MET Laboratories, Inc. *Safety Certification - EMI - Telecom Environmental Simulation*
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June 28, 2011

Ubiquiti Networks
91 E. Tasman
San Jose, CA 95134

Dear Jennifer Sanchez,

Enclosed is the EMC Wireless test report for compliance testing of the Ubiquiti Networks, NanoStationM2 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 8, Dec. 2010 for Intentional Radiators.

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

Sincerely yours,
MET LABORATORIES, INC.

Jennifer Warnell
Documentation Department

Reference: (\Ubiquiti Networks\EMC30567-FCC247 Rev. 1)

Electromagnetic Compatibility Criteria
Test Report

for the

Ubiquiti Networks
NanoStationM2

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 8, Dec. 2010
for Intentional Radiators

MET Report: EMC30567-FCC247 Rev. 1

June 28, 2011

Prepared For:

Ubiquiti Networks
91 E. Tasman
San Jose, CA 95134

Prepared By:
MET Laboratories, Inc.
3162 Belick St.
Santa Clara, CA 95054

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for Intentional Radiators

Anderson Soungpanya, 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 8, Dec. 2010 under normal use and maintenance.

Shawn McMillen,
Wireless Manager, Electromagnetic Compatibility Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
∅	June 13, 2011	Initial Issue.
1	June 28, 2011	Revised to reflect engineer corrections.

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List of Terms and Abbreviations

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

I. Executive Summary

A. Purpose of Test

An EMC evaluation was performed to determine compliance of the Ubiquiti Networks NanoStationM2, 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 NanoStationM2. Ubiquiti Networks should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the NanoStationM2, 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 Ubiquiti Networks, purchase order number US100132. All tests were conducted using measurement procedure ANSI C63.4-2003.

FCC Reference 47 CFR Part 15.247:2005	IC Reference RSS-210 Issue 8: 2010; RSS-GEN Issue 3: 2010	Description	Compliance
47 CFR Part 15.107 (a)	ICES-003 Issue 4 February 2004	Conducted Emission Limits for a Class A Digital Device	Compliant
47 CFR Part 15.109 (a)	ICES-003 Issue 4 February 2004	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-GEN (7.2.4)	Conducted Emission Limits	Compliant
Title 47 of the CFR, Part 15 §15.247(a)(2)	RSS-Gen(4.6)	6dB Occupied Bandwidth	Compliant
		99% Occupied Bandwidth	Compliant
Title 47 of the CFR, Part 15 §15.247(b)	RSS-210(A8.4)	Peak Power Output	Compliant
Title 47 of the CFR, Part 15 §15.247(d); §15.209; §15.205	RSS-210(A8.5)	Radiated Spurious Emissions Requirements	Compliant
Title 47 of the CFR, Part 15 §15.247(d)	RSS-210(A8.5)	RF Conducted Spurious Emissions Requirements	Compliant
Title 47 of the CFR, Part 15 §15.247(d)	RSS-210(A8.5)	RF Conducted Band Edge	Compliant
Title 47 of the CFR, Part 15; §15.247(e)	RSS-210(A8.2)	Peak Power Spectral Density	Compliant
Title 47 of the CFR, Part 15 §15.247(i)	RSS-Gen(5.6)	Maximum Permissible Exposure (MPE)	Compliant
N/A	RSS-Gen(4.10)	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 Ubiquiti Networks to perform testing on the NanoStationM2, under Ubiquiti Networks's purchase order number US100132.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Ubiquiti Networks, NanoStationM2.

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

Model(s) Tested:	NanoStationM2	
Model(s) Covered:	NanoStationM2	
EUT Specifications:	Primary Power: 120 VAC, 60 Hz	
	FCC ID: SWX-M2N IC: 6545A-M2N	
	OATS:	2043C-1
	Type of Modulations:	DSSS
	Equipment Code:	DTS
	Peak RF Output Power:	**b Mode:** 28.16 dBm; **g Mode 20 MHz:** 28.23 dBm; **g Mode 40 MHz:** 23.81; **HT5:** 28.81 dBm; **HT8:** 28.55 dBm; **HT10:** 28.68 dBm; **HT20:** 28.70 dBm; **HT30:** 26.59 dBm; **HT40:** 26.77 dBm
	Occupied Bandwidth (99%):	**b Mode:** 16.0800 MHz; **g Mode 20 MHz:** 16.7021 MHz; **g Mode 40 MHz:** 36.3003 MHz; **HT5:** 4.4639 MHz; **HT8:** 6.8893 MHz; **HT10:** 8.9325 MHz; **HT20:** 17.9455; **HT30:** 26.7141 MHz; **HT40:** 36.3656 MHz
	Antenna Gain:	11.2 dBi
	EUT Frequency Ranges:	2412 – 2462 MHz; 2422 – 2452 MHz; 2403 – 2475 MHz; 2405 – 2473 MHz; 2408 – 2470 MHz; 2420 – 2454 MHz
Analysis:	The results obtained relate only to the item(s) tested.	
Environmental Test Conditions:	Temperature: 15-35º C	
	Relative Humidity: 30-60%	
	Barometric Pressure: 860-1060 mbar	
Evaluated by:	Anderson Soungpanya	
Report Date(s):	June 28, 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
CFR 47, Part 15, Subpart B	Electromagnetic Compatibility: Criteria for Radio Frequency Devices
RSS-210, Issue 8, Dec. 2010	Low-power Licence-exempt Radiocommunications Devices (All Frequency Bands): Category I Equipment
RSS-GEN, Issue 3, Dec. 2010	General Requirements and Information for the Certification of Radio Apparatus
ICES-003, Issue 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 St., 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 NanoStationM2, Equipment Under Test (EUT) for the remainder of this document, is a 2.4GHz Hi Power 2x2 MIMO AirMax Station.

Photograph 1. Ubiquiti Networks NanoStationM2

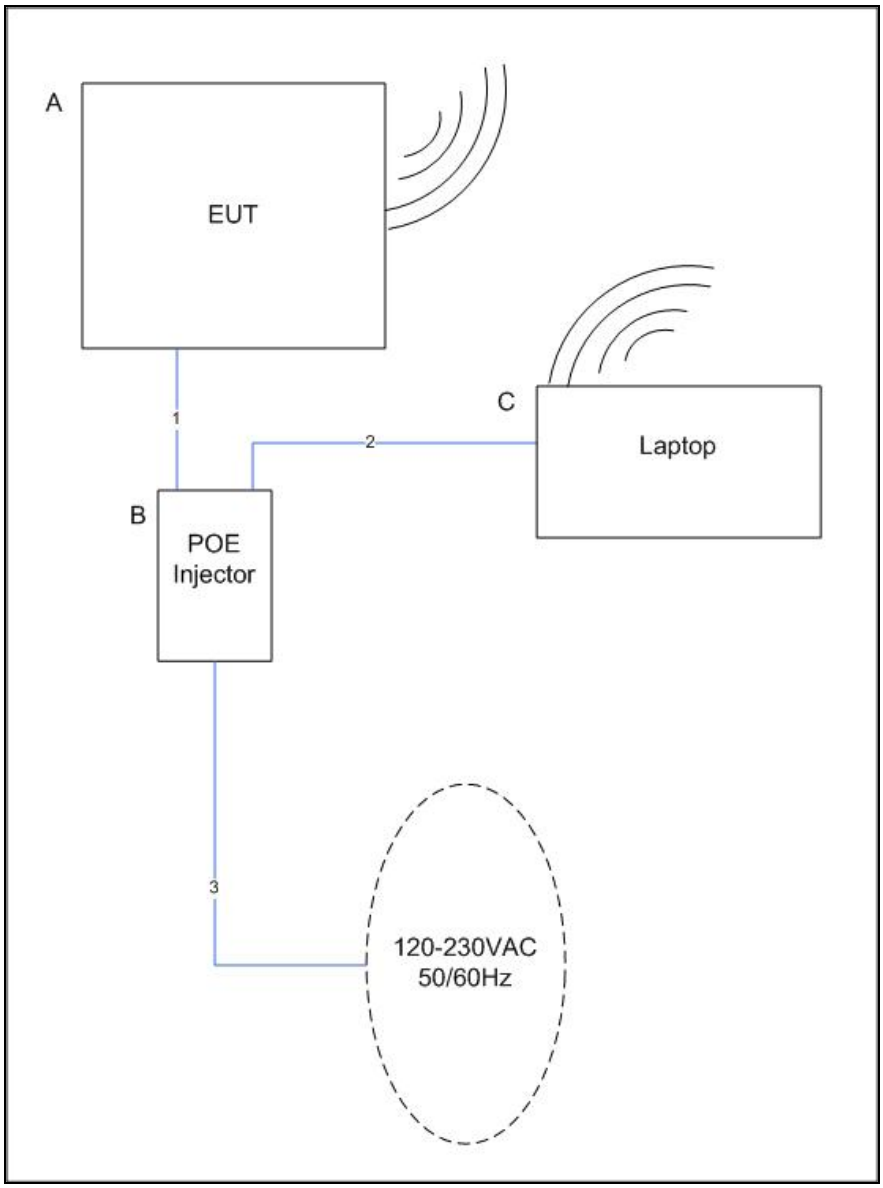


Figure 1. Block Diagram of Test Configuration

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	Serial Number
A	NanoStationM2	NS5	1112L 002722169CDE
B	Power Supply	CPWA240500US	POEZC101126181008
B	Power Supply	UBI-POE-24-5	0912-0007163

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	Serial Number
C	Laptop	Dell	Vostro 1510	4953929473

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 ID
1	NanoM2 - Main	Ethernet	1	10	Y	PSU – POE port
	NanoM2- Secondary	Ethernet	1	10	Y	Unterminated
1	PSU - POE	Ethernet	1	10	Y	NanoM2 - Main
2	PSU - LAN	Ethernet	1	10	Y	Laptop
3	AC port	AC Cable	1	0.5	Y	100-240VAC Source

Table 6. Ports and Cabling Information

H. Mode of Operation

Transmit 1-24Mbps, 36-54Mbps at 802.11b/g modes and MCS0-MCS15 at 802.11n modes @2.4GHz.

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

No modifications were made to the EUT.

b) Modifications to Test Standard

No modifications were made to the test standard.

K. Disposition of EUT

The test sample including all support equipment submitted to the Electro-Magnetic Compatibility Lab for testing was returned to Ubiquiti Networks 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 A requirement(s) of this section. Measured emissions were below applicable limits.

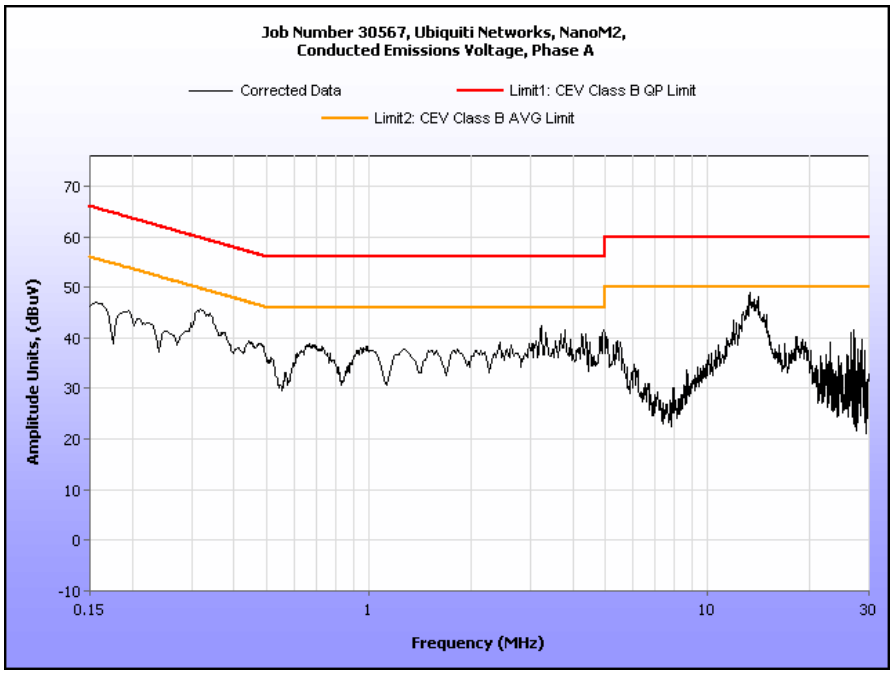
Test Engineer(s): Jeff Pratt and Lionel Gabrillo

Test Date(s): 02/10/11 and 03/24/11

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

Frequency (MHz)	Uncorrected Meter Reading (dBuV) QP	Cable Loss (dB)	Corrected Measurement (dBuV) QP	Limit (dBuV) QP	Margin (dB) QP	Uncorrected Meter Reading (dBuV) Avg.	Cable Loss (dB)	Corrected Measurement (dBuV) AVG	Limit (dBuV) AVG	Margin (dB) AVG
0.32	39.06	0	39.06	59.71	-20.65	29.65	0	29.65	49.71	-20.06
3.23	33.1	0.01	33.11	56	-22.89	27.55	0.01	27.56	46	-18.44
4.975	32.35	0.1	32.45	56	-23.55	26.27	0.1	26.37	46	-19.63
13.37	38.42	0.06	38.48	60	-21.52	33.78	0.06	33.84	50	-16.16
19.48	26.94	0.12	27.06	60	-32.94	19.12	0.12	19.24	50	-30.76
27.16	38.15	0.14	38.29	60	-21.71	29.63	0.14	29.77	50	-20.23

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

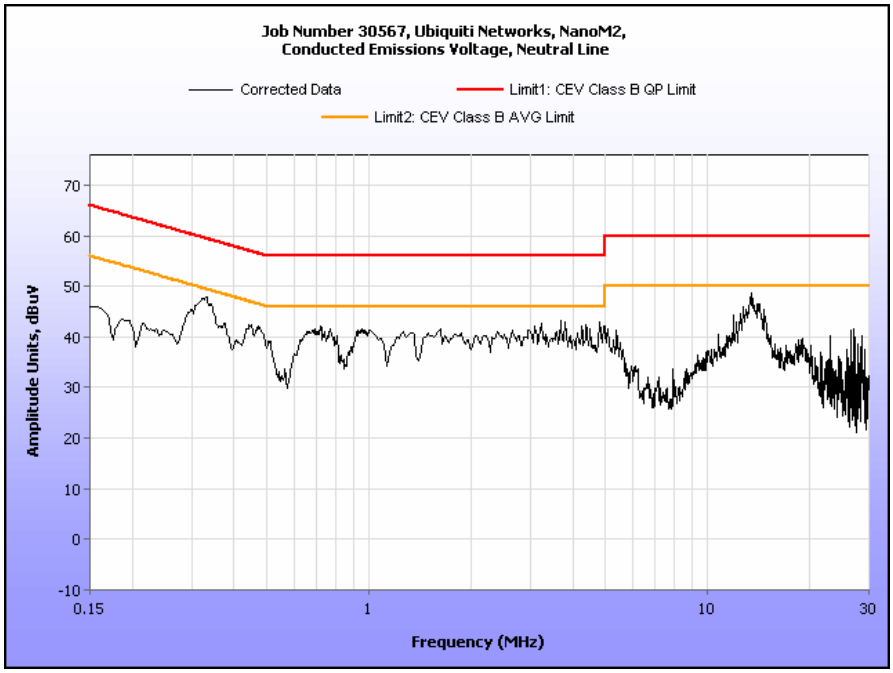


Plot 1. Conducted Emission, Phase Line Plot, GME Power Supply

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

Frequency (MHz)	Uncorrected Meter Reading (dBuV) QP	Cable Loss (dB)	Corrected Measurement (dBuV) QP	Limit (dBuV) QP	Margin (dB) QP	Uncorrected Meter Reading (dBuV) Avg.	Cable Loss (dB)	Corrected Measurement (dBuV) AVG	Limit (dBuV) AVG	Margin (dB) AVG
0.32	42.83	0	42.83	59.71	-16.88	37.9	0	37.9	49.71	-11.81
3.28	33.49	0.01	33.5	56	-22.5	24.43	0.01	24.44	46	-21.56
4.992	33.04	0.1	33.14	56	-22.86	25.99	0.1	26.09	46	-19.91
13.58	38.21	0.06	38.27	60	-21.73	33.04	0.06	33.1	50	-16.9
26.55	35.91	0.14	36.05	60	-23.95	27.52	0.14	27.66	50	-22.34
27.16	38.61	0.14	38.75	60	-21.25	30.3	0.14	30.44	50	-19.56

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

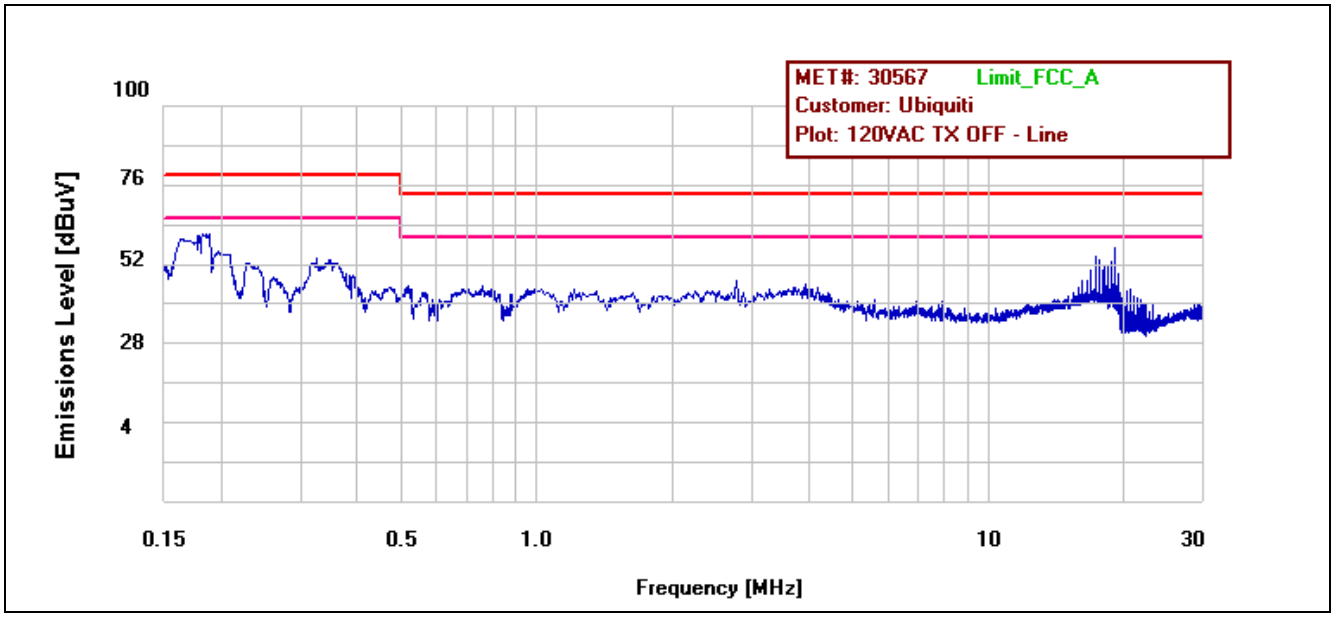


Plot 2. Conducted Emission, Neutral Line Plot, GME Power Supply

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

Freq. (MHz)	QP Amplitude	QP Limit	Delta	Pass	Average Amplitude	Average Limit	Delta	Pass
0.1721	56.37	79	-22.63	Pass	40.23	66	-25.77	Pass
0.3555	50.04	79	-28.96	Pass	37.46	66	-28.54	Pass
19.12	53.99	73	-19.01	Pass	49.23	60	-10.77	Pass
0.1621	56.43	79	-22.57	Pass	39.1	66	-26.9	Pass
19.12	50.65	73	-22.35	Pass	48.17	60	-11.83	Pass
17.65	49.85	73	-23.15	Pass	43.63	60	-16.37	Pass

Table 10. Conducted Emissions - Voltage, AC Power, Phase Line (120 VAC, 60 Hz), Cetus Power Supply

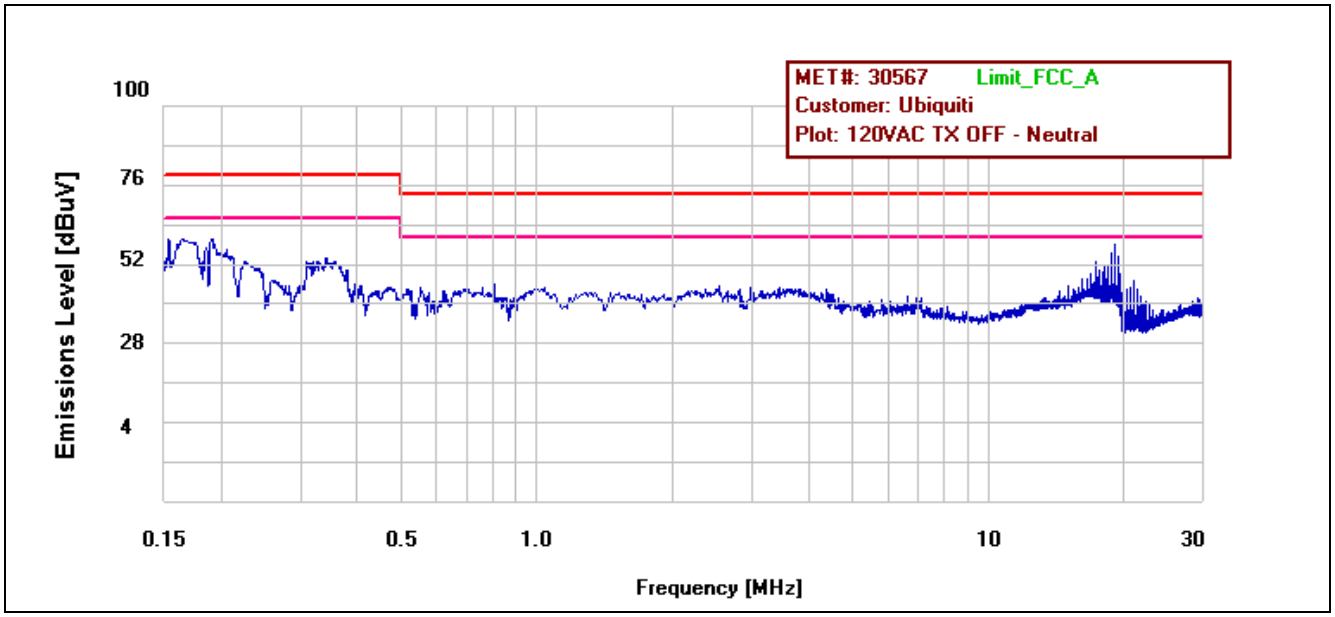


Plot 3. Conducted Emission, Phase Line Plot, Cetus Power Supply

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

Freq. (MHz)	QP Amplitude	QP Limit	Delta	Pass	Average Amplitude	Average Limit	Delta	Pass
0.1721	56.37	79	-22.63	Pass	40.23	66	-25.77	Pass
0.3555	50.04	79	-28.96	Pass	37.46	66	-28.54	Pass
19.12	53.99	73	-19.01	Pass	49.23	60	-10.77	Pass
0.1621	56.43	79	-22.57	Pass	39.1	66	-26.9	Pass
19.12	50.65	73	-22.35	Pass	48.17	60	-11.83	Pass
17.65	49.85	73	-23.15	Pass	43.63	60	-16.37	Pass

Table 11. Conducted Emissions - Voltage, AC Power, Neutral Line (120 VAC, 60 Hz), Cetus Power Supply



Plot 4. Conducted Emission, Neutral Line Plot, Cetus Power Supply

Conducted Emission Limits Test Setup

Photograph 2. Conducted Emissions, Test Setup, GME Power Supply

Photograph 3. Conducted Emissions, Test Setup, Cetus Power Supply

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 12.

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 12.

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

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

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

Test Engineer(s): Len Knight and Anderson Soungpanya

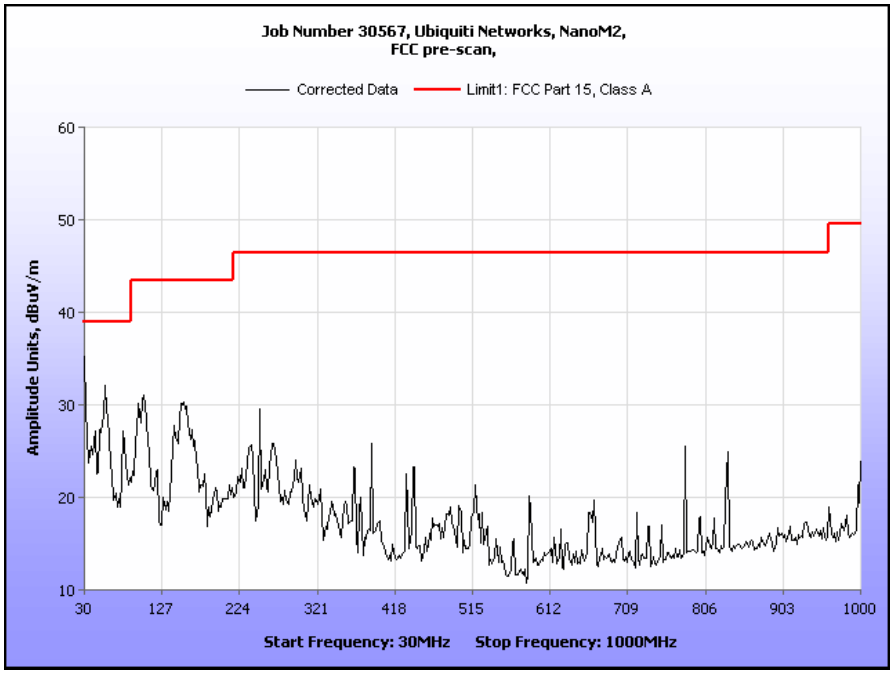
Test Date(s): 02/23/11 and 05/27/11

Radiated Emissions Limits Test Results, Class A

Frequency (MHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna HEIGHT (m)	Uncorrected Amplitude (dBuV)	Antenna Correction Factor (dB) (+)	Cable Loss (dB) (+)	Distance Correction Factor (dB) (-)	Corrected Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)
30.521042	0	H	1.60	5.42	21.43	0.23	0.00	27.08	40.00	-12.92
30.521042	270	V	1.01	12.53	21.43	0.23	0.00	34.19	40.00	-5.81
59.549098	149	H	1.44	5.87	7.50	0.23	0.00	13.60	40.00	-26.40
59.549098	46	V	1.01	18.26	7.50	0.23	0.00	25.99	40.00	-14.01
79.078156	193	H	1.53	7.48	7.80	0.23	0.00	15.51	40.00	-24.49
79.078156	361	V	1.00	13.41	7.80	0.23	0.00	21.44	40.00	-18.56
389.98597	144	H	1.01	17.93	15.90	0.83	0.00	34.66	46.00	-11.34
389.98597	152	V	1.00	20.31	15.90	0.83	0.00	37.04	46.00	-8.96
50.02004	96	H	1.31	5.57	8.40	0.23	0.00	14.20	40.00	-25.80
50.02004	274	V	1.01	17.00	8.40	0.23	0.00	25.63	40.00	-14.37
271.58317	196	H	1.23	11.00	13.63	0.65	0.00	25.28	46.00	-20.72
271.58317	253	V	1.17	11.52	13.63	0.65	0.00	25.80	46.00	-20.20

Table 13. Radiated Emissions Limits, Test Results, 30 MHz – 1 GHz, FCC Limits, GME Power Supply

Note: The EUT was tested at 3 m.



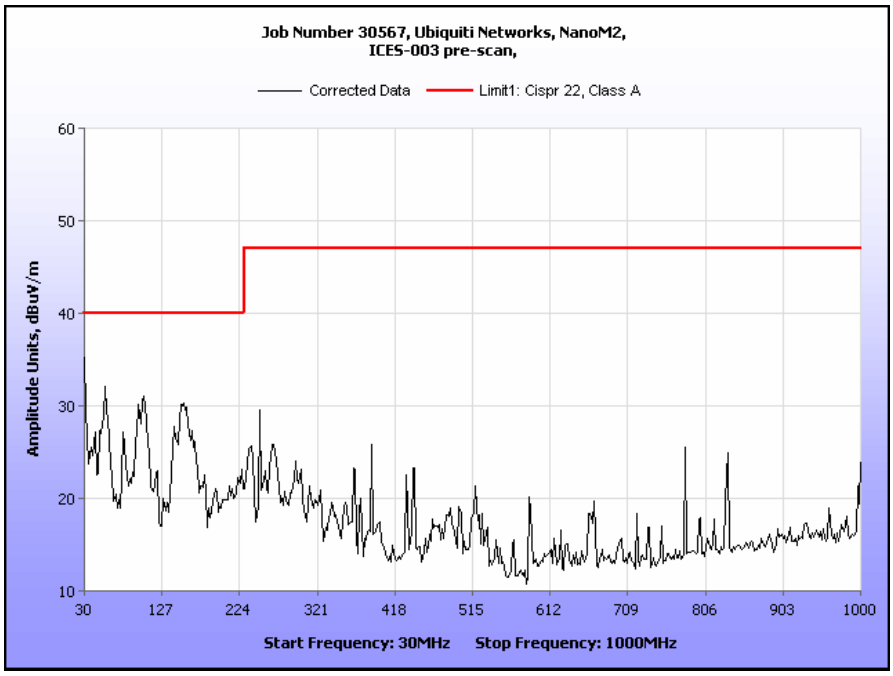
Plot 5. Radiated Emissions, 30 MHz - 1 GHz, FCC Limits, GME Power Supply

Radiated Emissions Limits Test Results, Class A

Frequency (MHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna HEIGHT (m)	Uncorrected Amplitude (dBuV)	Antenna Correction Factor (dB) (+)	Cable Loss (dB) (+)	Distance Correction Factor (dB) (-)	Corrected Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)
30.521042	0	H	1.60	5.42	21.43	0.23	10.46	16.62	30.00	-13.38
30.521042	270	V	1.01	12.53	21.43	0.23	10.46	23.73	30.00	-6.27
59.549098	149	H	1.44	5.87	7.50	0.23	10.46	3.14	30.00	-26.86
59.549098	46	V	1.01	18.26	7.50	0.23	10.46	15.53	30.00	-14.47
79.078156	193	H	1.53	7.48	7.80	0.23	10.46	5.05	30.00	-24.95
79.078156	361	V	1.00	13.41	7.80	0.23	10.46	10.98	30.00	-19.02
389.98597	144	H	1.01	17.93	15.90	0.83	10.46	24.20	37.00	-12.80
389.98597	152	V	1.00	20.31	15.90	0.83	10.46	26.58	37.00	-10.42
50.02004	96	H	1.31	5.57	8.40	0.23	10.46	3.74	30.00	-26.26
50.02004	274	V	1.01	17.00	8.40	0.23	10.46	15.17	30.00	-14.83
271.58317	196	H	1.23	11.00	13.63	0.65	10.46	14.82	37.00	-22.18
271.58317	253	V	1.17	11.52	13.63	0.65	10.46	15.34	37.00	-21.66

Table 14. Radiated Emissions Limits, Test Results, ICES-003 Limits, GME Power Supply

Note: The EUT was tested at 3 m.



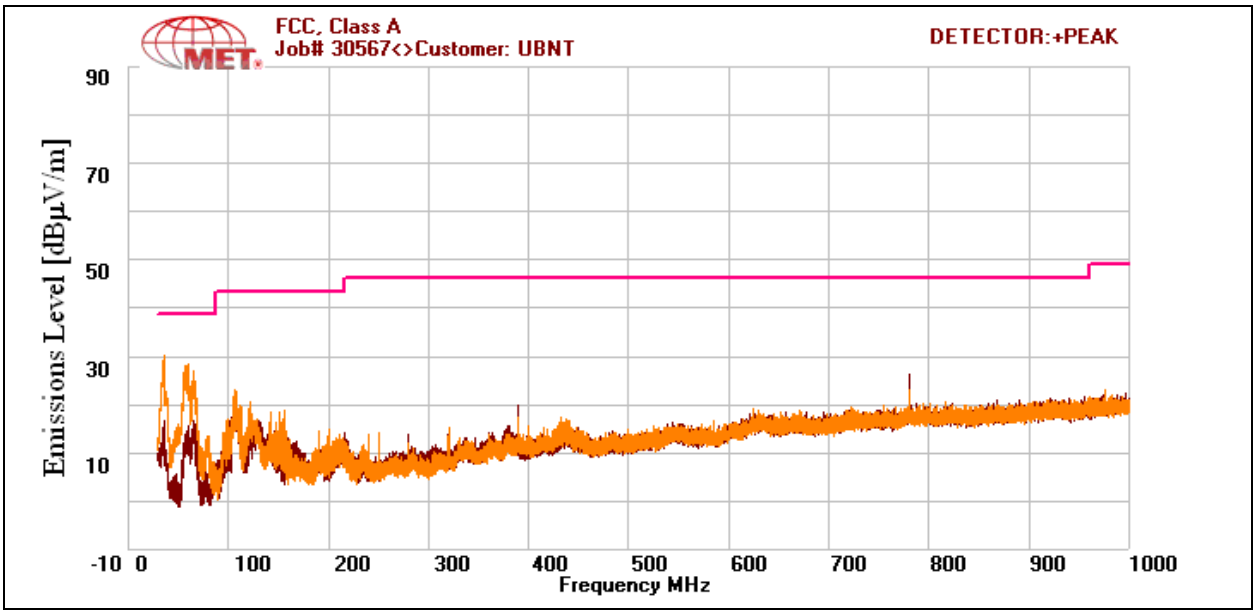
Plot 6. Radiated Emissions, ICES-003 Limits, GME Power Supply

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)	Limit (dBuV)	Margin (dB)
36.1	V	99	100	25.21	15.16	0	1.424	-10.46	31.334	39	-7.666
60.11	V	111	100	27.55	6.289	0	2.018	-10.46	25.397	39	-13.603
108.83	V	83	110	19.55	12.083	0	2.944	-10.46	24.117	43.5	-19.383
120.82	V	155	100	10.55	12.318	0	3.071	-10.46	15.479	43.5	-28.021
389.98	H	255	188	12.2	15.1	0	4.092	-10.46	20.932	46.4	-25.468
780	H	347	245	11.15	19.9	0	6.132	-10.46	26.722	46.4	-19.678

Table 15. Radiated Emissions Limits, Test Results, 30 MHz – 1 GHz, FCC Limits, Cetus Power Supply

Note: The EUT was tested at 3 m.



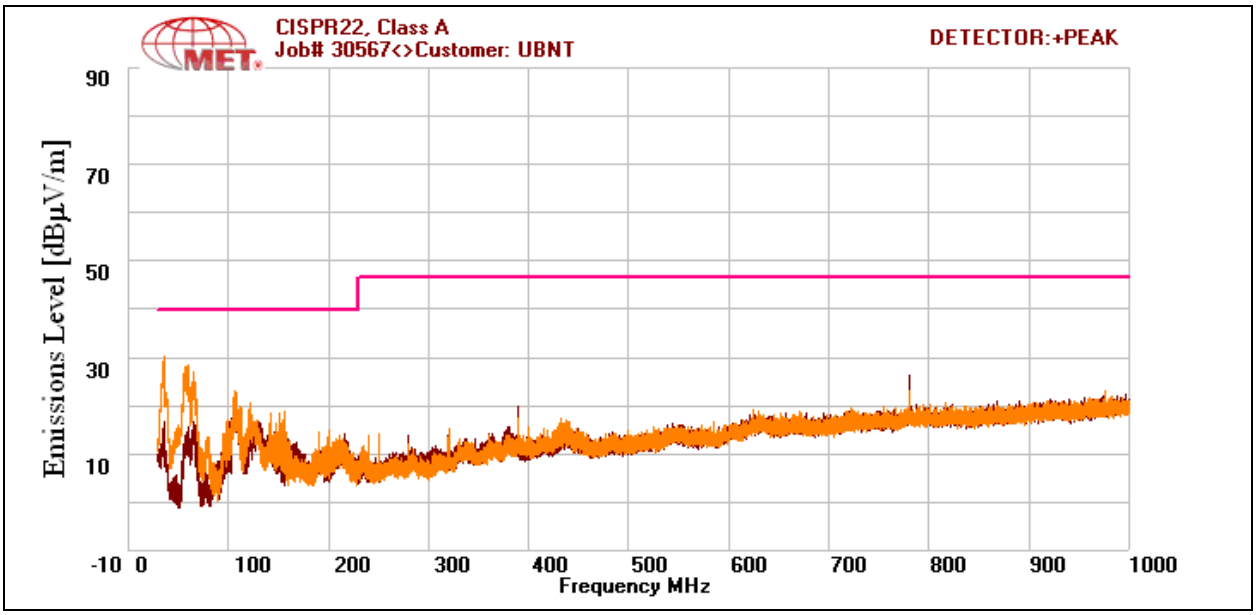
Plot 7. Radiated Emissions, 30 MHz - 1 GHz, FCC Limits, Cetus Power Supply

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)	Limit (dBuV)	Margin (dB)
36.1	V	99	100	25.21	15.16	0	1.424	-10.46	31.334	40	-8.666
60.11	V	111	100	27.55	6.289	0	2.018	-10.46	25.397	40	-14.603
108.83	V	83	110	19.55	12.083	0	2.944	-10.46	24.117	40	-15.883
120.82	V	155	100	10.55	12.318	0	3.071	-10.46	15.479	40	-24.521
389.98	H	255	188	12.2	15.1	0	4.092	-10.46	20.932	47	-26.068
780	H	347	245	11.15	19.9	0	6.132	-10.46	26.722	47	-20.278

Table 16. Radiated Emissions Limits, Test Results, ICES-003 Limits, Cetus Power Supply

Note: The EUT was tested at 3 m.



Plot 8. Radiated Emissions, ICES-003 Limits, Cetus Power Supply

Radiated Emission Limits Test Setup

Photograph 4. Radiated Emission, Test Setup, GME Power Supply

Photograph 5. Radiated Emission, Test Setup, Cetus Power Supply

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 EUT has an integral antenna.

Test Engineer(s): Anderson Soungpanya

Test Date(s): 05/18/11

Gain	Type	Model	Manufacturer
11.2 dBi	Integral	NA	Ubiquiti Networks

Table 17. Antenna List

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.207(a) Conducted Emissions Limits

Test Requirement(s): **§ 15.207 (a):** For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 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 18. Conducted Limits for Intentional Radiators from FCC Part 15 § 15.207(a)

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

Test Results: The EUT was compliant with this requirement. Measured emissions were below applicable limits.

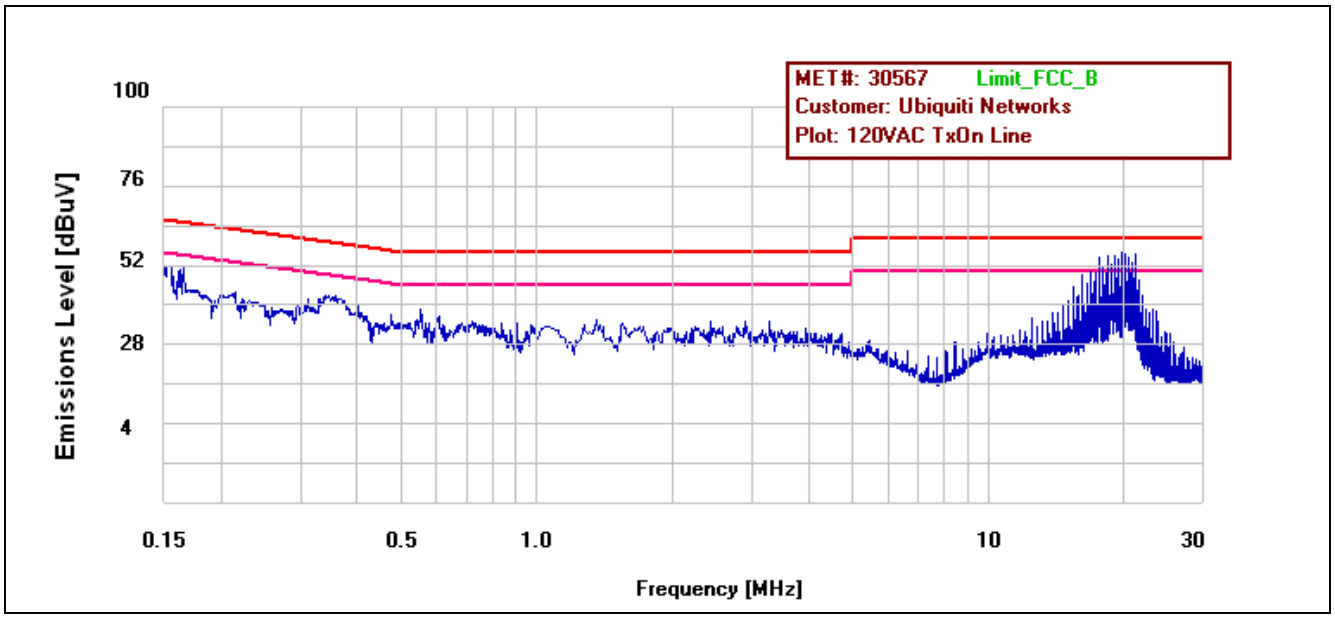
Test Engineer(s): Joe Vang and Lionel Gabrillo

Test Date(s): 03/18/11 and 03/24/11

15.207(a) Conducted Emissions Test Results

Line	Freq. (MHz)	QP Amplitude	QP Limit	Delta	Pass	Average Amplitude	Average Limit	Delta	Pass
120VAC TxOn Line	19.81	54.9	60	-5.1	Pass	47.8	50	-2.2	Pass
120VAC TxOn Line	16.14	43.58	60	-16.42	Pass	40.05	50	-9.95	Pass
120VAC TxOn Line	.168	42.28	65.061	-22.781	Pass	27.62	55.061	-27.441	Pass

Table 19. Conducted Emissions, 15.207(a), Phase Line, Test Results, GME Power Supply

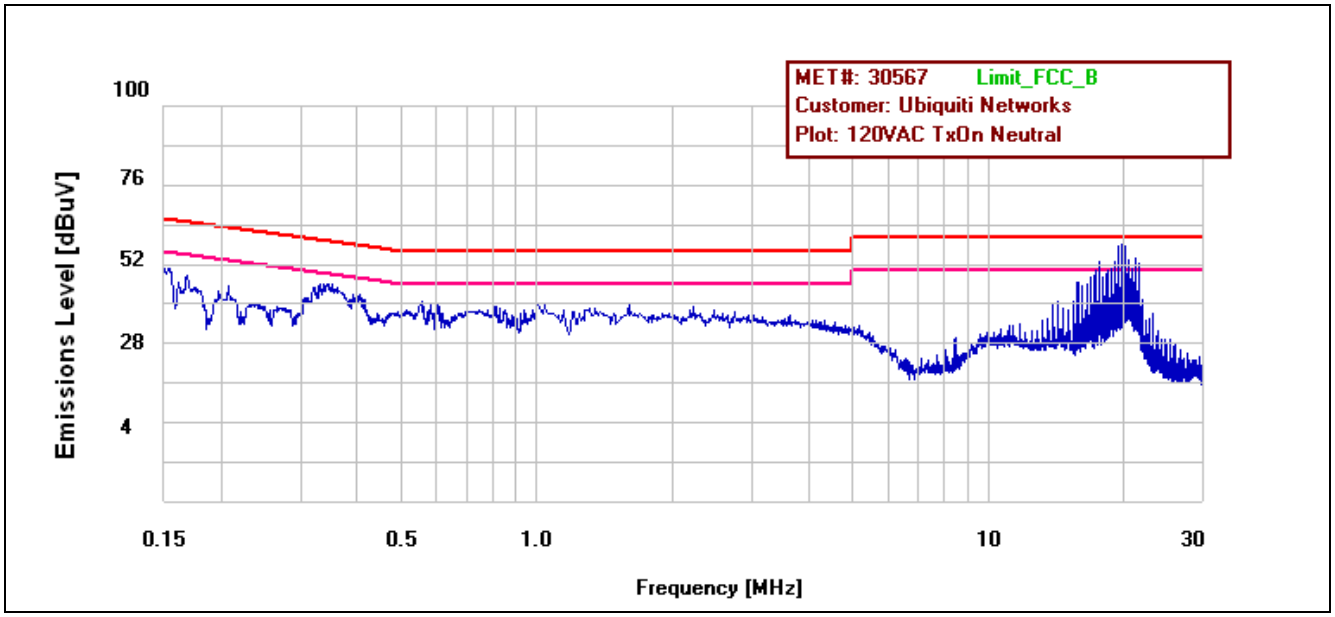


Plot 9. Conducted Emissions, 15.207(a), Phase Line, GME Power Supply

15.207(a) Conducted Emissions Test Results

Line	Freq. (MHz)	QP Amplitude	QP Limit	Delta	Pass	Average Amplitude	Average Limit	Delta	Pass
120VAC TxOn Neutral	20.18	54.1	60	-5.9	Pass	47.4	50	-2.6	Pass
120VAC TxOn Neutral	16.88	43.25	60	-16.75	Pass	41.91	50	-8.09	Pass
120VAC TxOn Neutral	.171	38.83	64.915	-26.085	Pass	25.54	54.915	-29.375	Pass

Table 20. Conducted Emissions, 15.207(a), Neutral Line, Test Results, GME Power Supply

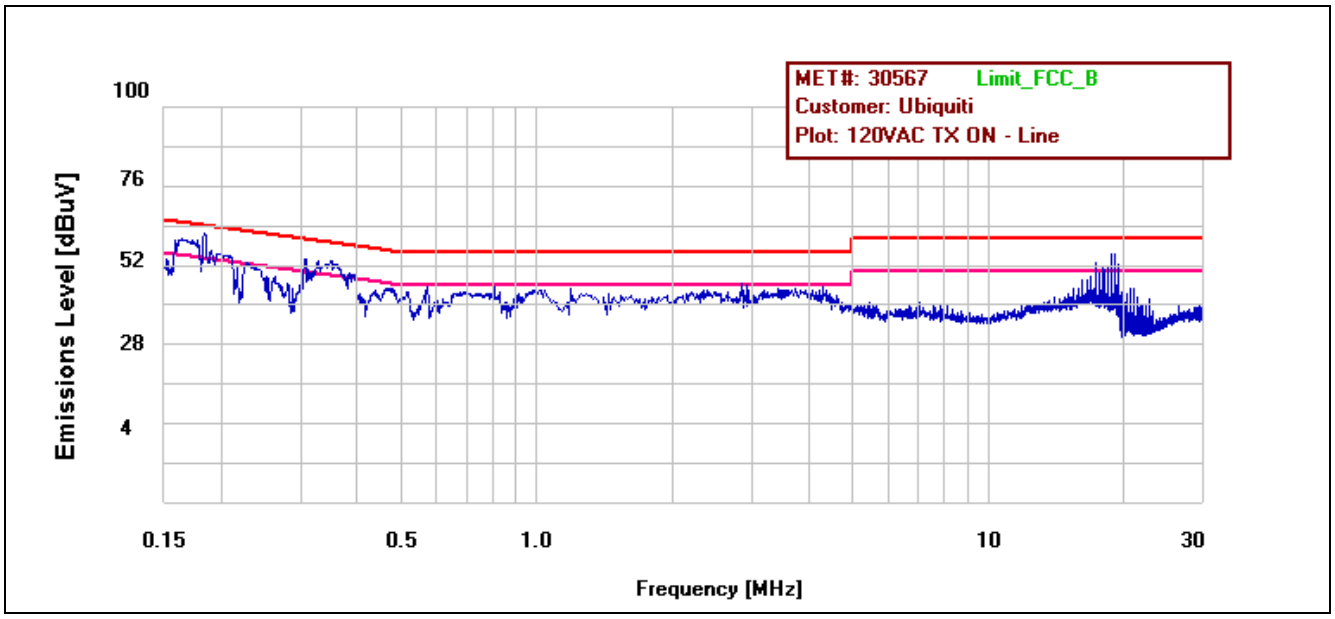


Plot 10. Conducted Emissions, 15.207(a), Neutral Line, GME Power Supply

15.207(a) Conducted Emissions Test Results

Line	Freq. (MHz)	QP Amplitude	QP Limit	Delta	Pass	Average Amplitude	Average Limit	Delta	Pass
120VAC TX ON - Line	0.168	56.71	65.061	-8.351	Pass	42.07	55.061	-12.991	Pass
120VAC TX ON - Line	0.204	52.2	63.453	-11.253	Pass	39.43	53.453	-14.023	Pass
120VAC TX ON - Line	0.345	50.52	59.101	-8.581	Pass	40.97	49.101	-8.131	Pass
120VAC TX ON - Line	3.566	39.86	56	-16.14	Pass	30.46	46	-15.54	Pass
120VAC TX ON - Line	19.12	51.61	60	-8.39	Pass	47.55	50	-2.45	Pass
120VAC TX ON - Line	18.02	49.01	60	-10.99	Pass	45.94	50	-4.06	Pass

Table 21. Conducted Emissions, 15.207(a), Phase Line, Test Results, Cetus Power Supply

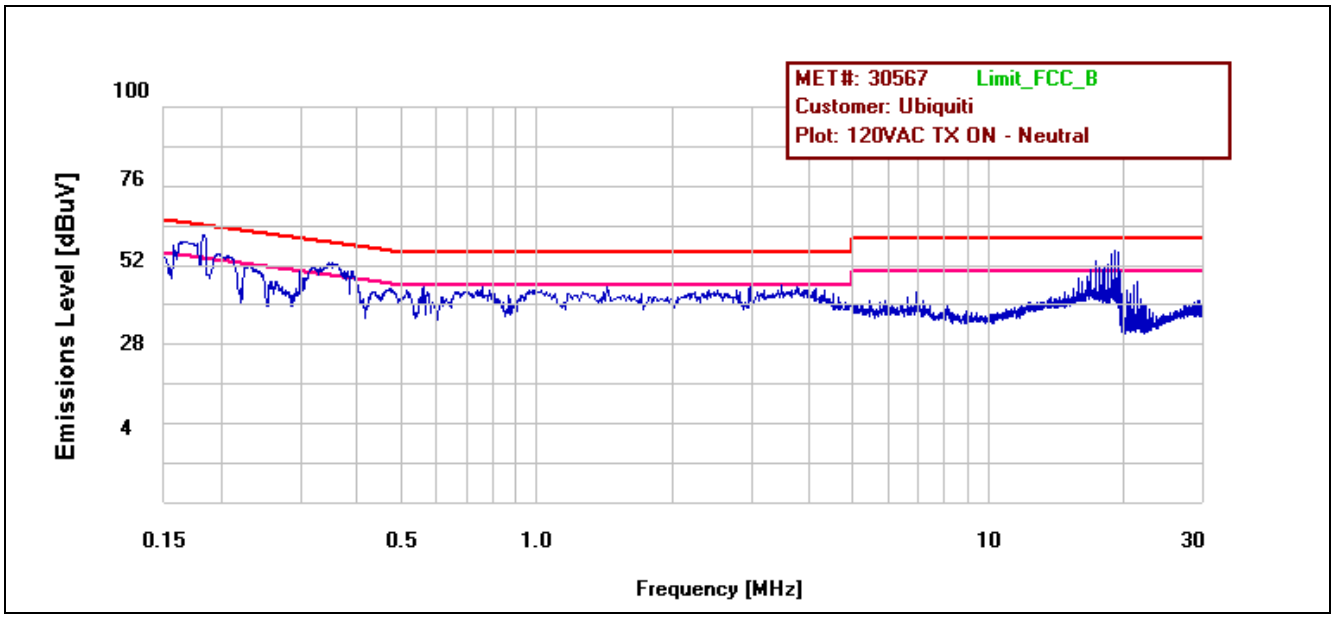


Plot 11. Conducted Emissions, 15.207(a), Phase Line, Cetus Power Supply

15.207(a) Conducted Emissions Test Results

Line	Freq. (MHz)	QP Amplitude	QP Limit	Delta	Pass	Average Amplitude	Average Limit	Delta	Pass
120VAC TX ON - Neutral	0.1646	57.16	65.231	-8.071	Pass	40.33	55.231	-14.901	Pass
120VAC TX ON - Neutral	0.3458	50.39	59.082	-8.692	Pass	40.51	49.082	-8.572	Pass
120VAC TX ON - Neutral	0.6875	40.75	56	-15.25	Pass	32.27	46	-13.73	Pass
120VAC TX ON - Neutral	4.26	37.91	56	-18.09	Pass	30.05	46	-15.95	Pass
120VAC TX ON - Neutral	18.75	52.12	60	-7.88	Pass	48.87	50	-1.13	Pass
120VAC TX ON - Neutral	19.12	53.01	60	-6.99	Pass	49.56	50	-0.44	Pass

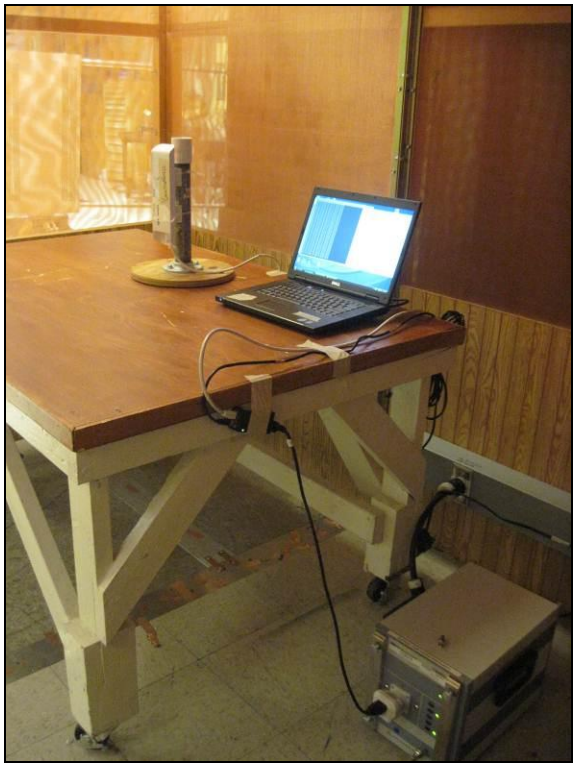
Table 22. Conducted Emissions, 15.207(a), Neutral Line, Test Results, Cetus Power Supply



Plot 12. Conducted Emissions, 15.207(a), Neutral Line, Cetus Power Supply

15.207(a) Conducted Emissions Test Setup Photo

Photograph 6. Conducted Emissions, 15.207(a), Test Setup, GME Power Supply



Photograph 7. Conducted Emissions, 15.207(a), Test Setup, Cetus Power Supply

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(a)(2) 6 dB and 99% Bandwidth

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

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

Test Procedure: The transmitter was on and transmitting at the highest output power. The 99% 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 with 100kHz RBW and 300kHz VBW & a Peak Detector.. The measurements were performed on the low, mid and high channels.

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

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

Test Engineer(s): Anderson Soungpanya

Test Date(s): 05/18/11

Figure 2. Block Diagram, Occupied Bandwidth Test Setup

Occupied Bandwidth Test Results

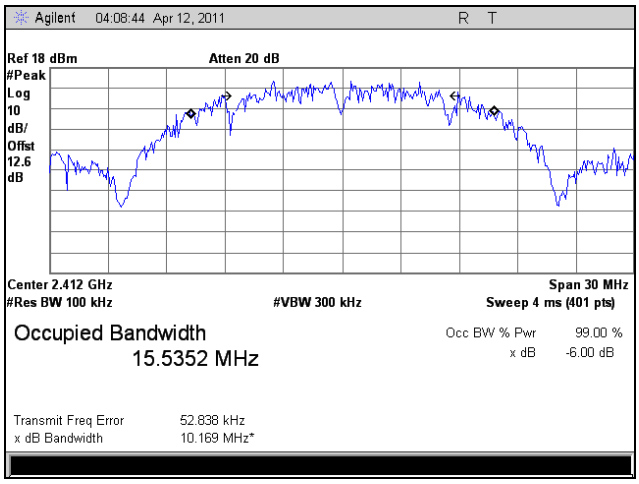
Occupied Bandwidth			
Mode	**Carrier Channel**	**Frequency (MHz)**	**Measured 6 dB Bandwidth (MHz)**
802.11b	Low	2412	10.169
	Mid	2437	9.801
	High	2462	10.862
802.11g 20 MHz	Low	2412	16.466
	Mid	2437	16.463
	High	2462	13.568
802.11g 40 MHz	Low	2422	36.500
	Mid	2437	34.297
	High	2452	31.369
HT5 Port 1	Low	2403	4.363
	Mid	2437	4.373
	High	2475	4.403
HT5 Port 2	Low	2403	4.406
	Mid	2437	4.362
	High	2475	4.366
HT8 Port 1	Low	2405	6.770
	Mid	2437	6.751
	High	2473	6.853
HT8 Port 2	Low	2405	6.799
	Mid	2437	6.756
	High	2473	6.853
HT10 Port 1	Low	2408	8.851
	Mid	2437	8.796
	High	2470	8.825
HT10 Port 2	Low	2408	8.793
	Mid	2437	8.771
	High	2470	8.683
HT20 Port 1	Low	2412	17.663
	Mid	2437	17.492
	High	2462	17.683
HT20 Port 2	Low	2412	17.648
	Mid	2437	17.659
	High	2462	17.689
HT30 Port 1	Low	2420	26.393
	Mid	2437	26.519
	High	2454	25.190
HT30 Port 2	Low	2420	26.308
	Mid	2437	26.397
	High	2454	25.376
HT40 Port 1	Low	2422	36.441
	Mid	2437	36.420
	High	2452	34.908
HT40 Port 2	Low	2422	36.372
	Mid	2437	36.110
	High	2452	36.011

Table 23. 6 dB Occupied Bandwidth, Test Results

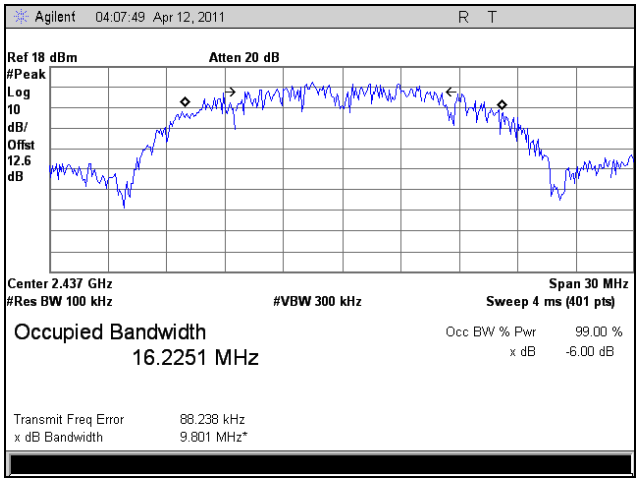
Occupied Bandwidth			
Mode	**Carrier Channel**	**Frequency (MHz)**	**Measured 99% Bandwidth (MHz)**
802.11b	Low	2412	15.8439
	Mid	2437	15.7138
	High	2462	16.0800
802.11g 20 MHz	Low	2412	16.5397
	Mid	2437	16.5565
	High	2462	16.7021
802.11g 40 MHz	Low	2422	36.3003
	Mid	2437	36.1296
	High	2452	36.2267
HT5 Port 1	Low	2403	4.4278
	Mid	2437	4.4466
	High	2475	4.4639
HT5 Port 2	Low	2403	4.4555
	Mid	2437	4.4482
	High	2475	4.4583
HT8 Port 1	Low	2405	6.8832
	Mid	2437	6.8787
	High	2473	6.8893
HT8 Port 2	Low	2405	6.8649
	Mid	2437	6.8648
	High	2473	6.8588
HT10 Port 1	Low	2408	8.9101
	Mid	2437	8.9204
	High	2470	8.8853
HT10 Port 2	Low	2408	8.8226
	Mid	2437	8.9325
	High	2470	8.9204
HT20 Port 1	Low	2412	17.7852
	Mid	2437	17.7951
	High	2462	17.9455
HT20 Port 2	Low	2412	17.7770
	Mid	2437	17.7403
	High	2462	17.8108
HT30 Port 1	Low	2420	26.4758
	Mid	2437	26.7141
	High	2454	26.5275
HT30 Port 2	Low	2420	26.5966
	Mid	2437	26.5005
	High	2454	26.5999
HT40 Port 1	Low	2422	36.3656
	Mid	2437	36.2954
	High	2452	36.0880
HT40 Port 2	Low	2422	36.2249
	Mid	2437	36.3138
	High	2452	36.0788

Table 24. 99% Occupied Bandwidth, Test Results

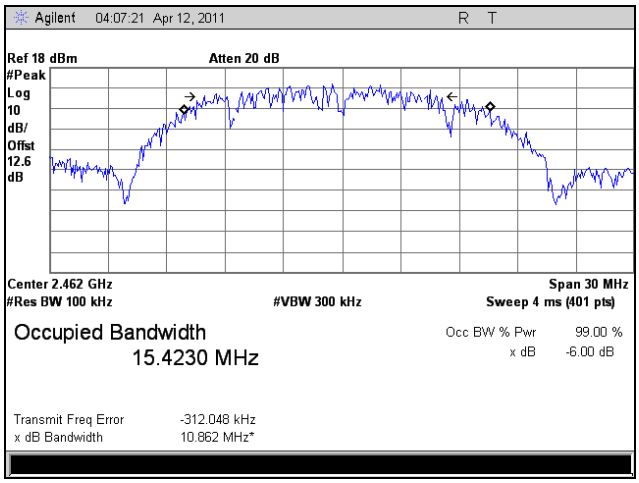
6 dB Occupied Bandwidth Test Results, 802.11b



Plot 13. 6 dB Occupied Bandwidth, Low Channel, 802.11b

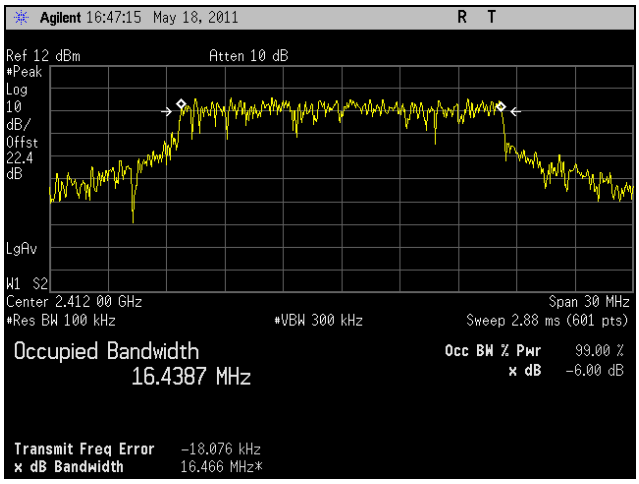


Plot 14. 6 dB Occupied Bandwidth, Mid Channel, 802.11b

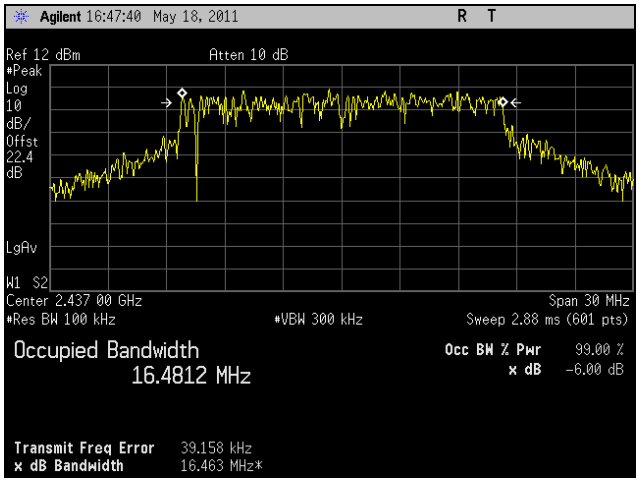


Plot 15. 6 dB Occupied Bandwidth, High Channel, 802.11b

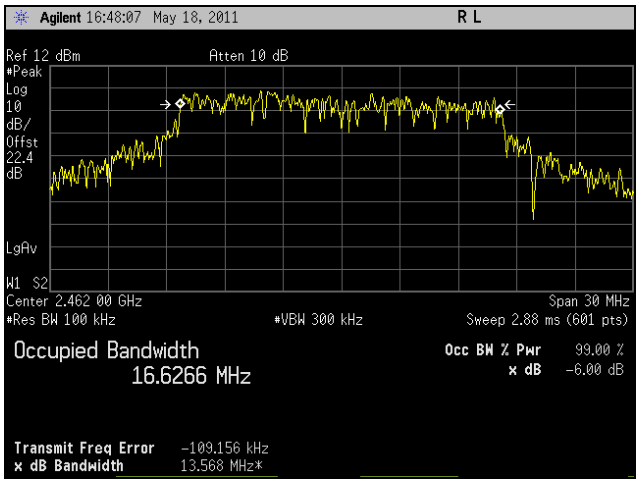
6 dB Occupied Bandwidth Test Results, 802.11g 20 MHz



Plot 16. 6 dB Occupied Bandwidth, Low Channel, 802.11g 20 MHz

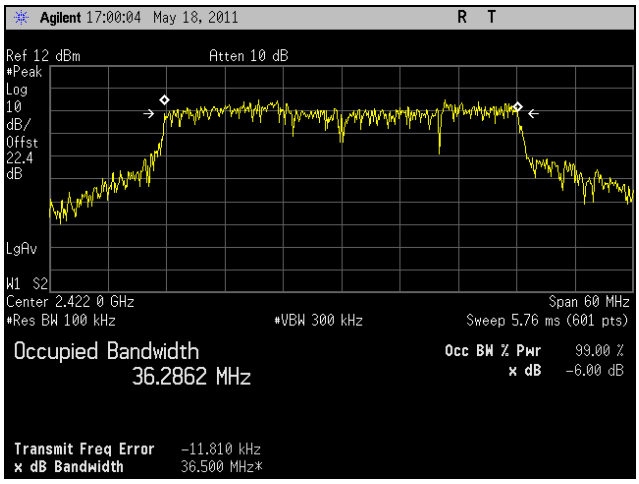


Plot 17. 6 dB Occupied Bandwidth, Mid Channel, 802.11g 20 MHz

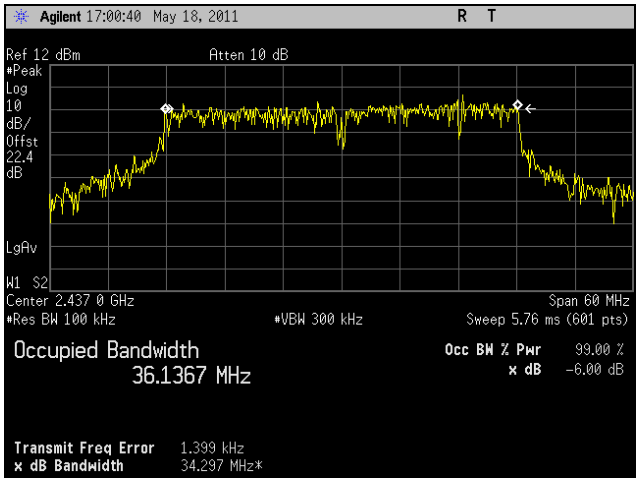


Plot 18. 6 dB Occupied Bandwidth, High Channel, 802.11g 20 MHz

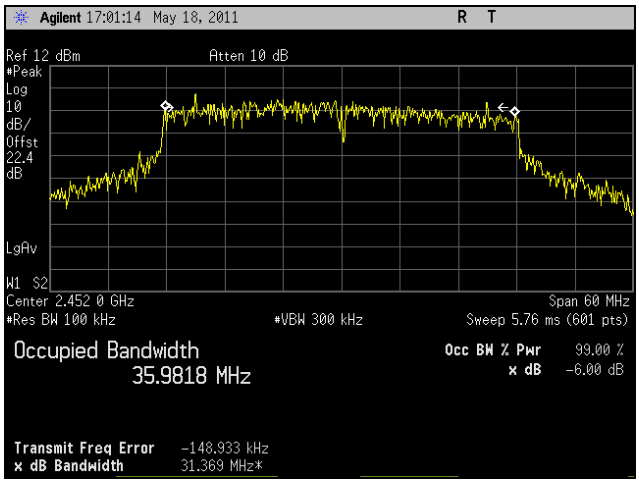
6 dB Occupied Bandwidth Test Results, 802.11g 40 MHz



Plot 19. 6 dB Occupied Bandwidth, Low Channel, 802.11g 40 MHz

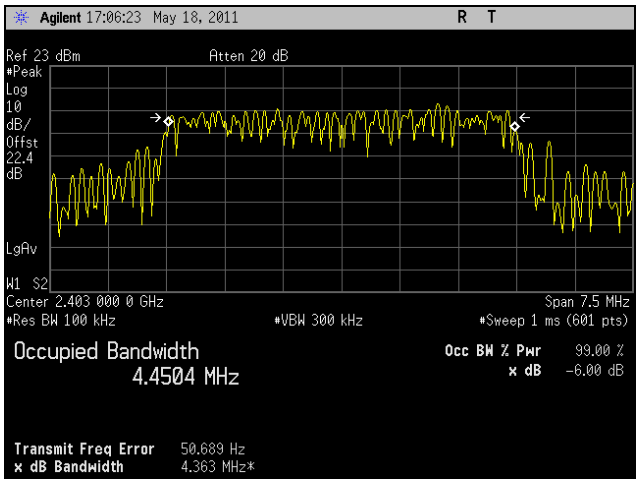


Plot 20. 6 dB Occupied Bandwidth, Mid Channel, 802.11g 40 MHz

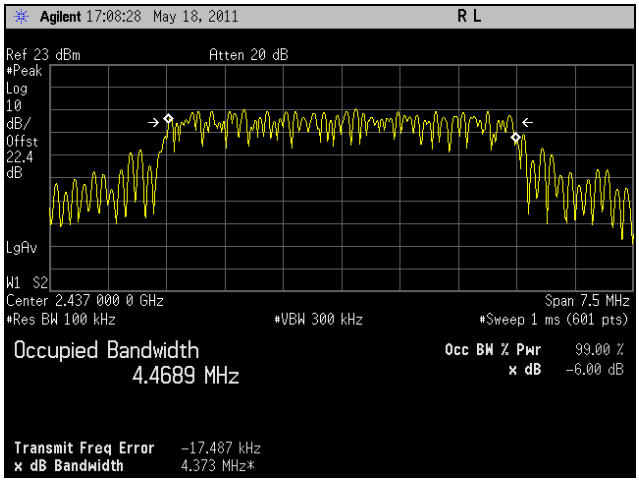


Plot 21. 6 dB Occupied Bandwidth, High Channel, 802.11g 40 MHz

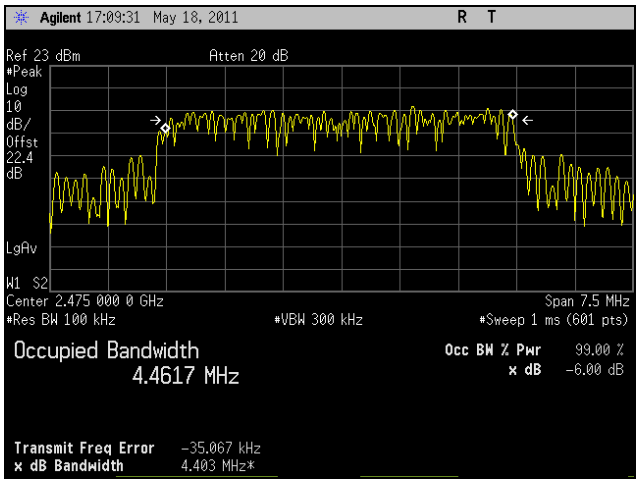
6 dB Occupied Bandwidth Test Results, 802.11n HT5, Port 1



Plot 22. 6 dB Occupied Bandwidth, Low Channel, 802.11n HT5, Port 1

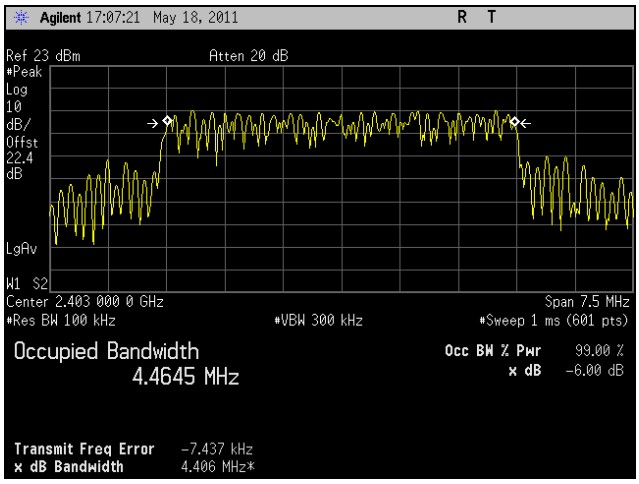


Plot 23. 6 dB Occupied Bandwidth, Mid Channel, 802.11n HT5, Port 1

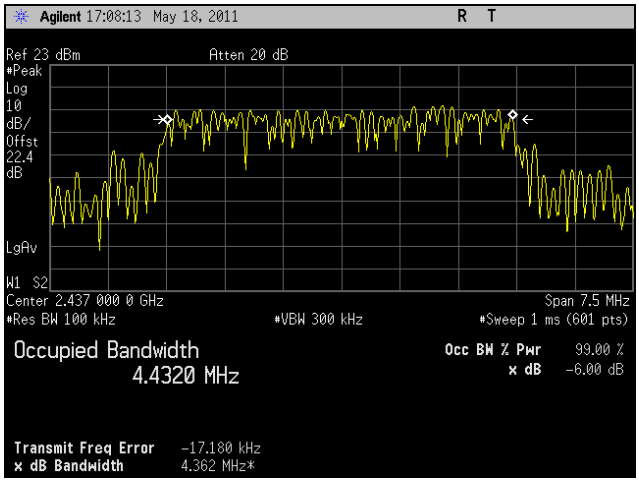


Plot 24. 6 dB Occupied Bandwidth, High Channel, 802.11n HT5, Port 1

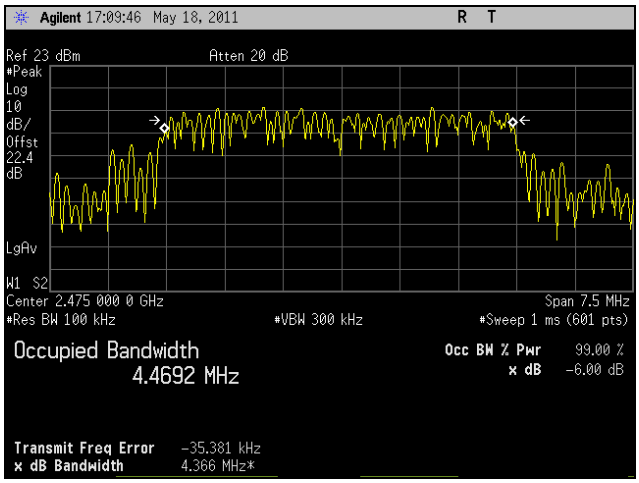
6 dB Occupied Bandwidth Test Results, 802.11n HT5, Port 2



Plot 25. 6 dB Occupied Bandwidth, Low Channel, 802.11n HT5, Port 2

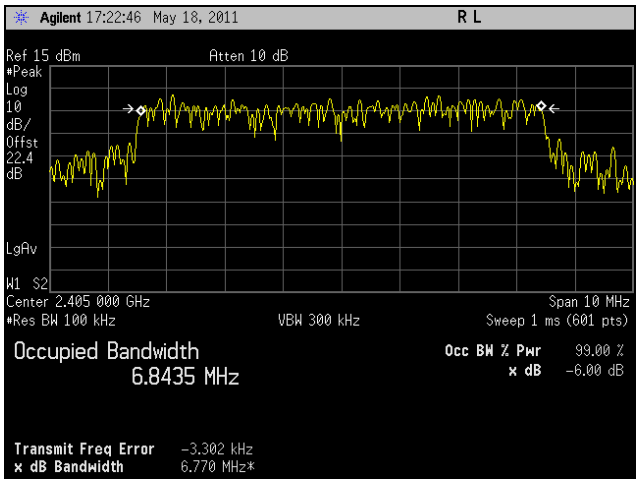


Plot 26. 6 dB Occupied Bandwidth, Mid Channel, 802.11n HT5, Port 2

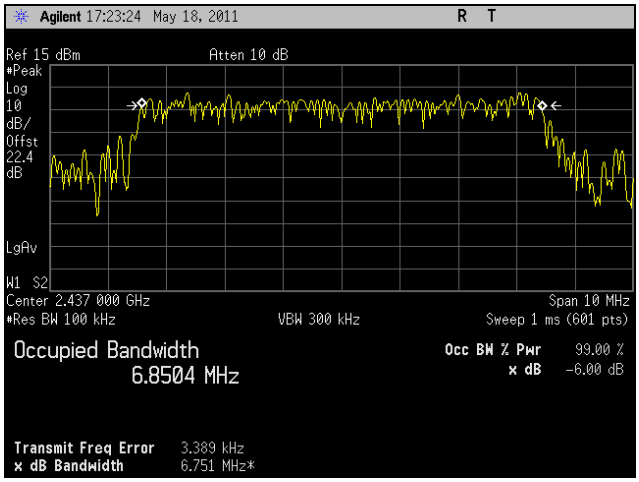


Plot 27. 6 dB Occupied Bandwidth, High Channel, 802.11n HT5, Port 2

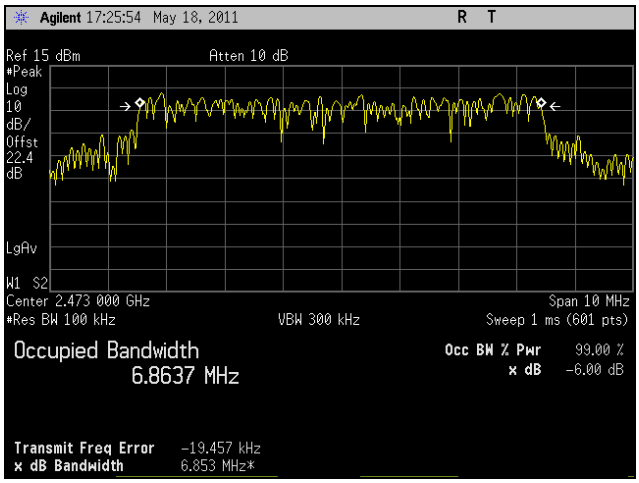
6 dB Occupied Bandwidth Test Results, 802.11n HT8, Port 1



Plot 28. 6 dB Occupied Bandwidth, Low Channel, 802.11n HT8, Port 1

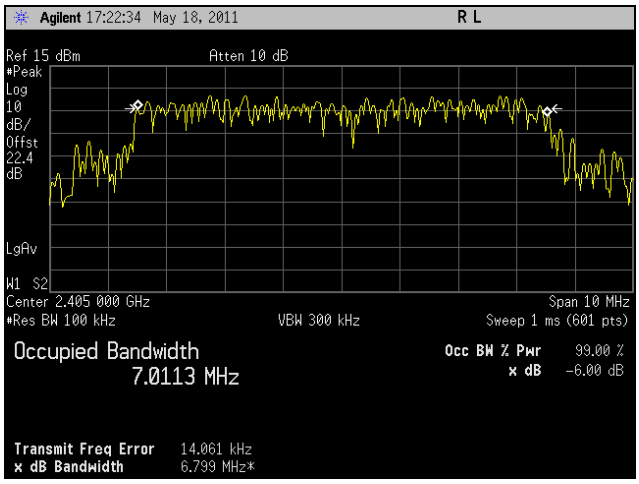


Plot 29. 6 dB Occupied Bandwidth, Mid Channel, 802.11n HT8, Port 1

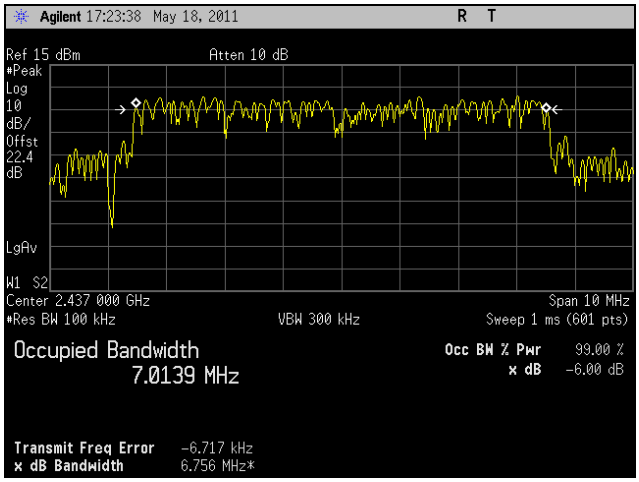


Plot 30. 6 dB Occupied Bandwidth, High Channel, 802.11n HT8, Port 1

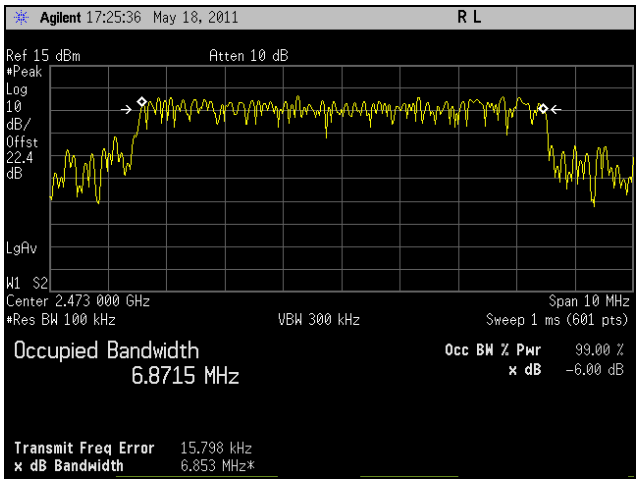
6 dB Occupied Bandwidth Test Results, 802.11n HT8, Port 2



