHz



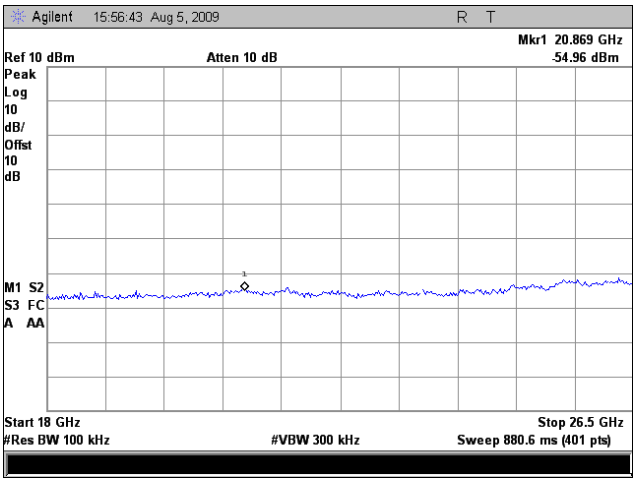
Plot 114. Conducted Emissions, High Channel, 5 GHz, Port 2, 802.11n 20MHz, 18 GHz – 26.5 GHz



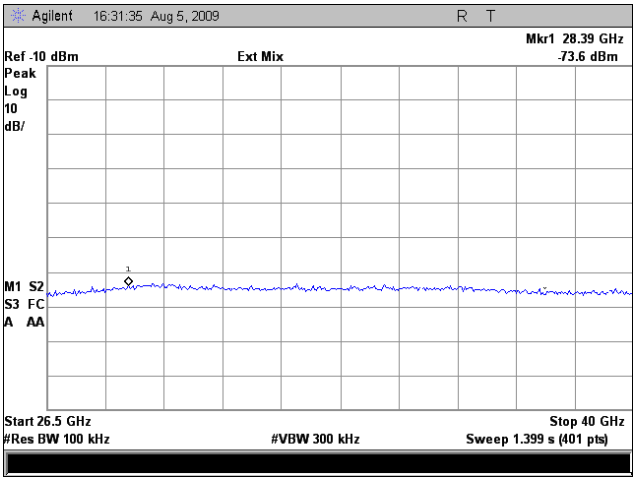
Plot 115. Conducted Emissions, High Channel, 5 GHz, Port 2, 802.11n 20MHz, 26.5 GHz – 40 GHz



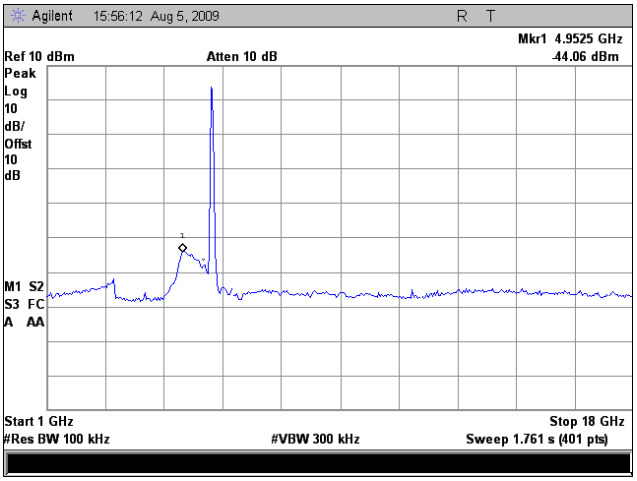
Plot 116. Conducted Emissions, Low Channel, 5 GHz, Port 2, 802.11n 40MHz, 1 GHz – 18 GHz



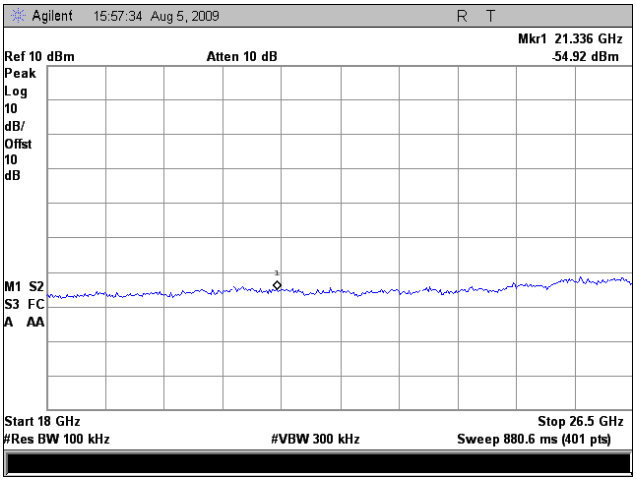
Plot 117. Conducted Emissions, Low Channel, 5 GHz, Port 2, 802.11n 40MHz, 18 GHz – 26.5 GHz



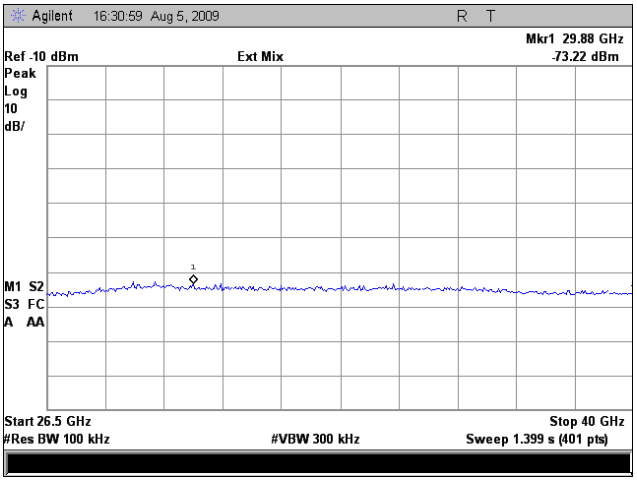
Plot 118. Conducted Emissions, Low Channel, 5 GHz, Port 2, 802.11n 40MHz, 26.5 GHz – 40 GHz



Plot 119. Conducted Emissions, High Channel, 5 GHz, Port 2, 802.11n 40MHz, 1 GHz – 18 GHz

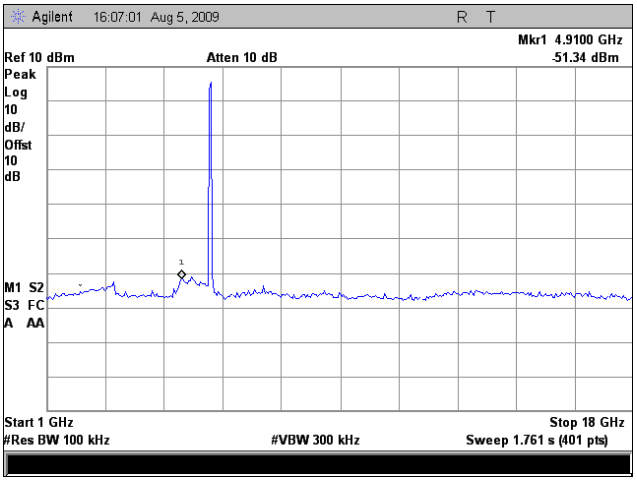


Plot 120. Conducted Emissions, High Channel, 5 GHz, Port 2, 802.11n 40MHz, 18 GHz – 26.5 GHz

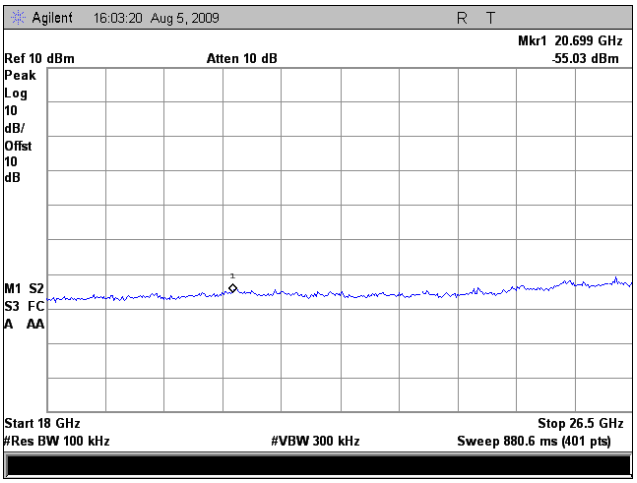


Plot 121. Conducted Emissions, High Channel, 5 GHz, Port 2, 802.11n 40MHz, 26.5 GHz – 40 GHz

