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

TEST REPORT

For

802.11b/g MIMO Mini-PCI Card

Model : WMP-N06

Trade Name : Alpha

Issued for

Alpha Networks Inc.

No.8, Li-shing Road VII, Science-based Industrial Park,

Hsinchu, Taiwan R.O.C.

Issued by

Compliance Certification Services Inc.
Hsinchu Lab.
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ChuTung Chen, Hsinchu, Taiwan 310, R.O.C
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NVLAP LAB CODE 200118-0

Testing Laboratory
0240

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1. TEST REPORT CERTIFICATION

Applicant	：Alpha Networks Inc.
Address	：No.8, Li-shing Road VII, Science-based Industrial Park, Hsinchu, Taiwan R.O.C.
Applicant	：802.11b/g MIMO Mini-PCI Card
Model	：WMP-N06
Trade Name	：Alpha
Tested Date	：July 10 ~ September 11, 2006

APPLICABLE STANDARD	
STANDARD	**TEST RESULT**
FCC Part 15 Subpart C : 2004 AND ANSI C63.4 : 2003	No non-compliance noted

Approved by:

C. F. Wu
Manager of Hsinchu Laboratory
Compliance Certification Services Inc.

Reviewed by:

Alan Fan
Test Engineer of Hsinchu Laboratory
Compliance Certification Services Inc.

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	802.11b/g MIMO Mini-PCI Card
Model Number	WMP-N06
Frequency Range	IEEE 802.11b/g, 802.11n HT20 (DTS Band):2412MHz～2462MHz IEEE 802.11n HT40 (DTS Band):2422MHz～2452MHz
Transmit Power (ERP)	For Antenna (1) and Antenna (2) IEEE 802.11b: 28.22dBm (DTS Band) IEEE 802.11g: 28.94dBm (DTS Band) IEEE 802.11n HT20: 29.64dBm (DTS Band) IEEE 802.11n HT40: 29.47dBm (DTS Band)
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, 1Mbps IEEE 802.11g : 54, 48 ,36, 24, 18, 12, 11, 9, 6Mbps IEEE 802.11n HT20 : 130, 117 ,104, 78, 65, 58.5, 52, 39, 26, 19.5, 13, 6.5 Mbps IEEE 802.11n HT40 : 270, 243, 216, 162, 135, 121.5, 108, 81, 54, 40.5, 27, 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	Antenna (1) Dipole Antenna, Antenna Gain 2 dBi at 2.4GHz (× 3). Antenna (2) Dipole Antenna, Antenna Gain 3 dBi at 2.4GHz (× 3).
Power Source	3.3VDC (From Notebook PC, Powered From Host Device)

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: **RRK2005110016-1** filing to comply with Section 15.207,15.209 and 15.247 of the FCC Part 15, Subpart C Rules.*

3. DESCRIPTION OF TEST MODES

The EUT is an 802.11n MIMO transceiver in Mini-PCI module form factor. It has three transmitter chains and three receive chains (3x3 configurations). The 3x3 configuration is implemented with three outside chains (Chain 0, 1 and 2).

The RF chipset is manufactured by Atheros Communications Inc.

IEEE 802.11 b ,802.11g ,802.11n HT20 mode (DTS Band)

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 : 11Mbps 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 (DTS Band)

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.

The worst-case data rates are determined according to the description above, based on the investigations by measuring the PSD, peak power and average power across all the data rates, bandwidths, modulations and spatial stream modes.

The worst-case channel is determined as the channel with the highest output power. The highest measured output power was at 2437 MHz.

4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4 and FCC CFR 47 2.1046, 2046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, 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
Rm.258, Bldg.17, NO.195 , Sec. 4, Chung Hsing Rd., Chu-Tung Chen. Hsin-Chu,
Taiwan 310 R.O.C.
The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with 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 National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200118-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are listed with Federal Communications Commission (registration no: 90585 and 90584).

5.4 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	NVLAP	EN 55014-1, AS/NZS 1044, CNS 13783-1, IEC/CISPR 14-1, IEC/CISPR 22, EN 55022, EN 61000-3-2, EN 61000-3-3, ANSI C63.4, AS/NZS CISPR 22, AS/NZS 3548, IEC 61000-4-2/3/4/5/6/8/11	200118-0
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	90585, 90584
Japan	VCCI	3/10 meter Open Area Test Sites to perform conducted/radiated measurements	R-1229/1189 C-1250/1294
Taiwan	TAF	FCC Method-47 CFR Part 15 Subpart C,D,E CISPR 11, FCC METHOD-47 CFR Part 18, EN 55011, CNS 13803, CISPR 13, CNS 13439, FCC Method-47 CFR Part 15 Subpart B, CISPR 14-1, EN 55014-1, CNS 13783-1, EN 55015, CNS 14115, CISPR 22, EN 55022, VCCI CNS 13438, EN 61000-4-2/3/4/5/6/8/11	Testing Laboratory 0240
Taiwan	BSMI	CNS 13803, CNS 13438, CNS 13439, CNS 13783-1, CNS 14115	SL2-IS-E-0002 SL2-IN-E-0002 SL2-A1-E-0002 SL2-R1-E-0002 SL2-R2-E-0002 SL2-L1-E-0002
Canada	Industry Canada	RSS212, Issue 1	IC 4417-1

** No part of this report may be used to claim or imply product endorsement by NVLAP 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

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

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

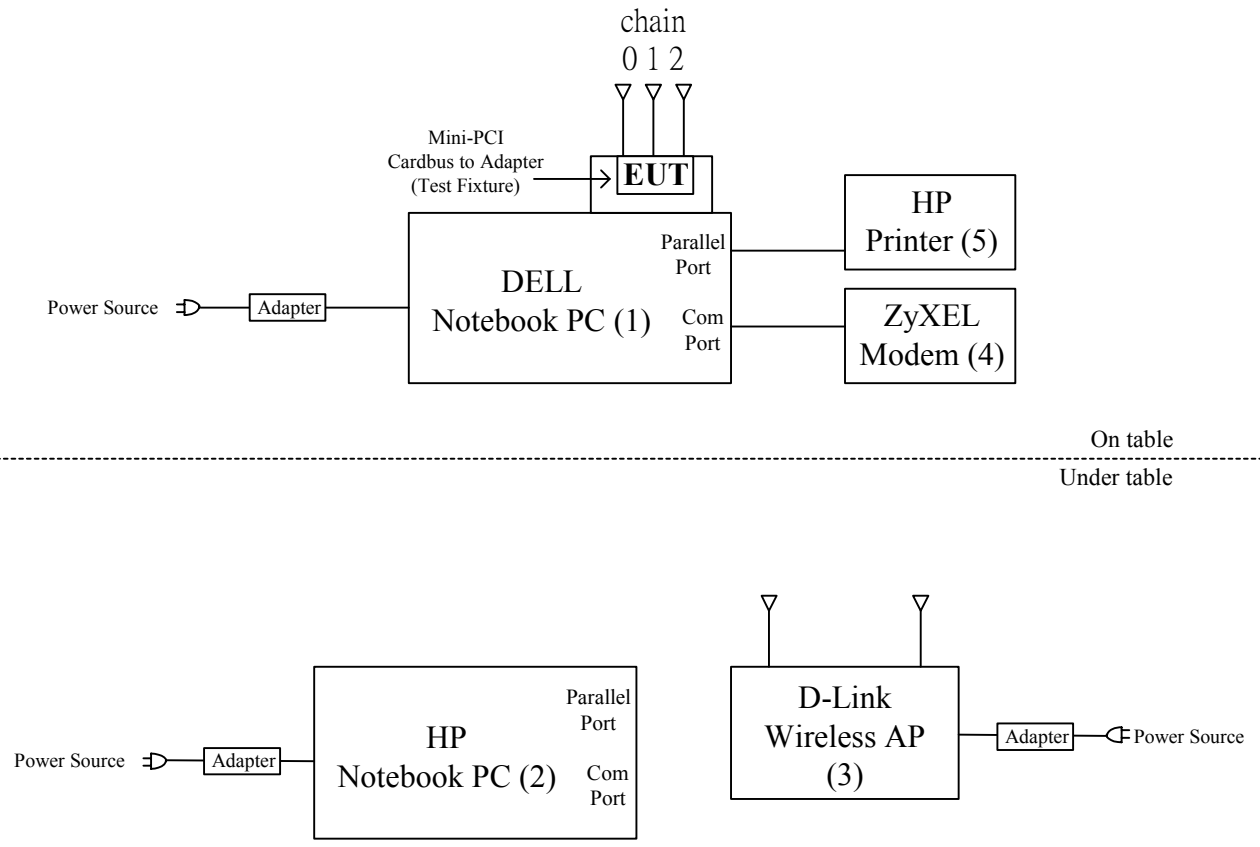
Uncertainty figures are valid to a confidence level of 95%

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	Wireless Access Point	D-Link	DWL-7100AP	DQ6114B00002	KA22003040018-1
4	Modem	ZyXEL	Omni 56K	S1Z4107727	1880MN156K
5	Printer	HP	hp desk jet 948c	CN19S6S1XS	DoC

SETUP DIAGRAM FOR TESTS



EUT OPERATING CONDITION

1. Set up all computers like the setup diagram.
2. The "**Atheros Radio Test <ART> Devilib Revision 0.3 BUILD #4 ART_11n"** software was used for testing.
   The EUT driver software installed in the host support equipment during testing was Atheros AR5002, ANWI Diagnostic Kernel Drive.

For Dipole 2dBi Antenna (1):

(1) **TX Mode:**

- ⇨ **Tx Antenna: ANT_A, [TX99]**
- ⇨ **Tx Data Rate:11Mbps 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**
  Target Power: IEEE 802.11b Channel Low (2412MHz) = **17.5**
  IEEE 802.11b Channel Middle (2437MHz) = **18**
  IEEE 802.11b Channel High (2462MHz) = **17.5**
  Target Power: IEEE 802.11g Channel Low (2412MHz) = **14.5**
  IEEE 802.11g Channel Middle (2437MHz) = **15**
  IEEE 802.11g Channel High (2462MHz) = **15**
  Target Power: IEEE 802.11n HT20 Channel Low (2412MHz) = **13**
  IEEE 802.11n HT20 Channel Middle (2437MHz) = **16**
  IEEE 802.11n HT20 Channel High (2462MHz) = **14**
  Target Power: IEEE 802.11n HT40 Channel Low (2422MHz) = **10**
  IEEE 802.11n HT40 Channel Middle (2437MHz) = **15**
  IEEE 802.11n HT40 Channel High (2452MHz) = **10**

(2) **RX Mode：**

- ⇨ **Continuous RF <R>eceive mode (ANT_A)**

For Dipole 3dBi Antenna (2):

(1) **TX Mode:**

- ⇨ **Tx Antenna: ANT_A, [TX99]**
- ⇨ **Tx Data Rate:11Mbps 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**
  Target Power: IEEE 802.11b Channel Low (2412MHz) = **17**
  IEEE 802.11b Channel Middle (2437MHz) = **18**
  IEEE 802.11b Channel High (2462MHz) = **17.5**
  Target Power: IEEE 802.11g Channel Low (2412MHz) = **13.5**
  IEEE 802.11g Channel Middle (2437MHz) = **14**
  IEEE 802.11g Channel High (2462MHz) = **14**
  Target Power: IEEE 802.11n HT20 Channel Low (2412MHz) = **11.5**
  IEEE 802.11n HT20 Channel Middle (2437MHz) = **16**
  IEEE 802.11n HT20 Channel High (2462MHz) = **13**
  Target Power: IEEE 802.11n HT40 Channel Low (2422MHz) = **8**
  IEEE 802.11n HT40 Channel Middle (2437MHz) = **15**
  IEEE 802.11n HT40 Channel High (2452MHz) = **9**

(2) RX Mode：

Continuous RF <R>eceive mode (ANT_A)

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

For Normal operating :

1. Set up all computers like the setup diagram.
2. Notebook PC (2) ping 192.168.0.10 –t to Notebook PC(1).
3. Notebook PC (1) ping 192.168.0.20 –t to Notebook PC(2).
4. Notebook PC (1) (2) ping 192.168.0.50 –t to AP.
5. All of the function are under run.
6. Start test.

8. APPLICABLE LIMITS AND TEST RESULTS

8.1 6dB BANDWIDTH

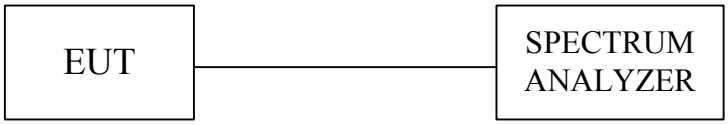
LIMIT

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

TEST EQUIPMENTS

Description & Manufacturer	Model No.	Serial No.	Date of Calibration
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	September 24, 2005
AGILENT SPECTRUM ANALYZER	E4446A	MY433601.32	March 22 , 2006

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

For Dipole 2dBi Antenna (1):

IEEE 802.11b mode (Three TX)

Channel	Channel Frequency (MHz)	6dB Bandwidth (kHz)			Minimum Limit (kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
Low	2412	12100	11600	11700	500	PASS
Middle	2437	11000	11800	10350	500	PASS
High	2462	11450	12400	11650	500	PASS

IEEE 802.11g mode (Three TX)

Channel	Channel Frequency (MHz)	6dB Bandwidth (kHz)			Minimum Limit (kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
Low	2412	14850	15650	15900	500	PASS
Middle	2437	15400	15400	15450	500	PASS
High	2462	15050	15000	15000	500	PASS

IEEE 802.11n HT20 mode (Three TX)

Channel	Channel Frequency (MHz)	6dB Bandwidth (kHz)			Minimum Limit (kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
Low	2412	16300	14650	17300	500	PASS
Middle	2437	15900	15700	15200	500	PASS
High	2462	15650	17200	16300	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	35650	35700	34650	500	PASS
Middle	2437	36100	35300	36250	500	PASS
High	2452	36050	36300	35950	500	PASS

For Dipole 3dBi Antenna (2):

IEEE 802.11b mode (Three TX)

Channel	Channel Frequency (MHz)	6dB Bandwidth (kHz)			Minimum Limit (kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
Low	2412	10150	10350	11750	500	PASS
Middle	2437	11000	11800	10350	500	PASS
High	2462	11450	12400	11650	500	PASS

IEEE 802.11g mode (Three TX)

Channel	Channel Frequency (MHz)	6dB Bandwidth (kHz)			Minimum Limit (kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
Low	2412	16100	16050	15900	500	PASS
Middle	2437	16050	16450	15050	500	PASS
High	2462	15750	16300	16250	500	PASS

IEEE 802.11n HT20 mode (Three TX)

Channel	Channel Frequency (MHz)	6dB Bandwidth (kHz)			Minimum Limit (kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
Low	2412	16900	15150	16650	500	PASS
Middle	2437	15900	15700	15200	500	PASS
High	2462	16500	15850	15050	500	PASS

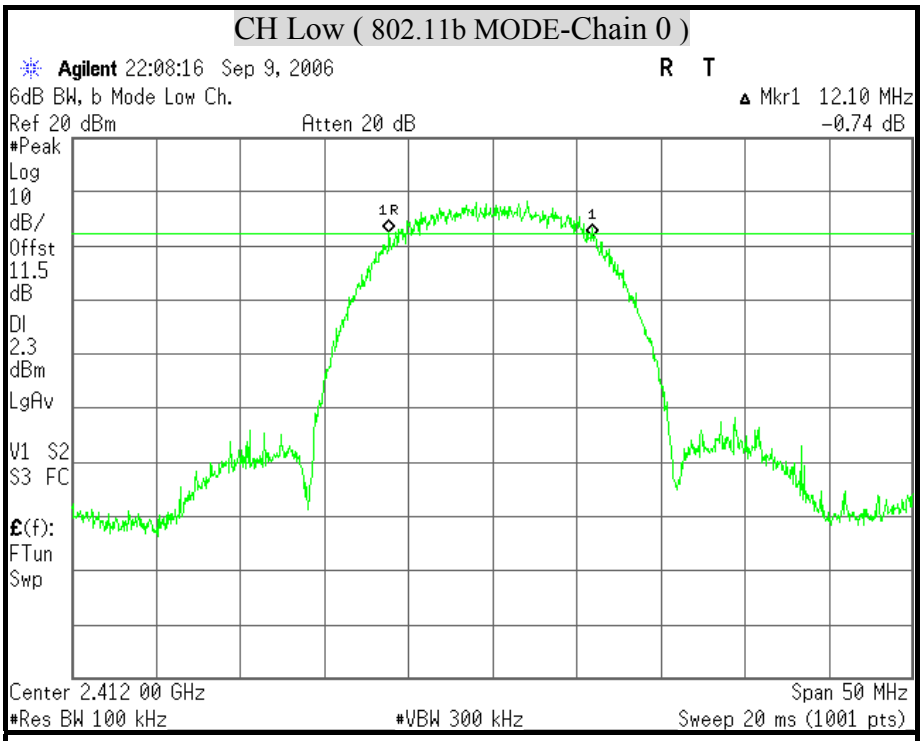
IEEE 802.11n HT40 mode (Three TX)

Channel	Channel Frequency (MHz)	6dB Bandwidth (kHz)			Minimum Limit (kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
Low	2422	34800	35700	35700	500	PASS
Middle	2437	36100	35300	36250	500	PASS
High	2452	36250	36300	33900	500	PASS

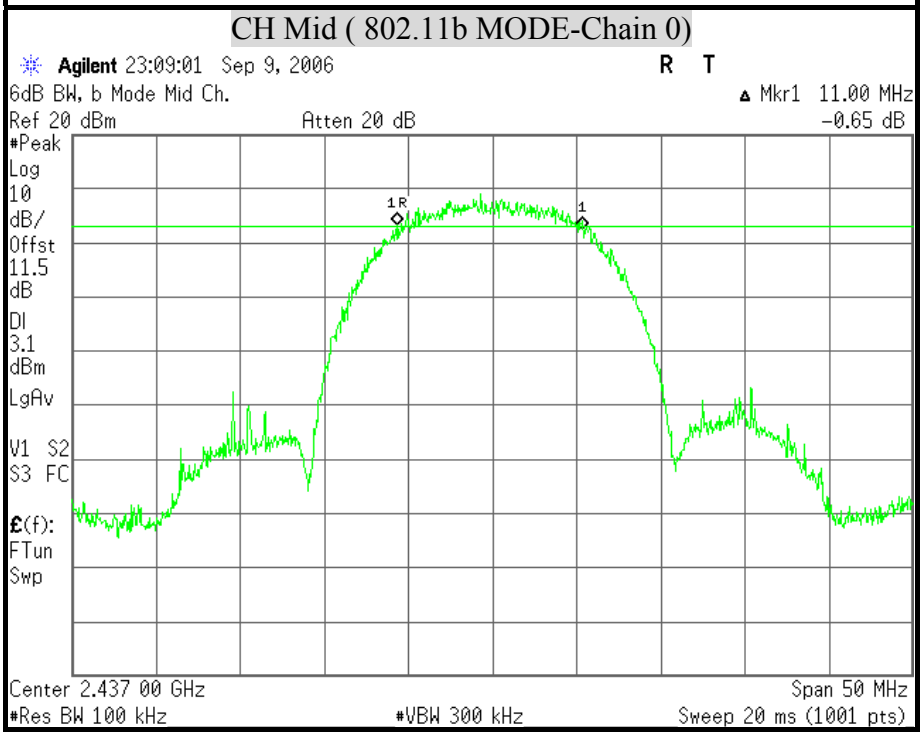
6dB BANDWIDTH (802.11b MODE)

2dBi Antenna

CH Low (802.11b MODE-Chain 0)



CH Mid (802.11b MODE-Chain 0)



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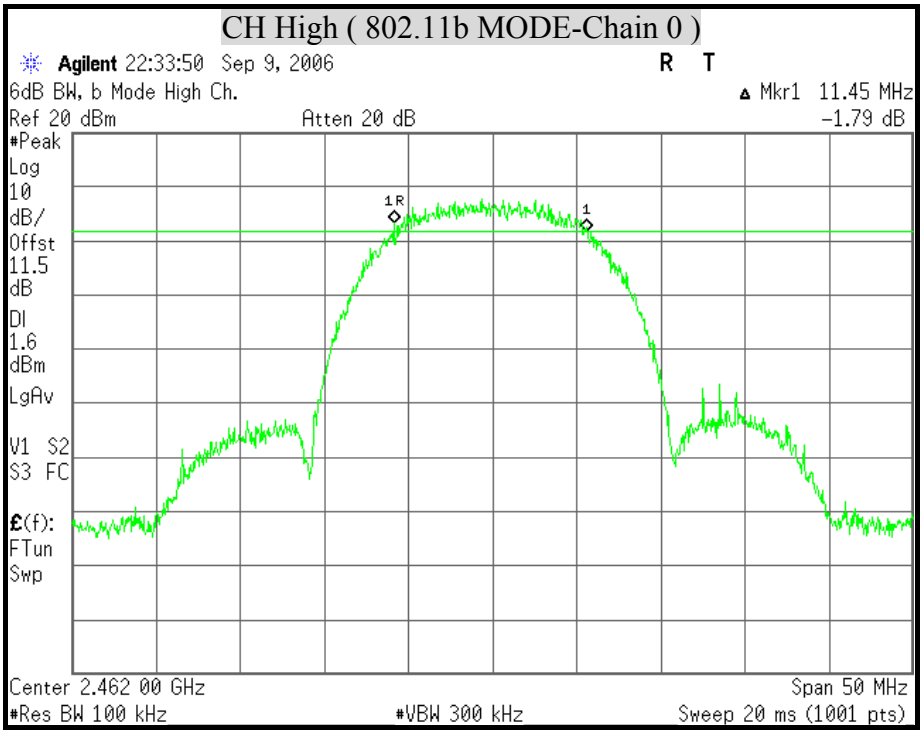

2dBi Antenna

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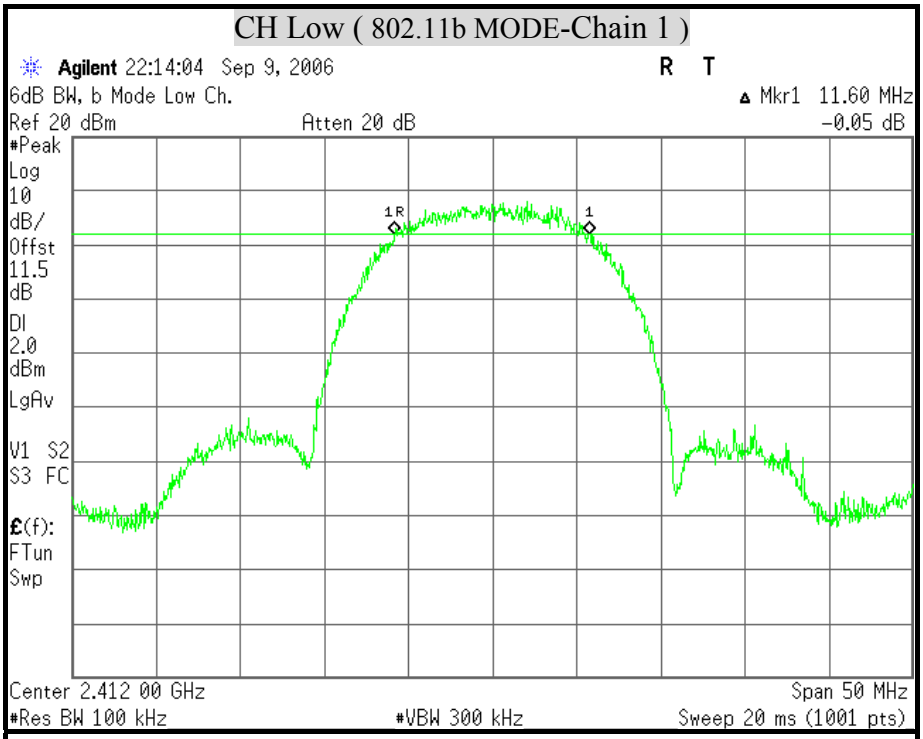

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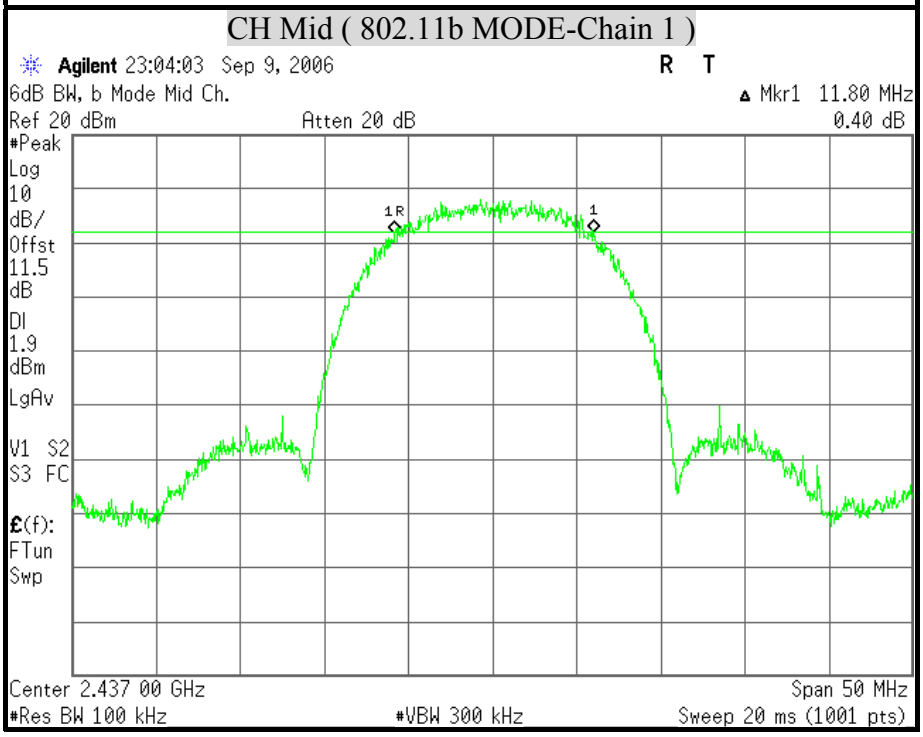

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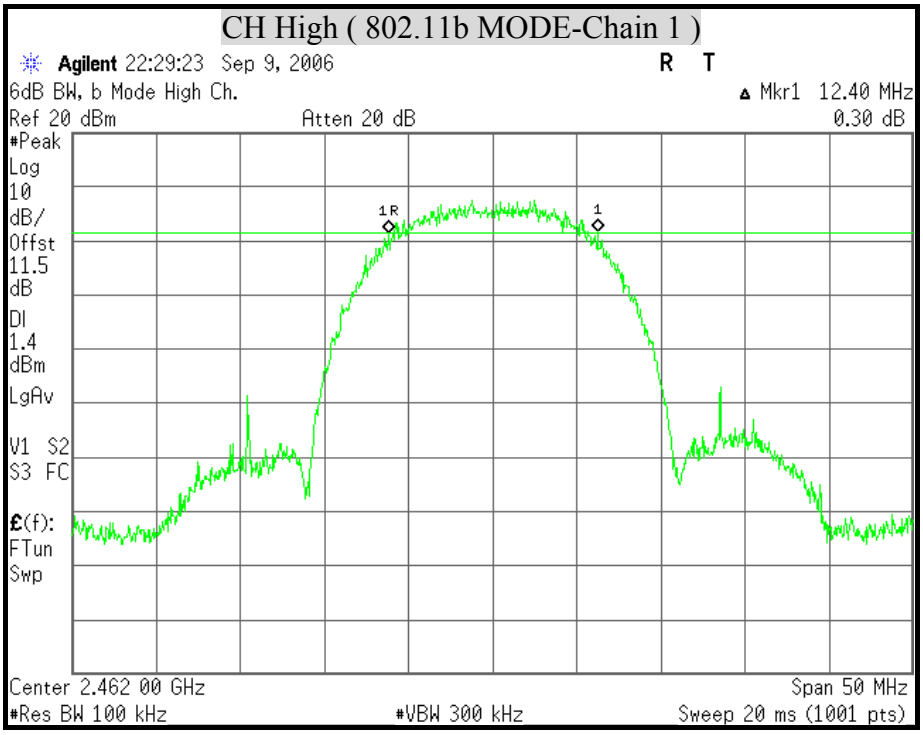
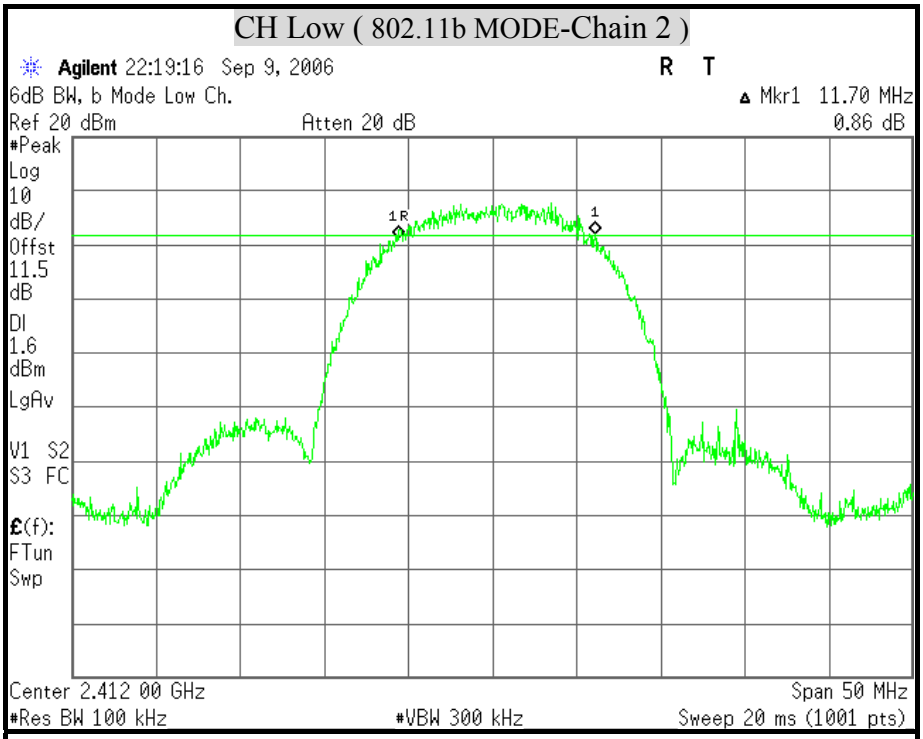


2dBi Antenna

CH Low (802.11b MODE-Chain 2)



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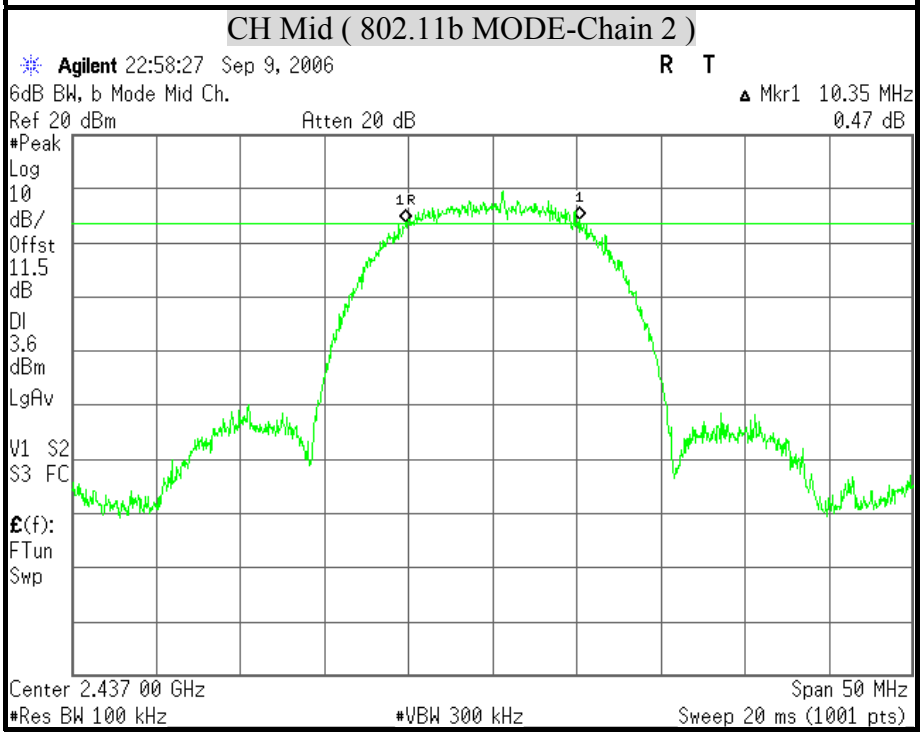
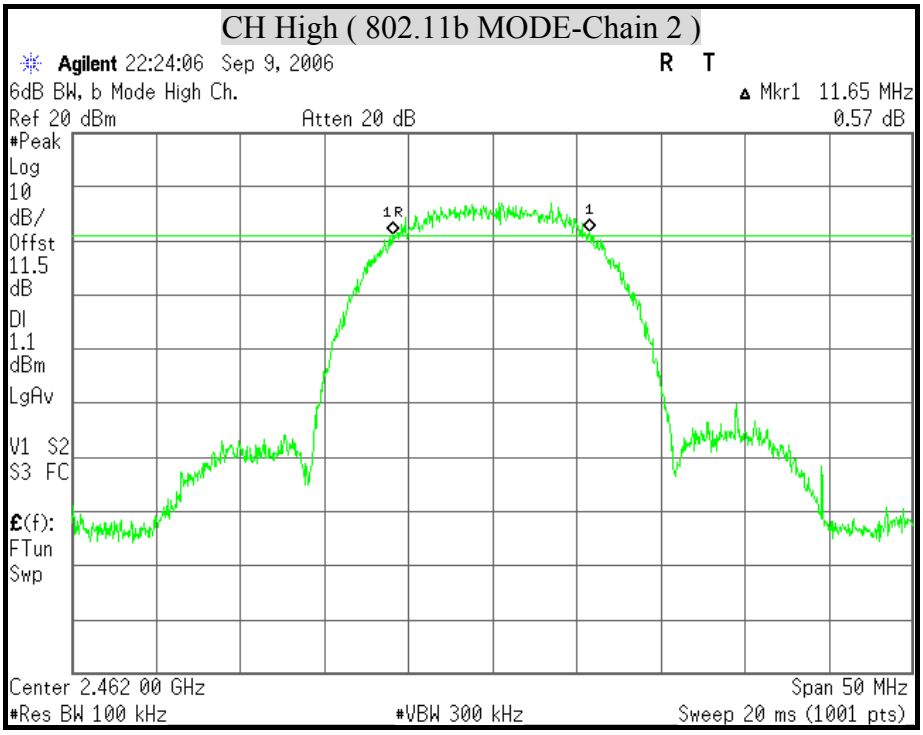


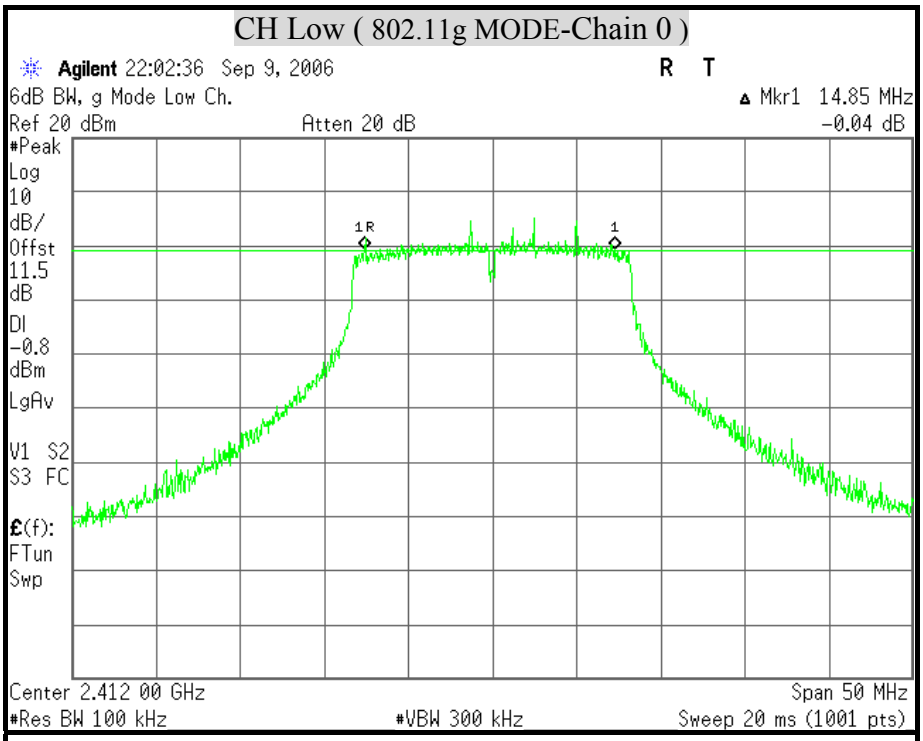
CH High (802.11b MODE-Chain 2)



6dB BANDWIDTH (802.11g MODE)

2dBi Antenna

CH Low (802.11g MODE-Chain 0)



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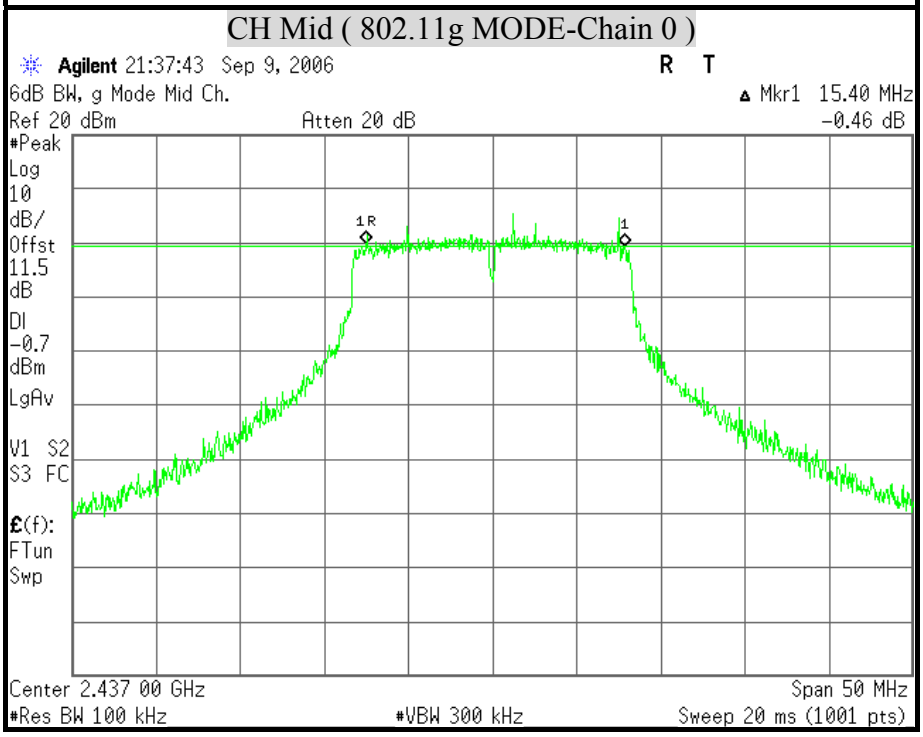

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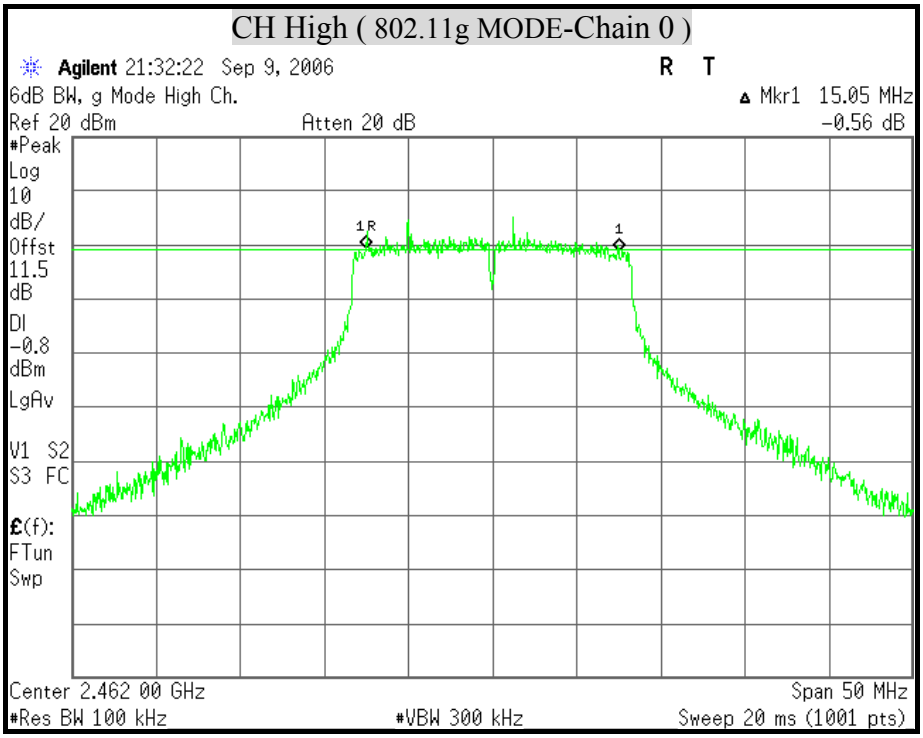
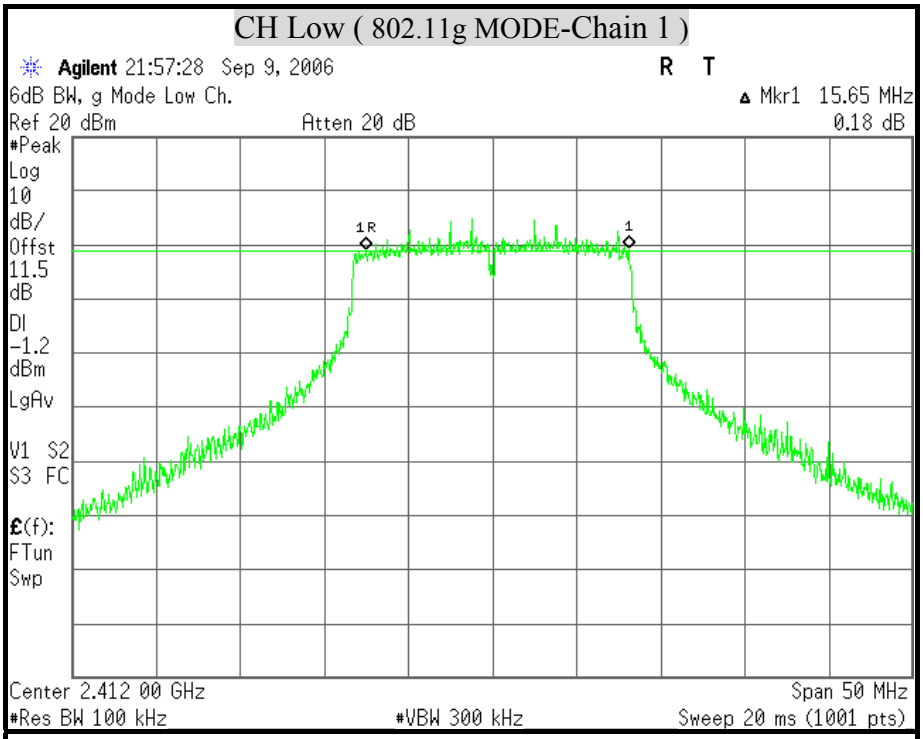


2dBi Antenna

CH Low (802.11g MODE-Chain 1)



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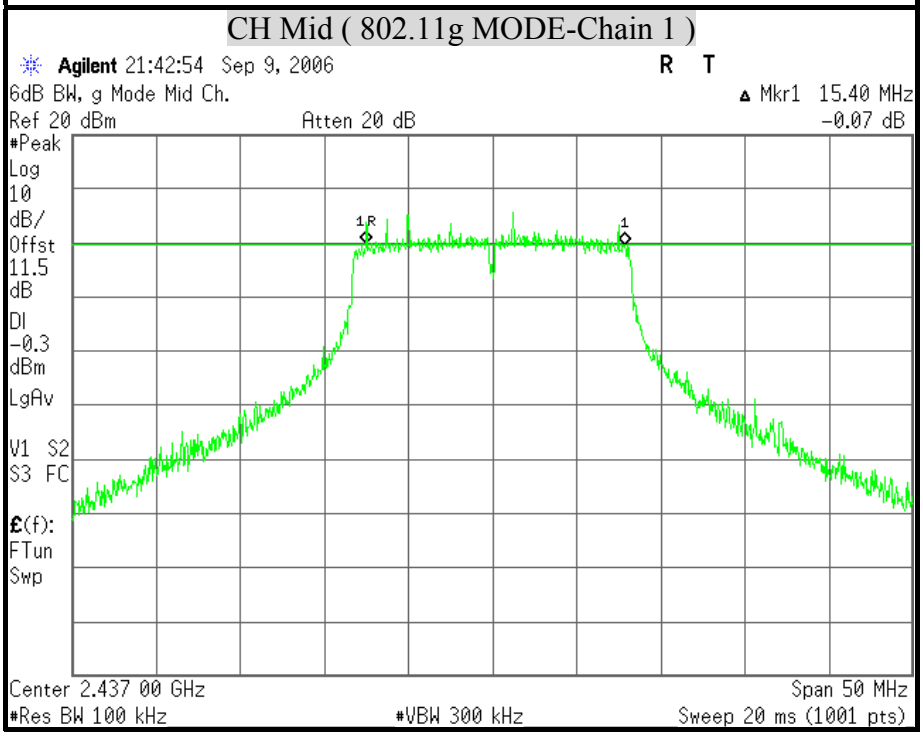
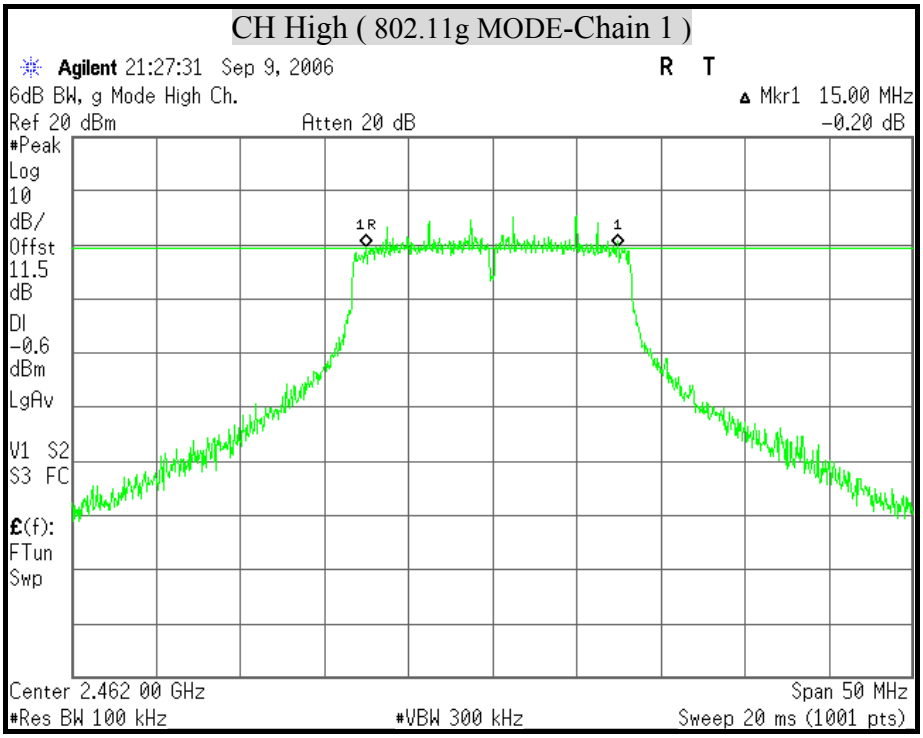
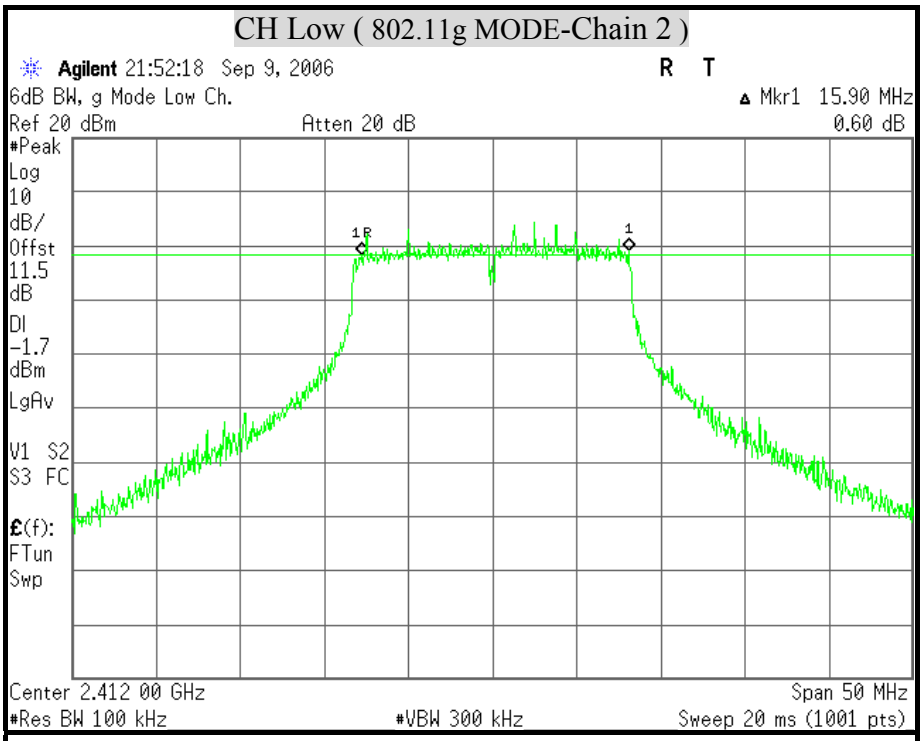


CH High (802.11g MODE-Chain 1)



2dBi Antenna

CH Low (802.11g MODE-Chain 2)



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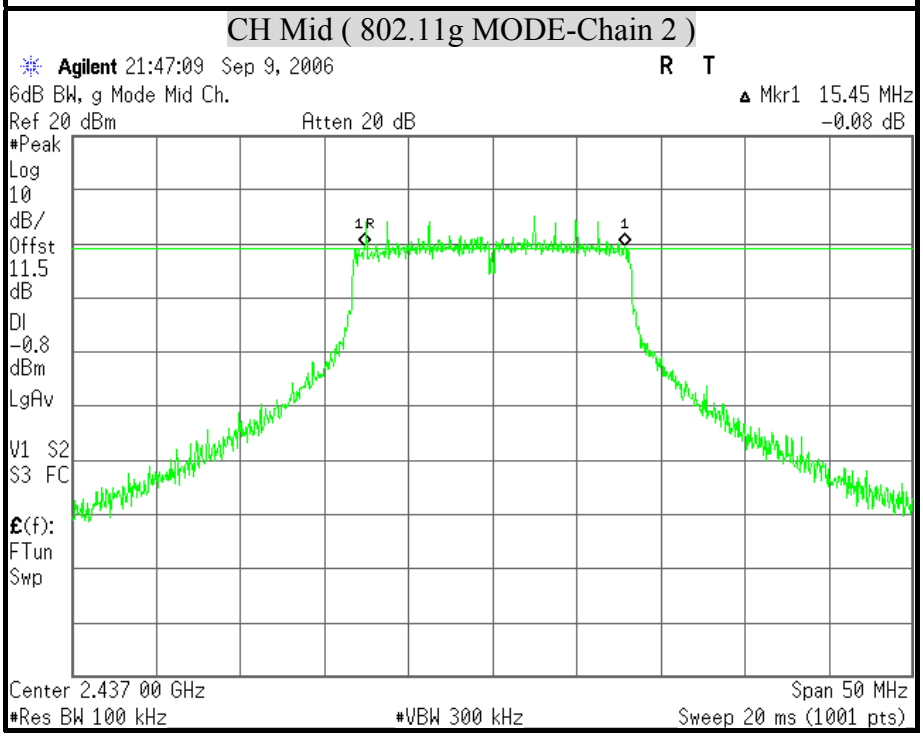
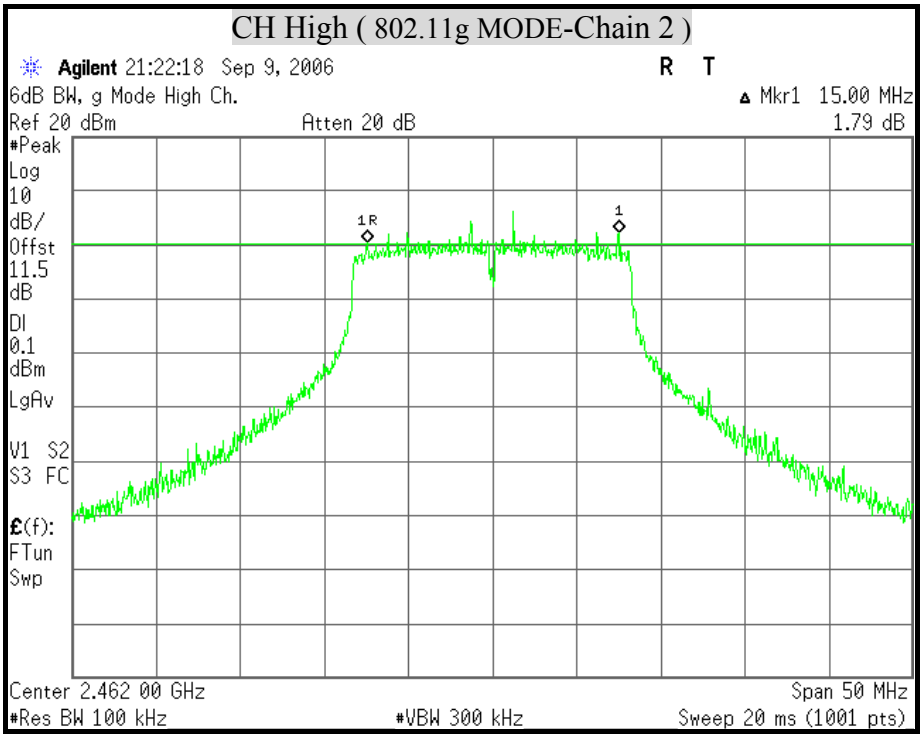


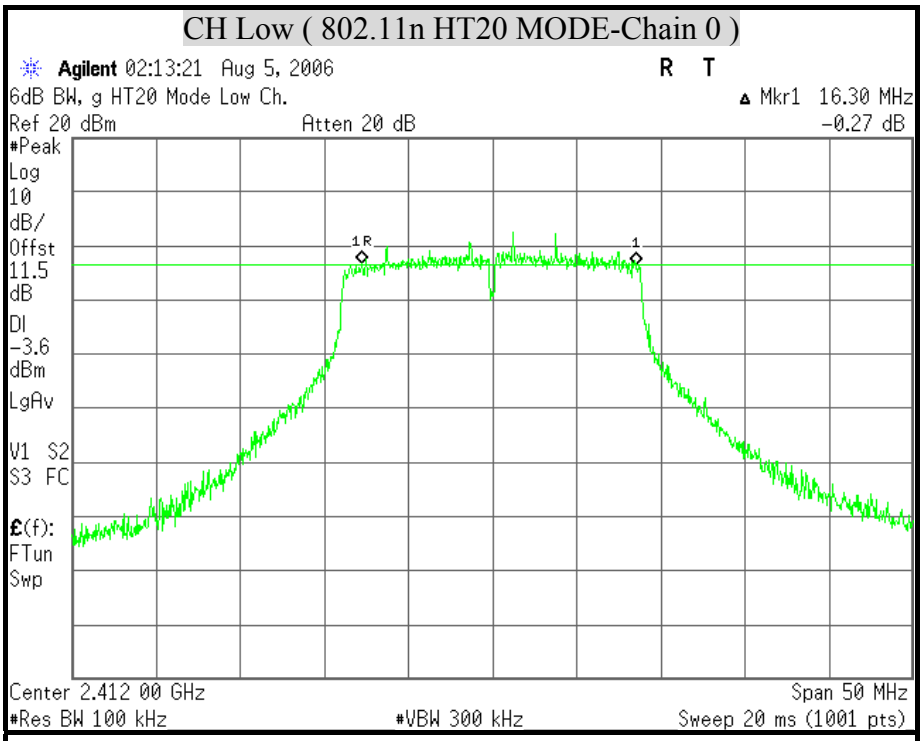
CH High (802.11g MODE-Chain 2)



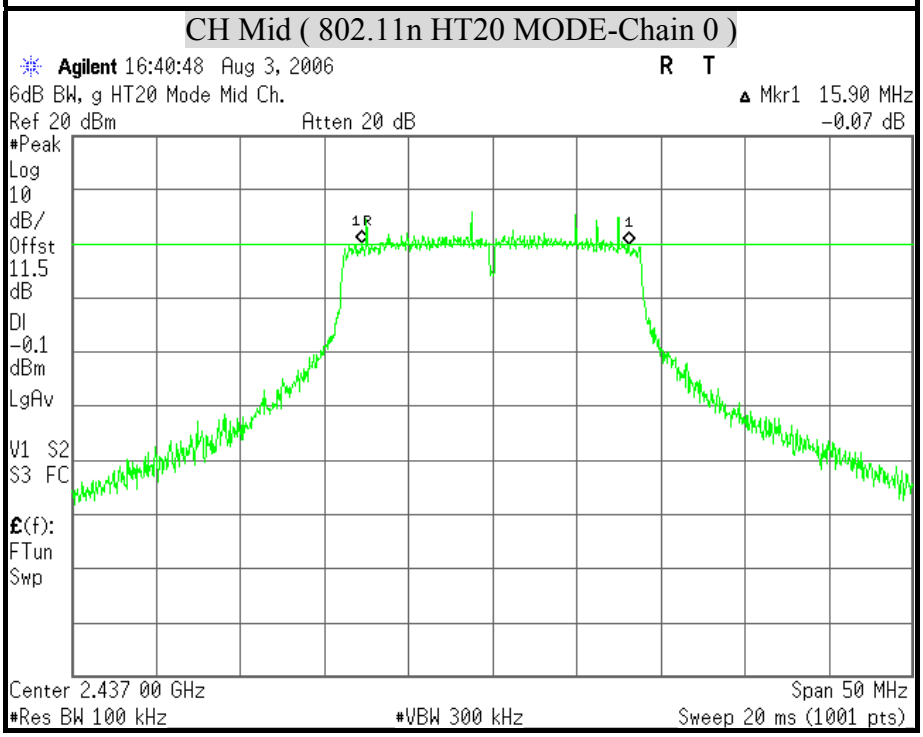
6dB BANDWIDTH (802.11n HT20 MODE)