Plot 31. 6 dB Occupied Bandwidth, Low Channel, 802.11n HT8, Port 2

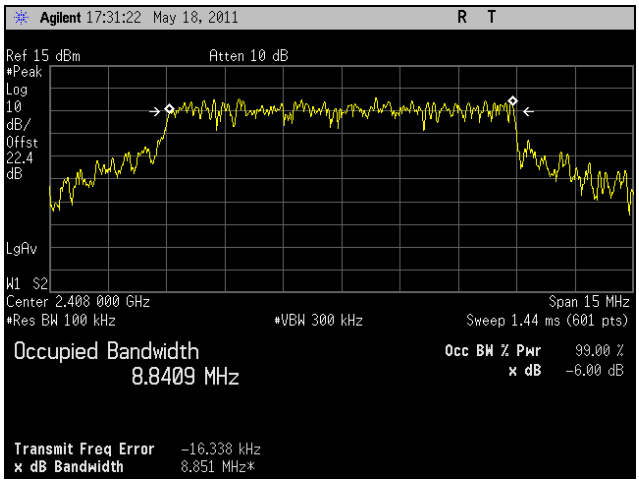


Plot 32. 6 dB Occupied Bandwidth, Mid Channel, 802.11n HT8, Port 2

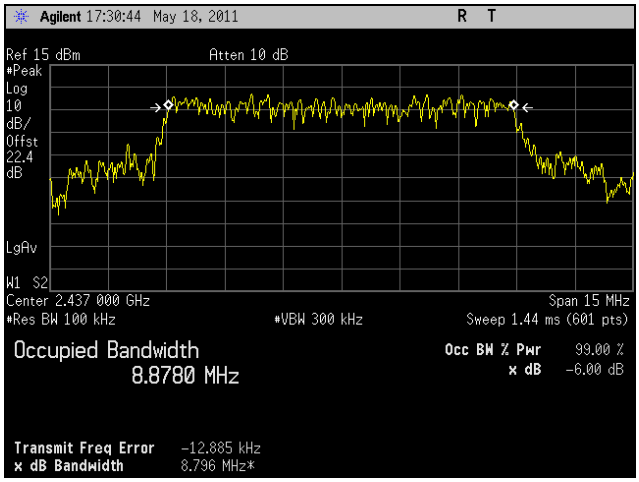


Plot 33. 6 dB Occupied Bandwidth, High Channel, 802.11n HT8, Port 2

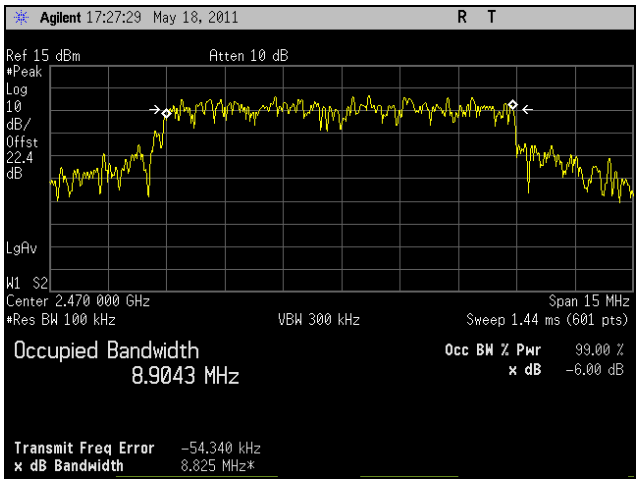
6 dB Occupied Bandwidth Test Results, 802.11n HT10, Port 1



Plot 34. 6 dB Occupied Bandwidth, Low Channel, 802.11n HT10, Port 1

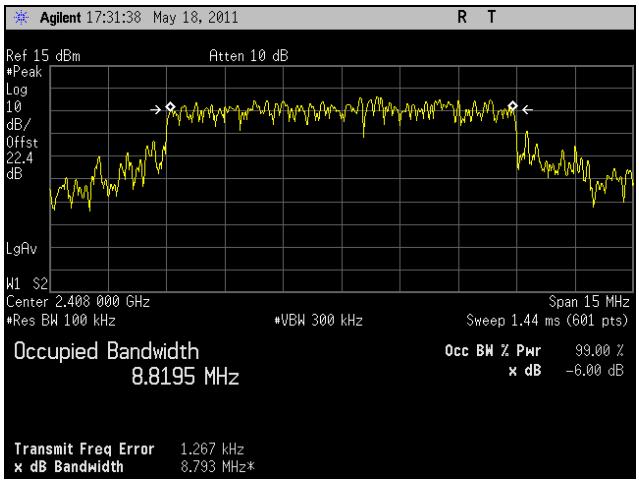


Plot 35. 6 dB Occupied Bandwidth, Mid Channel, 802.11n HT10, Port 1

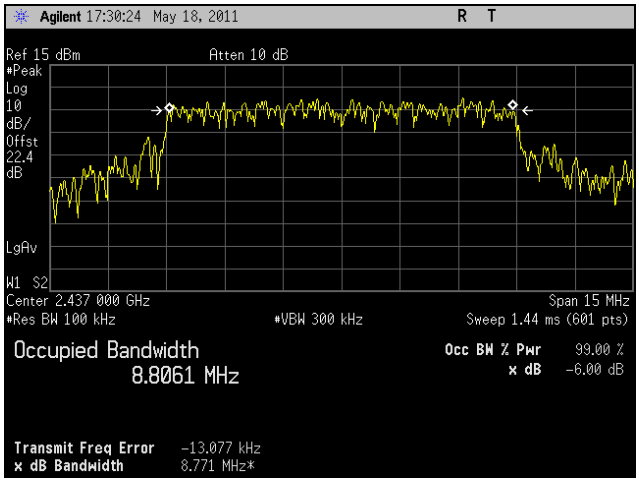


Plot 36. 6 dB Occupied Bandwidth, High Channel, 802.11n HT10, Port 1

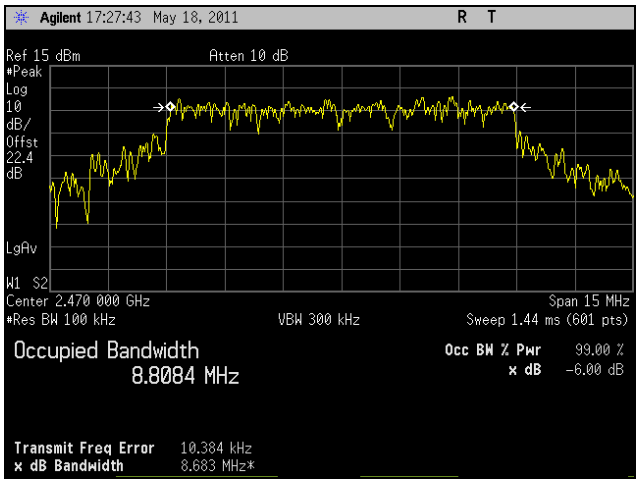
6 dB Occupied Bandwidth Test Results, 802.11n HT10, Port 2



Plot 37. 6 dB Occupied Bandwidth, Low Channel, 802.11n HT10, Port 2

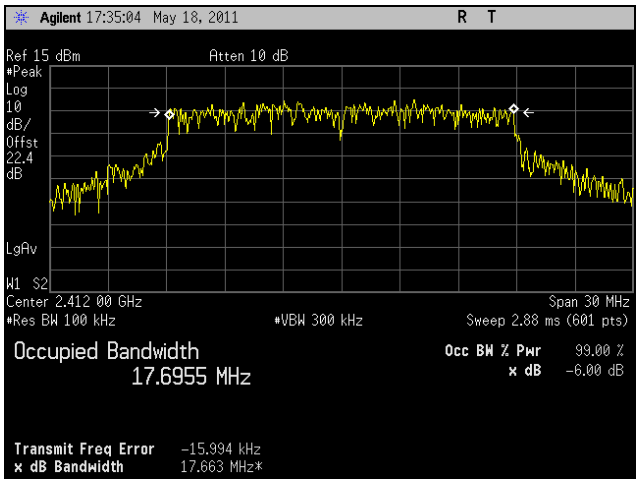


Plot 38. 6 dB Occupied Bandwidth, Mid Channel, 802.11n HT10, Port 2

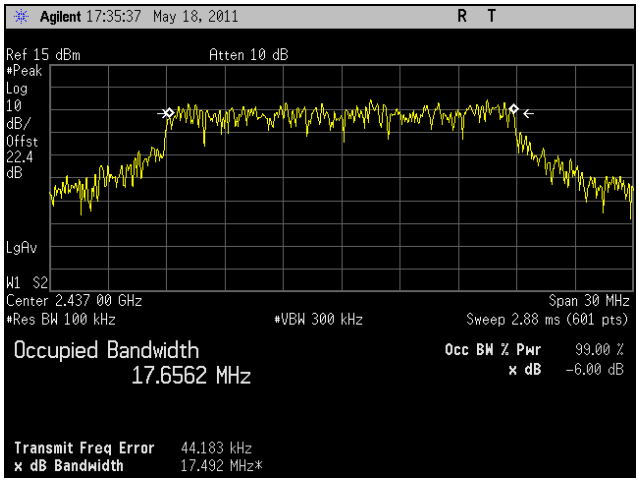


Plot 39. 6 dB Occupied Bandwidth, High Channel, 802.11n HT10, Port 2

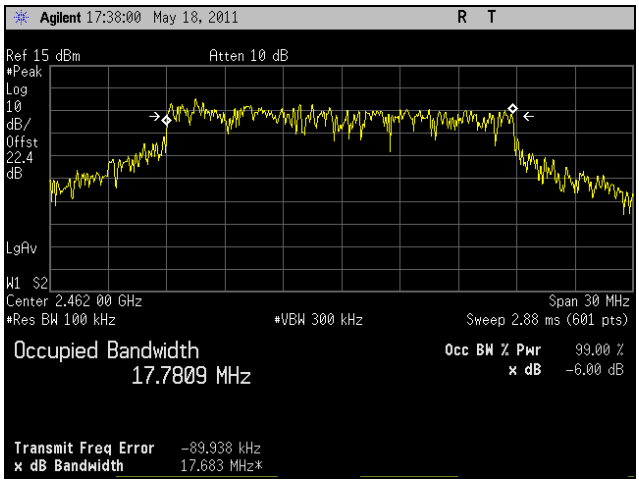
6 dB Occupied Bandwidth Test Results, 802.11n HT20, Port 1



Plot 40. 6 dB Occupied Bandwidth, Low Channel, 802.11n HT20, Port 1

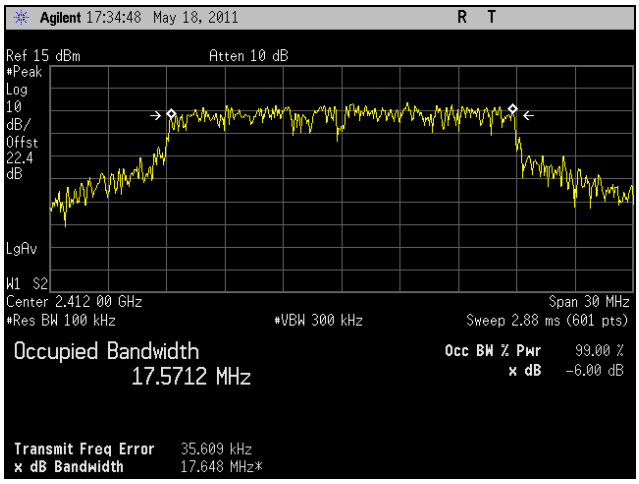


Plot 41. 6 dB Occupied Bandwidth, Mid Channel, 802.11n HT20, Port 1

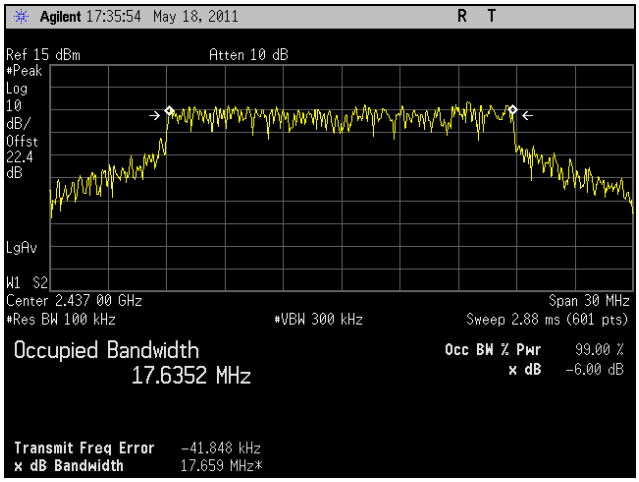


Plot 42. 6 dB Occupied Bandwidth, High Channel, 802.11n HT20, Port 1

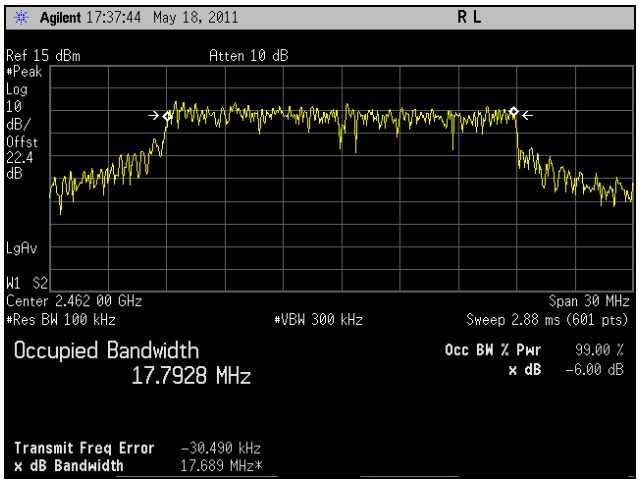
6 dB Occupied Bandwidth Test Results, 802.11n HT20, Port 2



Plot 43. 6 dB Occupied Bandwidth, Low Channel, 802.11n HT20, Port 2

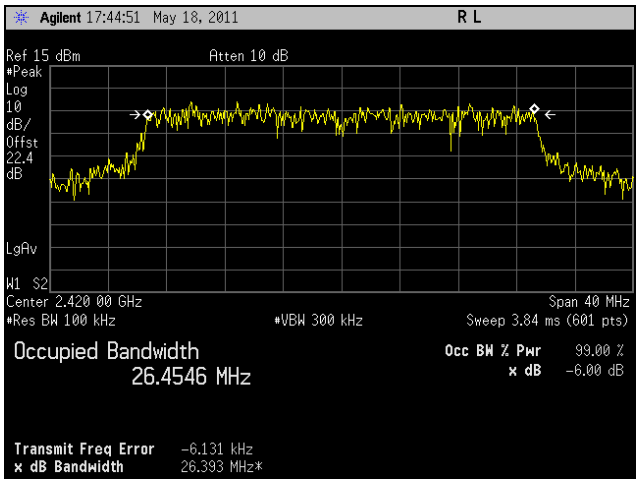


Plot 44. 6 dB Occupied Bandwidth, Mid Channel, 802.11n HT20, Port 2

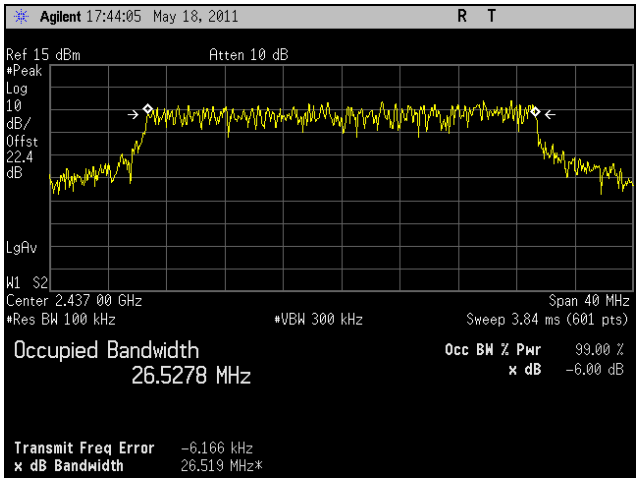


Plot 45. 6 dB Occupied Bandwidth, High Channel, 802.11n HT20, Port 2

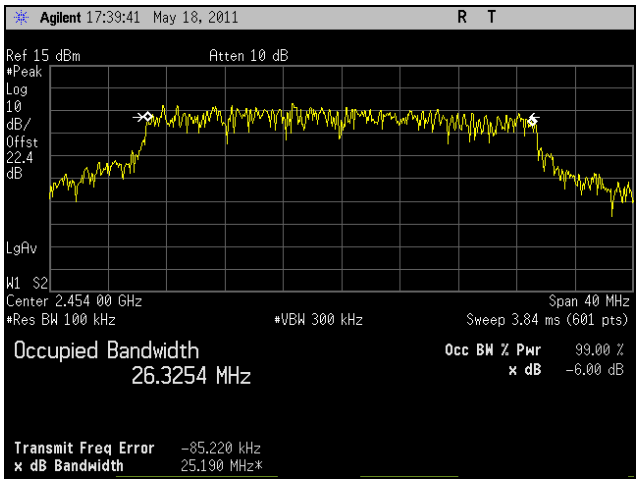
6 dB Occupied Bandwidth Test Results, 802.11n HT30, Port 1



Plot 46. 6 dB Occupied Bandwidth, Low Channel, 802.11n HT30, Port 1

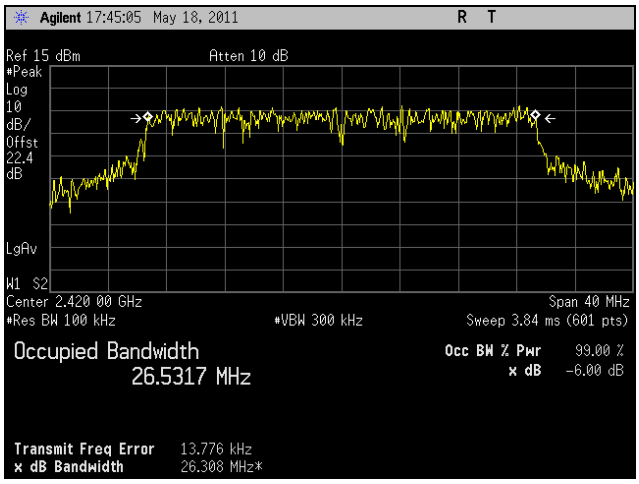


Plot 47. 6 dB Occupied Bandwidth, Mid Channel, 802.11n HT30, Port 1

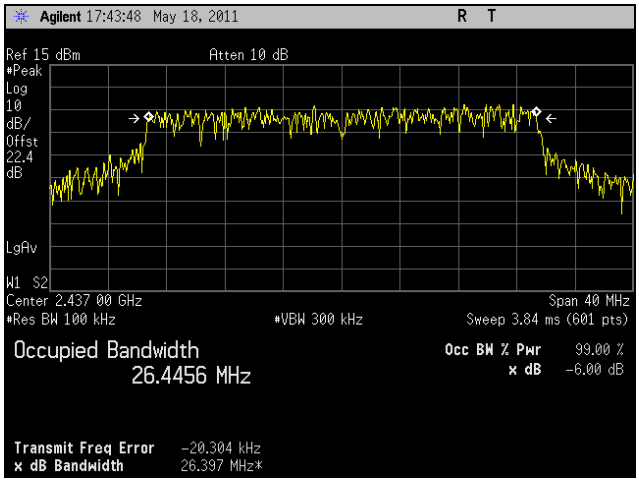


Plot 48. 6 dB Occupied Bandwidth, High Channel, 802.11n HT30, Port 1

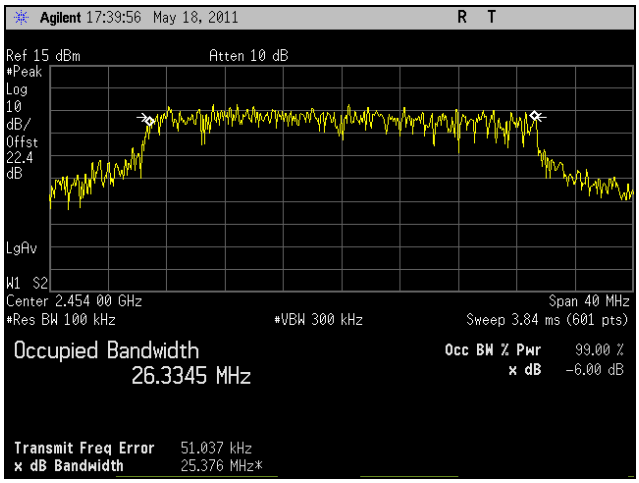
6 dB Occupied Bandwidth Test Results, 802.11n HT30, Port 2



Plot 49. 6 dB Occupied Bandwidth, Low Channel, 802.11n HT30, Port 2

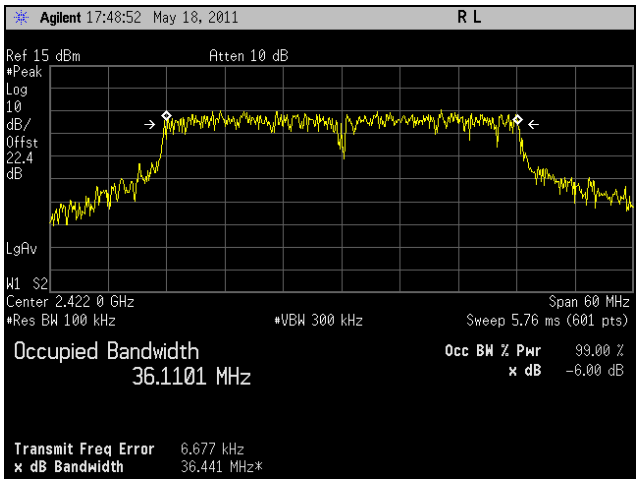


Plot 50. 6 dB Occupied Bandwidth, Mid Channel, 802.11n HT30, Port 2

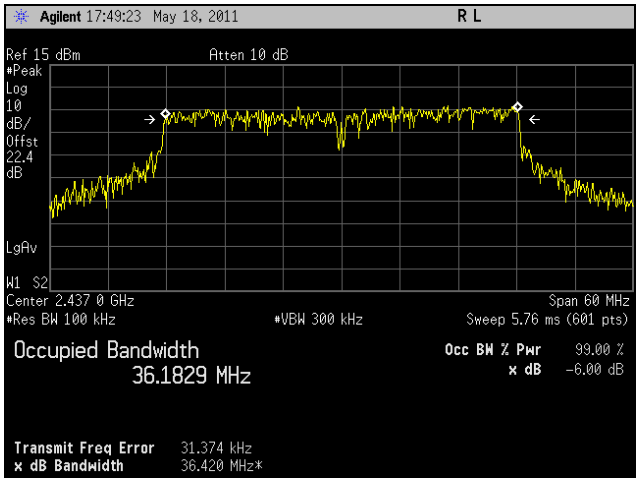


Plot 51. 6 dB Occupied Bandwidth, High Channel, 802.11n HT30, Port 2

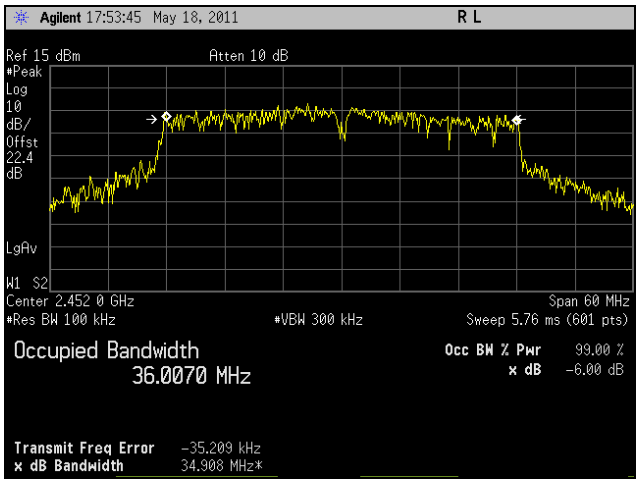
6 dB Occupied Bandwidth Test Results, 802.11n HT40, Port 1



Plot 52. 6 dB Occupied Bandwidth, Low Channel, 802.11n HT40, Port 1

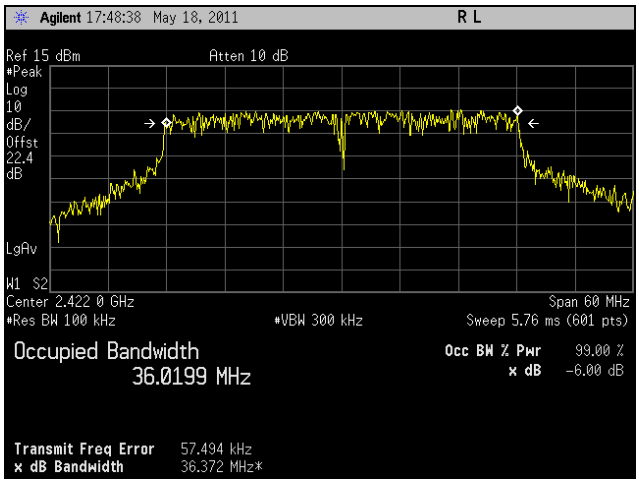


Plot 53. 6 dB Occupied Bandwidth, Mid Channel, 802.11n HT40, Port 1

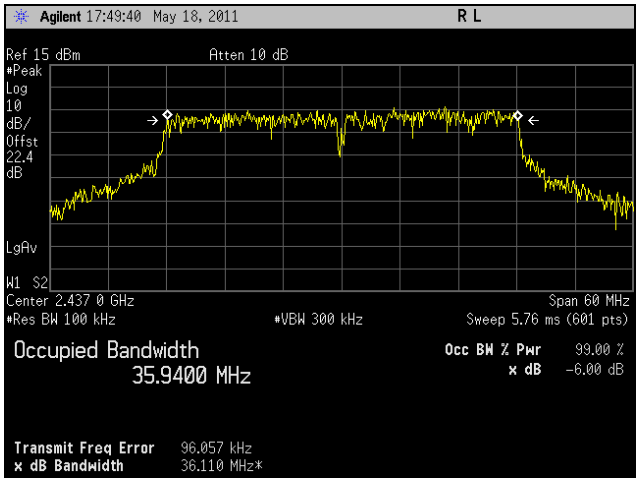


Plot 54. 6 dB Occupied Bandwidth, High Channel, 802.11n HT40, Port 1

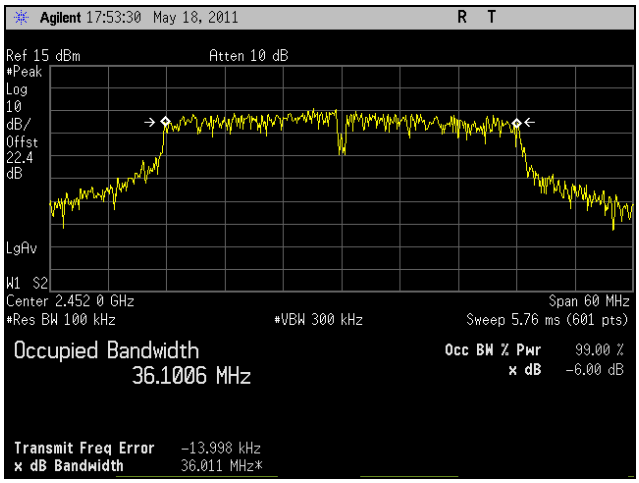
6 dB Occupied Bandwidth Test Results, 802.11n HT40, Port 2



Plot 55. 6 dB Occupied Bandwidth, Low Channel, 802.11n HT40, Port 2

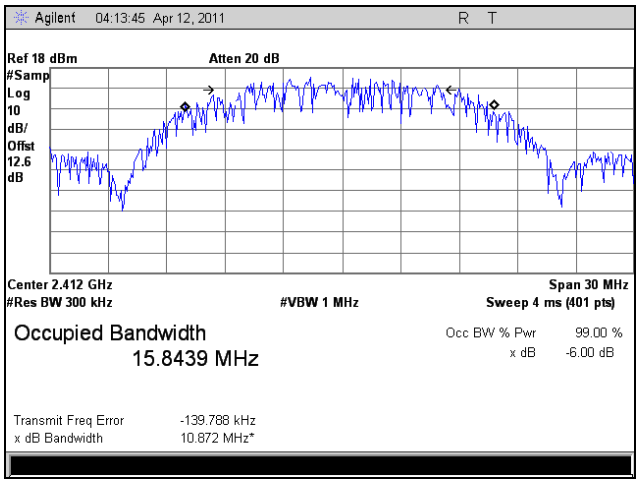


Plot 56. 6 dB Occupied Bandwidth, Mid Channel, 802.11n HT40, Port 2

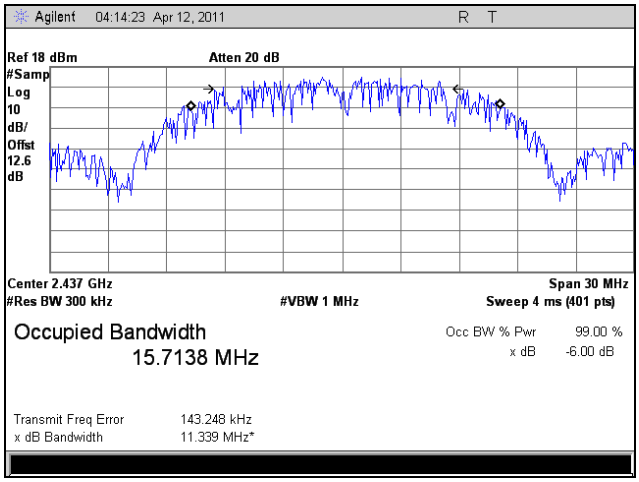


Plot 57. 6 dB Occupied Bandwidth, High Channel, 802.11n HT40, Port 2

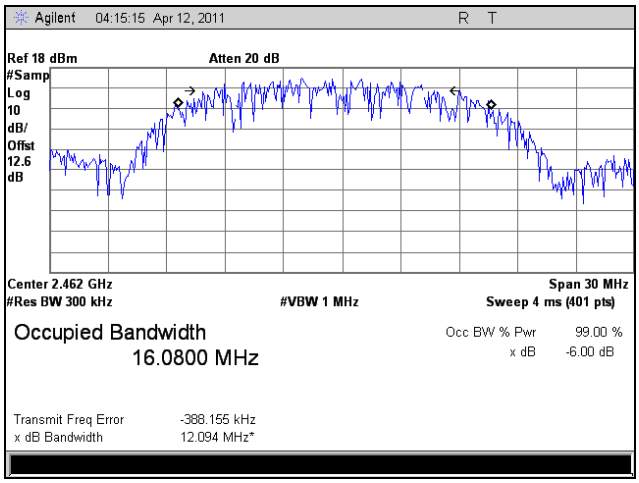
99% Occupied Bandwidth Test Results, 802.11b



Plot 58. 99% Occupied Bandwidth, Low Channel, 802.11b

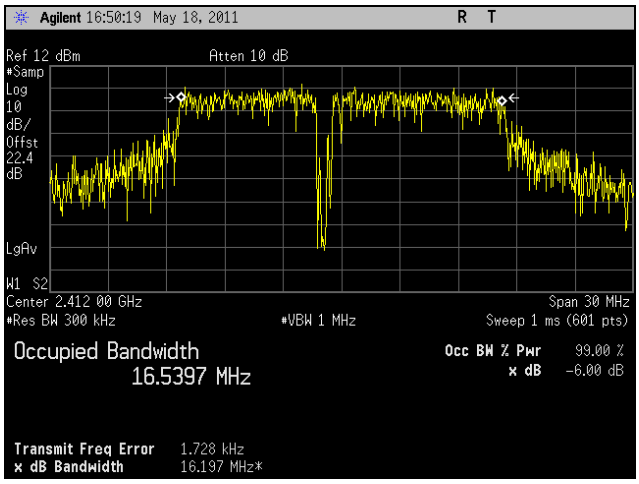


Plot 59. 99% Occupied Bandwidth, Mid Channel, 802.11b

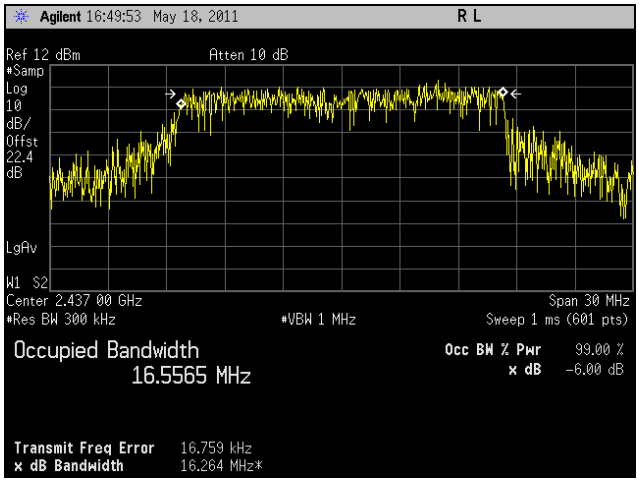


Plot 60. 99% Occupied Bandwidth, High Channel, 802.11b

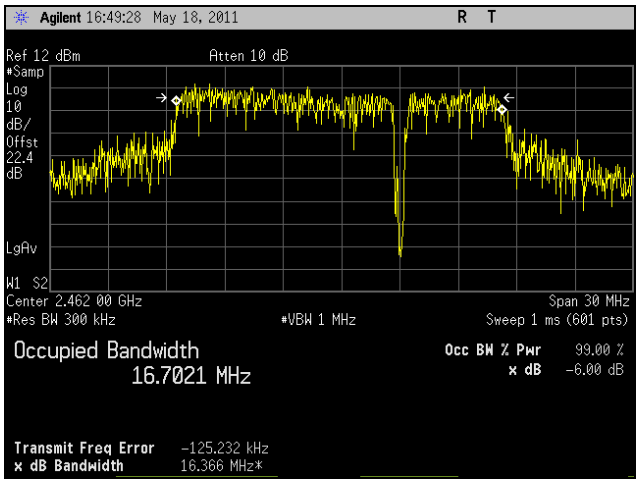
99% Occupied Bandwidth Test Results, 802.11g 20 MHz



Plot 61. 99% Occupied Bandwidth, Low Channel, 802.11g 20 MHz

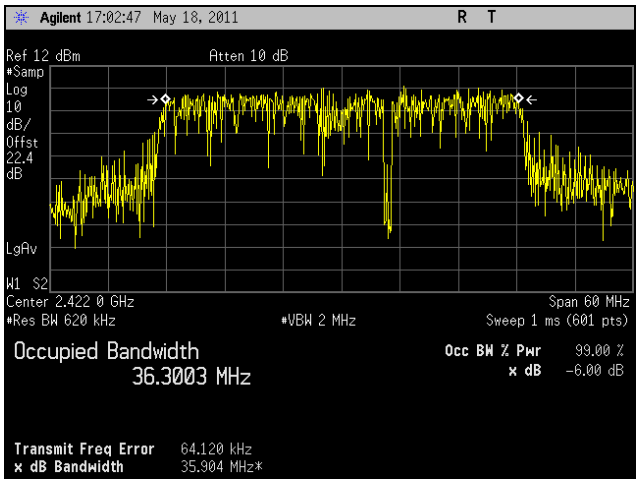


Plot 62. 99% Occupied Bandwidth, Mid Channel, 802.11g 20 MHz

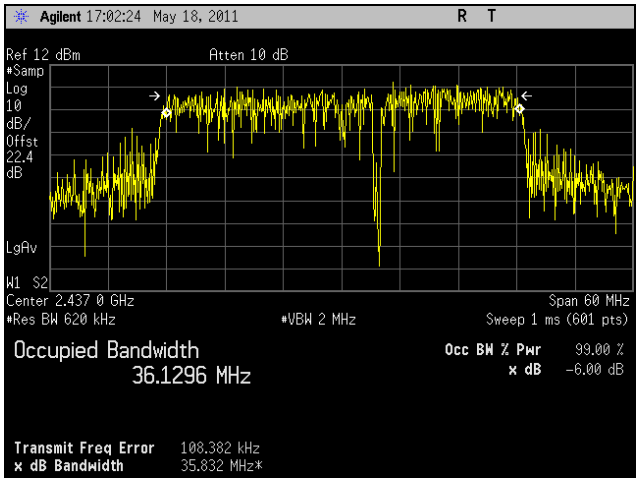


Plot 63. 99% Occupied Bandwidth, High Channel, 802.11g 20 MHz

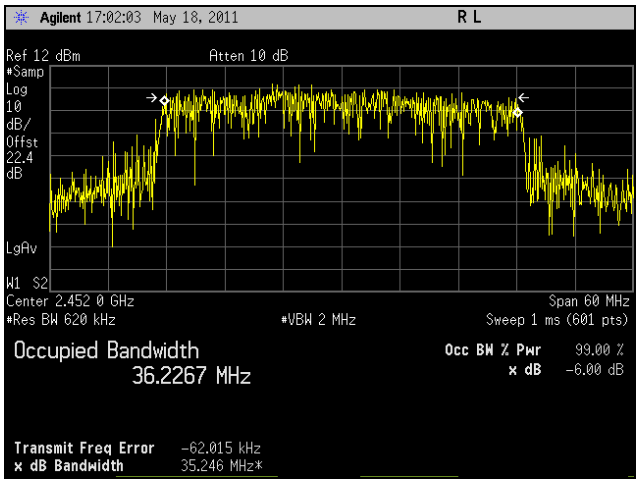
99% Occupied Bandwidth Test Results, 802.11g 40 MHz



Plot 64. 99% Occupied Bandwidth, Low Channel, 802.11g 40 MHz

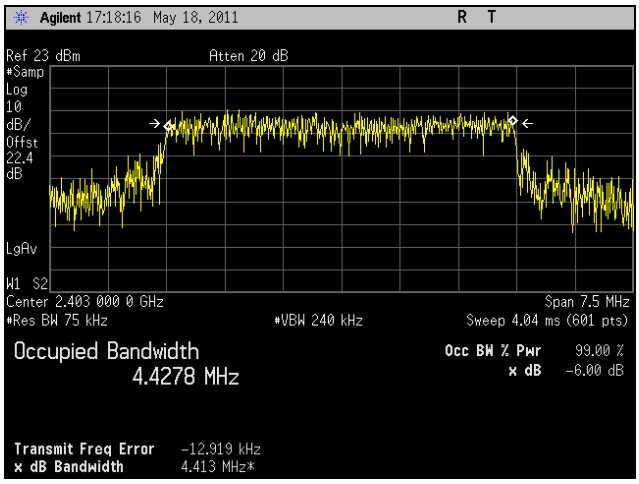


Plot 65. 99% Occupied Bandwidth, Mid Channel, 802.11g 40 MHz

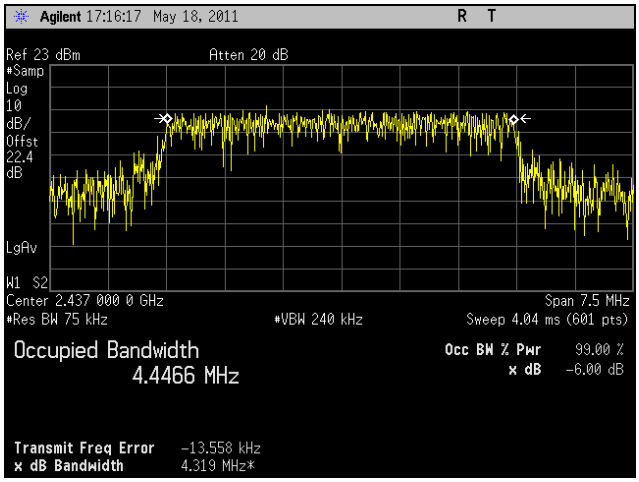


Plot 66. 99% Occupied Bandwidth, High Channel, 802.11g 40 MHz

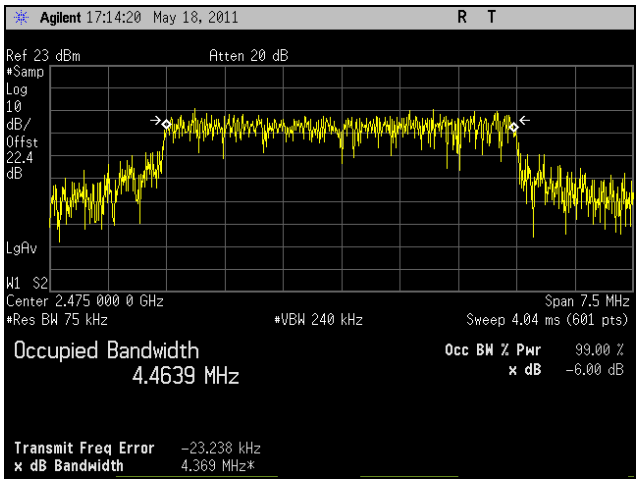
99% Occupied Bandwidth Test Results, 802.11n HT5, Port 1



Plot 67. 99% Occupied Bandwidth, Low Channel, 802.11n HT5, Port 1

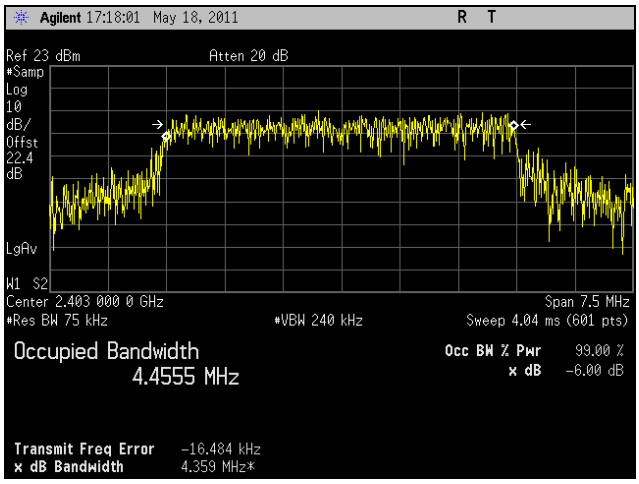


Plot 68. 99% Occupied Bandwidth, Mid Channel, 802.11n HT5, Port 1

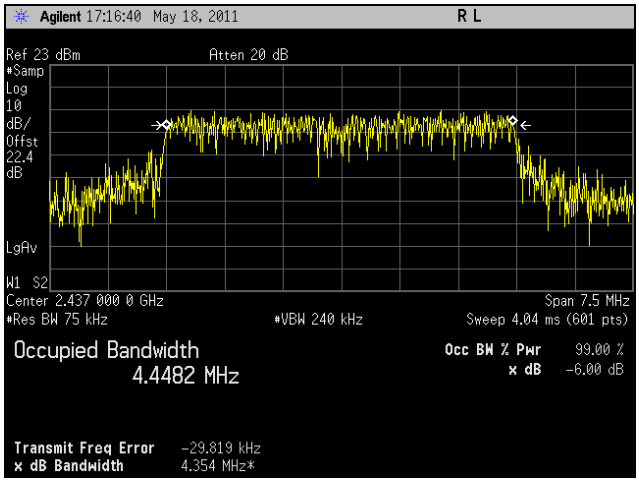


Plot 69. 99% Occupied Bandwidth, High Channel, 802.11n HT5, Port 1

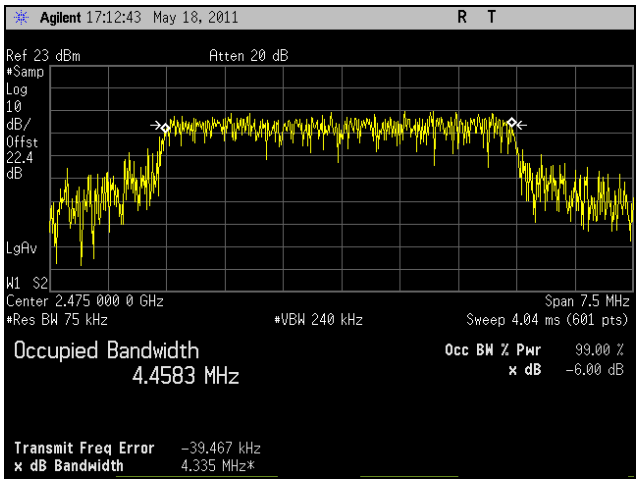
99% Occupied Bandwidth Test Results, 802.11n HT5, Port 2



Plot 70. 99% Occupied Bandwidth, Low Channel, 802.11n HT5, Port 2

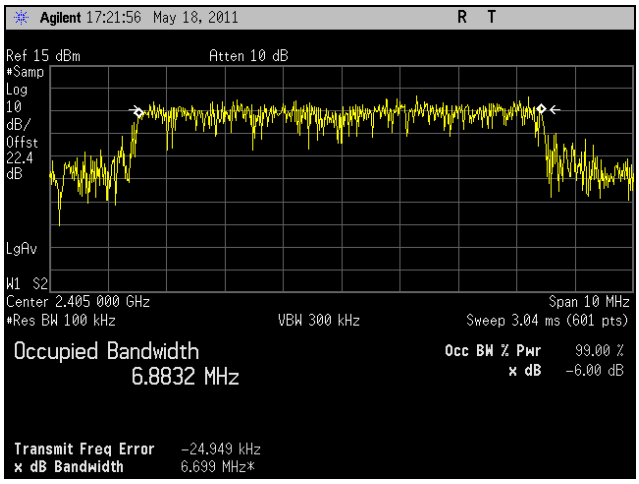


Plot 71. 99% Occupied Bandwidth, Mid Channel, 802.11n HT5, Port 2

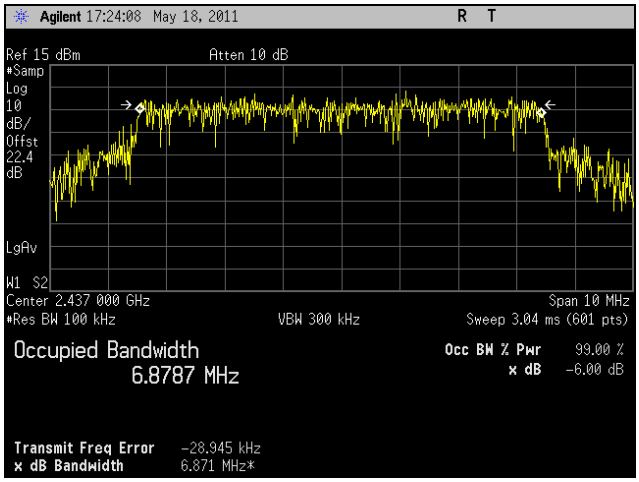


Plot 72. 99% Occupied Bandwidth, High Channel, 802.11n HT5, Port 2

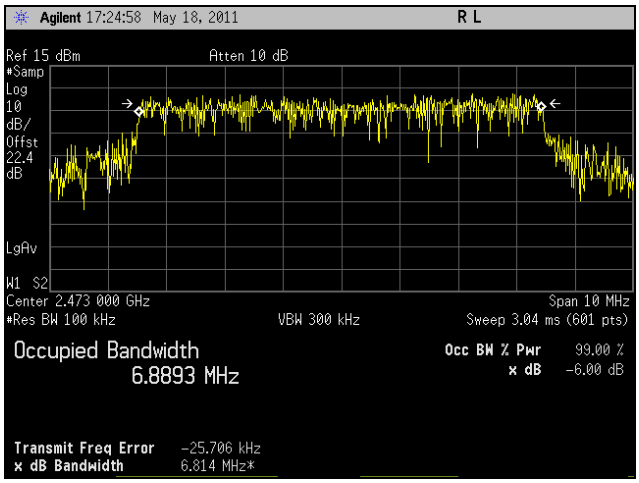
99% Occupied Bandwidth Test Results, 802.11n HT8, Port 1



Plot 73. 99% Occupied Bandwidth, Low Channel, 802.11n HT8, Port 1

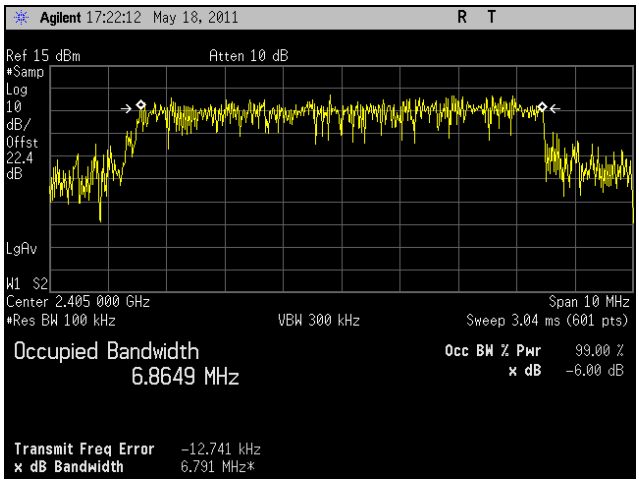


Plot 74. 99% Occupied Bandwidth, Mid Channel, 802.11n HT8, Port 1

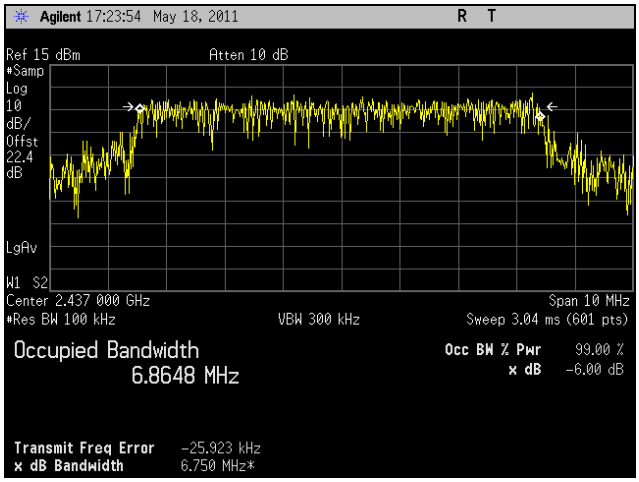


Plot 75. 99% Occupied Bandwidth, High Channel, 802.11n HT8, Port 1

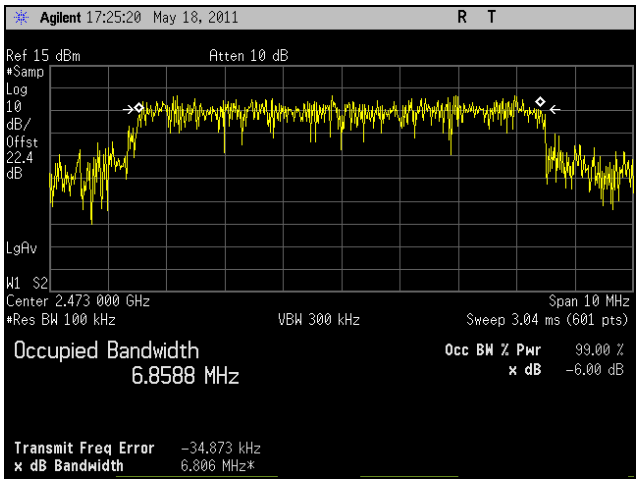
99% Occupied Bandwidth Test Results, 802.11n HT8, Port 2



Plot 76. 99% Occupied Bandwidth, Low Channel, 802.11n HT8, Port 2

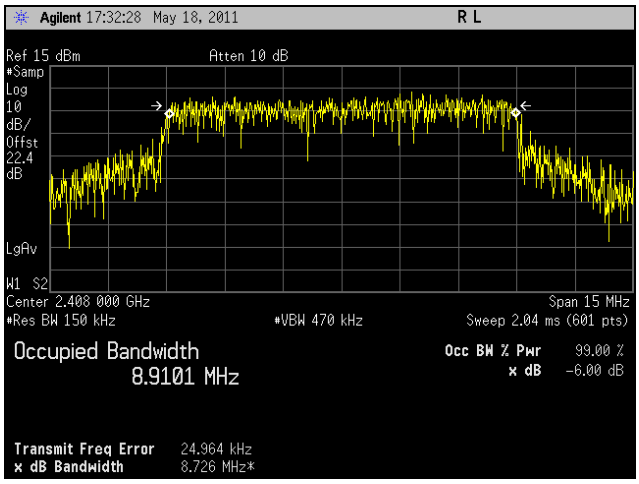


Plot 77. 99% Occupied Bandwidth, Mid Channel, 802.11n HT8, Port 2

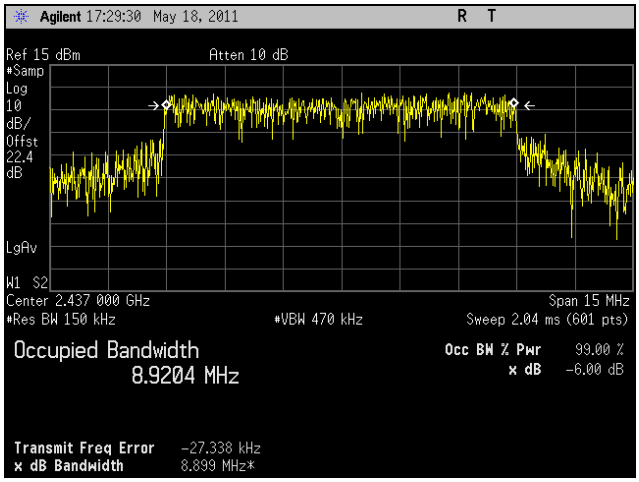


Plot 78. 99% Occupied Bandwidth, High Channel, 802.11n HT8, Port 2

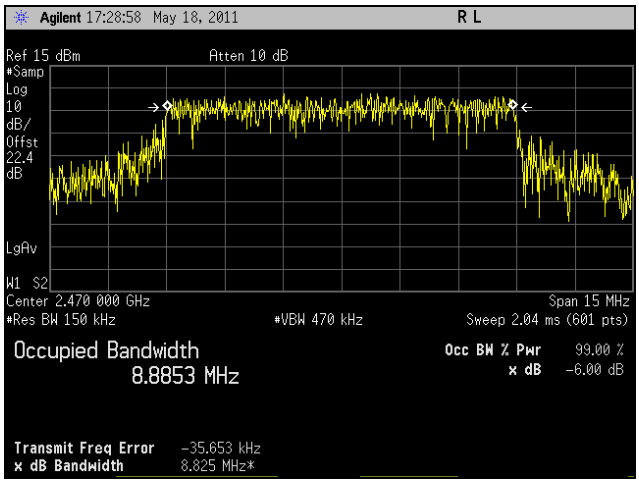
99% Occupied Bandwidth Test Results, 802.11n HT10, Port 1



Plot 79. 99% Occupied Bandwidth, Low Channel, 802.11n HT10, Port 1

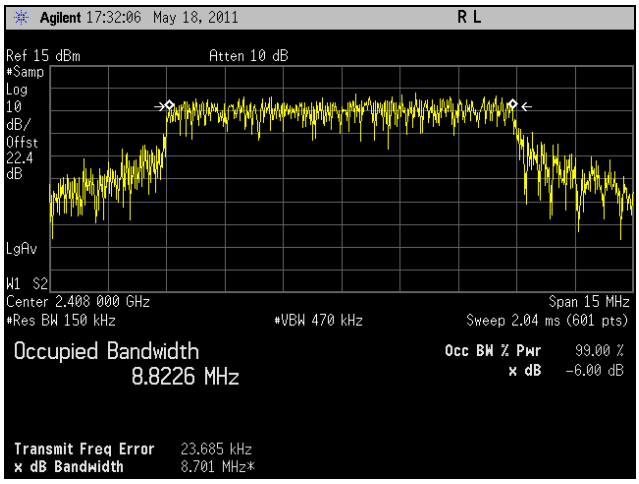


Plot 80. 99% Occupied Bandwidth, Mid Channel, 802.11n HT10, Port 1

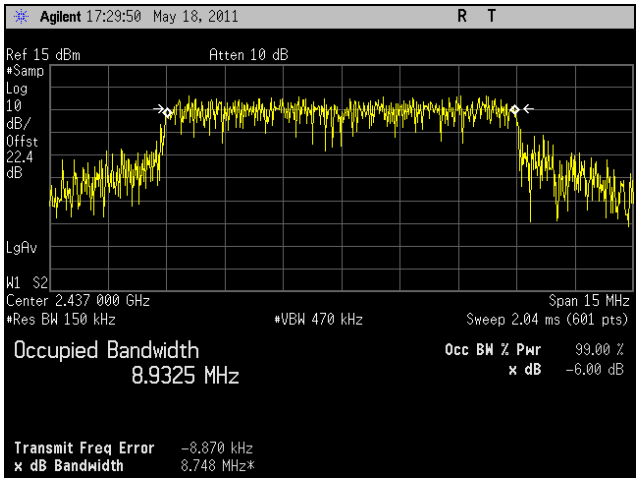


Plot 81. 99% Occupied Bandwidth, High Channel, 802.11n HT10, Port 1

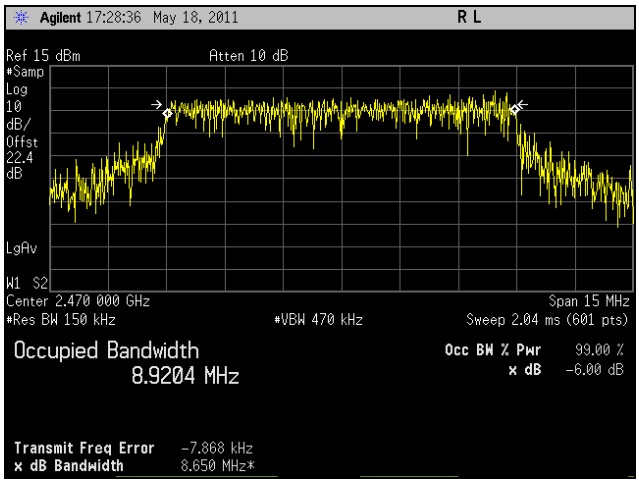
99% Occupied Bandwidth Test Results, 802.11n HT10, Port 2



Plot 82. 99% Occupied Bandwidth, Low Channel, 802.11n HT10, Port 2

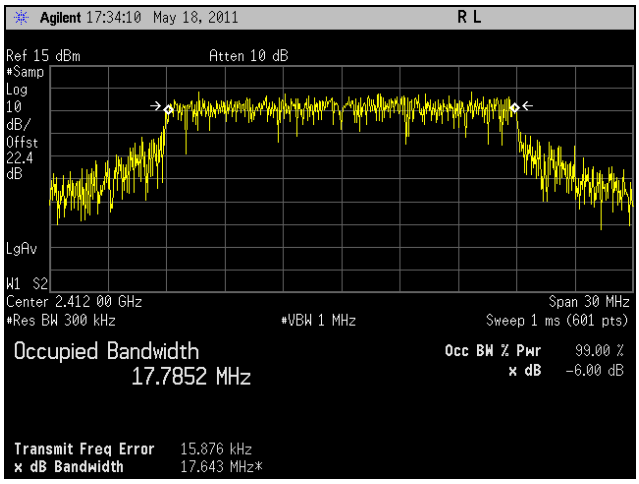


Plot 83. 99% Occupied Bandwidth, Mid Channel, 802.11n HT10, Port 2

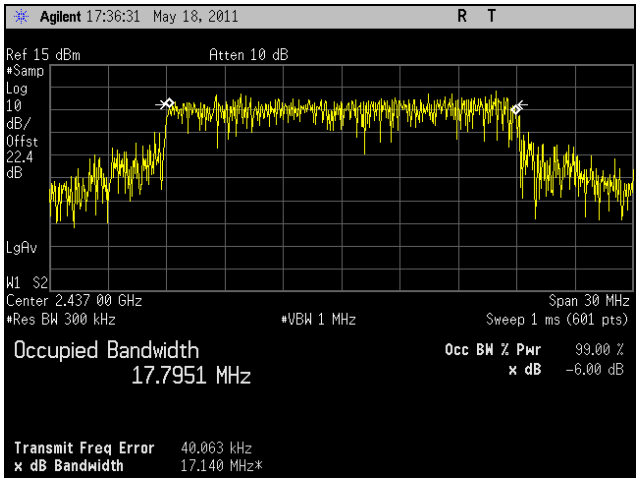


Plot 84. 99% Occupied Bandwidth, High Channel, 802.11n HT10, Port 2

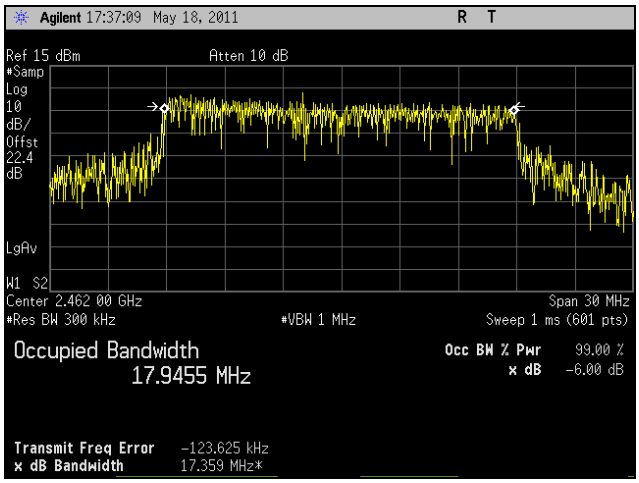
99% Occupied Bandwidth Test Results, 802.11n HT20, Port 1



Plot 85. 99% Occupied Bandwidth, Low Channel, 802.11n HT20, Port 1

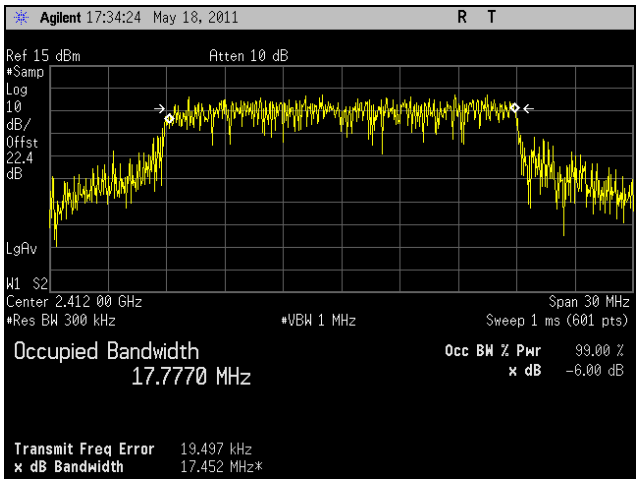


Plot 86. 99% Occupied Bandwidth, Mid Channel, 802.11n HT20, Port 1

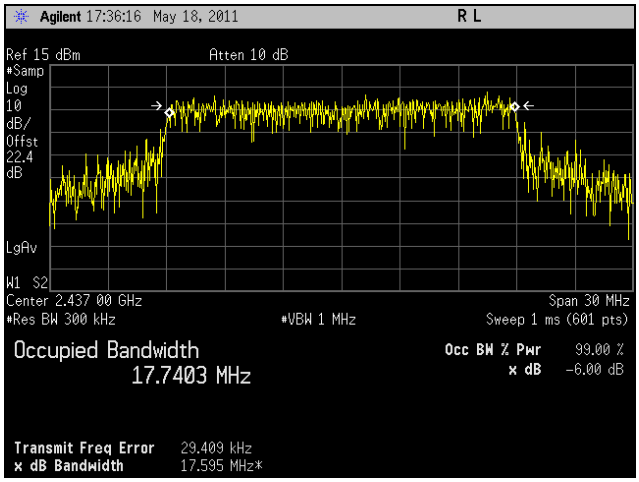


Plot 87. 99% Occupied Bandwidth, High Channel, 802.11n HT20, Port 1

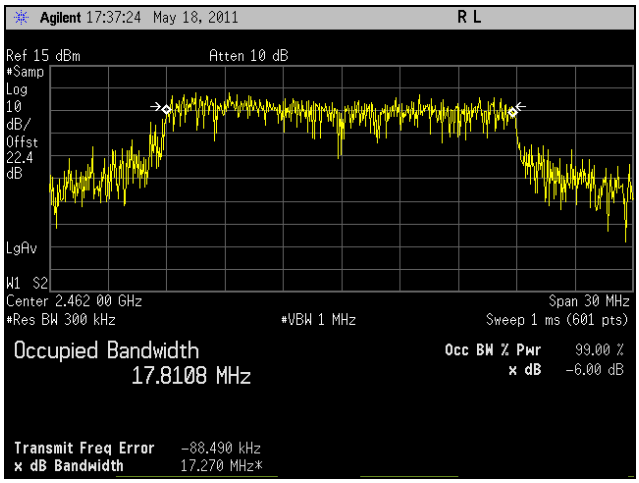
99% Occupied Bandwidth Test Results, 802.11n HT20, Port 2



Plot 88. 99% Occupied Bandwidth, Low Channel, 802.11n HT20, Port 2

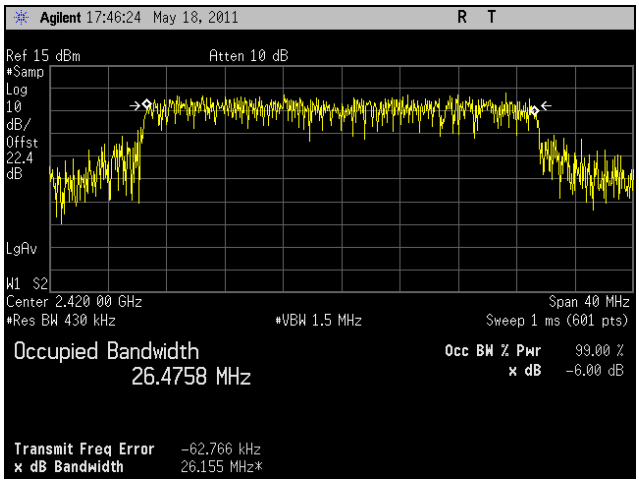


Plot 89. 99% Occupied Bandwidth, Mid Channel, 802.11n HT20, Port 2

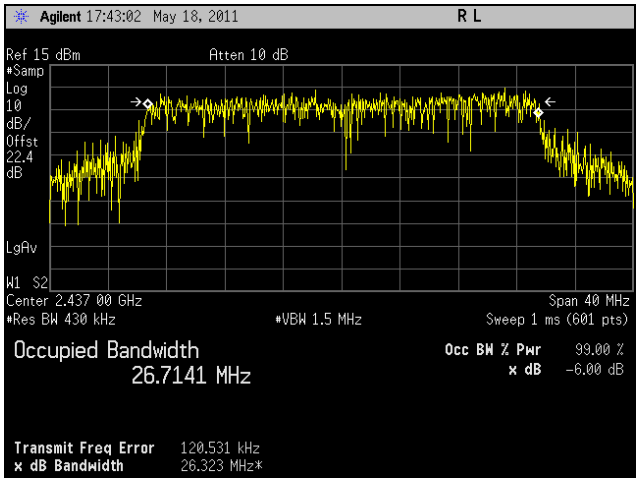


Plot 90. 99% Occupied Bandwidth, High Channel, 802.11n HT20, Port 2

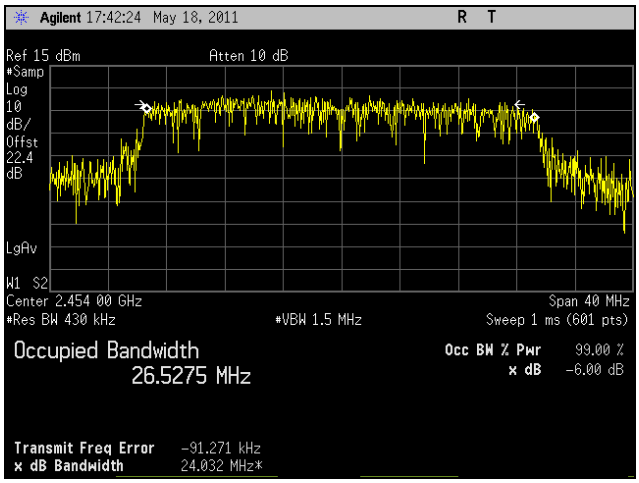
99% Occupied Bandwidth Test Results, 802.11n HT30, Port 1



Plot 91. 99% Occupied Bandwidth, Low Channel, 802.11n HT30, Port 1

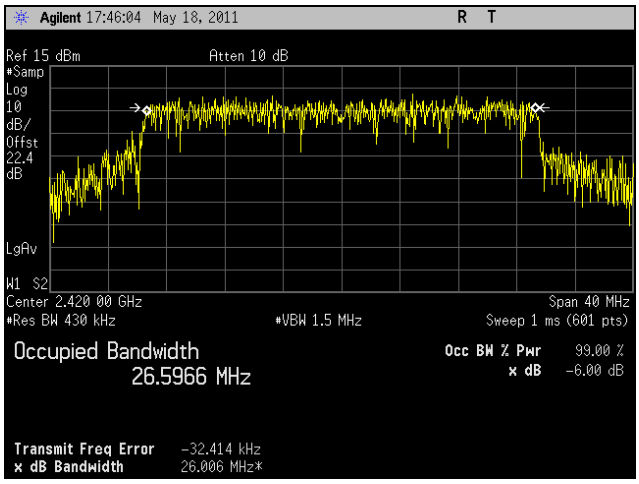


Plot 92. 99% Occupied Bandwidth, Mid Channel, 802.11n HT30, Port 1

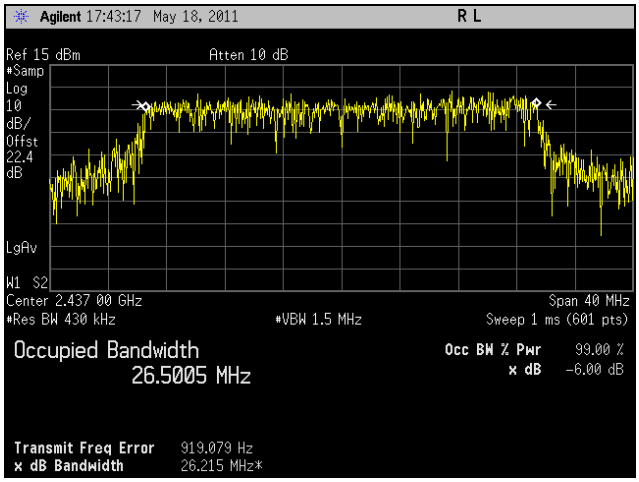


Plot 93. 99% Occupied Bandwidth, High Channel, 802.11n HT30, Port 1

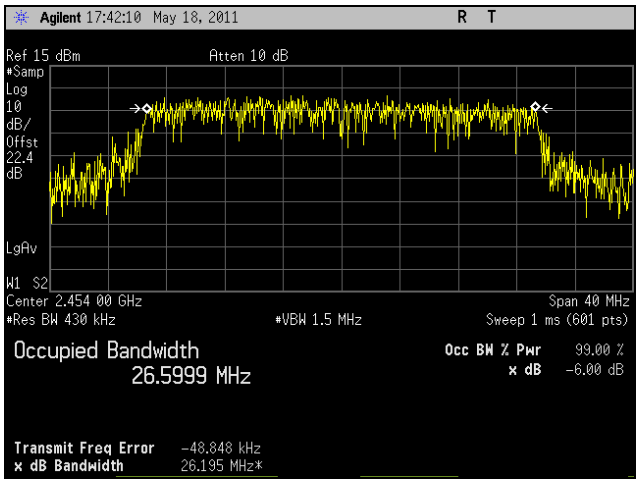
99% Occupied Bandwidth Test Results, 802.11n HT30, Port 2



Plot 94. 99% Occupied Bandwidth, Low Channel, 802.11n HT30, Port 2

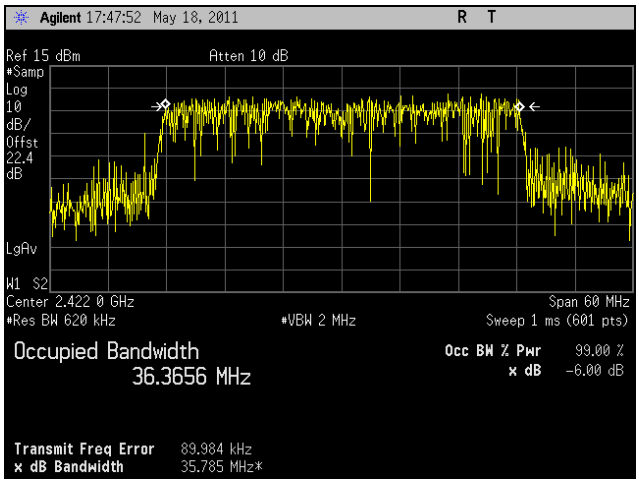


Plot 95. 99% Occupied Bandwidth, Mid Channel, 802.11n HT30, Port 2

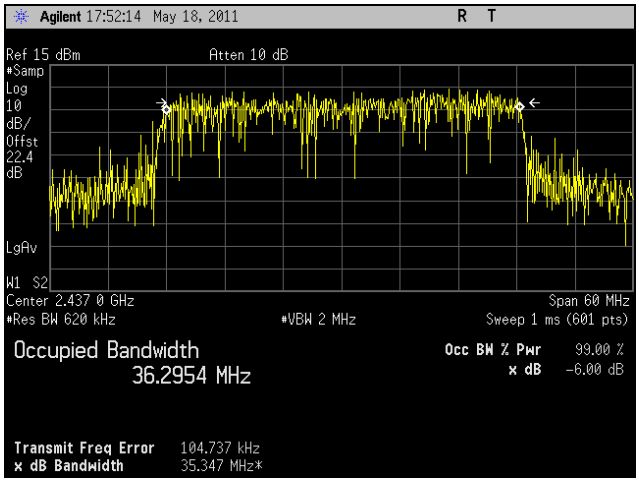


Plot 96. 99% Occupied Bandwidth, High Channel, 802.11n HT30, Port 2

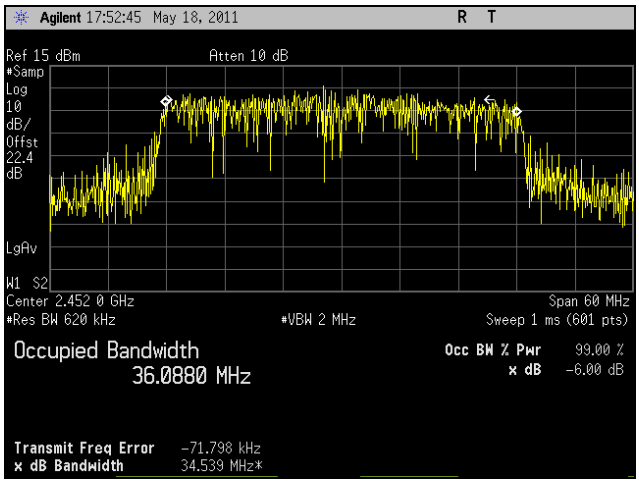
99% Occupied Bandwidth Test Results, 802.11n HT40, Port 1



Plot 97. 99% Occupied Bandwidth, Low Channel, 802.11n HT40, Port 1

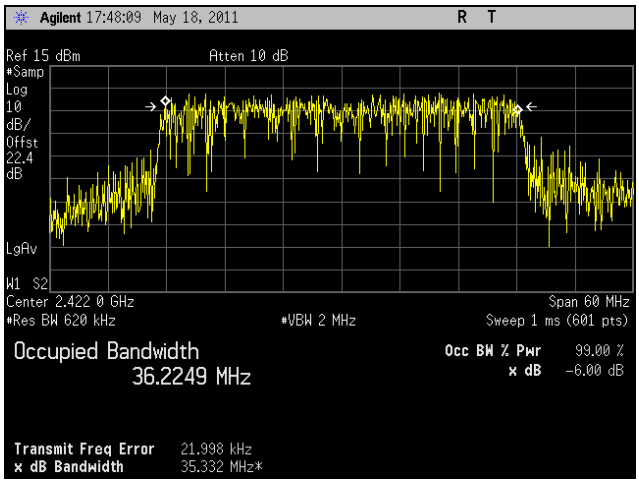


Plot 98. 99% Occupied Bandwidth, Mid Channel, 802.11n HT40, Port 1

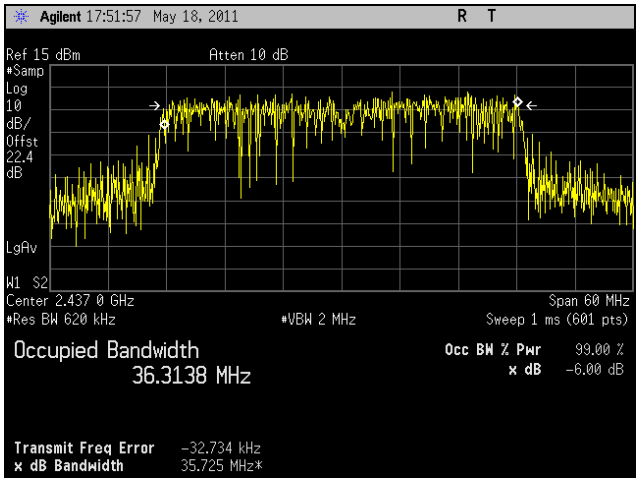


Plot 99. 99% Occupied Bandwidth, High Channel, 802.11n HT40, Port 1

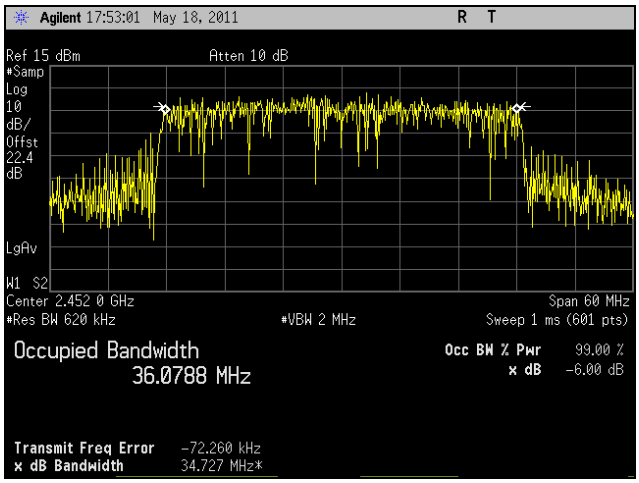
99% Occupied Bandwidth Test Results, 802.11n HT40, Port 2



Plot 100. 99% Occupied Bandwidth, Low Channel, 802.11n HT40, Port 2



Plot 101. 99% Occupied Bandwidth, Mid Channel, 802.11n HT40, Port 2



Plot 102. 99% Occupied Bandwidth, High Channel, 802.11n HT40, Port 2

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(b) Peak Power Output

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

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

Table 25. Output Power Requirements from §15.247(b)

§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 25, 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 and using a point to point application 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): Anderson Soungpanya

Test Date(s): 05/18/11

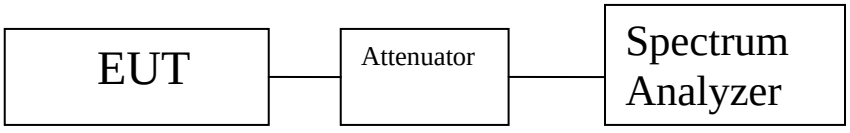


Figure 3. Peak Power Output Test Setup

Peak Power Output Test Results

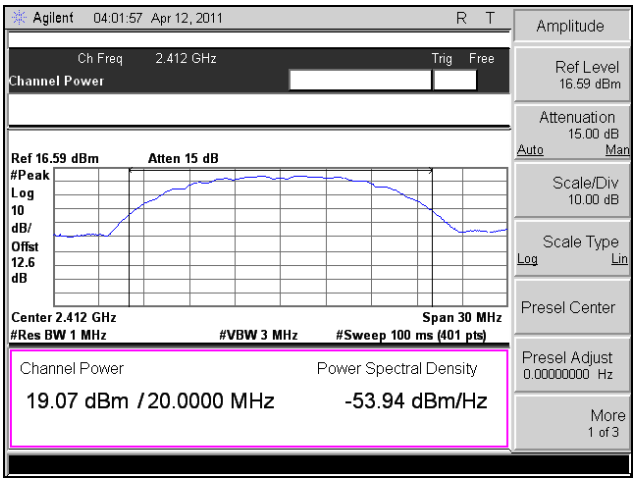
Peak Conducted Output Power			
Mode	**Carrier Channel**	**Frequency (MHz)**	**Measured Peak Output Power (dBm)**
802.11b	Low	2412	19.07
	Mid	2437	28.16
	High	2462	16.81
802.11g 20 MHz	Low	2412	23.17
	Mid	2437	28.23
	High	2462	20.08
802.11g 40 MHz	Low	2422	21.21
	Mid	2437	23.81
	High	2452	16.96
HT5 Port 1	Low	2403	23.03
	Mid	2437	25.96
	High	2475	20.58
HT5 Port 2	Low	2403	23.74
	Mid	2437	25.64
	High	2475	20.44
HT8 Port 1	Low	2405	23.49
	Mid	2437	25.66
	High	2473	20.38
HT8 Port 2	Low	2405	23.77
	Mid	2437	25.42
	High	2473	20.39
HT10 Port 1	Low	2408	23.97
	Mid	2437	25.54
	High	2470	20.15
HT10 Port 2	Low	2408	23.49
	Mid	2437	25.79
	High	2470	19.62
HT20 Port 1	Low	2412	23.85
	Mid	2437	25.74
	High	2462	18.23
HT20 Port 2	Low	2412	23.37
	Mid	2437	25.64
	High	2462	17.98
HT30 Port 1	Low	2420	22.55
	Mid	2437	23.70
	High	2454	19.37
HT30 Port 2	Low	2420	20.92
	Mid	2437	23.46
	High	2454	18.54
HT40 Port 1	Low	2422	22.00
	Mid	2437	23.63
	High	2452	16.78
HT40 Port 2	Low	2422	21.47
	Mid	2437	23.88
	High	2452	16.10

Table 26. Peak Power Output, Test Results

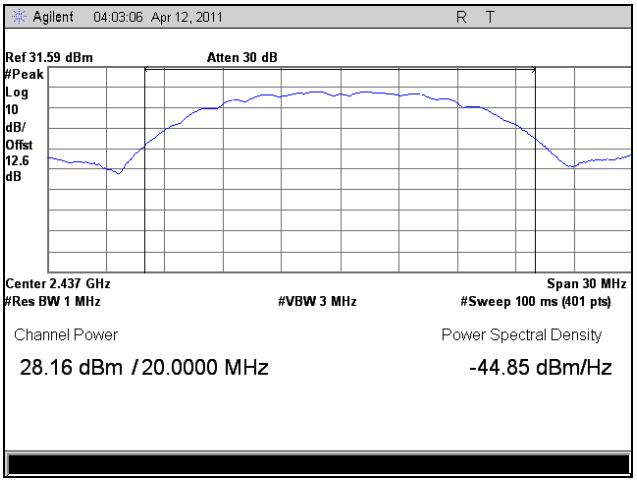
Peak Conducted Output Power			
Mode	**Carrier Channel**	**Frequency (MHz)**	**Summed Peak Output Power (dBm)**
HT5	Low	2403	26.41
	Mid	2437	28.81
	High	2475	23.52
HT8	Low	2403	26.64
	Mid	2437	28.55
	High	2475	23.40
HT 10	Low	2405	26.75
	Mid	2437	28.68
	High	2473	22.90
HT20	Low	2405	26.63
	Mid	2437	28.70
	High	2473	21.12
HT 30	Low	2408	24.82
	Mid	2437	26.59
	High	2470	21.99
HT 40	Low	2408	24.75
	Mid	2437	26.77
	High	2470	19.46

