FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

N300 Wireless Router

Model: TEW-732BR

Trade Name: TRENDnet

Issued to

TRENDNET, Inc.
20675 Manhattan Place, Torrance, CA 90501 U.S.A

Issued by

Compliance Certification Services Inc.
No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township,
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Testing Laboratory
0363

Revision History

Rev.		Issue Date		Revisions	Effect Page	Revised By
00		January 11, 2013		Initial Issue	ALL	Landy Huang

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1. TEST RESULT CERTIFICATION

Applicant:	**TRENDNET, Inc.** 20675 Manhattan Place, Torrance, CA 90501 U.S.A
Manufacturer:	**TRENDNET, Inc.** 20675 Manhattan Place, Torrance, CA 90501 U.S.A
Equipment Under Test:	N300 Wireless Router
Trade Name:	TRENDnet
Model:	TEW-732BR
Date of Test:	November 26, 2012 ~ January 10, 2013

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 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:

Stan Lin
Section Manager

Reviewed by:

Angel Hu
Section Manager

2. EUT DESCRIPTION

Product	N300 Wireless Router		
Trade Name	TRENDnet		
Model Number	TEW-732BR		
EUT Power Rating	5VDC, 1.0A		
Power Adapter	SHENZHEN FRECOM	**Model**	F05W-050100SPAU
	AMIGO	**Model**	AMS47-0501000FU
Power Adapter Rating	**For F05W-050100SPAU** I/P: 100-240VAC, 50/60Hz, 0.2A O/P: 5VDC, 1.0A **For AMS47-0501000FU** I/P: 100-240VAC, 50/60Hz,190mA O/P: 5VDC, 1.0A		
RF Module Manufacturer	Atheros	**Model**	AR1321-AL1A
Operating Frequency Range	IEEE 802.11 b/g/HT 20MHz: 2412 ~ 2462 MHz IEEE 802.11 HT 40MHz: 2422 ~ 2452 MHz		
Transmit Power	IEEE 802.11b mode: 18.32 dBm (0.0679W) IEEE 802.11g mode: 21.11 dBm (0.1291W) IEEE 802.11n 20 MHz Channel mode: 23.33 dBm (0.2151W) IEEE 802.11n 40 MHz Channel mode: 22.90 dBm (0.1950W)		
Modulation Technique	IEEE 802.11b mode: DSSS (1, 2, 5.5 and 11 Mpbs) IEEE 802.11g mode: OFDM (6, 9, 12, 18, 24, 36, 48 and 54 Mpbs) IEEE 802.11n 20 MHz Channel mode: OFDM (6.5, 7.2, 13, 14.4, 14.44, 19.5, 21.7, 26, 28.89, 28.9, 39, 43.3, 43.33 52, 57.78, 57.8, 58.5, 65.0, 72.2, 78, 86.67, 104, 115.56, 117, 130, 144.44 Mbps) IEEE 802.11n 40 MHz Channel mode: OFDM (13.5, 15, 27, 30, 40.5, 45, 54, 60, 81, 90, 108, 120, 121.5, 135, 150, 162, 180, 216, 240, 243, 270, 300 Mbps)		
Number of Channels	IEEE 802.11b/g mode: 11 Channels IEEE 802.11n 20 MHz Channel mode: 11 Channels IEEE 802.11n 40 MHz Channel mode: 7 Channels		
Antenna Specification	Chain 0: Printed Antenna / Gain: 2.28dBi (For IEEE 802.11b/g) Chain 1: Printed Antenna / Gain: 2.10dBi(For IEEE 802.11b/g) (MIMO: $10\log[(10^{2.28/20}+10^{2.10/20})/2]=5.20$) (For IEEE 802.11n)		

Remark:

1. The sample selected for test was production product and was provided by manufacturer.
*2. This submittal(s) (test report) is intended for FCC ID: **XU8TEW732BR** filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.*
3. The antenna gain calculation is follow the KDB 662911 D01 Multiple Transmitter Output v01r02.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4 and FCC CFR 47 Part 2, Part 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 is a 2Tx2R Spatial Multiplexing MIMO transmitter without CDD mode.

Software used to control the EUT for staying in continuous transmitting mode was programmed.
The worst case data rate is determined as the data rate with highest output power.
After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz, which worst case was in normal link mode only.

F05W-050100SPAU & AMS47-0501000FU have been pre-scanned during the test, and the model F05W-050100SPAU was selected as the worst case for final test.

IEEE 802.11b mode:

Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 1Mbps data rate was chosen for full testing.

IEEE 802.11g mode:

Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 6Mbps data rate was chosen for full testing.

IEEE 802.11n 20 MHz Channel mode:

Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 13.5Mbps data rate were chosen for full testing.

IEEE 802.11n 40 MHz Channel mode:

Channel Low (2422MHz), Channel Mid (2437MHz) and Channel High (2452MHz) with 13.5Mbps data rate were chosen for full testing.

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.*

Conducted Emissions Test Site				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	Agilent	E4446A	MY48250064	01/01/2014
Spectrum Analyzer	R&S	FSEB	825829/011	12/18/2013
Power meter	Anritsu	ML2495A	1033009	08/19/2013
Power Sensor	Anritsu	MA2411B	0917221	08/19/2013

3M Semi Anechoic Chamber				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	Agilent	E4446A	MY48250064	12/23/2013
Pre-Amplifier	HP	8447D	2944A06530	01/02/2014
Pre-Amplifier	HP	8449B	3008A01738	04/17/2013
Pre-Amplifier	MITEQ	AMF-6F-26040 0-40-8P	985646	05/20/2013
EMI Test Receiver	SCHAFFNER	SCR 3501	430	01/10/2014
Loop Antenna	EMCO	6502	2356	06/11/2013
Bilog Antenna	SCHWAZBECK	VULB9160	3084	09/26/2013
Horn Antenna	EMCO	3115	9602-4659	06/14/2013
Horn Antenna	EMCO	3116	00026370	10/07/2013
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R
Test S/W	LabVIEW 6.1 (Wugu Chamber EMI Teat V1_4.5.3)			

Powerline Conducted Emissions Test Site				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
EMI Test Receiver	R&S	ESCI	101300	09/03/2013
LISN	R&S	ENV216	100069	06/18/2013
LISN	FCC	FCC-LISN-50/250-16-2-07	06013	11/18/2013
ISN	FCC	FCC-TLISN-T2-02	20587	06/24/2013
ISN	TESEQ	ISN-T8	30842	08/19/2013
Current Probe	FCC	F-35	506	07/01/2013
ISN	FCC	FCC-TLISN-T4-02	20396	07/05/2013
Test S/W	EZ-EMC			

4.3 MEASUREMENT UNCERTAINTY

Parameter	Uncertainty
Powerline Conducted Emission	±2.3876
3M Semi Anechoic Chamber / 30MHz ~ 1GHz	±3.7046
3M Semi Anechoic Chamber / Above 1GHz	±3.0958

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 FACILTIES

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

☐ No. 163-1, Jhongsheng Rd., Sindien District, Taipei City 23151, Taiwan

☐ No 11, Wugong 6th Rd, Wugu District, New Taipei City 24891, 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	A2LA	CFR 47, FCC Part15/18, CISPR 22, EN 55022, ICES-003, AS/NZS CISPR 22, VCCI V-3, EN 55011, CISPR 11, IEC/EN 61000-4-2/3/4/5/6/8/11, EN 61000-6-1/2/3/4, EN 55024, CISPR 24, AS/NZS CISPR 24, AS/NZS 61000.6.2, EN 55014-1/-2, ETSI EN 300 386 v1.3.2/v1.3.3, IEC/EN 61000-3-2, AS/NZS 61000.3.2, IEC/EN 61000-3-3, AS/NZS 61000.3.3	ACCREDITED TESTING CERT #0824.01
USA	FCC MRA	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	TW1026
Japan	VCCI	3/10 meter Open Area Test Sites and conducted test sites to perform radiated/conducted measurements	VCCI R-2882/2541/2798/725/1868 C-402/747/912 T-1930/1646
Taiwan	TAF	EN 55014-1, CISPR 14, CNS 13781-1, EN 55013, CISPR 13, CNS 13439, EN 55011, CISPR 11, CNS 13803, PLMN09, IS2045-0, LP0002 FCC Part 27/90, Part 15B/C/D/E, RSS-192/193/210/310 ETSI EN 300 328/ 300 220-1/ 300 220-2/ 301 893/ 301 489-01/ 301 489-03/ 301 489-07 / 301 489-17/ 300 440-1/ 300 440-2 AS/NZS 4268, AS/NZS 4771 CISPR 22, EN 55022, CNS 13438, AS/NZS CISPR 22, VCCI, IEC/EN 61000-4-2/3/4/5/6/8/11, CNS 14676-2/3/4/5/6/8, CNS 14934-2/3, CNS 13783-1, CNS 13439, CNS 13803	ilac-MRA TAF Testing Laboratory 0363
Taiwan	BSMI	CNS 13438, CNS 13783-1, CNS 13439, CNS 14115	SL2-IS-E-0014 / IN-E-0014 /A1-E-0014 /R1-E-0014 /R2-E-0014 /L1-E-0014
Canada	Industry Canada	RSS-Gen Issue 3	Canada IC 2324C-5

Note: *No part of this report may be used to claim or imply product endorsement by A2LA, TAF or other government agency.*

6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

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

6.2 SUPPORT EQUIPMENT

For Conducted:							
No.	**Device Type**	**Brand**	**Model**	**Series No.**	**FCC ID**	**Data Cable**	**Power Cord**
1.	Notebook PC	1706-A78	LV-L1870 06/09	FCC DoC	IBM	LAN Cable: Unshielded, 10m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core

For Radiated Emission (Below 1GHz) and Power line conducted emission measurement:							
No.	**Device Type**	**Brand**	**Model**	**Series No.**	**FCC ID**	**Data Cable**	**Power Cord**
1.	Notebook PC (Remote)	1706-A78	LV-L1870 06/09	FCC DoC	IBM	LAN Cable: Unshielded, 10m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
2.	Notebook PC (Remote)	D400	0932RY	E2K24GBRL	DELL	LAN Cable: Unshielded, 10m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
3.	Notebook PC (Remote)	M285	NU2503544	FCC DoC	LEO	LAN Cable: Unshielded, 10m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
4.	Notebook PC (Remote)	S7110	DU4A00EG0944 P010	FCC DoC	Fujitsu	LAN Cable: Unshielded, 10m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
5.	Notebook PC (Remote)	TP00013A	LR-9XH2K	FCC DoC	Lenovo	LAN Cable: Unshielded, 10m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core

For Radiated Emission (Above 1GHz) measurement:							
No.	**Device Type**	**Brand**	**Model**	**Series No.**	**FCC ID**	**Data Cable**	**Power Cord**
1.	N/A						

Remark: *Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

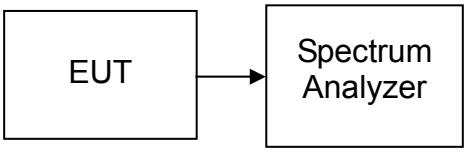
7. FCC PART 15.247 REQUIREMENTS

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 6 dB bandwidth shall be at least 500 kHz.

TEST CONFIGURATION



TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 100kHz, VBW = 300kHz, Span = 30MHz or 50MHz, Sweep = auto.
4. Mark the peak frequency and –6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

TEST RESULTS

No non-compliance noted

TEST DATA

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	10.15	>500	PASS
Mid	2437	10.15		PASS
High	2462	10.15		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.45	>500	PASS
Mid	2437	16.40		PASS
High	2462	16.40		PASS

Test mode: IEEE 802.11n 20 MHz Channel mode

Channel	Frequency (MHz)	Bandwidth (MHz)		Limit (kHz)	Result
		Chain 0	Chain 1		
Low	2412	17.30	17.60	>500	PASS
Mid	2437	17.25	17.55		PASS
High	2462	17.60	17.55		PASS

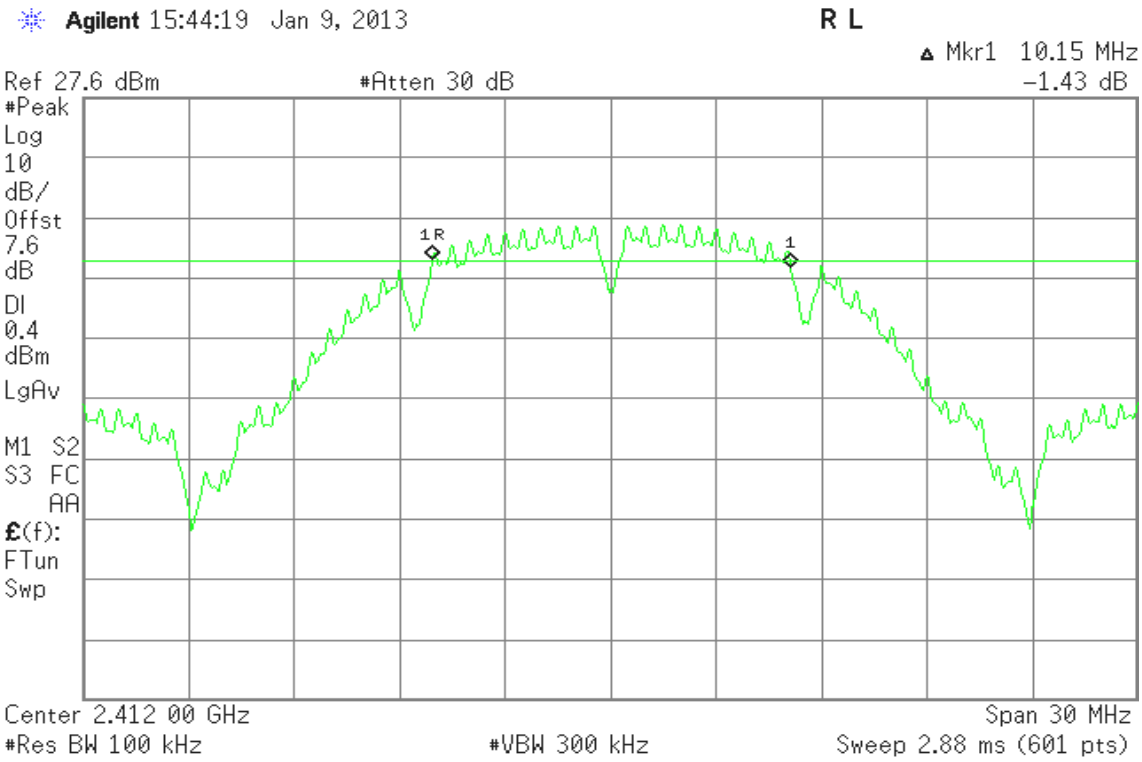
Test mode: IEEE 802.11n 40 MHz Channel mode

Channel	Frequency (MHz)	Bandwidth (MHz)		Limit (kHz)	Result
		Chain 0	Chain 1		
Low	2422	36.33	36.08	>500	PASS
Mid	2437	36.00	36.17		PASS
High	2452	36.33	36.33		PASS

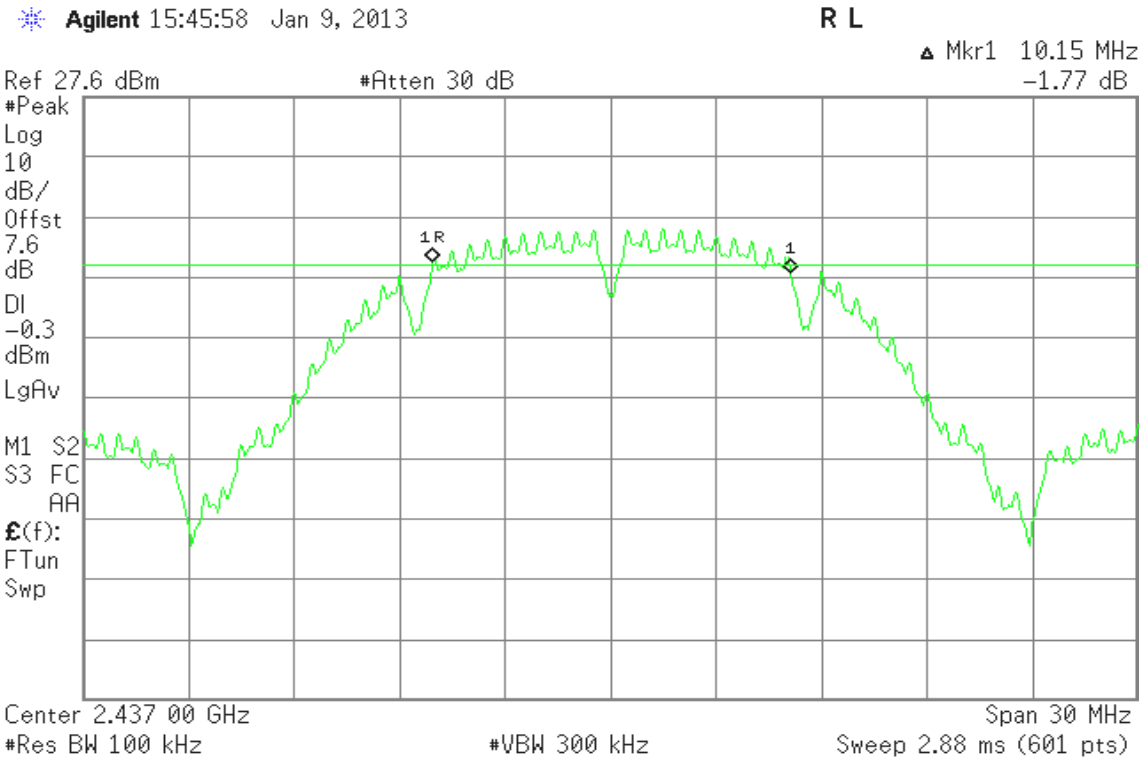
Test Plot

IEEE 802.11b mode

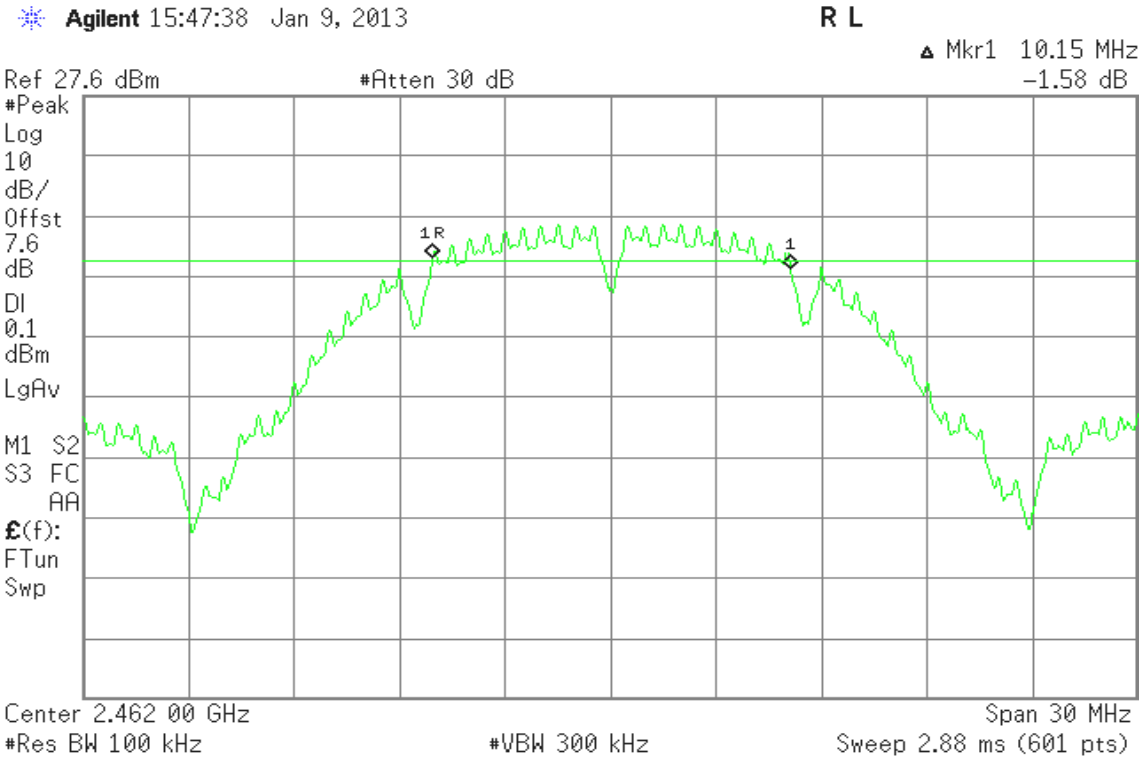
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

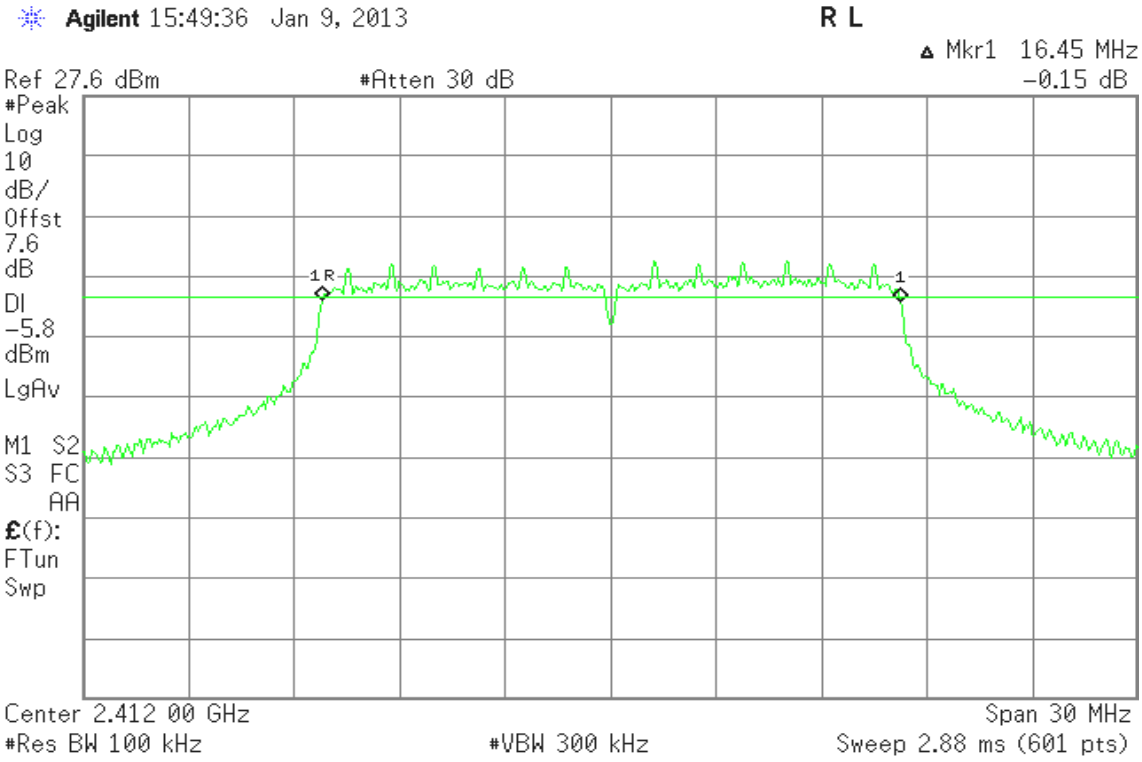


6dB Bandwidth (CH High)

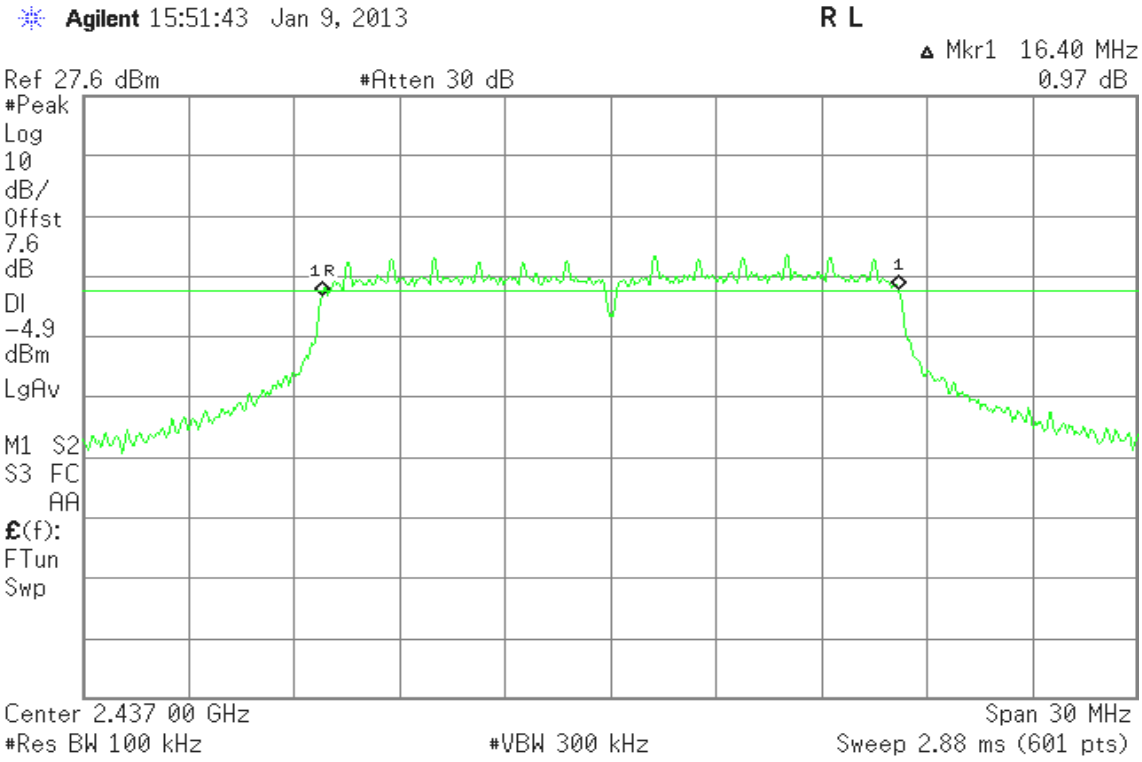


IEEE 802.11g mode

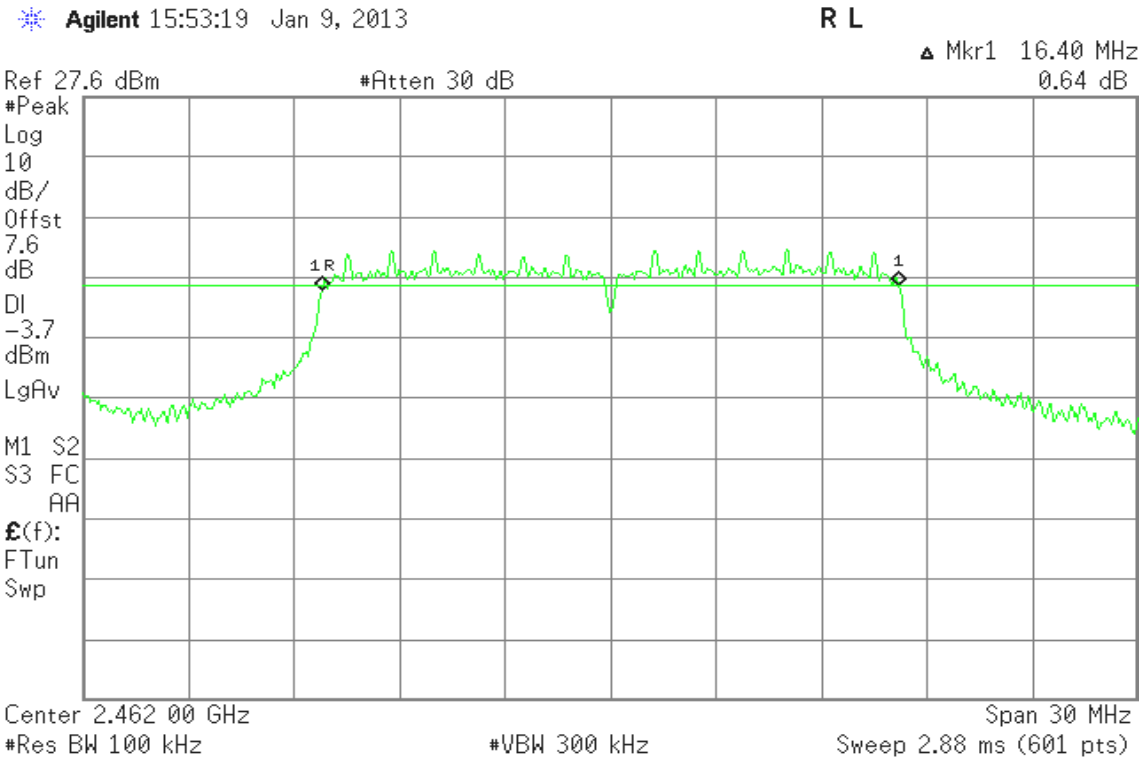
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

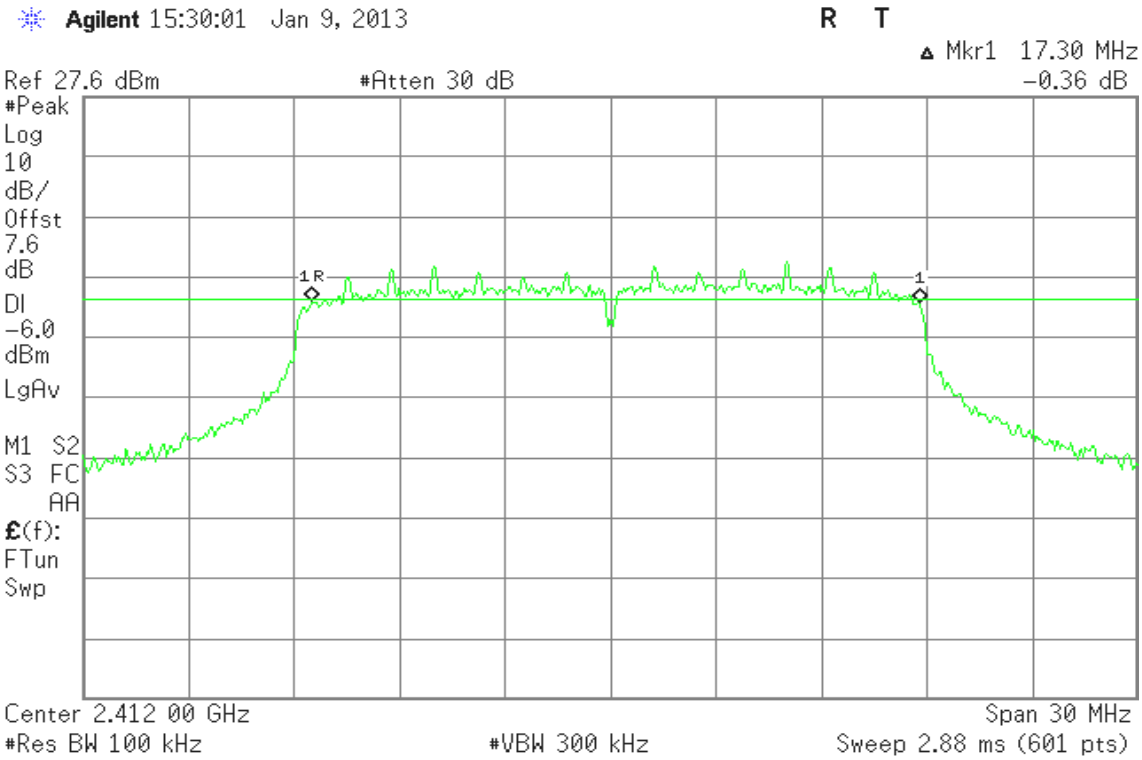


6dB Bandwidth (CH High)

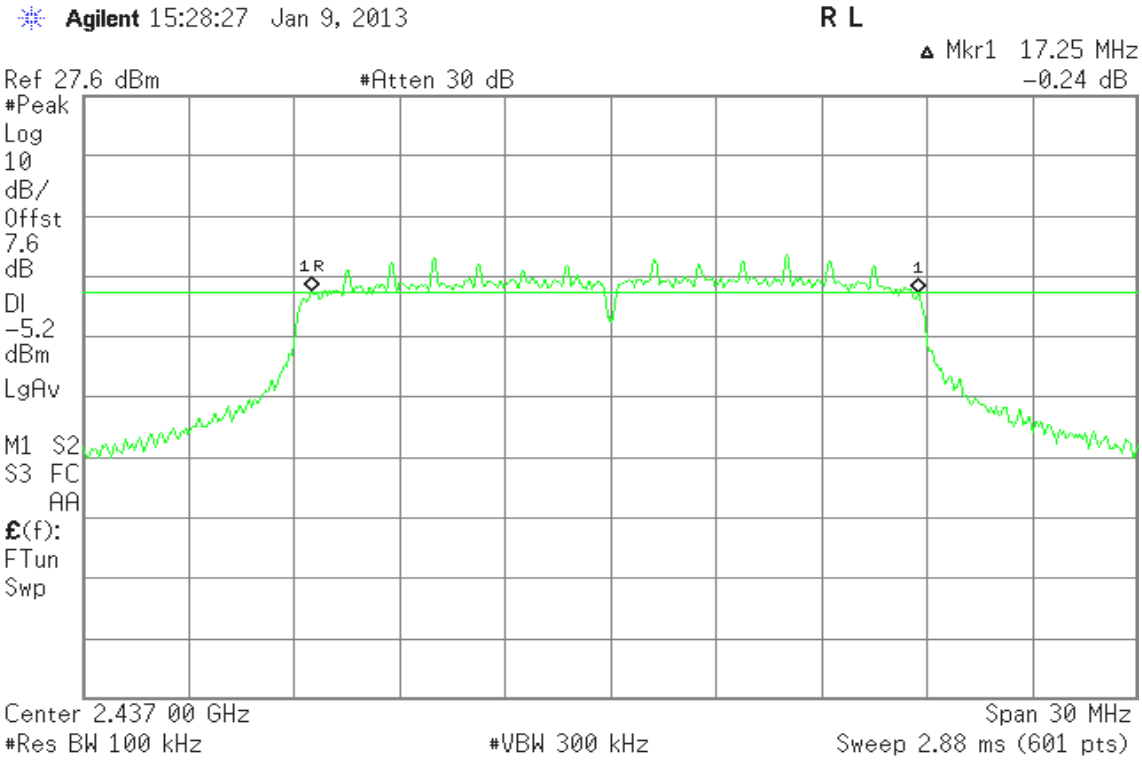


IEEE 802.11n 20 MHz Channel mode / Chain 0

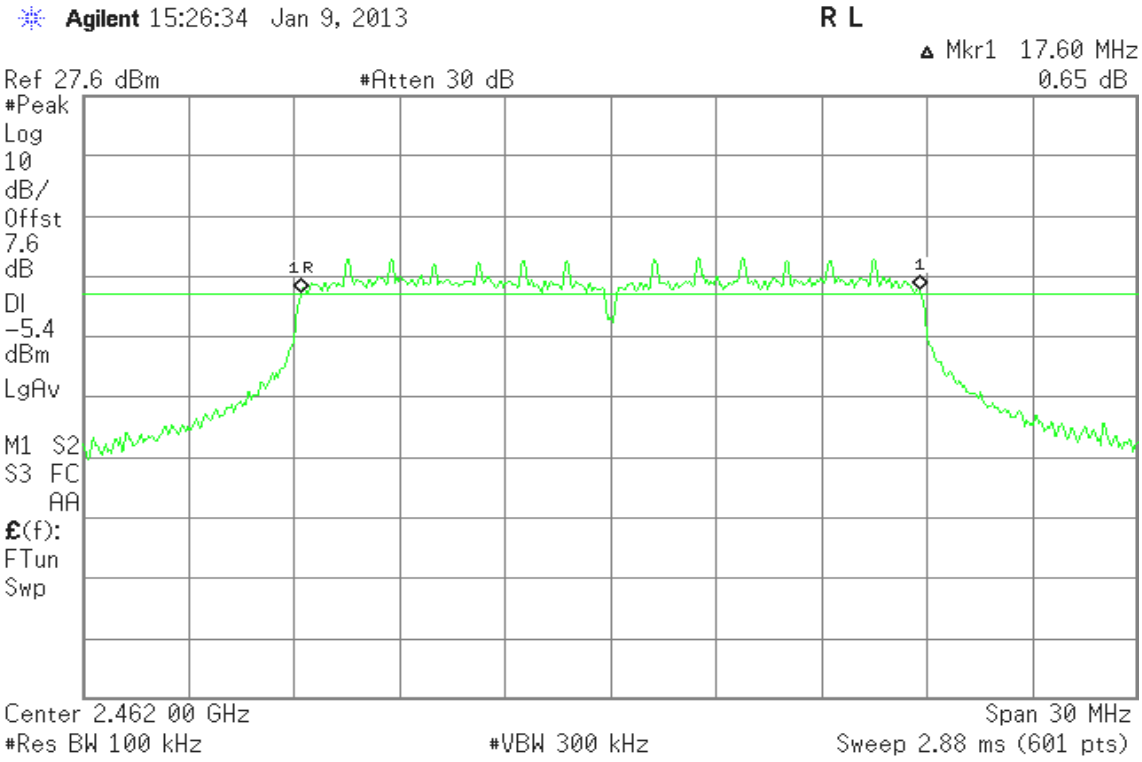
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

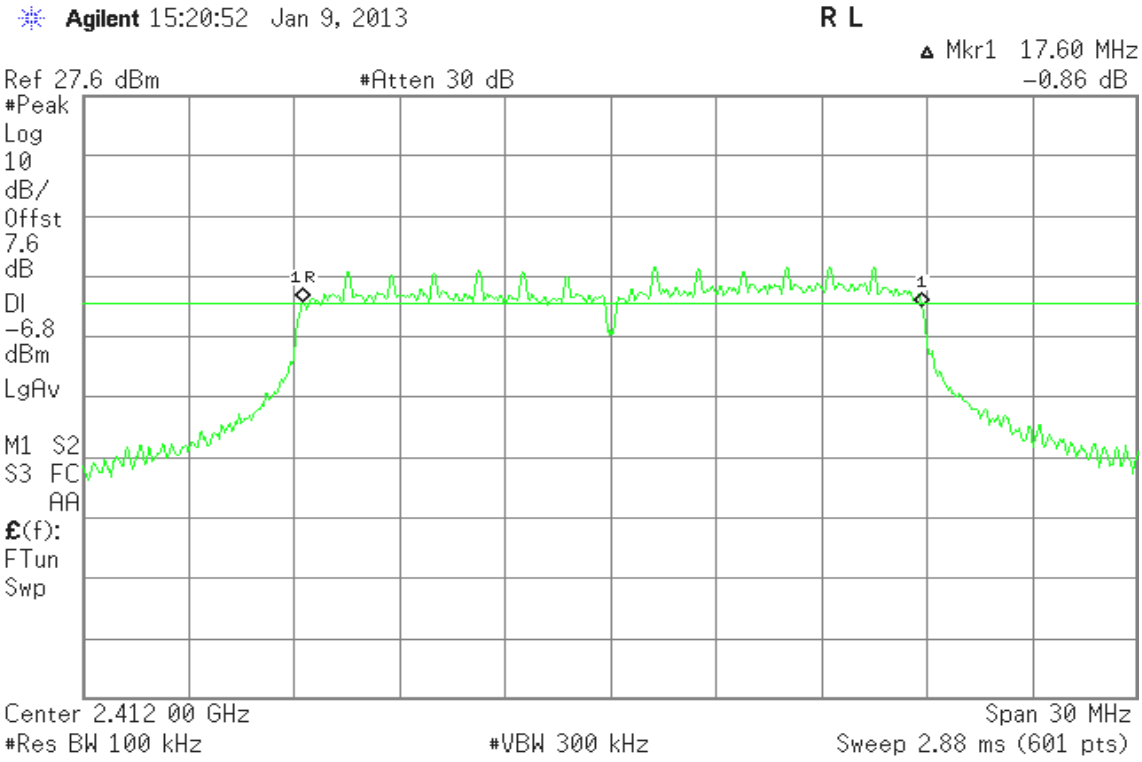


6dB Bandwidth (CH High)

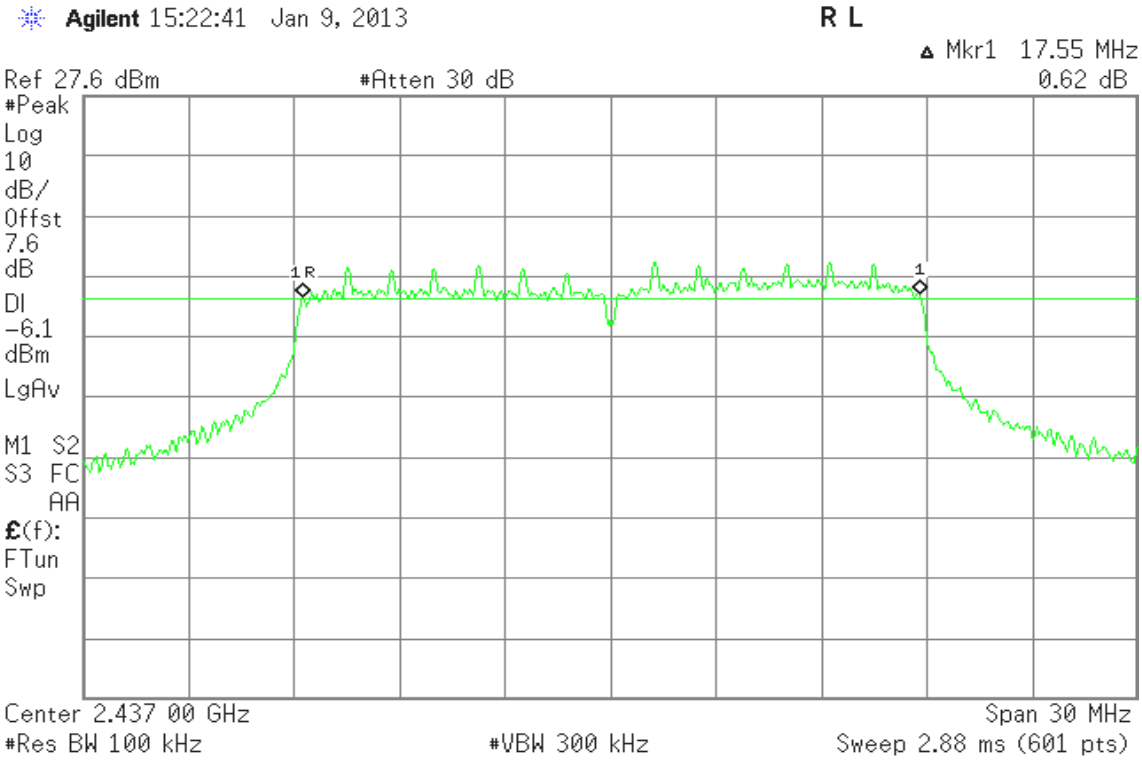


IEEE 802.11n 20 MHz Channel mode / Chain 1

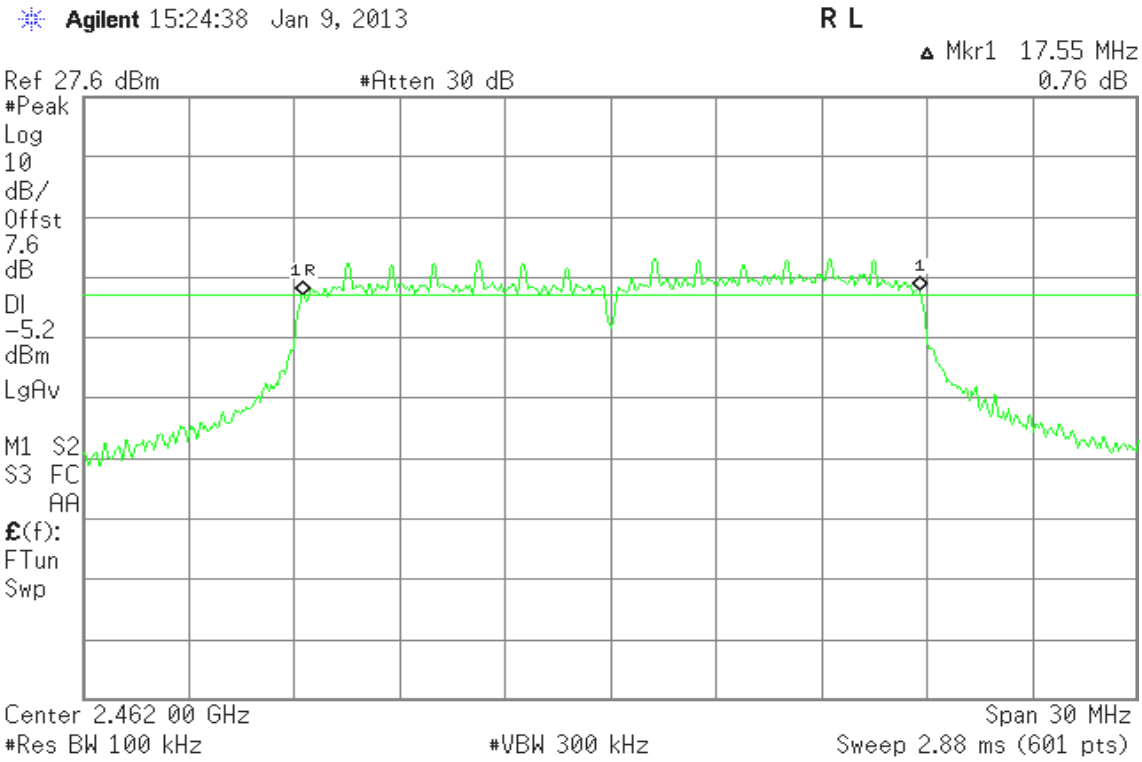
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

