FCC 47 CFR PART 15 SUBPART C AND ANSI C63.4 : 2003

TEST REPORT

For

RANGEBOOSTER N 650 ACCESS POINT

Model : DAP-1353

Trade Name : D-Link

Issued for

D-Link Corporation

No. 289, Sinhu 3rd Rd., Neihu District, Taipei City 114,
Taiwan, R.O.C.

Issued by

Compliance Certification Services Inc.
Tainan Laboratory
No. 8, Jiu Cheng Ling, Jiaokeng Village, Sinhua Township, Tainan Hsien 712, Taiwan R.O.C.
TEL: 886-6-580-2201
FAX: 886-6-580-2202

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	06/09/2009	Initial Issue	All Page 213	Jeter Wu

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1. TEST REPORT CERTIFICATION

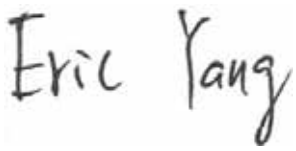
Applicant	：	D-Link Corporation
Address	：	No. 289, Sinhu 3rd Rd., Neihu District, Taipei City 114, Taiwan, R.O.C.
Equipment Under Test	：	RANGEBOOSTER N 650 ACCESS POINT
Model	：	DAP-1353
Trade Name	：	D-Link
Tested Date	：	March 07 ~ June 05, 2009

APPLICABLE STANDARD	
STANDARD	**TEST RESULT**
FCC Part 15 Subpart C AND ANSI C63.4:2003	No non-compliance noted

Approved by:

Jeter Wu
Section Manager

Reviewed by:



Eric Yang
Senior Engineer

WE HEREBY CERTIFY THAT: The measurements shown in the attachment were made in accordance with the procedures indicated, and the energy emitted by the equipment was found to be within the limits applicable. We assume full responsibility for the accuracy and completeness of these measurements and vouch for the qualifications of all persons taking them.

2. EUT DESCRIPTION

2.1 DESCRIPTION OF EUT & POWER

Product Name	RANGEBOOSTER N 650 ACCESS POINT
Model Number	DAP-1353
Frequency Range	IEEE 802.11b/g, 802.11n HT20 : 2412MHz ~ 2462MHz IEEE 802.11n HT40 : 2422MHz ~ 2452MHz
Transmit Power	IEEE 802.11b : 25.81dBm IEEE 802.11g : 25.82dBm IEEE 802.11n HT20 : 25.84dBm IEEE 802.11n HT40 : 25.74dBm
Channel Spacing	IEEE 802.11b/g, 802.11n HT20/HT40 : 5MHz
Channel Number	IEEE 802.11b/g, 802.11n HT20 : 11 Channels IEEE 802.11n HT40 :7 Channels
Transmit Data Rate	IEEE 802.11b : 11, 5.5, 2, 1 Mbps IEEE 802.11g : 54, 48, 36, 24, 18, 12, 9, 6 Mbps IEEE 802.11n HT20 : 144.44, 130, 117, 115.556, 104, 86.667, 78, 72.2, 65, 58.5, 57.8, 57.778, 52, 43.333, 43.3, 39, 28.9, 28.889, 26, 21.7, 19.5, 14.444, 14.4, 13, 7.2, 6.5 Mbps IEEE 802.11n HT40 : 300, 270, 243, 240, 216, 180, 162, 150, 135, 121.5, 120, 108, 90, 81, 60, 54, 45, 40.5, 30, 27, 15, 13.5Mbps
Type of Modulation	IEEE 802.11b : DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g : OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20/40 : OFDM (64QAM, 16QAM, QPSK, BPSK)
Frequency Selection	by software / firmware
Antenna Type	Dipole Antenna × 3 ,Antenna Gain 3 dBi
Power Source	5.0VDC (From Power Adapter)
I/O Port	Ethernet LAN port × 1、Power port × 1

Power Adapter :

No.	Manufacturer	Model No.	Power Input	Power Output
1	D-Link	CF1505-B	100-120VAC, 50/60Hz, 0.4A	5VDC, 2.5A
2	D-Link	CF1505-B	100-240VAC, 50/60Hz, 0.4A	5VDC, 2.5A
3	D-Link	AMS3-0502500SU	100-120VAC, 60Hz, 0.5A	5VDC, 2.5A
4	D-Link	AMS3-0502500FU	100-240VAC, 50/60Hz, 0.5A	5VDC, 2.5A

Remark:

1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.

2. This submittal(s) (test report) is intended for FCC ID: KA2AP1353B1 filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.

3. For more details, please refer to the User's manual of the EUT.

3. DESCRIPTION OF TEST MODES

The EUT is an 802.11n MIMO transceiver in Access Point form factor. It has three transmitter chains and three receive chains (3 × 3 configurations). The 3 × 3 configuration is implemented with three outside chains (Chain 0, 1, 2).

The RF chipset is manufactured by Atheros Communications Inc.

IEEE 802.11 b ,802.11g ,802.11n HT20 mode

The EUT had been tested under operating condition.

There are three channels have been tested as following :

Channel	Frequency (MHz)
Low	2412
Middle	2437
High	2462

IEEE 802.11b mode : 1Mbps data rate (worst case) were chosen for full testing.
IEEE 802.11g mode : 6Mbps data rate (worst case) were chosen for full testing.
IEEE 802.11n HT20 mode : 6.5Mbps data rate (worst case) were chosen for full testing.

IEEE 802.11n HT40 mode

The EUT had been tested under operating condition.

There are three channels have been tested as following :

Channel	Frequency (MHz)
Low	2422
Middle	2437
High	2452

IEEE 802.11n HT40 mode : 13.5Mbps data rate (worst case) were chosen for full testing.

4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4:2003 and FCC CRF 47 15.207, 15.209 and 15.247.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

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

No. 8, Jiu Cheng Ling, Jiaokeng Village,Sinhua Township, Tainan Hsien 712, Taiwan R.O.C.

The sites are constructed in conformance with the requirements of 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 preselectors 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 LABORATORY ACCREDITATIONS LISTINGS

The test facilities used to perform radiated and conducted emissions tests are accredited by Taiwan Accreditation Foundation for the specific scope of accreditation under Lab Code: 1109 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. In addition, the test facilities are listed with Industry Canada, Certification and Engineering Bureau, IC 2324H-1 for OATS -6.

5.4 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	455173 TW-1037
Japan	VCCI	3/10 meter Open Area Test Sites to perform conducted/radiated measurements	C-2882 R-2635
Taiwan	TAF	CISPR 11, FCC METHOD-47 CFR Part 18, EN 55011, EN 60601-1-2, CISPR 22, CNS 13438, EN 55022, EN 55024, AS/NZS CISPR 22 CISPR 14, EN 55014-1, EN 55014-2, CNS 13783-1, CISPR 22, CNS 13439, EN 55013, FCC Method-47 CFR Part 15 Subpart B, IC ICES-003, VCCI V-3 & V-4 FCC Method-47 CFR Part 15 Subpart C and ANSI C63.4, LP 0002 EN / IEC 61000-4-2 / -3 / -4 / -5 / -6 / -8 / -11 EN 61000-3-2, EN 61000-3-3 EN 61000-6-3, EN 61000-6-1, AS/NZS 4251.1, EN 61000-6-4, EN 61000-6-2, AS/NZS 4251.2, EN 61204-3, EN 50130-4, EN 62040-2, EN 50371, EN 50385, AS/NZS 4268, ETSI EN 300 386 ETSI EN 300 328, ETSI EN 301 489-1/-3/-9/-17 ETSI EN 301 893, ETSI EN 300 220-2/-1 ETSI EN 300 440-2/-1 ETSI EN 301 357-2/-1 RSS-310, RSS-210 Issue 7, RSS-Gen Issue 2	Testing Laboratory 1109
Taiwan	BSMI	CNS 13438, CNS 13783-1, CNS13439	SL2-IN-E-0039 SL2-R1/R2-0039 SL2-A1-E-0039
Canada	Industry Canada	RSS210, Issue 7	IC 2324H-1

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

6. CALIBRATION AND UNCERTAINTY

6.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

6.2 MEASUREMENT UNCERTAINTY

The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4.

PARAMETER	UNCERTAINTY
Radiated Emission, 30 to 1000 MHz	+/- 3.2 dB
Radiated Emission, 1 to 26.5GHz	+/- 3.2 dB
Power Line Conducted Emission	+/- 2.1 dB

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

7. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

No.	Product	Manufacturer	Model No.	Serial No.	FCC ID
1	Notebook PC	DELL	Latitude D610	CN-0C4708-48643-625-5565	E2K24BNHM
2	Notebook PC	HP	nx6130	CNU543274R	CNTWM3B2200BGA
3	DIY PC	---	---	---	---

SETUP DIAGRAM FOR TESTS

EUT & peripherals setup diagram is shown in appendix setup photos.

EUT OPERATING CONDITION

RF

1. Set up all computers like the setup diagram.
2. The “Atheros Radio Test <ART> Devilib Revision 0.7 BUILD #16 ART_11n” software was used for testing.
3. telnet 192.168.0.50
   Account Number:admin / No Password
   →alpha sdd21234
   →set art_start
   TX Mode:
   - ⇨ Tx Antenna: ANT_A, [TX99] [Chain masks:0x7(Tx),0x7(Rx)]
   - ⇨ Tx Data Rate:1Mbps long (IEEE 802.11b mode , chain 0/1/2 TX)
     6Mbps (IEEE 802.11g mode , chain 0/1/2 TX)
     6.5Mbps (IEEE 802.11n HT20 mode ,chain 0/1/2 TX)
     13.5Mbps (IEEE 802.11n HT40 mode, chain 0/1/2 TX)
   - ⇨ Power control mode
     Output Power: IEEE 802.11b Channel Low (2412MHz) = 17.5
     IEEE 802.11b Channel Middle (2437MHz) = 18
     IEEE 802.11b Channel High (2462MHz) = 16
     Output Power: IEEE 802.11g Channel Low (2412MHz) = 13
     IEEE 802.11g Channel Middle (2437MHz) = 17
     IEEE 802.11g Channel High (2462MHz) = 11.5
     Output Power: IEEE 802.11n HT20 Channel Low (2412MHz) = 11
     IEEE 802.11n HT20 Channel Middle (2437MHz) = 17
     IEEE 802.11n HT20 Channel High (2462MHz) = 10

Output Power: IEEE 802.11n HT40 Channel Low (2422MHz) = 7.5
IEEE 802.11n HT40 Channel Middle (2437MHz) = 17
IEEE 802.11n HT40 Channel High (2452MHz) = 8

4. All of the function are under run.
5. Start test.

For Normal operating :

1. Set up all computers like the setup diagram.
2. Notebook PC (2) ping to Notebook PC (3).
3. Notebook PC (2) (3) ping 192.168.0.50 –t to EUT.
4. All of the function are under run.
5. Start test.

8. APPLICABLE LIMITS AND TEST RESULTS

8.1 6dB BANDWIDTH

LIMIT

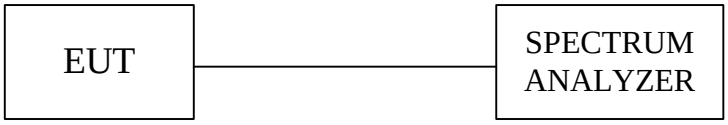
§ 15.207(a) (2) For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
SPECTRUM ANALYZER	AGILENT	E4446A	MY43360132	06/05/2009
SPECTRUM ANALYZER	AGILENT	E4446A	MY46180323	05/26/2010

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP



TEST PROCEDURE

The transmitter output was connected to a spectrum analyzer. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 KHz RBW and 300 KHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

TEST RESULTS

No non-compliance noted

IEEE 802.11b mode (Three TX)

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
Low	2412	10.25	10.08	10.08	500	PASS
Middle	2437	10.17	10.08	10.08	500	PASS
High	2462	10.00	11.00	11.00	500	PASS

IEEE 802.11g mode (Three TX)

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
Low	2412	16.50	16.50	16.50	500	PASS
Middle	2437	16.50	16.50	16.50	500	PASS
High	2462	16.42	16.42	16.50	500	PASS

IEEE 802.11n HT20 mode (Three TX)

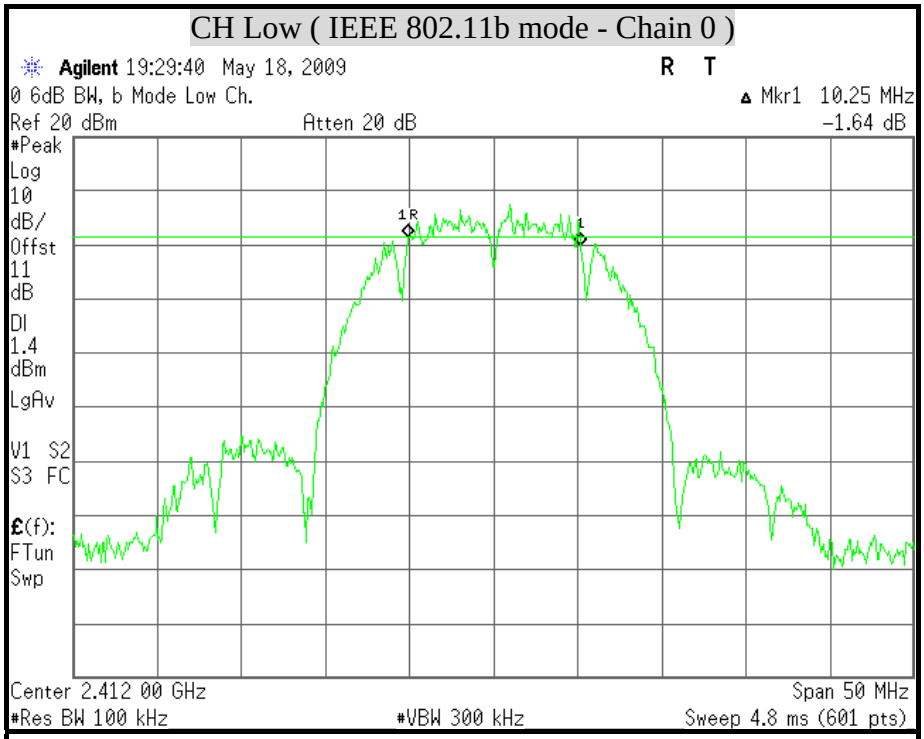
Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
Low	2412	17.25	17.67	17.75	500	PASS
Middle	2437	17.67	17.75	17.83	500	PASS
High	2462	17.83	17.67	17.50	500	PASS

IEEE 802.11n HT40 mode (Three TX)

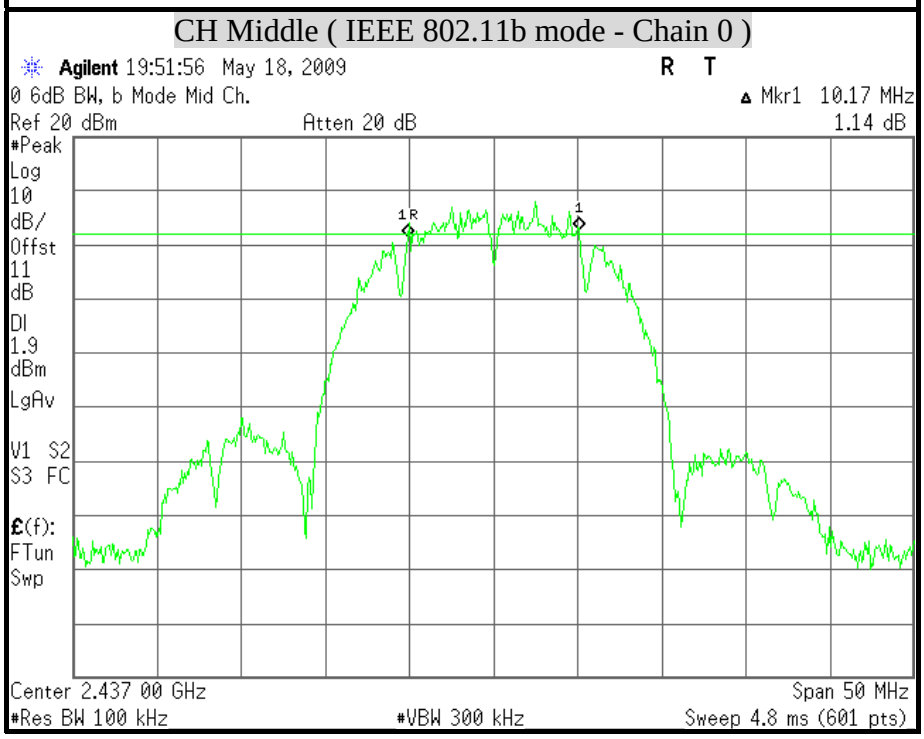
Channel	Channel Frequency (MHz)	6dB Bandwidth (kHz)			Minimum Limit (kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
Low	2422	36.42	36.50	36.50	500	PASS
Middle	2437	36.58	36.50	36.42	500	PASS
High	2452	36.58	36.42	36.50	500	PASS

6dB BANDWIDTH (IEEE 802.11b mode)

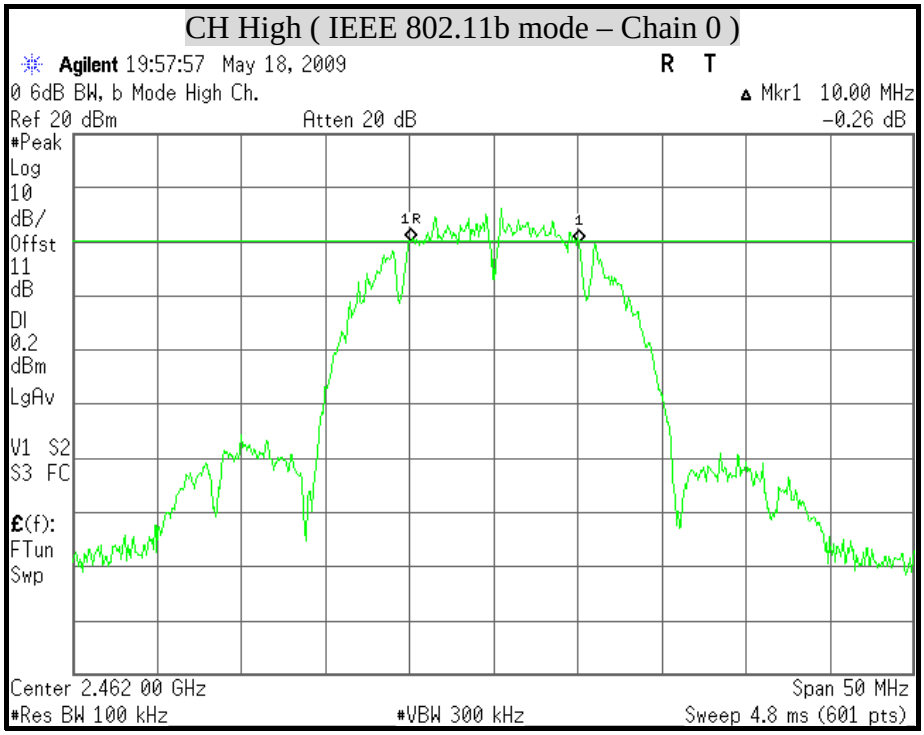
CH Low (IEEE 802.11b mode - Chain 0)



CH Middle (IEEE 802.11b mode - Chain 0)



CH High (IEEE 802.11b mode – Chain 0)



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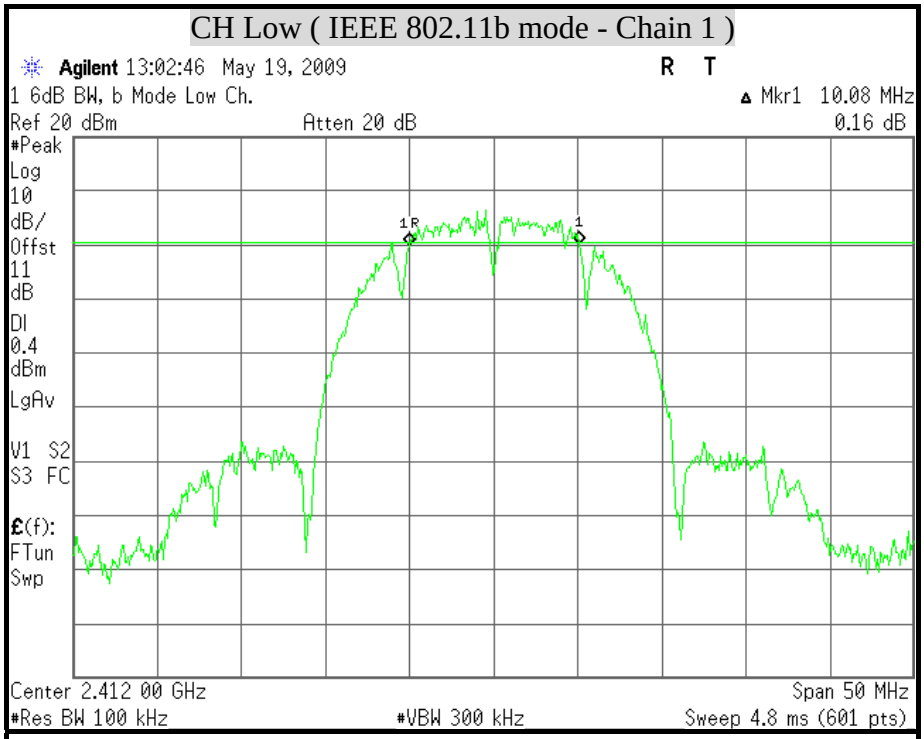

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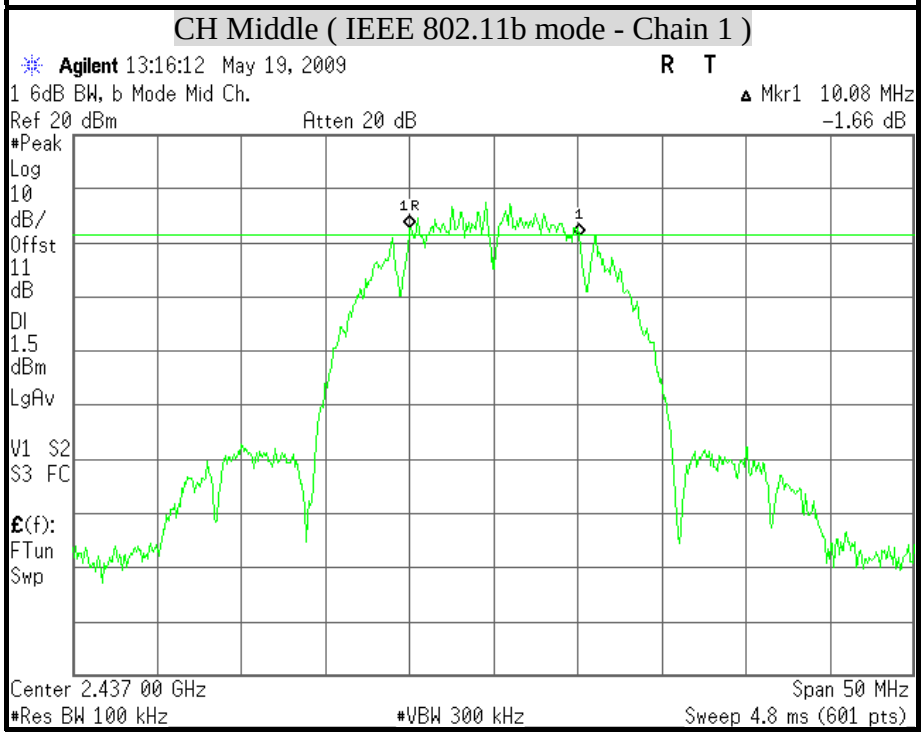

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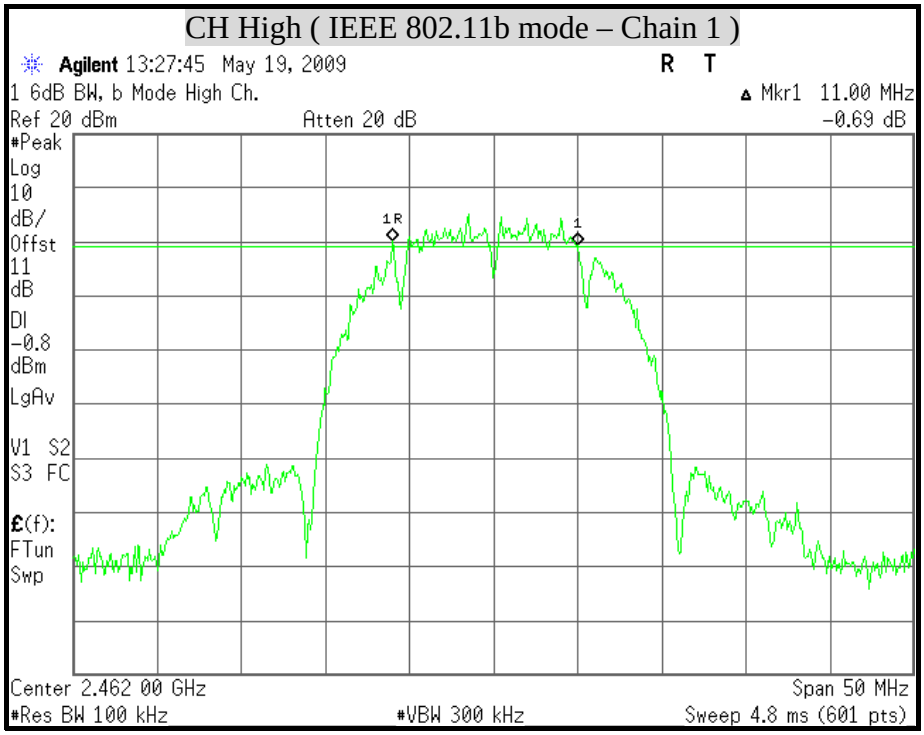

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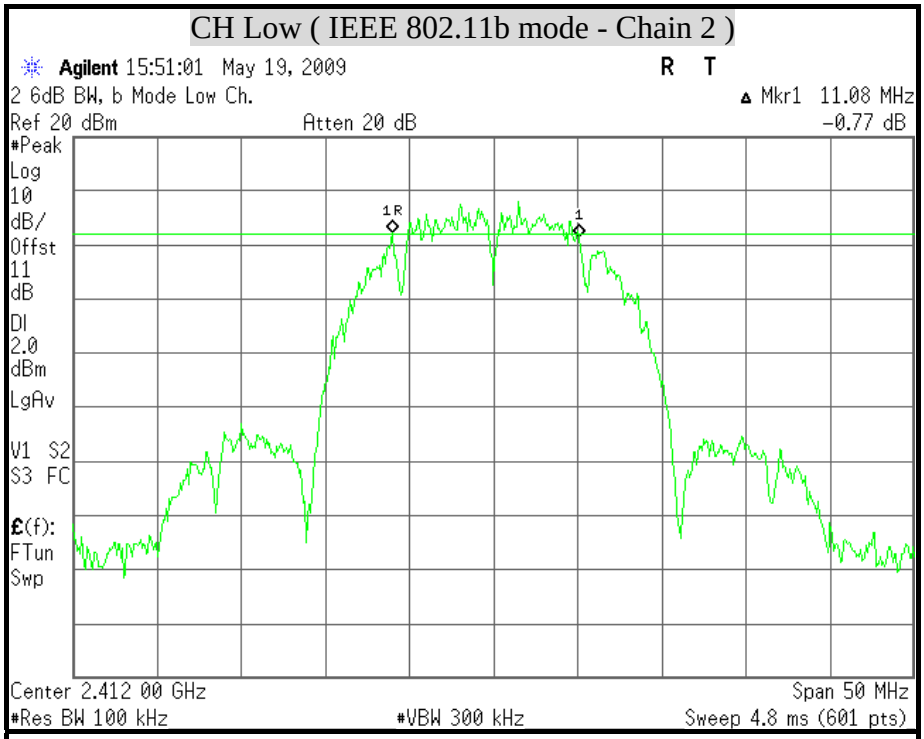

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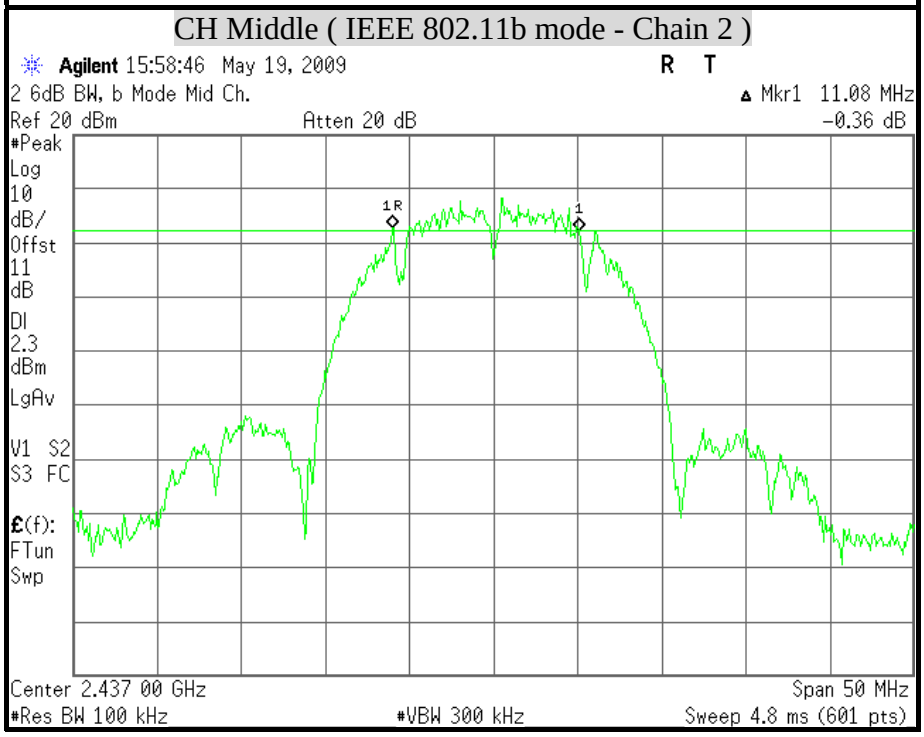

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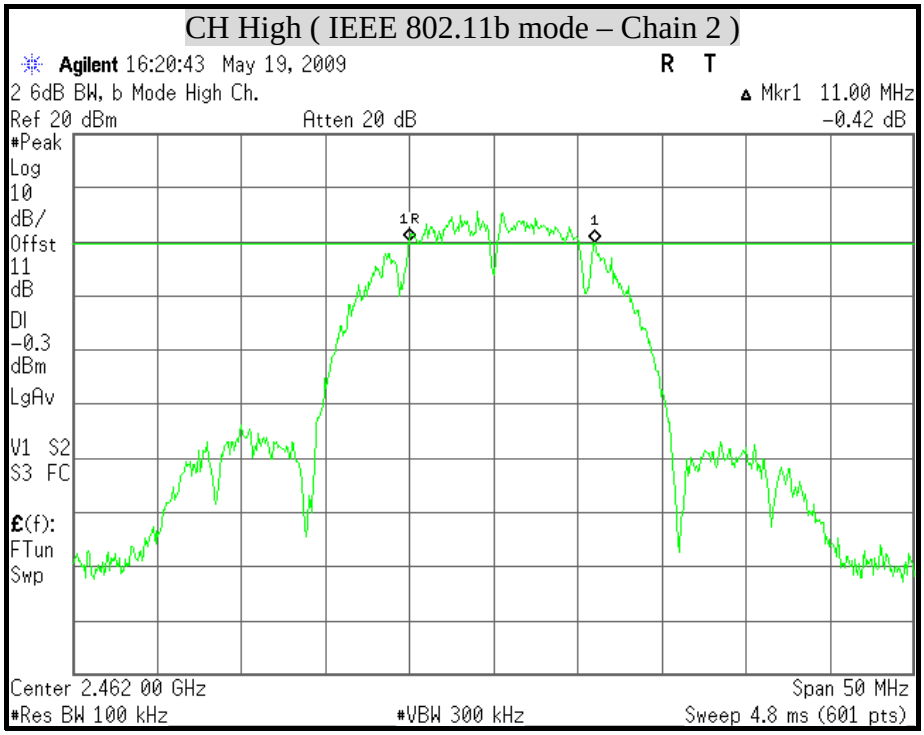

6dB BANDWIDTH (IEEE 802.11g mode)

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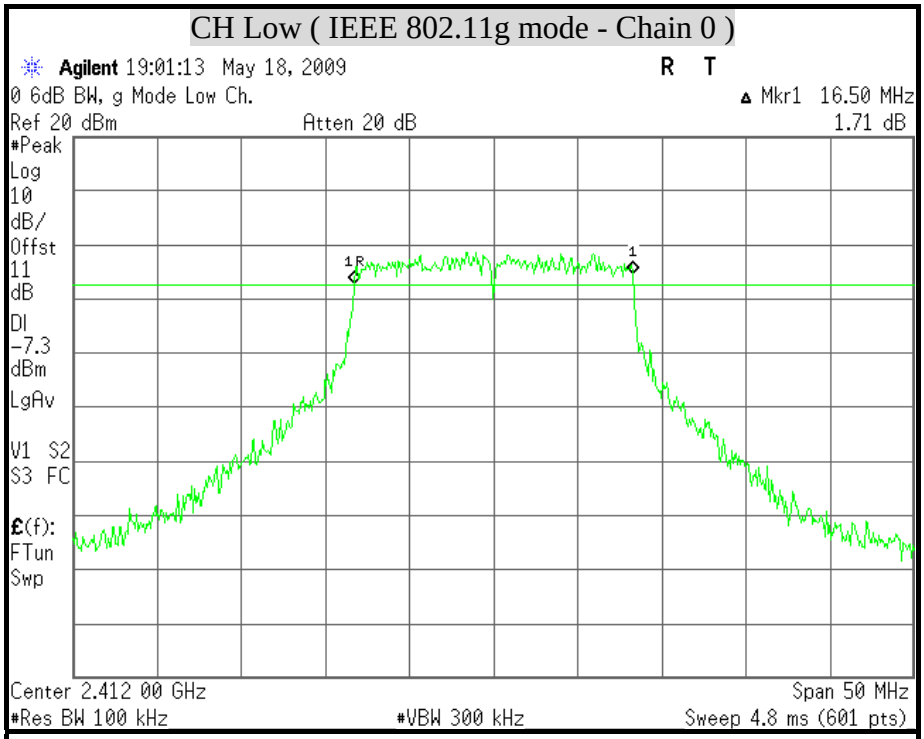

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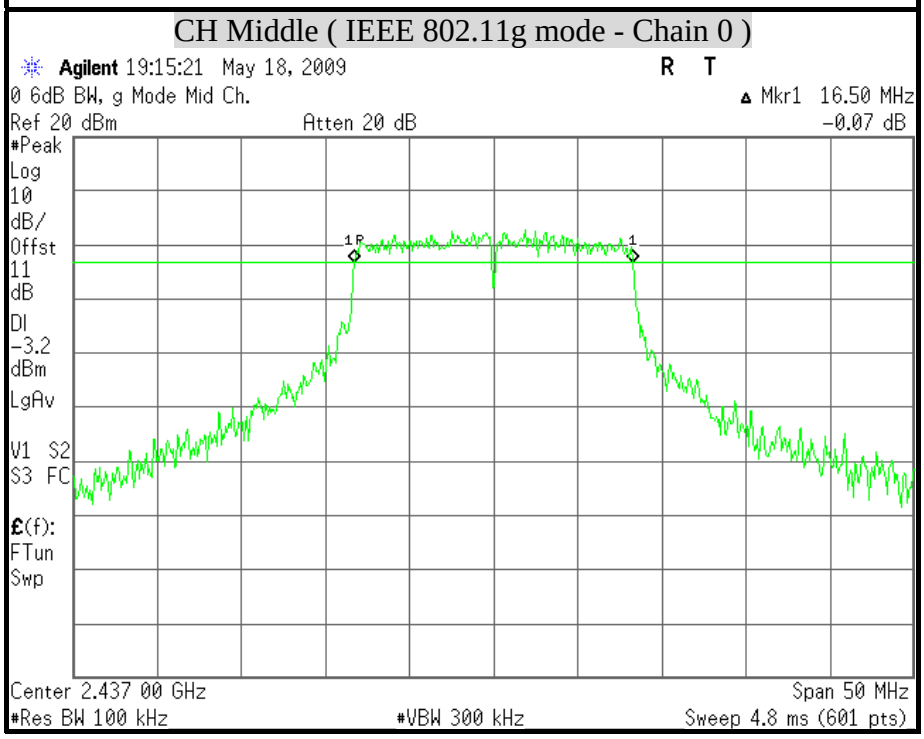

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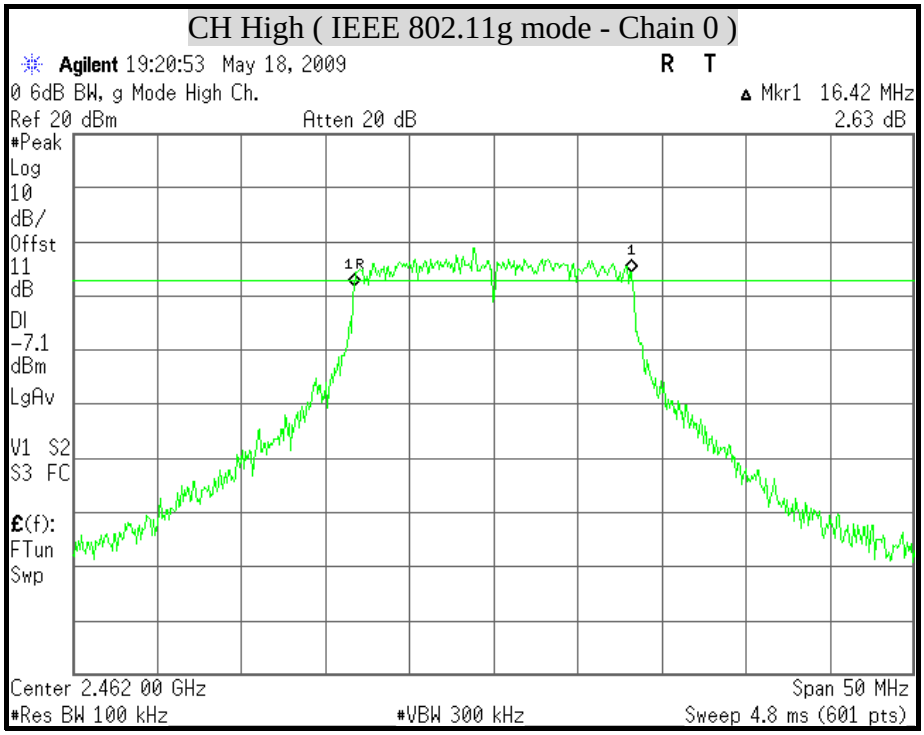

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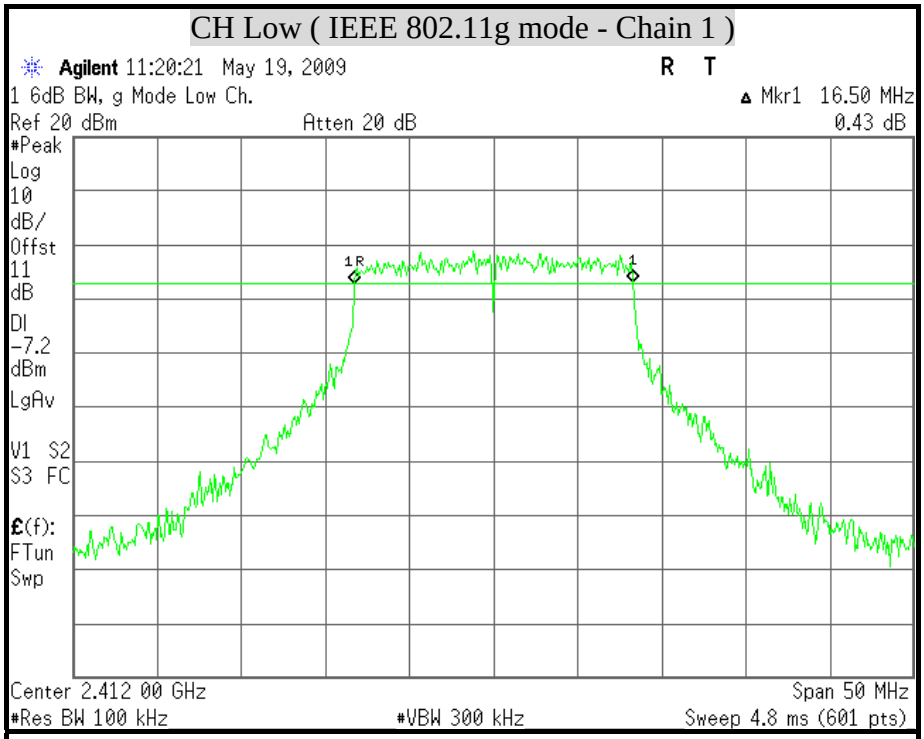

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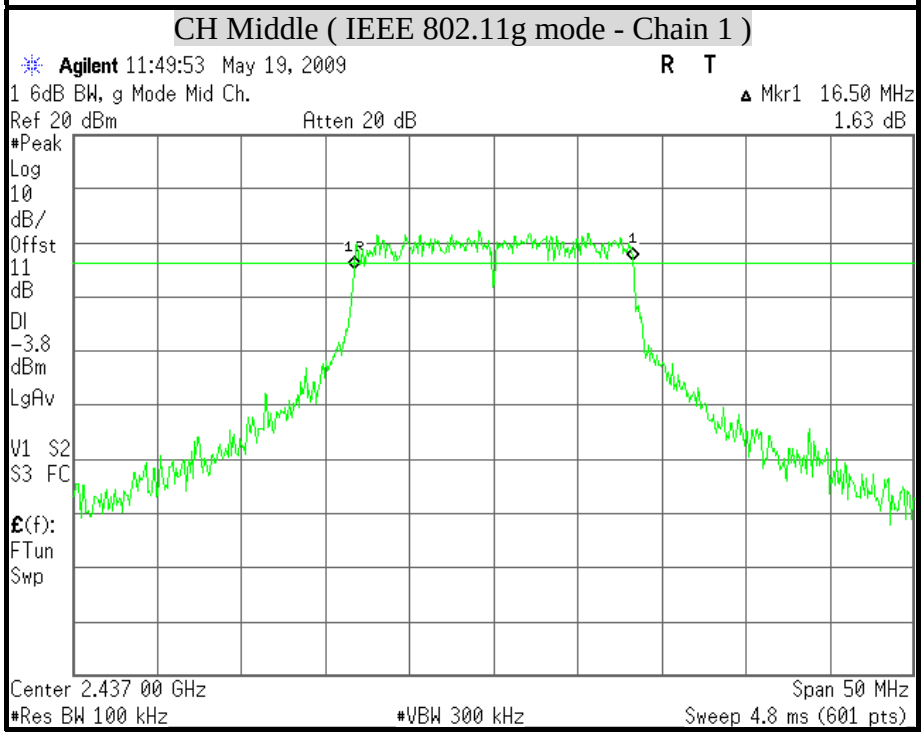

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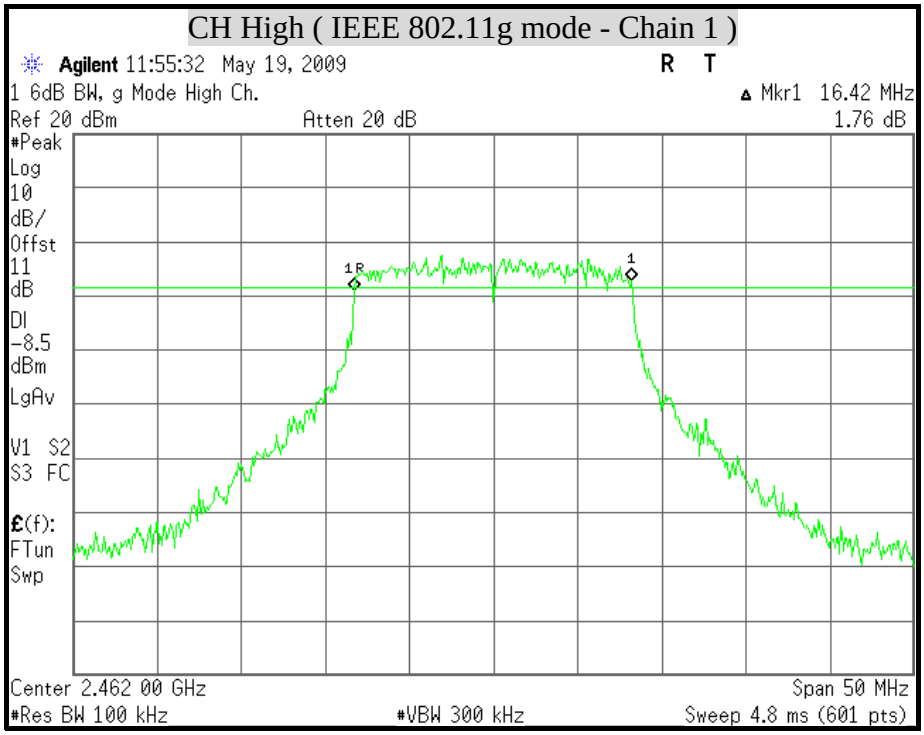

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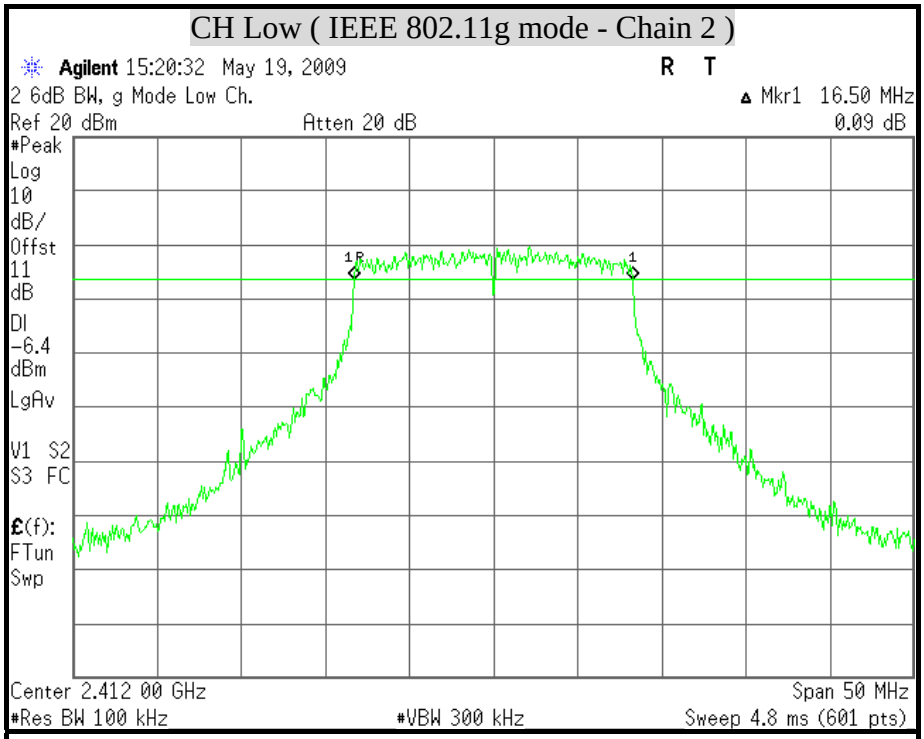

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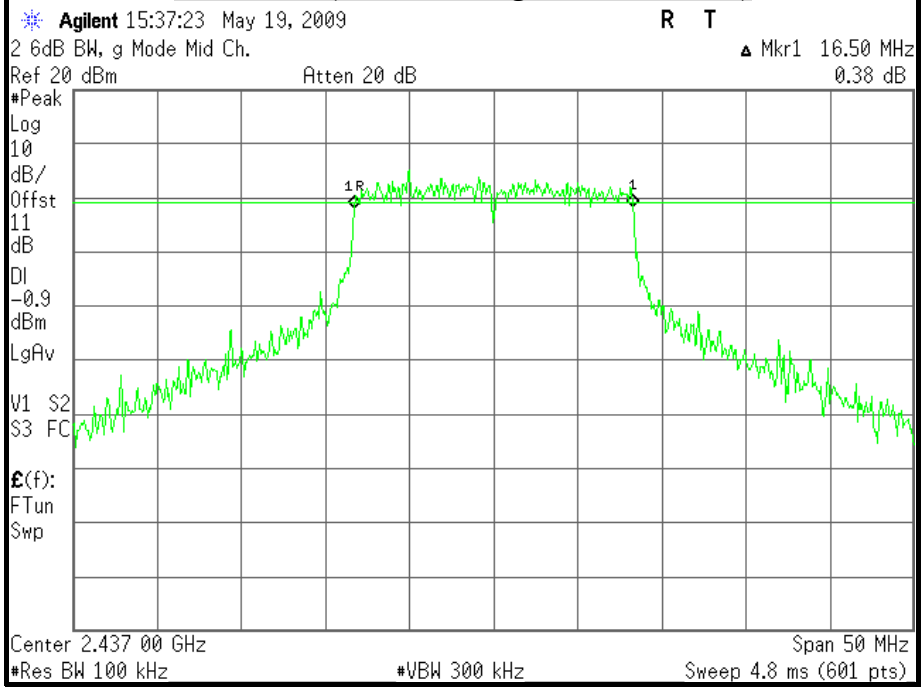

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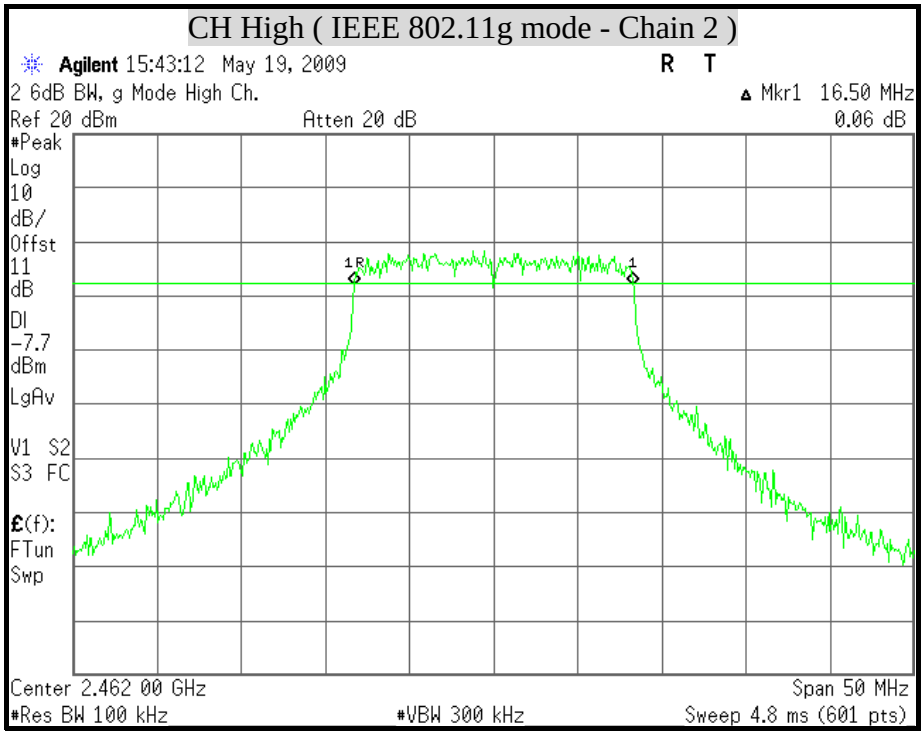
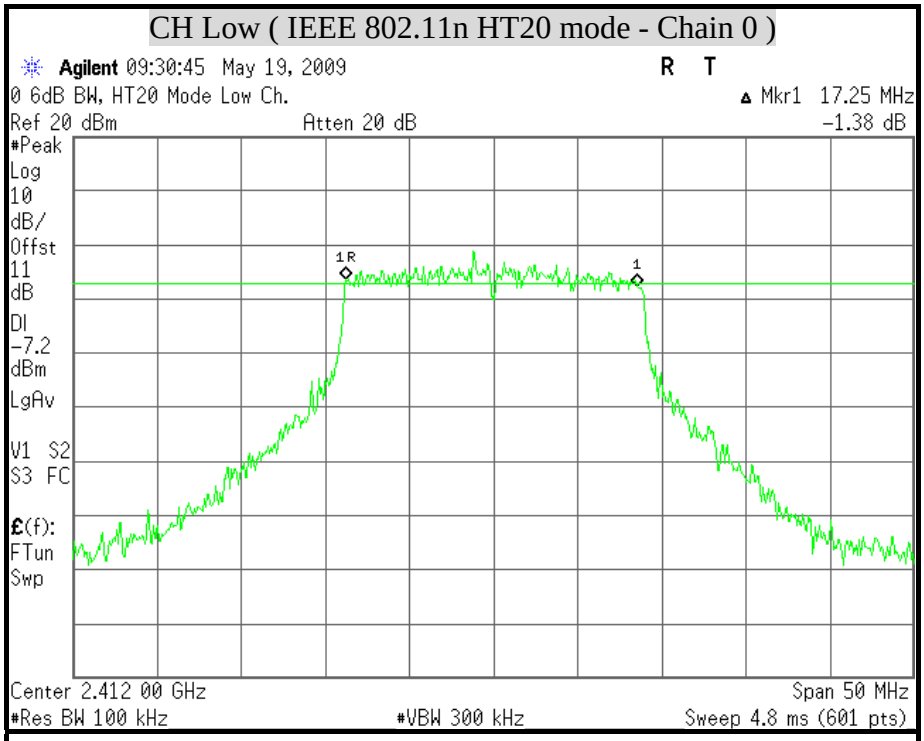


6dB BANDWIDTH (IEEE 802.11n HT20 mode)

CH Low (IEEE 802.11n HT20 mode - Chain 0)



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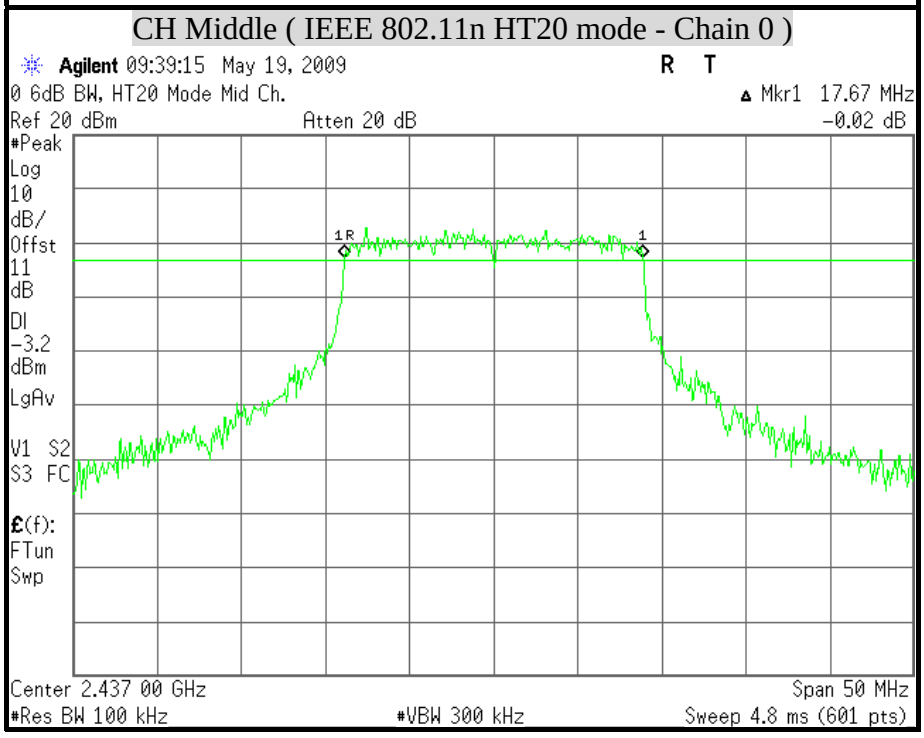

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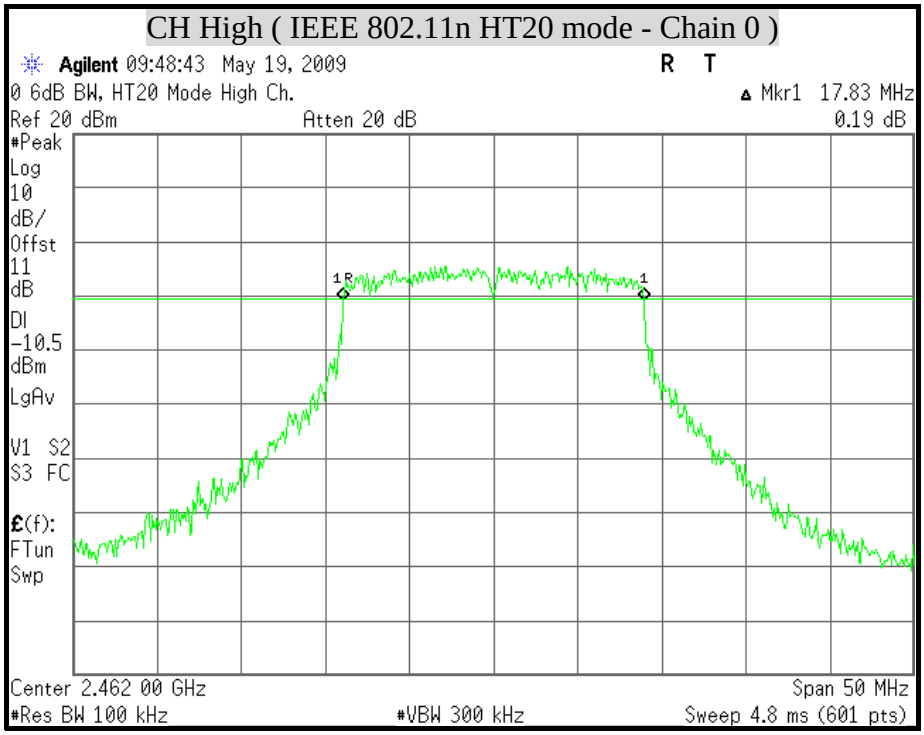
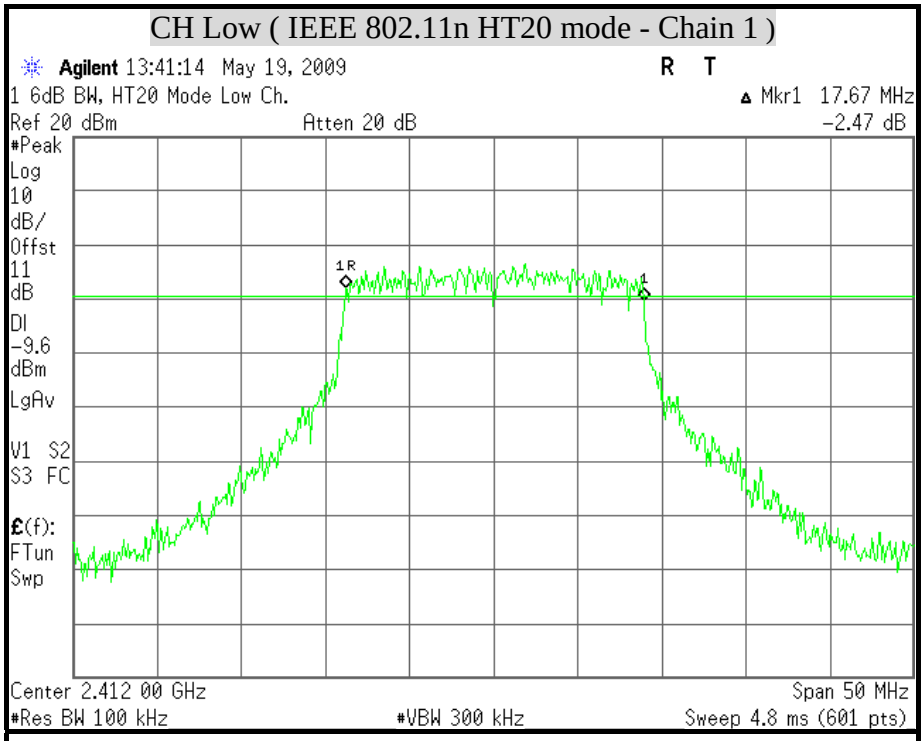


CH Low (IEEE 802.11n HT20 mode - Chain 1)



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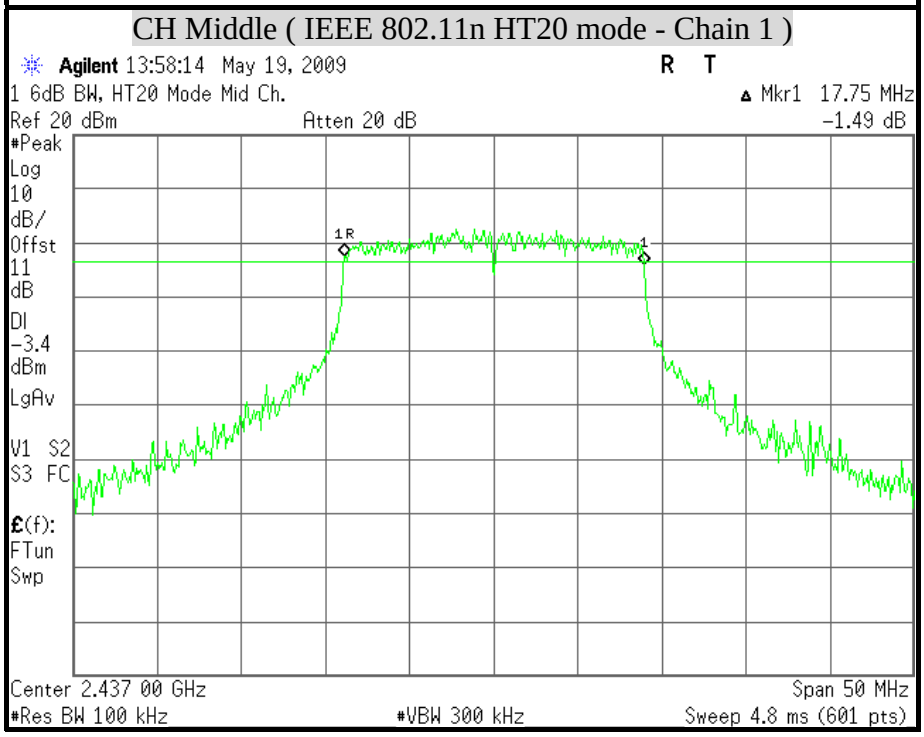

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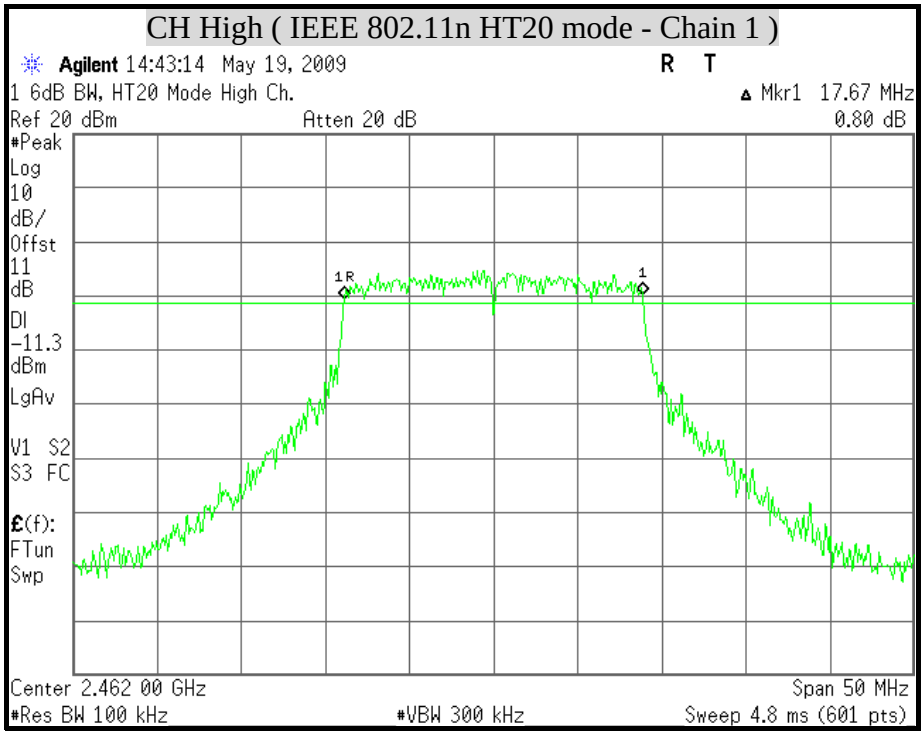

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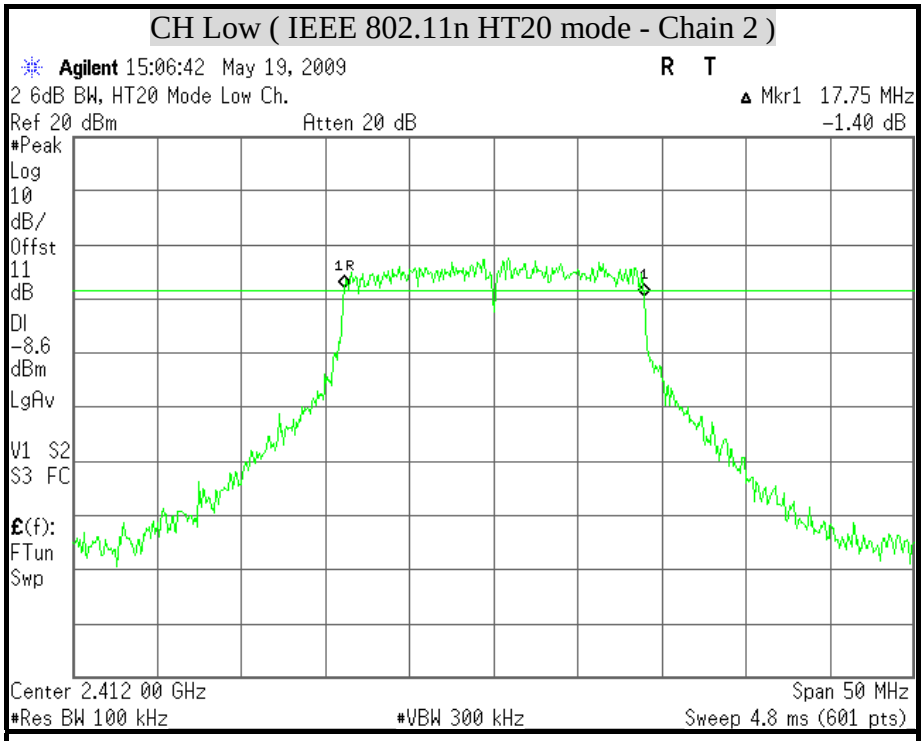
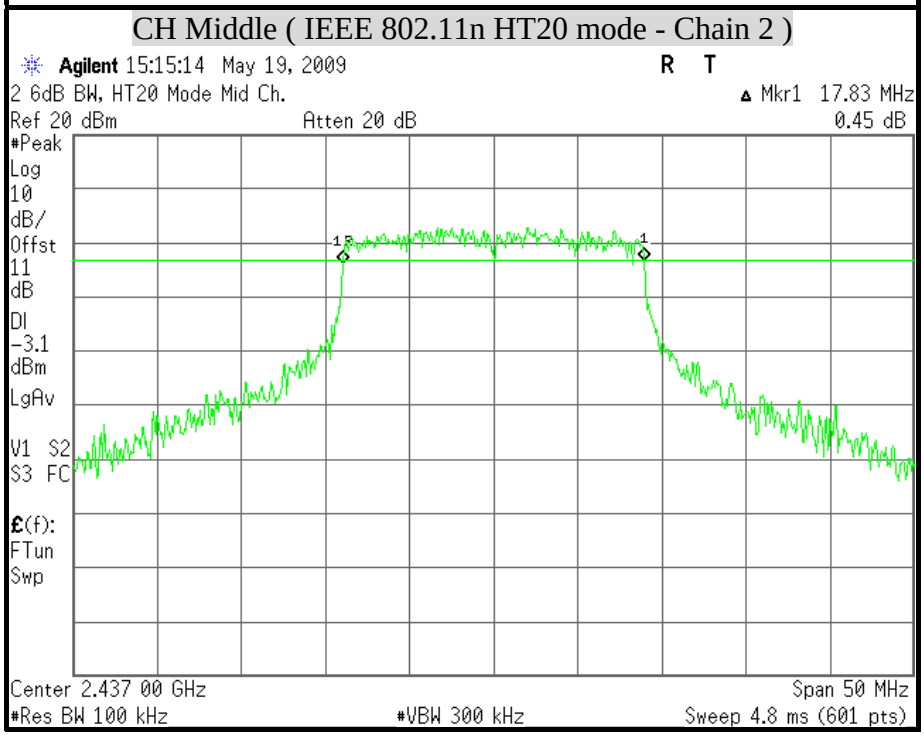
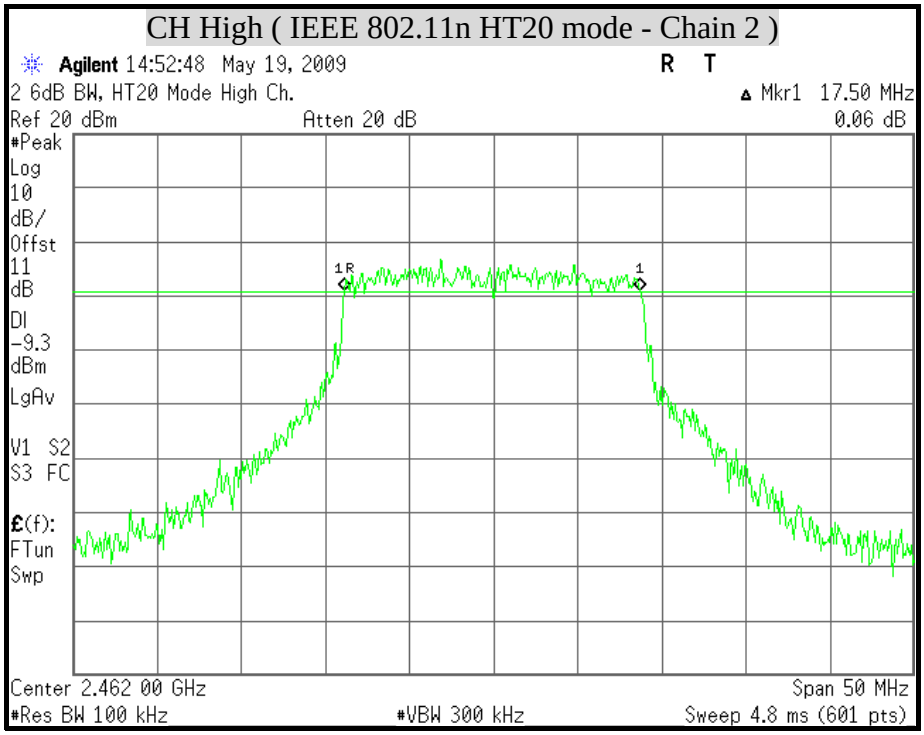


CH Middle (IEEE 802.11n HT20 mode - Chain 2)

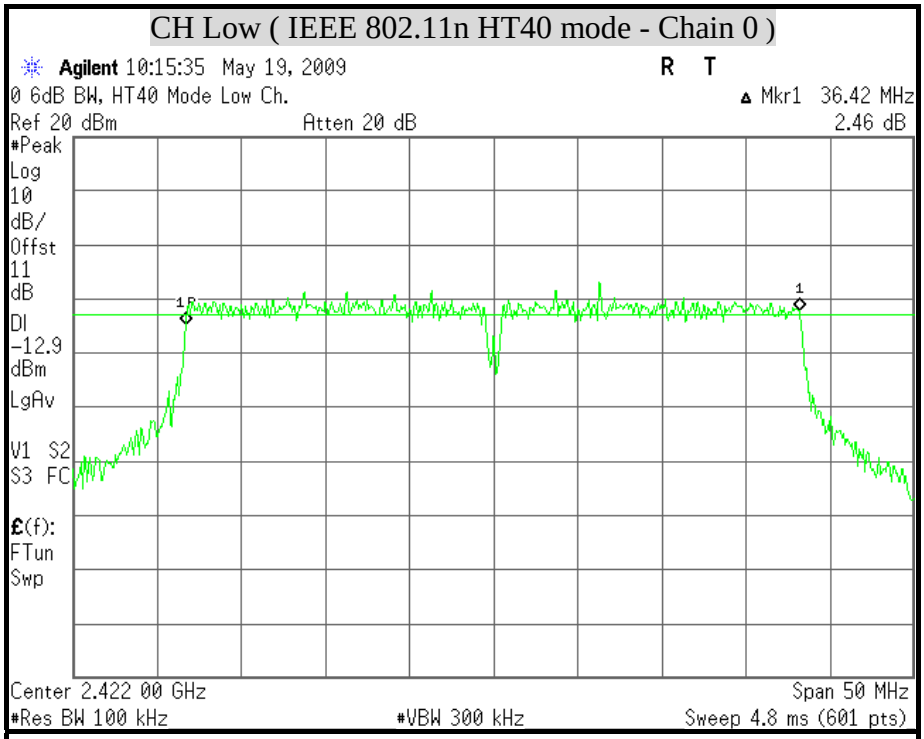


CH High (IEEE 802.11n HT20 mode - Chain 2)