2dBi Antenna

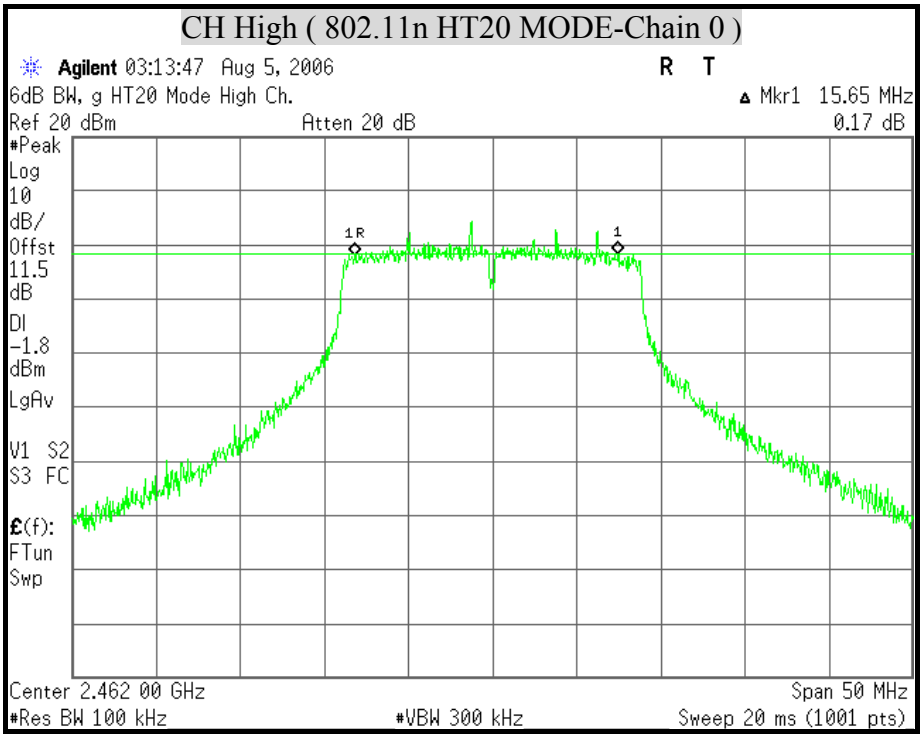
CH Low (802.11n HT20 MODE-Chain 0)



CH Mid (802.11n HT20 MODE-Chain 0)

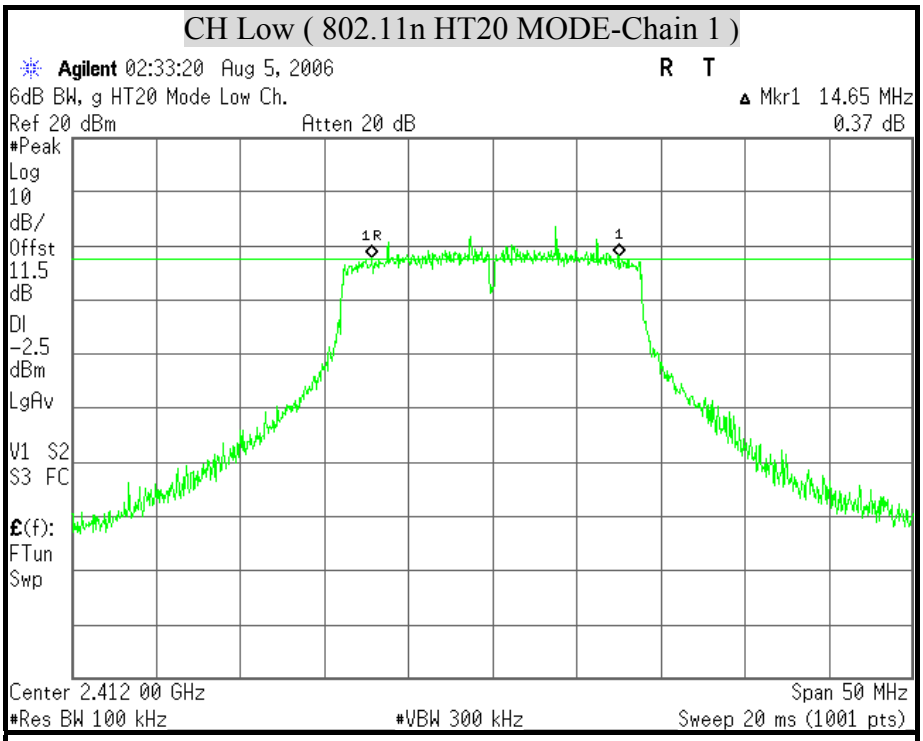


CH High (802.11n HT20 MODE-Chain 0)

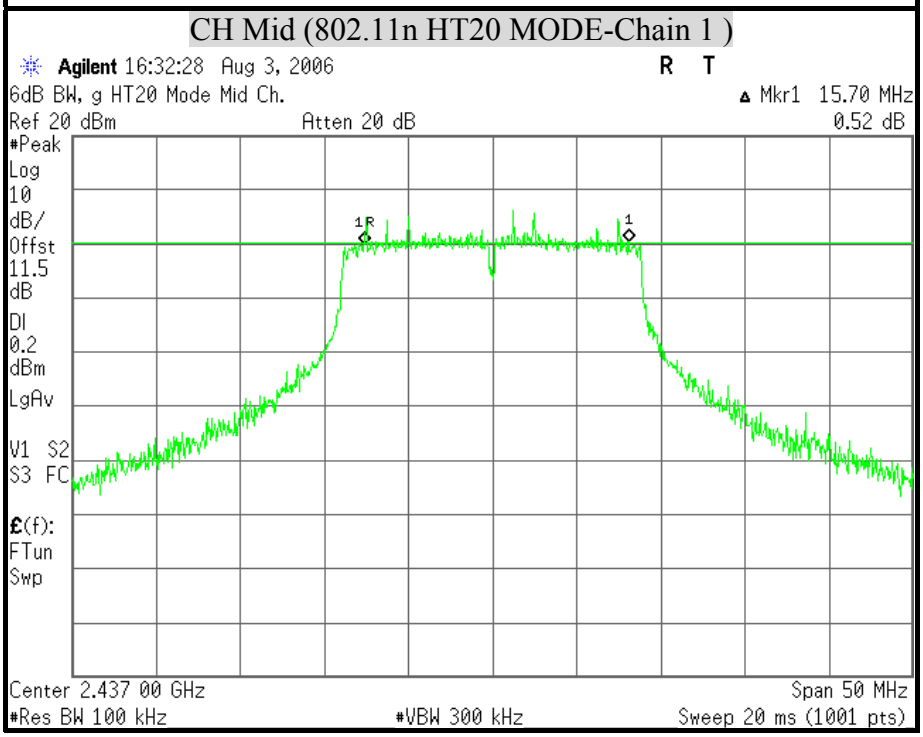


2dBi Antenna

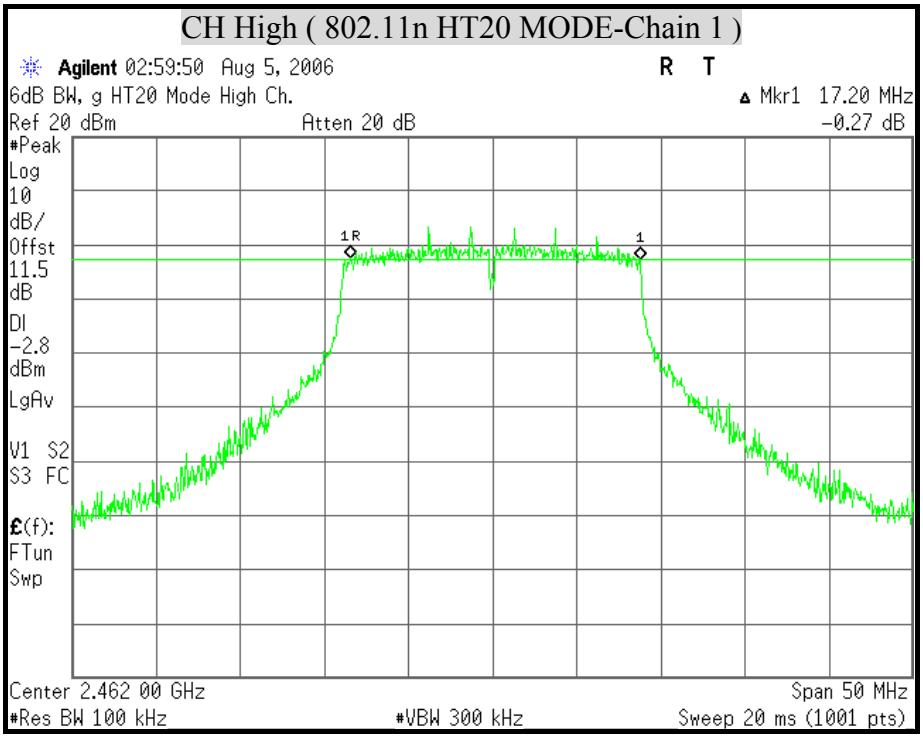
CH Low (802.11n HT20 MODE-Chain 1)



CH Mid (802.11n HT20 MODE-Chain 1)

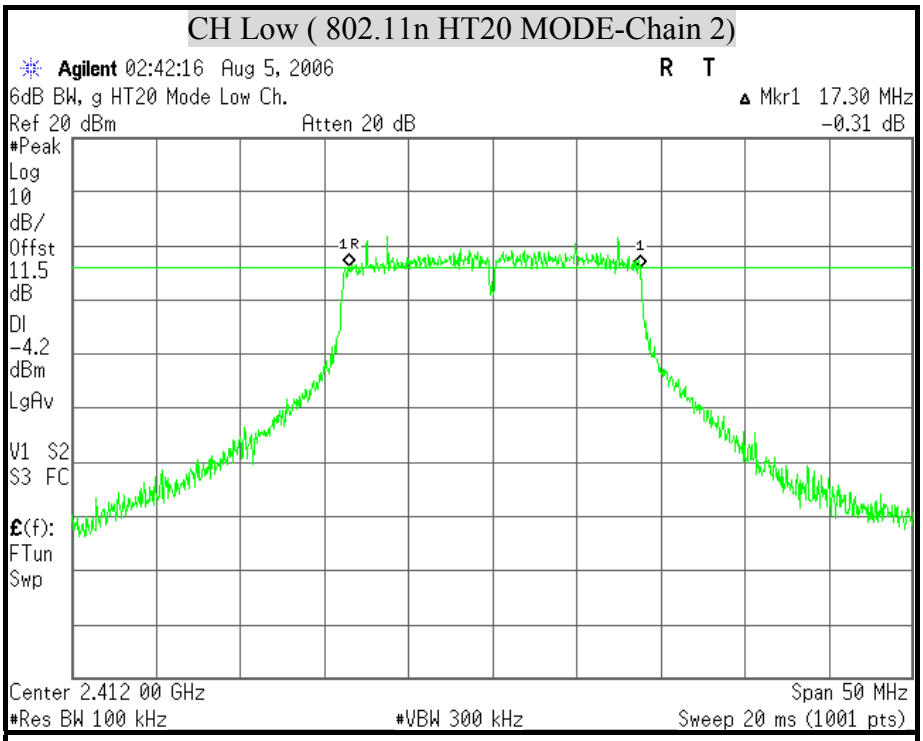


CH High (802.11n HT20 MODE-Chain 1)

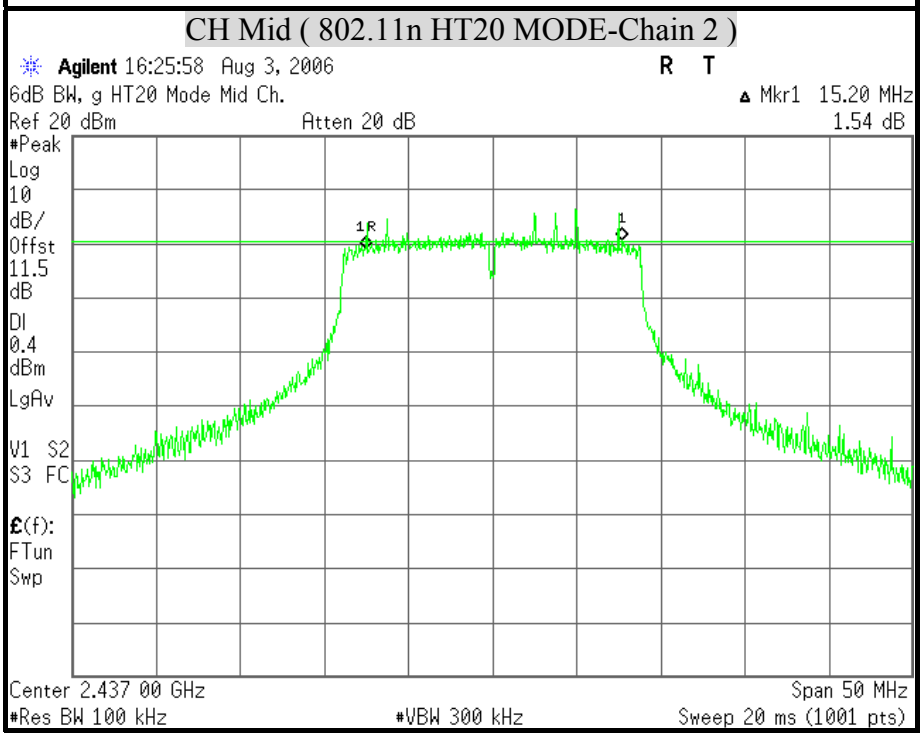


2dBi Antenna

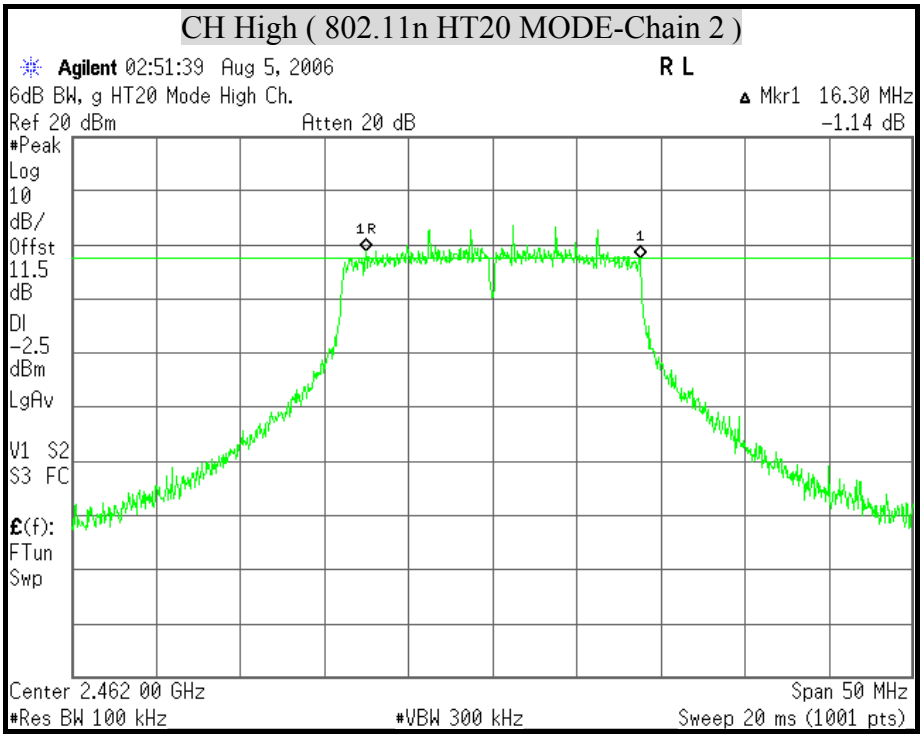
CH Low (802.11n HT20 MODE-Chain 2)



CH Mid (802.11n HT20 MODE-Chain 2)



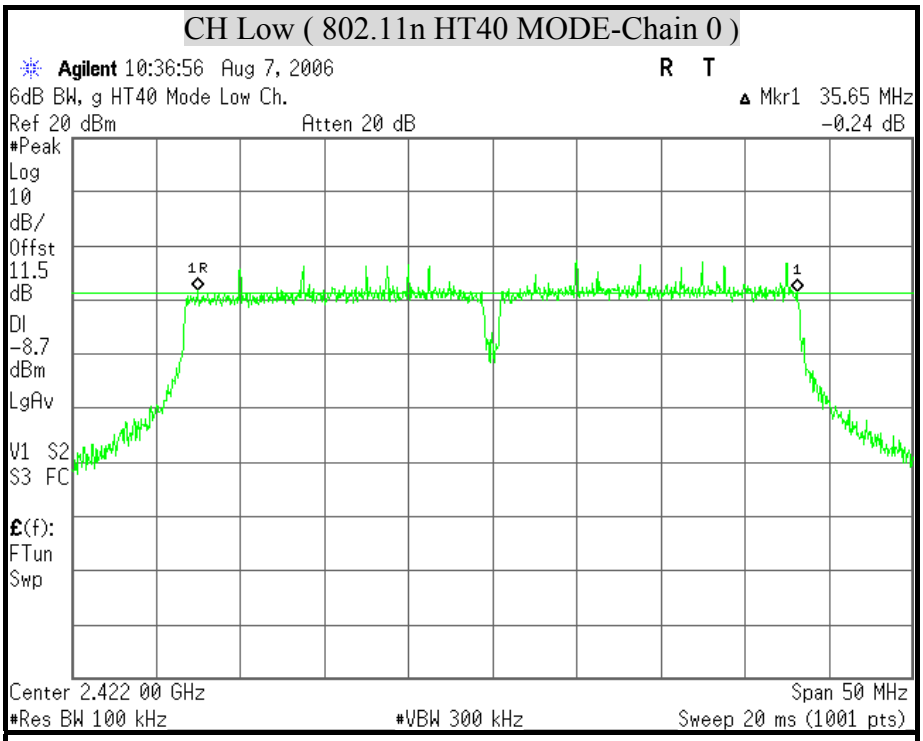
CH High (802.11n HT20 MODE-Chain 2)



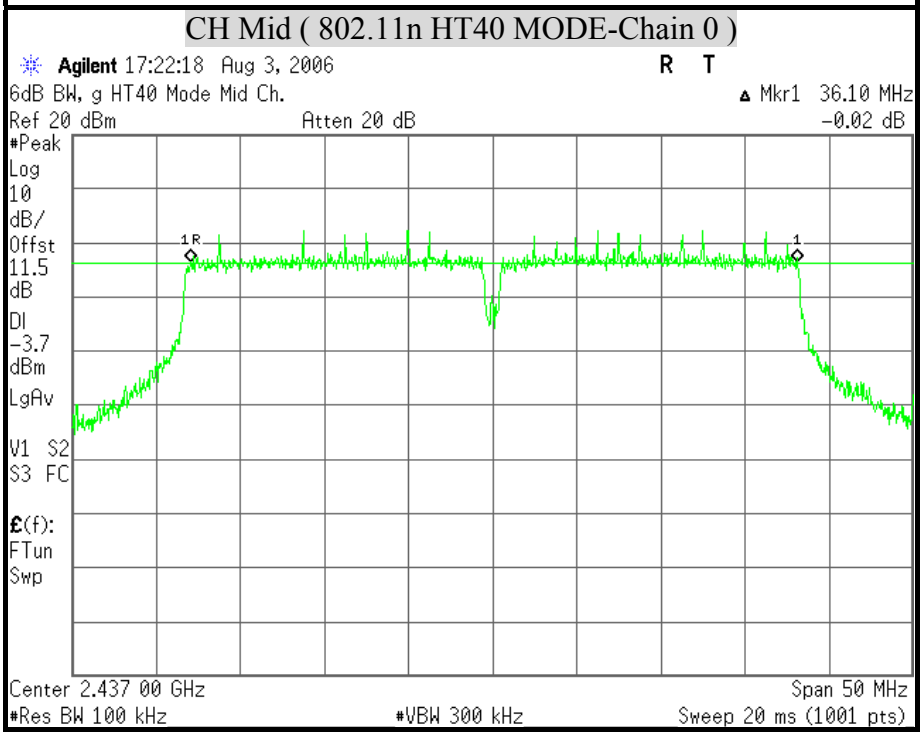
6dB BANDWIDTH (802.11n HT40 MODE)

2dBi Antenna

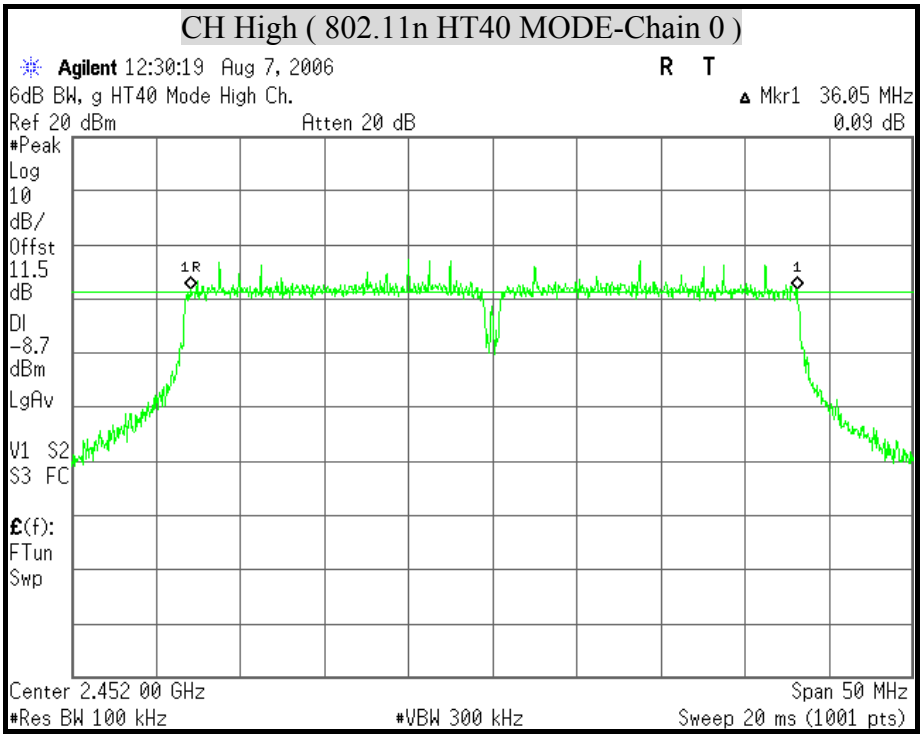
CH Low (802.11n HT40 MODE-Chain 0)



CH Mid (802.11n HT40 MODE-Chain 0)

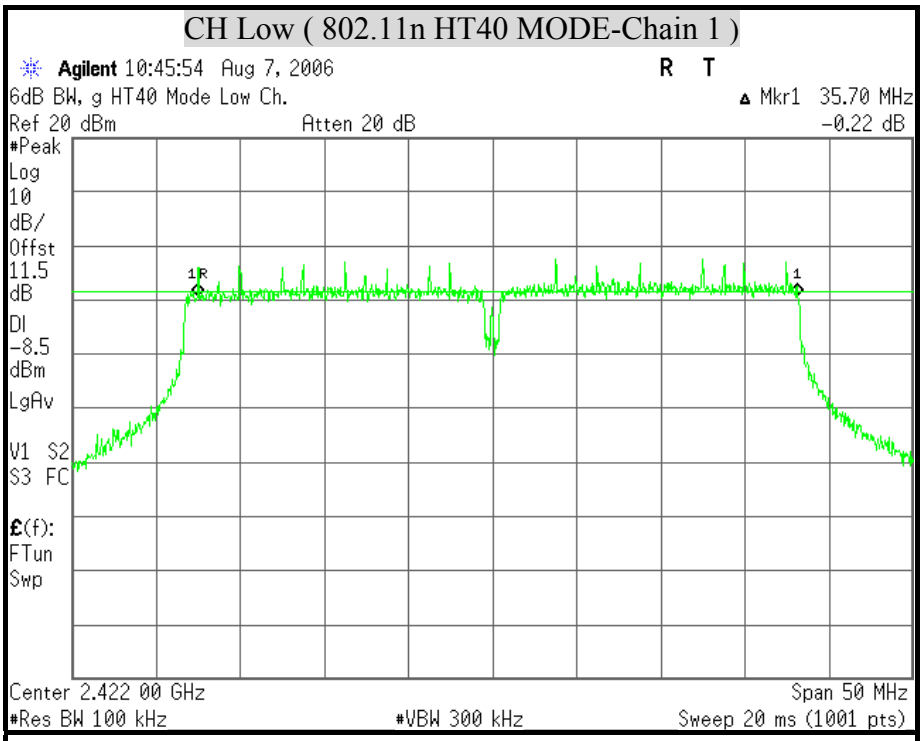


CH High (802.11n HT40 MODE-Chain 0)

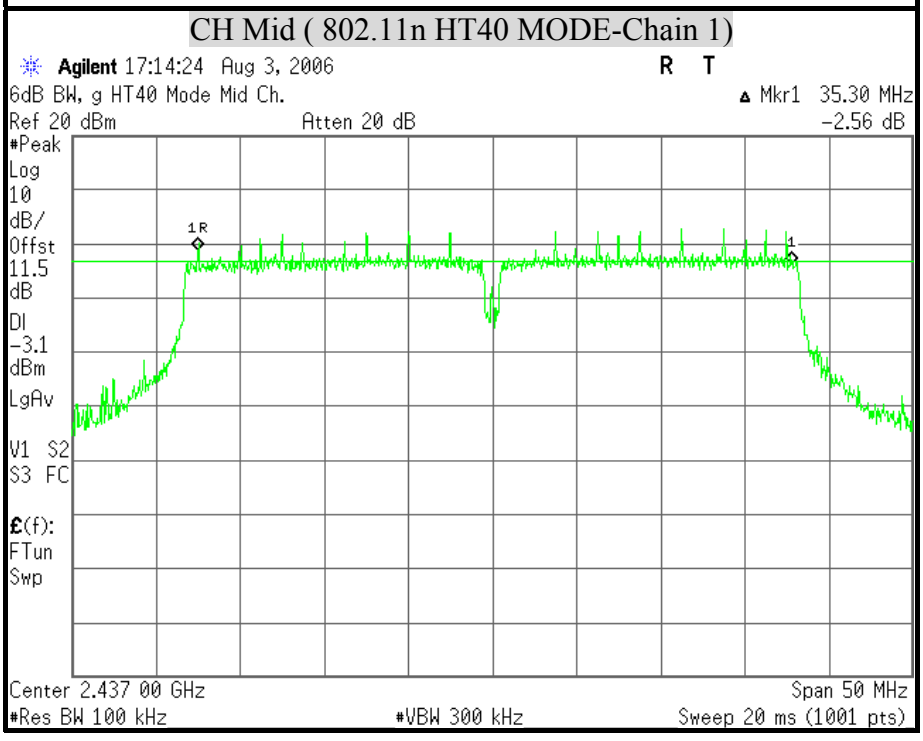


2dBi Antenna

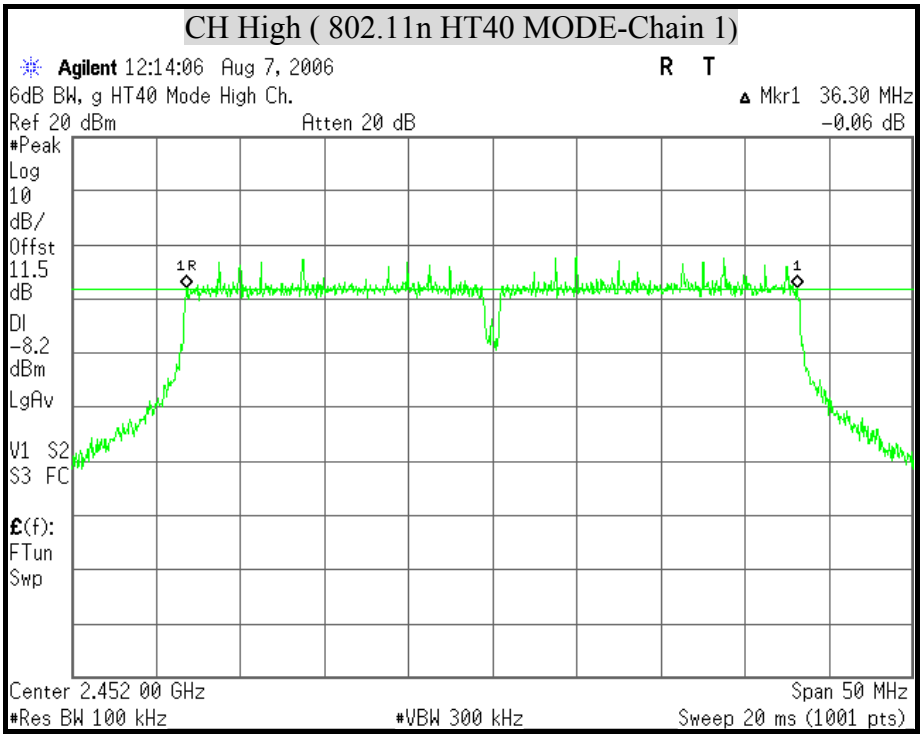
CH Low (802.11n HT40 MODE-Chain 1)



CH Mid (802.11n HT40 MODE-Chain 1)

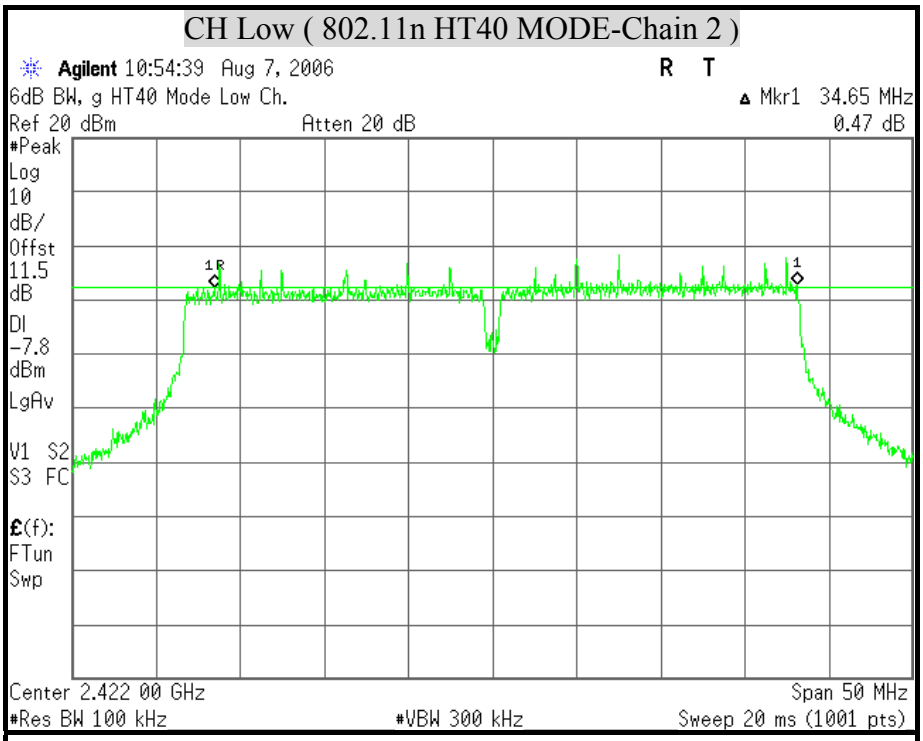


CH High (802.11n HT40 MODE-Chain 1)

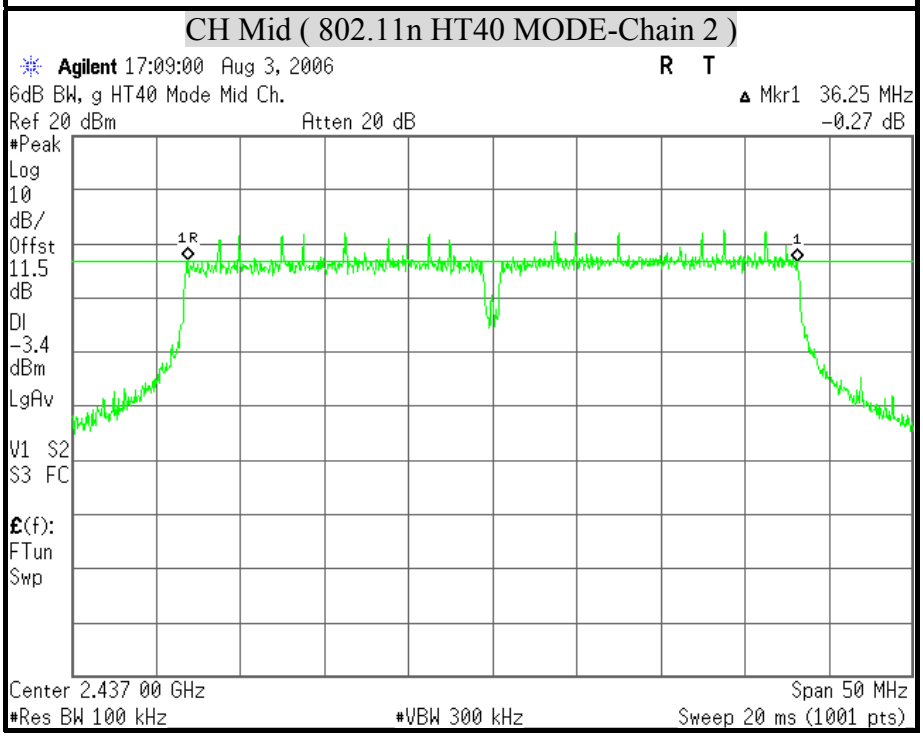


2dBi Antenna

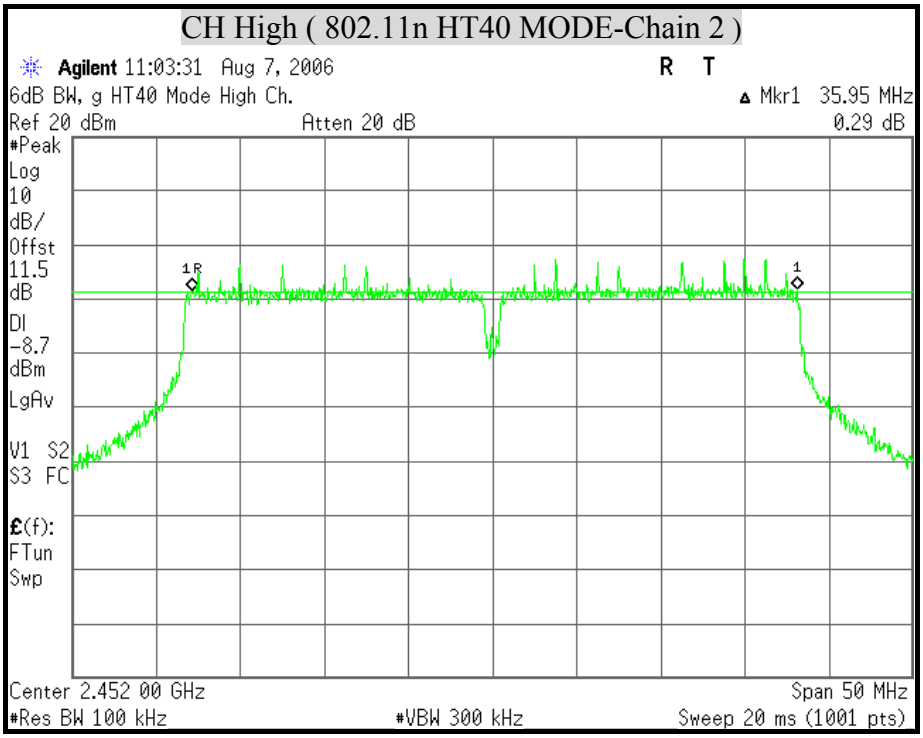
CH Low (802.11n HT40 MODE-Chain 2)



CH Mid (802.11n HT40 MODE-Chain 2)



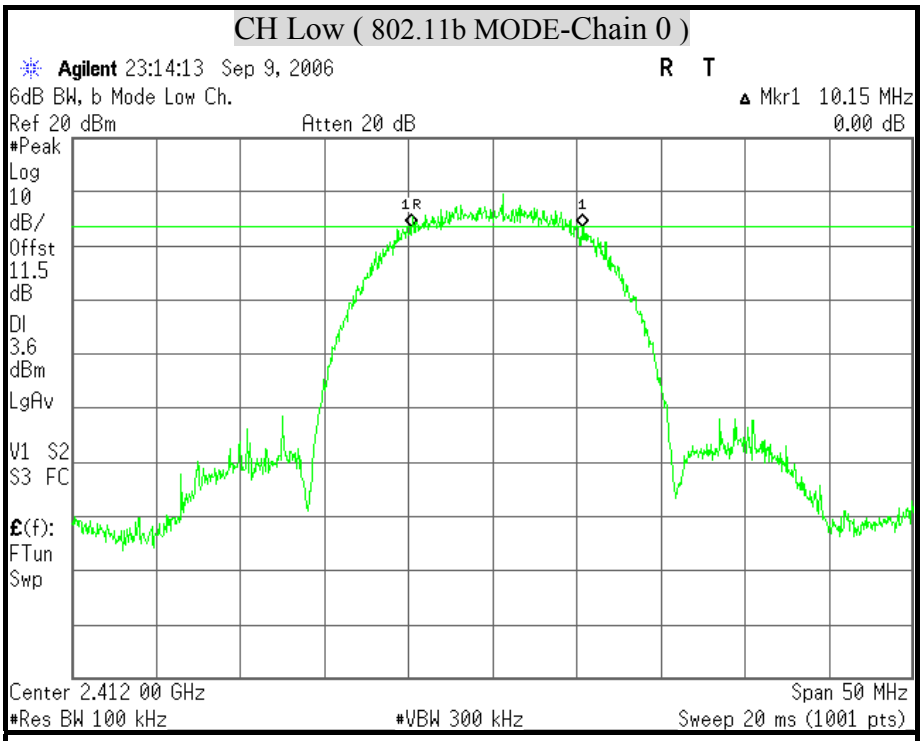
CH High (802.11n HT40 MODE-Chain 2)



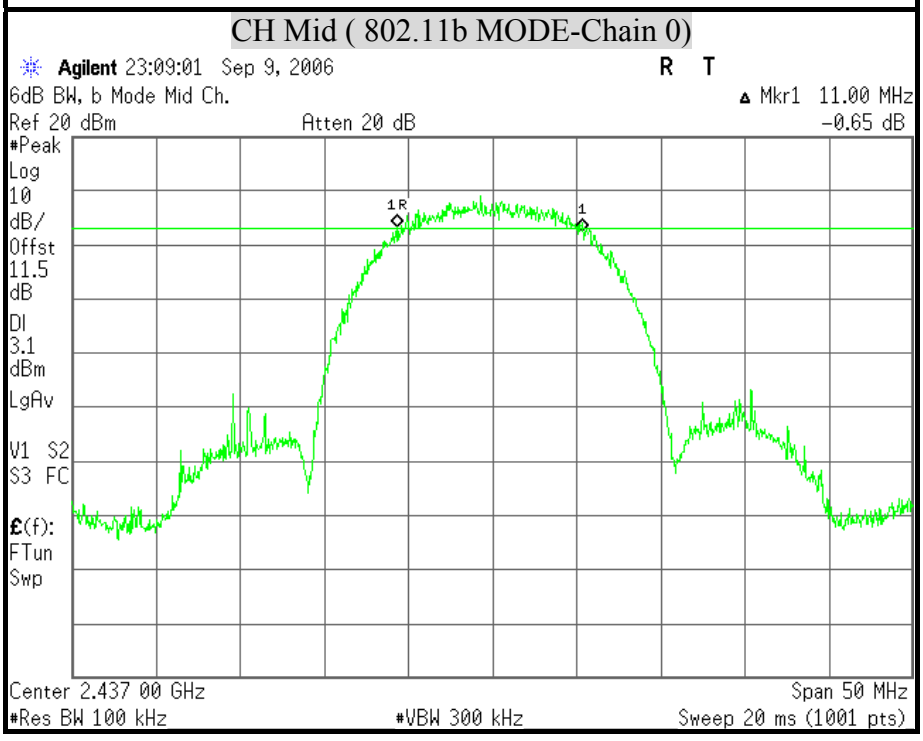
6dB BANDWIDTH (802.11b MODE)

3dBi Antenna

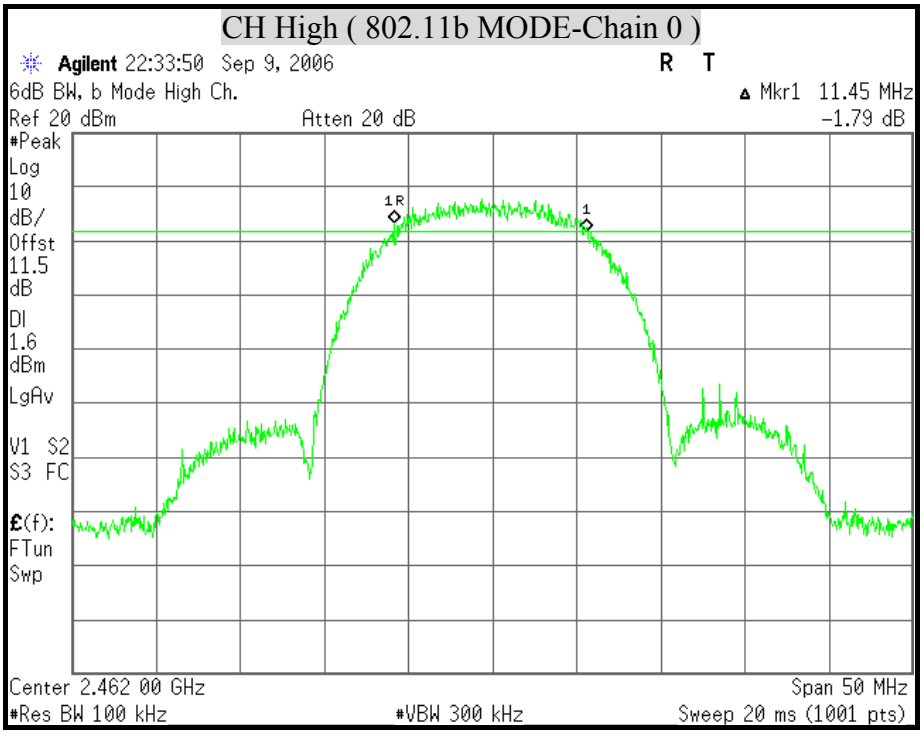
CH Low (802.11b MODE-Chain 0)



CH Mid (802.11b MODE-Chain 0)

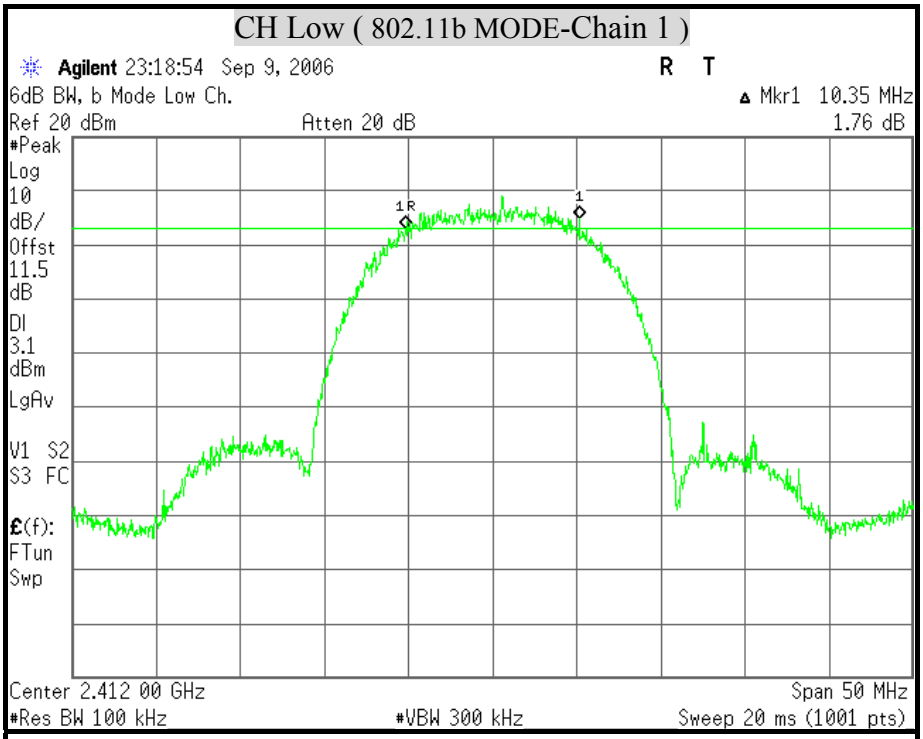


CH High (802.11b MODE-Chain 0)

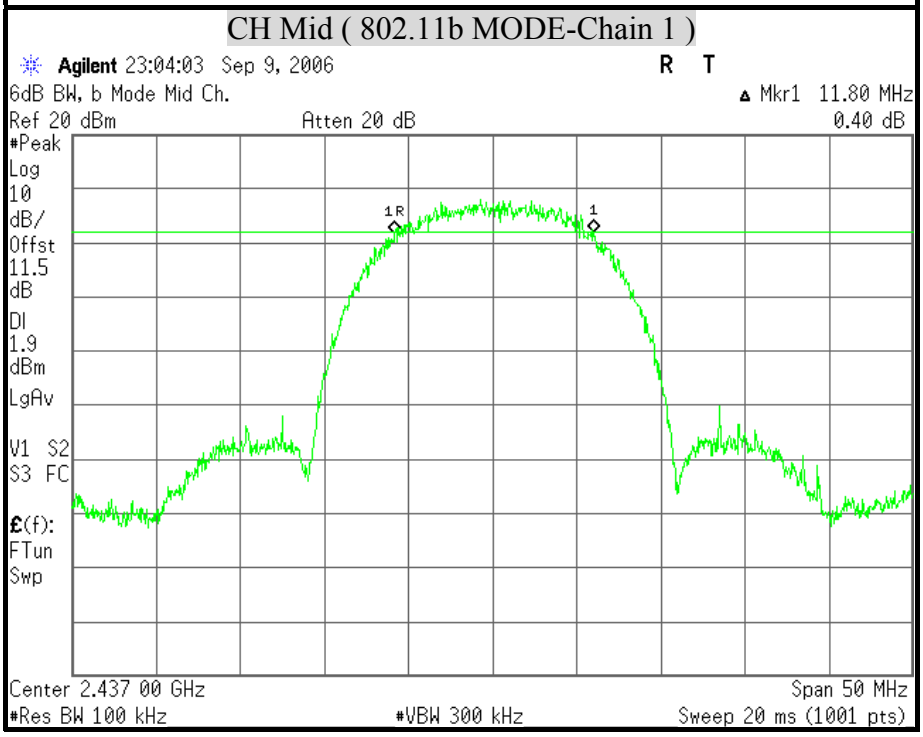


3dBi Antenna

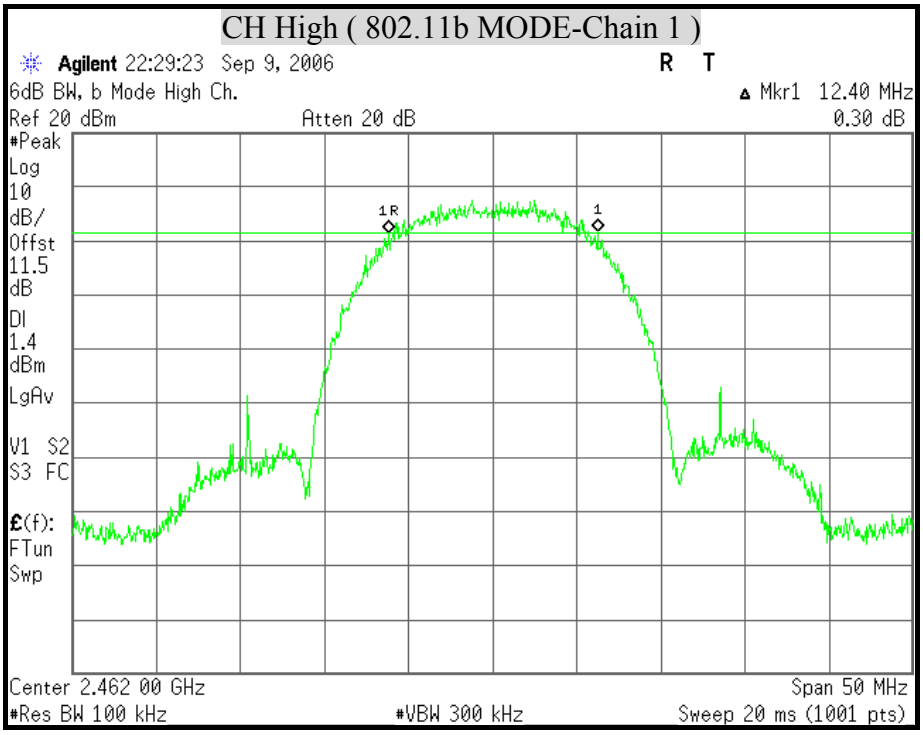
CH Low (802.11b MODE-Chain 1)



CH Mid (802.11b MODE-Chain 1)

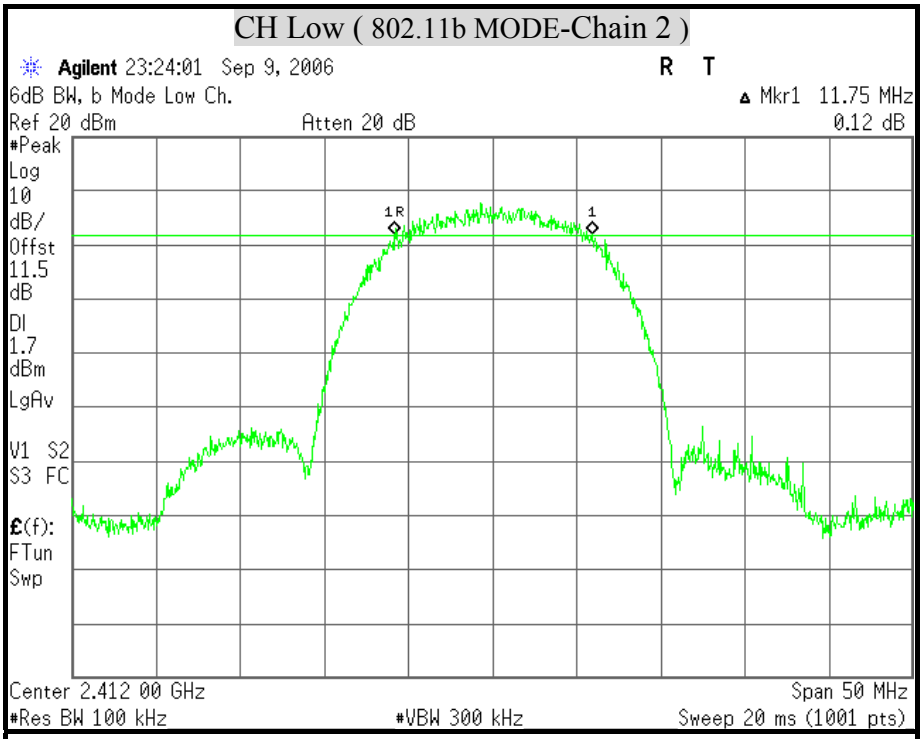


CH High (802.11b MODE-Chain 1)

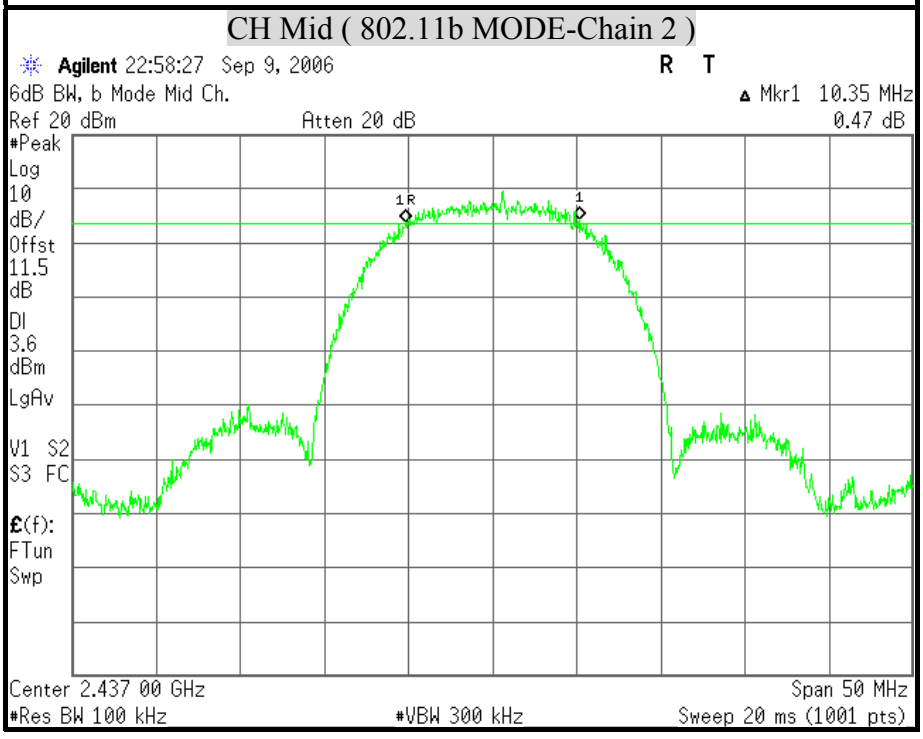


3dBi Antenna

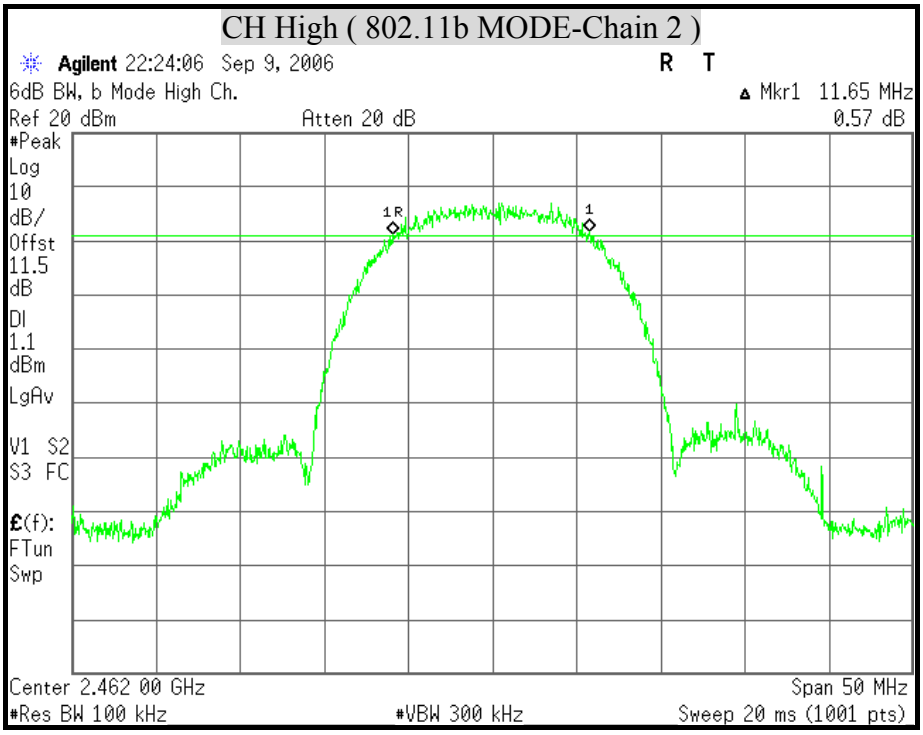
CH Low (802.11b MODE-Chain 2)



CH Mid (802.11b MODE-Chain 2)



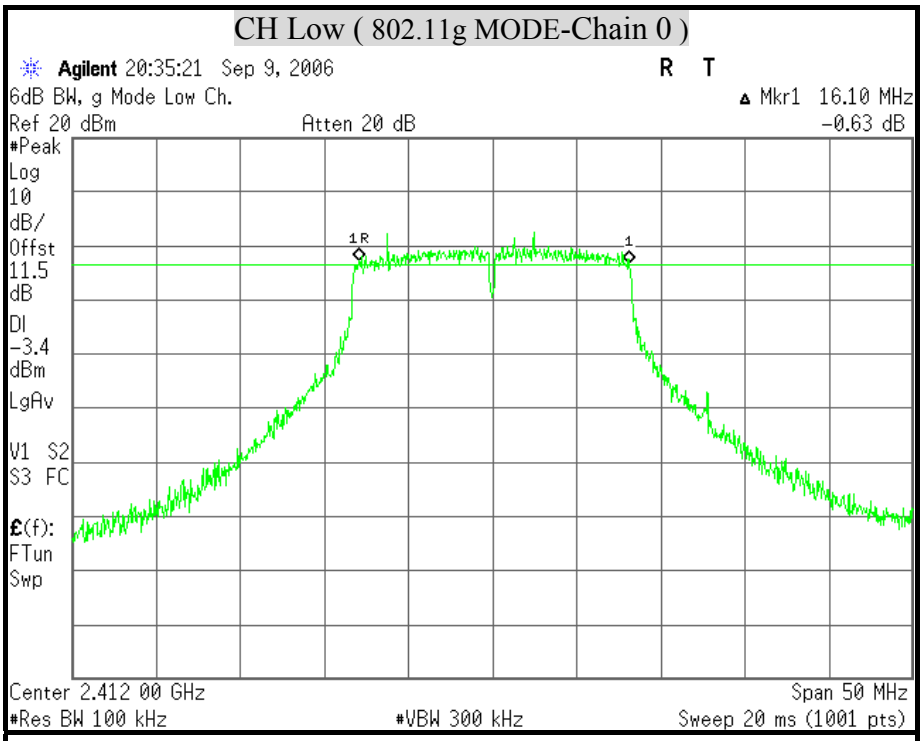
CH High (802.11b MODE-Chain 2)