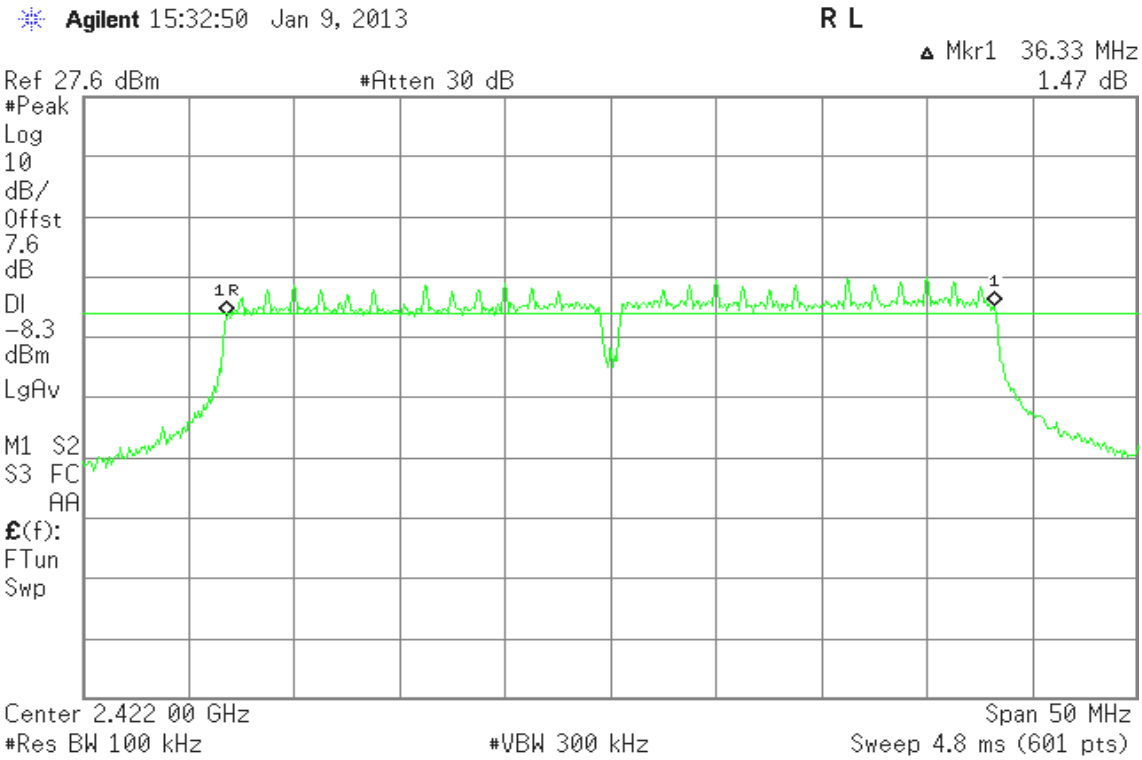


6dB Bandwidth (CH High)

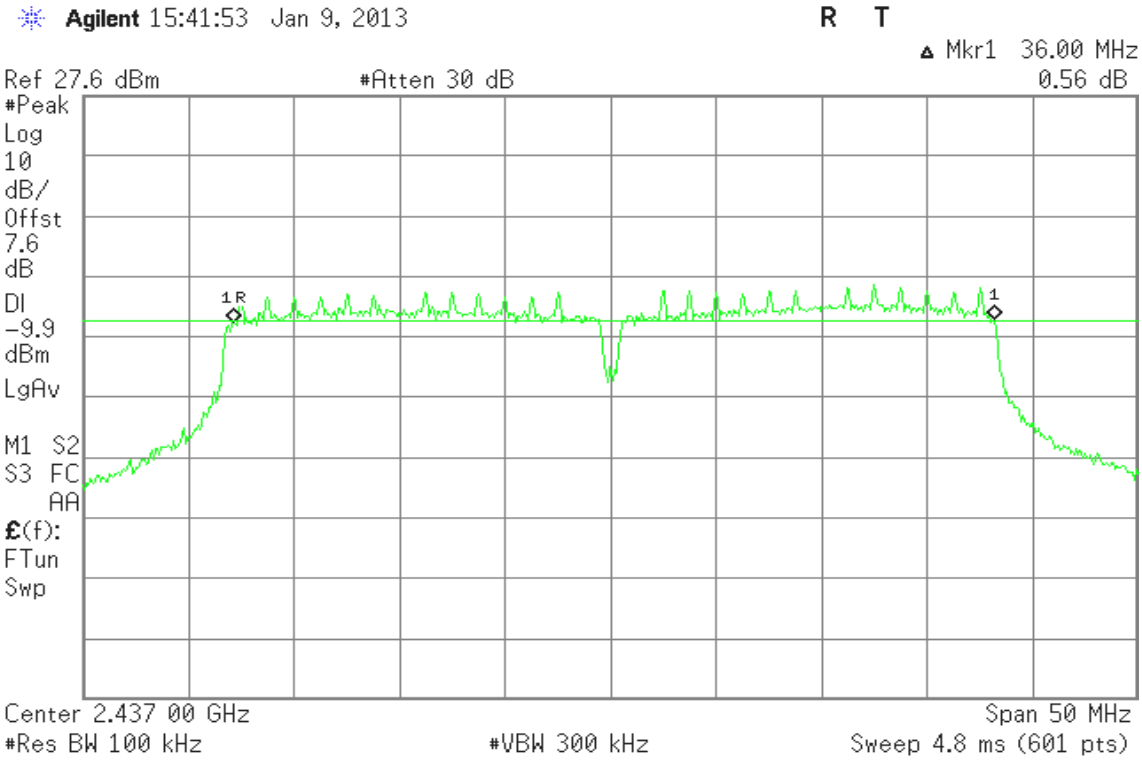


IEEE 802.11n 40 MHz Channel mode / Chain 0

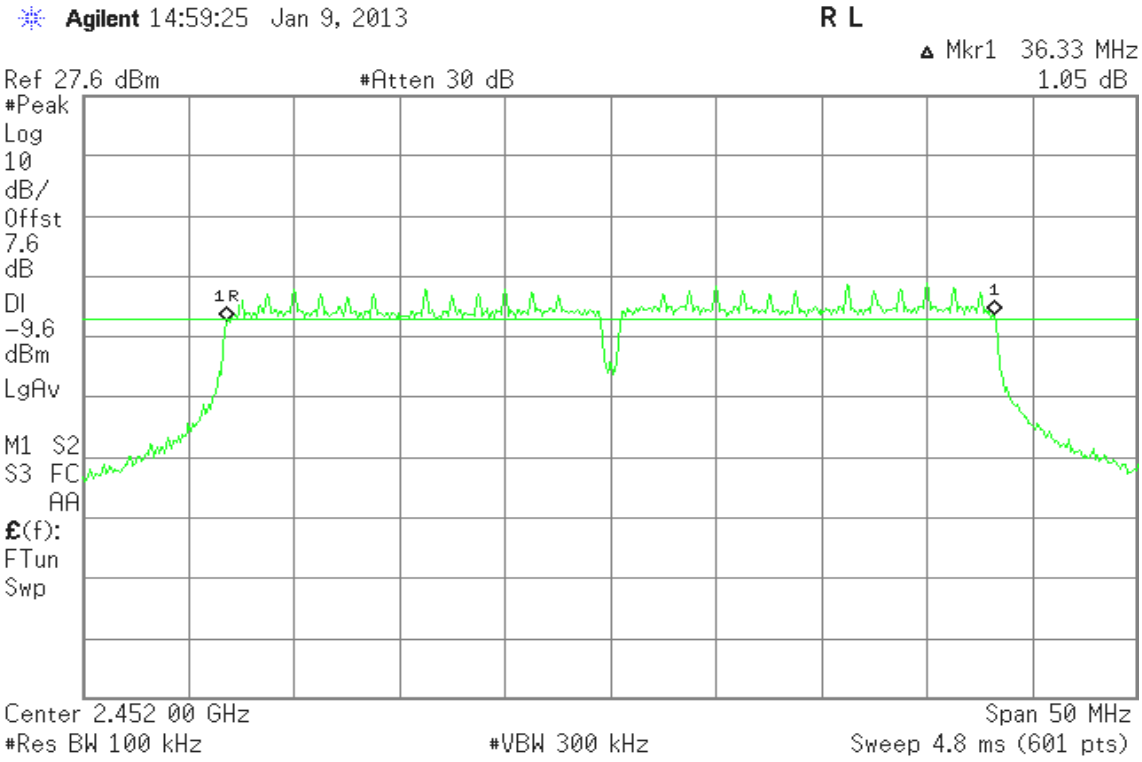
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

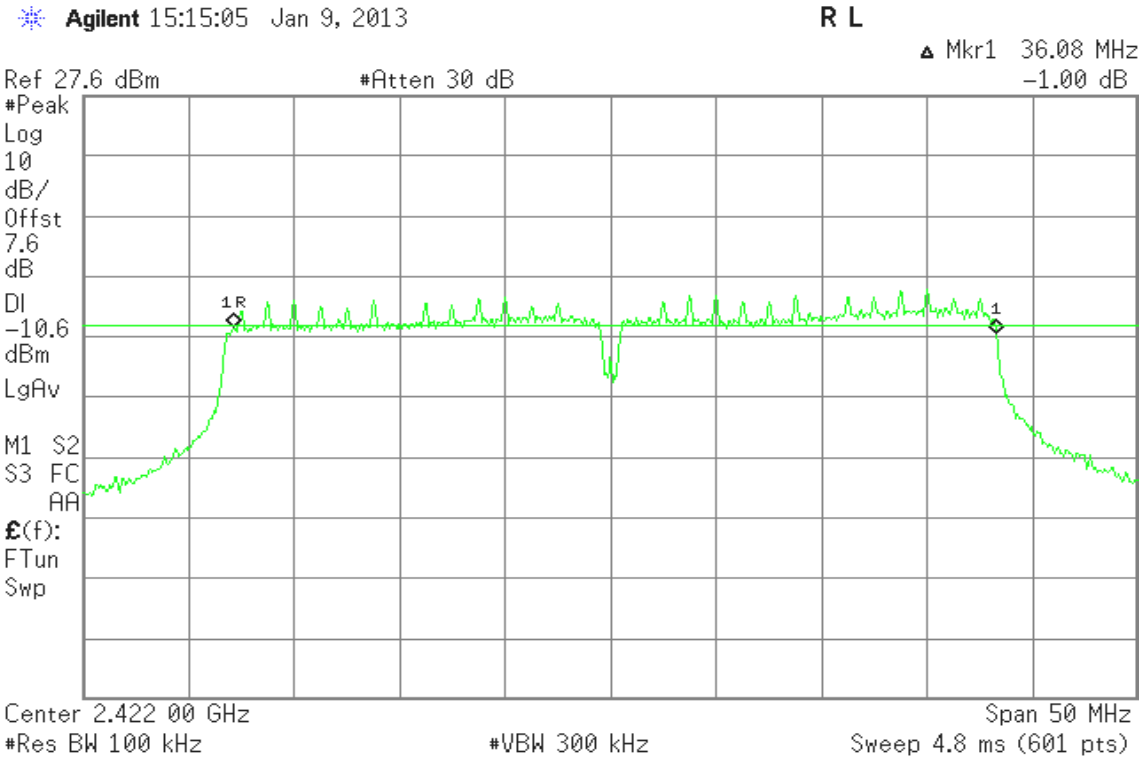


6dB Bandwidth (CH High)

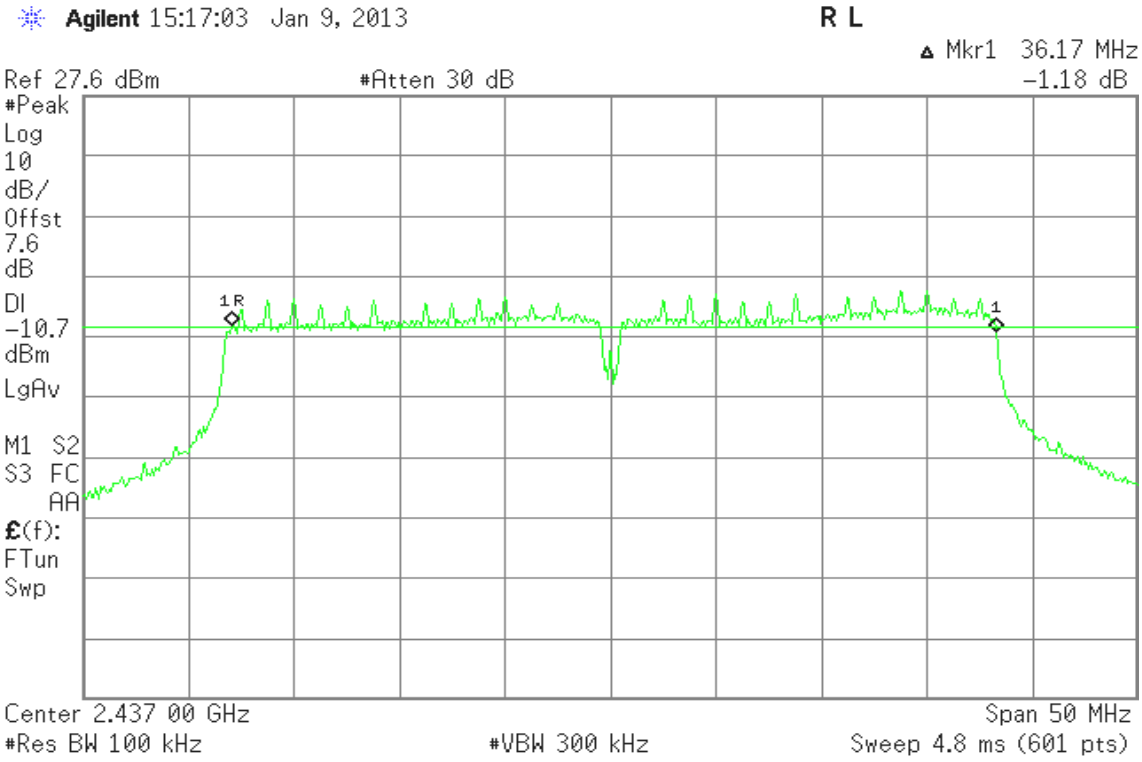


IEEE 802.11n 40 MHz Channel mode / Chain 1

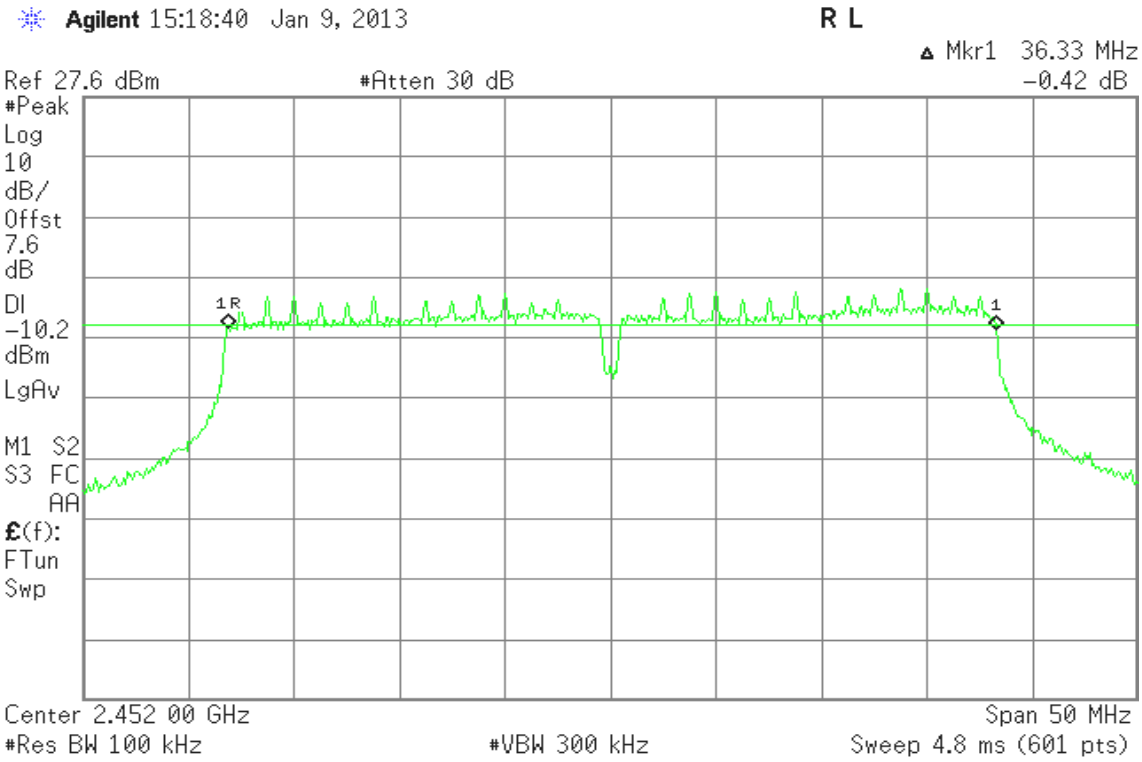
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)



6dB Bandwidth (CH High)



7.2 PEAK POWER

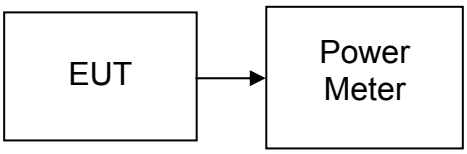
LIMIT

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.

3.

TEST CONFIGURATION



TEST PROCEDURE

Per KDB 558074 V02 and KDB 662911 D01 Multiple Transmitter Output v01r02

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

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	18.32	0.0679	1	PASS
Mid	2437	17.61	0.0577		PASS
High	2462	18.05	0.0638		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	20.58	0.1143	1	PASS
Mid	2437	20.21	0.1050		PASS
High	2462	21.11	0.1291		PASS

Test mode: IEEE 802.11n 20 MHz Channel mode

Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)			Limit (W)	Result
		Chain 0	Chain 1	Total	Chain 0	Chain 1	Total		
Low	2412	20.04	19.46	22.77	0.1009	0.0883	0.1892	1	PASS
Mid	2437	19.94	20.16	23.06	0.0986	0.1038	0.2024		PASS
High	2462	20.25	20.38	23.33	0.1059	0.1091	0.2151		PASS

Test mode: IEEE 802.11n 40 MHz Channel mode

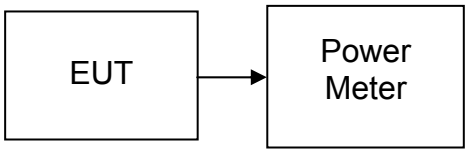
Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)			Limit (W)	Result
		Chain 0	Chain 1	Total	Chain 0	Chain 1	Total		
Low	2422	20.22	19.25	22.77	0.1052	0.0841	0.1893	1	PASS
Mid	2437	19.71	19.53	22.63	0.0935	0.0897	0.1833		PASS
High	2452	19.91	19.87	22.90	0.0979	0.0971	0.1950		PASS

7.3 AVERAGE POWER

LIMIT

None; for reporting purposes only.

TEST CONFIGURATION



TEST PROCEDURE

Per KDB 558074 V02

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

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2412	16.43	0.0440
Mid	2437	15.54	0.0358
High	2462	16.13	0.0410

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2412	12.45	0.0176
Mid	2437	12.17	0.0165
High	2462	13.11	0.0205

Test mode: IEEE 802.11n 20 MHz Channel mode

Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)		
		Chain 0	Chain 1	Total	Chain 0	Chain 1	Total
Low	2412	11.82	11.01	14.44	0.0152	0.0126	0.0278
Mid	2437	11.35	11.82	14.60	0.0136	0.0152	0.0289
High	2462	11.86	12.43	15.16	0.0153	0.0175	0.0328

Test mode: IEEE 802.11n 40 MHz Channel mode

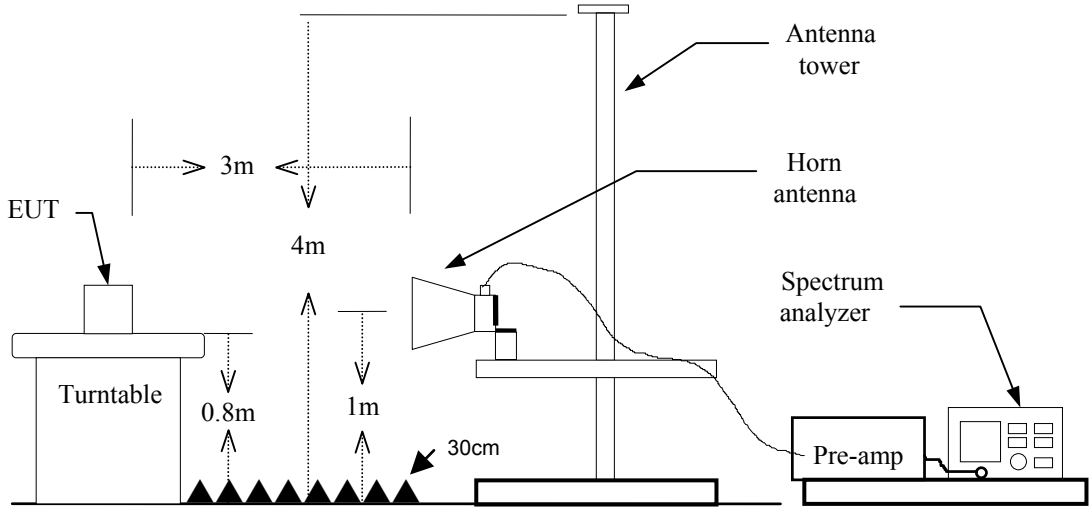
Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)		
		Chain 0	Chain 1	Total	Chain 0	Chain 1	Total
Low	2422	10.41	8.92	12.74	0.0110	0.0078	0.0188
Mid	2437	9.54	9.51	12.54	0.0090	0.0089	0.0179
High	2452	9.88	10.05	12.98	0.0097	0.0101	0.0198

7.4 BAND EDGES 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

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=VBW=1MHz / Sweep=100ms
   (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

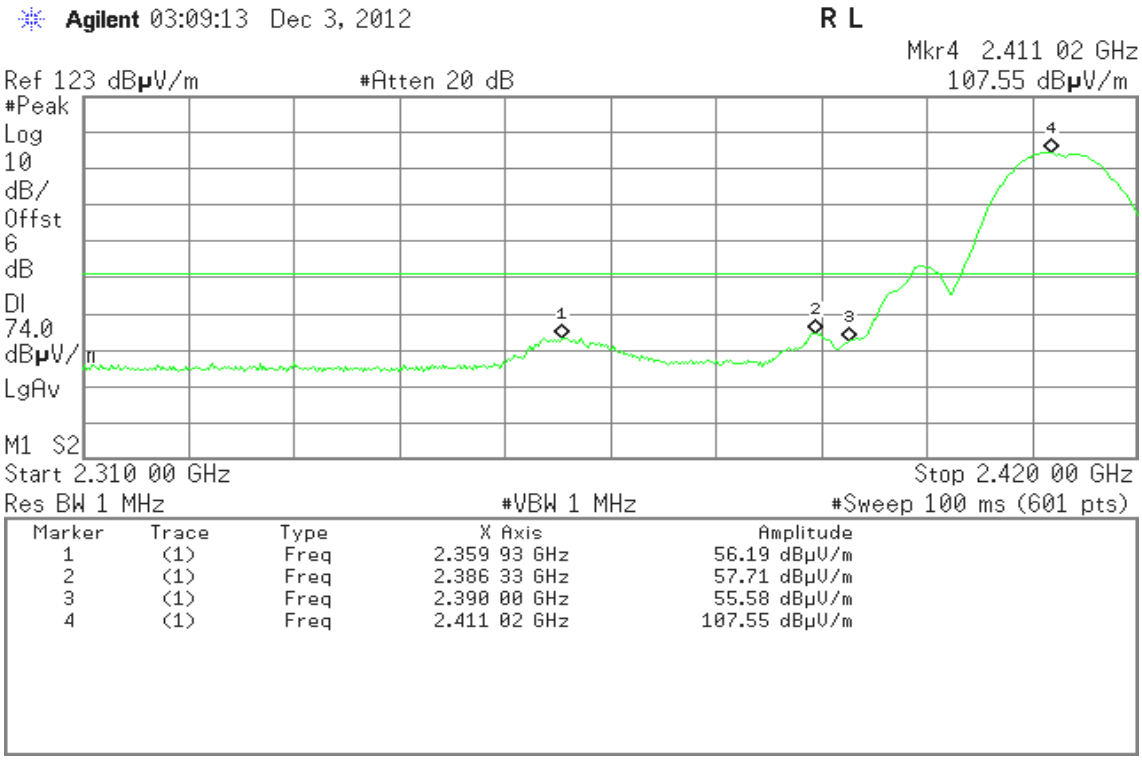
TEST RESULTS

Refer to attach spectrum analyzer data chart.

Test Plot

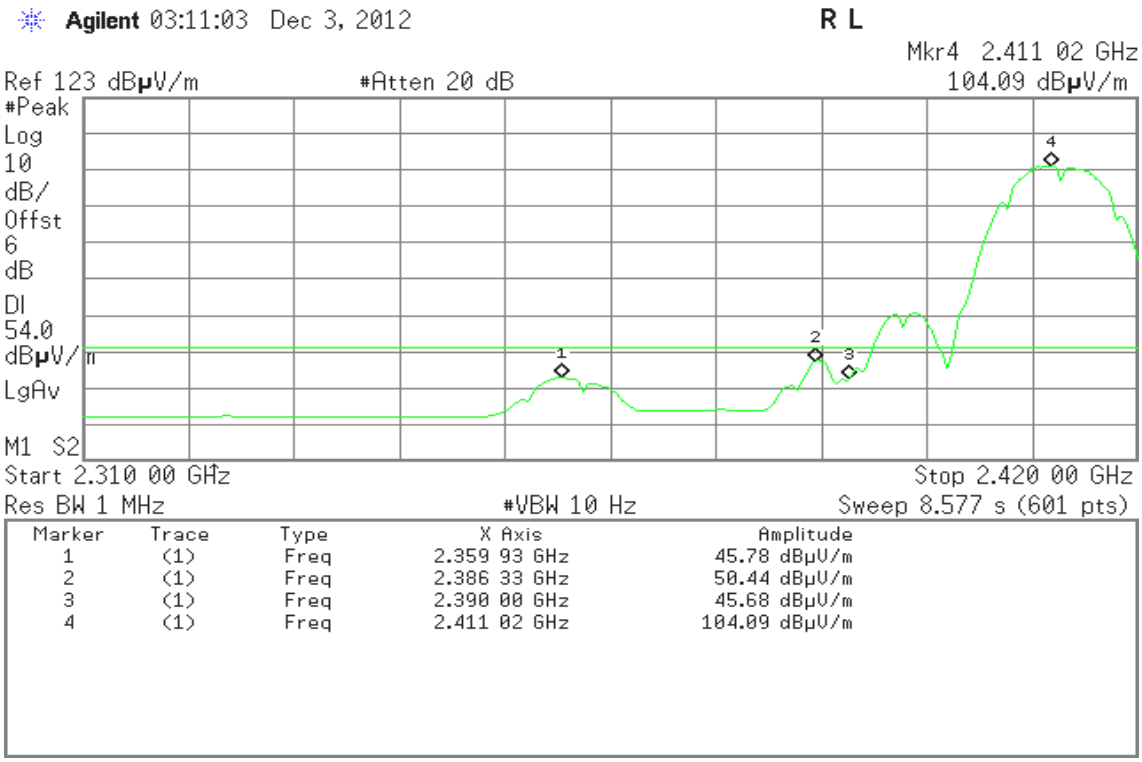
Band Edges (IEEE 802.11b mode / CH Low)

Detector mode: Peak **Polarity: Vertical**



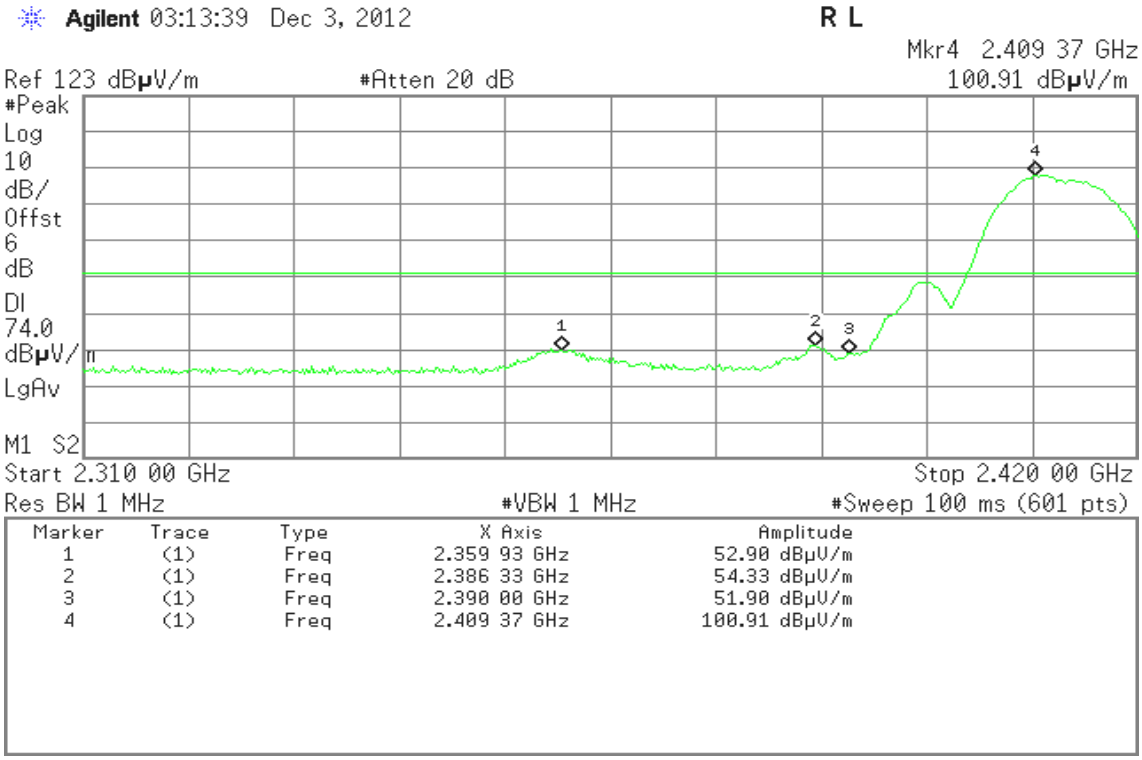
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.359 93 GHz	56.19 dBµV/m
2	(1)	Freq	2.386 33 GHz	57.71 dBµV/m
3	(1)	Freq	2.390 00 GHz	55.58 dBµV/m
4	(1)	Freq	2.411 02 GHz	107.55 dBµV/m

Detector mode: Average **Polarity: Vertical**



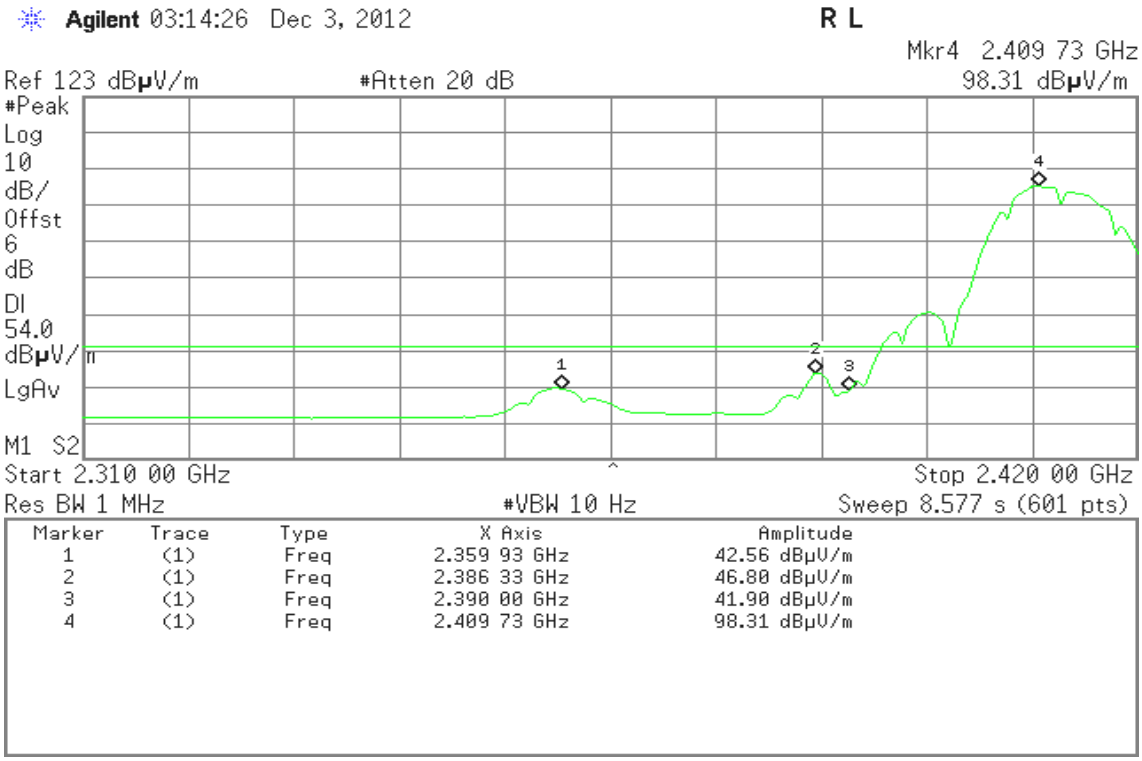
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.359 93 GHz	45.78 dBµV/m
2	(1)	Freq	2.386 33 GHz	50.44 dBµV/m
3	(1)	Freq	2.390 00 GHz	45.68 dBµV/m
4	(1)	Freq	2.411 02 GHz	104.09 dBµV/m

Detector mode: Peak Polarity: Horizontal



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.359 93 GHz	52.90 dBµV/m
2	(1)	Freq	2.386 33 GHz	54.33 dBµV/m
3	(1)	Freq	2.390 00 GHz	51.90 dBµV/m
4	(1)	Freq	2.409 37 GHz	100.91 dBµV/m

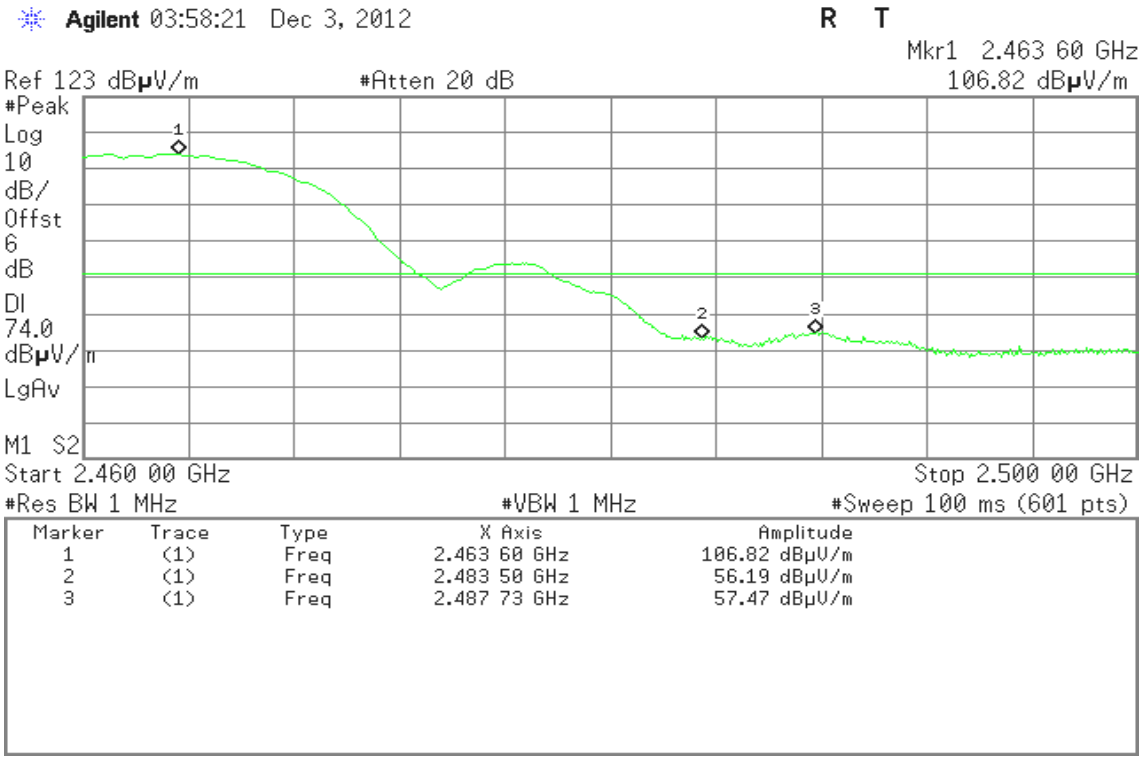
Detector mode: Average Polarity: Horizontal



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.359 93 GHz	42.56 dBµV/m
2	(1)	Freq	2.386 33 GHz	46.80 dBµV/m
3	(1)	Freq	2.390 00 GHz	41.90 dBµV/m
4	(1)	Freq	2.409 73 GHz	98.31 dBµV/m

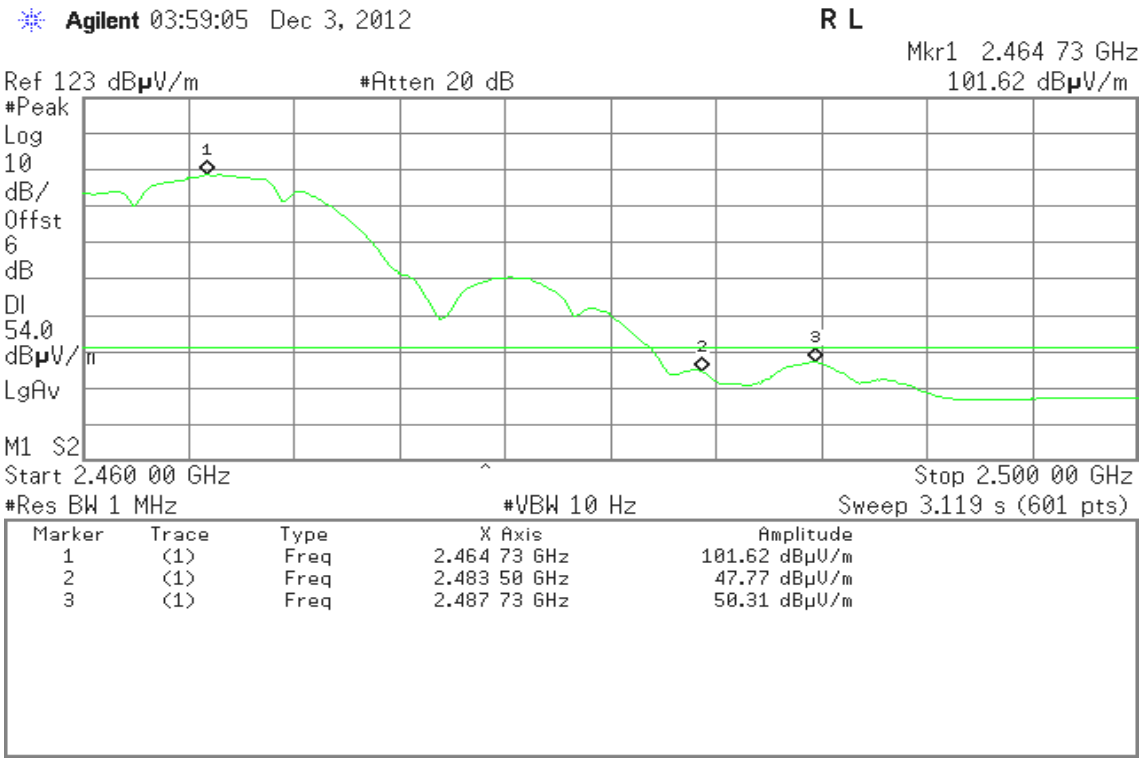
Band Edges (IEEE 802.11b mode / CH High)

Detector mode: Peak Polarity: Vertical



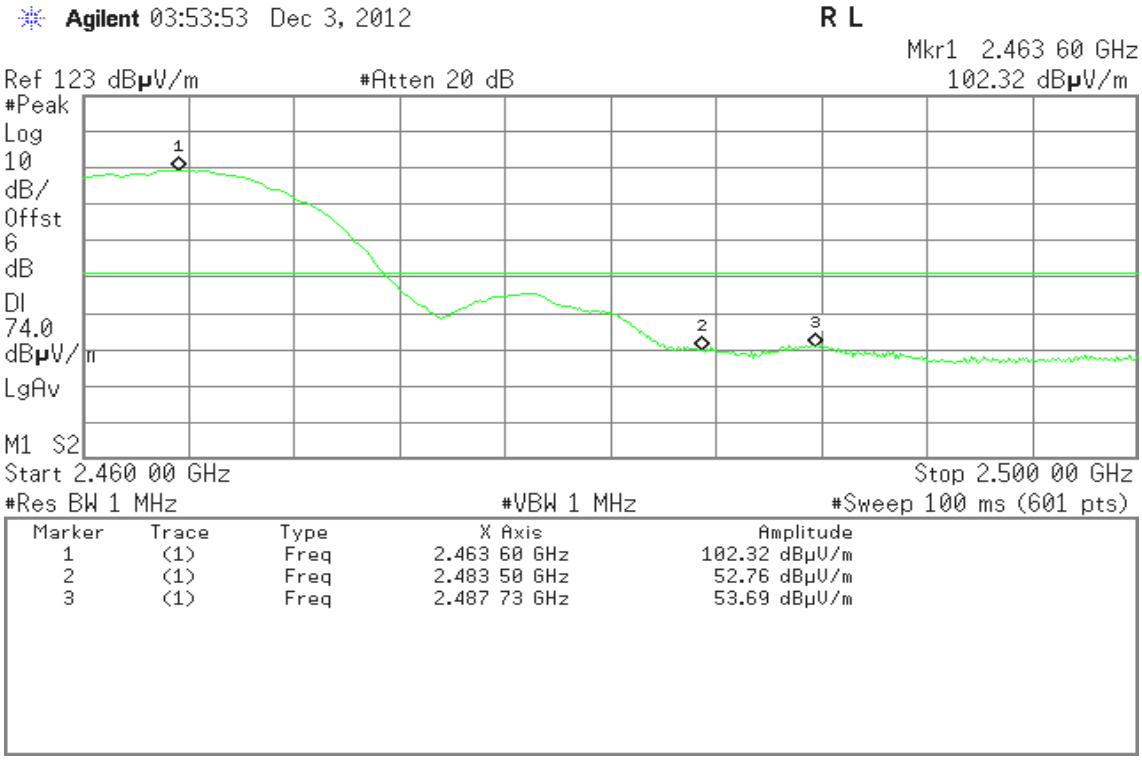
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.463 60 GHz	106.82 dBµV/m
2	(1)	Freq	2.483 50 GHz	56.19 dBµV/m
3	(1)	Freq	2.487 73 GHz	57.47 dBµV/m