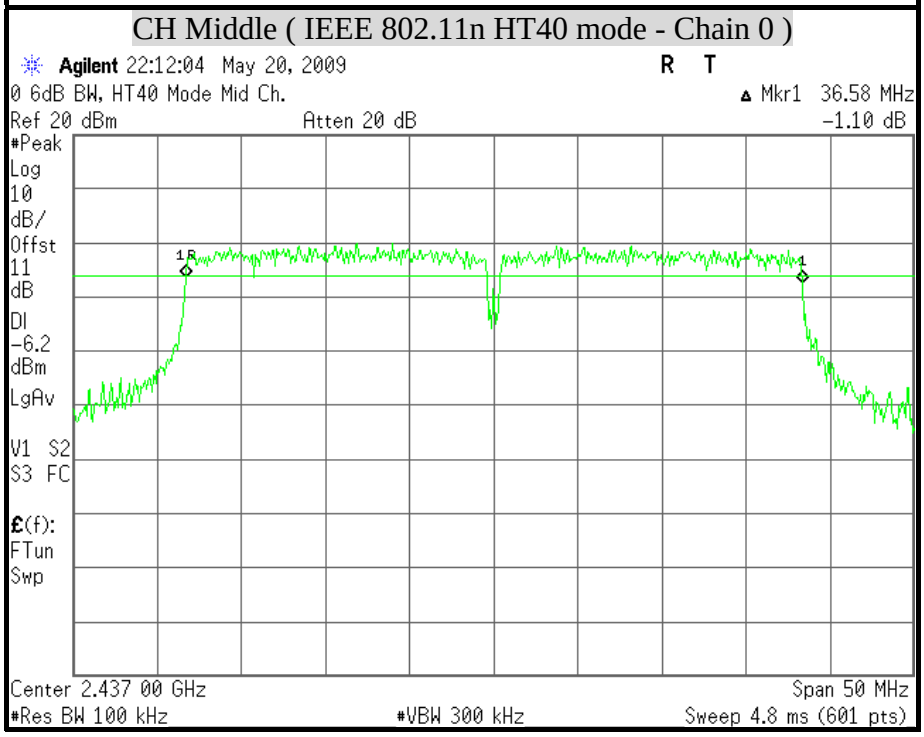


6dB BANDWIDTH (IEEE 802.11n HT40 mode)

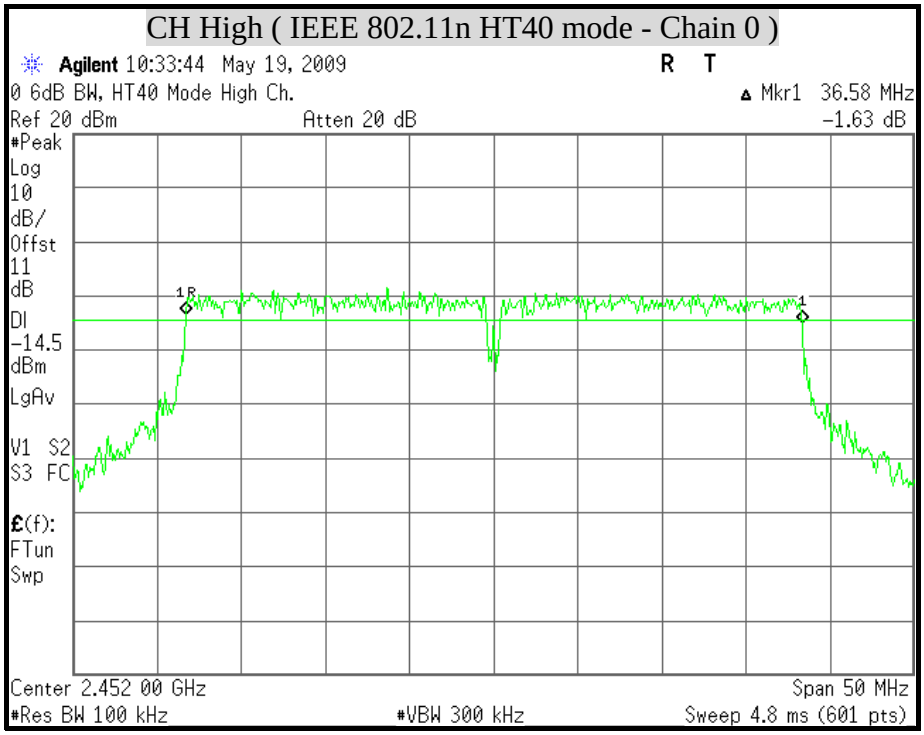
CH Low (IEEE 802.11n HT40 mode - Chain 0)



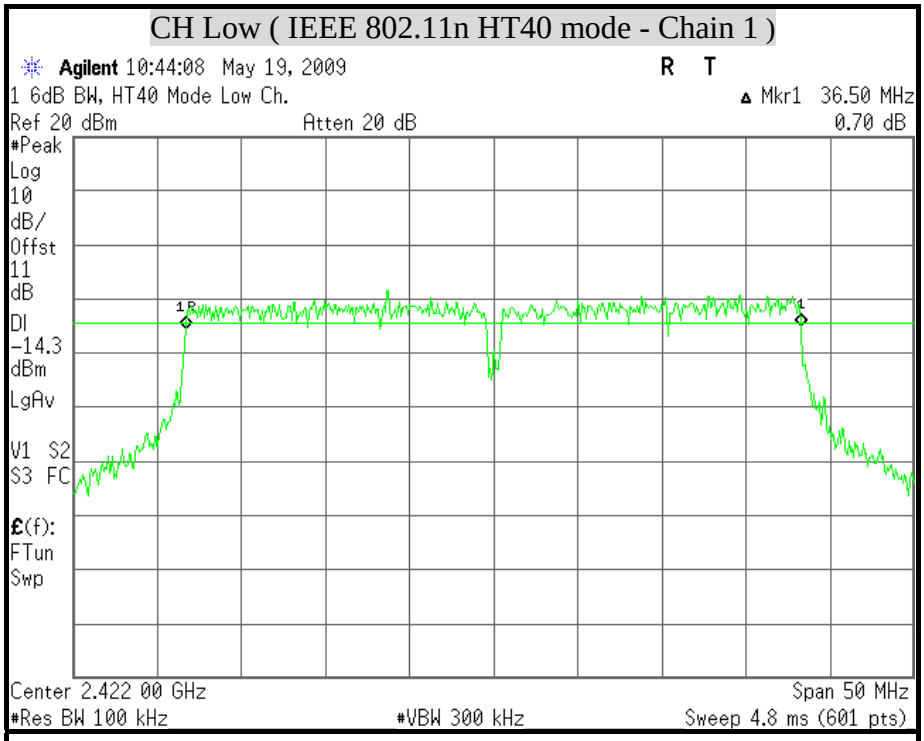
CH Middle (IEEE 802.11n HT40 mode - Chain 0)



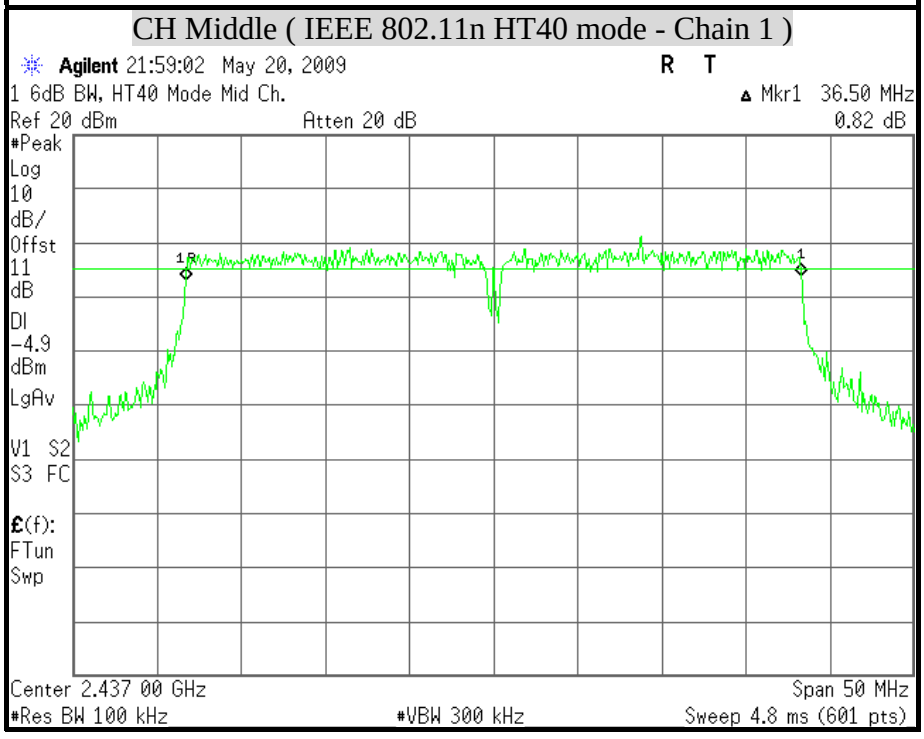
CH High (IEEE 802.11n HT40 mode - Chain 0)



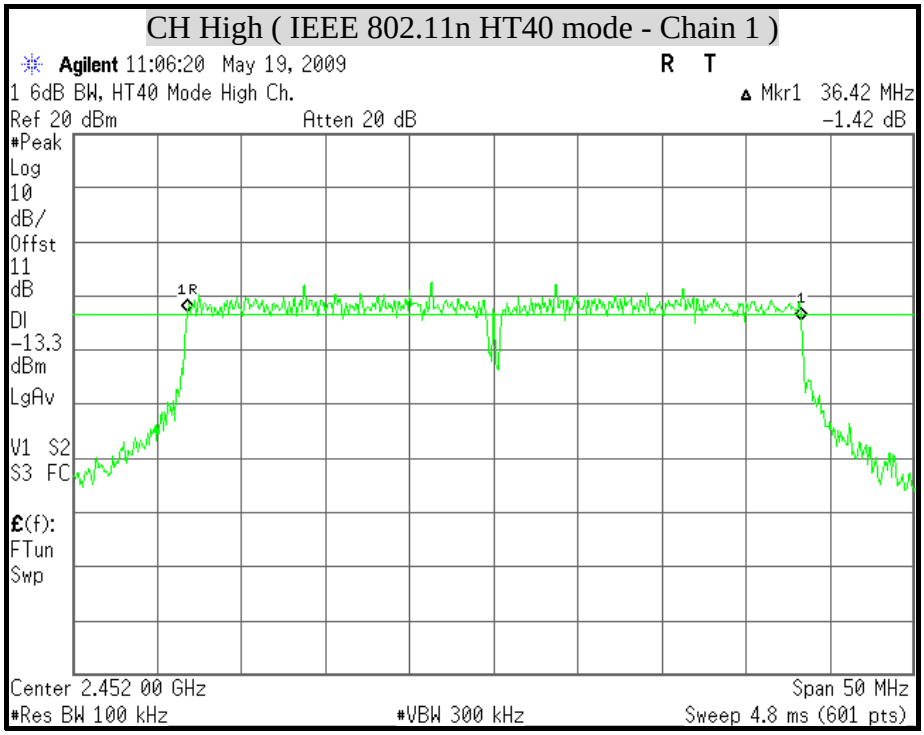
CH Low (IEEE 802.11n HT40 mode - Chain 1)



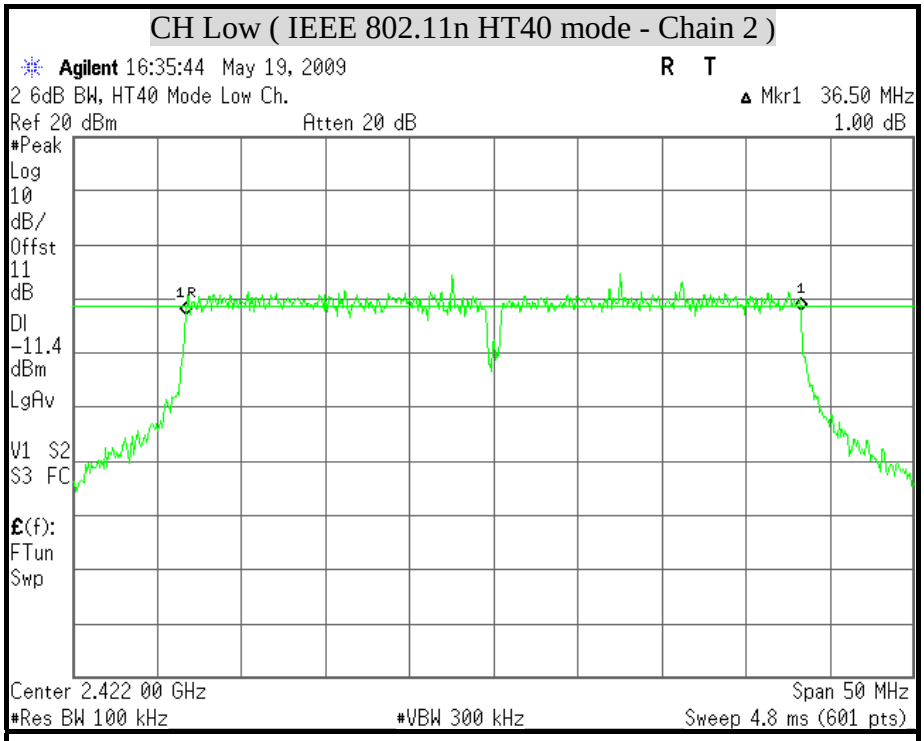
CH Middle (IEEE 802.11n HT40 mode - Chain 1)



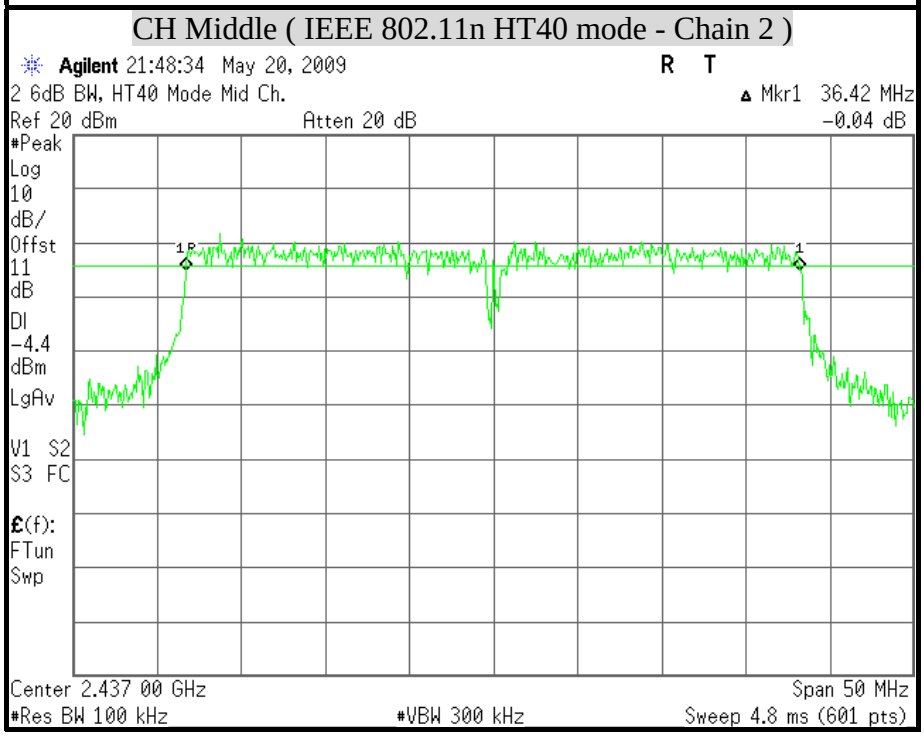
CH High (IEEE 802.11n HT40 mode - Chain 1)



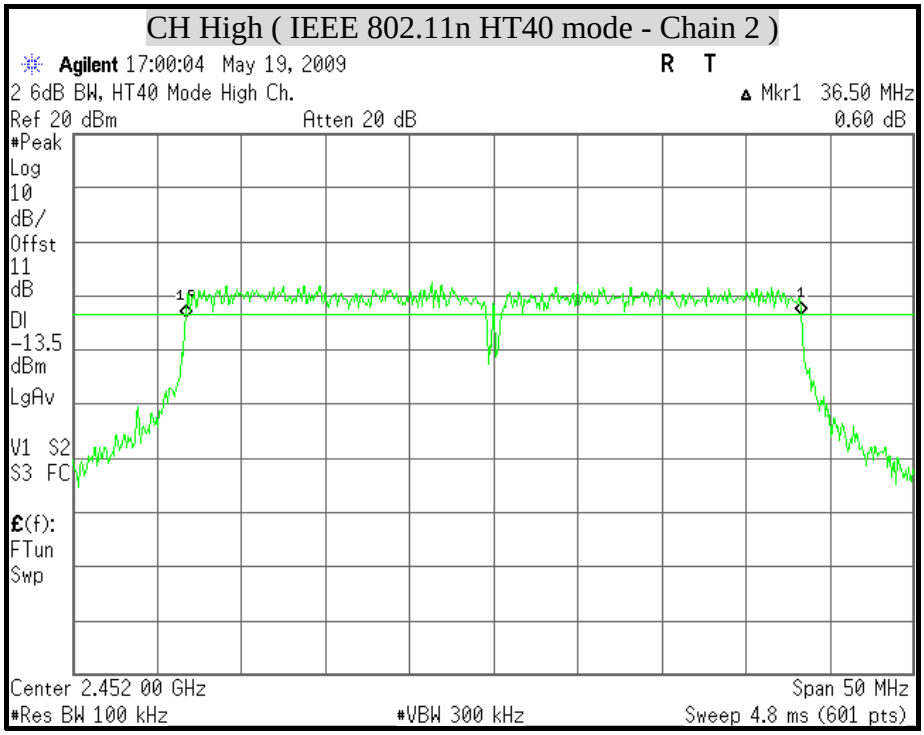
CH Low (IEEE 802.11n HT40 mode - Chain 2)



CH Middle (IEEE 802.11n HT40 mode - Chain 2)



CH High (IEEE 802.11n HT40 mode - Chain 2)



8.2 99% BANDWIDTH

LIMIT

None; for reporting purposes only.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
SPECTRUM ANALYZER	AGILENT	E4446A	MY43360132	06/05/2009
SPECTRUM ANALYZER	AGILENT	E4446A	MY46180323	05/26/2010

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP

TEST PROCEDURE

1. The spectrum shall be set as follows :
   Span : The minimum span to fully display the emission and approximately 20dB below peak level.
   RBW : The set to 1% to 3% of the approximate emission width.
2. Compute the combined power of all signal responses contained in the trace by covering all the data points.
3. For 99% occupied BW, place the markers at the frequency at which 0.5% of the power lies to the right of the right marker and 0.5% of the power lies to the left of the left marker.
4. The 99% BW is the bandwidth between the right and left markers.

TEST RESULTS

No non-compliance noted

IEEE 802.11b mode (Three TX)

Channel	Channel Frequency (MHz)	99% Occupied power bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
Low	2412	15.55	15.54	15.73
Middle	2437	15.42	15.77	15.60
High	2462	15.58	15.41	15.52

IEEE 802.11g mode (Three TX)

Channel	Channel Frequency (MHz)	99% Occupied power bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
Low	2412	16.35	16.44	16.33
Middle	2437	16.37	16.40	16.25
High	2462	16.37	16.47	16.36

IEEE 802.11n HT20 mode (Three TX)

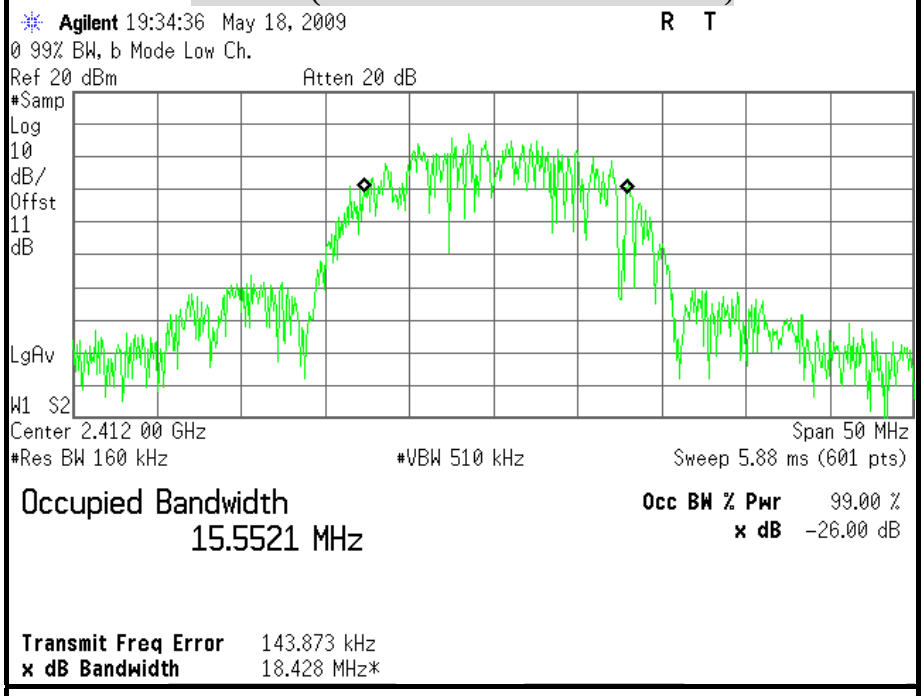
Channel	Channel Frequency (MHz)	99% Occupied power bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
Low	2412	17.65	17.74	17.70
Middle	2437	17.67	17.66	17.60
High	2462	17.65	17.57	17.56

IEEE 802.11n HT40 mode (Three TX)

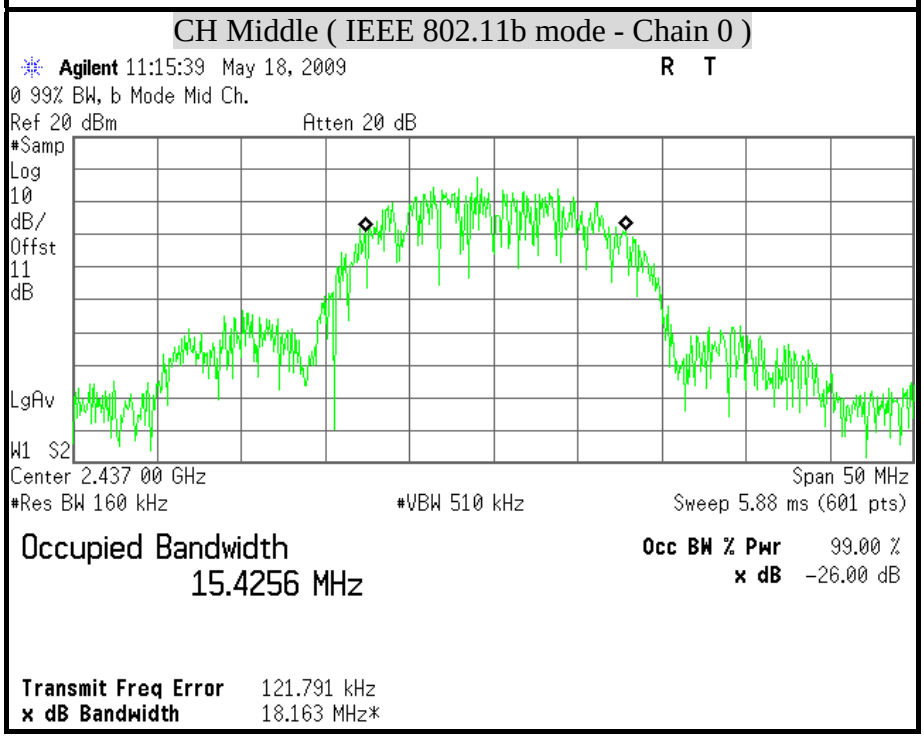
Channel	Channel Frequency (MHz)	99% Occupied power bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
Low	2422	36.22	36.27	36.28
Middle	2437	36.23	36.20	36.33
High	2452	36.37	36.28	36.26

99% BANDWIDTH (IEEE 802.11b mode)

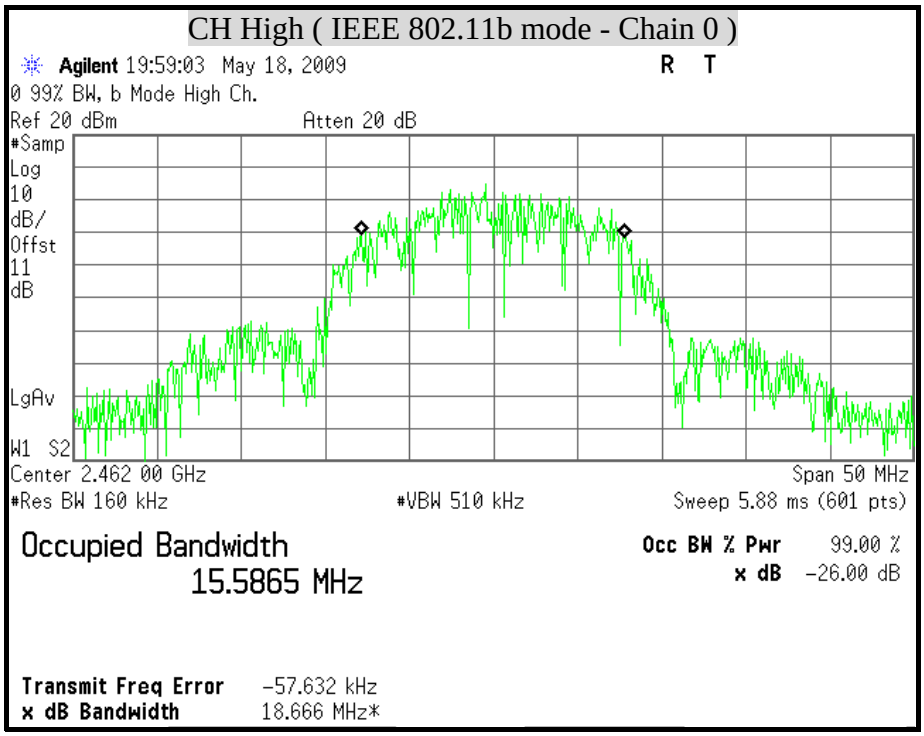
CH Low (IEEE 802.11b mode - Chain 0)



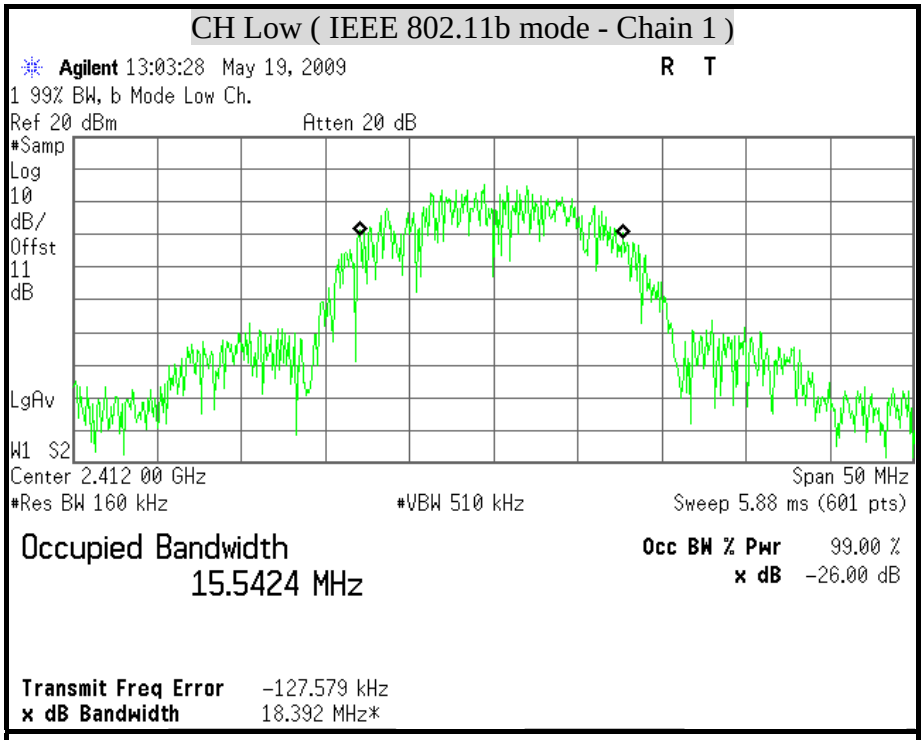
CH Middle (IEEE 802.11b mode - Chain 0)



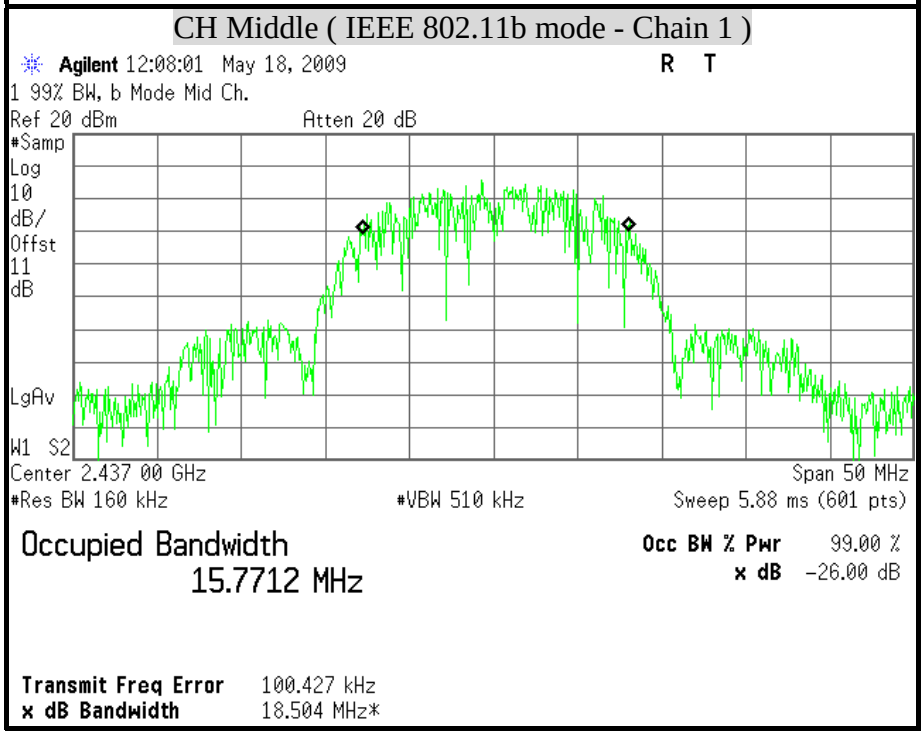
CH High (IEEE 802.11b mode - Chain 0)



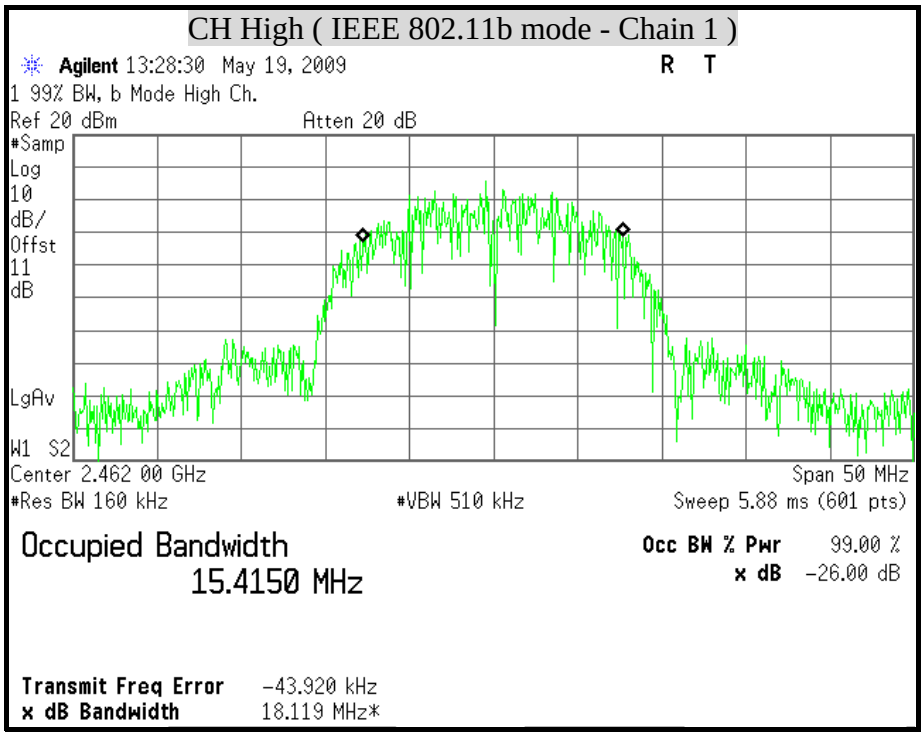
CH Low (IEEE 802.11b mode - Chain 1)



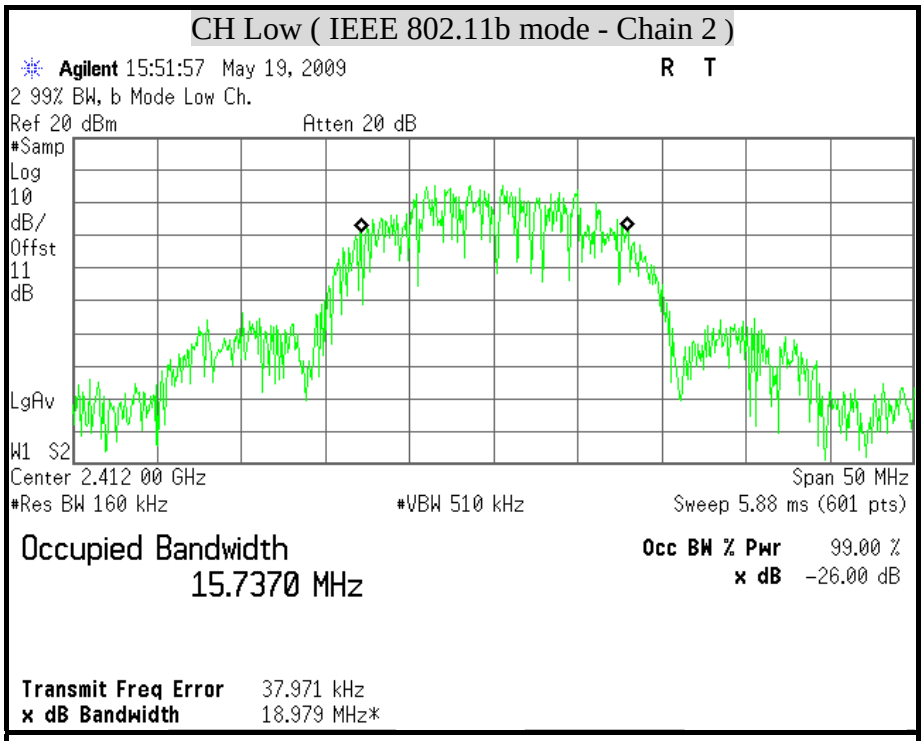
CH Middle (IEEE 802.11b mode - Chain 1)



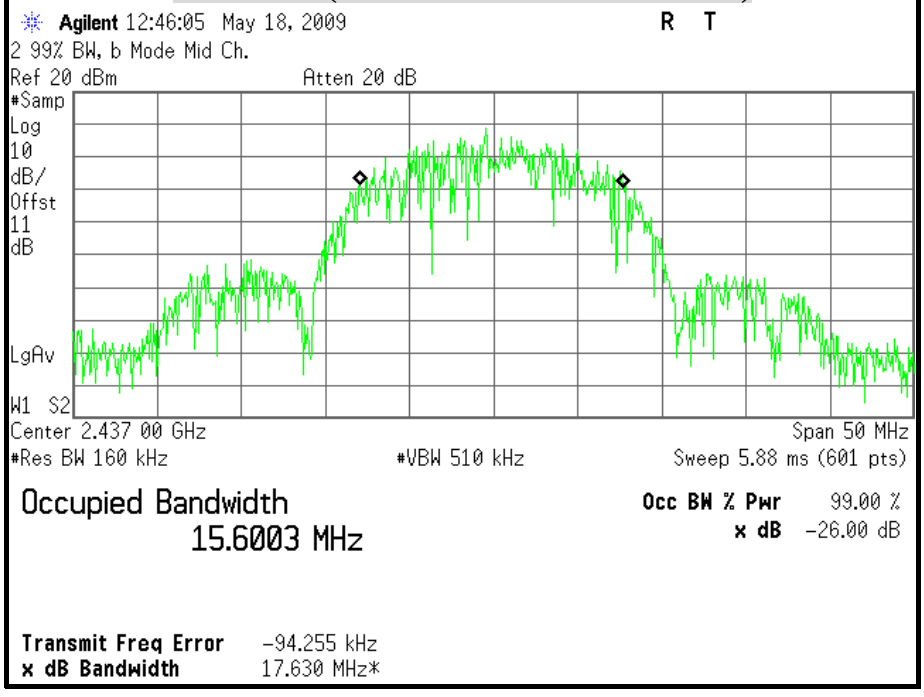
CH High (IEEE 802.11b mode - Chain 1)



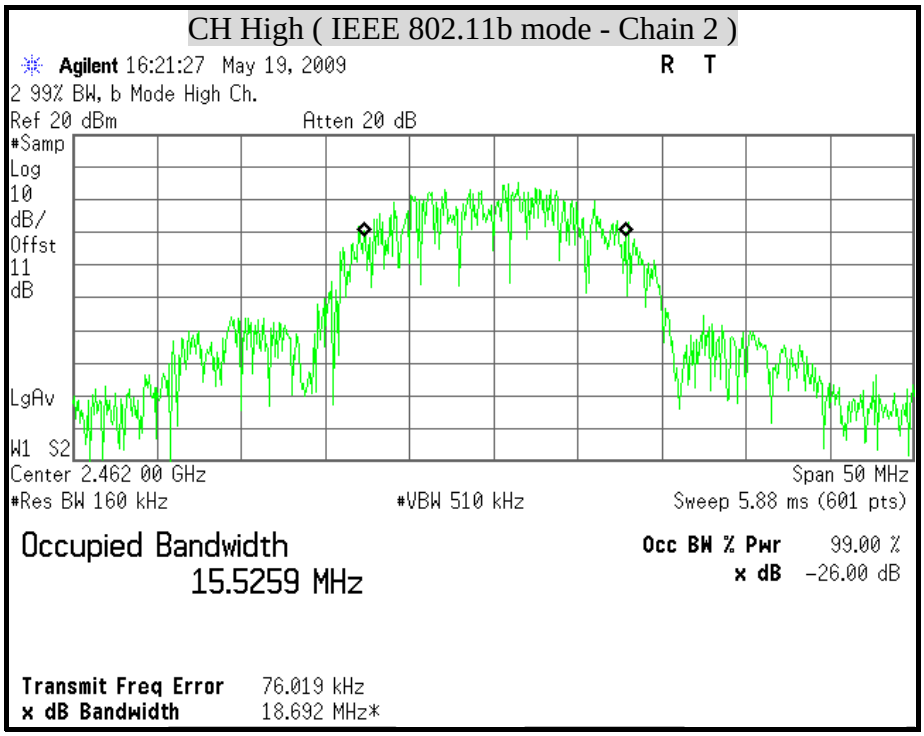
CH Low (IEEE 802.11b mode - Chain 2)



CH Middle (IEEE 802.11b mode - Chain 2)

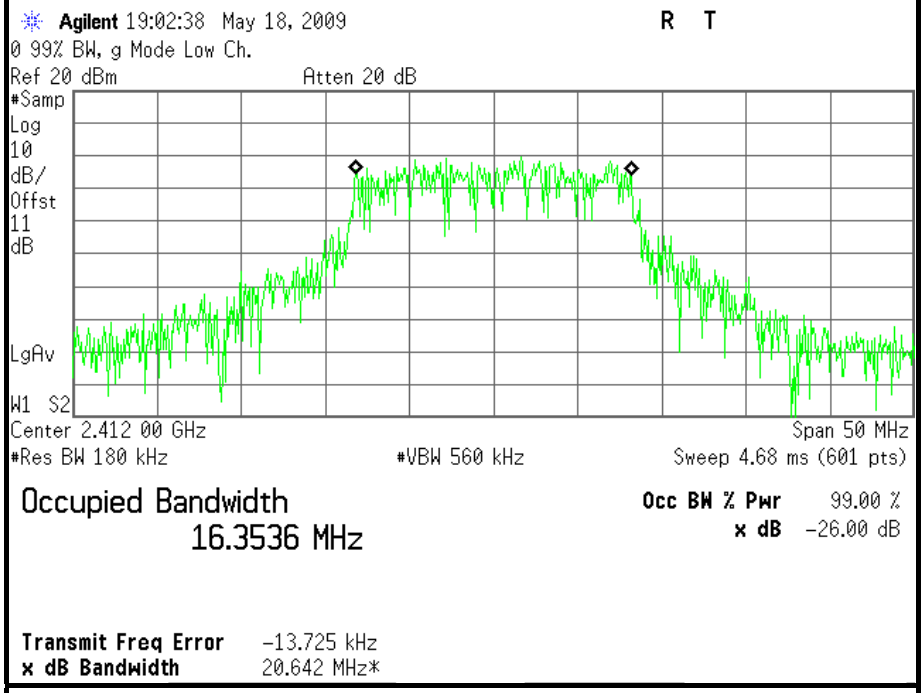


CH High (IEEE 802.11b mode - Chain 2)

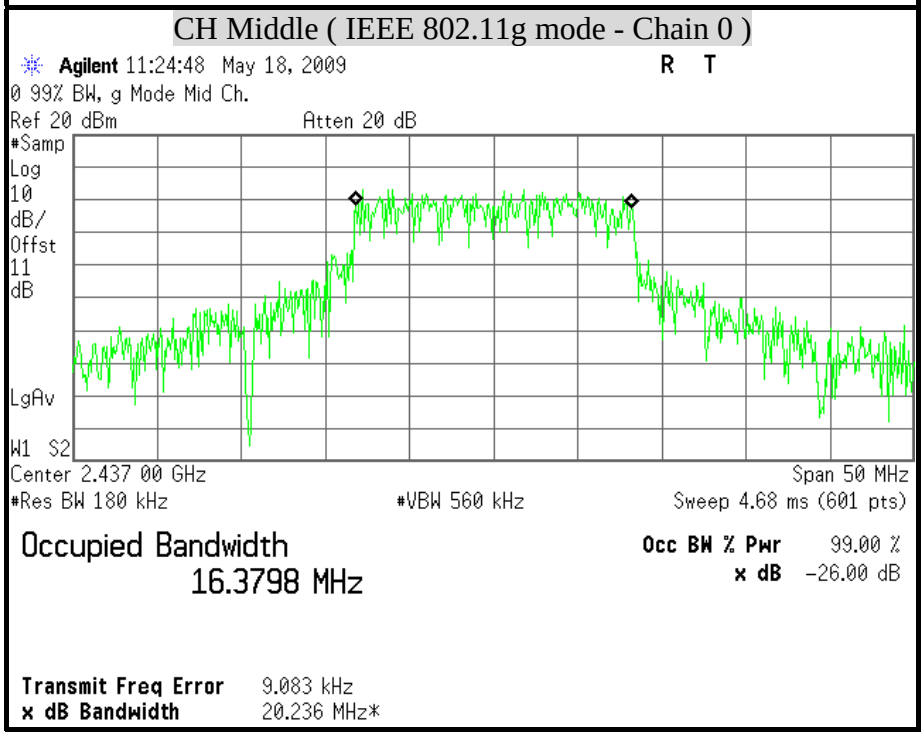


99% BANDWIDTH (IEEE 802.11g mode)

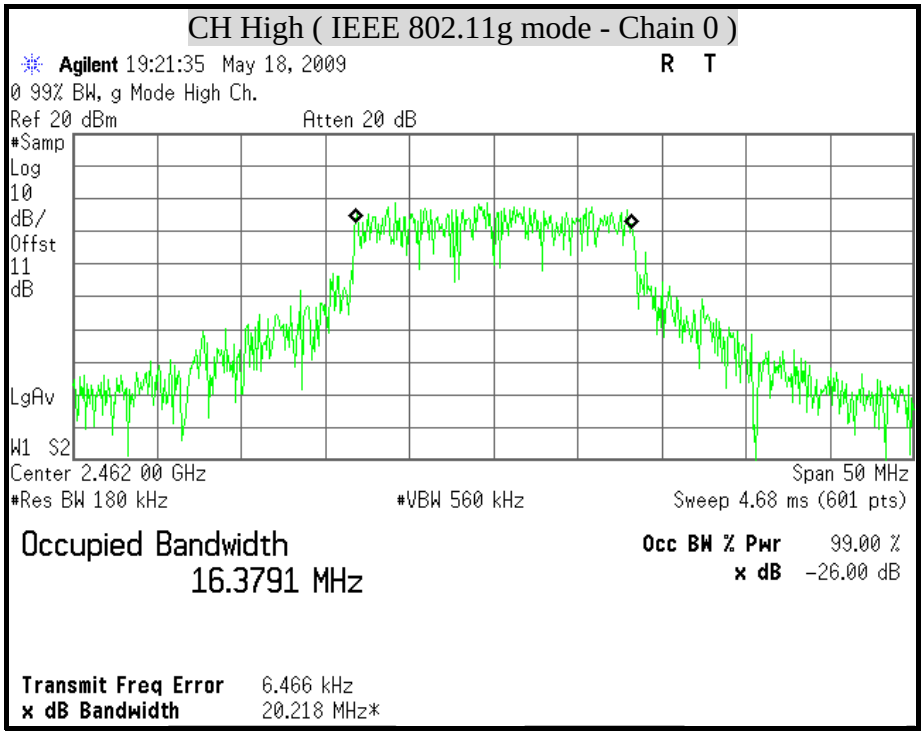
CH Low (IEEE 802.11g mode - Chain 0)



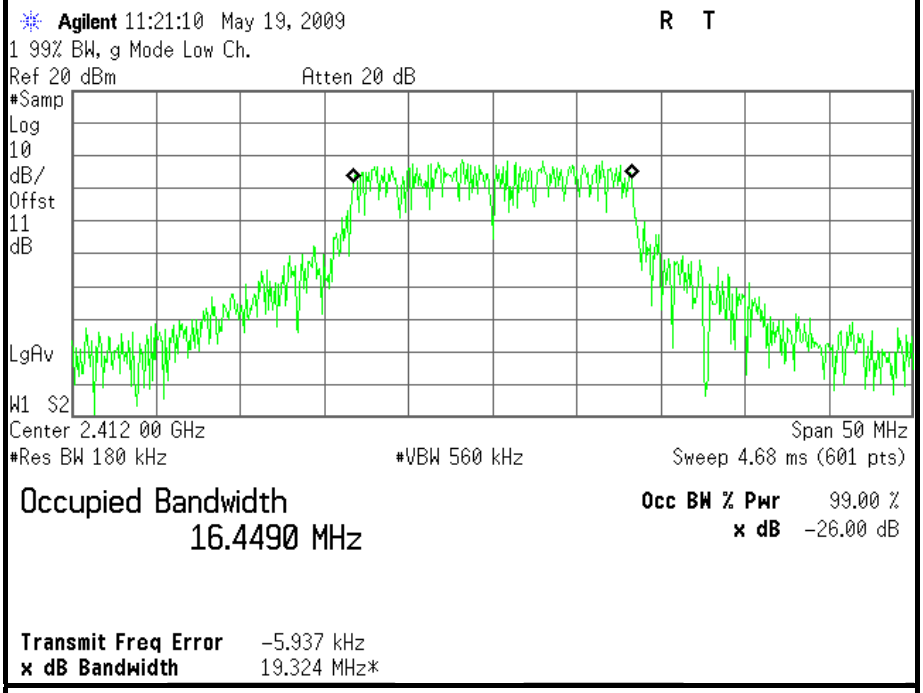
CH Middle (IEEE 802.11g mode - Chain 0)



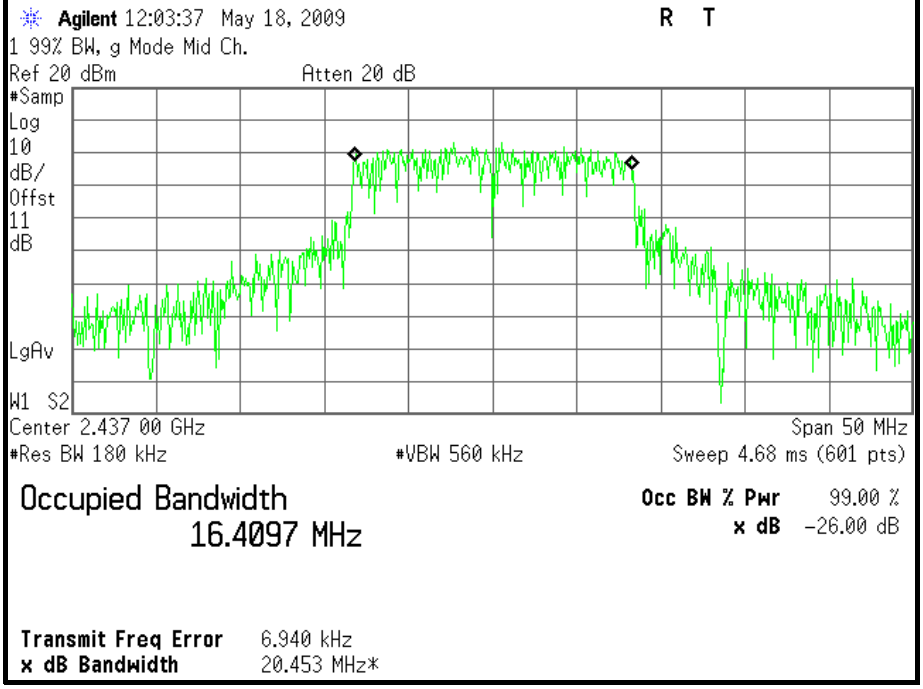
CH High (IEEE 802.11g mode - Chain 0)



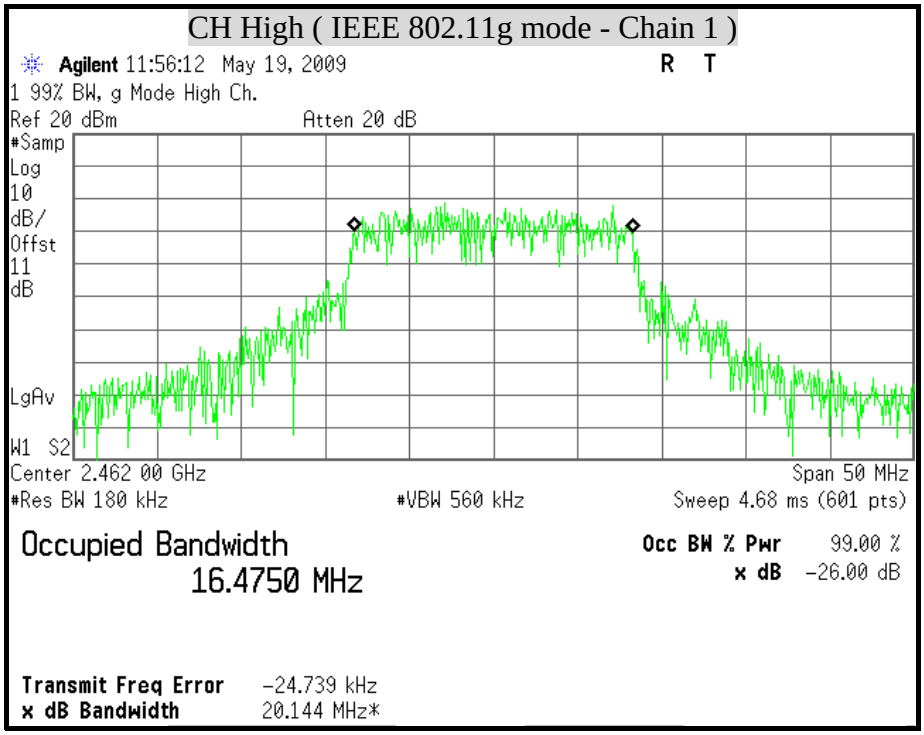
CH Low (IEEE 802.11g mode - Chain 1)



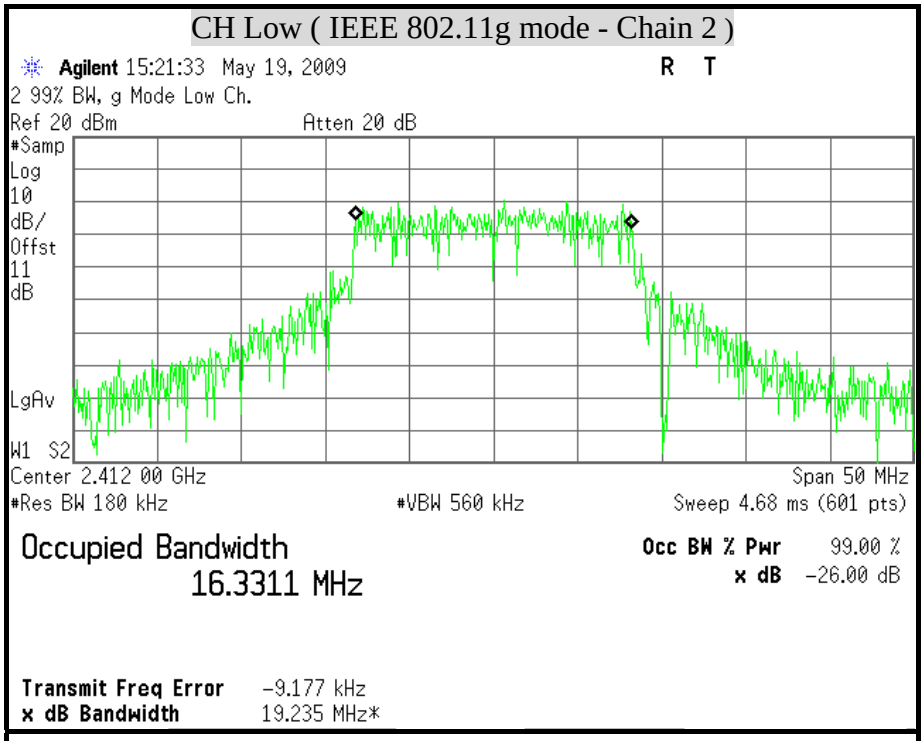
CH Middle (IEEE 802.11g mode - Chain 1)



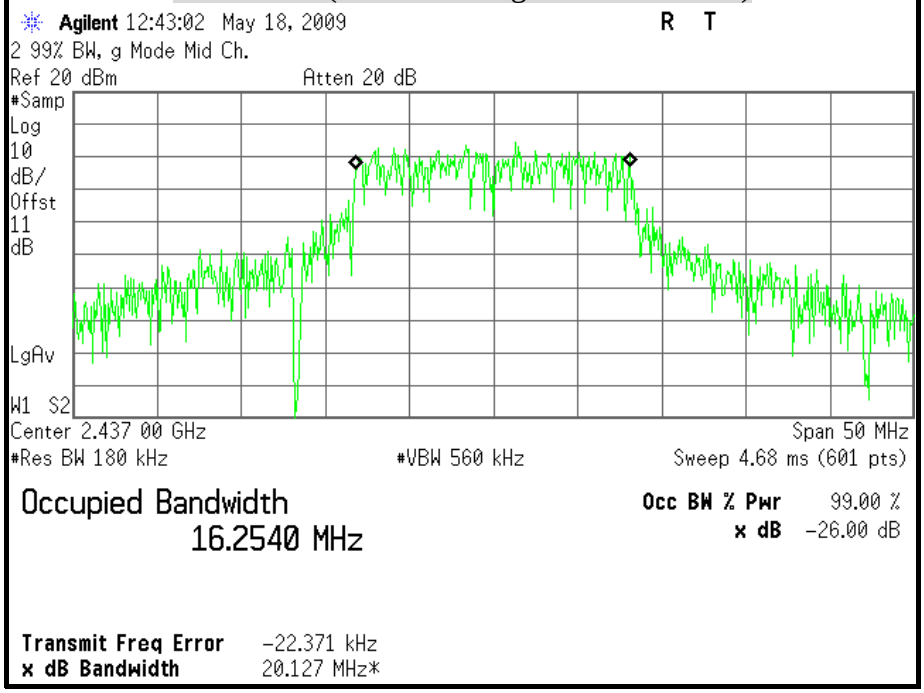
CH High (IEEE 802.11g mode - Chain 1)



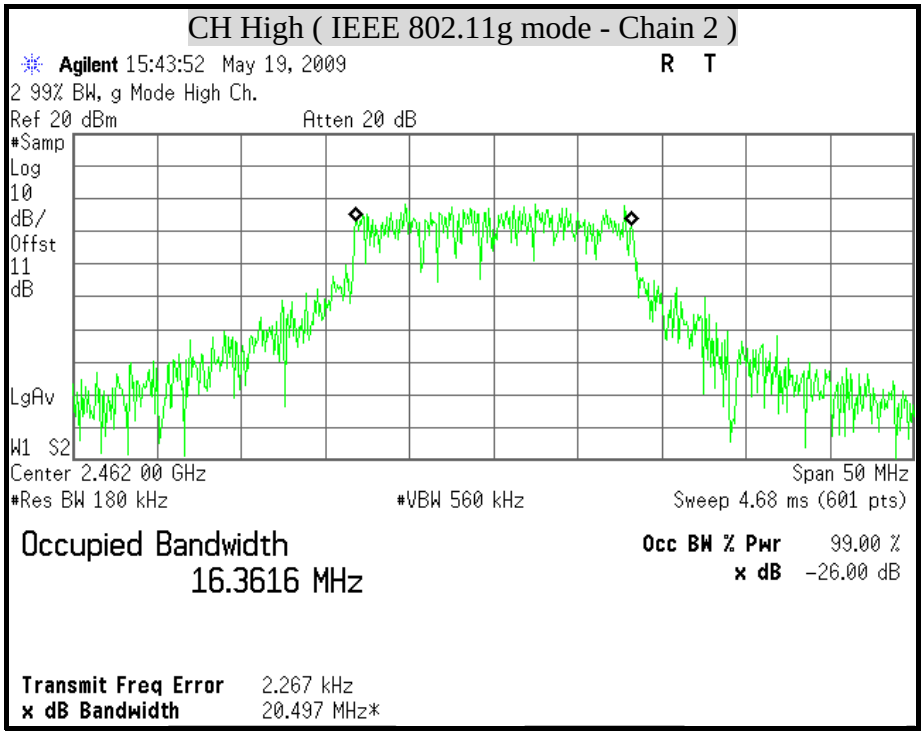
CH Low (IEEE 802.11g mode - Chain 2)



CH Middle (IEEE 802.11g mode - Chain 2)

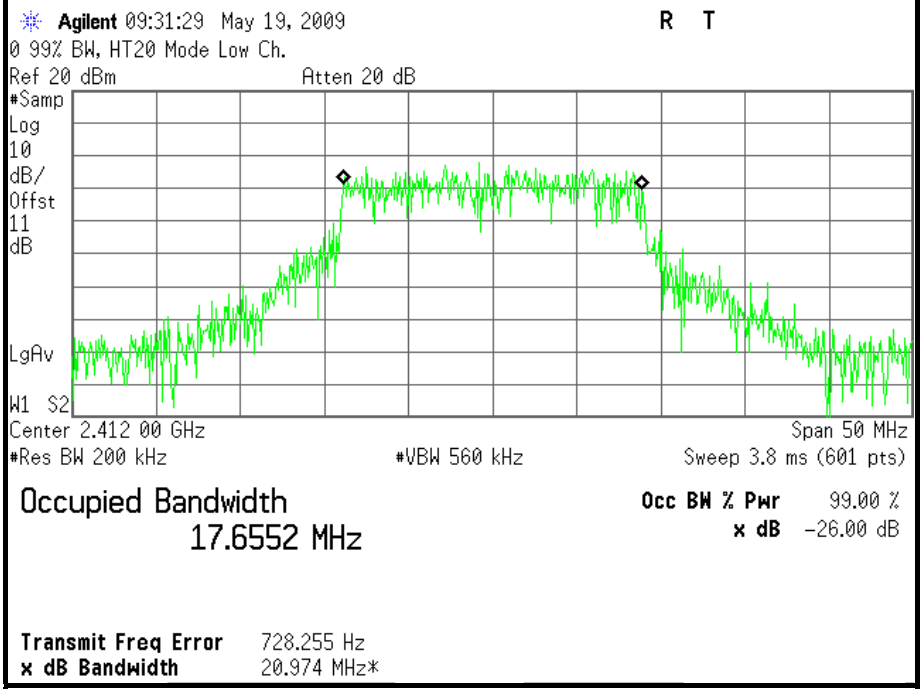


CH High (IEEE 802.11g mode - Chain 2)

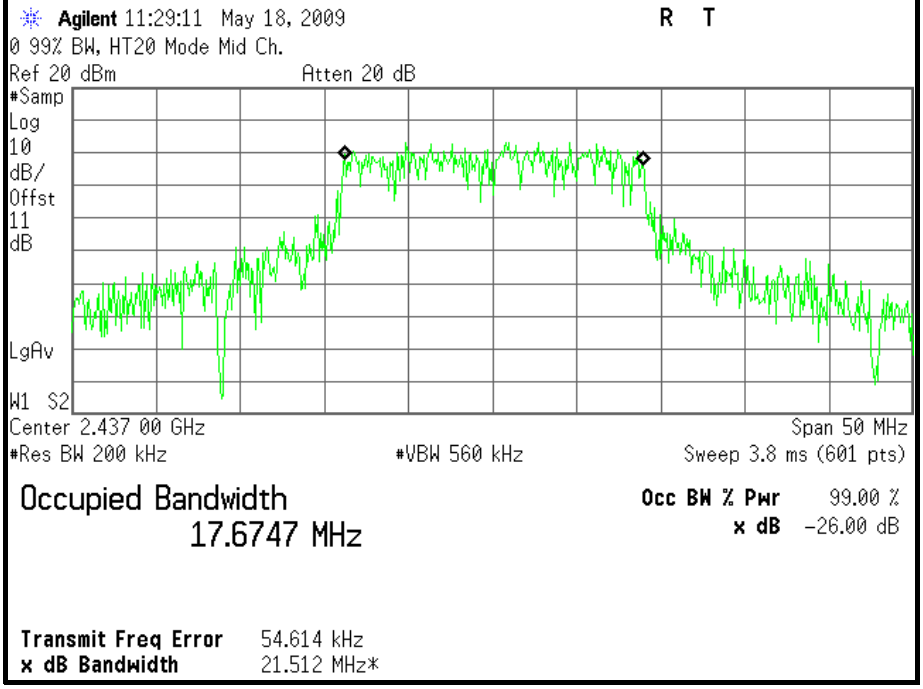


99% BANDWIDTH (IEEE 802.11n HT20 mode)

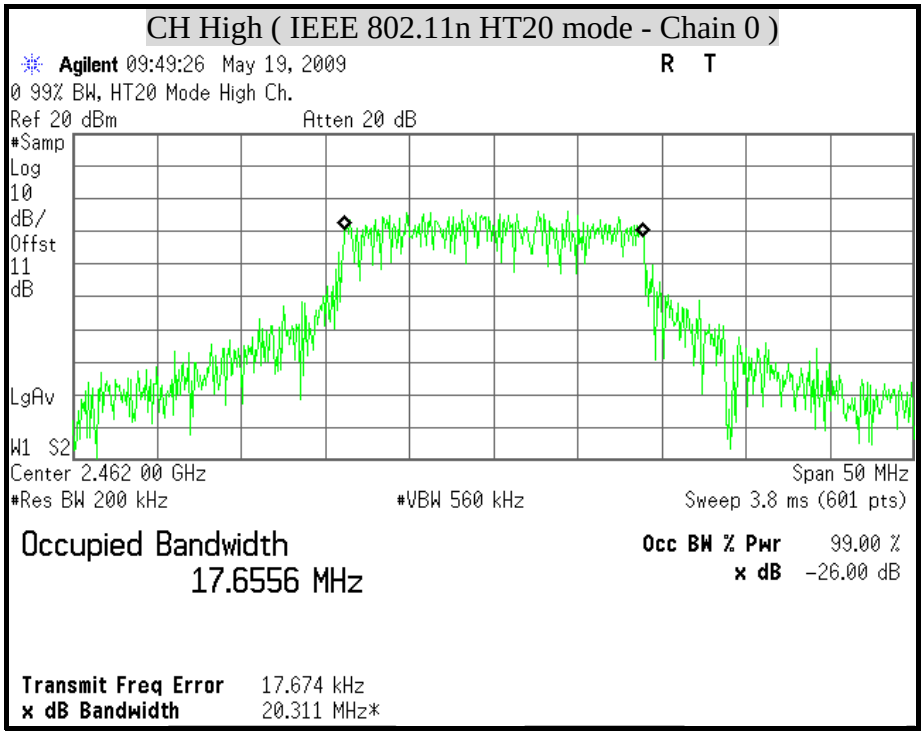
CH Low (IEEE 802.11n HT20 mode - Chain 0)



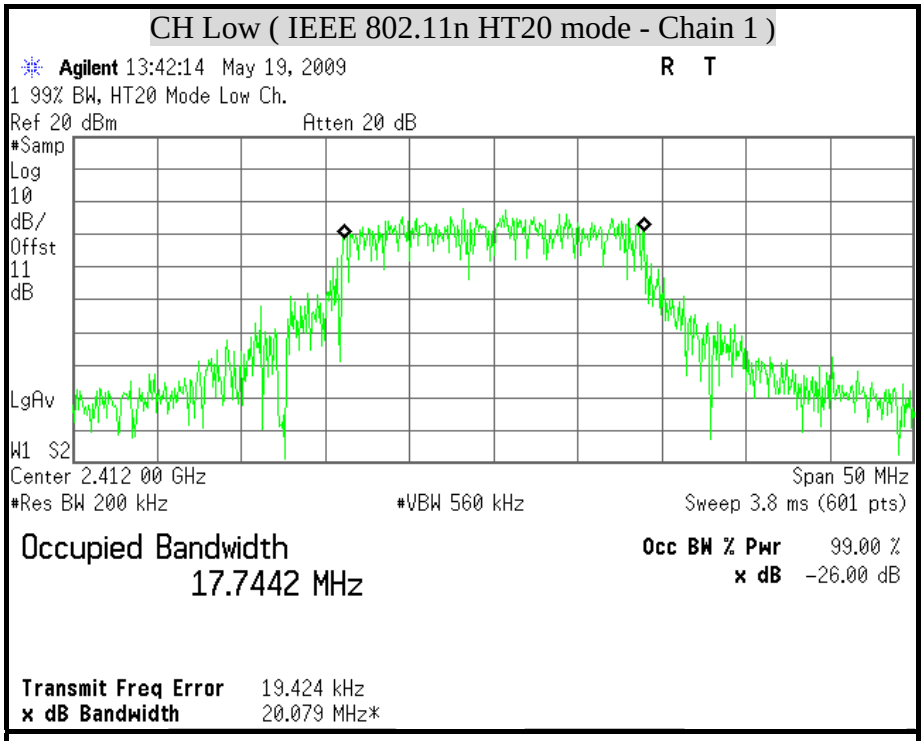
CH Middle (IEEE 802.11n HT20 mode - Chain 0)



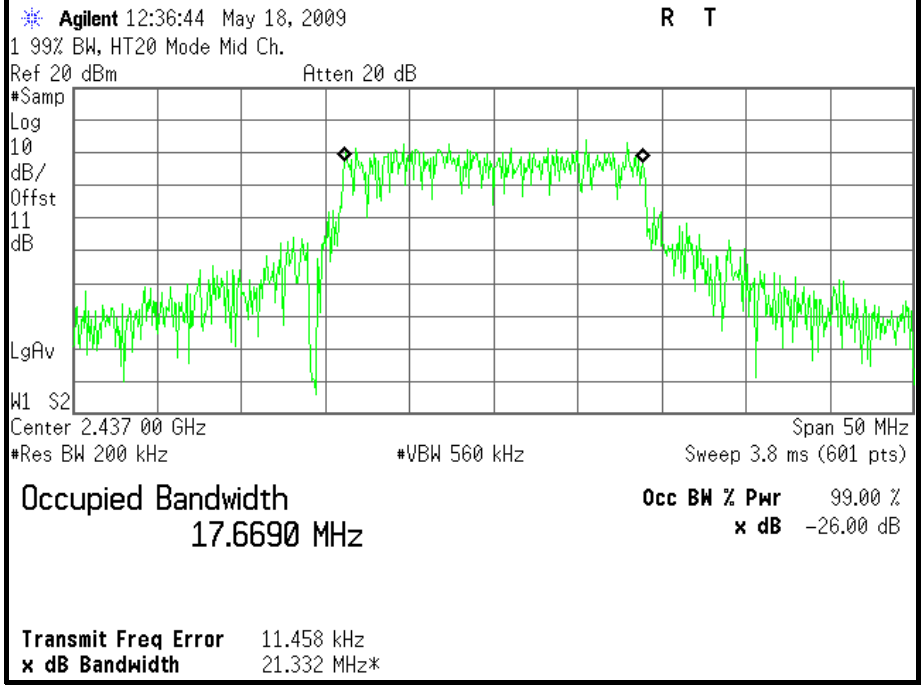
CH High (IEEE 802.11n HT20 mode - Chain 0)



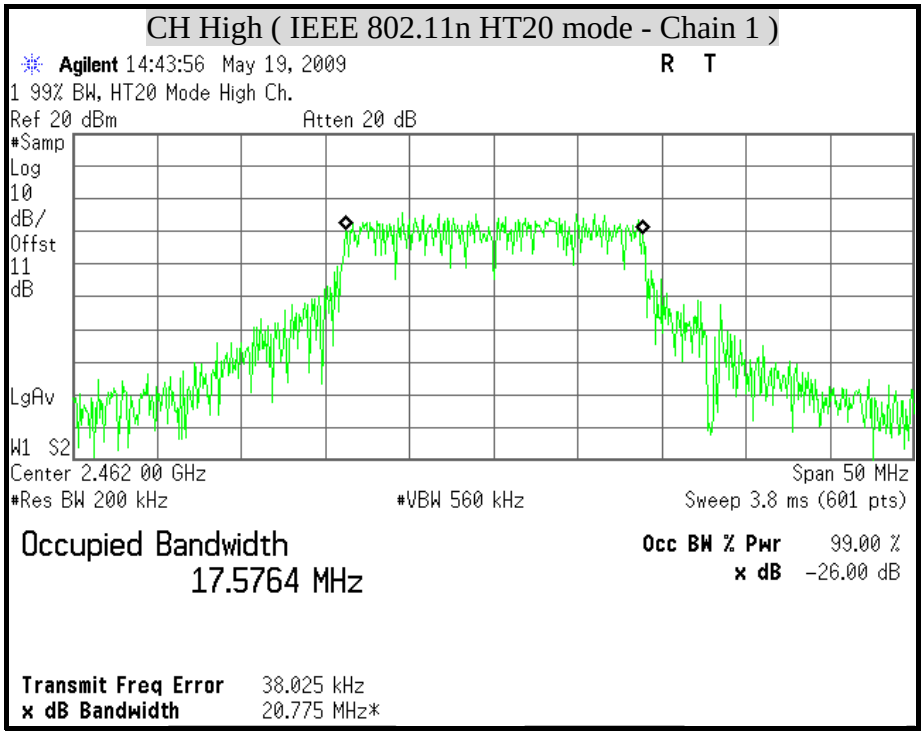
CH Low (IEEE 802.11n HT20 mode - Chain 1)



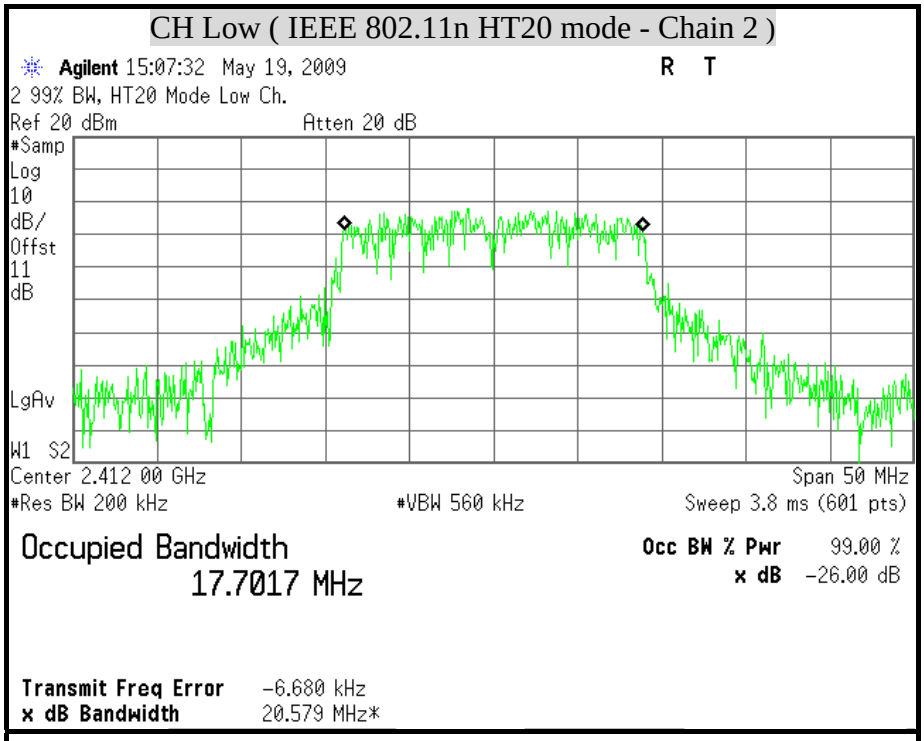
CH Middle (IEEE 802.11n HT20 mode - Chain 1)



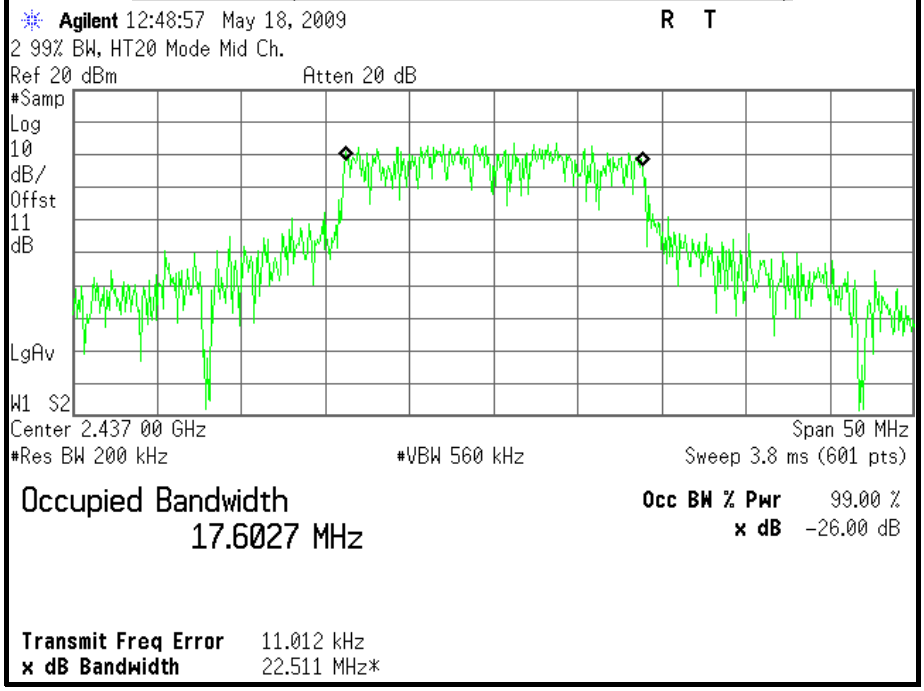
CH High (IEEE 802.11n HT20 mode - Chain 1)