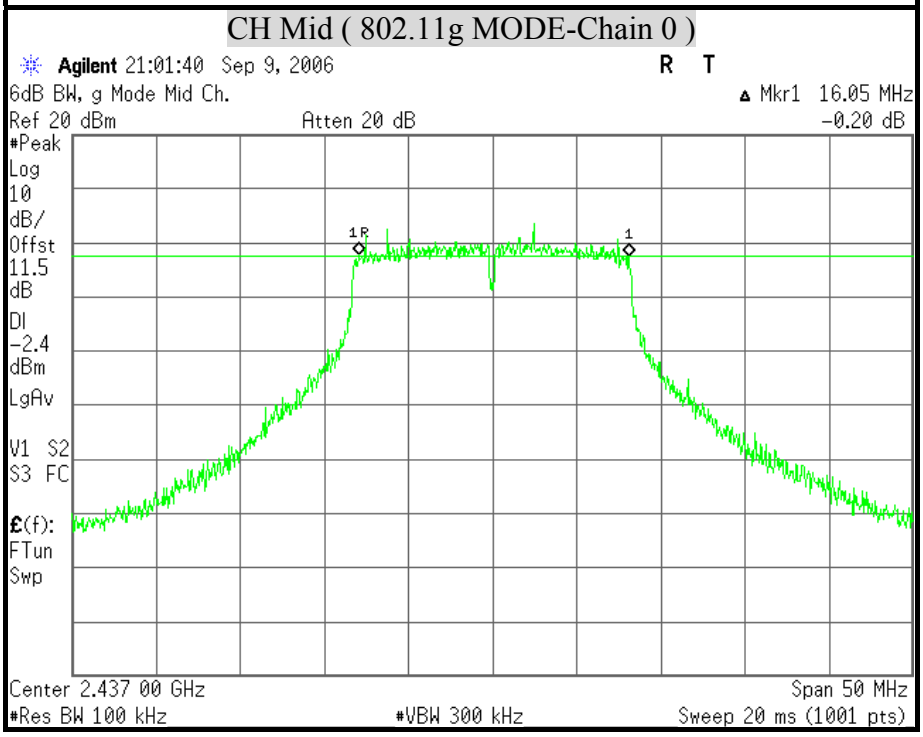
6dB BANDWIDTH (802.11g MODE)

3dBi Antenna

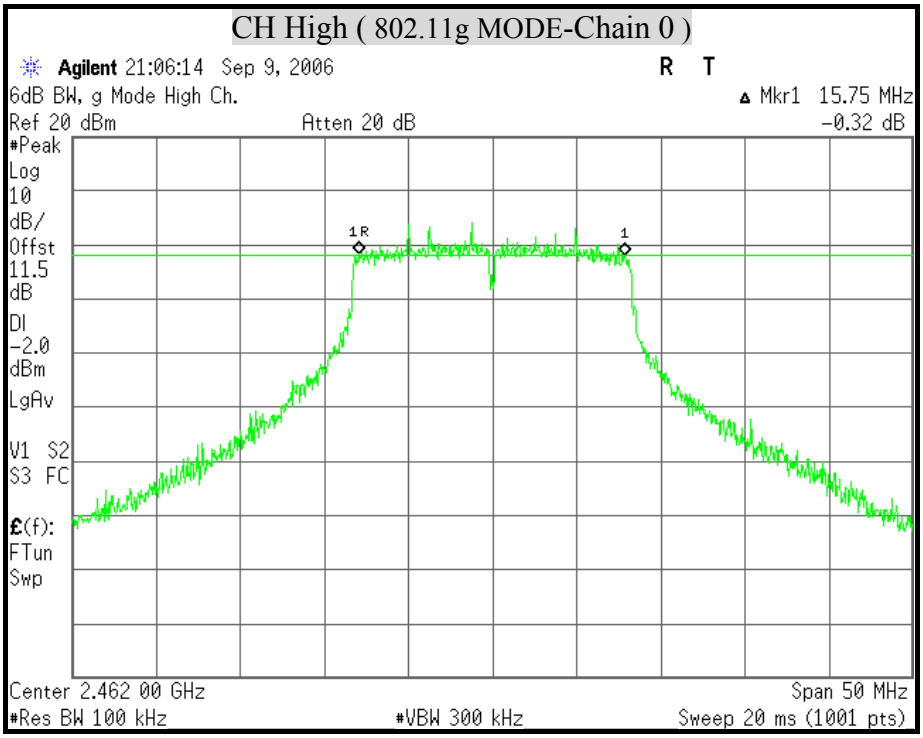
CH Low (802.11g MODE-Chain 0)



CH Mid (802.11g MODE-Chain 0)

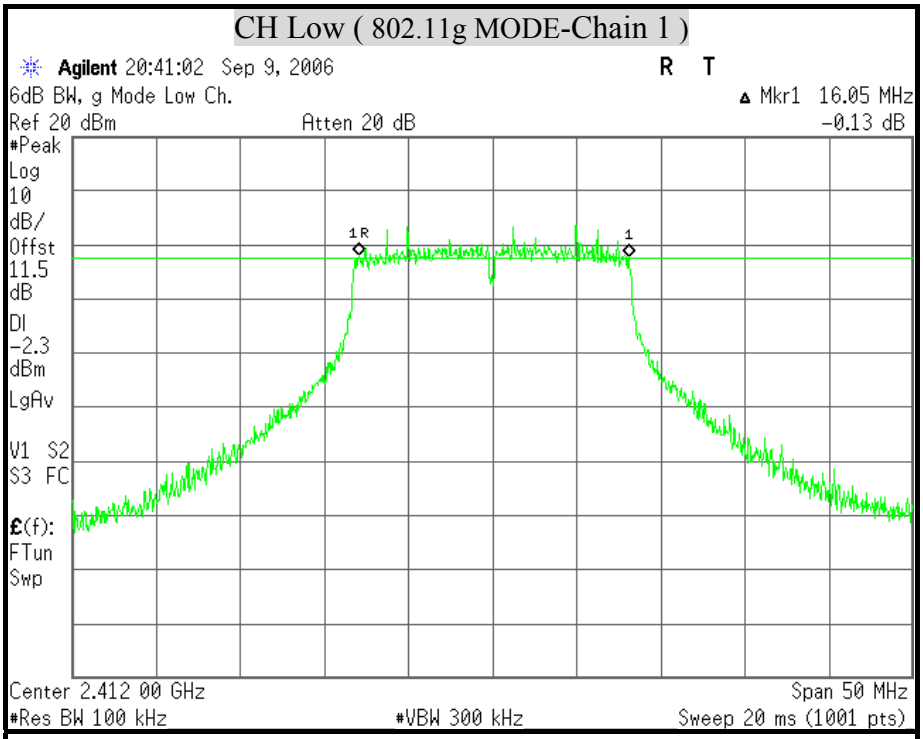


CH High (802.11g MODE-Chain 0)

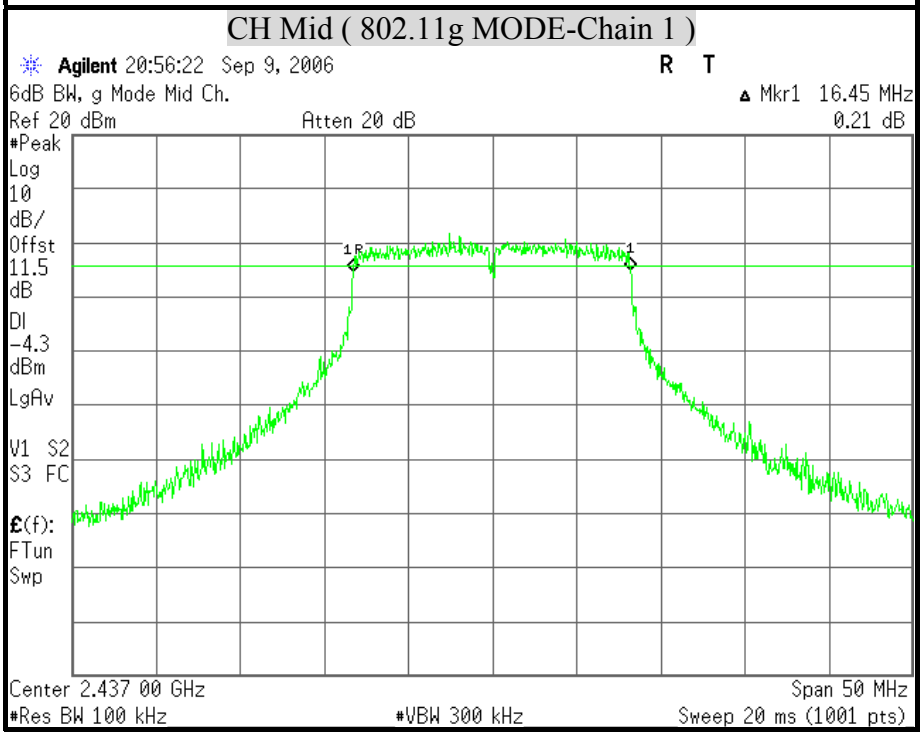


3dBi Antenna

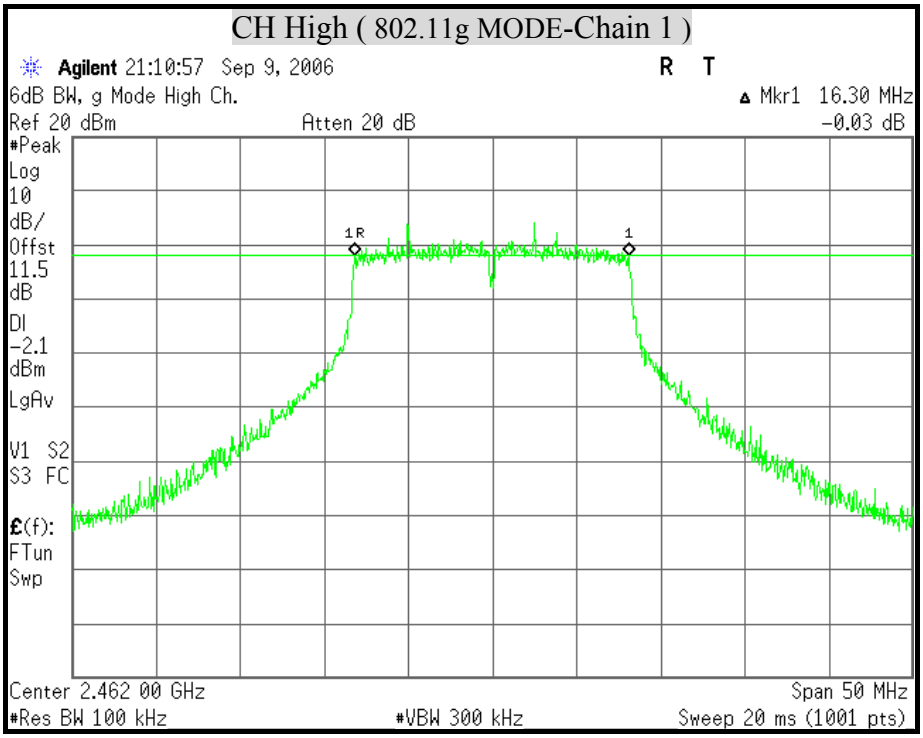
CH Low (802.11g MODE-Chain 1)



CH Mid (802.11g MODE-Chain 1)

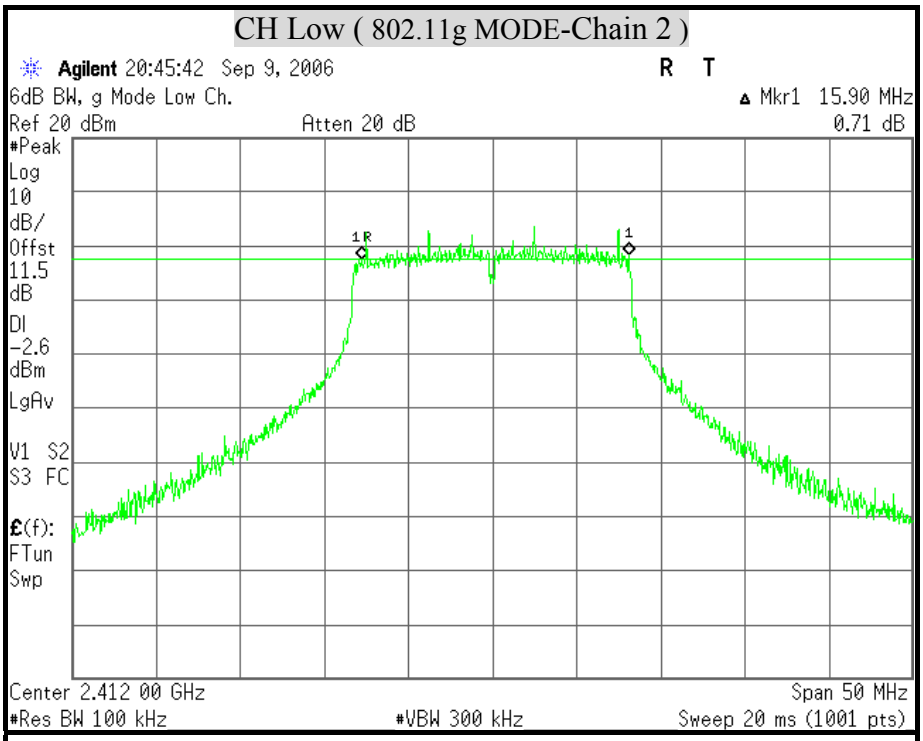


CH High (802.11g MODE-Chain 1)

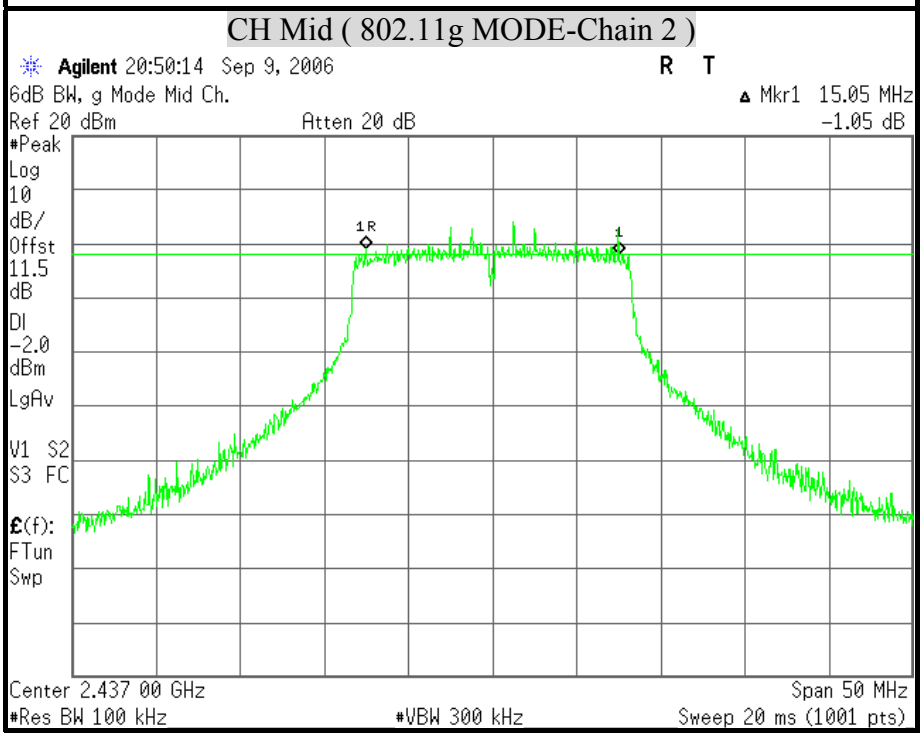


3dBi Antenna

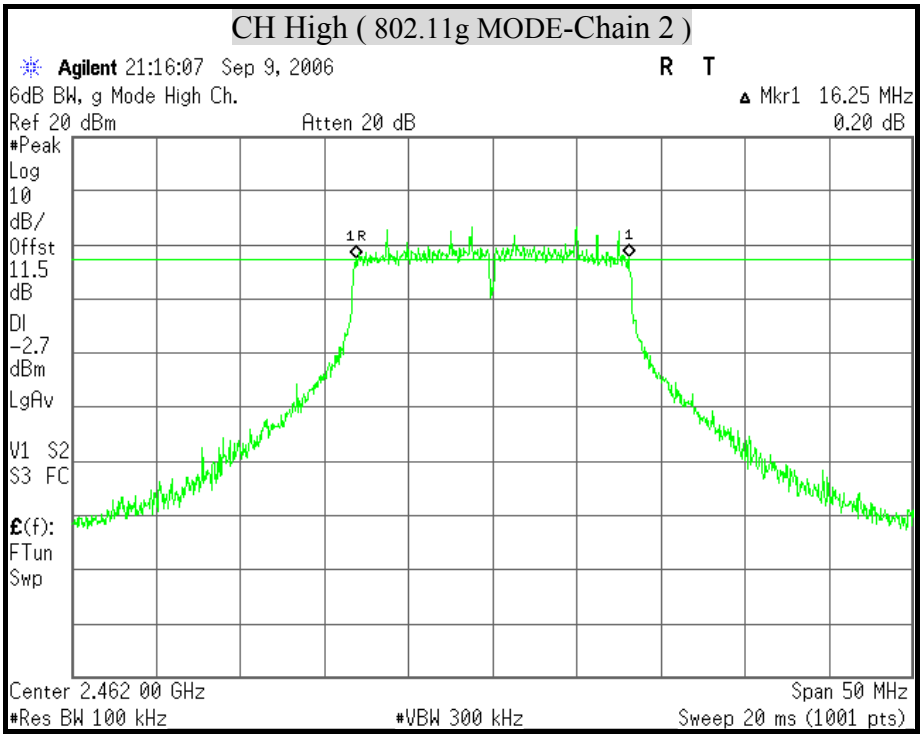
CH Low (802.11g MODE-Chain 2)



CH Mid (802.11g MODE-Chain 2)



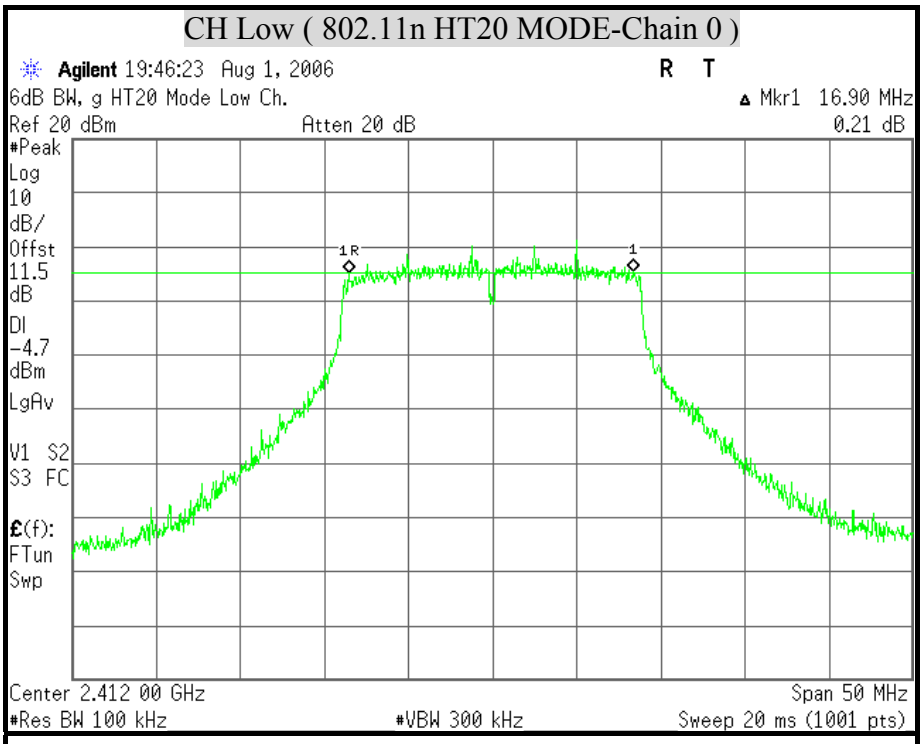
CH High (802.11g MODE-Chain 2)



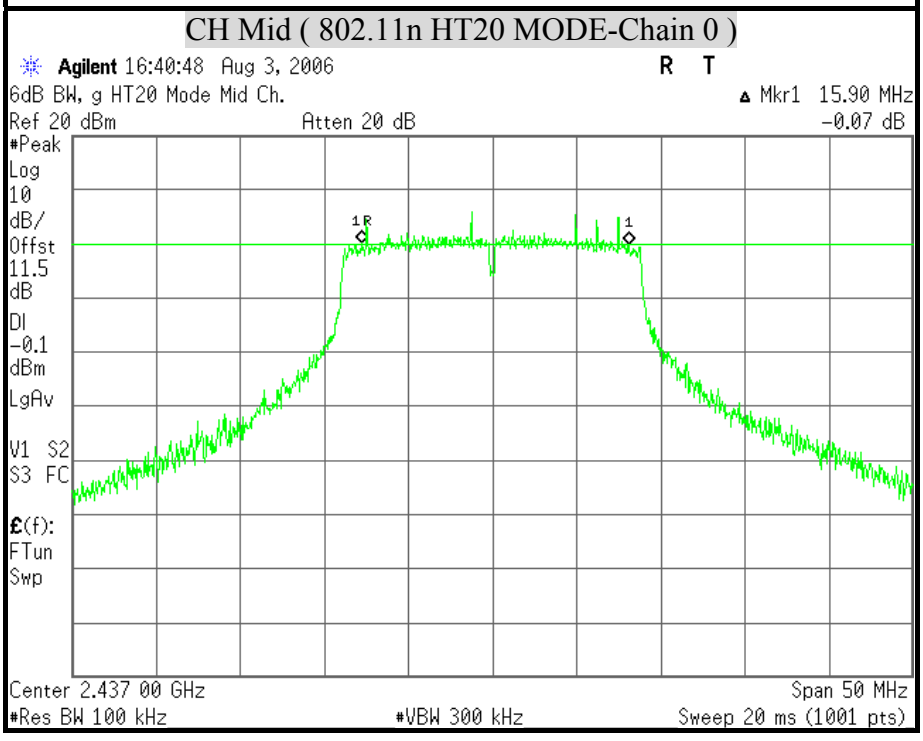
6dB BANDWIDTH (802.11n HT20 MODE)

3dBi Antenna

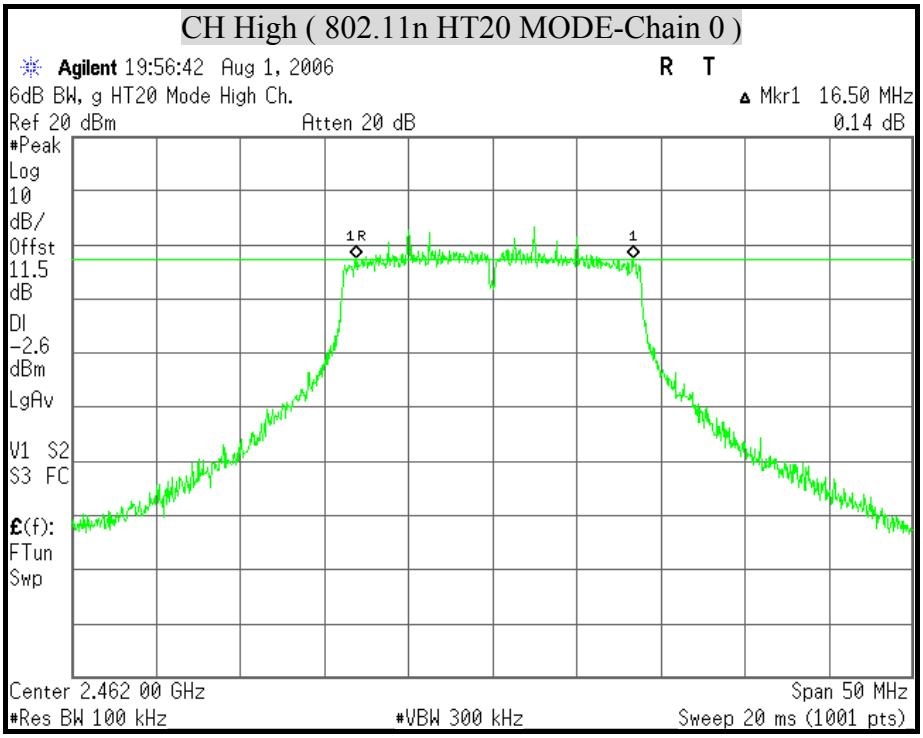
CH Low (802.11n HT20 MODE-Chain 0)



CH Mid (802.11n HT20 MODE-Chain 0)

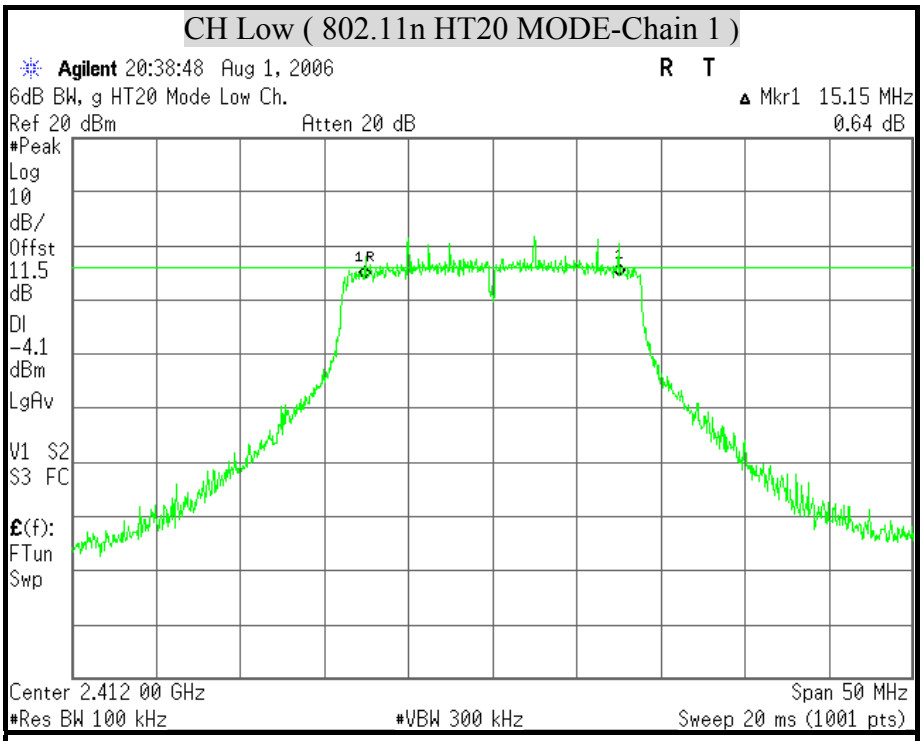


CH High (802.11n HT20 MODE-Chain 0)

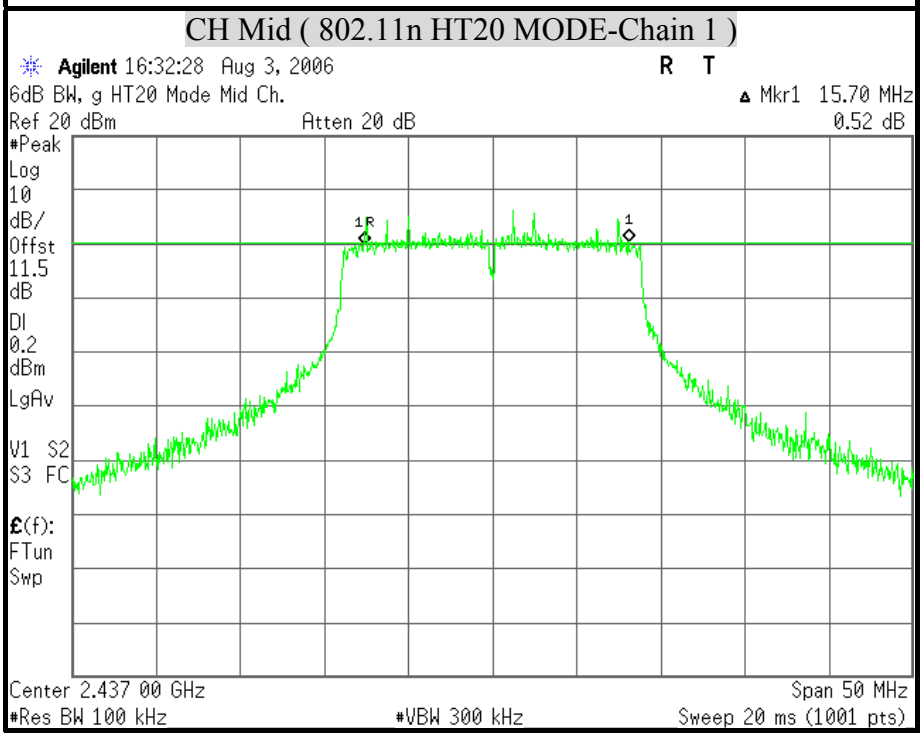


3dBi Antenna

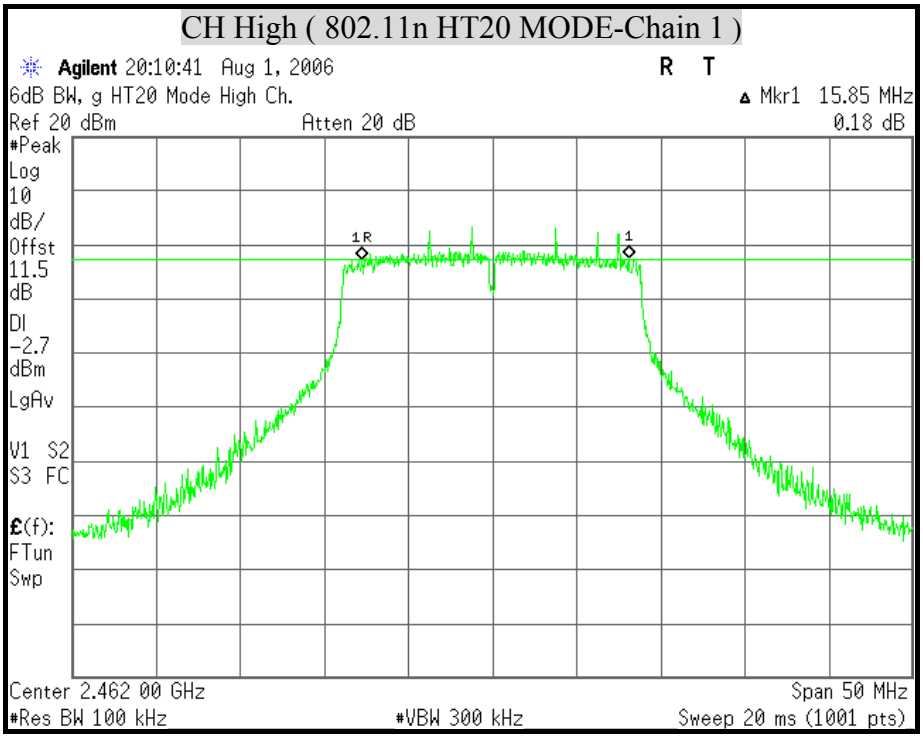
CH Low (802.11n HT20 MODE-Chain 1)



CH Mid (802.11n HT20 MODE-Chain 1)

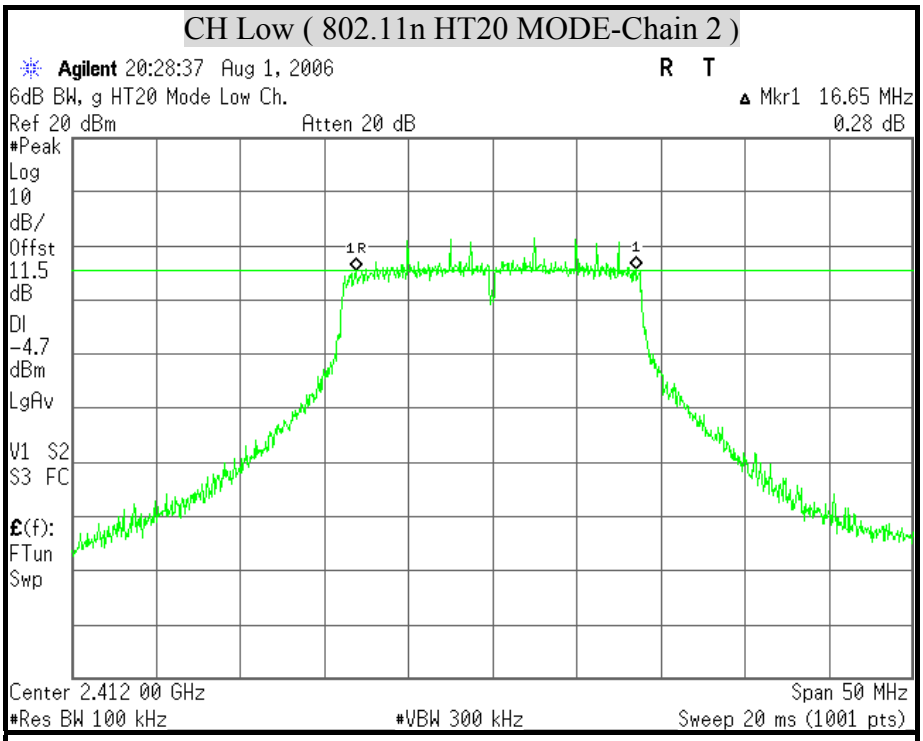


CH High (802.11n HT20 MODE-Chain 1)

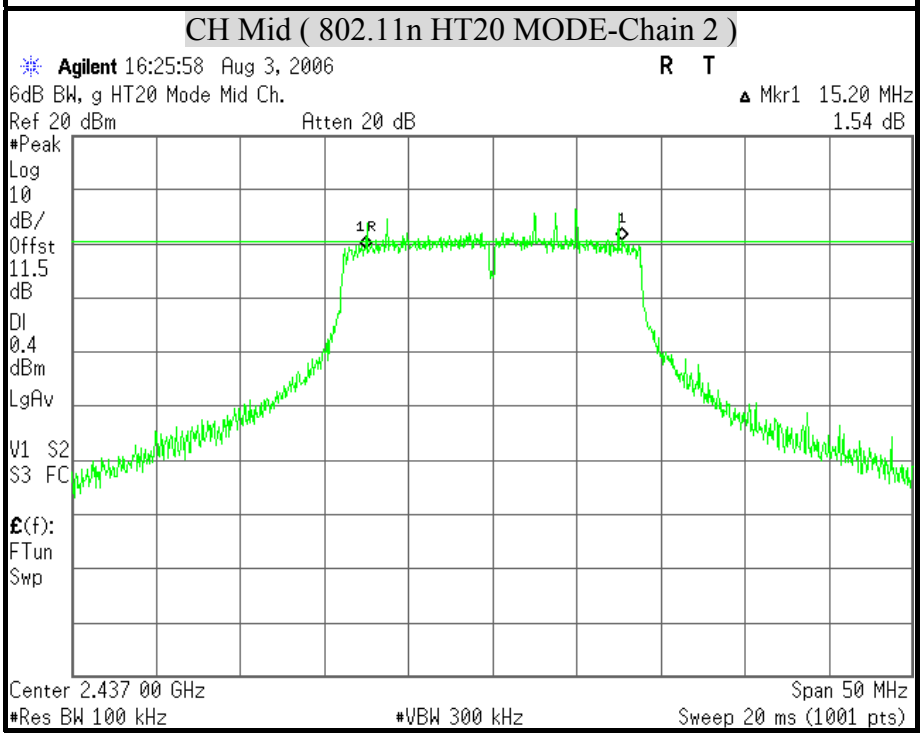


3dBi Antenna

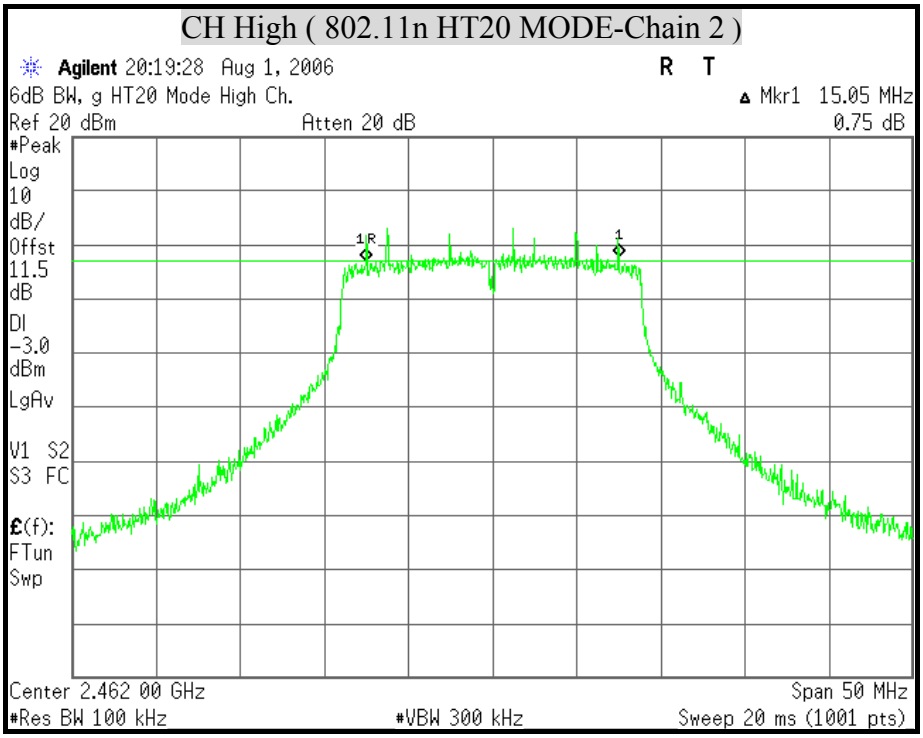
CH Low (802.11n HT20 MODE-Chain 2)



CH Mid (802.11n HT20 MODE-Chain 2)



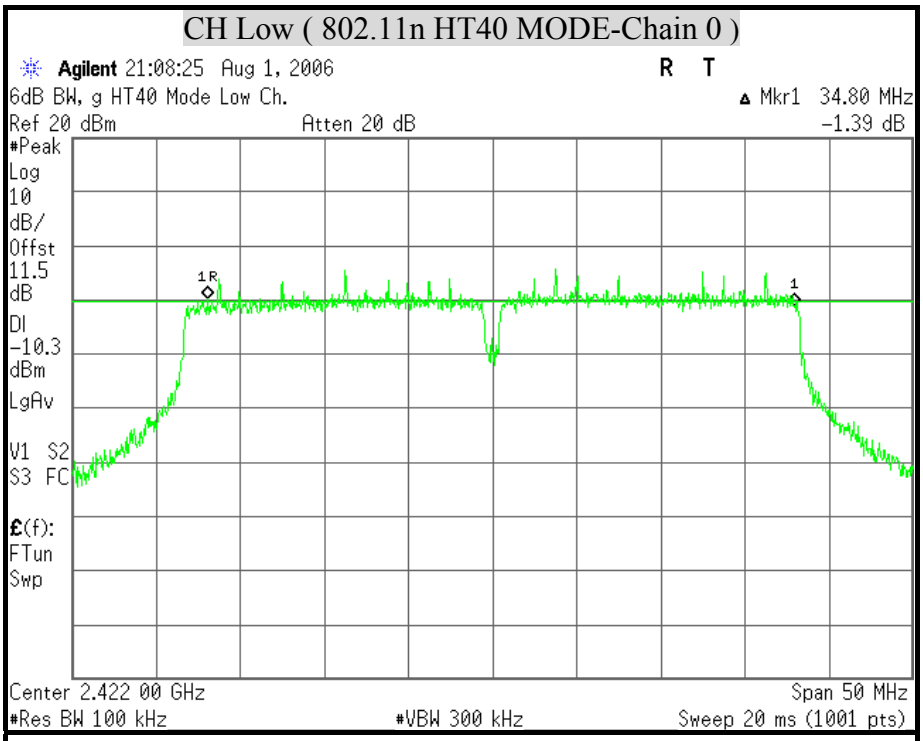
CH High (802.11n HT20 MODE-Chain 2)



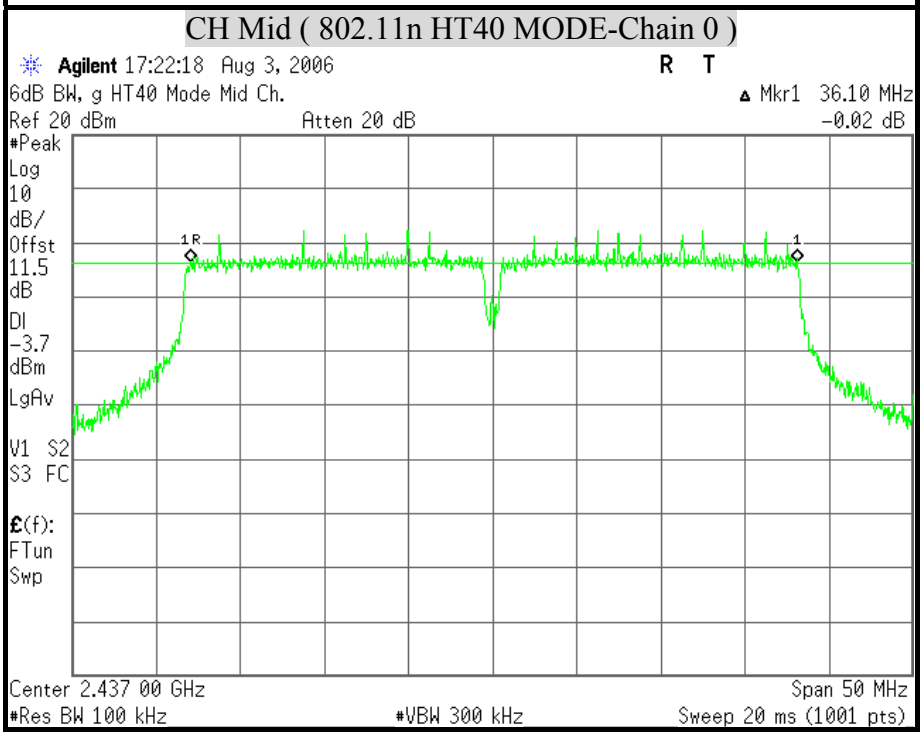
6dB BANDWIDTH (802.11n HT40 MODE)

3dBi Antenna

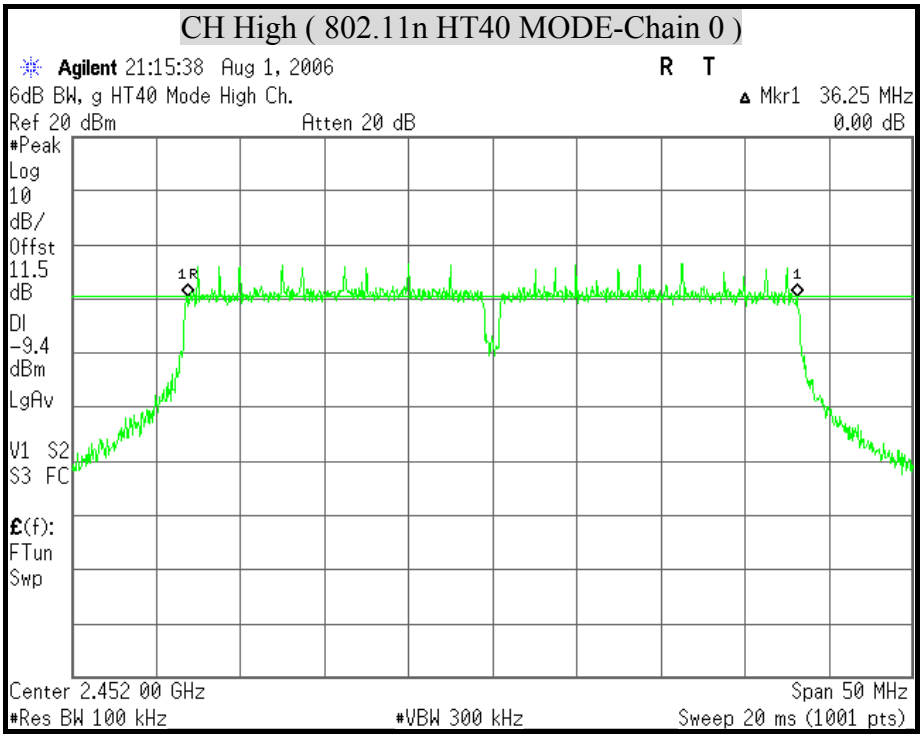
CH Low (802.11n HT40 MODE-Chain 0)



CH Mid (802.11n HT40 MODE-Chain 0)

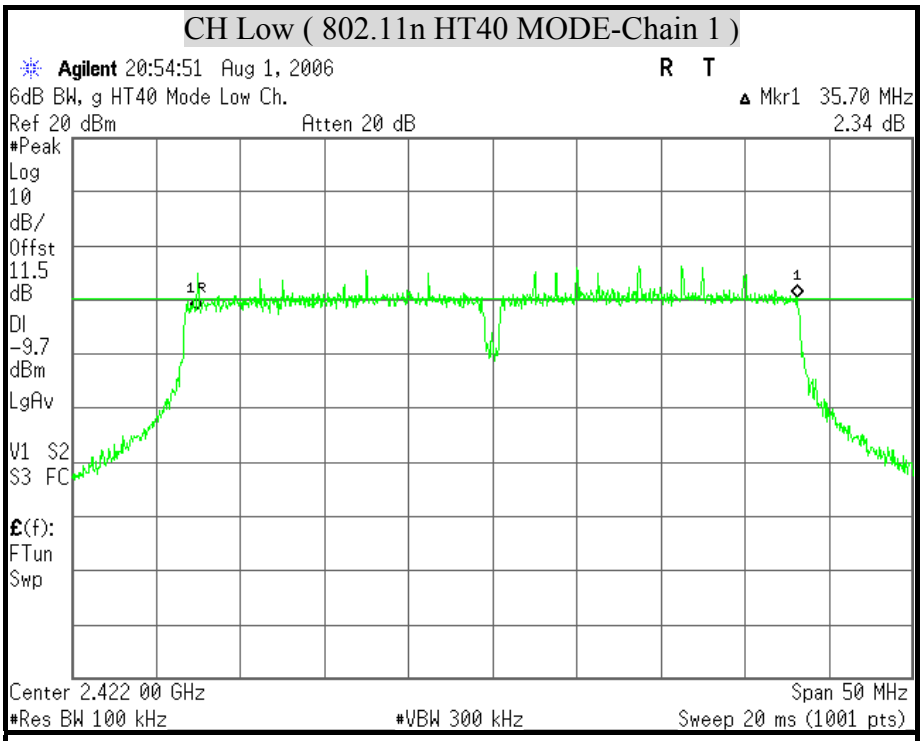


CH High (802.11n HT40 MODE-Chain 0)

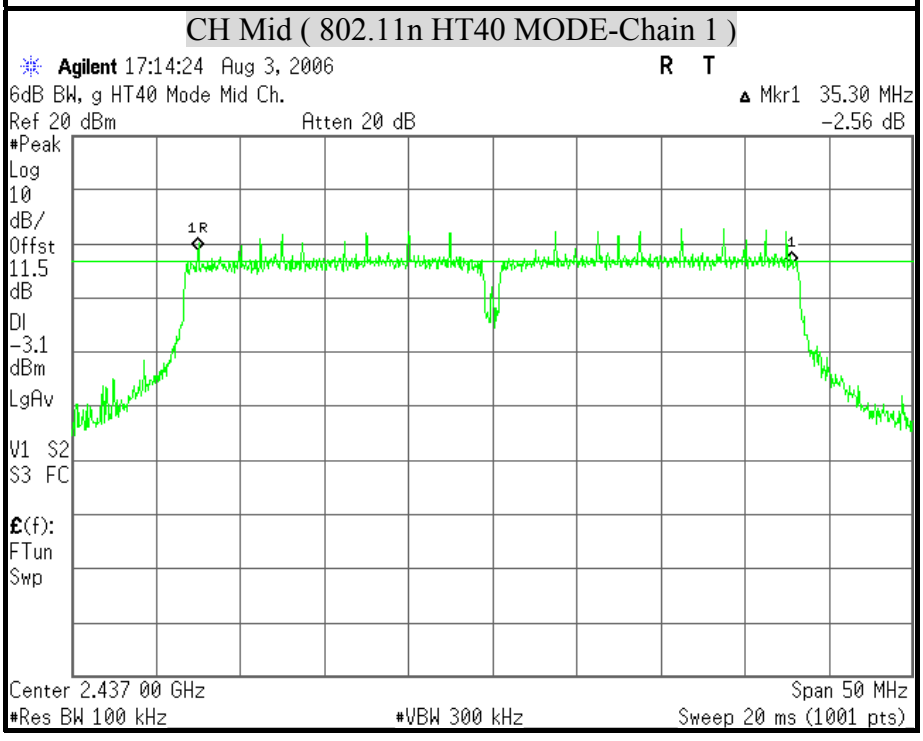


3dBi Antenna

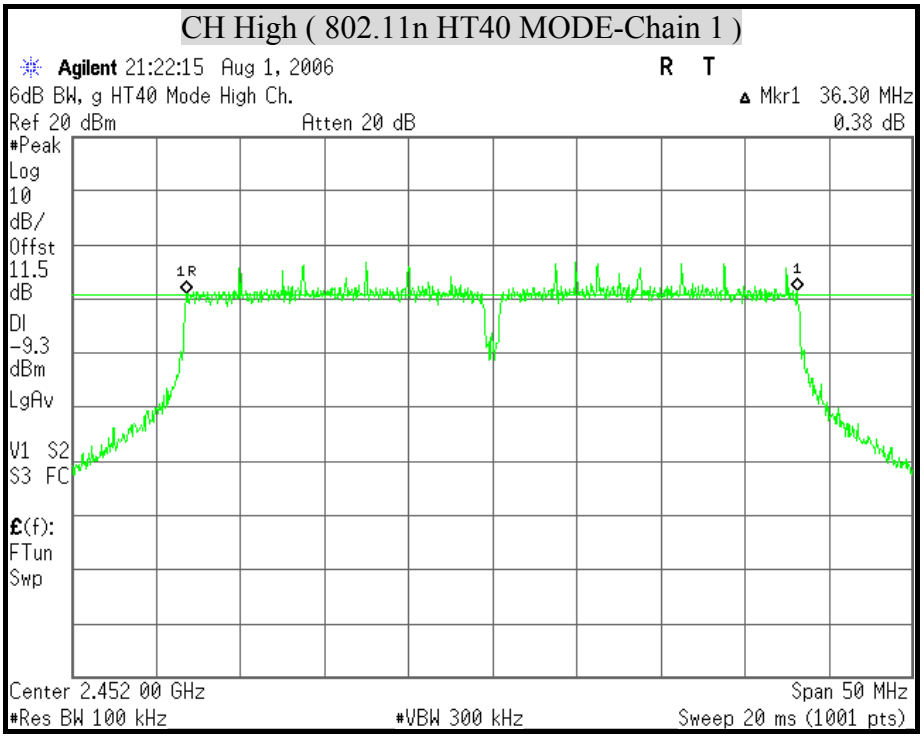
CH Low (802.11n HT40 MODE-Chain 1)



CH Mid (802.11n HT40 MODE-Chain 1)

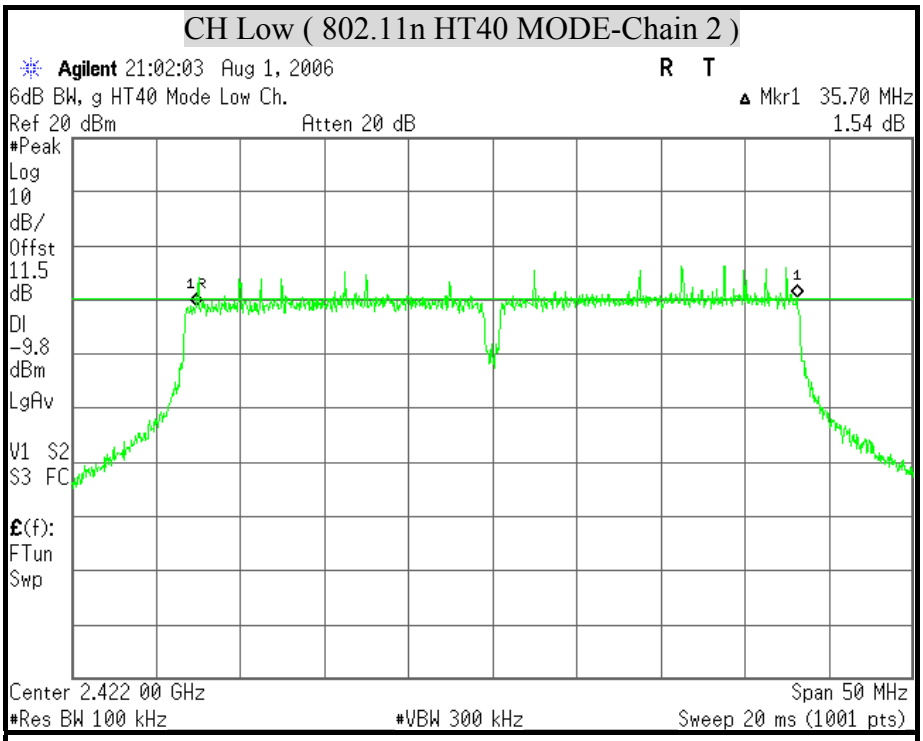


CH High (802.11n HT40 MODE-Chain 1)

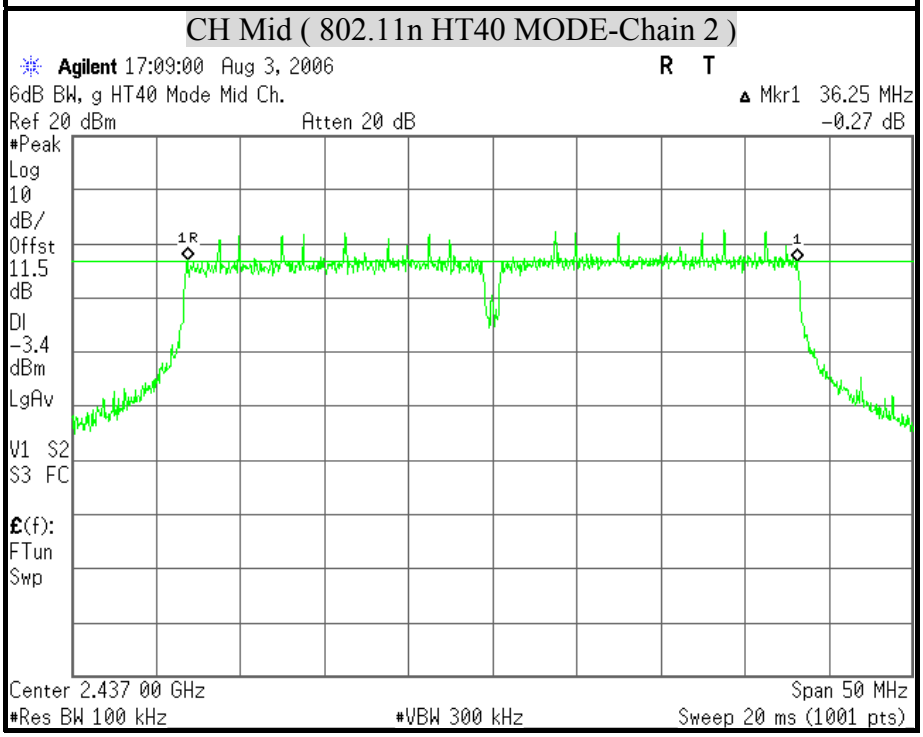


3dBi Antenna

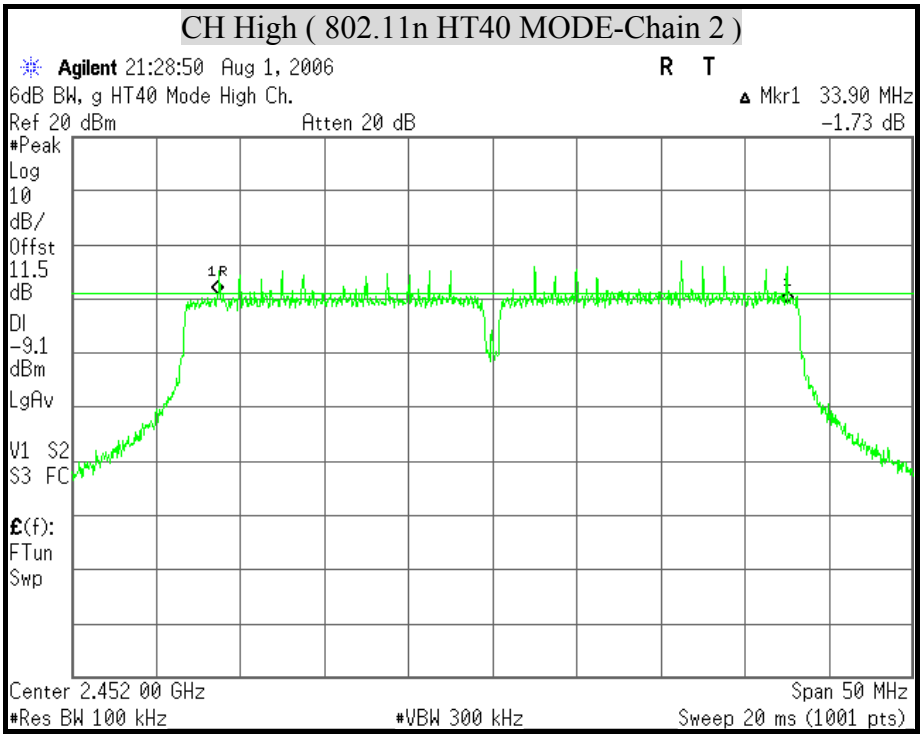
CH Low (802.11n HT40 MODE-Chain 2)



CH Mid (802.11n HT40 MODE-Chain 2)



CH High (802.11n HT40 MODE-Chain 2)



8.2 99% BANDWIDTH

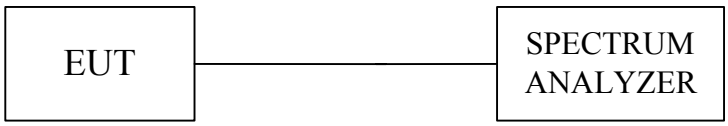
LIMIT

None; for reporting purposes only.