Detector mode: Average Polarity: Vertical



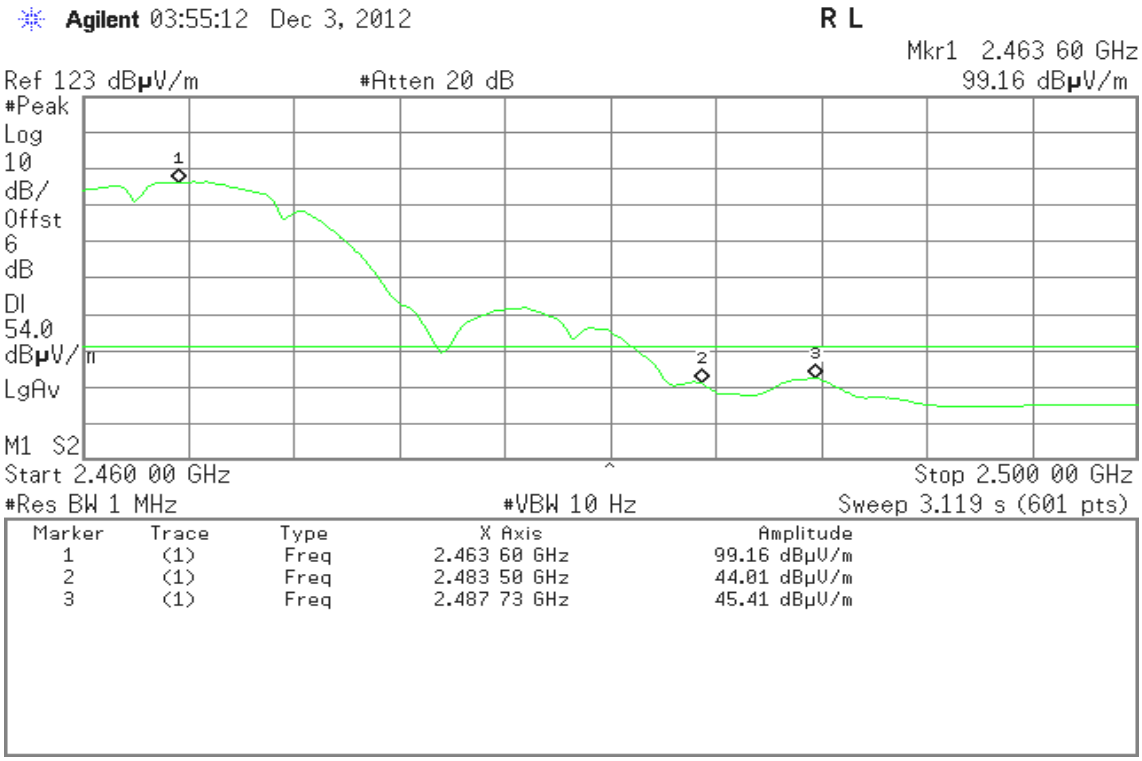
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.464 73 GHz	101.62 dBµV/m
2	(1)	Freq	2.483 50 GHz	47.77 dBµV/m
3	(1)	Freq	2.487 73 GHz	50.31 dBµV/m

Detector mode: Peak Polarity: Horizontal



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.463 60 GHz	102.32 dBµV/m
2	(1)	Freq	2.483 50 GHz	52.76 dBµV/m
3	(1)	Freq	2.487 73 GHz	53.69 dBµV/m

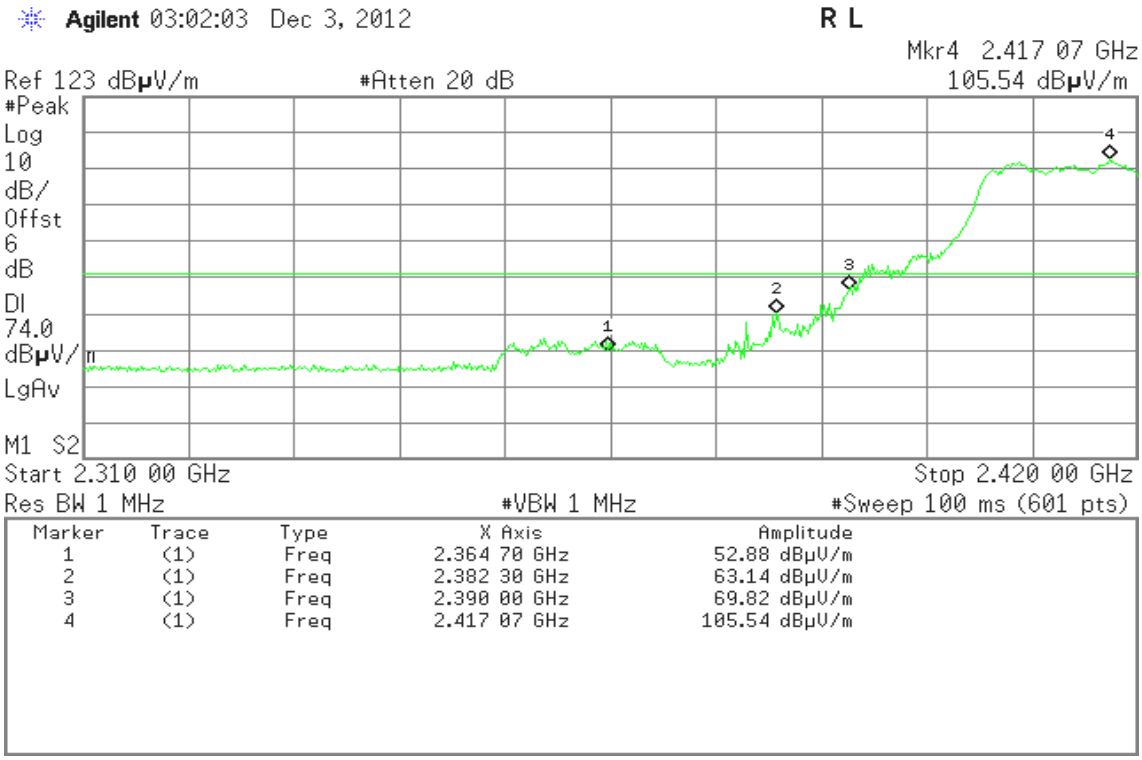
Detector mode: Average Polarity: Horizontal



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.463 60 GHz	99.16 dBµV/m
2	(1)	Freq	2.483 50 GHz	44.01 dBµV/m
3	(1)	Freq	2.487 73 GHz	45.41 dBµV/m

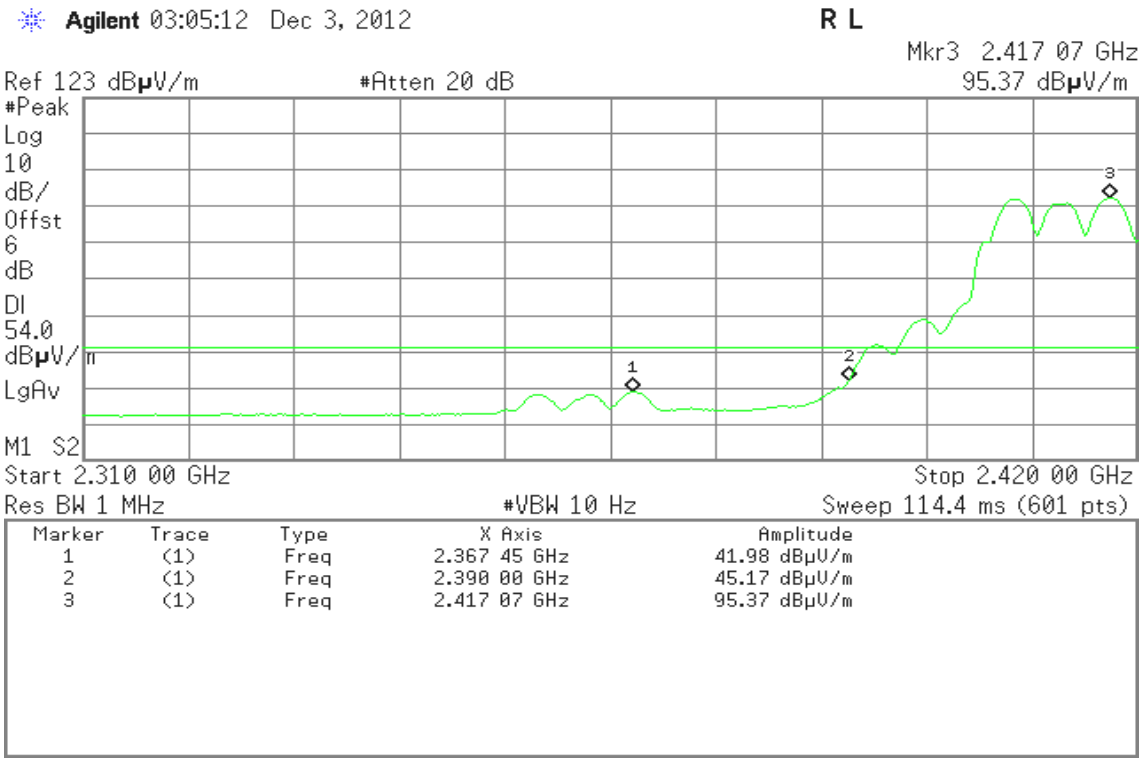
Band Edges (IEEE 802.11g mode / CH Low)

Detector mode: Peak Polarity: Vertical



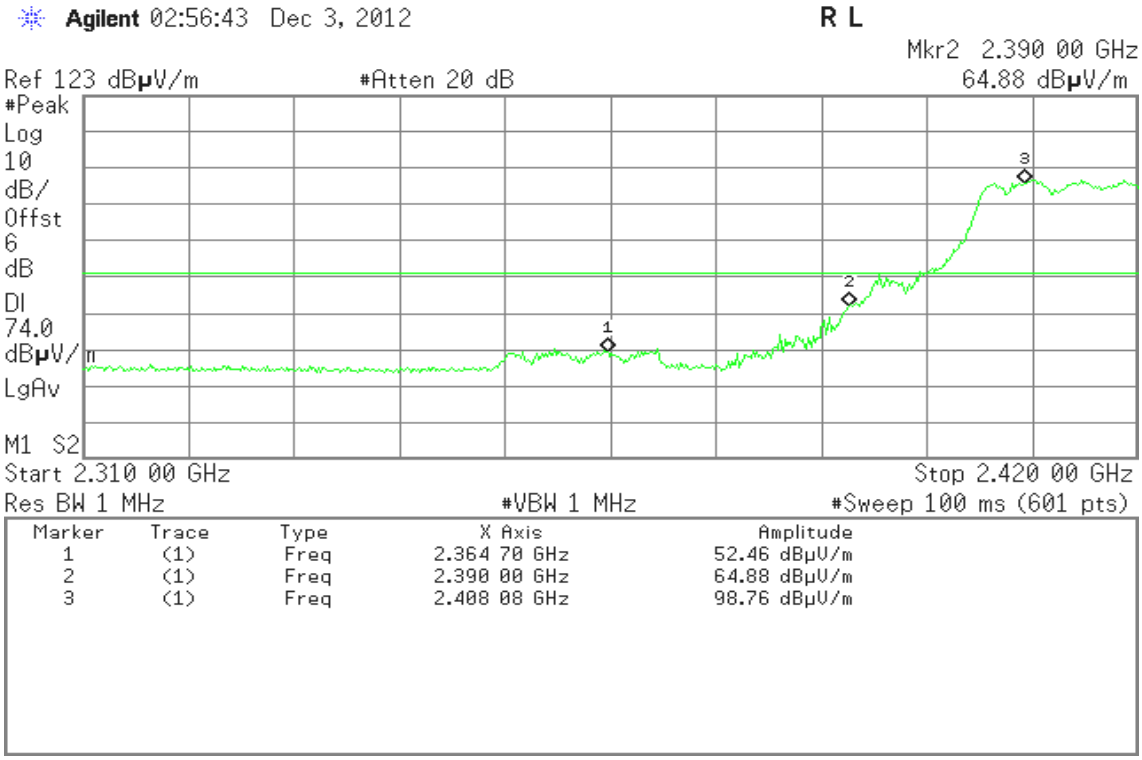
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.364 70 GHz	52.88 dBµV/m
2	(1)	Freq	2.382 30 GHz	63.14 dBµV/m
3	(1)	Freq	2.390 00 GHz	69.82 dBµV/m
4	(1)	Freq	2.417 07 GHz	105.54 dBµV/m

Detector mode: Average Polarity: Vertical



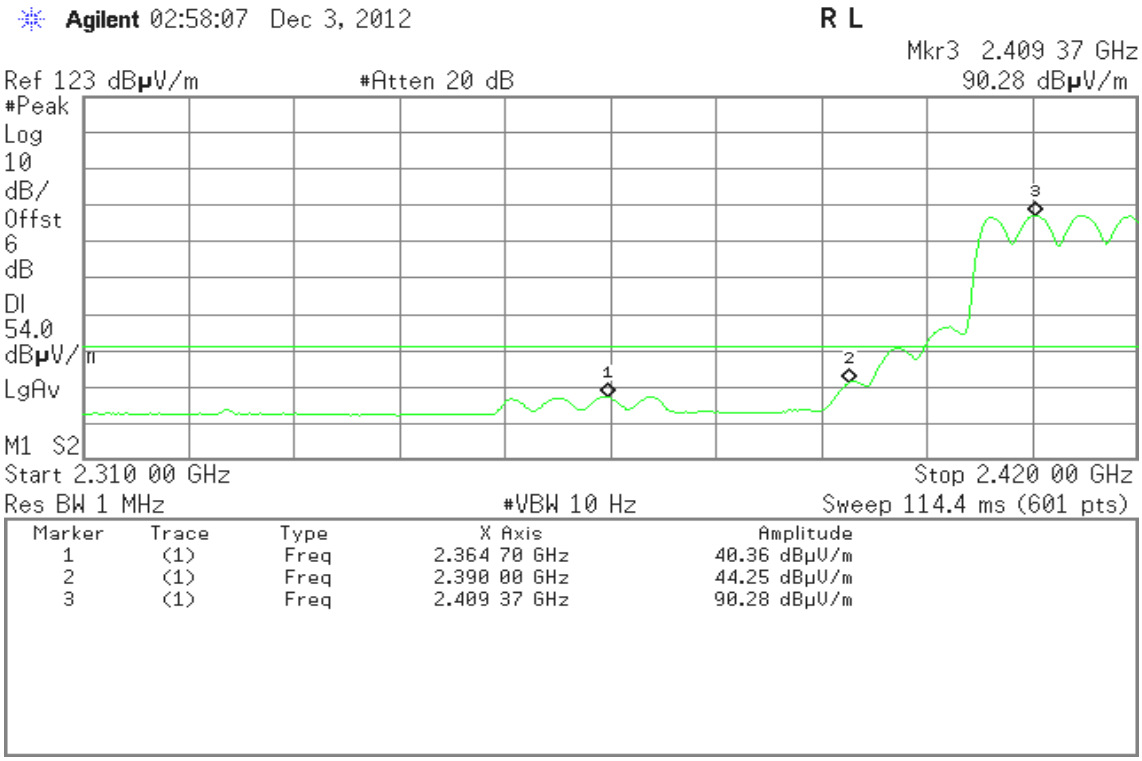
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.367 45 GHz	41.98 dBµV/m
2	(1)	Freq	2.390 00 GHz	45.17 dBµV/m
3	(1)	Freq	2.417 07 GHz	95.37 dBµV/m

Detector mode: Peak Polarity: Horizontal



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.364 70 GHz	52.46 dBµV/m
2	(1)	Freq	2.390 00 GHz	64.88 dBµV/m
3	(1)	Freq	2.408 08 GHz	98.76 dBµV/m

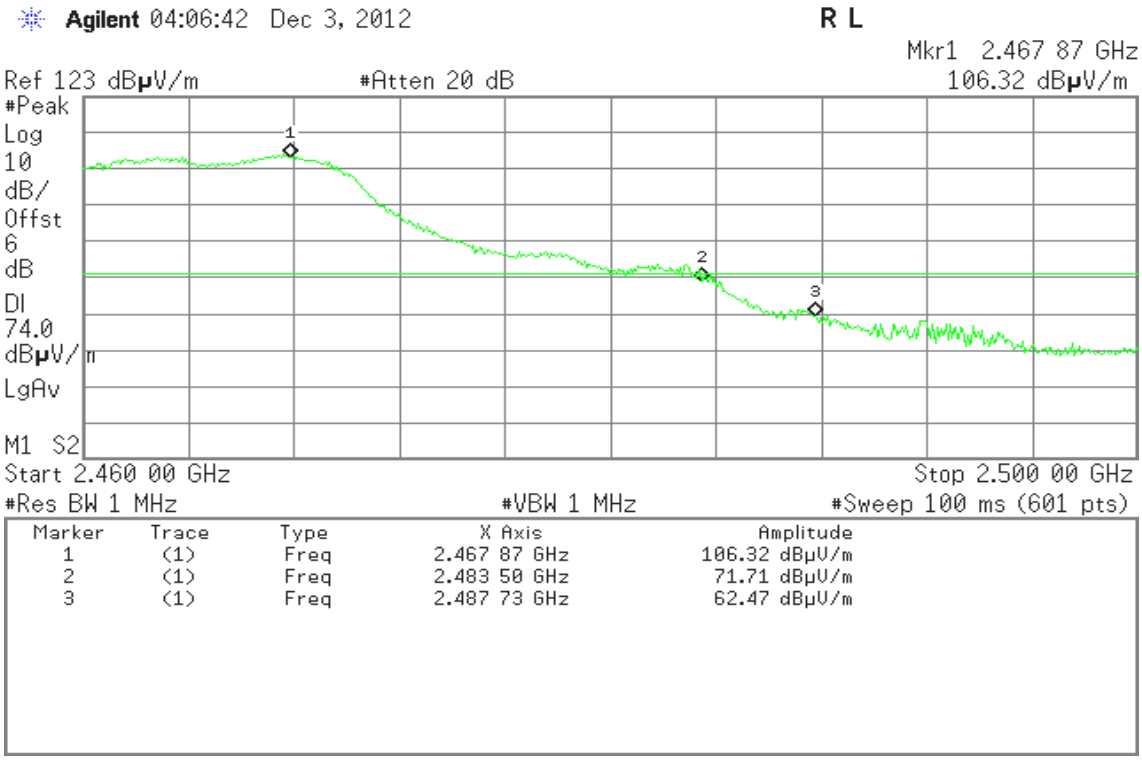
Detector mode: Average Polarity: Horizontal



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.364 70 GHz	40.36 dBµV/m
2	(1)	Freq	2.390 00 GHz	44.25 dBµV/m
3	(1)	Freq	2.409 37 GHz	90.28 dBµV/m

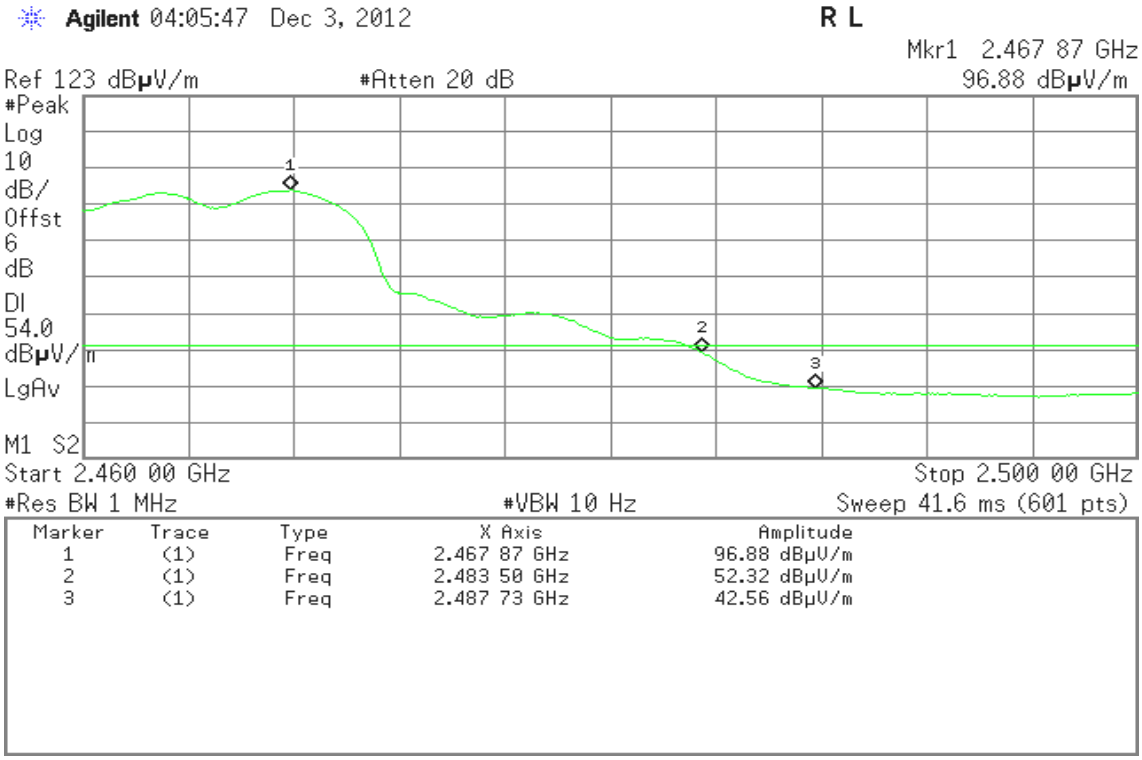
Band Edges (IEEE 802.11g mode / CH High)

Detector mode: Peak Polarity: Vertical



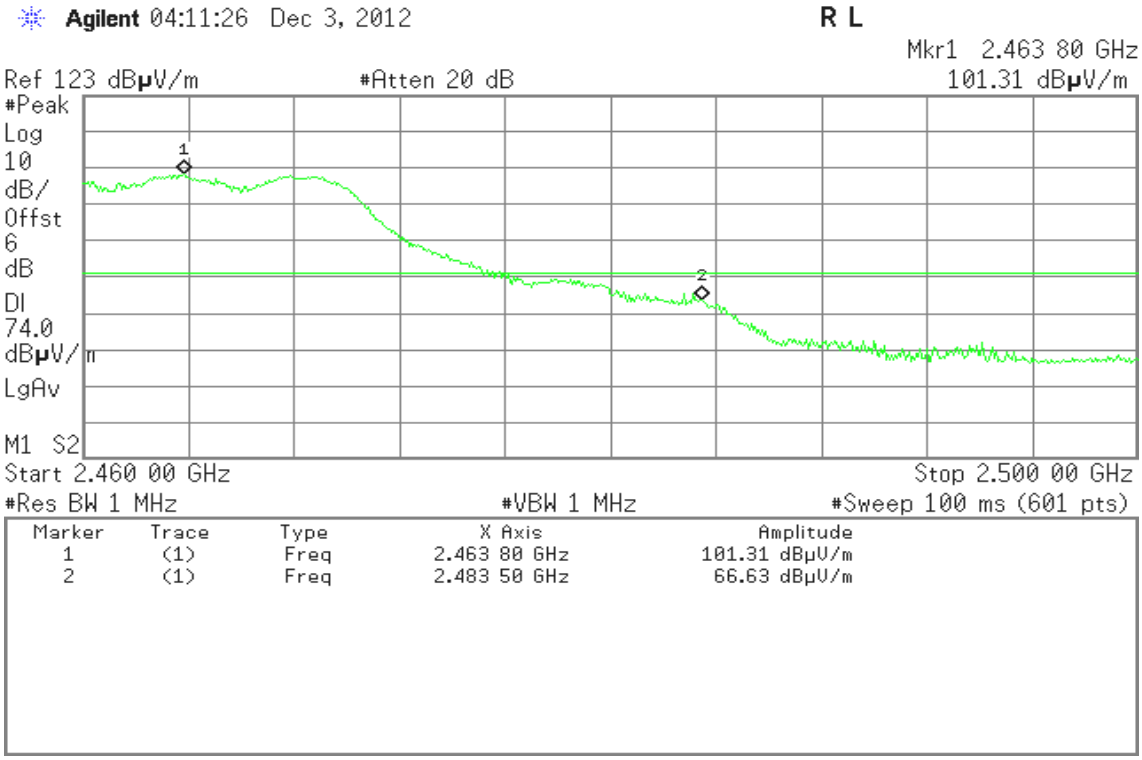
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.467 87 GHz	106.32 dBµV/m
2	(1)	Freq	2.483 50 GHz	71.71 dBµV/m
3	(1)	Freq	2.487 73 GHz	62.47 dBµV/m

Detector mode: Average Polarity: Vertical

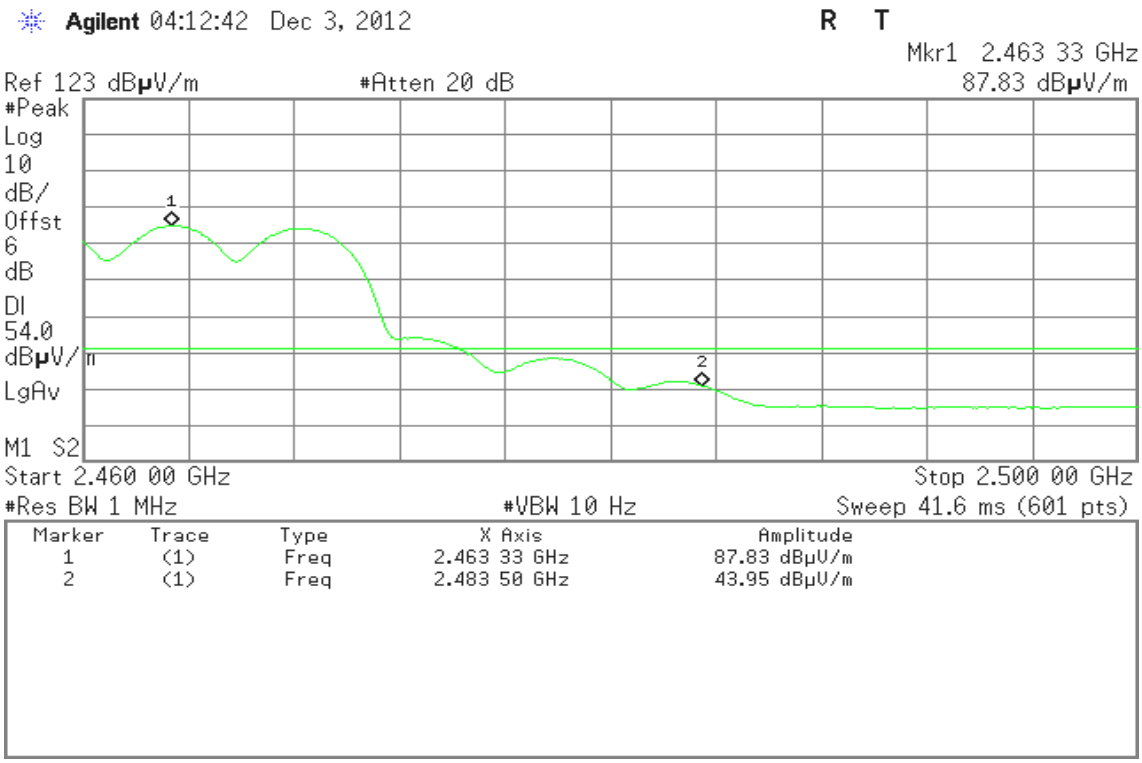


Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.467 87 GHz	96.88 dBµV/m
2	(1)	Freq	2.483 50 GHz	52.32 dBµV/m
3	(1)	Freq	2.487 73 GHz	42.56 dBµV/m

Detector mode: Peak Polarity: Horizontal

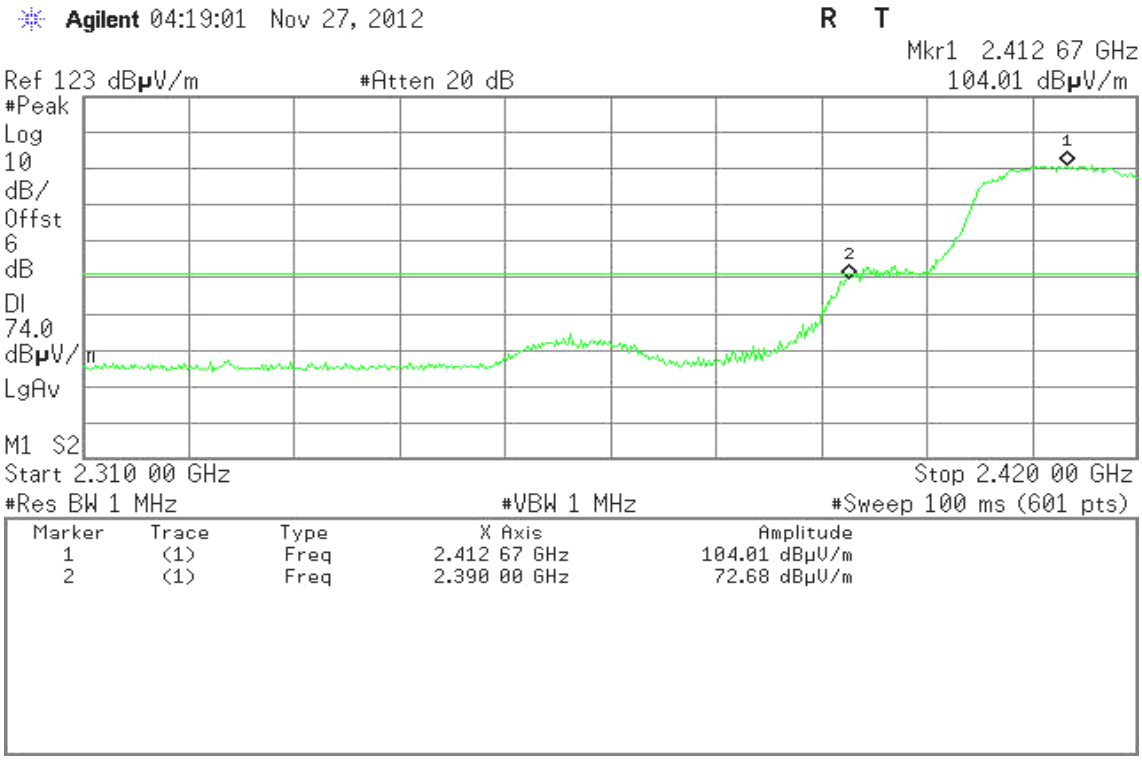


Detector mode: Average Polarity: Horizontal

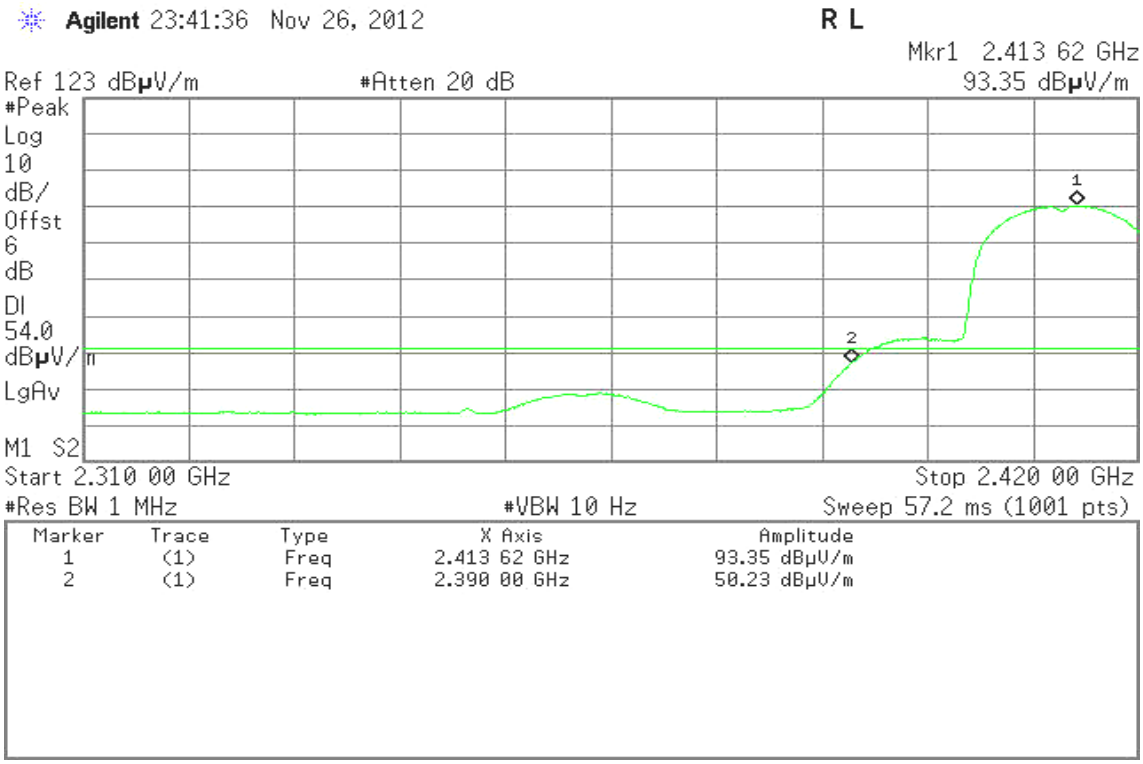


Band Edges (IEEE 802.11n 20 MHz Channel mode / CH Low)

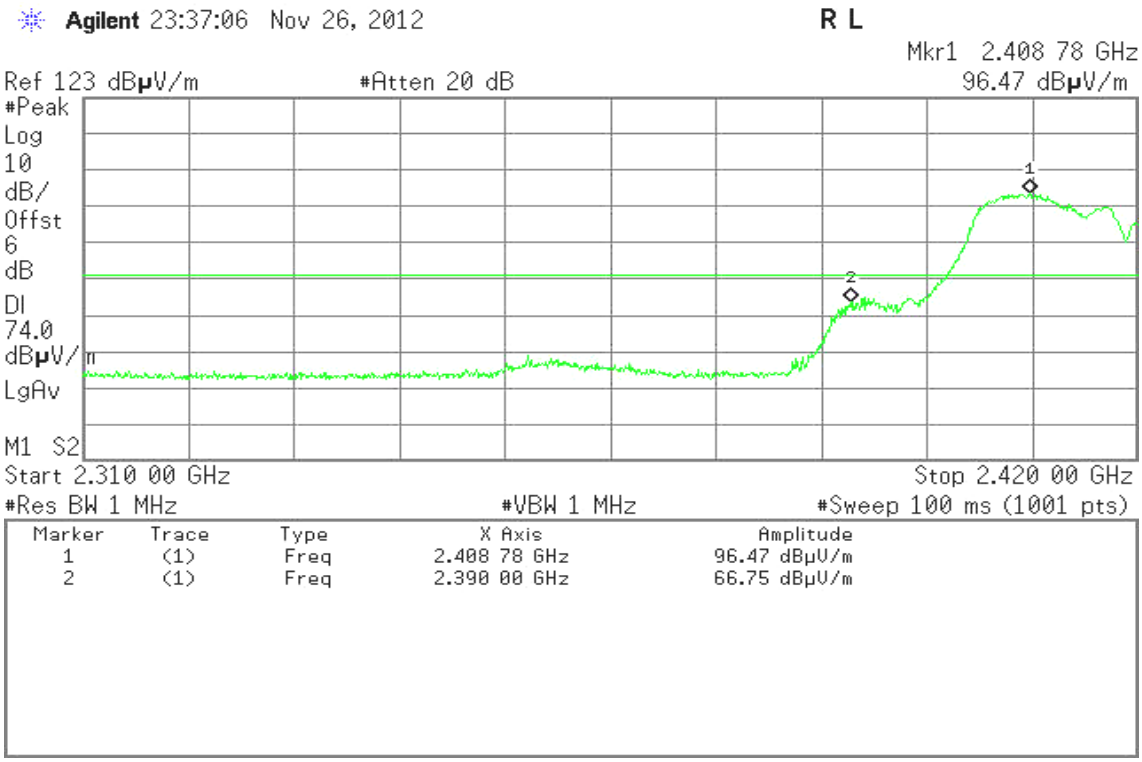
Detector mode: Peak Polarity: Vertical



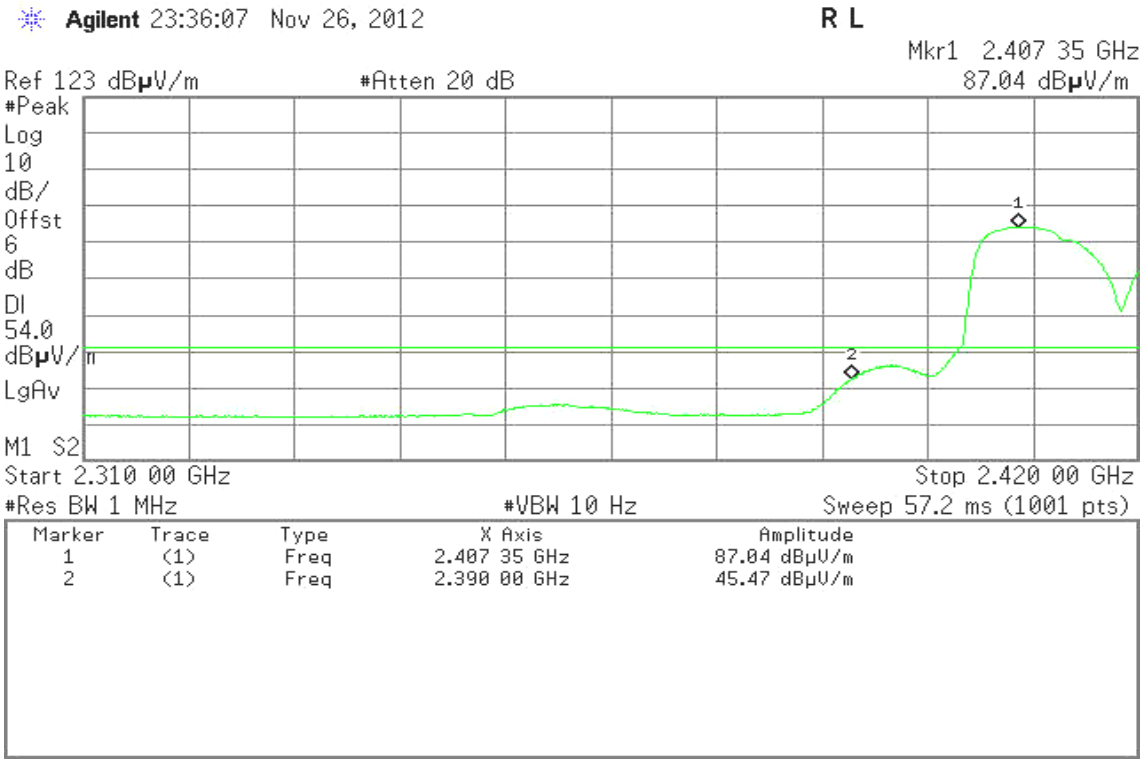
Detector mode: Average Polarity: Vertical



Detector mode: Peak Polarity: Horizontal

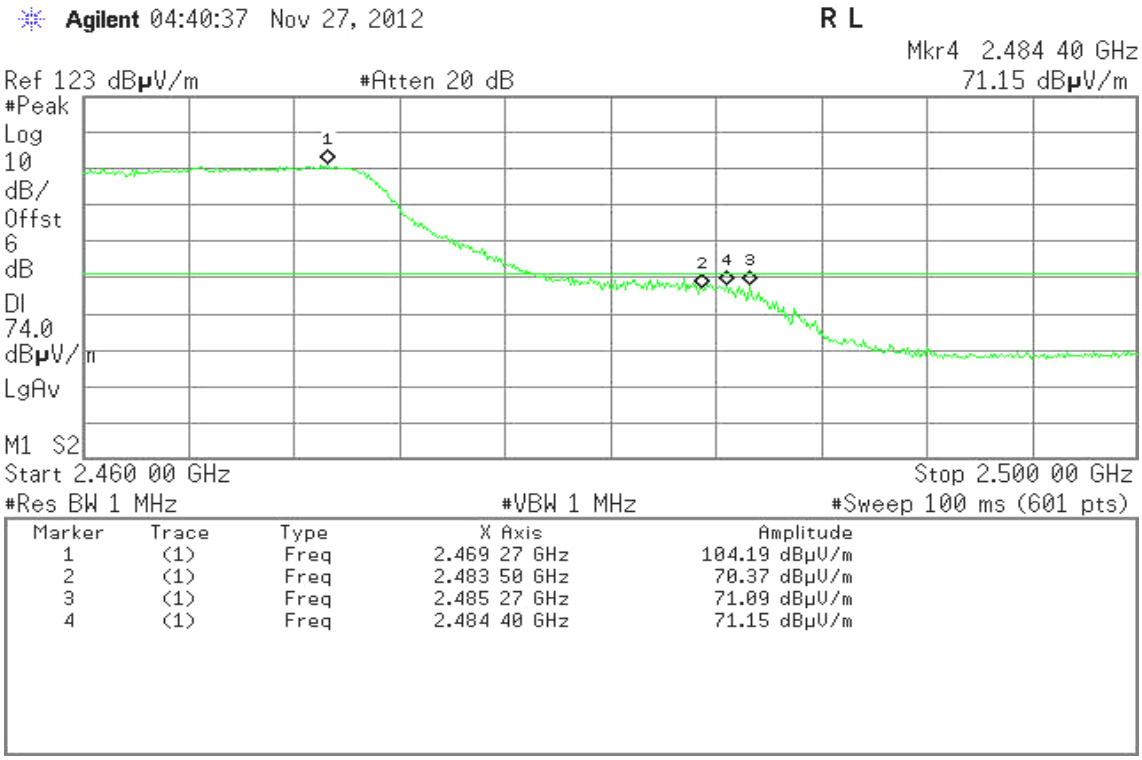


Detector mode: Average Polarity: Horizontal



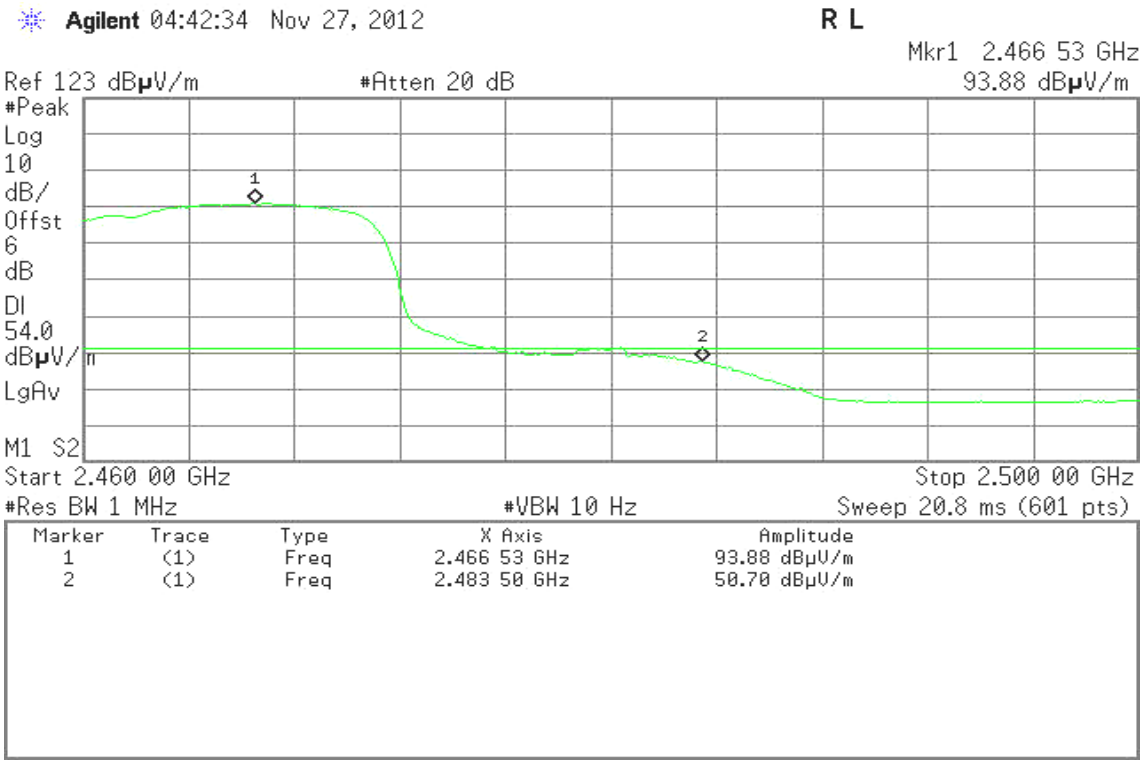
Band Edges (IEEE 802.11n 20 MHz Channel mode / CH High)