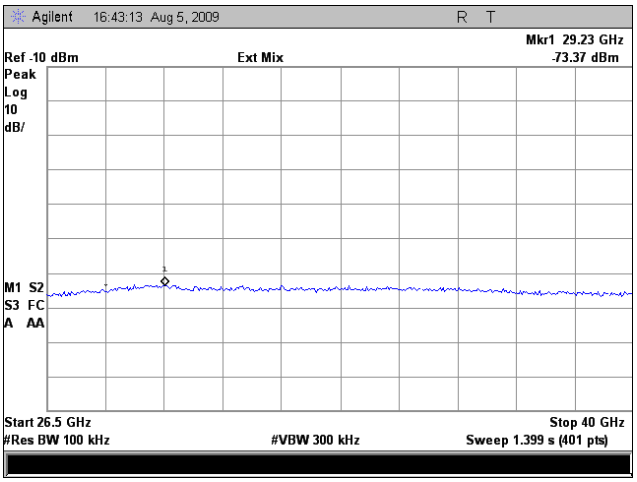
RF Conducted Spurious Emissions Requirements, 5 GHz, Port 3



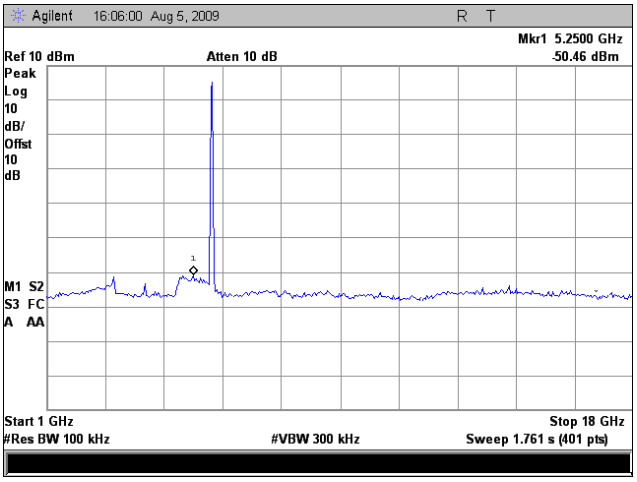
Plot 122. Conducted Emissions, Low Channel, 5 GHz, Port 3, 802.11n 20MHz, 1 GHz – 18 GHz



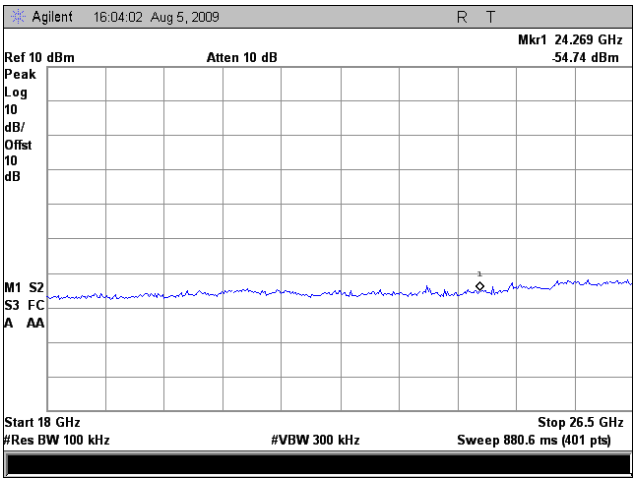
Plot 123. Conducted Emissions, Low Channel, 5 GHz, Port 3, 802.11n 20MHz, 18 GHz – 26.5 GHz



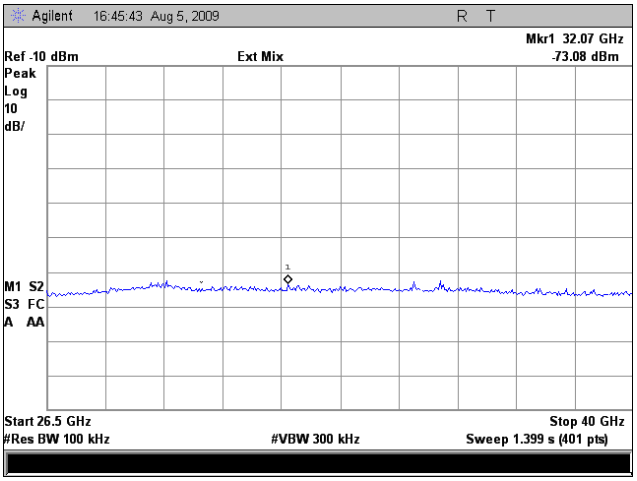
Plot 124. Conducted Emissions, Low Channel, 5 GHz, Port 3, 802.11n 20MHz, 26.5 GHz – 40 GHz



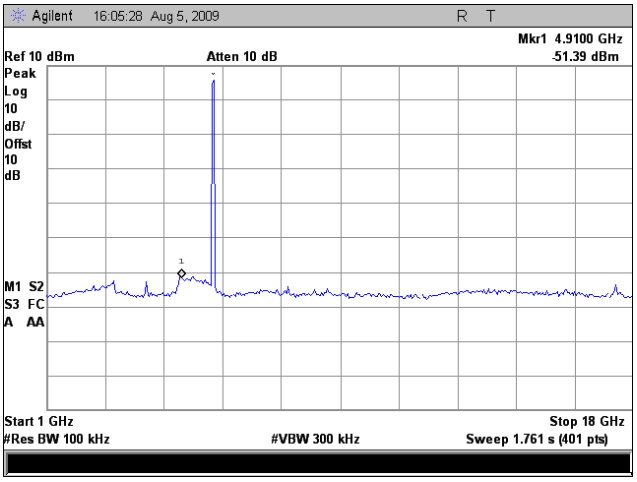
Plot 125. Conducted Emissions, Mid Channel, 5 GHz, Port 3, 802.11n 20MHz, 1 GHz – 18 GHz



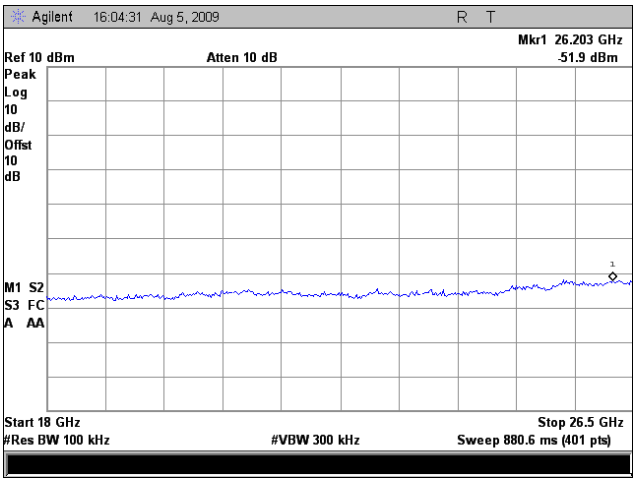
Plot 126. Conducted Emissions, Mid Channel, 5 GHz, Port 3, 802.11n 20MHz, 18 GHz – 26.5 GHz



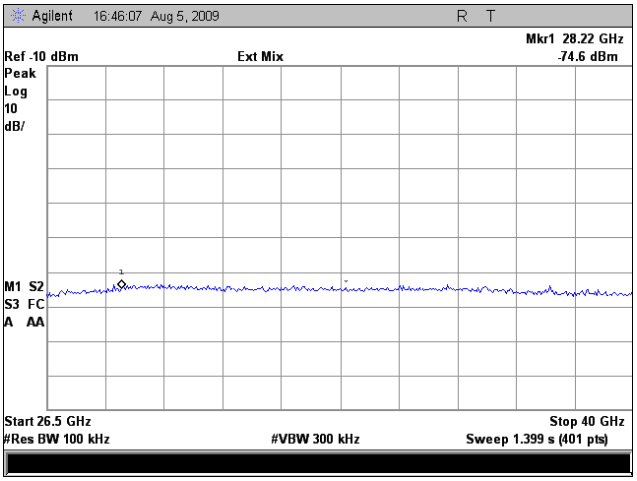
Plot 127. Conducted Emissions, Mid Channel, 5 GHz, Port 3, 802.11n 20MHz, 26.5 GHz – 40 GHz



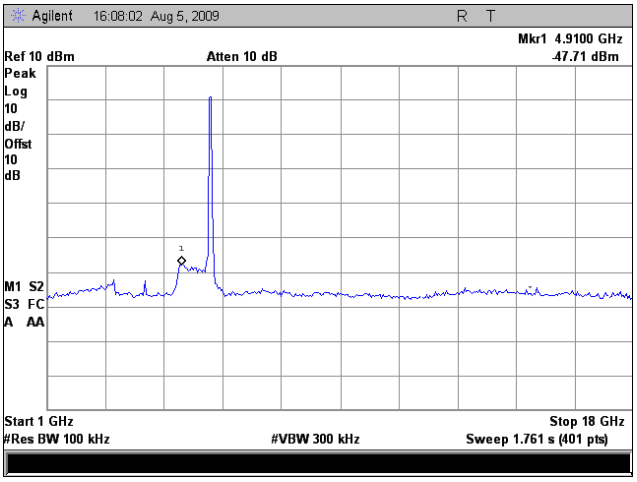
Plot 128. Conducted Emissions, High Channel, 5 GHz, Port 3, 802.11n 20MHz, 1 GHz – 18 GHz