Table 27. Summed Peak Power Output, Test Results

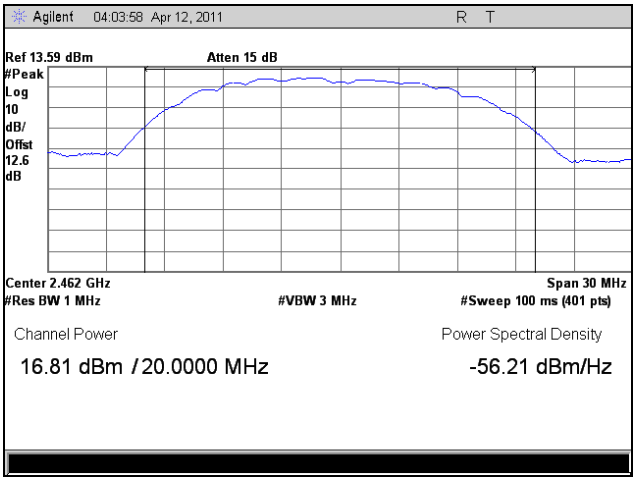
Peak Power Output Test Results, 802.11b



Plot 103. Peak Power Output, Low Channel, 802.11b

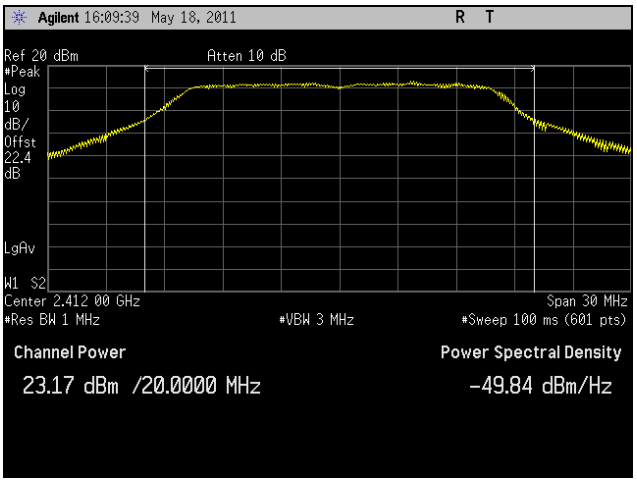


Plot 104. Peak Power Output, Mid Channel, 802.11b

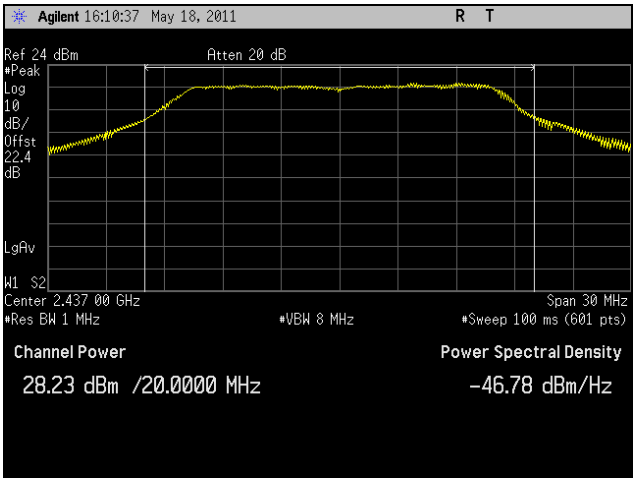


Plot 105. Peak Power Output, High Channel, 802.11b

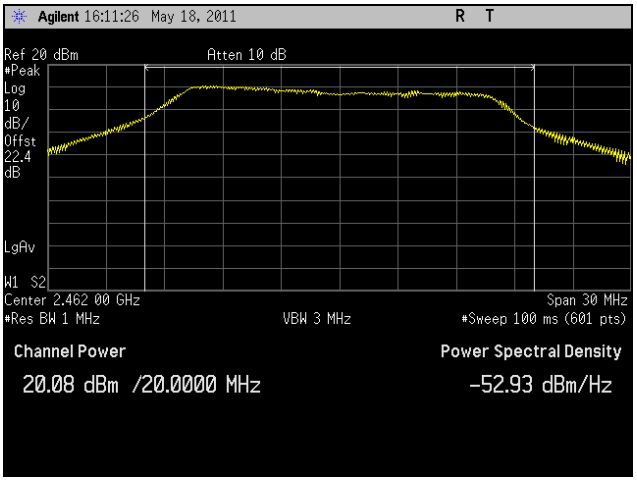
Peak Power Output Test Results, 802.11g 20 MHz



Plot 106. Peak Power Output, Low Channel, 802.11g 20 MHz

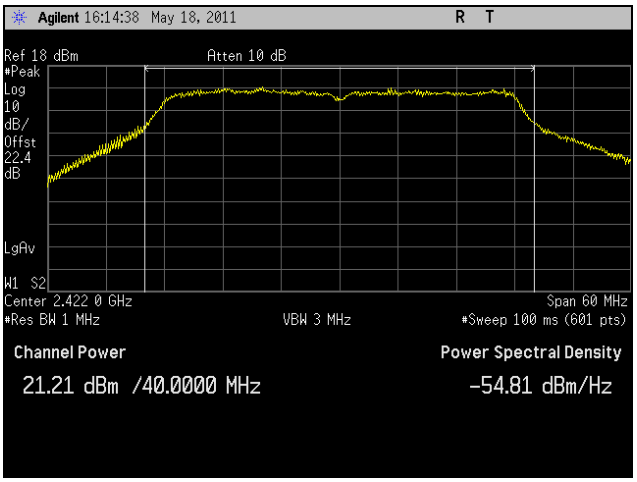


Plot 107. Peak Power Output, Mid Channel, 802.11g 20 MHz

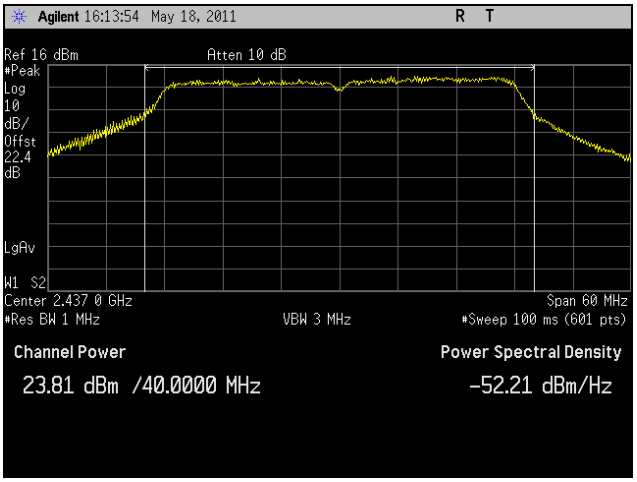


Plot 108. Peak Power Output, High Channel, 802.11g 20 MHz

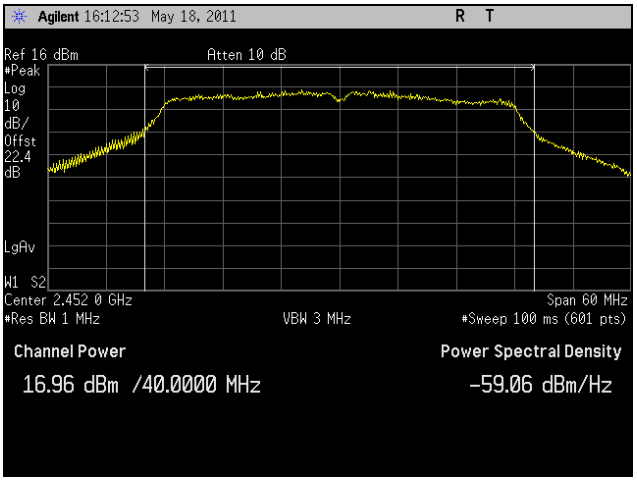
Peak Power Output Test Results, 802.11g 40 MHz



Plot 109. Peak Power Output, Low Channel, 802.11g 40 MHz

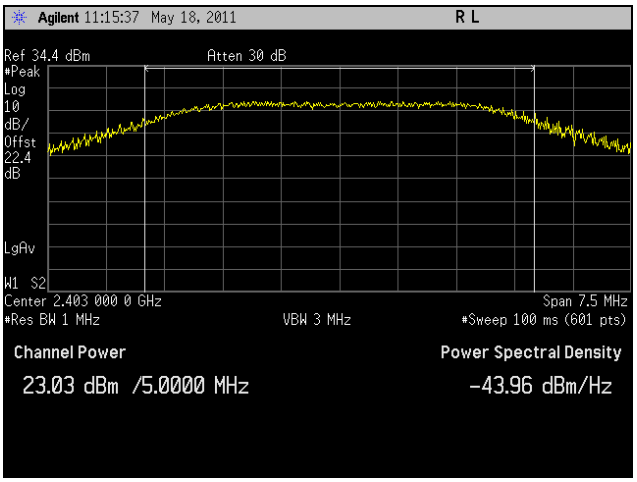


Plot 110. Peak Power Output, Mid Channel, 802.11g 40 MHz

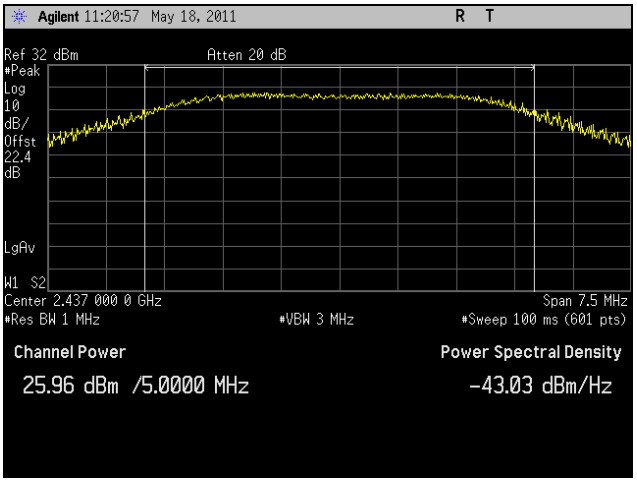


Plot 111. Peak Power Output, High Channel, 802.11g 40 MHz

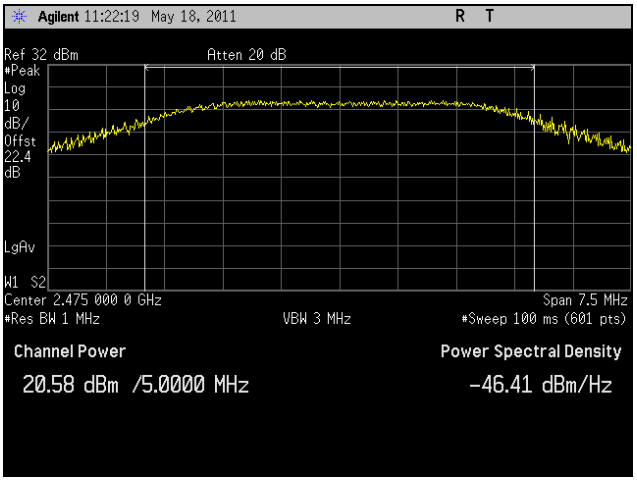
Peak Power Output Test Results, 802.11n HT5, Port 1



Plot 112. Peak Power Output, Low Channel, 802.11n HT5, Port 1

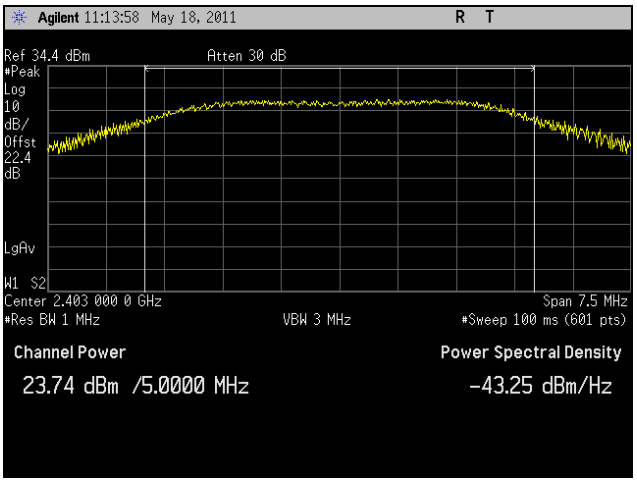


Plot 113. Peak Power Output, Mid Channel, 802.11n HT5, Port 1

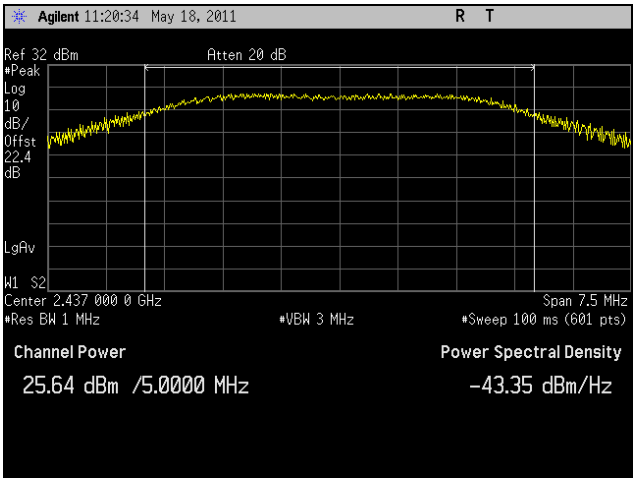


Plot 114. Peak Power Output, High Channel, 802.11n HT5, Port 1

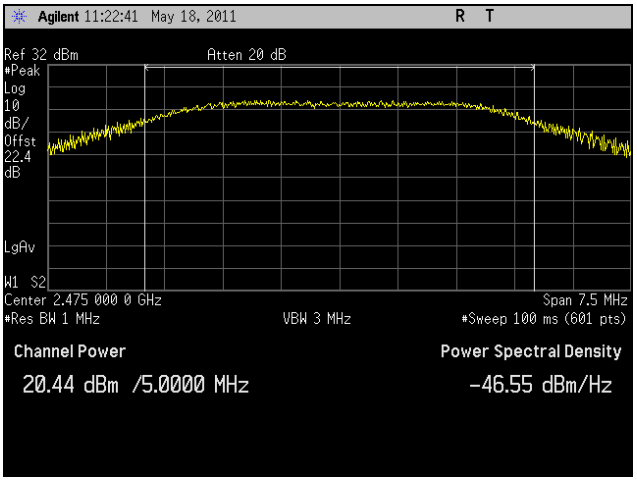
Peak Power Output Test Results, 802.11n HT5, Port 2



Plot 115. Peak Power Output, Low Channel, 802.11n HT5, Port 2

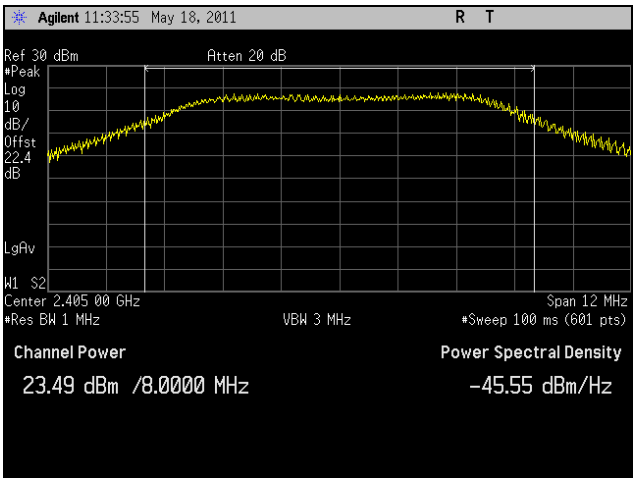


Plot 116. Peak Power Output, Mid Channel, 802.11n HT5, Port 2

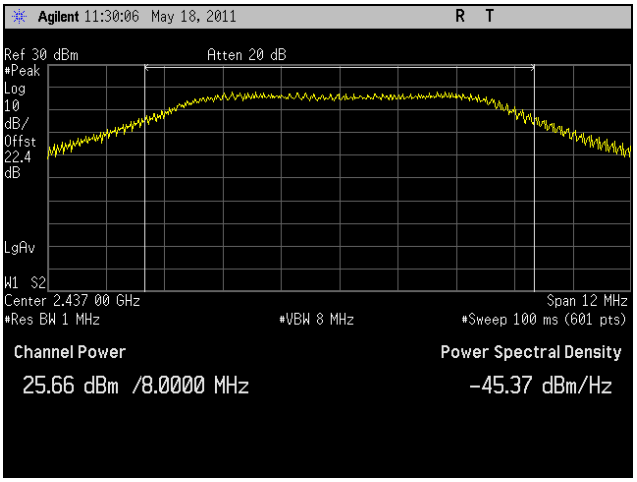


Plot 117. Peak Power Output, High Channel, 802.11n HT5, Port 2

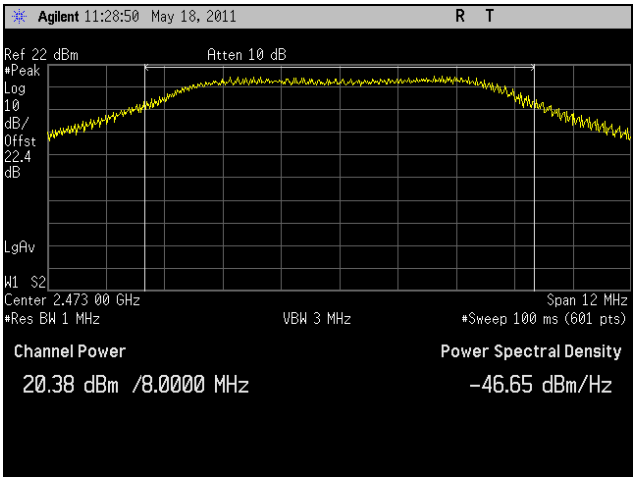
Peak Power Output Test Results, 802.11n HT8, Port 1



Plot 118. Peak Power Output, Low Channel, 802.11n HT8, Port 1

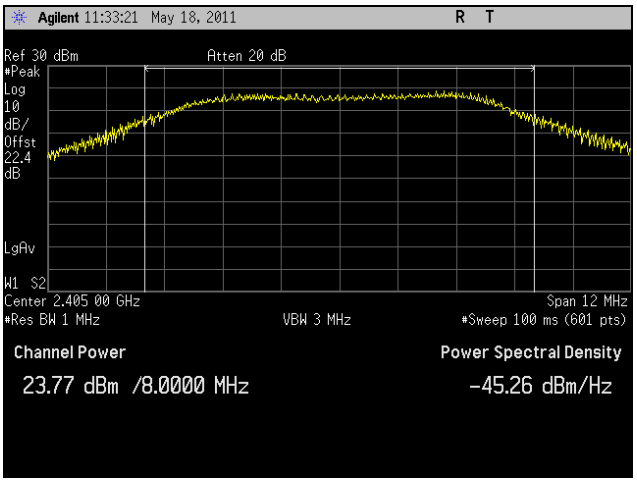


Plot 119. Peak Power Output, Mid Channel, 802.11n HT8, Port 1

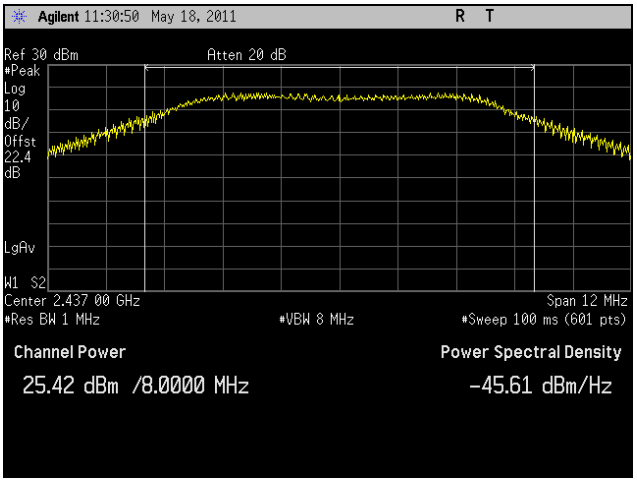


Plot 120. Peak Power Output, High Channel, 802.11n HT8, Port 1

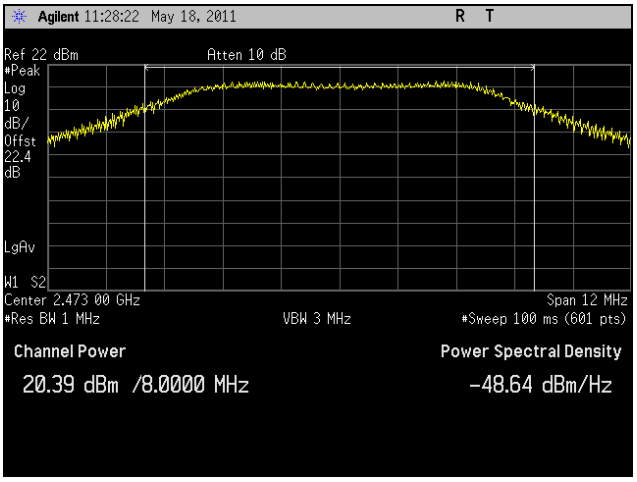
Peak Power Output Test Results, 802.11n HT8, Port 2



Plot 121. Peak Power Output, Low Channel, 802.11n HT8, Port 2

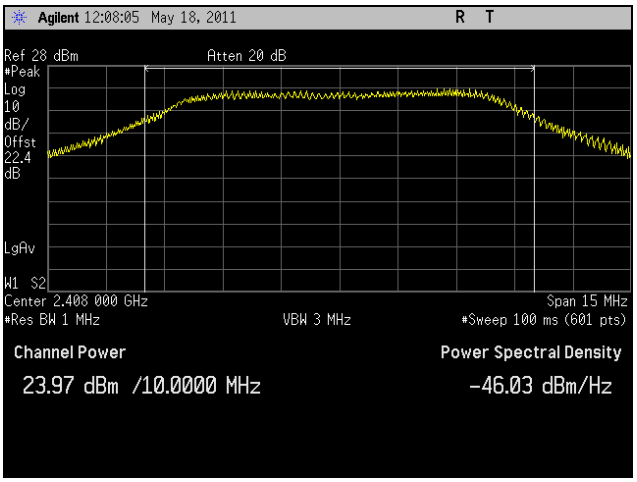


Plot 122. Peak Power Output, Mid Channel, 802.11n HT8, Port 2

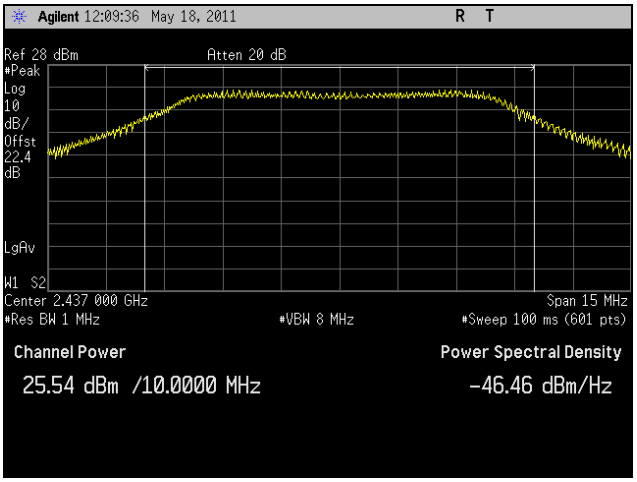


Plot 123. Peak Power Output, High Channel, 802.11n HT8, Port 2

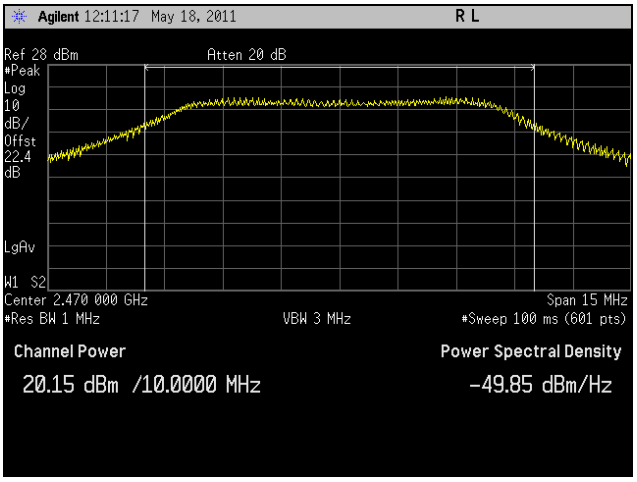
Peak Power Output Test Results, 802.11n HT10, Port 1



Plot 124. Peak Power Output, Low Channel, 802.11n HT10, Port 1

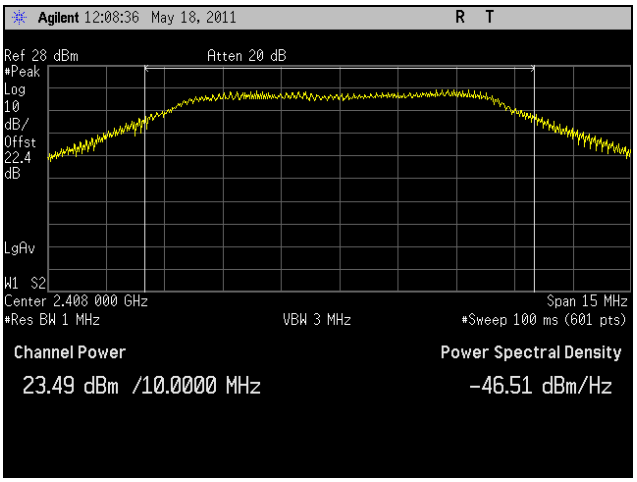


Plot 125. Peak Power Output, Mid Channel, 802.11n HT10, Port 1

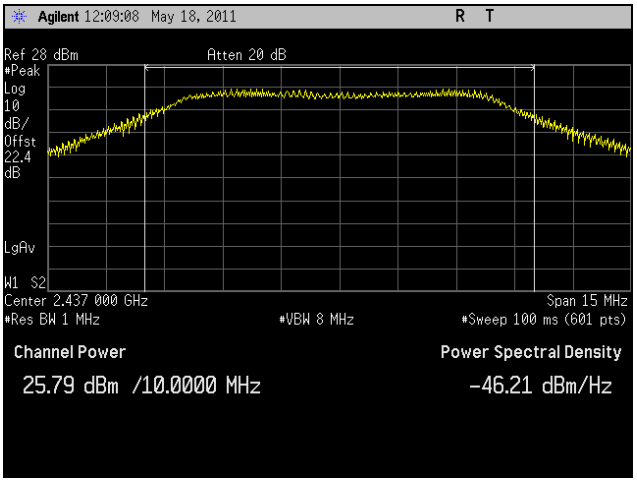


Plot 126. Peak Power Output, High Channel, 802.11n HT10, Port 1

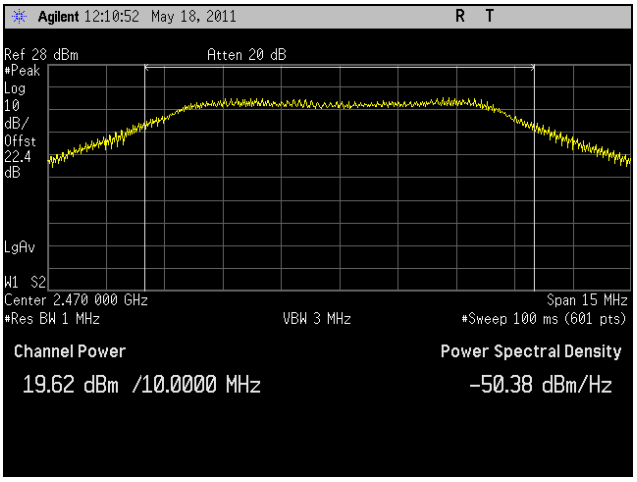
Peak Power Output Test Results, 802.11n HT10, Port 2



Plot 127. Peak Power Output, Low Channel, 802.11n HT10, Port 2



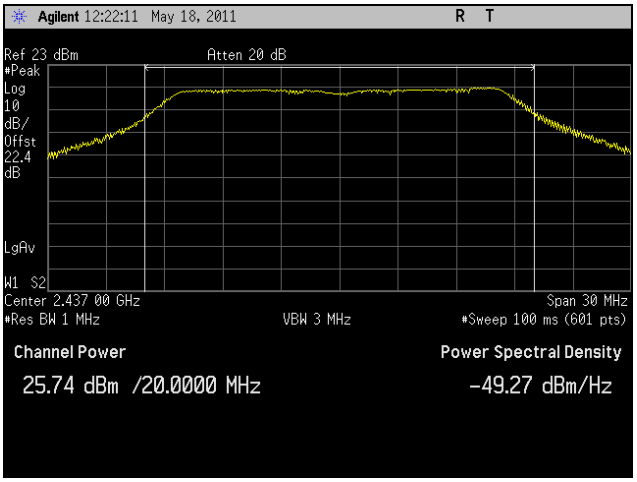
Plot 128. Peak Power Output, Mid Channel, 802.11n HT10, Port 2



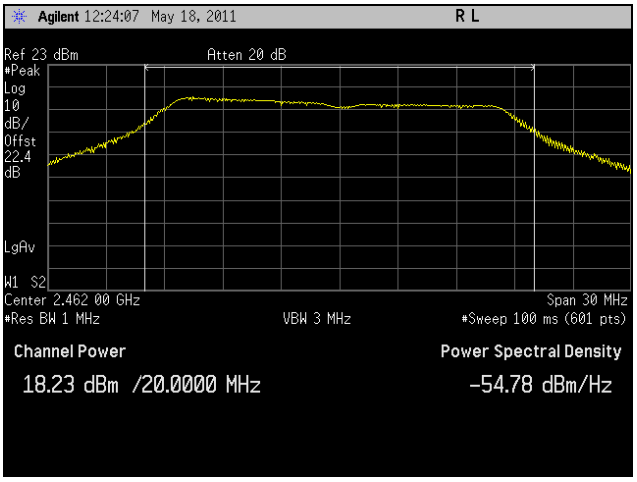
Plot 129. Peak Power Output, High Channel, 802.11n HT10, Port 2

Peak Power Output Test Results, 802.11n HT20, Port 1

Plot 130. Peak Power Output, Low Channel, 802.11n HT20, Port 1

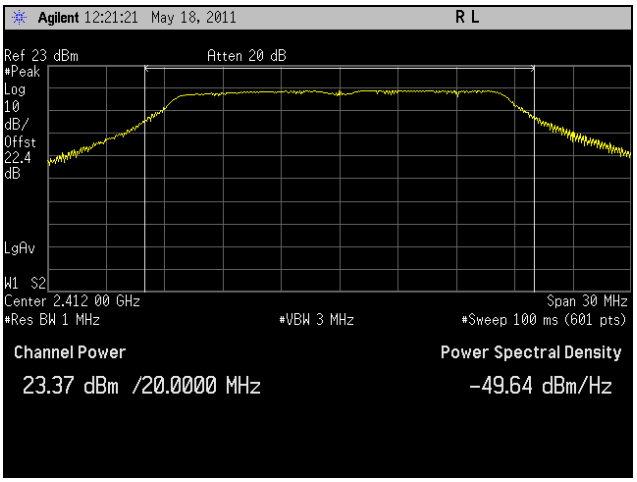


Plot 131. Peak Power Output, Mid Channel, 802.11n HT20, Port 1

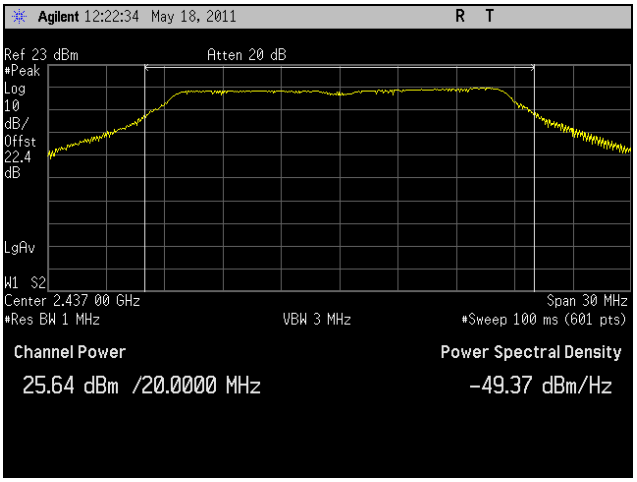


Plot 132. Peak Power Output, High Channel, 802.11n HT20, Port 1

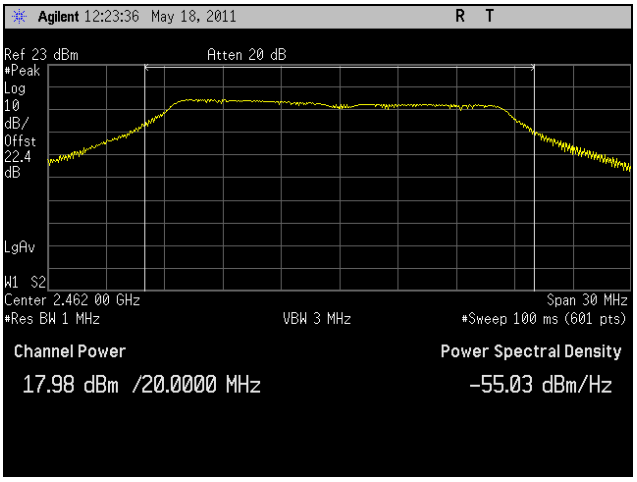
Peak Power Output Test Results, 802.11n HT20, Port 2



Plot 133. Peak Power Output, Low Channel, 802.11n HT20, Port 2

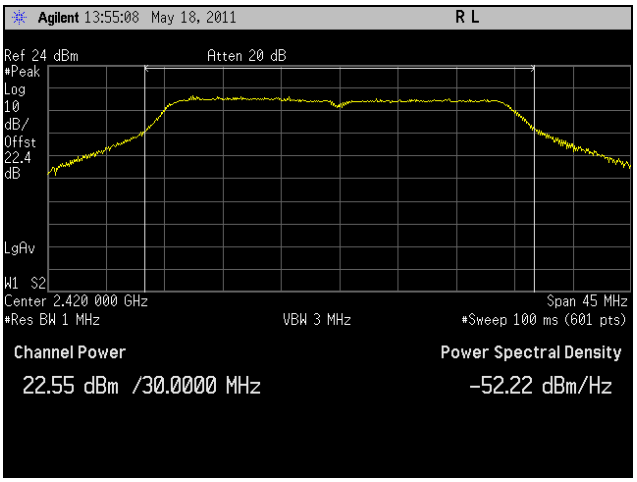


Plot 134. Peak Power Output, Mid Channel, 802.11n HT20, Port 2

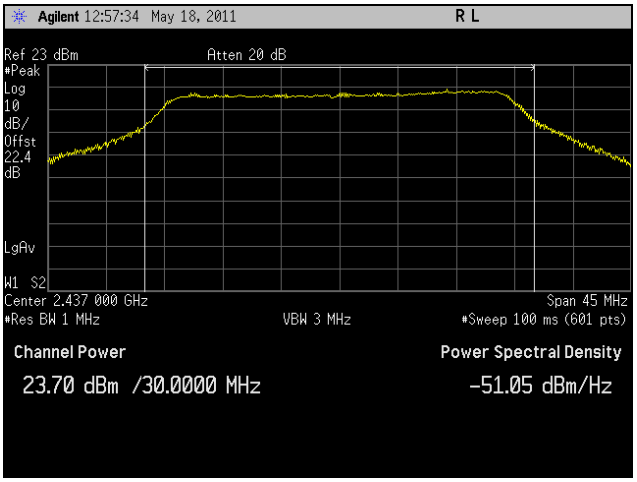


Plot 135. Peak Power Output, High Channel, 802.11n HT20, Port 2

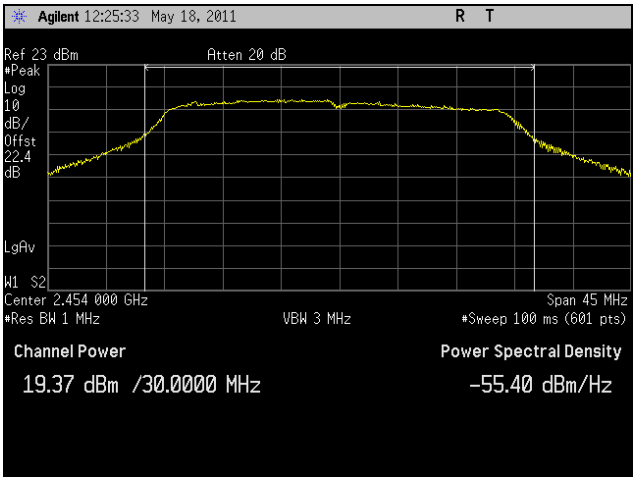
Peak Power Output Test Results, 802.11n HT30, Port 1



Plot 136. Peak Power Output, Low Channel, 802.11n HT30, Port 1

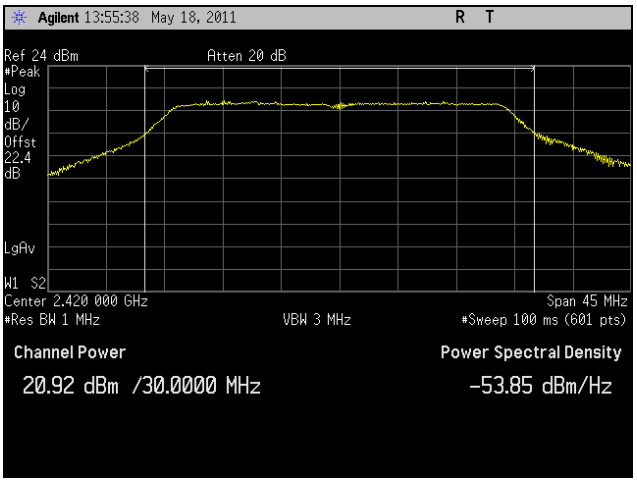


Plot 137. Peak Power Output, Mid Channel, 802.11n HT30, Port 1

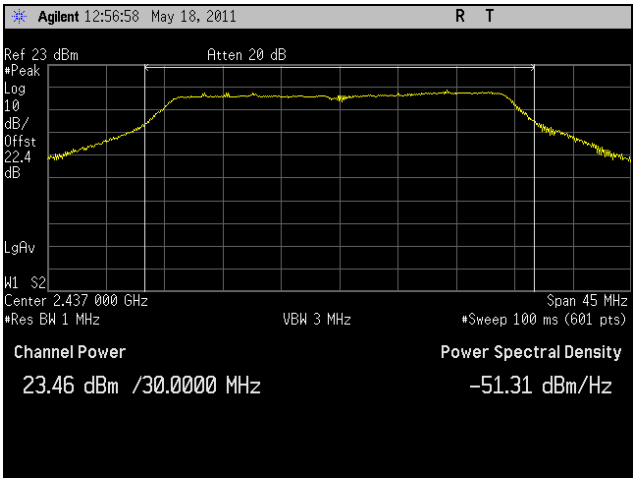


Plot 138. Peak Power Output, High Channel, 802.11n HT30, Port 1

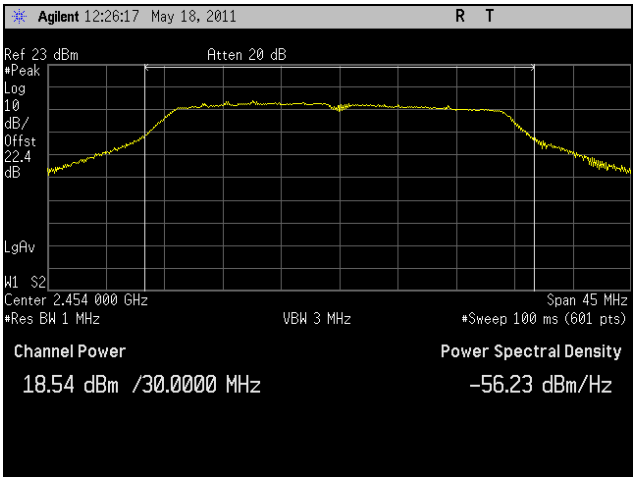
Peak Power Output Test Results, 802.11n HT30, Port 2



Plot 139. Peak Power Output, Low Channel, 802.11n HT30, Port 2

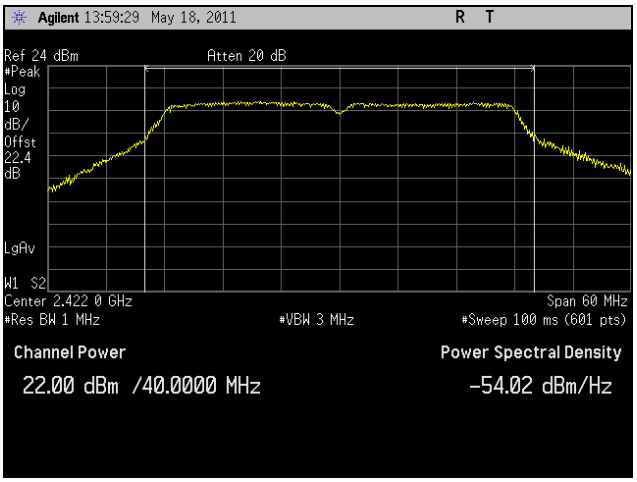


Plot 140. Peak Power Output, Mid Channel, 802.11n HT30, Port 2

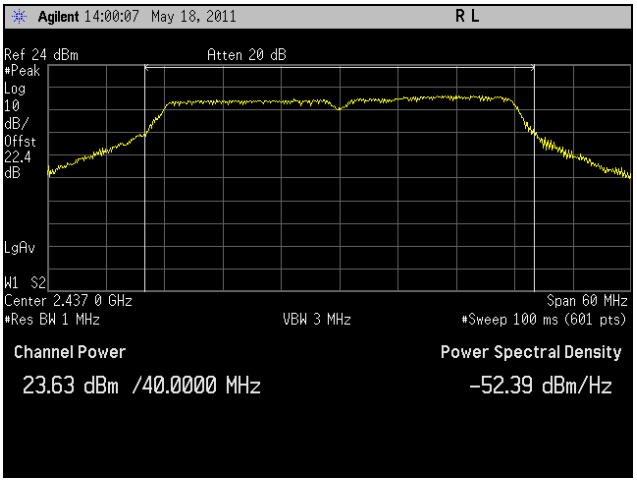


Plot 141. Peak Power Output, High Channel, 802.11n HT30, Port 2

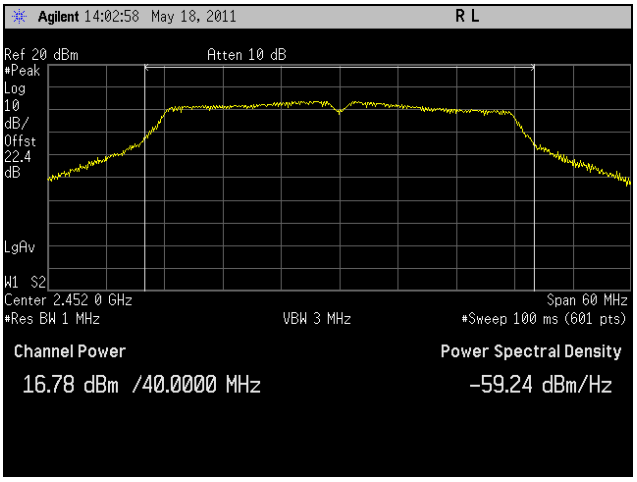
Peak Power Output Test Results, 802.11n HT40, Port 1



Plot 142. Peak Power Output, Low Channel, 802.11n HT40, Port 1

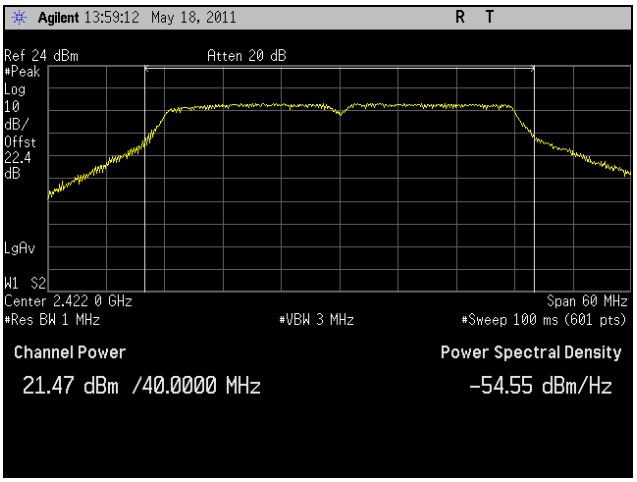


Plot 143. Peak Power Output, Mid Channel, 802.11n HT40, Port 1

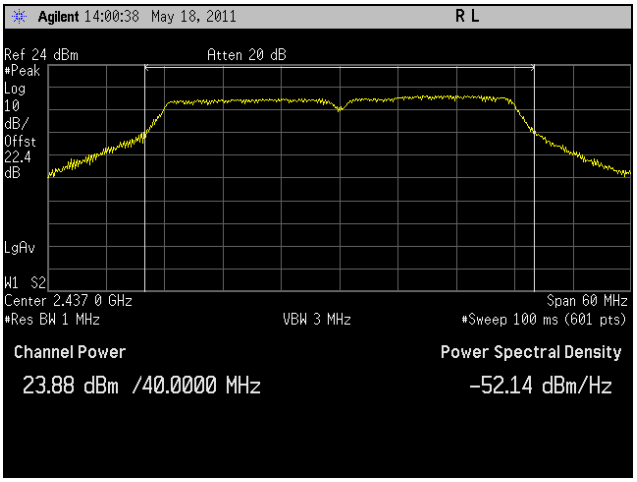


Plot 144. Peak Power Output, High Channel, 802.11n HT40, Port 1

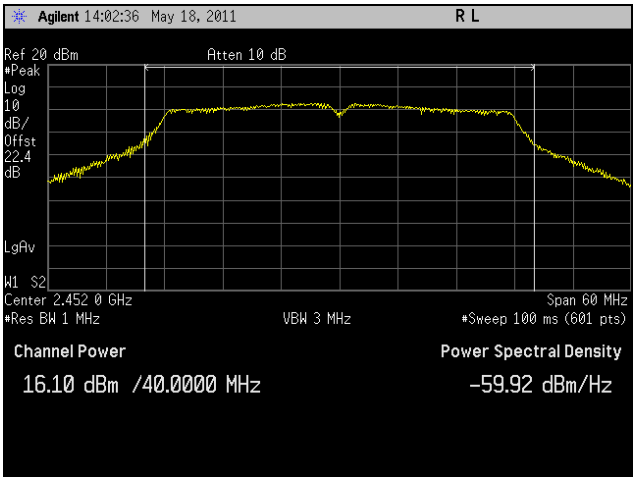
Peak Power Output Test Results, 802.11n HT40, Port 2



Plot 145. Peak Power Output, Low Channel, 802.11n HT40, Port 2



Plot 146. Peak Power Output, Mid Channel, 802.11n HT40, Port 2



Plot 147. Peak Power Output, High Channel, 802.11n HT40, Port 2

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 28. 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 29.

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

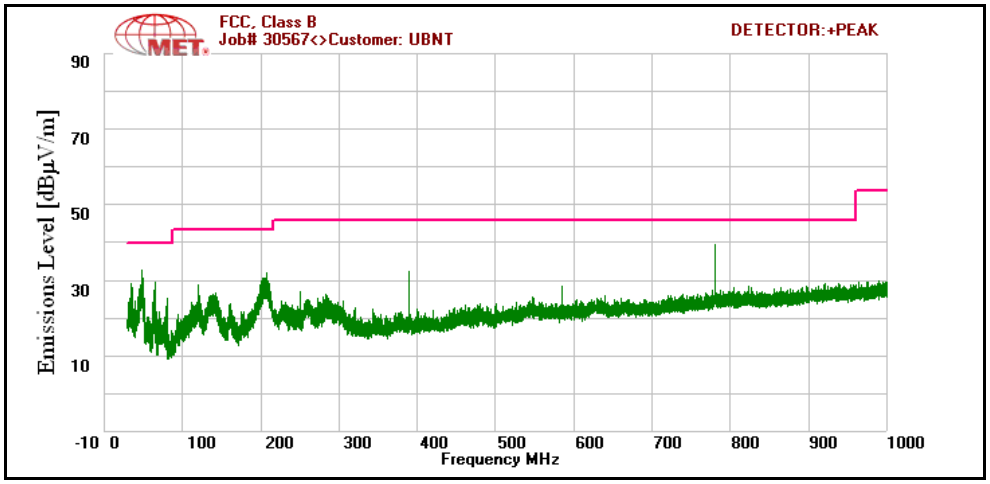
Table 29. Radiated Emissions Limits Calculated from FCC Part 15, § 15.209 (a)

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

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

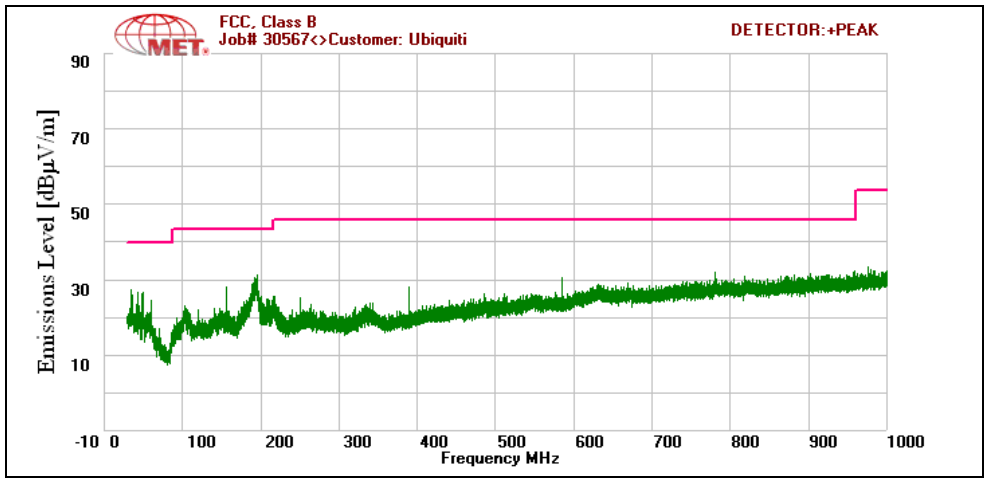
Test Engineer(s): Anderson Soungpanya

Test Date(s): 05/18/11

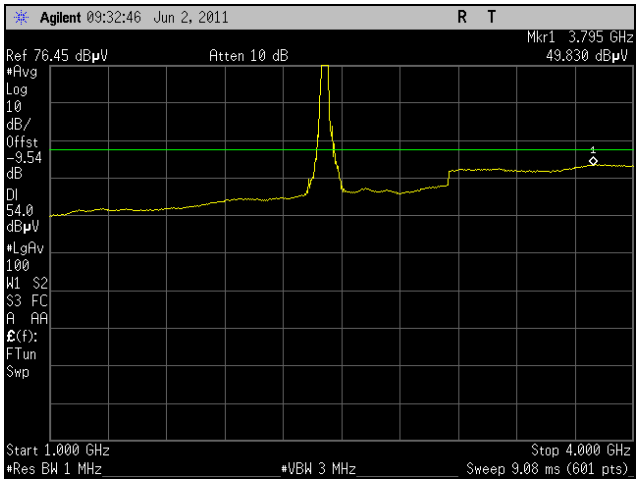


Plot 148. 2437 MHz, Mid Channel, 802.11n 40MHz, Bandwidth

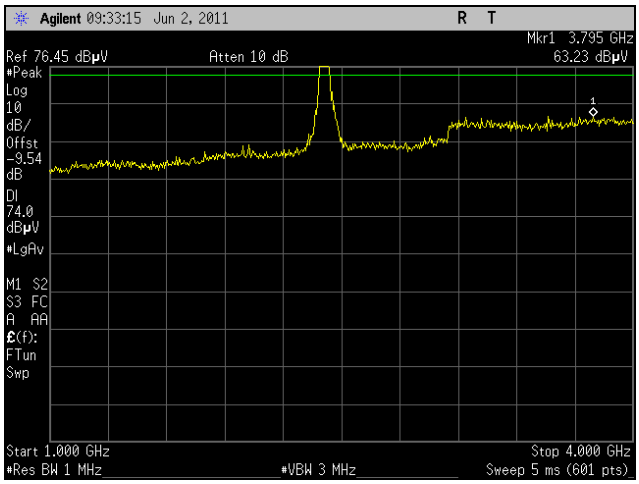
Radiated Harmonic Emissions, 802.11b



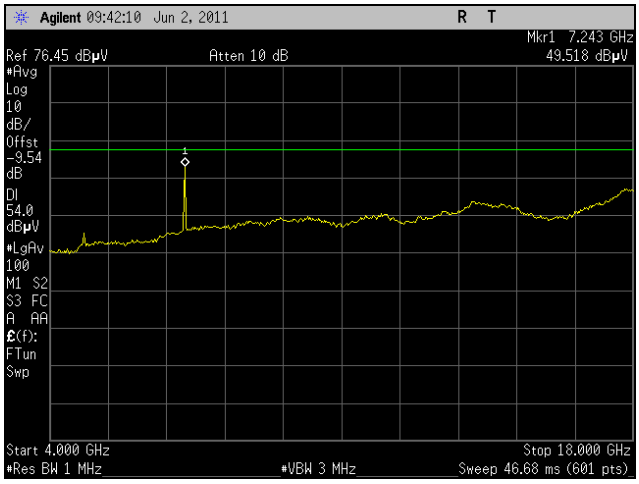
Plot 149. Radiated Harmonic Emissions, Low Channel, 802.11b, 30 MHz – 1 GHz



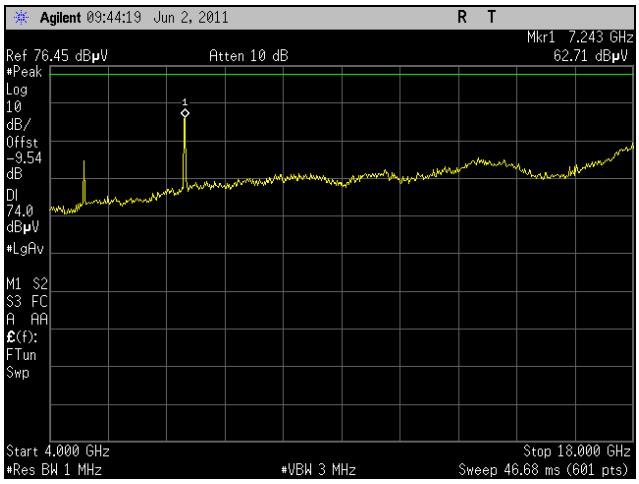
Plot 150. Radiated Harmonic Emissions, Low Channel, 802.11b, Average, 1 GHz – 4 GHz



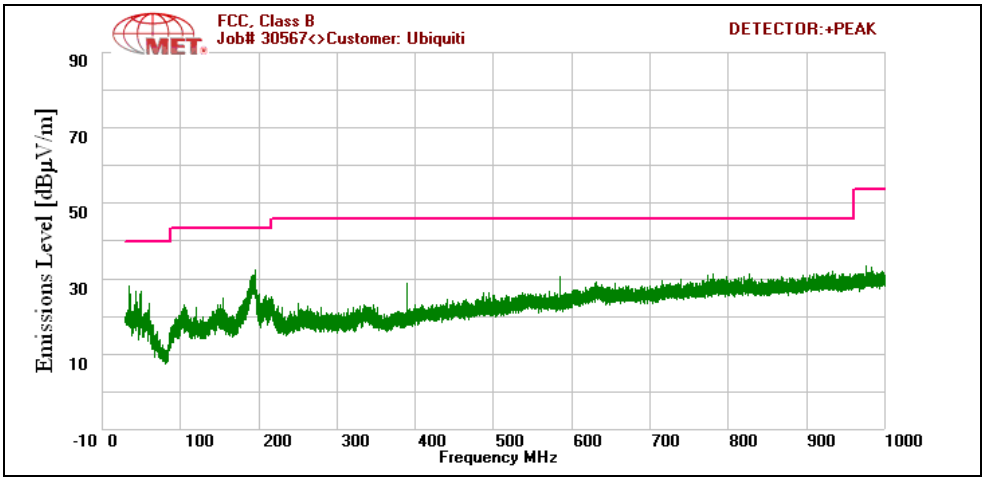
Plot 151. Radiated Harmonic Emissions, Low Channel, 802.11b, Peak, 1 GHz – 4 GHz



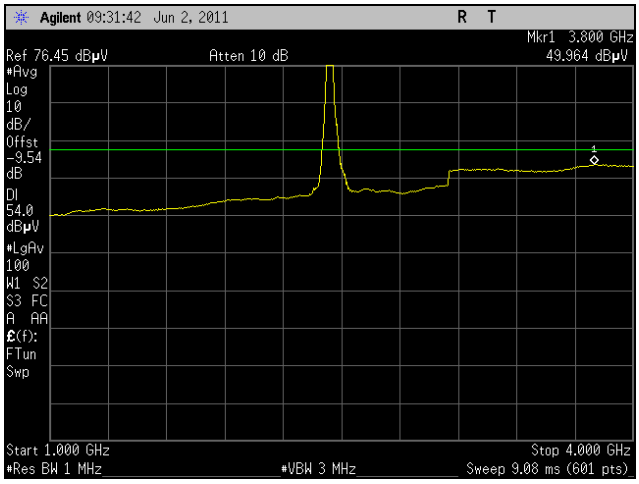
Plot 152. Radiated Harmonic Emissions, Low Channel, 802.11b, Average, 4 GHz – 18 GHz



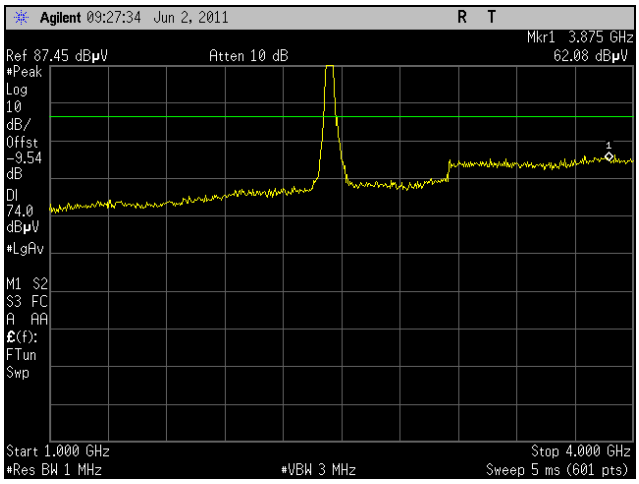
Plot 153. Radiated Harmonic Emissions, Low Channel, 802.11b, Peak, 4 GHz – 18 GHz



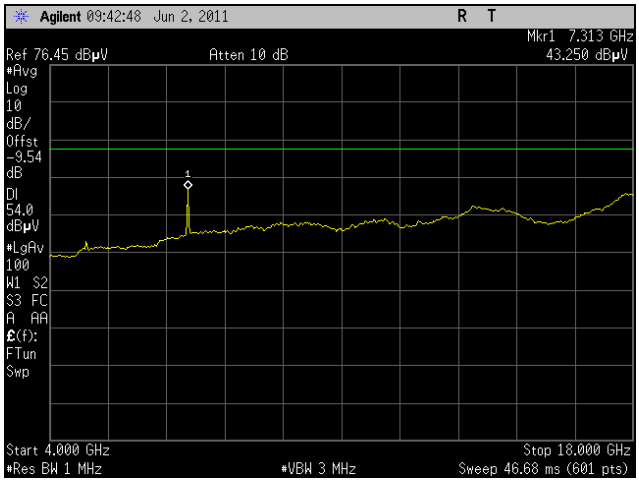
Plot 154. Radiated Harmonic Emissions, Mid Channel, 802.11b, 30 MHz – 1 GHz



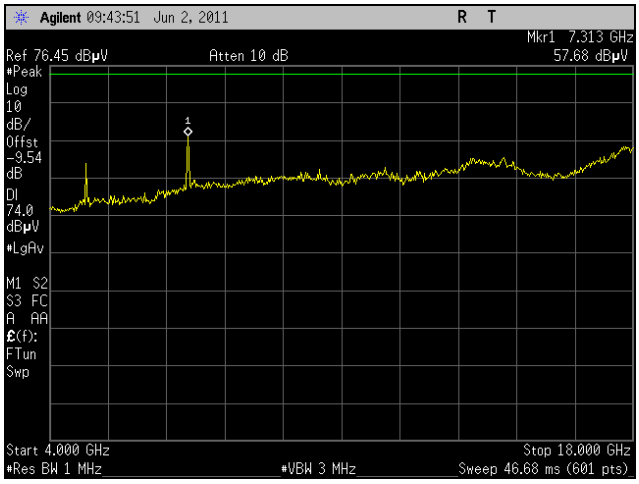
Plot 155. Radiated Harmonic Emissions, Mid Channel, 802.11b, Average, 1 GHz – 4 GHz



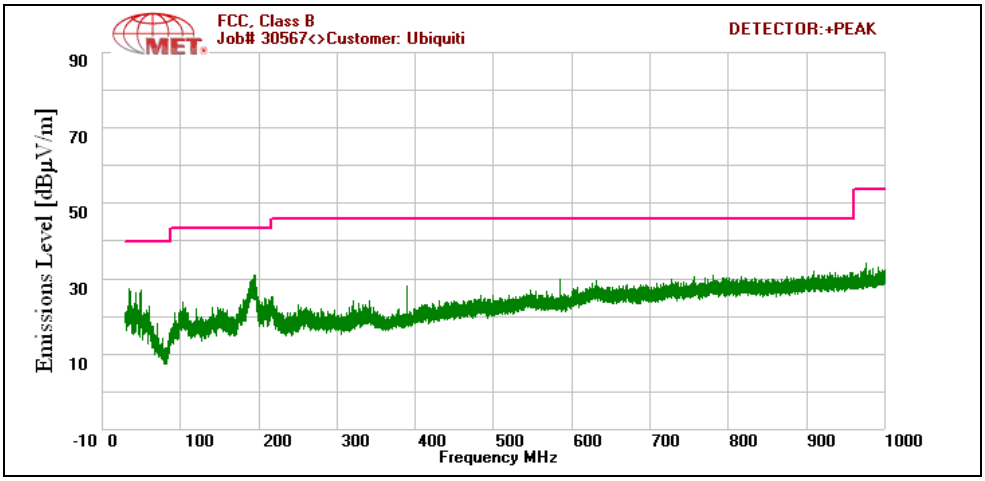
Plot 156. Radiated Harmonic Emissions, Mid Channel, 802.11b, Peak, 1 GHz – 4 GHz



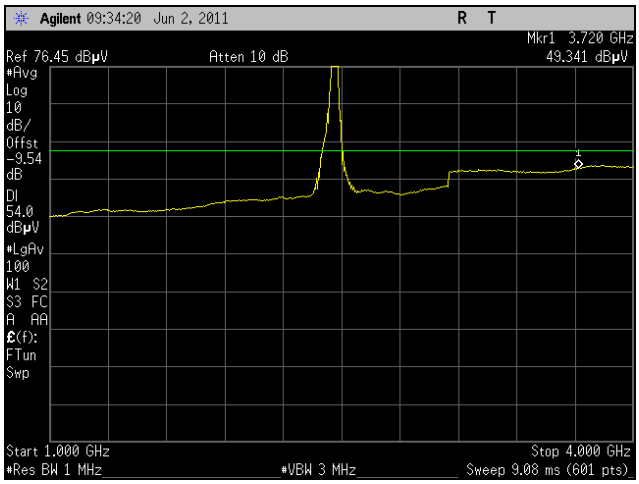
Plot 157. Radiated Harmonic Emissions, Mid Channel, 802.11b, Average, 4 GHz – 18 GHz



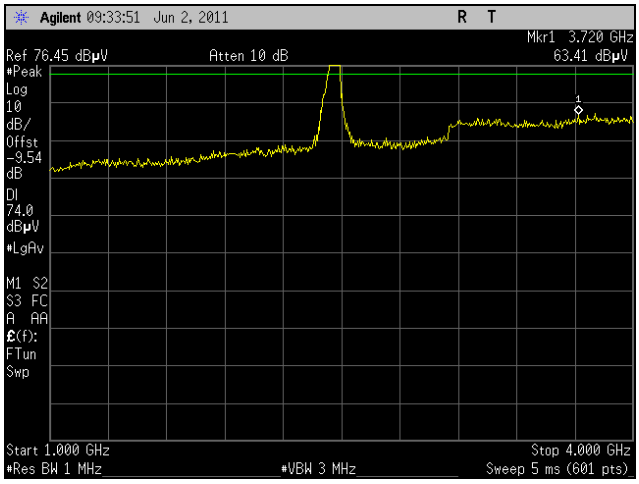
Plot 158. Radiated Harmonic Emissions, Mid Channel, 802.11b, Peak, 4 GHz – 18 GHz



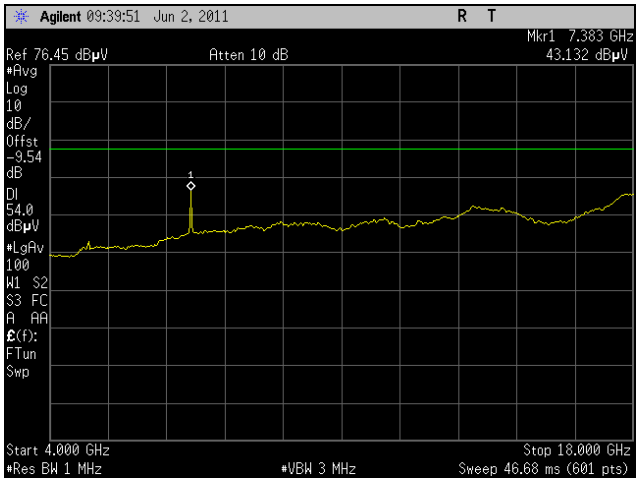
Plot 159. Radiated Harmonic Emissions, High Channel, 802.11b, 30 MHz – 1 GHz



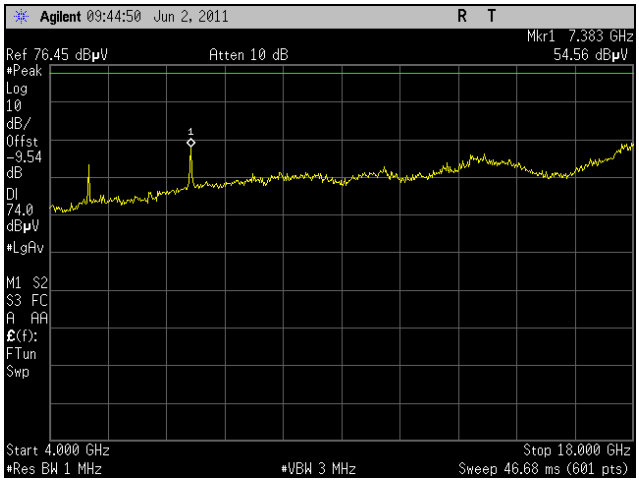
Plot 160. Radiated Harmonic Emissions, High Channel, 802.11b, Average, 1 GHz – 4 GHz



Plot 161. Radiated Harmonic Emissions, High Channel, 802.11b, Peak, 1 GHz – 4 GHz

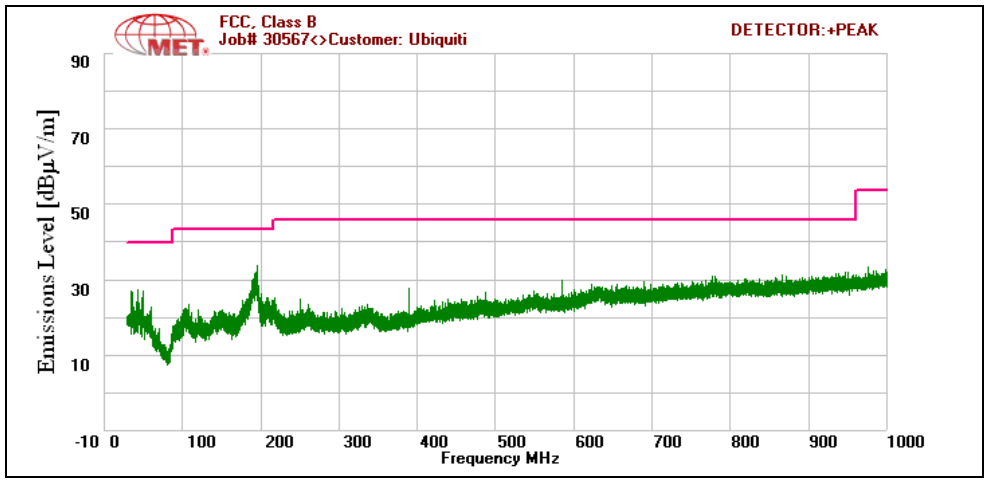


Plot 162. Radiated Harmonic Emissions, High Channel, 802.11b, Average, 4 GHz – 18 GHz

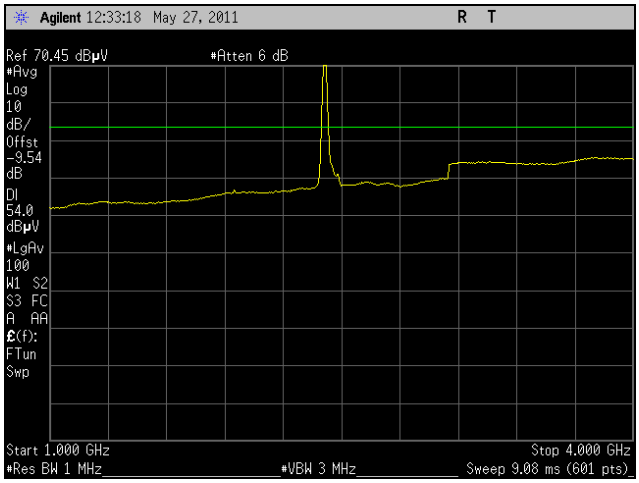


Plot 163. Radiated Harmonic Emissions, High Channel, 802.11b, Peak, 4 GHz – 18 GHz

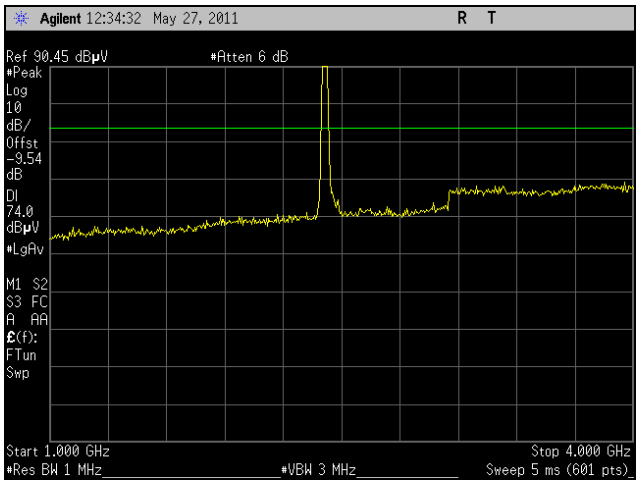
Radiated Harmonic Emissions, 802.11g 20 MHz



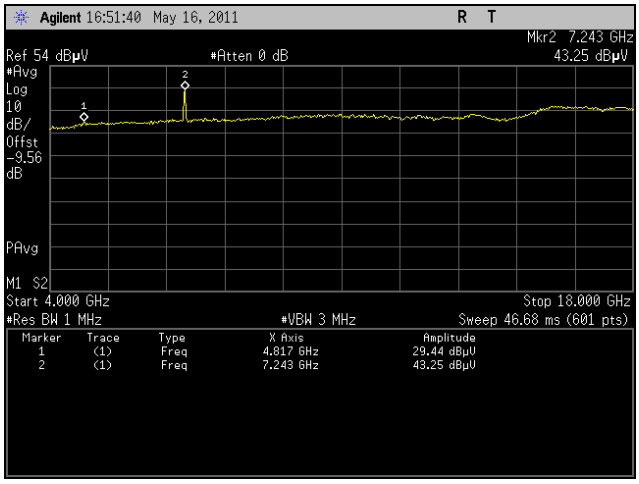
Plot 164. Radiated Harmonic Emissions, Low Channel, 802.11g 20 MHz, 30 MHz – 1 GHz



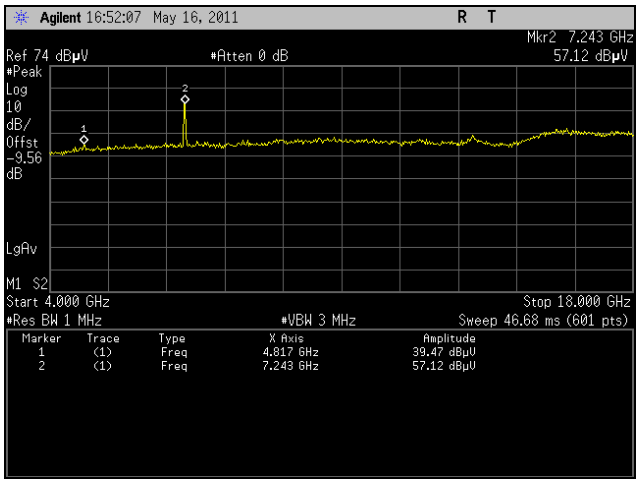
Plot 165. Radiated Harmonic Emissions, Low Channel, 802.11g 20 MHz, Average, 1 GHz – 4 GHz



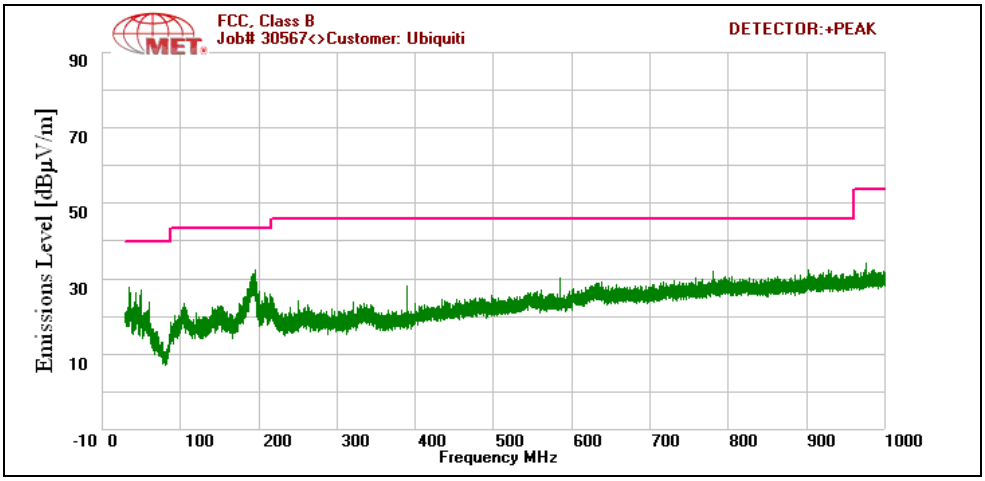
Plot 166. Radiated Harmonic Emissions, Low Channel, 802.11g 20 MHz, Peak, 1 GHz – 4 GHz



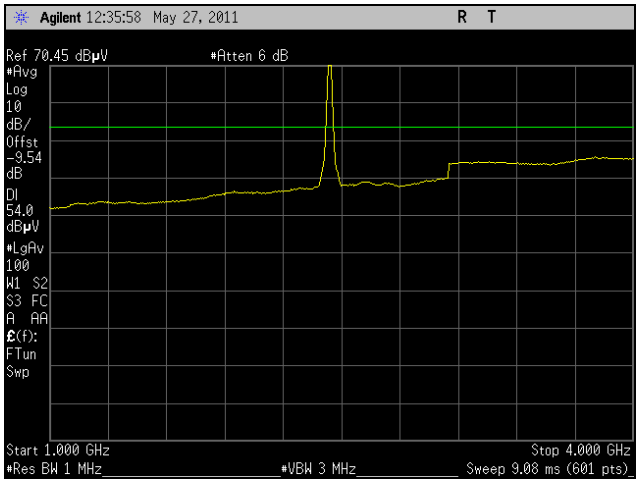
Plot 167. Radiated Harmonic Emissions, Low Channel, 802.11g 20 MHz, Average, 4 GHz – 18 GHz



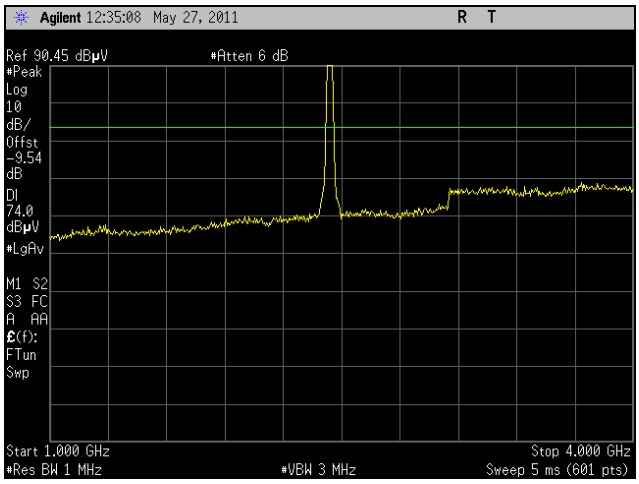
Plot 168. Radiated Harmonic Emissions, Low Channel, 802.11g 20 MHz, Peak, 4 GHz – 18 GHz



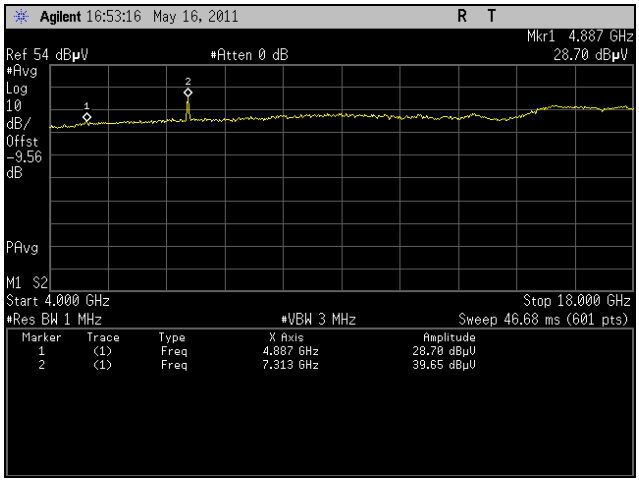
Plot 169. Radiated Harmonic Emissions, Mid Channel, 802.11g 20 MHz, 30 MHz – 1 GHz



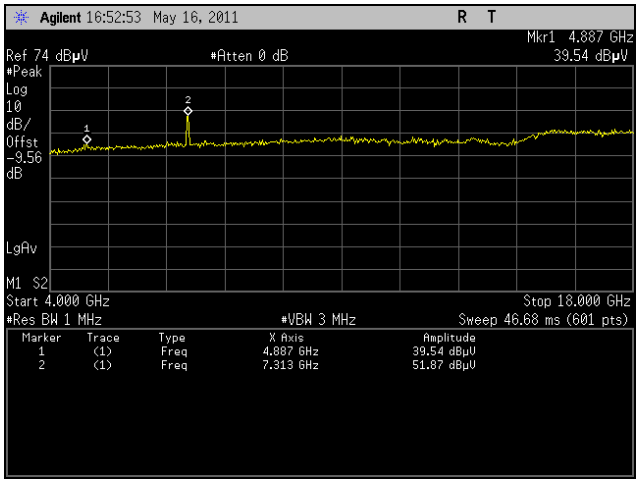
Plot 170. Radiated Harmonic Emissions, Mid Channel, 802.11g 20 MHz, Average, 1 GHz – 4 GHz



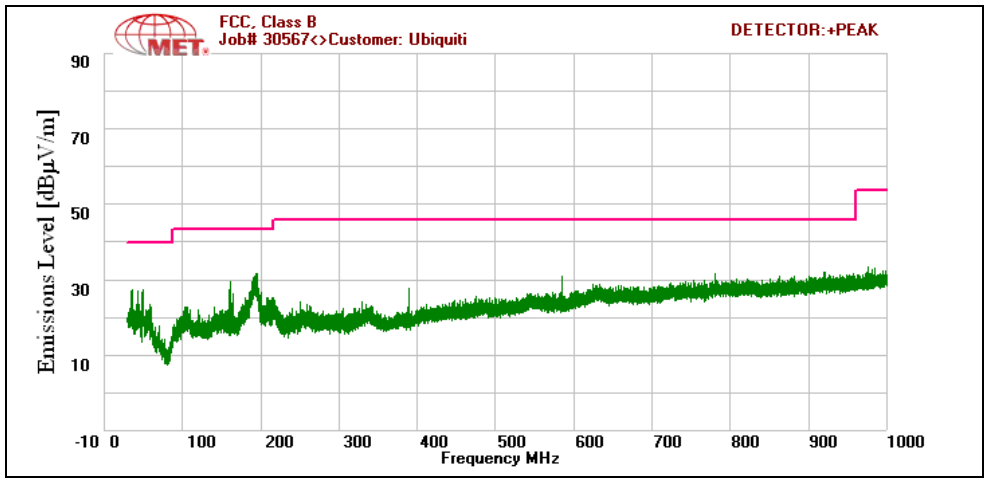
Plot 171. Radiated Harmonic Emissions, Mid Channel, 802.11g 20 MHz, Peak, 1 GHz – 4 GHz



