FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

802.11 b/g/n WLAN Module

Model: 1491

Trade Name: Microsoft

Issued to

Microsoft
One Microsoft Way, Redmond, WA 98052

Issued by

Compliance Certification Services Inc.
No.11, Wu-Gong 6th Rd., Wugu Industrial Park,
New Taipei City 248, Taiwan (R.O.C.)
http://www.ccsrf.com
service@ccsrf.com
Issued Date: May 23, 2012

Testing Laboratory
1309

Revision History

Rev.		Issue Date		Revisions	Effect Page	Revised By
00		March 28, 2012		Initial Issue	ALL	Jessica Ho
01		May 23, 2012		Re-test 6dB BANDWIDTH and SPURIOUS EMISSIONS.	ALL	Gina Lo

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1. TEST RESULT CERTIFICATION

Applicant:	Microsoft One Microsoft Way, Redmond, WA 98052
Equipment Under Test:	802.11 b/g/n WLAN Module
Trade Name:	Microsoft
Model:	1491
Date of Test:	January 31 ~ May 22, 2012

APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
FCC 47 CFR Part 15 Subpart C	No non-compliance noted

We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4: 2003 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.247.

The test results of this report relate only to the tested sample EUT identified in this report.

Approved by:

Jason Lin

Jason Lin
Section Manager
Compliance Certification Services Inc.

Reviewed by:

Gina Lo

Gina Lo
Section Manager
Compliance Certification Services Inc.

2. EUT DESCRIPTION

Product	802.11 b/g/n WLAN Module
Trade Name	Microsoft
Model Number	1491
Model Discrepancy	N/A
Received Date	January 2, 2012
Power Ratting	Powered by host device
Frequency Range	2412 ~ 2462 MHz
Transmit Power	**For Monopole Antenna** IEEE 802.11b mode: 19.72 dBm IEEE 802.11g mode: 25.79 dBm IEEE 802.11n HT 20 MHz mode: 25.74 dBm IEEE 802.11n HT 40 MHz mode: 23.92 dBm **For PIFA Antenna** IEEE 802.11b mode: 19.67 dBm IEEE 802.11g mode: 25.71 dBm IEEE 802.11n HT 20 MHz mode: 25.72 dBm IEEE 802.11n HT 40 MHz mode: 22.88 dBm
Modulation Technique	IEEE 802.11b mode: DSSS (1, 2, 5.5 and 11 Mbps) IEEE 802.11g mode: OFDM (6, 9, 12, 18, 24, 36, 48 and 54 Mbps) IEEE 802.11n HT 20 MHz mode: OFDM (6.5, 13, 19.5, 26, 39, 52, 58.5, 65.0Mbps) IEEE 802.11n HT 40 MHz mode: OFDM (13.5, 27, 40.5, 54, 81, 108, 121.5, 135Mbps)
Number of Channels	IEEE 802.11b/g mode: 11 Channels IEEE 802.11n HT 20 MHz mode: 11 Channels IEEE 802.11n HT 40 MHz mode: 7 Channels
Antenna Specification	Monopole Antenna / Gain: 1.97 dBi PIFA Antenna / Gain: 1.05 dBi

Remark:

1. *The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.*
2. *This submittal(s) (test report) is intended for FCC ID: C3K1491 filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.*

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, 15.207, 15.209 and 15.247.

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4.

3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

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

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	([2])
13.36 - 13.41	322 - 335.4		

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2] Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

3.5 DESCRIPTION OF TEST MODES

The EUT (model: 1491) comes with two different antennas for sale, for detail descriptions, please refer to antenna specification.

Software used to control the EUT for staying in continuous transmitting mode was programmed.

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz and power line conducted emissions below 30MHz, which worst case was in normal link mode only.

IEEE 802.11b mode:

Channel Low (2412MHz), Channel Mid (2442MHz) and Channel High (2462MHz) with 1Mbps data rate were chosen for full testing.

IEEE 802.11g mode:

Channel Low (2412MHz), Channel Mid (2442MHz) and Channel High (2462MHz) with 6Mbps data rate were chosen for full testing.

IEEE 802.11n HT 20 MHz mode:

Channel Low (2412MHz), Channel Mid (2442MHz) and Channel High (2462MHz) with 6.5Mbps data rate were chosen for full testing.

IEEE 802.11n HT 40 MHz mode:

Channel Low (2422MHz), Channel Mid (2442MHz), Channel Mid (2447MHz) and Channel High (2452MHz) with 13.5Mbps data rate were chosen for full testing.

The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the worst case was recorded.

4. INSTRUMENT CALIBRATION

4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

4.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

Remark: *Each piece of equipment is scheduled for calibration once a year and Loop Antenna is scheduled for calibration once three years.*

Conducted Emissions Test Site				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	Agilent	E4446A	MY43360131	03/16/2013
Power Meter	Anritsu	ML2495A	1012009	04/26/2013
Power Sensor	Anritsu	MA2411B	0917072	04/26/2013

Wugu 966 Chamber A				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	Agilent	E4446A	US42510268	11/15/2012
EMI Test Receiver	R&S	ESCI	100064	03/01/2013
Pre-Amplifier	Mini-Circults	ZFL-1000LN	SF350700823	01/13/2013
Pre-Amplifier	MITEQ	AFS44-00102650-42-10P-44	1415367	11/20/2012
Bilog Antenna	Sunol Sciences	JB3	A030105	10/03/2012
Horn Antenna	EMCO	3117	00055165	01/11/2013
Turn Table	CCS	CC-T-1F	N/A	N.C.R
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R
Site NSA	CCS	N/A	N/A	12/23/2012
Test S/W	EZ-EMC (CCS-3A1RE)			

Conducted Emission room # A				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
EMI Test Receiver	R&S	ESCI	101203	07/26/2012
LISN	R&S	ESH3-Z5	848773/014	12/07/2012
LISN	SCHWARZBECK	NSLK 8127	8127-541	12/14/2012
ISN	FCC	FCC-TLISN-T4-02	20395	10/17/2012
ISN	FCC	FCC-TLISN-T8-02-09	101131	09/13/2012
Test S/W	CCS-3A1-CE			

4.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
Powerline Conducted Emission	+/- 1.2159
3M Semi Anechoic Chamber / 30M~200M	+/- 4.0138
3M Semi Anechoic Chamber / 200M~1000M	+/- 3.9483
3M Semi Anechoic Chamber / 1G~8G	+/- 2.5975
3M Semi Anechoic Chamber / 8G~18G	+/- 2.6112
3M Semi Anechoic Chamber / 18G~26G	+/- 2.7389
3M Semi Anechoic Chamber / 26G~40G	+/- 2.9683

***Remark**: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.*

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

☒ No.11, Wu-Gong 6th Rd., Wugu Industrial Park, New Taipei City 248, Taiwan (R.O.C.)
Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

☐ No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township, Taoyuan County 33841, TAIWAN, R.O.C.
Tel: 886-3-324-0332 / Fax: 886-3-324-5235

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

5.3 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements	FCC MRA: TW1039
Taiwan	TAF	LP0002, RTTE01, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-210, RSS-310 IDA TS SRD, AS/NZS 4268, AS/NZS 4771, TS 12.1 & 12,2, ETSI EN 300 440-1, ETSI EN 300 440-2, ETSI EN 300 328, ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 301 893, ETSI EN 301 489-1/3/7/17 FCC OET Bulletin 65 + Supplement C, EN 50360, EN 50361, EN 50371, RSS 102, EN 50383, EN 50385, EN 50392, IEC 62209, CNS 14958-1, CNS 14959 FCC Method –47 CFR Part 15 Subpart B IEC / EN 61000-3-2, IEC / EN 61000-3-3, IEC / EN 61000-4-2/3/4/5/6/8/11	TAF Testing Laboratory 1309
Canada	Industry Canada	3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform	Canada IC 2324G-1 IC 2324G-2

** No part of this report may be used to claim or imply product endorsement by A2LA or any agency of the US Government.*

6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.

6.2 SUPPORT EQUIPMENT

No	Device Type	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1.	Notebook PC	HP	dv6-1332TX	CNF9491GPS	PD9112BNHU	N/A	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
2.	Notebook PC	IBM	1951-I3V(T60)	L3B2188	FCC DoC	N/A	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
3.	LCD Monitor	DELL	3008WFP	CN-0XK290-71618-846-169L	FCC DoC	Unshielded, 1.8m	Shielded, 1.8m
4.	320GB 2.5" HDD	Seagate	9ZA2MG-500	538224 2806	FCC DoC	Shielded, 1.8m	N/A
5.	USB Mouse	Logitech	M-U0026	810-002147	N/A	N/A	N/A
6.	Test Kit	N/A	N/A	N/A	N/A	N/A	N/A

Remark:

1. *All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
2. *Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

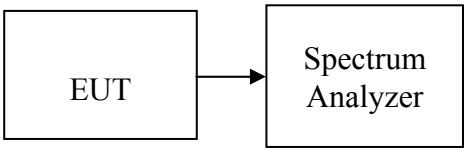
7. FCC PART 15.247 REQUIREMENTS

7.1 6DB BANDWIDTH

LIMIT

According to §15.247(a)(2), systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6dB bandwidth shall be at least 500 kHz.

Test Configuration



TEST PROCEDURE

According to 558074 DTS Meas Guidance D01 v01 5.1.1

The transmitter output is connected to the spectrum analyzer. Set the RBW = 1-5% of the emission bandwidth, VBW ≥ 3 x RBW, Detector = Peak, Trace mode = max hold, Sweep = auto couple.

Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6dB relative to the maximum level measured in the fundamental emission.

TEST RESULTS

No non-compliance noted

Test Data

For Monopole Antenna:

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	12.2	>500	PASS
Mid	2442	12.2		PASS
High	2462	12.2		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.43	>500	PASS
Mid	2442	16.40		PASS
High	2462	16.40		PASS

Test mode: IEEE 802.11n HT 20 MHz mode

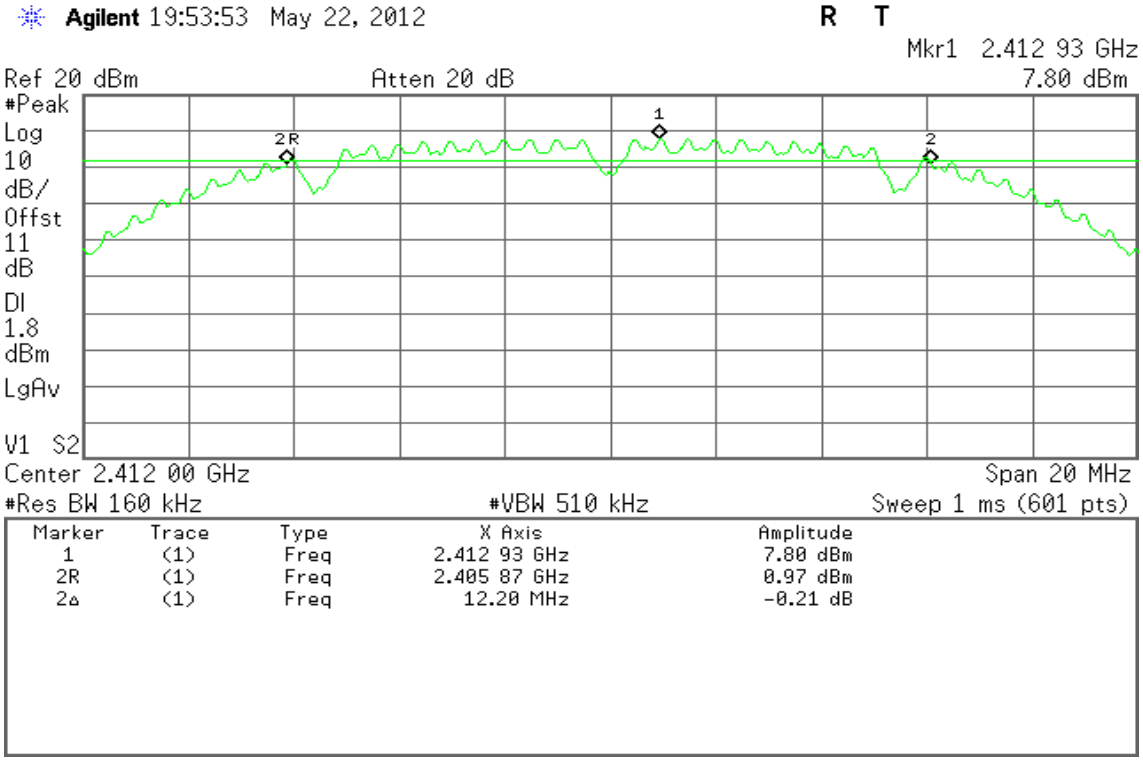
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	17.27	>500	PASS
Mid	2442	17.50		PASS
High	2462	17.23		PASS

Test mode: IEEE 802.11n HT 40 MHz mode

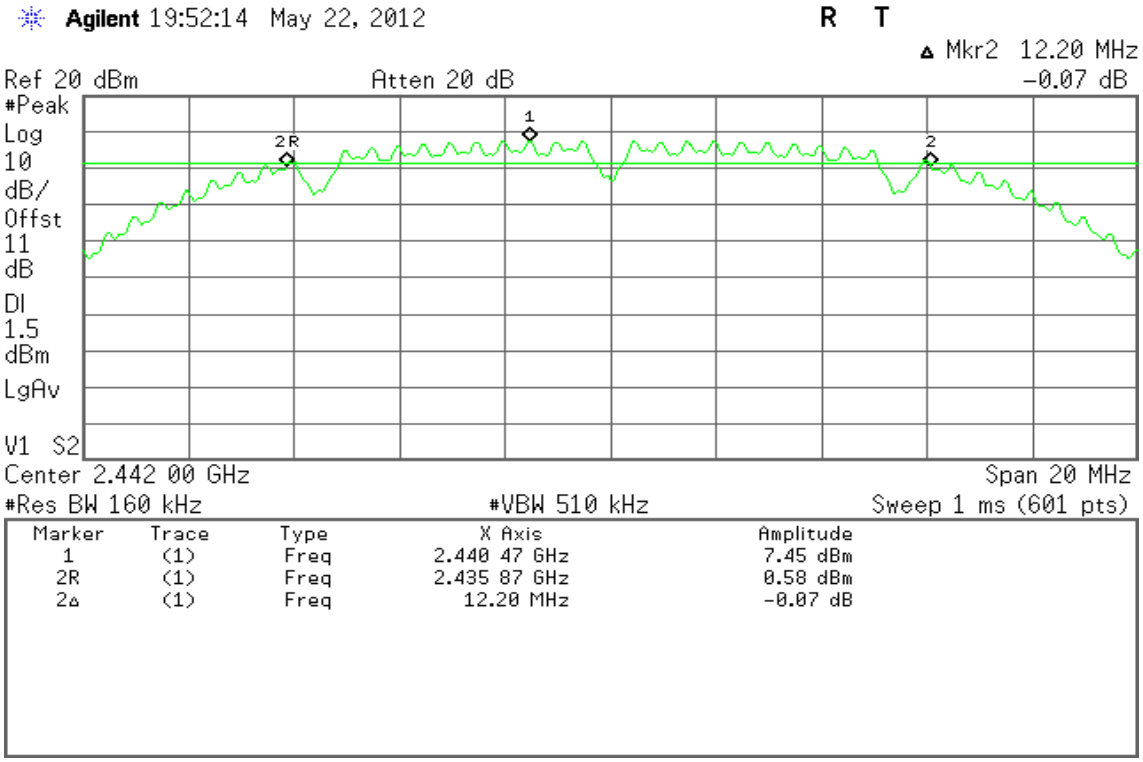
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (kHz)	Result
Low	2422	36.27	>500	PASS
Mid	2442	36.40		PASS
High	2452	35.93		PASS

IEEE 802.11b mode

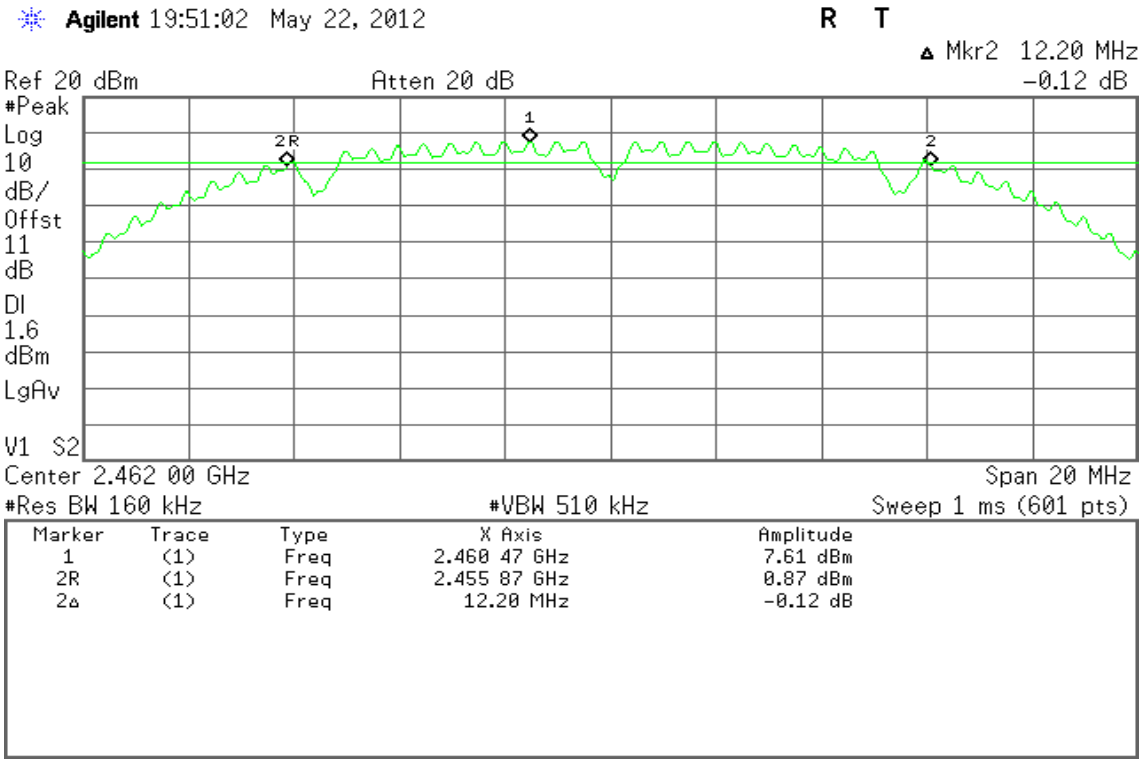
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

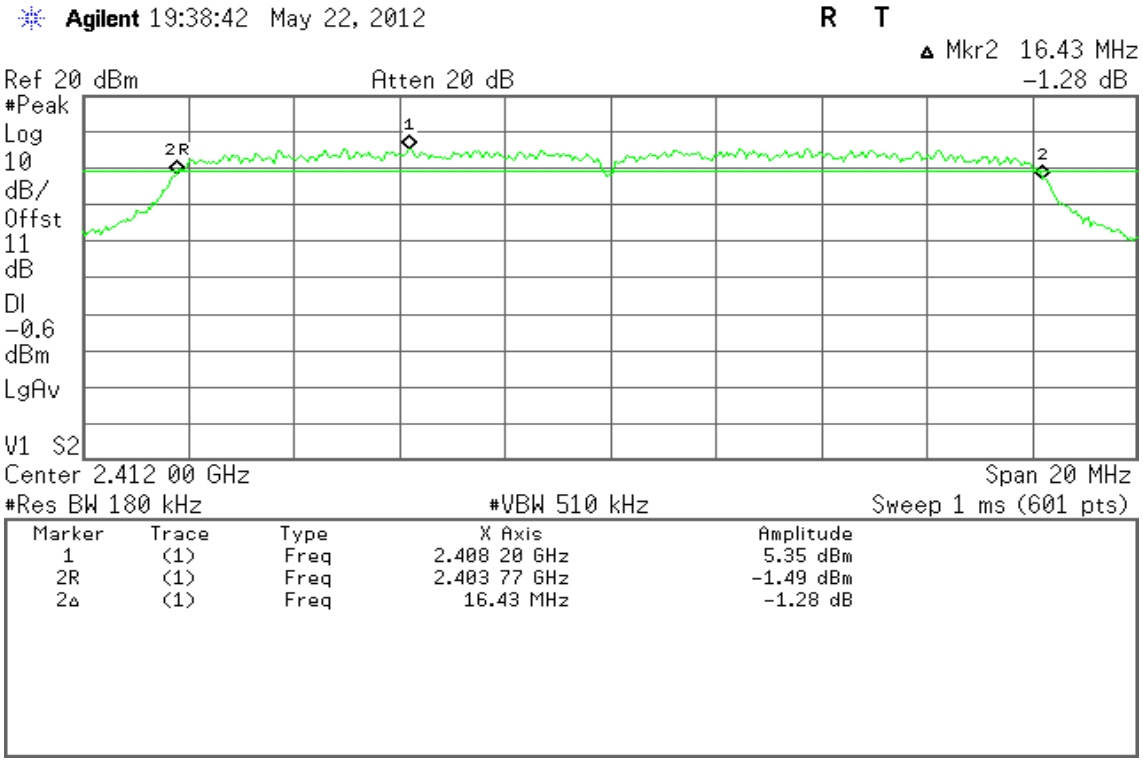


6dB Bandwidth (CH High)

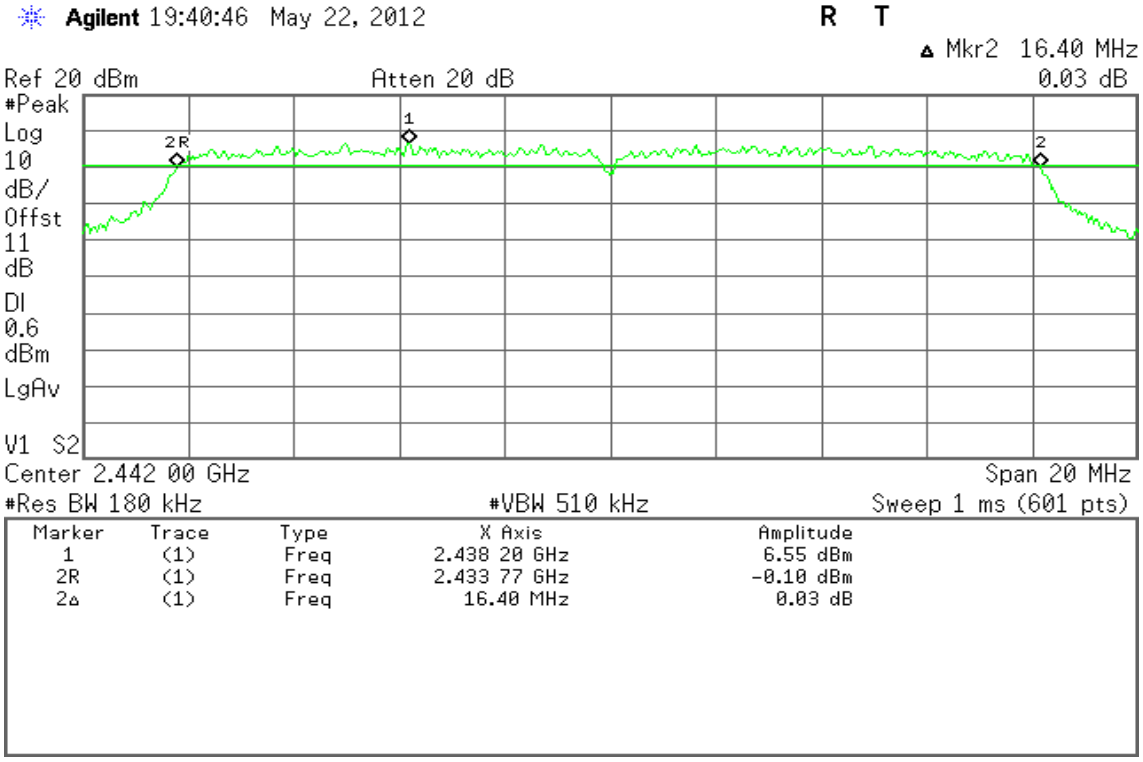


IEEE 802.11g mode

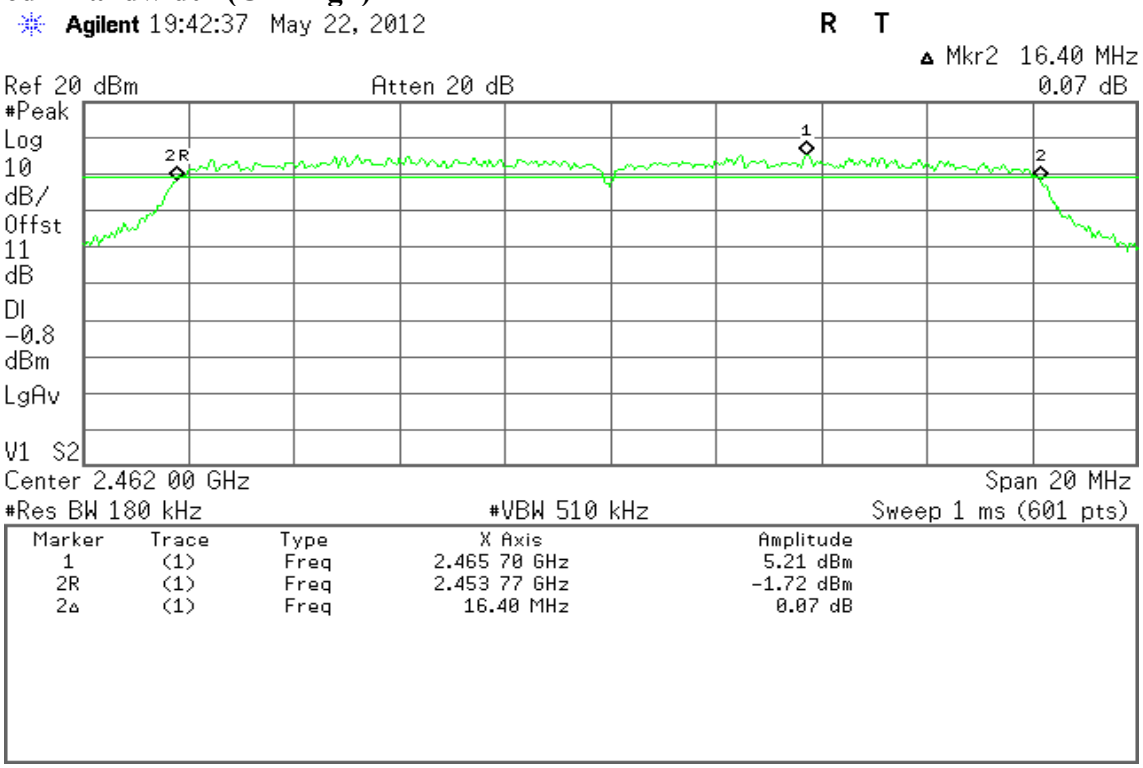
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

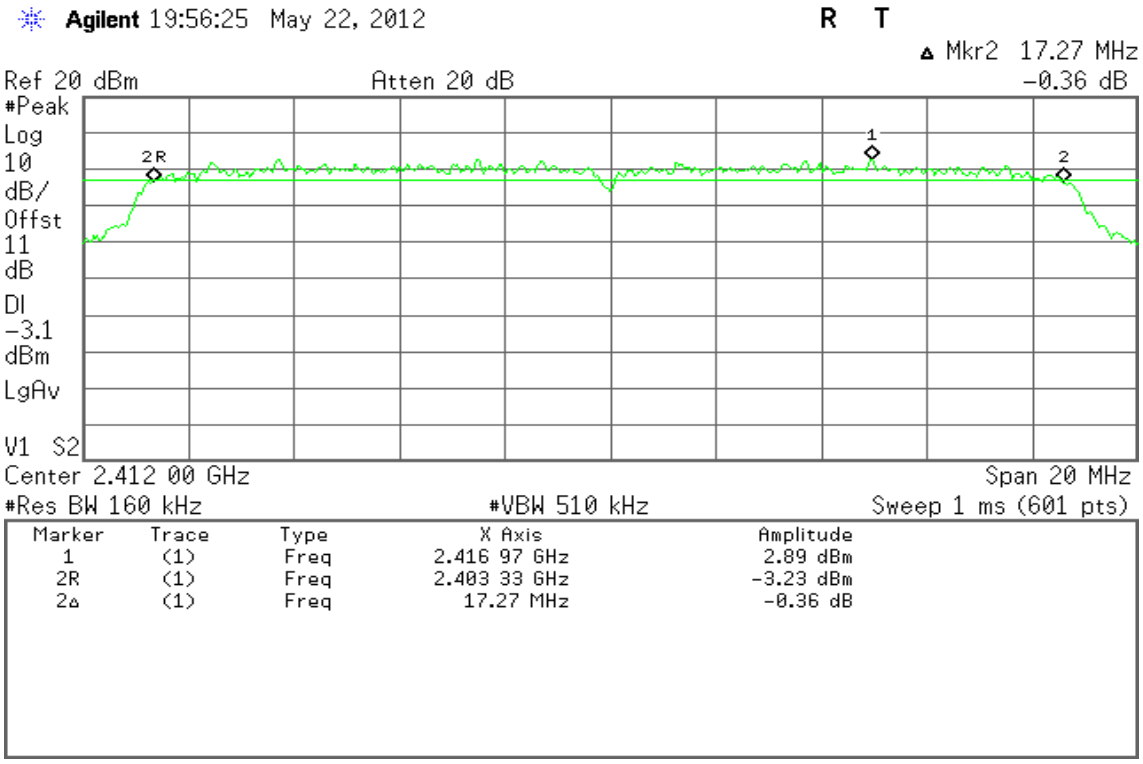


6dB Bandwidth (CH High)

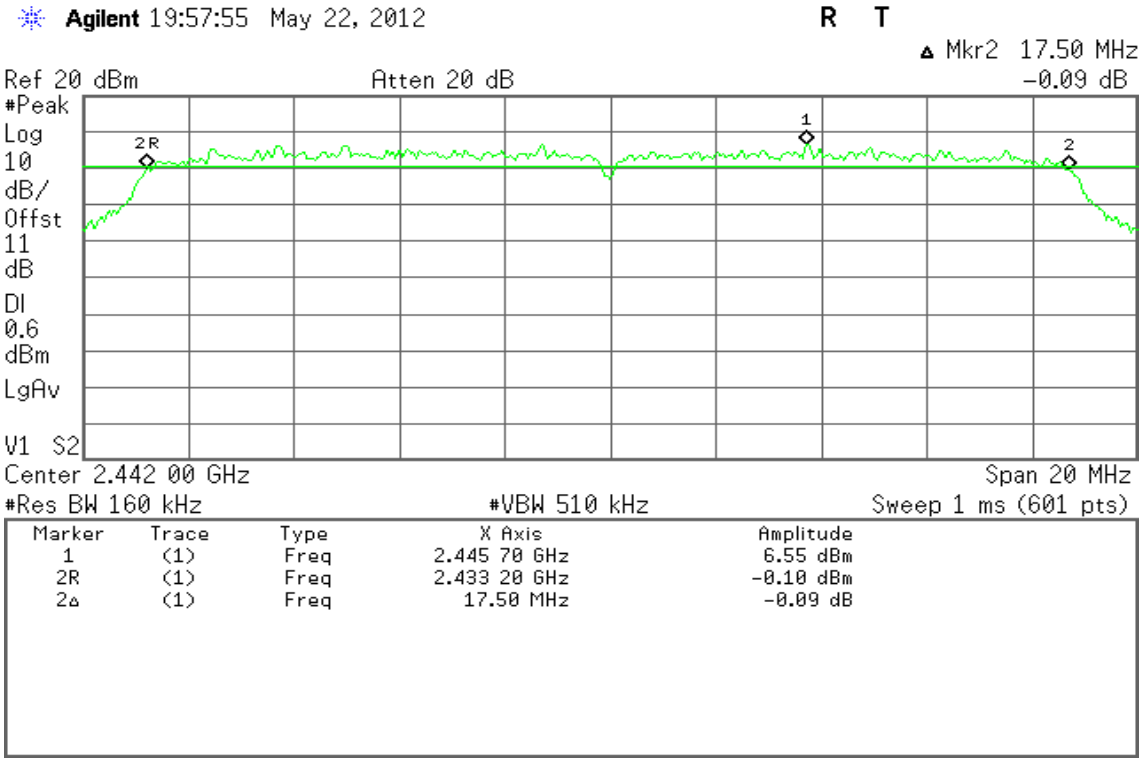


IEEE 802.11n HT 20 MHz mode

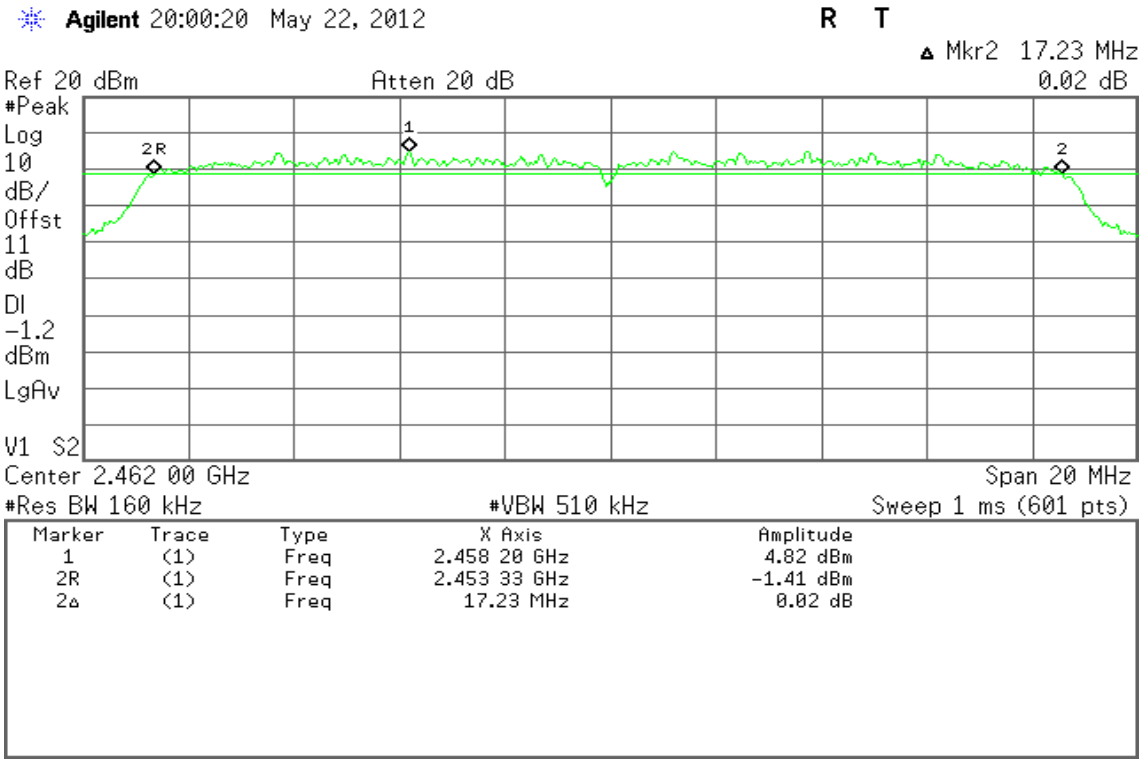
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

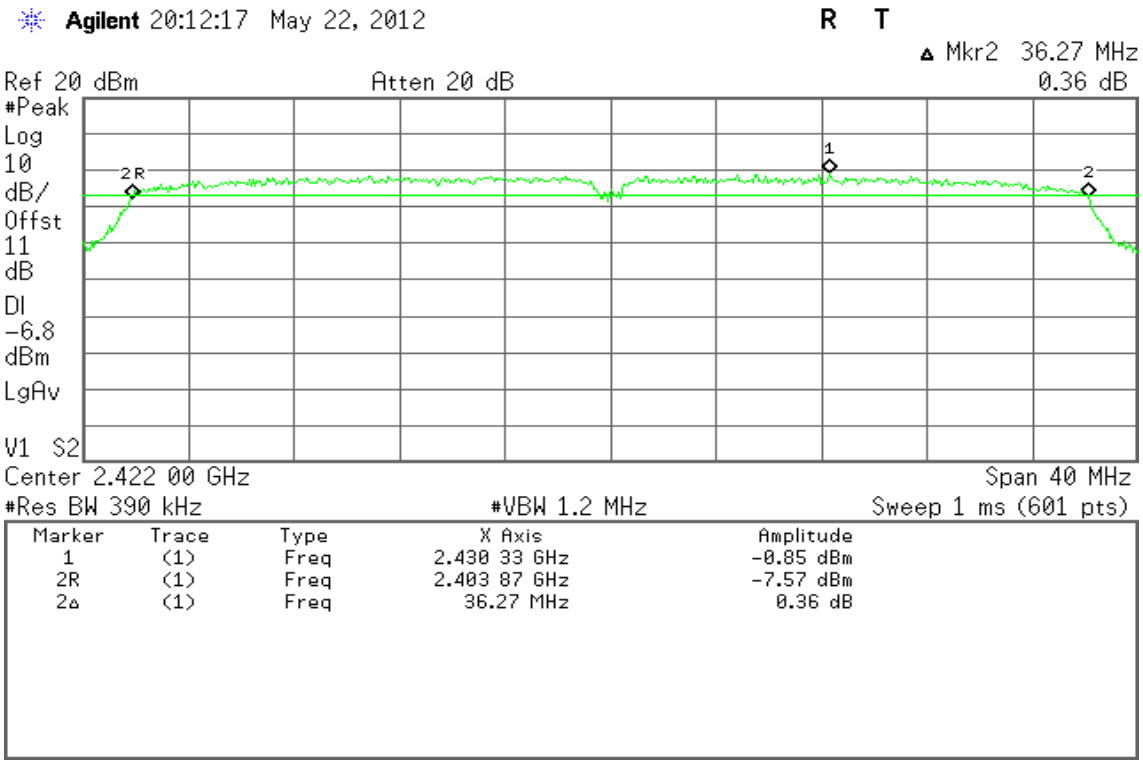


6dB Bandwidth (CH High)

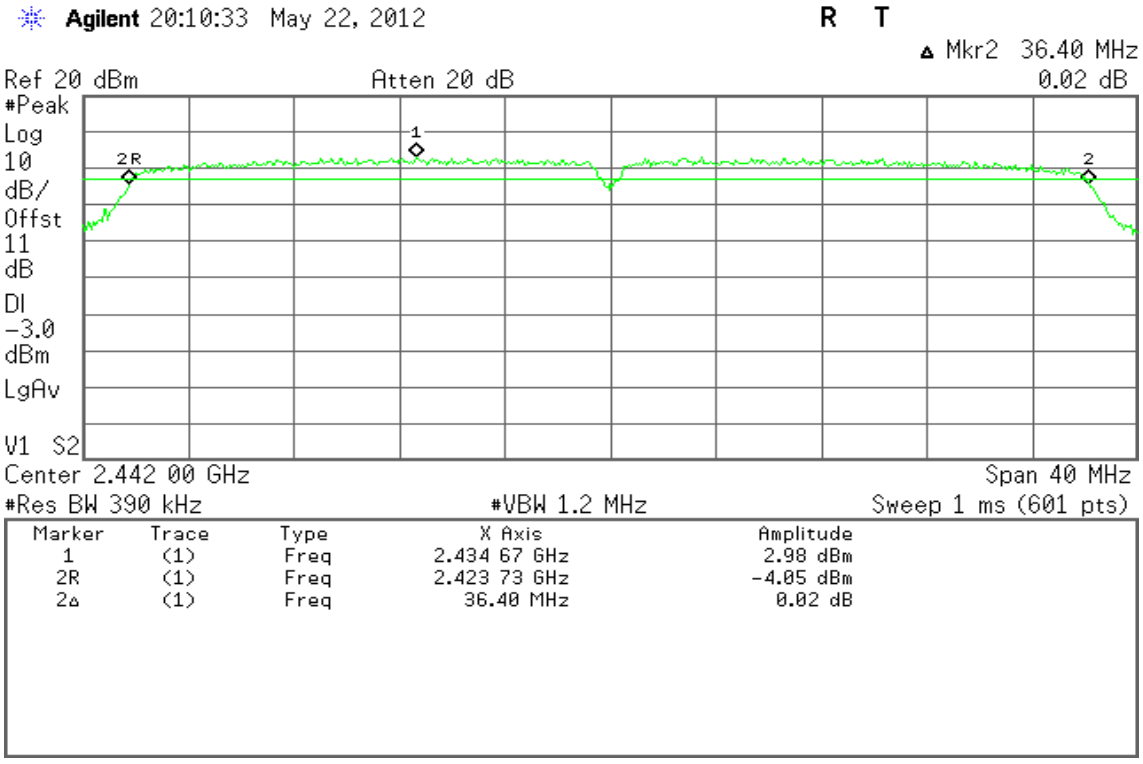


IEEE 802.11n HT 40 MHz mode

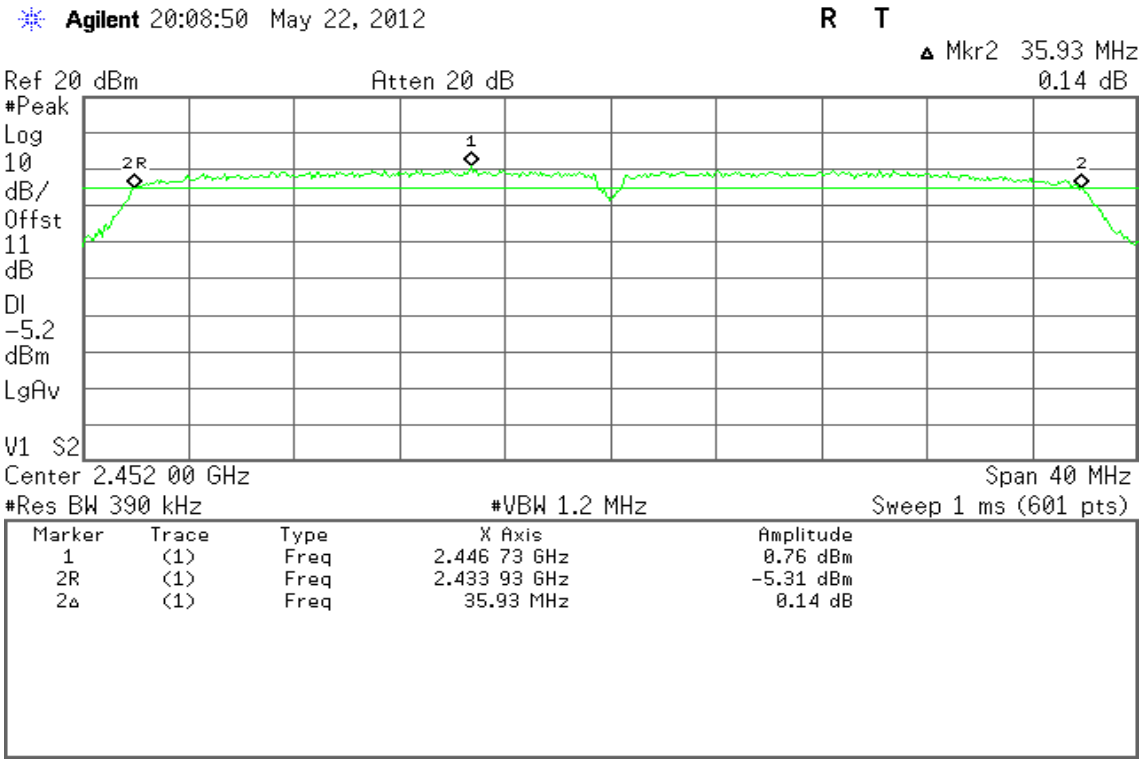
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)



6dB Bandwidth (CH High)



For PIFA Antenna:

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	12.20	>500	PASS
Mid	2442	12.20		PASS
High	2462	12.17		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.40	>500	PASS
Mid	2442	16.40		PASS
High	2462	16.40		PASS

Test mode: IEEE 802.11n HT 20 MHz mode

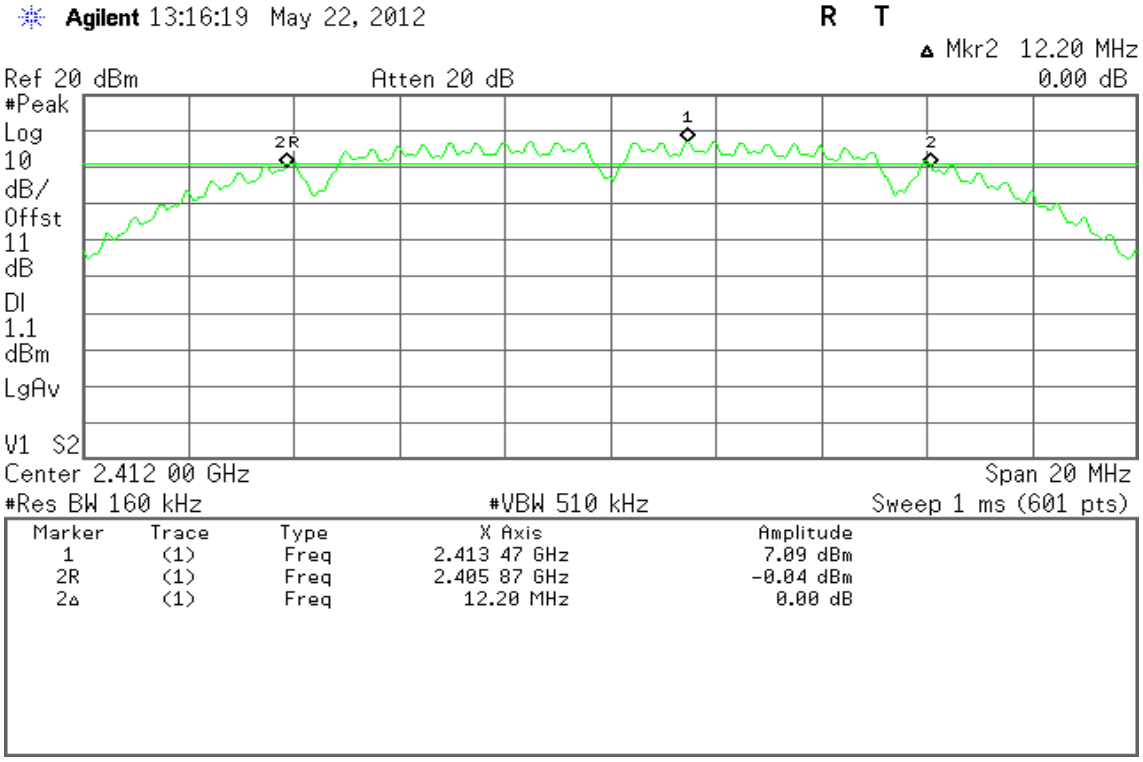
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	17.60	>500	PASS
Mid	2442	17.57		PASS
High	2462	17.50		PASS

Test mode: IEEE 802.11n HT 40 MHz mode

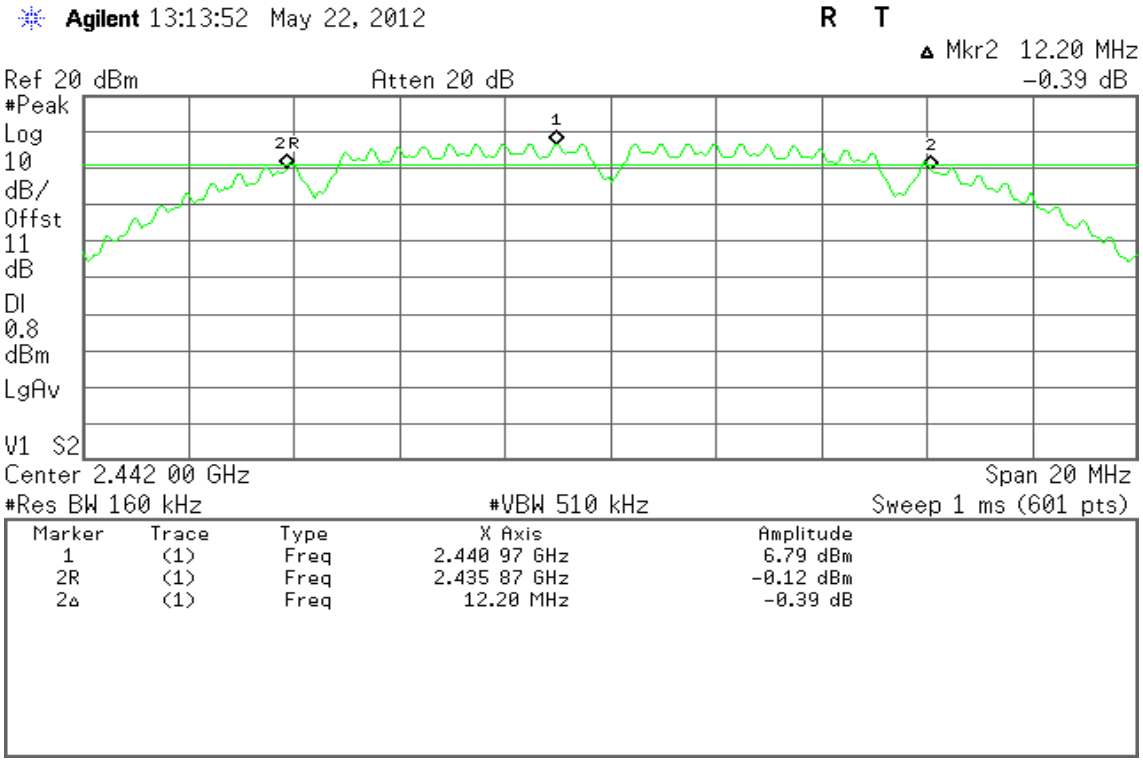
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (kHz)	Result
Low	2422	36.20	>500	PASS
Mid	2442	36.47		PASS
High	2452	36.33		PASS

IEEE 802.11b mode

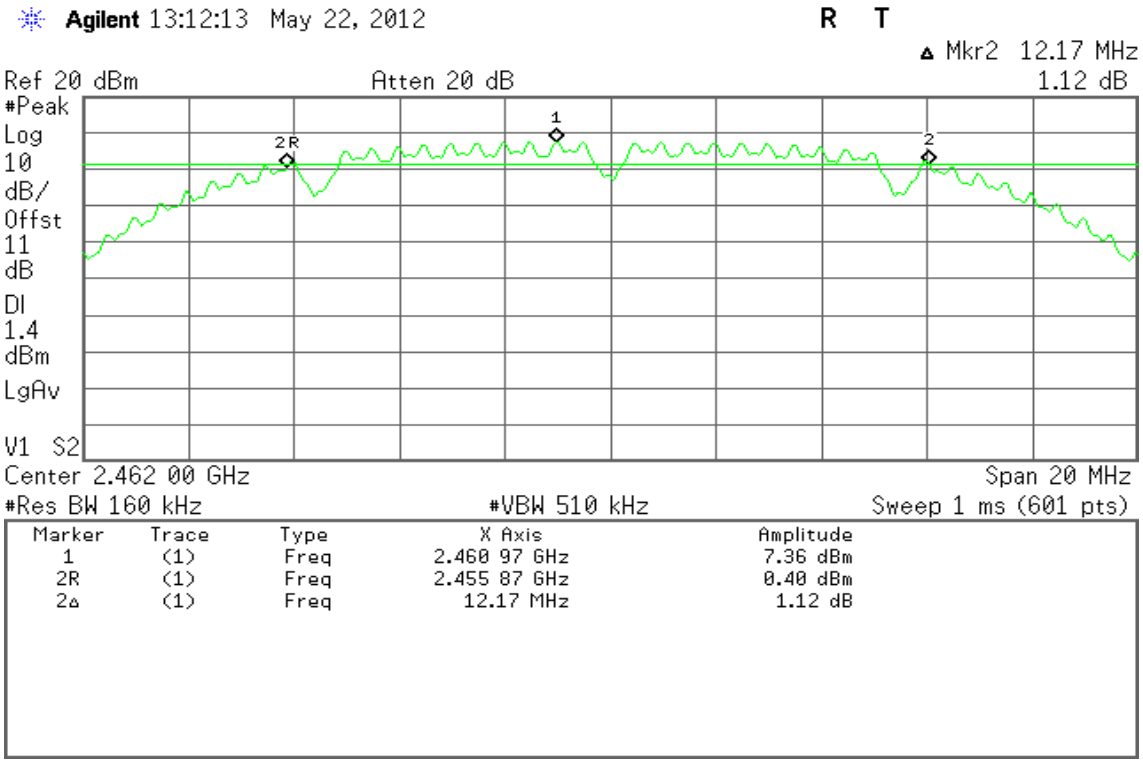
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

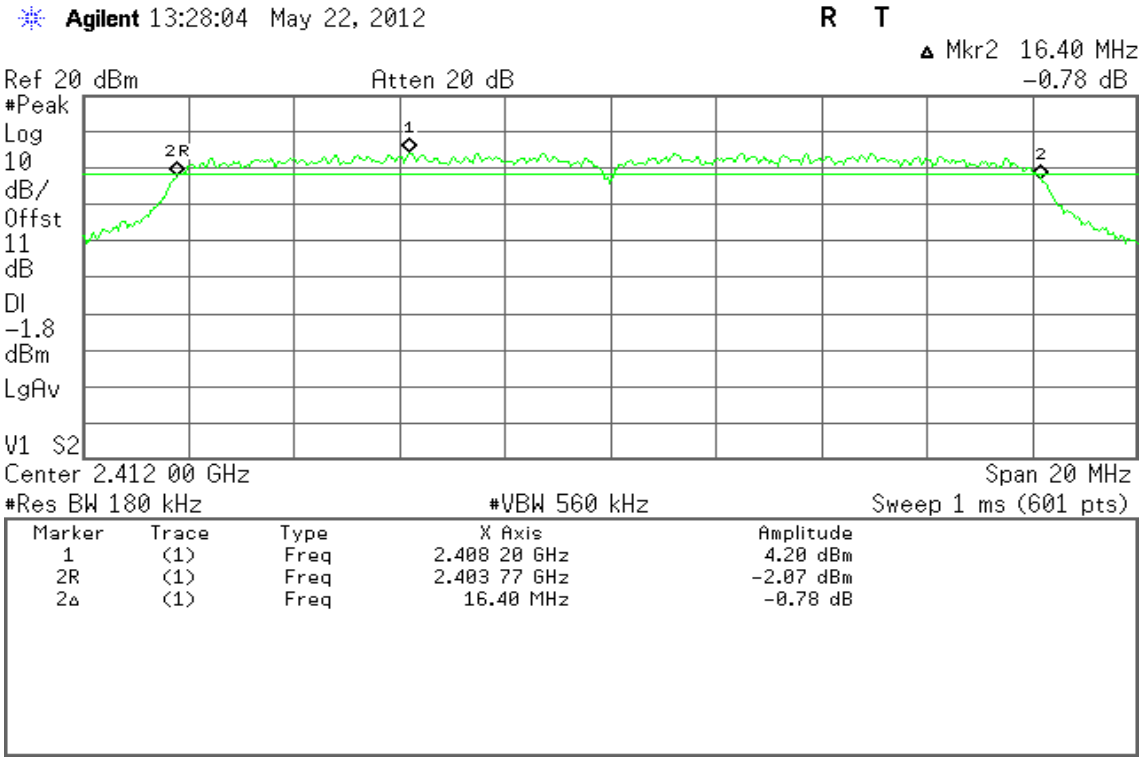


6dB Bandwidth (CH High)

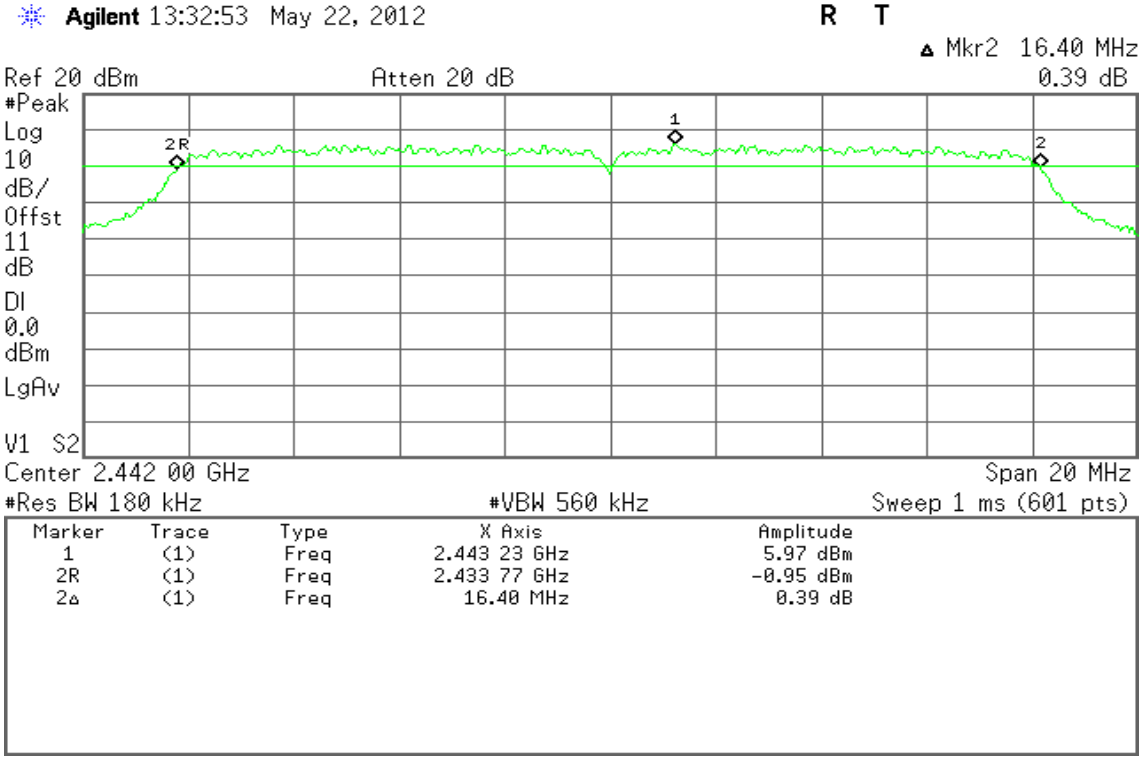


IEEE 802.11g mode

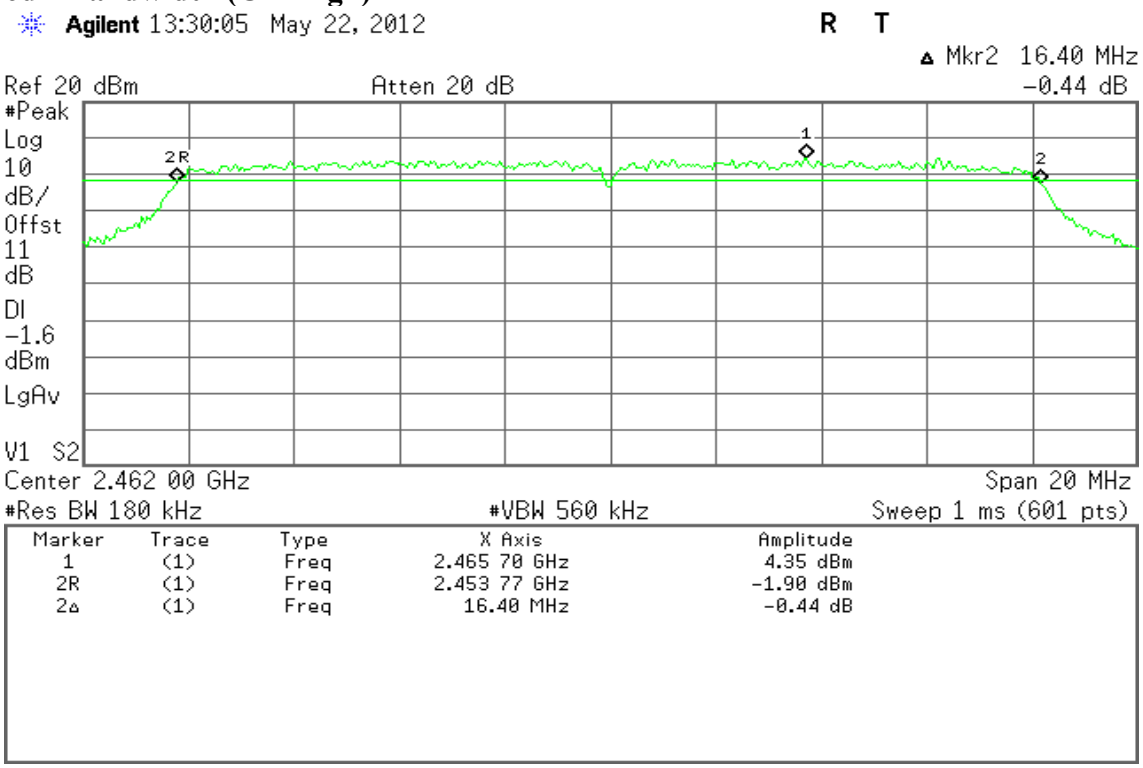
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

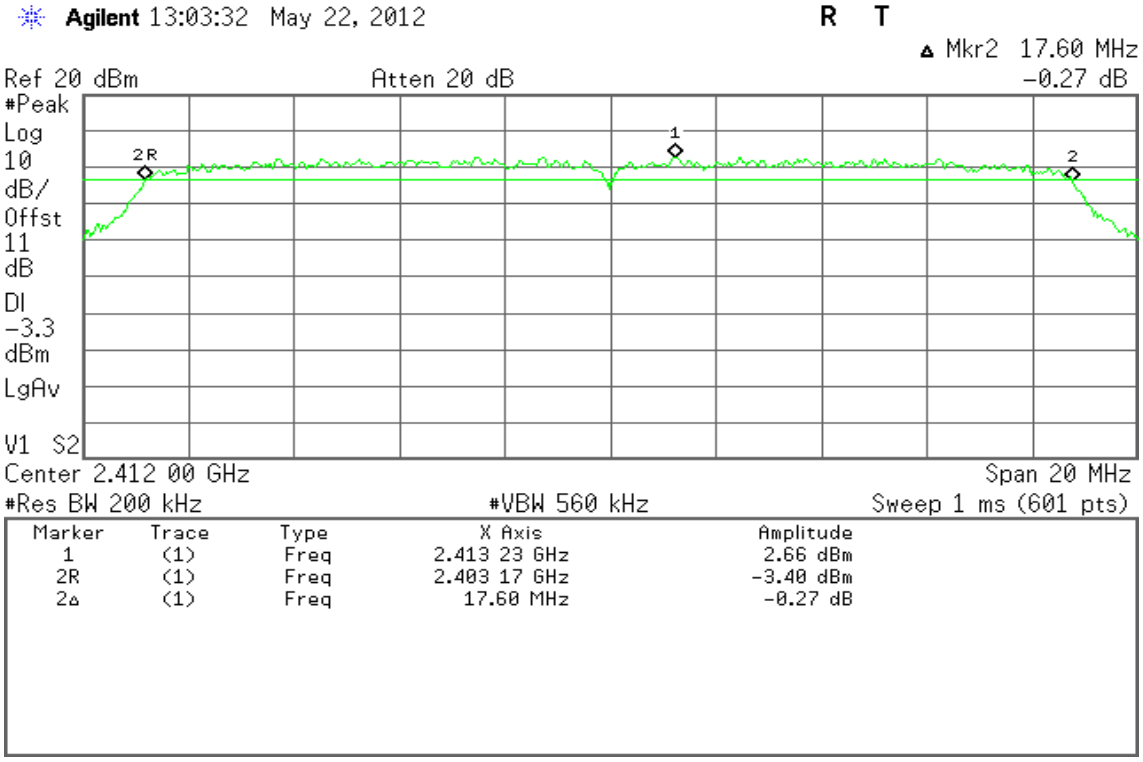


6dB Bandwidth (CH High)

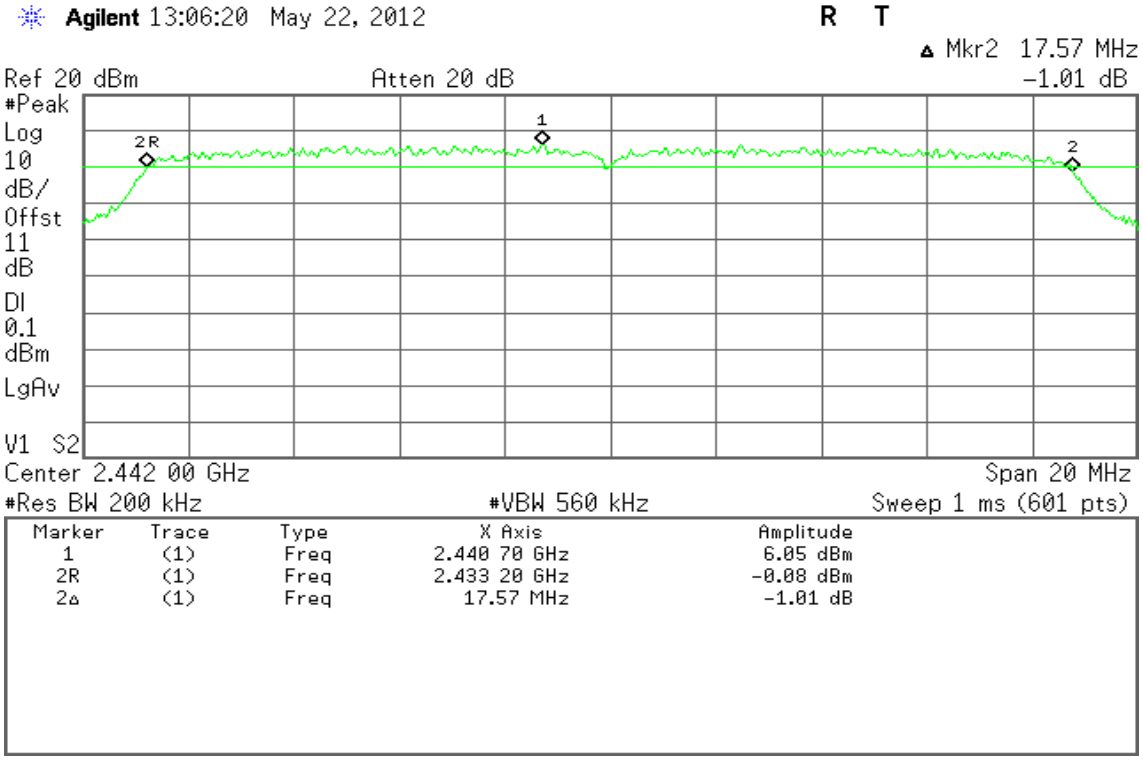


IEEE 802.11n HT 20 MHz mode

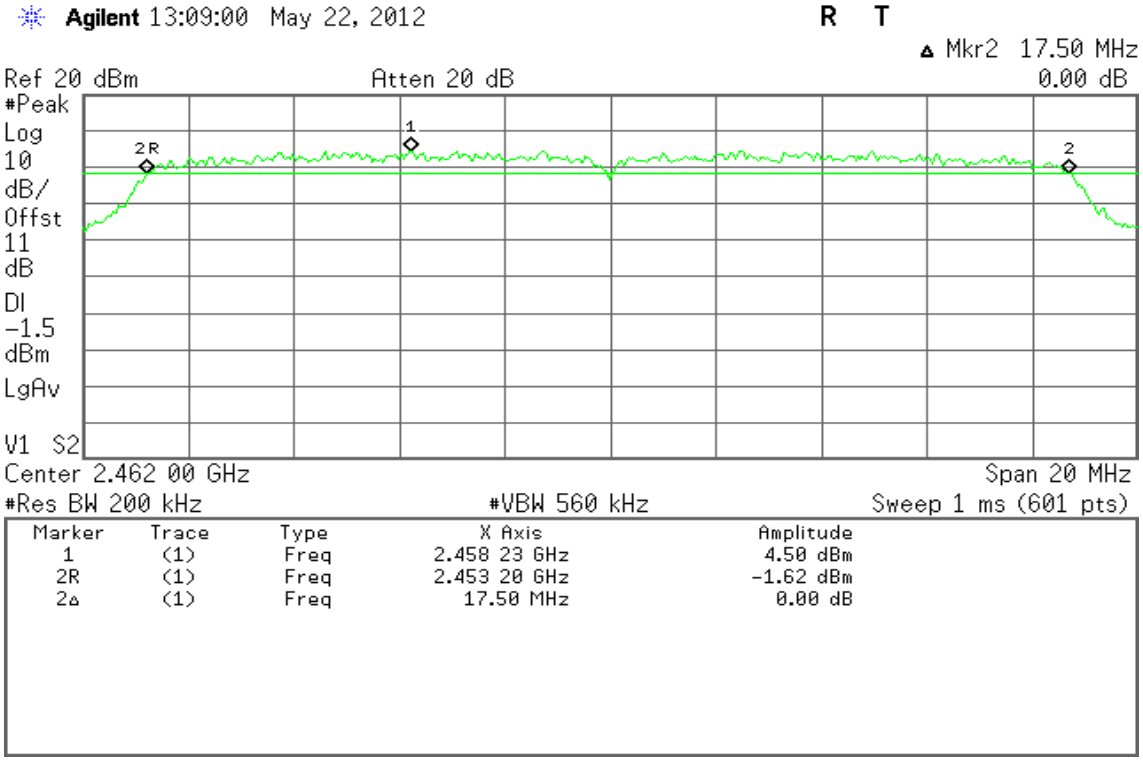
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

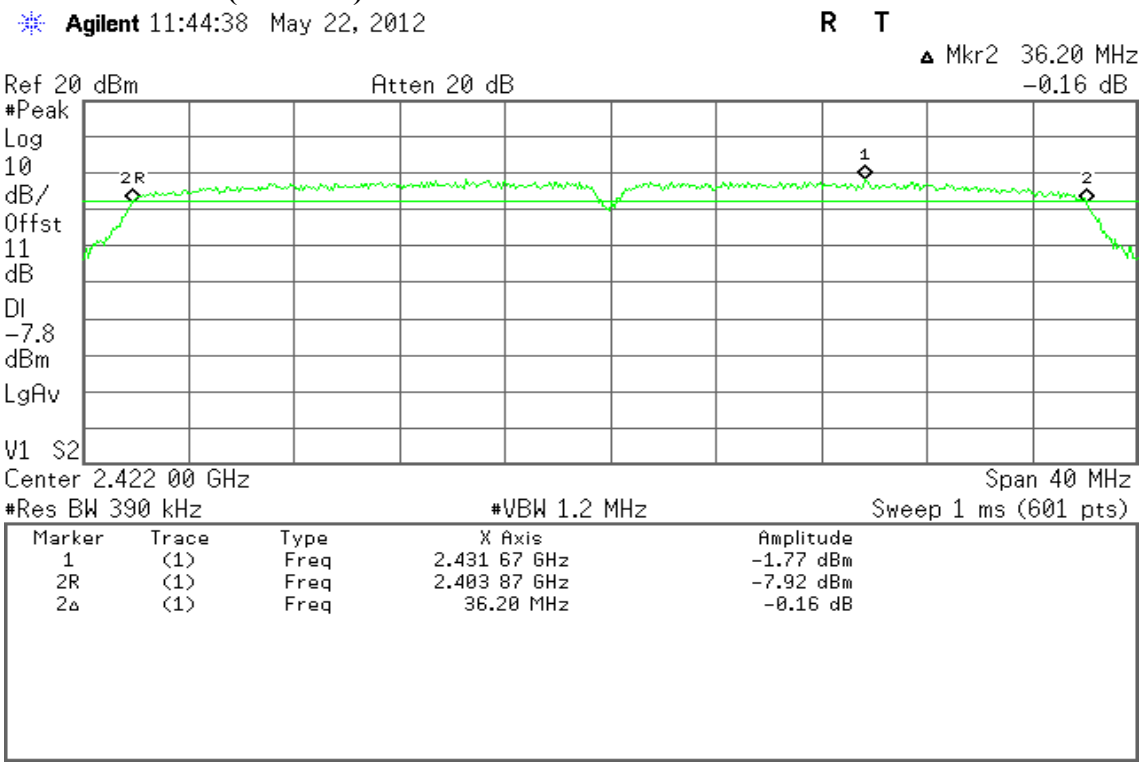


6dB Bandwidth (CH High)

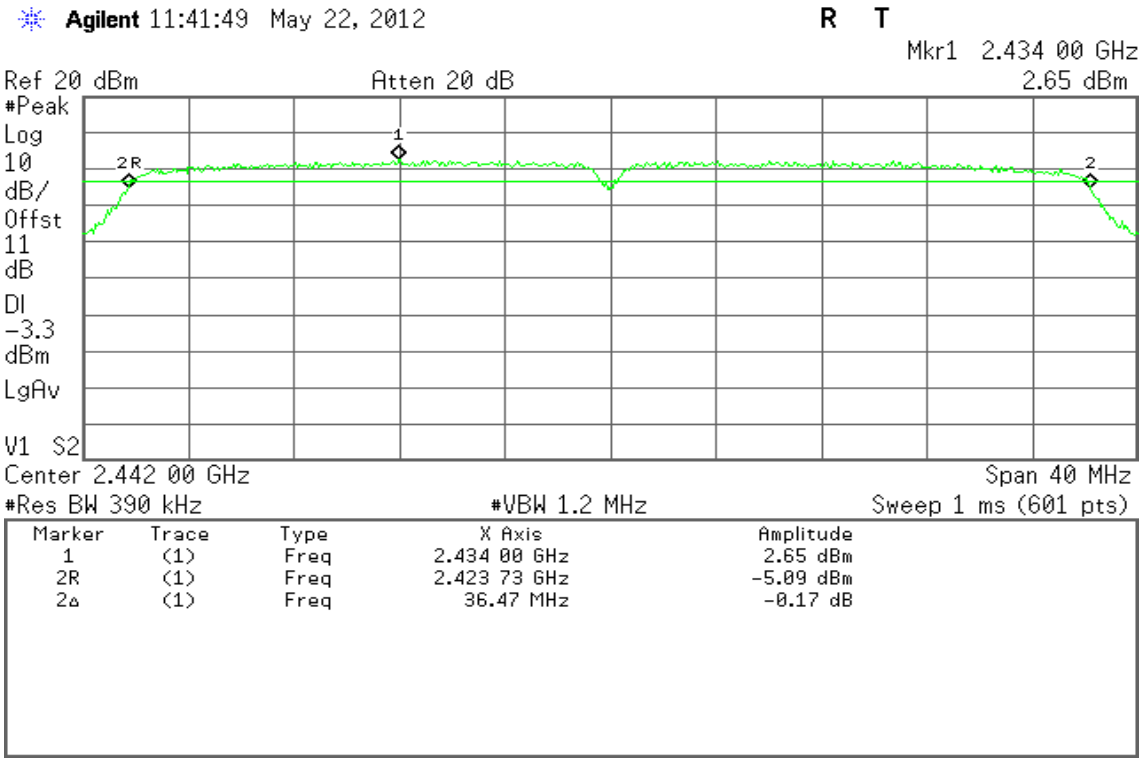


IEEE 802.11n HT 40 MHz mode

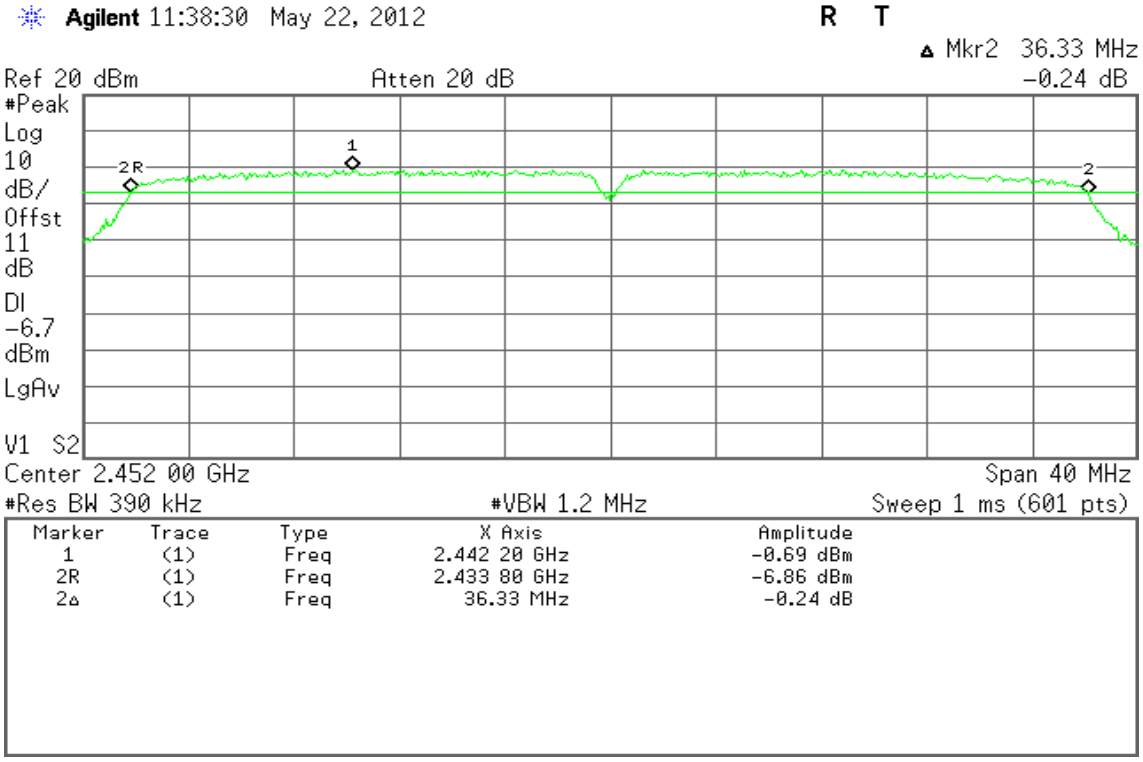
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)



6dB Bandwidth (CH High)



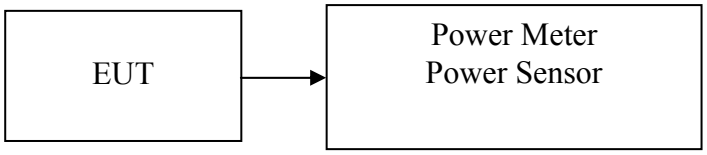
7.2 PEAK POWER

LIMIT

The maximum peak output power of the intentional radiator shall not exceed the following:

1. According to §15.247(b)(3), for systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 Watt.
2. According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Test Configuration



TEST PROCEDURE

According to KDB 558074 DTS Meas Guidance C63.10 6.10.2.1

The transmitter output is connected to the Power Meter. The Power Meter is set to the peak power detection.