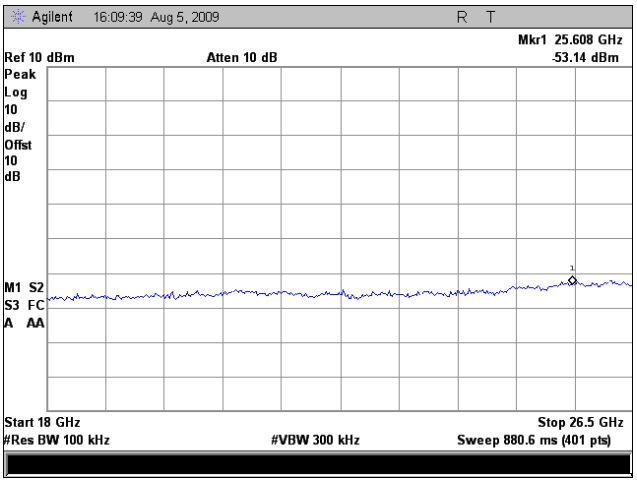
Plot 129. Conducted Emissions, High Channel, 5 GHz, Port 3, 802.11n 20MHz, 18 GHz – 26.5 GHz



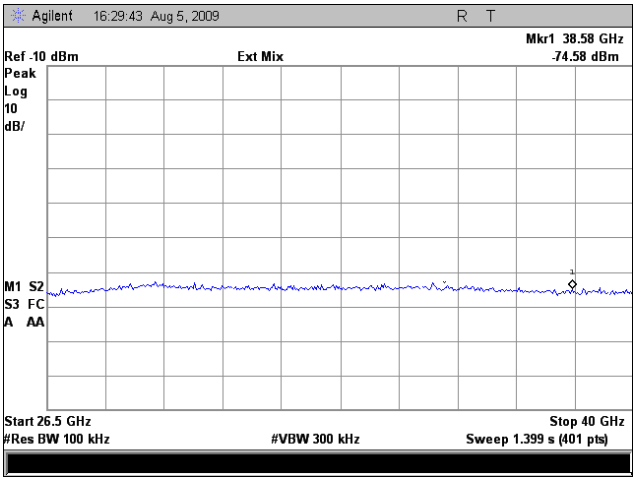
Plot 130. Conducted Emissions, High Channel, 5 GHz, Port 3, 802.11n 20MHz, 26.5 GHz – 40 GHz



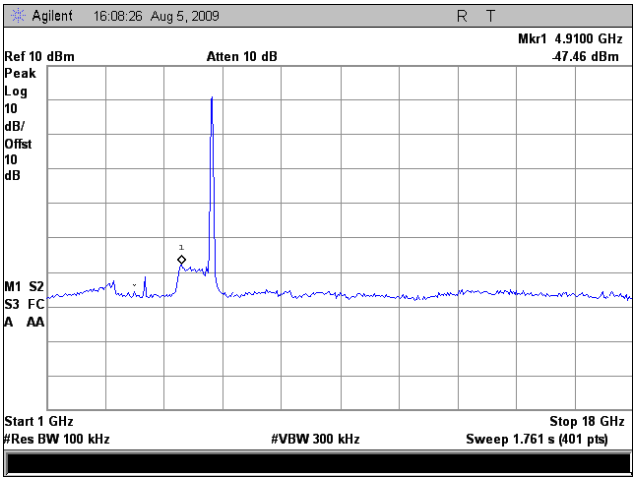
Plot 131. Conducted Emissions, Low Channel, 5 GHz, Port 3, 802.11n 40MHz, 1 GHz – 18 GHz



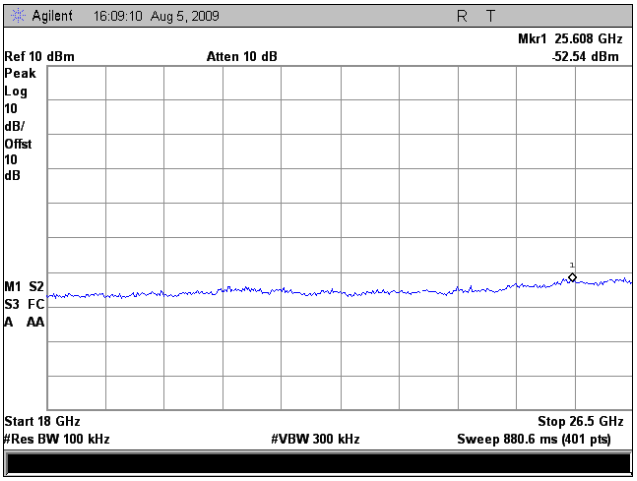
Plot 132. Conducted Emissions, Low Channel, 5 GHz, Port 3, 802.11n 40MHz, 18 GHz – 26.5 GHz



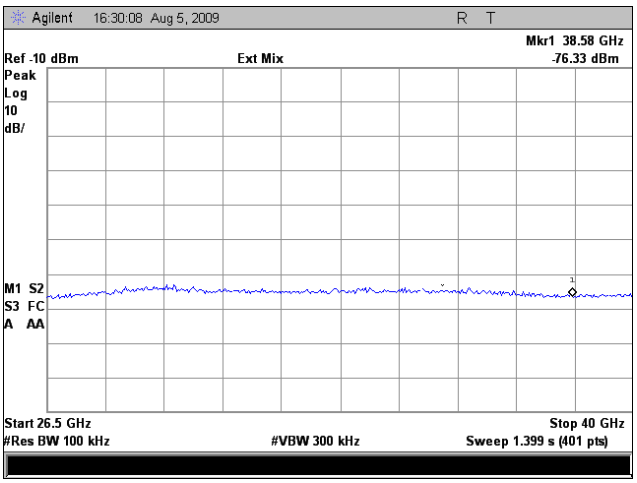
Plot 133. Conducted Emissions, Low Channel, 5 GHz, Port 3, 802.11n 40MHz, 26.5 GHz – 40 GHz



Plot 134. Conducted Emissions, High Channel, 5 GHz, Port 3, 802.11n 40MHz, 1 GHz – 18 GHz

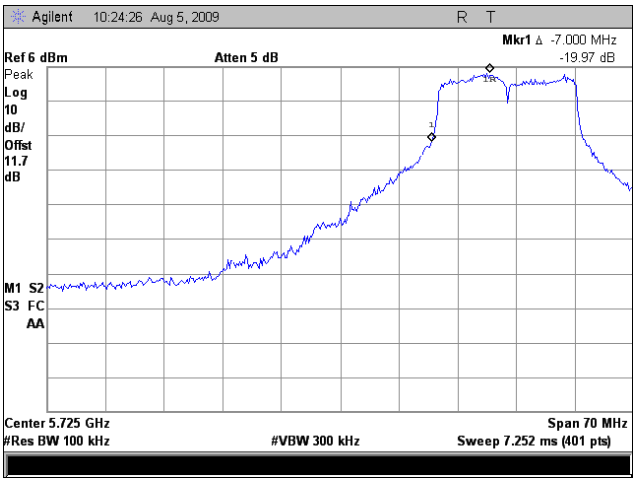


Plot 135. Conducted Emissions, High Channel, 5 GHz, Port 3, 802.11n 40MHz, 18 GHz – 26.5 GHz

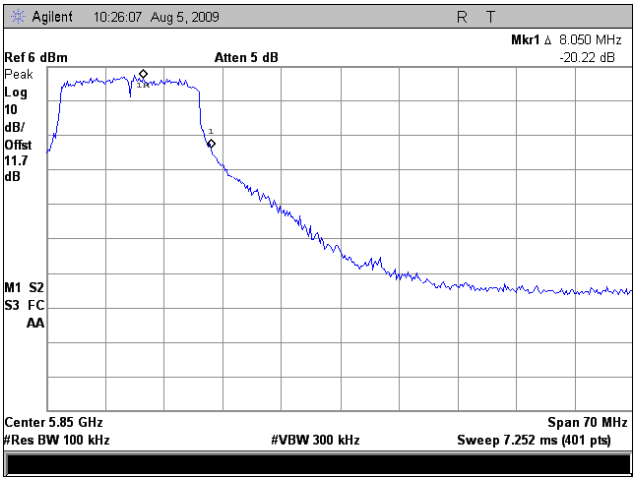


Plot 136. Conducted Emissions, High Channel, 5 GHz, Port 3, 802.11n 40MHz, 26.5 GHz – 40 GHz