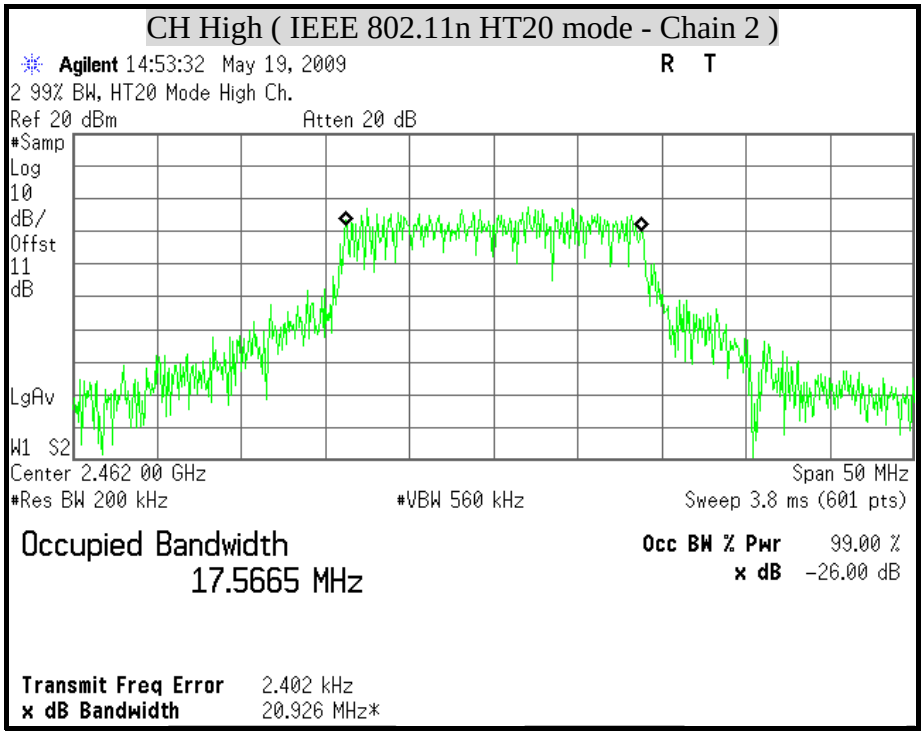
CH Low (IEEE 802.11n HT20 mode - Chain 2)



CH Middle (IEEE 802.11n HT20 mode - Chain 2)

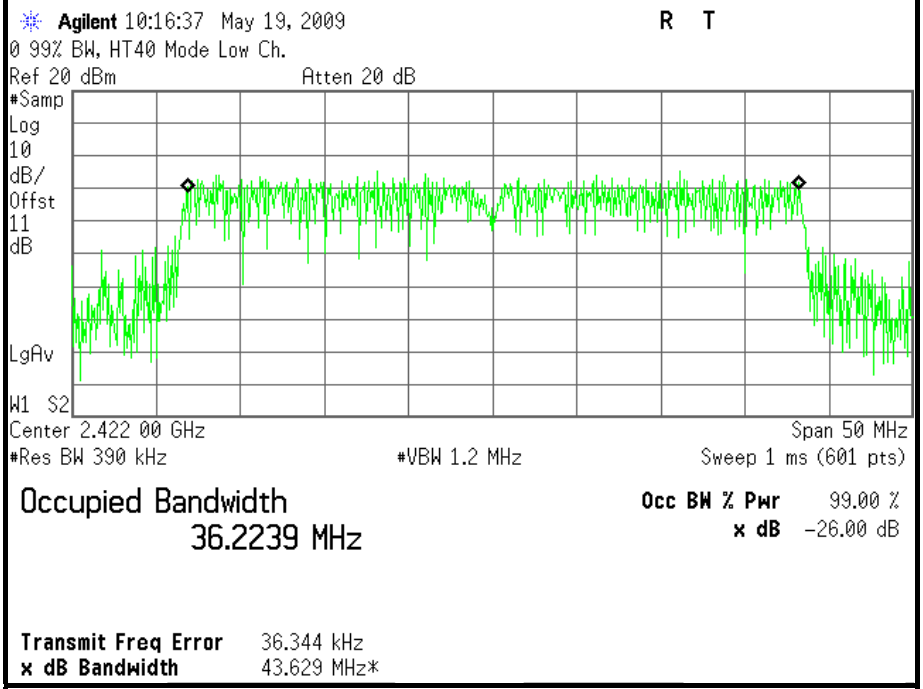


CH High (IEEE 802.11n HT20 mode - Chain 2)

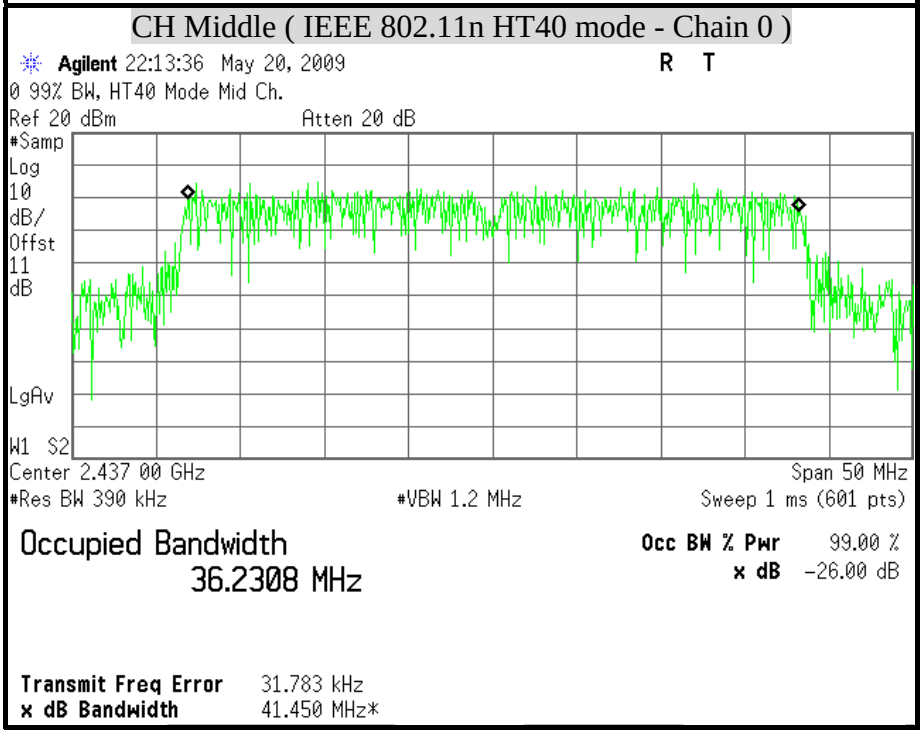


99% BANDWIDTH (IEEE 802.11n HT40 mode)

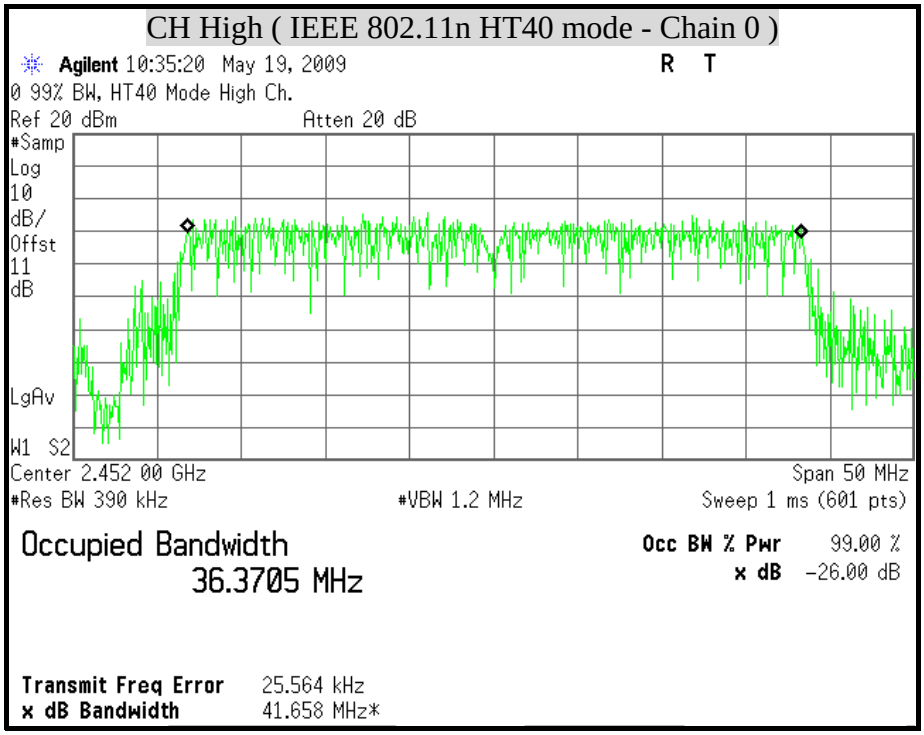
CH Low (IEEE 802.11n HT40 mode - Chain 0)



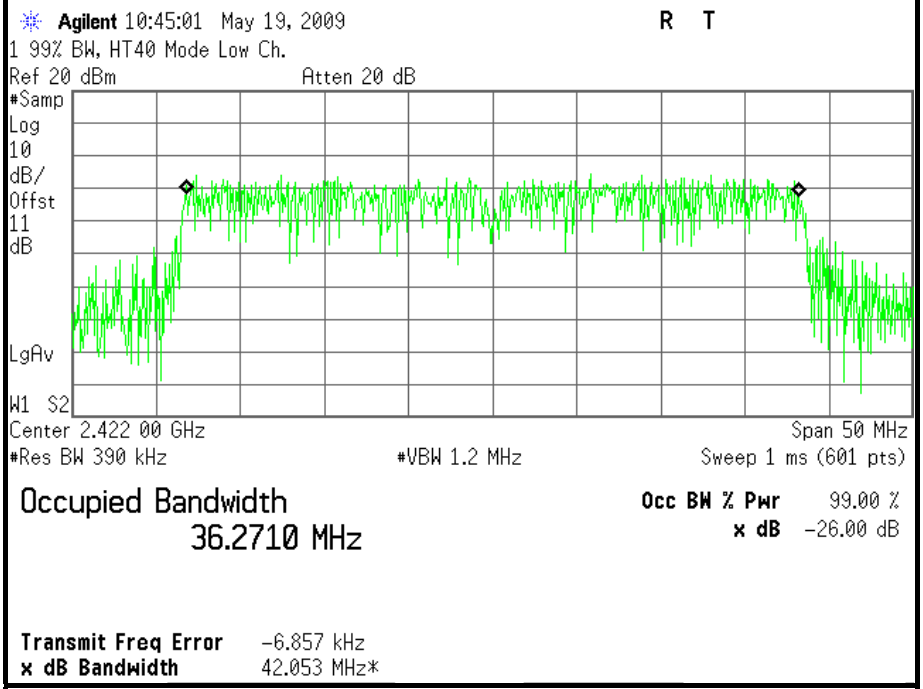
CH Middle (IEEE 802.11n HT40 mode - Chain 0)



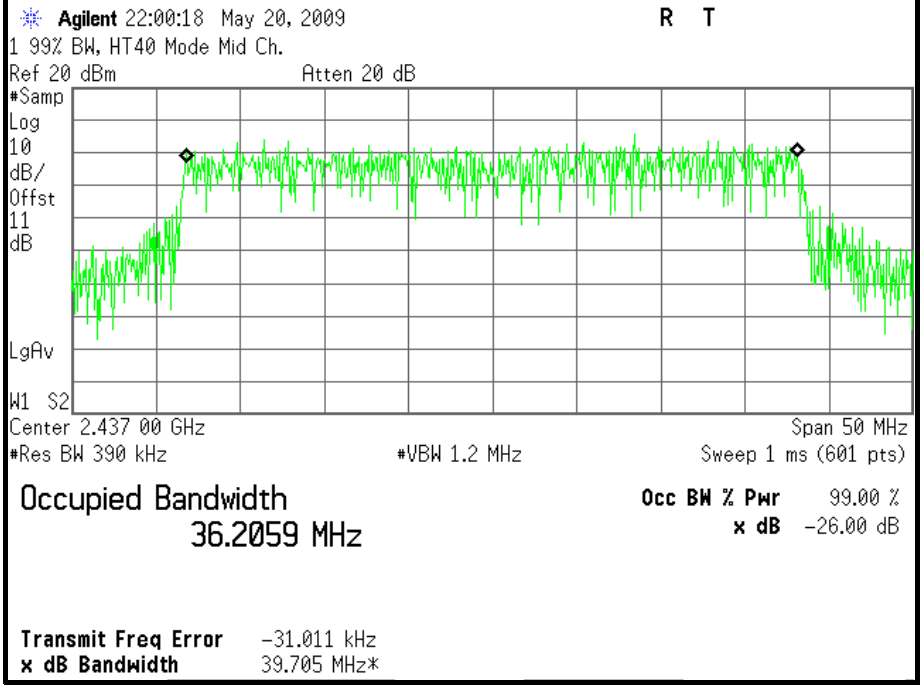
CH High (IEEE 802.11n HT40 mode - Chain 0)



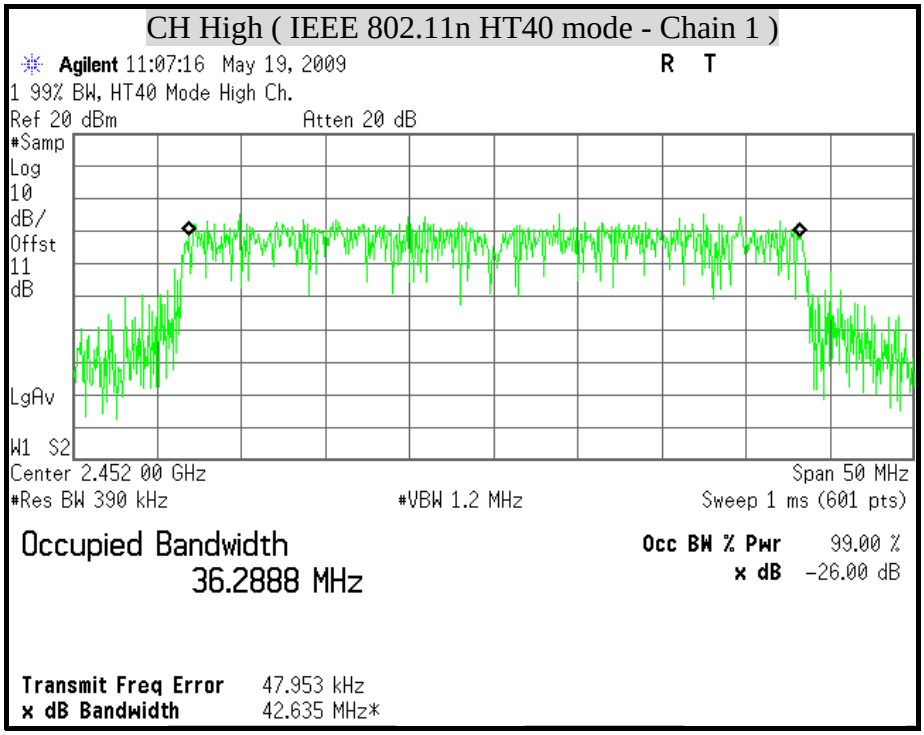
CH Low (IEEE 802.11n HT40 mode - Chain 1)



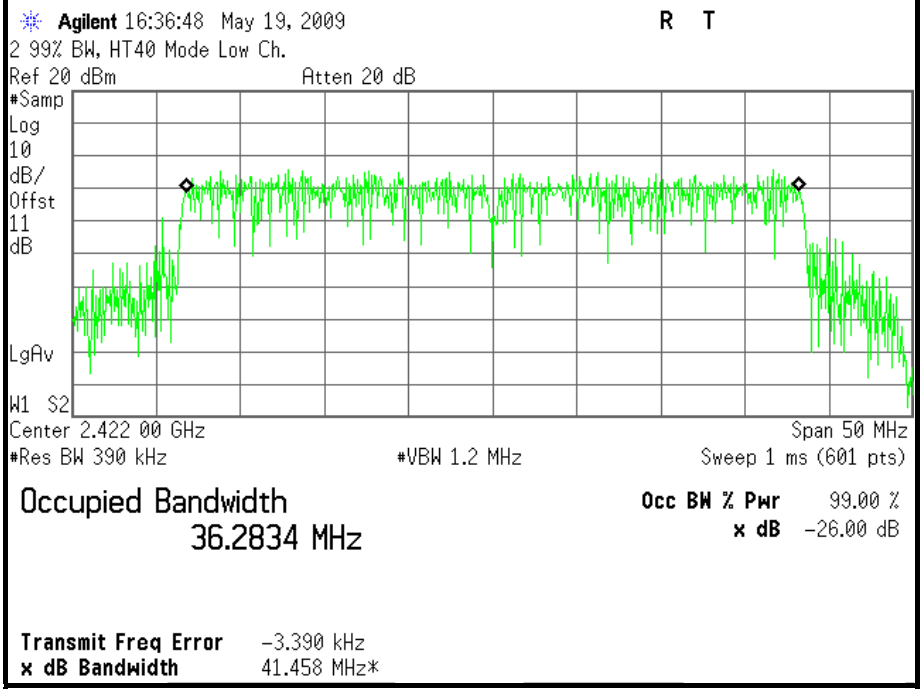
CH Middle (IEEE 802.11n HT40 mode - Chain 1)



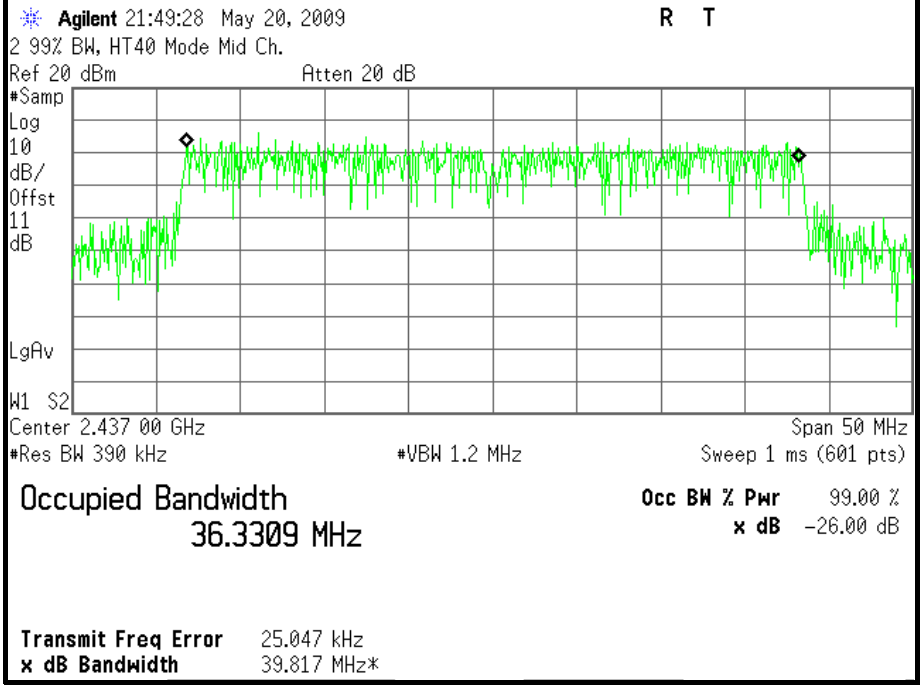
CH High (IEEE 802.11n HT40 mode - Chain 1)



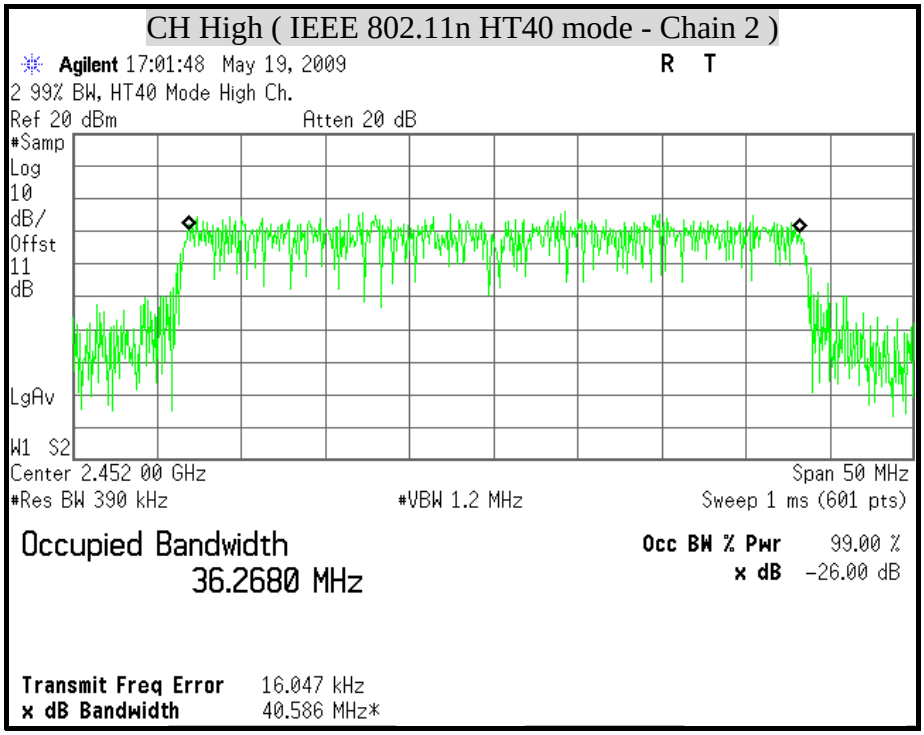
CH Low (IEEE 802.11n HT40 mode - Chain 2)



CH Middle (IEEE 802.11n HT40 mode - Chain 2)



CH High (IEEE 802.11n HT40 mode - Chain 2)



8.3 MAXIMUM PEAK OUTPUT POWER

LIMIT

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

§ 15.247(b) (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands : 1 watt.

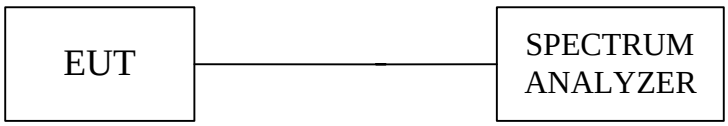
§ 15.247(b) (4) Except as shown in paragraphs (c) of this section , if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2), and (b)(3) of this section , as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
SPECTRUM ANALYZER	AGILENT	E4446A	MY43360132	06/05/2009
SPECTRUM ANALYZER	AGILENT	E4446A	MY46180323	05/26/2010

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP



TEST PROCEDURE

1. The spectrum shall be set as follows :
   Span : 1.5 times channel integration bandwidth.
   RBW : 1MHz
   VBW : 3MHz
   Detector : Peak
   Sweep : Single trace
2. Compute the combined power of all signal responses contained in the trace by covering all the data points.
3. For 99% occupied BW, place the markers at the frequency at which 0.5% of the power lies to the right of the right marker and 0.5% of the power lies to the left of the left marker.
4. The peak output power is the channel power integrated over 99% bandwidth.

TEST RESULTS

No non-compliance noted

Total peak power calculation formula:
10 log (10^ (Chain 0 Power / 10) + 10^ (Chain1 Power / 10) + 10^ (Chain2 Power / 10))

The maximum antenna gain is 3 dBi, therefore the limit is 30 dBm.
In the legacy mode, the effective antenna gain is 3 + 10 × Log (3) = 7.77 dBi.

IEEE 802.11b mode

Channel	Channel Frequency (MHz)	Peak Power (dBm)			Peak Power Total (dBm)	Peak Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2			
Low	2412	20.30	20.11	20.63	25.12	28.23	PASS
Middle	2437	20.91	20.33	21.78	25.81	28.23	PASS
High	2462	18.59	18.18	19.51	23.56	28.23	PASS

Remark:

1. *At finial test to get the worst-case emission at 1Mbps.*
2. *The cable assembly insertion loss of 11dB (including 10 dB pad and 1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

IEEE 802.11g mode

Channel	Channel Frequency (MHz)	Peak Power (dBm)			Peak Power Total (dBm)	Peak Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2			
Low	2412	17.02	16.63	17.18	21.72	28.23	PASS
Middle	2437	20.84	20.51	21.73	25.82	28.23	PASS
High	2462	15.60	15.02	16.10	20.36	28.23	PASS

Remark:

1. *At finial test to get the worst-case emission at 6Mbps.*
2. *The cable assembly insertion loss of 11dB (including 10 dB pad and 1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

IEEE 802.11n HT20 mode (Three TX)

Channel	Channel Frequency (MHz)	Peak Power (dBm)			Peak Power Total (dBm)	Peak Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2			
Low	2412	14.65	14.46	15.18	19.54	30.00	PASS
Middle	2437	20.75	20.80	21.62	25.84	30.00	PASS
High	2462	13.98	13.15	14.57	18.70	30.00	PASS

Remark:

1. At finial test to get the worst-case emission at 6.5Mbps.
2. The cable assembly insertion loss of 11dB (including 10 dB pad and 1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

IEEE 802.11n HT40 mode (Three TX)

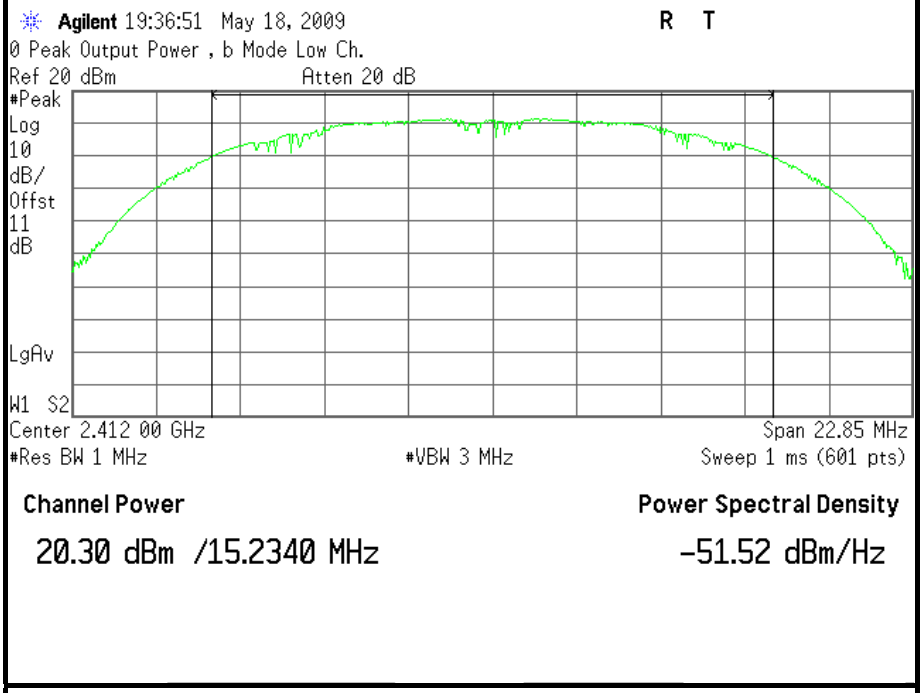
Channel	Channel Frequency (MHz)	Peak Power (dBm)			Peak Power Total (dBm)	Peak Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2			
Low	2422	11.74	11.72	12.36	16.72	30.00	PASS
Middle	2437	20.98	20.37	21.50	25.74	30.00	PASS
High	2452	12.25	11.93	12.95	17.16	30.00	PASS

Remark:

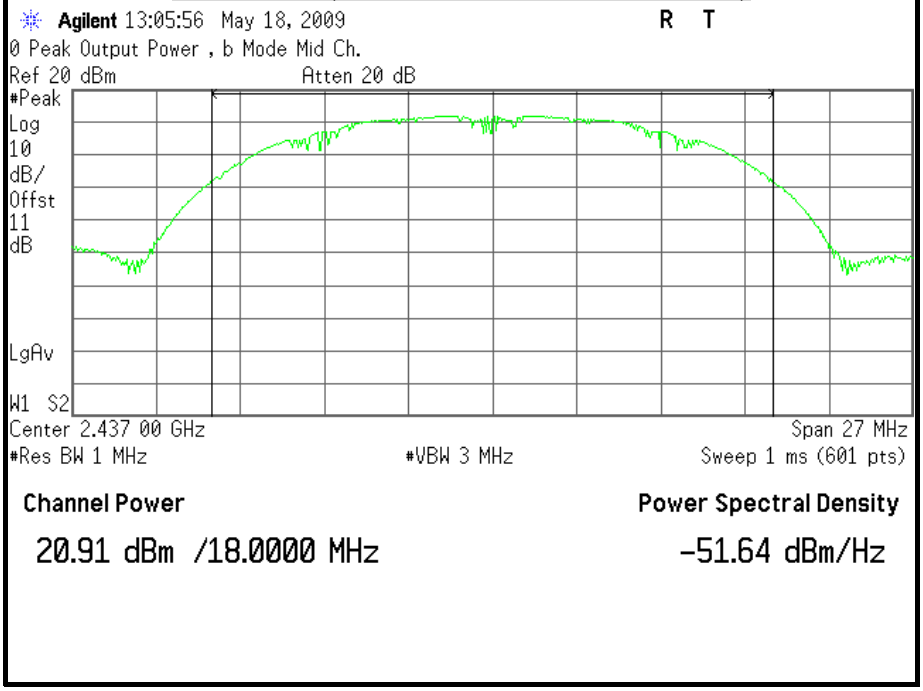
1. At finial test to get the worst-case emission at 13.5Mbps.
2. The cable assembly insertion loss of 11dB (including 10 dB pad and 1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

MAXIMUM PEAK OUTPUT POWER (IEEE 802.11b mode)

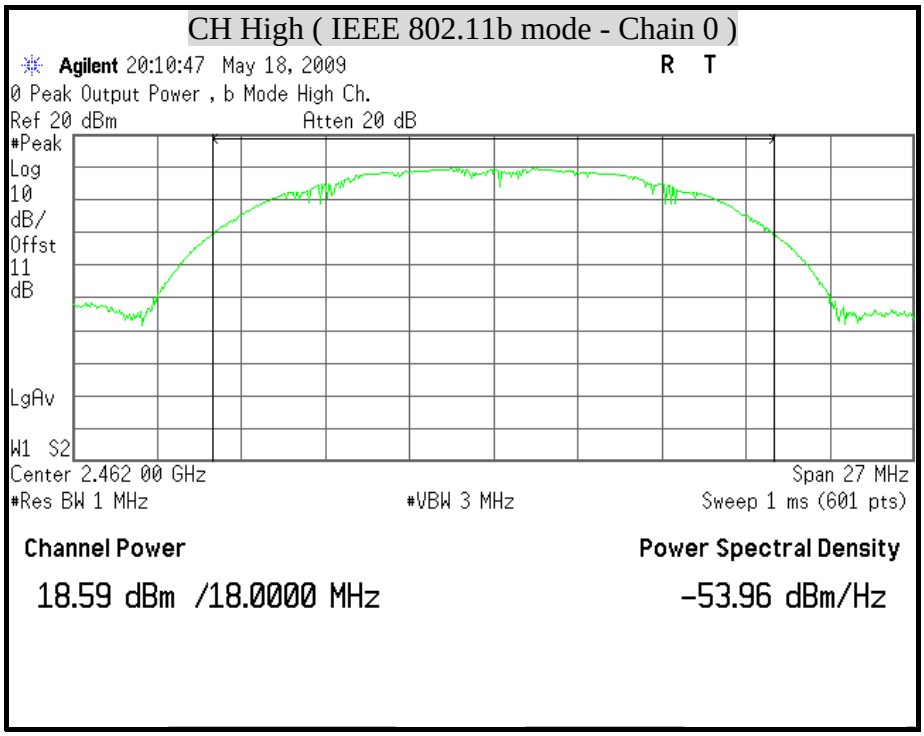
CH Low (IEEE 802.11b mode - Chain 0)



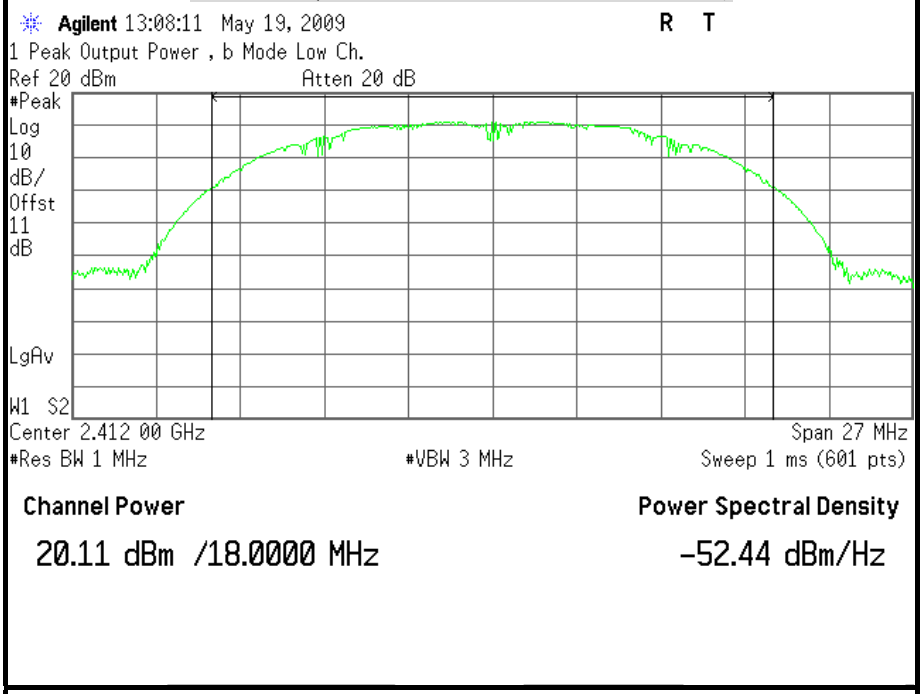
CH Middle (IEEE 802.11b mode - Chain 0)



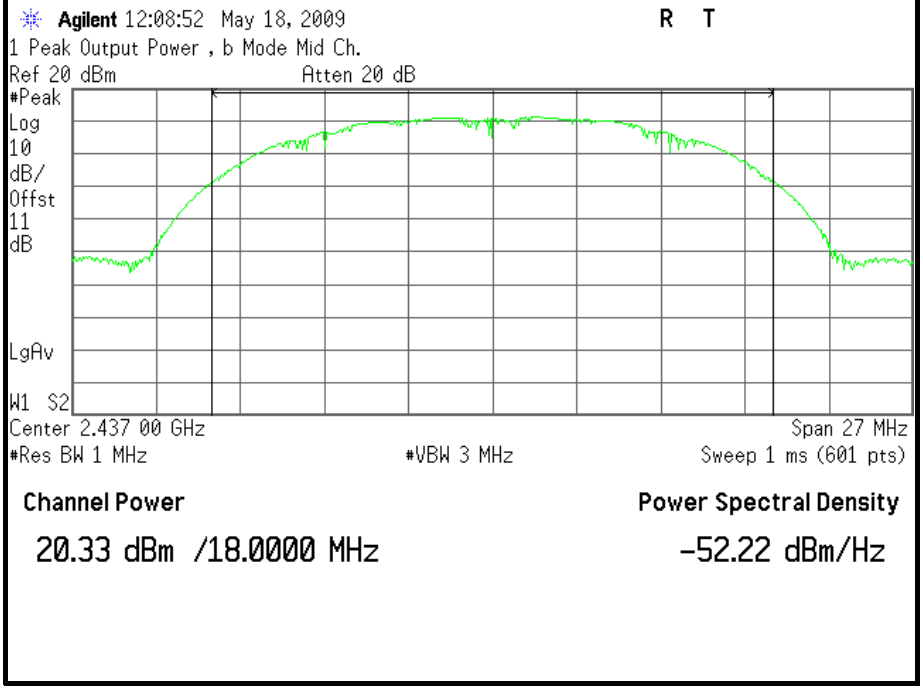
CH High (IEEE 802.11b mode - Chain 0)



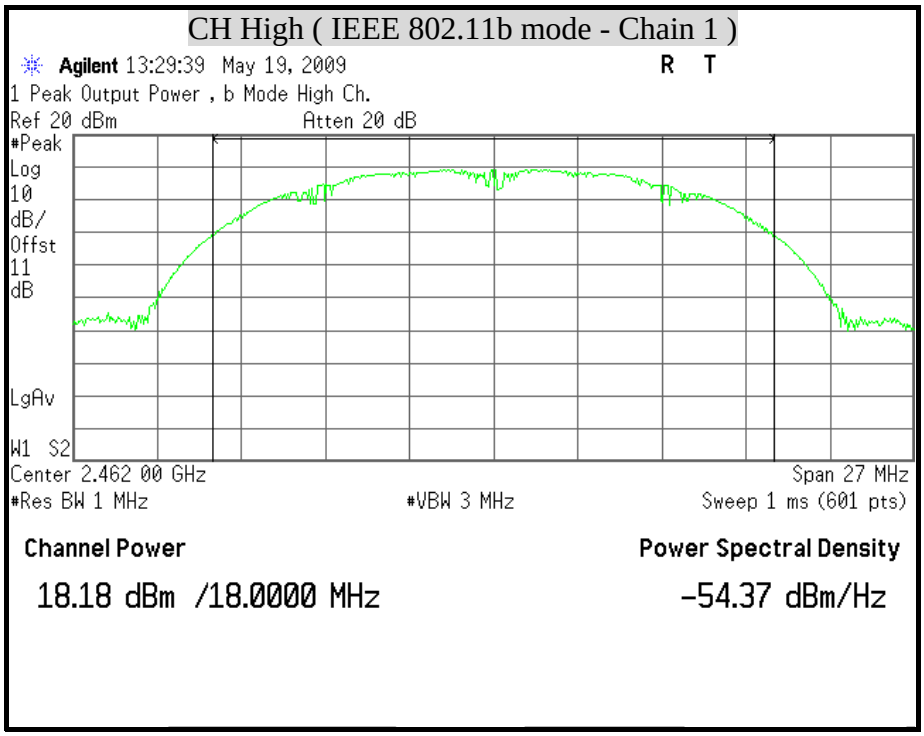
CH Low (IEEE 802.11b mode - Chain 1)



CH Middle (IEEE 802.11b mode - Chain 1)



CH High (IEEE 802.11b mode - Chain 1)



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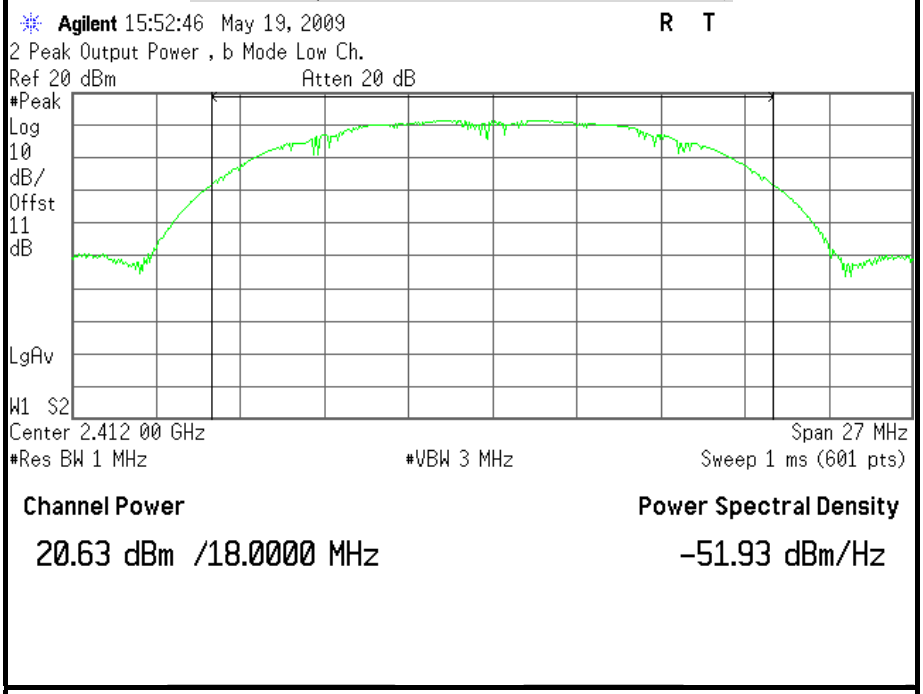

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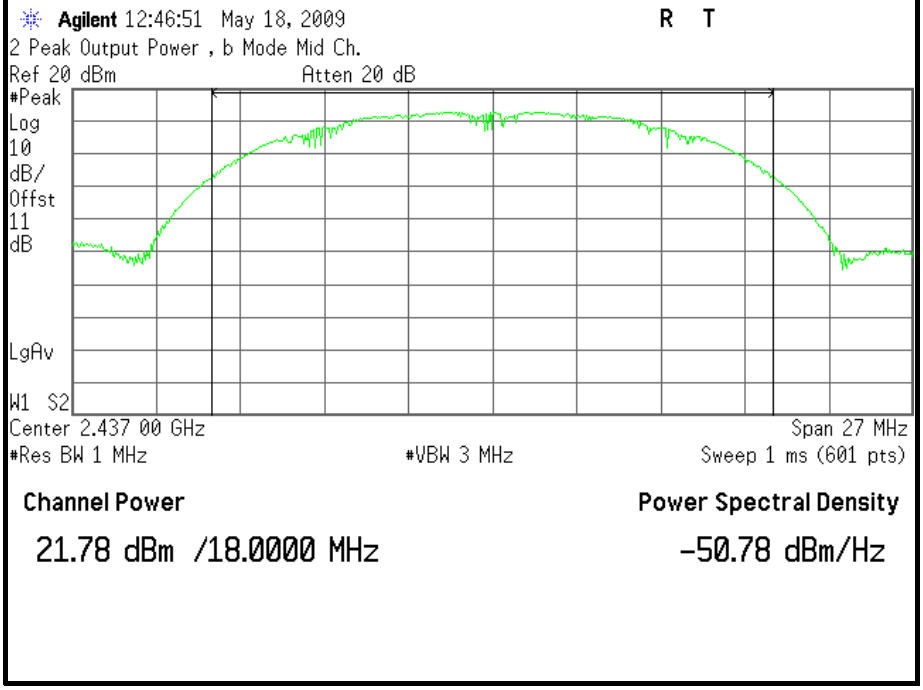

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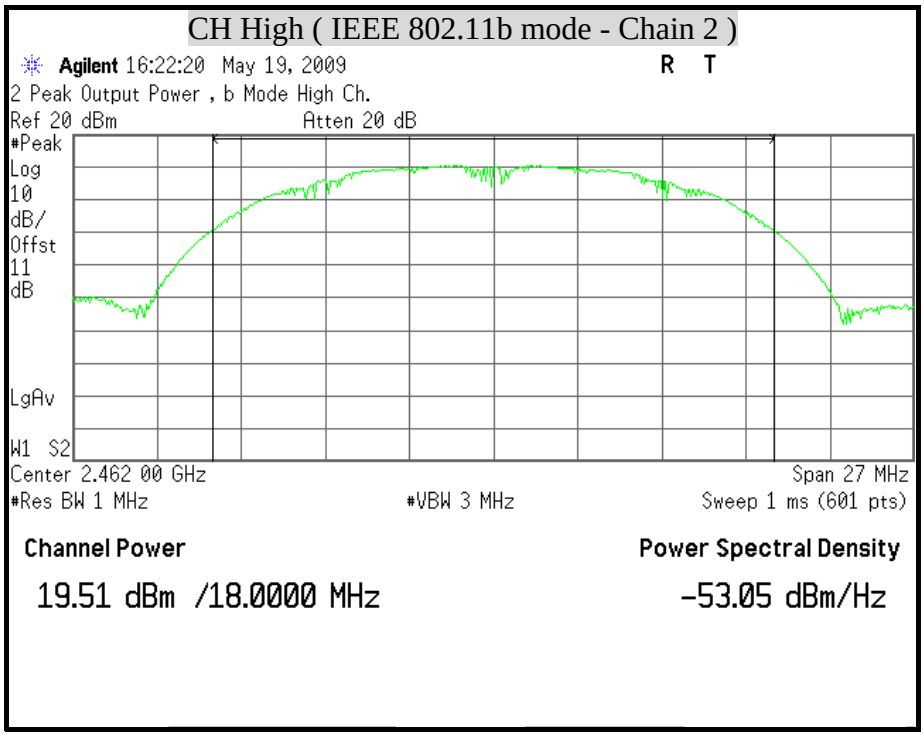
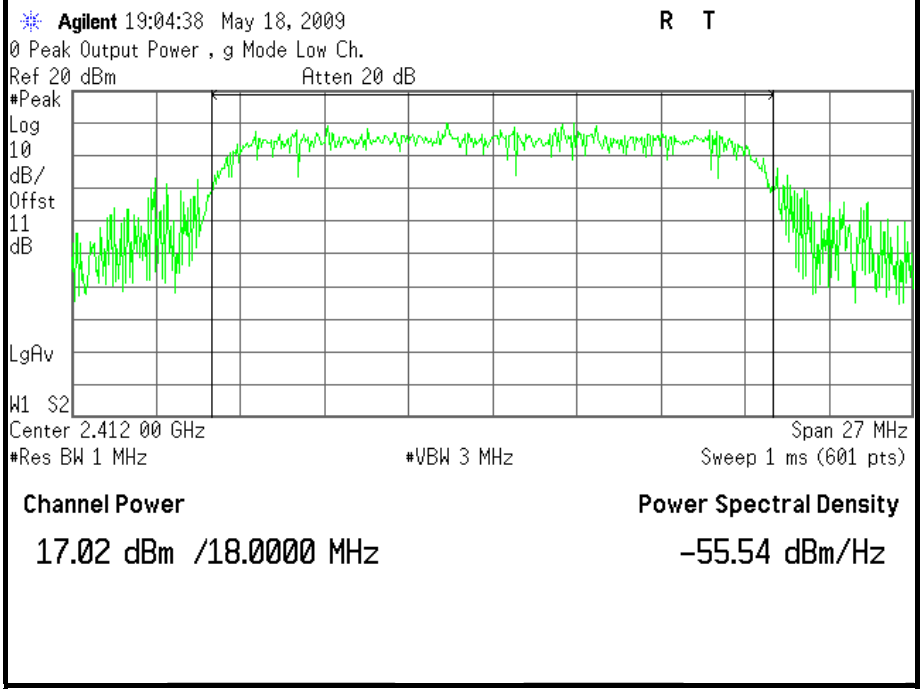
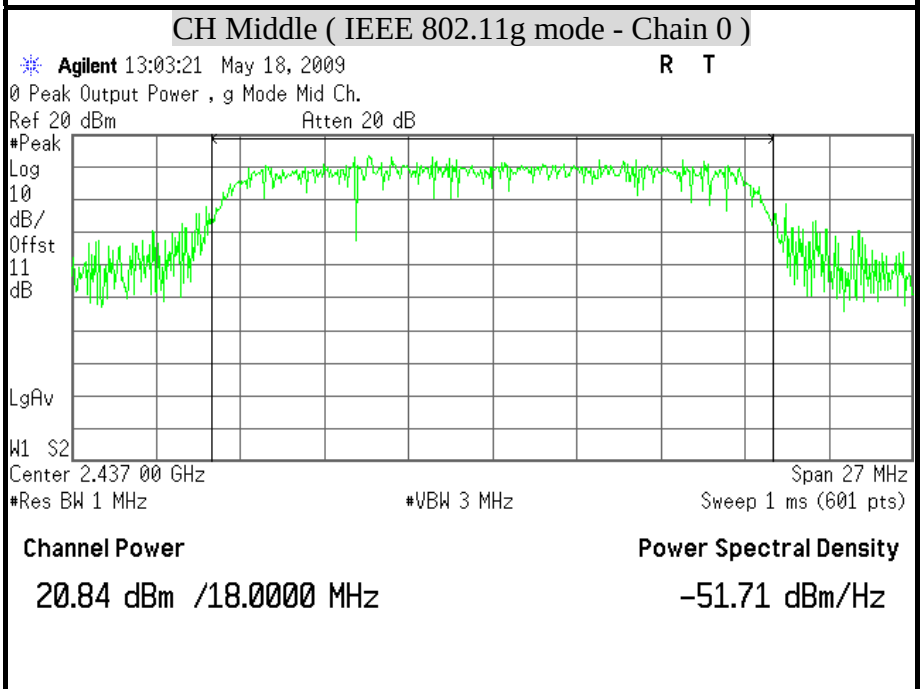


MAXIMUM PEAK OUTPUT POWER (IEEE 802.11g mode)

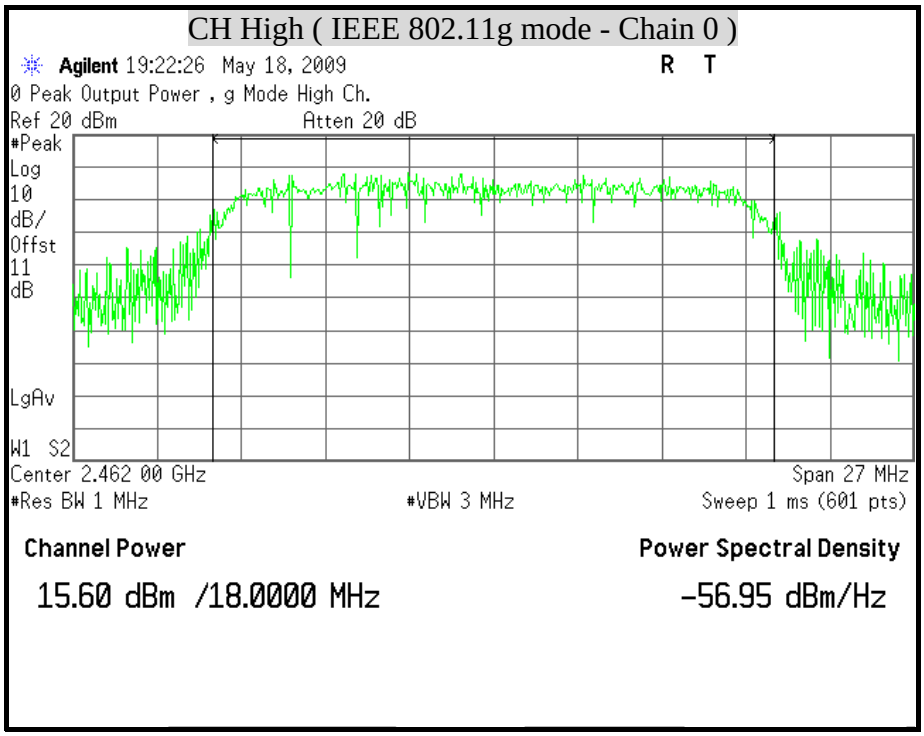
CH Low (IEEE 802.11g mode - Chain 0)



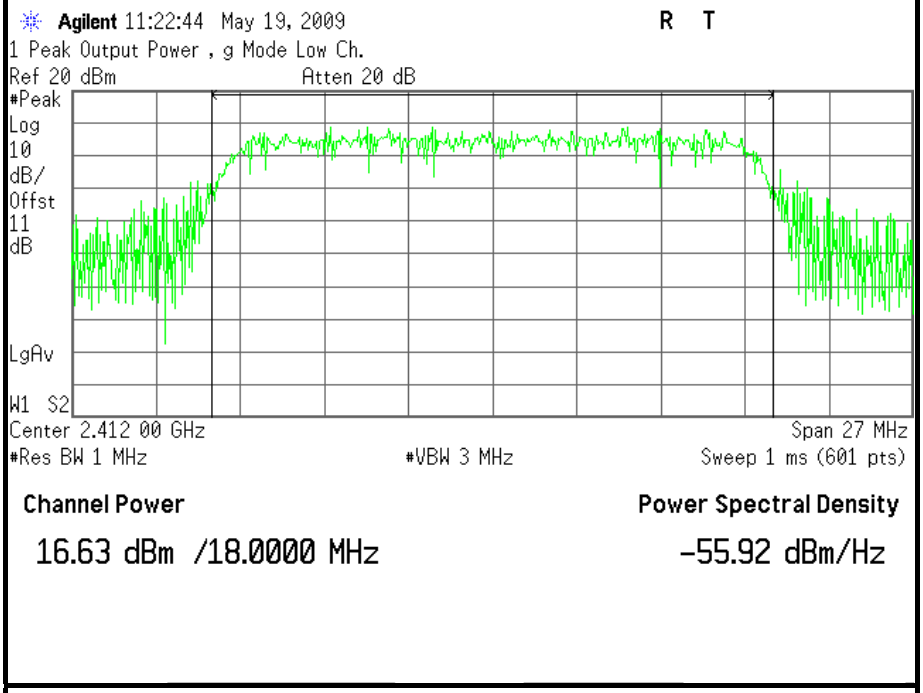
CH Middle (IEEE 802.11g mode - Chain 0)



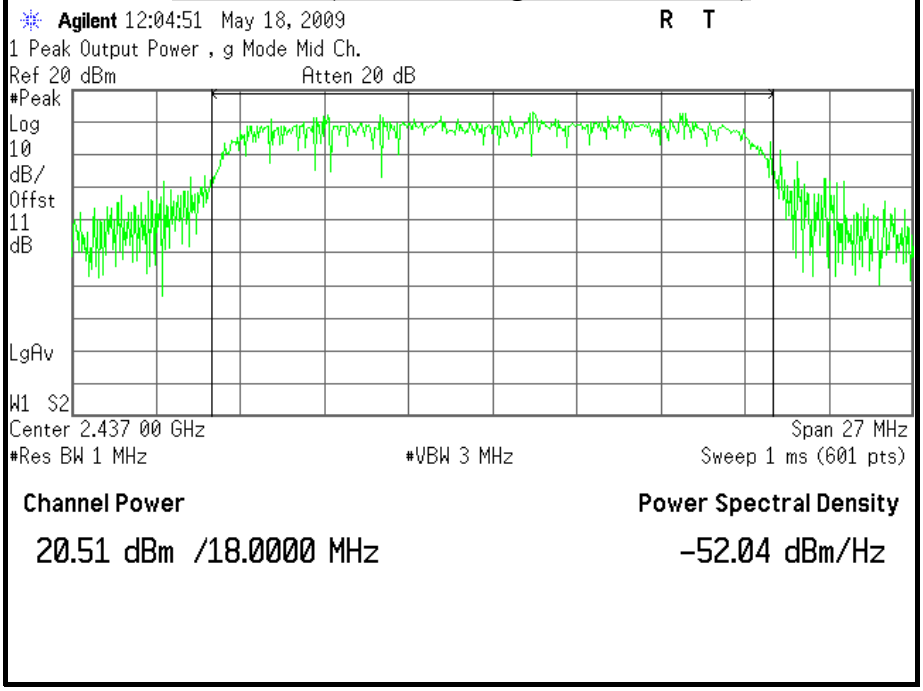
CH High (IEEE 802.11g mode - Chain 0)



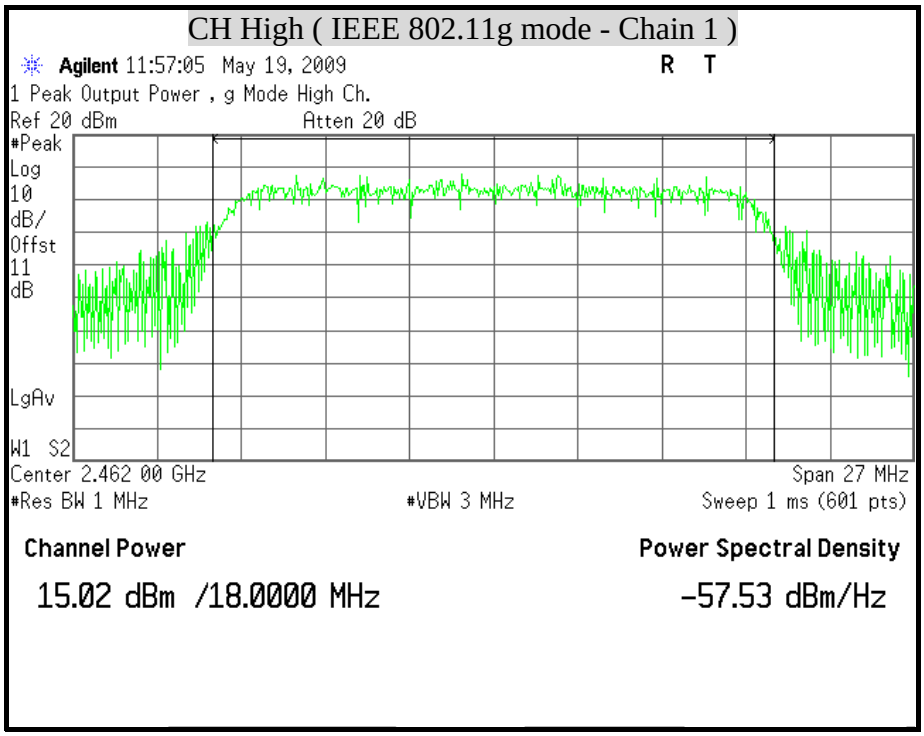
CH Low (IEEE 802.11g mode - Chain 1)



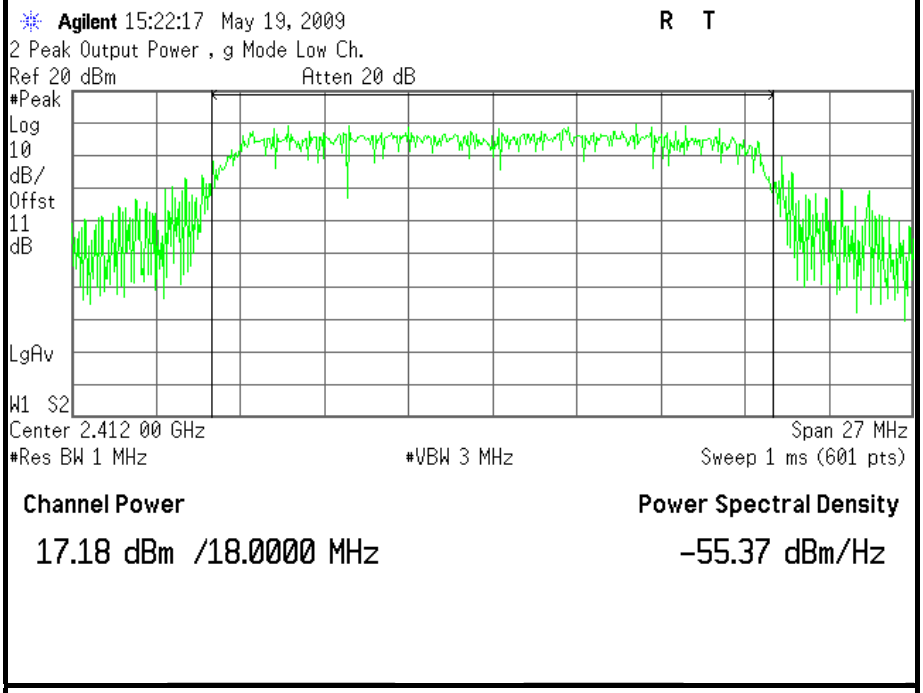
CH Middle (IEEE 802.11g mode - Chain 1)



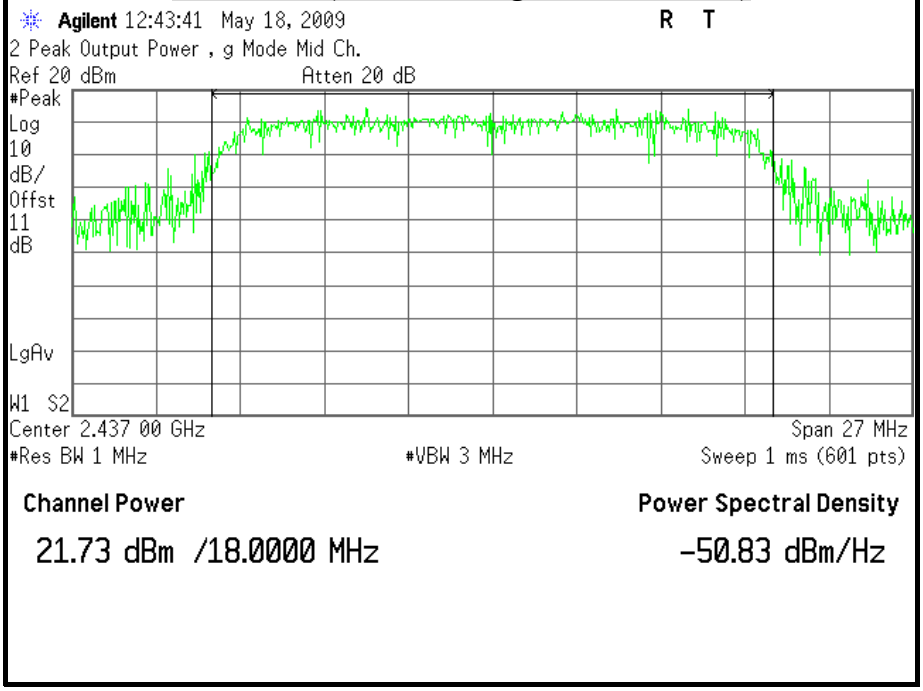
CH High (IEEE 802.11g mode - Chain 1)



CH Low (IEEE 802.11g mode - Chain 2)



CH Middle (IEEE 802.11g mode - Chain 2)



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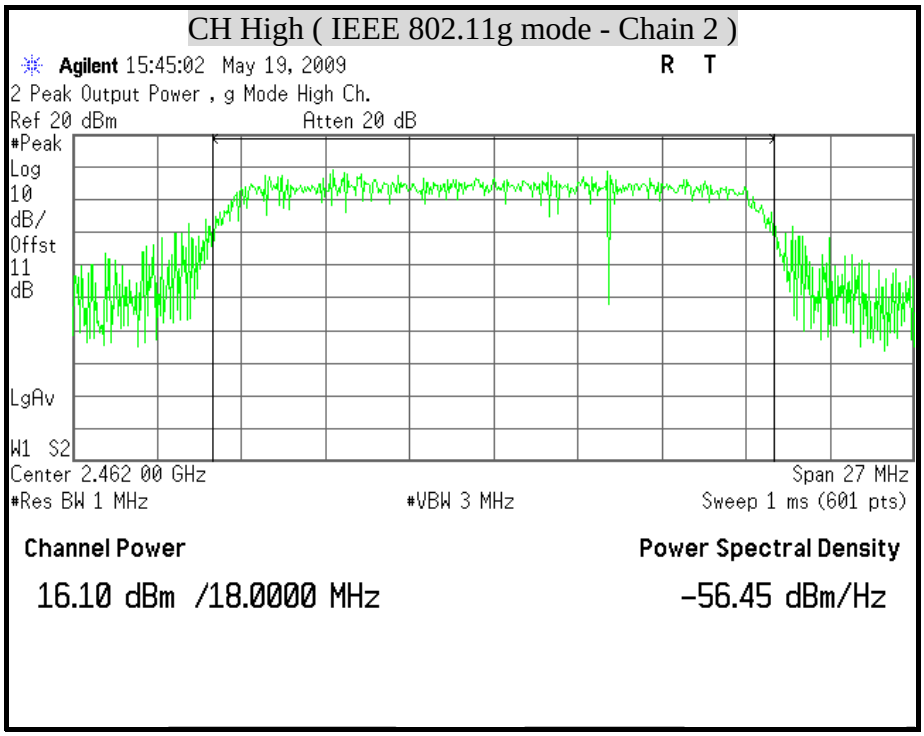
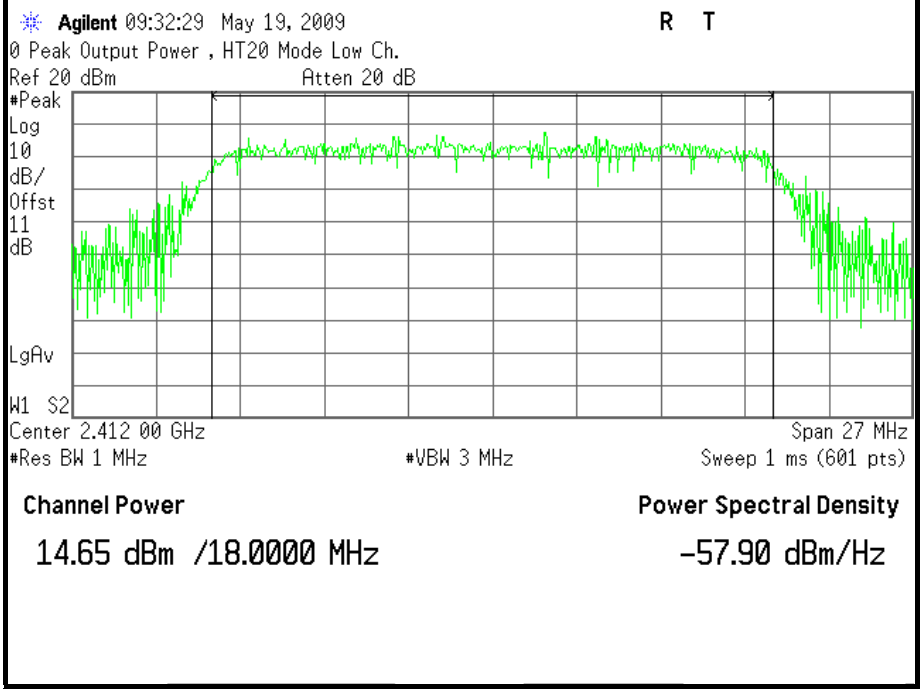
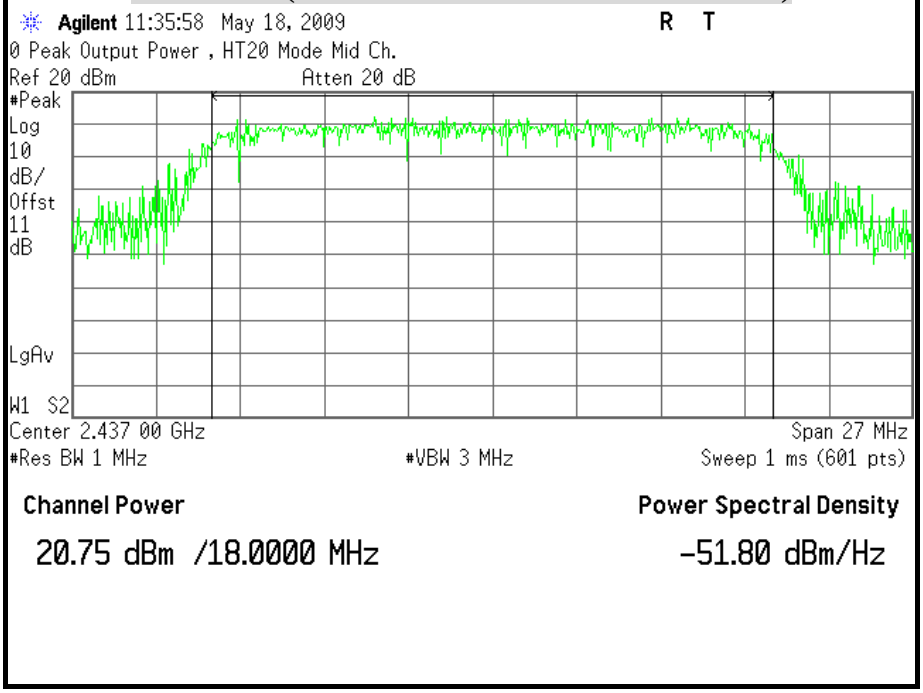


MAXIMUM PEAK OUTPUT POWER (IEEE 802.11n HT20 mode)

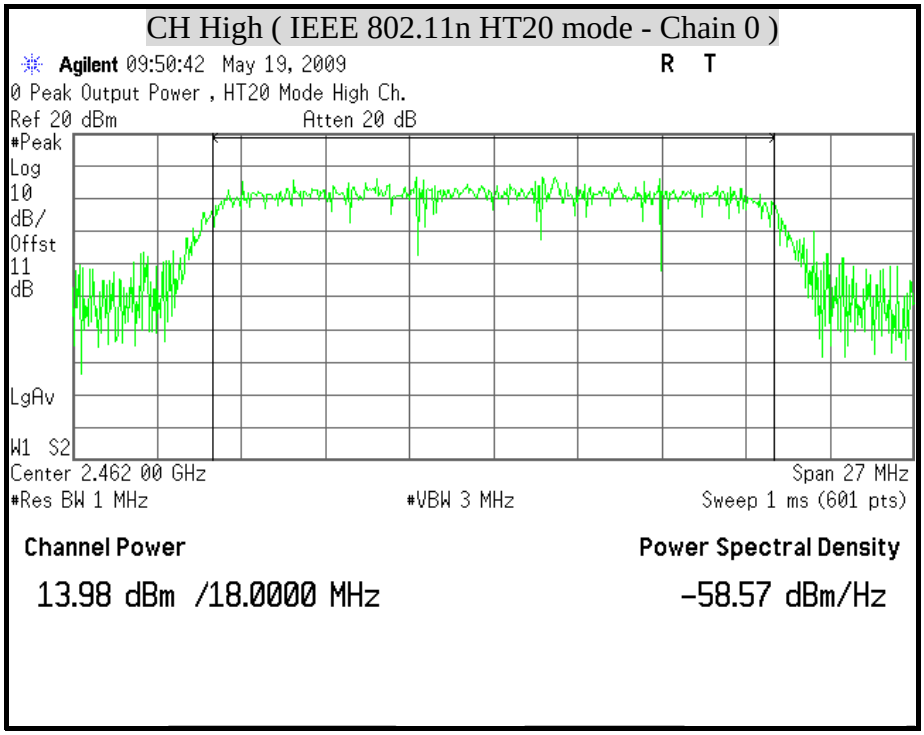
CH Low (IEEE 802.11n HT20 mode - Chain 0)



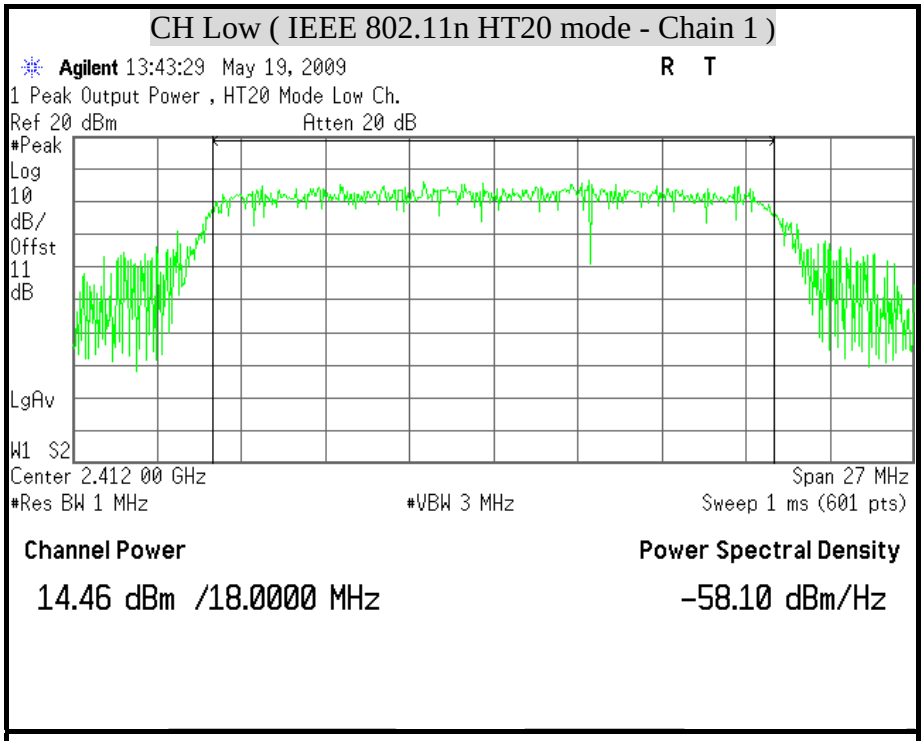
CH Middle (IEEE 802.11n HT20 mode - Chain 0)



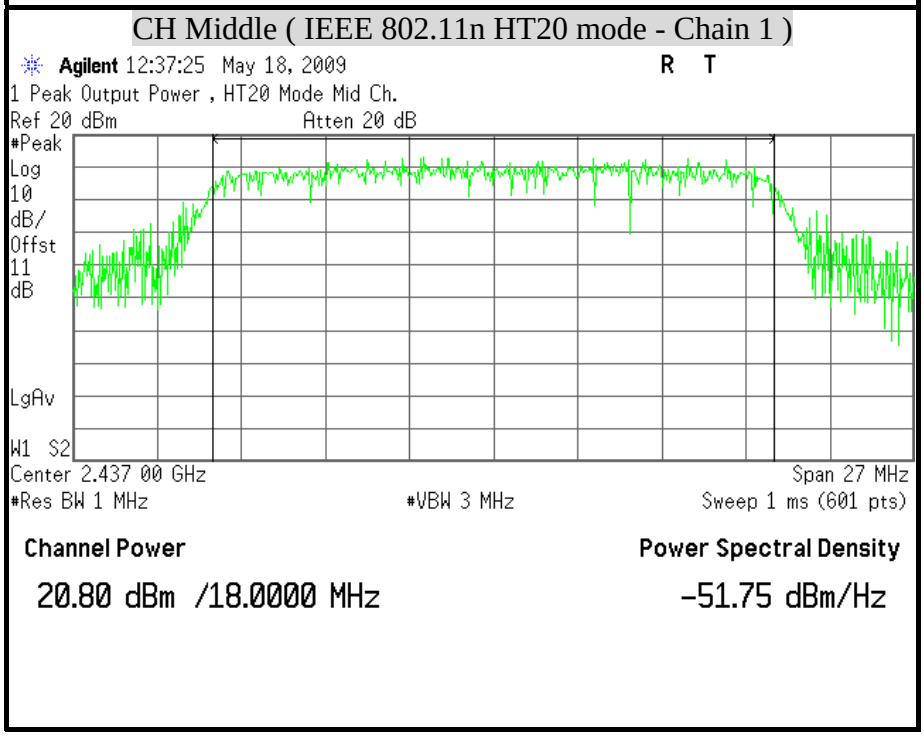
CH High (IEEE 802.11n HT20 mode - Chain 0)