TEST RESULTS

No non-compliance noted

Test Data

For Monopole Antenna

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	19.72	0.093756	1.00	PASS
Mid	2442	18.87	0.077090		PASS
High	2462	18.84	0.076560		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	23.49	0.223357	1.00	PASS
Mid	2442	25.79	0.379314		PASS
High	2462	23.52	0.224905		PASS

Test mode: IEEE 802.11n HT 20 MHz mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	21.91	0.155239	1.00	PASS
Mid	2442	25.74	0.374973		PASS
High	2462	23.9	0.245471		PASS

Test mode: IEEE 802.11n HT 40 MHz mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2422	17.87	0.061235	1.00	PASS
Mid	2442	22.6	0.181970		PASS
Mid	2447	23.92	0.246604		PASS
High	2452	20.09	0.102094		PASS

For PIFA Antenna

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	19.55	0.0902	1.00	PASS
Mid	2442	19.67	0.0927		PASS
High	2462	19.43	0.087700		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	23.92	0.246604	1.00	PASS
Mid	2442	25.71	0.3724		PASS
High	2462	24.37	0.273527		PASS

Test mode: IEEE 802.11n HT 20 MHz mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	22.85	0.192752	1.00	PASS
Mid	2442	25.72	0.3733		PASS
High	2462	24.37	0.273527		PASS

Test mode: IEEE 802.11n HT 40 MHz mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2422	18.06	0.063973	1.00	PASS
Mid	2442	22.59	0.181552		PASS
Mid	2447	22.88	0.194089		PASS
High	2452	20.06	0.101391		PASS

7.3 BAND EDGES MEASUREMENT

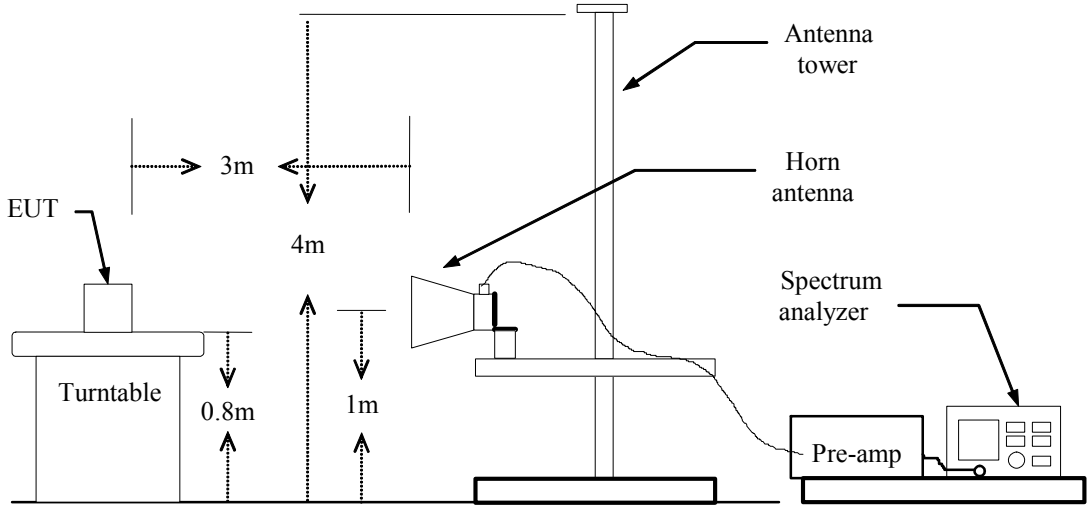
LIMIT

According to §15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

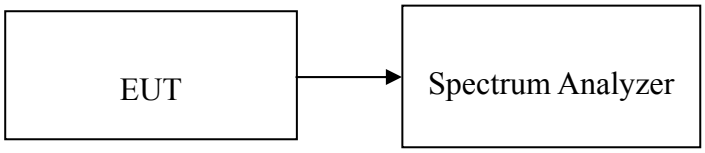
According to RSS-210 §A8.5, in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required. In addition, radiated emissions which fall in the restricted bands of Table 1 must also comply with the radiated emission limits specified in Tables 2 and 3.

Test Configuration

For Radiated



For Conducted



TEST PROCEDURE

For Radiated

According to ANSI C63.4 (2003)

1. The EUT is placed on a turntable, which is 0.8m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
   (a) PEAK: RBW =1MHz, VBW =3MHz, / Sweep=AUTO
   (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

For Conducted

According to KDB 558074 DTS Meas Guidance D01 5.4.1

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

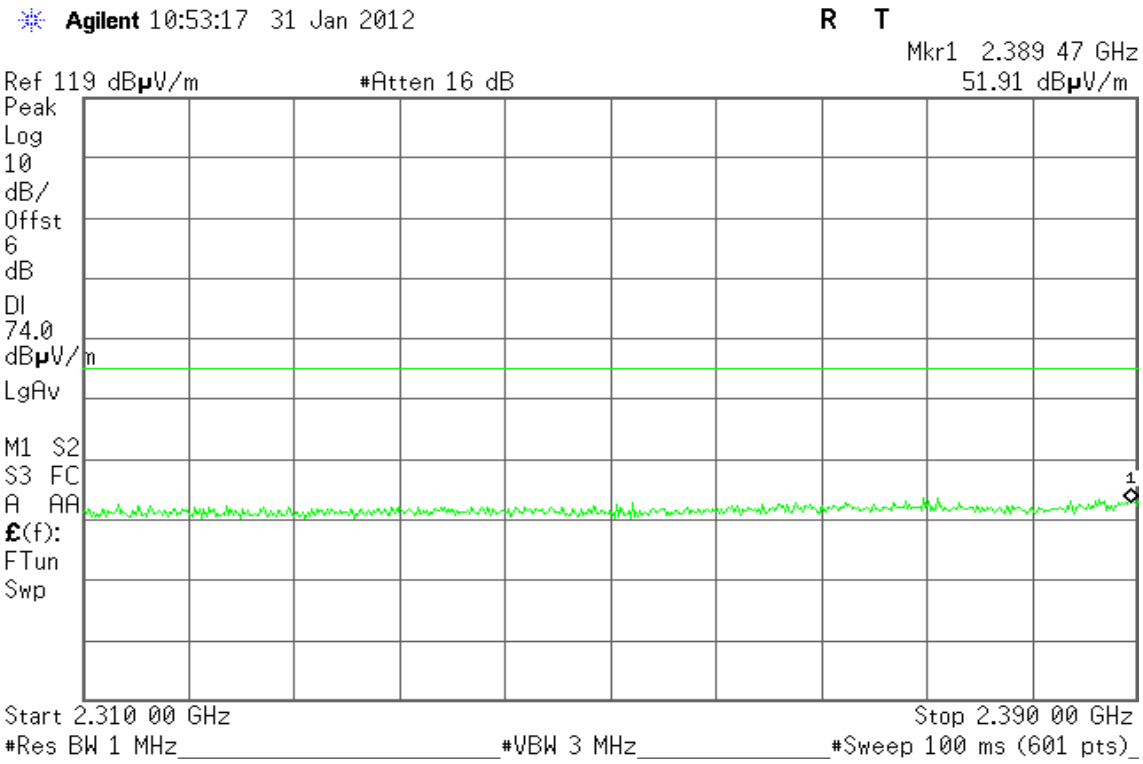
TEST RESULTS

Refer to attach spectrum analyzer data chart.

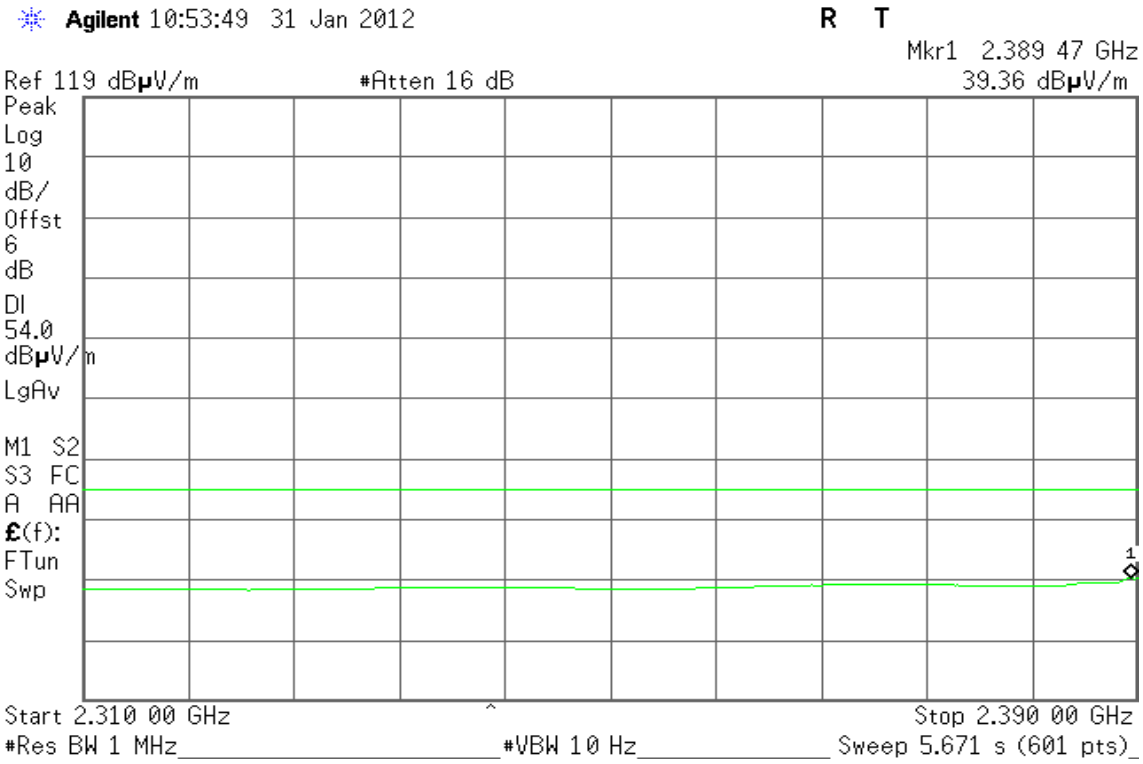
For Monopole Antenna

Band Edges (IEEE 802.11b mode / CH Low)

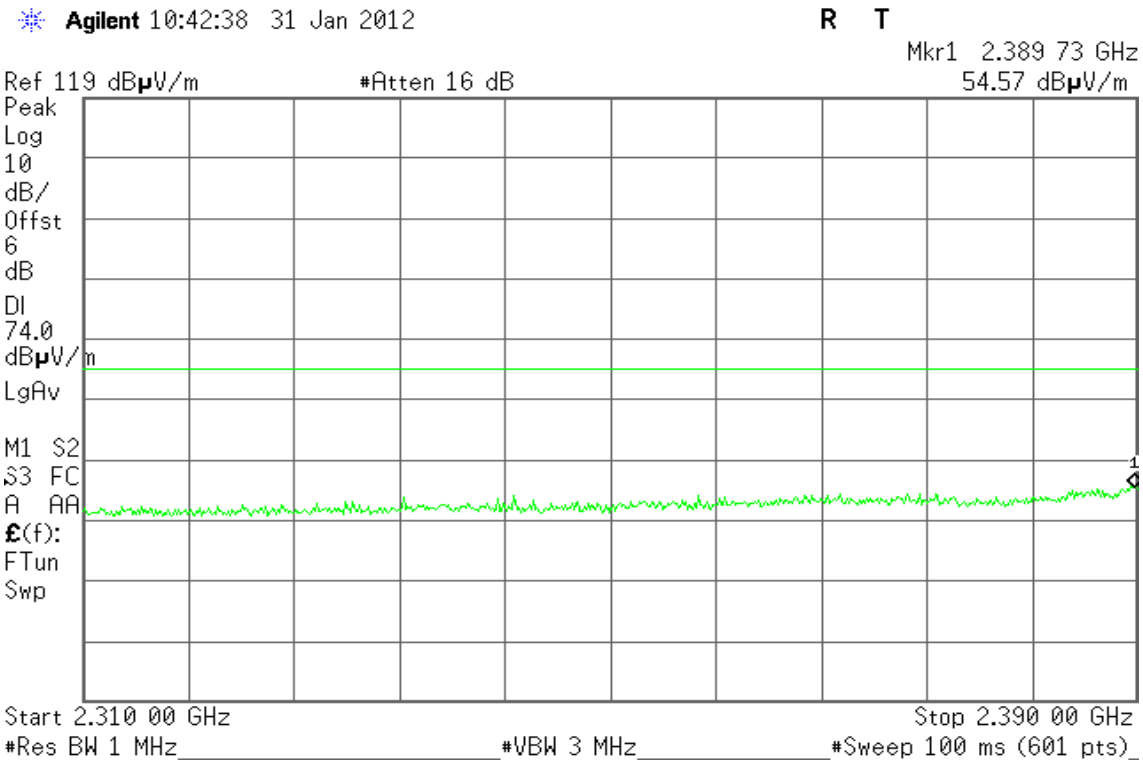
Detector mode: Peak **Polarity: Vertical**



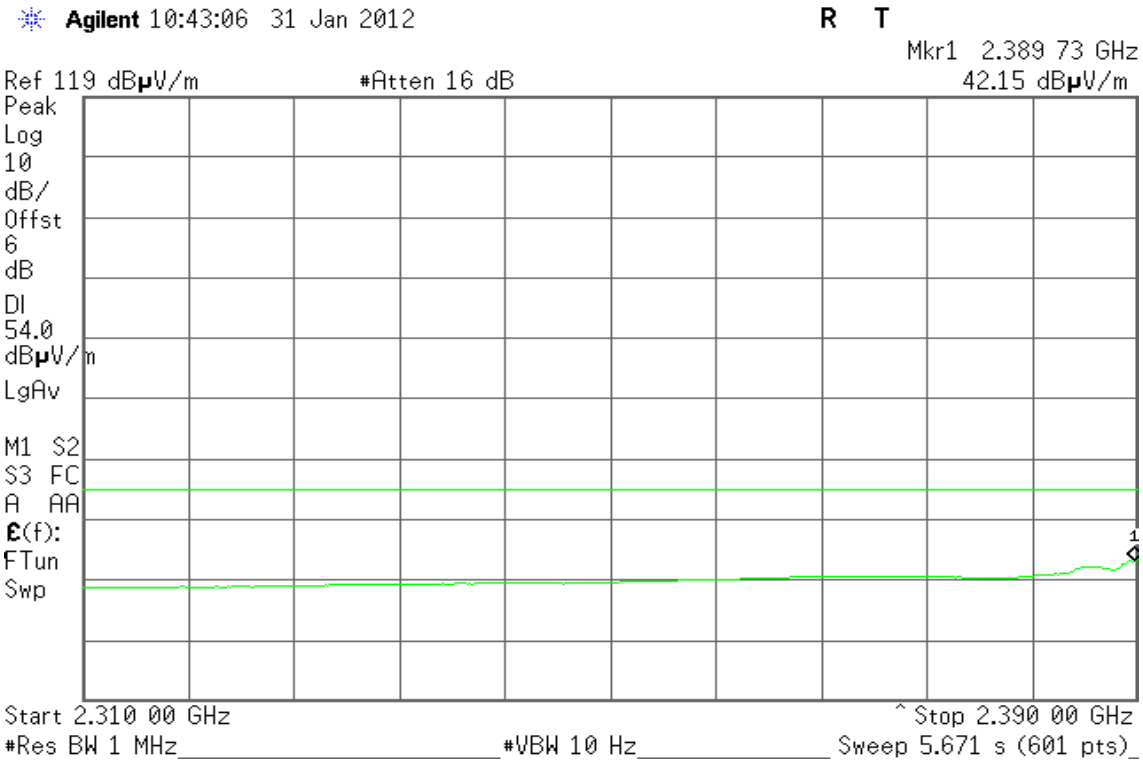
Detector mode: Average **Polarity: Vertical**



Detector mode: Peak **Polarity: Horizontal**

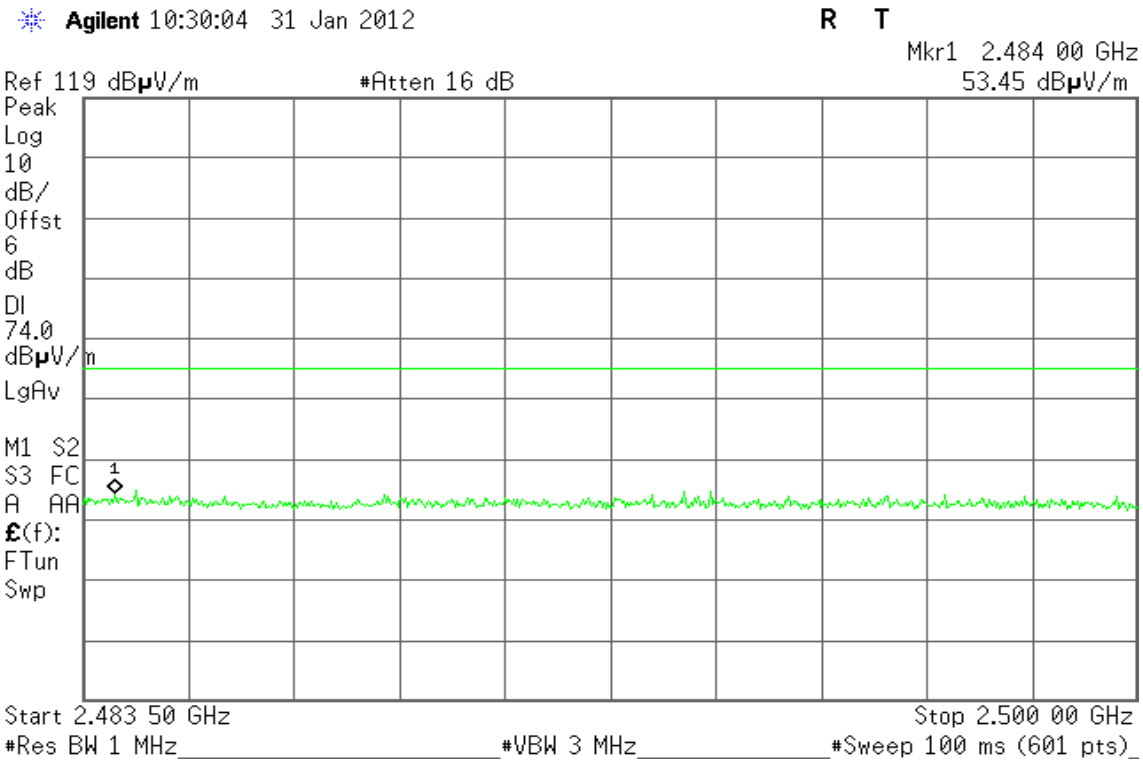


Detector mode: Average **Polarity: Horizontal**

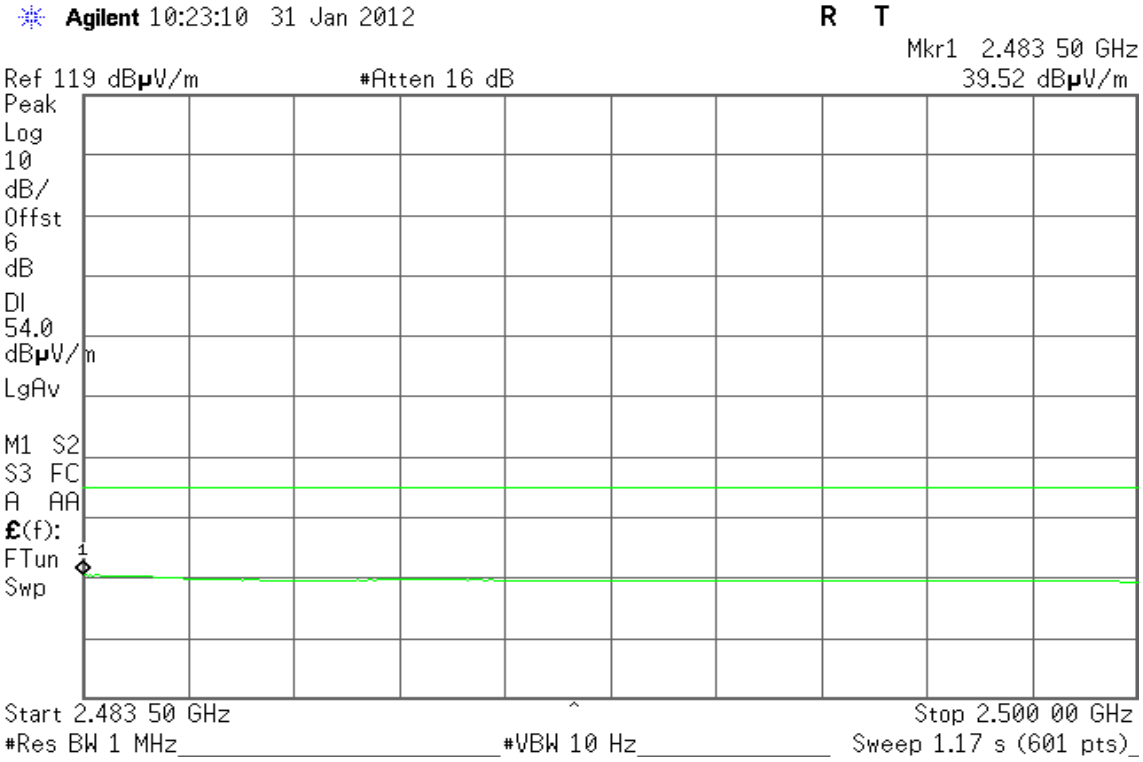


Band Edges (IEEE 802.11b mode / CH High)

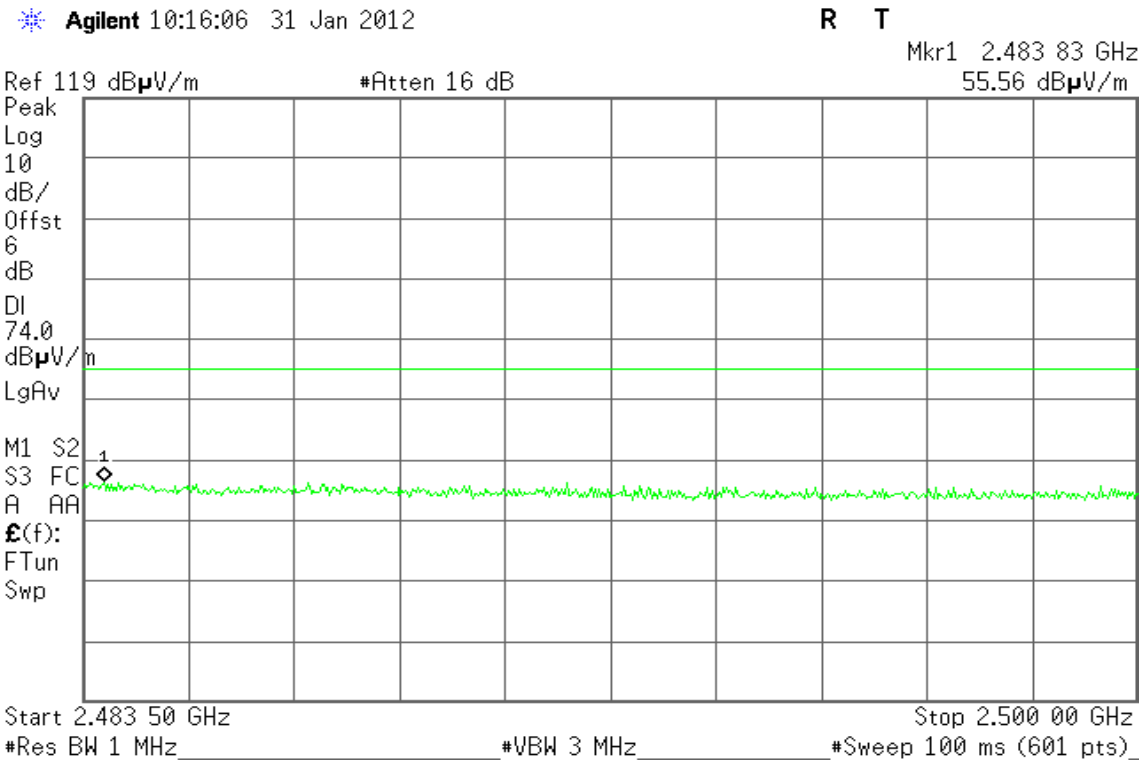
Detector mode: Peak Polarity: Vertical



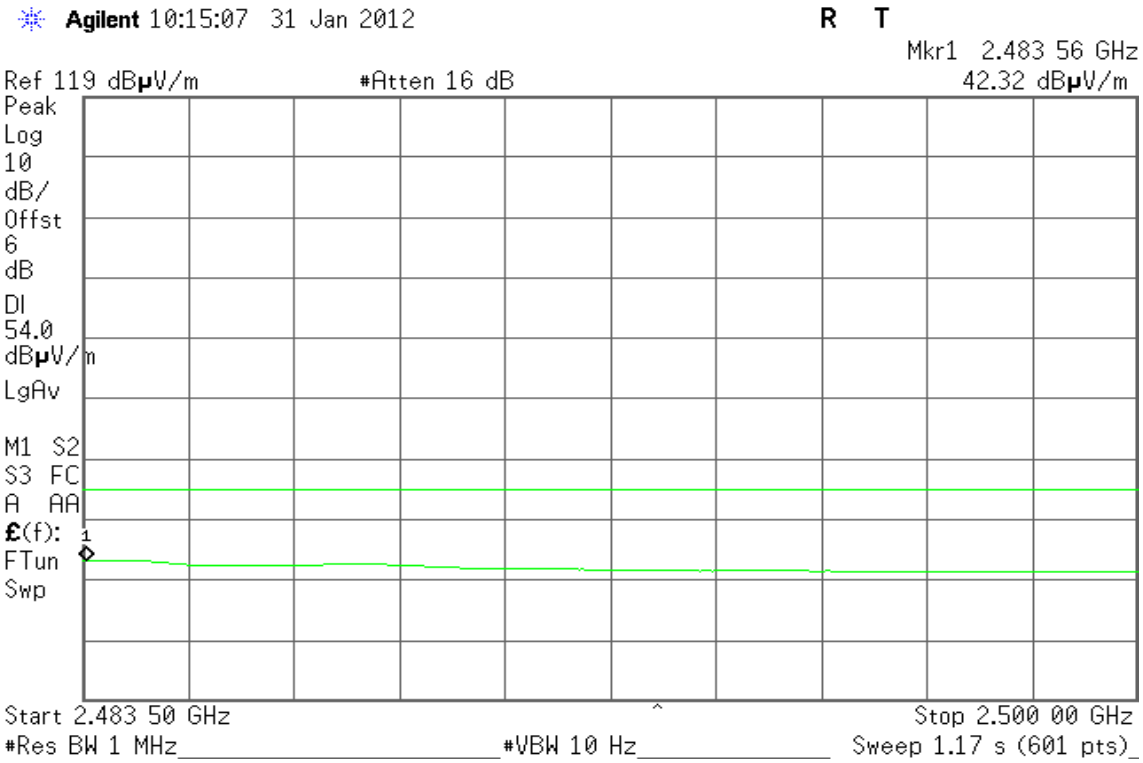
Detector mode: Average Polarity: Vertical



Detector mode: Peak **Polarity: Horizontal**

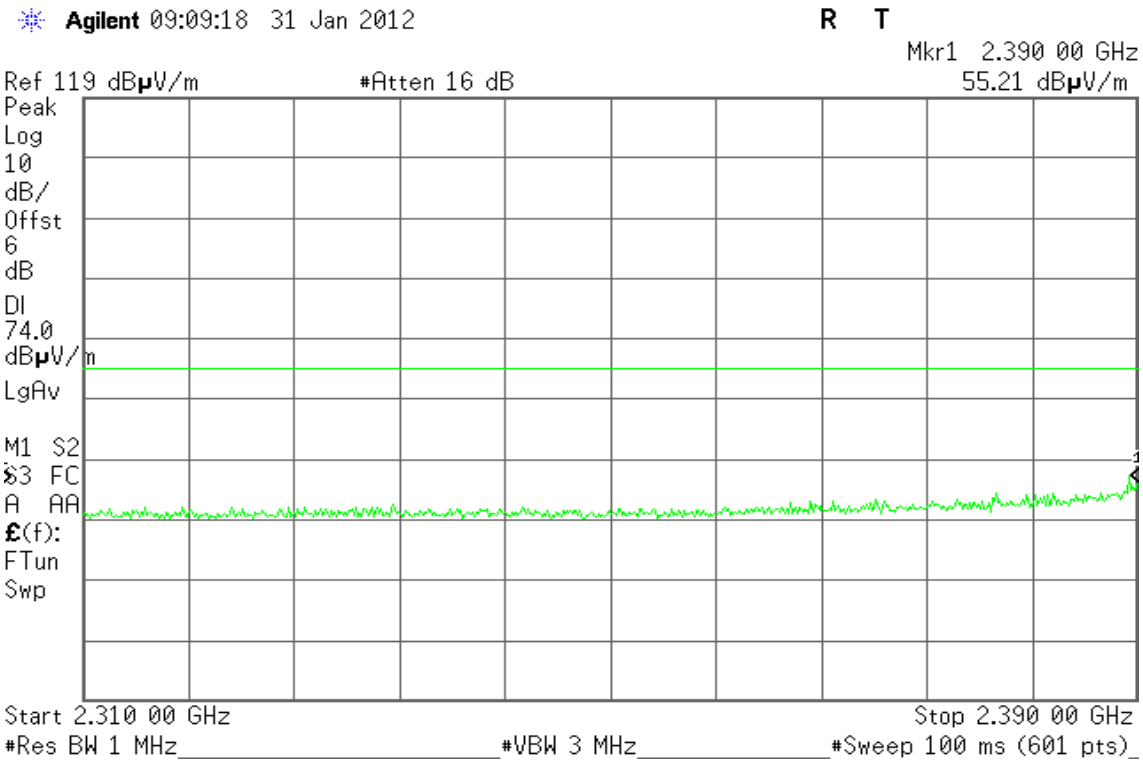


Detector mode: Average **Polarity: Horizontal**

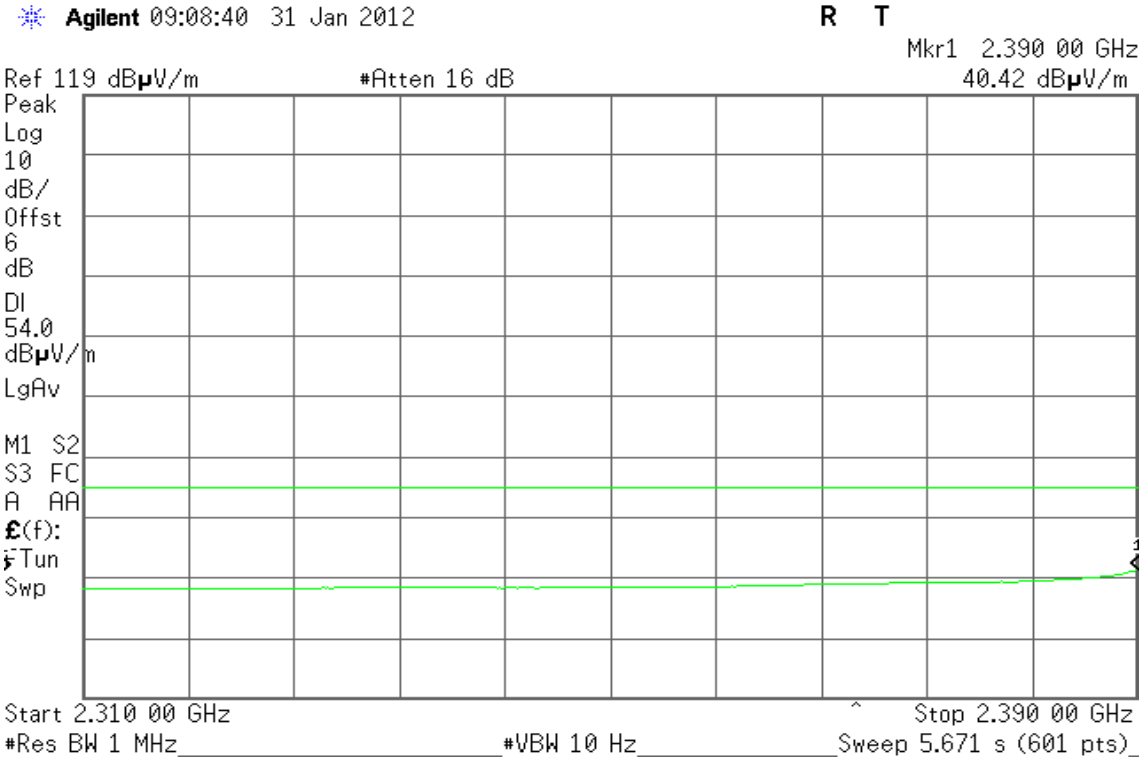


Band Edges (IEEE 802.11g mode / CH Low)

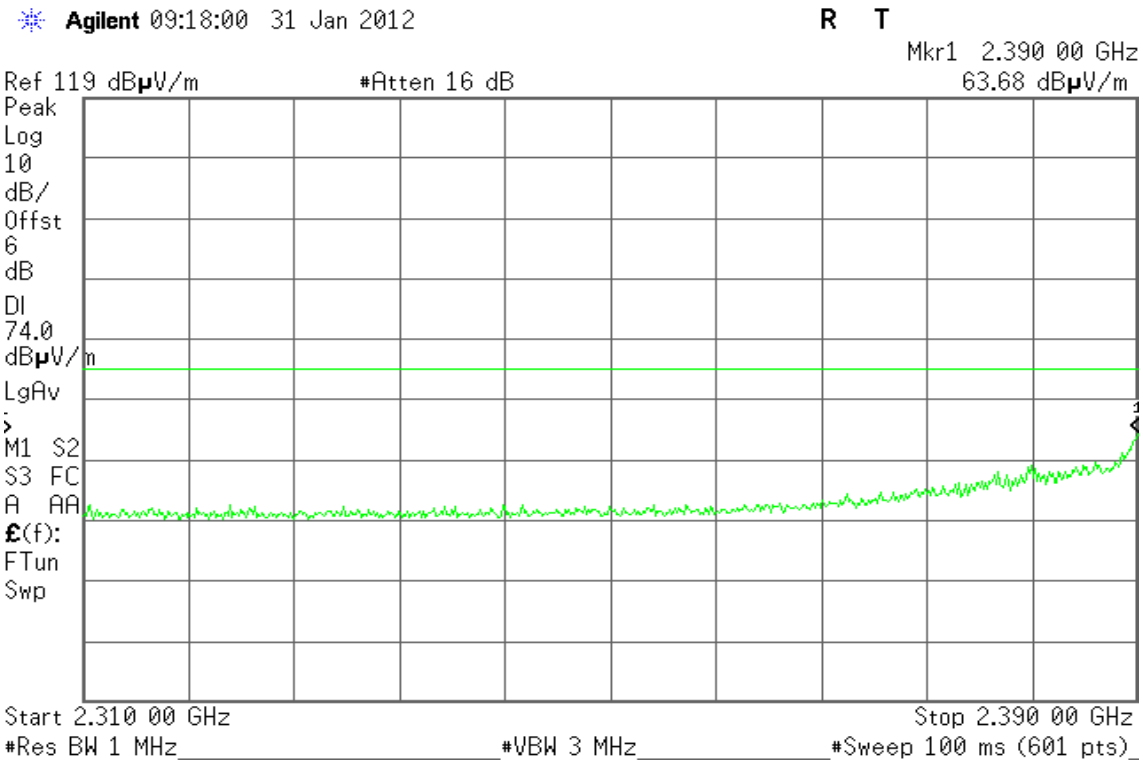
Detector mode: Peak **Polarity: Vertical**



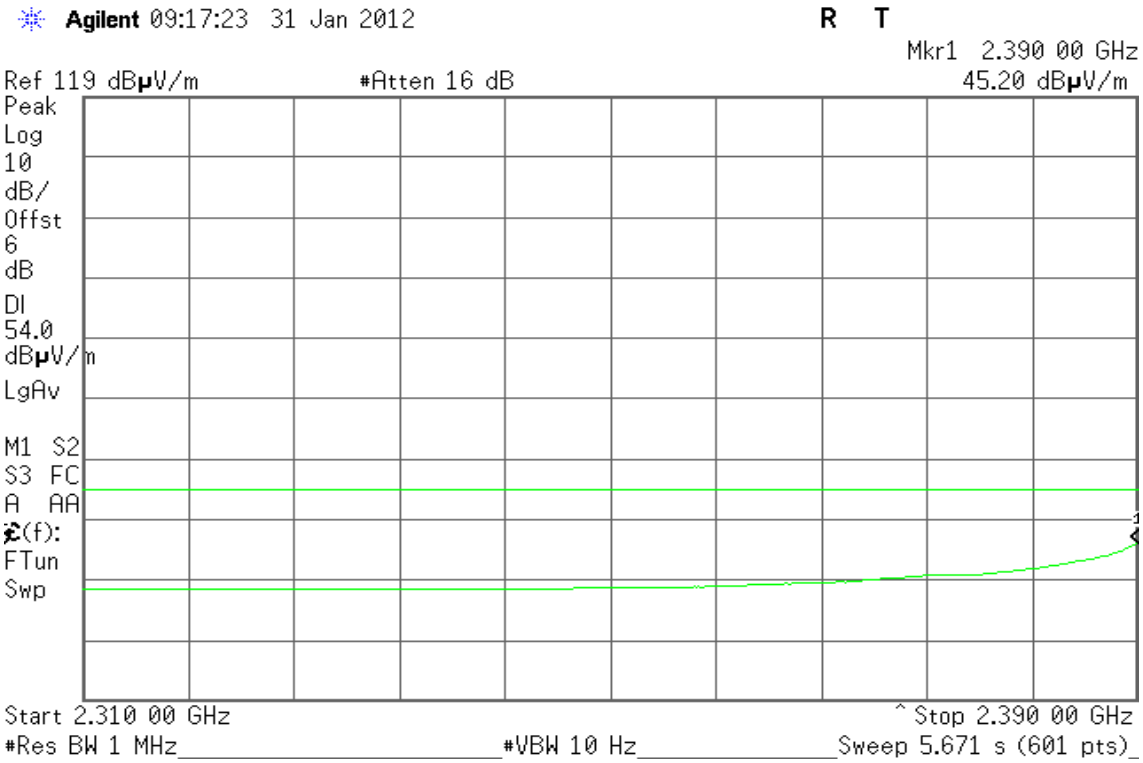
Detector mode: Average **Polarity: Vertical**



Detector mode: Peak **Polarity: Horizontal**

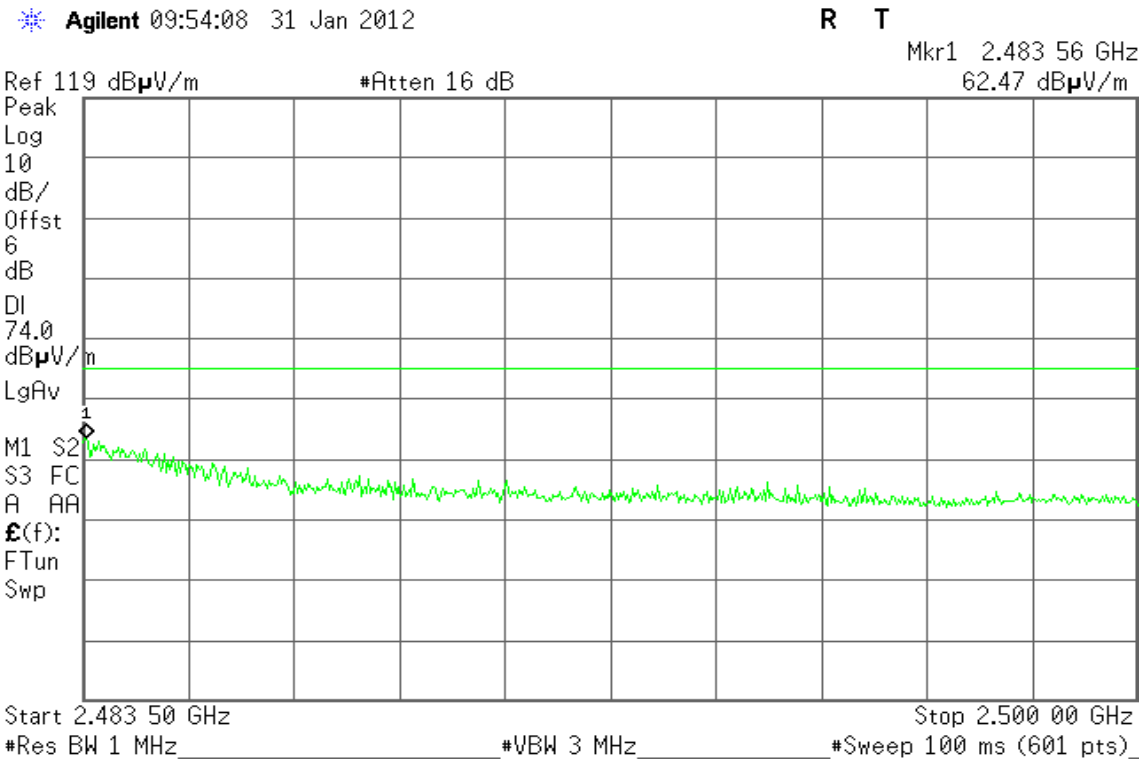


Detector mode: Average **Polarity: Horizontal**

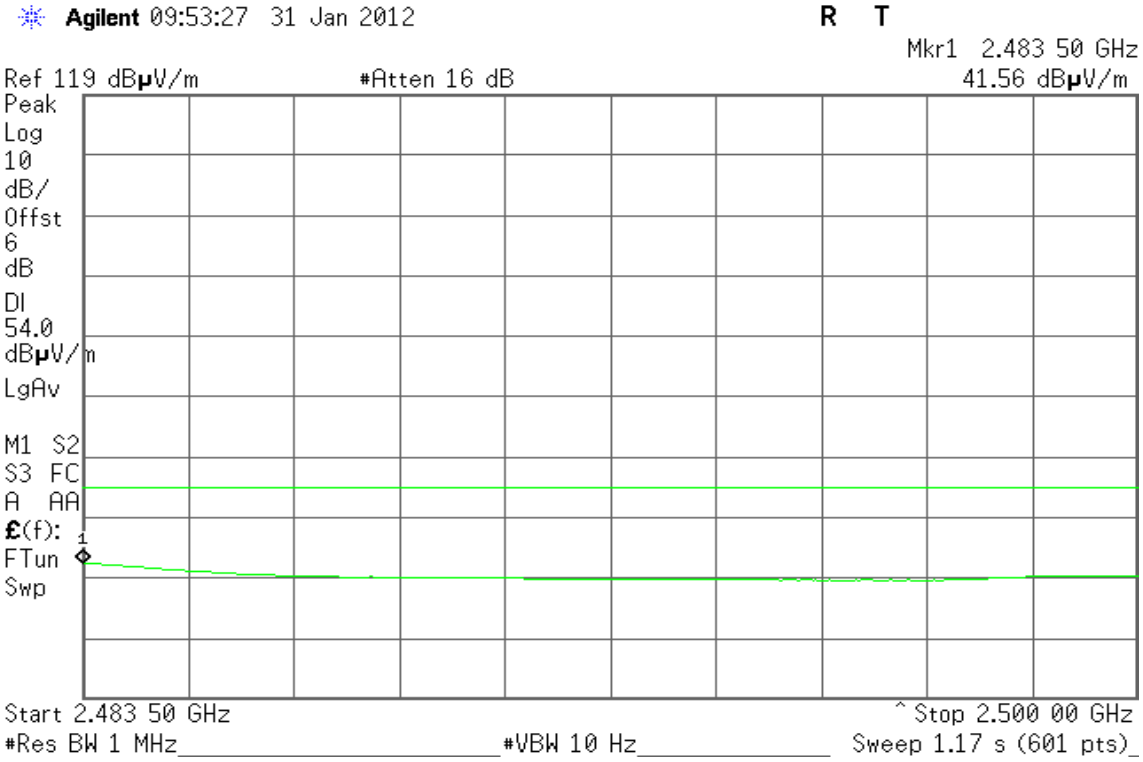


Band Edges (IEEE 802.11g mode / CH High)

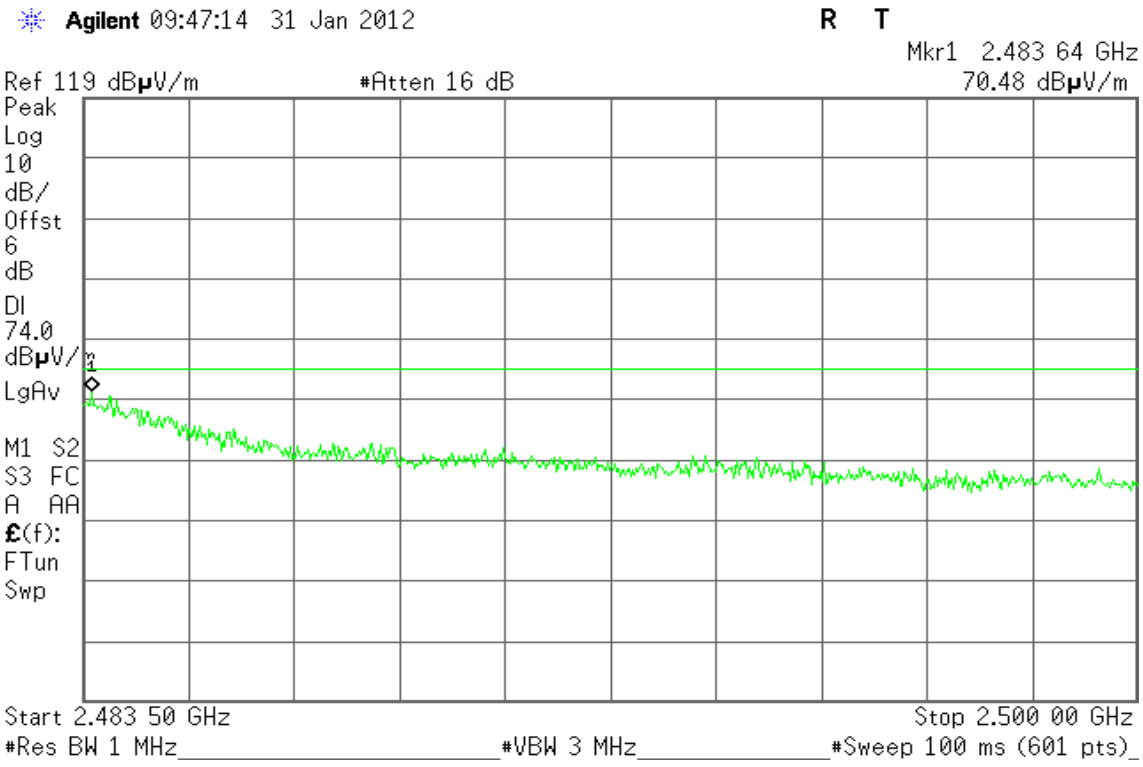
Detector mode: Peak **Polarity: Vertical**



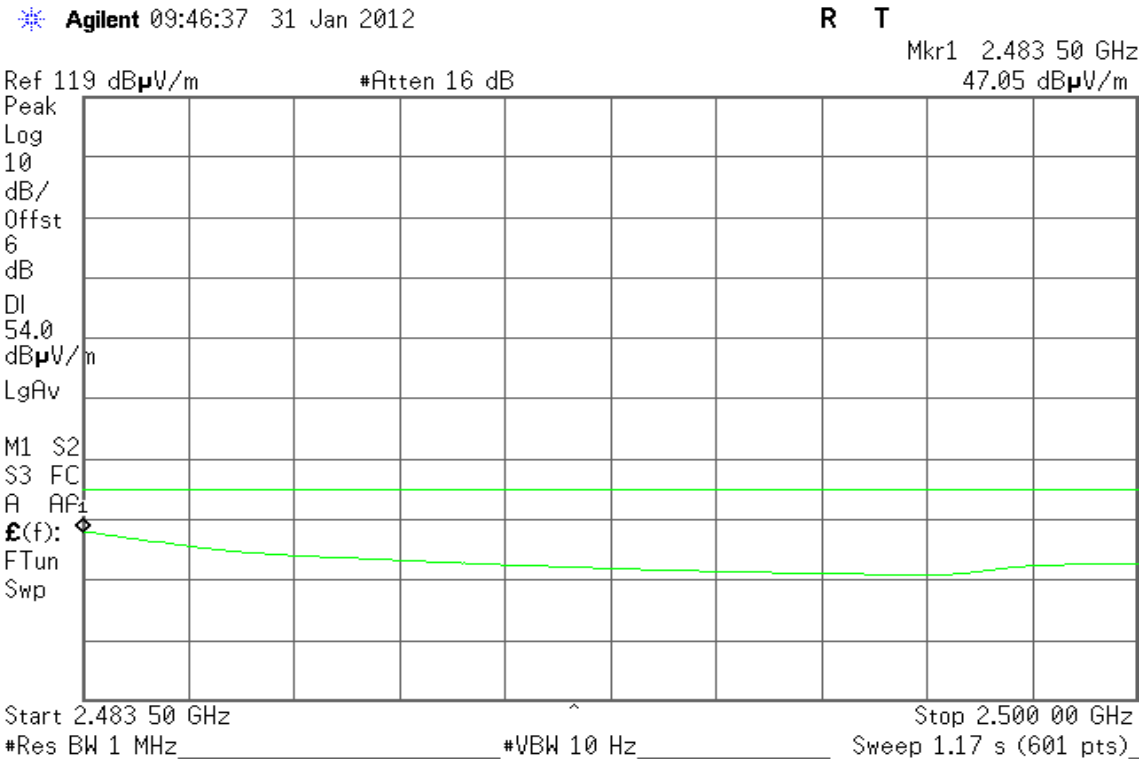
Detector mode: Average **Polarity: Vertical**



Detector mode: Peak **Polarity: Horizontal**

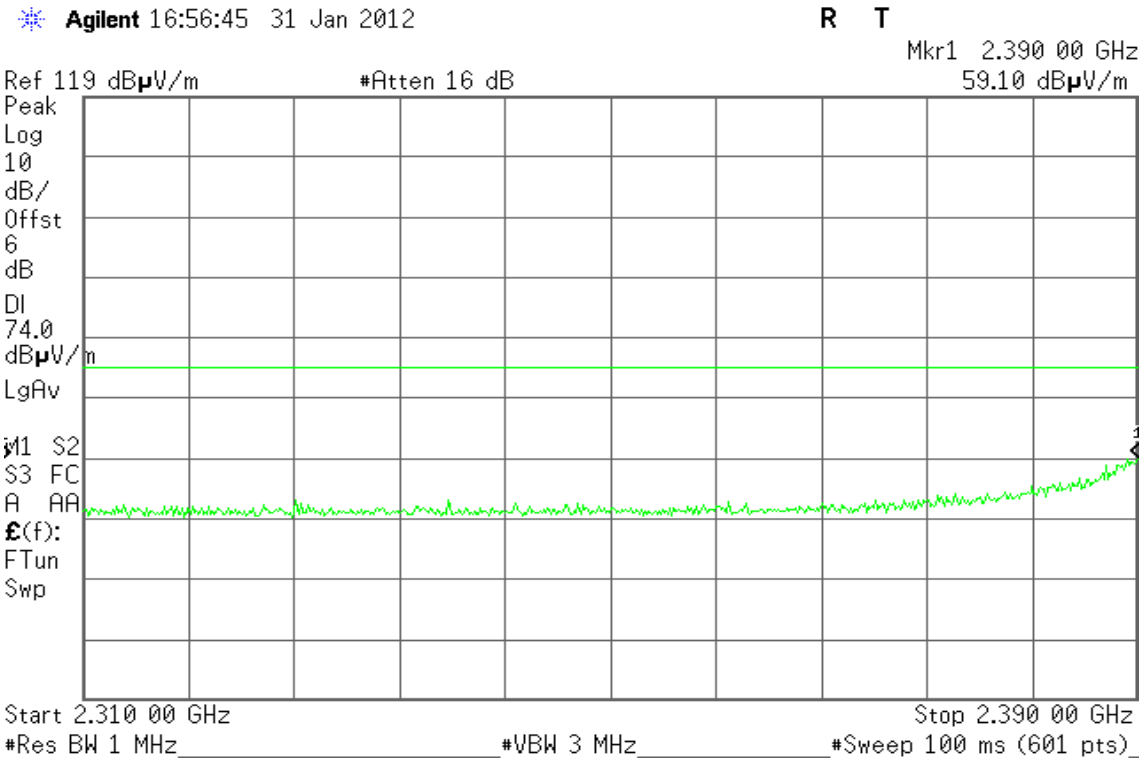


Detector mode: Average **Polarity: Horizontal**

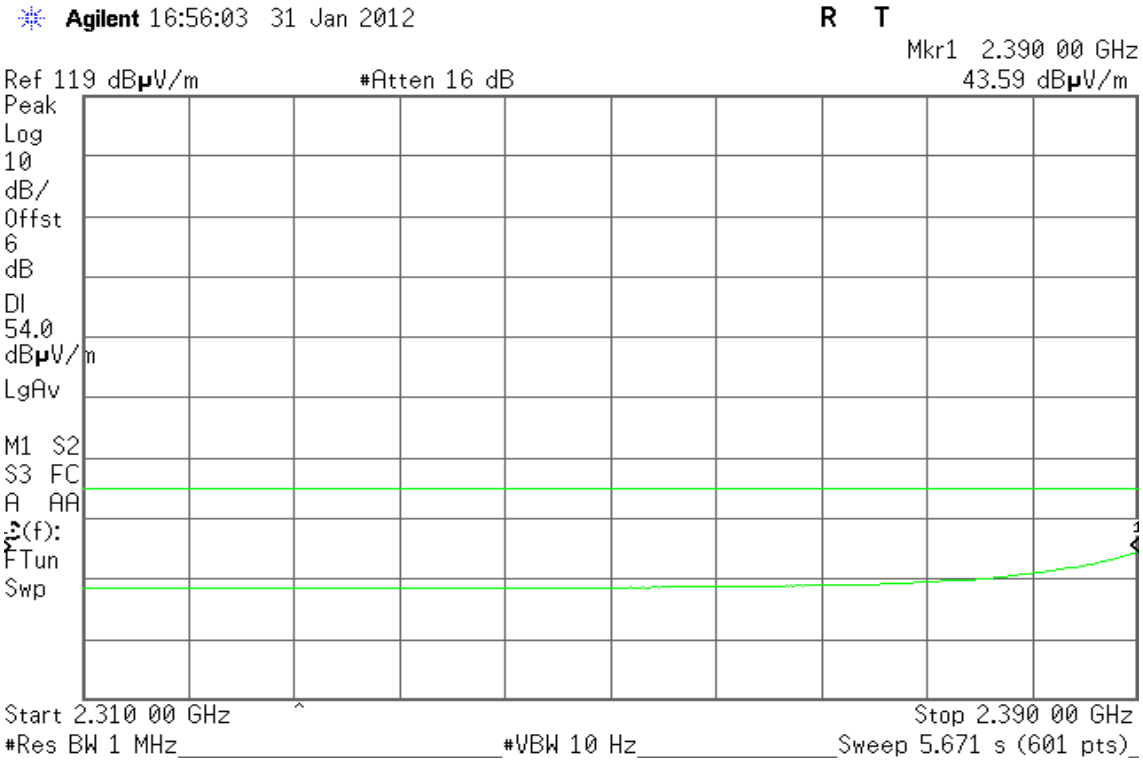


Band Edges (IEEE 802.11n HT 20 MHz mode / CH Low)

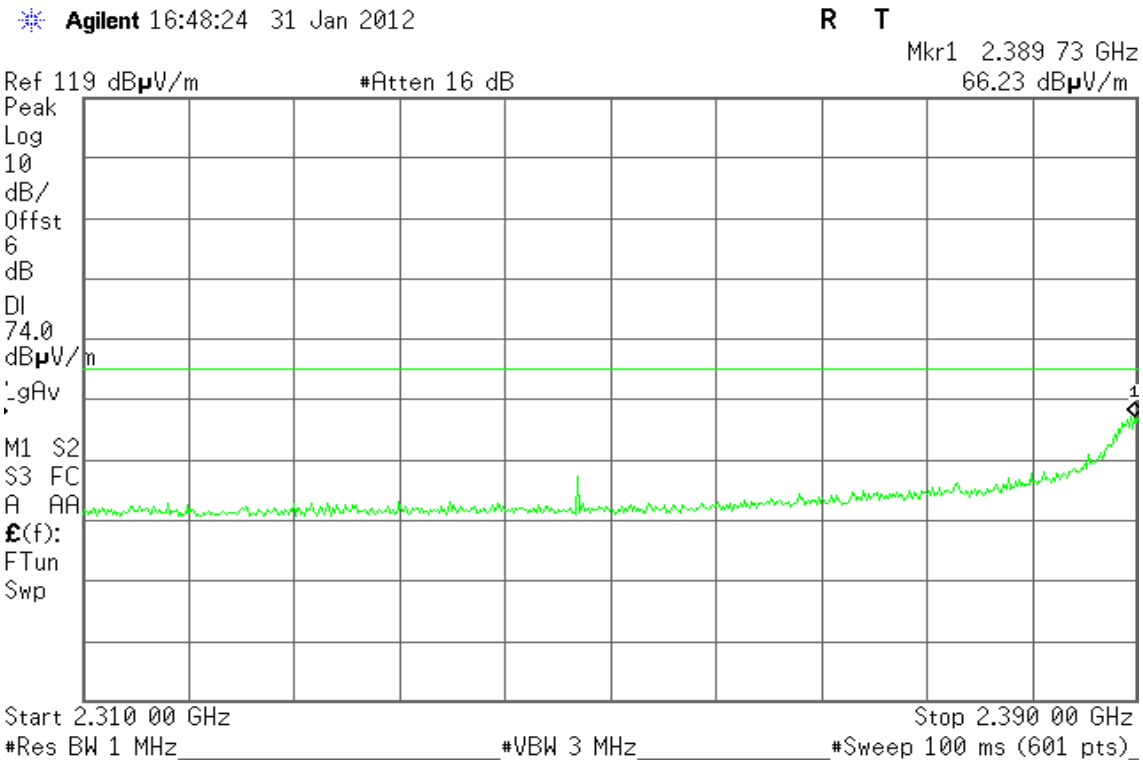
Detector mode: Peak **Polarity: Vertical**



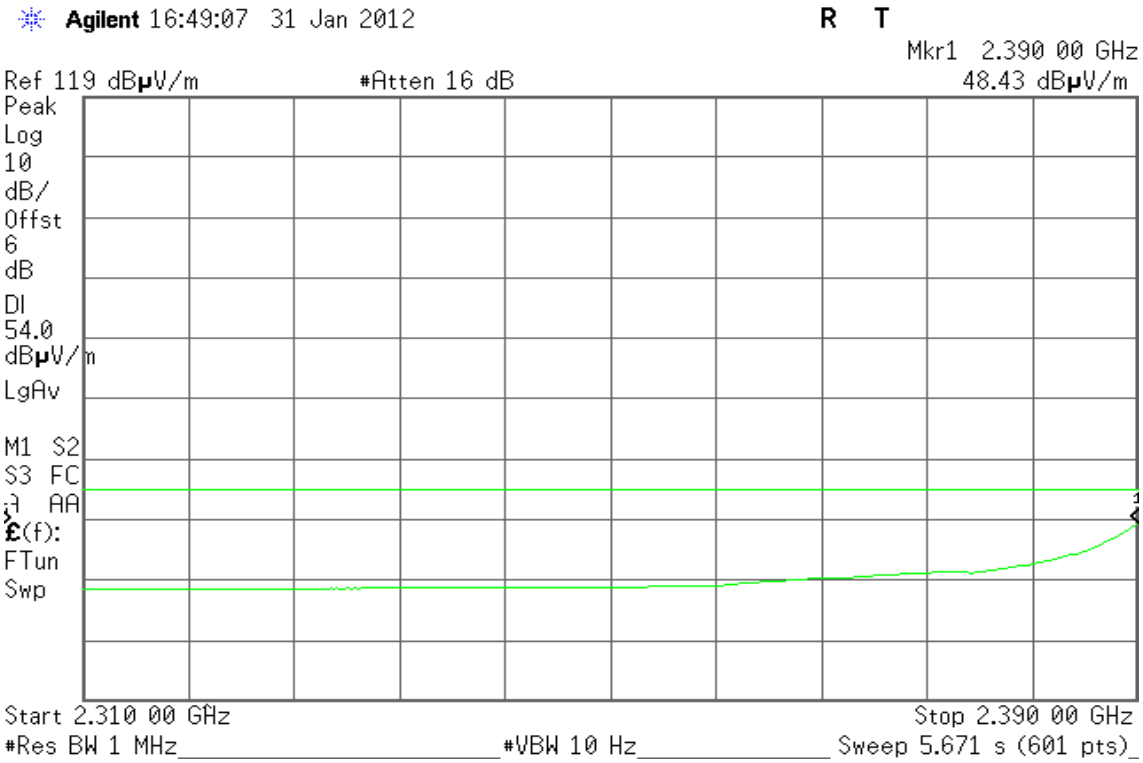
Detector mode: Average **Polarity: Vertical**



Detector mode: Peak **Polarity: Horizontal**

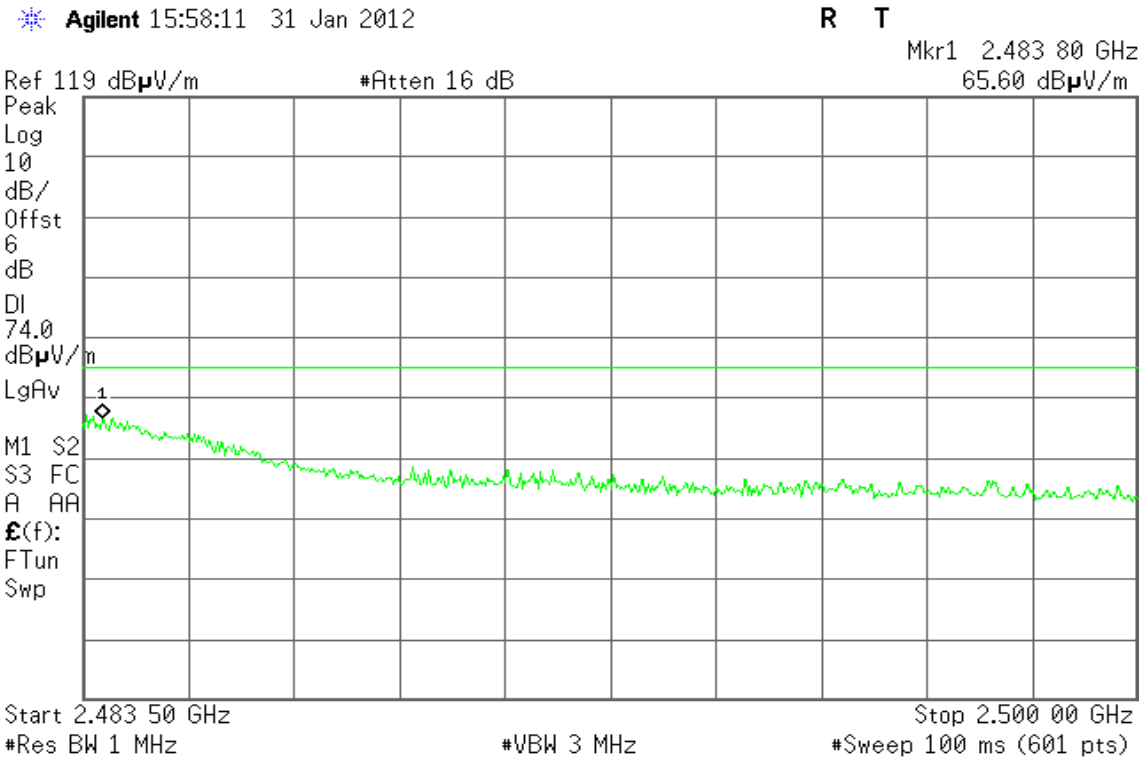


Detector mode: Average **Polarity: Horizontal**

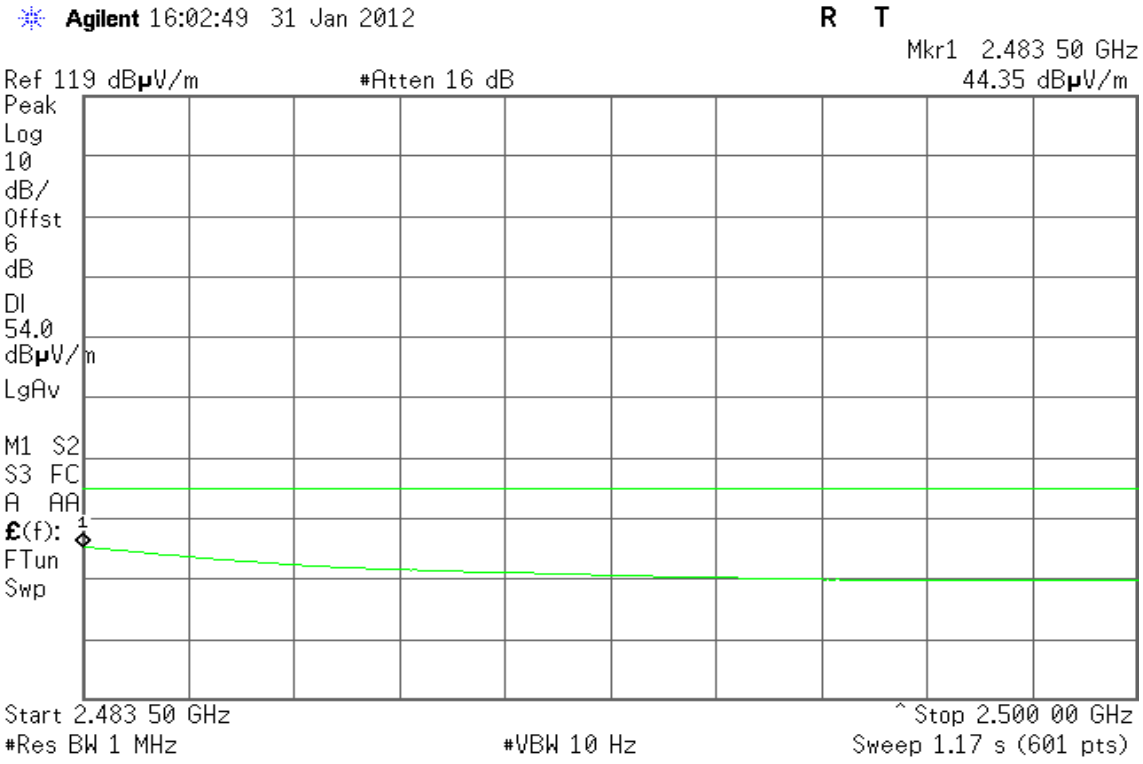


Band Edges (IEEE 802.11n HT 20 MHz mode / CH High)

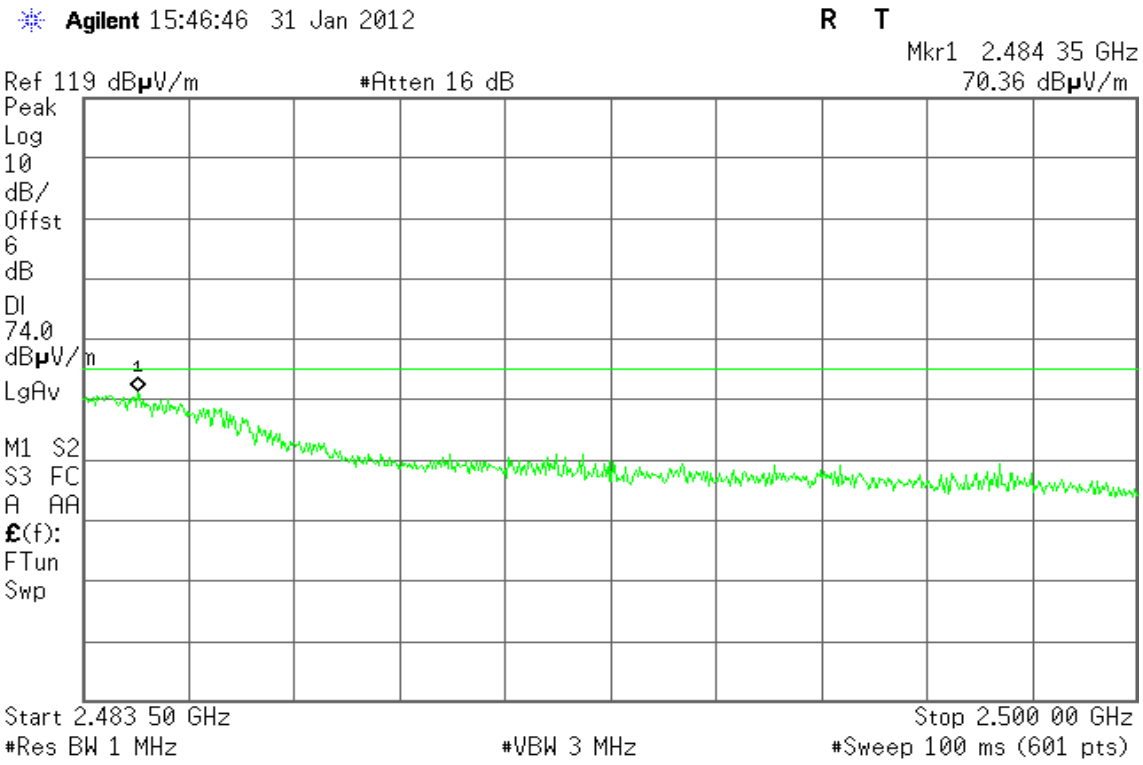
Detector mode: Peak **Polarity: Vertical**



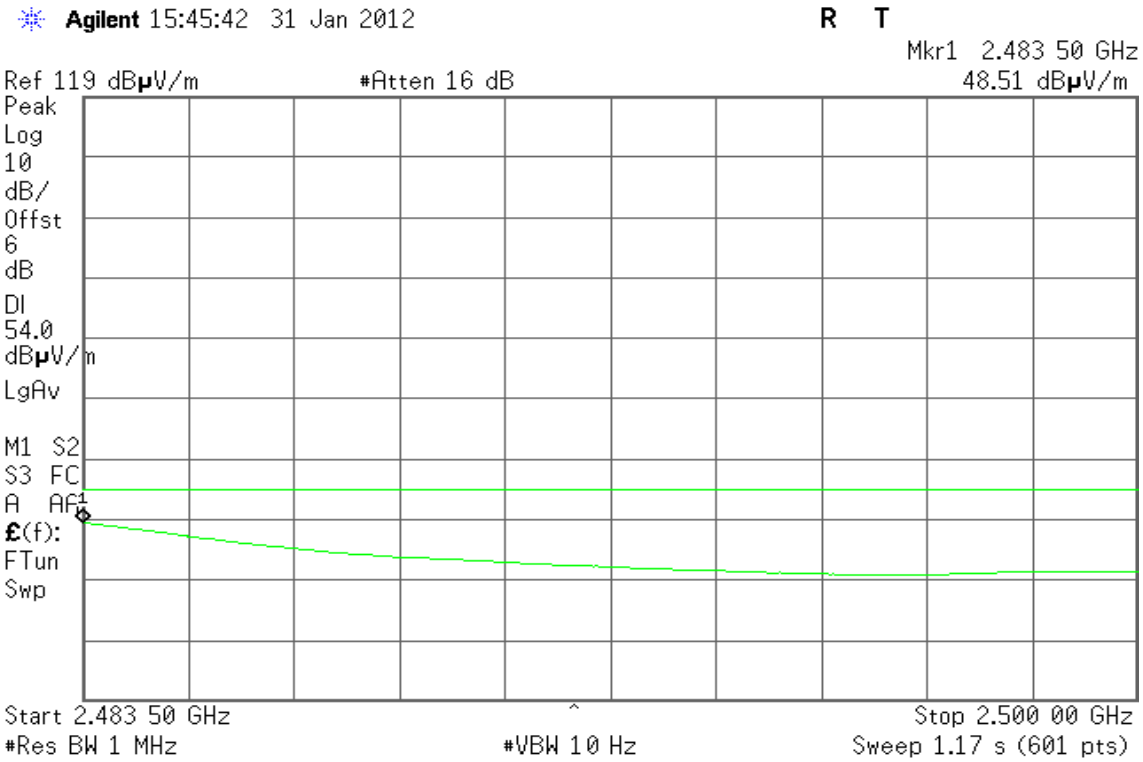
Detector mode: Average **Polarity: Vertical**



