MET Laboratories, Inc. *Safety Certification - EMI - Telecom Environmental Simulation*
914 WEST PATAPSCO AVENUE • BALTIMORE, MARYLAND 21230-3432 • PHONE (410) 354-3300 • FAX (410) 354-3313
33439 WESTERN AVENUE • UNION CITY, CALIFORNIA 94587 • PHONE (510) 489-6300 • FAX (510) 489-6372
3162 BELICK STREET • SANTA CLARA, CA 95054 • PHONE (408) 748-3585 • FAX (510) 489-6372
13301 MCCALLEN PASS • AUSTIN, TEXAS 78753 • PHONE (512) 287-2500 • FAX (512) 287-2513

September 20, 2013

Firetide, Inc.
2105 South Bascom Ave., Suite 220
Campbell, CA 95008

Dear Pramod Akkarachittor,

Enclosed is the EMC Wireless test report for compliance testing of the Firetide, Inc., HotPort 5020 Wireless Mesh Node as tested to the requirements of Title 47 of the CFR, Ch. 1 (10-1-06 ed.), Title 47 of the CFR, Part 15, Subpart B and ICES-003, Issue 5 August 2012 for a Class A Digital Device, and Part 15.407 and RSS-210, Issue 8, Dec. 2010 for Intentional Radiators.

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

Sincerely yours,
MET LABORATORIES, INC.

Jennifer Warnell
Documentation Department

Reference: (\Firetide, Inc.\EMCS38293B-FCC407 Rev. 2)

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Electromagnetic Compatibility Criteria
Test Report

for the

Firetide, Inc.
Model HotPort 5020 Wireless Mesh Node

Tested under
the Certification Rules
contained in
Title 47 of the CFR, Part 15, Subpart B & ICES-003
for Class A Digital Devices
and
Title 47 of the CFR, Part 15.407 & RSS-210, Issue 8, Dec. 2010
for Intentional Radiators

MET Report: EMCS38293B-FCC407 Rev. 2

September 20, 2013

Prepared For:

Firetide, Inc.
2105 South Bascom Ave., Suite 220
Campbell, CA 95008

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

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for Intentional Radiators

Aaron Chang, 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 FCC Rules Parts 15B, 15.407 and Industry Canada standards ICES-003, Issue 5 August 2012, RSS-210, Issue 8, Dec. 2010 under normal use and maintenance.

Asad Bajwa,
Director, Electromagnetic Compatibility Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
∅	August 12, 2013	Initial Issue.
1	September 9, 2013	Revised to reflect customer corrections.
2	September 20, 2013	Revised to reflect engineer corrections.

Table of Contents

List of Tables

List of Figures

List of Plots

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
PRF	**P**ulse **R**epetition **F**requency
RF	**R**adio **F**requency
RMS	**R**oot-**M**ean-**S**quare
TWT	**T**raveling **W**ave **T**ube
V/m	**V**olts **per m**eter
VCP	**V**ertical **C**oupling **P**lane

I. Executive Summary

A. Purpose of Test

An EMC evaluation was performed to determine compliance of the Firetide, Inc. HotPort 5020 Wireless Mesh Node, with the requirements of Part 15, §15.407. All references are to the most current version of Title 47 of the Code of Federal Regulations in effect. In accordance with §2.1033, the following data is presented in support of the Certification of the HotPort 5020 Wireless Mesh Node. Firetide, Inc. should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the HotPort 5020 Wireless Mesh Node, has been **permanently** discontinued.

B. Executive Summary

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, §15.407, in accordance with Firetide, Inc., purchase order number 3522. All tests were conducted using measurement procedure ANSI C63.4-2003.

FCC Reference	IC Reference RSS-210 Issue 8: 2010; RSS-GEN Issue 3: 2010	Description	Results
47 CFR Part 15.107 (a)	ICES-003 Issue 5 August 2012	Conducted Emission Limits for a Class A Digital Device	Compliant
47 CFR Part 15.109 (a)	ICES-003 Issue 5 August 2012	Radiated Emission Limits for a Class A Digital Device	Compliant
Title 47 of the CFR, Part 15 §15.203	RSS-GEN 7.1.4	Antenna Requirement	Compliant
Title 47 of the CFR, Part 15 §15.207(a)	RSS-GEN 7.2.2; RSS-210 2.2	Conducted Emission Limits	Compliant
Title 47 of the CFR, Part 15 §15.403 (i)	A8.2	26dB Occupied Bandwidth	Compliant
Title 47 of the CFR, Part 15 §15.407 (a)(3)	A9.2(3)	Conducted Transmitter Output Power	Compliant
Title 47 of the CFR, Part 15 §15.407 (a)(2)	A9.2(3)	Power Spectral Density	Compliant
Title 47 of the CFR, Part 15 §15.407 (a)(6)	A8.2	Peak Excursion	Compliant
Title 47 of the CFR, Part 15 §15.407 (b)(4), (5), (6)	A9.3(4)	Undesirable Emissions (15.205/15.209 - General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Compliant
Title 47 of the CFR, Part 15 §15.407(f)	RSS-GEN	RF Exposure	Compliant
15.407(g)	2.1	Frequency Stability	Compliant
15.407 (h)(1)	A9.4	Transmit Power Control (TPC) and Dynamic Frequency Selection (DFS)	Compliant
15.407 (h)(2)	A9.4	Channel Availability Check Time	Compliant
15.407 (h)(2)(ii)	A9.4	Channel Move Time and Channel Closing Time	Compliant
15.407 (h)(2)(iii)	A9.4	Non-Occupancy Period	Compliant
15.407 (h)(2)(iv)	A9.4	Radar Detection Function of Dynamic Frequency Selection (DFS)	Compliant

Table 1. Executive Summary of EMC Part 15.407 ComplianceTesting

II. Equipment Configuration

A. Overview

MET Laboratories, Inc. was contracted by Firetide, Inc. to perform testing on the HotPort 5020 Wireless Mesh Node, under Firetide, Inc.'s purchase order number 3522.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Firetide, Inc. HotPort 5020 Wireless Mesh Node.

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

Model(s) Tested:	HotPort 5020 Wireless Mesh Node		
Model(s) Covered:	HotPort 5020E, 5020ER, 5020LNK, 5020M		
EUT Specifications:	Primary Power: 120 VAC, 60 Hz		
	FCC ID: REP-5020-1 IC: 4988A-5020		
	Type of Modulations:	OFDM	
	Emission Designators:	D7D	
	Equipment Code:	NII	
	Peak RF Output Power:	**MHz**	**Power**
		5260-5320	20.22 dBm
		5500-5700	20.2 dBm
	EUT Frequency Ranges:	802.11a and 802.11n 20MHz BW 5260 MHz – 5320 MHz 5500 MHz – 5580 MHz 5660 MHz – 5700 MHz 40MHz BW 5270 MHz – 5310 MHz 5510 MHz – 5550 MHz 5670MHz	
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:	Aaron Chang		
Report Date(s):	September 20, 2013		

Table 2. EUT Summary

B. References

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

Table 3. References

C. Test Site

All testing was performed at MET Laboratories, Inc., 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 10 meter semi-anechoic chamber (equivalent to an Open Area Test Site). In accordance with §2.948(a)(3), a complete site description is contained at MET Laboratories.

D. Description of Test Sample

The Firetide, Inc. HotPort 5020 Wireless Mesh Node, Equipment Under Test (EUT), is a member of Firetide's HotPort family of wireless mesh nodes. Firetide mesh network gives you the convenience of a wired-Ethernet switch combined with the flexibility of wireless technology in the 900 MHz, 2.4, 4.9 (public safety), and 5 GHz bands in MIMO environment ,satisfies the demands of high-bandwidth/low-latency applications, such as video, voice, and data.

The HotPort 5020 powered using external AC-PoE power adapter which operates from 100~230V and provides 56 VDC output to the EUT. The EUT may alternatively be powered by an external AC-DC power adapter which operates from 100~230V and provides 15 VDC output to the EUT.

E. Equipment Configuration

All cards, racks, etc., incorporated as part of the EUT is included in the following list.

Ref. ID	Slot #	Name / Description	Model Number	Part Number	Serial Number	Rev. #
A	Chassis	Wireless Mesh Node	HotPort 5020	130-0094-001	WV6011235503291	1
B	N/A	External DC Adapter	HON-KWANG	HK-D532-A16	K0000003353	--
C	N/A	PoE Adapter	Phihong	POE30U-560(G)	P15000113D1	--

Table 4. Equipment Configuration

F. Support Equipment

Firetide, Inc. supplied support equipment necessary for the operation and testing of the HotPort 5020 Wireless Mesh Node. All support equipment supplied is listed in the following Support Equipment List.

Ref. ID	Name / Description	Manufacturer	Model Number	Customer Supplied Calibration Data
D	Laptop	Sony	N/A	N/A

Table 5. Support Equipment

G. Ports and Cabling Information

Ref. ID	Port name on EUT	Cable Description or reason for no cable	Qty.	Length as tested (m)	Max Length (m)	Shielded (Y/N)	Termination Box ID & Port Name
E	Ethernet Port	RJ45	1	5	>100	N	RJ45 Port and Cable
F	DC Power Input Port	6-PIN DIN Cable	1	8	>100	Y	DC Power Source

Table 6. Ports and Cabling Information

H. Mode of Operation

Once the DC power is applied to the EUT, an LED indicates to mention that the unit is powered on properly. Proper IP address should be set in the PC prior to the Ethernet cable connection. The Ethernet connectivity needs to be made by connecting an Ethernet cable. Once the connection is established, you can verify this in the PC's LAN connectivity status. Proper IP address should be set in the PC prior to the Ethernet cable connection. Both the radios will be disabled.

I. Method of Monitoring EUT Operation

HotPort5020 will be used for wireless mesh node application and all the 5020 nodes connectivity will be monitored using a common server (PC or Laptop). The link connectivity can always be verified using the Firetide provided Software which will run on server PC or Laptop. If some connectivity is broken then we can verify this with Firetide software running on the server then we can take necessary action accordingly.

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 Firetide, Inc. upon completion of testing.

III. Electromagnetic Compatibility Criteria for Unintentional Radiators

Electromagnetic Compatibility Criteria

§ 15.107 Conducted Emissions Limits

Test Requirement(s):

15.107 (a) Except for Class A digital devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in Table 7. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.

15.107 (b) For a Class A digital device that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in Table 7. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals. The lower limit applies at the band edges.

Frequency range (MHz)	Class A Conducted Limits (dBµV)		*Class B Conducted Limits (dBµV)	
	Quasi-Peak	Average	Quasi-Peak	Average
* 0.15- 0.45	79	66	66 - 56	56 - 46
0.45 - 0.5	79	66	56	46
0.5 - 30	73	60	60	50
Note 1 — The lower limit shall apply at the transition frequencies. Note 2 — The limit decreases linearly with the logarithm if the frequency in the range 0.15 MHz to 0.5 MHz. * -- Limits per Subsection 15.207(a).				

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

Test Procedures:

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

Test Results:

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

Test Engineer(s):

Joseph Mendoza

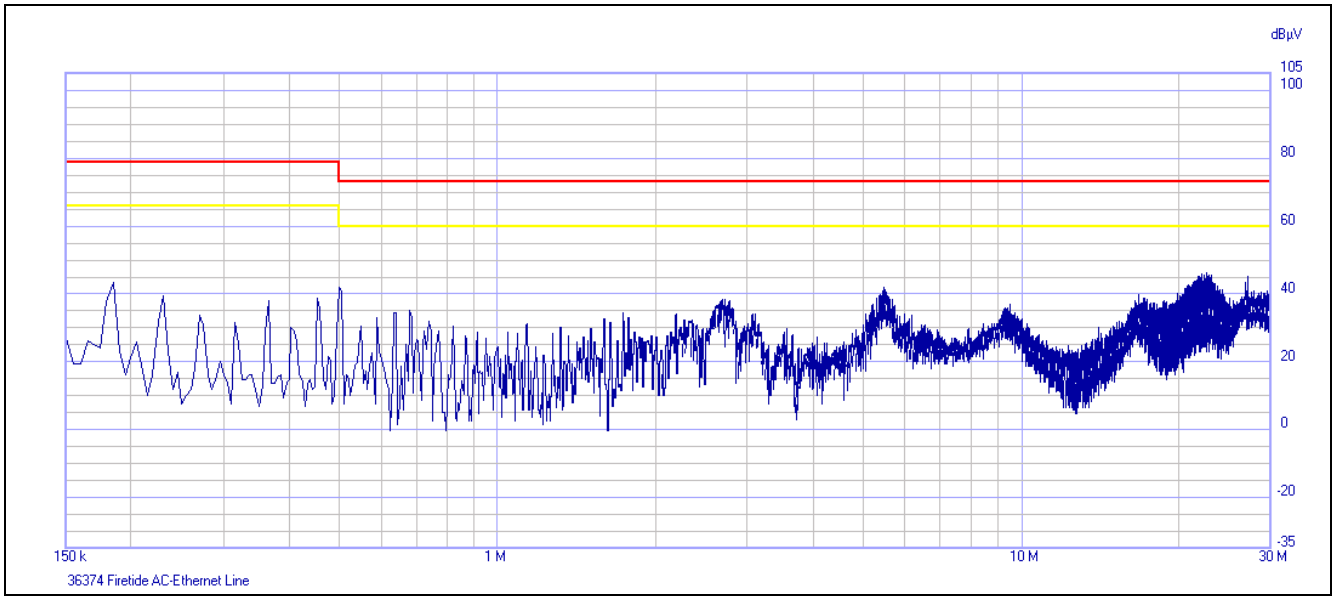
Test Date(s):

10/5/2012 & 10/10/2012

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

Freq. (MHz)	QP Amplitude	QP Limit	Delta	Results	Average Amplitude	Average Limit	Delta	Results
.185	42.47	79	-36.53	Pass	39.89	66	-26.11	Pass
.5	41.38	73	-31.62	Pass	39.78	60	-20.22	Pass
2.66	35.43	73	-37.57	Pass	29.83	60	-30.17	Pass
5.455	43.35	73	-29.65	Pass	24.52	60	-35.48	Pass
22.405	43	73	-30	Pass	37.97	60	-22.03	Pass
27	45.54	73	-27.46	Pass	42.68	60	-17.32	Pass

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

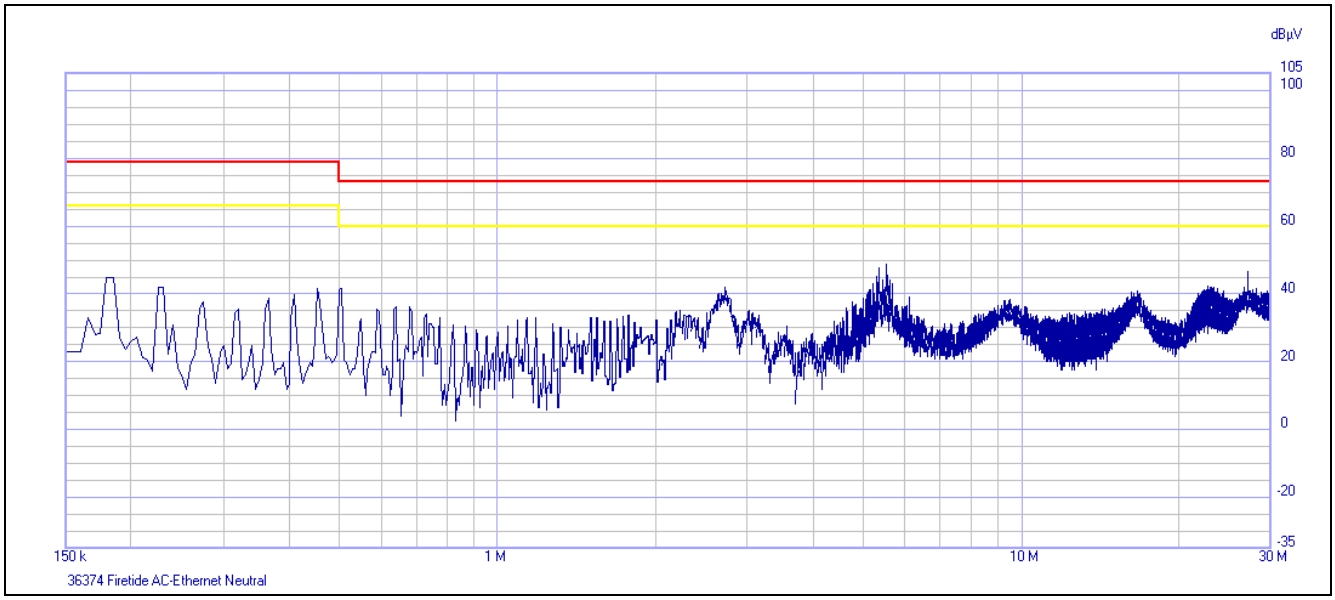


Plot 1. Conducted Emissions, Phase Line, PoE Adapter

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

Freq. (MHz)	QP Amplitude	QP Limit	Delta	Results	Average Amplitude	Average Limit	Delta	Results
.18	43.49	79	-35.51	Pass	41.78	66	-24.22	Pass
.455	40.05	79	-38.95	Pass	38.81	66	-27.19	Pass
1.23	32.48	73	-40.52	Pass	30.37	60	-29.63	Pass
2.71	36.1	73	-36.9	Pass	30.34	60	-29.66	Pass
5.515	40.97	73	-32.03	Pass	34.75	60	-25.25	Pass
27	45.62	73	-27.38	Pass	43	60	-17	Pass

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

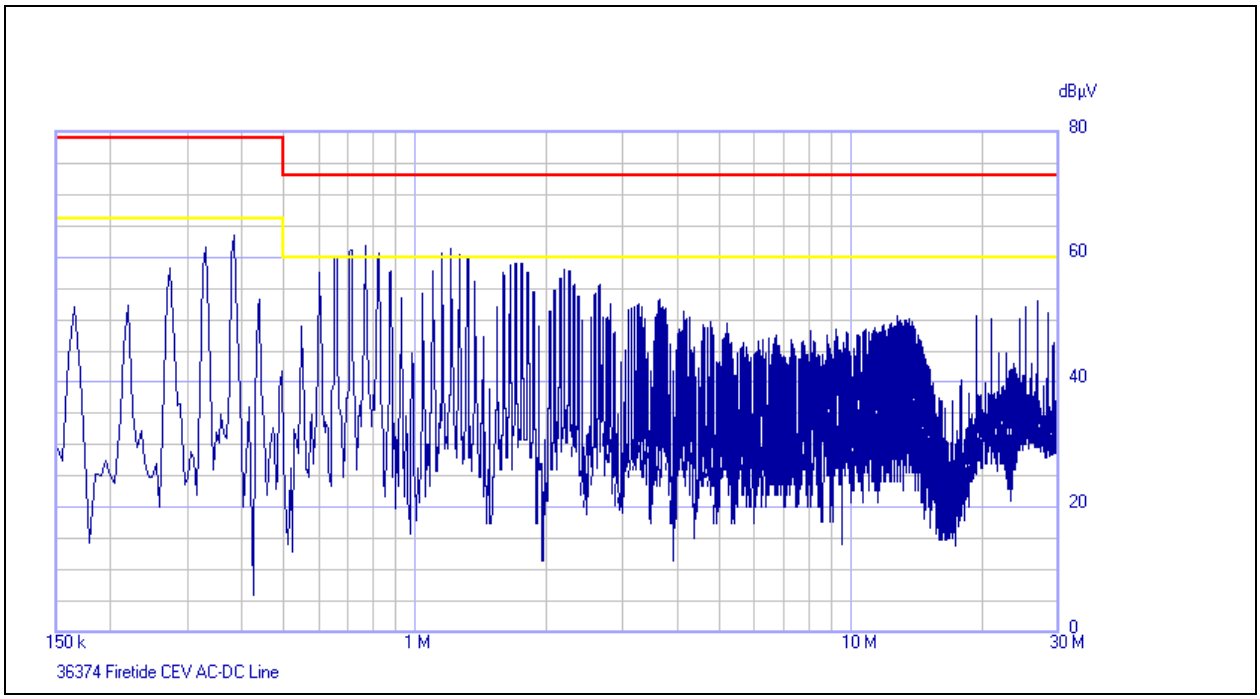


Plot 2. Conducted Emissions, Neutral Line, PoE Adapter

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

Freq. (MHz)	QP Amplitude	QP Limit	Delta	Results	Average Amplitude	Average Limit	Delta	Results
.33	61.46	79	-17.54	Pass	58.64	66	-7.36	Pass
.385	62.88	79	-16.12	Pass	60.08	66	-5.92	Pass
.715	60.61	73	-12.39	Pass	57.39	60	-2.61	Pass
.77	61.16	73	-11.84	Pass	58.08	60	-1.92	Pass
.825	59.92	73	-13.08	Pass	56.94	60	-3.06	Pass
1.15	60.26	73	-12.74	Pass	57.14	60	-2.86	Pass
1.205	60.88	73	-12.12	Pass	57.86	60	-2.14	Pass
1.26	59.98	73	-13.02	Pass	56.97	60	-3.03	Pass

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

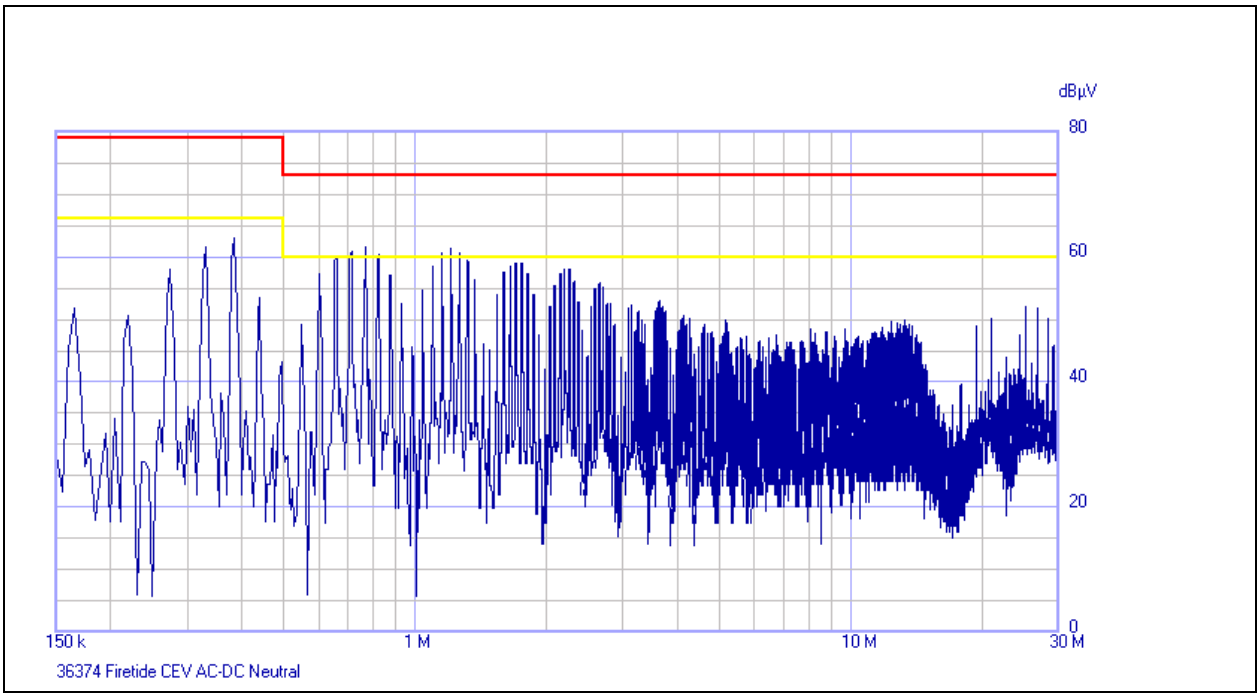


Plot 3. Conducted Emissions, Phase Line, DC Adapter

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

Freq. (MHz)	QP Amplitude	QP Limit	Delta	Results	Average Amplitude	Average Limit	Delta	Results
.33	61.4	79	-17.6	Pass	58.67	66	-7.33	Pass
.385	62.71	79	-16.29	Pass	59.93	66	-6.07	Pass
.715	60.55	73	-12.45	Pass	57.66	60	-2.34	Pass
.77	61.04	73	-11.96	Pass	58.02	60	-1.98	Pass
.825	60.55	73	-12.45	Pass	57.62	60	-2.38	Pass
1.15	60.41	73	-12.59	Pass	57.33	60	-2.67	Pass
1.205	60.74	73	-12.26	Pass	57.77	60	-2.23	Pass
1.26	59.75	73	-13.25	Pass	56.81	60	-3.19	Pass

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



Plot 4. Conducted Emissions, Neutral Line, DC Adapter

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.

Emissions measured at 3m were normalized using an inverse proportionality factor of 20dB per decade for comparison to the 10 m limit.

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

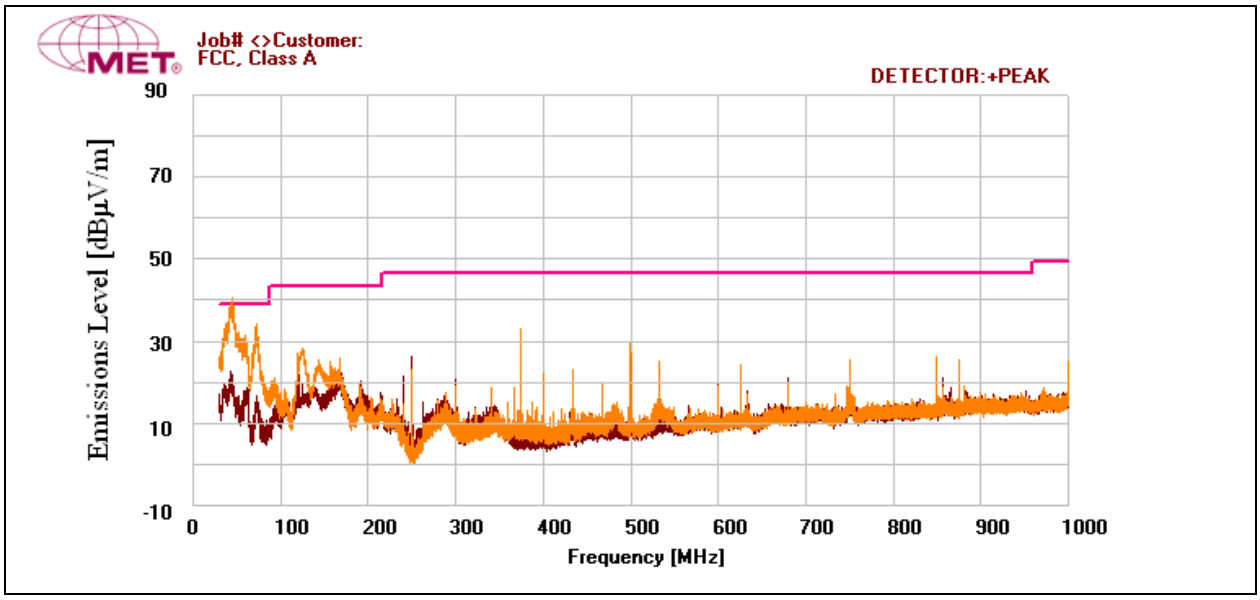
Test Engineer(s): Joseph Mendoza

Test Date(s): 10/5/2012 & 10/10/2012

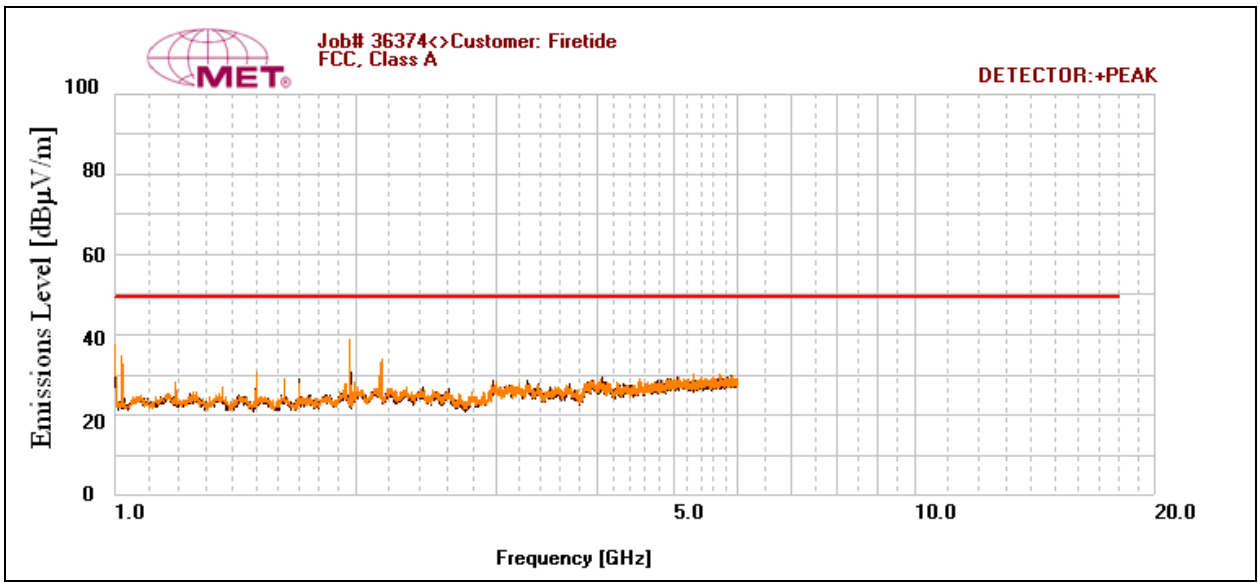
Radiated Emissions Limits Test Results, Class A

Frequency (MHz)	Antenna Polarity	EUT Azimuth (Degrees)	Antenna Height (cm)	Uncorrected Amplitude (dBµV)	ACF (dB/m)	Pre Amp Gain (dB)	CBL (dB)	DCF (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
44.368	V	316	99	33.689	11.39	0	0.639	-10.46	35.258	39	-3.742
249.99	H	360	99	22.667	12.3	0	1.31	-10.46	25.817	46.4	-20.583
374.981	V	348	99	23.538	16.199	0	1.77	-10.46	31.047	46.4	-15.353
499.989	V	166	99	18.1	18.5	0	2.11	-10.46	28.25	46.4	-18.15
750.015	V	79	99	9.336	21.499	0	2.63	-10.46	23.005	46.4	-23.395
849.99	V	216	100	10.141	22.899	0	2.73	-10.46	25.31	46.4	-21.09
1000	V	205	100	74.74	22.075	56.682	4.513	-10.46	34.186	49.5	-15.314
1020	V	204	100	73.94	22.517	57.815	4.604	-10.46	32.786	49.5	-16.714
1962	V	267	100	74.48	27.906	62.194	7.888	-10.46	37.62	49.5	-11.88

Table 13. Radiated Emissions Limits, Test Results, 30 MHz – 6 GHz, FCC Limits, PoE Adapter



Plot 5. Radiated Emissions, 30 MHz - 1 GHz, FCC Limits, PoE Adapter



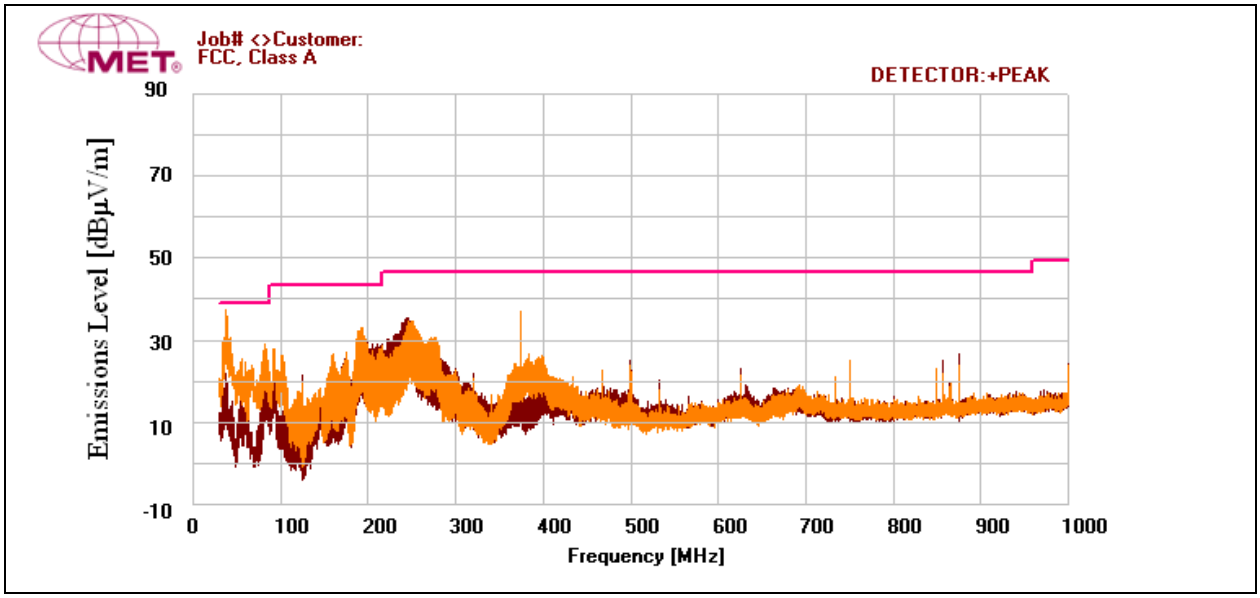
Plot 6. Radiated Emissions, Above 1 GHz, FCC Limits, PoE Adapter

Radiated Emissions Limits Test Results, Class A

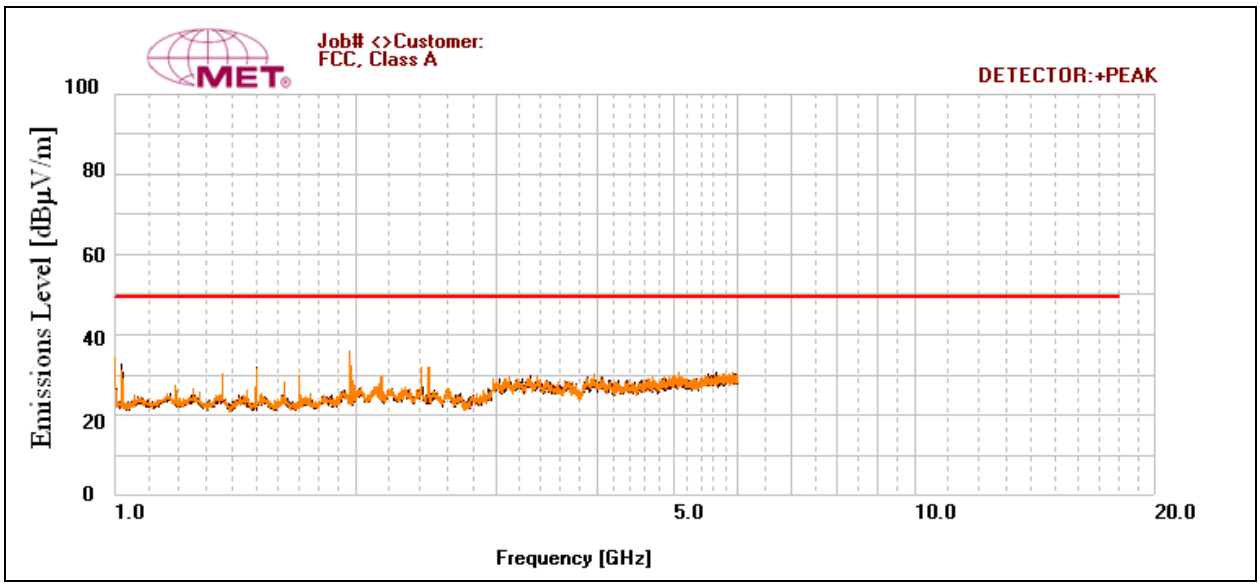
Frequency (MHz)	Antenna Polarity	EUT Azimuth (Degrees)	Antenna Height (cm)	Uncorrected Amplitude (dBµV)	ACF (dB/m)	Pre Amp Gain (dB)	CBL (dB)	DCF (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
*37.857	V	277	100	31.731	14.372	0	0.659	-10.46	36.302	39	-2.698
245.054	H	195	99	30.1	12.201	0	1.306	-10.46	33.147	46.4	-13.253
374.988	V	189	122	29.124	16.2	0	1.77	-10.46	36.634	46.4	-9.766
499.993	H	19	99	17.137	18.5	0	2.11	-10.46	27.287	46.4	-19.113
750.012	V	149	100	11.435	21.5	0	2.63	-10.46	25.105	46.4	-21.295
875.003	H	146	99	11.299	22.7	0	2.84	-10.46	26.379	46.4	-20.021
1000	V	143	187	71.18	22.075	56.682	4.513	-10.46	30.626	49.5	-18.874
1020	H	167	108	74.85	22.507	57.815	4.604	-10.46	33.686	49.5	-15.814
1962	V	343	187	71.95	27.906	62.194	7.888	-10.46	35.09	49.5	-14.41

Table 14. Radiated Emissions Limits, Test Results, 30 MHz – 6 GHz, FCC Limits, DC Adapter

Note: * - At this frequency, the measured electric-field strength exhibits a margin of compliance that is less than 3 dB below the specification limit. We recommend that every emission measured, have at least a 3 dB margin to allow for deviations in the emission characteristics that may occur during the production process.



Plot 7. Radiated Emissions, 30 MHz - 1 GHz, FCC Limits, DC Adapter



Plot 8. Radiated Emissions, Above 1 GHz, FCC Limits, DC Adapter

Radiated Emissions Limits Test Results, Class A

Frequency (MHz)	Antenna Polarity	EUT Azimuth (Degrees)	Antenna Height (cm)	Uncorrected Amplitude (dBµV)	ACF (dB/m)	CBL (dB)	DCF (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
44.368	V	316	1.00	33.69	11.39	0.64	10.46	35.26	40.00	-4.74
374.981	V	348	1.00	23.54	16.20	1.77	10.46	31.05	47.00	-15.95
249.99	H	360	1.00	22.67	12.30	1.31	10.46	25.82	47.00	-21.18
499.989	V	166	1.00	18.10	18.50	2.11	10.46	28.25	47.00	-18.75
750.015	V	79	1.00	9.34	21.50	2.63	10.46	23.01	47.00	-24.00
849.99	V	216	1.00	10.14	22.90	2.73	10.46	25.31	47.00	-21.69

Table 15. Radiated Emissions Limits, Test Results, ICES-003 Limits, PoE Adapter

Frequency (MHz)	Antenna Polarity	EUT Azimuth (Degrees)	Antenna Height (cm)	Uncorrected Amplitude (dBµV)	ACF (dB/m)	CBL (dB)	DCF (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
37.857	V	277	100.00	31.73	14.37	0.66	10.46	36.30	40.00	-3.70
245.054	H	195	99.00	30.10	12.20	1.31	10.46	33.15	47.00	-13.85
374.988	V	189	122.00	29.12	16.20	1.77	10.46	36.63	47.00	-10.37
499.993	H	19	99.00	17.14	18.50	2.11	10.46	27.29	47.00	-19.71
750.012	V	149	100.00	11.44	21.50	2.63	10.46	25.11	47.00	-21.90
875.003	H	146	99.00	11.30	22.70	2.84	10.46	26.38	47.00	-20.62

Table 16. Radiated Emissions Limits, Test Results, ICES-003 Limits, DC Adapter

IV. Electromagnetic Compatibility Criteria for Intentional Radiators

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.203 Antenna Requirement

Test Requirement: **§ 15.203:** An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

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

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

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

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

Results: The EUT as tested is compliant the criteria of §15.203. The unit will be professionally installed.

Test Engineer(s): Aaron Chang

Test Date(s): 5/26/13

Gain/Type	Model	Manufacturer
5dBi Omni (2.4GHz)	C812-510010-A	WHA YU INDUSTRIAL CO. LTD.
5dBi Omni (5GHz)	C812-510012-A	WHA YU INDUSTRIAL CO. LTD.
19dBi Panel (5GHz)	MA-WA55-MIMO	MARS ANTENNAS & RF Systems LTD

Table 17. Antenna Information

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.207 Conducted Emissions Limits

Test Requirement(s): **§ 15.207 (a):** For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 Σ line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency range (MHz)	§ 15.207(a), Conducted Limit (dBμV)	
	Quasi-Peak	Average
* 0.15- 0.45	66 - 56	56 - 46
0.45 - 0.5	56	46
0.5 - 30	60	50

Table 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 semi-anechoic chamber. The EUT was situated such that the back of the EUT was 0.4 m from one wall of the vertical ground plane, and the remaining sides of the EUT were no closer than 0.8 m from any other conductive surface. The EUT was powered from a 50 Ω/50 μH Line Impedance Stabilization Network (LISN). The EMC receiver scanned the frequency range from 150 kHz to 30 MHz. Conducted Emissions measurements were made in accordance with *ANSI C63.4-1992 "Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40 GHz"*. The measurements were performed over the frequency range of 0.15 MHz to 30 MHz using a 50 Ω/50 μH LISN as the input transducer to an EMC/field intensity meter.

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

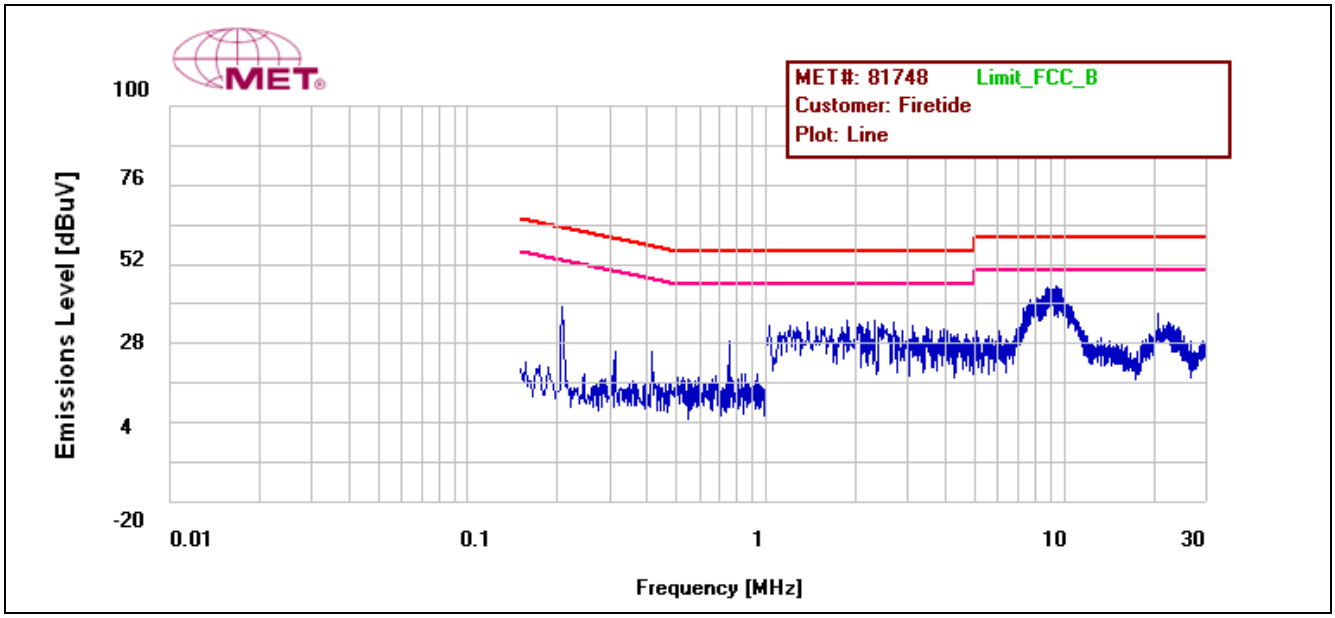
Test Engineer(s): Minh Ly

Test Date(s): 08/17/09

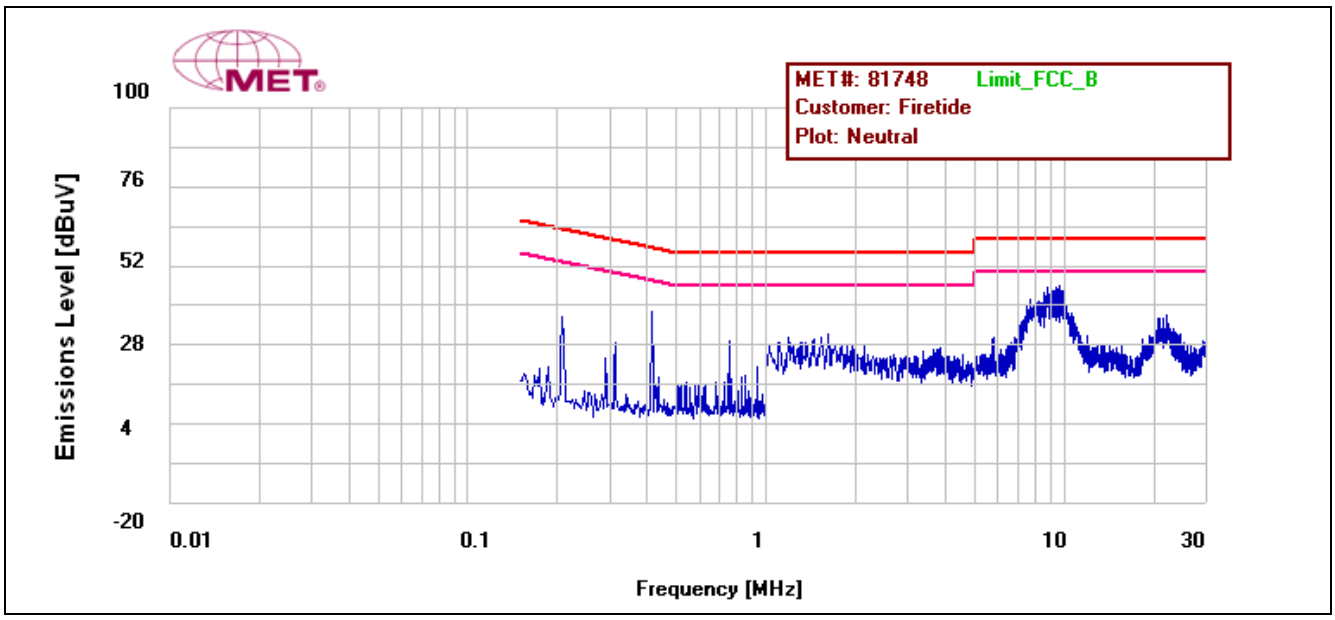
Conducted Emissions - Voltage, AC Power, (120 VAC, 60 Hz)

Line	Freq (MHz)	QP Amplitude	QP Limit	Delta	Pass	Average Amplitude	Average Limit	Delta	Pass
Line	0.206	38.73	63.372	-24.642	Pass	33.83	53.372	-19.542	Pass
Line	0.76	21.03	56	-34.97	Pass	16.023	46	-29.977	Pass
Line	9.45	37.95	60	-22.05	Pass	31.47	50	-18.53	Pass
Neutral	0.207	36.5	63.332	-26.832	Pass	33.9	53.332	-19.432	Pass
Neutral	0.414	33.77	57.591	-23.821	Pass	32.7	47.591	-14.891	Pass
Neutral	9.117	38.87	60	-21.13	Pass	32.33	50	-17.67	Pass

Table 19. Conducted Emissions - Voltage, AC Power (120 VAC, 60 Hz)



Plot 9. §15.207 Conducted Emissions, Phase Line



Plot 10. §15.207 Conducted Emissions, Neutral Line

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15. 403(c) 26dB Bandwidth

Test Requirements: **§ 15.403 (i):** For purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Determination of the emissions bandwidth is based on the use of measurement instrumentation employing a peak detector function with an instrument resolution bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

Test Procedure: The transmitter was set to both operating frequencies at the highest output power and connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using a RBW approximately equal to 1% of the total emission bandwidth, VBW > RBW. The 26 dB Bandwidth was measured and recorded.

Test Results The 26 dB Bandwidth was compliant with the requirements of this section and was determined from the plots on the following pages.