TEST EQUIPMENTS

Description & Manufacturer	Model No.	Serial No.	Date of Calibration
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	September 24, 2005
AGILENT SPECTRUM ANALYZER	E4446A	MY433601.32	March 22 , 2006

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

For Dipole 2dBi Antenna (1):

IEEE 802.11b mode (Three TX)

Channel	Channel Frequency (MHz)	99% Occupied power bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
Low	2412	15.09	15.17	15.12
Middle	2437	15.09	15.14	15.14
High	2462	15.07	15.09	15.16

IEEE 802.11g mode (Three TX)

Channel	Channel Frequency (MHz)	99% Occupied power bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
Low	2412	16.58	16.54	16.53
Middle	2437	16.59	16.53	16.53
High	2462	16.58	16.53	16.52

IEEE 802.11n HT20 mode (Three TX)

Channel	Channel Frequency (MHz)	99% Occupied power bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
Low	2412	17.79	17.76	17.73
Middle	2437	17.79	17.76	17.74
High	2462	17.78	17.75	17.73

IEEE 802.11n HT40 mode (Three TX)

Channel	Channel Frequency (MHz)	99% Occupied power bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
Low	2422	36.64	36.51	36.49
Middle	2437	36.55	36.51	36.45
High	2452	36.59	36.49	36.43

For Dipole 3dBi Antenna (2):

IEEE 802.11b mode (Three TX)

Channel	Channel Frequency (MHz)	99% Occupied power bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
Low	2412	15.09	15.13	15.15
Middle	2437	15.09	15.14	15.14
High	2462	15.07	15.09	15.16

IEEE 802.11g mode (Three TX)

Channel	Channel Frequency (MHz)	99% Occupied power bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
Low	2412	16.58	16.54	16.52
Middle	2437	16.55	16.51	16.52
High	2462	16.56	16.53	16.50

IEEE 802.11n HT20 mode (Three TX)

Channel	Channel Frequency (MHz)	99% Occupied power bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
Low	2412	17.77	17.74	17.71
Middle	2437	17.79	17.76	17.74
High	2462	17.78	17.74	17.68

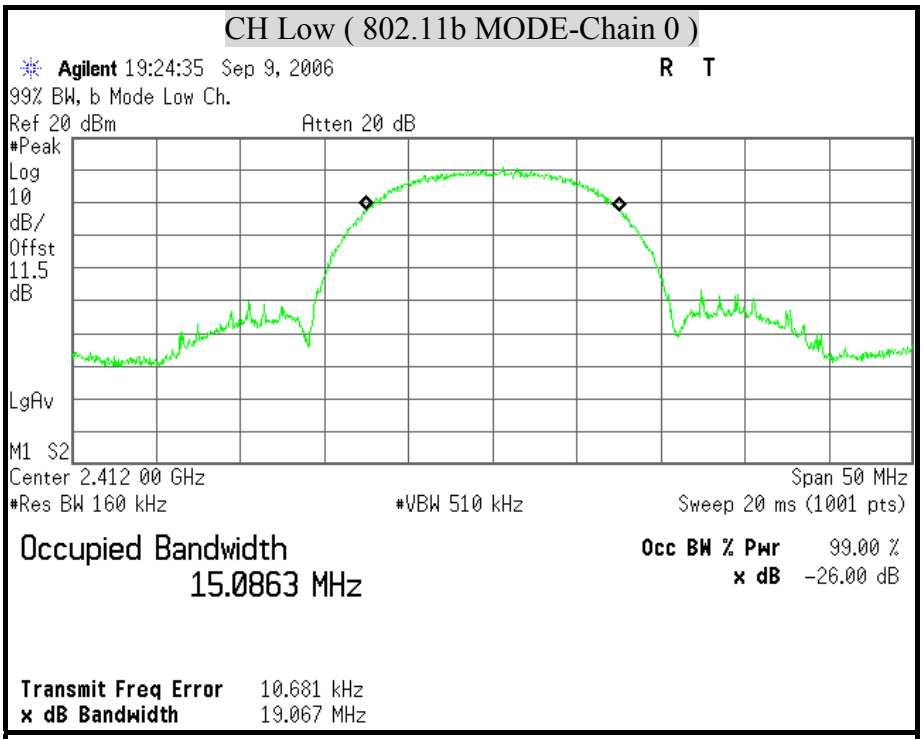
IEEE 802.11n HT40 mode (Three TX)

Channel	Channel Frequency (MHz)	99% Occupied power bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
Low	2422	36.66	36.50	36.48
Middle	2437	36.55	36.51	36.45
High	2452	36.67	36.47	36.48

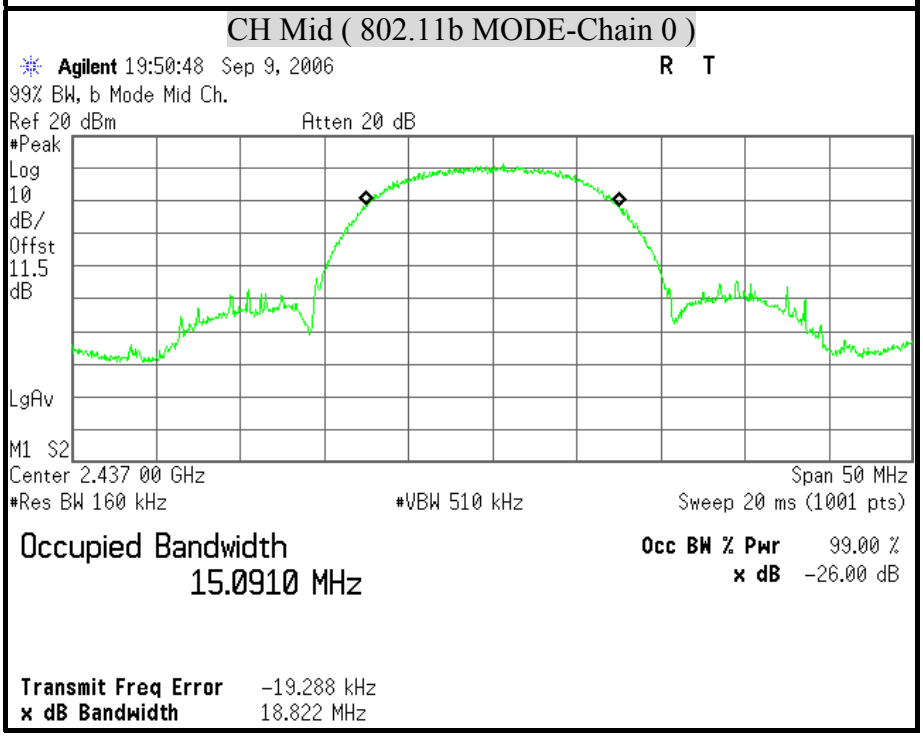
99% BANDWIDTH (802.11b MODE)

2dBi Antenna

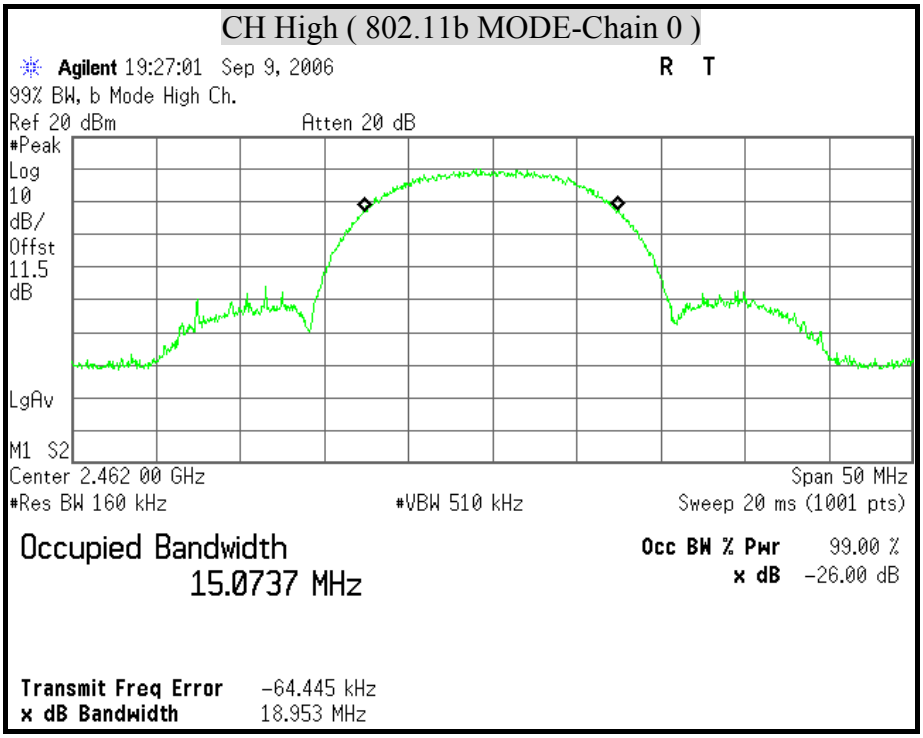
CH Low (802.11b MODE-Chain 0)



CH Mid (802.11b MODE-Chain 0)

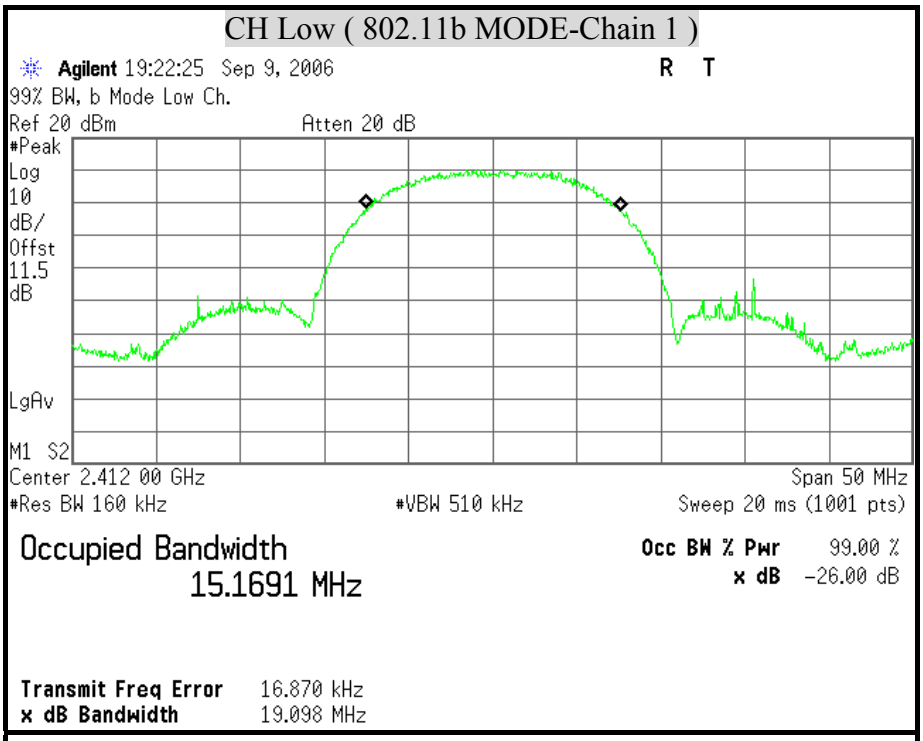


CH High (802.11b MODE-Chain 0)

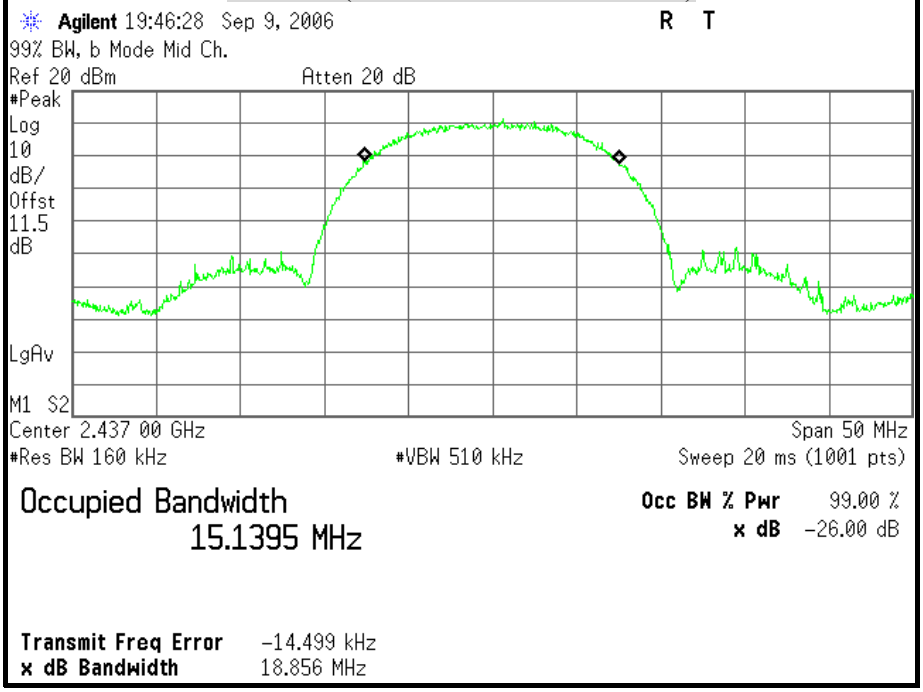


2dBi Antenna

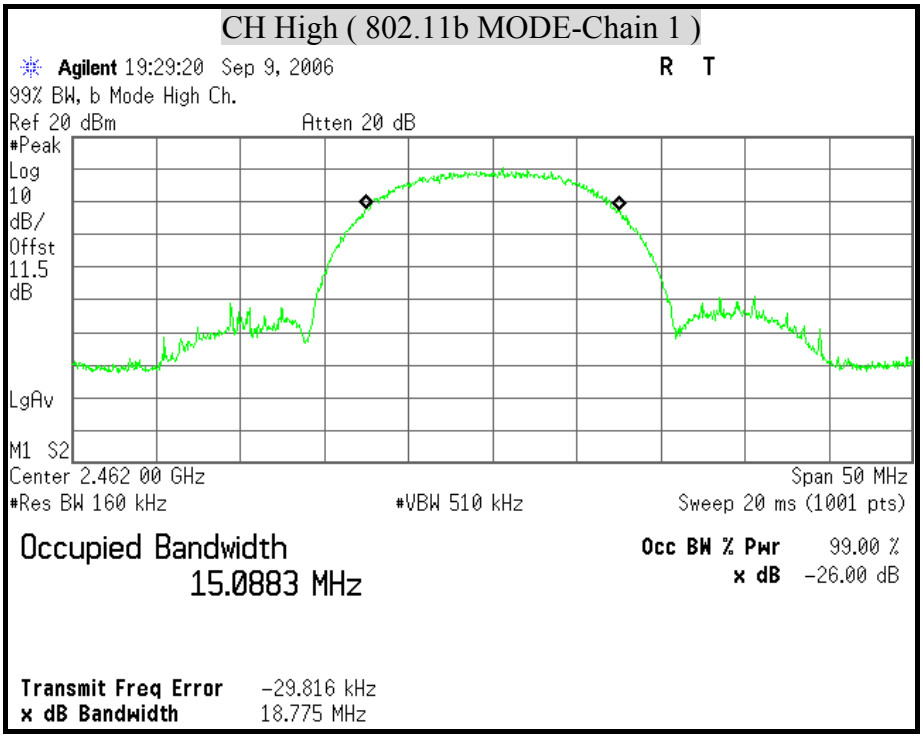
CH Low (802.11b MODE-Chain 1)



CH Mid (802.11b MODE-Chain 1)

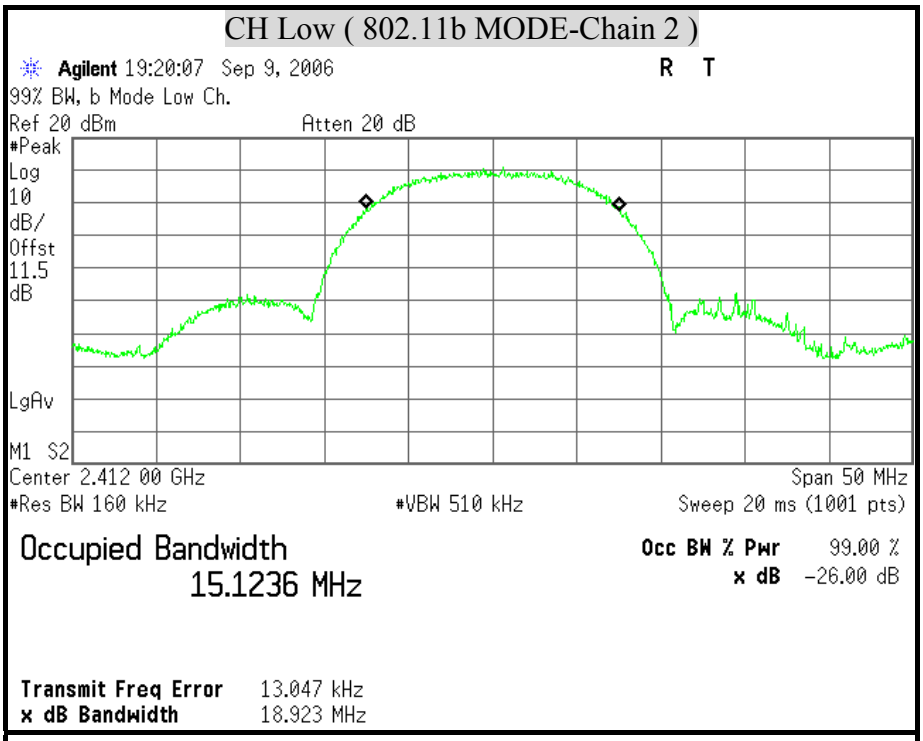


CH High (802.11b MODE-Chain 1)

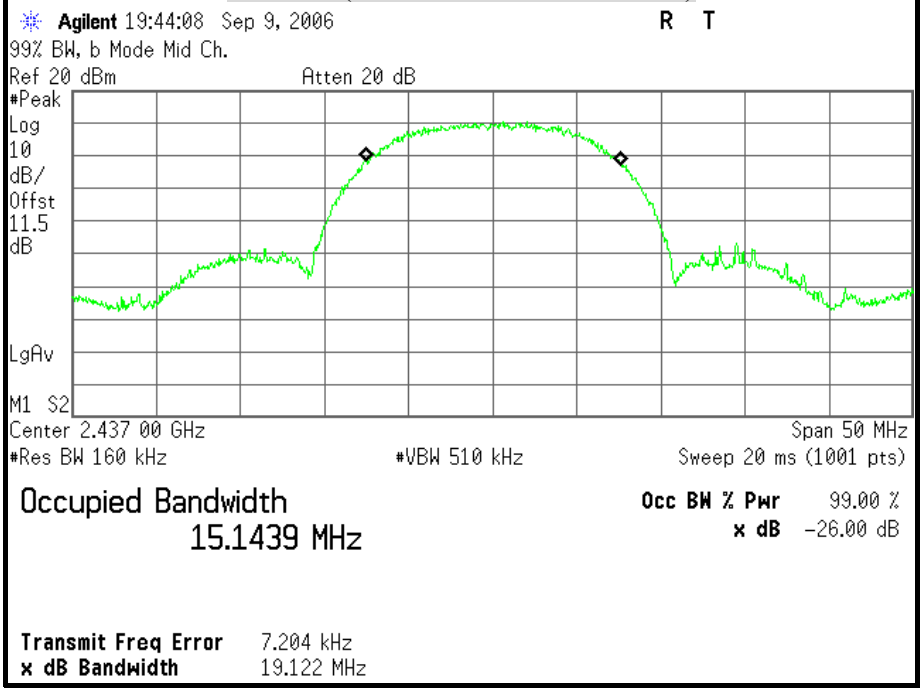


2dBi Antenna

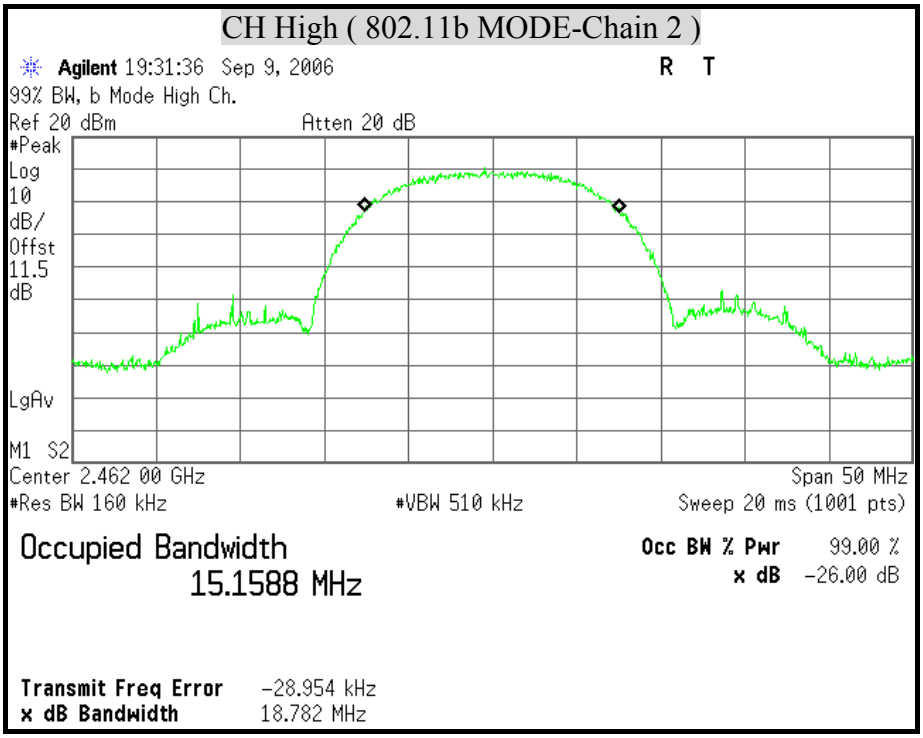
CH Low (802.11b MODE-Chain 2)



CH Mid (802.11b MODE-Chain 2)



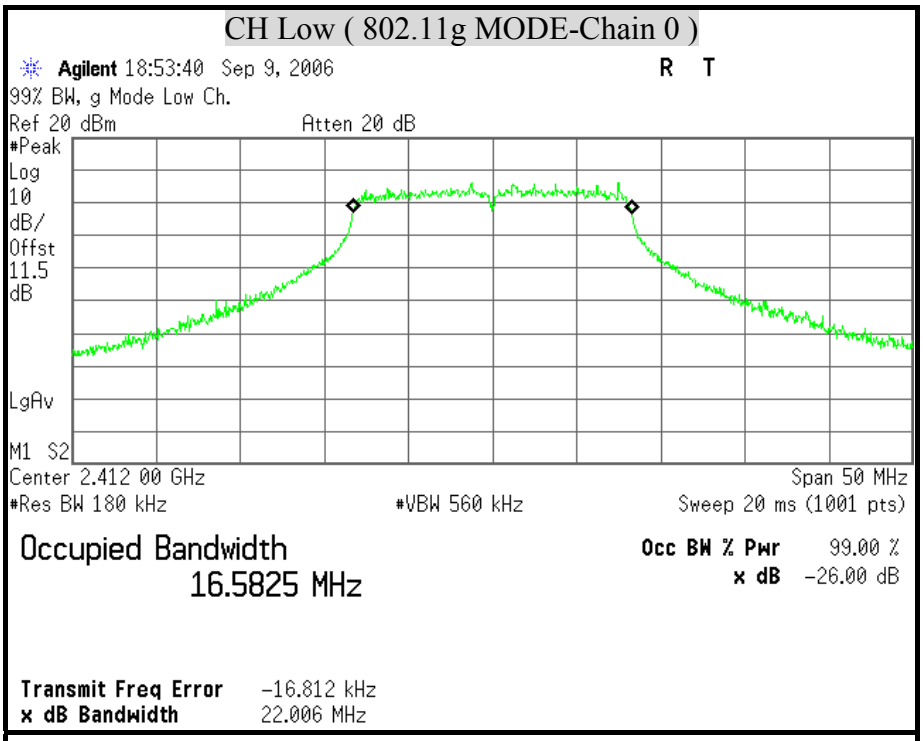
CH High (802.11b MODE-Chain 2)



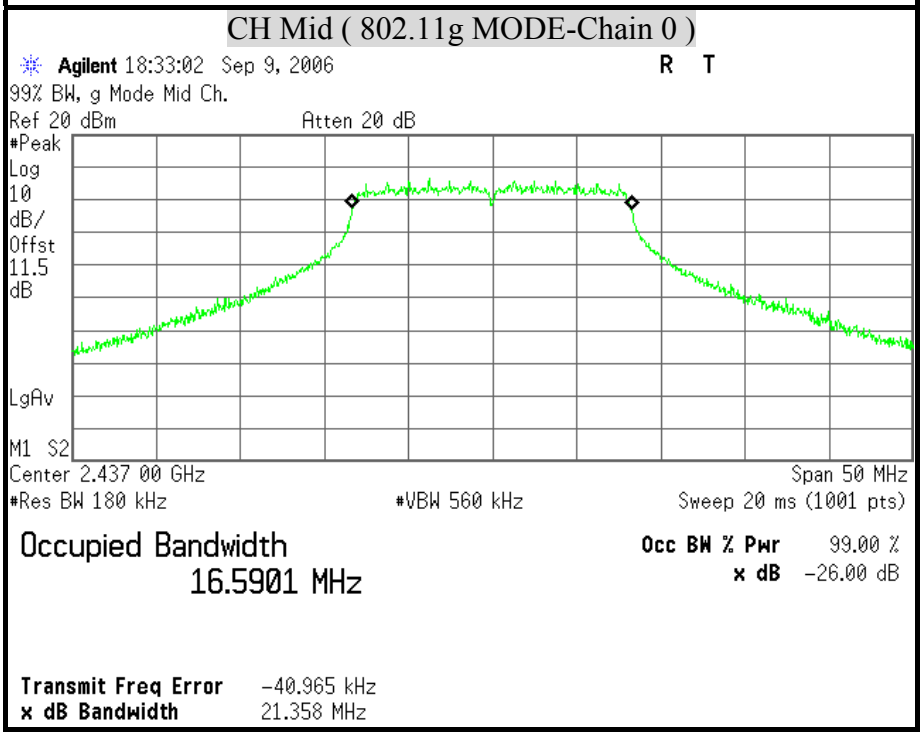
99% BANDWIDTH (802.11g MODE)

2dBi Antenna

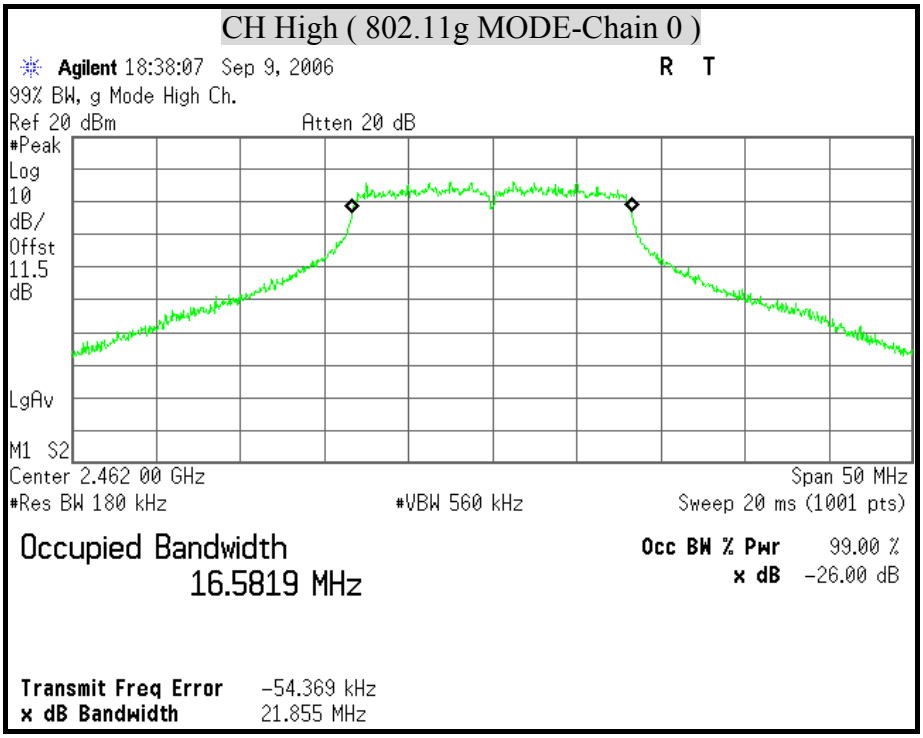
CH Low (802.11g MODE-Chain 0)



CH Mid (802.11g MODE-Chain 0)

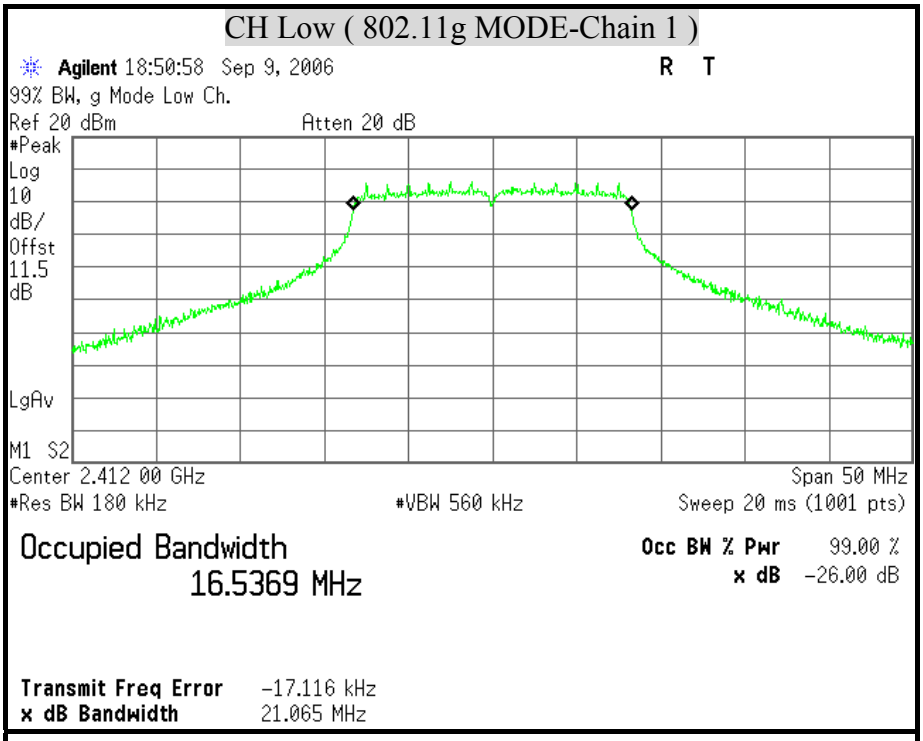


CH High (802.11g MODE-Chain 0)

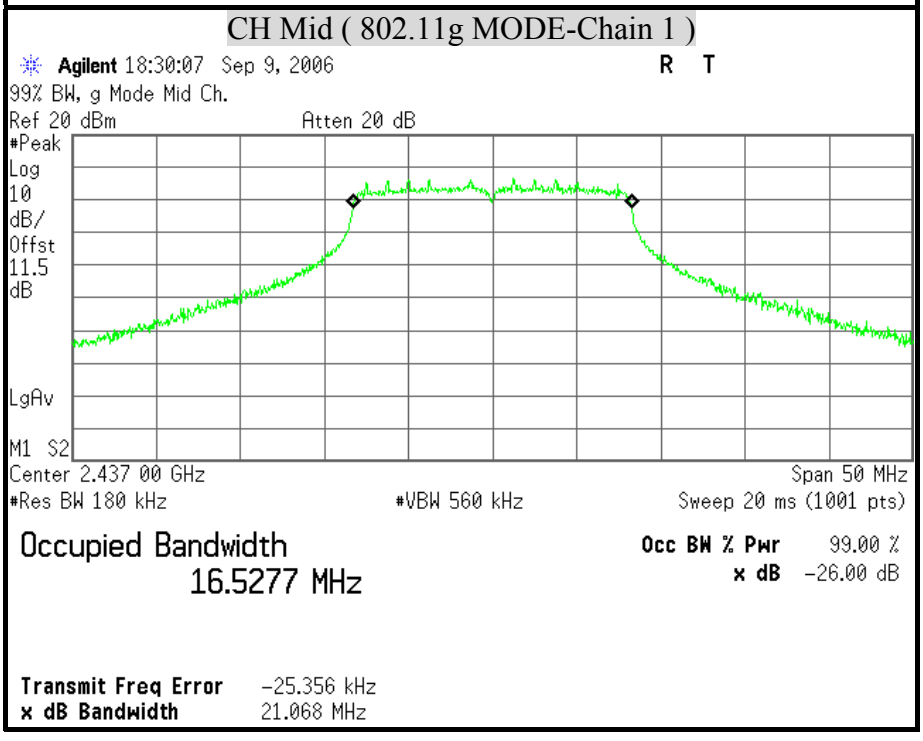


2dBi Antenna

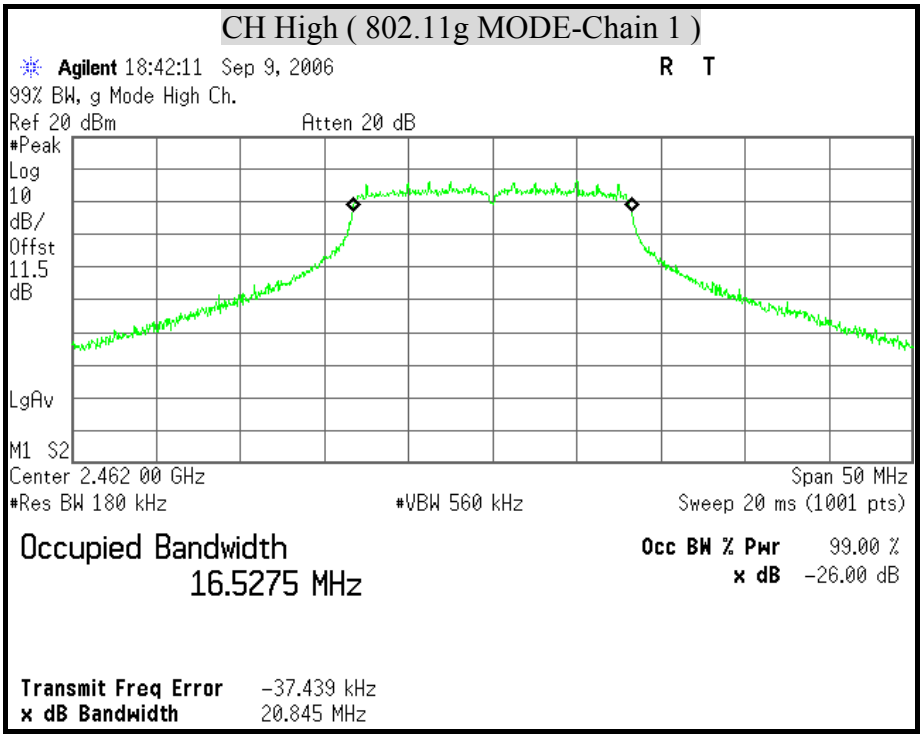
CH Low (802.11g MODE-Chain 1)



CH Mid (802.11g MODE-Chain 1)

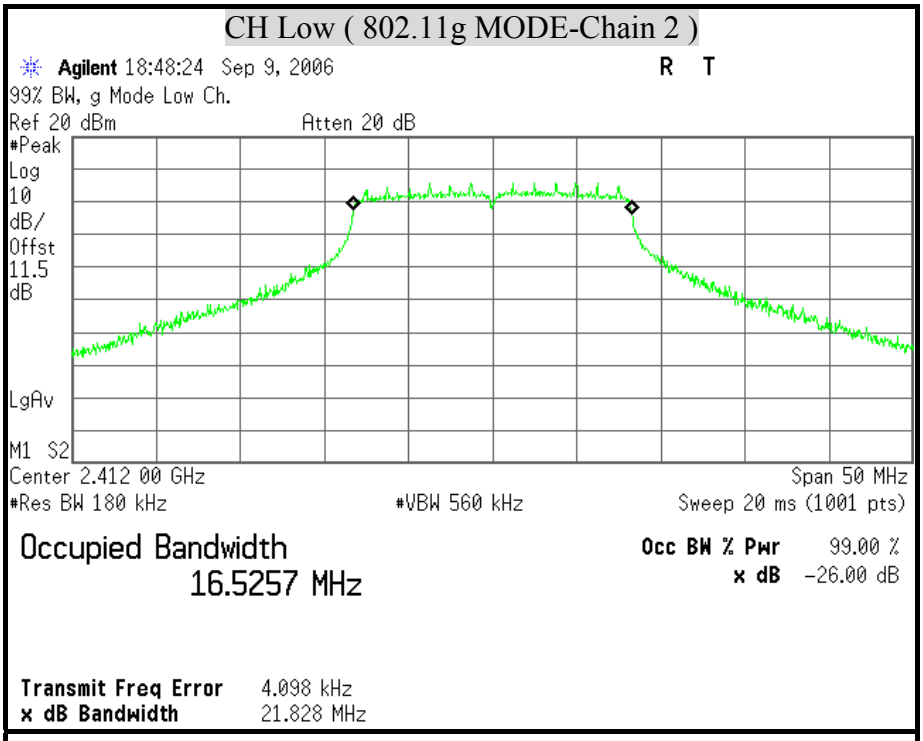


CH High (802.11g MODE-Chain 1)

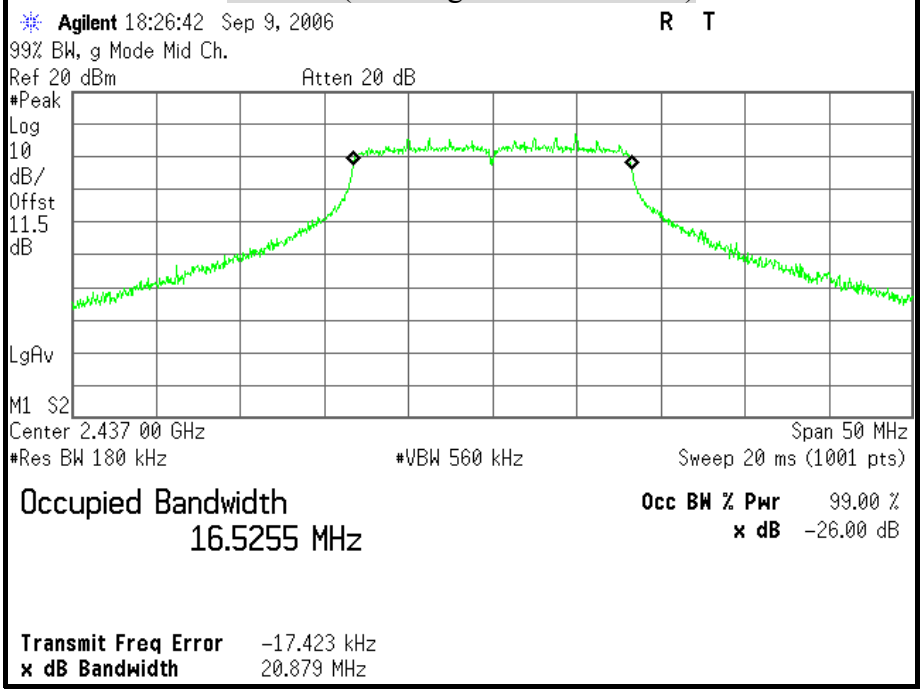


2dBi Antenna

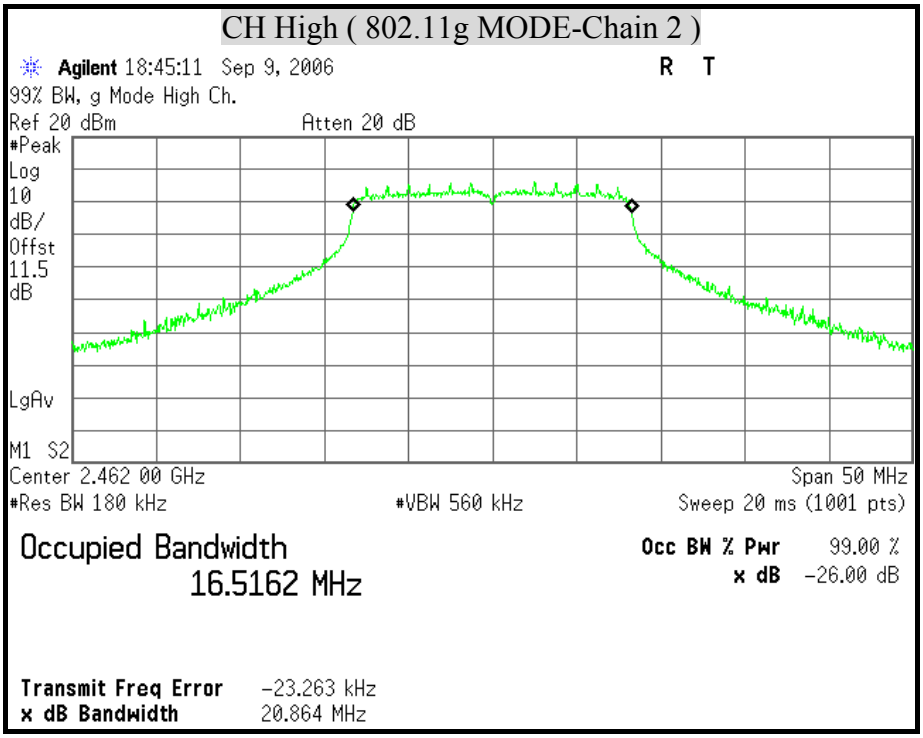
CH Low (802.11g MODE-Chain 2)



CH Mid (802.11g MODE-Chain 2)



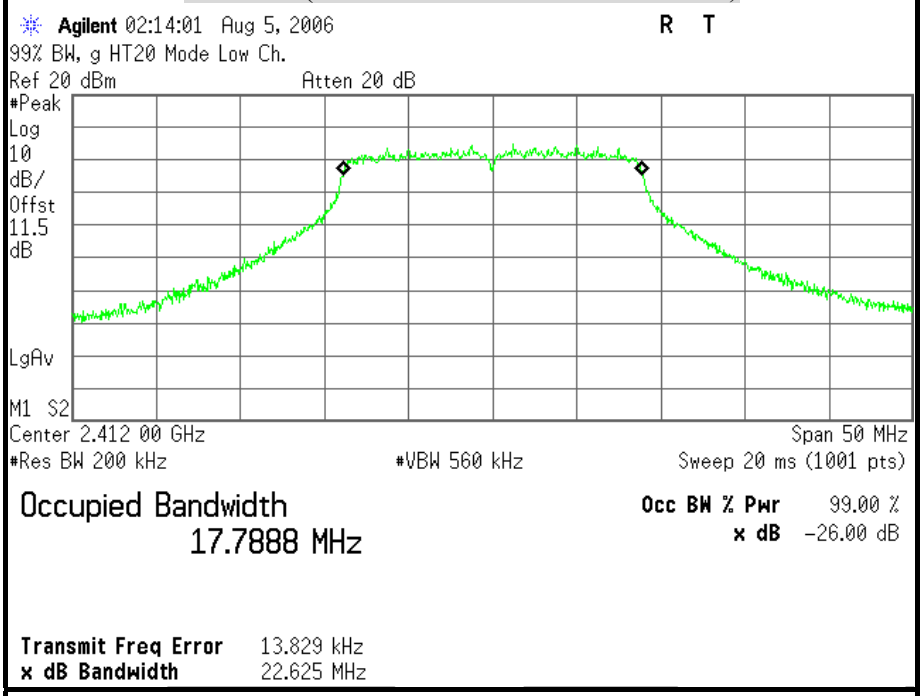
CH High (802.11g MODE-Chain 2)



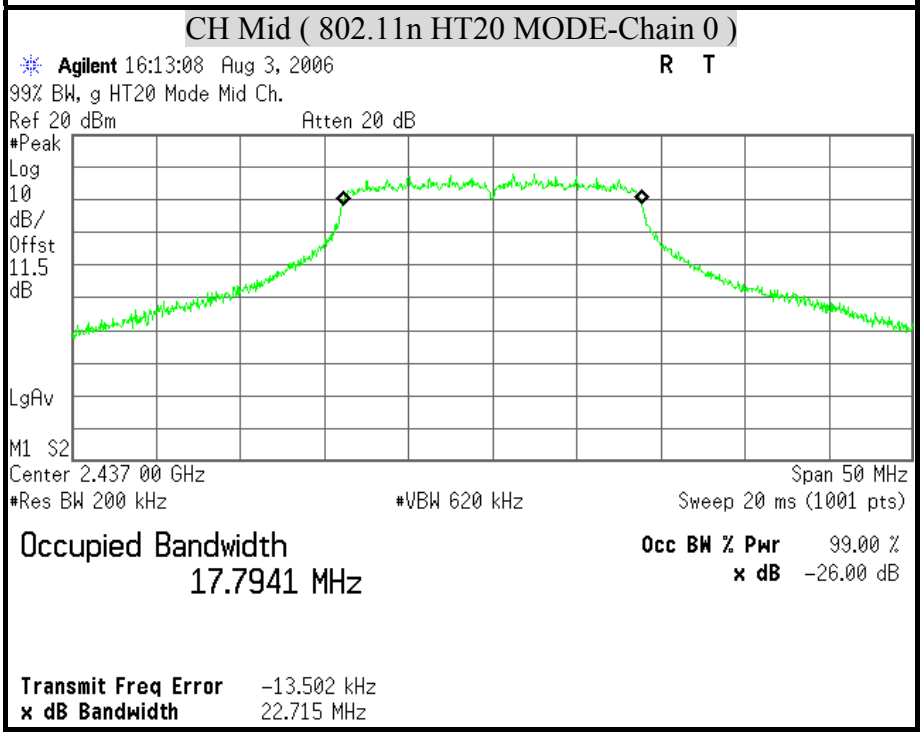
99% BANDWIDTH (802.11n HT20 MODE)

2dBi Antenna

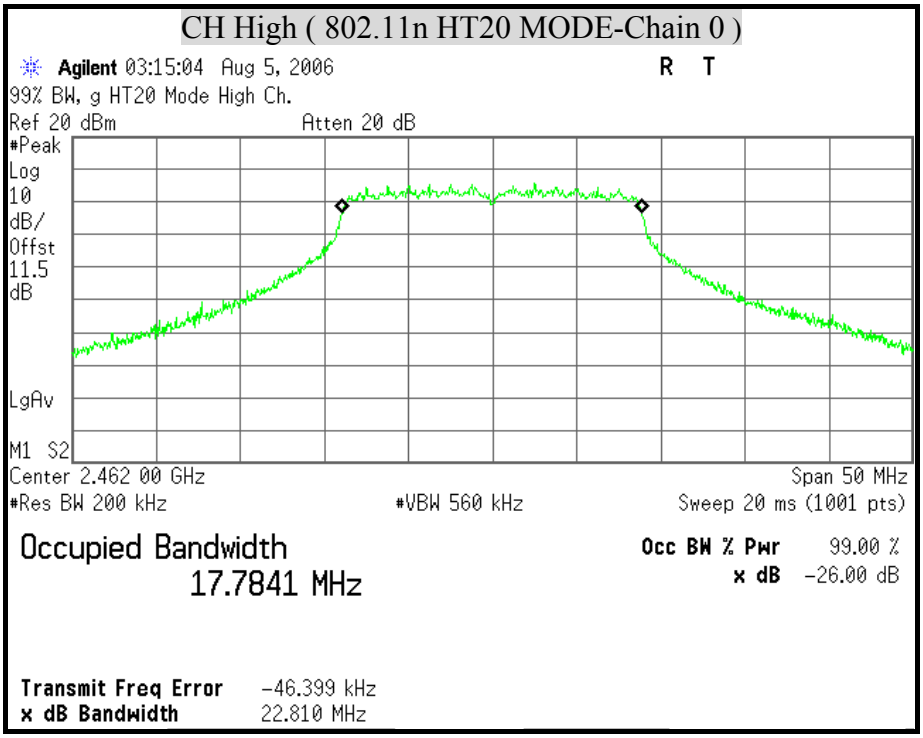
CH Low (802.11n HT20 MODE-Chain 0)



CH Mid (802.11n HT20 MODE-Chain 0)

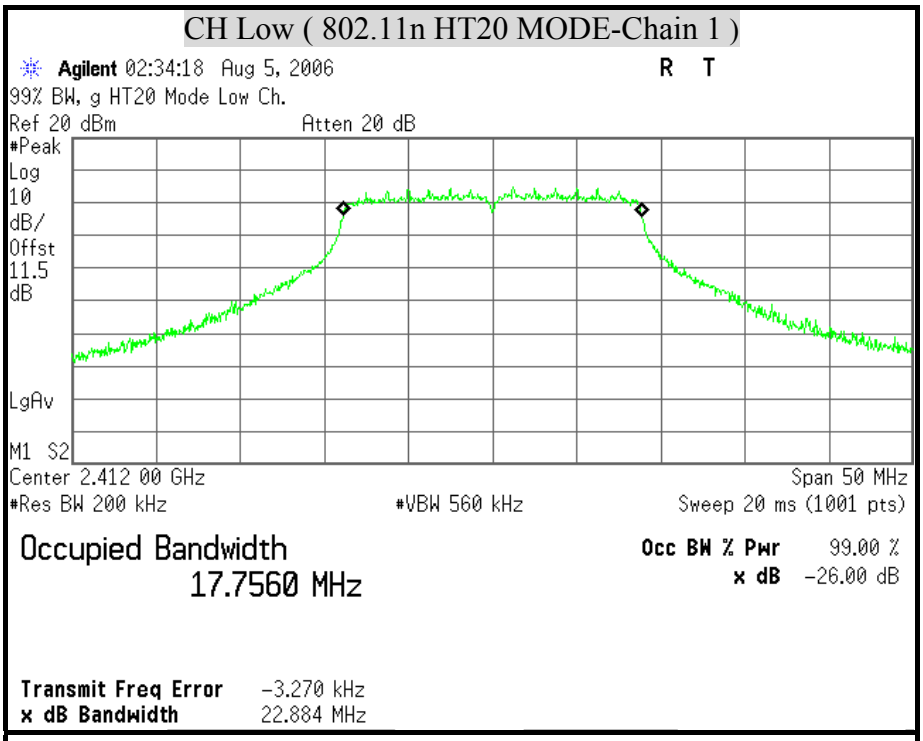


CH High (802.11n HT20 MODE-Chain 0)

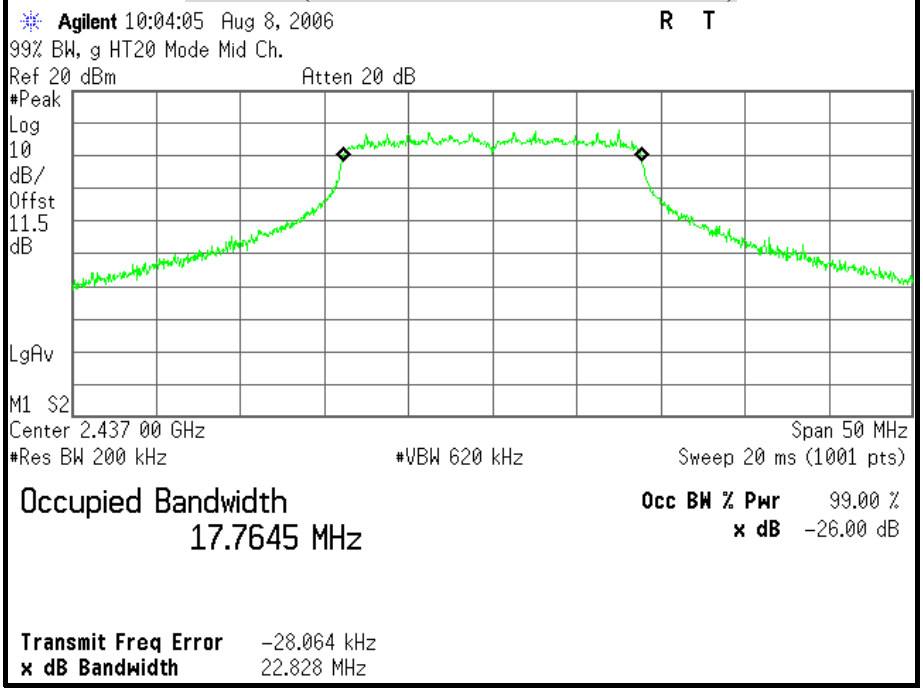


2dBi Antenna

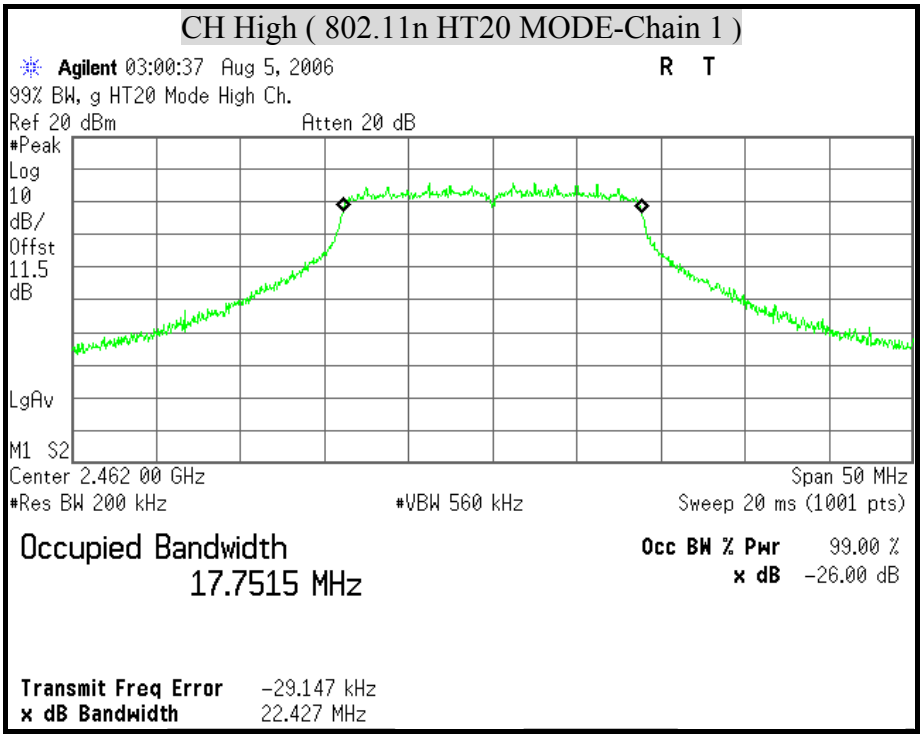
CH Low (802.11n HT20 MODE-Chain 1)



CH Mid (802.11n HT20 MODE-Chain 1)

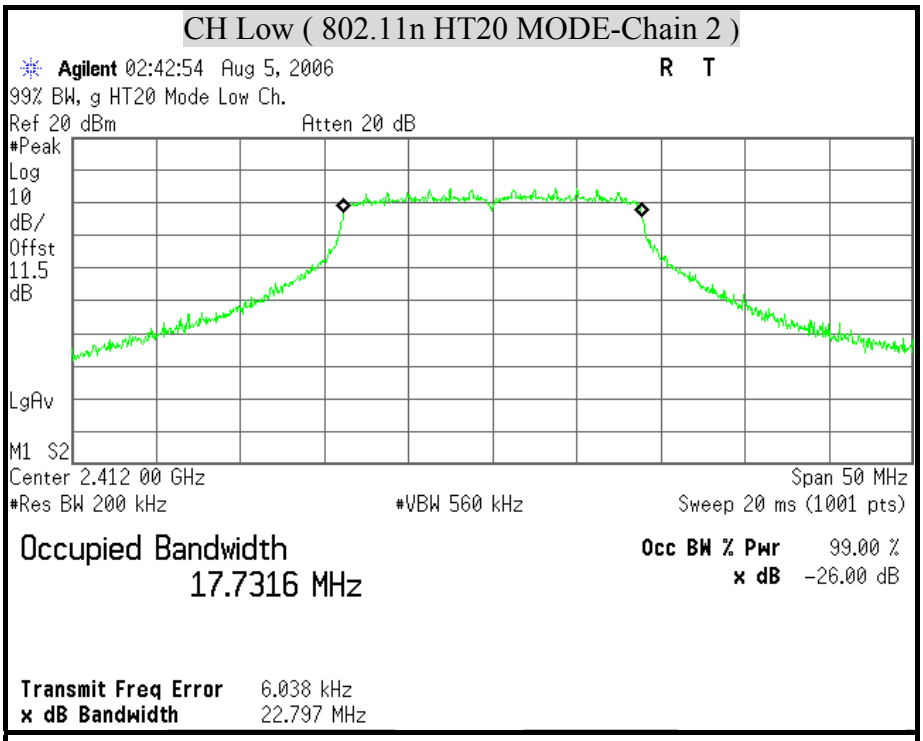


CH High (802.11n HT20 MODE-Chain 1)