Detector mode: Peak **Polarity: Horizontal**

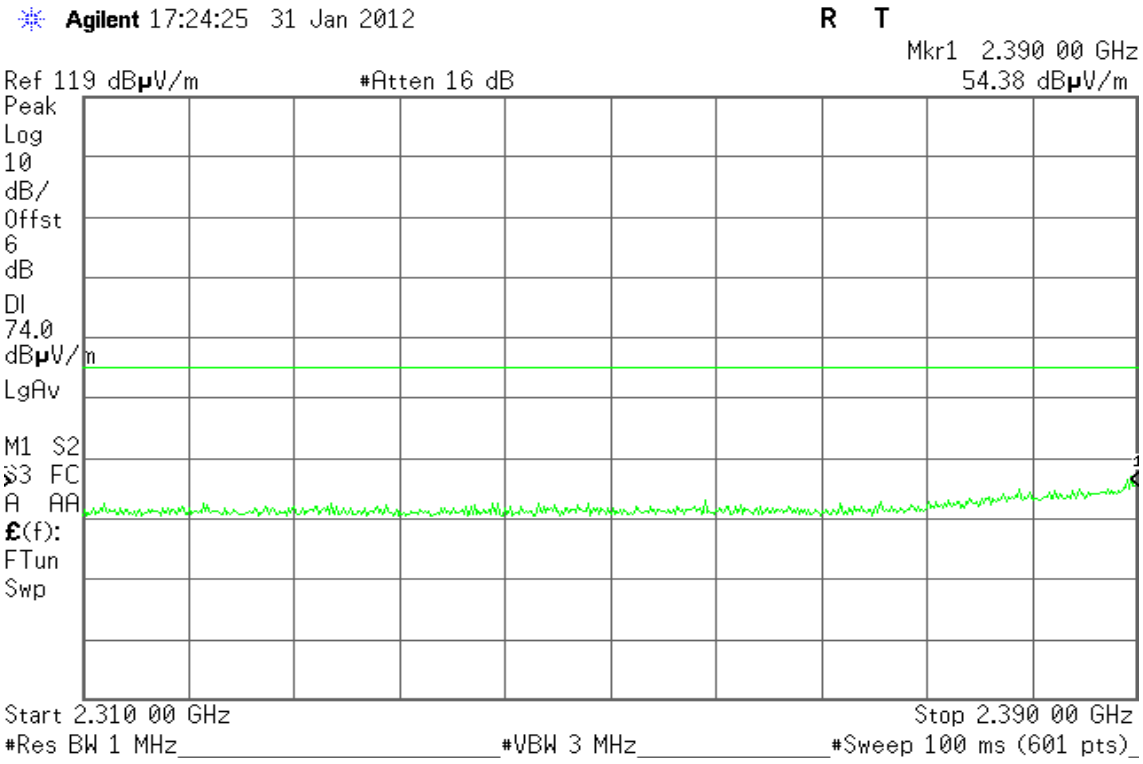


Detector mode: Average **Polarity: Horizontal**

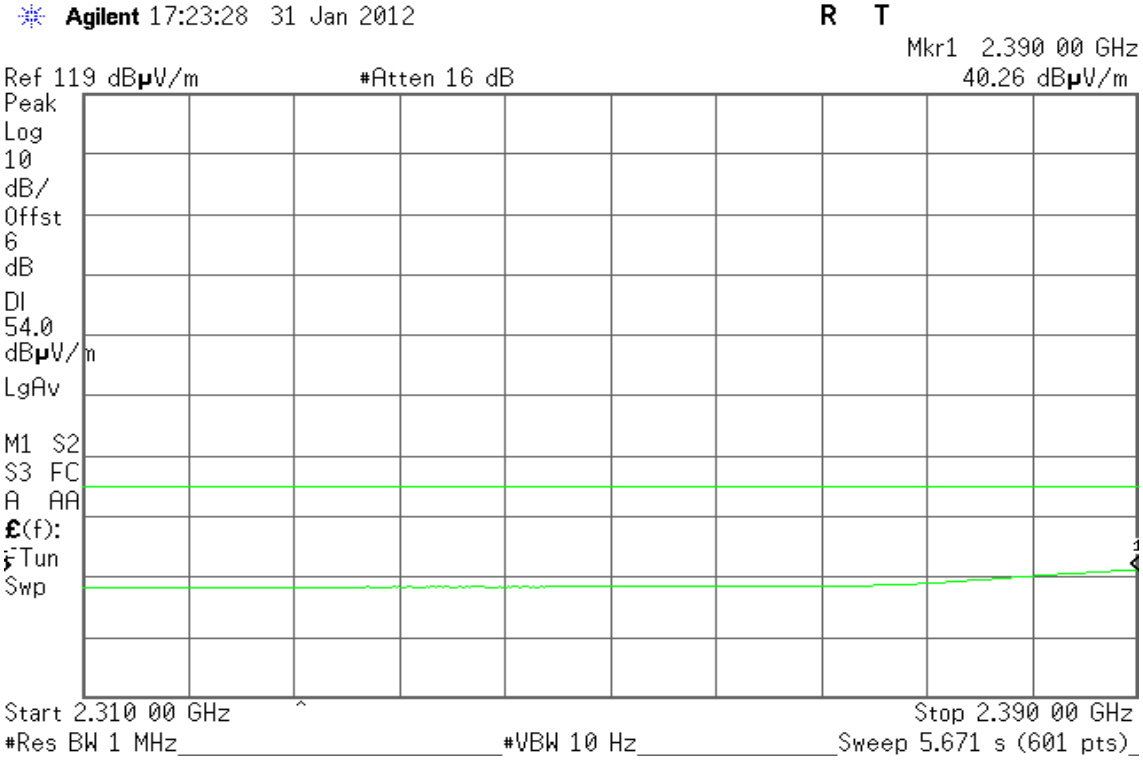


Band Edges (IEEE 802.11n HT 40 MHz mode / CH Low)

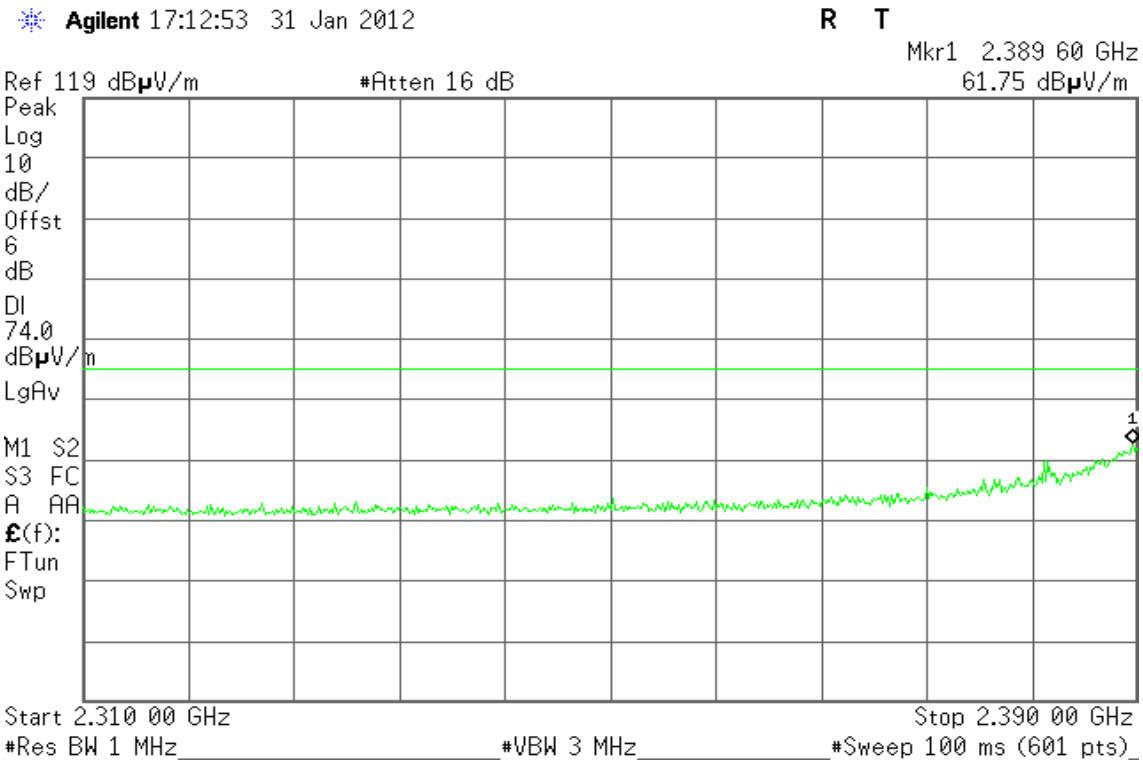
Detector mode: Peak **Polarity: Vertical**



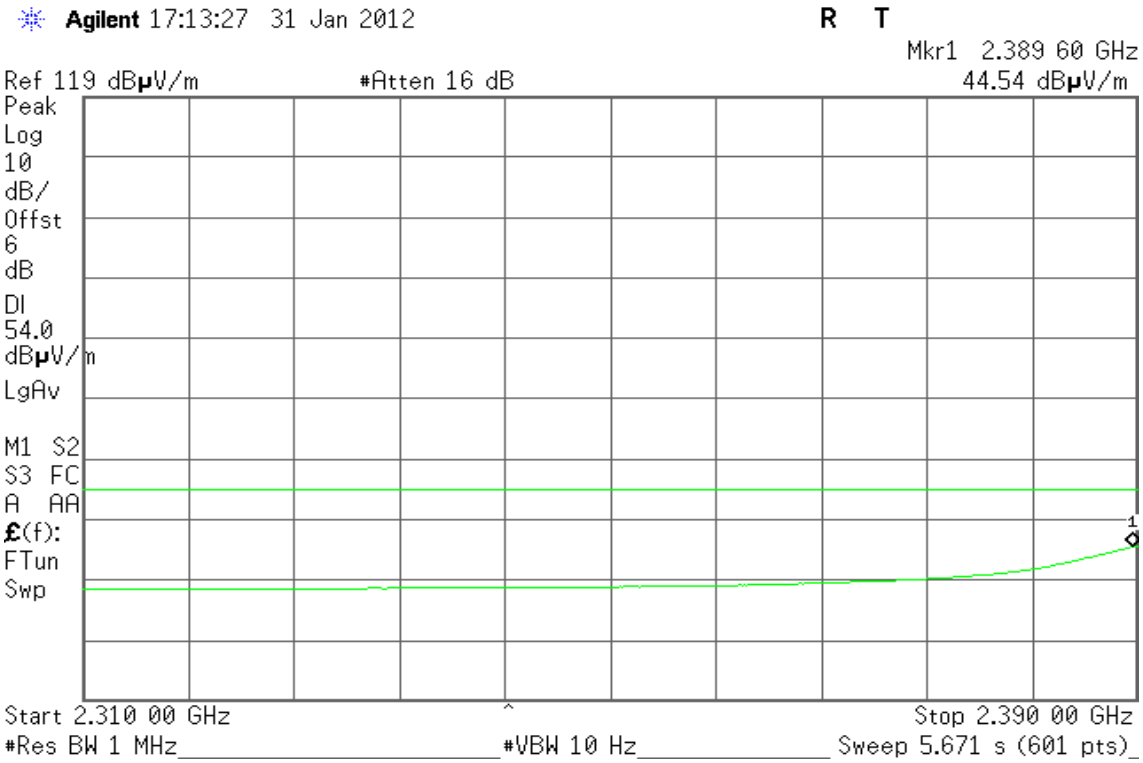
Detector mode: Average **Polarity: Vertical**



Detector mode: Peak **Polarity: Horizontal**

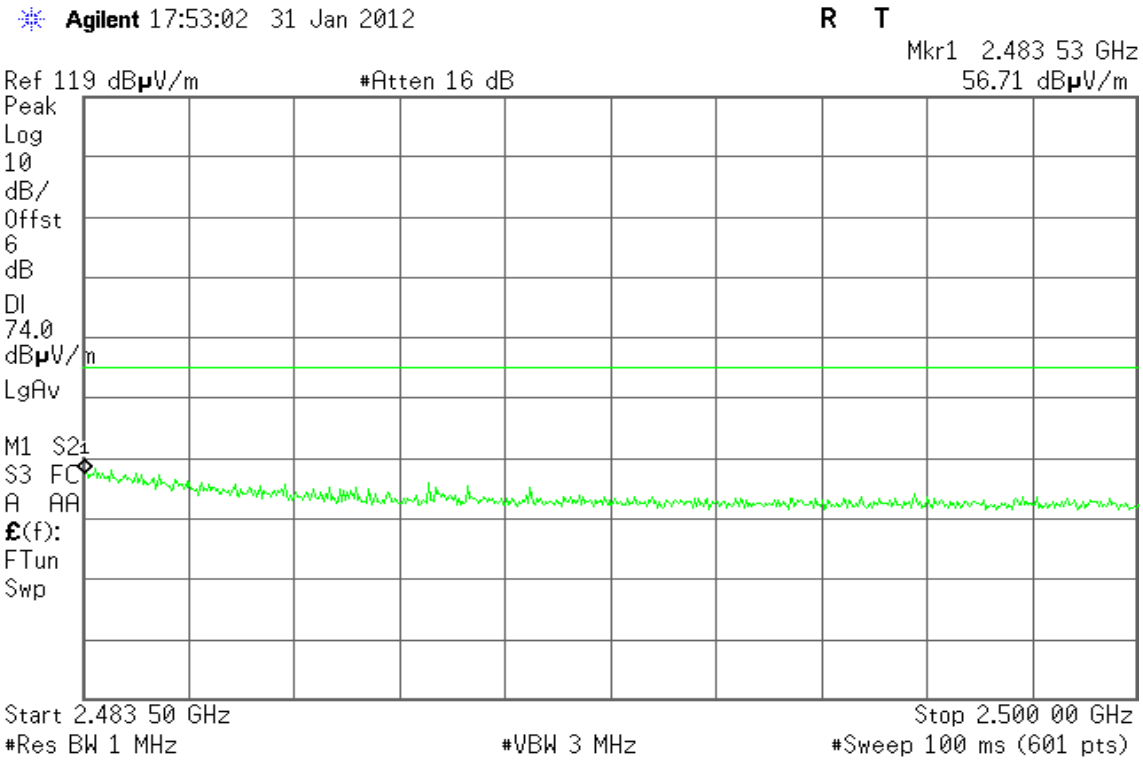


Detector mode: Average **Polarity: Horizontal**

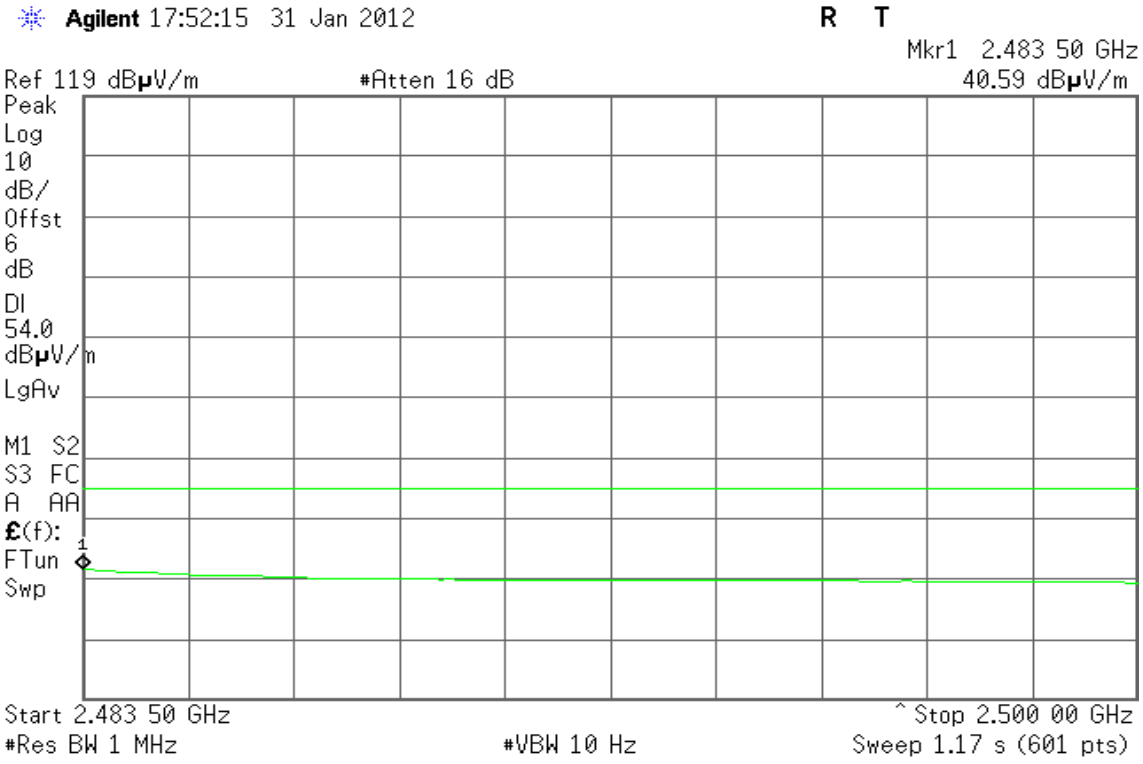


Band Edges (IEEE 802.11n HT 40 MHz mode / CH High)

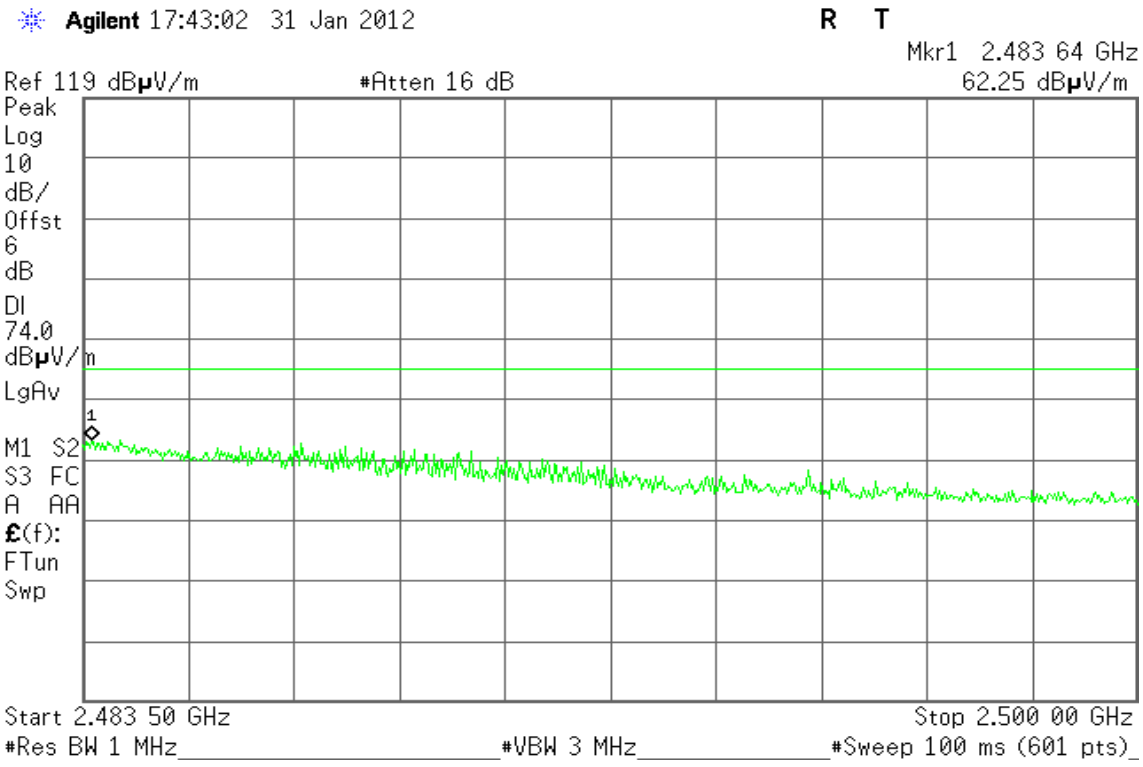
Detector mode: Peak **Polarity: Vertical**



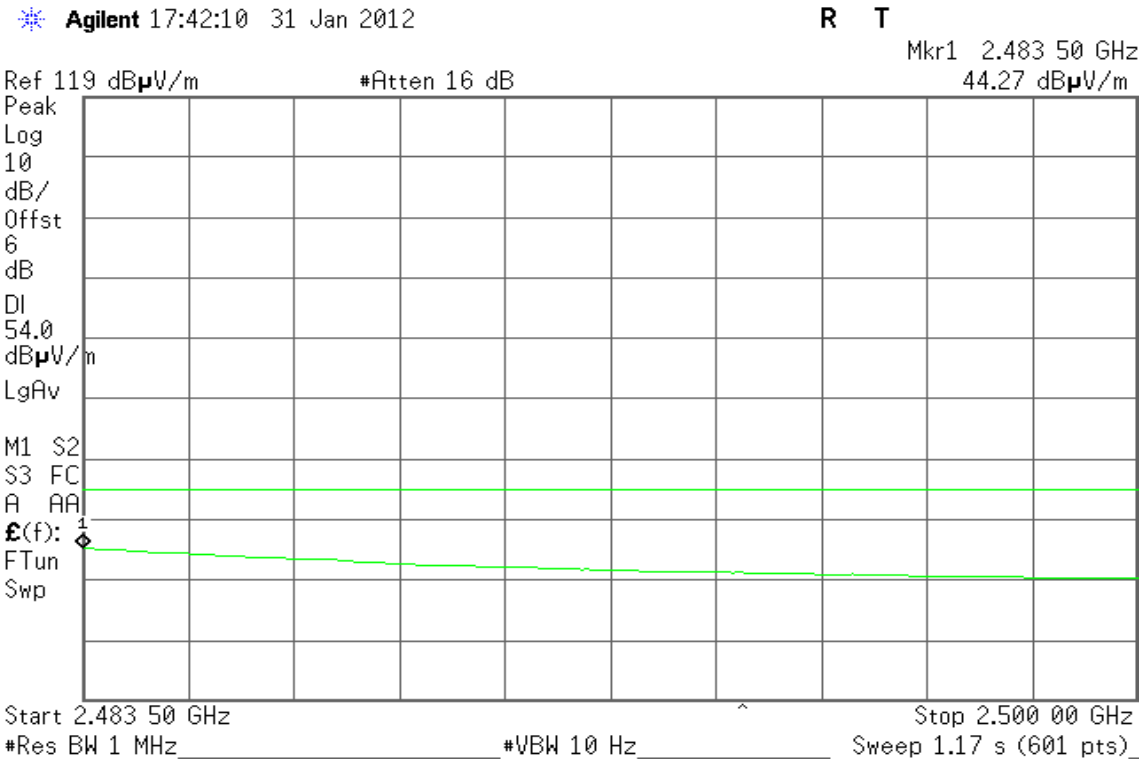
Detector mode: Average **Polarity: Vertical**



Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**



IEEE 802.11b mode / CH Low				
Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Ant. Pol. (H/V)	Note.
2389.47	51.91	74	V	PASS
2389.47	39.36	54	V	PASS
2389.73	54.57	74	H	PASS
2389.73	42.15	54	H	PASS

IEEE 802.11b mode / CH High				
Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Ant. Pol. (H/V)	Note.
2484	53.45	74	V	PASS
2483.5	39.52	54	V	PASS
2483.83	55.56	74	H	PASS
2483.56	42.43	54	H	PASS

IEEE 802.11g mode / CH Low				
Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Ant. Pol. (H/V)	Note.
2390	55.21	74	V	PASS
2390	40.42	54	V	PASS
2390	63.68	74	H	PASS
2390	45.2	54	H	PASS

IEEE 802.11g mode / CH High				
Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Ant. Pol. (H/V)	Note.
2483.56	62.47	74	V	PASS
2483.5	41.56	54	V	PASS
2483.64	70.48	74	H	PASS
2483.5	47.05	54	H	PASS

IEEE 802.11n HT 20 MHz mode / CH Low				
Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Ant. Pol. (H/V)	Note.
2390	59.1	74	V	PASS
2390	43.59	54	V	PASS
2389.73	66.23	74	H	PASS
2390	48.43	54	H	PASS

IEEE 802.11n HT 20 MHz mode / CH High				
Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Ant. Pol. (H/V)	Note.
2483.8	65.6	74	V	PASS
2483.5	44.35	54	V	PASS
2484.35	70.36	74	H	PASS
2483.5	48.51	54	H	PASS

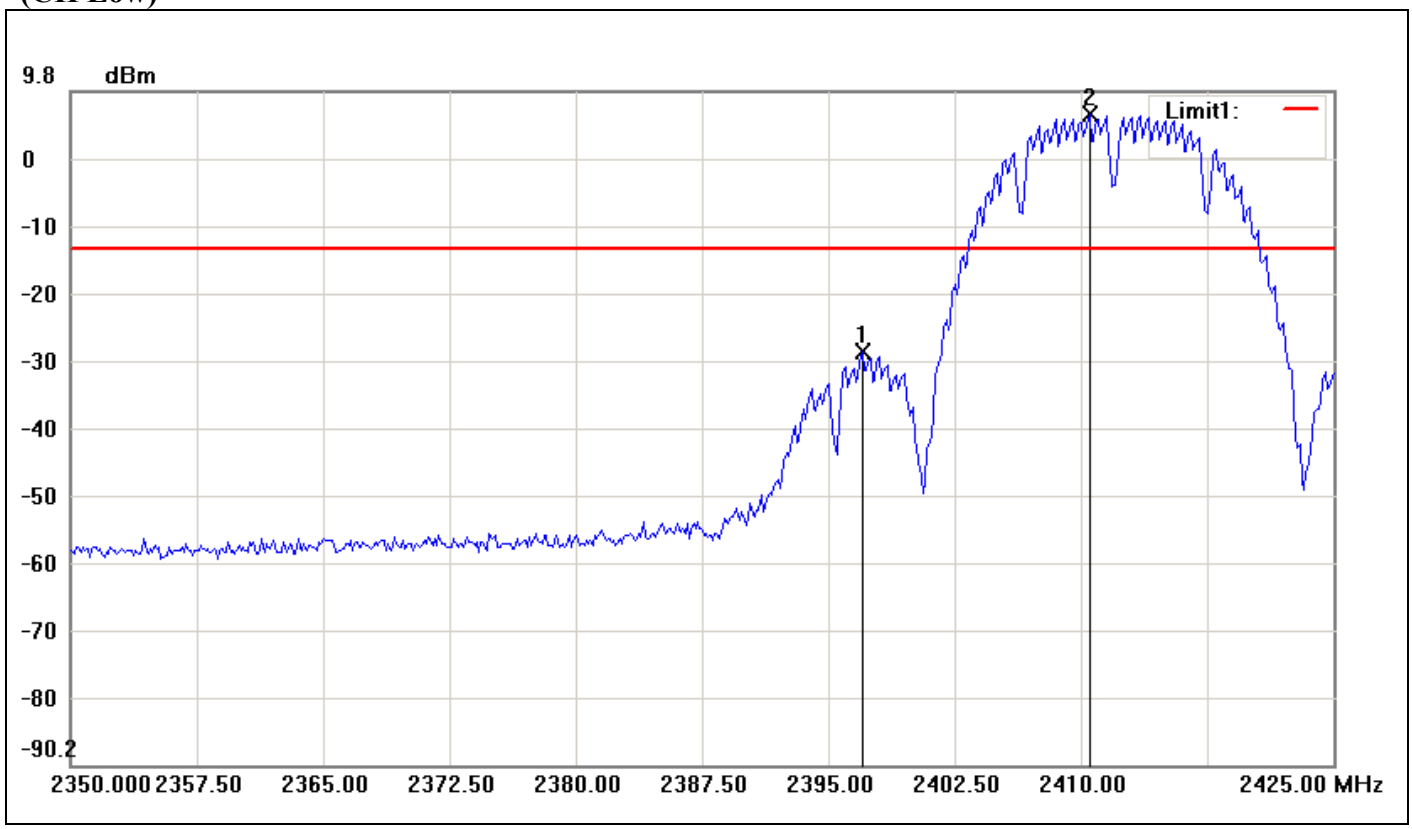
IEEE 802.11n HT 40 MHz mode / CH Low				
Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Ant. Pol. (H/V)	Note.
2390	54.38	74	V	PASS
2390	40.26	54	V	PASS
2389.6	61.75	74	H	PASS
2389.6	44.54	54	H	PASS

IEEE 802.11n HT 40 MHz mode / CH High				
Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Ant. Pol. (H/V)	Note.
2483.53	56.71	74	V	PASS
2483.5	40.59	54	V	PASS
2483.64	62.25	74	H	PASS
2483.5	44.27	54	H	PASS

Conducted Bandedge

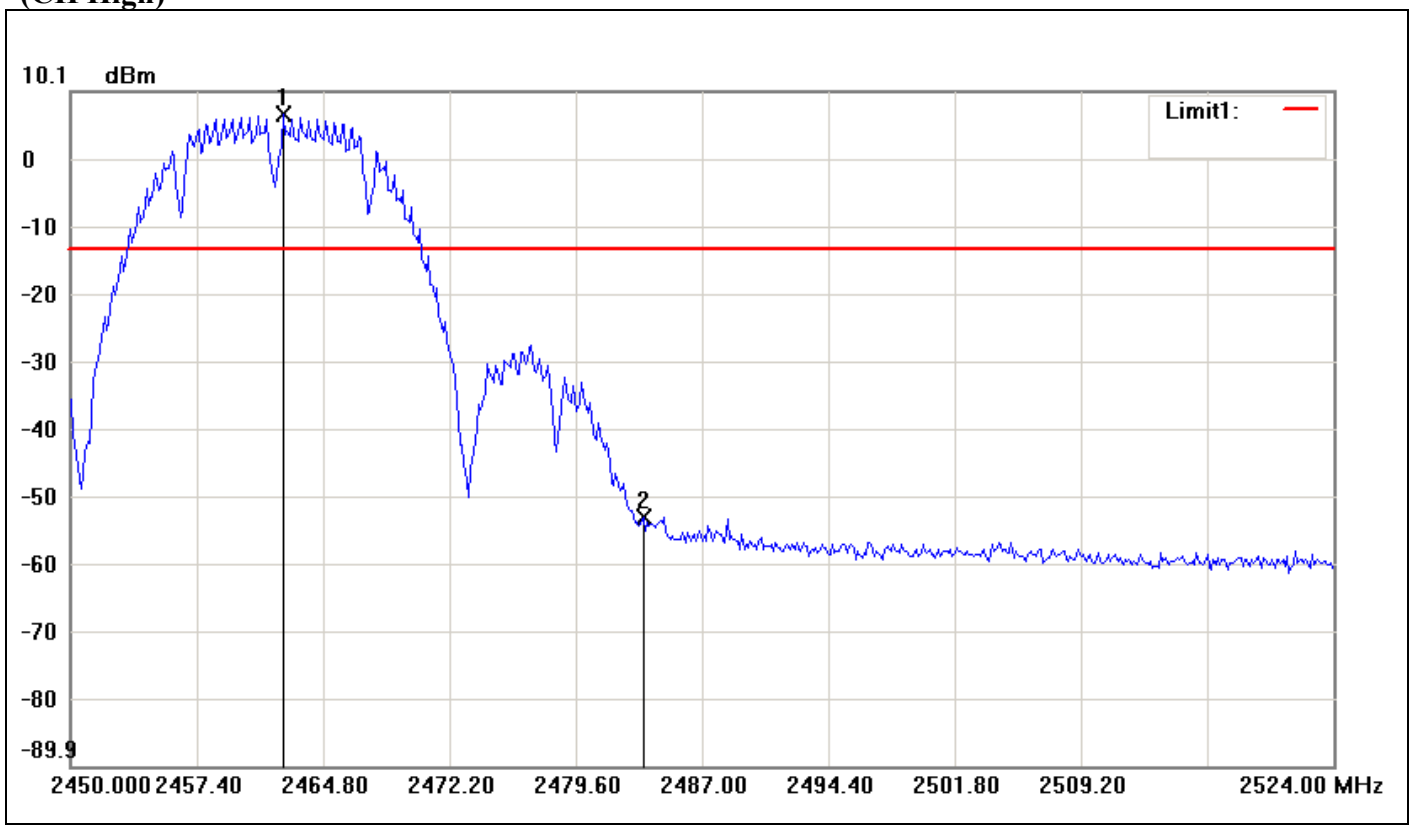
IEEE 802.11b mode:

(CH Low)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2397.0000	-28.77	-13.64	-15.13
2	2410.5000	6.36	-13.64	20.00

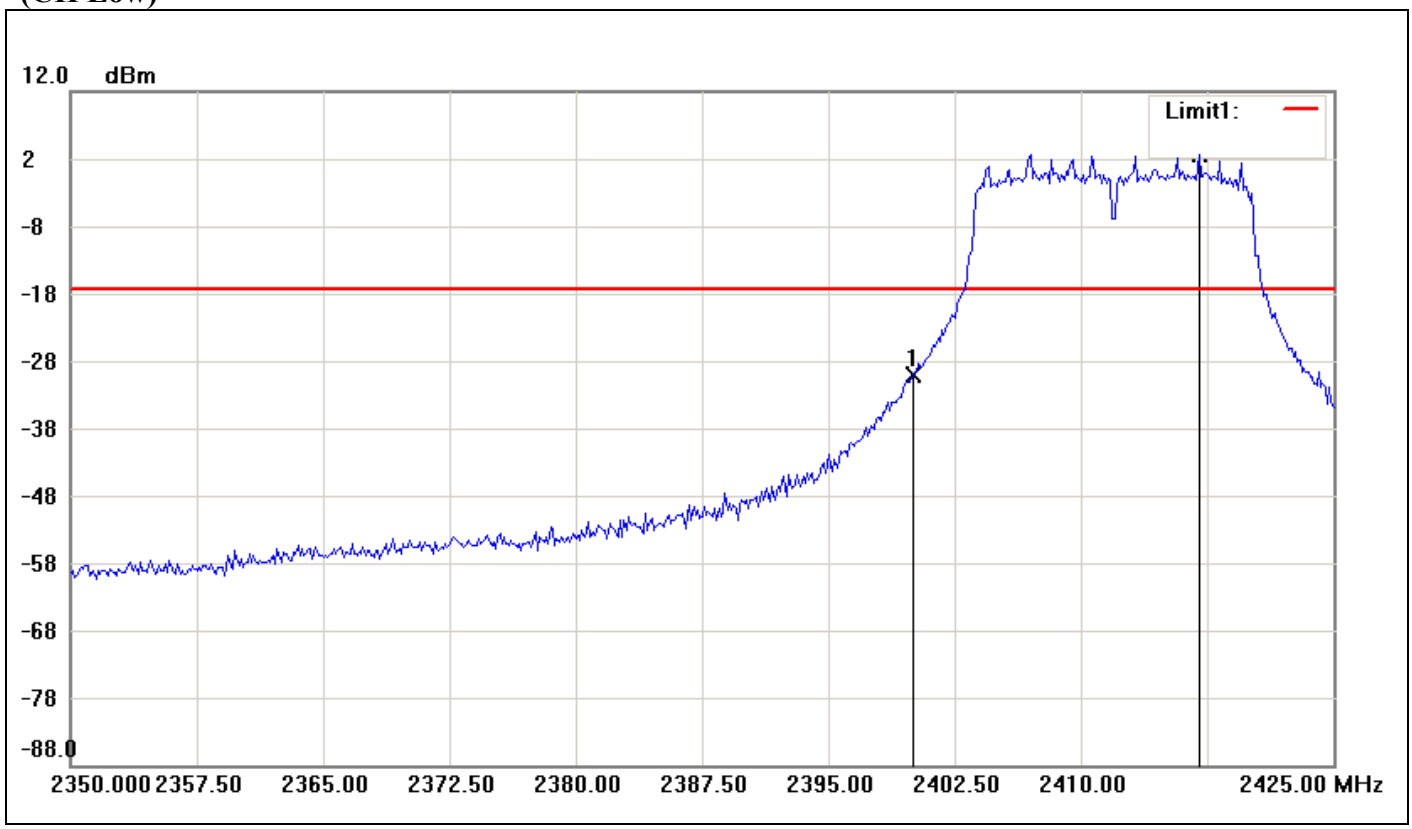
(CH High)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2462.4567	6.60	-13.40	20.00
2	2483.5467	-53.04	-13.40	-39.64

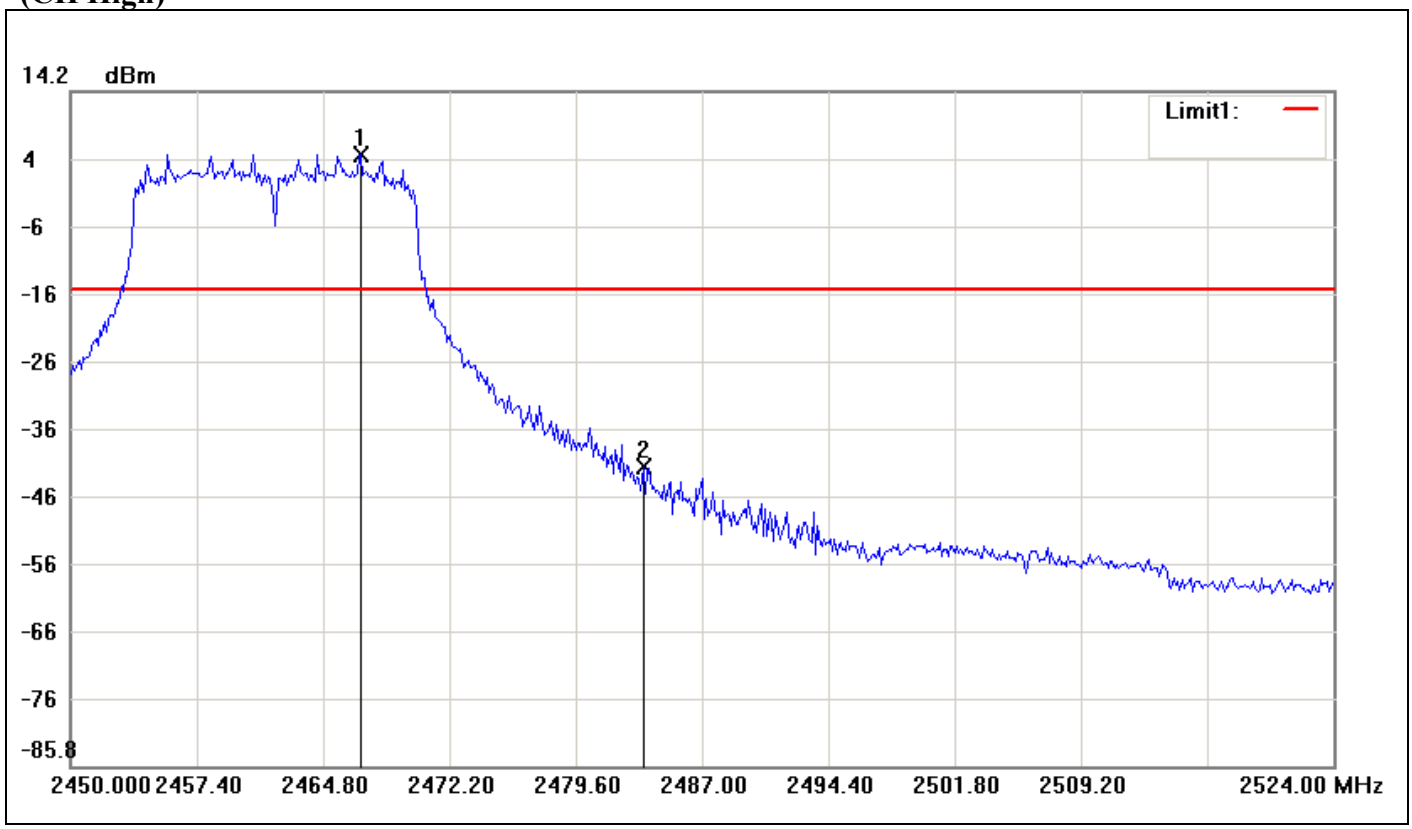
IEEE 802.11g mode:

(CH Low)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2400.0000	-30.09	-17.35	-12.74
2	2417.0000	2.65	-17.35	20.00

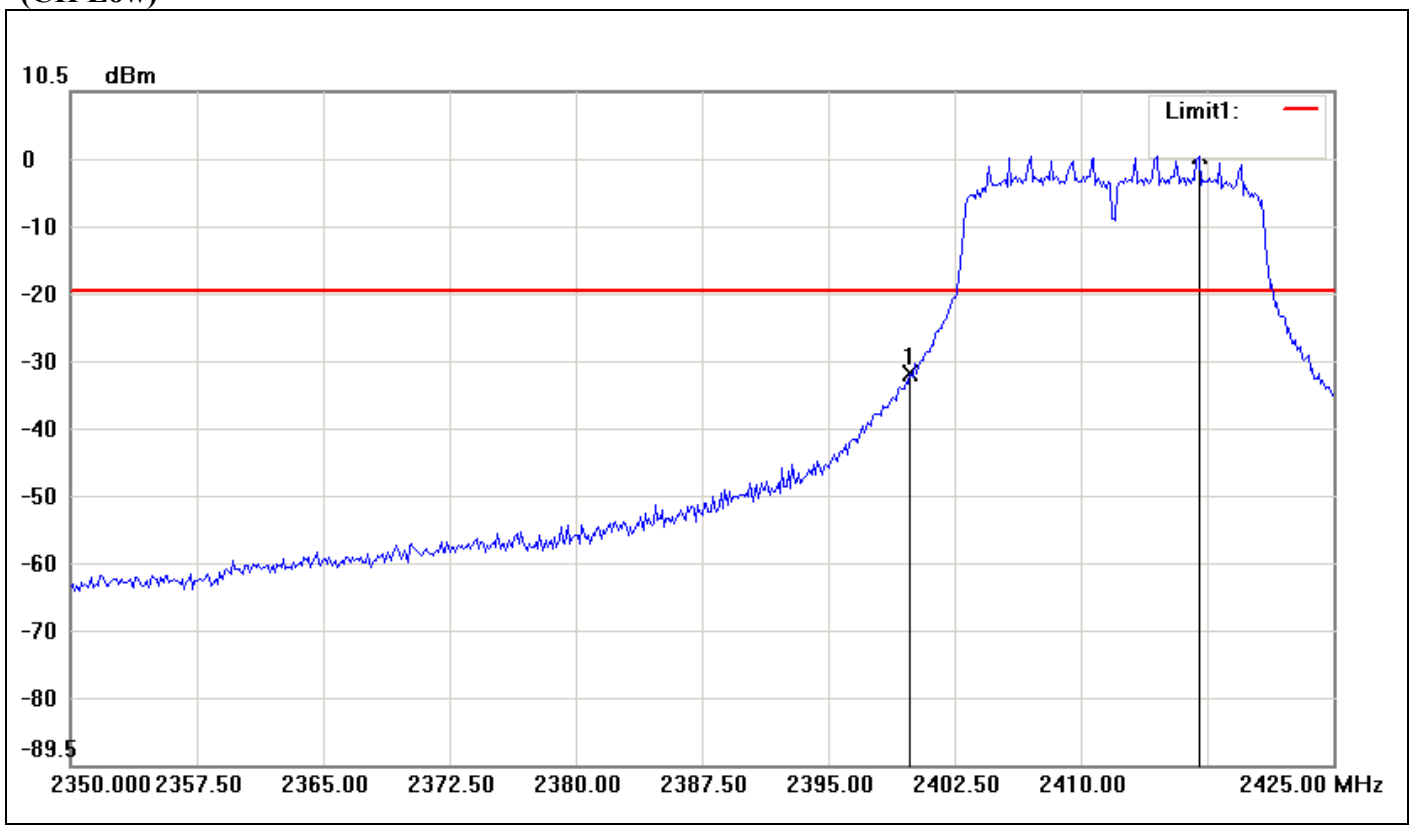
(CH High)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2467.0200	4.89	-15.11	20.00
2	2483.5467	-41.38	-15.11	-26.27

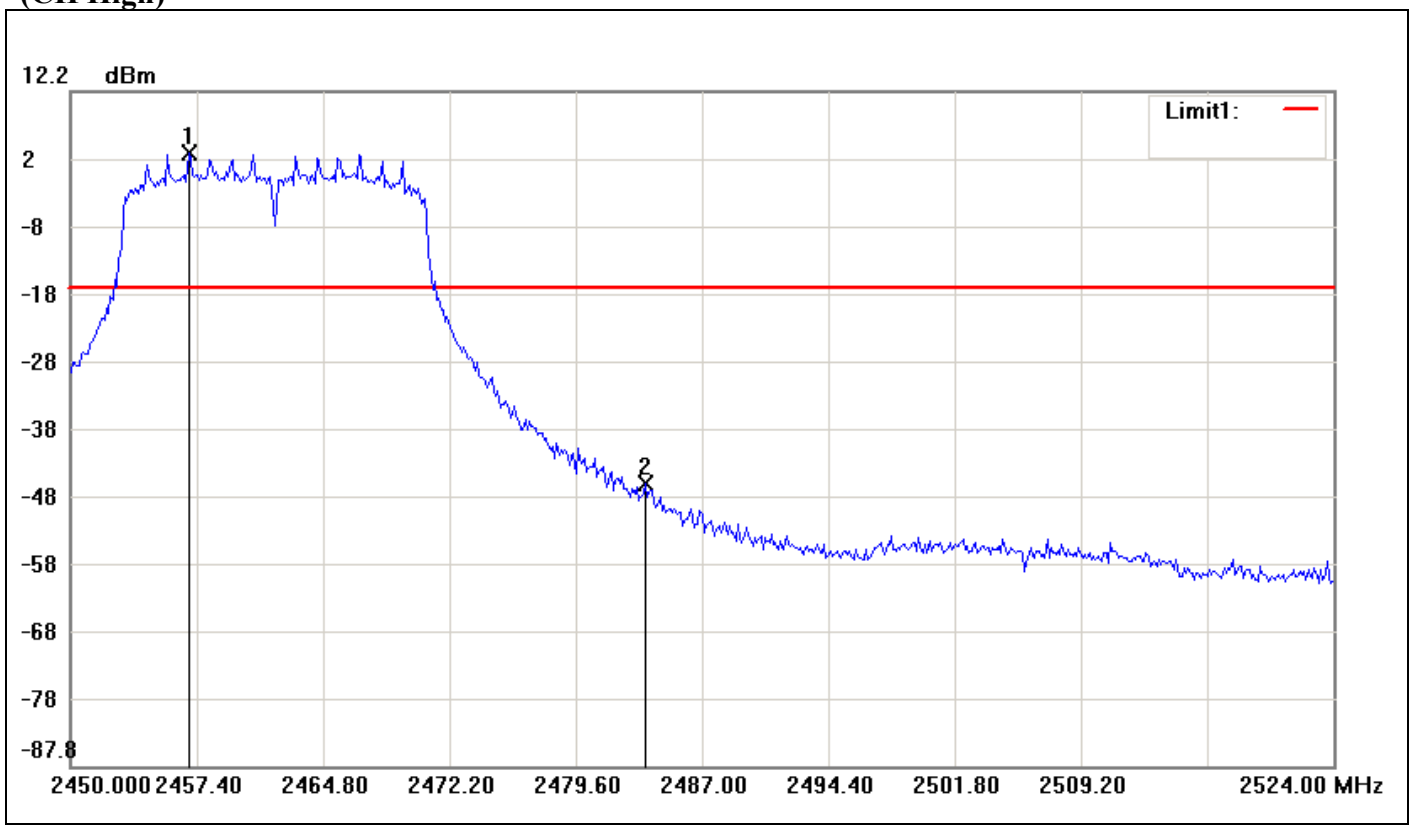
IEEE 802.11n HT 20 MHz mode:

(CH Low)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2399.8750	-31.40	-19.07	-12.33
2	2417.0000	0.93	-19.07	20.00

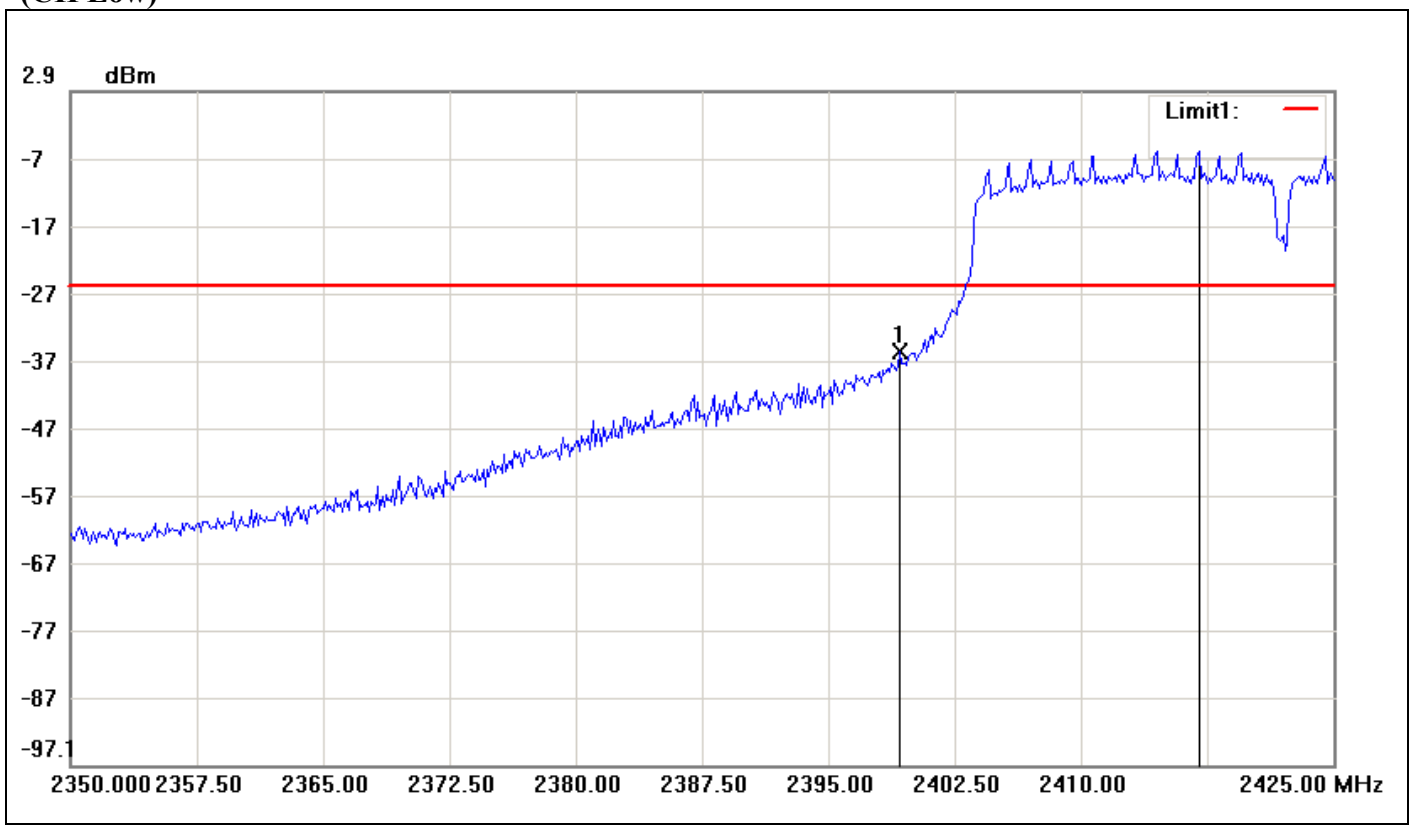
(CH High)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2456.9067	2.94	-17.06	20.00
2	2483.6700	-45.86	-17.06	-28.80

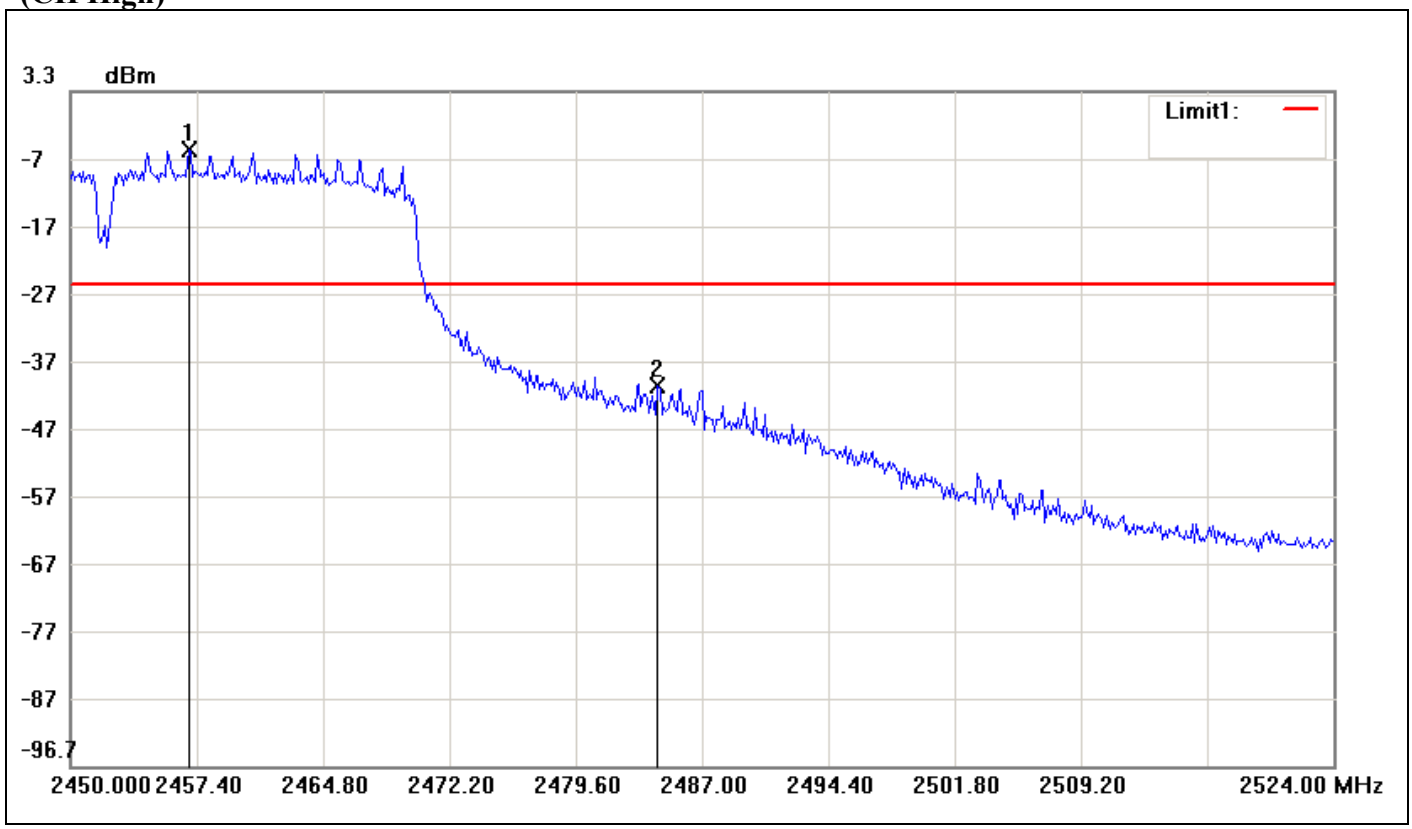
IEEE 802.11n HT 40 MHz mode:

(CH Low)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2399.2500	-35.74	-25.97	-9.77
2	2417.0000	-5.97	-25.97	20.00

(CH High)

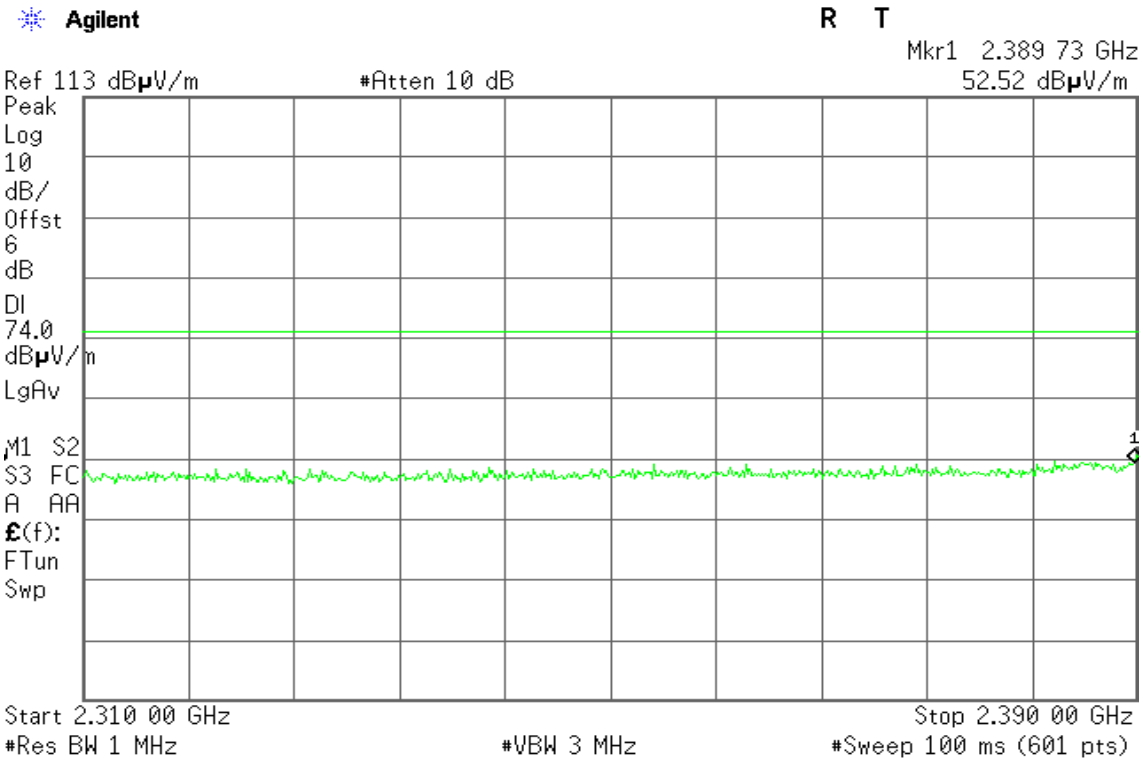


No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2456.9067	-5.40	-25.40	20.00
2	2484.4100	-40.17	-25.40	-14.77

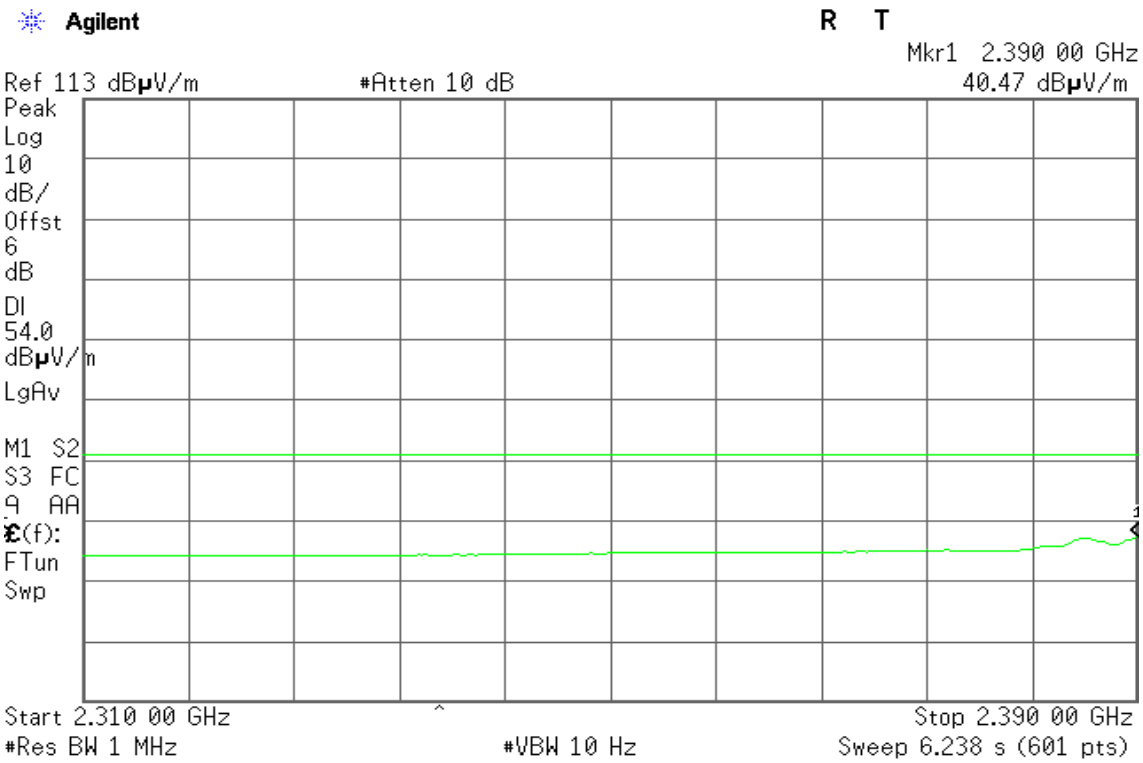
For PIFA Antenna

Band Edges (IEEE 802.11b mode / CH Low)

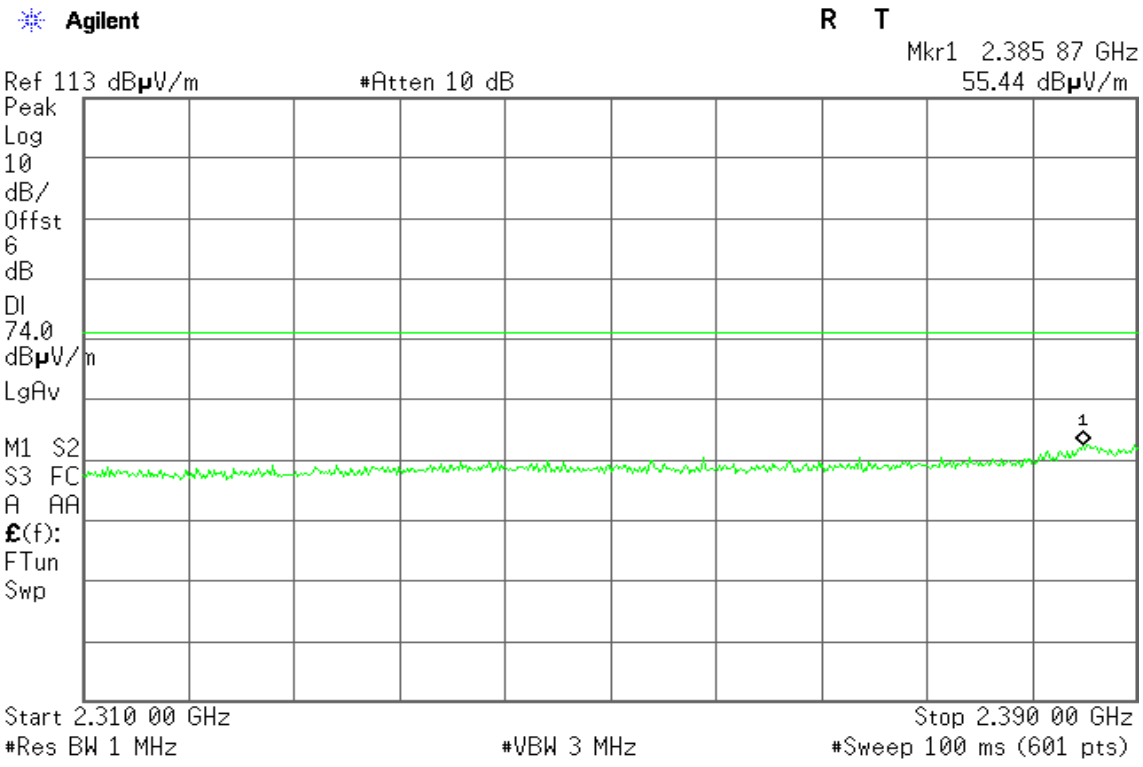
Detector mode: Peak **Polarity: Vertical**



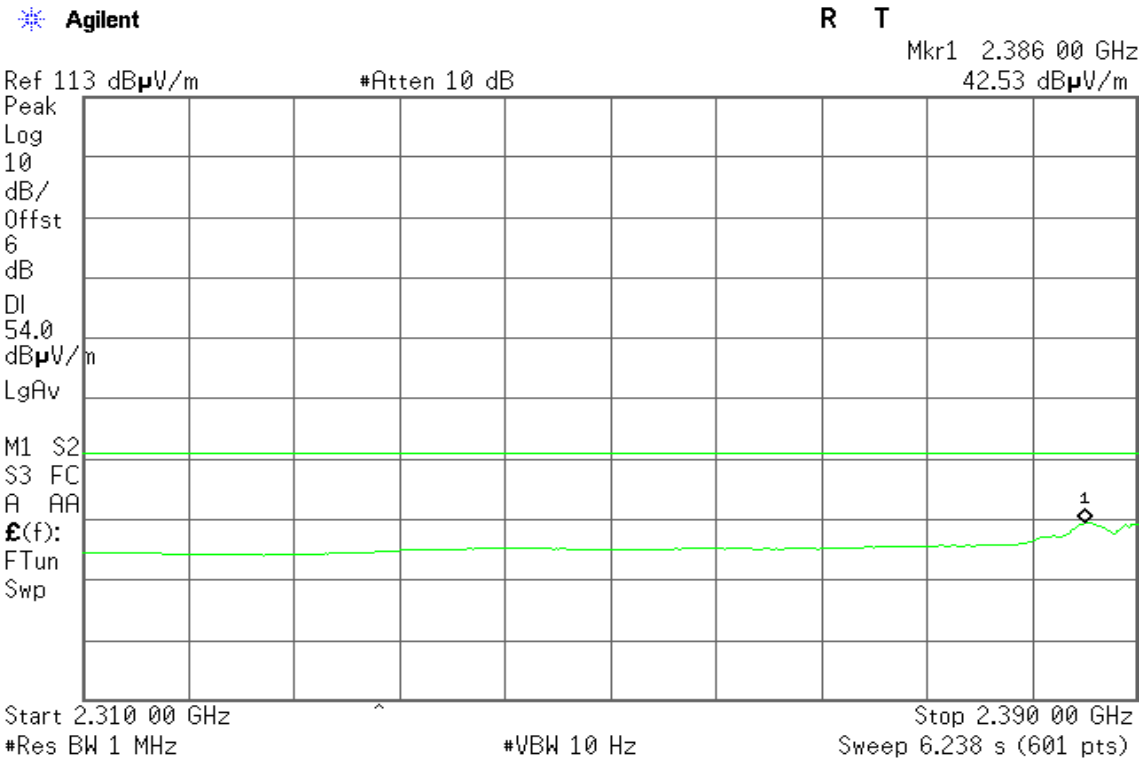
Detector mode: Average **Polarity: Vertical**



Detector mode: Peak **Polarity: Horizontal**

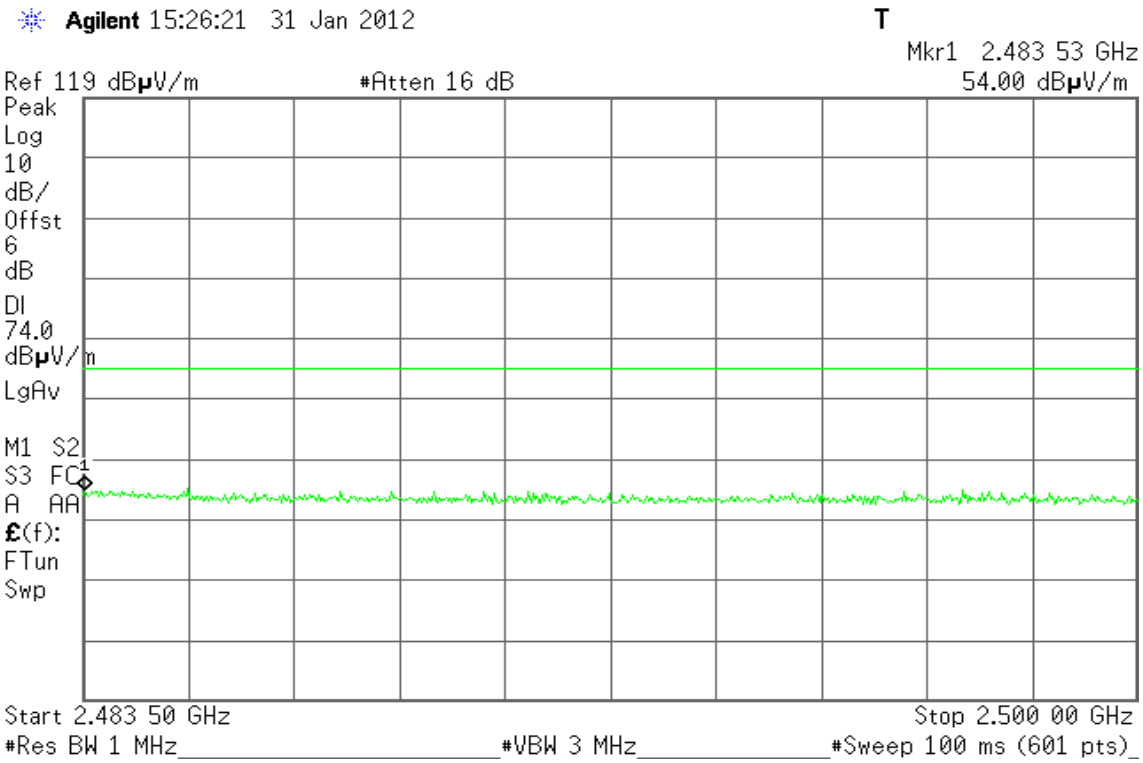


Detector mode: Average **Polarity: Horizontal**

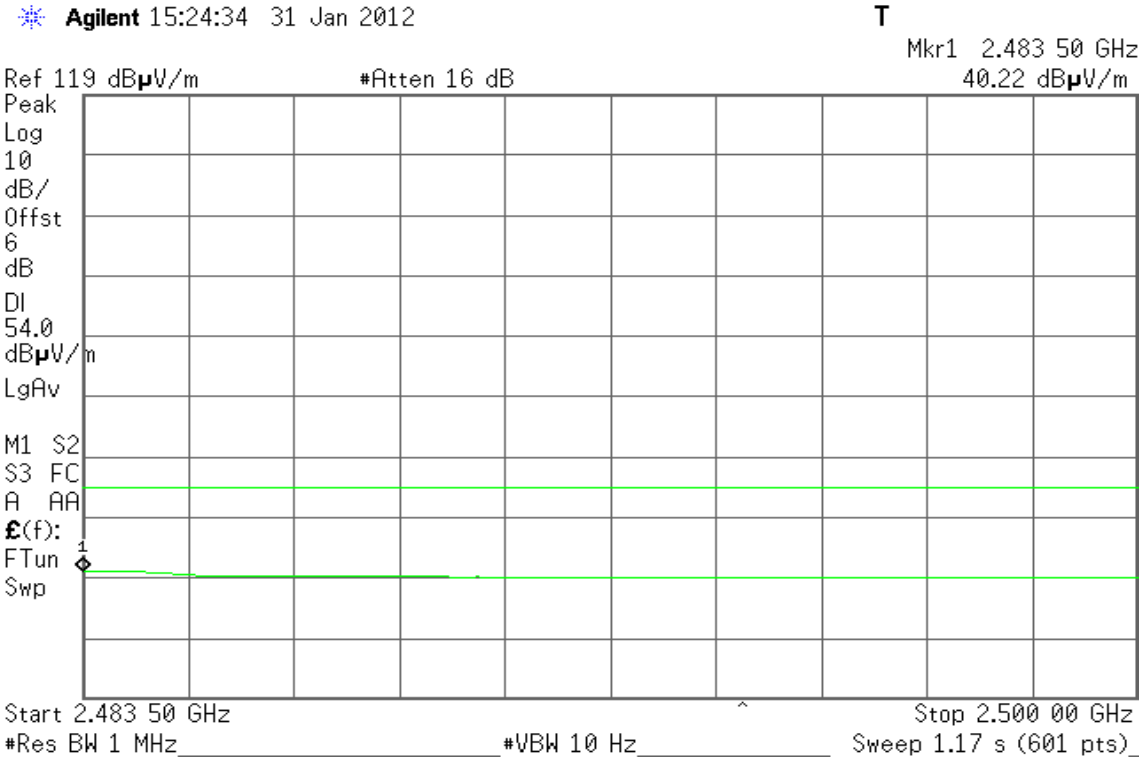


Band Edges (IEEE 802.11b mode / CH High)

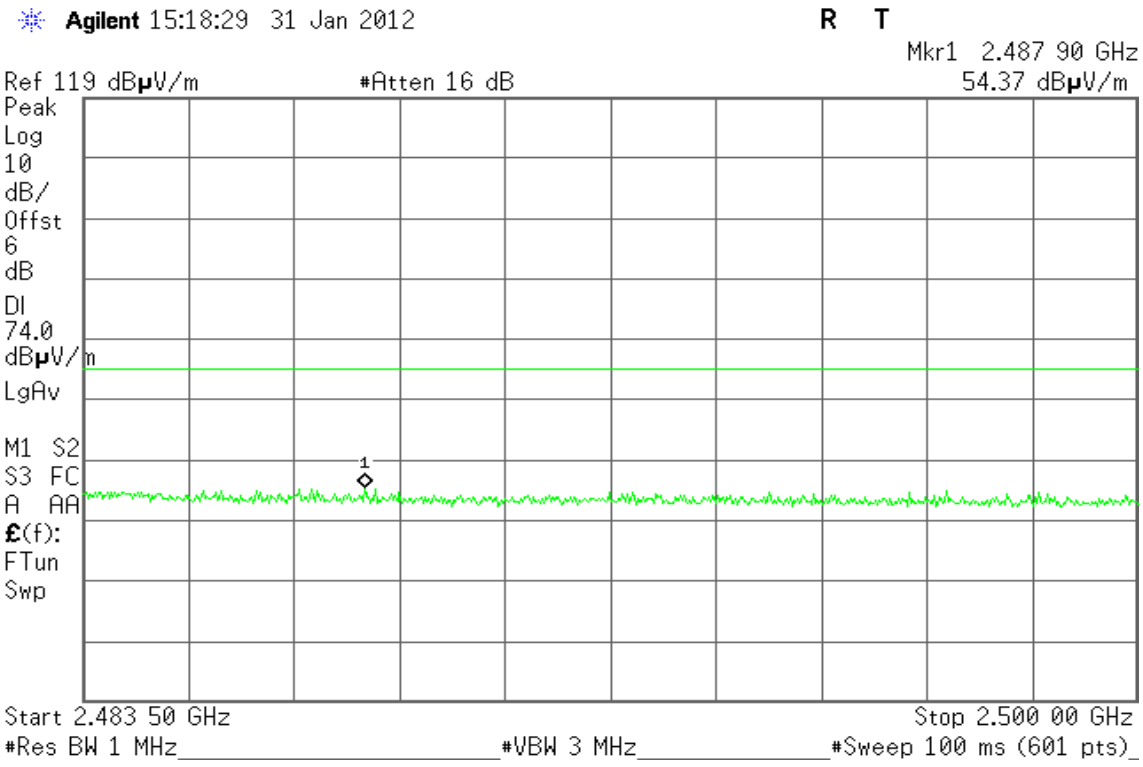
Detector mode: Peak Polarity: Vertical



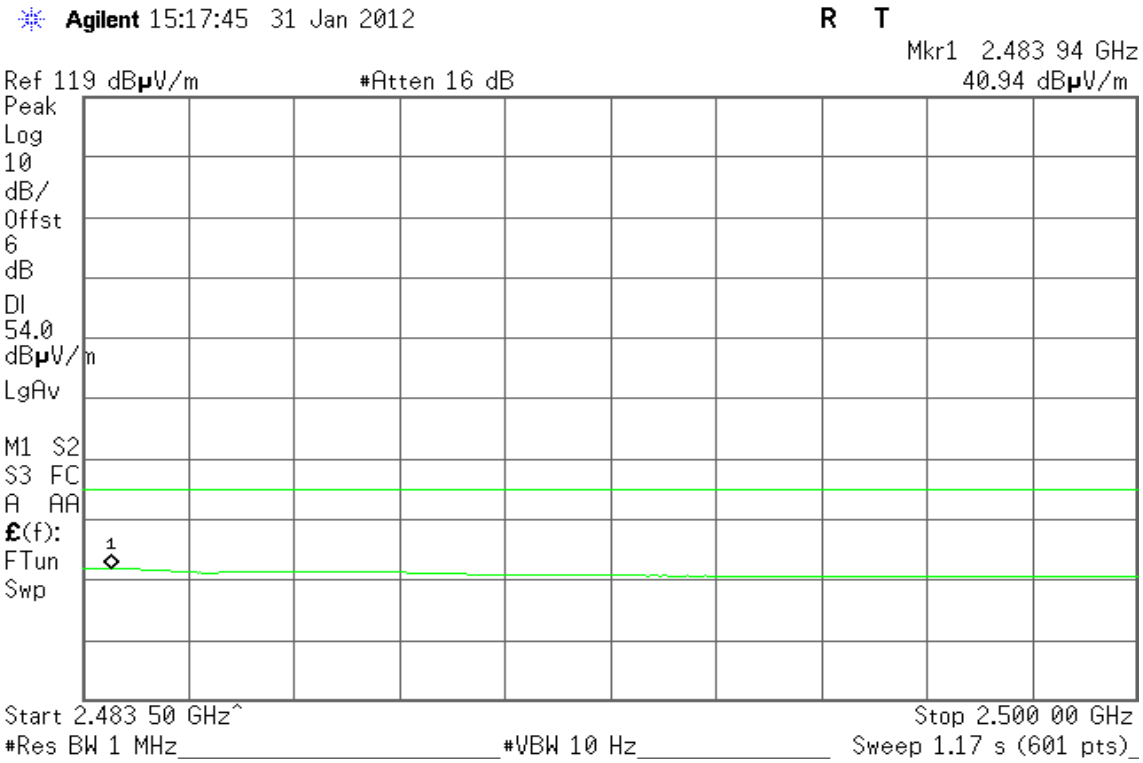
Detector mode: Average Polarity: Vertical