Test Engineer(s): Aaron Chang

Test Date(s): 05/31/13

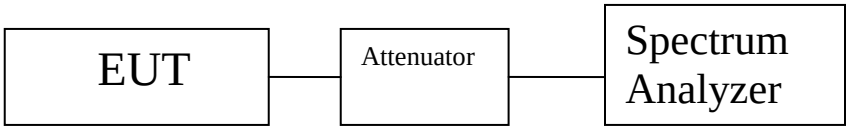


Figure 1. Occupied Bandwidth, Test Setup

	Frequency (MHz)	26 dB Bandwidth (MHz)
802.11a Port 1	5260	21.306
	5300	20.125
	5320	20.930
802.11a Port 2	5260	19.535
	5300	19.690
	5320	20.229
802.11a Port 3	5260	19.993
	5300	19.472
	5320	19.710
802.11n 20 MHz Port 1	5260	19.586
	5300	19.446
	5320	19.582
802.11n 20 MHz Port 2	5260	19.350
	5300	19.686
	5320	19.277
802.11n 20 MHz Port 3	5260	19.360
	5300	19.396
	5320	19.452
802.11n 40 MHz Port 1	5270	39.273
	5310	39.245
802.11n 40 MHz Port 2	5270	40.981
	5310	40.217
802.11n 40 MHz Port 3	5270	39.765
	5310	39.215

Table 20. 26 dB Occupied Bandwidth, Test Results, Lower Band

	Frequency (MHz)	26 dB Bandwidth (MHz)
802.11a Port 1	5500	21.891
	5580	21.317
	5700	20.404
802.11a Port 2	5500	19.538
	5580	19.999
	5700	20.656
802.11a Port 3	5500	19.339
	5580	20.656
	5700	19.424
802.11n 20 MHz Port 1	5500	19.724
	5580	19.513
	5700	19.886
802.11n 20 MHz Port 2	5500	19.631
	5580	19.554
	5700	19.614
802.11n 20 MHz Port 3	5500	19.527
	5580	19.732
	5700	19.568
802.11n 40 MHz Port 1	5510	39.018
	5550	39.501
	5670	39.354
802.11n 40 MHz Port 2	5510	40.632
	5550	40.067
	5670	41.315
802.11n 40 MHz Port 3	5510	39.158
	5550	39.361
	5670	40.787

Table 21. 26 dB Occupied Bandwidth, Test Results, Upper Band

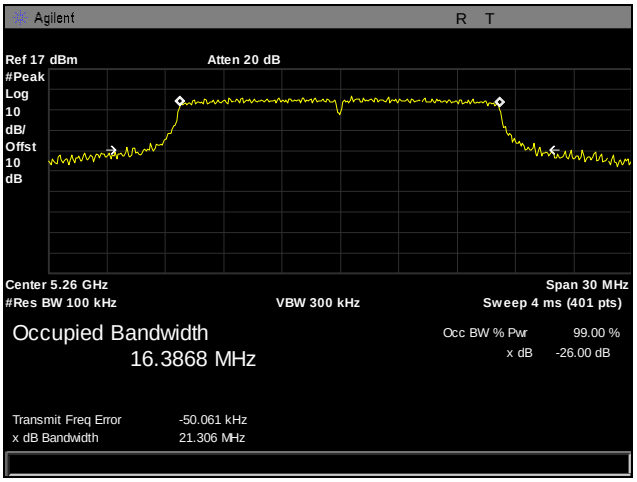
	Frequency (MHz)	99% Bandwidth (MHz)
802.11a Port 1	5260	25.5876
	5300	25.0705
	5320	24.8689
802.11a Port 2	5260	18.5671
	5300	18.9536
	5320	18.7909
802.11a Port 3	5260	20.9482
	5300	19.9272
	5320	21.0703
802.11n 20 MHz Port 1	5260	25.0548
	5300	24.9619
	5320	25.7883
802.11n 20 MHz Port 2	5260	18.8673
	5300	19.4238
	5320	18.3997
802.11n 20 MHz Port 3	5260	22.7074
	5300	21.7923
	5320	22.0893
802.11n 40 MHz Port 1	5270	41.6969
	5310	40.6245
802.11n 40 MHz Port 2	5270	40.7132
	5310	40.9259
802.11n 40 MHz Port 3	5270	42.8418
	5310	41.7821

Table 22. 99% Occupied Bandwidth, Test Results, Lower Band

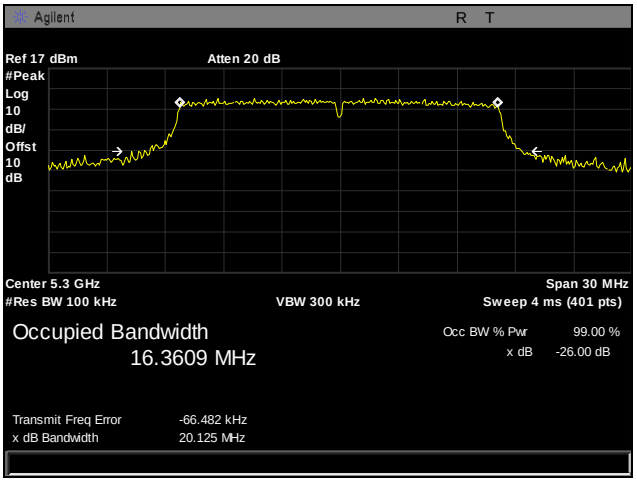
	Frequency (MHz)	99% Bandwidth (MHz)
802.11a Port 1	5500	20.4488
	5580	21.9242
	5700	22.6597
802.11a Port 2	5500	16.6540
	5580	21.4673
	5700	19.7229
802.11a Port 3	5500	23.2364
	5580	22.2166
	5700	17.5272
802.11n 20 MHz Port 1	5500	19.5730
	5580	21.7037
	5700	21.5749
802.11n 20 MHz Port 2	5500	17.8258
	5580	21.8492
	5700	20.6414
802.11n 20 MHz Port 3	5500	20.8334
	5580	21.0927
	5700	18.5458
802.11n 40 MHz Port 1	5510	37.1953
	5550	37.7638
	5670	36.6141
802.11n 40 MHz Port 2	5510	37.4008
	5550	38.2817
	5670	36.5937
802.11n 40 MHz Port 3	5510	38.0587
	5550	37.0574
	5670	36.2545

Table 23. 99% Occupied Bandwidth, Test Results, Upper Band

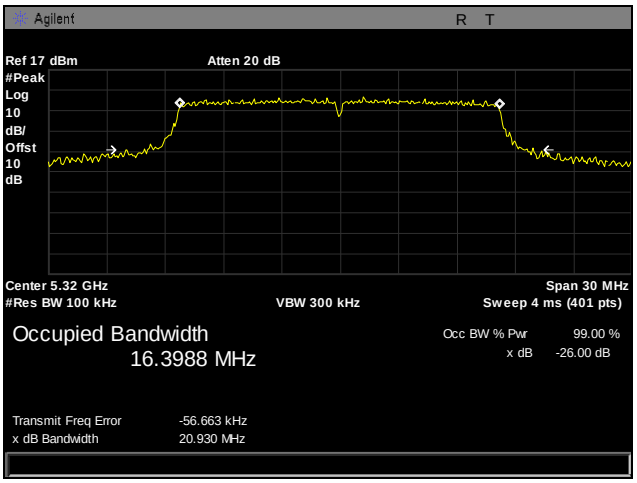
26 dB Occupied Bandwidth, 802.11a, Port 1, Lower Band



Plot 11. 26 dB Occupied Bandwidth, 802.11a, 5260 MHz, Port 1

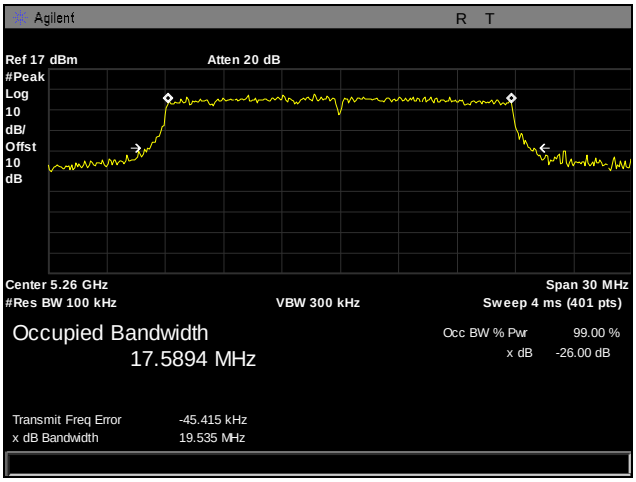


Plot 12. 26 dB Occupied Bandwidth, 802.11a, 5300 MHz, Port 1

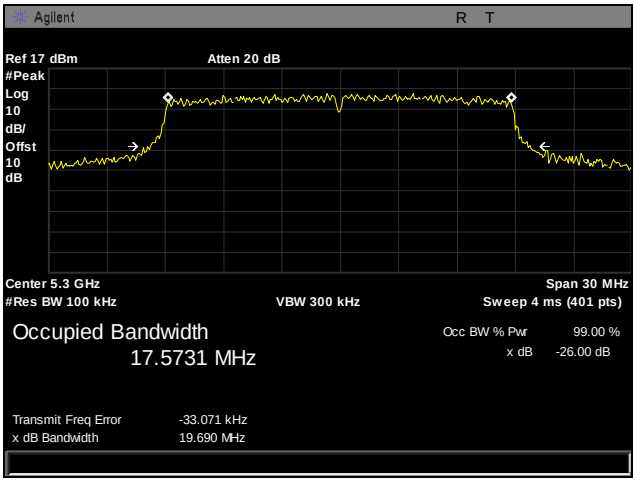


Plot 13. 26 dB Occupied Bandwidth, 802.11a, 5320 MHz, Port 1

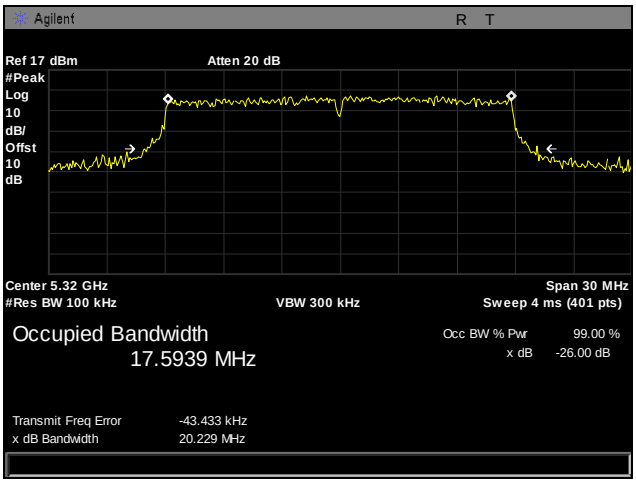
26 dB Occupied Bandwidth, 802.11a, Port 2, Lower Band



Plot 14. 26 dB Occupied Bandwidth, 802.11a, 5260 MHz, Port 2

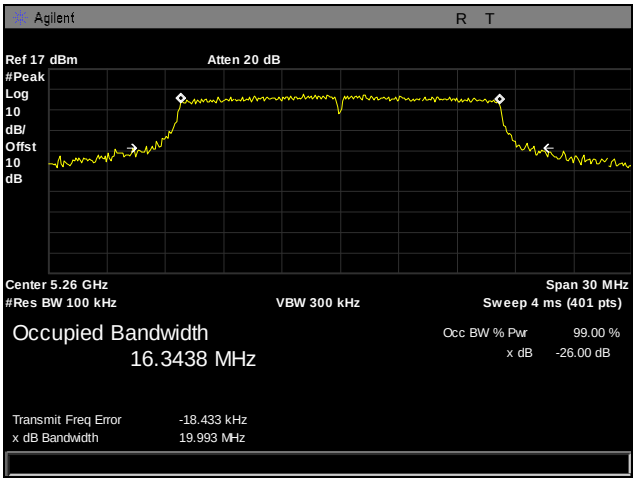


Plot 15. 26 dB Occupied Bandwidth, 802.11a, 5300 MHz, Port 2

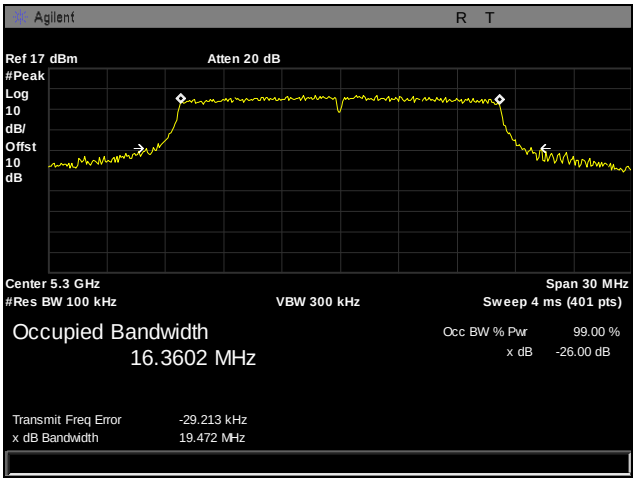


Plot 16. 26 dB Occupied Bandwidth, 802.11a, 5320 MHz, Port 2

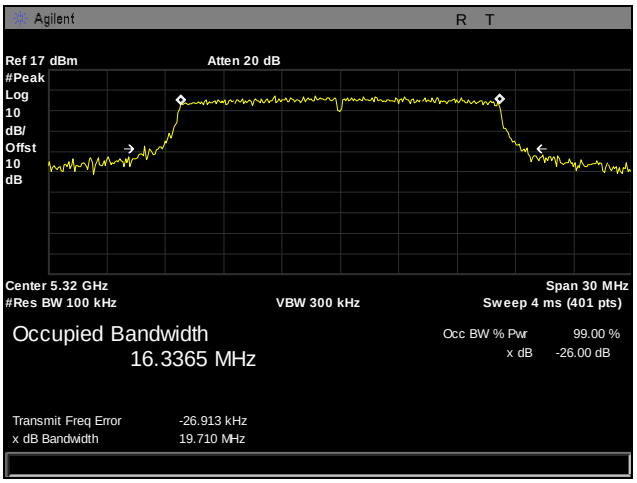
26 dB Occupied Bandwidth, 802.11a, Port 3, Lower Band



Plot 17. 26 dB Occupied Bandwidth, 802.11a, 5260 MHz, Port 3

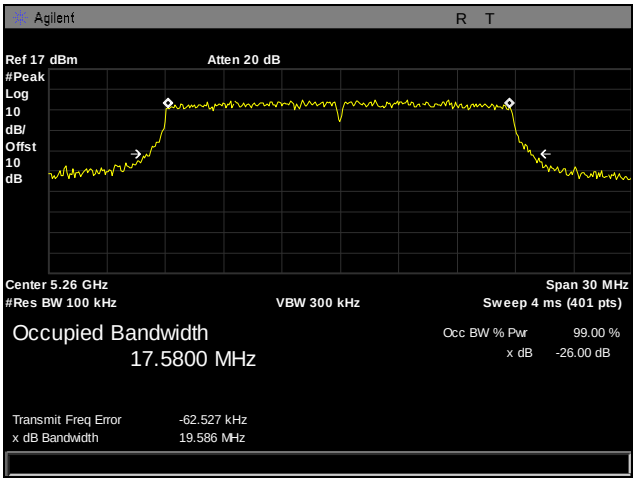


Plot 18. 26 dB Occupied Bandwidth, 802.11a, 5300 MHz, Port 3

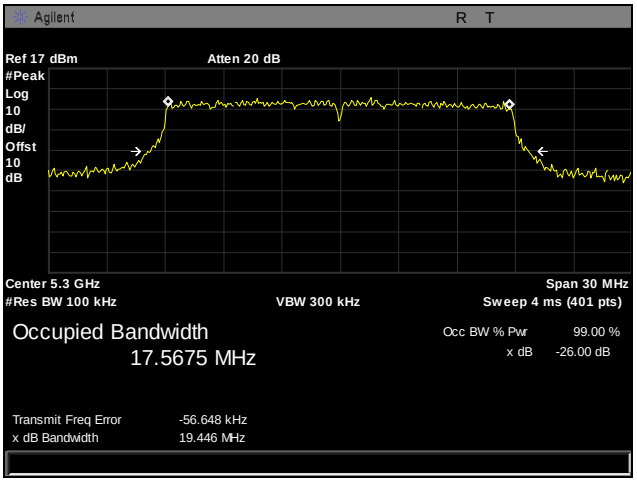


Plot 19. 26 dB Occupied Bandwidth, 802.11a, 5320 MHz, Port 3

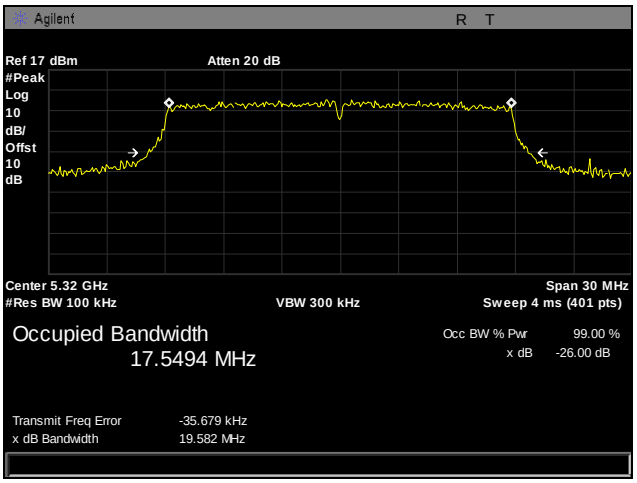
26 dB Occupied Bandwidth, 802.11n 20 MHz, Port 1, Lower Band



Plot 20. 26 dB Occupied Bandwidth, 802.11n 20 MHz, 5260 MHz, Port 1

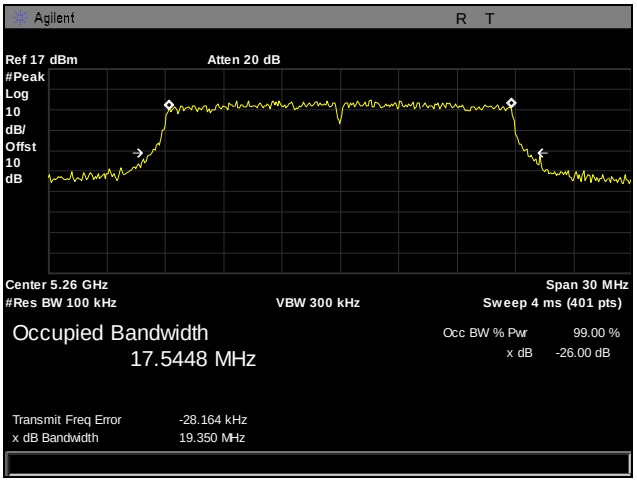


Plot 21. 26 dB Occupied Bandwidth, 802.11n 20 MHz, 5300 MHz, Port 1

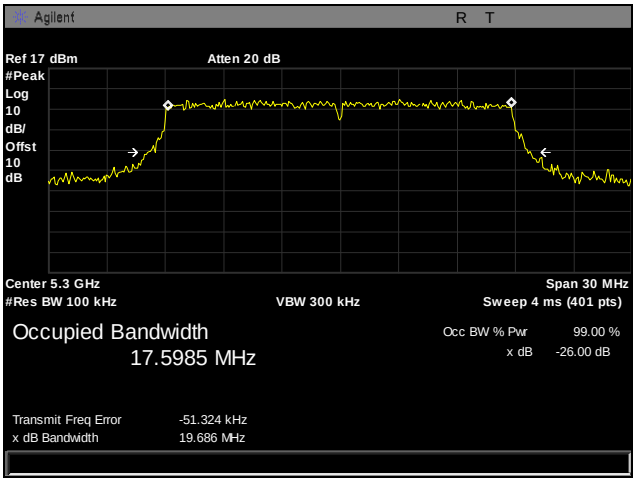


Plot 22. 26 dB Occupied Bandwidth, 802.11n 20 MHz, 5320 MHz, Port 1

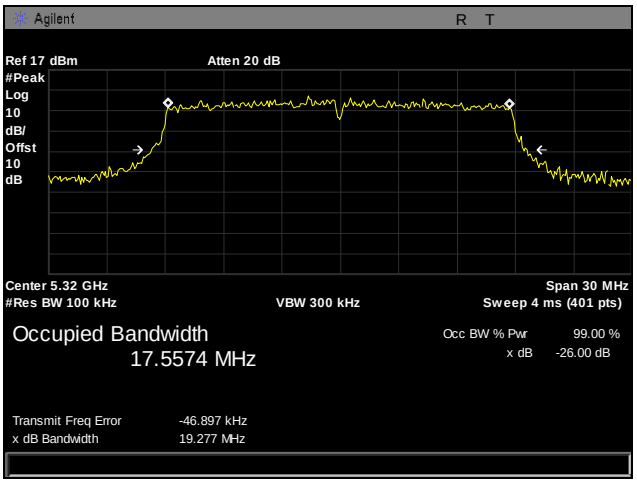
26 dB Occupied Bandwidth, 802.11n 20 MHz, Port 2, Lower Band



Plot 23. 26 dB Occupied Bandwidth, 802.11n 20 MHz, 5260 MHz, Port 2

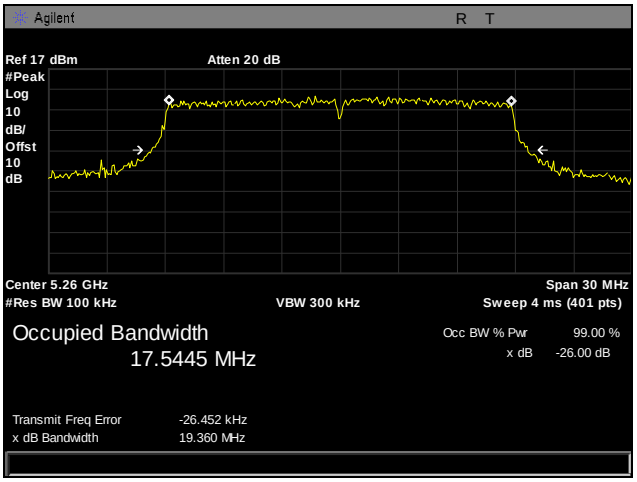


Plot 24. 26 dB Occupied Bandwidth, 802.11n 20 MHz, 5300 MHz, Port 2

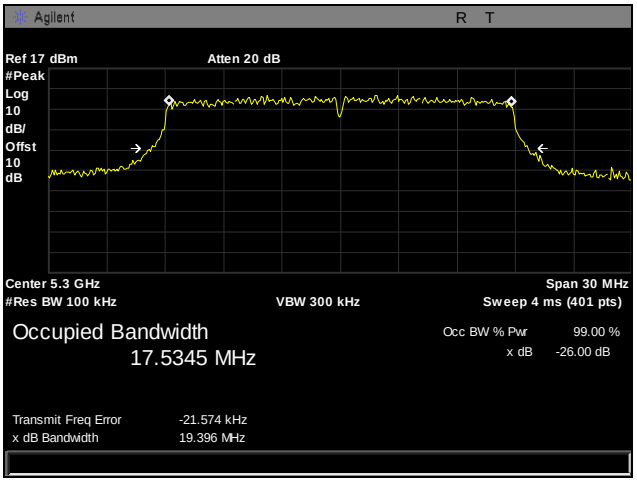


Plot 25. 26 dB Occupied Bandwidth, 802.11n 20 MHz, 5320 MHz, Port 2

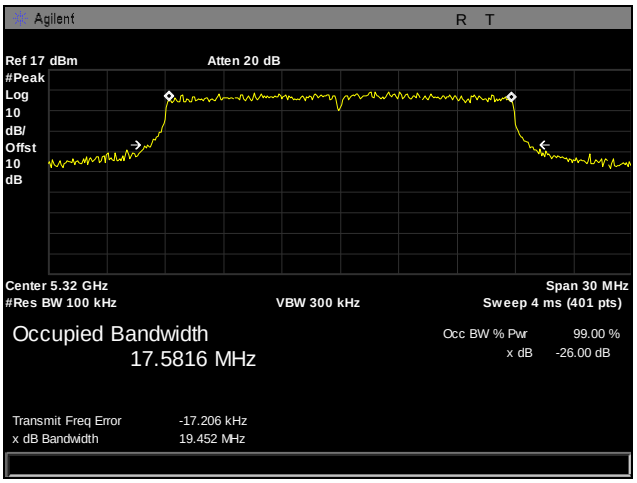
26 dB Occupied Bandwidth, 802.11n 20 MHz, Port 3, Lower Band



Plot 26. 26 dB Occupied Bandwidth, 802.11n 20 MHz, 5260 MHz, Port 3

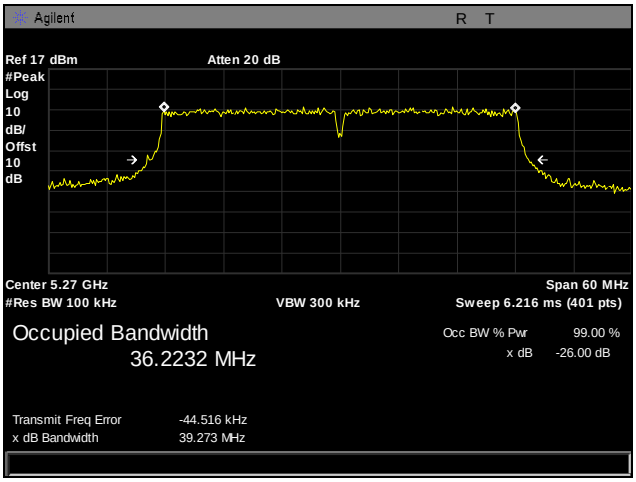


Plot 27. 26 dB Occupied Bandwidth, 802.11n 20 MHz, 5300 MHz, Port 3

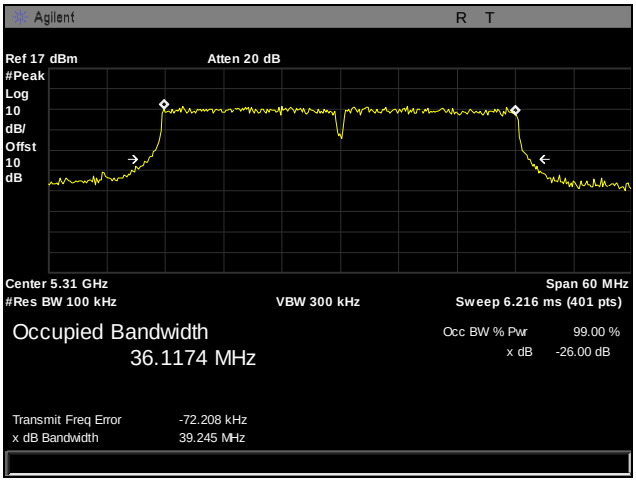


Plot 28. 26 dB Occupied Bandwidth, 802.11n 20 MHz, 5320 MHz, Port 3

26 dB Occupied Bandwidth, 802.11 40 MHz, Port 1, Lower Band

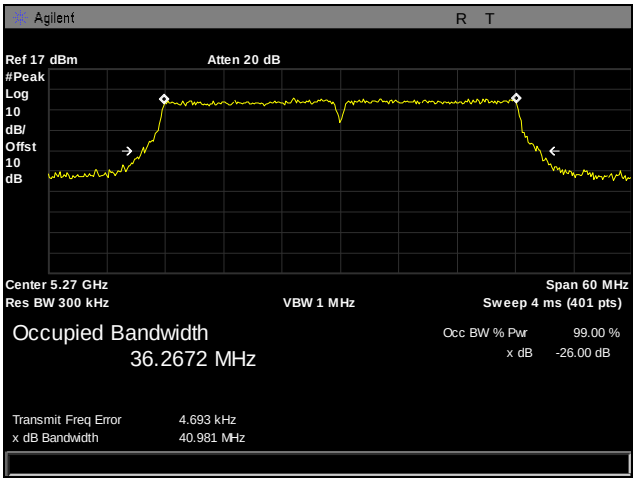


Plot 29. 26 dB Occupied Bandwidth, 802.11 40 MHz, 5270 MHz, Port 1

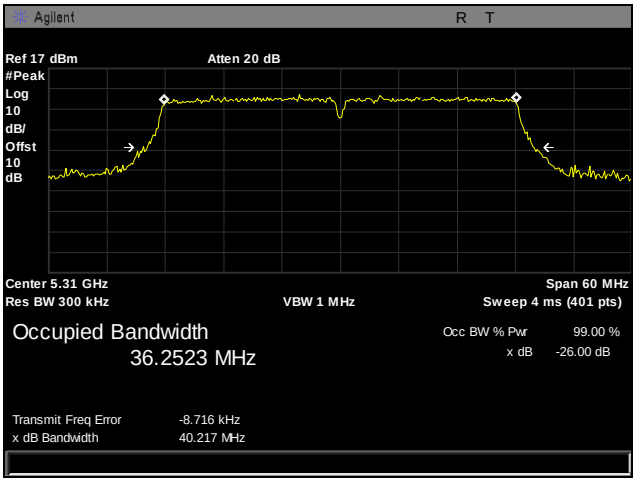


Plot 30. 26 dB Occupied Bandwidth, 802.11 40 MHz, 5310 MHz, Port 1

26 dB Occupied Bandwidth, 802.11 40 MHz, Port 2, Lower Band

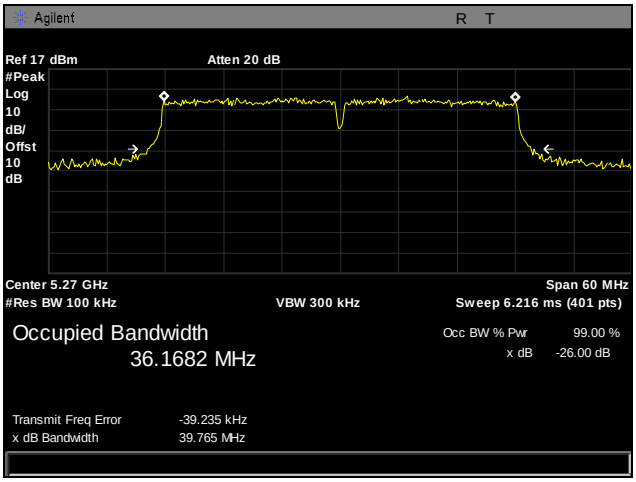


Plot 31. 26 dB Occupied Bandwidth, 802.11 40 MHz, 5270 MHz, Port 2

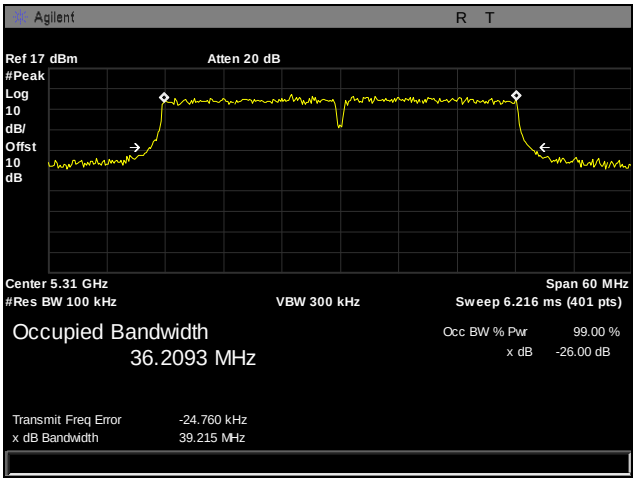


Plot 32. 26 dB Occupied Bandwidth, 802.11 40 MHz, 5310 MHz, Port 2

26 dB Occupied Bandwidth, 802.11 40 MHz, Port 3, Lower Band

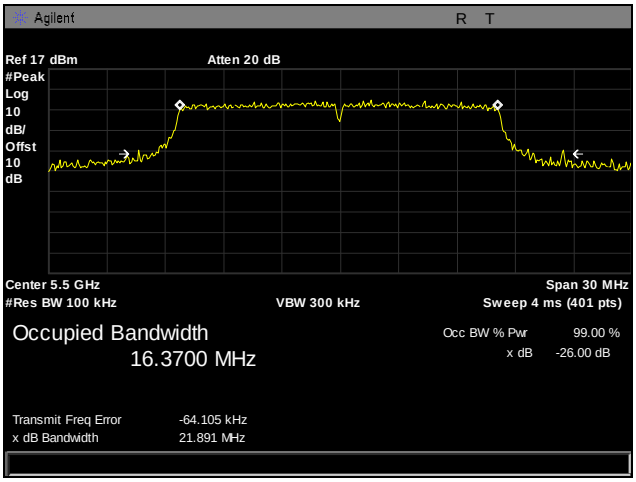


Plot 33. 26 dB Occupied Bandwidth, 802.11 40 MHz, 5270 MHz, Port 3

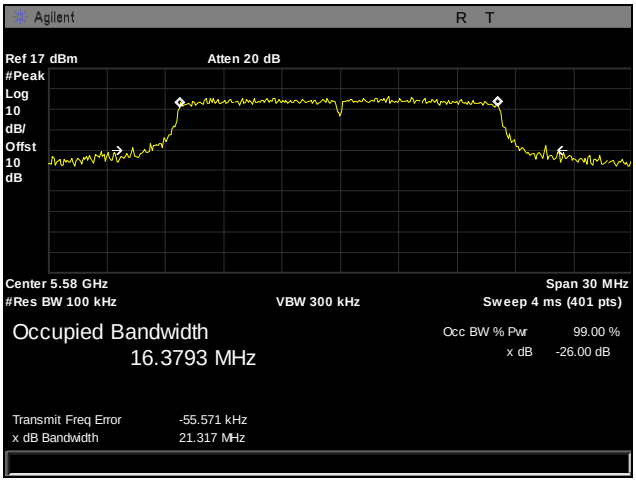


Plot 34. 26 dB Occupied Bandwidth, 802.11 40 MHz, 5310 MHz, Port 3

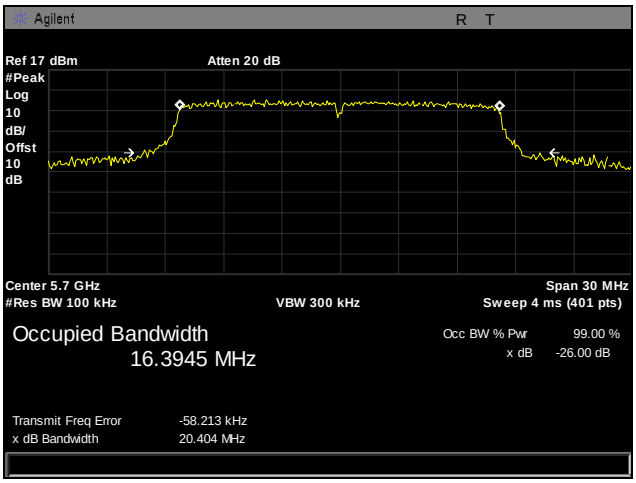
26 dB Occupied Bandwidth, 802.11a, Port 1, Upper Band



Plot 35. 26 dB Occupied Bandwidth, 802.11a, 5500 MHz, Port 1

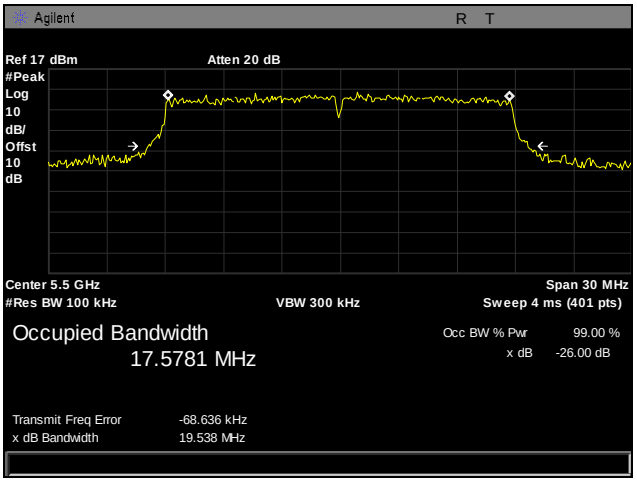


Plot 36. 26 dB Occupied Bandwidth, 802.11a, 5580 MHz, Port 1

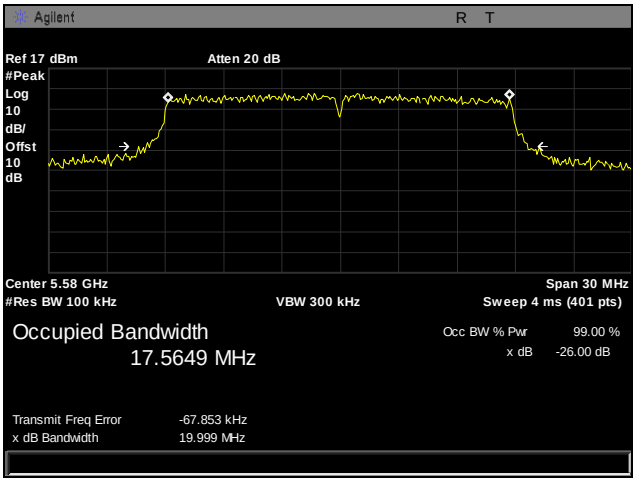


Plot 37. 26 dB Occupied Bandwidth, 802.11a, 5700 MHz, Port 1

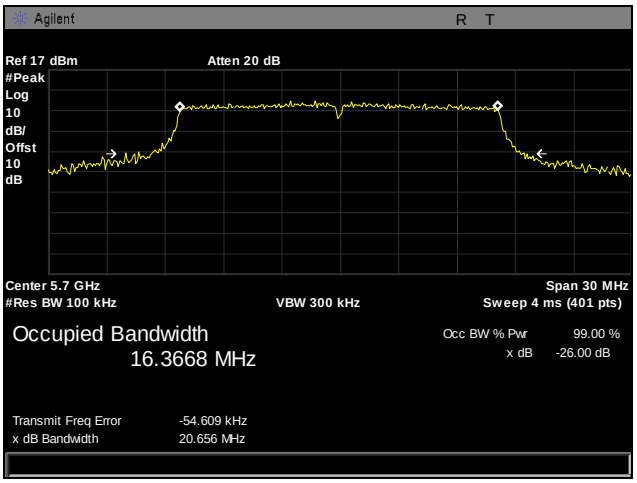
26 dB Occupied Bandwidth, 802.11a, Port 2, Upper Band



Plot 38. 26 dB Occupied Bandwidth, 802.11a, 5500 MHz, Port 2

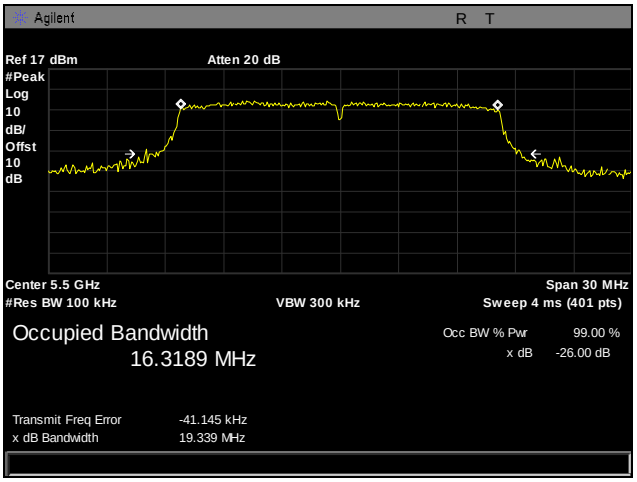


Plot 39. 26 dB Occupied Bandwidth, 802.11a, 5580 MHz, Port 2

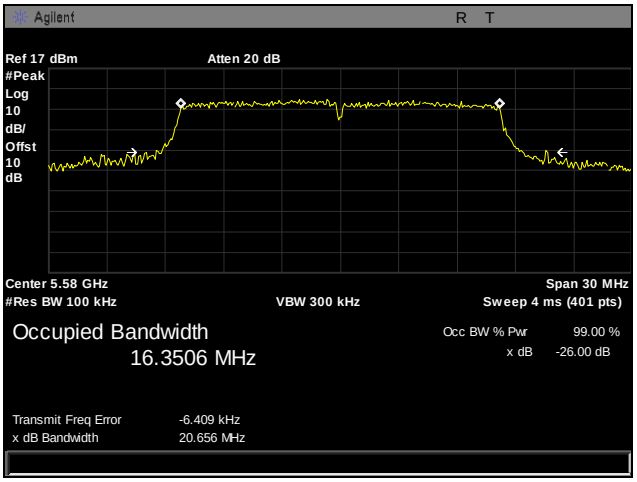


Plot 40. 26 dB Occupied Bandwidth, 802.11a, 5700 MHz, Port 2

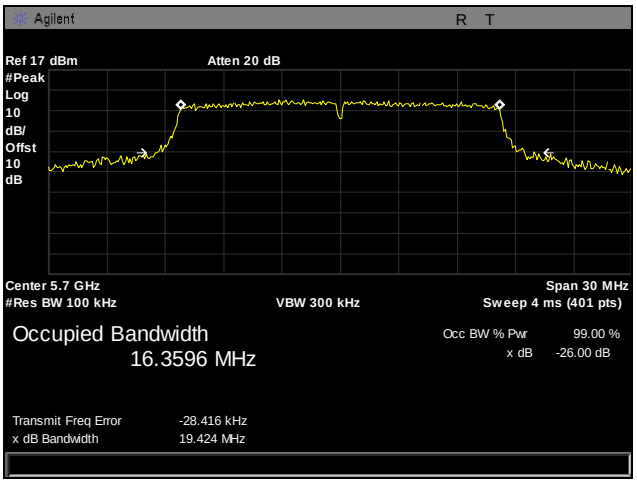
26 dB Occupied Bandwidth, 802.11a, Port 3, Upper Band



Plot 41. 26 dB Occupied Bandwidth, 802.11a, 5500 MHz, Port 3

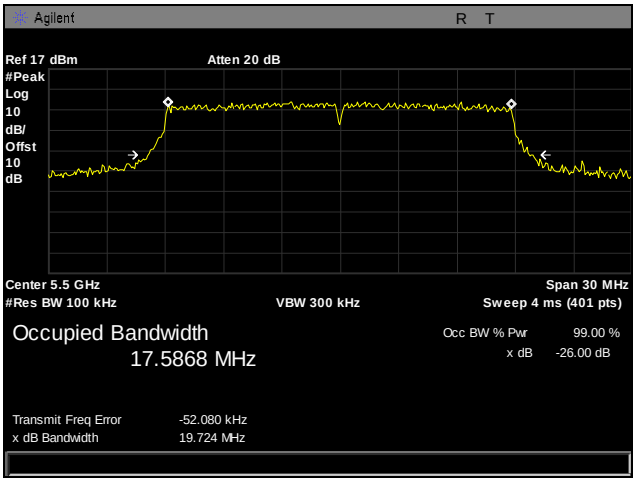


Plot 42. 26 dB Occupied Bandwidth, 802.11a, 5580 MHz, Port 3

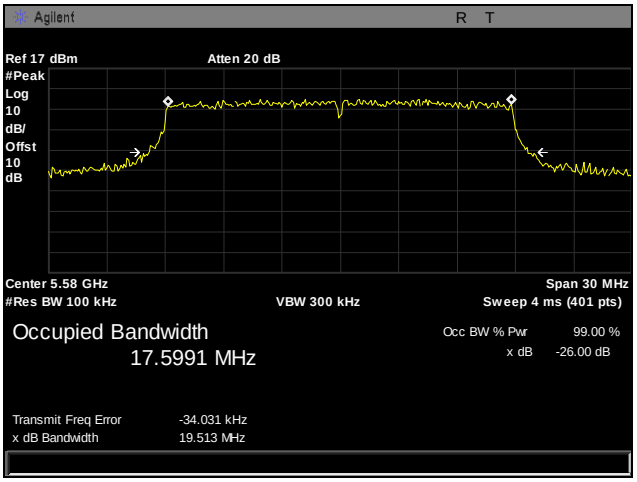


Plot 43. 26 dB Occupied Bandwidth, 802.11a, 5700 MHz, Port 3

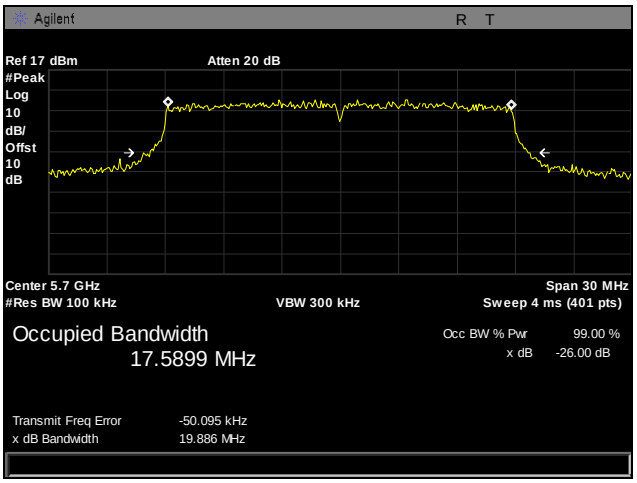
26 dB Occupied Bandwidth, 802.11n 20 MHz, Port 1, Upper Band



Plot 44. 26 dB Occupied Bandwidth, 802.11n 20 MHz, 5500 MHz, Port 1

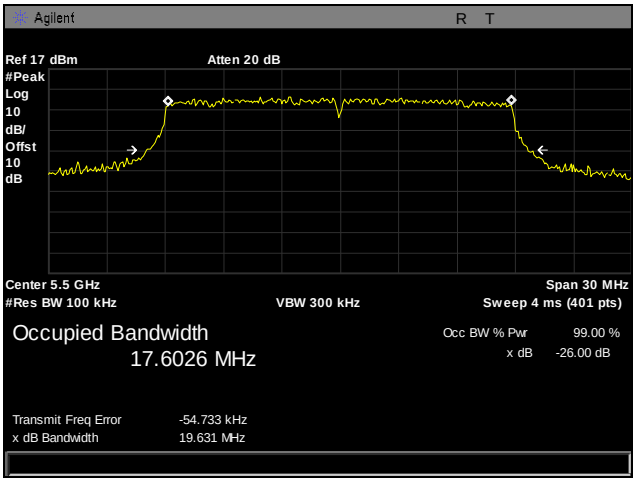


Plot 45. 26 dB Occupied Bandwidth, 802.11n 20 MHz, 5580 MHz, Port 1

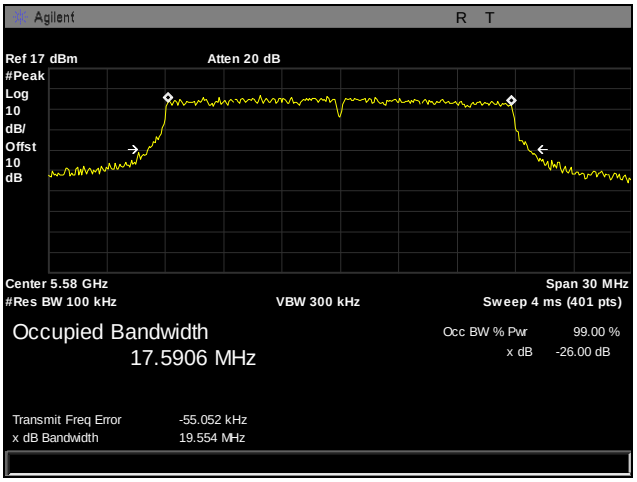


Plot 46. 26 dB Occupied Bandwidth, 802.11n 20 MHz, 5700 MHz, Port 1

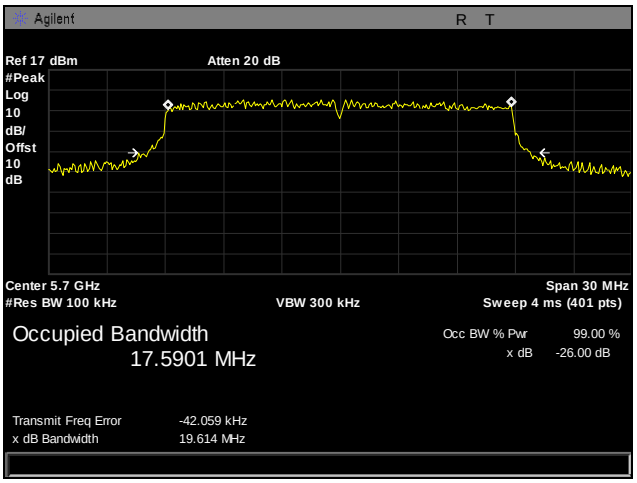
26 dB Occupied Bandwidth, 802.11n 20 MHz, Port 2, Upper Band