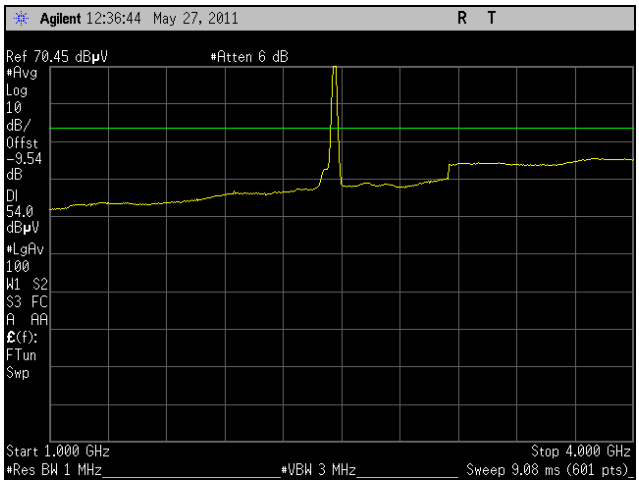
Plot 172. Radiated Harmonic Emissions, Mid Channel, 802.11g 20 MHz, Average, 4 GHz – 18 GHz



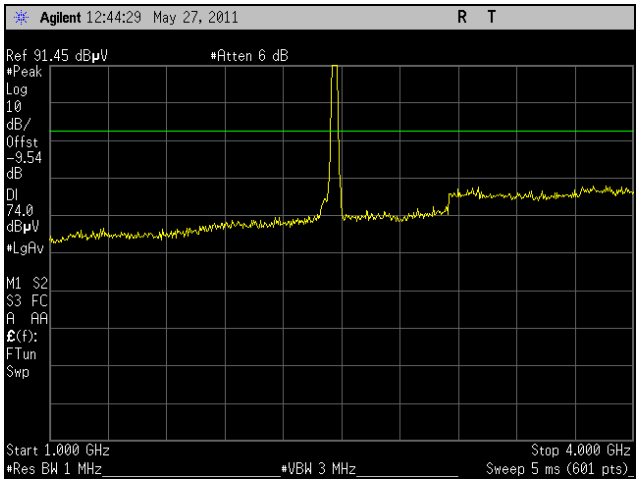
Plot 173. Radiated Harmonic Emissions, Mid Channel, 802.11g 20 MHz, Peak, 4 GHz – 18 GHz



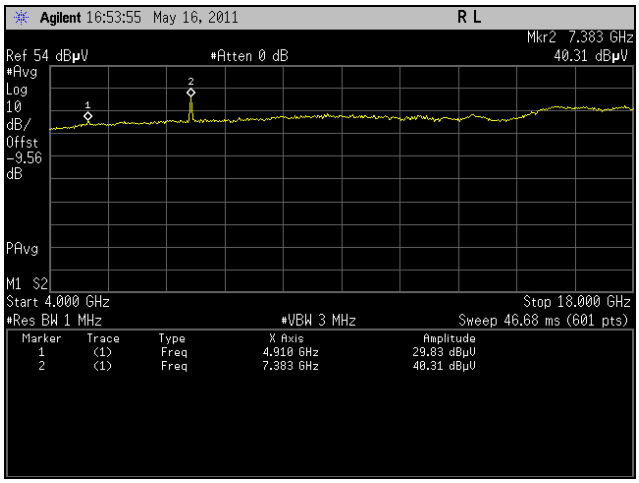
Plot 174. Radiated Harmonic Emissions, High Channel, 802.11g 20 MHz, 30 MHz – 1 GHz



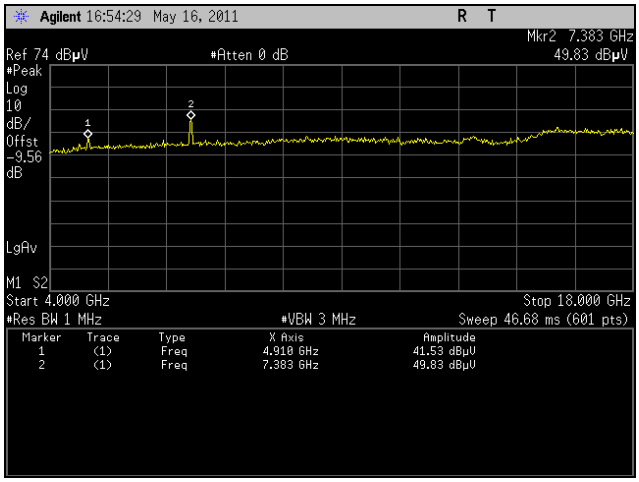
Plot 175. Radiated Harmonic Emissions, High Channel, 802.11g 20 MHz, Average, 1 GHz – 4 GHz



Plot 176. Radiated Harmonic Emissions, High Channel, 802.11g 20 MHz, Peak, 1 GHz – 4 GHz

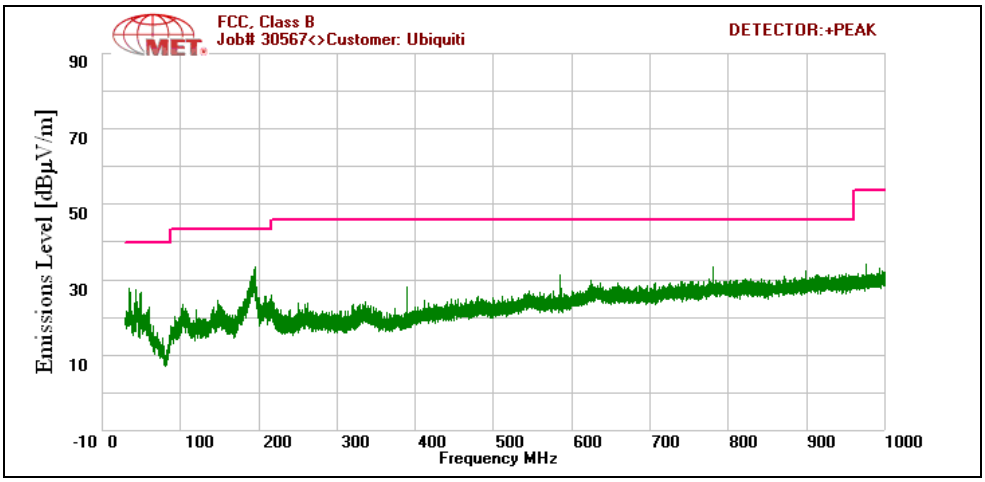


Plot 177. Radiated Harmonic Emissions, High Channel, 802.11g 20 MHz, Average, 4 GHz – 18 GHz

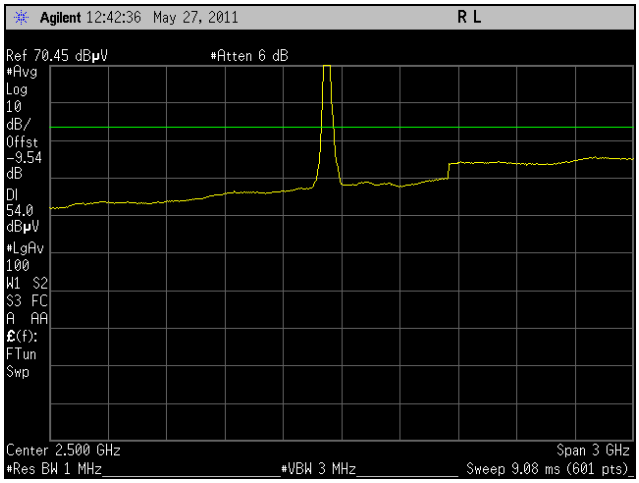


Plot 178. Radiated Harmonic Emissions, High Channel, 802.11g 20 MHz, Peak, 4 GHz – 18 GHz

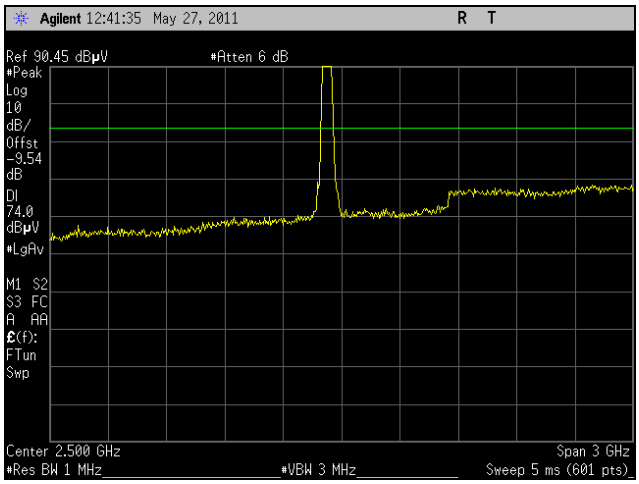
Radiated Harmonic Emissions, 802.11g 40 MHz



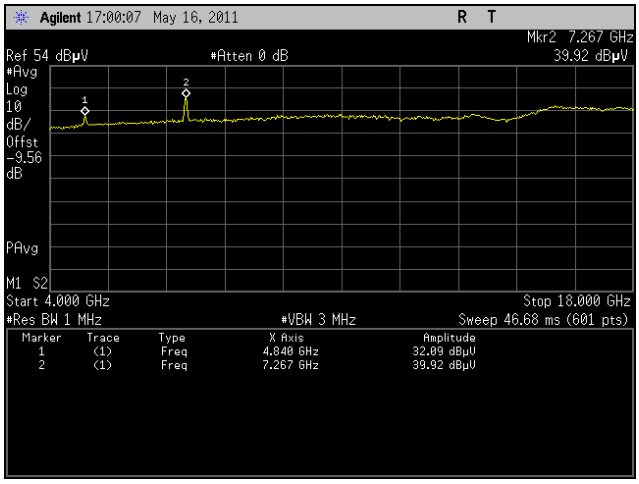
Plot 179. Radiated Harmonic Emissions, Low Channel, 802.11g 40 MHz, 30 MHz – 1 GHz



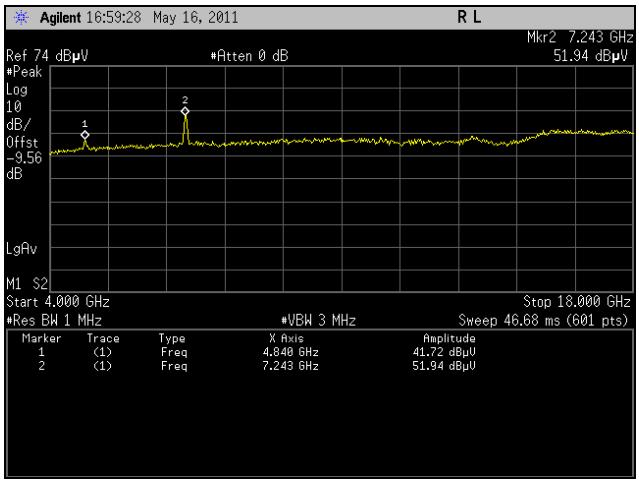
Plot 180. Radiated Harmonic Emissions, Low Channel, 802.11g 40 MHz, Average, 1 GHz – 4 GHz



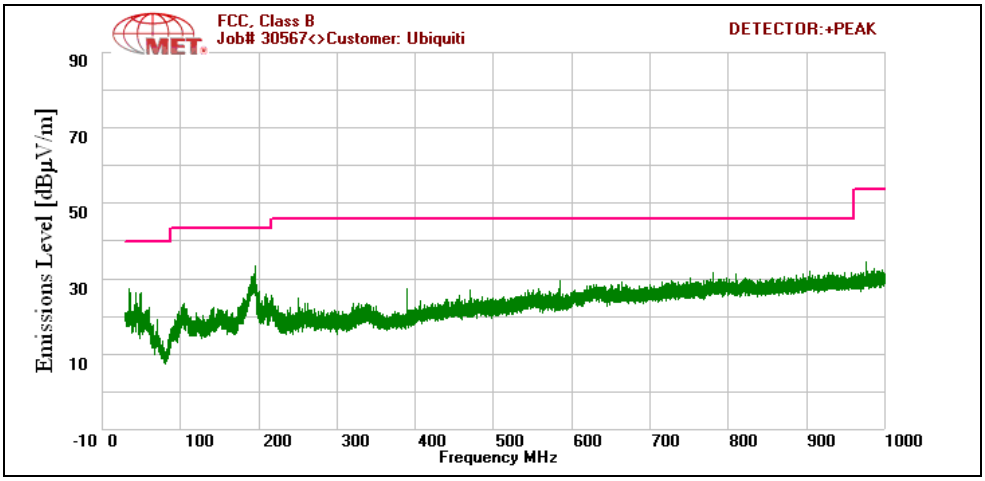
Plot 181. Radiated Harmonic Emissions, Low Channel, 802.11g 40 MHz, Peak, 1 GHz – 4 GHz



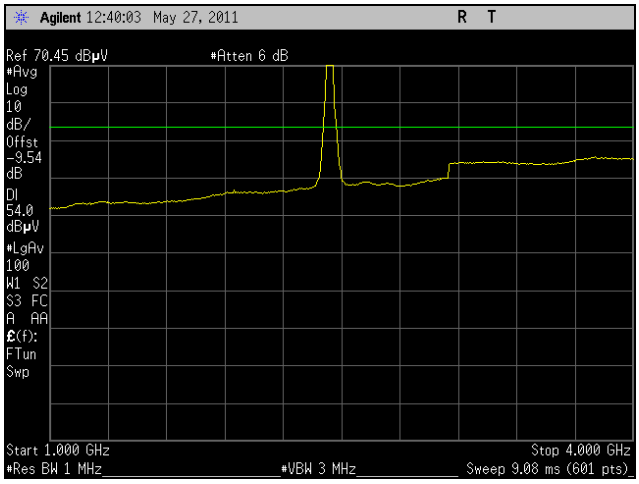
Plot 182. Radiated Harmonic Emissions, Low Channel, 802.11g 40 MHz, Average, 4 GHz – 18 GHz



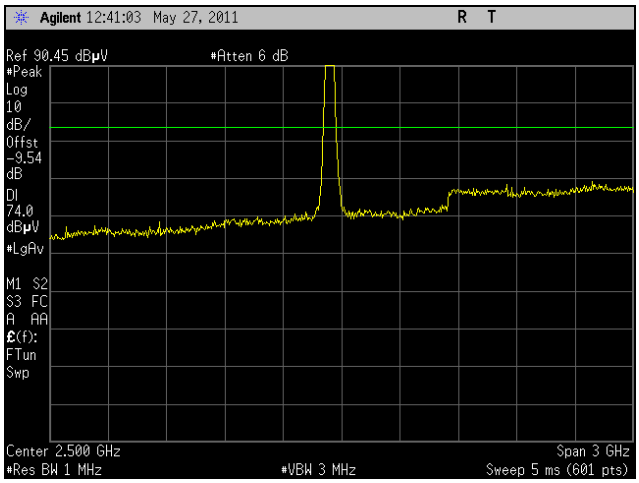
Plot 183. Radiated Harmonic Emissions, Low Channel, 802.11g 40 MHz, Peak, 4 GHz – 18 GHz



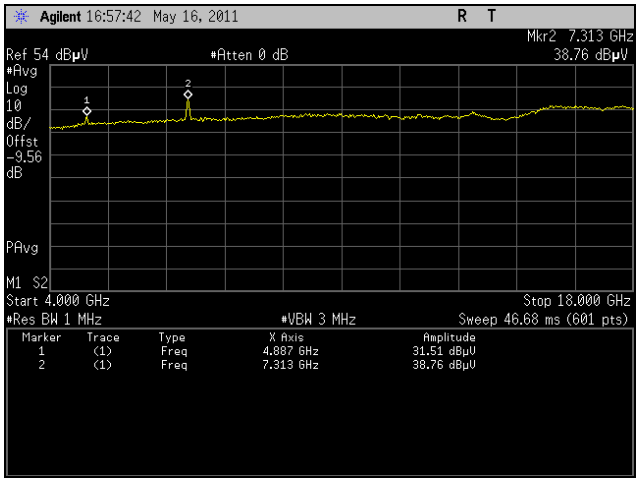
Plot 184. Radiated Harmonic Emissions, Mid Channel, 802.11g 40 MHz, 30 MHz – 1 GHz



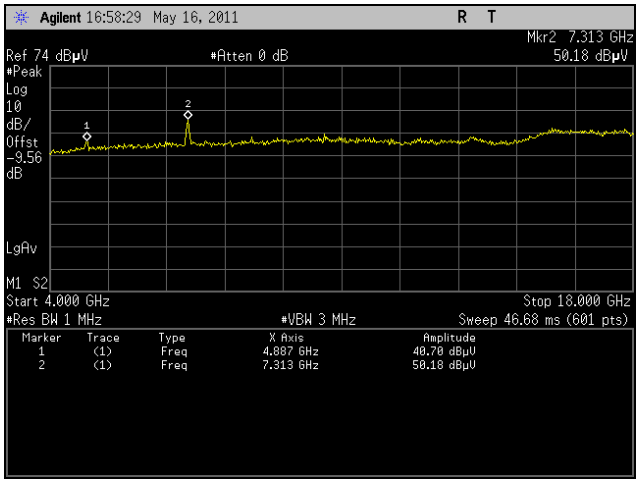
Plot 185. Radiated Harmonic Emissions, Mid Channel, 802.11g 40 MHz, Average, 1 GHz – 4 GHz



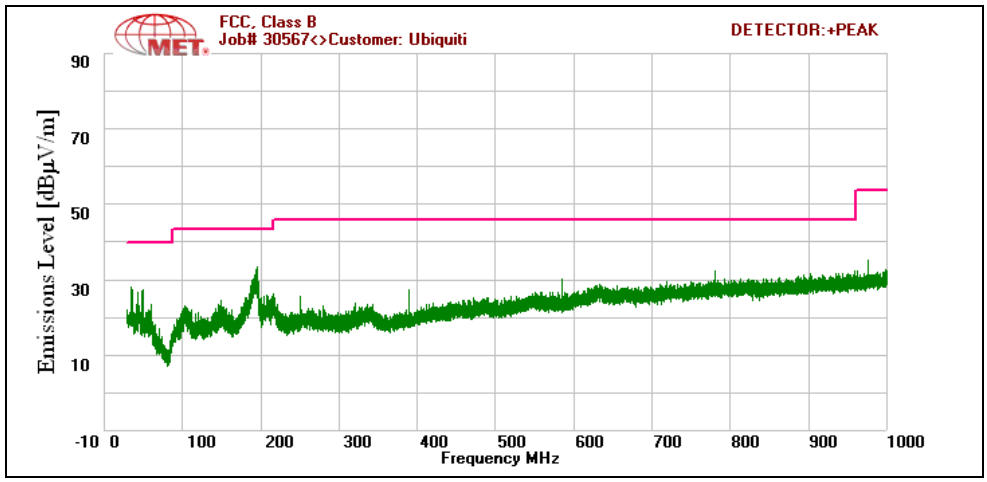
Plot 186. Radiated Harmonic Emissions, Mid Channel, 802.11g 40 MHz, Peak, 1 GHz – 4 GHz



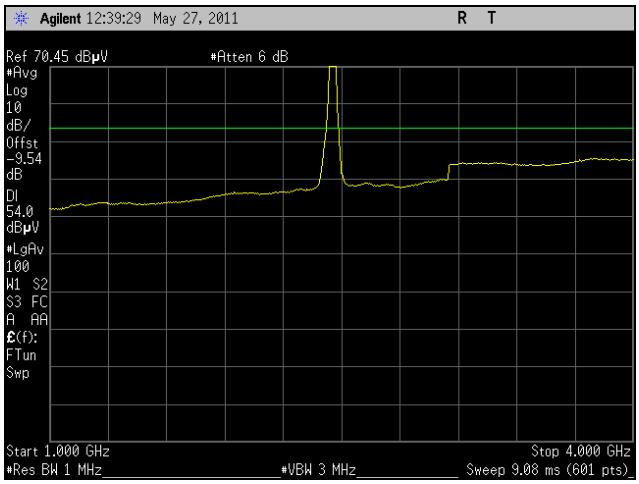
Plot 187. Radiated Harmonic Emissions, Mid Channel, 802.11g 40 MHz, Average, 4 GHz – 18 GHz



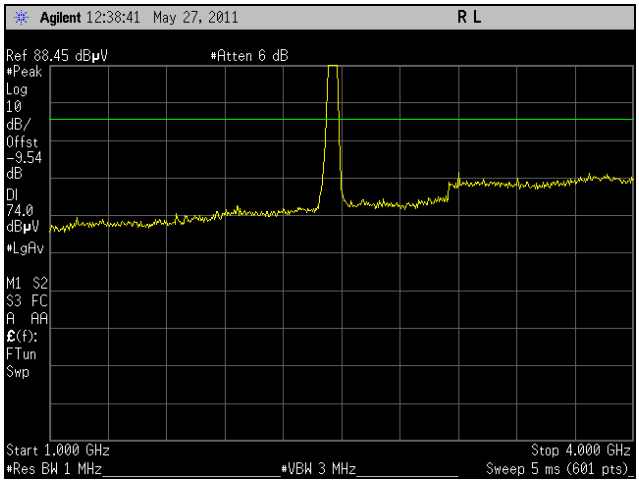
Plot 188. Radiated Harmonic Emissions, Mid Channel, 802.11g 40 MHz, Peak, 4 GHz – 18 GHz



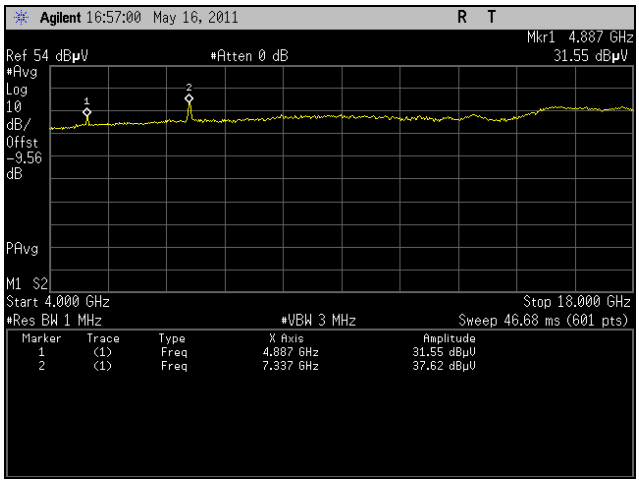
Plot 189. Radiated Harmonic Emissions, High Channel, 802.11g 40 MHz, 30 MHz – 1 GHz



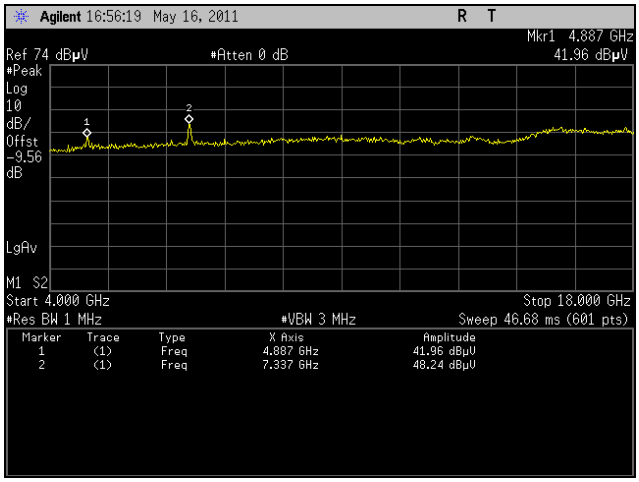
Plot 190. Radiated Harmonic Emissions, High Channel, 802.11g 40 MHz, Average, 1 GHz – 4 GHz



Plot 191. Radiated Harmonic Emissions, High Channel, 802.11g 40 MHz, Peak, 1 GHz – 4 GHz

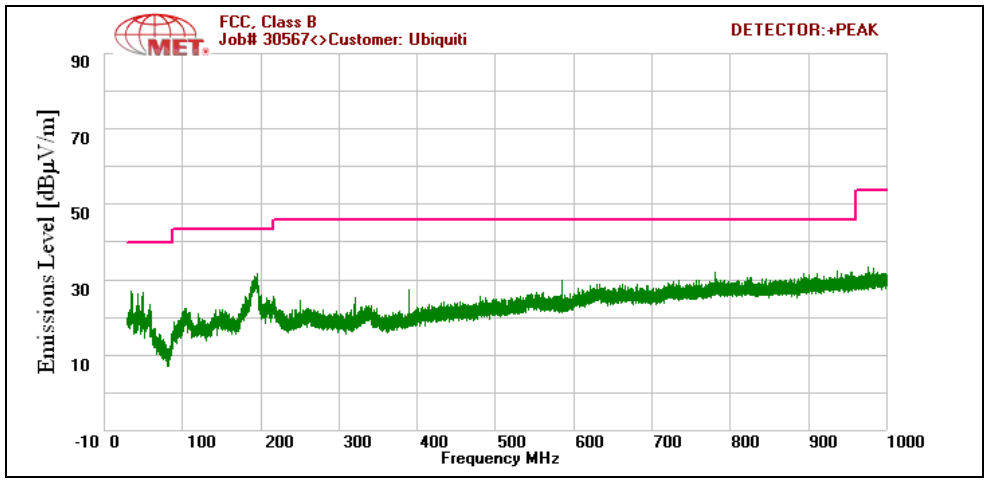


Plot 192. Radiated Harmonic Emissions, High Channel, 802.11g 40 MHz, Average, 4 GHz – 18 GHz

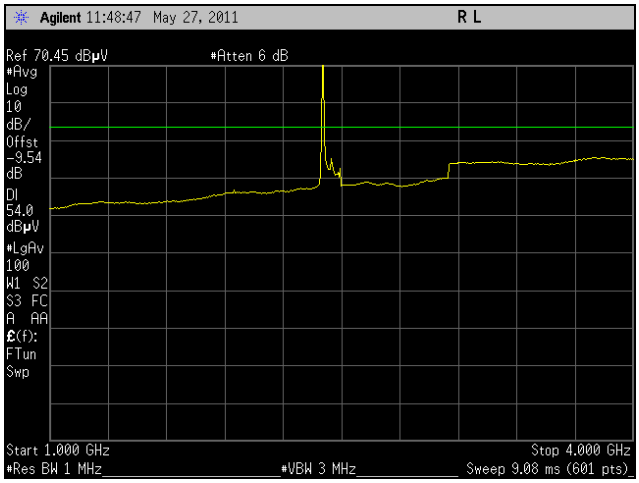


Plot 193. Radiated Harmonic Emissions, High Channel, 802.11g 40 MHz, Peak, 4 GHz – 18 GHz

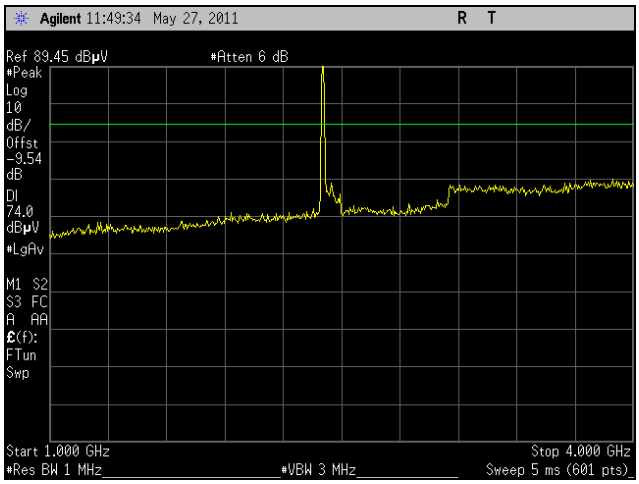
Radiated Harmonic Emissions, 802.11n HT5



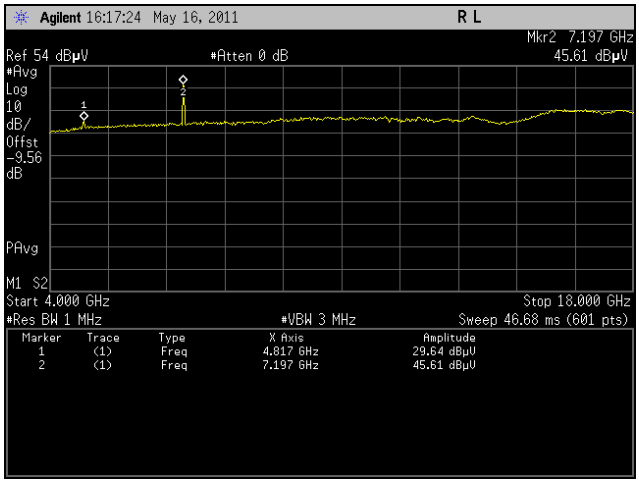
Plot 194. Radiated Harmonic Emissions, Low Channel, 802.11n HT5, 30 MHz – 1 GHz



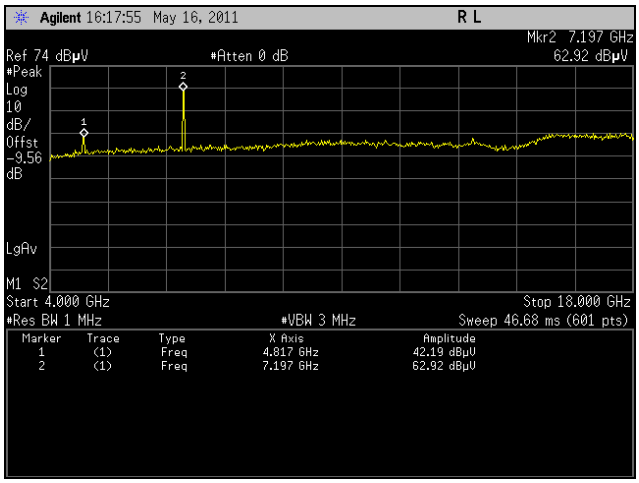
Plot 195. Radiated Harmonic Emissions, Low Channel, 802.11n HT5, Average, 1 GHz – 4 GHz



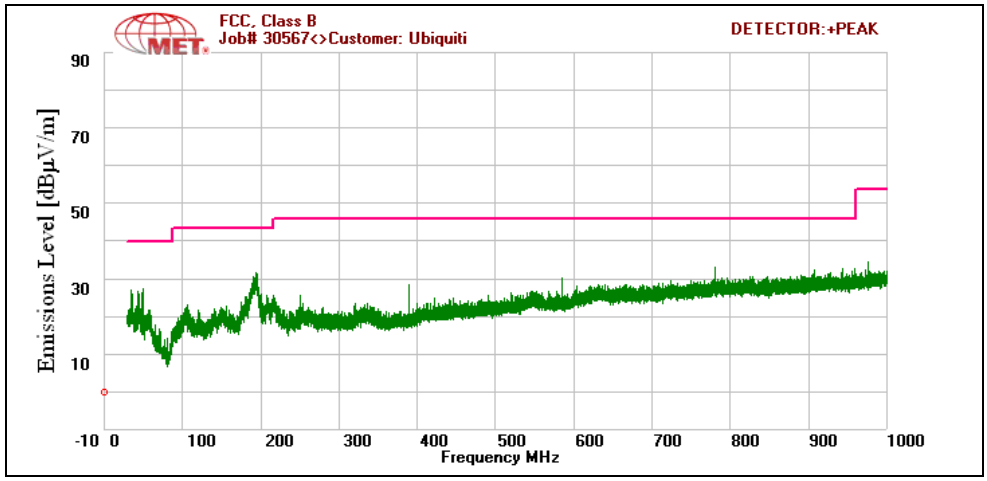
Plot 196. Radiated Harmonic Emissions, Low Channel, 802.11n HT5, Peak, 1 GHz – 4 GHz



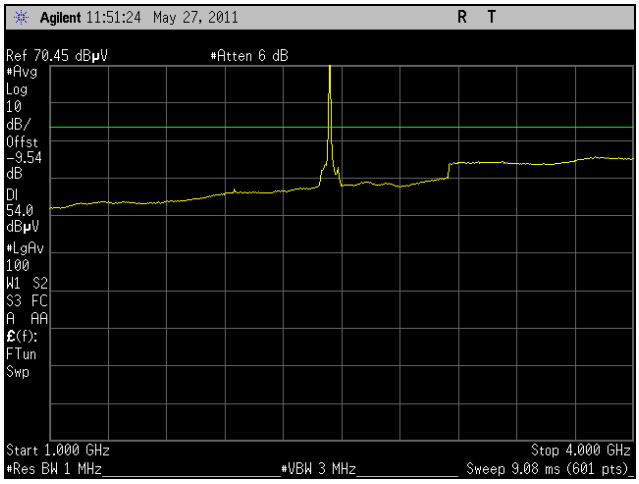
Plot 197. Radiated Harmonic Emissions, Low Channel, 802.11n HT5, Average, 4 GHz – 18 GHz



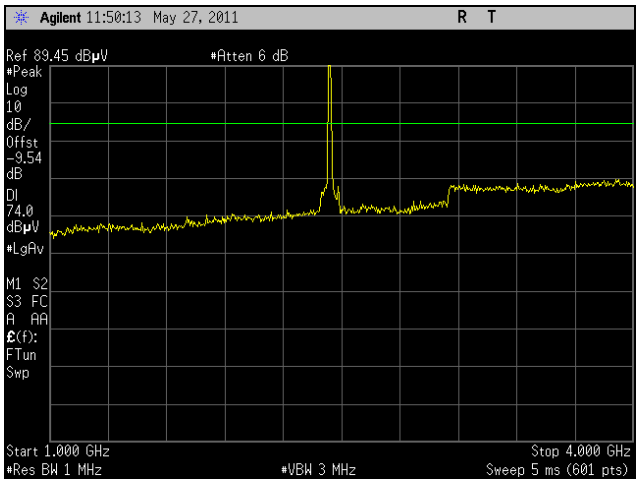
Plot 198. Radiated Harmonic Emissions, Low Channel, 802.11n HT5, Peak, 4 GHz – 18 GHz



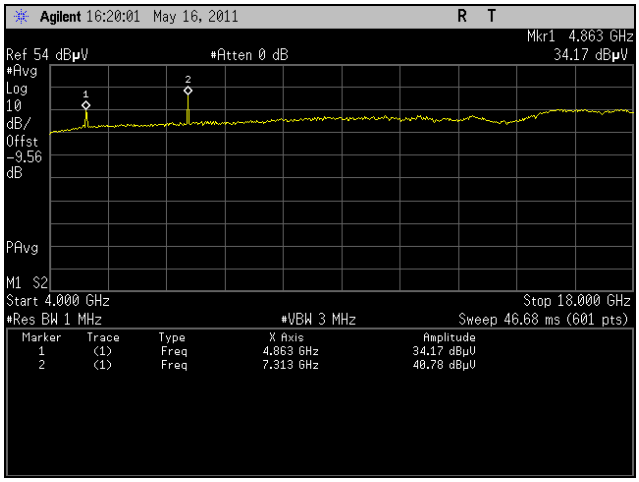
Plot 199. Radiated Harmonic Emissions, Mid Channel, 802.11n HT5, 30 MHz – 1 GHz



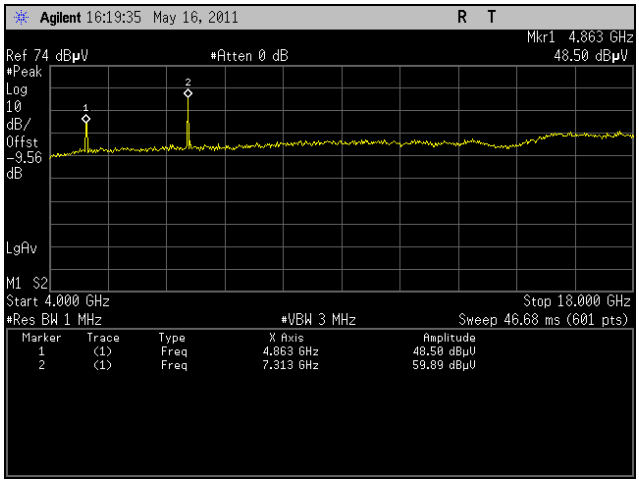
Plot 200. Radiated Harmonic Emissions, Mid Channel, 802.11n HT5, Average, 1 GHz – 4 GHz



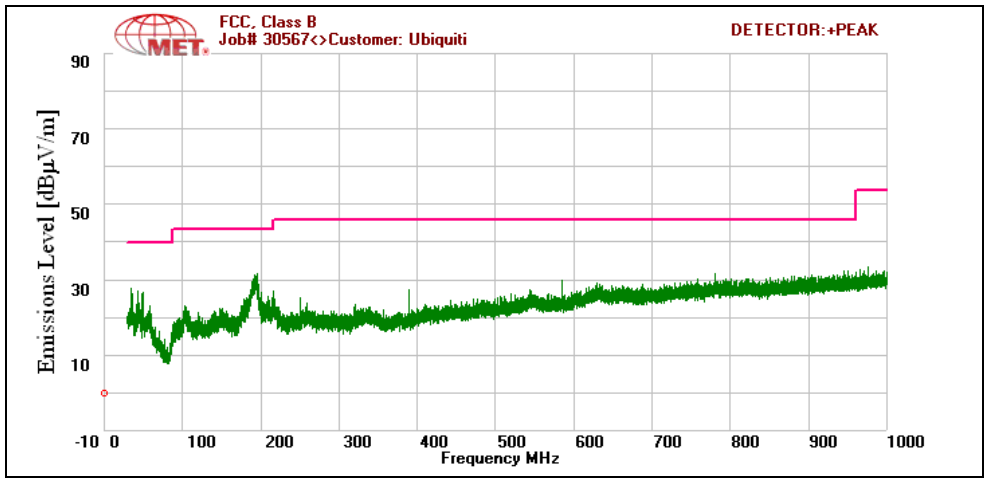
Plot 201. Radiated Harmonic Emissions, Mid Channel, 802.11n HT5, Peak, 1 GHz – 4 GHz



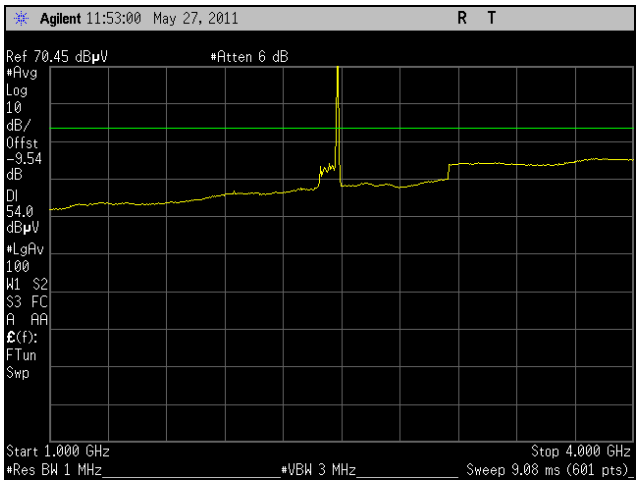
Plot 202. Radiated Harmonic Emissions, Mid Channel, 802.11n HT5, Average, 4 GHz – 18 GHz



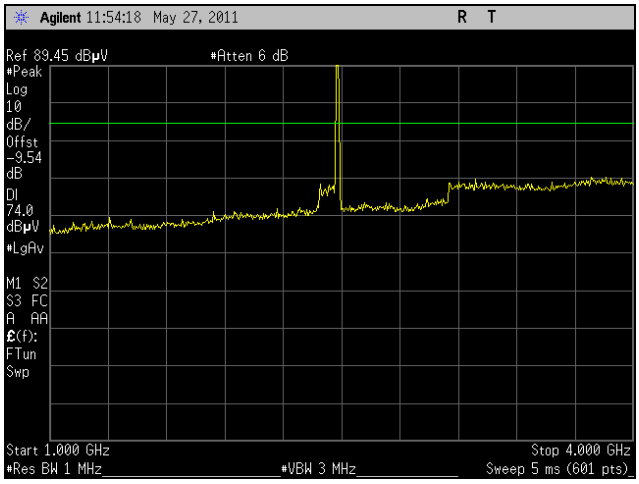
Plot 203. Radiated Harmonic Emissions, Mid Channel, 802.11n HT5, Peak, 4 GHz – 18 GHz



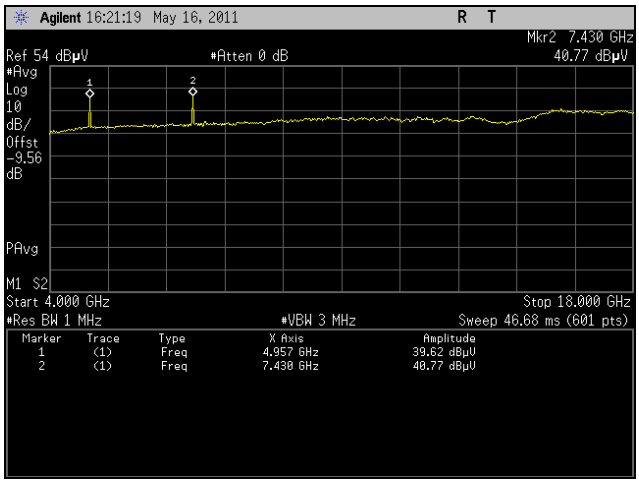
Plot 204. Radiated Harmonic Emissions, High Channel, 802.11n HT5, 30 MHz – 1 GHz



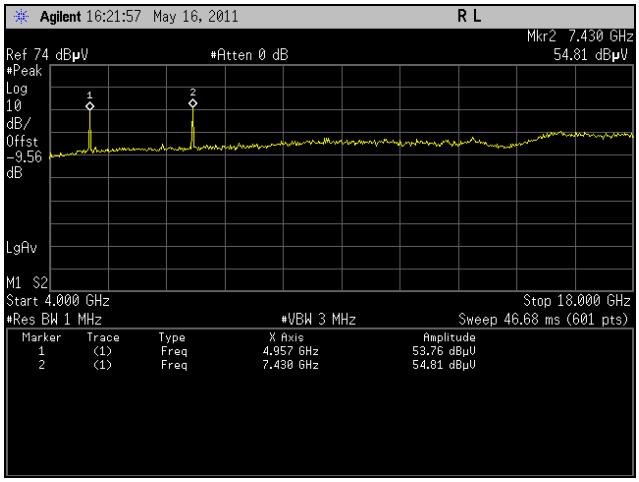
Plot 205. Radiated Harmonic Emissions, High Channel, 802.11n HT5, Average, 1 GHz – 4 GHz



Plot 206. Radiated Harmonic Emissions, High Channel, 802.11n HT5, Peak, 1 GHz – 4 GHz

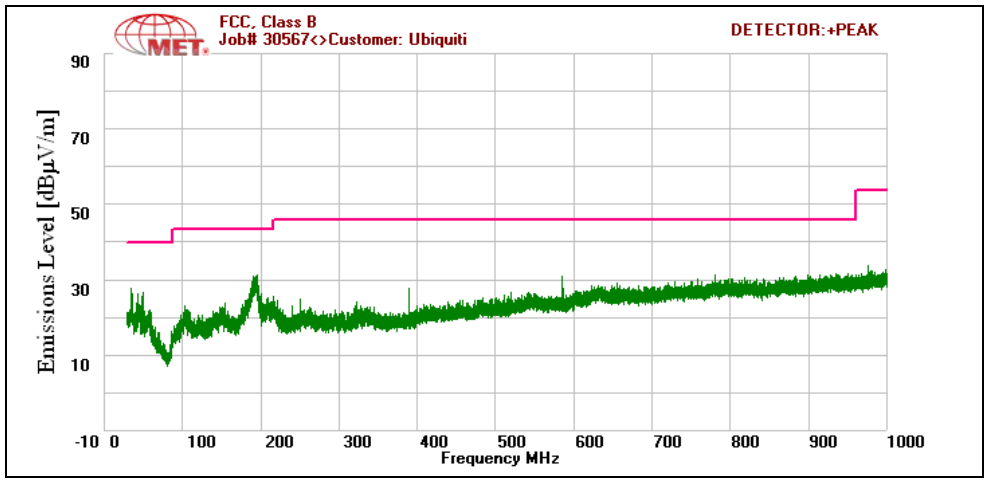


Plot 207. Radiated Harmonic Emissions, High Channel, 802.11n HT5, Average, 4 GHz – 18 GHz

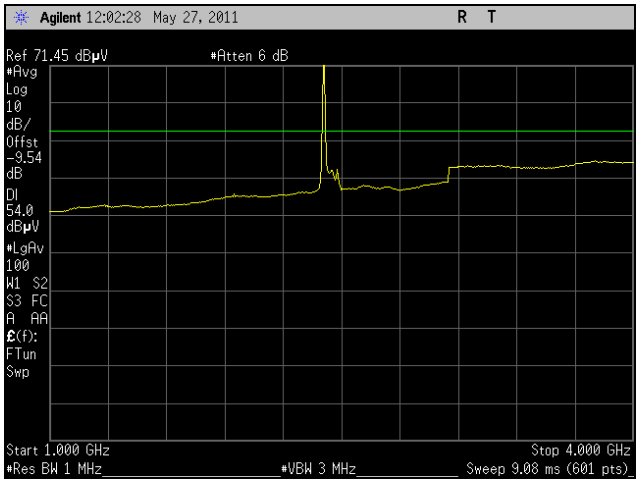


Plot 208. Radiated Harmonic Emissions, High Channel, 802.11n HT5, Peak, 4 GHz – 18 GHz

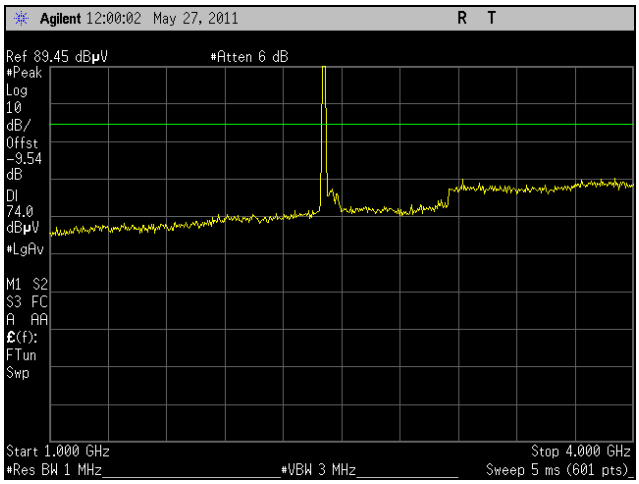
Radiated Harmonic Emissions, 802.11n HT8



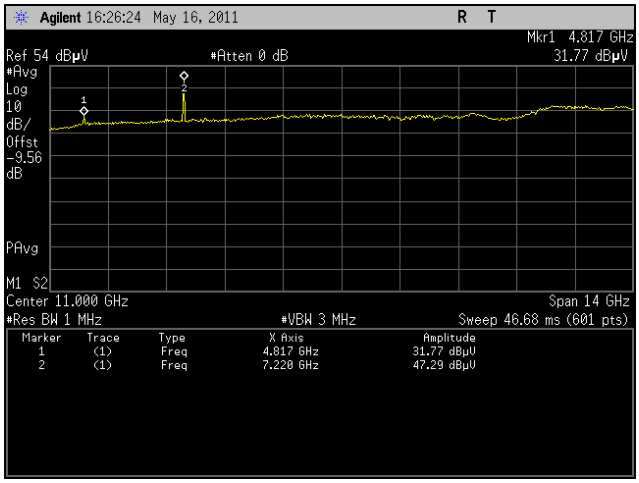
Plot 209. Radiated Harmonic Emissions, Low Channel, 802.11n HT8, 30 MHz – 1 GHz



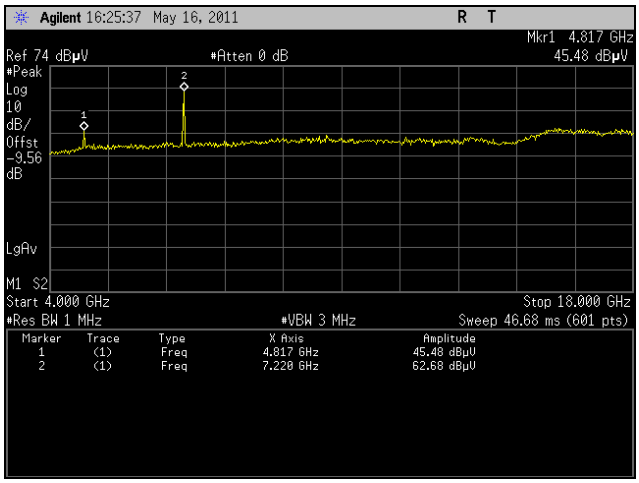
Plot 210. Radiated Harmonic Emissions, Low Channel, 802.11n HT8, Average, 1 GHz – 4 GHz



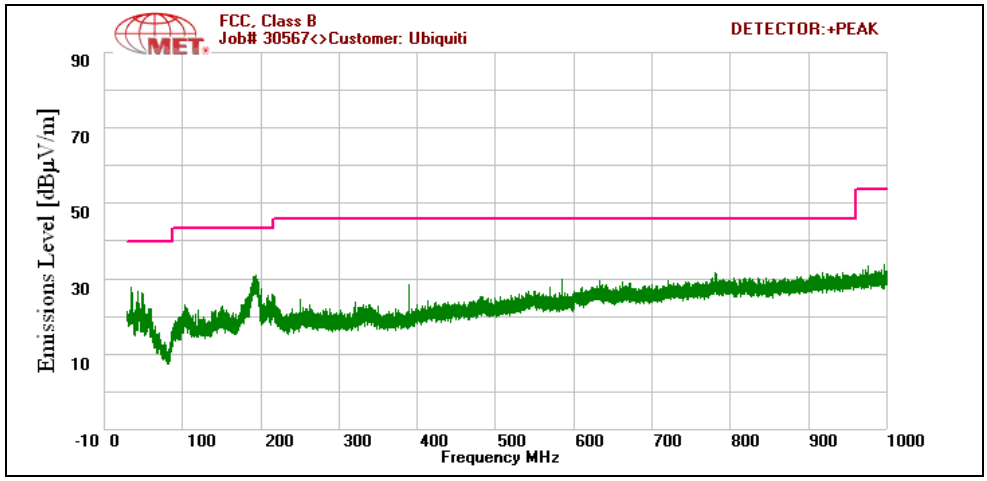
Plot 211. Radiated Harmonic Emissions, Low Channel, 802.11n HT8, Peak, 1 GHz – 4 GHz



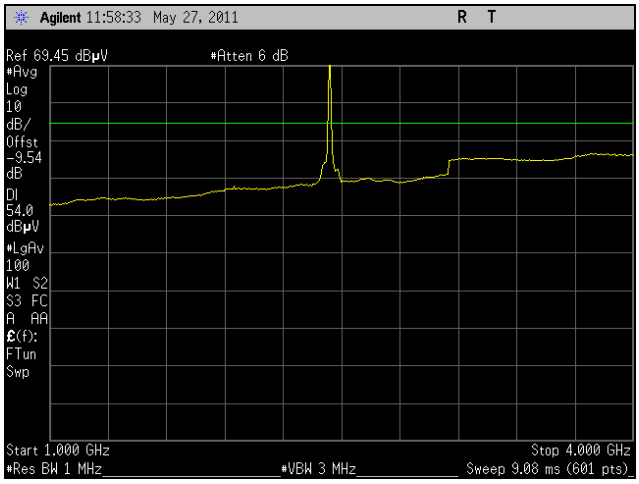
Plot 212. Radiated Harmonic Emissions, Low Channel, 802.11n HT8, Average, 4 GHz – 18 GHz



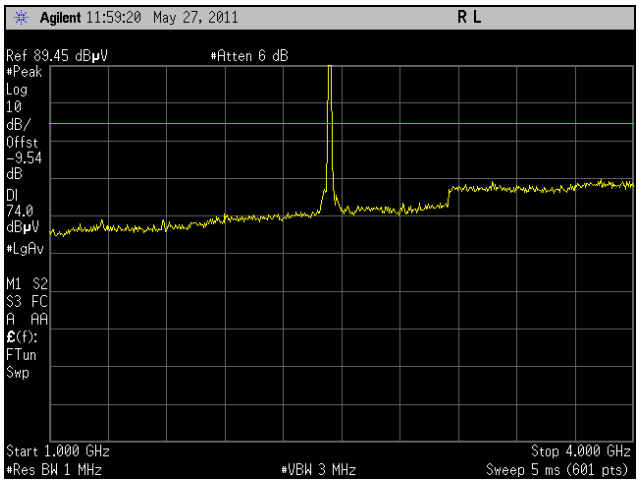
Plot 213. Radiated Harmonic Emissions, Low Channel, 802.11n HT8, Peak, 4 GHz – 18 GHz



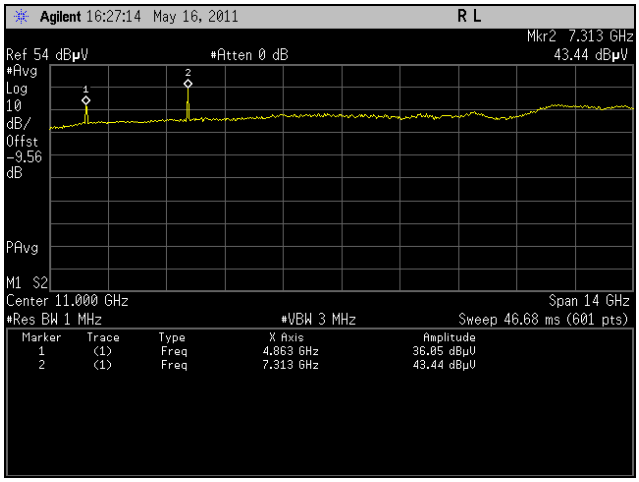
Plot 214. Radiated Harmonic Emissions, Mid Channel, 802.11n HT8, 30 MHz – 1 GHz



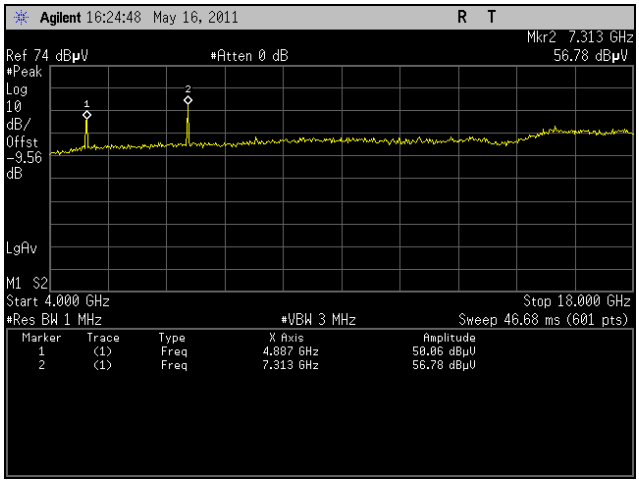
Plot 215. Radiated Harmonic Emissions, Mid Channel, 802.11n HT8, Average, 1 GHz – 4 GHz



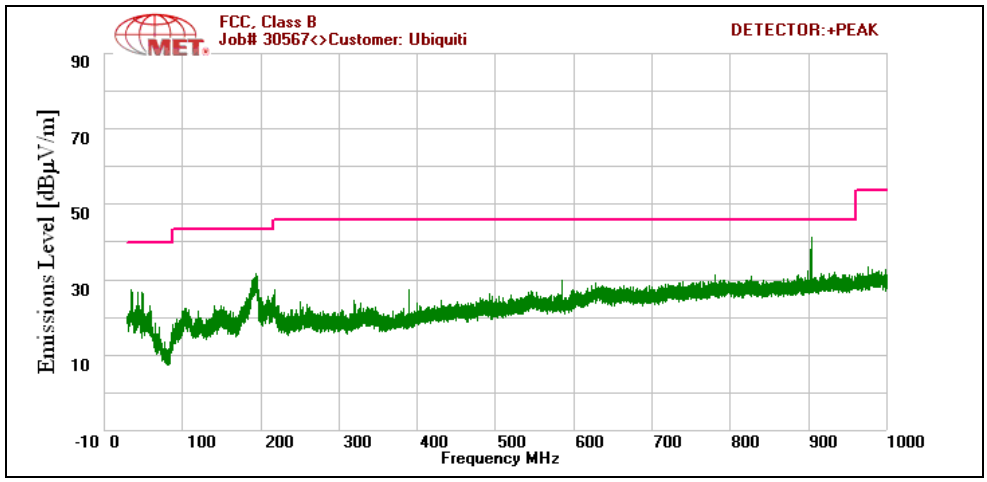
Plot 216. Radiated Harmonic Emissions, Mid Channel, 802.11n HT8, Peak, 1 GHz – 4 GHz



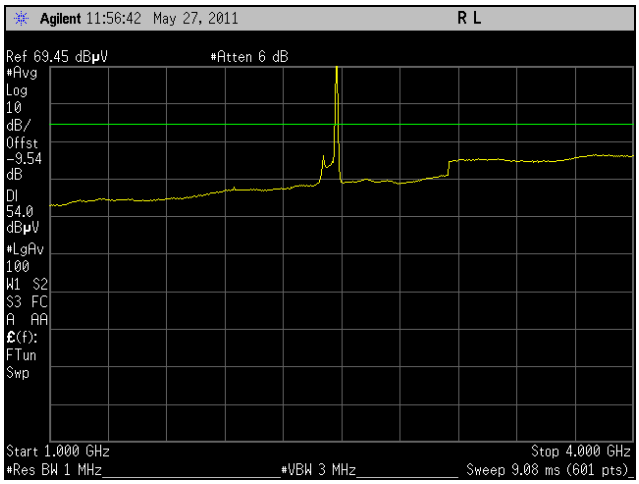
Plot 217. Radiated Harmonic Emissions, Mid Channel, 802.11n HT8, Average, 4 GHz – 18 GHz



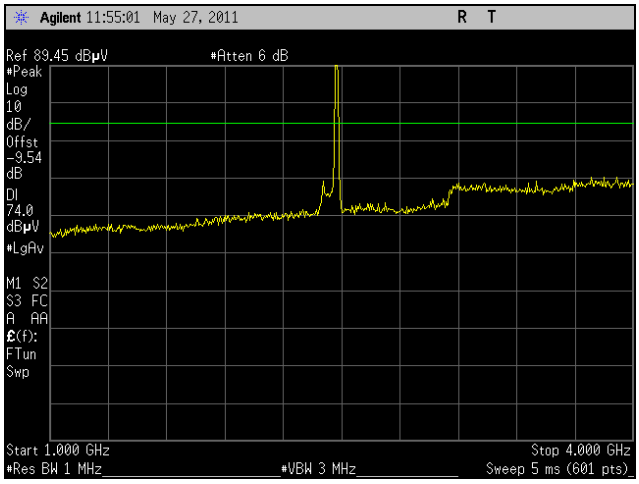
Plot 218. Radiated Harmonic Emissions, Mid Channel, 802.11n HT8, Peak, 4 GHz – 18 GHz



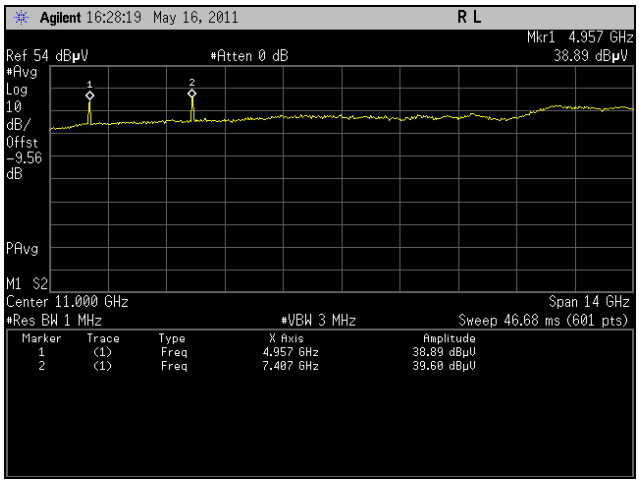
Plot 219. Radiated Harmonic Emissions, High Channel, 802.11n HT8, 30 MHz – 1 GHz



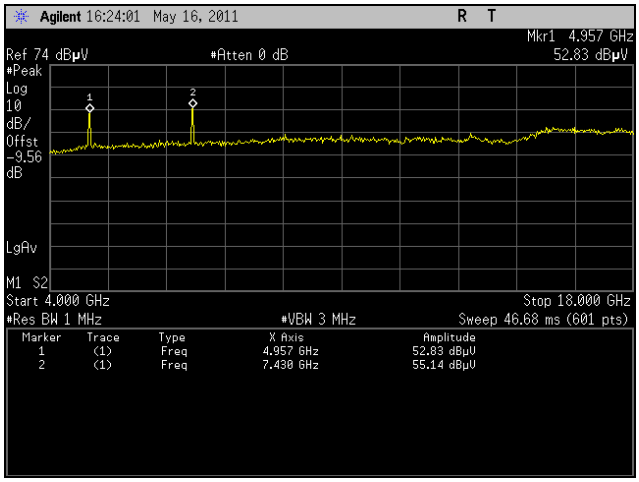
Plot 220. Radiated Harmonic Emissions, High Channel, 802.11n HT8, Average, 1 GHz – 4 GHz



Plot 221. Radiated Harmonic Emissions, High Channel, 802.11n HT8, Peak, 1 GHz – 4 GHz

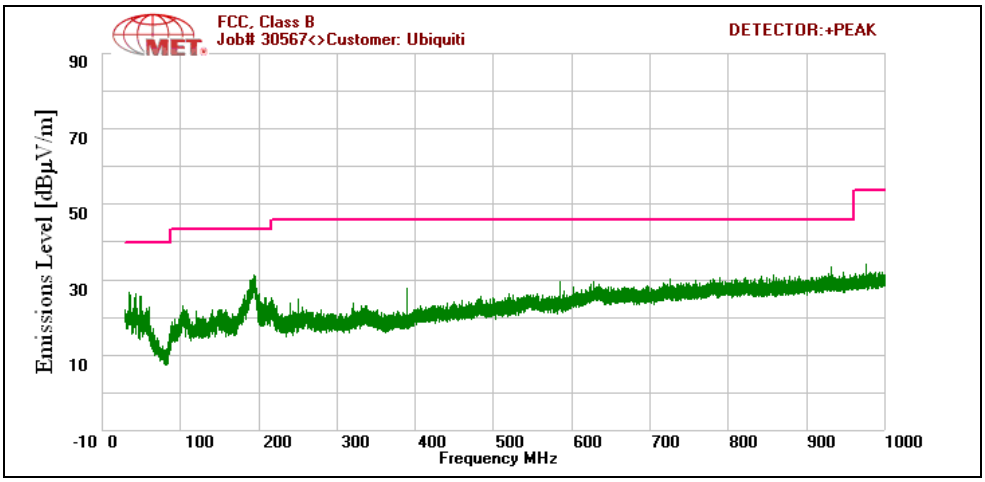


Plot 222. Radiated Harmonic Emissions, High Channel, 802.11n HT8, Average, 4 GHz – 18 GHz

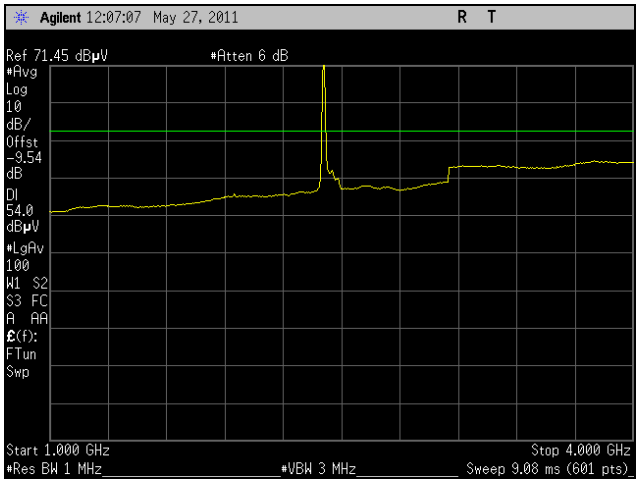


Plot 223. Radiated Harmonic Emissions, High Channel, 802.11n HT8, Peak, 4 GHz – 18 GHz

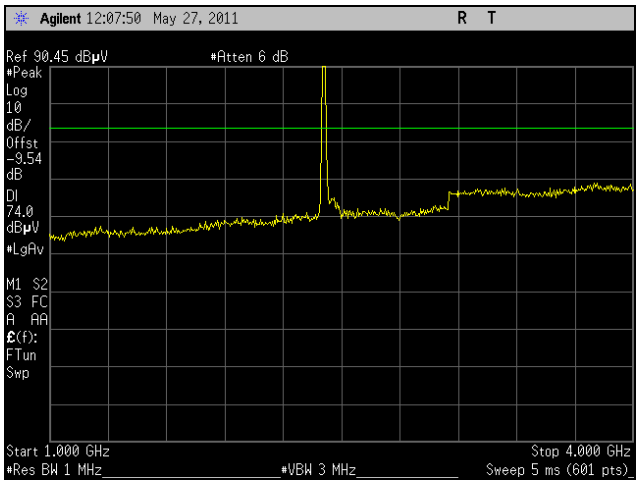
Radiated Harmonic Emissions, 802.11n HT10



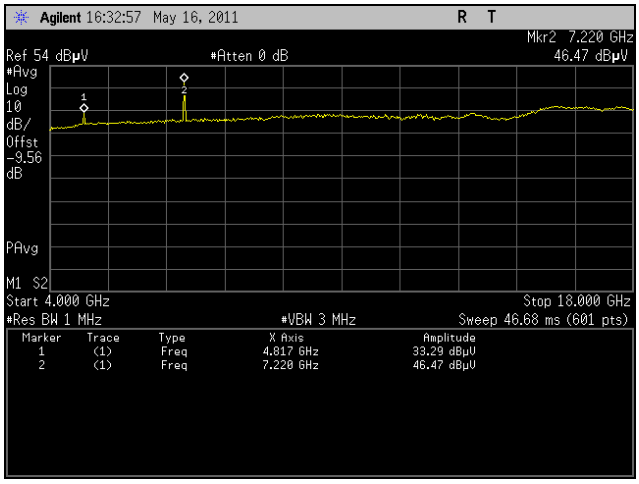
Plot 224. Radiated Harmonic Emissions, Low Channel, 802.11n HT10, 30 MHz – 1 GHz



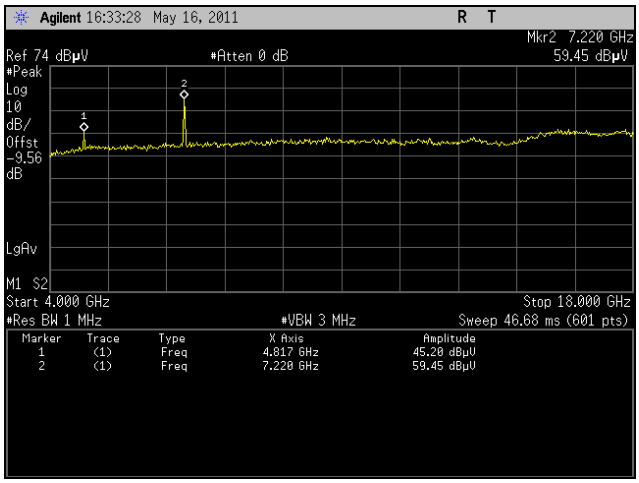
Plot 225. Radiated Harmonic Emissions, Low Channel, 802.11n HT10, Average, 1 GHz – 4 GHz



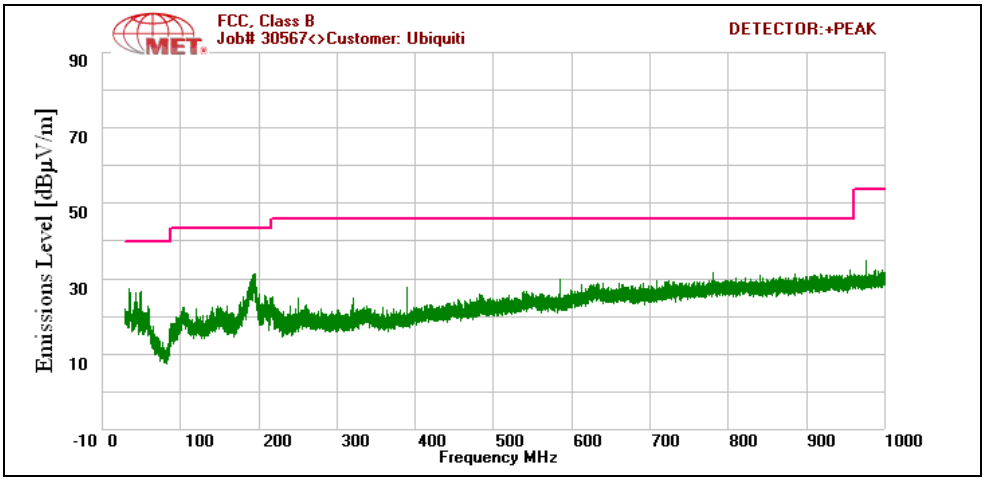
Plot 226. Radiated Harmonic Emissions, Low Channel, 802.11n HT10, Peak, 1 GHz – 4 GHz



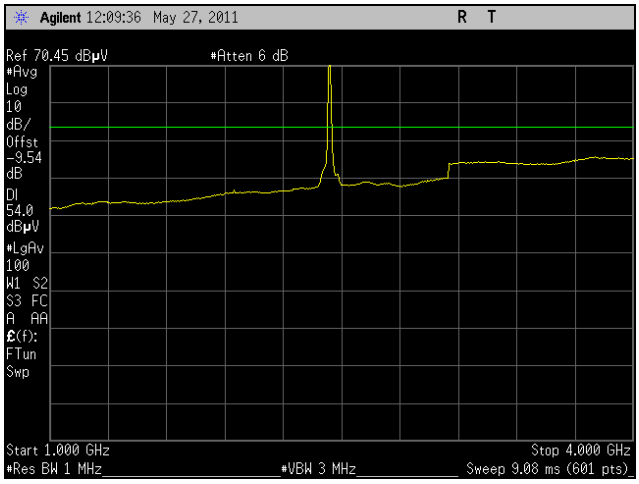
Plot 227. Radiated Harmonic Emissions, Low Channel, 802.11n HT10, Average, 4 GHz – 18 GHz



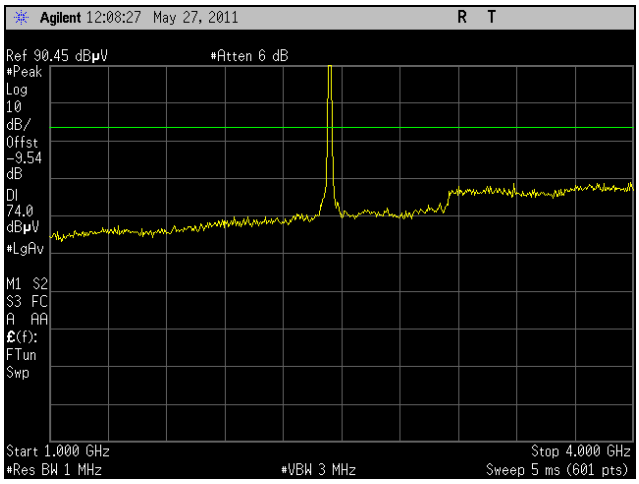
Plot 228. Radiated Harmonic Emissions, Low Channel, 802.11n HT10, Peak, 4 GHz – 18 GHz



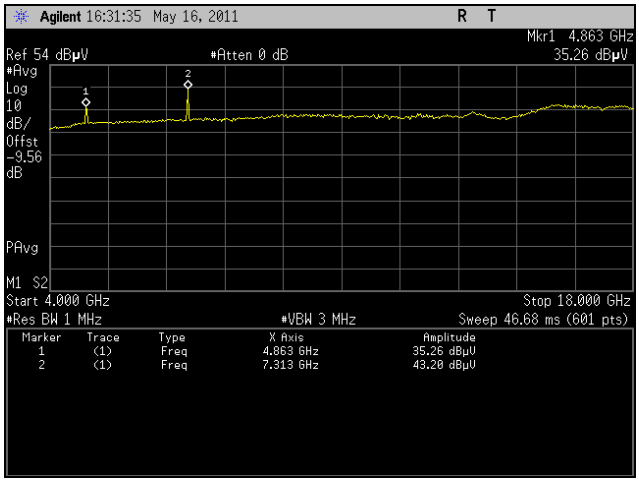
Plot 229. Radiated Harmonic Emissions, Mid Channel, 802.11n HT10, 30 MHz – 1 GHz



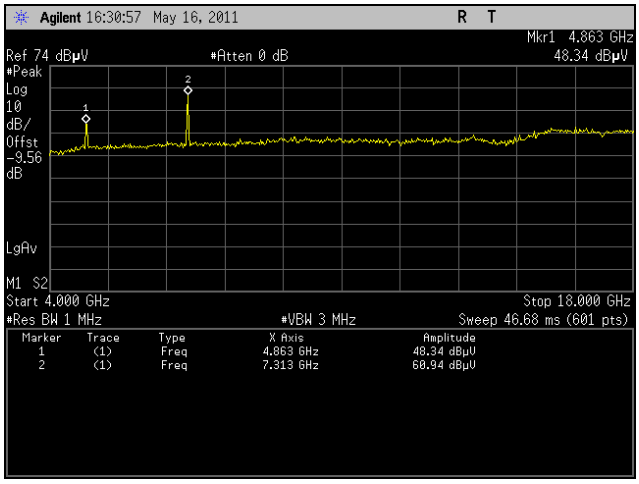
Plot 230. Radiated Harmonic Emissions, Mid Channel, 802.11n HT10, Average, 1 GHz – 4 GHz



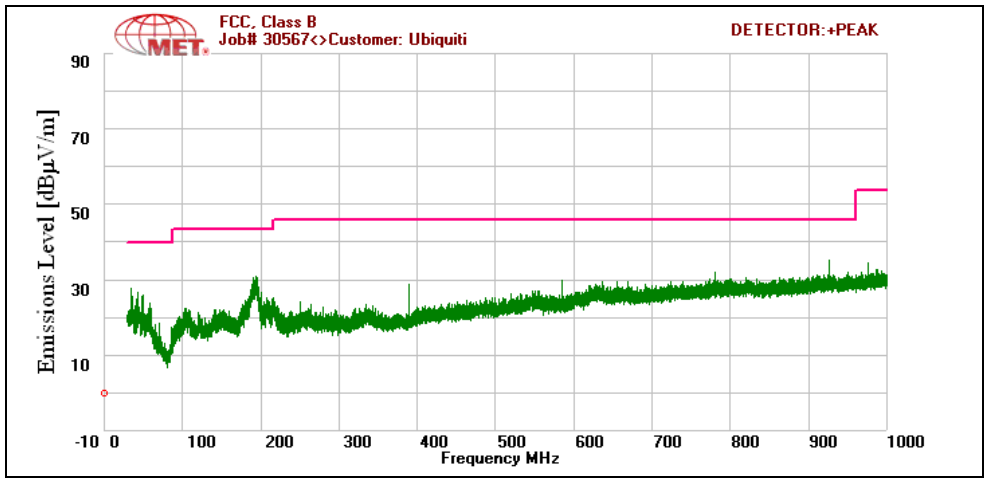
Plot 231. Radiated Harmonic Emissions, Mid Channel, 802.11n HT10, Peak, 1 GHz – 4 GHz



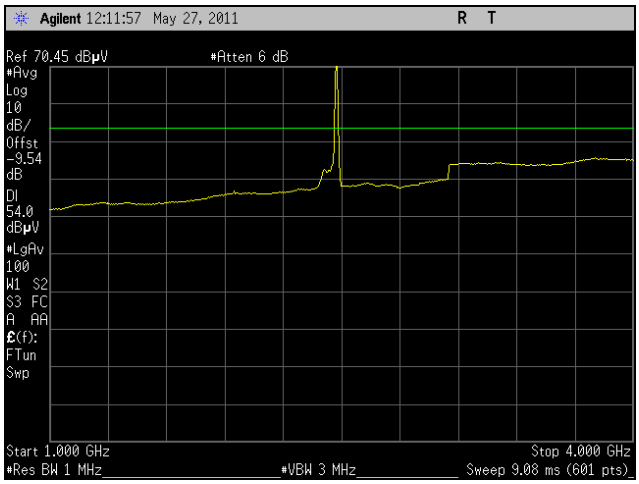
Plot 232. Radiated Harmonic Emissions, Mid Channel, 802.11n HT10, Average, 4 GHz – 18 GHz



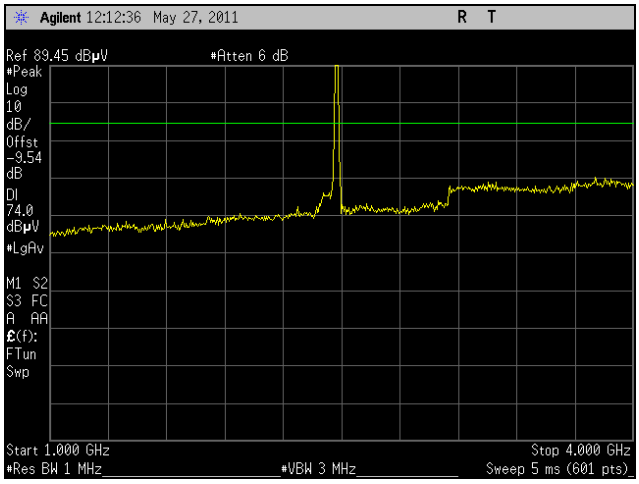
Plot 233. Radiated Harmonic Emissions, Mid Channel, 802.11n HT10, Peak, 4 GHz – 18 GHz



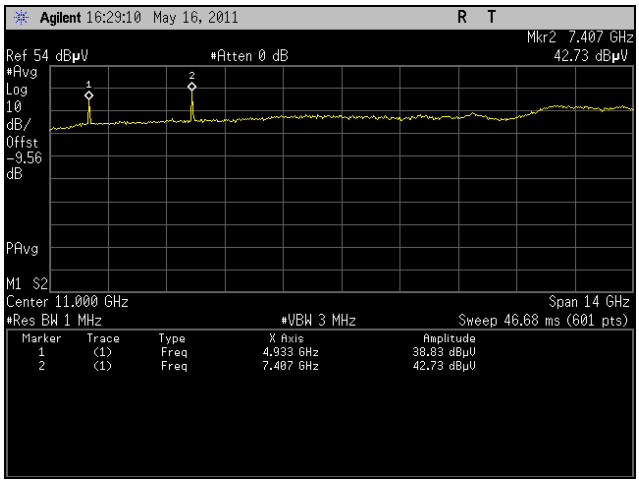
Plot 234. Radiated Harmonic Emissions, High Channel, 802.11n HT10, 30 MHz – 1 GHz



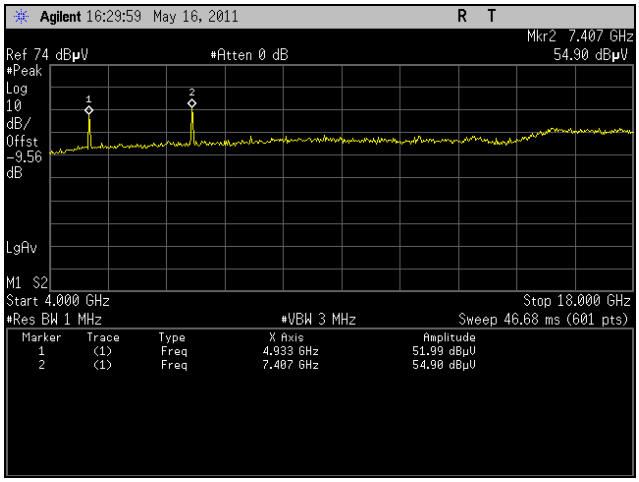
Plot 235. Radiated Harmonic Emissions, High Channel, 802.11n HT10, Average, 1 GHz – 4 GHz



Plot 236. Radiated Harmonic Emissions, High Channel, 802.11n HT10, Peak, 1 GHz – 4 GHz

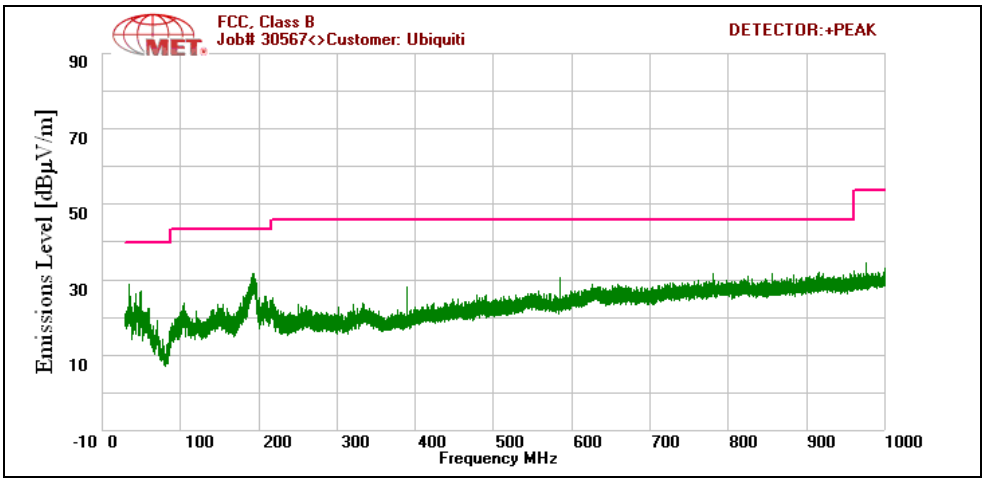


Plot 237. Radiated Harmonic Emissions, High Channel, 802.11n HT10, Average, 4 GHz – 18 GHz

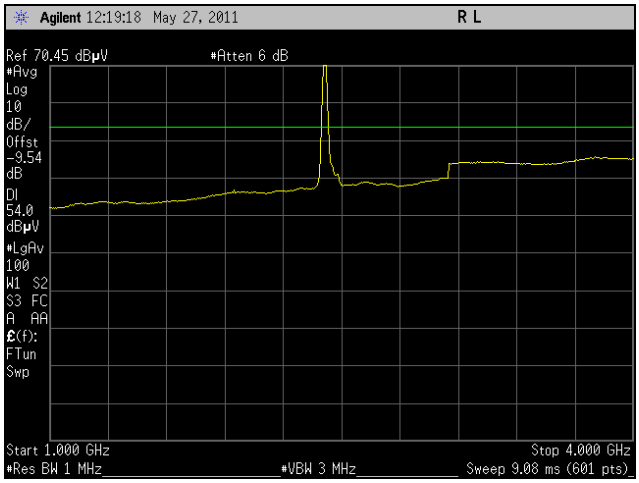


Plot 238. Radiated Harmonic Emissions, High Channel, 802.11n HT10, Peak, 4 GHz – 18 GHz