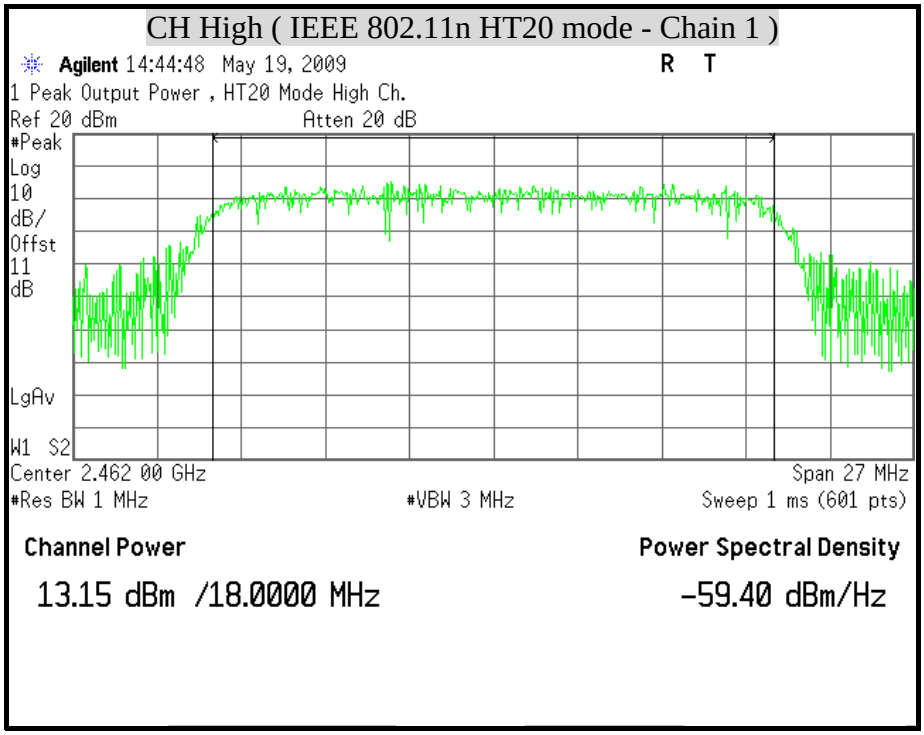
CH Low (IEEE 802.11n HT20 mode - Chain 1)



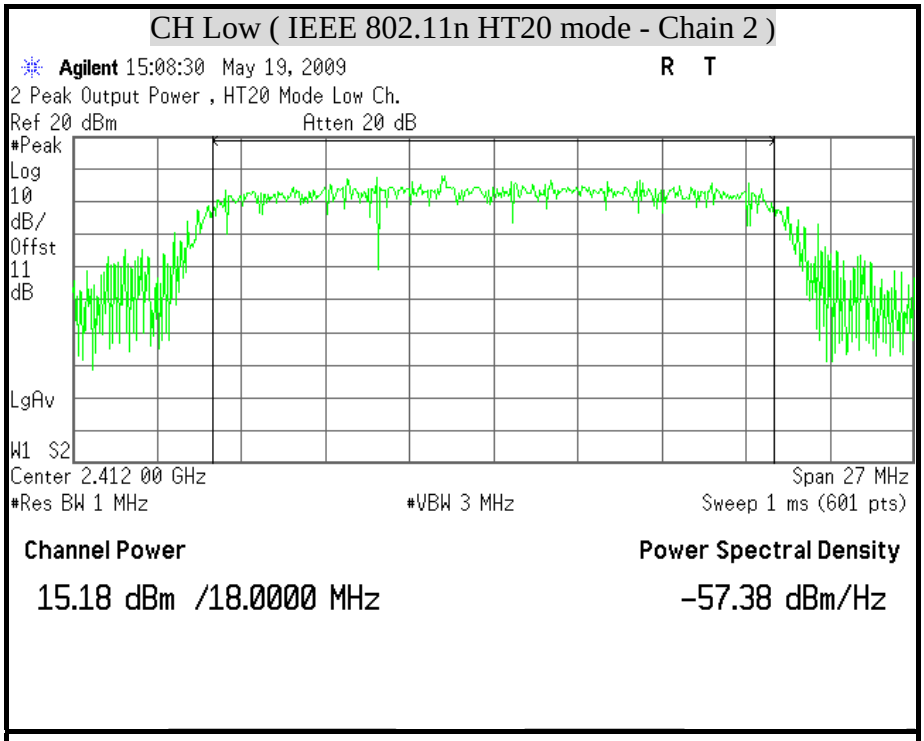
CH Middle (IEEE 802.11n HT20 mode - Chain 1)



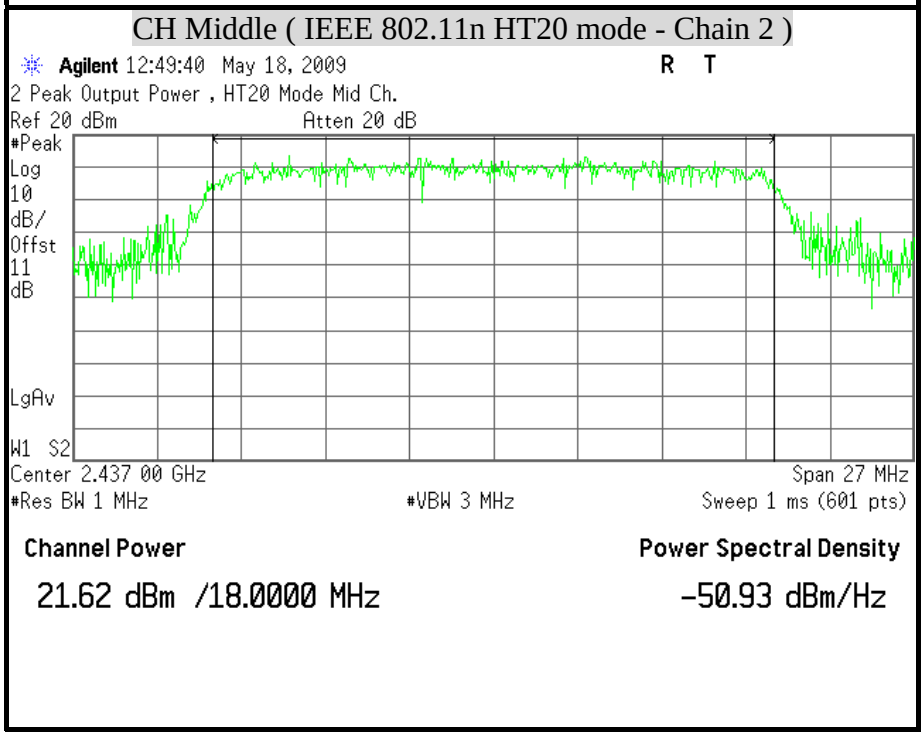
CH High (IEEE 802.11n HT20 mode - Chain 1)



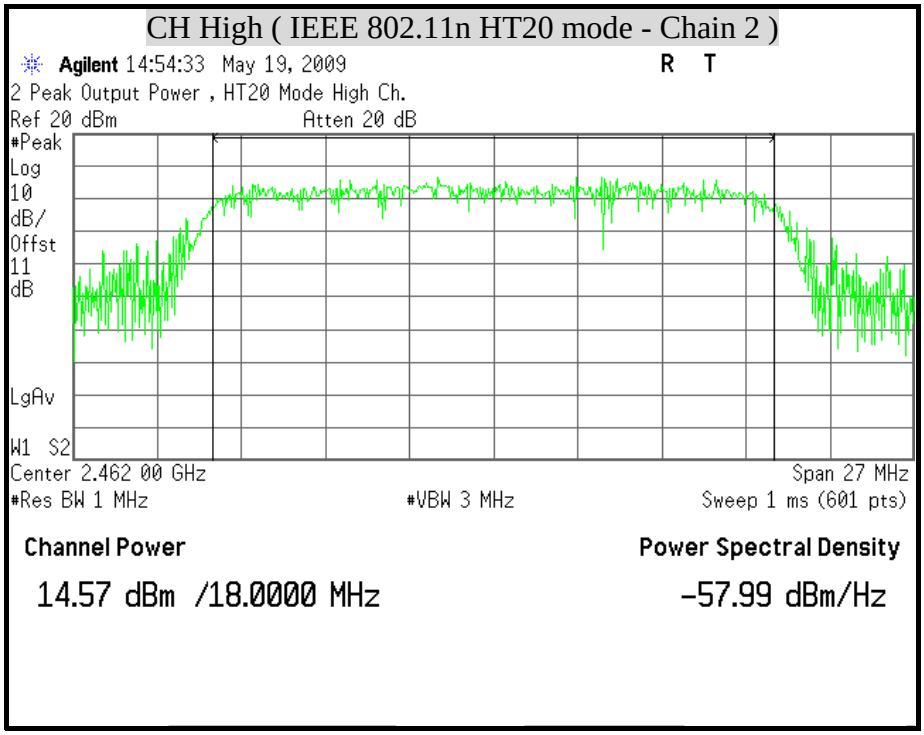
CH Low (IEEE 802.11n HT20 mode - Chain 2)



CH Middle (IEEE 802.11n HT20 mode - Chain 2)

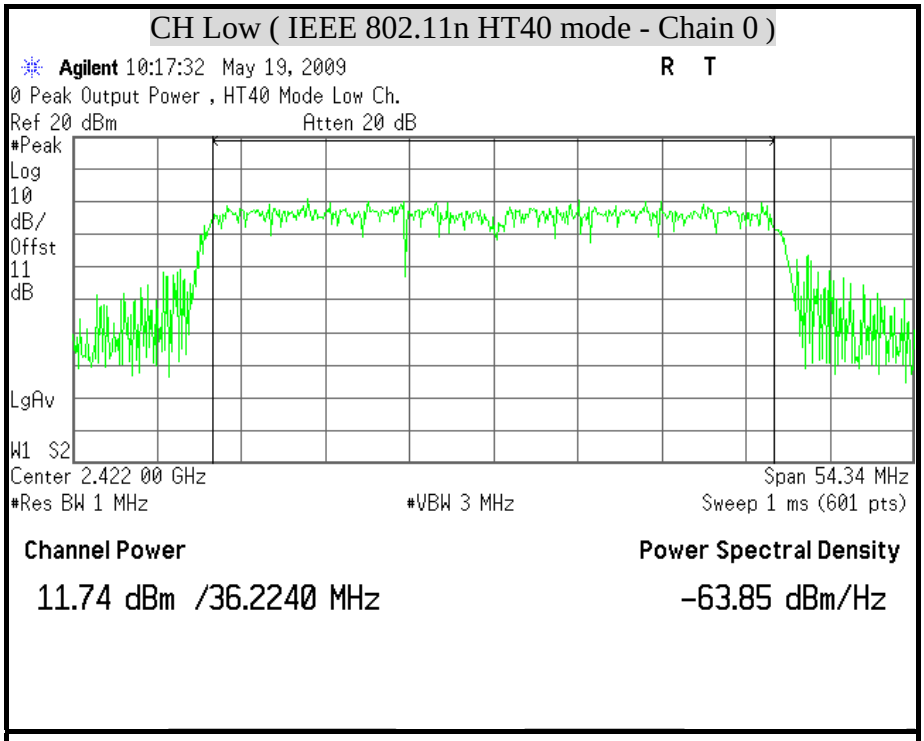


CH High (IEEE 802.11n HT20 mode - Chain 2)

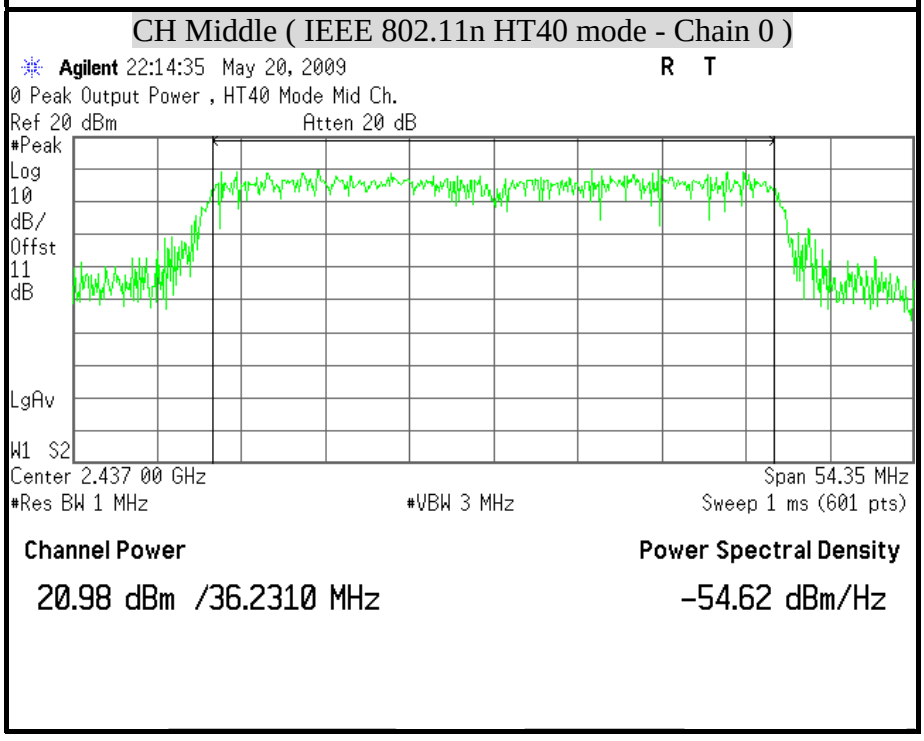


MAXIMUM PEAK OUTPUT POWER (IEEE 802.11n HT40 mode)

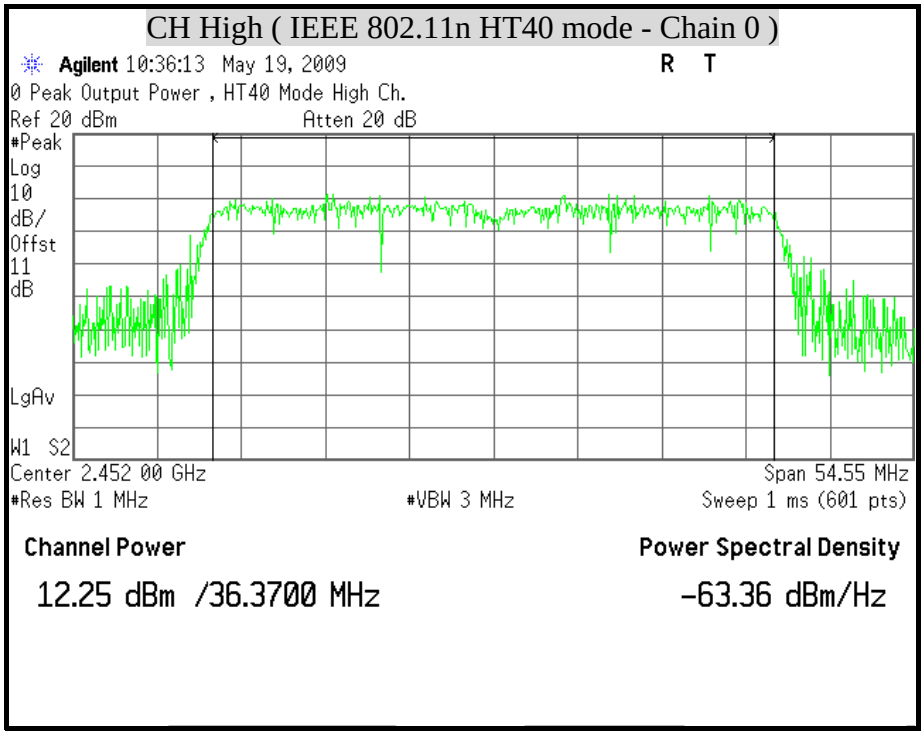
CH Low (IEEE 802.11n HT40 mode - Chain 0)



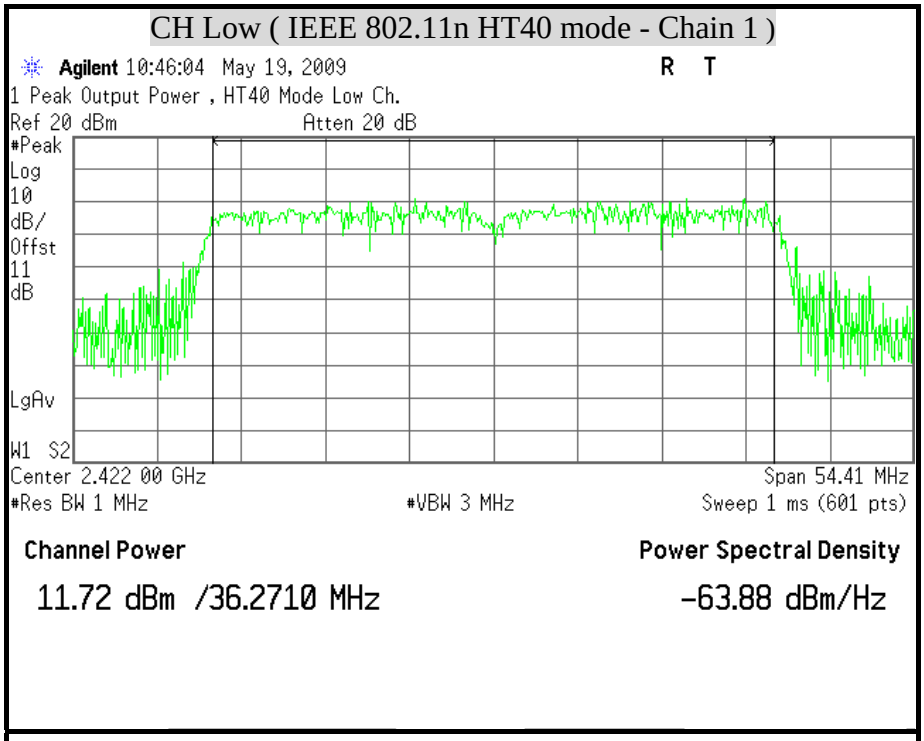
CH Middle (IEEE 802.11n HT40 mode - Chain 0)



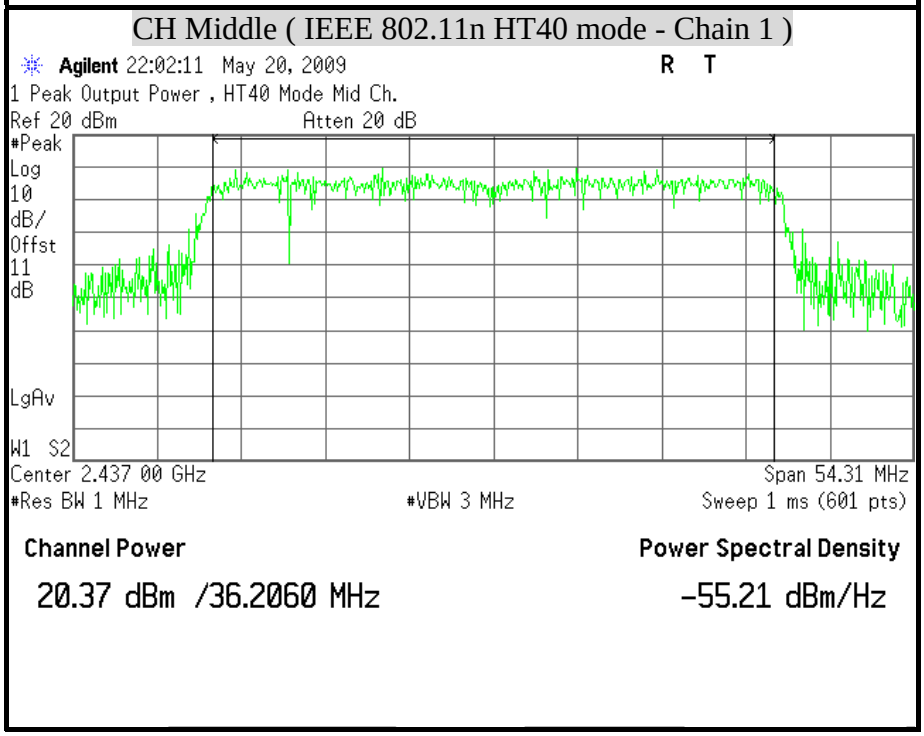
CH High (IEEE 802.11n HT40 mode - Chain 0)



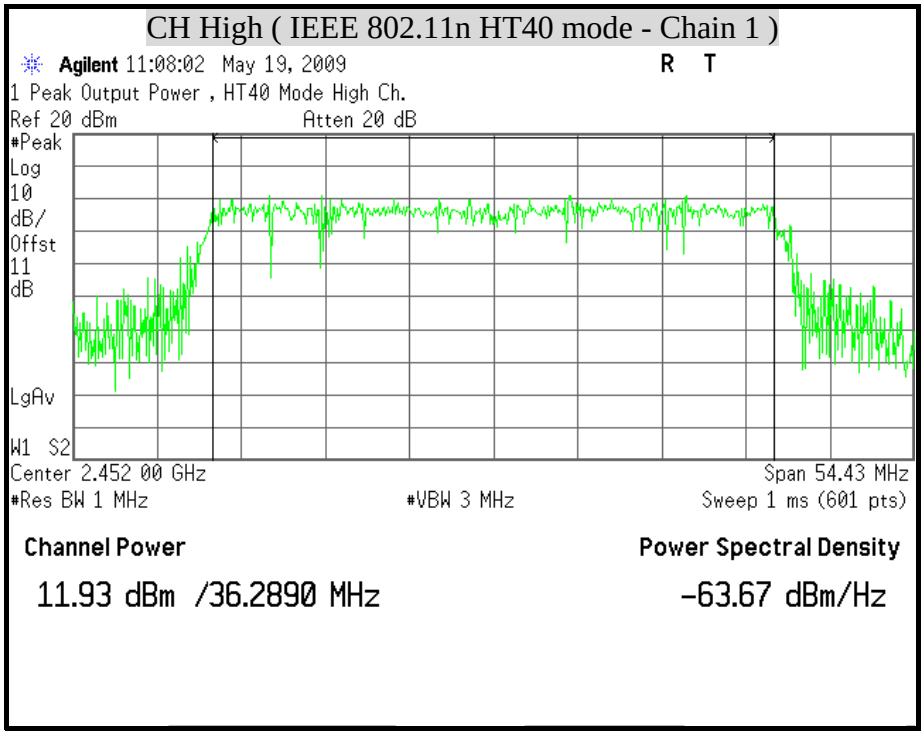
CH Low (IEEE 802.11n HT40 mode - Chain 1)



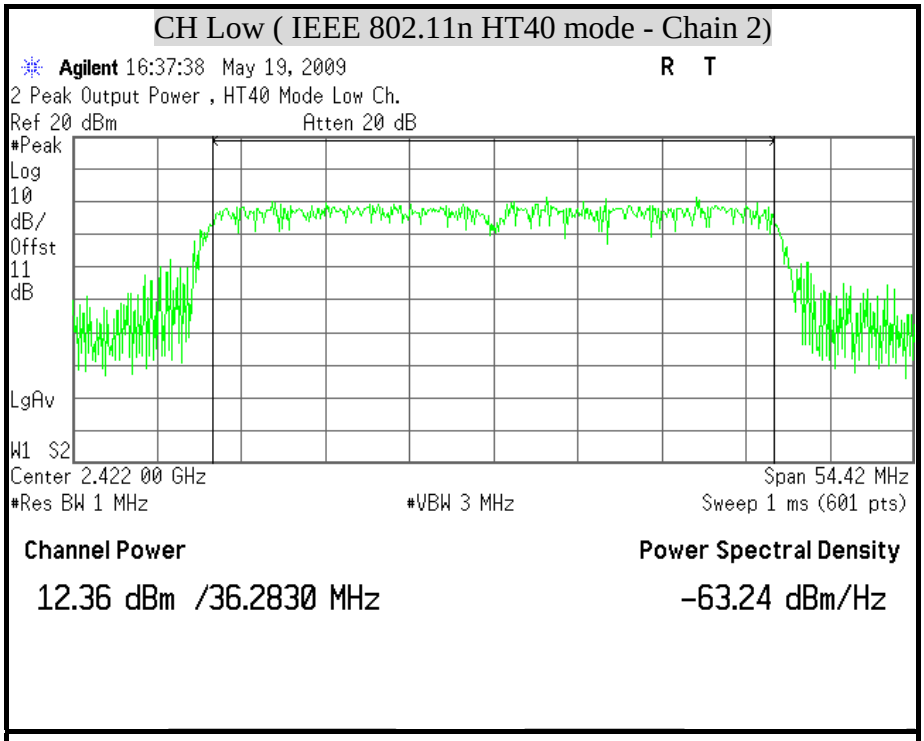
CH Middle (IEEE 802.11n HT40 mode - Chain 1)



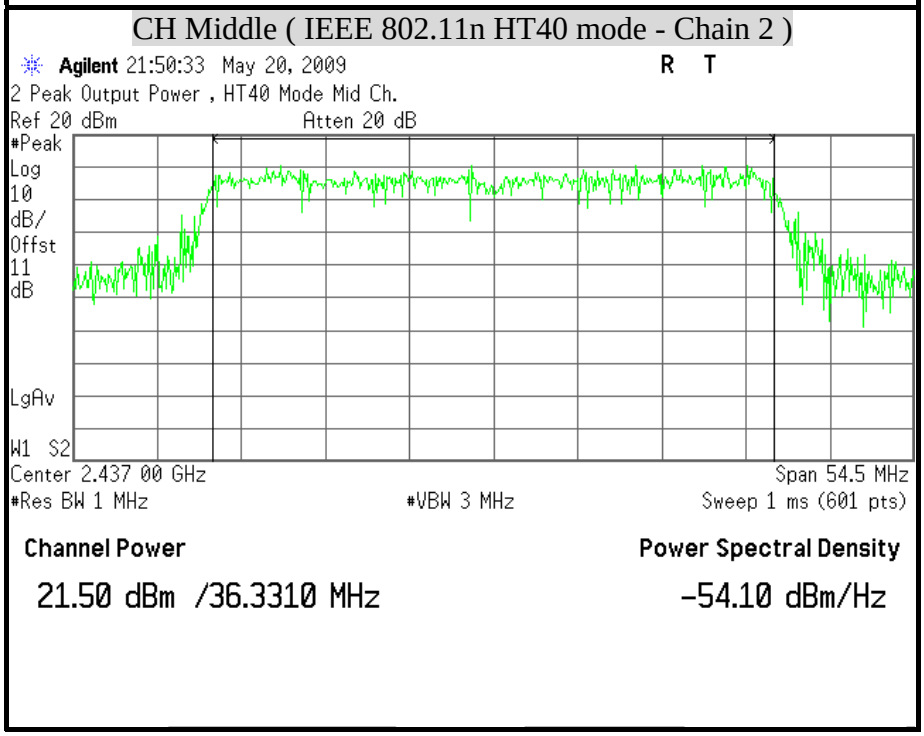
CH High (IEEE 802.11n HT40 mode - Chain 1)



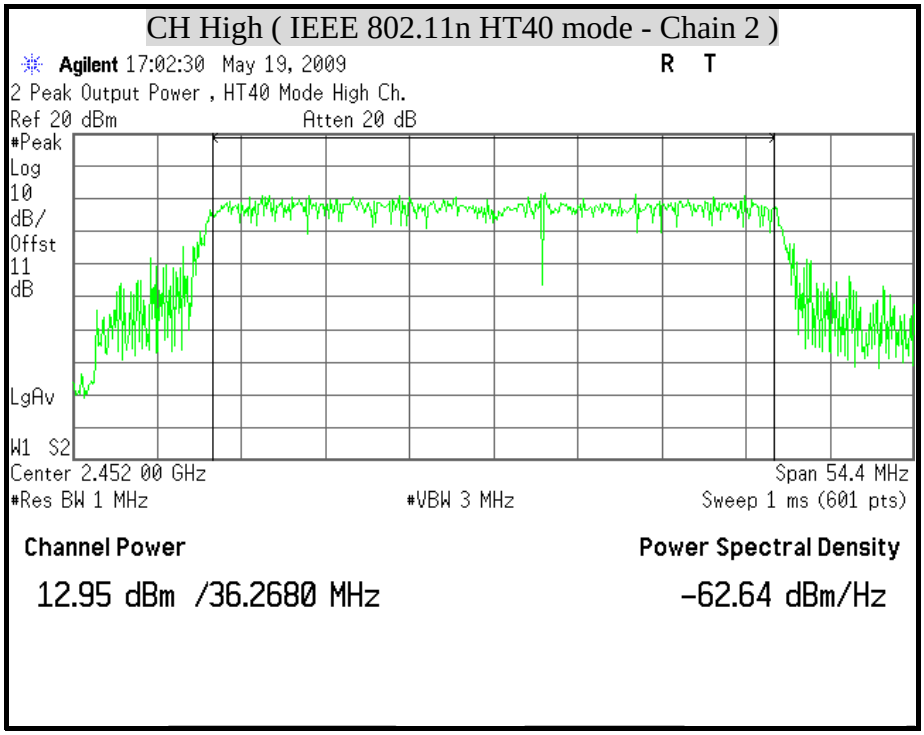
CH Low (IEEE 802.11n HT40 mode - Chain 2)



CH Middle (IEEE 802.11n HT40 mode - Chain 2)



CH High (IEEE 802.11n HT40 mode - Chain 2)



8.4 MAXIMUM PERMISSIBLE EXPOSURE

According to FCC 1.1310 : The criteria listed in the following table shall be used to evaluate theenvironment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time
(A) Limits for Occupational / Control Exposures				
300-1,500	--	--	F/300	6
1,500-100,000	--	--	5	6
(B) Limits for General Population / Uncontrol Exposures				
300-1,500	--	--	F/1500	6
1,500-100,000	--	--	1	30

CALCULATIONS

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

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

Where *d = Distance in cm*

P = Power in mW

G = Numeric antenna gain

S = Power density in mW / cm^2

LIMIT

Power Density Limit, S=1.0mW/cm^2

TEST RESULTS

No non-compliance noted

Mode	Antenna Gain (dBi)	Minimum separation distance (cm)	Output Power (dBm)	Numeric antenna gain (dB)	Power Density Limit (mW/cm^2)	Power Density at 20cm (mW/cm^2)
IEEE 802.11b	3	20.0	25.81	2	1.00	0.151259
IEEE 802.11g	3	20.0	25.82	2	1.00	0.151607
IEEE 802.11n HT20	3	20.0	25.84	2	1.00	0.152307
IEEE 802.11n HT40	3	20.0	25.74	2	1.00	0.148840

Remark: *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.*

8.5 AVERAGE POWER

LIMIT

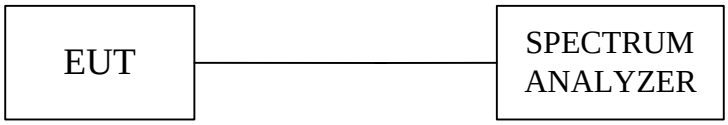
None; for reporting purposes only.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
SPECTRUM ANALYZER	AGILENT	E4446A	MY43360132	06/05/2009
SPECTRUM ANALYZER	AGILENT	E4446A	MY46180323	05/26/2010

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP



TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer.

TEST RESULTS

No non-compliance noted

Total avg power calculation formula:
10 log (10^ (Chain 0 Power / 10) + 10^ (Chain1 Power / 10) + 10^ (Chain2 Power / 10))

IEEE 802.11b mode (Three TX)

Channel	Channel Frequency (MHz)	Average Power (dBm)			Average Power Total (dBm)
		Chain 0	Chain 1	Chain 2	
Low	2412	17.72	17.43	18.32	22.61
Middle	2437	18.39	17.73	19.15	23.23
High	2462	15.98	15.69	16.97	21.01

Remark:

1. At finial test to get the worst-case emission at 1Mbps.
2. The cable assembly insertion loss of 11dB (including 10 dB pad and 1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

IEEE 802.11g mode (Three TX)

Channel	Channel Frequency (MHz)	Average Power (dBm)			Average Power Total (dBm)
		Chain 0	Chain 1	Chain 2	
Low	2412	13.83	13.12	13.73	18.34
Middle	2437	17.39	16.93	18.20	22.30
High	2462	12.00	11.53	12.86	16.93

Remark:

1. At finial test to get the worst-case emission at 6Mbps.
2. The cable assembly insertion loss of 11dB (including 10 dB pad and 1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

IEEE 802.11n HT20 mode (Three TX)

Channel	Channel Frequency (MHz)	Average Power (dBm)			Average Power Total (dBm)
		Chain 0	Chain 1	Chain 2	
Low	2412	11.55	11.11	11.96	16.32
Middle	2437	17.37	17.12	18.03	22.29
High	2462	10.83	10.01	11.23	15.49

Remark:

1. At finial test to get the worst-case emission at 6.5Mbps.
2. The cable assembly insertion loss of 11dB (including 10 dB pad and 1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

IEEE 802.11n HT40 mode (Three TX)

Channel	Channel Frequency (MHz)	Average Power (dBm)			Average Power Total (dBm)
		Chain 0	Chain 1	Chain 2	
Low	2422	8.75	8.39	9.17	13.55
Middle	2437	17.27	16.95	18.05	22.21
High	2452	8.95	8.54	9.72	13.86

Remark:

1. At finial test to get the worst-case emission at 13.5Mbps.
2. The cable assembly insertion loss of 11dB (including 10 dB pad and 1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

8.6 POWER SPECTRAL DENSITY

LIMIT

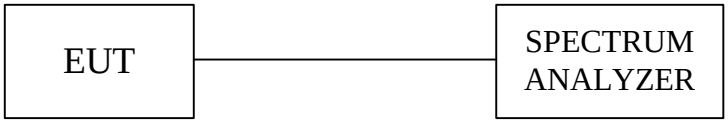
§ 15.247(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
SPECTRUM ANALYZER	AGILENT	E4446A	MY43360132	06/05/2009
SPECTRUM ANALYZER	AGILENT	E4446A	MY46180323	05/26/2010

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP



Combined mode

TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using RBW＝3KHz and VBW≧RBW, set sweep time＝span / 3KHz.

The power spectral density was measured and recorded.

The sweep time is allowed to be longer than span / 3KHz for a full response of the mixer in the spectrum analyzer.

TEST RESULTS

No non-compliance noted

Total peak power calculation formula:
10 log (10^ (Chain 0 PPSD / 10) + 10^ (Chain1 PPSD / 10) + 10^ (Chain2 PPSD / 10))

IEEE 802.11b mode (Three TX)

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)			PPSD Total (dBm)	Maxmum Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2			
Low	2412	-5.47	-5.47	-4.26	-0.25	8	PASS
Middle	2437	-6.34	-5.45	-4.14	-0.44	8	PASS
High	2462	-8.98	-7.36	-5.93	-2.47	8	PASS

Remark:

1. At finial test to get the worst-case emission at 1Mbps.
2. The cable assembly insertion loss of 11dB (including 10 dB pad and 1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

IEEE 802.11b Combined mode (Three TX)

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Maxmum Limit (dBm)	Pass / Fail
Low	2412	3.67	8	PASS
Middle	2437	4.36	8	PASS
High	2462	2.93	8	PASS

Remark:

1. At finial test to get the worst-case emission at 1Mbps.
2. The cable assembly insertion loss of 16.5dB (including 10 dB pad and 6.5 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

IEEE 802.11g mode (Three TX)

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)			PPSD Total (dBm)	Maxmum Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2			
Low	2412	-11.58	-11.56	-10.53	-6.42	8	PASS
Middle	2437	-6.90	-7.56	-6.29	-2.11	8	PASS
High	2462	-13.60	-13.30	-9.79	-7.09	8	PASS

Remark:

1. At finial test to get the worst-case emission at 6Mbps.
2. The cable assembly insertion loss of 11dB (including 10 dB pad and 1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

IEEE 802.11g Combined mode (Three TX)

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Maxmum Limit (dBm)	Pass / Fail
Low	2412	-1.45	8	PASS
Middle	2437	2.58	8	PASS
High	2462	-3.46	8	PASS

Remark:

1. At finial test to get the worst-case emission at 6Mbps.
2. The cable assembly insertion loss of 16.5dB (including 10 dB pad and 6.5 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

IEEE 802.11n HT20 mode (Three TX)

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)			PPSD Total (dBm)	Maxmum Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2			
Low	2412	-11.77	-14.14	-12.75	-8.00	8	PASS
Middle	2437	-4.97	-8.80	-4.92	-1.12	8	PASS
High	2462	-10.74	-15.42	-9.47	-6.45	8	PASS

Remark:

1. At finial test to get the worst-case emission at 6.5Mbps.
2. The cable assembly insertion loss of 11dB (including 10 dB pad and 1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

IEEE 802.11n HT20 Combined mode (Three TX)

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Maxmum Limit (dBm)	Pass / Fail
Low	2412	-3.29	8	PASS
Middle	2437	2.72	8	PASS
High	2462	-5.42	8	PASS

Remark:

1. At finial test to get the worst-case emission at 6.5Mbps.
2. The cable assembly insertion loss of 16.5dB (including 10 dB pad and 6.5 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

IEEE 802.11n HT40 mode (Three TX)

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)			PPSD Total (dBm)	Maxmum Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2			
Low	2422	-17.93	-19.65	-17.18	-13.36	8	PASS
Middle	2437	-8.84	-5.15	-4.89	-1.18	8	PASS
High	2452	-16.49	-14.49	-12.06	-9.19	8	PASS

Remark:

1. At finial test to get the worst-case emission at 13.5Mbps.
2. The cable assembly insertion loss of 11dB (including 10 dB pad and 1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

IEEE 802.11n HT40 Combined mode (Three TX)

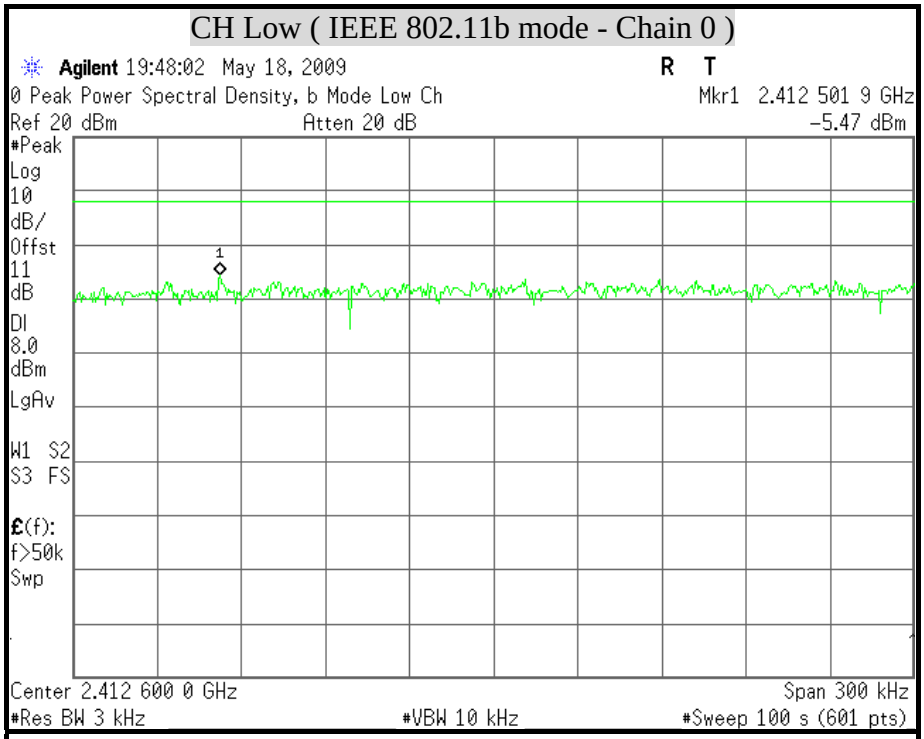
Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Maxmum Limit (dBm)	Pass / Fail
Low	2412	-9.82	8	PASS
Middle	2437	1.88	8	PASS
High	2462	-8.13	8	PASS

Remark:

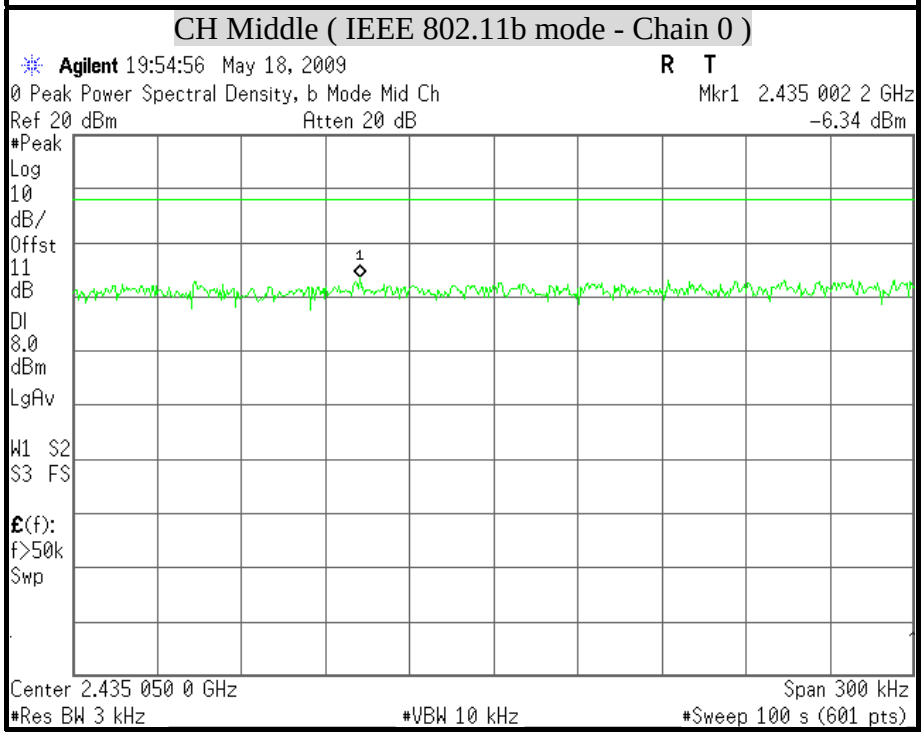
1. At finial test to get the worst-case emission at 13.5Mbps.
2. The cable assembly insertion loss of 16.5dB (including 10 dB pad and 6.5 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

POWER SPECTRAL DENSITY (IEEE 802.11b mode)

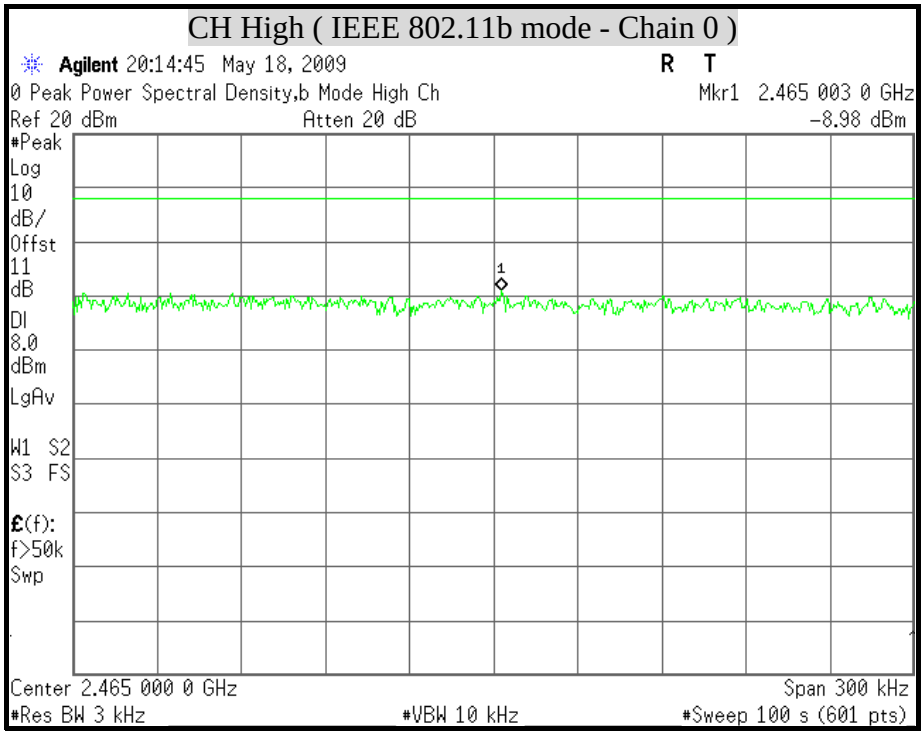
CH Low (IEEE 802.11b mode - Chain 0)



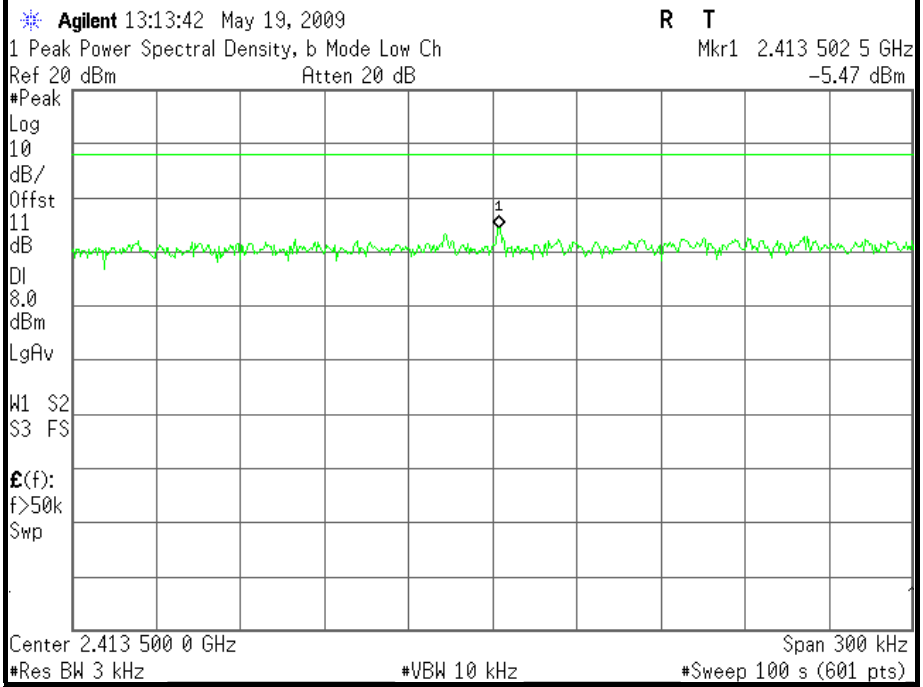
CH Middle (IEEE 802.11b mode - Chain 0)



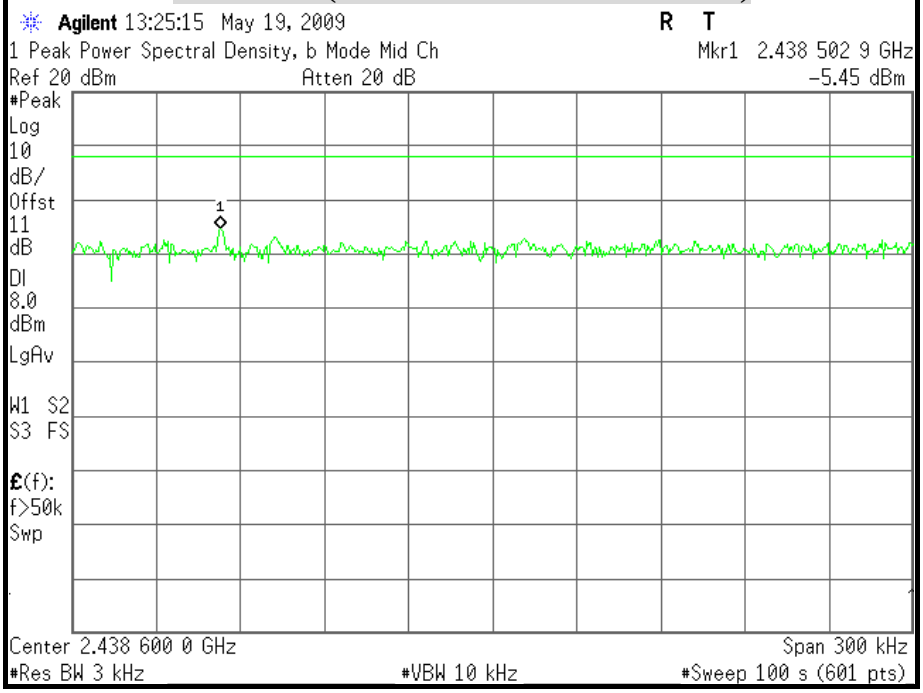
CH High (IEEE 802.11b mode - Chain 0)



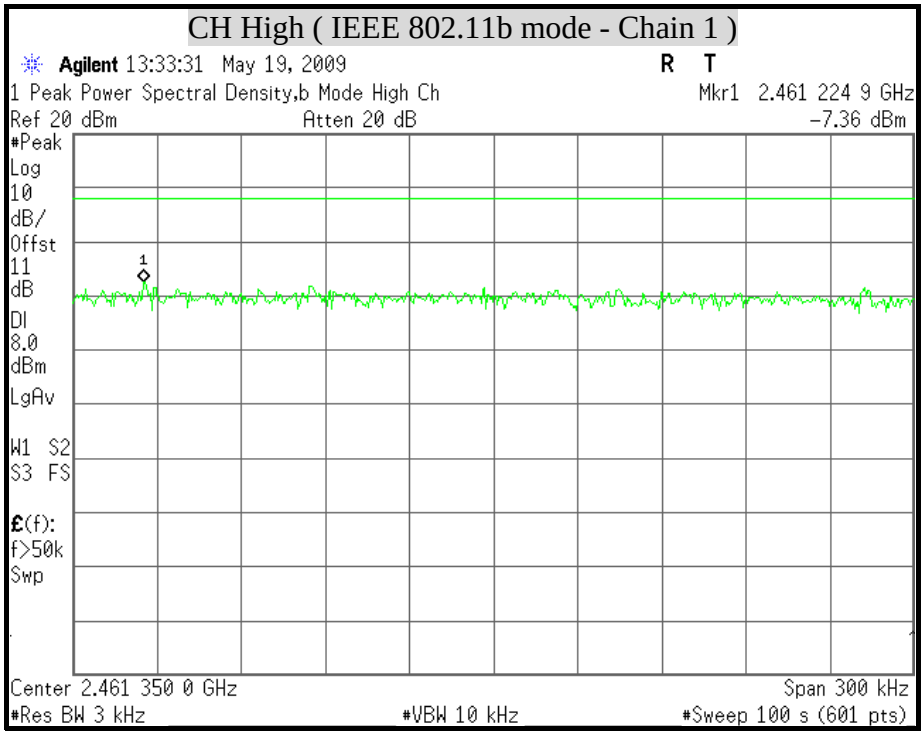
CH Low (IEEE 802.11b mode - Chain 1)



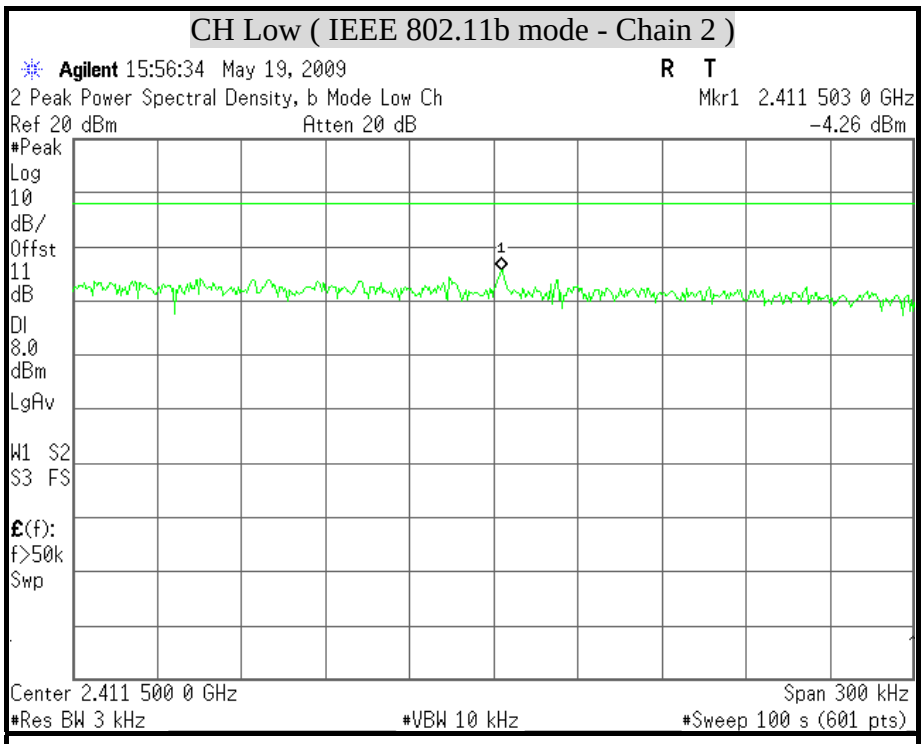
CH Middle (IEEE 802.11b mode - Chain 1)



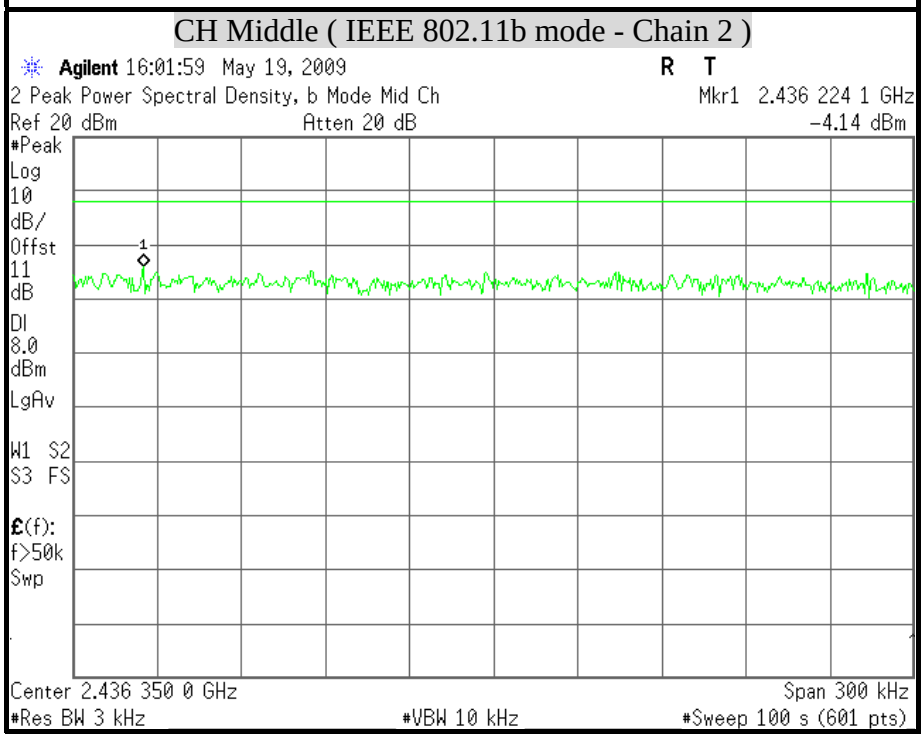
CH High (IEEE 802.11b mode - Chain 1)



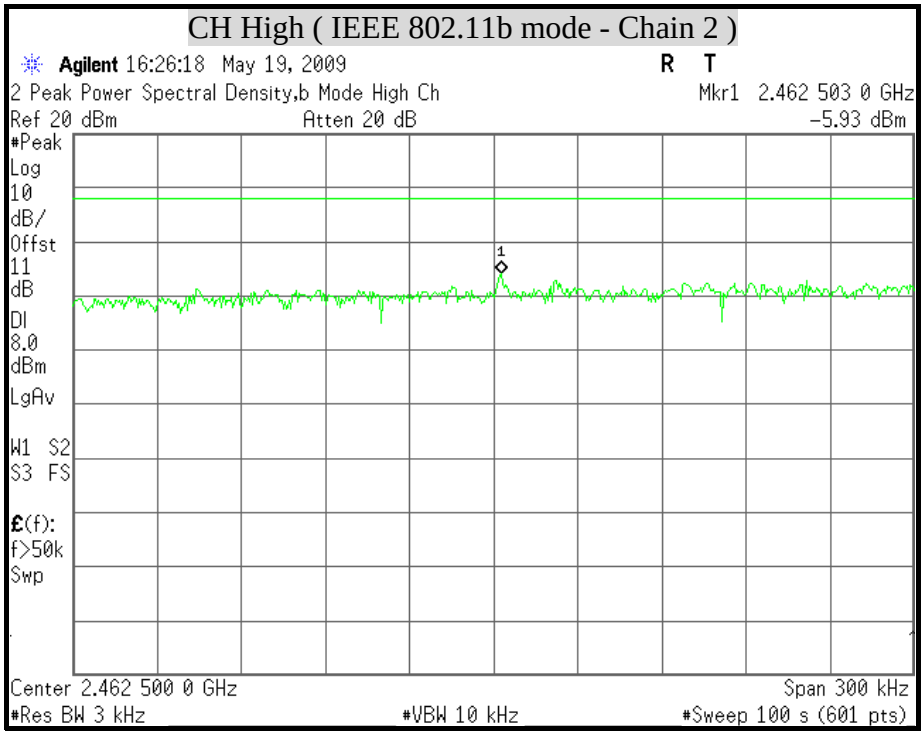
CH Low (IEEE 802.11b mode - Chain 2)



CH Middle (IEEE 802.11b mode - Chain 2)

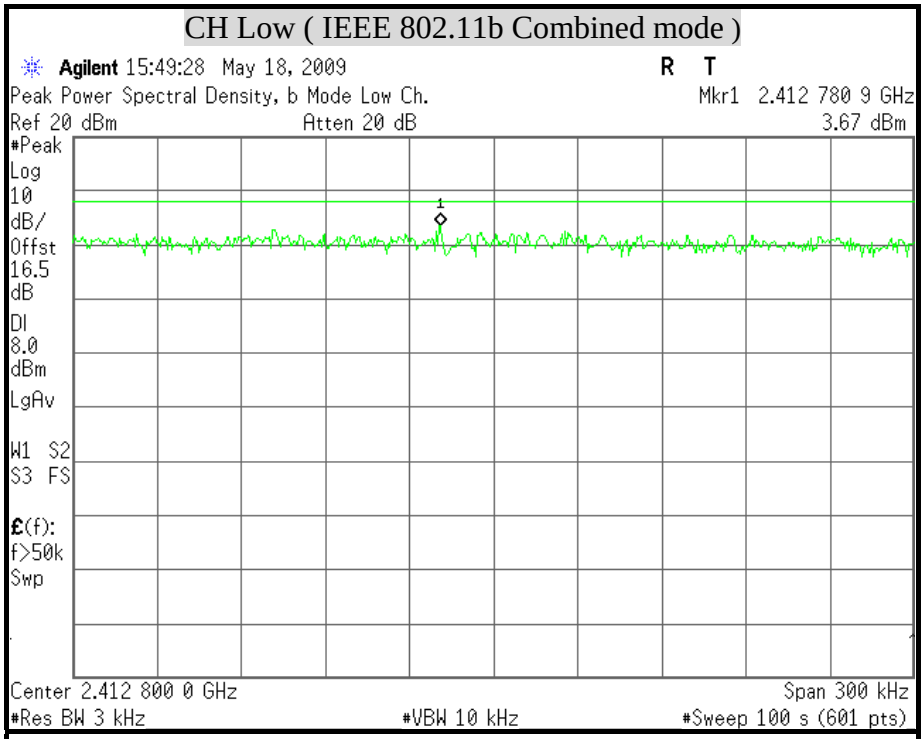


CH High (IEEE 802.11b mode - Chain 2)

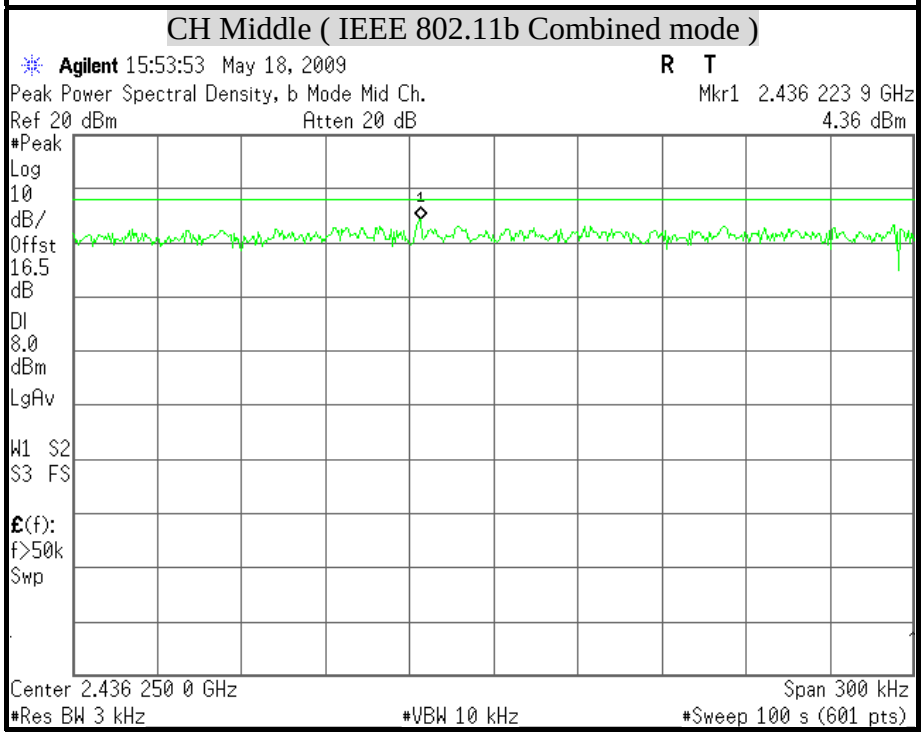


POWER SPECTRAL DENSITY (IEEE 802.11b Combined mode)

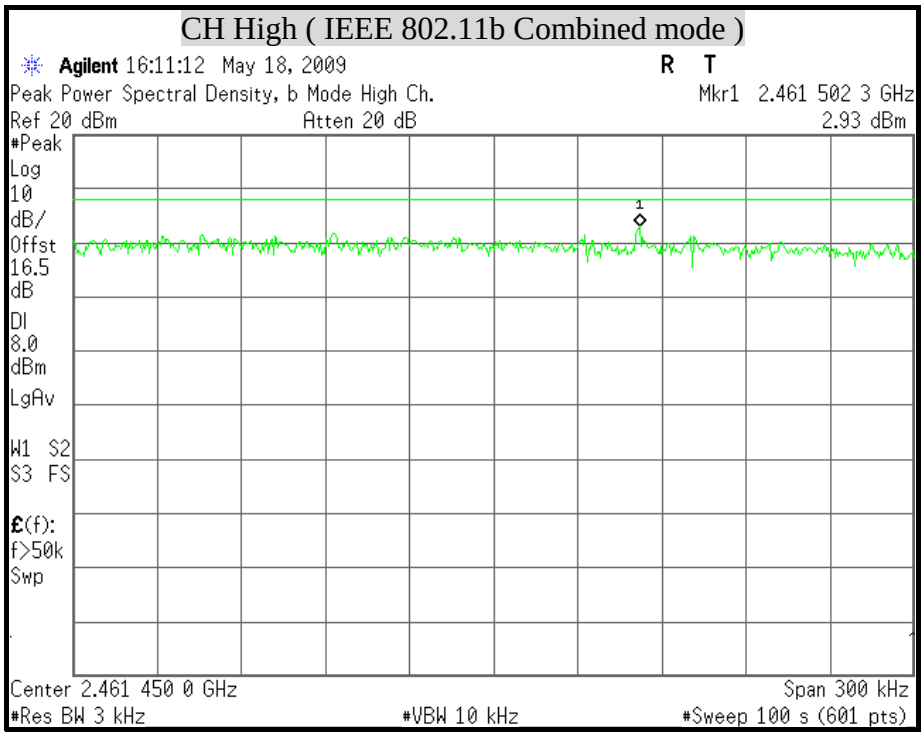
CH Low (IEEE 802.11b Combined mode)



CH Middle (IEEE 802.11b Combined mode)

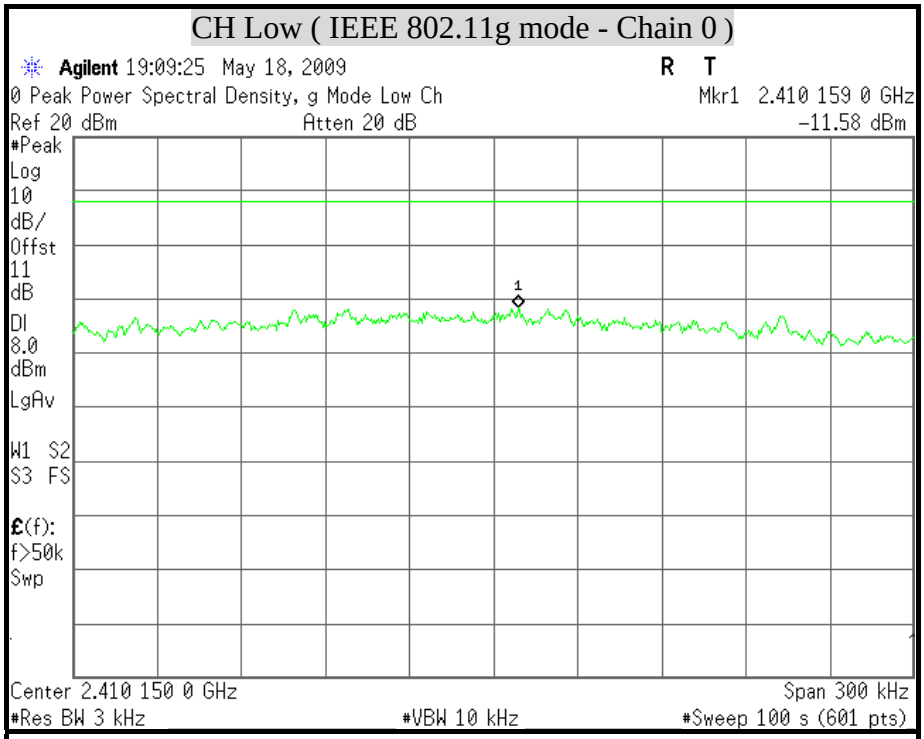


CH High (IEEE 802.11b Combined mode)

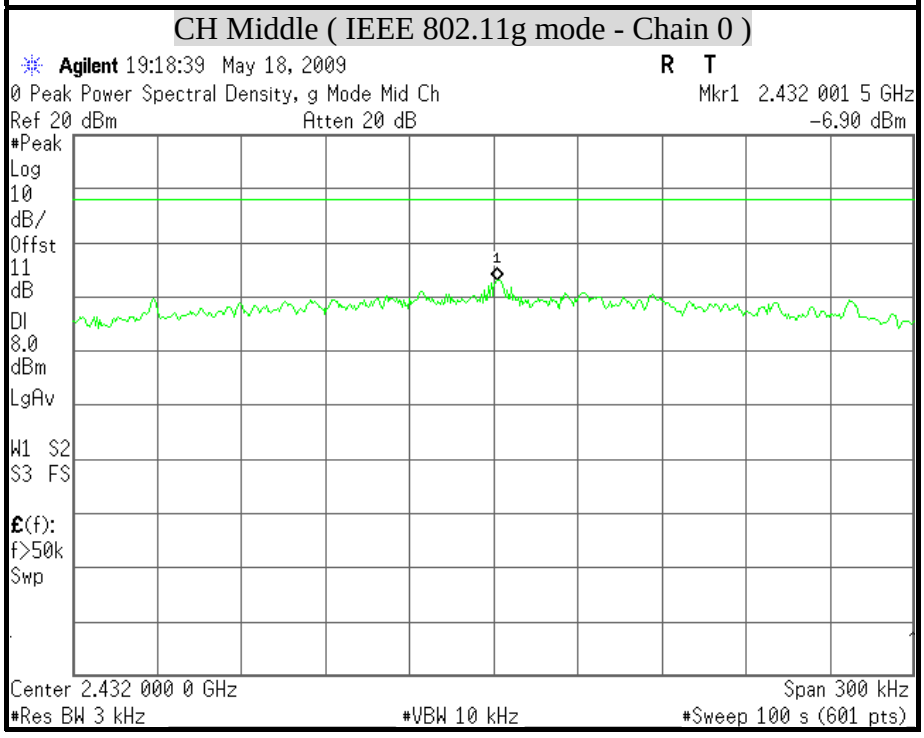


POWER SPECTRAL DENSITY (IEEE 802.11g mode)

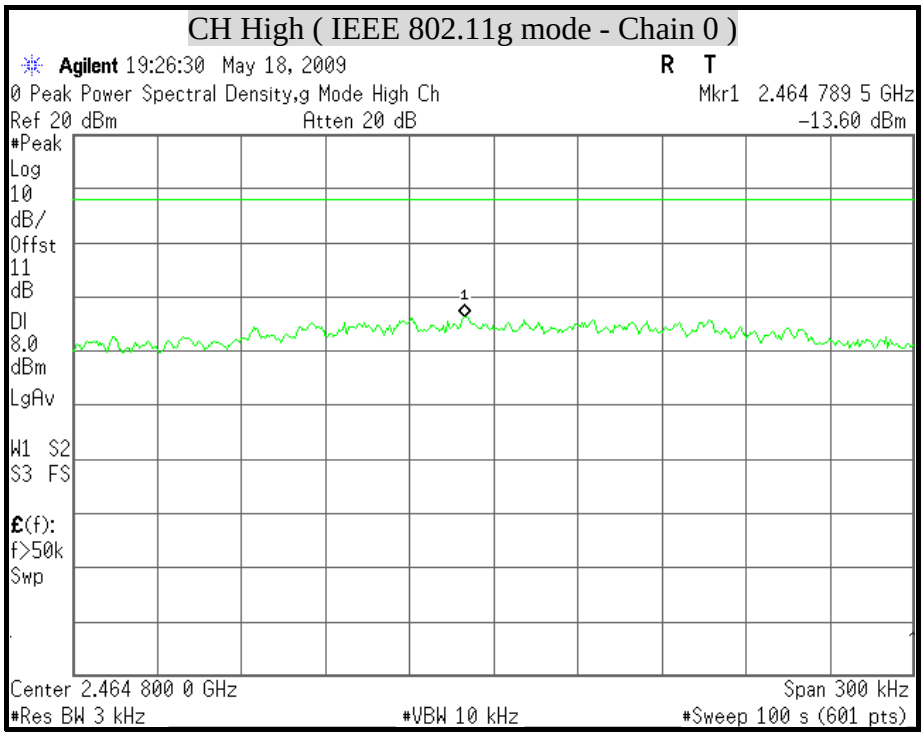
CH Low (IEEE 802.11g mode - Chain 0)



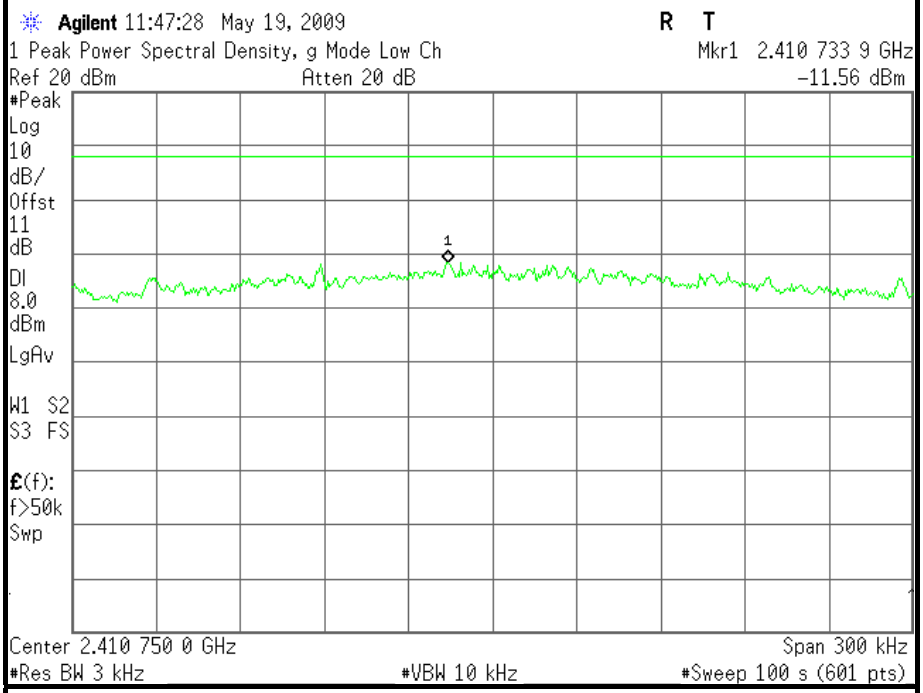
CH Middle (IEEE 802.11g mode - Chain 0)



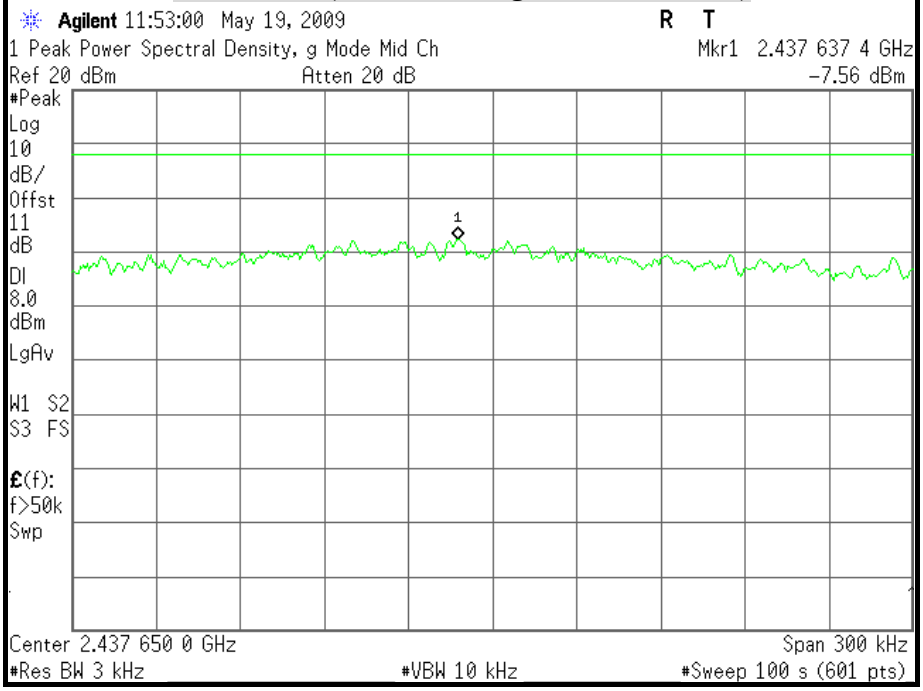
CH High (IEEE 802.11g mode - Chain 0)