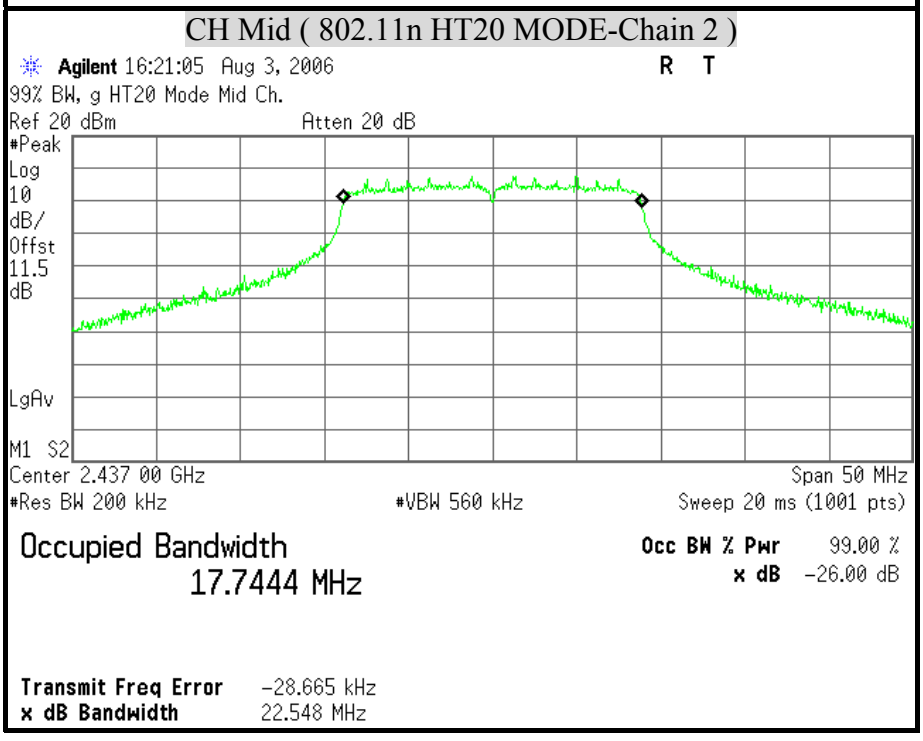


2dBi Antenna

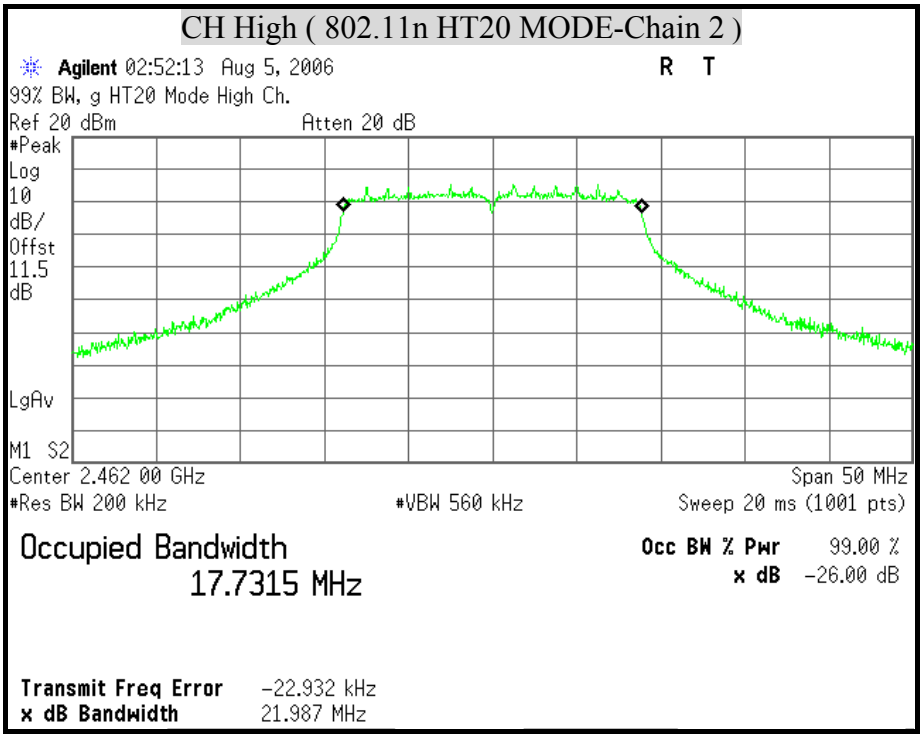
CH Low (802.11n HT20 MODE-Chain 2)



CH Mid (802.11n HT20 MODE-Chain 2)



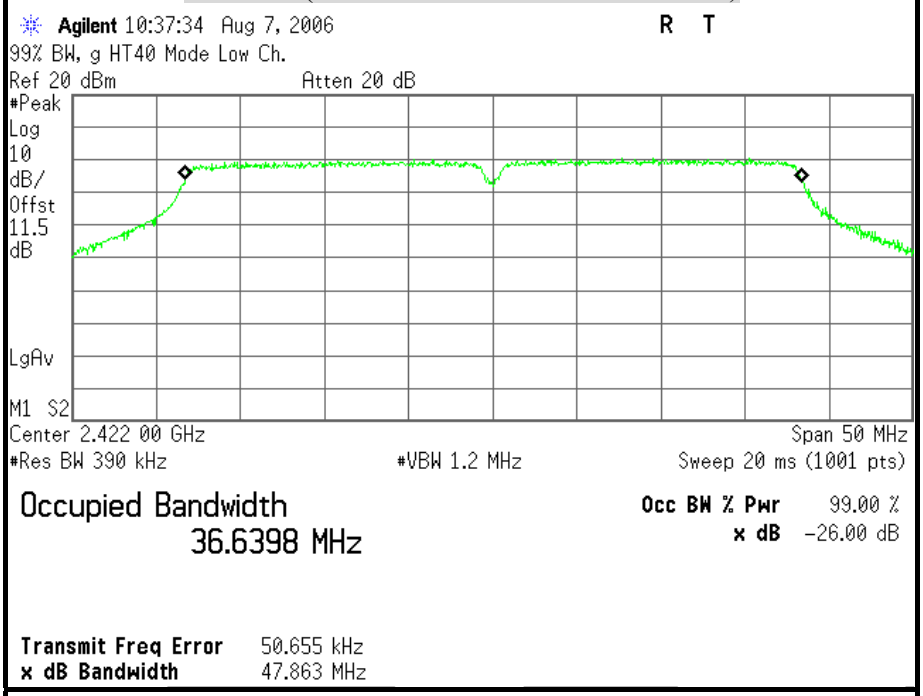
CH High (802.11n HT20 MODE-Chain 2)



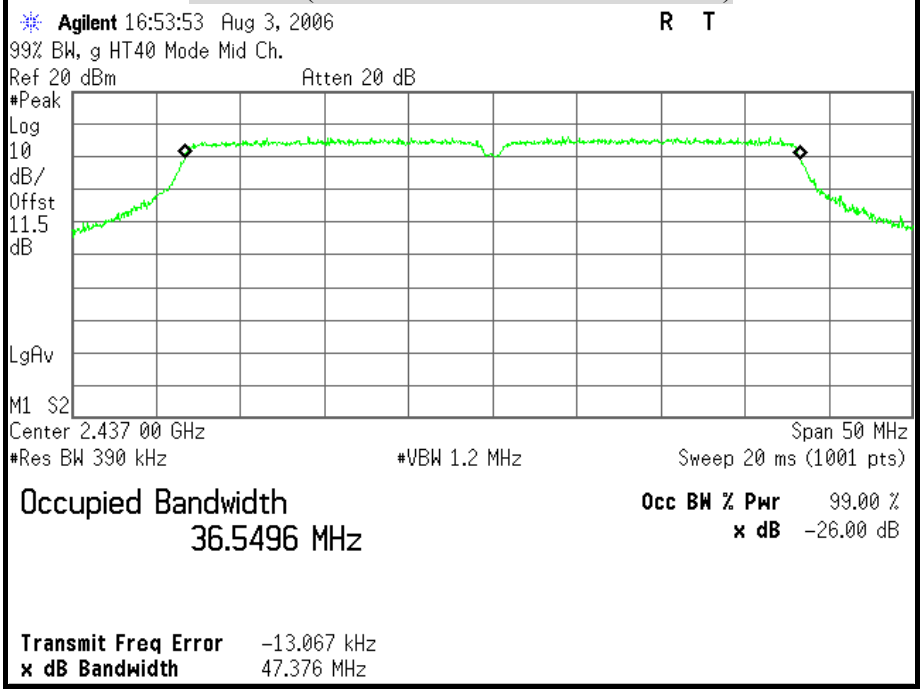
99% BANDWIDTH (802.11n HT40 MODE)

2dBi Antenna

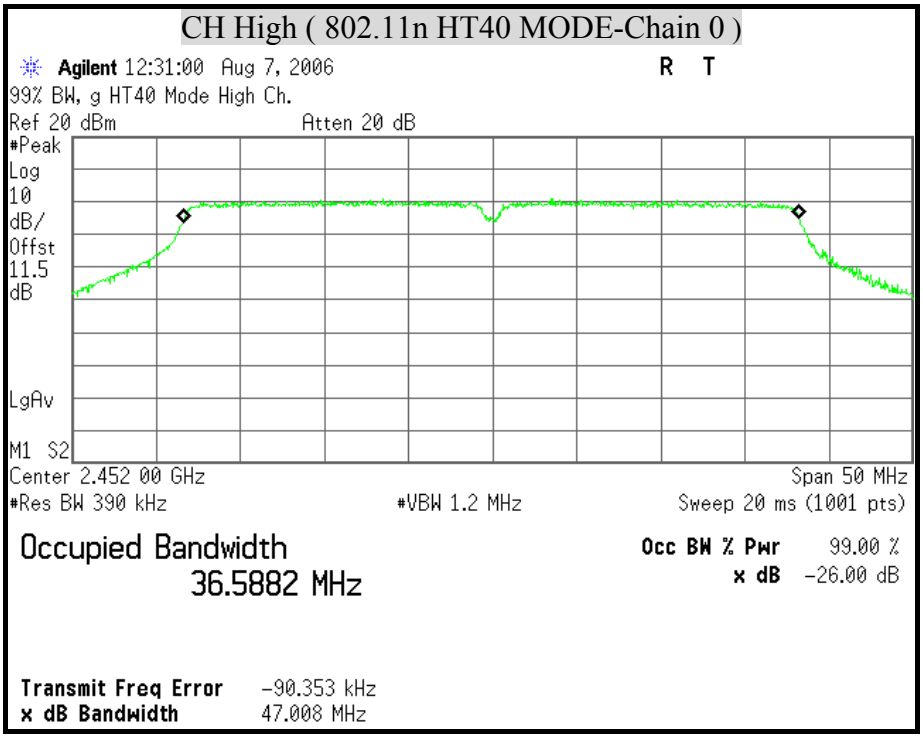
CH Low (802.11n HT40 MODE-Chain 0)



CH Mid (802.11n HT40 MODE-Chain 0)

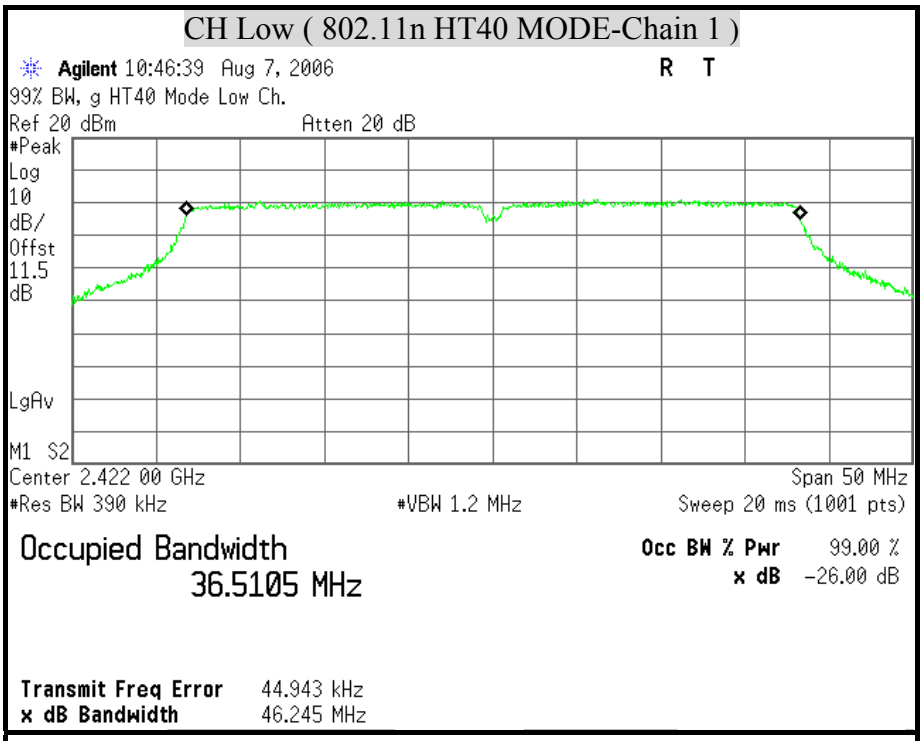


CH High (802.11n HT40 MODE-Chain 0)

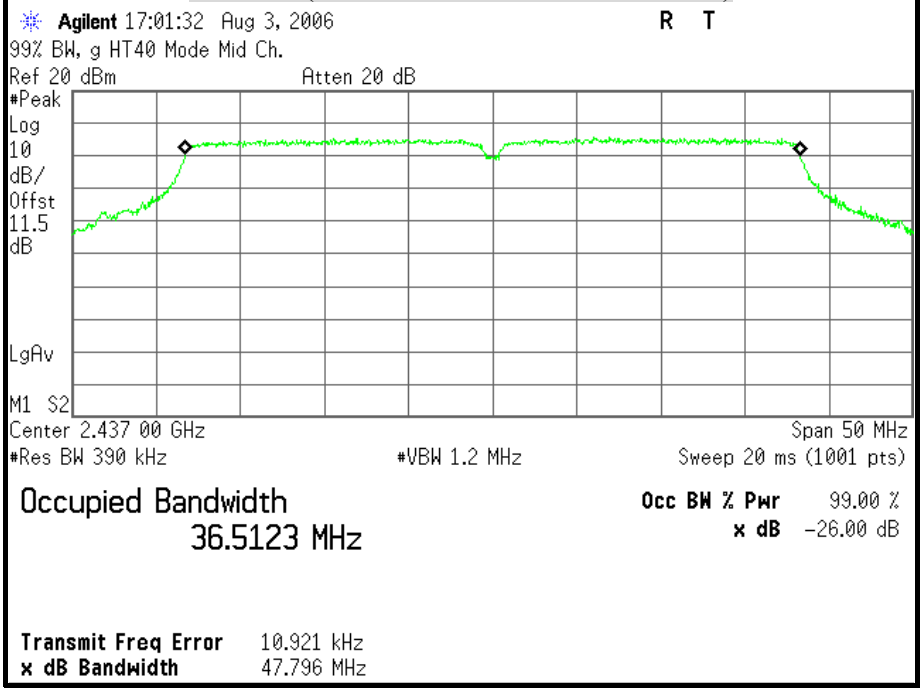


2dBi Antenna

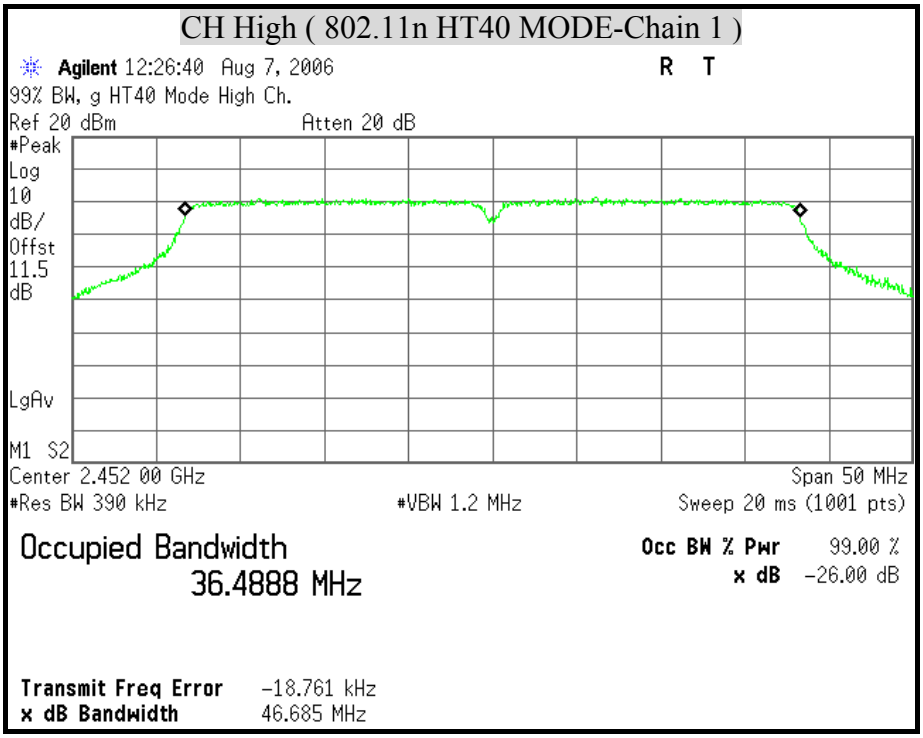
CH Low (802.11n HT40 MODE-Chain 1)



CH Mid (802.11n HT40 MODE-Chain 1)

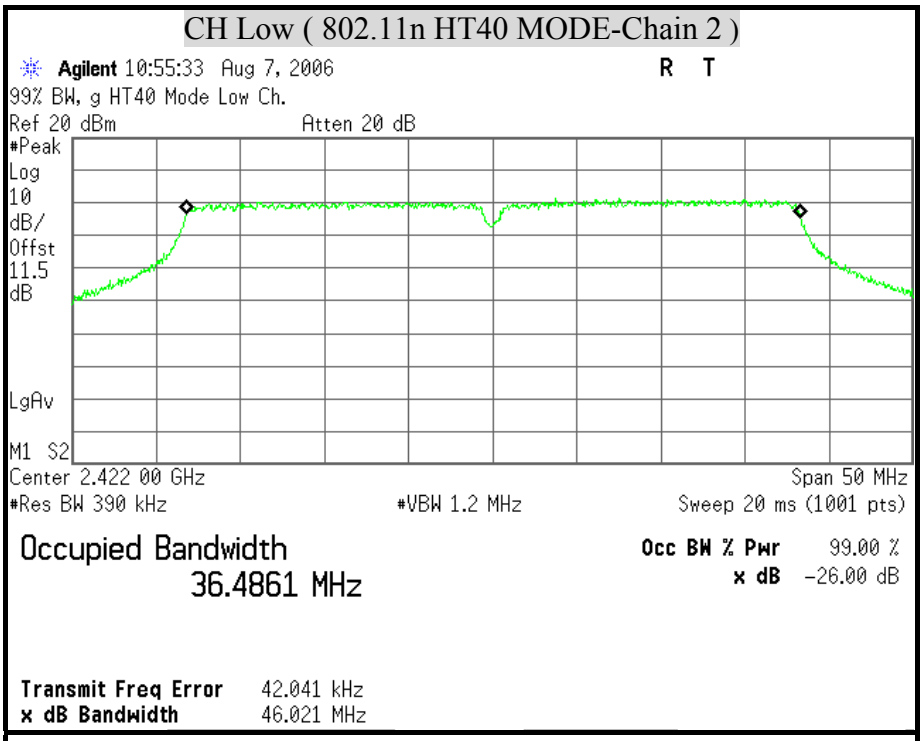


CH High (802.11n HT40 MODE-Chain 1)

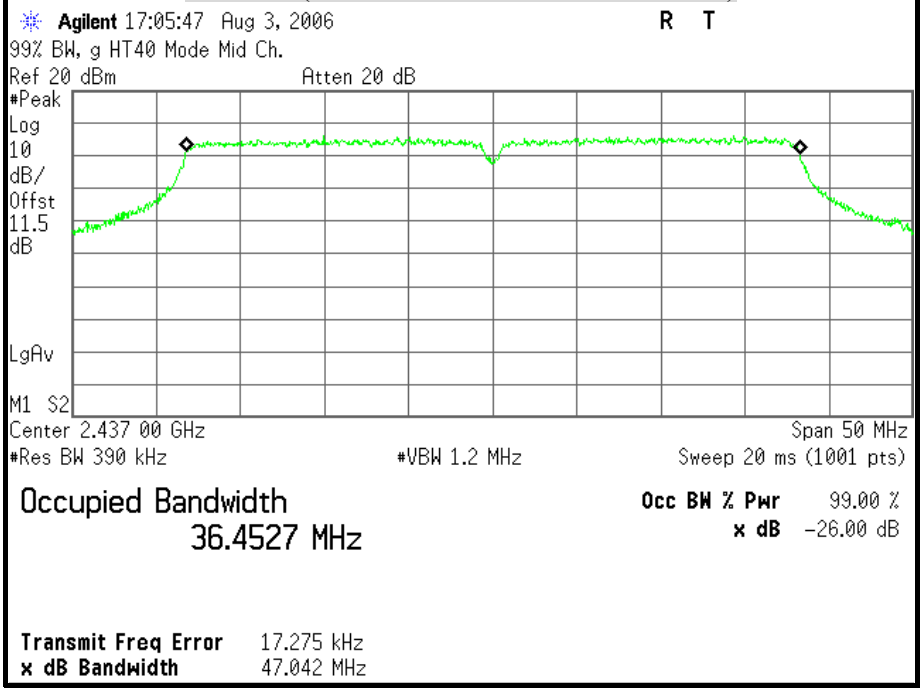


2dBi Antenna

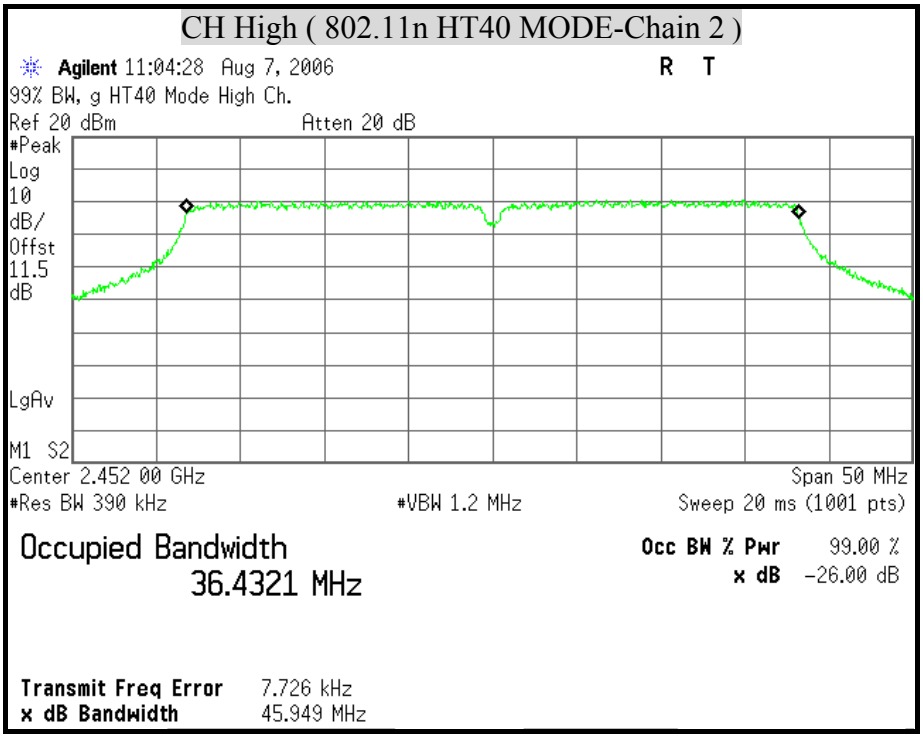
CH Low (802.11n HT40 MODE-Chain 2)



CH Mid (802.11n HT40 MODE-Chain 2)



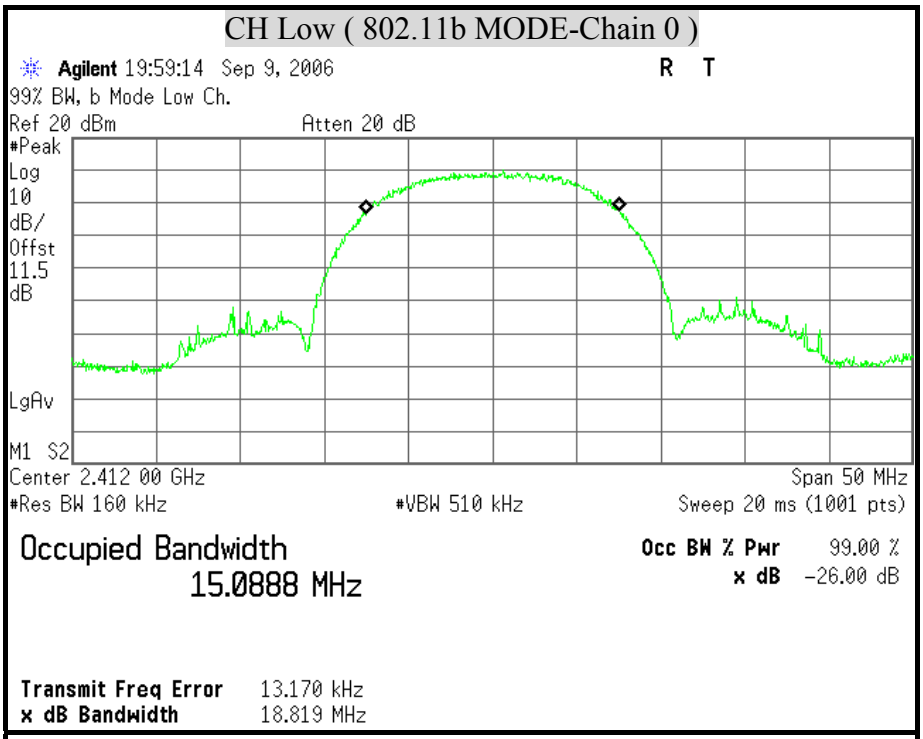
CH High (802.11n HT40 MODE-Chain 2)



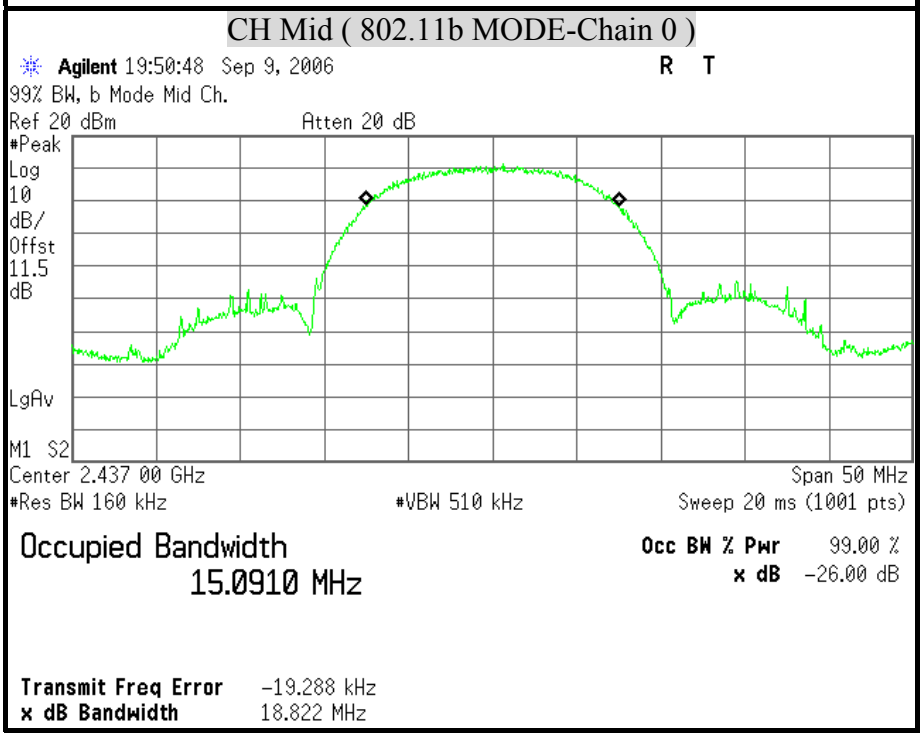
99% BANDWIDTH (802.11b MODE)

3dBi Antenna

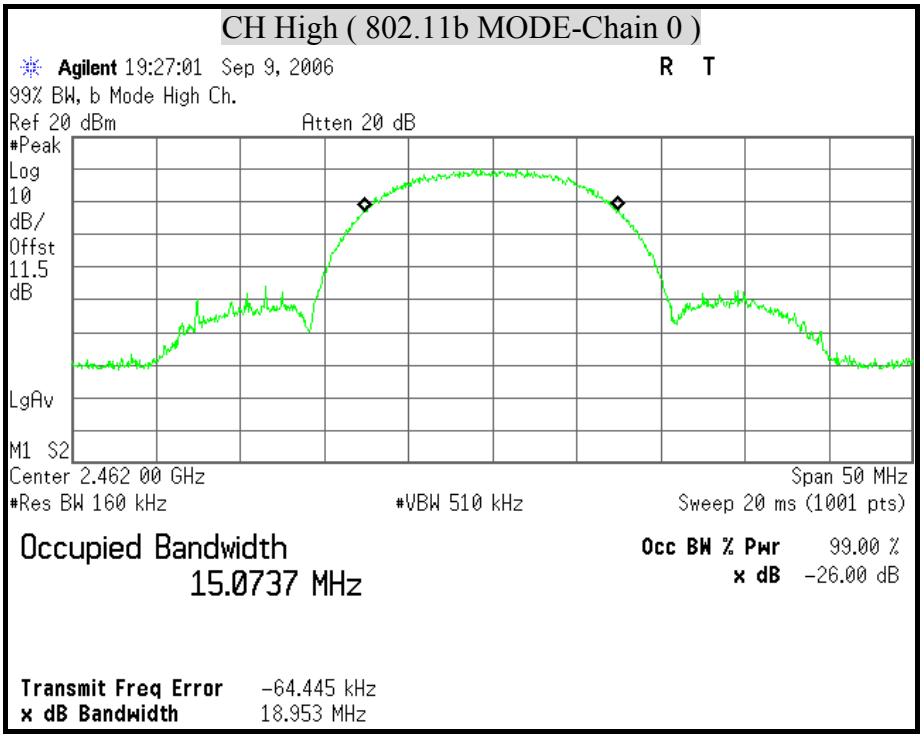
CH Low (802.11b MODE-Chain 0)



CH Mid (802.11b MODE-Chain 0)

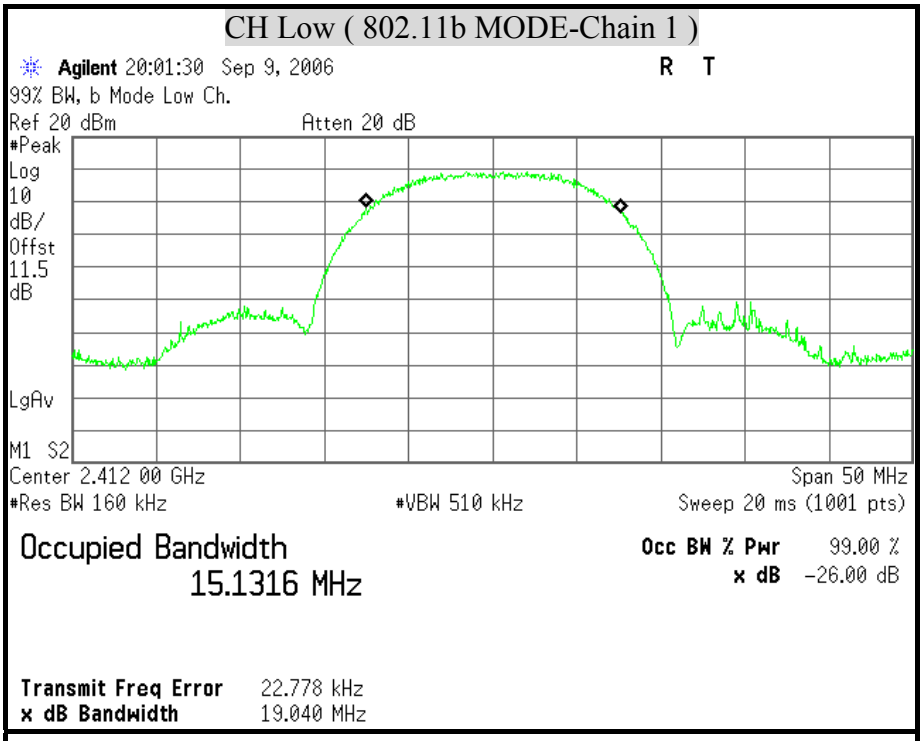


CH High (802.11b MODE-Chain 0)

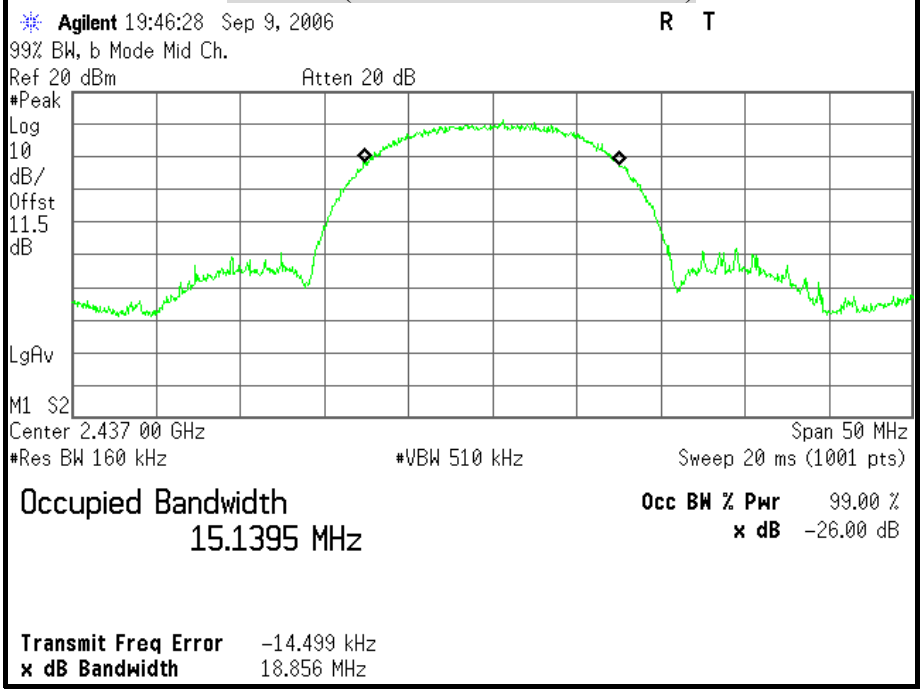


3dBi Antenna

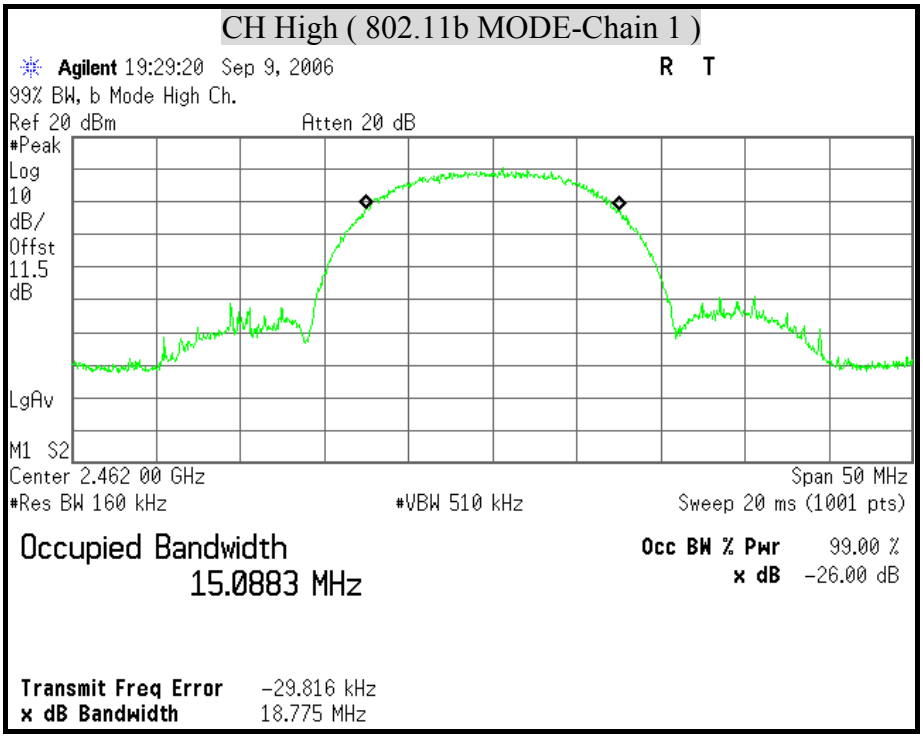
CH Low (802.11b MODE-Chain 1)



CH Mid (802.11b MODE-Chain 1)

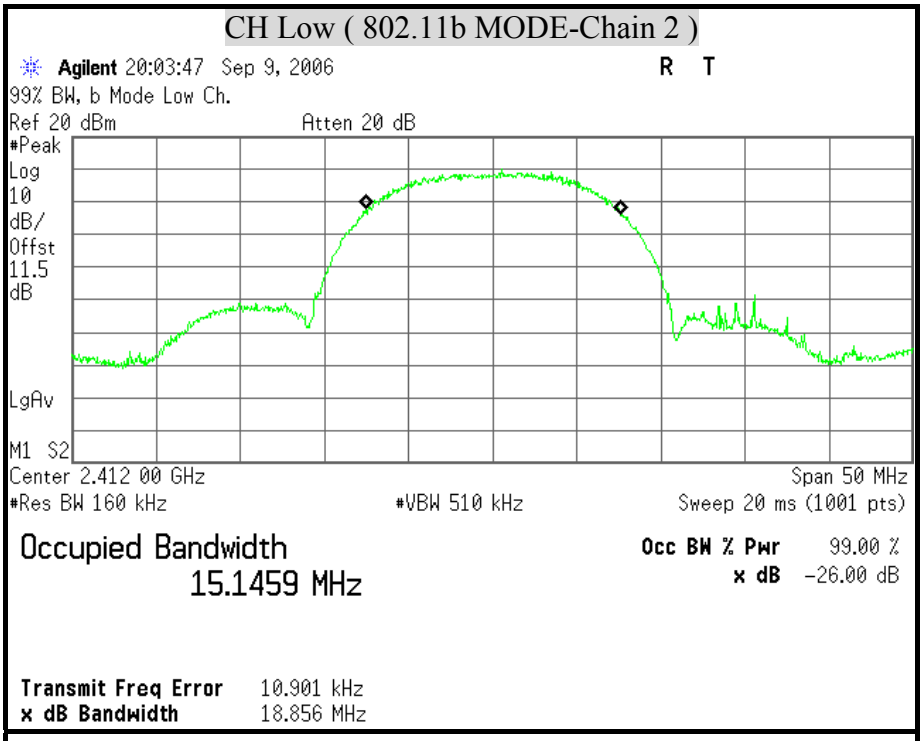


CH High (802.11b MODE-Chain 1)

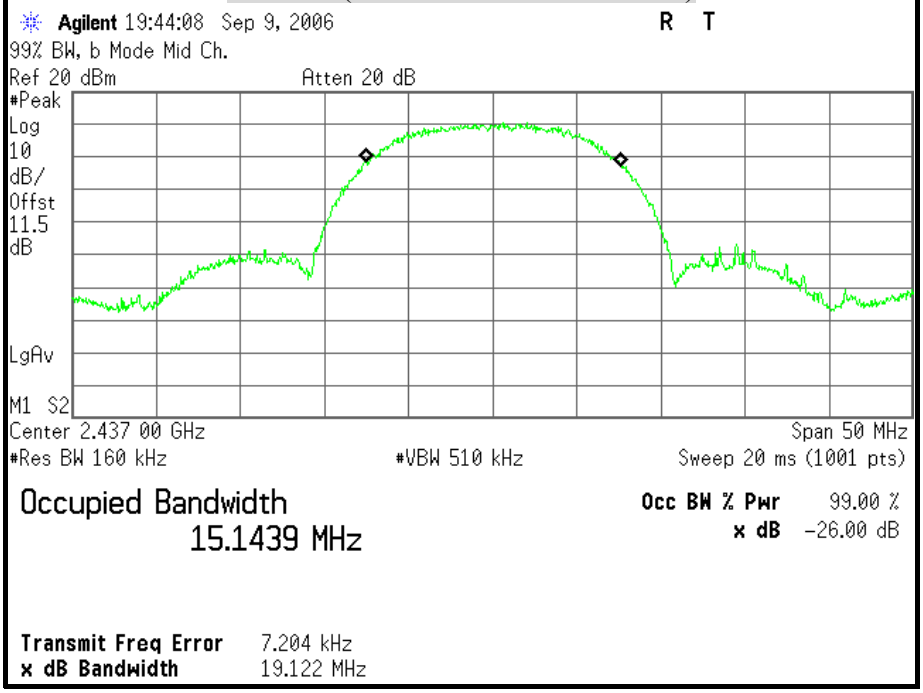


3dBi Antenna

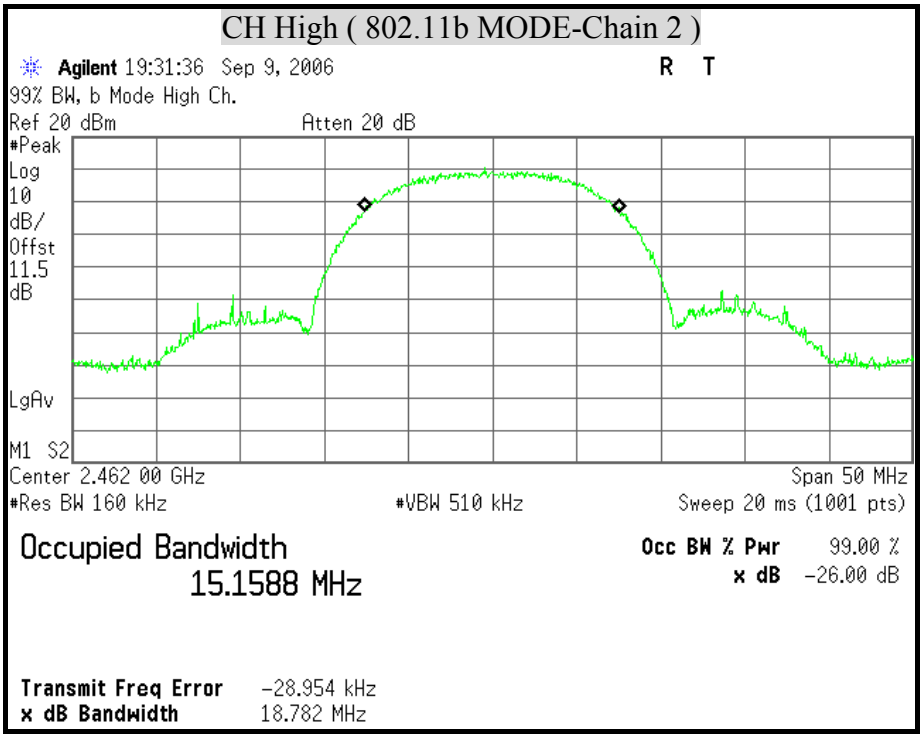
CH Low (802.11b MODE-Chain 2)



CH Mid (802.11b MODE-Chain 2)



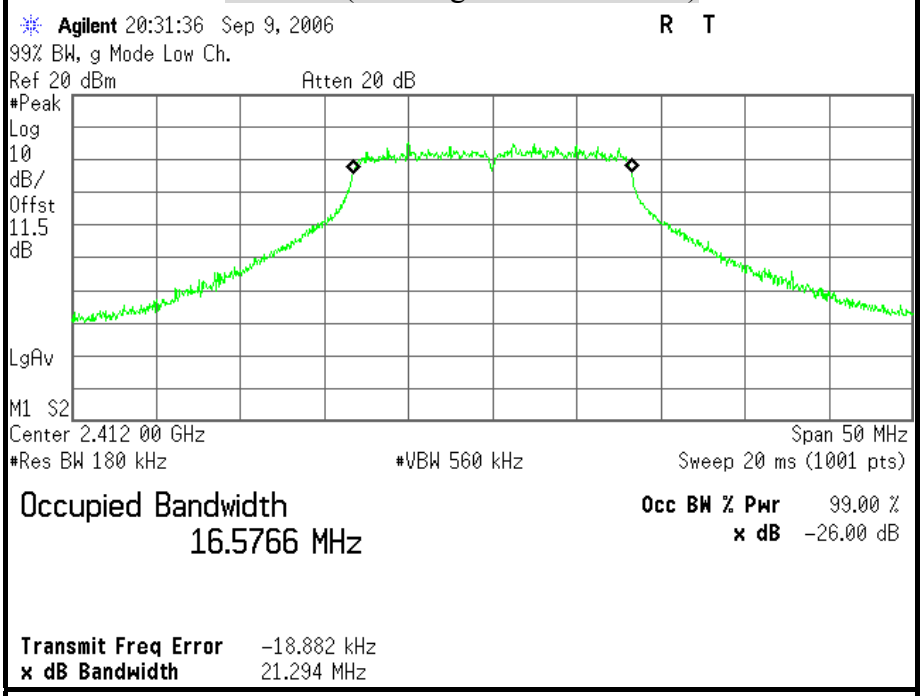
CH High (802.11b MODE-Chain 2)



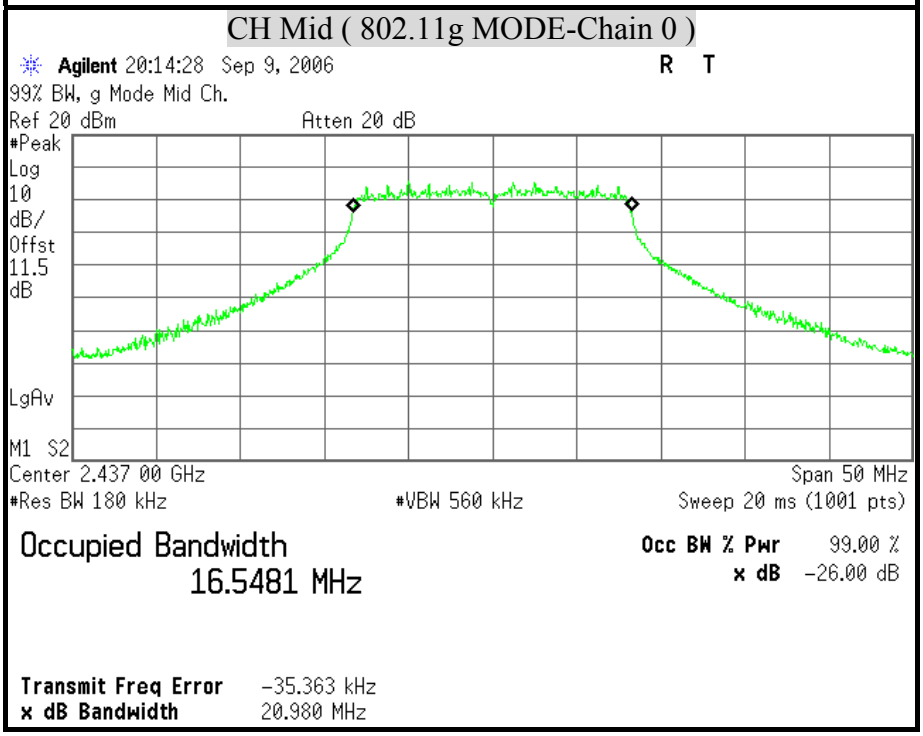
99% BANDWIDTH (802.11g MODE)

3dBi Antenna

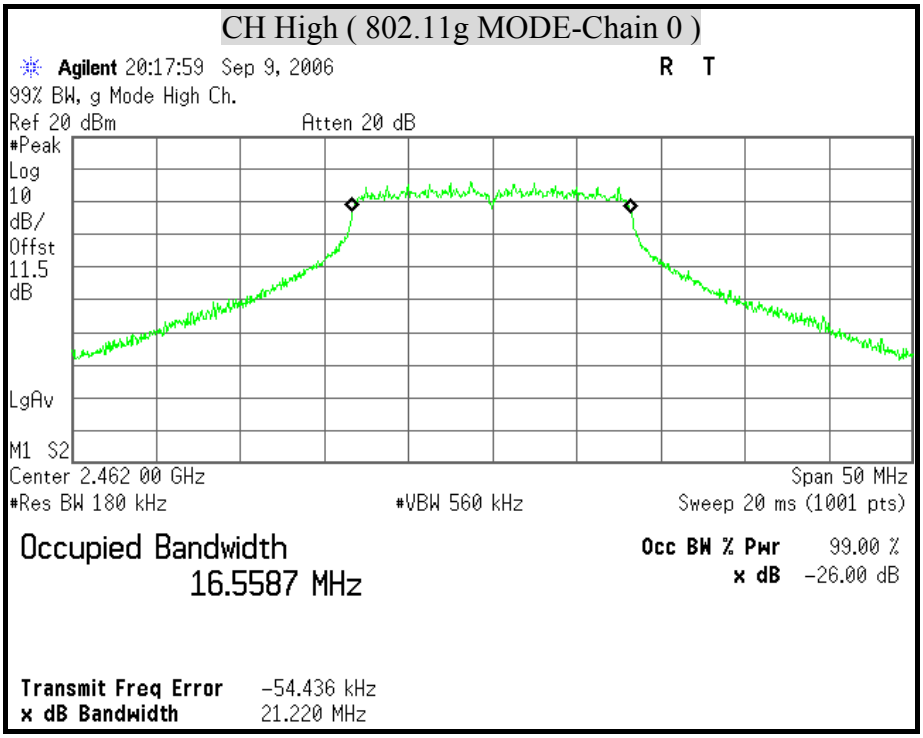
CH Low (802.11g MODE-Chain 0)



CH Mid (802.11g MODE-Chain 0)

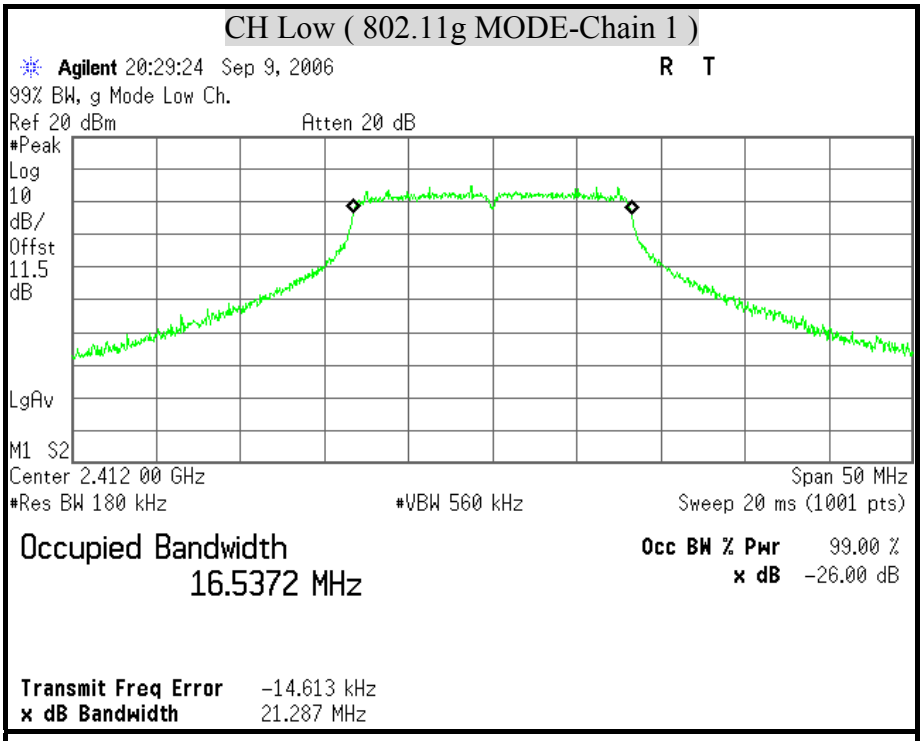


CH High (802.11g MODE-Chain 0)

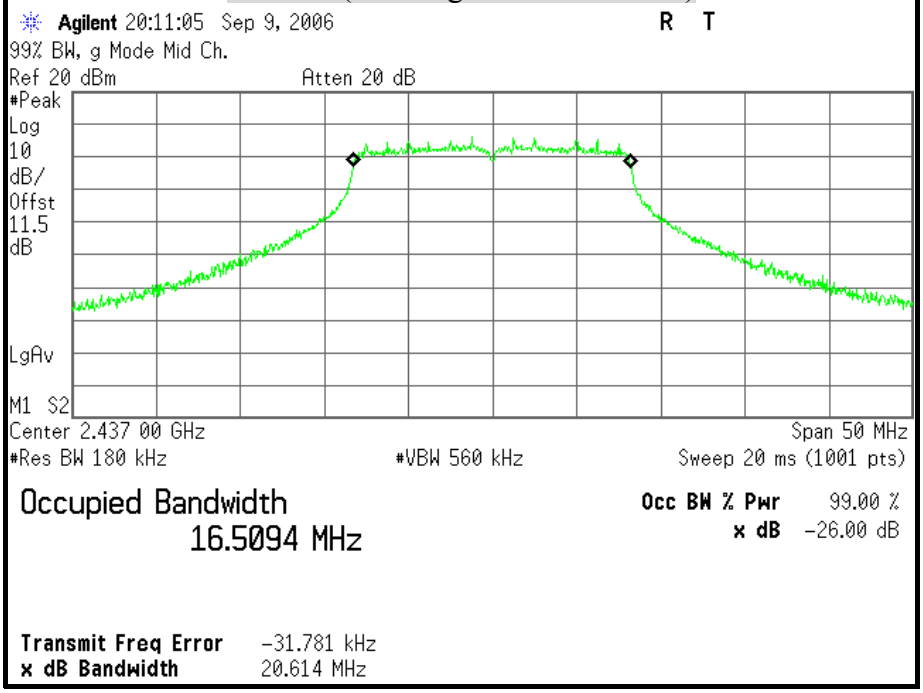


2dBi Antenna

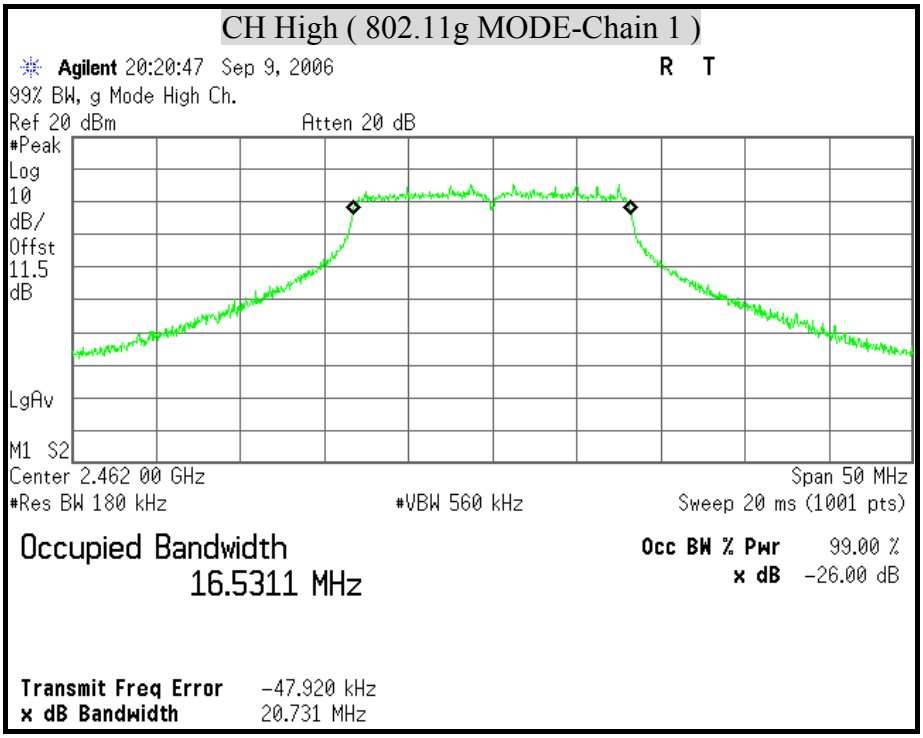
CH Low (802.11g MODE-Chain 1)



CH Mid (802.11g MODE-Chain 1)



CH High (802.11g MODE-Chain 1)