Plot 47. 26 dB Occupied Bandwidth, 802.11n 20 MHz, 5500 MHz, Port 2

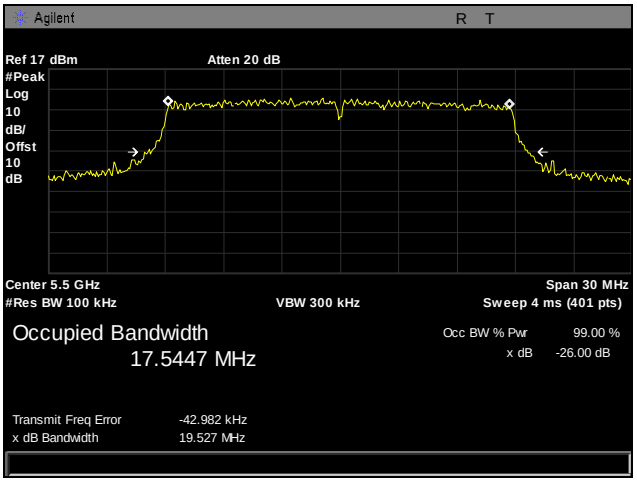


Plot 48. 26 dB Occupied Bandwidth, 802.11n 20 MHz, 5580 MHz, Port 2

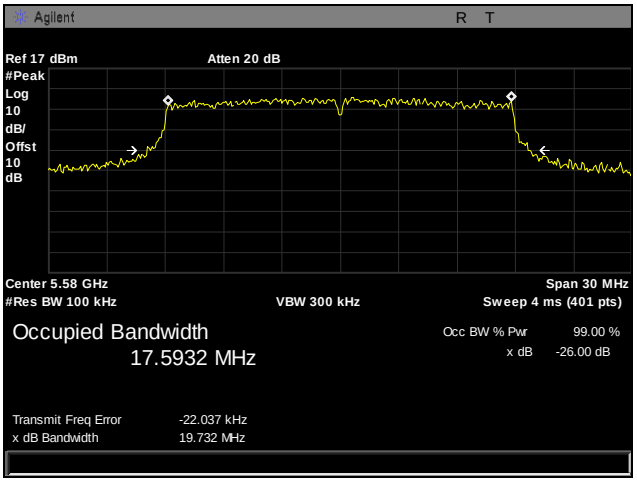


Plot 49. 26 dB Occupied Bandwidth, 802.11n 20 MHz, 5700 MHz, Port 2

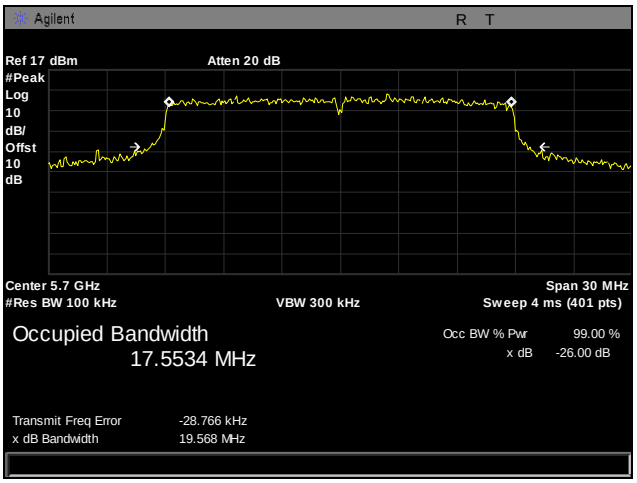
26 dB Occupied Bandwidth, 802.11n 20 MHz, Port 3, Upper Band



Plot 50. 26 dB Occupied Bandwidth, 802.11n 20 MHz, 5500 MHz, Port 3

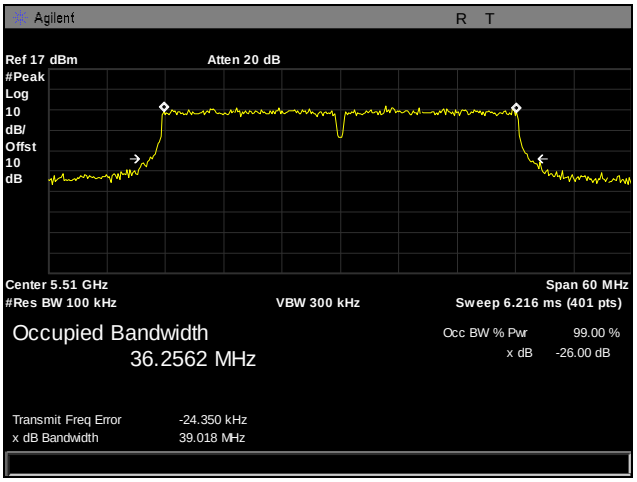


Plot 51. 26 dB Occupied Bandwidth, 802.11n 20 MHz, 5580 MHz, Port 3

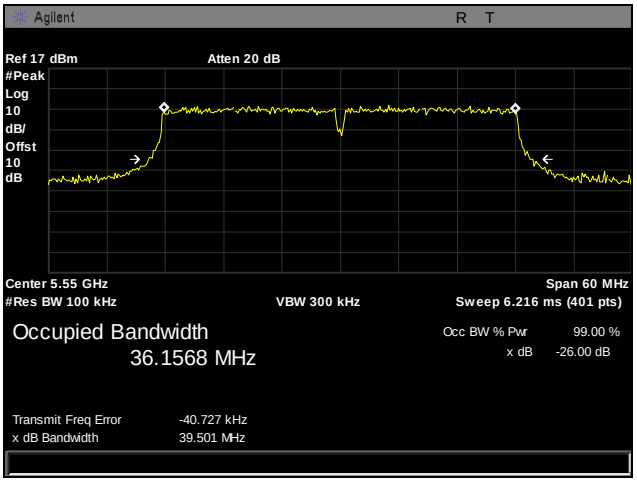


Plot 52. 26 dB Occupied Bandwidth, 802.11n 20 MHz, 5700 MHz, Port 3

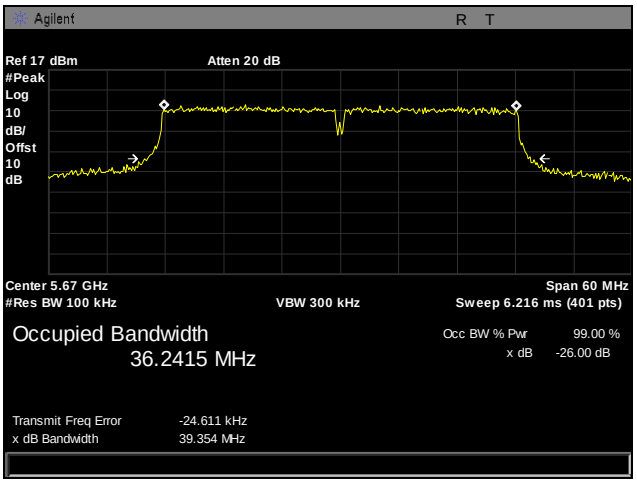
26 dB Occupied Bandwidth, 802.11 40 MHz, Port 1, Upper Band



Plot 53. 26 dB Occupied Bandwidth, 802.11 40 MHz, 5510 MHz, Port 1

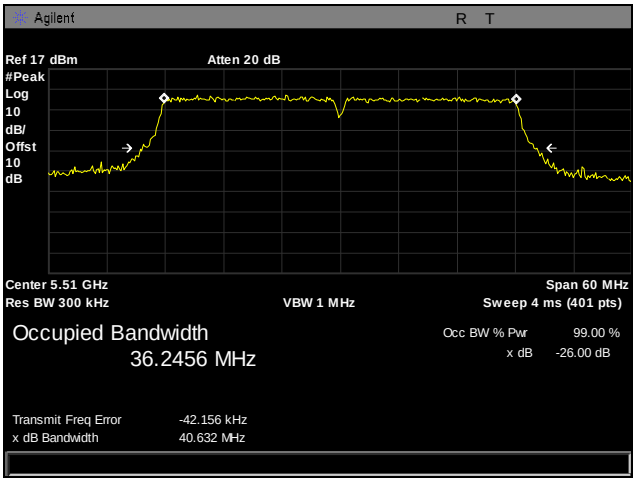


Plot 54. 26 dB Occupied Bandwidth, 802.11 40 MHz, 5550 MHz, Port 1

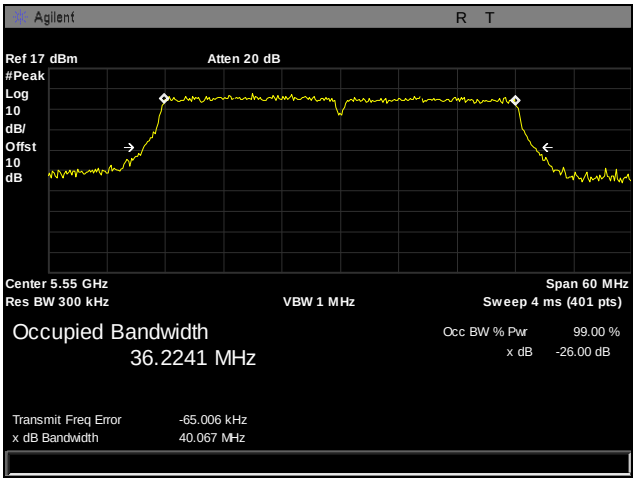


Plot 55. 26 dB Occupied Bandwidth, 802.11 40 MHz, 5670 MHz, Port 1

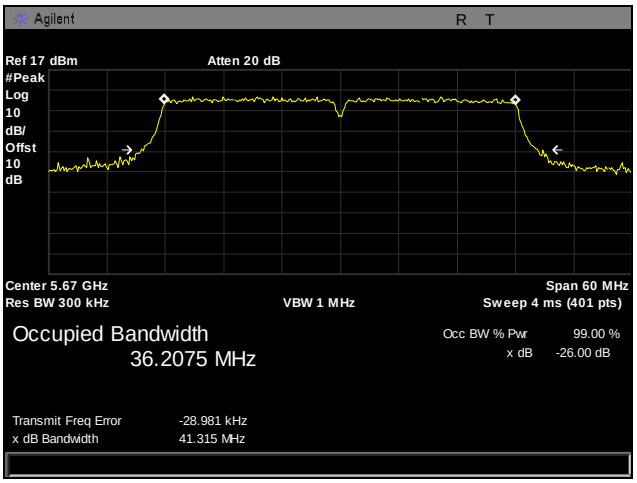
26 dB Occupied Bandwidth, 802.11 40 MHz, Port 2, Upper Band



Plot 56. 26 dB Occupied Bandwidth, 802.11 40 MHz, 5510 MHz, Port 2

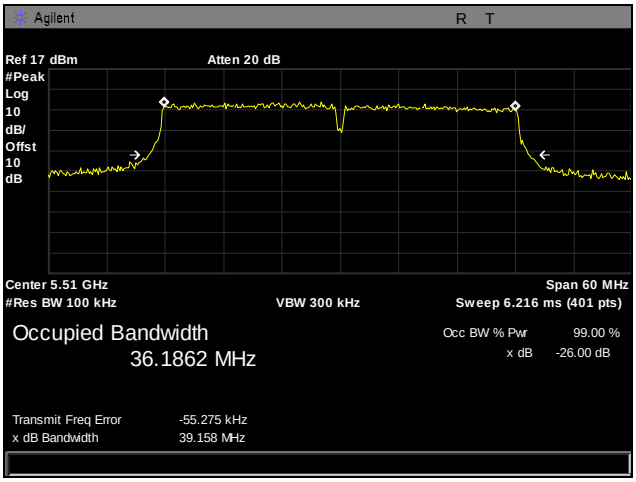


Plot 57. 26 dB Occupied Bandwidth, 802.11 40 MHz, 5550 MHz, Port 2

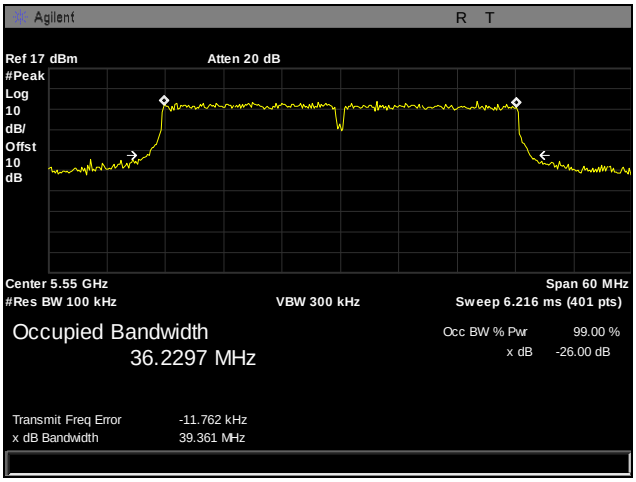


Plot 58. 26 dB Occupied Bandwidth, 802.11 40 MHz, 5670 MHz, Port 2

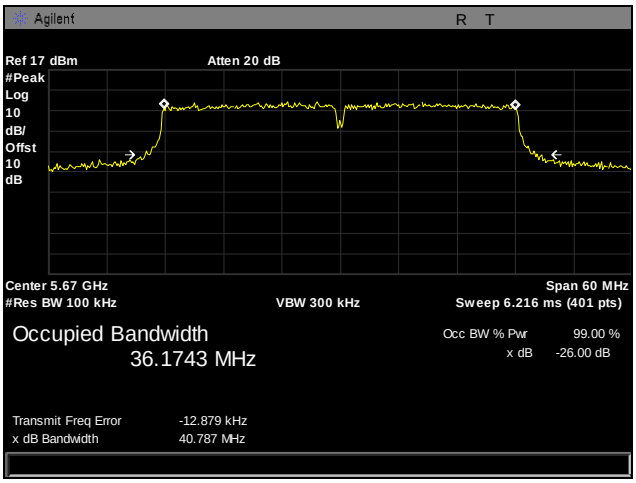
26 dB Occupied Bandwidth, 802.11 40 MHz, Port 3, Upper Band



Plot 59. 26 dB Occupied Bandwidth, 802.11 40 MHz, 5510 MHz, Port 3

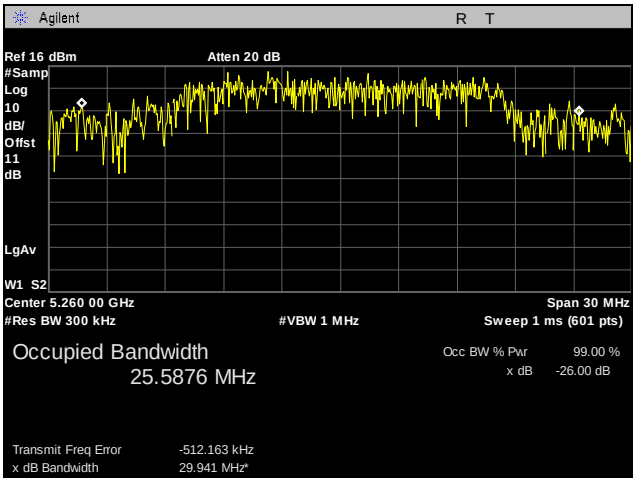


Plot 60. 26 dB Occupied Bandwidth, 802.11 40 MHz, 5550 MHz, Port 3

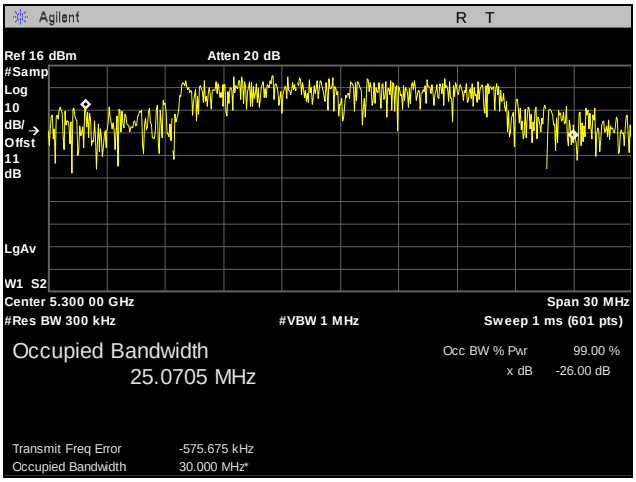


Plot 61. 26 dB Occupied Bandwidth, 802.11 40 MHz, 5670 MHz, Port 3

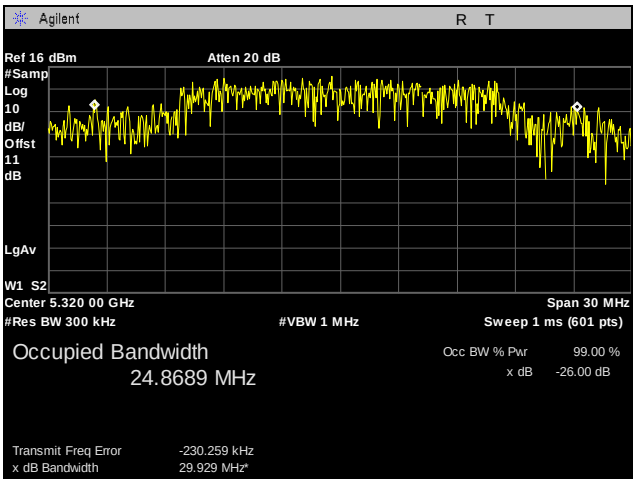
99% Occupied Bandwidth, 802.11a, Port 1, Lower Band



Plot 62. 99% Occupied Bandwidth, 802.11a, 5260 MHz, Port 1

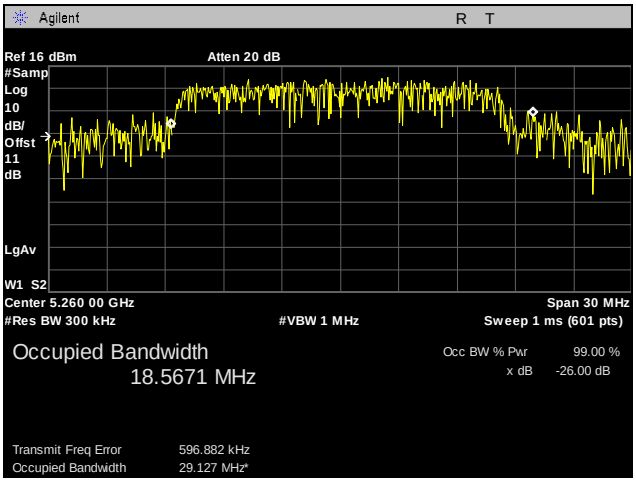


Plot 63. 99% Occupied Bandwidth, 802.11a, 5300 MHz, Port 1

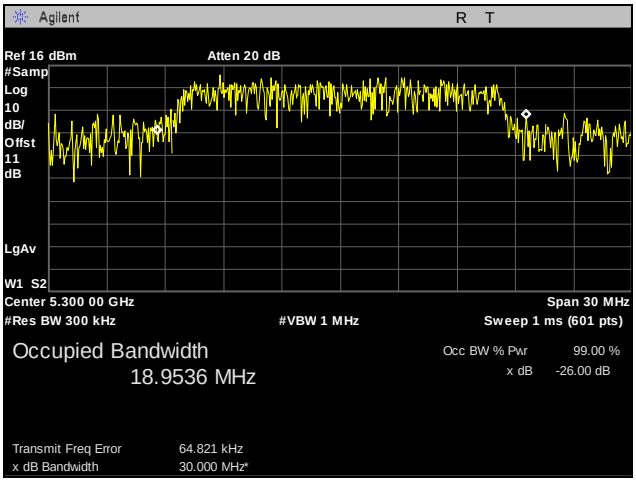


Plot 64. 99% Occupied Bandwidth, 802.11a, 5320 MHz, Port 1

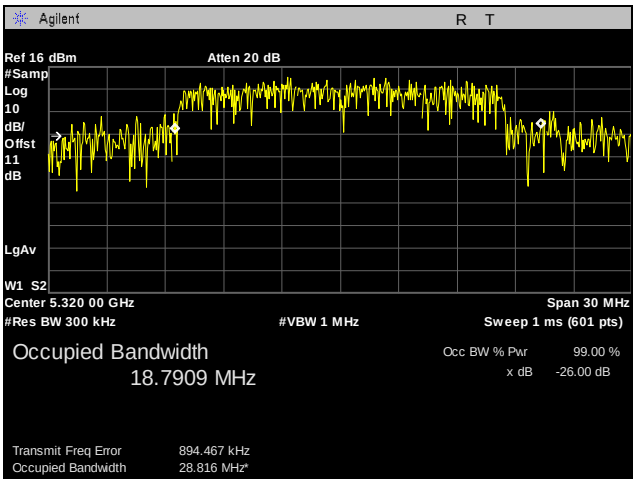
99% Occupied Bandwidth, 802.11a, Port 2, Lower Band



Plot 65. 99% Occupied Bandwidth, 802.11a, 5260 MHz, Port 2

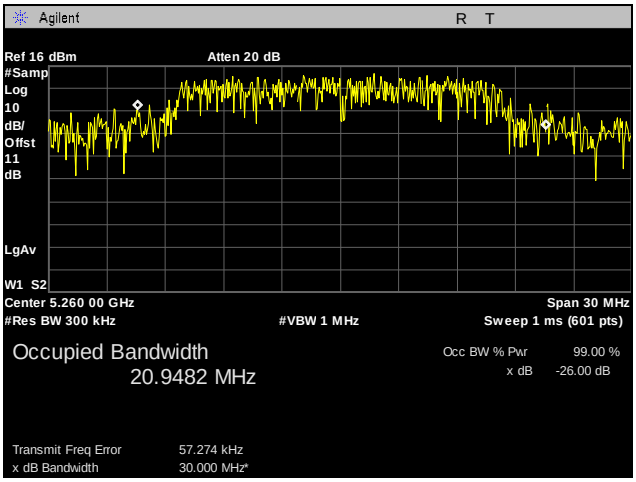


Plot 66. 99% Occupied Bandwidth, 802.11a, 5300 MHz, Port 2

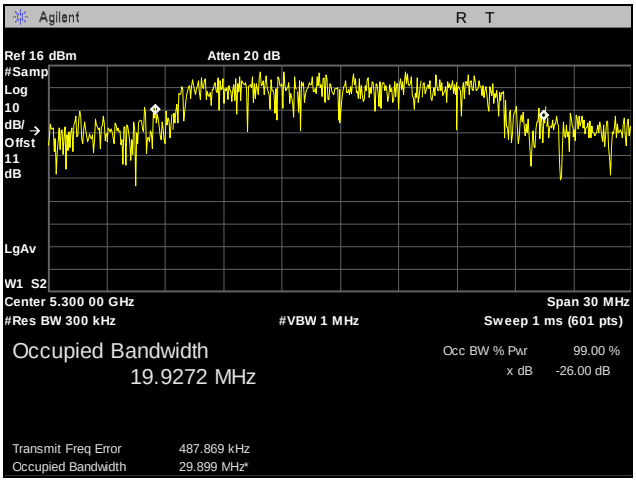


Plot 67. 99% Occupied Bandwidth, 802.11a, 5320 MHz, Port 2

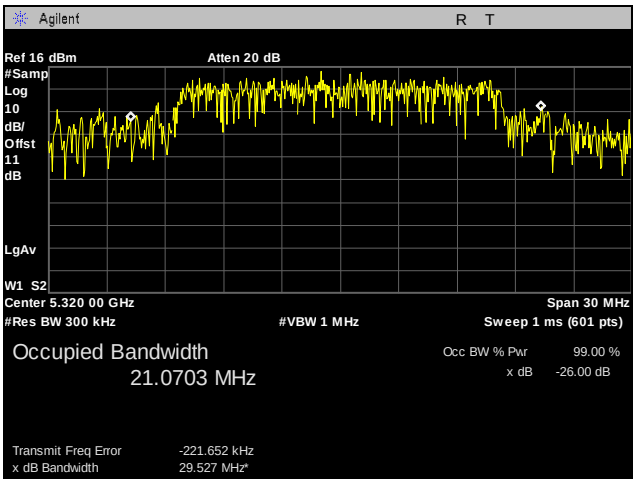
99% Occupied Bandwidth, 802.11a, Port 3, Lower Band



Plot 68. 99% Occupied Bandwidth, 802.11a, 5260 MHz, Port 3

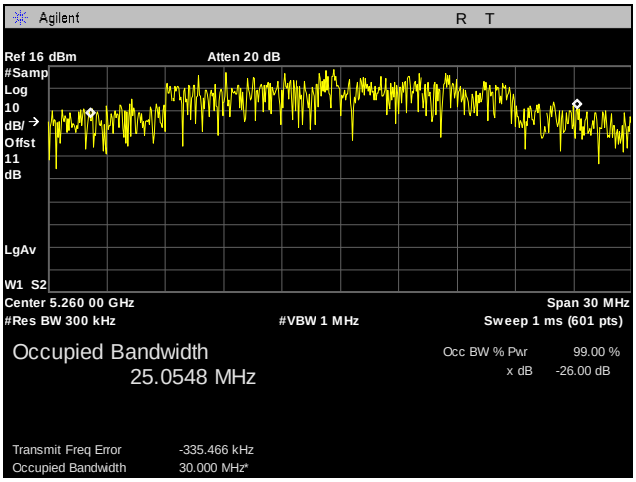


Plot 69. 99% Occupied Bandwidth, 802.11a, 5300 MHz, Port 3

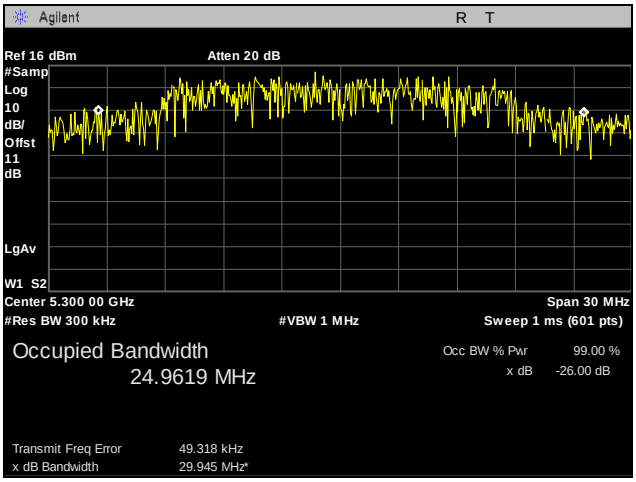


Plot 70. 99% Occupied Bandwidth, 802.11a, 5320 MHz, Port 3

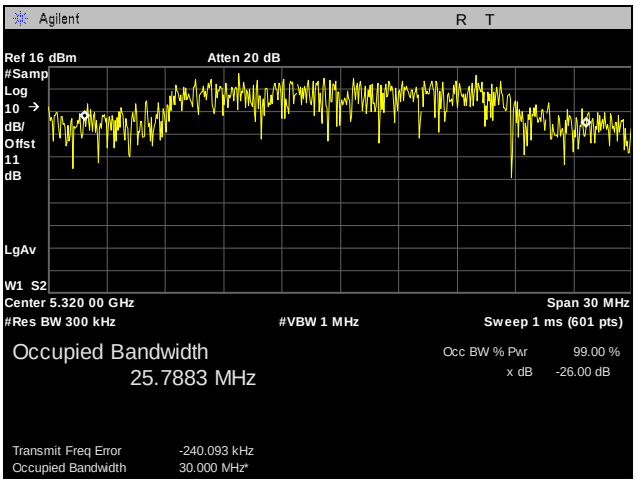
99% Occupied Bandwidth, 802.11n 20 MHz, Port 1, Lower Band



Plot 71. 99% Occupied Bandwidth, 802.11n 20 MHz, 5260 MHz, Port 1

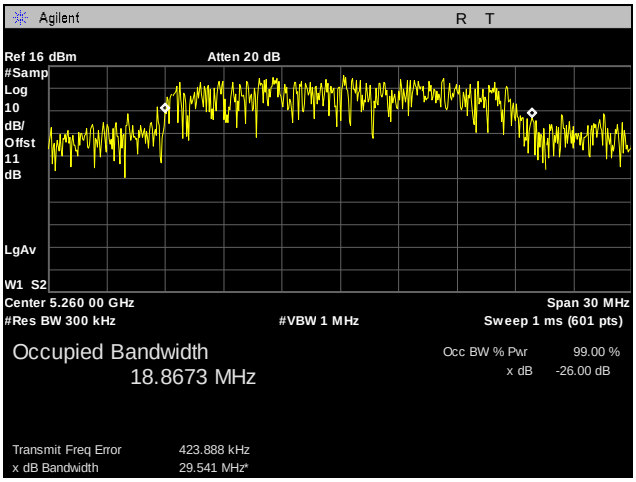


Plot 72. 99% Occupied Bandwidth, 802.11n 20 MHz, 5300 MHz, Port 1

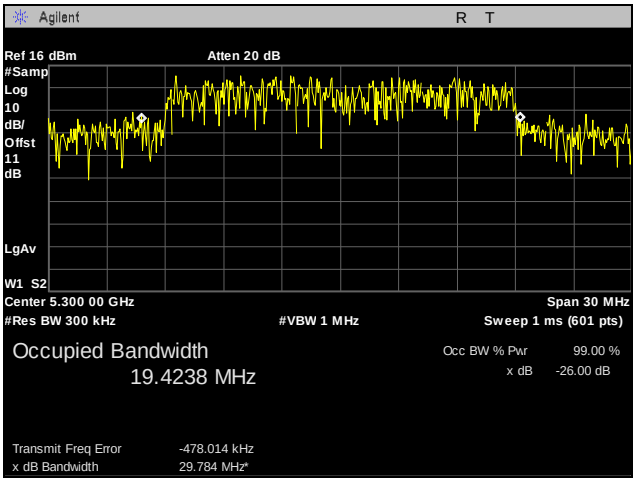


Plot 73. 99% Occupied Bandwidth, 802.11n 20 MHz, 5320 MHz, Port 1

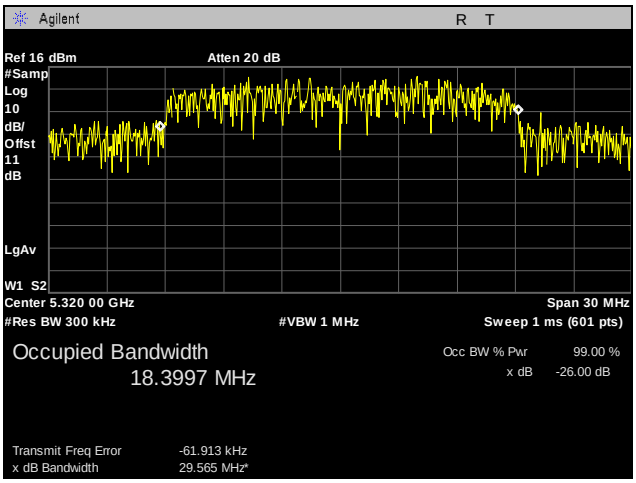
99% Occupied Bandwidth, 802.11n 20 MHz, Port 2, Lower Band



Plot 74. 99% Occupied Bandwidth, 802.11n 20 MHz, 5260 MHz, Port 2

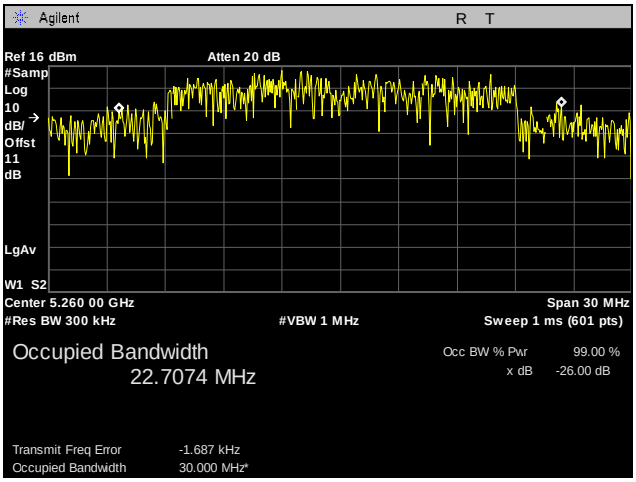


Plot 75. 99% Occupied Bandwidth, 802.11n 20 MHz, 5300 MHz, Port 2

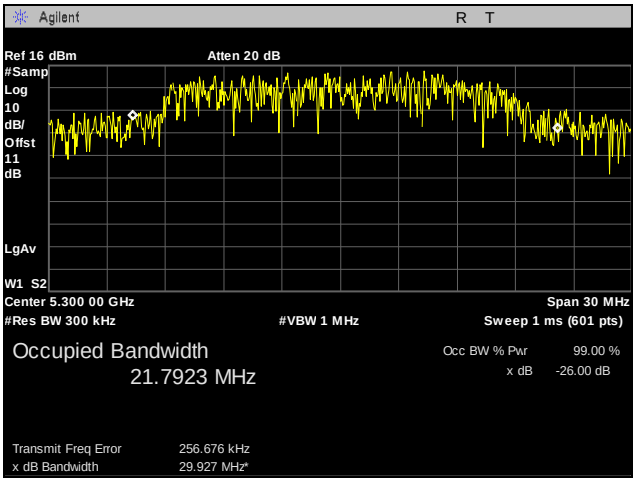


Plot 76. 99% Occupied Bandwidth, 802.11n 20 MHz, 5320 MHz, Port 2

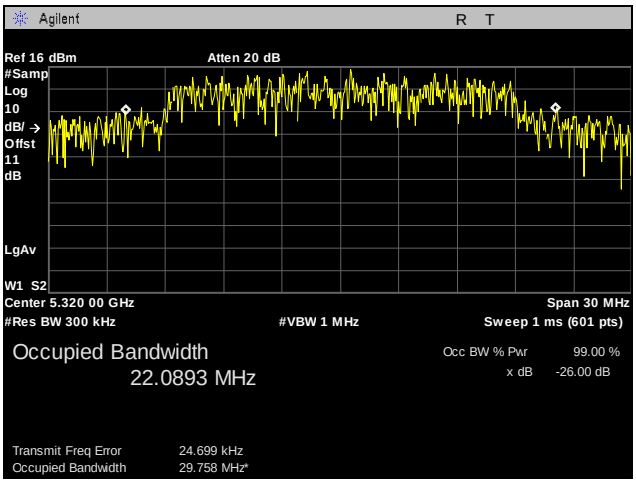
99% Occupied Bandwidth, 802.11n 20 MHz, Port 3, Lower Band



Plot 77. 99% Occupied Bandwidth, 802.11n 20 MHz, 5260 MHz, Port 3

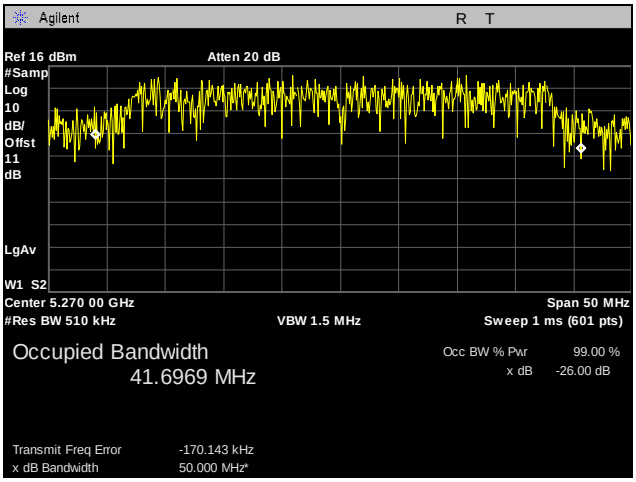


Plot 78. 99% Occupied Bandwidth, 802.11n 20 MHz, 5300 MHz, Port 3

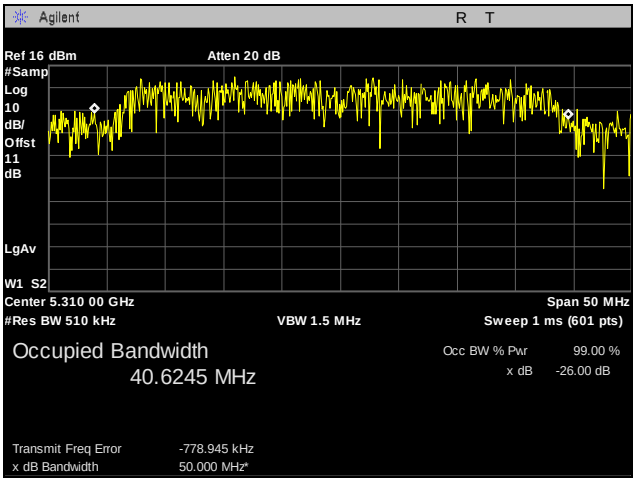


Plot 79. 99% Occupied Bandwidth, 802.11n 20 MHz, 5320 MHz, Port 3

99% Occupied Bandwidth, 802.11 40 MHz, Port 1, Lower Band

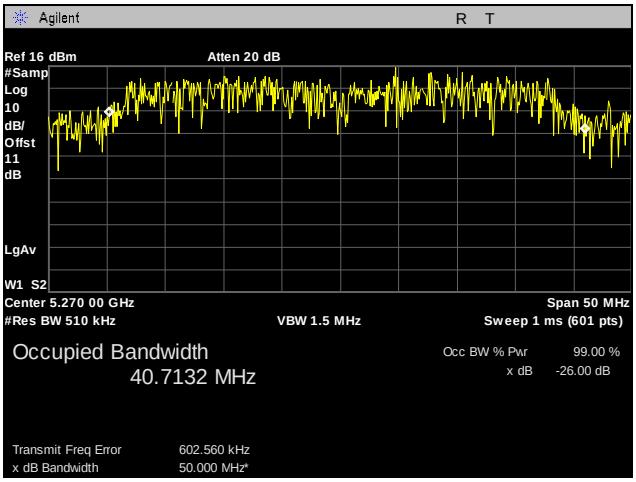


Plot 80. 99% Occupied Bandwidth, 802.11 40 MHz, 5270 MHz, Port 1

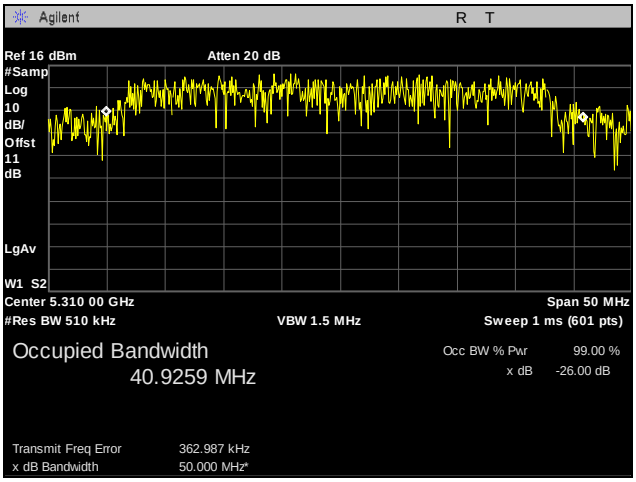


Plot 81. 99% Occupied Bandwidth, 802.11 40 MHz, 5310 MHz, Port 1

99% Occupied Bandwidth, 802.11 40 MHz, Port 2, Lower Band

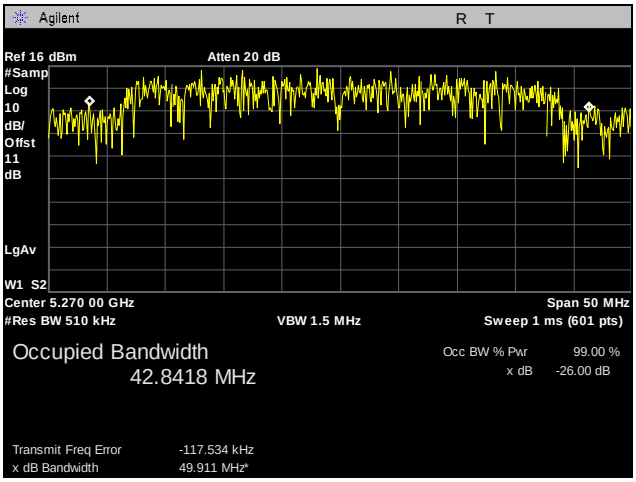


Plot 82. 99% Occupied Bandwidth, 802.11 40 MHz, 5270 MHz, Port 2

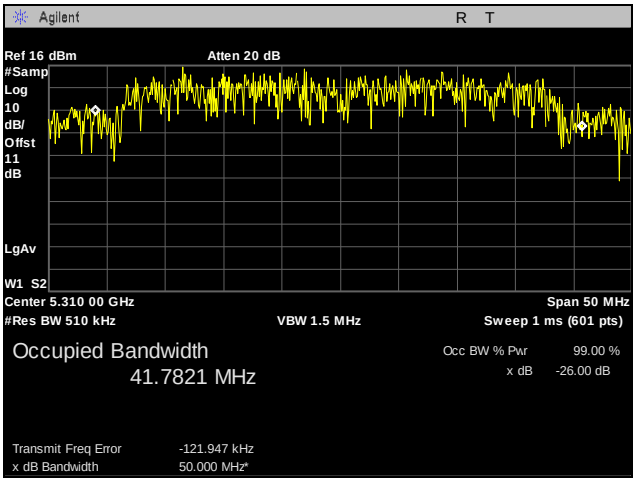


Plot 83. 99% Occupied Bandwidth, 802.11 40 MHz, 5310 MHz, Port 2

99% Occupied Bandwidth, 802.11 40 MHz, Port 3, Lower Band

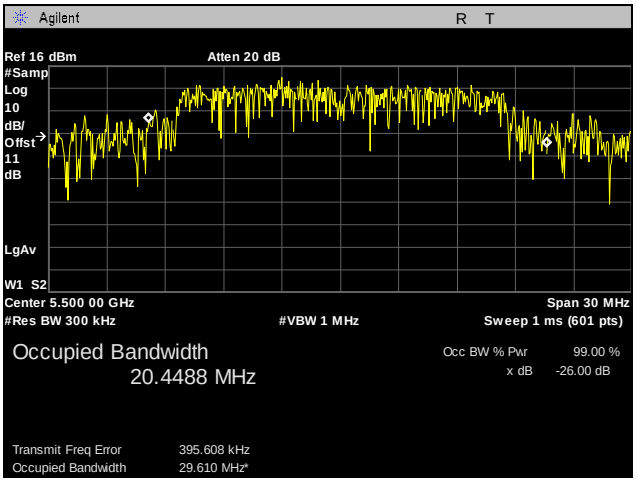


Plot 84. 99% Occupied Bandwidth, 802.11 40 MHz, 5270 MHz, Port 3

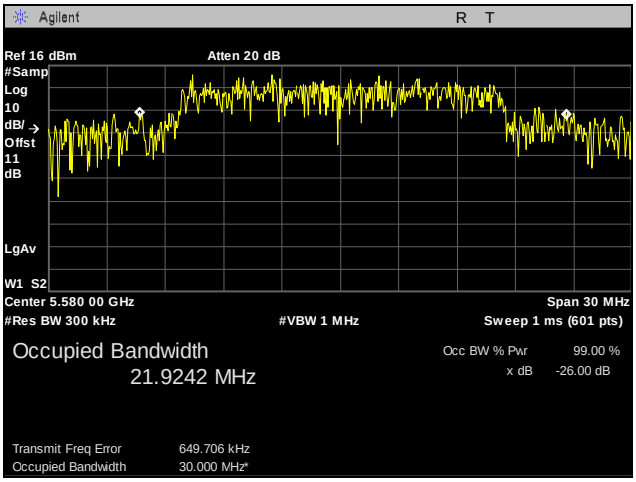


Plot 85. 99% Occupied Bandwidth, 802.11 40 MHz, 5310 MHz, Port 3

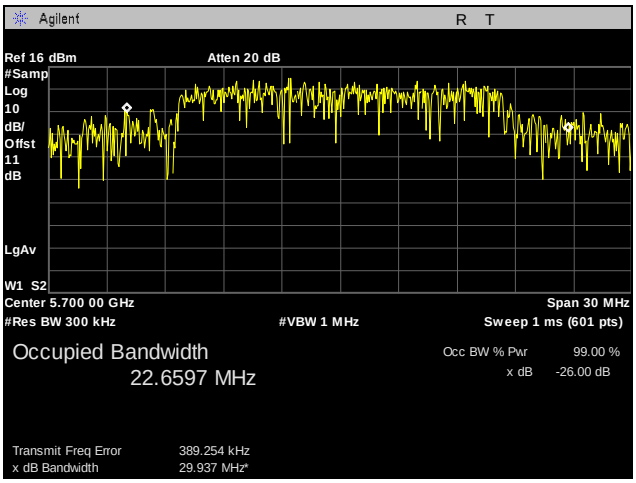
99% Occupied Bandwidth, 802.11a, Port 1, Upper Band



Plot 86. 99% Occupied Bandwidth, 802.11a, 5500 MHz, Port 1

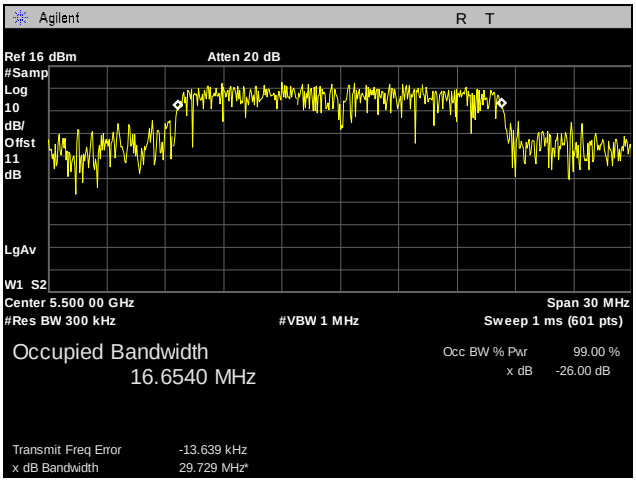


Plot 87. 99% Occupied Bandwidth, 802.11a, 5580 MHz, Port 1

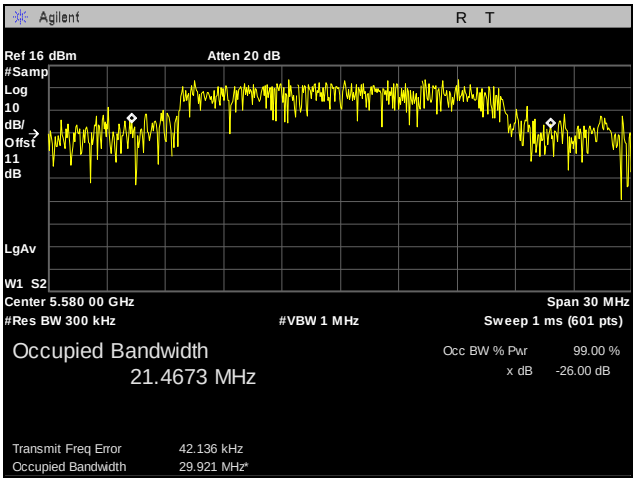


Plot 88. 99% Occupied Bandwidth, 802.11a, 5700 MHz, Port 1

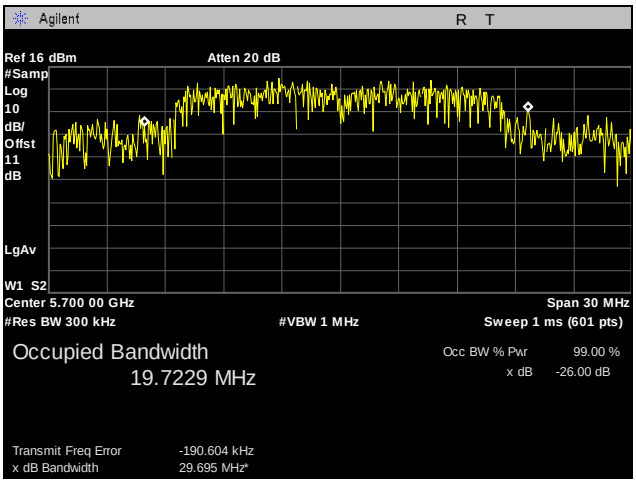
99% Occupied Bandwidth, 802.11a, Port 2, Upper Band



Plot 89. 99% Occupied Bandwidth, 802.11a, 5500 MHz, Port 2

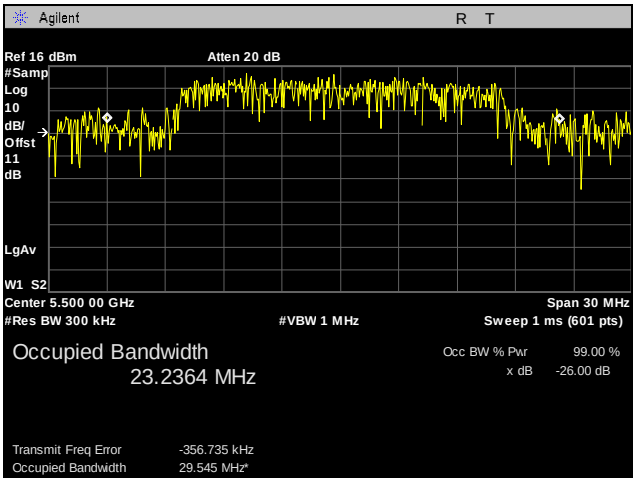


Plot 90. 99% Occupied Bandwidth, 802.11a, 5580 MHz, Port 2

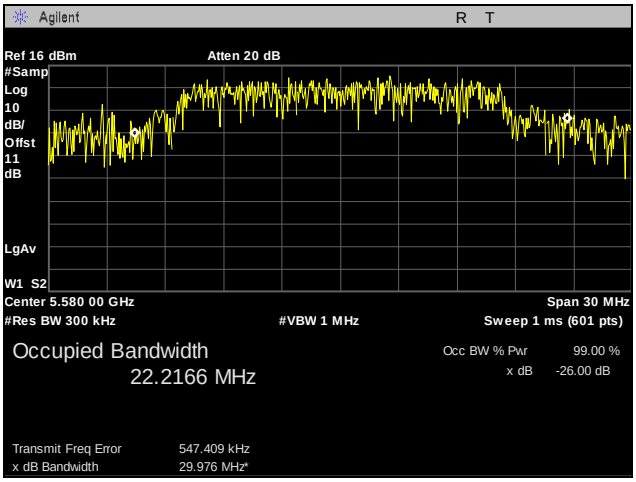


Plot 91. 99% Occupied Bandwidth, 802.11a, 5700 MHz, Port 2

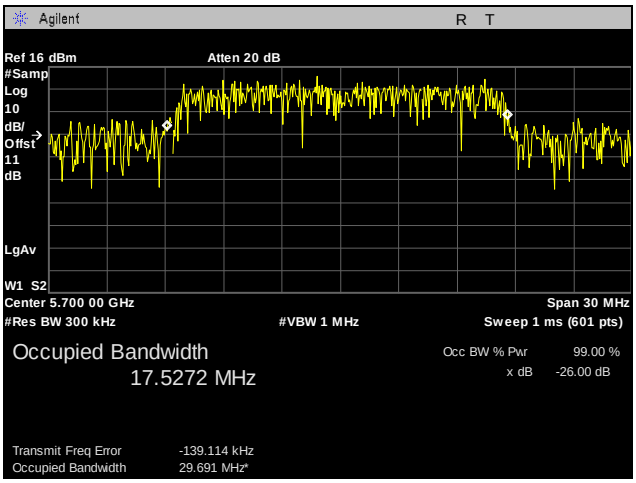
99% Occupied Bandwidth, 802.11a, Port 3, Upper Band