Detector mode: Peak **Polarity: Horizontal**

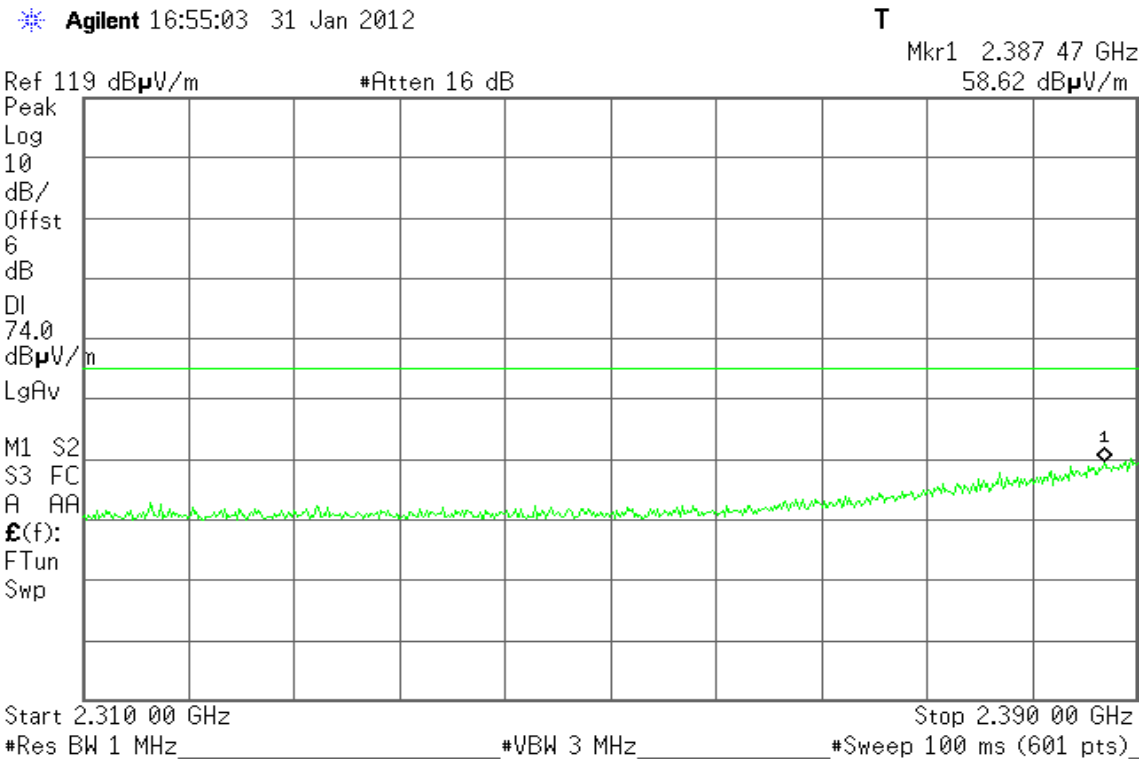


Detector mode: Average **Polarity: Horizontal**

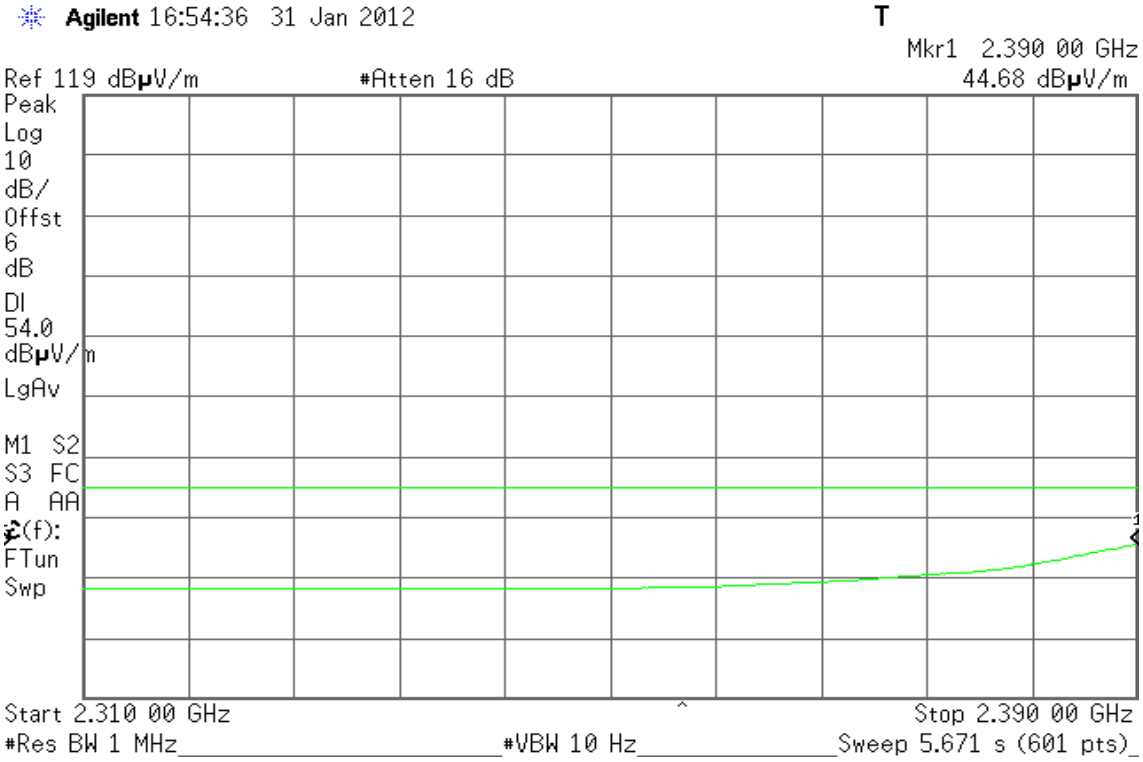


Band Edges (IEEE 802.11g mode / CH Low)

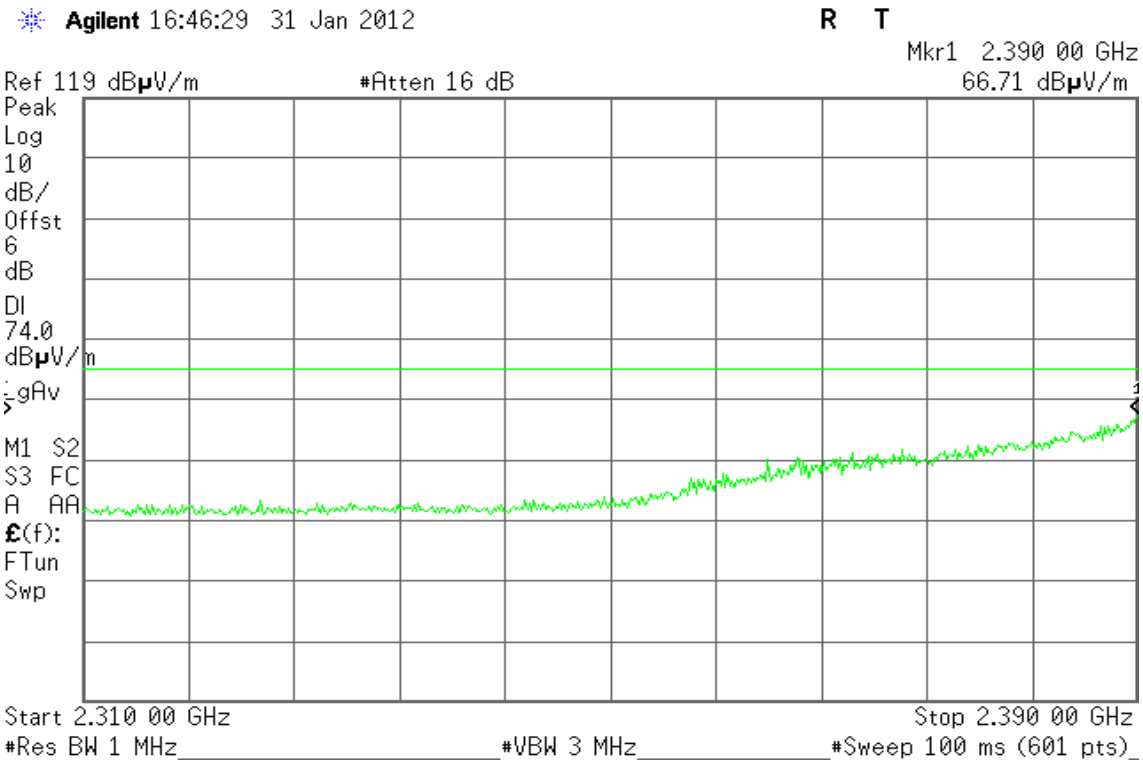
Detector mode: Peak **Polarity: Vertical**



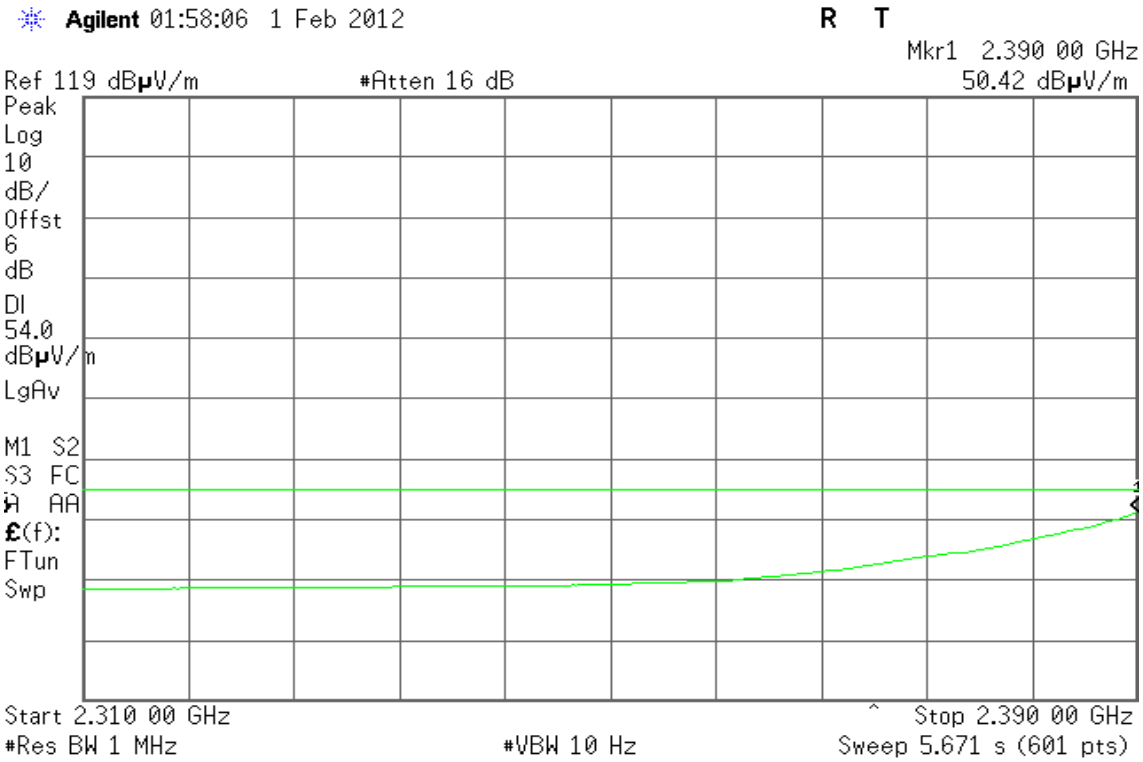
Detector mode: Average **Polarity: Vertical**



Detector mode: Peak **Polarity: Horizontal**

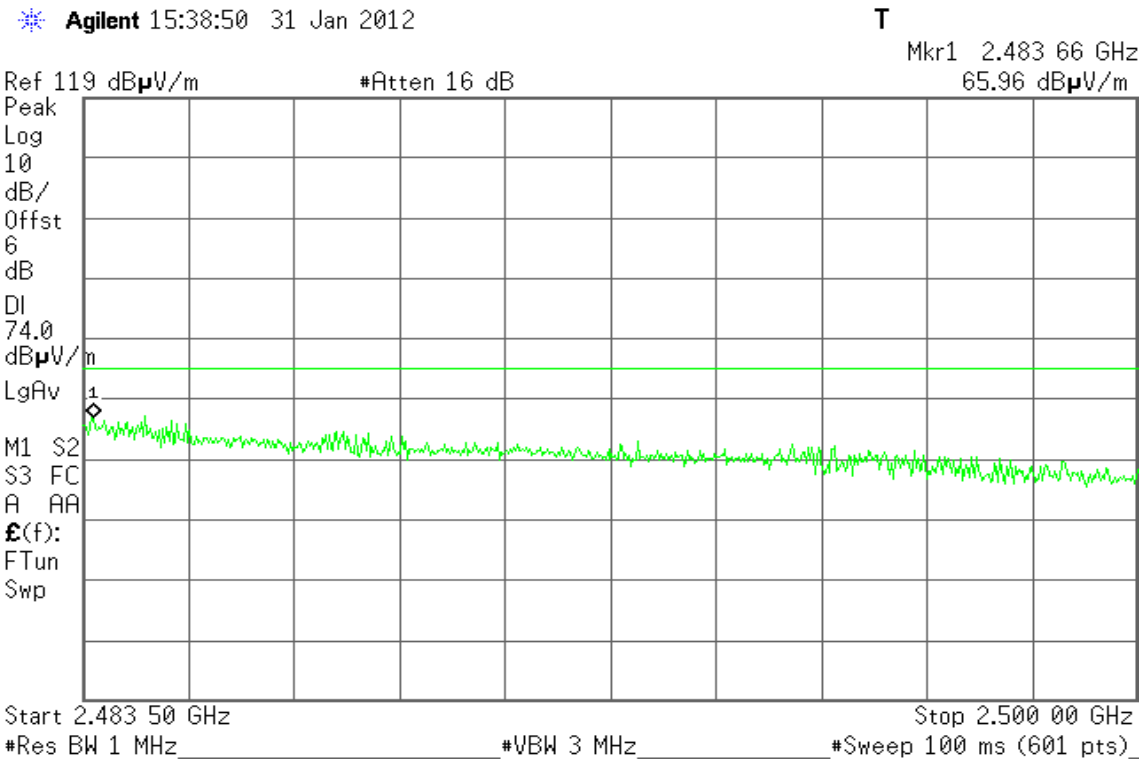


Detector mode: Average **Polarity: Horizontal**

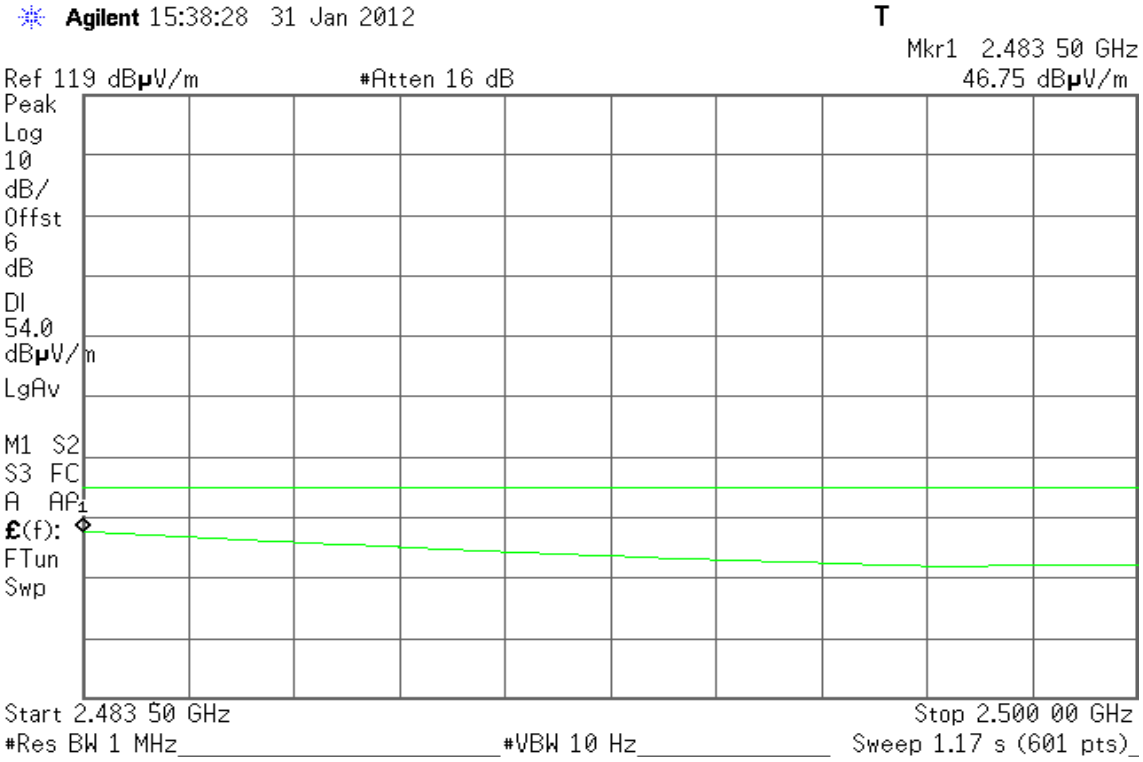


Band Edges (IEEE 802.11g mode / CH High)

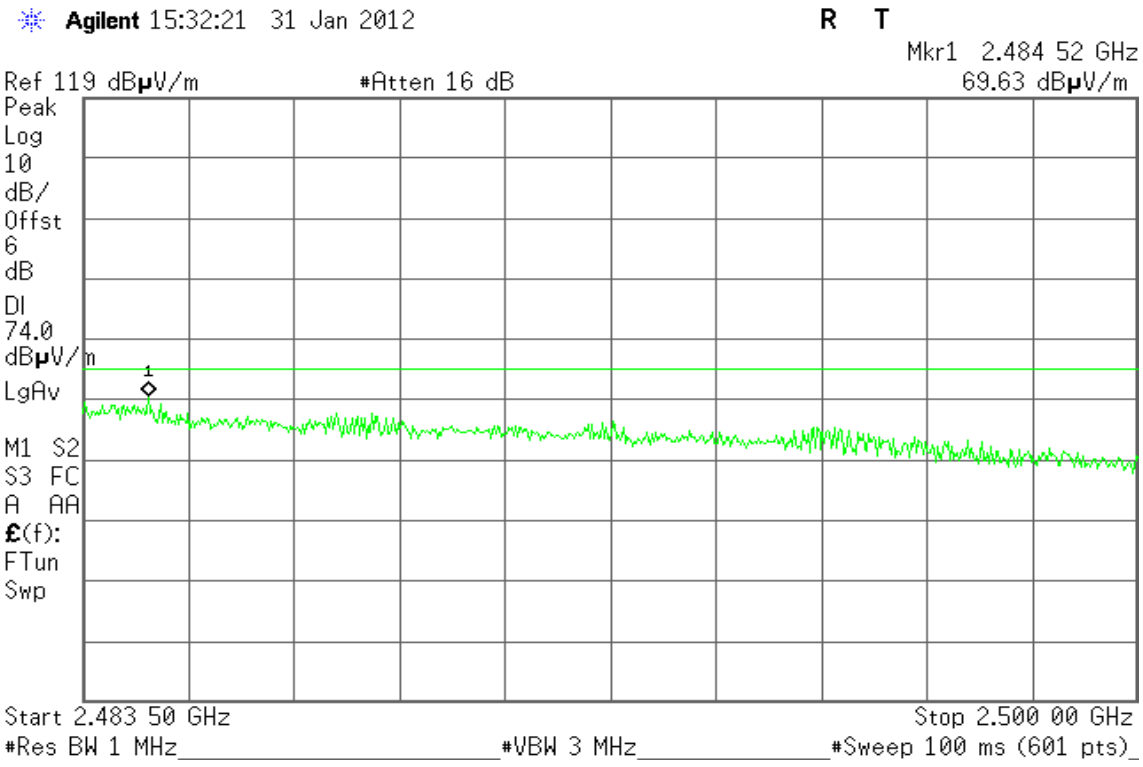
Detector mode: Peak Polarity: Vertical



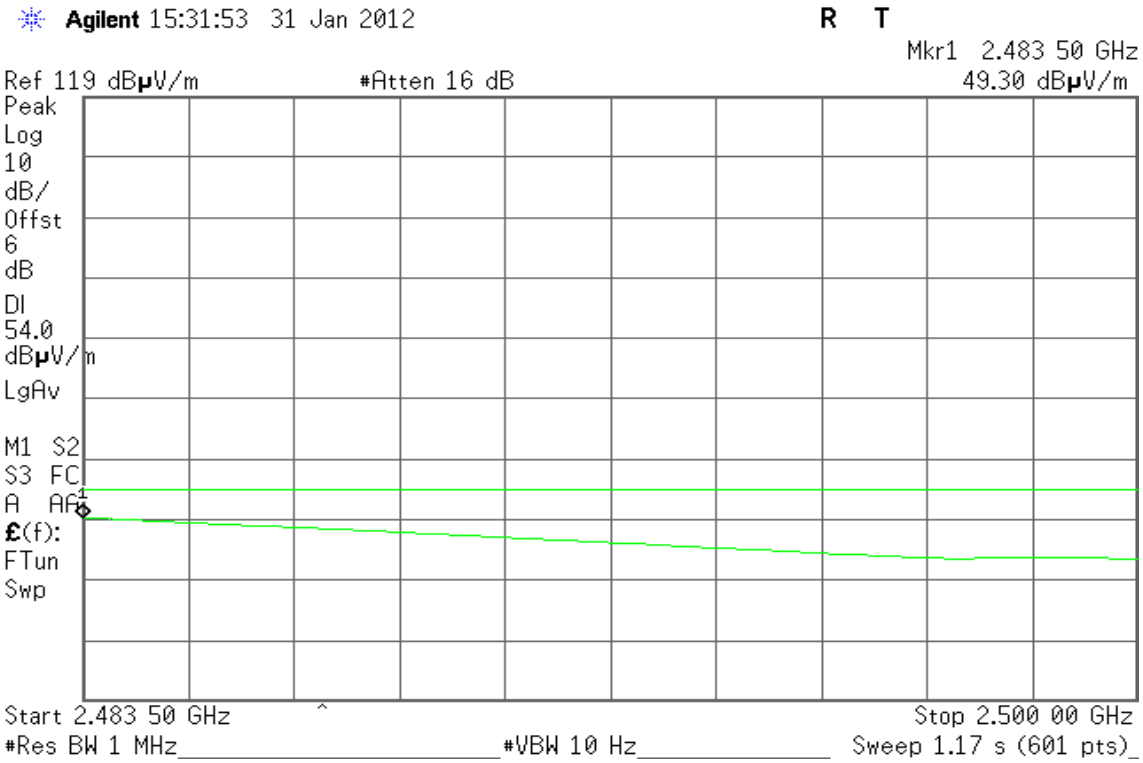
Detector mode: Average Polarity: Vertical



Detector mode: Peak **Polarity: Horizontal**

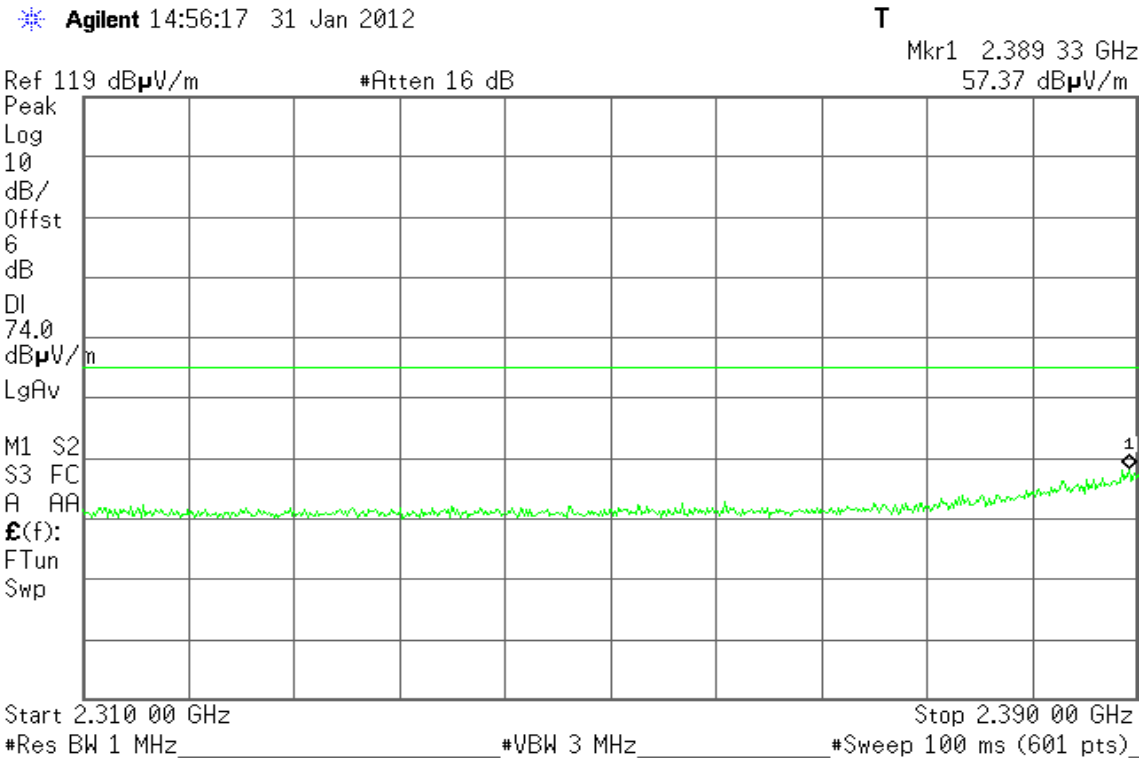


Detector mode: Average **Polarity: Horizontal**

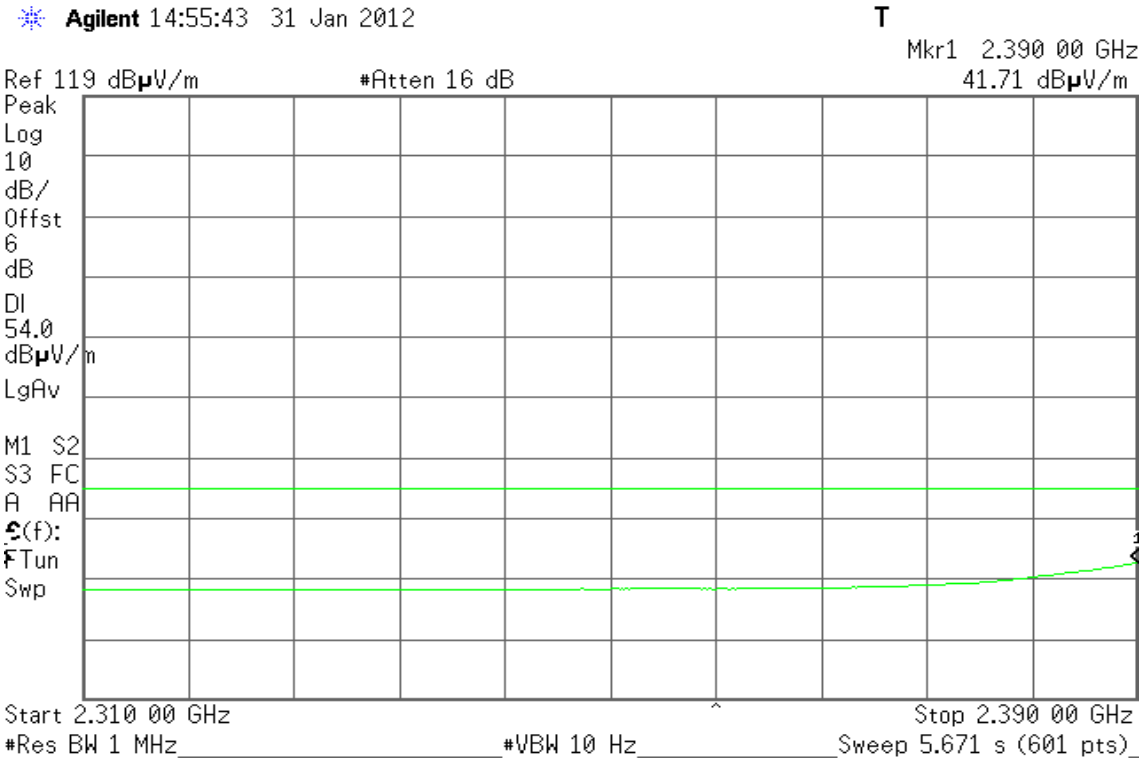


Band Edges (IEEE 802.11n HT 20 MHz mode / CH Low)

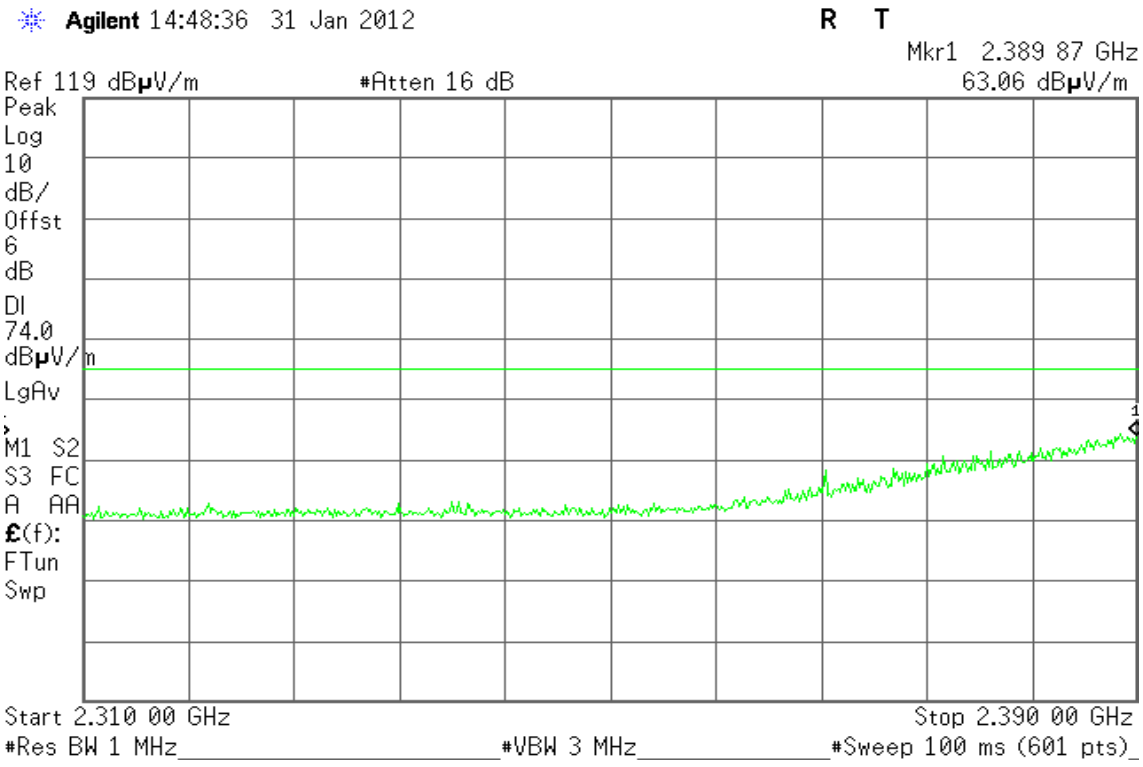
Detector mode: Peak **Polarity: Vertical**



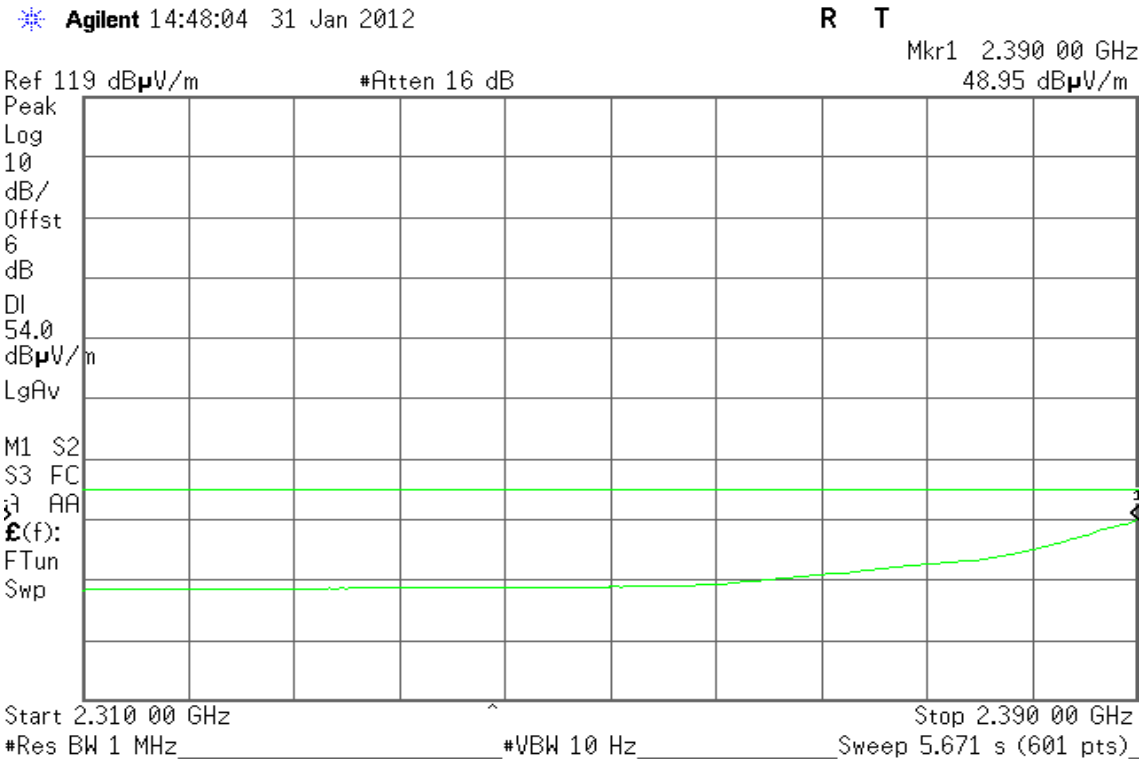
Detector mode: Average **Polarity: Vertical**



Detector mode: Peak **Polarity: Horizontal**

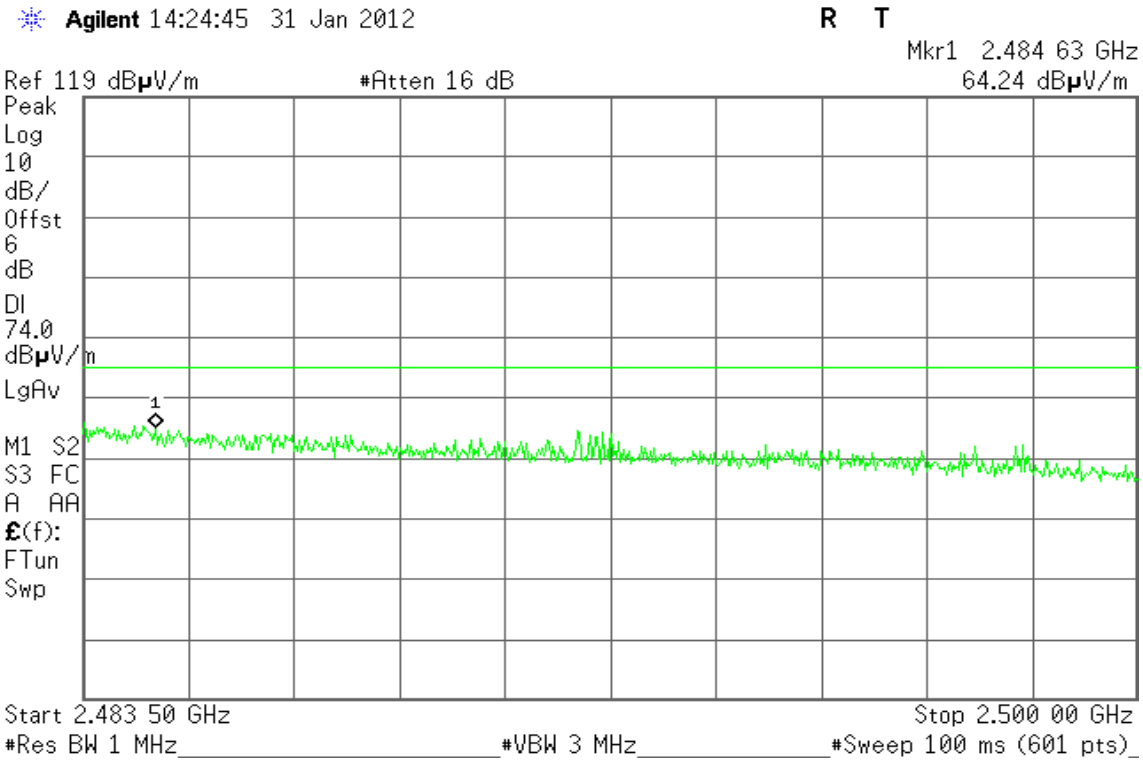


Detector mode: Average **Polarity: Horizontal**

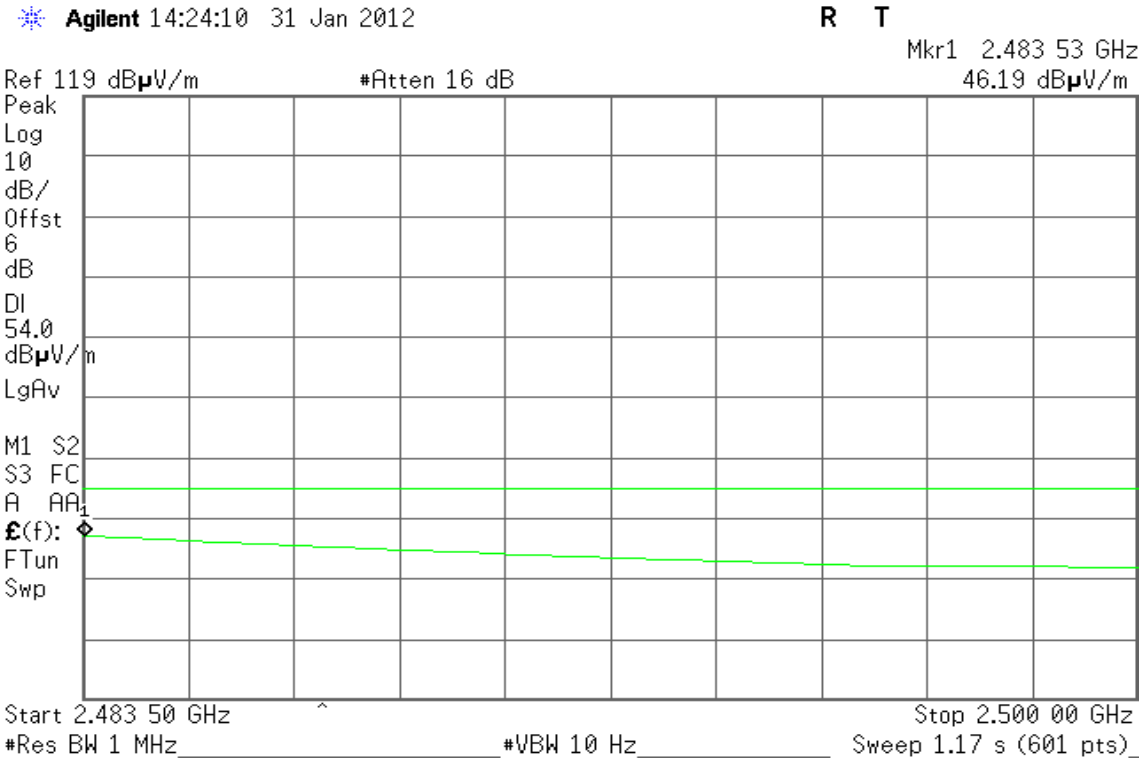


Band Edges (IEEE 802.11n HT 20 MHz mode / CH High)

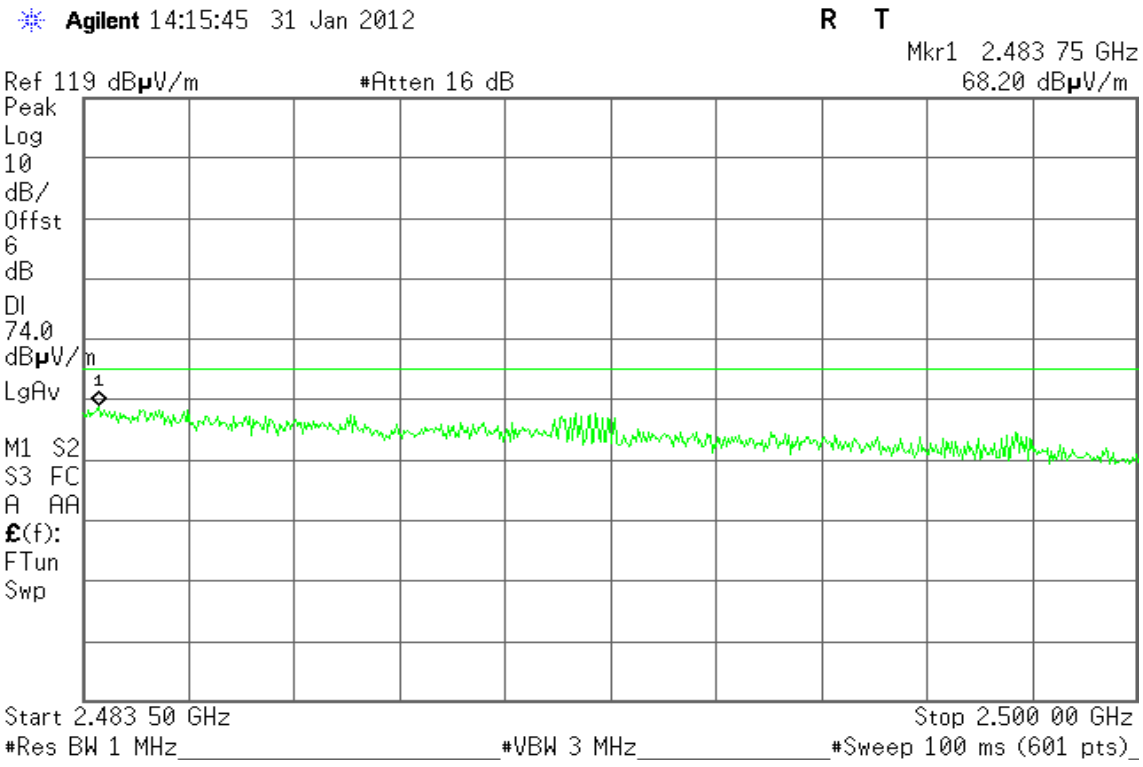
Detector mode: Peak **Polarity: Vertical**



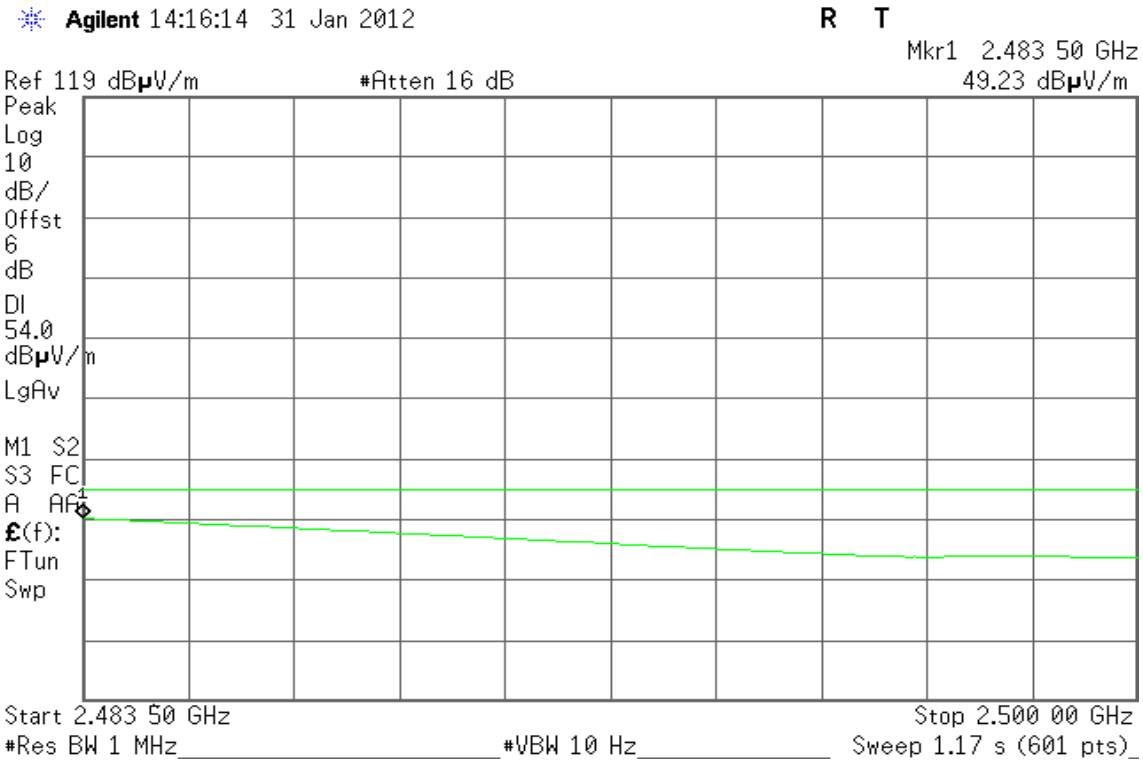
Detector mode: Average **Polarity: Vertical**



Detector mode: Peak **Polarity: Horizontal**

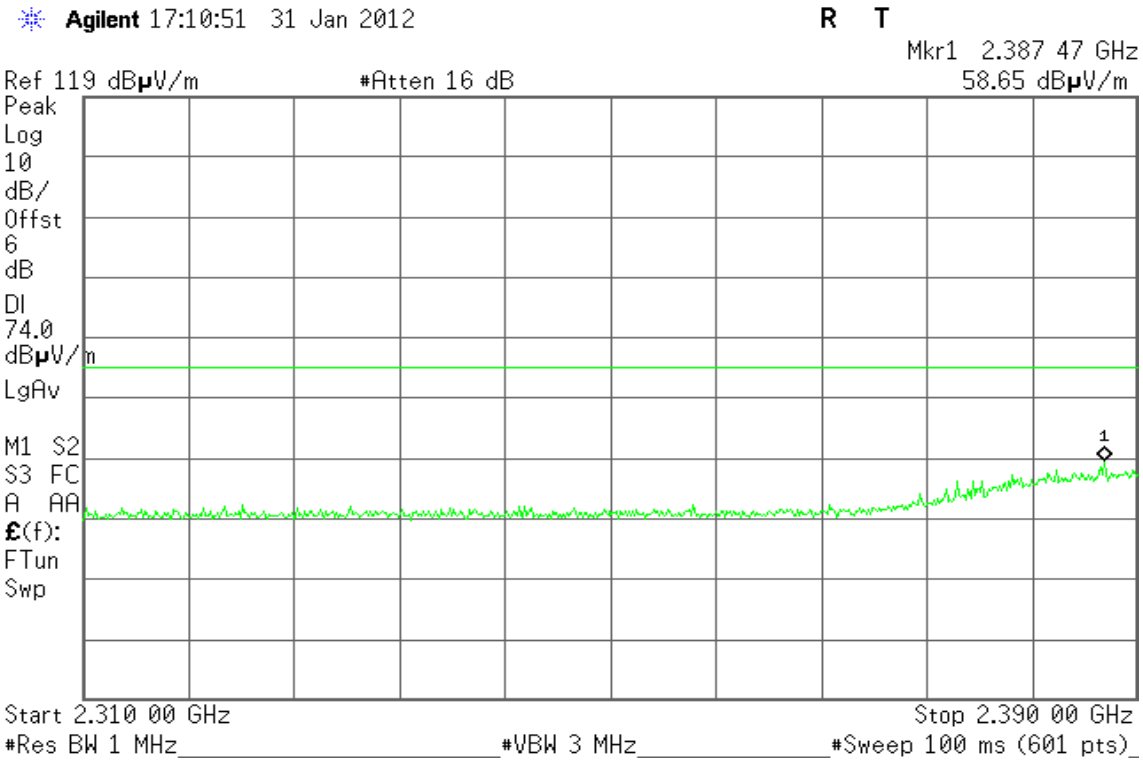


Detector mode: Average **Polarity: Horizontal**

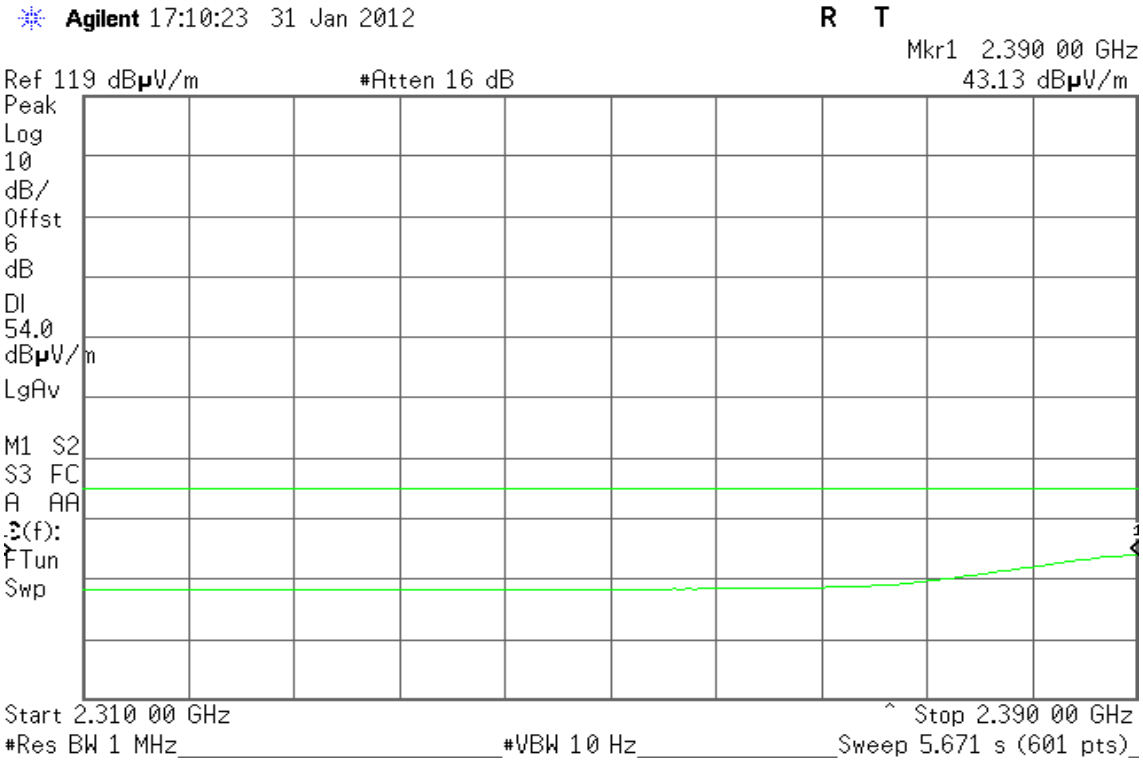


Band Edges (IEEE 802.11n HT 40 MHz mode / CH Low)

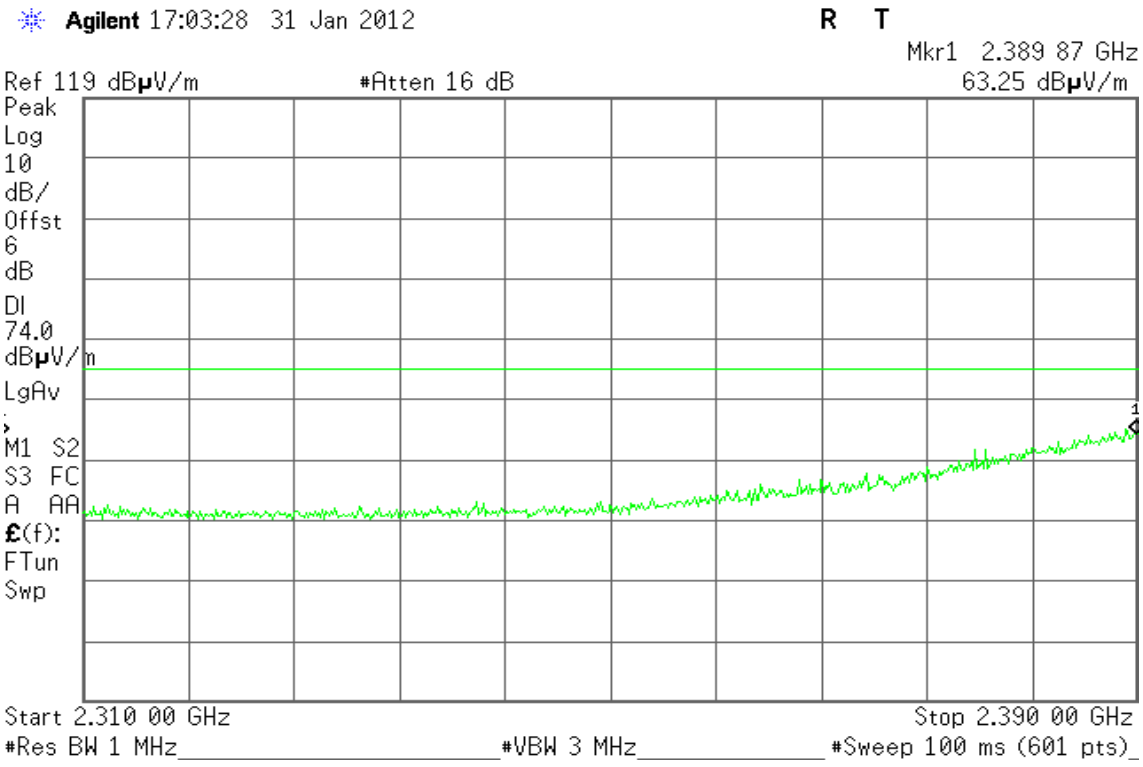
Detector mode: Peak **Polarity: Vertical**



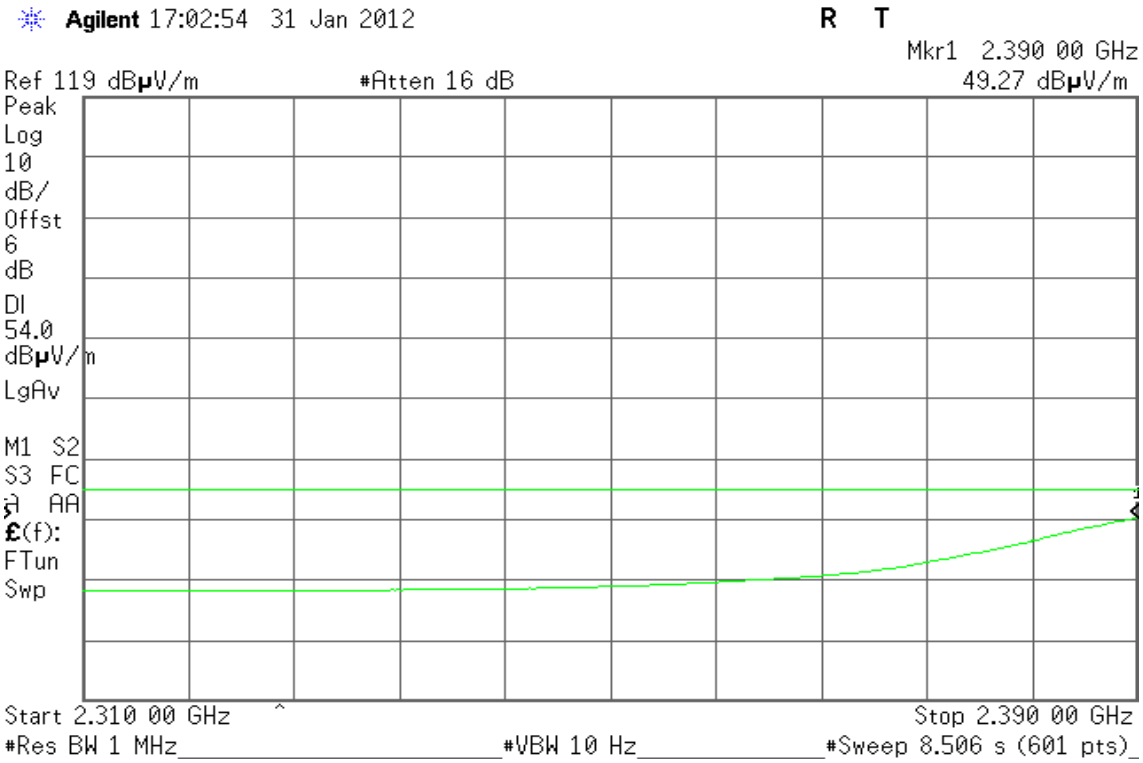
Detector mode: Average **Polarity: Vertical**



Detector mode: Peak **Polarity: Horizontal**

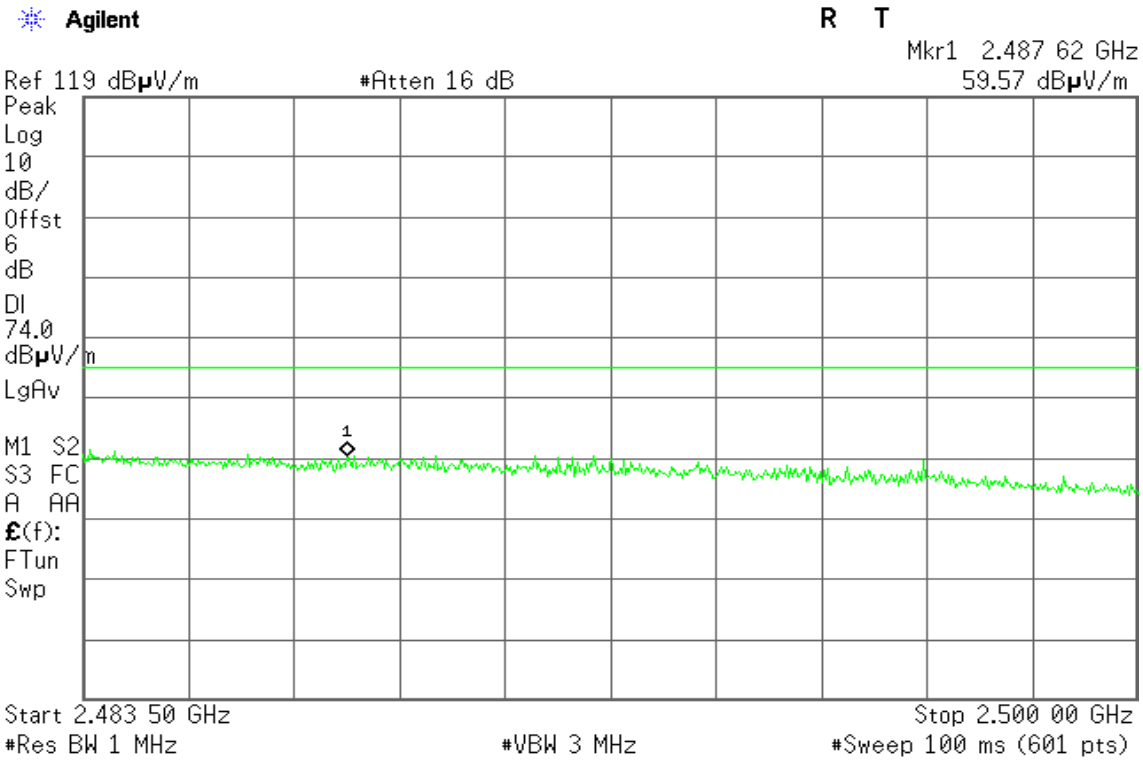


Detector mode: Average **Polarity: Horizontal**

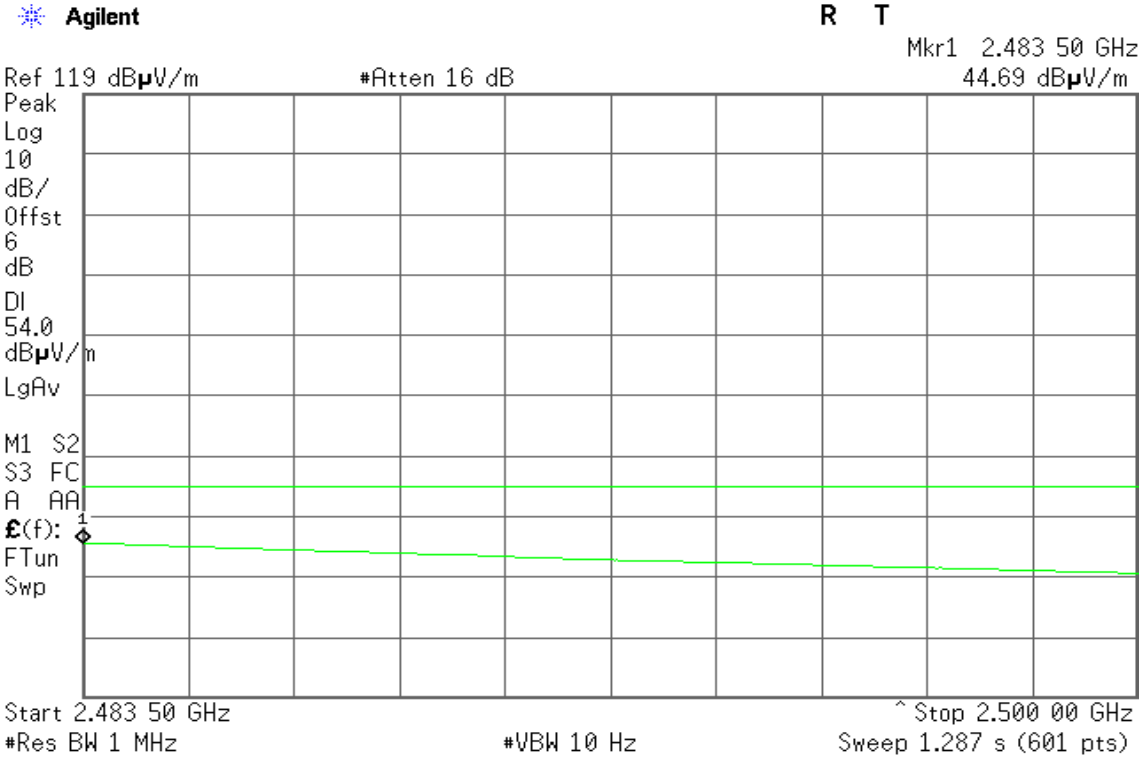


Band Edges (IEEE 802.11n HT 40 MHz mode / CH High)

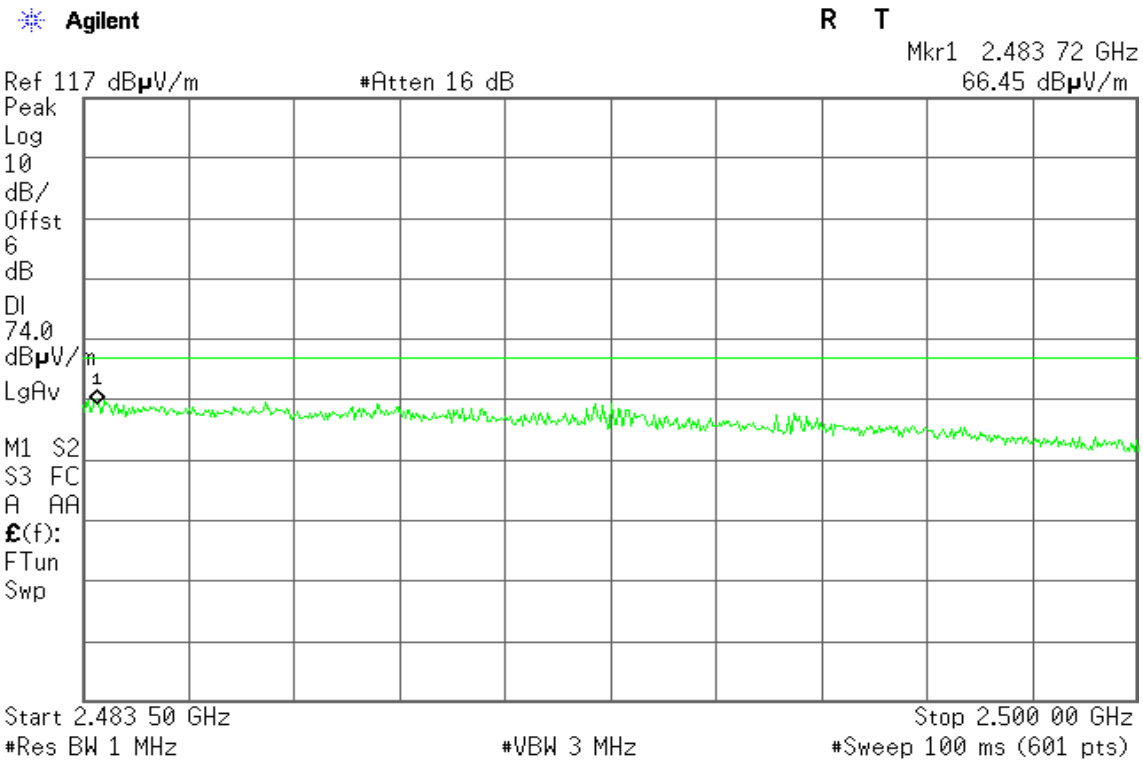
Detector mode: Peak **Polarity: Vertical**



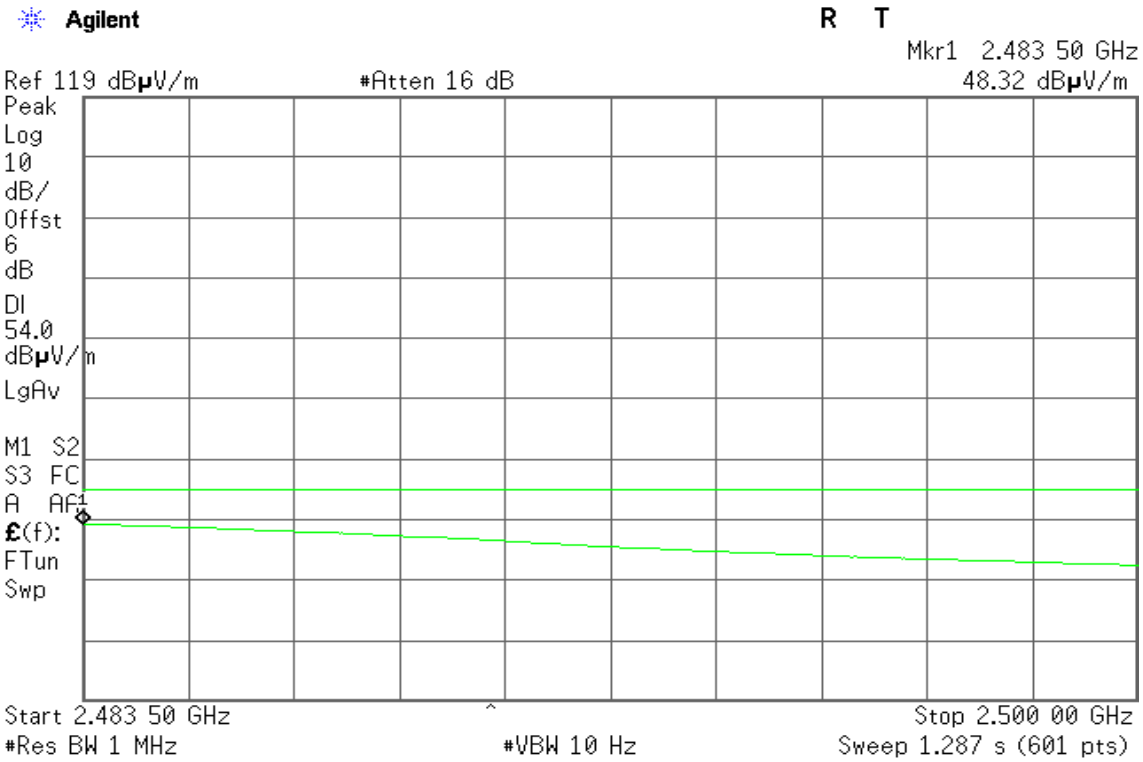
Detector mode: Average **Polarity: Vertical**



Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**



IEEE 802.11b mode / CH Low				
Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Ant. Pol. (H/V)	Note.
2389.73	52.52	74	V	PASS
2390.00	40.47	54	V	PASS
2385.87	55.44	74	H	PASS
2386.00	42.53	54	H	PASS

IEEE 802.11b mode / CH High				
Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Ant. Pol. (H/V)	Note.
2483.53	54	74	V	PASS
2483.5	40.22	54	V	PASS
2487.9	54.37	74	H	PASS
2483.94	40.94	54	H	PASS

IEEE 802.11g mode / CH Low				
Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Ant. Pol. (H/V)	Note.
2387.47	58.62	74	V	PASS
2390	44.68	54	V	PASS
2390	66.71	74	H	PASS
2390	50.42	54	H	PASS

IEEE 802.11g mode / CH High				
Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Ant. Pol. (H/V)	Note.
2483.66	65.96	74	V	PASS
2483.5	46.75	54	V	PASS
2484.52	69.63	74	H	PASS
2483.5	49.3	54	H	PASS

IEEE 802.11n HT 20 MHz mode / CH Low				
Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Ant. Pol. (H/V)	Note.
2389.33	57.37	74	V	PASS
2390	41.71	54	V	PASS
2389.87	63.06	74	H	PASS
2390	48.95	54	H	PASS

IEEE 802.11n HT 20 MHz mode / CH High				
Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Ant. Pol. (H/V)	Note.
2484.63	64.24	74	V	PASS
2483.53	46.19	54	V	PASS
2483.75	68.2	74	H	PASS
2483.5	49.23	54	H	PASS

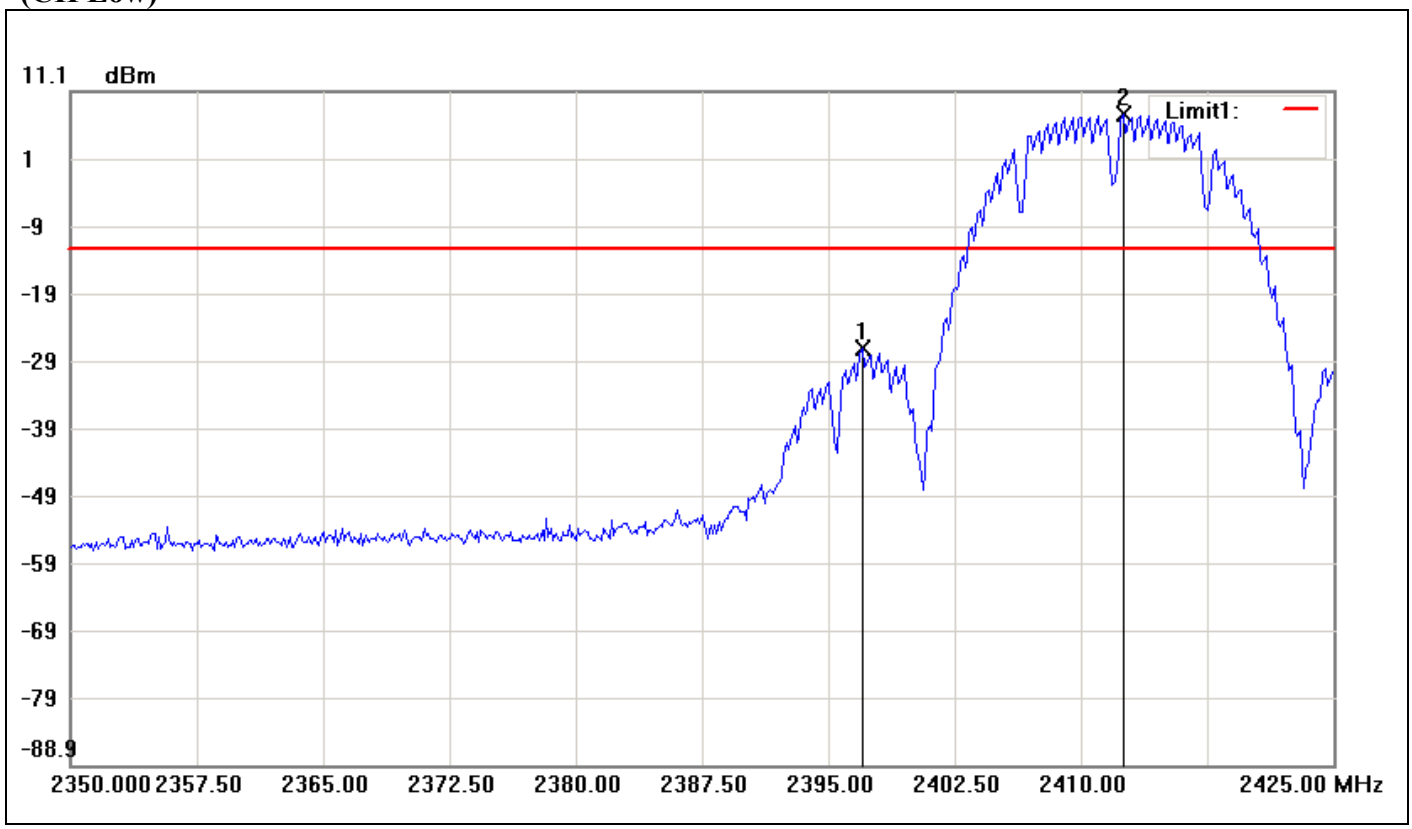
IEEE 802.11n HT 40 MHz mode / CH Low				
Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Ant. Pol. (H/V)	Note.
2387.47	58.65	74	V	PASS
2390	43.13	54	V	PASS
2389.87	63.25	74	H	PASS
2390	49.27	54	H	PASS