2dBi Antenna

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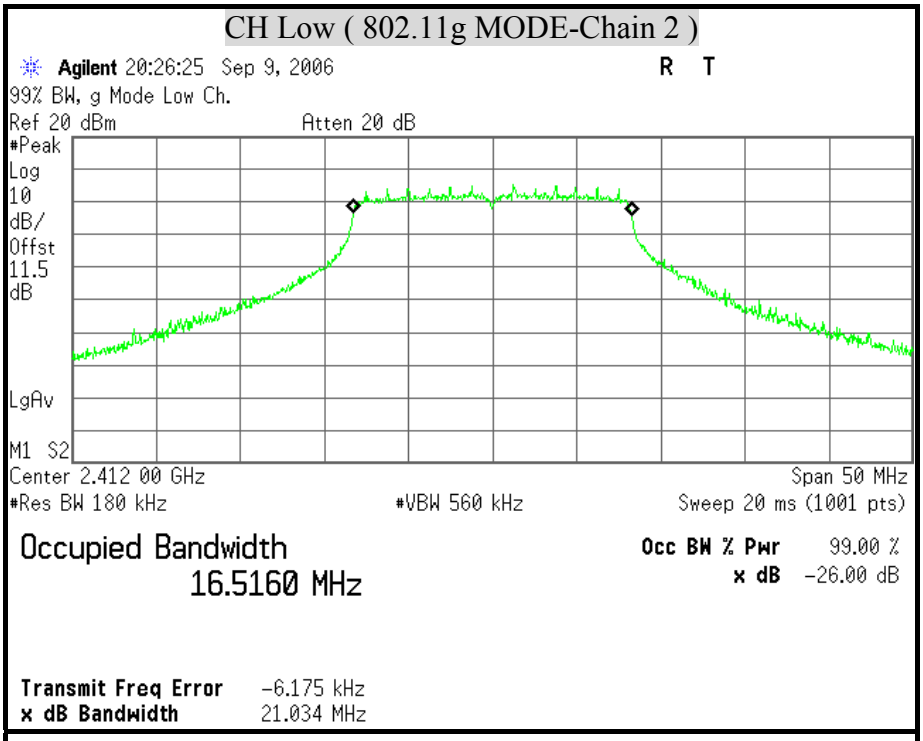
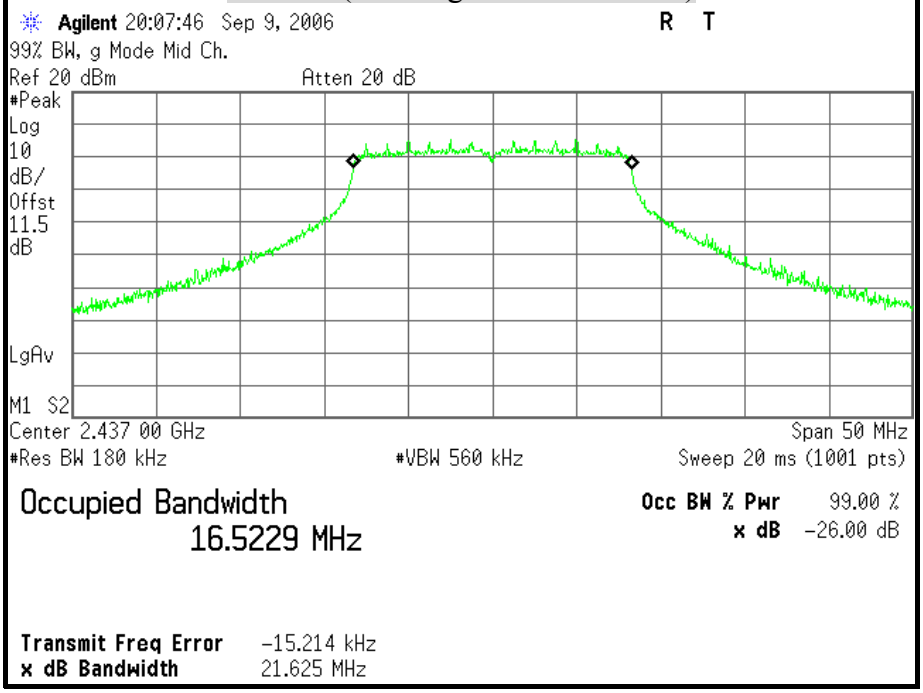


CH Mid (802.11g MODE-Chain 2)



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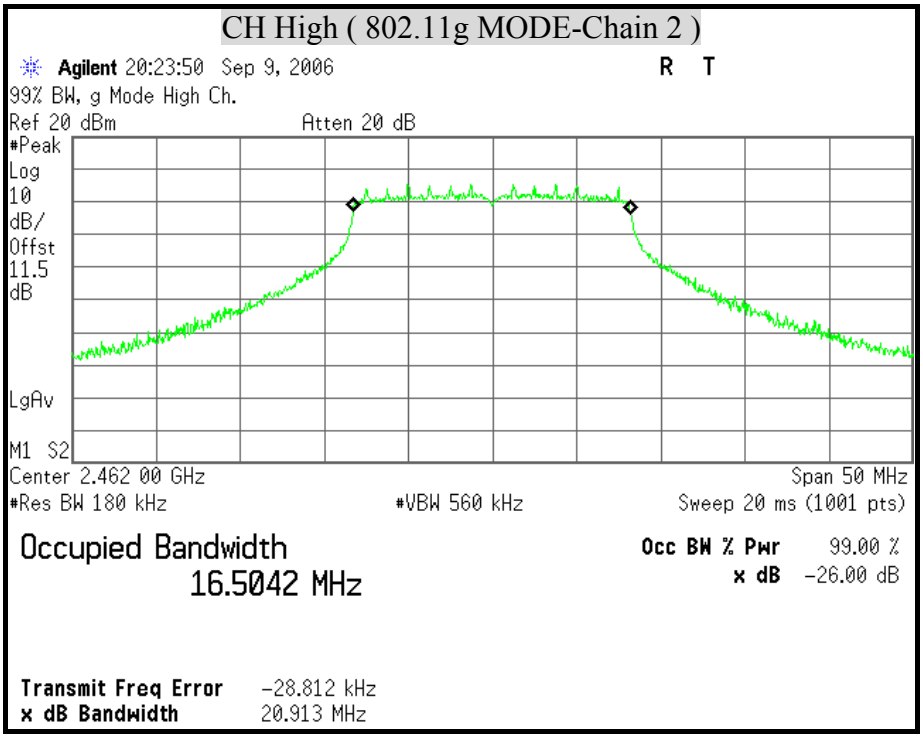

99% BANDWIDTH (802.11n HT20 MODE)

3dBi Antenna

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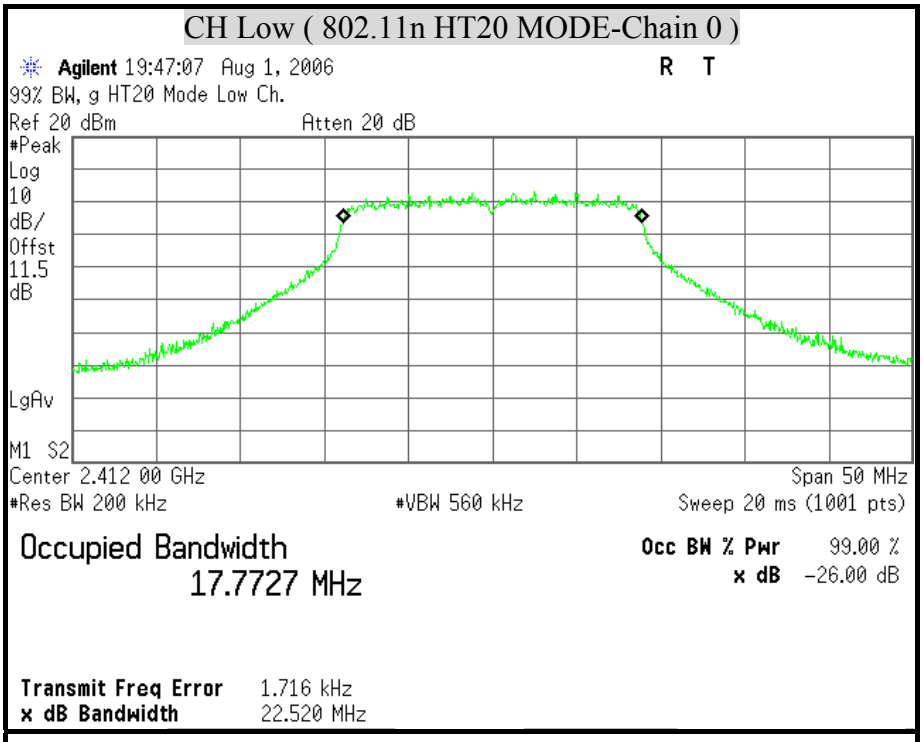
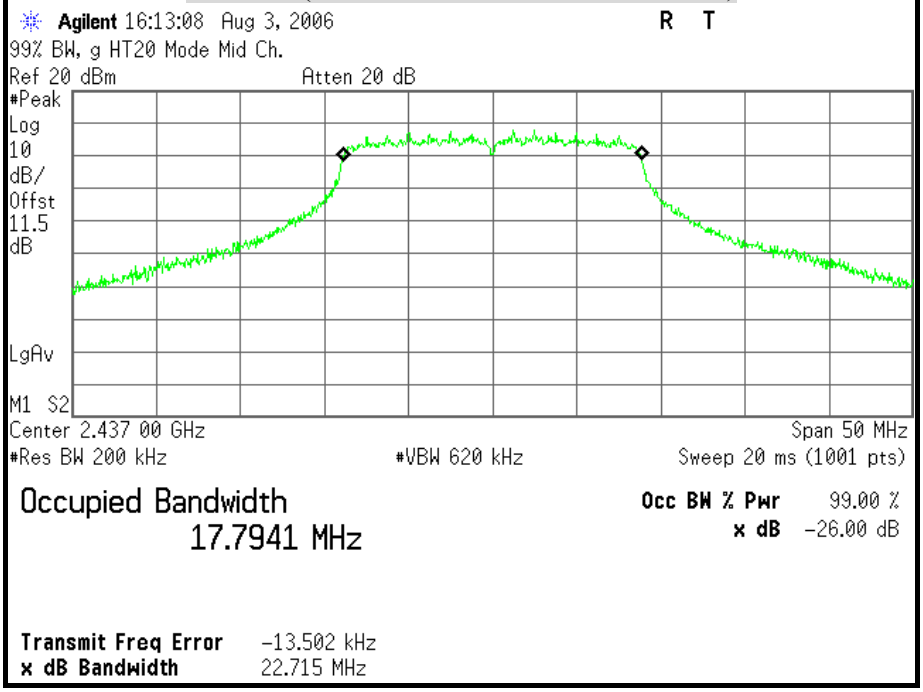
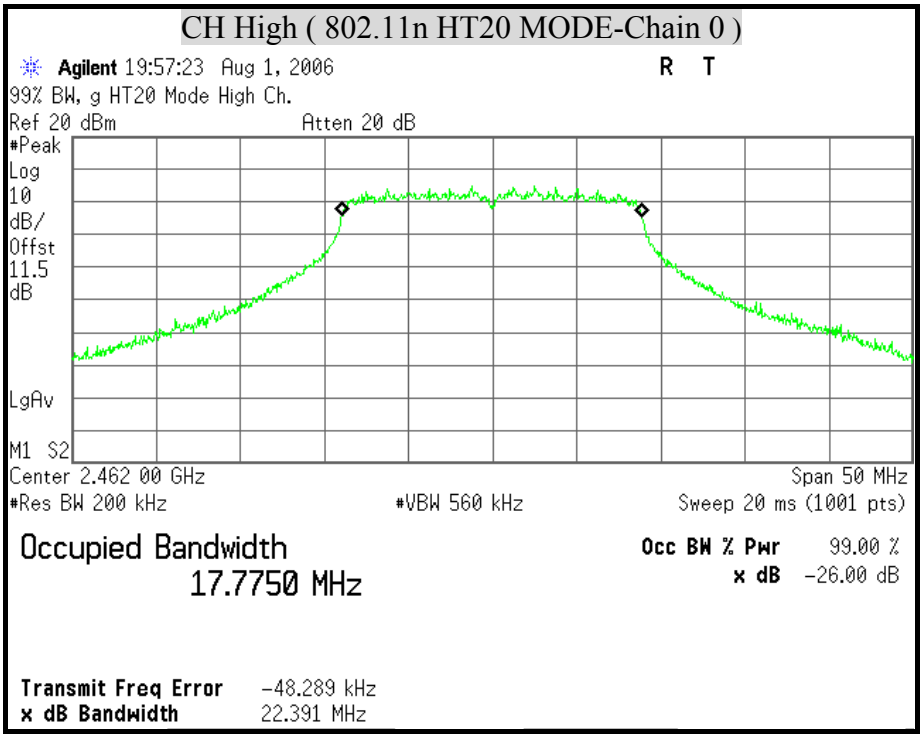


CH Mid (802.11n HT20 MODE-Chain 0)

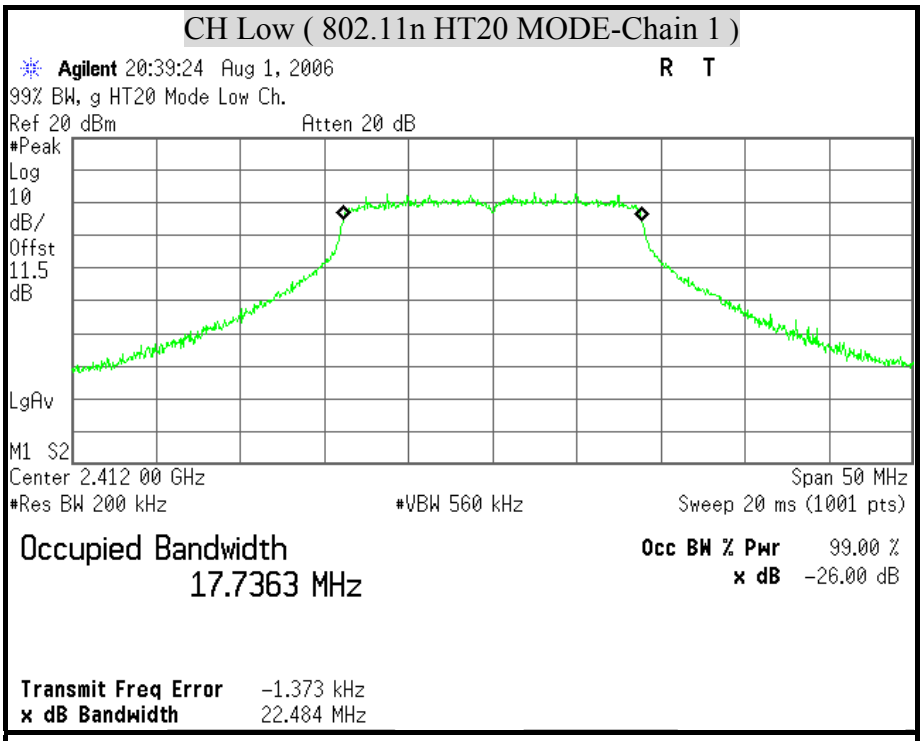


CH High (802.11n HT20 MODE-Chain 0)

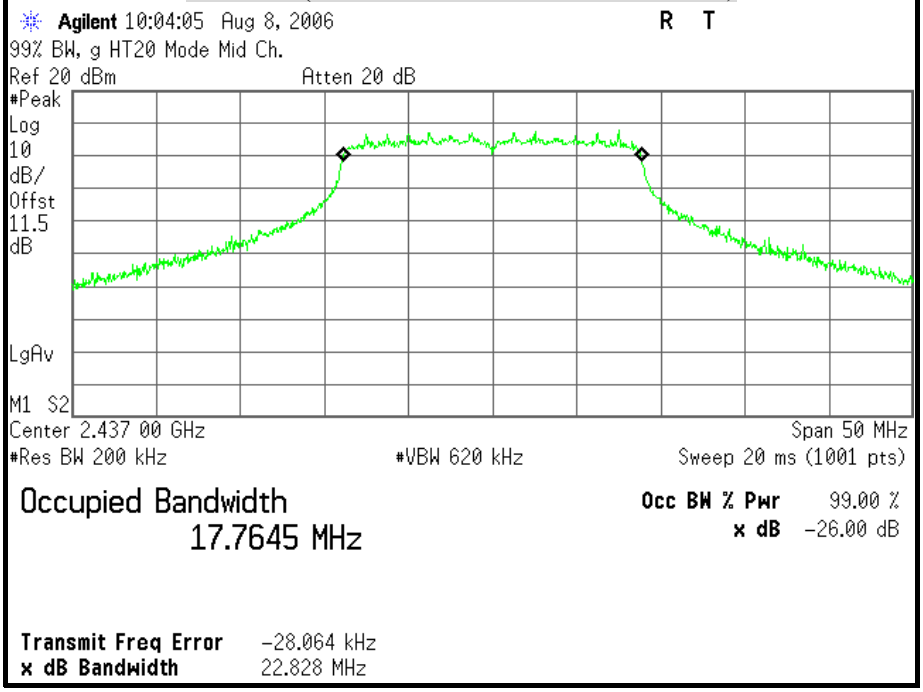


3dBi Antenna

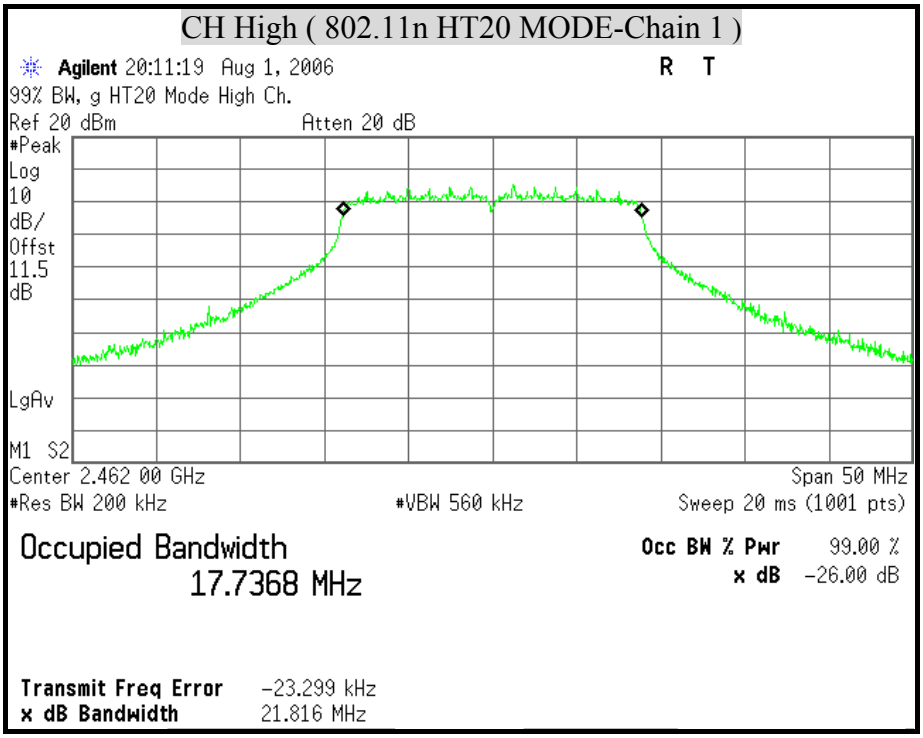
CH Low (802.11n HT20 MODE-Chain 1)



CH Mid (802.11n HT20 MODE-Chain 1)



CH High (802.11n HT20 MODE-Chain 1)



3dBi Antenna

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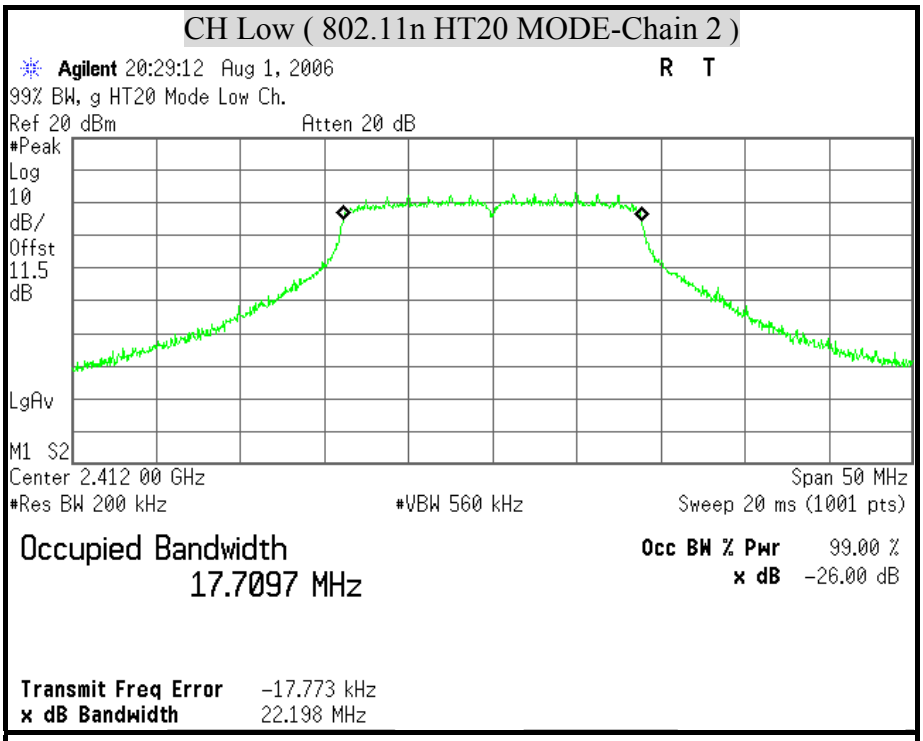
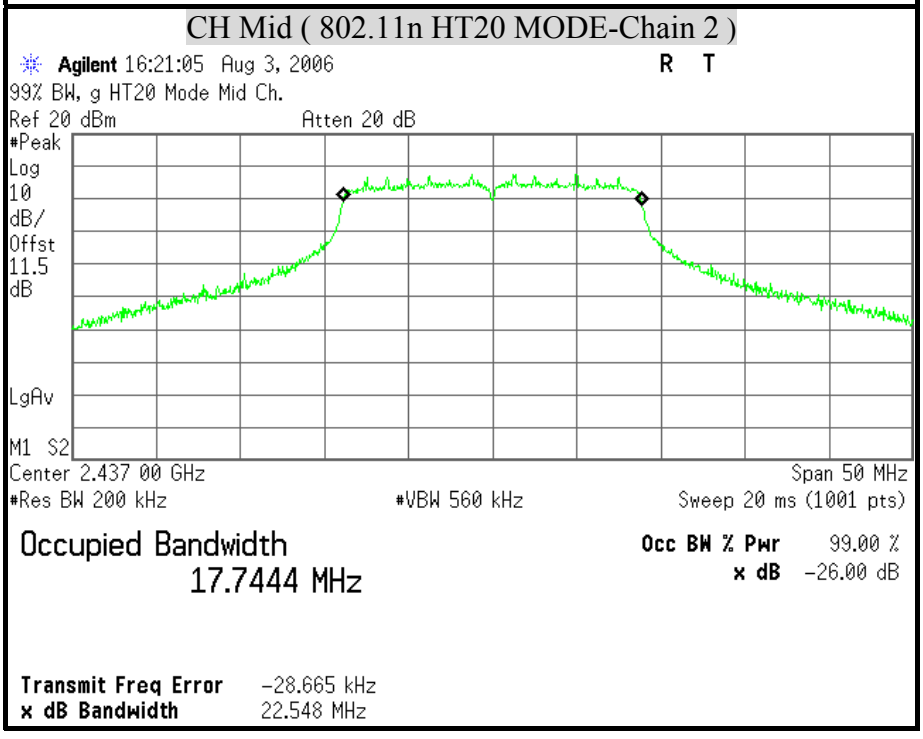
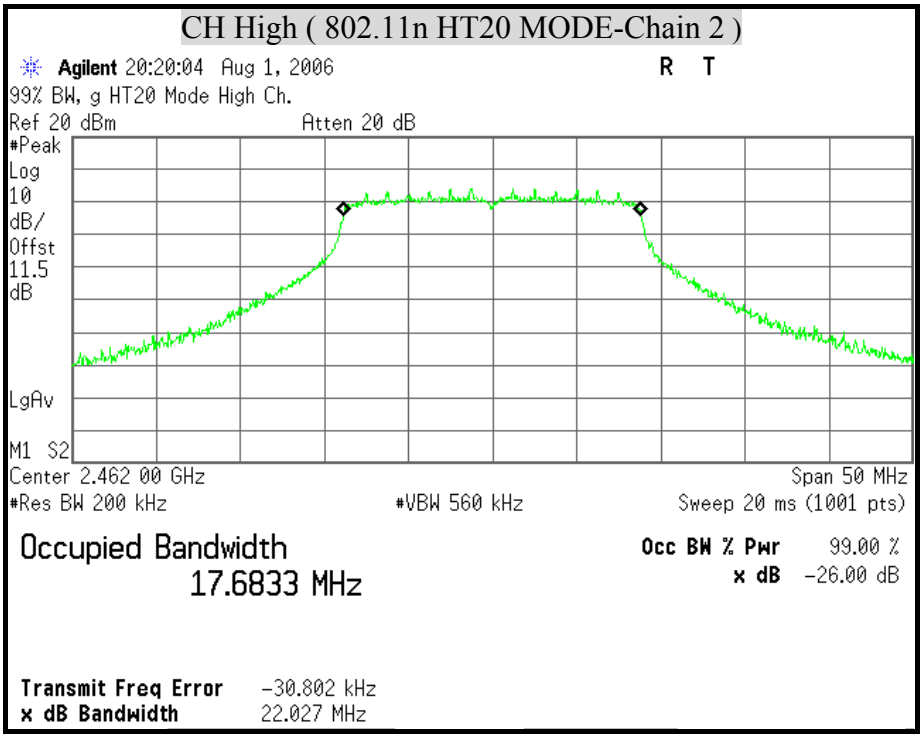


CH Mid (802.11n HT20 MODE-Chain 2)



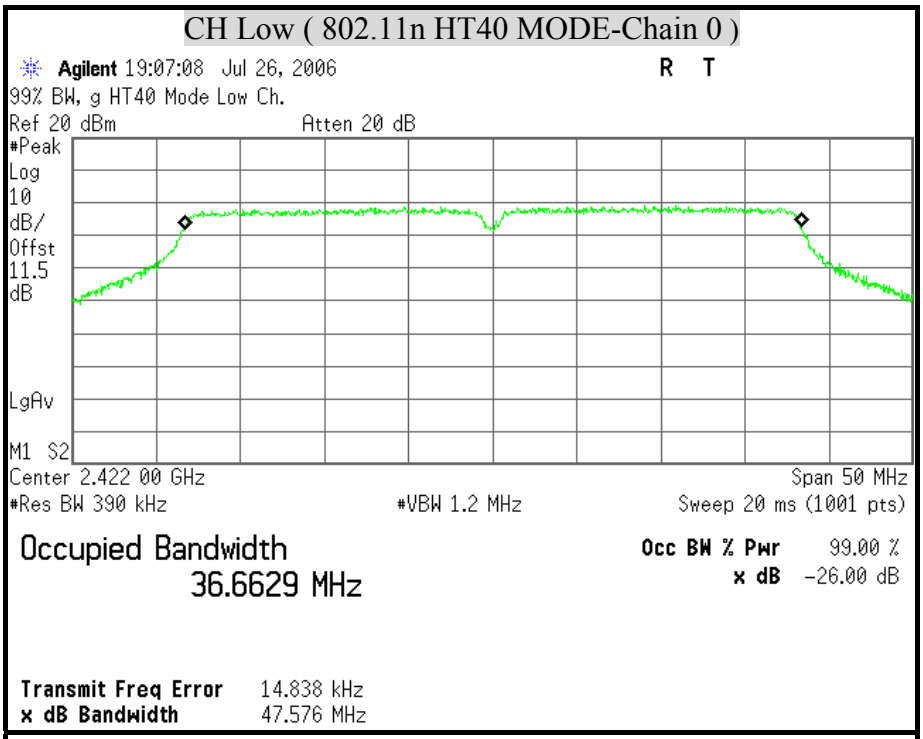
CH High (802.11n HT20 MODE-Chain 2)



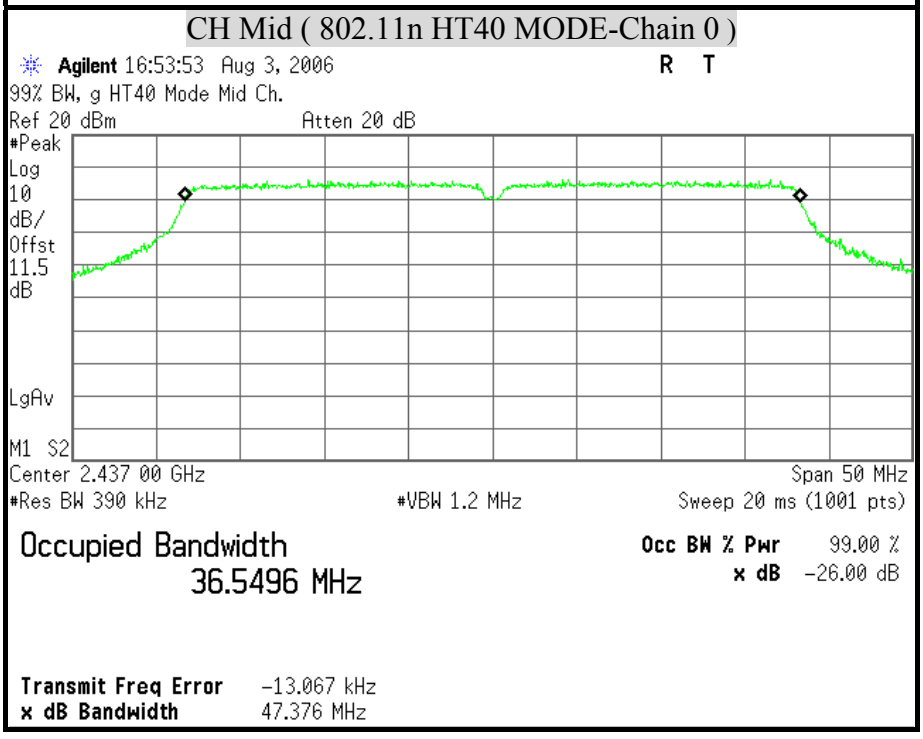
99% BANDWIDTH (802.11n HT40 MODE)

3dBi Antenna

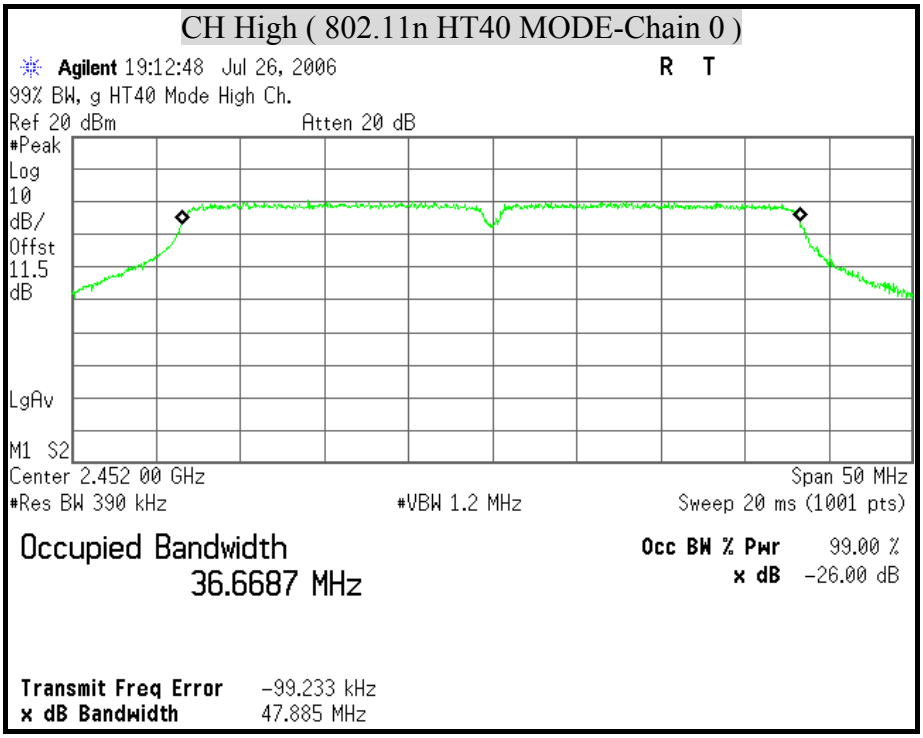
CH Low (802.11n HT40 MODE-Chain 0)



CH Mid (802.11n HT40 MODE-Chain 0)

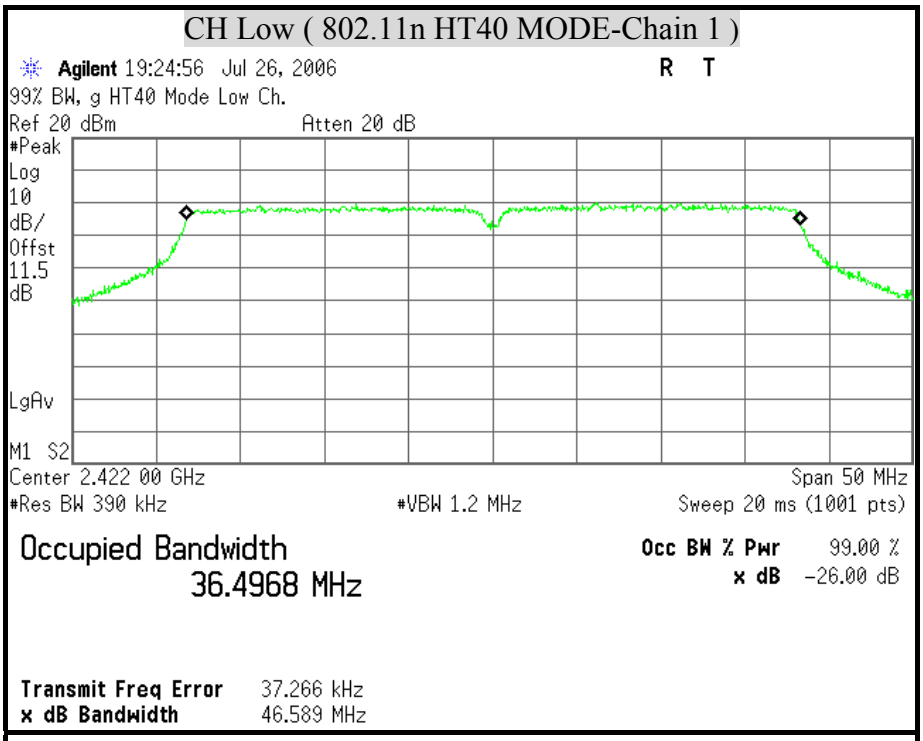


CH High (802.11n HT40 MODE-Chain 0)

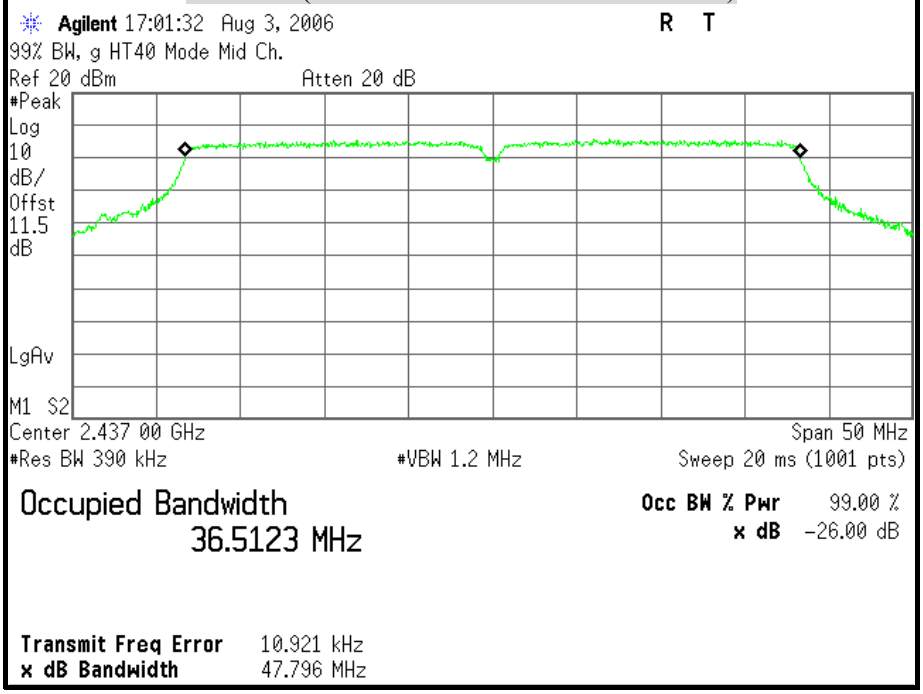


3dBi Antenna

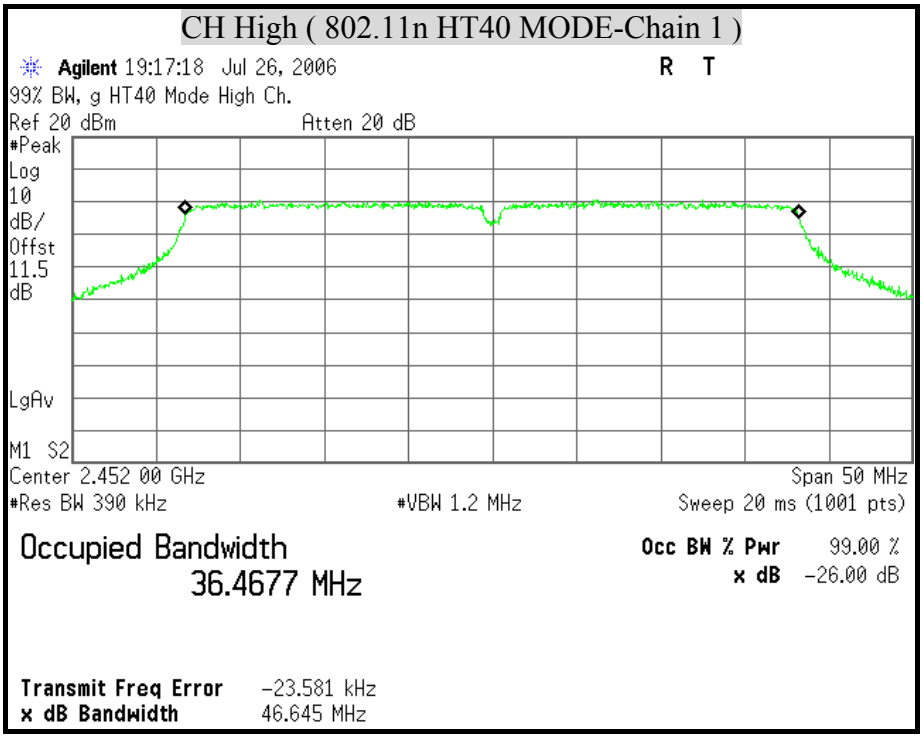
CH Low (802.11n HT40 MODE-Chain 1)



CH Mid (802.11n HT40 MODE-Chain 1)

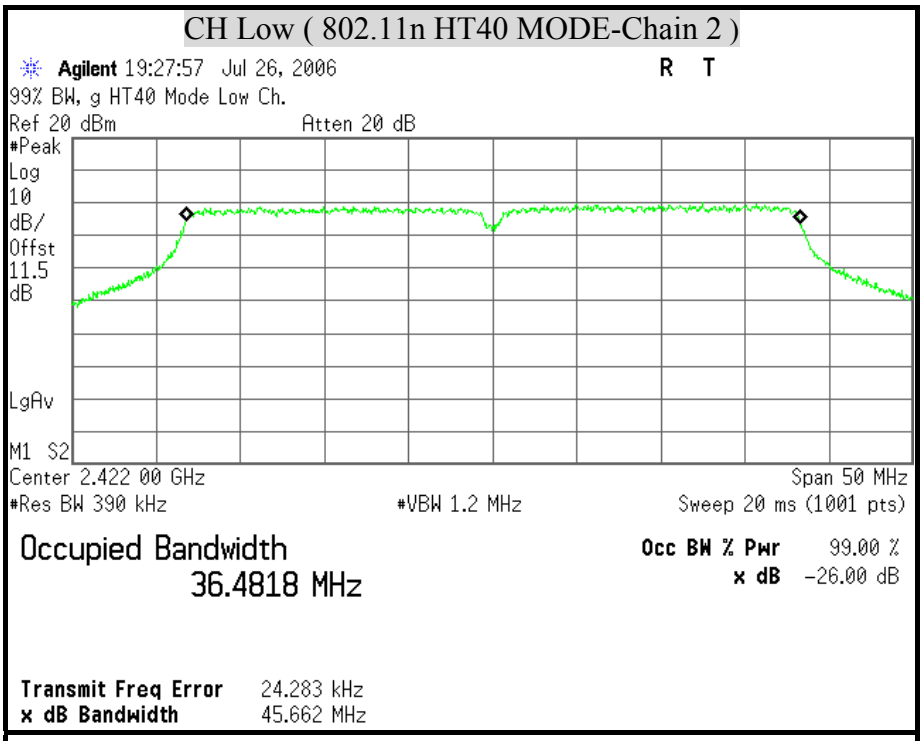


CH High (802.11n HT40 MODE-Chain 1)

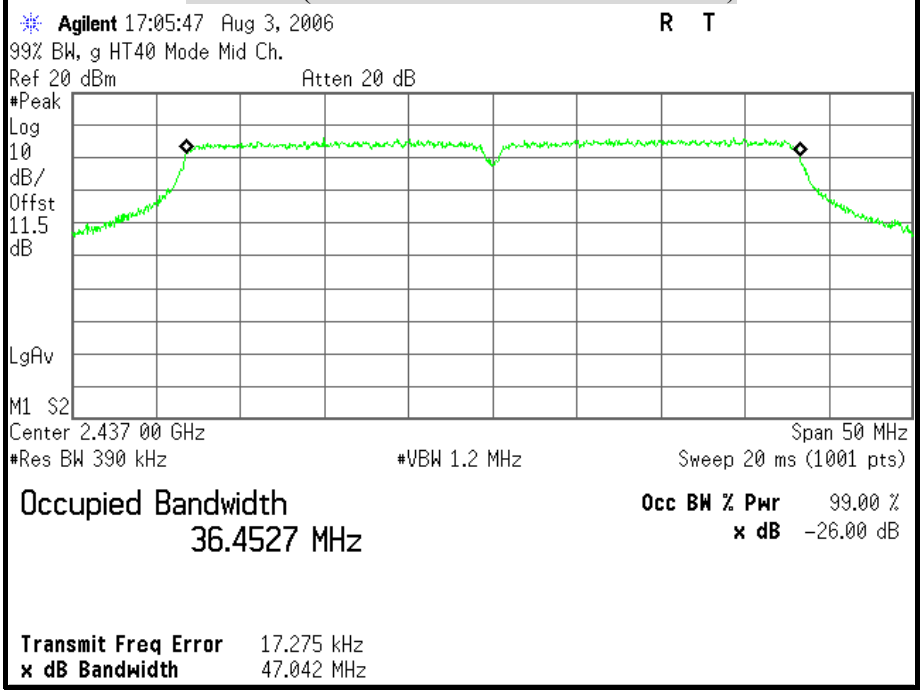


3dBi Antenna

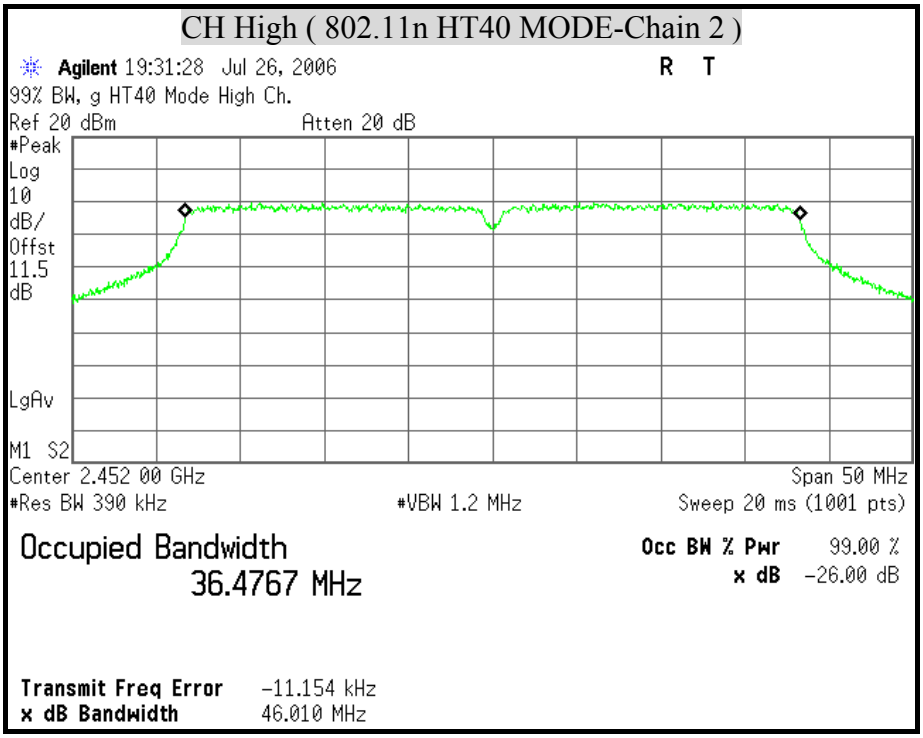
CH Low (802.11n HT40 MODE-Chain 2)



CH Mid (802.11n HT40 MODE-Chain 2)



CH High (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 :

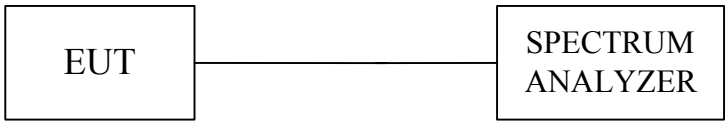
§ 15.247(b) (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands : 1 watt.

§ 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 EQUIPMENTS

Description & Manufacturer	Model No.	Serial No.	Date of Calibration
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	September 24, 2005
AGILENT SPECTRUM ANALYZER	E4446A	MY433601.32	March 22 , 2006

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

For Dipole 2dBi Antenna (1):

Total peak power calculation formula:
10 log (10^ (Chain 0 Power / 10) + 10^ (Chain1 Power / 10) + 10^ (Chain 2 Power /10)).

The maximum antenna gain is 2dBi for other than fixed, point-to-point operations, therefore the limit is 30 dBm. In the legacy mode, the effective antenna gain is 2 + 10 x Log (3) = 6.77 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	23.20	23.32	23.12	27.98	29.23	PASS
Middle	2437	23.36	23.46	23.55	28.22	29.23	PASS
High	2462	22.87	22.68	22.76	27.54	29.23	PASS

Note : 1. At finial test to get the worst-case emission at 11Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 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	23.60	24.11	24.14	28.72	29.23	PASS
Middle	2437	23.63	24.45	24.40	28.94	29.23	PASS
High	2462	23.57	24.31	24.49	28.91	29.23	PASS

Note : 1.At finial test to get the worst-case emission at 6Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 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)	Peak Power (dBm)			Peak Power Total (dBm)	Peak Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2			
Low	2412	21.85	22.25	22.34	26.92	30	PASS
Middle	2437	24.62	24.89	25.07	29.64	30	PASS
High	2462	22.82	22.95	22.90	27.66	30	PASS

Note : 1.At finial test to get the worst-case emission at 6.5Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 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)	Peak Power (dBm)			Peak Power Total (dBm)	Peak Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2			
Low	2422	19.16	19.77	20.03	24.44	30	PASS
Middle	2437	24.73	24.63	24.74	29.47	30	PASS
High	2452	19.68	20.09	19.56	24.55	30	PASS

Note : 1.At finial test to get the worst-case emission at 13.5Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

For Dipole 3dBi Antenna (2):

Total peak power calculation formula:
10 log (10^ (Chain 0 Power / 10) + 10^ (Chain1 Power / 10) + 10^ (Chain 2 Power /10)).

The maximum antenna gain is 3dBi for other than fixed, point-to-point operations, therefore the limit is 30 dBm. In the legacy mode, the effective antenna gain is 3 + 10 x Log (3) = 7.77 dBi.

IEEE 802.11b 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	22.59	22.60	22.52	27.34	28.23	PASS
Middle	2437	23.36	23.46	23.55	28.22	28.23	PASS
High	2462	22.87	22.68	22.76	27.54	28.23	PASS

Note : 1. At finial test to get the worst-case emission at 11Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 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)	Peak Power (dBm)			Peak Power Total (dBm)	Peak Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2			
Low	2412	22.19	23.17	23.37	27.71	28.23	PASS
Middle	2437	22.52	23.59	23.48	27.99	28.23	PASS
High	2462	23.01	23.43	23.47	28.07	28.23	PASS

Note : 1.At finial test to get the worst-case emission at 6Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 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)	Peak Power (dBm)			Peak Power Total (dBm)	Peak Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2			
Low	2412	19.88	20.61	20.84	25.23	30	PASS
Middle	2437	24.62	24.89	25.07	29.64	30	PASS
High	2462	21.98	21.89	21.70	26.63	30	PASS

Note : 1.At finial test to get the worst-case emission at 6.5Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 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)

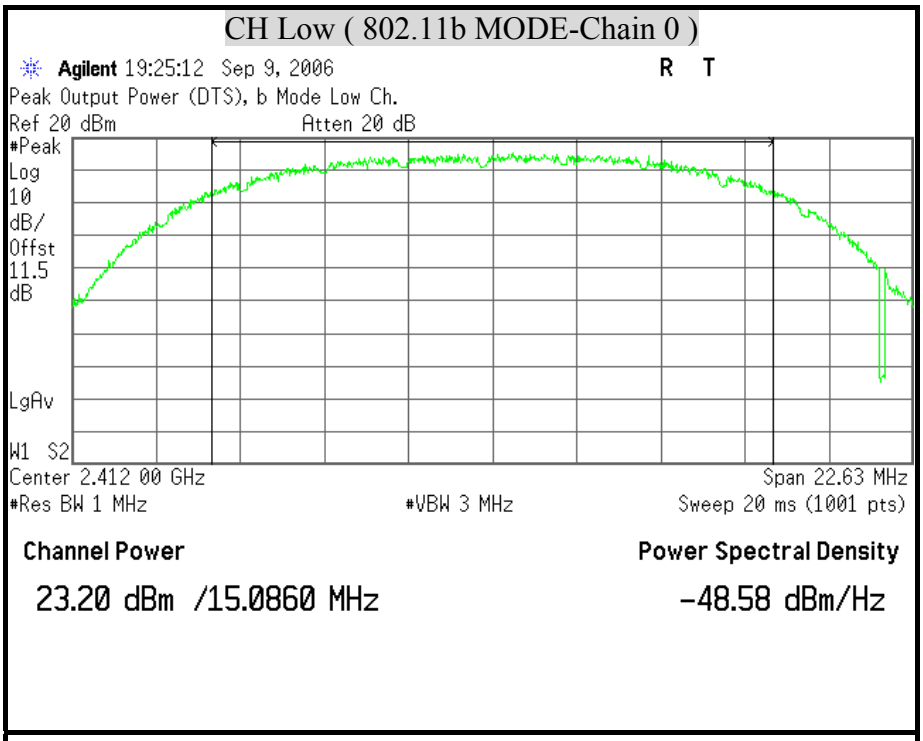
Channel	Channel Frequency (MHz)	Peak Power (dBm)			Peak Power Total (dBm)	Peak Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2			
Low	2422	17.78	18.48	18.48	23.03	30	PASS
Middle	2437	24.73	24.63	24.74	29.47	30	PASS
High	2452	18.87	19.17	18.80	23.72	30	PASS

Note : 1.At finial test to get the worst-case emission at 13.5Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

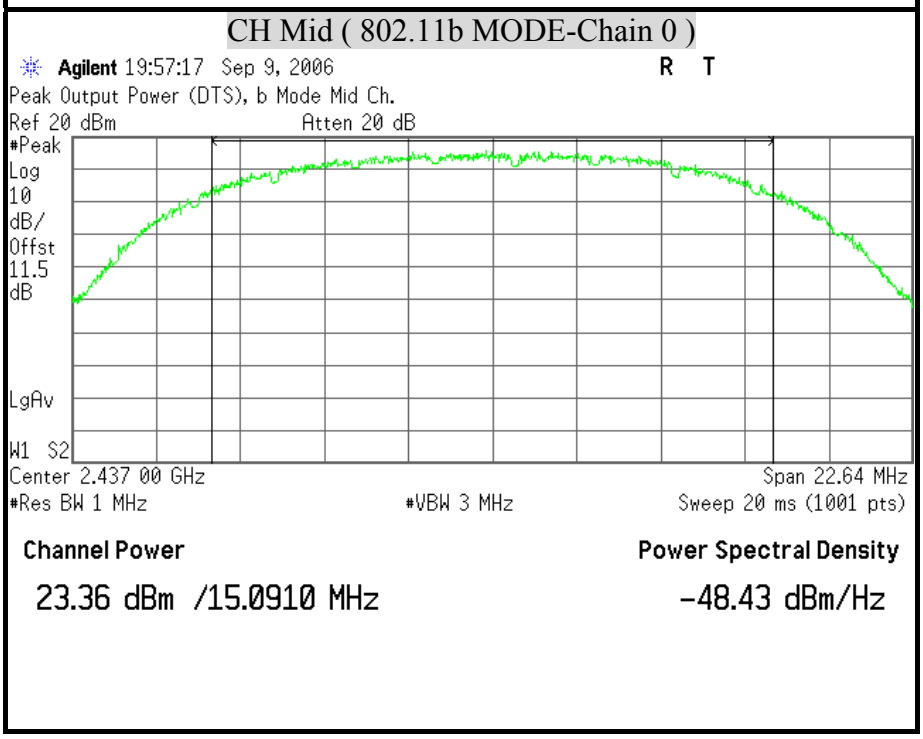
MAXIMUM PEAK OUTPUT POWER (802.11b MODE)

2dBi Antenna

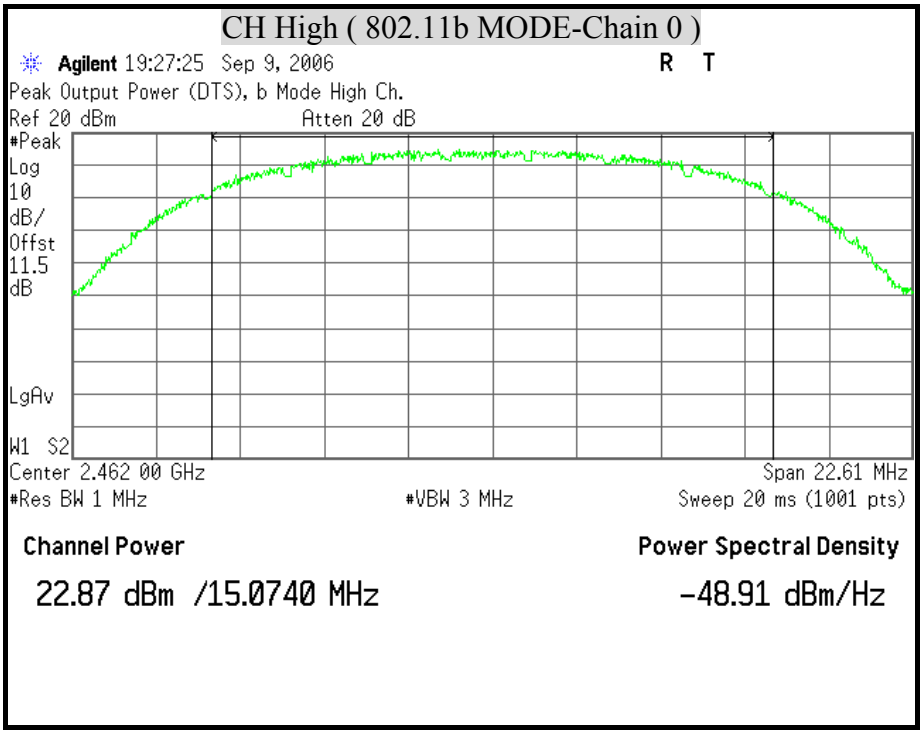
CH Low (802.11b MODE-Chain 0)



CH Mid (802.11b MODE-Chain 0)

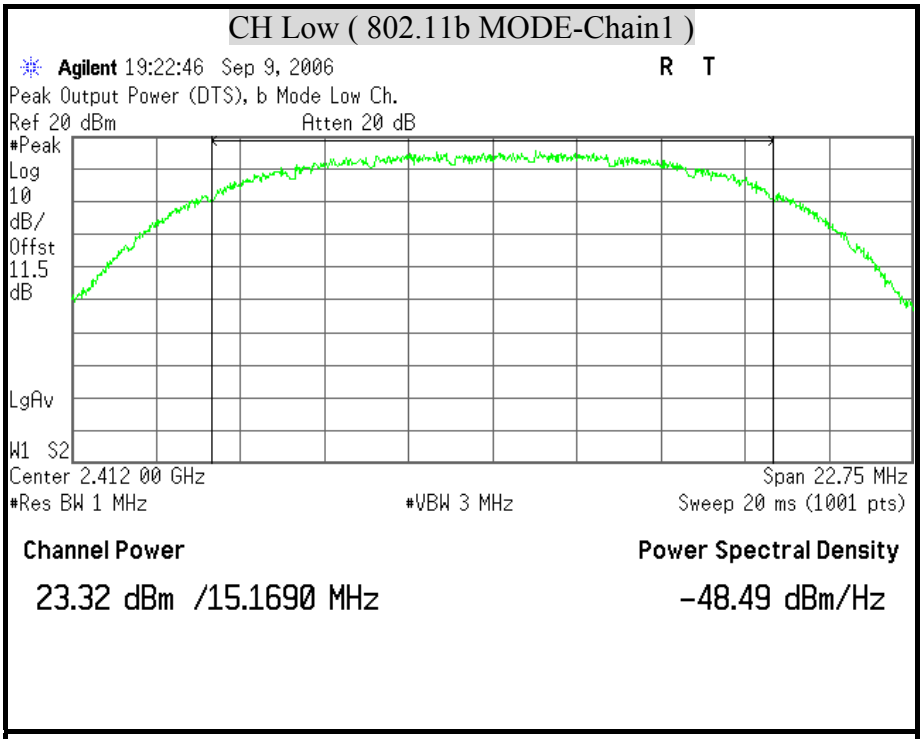


CH High (802.11b MODE-Chain 0)