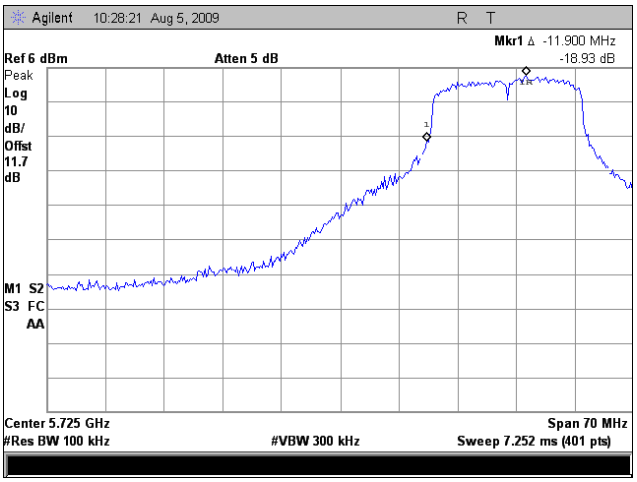
Conducted Band Edge, 5 GHz, Port 1



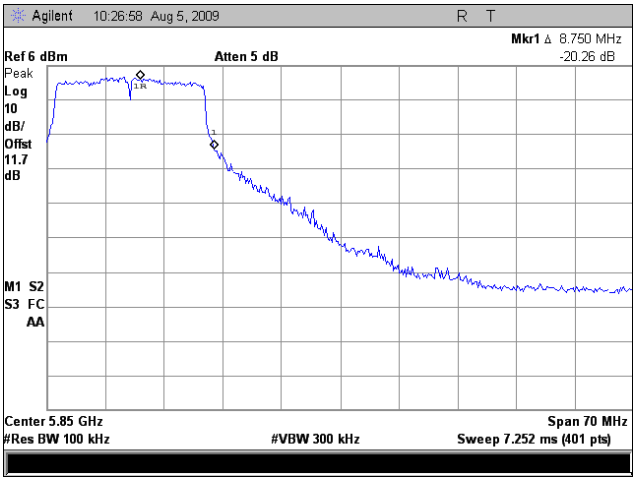
Plot 137. Lower Conducted Band Edge, 5 GHz, Port 1, 802.11a



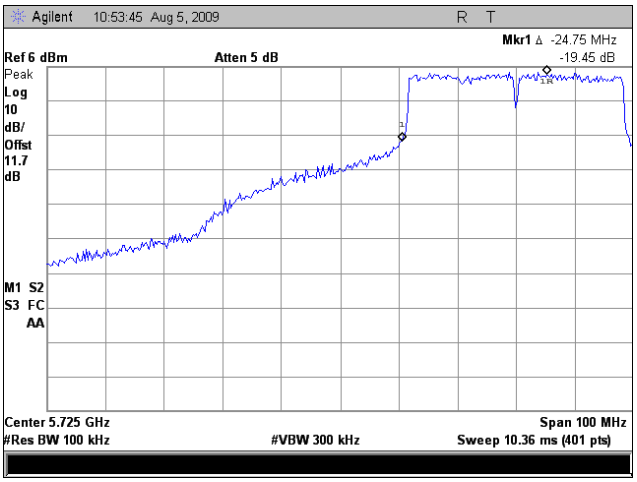
Plot 138. Upper Conducted Band Edge, 5 GHz, Port 1, 802.11a



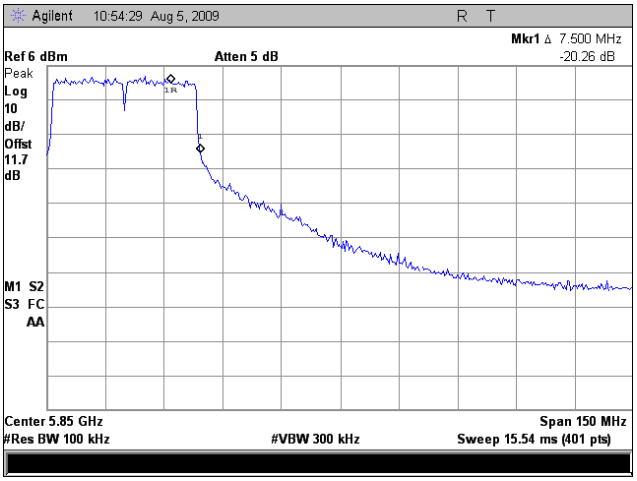
Plot 139. Lower Conducted Band Edge, 5 GHz, Port 1, 802.11n 20MHz



Plot 140. Upper Conducted Band Edge, 5 GHz, Port 1, 802.11n 20MHz

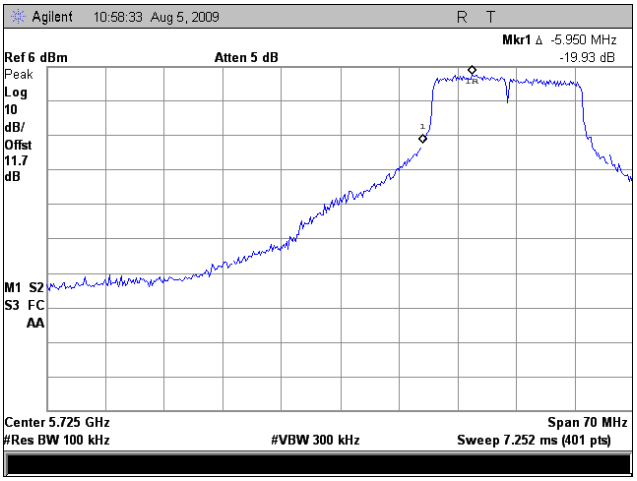


Plot 141. Lower Conducted Band Edge, 5 GHz, Port 1, 802.11n 40MHz

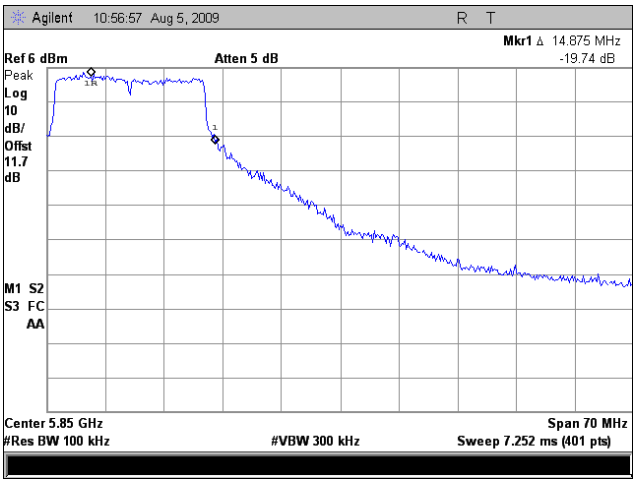


Plot 142. Upper Conducted Band Edge, 5 GHz, Port 1, 802.11n 40MHz

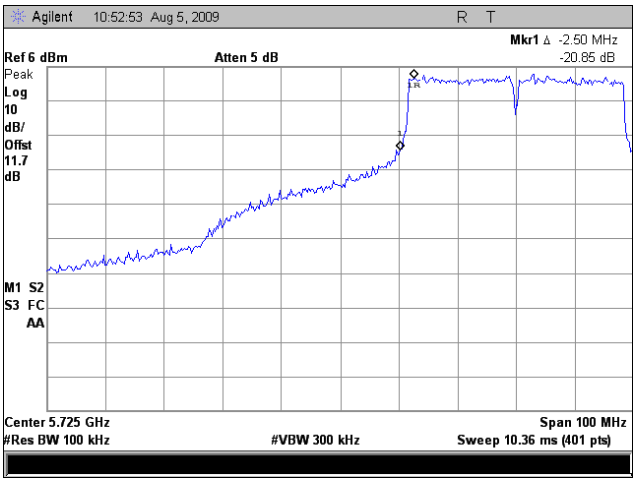
Conducted Band Edge, 5 GHz, Port 2



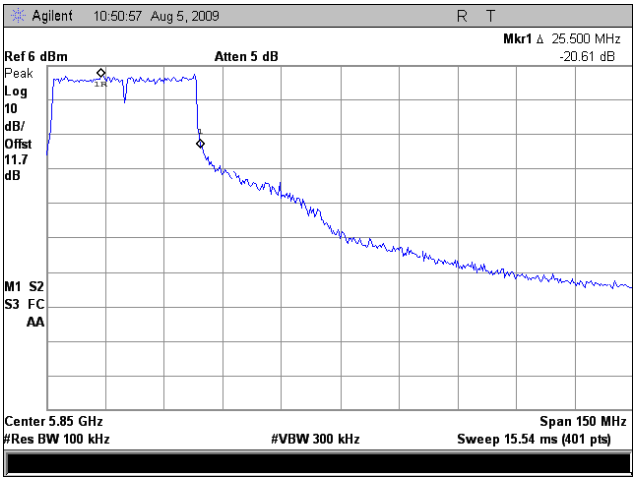
Plot 143. Lower Conducted Band Edge, 5 GHz, Port 2, 802.11n 20MHz