IEEE 802.11n HT 40 MHz mode / CH High				
Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Ant. Pol. (H/V)	Note.
2487.62	59.57	74	V	PASS
2483.5	44.69	54	V	PASS
2483.72	66.45	74	H	PASS
2483.5	48.32	54	H	PASS

Conducted Bandedge

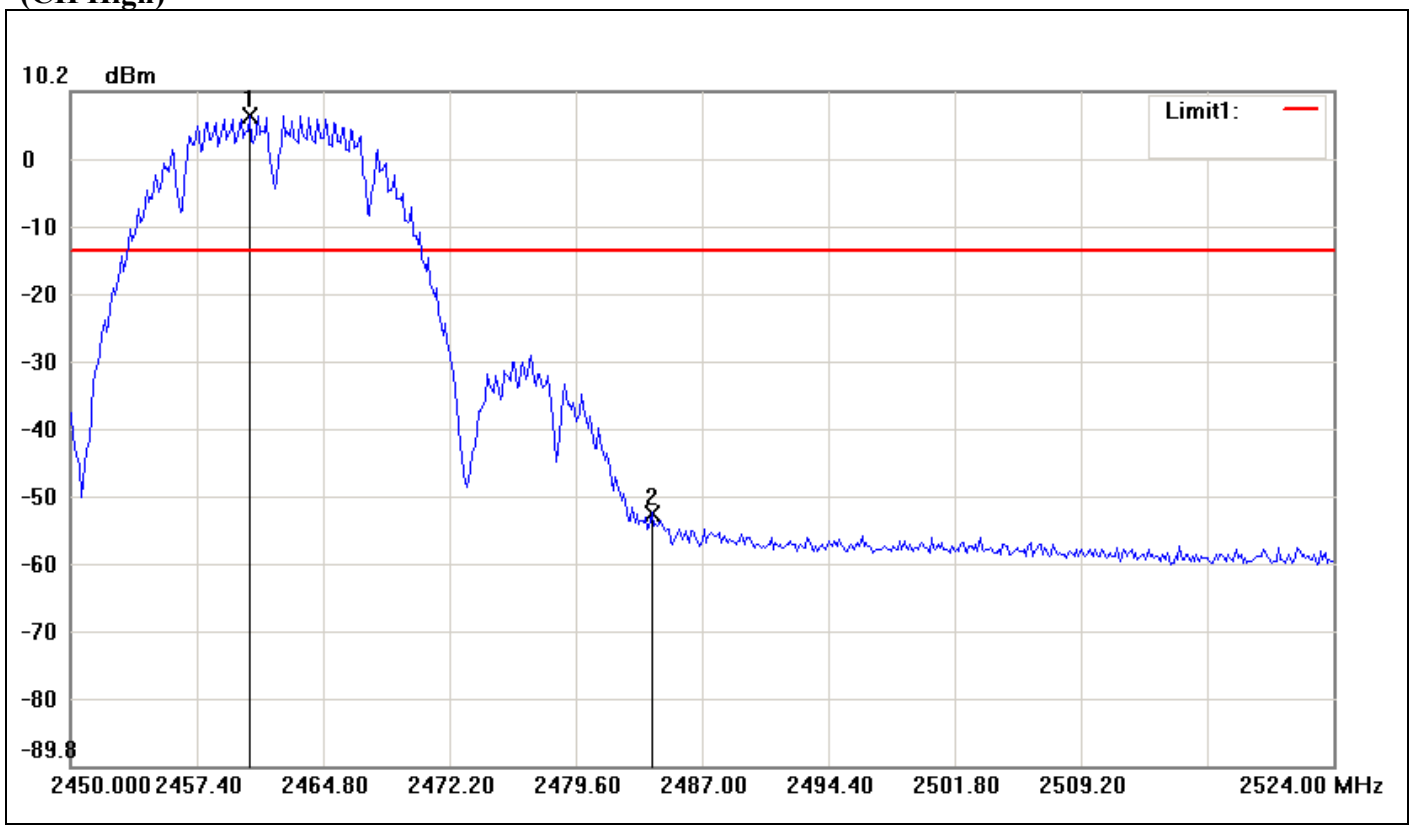
IEEE 802.11b mode:

(CH Low)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2397.0000	-27.10	-12.39	-14.71
2	2412.5000	7.61	-12.39	20.00

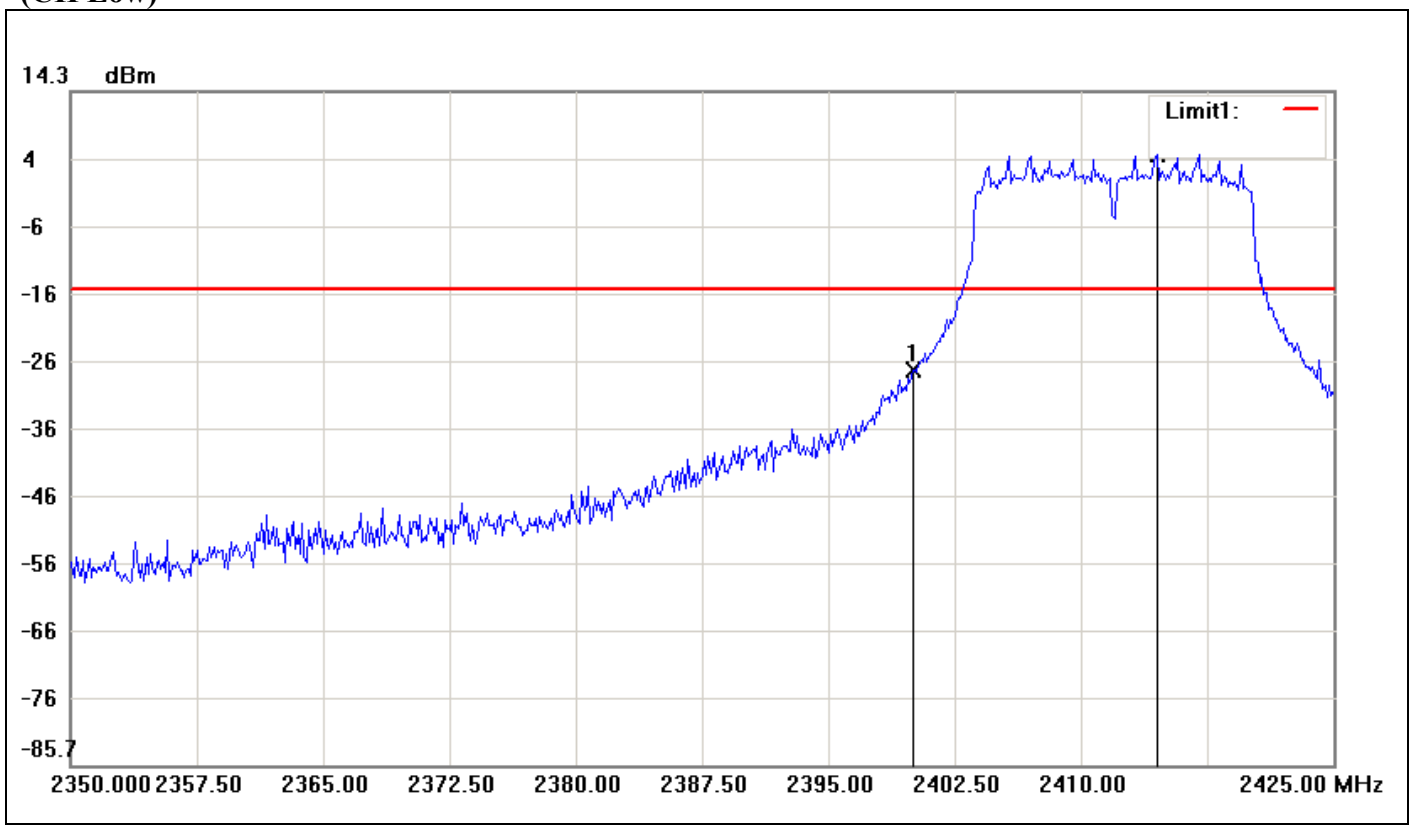
(CH High)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2460.4833	6.61	-13.39	20.00
2	2484.0400	-52.34	-13.39	-38.95

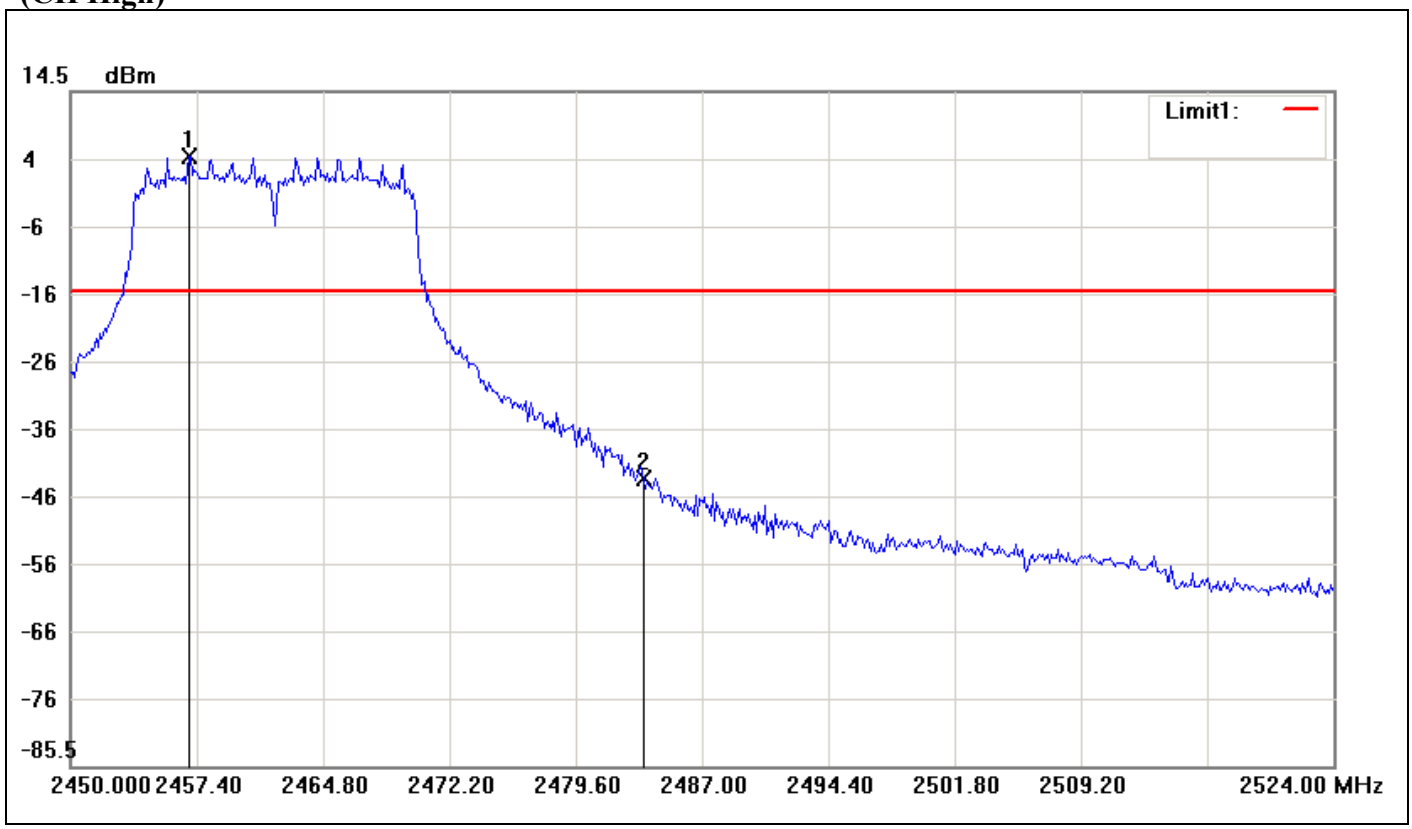
IEEE 802.11g mode:

(CH Low)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2400.0000	-27.10	-15.08	-12.02
2	2414.5000	4.92	-15.08	20.00

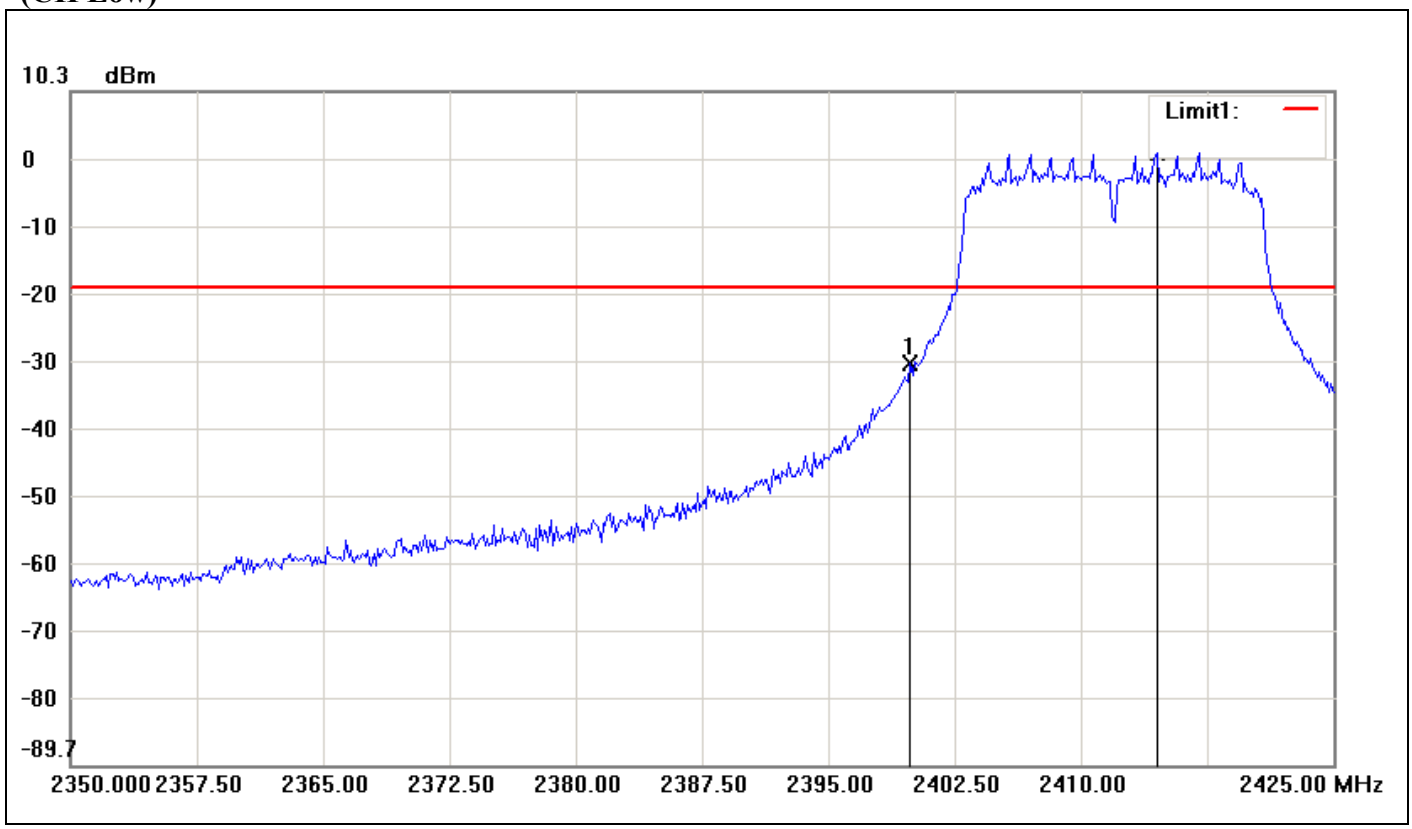
(CH High)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2456.9067	4.80	-15.20	20.00
2	2483.5467	-42.92	-15.20	-27.72

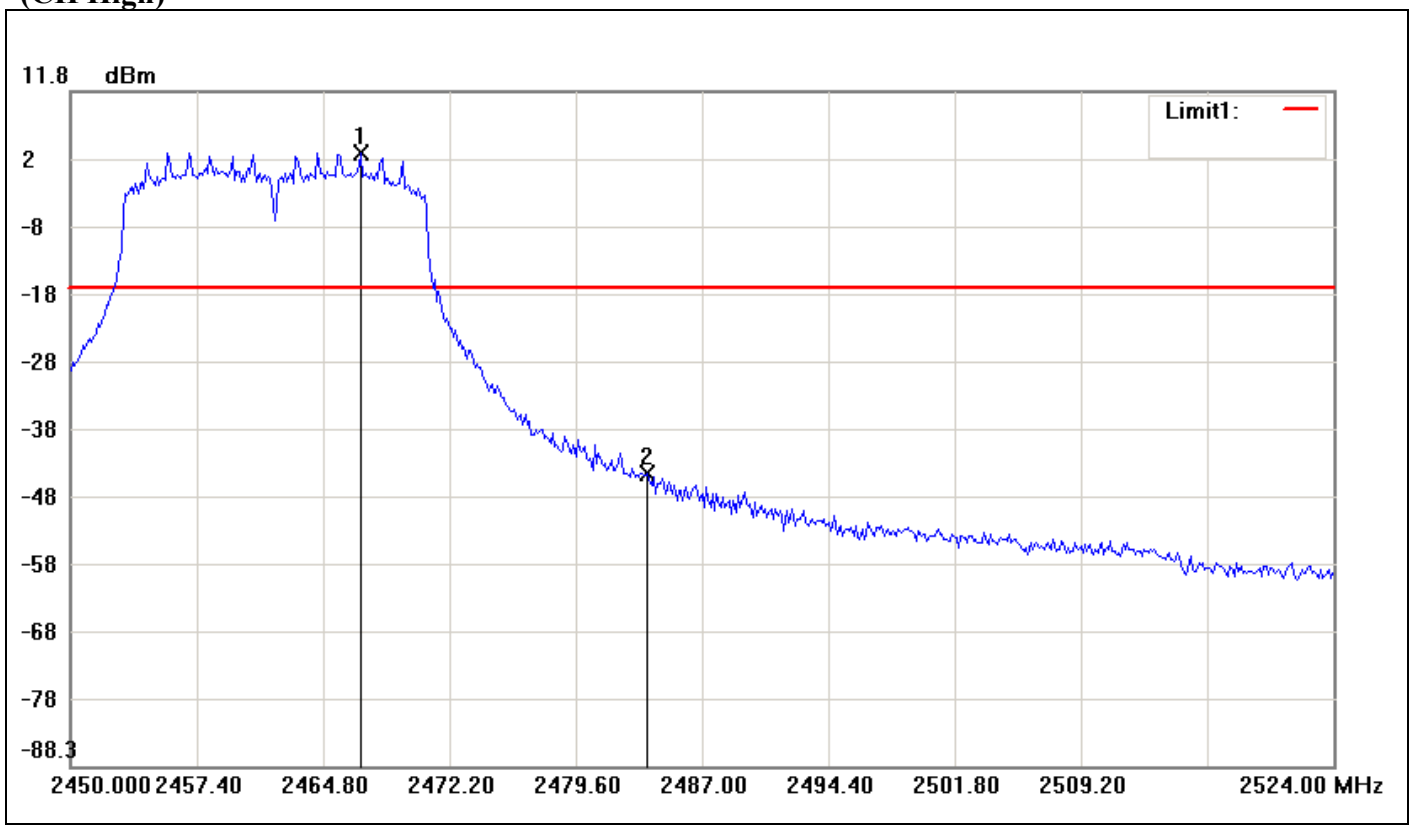
IEEE 802.11n HT 20 MHz mode:

(CH Low)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2399.8750	-30.05	-18.88	-11.17
2	2414.5000	1.12	-18.88	20.00

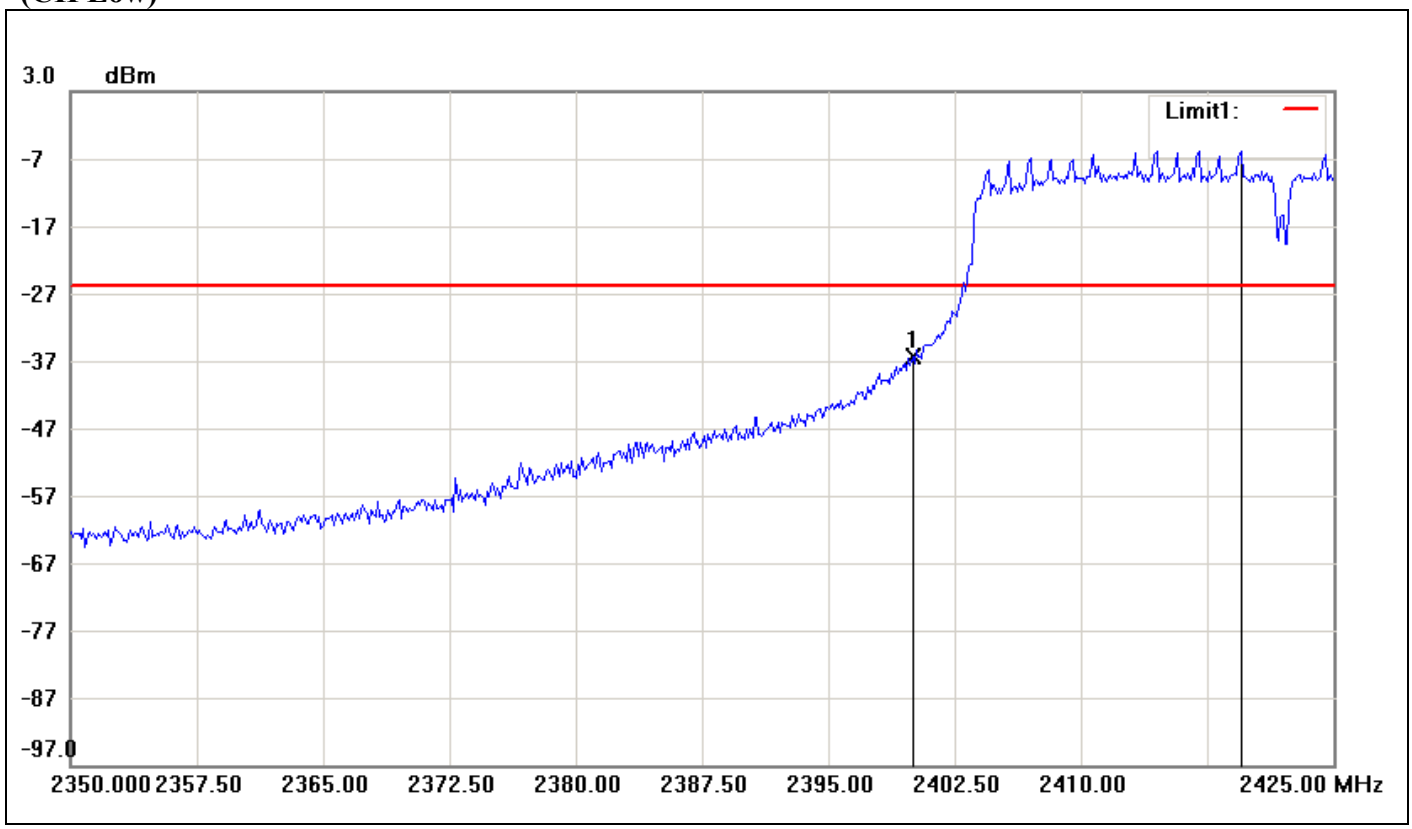
(CH High)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2467.0200	2.74	-17.26	20.00
2	2483.7933	-44.80	-17.26	-27.54

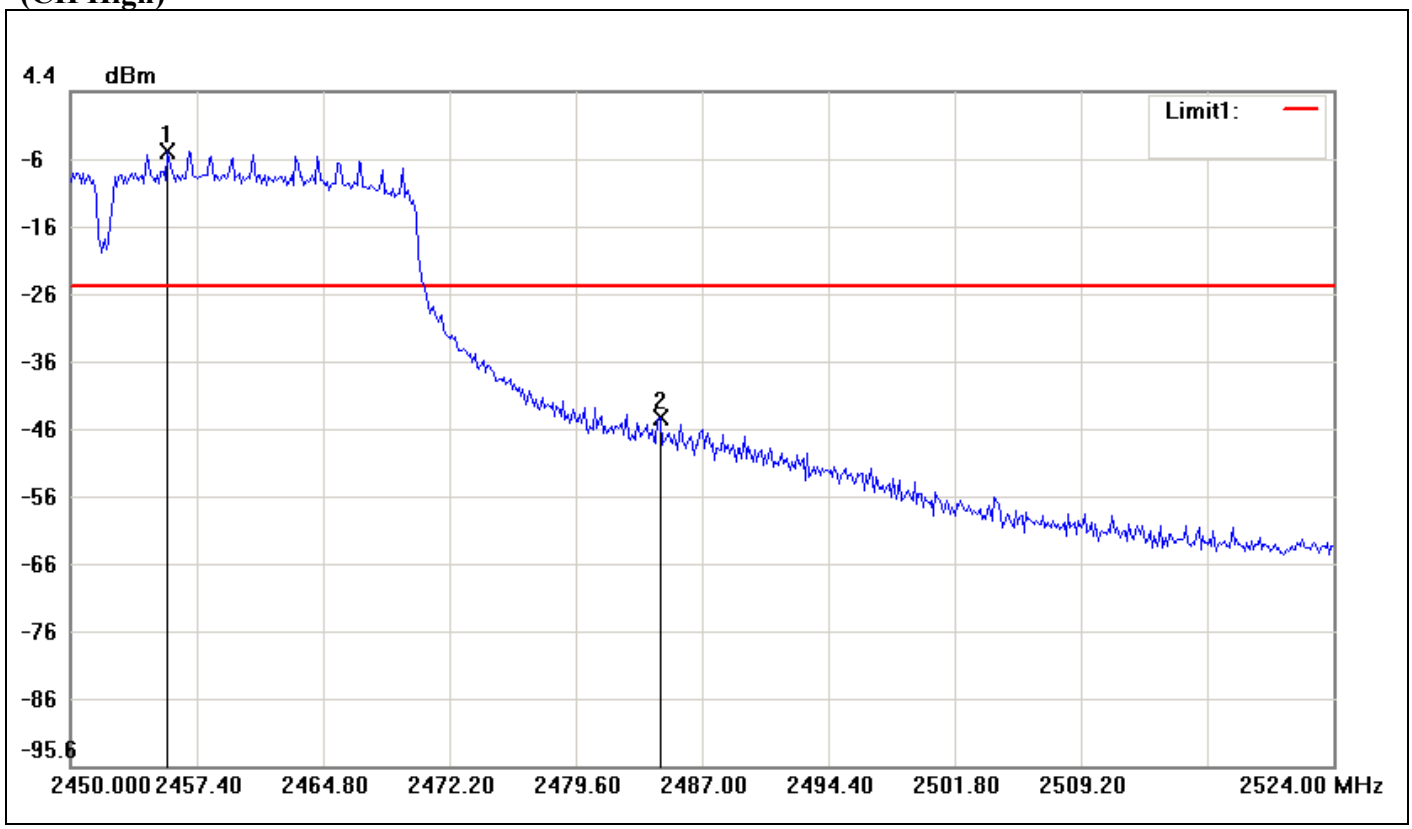
IEEE 802.11n HT 40 MHz mode:

(CH Low)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2400.0000	-36.28	-25.71	-10.57
2	2419.5000	-5.71	-25.71	20.00

(CH High)



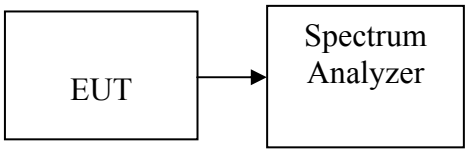
No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2455.6733	-4.54	-24.54	20.00
2	2484.5333	-44.08	-24.54	-19.54

7.4 PEAK POWER SPECTRAL DENSITY

LIMIT

1. According to §15.247(e), for digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.
2. According to §15.247(f), the digital modulation operation of the hybrid system, with the frequency hopping turned off, shall comply with the power density requirements of paragraph (d) of this section.

Test Configuration



TEST PROCEDURE

According to KDB 558074 DTS Meas Guidance C63.10 6.11.2

1. Place the EUT on the table and set it in transmitting mode.
   Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set the spectrum analyzer as RBW = 3 kHz, VBW = 10 kHz, Span = 300 kHz, Sweep time = 100 s
3. Record the max reading.
4. Repeat the above procedure until the measurements for all frequencies are completed.

TEST RESULTS

No non-compliance noted

Test Data

For Monopole Antenna

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-6.87	8.00	PASS
Mid	2442	-7.04		PASS
High	2462	-6.80		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-11.16	8.00	PASS
Mid	2442	-6.62		PASS
High	2462	-8.62		PASS

Test mode: IEEE 802.11n HT 20 MHz mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-11.97	8.00	PASS
Mid	2442	-6.92		PASS
High	2462	-10.65		PASS

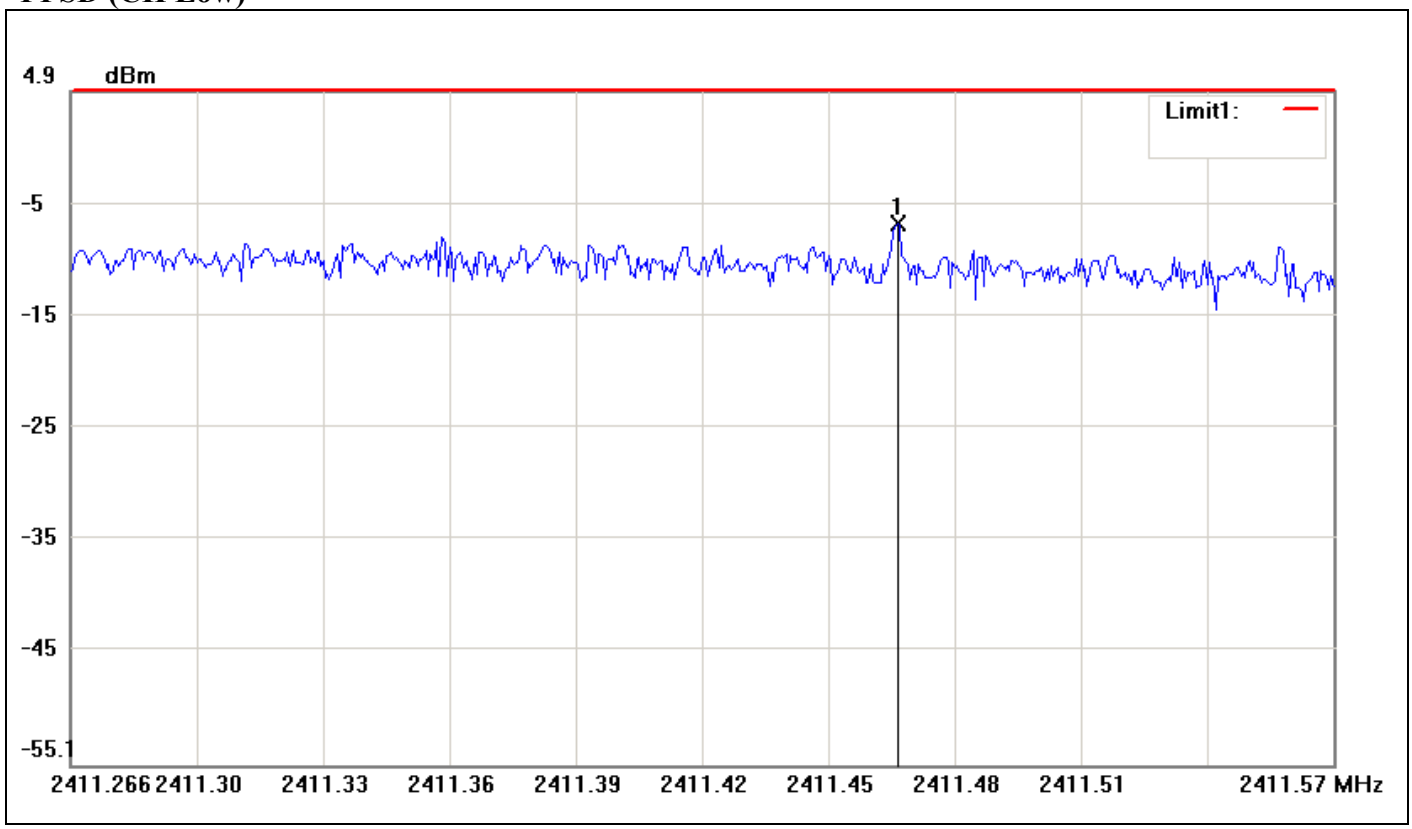
Test mode: IEEE 802.11n HT 40 MHz mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2422	-18.82	8.00	PASS
Mid	2442	-14.88		PASS
High	2452	-17.88		PASS

Test Plot

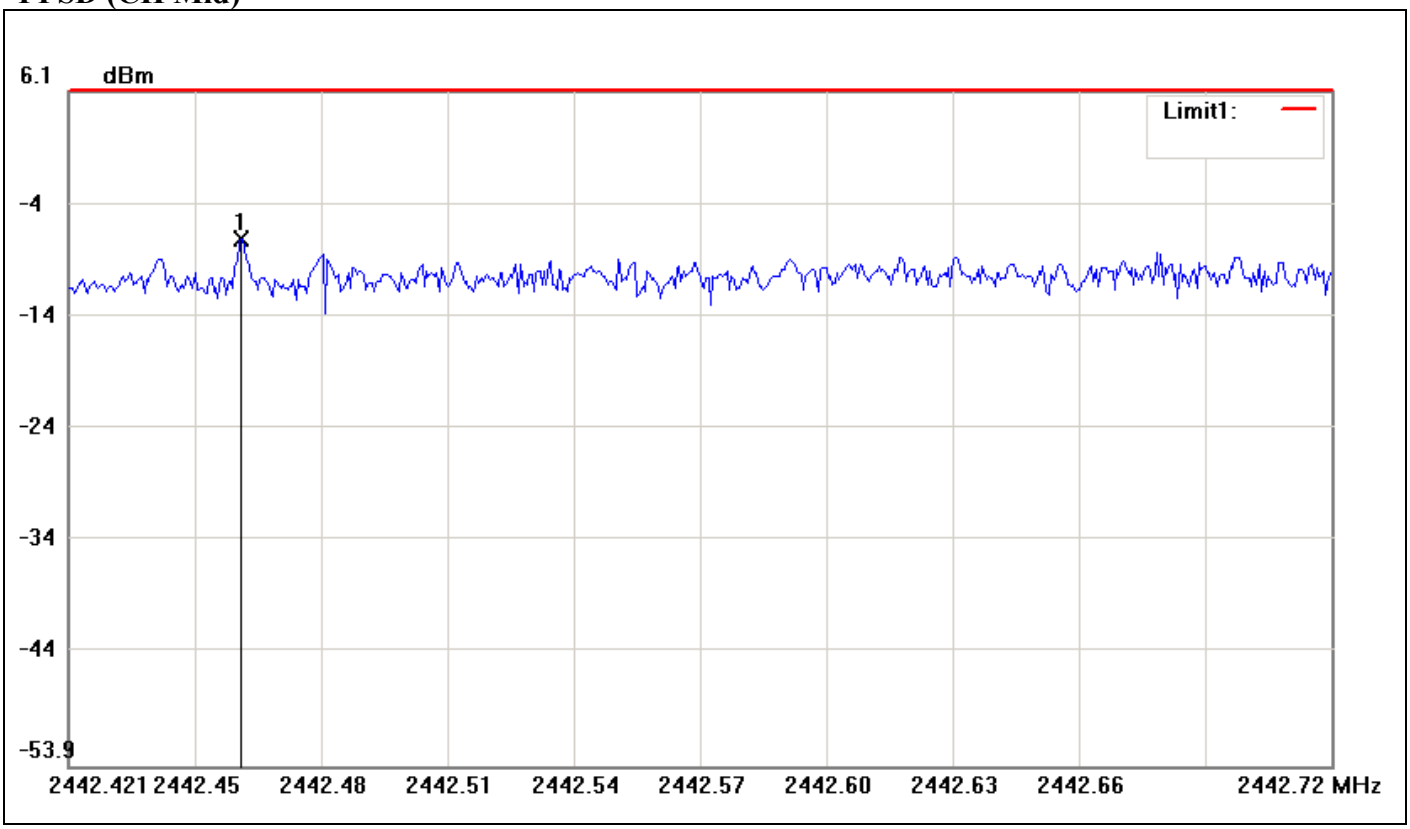
IEEE 802.11b mode

PPSD (CH Low)



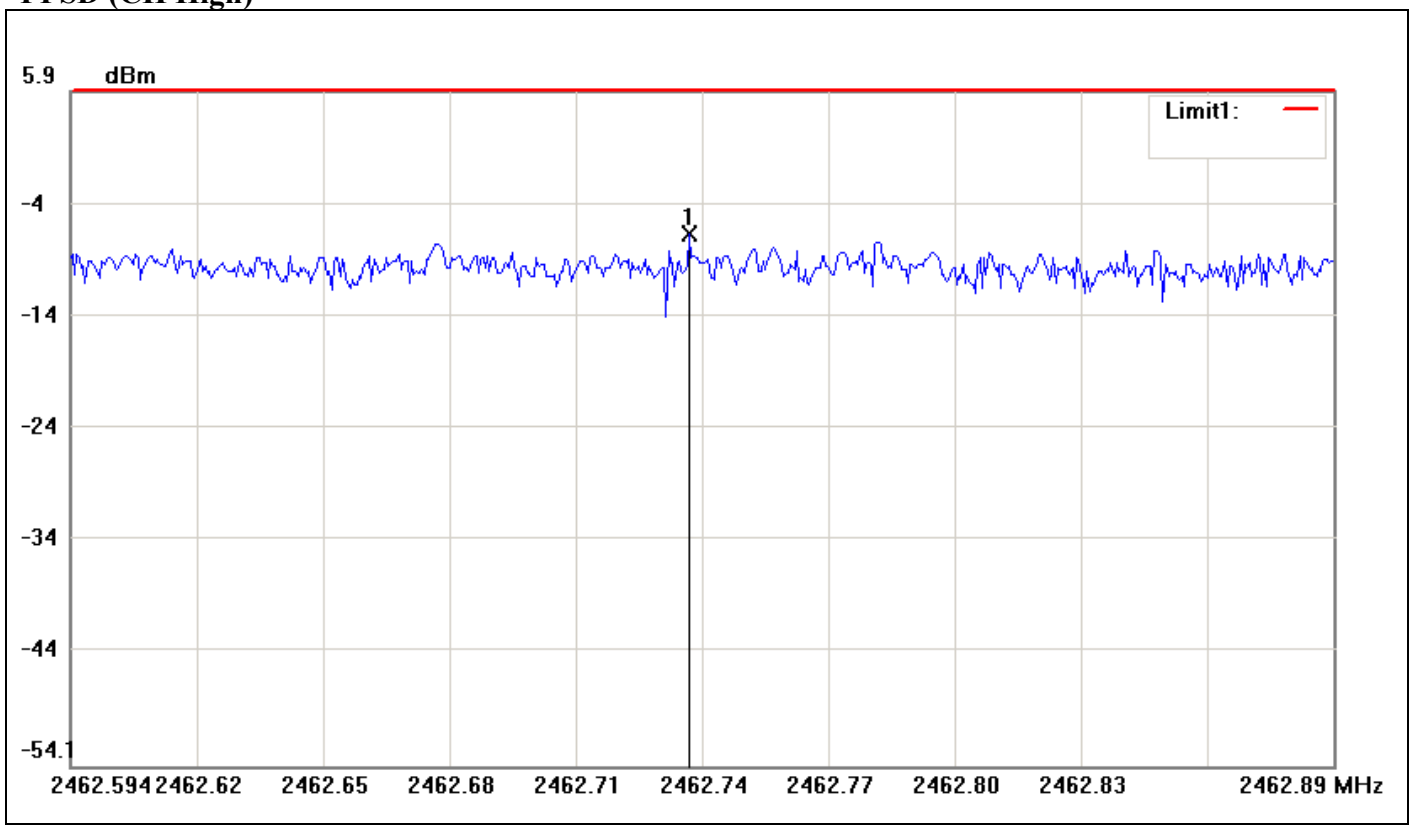
No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2411.4624	-6.87	8.00	-14.87

PPSD (CH Mid)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2442.4623	-7.04	8.00	-15.04

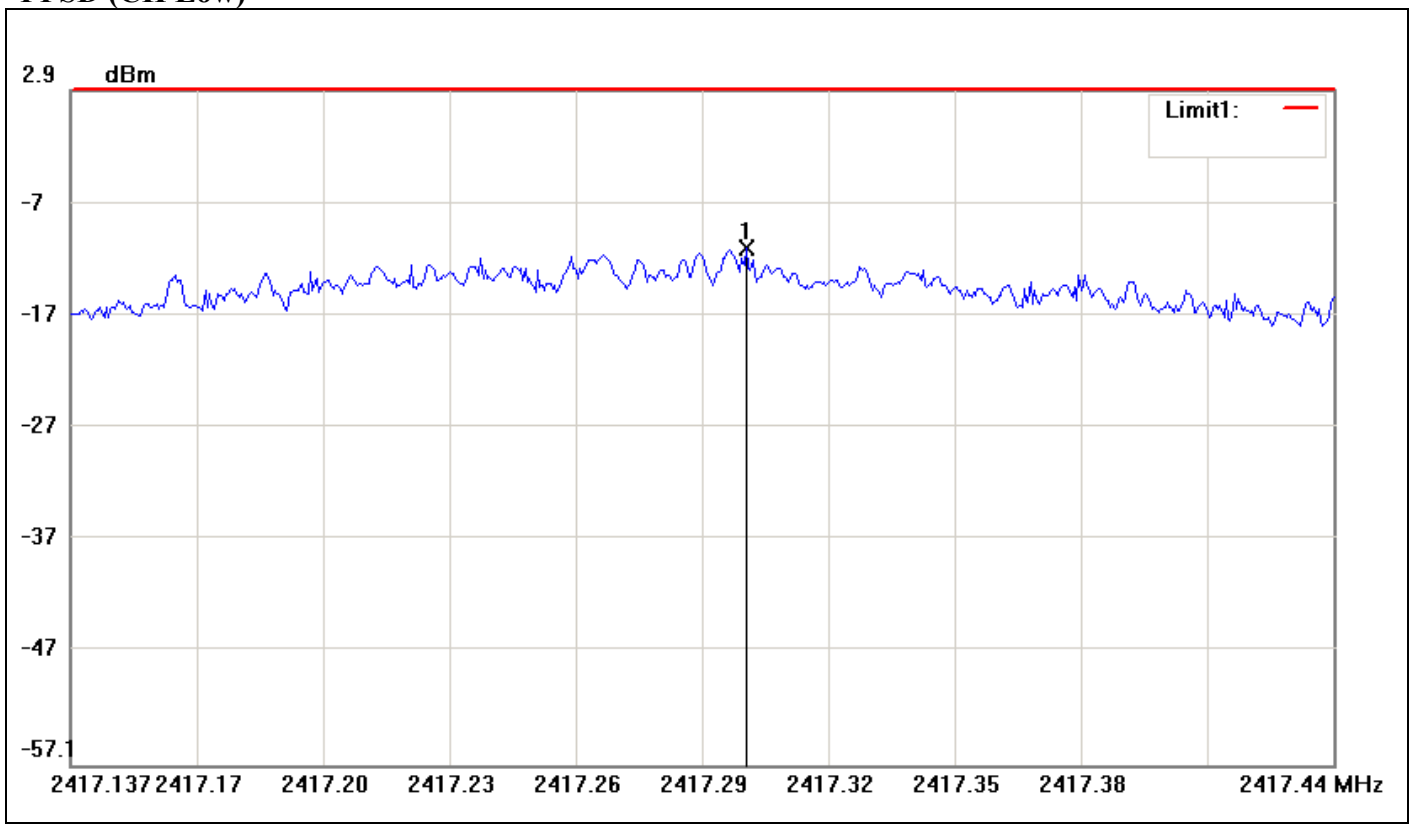
PPSD (CH High)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2462.7406	-6.80	8.00	-14.80

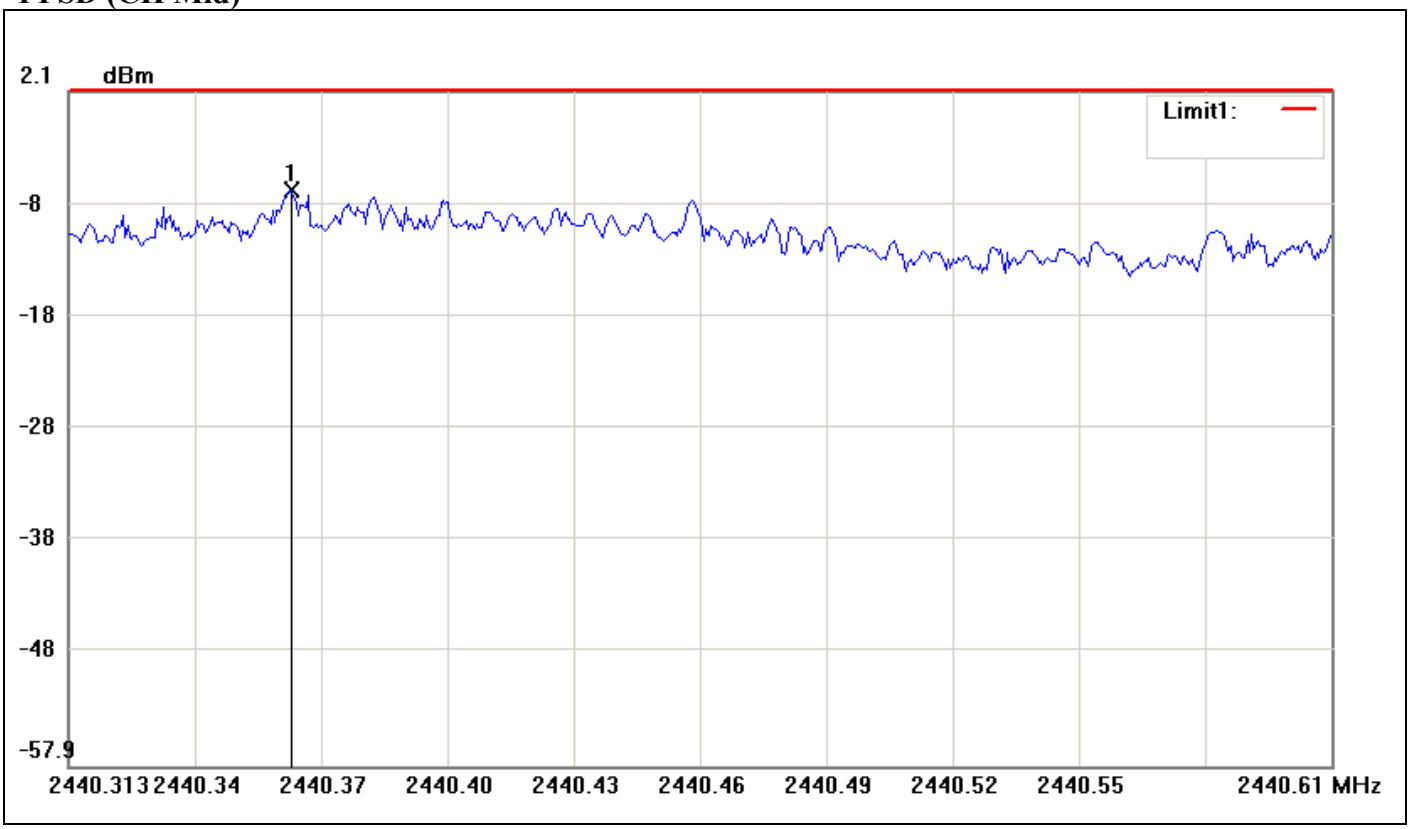
IEEE 802.11g mode

PPSD (CH Low)



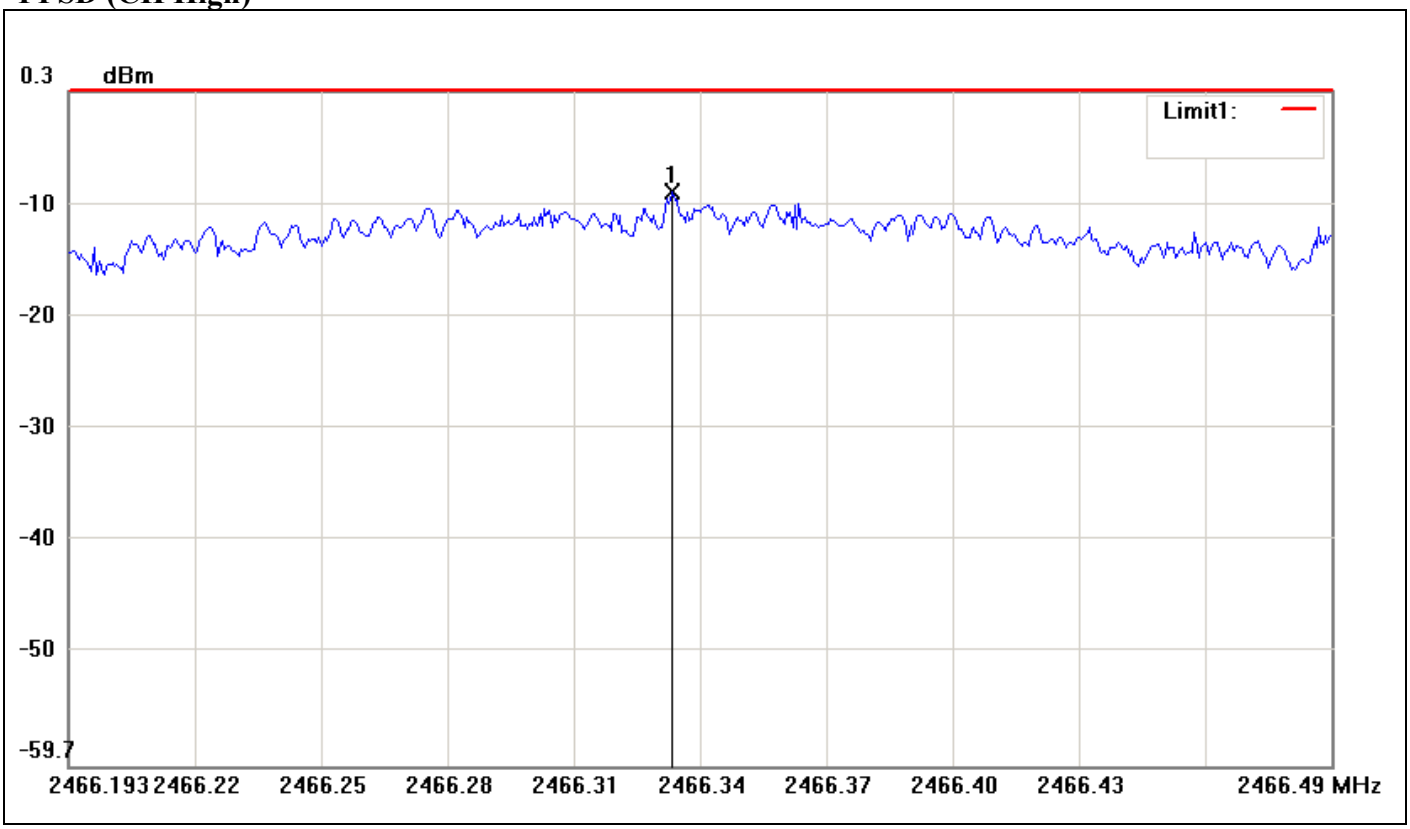
No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2417.2973	-11.16	8.00	-19.16

PPSD (CH Mid)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2440.3664	-6.62	8.00	-14.62

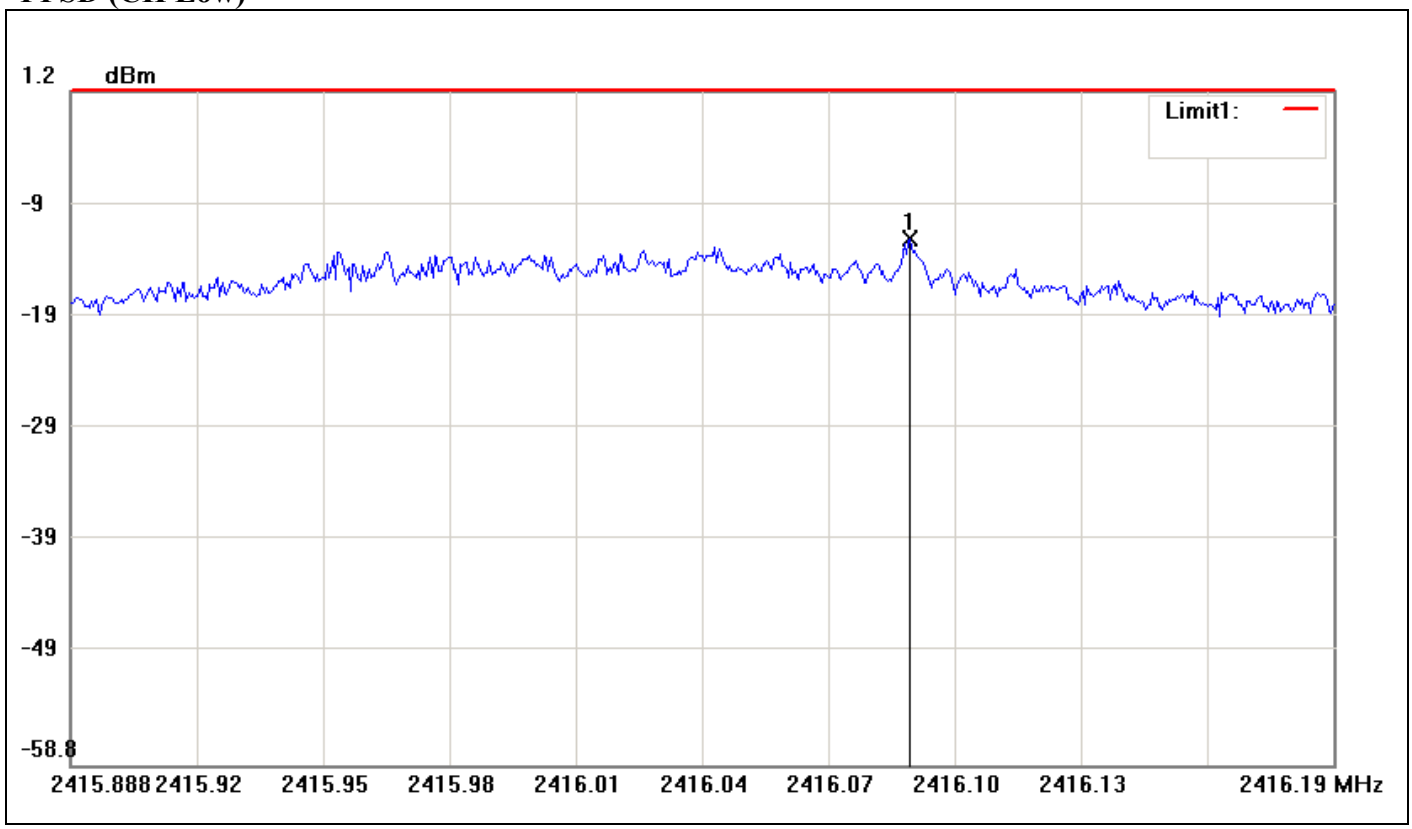
PPSD (CH High)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2466.3367	-8.62	8.00	-16.62

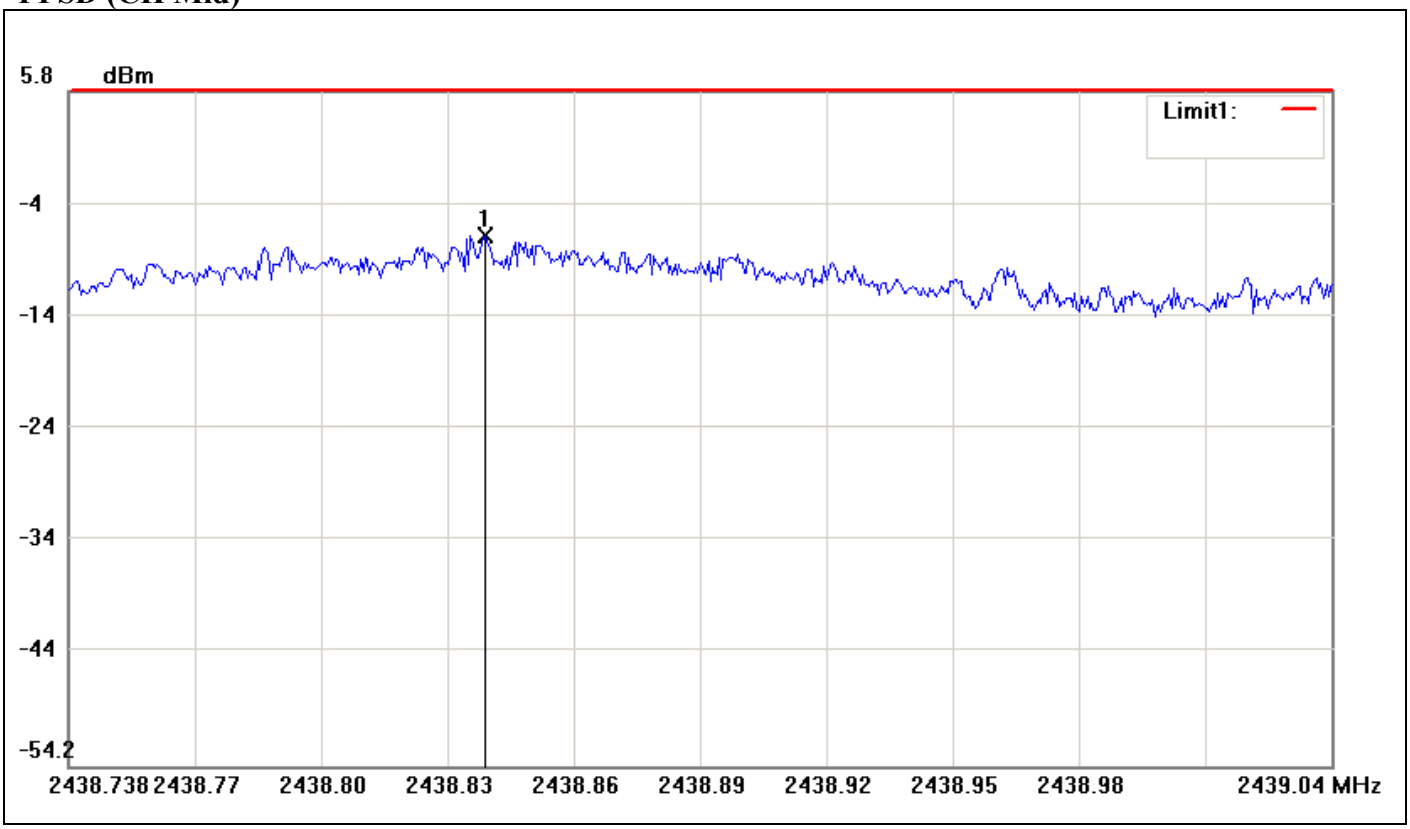
IEEE 802.11n HT 20 MHz mode

PPSD (CH Low)



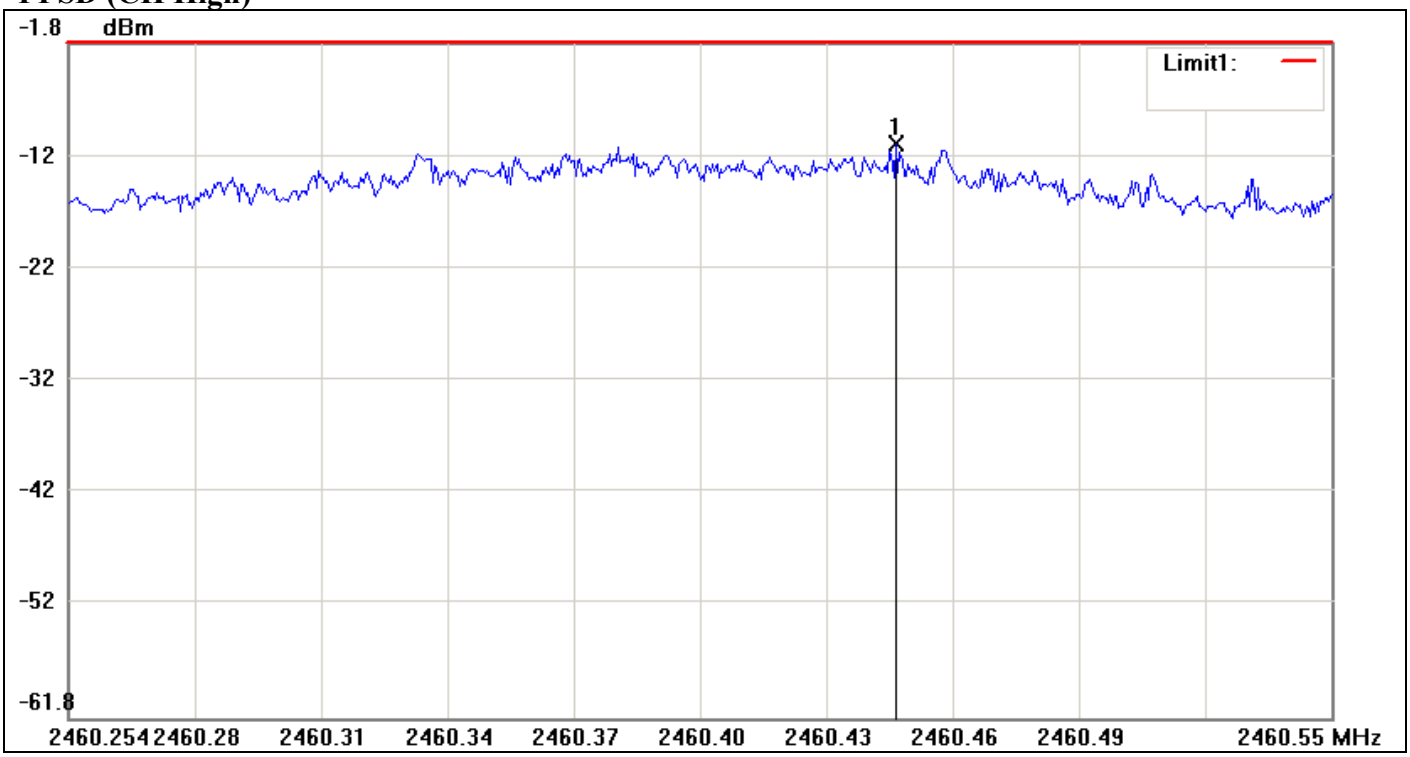
No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2416.0879	-11.97	8.00	-19.97

PPSD (CH Mid)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2438.8368	-6.92	8.00	-14.92

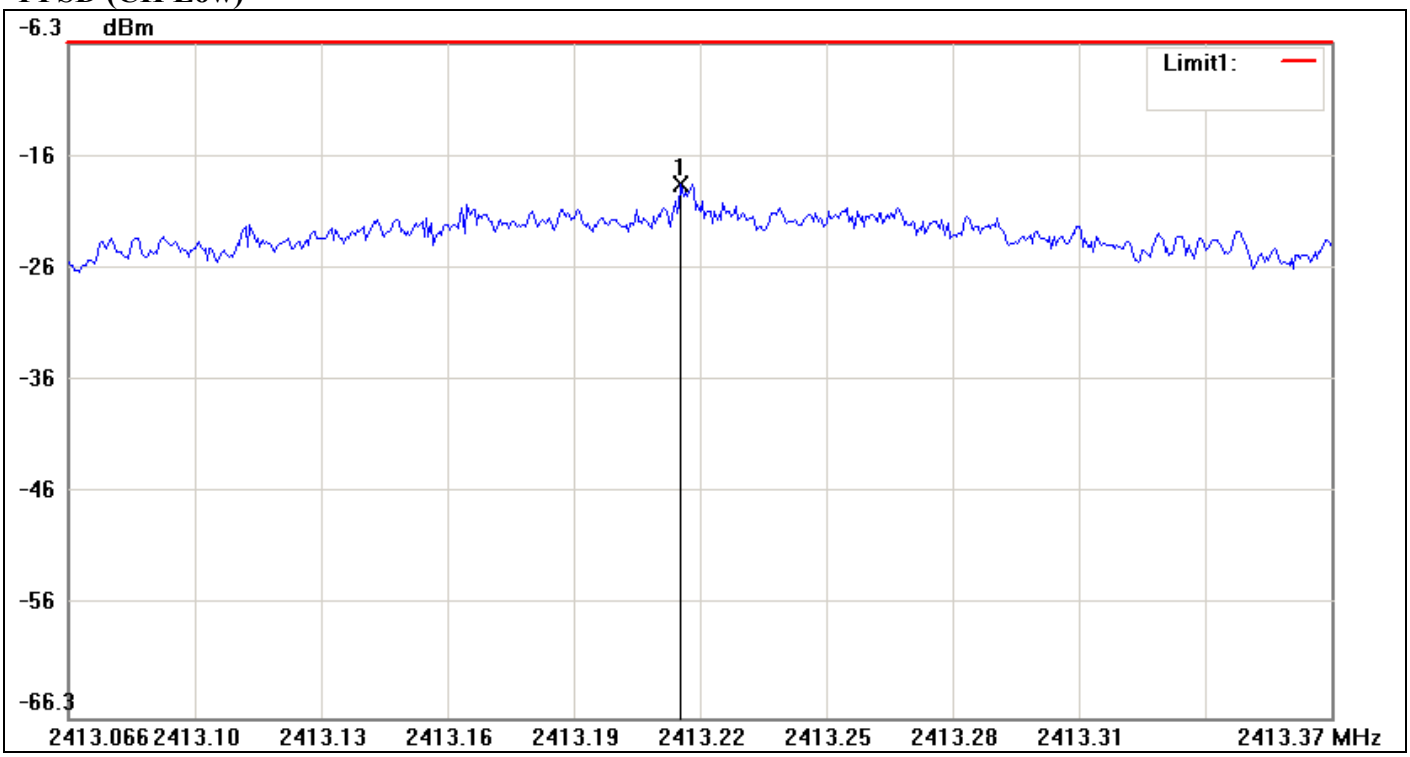
PPSD (CH High)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2460.4503	-10.65	8.00	-18.65

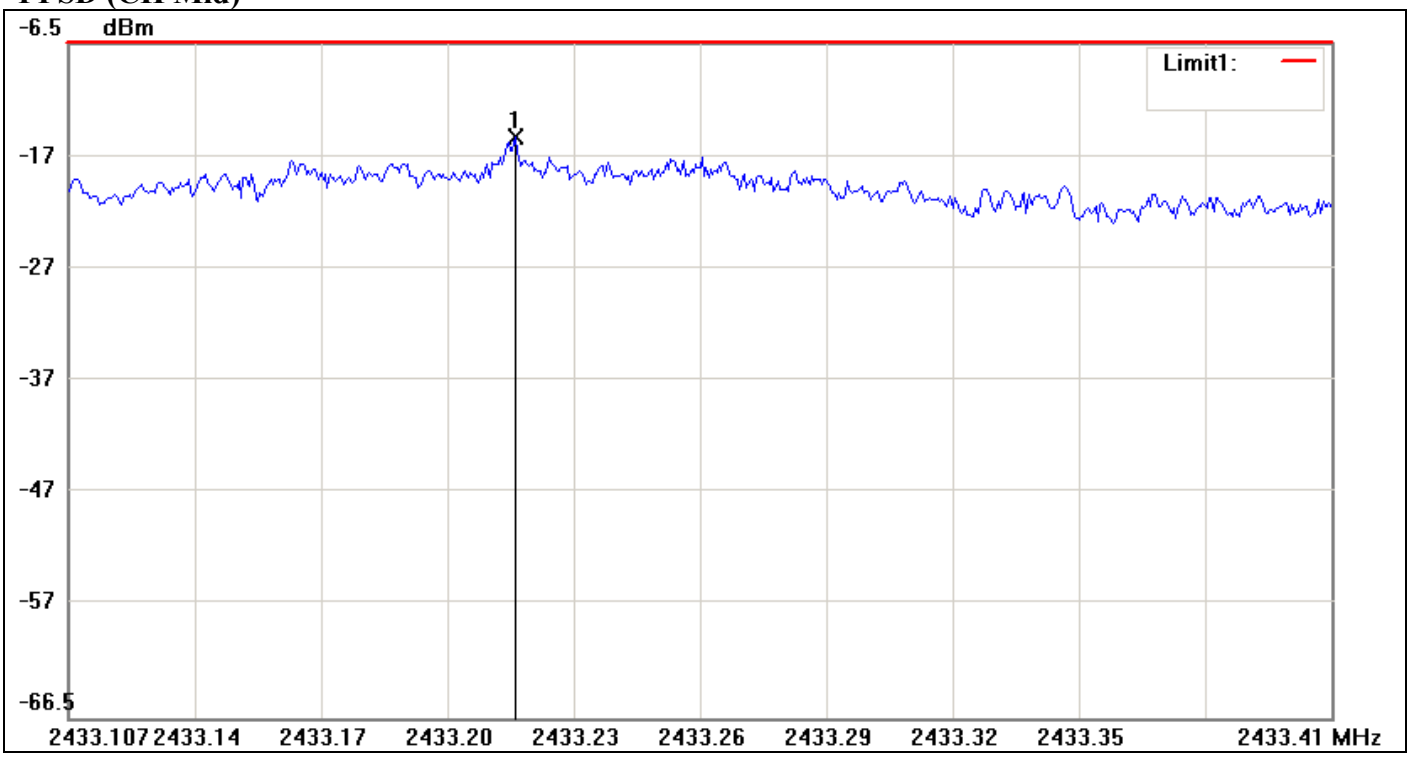
IEEE 802.11n HT 40 MHz mode

PPSD (CH Low)



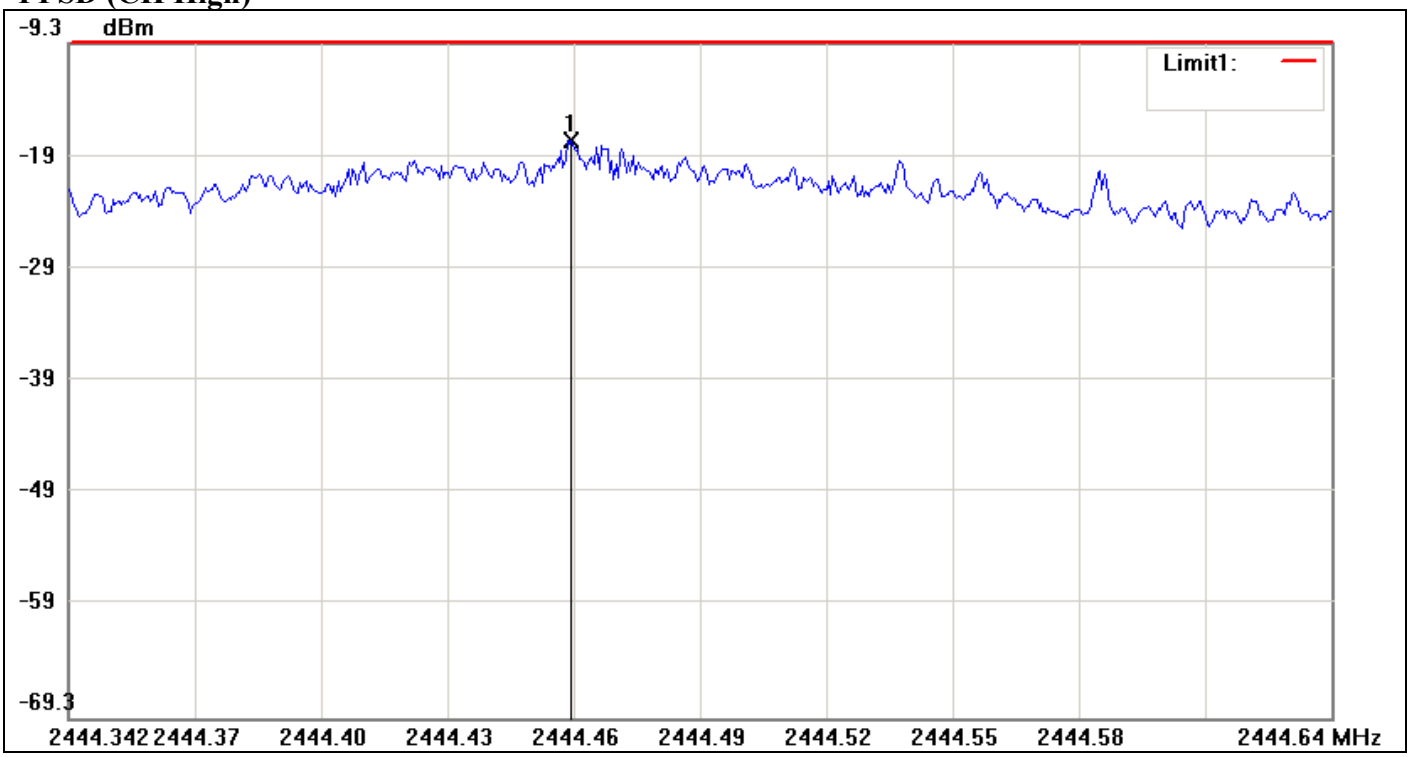
No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2413.2113	-18.82	8.00	-26.82

PPSD (CH Mid)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2433.2126	-14.88	8.00	-22.88

PPSD (CH High)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2444.4610	-17.88	8.00	-25.88

For PIFA Antenna

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-5.95	8.00	PASS
Mid	2442	-5.89		PASS
High	2462	-6.47		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-8.14	8.00	PASS
Mid	2442	-7.65		PASS
High	2462	-9.14		PASS

Test mode: IEEE 802.11n HT 20 MHz mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-12.16	8.00	PASS
Mid	2442	-6.94		PASS
High	2462	-10.91		PASS