Plot 92. 99% Occupied Bandwidth, 802.11a, 5500 MHz, Port 3

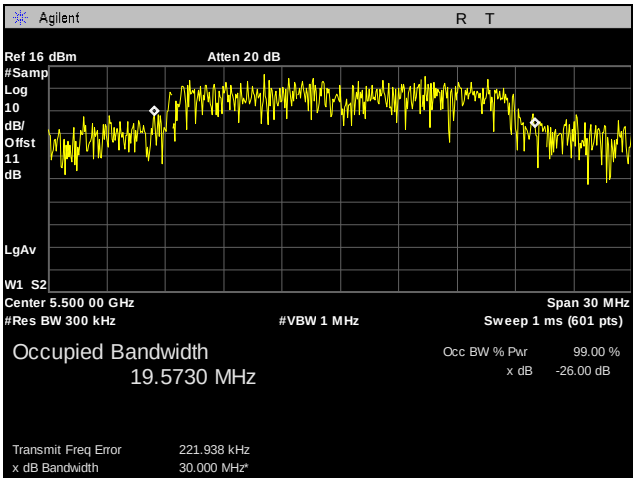


Plot 93. 99% Occupied Bandwidth, 802.11a, 5580 MHz, Port 3

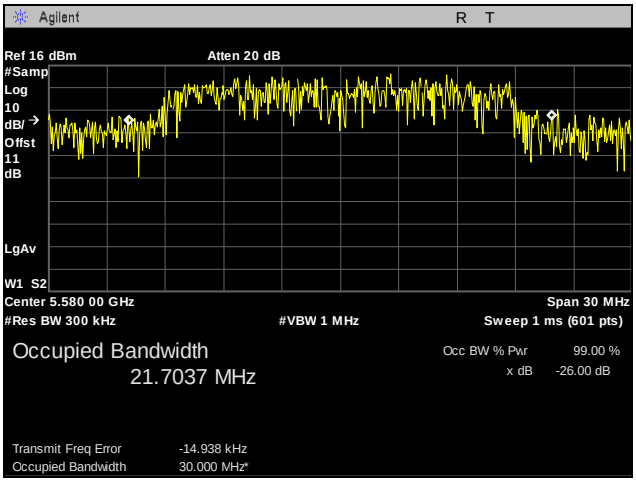


Plot 94. 99% Occupied Bandwidth, 802.11a, 5700 MHz, Port 3

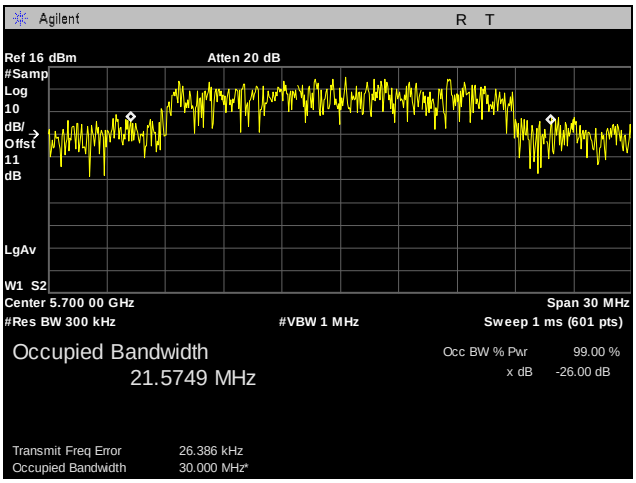
99% Occupied Bandwidth, 802.11n 20 MHz, Port 1, Upper Band



Plot 95. 99% Occupied Bandwidth, 802.11n 20 MHz, 5500 MHz, Port 1

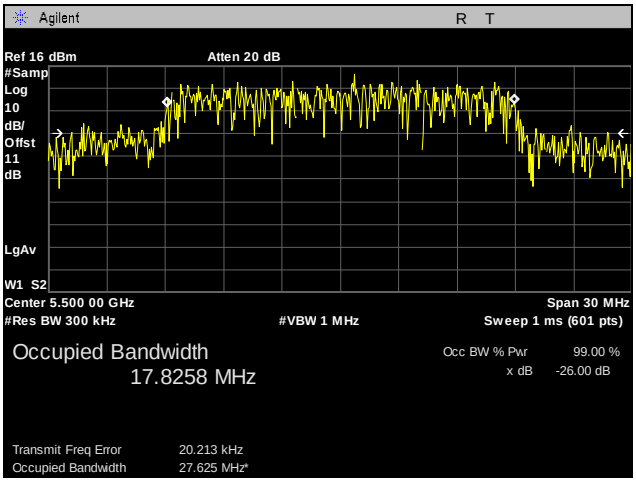


Plot 96. 99% Occupied Bandwidth, 802.11n 20 MHz, 5580 MHz, Port 1

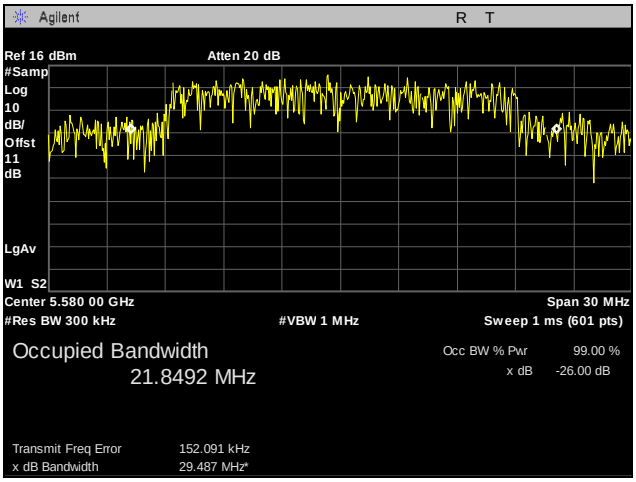


Plot 97. 99% Occupied Bandwidth, 802.11n 20 MHz, 5700 MHz, Port 1

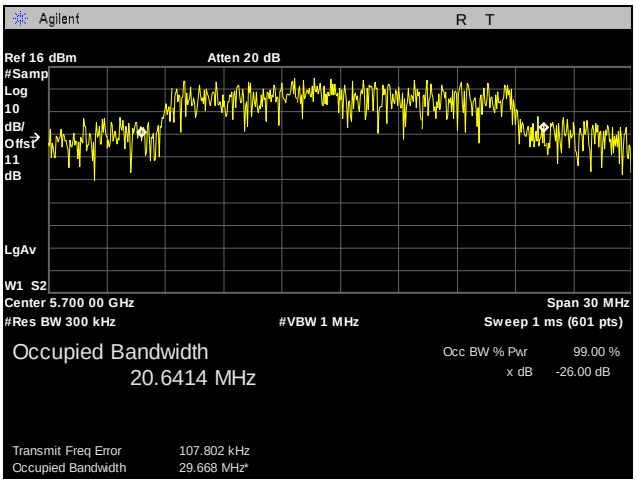
99% Occupied Bandwidth, 802.11n 20 MHz, Port 2, Upper Band



Plot 98. 99% Occupied Bandwidth, 802.11n 20 MHz, 5500 MHz, Port 2

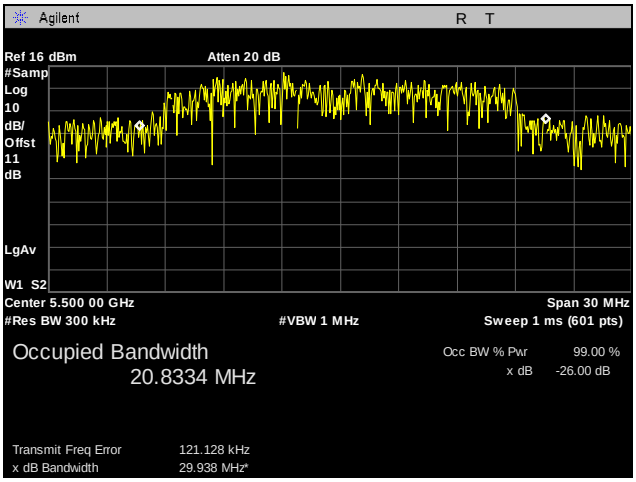


Plot 99. 99% Occupied Bandwidth, 802.11n 20 MHz, 5580 MHz, Port 2

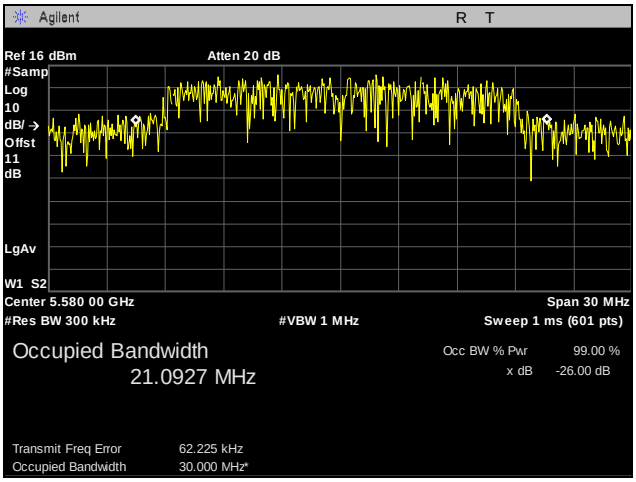


Plot 100. 99% Occupied Bandwidth, 802.11n 20 MHz, 5700 MHz, Port 2

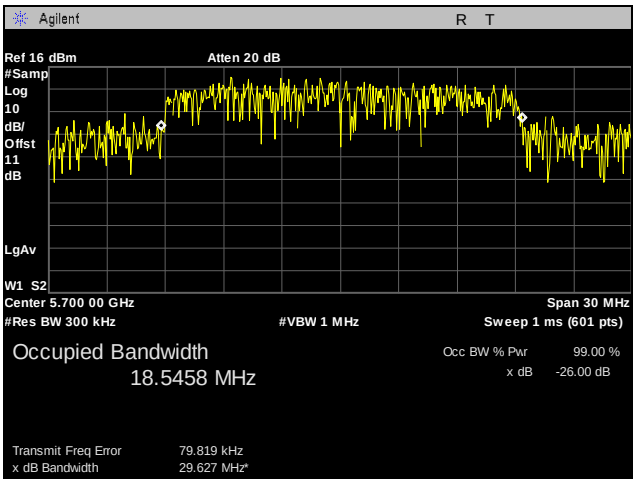
99% Occupied Bandwidth, 802.11n 20 MHz, Port 3, Upper Band



Plot 101. 99% Occupied Bandwidth, 802.11n 20 MHz, 5500 MHz, Port 3

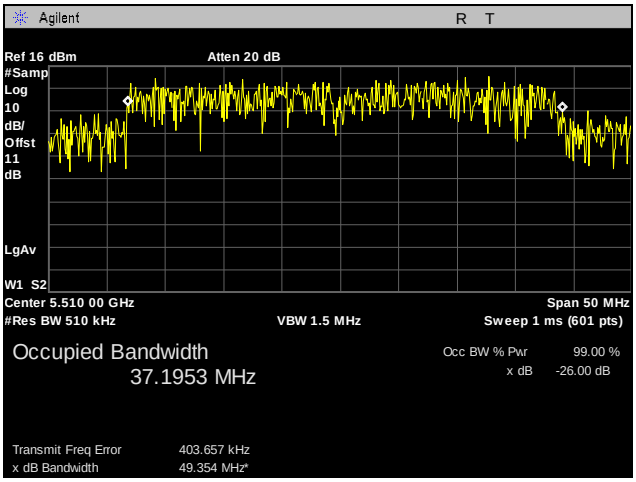


Plot 102. 99% Occupied Bandwidth, 802.11n 20 MHz, 5580 MHz, Port 3

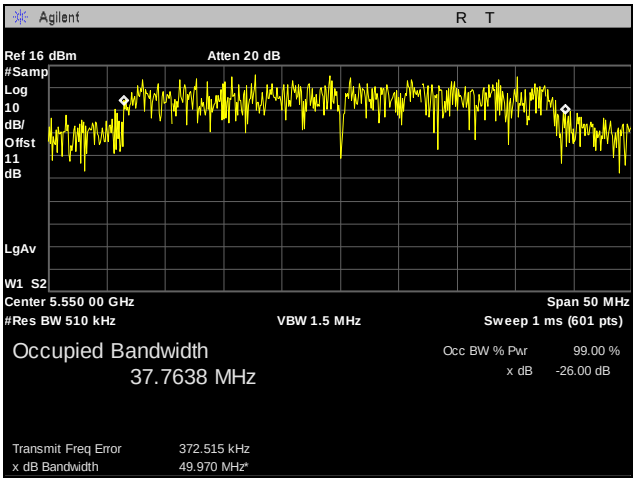


Plot 103. 99% Occupied Bandwidth, 802.11n 20 MHz, 5700 MHz, Port 3

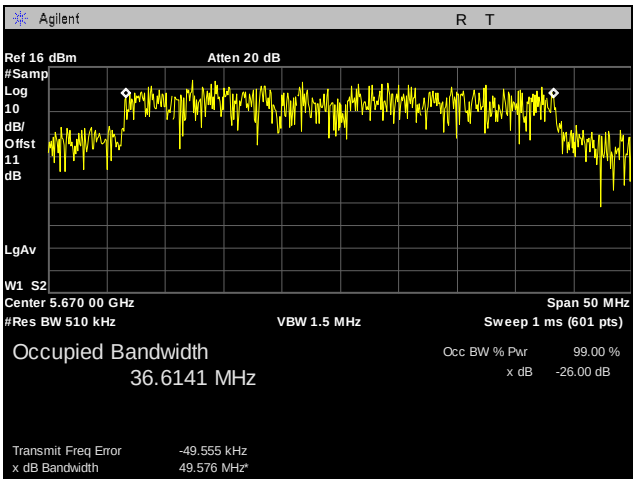
99% Occupied Bandwidth, 802.11 40 MHz, Port 1, Upper Band



Plot 104. 99% Occupied Bandwidth, 802.11 40 MHz, 5510 MHz, Port 1

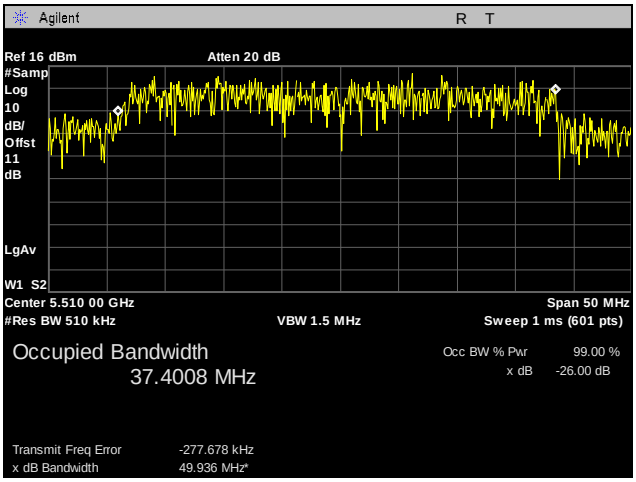


Plot 105. 99% Occupied Bandwidth, 802.11 40 MHz, 5550 MHz, Port 1

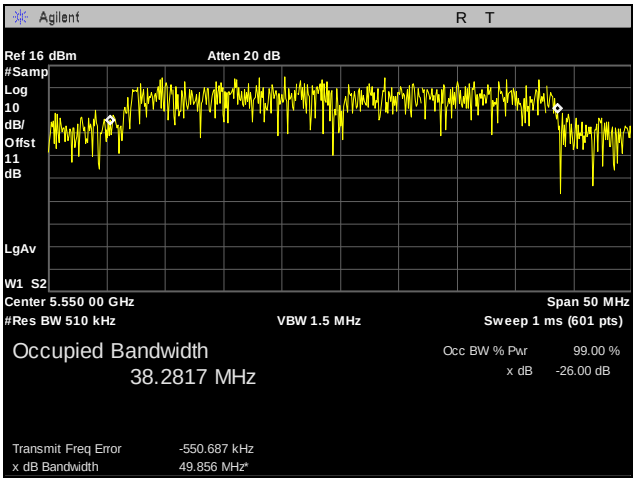


Plot 106. 99% Occupied Bandwidth, 802.11 40 MHz, 5670 MHz, Port 1

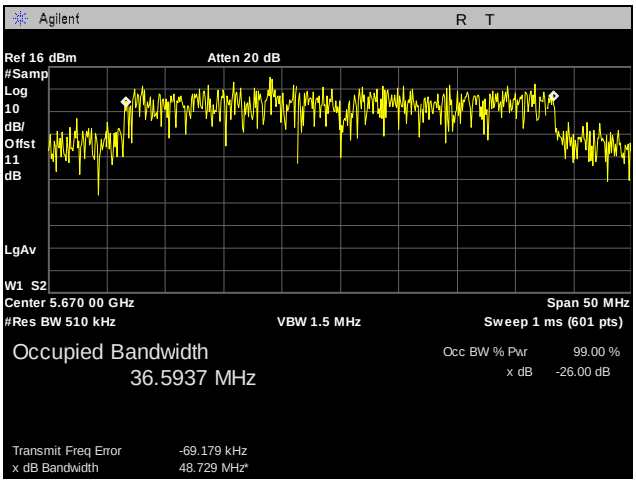
99% Occupied Bandwidth, 802.11 40 MHz, Port 2, Upper Band



Plot 107. 99% Occupied Bandwidth, 802.11 40 MHz, 5510 MHz, Port 2

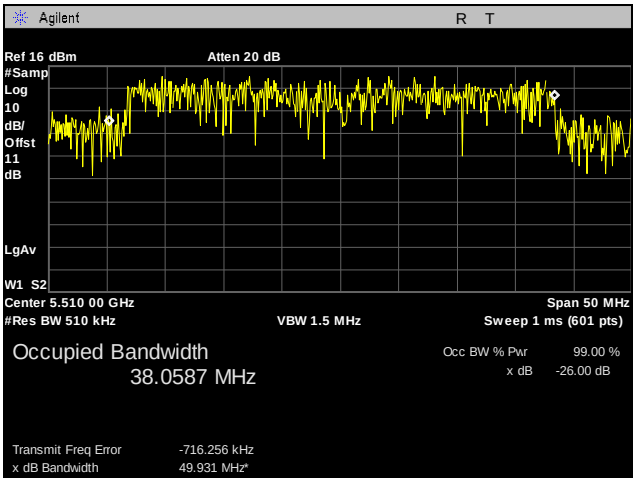


Plot 108. 99% Occupied Bandwidth, 802.11 40 MHz, 5550 MHz, Port 2

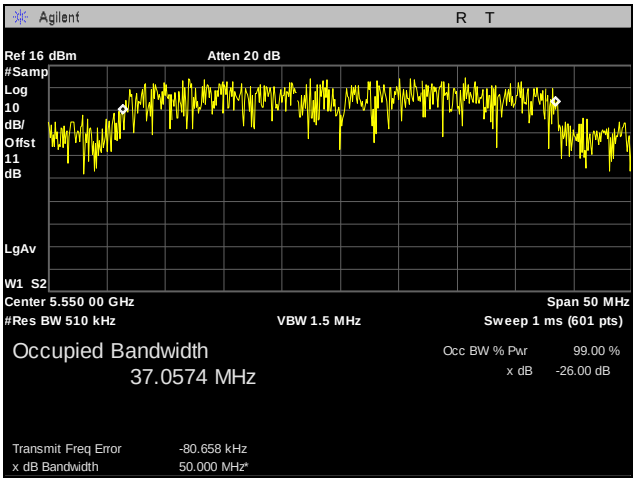


Plot 109. 99% Occupied Bandwidth, 802.11 40 MHz, 5670 MHz, Port 2

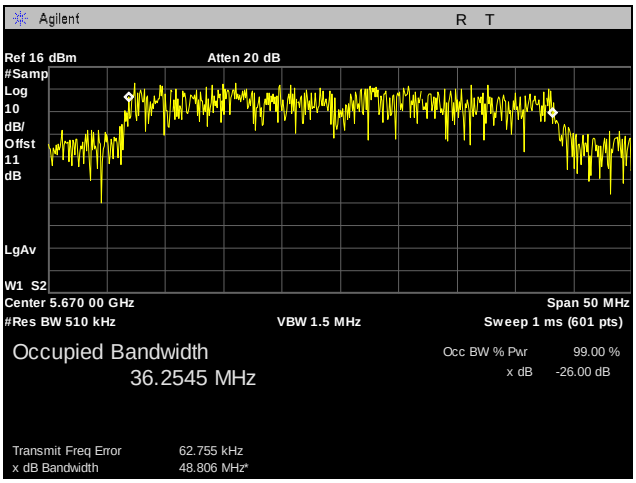
99% Occupied Bandwidth, 802.11 40 MHz, Port 3, Upper Band



Plot 110. 99% Occupied Bandwidth, 802.11 40 MHz, 5510 MHz, Port 3



Plot 111. 99% Occupied Bandwidth, 802.11 40 MHz, 5550 MHz, Port 3



Plot 112. 99% Occupied Bandwidth, 802.11 40 MHz, 5670 MHz, Port 3

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15. 407(a)(2) RF Power Output

Test Requirements: **§15.407(a)(2):** The maximum output power of the intentional radiator shall not exceed the following:

§15.407(a) (2): For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10log B, where B is the 26 dB emission bandwidth in megahertz.

Test Procedure: The transmitter was connected to a calibrated Spectrum analyzer. The EUT was measured at the low, mid and high channels of each band with the data rate that produced the highest output power.

Test Results: Equipment complies with the Peak Power Output limits of **§ 15.401(a) (2).**

Test Engineer(s): Minh Ly

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

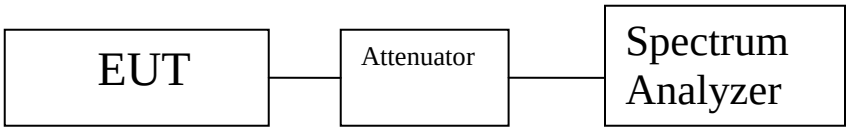


Figure 2. Power Output Test Setup

802.11a			
Mode	**Frequency (MHz)**		**Measured Output Power (dBm)**
802.11a	UNII-2 Lower Band	5260	15.59
		5320	16.85
	UNII-2 Upper Band	5500	19.15
		5580	19.21
		5700	19.05

Table 24. RF Power Output, Test Results

Summed Power (n mode)						
Mode	**Frequency (MHz)**		**Port 1**	**Port 2**	**Port 3**	**Summed Power (dBm)**
802.11n 20MHz	UNII-2 Lower Band	5260	15.04	15.47	15.67	20.17
		5300	15.61	15.57	15.15	20.22
		5320	15.52	15.50	15.32	20.21
	UNII-2 Upper Band	5500	15.25	15.30	15.57	20.14
		5580	15.02	15.71	15.53	20.20
		5700	15.90	15.23	15.08	20.19
802.11n 40MHz	UNII-2 Lower Band	5270	14.05	14.09	14.31	18.92
		5310	14.78	14.69	14.30	19.37
	UNII-2 Upper Band	5510	14.73	14.28	14.44	19.23
		5550	14.41	15.00	14.55	19.43
		5670	14.20	14.44	14.16	19.04

Table 25, RF Power Output, 5 dBi, Summed Power

Port 1(a mode)			
Mode	**Frequency (MHz)**		**Measured Output Power (dBm)**
802.11a	UNII-2 Lower Band	5260	10.31
		5320	10.14
	UNII-2 Upper Band	5500	10.41
		5600	10.52
		5700	10.22

Table 26- RF Power Output, 19dBi Antenna, Summed Power

19dBi Antenna, Summed Power (n mode)						
Mode	**Frequency (MHz)**		**Port 1**	**Port 2**	**Port 3**	**Summed Power (dBm)**
802.11n 20MHz	UNII-2 Lower Band	5260	6.1	5.52	5.65	10.54
		5320	6.29	5.62	6.01	10.75
	UNII-2 Upper Band	5500	6.21	5.93	5.72	10.73
		5600	6.41	6.1	5.21	10.71
		5700	6.05	5.46	5.74	10.53
802.11n 40MHz	UNII-2 Lower Band	5270	5.18	5.22	5.21	9.97
		5310	5.81	5.51	5.98	10.54
	UNII-2 Upper Band	5510	5.38	5.18	5.34	10.07
		5590	5.39	5.89	5.91	10.51
		5670	5.09	5.39	5.18	9.99

Table 27- RF Power Output, 19dBi Antenna, Summed Power

Electromagnetic Compatibility Criteria for Intentional Radiators

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

Test Requirements: **§ 15.407(a)(2):** In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band.

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

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

Test Engineer(s): Minh Ly

Test Date(s): 07/28/09 – 08/11/09

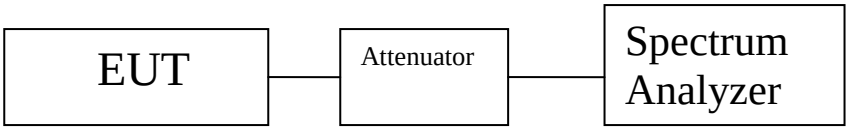


Figure 3. Power Spectral Density Test Setup

802.11a Mode				
Mode	Frequency	Measured PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
802.11a	5260	4.342	11	6.658
	5320	4.682	11	6.318
	5500	8.358	11	2.642
	5580	8.253	11	2.747
	5700	8.450	11	2.550

Table 28. Power Spectral Density, 802.11a, Test Results

Mode	Frequency	Port 1	Port 2	Port 3	Summed	Limit
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)
802.11n 20MHz	5260	2.10	2.50	2.40	7.11	7.23
	5300	1.80	2.10	2.00	6.73	7.23
	5320	1.67	2.00	2.10	6.70	7.23
	5500	1.80	2.10	2.30	6.84	7.23
	5580	2.03	2.34	2.20	6.96	7.23
	5700	2.10	2.15	1.90	6.82	7.23
802.11n 40MHz	5270	1.578	1.477	2.129	6.856	7.23
	5310	1.657	1.749	2.385	6.714	7.23
	5510	2.370	2.453	2.488	7.20	7.23
	5550	2.357	2.352	2.455	7.16	7.23
	5670	2.122	2.261	2.534	7.080	7.23

Table 29. Power Spectral Density, 802.11n, Test Results, Port 1-3 & Summed

Peak Power Spectral Density (19dBi Antenna)			
Mode/Antenna	Carrier Channel	Frequency	Measured Peak Power Spectral Density
UNII- 2 Lower 20MHz	Low	5260	-3.116
	Mid	5300	-3.361
	High	5320	-2.585
UNII-2 Lower 40MHz	Low	5270	-4.35
	High	5310	-3.921
UNII-2 Upper 20MHz	Low	5500	-3.597
	Mid	5580	-2.599
	High	5700	-2.88
UNII-2 Upper 40MHz	Low	5510	-4.01
	Mid	5550	-2.516
	High	5670	-2.5

Table 30. Power Spectral Density, 802.11n, Test Results, 19dBi Antenna, Summed

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.407(a)(6) Peak Excursion Ratio

Test Requirements: **§ 15.407(a)(6):** The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

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

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

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

Test Engineer(s): Minh Ly

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

Port 1				
Mode	**Frequency (MHz)**	**Excursion Ratio (dBm)**	**Limit (dBm)**	**Margin (dB)**
802.11a	5260	9.087	13	3.913
	5320	9.009	13	3.991
	5500	9.613	13	3.387
	5580	11.37	13	1.63
	5700	9.827	13	3.173
802.11n 20MHz	5260	10.32	13	2.68
	5320	11.53	13	1.47
	5500	10.65	13	2.35
	5580	10.26	13	2.74
	5700	10.79	13	2.21
802.11n 40MHz	5270	12.71	13	0.29
	5310	12.65	13	0.35
	5510	12.59	13	0.41
	5550	10.68	13	2.32
	5670	11.73	13	1.27

Table 31. Peak Excursion Ration, Test Results, Port 1

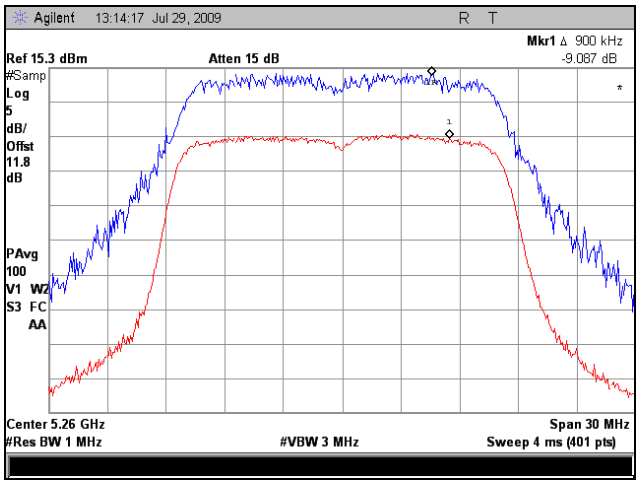
Port 2				
Mode	**Frequency (MHz)**	**Excursion Ratio (dBm)**	**Limit (dBm)**	**Margin (dB)**
802.11n 20MHz	5260	10.33	13	2.67
	5320	9.634	13	3.366
	5500	11.02	13	1.98
	5580	11.27	13	1.73
	5700	10.63	13	2.37
802.11n 40MHz	5270	12.95	13	0.05
	5310	11.98	13	1.02
	5510	11.73	13	1.27
	5550	10.52	13	2.48
	5670	9.8	13	3.2

Table 32. Peak Excursion Ration, Test Results, Port 2

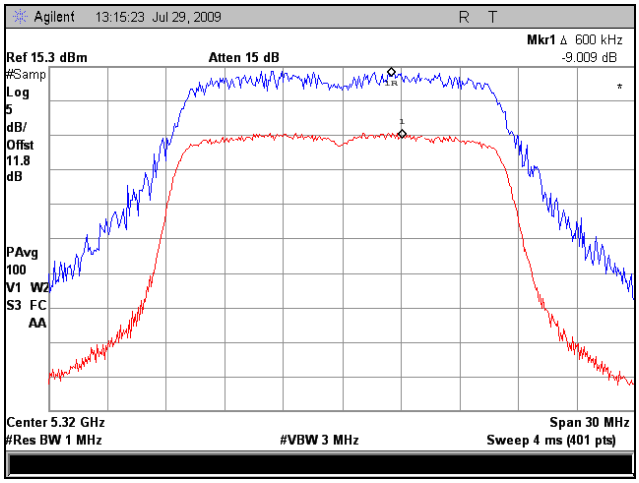
Port 3				
Mode	**Frequency (MHz)**	**Excursion Ratio (dBm)**	**Limit (dBm)**	**Margin (dB)**
802.11n 20MHz	5260	11.96	13	1.04
	5320	9.529	13	3.471
	5500	10.11	13	2.89
	5580	10.24	13	2.76
	5700	8.677	13	4.323
802.11n 40MHz	5270	12.86	13	0.14
	5310	12.17	13	0.83
	5510	12.6	13	0.4
	5550	11.2	13	1.8
	5670	12	13	1

Table 33. Peak Excursion Ration, Test Results, Port 3

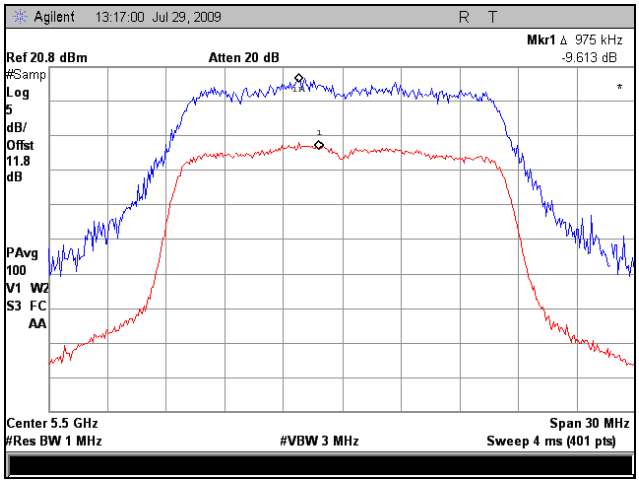
Peak Excursion Ratio, Port 1, 802.11a



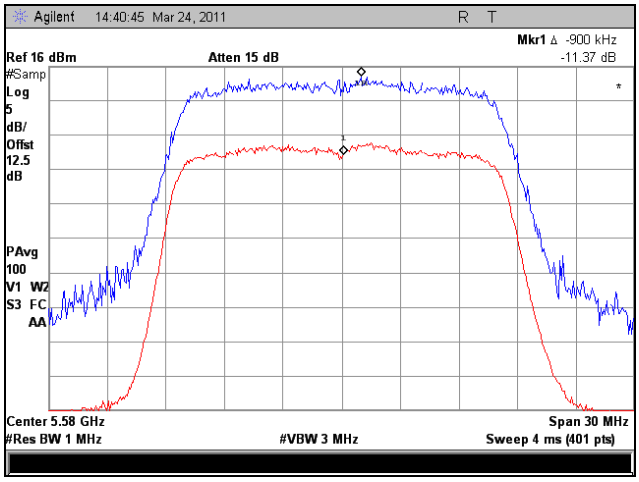
Plot 113. Peak Excursion, Port 1, 802.11a, 5260 MHz



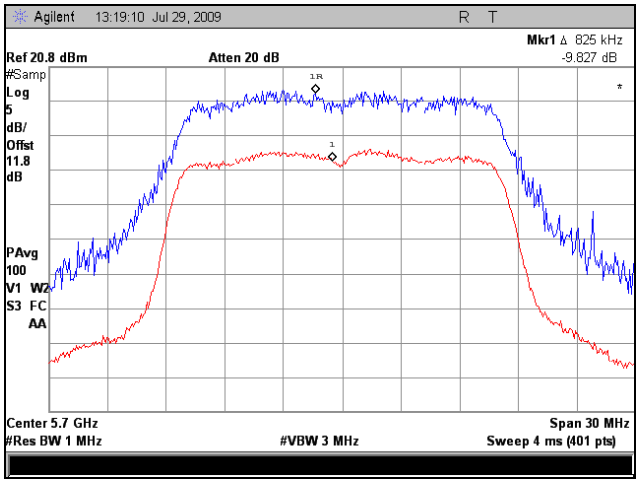
Plot 114. Peak Excursion, Port 1, 802.11a, 5320 MHz



Plot 115. Peak Excursion, Port 1, 802.11a, 5500 MHz

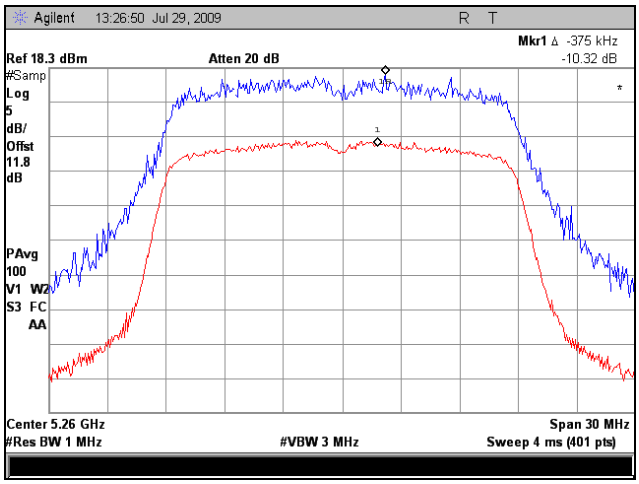


Plot 116. Peak Excursion, Port 1, 802.11a, 5580 MHz

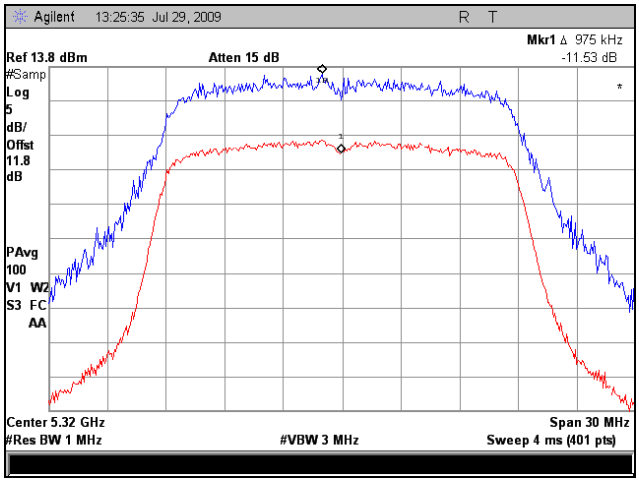


Plot 117. Peak Excursion, Port 1, 802.11a, 5700 MHz

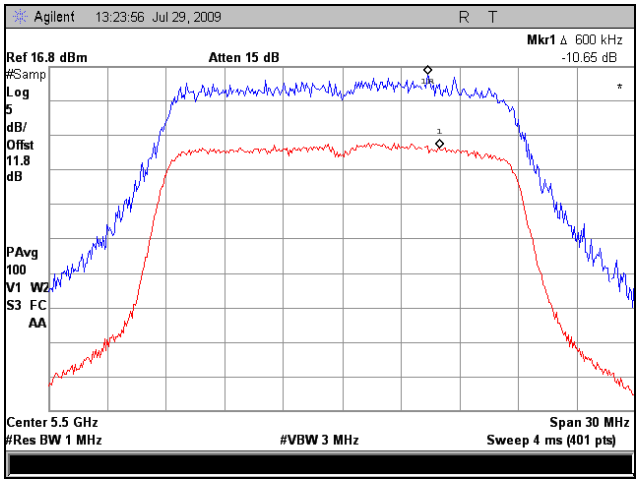
Peak Excursion Ratio, 7200 Outdoor, Port 1, 802.11n 20MHz



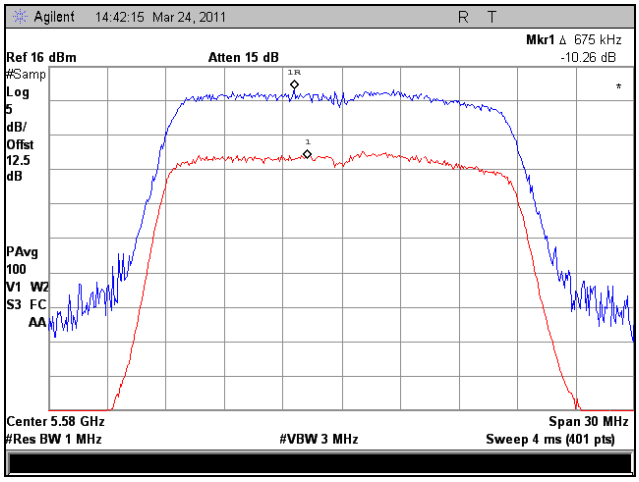
Plot 118. Peak Excursion, Port 1, 802.11n 20MHz, 5260 MHz



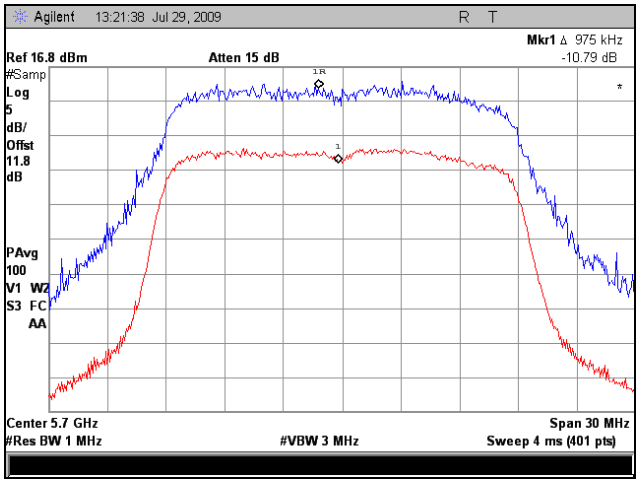
Plot 119. Peak Excursion, Port 1, 802.11n 20MHz, 5320 MHz



Plot 120. Peak Excursion, Port 1, 802.11n 20MHz, 5500 MHz

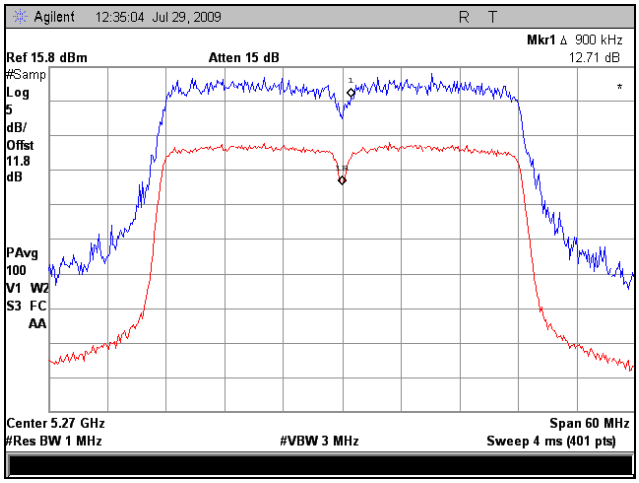


Plot 121. Peak Excursion, Port 1, 802.11n 20MHz, 5580 MHz

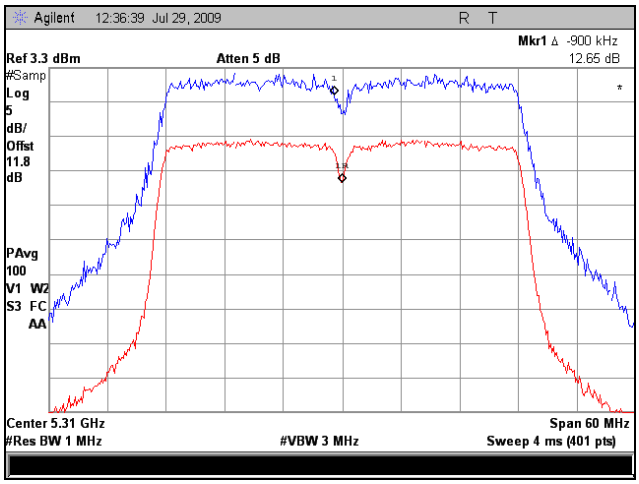


Plot 122. Peak Excursion, Port 1, 802.11n 20MHz, 5700 MHz

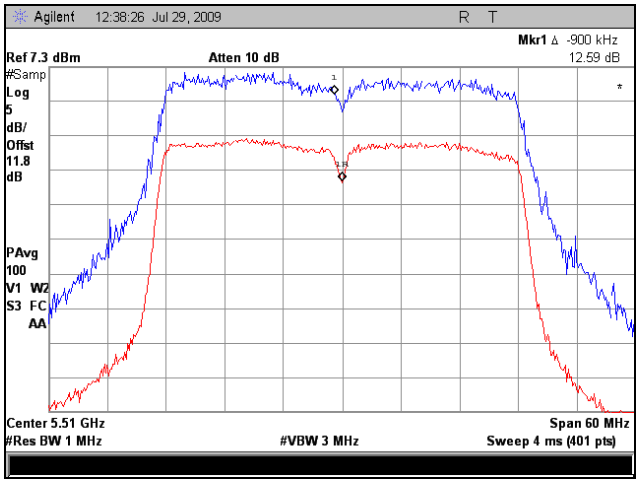
Peak Excursion Ratio, Port 1, 802.11n 40MHz



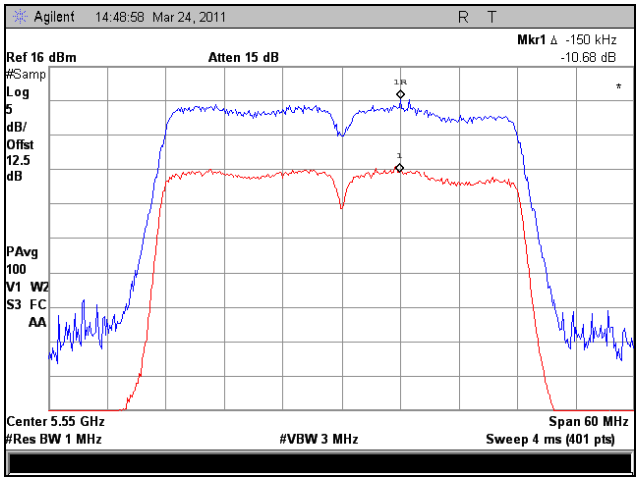
Plot 123. Peak Excursion, Port 1, 802.11n 40MHz, 5270 MHz



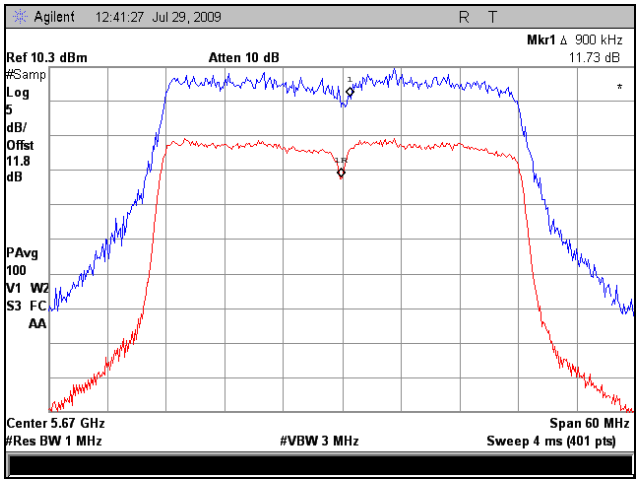
Plot 124. Peak Excursion, Port 1, 802.11n 40MHz, 5310 MHz



Plot 125. Peak Excursion, Port 1, 802.11n 40MHz, 5510 MHz

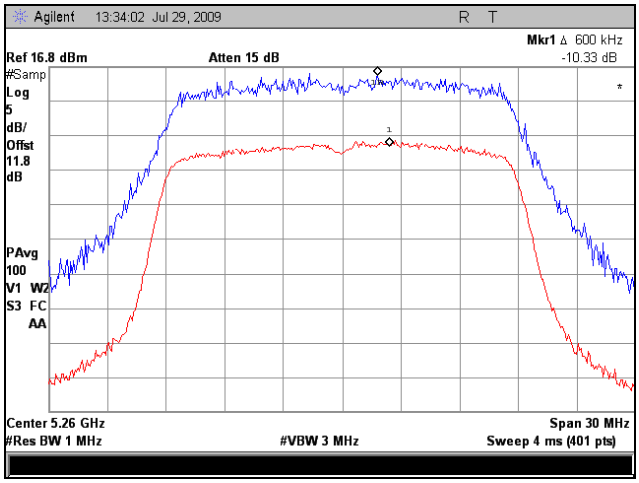


Plot 126. Peak Excursion, Port 1, 802.11n 40MHz, 5550 MHz

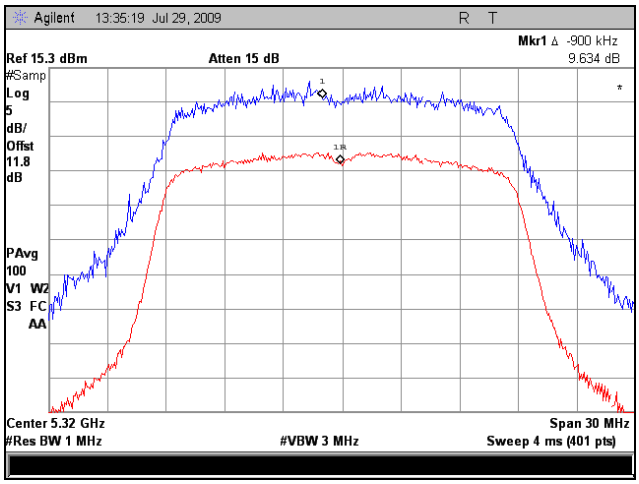


Plot 127. Peak Excursion Ratio, Port 1, 802.11n 40MHz, 5670 MHz

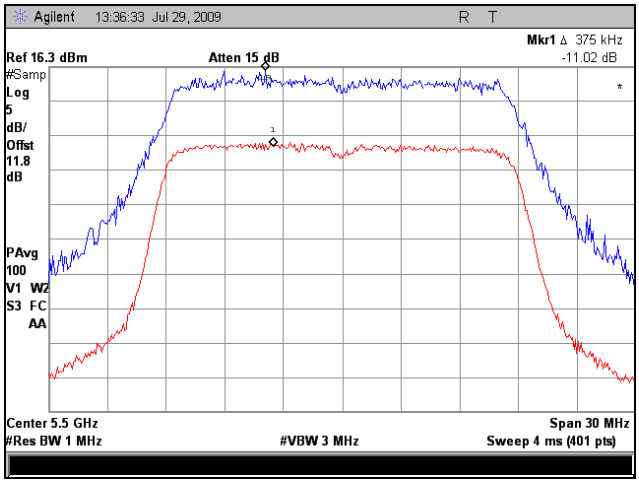
Peak Excursion Ratio, Port 2, 802.11n 20MHz