Detector mode: Peak Polarity: Vertical



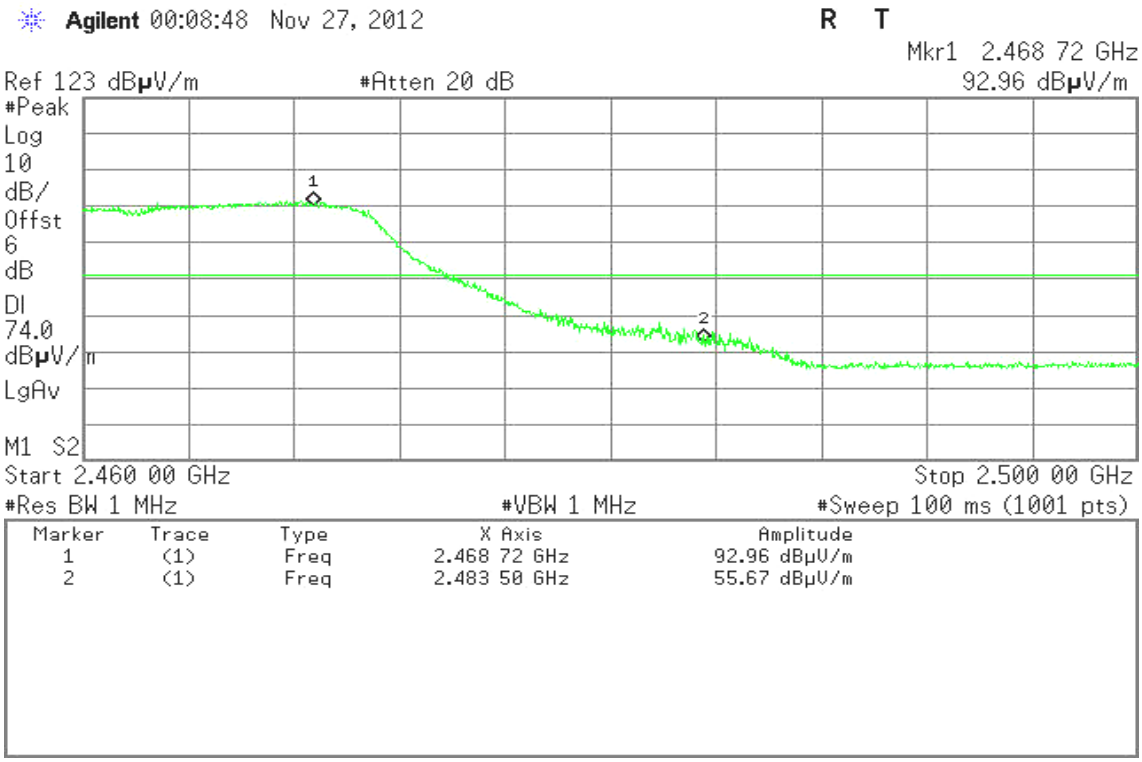
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.469 27 GHz	104.19 dBµV/m
2	(1)	Freq	2.483 50 GHz	70.37 dBµV/m
3	(1)	Freq	2.485 27 GHz	71.09 dBµV/m
4	(1)	Freq	2.484 40 GHz	71.15 dBµV/m

Detector mode: Average Polarity: Vertical

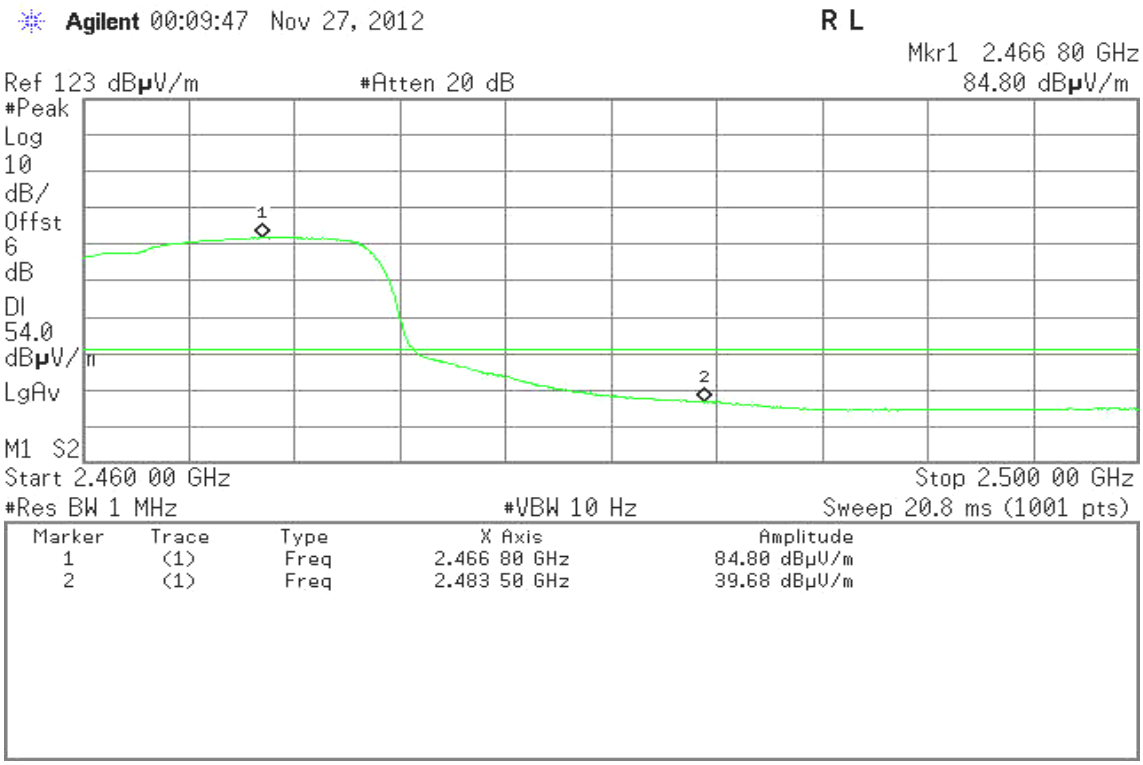


Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.466 53 GHz	93.88 dBµV/m
2	(1)	Freq	2.483 50 GHz	50.70 dBµV/m

Detector mode: Peak Polarity: Horizontal

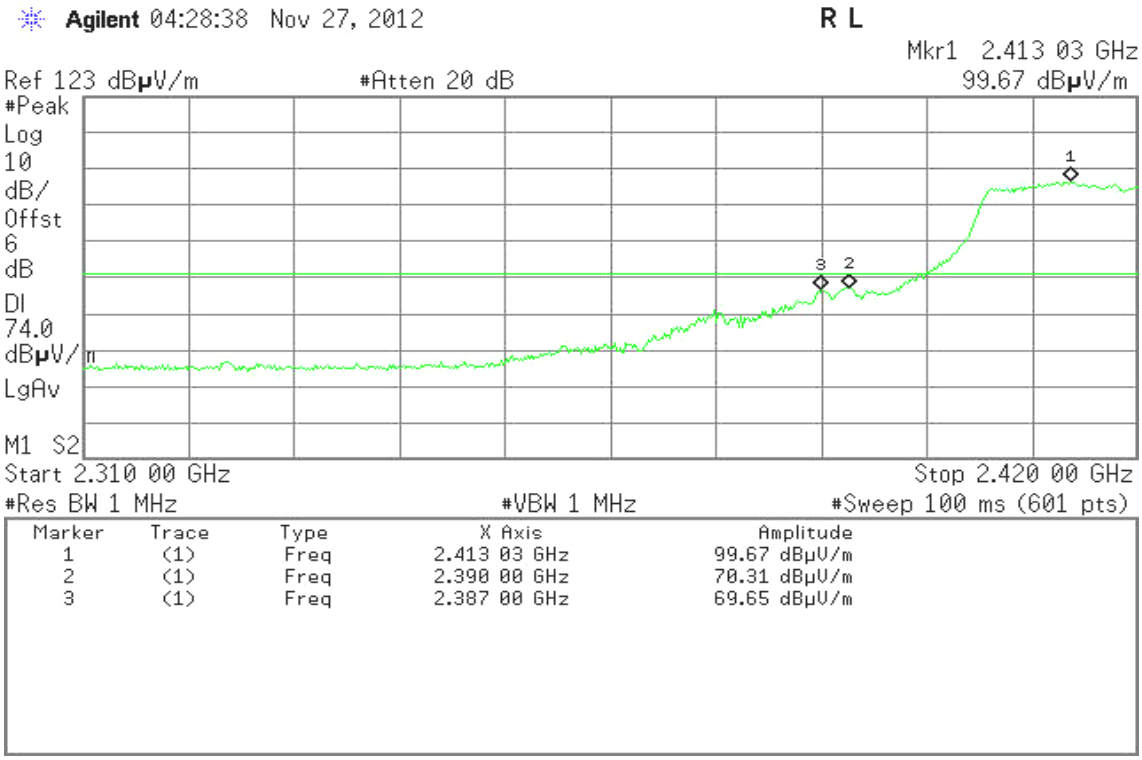


Detector mode: Average Polarity: Horizontal

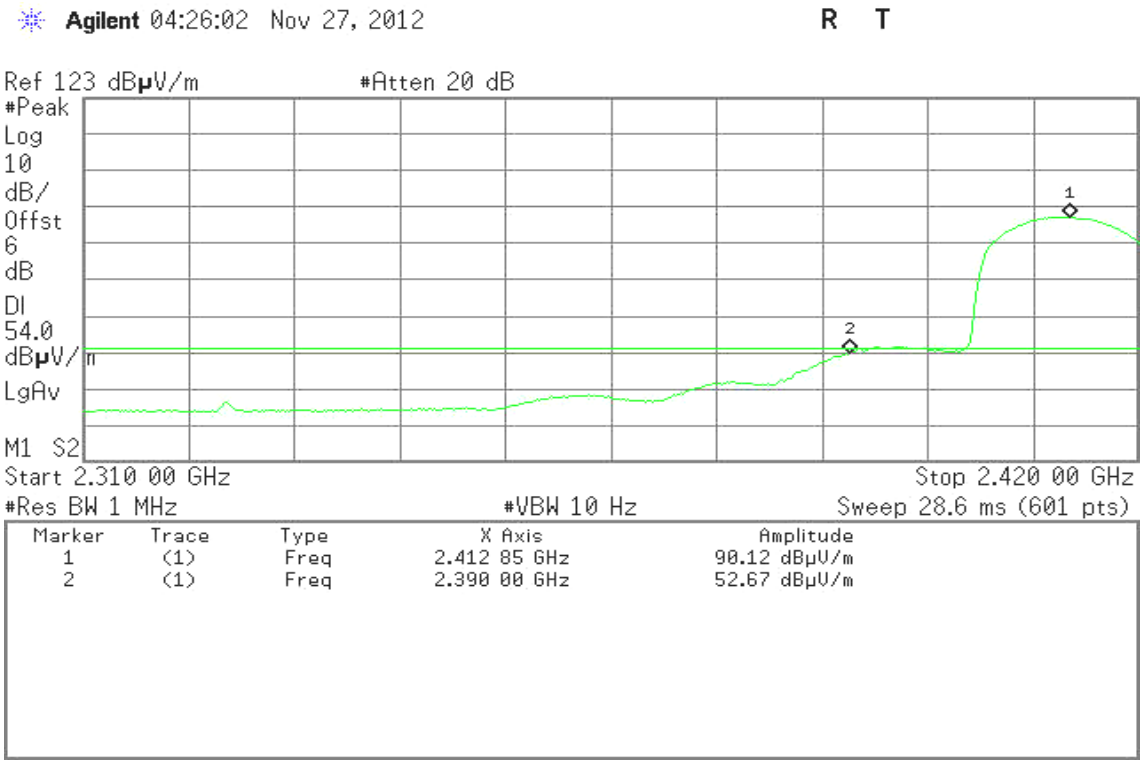


Band Edges (IEEE 802.11n 40 MHz Channel mode / CH Low)

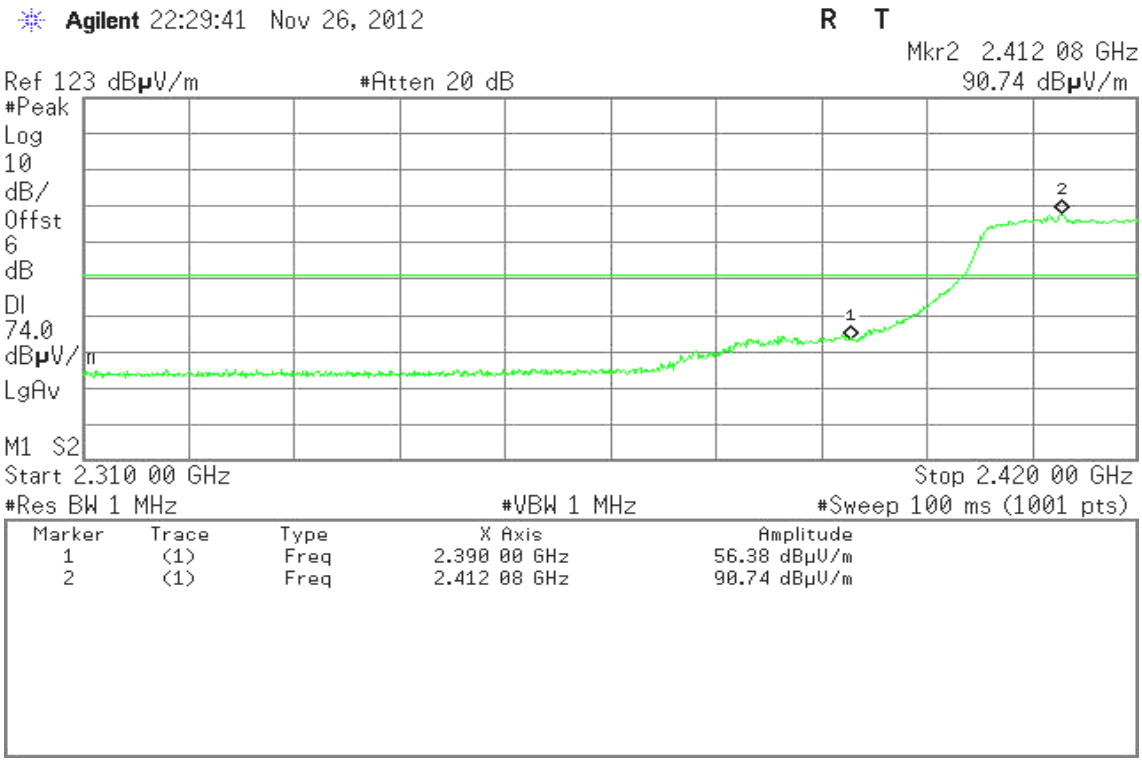
Detector mode: Peak Polarity: Vertical



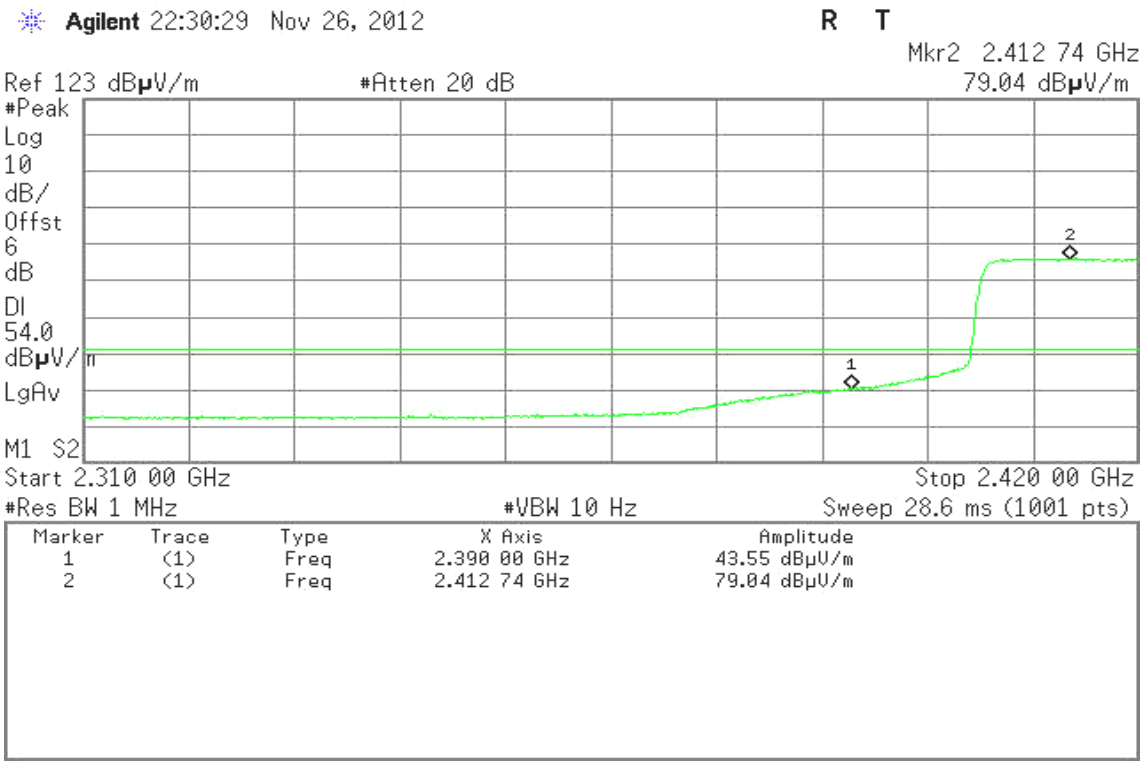
Detector mode: Average Polarity: Vertical



Detector mode: Peak Polarity: Horizontal

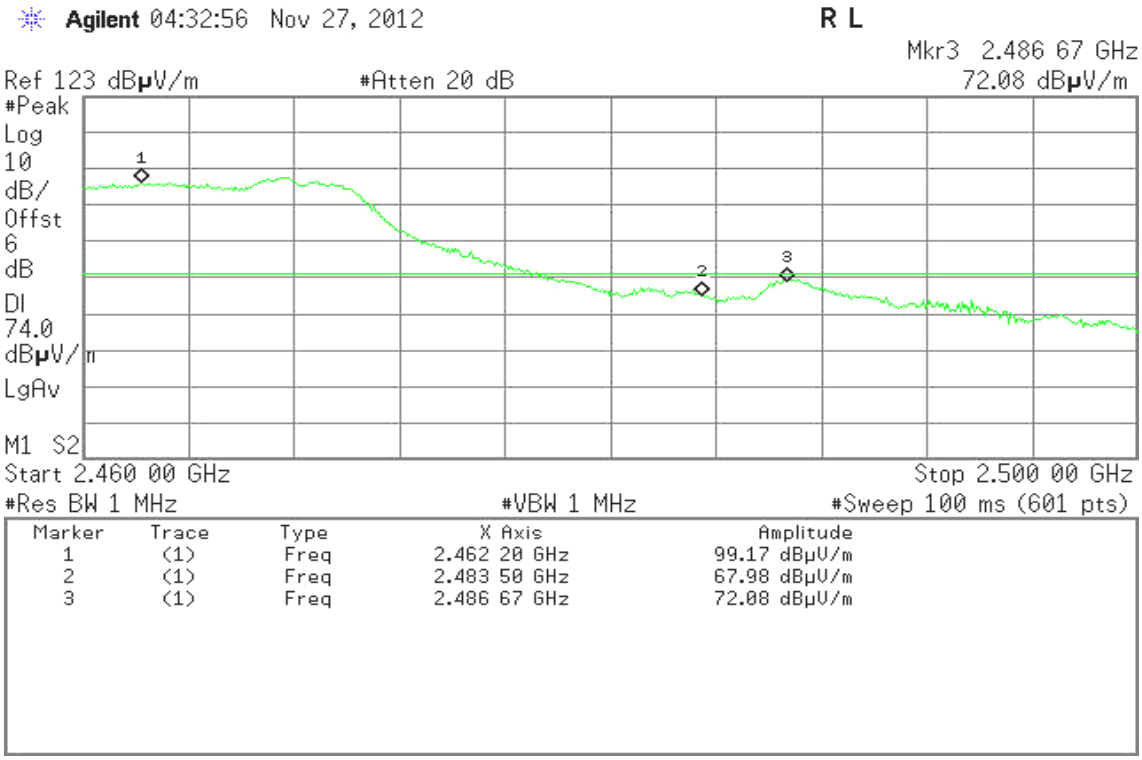


Detector mode: Average Polarity: Horizontal



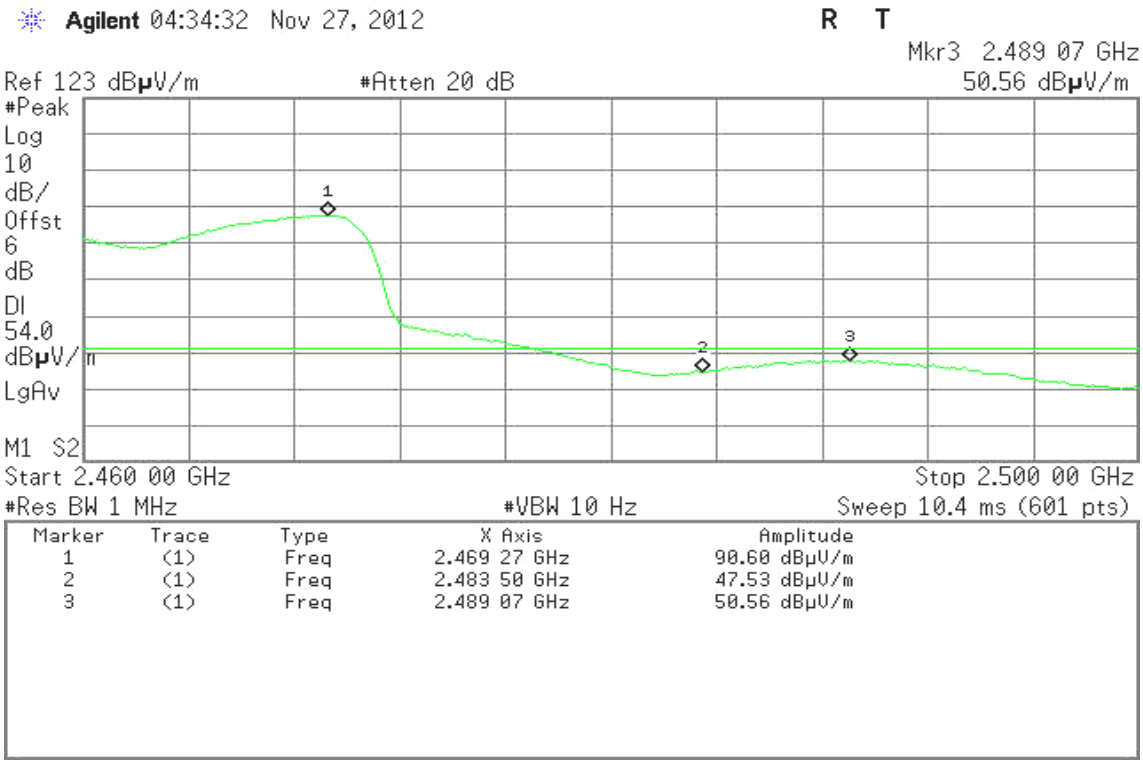
Band Edges (IEEE 802.11n 40 MHz Channel mode / CH High)

Detector mode: Peak Polarity: Vertical



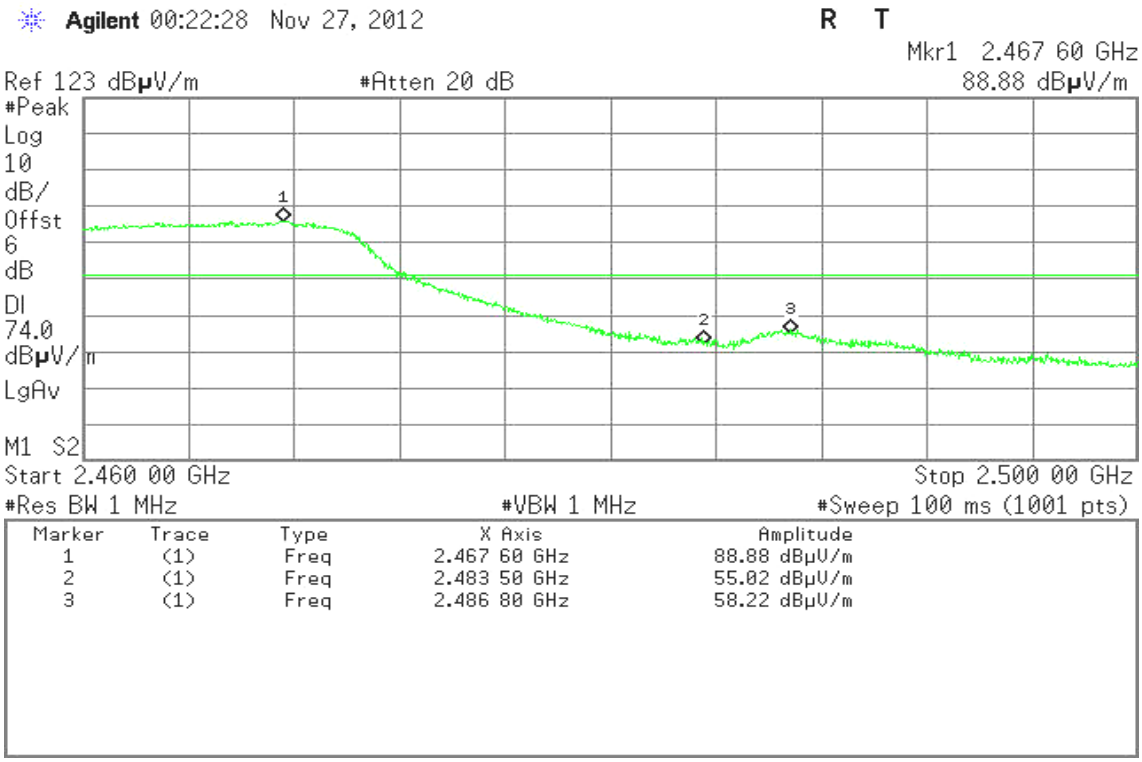
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.462 20 GHz	99.17 dBµV/m
2	(1)	Freq	2.483 50 GHz	67.98 dBµV/m
3	(1)	Freq	2.486 67 GHz	72.08 dBµV/m

Detector mode: Average Polarity: Vertical



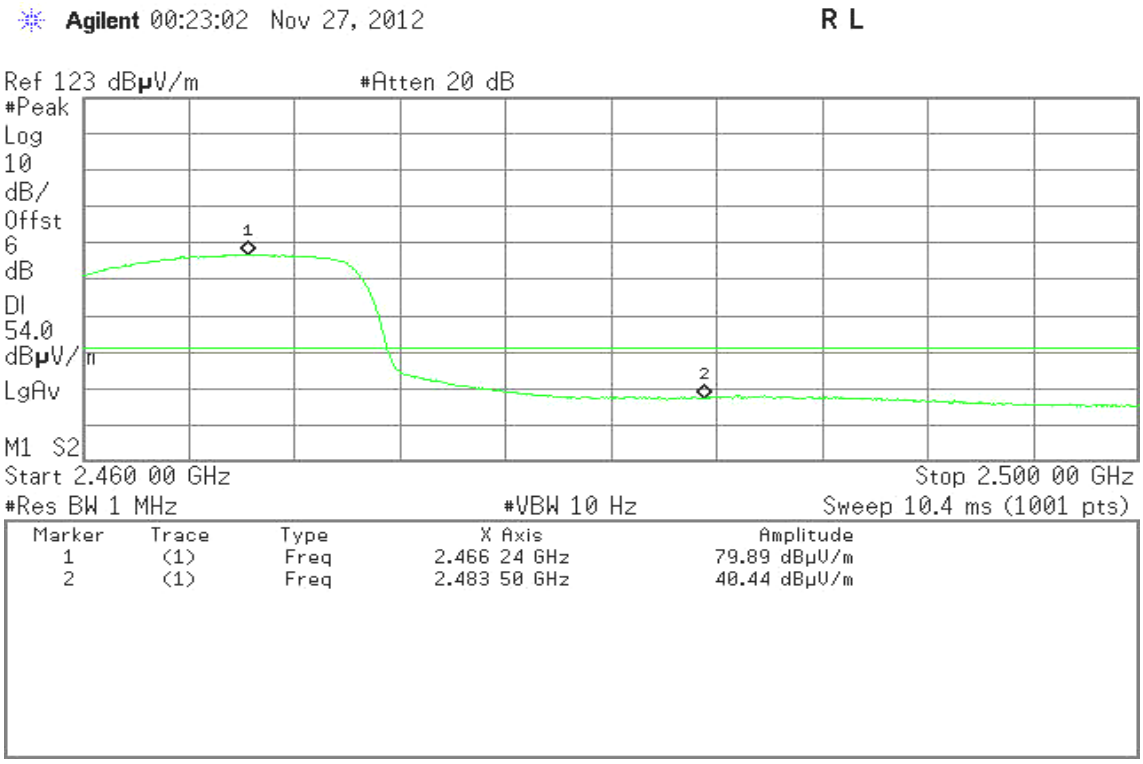
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.469 27 GHz	90.60 dBµV/m
2	(1)	Freq	2.483 50 GHz	47.53 dBµV/m
3	(1)	Freq	2.489 07 GHz	50.56 dBµV/m

Detector mode: Peak Polarity: Horizontal



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.467 60 GHz	88.88 dBµV/m
2	(1)	Freq	2.483 50 GHz	55.02 dBµV/m
3	(1)	Freq	2.486 80 GHz	58.22 dBµV/m

Detector mode: Average Polarity: Horizontal



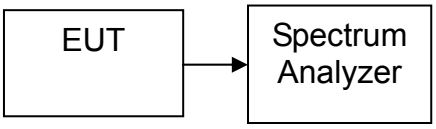
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.466 24 GHz	79.89 dBµV/m
2	(1)	Freq	2.483 50 GHz	40.44 dBµV/m

7.5 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

Per KDB 558074 V02 and KDB 662911 D01 Multiple Transmitter Output v01r02

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 = 3kHz, VBW = 10kHz, Span = 30MHz (for IEEE 802.11 b/g/HT 20MHz) or SPAN = 60MHz (for IEEE 802.11 HT 40MHz), Sweep= auto.
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

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-8.64	8.00	PASS
Mid	2437	-7.95		
High	2462	-7.91		

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-12.97	8.00	PASS
Mid	2437	-12.37		
High	2462	-11.61		

Test mode: IEEE 802.11n 20 MHz Channel mode

Channel	Frequency (MHz)	PPSD (dBm)			Limit (dBm)	Result
		Chain 0	Chain 1	Total		
Low	2412	-13.47	-14.43	-10.91	8.00	PASS
Mid	2437	-14.10	-13.63	-10.85		PASS
High	2462	-13.51	-13.21	-10.35		PASS

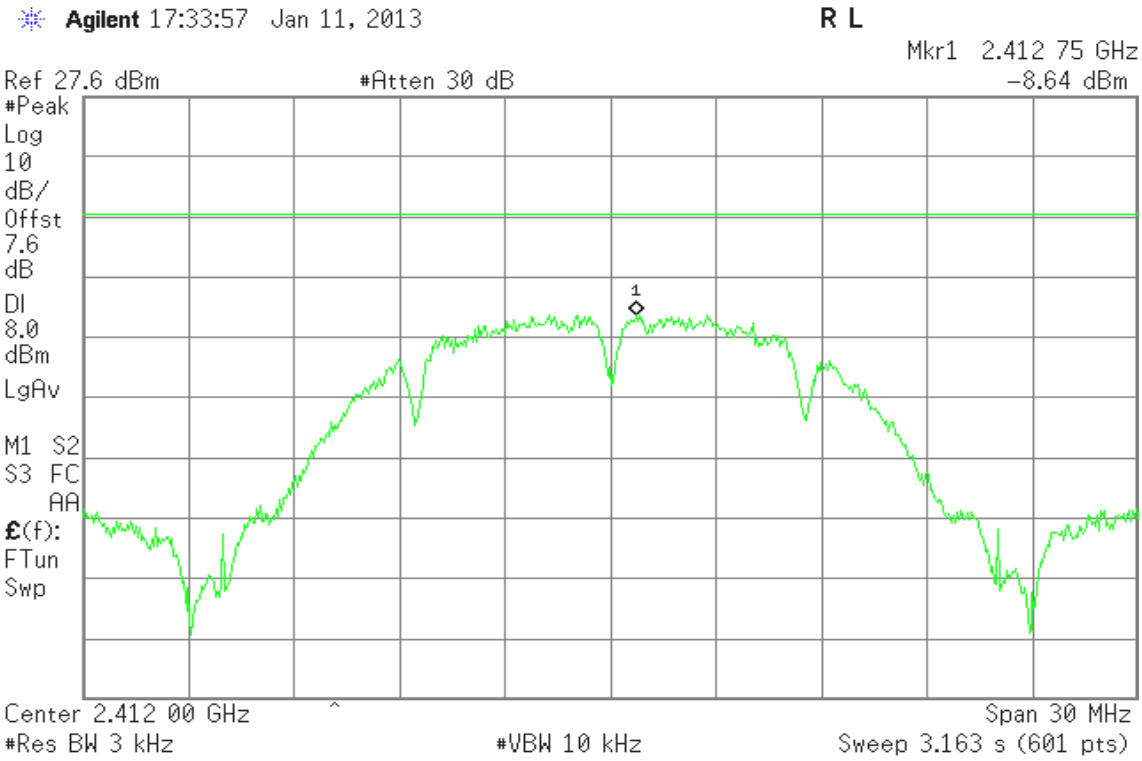
Test mode: IEEE 802.11n 40 MHz Channel mode

Channel	Frequency (MHz)	PPSD (dBm)			Limit (dBm)	Result
		Chain 0	Chain 1	Total		
Low	2422	-19.13	-18.44	-15.76	8.00	PASS
Mid	2437	-17.02	-18.74	-14.79		PASS
High	2452	-17.19	-17.85	-14.50		PASS

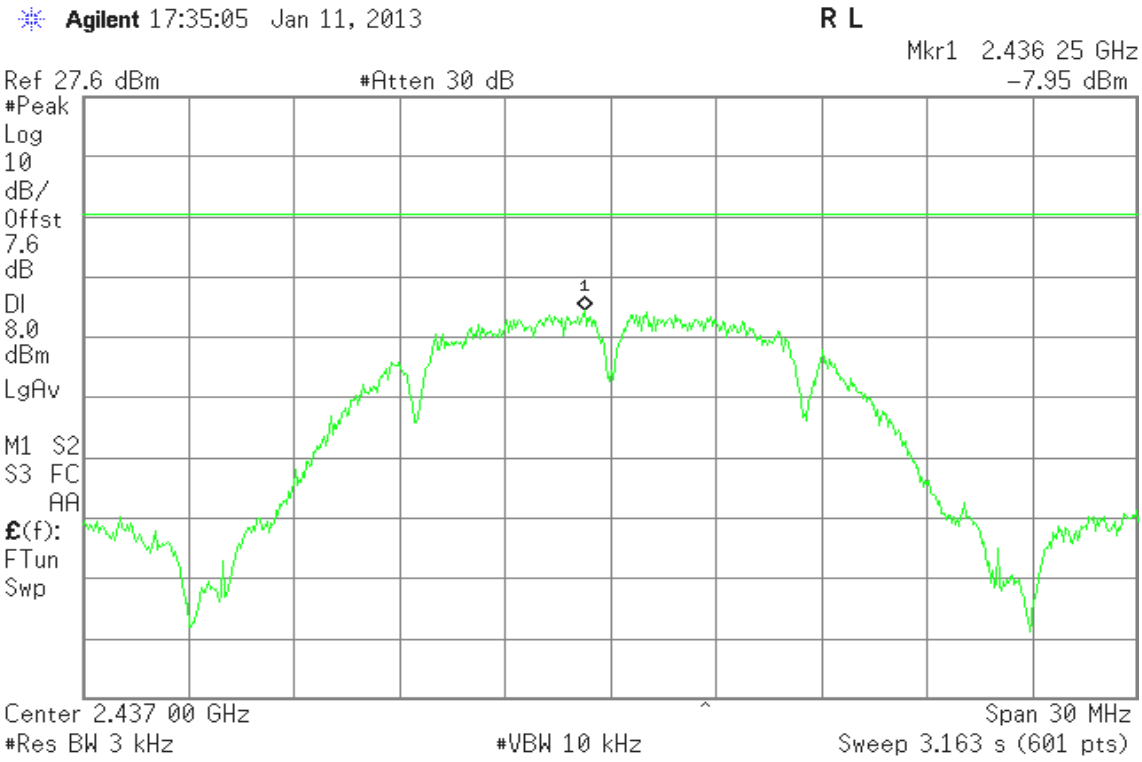
Test Plot

IEEE 802.11b mode

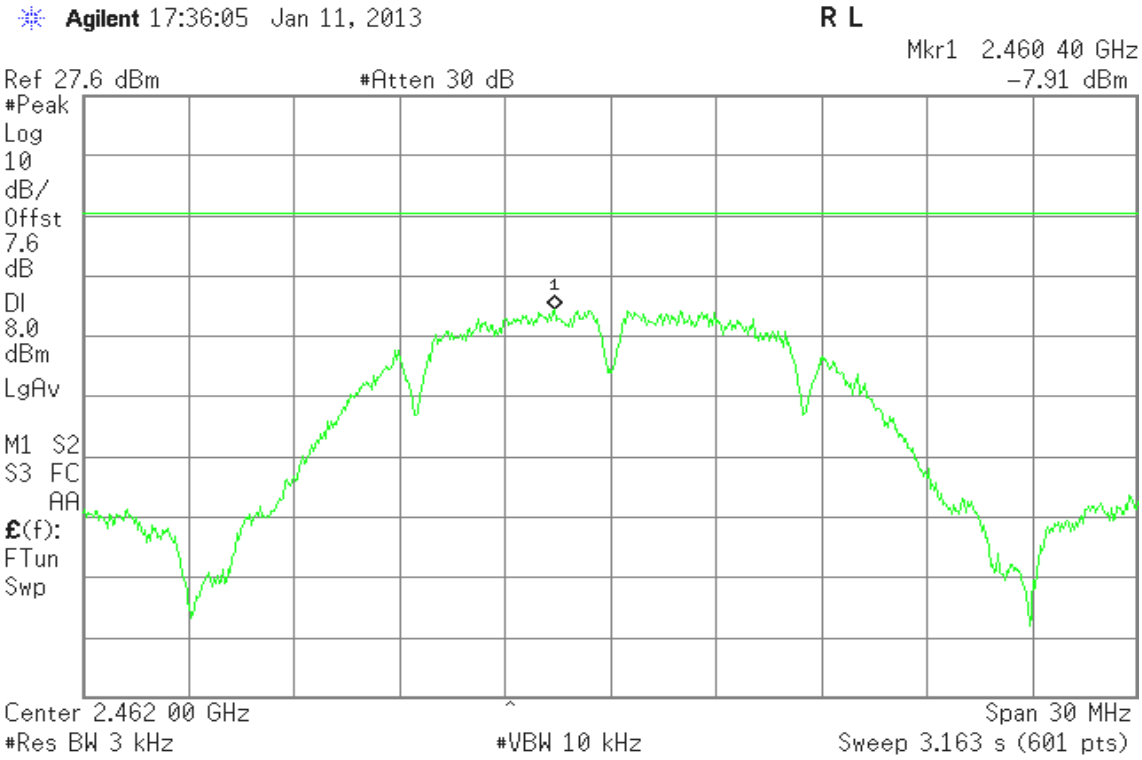
PPSD (CH Low)



PPSD (CH Mid)

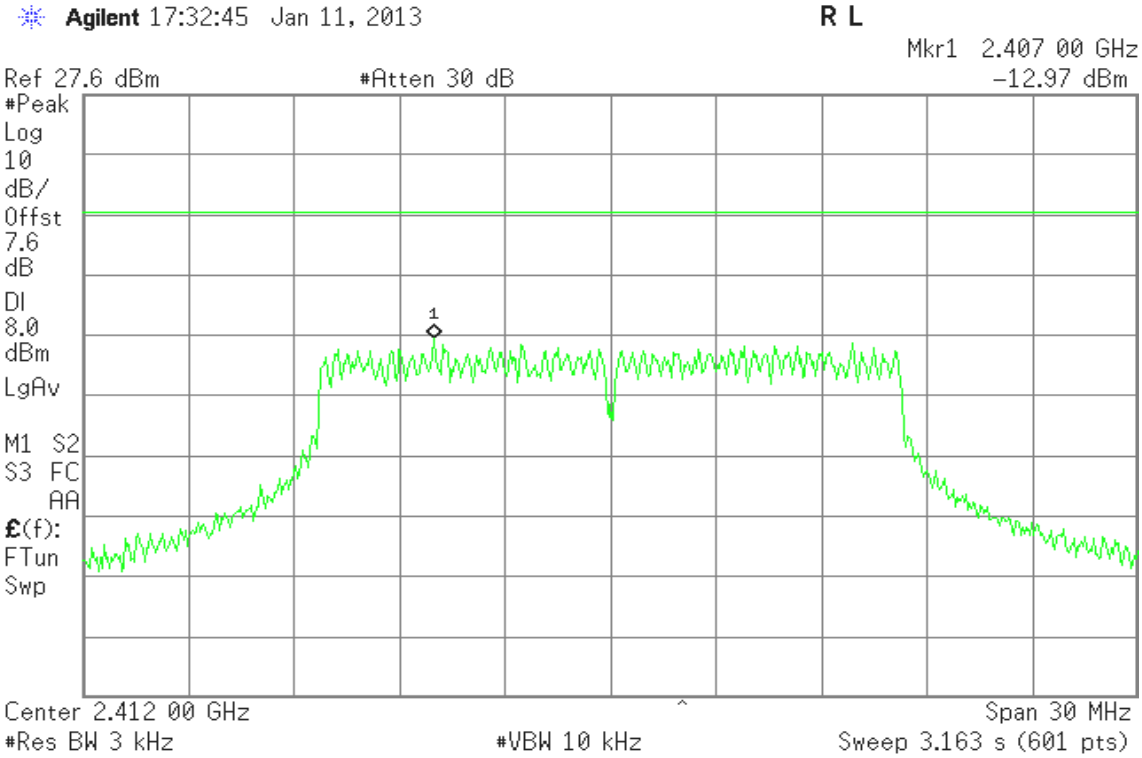


PPSD (CH High)