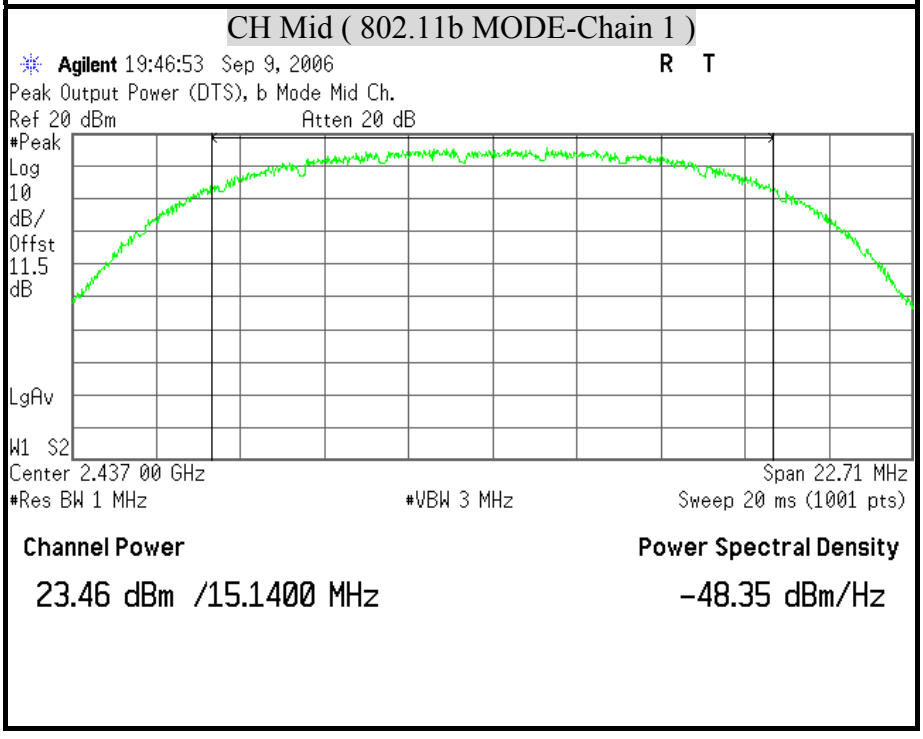


2dBi Antenna

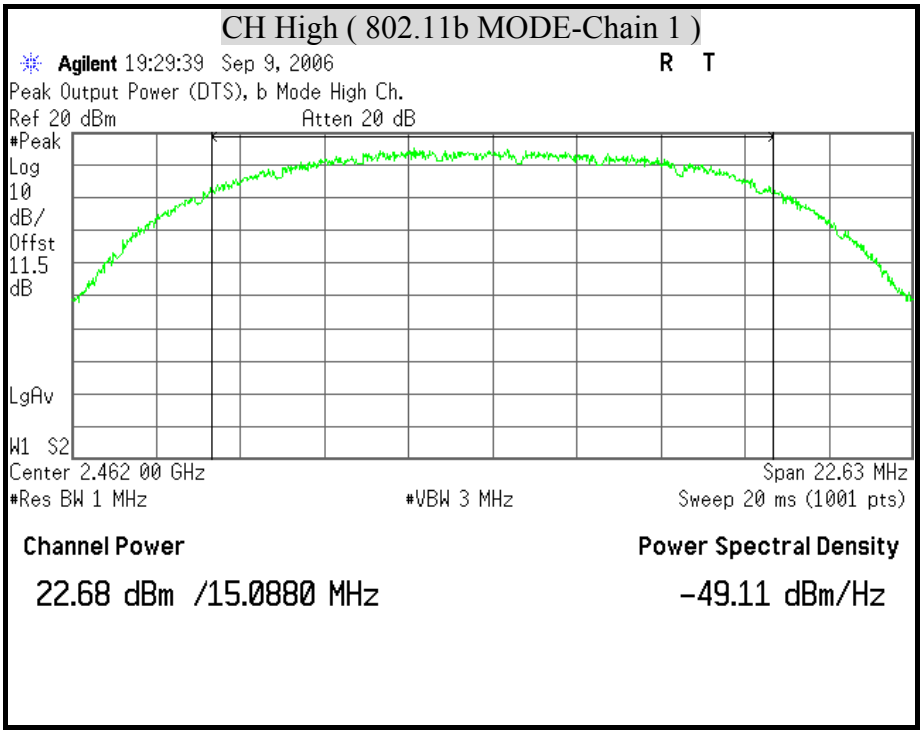
CH Low (802.11b MODE-Chain1)



CH Mid (802.11b MODE-Chain 1)

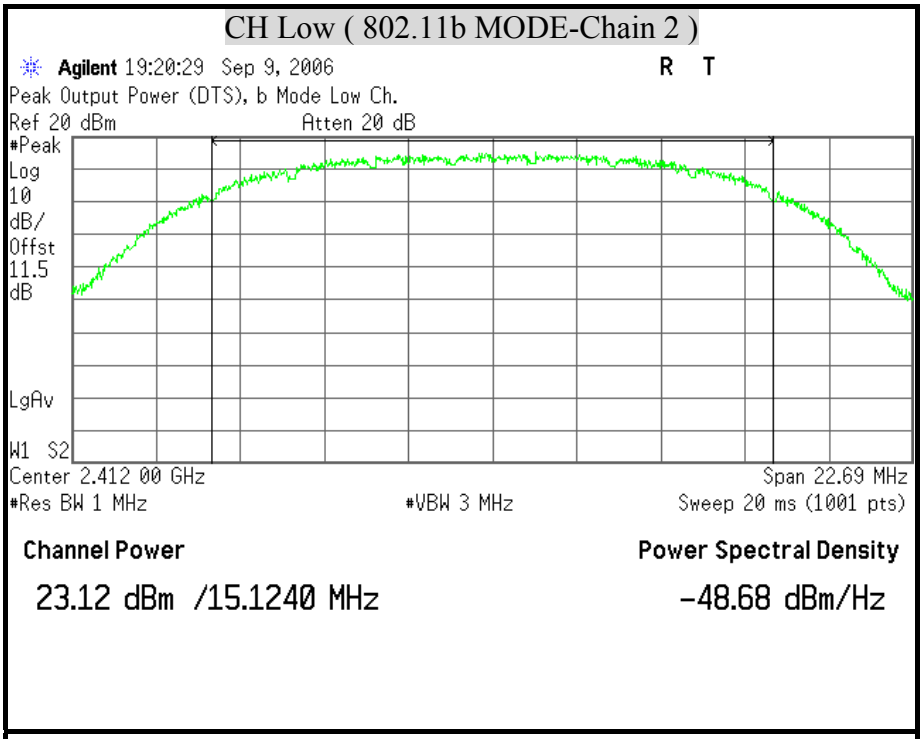


CH High (802.11b MODE-Chain 1)

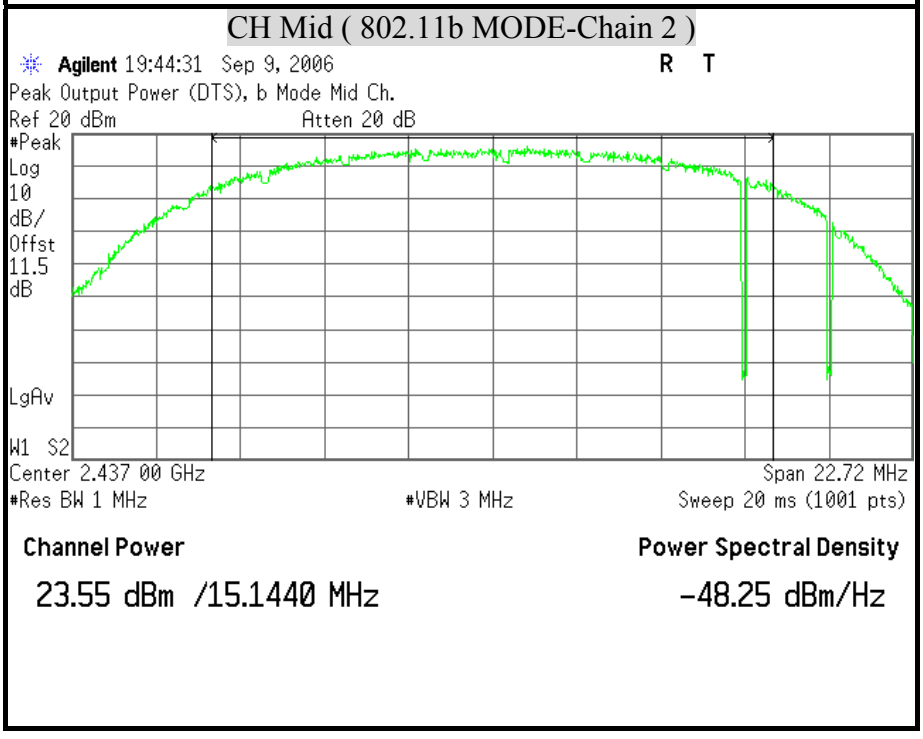


2dBi Antenna

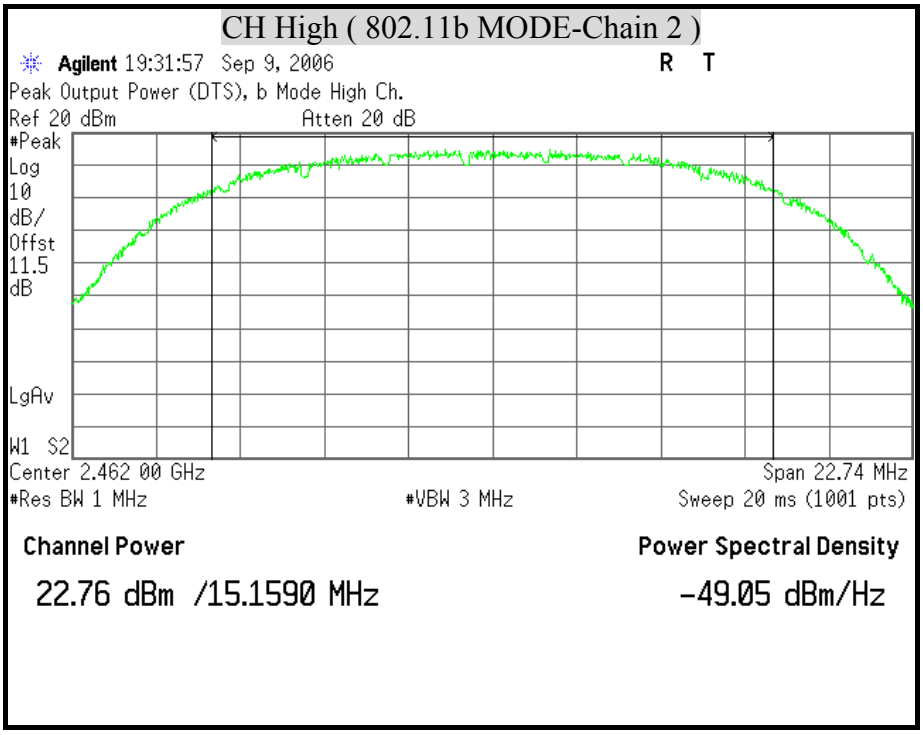
CH Low (802.11b MODE-Chain 2)



CH Mid (802.11b MODE-Chain 2)



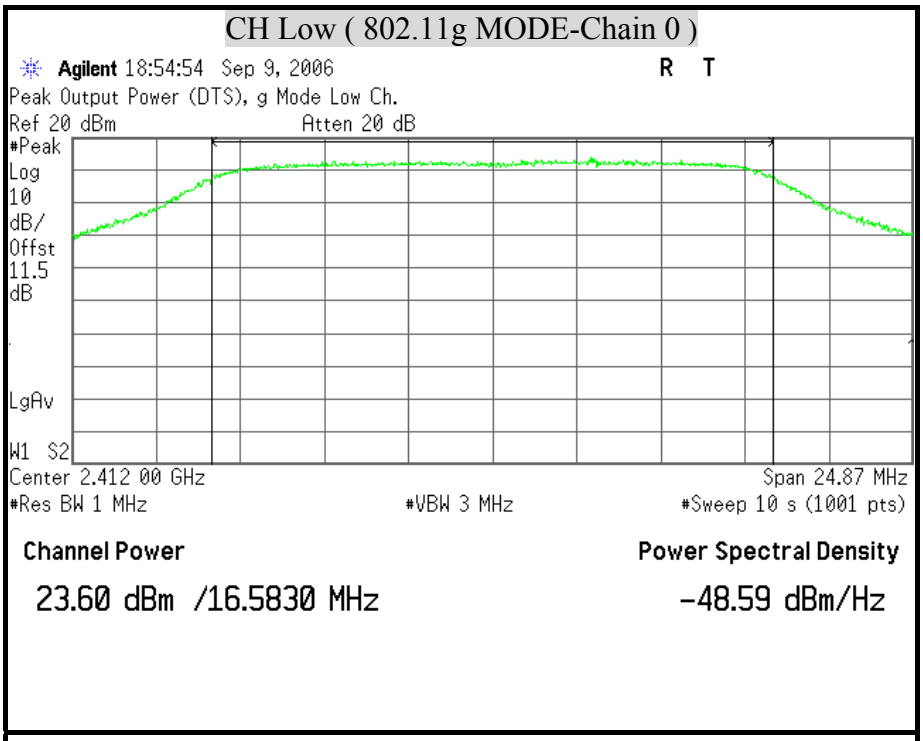
CH High (802.11b MODE-Chain 2)



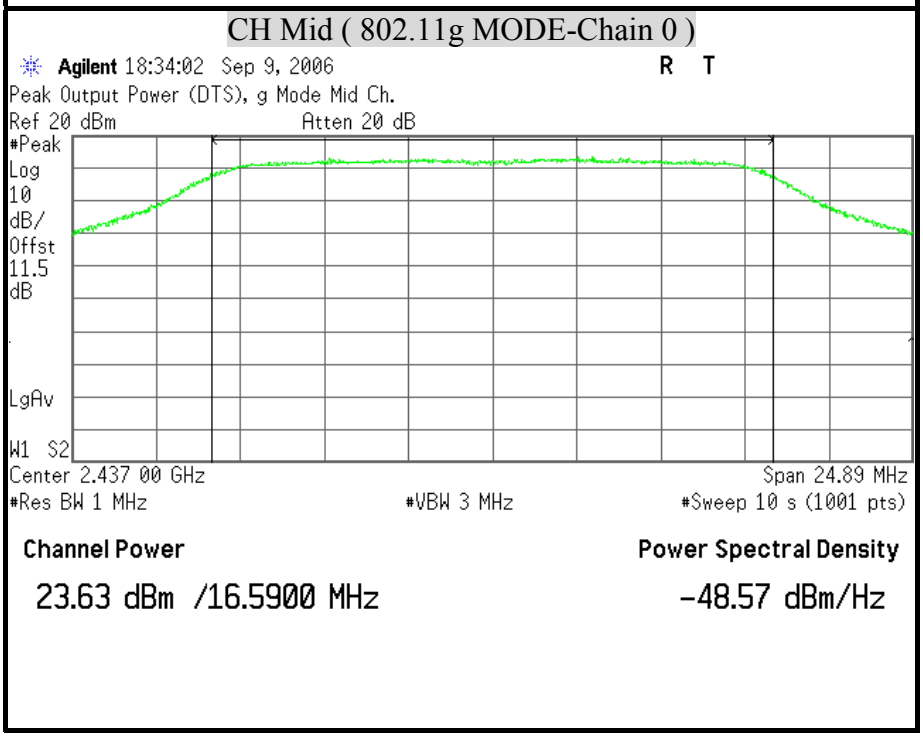
MAXIMUM PEAK OUTPUT POWER (802.11g MODE)

2dBi Antenna

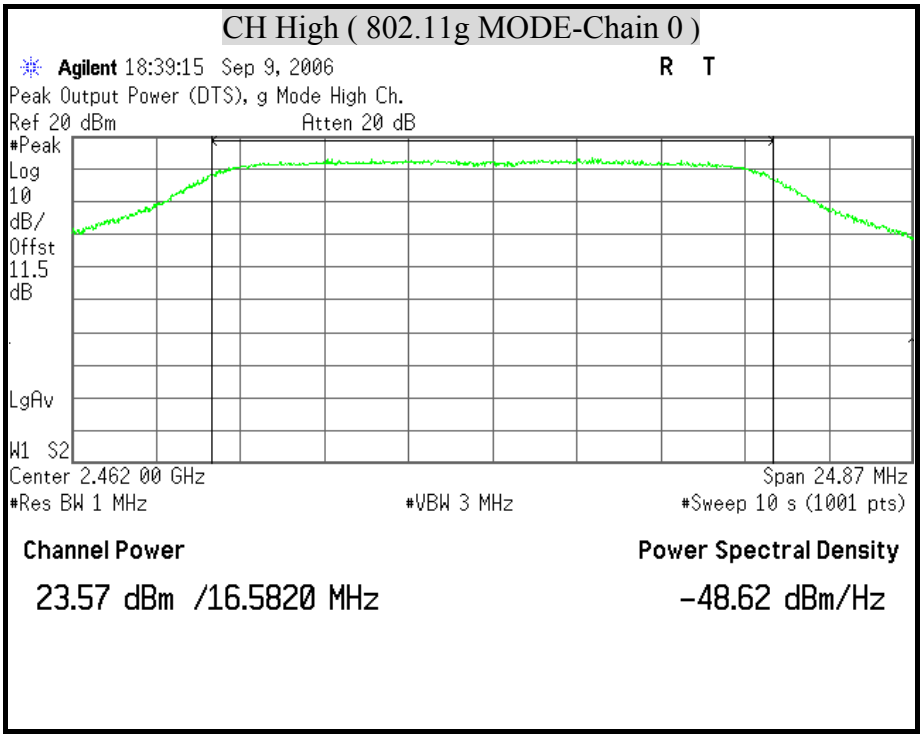
CH Low (802.11g MODE-Chain 0)



CH Mid (802.11g MODE-Chain 0)

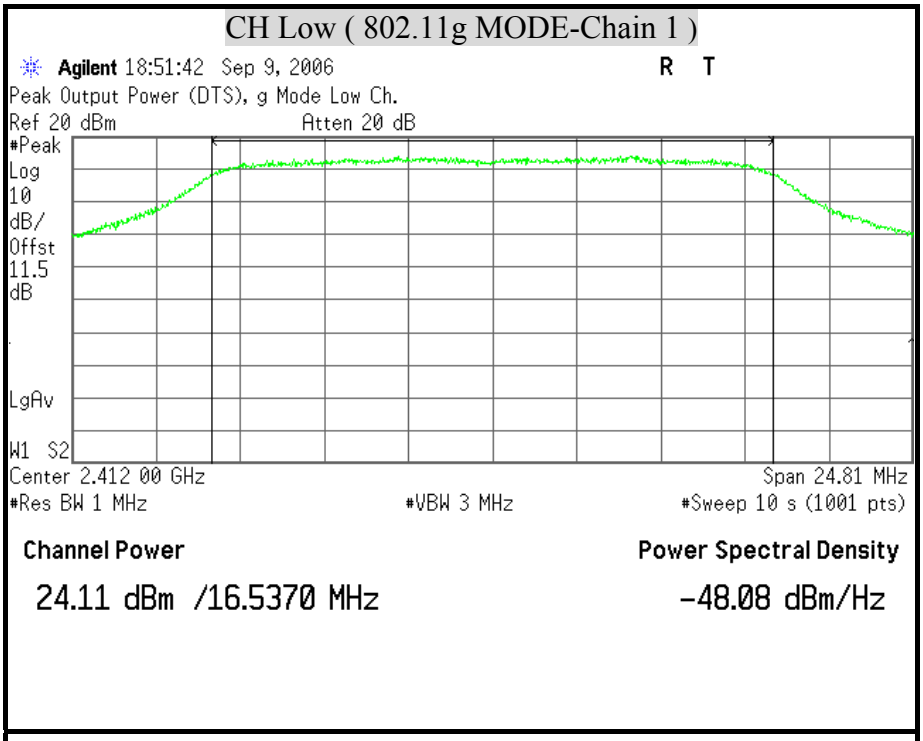


CH High (802.11g MODE-Chain 0)

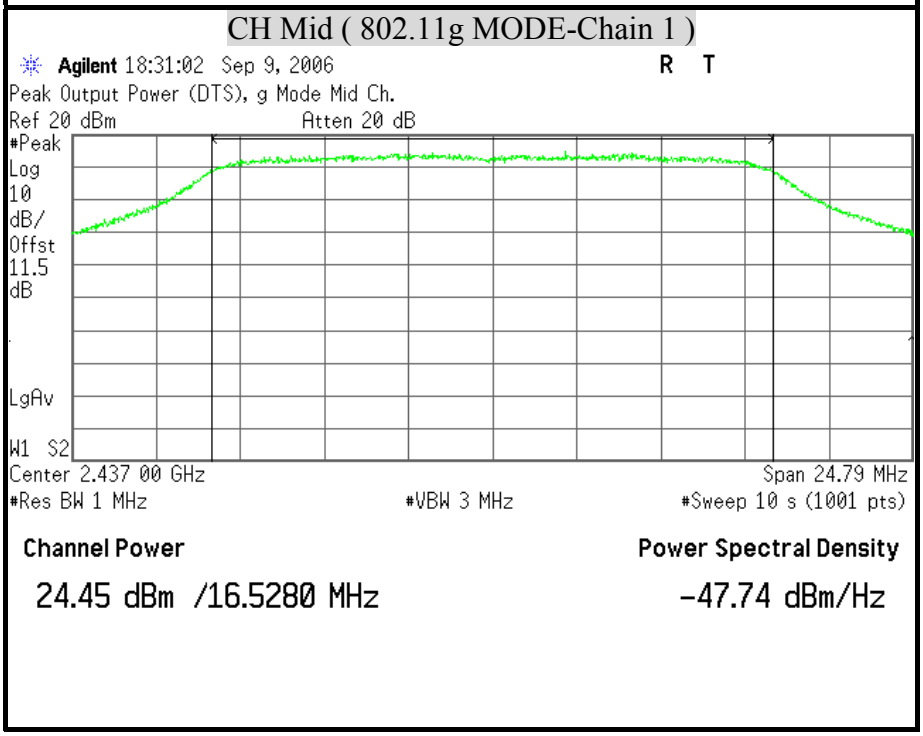


2dBi Antenna

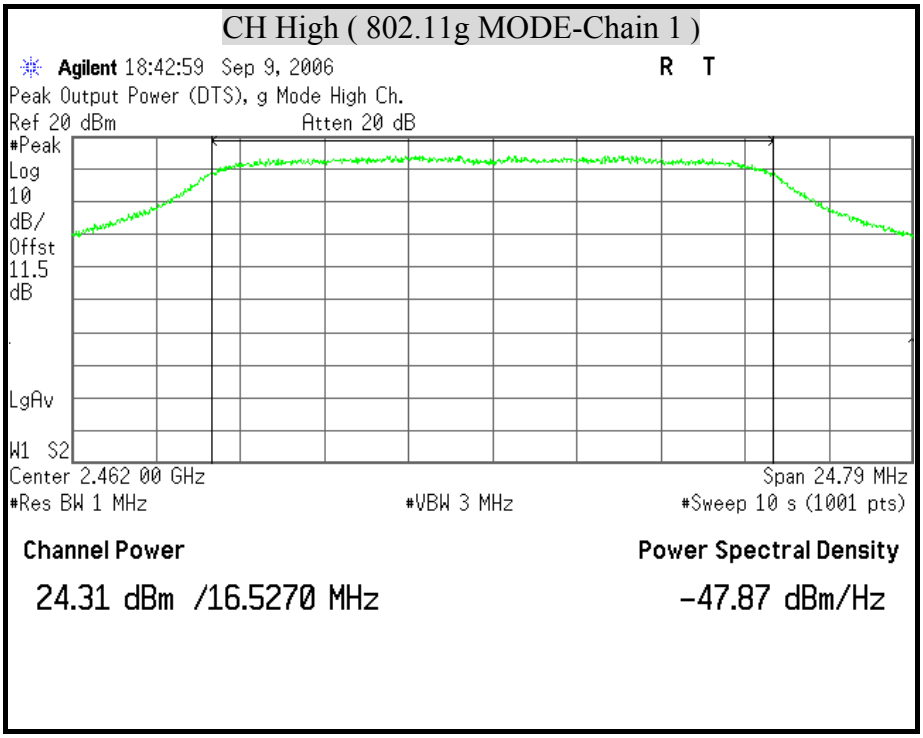
CH Low (802.11g MODE-Chain 1)



CH Mid (802.11g MODE-Chain 1)

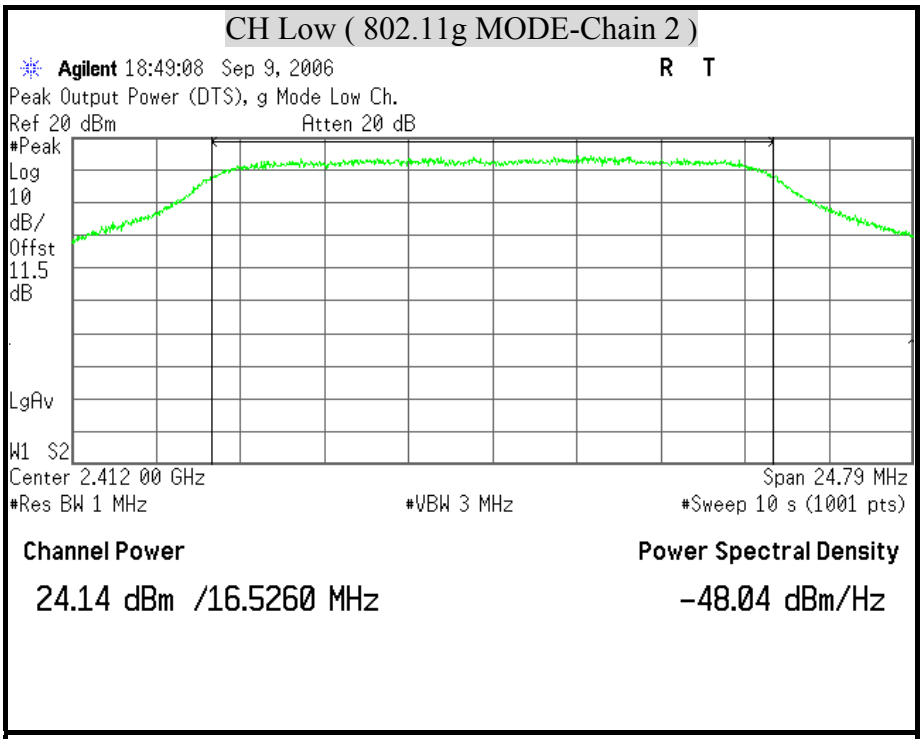


CH High (802.11g MODE-Chain 1)

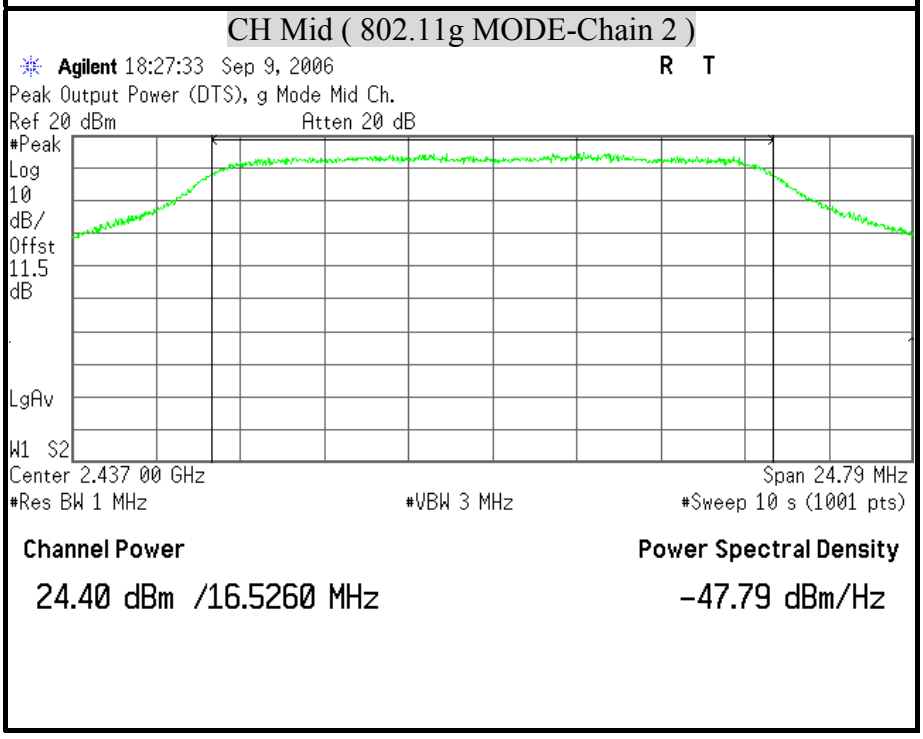


2dBi Antenna

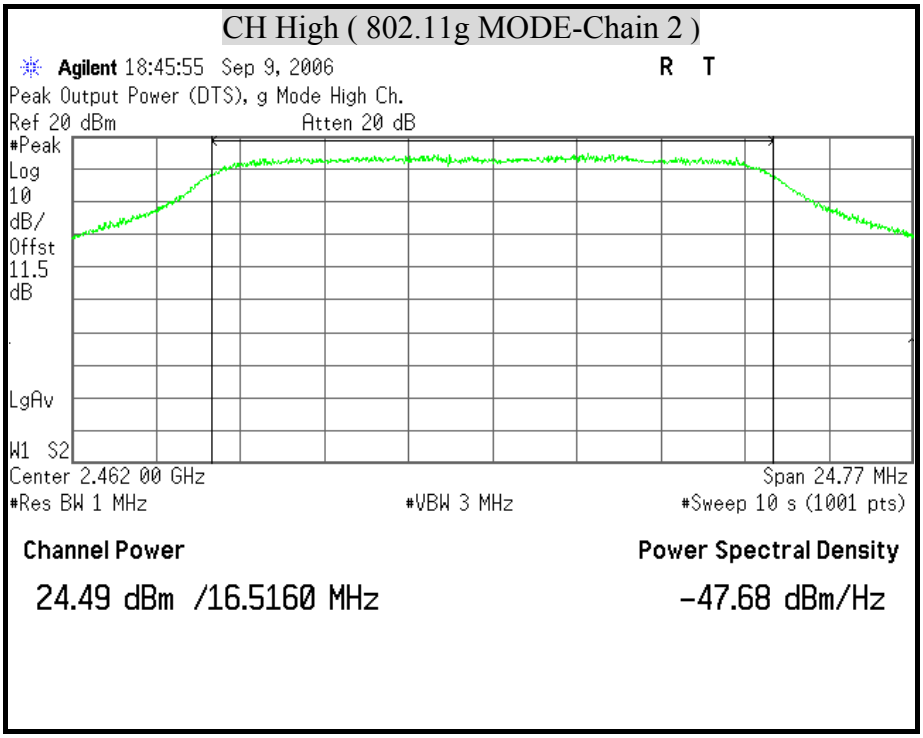
CH Low (802.11g MODE-Chain 2)



CH Mid (802.11g MODE-Chain 2)



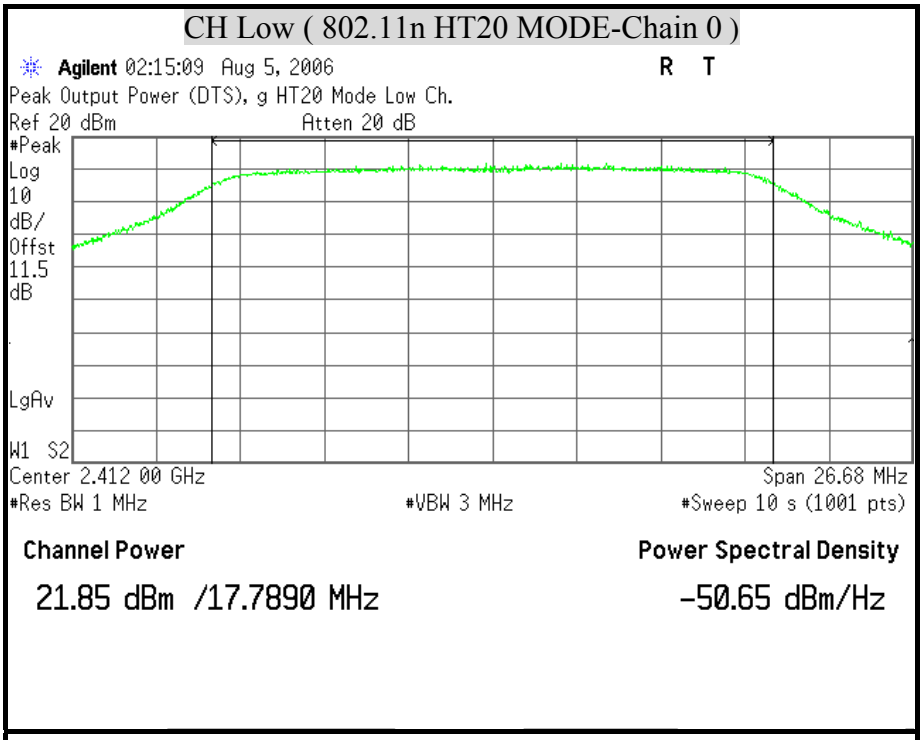
CH High (802.11g MODE-Chain 2)



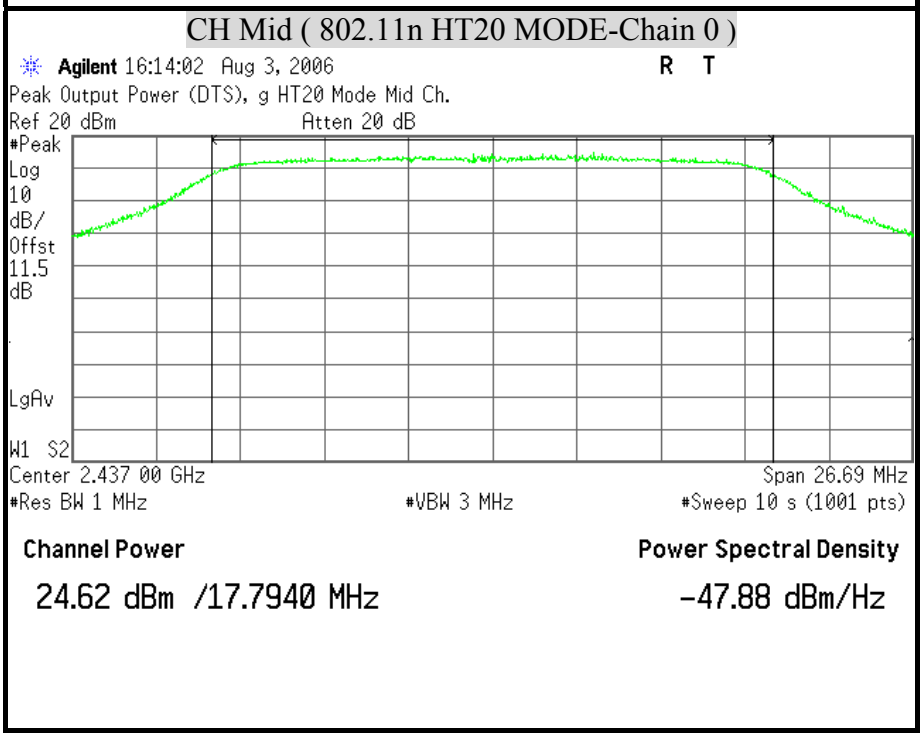
MAXIMUM PEAK OUTPUT POWER (802.11n HT20 MODE)

2dBi Antenna

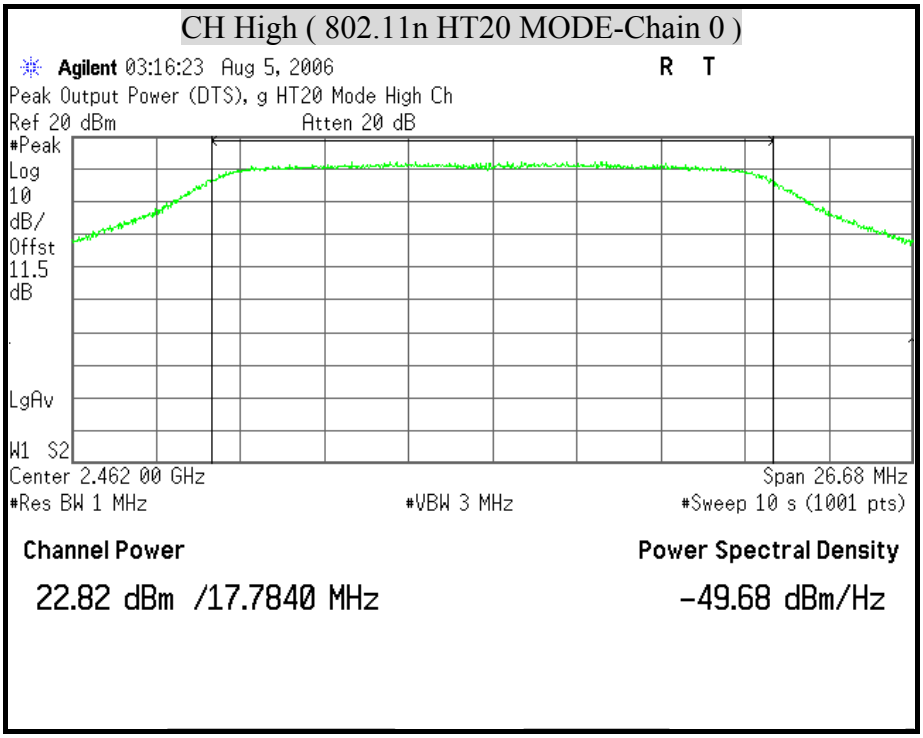
CH Low (802.11n HT20 MODE-Chain 0)



CH Mid (802.11n HT20 MODE-Chain 0)

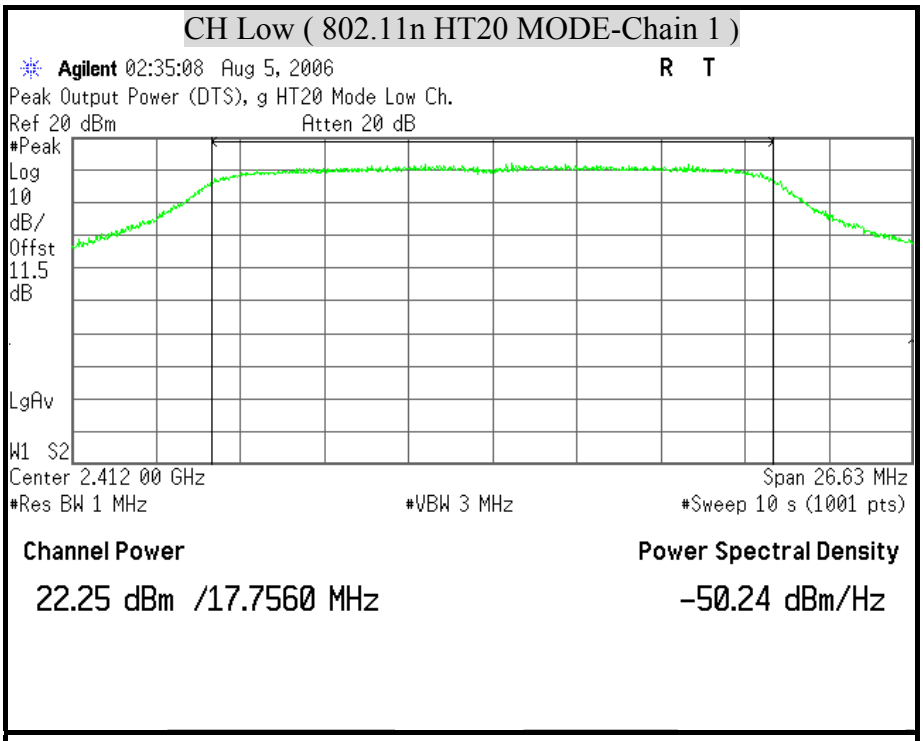


CH High (802.11n HT20 MODE-Chain 0)

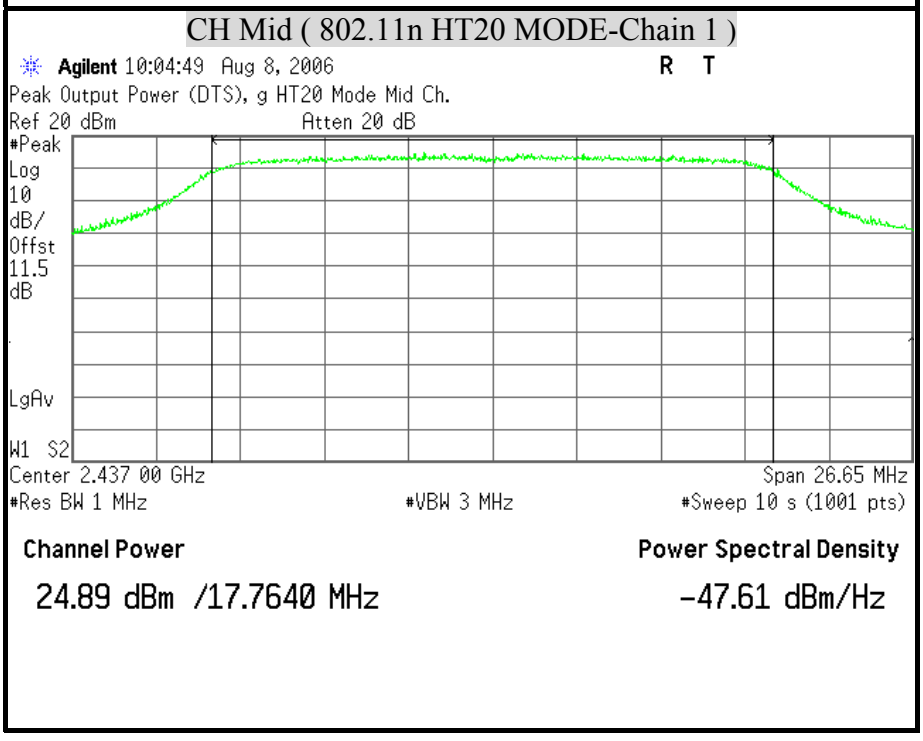


2dBi Antenna

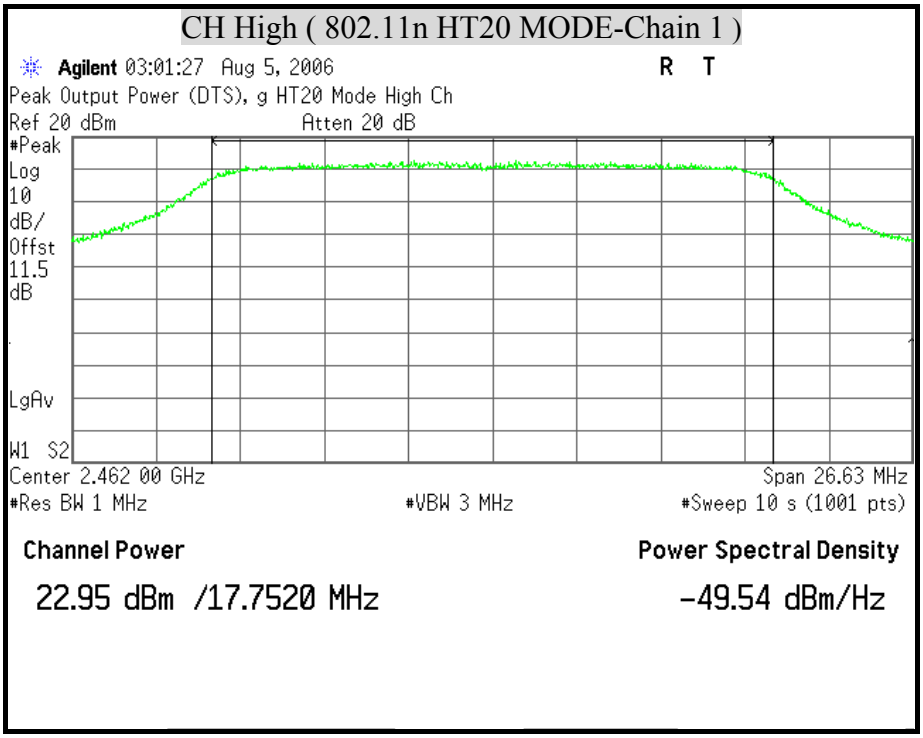
CH Low (802.11n HT20 MODE-Chain 1)



CH Mid (802.11n HT20 MODE-Chain 1)

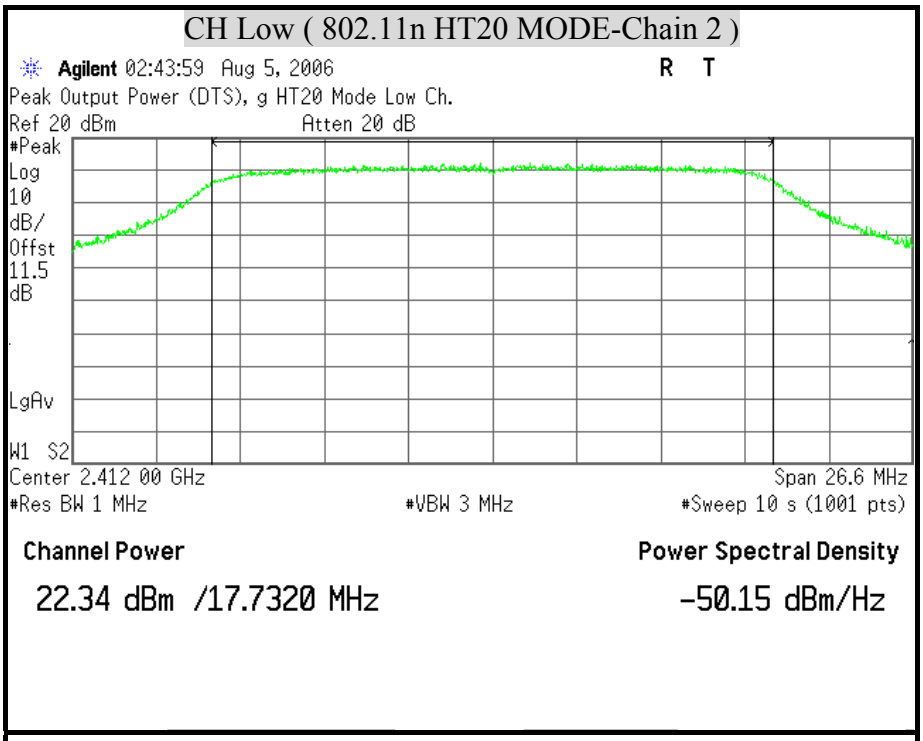


CH High (802.11n HT20 MODE-Chain 1)

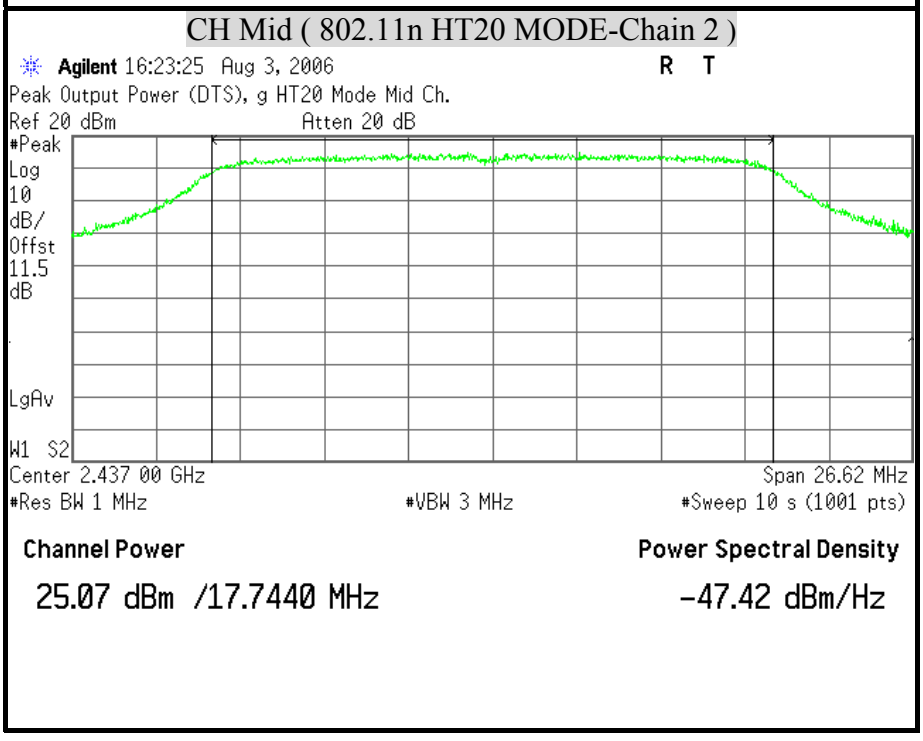


2dBi Antenna

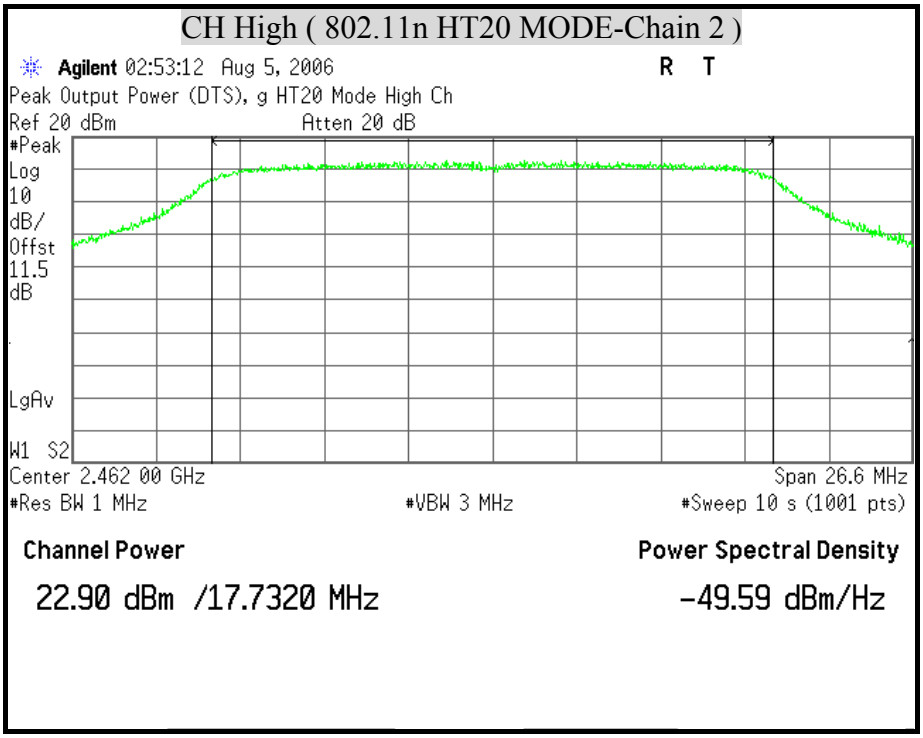
CH Low (802.11n HT20 MODE-Chain 2)



CH Mid (802.11n HT20 MODE-Chain 2)



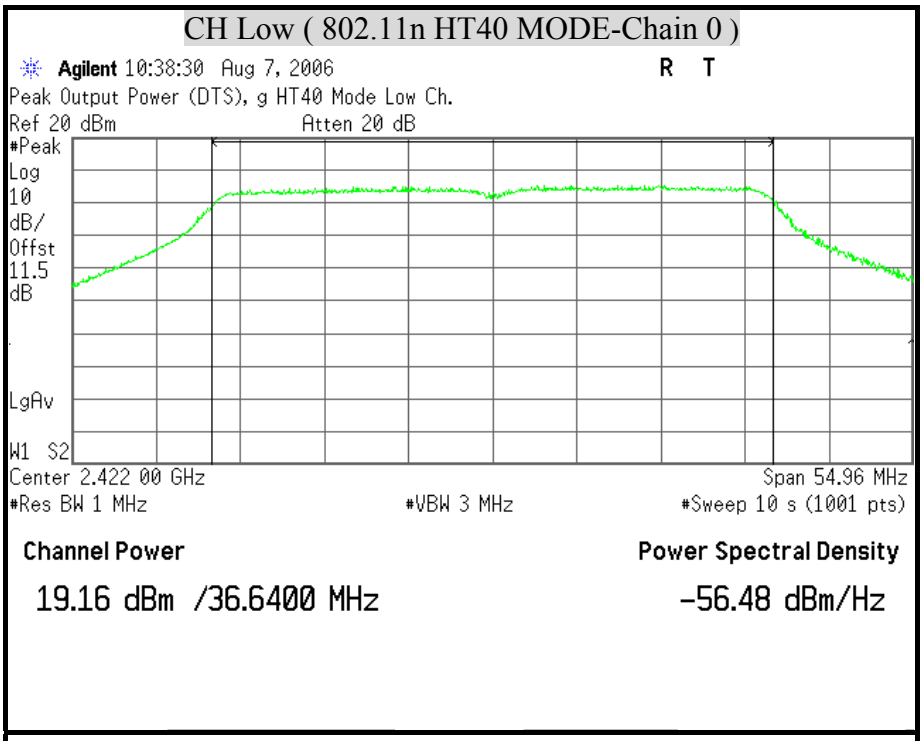
CH High (802.11n HT20 MODE-Chain 2)



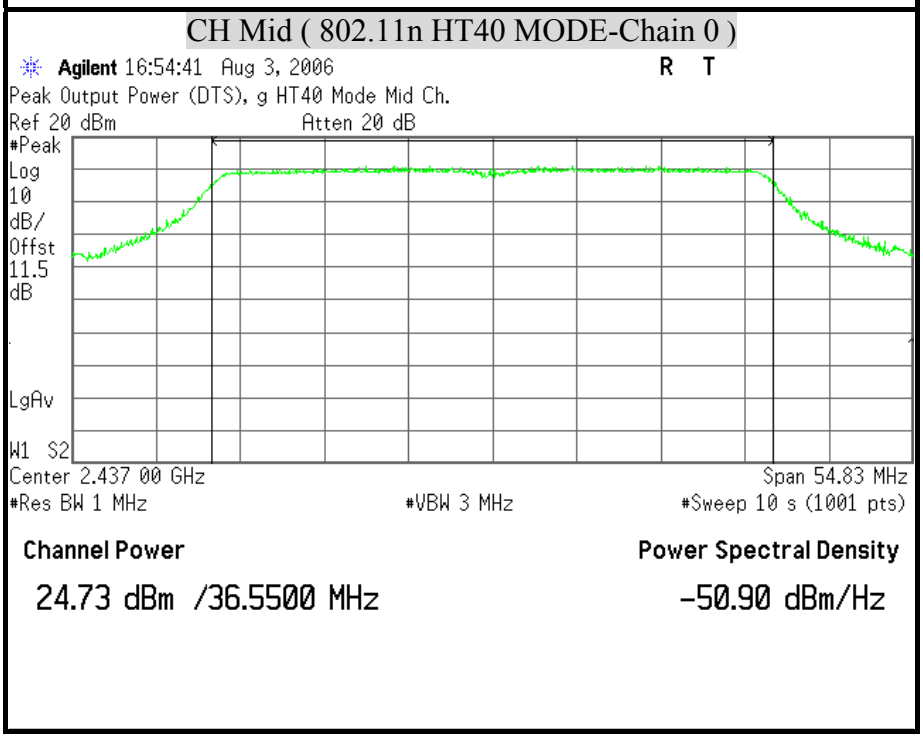
MAXIMUM PEAK OUTPUT POWER (802.11n HT40 MODE)

2dBi Antenna

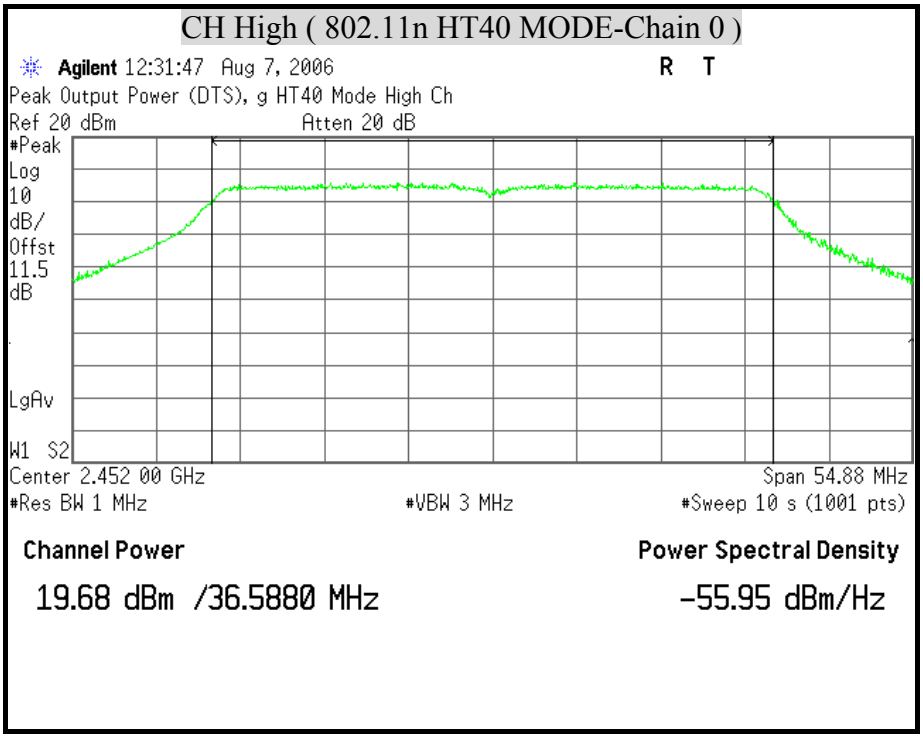
CH Low (802.11n HT40 MODE-Chain 0)