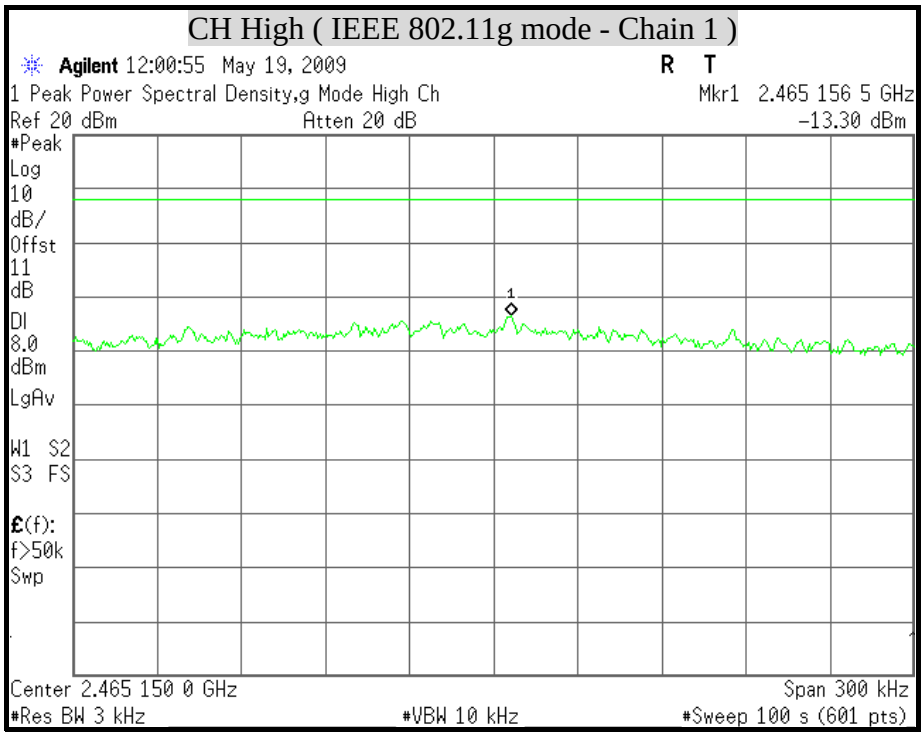
CH Low (IEEE 802.11g mode - Chain 1)



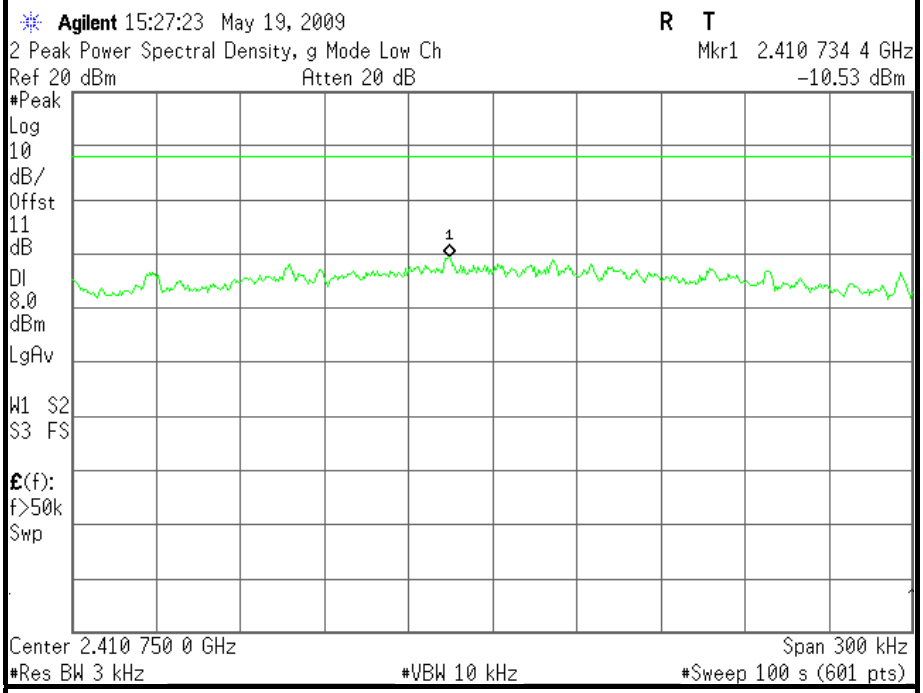
CH Middle (IEEE 802.11g mode - Chain 1)



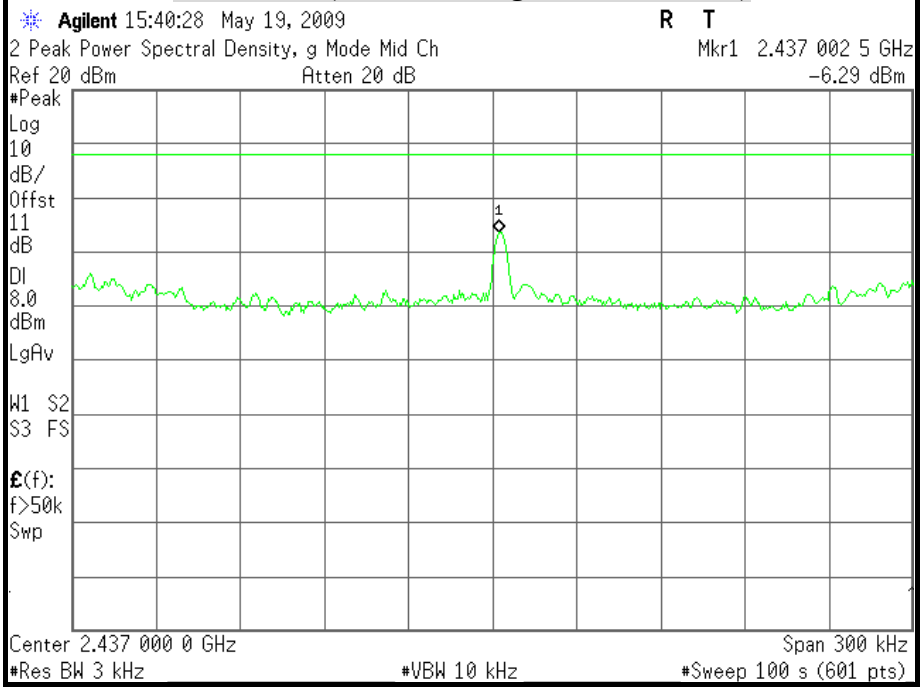
CH High (IEEE 802.11g mode - Chain 1)



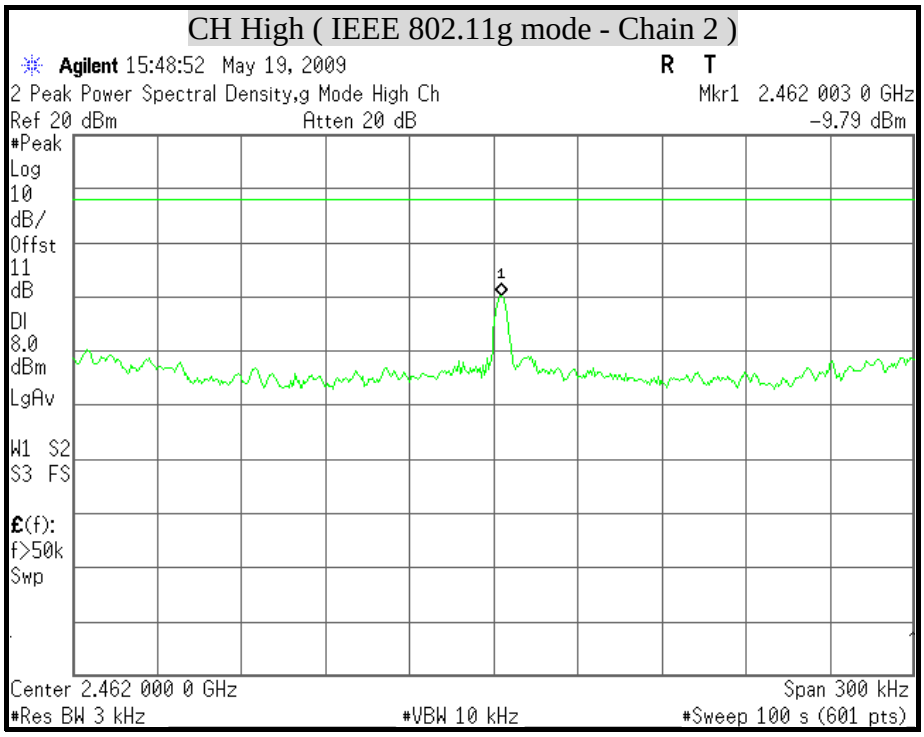
CH Low (IEEE 802.11g mode - Chain 2)



CH Middle (IEEE 802.11g mode - Chain 2)

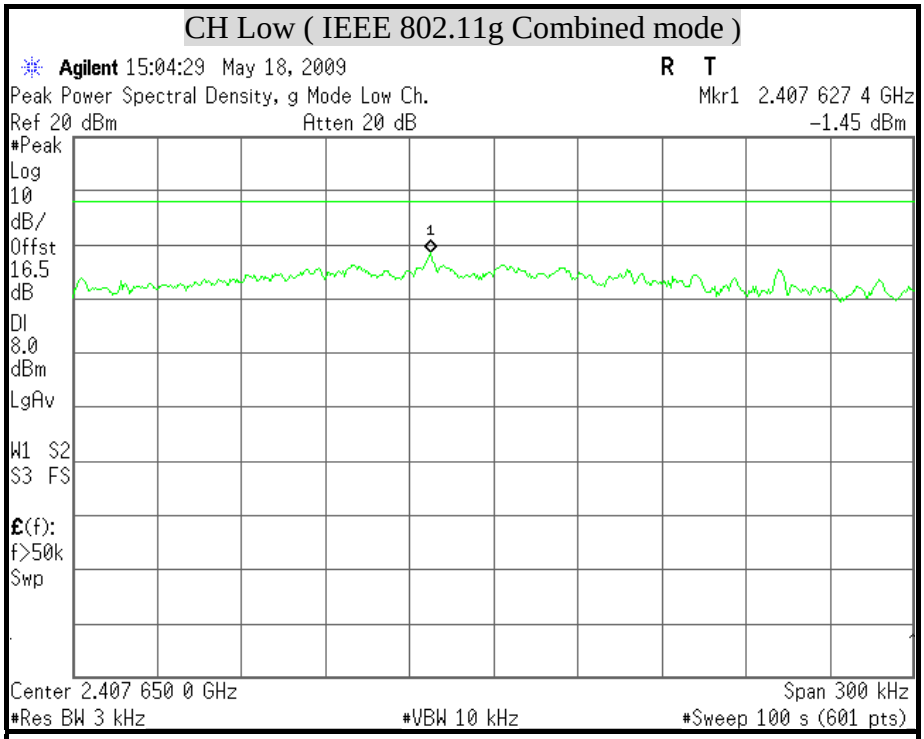


CH High (IEEE 802.11g mode - Chain 2)

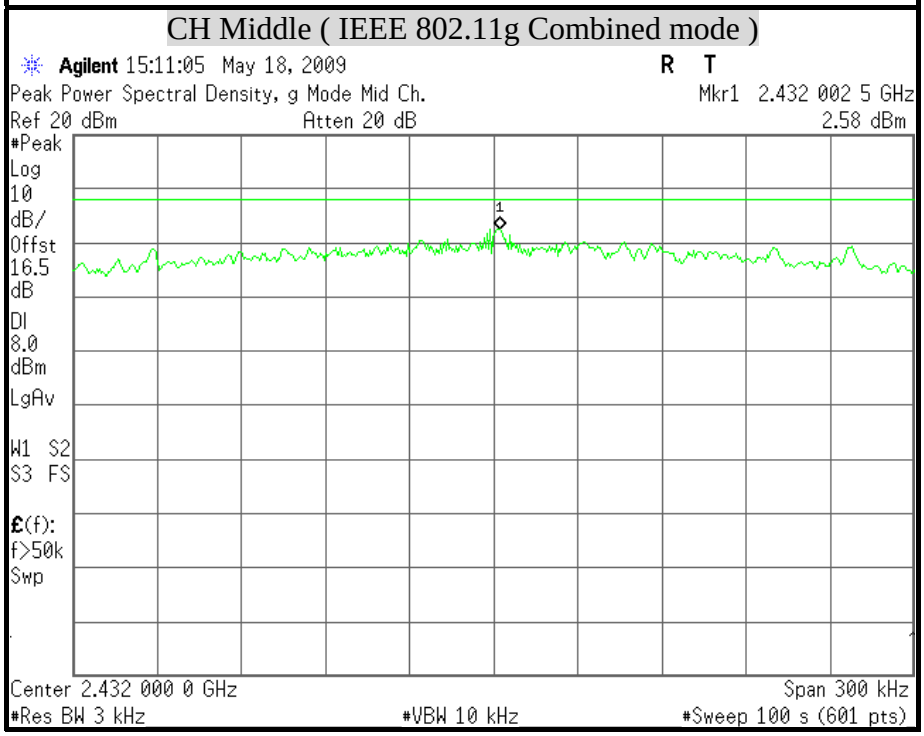


POWER SPECTRAL DENSITY (IEEE 802.11g Combined mode)

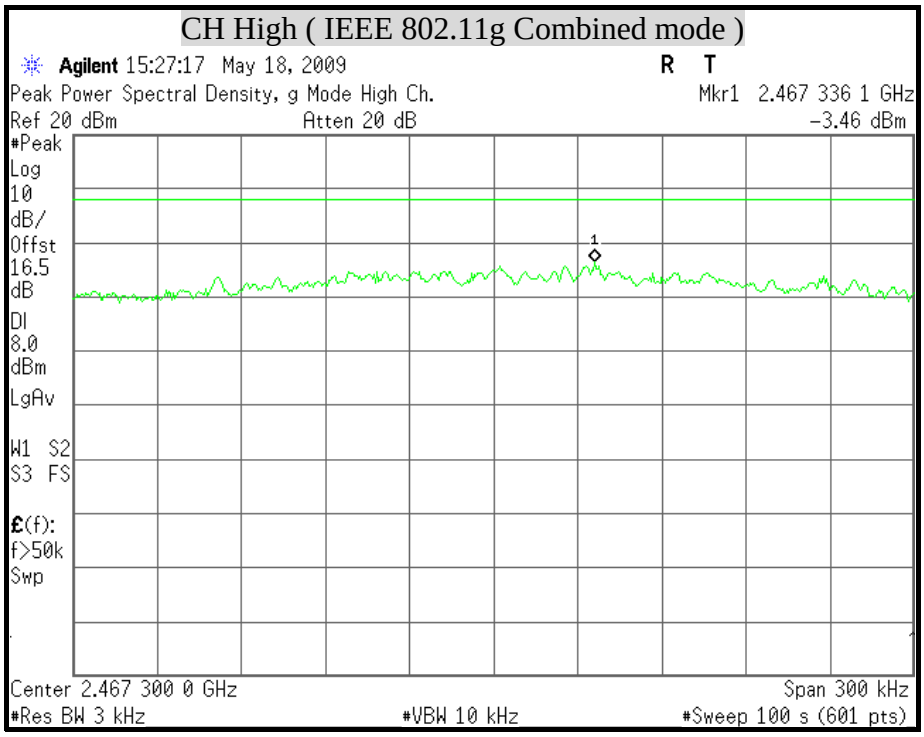
CH Low (IEEE 802.11g Combined mode)



CH Middle (IEEE 802.11g Combined mode)

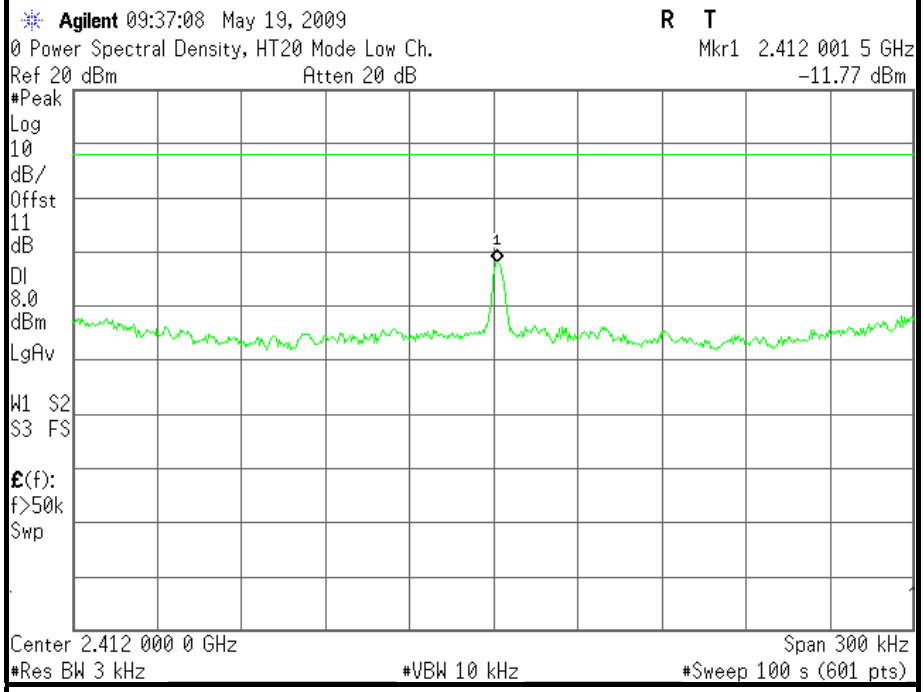


CH High (IEEE 802.11g Combined mode)

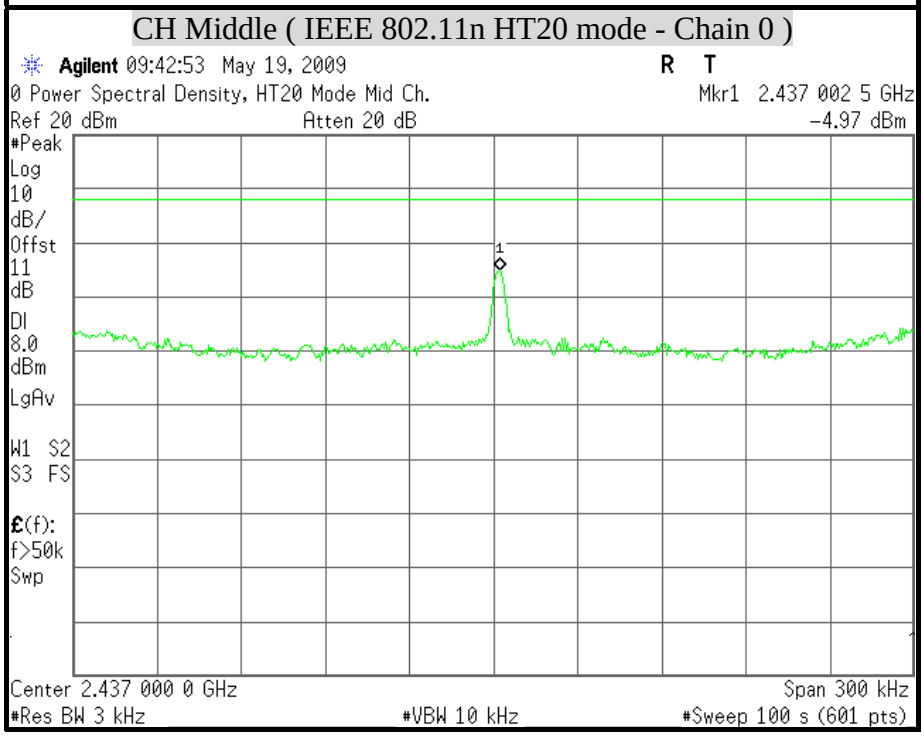


POWER SPECTRAL DENSITY (IEEE 802.11n HT20 mode)

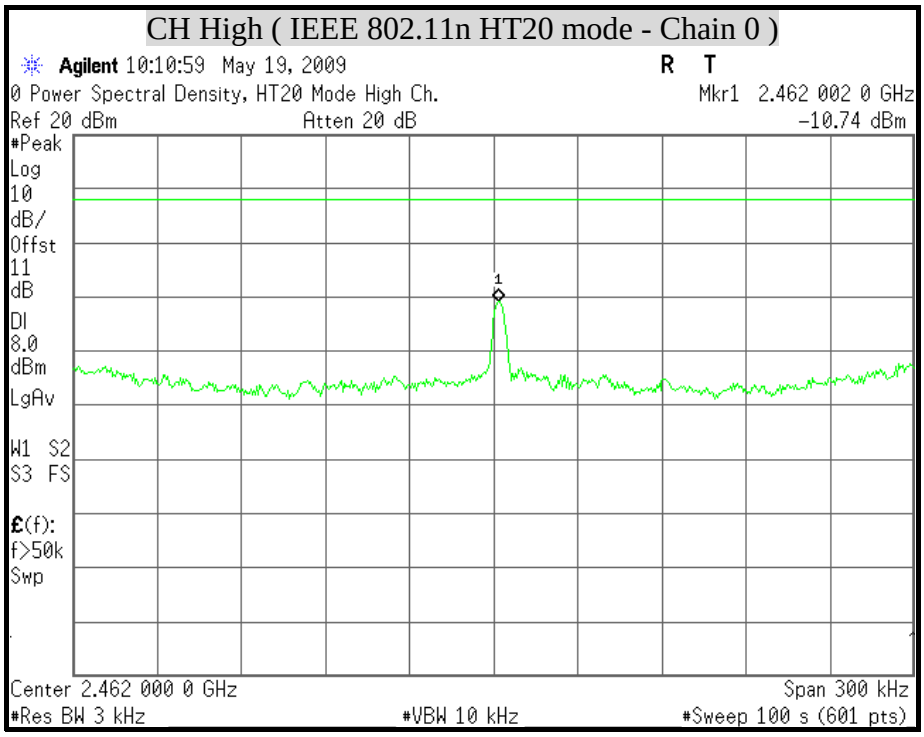
CH Low (IEEE 802.11n HT20 mode - Chain 0)



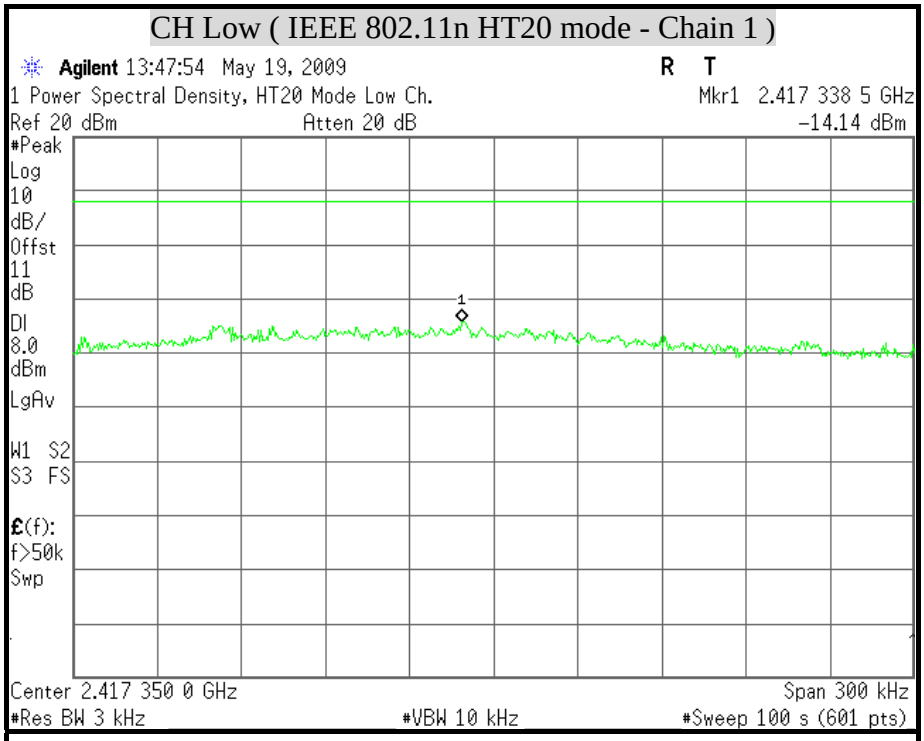
CH Middle (IEEE 802.11n HT20 mode - Chain 0)



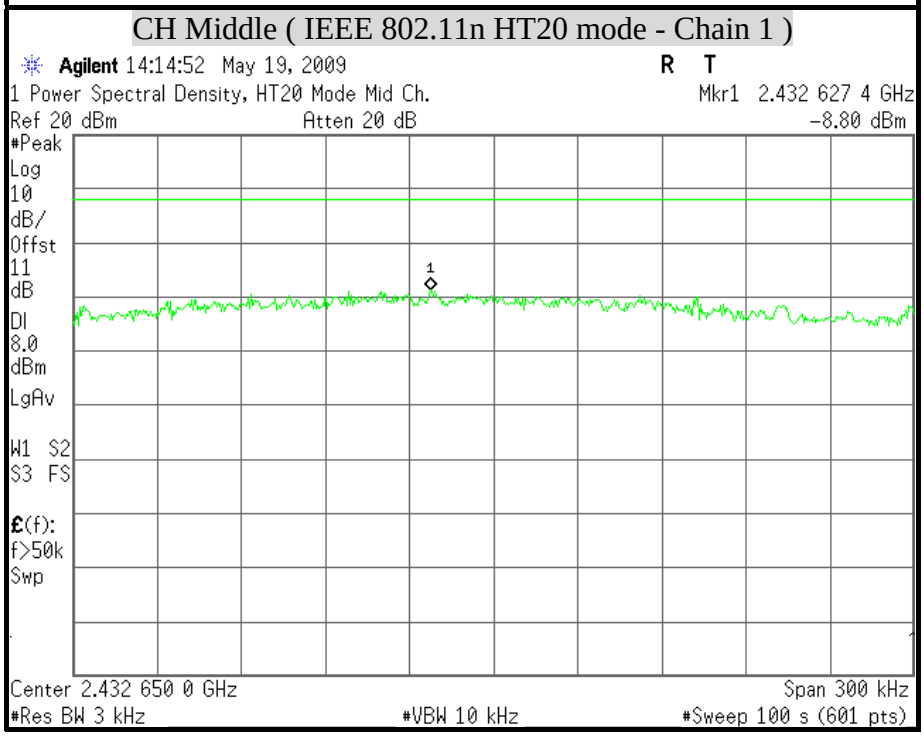
CH High (IEEE 802.11n HT20 mode - Chain 0)



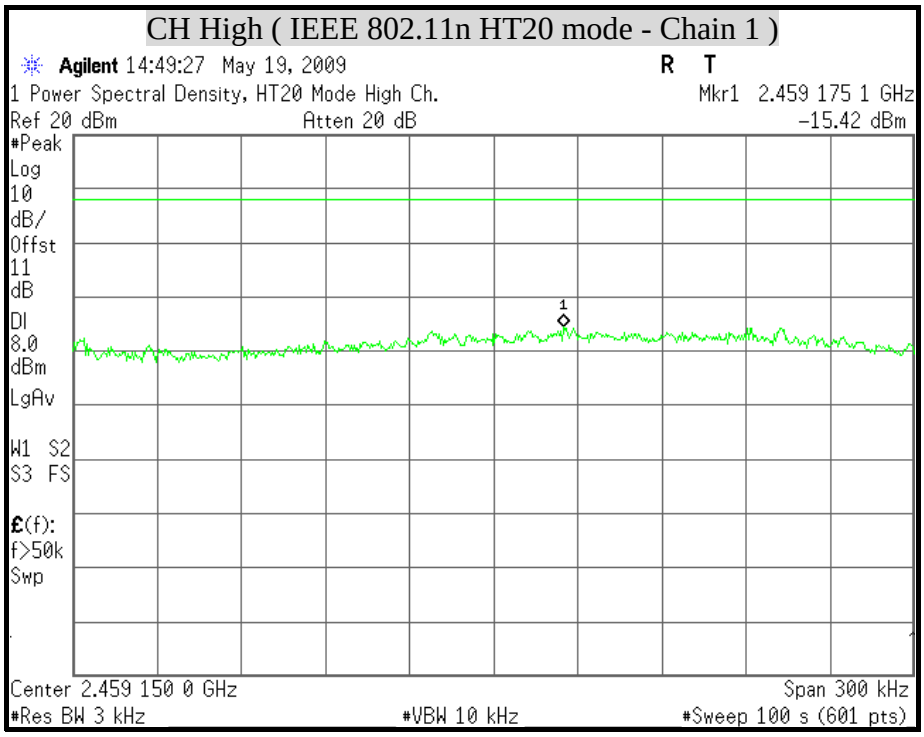
CH Low (IEEE 802.11n HT20 mode - Chain 1)



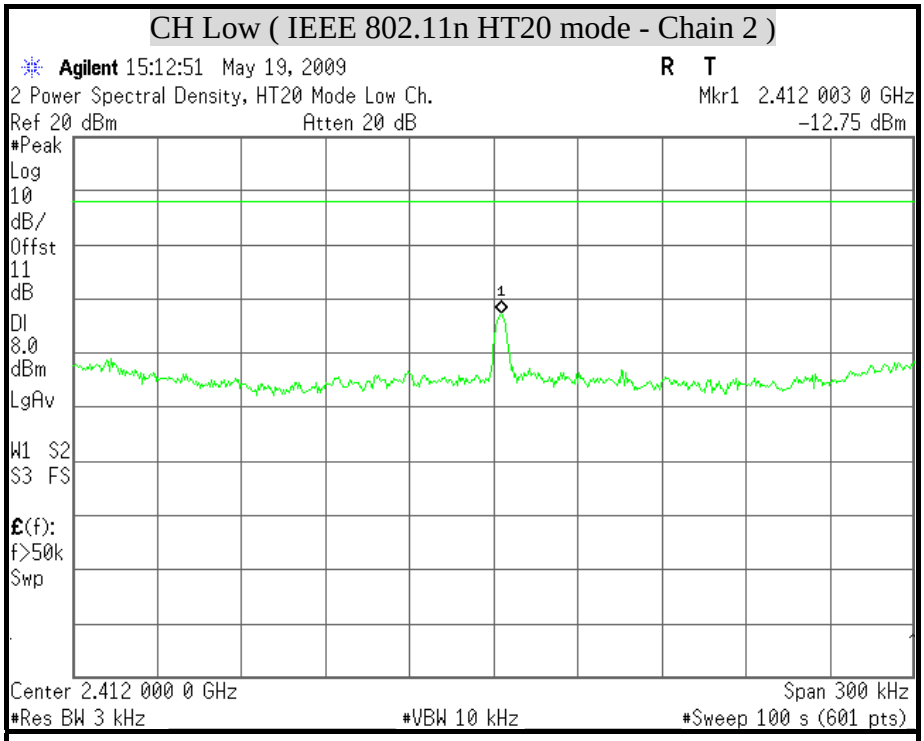
CH Middle (IEEE 802.11n HT20 mode - Chain 1)



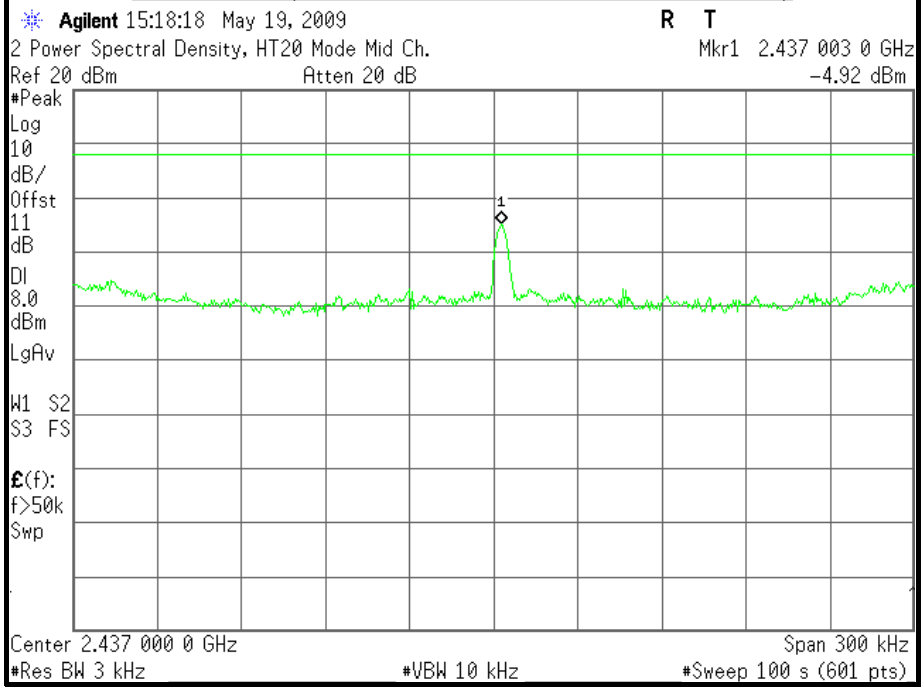
CH High (IEEE 802.11n HT20 mode - Chain 1)



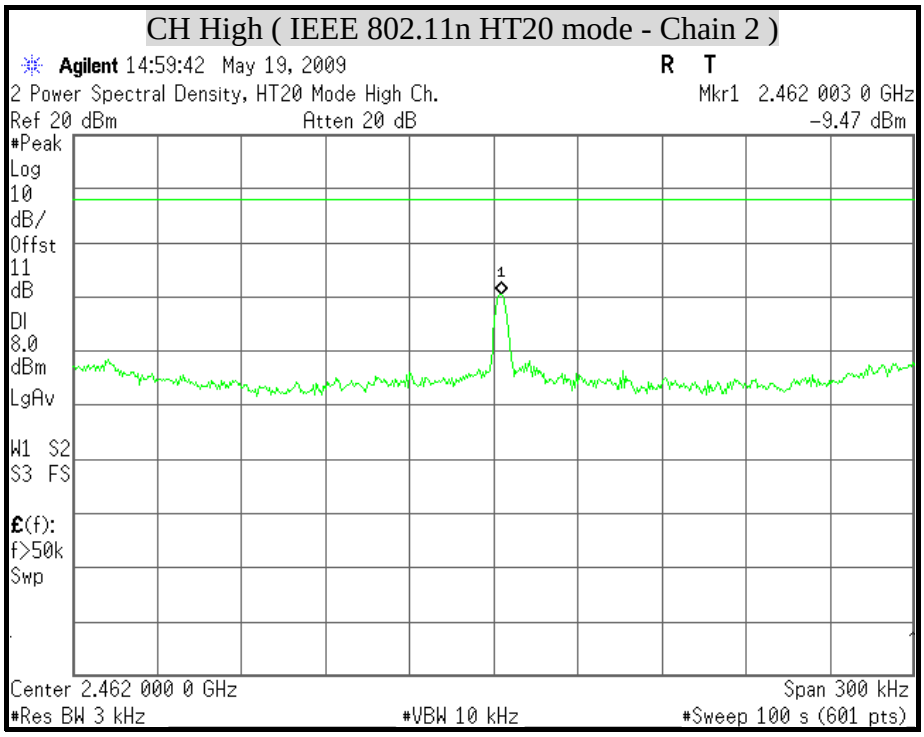
CH Low (IEEE 802.11n HT20 mode - Chain 2)



CH Middle (IEEE 802.11n HT20 mode - Chain 2)

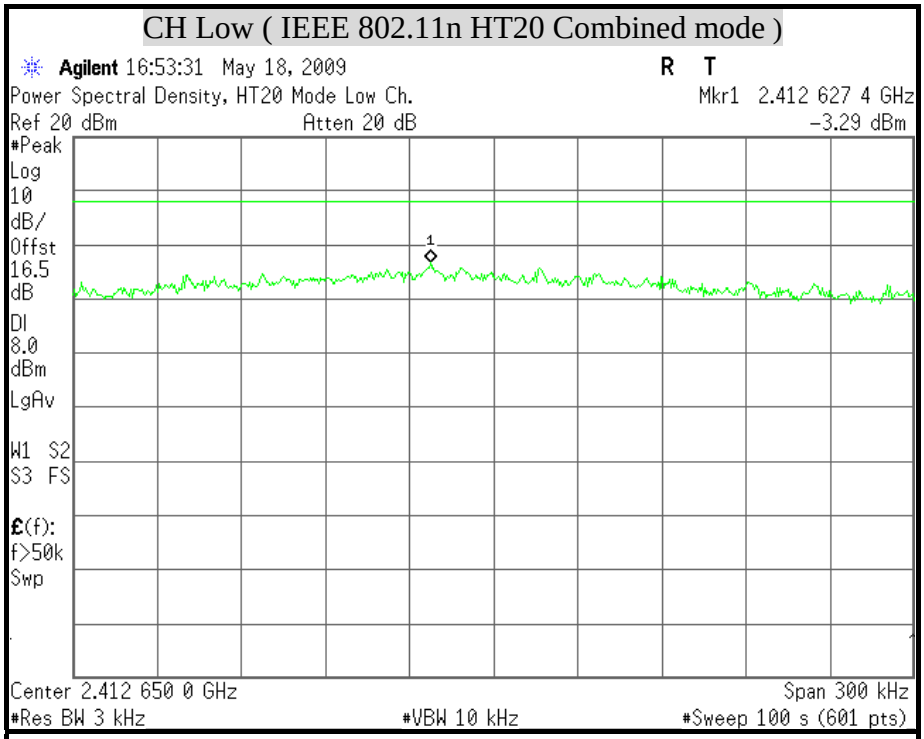


CH High (IEEE 802.11n HT20 mode - Chain 2)

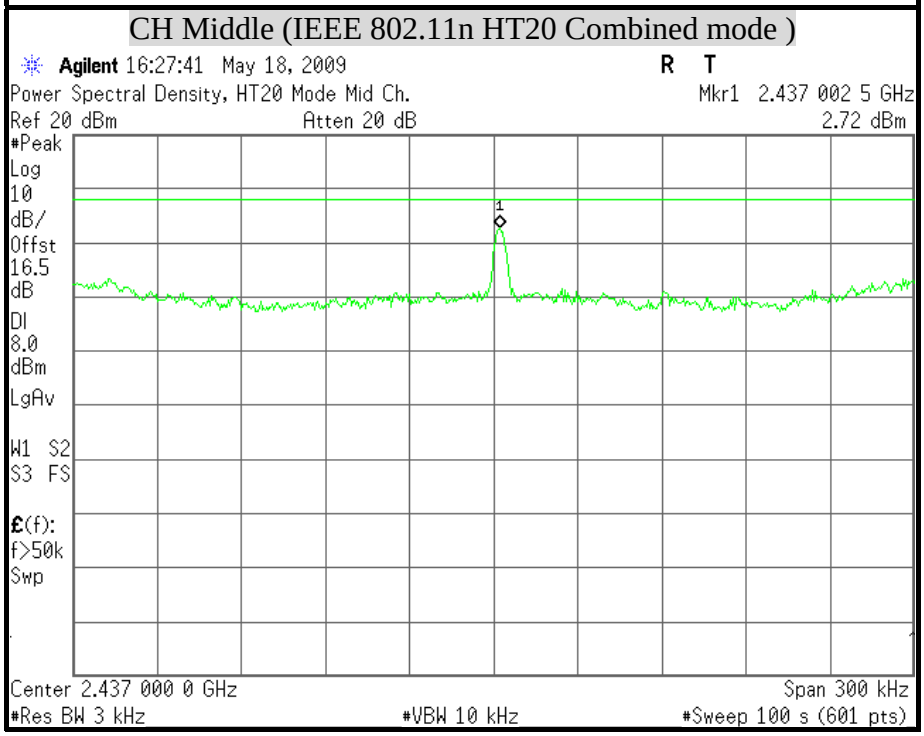


POWER SPECTRAL DENSITY (IEEE 802.11n HT20 Combined mode)

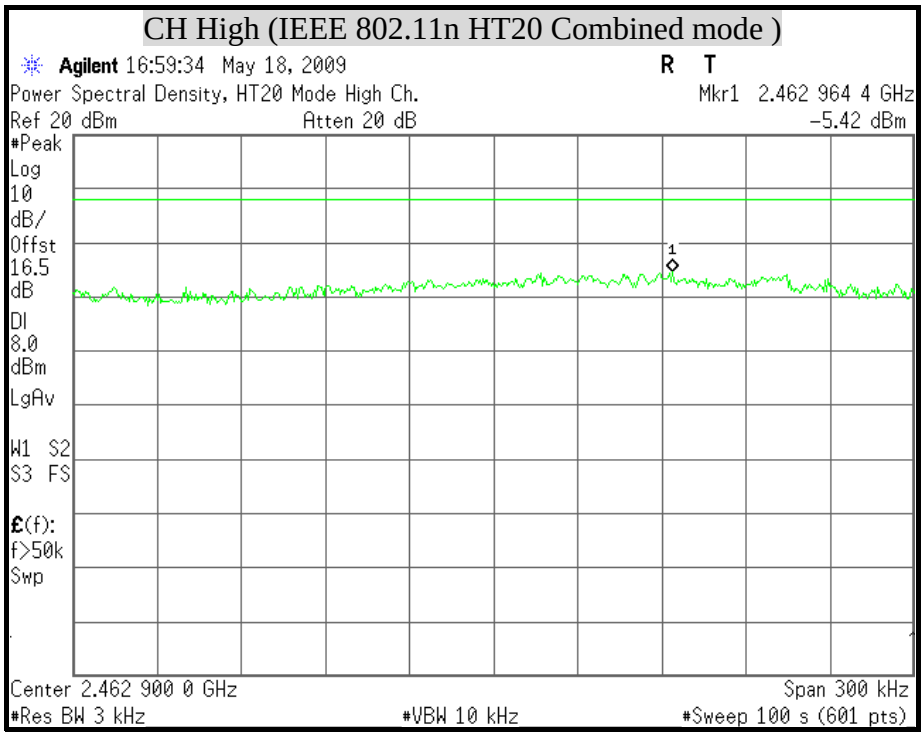
CH Low (IEEE 802.11n HT20 Combined mode)



CH Middle (IEEE 802.11n HT20 Combined mode)

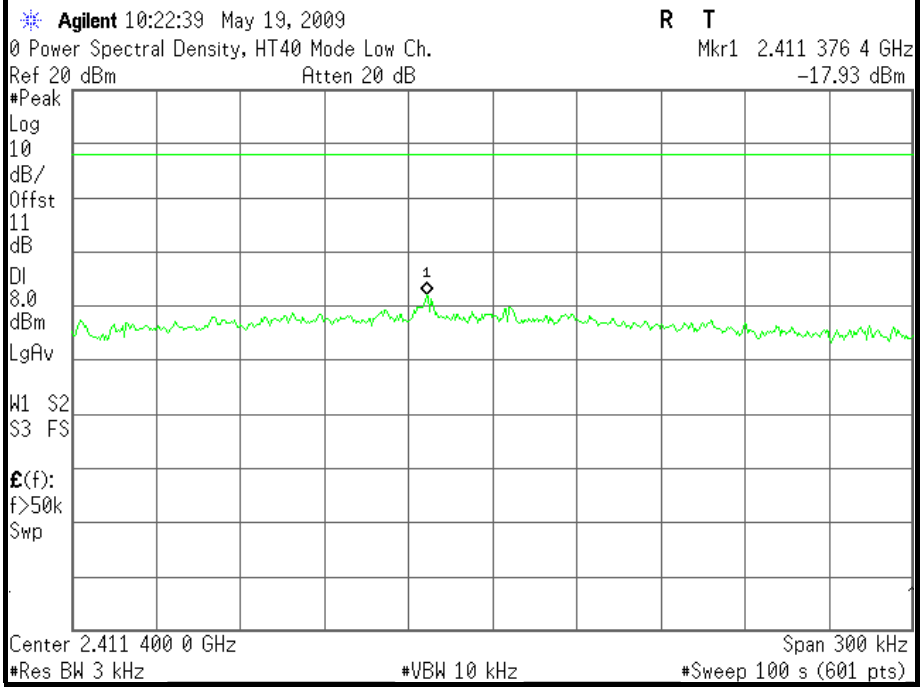


CH High (IEEE 802.11n HT20 Combined mode)

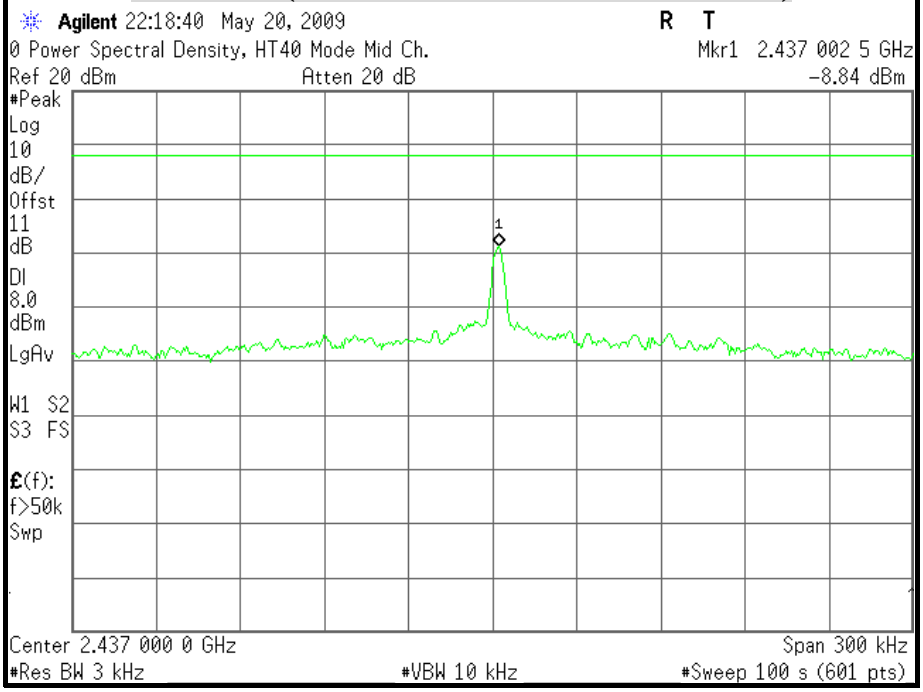


POWER SPECTRAL DENSITY (IEEE 802.11n HT40 mode)

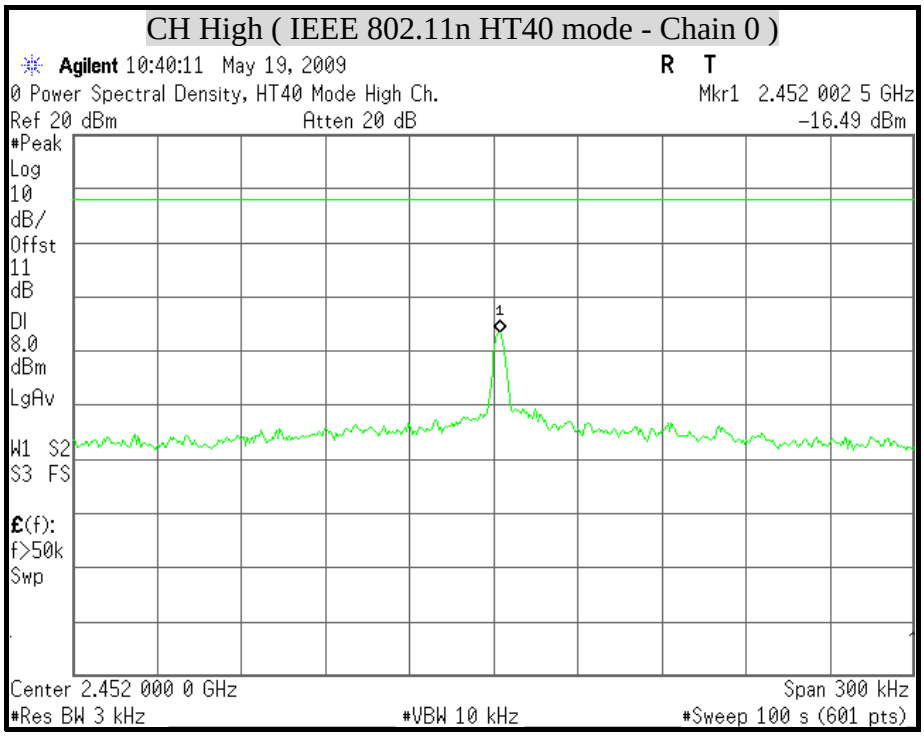
CH Low (IEEE 802.11n HT40 mode - Chain 0)



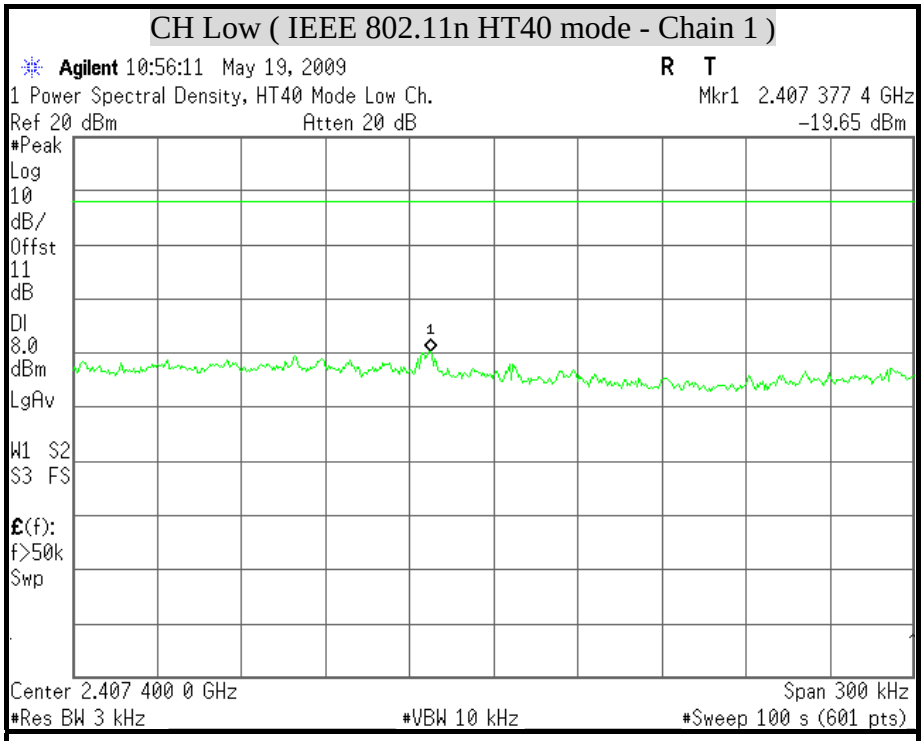
CH Middle (IEEE 802.11n HT40 mode - Chain 0)



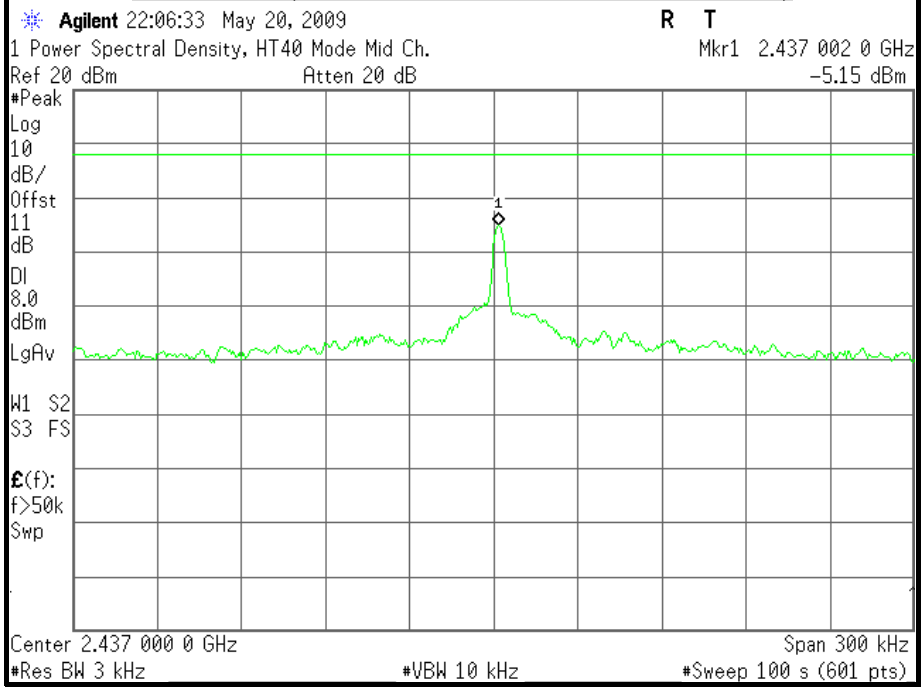
CH High (IEEE 802.11n HT40 mode - Chain 0)



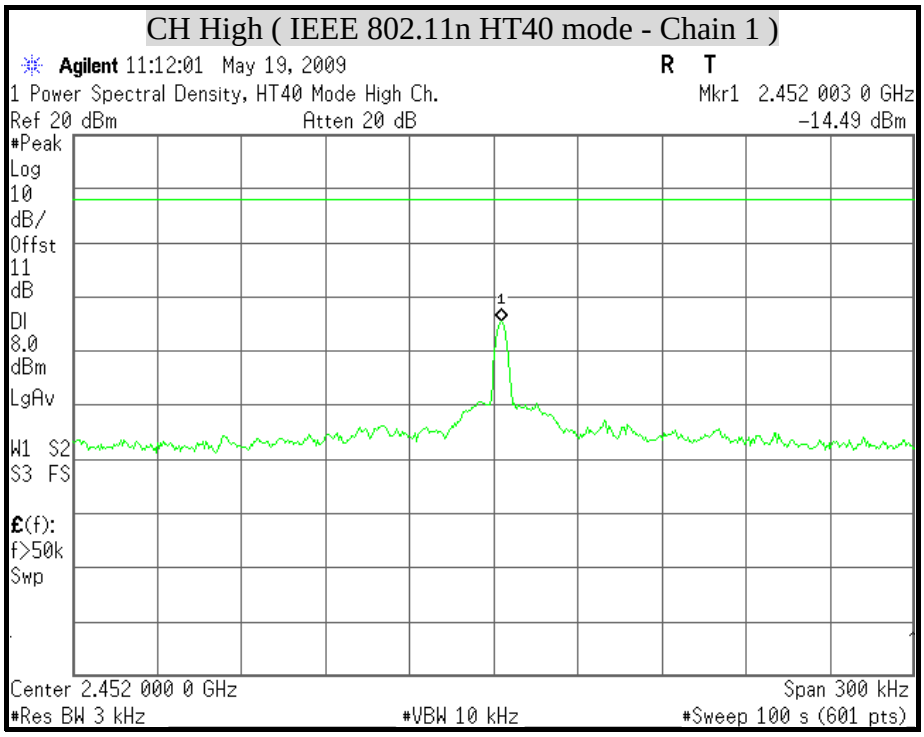
CH Low (IEEE 802.11n HT40 mode - Chain 1)



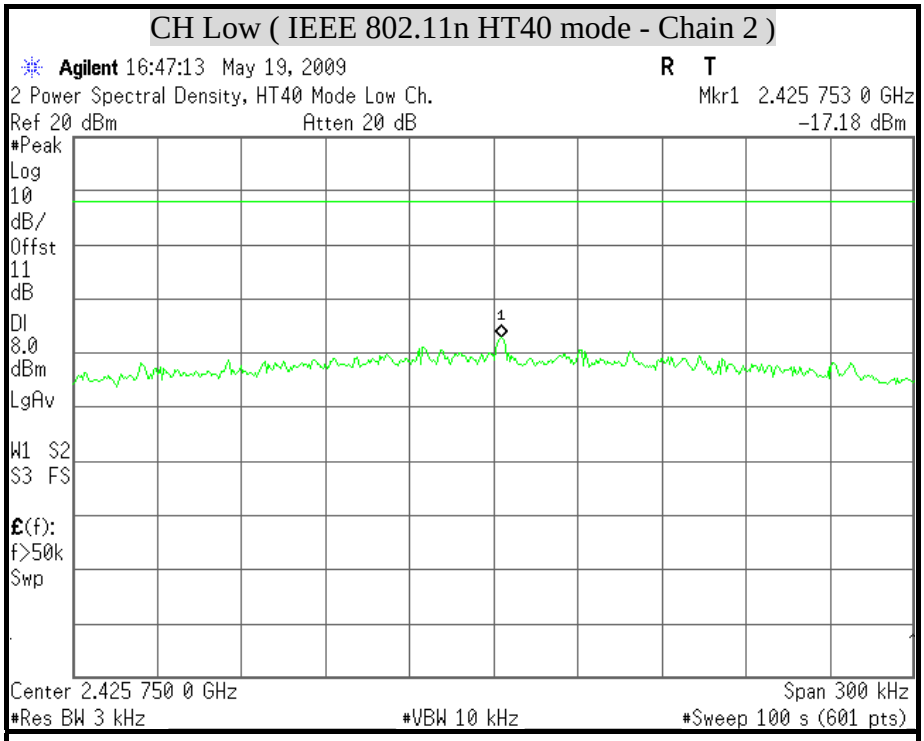
CH Middle (IEEE 802.11n HT40 mode - Chain 1)



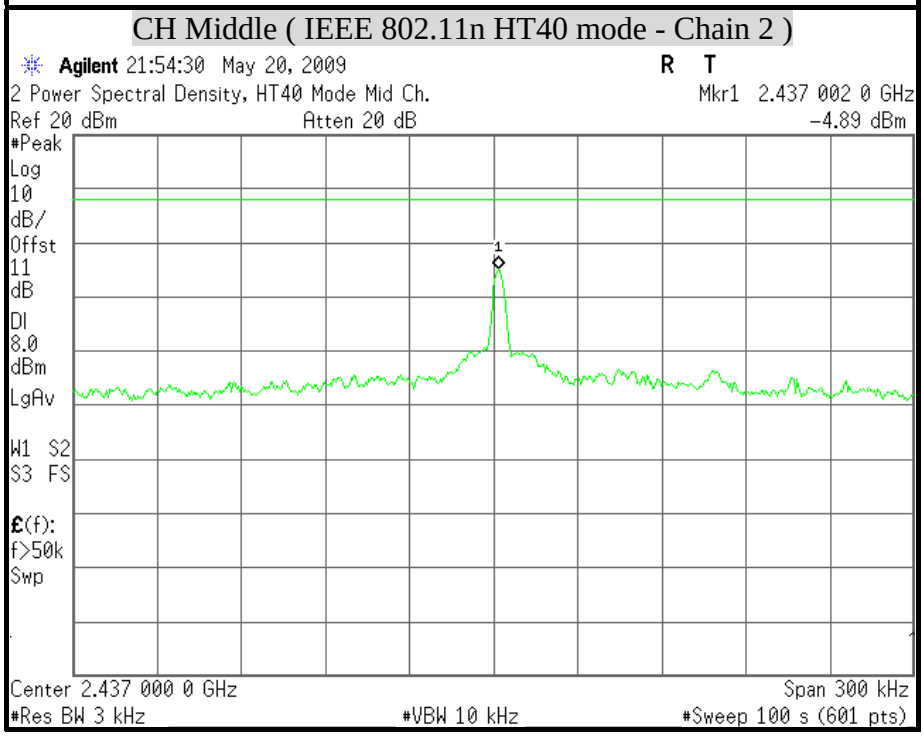
CH High (IEEE 802.11n HT40 mode - Chain 1)



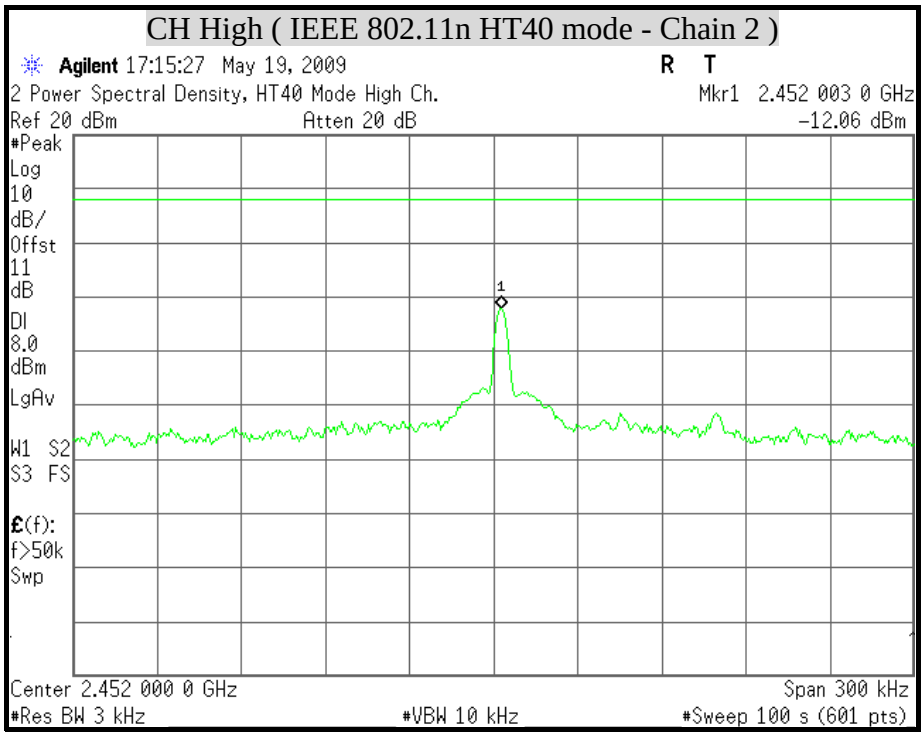
CH Low (IEEE 802.11n HT40 mode - Chain 2)



CH Middle (IEEE 802.11n HT40 mode - Chain 2)



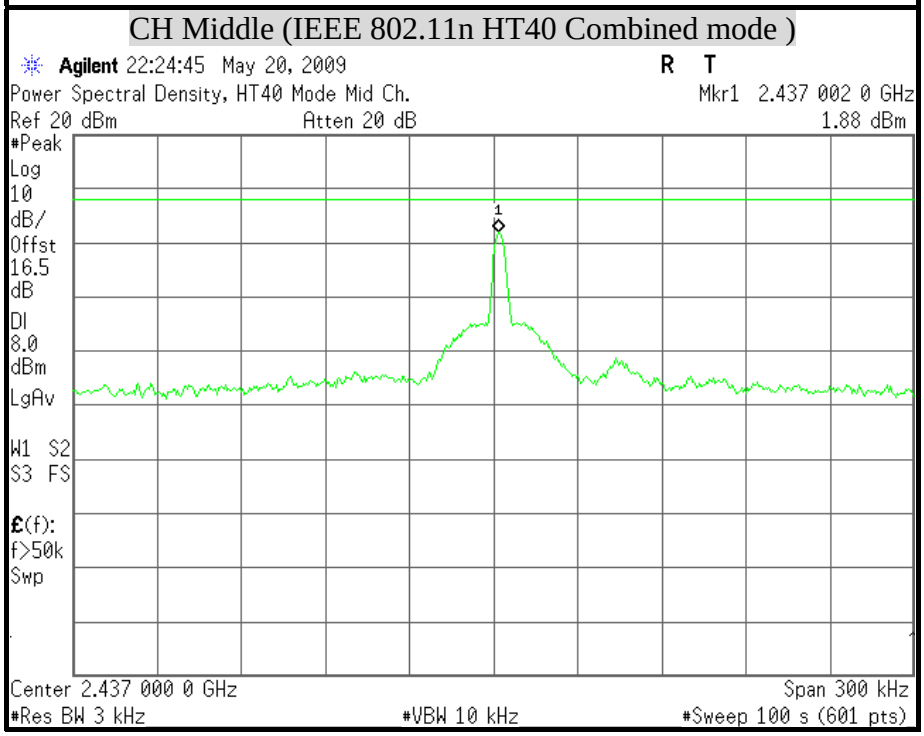
CH High (IEEE 802.11n HT40 mode - Chain 2)



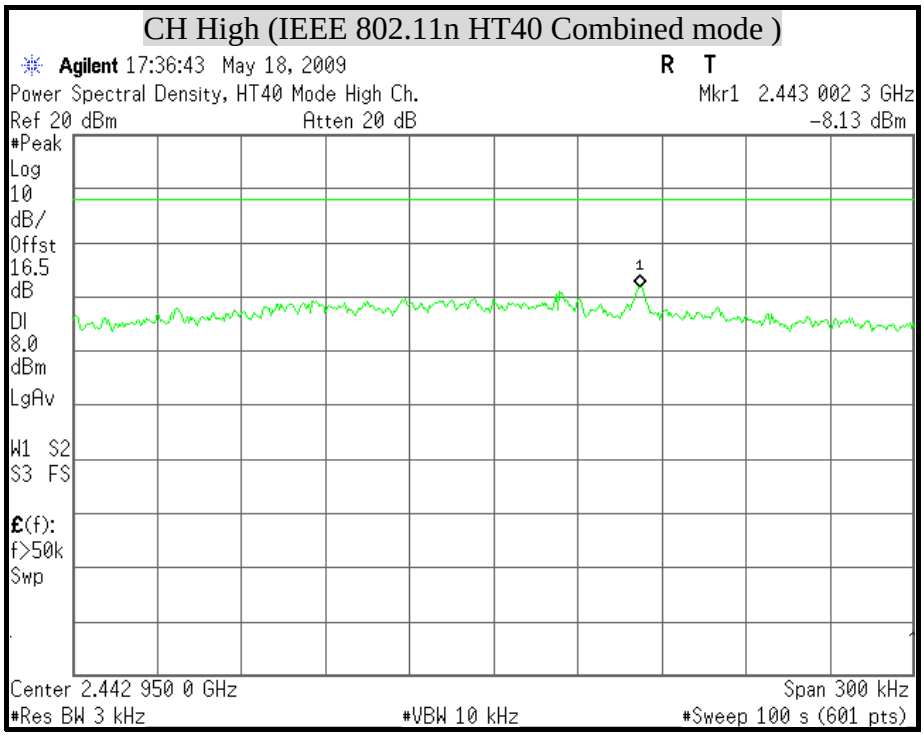
POWER SPECTRAL DENSITY (IEEE 802.11n HT40 Combined mode)

CH Low (IEEE 802.11n HT40 Combined mode)

CH Middle (IEEE 802.11n HT40 Combined mode)



CH High (IEEE 802.11n HT40 Combined mode)



8.7 CONDUCTED SPURIOUS EMISSION

LIMITS

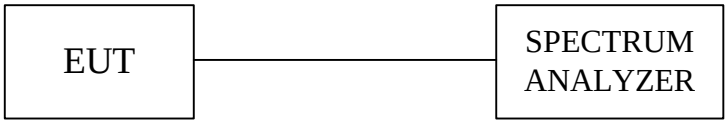
§ 15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the and that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

TEST PROCEDURE

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

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

TEST SETUP



Combined mode

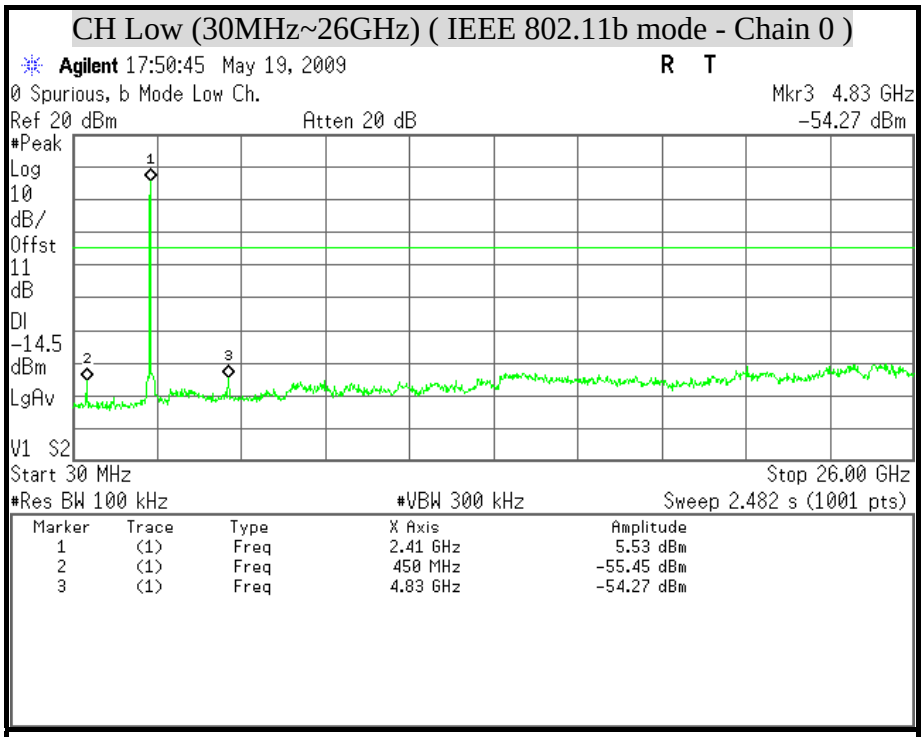
TEST RESULTS

No non-compliance noted

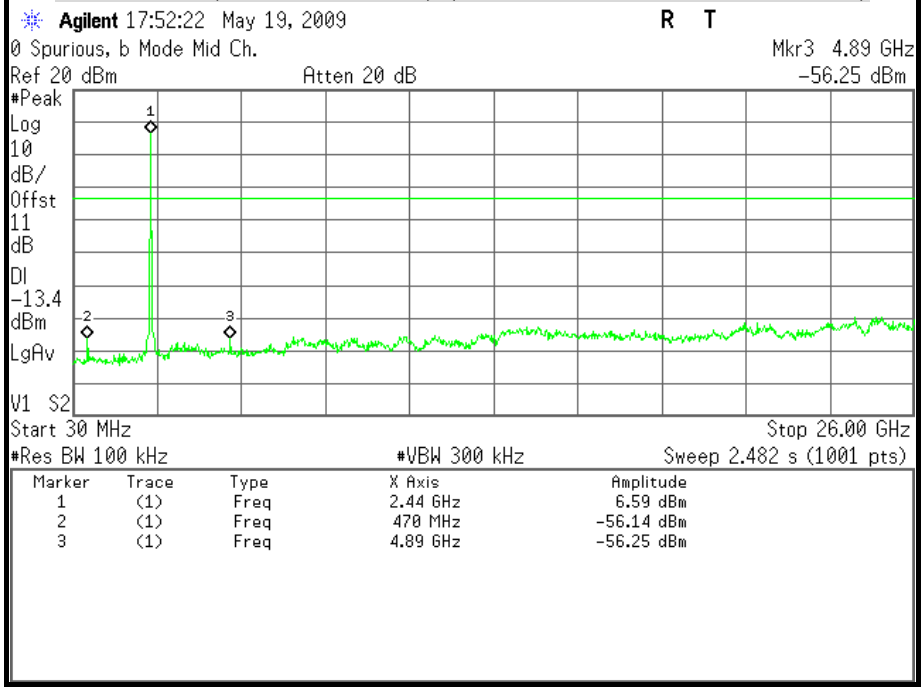
OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

(IEEE 802.11b mode)

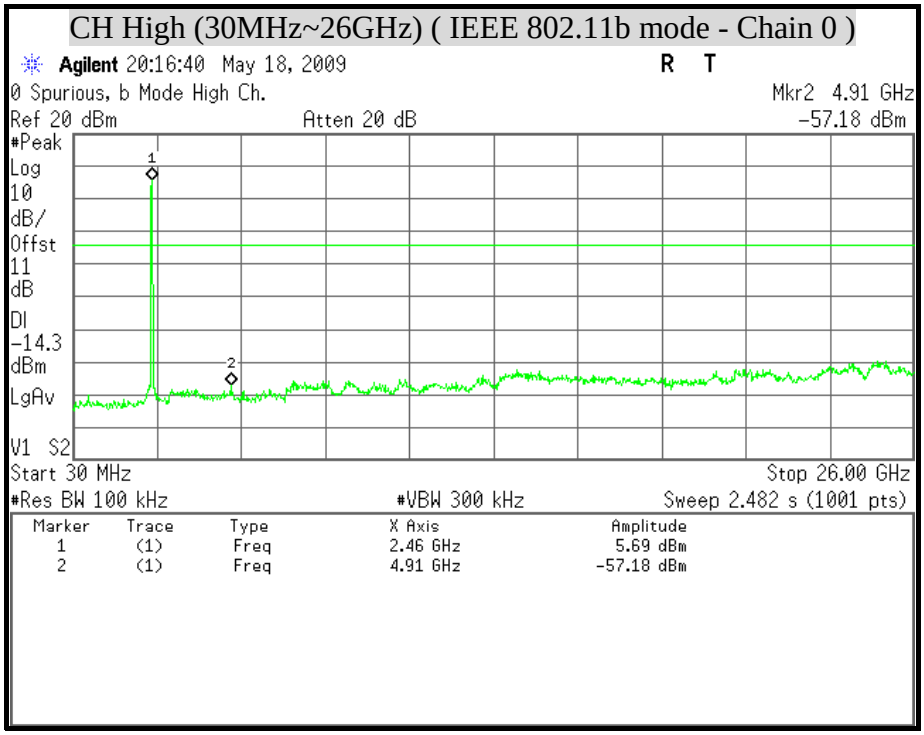
CH Low (30MHz~26GHz) (IEEE 802.11b mode - Chain 0)