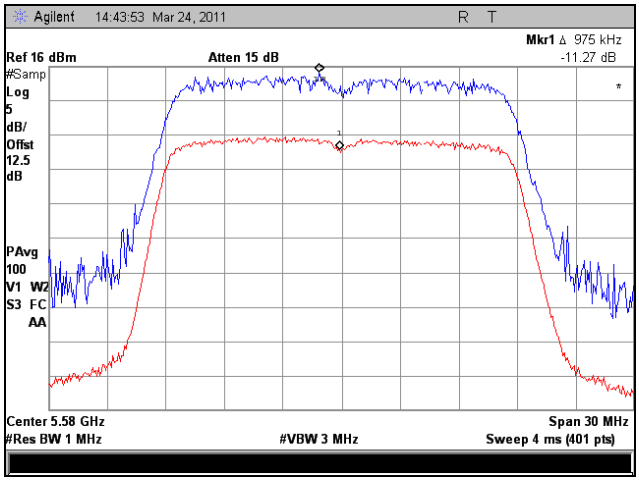
Plot 128. Peak Excursion, Port 2, 802.11n 20MHz, 5260 MHz



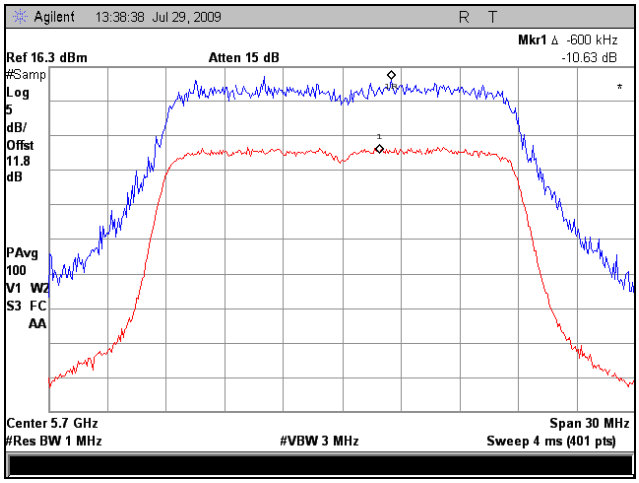
Plot 129. Peak Excursion, Port 2, 802.11n 20MHz, 5320 MHz



Plot 130. Peak Excursion, Port 2, 802.11n 20MHz, 5500 MHz

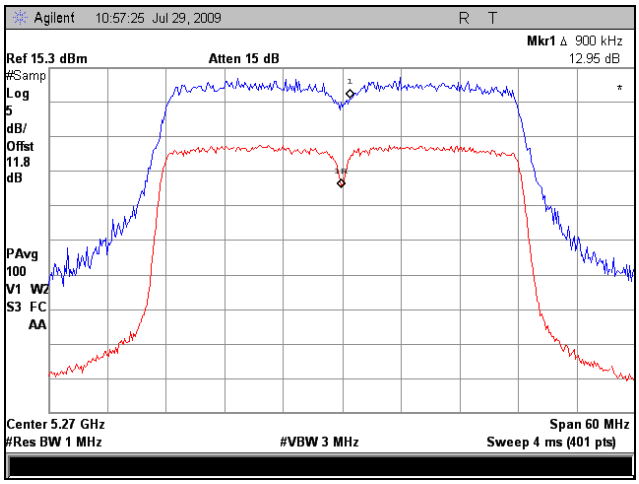


Plot 131. Peak Excursion, Port 2, 802.11n 20MHz, 5580 MHz

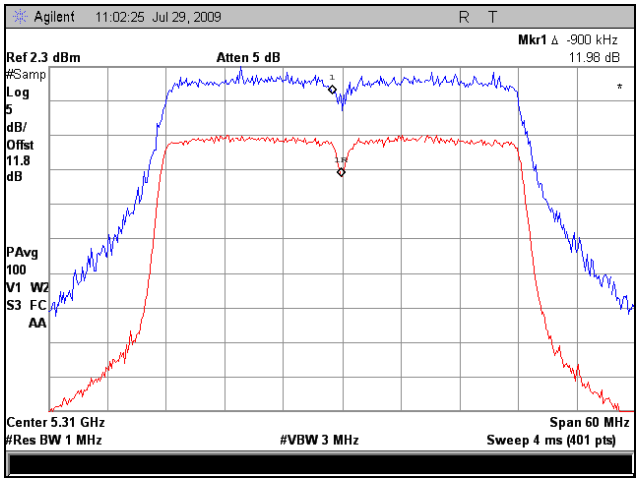


Plot 132. Peak Excursion Ratio, Port 2, 802.11n 20MHz, 5700 MHz

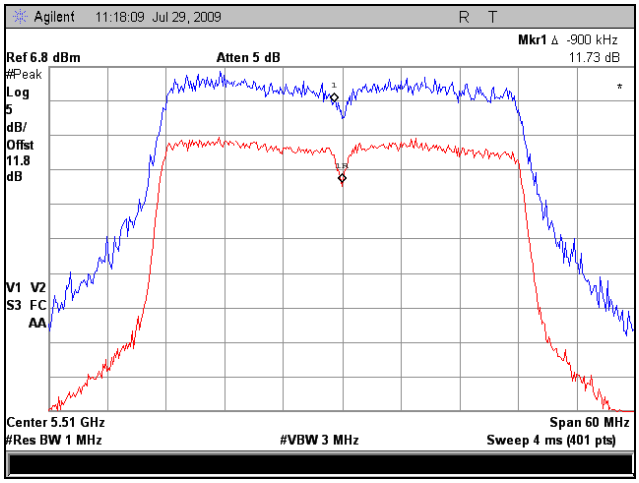
Peak Excursion Ratio, Port 2, 802.11n 40MHz



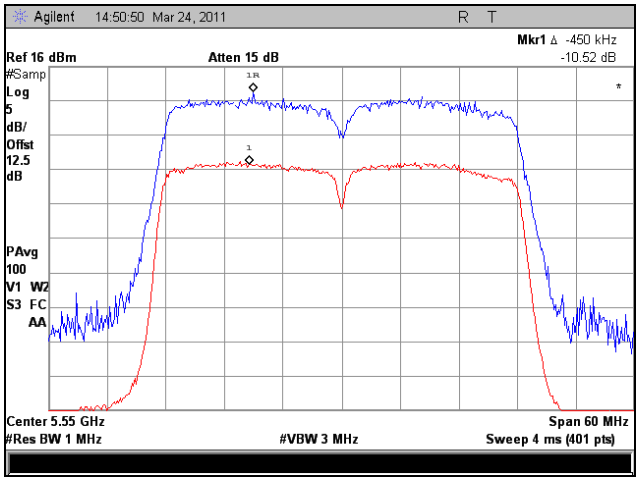
Plot 133. Peak Excursion, Port 2, 802.11n 40MHz, 5270 MHz



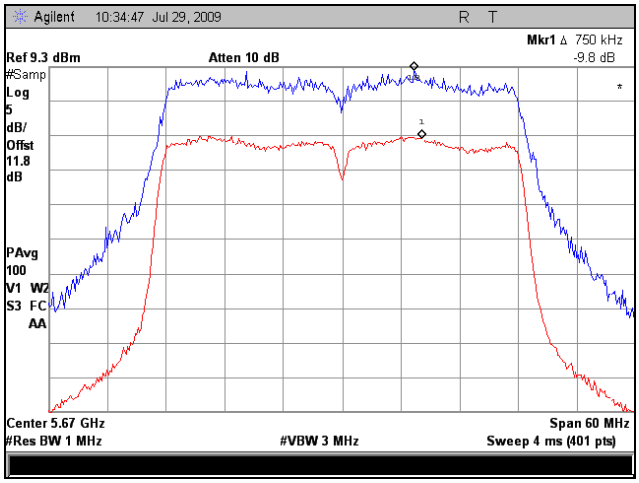
Plot 134. Peak Excursion, Port 2, 802.11n 40MHz, 5310 MHz



Plot 135. Peak Excursion, Port 2, 802.11n 40MHz, 5510 MHz

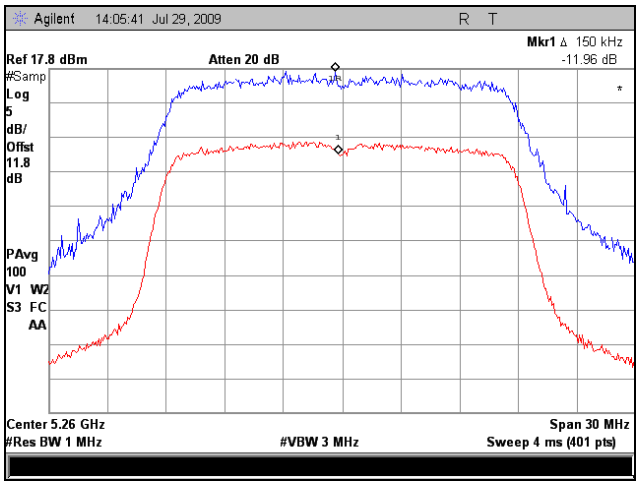


Plot 136. Peak Excursion, Port 2, 802.11n 40MHz, 5550 MHz

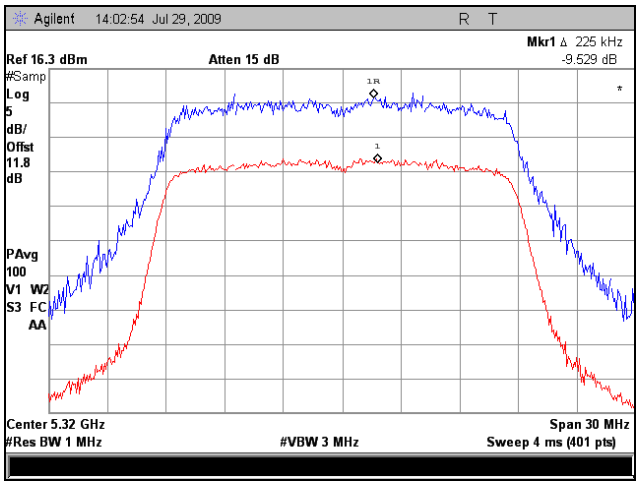


Plot 137. Peak Excursion, Port 2, 802.11n 40MHz, 5670 MHz

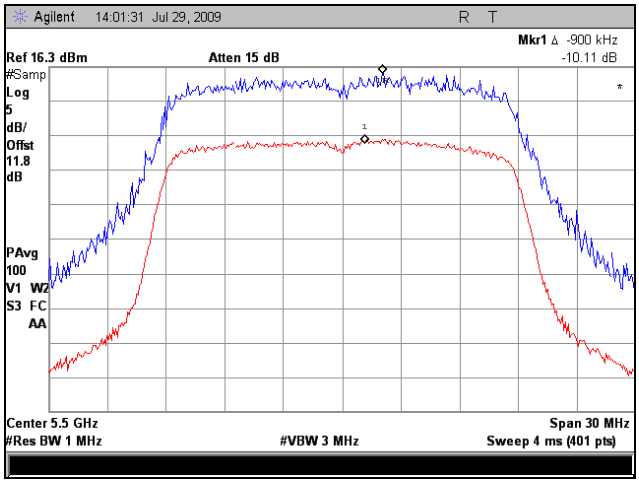
Peak Excursion Ratio, Port 3, 802.11n 20MHz



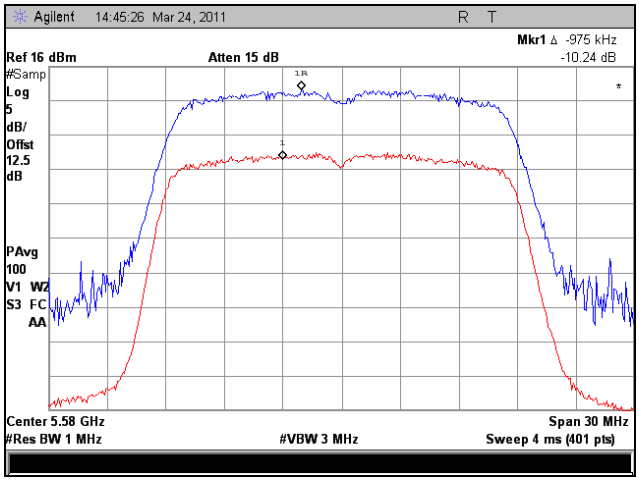
Plot 138. Peak Excursion, Port 3, 802.11n 20MHz, 5260 MHz



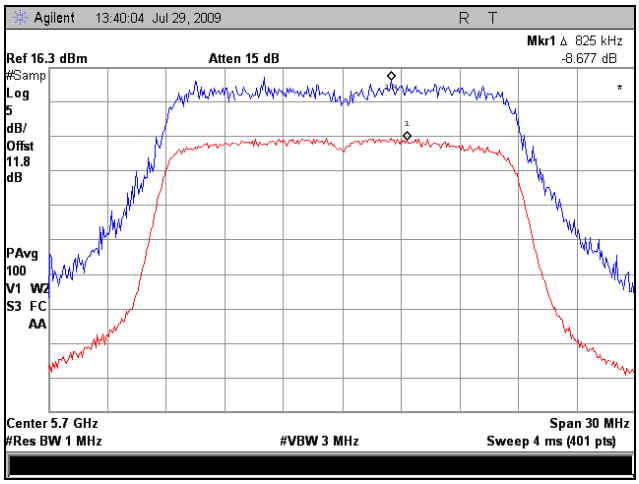
Plot 139. Peak Excursion, Port 3, 802.11n 20MHz, 5320 MHz



Plot 140. Peak Excursion, Port 3, 802.11n 20MHz, 5500 MHz

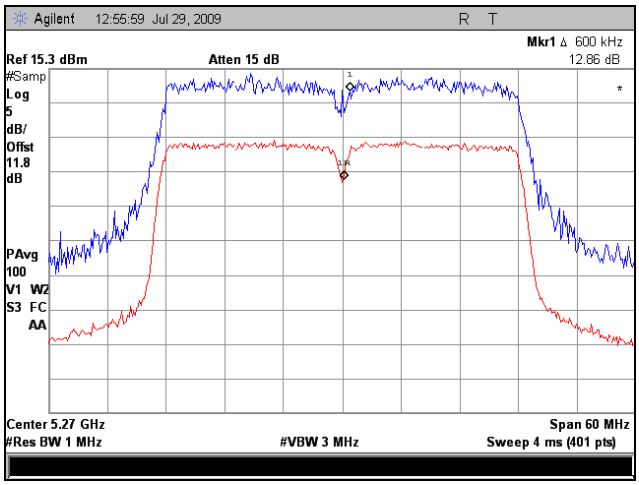


Plot 141. Peak Excursion, Port 3, 802.11n 20MHz, 5580 MHz

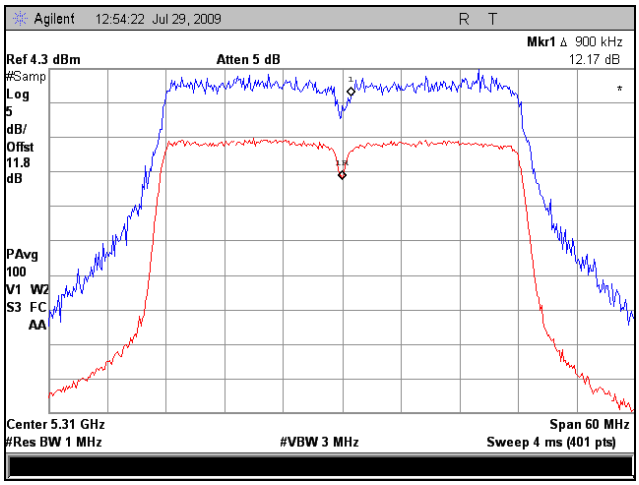


Plot 142. Peak Excursion Ratio, Port 3, 802.11n 20MHz, 5700 MHz

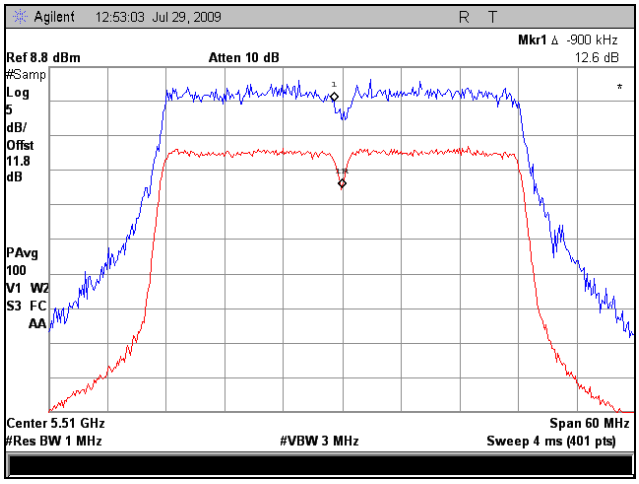
Peak Excursion Ratio, Port 3, 802.11n 40MHz



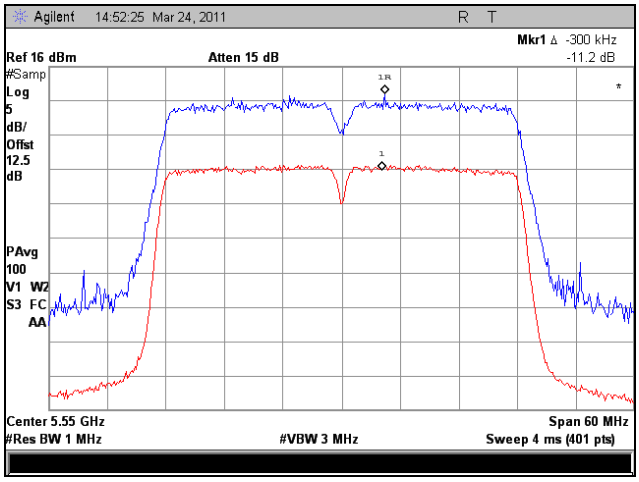
Plot 143. Peak Excursion, Port 3, 802.11n 40MHz, 5270 MHz



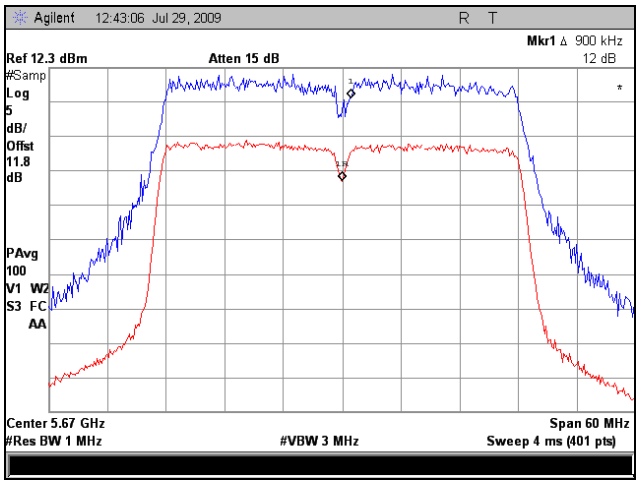
Plot 144. Peak Excursion, Port 3, 802.11n 40MHz, 5310 MHz



Plot 145. Peak Excursion, Port 3, 802.11n 40MHz, 5510 MHz



Plot 146. Peak Excursion, Port 3, 802.11n 40MHz, 5550 MHz



Plot 147. Peak Excursion, Port 3, 802.11n 40MHz, 5670 MHz

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.407(b)(2), (3), (6), (7) Undesirable Emissions

Test Requirements: **§ 15.407(b)(2), (3), (6), (7)**; **§15.205:** Emissions outside the frequency band.

§ 15.407(b)(2): For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.

§ 15.407(b)(3): For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz**.**

§ 15.407(b)(6): Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in Section 15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in Section 15.207.

§ 15.407(b)(7): The provisions of Section 15.205 of this part apply to intentional radiators operating under this section.

Test Procedure: The transmitter was placed on a wooden table in a semi-anechoic chamber. Measurements were performed with the EUT rotated 360 degrees and varying the adjustable antenna mast height to determine worst case orientation for maximum emissions.

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

For measurements above 1 GHz, measurements were made with a Peak detector with 1 MHz resolution bandwidth. Where the spurious emissions fell into a restricted band, measurements were also made with an average detector to make sure they complied with 15.209 limits. Emissions were explored up to 40 GHz.
The equation, **EIRP= E + 20 log D – 104.8** was used to convert an EIRP limit to a field strength limit.
E = field strength (dBUv/m)
D = Reference measurement distance

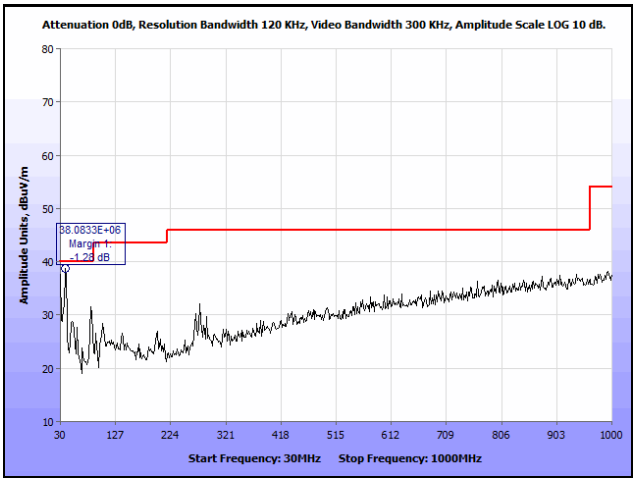
No peaks were found above 18 GHz.

Test Results: The EUT was compliant with the Radiated Emission limits for Intentional Radiators. See following pages for detailed test results.

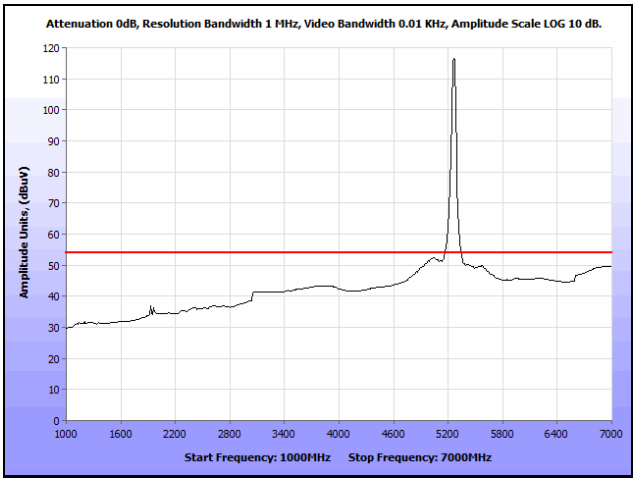
Test Engineer(s): Aaron Chang

Test Date(s): 06/24/13

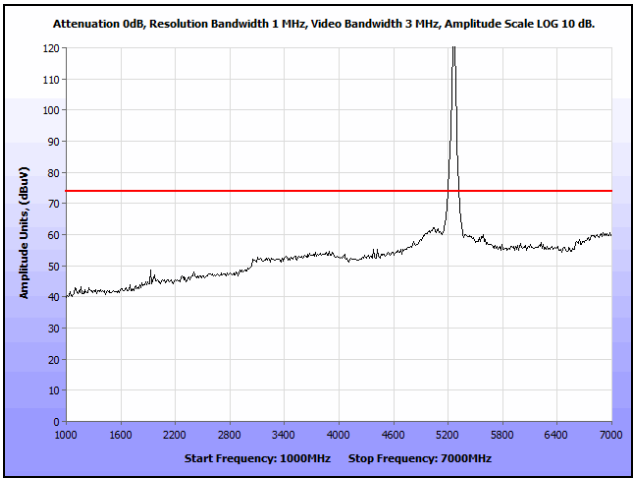
Radiated Spurious Emissions, 5 dBi Omni, 802.11a



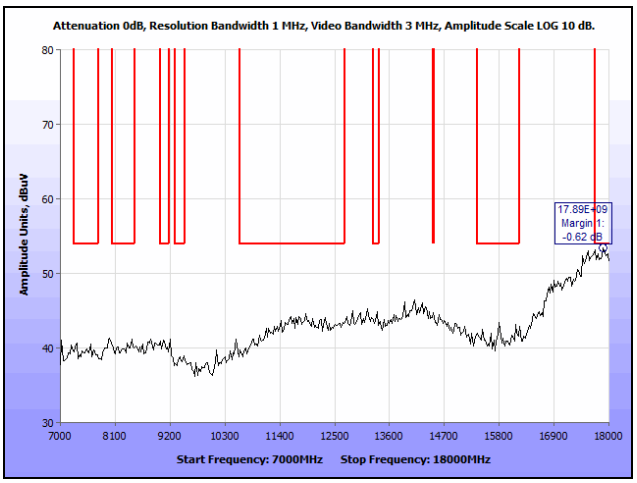
Plot 148. Radiated Spurious Emissions, 5 dBi Omni, 802.11a, 5260 MHz, 30 MHz – 1 GHz



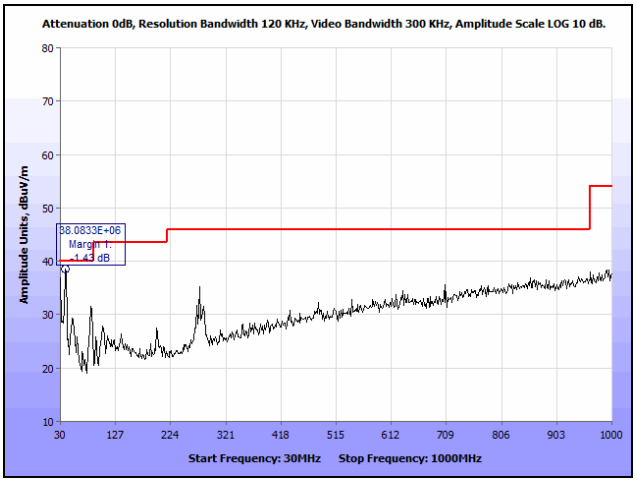
Plot 149. Radiated Spurious Emissions, 5 dBi Omni, 802.11a, 5260 MHz, 1 GHz – 7 GHz, Average



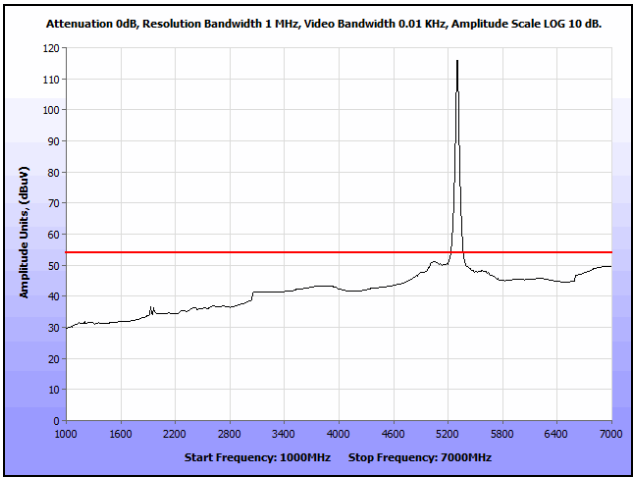
Plot 150. Radiated Spurious Emissions, 5 dBi Omni, 802.11a, 5260 MHz, 1 GHz – 7 GHz, Peak



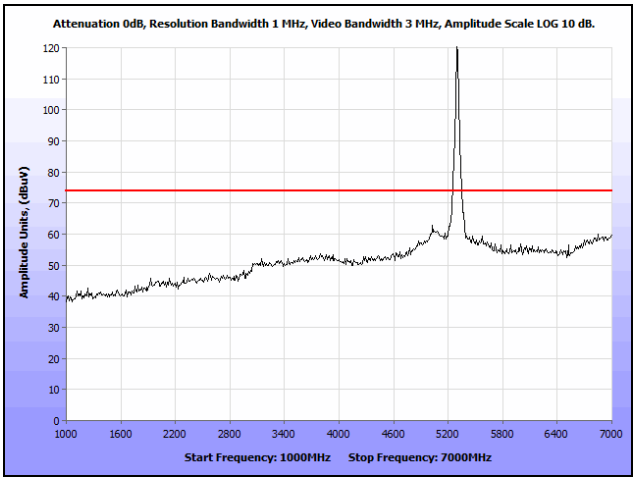
Plot 151. Radiated Spurious Emissions, 5 dBi Omni, 802.11a, 5260 MHz, 7 GHz – 18 GHz



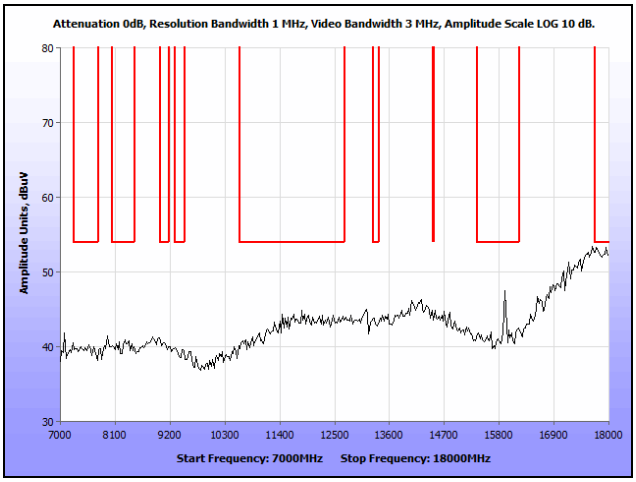
Plot 152. Radiated Spurious Emissions, 5 dBi Omni, 802.11a, 5300 MHz, 30 MHz – 1 GHz



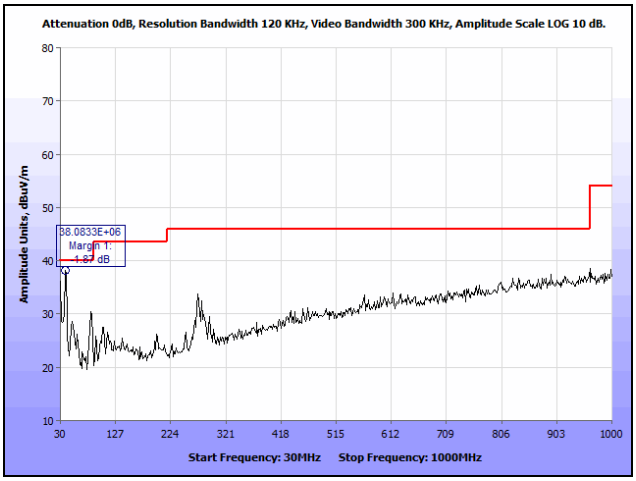
Plot 153. Radiated Spurious Emissions, 5 dBi Omni, 802.11a, 5300 MHz, 1 GHz – 7 GHz, Average



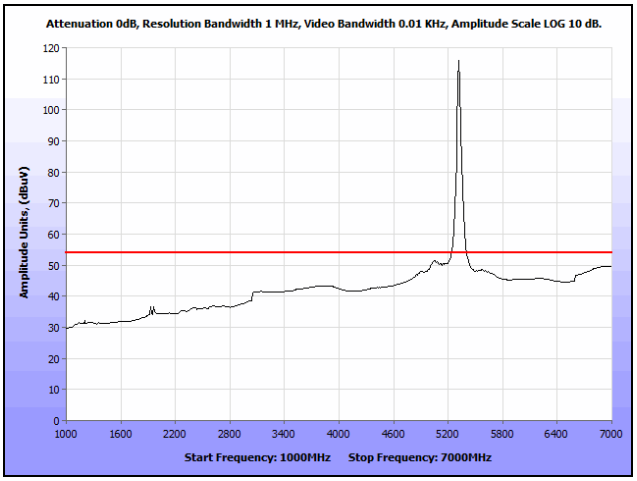
Plot 154. Radiated Spurious Emissions, 5 dBi Omni, 802.11a, 5300 MHz, 1 GHz – 7 GHz, Peak



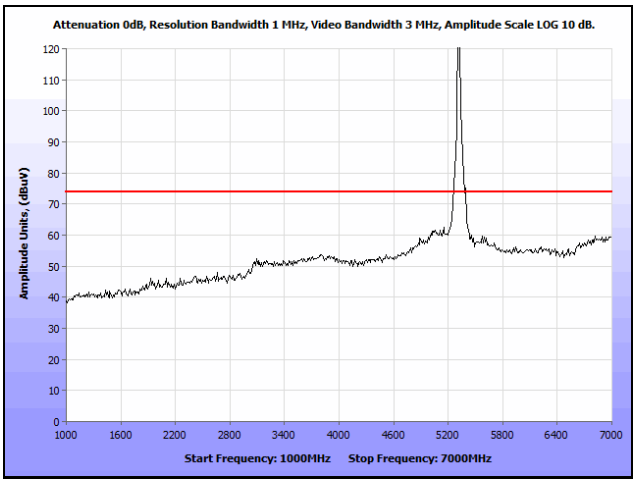
Plot 155. Radiated Spurious Emissions, 5 dBi Omni, 802.11a, 5300 MHz, 7 GHz – 18 GHz



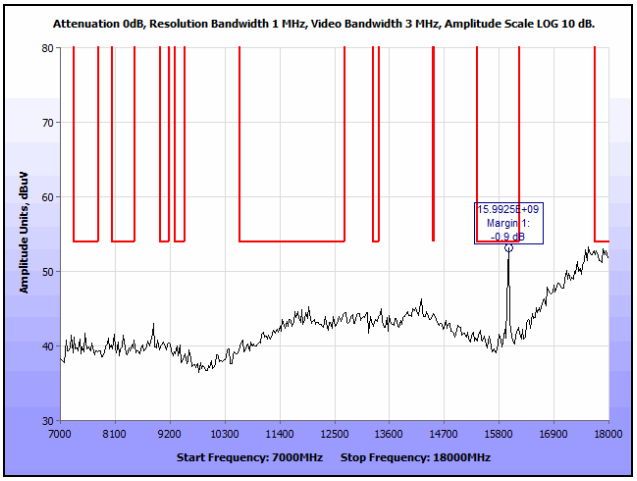
Plot 156. Radiated Spurious Emissions, 5 dBi Omni, 802.11a, 5320 MHz, 30 MHz – 1 GHz



Plot 157. Radiated Spurious Emissions, 5 dBi Omni, 802.11a, 5320 MHz, 1 GHz – 7 GHz, Average

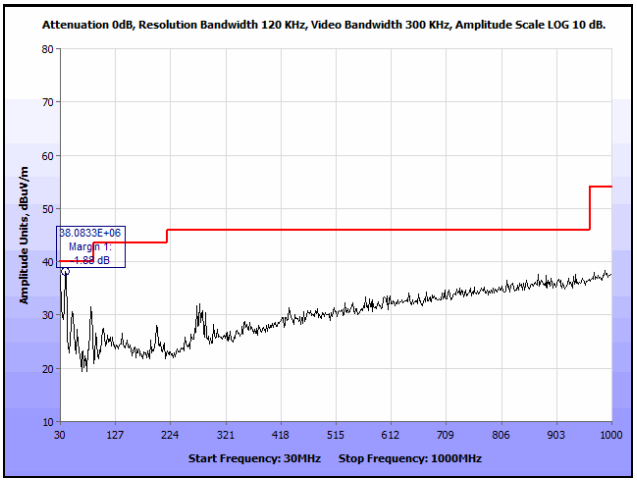


Plot 158. Radiated Spurious Emissions, 5 dBi Omni, 802.11a, 5320 MHz, 1 GHz – 7 GHz, Peak

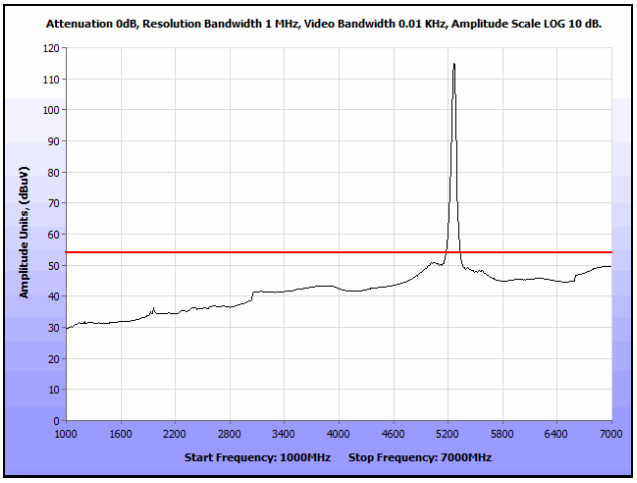


Plot 159. Radiated Spurious Emissions, 5 dBi Omni, 802.11a, 5320 MHz, 7 GHz – 18 GHz

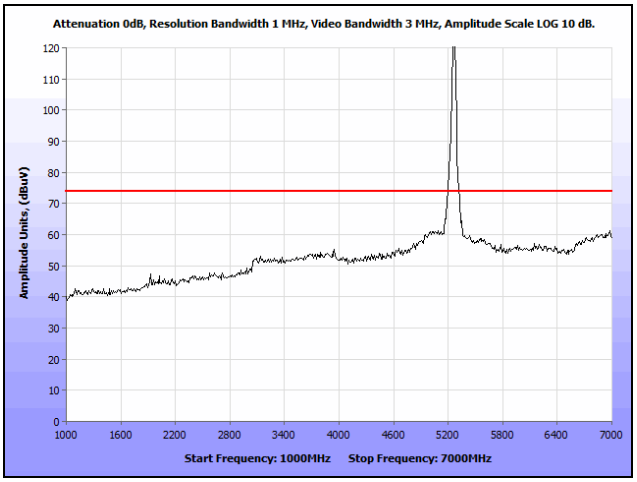
Radiated Spurious Emissions, 5 dBi Omni, 802.11n 20 MHz



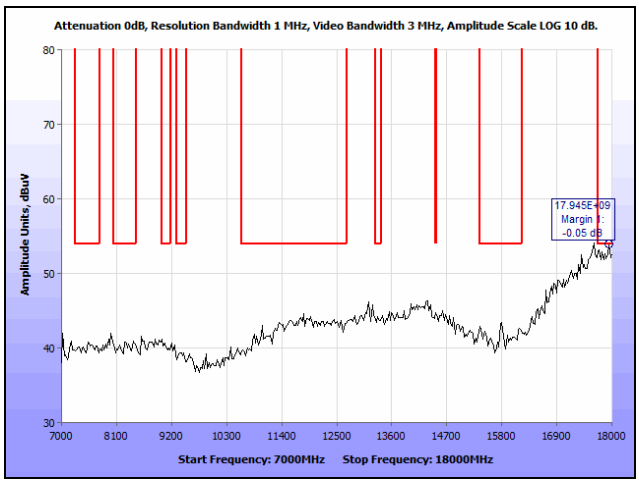
Plot 160. Radiated Spurious Emissions, 5 dBi Omni, 802.11n 20 MHz, 5260 MHz, 30 MHz – 1 GHz



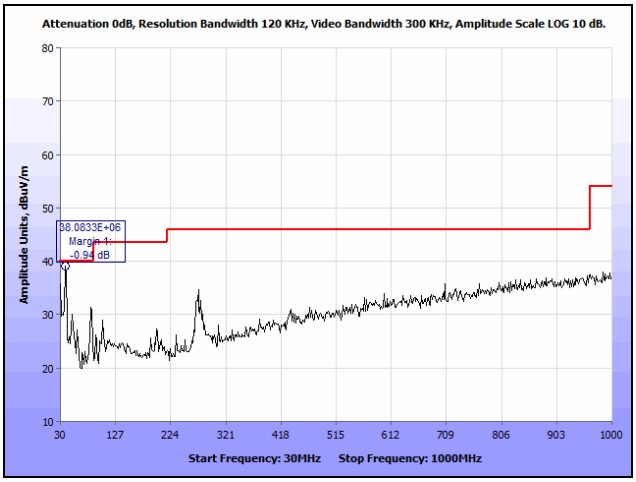
Plot 161. Radiated Spurious Emissions, 5 dBi Omni, 802.11n 20 MHz, 5260 MHz, 1 GHz – 7 GHz, Average



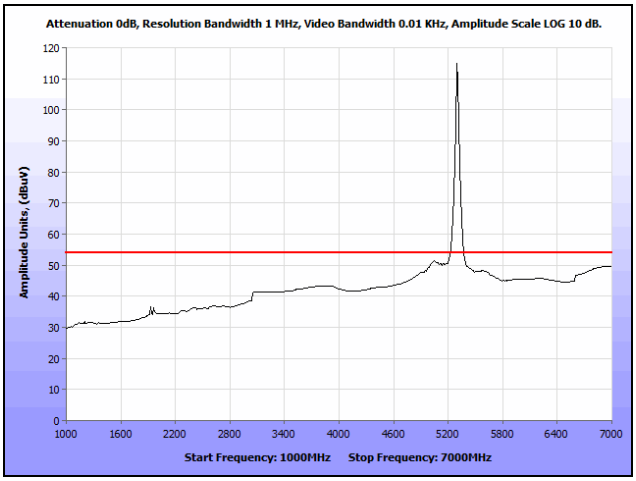
Plot 162. Radiated Spurious Emissions, 5 dBi Omni, 802.11n 20 MHz, 5260 MHz, 1 GHz – 7 GHz, Peak



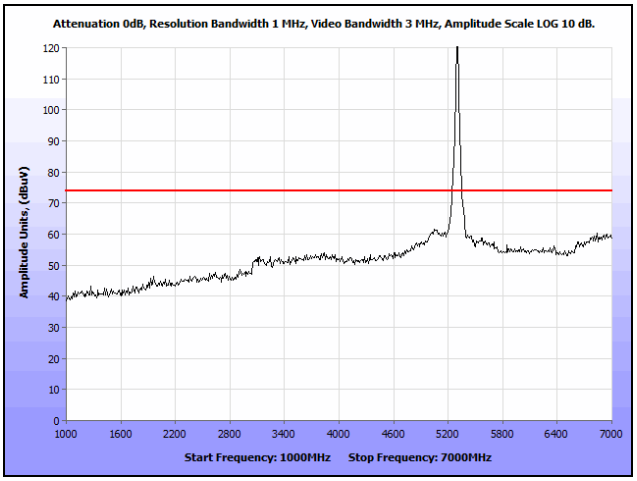
Plot 163. Radiated Spurious Emissions, 5 dBi Omni, 802.11n 20 MHz, 5260 MHz, 7 GHz – 18 GHz



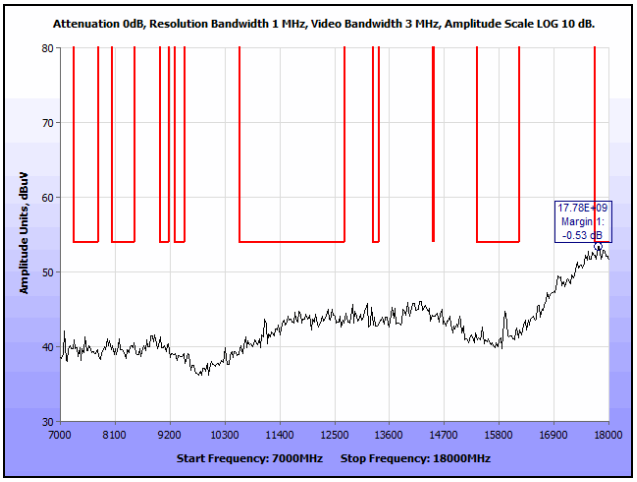
Plot 164. Radiated Spurious Emissions, 5 dBi Omni, 802.11n 20 MHz, 5300 MHz, 30 MHz – 1 GHz



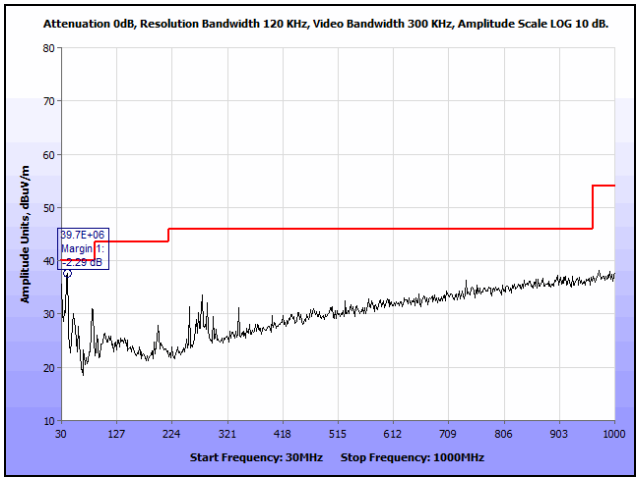
Plot 165. Radiated Spurious Emissions, 5 dBi Omni, 802.11n 20 MHz, 5300 MHz, 1 GHz – 7 GHz, Average



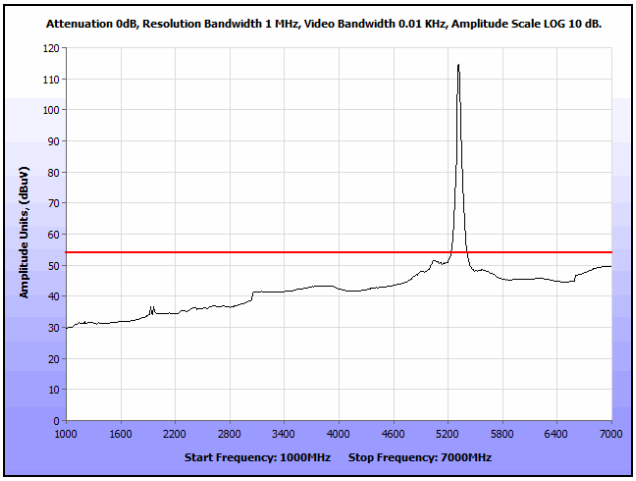
Plot 166. Radiated Spurious Emissions, 5 dBi Omni, 802.11n 20 MHz, 5300 MHz, 1 GHz – 7 GHz, Peak



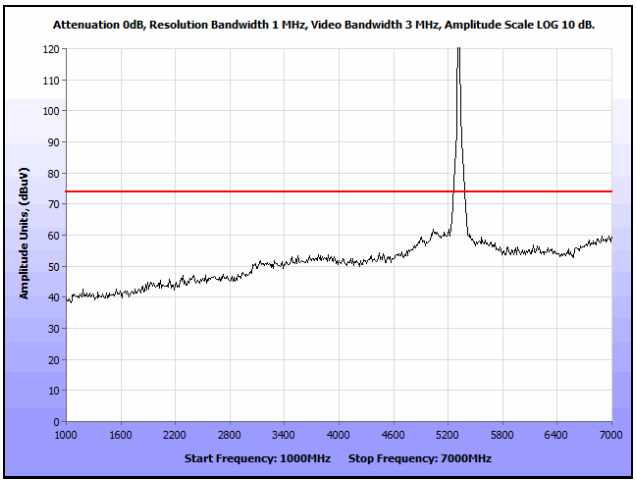
Plot 167. Radiated Spurious Emissions, 5 dBi Omni, 802.11n 20 MHz, 5300 MHz, 7 GHz – 18 GHz



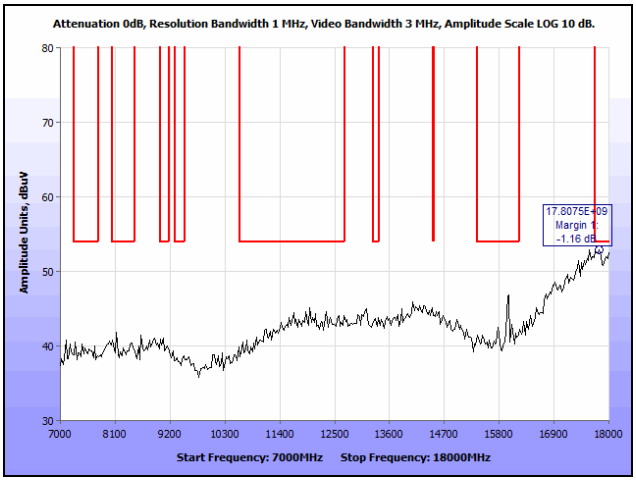
Plot 168. Radiated Spurious Emissions, 5 dBi Omni, 802.11n 20 MHz, 5320 MHz, 30 MHz – 1 GHz