Plot 144. Upper Conducted Band Edge, 5 GHz, Port 2, 802.11n 20MHz

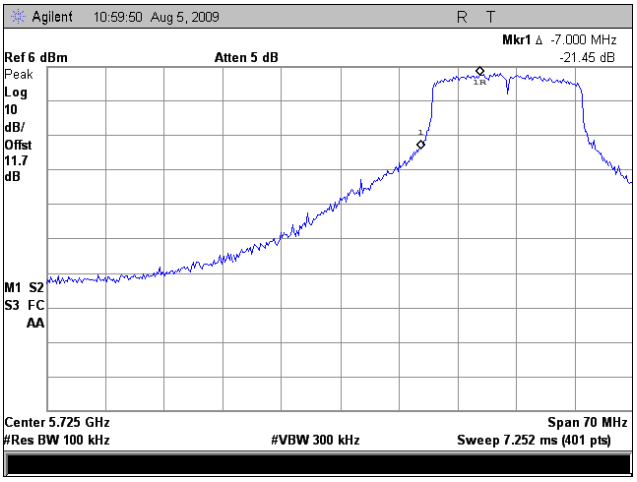


Plot 145. Lower Conducted Band Edge, 5 GHz, Port 2, 802.11n 40MHz

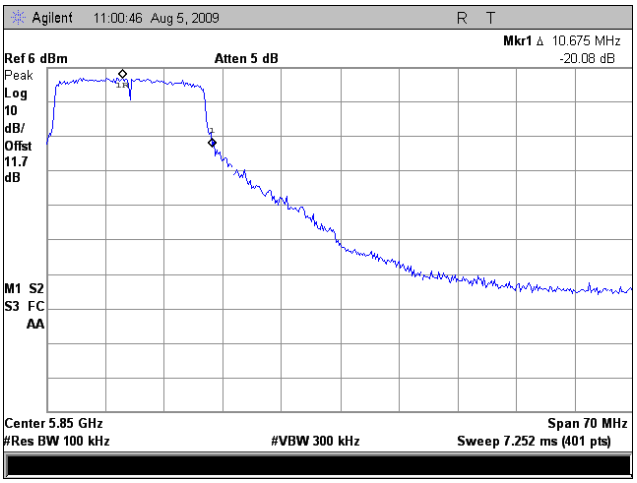


Plot 146. Upper Conducted Band Edge, 5 GHz, Port 2, 802.11n 40MHz

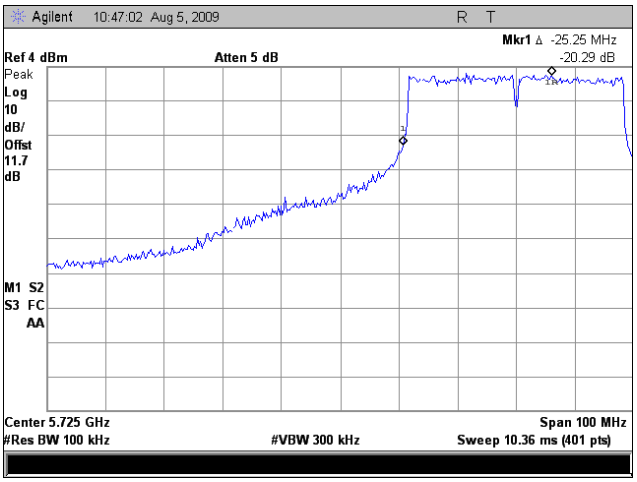
Conducted Band Edge, 5 GHz, Port 3



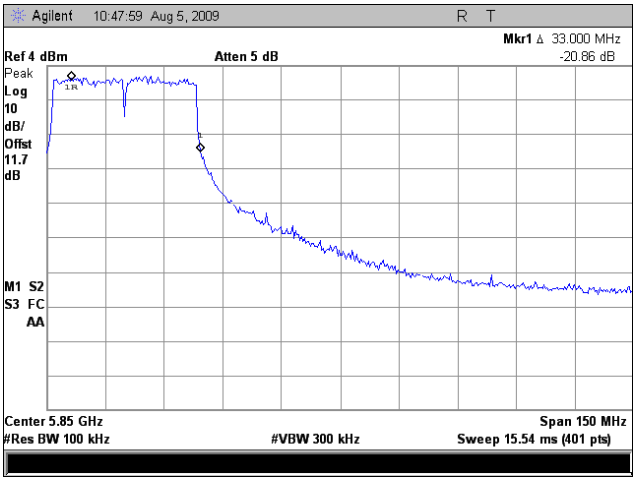
Plot 147. Lower Conducted Band Edge, 5 GHz, Port 3, 802.11n 20MHz



Plot 148. Upper Conducted Band Edge, 5 GHz, Port 3, 802.11n 20MHz



Plot 149. Lower Conducted Band Edge, 5 GHz, Port 3, 802.11n 40MHz



Plot 150. Upper Conducted Band Edge, 5 GHz, Port 3, 802.11n 40MHz

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 throughout each of the 100 sweeps of power averaging. 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: Minh Ly

Test Date: 08/17/09

Peak Power Spectral Density, 5 GHz, Port 1					
Mode	**Carrier Channel**	**Frequency (MHz)**	**Measured PPSD (dBm)**	**Limit (dBm)**	**Margin (dB)**
802.11a	Low	5745	-8.054	3	-11.05
	Mid	5785	-7.195	3	-10.19
	High	5825	-6.632	3	-9.63
802.11n 20MHz	Low	5745	-6.409	3	-9.40
	Mid	5785	-6.886	3	-9.88
	High	5825	-6.471	3	-9.47
802.11n 40MHz	Low	5755	-8.285	3	-11.28
	High	5795	-9.881	3	-12.88

Table 44. Peak Power Spectral Density, Test Results, 5 GHz, Port 1

Peak Power Spectral Density, 5 GHz, Port 2					
Mode	**Carrier Channel**	**Frequency (MHz)**	**Measured PPSD (dBm)**	**Limit (dBm)**	**Margin (dB)**
802.11n 20MHz	Low	5745	-7.41	3	-10.41
	Mid	5785	-7.445	3	-10.44
	High	5825	-6.819	3	-9.82
802.11n 40Mhz	Low	5755	-9.474	3	-12.47
	High	5795	-8.649	3	-11.64

Table 45. Peak Power Spectral Density, Test Results, 5 GHz, Port 2

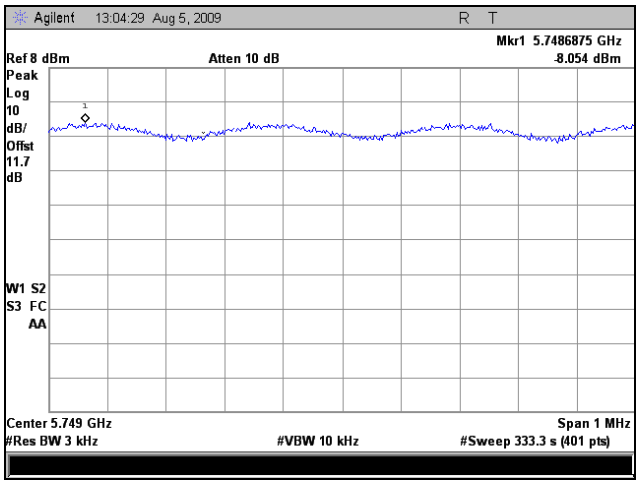
Peak Power Spectral Density, 5 GHz, Port 3					
Mode	**Carrier Channel**	**Frequency (MHz)**	**Measured PPSD (dBm)**	**Limit (dBm)**	**Margin (dB)**
802.11n 20MHz	Low	5745	-7.379	3	-10.37
	Mid	5785	-6.757	3	-9.57
	High	5825	-7.983	3	-10.98
802.11n 40MHz	Low	5755	-9.001	3	-12.00
	High	5795	-8.733	3	-11.73