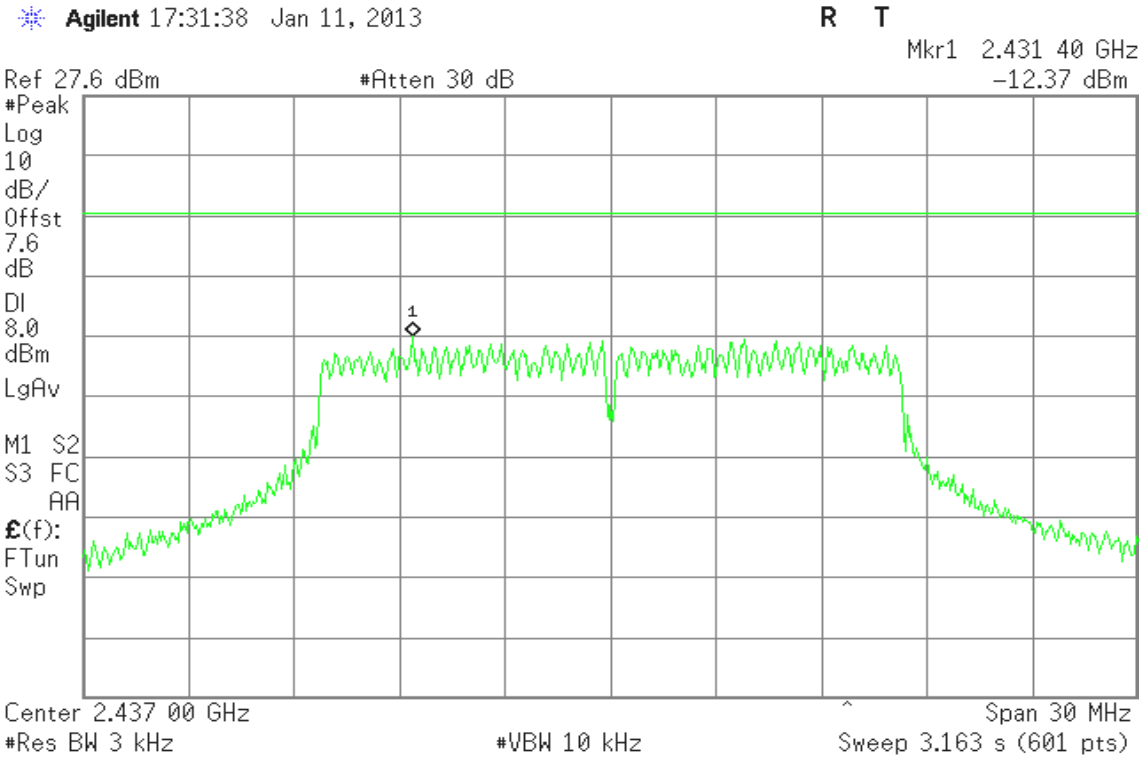


IEEE 802.11g mode

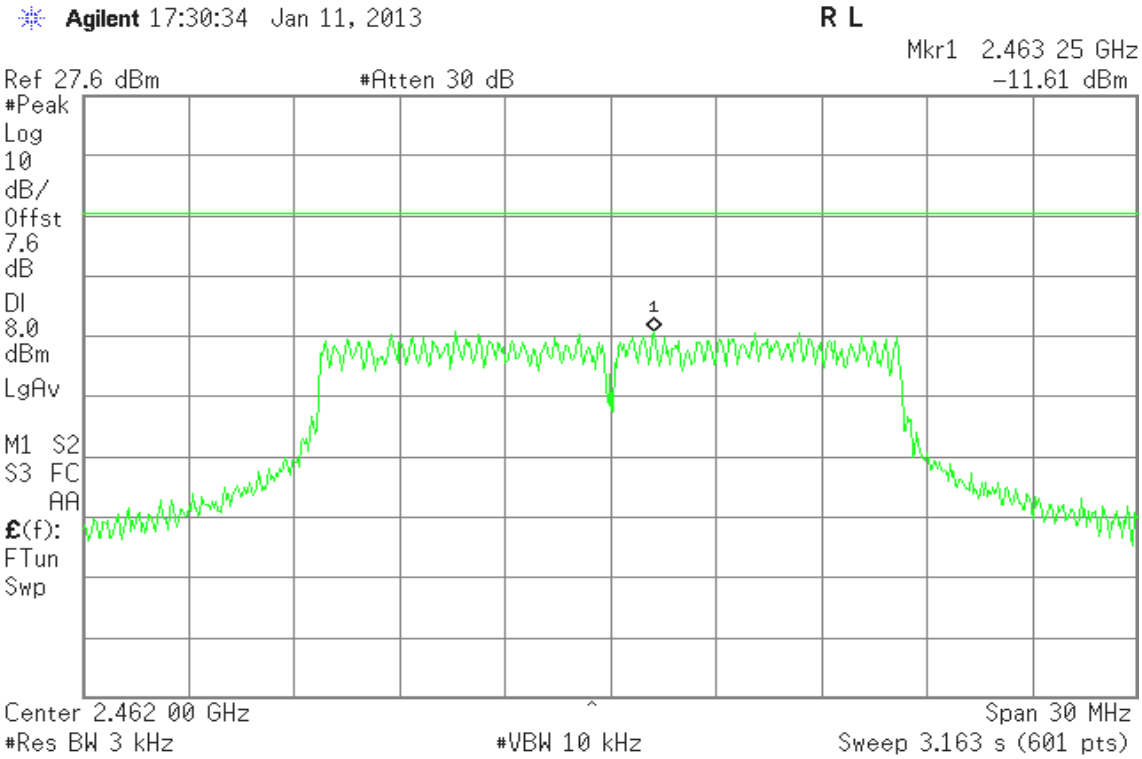
PPSD (CH Low)



PPSD (CH Mid)

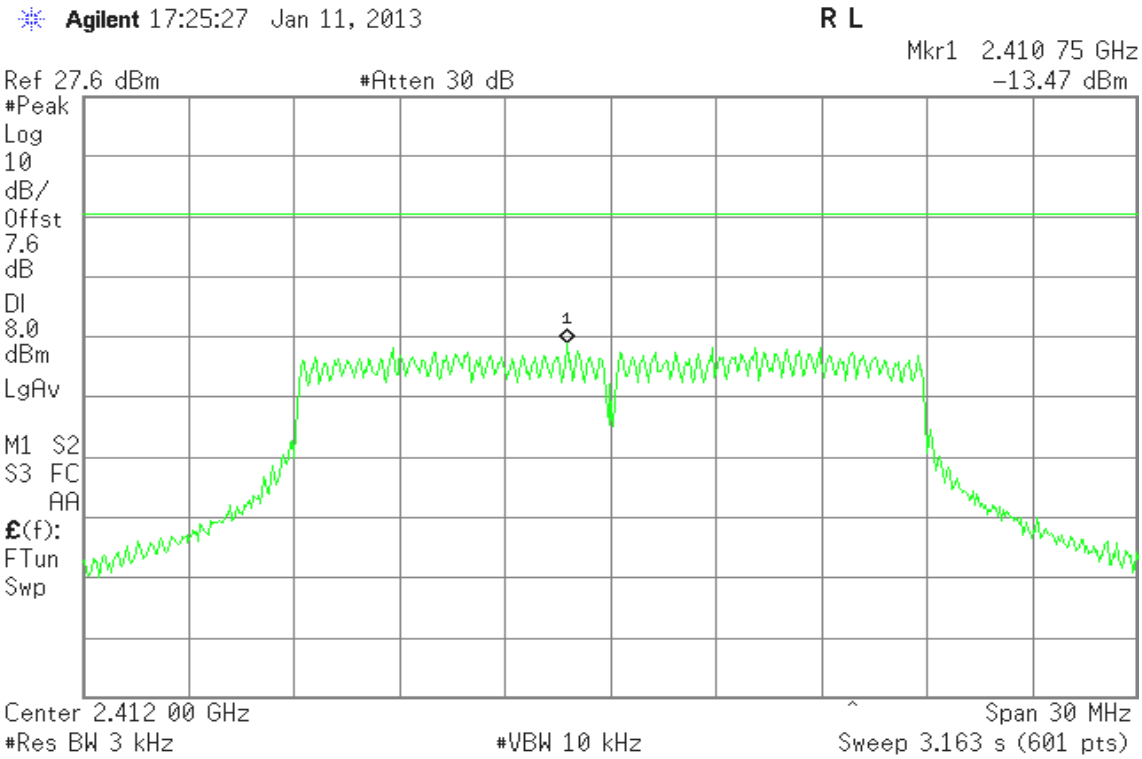


PPSD (CH High)

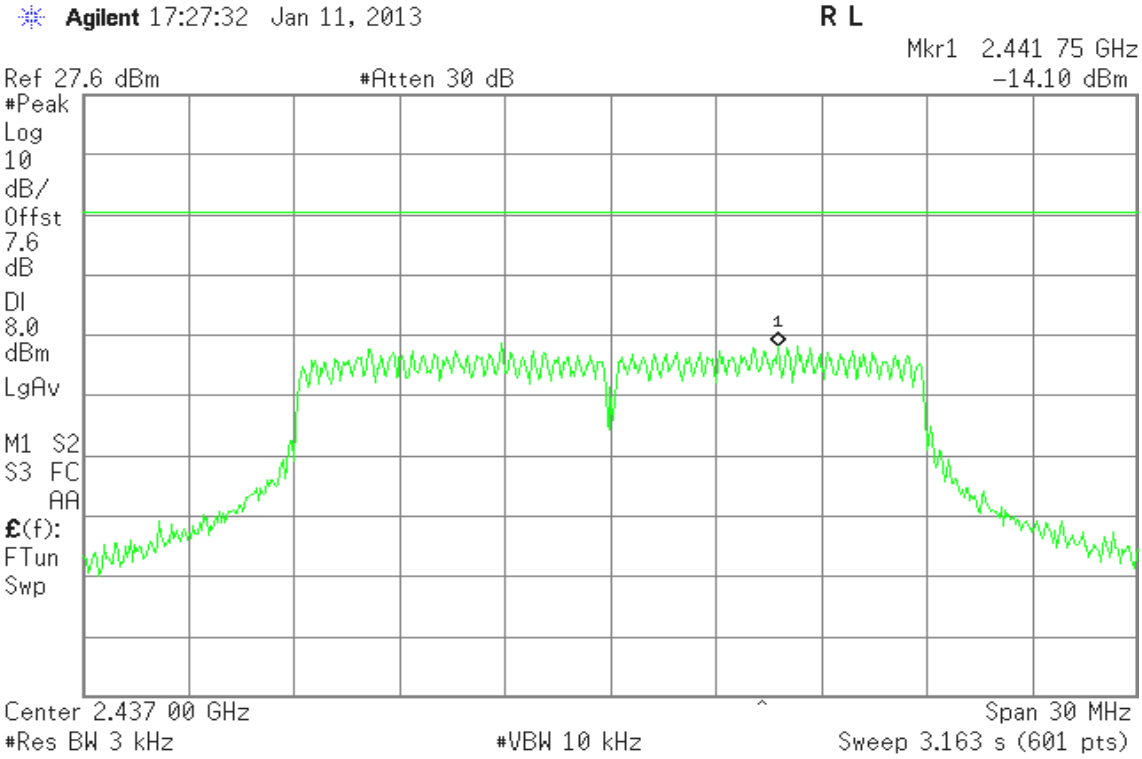


IEEE 802.11n 20 MHz Channel mode / Chain 0

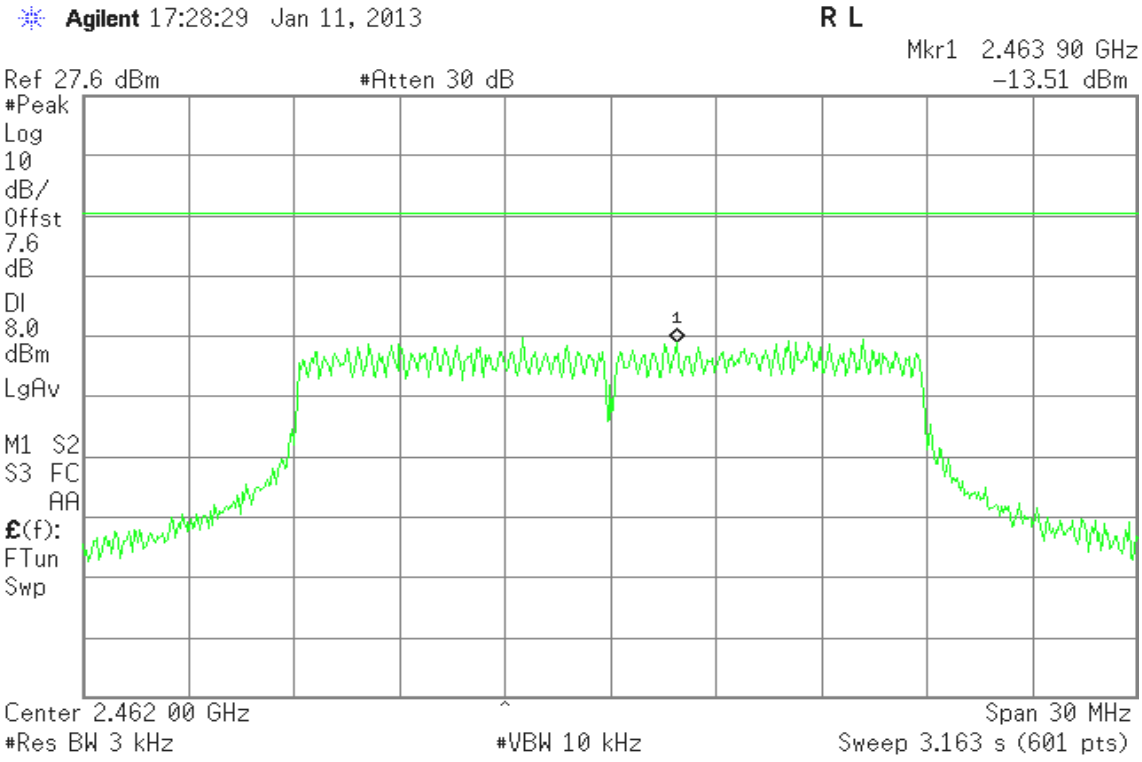
PPSD (CH Low)



PPSD (CH Mid)

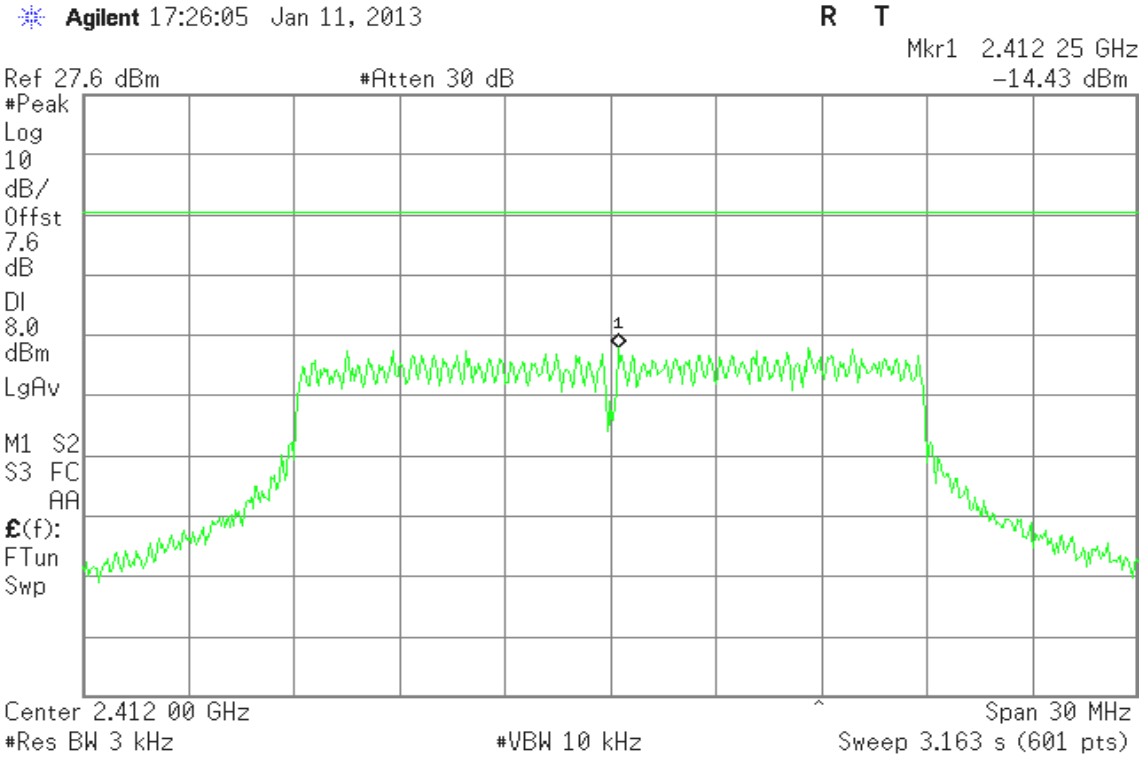


PPSD (CH High)

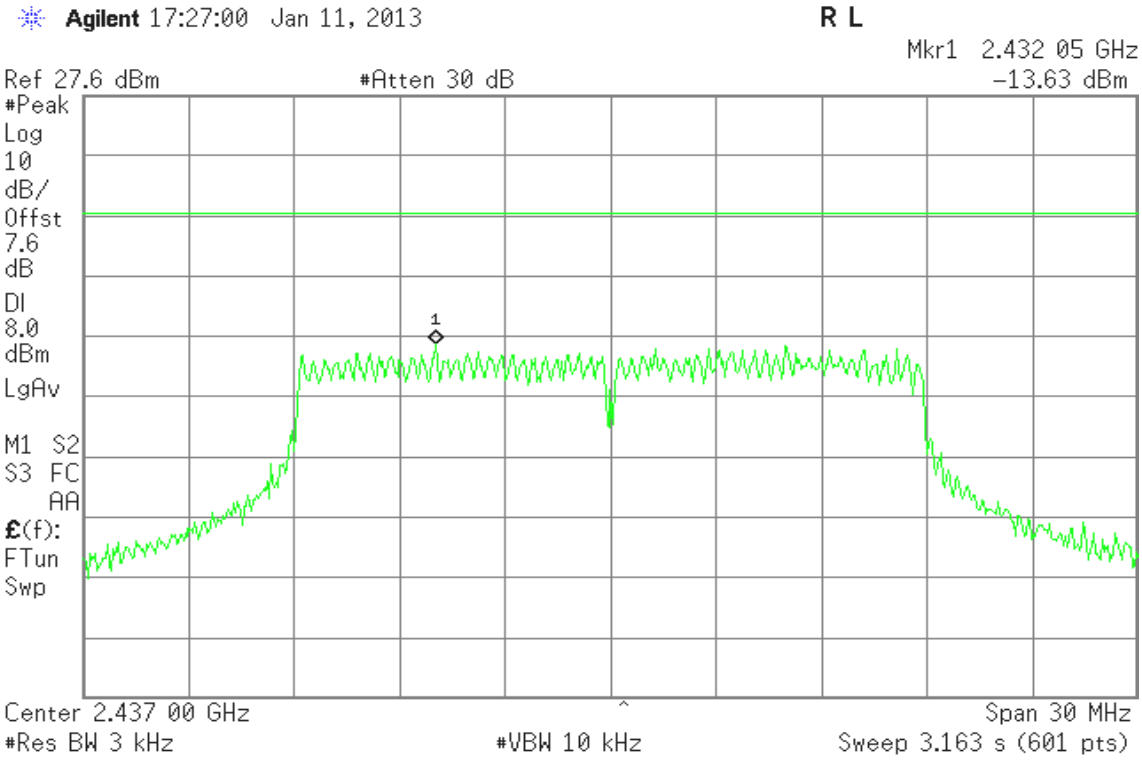


IEEE 802.11n 20 MHz Channel mode / Chain 1

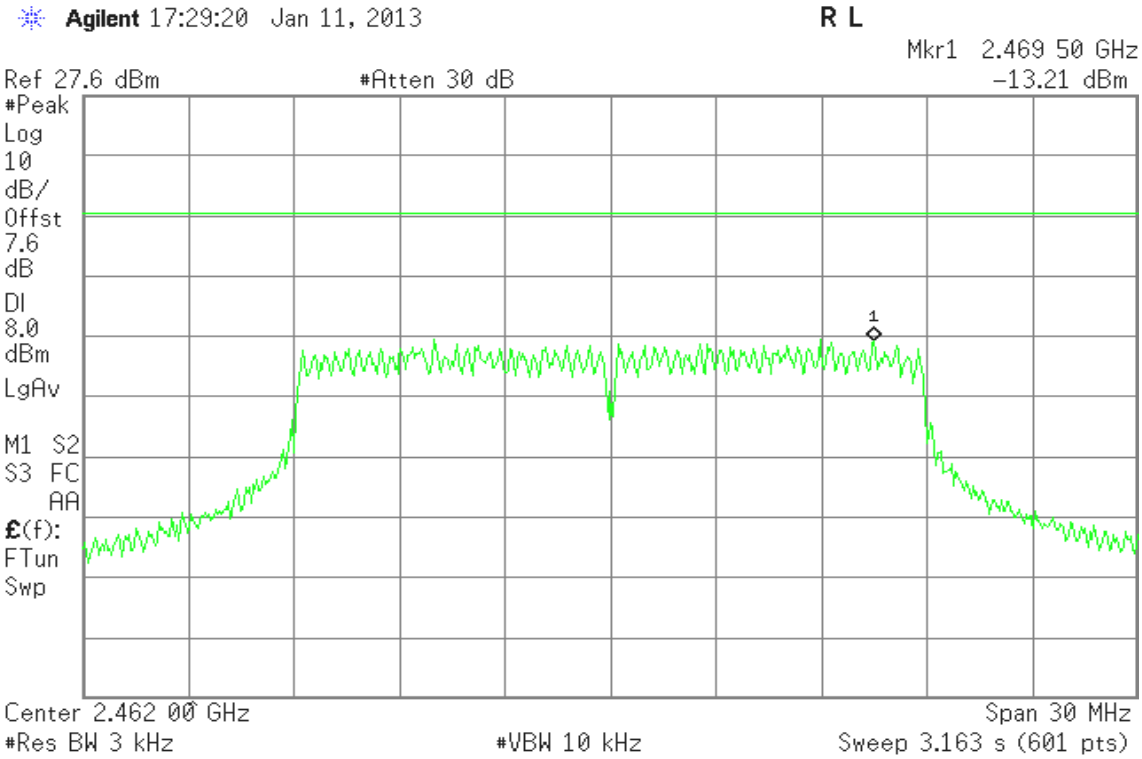
PPSD (CH Low)



PPSD (CH Mid)

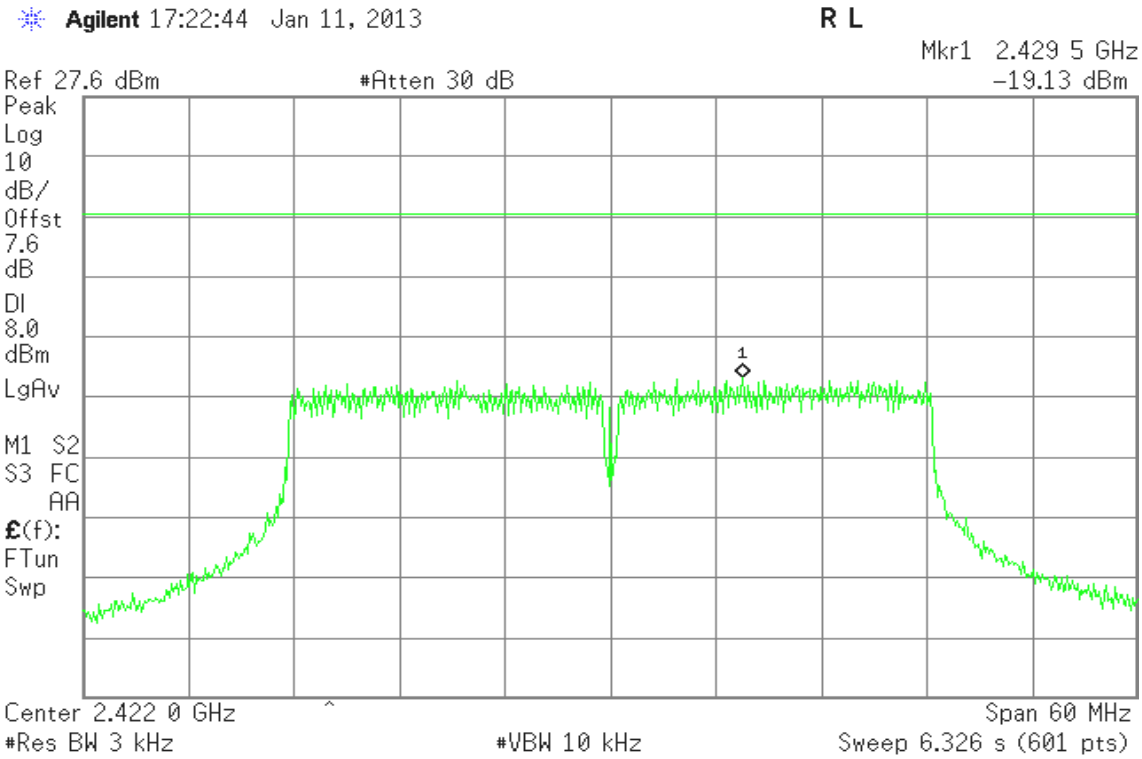


PPSD (CH High)

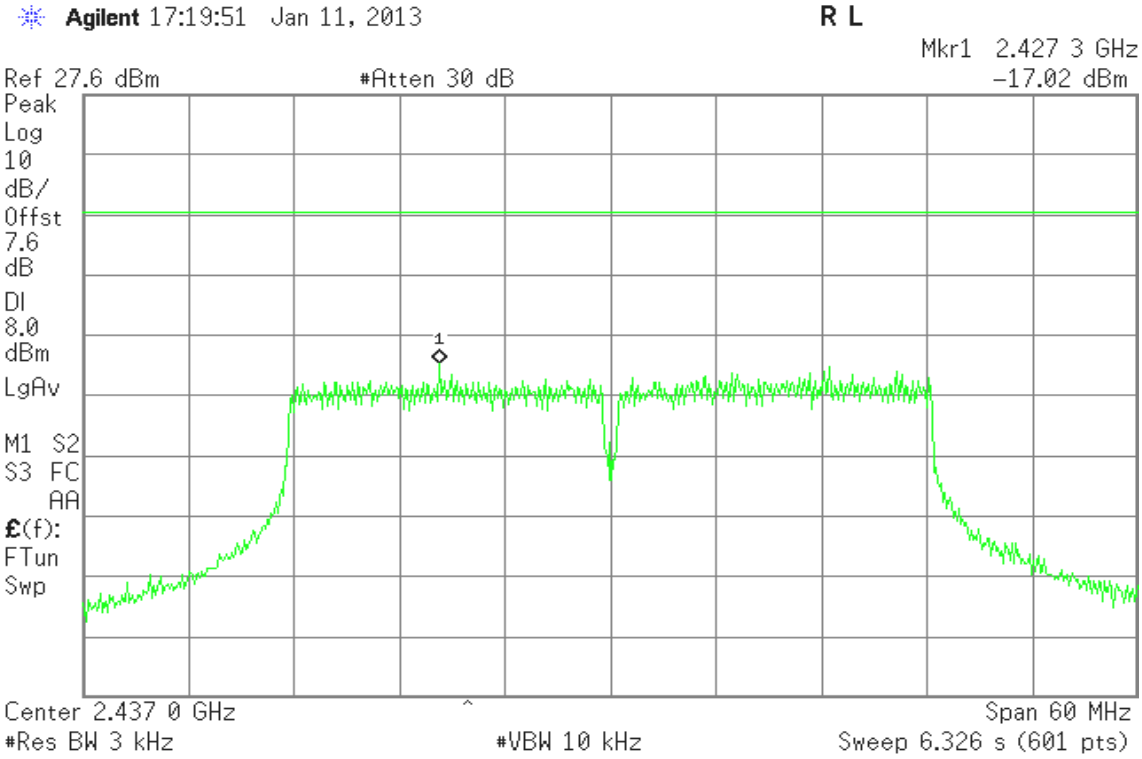


IEEE 802.11n 40 MHz Channel mode / Chain 0

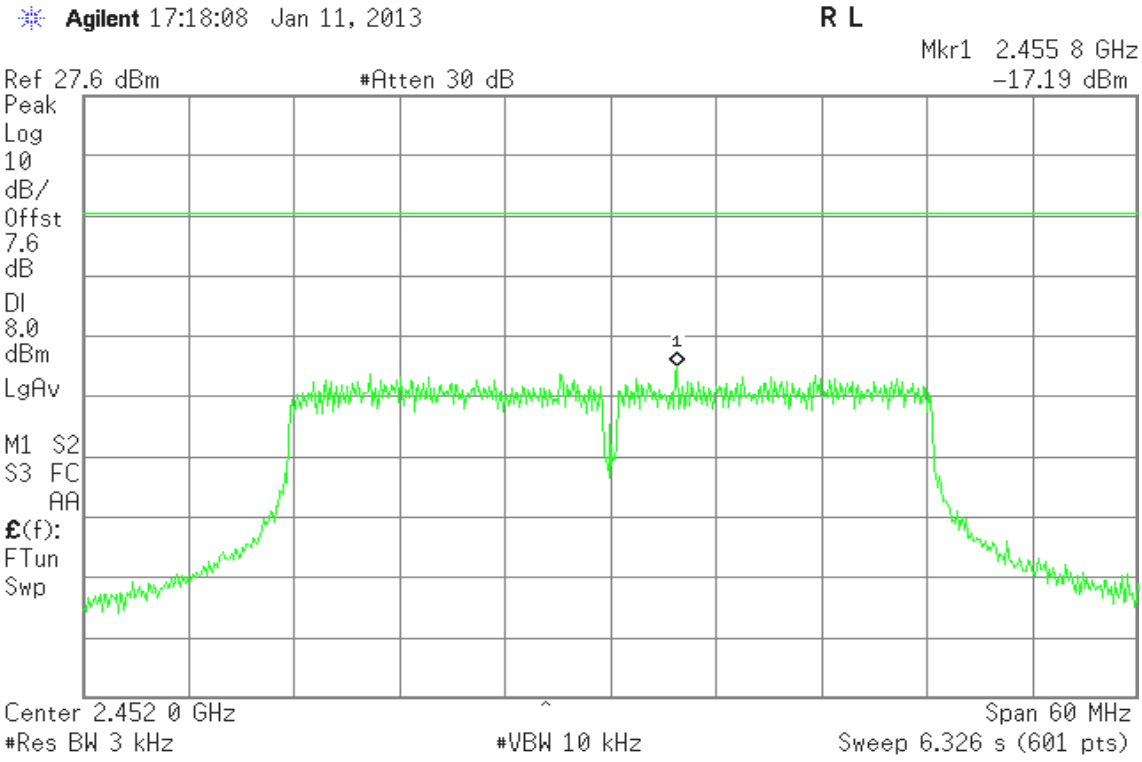
PPSD (CH Low)



PPSD (CH Mid)

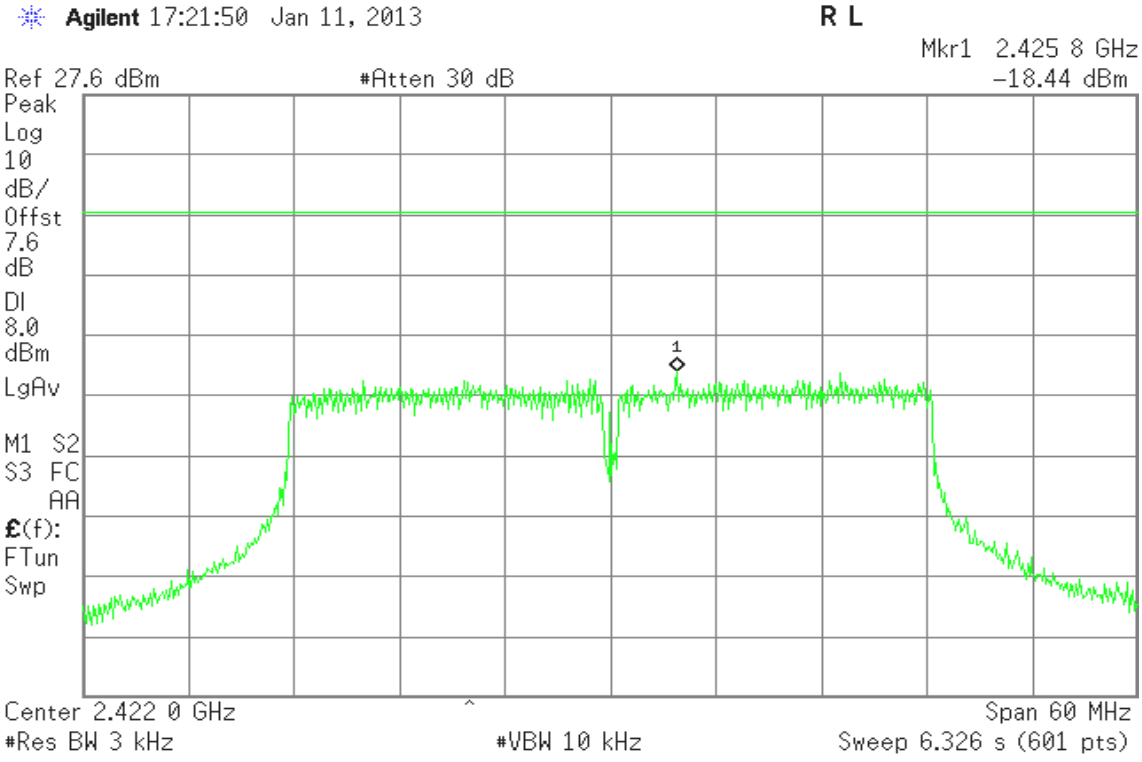


PPSD (CH High)

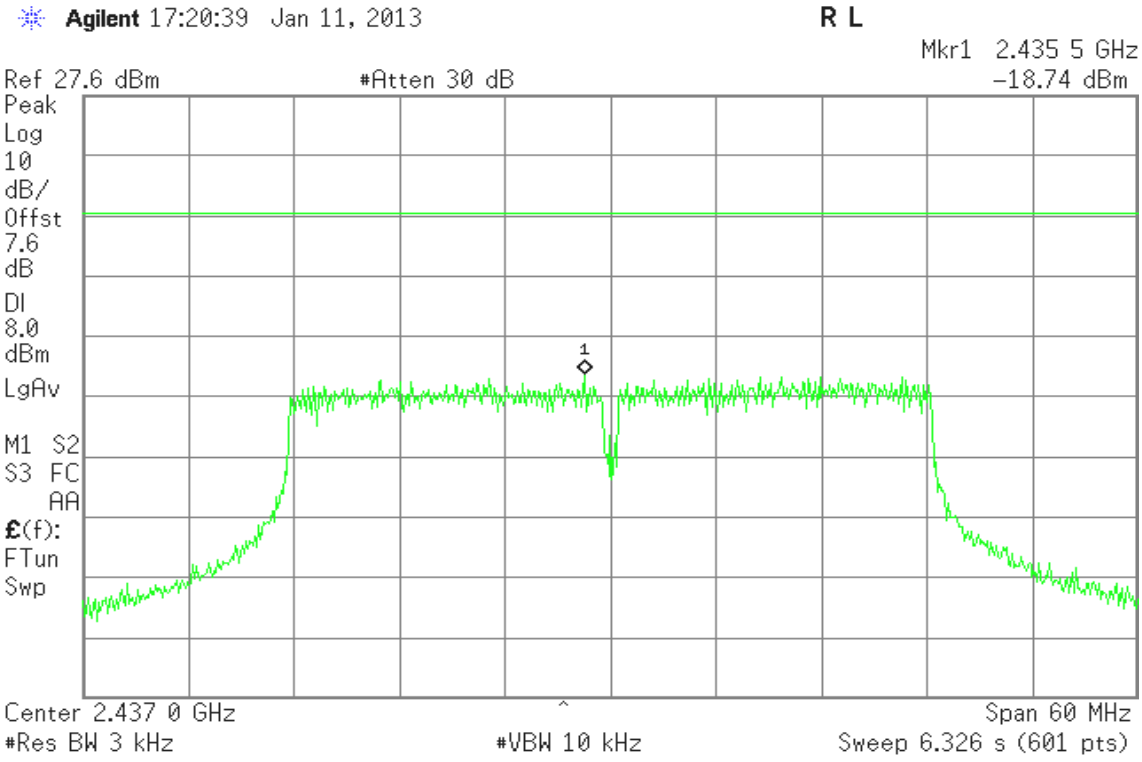


IEEE 802.11n 40 MHz Channel mode / Chain 1

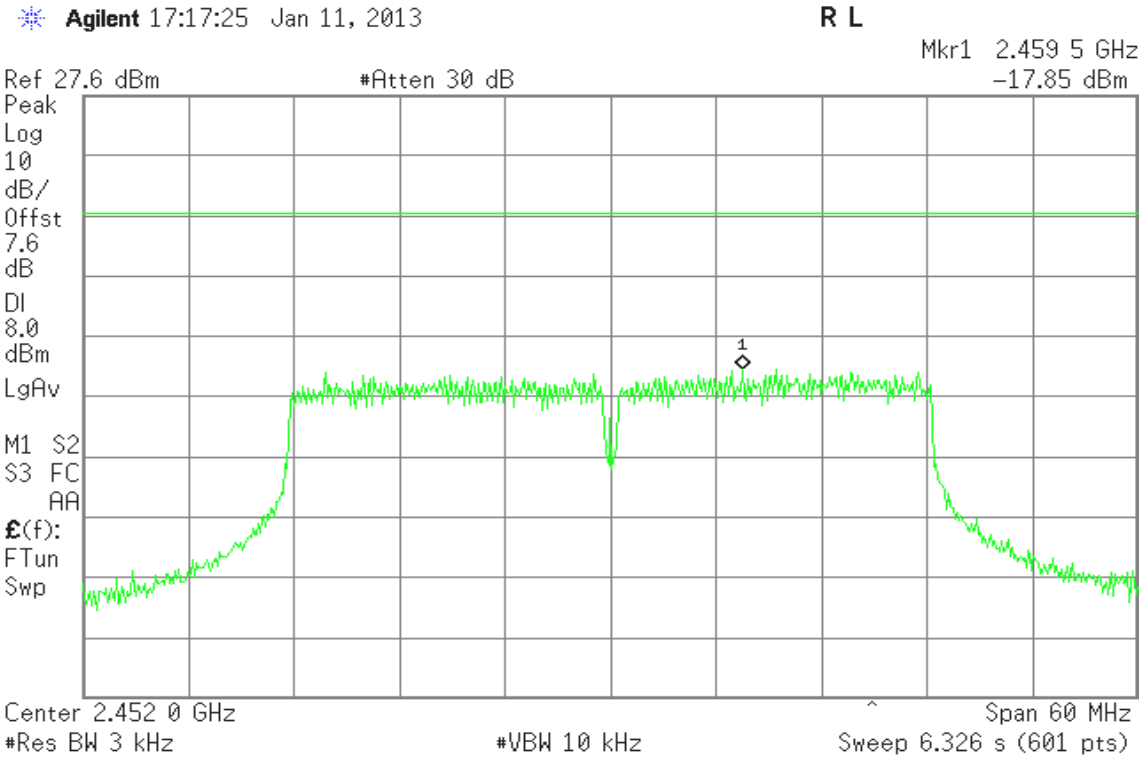
PPSD (CH Low)



PPSD (CH Mid)



PPSD (CH High)



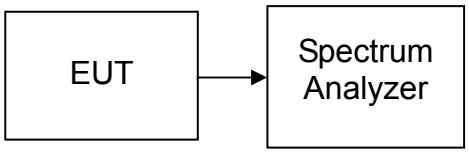
7.6 SPURIOUS EMISSIONS

7.6.1 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

Per KDB 662911 D01 Multiple Transmitter Output v01r02

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 100 kHz.

Measurements are made over the 30MHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels.

TEST RESULTS

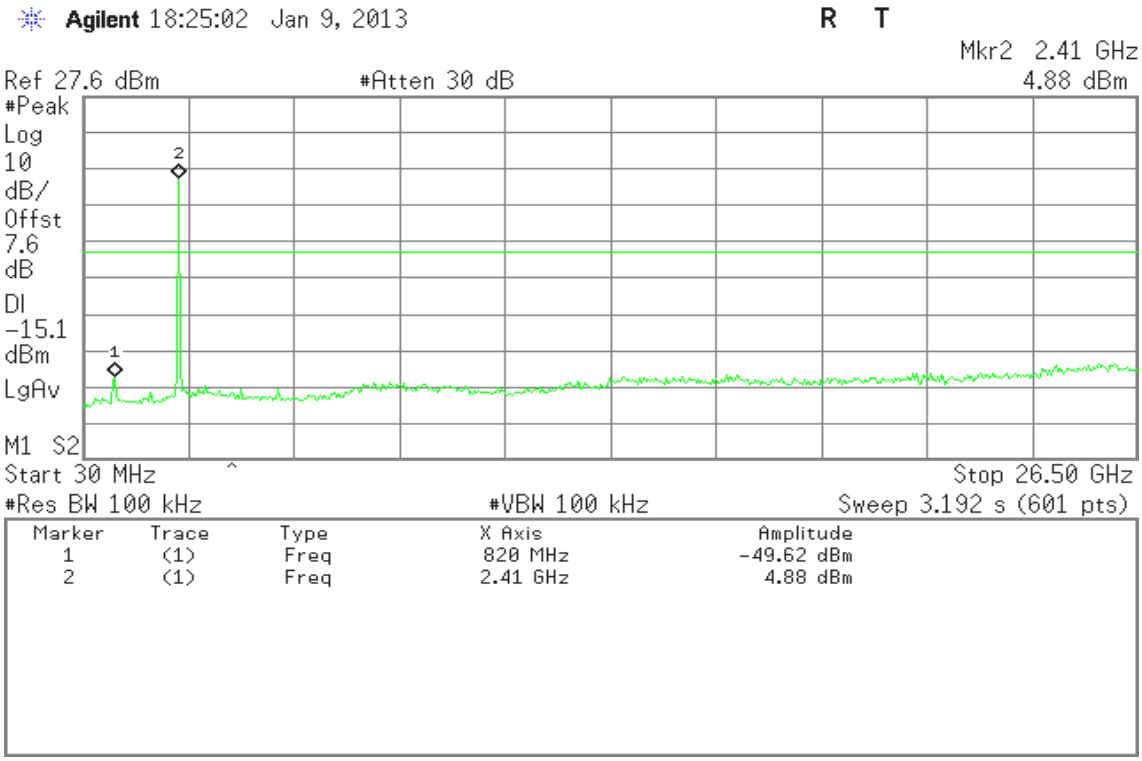
No non-compliance noted.