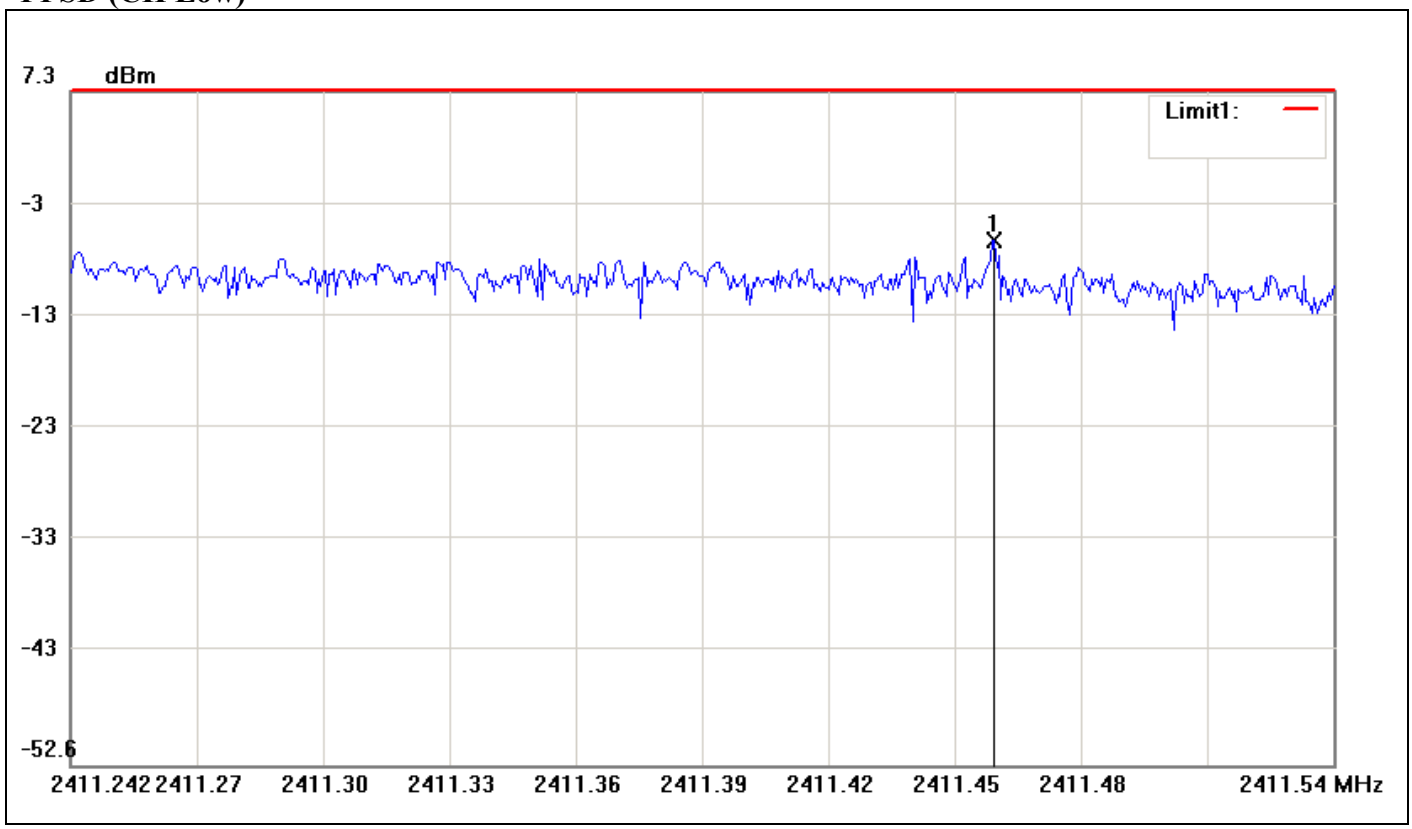
Test mode: IEEE 802.11n HT 40 MHz mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2422	-18.85	8.00	PASS
Mid	2442	-16.29		PASS
High	2452	-16.38		PASS

Test Plot

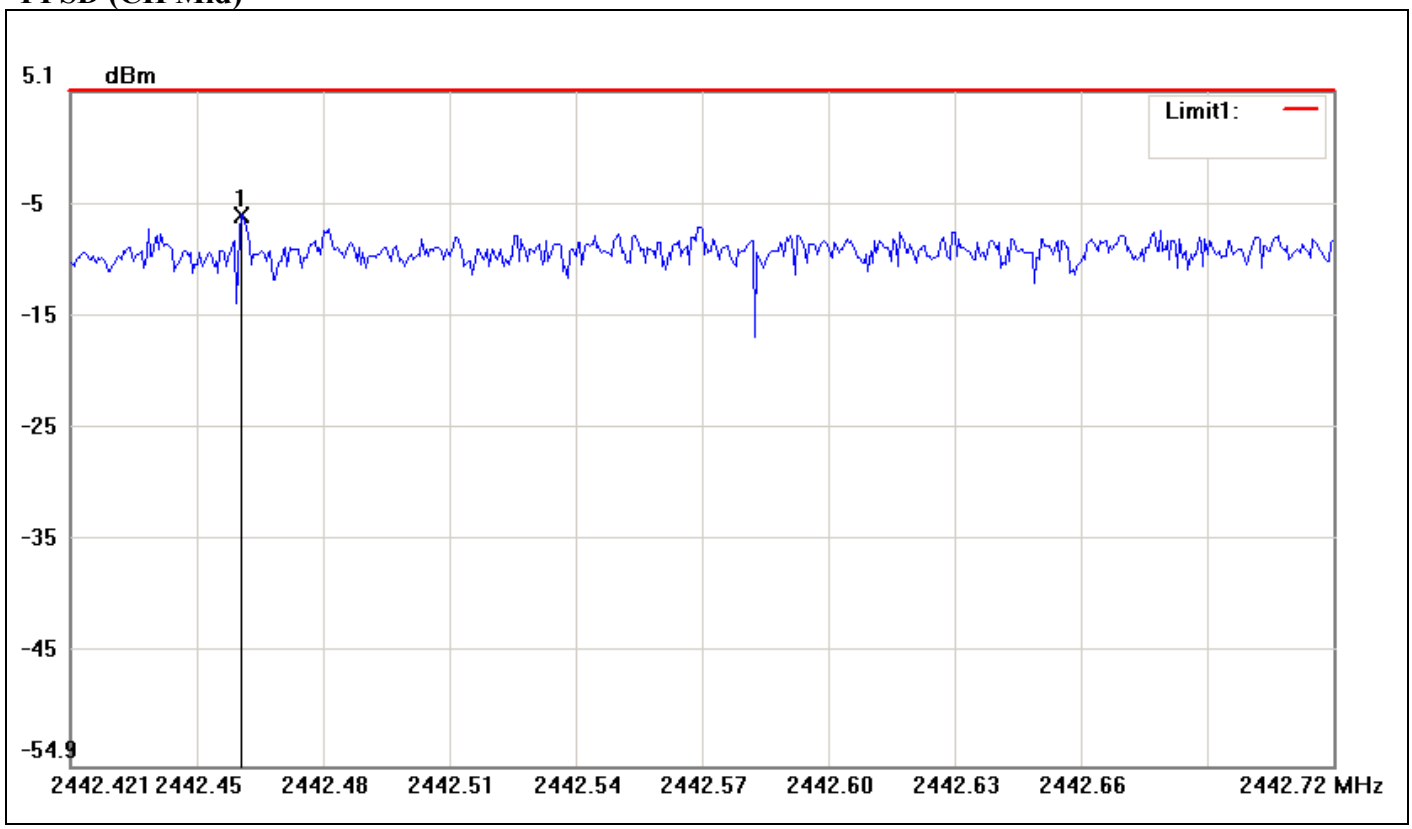
IEEE 802.11b mode

PPSD (CH Low)



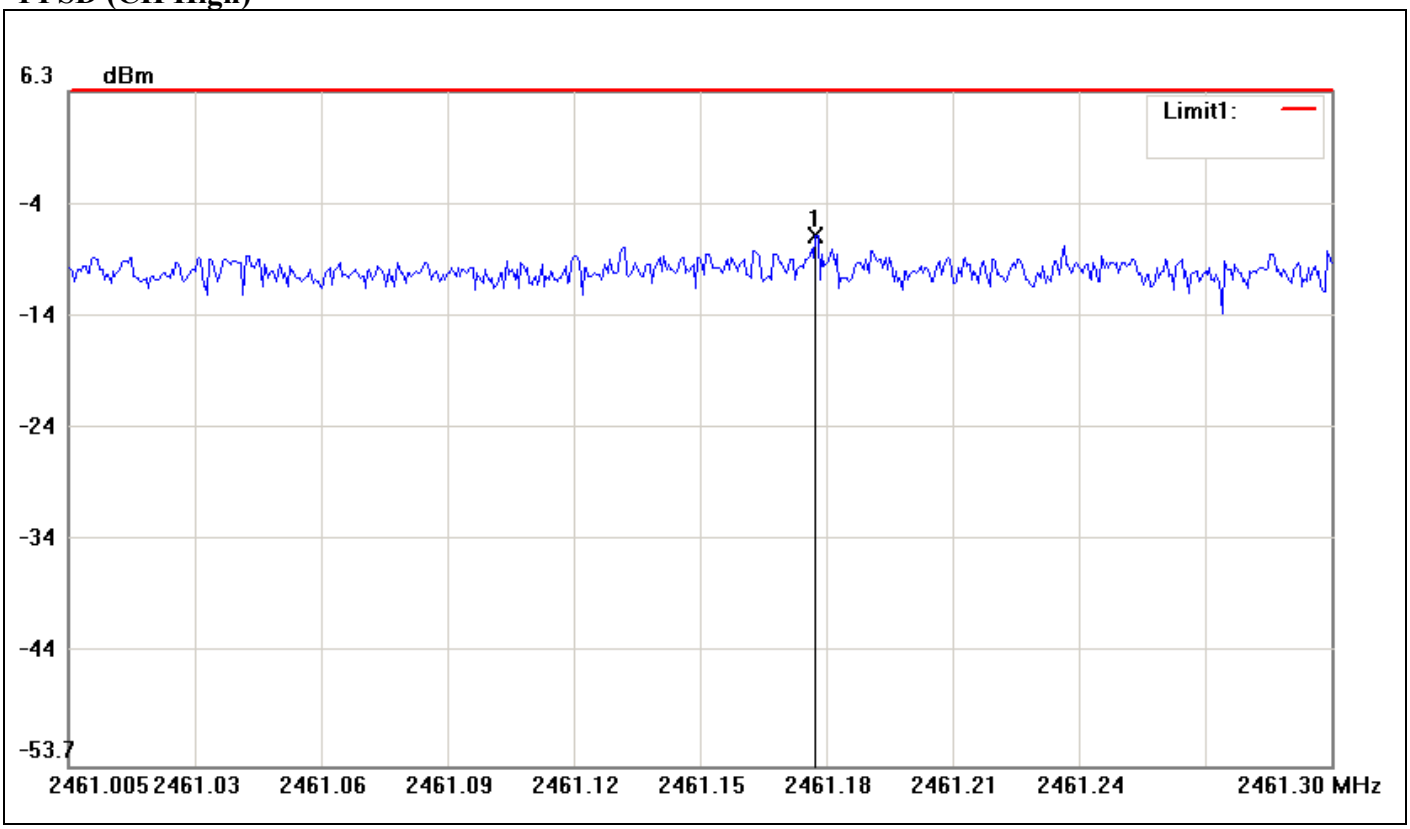
No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2411.4616	-5.95	8.00	-13.95

PPSD (CH Mid)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2442.4614	-5.89	8.00	-13.89

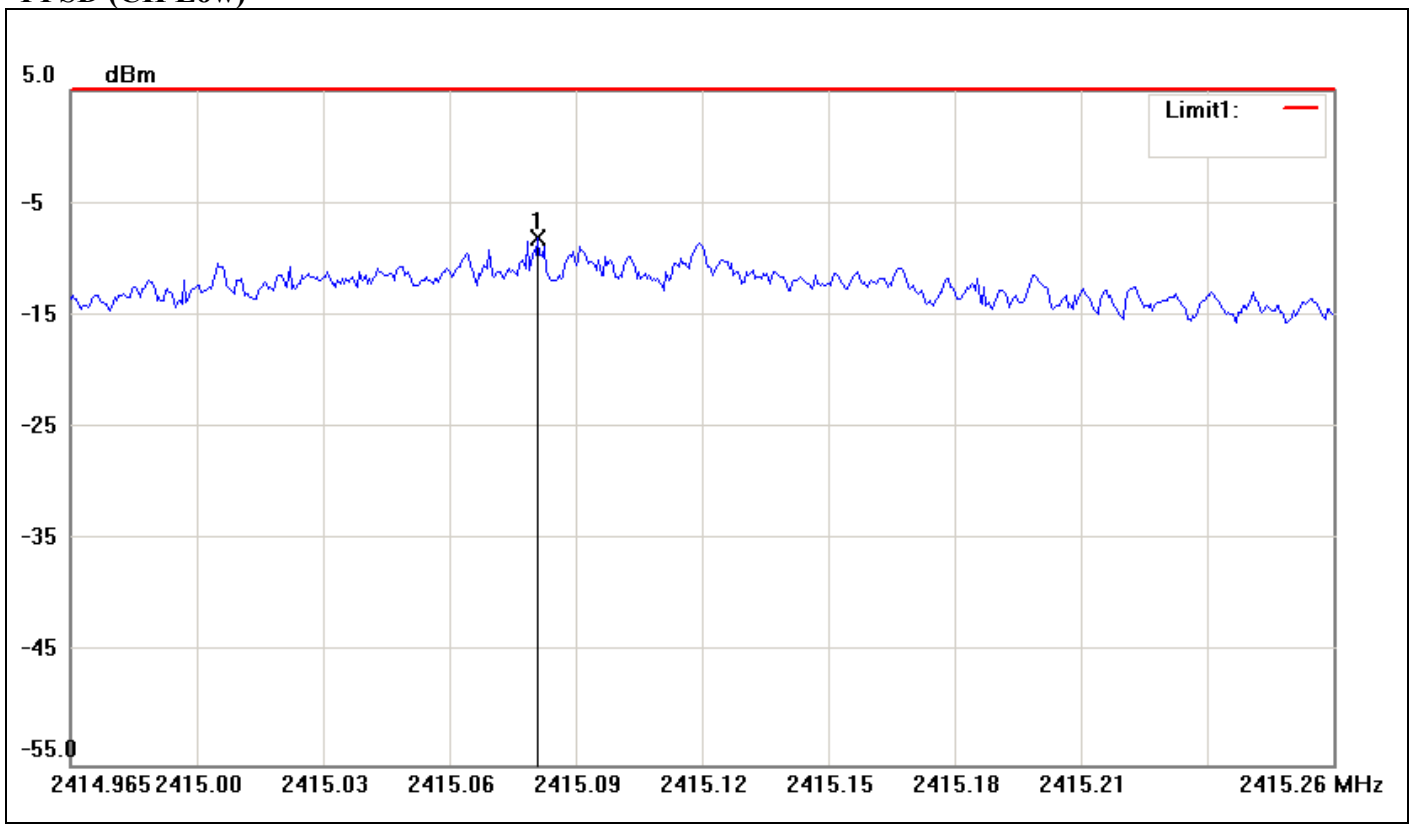
PPSD (CH High)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2461.1823	-6.47	8.00	-14.47

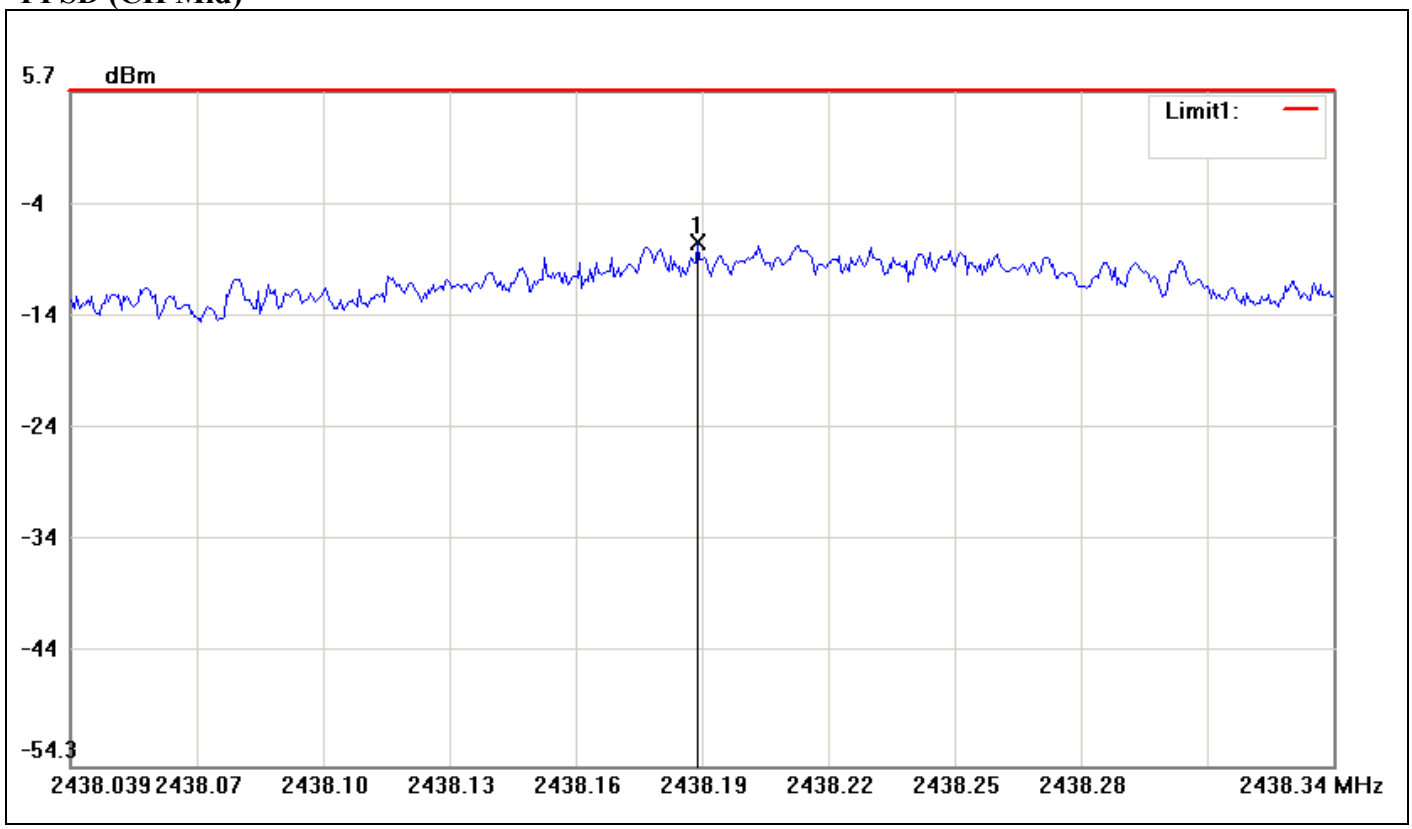
IEEE 802.11g mode

PPSD (CH Low)



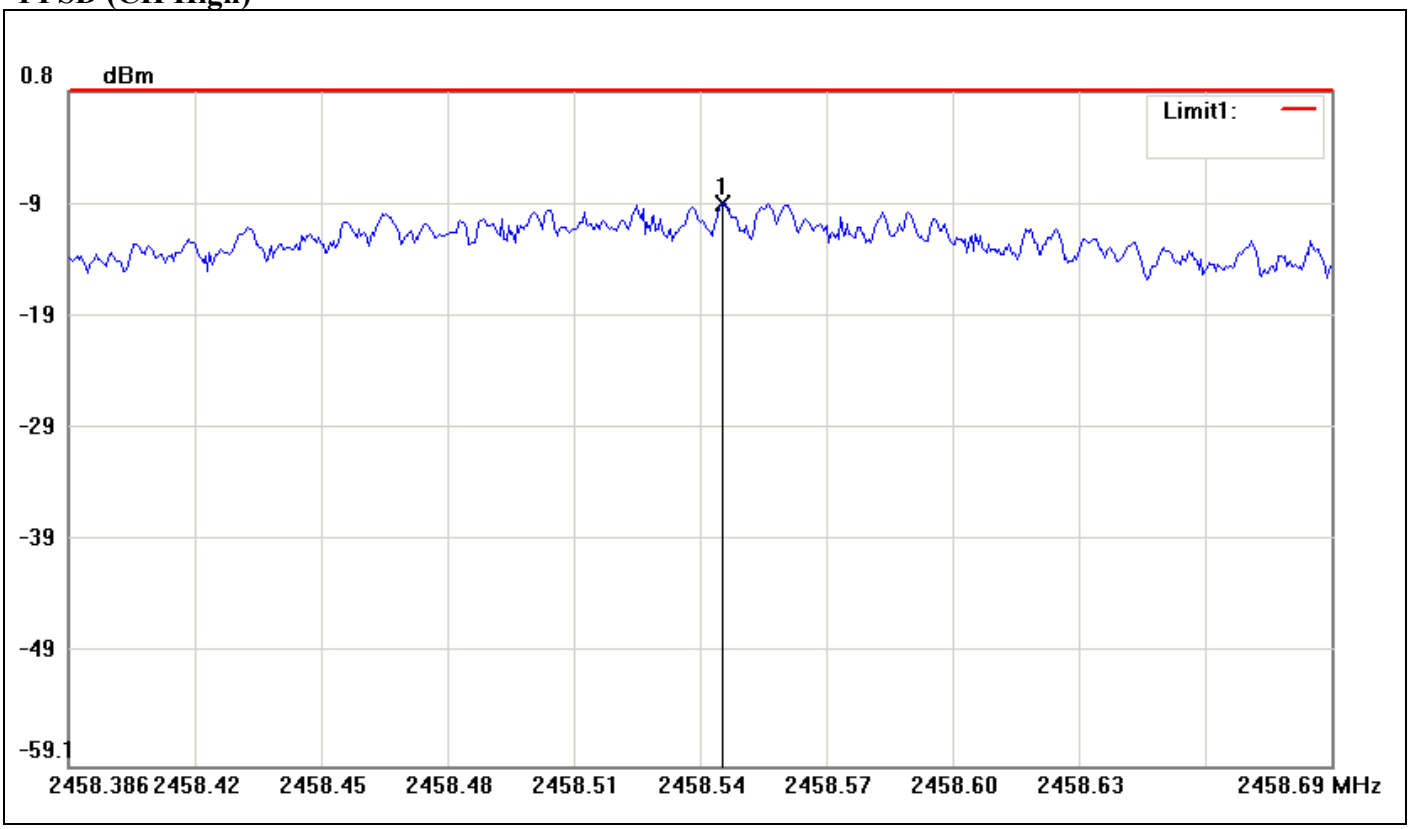
No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2415.0764	-8.14	8.00	-16.14

PPSD (CH Mid)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2438.1878	-7.65	8.00	-15.65

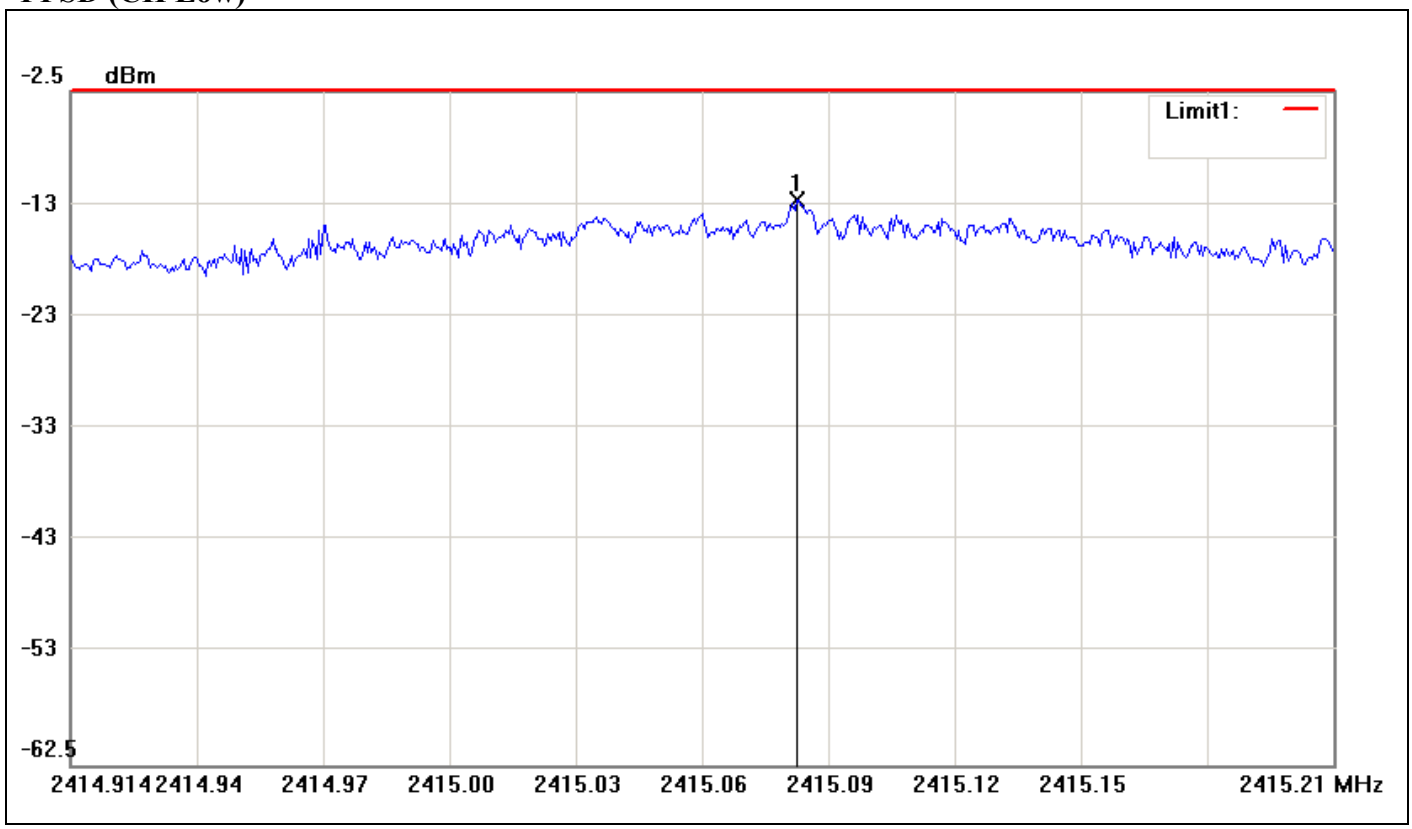
PPSD (CH High)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2458.5418	-9.14	8.00	-17.14

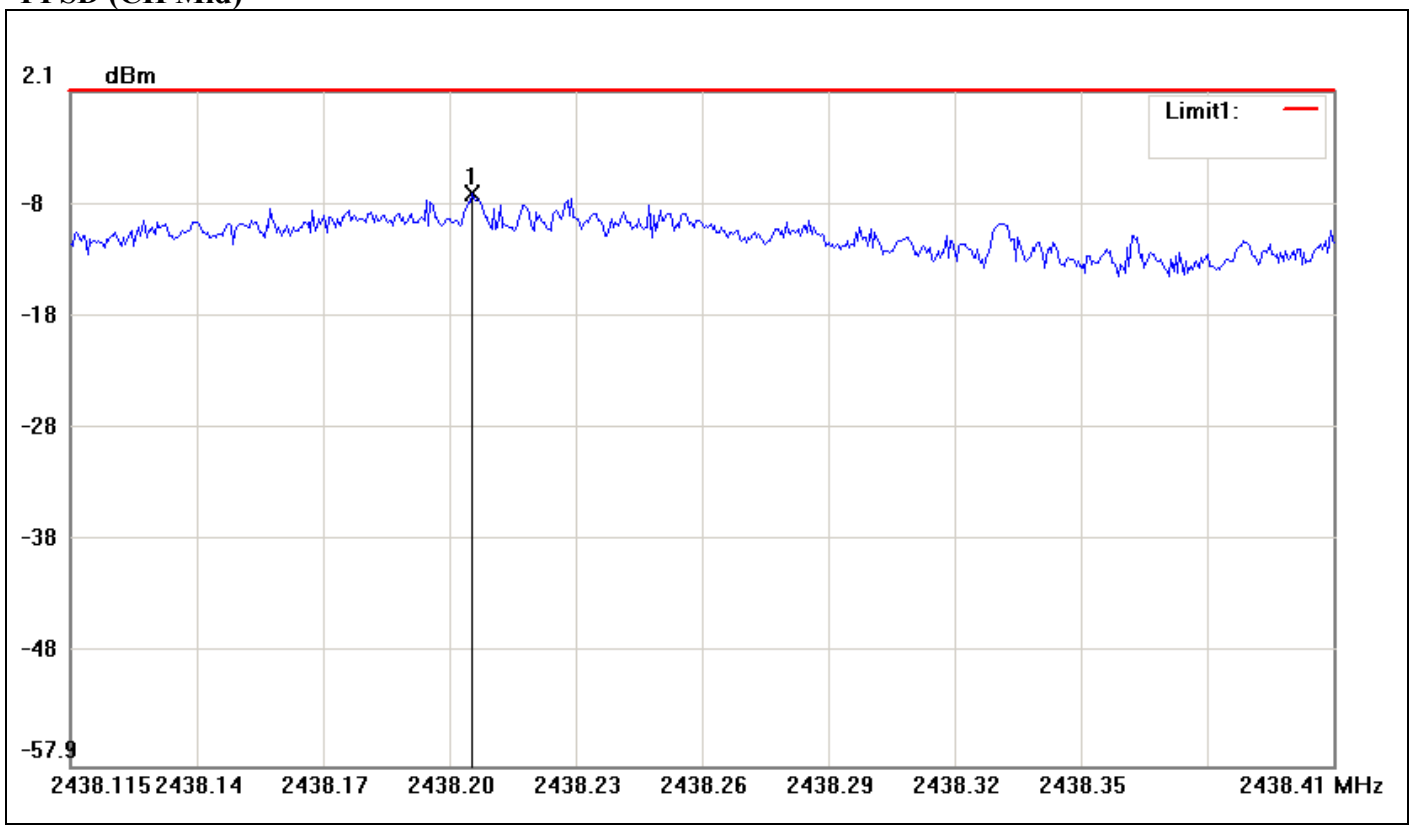
IEEE 802.11n HT 20 MHz mode

PPSD (CH Low)



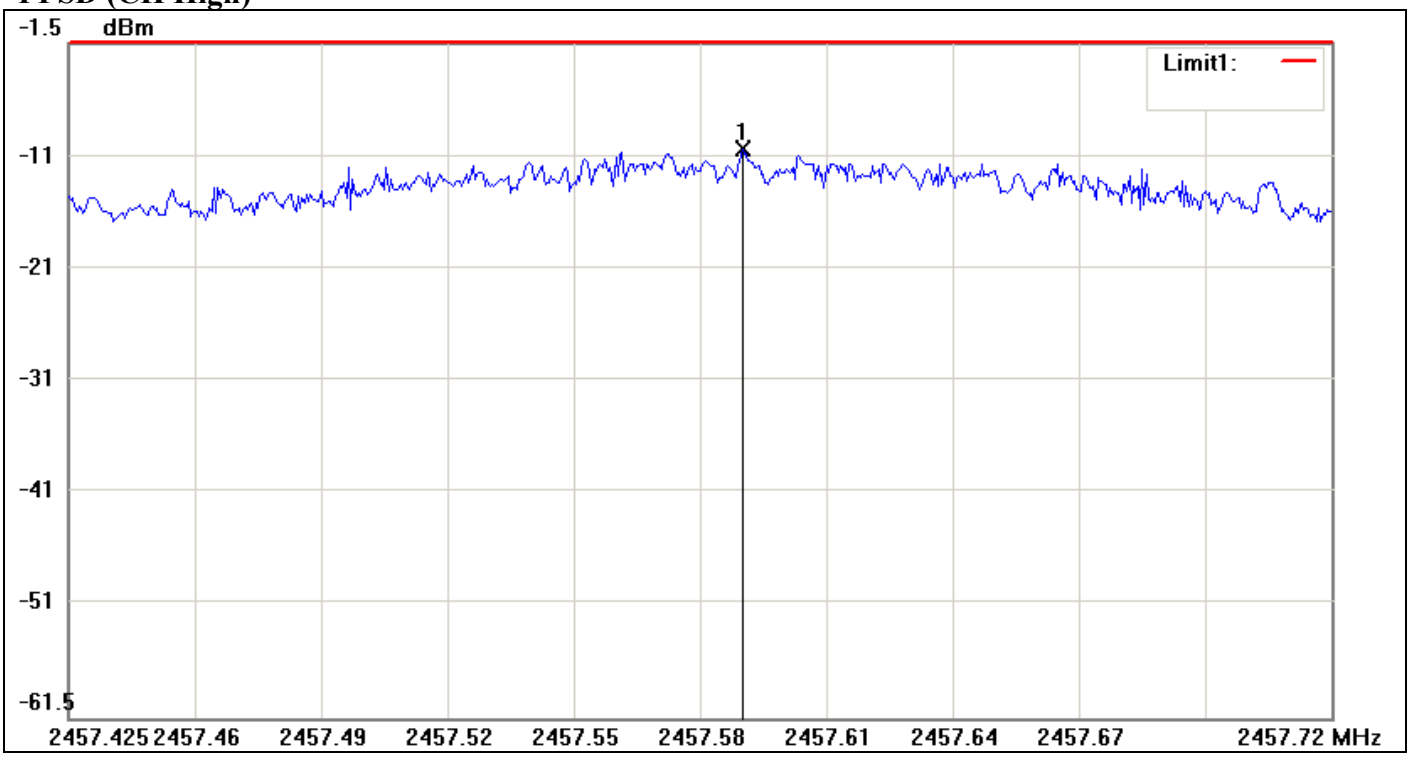
No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2415.0868	-12.16	8.00	-20.16

PPSD (CH Mid)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2438.2105	-6.94	8.00	-14.94

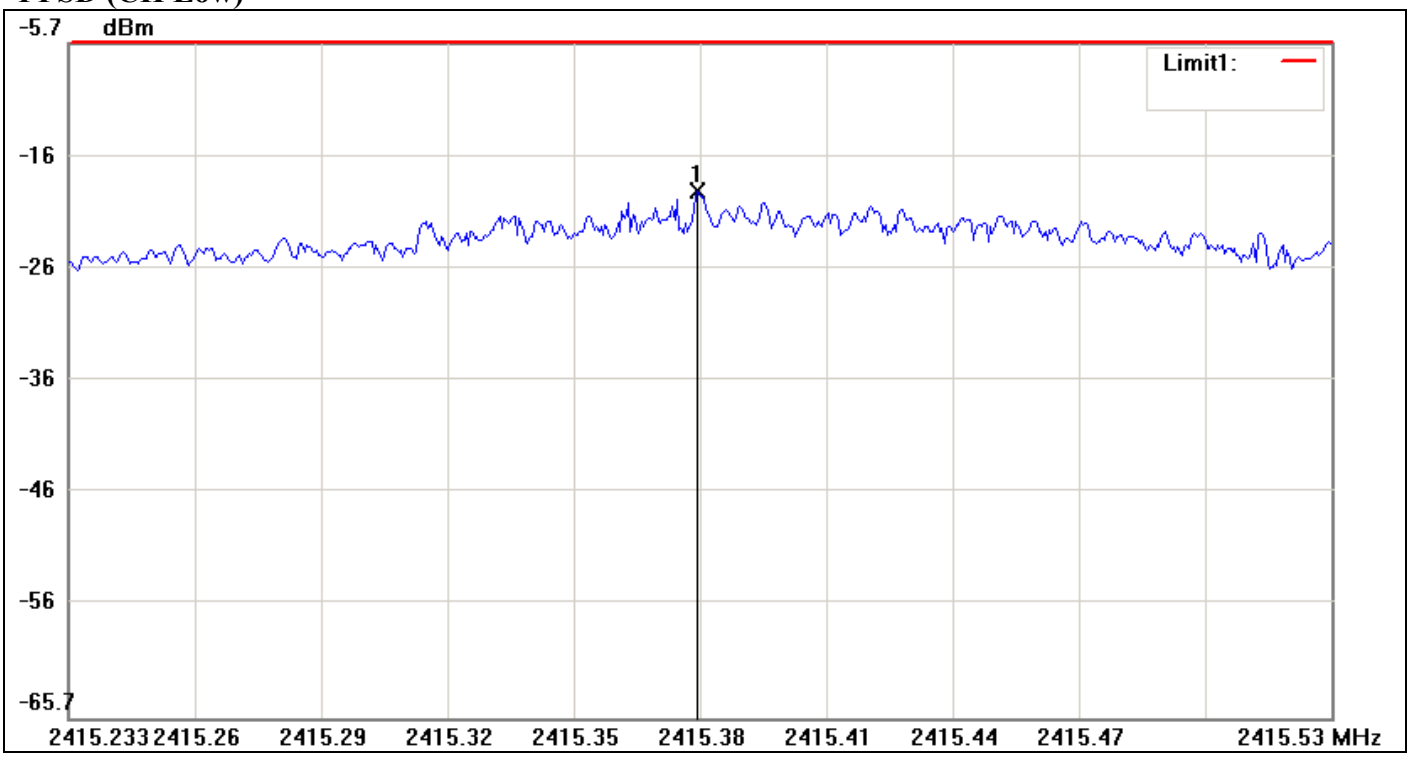
PPSD (CH High)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2457.5854	-10.91	8.00	-18.91

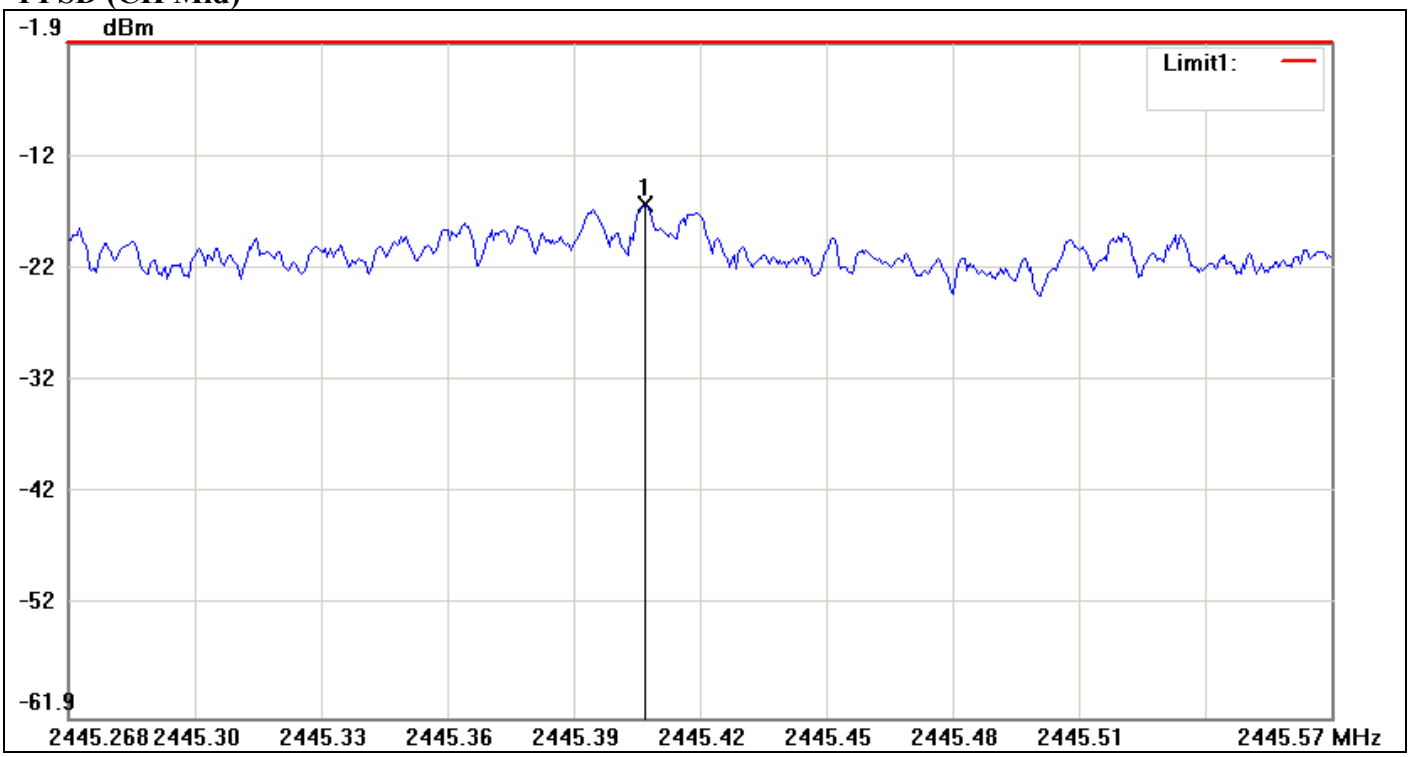
IEEE 802.11n HT 40 MHz mode

PPSD (CH Low)



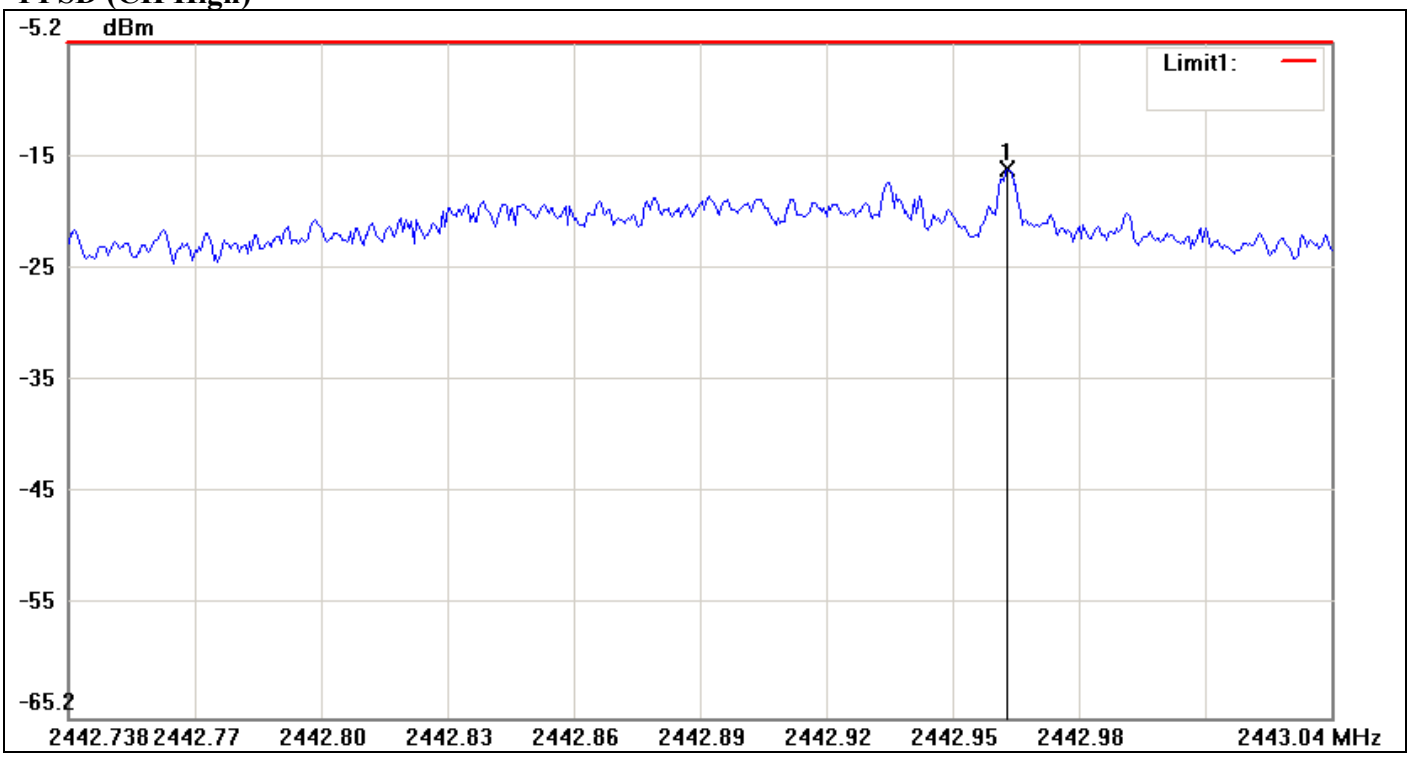
No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2415.3822	-18.85	8.00	-26.85

PPSD (CH Mid)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2445.4048	-16.29	8.00	-24.29

PPSD (CH High)



No.	Frequency(MHz)	Level(dBm)	Limit(dBm)	Margin(dBm)
1	2442.9610	-16.38	8.00	-24.38

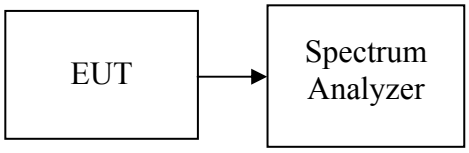
7.5 SPURIOUS EMISSIONS

7.5.1 Conducted Measurement

LIMIT

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

Test Configuration



TEST PROCEDURE

Reference Level Measurement
According to KDB 558074 DTS Meas Guidance D01 v01 5.4.1.1
The transmitter output is connected to the spectrum analyzer. Set the RBW = 100 kHz, VBW ≥ 300 kHz, span = 5-30 % greater than the EBW. Detector = Peak, Trace mode = max hold, Sweep = auto couple.

Unwanted Emissions Level Measurement
According to KDB 558074 DTS Meas Guidance DR01 5.4.1.2
The transmitter output is connected to the spectrum analyzer. Set the RBW = 100 kHz, VBW ≥ 300 kHz, span =From 30MHz to 26GHz. Detector = Peak, Trace mode = max hold, Sweep = auto couple.

TEST RESULTS

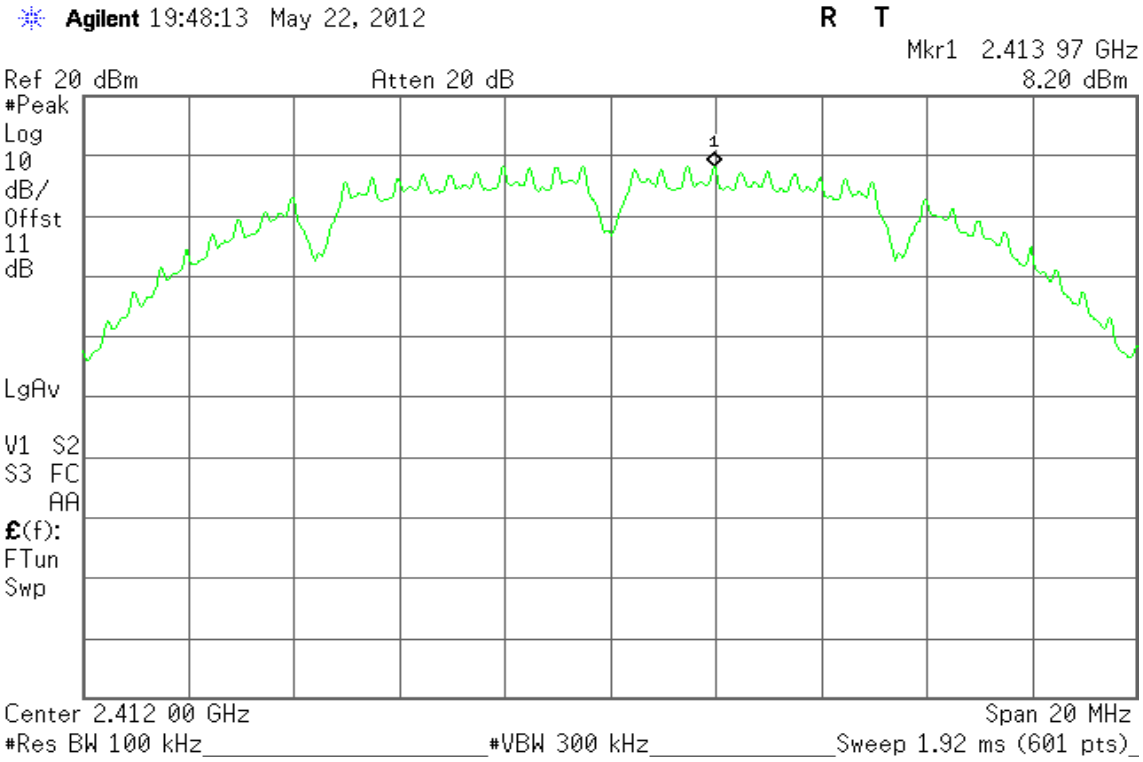
No non-compliance noted.

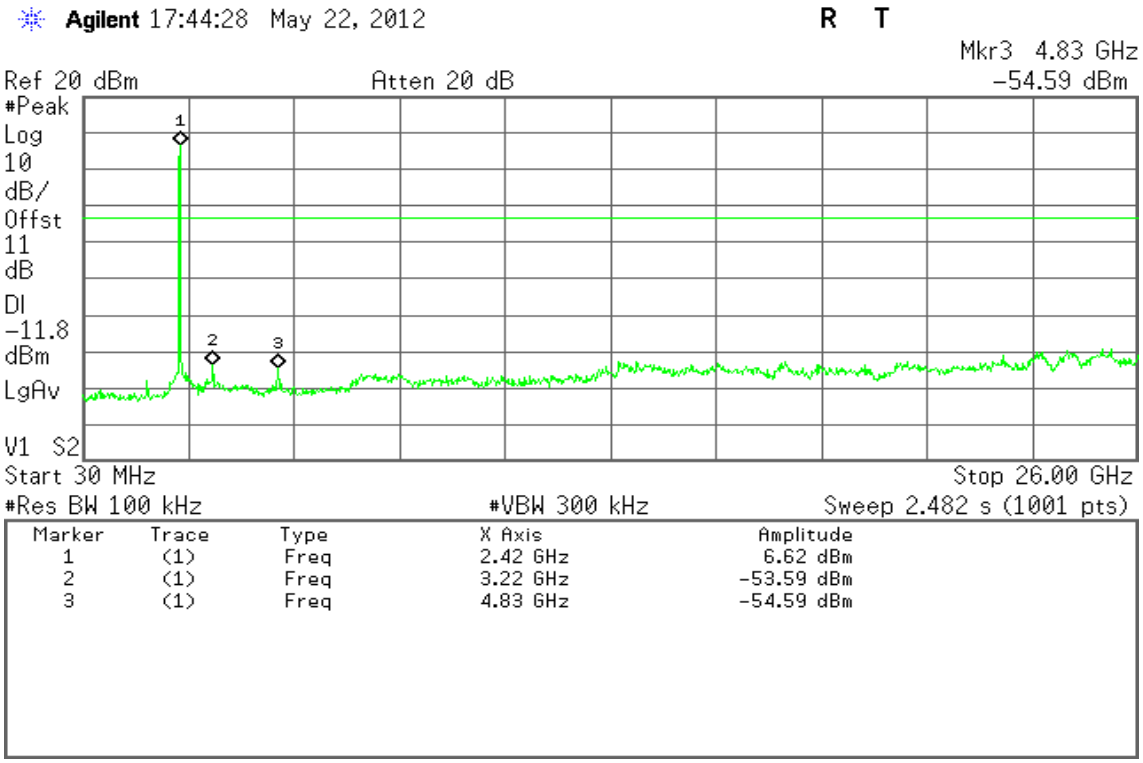
For Monopole Antenna

Test Plot

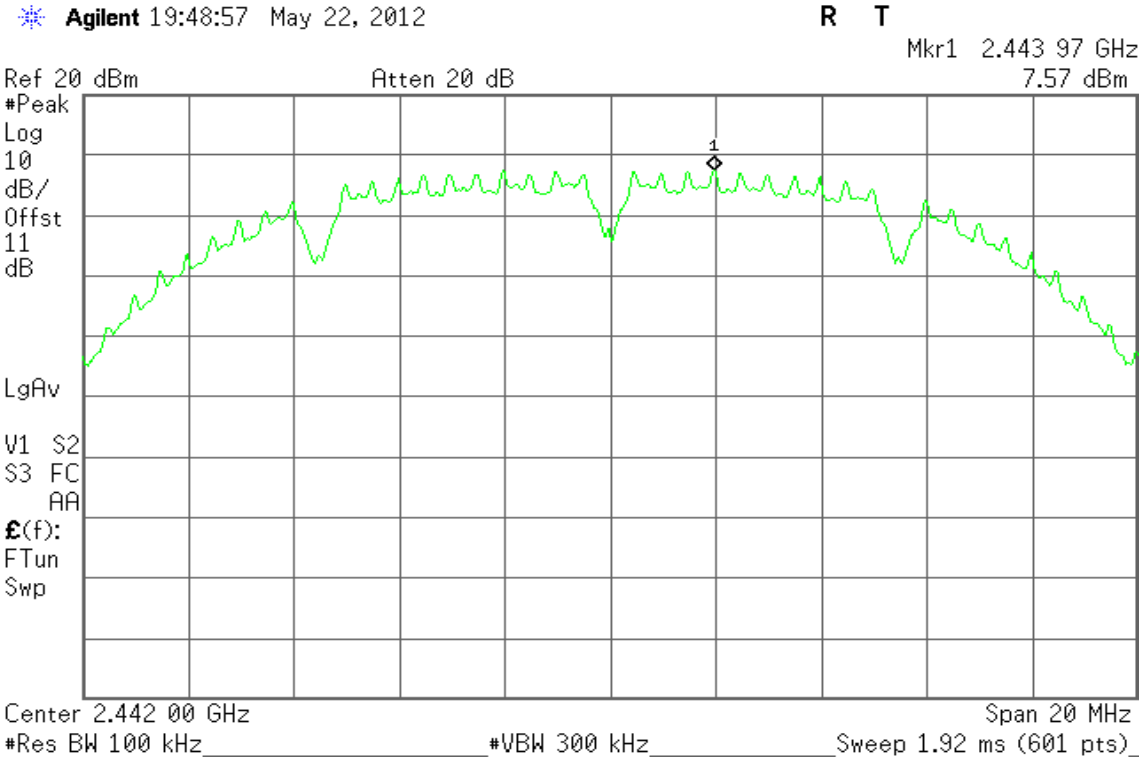
IEEE 802.11b mode

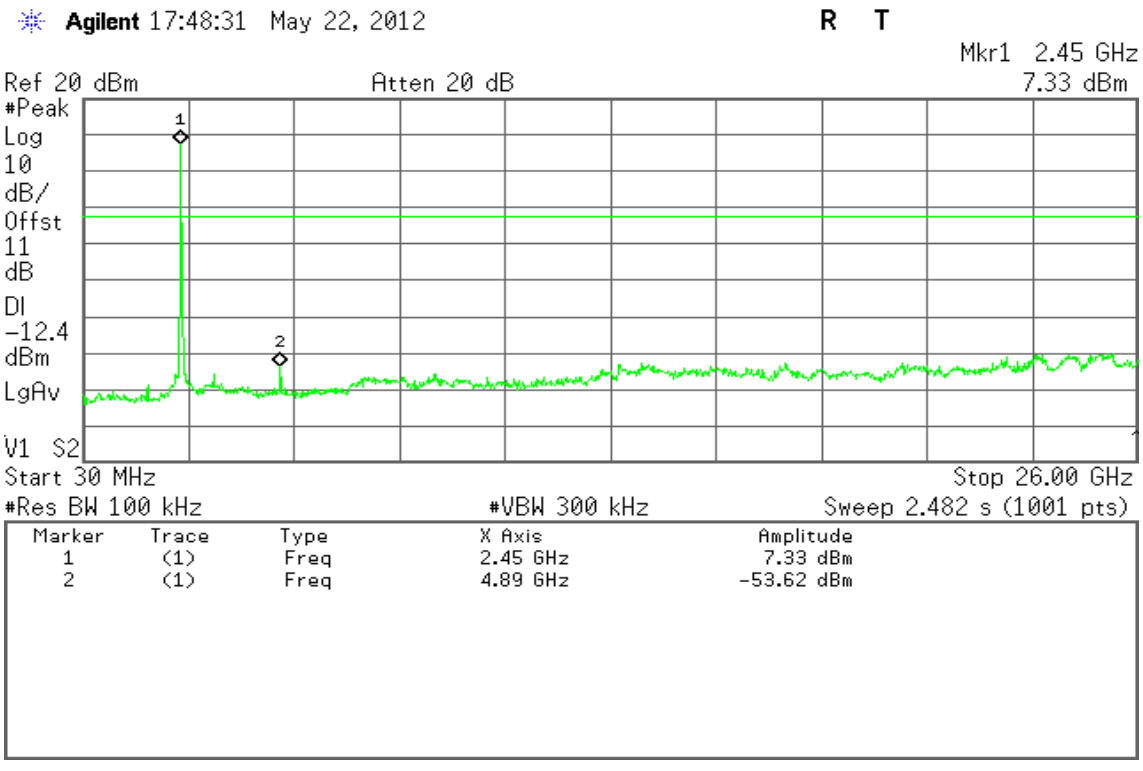
CH Low



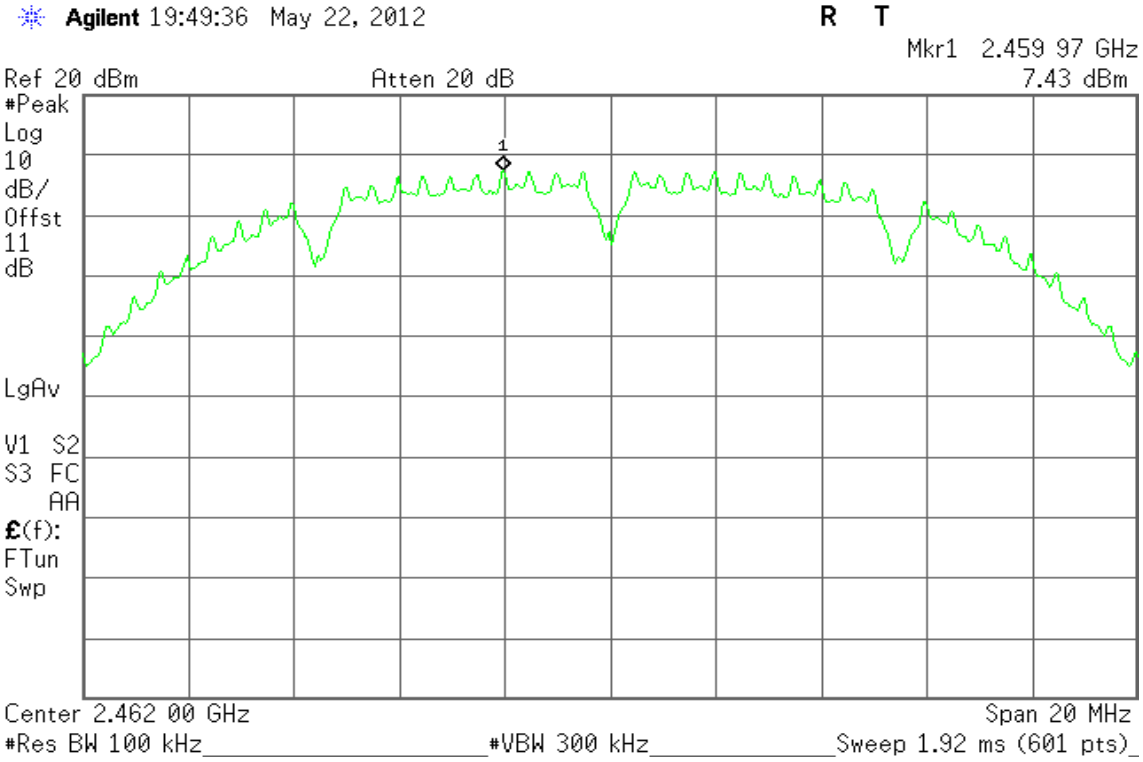


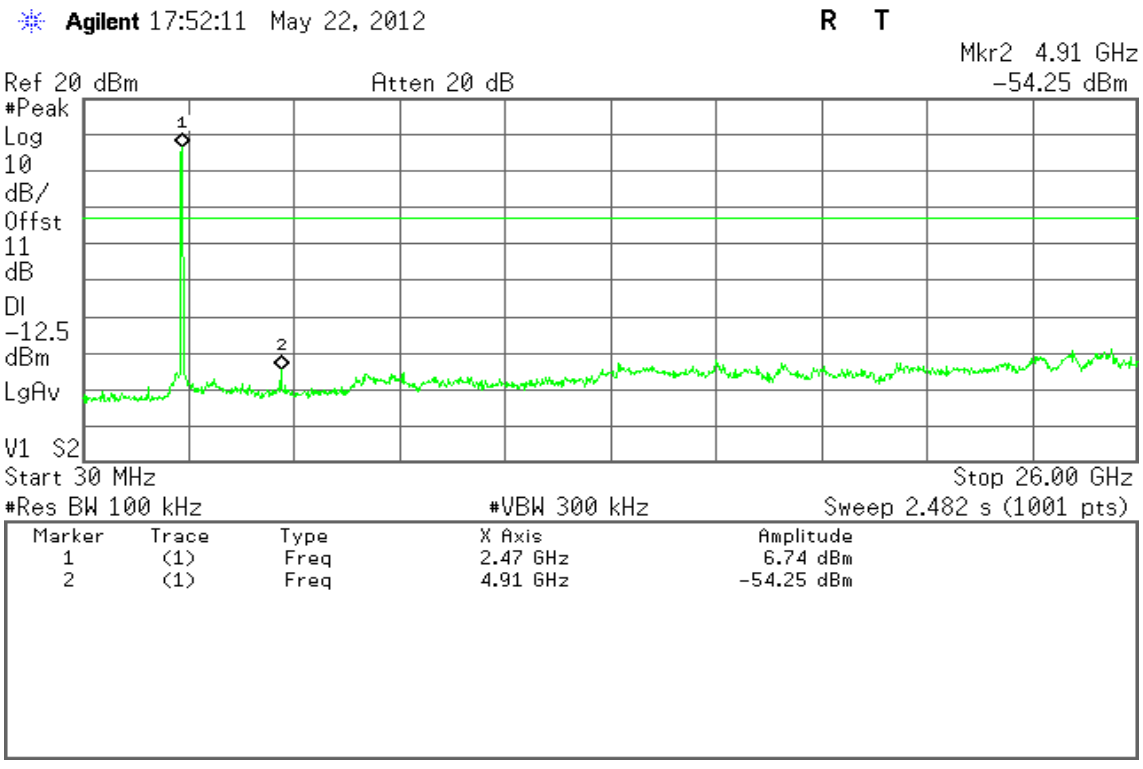
CH Mid


Agilent 19:48:57 May 22, 2012
R T
Mkr1 2.443 97 GHz
7.57 dBm
Ref 20 dBm
Atten 20 dB
#Peak
Log
10
dB/
Offst
11
dB
LgAv
V1 S2
S3 FC
AA
£(f):
FTun
Swp
Center 2.442 00 GHz
Span 20 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 1.92 ms (601 pts)


Agilent 17:48:31 May 22, 2012
R T
Mkr1 2.45 GHz
7.33 dBm
Ref 20 dBm
Atten 20 dB
#Peak
Log
10
dB/
Offst
11
dB
Dl
-12.4
dBm
LgAv
V1 S2
Start 30 MHz
Stop 26.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 2.482 s (1001 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.45 GHz 7.33 dBm
2 (1) Freq 4.89 GHz -53.62 dBm

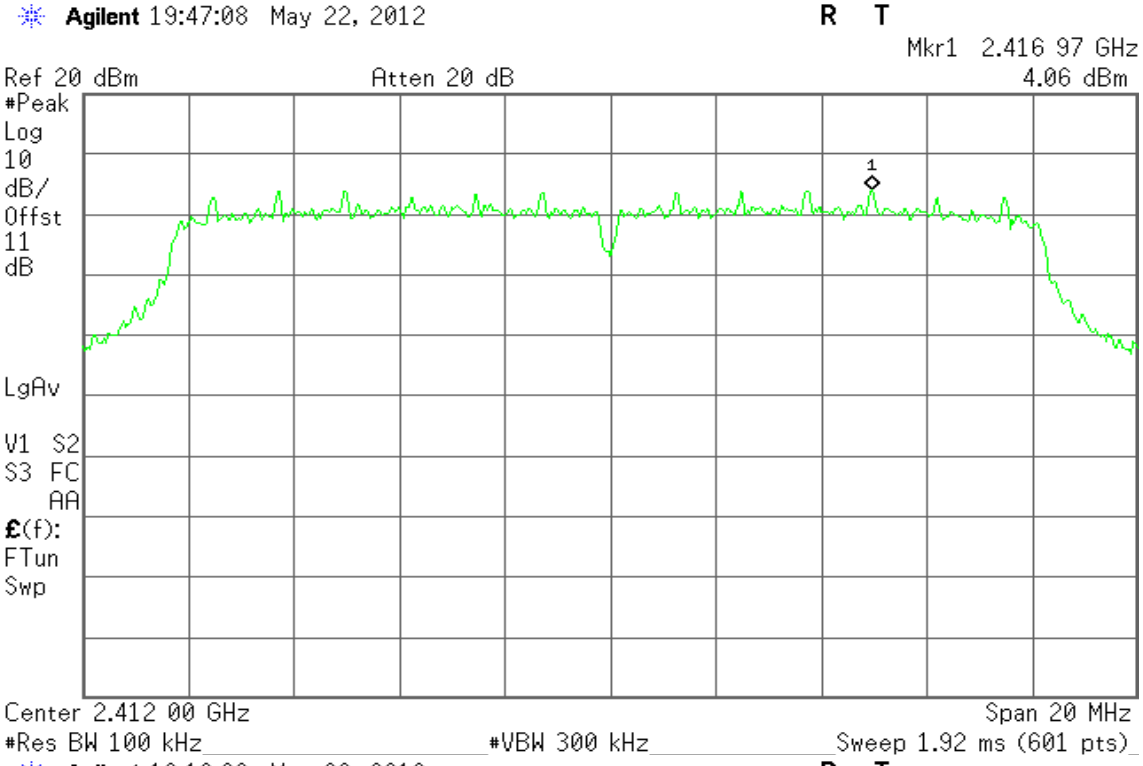
CH High

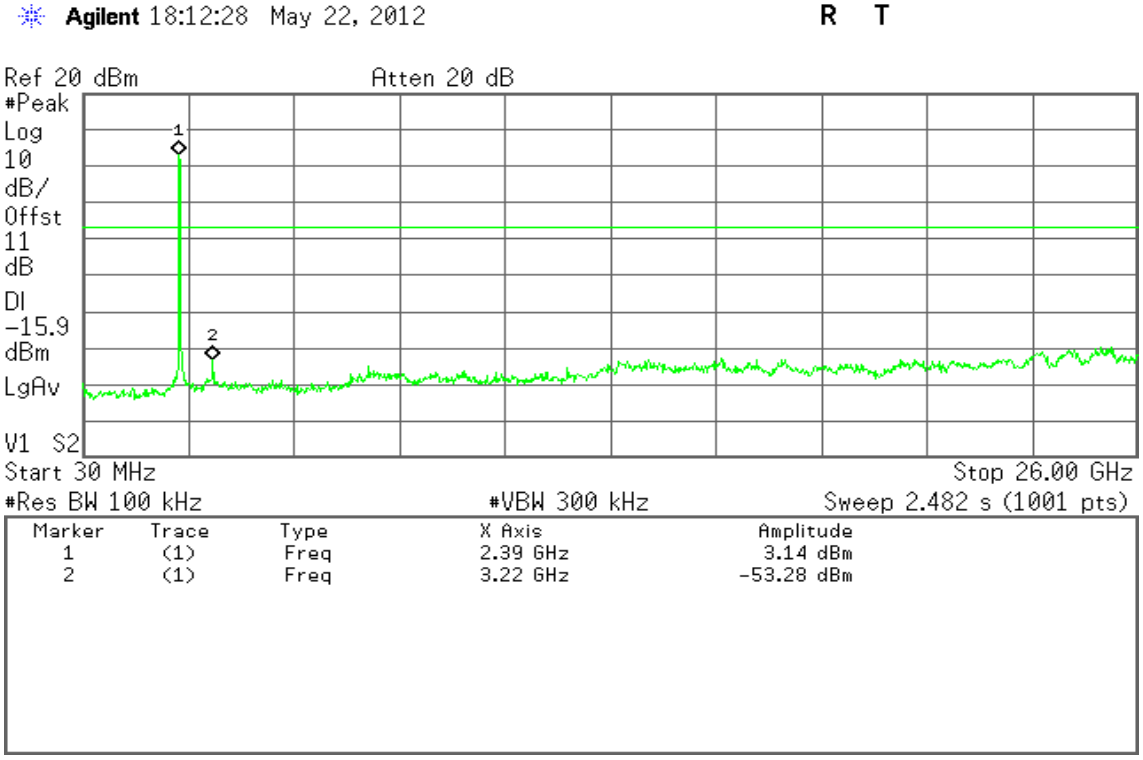

Agilent 19:49:36 May 22, 2012
R T
Mkr1 2.459 97 GHz
7.43 dBm
Ref 20 dBm
Atten 20 dB
#Peak
Log
10
dB/
Offst
11
dB
LgAv
V1 S2
S3 FC
AA
£(f):
FTun
Swp
Center 2.462 00 GHz
Span 20 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 1.92 ms (601 pts)


Agilent 17:52:11 May 22, 2012
R T
Mkr2 4.91 GHz
-54.25 dBm
Ref 20 dBm
Atten 20 dB
#Peak
Log
10
dB/
Offst
11
dB
Dl
-12.5
dBm
LgAv
V1 S2
Start 30 MHz
Stop 26.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 2.482 s (1001 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.47 GHz 6.74 dBm
2 (1) Freq 4.91 GHz -54.25 dBm

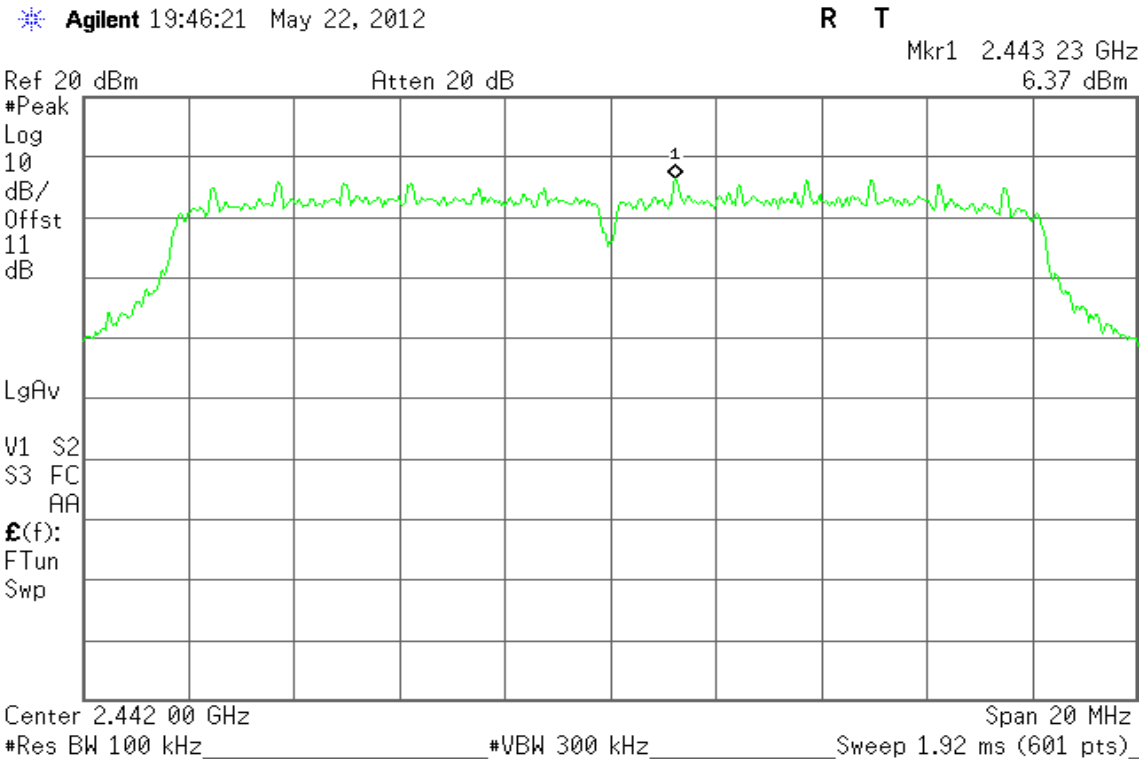
IEEE 802.11g mode

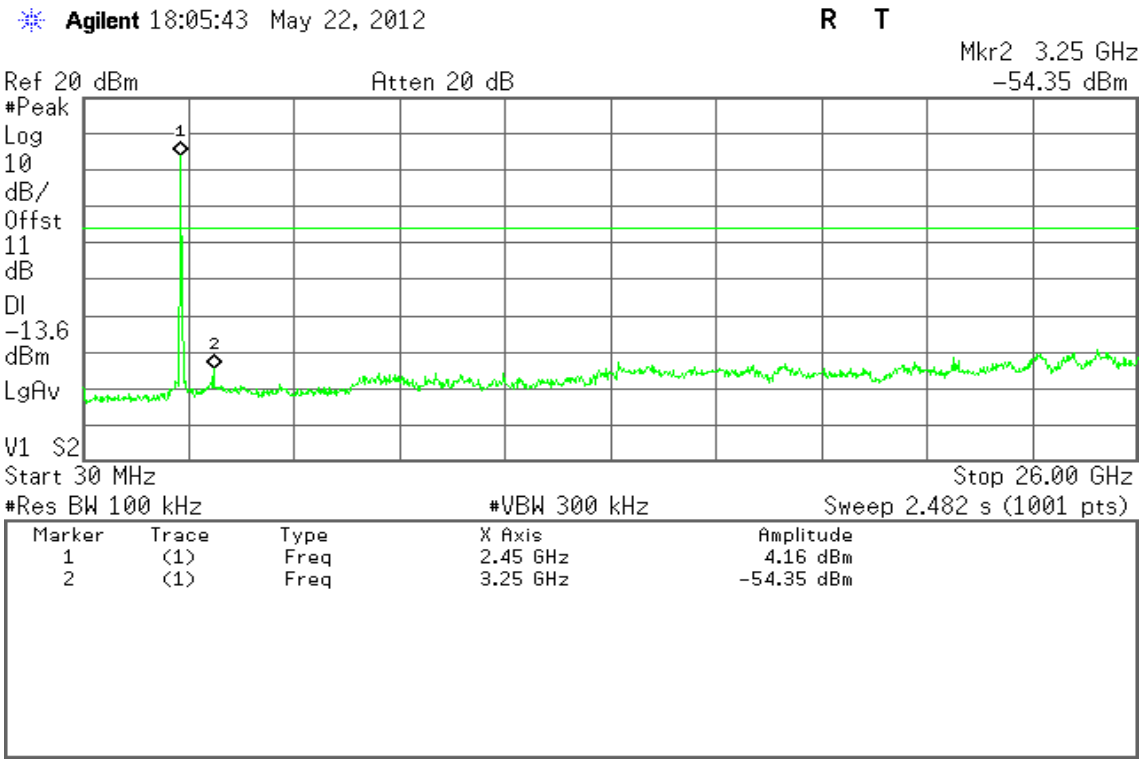
CH Low



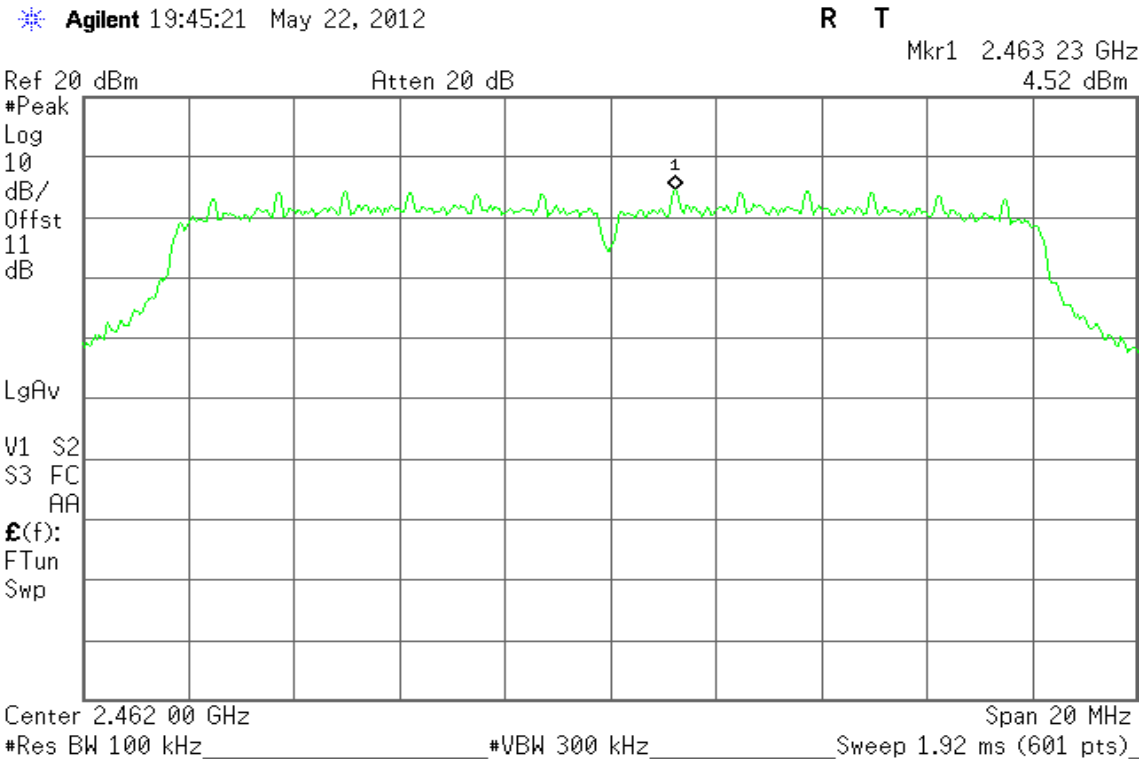


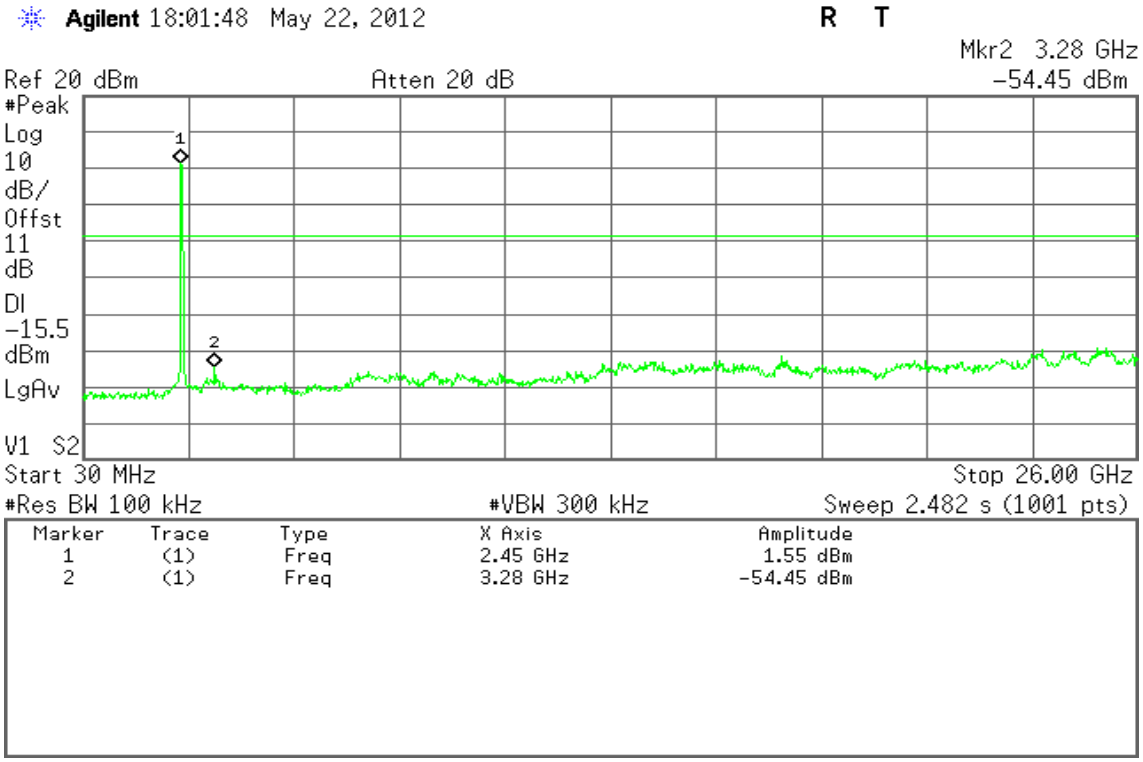
CH Mid


Agilent 19:46:21 May 22, 2012
R T
Mkr1 2.443 23 GHz
6.37 dBm
Ref 20 dBm
Atten 20 dB
#Peak
Log
10
dB/
Offst
11
dB
LgAv
V1 S2
S3 FC
AA
£(f):
FTun
Swp
Center 2.442 00 GHz
Span 20 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 1.92 ms (601 pts)