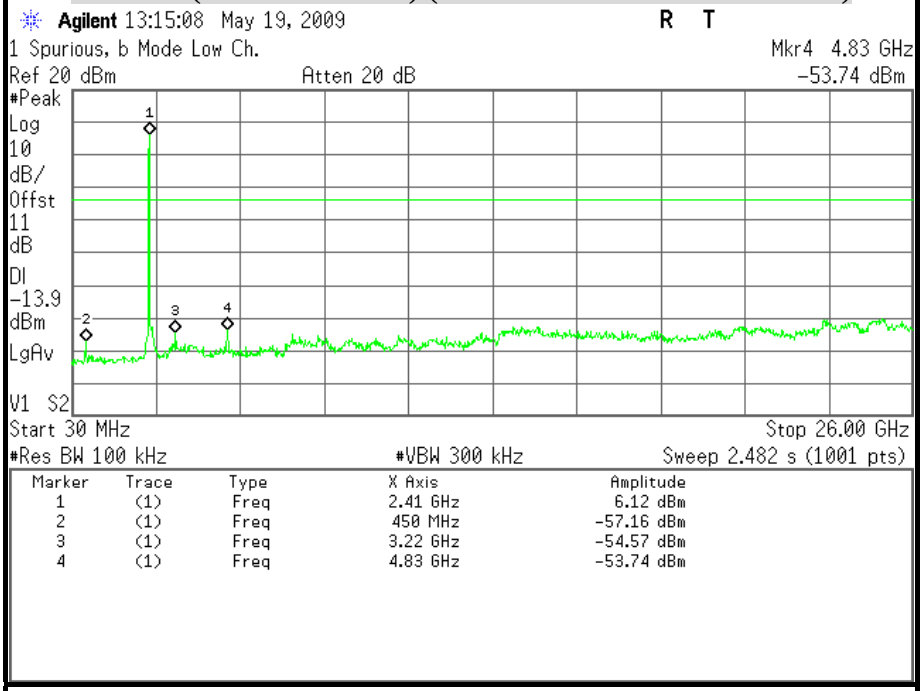
CH Middle (30MHz~26GHz) (IEEE 802.11b mode - Chain 0)



CH High (30MHz~26GHz) (IEEE 802.11b mode - Chain 0)

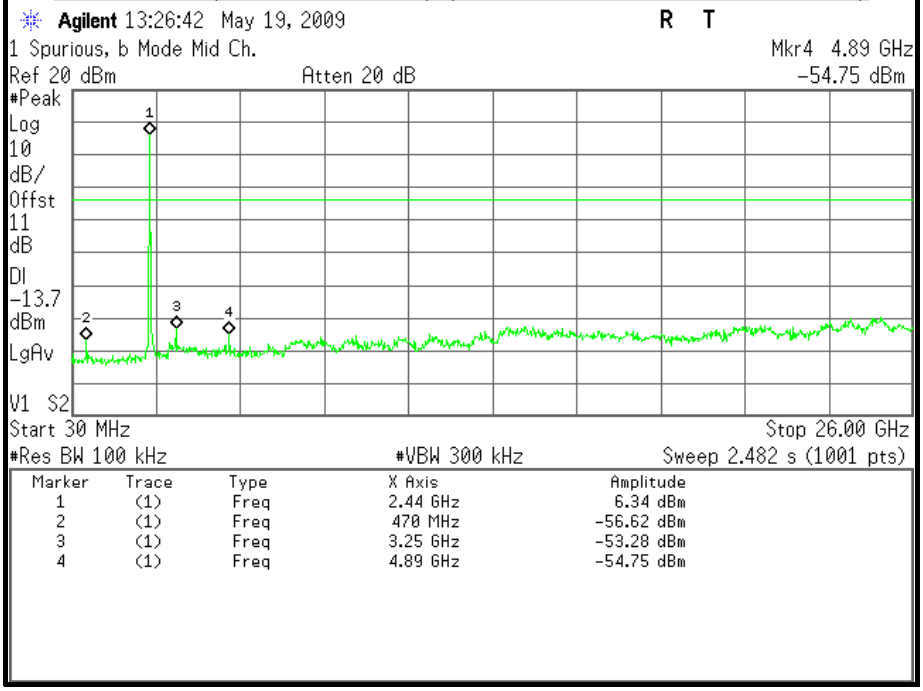


CH Low (30MHz~26GHz) (IEEE 802.11b mode - Chain 1)



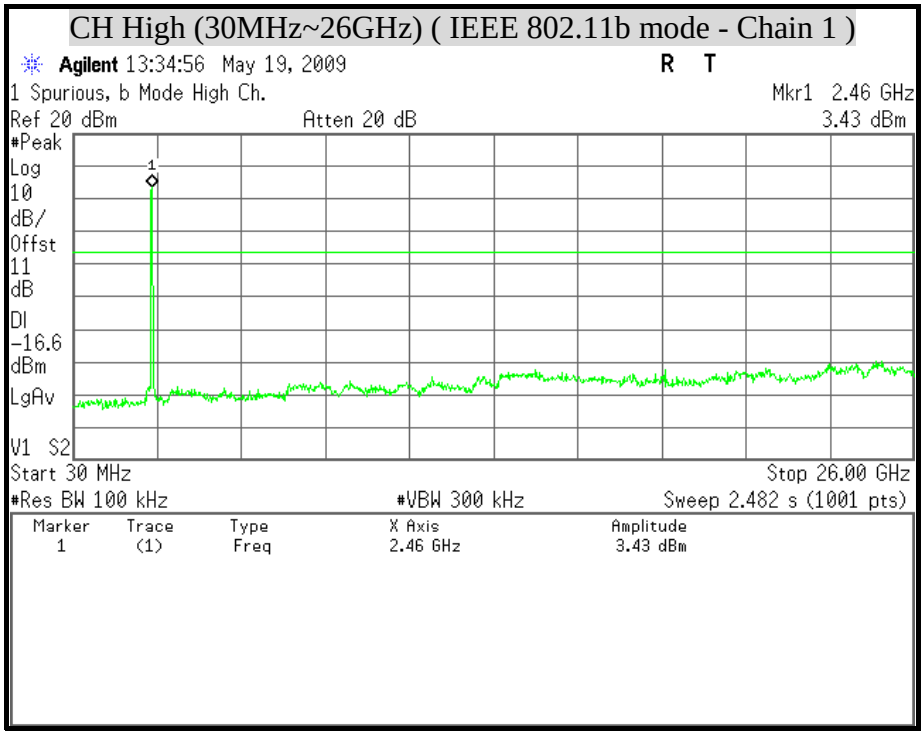
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.41 GHz	6.12 dBm
2	(1)	Freq	450 MHz	-57.16 dBm
3	(1)	Freq	3.22 GHz	-54.57 dBm
4	(1)	Freq	4.83 GHz	-53.74 dBm

CH Middle (30MHz~26GHz) (IEEE 802.11b mode - Chain 1)

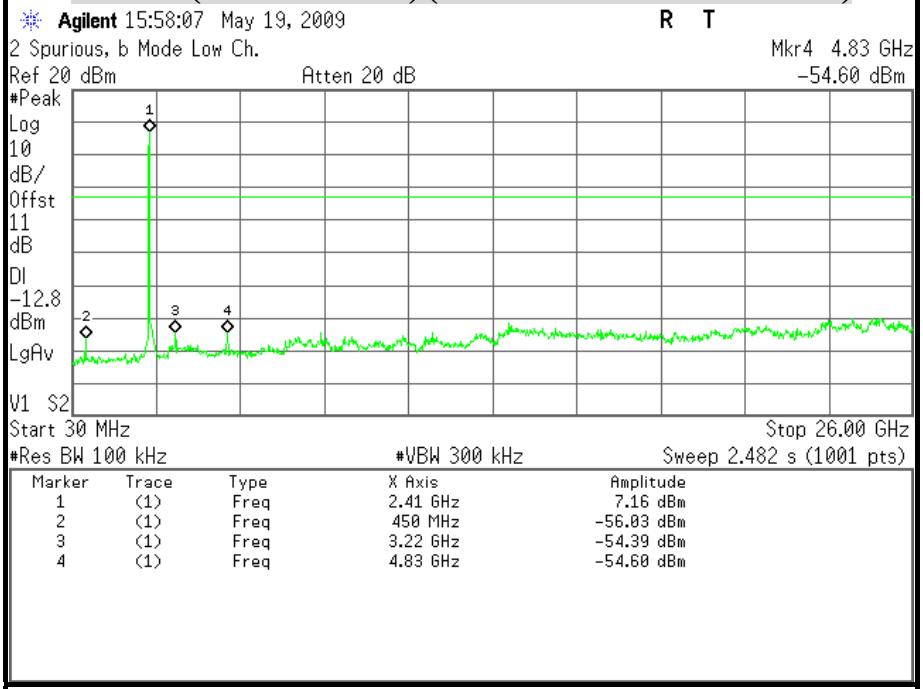


Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.44 GHz	6.34 dBm
2	(1)	Freq	470 MHz	-56.62 dBm
3	(1)	Freq	3.25 GHz	-53.28 dBm
4	(1)	Freq	4.89 GHz	-54.75 dBm

CH High (30MHz~26GHz) (IEEE 802.11b mode - Chain 1)

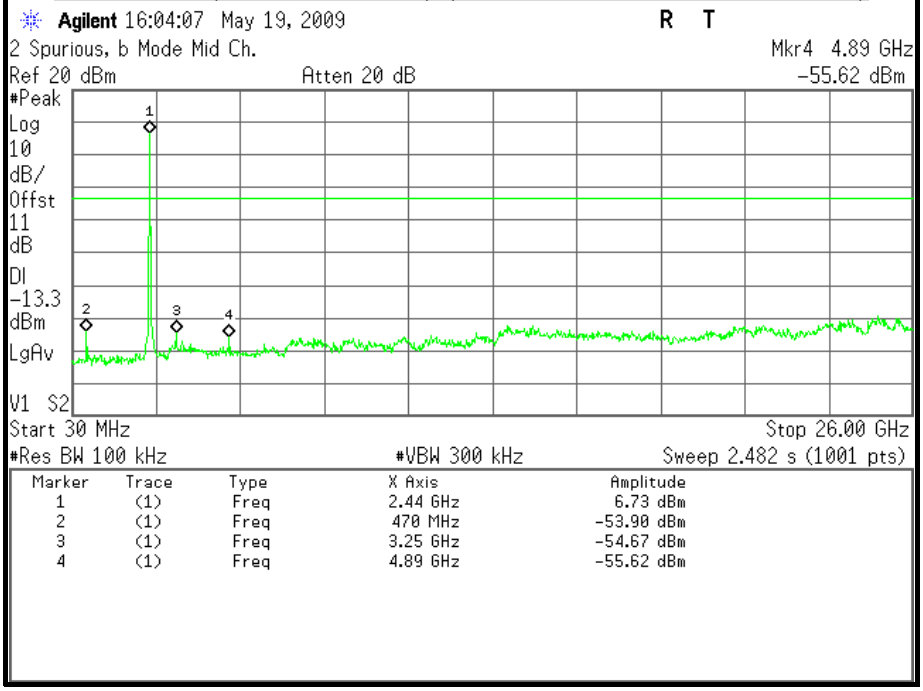


CH Low (30MHz~26GHz) (IEEE 802.11b mode - Chain 2)



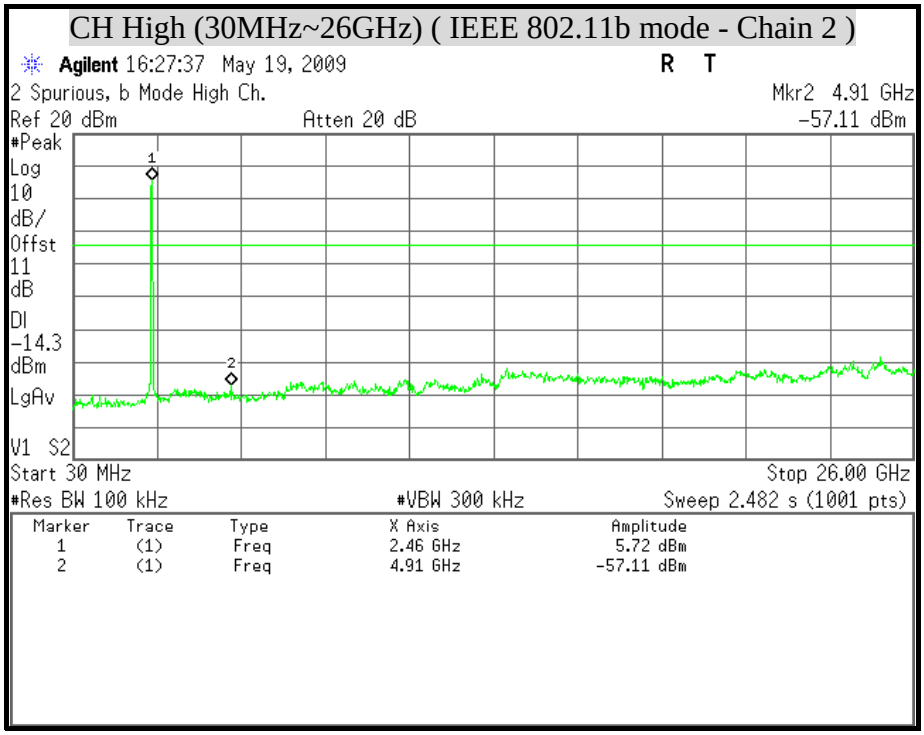
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.41 GHz	7.16 dBm
2	(1)	Freq	450 MHz	-56.03 dBm
3	(1)	Freq	3.22 GHz	-54.39 dBm
4	(1)	Freq	4.83 GHz	-54.60 dBm

CH Middle (30MHz~26GHz) (IEEE 802.11b mode - Chain 2)



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.44 GHz	6.73 dBm
2	(1)	Freq	470 MHz	-53.90 dBm
3	(1)	Freq	3.25 GHz	-54.67 dBm
4	(1)	Freq	4.89 GHz	-55.62 dBm

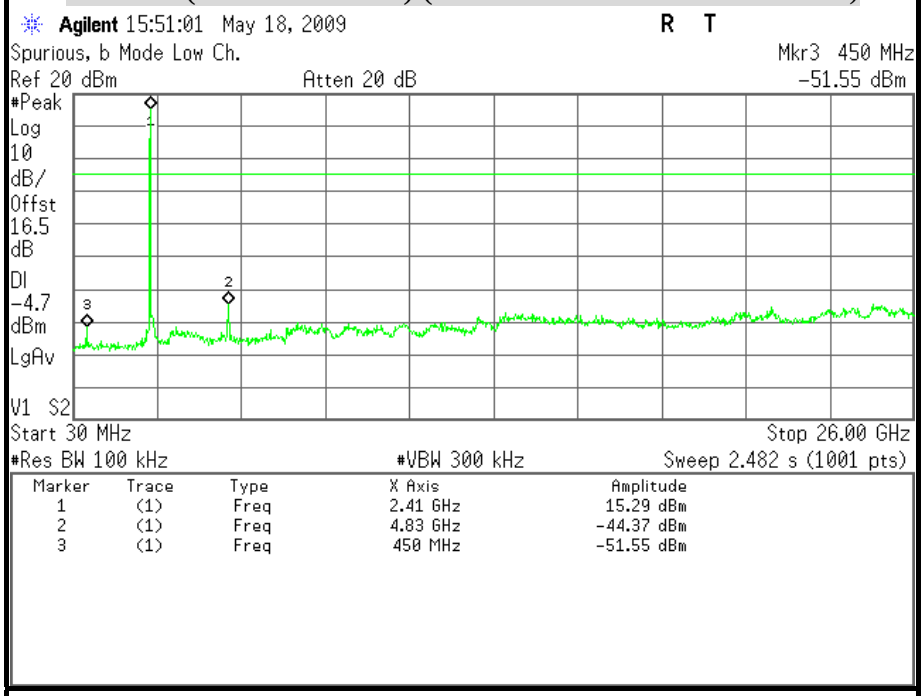
CH High (30MHz~26GHz) (IEEE 802.11b mode - Chain 2)



OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

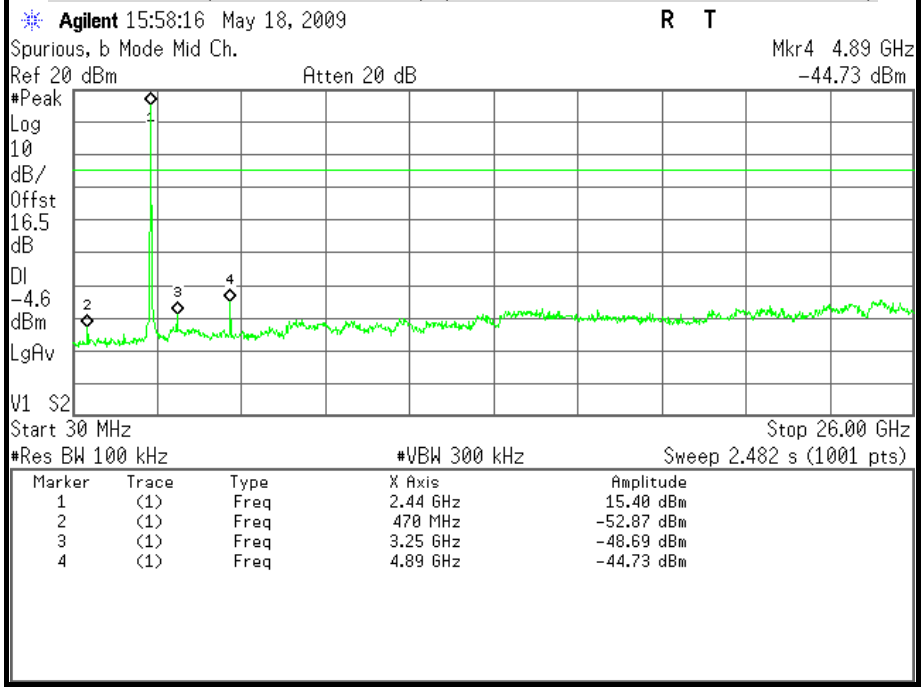
(IEEE 802.11b Combined mode)

CH Low (30MHz~26GHz) (IEEE 802.11b Combined mode)



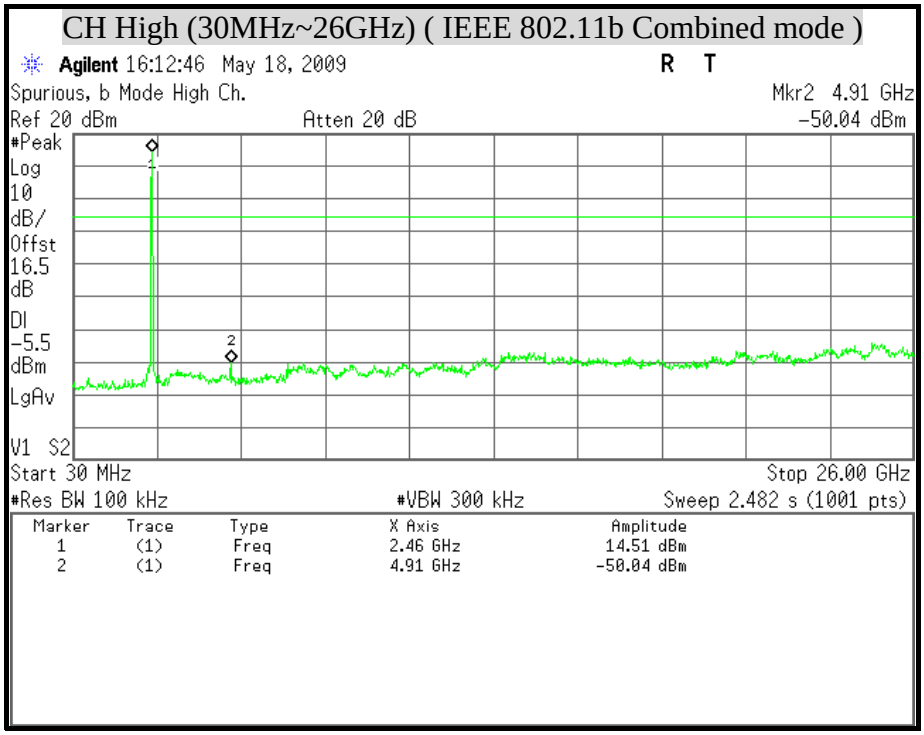
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.41 GHz	15.29 dBm
2	(1)	Freq	4.83 GHz	-44.37 dBm
3	(1)	Freq	450 MHz	-51.55 dBm

CH Middle (30MHz~26GHz) (IEEE 802.11b Combined mode)



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.44 GHz	15.40 dBm
2	(1)	Freq	470 MHz	-52.87 dBm
3	(1)	Freq	3.25 GHz	-48.69 dBm
4	(1)	Freq	4.89 GHz	-44.73 dBm

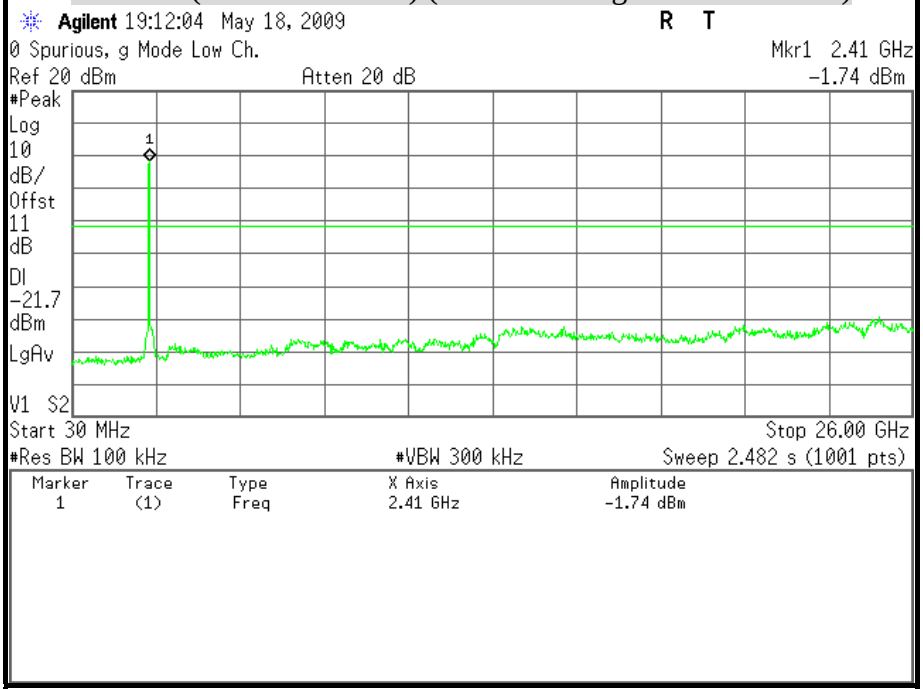
CH High (30MHz~26GHz) (IEEE 802.11b Combined mode)



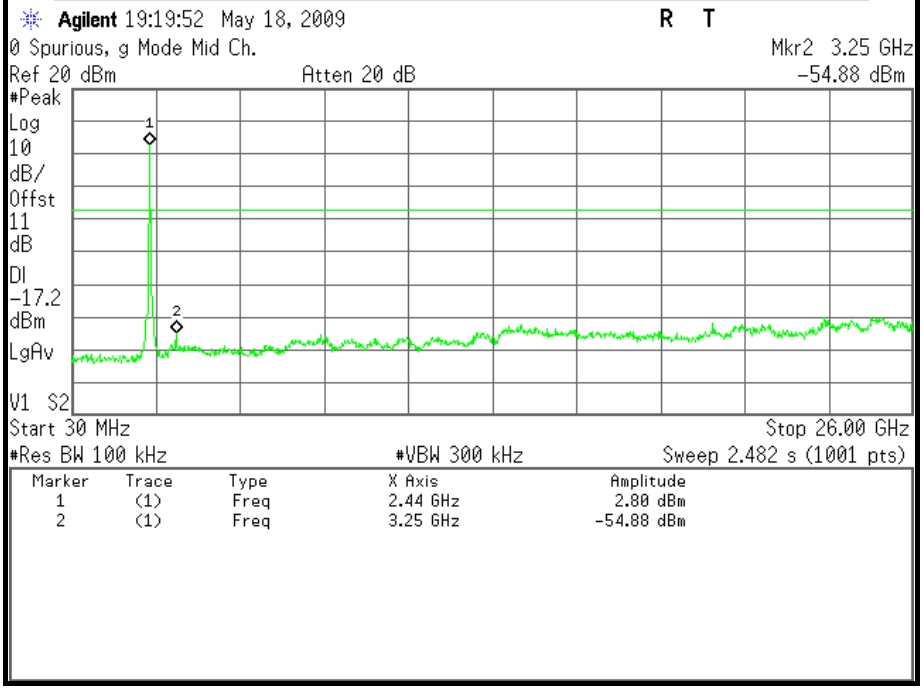
OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

(IEEE 802.11g mode)

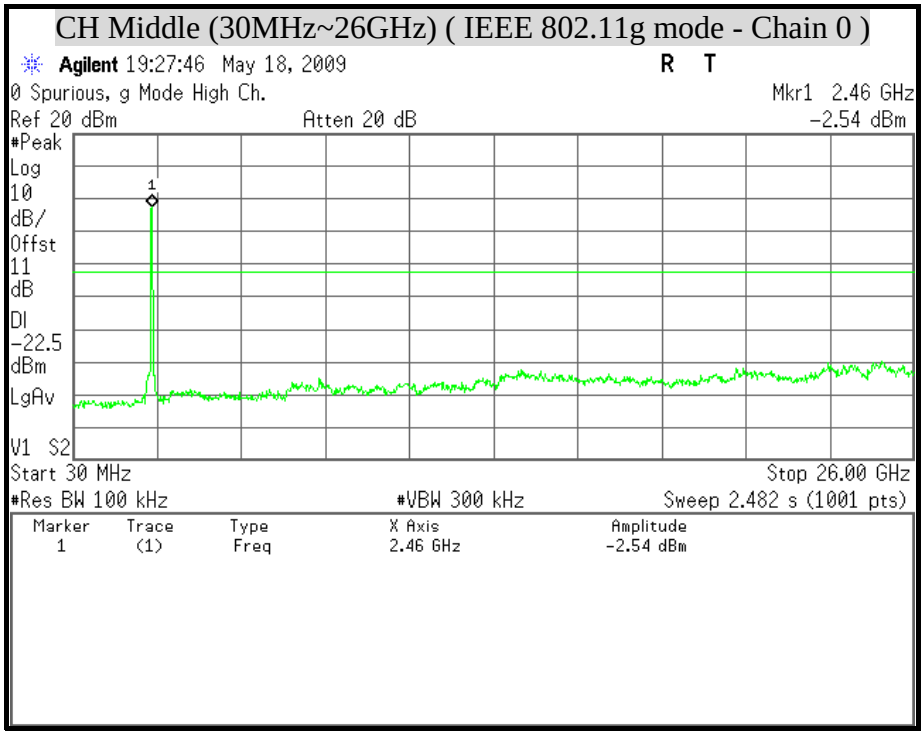
CH Low (30MHz~26GHz) (IEEE 802.11g mode - Chain 0)



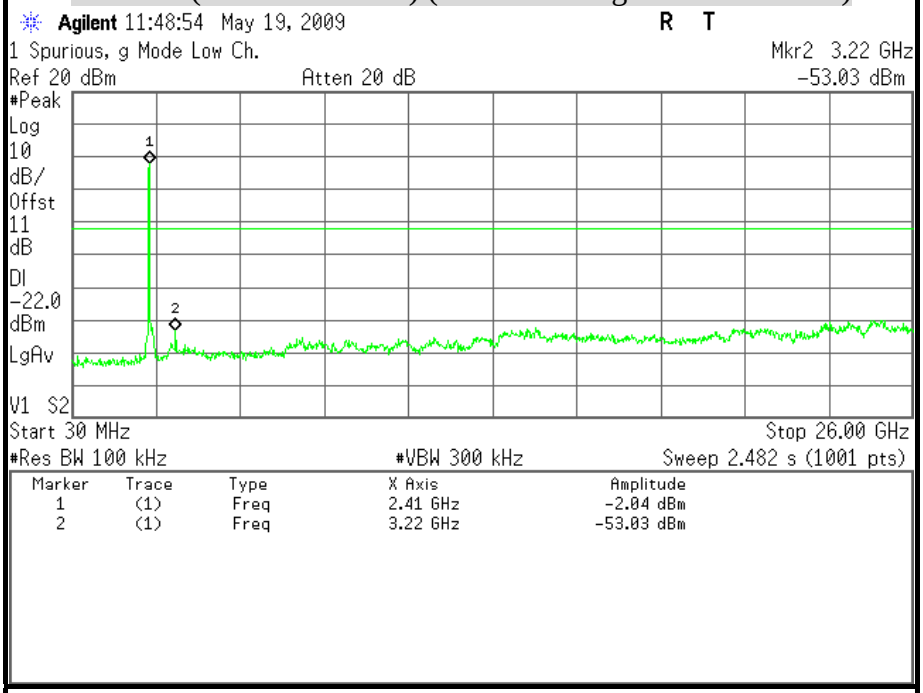
CH Middle (30MHz~26GHz) (IEEE 802.11g mode - Chain 0)



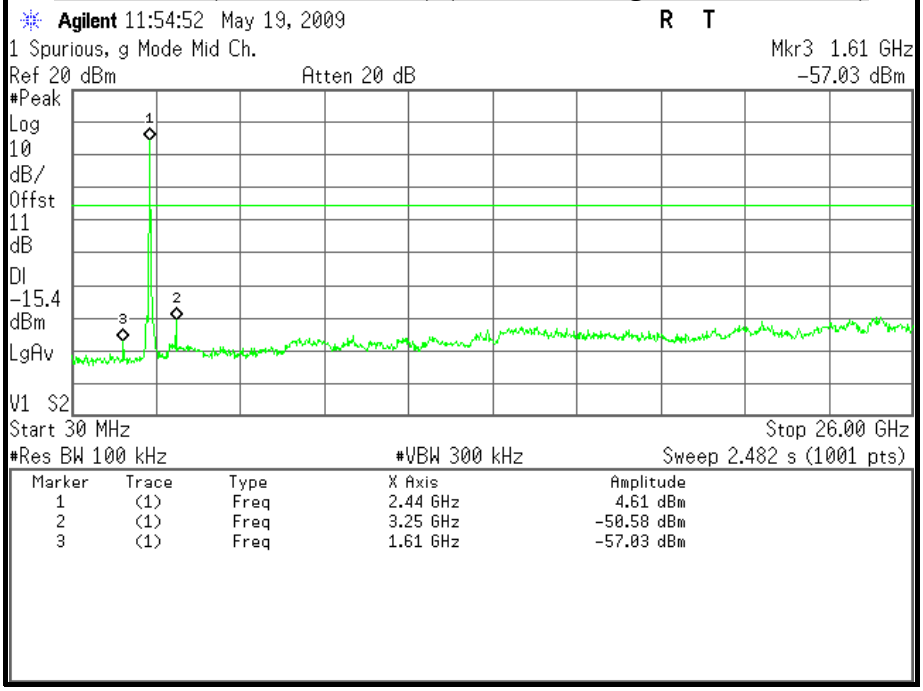
CH Middle (30MHz~26GHz) (IEEE 802.11g mode - Chain 0)



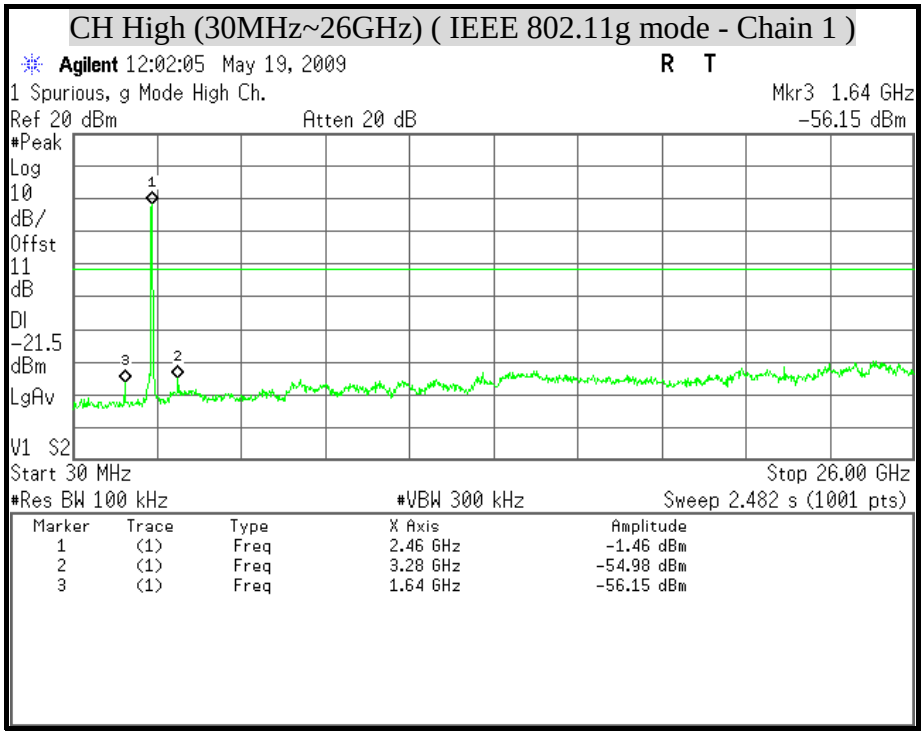
CH Low (30MHz~26GHz) (IEEE 802.11g mode - Chain 1)



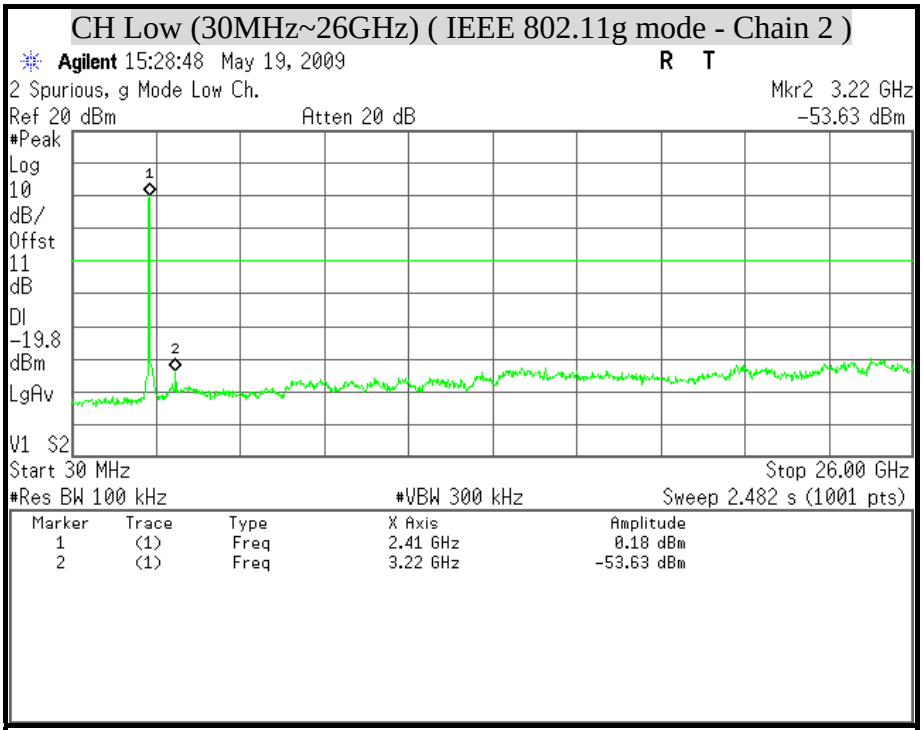
CH Middle (30MHz~26GHz) (IEEE 802.11g mode - Chain 1)



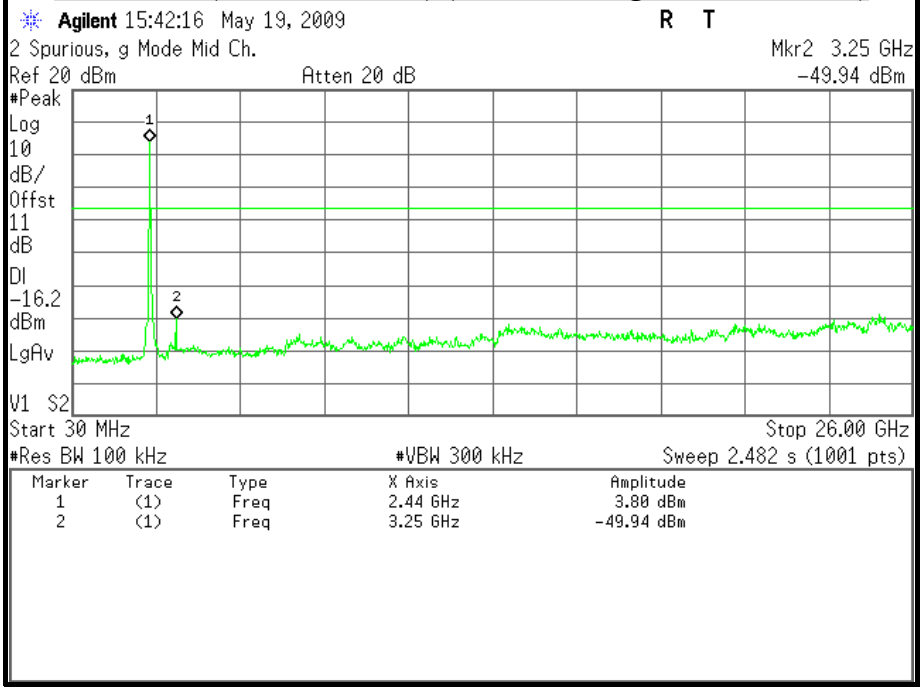
CH High (30MHz~26GHz) (IEEE 802.11g mode - Chain 1)



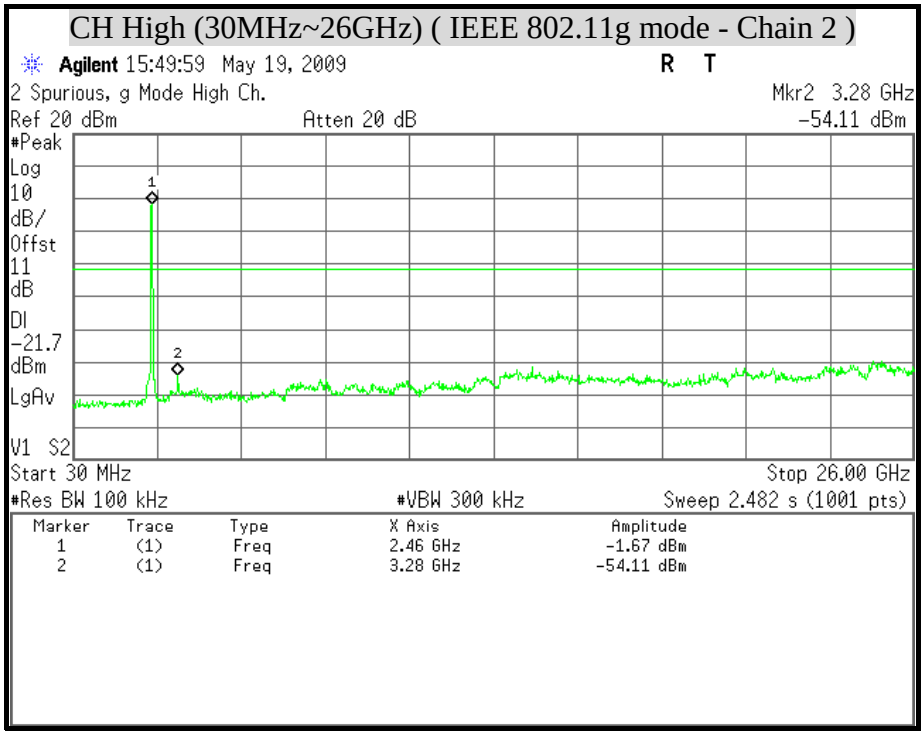
CH Low (30MHz~26GHz) (IEEE 802.11g mode - Chain 2)



CH Middle (30MHz~26GHz) (IEEE 802.11g mode - Chain 2)



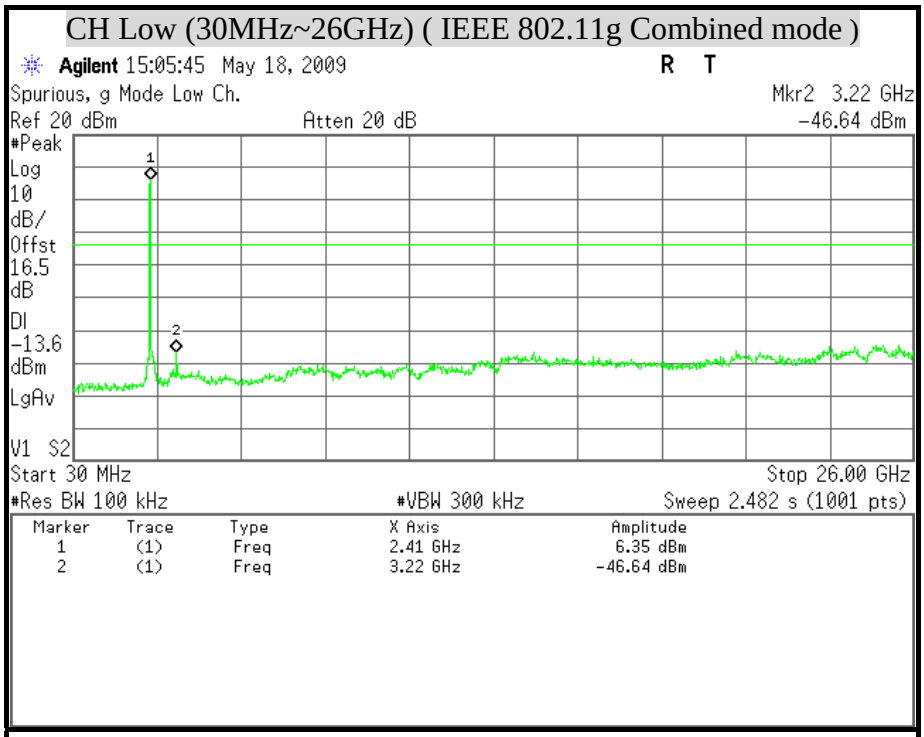
CH High (30MHz~26GHz) (IEEE 802.11g mode - Chain 2)



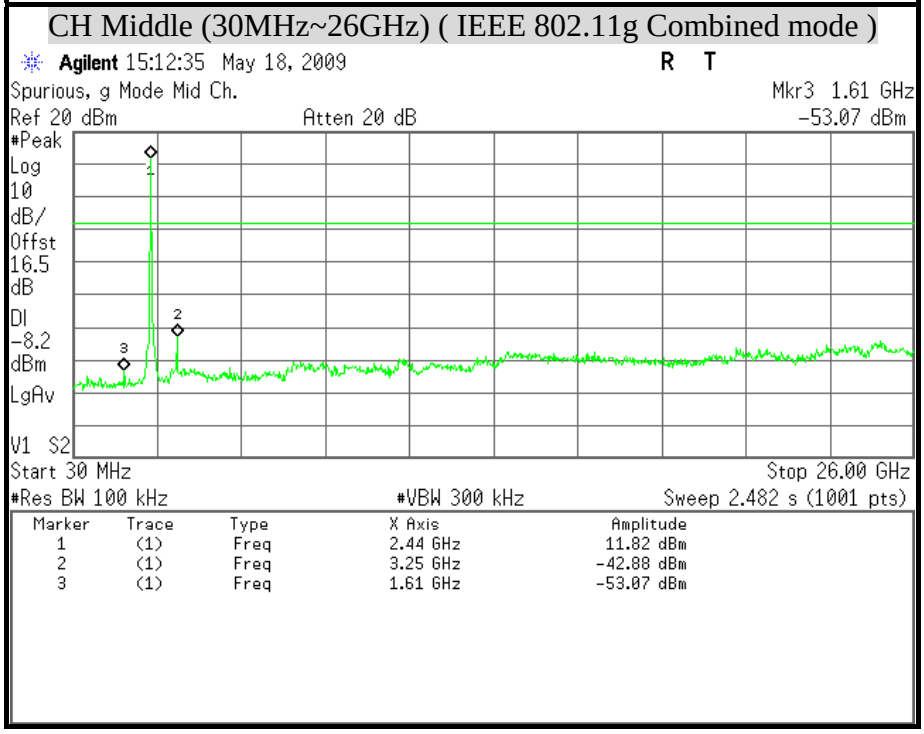
OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

(IEEE 802.11g Combined mode)

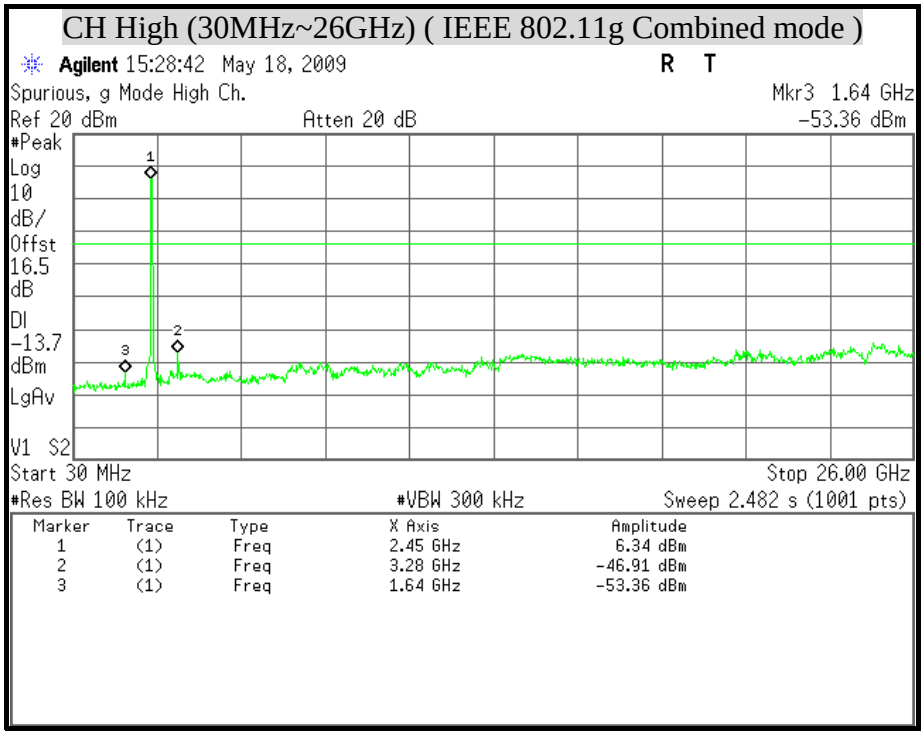
CH Low (30MHz~26GHz) (IEEE 802.11g Combined mode)



CH Middle (30MHz~26GHz) (IEEE 802.11g Combined mode)



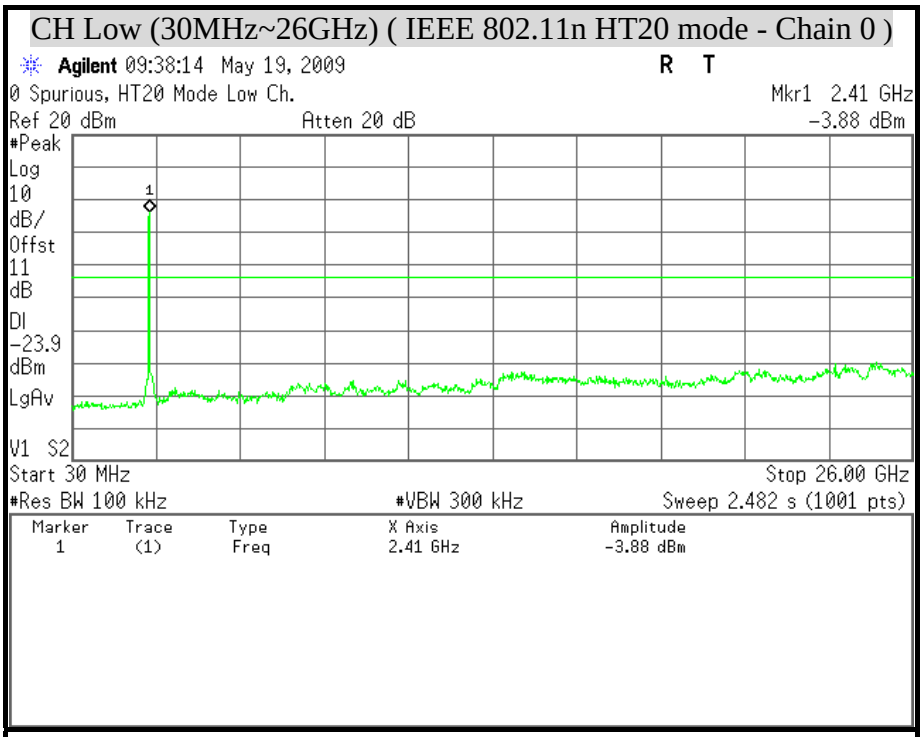
CH High (30MHz~26GHz) (IEEE 802.11g Combined mode)



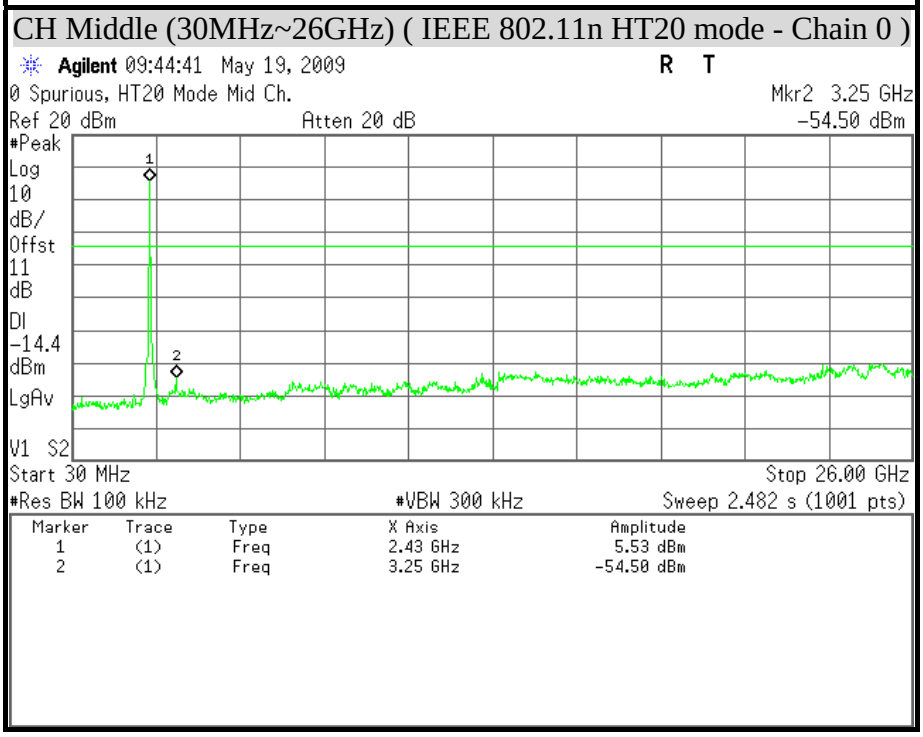
OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

(IEEE 802.11n HT20 mode)

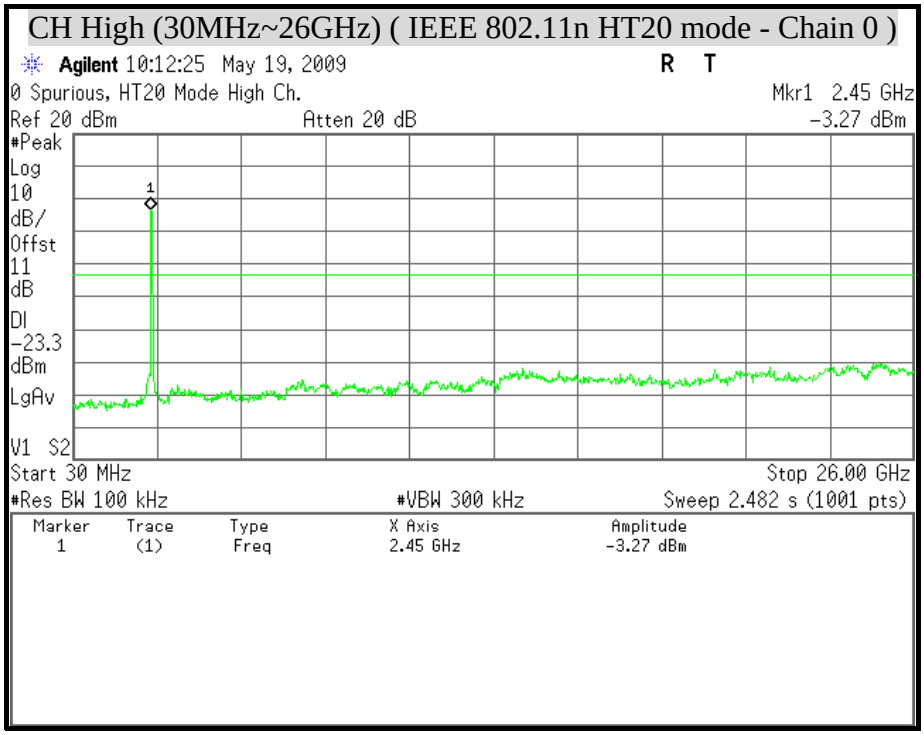
CH Low (30MHz~26GHz) (IEEE 802.11n HT20 mode - Chain 0)



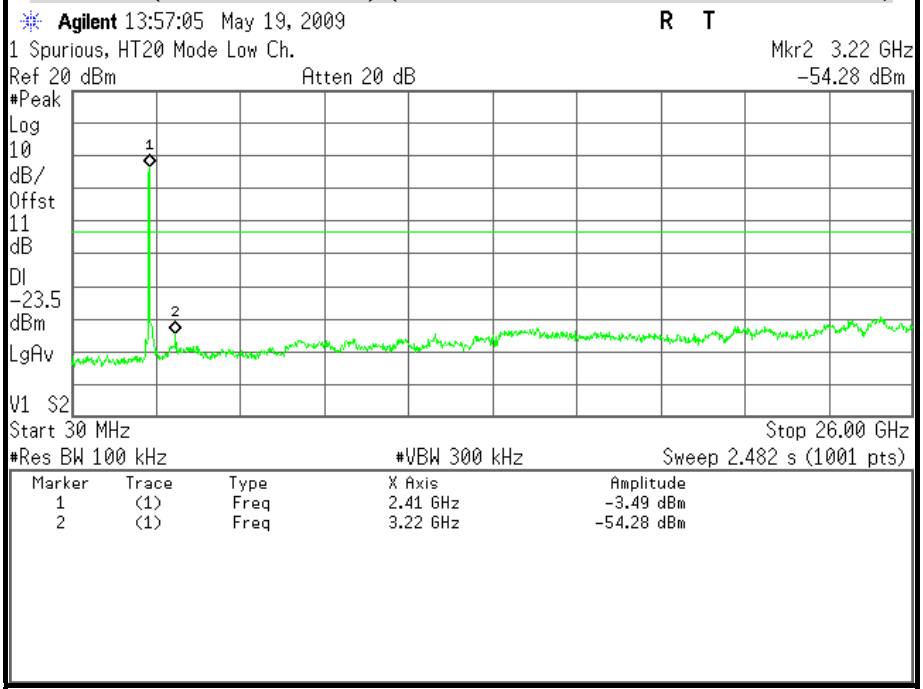
CH Middle (30MHz~26GHz) (IEEE 802.11n HT20 mode - Chain 0)



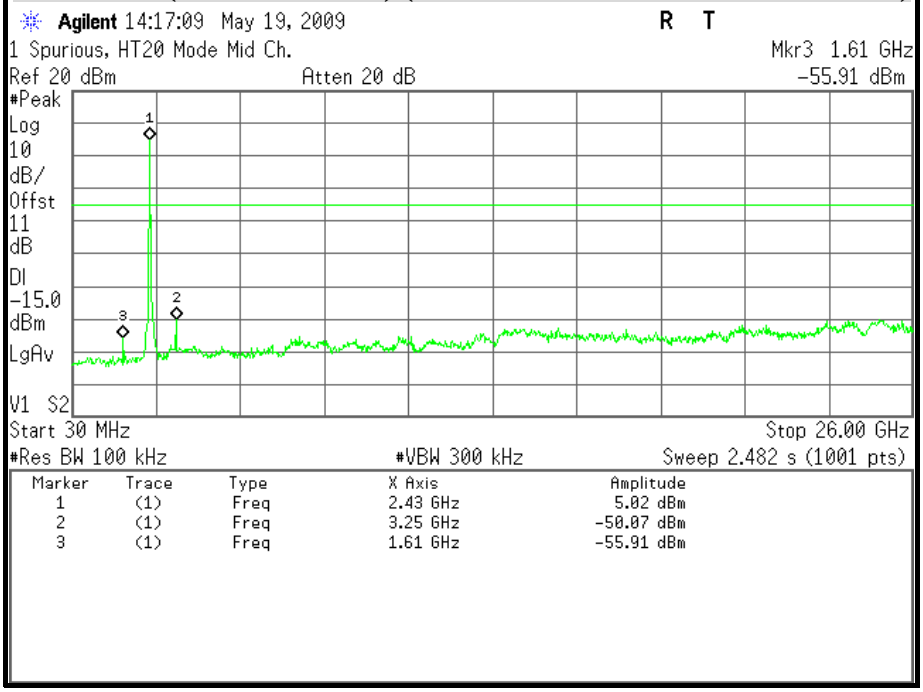
CH High (30MHz~26GHz) (IEEE 802.11n HT20 mode - Chain 0)



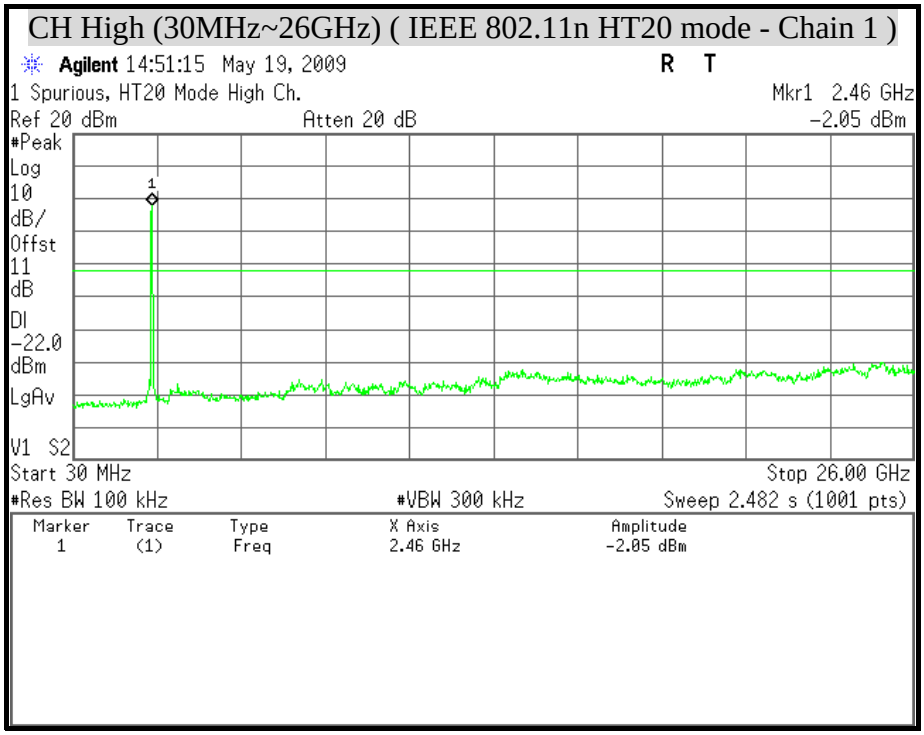
CH Low (30MHz~26GHz) (IEEE 802.11n HT20 mode - Chain 1)



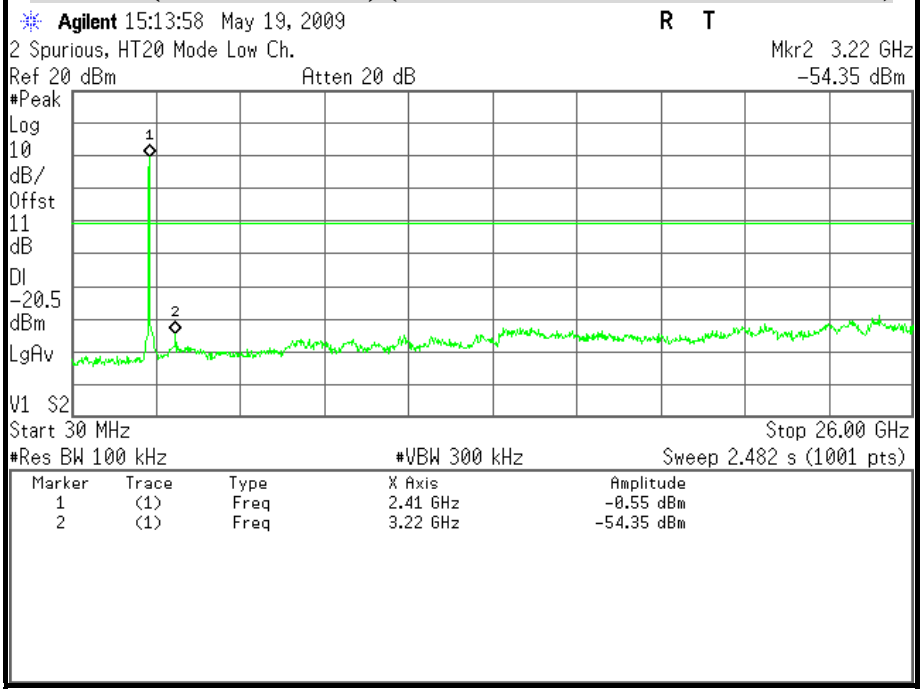
CH Middle (30MHz~26GHz) (IEEE 802.11n HT20 mode - Chain 1)



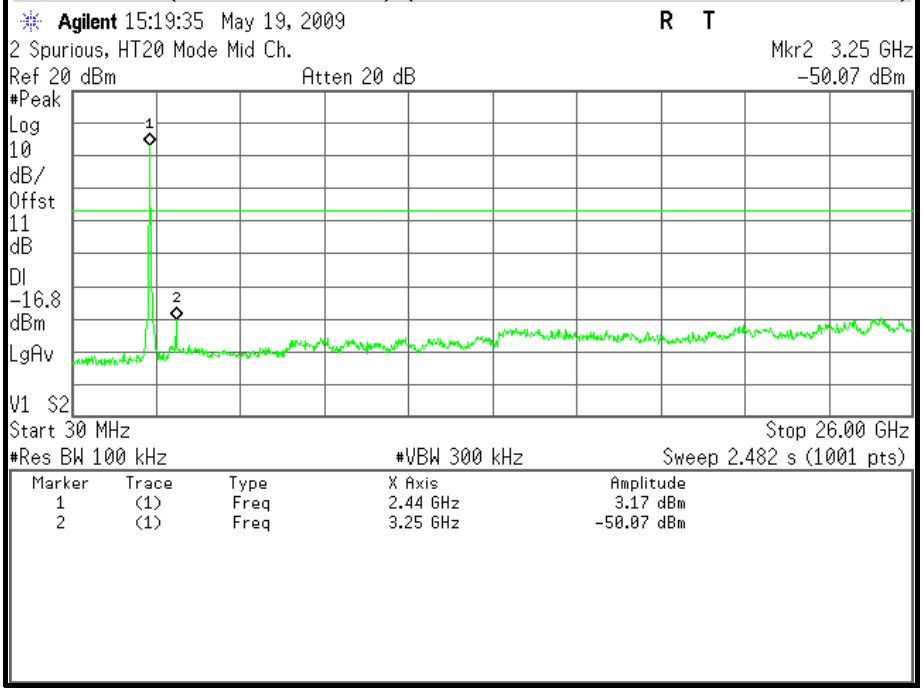
CH High (30MHz~26GHz) (IEEE 802.11n HT20 mode - Chain 1)



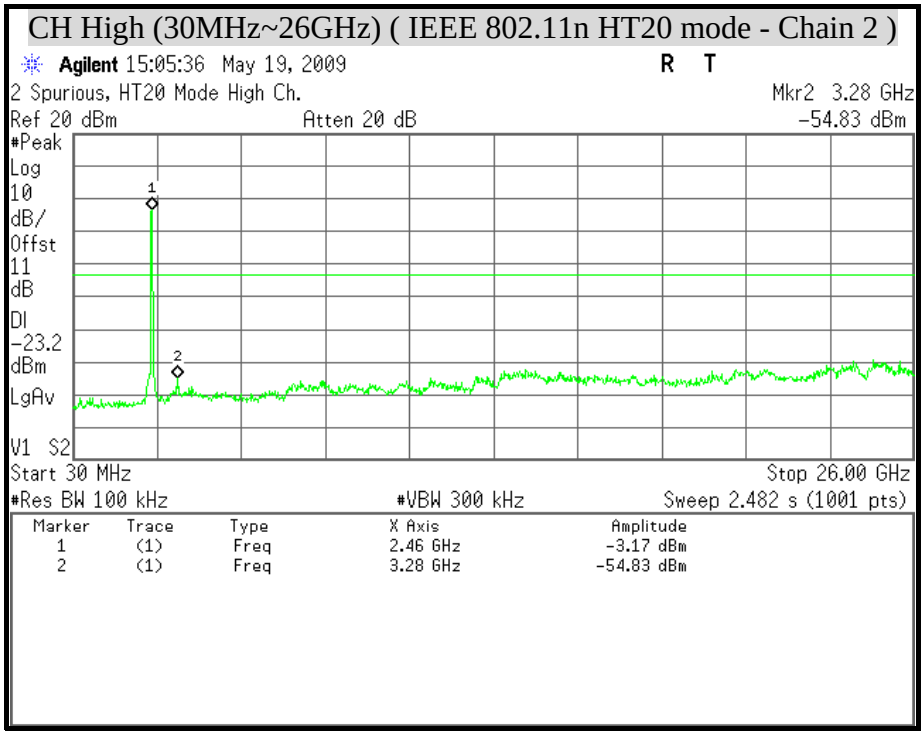
CH Low (30MHz~26GHz) (IEEE 802.11n HT20 mode - Chain 2)



CH Middle (30MHz~26GHz) (IEEE 802.11n HT20 mode - Chain 2)



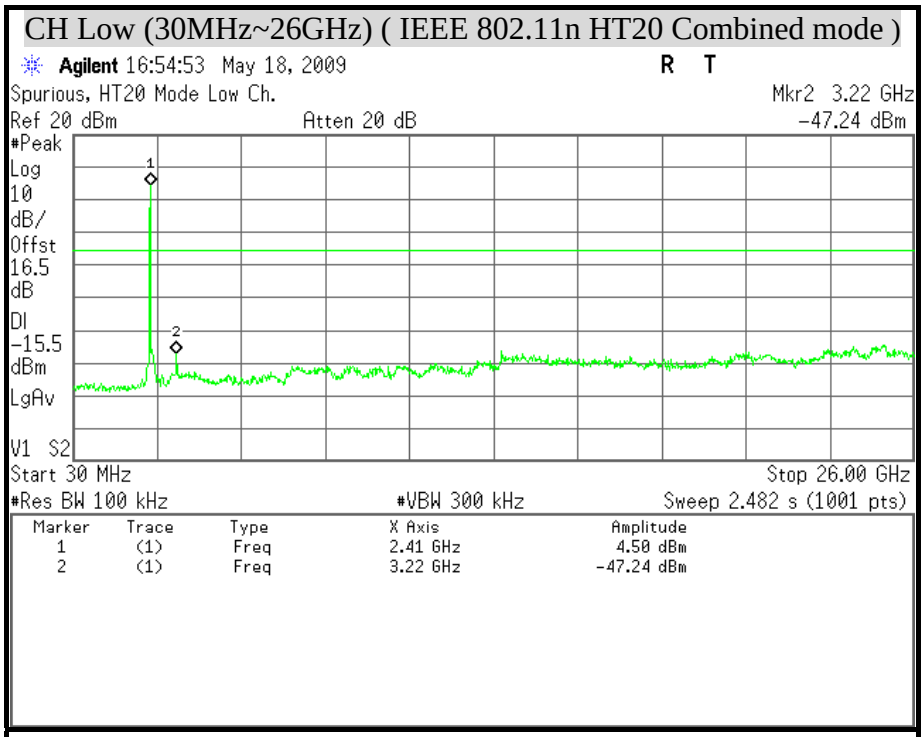
CH High (30MHz~26GHz) (IEEE 802.11n HT20 mode - Chain 2)



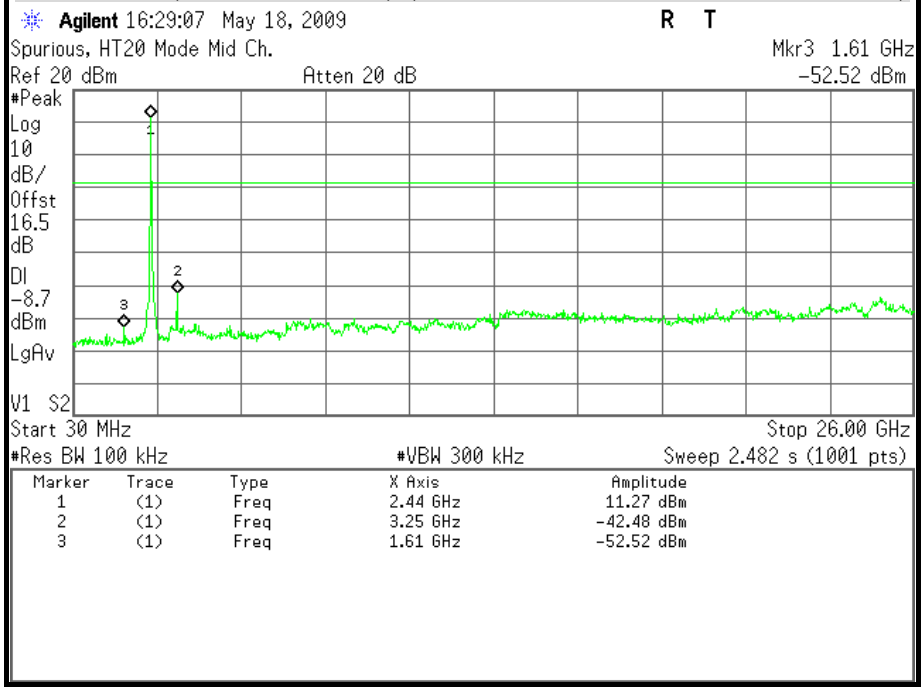
OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

(IEEE 802.11n HT20 Combined mode)

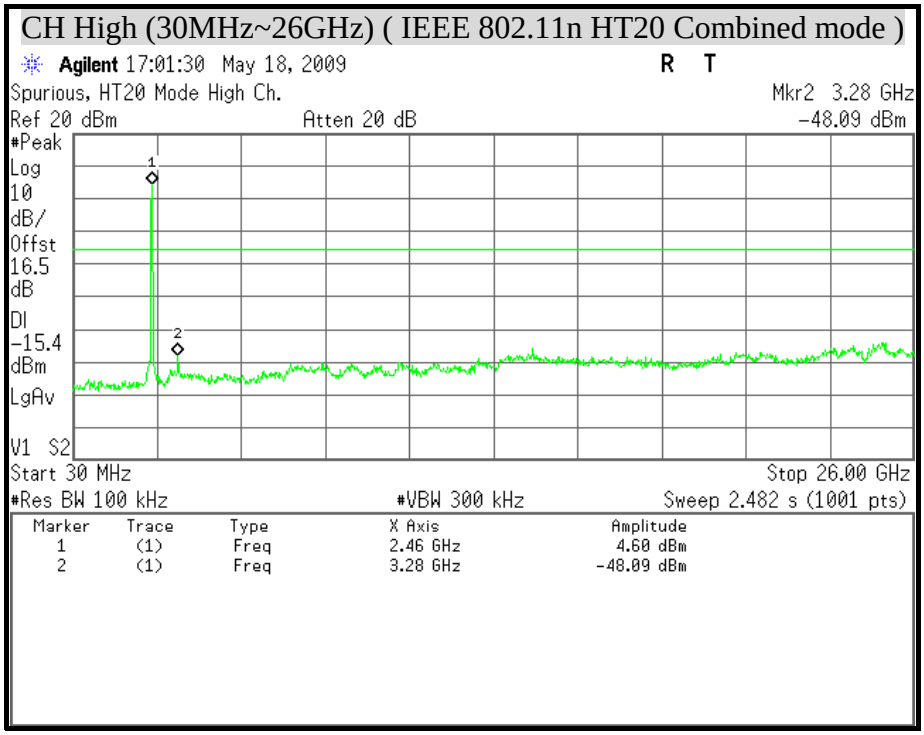
CH Low (30MHz~26GHz) (IEEE 802.11n HT20 Combined mode)



CH Middle (30MHz~26GHz) (IEEE 802.11n HT20 Combined mode)



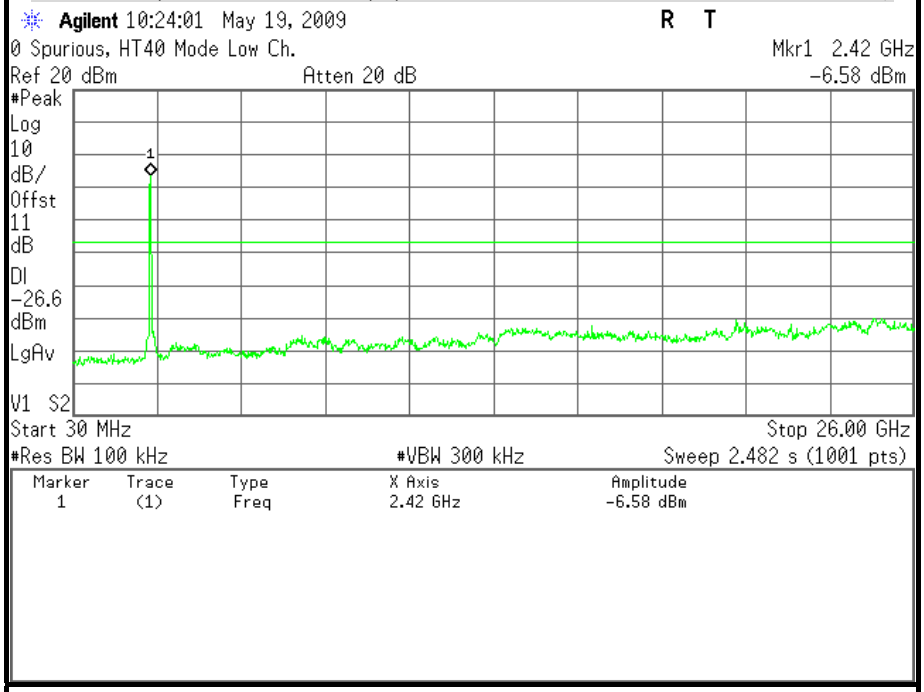
CH High (30MHz~26GHz) (IEEE 802.11n HT20 Combined mode)