Test Plot

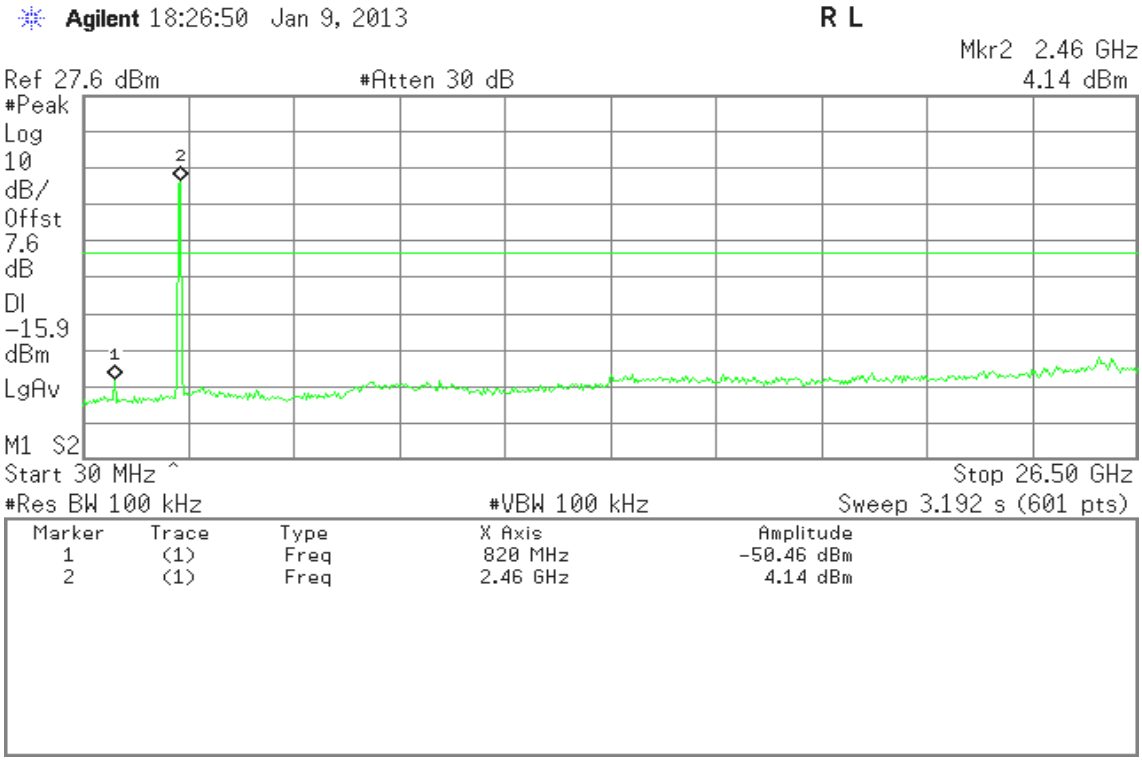
Spurious Emissions

IEEE 802.11b mode

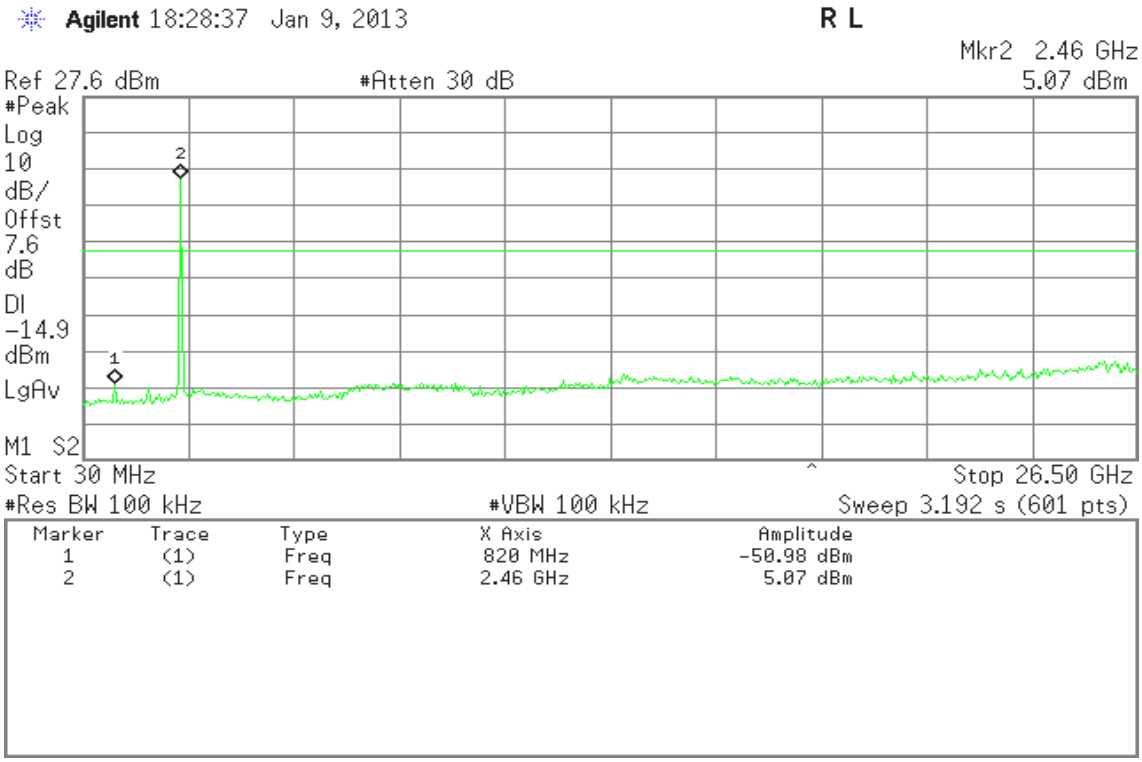
CH Low



CH Mid

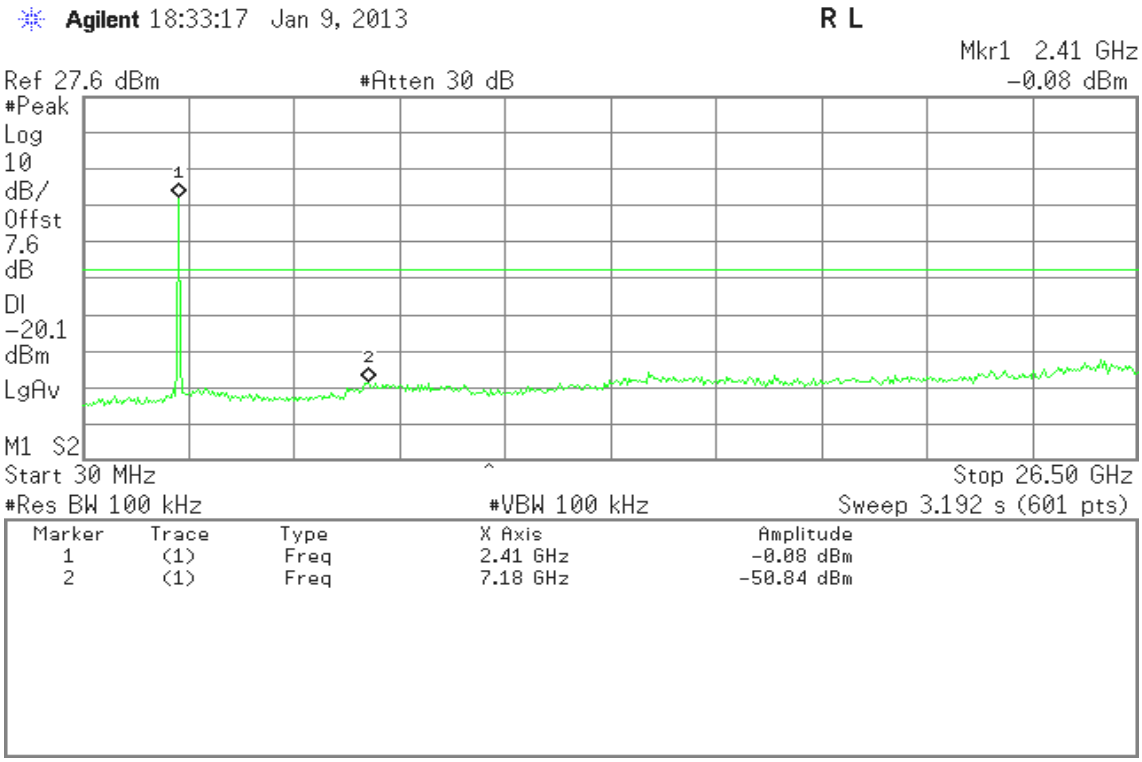


CH High

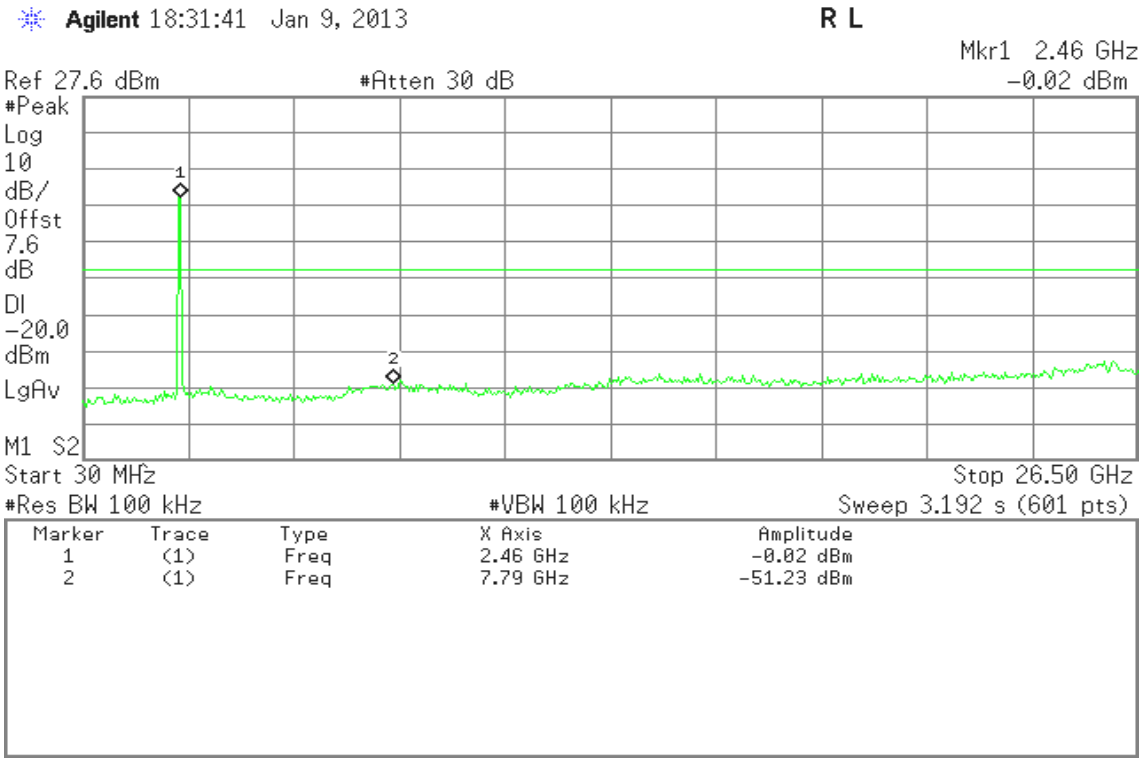


IEEE 802.11g mode

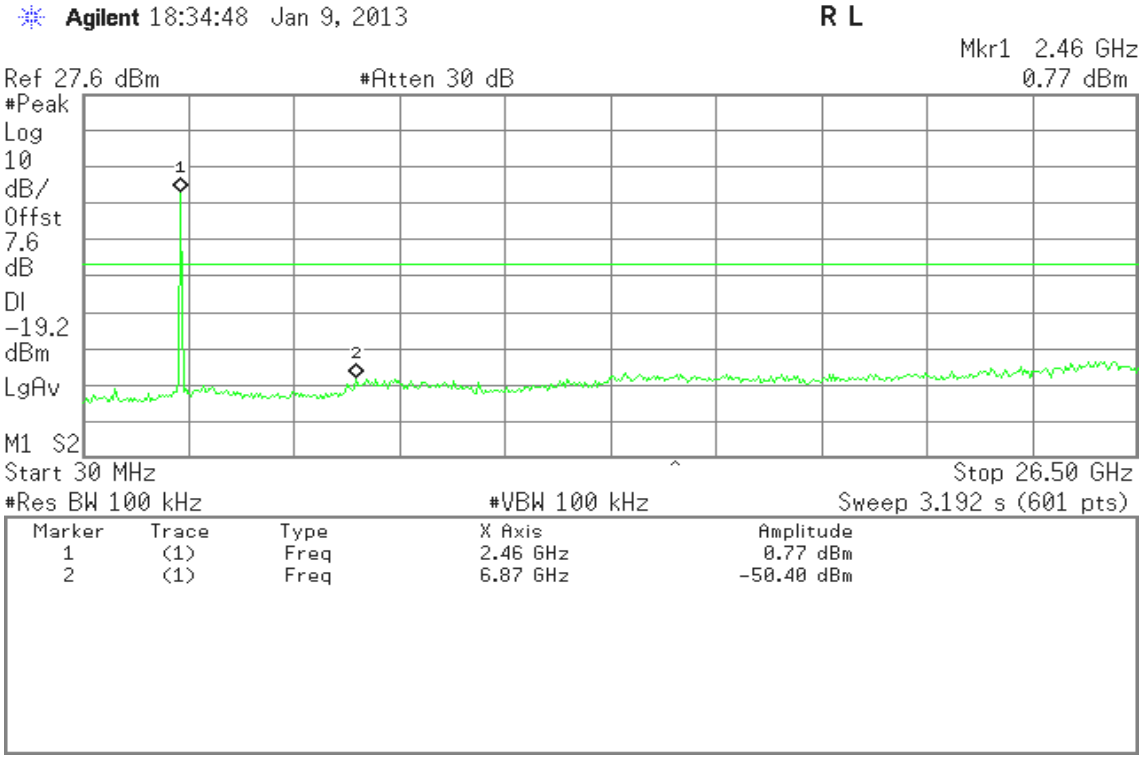
CH Low



CH Mid

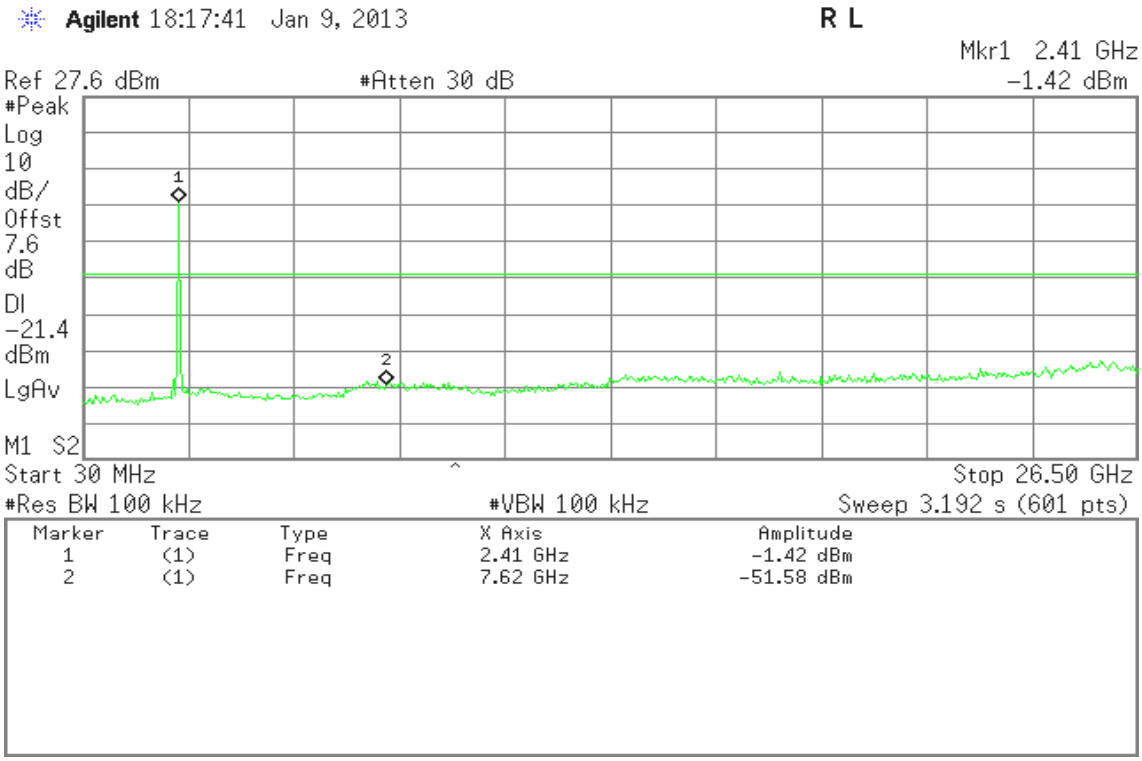


CH High

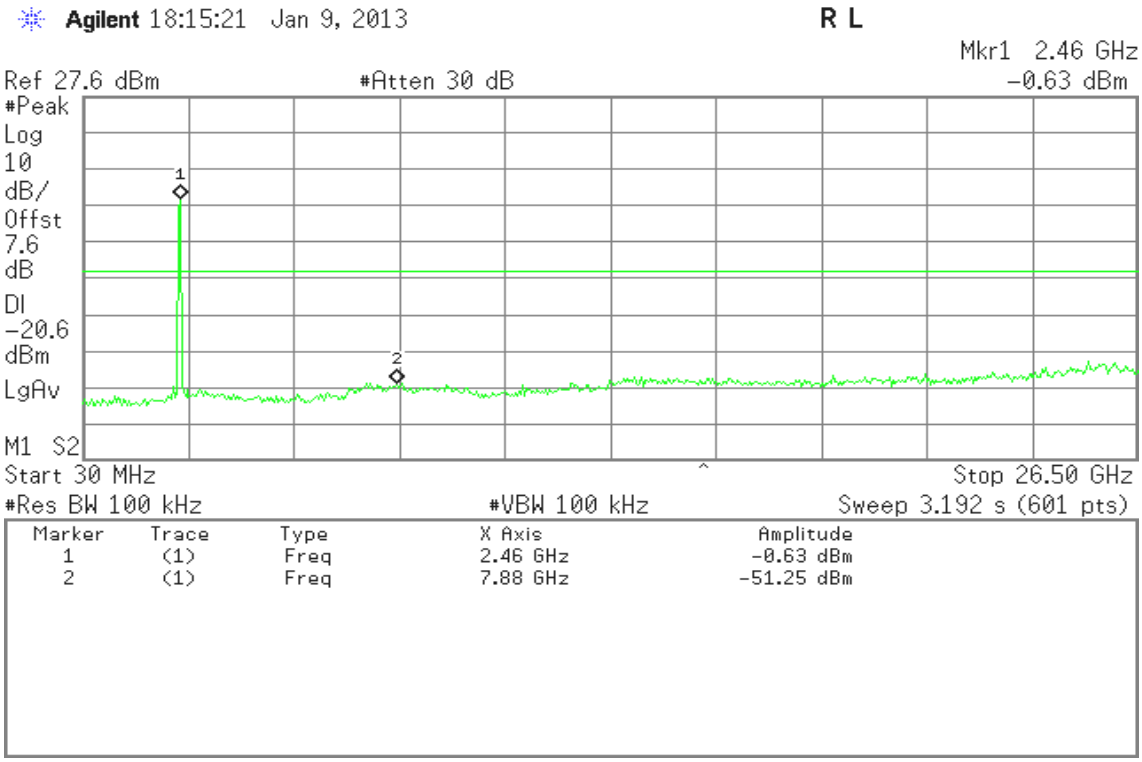


IEEE 802.11n 20 MHz Channel mode / Chain 0

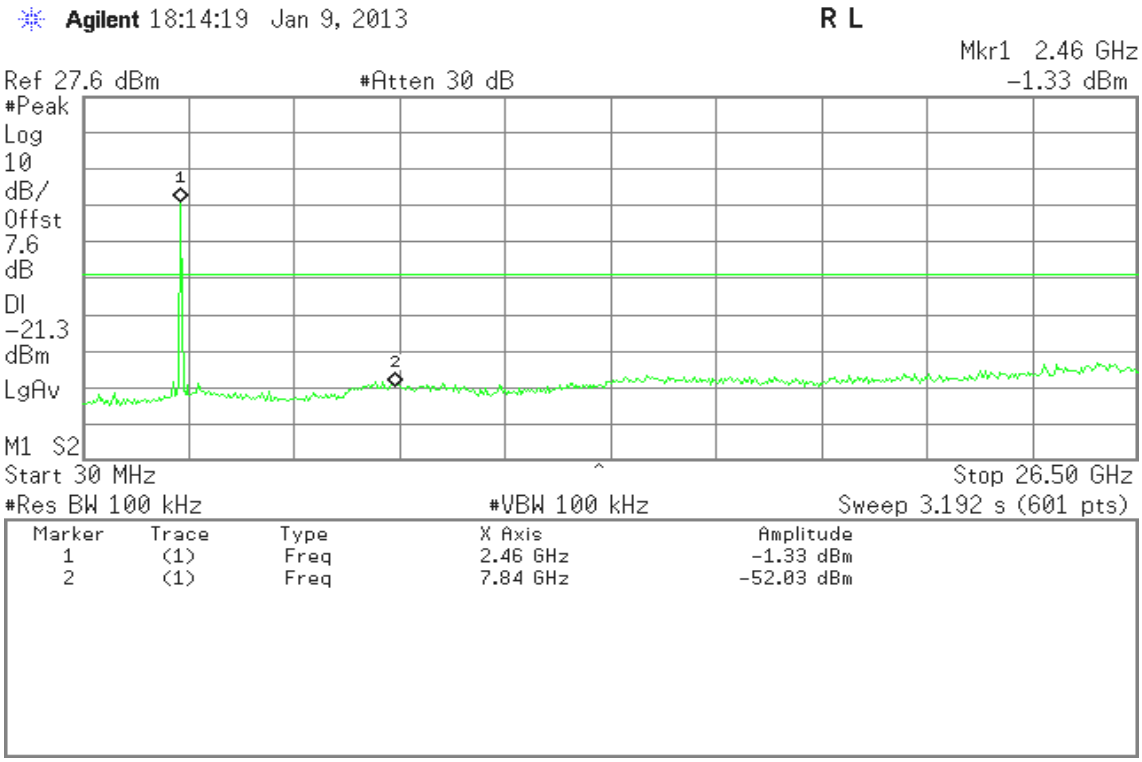
CH Low



CH Mid

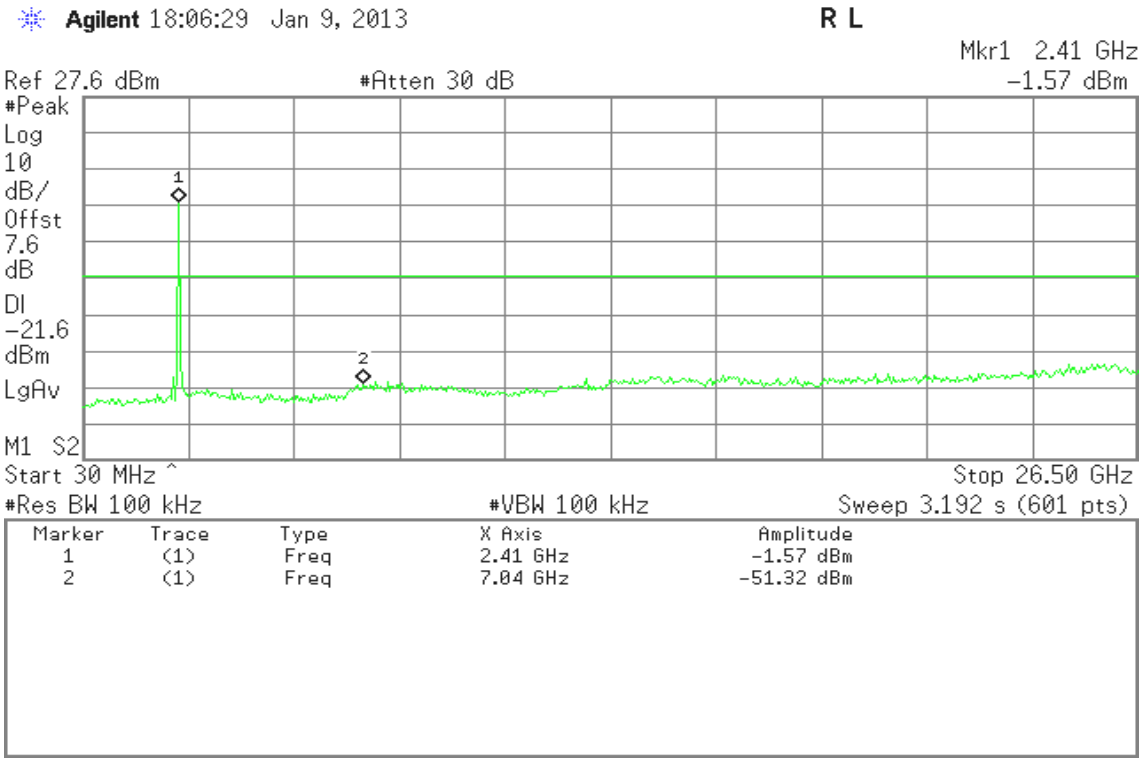


CH High

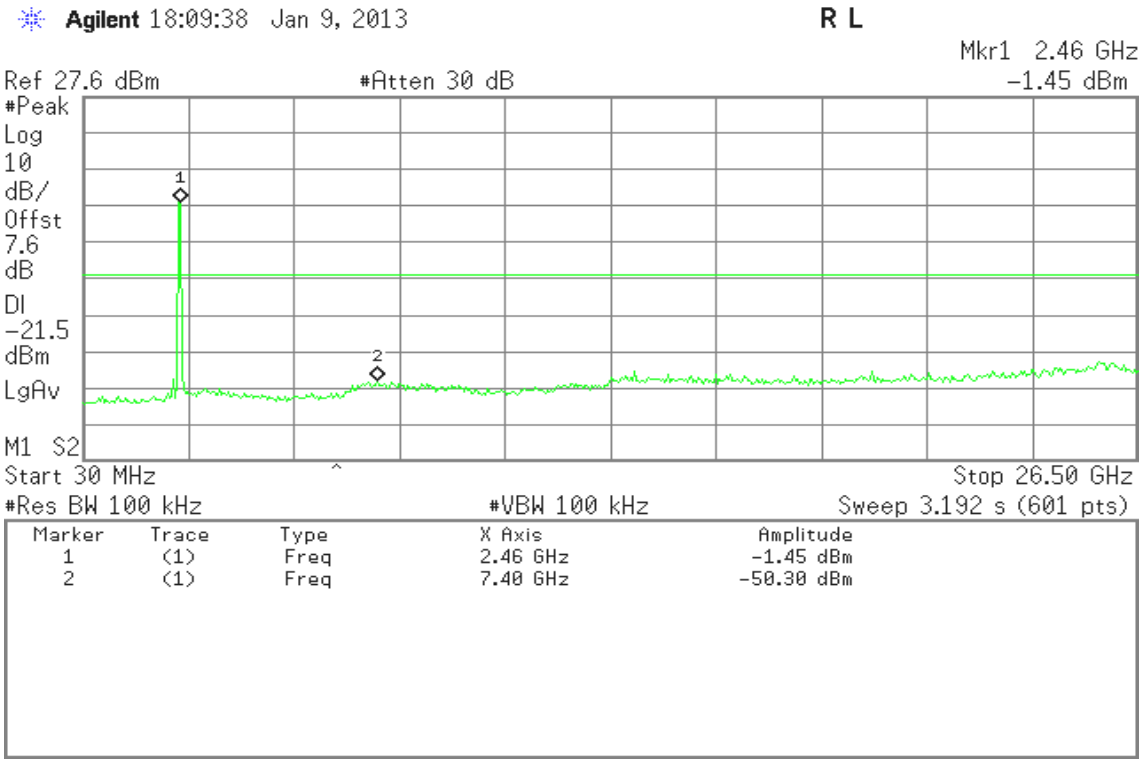


IEEE 802.11n 20 MHz Channel mode / Chain 1

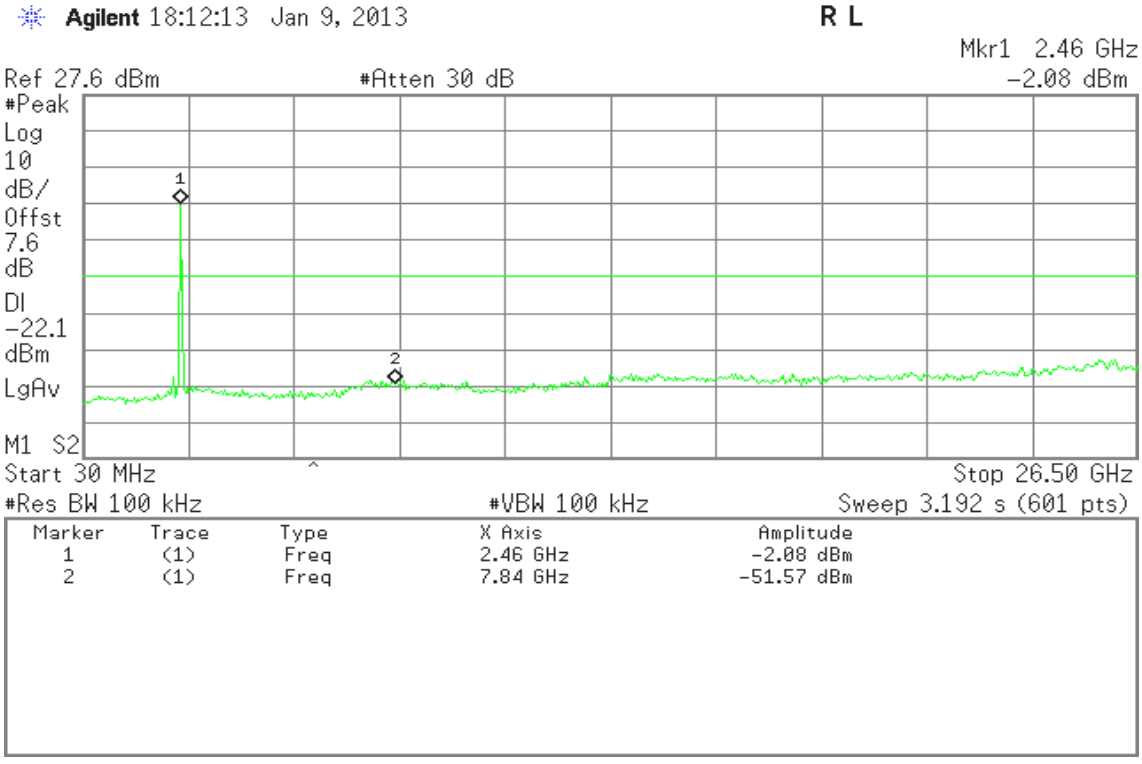
CH Low



CH Mid



CH High



IEEE 802.11n HT 20 MHz Channel mode

Low Channel					
Frequency (MHz)	**Chain0 (dBm)**	**Chain1 (dBm)**	**Total (dBm)**	**Limit (dBm)**	**Margin (dBm)**
7620	-51.58	---	-48.31	-21.40	-26.91
7040	---	-51.32			
Fundamental limit	-21.40	-21.60	---	---	---

Mid Channel					
Frequency (MHz)	**Chain0 (dBm)**	**Chain1 (dBm)**	**Total (dBm)**	**Limit (dBm)**	**Margin (dBm)**
7880	-51.25	---	-47.29	-20.60	-26.69
7400	---	-50.30			
Fundamental limit	-20.60	-21.50	---	---	---

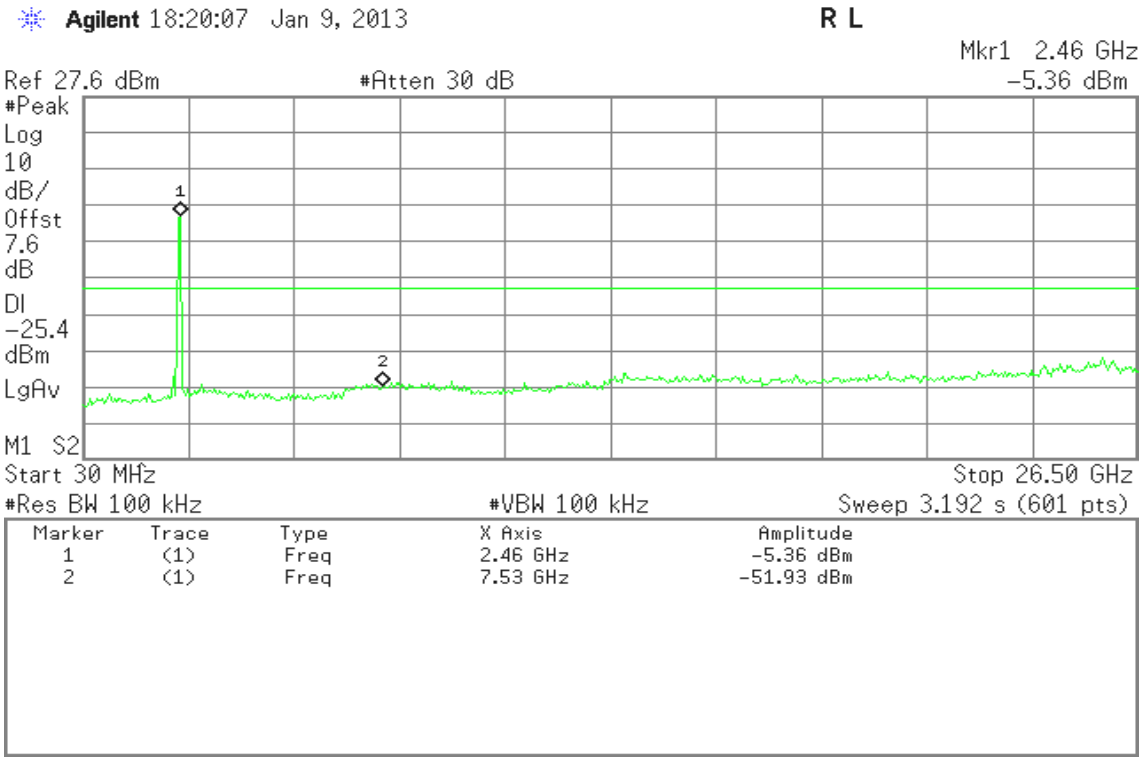
High Channel					
Frequency (MHz)	**Chain0 (dBm)**	**Chain1 (dBm)**	**Total (dBm)**	**Limit (dBm)**	**Margin (dBm)**
7840	-52.03	---	-48.56	-21.30	-27.26
7840	---	-51.57			
Fundamental limit	-21.30	-22.10	---	---	---

Remark:

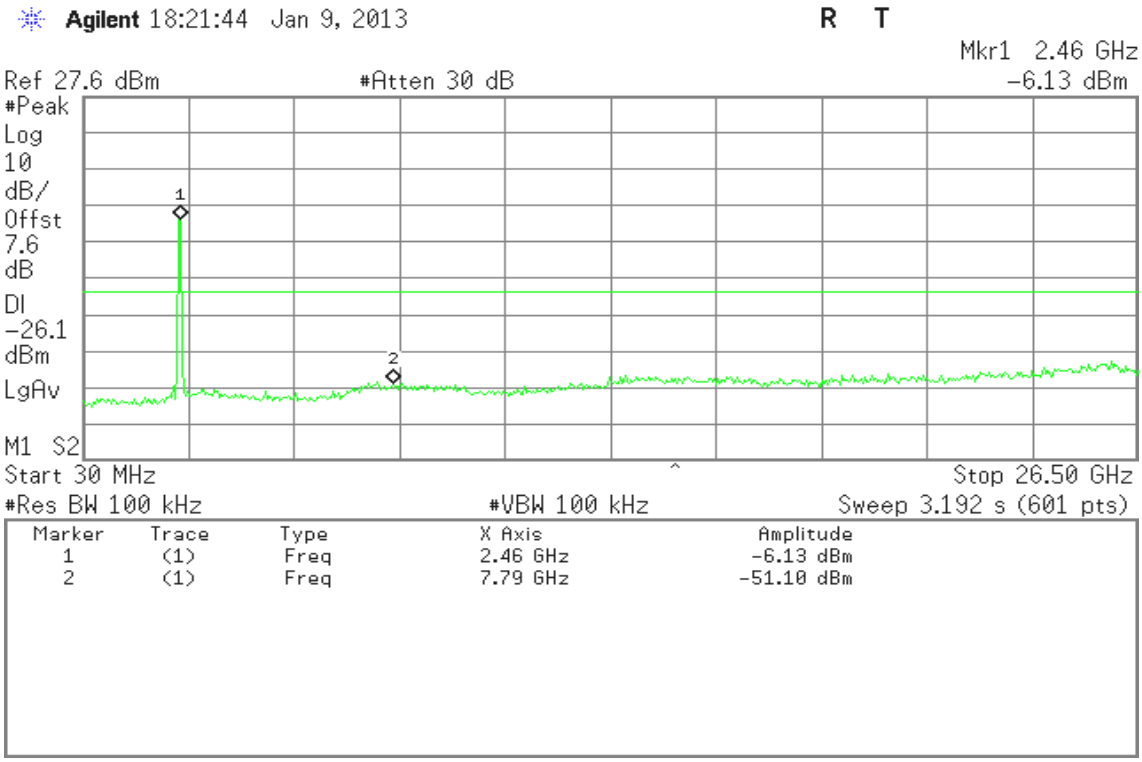
1. Total (dBm) = Measure + 10 log(2) dB,
Measure=Choose the max chain value