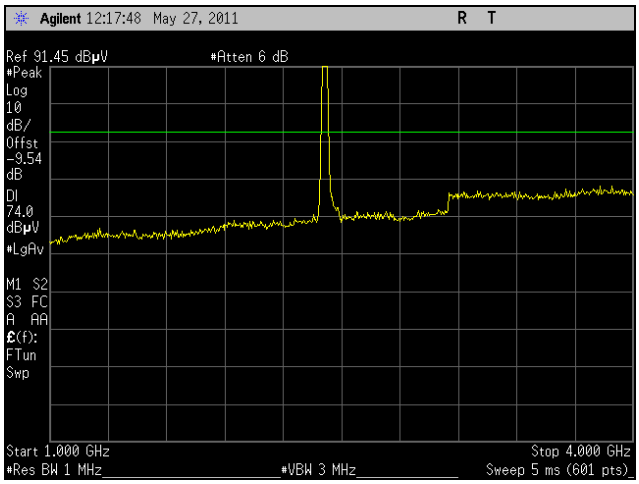
Radiated Harmonic Emissions, 802.11n HT20



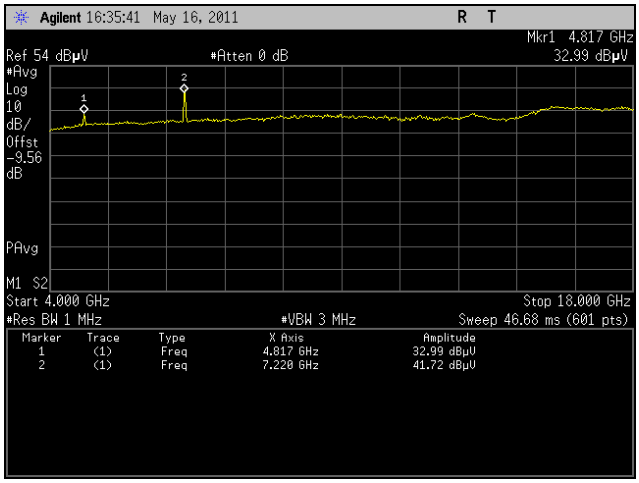
Plot 239. Radiated Harmonic Emissions, Low Channel, 802.11n HT20, 30 MHz – 1 GHz



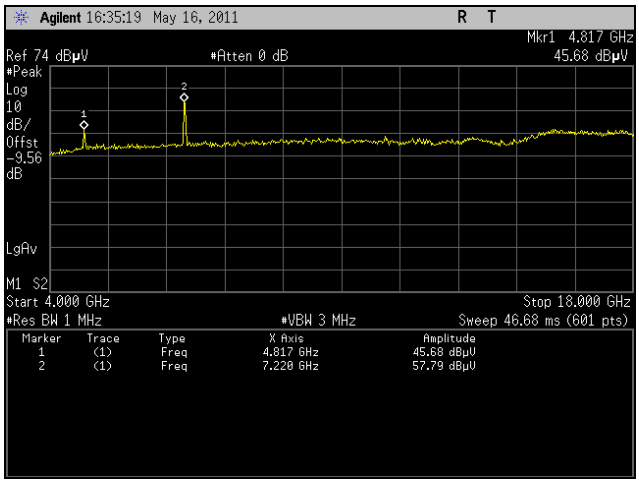
Plot 240. Radiated Harmonic Emissions, Low Channel, 802.11n HT20, Average, 1 GHz – 4 GHz



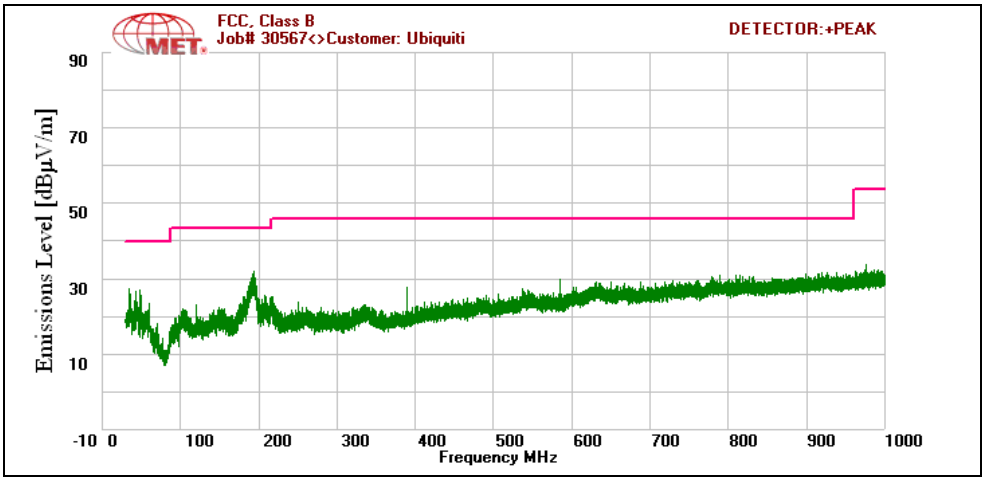
Plot 241. Radiated Harmonic Emissions, Low Channel, 802.11n HT20, Peak, 1 GHz – 4 GHz



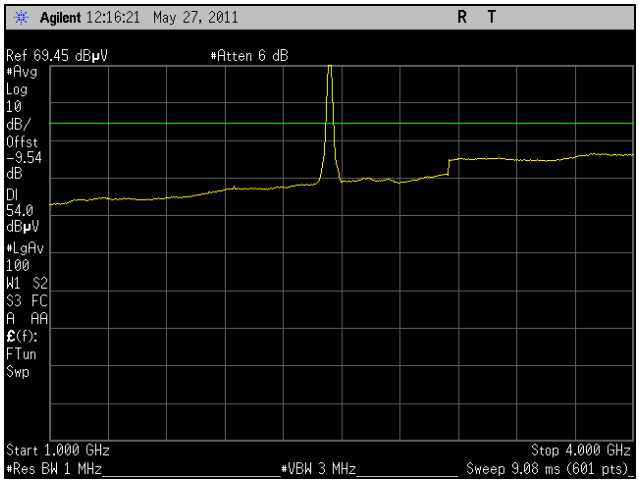
Plot 242. Radiated Harmonic Emissions, Low Channel, 802.11n HT20, Average, 4 GHz – 18 GHz



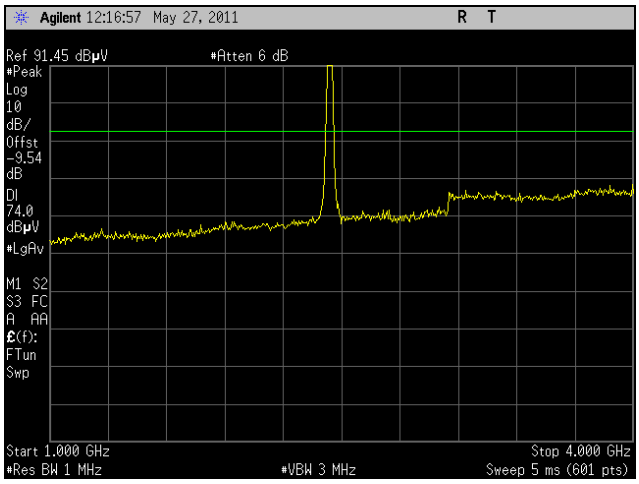
Plot 243. Radiated Harmonic Emissions, Low Channel, 802.11n HT20, Peak, 4 GHz – 18 GHz



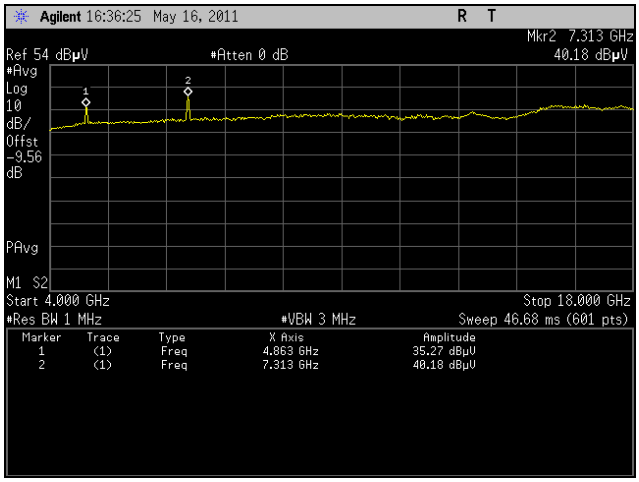
Plot 244. Radiated Harmonic Emissions, Mid Channel, 802.11n HT20, 30 MHz – 1 GHz



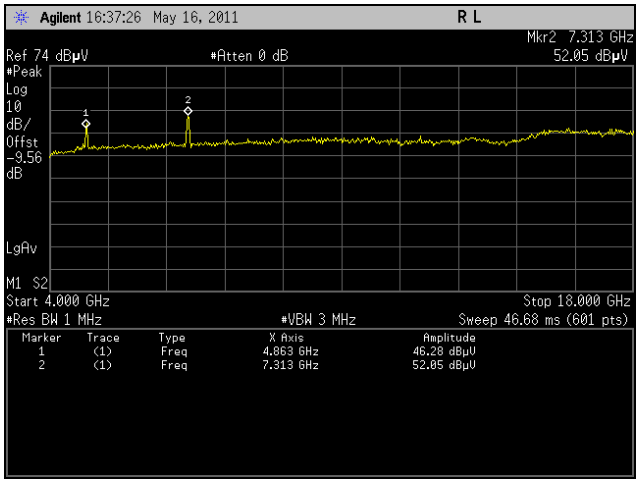
Plot 245. Radiated Harmonic Emissions, Mid Channel, 802.11n HT20, Average, 1 GHz – 4 GHz



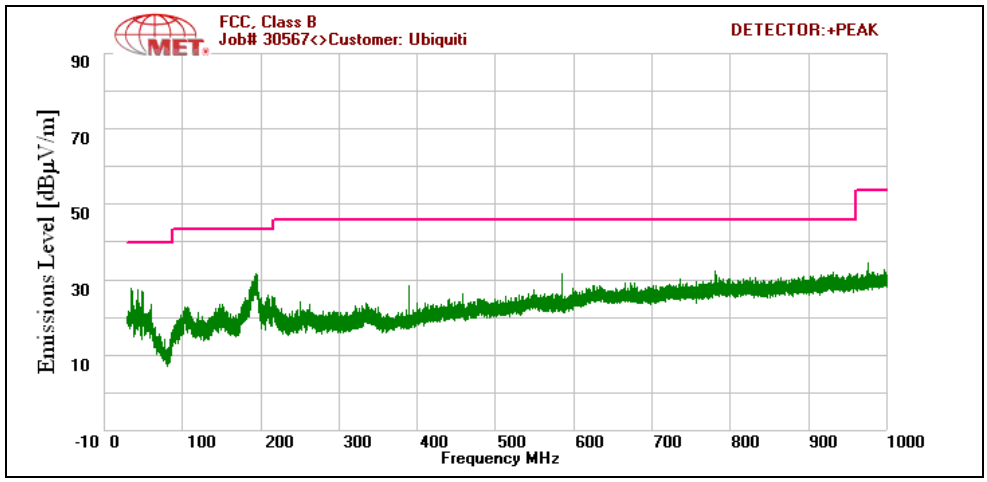
Plot 246. Radiated Harmonic Emissions, Mid Channel, 802.11n HT20, Peak, 1 GHz – 4 GHz



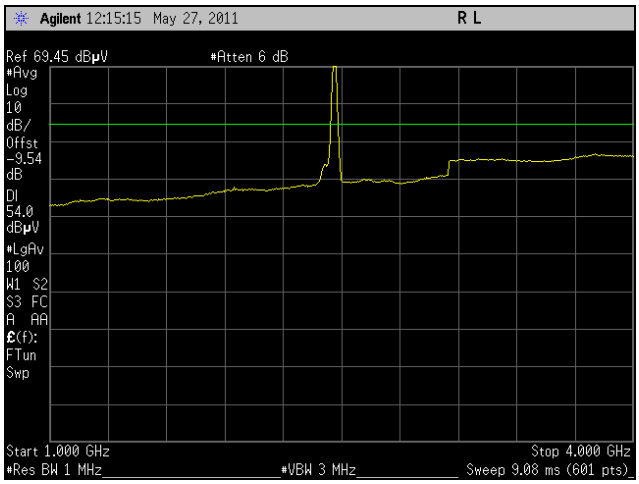
Plot 247. Radiated Harmonic Emissions, Mid Channel, 802.11n HT20, Average, 4 GHz – 18 GHz



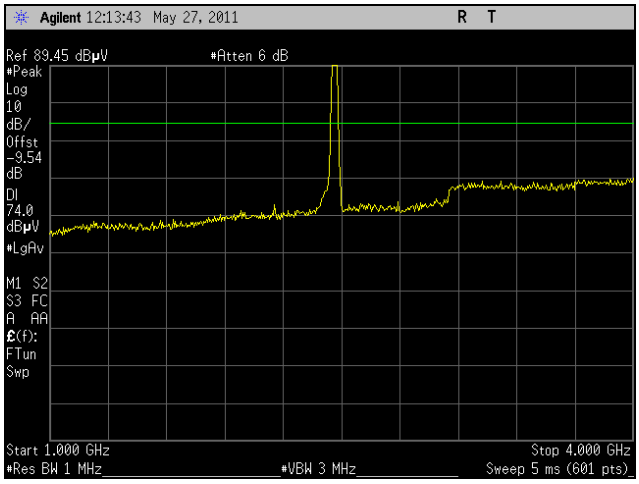
Plot 248. Radiated Harmonic Emissions, Mid Channel, 802.11n HT20, Peak, 4 GHz – 18 GHz



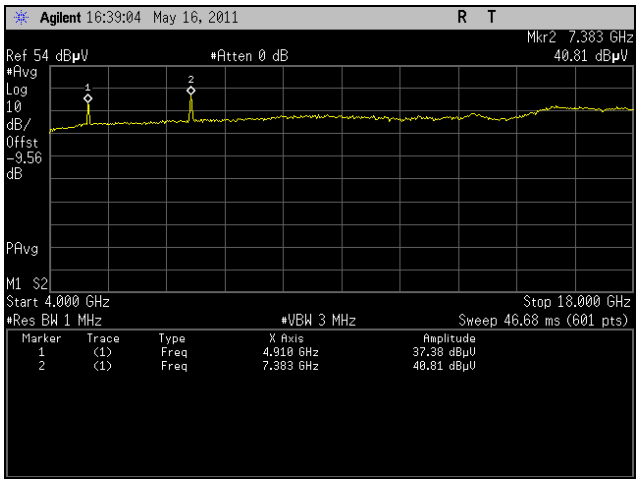
Plot 249. Radiated Harmonic Emissions, High Channel, 802.11n HT20, 30 MHz – 1 GHz



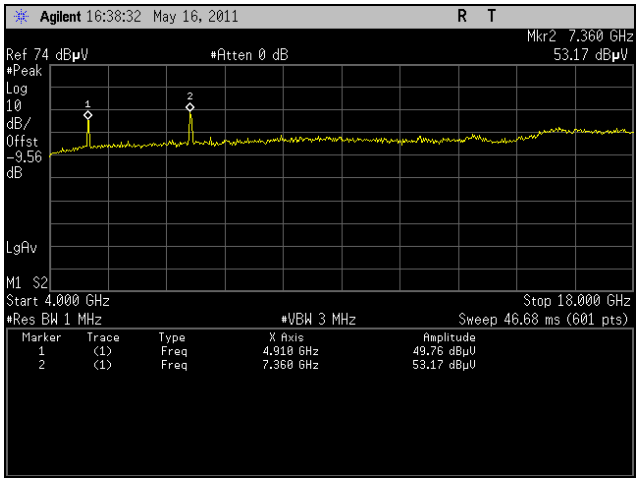
Plot 250. Radiated Harmonic Emissions, High Channel, 802.11n HT20, Average, 1 GHz – 4 GHz



Plot 251. Radiated Harmonic Emissions, High Channel, 802.11n HT20, Peak, 1 GHz – 4 GHz

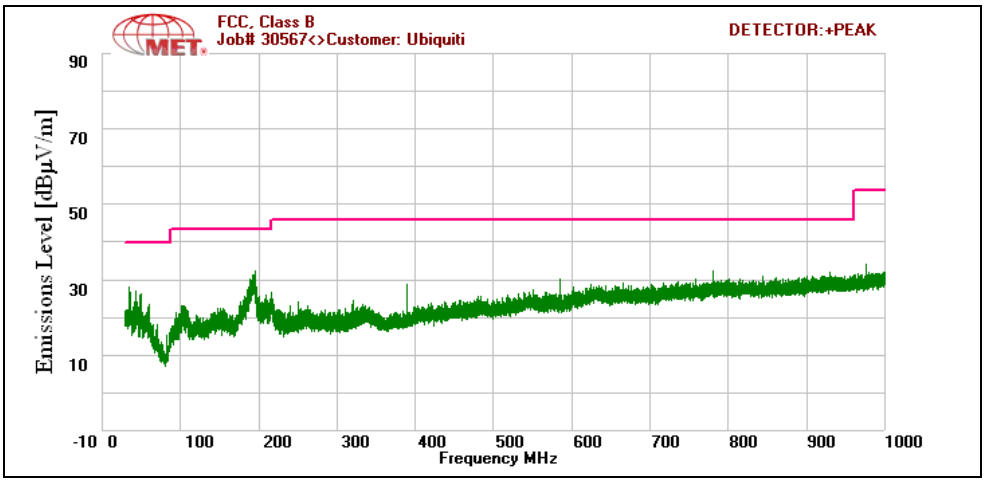


Plot 252. Radiated Harmonic Emissions, High Channel, 802.11n HT20, Average, 4 GHz – 18 GHz

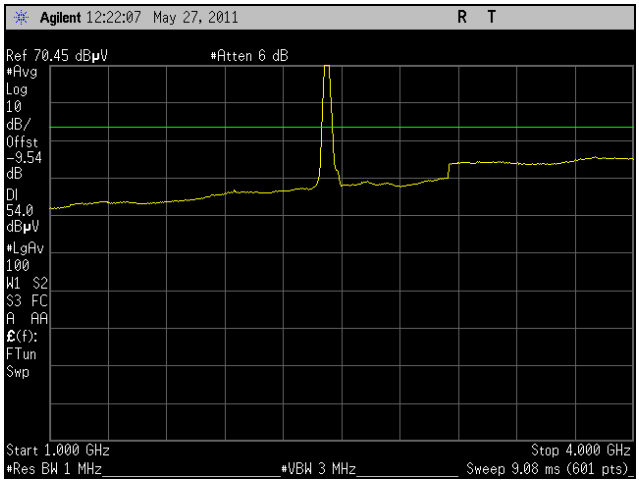


Plot 253. Radiated Harmonic Emissions, High Channel, 802.11n HT20, Peak, 4 GHz – 18 GHz

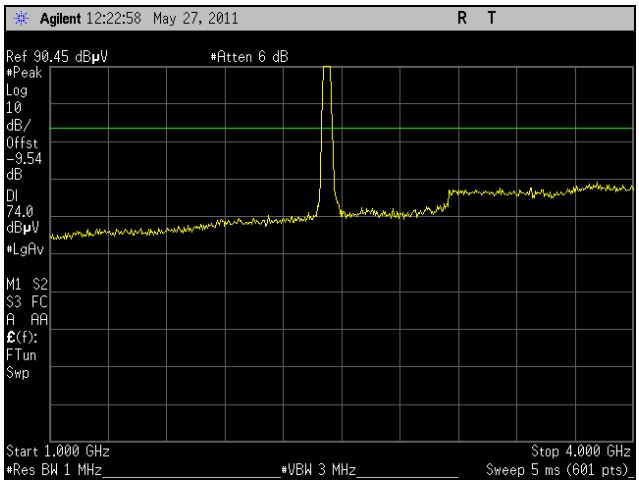
Radiated Harmonic Emissions, 802.11n HT30



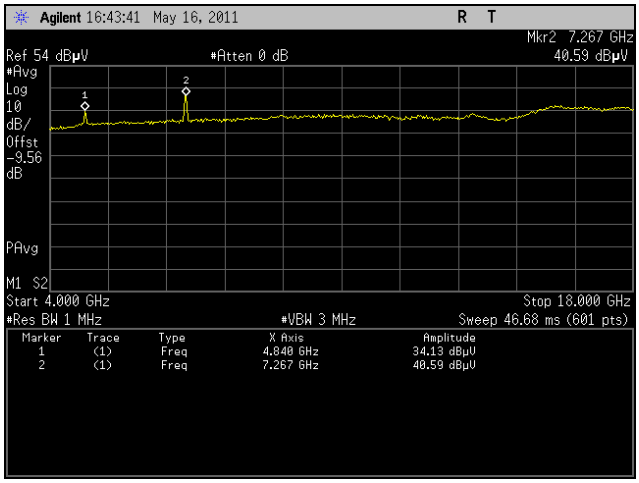
Plot 254. Radiated Harmonic Emissions, Low Channel, 802.11n HT30, 30 MHz – 1 GHz



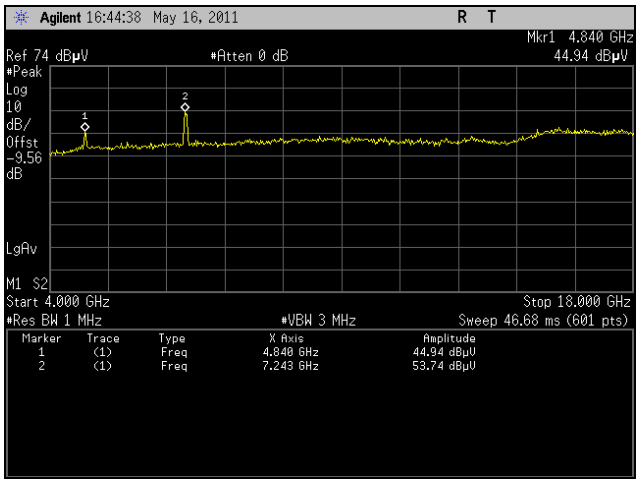
Plot 255. Radiated Harmonic Emissions, Low Channel, 802.11n HT30, Average, 1 GHz – 4 GHz



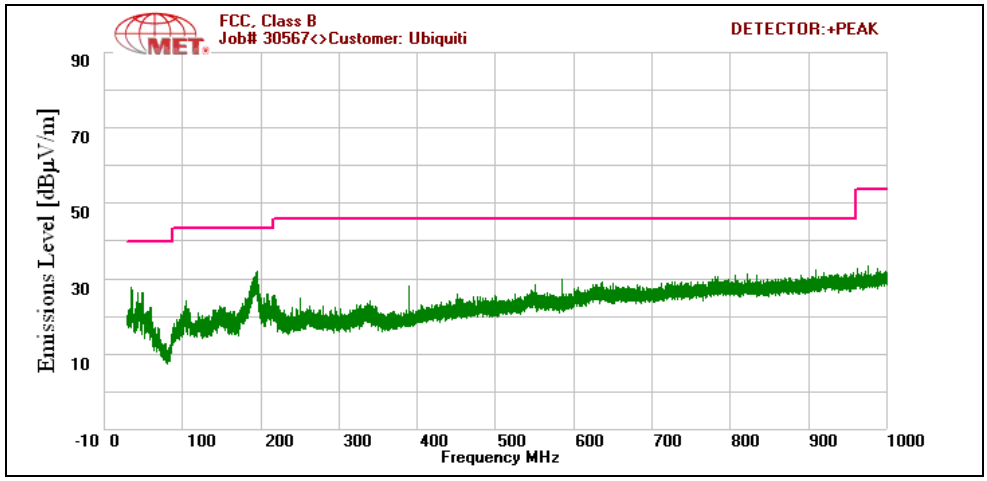
Plot 256. Radiated Harmonic Emissions, Low Channel, 802.11n HT30, Peak, 1 GHz – 4 GHz



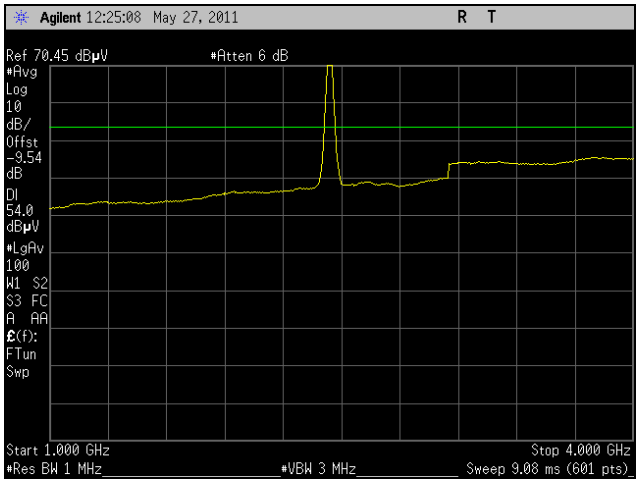
Plot 257. Radiated Harmonic Emissions, Low Channel, 802.11n HT30, Average, 4 GHz – 18 GHz



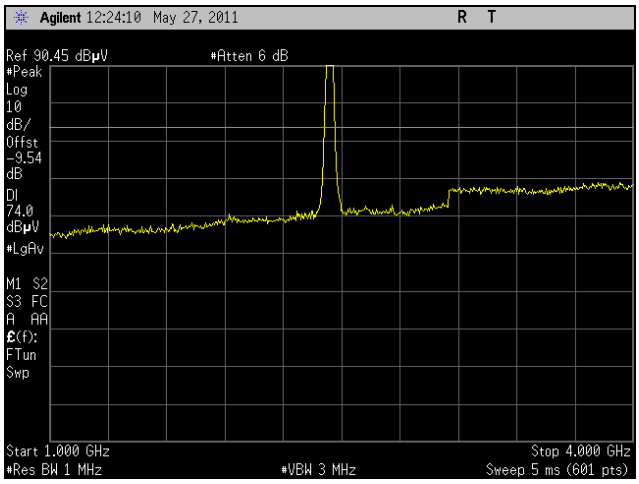
Plot 258. Radiated Harmonic Emissions, Low Channel, 802.11n HT30, Peak, 4 GHz – 18 GHz



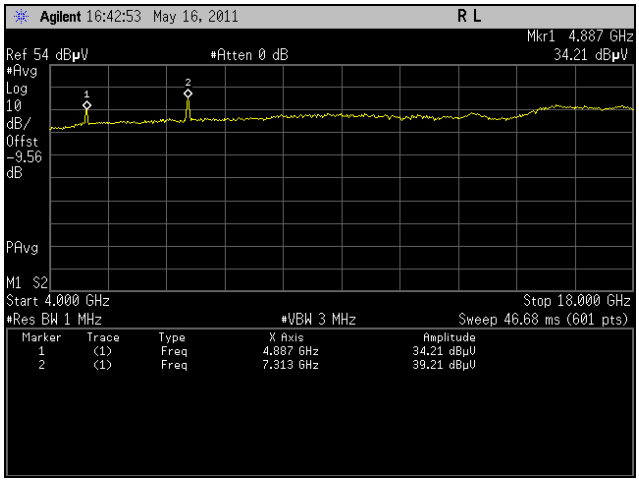
Plot 259. Radiated Harmonic Emissions, Mid Channel, 802.11n HT30, 30 MHz – 1 GHz



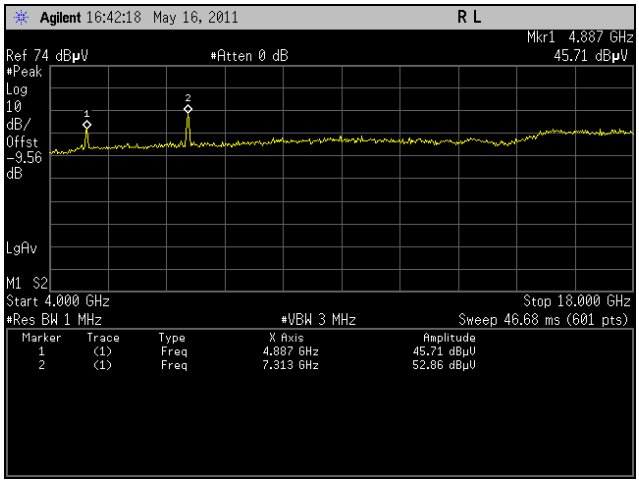
Plot 260. Radiated Harmonic Emissions, Mid Channel, 802.11n HT30, Average, 1 GHz – 4 GHz



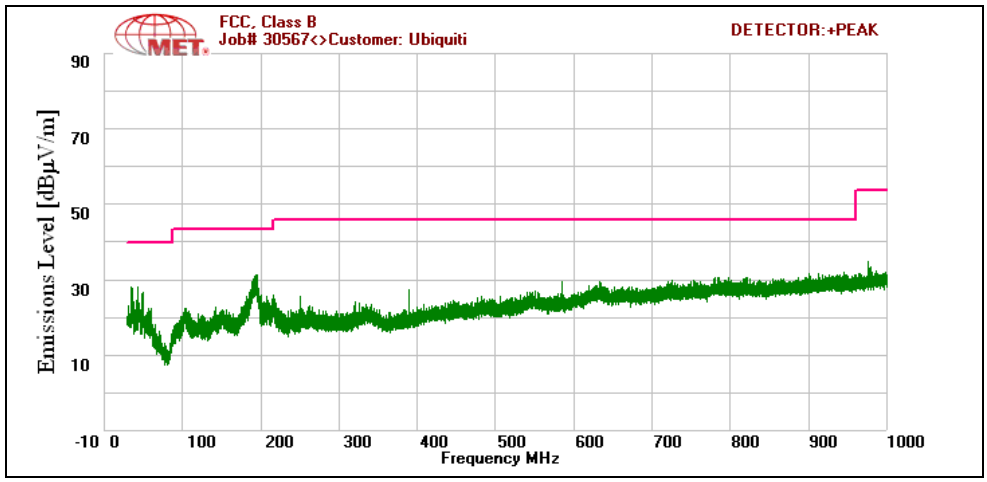
Plot 261. Radiated Harmonic Emissions, Mid Channel, 802.11n HT30, Peak, 1 GHz – 4 GHz



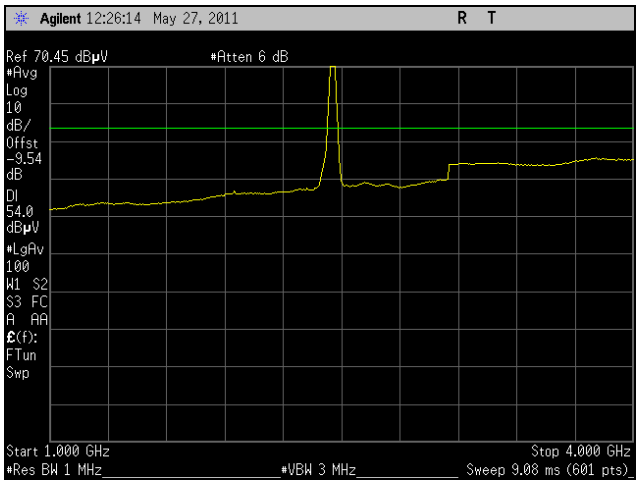
Plot 262. Radiated Harmonic Emissions, Mid Channel, 802.11n HT30, Average, 4 GHz – 18 GHz



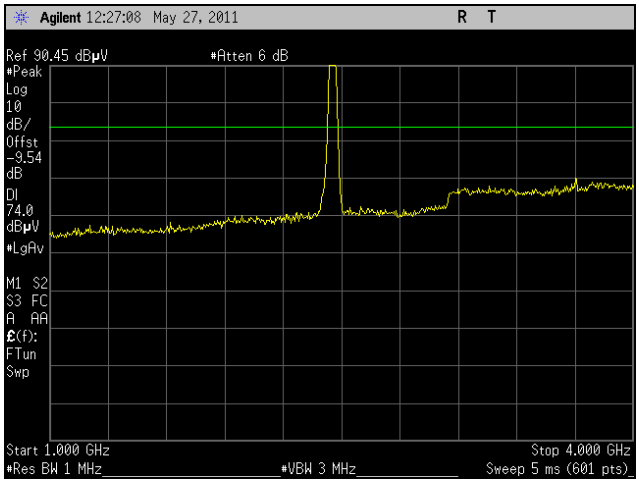
Plot 263. Radiated Harmonic Emissions, Mid Channel, 802.11n HT30, Peak, 4 GHz – 18 GHz



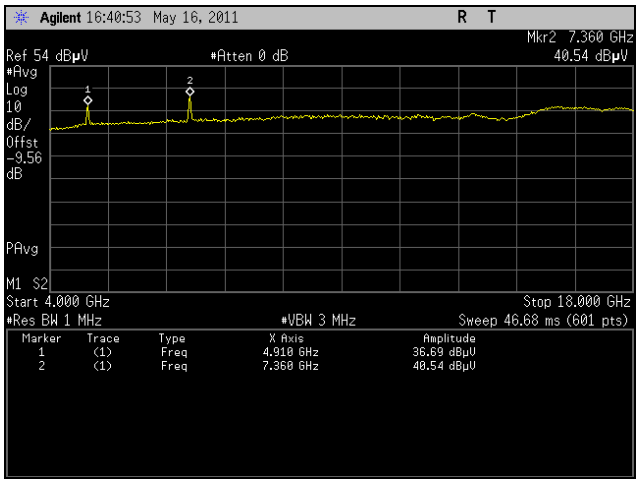
Plot 264. Radiated Harmonic Emissions, High Channel, 802.11n HT30, 30 MHz – 1 GHz



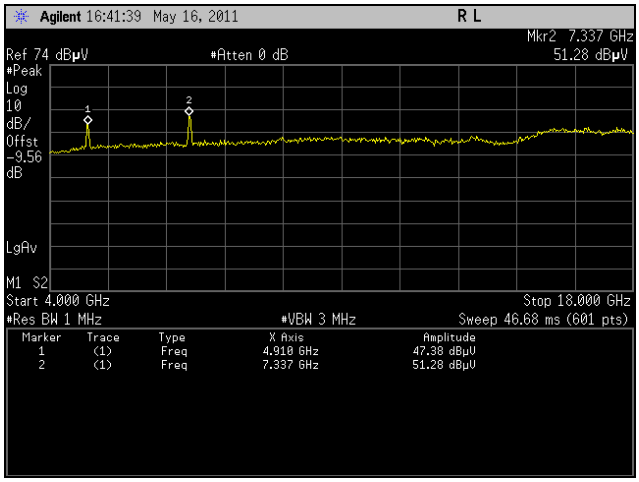
Plot 265. Radiated Harmonic Emissions, High Channel, 802.11n HT30, Average, 1 GHz – 4 GHz



Plot 266. Radiated Harmonic Emissions, High Channel, 802.11n HT30, Peak, 1 GHz – 4 GHz

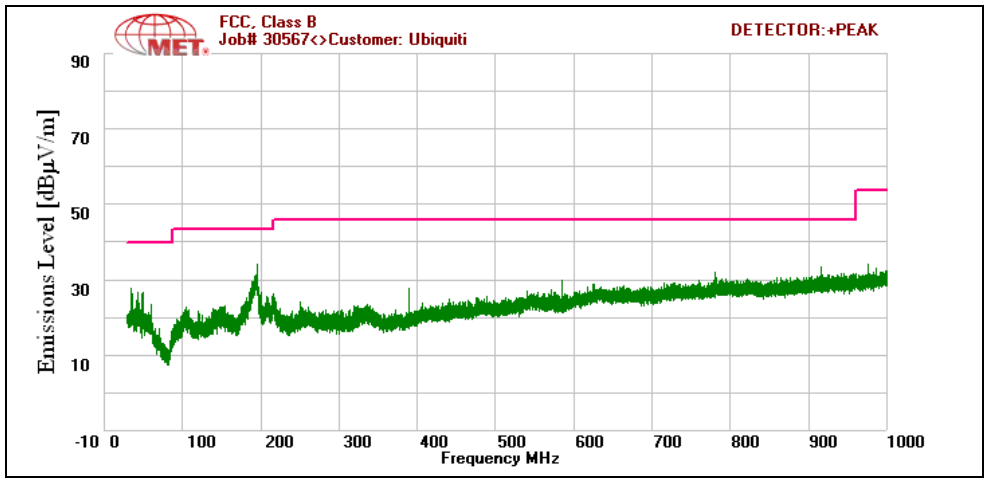


Plot 267. Radiated Harmonic Emissions, High Channel, 802.11n HT30, Average, 4 GHz – 18 GHz

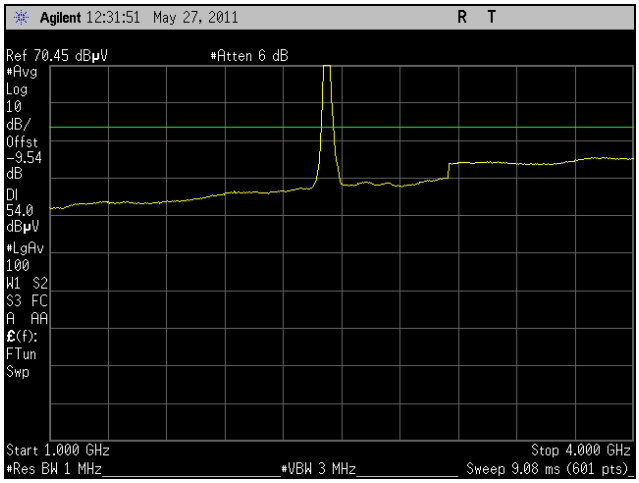


Plot 268. Radiated Harmonic Emissions, High Channel, 802.11n HT30, Peak, 4 GHz – 18 GHz

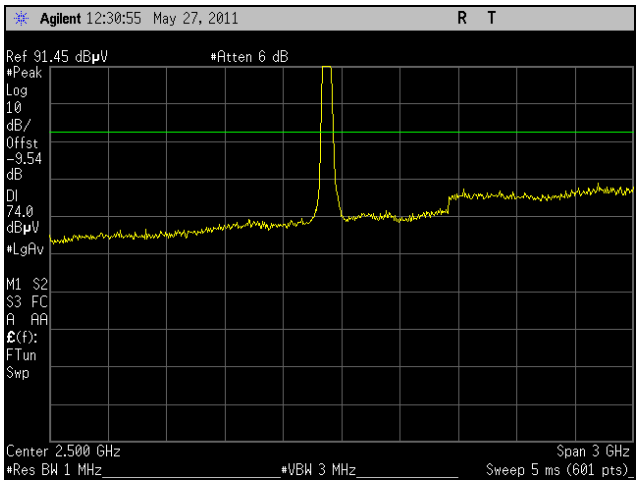
Radiated Harmonic Emissions, 802.11n HT40



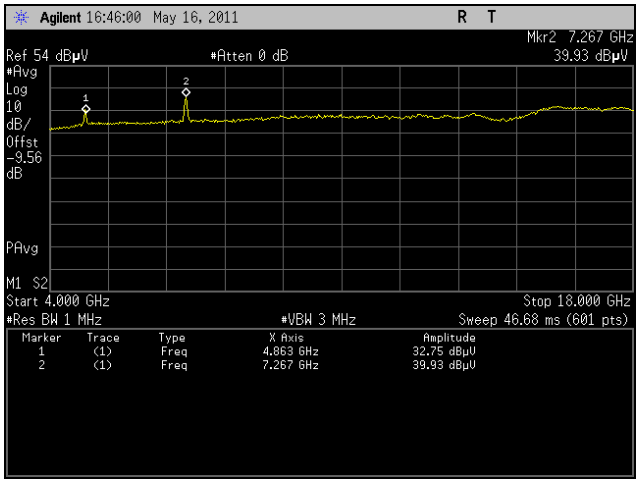
Plot 269. Radiated Harmonic Emissions, Low Channel, 802.11n HT40, 30 MHz – 1 GHz



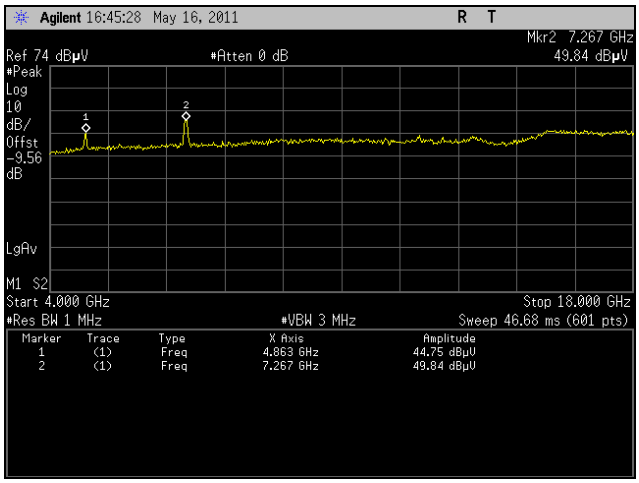
Plot 270. Radiated Harmonic Emissions, Low Channel, 802.11n HT40, Average, 1 GHz – 4 GHz



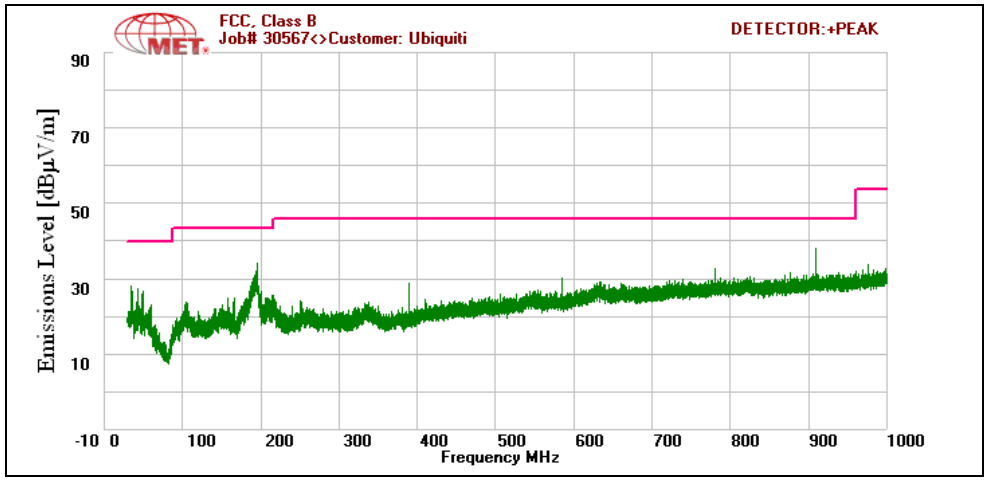
Plot 271. Radiated Harmonic Emissions, Low Channel, 802.11n HT40, Peak, 1 GHz – 4 GHz



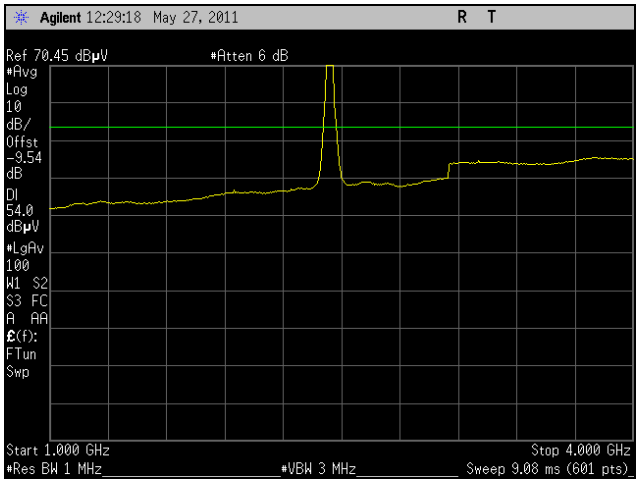
Plot 272. Radiated Harmonic Emissions, Low Channel, 802.11n HT40, Average, 4 GHz – 18 GHz



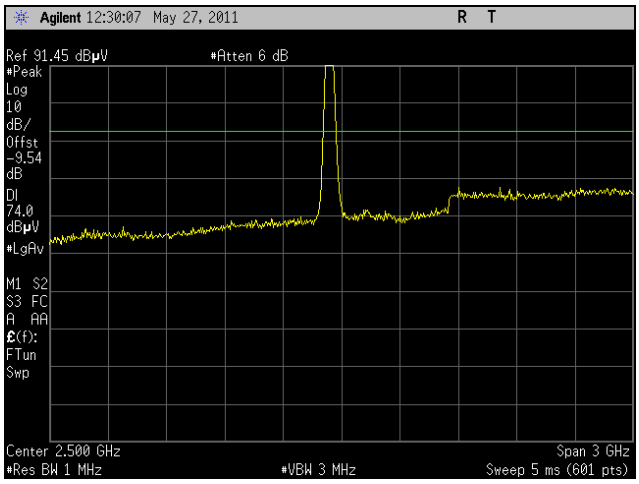
Plot 273. Radiated Harmonic Emissions, Low Channel, 802.11n HT40, Peak, 4 GHz – 18 GHz



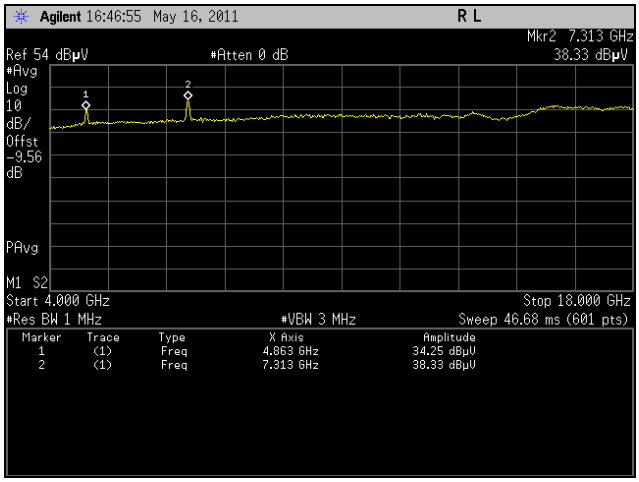
Plot 274. Radiated Harmonic Emissions, Mid Channel, 802.11n HT40, 30 MHz – 1 GHz



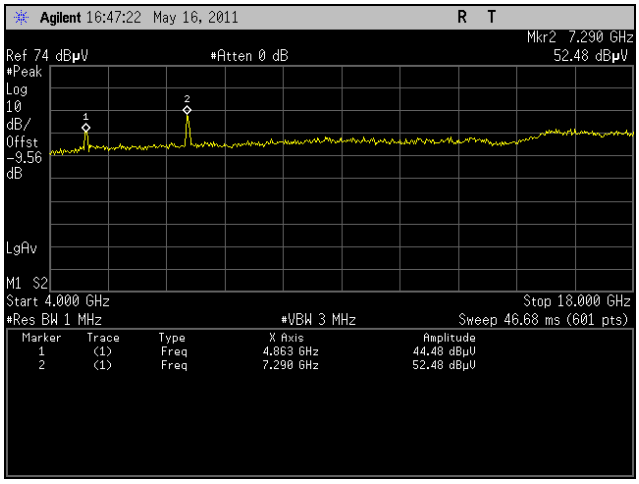
Plot 275. Radiated Harmonic Emissions, Mid Channel, 802.11n HT40, Average, 1 GHz – 4 GHz



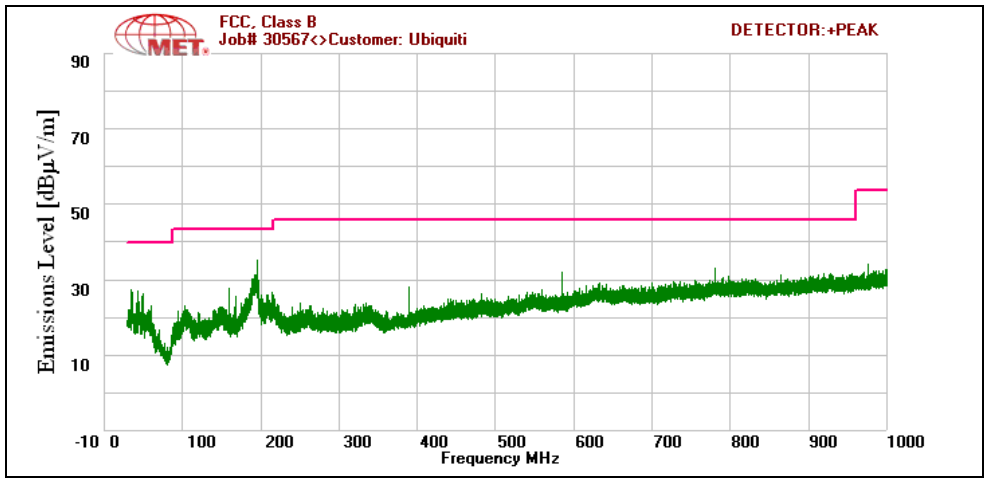
Plot 276. Radiated Harmonic Emissions, Mid Channel, 802.11n HT40, Peak, 1 GHz – 4 GHz



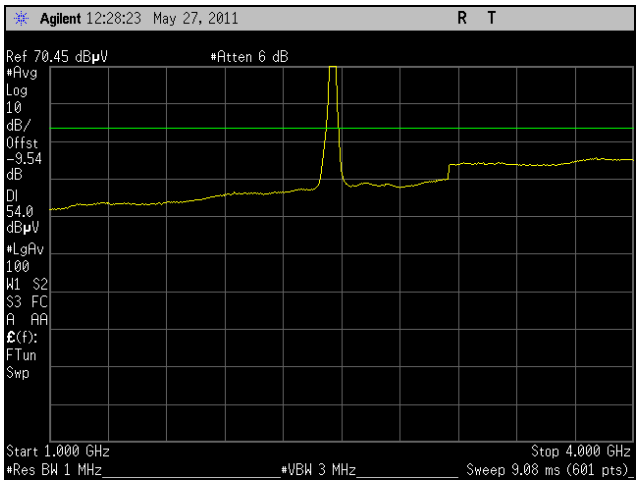
Plot 277. Radiated Harmonic Emissions, Mid Channel, 802.11n HT40, Average, 4 GHz – 18 GHz



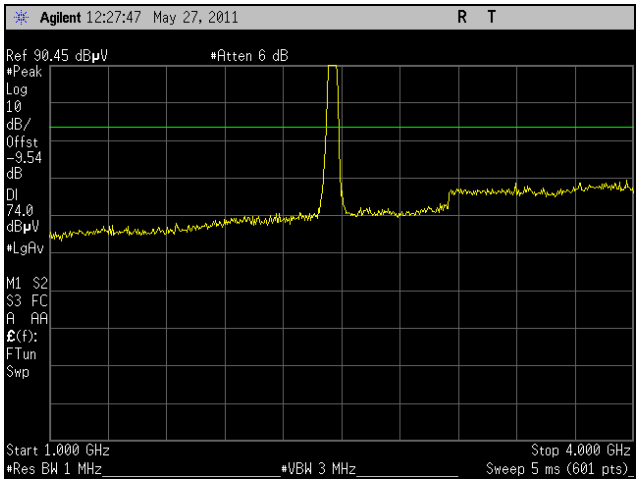
Plot 278. Radiated Harmonic Emissions, Mid Channel, 802.11n HT40, Peak, 4 GHz – 18 GHz



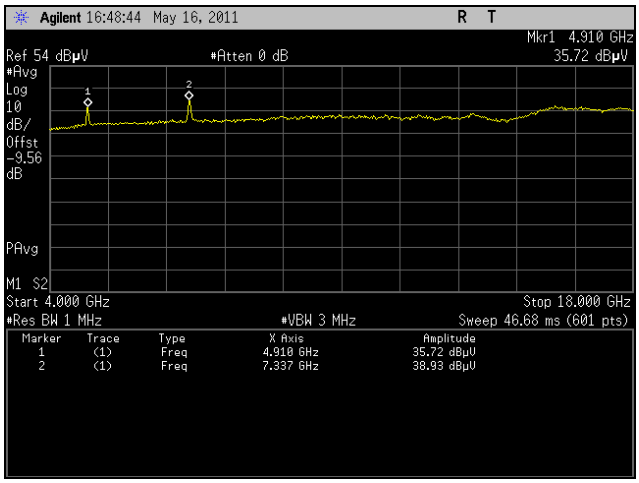
Plot 279. Radiated Harmonic Emissions, High Channel, 802.11n HT40, 30 MHz – 1 GHz



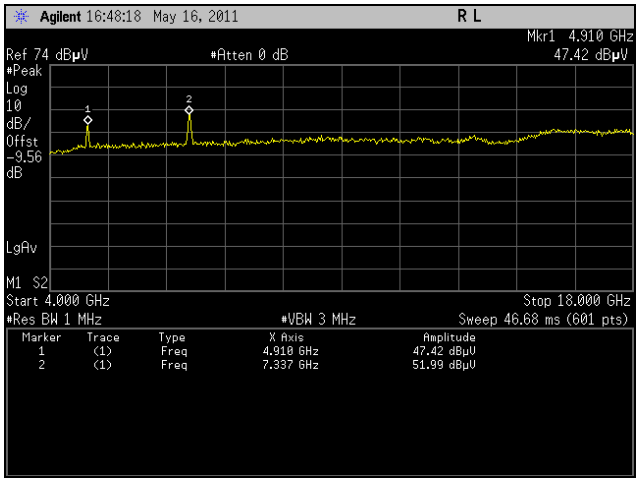
Plot 280. Radiated Harmonic Emissions, High Channel, 802.11n HT40, Average, 1 GHz – 4 GHz



Plot 281. Radiated Harmonic Emissions, High Channel, 802.11n HT40, Peak, 1 GHz – 4 GHz



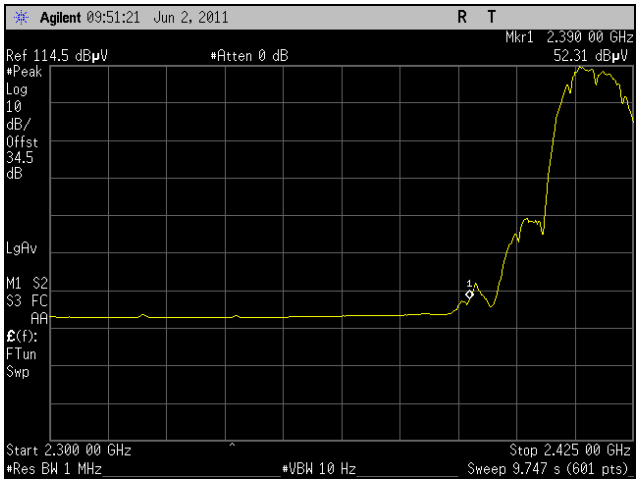
Plot 282. Radiated Harmonic Emissions, High Channel, 802.11n HT40, Average, 4 GHz – 18 GHz



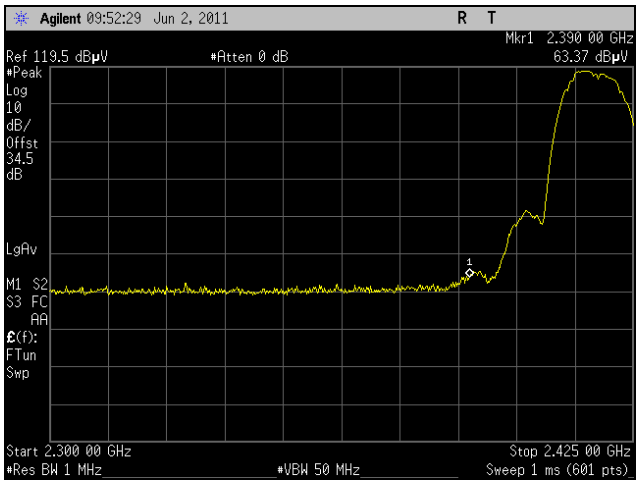
Plot 283. Radiated Harmonic Emissions, High Channel, 802.11n HT40, Peak, 4 GHz – 18 GHz

Radiated Band Edge Measurements

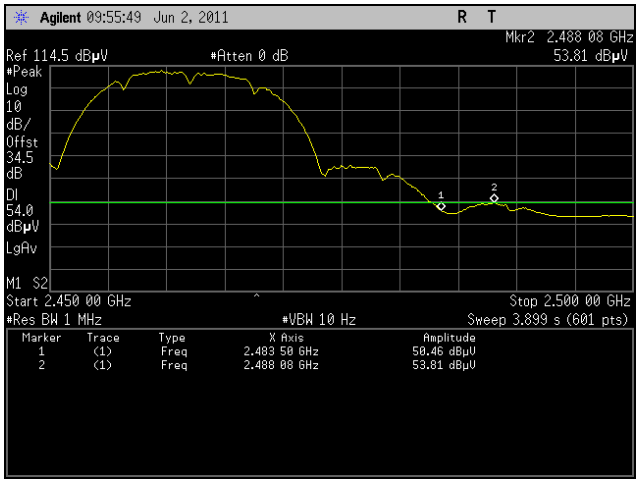
Test Procedures: The transmitter was turned on. Measurements were performed of the low, mid and high Channels. The EUT was rotated orthogonally through all three axes. Plots shown are corrected for both antenna and cable loss corrections and compared to a 3 m limit line.



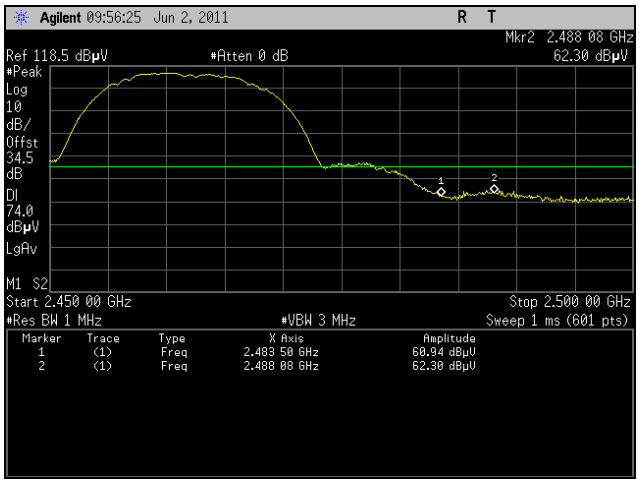
Plot 284. Radiated Restricted Band Edge, Low Channel, Average, 802.11b



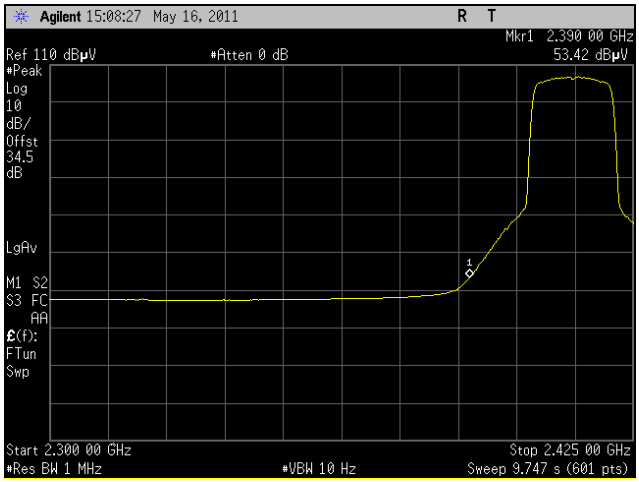
Plot 285. Radiated Restricted Band Edge, Low Channel, Peak, 802.11b



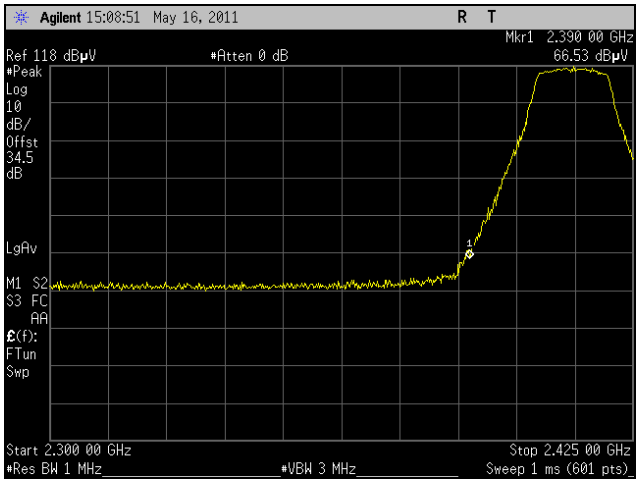
Plot 286. Radiated Restricted Band Edge, High Channel, Average, 802.11b



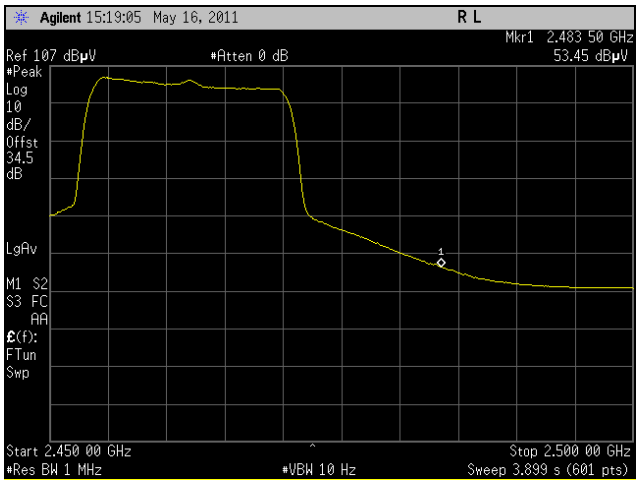
Plot 287. Radiated Restricted Band Edge, High Channel, Peak, 802.11b



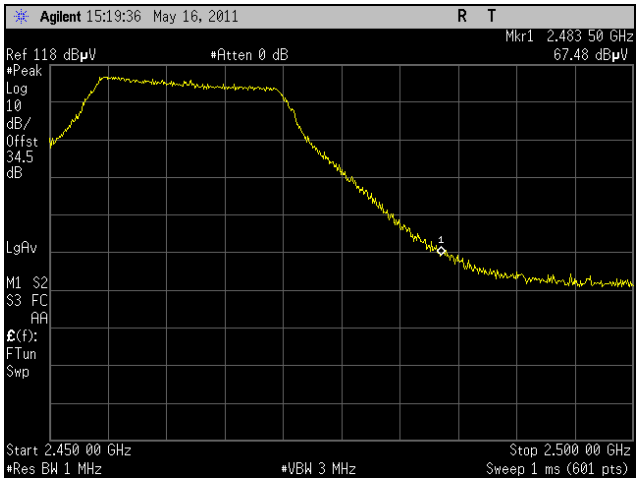
Plot 288. Radiated Restricted Band Edge, Low Channel, Average, 802.11g 20 MHz



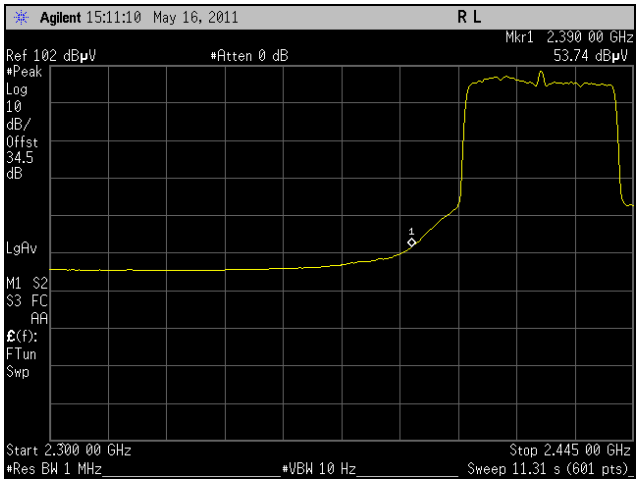
Plot 289. Radiated Restricted Band Edge, Low Channel, Peak, 802.11g 20 MHz



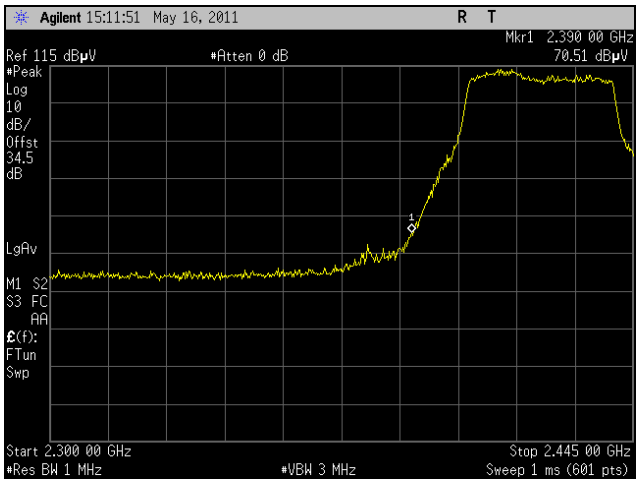
Plot 290. Radiated Restricted Band Edge, High Channel, Average, 802.11g 20 MHz



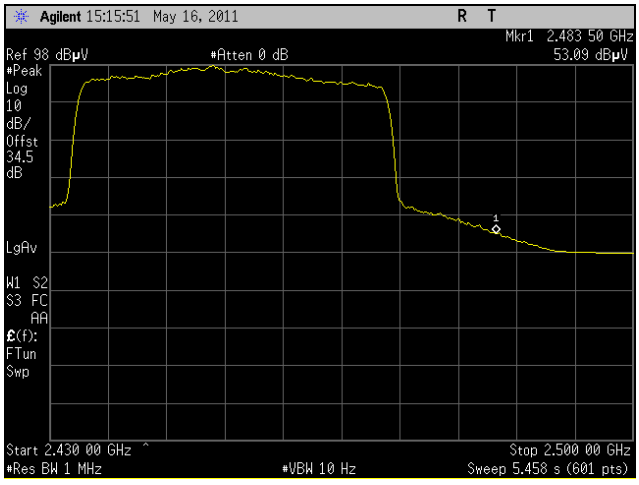
Plot 291. Radiated Restricted Band Edge, High Channel, Peak, 802.11g 20 MHz



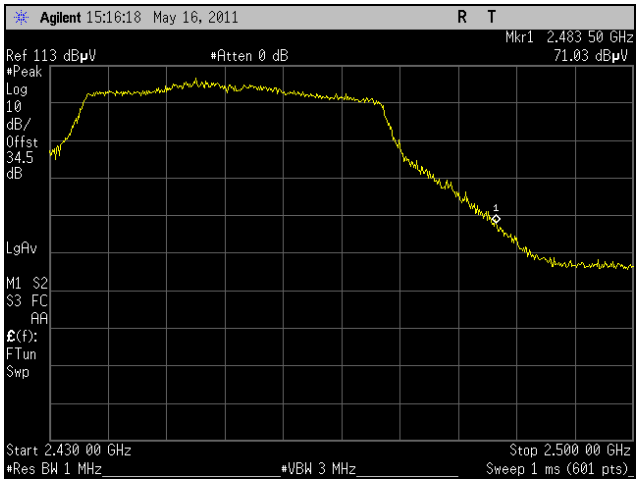
Plot 292. Radiated Restricted Band Edge, Low Channel, Average, 802.11g 40 MHz



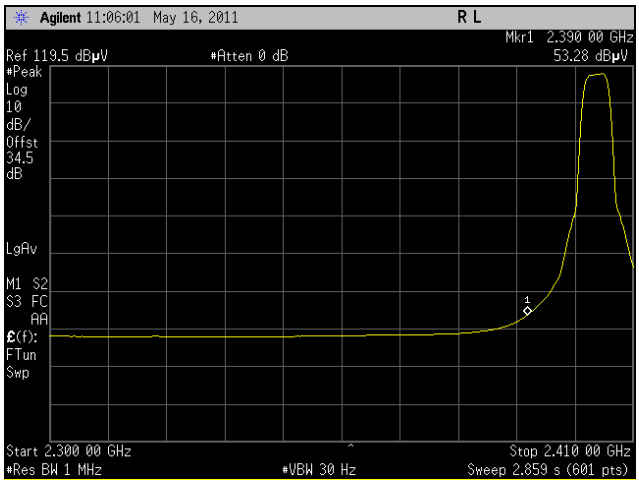
Plot 293. Radiated Restricted Band Edge, Low Channel, Peak, 802.11g 40 MHz



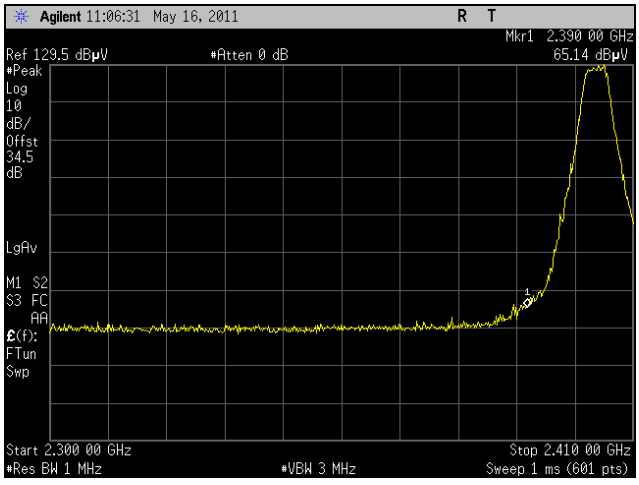
Plot 294. Radiated Restricted Band Edge, High Channel, Average, 802.11g 40 MHz



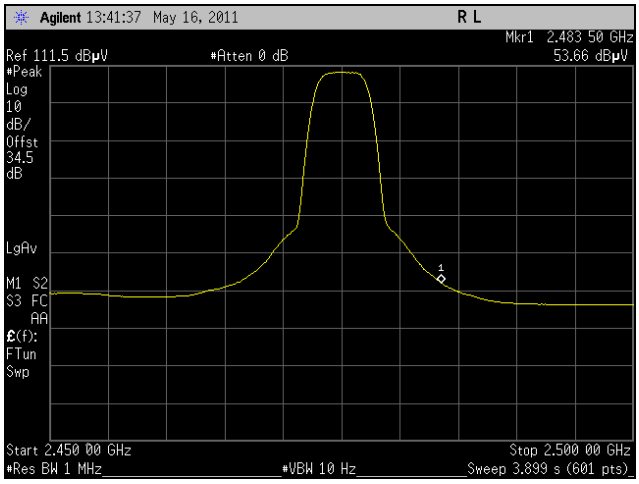
Plot 295. Radiated Restricted Band Edge, High Channel, Peak, 802.11g 40 MHz



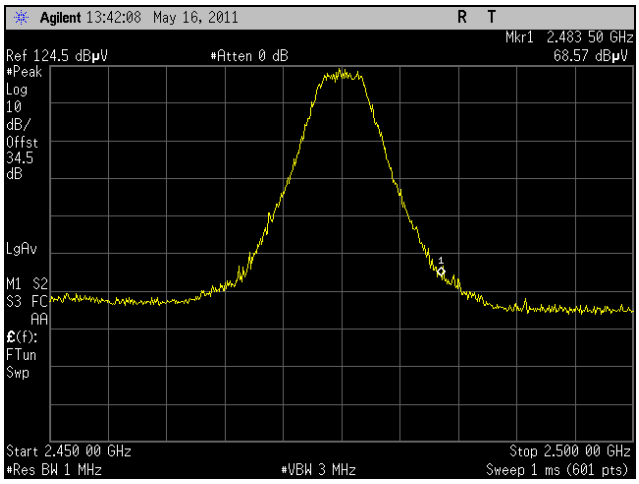
Plot 296. Radiated Restricted Band Edge, Low Channel, Average, 802.11n HT5



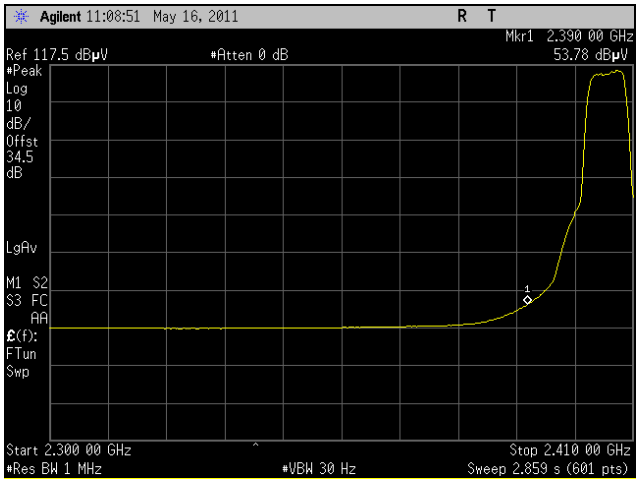
Plot 297. Radiated Restricted Band Edge, Low Channel, Peak, 802.11n HT5



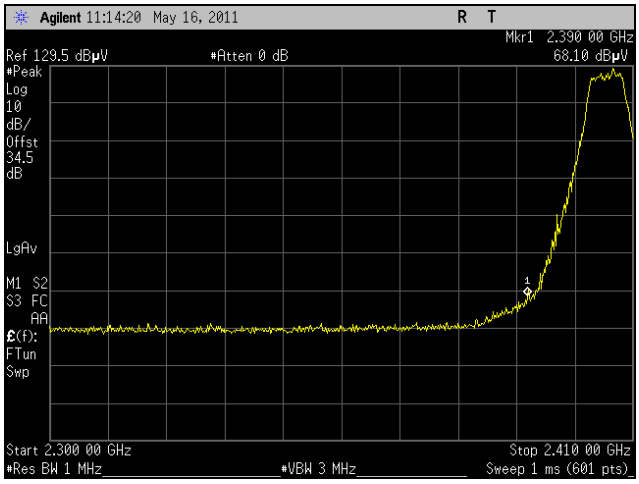
Plot 298. Radiated Restricted Band Edge, High Channel, Average, 802.11n HT5



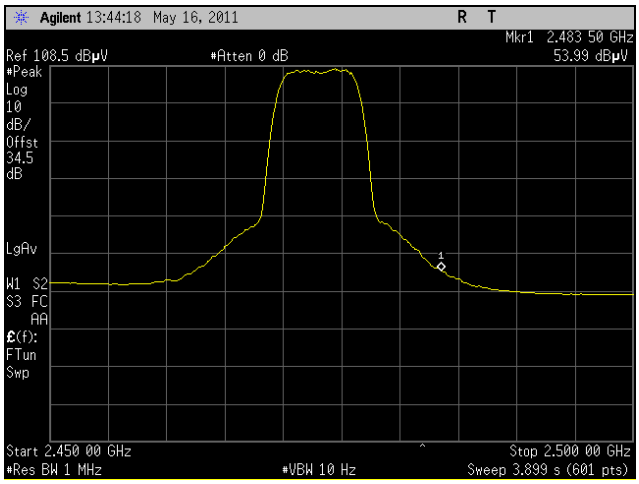
Plot 299. Radiated Restricted Band Edge, High Channel, Peak, 802.11n HT5



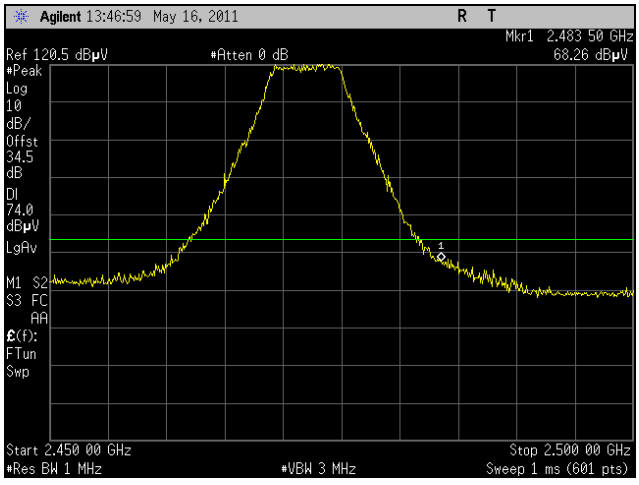
Plot 300. Radiated Restricted Band Edge, Low Channel, Average, 802.11n HT8



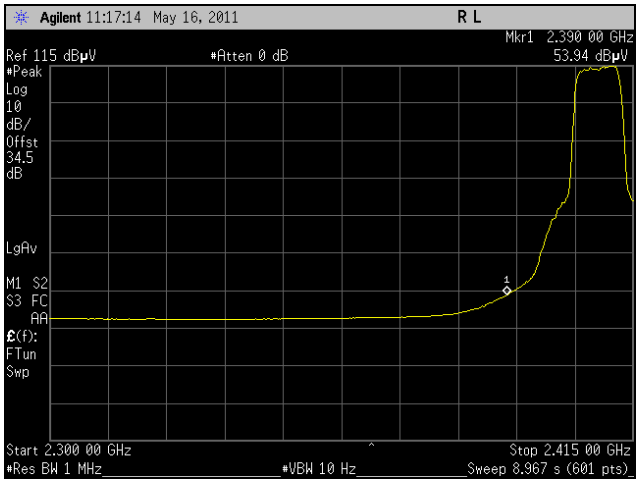
Plot 301. Radiated Restricted Band Edge, Low Channel, Peak, 802.11n HT8



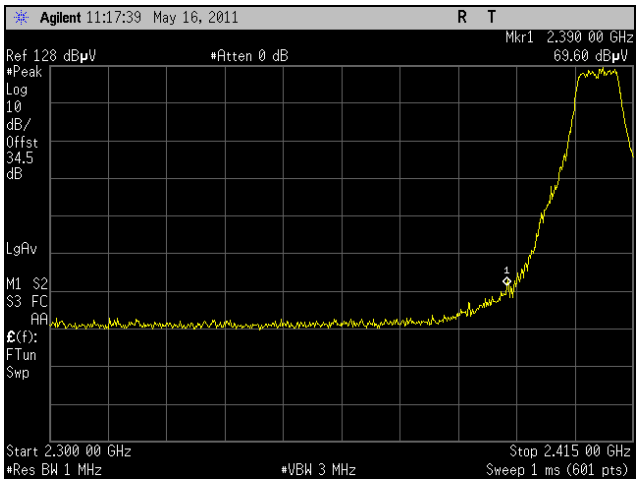
Plot 302. Radiated Restricted Band Edge, High Channel, Average, 802.11n HT8



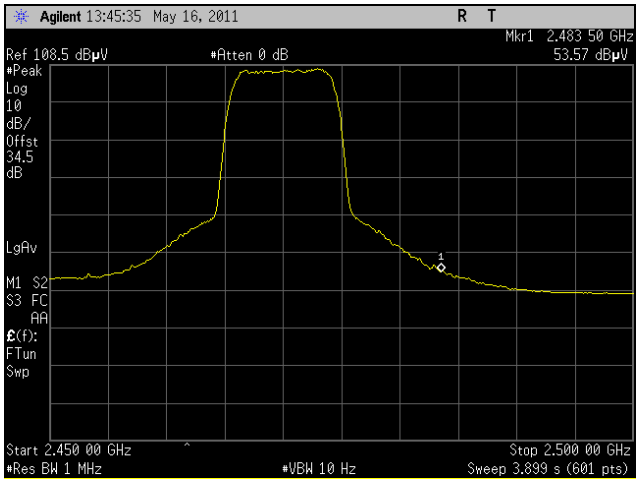
Plot 303. Radiated Restricted Band Edge, High Channel, Peak, 802.11n HT8



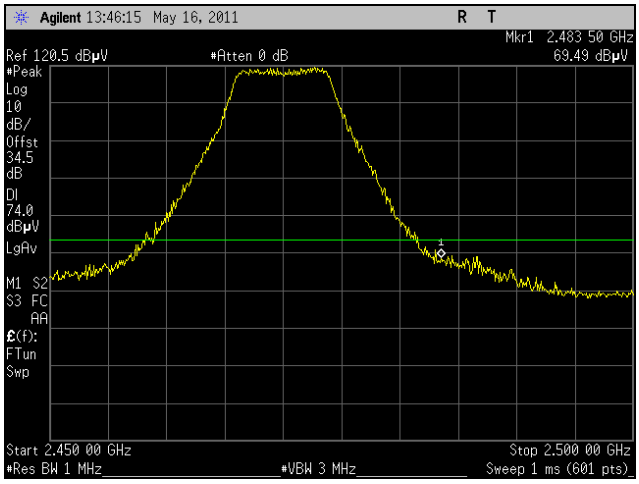
Plot 304. Radiated Restricted Band Edge, Low Channel, Average, 802.11n HT10



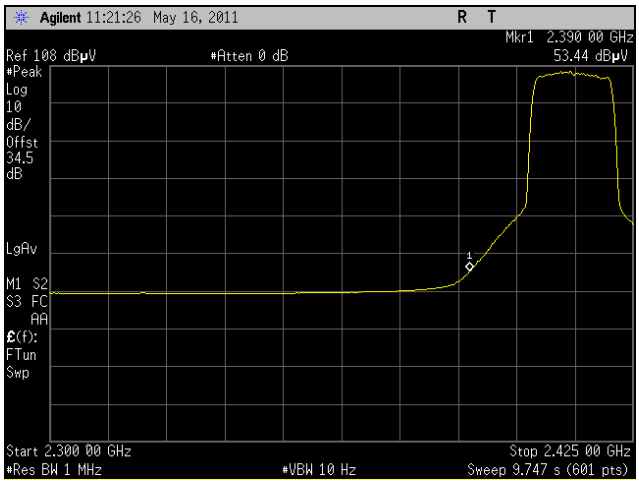
Plot 305. Radiated Restricted Band Edge, Low Channel, Peak, 802.11n HT10



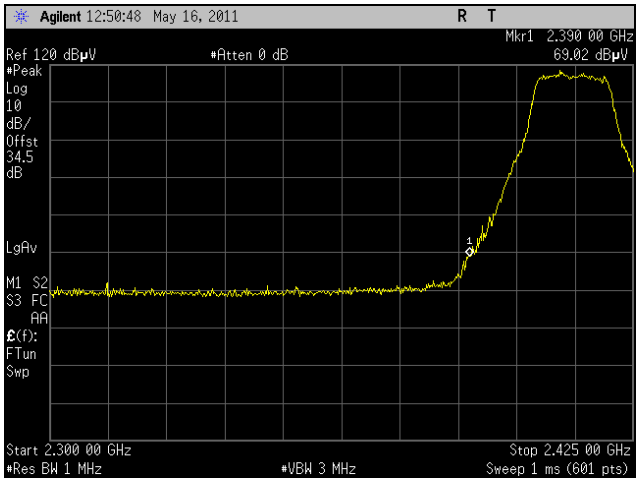
Plot 306. Radiated Restricted Band Edge, High Channel, Average, 802.11n HT10