Plot 169. Radiated Spurious Emissions, 5 dBi Omni, 802.11n 20 MHz, 5320 MHz, 1 GHz – 7 GHz, Average

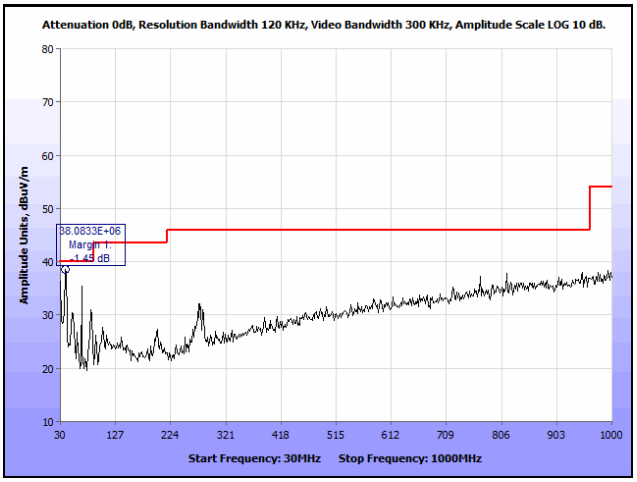


Plot 170. Radiated Spurious Emissions, 5 dBi Omni, 802.11n 20 MHz, 5320 MHz, 1 GHz – 7 GHz, Peak

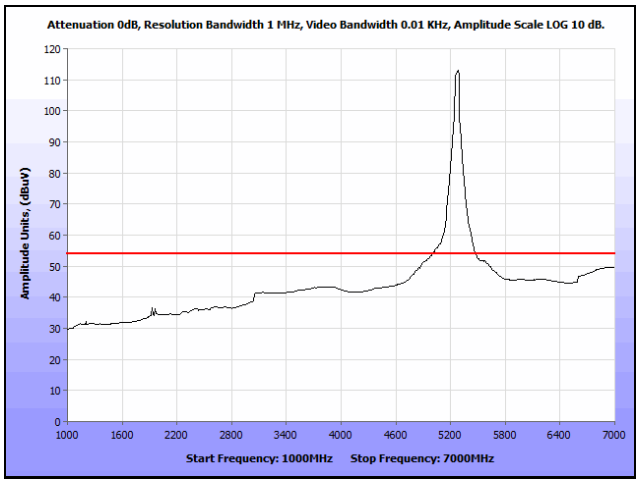


Plot 171. Radiated Spurious Emissions, 5 dBi Omni, 802.11n 20 MHz, 5320 MHz, 7 GHz – 18 GHz

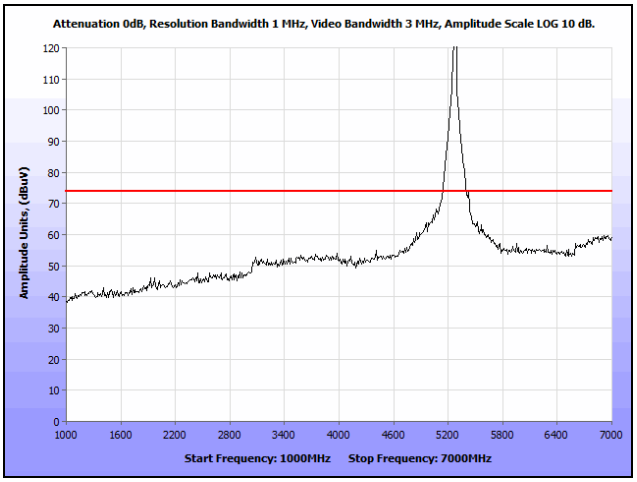
Radiated Spurious Emissions, 5 dBi Omni, 802.11n 40 MHz



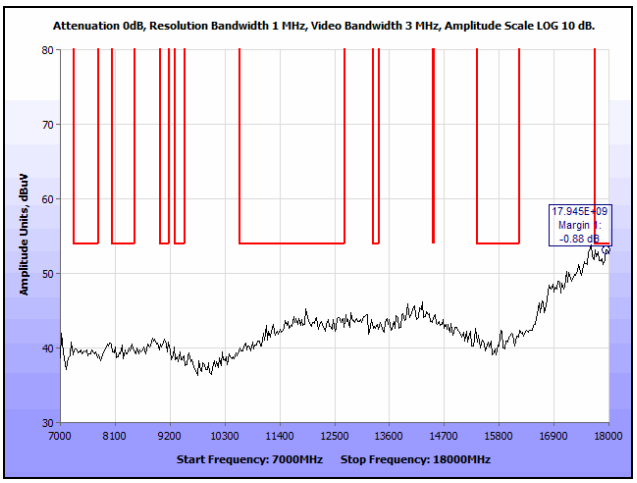
Plot 172. Radiated Spurious Emissions, 5 dBi Omni, 802.11n 40 MHz, 5270 MHz, 30 MHz – 1 GHz



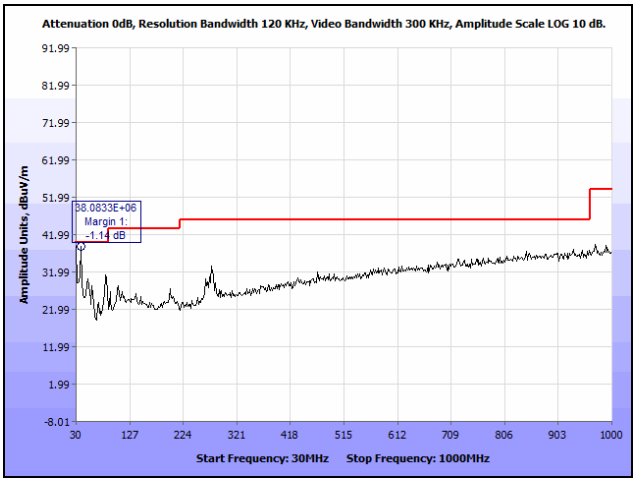
Plot 173. Radiated Spurious Emissions, 5 dBi Omni, 802.11n 40 MHz, 5270 MHz, 1 GHz – 7 GHz, Average



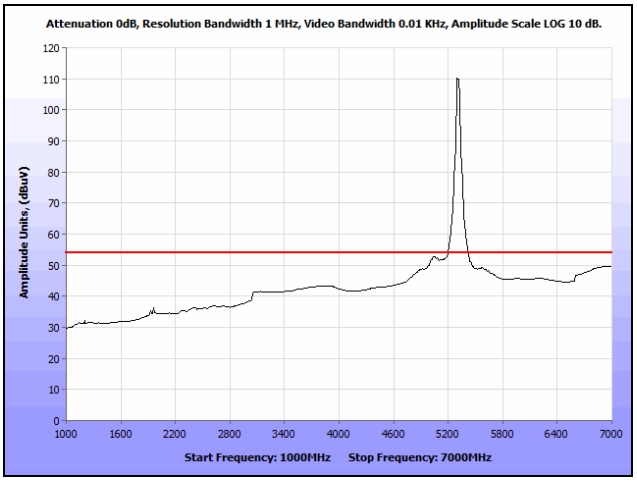
Plot 174. Radiated Spurious Emissions, 5 dBi Omni, 802.11n 40 MHz, 5270 MHz, 1 GHz – 7 GHz, Peak



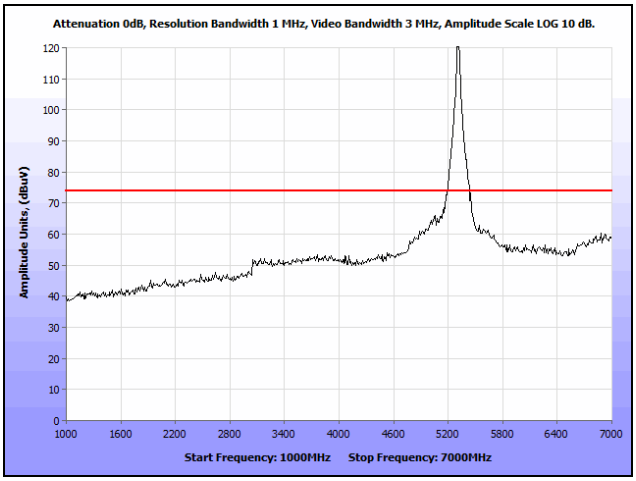
Plot 175. Radiated Spurious Emissions, 5 dBi Omni, 802.11n 40 MHz, 5270 MHz, 7 GHz – 18 GHz



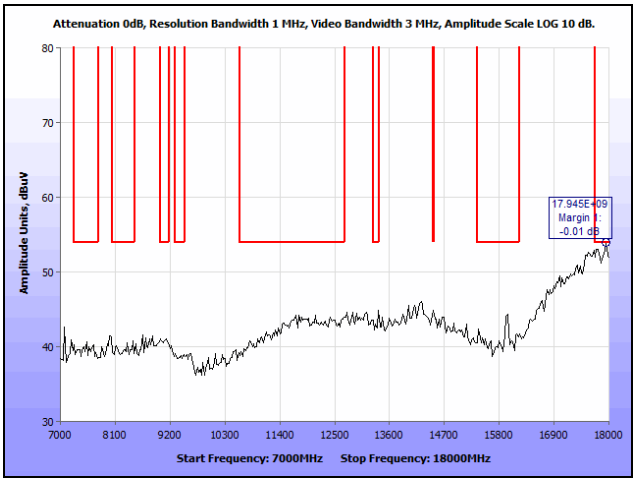
Plot 176. Radiated Spurious Emissions, 5 dBi Omni, 802.11n 40 MHz, 5310 MHz, 30 MHz – 1 GHz



Plot 177. Radiated Spurious Emissions, 5 dBi Omni, 802.11n 40 MHz, 5310 MHz, 1 GHz – 7 GHz, Average

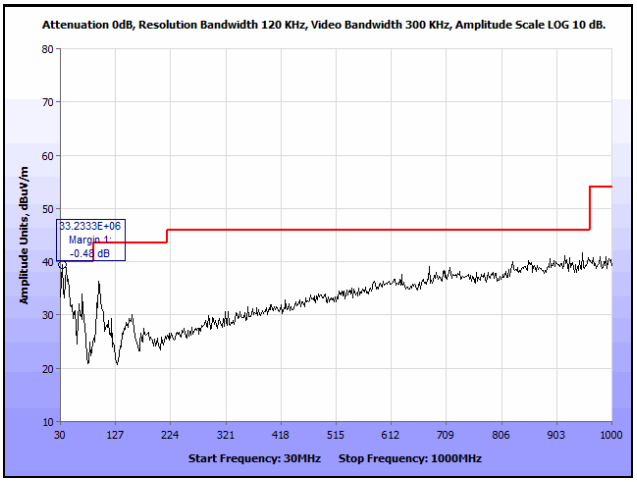


Plot 178. Radiated Spurious Emissions, 5 dBi Omni, 802.11n 40 MHz, 5310 MHz, 1 GHz – 7 GHz, Peak

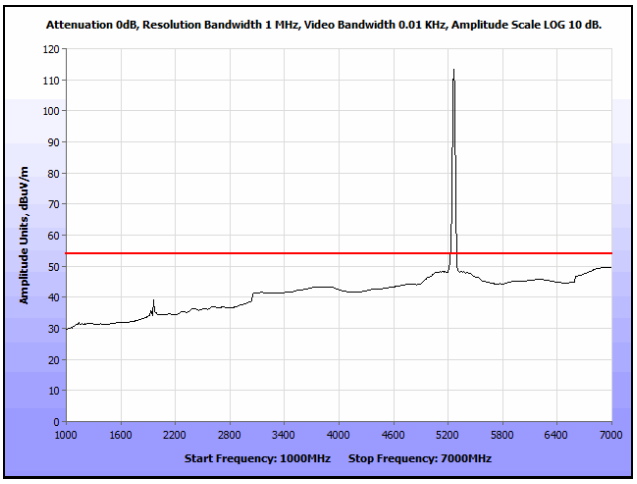


Plot 179. Radiated Spurious Emissions, 5 dBi Omni, 802.11n 40 MHz, 5310 MHz, 7 GHz – 18 GHz

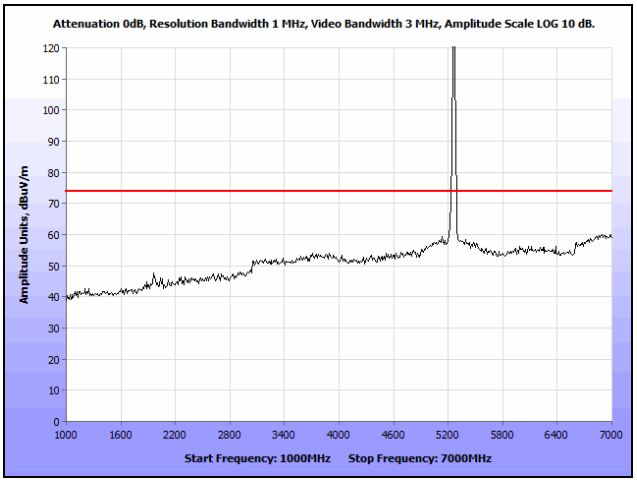
Radiated Spurious Emissions, 19 dBi Patch, 802.11a



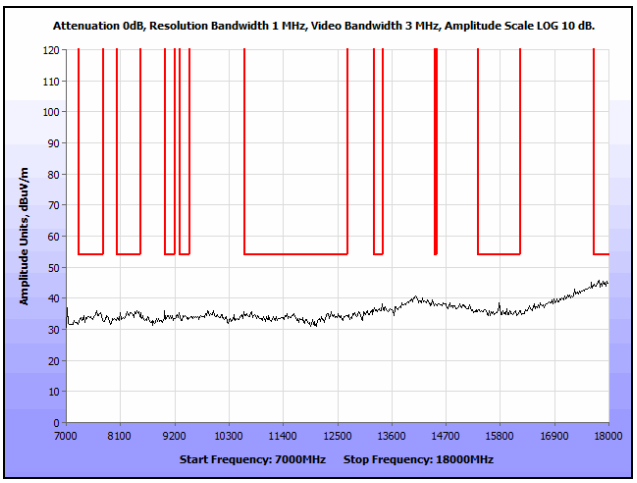
Plot 180. Radiated Spurious Emissions, 19 dBi Patch, 802.11a, 5260 MHz, 30 MHz – 1 GHz



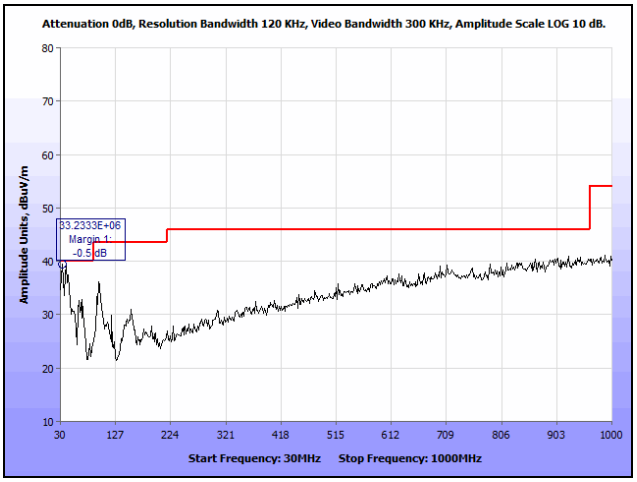
Plot 181. Radiated Spurious Emissions, 19 dBi Patch, 802.11a, 5260 MHz, 1 GHz – 7 GHz, Average



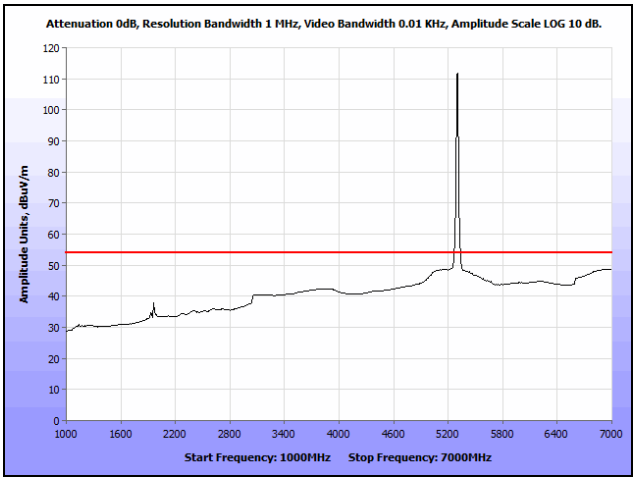
Plot 182. Radiated Spurious Emissions, 19 dBi Patch, 802.11a, 5260 MHz, 1 GHz – 7 GHz, Peak



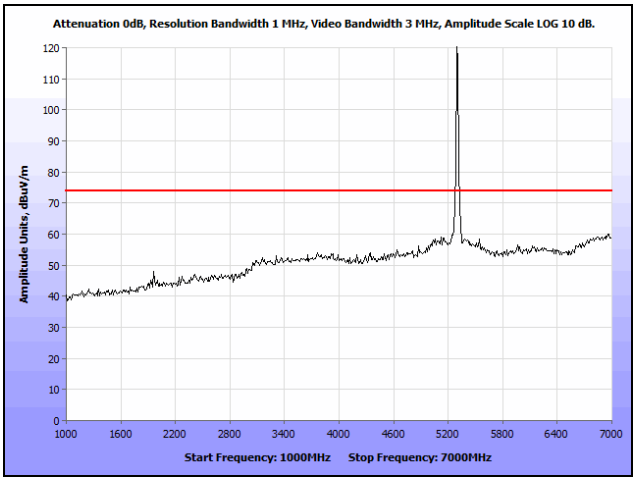
Plot 183. Radiated Spurious Emissions, 19 dBi Patch, 802.11a, 5260 MHz, 7 GHz – 18 GHz



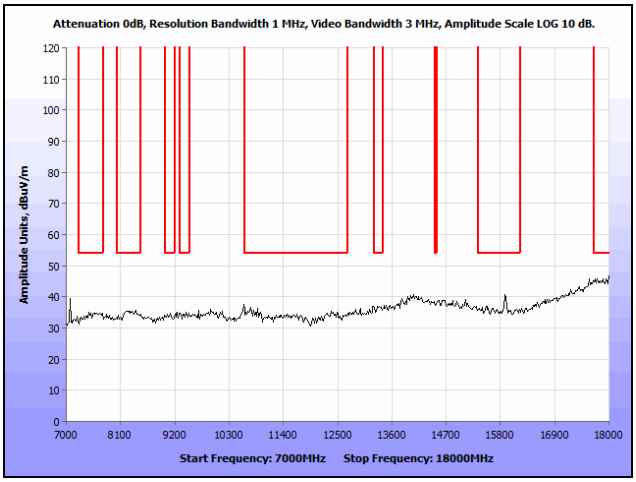
Plot 184. Radiated Spurious Emissions, 19 dBi Patch, 802.11a, 5300 MHz, 30 MHz – 1 GHz



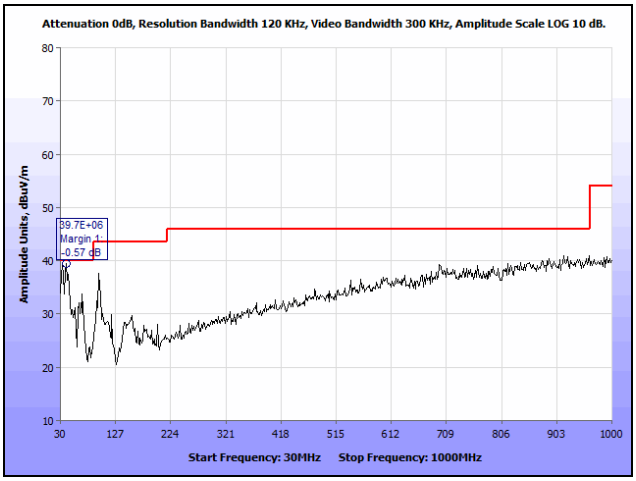
Plot 185. Radiated Spurious Emissions, 19 dBi Patch, 802.11a, 5300 MHz, 1 GHz – 7 GHz, Average



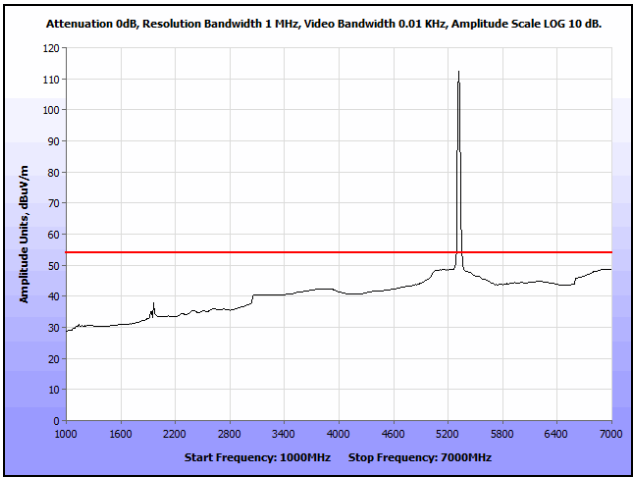
Plot 186. Radiated Spurious Emissions, 19 dBi Patch, 802.11a, 5300 MHz, 1 GHz – 7 GHz, Peak



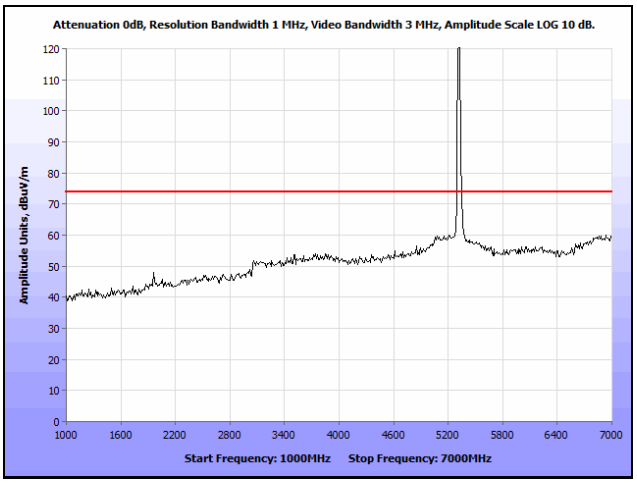
Plot 187. Radiated Spurious Emissions, 19 dBi Patch, 802.11a, 5300 MHz, 7 GHz – 18 GHz



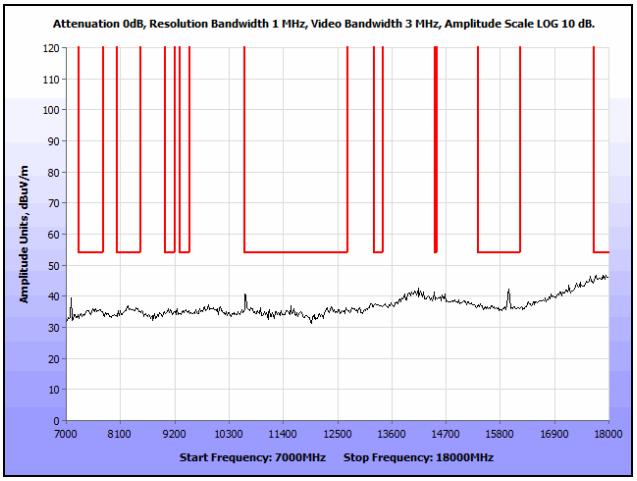
Plot 188. Radiated Spurious Emissions, 19 dBi Patch, 802.11a, 5320 MHz, 30 MHz – 1 GHz



Plot 189. Radiated Spurious Emissions, 19 dBi Patch, 802.11a, 5320 MHz, 1 GHz – 7 GHz, Average

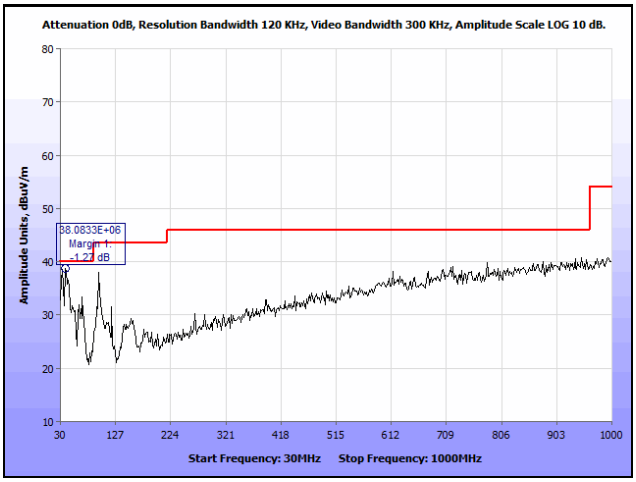


Plot 190. Radiated Spurious Emissions, 19 dBi Patch, 802.11a, 5320 MHz, 1 GHz – 7 GHz, Peak

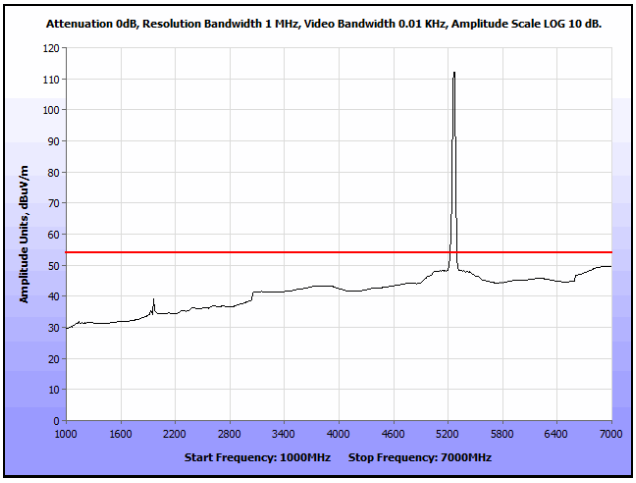


Plot 191. Radiated Spurious Emissions, 19 dBi Patch, 802.11a, 5320 MHz, 7 GHz – 18 GHz

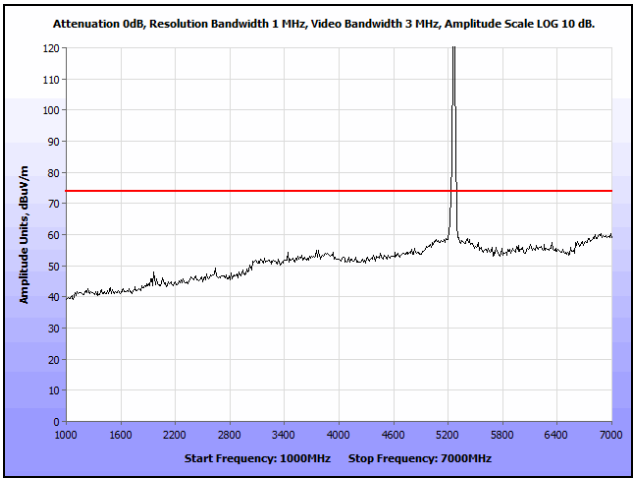
Radiated Spurious Emissions, 19 dBi Patch, 802.11n 20 MHz



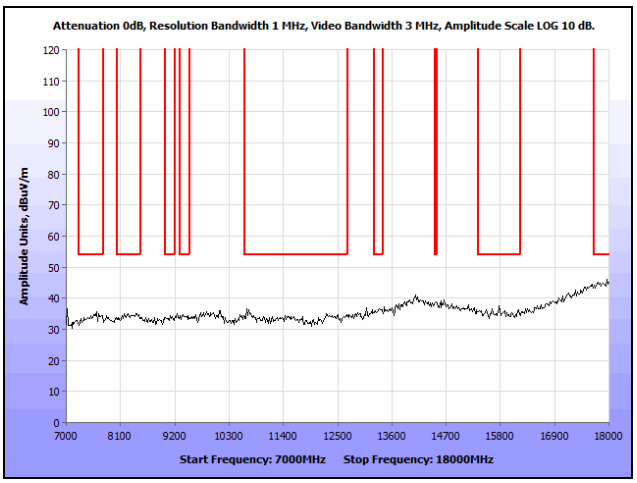
Plot 192. Radiated Spurious Emissions, 19 dBi Patch, 802.11n 20 MHz, 5260 MHz, 30 MHz – 1 GHz



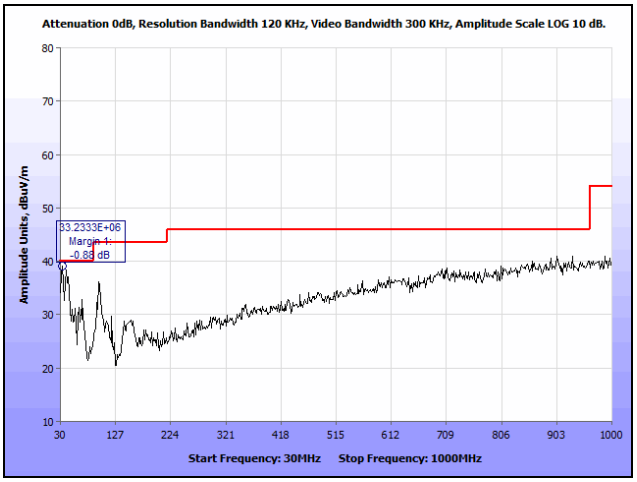
Plot 193. Radiated Spurious Emissions, 19 dBi Patch, 802.11n 20 MHz, 5260 MHz, 1 GHz – 7 GHz, Average



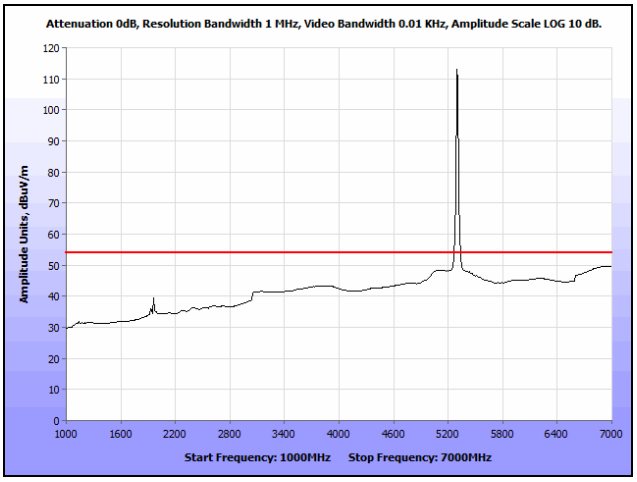
Plot 194. Radiated Spurious Emissions, 19 dBi Patch, 802.11n 20 MHz, 5260 MHz, 1 GHz – 7 GHz, Peak



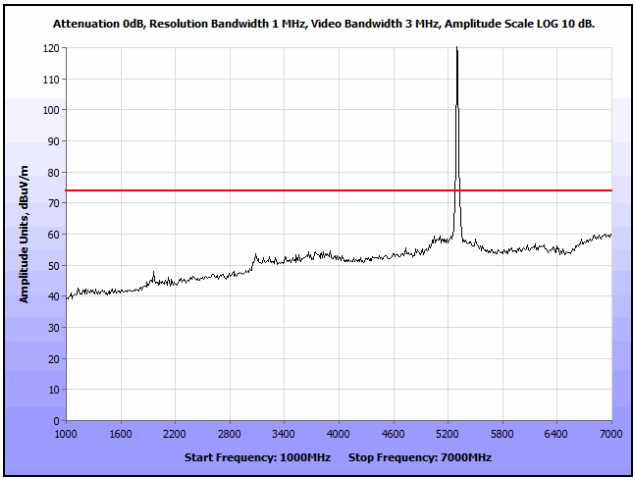
Plot 195. Radiated Spurious Emissions, 19 dBi Patch, 802.11n 20 MHz, 5260 MHz, 7 GHz – 18 GHz



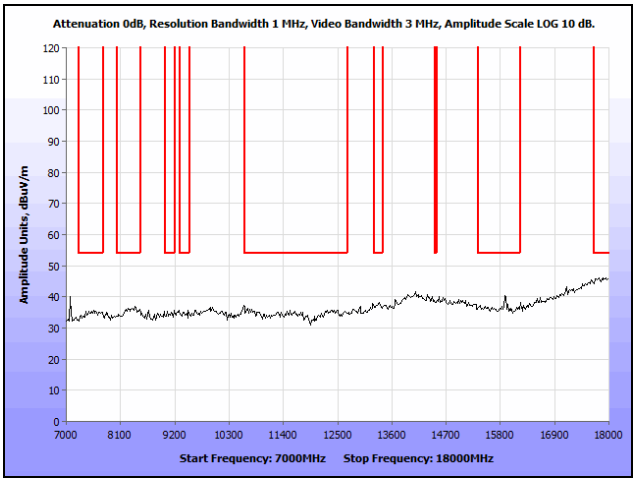
Plot 196. Radiated Spurious Emissions, 19 dBi Patch, 802.11n 20 MHz, 5300 MHz, 30 MHz – 1 GHz



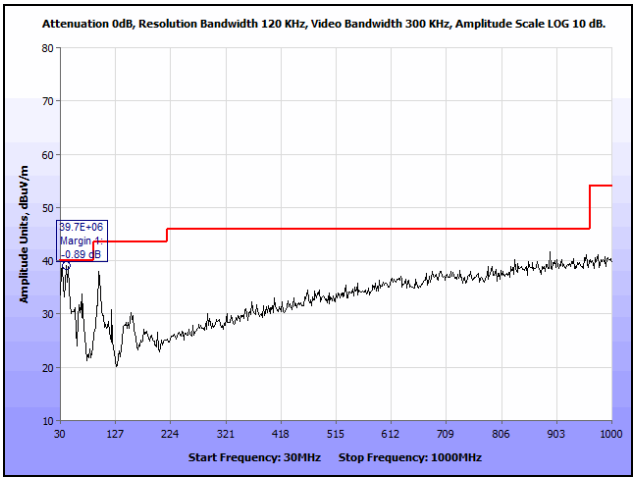
Plot 197. Radiated Spurious Emissions, 19 dBi Patch, 802.11n 20 MHz, 5300 MHz, 1 GHz – 7 GHz, Average



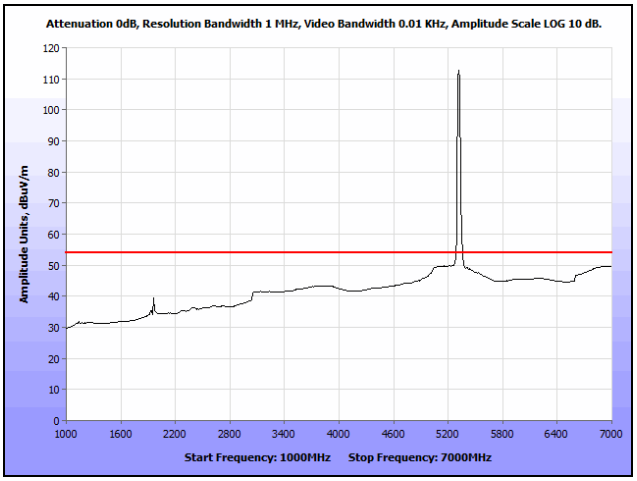
Plot 198. Radiated Spurious Emissions, 19 dBi Patch, 802.11n 20 MHz, 5300 MHz, 1 GHz – 7 GHz, Peak



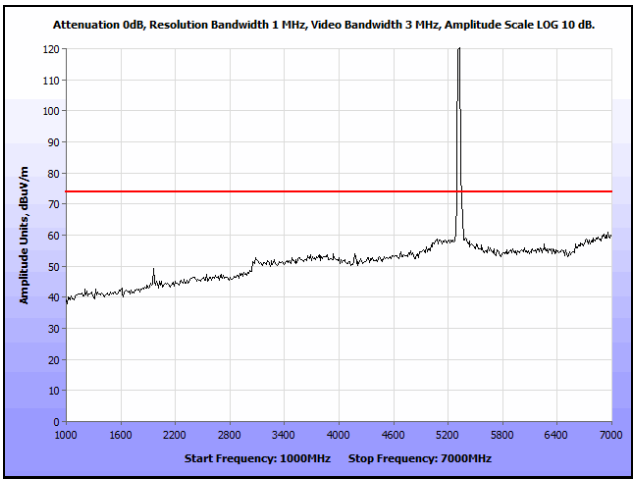
Plot 199. Radiated Spurious Emissions, 19 dBi Patch, 802.11n 20 MHz, 5300 MHz, 7 GHz – 18 GHz



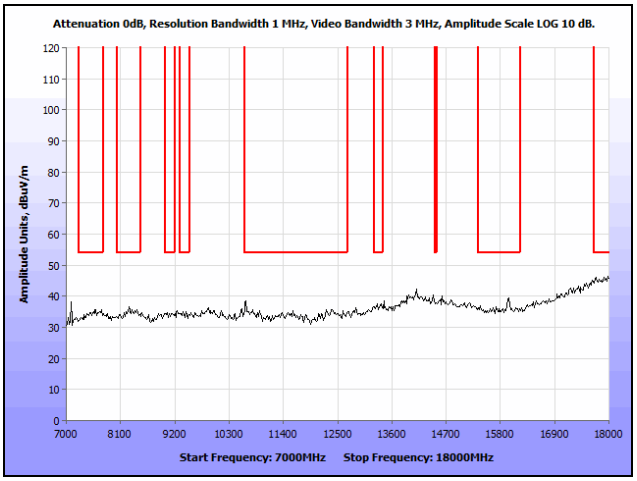
Plot 200. Radiated Spurious Emissions, 19 dBi Patch, 802.11n 20 MHz, 5320 MHz, 30 MHz – 1 GHz



Plot 201. Radiated Spurious Emissions, 19 dBi Patch, 802.11n 20 MHz, 5320 MHz, 1 GHz – 7 GHz, Average

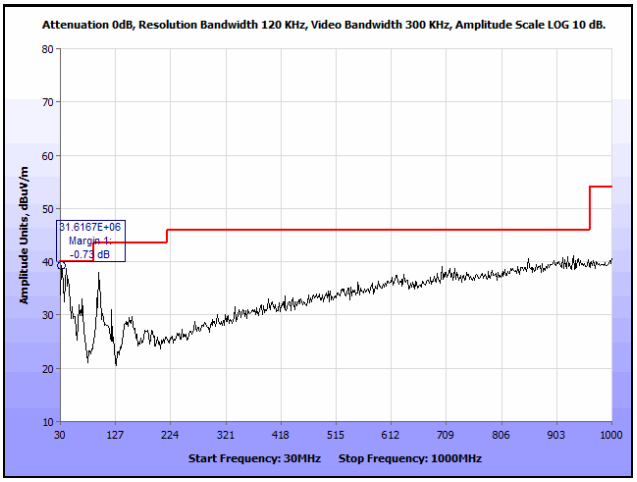


Plot 202. Radiated Spurious Emissions, 19 dBi Patch, 802.11n 20 MHz, 5320 MHz, 1 GHz – 7 GHz, Peak

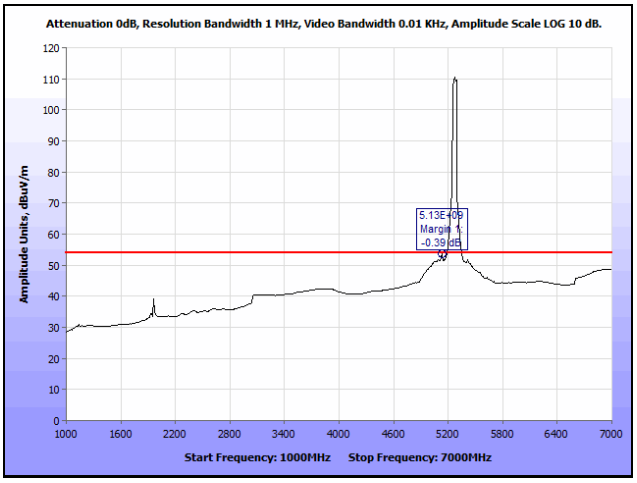


Plot 203. Radiated Spurious Emissions, 19 dBi Patch, 802.11n 20 MHz, 5320 MHz, 7 GHz – 18 GHz

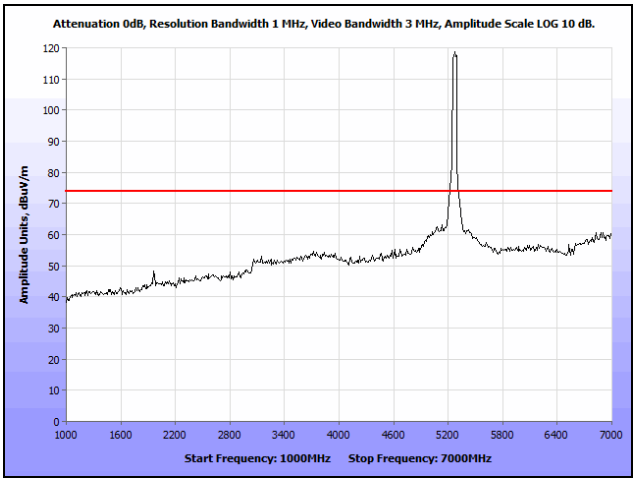
Radiated Spurious Emissions, 19 dBi Patch, 802.11n 40 MHz



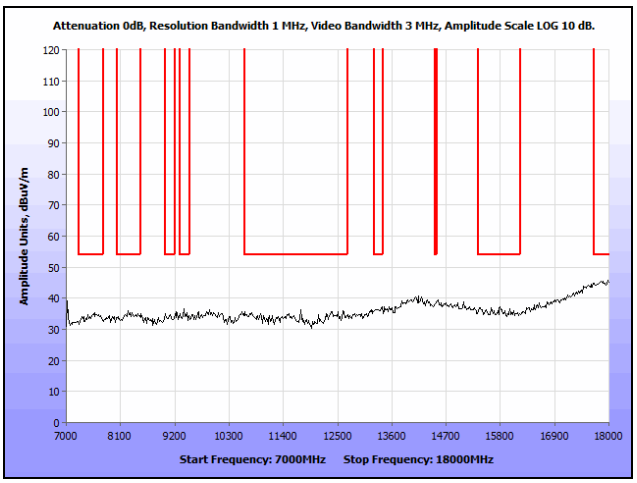
Plot 204. Radiated Spurious Emissions, 19 dBi Patch, 802.11n 40 MHz, 5270 MHz, 30 MHz – 1 GHz



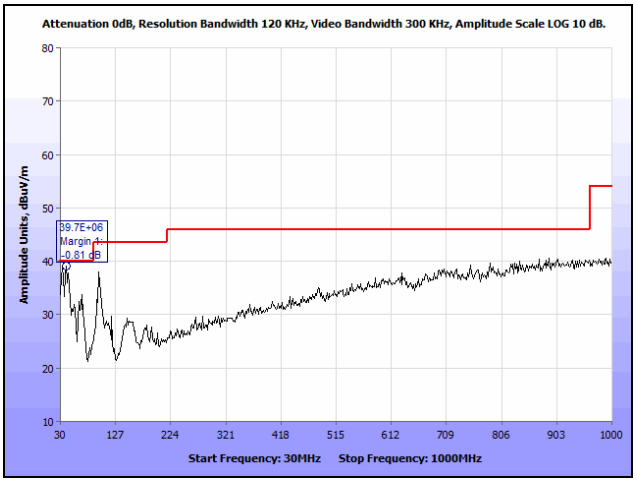
Plot 205. Radiated Spurious Emissions, 19 dBi Patch, 802.11n 40 MHz, 5270 MHz, 1 GHz – 7 GHz, Average



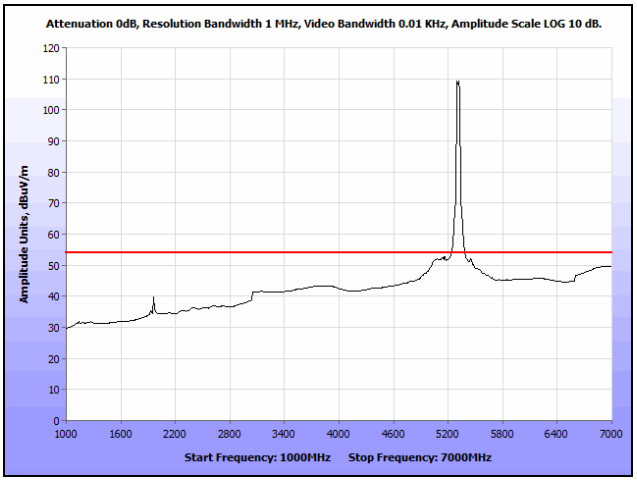
Plot 206. Radiated Spurious Emissions, 19 dBi Patch, 802.11n 40 MHz, 5270 MHz, 1 GHz – 7 GHz, Peak



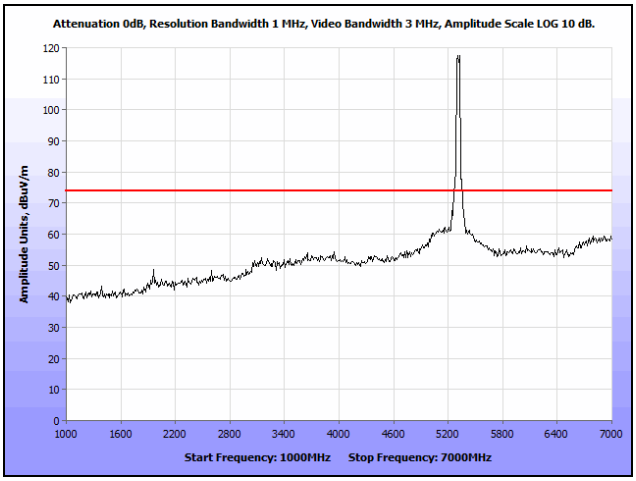
Plot 207. Radiated Spurious Emissions, 19 dBi Patch, 802.11n 40 MHz, 5270 MHz, 7 GHz – 18 GHz



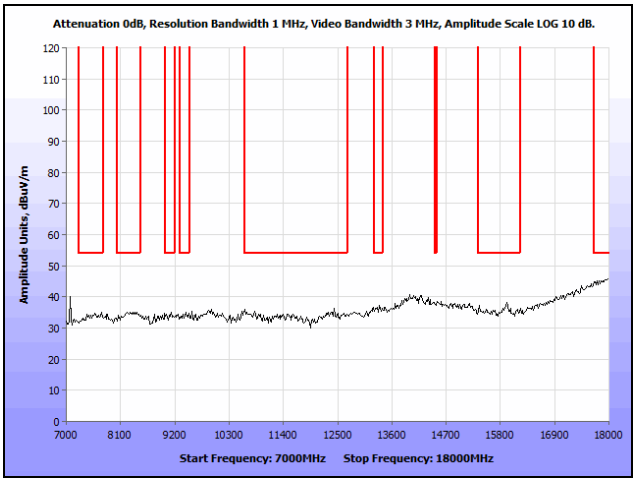
Plot 208. Radiated Spurious Emissions, 19 dBi Patch, 802.11n 40 MHz, 5310 MHz, 30 MHz – 1 GHz



Plot 209. Radiated Spurious Emissions, 19 dBi Patch, 802.11n 40 MHz, 5310 MHz, 1 GHz – 7 GHz, Average



Plot 210. Radiated Spurious Emissions, 19 dBi Patch, 802.11n 40 MHz, 5310 MHz, 1 GHz – 7 GHz, Peak



Plot 211. Radiated Spurious Emissions, 19 dBi Patch, 802.11n 40 MHz, 5310 MHz, 7 GHz – 18 GHz

EIRP

5 dBi Omni Antenna								
802.11a	**Band Edge Freq**	**Uncorrected Peak (dBuV)**	**Cable Loss**	**ACF**	**DCF**	**Corrected**	**Limit (dBuV/m)**	**Margin**
	5350 MHz	19.89	7.03	35	9.54	52.38	68.23	-15.85
	5470 MHz	24.31	7.03	35	9.54	56.8	68.23	-11.43
	5725 MHz	34.1	7.5	35	9.54	67.06	68.23	-1.17
802.11n 20MHz	**Band Edge Freq**	**Uncorrected Peak (dBuV)**	**Cable Lost**	**ACF**	**DCF**	**Corrected**	**Limit (dBuV/m)**	**Margin**
	5350 MHz	19.9	7.03	35	9.54	52.39	68.23	-15.84
	5470 MHz	22.93	7.03	35	9.54	55.42	68.23	-12.81
	5725 MHz	30.75	7.5	35	9.54	63.71	68.23	-4.52
802.11n 40MHz	**Band Edge Freq**	**Uncorrected Peak (dBuV)**	**Cable Lost**	**ACF**	**DCF**	**Corrected**	**Limit (dBuV/m))**	**Margin**
	5350 MHz	21	7.03	35	9.54	53.49	68.23	-14.74
	5470 MHz	25.11	7.03	35	9.54	57.6	68.23	-10.63
	5725 MHz	31.66	7.5	35	9.54	64.62	68.23	-3.61