IEEE 802.11n 40 MHz Channel mode / Chain 0

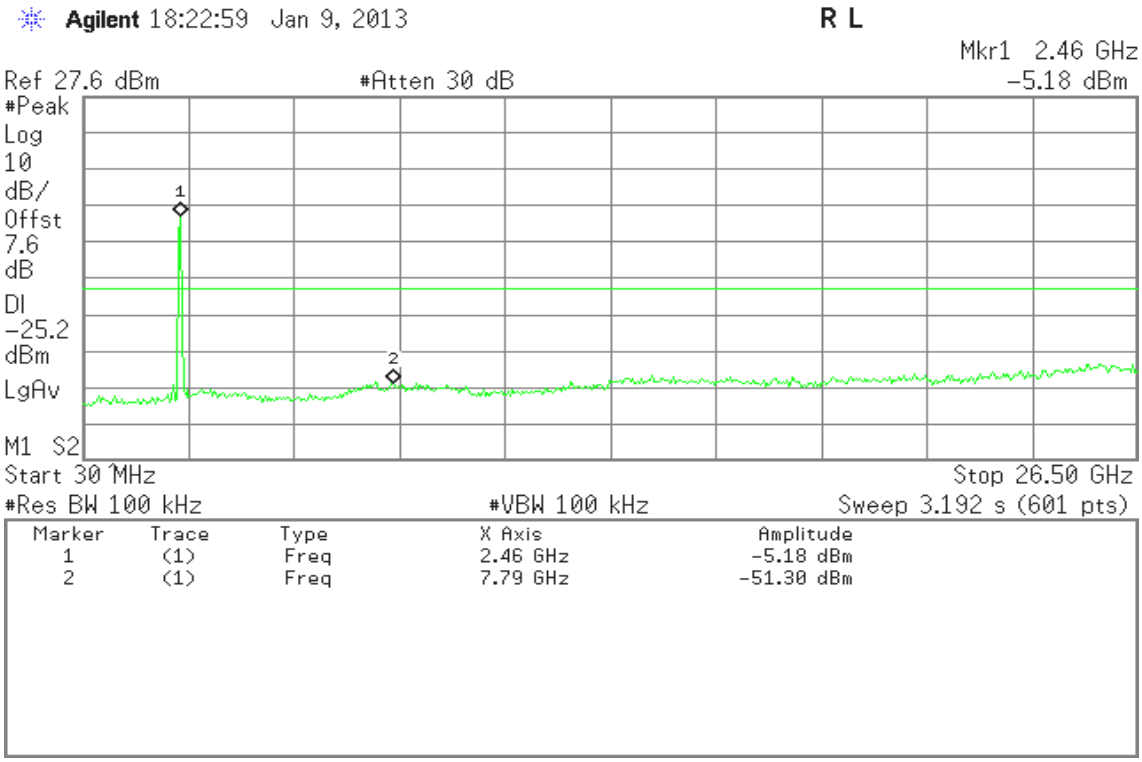
CH Low



CH Mid

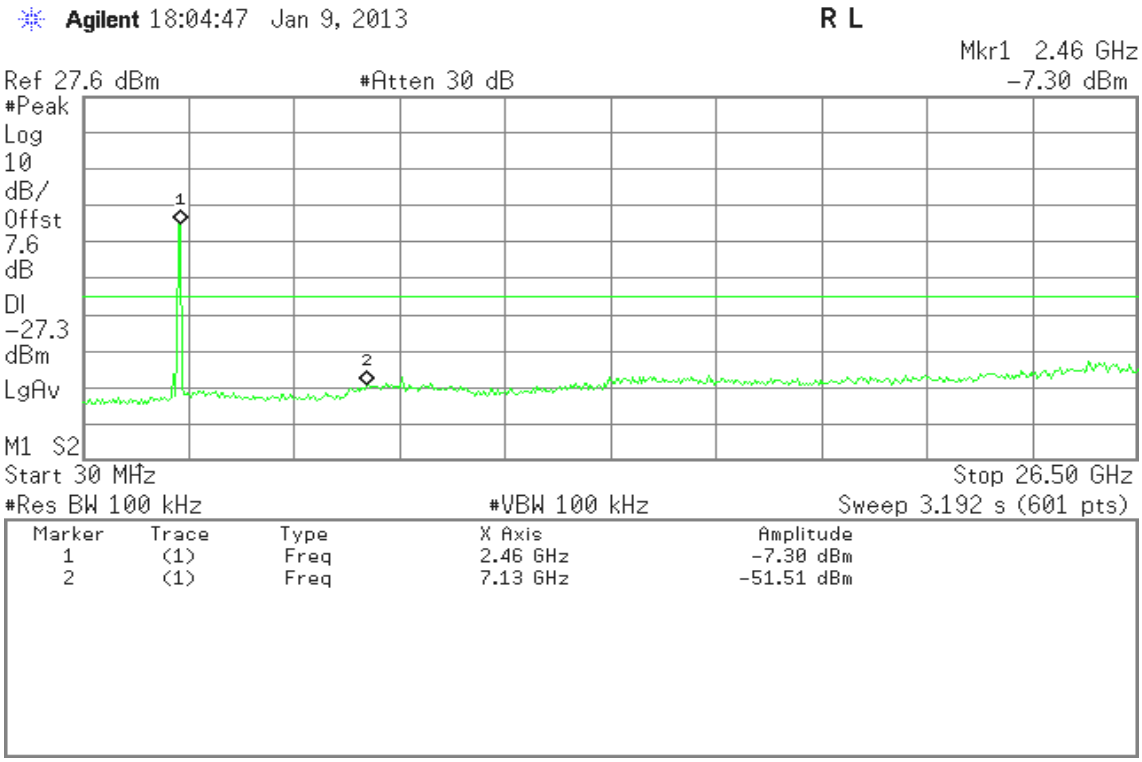


CH High

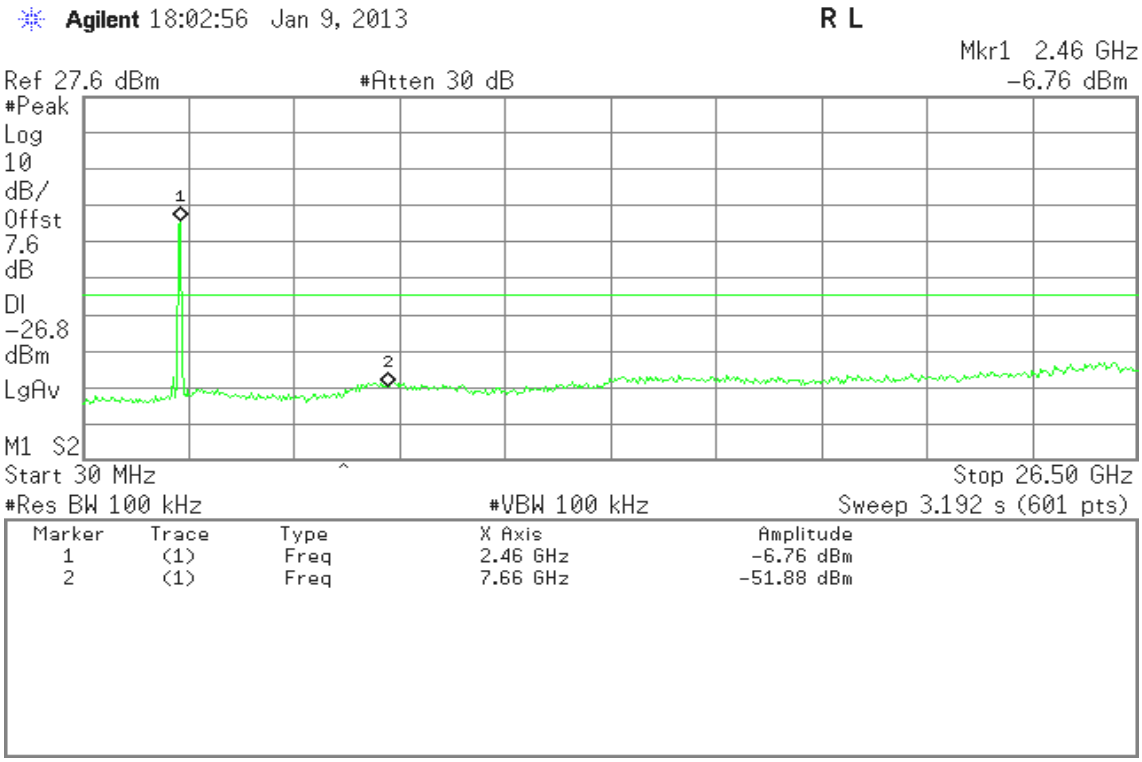


IEEE 802.11n 40 MHz Channel mode / Chain 1

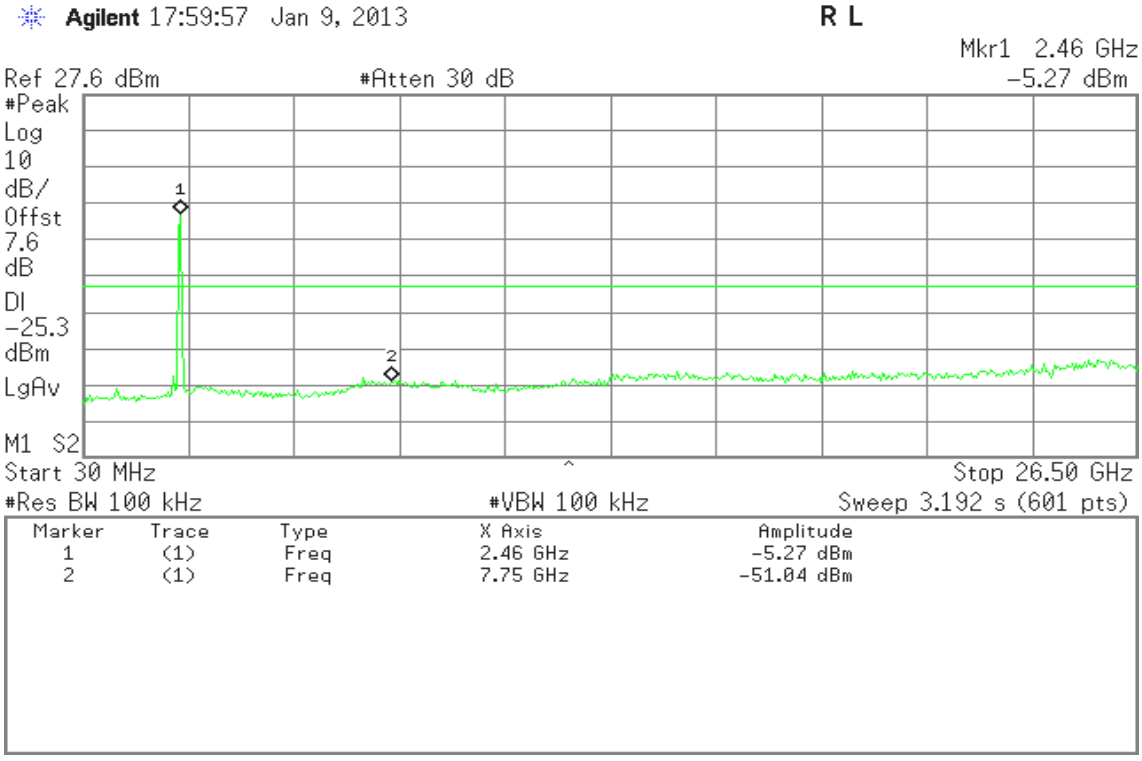
CH Low



CH Mid



CH High



IEEE 802.11n HT 40 MHz Channel mode

Low Channel					
Frequency (MHz)	**Chain0 (dBm)**	**Chain1 (dBm)**	**Total (dBm)**	**Limit (dBm)**	**Margin (dBm)**
7530	-51.93	---	-48.50	-25.40	-23.10
7130	---	-51.51			
Fundamental limit	-25.40	-27.30	---	---	---

Mid Channel					
Frequency (MHz)	**Chain0 (dBm)**	**Chain1 (dBm)**	**Total (dBm)**	**Limit (dBm)**	**Margin (dBm)**
7790	-51.10	---	-48.09	-26.10	-21.99
7660	---	-51.88			
Fundamental limit	-26.10	-26.80	---	---	---

High Channel					
Frequency (MHz)	**Chain0 (dBm)**	**Chain1 (dBm)**	**Total (dBm)**	**Limit (dBm)**	**Margin (dBm)**
7790	-51.30	---	-48.03	-25.20	-22.83
7750	---	-51.04			
Fundamental limit	-25.20	-25.30	---	---	---

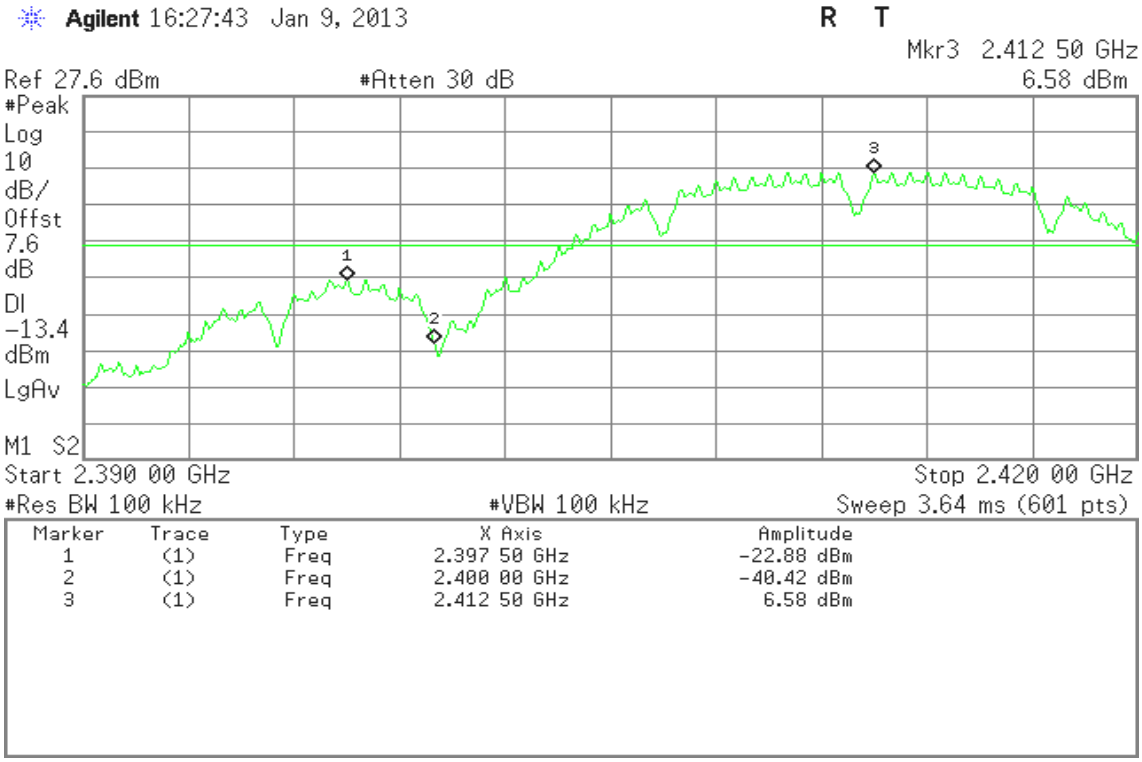
Remark:

1. Total (dBm) = Measure + 10 log(2) dB,
Measure=Choose the max chain value

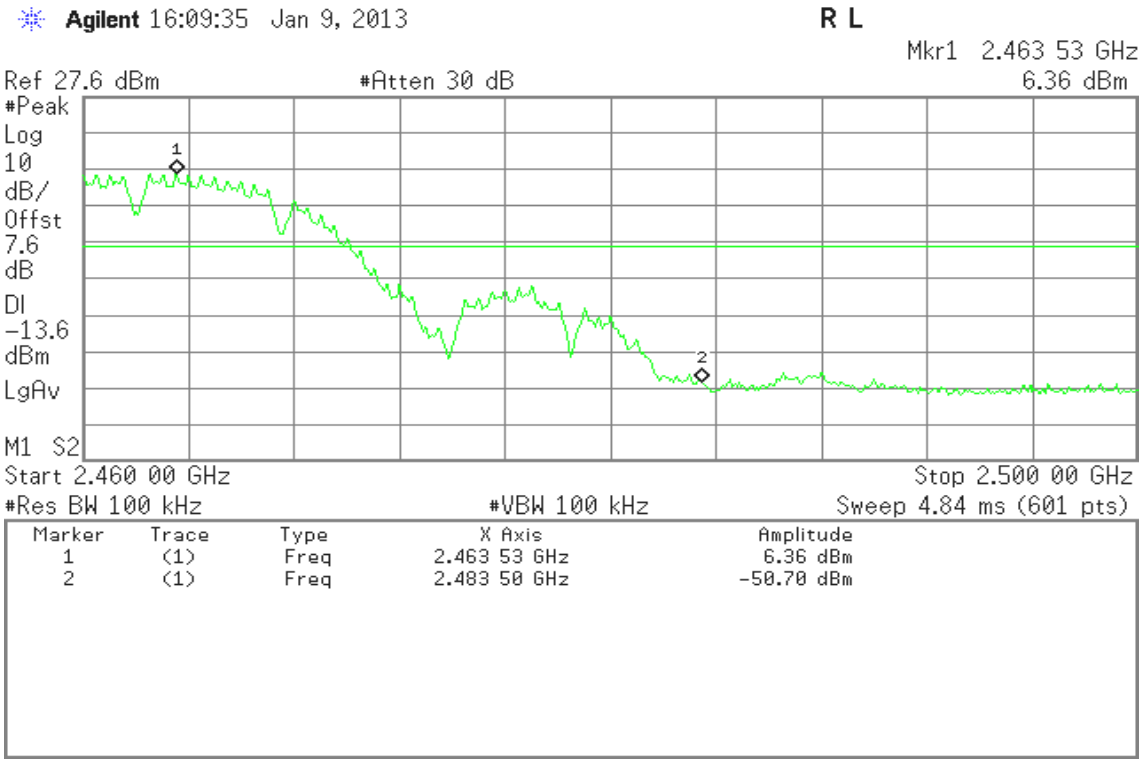
Conducted band-edge

IEEE 802.11b mode

CH Low

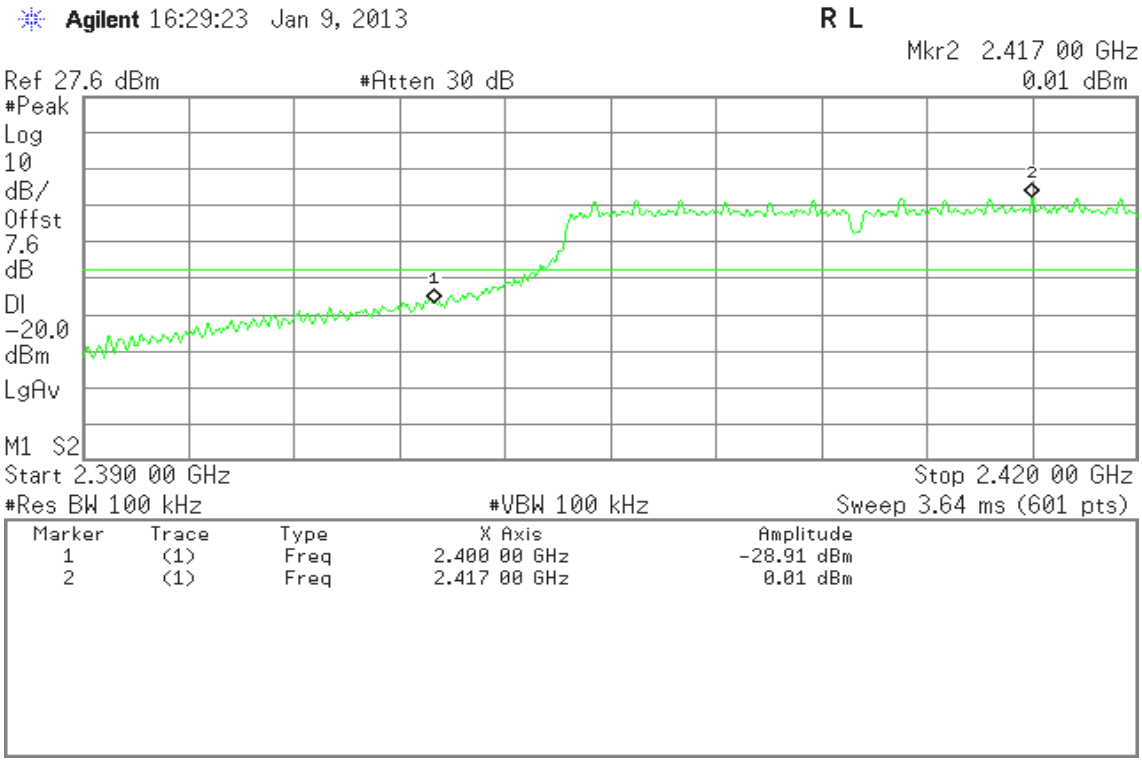


CH High

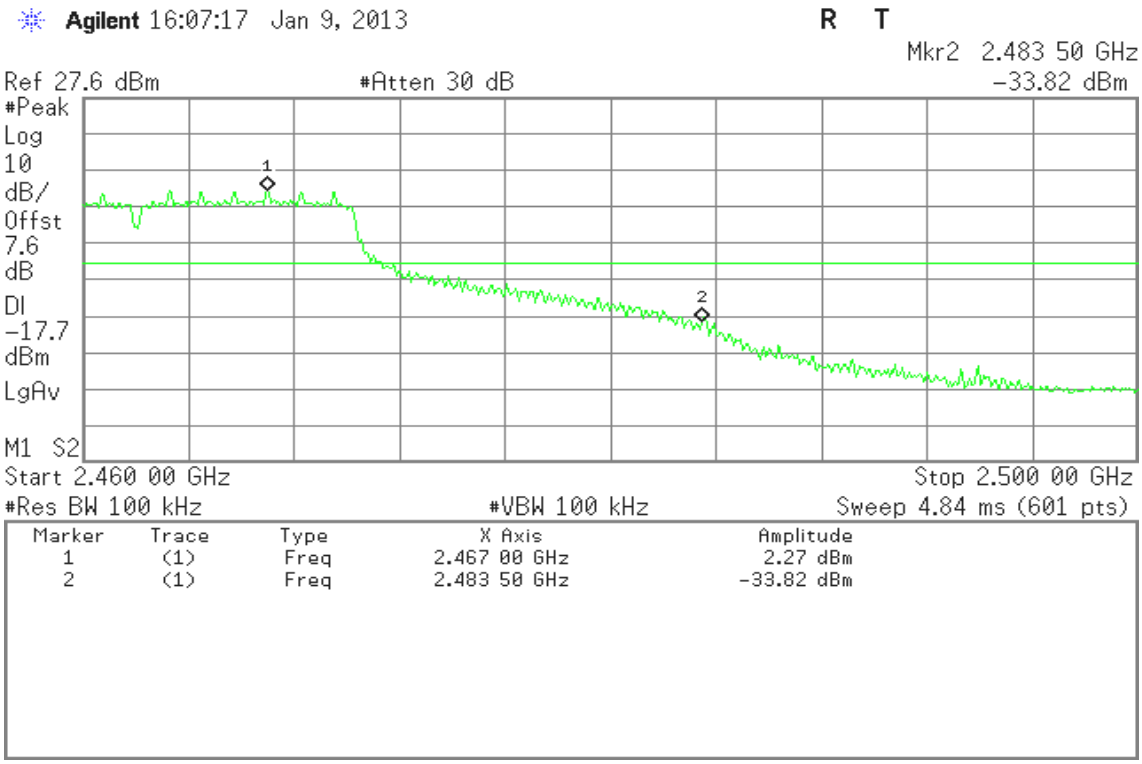


IEEE 802.11g mode

CH Low

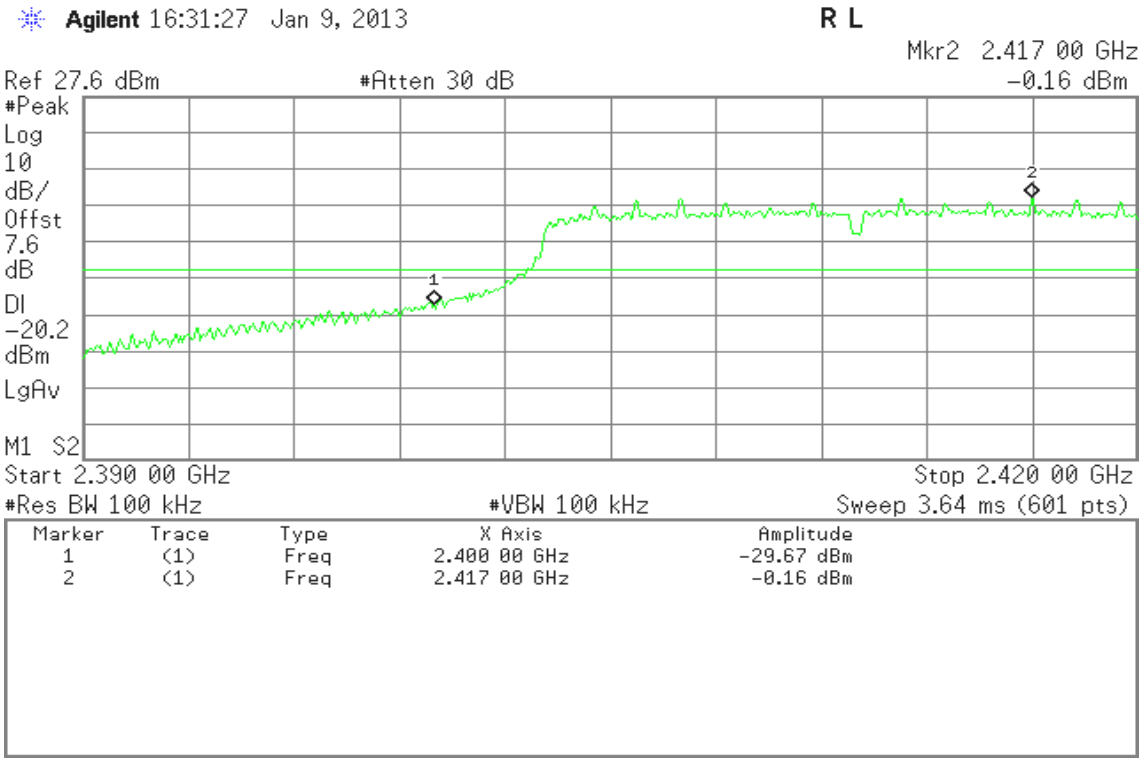


CH High

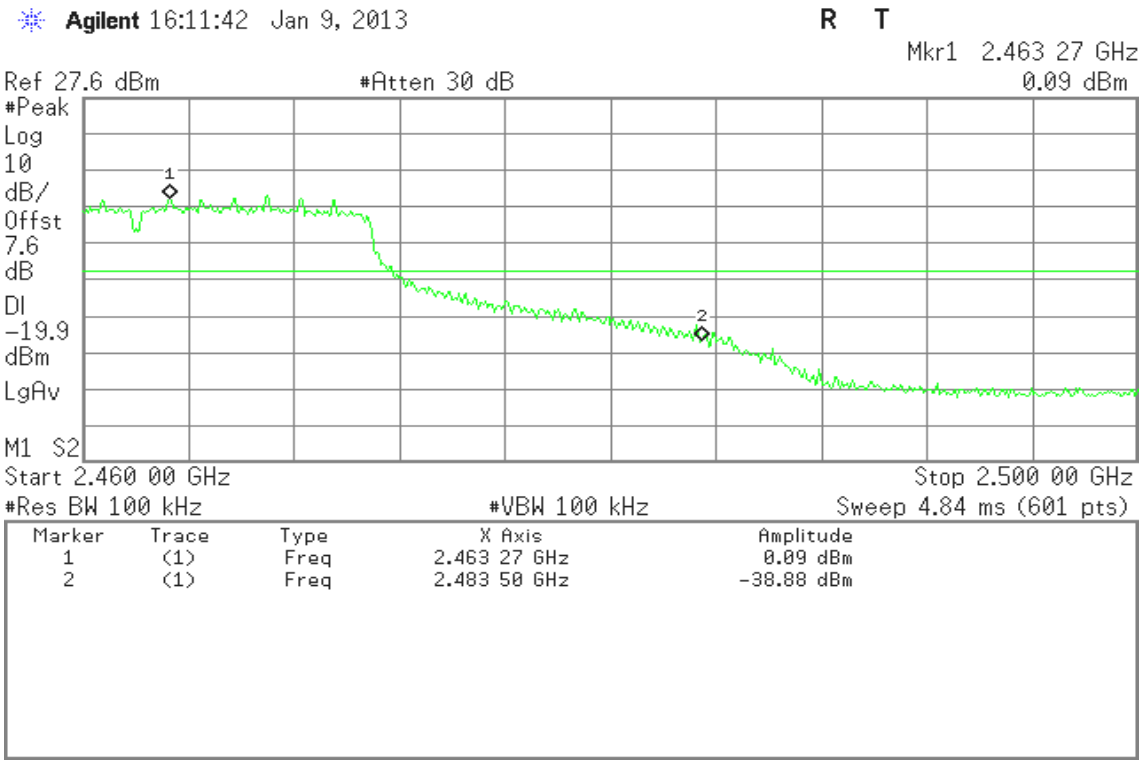


IEEE 802.11n HT20 mode / Chain 0

CH Low

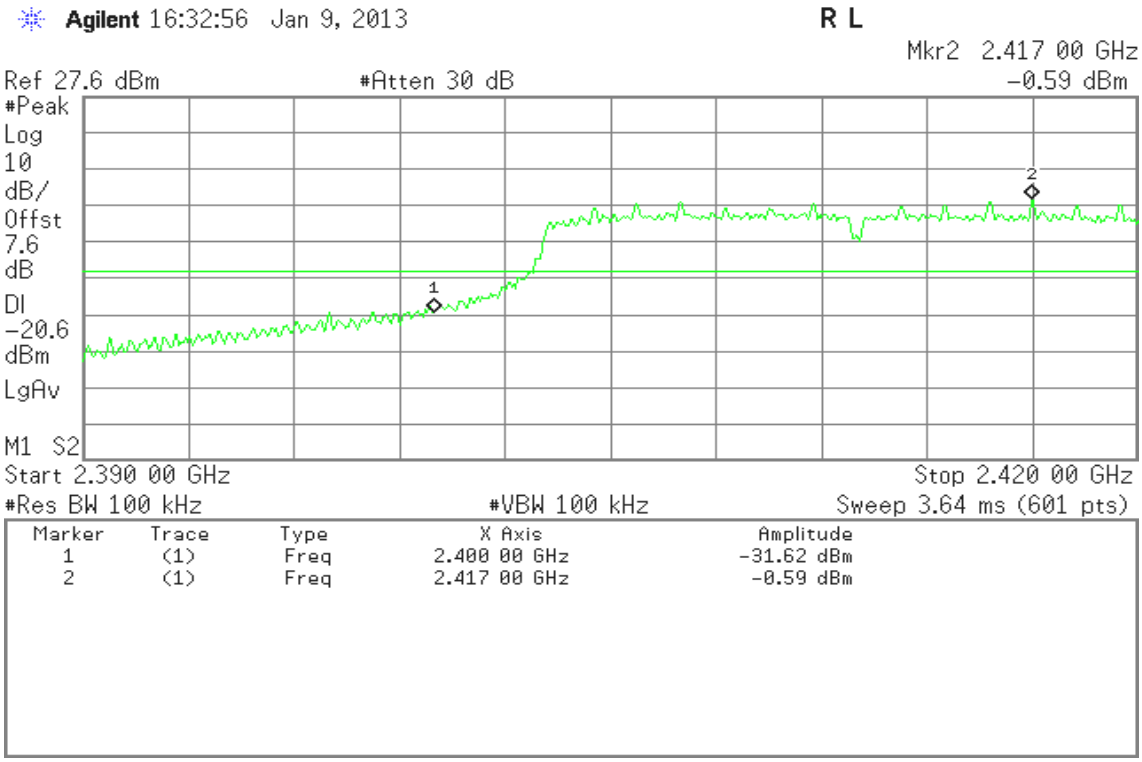


CH High

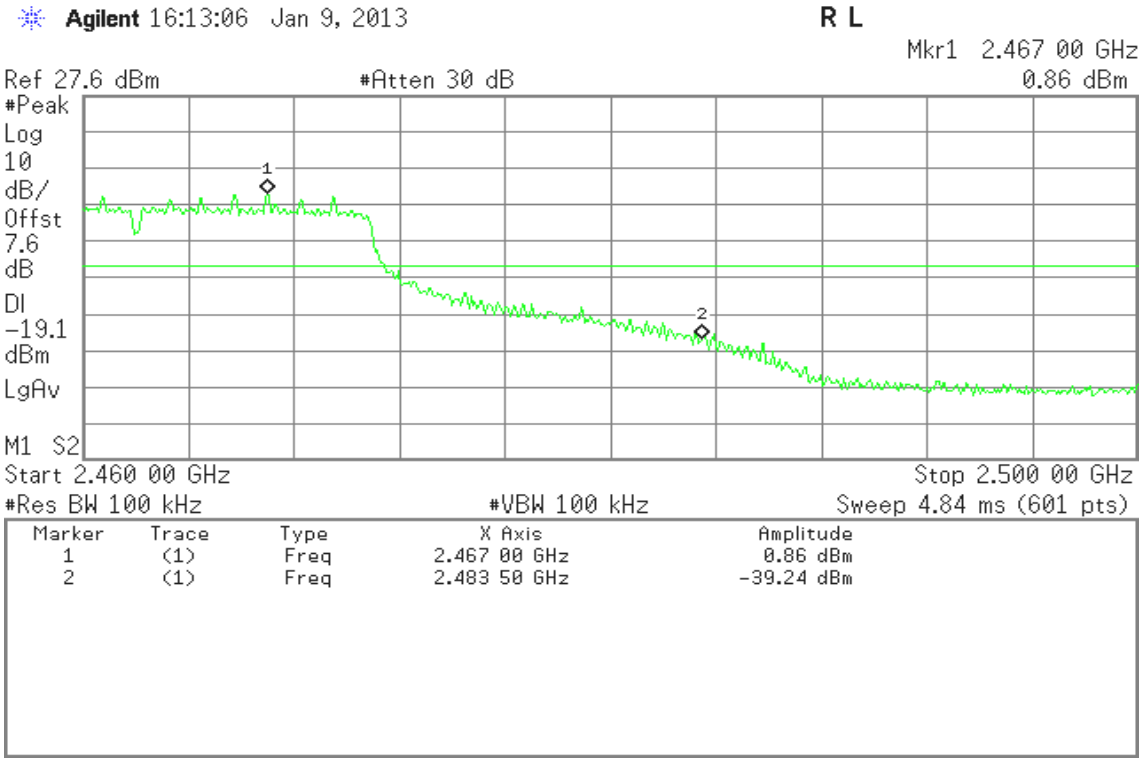


IEEE 802.11n HT20 mode / Chain 1

CH Low



CH High



IEEE 802.11n HT 20 MHz Channel mode

Low Channel					
Frequency (MHz)	**Chain0 (dBm)**	**Chain1 (dBm)**	**Total (dBm)**	**Limit (dBm)**	**Margin (dBm)**
2400	-29.67	-31.62	-26.66	-20.20	-6.46
Fundamental limit	-20.20	-20.60	---	---	---

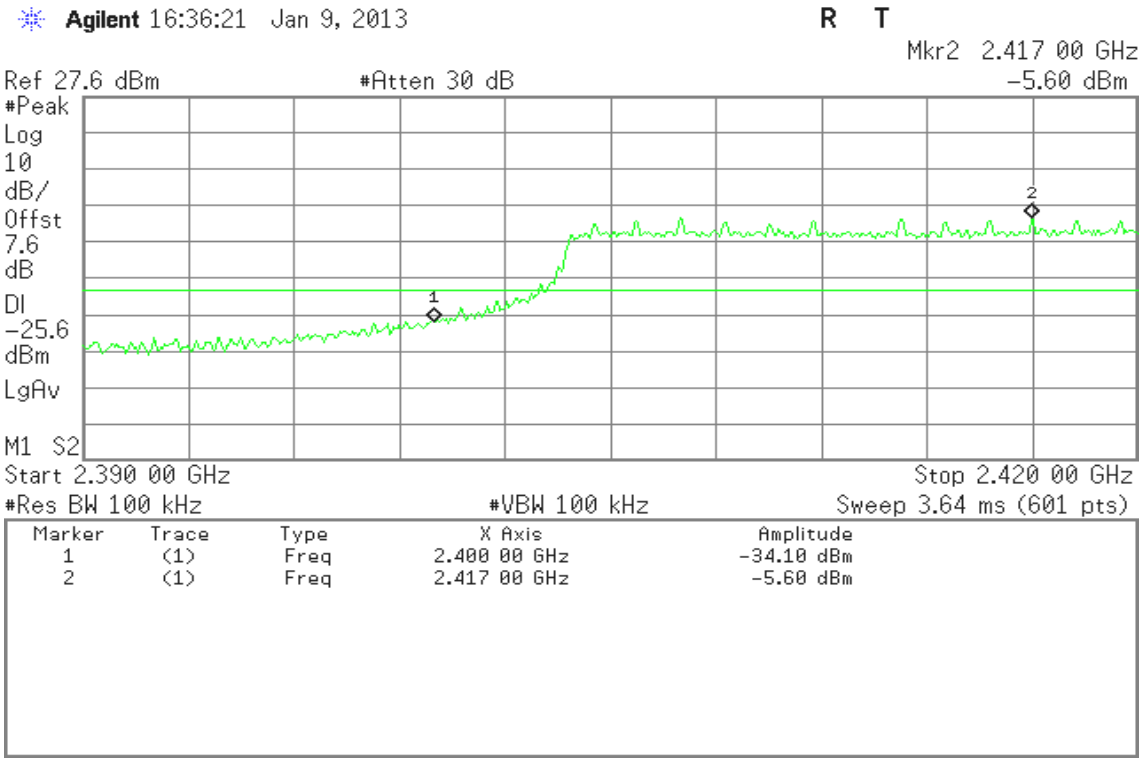
High Channel					
Frequency (MHz)	**Chain0 (dBm)**	**Chain1 (dBm)**	**Total (dBm)**	**Limit (dBm)**	**Margin (dBm)**
2483.5	-38.88	-39.24	-35.87	-19.10	-16.77
Fundamental limit	-19.90	-19.10	---	---	---

Remark:

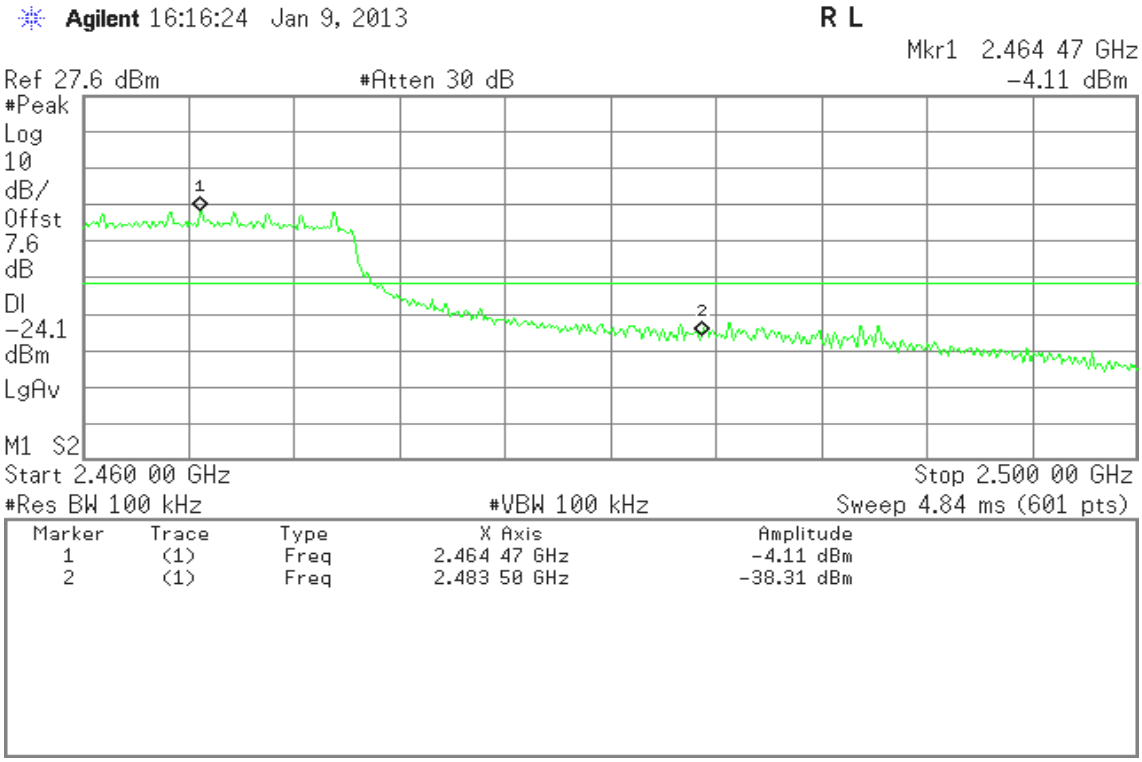
1. Total (dBm) = Measure + 10 log(2) dB,
Measure=Choose the max chain value

IEEE 802.11n HT40 mode / Chain 0

CH Low

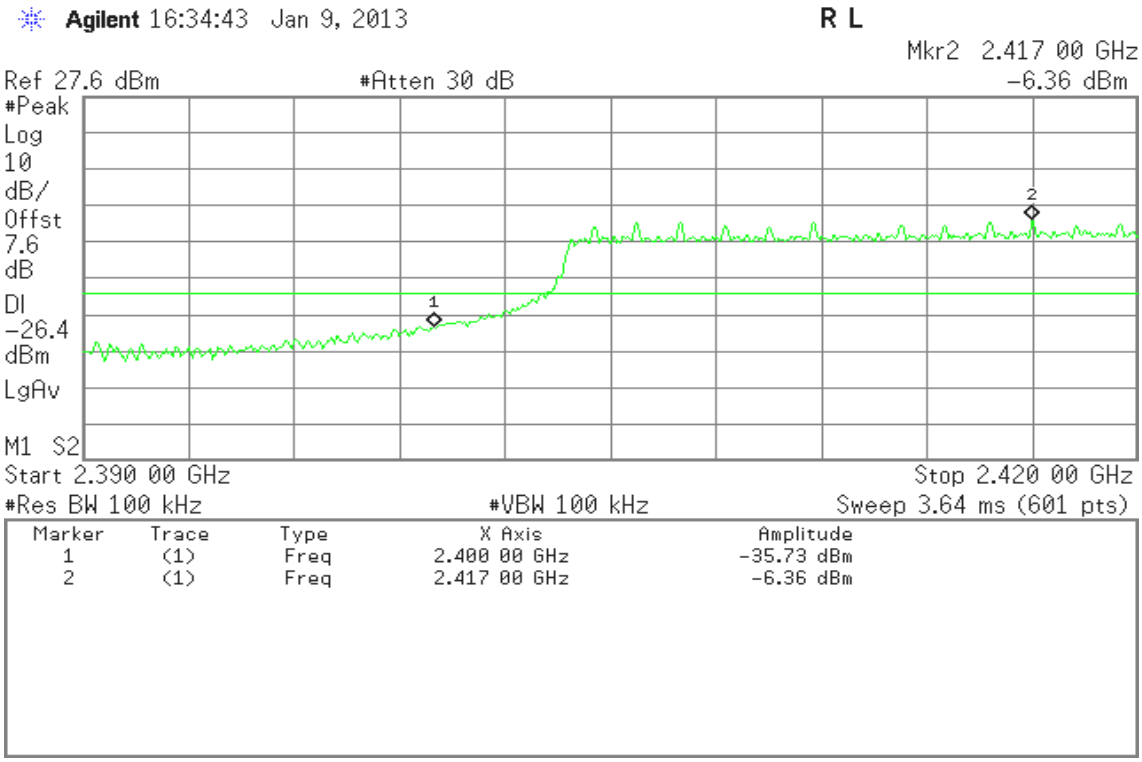


CH High

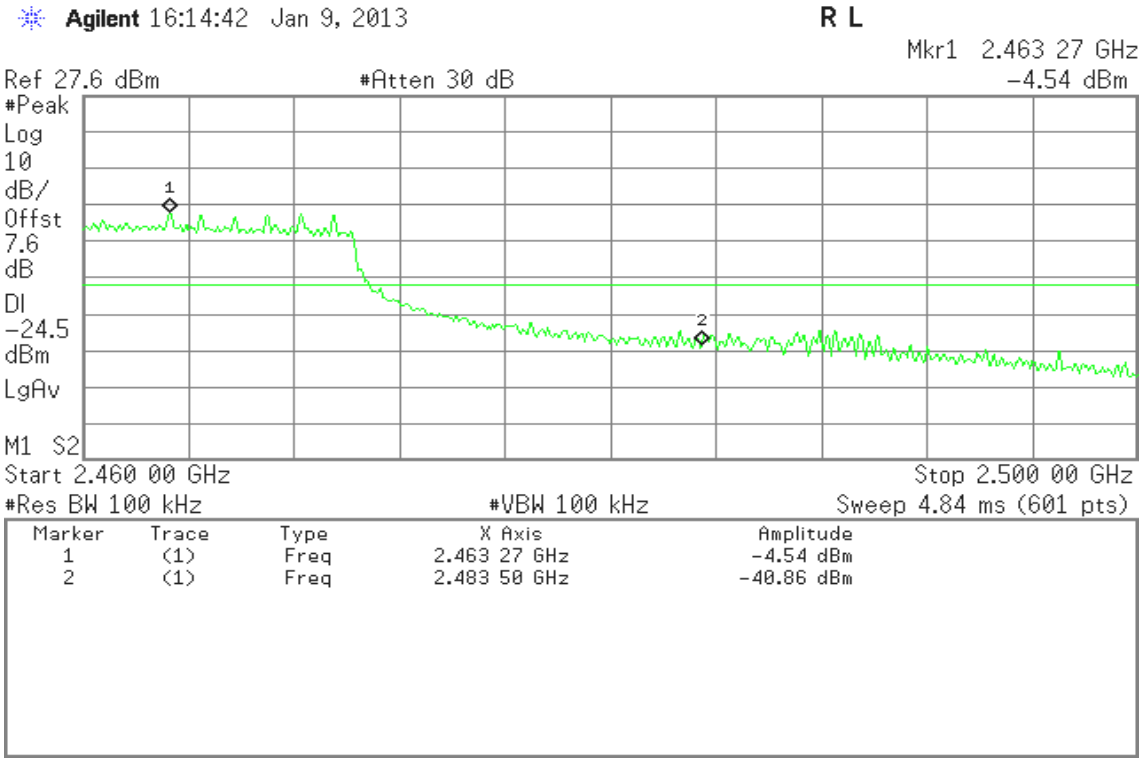


IEEE 802.11n HT40 mode / Chain 1

CH Low



CH High



IEEE 802.11n HT 40 MHz Channel mode

Low Channel					
Frequency (MHz)	**Chain0 (dBm)**	**Chain1 (dBm)**	**Total (dBm)**	**Limit (dBm)**	**Margin (dBm)**
2400	-34.10	-35.73	-31.09	-25.60	-5.49
Fundamental limit	-25.60	-26.40	---	---	---

High Channel					
Frequency (MHz)	**Chain0 (dBm)**	**Chain1 (dBm)**	**Total (dBm)**	**Limit (dBm)**	**Margin (dBm)**
2483.5	-38.31	-40.86	-35.30	-24.10	-11.20
Fundamental limit	-24.10	-24.50	---	---	---

Remark:

1. Total (dBm) = Measure + 10 log(2) dB,
Measure=Choose the max chain value

7.6.2 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

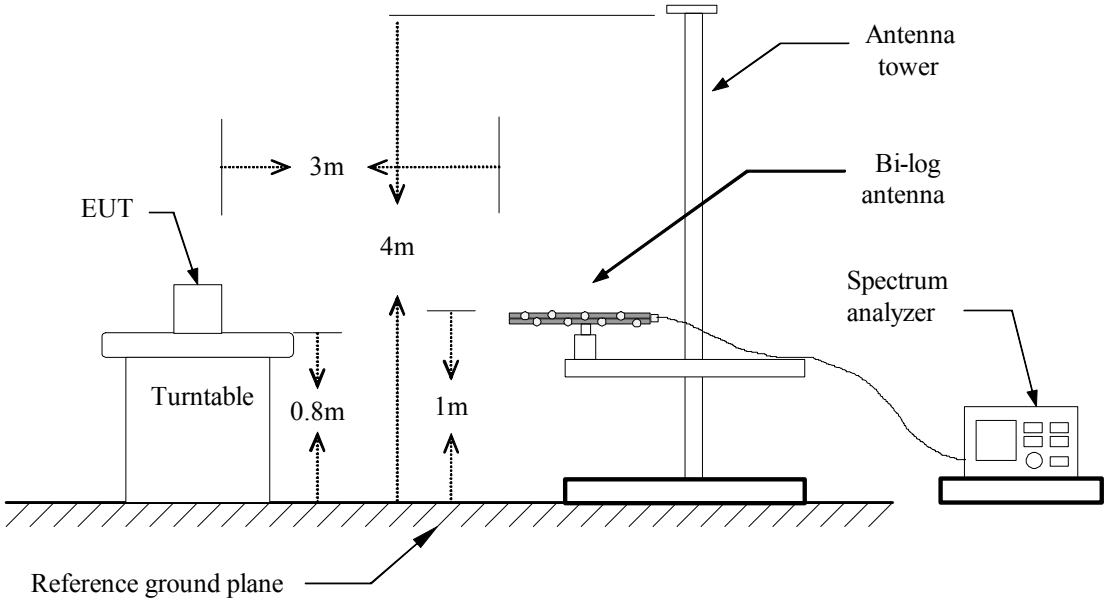
Remark: *Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of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

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

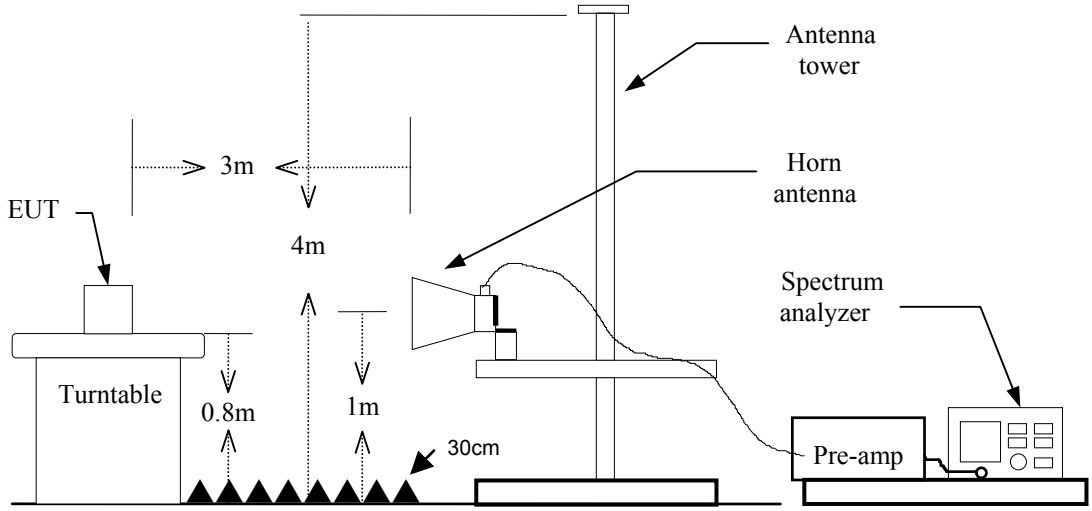
Frequency (MHz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

TEST CONFIGURATION

Below 1 GHz



Above 1 GHz



TEST PROCEDURE

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 30MHz

   RBW=9kHz / VBW=300kHz / Sweep=AUTO

   30 ~ 1000MHz:

   RBW=120kHz / VBW=3MHz / Sweep=AUTO

   Above 1GHz:

   (a.)PEAK: RBW=VBW=1MHz / Sweep=AUTO

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

TEST RESULTS

No non-compliance noted.