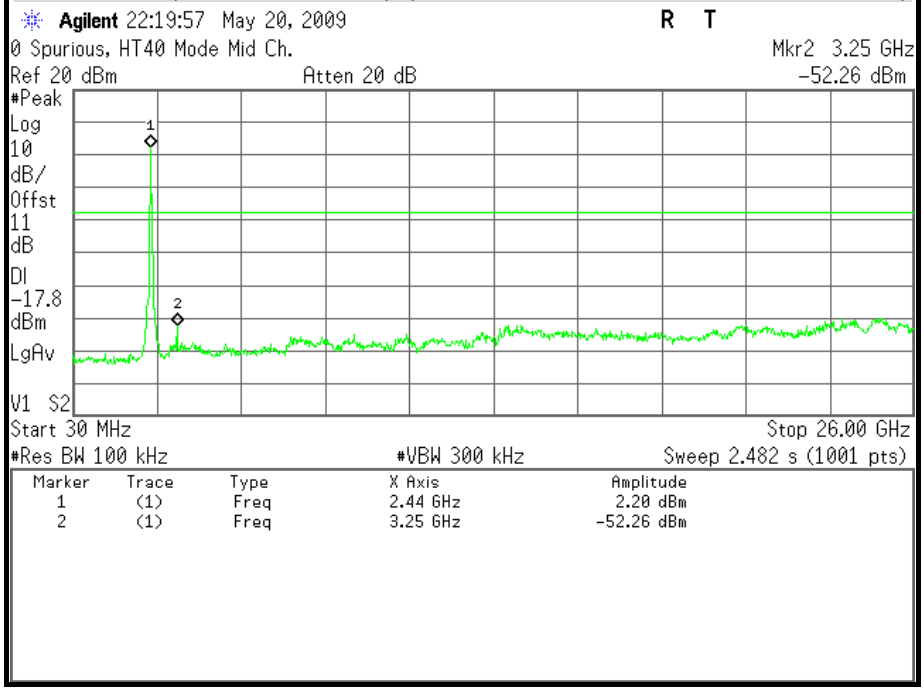
OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

(IEEE 802.11n HT40 mode)

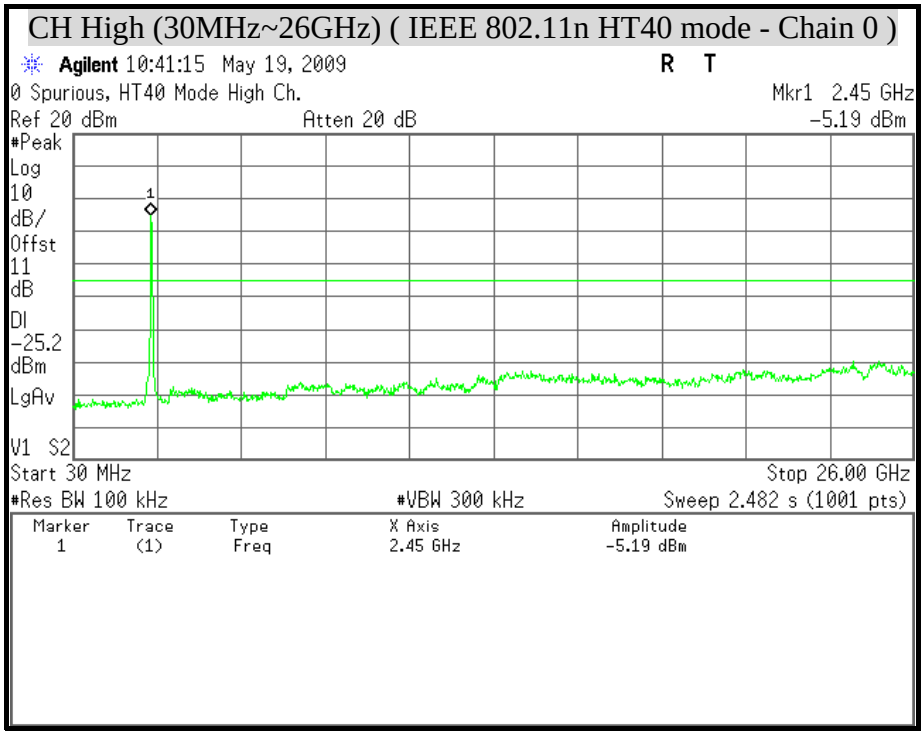
CH Low (30MHz~26GHz) (IEEE 802.11n HT40 mode - Chain 0)



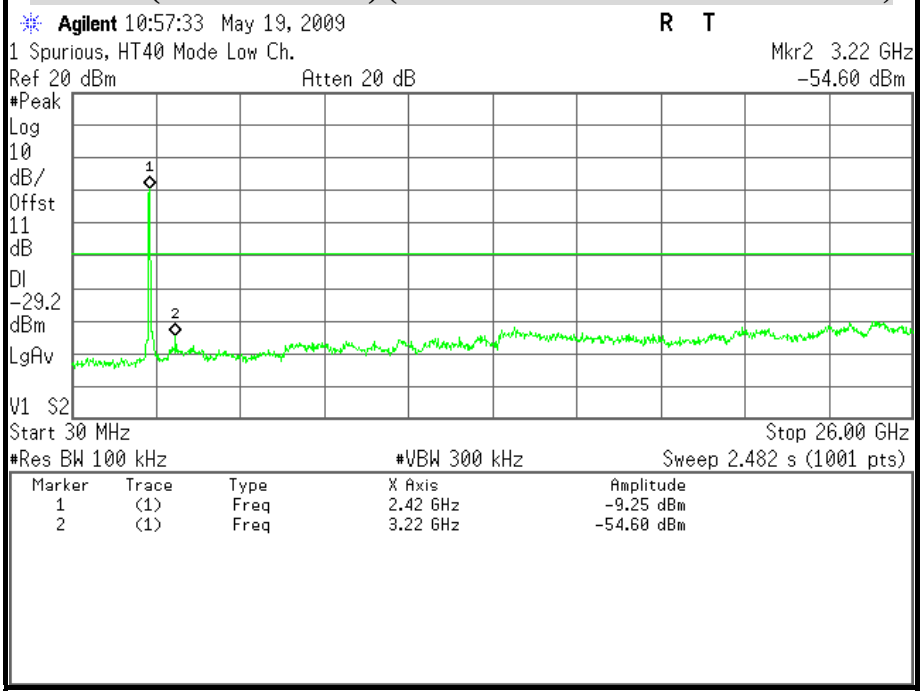
CH Middle (30MHz~26GHz) (IEEE 802.11n HT40 mode - Chain 0)



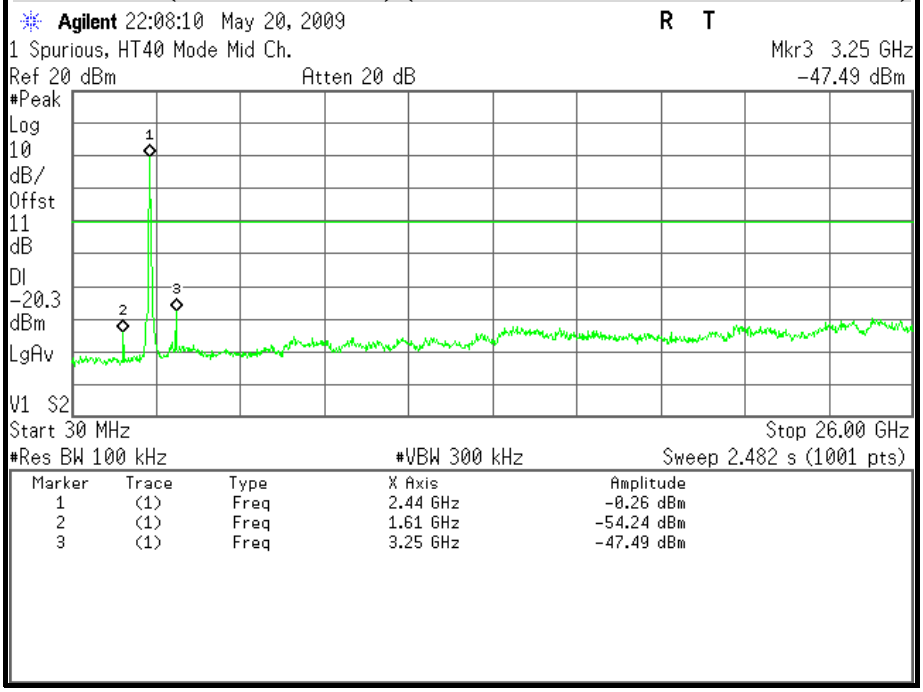
CH High (30MHz~26GHz) (IEEE 802.11n HT40 mode - Chain 0)



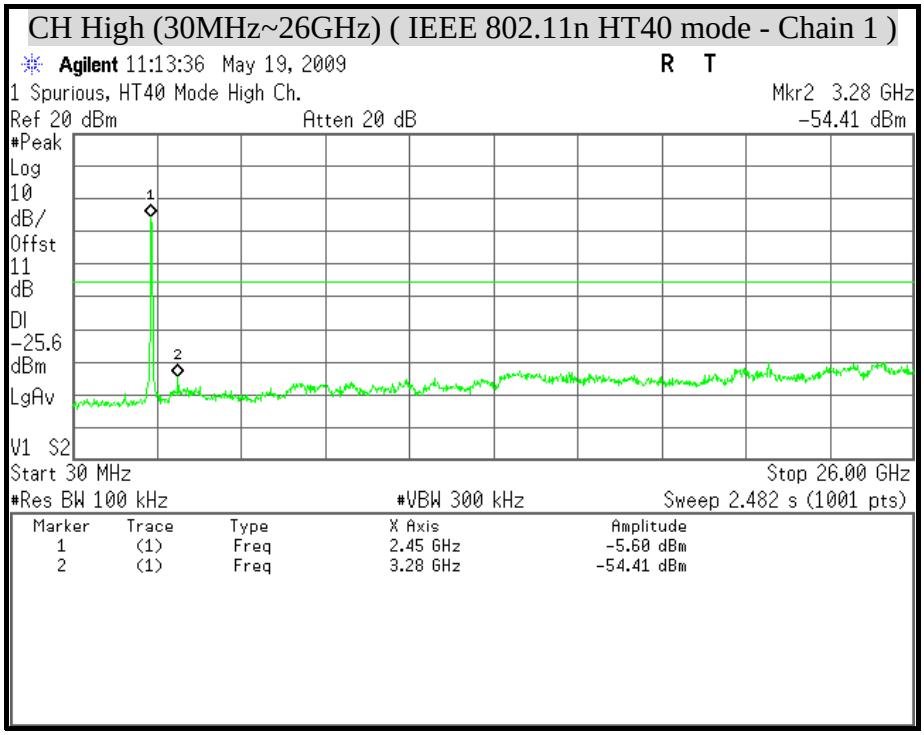
CH Low (30MHz~26GHz) (IEEE 802.11n HT40 mode - Chain 1)



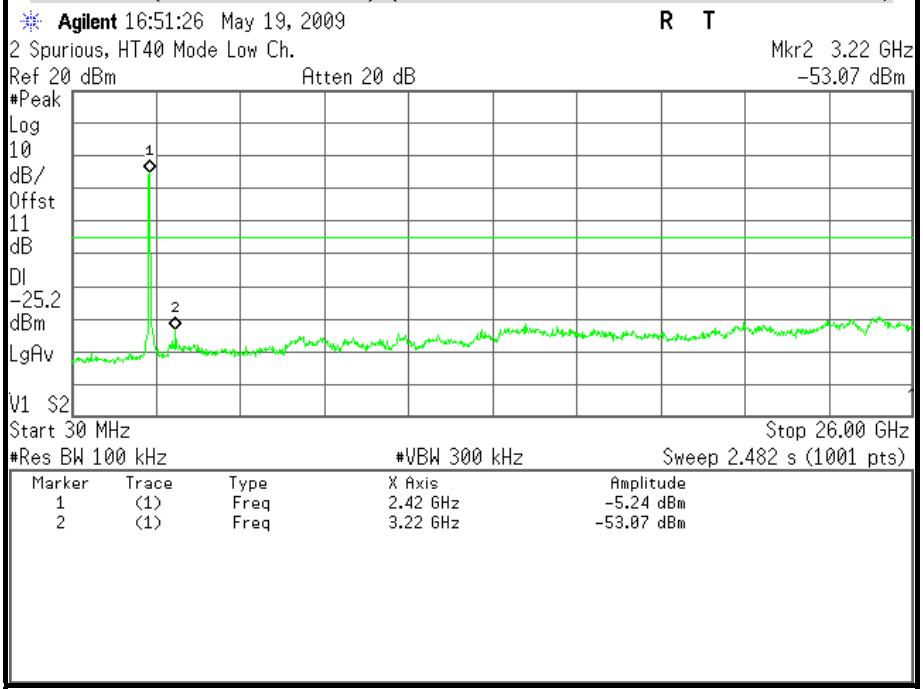
CH Middle (30MHz~26GHz) (IEEE 802.11n HT40 mode - Chain 1)



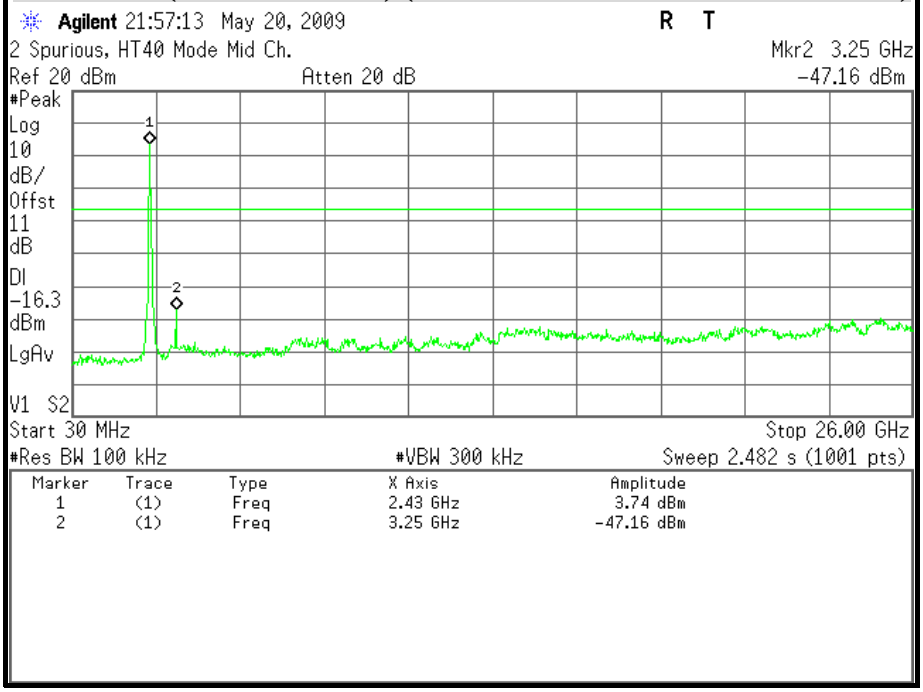
CH High (30MHz~26GHz) (IEEE 802.11n HT40 mode - Chain 1)



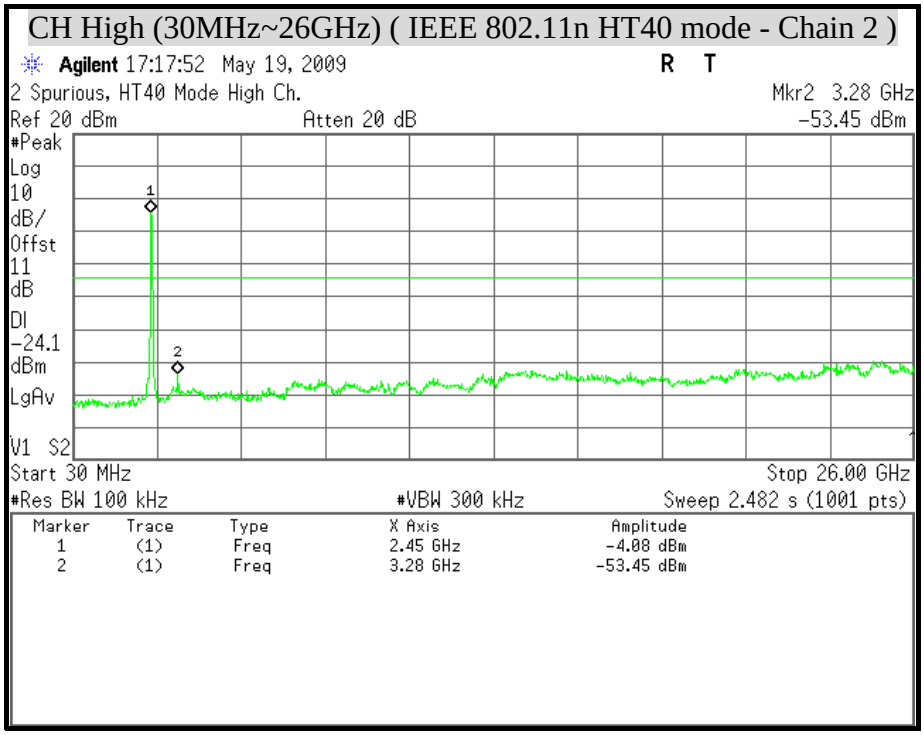
CH Low (30MHz~26GHz) (IEEE 802.11n HT40 mode - Chain 2)



CH Middle (30MHz~26GHz) (IEEE 802.11n HT40 mode - Chain 2)



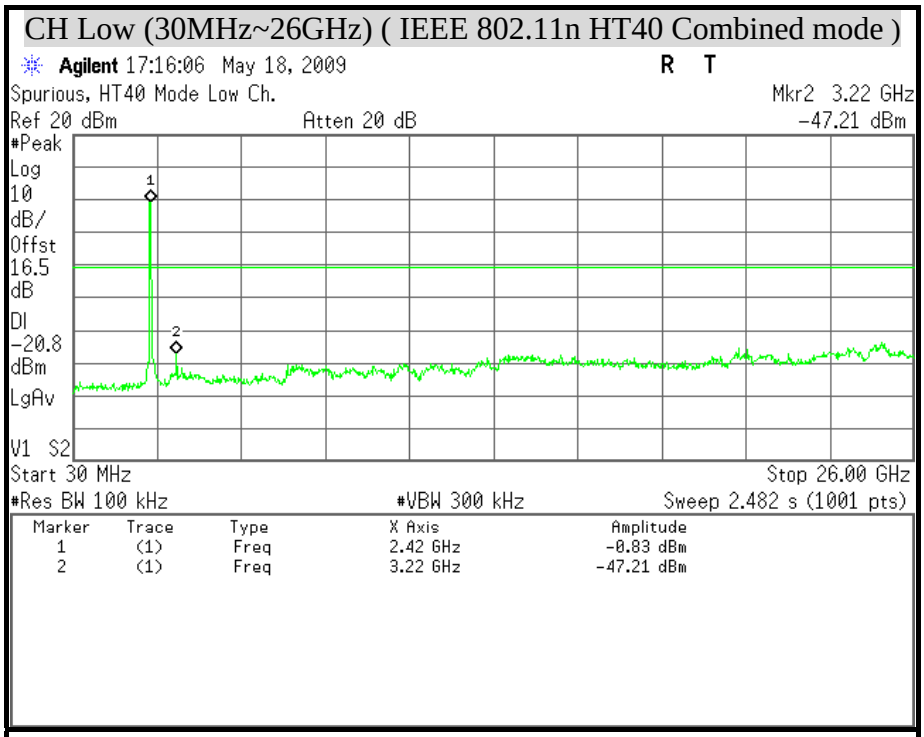
CH High (30MHz~26GHz) (IEEE 802.11n HT40 mode - Chain 2)



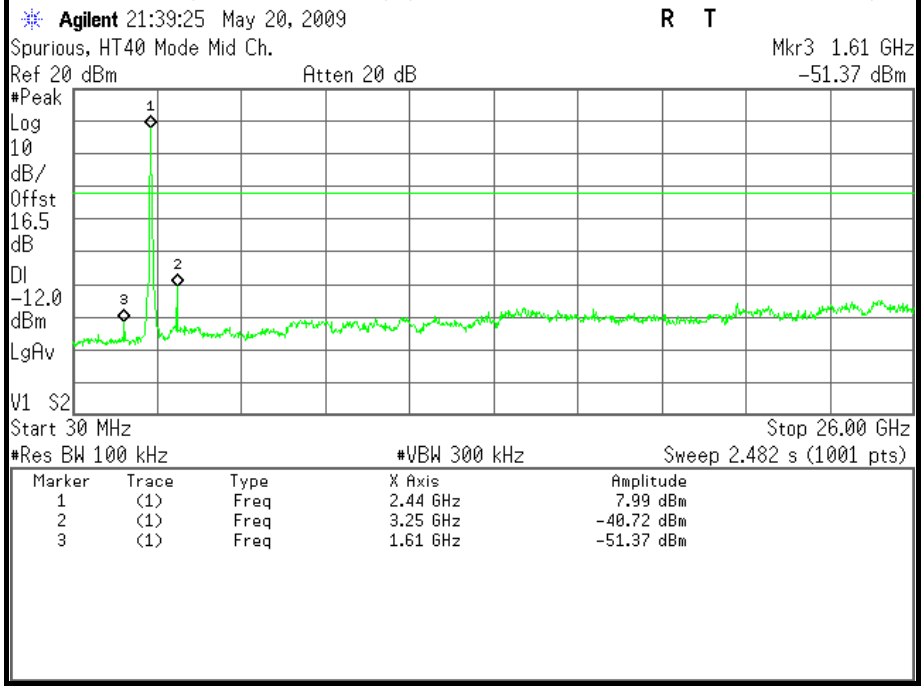
OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

(IEEE 802.11n HT40 Combined mode)

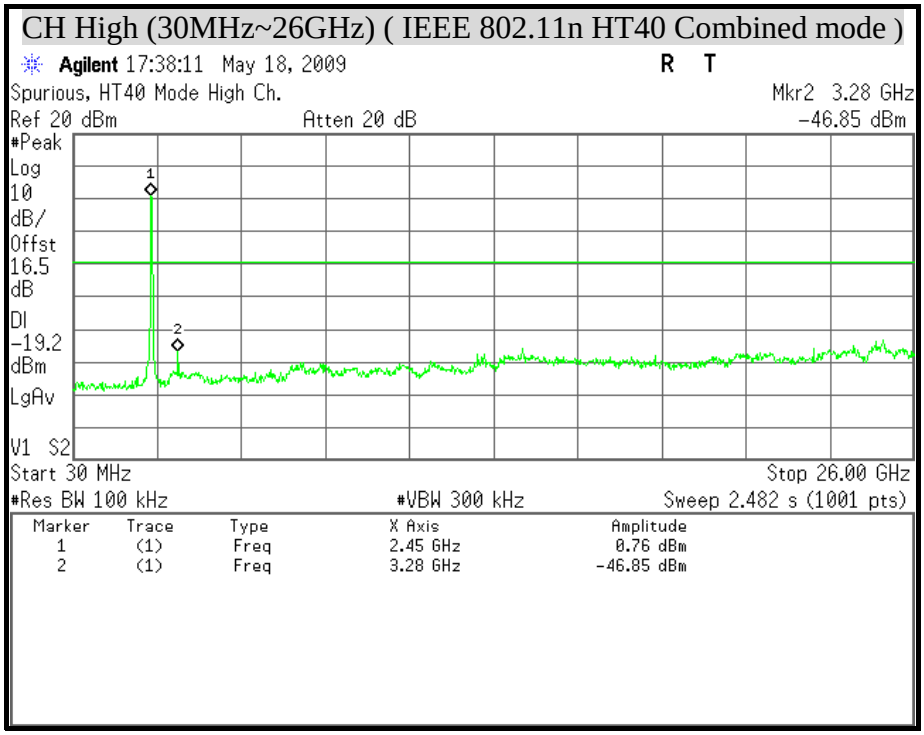
CH Low (30MHz~26GHz) (IEEE 802.11n HT40 Combined mode)



CH Middle (30MHz~26GHz) (IEEE 802.11n HT40 Combined mode)



CH High (30MHz~26GHz) (IEEE 802.11n HT40 Combined mode)



8.8 RADIATED EMISSIONS

8.8.1 TRANSMITTER RADIATED SUPURIOUS EMSSIONS

LIMITS

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

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 -1710	10.6 -12.7
6.26775 - 6.26825	108 -121.94	1718.8 - 1722.2	13.25 -13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 – 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 -16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3338	36.43 - 36.5
12.57675 - 12.57725	322 -335.4	3600 - 4400	([2])
13.36 - 13.41			

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

[2] Above 38.6

§ 15.205 (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 is 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.

§ 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 (microvolts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

** 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.

§ 15.209 (b) In the emission table above, the tighter limit applies at the band edges.

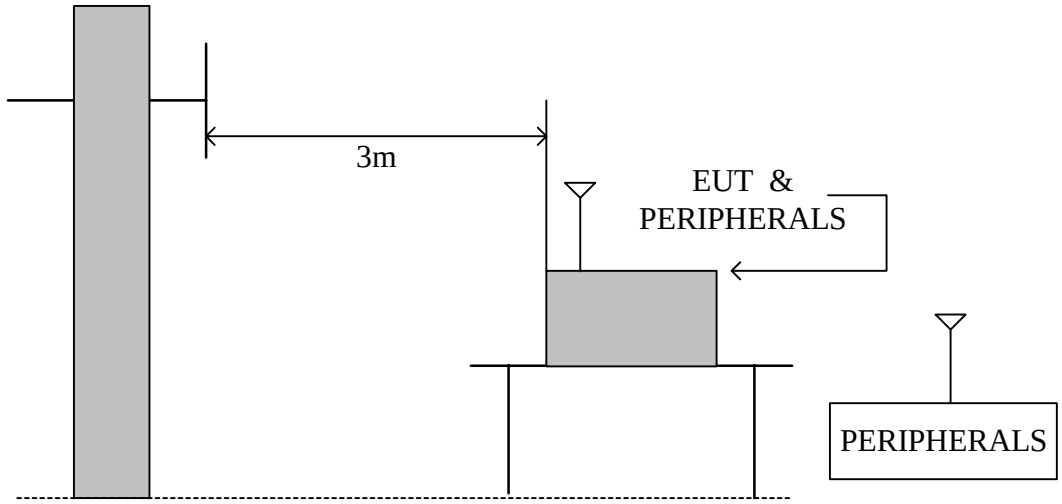
TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
SPECTRUM ANALYZER	AGILENT	E4446A	MY43360132	06/05/2009
EMI TEST RECEIVER	R & S	ESCI	100221	05/17/2010
BILOG ANTENNA	SCHWARZBECK	VULB	9168_249	09/17/2009
3117 Double Ridge (HORN) ANTENNA	ETS LINDGREN	EMCO-0746	00078732	05/19/2010
PRE-AMPLIFIER	EM	EM30265	07032612	05/21/2010
Notch Filters Band Reject	Micro-Tronics	BRM50702-01	009	N.C.R.
RF COAXIAL CABLE	HUBERSUHNER	SUCOFLEX 104PEA	SN31350	07/21/2009

Remark: *1. Each piece of equipment is scheduled for calibration once a year.*
2. N.C.R = No Calibration Request.

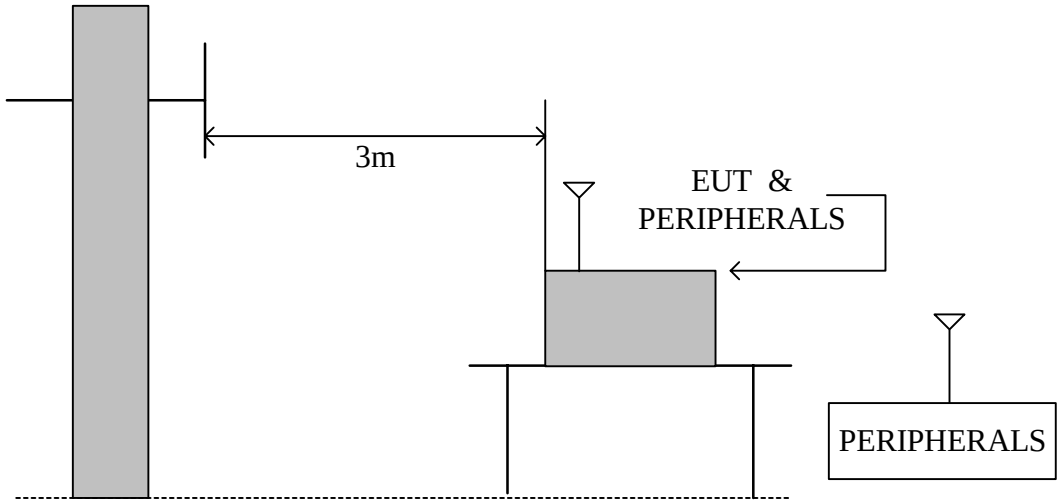
TEST SETUP

The diagram below shows the test setup that is utilized to make the measurements for emission from below 1GHz.



Antenna Elevation Variable

The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



Antenna Elevation Variable

TEST PROCEDURE

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.

b. White measuring the radiated emission below 1GHz, the EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. White measuring the radiated emission above 1GHz, the EUT was set 3 meters away from the interference-receiving antenna.

c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Note：

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.

2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.

3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

TEST RESULTS

No non-compliance noted

8.8.2 WORST-CASE RADIATED EMISSION BELOW 1 GHz

This EUT have four adapter with 4 testing modes of CH Low, Middle, High and Normal Link. After verified, we chose the Power Adapter (2) Normal Link as the worst case.

Product Name	RANGEBOOSTER N 650 ACCESS POINT	**Test Date**	2009/04/16
Model	DAP-1353	**Test By**	Rick Lin
Test Mode	Normal operating / Power Adapter (2) (worst-case)	**TEMP & Humidity**	23.9°C, 57%

Horizontal						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
30.00	65.85	-32.25	33.60	40.00	-6.40	Peak
49.40	57.63	-30.27	27.37	40.00	-12.63	Peak
169.68	61.49	-31.32	30.17	43.50	-13.33	Peak
236.61	67.27	-31.24	36.03	46.00	-9.97	Peak
241.46	64.94	-30.78	34.16	46.00	-11.84	Peak
476.20	61.22	-25.55	35.67	46.00	-10.33	Peak
574.17	56.85	-23.83	33.02	46.00	-12.98	Peak
649.83	55.28	-22.62	32.66	46.00	-13.34	Peak

Vertical						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
50.37	66.80	-30.33	36.47	40.00	-3.53	QP
81.41	67.93	-36.20	31.74	40.00	-8.26	Peak
168.71	65.12	-31.24	33.88	43.50	-9.62	Peak
249.22	63.46	-30.34	33.12	46.00	-12.88	Peak
363.68	64.92	-27.51	37.41	46.00	-8.59	Peak
476.20	62.27	-25.55	36.72	46.00	-9.28	Peak
600.36	57.43	-23.31	34.12	46.00	-11.88	Peak
902.03	57.61	-18.98	38.64	46.00	-7.36	Peak

Remark:

1. *Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit.*
2. *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.*
3. *Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) – PreAmp.Gain (dB)*
4. *Result (dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)*
5. *Margin (dB) = Remark result (dBuV/m) - Quasi-peak limit (dBuV/m).*

8.8.3 TRANSMITTER RADIATED EMISSION ABOVE 1 GHz

Product Name	RANGEBOOSTER N 650 ACCESS POINT	**Test Date**	2009/05/15
Model	DAP-1353	**Test By**	Rueyyan Lin
Test Mode	IEEE 802.11b TX (CH Low)	**TEMP & Humidity**	25.1°C, 59%

Horizontal									
Frequency (MHz)	Reading-PK (dBµV)	Reading-AV (dBµV)	Correction Factor (dB/m)	Result-PK (dBµV/m)	Result-AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-AV (dBµV/m)	Margin (dB)	Remark
2414.00	118.68	---	-8.94	109.74	---	---	---	---	Carrier

Vertical									
Frequency (MHz)	Reading-PK (dBµV)	Reading-AV (dBµV)	Correction Factor (dB/m)	Result-PK (dBµV/m)	Result-AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-AV (dBµV/m)	Margin (dB)	Remark
2414.00	122.38	---	-8.94	113.44	---	---	---	---	Carrier
3217.50	55.44	---	-7.79	47.65	---	74.00	54.00	-6.35	Peak
4822.50	59.36	55.90	-4.56	54.80	51.34	74.00	54.00	-2.66	AVG

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *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.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	RANGEBOOSTER N 650 ACCESS POINT	Test Date	2009/05/15
Model	DAP-1353	Test By	Rueyyan Lin
Test Mode	IEEE 802.11b TX (CH Middle)	TEMP & Humidity	25.1°C, 59%

Horizontal

Frequency (MHz)	Reading-PK (dBμV)	Reading-AV (dBμV)	Correction Factor (dB/m)	Result-PK (dBμV/m)	Result-AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-AV (dBμV/m)	Margin (dB)	Remark
2438.00	117.54	---	-8.92	108.62	---	---	---	---	Carrier

Vertical

Frequency (MHz)	Reading-PK (dBμV)	Reading-AV (dBμV)	Correction Factor (dB/m)	Result-PK (dBμV/m)	Result-AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-AV (dBμV/m)	Margin (dB)	Remark
2438.00	124.70	---	-8.92	115.78	---	---	---	---	Carrier
3247.50	54.77	---	-7.75	47.02	---	74.00	54.00	-6.98	Peak
4875.00	60.35	56.73	-4.42	55.93	52.31	74.00	54.00	-1.69	AVG

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *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.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	RANGEBOOSTER N 650 ACCESS POINT	**Test Date**	2009/05/15
Model	DAP-1353	**Test By**	Rueyyan Lin
Test Mode	IEEE 802.11b TX (CH High)	**TEMP & Humidity**	25.1°C, 59%

Horizontal									
Frequency (MHz)	Reading-PK (dBµV)	Reading-AV (dBµV)	Correction Factor (dB/m)	Result-PK (dBµV/m)	Result-AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-AV (dBµV/m)	Margin (dB)	Remark
2462.00	115.08	---	-8.89	106.19	---	---	---	---	Carrier

Vertical									
Frequency (MHz)	Reading-PK (dBµV)	Reading-AV (dBµV)	Correction Factor (dB/m)	Result-PK (dBµV/m)	Result-AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-AV (dBµV/m)	Margin (dB)	Remark
2462.00	122.19	---	-8.89	113.30	---	---	---	---	Carrier
4927.50	53.50	---	-4.29	49.21	---	74.00	54.00	-4.79	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *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.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	RANGEBOOSTER N 650 ACCESS POINT	**Test Date**	2009/05/15
Model	DAP-1353	**Test By**	Rueyyan Lin
Test Mode	IEEE 802.11g TX (CH Low)	**TEMP & Humidity**	25.1°C, 59%

Horizontal									
Frequency (MHz)	Reading-PK (dBµV)	Reading-AV (dBµV)	Correction Factor (dB/m)	Result-PK (dBµV/m)	Result-AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-AV (dBµV/m)	Margin (dB)	Remark
2416.00	114.89	---	-8.94	105.95	---	---	---	---	Carrier

Vertical									
Frequency (MHz)	Reading-PK (dBµV)	Reading-AV (dBµV)	Correction Factor (dB/m)	Result-PK (dBµV/m)	Result-AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-AV (dBµV/m)	Margin (dB)	Remark
2418.00	119.18	---	-8.94	110.24	---	---	---	---	Carrier
3217.50	55.26	---	-7.79	47.47	---	74.00	54.00	-6.53	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *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.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	RANGEBOOSTER N 650 ACCESS POINT	Test Date	2009/05/15
Model	DAP-1353	Test By	Rueyyan Lin
Test Mode	IEEE 802.11g TX (CH Middle)	TEMP & Humidity	25.1°C, 59%

Horizontal

Frequency (MHz)	Reading-PK (dBµV)	Reading-AV (dBµV)	Correction Factor (dB/m)	Result-PK (dBµV/m)	Result-AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-AV (dBµV/m)	Margin (dB)	Remark
2436.00	121.37	---	-8.92	112.45	---	---	---	---	Carrier
3247.50	53.69	---	-7.75	45.94	---	74.00	54.00	-8.06	Peak

Vertical

Frequency (MHz)	Reading-PK (dBµV)	Reading-AV (dBµV)	Correction Factor (dB/m)	Result-PK (dBµV/m)	Result-AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-AV (dBµV/m)	Margin (dB)	Remark
2434.00	126.25	---	-8.92	117.33	---	---	---	---	Carrier
3247.50	64.97	61.45	-7.75	57.22	53.70	74.00	54.00	-0.30	AVG
4867.50	52.53	---	-4.44	48.09	---	74.00	54.00	-5.91	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *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.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	RANGEBOOSTER N 650 ACCESS POINT	Test Date	2009/05/15
Model	DAP-1353	Test By	Rueyyan Lin
Test Mode	IEEE 802.11g TX (CH High)	TEMP & Humidity	25.1°C, 59%

Horizontal

Frequency (MHz)	Reading-PK (dBµV)	Reading-AV (dBµV)	Correction Factor (dB/m)	Result-PK (dBµV/m)	Result-AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-AV (dBµV/m)	Margin (dB)	Remark
2462.00	112.88	---	-8.89	103.99	---	---	---	---	Carrier
4995.00	52.14	---	-4.12	48.03	---	74.00	54.00	-5.97	Peak
7372.50	49.82	---	-0.79	49.03	---	74.00	54.00	-4.97	Peak

Vertical

Frequency (MHz)	Reading-PK (dBµV)	Reading-AV (dBµV)	Correction Factor (dB/m)	Result-PK (dBµV/m)	Result-AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-AV (dBµV/m)	Margin (dB)	Remark
2458.00	121.24	---	-8.90	112.34	---	---	---	---	Carrier
3285.00	55.52	---	-7.69	47.82	---	74.00	54.00	-6.18	Peak
4995.00	52.20	---	-4.12	48.08	---	74.00	54.00	-5.92	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *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.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	RANGEBOOSTER N 650 ACCESS POINT	Test Date	2009/05/15
Model	DAP-1353	Test By	Rueyyan Lin
Test Mode	IEEE 802.11n HT20 TX (CH Low)	TEMP & Humidity	25.1°C, 59%

Horizontal

Frequency (MHz)	Reading-PK (dBµV)	Reading-AV (dBµV)	Correction Factor (dB/m)	Result-PK (dBµV/m)	Result-AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-AV (dBµV/m)	Margin (dB)	Remark
2408.00	114.51	---	-8.95	105.55	---	---	---	---	Carrier
3427.50	53.33	---	-7.48	45.85	---	74.00	54.00	-8.15	Peak

Vertical

Frequency (MHz)	Reading-PK (dBµV)	Reading-AV (dBµV)	Correction Factor (dB/m)	Result-PK (dBµV/m)	Result-AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-AV (dBµV/m)	Margin (dB)	Remark
2410.00	117.51	---	-8.95	108.56	---	---	---	---	Carrier
3217.50	55.03	---	-7.79	47.23	---	74.00	54.00	-6.77	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *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.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	RANGEBOOSTER N 650 ACCESS POINT	Test Date	2009/05/15
Model	DAP-1353	Test By	Rueyyan Lin
Test Mode	IEEE 802.11n HT20 TX (CH Middle)	TEMP & Humidity	25.1°C, 59%

Horizontal

Frequency (MHz)	Reading-PK (dBµV)	Reading-AV (dBµV)	Correction Factor (dB/m)	Result-PK (dBµV/m)	Result-AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-AV (dBµV/m)	Margin (dB)	Remark
2442.00	121.90	---	-8.91	112.99	---	---	---	---	Carrier
3247.50	54.91	---	-7.75	47.16	---	74.00	54.00	-6.84	Peak
7320.00	48.81	---	-0.83	47.99	---	74.00	54.00	-6.01	Peak

Vertical

Frequency (MHz)	Reading-PK (dBµV)	Reading-AV (dBµV)	Correction Factor (dB/m)	Result-PK (dBµV/m)	Result-AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-AV (dBµV/m)	Margin (dB)	Remark
2442.00	126.50	116.71	-8.91	117.58	107.80	---	---	---	Carrier
3247.50	65.23	61.99	-7.75	57.48	54.24	97.58	87.80	-33.56	AVG
4867.50	53.29	---	-4.44	48.84	---	74.00	54.00	-5.16	Peak
7312.50	50.74	---	-0.83	49.90	---	74.00	54.00	-4.10	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *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.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	RANGEBOOSTER N 650 ACCESS POINT	Test Date	2009/05/15
Model	DAP-1353	Test By	Rueyyan Lin
Test Mode	IEEE 802.11n HT20 TX (CH High)	TEMP & Humidity	25.1°C, 59%

Horizontal

Frequency (MHz)	Reading-PK (dBµV)	Reading-AV (dBµV)	Correction Factor (dB/m)	Result-PK (dBµV/m)	Result-AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-AV (dBµV/m)	Margin (dB)	Remark
2462.00	110.35	---	-8.89	101.46	---	---	---	---	Carrier
3322.50	52.54	---	-7.64	44.90	---	74.00	54.00	-9.10	Peak

Vertical

Frequency (MHz)	Reading-PK (dBµV)	Reading-AV (dBµV)	Correction Factor (dB/m)	Result-PK (dBµV/m)	Result-AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-AV (dBµV/m)	Margin (dB)	Remark
2458.00	118.30	---	-8.90	109.40	---	---	---	---	Carrier
3285.00	55.17	---	-7.69	47.48	---	74.00	54.00	-6.52	Peak
4920.00	51.33	---	-4.31	47.02	---	74.00	54.00	-6.98	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *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.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	RANGEBOOSTER N 650 ACCESS POINT	Test Date	2009/05/15
Model	DAP-1353	Test By	Rueyyan Lin
Test Mode	IEEE 802.11n HT40 TX (CH Low)	TEMP & Humidity	25.1°C, 59%

Horizontal

Frequency (MHz)	Reading-PK (dBµV)	Reading-AV (dBµV)	Correction Factor (dB/m)	Result-PK (dBµV/m)	Result-AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-AV (dBµV/m)	Margin (dB)	Remark
2412.00	107.04	---	-8.95	98.10	---	---	---	---	Carrier

Vertical

Frequency (MHz)	Reading-PK (dBµV)	Reading-AV (dBµV)	Correction Factor (dB/m)	Result-PK (dBµV/m)	Result-AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-AV (dBµV/m)	Margin (dB)	Remark
2414.00	111.59	---	-8.94	102.65	---	---	---	---	Carrier
3232.50	55.26	---	-7.77	47.49	---	74.00	54.00	-6.51	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *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.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	RANGEBOOSTER N 650 ACCESS POINT	Test Date	2009/05/15
Model	DAP-1353	Test By	Rueyyan Lin
Test Mode	IEEE 802.11n HT40 TX (CH Middle)	TEMP & Humidity	25.1°C, 59%

Horizontal

Frequency (MHz)	Reading-PK (dBµV)	Reading-AV (dBµV)	Correction Factor (dB/m)	Result-PK (dBµV/m)	Result-AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-AV (dBµV/m)	Margin (dB)	Remark
2426.00	118.89	---	-8.93	109.95	---	---	---	---	Carrier
3247.50	52.99	---	-7.75	45.24	---	74.00	54.00	-8.76	Peak

Vertical

Frequency (MHz)	Reading-PK (dBµV)	Reading-AV (dBµV)	Correction Factor (dB/m)	Result-PK (dBµV/m)	Result-AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-AV (dBµV/m)	Margin (dB)	Remark
2448.00	125.21	---	-8.91	116.31	---	---	---	---	Carrier
3247.50	63.31	58.89	-7.75	55.56	51.14	74.00	54.00	-2.86	AVG
4867.50	52.33	---	-4.44	47.89	---	74.00	54.00	-6.11	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *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.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	RANGEBOOSTER N 650 ACCESS POINT	Test Date	2009/05/15
Model	DAP-1353	Test By	Rueyyan Lin
Test Mode	IEEE 802.11n HT40 TX (CH High)	TEMP & Humidity	25.1°C, 59%

Horizontal

Frequency (MHz)	Reading-PK (dBµV)	Reading-AV (dBµV)	Correction Factor (dB/m)	Result-PK (dBµV/m)	Result-AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-AV (dBµV/m)	Margin (dB)	Remark
2436.00	110.04	---	-8.92	101.12	---	---	---	---	Carrier

Vertical

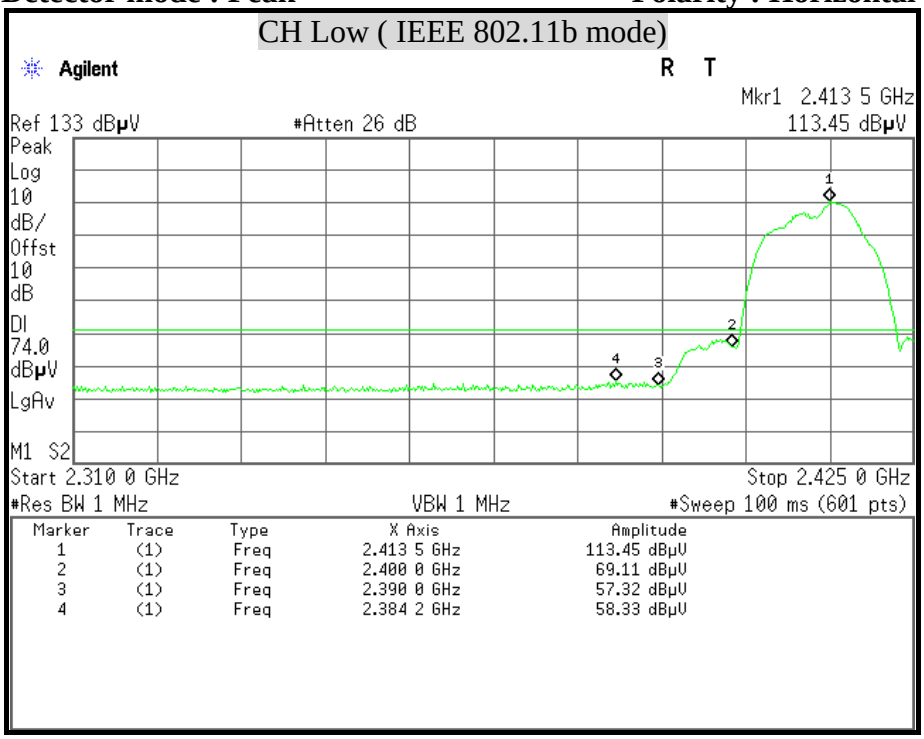
Frequency (MHz)	Reading-PK (dBµV)	Reading-AV (dBµV)	Correction Factor (dB/m)	Result-PK (dBµV/m)	Result-AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-AV (dBµV/m)	Margin (dB)	Remark
2458.00	117.70	---	-8.90	108.80	---	---	---	---	Carrier
3270.00	55.19	---	-7.71	47.48	---	74.00	54.00	-6.52	Peak

Remark:

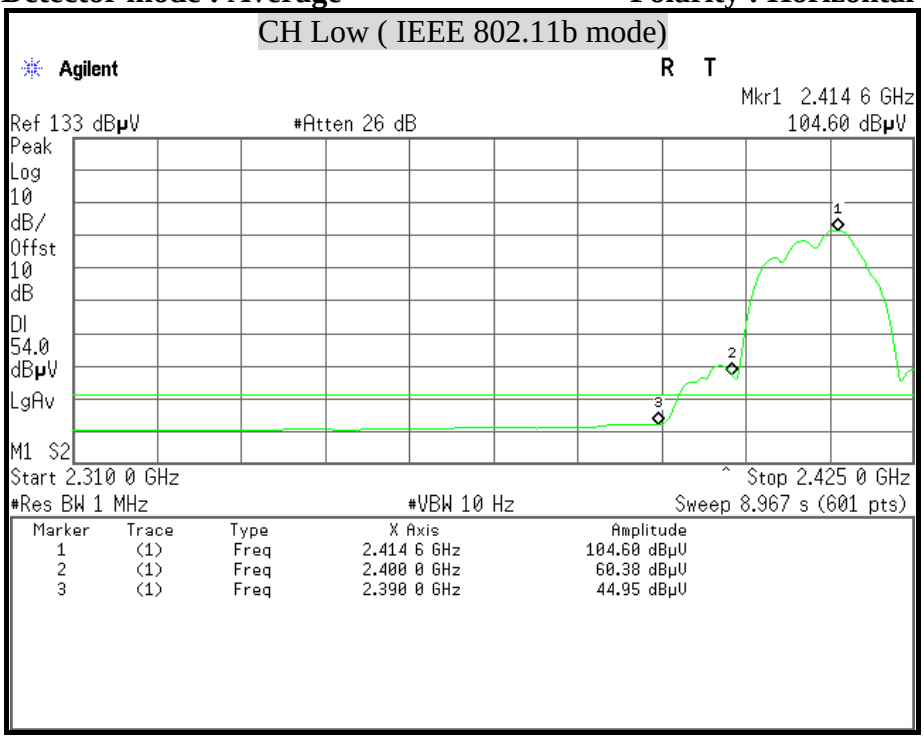
1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

8.8.4 RESTRICTED BAND EDGES

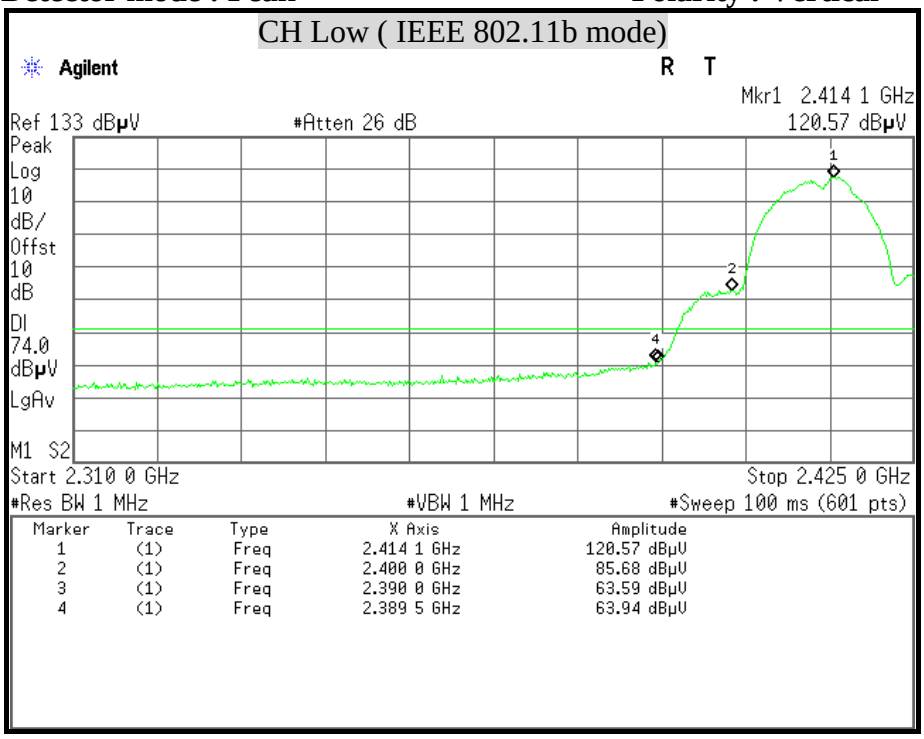
Detector mode : Peak **Polarity : Horizontal**



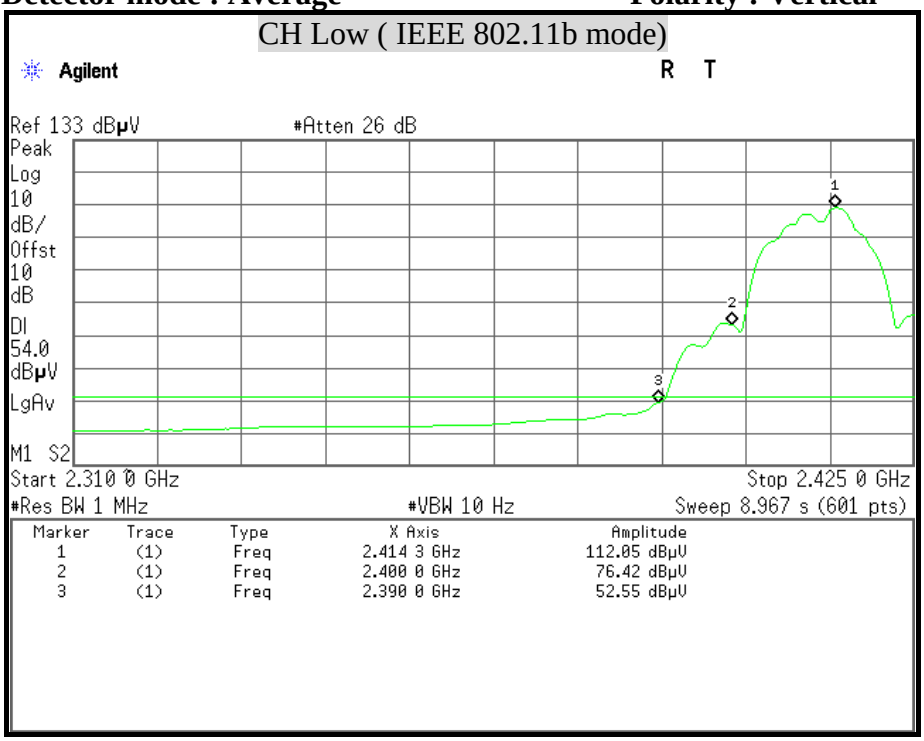
Detector mode : Average **Polarity : Horizontal**



Detector mode : Peak **Polarity : Vertical**

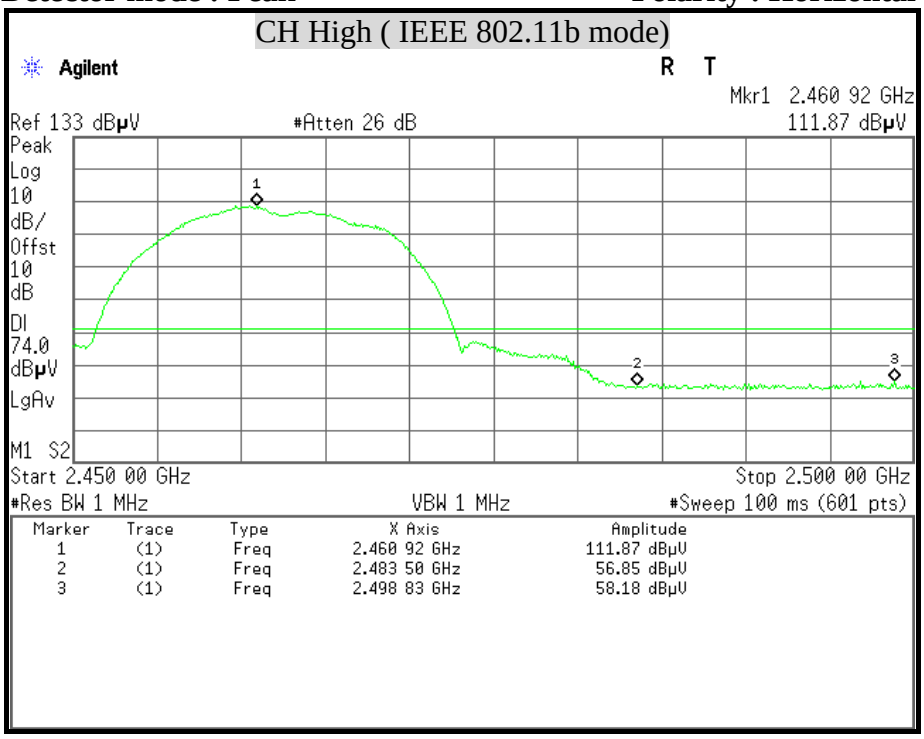


Detector mode : Average **Polarity : Vertical**



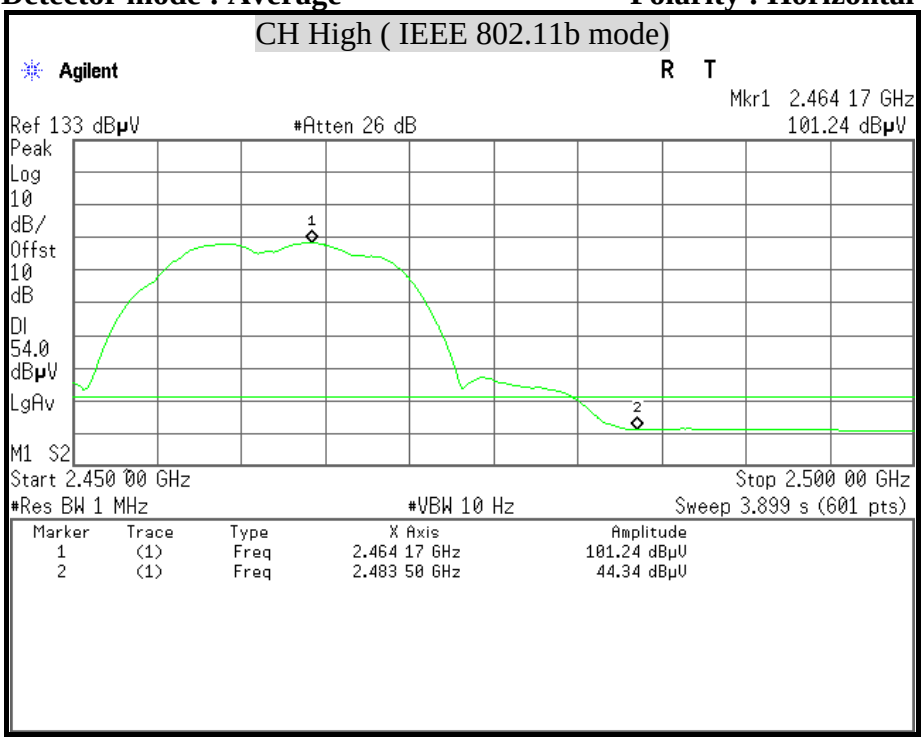
Detector mode : Peak **Polarity : Horizontal**

CH High (IEEE 802.11b mode)



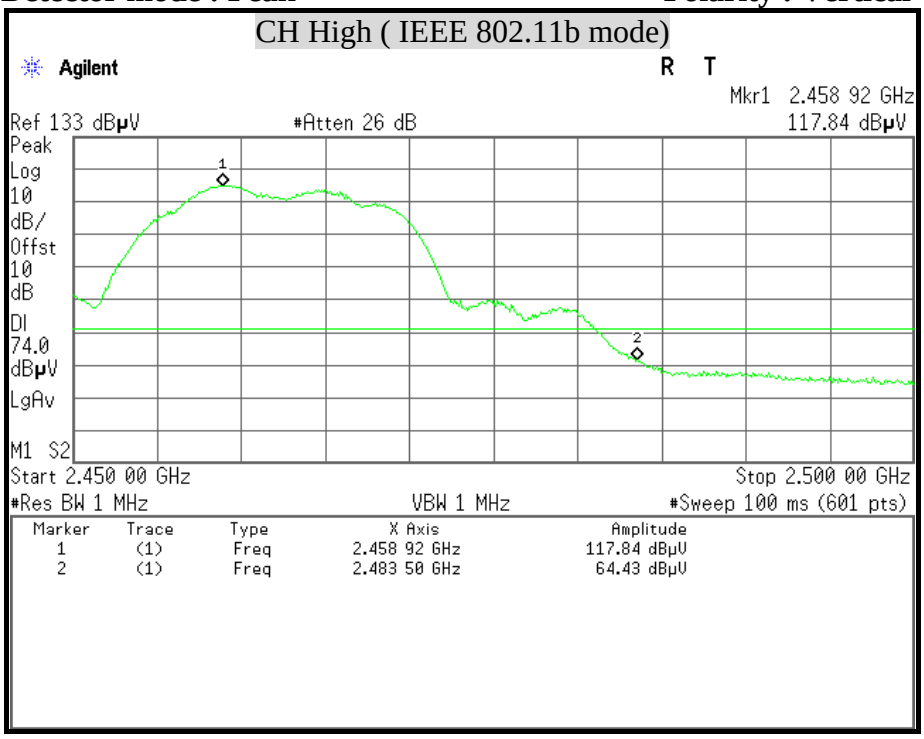
Detector mode : Average **Polarity : Horizontal**

CH High (IEEE 802.11b mode)



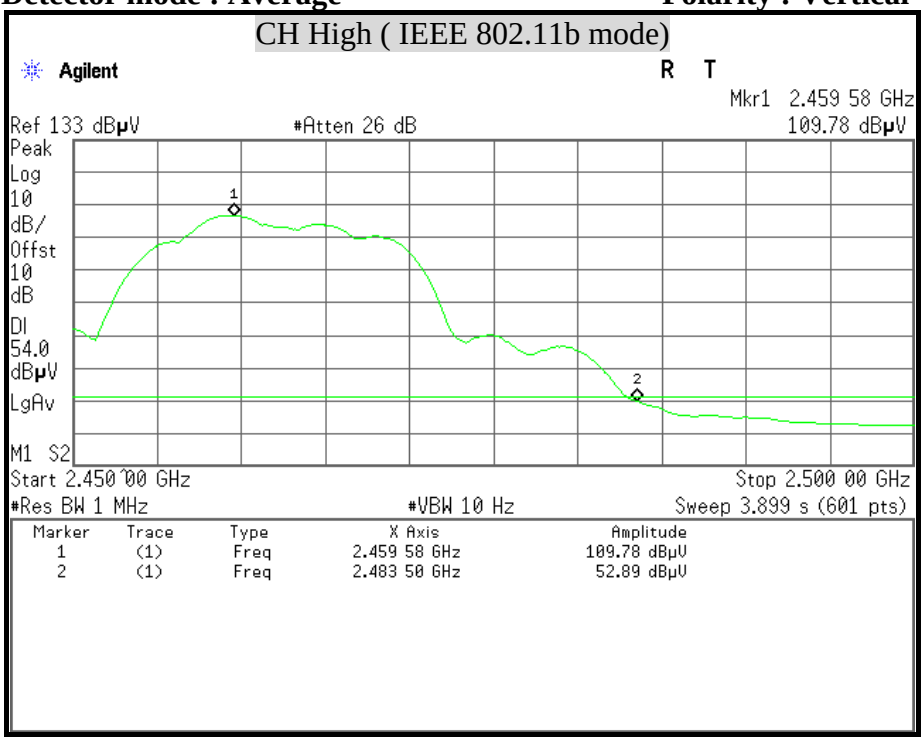
Detector mode : Peak **Polarity : Vertical**

CH High (IEEE 802.11b mode)

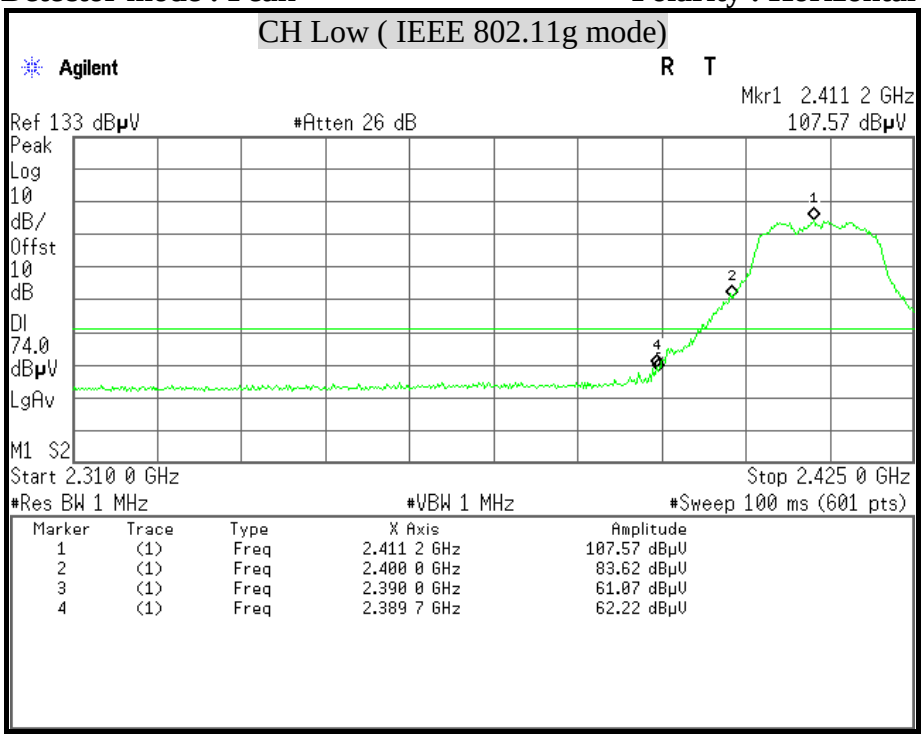


Detector mode : Average **Polarity : Vertical**

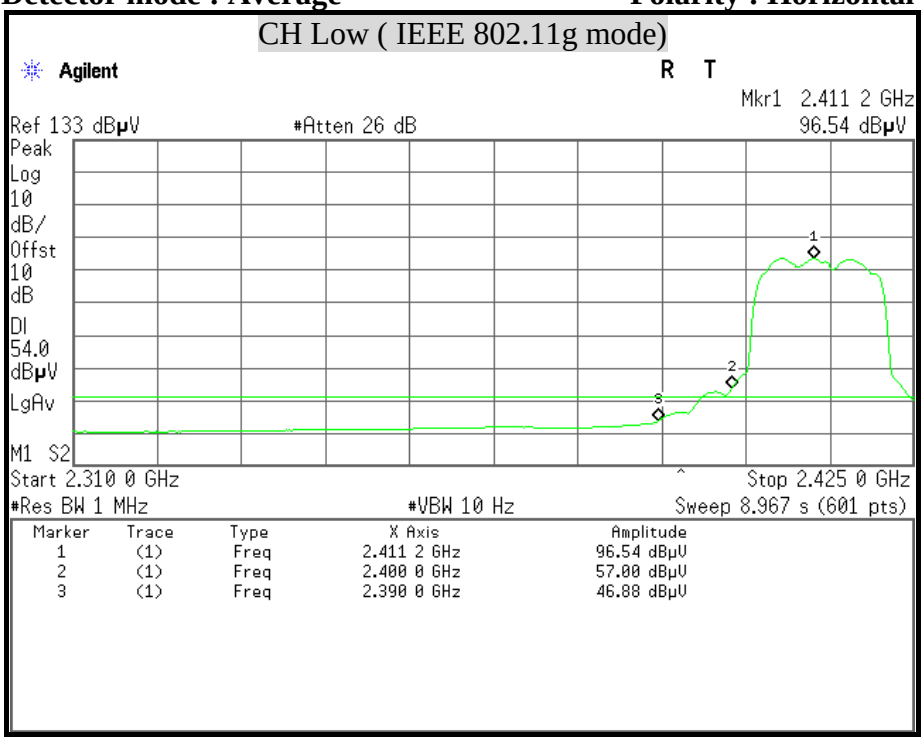
CH High (IEEE 802.11b mode)



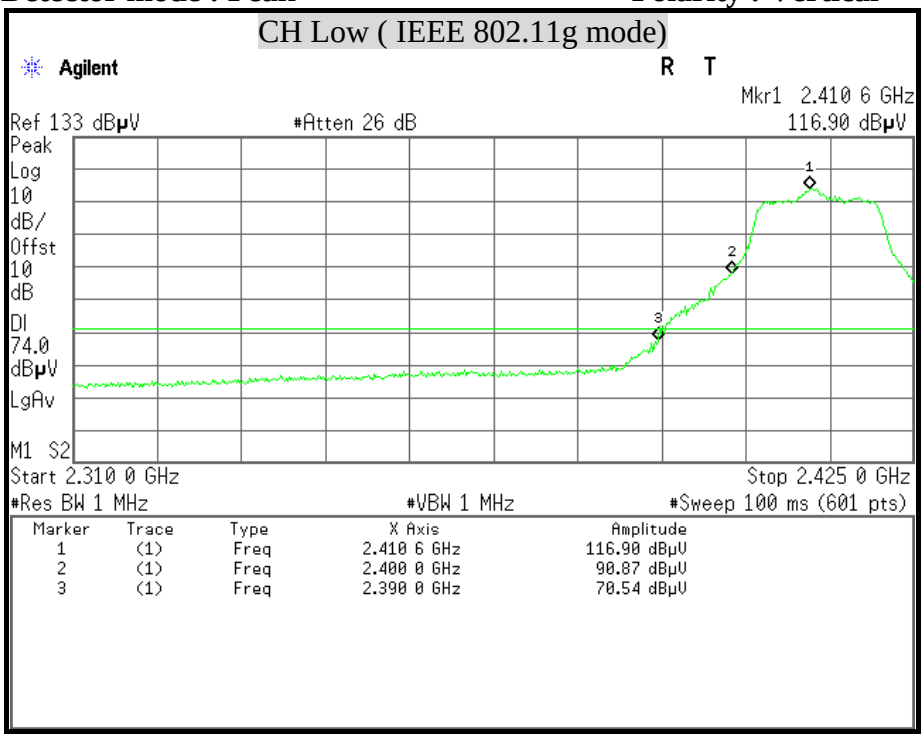
Detector mode : Peak **Polarity : Horizontal**



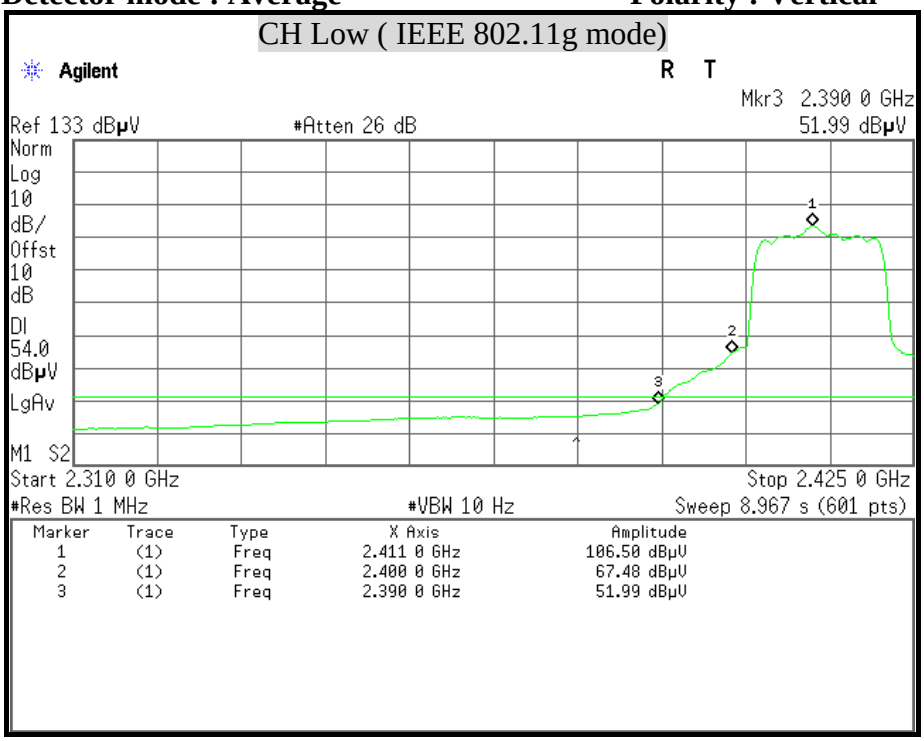
Detector mode : Average **Polarity : Horizontal**



Detector mode : Peak **Polarity : Vertical**

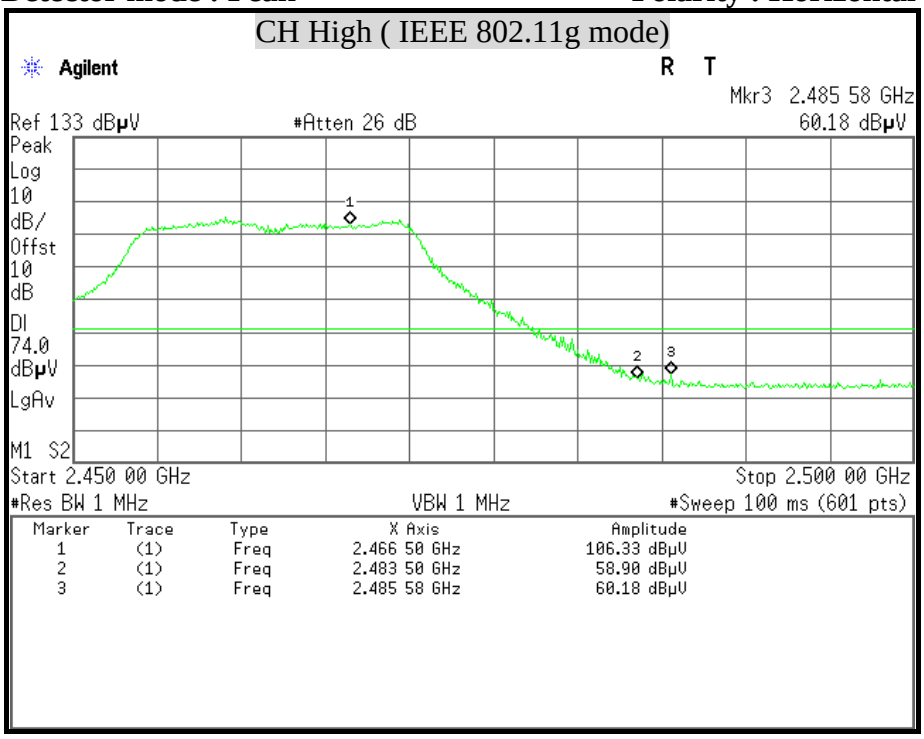


Detector mode : Average **Polarity : Vertical**



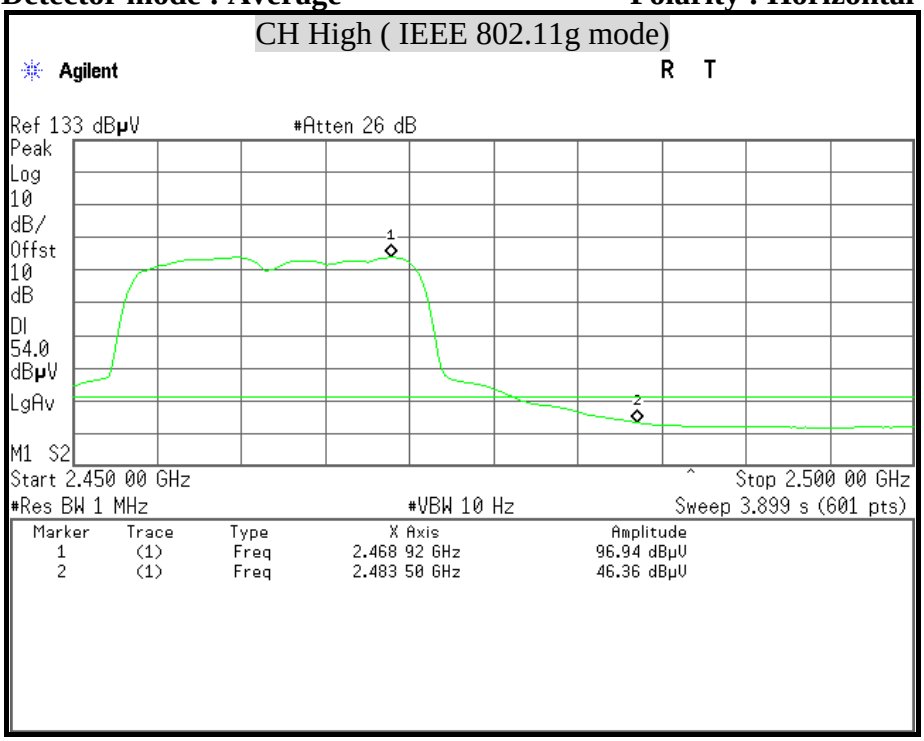
Detector mode : Peak **Polarity : Horizontal**