Table 34. EIRP Calculation, 5 dBi Omni

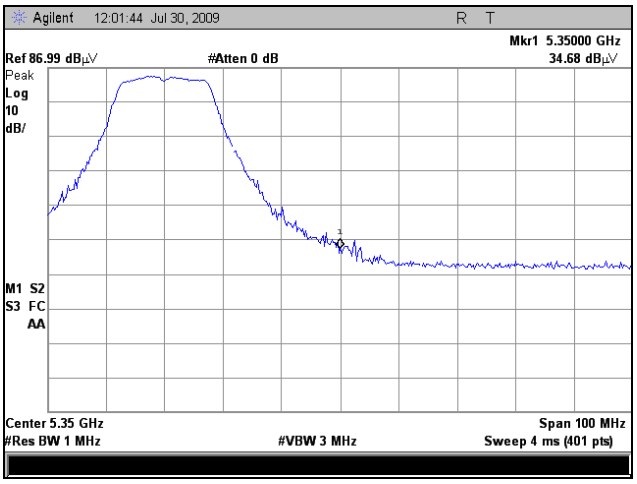
Note: EIRP Limit -27dBm/MHz = 68.23dBuV/m

19dBi Panel Antenna								
802.11a	**Band Edge Freq**	**Uncorrected Peak (dBuV)**	**Cable Loss**	**ACF**	**DCF**	**Corrected**	**Limit (dBuV/m)**	**Margin**
	5350 MHz	20.09	7.03	35	9.54	52.58	68.23	-15.65
	5470 MHz	21.92	7.03	35	9.54	54.41	68.23	-13.82
	5725 MHz	33.2	7.5	35	9.54	66.16	68.23	-2.07
802.11n 20MHz	**Band Edge Freq**	**Uncorrected Peak (dBuV)**	**Cable Lost**	**ACF**	**DCF**	**Corrected**	**Limit (dBuV/m)**	**Margin**
	5350 MHz	19.03	7.03	35	9.54	51.52	68.23	-16.71
	5470 MHz	23.2	7.03	35	9.54	55.69	68.23	-12.54
	5725 MHz	34.25	7.5	35	9.54	67.21	68.23	-1.02
802.11n 40MHz	**Band Edge Freq**	**Uncorrected Peak (dBuV)**	**Cable Lost**	**ACF**	**DCF**	**Corrected**	**Limit (dBuV/m))**	**Margin**
	5350 MHz	20.83	7.03	35	9.54	53.32	68.23	-14.91
	5470 MHz	27.54	7.03	35	9.54	60.03	68.23	-8.2
	5725 MHz	34.83	7.5	35	9.54	67.79	68.23	-0.44

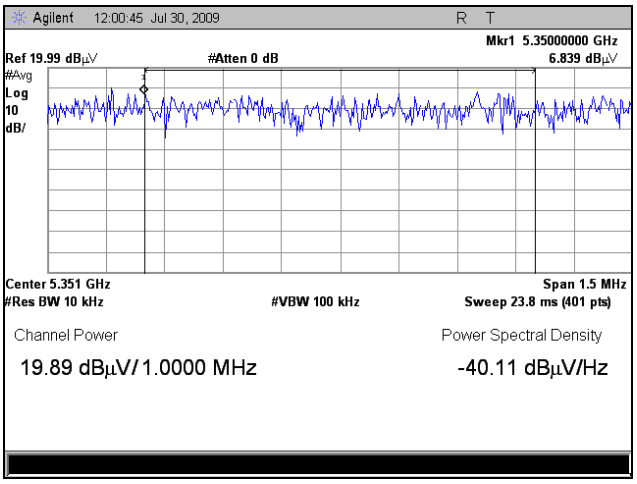
Table 35. EIRP Calculation, 19 dBi Panel

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

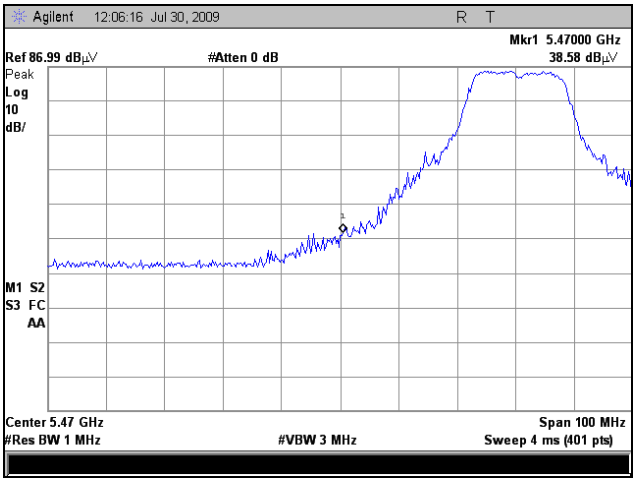
EIRP, Port 1, 802.11a



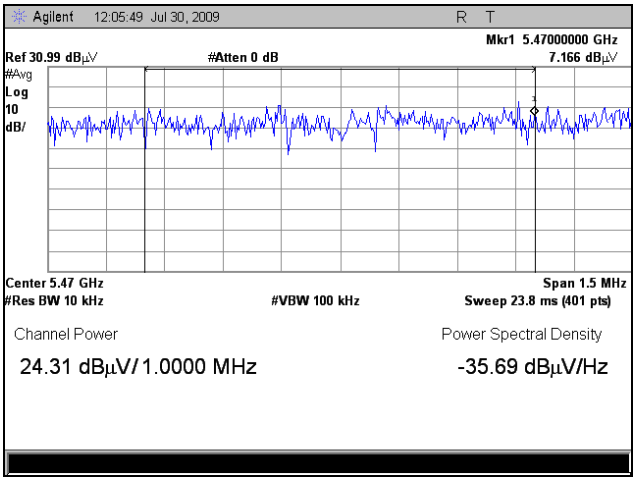
Plot 212. EIRP, Port 1, 802.11a, 5350 MHz Peak, 5 dBi Omni



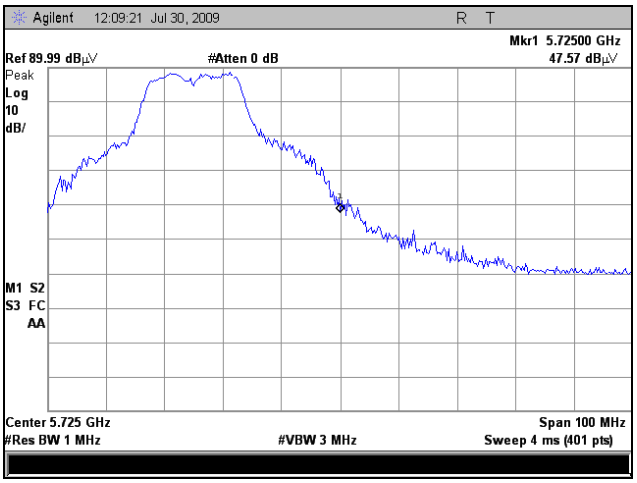
Plot 213. EIRP, Port 1, 802.11a, 5350 MHz Over 1 MHz, 5 dBi Omni



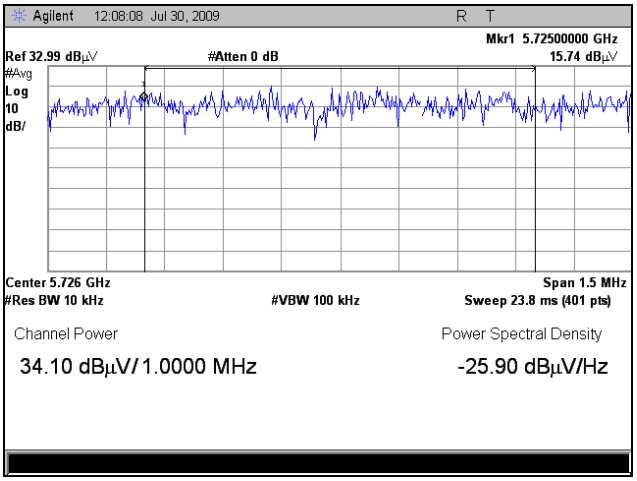
Plot 214. EIRP, Port 1, 802.11a, 5470 MHz Peak, 5 dBi Omni



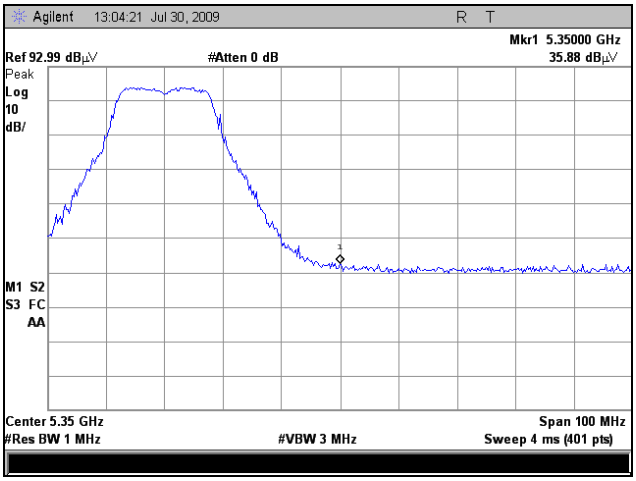
Plot 215. EIRP, Port 1, 802.11a, 5470 MHz Over 1 MHz, 5 dBi Omni



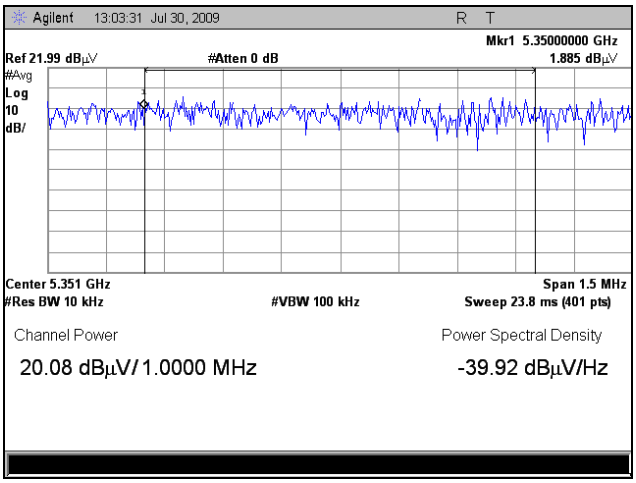
Plot 216. EIRP, Port 1, 802.11a, 5725 MHz Peak, 5 dBi Omni



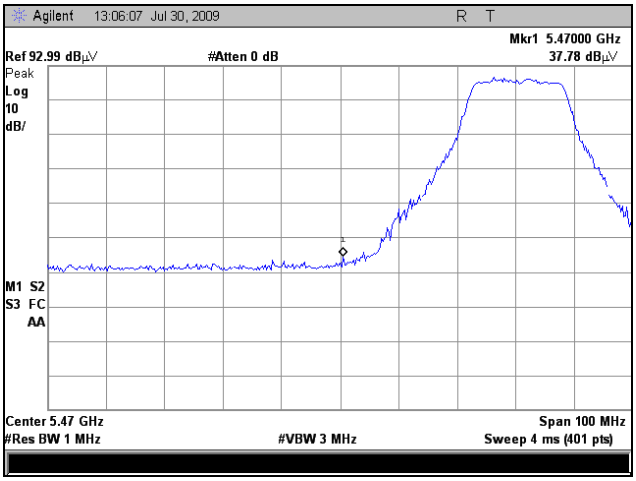
Plot 217. EIRP, Port 1, 802.11a, 5725 MHz Over 1 MHz, 5 dBi Omni



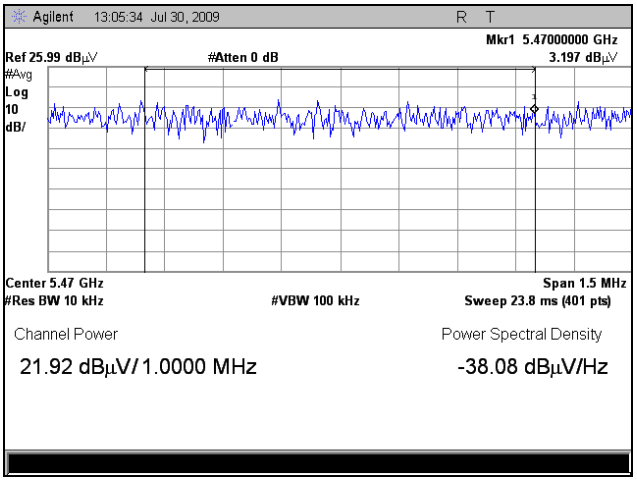
Plot 218. EIRP, Port 1, 802.11a, 5350 MHz Peak, 19 dBi Panel



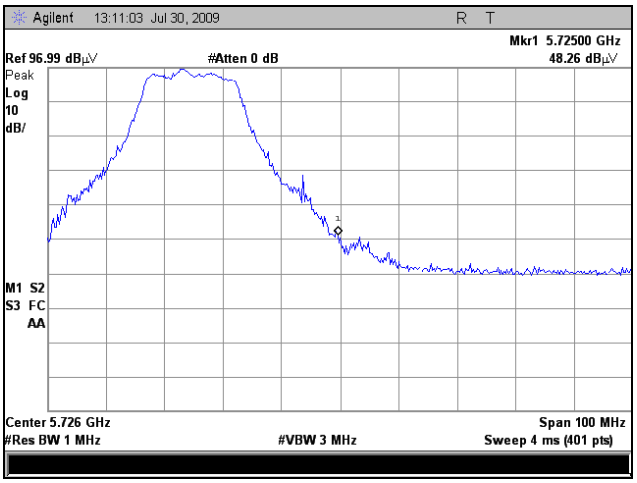
Plot 219. EIRP, Port 1, 802.11a, 5350 MHz Over 1 MHz, 19 dBi Panel



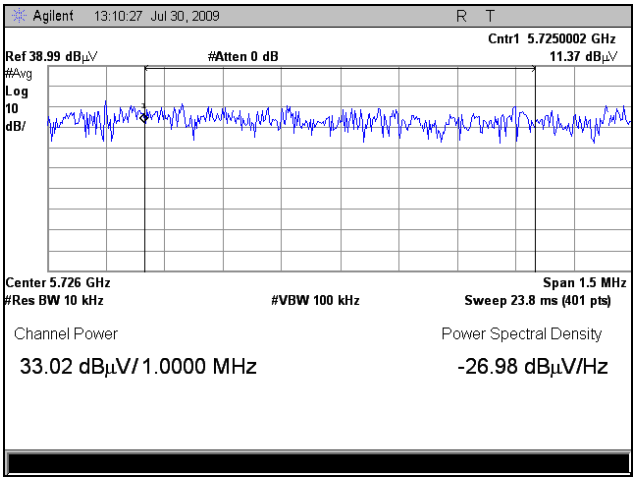
Plot 220. EIRP, Port 1, 802.11a, 5470 MHz Peak, 19 dBi Panel



Plot 221. EIRP, Port 1, 802.11a, 5470 MHz Over 1 MHz, 19 dBi Panel

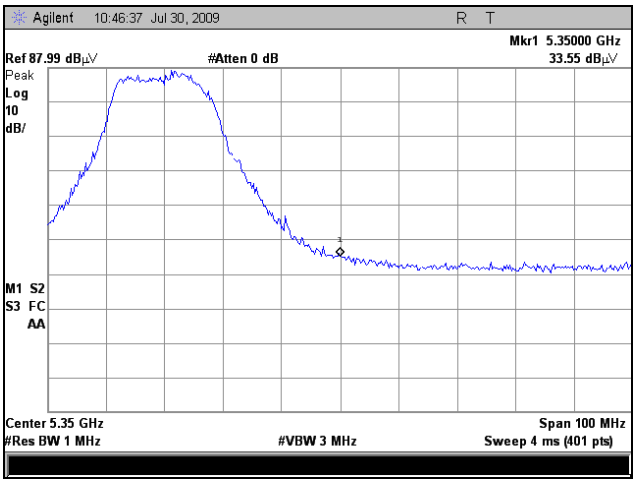


Plot 222. EIRP, Port 1, 802.11a, 5725 MHz Peak, 19 dBi Panel

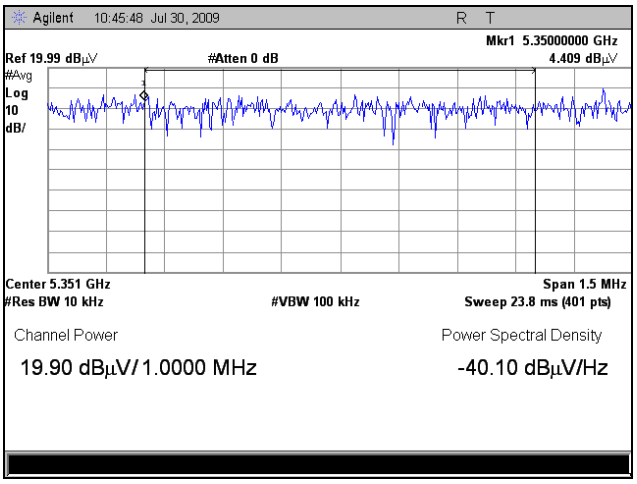


Plot 223. EIRP, Port 1, 802.11a, 5725 MHz Over 1 MHz, 19 dBi Panel

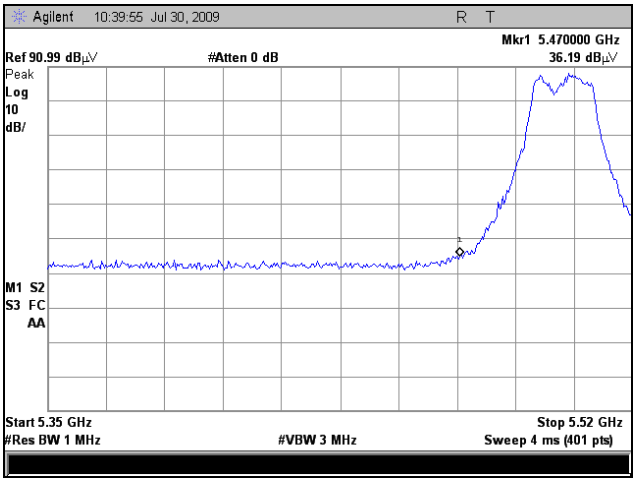
EIRP, 802.11n 20MHz



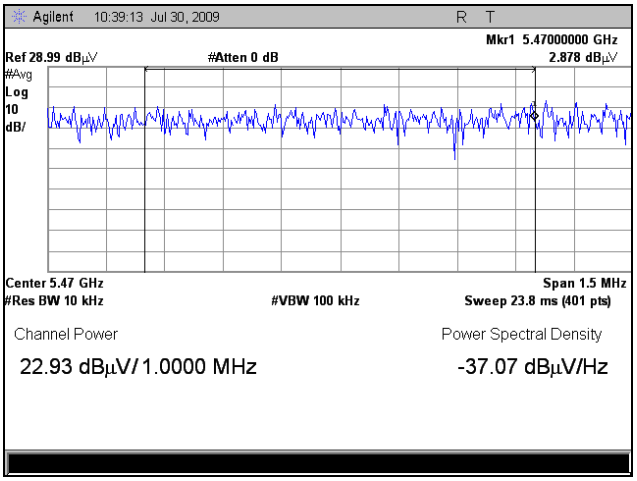
Plot 224. EIRP, 802.11n 20MHz, 5350 MHz Peak, 5 dBi Omni



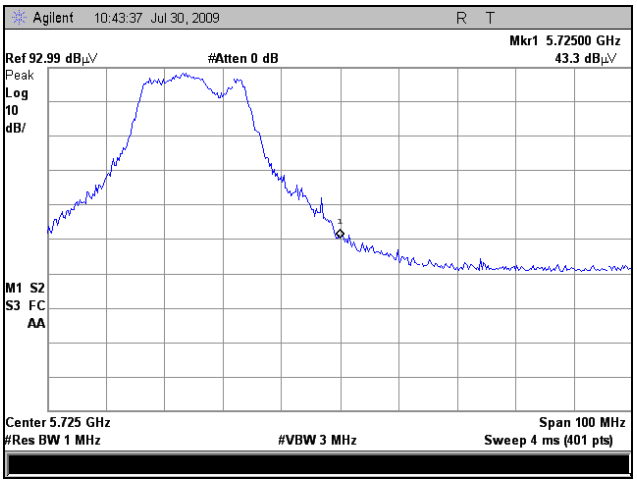
Plot 225. EIRP, 802.11n 20MHz, 5350 MHz Over 1 MHz, 5 dBi Omni



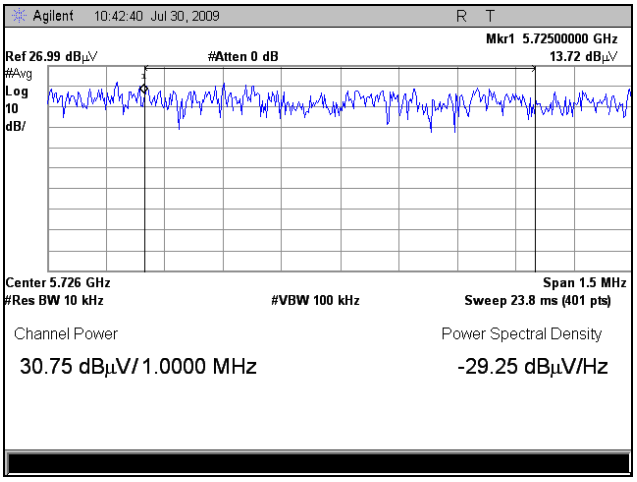
Plot 226. EIRP, 802.11n 20MHz, 5470 MHz Peak, 5 dBi Omni



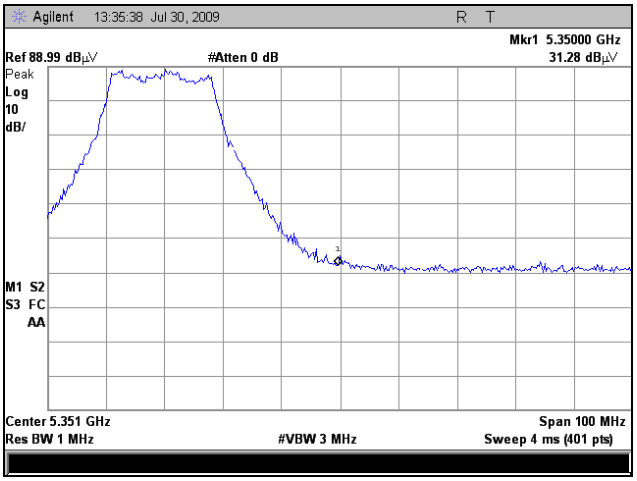
Plot 227. EIRP, 802.11n 20MHz, 5470 MHz Over 1 MHz, 5 dBi Omni



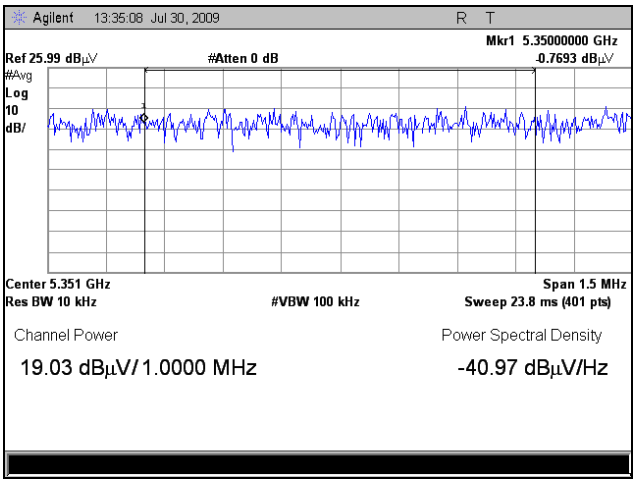
Plot 228. EIRP, 802.11n 20MHz, 5725 MHz Peak, 5 dBi Omni



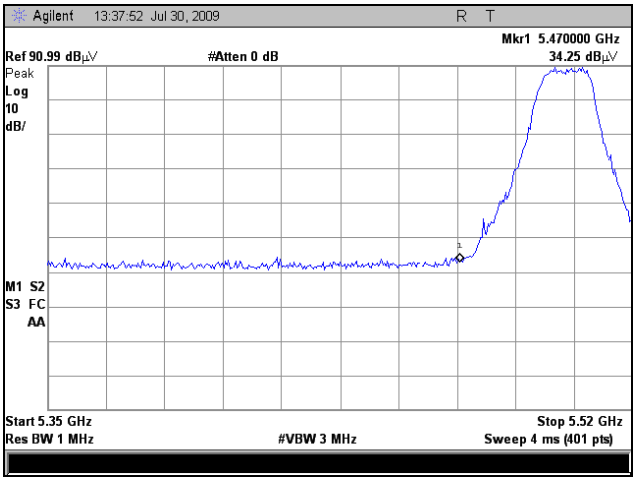
Plot 229. EIRP, 802.11n 20MHz, 5725 MHz Over 1 MHz, 5 dBi Omni



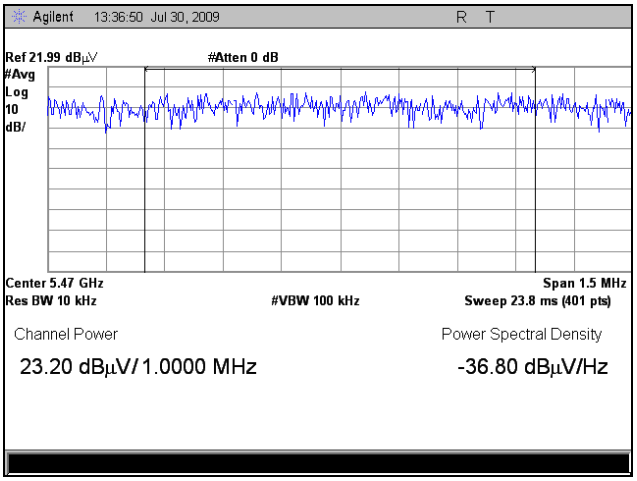
Plot 230. EIRP, 802.11n 20MHz, 5350 MHz Peak, 19 dBi Panel



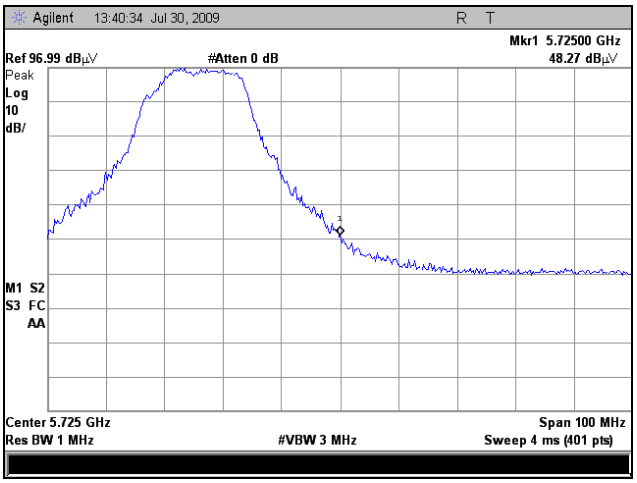
Plot 231. EIRP, 802.11n 20MHz, 5350 MHz Over 1 MHz, 19 dBi Panel



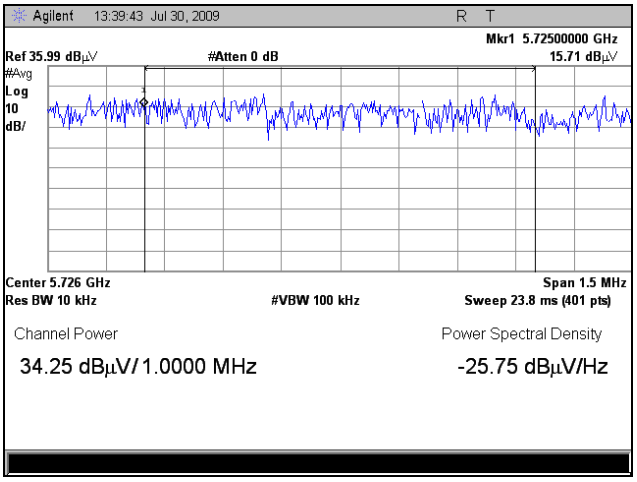
Plot 232. EIRP, 802.11n 20MHz, 5470 MHz Peak, 19 dBi Panel



Plot 233. EIRP, 802.11n 20MHz, 5470 MHz Over 1 MHz, 19 dBi Panel

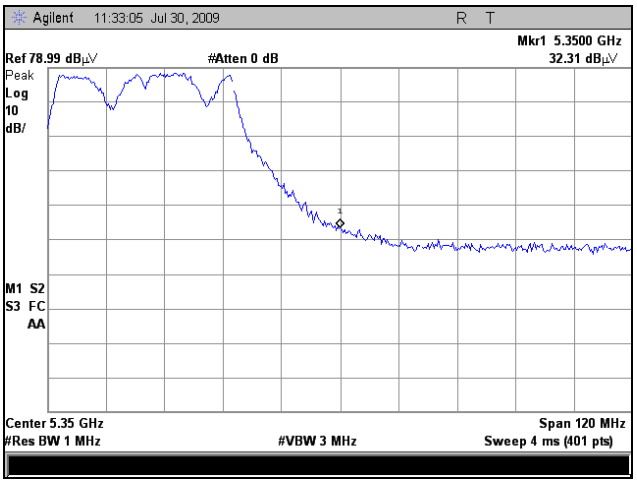


Plot 234. EIRP, 802.11n 20MHz, 5725 MHz Peak, 19 dBi Panel

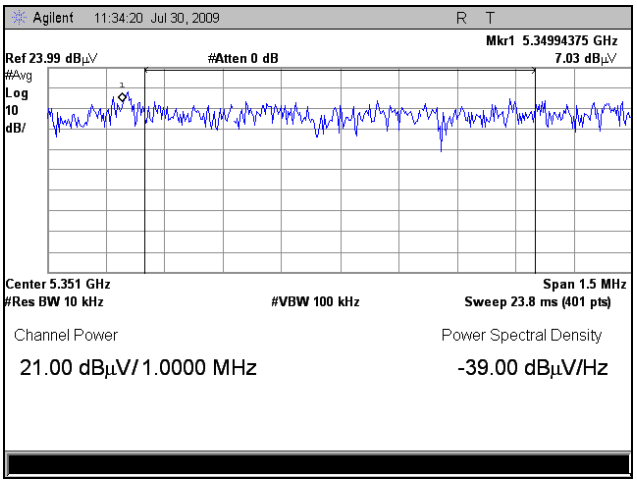


Plot 235. EIRP, 802.11n 20MHz, 5725 MHz Over 1 MHz, 19 dBi Panel

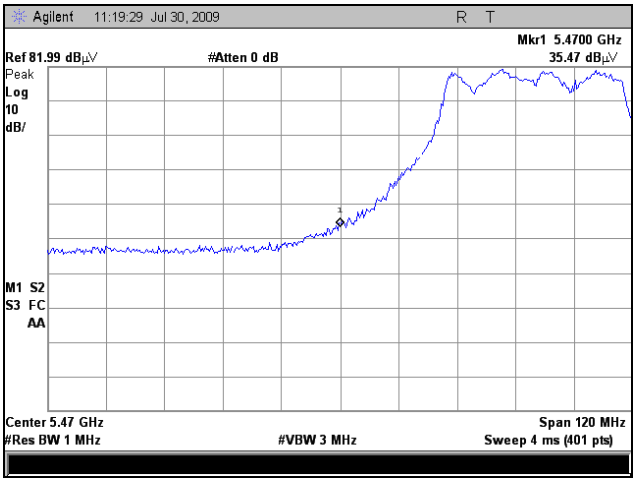
EIRP, 802.11n 40MHz



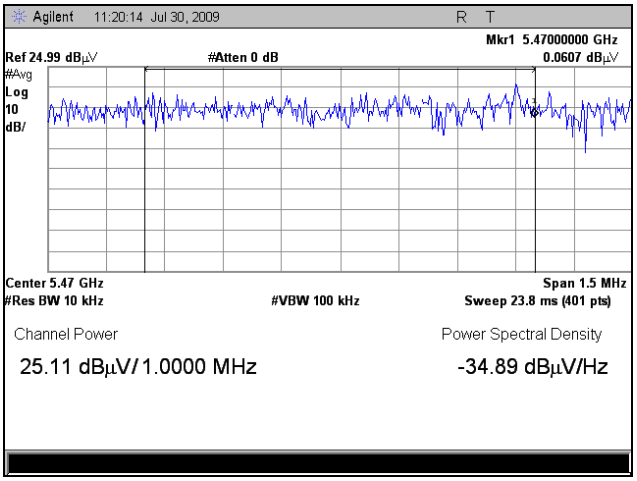
Plot 236. EIRP, 802.11n 40MHz, 5350 MHz Peak, 5 dBi Omni



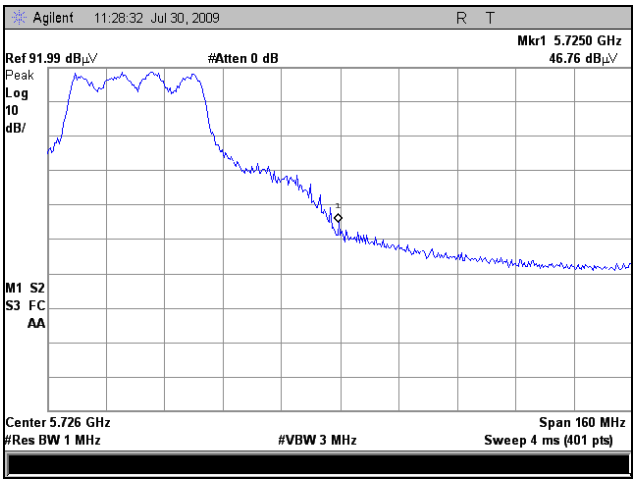
Plot 237. EIRP, 802.11n 40MHz, 5350 MHz Over 1 MHz, 5 dBi Omni



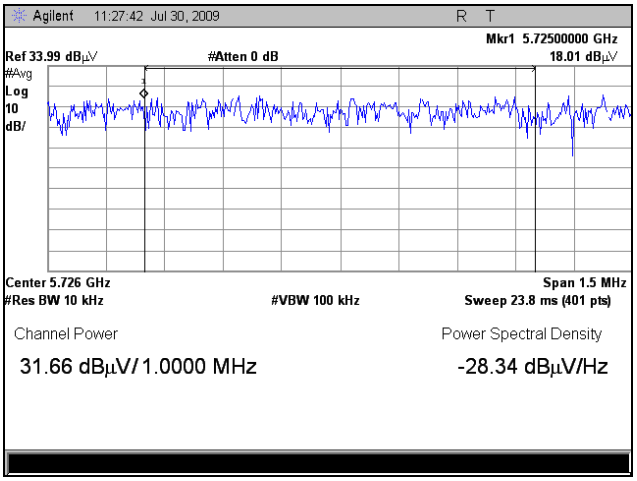
Plot 238. EIRP, 802.11n 40MHz, 5470 MHz Peak, 5 dBi Omni



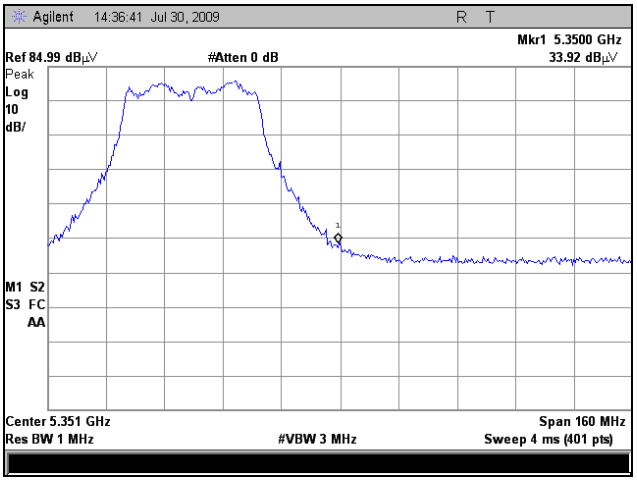
Plot 239. EIRP, 802.11n 40MHz, 5470 MHz Over 1 MHz, 5 dBi Omni



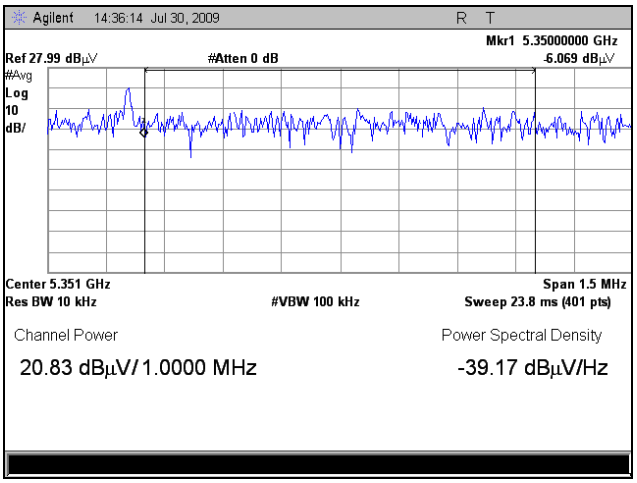
Plot 240. EIRP, 802.11n 40MHz, 5725 MHz Peak, 5 dBi Omni



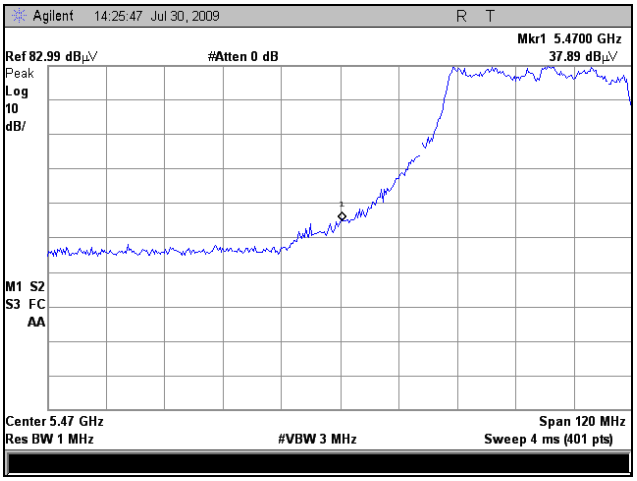
Plot 241. EIRP, 802.11n 40MHz, 5725 MHz Over 1 MHz, 5 dBi Omni



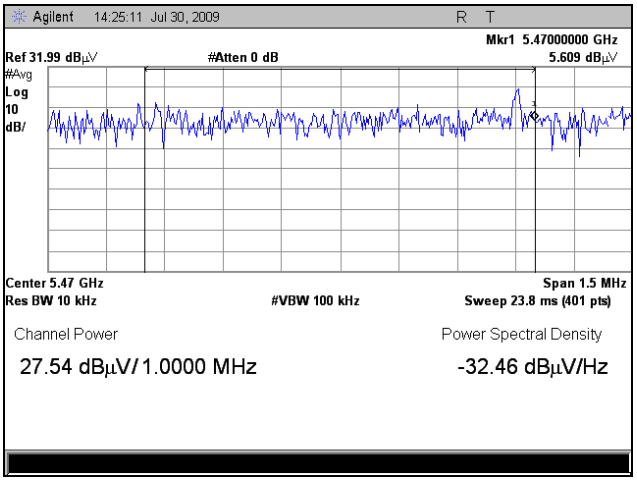
Plot 242. EIRP, 802.11n 40MHz, 5350 MHz Peak, 19 dBi Panel



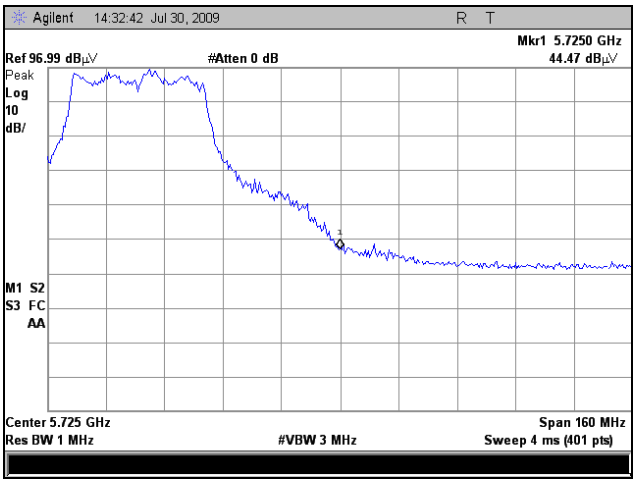
Plot 243. EIRP, 802.11n 40MHz, 5350 MHz Over 1 MHz, 19 dBi Panel



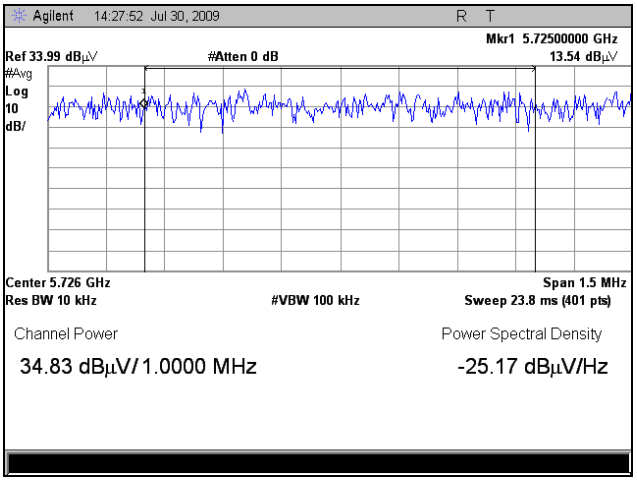
Plot 244. EIRP, 802.11n 40MHz, 5470 MHz Peak, 19 dBi Panel



Plot 245. EIRP, 802.11n 40MHz, 5470 MHz Over 1 MHz, 19 dBi Panel

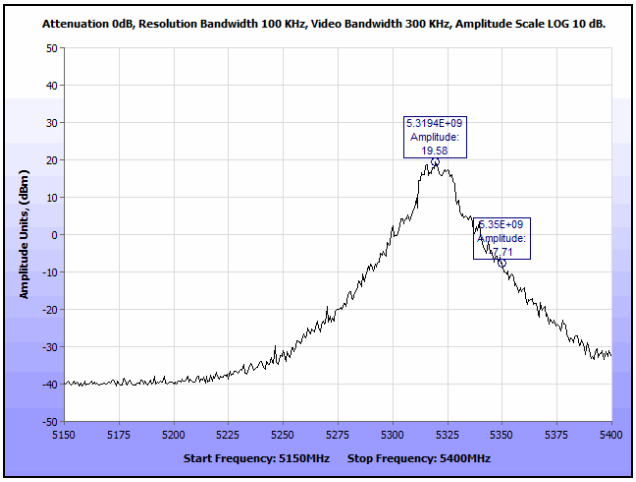


Plot 246. EIRP, 802.11n 40MHz, 5725 MHz Peak, 19 dBi Panel

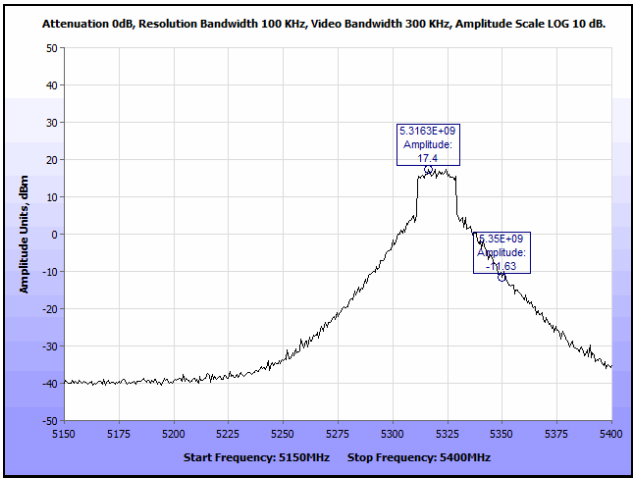


Plot 247. EIRP, 802.11n 40MHz, 5725 MHz Over 1 MHz, 19 dBi Panel

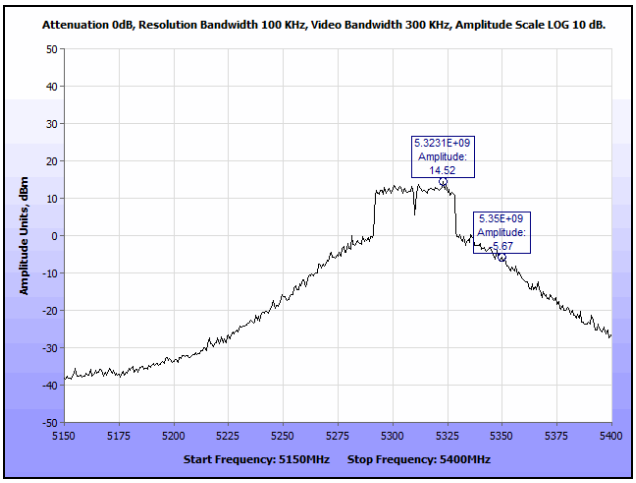
Restricted Band



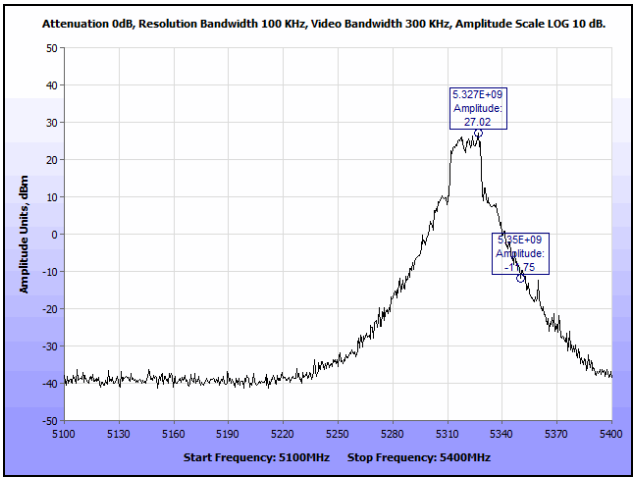
Plot 248. Restricted Band Edge, 5 dBi Omni, 802.11a, 5320 MHz



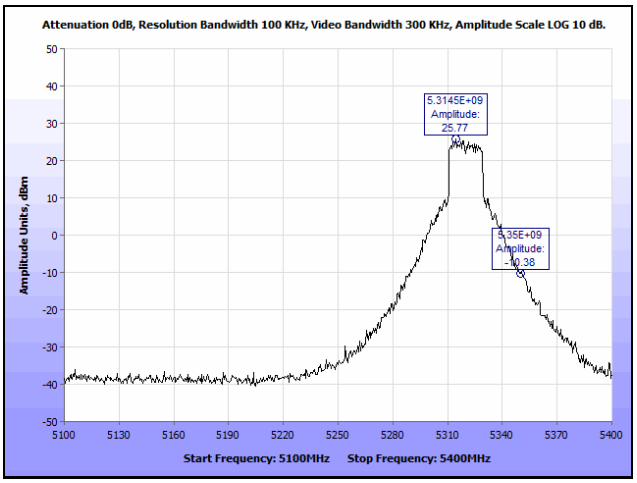
Plot 249. Restricted Band Edge, 5 dBi Omni, 802.11n HT20, 5320 MHz



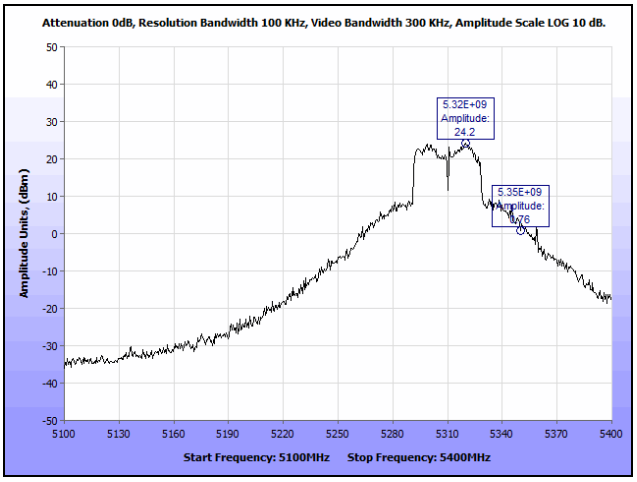
Plot 250. Restricted Band Edge, 5 dBi Omni, 802.11n HT40, 5310 MHz



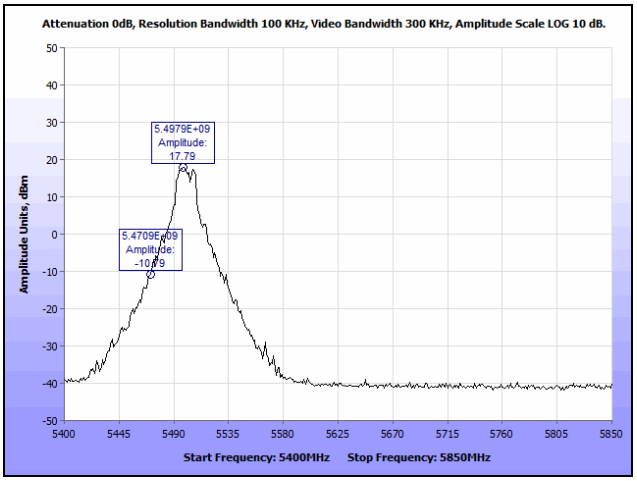
Plot 251. Restricted Band Edge, 19 dBi Patch, 802.11a, 5320 MHz



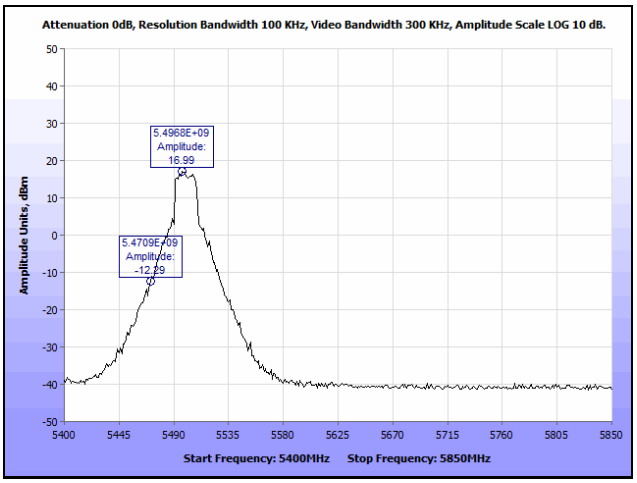
Plot 252. Restricted Band Edge, 19 dBi Patch, 802.11n HT20, 5320 MHz



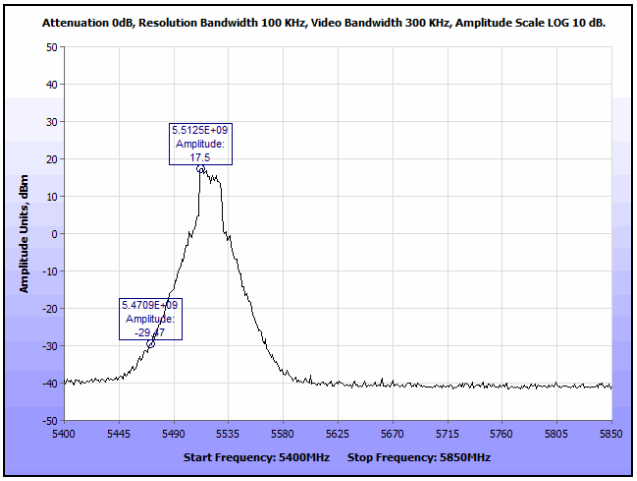
Plot 253. Restricted Band Edge, 19 dBi Patch, 802.11n HT40, 5310 MHz



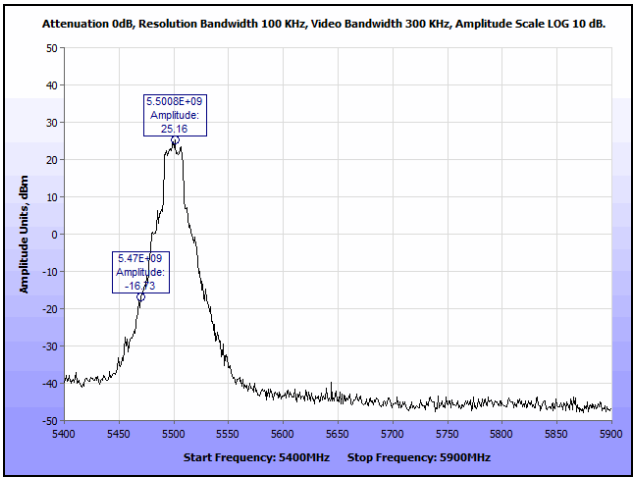
Plot 254. Restricted Band Edge, 5 dBi Omni, 802.11a, 5500 MHz



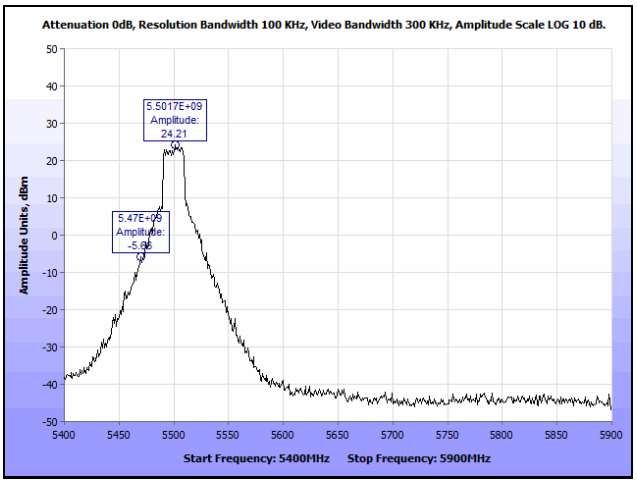
Plot 255. Restricted Band Edge, 5 dBi Omni, 802.11n HT20, 5500 MHz



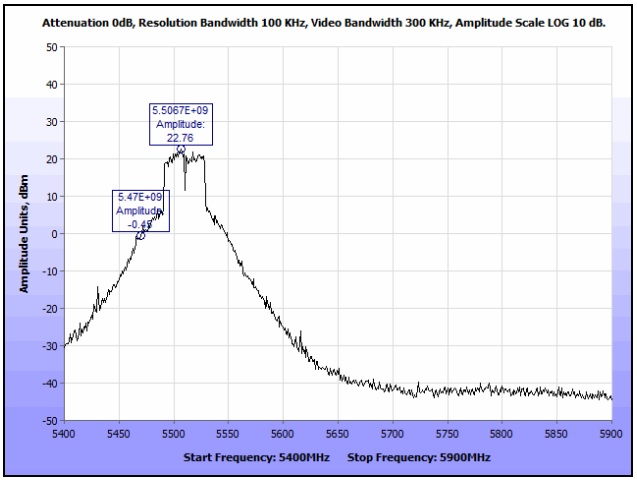
Plot 256. Restricted Band Edge, 5 dBi Omni, 802.11n HT40, 5510 MHz



Plot 257. Restricted Band Edge, 19 dBi Patch, 802.11a, 5500 MHz



Plot 258. Restricted Band Edge, 19 dBi Patch, 802.11n HT20, 5500 MHz



Plot 259. Restricted Band Edge, 19 dBi Patch, 802.11n HT40, 5510 MHz

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.407(f) RF Exposure

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

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

MPE Limit Calculation: EUT's operating frequencies @ 5250-5350MHz and 5470-5725MHz; highest conducted power = 20.22dBm (peak); therefore, **Limit for Uncontrolled exposure: 1 mW/cm^2 or 10 W/m^2**

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

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

EUT maximum antenna gain = 9.77dBi Combined (EUT is deployed with three 5 dBi Gain Omni)

where, S = Power Density (1 mW/cm^2)
P = Power Input to antenna (105.2 mW)
G = Antenna Gain (8.87 numeric)

S = (105.2*8.87 / 4*3.14*20.0^2) = (815.46 / 5024) = **0.185 mW/cm^2**@ 20cm separation

EUT maximum antenna gain = 19 dBi Panel

where, S = Power Density (1 mW/cm^2)
P = Power Input to antenna (11.9 mW)
G = Antenna Gain (79.43 numeric)

S = (11.9*79.43/4*3.14*20.0^2) = **0.188 mW/cm^2** @ 20cm separation.