Table 46. Peak Power Spectral Density, Test Results, 5 GHz, Port 3

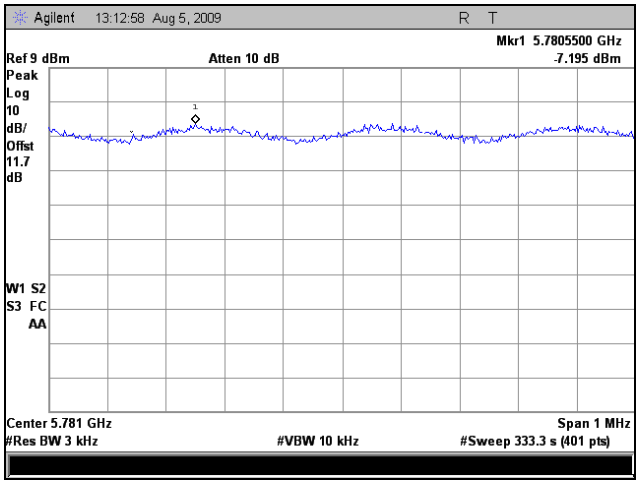
Peak Power Spectral Density, 5 GHz, Combined Ports					
Mode	**Carrier Channel**	**Frequency (MHz)**	**Measured PPSD (dBm)**	**Limit (dBm)**	**Margin (dB)**
802.11n 20MHz	Low	5745	-1.01	3	-4.01
	Mid	5785	-0.63	3	-3.63
	High	5825	-0.707	3	-3.70
802.11n 4MHz	Low	5755	-1.885	3	-4.88
	High	5795	-2.769	3	-5.77

Table 47. Peak Power Spectral Density, Test Results, 5 GHz, Combined Ports

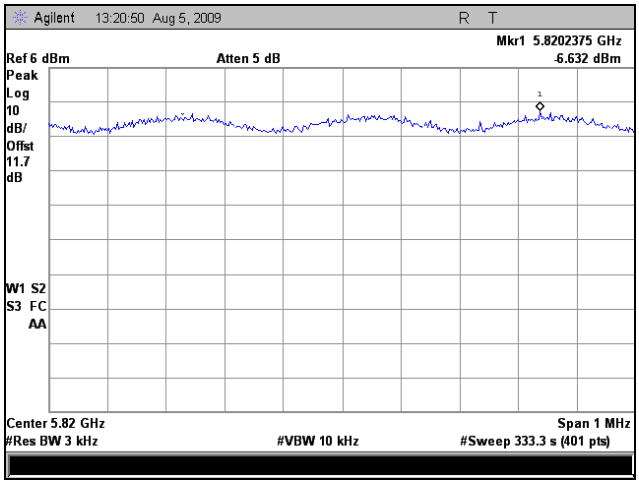
Peak Power Spectral Density, 5 GHz, Port 1



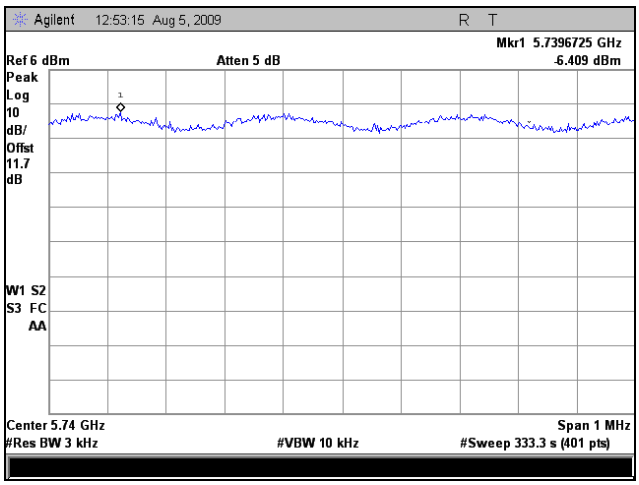
Plot 151. Peak Power Spectral Density, Low Channel, 5 GHz, Port 1, 802.11a



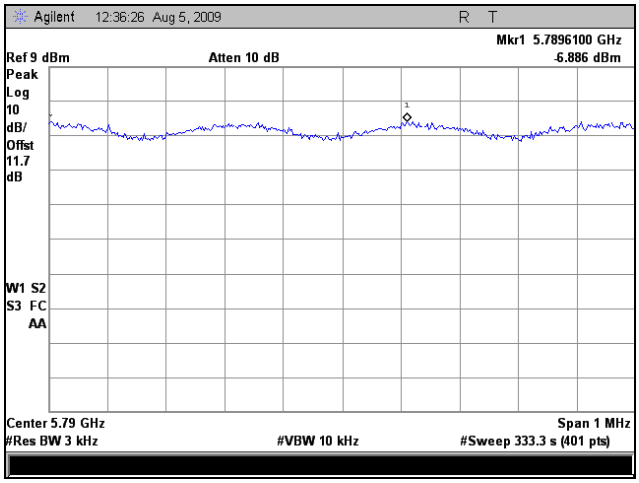
Plot 152. Peak Power Spectral Density, Mid Channel, 5 GHz, Port 1, 802.11a



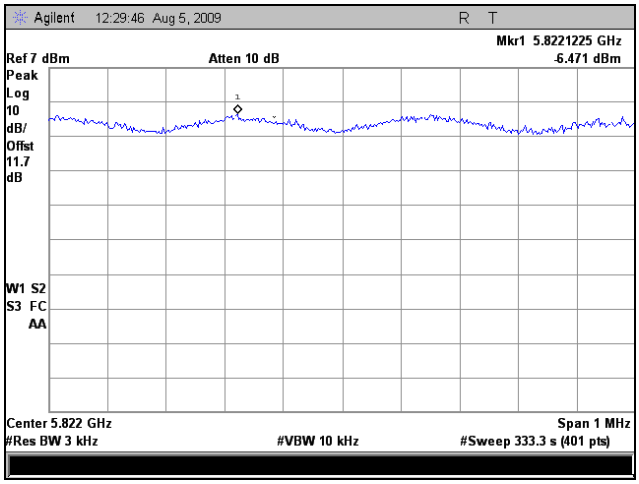
Plot 153. Peak Power Spectral Density, High Channel, 5 GHz, Port 1, 802.11a



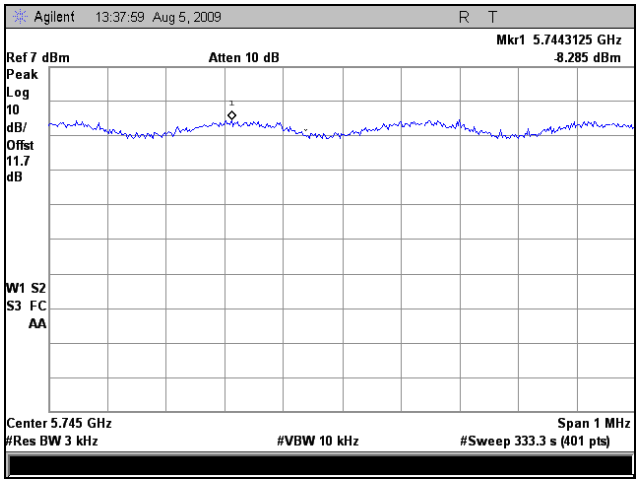
Plot 154. Peak Power Spectral Density, Low Channel, 5 GHz, Port 1, 802.11n 20MHz



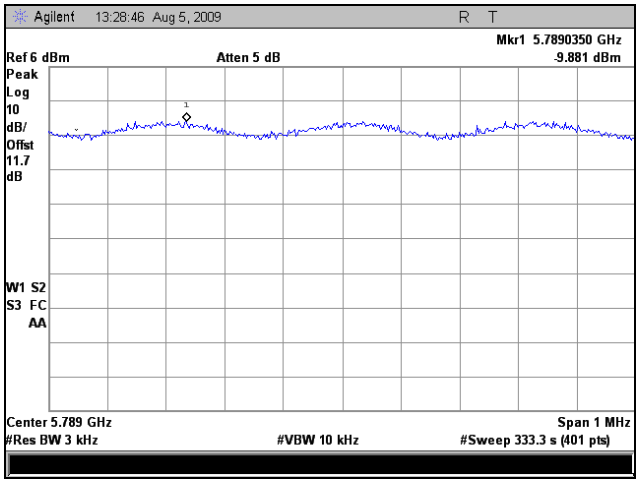
Plot 155. Peak Power Spectral Density, Mid Channel, 5 GHz, Port 1, 802.11n 20MHz



Plot 156. Peak Power Spectral Density, High Channel, 5 GHz, Port 1, 802.11n 20MHz