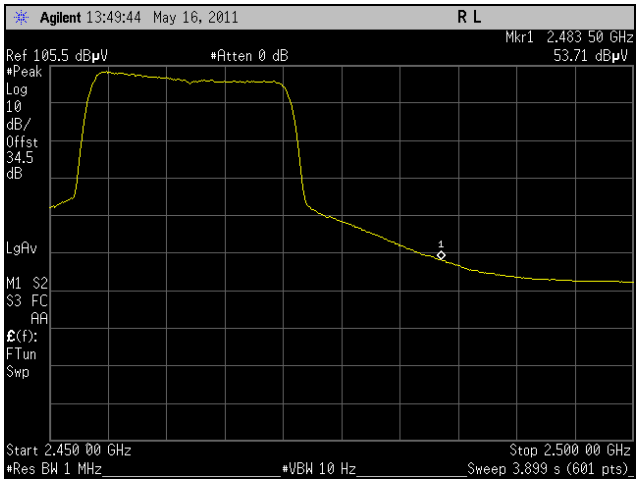
Plot 307. Radiated Restricted Band Edge, High Channel, Peak, 802.11n HT10



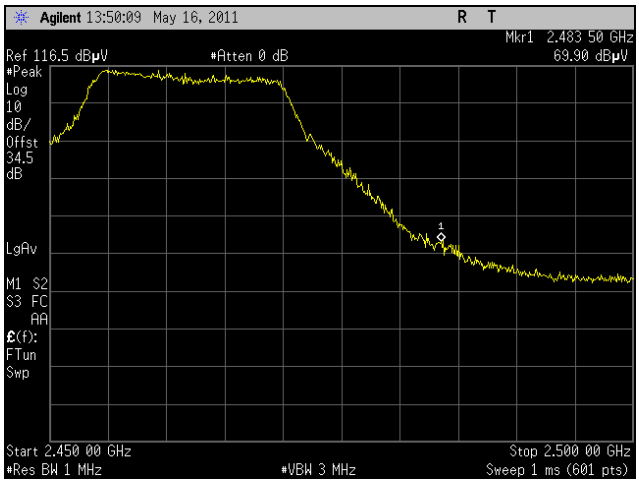
Plot 308. Radiated Restricted Band Edge, Low Channel, Average, 802.11n HT20



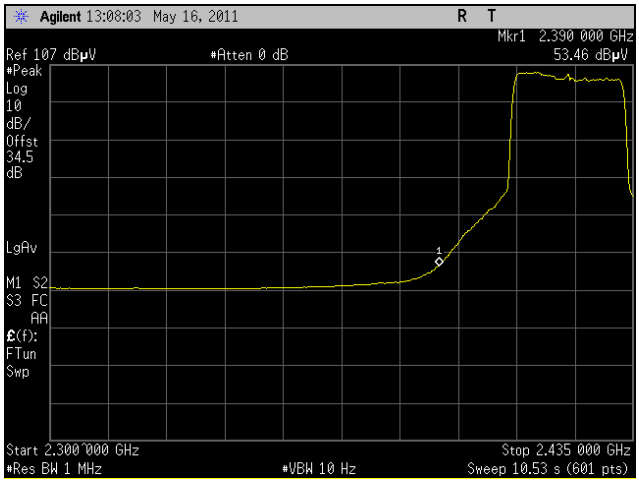
Plot 309. Radiated Restricted Band Edge, Low Channel, Peak, 802.11n HT20



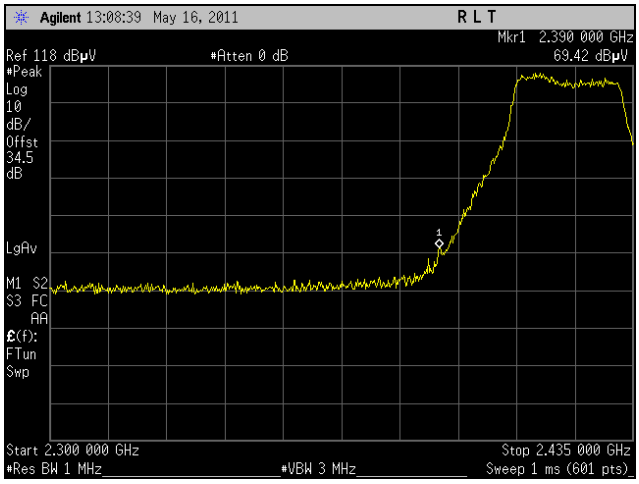
Plot 310. Radiated Restricted Band Edge, High Channel, Average, 802.11n HT20



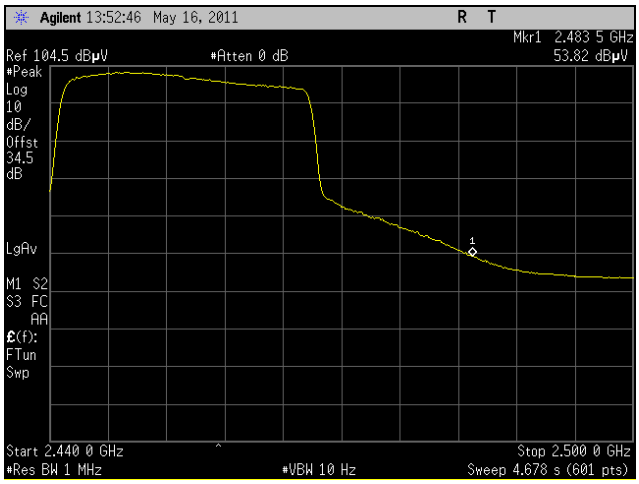
Plot 311. Radiated Restricted Band Edge, High Channel, Peak, 802.11n HT20



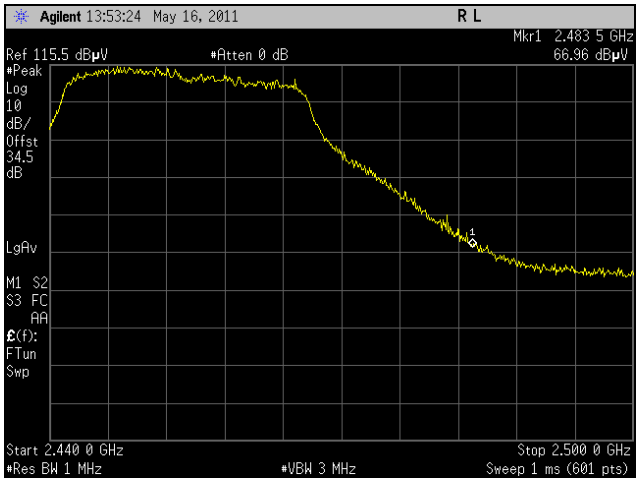
Plot 312. Radiated Restricted Band Edge, Low Channel, Average, 802.11n HT30



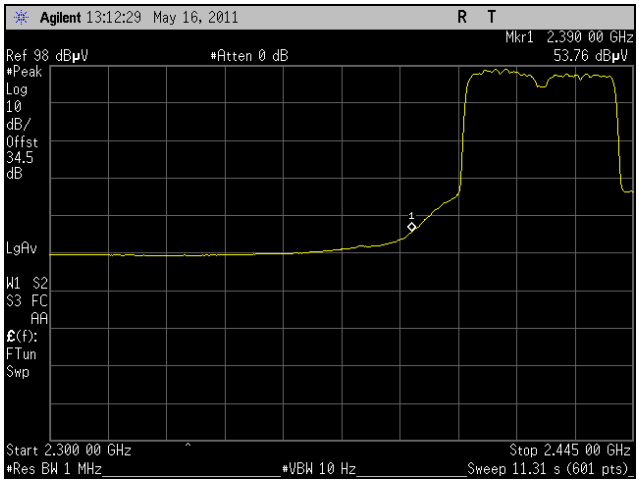
Plot 313. Radiated Restricted Band Edge, Low Channel, Peak, 802.11n HT30



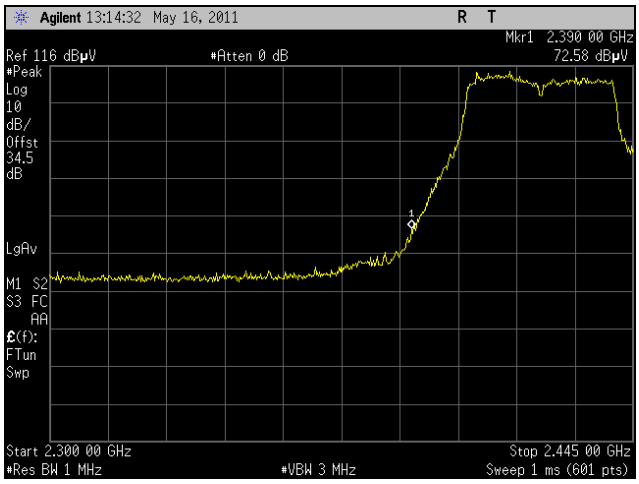
Plot 314. Radiated Restricted Band Edge, High Channel, Average, 802.11n HT30



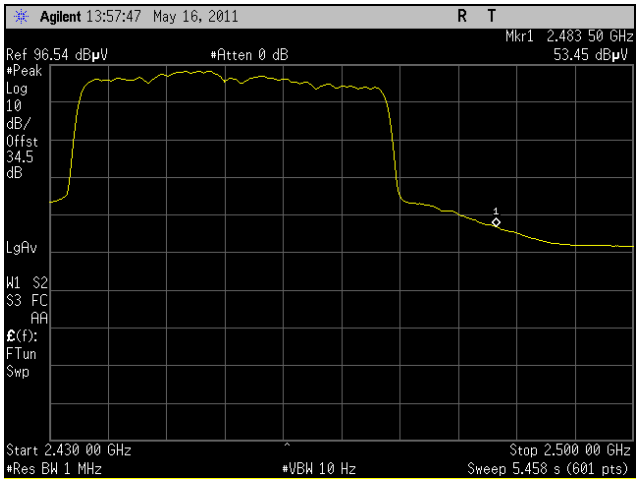
Plot 315. Radiated Restricted Band Edge, High Channel, Peak, 802.11n HT30



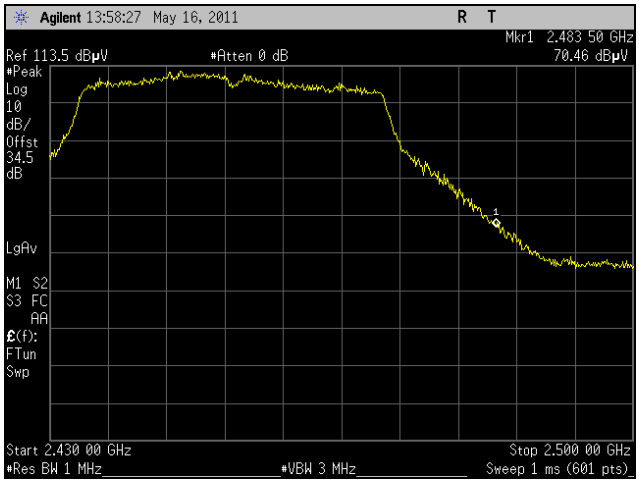
Plot 316. Radiated Restricted Band Edge, Low Channel, Average, 802.11n HT40



Plot 317. Radiated Restricted Band Edge, Low Channel, Peak, 802.11n HT40



Plot 318. Radiated Restricted Band Edge, High Channel, Average, 802.11n HT40

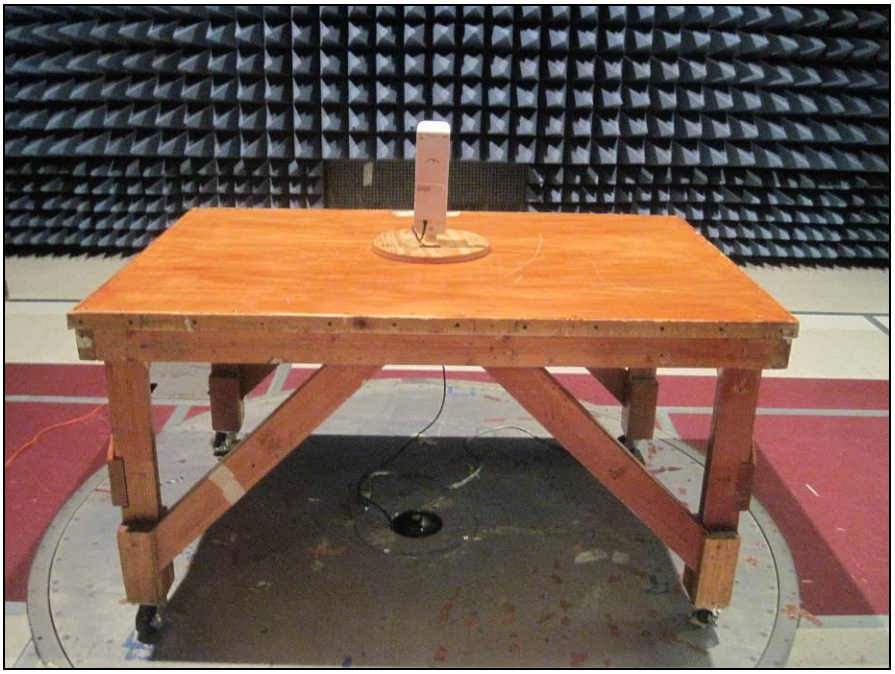


Plot 319. Radiated Restricted Band Edge, High Channel, Peak, 802.11n HT40

Radiated Spurious Emissions Test Setup

Photograph 8. Radiated Harmonic/Spurious Emissions, Test Setup, Horn

Photograph 9. Radiated Harmonic/Spurious Emissions, Test Setup, Bilog



Photograph 10. Radiated Harmonic/Spurious Emissions, Test Setup

Photograph 11. Radiated Band Edge Emissions, Test Setup, 3m

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 leas 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.

A conducted sample was provided fitted with a mmcx connector. The EUT was connecedt from the mmcx connector to a spectrum analyzer using a 10 dB Attenuator. Testing was performed on Low, Mid and High Channels. A resolution bandwidth of 100kHz and and video bandwidth of 300kHz were utilized.

For conducted band edge, a delta measurement was taken from the peak of the fundamental to the Band edge then compared to the limit.

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): Anderson Soungpanya

Test Date(s): 05/24/11

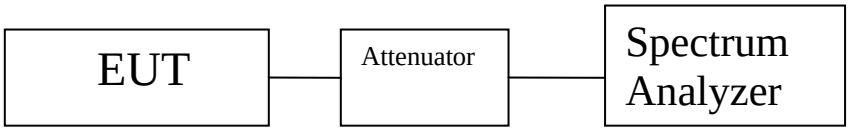
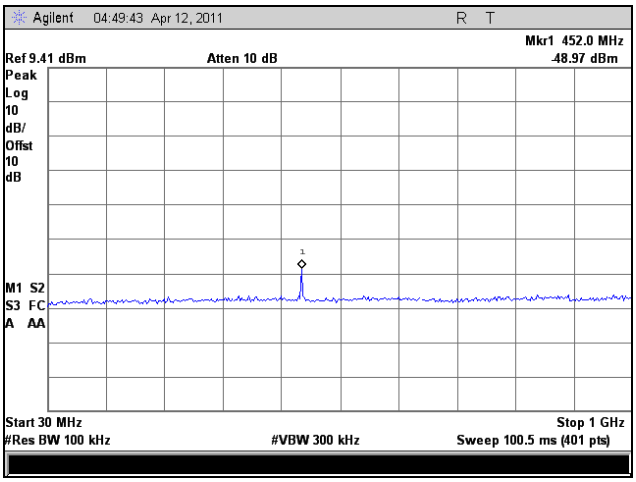
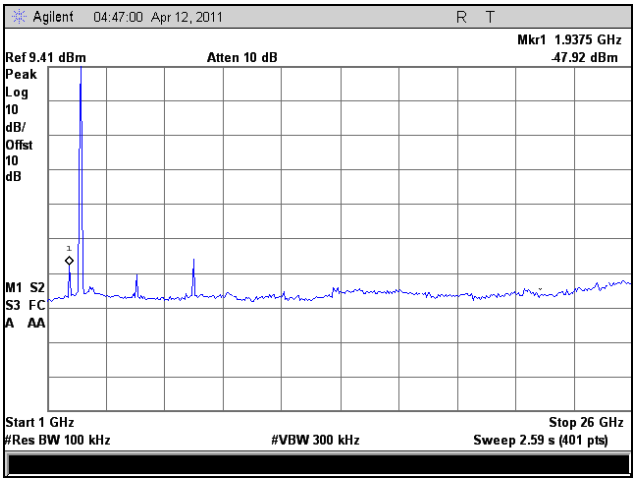


Figure 4. Block Diagram, Conducted Spurious Emissions Test Setup

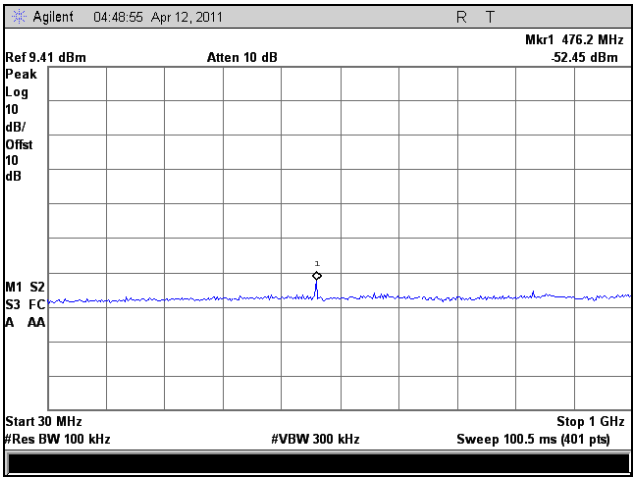
Conducted Spurious Emissions Test Results, 802.11b



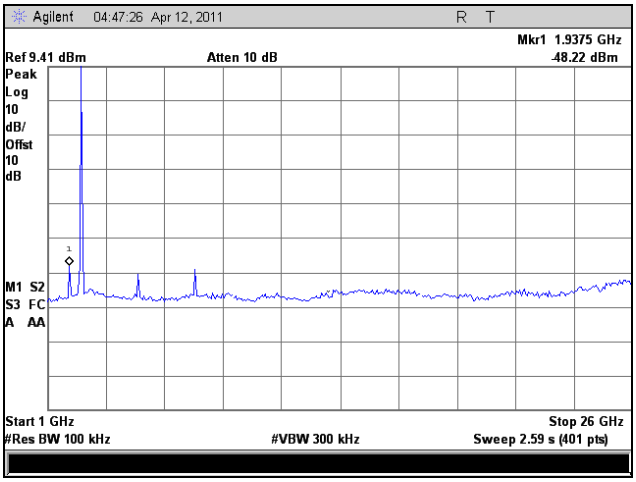
Plot 320. Conducted Spurious Emissions, Low Channel, 30 MHz – 1 GHz, 802.11b



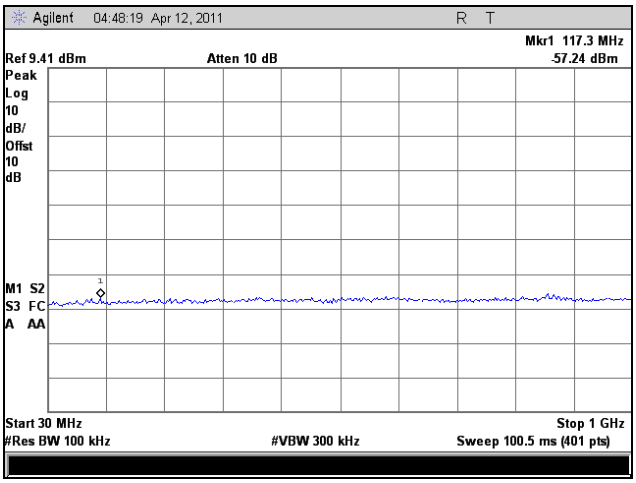
Plot 321. Conducted Spurious Emissions, Low Channel, 1 GHz – 26 GHz, 802.11b



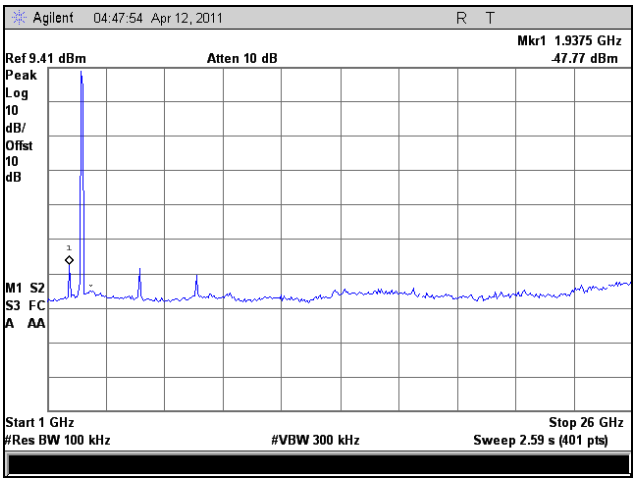
Plot 322. Conducted Spurious Emissions, Mid Channel, 30 MHz – 1 GHz, 802.11b



Plot 323. Conducted Spurious Emissions, Mid Channel, 1 GHz – 26 GHz, 802.11b

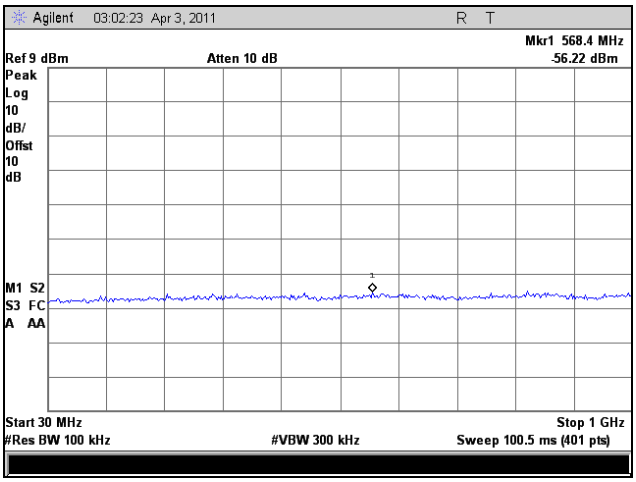


Plot 324. Conducted Spurious Emissions, High Channel, 30 MHz – 1 GHz, 802.11b

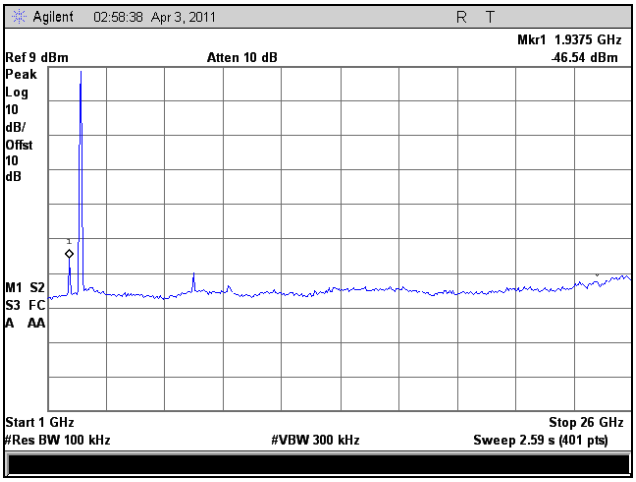


Plot 325. Conducted Spurious Emissions, High Channel, 1 GHz – 26 GHz, 802.11b

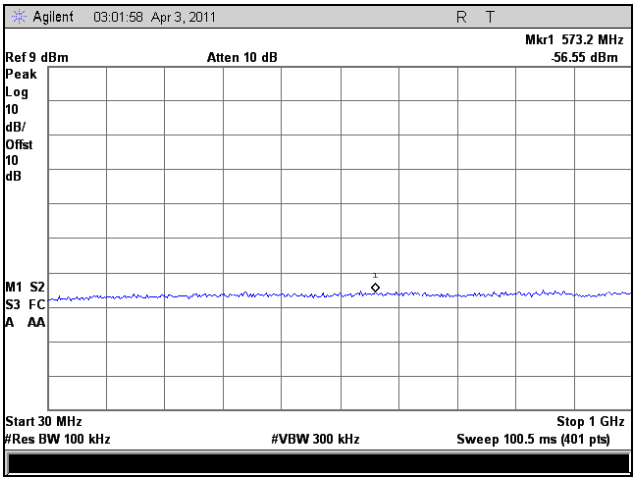
Conducted Spurious Emissions Test Results, 802.11g 20 MHz



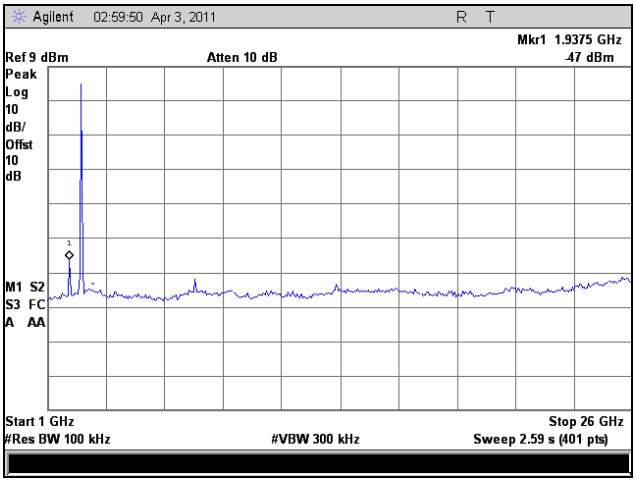
Plot 326. Conducted Spurious Emissions, Low Channel, 30 MHz – 1 GHz, 802.11g 20 MHz



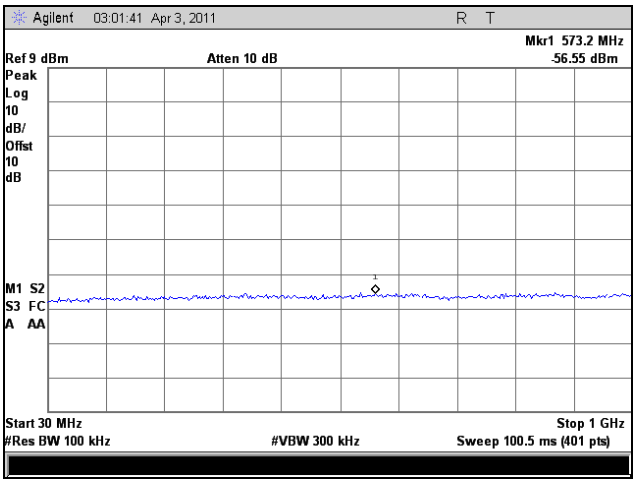
Plot 327. Conducted Spurious Emissions, Low Channel, 1 GHz – 26 GHz, 802.11g 20 MHz



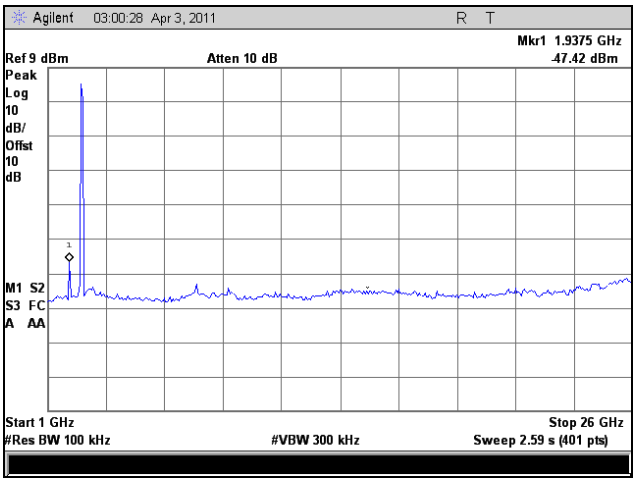
Plot 328. Conducted Spurious Emissions, Mid Channel, 30 MHz – 1 GHz, 802.11g 20 MHz



Plot 329. Conducted Spurious Emissions, Mid Channel, 1 GHz – 26 GHz, 802.11g 20 MHz

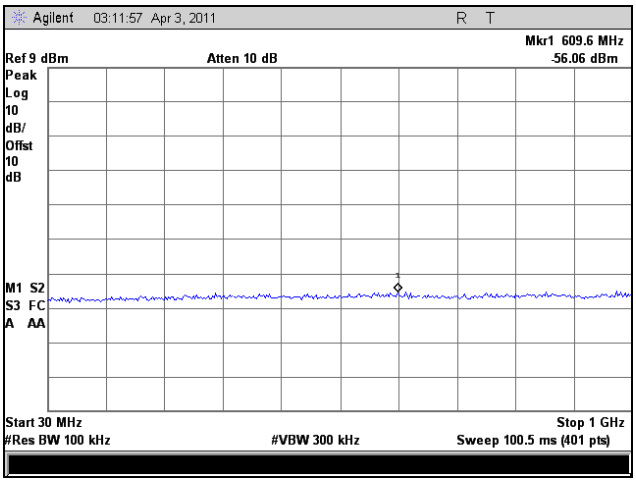


Plot 330. Conducted Spurious Emissions, High Channel, 30 MHz – 1 GHz, 802.11g 20 MHz

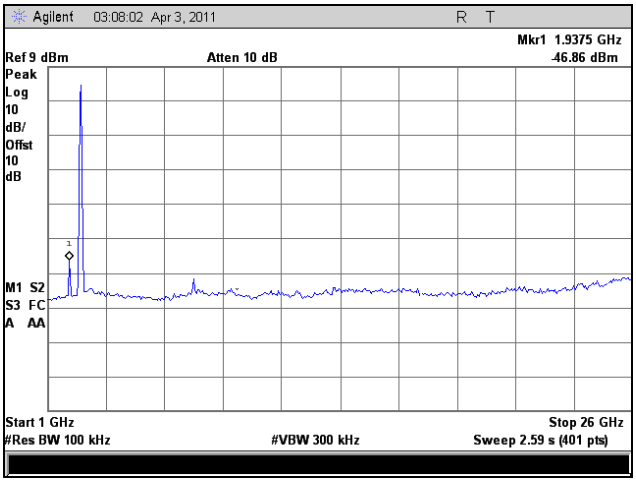


Plot 331. Conducted Spurious Emissions, High Channel, 1 GHz – 26 GHz, 802.11g 20 MHz

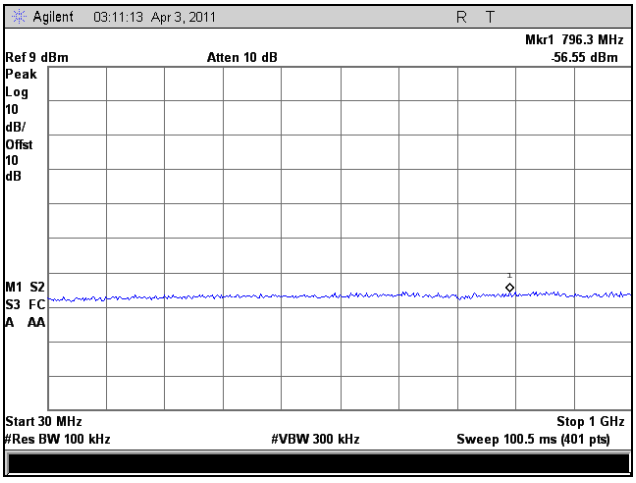
Conducted Spurious Emissions Test Results, 802.11g 40 MHz



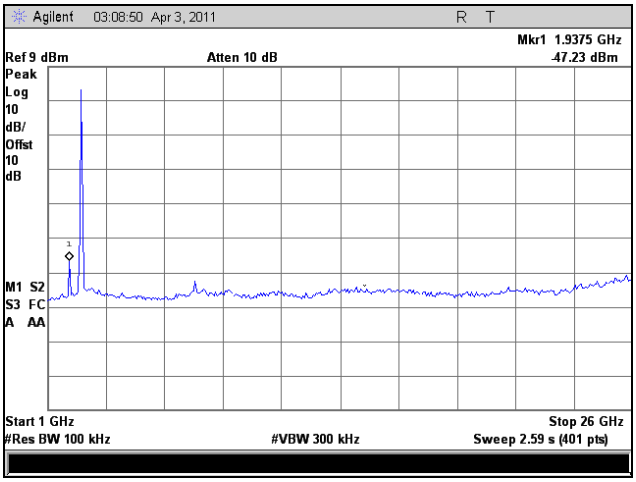
Plot 332. Conducted Spurious Emissions, Low Channel, 30 MHz – 1 GHz, 802.11g 40 MHz



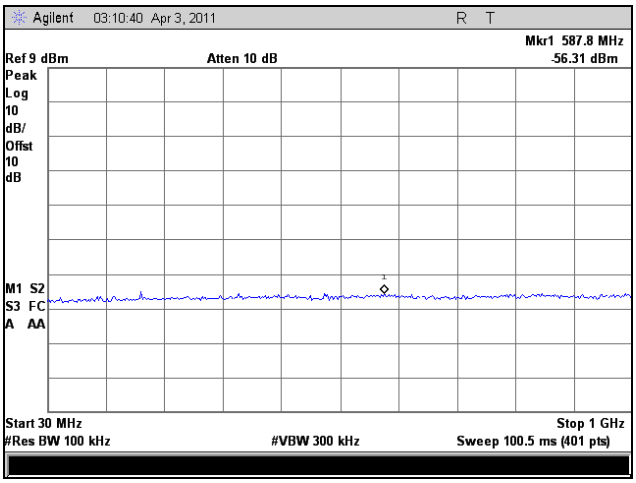
Plot 333. Conducted Spurious Emissions, Low Channel, 1 GHz – 26 GHz, 802.11g 40 MHz



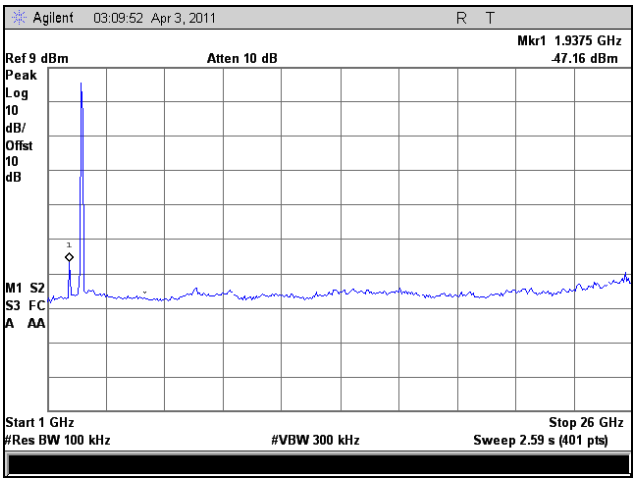
Plot 334. Conducted Spurious Emissions, Mid Channel, 30 MHz – 1 GHz, 802.11g 40 MHz



Plot 335. Conducted Spurious Emissions, Mid Channel, 1 GHz – 26 GHz, 802.11g 40 MHz

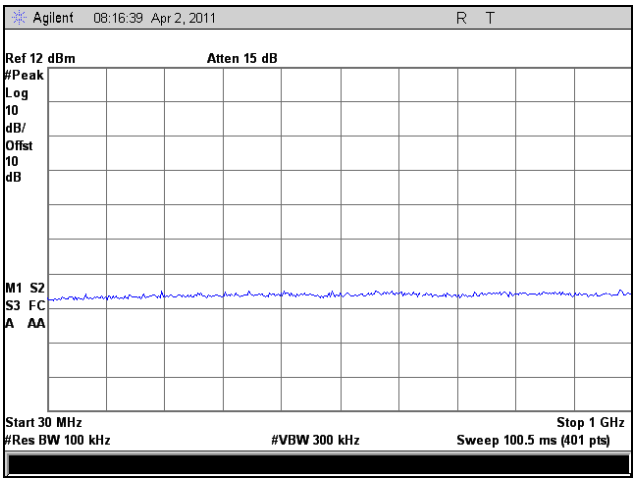


Plot 336. Conducted Spurious Emissions, High Channel, 30 MHz – 1 GHz, 802.11g 40 MHz

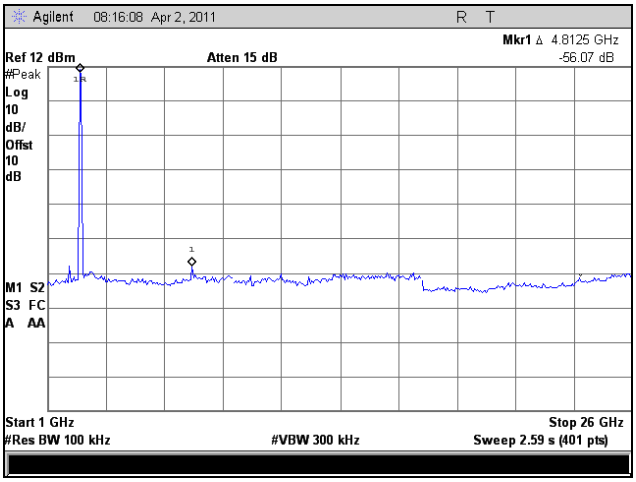


Plot 337. Conducted Spurious Emissions, High Channel, 1 GHz – 26 GHz, 802.11g 40 MHz

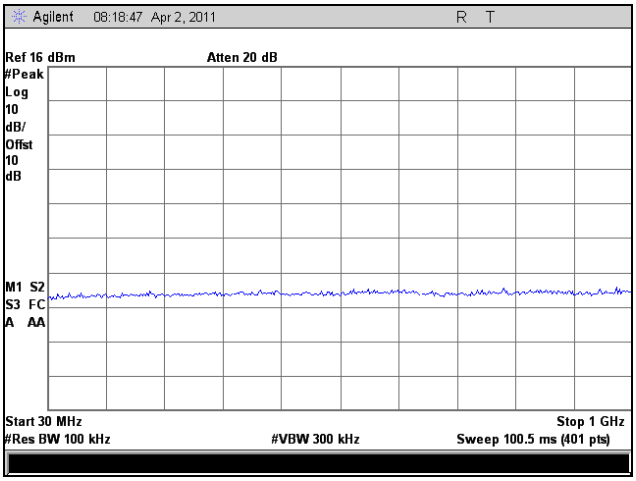
Conducted Spurious Emissions Test Results, 802.11n HT5, Port 1



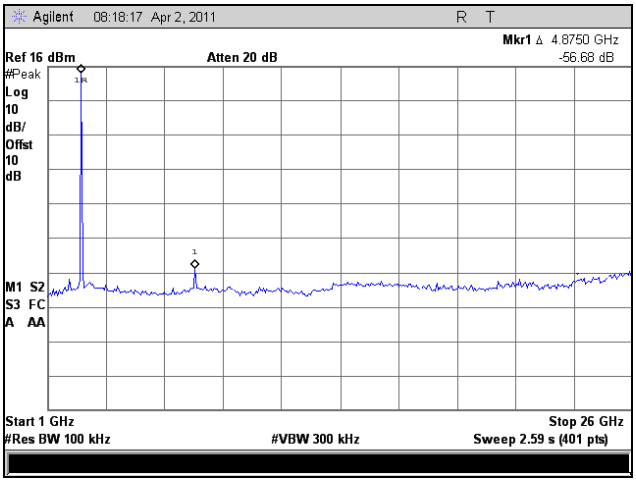
Plot 338. Conducted Spurious Emissions, Low Channel, 30 MHz – 1 GHz, 802.11n HT5, Port 1



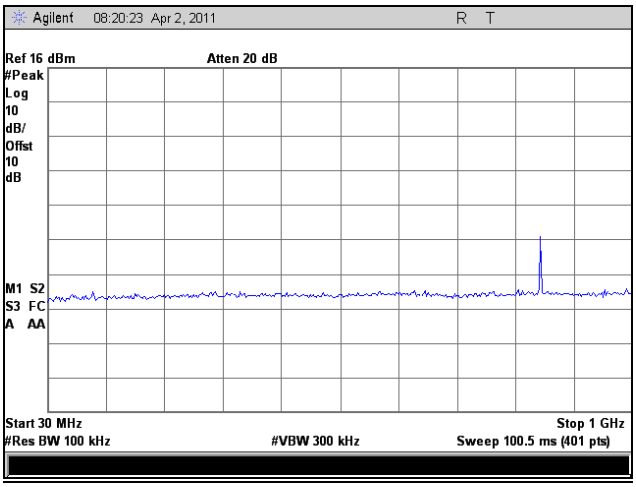
Plot 339. Conducted Spurious Emissions, Low Channel, 1 GHz – 26 GHz, 802.11n HT5, Port 1



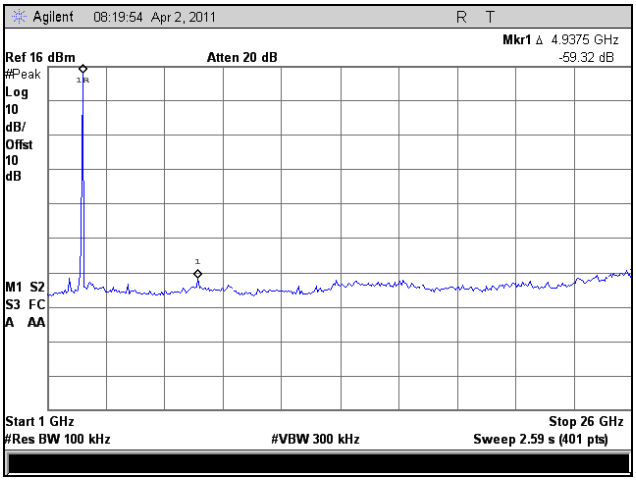
Plot 340. Conducted Spurious Emissions, Mid Channel, 30 MHz – 1 GHz, 802.11n HT5, Port 1



Plot 341. Conducted Spurious Emissions, Mid Channel, 1 GHz – 26 GHz, 802.11n HT5, Port 1

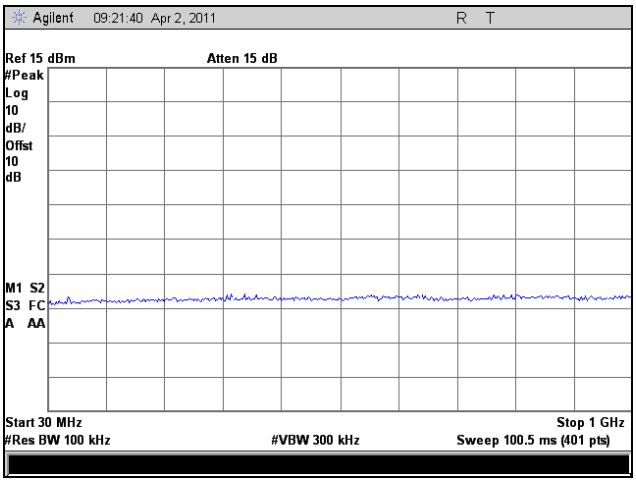


Plot 342. Conducted Spurious Emissions, High Channel, 30 MHz – 1 GHz, 802.11n HT5, Port 1

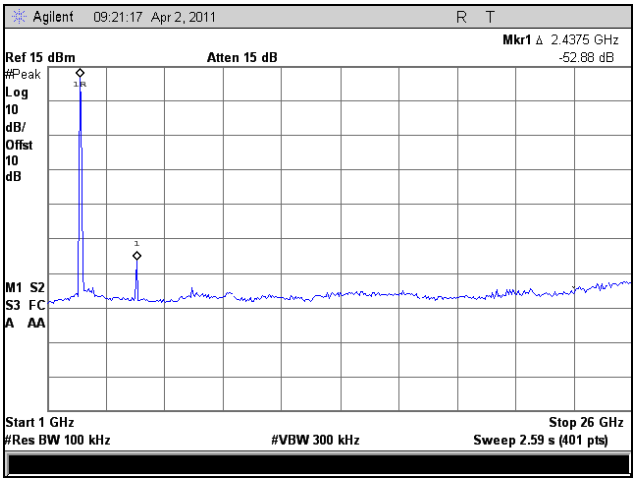


Plot 343. Conducted Spurious Emissions, High Channel, 1 GHz – 26 GHz, 802.11n HT5, Port 1

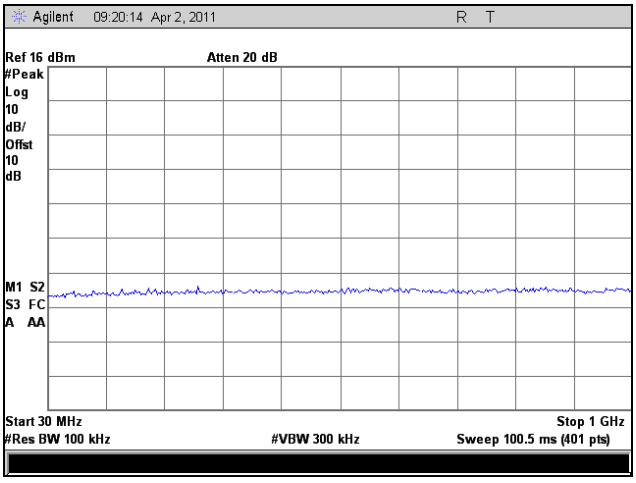
Conducted Spurious Emissions Test Results, 802.11n HT5, Port 2



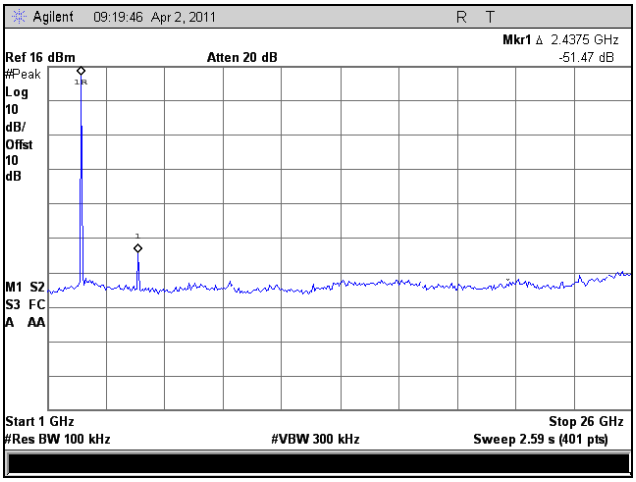
Plot 344. Conducted Spurious Emissions, Low Channel, 30 MHz – 1 GHz, 802.11n HT5, Port 2



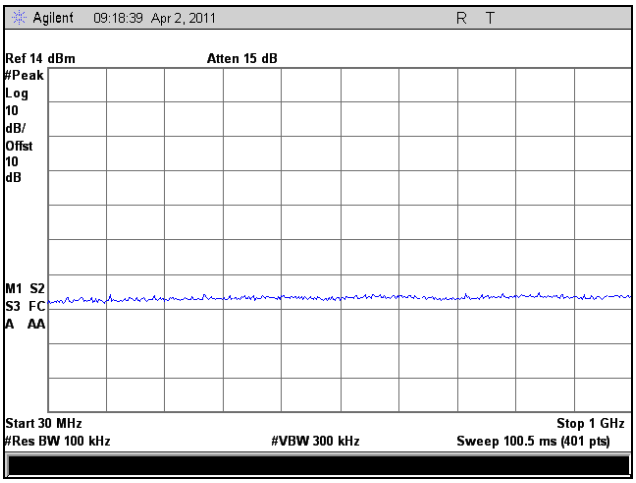
Plot 345. Conducted Spurious Emissions, Low Channel, 1 GHz – 26 GHz, 802.11n HT5, Port 2



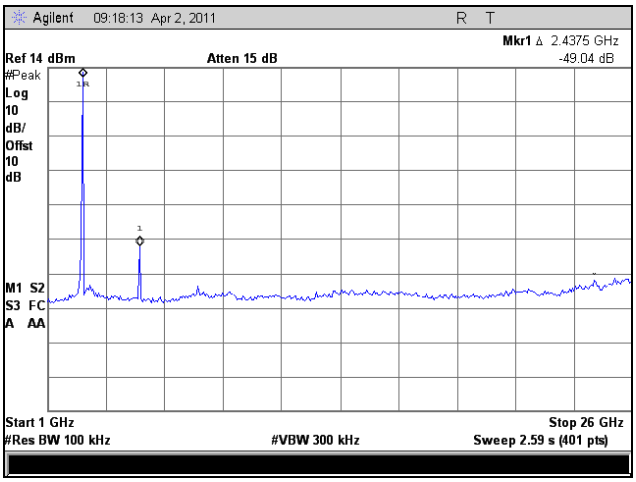
Plot 346. Conducted Spurious Emissions, Mid Channel, 30 MHz – 1 GHz, 802.11n HT5, Port 2



Plot 347. Conducted Spurious Emissions, Mid Channel, 1 GHz – 26 GHz, 802.11n HT5, Port 2

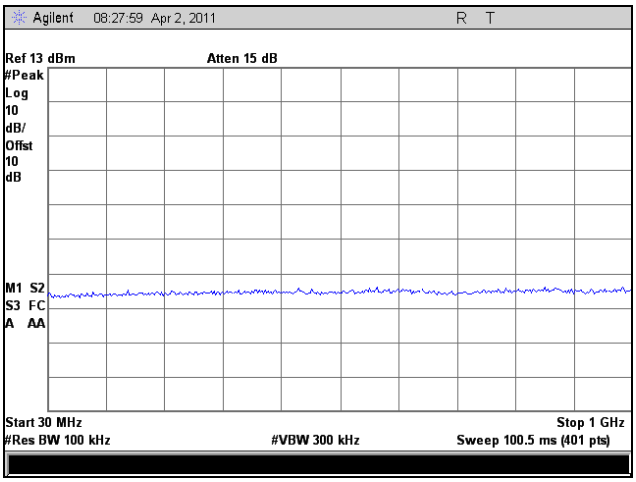


Plot 348. Conducted Spurious Emissions, High Channel, 30 MHz – 1 GHz, 802.11n HT5, Port 2

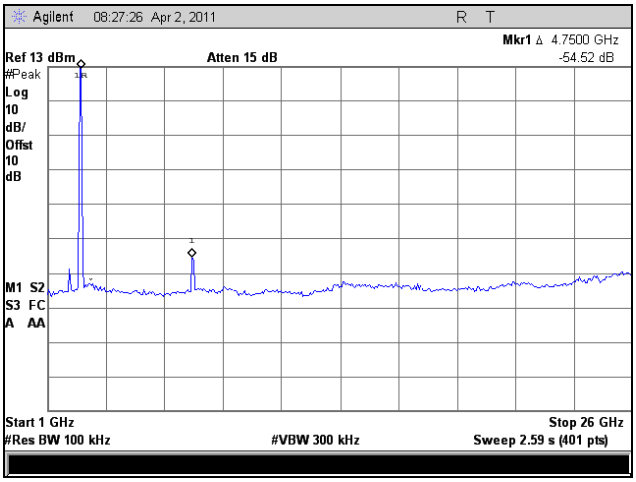


Plot 349. Conducted Spurious Emissions, High Channel, 1 GHz – 26 GHz, 802.11n HT5, Port 2

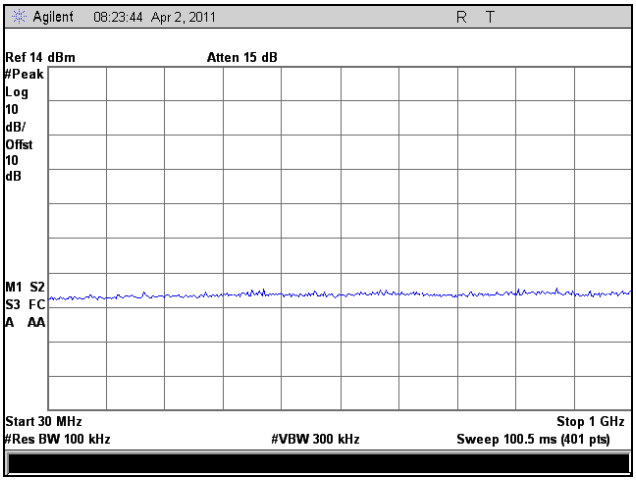
Conducted Spurious Emissions Test Results, 802.11n HT8, Port 1



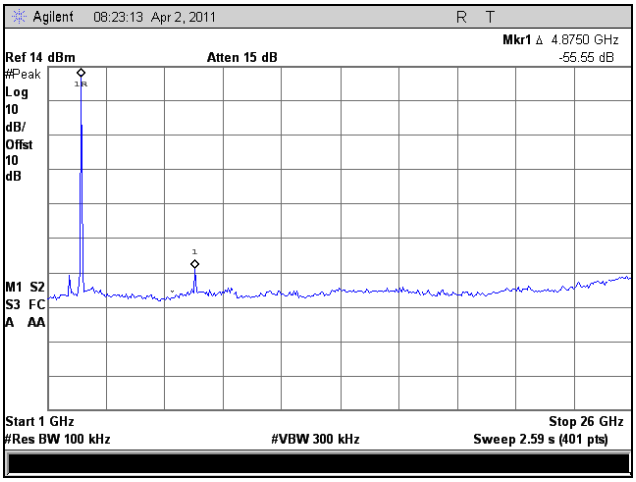
Plot 350. Conducted Spurious Emissions, Low Channel, 30 MHz – 1 GHz, 802.11n HT8, Port 1



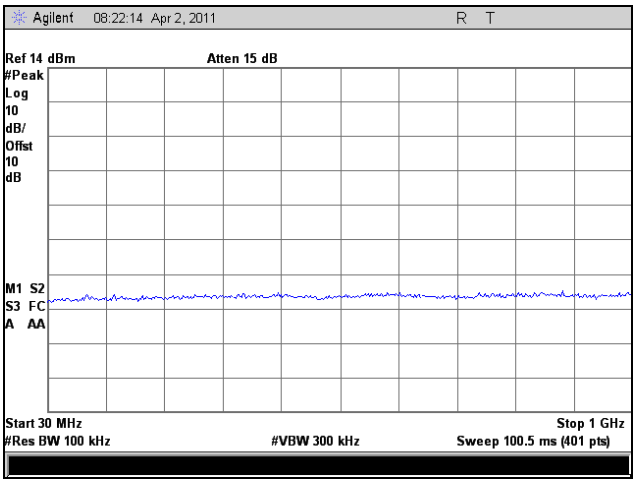
Plot 351. Conducted Spurious Emissions, Low Channel, 1 GHz – 26 GHz, 802.11n HT8, Port 1



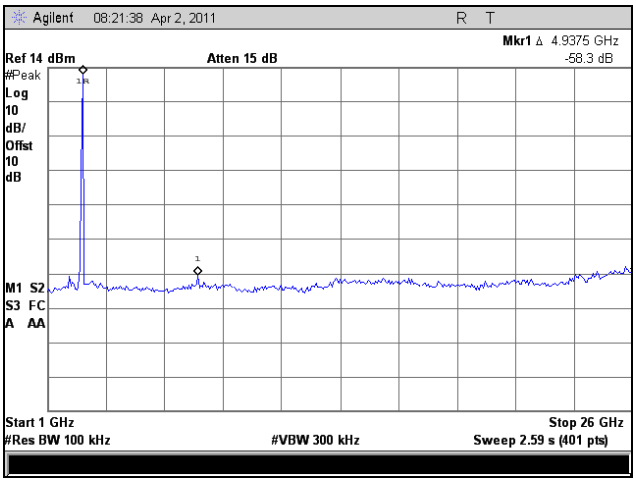
Plot 352. Conducted Spurious Emissions, Mid Channel, 30 MHz – 1 GHz, 802.11n HT8, Port 1



Plot 353. Conducted Spurious Emissions, Mid Channel, 1 GHz – 26 GHz, 802.11n HT8, Port 1

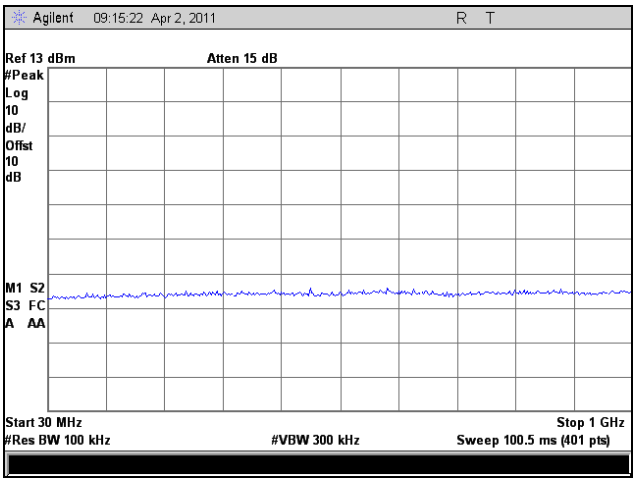


Plot 354. Conducted Spurious Emissions, High Channel, 30 MHz – 1 GHz, 802.11n HT8, Port 1

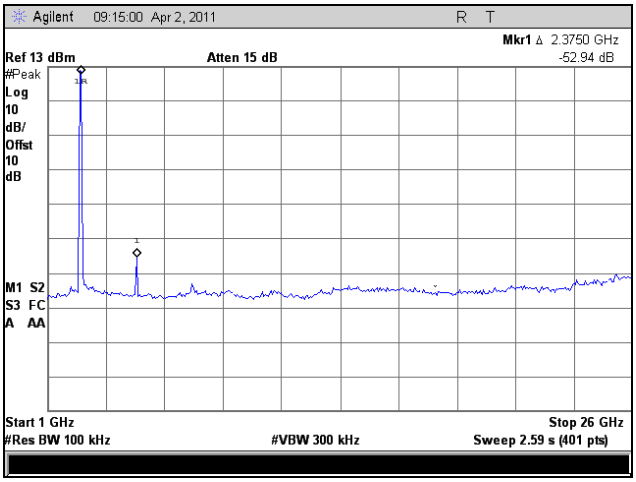


Plot 355. Conducted Spurious Emissions, High Channel, 1 GHz – 26 GHz, 802.11n HT8, Port 1

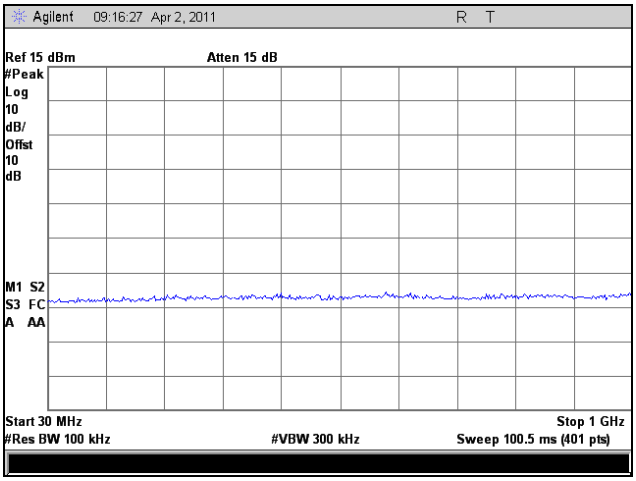
Conducted Spurious Emissions Test Results, 802.11n HT8, Port 2



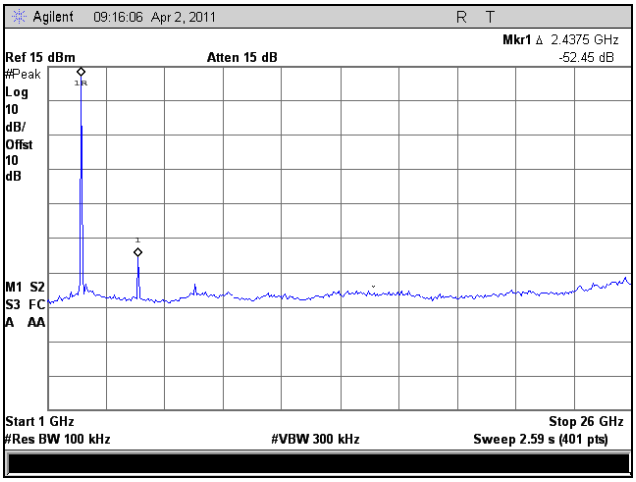
Plot 356. Conducted Spurious Emissions, Low Channel, 30 MHz – 1 GHz, 802.11n HT8, Port 2



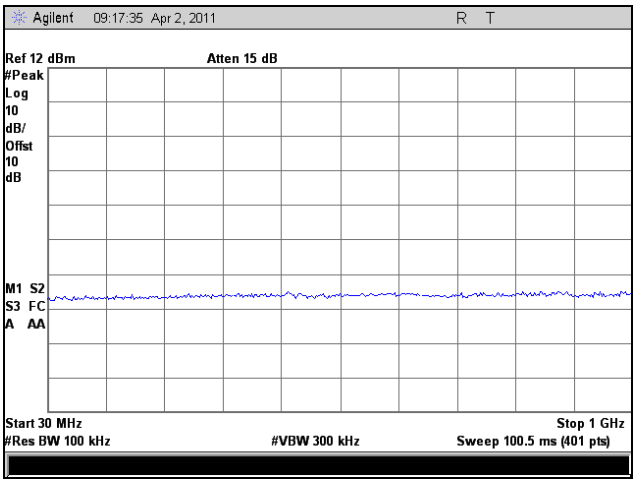
Plot 357. Conducted Spurious Emissions, Low Channel, 1 GHz – 26 GHz, 802.11n HT8, Port 2



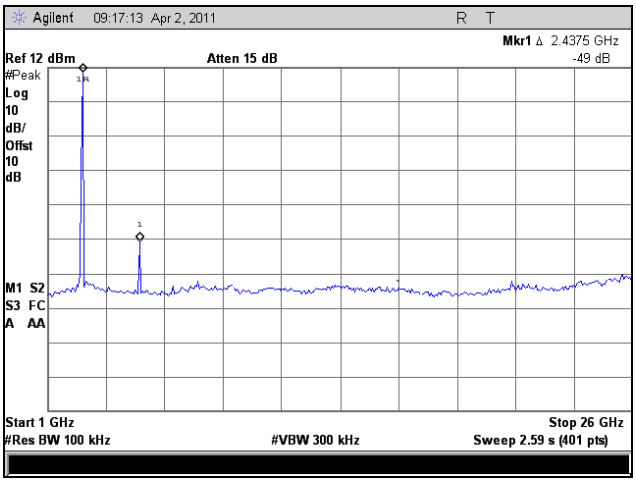
Plot 358. Conducted Spurious Emissions, Mid Channel, 30 MHz – 1 GHz, 802.11n HT8, Port 2



Plot 359. Conducted Spurious Emissions, Mid Channel, 1 GHz – 26 GHz, 802.11n HT8, Port 2

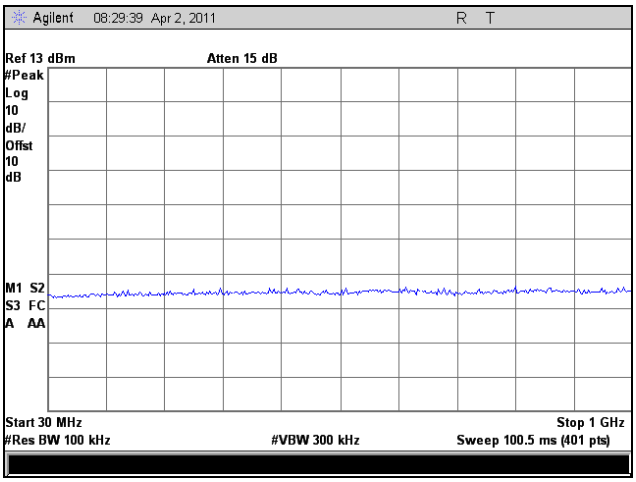


Plot 360. Conducted Spurious Emissions, High Channel, 30 MHz – 1 GHz, 802.11n HT8, Port 2

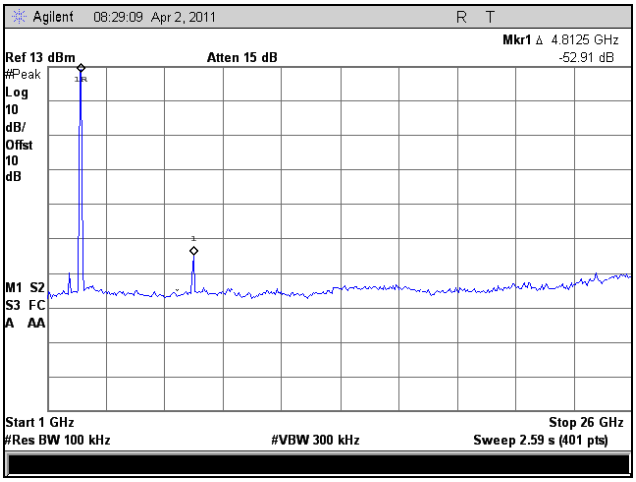


Plot 361. Conducted Spurious Emissions, High Channel, 1 GHz – 26 GHz, 802.11n HT8, Port 2

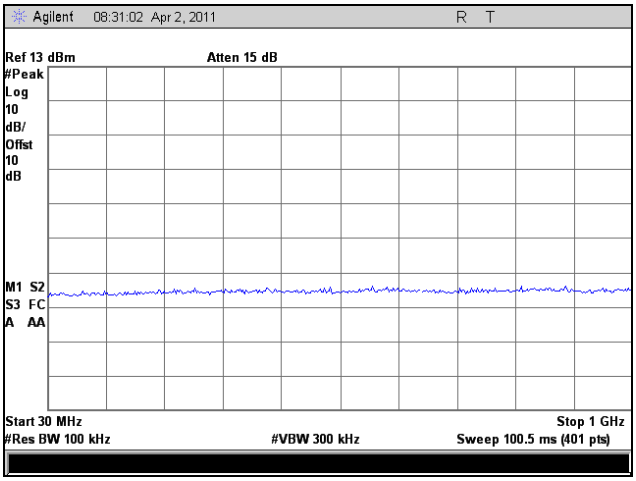
Conducted Spurious Emissions Test Results, 802.11n HT10, Port 1



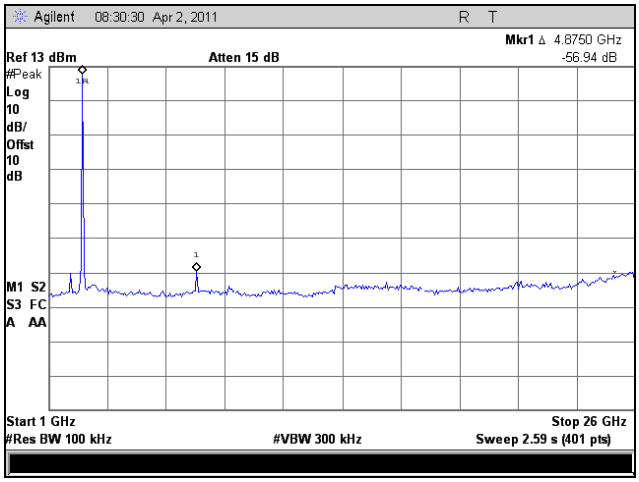
Plot 362. Conducted Spurious Emissions, Low Channel, 30 MHz – 1 GHz, 802.11n HT10, Port 1



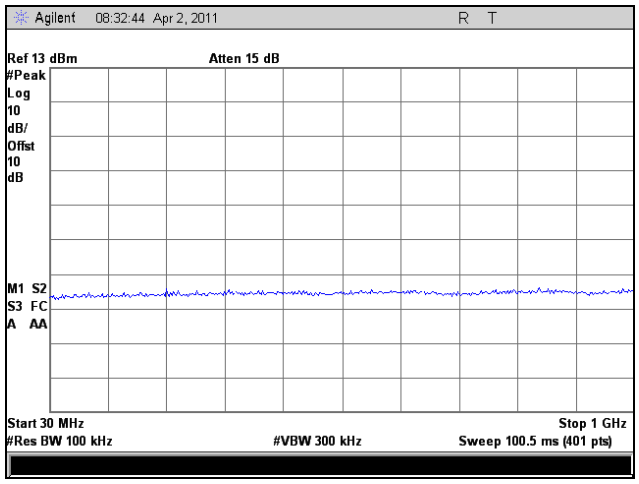
Plot 363. Conducted Spurious Emissions, Low Channel, 1 GHz – 26 GHz, 802.11n HT10, Port 1



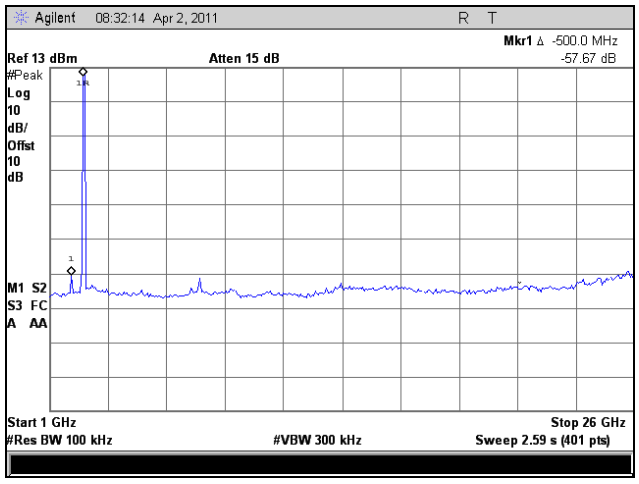
Plot 364. Conducted Spurious Emissions, Mid Channel, 30 MHz – 1 GHz, 802.11n HT10, Port 1



Plot 365. Conducted Spurious Emissions, Mid Channel, 1 GHz – 26 GHz, 802.11n HT10, Port 1

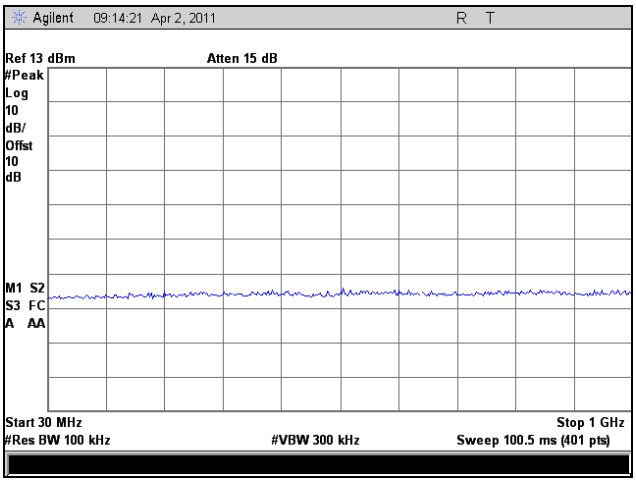


Plot 366. Conducted Spurious Emissions, High Channel, 30 MHz – 1 GHz, 802.11n HT10, Port 1

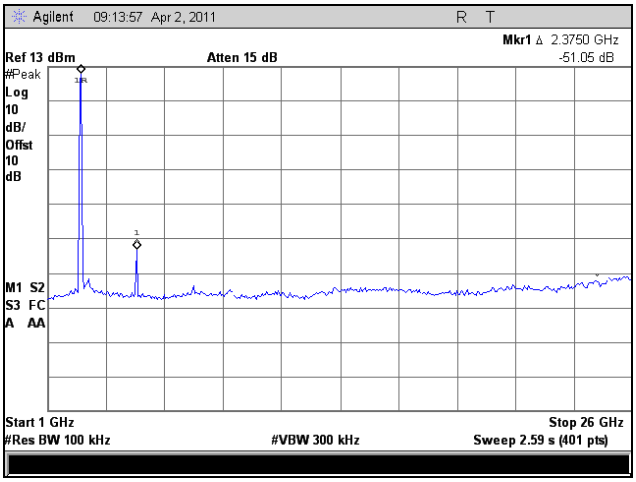


Plot 367. Conducted Spurious Emissions, High Channel, 1 GHz – 26 GHz, 802.11n HT10, Port 1

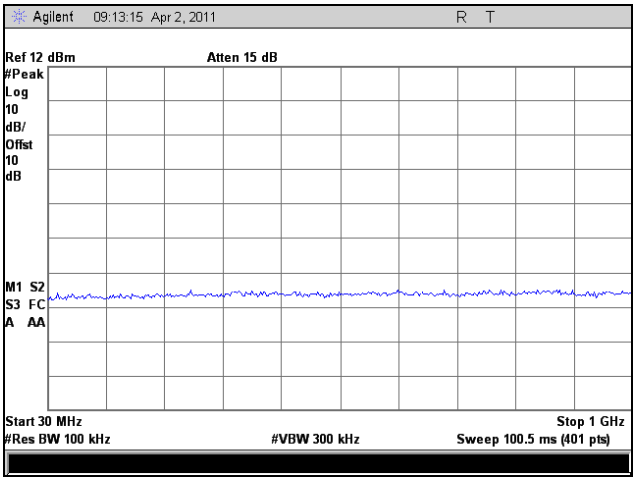
Conducted Spurious Emissions Test Results, 802.11n HT10, Port 2



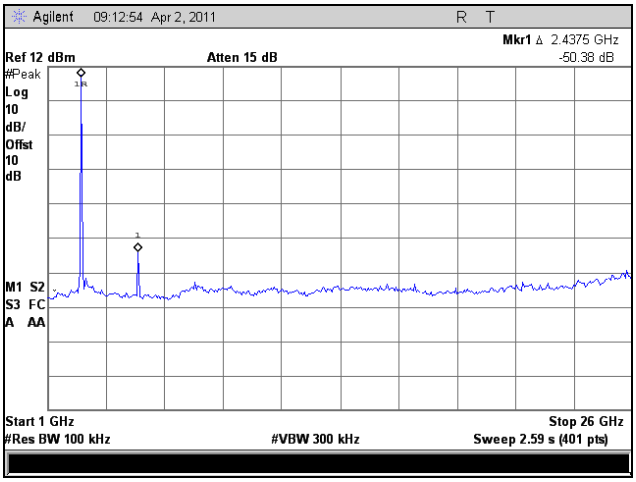
Plot 368. Conducted Spurious Emissions, Low Channel, 30 MHz – 1 GHz, 802.11n HT10, Port 2



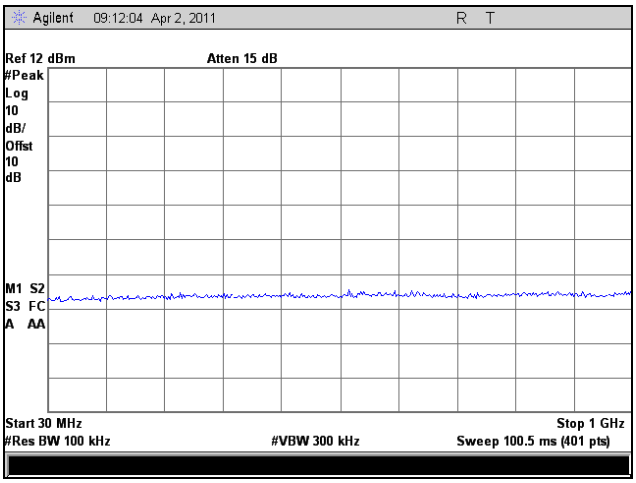
Plot 369. Conducted Spurious Emissions, Low Channel, 1 GHz – 26 GHz, 802.11n HT10, Port 2



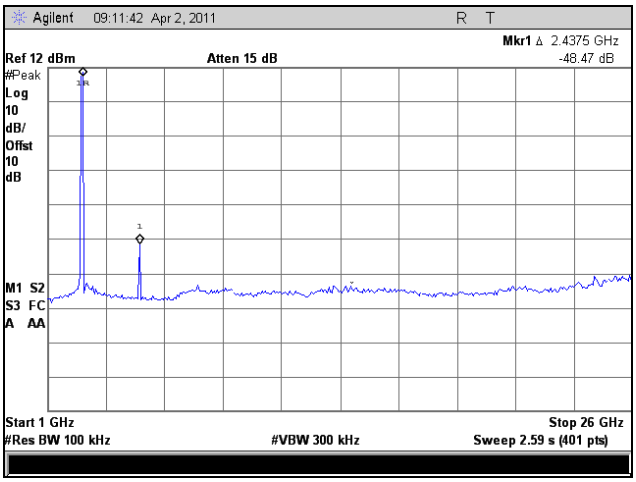
Plot 370. Conducted Spurious Emissions, Mid Channel, 30 MHz – 1 GHz, 802.11n HT10, Port 2



Plot 371. Conducted Spurious Emissions, Mid Channel, 1 GHz – 26 GHz, 802.11n HT10, Port 2

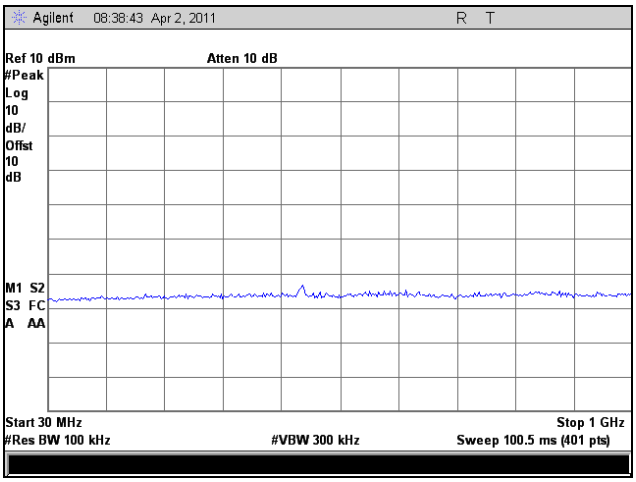


Plot 372. Conducted Spurious Emissions, High Channel, 30 MHz – 1 GHz, 802.11n HT10, Port 2

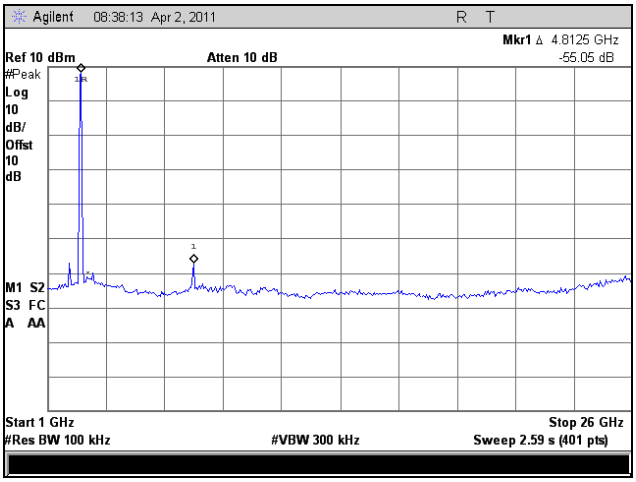


Plot 373. Conducted Spurious Emissions, High Channel, 1 GHz – 26 GHz, 802.11n HT10, Port 2

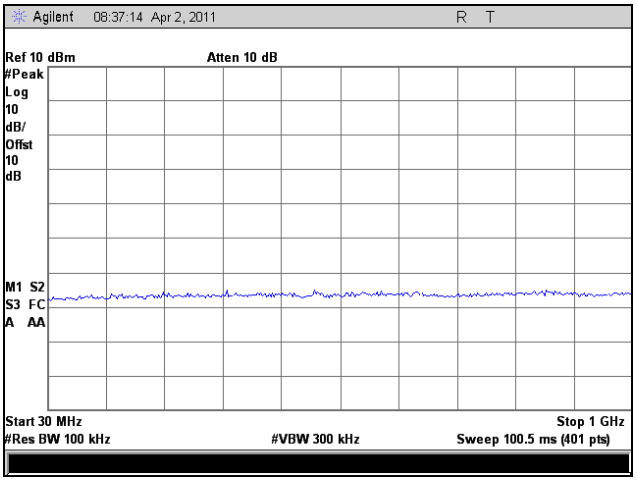
Conducted Spurious Emissions Test Results, 802.11n HT20, Port 1



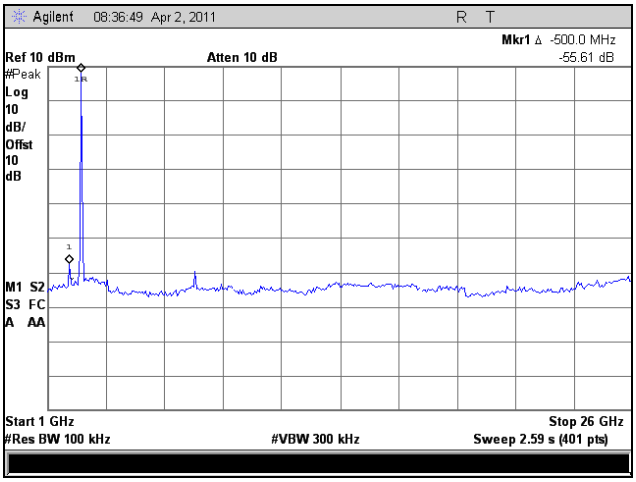
Plot 374. Conducted Spurious Emissions, Low Channel, 30 MHz – 1 GHz, 802.11n HT20, Port 1



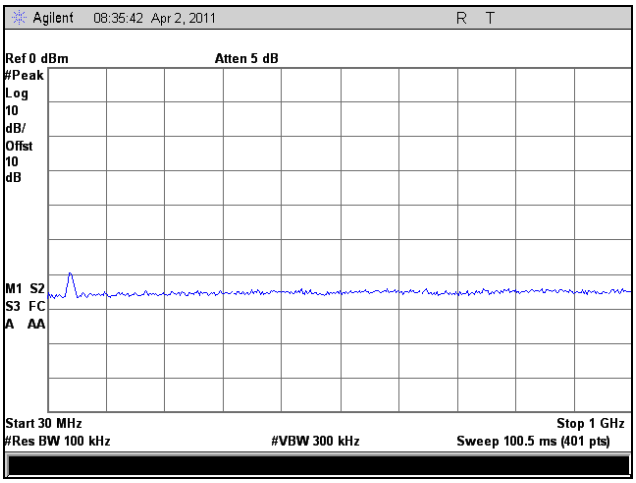
Plot 375. Conducted Spurious Emissions, Low Channel, 1 GHz – 26 GHz, 802.11n HT20, Port 1



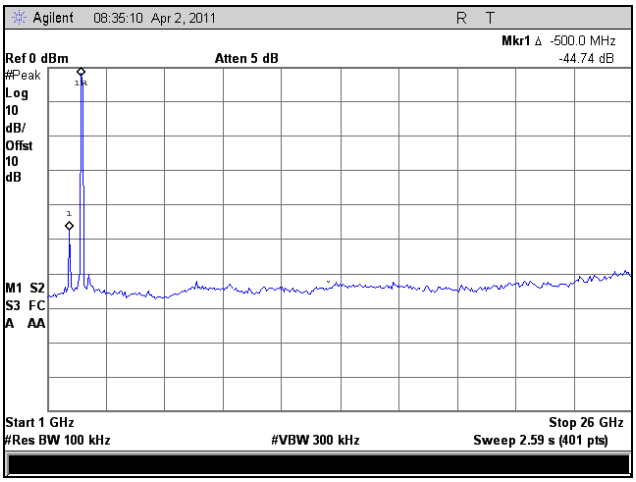
Plot 376. Conducted Spurious Emissions, Mid Channel, 30 MHz – 1 GHz, 802.11n HT20, Port 1