Agilent 18:05:43 May 22, 2012
R T
Mkr2 3.25 GHz
-54.35 dBm
Ref 20 dBm
Atten 20 dB
#Peak
Log
10
dB/
Offst
11
dB
Dl
-13.6
dBm
LgAv
V1 S2
Start 30 MHz
Stop 26.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 2.482 s (1001 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.45 GHz 4.16 dBm
2 (1) Freq 3.25 GHz -54.35 dBm

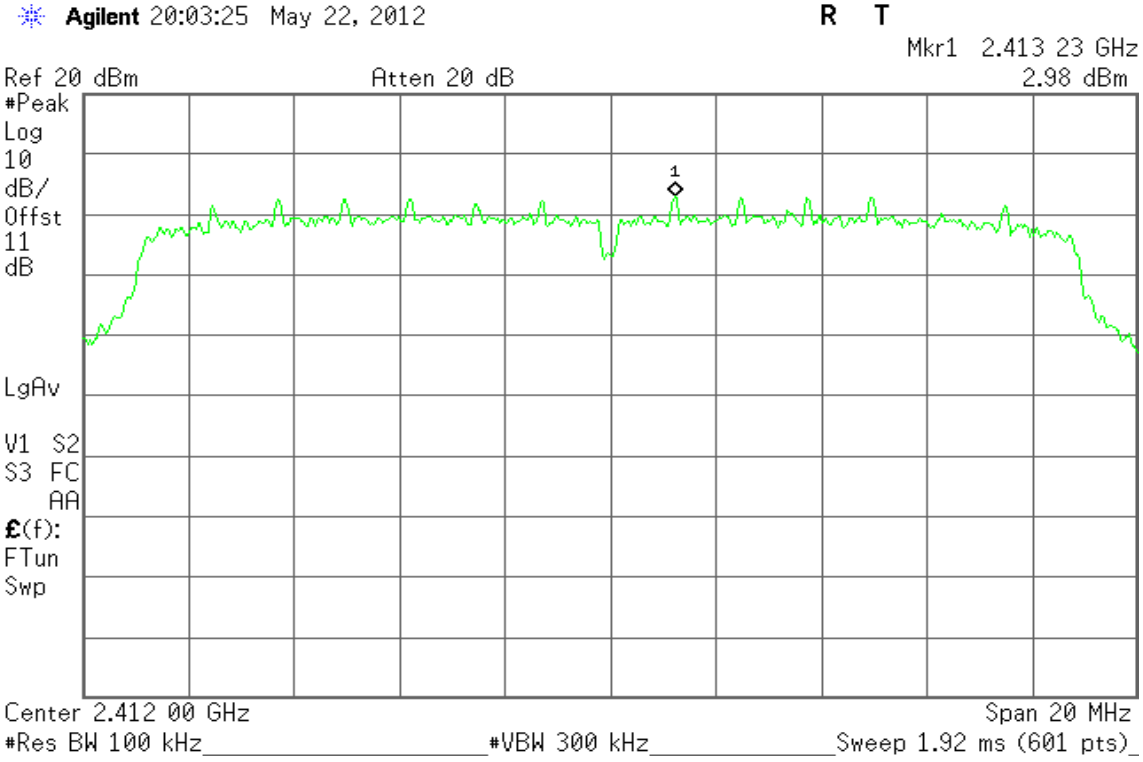
CH High

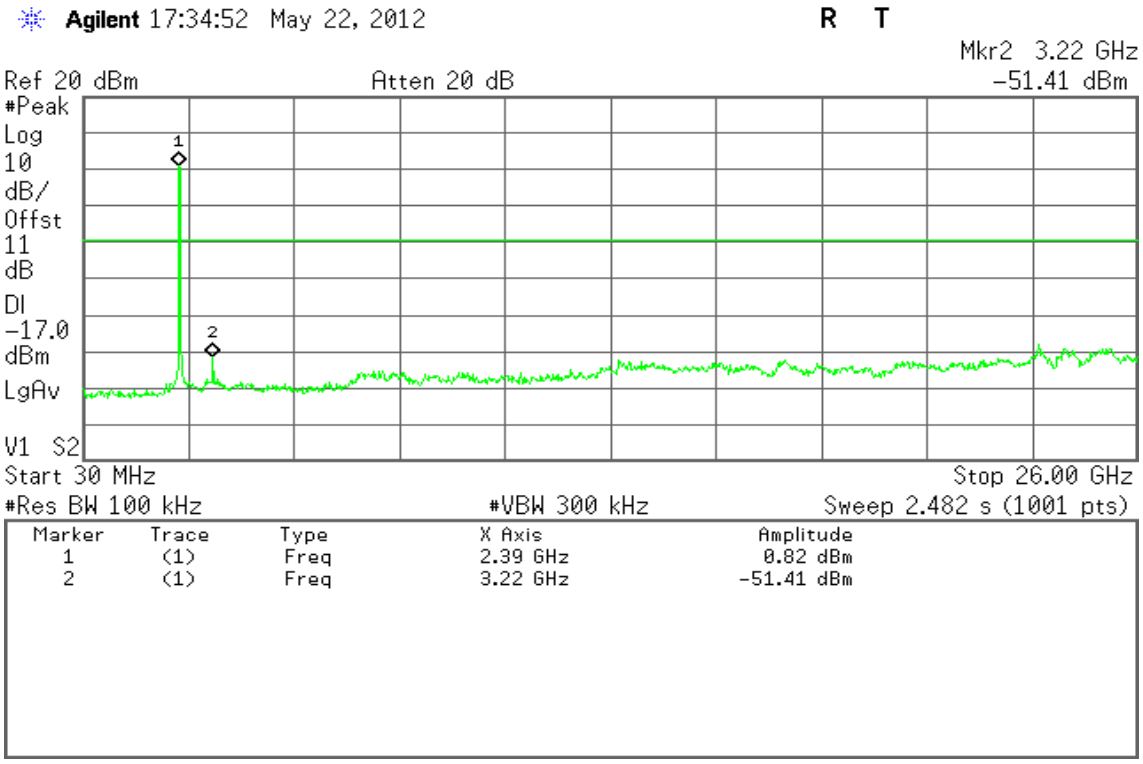

Agilent 19:45:21 May 22, 2012
R T
Mkr1 2.463 23 GHz
Ref 20 dBm
Atten 20 dB
4.52 dBm
#Peak
Log
10
dB/
Offst
11
dB
LgAv
V1 S2
S3 FC
AA
£(f):
FTun
Swp
Center 2.462 00 GHz
Span 20 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 1.92 ms (601 pts)


Agilent 18:01:48 May 22, 2012
R T
Mkr2 3.28 GHz
Ref 20 dBm
Atten 20 dB
-54.45 dBm
#Peak
Log
10
dB/
Offst
11
dB
Dl
-15.5
dBm
LgAv
V1 S2
Start 30 MHz
Stop 26.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 2.482 s (1001 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.45 GHz 1.55 dBm
2 (1) Freq 3.28 GHz -54.45 dBm

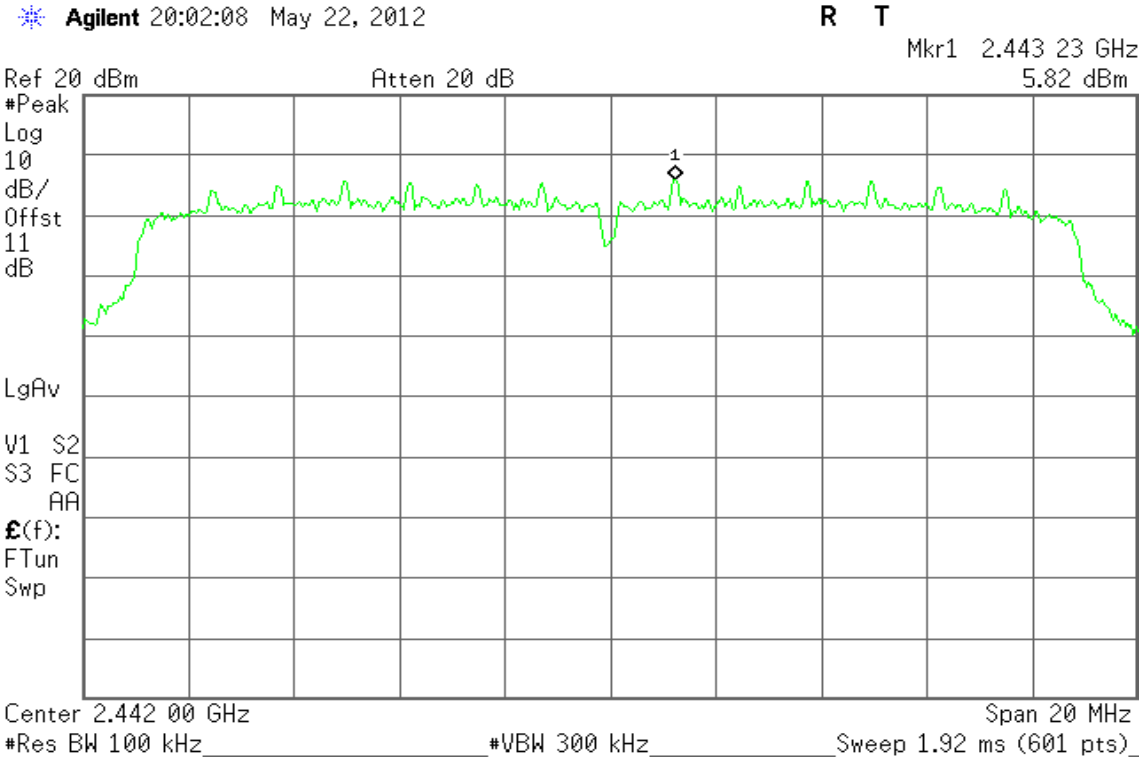
IEEE 802.11n HT 20 MHz mode

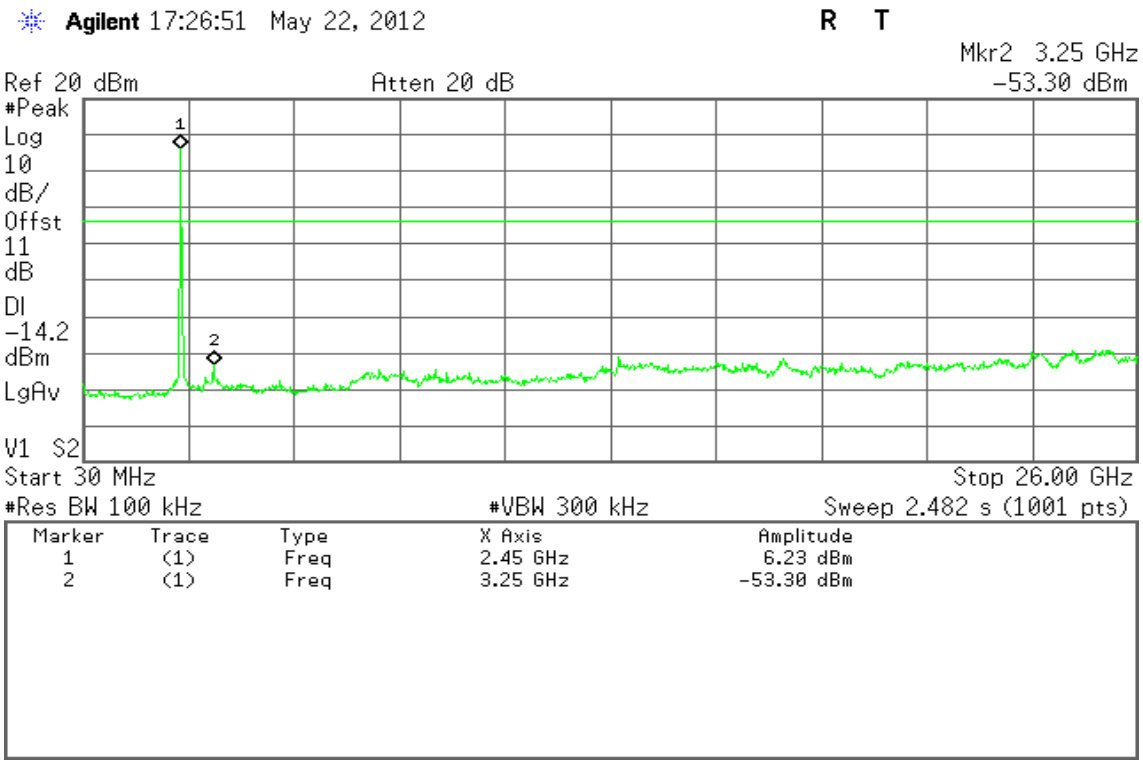
CH Low



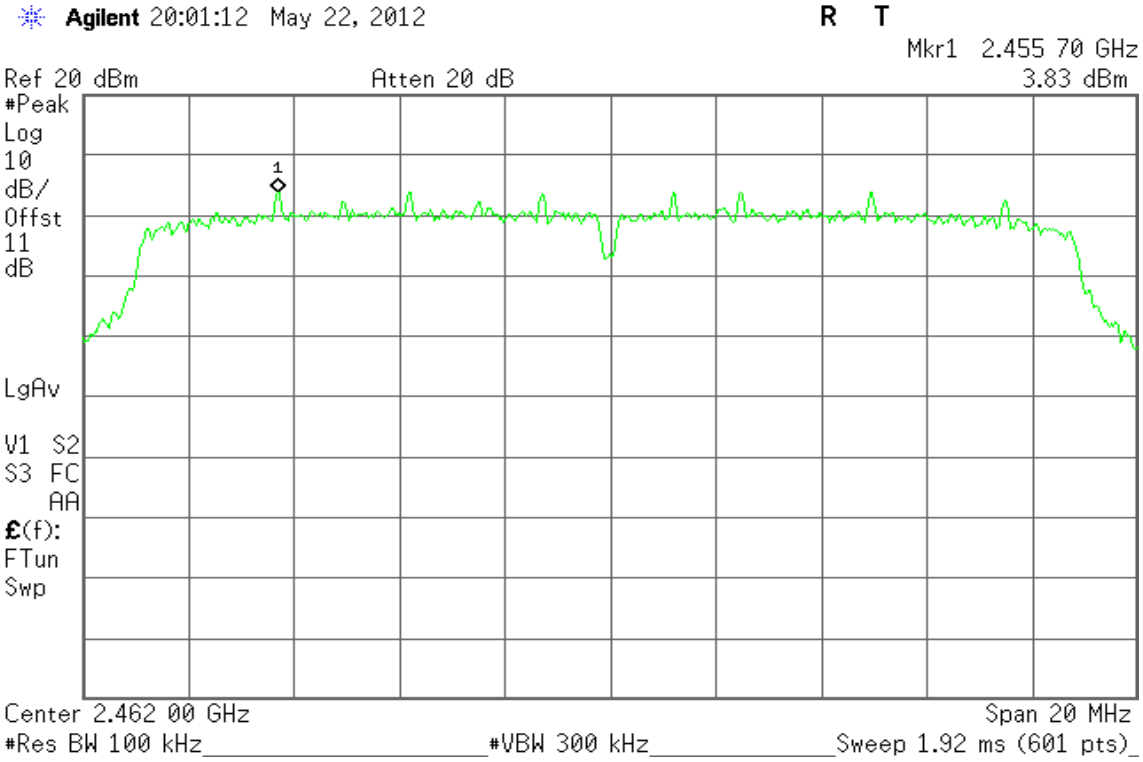


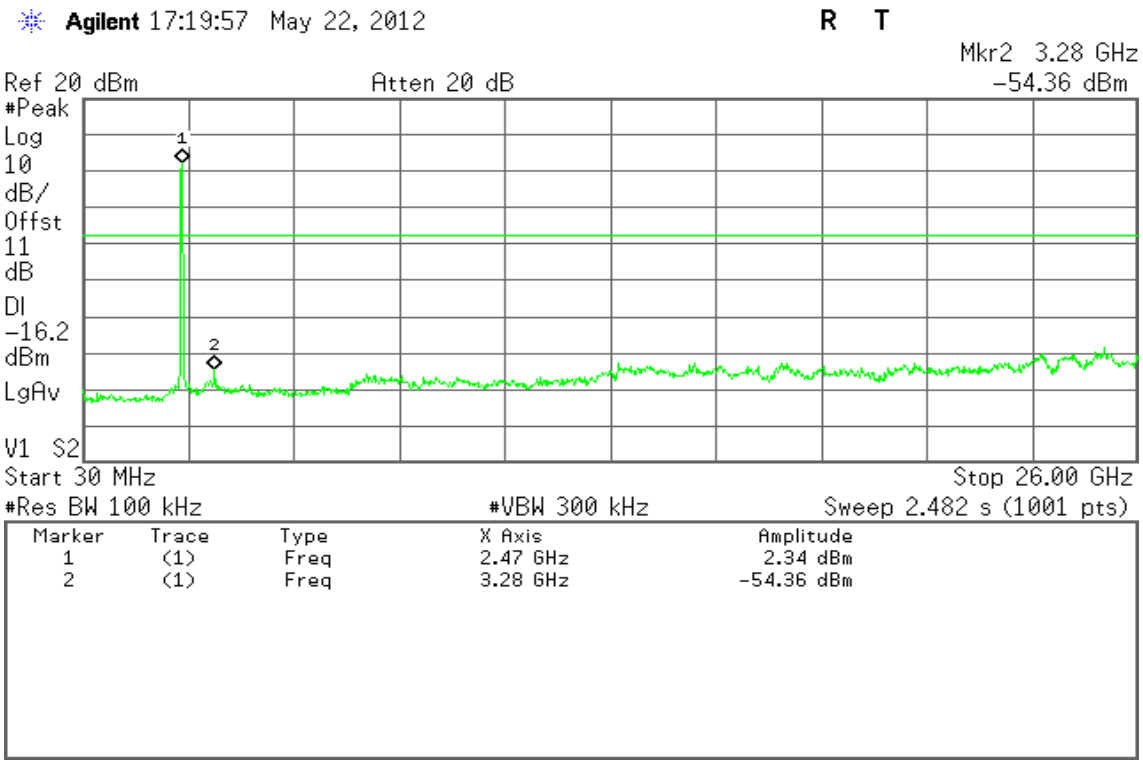
CH Mid


Agilent 20:02:08 May 22, 2012
R T
Mkr1 2.443 23 GHz
5.82 dBm
Ref 20 dBm
Atten 20 dB
#Peak
Log
10
dB/
Offst
11
dB
LgAv
V1 S2
S3 FC
AA
£(f):
FTun
Swp
Center 2.442 00 GHz
Span 20 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 1.92 ms (601 pts)


Agilent 17:26:51 May 22, 2012
R T
Mkr2 3.25 GHz
-53.30 dBm
Ref 20 dBm
Atten 20 dB
#Peak
Log
10
dB/
Offst
11
dB
Dl
-14.2
dBm
LgAv
V1 S2
Start 30 MHz
Stop 26.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 2.482 s (1001 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.45 GHz 6.23 dBm
2 (1) Freq 3.25 GHz -53.30 dBm

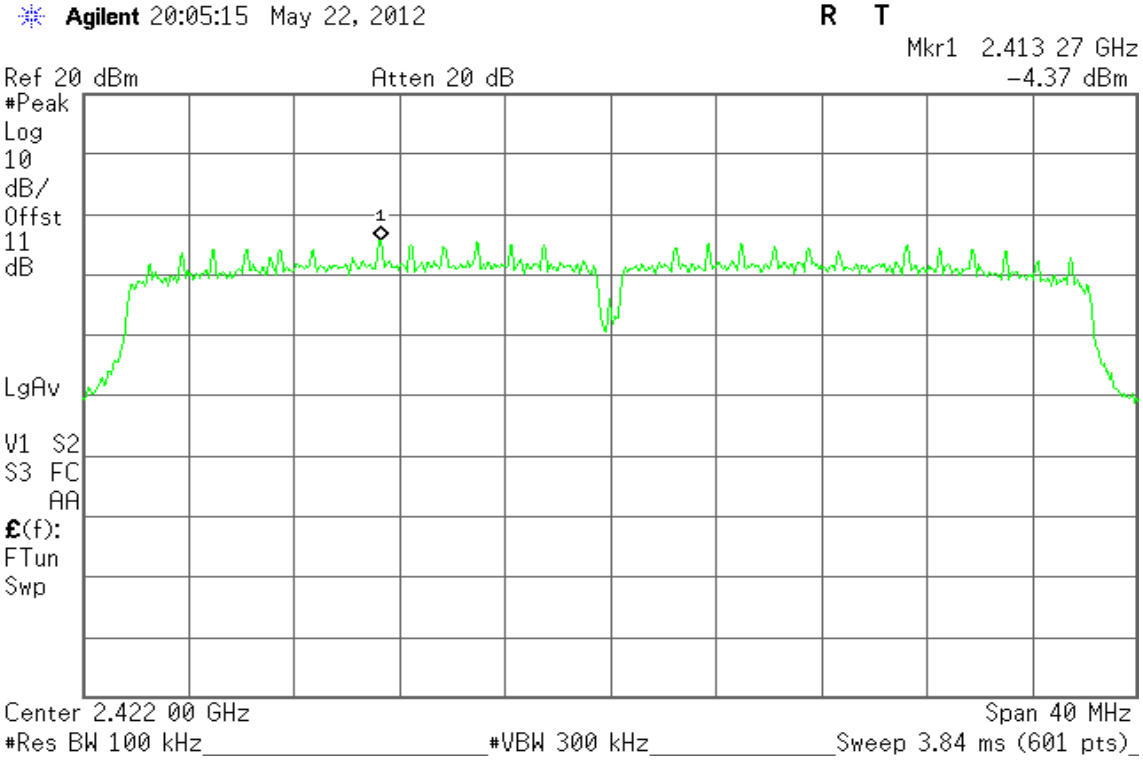
CH High

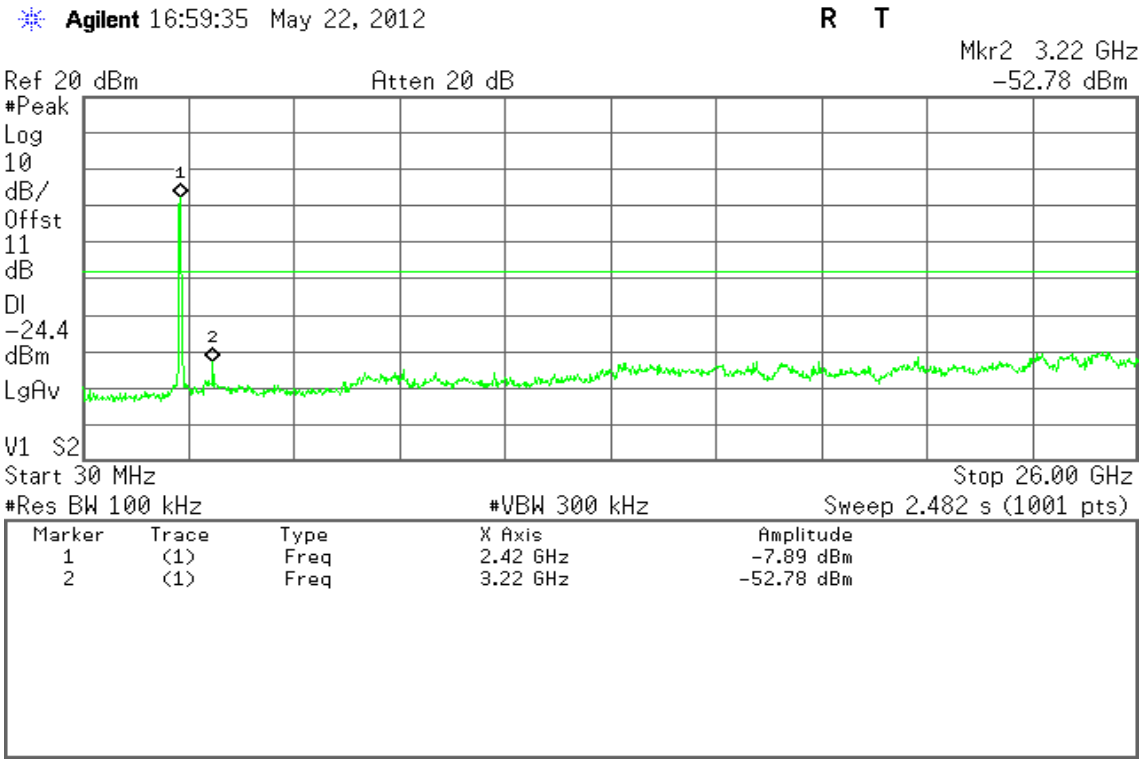

Agilent 20:01:12 May 22, 2012
R T
Mkr1 2.455 70 GHz
3.83 dBm
Ref 20 dBm
Atten 20 dB
#Peak
Log
10
dB/
Offst
11
dB
LgAv
V1 S2
S3 FC
AA
£(f):
FTun
Swp
Center 2.462 00 GHz
Span 20 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 1.92 ms (601 pts)


Agilent 17:19:57 May 22, 2012
R T
Mkr2 3.28 GHz
-54.36 dBm
Ref 20 dBm
Atten 20 dB
#Peak
Log
10
dB/
Offst
11
dB
Dl
-16.2
dBm
LgAv
V1 S2
Start 30 MHz
Stop 26.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 2.482 s (1001 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.47 GHz 2.34 dBm
2 (1) Freq 3.28 GHz -54.36 dBm

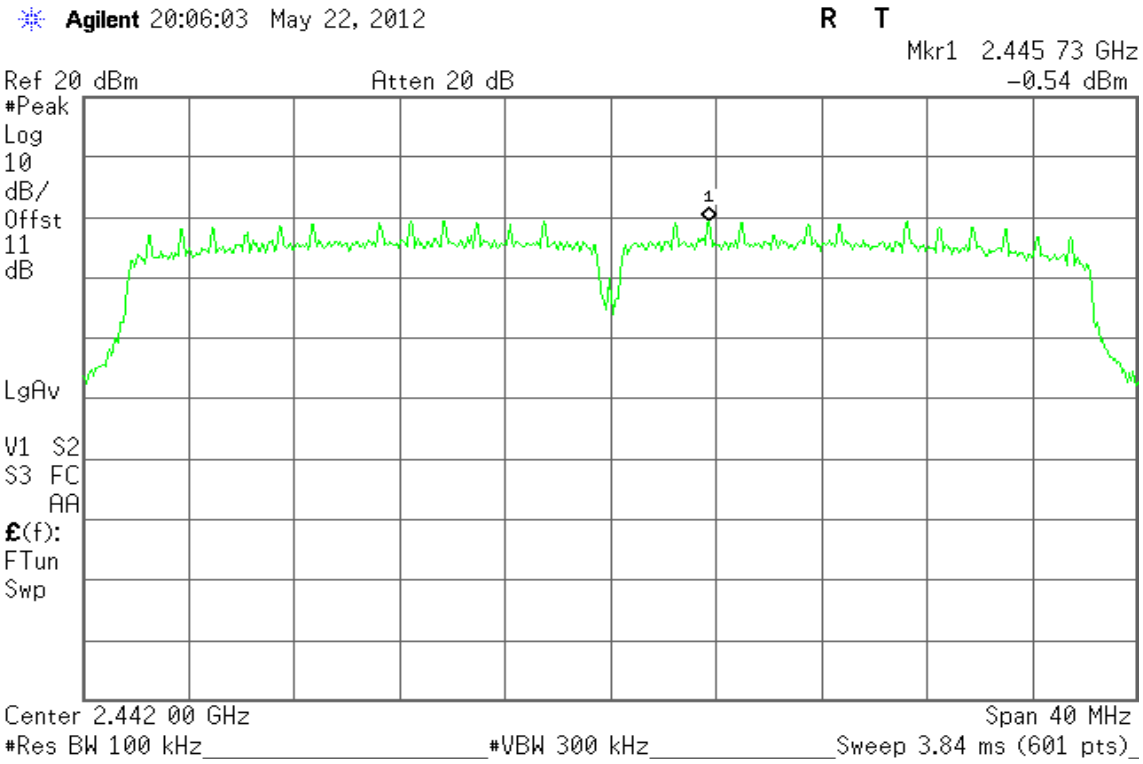
IEEE 802.11n HT 40 MHz mode

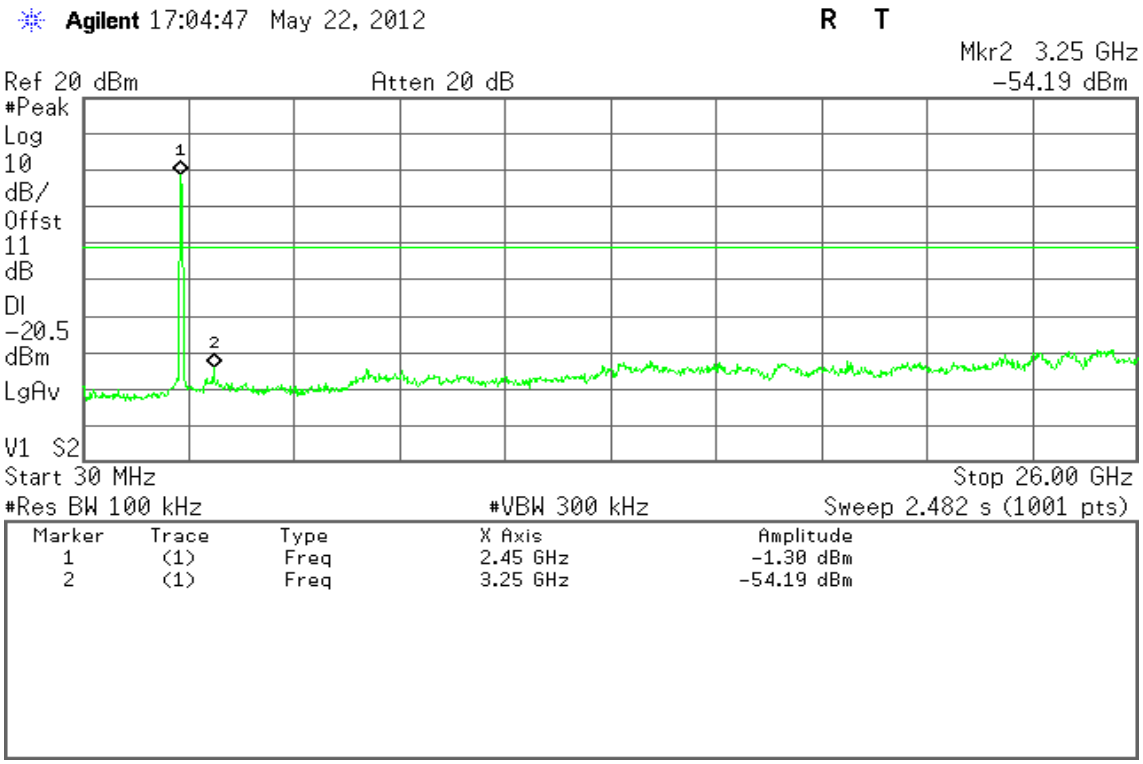
CH Low



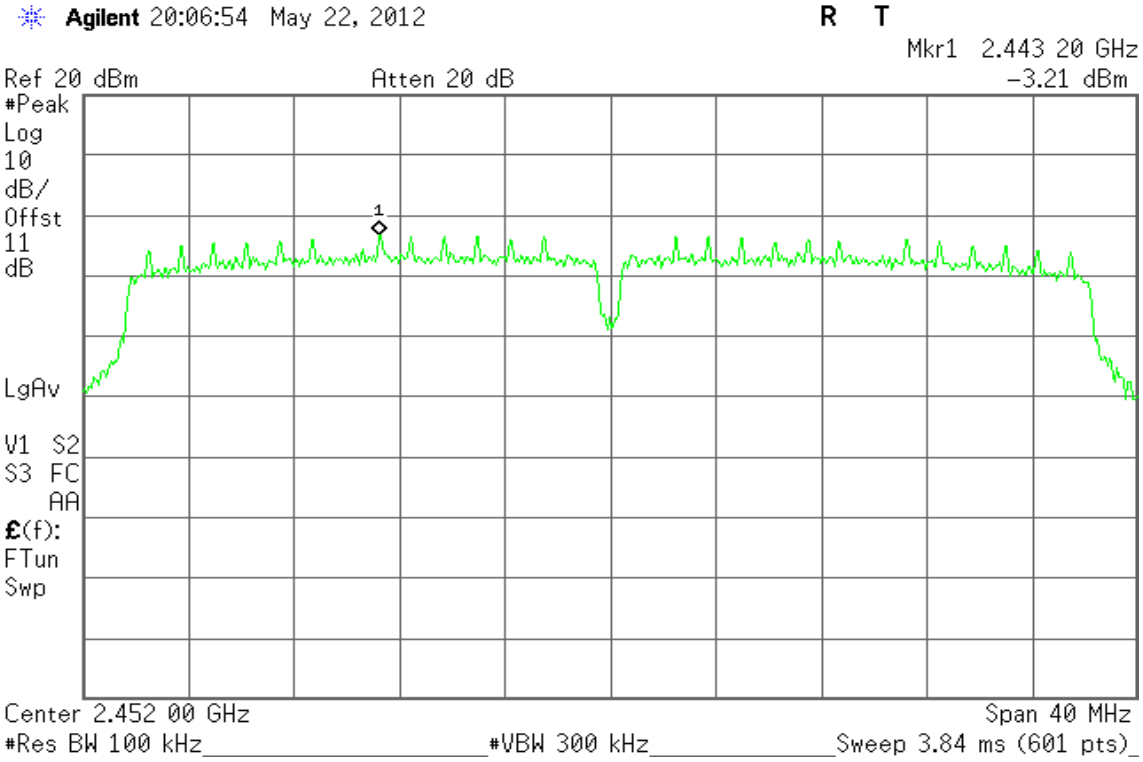


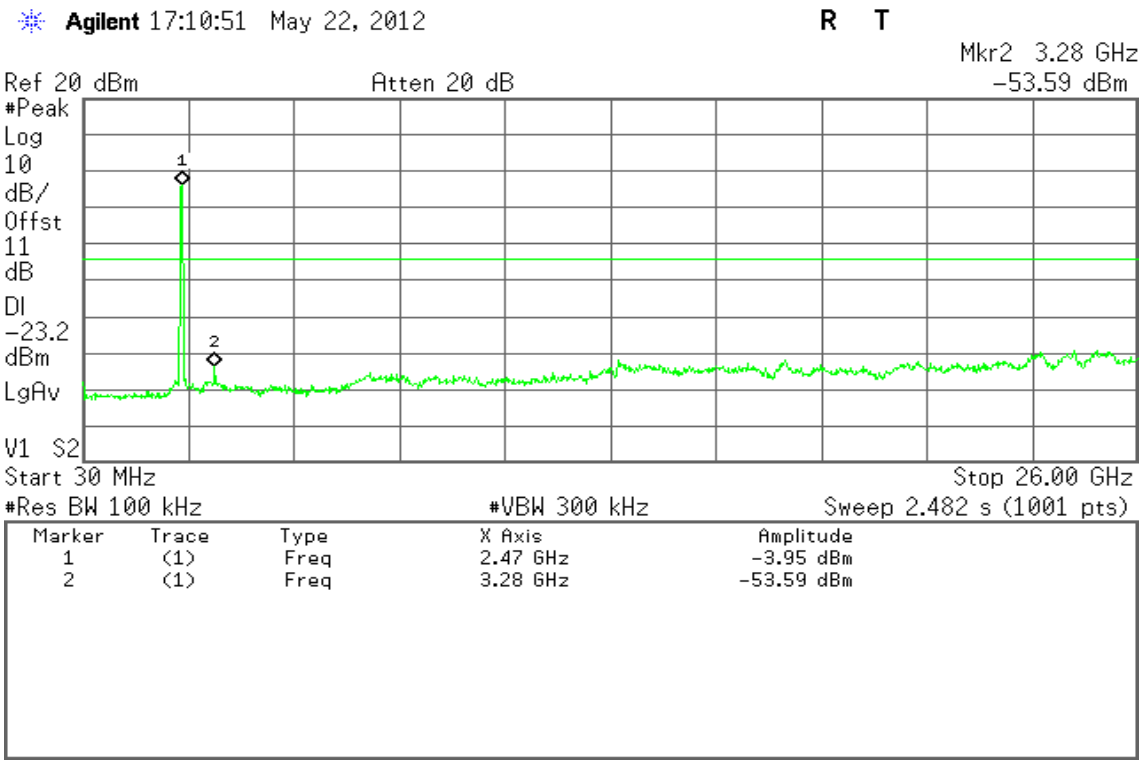
CH Mid


Agilent 20:06:03 May 22, 2012
R T
Mkr1 2.445 73 GHz
Ref 20 dBm
Atten 20 dB
-0.54 dBm
#Peak
Log
10
dB/
Offst
11
dB
LgAv
V1 S2
S3 FC
AA
£(f):
FTun
Swp
1
Center 2.442 00 GHz
Span 40 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 3.84 ms (601 pts)


Agilent 17:04:47 May 22, 2012
R T
Mkr2 3.25 GHz
Ref 20 dBm
Atten 20 dB
-54.19 dBm
#Peak
Log
10
dB/
Offst
11
dB
Dl
-20.5
dBm
LgAv
V1 S2
1
2
Start 30 MHz
Stop 26.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 2.482 s (1001 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.45 GHz -1.30 dBm
2 (1) Freq 3.25 GHz -54.19 dBm

CH High


Agilent 20:06:54 May 22, 2012
R T
Mkr1 2.443 20 GHz
-3.21 dBm
Ref 20 dBm
Atten 20 dB
#Peak
Log
10
dB/
Offst
11
dB
LgAv
V1 S2
S3 FC
AA
£(f):
FTun
Swp
Center 2.452 00 GHz
Span 40 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 3.84 ms (601 pts)

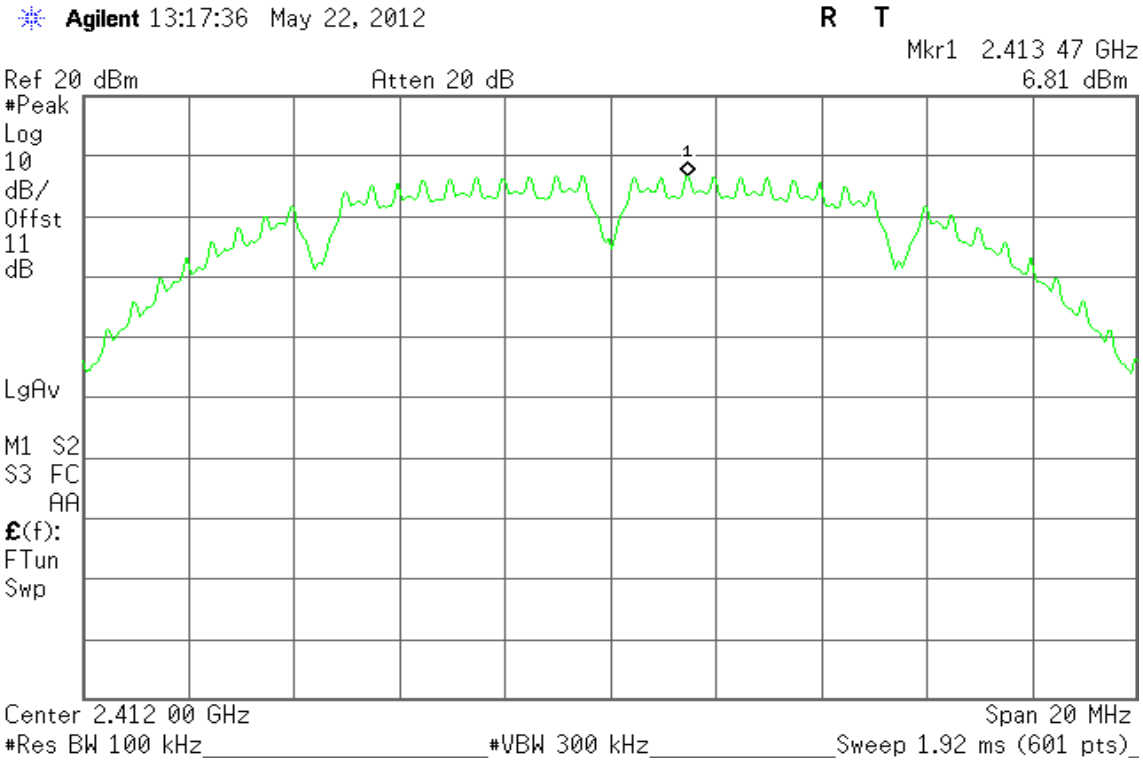

Agilent 17:10:51 May 22, 2012
R T
Mkr2 3.28 GHz
-53.59 dBm
Ref 20 dBm
Atten 20 dB
#Peak
Log
10
dB/
Offst
11
dB
Dl
-23.2
dBm
LgAv
V1 S2
Start 30 MHz
Stop 26.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 2.482 s (1001 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.47 GHz -3.95 dBm
2 (1) Freq 3.28 GHz -53.59 dBm

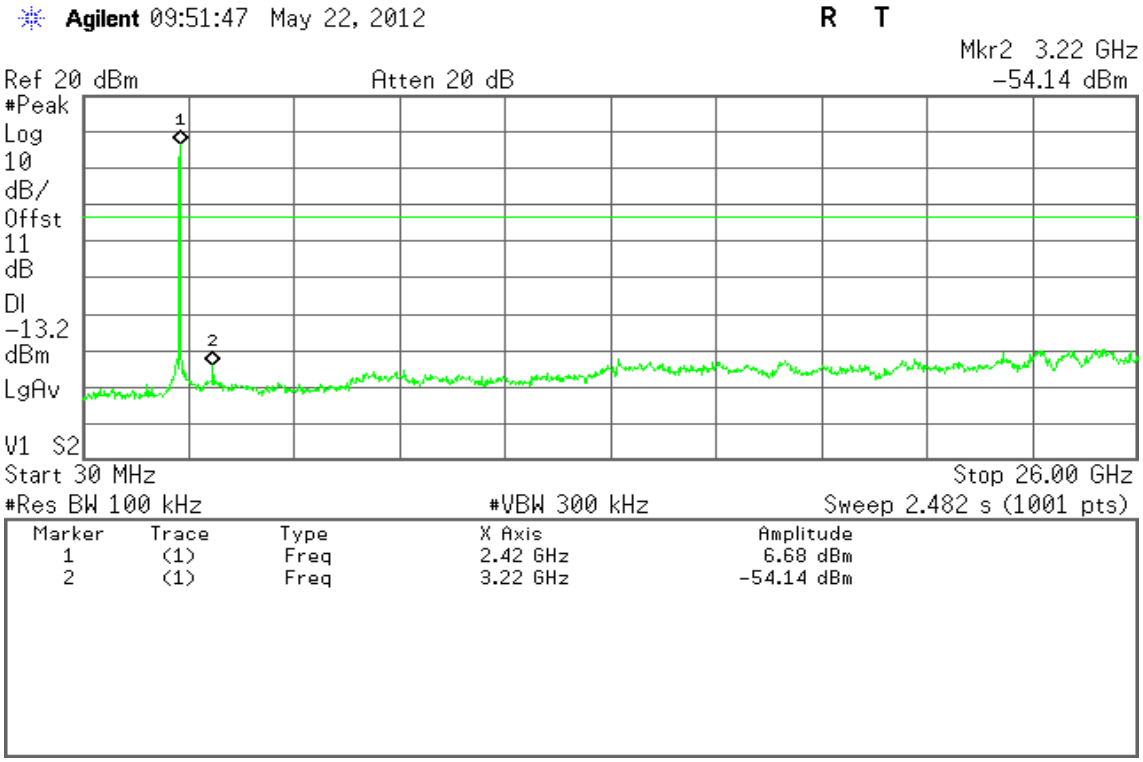
For PIFA Antenna

Test Plot

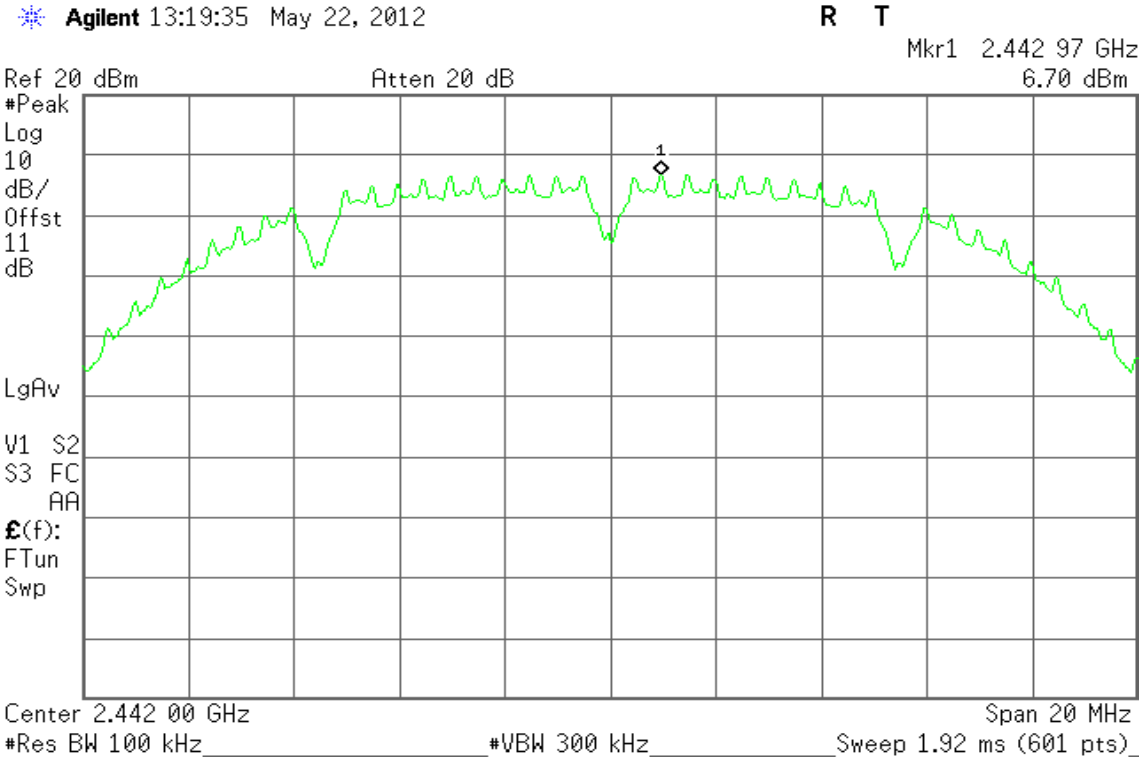
IEEE 802.11b mode

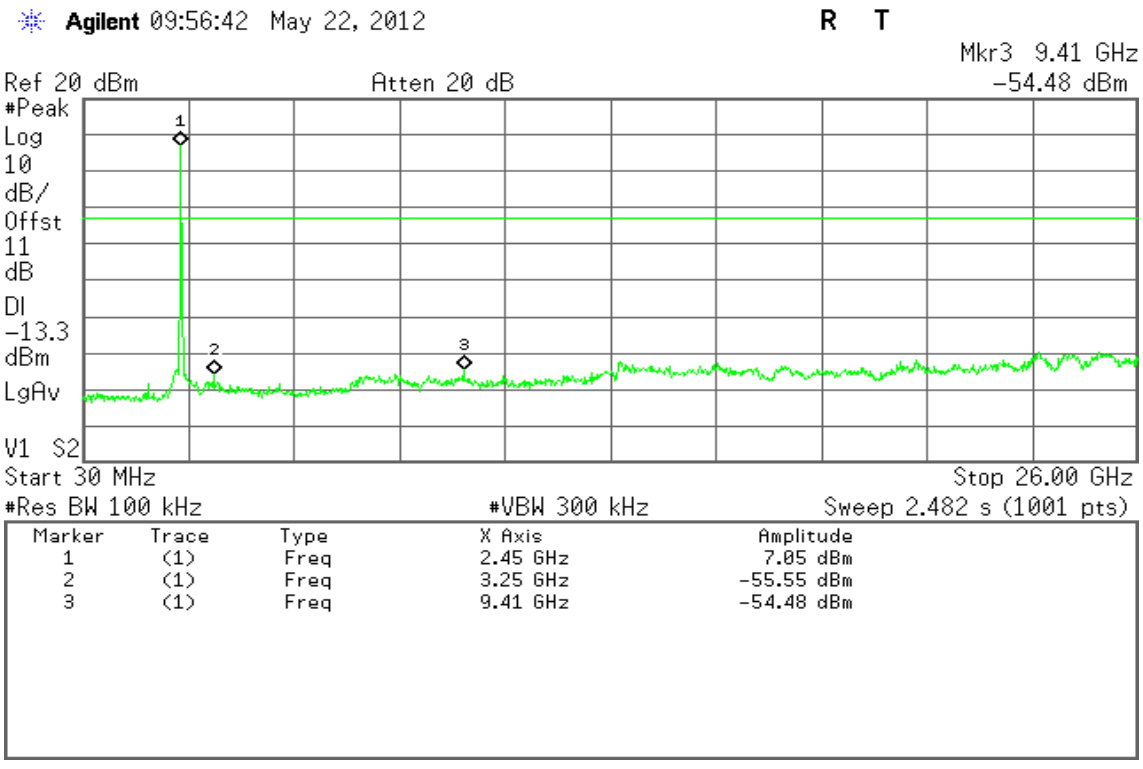
CH Low



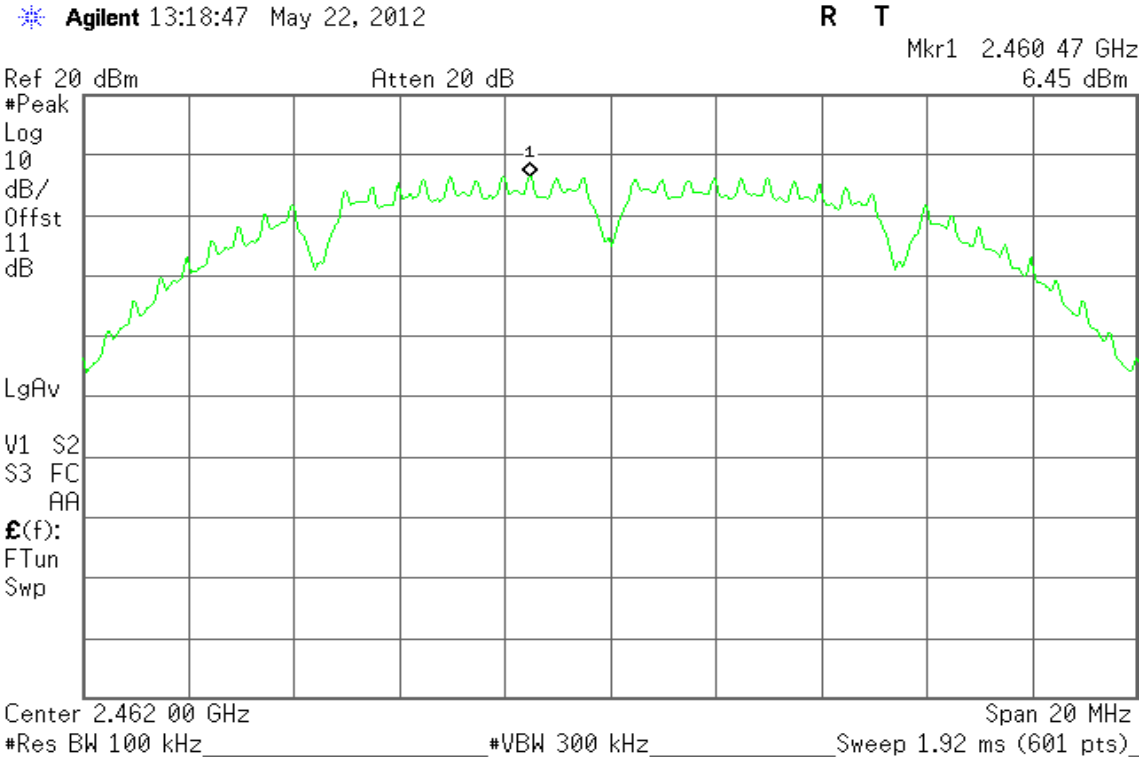


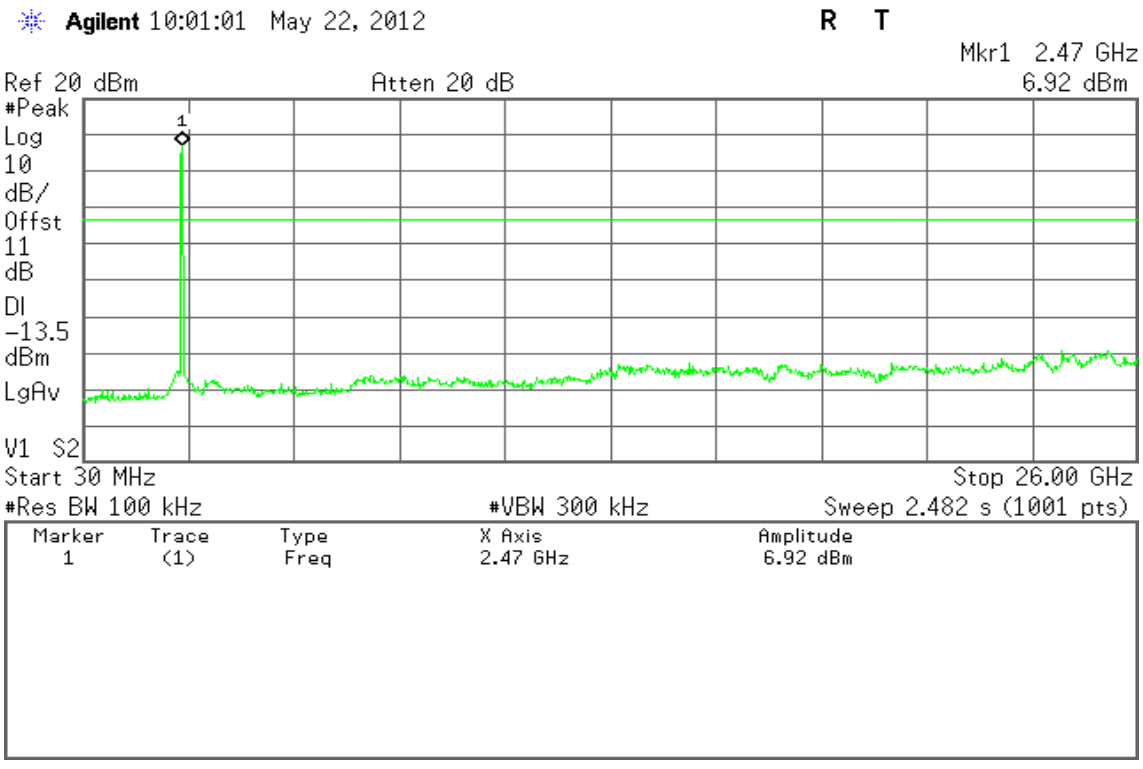
CH Mid


Agilent 13:19:35 May 22, 2012
R T
Mkr1 2.442 97 GHz
6.70 dBm
Ref 20 dBm
Atten 20 dB
#Peak
Log
10
dB/
Offst
11
dB
LgAv
V1 S2
S3 FC
AA
£(f):
FTun
Swp
Center 2.442 00 GHz
Span 20 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 1.92 ms (601 pts)


Agilent 09:56:42 May 22, 2012
R T
Mkr3 9.41 GHz
-54.48 dBm
Ref 20 dBm
Atten 20 dB
#Peak
Log
10
dB/
Offst
11
dB
Dl
-13.3
dBm
LgAv
V1 S2
Start 30 MHz
Stop 26.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 2.482 s (1001 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.45 GHz 7.05 dBm
2 (1) Freq 3.25 GHz -55.55 dBm
3 (1) Freq 9.41 GHz -54.48 dBm

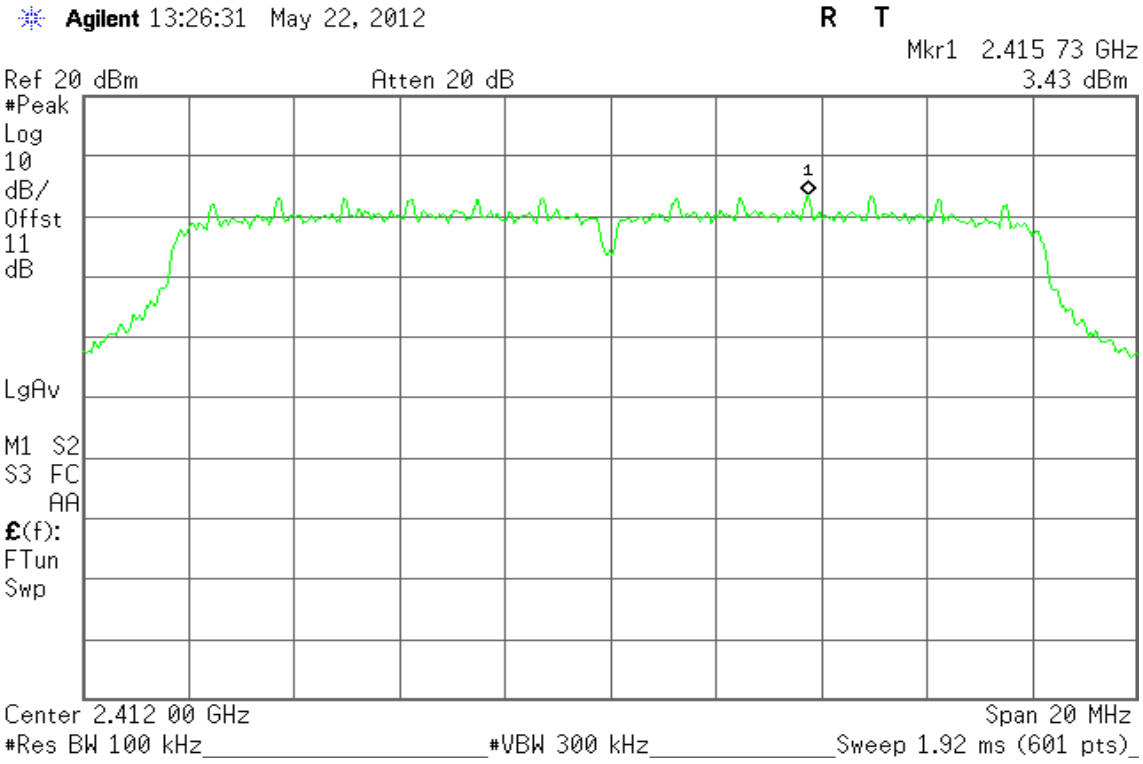
CH High

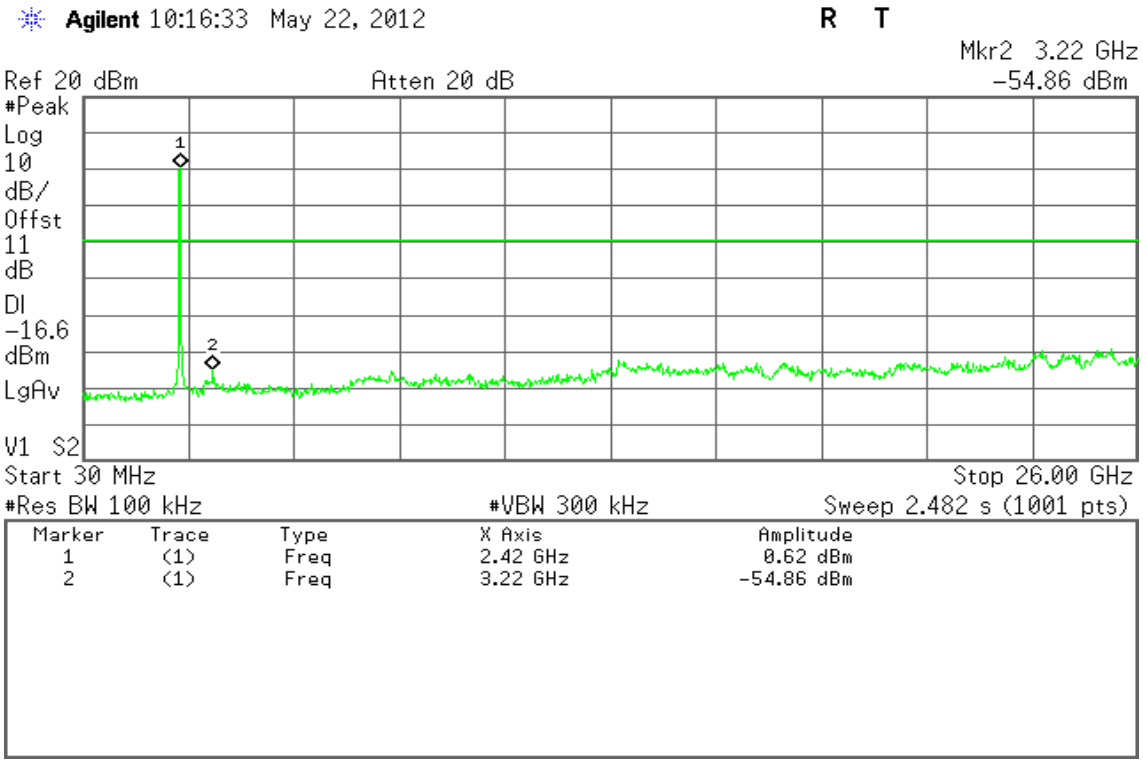

Agilent 13:18:47 May 22, 2012
R T
Mkr1 2.460 47 GHz
6.45 dBm
Ref 20 dBm
Atten 20 dB
#Peak
Log
10
dB/
Offst
11
dB
LgAv
V1 S2
S3 FC
AA
£(f):
FTun
Swp
Center 2.462 00 GHz
Span 20 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 1.92 ms (601 pts)


Agilent 10:01:01 May 22, 2012
R T
Mkr1 2.47 GHz
6.92 dBm
Ref 20 dBm
Atten 20 dB
#Peak
Log
10
dB/
Offst
11
dB
Dl
-13.5
dBm
LgAv
V1 S2
Start 30 MHz
Stop 26.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 2.482 s (1001 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.47 GHz 6.92 dBm

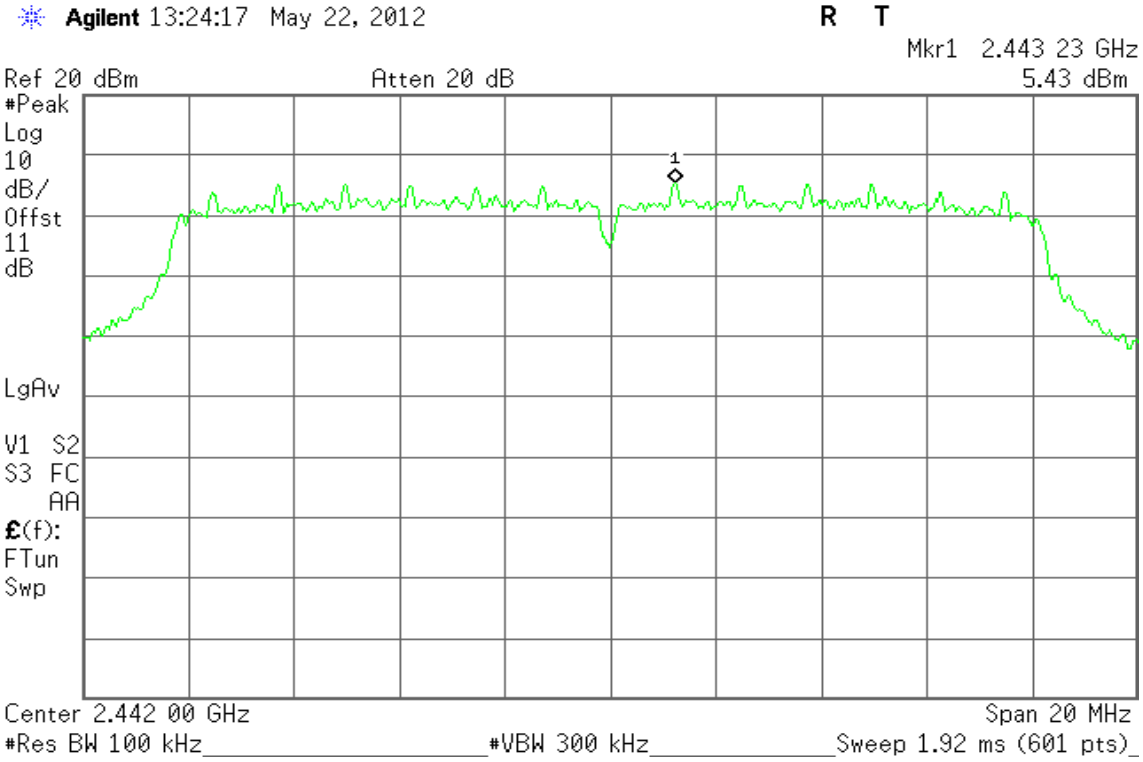
IEEE 802.11g mode

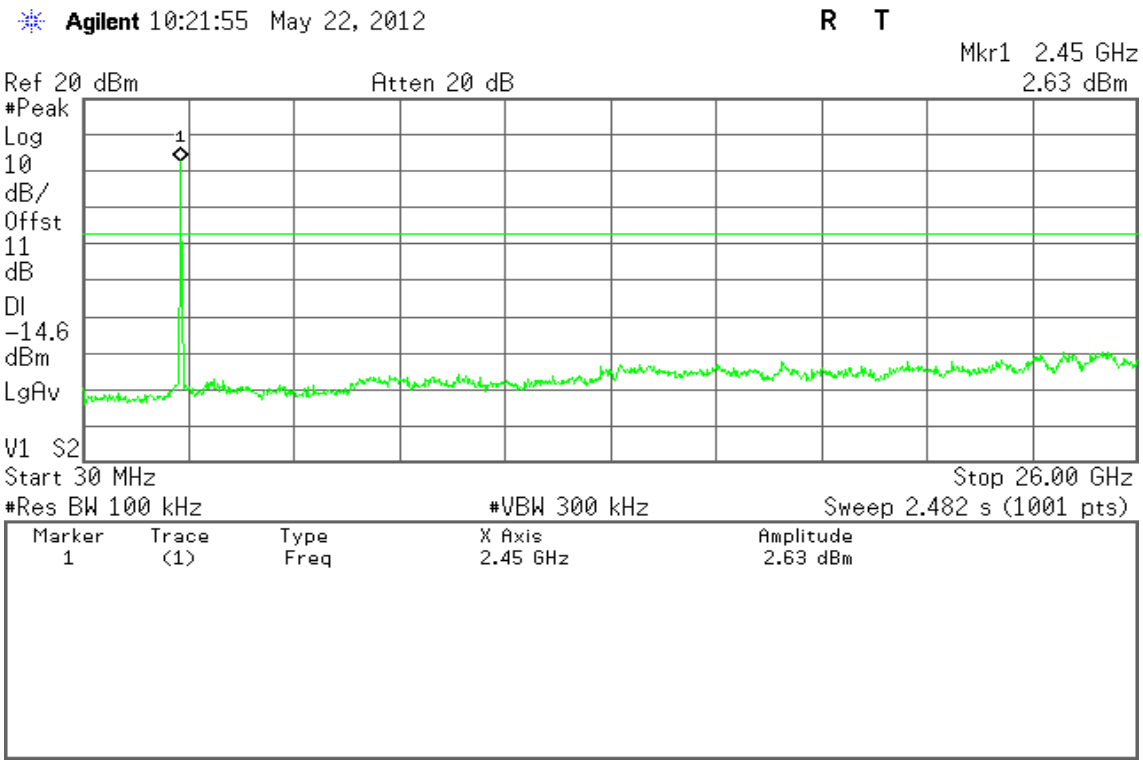
CH Low



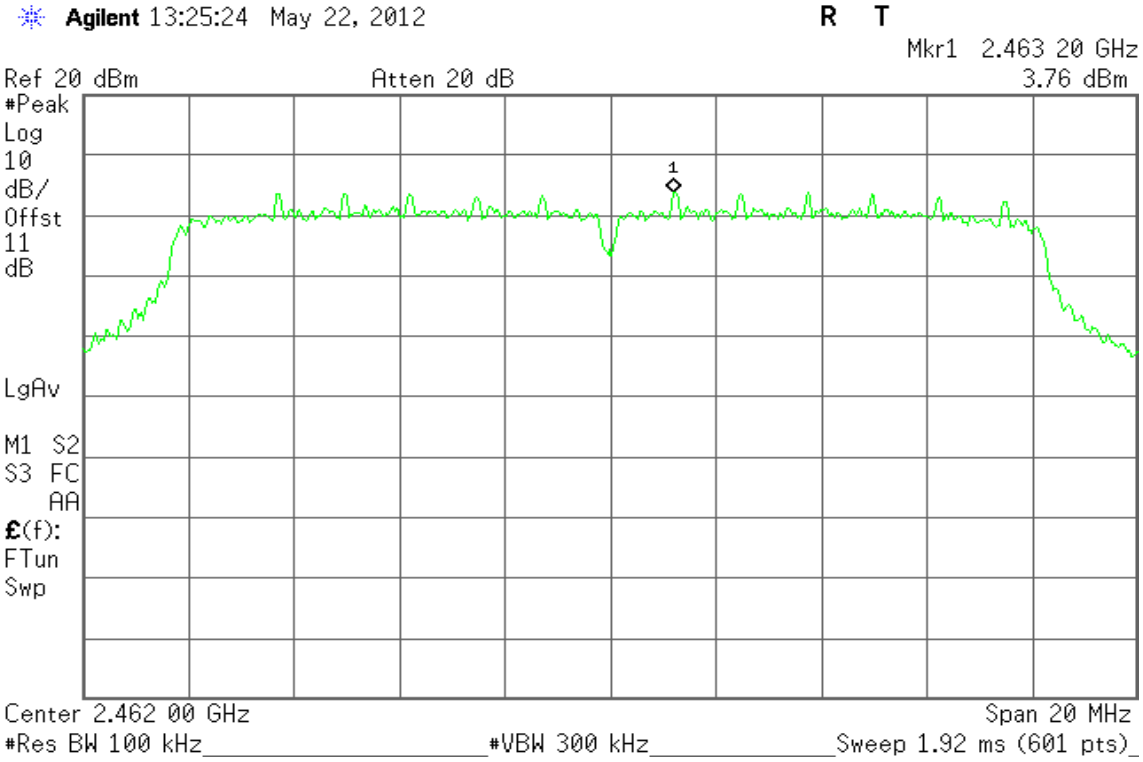


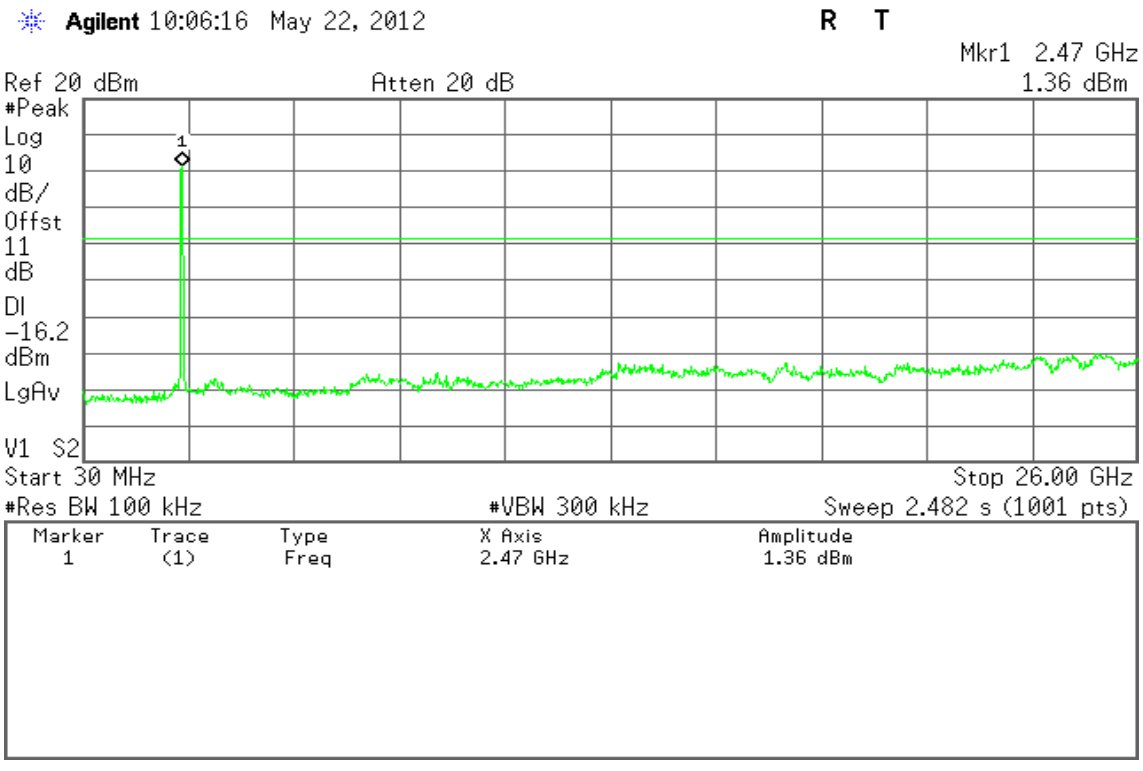
CH Mid


Agilent 13:24:17 May 22, 2012
R T
Mkr1 2.443 23 GHz
5.43 dBm
Ref 20 dBm
Atten 20 dB
#Peak
Log
10
dB/
Offst
11
dB
LgAv
V1 S2
S3 FC
AA
£(f):
FTun
Swp
Center 2.442 00 GHz
Span 20 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 1.92 ms (601 pts)