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.407(g) Frequency Stability

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

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

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

Test Engineer(s): 08/19/09 – 08/20/09

Test Date(s): Anderson Soungpanya

Port	Frequency (MHz)	Voltage	Temperature (°C)	Measured (MHz)	Δ ppm
Port 1	5320	Low	-40	5319.95800	7.89
	5320	High	-40	5319.95625	8.22
	5500	Low	-40	5499.95275	8.59
	5500	High	-40	5499.95450	8.27
	5700	Low	-40	5699.95100	8.60
	5700	High	-40	5699.94750	9.21
	5320	Low	60	5320.14175	26.64
	5320	High	60	5320.14875	27.96
	5500	Low	60	5500.15750	28.64
	5500	High	60	5500.15750	28.64
	5700	Low	60	5700.16275	28.55
	5700	High	60	5700.13475	23.64

Table 36. Frequency Stability, Port 1

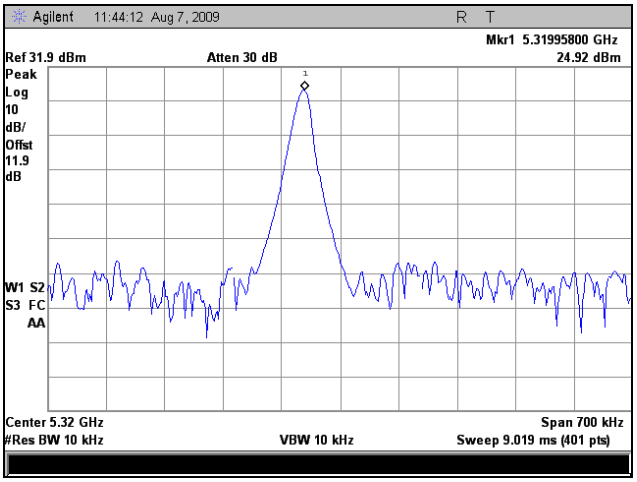
	Frequency (MHz)	Voltage	Temperature (°C)	Measured (MHz)	Δ ppm
Port 2	5320	Low	-40	5319.94925	9.54
	5320	High	-40	5319.95450	8.55
	5500	Low	-40	5499.94750	9.55
	5500	High	-40	5499.94925	9.23
	5700	Low	-40	5699.94400	9.82
	5700	High	-40	5699.94750	9.21
	5320	Low	60	5320.04025	7.57
	5320	High	60	5320.05425	10.20
	5500	Low	60	5500.05075	9.23
	5500	High	60	5500.05075	9.23
	5700	Low	60	5700.05250	9.21
	5700	High	60	5700.06300	11.05

Table 37. Frequency Stability, Port 2

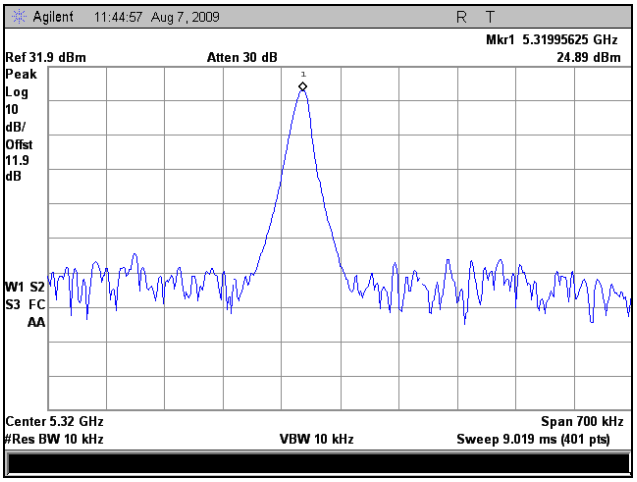
	Frequency (MHz)	Voltage	Temperature (°C)	Measured (MHz)	Δ ppm
Port 3	5320	Low	-40	5319.95100	9.21
	5320	High	-40	5319.94925	9.54
	5500	Low	-40	5499.94750	9.55
	5500	High	-40	5499.94925	9.23
	5700	Low	-40	5699.94575	9.52
	5700	High	-40	5699.94575	9.52
	5320	Low	60	5320.12950	24.34
	5320	High	60	5320.14700	27.63
	5500	Low	60	5500.11725	21.32
	5500	High	60	5500.15400	28.00
	5700	Low	60	5700.12075	21.18
	5700	High	60	5700.09800	17.19

Table 38. Frequency Stability, Port 3

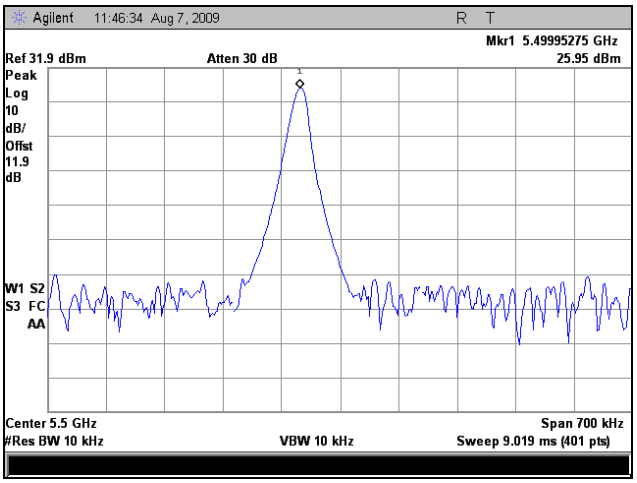
Frequency Stability, Port 1



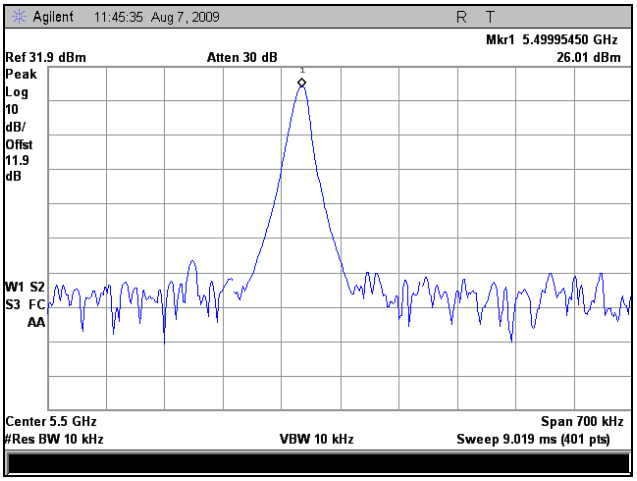
Plot 260. Freq. Stability, Port 1, 5320 MHz @-40C Low Volt.



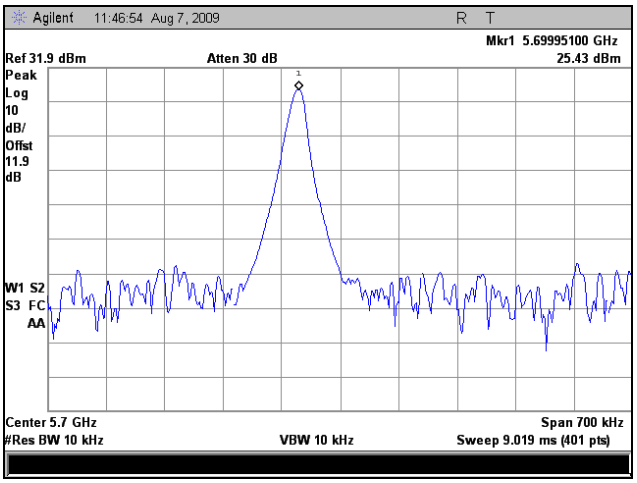
Plot 261. Freq. Stability, Port 1, 5320 MHz @-40C High Volt.



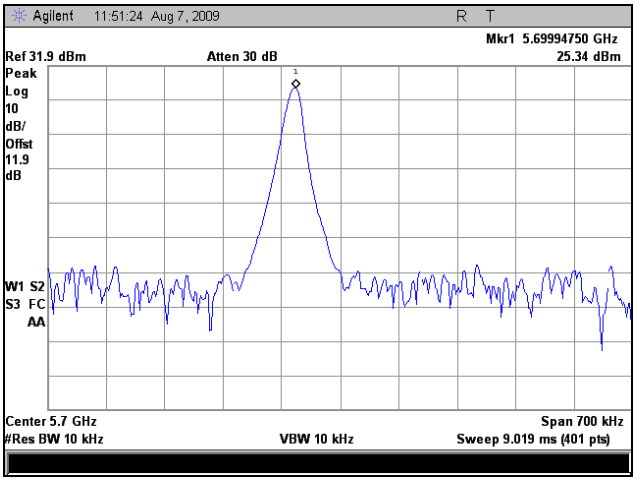
Plot 262. Freq. Stability, Port 1, 5500 MHz @-40C Low Volt.



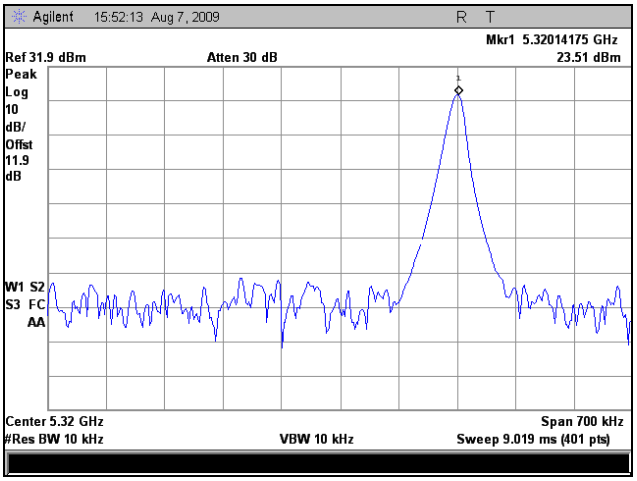
Plot 263. Freq. Stability, Port 1, 5500 MHz @-40C High Volt.



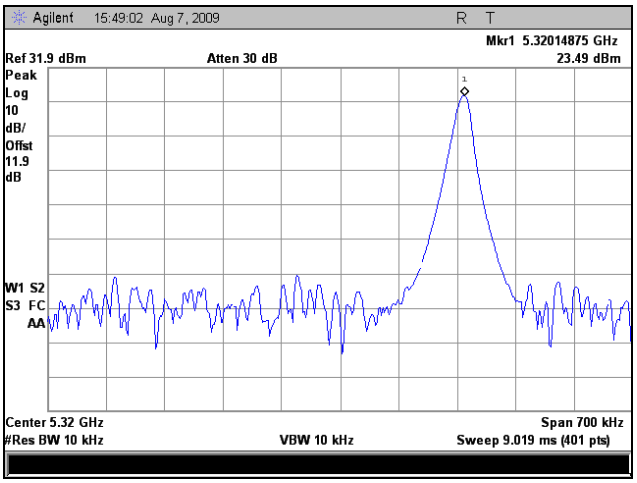
Plot 264. Freq. Stability, Port 1, 5700 MHz @-40C Low Volt.



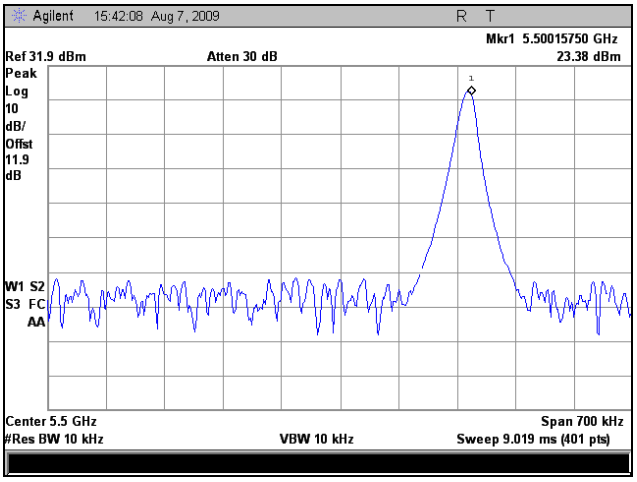
Plot 265. Freq. Stability, Port 1, 5700 MHz @-40C High Volt.



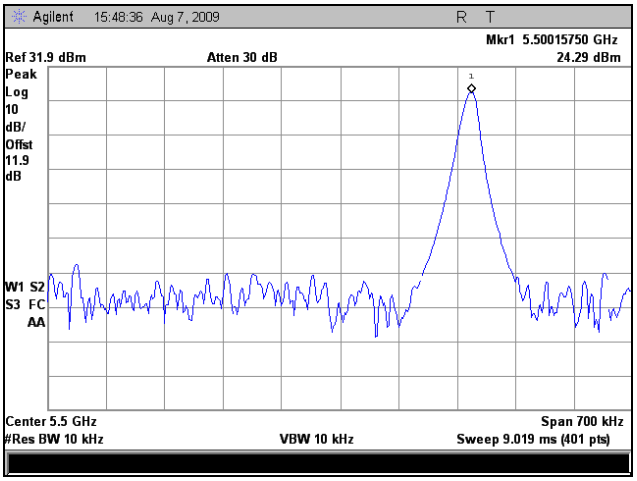
Plot 266. Freq. Stability, Port 1, 5320 MHz @+60C Low Volt.



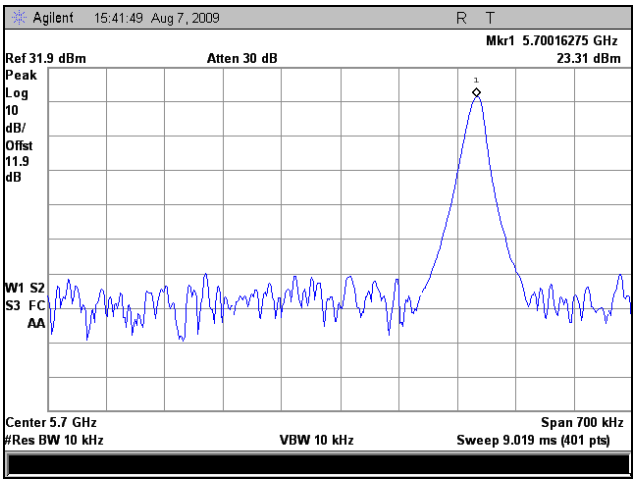
Plot 267. Freq. Stability, Port 1, 5320 MHz @+60C High Volt.



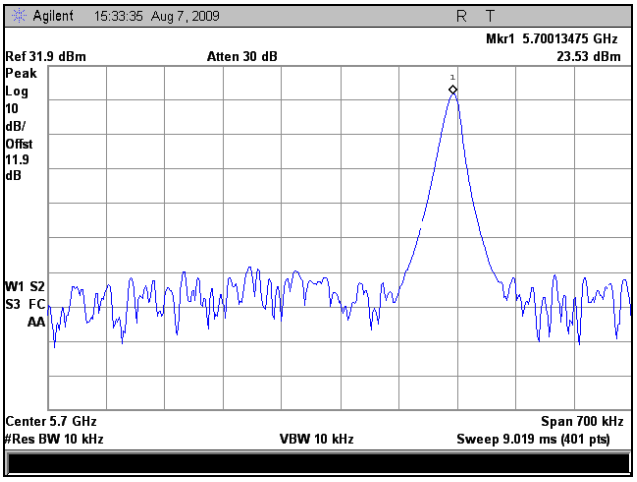
Plot 268. Freq. Stability, Port 1, 5500 MHz @+60C Low Volt.



Plot 269. Freq. Stability, Port 1, 5500 MHz @+60C High Volt.

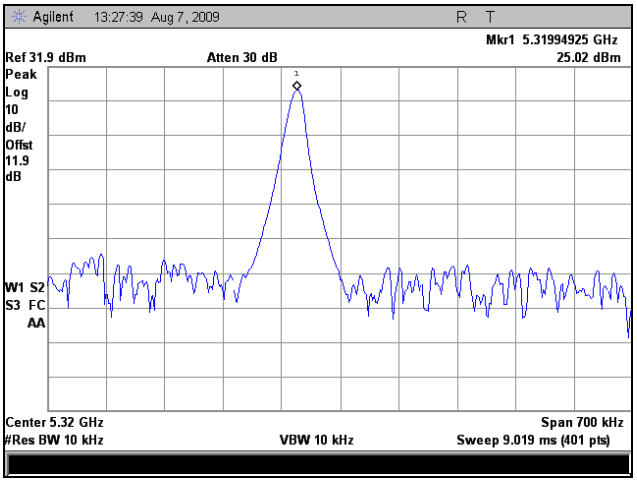


Plot 270. Freq. Stability, Port 1, 5700 MHz @+60C Low Volt.

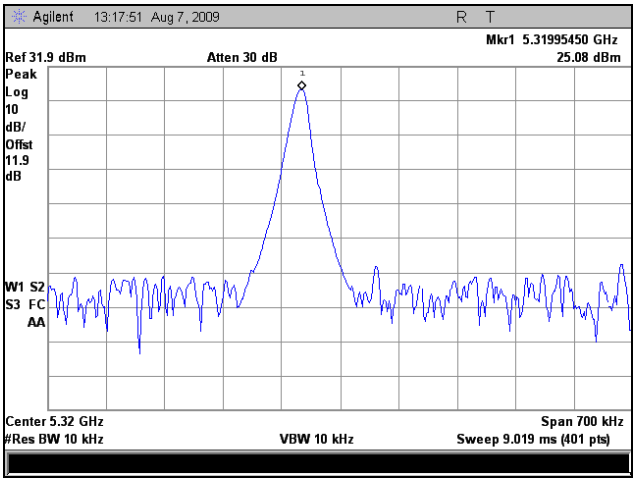


Plot 271. Freq. Stability, Port 1, 5700 MHz @+60C High Volt.

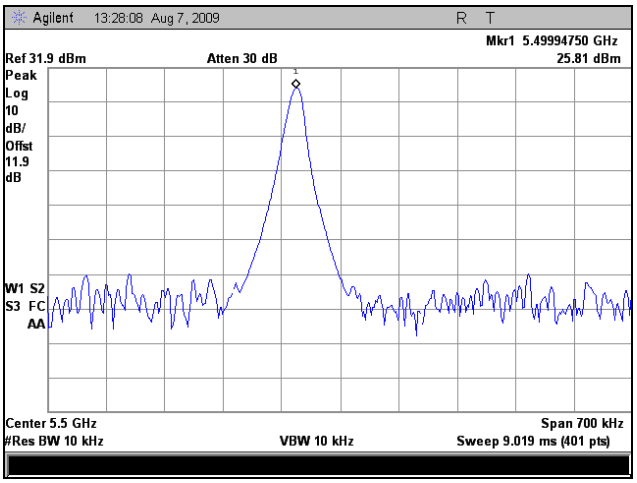
Frequency Stability, Port 2



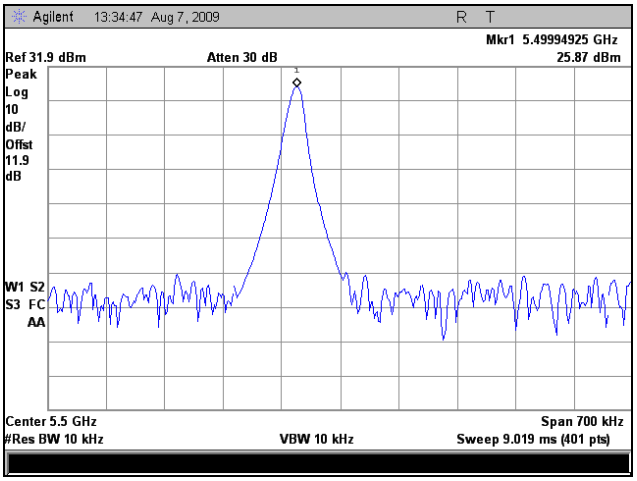
Plot 272. Freq. Stability, Port 2, 5320 MHz @-40C Low Volt.



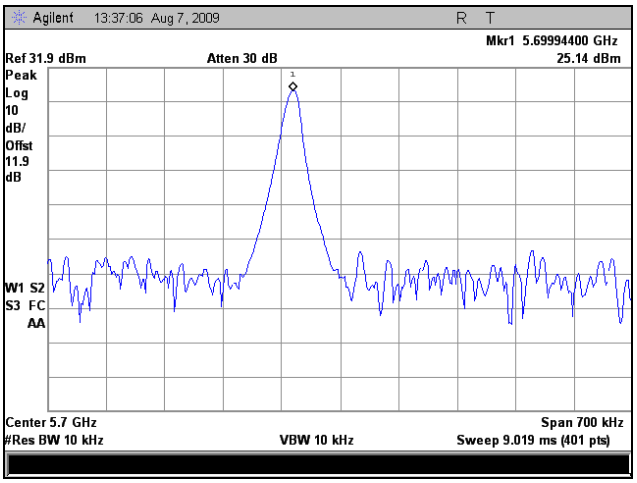
Plot 273. Freq. Stability, Port 2, 5320 MHz @-40C High Volt.



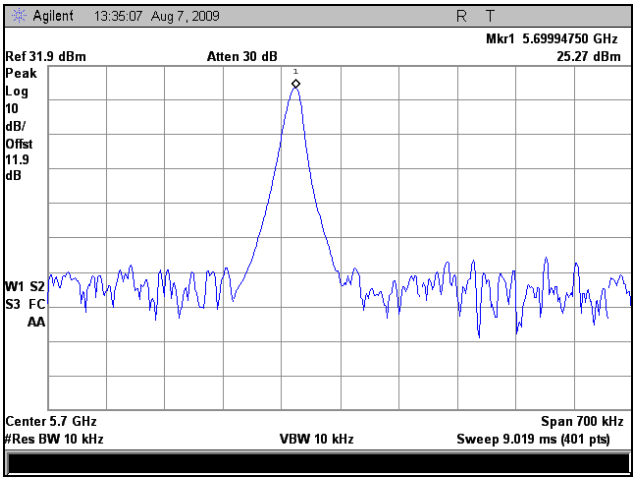
Plot 274. Freq. Stability, Port 2, 5500 MHz @-40C Low Volt.



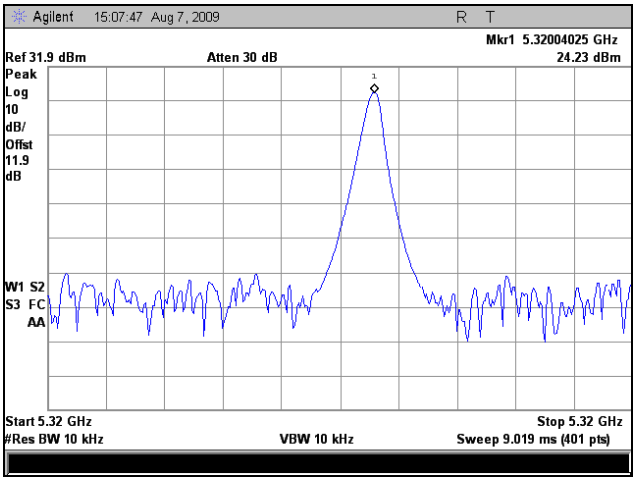
Plot 275. Freq. Stability, Port 2, 5500 MHz @-40C High Volt.



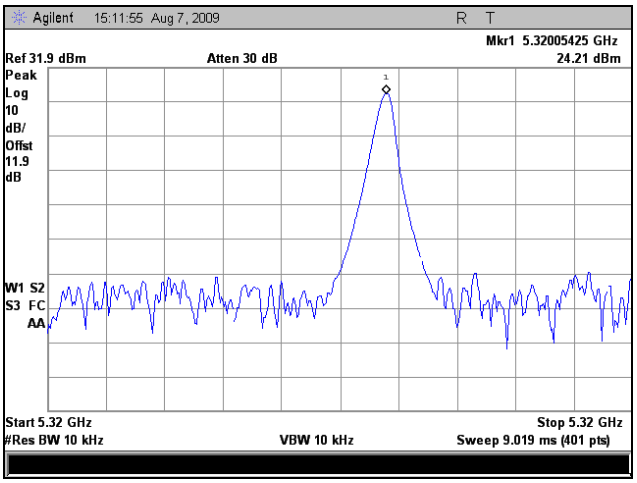
Plot 276. Freq. Stability, Port 2, 5700 MHz @-40C Low Volt.



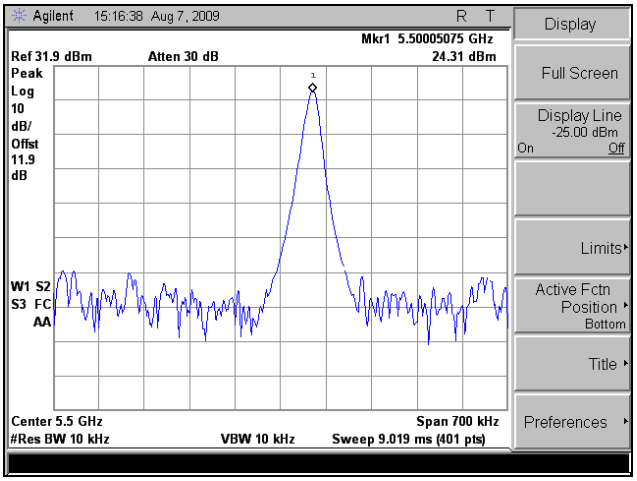
Plot 277. Freq. Stability, Port 2, 5700 MHz @-40C High Volt.



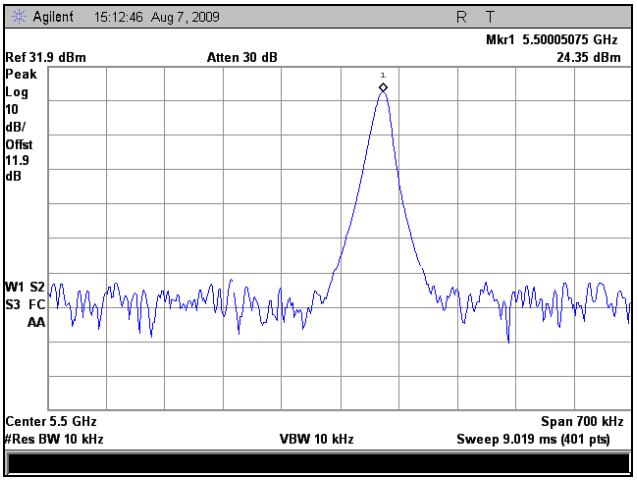
Plot 278. Freq. Stability, Port 2, 5320 MHz @+60C Low Volt.



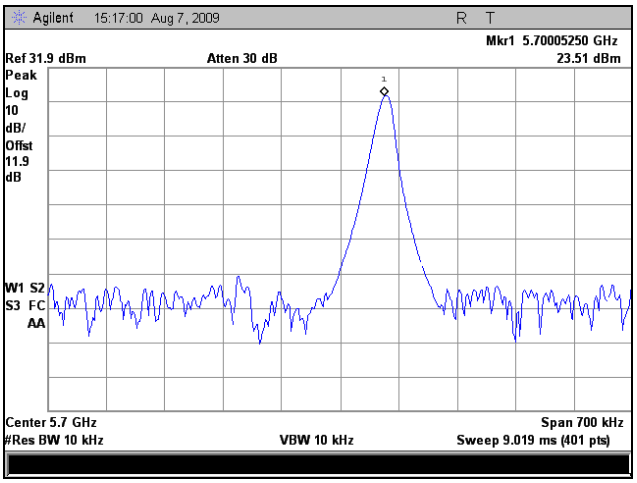
Plot 279. Freq. Stability, Port 2, 5320 MHz @+60C High Volt.



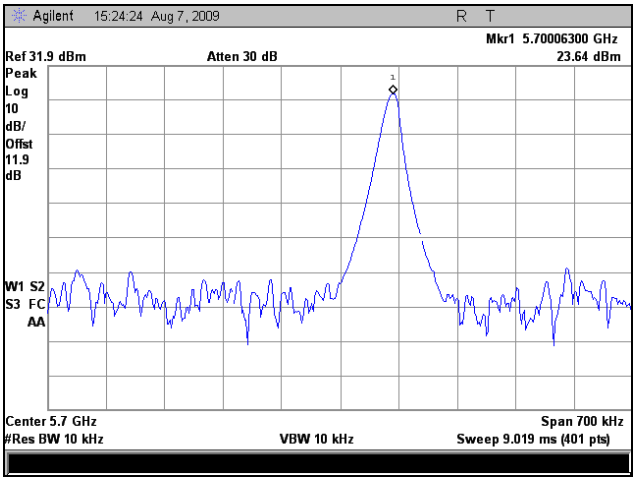
Plot 280. Freq. Stability, Port 2, 5500 MHz @+60C Low Volt.



Plot 281. Freq. Stability, Port 2, 5500 MHz @+60C High Volt.

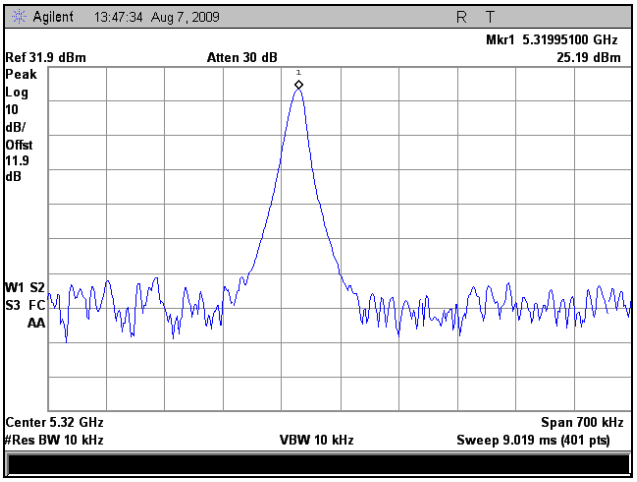


Plot 282. Freq. Stability, Port 2, 5700 MHz @+60C Low Volt.

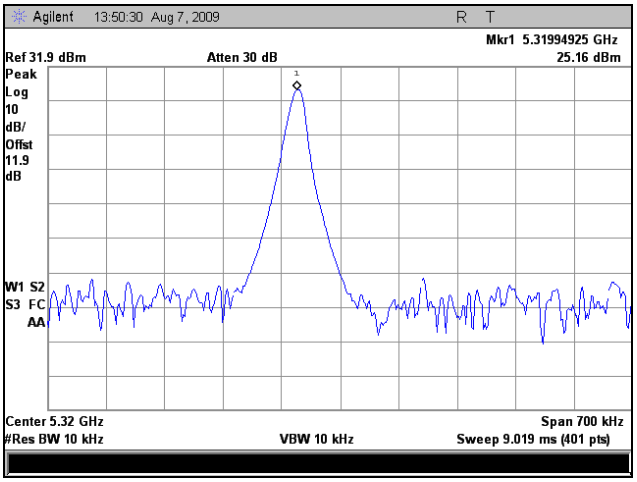


Plot 283. Freq. Stability, Port 2, 5700 MHz @+60C High Volt.

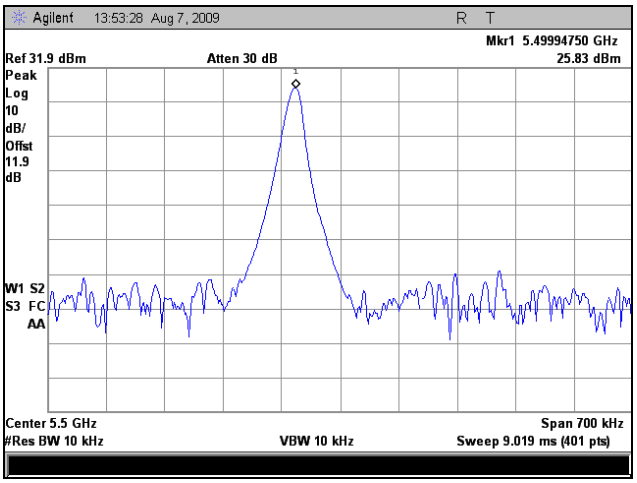
Frequency Stability, Port 3



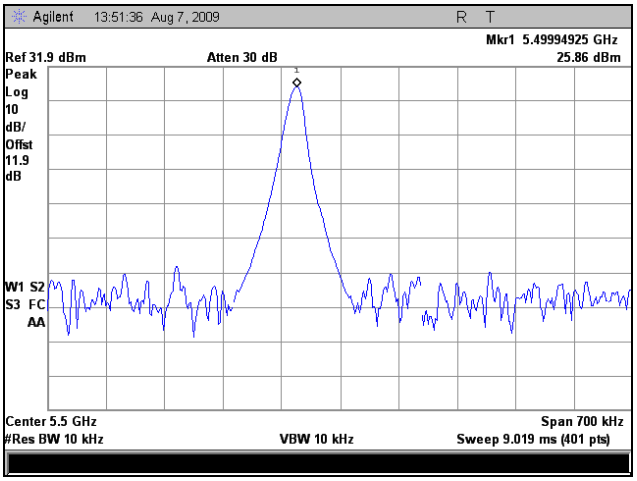
Plot 284. Freq. Stability, Port 3, 5320 MHz @-40C Low Volt.



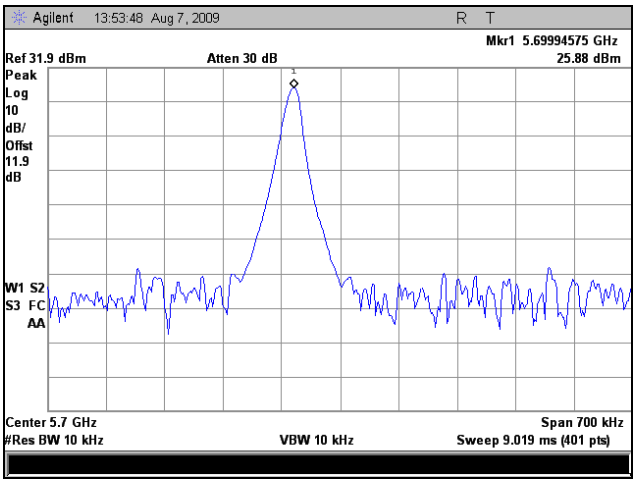
Plot 285. Freq. Stability, Port 3, 5320 MHz @-40C High Volt.



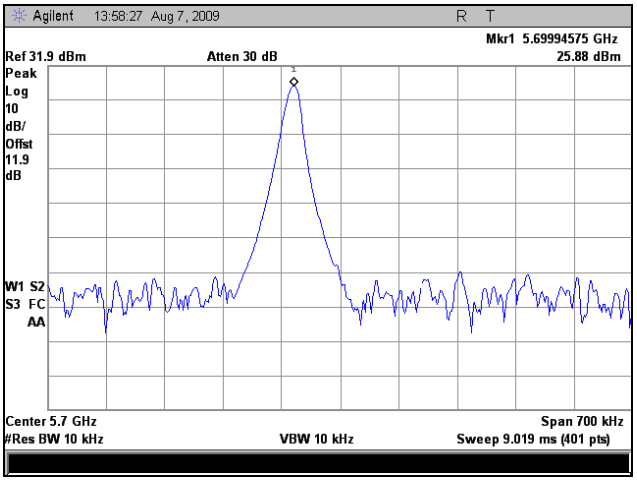
Plot 286. Freq. Stability, Port 3, 5500 MHz @-40C Low Volt.



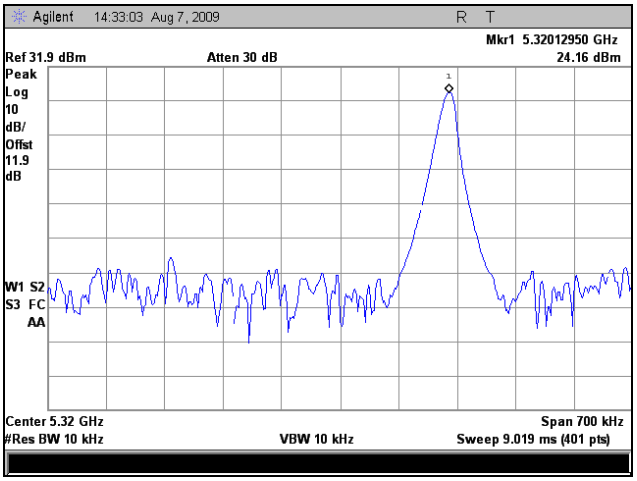
Plot 287. Freq. Stability, Port 3, 5500 MHz @-40C High Volt.



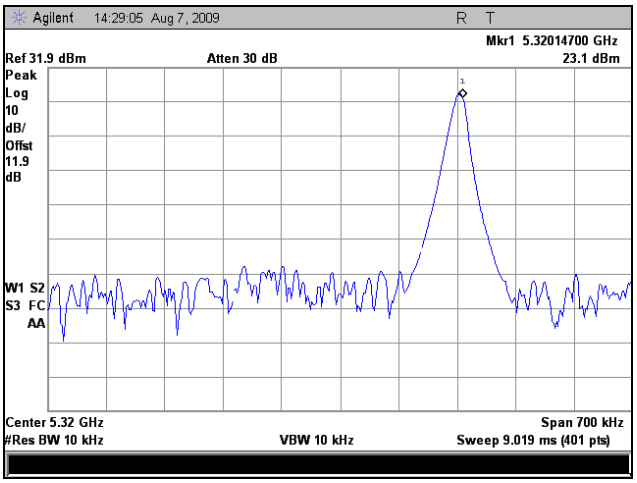
Plot 288. Freq. Stability, Port 3, 5700 MHz @-40C Low Volt.



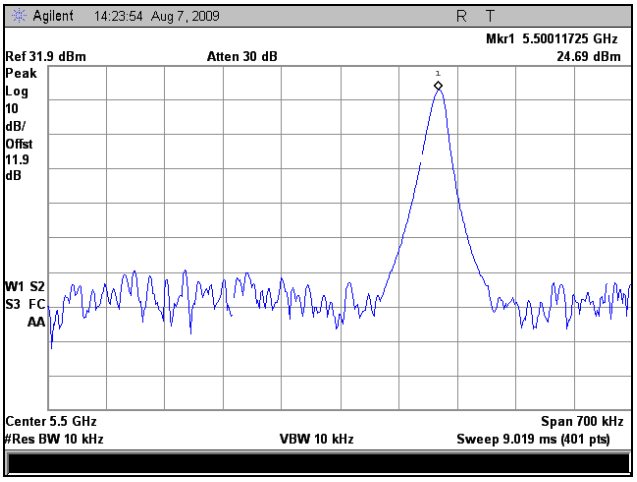
Plot 289. Freq. Stability, Port 3, 5700 MHz @-40C High Volt.



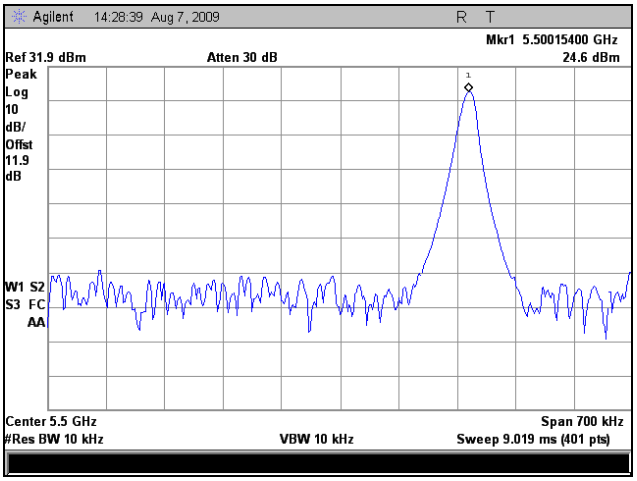
Plot 290. Freq. Stability, Port 3, 5320 MHz @+60C Low Volt.



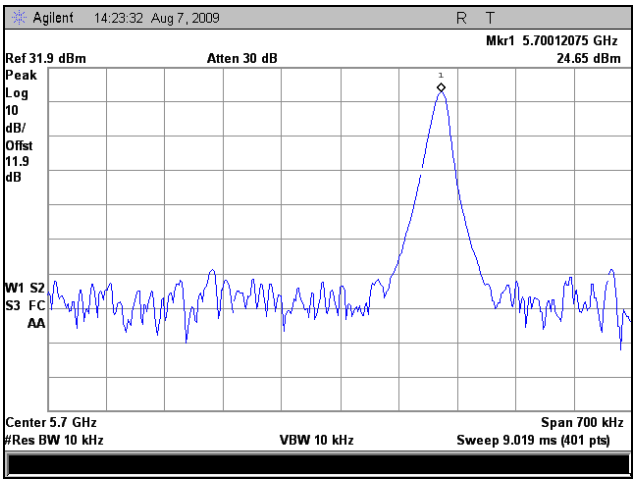
Plot 291. Freq. Stability, Port 3, 5320 MHz @+60C High Volt.



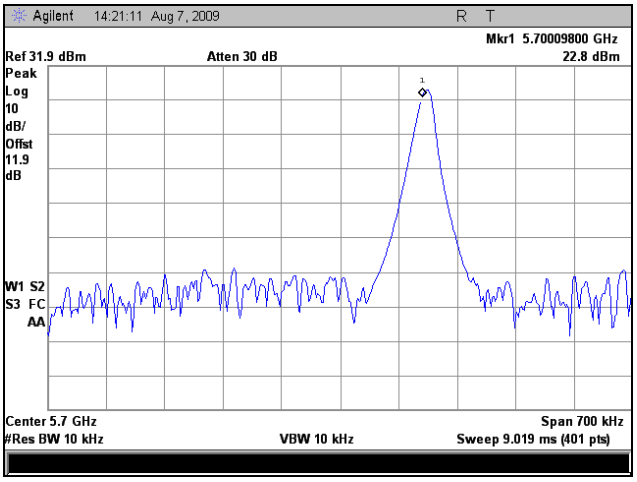
Plot 292. Freq. Stability, Port 3, 5500 MHz @+60C Low Volt.



Plot 293. Freq. Stability, Port 3, 5500 MHz @+60C High Volt.



Plot 294. Freq. Stability, Port 3, 5700 MHz @+60C Low Volt.



Plot 295. Freq. Stability, Port 3, 5700 MHz @+60C High Volt.