Plot 377. Conducted Spurious Emissions, Mid Channel, 1 GHz – 26 GHz, 802.11n HT20, Port 1

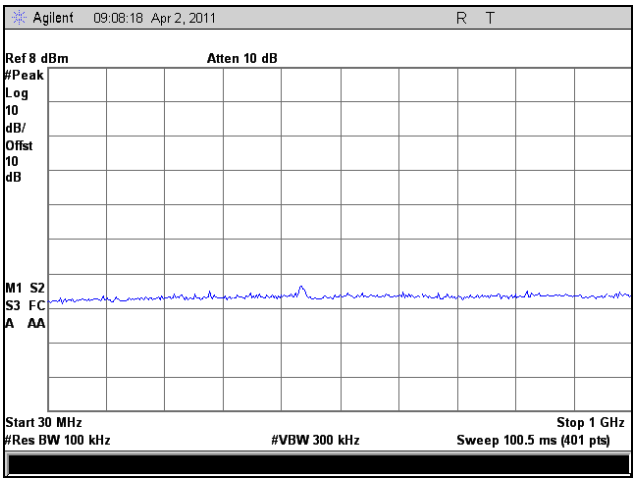


Plot 378. Conducted Spurious Emissions, High Channel, 30 MHz – 1 GHz, 802.11n HT20, Port 1

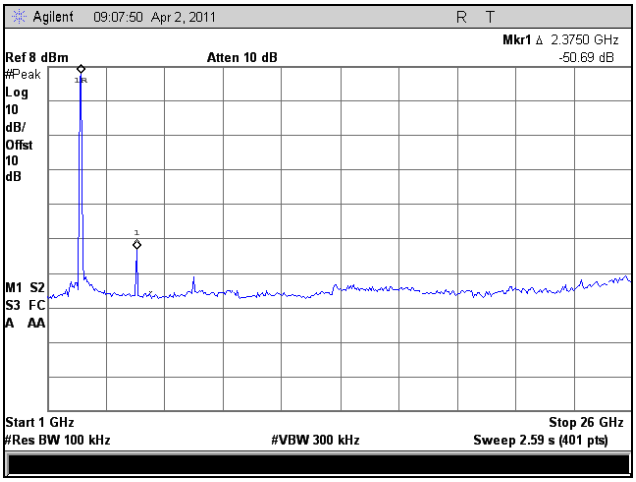


Plot 379. Conducted Spurious Emissions, High Channel, 1 GHz – 26 GHz, 802.11n HT20, Port 1

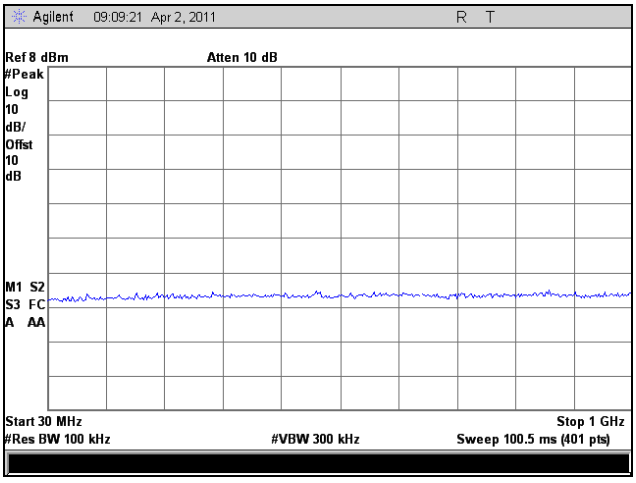
Conducted Spurious Emissions Test Results, 802.11n HT20, Port 2



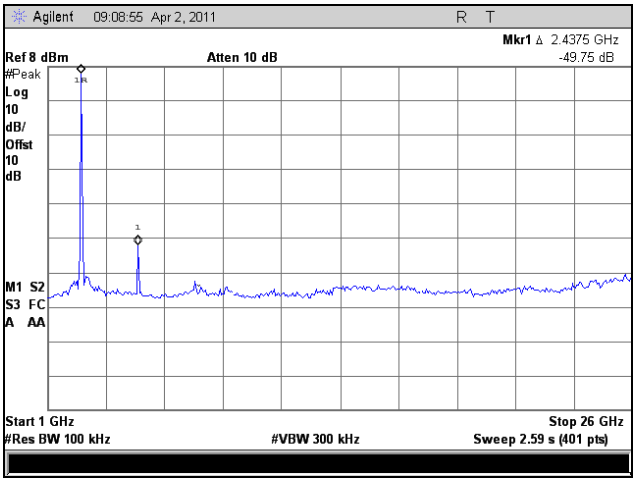
Plot 380. Conducted Spurious Emissions, Low Channel, 30 MHz – 1 GHz, 802.11n HT20, Port 2



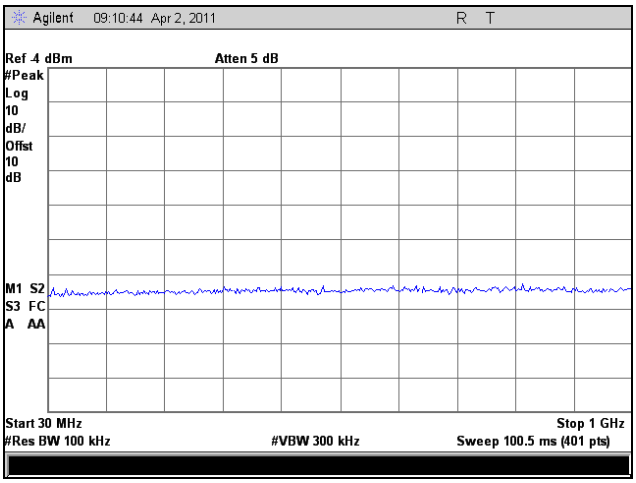
Plot 381. Conducted Spurious Emissions, Low Channel, 1 GHz – 26 GHz, 802.11n HT20, Port 2



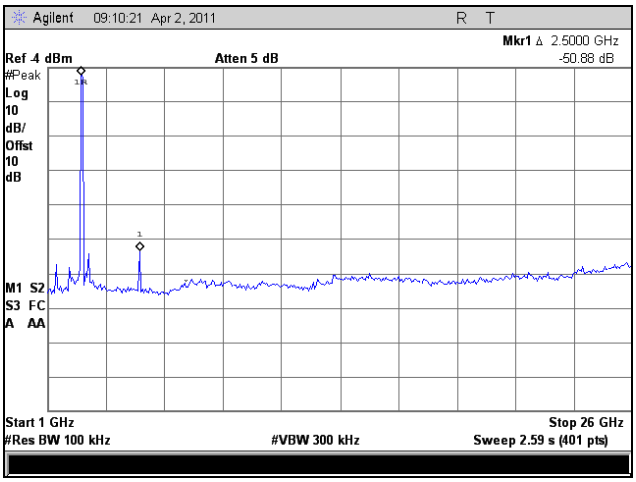
Plot 382. Conducted Spurious Emissions, Mid Channel, 30 MHz – 1 GHz, 802.11n HT20, Port 2



Plot 383. Conducted Spurious Emissions, Mid Channel, 1 GHz – 26 GHz, 802.11n HT20, Port 2

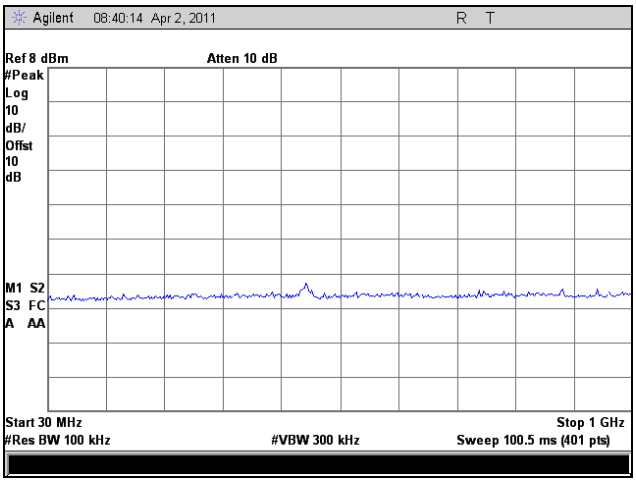


Plot 384. Conducted Spurious Emissions, High Channel, 30 MHz – 1 GHz, 802.11n HT20, Port 2

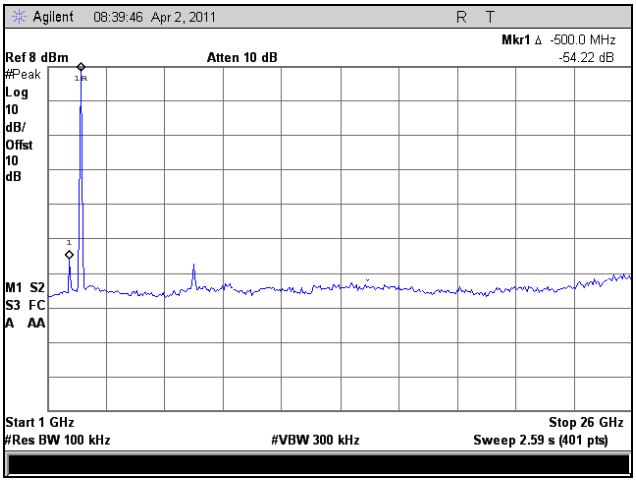


Plot 385. Conducted Spurious Emissions, High Channel, 1 GHz – 26 GHz, 802.11n HT20, Port 2

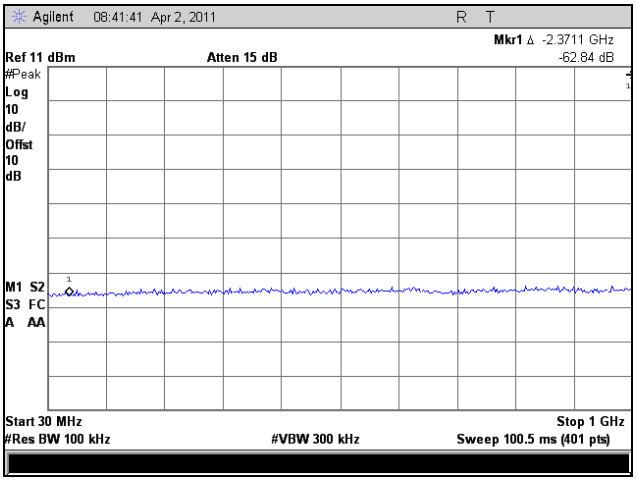
Conducted Spurious Emissions Test Results, 802.11n HT30, Port 1



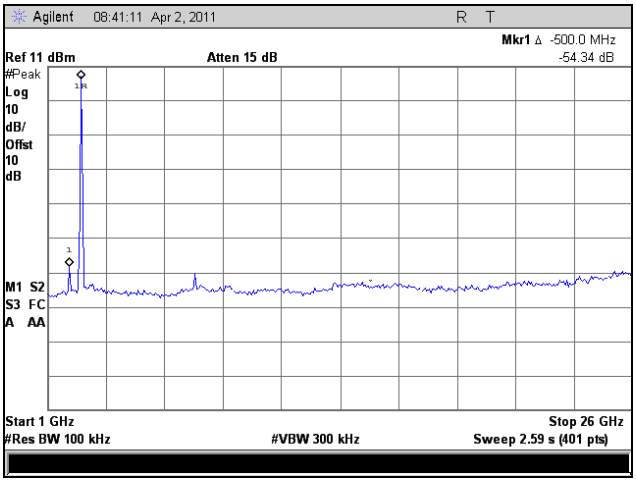
Plot 386. Conducted Spurious Emissions, Low Channel, 30 MHz – 1 GHz, 802.11n HT30, Port 1



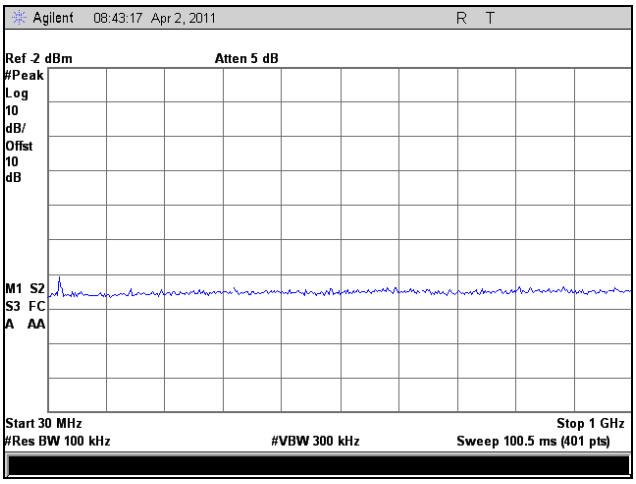
Plot 387. Conducted Spurious Emissions, Low Channel, 1 GHz – 26 GHz, 802.11n HT30, Port 1



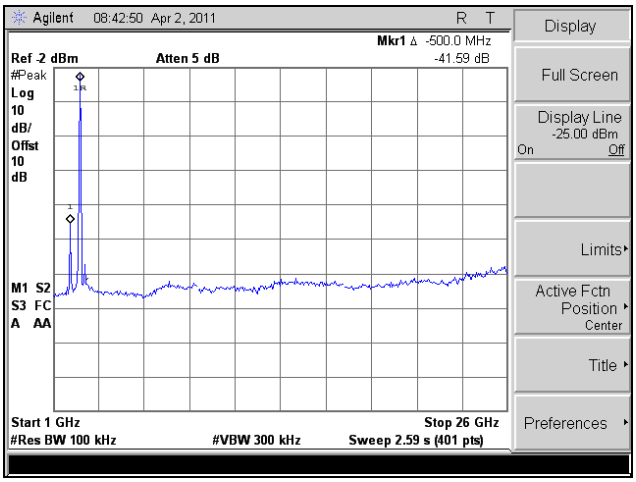
Plot 388. Conducted Spurious Emissions, Mid Channel, 30 MHz – 1 GHz, 802.11n HT30, Port 1



Plot 389. Conducted Spurious Emissions, Mid Channel, 1 GHz – 26 GHz, 802.11n HT30, Port 1

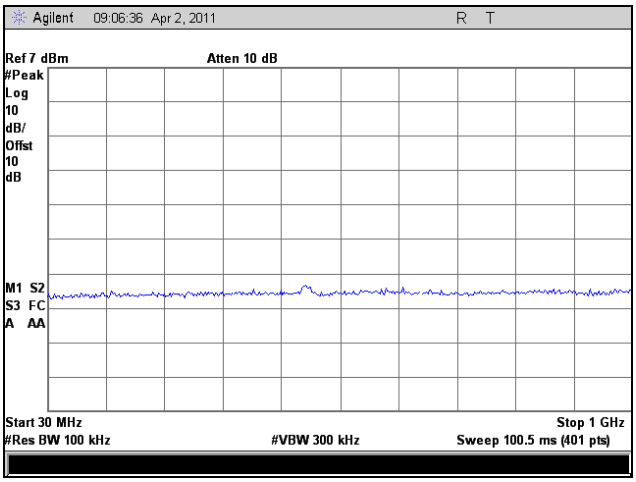


Plot 390. Conducted Spurious Emissions, High Channel, 30 MHz – 1 GHz, 802.11n HT30, Port 1

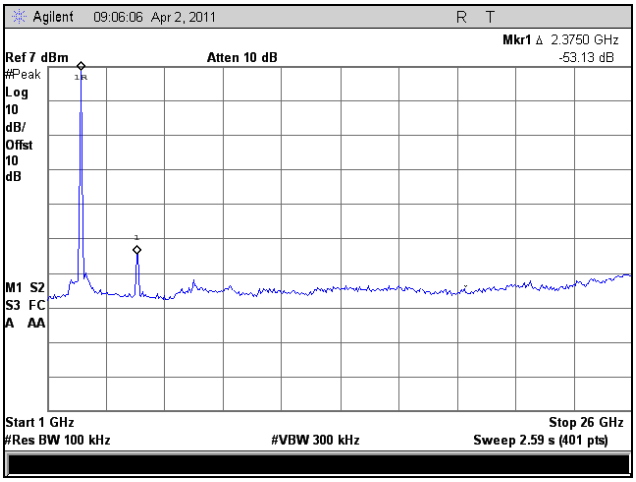


Plot 391. Conducted Spurious Emissions, High Channel, 1 GHz – 26 GHz, 802.11n HT30, Port 1

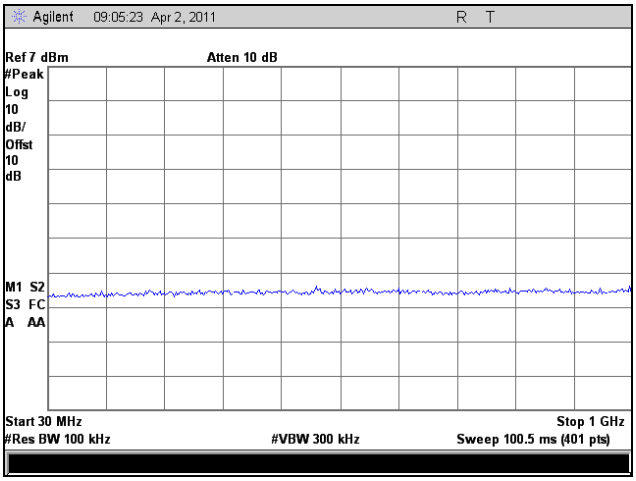
Conducted Spurious Emissions Test Results, 802.11n HT30, Port 2



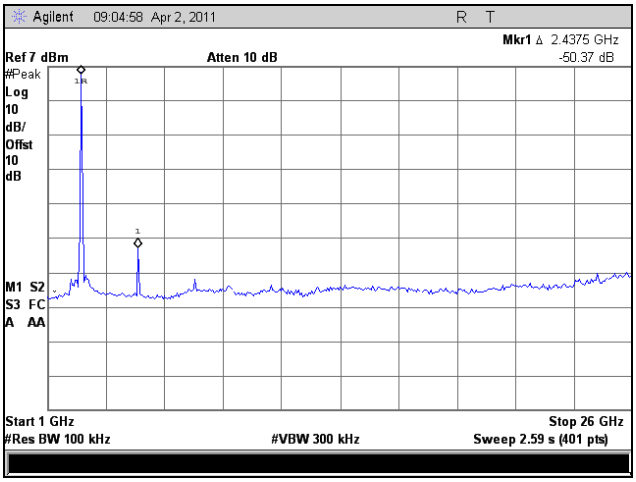
Plot 392. Conducted Spurious Emissions, Low Channel, 30 MHz – 1 GHz, 802.11n HT30, Port 2



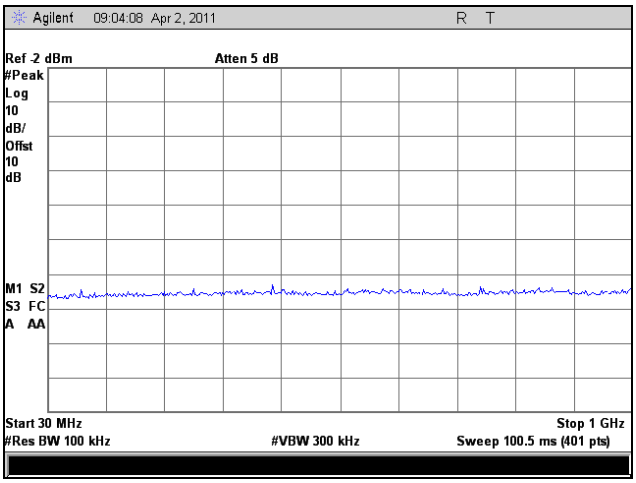
Plot 393. Conducted Spurious Emissions, Low Channel, 1 GHz – 26 GHz, 802.11n HT30, Port 2



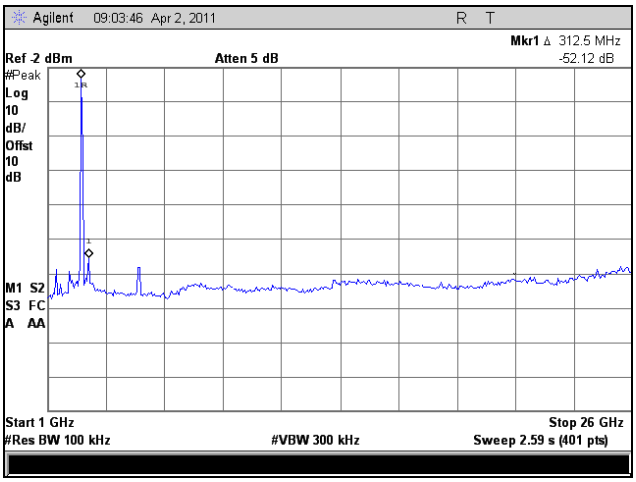
Plot 394. Conducted Spurious Emissions, Mid Channel, 30 MHz – 1 GHz, 802.11n HT30, Port 2



Plot 395. Conducted Spurious Emissions, Mid Channel, 1 GHz – 26 GHz, 802.11n HT30, Port 2

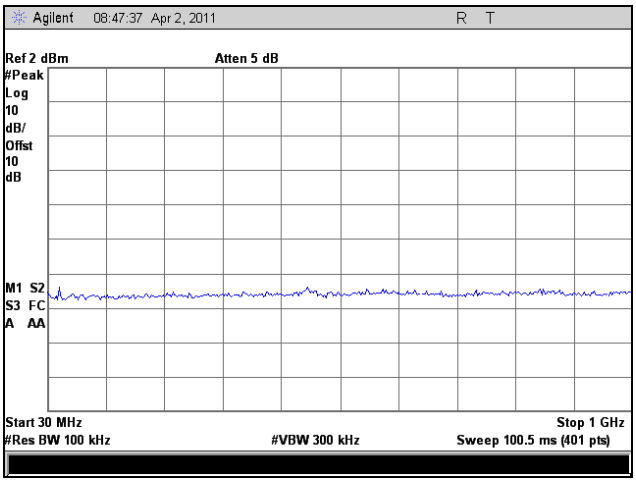


Plot 396. Conducted Spurious Emissions, High Channel, 30 MHz – 1 GHz, 802.11n HT30, Port 2

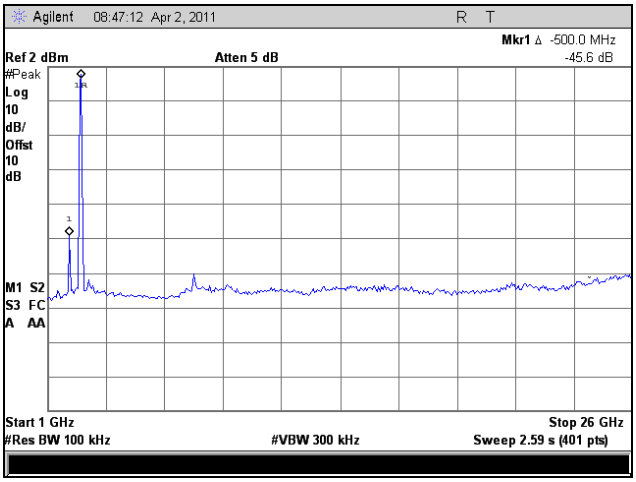


Plot 397. Conducted Spurious Emissions, High Channel, 1 GHz – 26 GHz, 802.11n HT30, Port 2

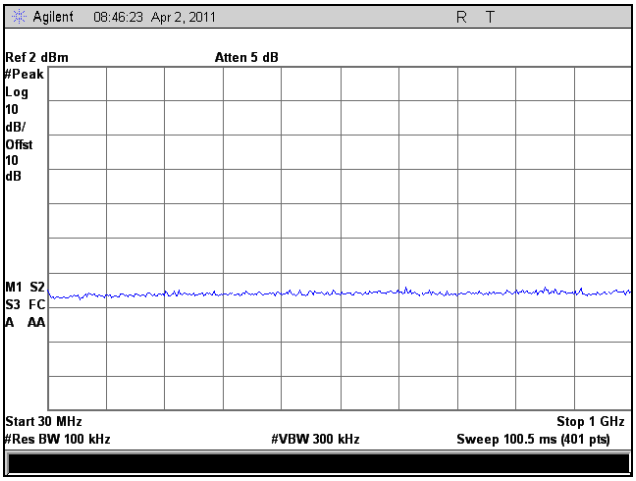
Conducted Spurious Emissions Test Results, 802.11n HT40, Port 1



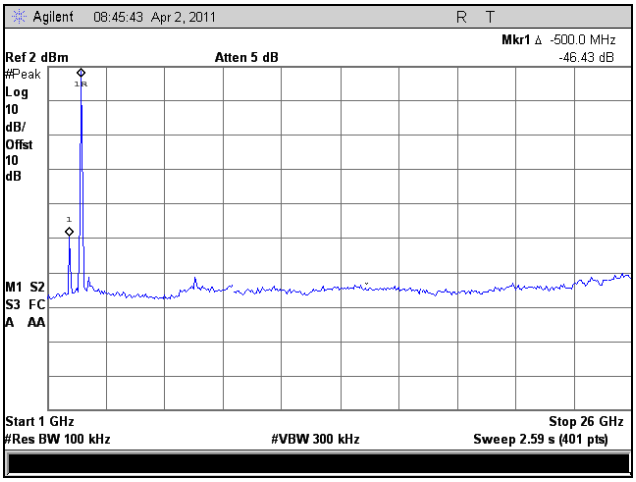
Plot 398. Conducted Spurious Emissions, Low Channel, 30 MHz – 1 GHz, 802.11n HT40, Port 1



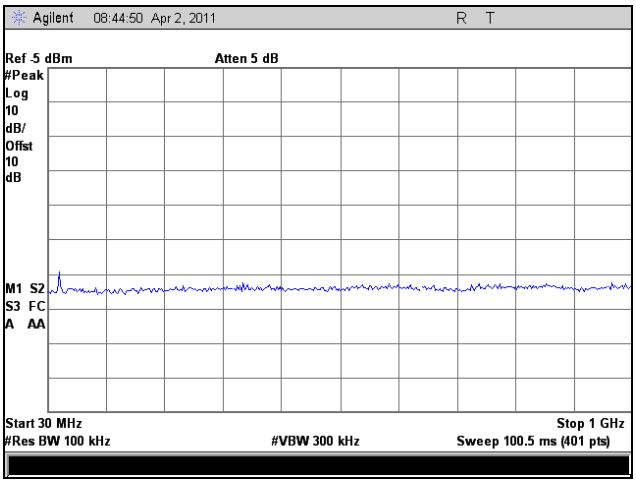
Plot 399. Conducted Spurious Emissions, Low Channel, 1 GHz – 26 GHz, 802.11n HT40, Port 1



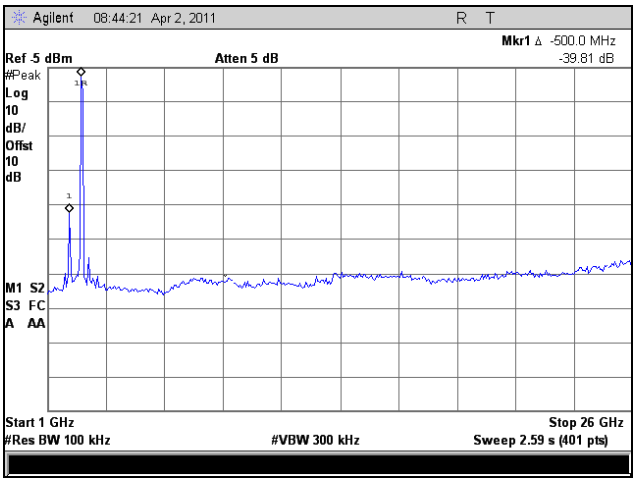
Plot 400. Conducted Spurious Emissions, Mid Channel, 30 MHz – 1 GHz, 802.11n HT40, Port 1



Plot 401. Conducted Spurious Emissions, Mid Channel, 1 GHz – 26 GHz, 802.11n HT40, Port 1

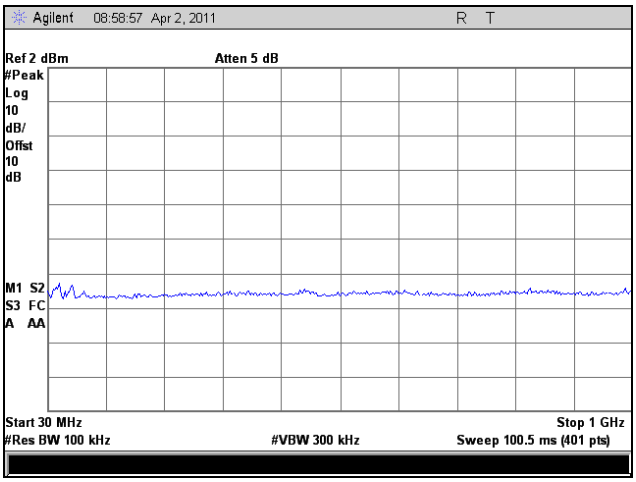


Plot 402. Conducted Spurious Emissions, High Channel, 30 MHz – 1 GHz, 802.11n HT40, Port 1

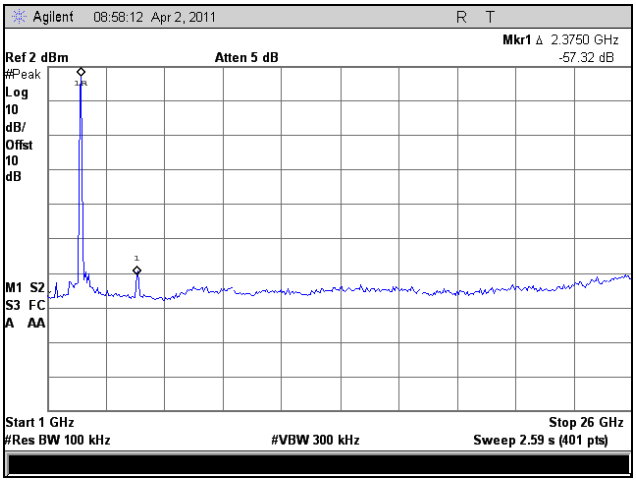


Plot 403. Conducted Spurious Emissions, High Channel, 1 GHz – 26 GHz, 802.11n HT40, Port 1

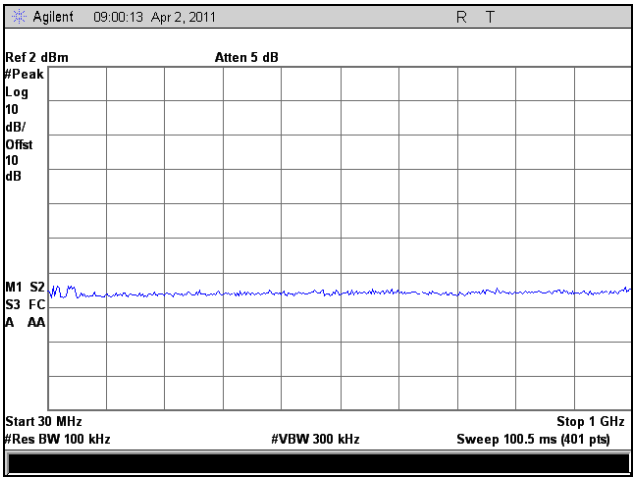
Conducted Spurious Emissions Test Results, 802.11n HT40, Port 2



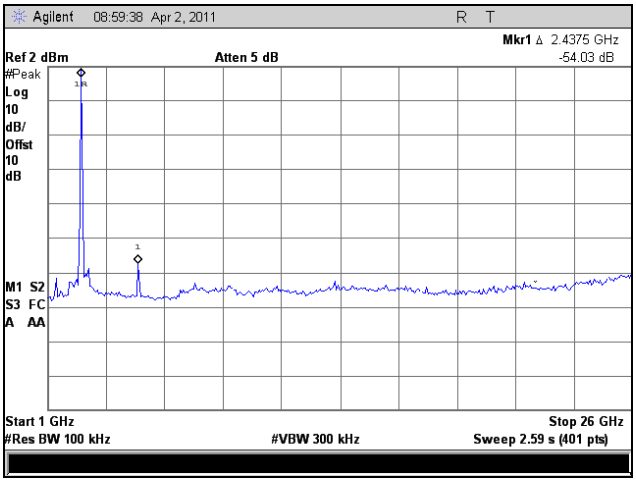
Plot 404. Conducted Spurious Emissions, Low Channel, 30 MHz – 1 GHz, 802.11n HT40, Port 2



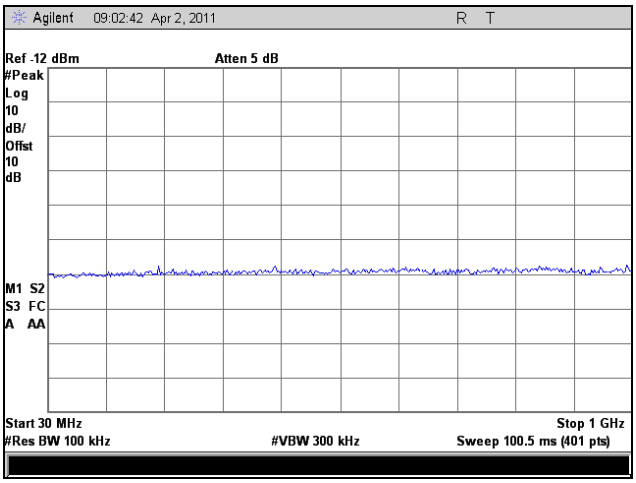
Plot 405. Conducted Spurious Emissions, Low Channel, 1 GHz – 26 GHz, 802.11n HT40, Port 2



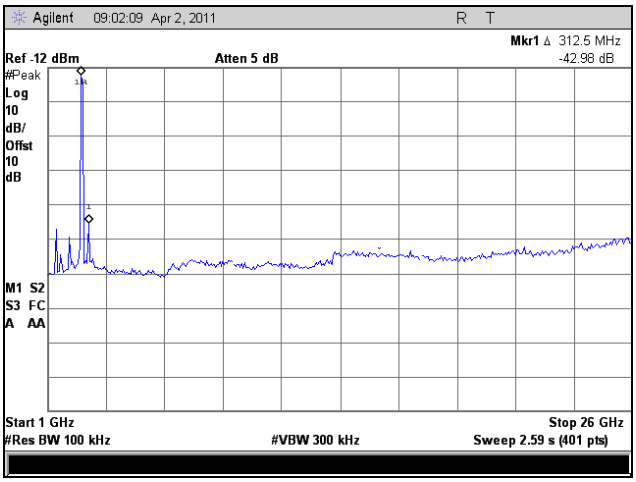
Plot 406. Conducted Spurious Emissions, Mid Channel, 30 MHz – 1 GHz, 802.11n HT40, Port 2



Plot 407. Conducted Spurious Emissions, Mid Channel, 1 GHz – 26 GHz, 802.11n HT40, Port 2

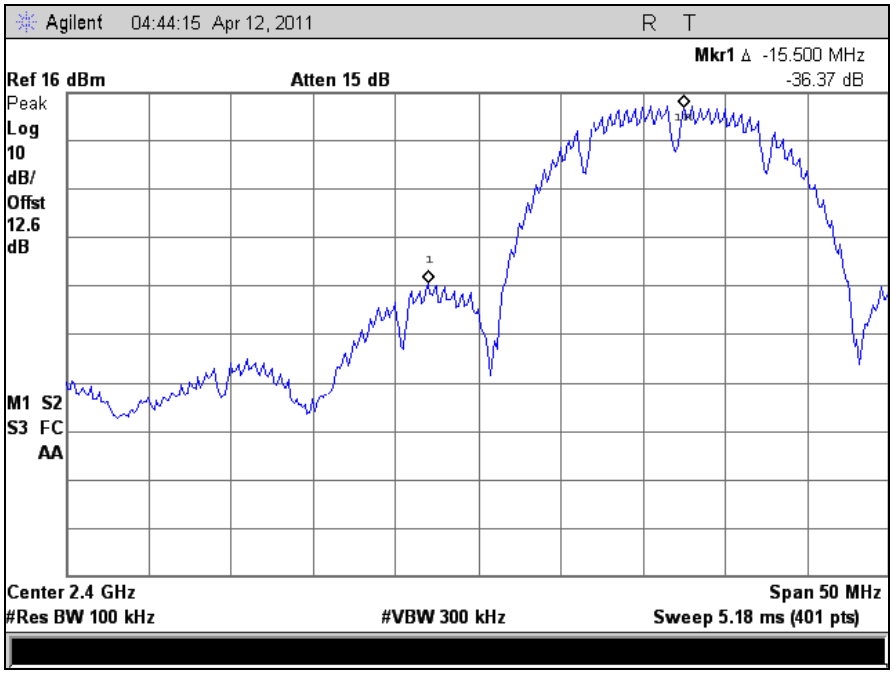


Plot 408. Conducted Spurious Emissions, High Channel, 30 MHz – 1 GHz, 802.11n HT40, Port 2

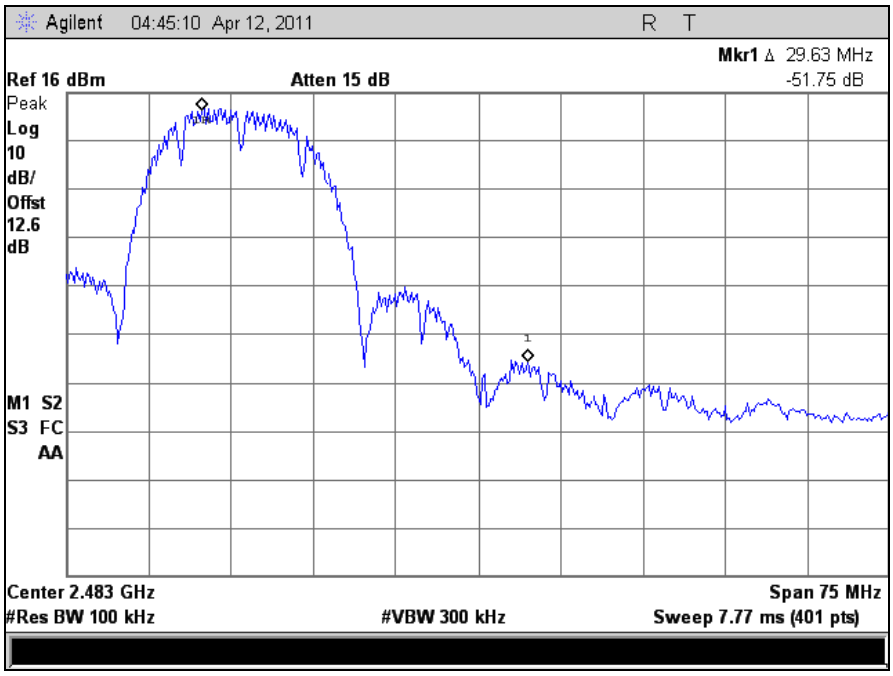


Plot 409. Conducted Spurious Emissions, High Channel, 1 GHz – 26 GHz, 802.11n HT40, Port 2