Agilent 10:21:55 May 22, 2012
R T
Mkr1 2.45 GHz
2.63 dBm
Ref 20 dBm
Atten 20 dB
#Peak
Log
10
dB/
Offst
11
dB
Dl
-14.6
dBm
LgAv
V1 S2
Start 30 MHz
Stop 26.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 2.482 s (1001 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.45 GHz 2.63 dBm

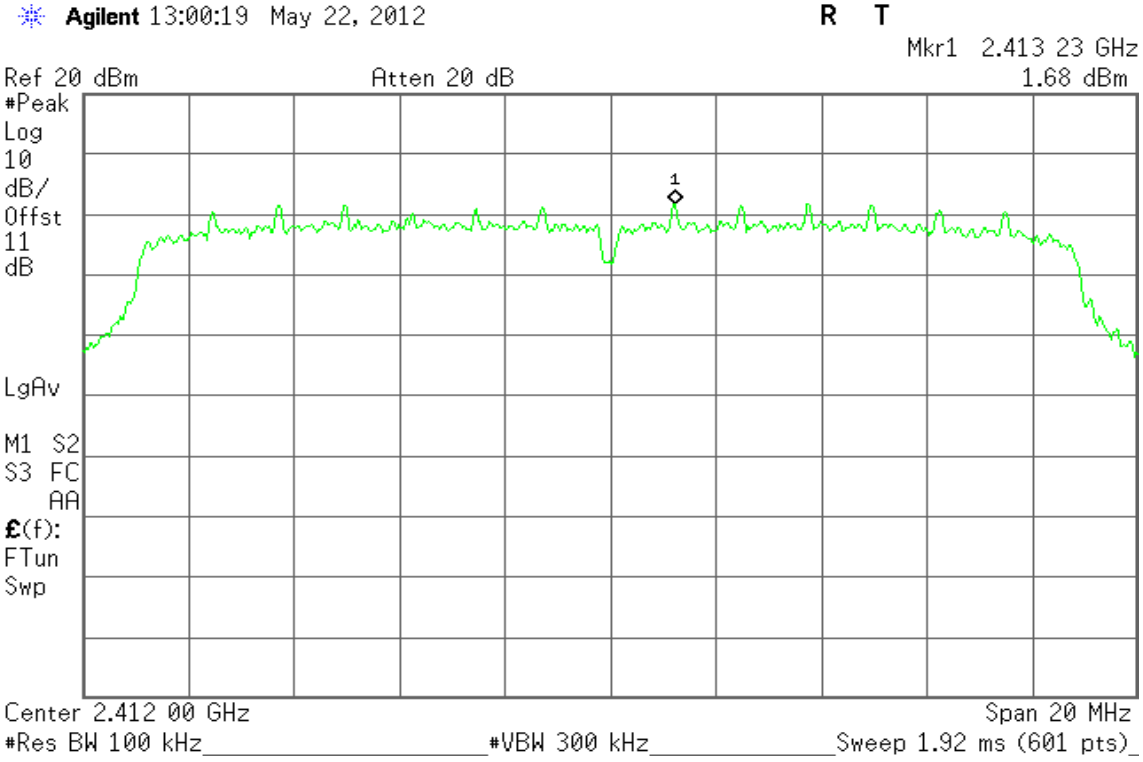
CH High

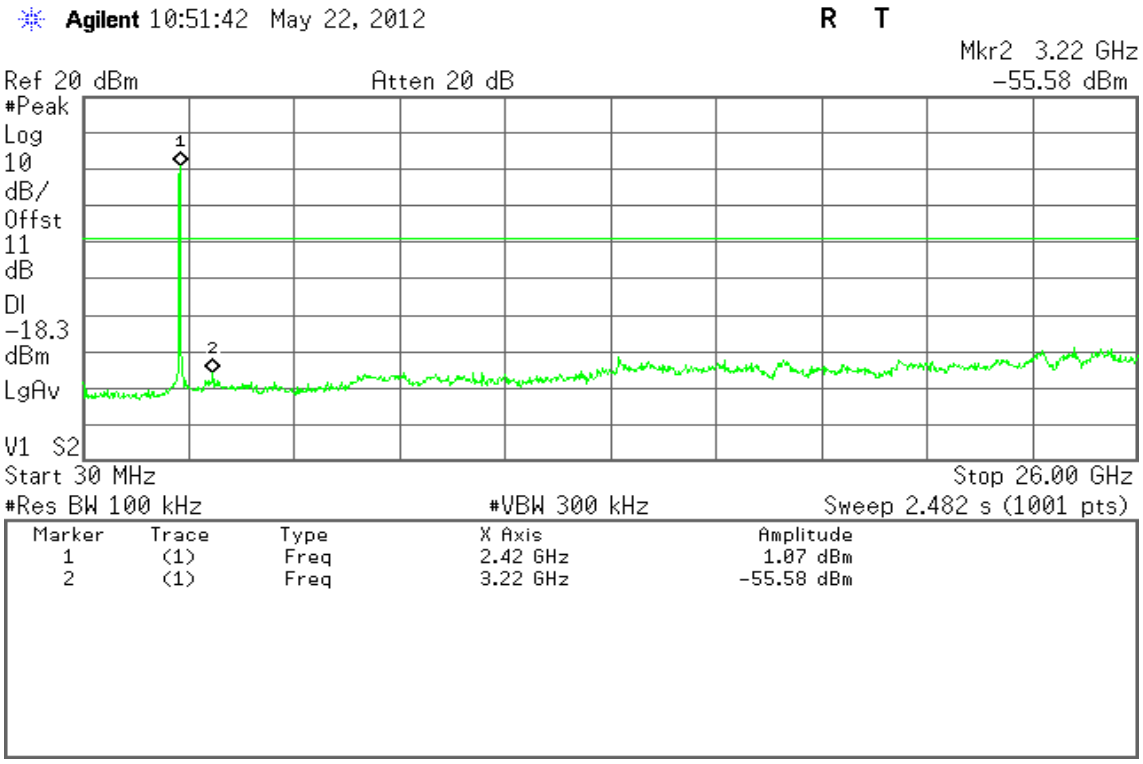

Agilent 13:25:24 May 22, 2012
R T
Mkr1 2.463 20 GHz
3.76 dBm
Ref 20 dBm
Atten 20 dB
#Peak
Log
10
dB/
Offst
11
dB
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Center 2.462 00 GHz
Span 20 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 1.92 ms (601 pts)


Agilent 10:06:16 May 22, 2012
R T
Mkr1 2.47 GHz
1.36 dBm
Ref 20 dBm
Atten 20 dB
#Peak
Log
10
dB/
Offst
11
dB
Dl
-16.2
dBm
LgAv
V1 S2
Start 30 MHz
Stop 26.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 2.482 s (1001 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.47 GHz 1.36 dBm

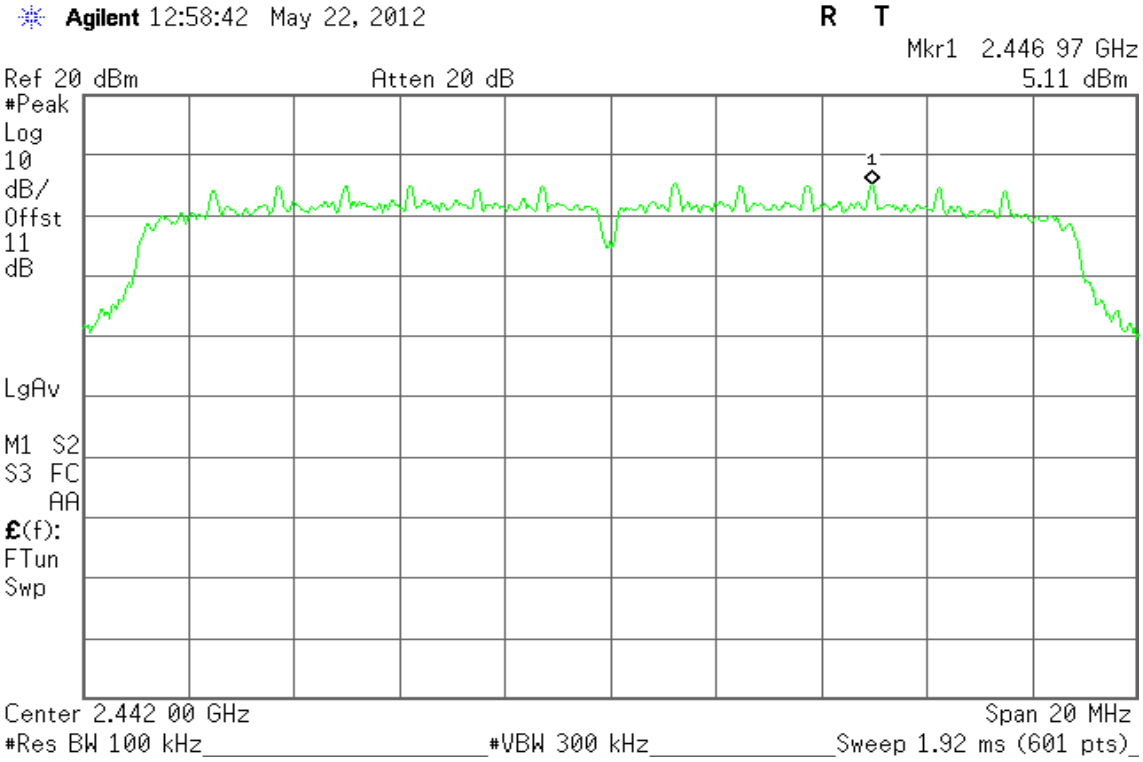
IEEE 802.11n HT 20 MHz mode

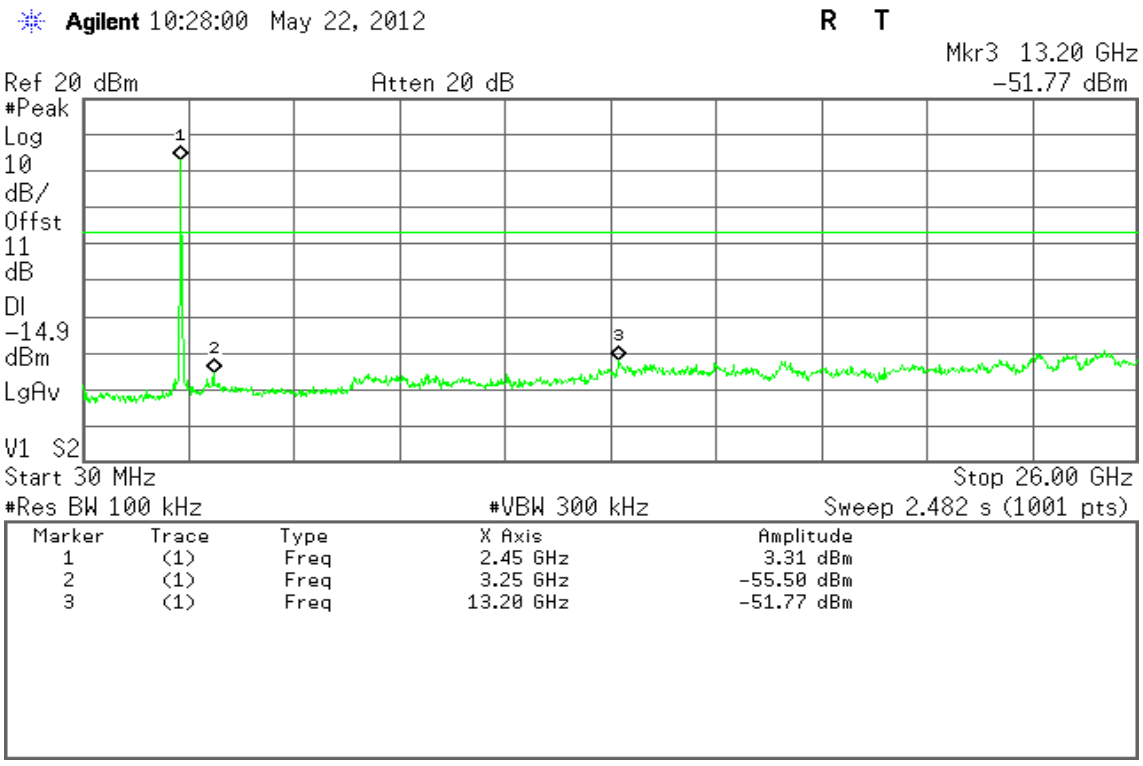
CH Low





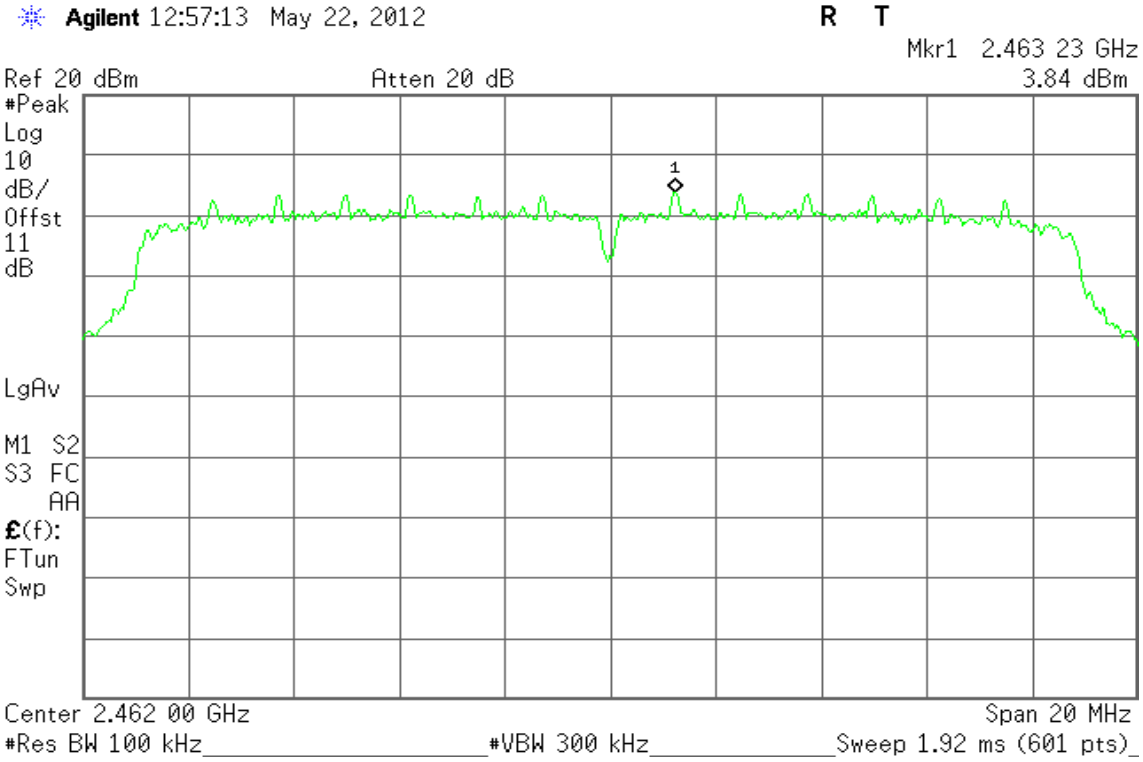
CH Mid

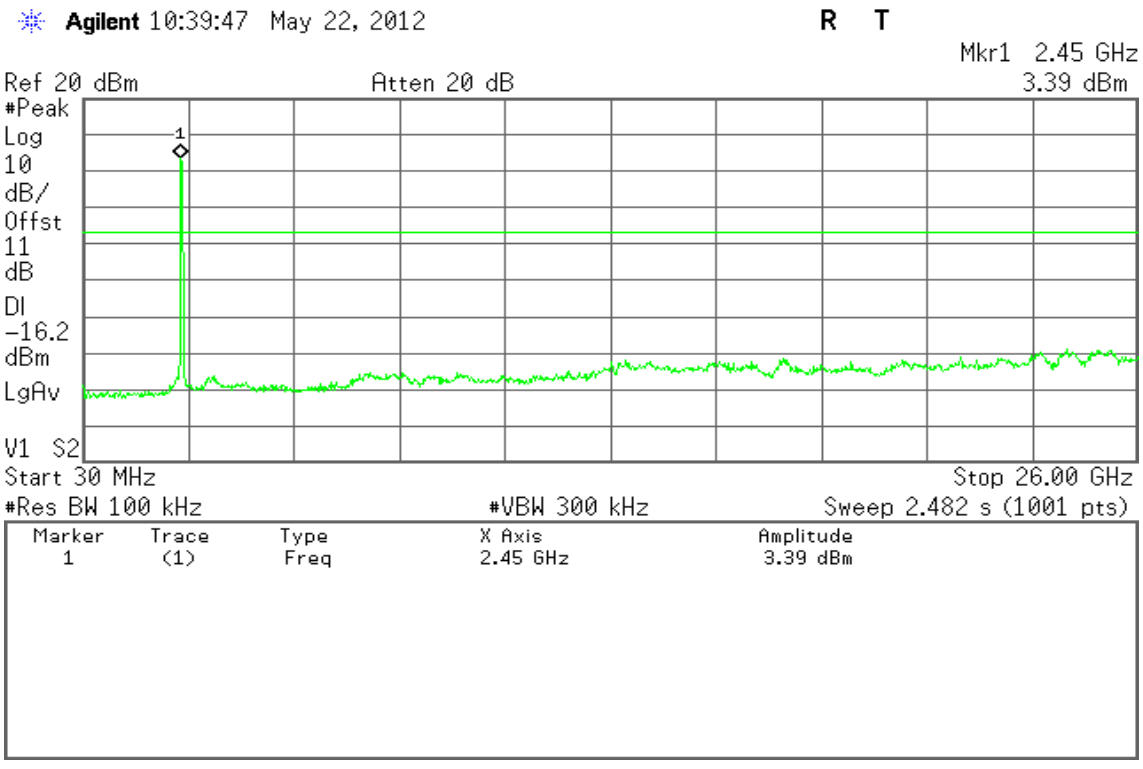




Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.45 GHz	3.31 dBm
2	(1)	Freq	3.25 GHz	-55.50 dBm
3	(1)	Freq	13.20 GHz	-51.77 dBm

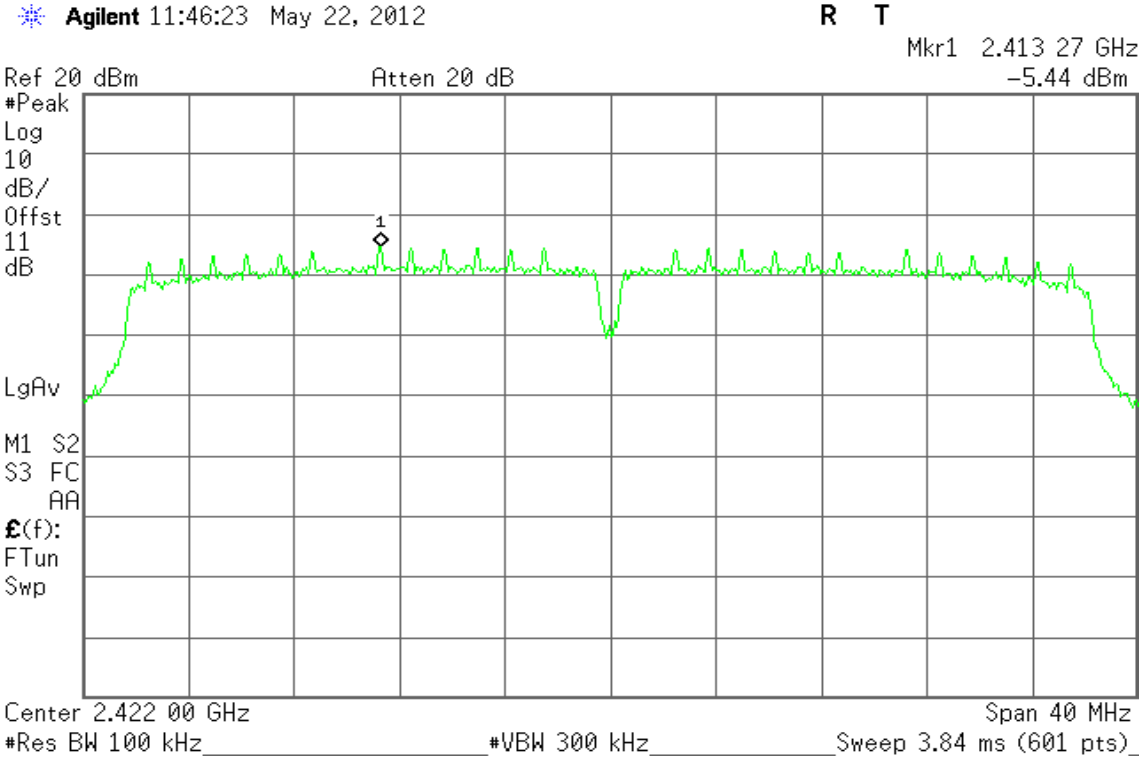
CH High

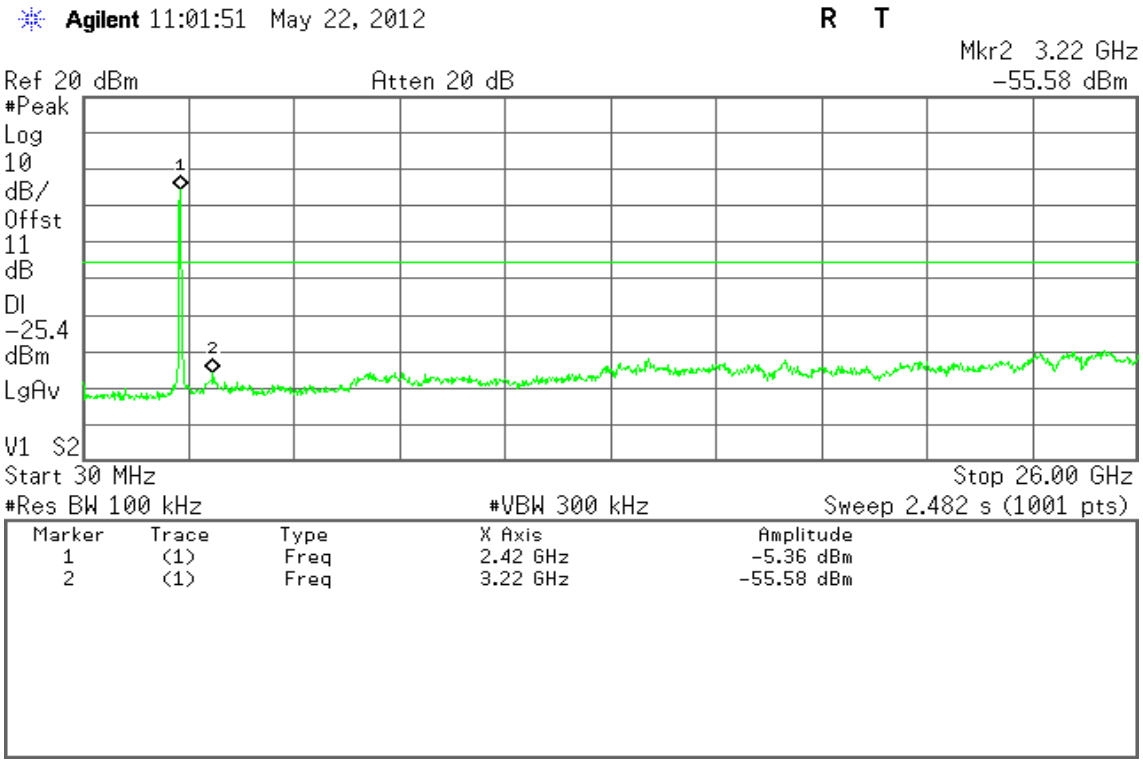

Agilent 12:57:13 May 22, 2012
R T
Mkr1 2.463 23 GHz
3.84 dBm
Ref 20 dBm
Atten 20 dB
#Peak
Log
10
dB/
Offst
11
dB
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Center 2.462 00 GHz
Span 20 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 1.92 ms (601 pts)


Agilent 10:39:47 May 22, 2012
R T
Mkr1 2.45 GHz
3.39 dBm
Ref 20 dBm
Atten 20 dB
#Peak
Log
10
dB/
Offst
11
dB
Dl
-16.2
dBm
LgAv
V1 S2
Start 30 MHz
Stop 26.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 2.482 s (1001 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.45 GHz 3.39 dBm

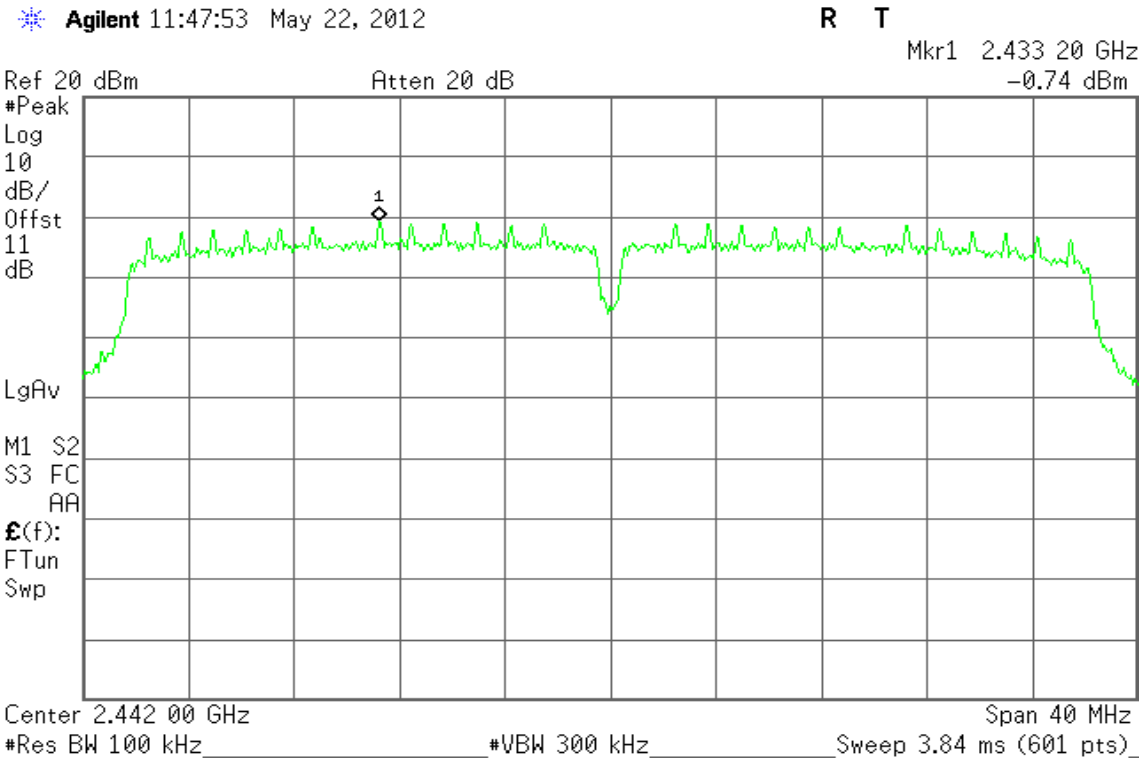
IEEE 802.11n HT 40 MHz mode

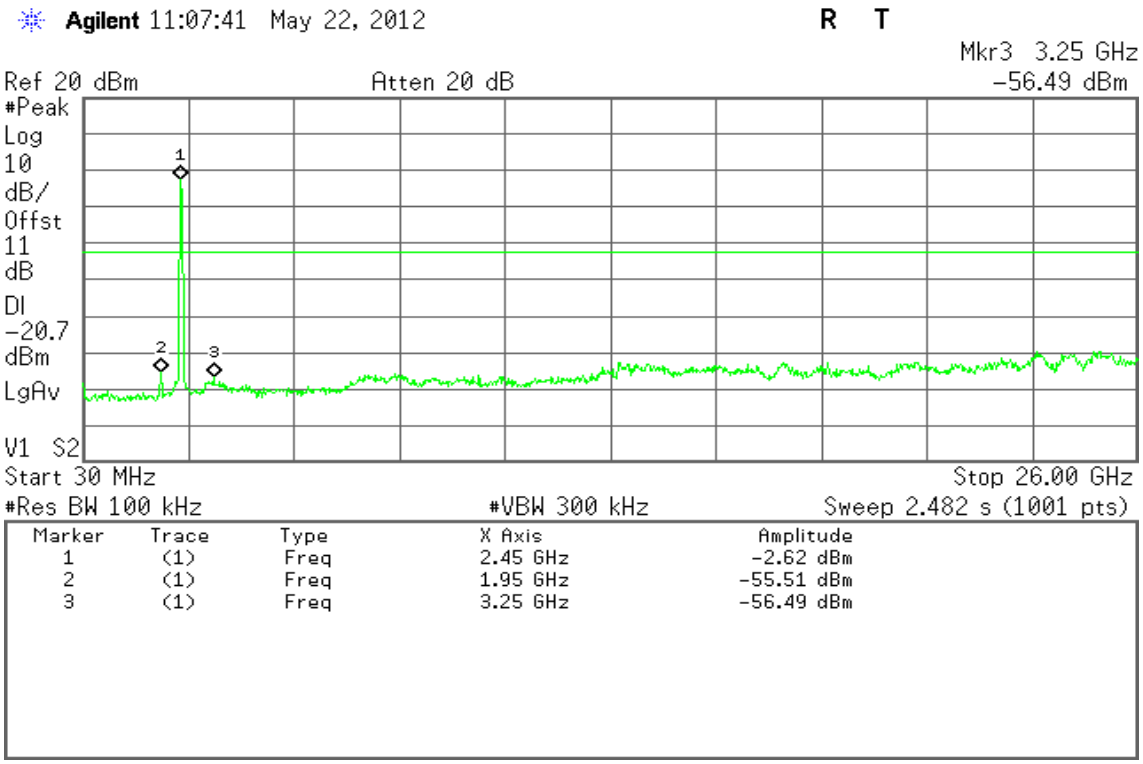
CH Low



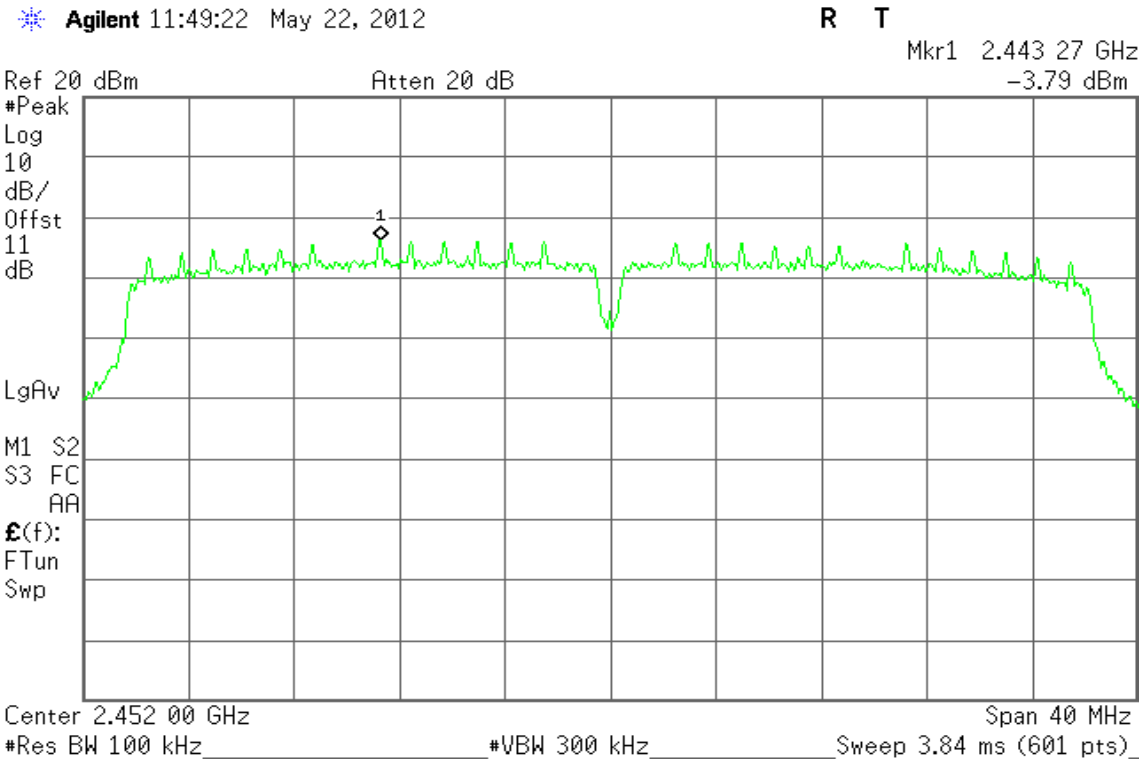


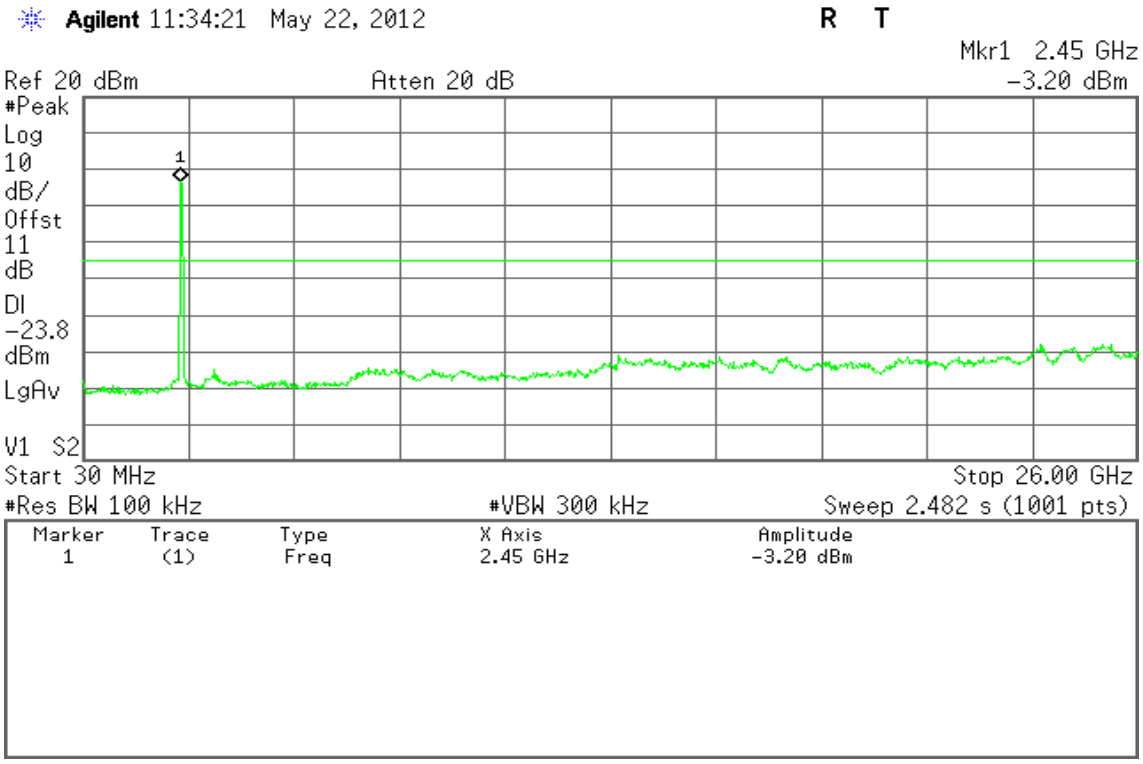
CH Mid


Agilent 11:47:53 May 22, 2012
R T
Mkr1 2.433 20 GHz
Ref 20 dBm
Atten 20 dB
−0.74 dBm
#Peak
Log
10
dB/
Offst
11
dB
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Center 2.442 00 GHz
Span 40 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 3.84 ms (601 pts)


Agilent 11:07:41 May 22, 2012
R T
Mkr3 3.25 GHz
Ref 20 dBm
Atten 20 dB
−56.49 dBm
#Peak
Log
10
dB/
Offst
11
dB
Dl
−20.7
dBm
LgAv
V1 S2
Start 30 MHz
Stop 26.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 2.482 s (1001 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.45 GHz −2.62 dBm
2 (1) Freq 1.95 GHz −55.51 dBm
3 (1) Freq 3.25 GHz −56.49 dBm

CH High


Agilent 11:49:22 May 22, 2012
R T
Mkr1 2.443 27 GHz
Ref 20 dBm
Atten 20 dB
-3.79 dBm
#Peak
Log
10
dB/
Offst
11
dB
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Center 2.452 00 GHz
Span 40 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 3.84 ms (601 pts)


Agilent 11:34:21 May 22, 2012
R T
Mkr1 2.45 GHz
Ref 20 dBm
Atten 20 dB
-3.20 dBm
#Peak
Log
10
dB/
Offst
11
dB
Dl
-23.8
dBm
LgAv
V1 S2
Start 30 MHz
Stop 26.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 2.482 s (1001 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.45 GHz -3.20 dBm

7.6 RADIATED EMISSIONS

LIMIT

1. According to §15.209(a), except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

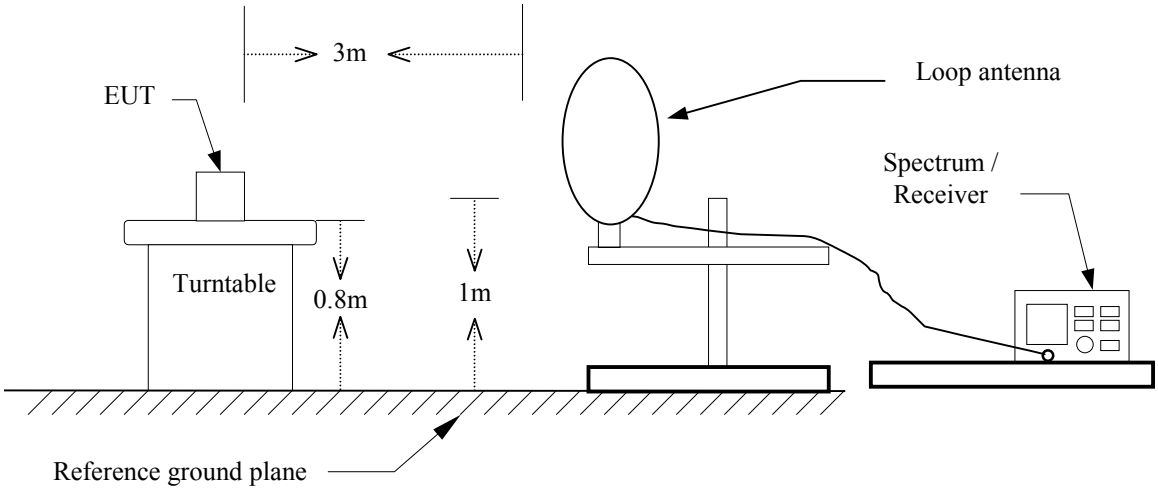
Remark: *Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.*

2. In the emission table above, the tighter limit applies at the band edges.

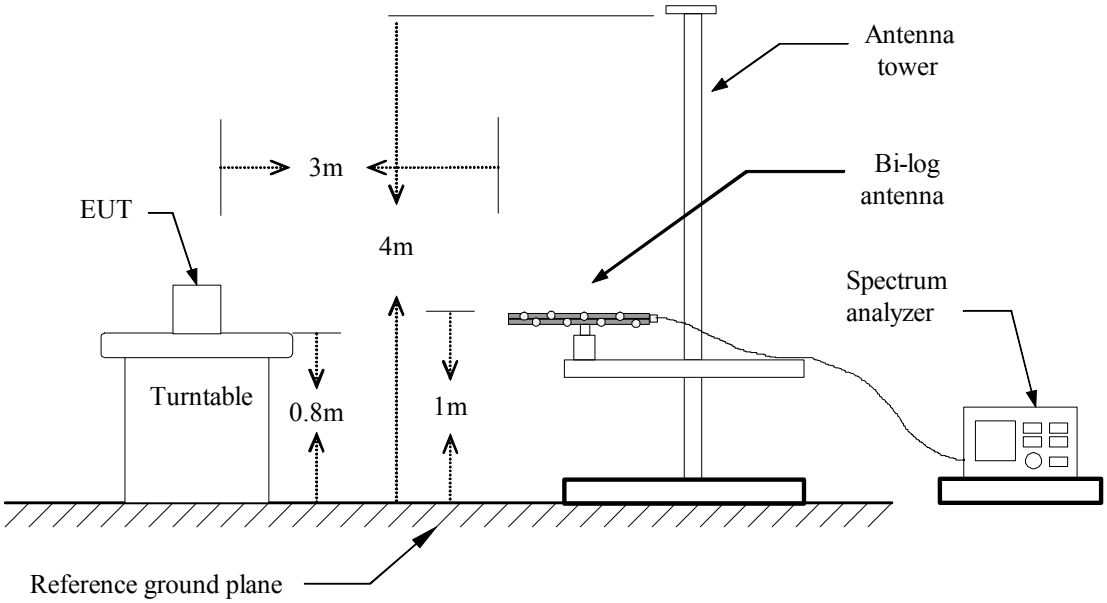
Frequency (MHz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Test Configuration

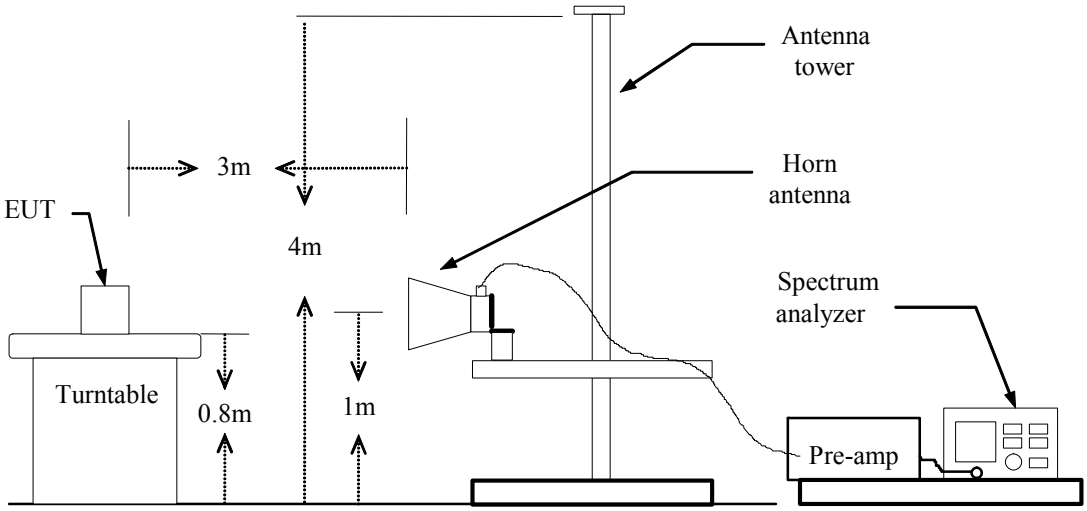
9kHz ~ 30MHz



30MHz ~ 1GHz



Above 1 GHz


Antenna
tower
3m
Horn
antenna
EUT
4m
Spectrum
analyzer
Turntable
0.8m
1m
Pre-amp

TEST PROCEDURE

According to ANSI C63.10

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

   Below 1GHz:

   RBW=100kHz / VBW=300kHz / Sweep=AUTO

   Above 1GHz:

   (a) PEAK: RBW=1HMz, VBW=3MHz / Sweep=AUTO

   (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
7. Repeat above procedures until the measurements for all frequencies are complete.

TEST RESULTS

For Monopole Antenna

Below 1GHz

Operation Mode: Normal Link **Test Date:** February 7, 2012

Temperature: 23°C **Tested by:** Ali Shu

Humidity: 45% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
70.42	58.82	-32.85	25.97	40.00	-14.03	Peak	V
146.40	61.16	-28.20	32.95	43.50	-10.55	Peak	V
245.02	57.96	-28.61	29.35	46.00	-16.65	Peak	V
464.88	50.97	-22.66	28.30	46.00	-17.70	Peak	V
485.90	49.92	-22.40	27.52	46.00	-18.48	Peak	V
996.77	50.31	-15.12	35.19	54.00	-18.81	Peak	V
146.40	56.37	-28.20	28.17	43.50	-15.33	Peak	H
241.78	64.45	-28.73	35.72	46.00	-10.28	Peak	H
274.12	62.36	-26.82	35.54	46.00	-10.46	Peak	H
322.62	58.82	-25.85	32.97	46.00	-13.03	Peak	H
484.28	52.63	-22.42	30.21	46.00	-15.79	Peak	H
797.92	50.91	-17.50	33.42	46.00	-12.58	Peak	H

Remark:

1. *No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz)*
2. *Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.*
3. *Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *Margin (dB) = Result (dBuV/m) – Limit (dBuV/m).*

Above 1 GHz

Operation Mode: TX / IEEE 802.11b / CH Low **Test Date:** February 1, 2012

Temperature: 23°C **Tested by:** Ali Shu

Humidity: 45% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
1746.67	56.03	---	-8.04	47.99	---	74.00	54.00	-6.01	Peak	V
N/A										
1560.00	56.36	---	-9.94	46.42	---	74.00	54.00	-7.58	Peak	H
3216.67	50.80	44.56	-1.60	49.20	42.96	74.00	54.00	-11.04	AVG	H
5350.00	48.21	34.25	2.95	51.15	37.20	74.00	54.00	-16.80	AVG	H
N/A										

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11b / CH Mid **Test Date:** February 1, 2012

Temperature: 23°C **Tested by:** Ali Shu

Humidity: 45% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
1640.00	55.72	---	-9.13	46.59	---	74.00	54.00	-7.41	Peak	V
N/A										
1436.67	57.32	---	-10.62	46.70	---	74.00	54.00	-7.30	Peak	H
3258.33	49.79	42.70	-1.49	48.31	41.21	74.00	54.00	-12.79	AVG	H
N/A										

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11b / CH High **Test Date:** February 1, 2012

Temperature: 23°C **Tested by:** Ali Shu

Humidity: 45% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
1616.67	55.71	---	-9.36	46.34	---	74.00	54.00	-7.66	Peak	V
4158.33	49.17	33.34	0.95	50.12	34.29	74.00	54.00	-19.71	AVG	V
N/A										
1356.67	57.49	---	-10.70	46.79	---	74.00	54.00	-7.21	Peak	H
N/A										

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11g / CH Low **Test Date:** February 1, 2012

Temperature: 23°C **Tested by:** Ali Shu

Humidity: 45% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
1526.67	57.44	---	-10.28	47.16	---	74.00	54.00	-6.84	Peak	V
1816.67	55.02	---	-7.33	47.69	---	74.00	54.00	-6.31	Peak	H
3216.67	50.46	45.22	-1.60	48.86	43.62	74.00	54.00	-10.38	AVG	H
N/A										

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11g / CH Mid **Test Date:** March 26, 2012

Temperature: 25°C **Tested by:** Ali Shu

Humidity: 50% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
2626.67	54.16	43.99	-3.44	50.72	40.55	74.00	54.00	-13.45	AVG	V
N/A										
3216.67	49.58	---	-1.60	47.98	---	74.00	54.00	-6.02	Peak	H
N/A										

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11g / CH High **Test Date:** February 1, 2012

Temperature: 23°C **Tested by:** Ali Shu

Humidity: 45% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
1566.67	57.04	---	-9.87	47.16	---	74.00	54.00	-6.84	Peak	V
N/A										
1643.33	56.28	---	-9.09	47.19	---	74.00	54.00	-6.81	Peak	H
N/A										

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11n HT 20 MHz mode / CH Low **Test Date:** February 1, 2012

Temperature: 23°C **Tested by:** Ali Shu

Humidity: 45% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
1700.00	56.07	---	-8.52	47.55	---	74.00	54.00	-6.45	Peak	V
N/A										
1420.00	56.30	---	-10.63	45.66	---	74.00	54.00	-8.34	Peak	H
3216.67	49.66	44.70	-1.60	48.06	43.10	74.00	54.00	-10.09	AVG	H
N/A										

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11n HT 20 MHz mode / CH Mid **Test Date:** March 26, 2012

Temperature: 25°C **Tested by:** Ali Shu

Humidity: 50% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
2770.00	54.07	43.45	-2.95	51.12	40.50	74.00	54.00	-13.50	AVG	V
N/A										
2056.67	53.04	---	-5.32	47.71	---	74.00	54.00	-6.29	Peak	H
N/A										

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11n HT 20 MHz mode / CH High **Test Date:** February 1, 2012

Temperature: 23°C **Tested by:** Ali Shu

Humidity: 45% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
1270.00	57.44	---	-10.79	46.65	---	74.00	54.00	-7.35	Peak	V
N/A										
1603.33	56.20	---	-9.50	46.70	---	74.00	54.00	-7.30	Peak	H
N/A										

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode:	TX / IEEE 802.11n HT 40 MHz mode / CH Low	**Test Date:**	February 1, 2012
Temperature:	23°C	**Tested by:**	Ali Shu
Humidity:	45% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
1536.67	56.05	---	-10.18	45.87	---	74.00	54.00	-8.13	Peak	V
4275.00	47.83	35.69	1.29	49.12	36.98	74.00	54.00	-17.02	AVG	V
N/A										
1343.33	56.84	---	-10.71	46.13	---	74.00	54.00	-7.87	Peak	H
3233.33	49.75	32.74	-1.55	48.19	31.19	74.00	54.00	-22.81	AVG	H
N/A										

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode:	TX / IEEE 802.11n HT 40 MHz mode / CH Mid (2442MHz)	**Test Date:**	February 1, 2012
Temperature:	23°C	**Tested by:**	Ali Shu
Humidity:	45% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
1376.67	56.96	---	-10.68	46.28	---	74.00	54.00	-7.72	Peak	V
5700.00	49.08	34.55	3.38	52.47	37.93	74.00	54.00	-16.07	AVG	V
N/A										
2226.67	56.00	42.96	-4.88	51.12	38.08	74.00	54.00	-15.92	AVG	H
N/A										

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode:	TX / IEEE 802.11n HT 40 MHz mode / CH Mid (2447MHz)	**Test Date:**	March 1, 2012
Temperature:	25°C	**Tested by:**	Sehni Hu
Humidity:	50% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
1976.67	53.21	---	-5.71	47.50	---	74.00	54.00	-6.50	Peak	V
N/A										
2136.67	52.61	---	-5.11	47.49	---	74.00	54.00	-6.51	Peak	H
N/A										

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode:	TX / IEEE 802.11n HT 40 MHz mode / CH High	**Test Date:**	February 1, 2012
Temperature:	23°C	**Tested by:**	Ali Shu
Humidity:	45% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
1756.67	55.91	---	-7.94	47.97	---	74.00	54.00	-6.03	Peak	V
4875.00	48.60	33.58	2.71	51.31	36.29	74.00	54.00	-17.71	AVG	V
N/A										
1560.00	56.40	---	-9.94	46.46	---	74.00	54.00	-7.54	Peak	H
3716.67	47.90	---	-0.27	47.63	---	74.00	54.00	-6.37	Peak	H
N/A										

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

For PIFA Antenna

Below 1GHz

Operation Mode: Normal Link **Test Date:** February 1, 2012

Temperature: 25°C **Tested by:** Ali Shu

Humidity: 50% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
146.40	61.07	-28.20	32.86	43.50	-10.64	Peak	V
256.33	59.32	-27.94	31.38	46.00	-14.62	Peak	V
299.98	56.14	-26.38	29.75	46.00	-16.25	Peak	V
489.13	48.62	-22.36	26.26	46.00	-19.74	Peak	V
666.97	43.99	-19.31	24.68	46.00	-21.32	Peak	V
1000.00	48.88	-15.05	33.83	74.00	-40.17	Peak	V
30.00	47.08	-19.87	27.20	40.00	-12.80	Peak	H
146.40	56.47	-28.20	28.27	43.50	-15.23	Peak	H
274.12	65.71	-26.82	38.90	46.00	-7.10	Peak	H
485.90	52.34	-22.40	29.94	46.00	-16.06	Peak	H
765.58	52.19	-17.91	34.28	46.00	-11.72	Peak	H
959.58	47.51	-15.97	31.54	46.00	-14.46	Peak	H

Remark:

1. *No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz)*
2. *Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.*
3. *Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *Margin (dB) = Result (dBuV/m) – Limit (dBuV/m).*

Above 1 GHz

Operation Mode: TX / IEEE 802.11b / CH Low **Test Date:** March 26, 2012

Temperature: 25°C **Tested by:** Ali Shu

Humidity: 50% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
2106.67	53.01	---	-5.19	47.81	---	74.00	54.00	-6.19	Peak	V
N/A										
1760.00	54.09	---	-7.91	46.18	---	74.00	54.00	-7.82	Peak	H
N/A										

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11b / CH Mid **Test Date:** March 26, 2012

Temperature: 25°C **Tested by:** Ali Shu

Humidity: 50% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
2746.67	54.56	43.03	-3.03	51.53	40.00	74.00	54.00	-14.00	AVG	V
N/A										
2233.33	52.45	---	-4.86	47.58	---	74.00	54.00	-6.42	Peak	H
N/A										

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11b / CH High **Test Date:** February 1, 2012

Temperature: 23°C **Tested by:** Ali Shu

Humidity: 45% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
2060.00	56.08	41.91	-5.31	50.77	36.60	74.00	54.00	-17.40	AVG	V
N/A										
1530.00	55.97	---	-10.25	45.72	---	74.00	54.00	-8.28	Peak	H
7508.33	46.37	31.99	7.18	53.56	39.17	74.00	54.00	-14.83	AVG	H
N/A										

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11g / CH Low **Test Date:** February 1, 2012

Temperature: 23°C **Tested by:** Ali Shu

Humidity: 45% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
2116.67	55.52	41.10	-5.17	50.36	35.93	74.00	54.00	-18.61	AVG	V
N/A										
1490.00	56.27	---	-10.56	45.71	---	74.00	54.00	-8.29	Peak	H
N/A										

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11g / CH Mid **Test Date:** March 26, 2012

Temperature: 25°C **Tested by:** Ali Shu

Humidity: 50% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
2390.00	57.42	42.65	-4.32	53.10	38.33	74.00	54.00	-15.67	AVG	V
N/A										
2196.67	52.51	---	-4.96	47.55	---	74.00	54.00	-6.45	Peak	H
N/A										

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11g / CH High **Test Date:** February 1, 2012

Temperature: 23°C **Tested by:** Ali Shu

Humidity: 45% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
1433.33	55.72	---	-10.62	45.10	---	74.00	54.00	-8.90	Peak	V
2776.67	55.53	42.31	-2.93	52.60	39.38	74.00	54.00	-14.62	AVG	V
5750.00	48.67	33.50	3.50	52.16	37.00	74.00	54.00	-17.00	AVG	V
N/A										
1560.00	56.61	---	-9.94	46.67	---	74.00	54.00	-7.33	Peak	H
N/A										

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11n HT 20 MHz mode / CH Low **Test Date:** February 1, 2012

Temperature: 23°C **Tested by:** Ali Shu

Humidity: 45% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
2113.33	56.37	41.82	-5.18	51.20	36.64	74.00	54.00	-17.36	AVG	V
5716.67	48.34	33.39	3.42	51.76	36.81	74.00	54.00	-17.19	AVG	V
N/A										
1246.67	56.72	---	-10.81	45.91	---	74.00	54.00	-8.09	Peak	H
3216.67	49.15	42.30	-1.60	47.55	40.70	74.00	54.00	-13.30	AVG	H
N/A										

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11n HT 20 MHz mode / CH Mid **Test Date:** March 26, 2012

Temperature: 25°C **Tested by:** Ali Shu

Humidity: 50% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
2316.67	54.92	45.72	-4.62	50.30	41.10	74.00	54.00	-12.90	AVG	V
4908.33	47.13	38.22	2.78	49.91	41.22	74.00	54.00	-12.78	AVG	V
N/A										
2280.00	52.62	---	-4.74	47.87	---	74.00	54.00	-6.13	Peak	H
N/A										

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode: TX / IEEE 802.11n HT 20 MHz mode / CH High **Test Date:** February 1, 2012

Temperature: 23°C **Tested by:** Ali Shu

Humidity: 45% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
1773.33	55.38	---	-7.77	47.61	---	74.00	54.00	-6.39	Peak	V
3958.33	47.53	33.44	0.37	47.90	33.81	74.00	54.00	-20.19	AVG	V
N/A										
1660.00	55.67	---	-8.92	46.75	---	74.00	54.00	-7.25	Peak	H
N/A										

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode:	TX / IEEE 802.11n HT 40 MHz mode / CH Low	**Test Date:**	February 1, 2012
Temperature:	23°C	**Tested by:**	Ali Shu
Humidity:	45% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
1493.33	56.21	---	-10.56	45.65	---	74.00	54.00	-8.35	Peak	V
N/A										
1440.00	55.70	---	-10.61	45.09	---	74.00	54.00	-8.91	Peak	H
N/A										

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode:	TX / IEEE 802.11n HT 40 MHz mode / CH Mid (2442MHz)	**Test Date:**	February 1, 2012
Temperature:	23°C	**Tested by:**	Ali Shu
Humidity:	45% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
1493.33	55.10	---	-10.56	44.55	---	74.00	54.00	-9.45	Peak	V
N/A										
1523.33	55.93	---	-10.31	45.62	---	74.00	54.00	-8.38	Peak	H
2313.33	56.39	41.04	-4.64	51.76	36.40	74.00	54.00	-17.60	AVG	H
5883.33	47.75	34.20	3.79	51.54	37.99	74.00	54.00	-16.01	AVG	H
N/A										

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode:	TX / IEEE 802.11n HT 40 MHz mode / CH Mid (2447MHz)	**Test Date:**	March 1, 2012
Temperature:	25°C	**Tested by:**	Sehni Hu
Humidity:	50% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
2193.33	52.74	---	-4.97	47.78	---	74.00	54.00	-6.22	Peak	V
N/A										
2136.67	53.06	---	-5.11	47.95	---	74.00	54.00	-6.05	Peak	H
4866.67	44.51	---	2.69	47.20	---	74.00	54.00	-6.80	Peak	H
N/A										

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode:	TX / IEEE 802.11n HT 40 MHz mode / CH High	**Test Date:**	February 1, 2012
Temperature:	23°C	**Tested by:**	Ali Shu
Humidity:	45% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
1586.67	55.97	---	-9.67	46.30	---	74.00	54.00	-7.70	Peak	V
2983.33	56.30	41.06	-2.23	54.08	38.83	74.00	54.00	-15.17	AVG	V
11366.67	39.77	27.02	20.31	60.08	47.33	74.00	54.00	-6.67	AVG	V
N/A										
1476.67	56.28	---	-10.57	45.70	---	74.00	54.00	-8.30	Peak	H
2616.67	55.92	41.53	-3.47	52.45	38.06	74.00	54.00	-15.95	AVG	H
7108.33	45.54	32.45	7.31	52.85	39.76	74.00	54.00	-14.24	AVG	H
N/A										

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

For Monopole Antenna

Operation Mode: RX **Test Date:** February 3, 2012

Temperature: 23°C **Tested by:** Ali Shu

Humidity: 45 % RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
1196.67	52.98	---	-10.87	42.12	---	74.00	54.00	-11.88	Peak	V
1226.67	50.40	---	-10.83	39.57	---	74.00	54.00	-14.43	Peak	V
1496.67	52.57	---	-10.55	42.02	---	74.00	54.00	-11.98	Peak	V
2130.00	50.28	---	-5.13	45.15	---	74.00	54.00	-8.85	Peak	V
2493.33	50.46	---	-3.90	46.56	---	74.00	54.00	-7.44	Peak	V
6550.00	47.66	33.78	5.14	52.79	38.92	74.00	54.00	-15.08	AVG	V
1486.67	50.03	---	-10.56	39.47	---	74.00	54.00	-14.53	Peak	H
2493.33	48.96	---	-3.90	45.06	---	74.00	54.00	-8.94	Peak	H
N/A										

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

For PIFA Antenna

Operation Mode: RX **Test Date:** February 3, 2012

Temperature: 23°C **Tested by:** Ali Shu

Humidity: 45 % RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
1496.67	53.14	---	-10.55	42.59	---	74.00	54.00	-11.41	Peak	V
2133.33	50.27	---	-5.12	45.15	---	74.00	54.00	-8.85	Peak	V
2490.00	49.89	---	-3.91	45.98	---	74.00	54.00	-8.02	Peak	V
2663.33	48.82	---	-3.31	45.50	---	74.00	54.00	-8.50	Peak	V
2846.67	48.43	---	-2.69	45.74	---	74.00	54.00	-8.26	Peak	V
3825.00	44.78	---	0.01	44.80	---	74.00	54.00	-9.20	Peak	V
1900.00	49.34	---	-6.49	42.86	---	74.00	54.00	-11.14	Peak	H
2753.33	47.82	---	-3.01	44.81	---	74.00	54.00	-9.19	Peak	H
3216.67	47.35	---	-1.60	45.76	---	74.00	54.00	-8.24	Peak	H
4075.00	46.08	---	0.70	46.78	---	74.00	54.00	-7.22	Peak	H
N/A										

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

7.7 POWERLINE CONDUCTED EMISSIONS

LIMIT

According to §15.207(a), except as shown in paragraphs (b) and (c) of this section, 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 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

** Decreases with the logarithm of the frequency.*

Test Configuration

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

TEST RESULTS

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Test Data

Operation Mode:	Normal Link	**Test Date:**	March 9, 2012
Temperature:	26°C	**Tested by:**	David Shu
Humidity:	60% RH		

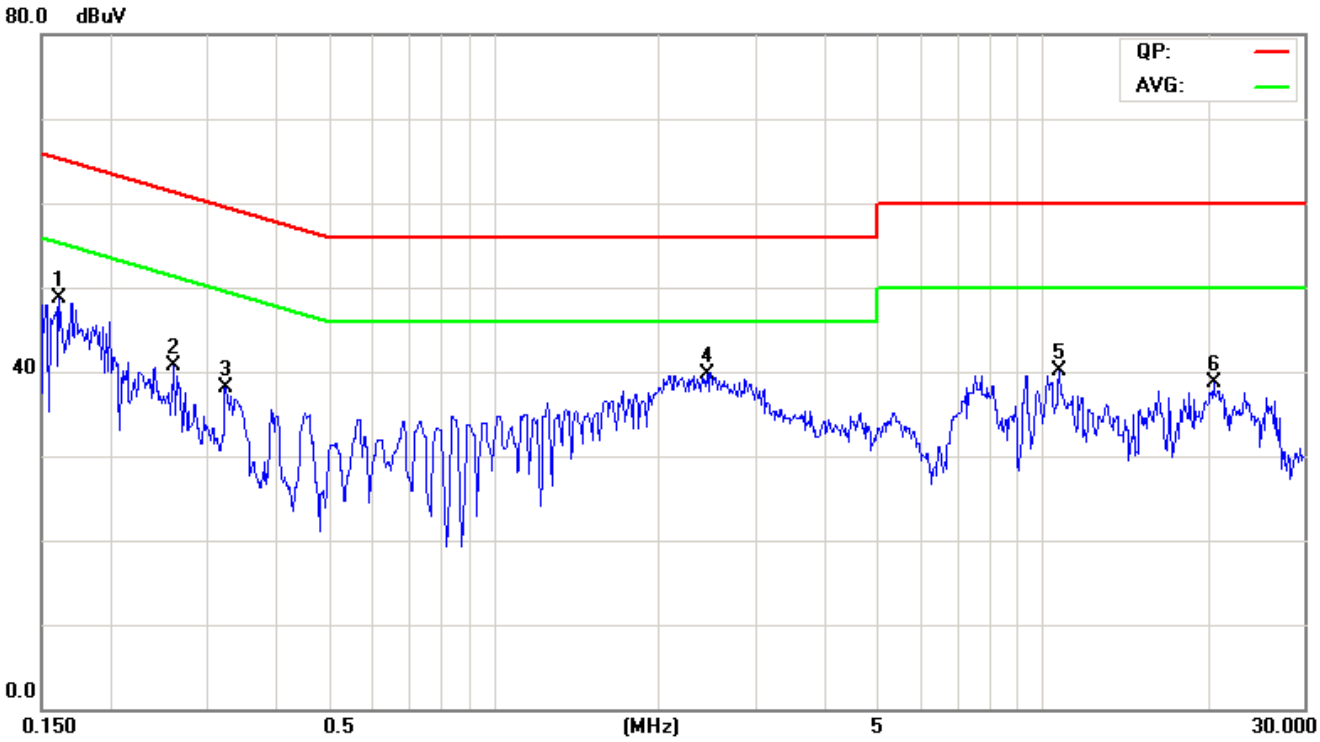
Freq. (MHz)	QP Reading (dBuV)	AV Reading (dBuV)	Corr. factor (dB/m)	QP Result (dBuV/m)	AV Result (dBuV/m)	QP Limit (dBuV)	AV Limit (dBuV)	QP Margin (dB)	AV Margin (dB)	Note
0.1594	36.86	27.76	0.07	36.93	27.83	65.50	55.50	-28.57	-27.67	L1
0.2640	30.22	16.20	0.06	30.28	16.26	61.30	51.30	-31.02	-35.04	L1
0.3246	28.07	16.77	0.07	28.14	16.84	59.59	49.59	-31.45	-32.75	L1
2.4469	36.66	26.98	0.09	36.75	27.07	56.00	46.00	-19.25	-18.93	L1
10.7356	36.95	33.08	0.22	37.17	33.30	60.00	50.00	-22.83	-16.70	L1
20.4014	33.47	26.97	0.34	33.81	27.31	60.00	50.00	-26.19	-22.69	L1
0.1533	35.44	23.44	0.03	35.47	23.47	65.82	55.82	-30.35	-32.35	L2
0.2254	40.28	32.83	0.03	40.31	32.86	62.62	52.62	-22.31	-19.76	L2
0.6278	29.17	24.82	0.02	29.19	24.84	56.00	46.00	-26.81	-21.16	L2
2.3470	33.38	24.34	0.05	33.43	24.39	56.00	46.00	-22.57	-21.61	L2
6.9647	37.28	29.50	0.11	37.39	29.61	60.00	50.00	-22.61	-20.39	L2
9.7247	33.89	28.25	0.15	34.04	28.40	60.00	50.00	-25.96	-21.60	L2

Remark:

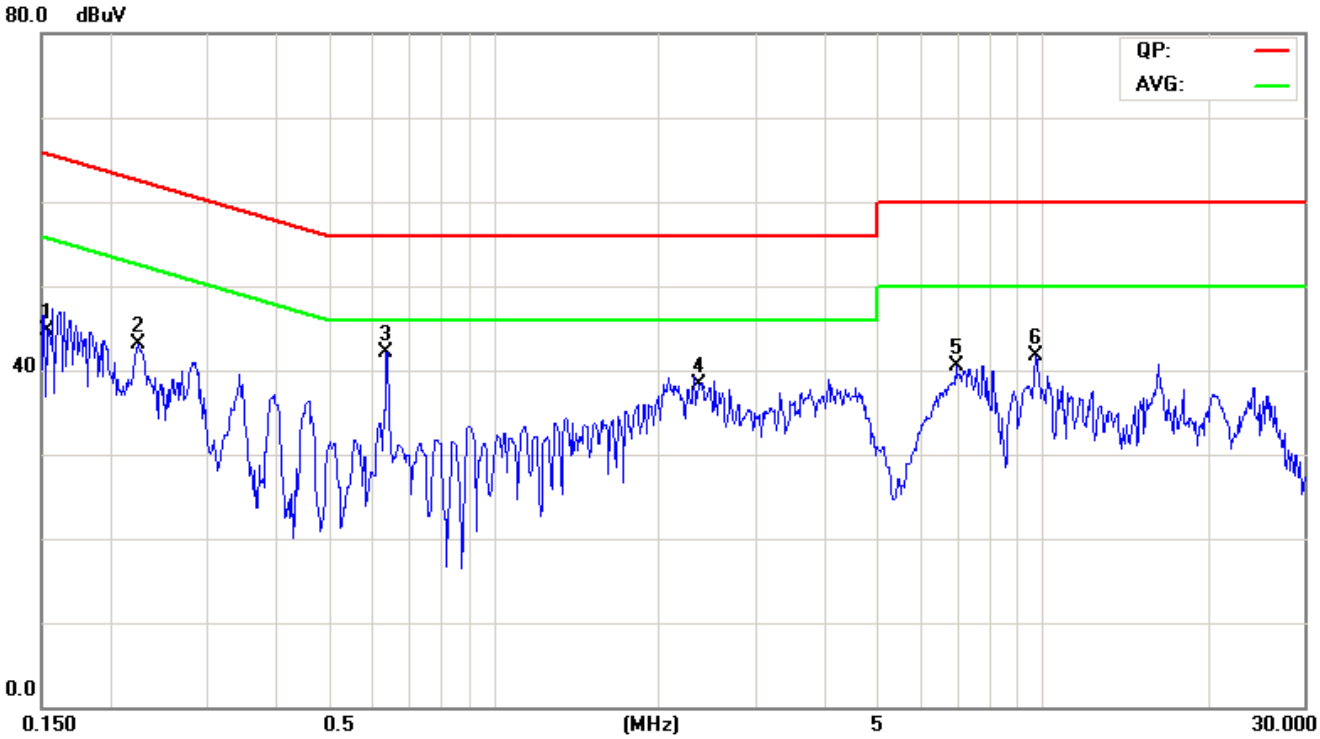
1. *Measuring frequencies from 0.15 MHz to 30MHz.*
2. *The emissions measured in frequency range from 0.15 MHz to 30MHz were made with an instrument using Quasi-peak detector and average detector.*
3. *The IF bandwidth of SPA between 0.15MHz and 30MHz was 10 kHz; the IF bandwidth of Test Receiver between 0.15MHz and 30MHz was 9 kHz;*
4. *L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)*

Test Plots

Conducted emissions (Line 1)



Conducted emissions (Line 2)



APPENDIX I
RADIO FREQUENCY EXPOSURE

LIMIT

According to §15.247(i), 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. See § 1.1307(b)(1) of this chapter.

EUT Specification

EUT	802.11 b/g/n WLAN Module
Frequency band (Operating)	☒ WLAN: 2.412GHz ~ 2.462GHz ☐ WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz ☐ WLAN: 5.745GHz ~ 5.825GHz ☐ Others
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others
Exposure classification	☒ Occupational/Controlled exposure (S = 5mW/cm^2) ☐ General Population/Uncontrolled exposure (S=1mW/cm^2)
Antenna diversity	☐ Single antenna ☒ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☒ Tx/Rx diversity
Max. output power	**For Monopole Antenna** IEEE 802.11b mode: 19.72 dBm (93.76 mW) IEEE 802.11g mode: 25.79 dBm (379.31 mW) IEEE 802.11n HT 20 MHz mode: 25.74 dBm (374.97 mW) IEEE 802.11n HT 40 MHz mode: 23.92 dBm (246.60 mW) **For PIFA Antenna** IEEE 802.11b mode: 19.67 dBm (92.68 mW) IEEE 802.11g mode: 25.71 dBm (372.39 mW) IEEE 802.11n HT 20 MHz mode: 25.72 dBm (343.25 mW) IEEE 802.11n HT 40 MHz mode: 22.88 dBm (194.09 mW)
Antenna gain (Max)	For Monopole Antenna: 1.97 dBi (Numeric gain: 1.57) For PIFA Antenna: 1.05 dBi (Numeric gain: 1.27)
Evaluation applied	☒ MPE Evaluation ☐ SAR Evaluation ☐ N/A
Remark: *The maximum output power is 25.79 dBm (379.31 mW) at 2442MHz (with 1.57numeric antenna gain.)*	

TEST RESULTS

No non-compliance noted.

MPE EVALUATION

No non-compliance noted.

Calculation

Given $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{3770}$

Where *E = Field strength in Volts / meter*
P = Power in Watts
G = Numeric antenna gain
d = Distance in meters
S = Power density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{3770 d^2}$$

Changing to units of mW and cm, using:

P (mW) = P (W) / 1000 and

d (cm) = d(m) / 100

Yields

$$S = \frac{30 \times (P/1000) \times G}{3770 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2}$$ ***Equation 1***

Where *d = Distance in cm*
P = Power in mW
G = Numeric antenna gain
S = Power density in mW / cm^2

Maximum Permissible Exposure

Substituting the MPE safe distance using d = 20 cm into Equation 1:

Yields

$$S = 0.000199 \times P \times G$$

Where *P = Power in mW*
G = Numeric antenna gain
S = Power density in mW / cm^2

For Monopole Antenna

IEEE 802.11b mode:

EUT output power = 93.76 mW

Numeric Antenna gain = 1.57

→ *Power density = 0.029293 mW / cm^2*

IEEE 802.11g mode:

EUT output power = 379.31 mW

Numeric Antenna gain = 1.57

→ *Power density =0.118507 mW / cm^2*

IEEE 802.11n HT 20 MHz mode:

EUT output power =374.97 mW

Numeric Antenna gain = 1.57

→ *Power density = 0.11715mW / cm^2*

IEEE 802.11n HT 40 MHz mode:

EUT output power = 181.97mW

Numeric Antenna gain = 1.57

→ *Power density = 0.056853 mW / cm^2*

For PIFA Antenna

IEEE 802.11b mode:

EUT output power = 92.68 mW

Numeric Antenna gain = 1.27

→ Power density = 0.023423 mW / cm^2

IEEE 802.11g mode:

EUT output power = 372.39 mW

Numeric Antenna gain = 1.27

→ Power density = 0.094114 mW / cm^2

IEEE 802.11n HT 20 MHz mode:

EUT output power = 343.25 mW

Numeric Antenna gain = 1.27

→ Power density = 0.086749mW / cm^2

IEEE 802.11n HT 40 MHz mode:

EUT output power = 194.09 mW

Numeric Antenna gain = 1.27

→ Power density = 0.049052 mW / cm^2

(For mobile or fixed location transmitters, the maximum power density is 1.0 mW/cm^2 even if the calculation indicates that the power density would be larger.)