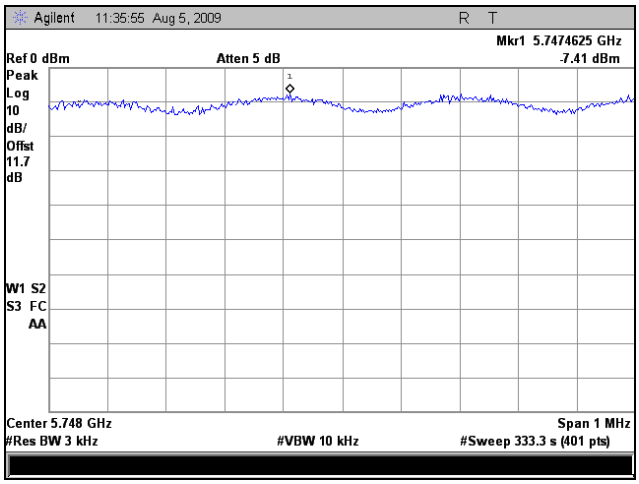


Plot 157. Peak Power Spectral Density, Low Channel, 5 GHz, Port 1, 802.11n 40MHz

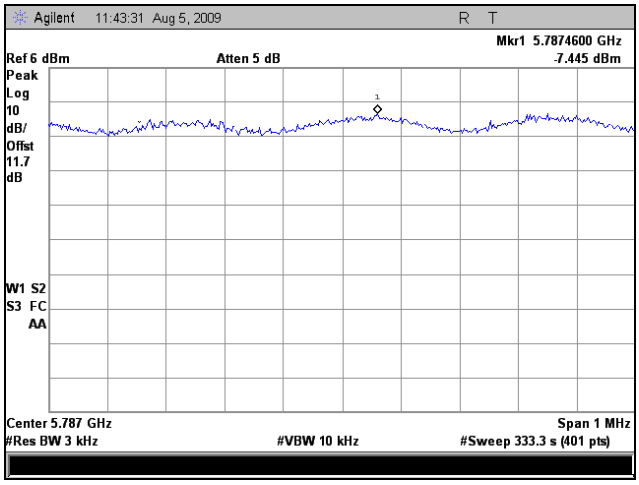


Plot 158. Peak Power Spectral Density, High Channel, 5 GHz, Port 1, 802.11n 40MHz

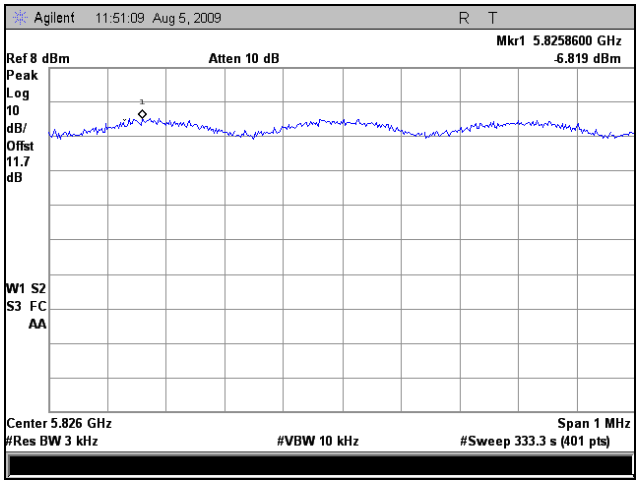
Peak Power Spectral Density, 5 GHz, Port 2



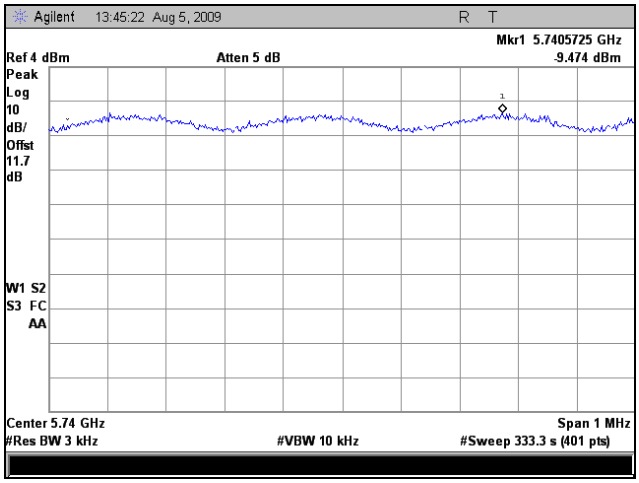
Plot 159. Peak Power Spectral Density, Low Channel, 5 GHz, Port 2, 802.11n 20MHz



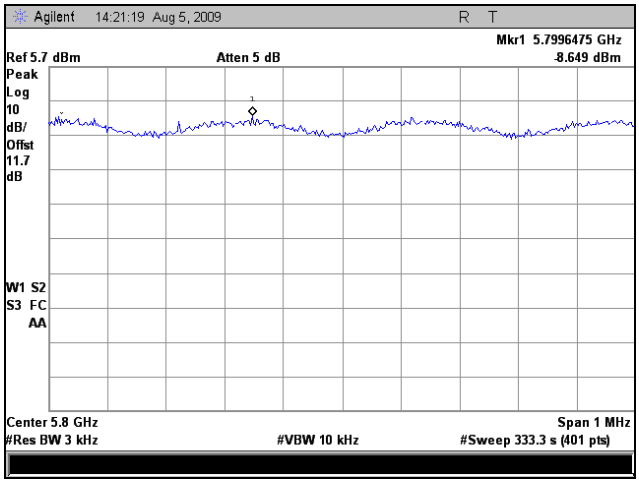
Plot 160. Peak Power Spectral Density, Mid Channel, 5 GHz, Port 2, 802.11n 20MHz



Plot 161. Peak Power Spectral Density, High Channel, 5 GHz, Port 2, 802.11n 20MHz

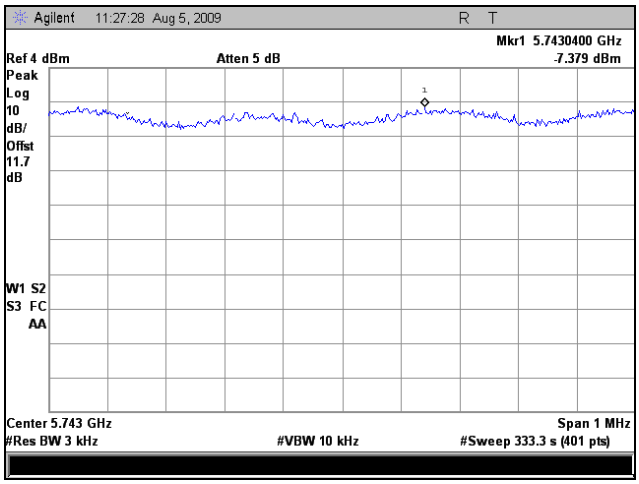


Plot 162. Peak Power Spectral Density, Low Channel, 5 GHz, Port 2, 802.11n 40MHz

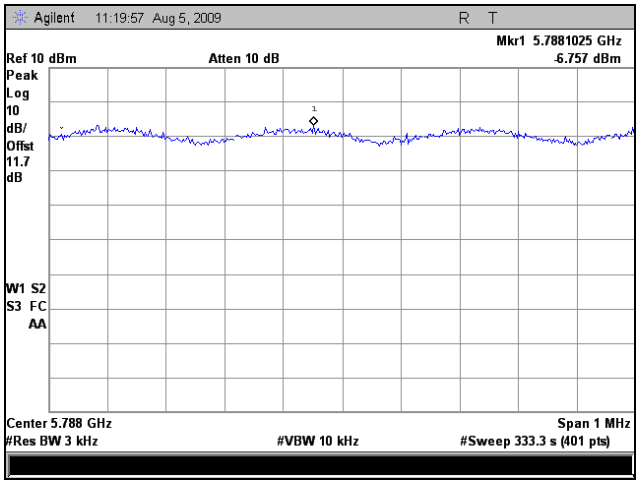


Plot 163. Peak Power Spectral Density, High Channel, 5 GHz, Port 2, 802.11n 40MHz

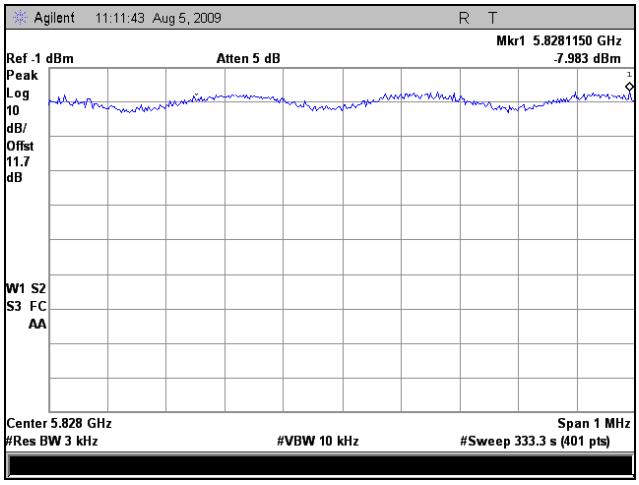
Peak Power Spectral Density, 5 GHz, Port 3