Conducted Band Edge Test Results, 802.11b

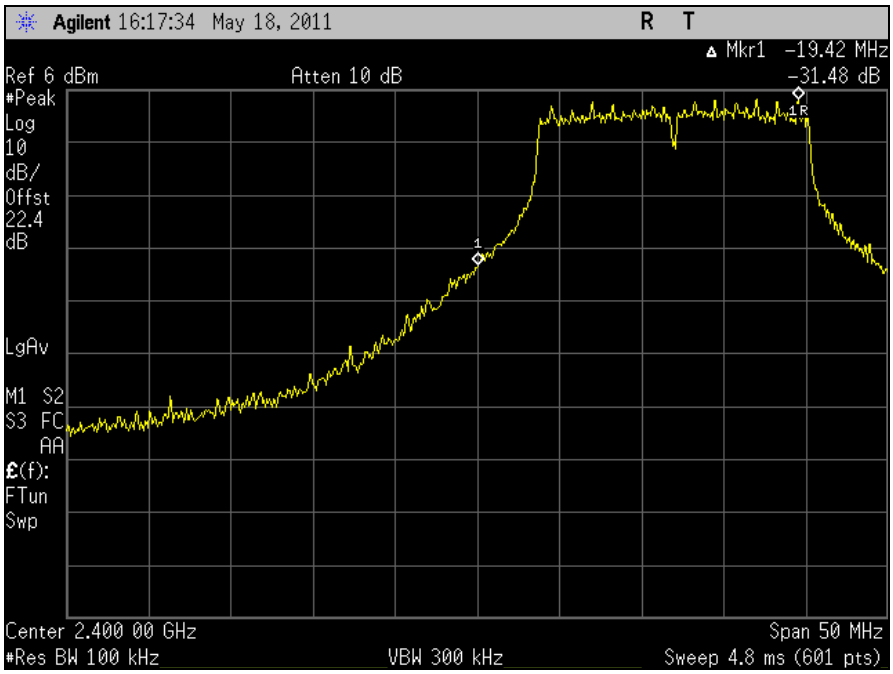


Plot 410. Conducted Band Edge, Low Channel, 802.11b

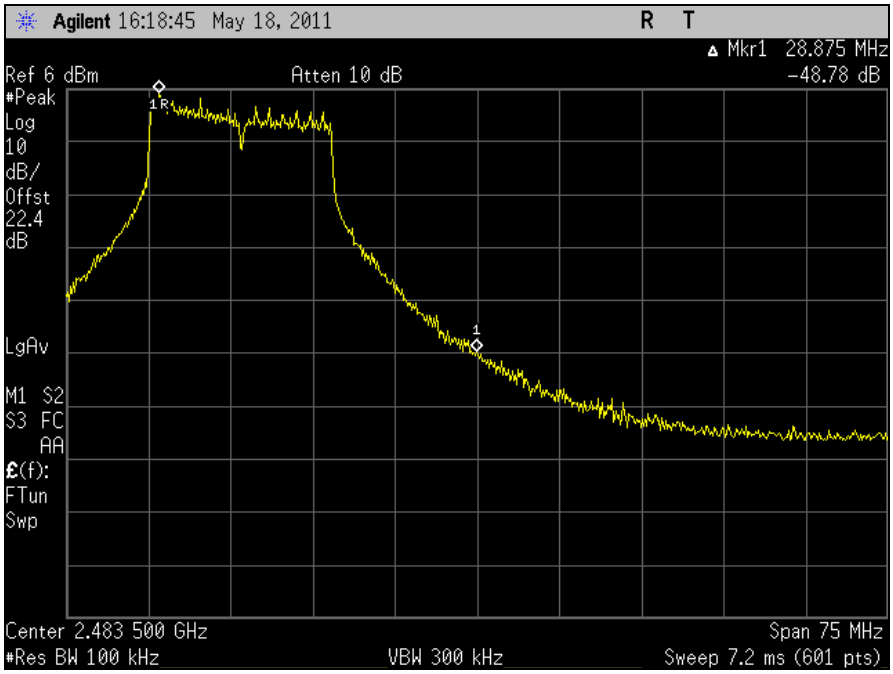


Plot 411. Conducted Band Edge, High Channel, 802.11b

Conducted Band Edge Test Results, 802.11g 20 MHz

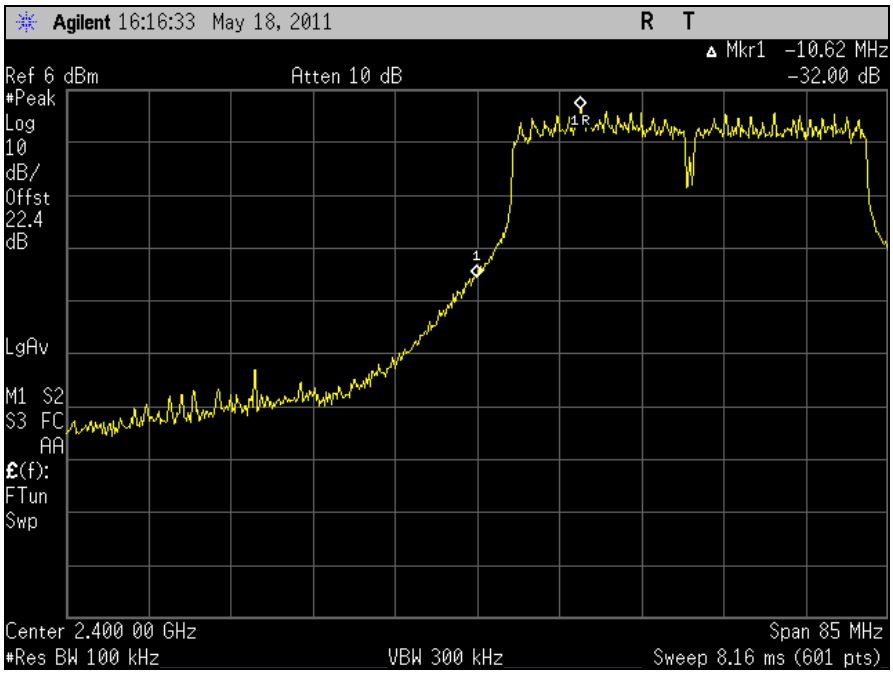


Plot 412. Conducted Band Edge, Low Channel, 802.11g 20 MHz

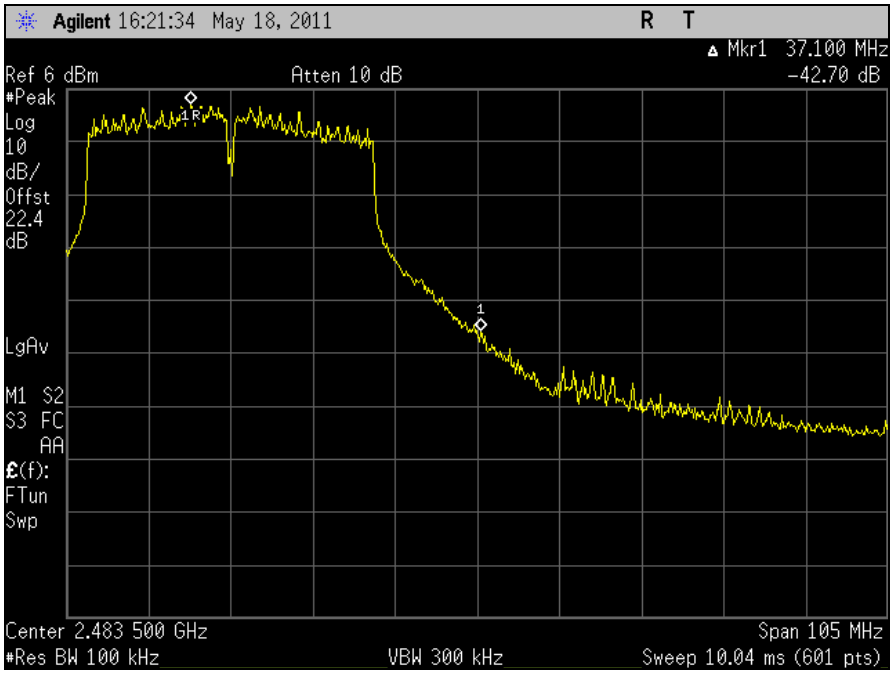


Plot 413. Conducted Band Edge, High Channel, 802.11g 20 MHz

Conducted Band Edge Test Results, 802.11g 40 MHz

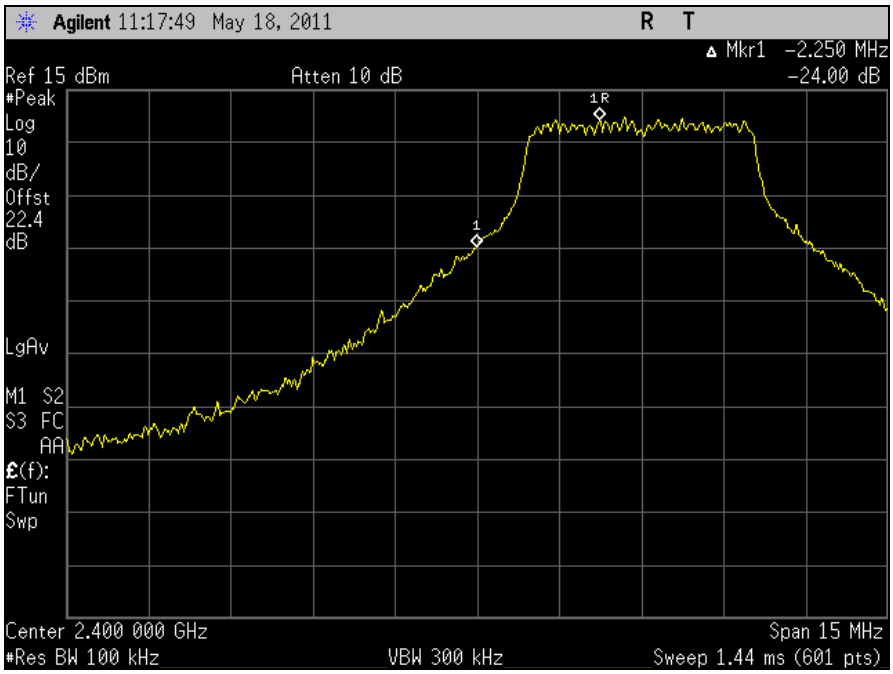


Plot 414. Conducted Band Edge, Low Channel, 802.11g 40 MHz

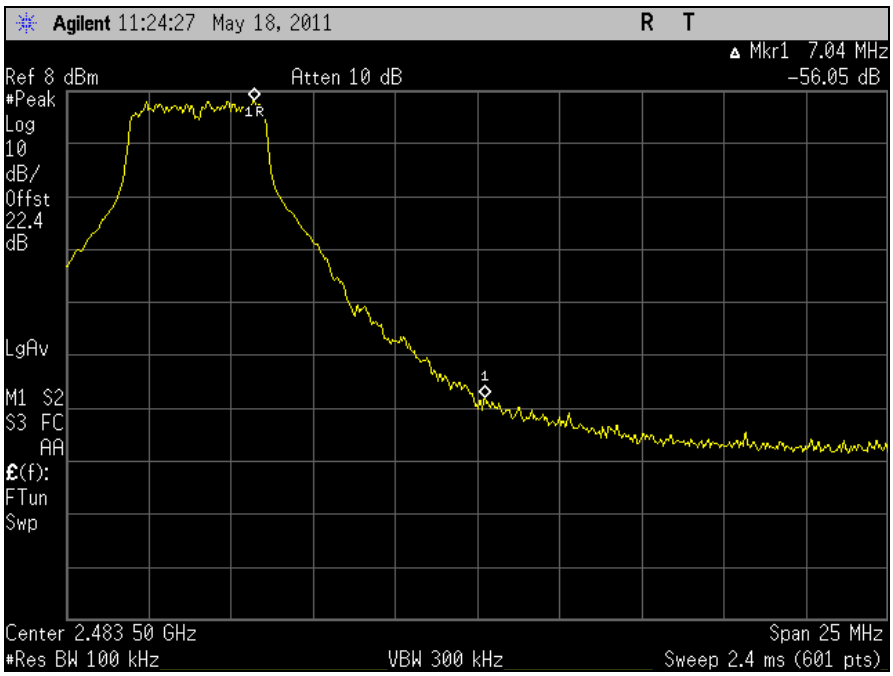


Plot 415. Conducted Band Edge, High Channel, 802.11g 40 MHz

Conducted Band Edge Test Results, 802.11n HT5, Port 1

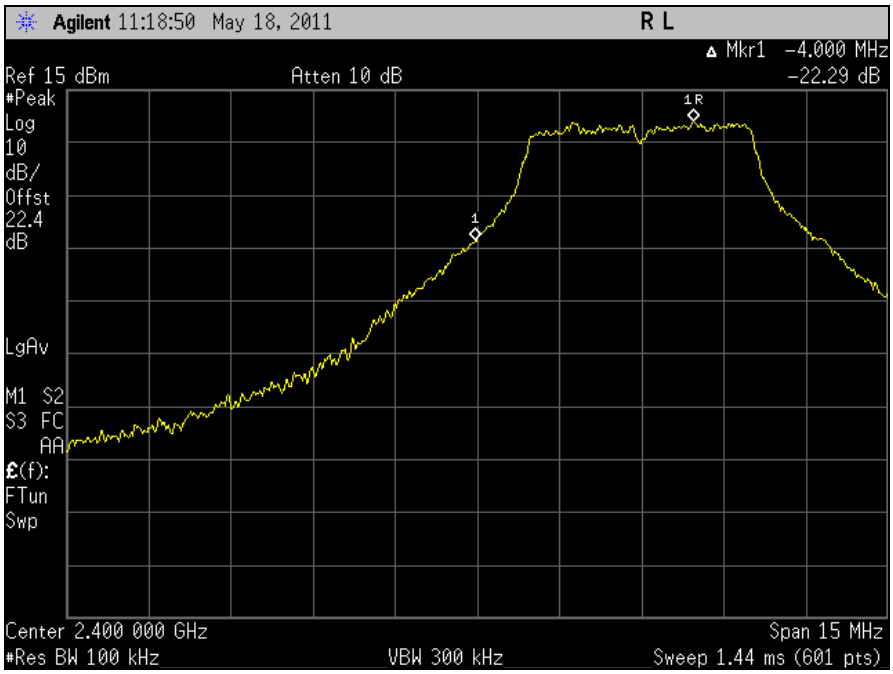


Plot 416. Conducted Band Edge, Low Channel, 802.11n HT5, Port 1

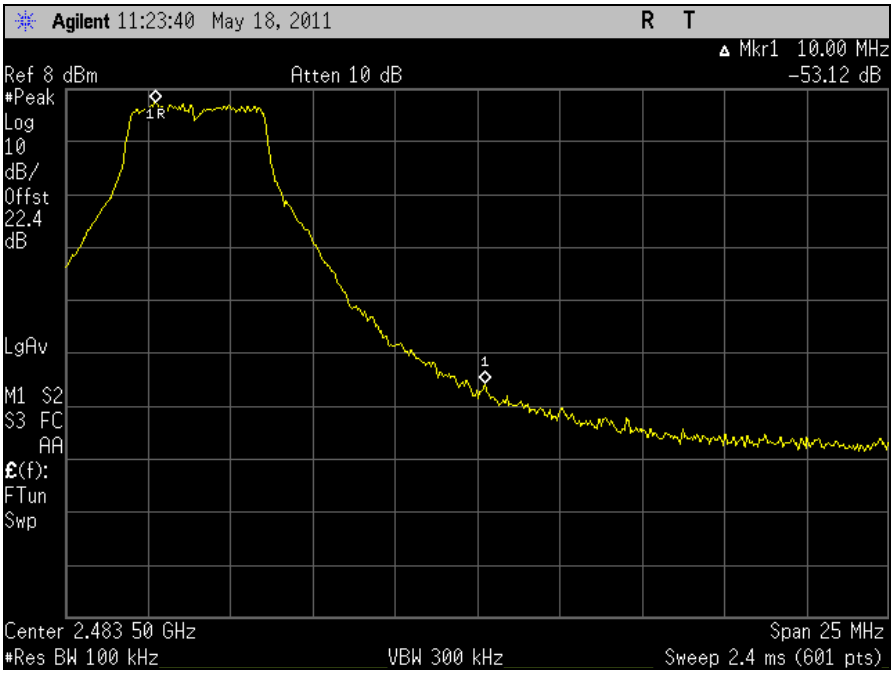


Plot 417. Conducted Band Edge, High Channel, 802.11n HT5, Port 1

Conducted Band Edge Test Results, 802.11n HT5, Port 2

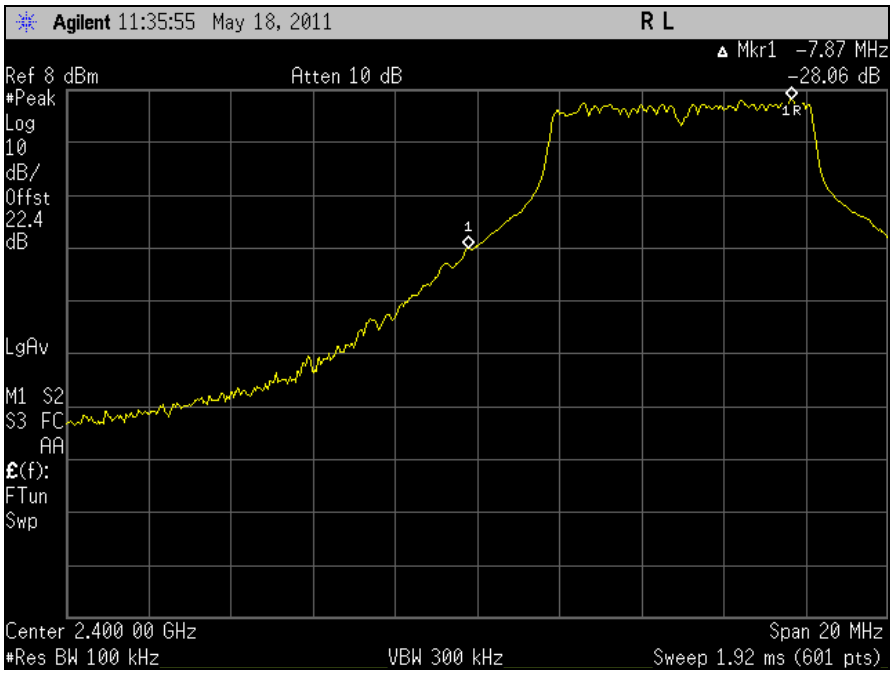


Plot 418. Conducted Band Edge, Low Channel, 802.11n HT5, Port 2

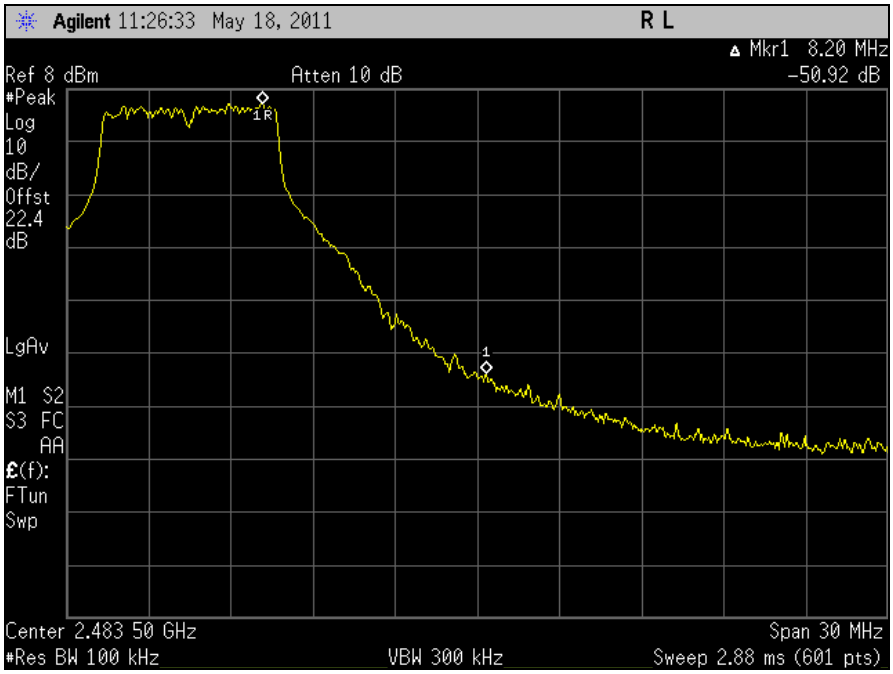


Plot 419. Conducted Band Edge, High Channel, 802.11n HT5, Port 2

Conducted Band Edge Test Results, 802.11n HT8, Port 1

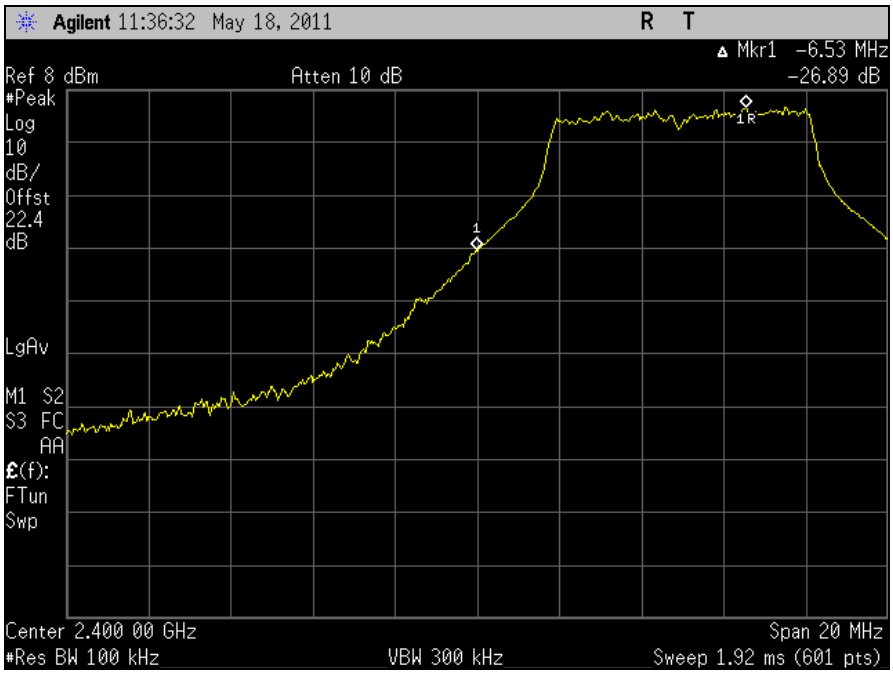


Plot 420. Conducted Band Edge, Low Channel, 802.11n HT8, Port 1

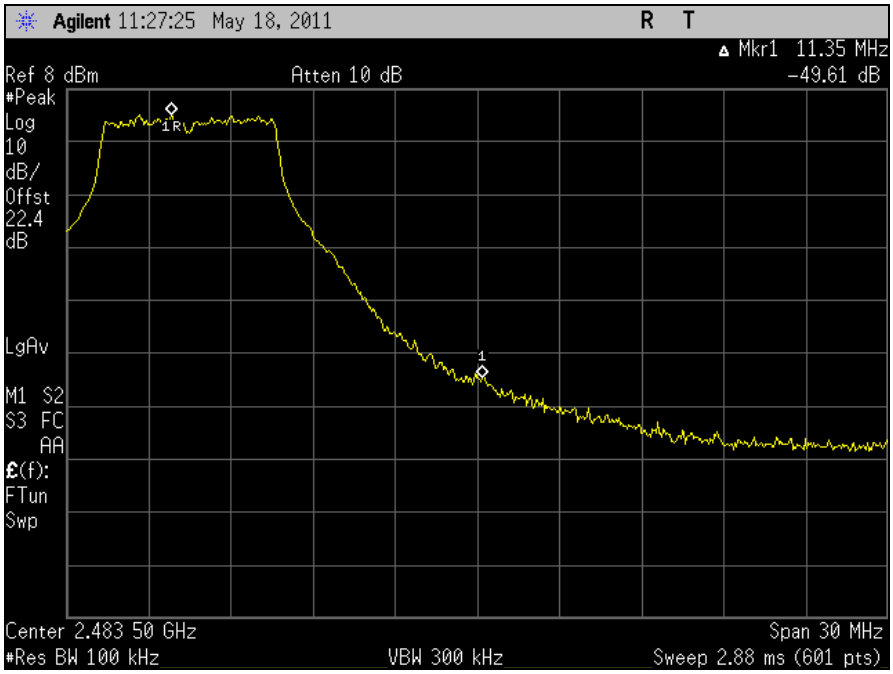


Plot 421. Conducted Band Edge, High Channel, 802.11n HT8, Port 1

Conducted Band Edge Test Results, 802.11n HT8, Port 2

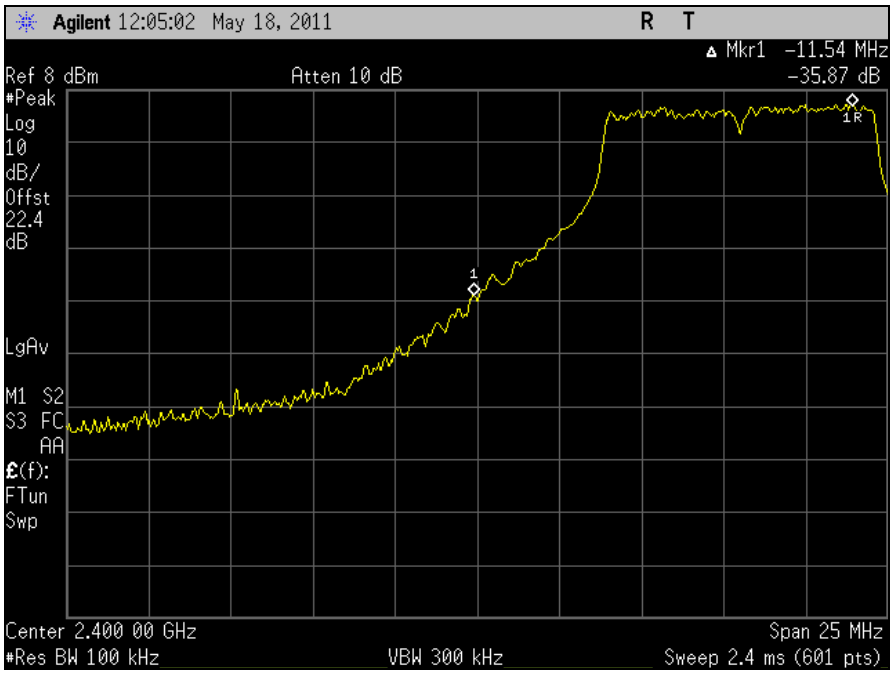


Plot 422. Conducted Band Edge, Low Channel, 802.11n HT8, Port 2

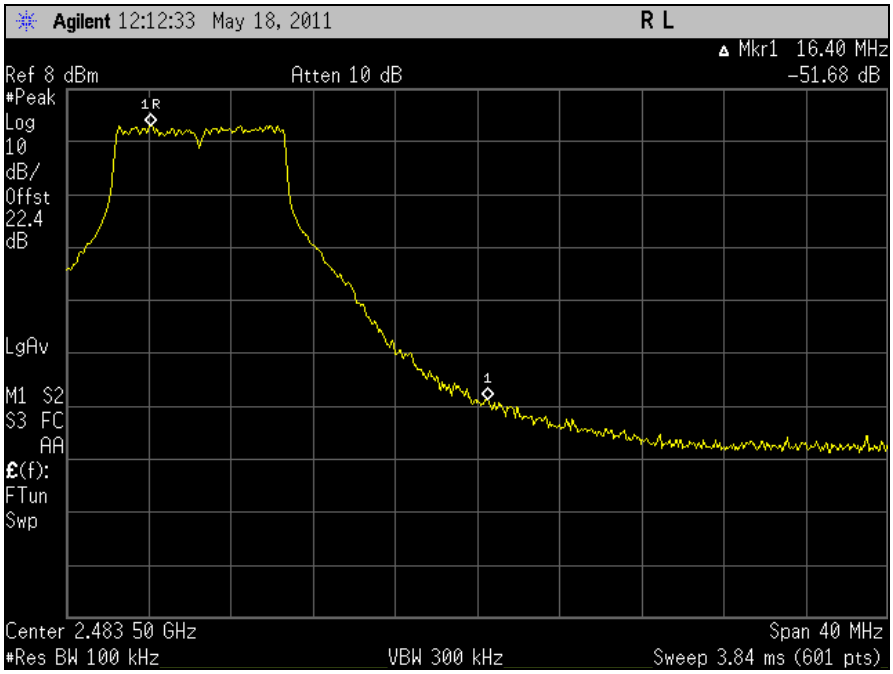


Plot 423. Conducted Band Edge, High Channel, 802.11n HT8, Port 2

Conducted Band Edge Test Results, 802.11n HT10, Port 1

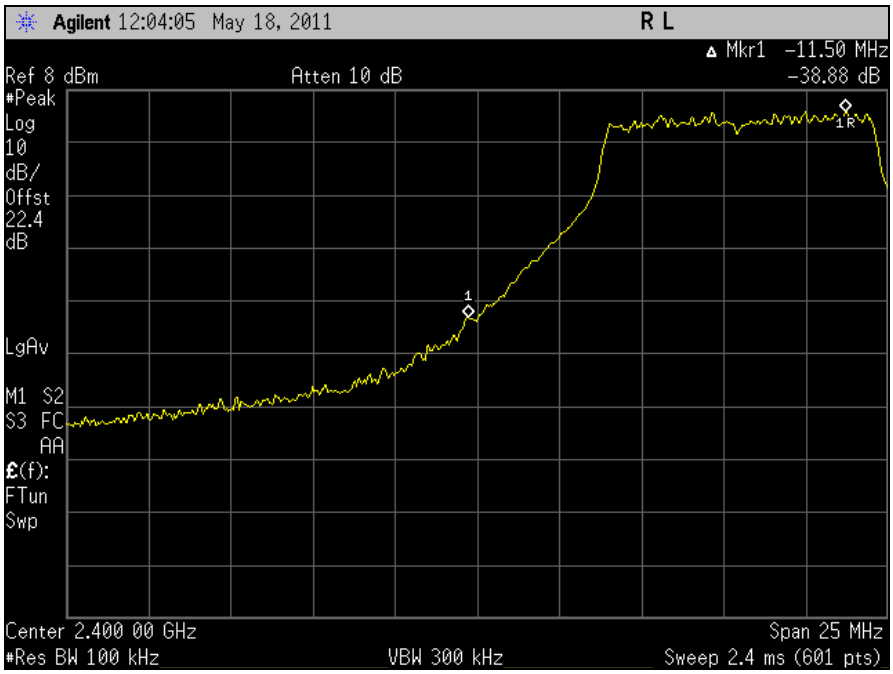


Plot 424. Conducted Band Edge, Low Channel, 802.11n HT10, Port 1

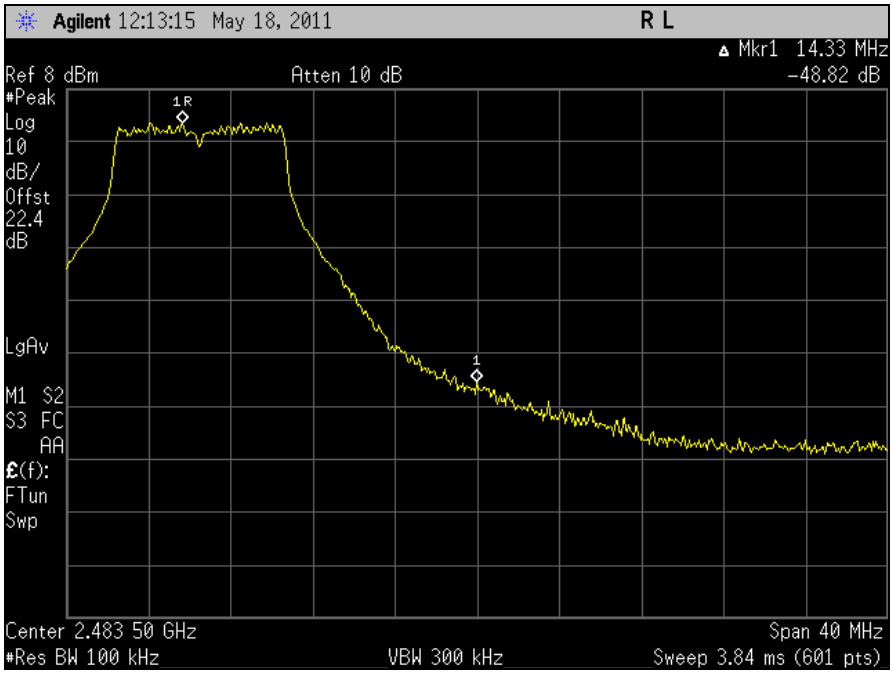


Plot 425. Conducted Band Edge, High Channel, 802.11n HT10, Port 1

Conducted Band Edge Test Results, 802.11n HT10, Port 2

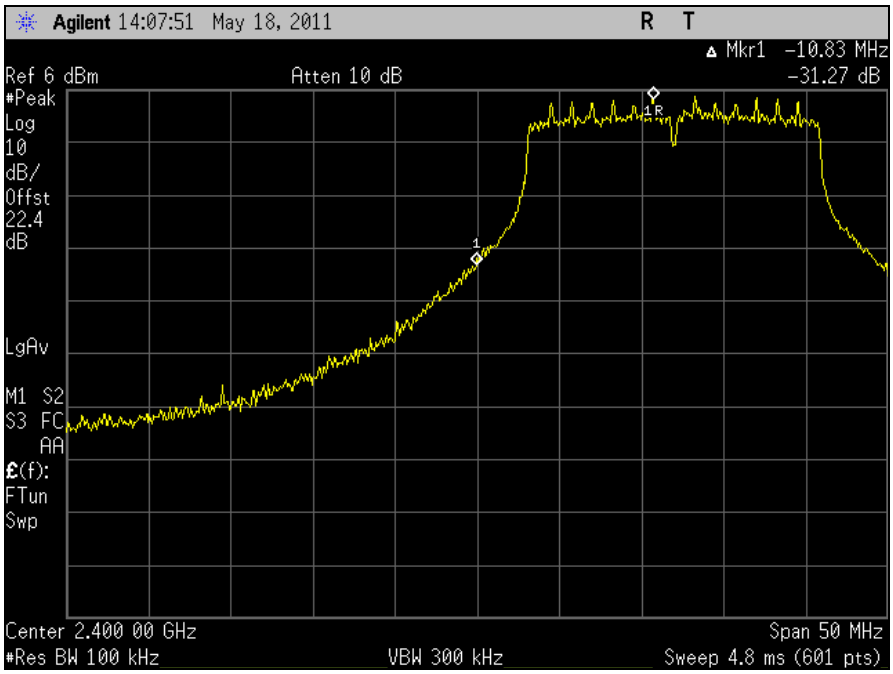


Plot 426. Conducted Band Edge, Low Channel, 802.11n HT10, Port 2

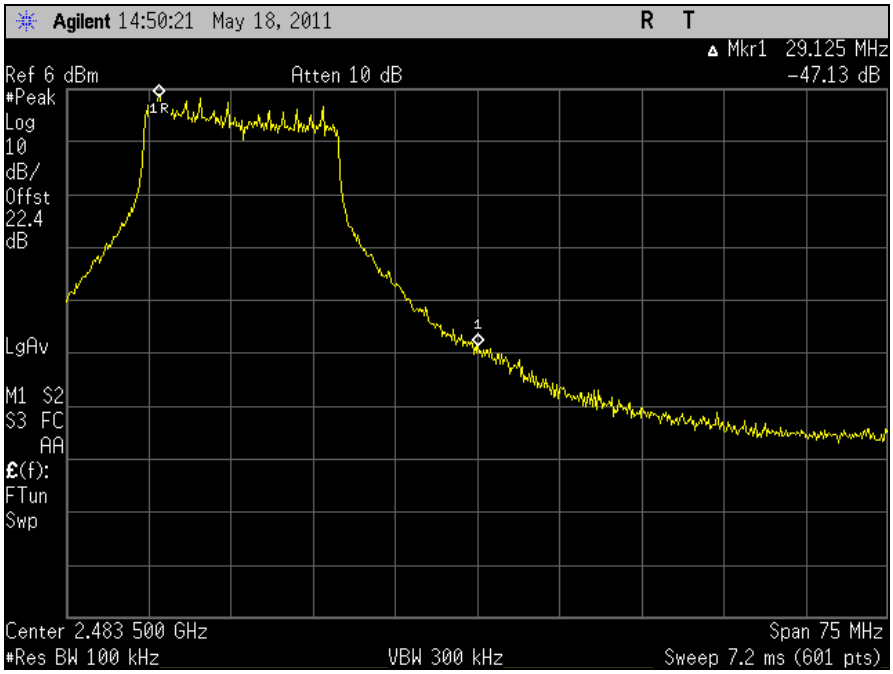


Plot 427. Conducted Band Edge, High Channel, 802.11n HT10, Port 2

Conducted Band Edge Test Results, 802.11n HT20, Port 1

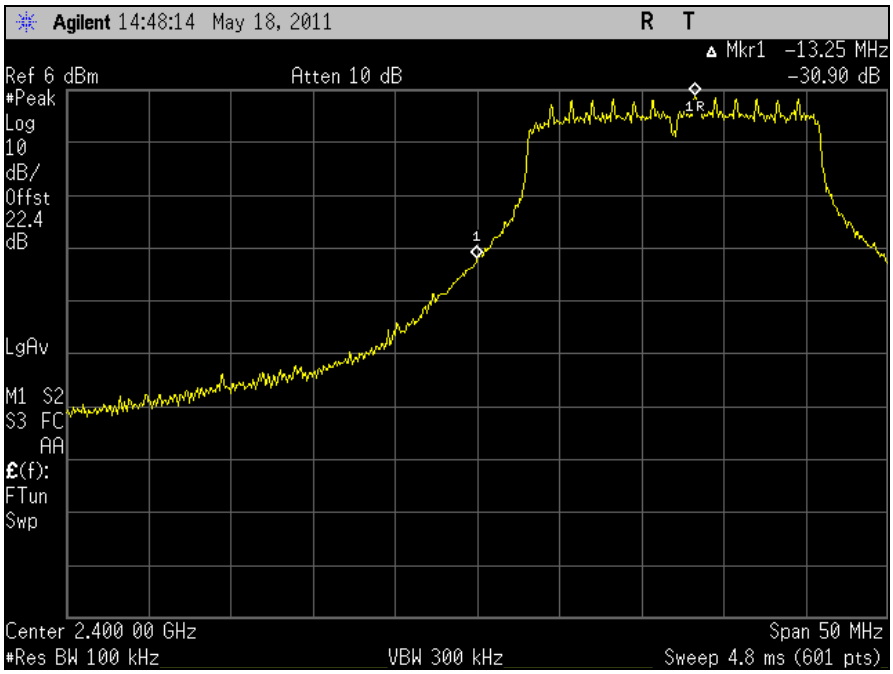


Plot 428. Conducted Band Edge, Low Channel, 802.11n HT20, Port 1

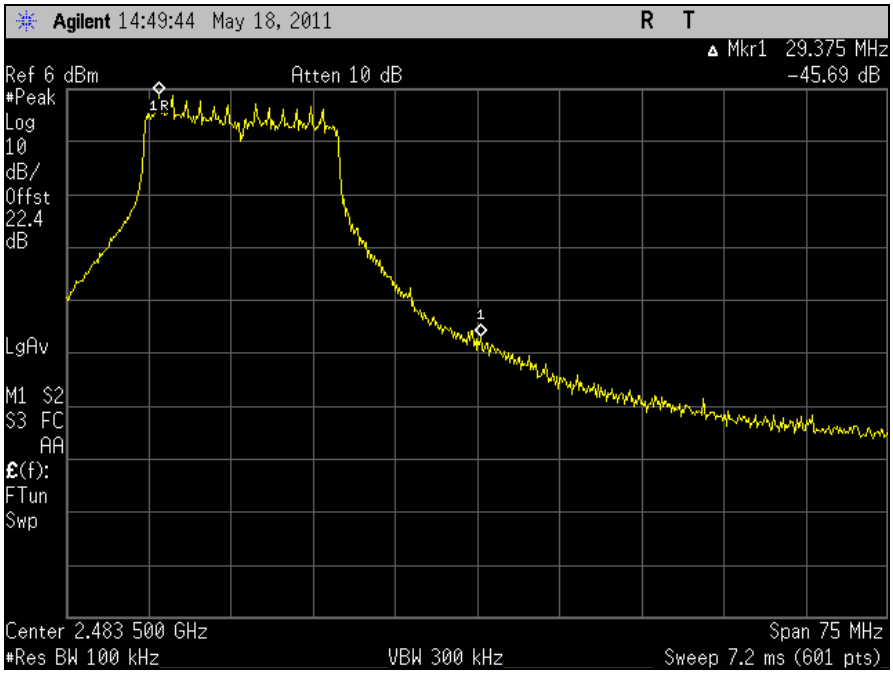


Plot 429. Conducted Band Edge, High Channel, 802.11n HT20, Port 1

Conducted Band Edge Test Results, 802.11n HT20, Port 2

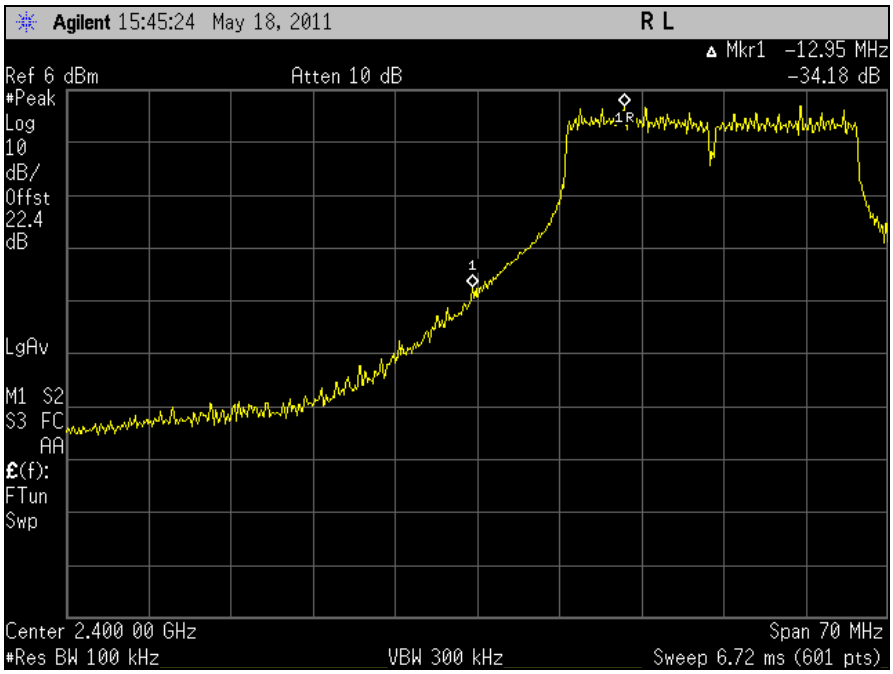


Plot 430. Conducted Band Edge, Low Channel, 802.11n HT20, Port 2

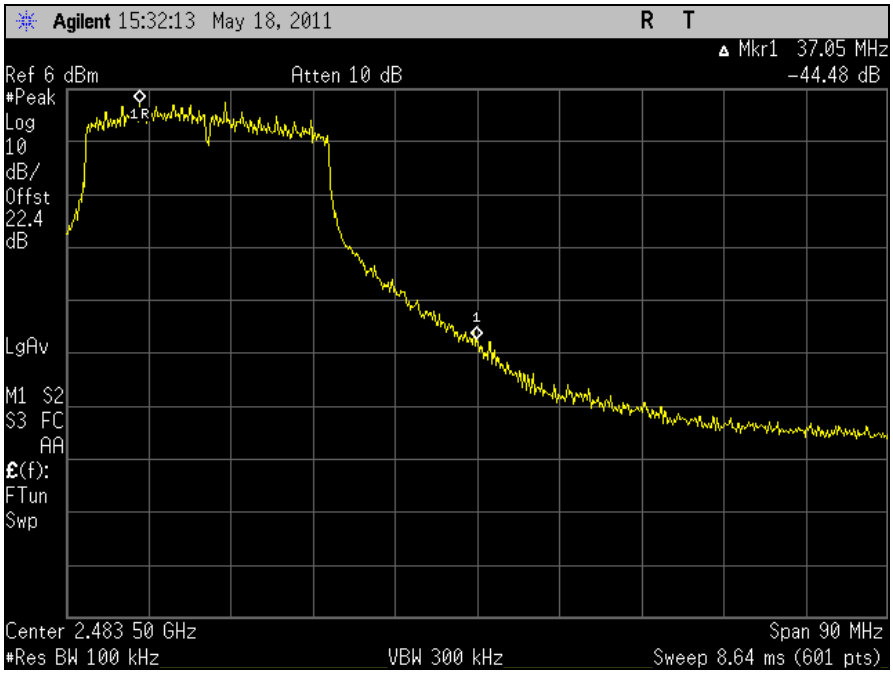


Plot 431. Conducted Band Edge, High Channel, 802.11n HT20, Port 2

Conducted Band Edge Test Results, 802.11n HT30, Port 1

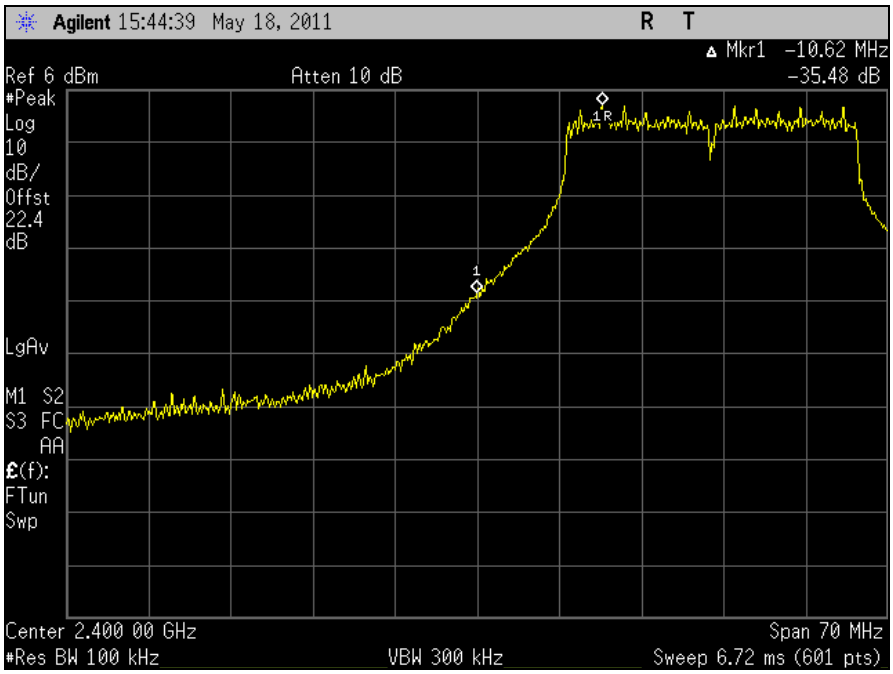


Plot 432. Conducted Band Edge, Low Channel, 802.11n HT30, Port 1

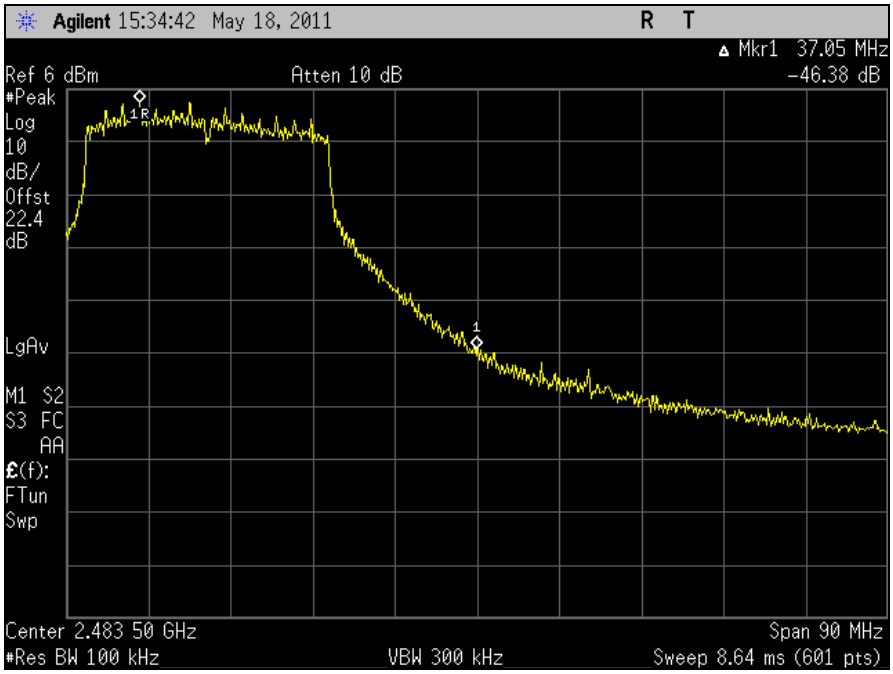


Plot 433. Conducted Band Edge, High Channel, 802.11n HT30, Port 1

Conducted Band Edge Test Results, 802.11n HT30, Port 2

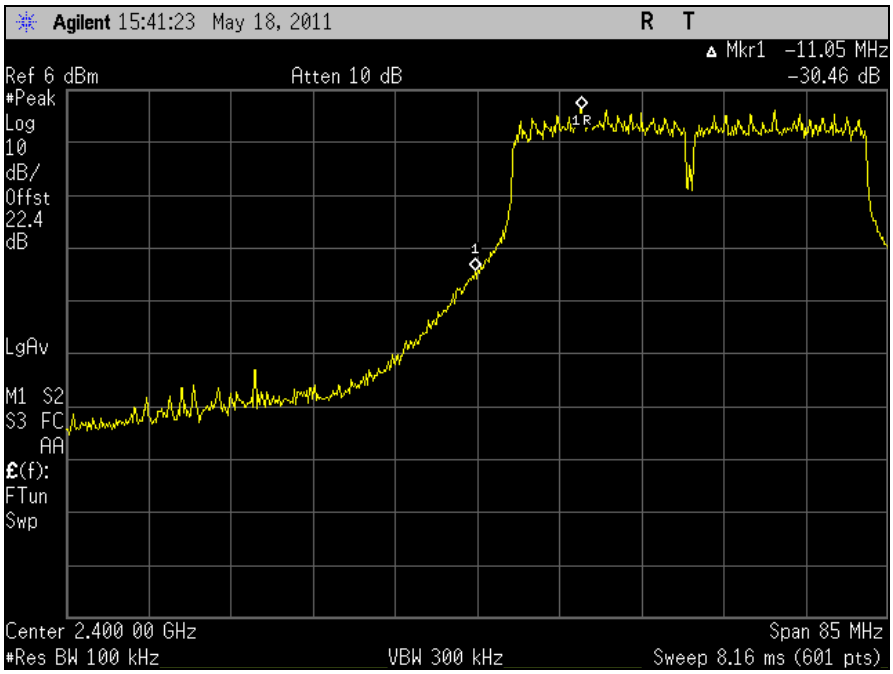


Plot 434. Conducted Band Edge, Low Channel, 802.11n HT30, Port 2

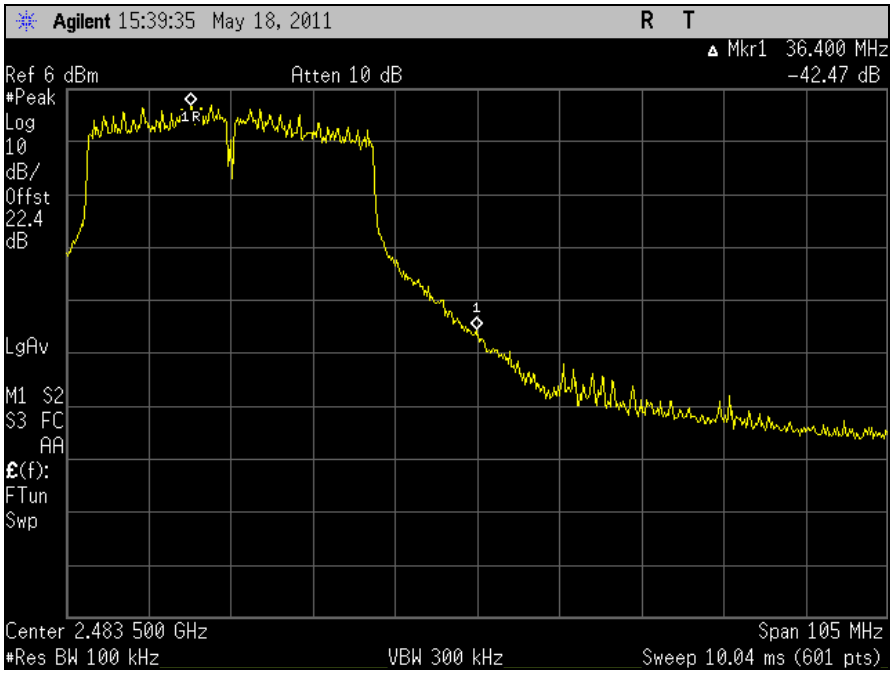


Plot 435. Conducted Band Edge, High Channel, 802.11n HT30, Port 2

Conducted Band Edge Test Results, 802.11n HT40, Port 1

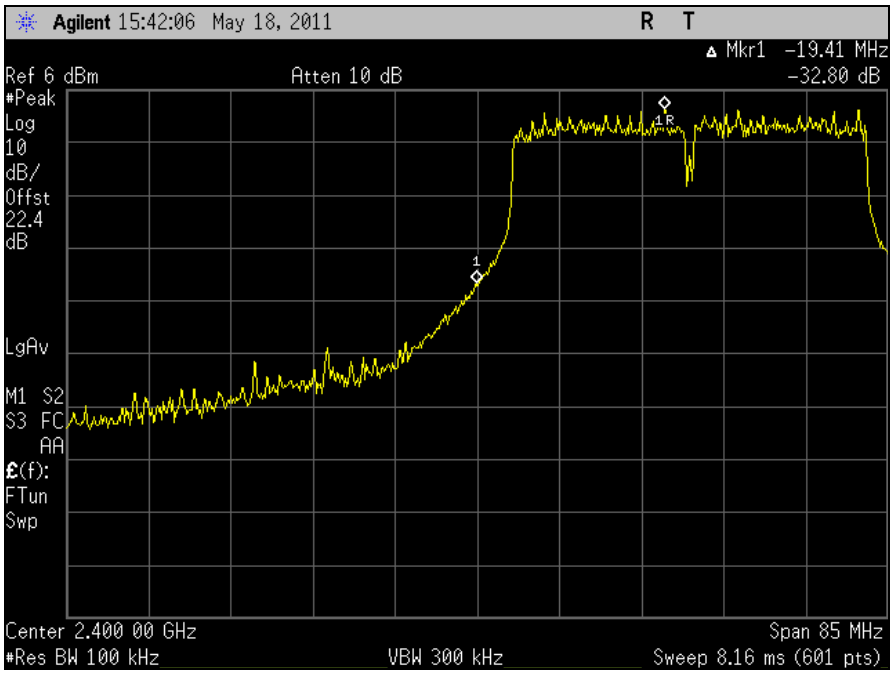


Plot 436. Conducted Band Edge, Low Channel, 802.11n HT40, Port 1

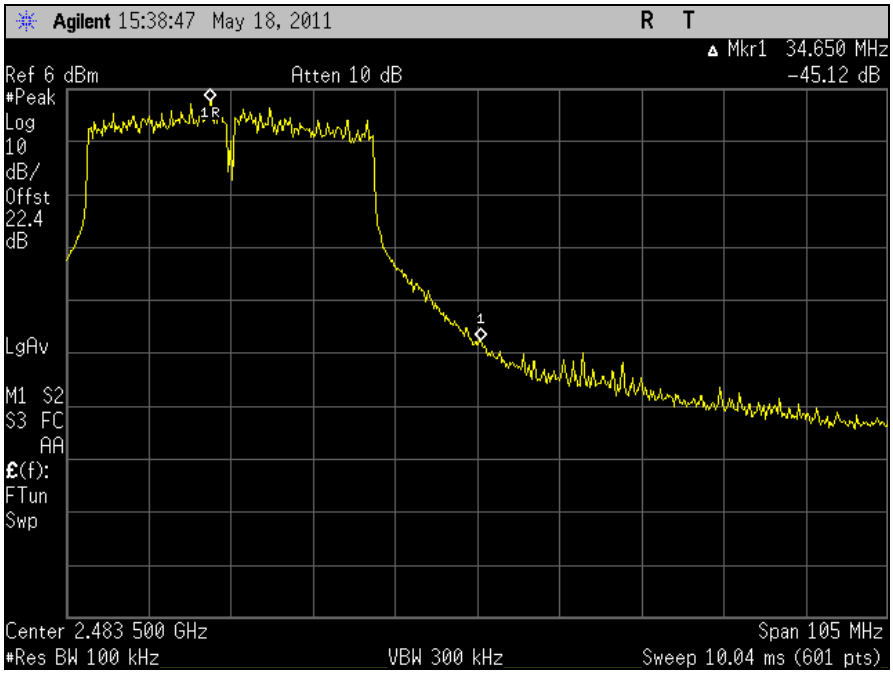


Plot 437. Conducted Band Edge, High Channel, 802.11n HT40, Port 1

Conducted Band Edge Test Results, 802.11n HT40, Port 2



Plot 438. Conducted Band Edge, Low Channel, 802.11n HT40, Port 2



Plot 439. Conducted Band Edge, High Channel, 802.11n HT40, Port 2

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. A RBW of 1 MHz and VBW of 3 MHz were used to determine the peak emissions within the band. The Spectrum analyzer was then set to a RBW of 3 kHz and VBW was set to 10 kHz. The SPAN of the analyzer was set to 1 MHz with a 333.3 second sweep. 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: Anderson Soungpanya

Test Date: 05/19/11

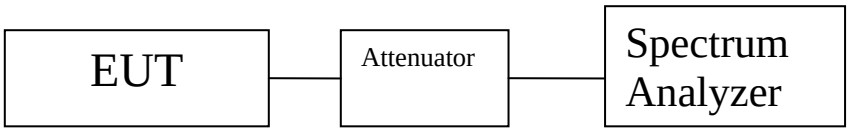


Figure 5. Block Diagram, Peak Power Spectral Density Test Setup

Peak Power Spectral Density Test Results

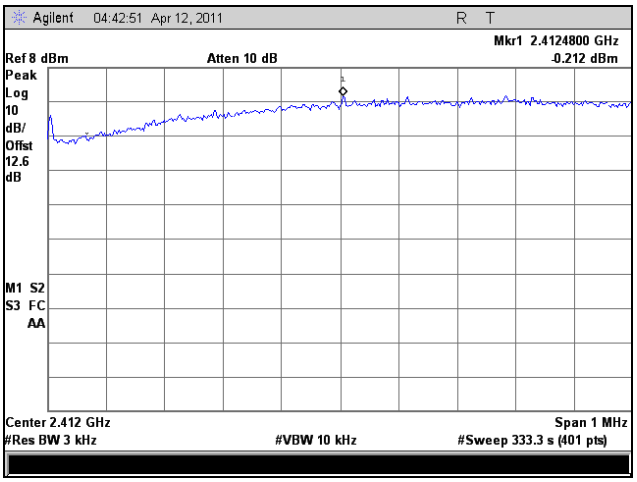
Peak Power Spectral Density					
Mode	**Carrier Channel**	**Frequency (MHz)**	**Measured PPSD (dBm)**	**Limit (dBm)**	**Margin (dB)**
802.11b	Low	2412	-0.212	7	-7.212
	Mid	2437	-0.162	7	-7.162
	High	2462	-0.378	7	-7.378
802.11g 20 MHz	Low	2412	-0.504	7	-7.504
	Mid	2437	1.417	7	-5.583
	High	2462	-1.203	7	-8.203
802.11g 40 MHz	Low	2422	-8.314	7	-15.314
	Mid	2437	-7.669	7	-14.669
	High	2452	-5.386	7	-12.386
HT5 Port 1	Low	2403	0.970	7	-6.030
	Mid	2437	0.765	7	-6.235
	High	2475	0.468	7	-6.532
HT5 Port 2	Low	2403	1.247	7	-5.753
	Mid	2437	0.322	7	-6.678
	High	2475	-0.121	7	-7.121
HT8 Port 1	Low	2405	-0.076	7	-7.076
	Mid	2437	-0.622	7	-7.622
	High	2473	-1.856	7	-8.856
HT8 Port 2	Low	2405	-1.198	7	-8.198
	Mid	2437	-0.423	7	-7.423
	High	2473	-1.732	7	-8.732
HT10 Port 1	Low	2408	-4.302	7	-11.302
	Mid	2437	-5.685	7	-12.685
	High	2470	-2.755	7	-9.755
HT10 Port 2	Low	2408	-3.955	7	-10.955
	Mid	2437	-4.226	7	-11.226
	High	2470	-4.790	7	-11.790
HT20 Port 1	Low	2412	-8.423	7	-15.423
	Mid	2437	-8.829	7	-15.829
	High	2462	-3.193	7	-10.193
HT20 Port 2	Low	2412	-6.987	7	-13.987
	Mid	2437	-7.117	7	-14.117
	High	2462	-7.417	7	-14.417
HT30 Port 1	Low	2420	-10.430	7	-17.430
	Mid	2437	-9.247	7	-16.247
	High	2454	-9.369	7	-16.369
HT30 Port 2	Low	2420	-7.486	7	-14.486
	Mid	2437	-7.945	7	-14.945
	High	2454	-6.460	7	-13.460
HT40 Port 1	Low	2422	-8.023	7	-15.023
	Mid	2437	-9.853	7	-16.853
	High	2452	-6.590	7	-13.590
HT40 Port 2	Low	2422	-7.722	7	-14.722
	Mid	2437	-10.200	7	-17.200
	High	2452	-8.375	7	-15.375

Table 30. Peak Power Spectral Density, Test Results

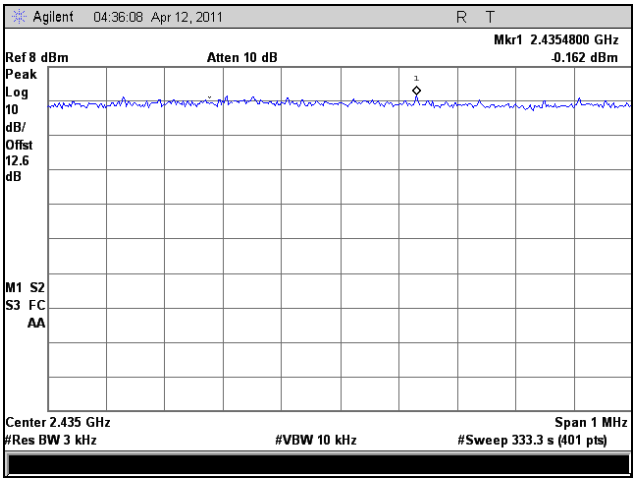
Peak Power Spectral Density					
Mode	**Carrier Channel**	**Frequency (MHz)**	**Summed PPSD (dBm)**	**Limit (dBm)**	**Margin (dB)**
HT5	Low	2403	4.120	7	-2.880
	Mid	2437	3.560	7	-3.440
	High	2475	3.190	7	-3.810
HT8	Low	2405	2.410	7	-4.590
	Mid	2437	2.490	7	-4.510
	High	2473	1.220	7	-5.780
HT10	Low	2408	-1.110	7	-8.110
	Mid	2437	-1.880	7	-8.880
	High	2470	-0.640	7	-7.640
HT20	Low	2412	-4.640	7	-11.640
	Mid	2437	-4.880	7	-11.880
	High	2462	-1.800	7	-8.800
HT30	Low	2420	-5.700	7	-12.700
	Mid	2437	-5.540	7	-12.540
	High	2454	-4.670	7	-11.670
HT40	Low	2422	-4.860	7	-11.860
	Mid	2437	-7.010	7	-14.010
	High	2452	-4.380	7	-11.380

Table 31. Summed Peak Power Spectral Density, Test Results

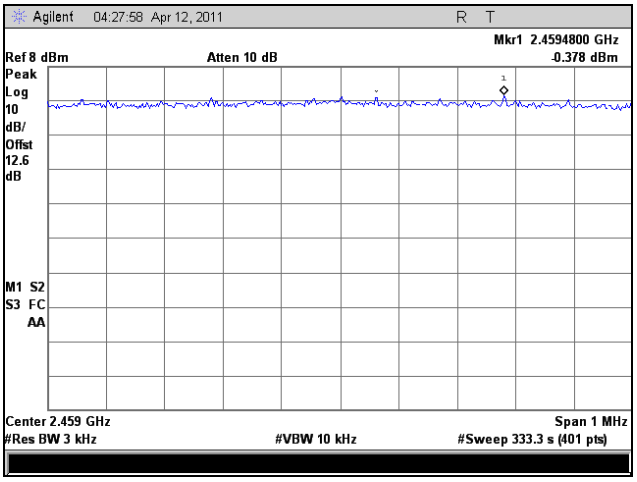
Peak Power Spectral Density, 802.11b



Plot 440. Peak Power Spectral Density, Low Channel, 802.11b

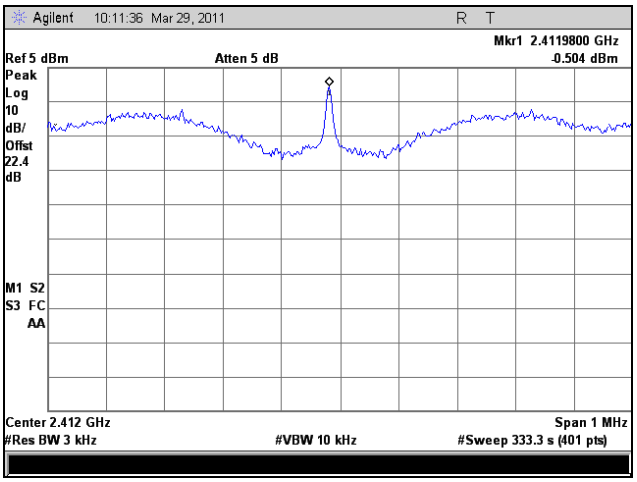


Plot 441. Peak Power Spectral Density, Mid Channel, 802.11b

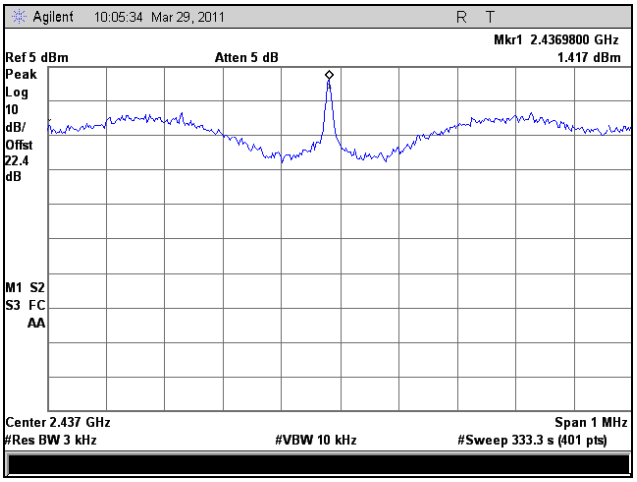


Plot 442. Peak Power Spectral Density, High Channel, 802.11b

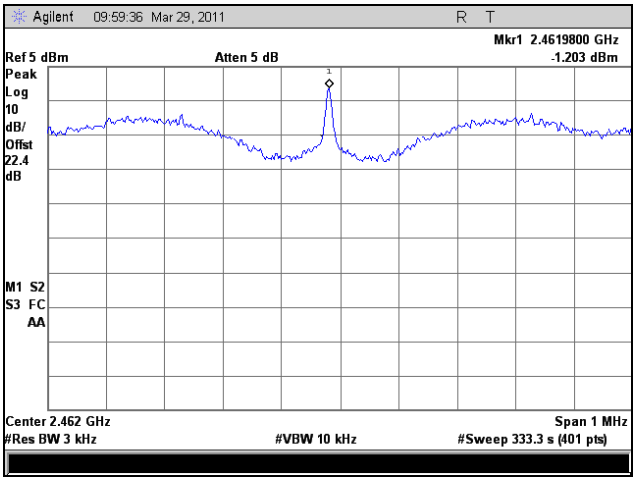
Peak Power Spectral Density, 802.11g 20 MHz



Plot 443. Peak Power Spectral Density, Low Channel, 802.11g 20 MHz

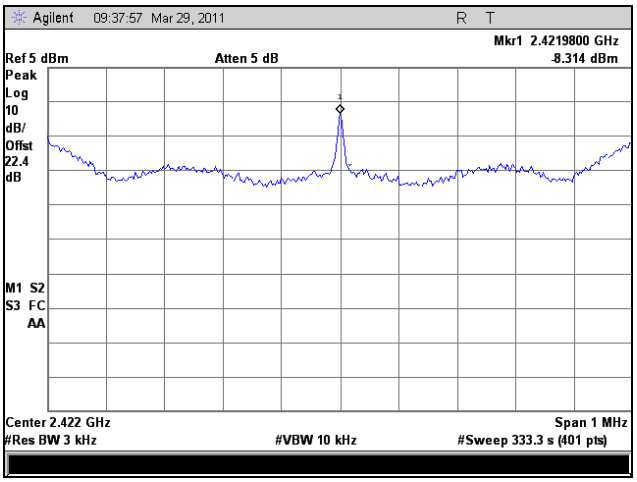


Plot 444. Peak Power Spectral Density, Mid Channel, 802.11g 20 MHz

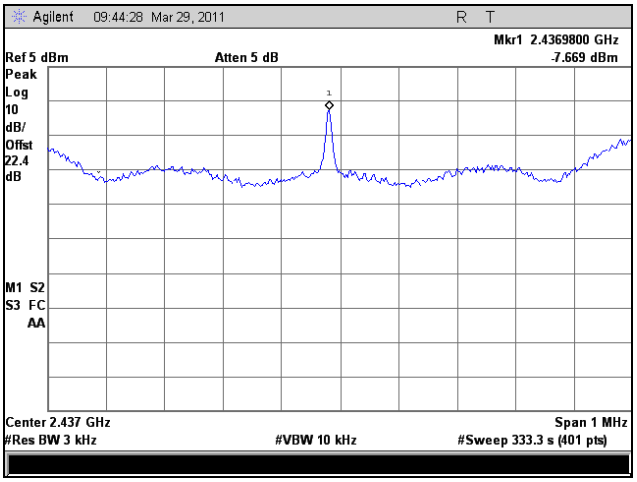


Plot 445. Peak Power Spectral Density, High Channel, 802.11g 20 MHz

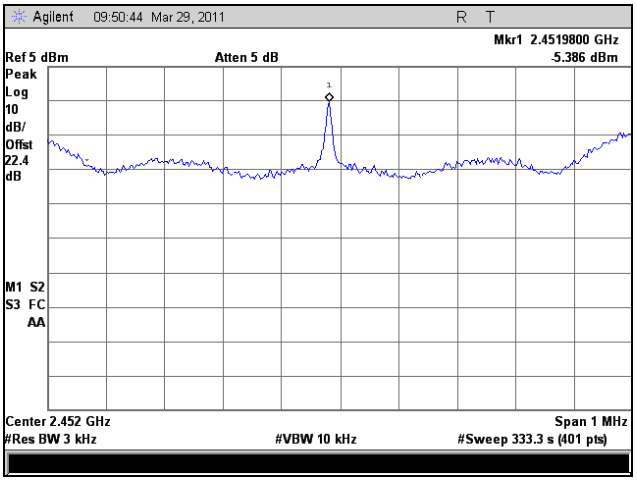
Peak Power Spectral Density, 802.11g 40 MHz



Plot 446. Peak Power Spectral Density, Low Channel, 802.11g 40 MHz

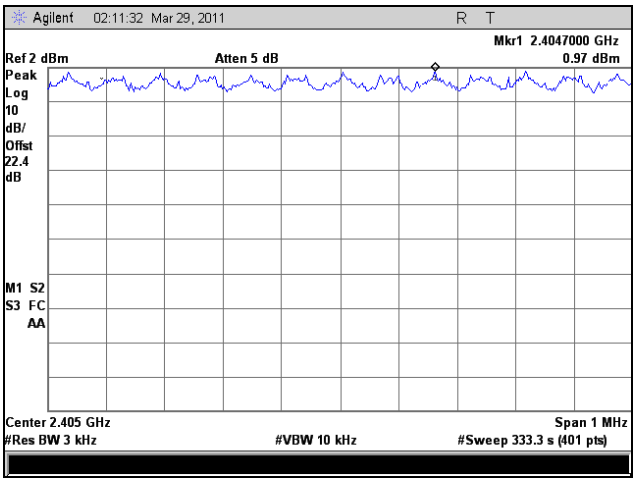


Plot 447. Peak Power Spectral Density, Mid Channel, 802.11g 40 MHz

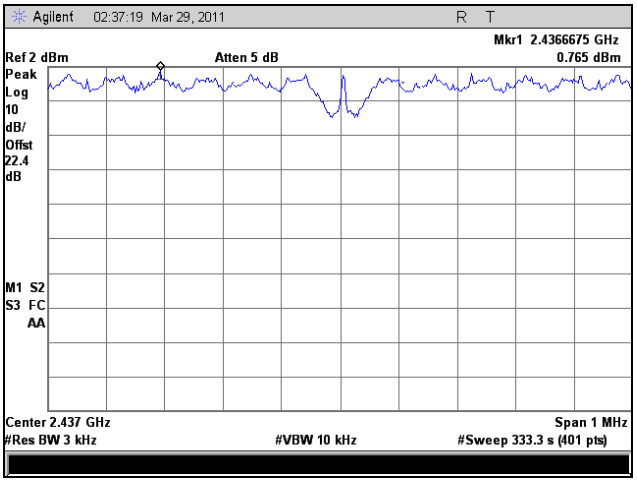


Plot 448. Peak Power Spectral Density, High Channel, 802.11g 40 MHz

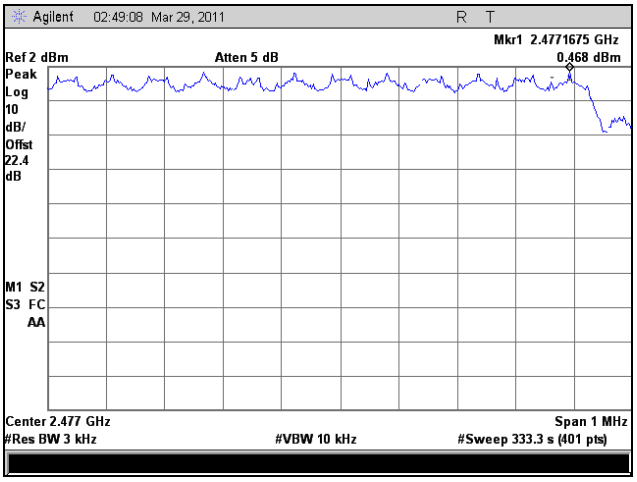
Peak Power Spectral Density, 802.11n HT5, Port 1



Plot 449. Peak Power Spectral Density, Low Channel, 802.11n HT5, Port 1

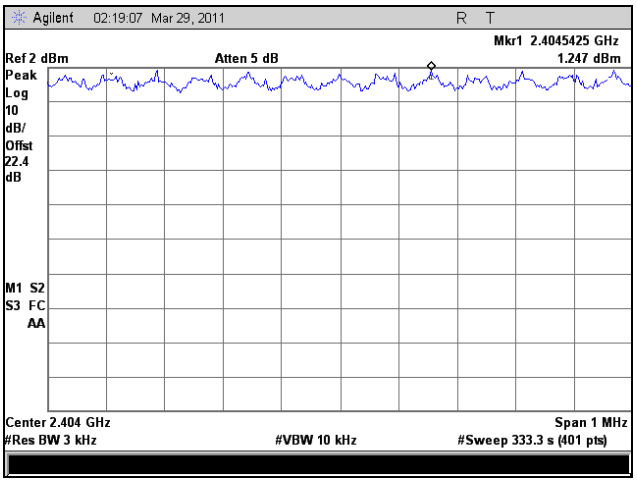


Plot 450. Peak Power Spectral Density, Mid Channel, 802.11n HT5, Port 1

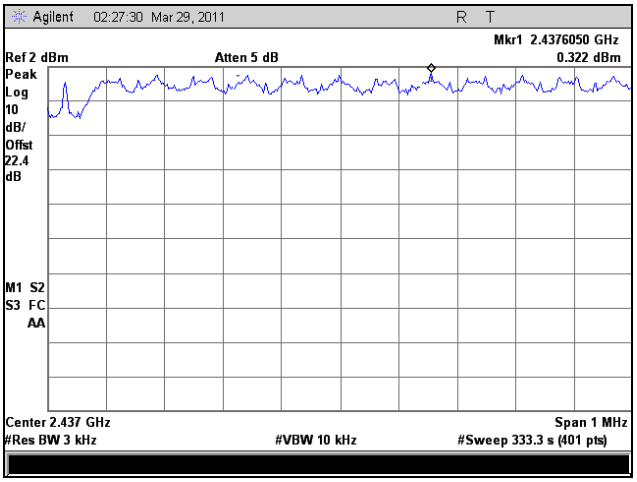


Plot 451. Peak Power Spectral Density, High Channel, 802.11n HT5, Port 1

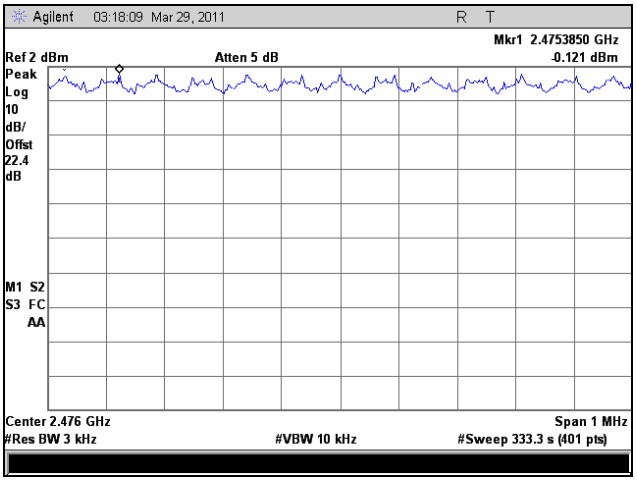
Peak Power Spectral Density, 802.11n HT5, Port 2



Plot 452. Peak Power Spectral Density, Low Channel, 802.11n HT5, Port 2

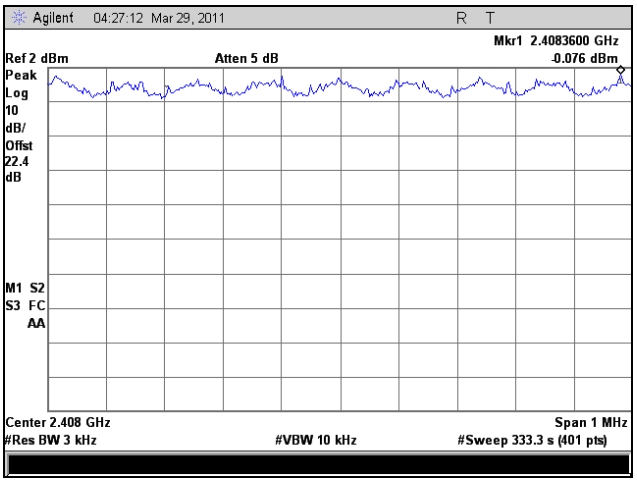


Plot 453. Peak Power Spectral Density, Mid Channel, 802.11n HT5, Port 2

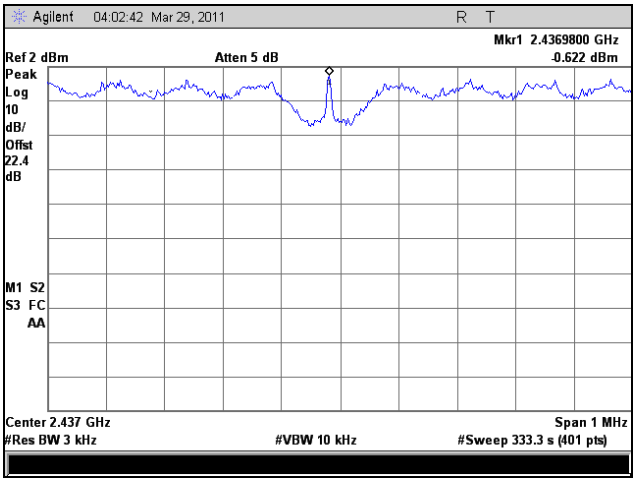


Plot 454. Peak Power Spectral Density, High Channel, 802.11n HT5, Port 2

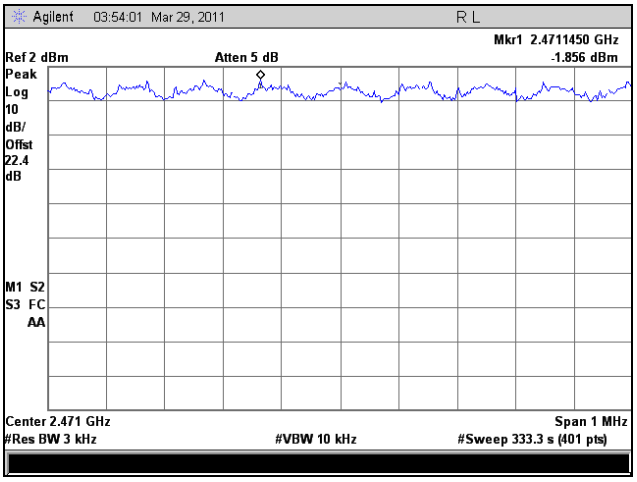
Peak Power Spectral Density, 802.11n HT8, Port 1



Plot 455. Peak Power Spectral Density, Low Channel, 802.11n HT8, Port 1

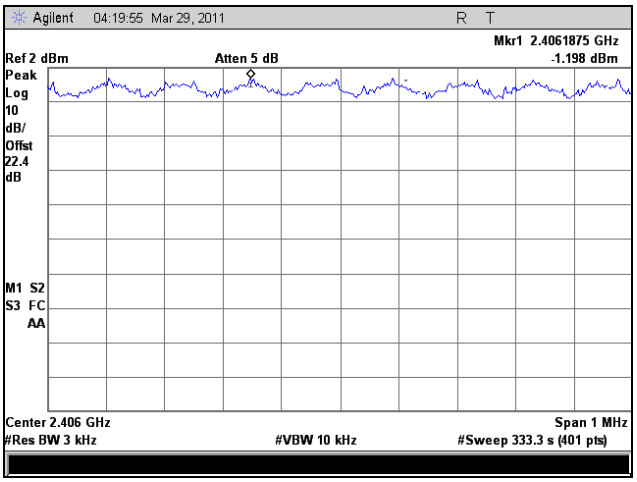


Plot 456. Peak Power Spectral Density, Mid Channel, 802.11n HT8, Port 1

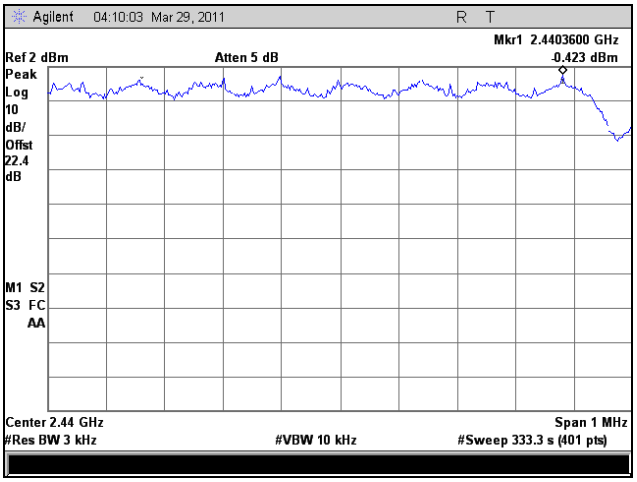


Plot 457. Peak Power Spectral Density, High Channel, 802.11n HT8, Port 1

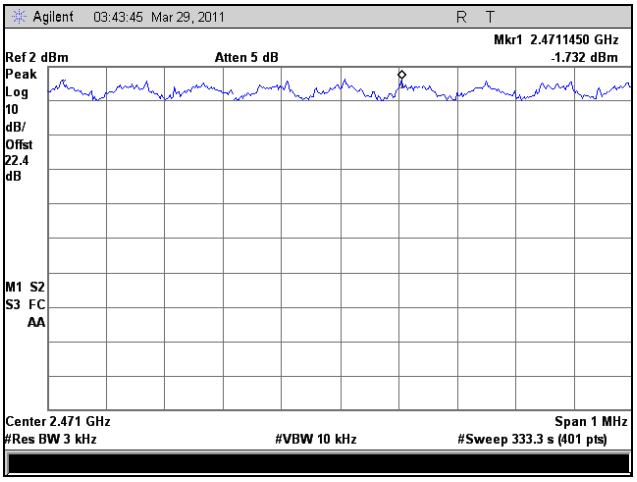
Peak Power Spectral Density, 802.11n HT8, Port 2



Plot 458. Peak Power Spectral Density, Low Channel, 802.11n HT8, Port 2

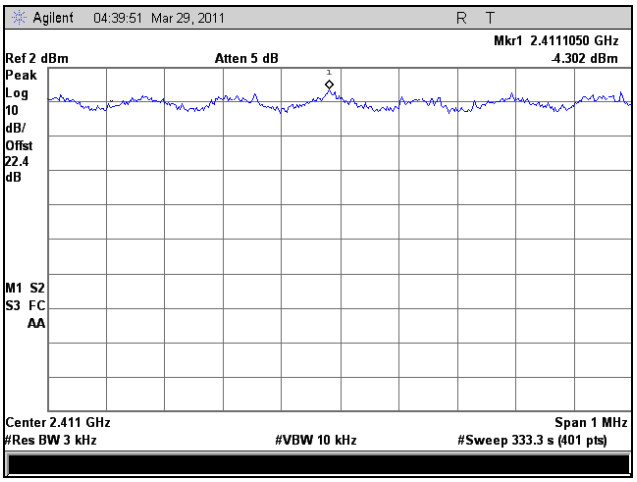


Plot 459. Peak Power Spectral Density, Mid Channel, 802.11n HT8, Port 2

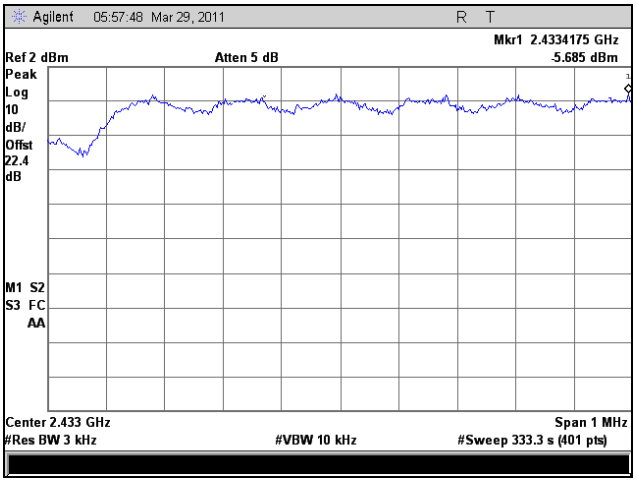


Plot 460. Peak Power Spectral Density, High Channel, 802.11n HT8, Port 2

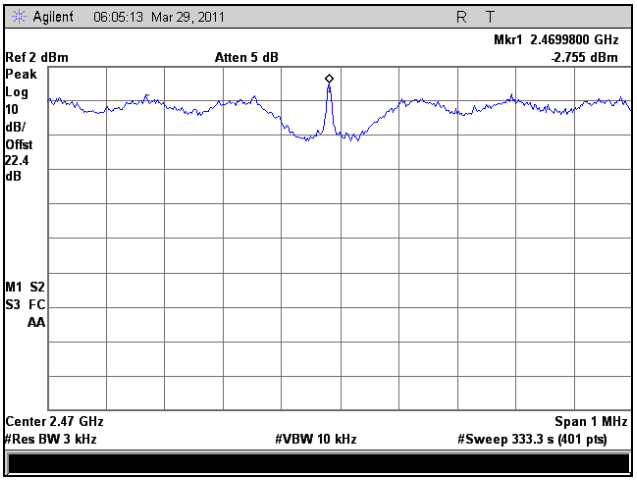
Peak Power Spectral Density, 802.11n HT10, Port 1



Plot 461. Peak Power Spectral Density, Low Channel, 802.11n HT10, Port 1

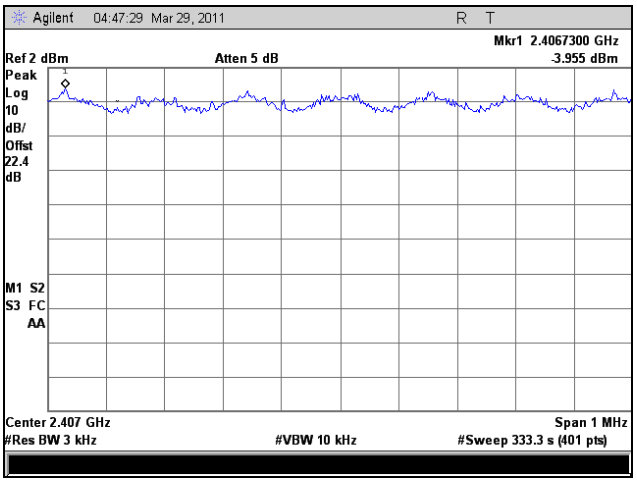


Plot 462. Peak Power Spectral Density, Mid Channel, 802.11n HT10, Port 1

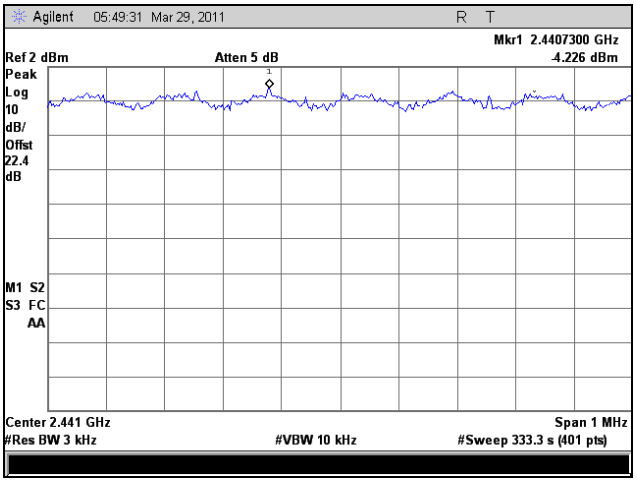


Plot 463. Peak Power Spectral Density, High Channel, 802.11n HT10, Port 1

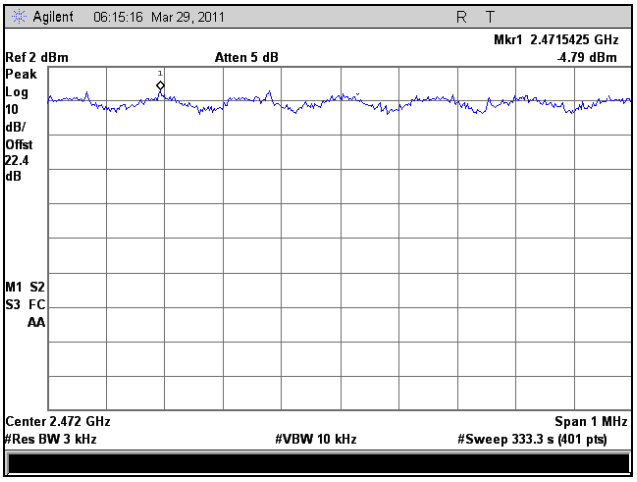
Peak Power Spectral Density, 802.11n HT10, Port 2



Plot 464. Peak Power Spectral Density, Low Channel, 802.11n HT10, Port 2

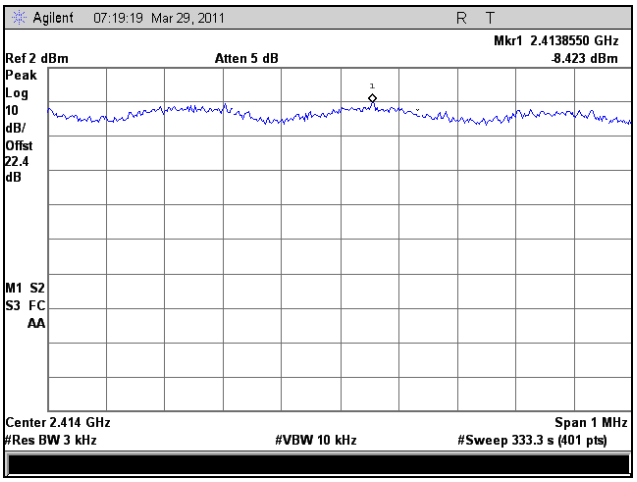


Plot 465. Peak Power Spectral Density, Mid Channel, 802.11n HT10, Port 2

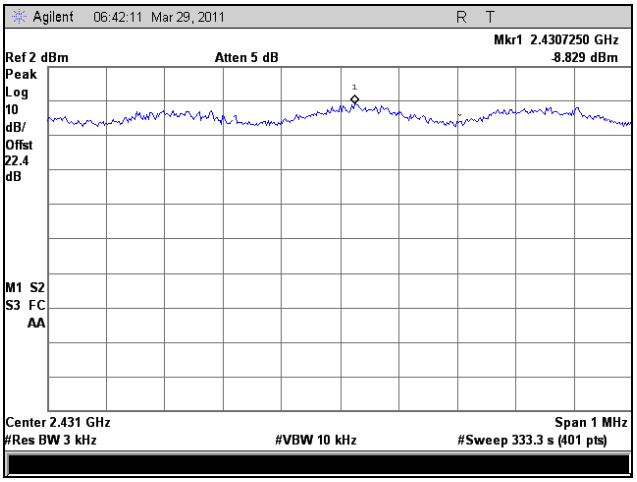


Plot 466. Peak Power Spectral Density, High Channel, 802.11n HT10, Port 2

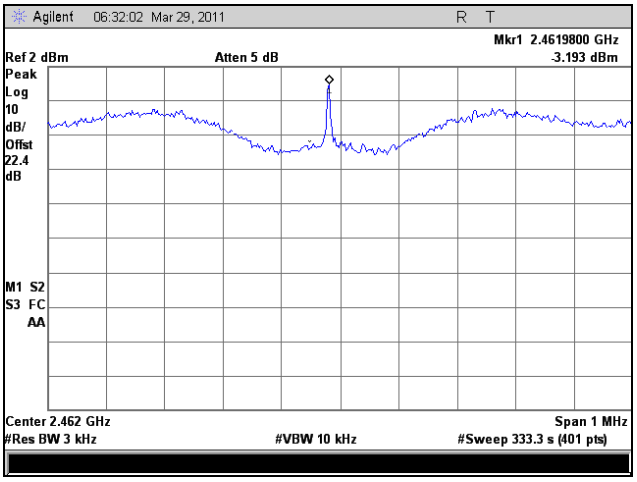
Peak Power Spectral Density, 802.11n HT20, Port 1



Plot 467. Peak Power Spectral Density, Low Channel, 802.11n HT20, Port 1

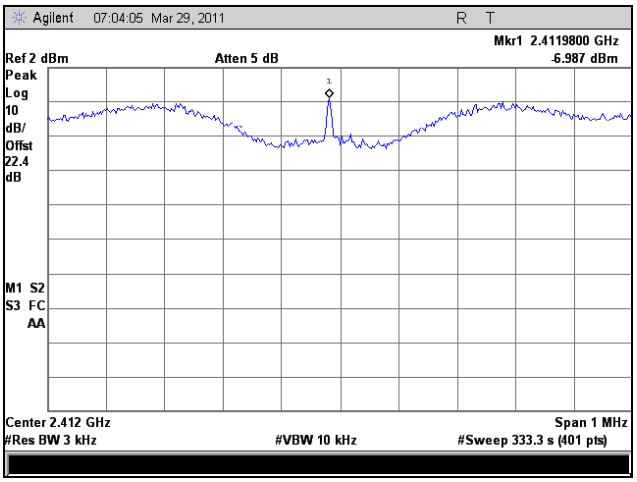


Plot 468. Peak Power Spectral Density, Mid Channel, 802.11n HT20, Port 1

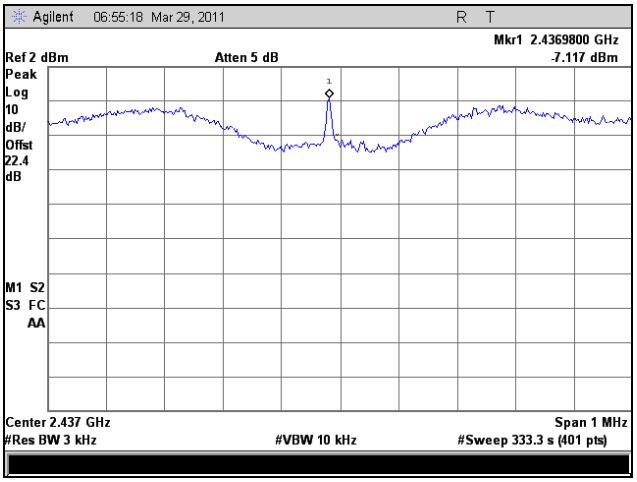


Plot 469. Peak Power Spectral Density, High Channel, 802.11n HT20, Port 1

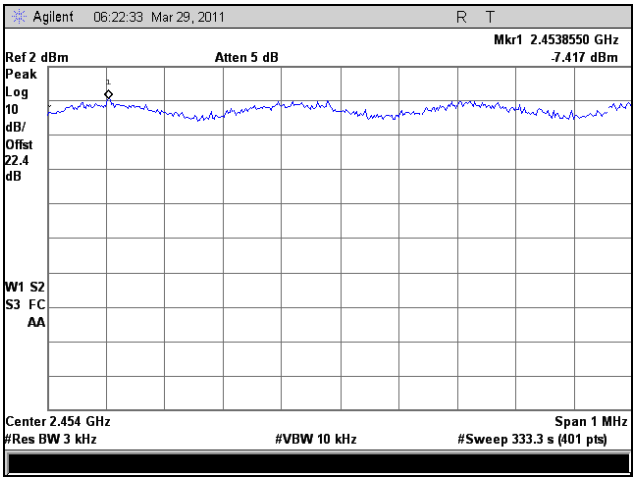
Peak Power Spectral Density, 802.11n HT20, Port 2



Plot 470. Peak Power Spectral Density, Low Channel, 802.11n HT20, Port 2

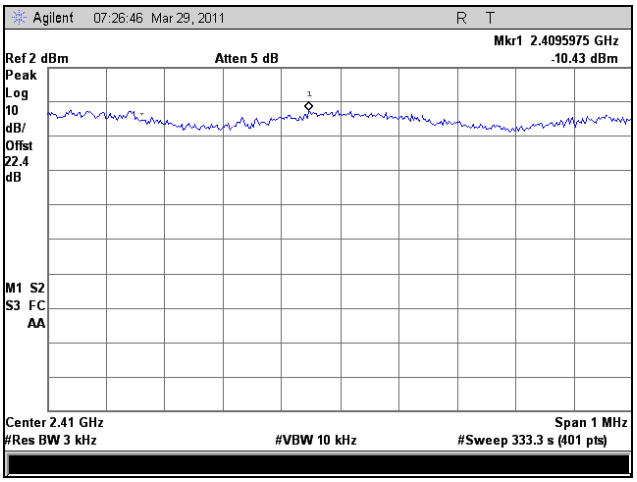


Plot 471. Peak Power Spectral Density, Mid Channel, 802.11n HT20, Port 2

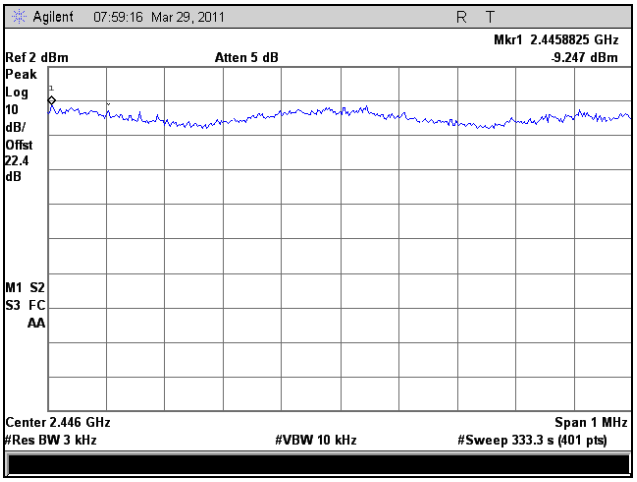


Plot 472. Peak Power Spectral Density, High Channel, 802.11n HT20, Port 2

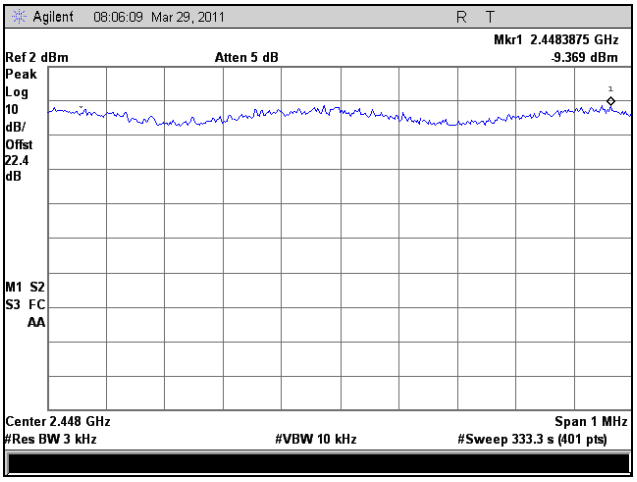
Peak Power Spectral Density, 802.11n HT30, Port 1



Plot 473. Peak Power Spectral Density, Low Channel, 802.11n HT30, Port 1

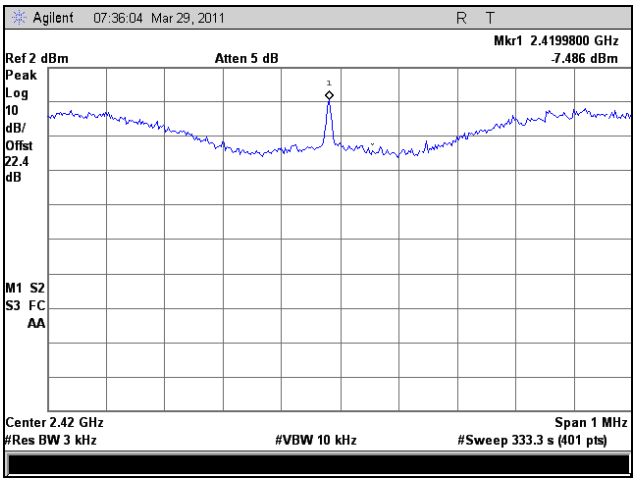


Plot 474. Peak Power Spectral Density, Mid Channel, 802.11n HT30, Port 1

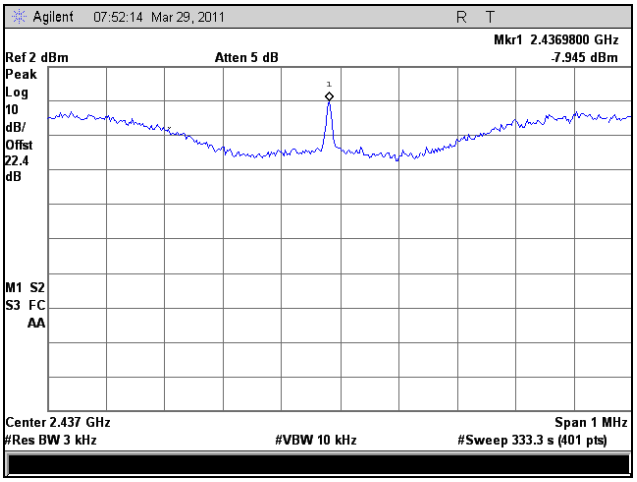


Plot 475. Peak Power Spectral Density, High Channel, 802.11n HT30, Port 1

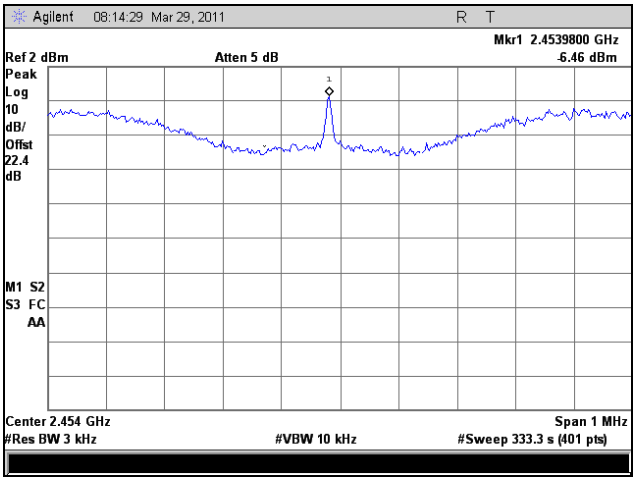
Peak Power Spectral Density, 802.11n HT30, Port 2



Plot 476. Peak Power Spectral Density, Low Channel, 802.11n HT30, Port 2

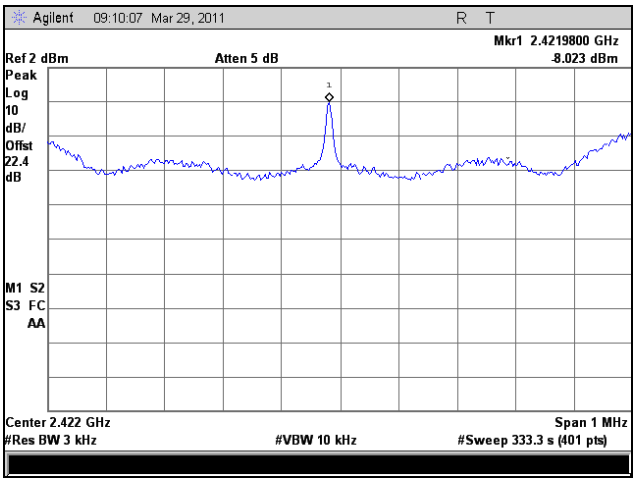


Plot 477. Peak Power Spectral Density, Mid Channel, 802.11n HT30, Port 2

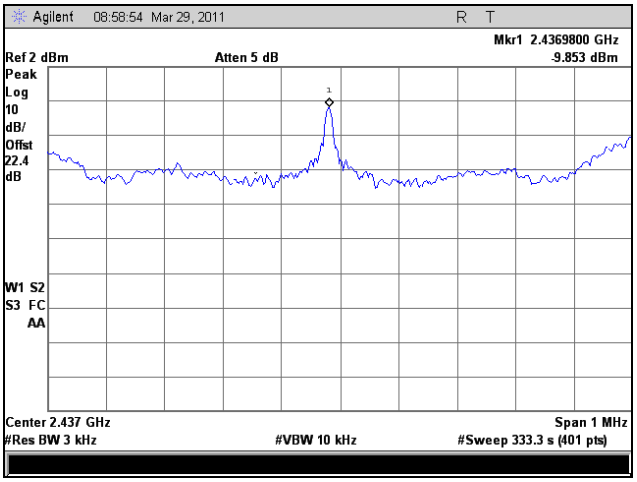


Plot 478. Peak Power Spectral Density, High Channel, 802.11n HT30, Port 2

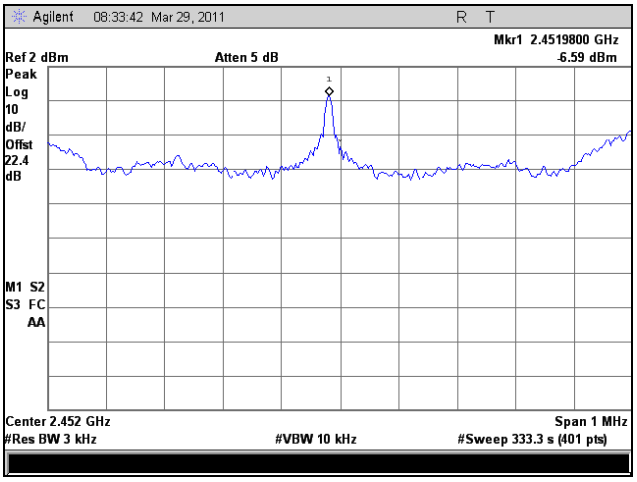
Peak Power Spectral Density, 802.11n HT40, Port 1



Plot 479. Peak Power Spectral Density, Low Channel, 802.11n HT40, Port 1

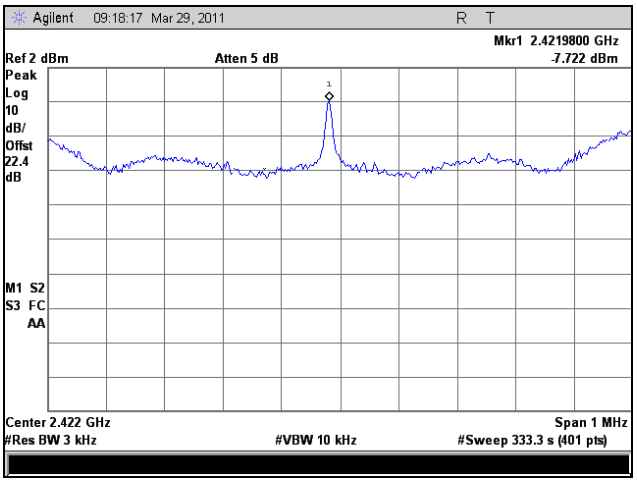


Plot 480. Peak Power Spectral Density, Mid Channel, 802.11n HT40, Port 1

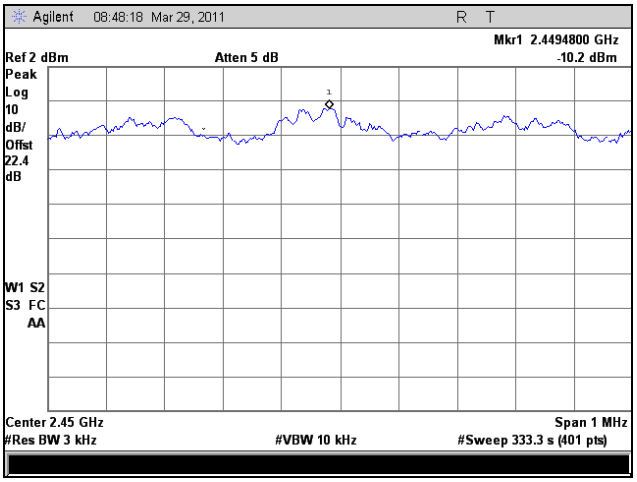


Plot 481. Peak Power Spectral Density, High Channel, 802.11n HT40, Port 1

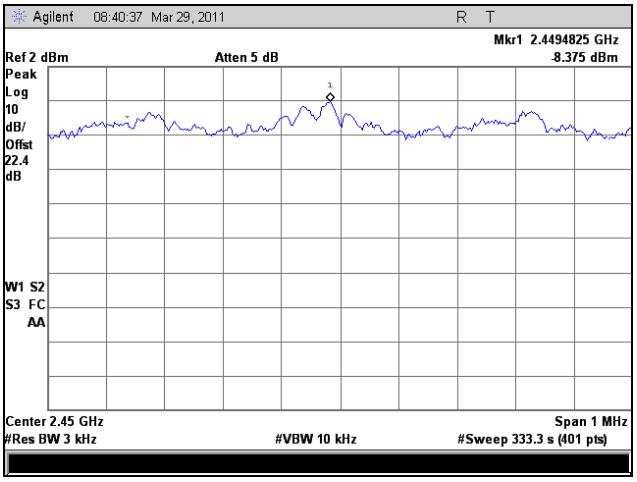
Peak Power Spectral Density, 802.11n HT40, Port 2



Plot 482. Peak Power Spectral Density, Low Channel, 802.11n HT40, Port 2



Plot 483. Peak Power Spectral Density, Mid Channel, 802.11n HT40, Port 2



Plot 484. Peak Power Spectral Density, High Channel, 802.11n HT40, Port 2

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(i) Maximum Permissible Exposure

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

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

MPE Limit Calculation: EUT's operating frequencies @ 2400-2483.5 MHz; highest conducted power = *28.81 dBm* (peak) therefore, **Limit for Uncontrolled exposure: 1 mW/cm^2 or 10 W/m^2**

EUT maximum antenna gain = *11.2 dBi.*

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

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

where, S = Power Density (1 mW/cm^2)
P = Power Input to antenna (760.3mW)
G = Antenna Gain (13.8 numeric)

$R = (760.3*13.8/ 4*3.14*1.0)^{1/2} = (10002.3 / 12.56)^{1/2} = 28.22cm$

Electromagnetic Compatibility Criteria for Intentional Radiators

RSS-GEN Receiver Spurious Emissions Requirements

Test Requirements: The following receiver spurious emission limits shall be complied with:

(a) If a radiated measurement is made, all spurious emissions shall comply with the limits of Table 32.

Spurious Frequency (MHz)	Field Strength (microvolt/m at 3 metres)
30 – 88	100
88 – 216	150
216 – 960	200
Above 960	500

Table 32. Spurious Emission Limits for Receivers

(b) If a conducted measurement is made, no spurious output signals appearing at the antenna terminals shall exceed 2 nanowatts per any 4 kHz spurious frequency in the band 30-1000 MHz, or 5 nanowatts above 1 GHz.

Test Procedures: The EUT was programmed for receive mode only. Conducted measurements were taken at the antenna port of the EUT. 100 kHz resolution bandwidth was used from 30 MHz - 1 GHz and 1 MHz resolution was used for measurements done above 1 GHz. All plots are corrected for cable loss.

Test Results: Equipment is compliant with the Receiver Spurious Emissions Requirements of RSS-GEN.

Test Engineer(s): Anderson Soungpanya

Test Date(s): April 12, 2011

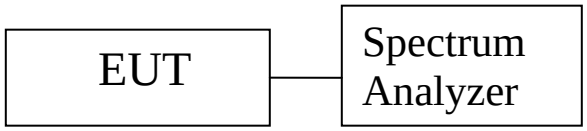
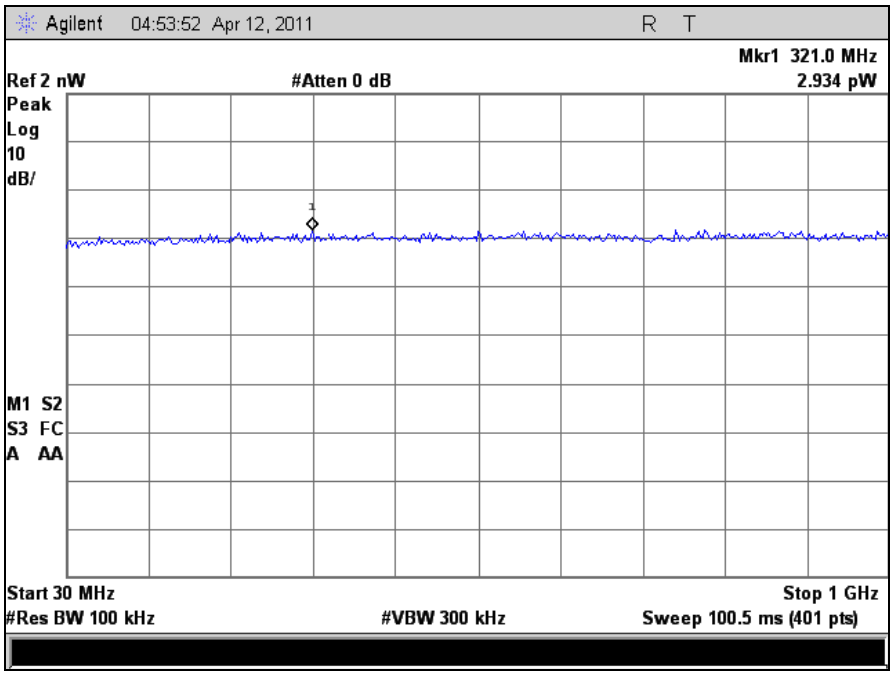
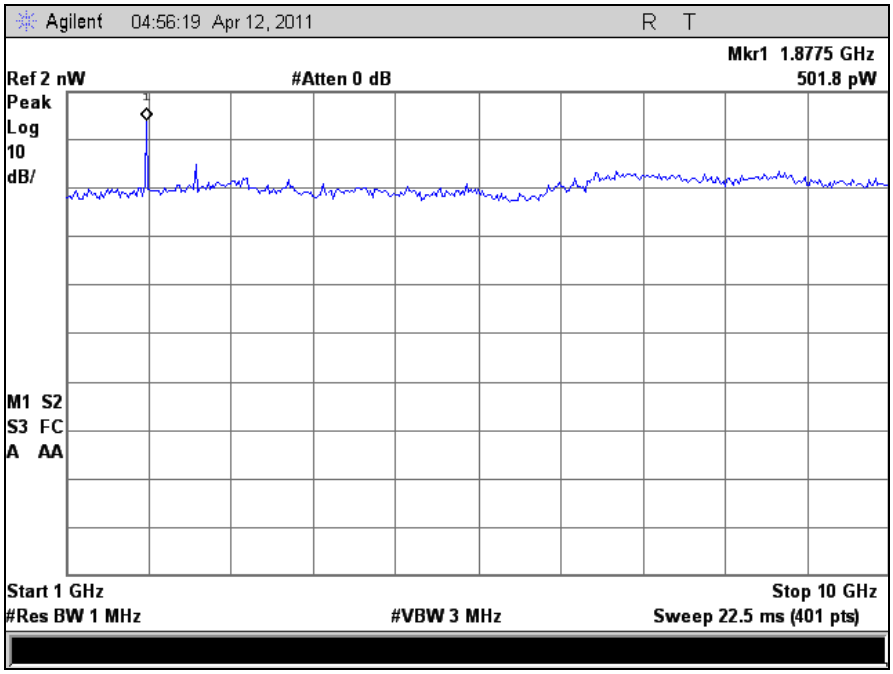


Figure 6. Block Diagram, Conducted Receiver Spurious Emissions Test Setup

Conducted Receiver Spurious Emissions, Port 1

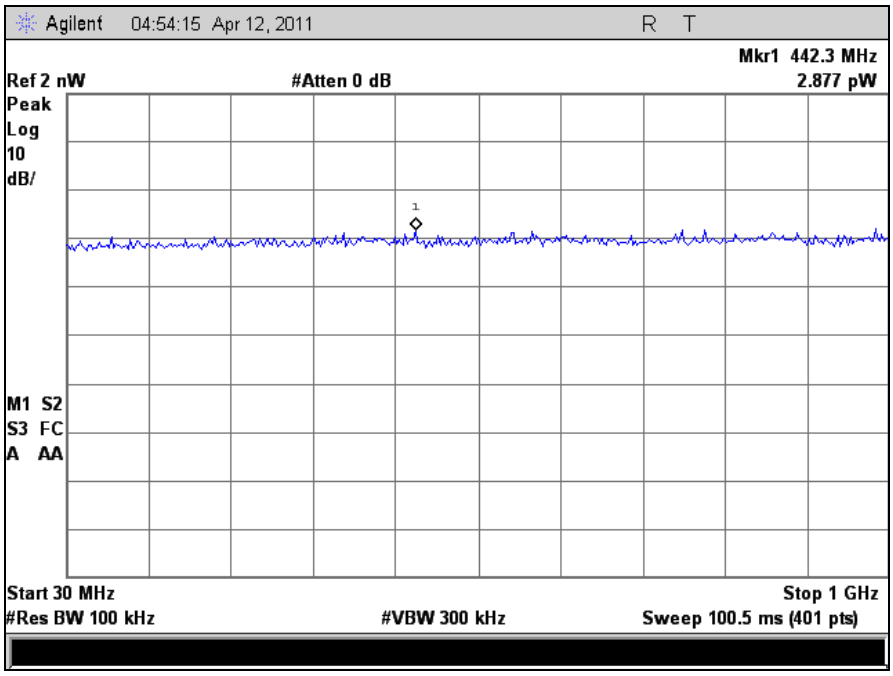


Plot 485. Receiver Spurious Emission, 30 MHz – 1 GHz, Port 1

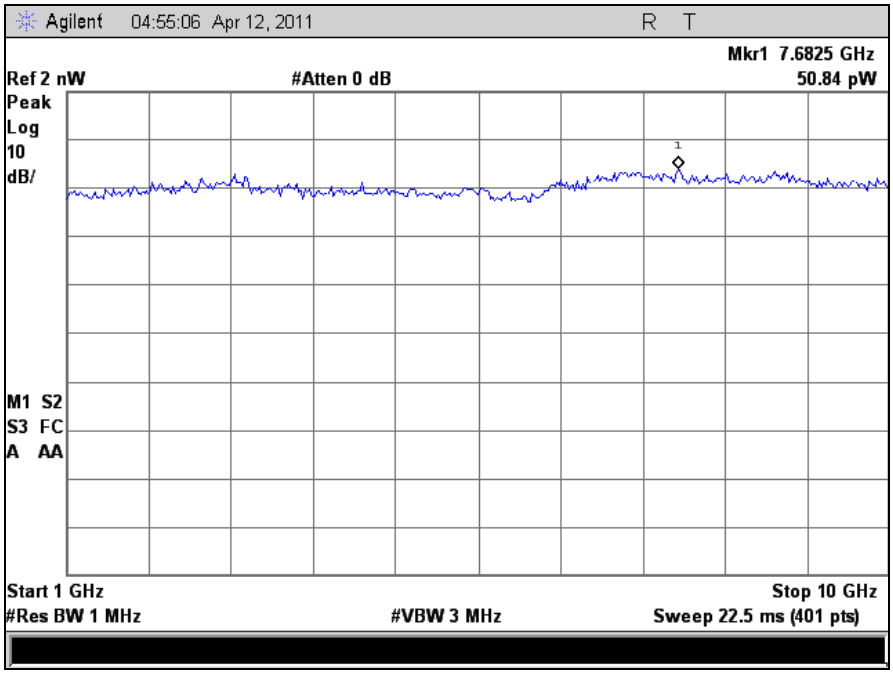


Plot 486. Receiver Spurious Emission, 1 GHz – 10 GHz, Port 1

Conducted Receiver Spurious Emissions, Port 2



Plot 487. Receiver Spurious Emission, 30 MHz – 1 GHz, Port 2



Plot 488. Receiver Spurious Emission, 1 GHz – 10 GHz, Port 2

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
1S2583	SPECTRUM ANALYZER	AGILENT	E4447A	3/18/2011	3/18/2012
1S2678	LISN, DUAL-LINE V-NETWORK	TESEQ	NNB 51	12/1/2010	12/1/2011
1S2399	TURNTABLE CONTROLLER	SUNOL SCIENCE	SC99V	NO CALIBRATION REQUIRED	
1S2481	10M CHAMBER	ETS-LINDGREN	DKE 8X8 DBL	11/6/2010	11/6/2011
1S2482	5 METER CHAMBER	PANASHIELD	641431	11/13/2010	11/13/2011
1S2485	BILOG ANTENNA	TESEQ	CBL6112D	5/7/2010	5/7/2011
1S2499	MULTI DEVICE CONTROLLER	ETS	2090	NO CALIBRATION REQUIRED	
1S2421	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB7	7/6/2010	7/6/2011
1S2460	SPECTRUM ANALYZER	AGILENT	E4407B	7/13/2010	7/13/2011
1S2198	HORN ANTENNA	EMCO	3115	9/22/2010	9/22/2011
N/A	HIGH PASS FILTER	MICRO-TRONICS	HPM13147	SEE NOTE	N/A
1S2521	THERMO-HYGROMETER	FISHER SCIENTIFIC	11-661-7D	12/2/2009	12/2/2011
N/A	DC-18GHZ COMBINER	MINI CIRCUITS	ZFRSC-183-S+	SEE NOTE	N/A
1S2523	PREAMP (1-26.5GHZ)	AGILENT	8449B	SEE NOTE	N/A
1S2128	HARMONIC MIXER	HEWLETT PACKARD	11970A	12/9/2010	12/9/2012
1S2129	HARMONIC MIXER	HEWLETT PACKARD	11970K	12/9/2010	12/9/2012

Table 33. Test Equipment List

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

V. Certification & User's Manual Information

Certification & User's Manual Information

A. Certification Information

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

§ 2.801 Radio-frequency device defined.

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

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

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

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

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

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

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

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

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

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

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

(i) Compliance testing;

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

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

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

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

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

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

Certification & User's Manual Information

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

§ 2.901 Basis and Purpose

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

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

§ 2.907 Certification.

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

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

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

Certification & User's Manual Information

§ 2.948 Description of measurement facilities.

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

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

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

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

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

Certification & User's Manual Information

1. Label and User's Manual Information

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

§ 15.19 Labeling requirements.

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

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

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

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

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

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

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

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

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

§ 15.21 Information to user.

The 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