CH High (IEEE 802.11g mode)

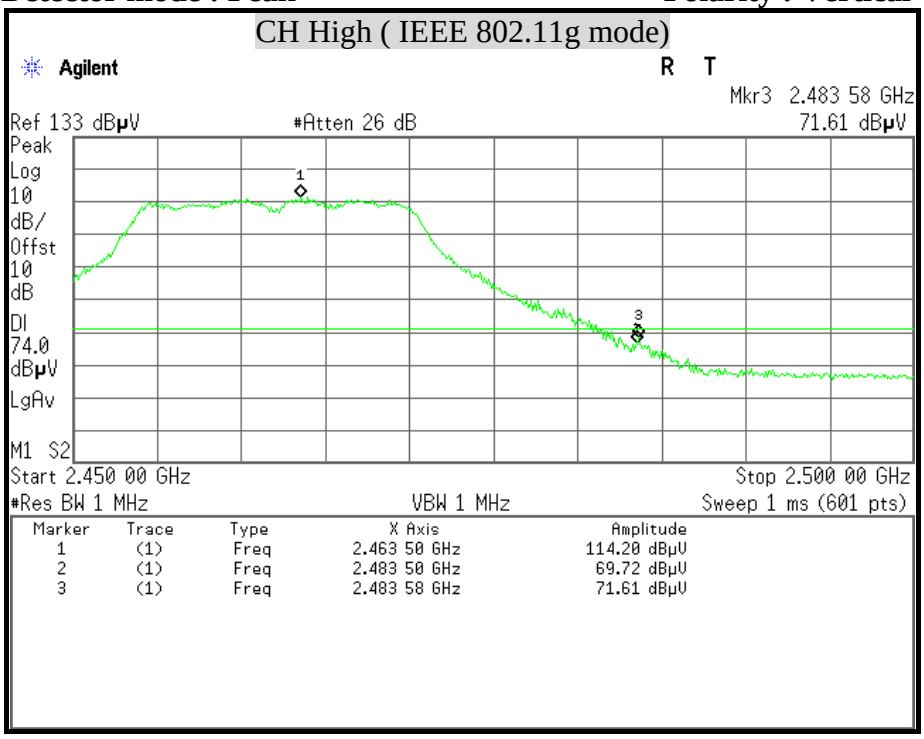


Detector mode : Average **Polarity : Horizontal**

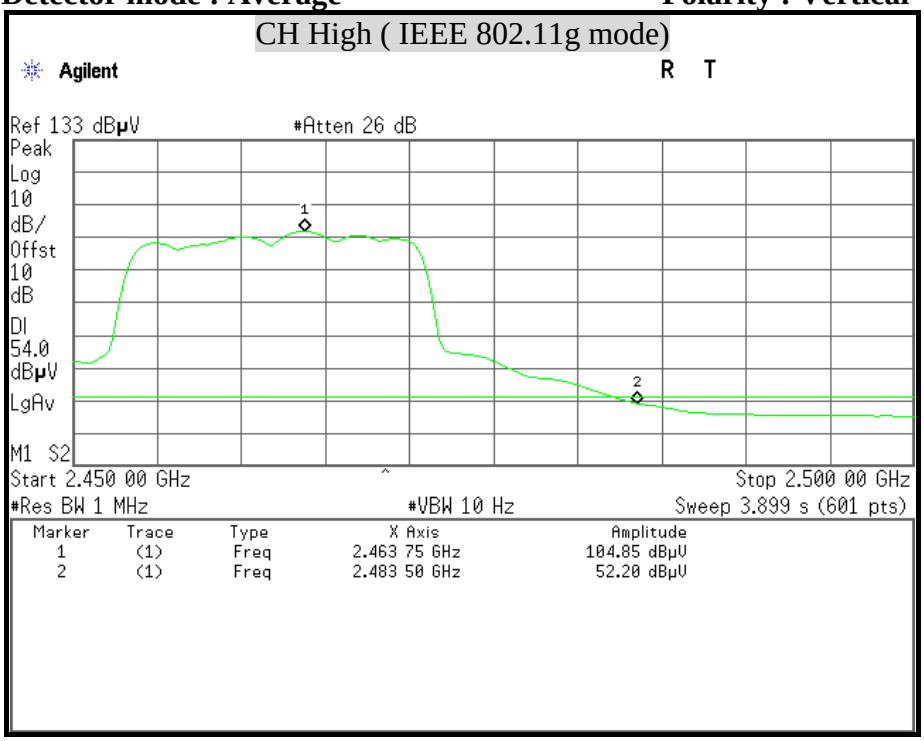
CH High (IEEE 802.11g mode)



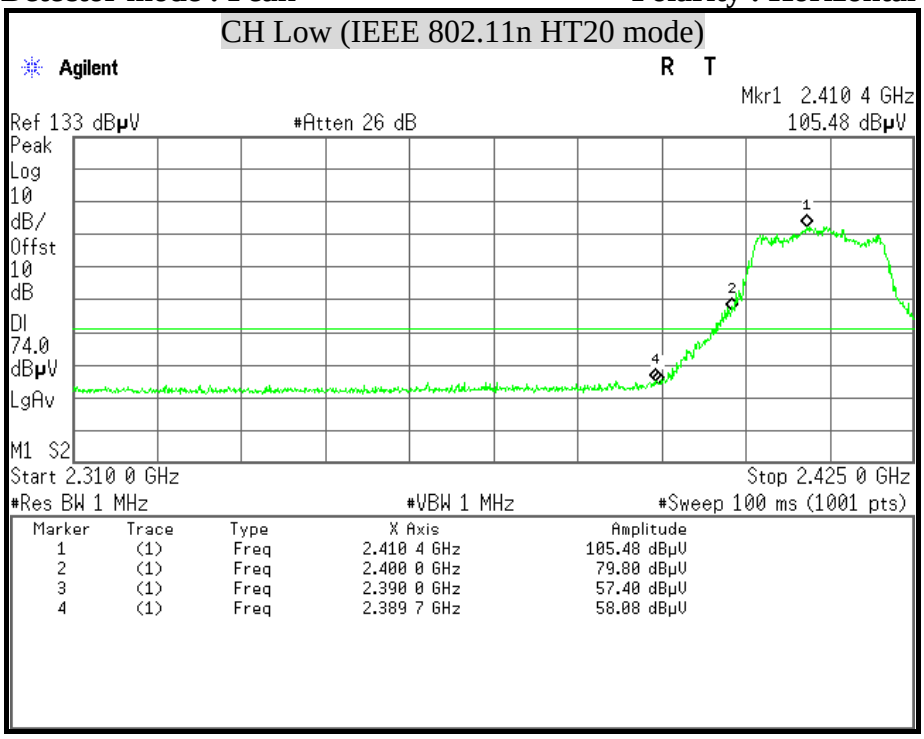
Detector mode : Peak **Polarity : Vertical**



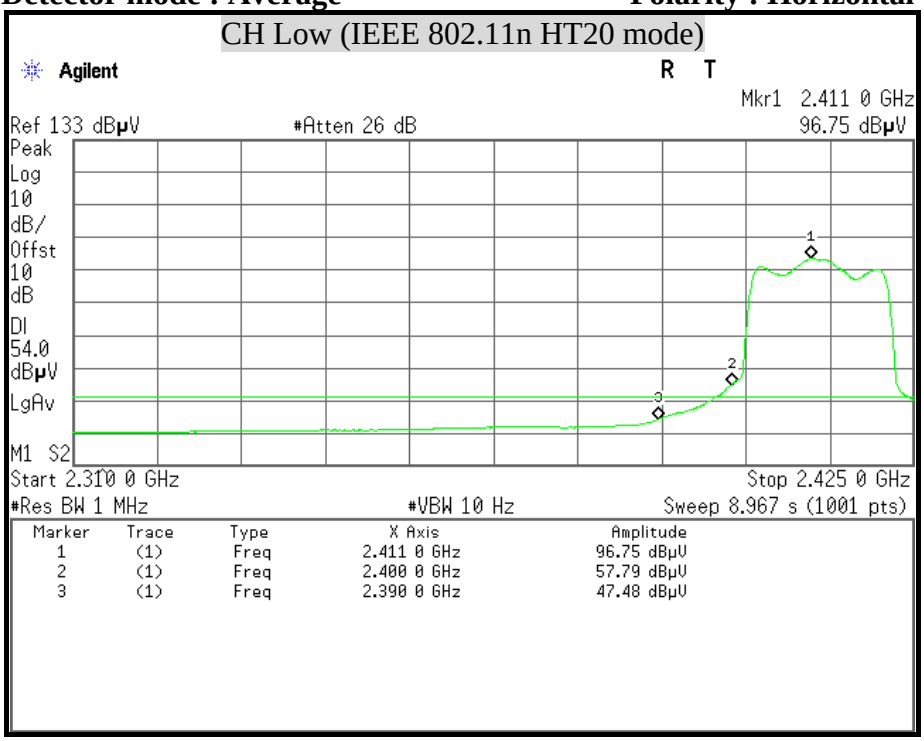
Detector mode : Average **Polarity : Vertical**



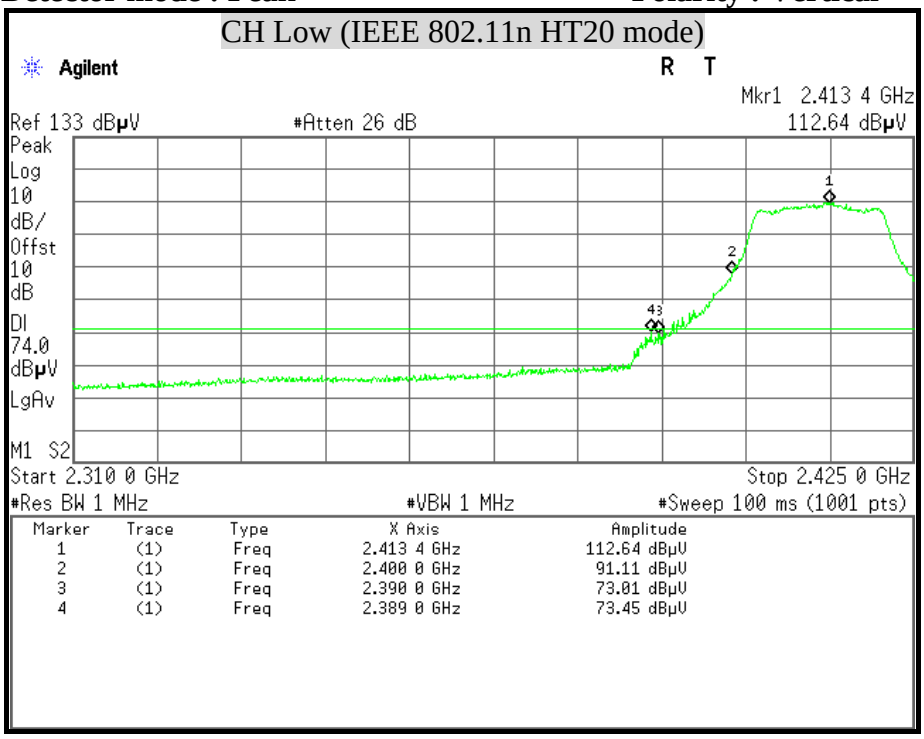
Detector mode : Peak **Polarity : Horizontal**



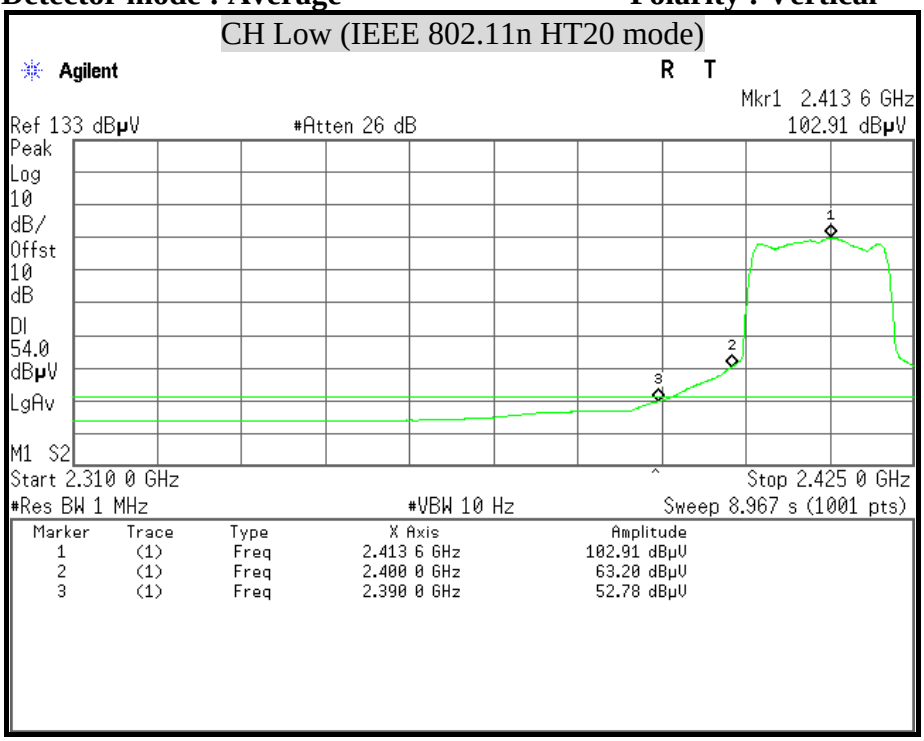
Detector mode : Average **Polarity : Horizontal**



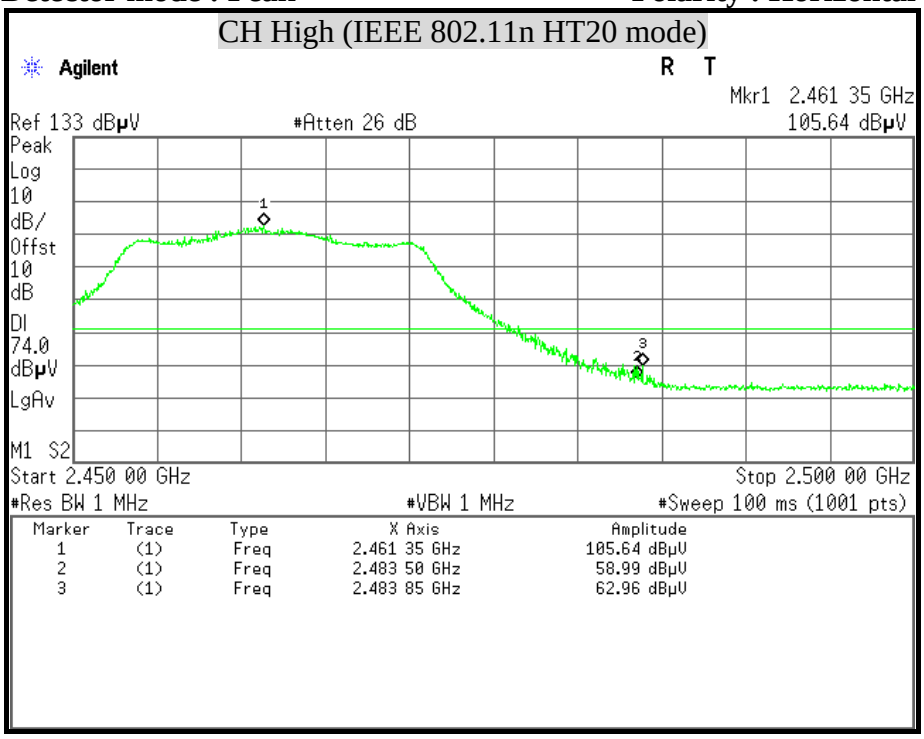
Detector mode : Peak **Polarity : Vertical**



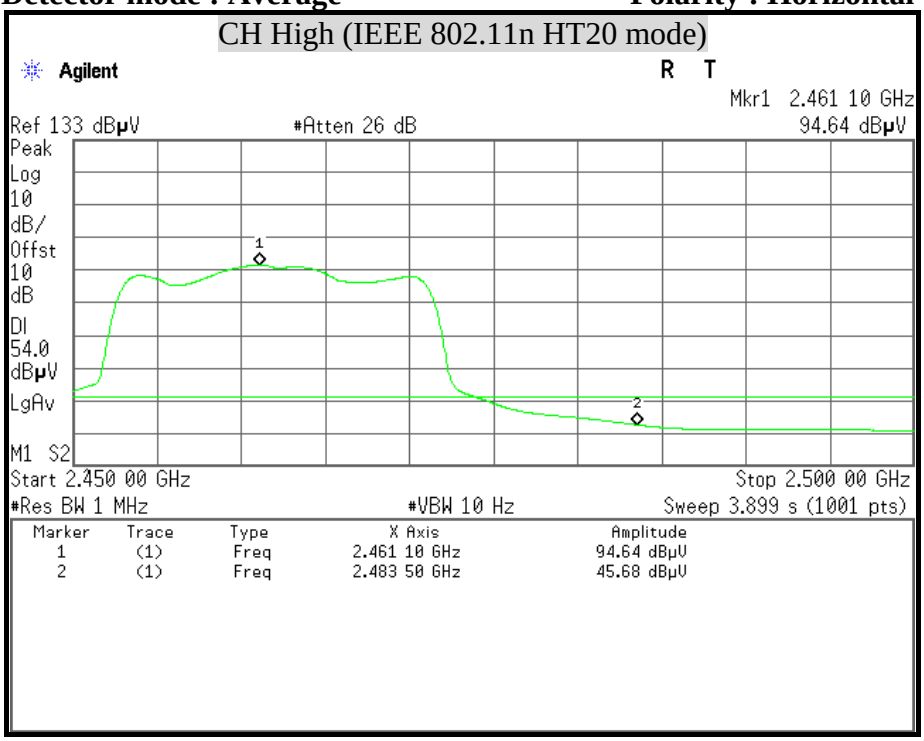
Detector mode : Average **Polarity : Vertical**



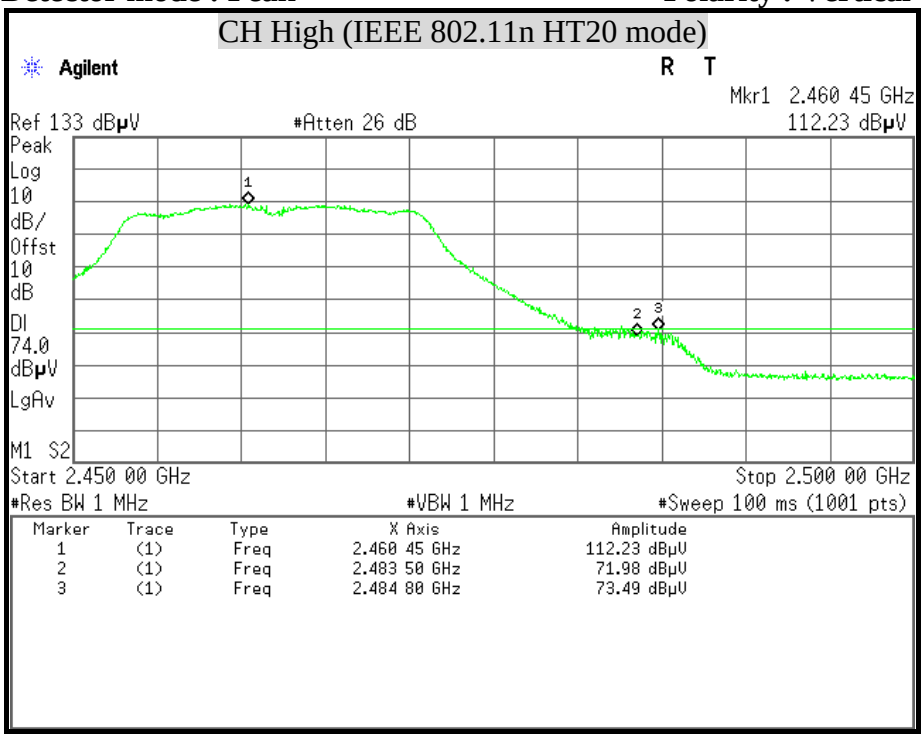
Detector mode : Peak **Polarity : Horizontal**



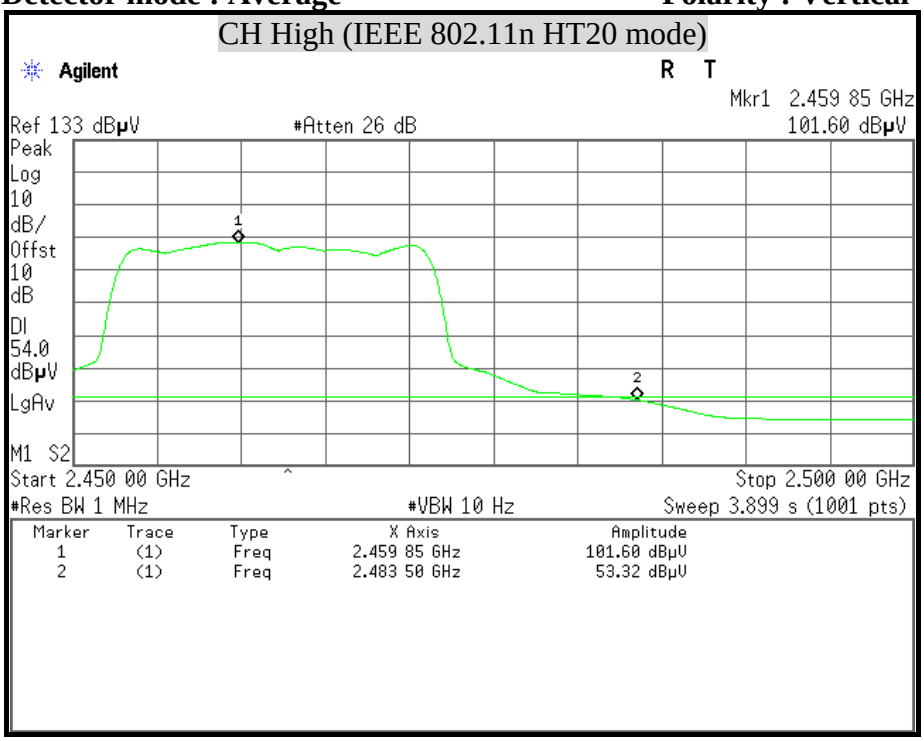
Detector mode : Average **Polarity : Horizontal**



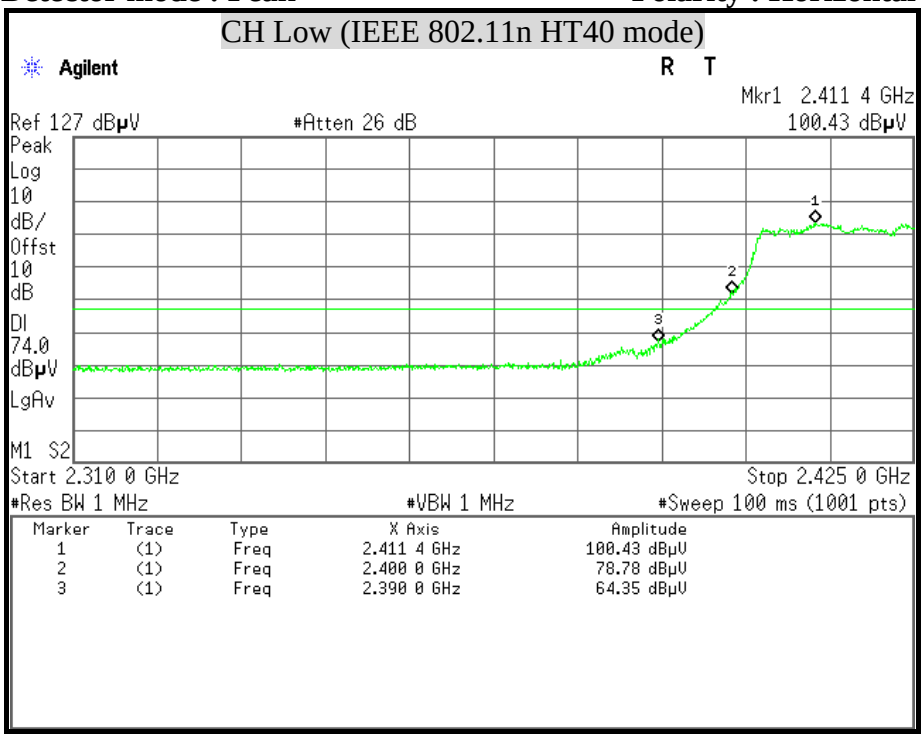
Detector mode : Peak **Polarity : Vertical**



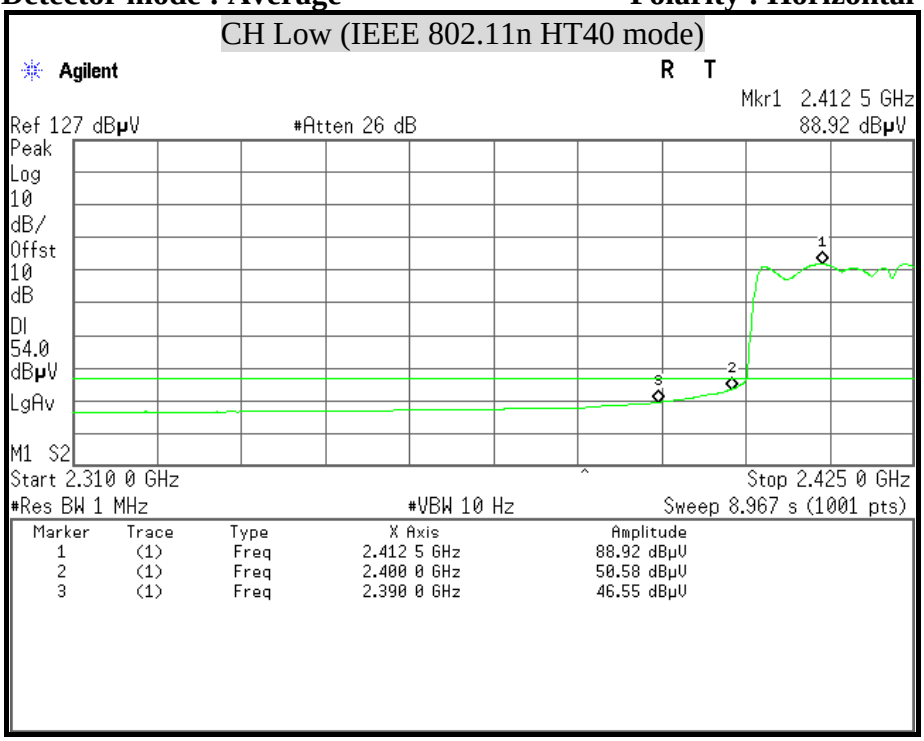
Detector mode : Average **Polarity : Vertical**



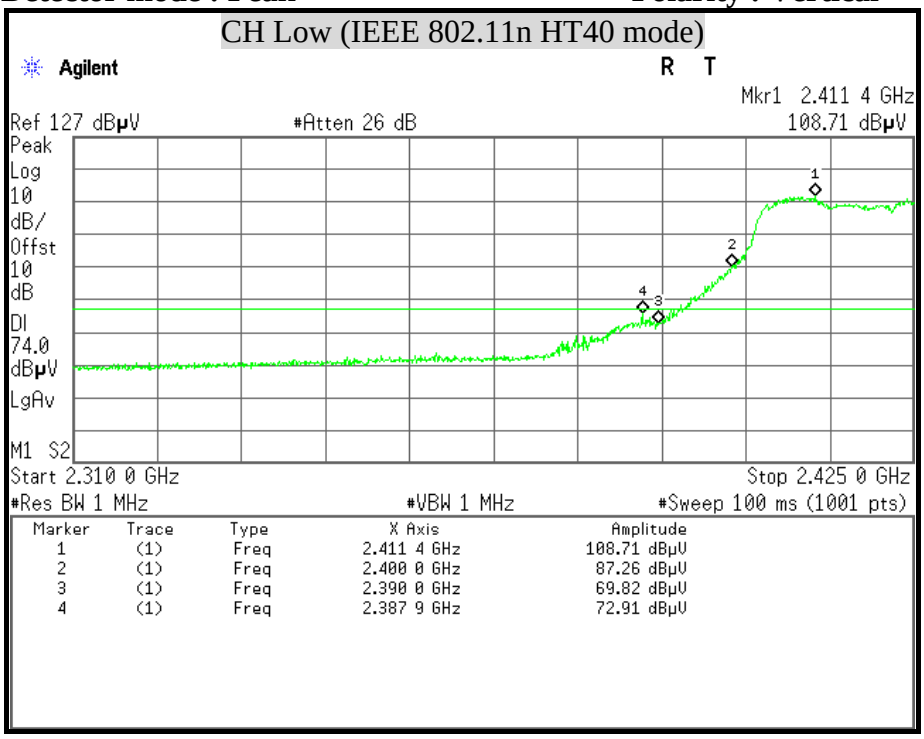
Detector mode : Peak **Polarity : Horizontal**



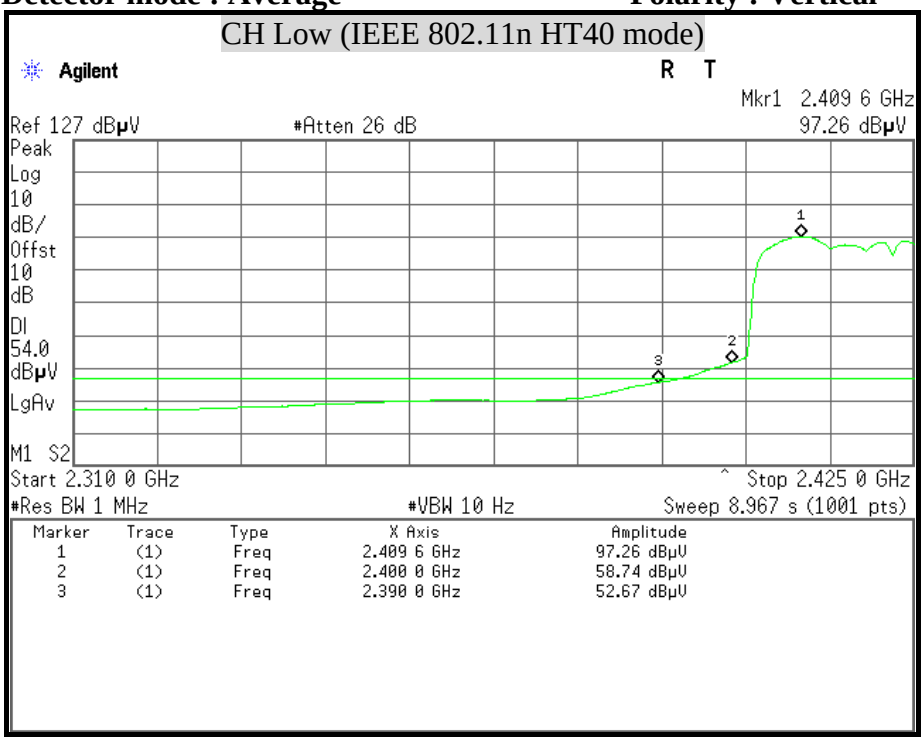
Detector mode : Average **Polarity : Horizontal**



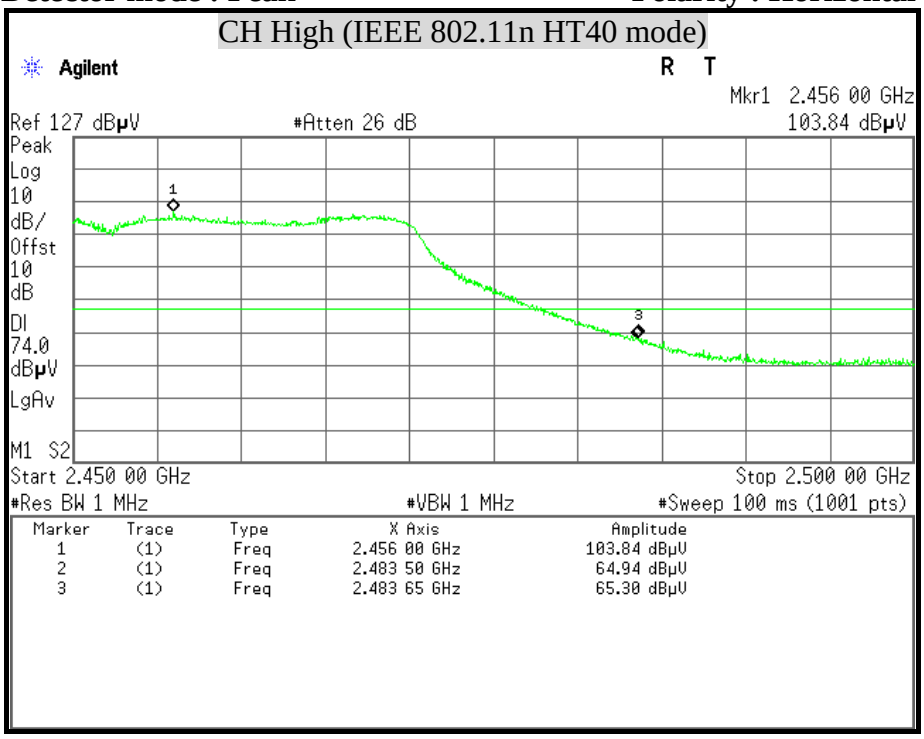
Detector mode : Peak **Polarity : Vertical**



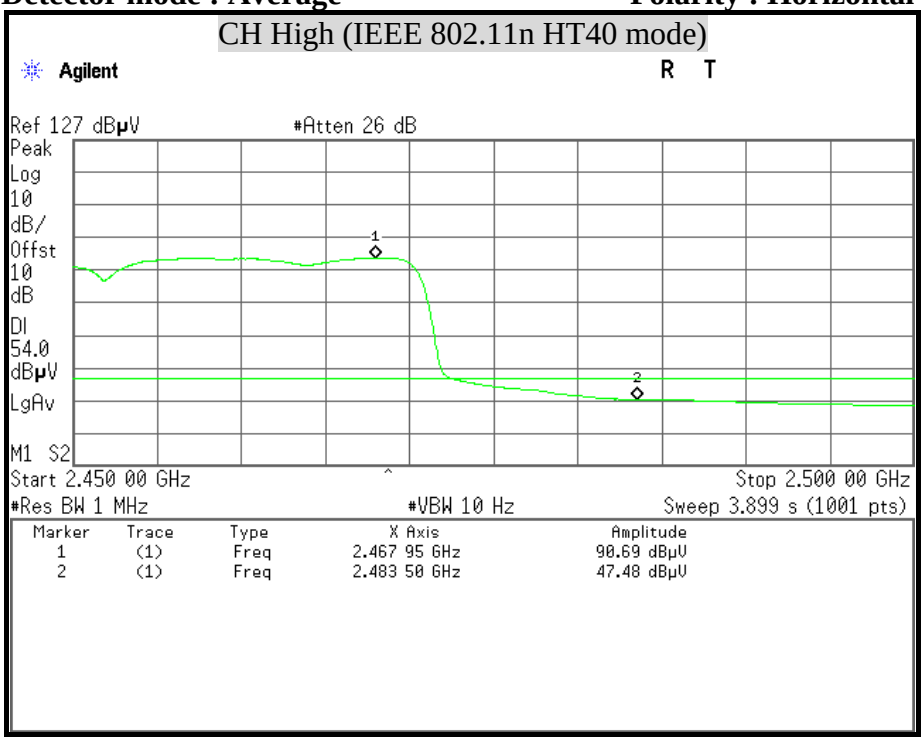
Detector mode : Average **Polarity : Vertical**



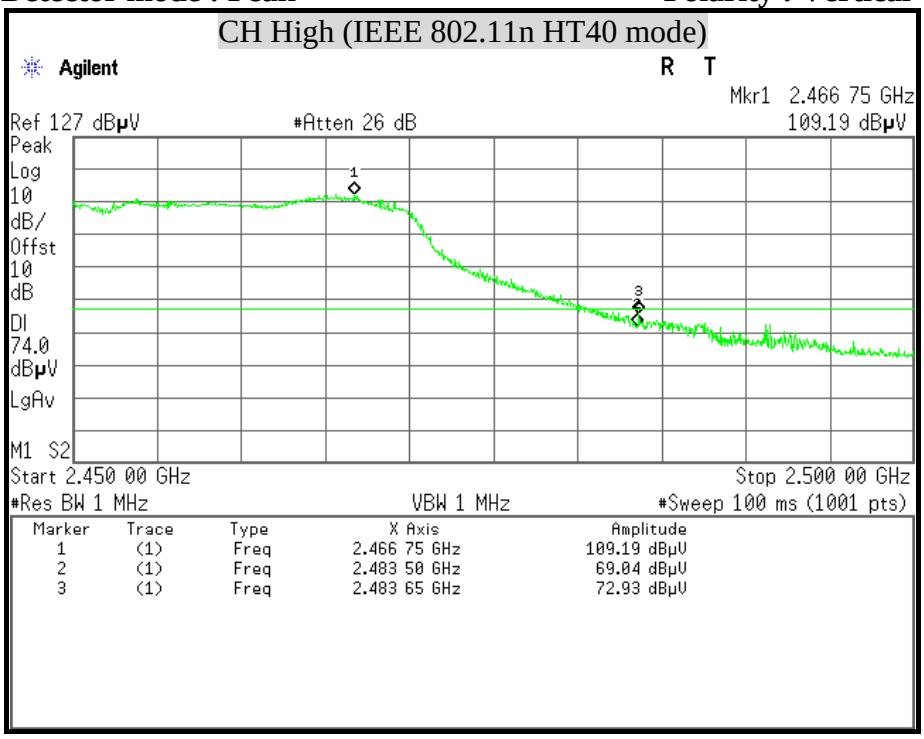
Detector mode : Peak **Polarity : Horizontal**



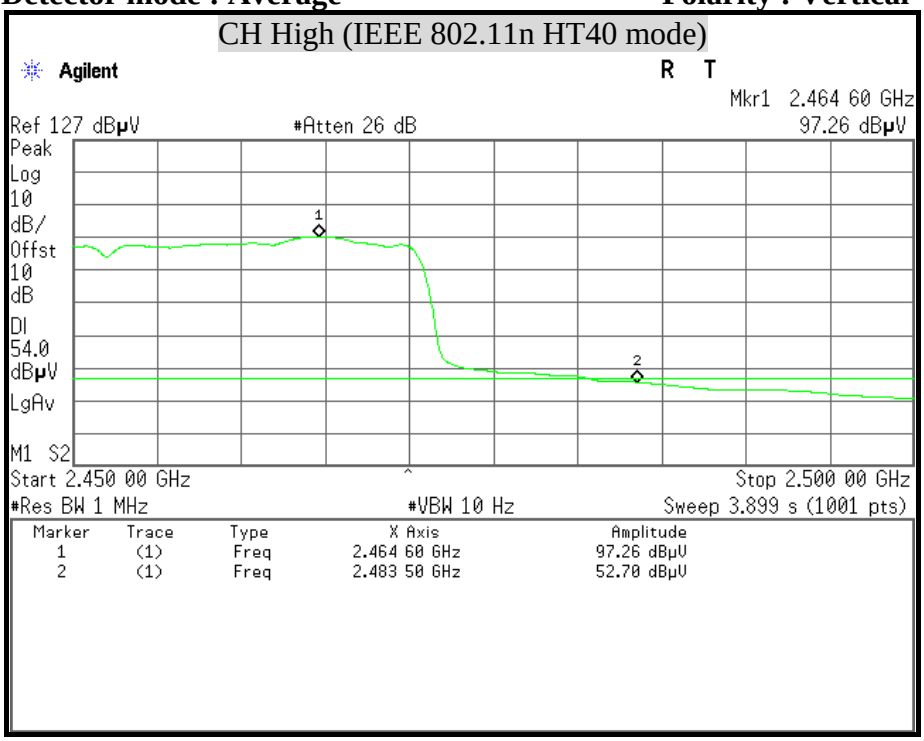
Detector mode : Average **Polarity : Horizontal**



Detector mode : Peak **Polarity : Vertical**



Detector mode : Average **Polarity : Vertical**



8.9 POWERLINE CONDUCTED EMISSIONS

LIMITS

§ 15.207 (a) Except as shown in paragraph (b) and (c) 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.

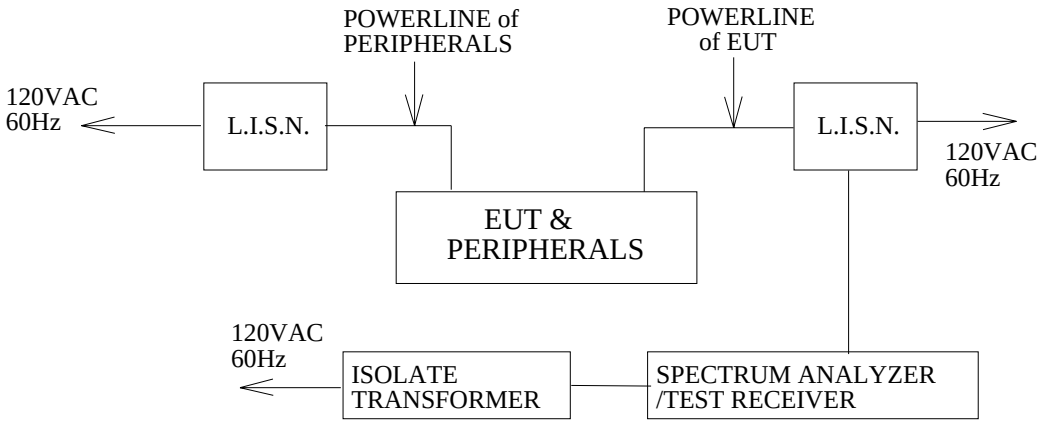
Frequency of Emission (MHz)	Conducted limit (dBμv)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56	56 to 46
0.5 - 5	56	46
5 - 30	60	50

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-465	08/13/2009
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-473	10/12/2009
TEST RECEIVER	R & S	ESHS30	838550/003	02/02/2010
PULSE LIMIT	R & S	ESH3-Z2	100117	09/23/2009
N TYPE COAXIAL CABLE	BELDEN	8268 M17/164	003	09/13/2009

Remark: *Each piece of equipment is scheduled for calibration once a year.*

TEST SETUP



TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80cm above the horizontal ground plane. The EUT IS CONFIGURED IN ACCORDANCE WITH ANSI C63.4:2003.

The resolution bandwidth is set to 9 kHz for both quasi-peak detection and average detection measurements.

Line conducted data is recorded for both NEUTRAL and LINE.

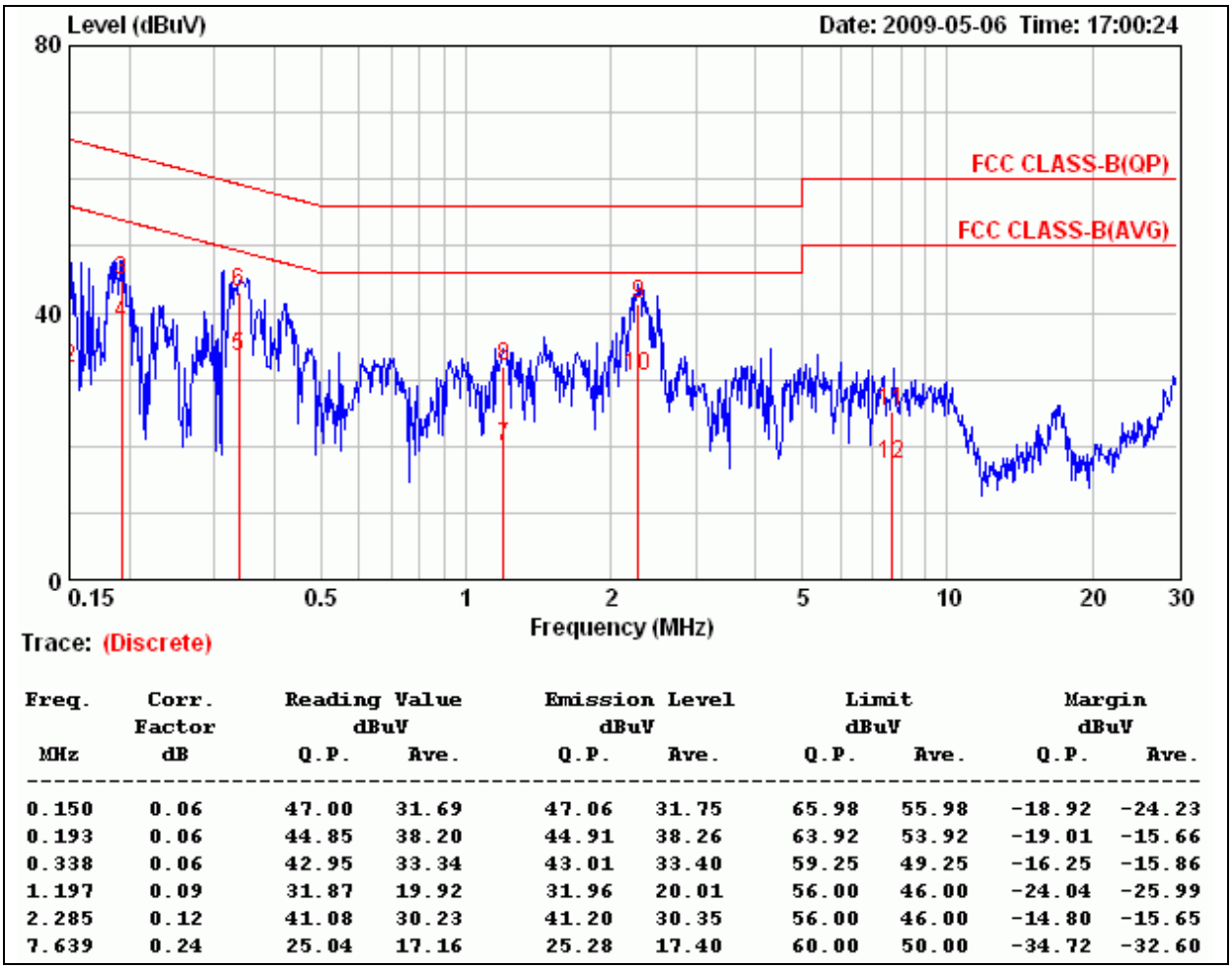
TEST RESULTS

No non-compliance noted

CONDUCTED RF VOLTAGE MEASUREMENT

Product Name	RANGEBOOSTER N 650 ACCESS POINT	Test Date	2009/05/06
Model	DAP-1353	Test By	Rueyyan Lin
Test Mode	Normal operating / Power Adapter (1)	TEMP & Humidity	23.4°C, 50%

LINE



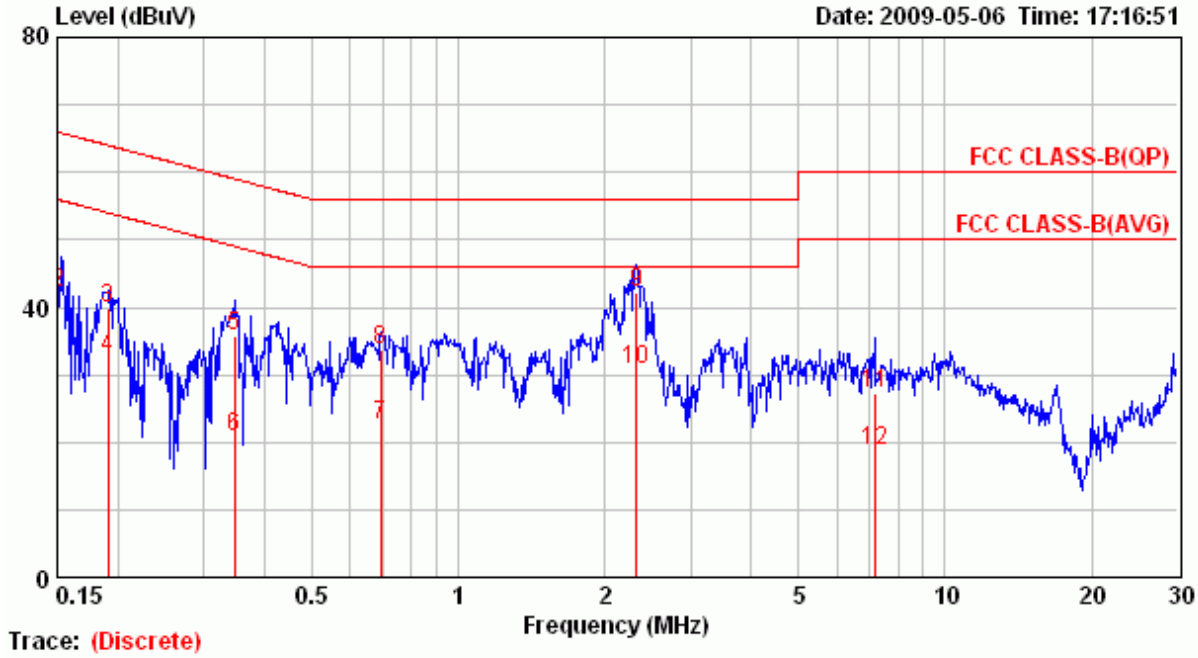
Freq. MHz	Corr. Factor dB	Reading Value dBuV Q.P.	Reading Value dBuV Ave.	Emission Level dBuV Q.P.	Emission Level dBuV Ave.	Limit dBuV Q.P.	Limit dBuV Ave.	Margin dBuV Q.P.	Margin dBuV Ave.
0.150	0.06	47.00	31.69	47.06	31.75	65.98	55.98	-18.92	-24.23
0.193	0.06	44.85	38.20	44.91	38.26	63.92	53.92	-19.01	-15.66
0.338	0.06	42.95	33.34	43.01	33.40	59.25	49.25	-16.25	-15.86
1.197	0.09	31.87	19.92	31.96	20.01	56.00	46.00	-24.04	-25.99
2.285	0.12	41.08	30.23	41.20	30.35	56.00	46.00	-14.80	-15.65
7.639	0.24	25.04	17.16	25.28	17.40	60.00	50.00	-34.72	-32.60

Remark:

1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value

Product Name	RANGEBOOSTER N 650 ACCESS POINT	Test Date	2009/05/06
Model	DAP-1353	Test By	Rueyyan Lin
Test Mode	Normal operating / Power Adapter (1)	TEMP & Humidity	23.4°C, 50%

NEUTRAL



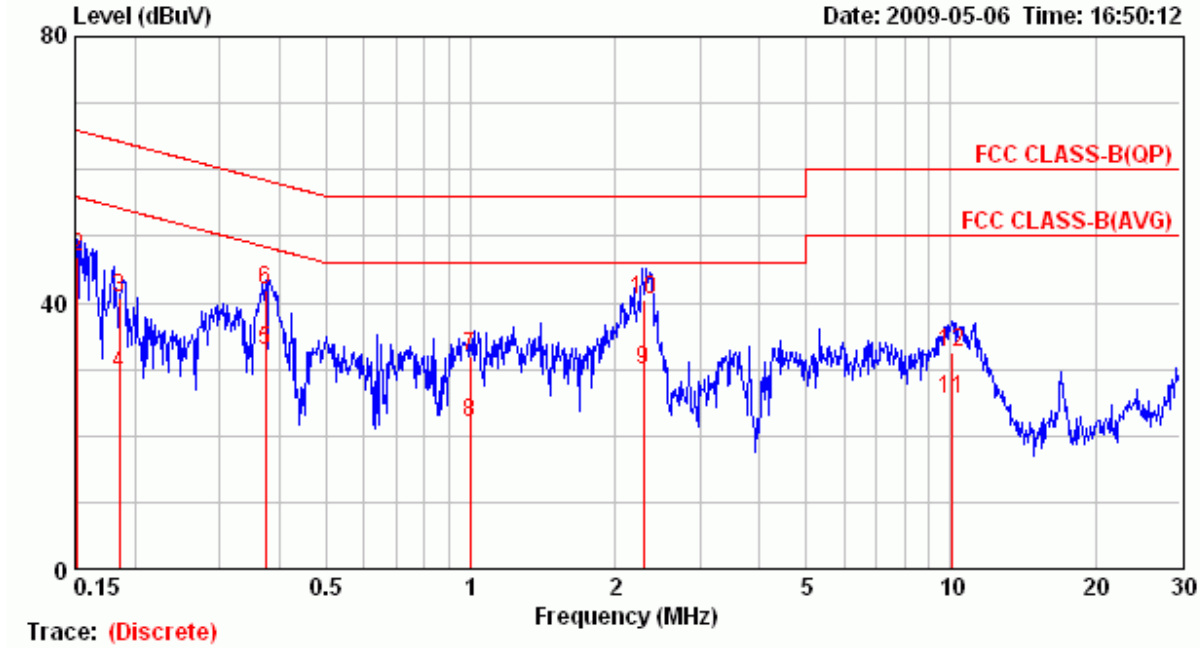
Freq. MHz	Corr. Factor dB	Reading Value dBuV Q.P.	Reading Value dBuV Ave.	Emission Level dBuV Q.P.	Emission Level dBuV Ave.	Limit dBuV Q.P.	Limit dBuV Ave.	Margin dBuV Q.P.	Margin dBuV Ave.
0.150	0.06	42.21	29.13	42.27	29.19	65.98	55.98	-23.71	-26.79
0.190	0.06	39.65	32.34	39.71	32.40	64.02	54.02	-24.31	-21.62
0.346	0.06	35.72	20.76	35.78	20.82	59.05	49.05	-23.27	-28.23
0.694	0.06	33.68	22.54	33.74	22.60	56.00	46.00	-22.26	-23.40
2.321	0.12	42.10	30.59	42.22	30.71	56.00	46.00	-13.78	-15.29
7.175	0.23	26.90	18.41	27.13	18.64	60.00	50.00	-32.87	-31.36

Remark:

1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value

Product Name	RANGEBOOSTER N 650 ACCESS POINT	Test Date	2009/05/06
Model	DAP-1353	Test By	Rueyyan Lin
Test Mode	Normal operating / Power Adapter (2)	TEMP & Humidity	23.4°C, 50%

LINE



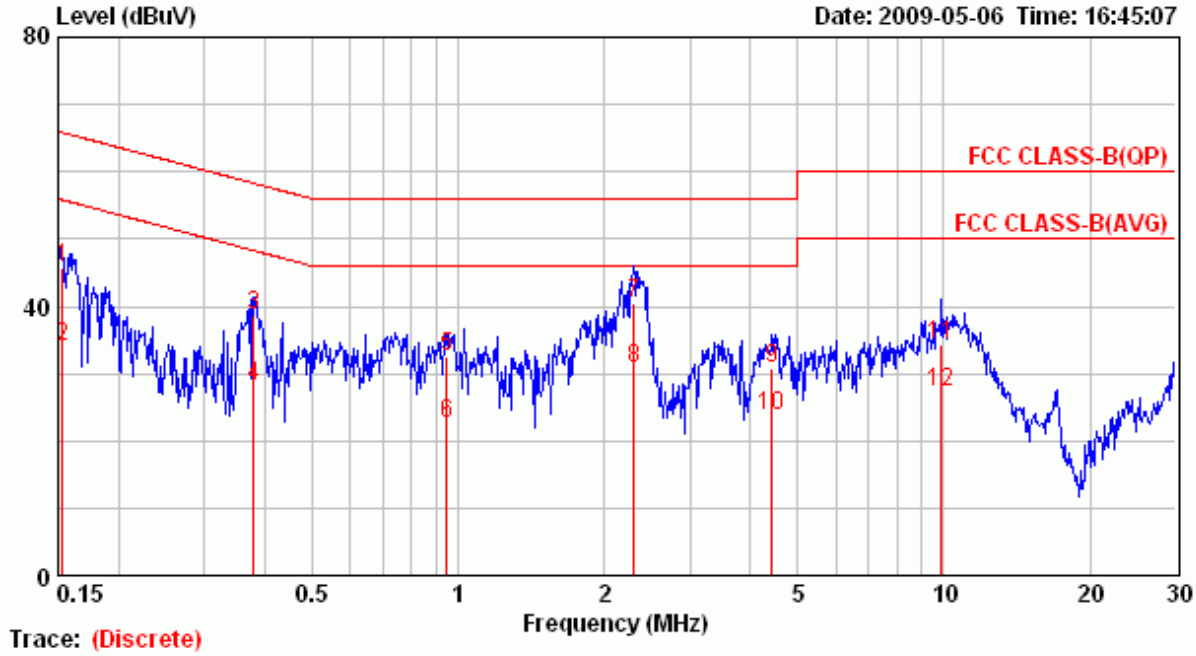
Freq. MHz	Corr. Factor dB	Reading Value dBuV Q.P.	Reading Value dBuV Ave.	Emission Level dBuV Q.P.	Emission Level dBuV Ave.	Limit dBuV Q.P.	Limit dBuV Ave.	Margin dBuV Q.P.	Margin dBuV Ave.
0.152	0.06	46.78	35.20	46.84	35.26	65.89	55.89	-19.05	-20.63
0.186	0.06	40.73	29.16	40.79	29.22	64.22	54.22	-23.43	-25.00
0.373	0.05	41.88	32.70	41.93	32.75	58.43	48.43	-16.50	-15.68
0.995	0.08	31.93	21.94	32.01	22.02	56.00	46.00	-23.99	-23.98
2.291	0.12	40.28	29.86	40.40	29.98	56.00	46.00	-15.60	-16.02
10.052	0.31	32.35	25.22	32.66	25.53	60.00	50.00	-27.34	-24.47

Remark:

1. *Correction Factor = Insertion loss + cable loss*
2. *Margin value = Emission level – Limit value*

Product Name	RANGEBOOSTER N 650 ACCESS POINT	Test Date	2009/05/06
Model	DAP-1353	Test By	Rueyyan Lin
Test Mode	Normal operating / Power Adapter (2)	TEMP & Humidity	23.4°C, 50%

NEUTRAL



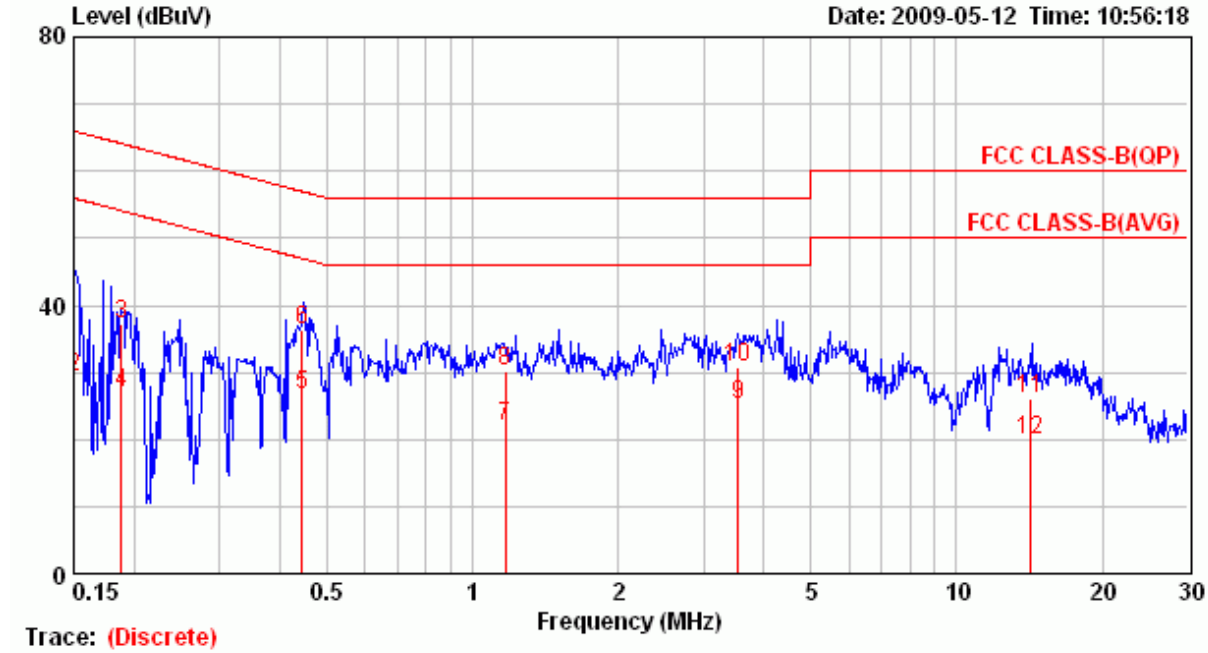
Freq. MHz	Corr. Factor dB	Reading Value dBuV Q.P.	Reading Value dBuV Ave.	Emission Level dBuV Q.P.	Emission Level dBuV Ave.	Limit dBuV Q.P.	Limit dBuV Ave.	Margin dBuV Q.P.	Margin dBuV Ave.
0.153	0.06	45.68	33.88	45.74	33.94	65.82	55.82	-20.08	-21.88
0.379	0.05	38.71	28.09	38.76	28.14	58.30	48.30	-19.53	-20.15
0.947	0.08	32.52	22.53	32.60	22.61	56.00	46.00	-23.40	-23.39
2.297	0.12	40.42	30.66	40.54	30.78	56.00	46.00	-15.46	-15.22
4.430	0.16	30.62	23.56	30.78	23.72	56.00	46.00	-25.22	-22.28
9.913	0.31	34.00	27.08	34.31	27.39	60.00	50.00	-25.69	-22.61

Remark:

1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value

Product Name	RANGEBOOSTER N 650 ACCESS POINT	Test Date	2009/05/12
Model	DAP-1353	Test By	Rueyyan Lin
Test Mode	Normal operating / Power Adapter (3)	TEMP & Humidity	25.1°C, 57%

LINE



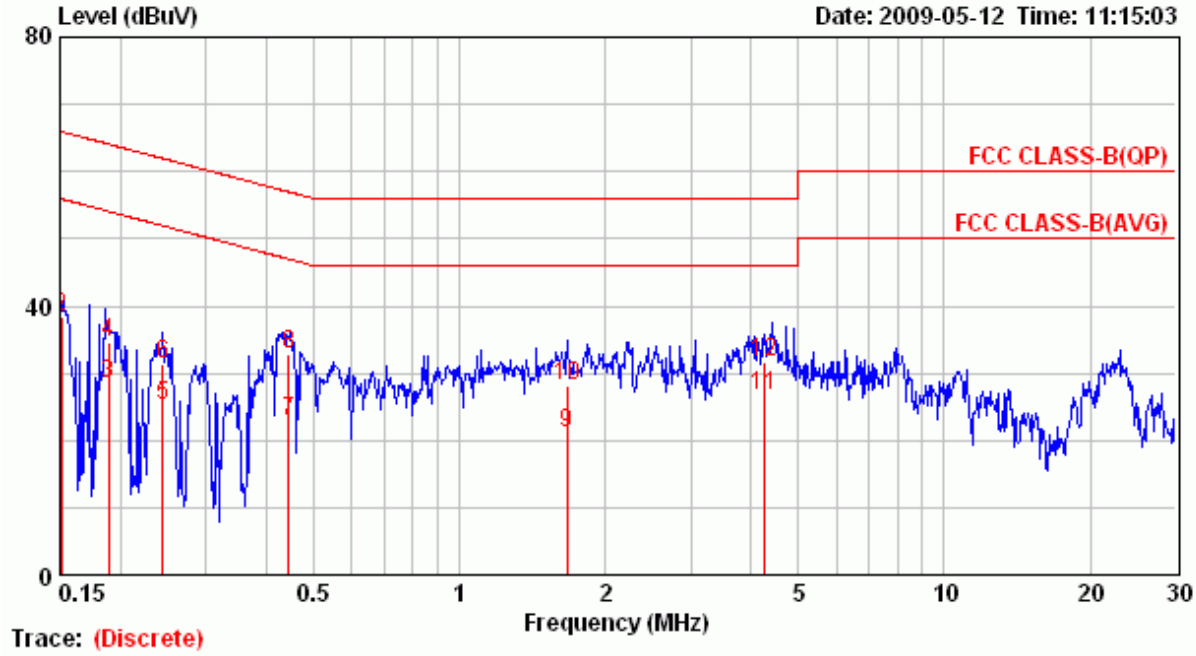
Freq.	Corr. Factor	Reading Value dBuV		Emission Level dBuV		Limit dBuV		Margin dBuV	
MHz	dB	Q.P.	Ave.	Q.P.	Ave.	Q.P.	Ave.	Q.P.	Ave.
0.151	0.06	42.62	29.15	42.68	29.21	65.97	55.97	-23.29	-26.76
0.188	0.06	37.11	27.03	37.17	27.09	64.13	54.13	-26.96	-27.04
0.445	0.05	36.28	26.68	36.33	26.73	56.97	46.97	-20.64	-20.24
1.172	0.09	30.04	21.81	30.13	21.90	56.00	46.00	-25.87	-24.10
3.547	0.14	30.66	25.19	30.80	25.33	56.00	46.00	-25.20	-20.67
14.260	0.37	25.76	19.70	26.13	20.07	60.00	50.00	-33.87	-29.93

Remark:

1. *Correction Factor = Insertion loss + cable loss*
2. *Margin value = Emission level – Limit value*

Product Name	RANGEBOOSTER N 650 ACCESS POINT	Test Date	2009/05/12
Model	DAP-1353	Test By	Rueyyan Lin
Test Mode	Normal operating / Power Adapter (3)	TEMP & Humidity	25.1°C, 57%

NEUTRAL



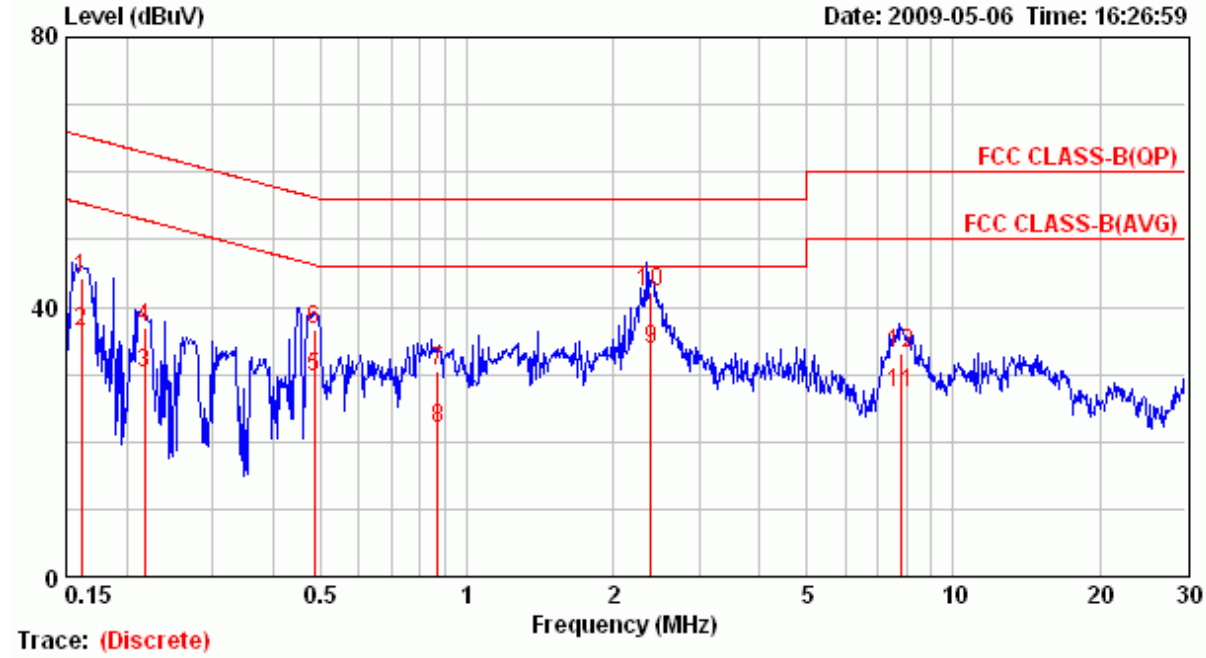
Freq. MHz	Corr. Factor dB	Reading Value dBuV Q.P.	Reading Value dBuV Ave.	Emission Level dBuV Q.P.	Emission Level dBuV Ave.	Limit dBuV Q.P.	Limit dBuV Ave.	Margin dBuV Q.P.	Margin dBuV Ave.
0.151	0.06	38.33	26.22	38.39	26.28	65.96	55.96	-27.57	-29.68
0.189	0.06	34.41	28.45	34.47	28.51	64.06	54.06	-29.59	-25.55
0.244	0.06	31.43	25.21	31.49	25.27	61.95	51.95	-30.46	-26.68
0.444	0.05	32.69	22.66	32.74	22.71	56.99	46.99	-24.25	-24.28
1.671	0.10	28.16	20.91	28.26	21.01	56.00	46.00	-27.74	-24.99
4.247	0.16	31.61	26.51	31.77	26.67	56.00	46.00	-24.24	-19.34

Remark:

1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value

Product Name	RANGEBOOSTER N 650 ACCESS POINT	Test Date	2009/05/06
Model	DAP-1353	Test By	Rueyyan Lin
Test Mode	Normal operating / Power Adapter (4)	TEMP & Humidity	23.4°C, 50%

LINE



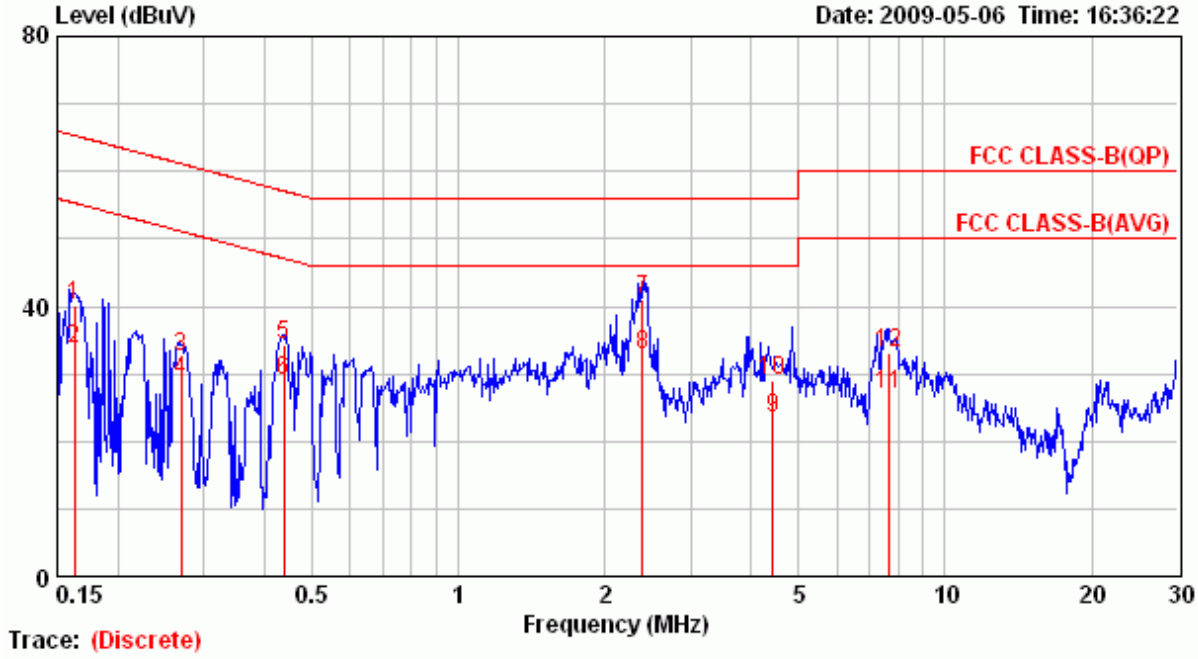
Freq. MHz	Corr. Factor dB	Reading Value dBuV Q.P.	Reading Value dBuV Ave.	Emission Level dBuV Q.P.	Emission Level dBuV Ave.	Limit dBuV Q.P.	Limit dBuV Ave.	Margin dBuV Q.P.	Margin dBuV Ave.
0.162	0.06	44.11	36.15	44.17	36.21	65.38	55.38	-21.21	-19.17
0.217	0.06	36.81	30.15	36.87	30.21	62.93	52.93	-26.06	-22.72
0.485	0.05	36.44	29.53	36.49	29.58	56.25	46.25	-19.76	-16.67
0.873	0.07	30.48	22.05	30.55	22.12	56.00	46.00	-25.45	-23.88
2.392	0.12	42.03	33.65	42.15	33.77	56.00	46.00	-13.85	-12.23
7.804	0.25	32.88	27.02	33.13	27.27	60.00	50.00	-26.87	-22.73

Remark:

1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value

Product Name	RANGEBOOSTER N 650 ACCESS POINT	Test Date	2009/05/06
Model	DAP-1353	Test By	Rueyyan Lin
Test Mode	Normal operating / Power Adapter (4)	TEMP & Humidity	23.4°C, 50%

NEUTRAL



Freq.	Corr. Factor	Reading Value dBuV		Emission Level dBuV		Limit dBuV		Margin dBuV	
MHz	dB	Q.P.	Ave.	Q.P.	Ave.	Q.P.	Ave.	Q.P.	Ave.
0.163	0.06	40.19	33.52	40.25	33.58	65.32	55.32	-25.07	-21.74
0.270	0.06	32.40	29.00	32.46	29.06	61.11	51.11	-28.66	-22.06
0.438	0.05	34.11	29.10	34.16	29.15	57.10	47.10	-22.94	-17.95
2.390	0.12	41.00	32.72	41.12	32.84	56.00	46.00	-14.88	-13.16
4.423	0.16	28.93	23.23	29.09	23.39	56.00	46.00	-26.91	-22.61
7.646	0.24	32.77	26.65	33.01	26.89	60.00	50.00	-26.99	-23.11

Remark:

1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value