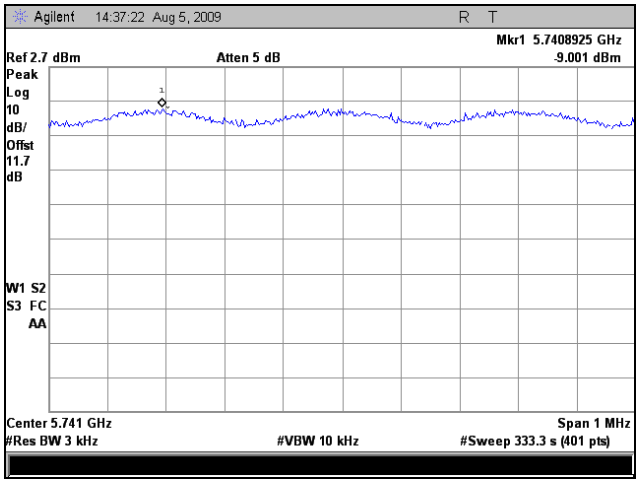
Plot 164. Peak Power Spectral Density, Low Channel, 5 GHz, Port 3, 802.11n 20MHz



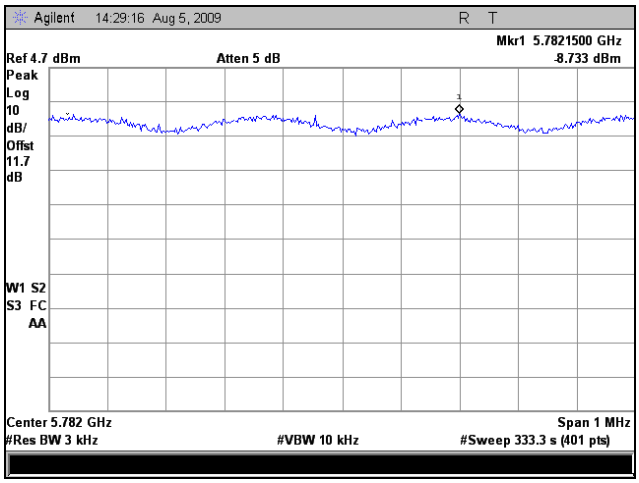
Plot 165. Peak Power Spectral Density, Mid Channel, 5 GHz, Port 3, 802.11n 20MHz



Plot 166. Peak Power Spectral Density, High Channel, 5 GHz, Port 3, 802.11n 20MHz

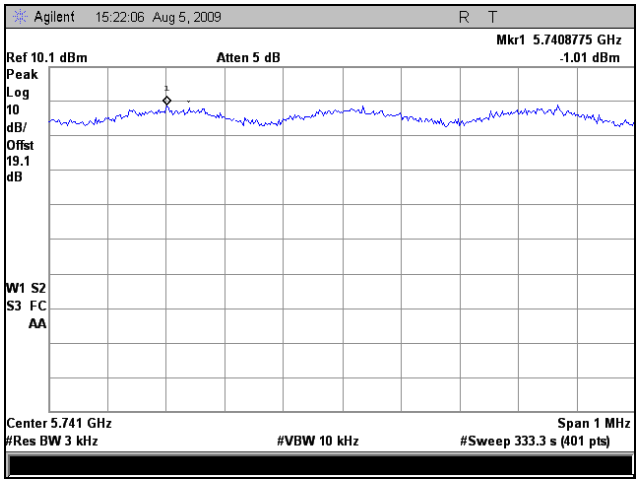


Plot 167. Peak Power Spectral Density, Low Channel, 5 GHz, Port 3, 802.11n 40MHz

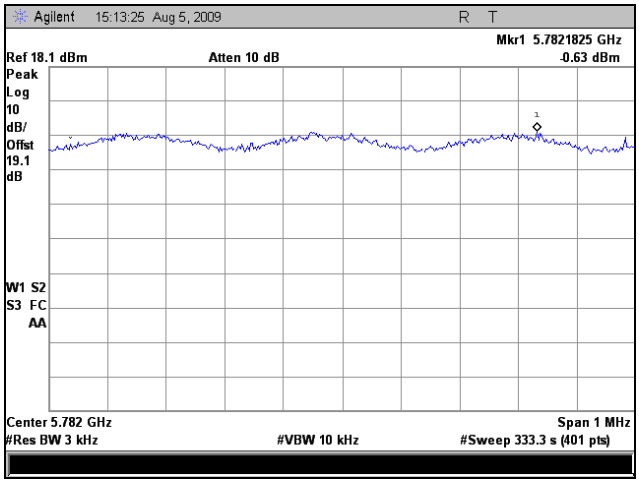


Plot 168. Peak Power Spectral Density, High Channel, 5 GHz, Port 3, 802.11n 40MHz

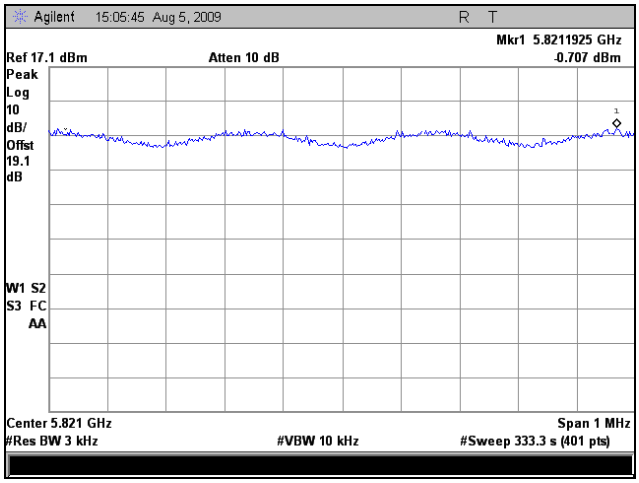
Peak Power Spectral Density, 5 GHz, Combined Ports



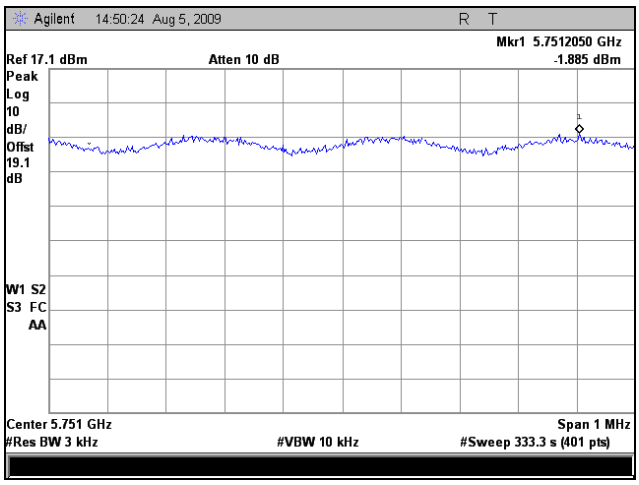
Plot 169. Peak Power Spectral Density, Low Channel, 5 GHz, Combined Ports, 802.11n 20MHz



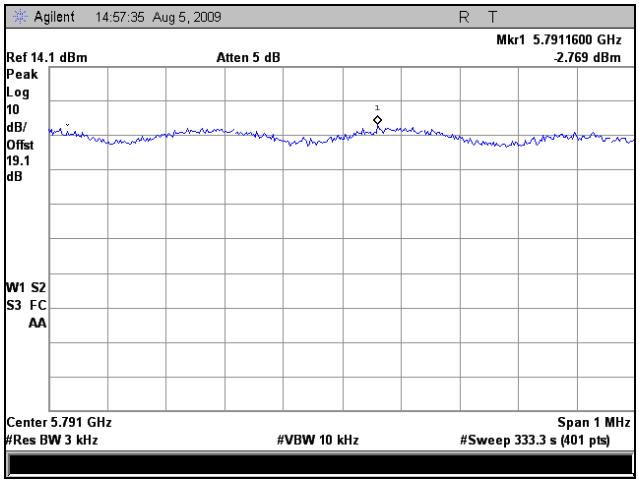
Plot 170. Peak Power Spectral Density, Mid Channel, 5 GHz, Combined Ports, 802.11n 20MHz



Plot 171. Peak Power Spectral Density, High Channel, 5 GHz, Combined Ports, 802.11n 20MHz



Plot 172. Peak Power Spectral Density, Low Channel, 5 GHz, Combined Ports, 802.11n 40MHz



Plot 173. Peak Power Spectral Density, High Channel, 5 GHz, Combined Ports, 802.11n 40MHz

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	HP	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

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