TEST DATA

Below 1GHz

Operation Mode:	Transmitting	**Test Date:**	January 10, 2013
Temperature:	26°C	**Tested by:**	Clark Su
Humidity:	56% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol. (H/V)	Remark
98.8700	36.84	2.91	39.75	43.50	-3.75	V	QP
141.5500	37.47	1.12	38.59	43.50	-4.91	V	QP
375.3200	46.78	-6.39	40.39	46.00	-5.61	V	QP
399.5700	40.76	-8.43	32.33	46.00	-13.67	V	QP
624.6100	36.94	-5.22	31.72	46.00	-14.28	V	QP
749.7400	36.00	-3.64	32.36	46.00	-13.64	V	QP
817.6400	37.40	-4.64	32.76	46.00	-13.24	V	QP
47.4600	34.35	2.31	36.66	40.00	-3.34	H	QP
65.8900	43.62	-7.24	36.38	40.00	-3.62	H	QP
115.3600	41.06	-4.75	36.31	43.50	-7.19	H	QP
375.3200	50.13	-10.67	39.46	46.00	-6.54	H	QP
399.5700	42.89	-9.94	32.95	46.00	-13.05	H	QP
624.6100	35.83	-4.65	31.18	46.00	-14.82	H	QP
749.7400	39.93	-7.67	32.26	46.00	-13.74	H	QP

Remark:

1. *No emission found between lowest internal used / generated frequency to 30 MHz. (9kHz ~ 30MHz)*
2. *Measuring frequencies from 9 kHz to the 1GHz.*
3. *Radiated emissions measured in the measured frequency range were made with an instrument using peak detector or quasi-peak detector mode.*
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. *The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.*

Above 1 GHz

Operation Mode:	TX / IEEE 802.11b / CH Low	**Test Date:**	January 7, 2013
Temperature:	26°C	**Tested by:**	Francis Lee
Humidity:	56 % RH	**Polarity:**	Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1994.000	50.34	-1.39	48.95	74.00	-25.05	V	Peak
2274.000	52.68	-1.49	51.19	74.00	-22.81	V	Peak
2288.000	55.21	-1.52	53.69	74.00	-20.31	V	Peak
2288.000	51.84	-1.52	50.32	54.00	-3.68	V	AVG
2360.000	58.66	-1.62	57.04	74.00	-16.96	V	Peak
2360.000	51.15	-1.62	49.53	54.00	-4.47	V	AVG
2462.000	61.66	-1.21	60.45	74.00	-13.55	V	Peak
2462.000	52.78	-1.21	51.57	54.00	-2.43	V	AVG
4825.000	52.05	2.68	54.73	74.00	-19.27	V	Peak
4825.000	49.85	2.68	52.53	54.00	-1.47	V	AVG
2162.000	49.52	-3.64	45.88	74.00	-28.12	H	Peak
2288.000	52.86	-6.02	46.84	74.00	-27.16	H	Peak
2360.000	54.31	-6.35	47.96	74.00	-26.04	H	Peak
2462.000	52.04	-4.78	47.26	74.00	-26.74	H	Peak
4435.000	40.76	6.82	47.58	74.00	-26.42	H	peak
4825.000	46.12	5.88	52.00	74.00	-22.00	H	peak
5465.000	38.97	8.70	47.67	74.00	-26.33	H	peak

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.*

Operation Mode: TX / IEEE 802.11b / CH Mid **Test Date:** January 7, 2013

Temperature: 26°C **Tested by:** Francis Lee

Humidity: 56 % RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
2288.000	55.46	-1.52	53.94	74.00	-20.06	V	peak
2288.000	50.84	-1.52	49.32	54.00	-4.68	V	AVG
2386.000	60.23	-1.65	58.58	74.00	-15.42	V	peak
2386.000	52.06	-1.65	50.41	54.00	-3.59	V	AVG
2488.000	60.78	-1.02	59.76	74.00	-14.24	V	peak
2488.000	52.47	-1.02	51.45	54.00	-2.55	V	AVG
2640.000	52.40	-1.89	50.51	74.00	-23.49	V	peak
3835.000	40.24	2.91	43.15	74.00	-30.85	V	peak
4875.000	51.32	3.81	55.13	74.00	-18.87	V	peak
4875.000	48.68	3.81	52.49	54.00	-1.51	V	AVG
5525.000	39.54	6.15	45.69	74.00	-28.31	V	peak
2200.000	49.71	-3.56	46.15	74.00	-27.85	H	peak
2288.000	53.49	-6.02	47.47	74.00	-26.53	H	peak
2386.000	54.73	-6.35	48.38	74.00	-25.62	H	peak
2484.000	51.83	-4.22	47.61	74.00	-26.39	H	peak
4345.000	39.48	7.33	46.81	74.00	-27.19	H	peak
4875.000	47.08	6.73	53.81	74.00	-20.19	H	peak
4875.000	45.53	6.73	52.26	54.00	-1.74	H	AVG
5445.000	38.82	8.60	47.42	74.00	-26.58	H	peak

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.*

Operation Mode: TX / IEEE 802.11b / CH High **Test Date:** January 7, 2013

Temperature: 26°C **Tested by:** Francis Lee

Humidity: 56 % RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
2288.000	55.23	-1.52	53.71	74.00	-20.29	V	peak
2288.000	50.00	-1.52	48.48	54.00	-5.52	V	AVG
2412.000	60.72	-1.58	59.14	74.00	-14.86	V	peak
2412.000	51.76	-1.58	50.18	54.00	-3.82	V	AVG
2514.000	58.87	-1.10	57.77	74.00	-16.23	V	peak
2514.000	50.03	-1.10	48.93	54.00	-5.07	V	AVG
2640.000	52.64	-1.89	50.75	74.00	-23.25	V	peak
4080.000	39.71	3.19	42.90	74.00	-31.10	V	peak
4925.000	51.54	4.61	56.15	74.00	-17.85	V	peak
4925.000	47.62	4.61	52.23	54.00	-1.77	V	AVG
5445.000	39.01	6.32	45.33	74.00	-28.67	V	peak
2160.000	49.91	-3.65	46.26	74.00	-27.74	H	peak
2288.000	53.00	-6.02	46.98	74.00	-27.02	H	peak
2416.000	54.95	-5.94	49.01	74.00	-24.99	H	peak
2516.000	52.10	-3.74	48.36	74.00	-25.64	H	peak
4335.000	40.04	7.40	47.44	74.00	-26.56	H	peak
4925.000	47.88	7.26	55.14	74.00	-18.86	H	peak
4925.000	44.92	7.26	52.18	54.00	-1.82	H	AVG
5595.000	39.12	9.18	48.30	74.00	-25.70	H	peak

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.*

Operation Mode: TX / IEEE 802.11g / CH Low **Test Date:** January 7, 2013

Temperature: 26°C **Tested by:** Francis Lee

Humidity: 56 % RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
2288.000	56.21	-1.52	54.69	74.00	-19.31	V	peak
2288.000	50.16	-1.52	48.64	54.00	-5.36	V	AVG
2354.000	60.49	-1.61	58.88	74.00	-15.12	V	peak
2354.000	51.62	-1.61	50.01	54.00	-3.99	V	AVG
2464.000	60.96	-1.20	59.76	74.00	-14.24	V	peak
2464.000	51.37	-1.20	50.17	54.00	-3.83	V	AVG
2640.000	52.01	-1.89	50.12	74.00	-23.88	V	peak
3985.000	39.50	3.19	42.69	74.00	-31.31	V	peak
4830.000	52.79	2.79	55.58	74.00	-18.42	V	peak
4830.000	37.06	2.79	39.85	54.00	-14.15	V	AVG
5560.000	39.65	6.04	45.69	74.00	-28.31	V	peak
2170.000	50.91	-3.63	47.28	74.00	-26.72	H	peak
2288.000	54.47	-6.02	48.45	74.00	-25.55	H	peak
2368.000	57.60	-6.35	51.25	74.00	-22.75	H	peak
2460.000	54.83	-4.83	50.00	74.00	-24.00	H	peak
4305.000	38.80	7.62	46.42	74.00	-27.58	H	peak
4825.000	48.11	5.88	53.99	74.00	-20.01	H	peak
4825.000	36.45	5.88	42.33	54.00	-11.67	H	AVG
5560.000	38.66	9.06	47.72	74.00	-26.28	H	peak

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.*

Operation Mode: TX / IEEE 802.11g / CH Mid **Test Date:** January 7, 2013

Temperature: 26°C **Tested by:** Francis Lee

Humidity: 56 % RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
2288.000	56.18	-1.52	54.66	74.00	-19.34	V	peak
2288.000	50.37	-1.52	48.85	54.00	-5.15	V	AVG
2384.000	58.75	-1.65	57.10	74.00	-16.90	V	peak
2384.000	49.38	-1.65	47.73	54.00	-6.27	V	AVG
2482.000	59.85	-1.06	58.79	74.00	-15.21	V	peak
2482.000	50.37	-1.06	49.31	54.00	-4.69	V	AVG
3725.000	40.42	2.78	43.20	74.00	-30.80	V	peak
4875.000	52.00	3.81	55.81	74.00	-18.19	V	peak
4875.000	41.10	3.81	44.91	54.00	-9.09	V	AVG
5475.000	38.92	6.27	45.19	74.00	-28.81	V	peak
2224.000	50.02	-4.23	45.79	74.00	-28.21	H	peak
2288.000	53.70	-6.02	47.68	74.00	-26.32	H	peak
2384.000	55.76	-6.35	49.41	74.00	-24.59	H	peak
2484.000	52.33	-4.22	48.11	74.00	-25.89	H	peak
4475.000	40.11	6.70	46.81	74.00	-27.19	H	peak
4880.000	48.13	6.81	54.94	74.00	-19.06	H	peak
4880.000	37.36	6.81	44.17	54.00	-9.83	H	AVG
5615.000	38.57	9.03	47.60	74.00	-26.40	H	peak

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.*

Operation Mode: TX / IEEE 802.11g / CH High **Test Date:** January 7, 2013

Temperature: 26°C **Tested by:** Francis Lee

Humidity: 56 % RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
2288.000	56.69	-1.52	55.17	74.00	-18.83	V	peak
2288.000	49.61	-1.52	48.09	54.00	-5.91	V	AVG
2410.000	59.34	-1.60	57.74	74.00	-16.26	V	peak
2410.000	50.29	-1.60	48.69	54.00	-5.31	V	AVG
2518.000	59.87	-1.15	58.72	74.00	-15.28	V	peak
2518.000	49.37	-1.15	48.22	54.00	-5.78	V	AVG
2640.000	53.41	-1.89	51.52	74.00	-22.48	V	peak
3770.000	40.05	3.32	43.37	74.00	-30.63	V	peak
4925.000	53.97	4.61	58.58	74.00	-15.42	V	peak
4925.000	41.17	4.61	45.78	54.00	-8.22	V	AVG
5465.000	39.52	6.29	45.81	74.00	-28.19	V	peak
2288.000	54.01	-6.02	47.99	74.00	-26.01	H	peak
2418.000	53.27	-5.89	47.38	74.00	-26.62	H	peak
2518.000	54.87	-3.73	51.14	74.00	-22.86	H	peak
4310.000	39.41	7.59	47.00	74.00	-27.00	H	peak
4920.000	46.07	7.24	53.31	74.00	-20.69	H	peak
4920.000	37.29	7.24	44.53	54.00	-9.47	H	AVG
5535.000	38.72	8.98	47.70	74.00	-26.30	H	peak

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.*

Operation Mode:	TX / IEEE 802.11n 20 MHz Channel mode / CH Low	**Test Date:**	January 7, 2013
Temperature:	26°C	**Tested by:**	Francis Lee
Humidity:	55 % RH	**Polarity:**	Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
2288.000	56.37	-1.52	54.85	74.00	-19.15	V	peak
2288.000	50.37	-1.52	48.85	54.00	-5.15	V	AVG
2356.000	58.10	-1.62	56.48	74.00	-17.52	V	peak
2356.000	50.18	-1.62	48.56	54.00	-5.44	V	AVG
2468.000	59.90	-1.17	58.73	74.00	-15.27	V	peak
2468.000	51.61	-1.17	50.44	54.00	-3.56	V	AVG
3590.000	41.68	2.86	44.54	74.00	-29.46	V	peak
4830.000	49.81	2.79	52.60	74.00	-21.40	V	peak
4830.000	37.52	2.79	40.31	54.00	-13.69	V	AVG
5465.000	39.48	6.29	45.77	74.00	-28.23	V	peak
2288.000	53.67	-6.02	47.65	74.00	-26.35	H	peak
2356.000	54.86	-6.35	48.51	74.00	-25.49	H	peak
2470.000	52.15	-4.57	47.58	74.00	-26.42	H	peak
4255.000	40.54	6.90	47.44	74.00	-26.56	H	peak
4825.000	44.66	5.88	50.54	74.00	-23.46	H	peak
5445.000	38.79	8.60	47.39	74.00	-26.61	H	peak

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.*

Operation Mode:	TX / IEEE 802.11n 20 MHz Channel mode / CH Mid	**Test Date:**	January 7, 2013
Temperature:	26°C	**Tested by:**	Francis Lee
Humidity:	56 % RH	**Polarity:**	Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
2288.000	55.95	-1.52	54.43	74.00	-19.57	V	peak
2288.000	51.57	-1.52	50.05	54.00	-3.95	V	AVG
2392.000	58.73	-1.66	57.07	74.00	-16.93	V	peak
2392.000	50.86	-1.66	49.20	54.00	-4.80	V	AVG
2482.000	60.55	-1.06	59.49	74.00	-14.51	V	peak
2482.000	51.65	-1.06	50.59	54.00	-3.41	V	AVG
2640.000	52.96	-1.89	51.07	74.00	-22.93	V	peak
3865.000	40.87	2.24	43.11	74.00	-30.89	V	peak
4885.000	48.11	4.03	52.14	74.00	-21.86	V	peak
4885.000	36.93	4.03	40.96	54.00	-13.04	V	AVG
5455.000	38.13	6.30	44.43	74.00	-29.57	V	peak
2288.000	54.20	-6.02	48.18	74.00	-25.82	H	peak
2392.000	53.29	-6.35	46.94	74.00	-27.06	H	peak
2488.000	52.11	-4.11	48.00	74.00	-26.00	H	peak
4250.000	41.93	6.82	48.75	74.00	-25.25	H	peak
4870.000	44.37	6.64	51.01	74.00	-22.99	H	peak
5475.000	39.40	8.74	48.14	74.00	-25.86	H	peak

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.*

Operation Mode:	TX / IEEE 802.11n 20 MHz Channel mode / CH High	**Test Date:**	January 7, 2013
Temperature:	26°C	**Tested by:**	Francis Lee
Humidity:	56 % RH	**Polarity:**	Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
2288.000	55.76	-1.52	54.24	74.00	-19.76	V	peak
2288.000	51.85	-1.52	50.33	54.00	-3.67	V	AVG
2416.000	58.49	-1.55	56.94	74.00	-17.06	V	peak
2416.000	50.24	-1.55	48.69	54.00	-5.31	V	AVG
2506.000	57.63	-1.00	56.63	74.00	-17.37	V	peak
2506.000	51.85	-1.00	50.85	54.00	-3.15	V	AVG
3555.000	40.59	2.62	43.21	74.00	-30.79	V	peak
4925.000	48.92	4.61	53.53	74.00	-20.47	V	peak
4925.000	37.05	4.61	41.66	54.00	-12.34	V	AVG
5400.000	39.30	6.39	45.69	74.00	-28.31	V	peak
2288.000	53.70	-6.02	47.68	74.00	-26.32	H	peak
2410.000	53.08	-6.10	46.98	74.00	-27.02	H	peak
2506.000	52.55	-3.78	48.77	74.00	-25.23	H	peak
3850.000	39.95	5.16	45.11	74.00	-28.89	H	peak
4920.000	44.13	7.24	51.37	74.00	-22.63	H	peak
5625.000	39.13	8.92	48.05	74.00	-25.95	H	peak

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.*

Operation Mode:	TX / IEEE 802.11n 40 MHz Channel mode / CH Low	**Test Date:**	January 7, 2013
Temperature:	26°C	**Tested by:**	Francis Lee
Humidity:	56 % RH	**Polarity:**	Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1990.000	49.11	-1.46	47.65	74.00	-26.35	V	peak
2288.000	56.85	-1.52	55.33	74.00	-18.67	V	peak
2288.000	48.32	-1.52	46.80	54.00	-7.20	V	AVG
2640.000	52.99	-1.89	51.10	74.00	-22.90	V	peak
3815.000	40.65	3.36	44.01	74.00	-29.99	V	peak
4845.000	46.03	3.13	49.16	74.00	-24.84	V	peak
5465.000	38.99	6.29	45.28	74.00	-28.72	V	peak
2160.000	49.94	-3.65	46.29	74.00	-27.71	H	peak
2288.000	53.68	-6.02	47.66	74.00	-26.34	H	peak
2542.000	49.26	-3.62	45.64	74.00	-28.36	H	peak
4305.000	39.51	7.62	47.13	74.00	-26.87	H	peak
4850.000	40.24	6.30	46.54	74.00	-27.46	H	peak
5570.000	38.06	9.10	47.16	74.00	-26.84	H	peak

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.*

Operation Mode:	TX / IEEE 802.11n 40 MHz Channel mode / CH Mid	**Test Date:**	January 7, 2013
Temperature:	26°C	**Tested by:**	Francis Lee
Humidity:	56 % RH	**Polarity:**	Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1994.000	49.55	-1.39	48.16	74.00	-25.84	V	peak
2288.000	56.12	-1.52	54.60	74.00	-19.40	V	peak
2288.000	48.26	-1.52	46.74	54.00	-7.26	V	AVG
2640.000	52.40	-1.89	50.51	74.00	-23.49	V	peak
3825.000	40.31	3.13	43.44	74.00	-30.56	V	peak
4900.000	42.20	4.37	46.57	74.00	-27.43	V	peak
5485.000	38.83	6.25	45.08	74.00	-28.92	V	peak
2190.000	49.70	-3.58	46.12	74.00	-27.88	H	peak
2288.000	54.09	-6.02	48.07	74.00	-25.93	H	peak
2882.000	49.19	-1.86	47.33	74.00	-26.67	H	peak
3970.000	40.21	4.96	45.17	74.00	-28.83	H	peak
4330.000	40.36	7.44	47.80	74.00	-26.20	H	peak
5010.000	39.31	7.46	46.77	74.00	-27.23	H	peak

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.*

Operation Mode:	TX / IEEE 802.11n 40 MHz Channel mode / CH High	**Test Date:**	January 7, 2013
Temperature:	26°C	**Tested by:**	Francis Lee
Humidity:	56 % RH	**Polarity:**	Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1978.000	49.27	-1.65	47.62	74.00	-26.38	V	peak
2288.000	57.15	-1.52	55.63	74.00	-18.37	V	peak
2640.000	52.87	-1.89	50.98	74.00	-23.02	V	peak
3555.000	41.88	2.62	44.50	74.00	-29.50	V	peak
4905.000	44.48	4.42	48.90	74.00	-25.10	V	peak
5455.000	40.74	6.30	47.04	74.00	-26.96	V	peak
2142.000	49.52	-3.69	45.83	74.00	-28.17	H	peak
2288.000	54.04	-6.02	48.02	74.00	-25.98	H	peak
2672.000	48.50	-3.37	45.13	74.00	-28.87	H	peak
4315.000	39.27	7.55	46.82	74.00	-27.18	H	peak
4905.000	40.28	7.17	47.45	74.00	-26.55	H	peak
5610.000	38.07	9.09	47.16	74.00	-26.84	H	peak

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.*

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 II for the actual connections between EUT and support equipment.

TEST PROCEDURE

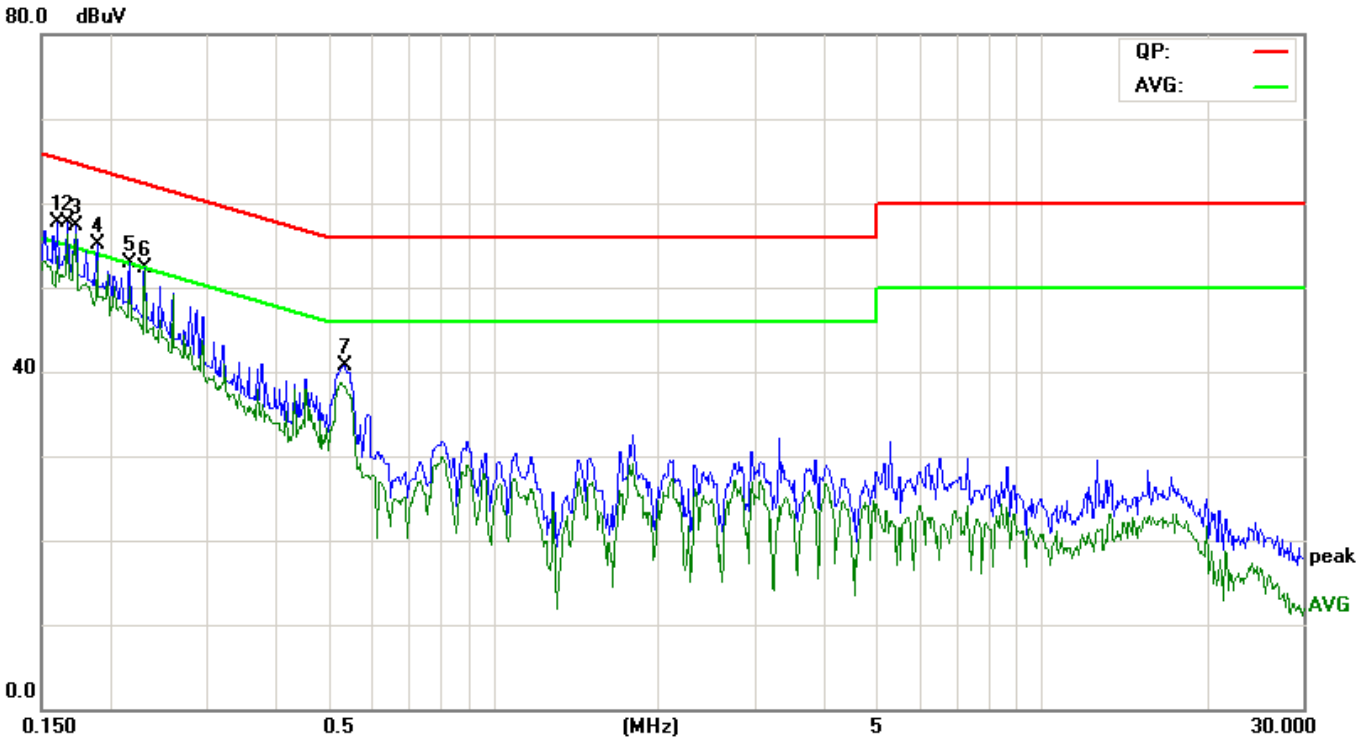
1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

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

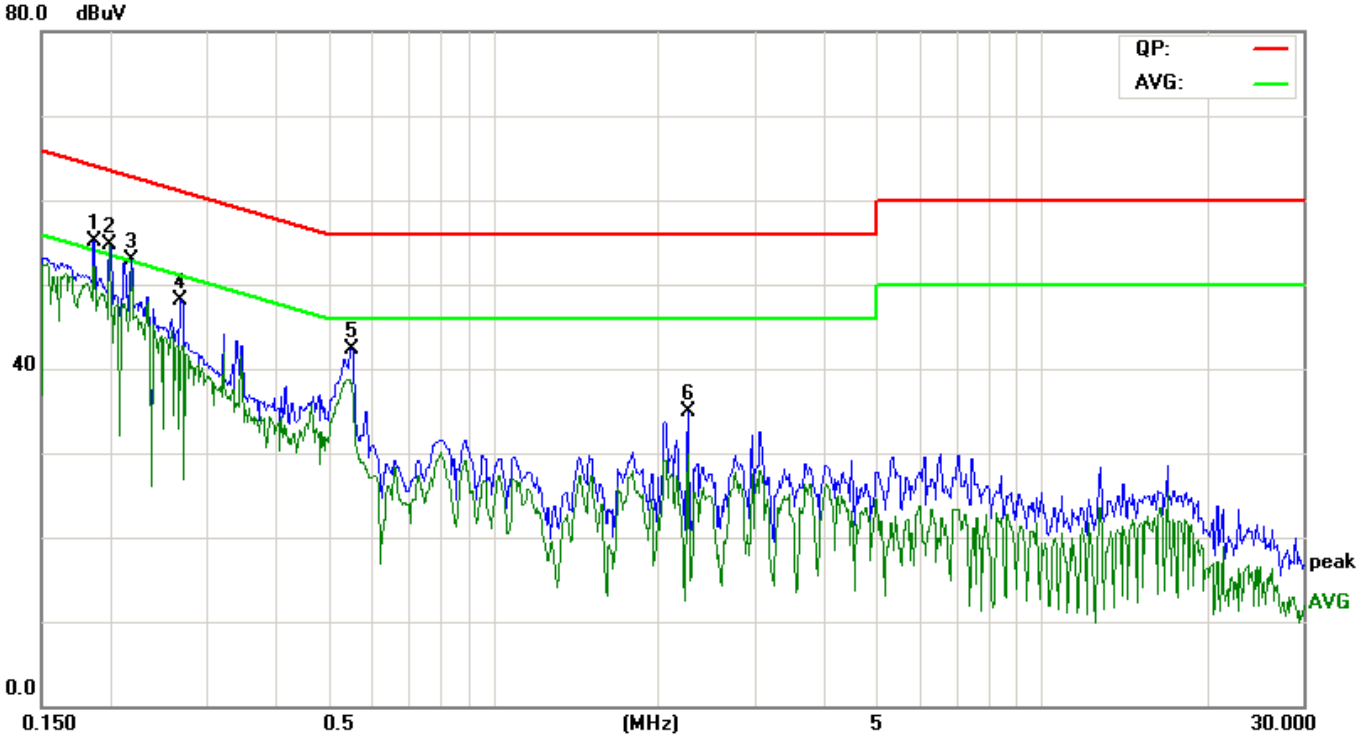
Test Mode	Charging	**6dB Bandwidth**	9 kHz
Environmental Conditions	25°C, 57% RH	**Test Date:**	January 10, 2013
Tested By	Clark Su	**Line**	L1



NO.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	(Pass/Fail)
1	0.1601	40.01	24.86	9.68	49.69	34.54	65.45	55.46	-15.76	-20.92	Pass
2*	0.1668	41.49	28.43	9.68	51.17	38.11	65.11	55.12	-13.94	-17.01	Pass
3	0.1731	39.31	22.93	9.68	48.99	32.61	64.81	54.81	-15.82	-22.20	Pass
4	0.1888	37.02	24.11	9.66	46.68	33.77	64.08	54.09	-17.40	-20.32	Pass
5	0.2168	35.38	20.62	9.66	45.04	30.28	62.94	52.94	-17.90	-22.66	Pass
6	0.2308	34.51	20.67	9.67	44.18	30.34	62.42	52.42	-18.24	-22.08	Pass
7	0.5360	29.25	20.54	9.70	38.95	30.24	56.00	46.00	-17.05	-15.76	Pass

REMARKS: L1 = Line One (Live Line)

Test Mode	Charging	**6dB Bandwidth**	9 kHz
Environmental Conditions	25°C, 57% RH	**Test Date:**	January 10, 2013
Tested By	Clark Su	**Line**	L2



NO.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	(Pass/Fail)
1	0.1867	36.49	23.48	9.65	46.14	33.13	64.18	54.18	-18.04	-21.05	Pass
2*	0.1997	36.90	21.27	9.65	46.55	30.92	63.62	53.62	-17.07	-22.70	Pass
3	0.2182	35.52	21.76	9.65	45.17	31.41	62.88	52.89	-17.71	-21.48	Pass
4	0.2686	32.15	16.61	9.66	41.81	26.27	61.16	51.16	-19.35	-24.89	Pass
5	0.5495	27.61	18.86	9.68	37.29	28.54	56.00	46.00	-18.71	-17.46	Pass
6	2.2550	22.06	18.21	9.77	31.83	27.98	56.00	46.00	-24.17	-18.02	Pass

REMARKS: L2 = Line Two (Neutral Line)

8. 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	N300 Wireless Router
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	IEEE 802.11b mode: 18.32 dBm (0.0679W) IEEE 802.11g mode: 21.11 dBm (0.1291W) IEEE 802.11n 20 MHz Channel mode: 23.33 dBm (0.2151W) IEEE 802.11n 40 MHz Channel mode: 22.90 dBm (0.1950W)
Antenna gain (Max)	5.20dBi (including cable loss) (Numeric gain: 3.31)
Evaluation applied	☒ MPE Evaluation ☐ SAR Evaluation ☐ N/A

Remark:

1. *The maximum output power is 23.33dBm (0.2151W) at 2462MHz (with 3.31numeric antenna gain.)*
2. *For mobile or fixed location transmitters, no SAR consideration applied. The maximum power density is 1.0 mW/cm^2 even if the calculation indicates that the power density would be larger.*

TEST RESULTS

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

EUT output power = 215.1mW

Numeric Antenna gain = 3.31

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

Yields

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

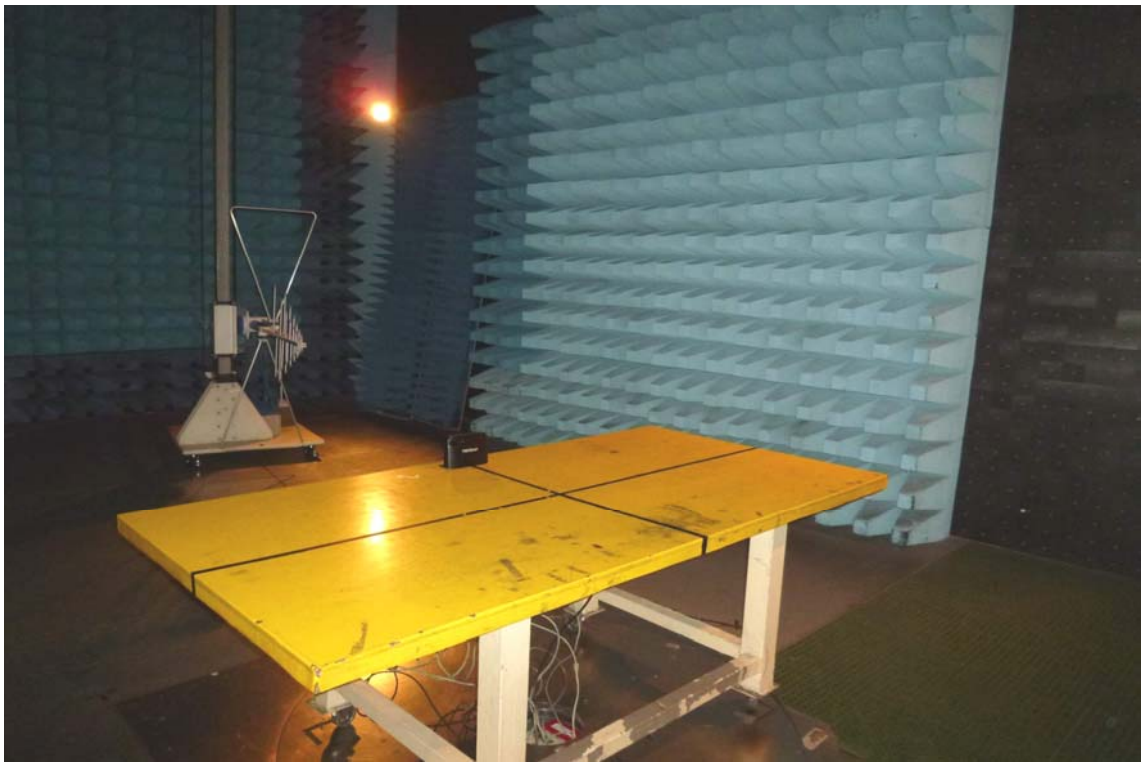
Where P = Power in mW
G = Numeric antenna gain
S = Power density in mW / cm^2

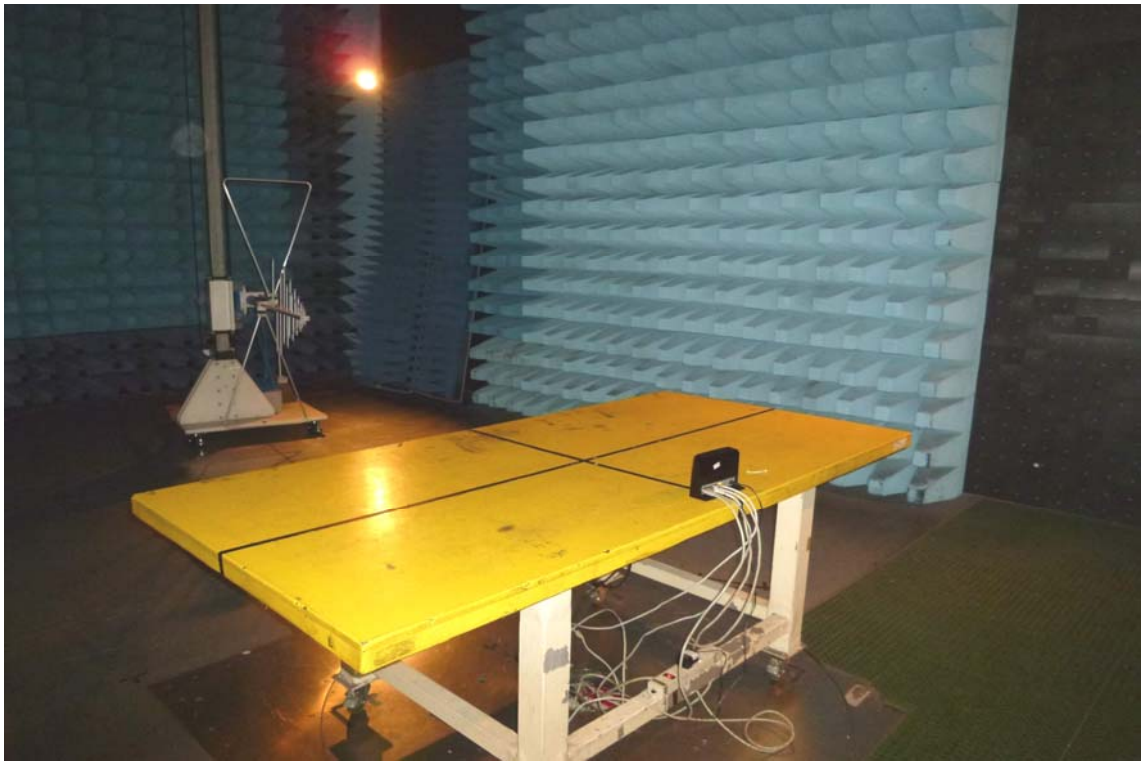
→ Power density = 0.142 mW / cm^2

(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.)

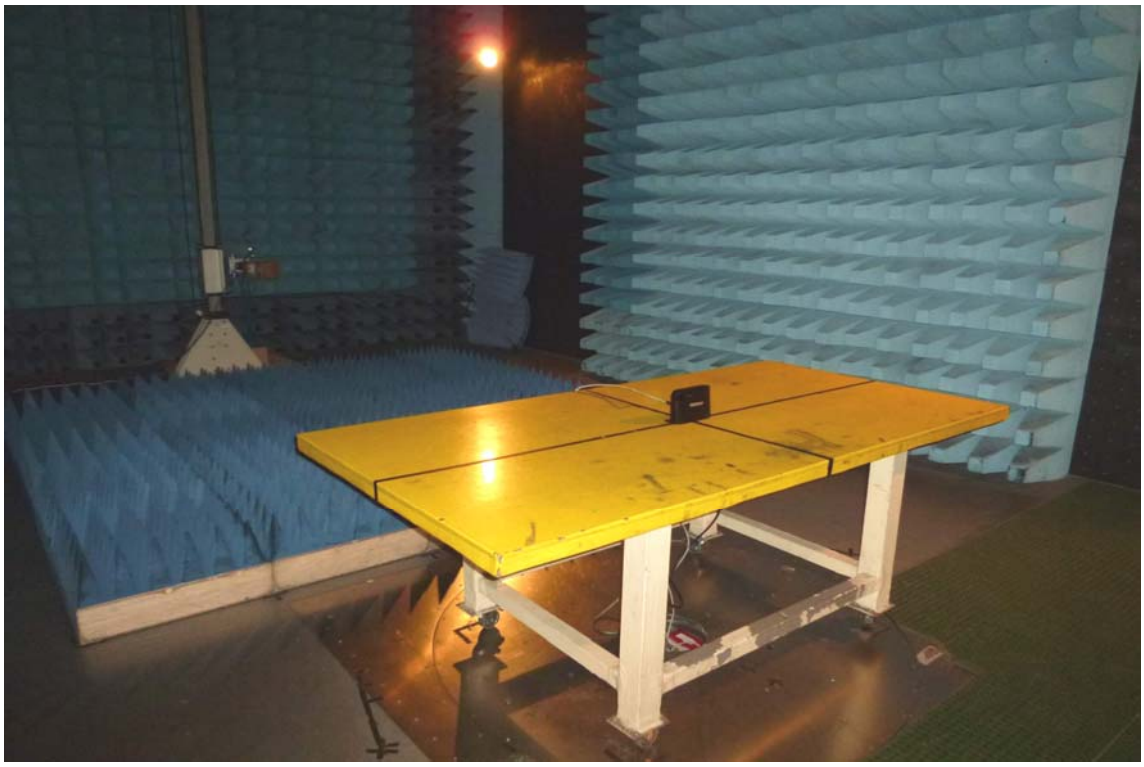
9. APPENDIX II
PHOTOGRAPHS OF TEST SETUP

Radiated Emission Set up Photos
Below 1GHz

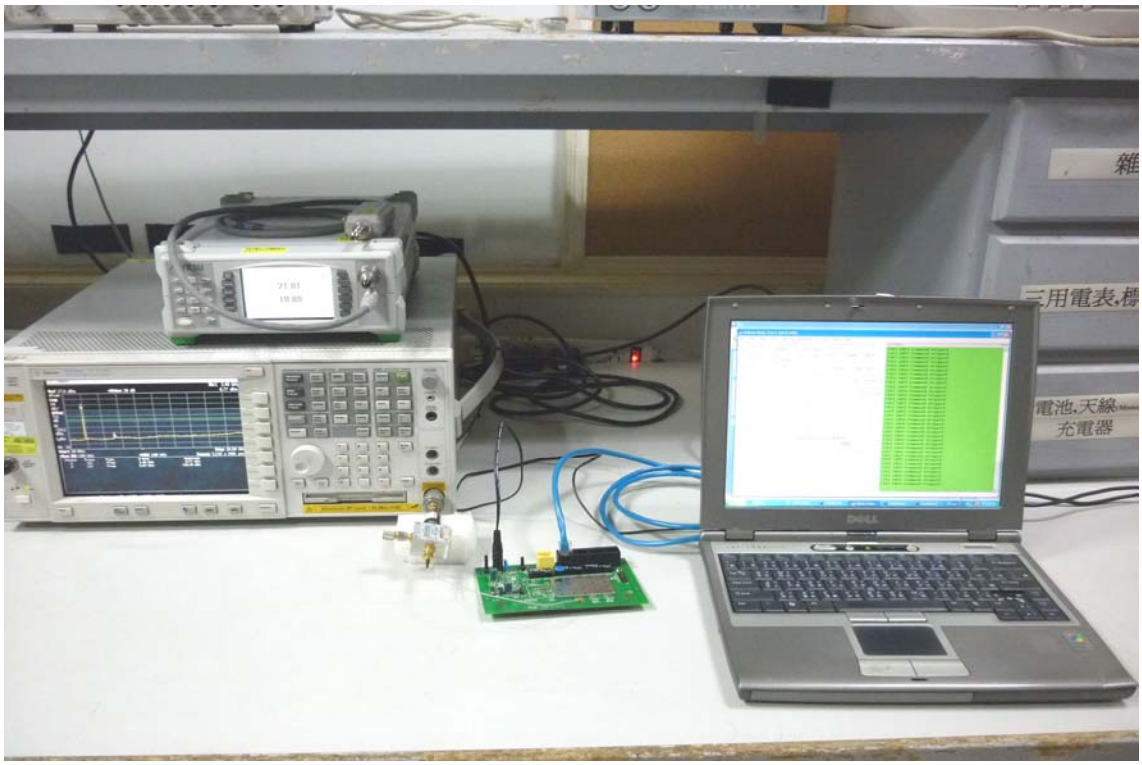




Above 1GHz



Conducted Emission Setup Photos



Powerline Conducted Emissions Setup Photos