CH Mid (802.11n HT40 MODE-Chain 0)

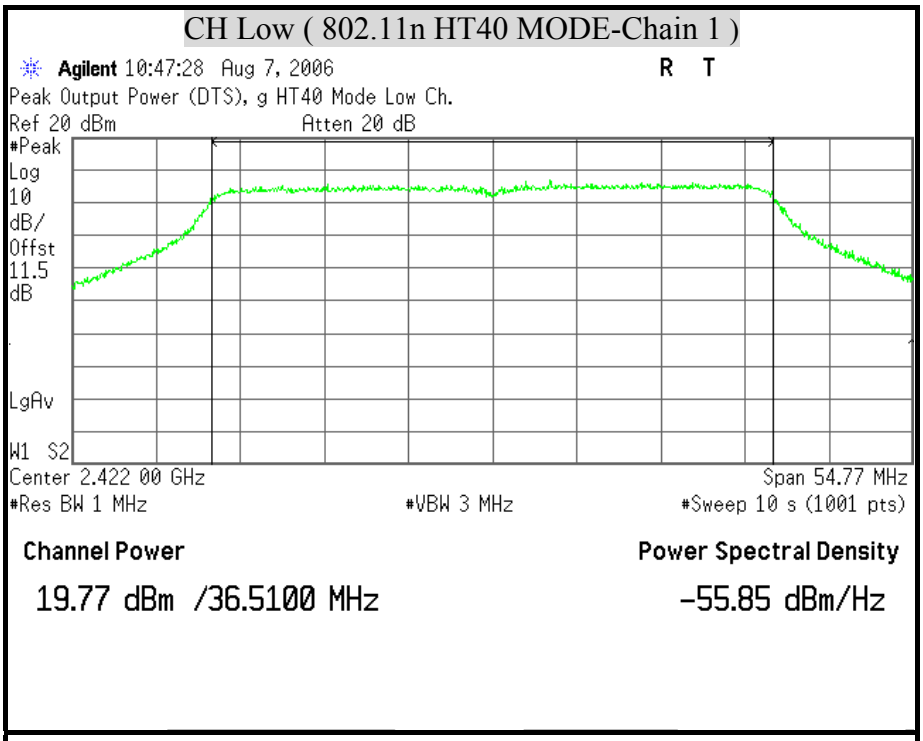


CH High (802.11n HT40 MODE-Chain 0)

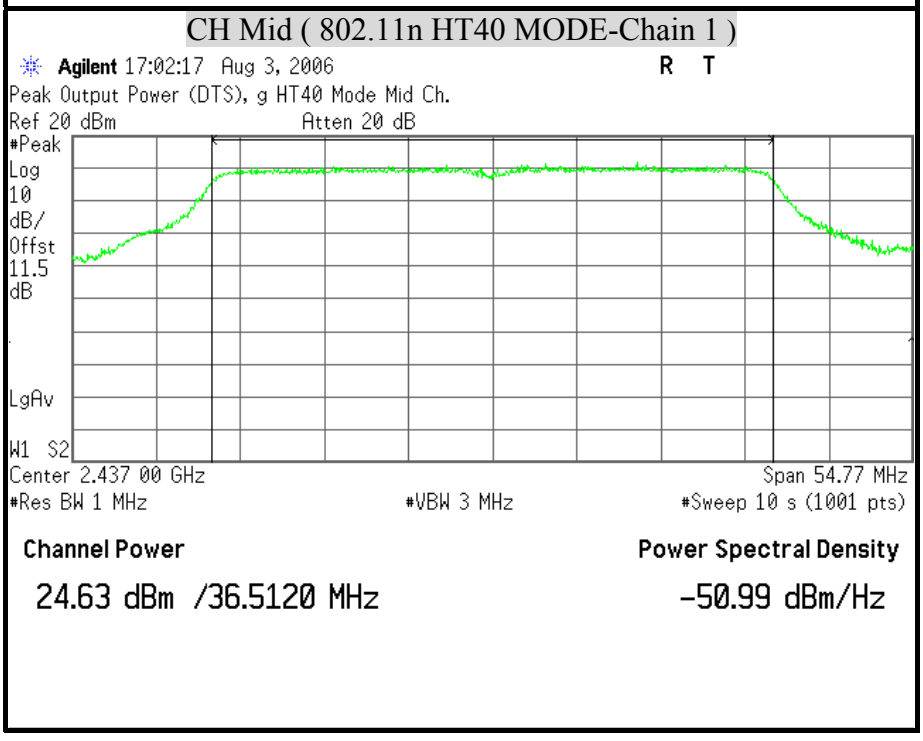


2dBi Antenna

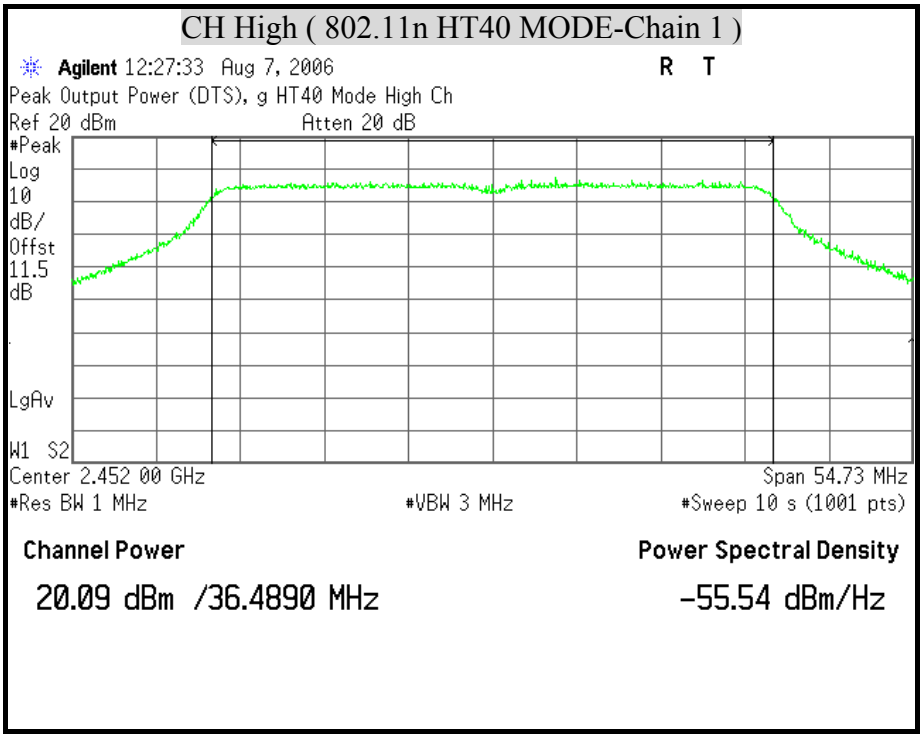
CH Low (802.11n HT40 MODE-Chain 1)



CH Mid (802.11n HT40 MODE-Chain 1)

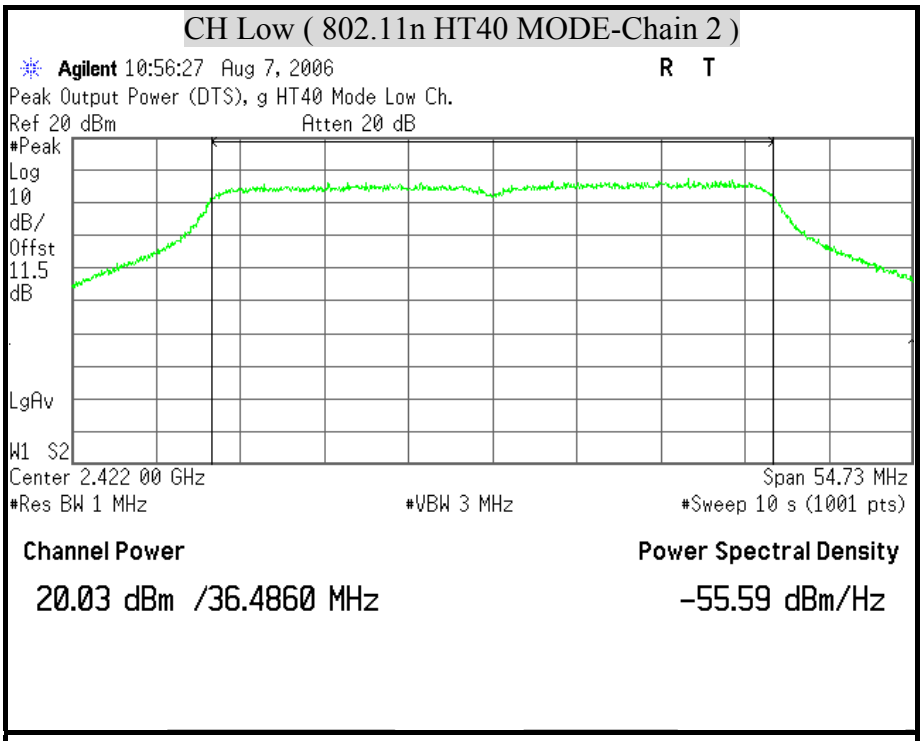


CH High (802.11n HT40 MODE-Chain 1)

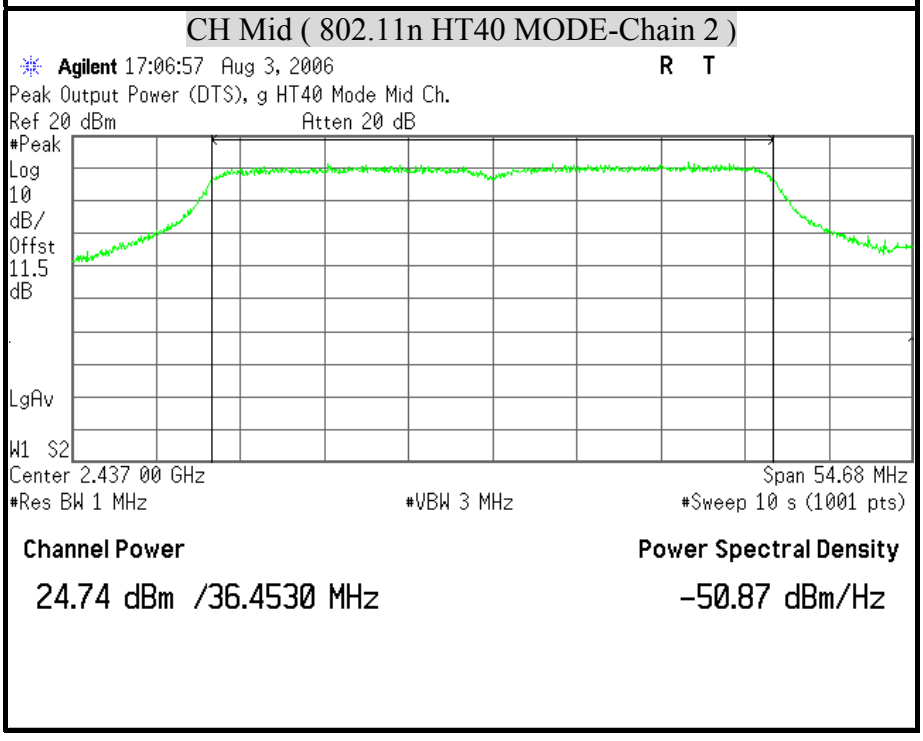


2dBi Antenna

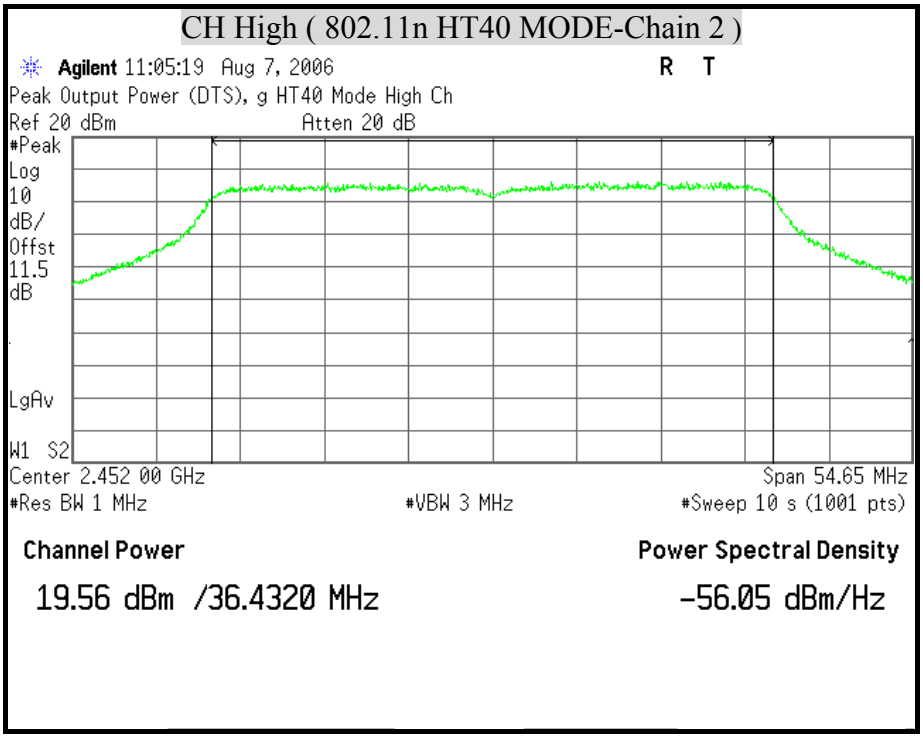
CH Low (802.11n HT40 MODE-Chain 2)



CH Mid (802.11n HT40 MODE-Chain 2)



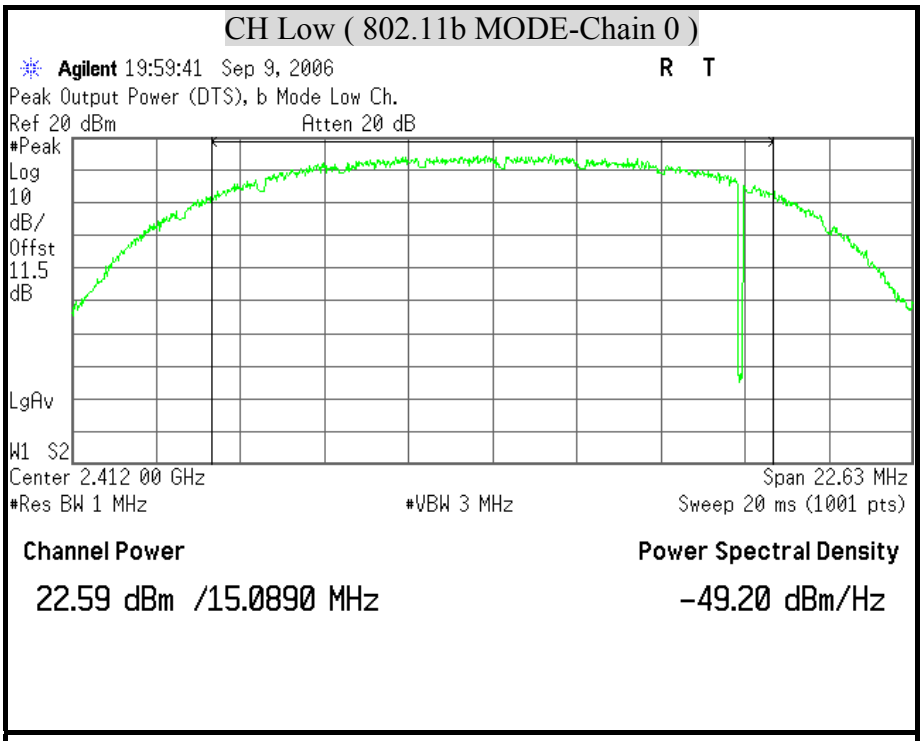
CH High (802.11n HT40 MODE-Chain 2)



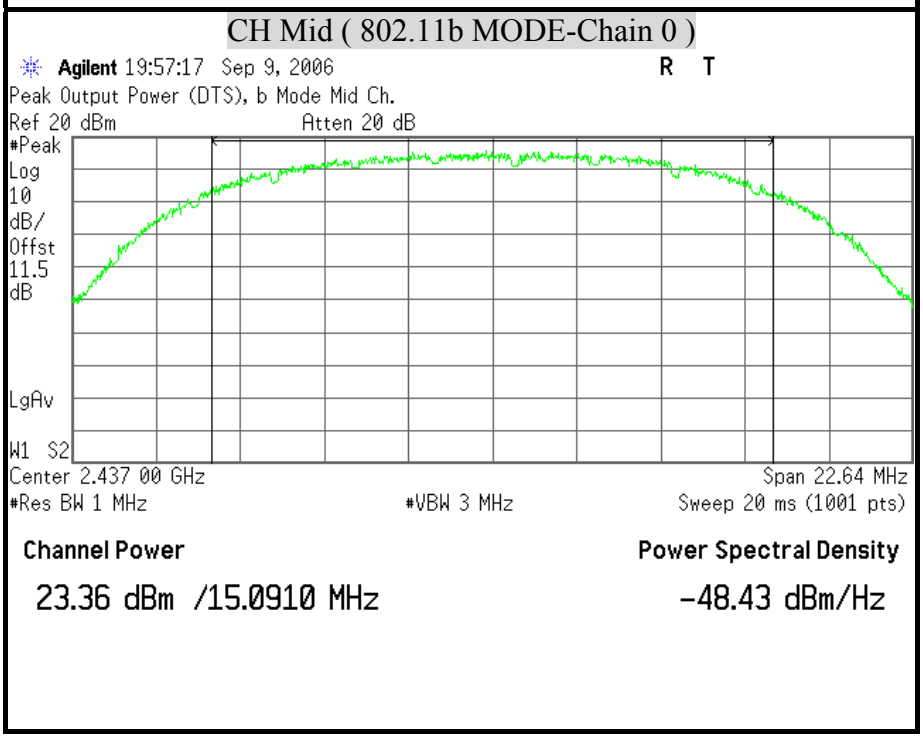
MAXIMUM PEAK OUTPUT POWER (802.11b MODE)

3dBi Antenna

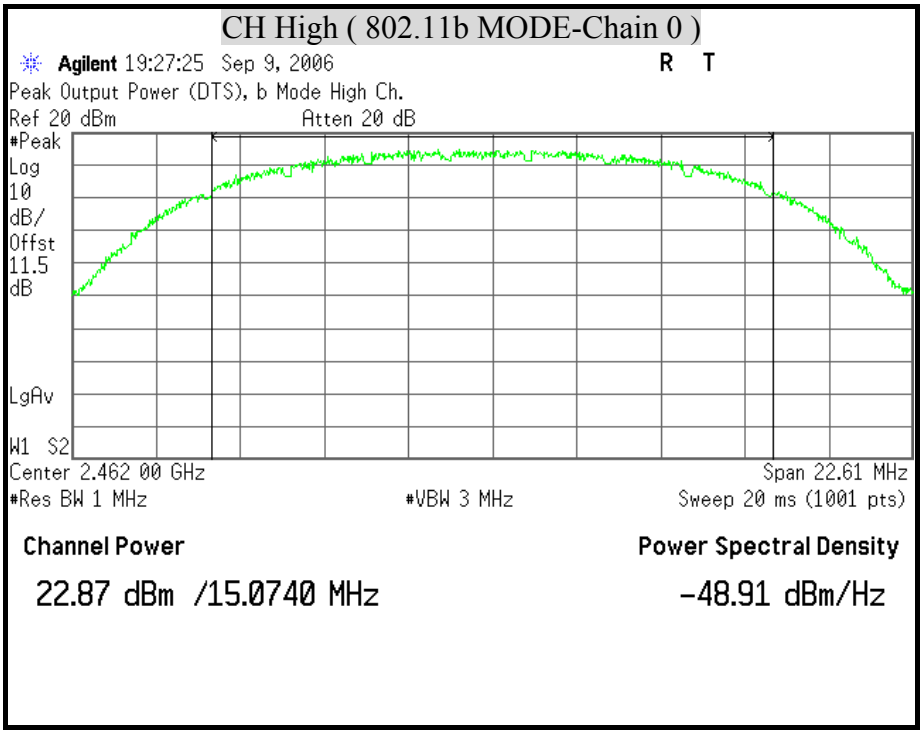
CH Low (802.11b MODE-Chain 0)



CH Mid (802.11b MODE-Chain 0)

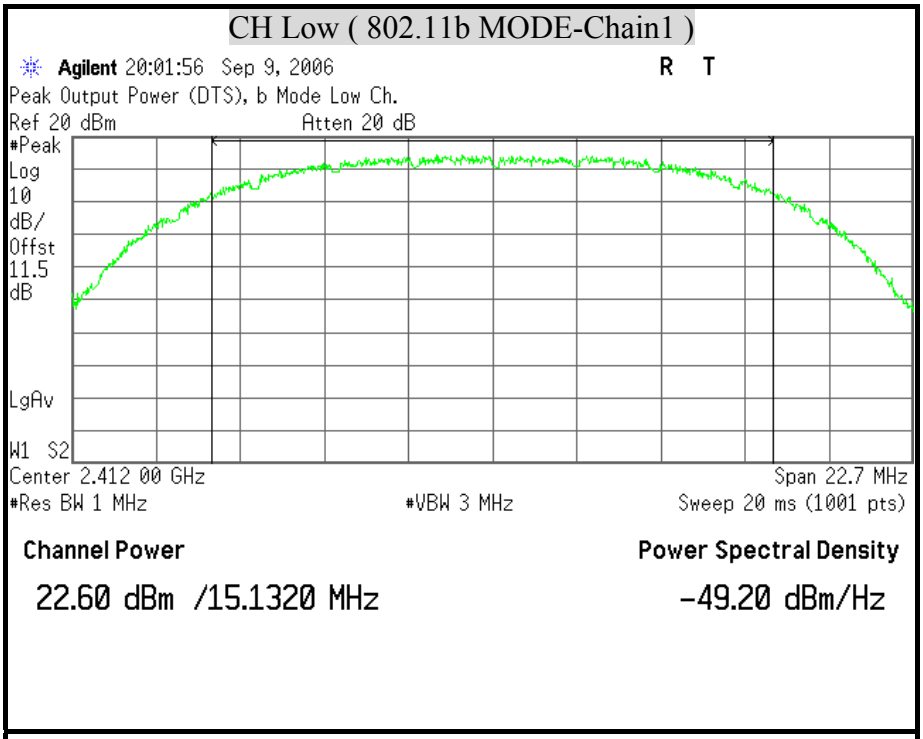


CH High (802.11b MODE-Chain 0)

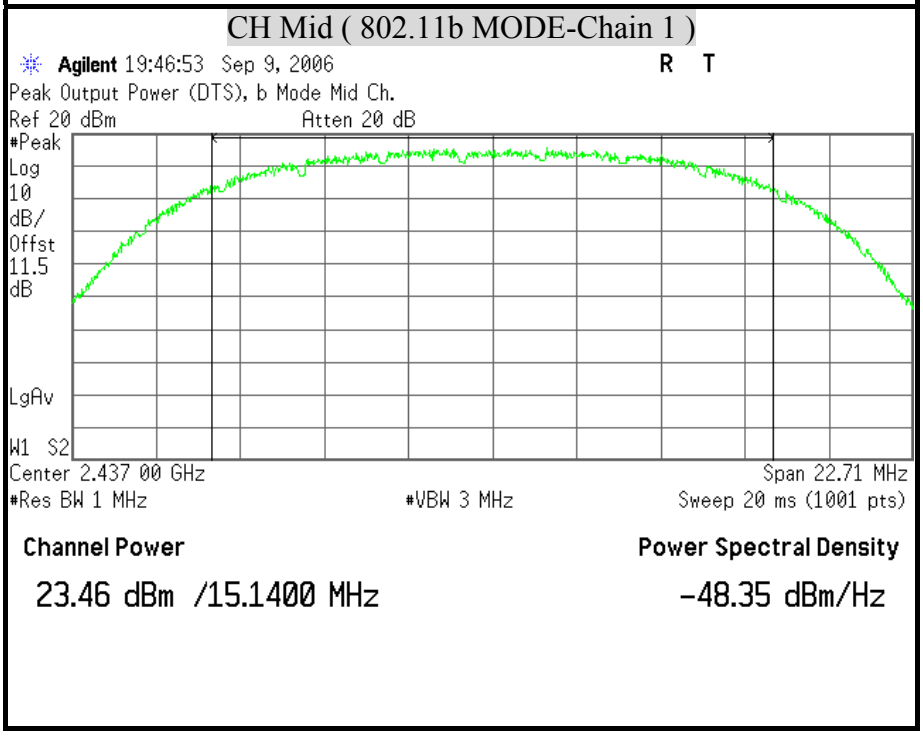


3dBi Antenna

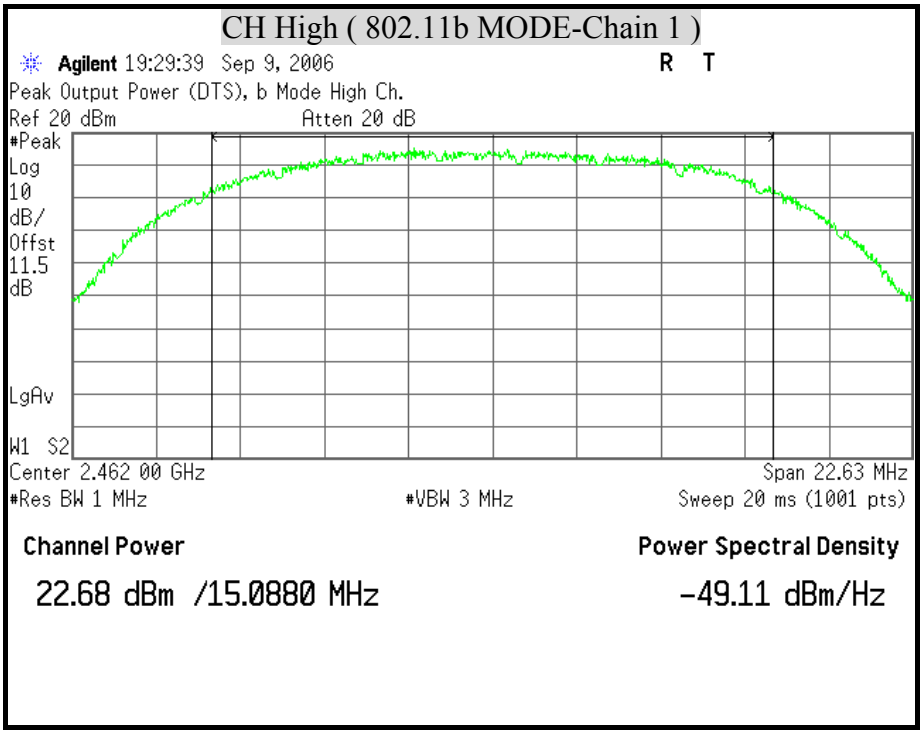
CH Low (802.11b MODE-Chain1)



CH Mid (802.11b MODE-Chain 1)

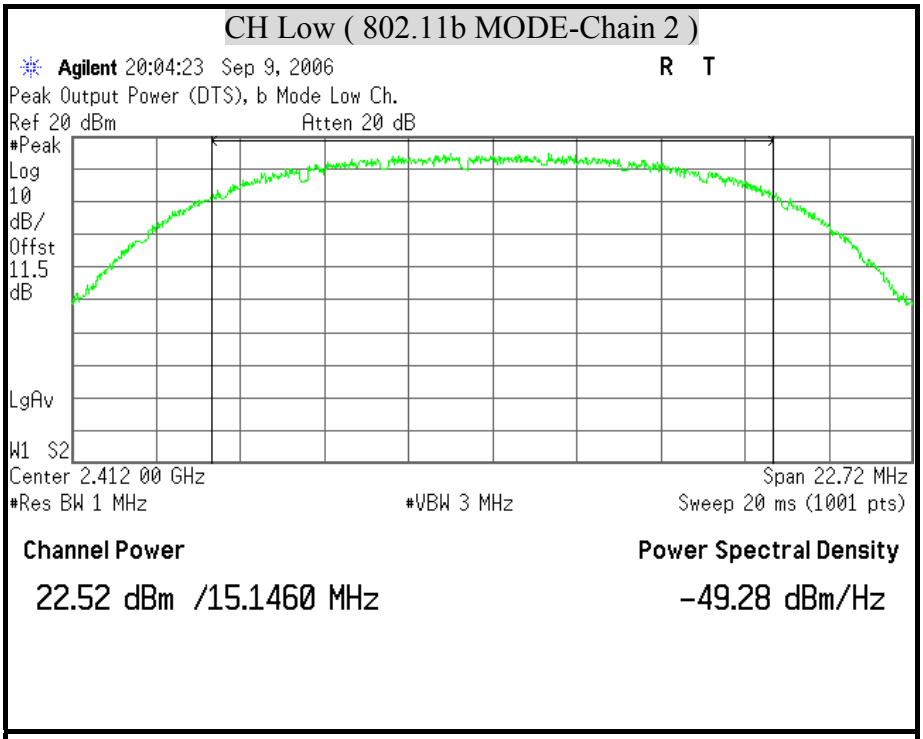


CH High (802.11b MODE-Chain 1)

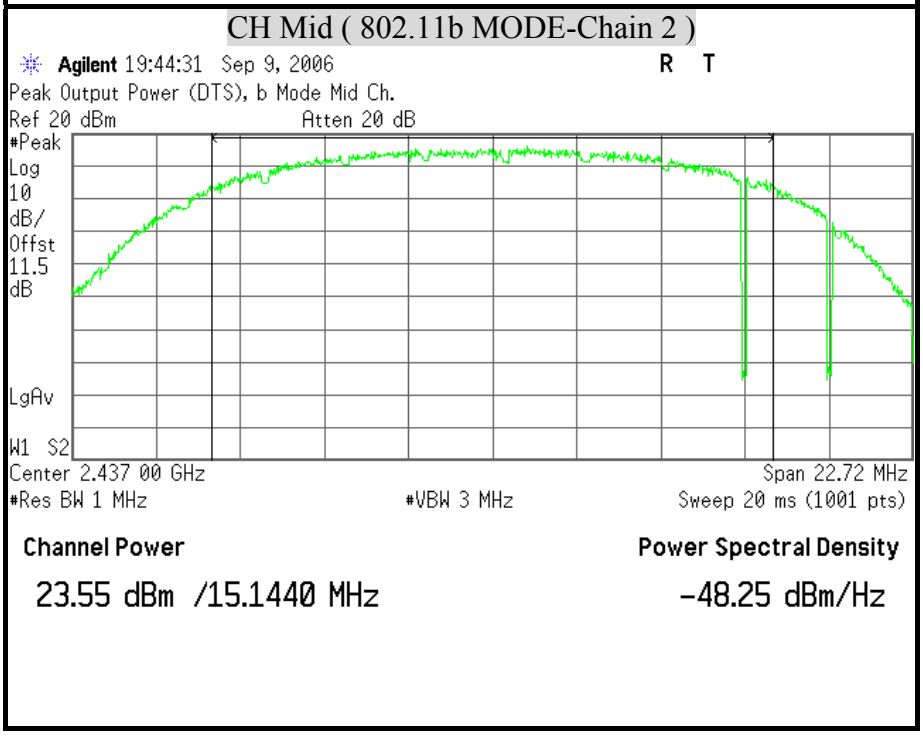


3dBi Antenna

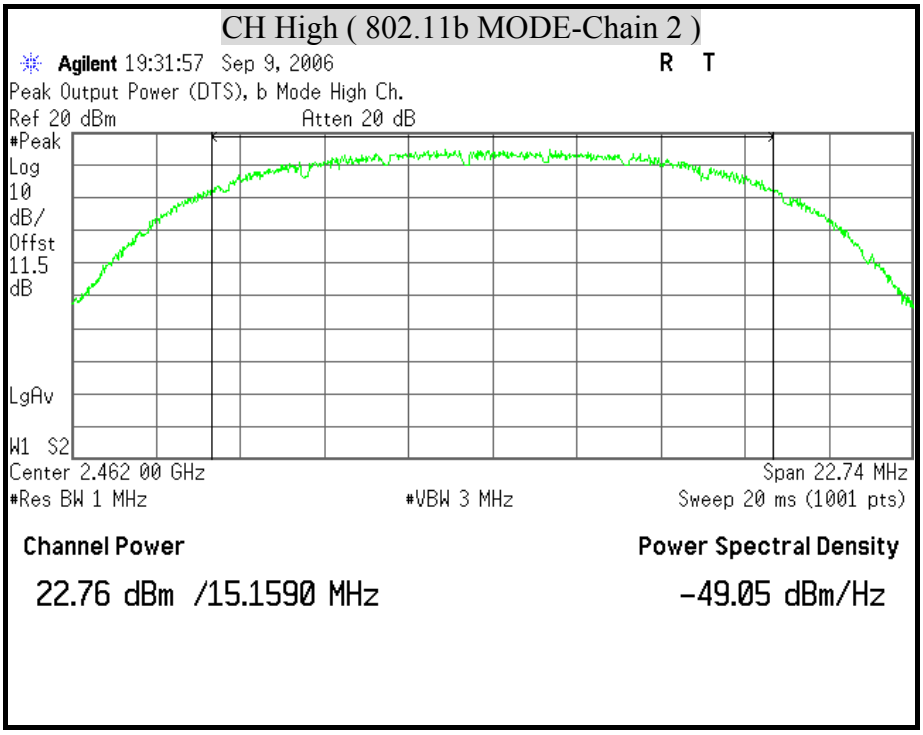
CH Low (802.11b MODE-Chain 2)



CH Mid (802.11b MODE-Chain 2)



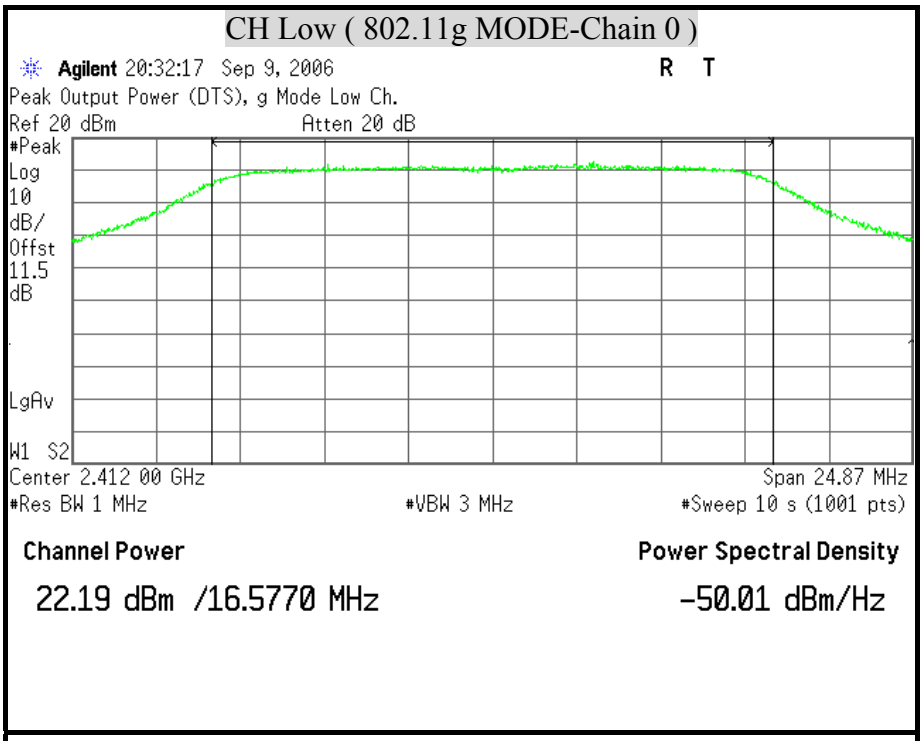
CH High (802.11b MODE-Chain 2)



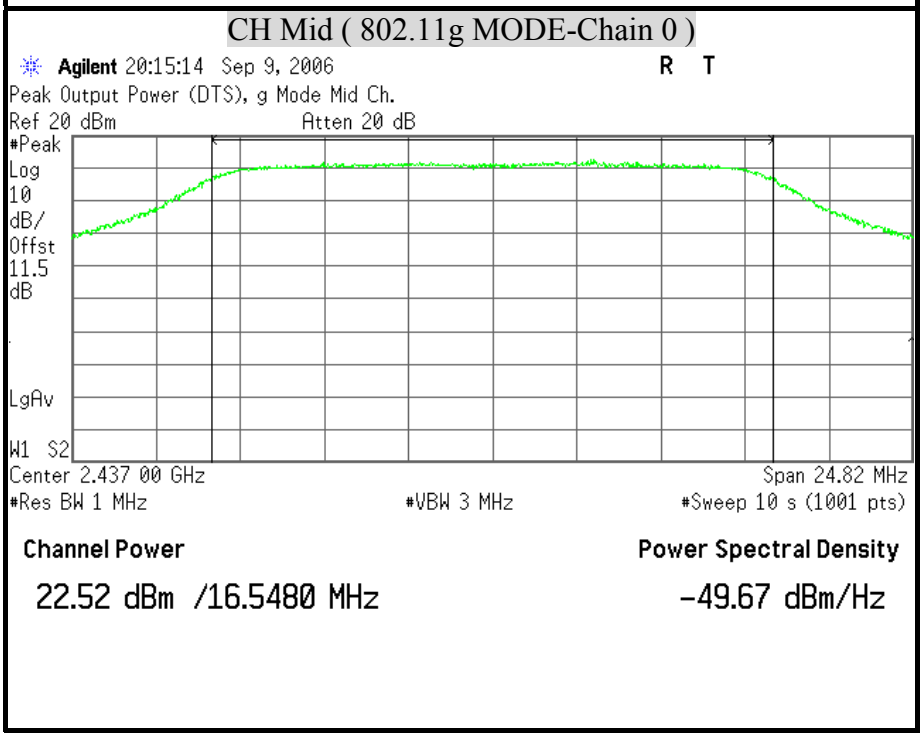
MAXIMUM PEAK OUTPUT POWER (802.11g MODE)

3dBi Antenna

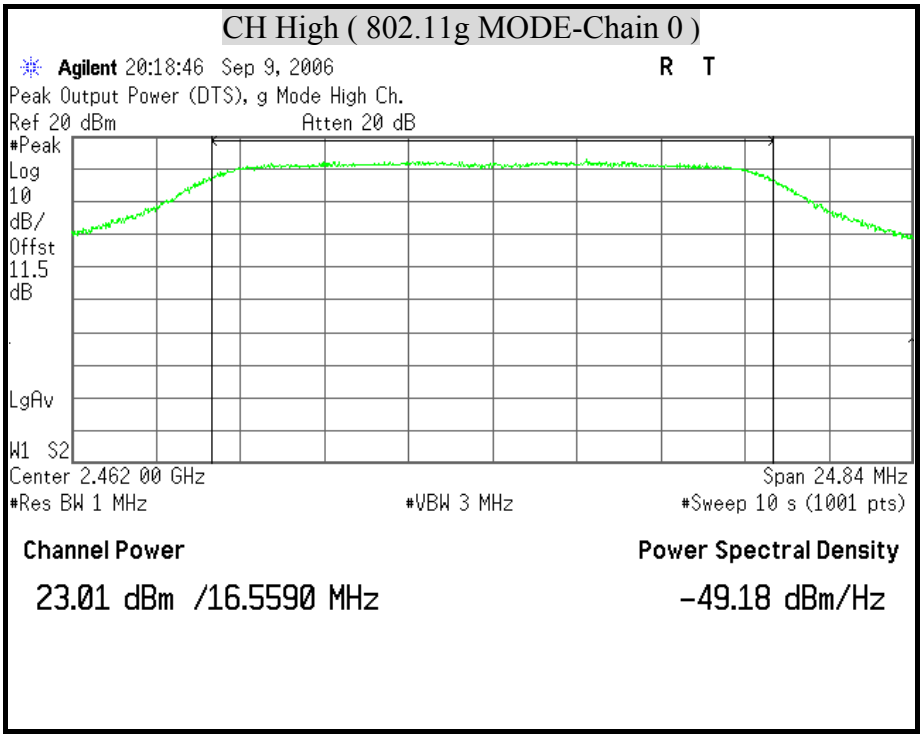
CH Low (802.11g MODE-Chain 0)



CH Mid (802.11g MODE-Chain 0)

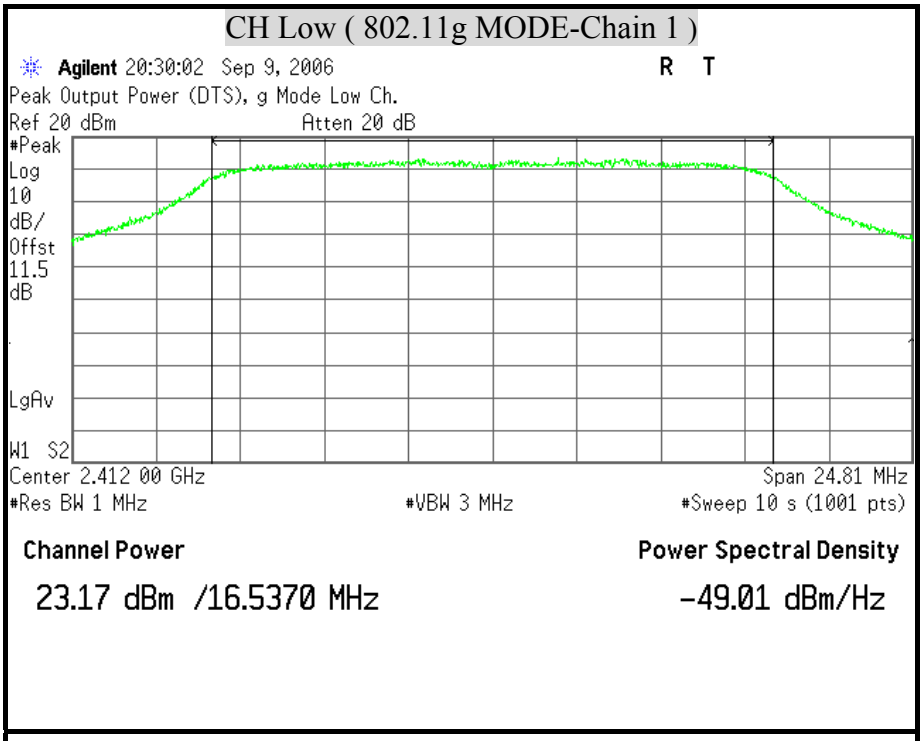


CH High (802.11g MODE-Chain 0)

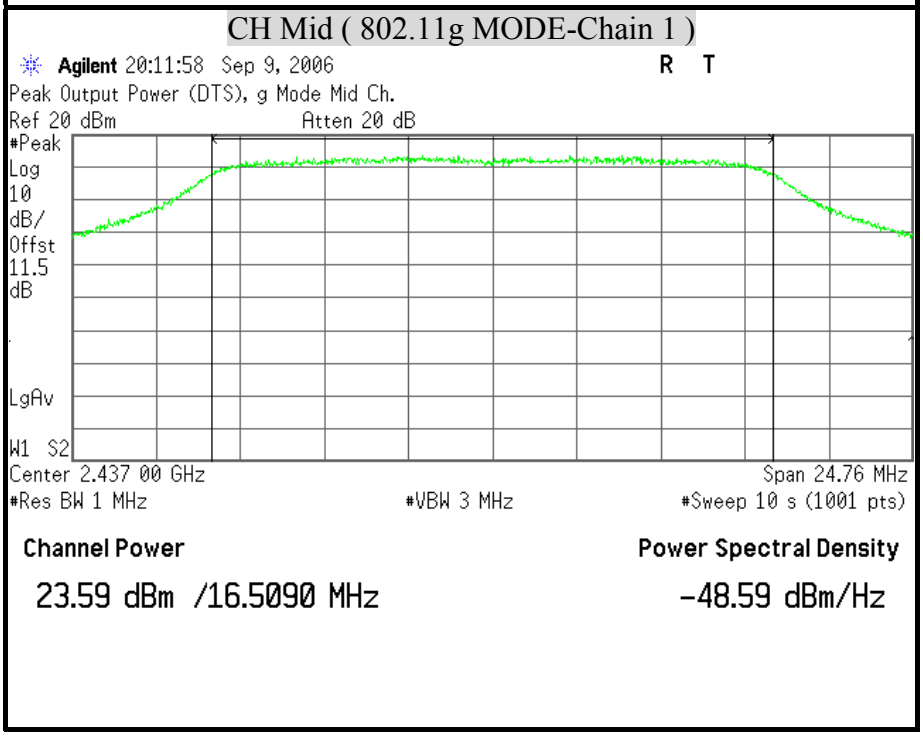


3dBi Antenna

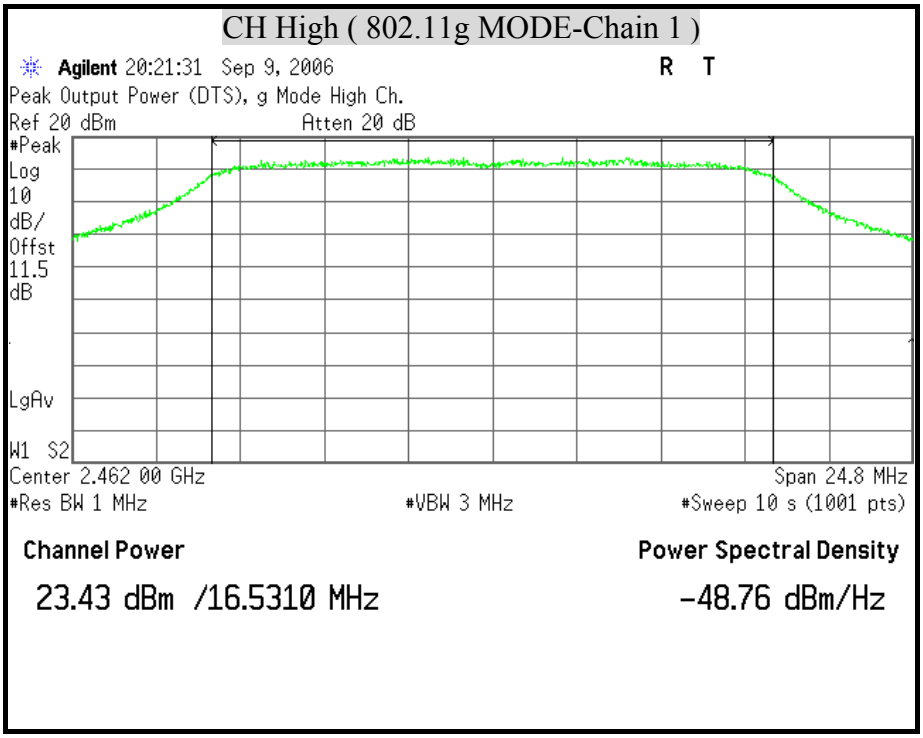
CH Low (802.11g MODE-Chain 1)



CH Mid (802.11g MODE-Chain 1)

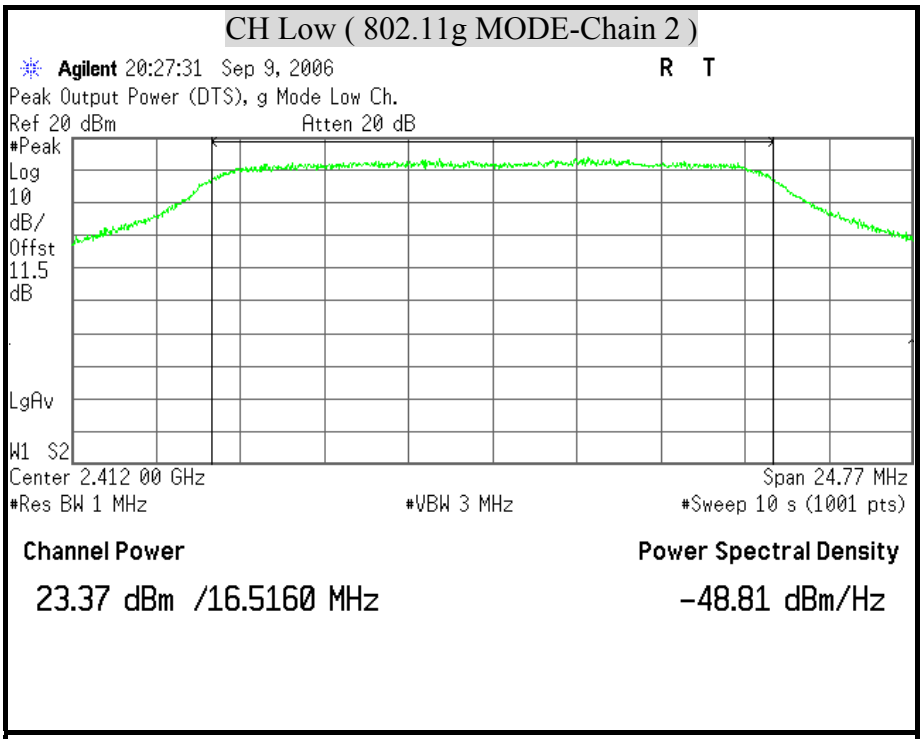


CH High (802.11g MODE-Chain 1)

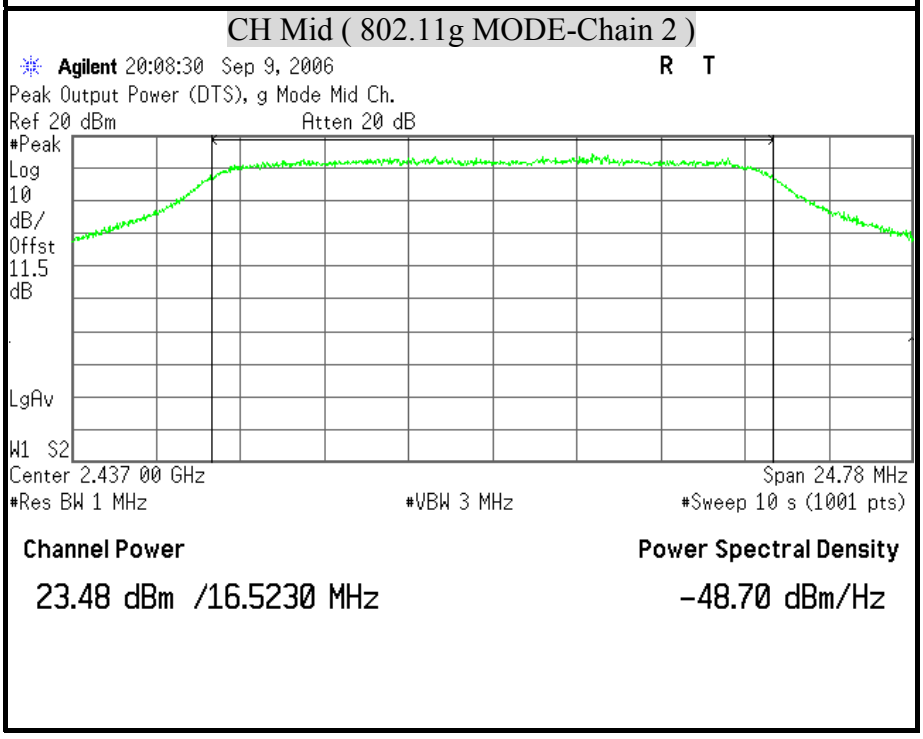


3dBi Antenna

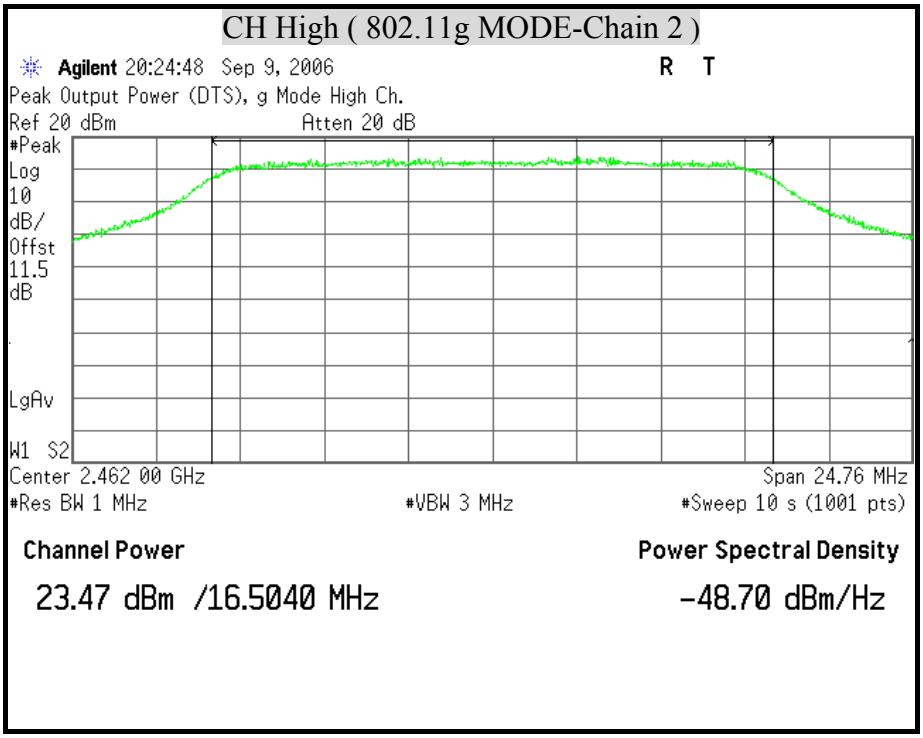
CH Low (802.11g MODE-Chain 2)



CH Mid (802.11g MODE-Chain 2)



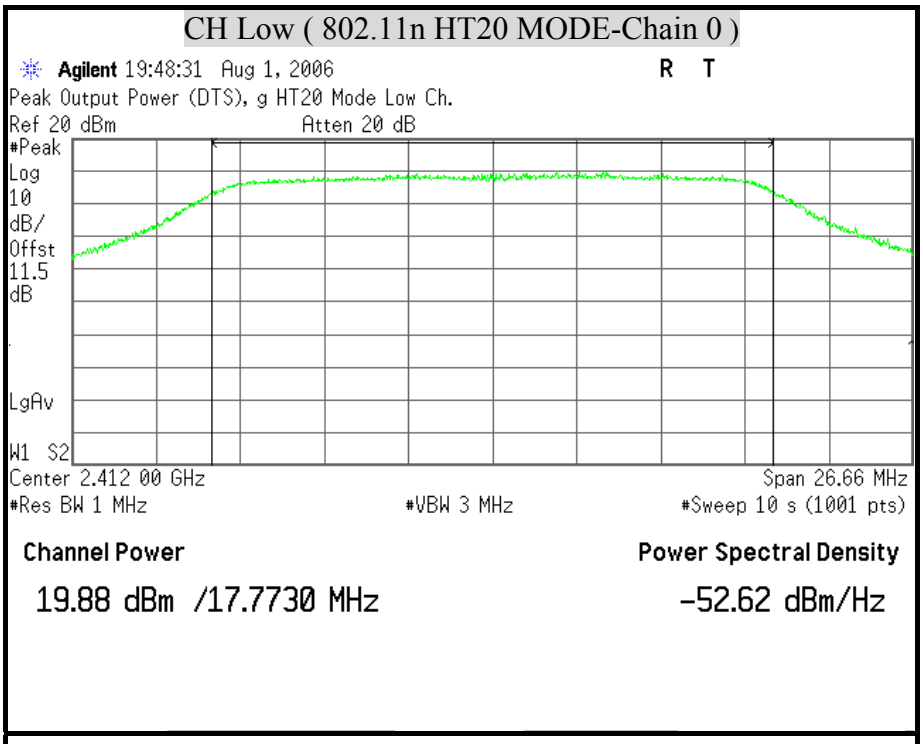
CH High (802.11g MODE-Chain 2)



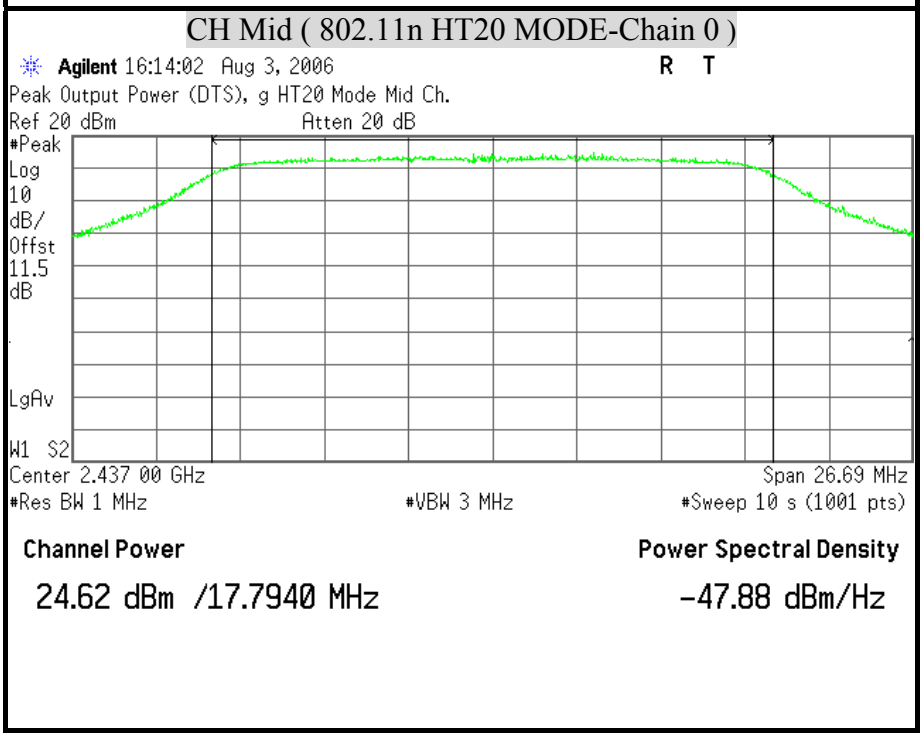
MAXIMUM PEAK OUTPUT POWER (802.11n HT20 MODE)

3dBi Antenna

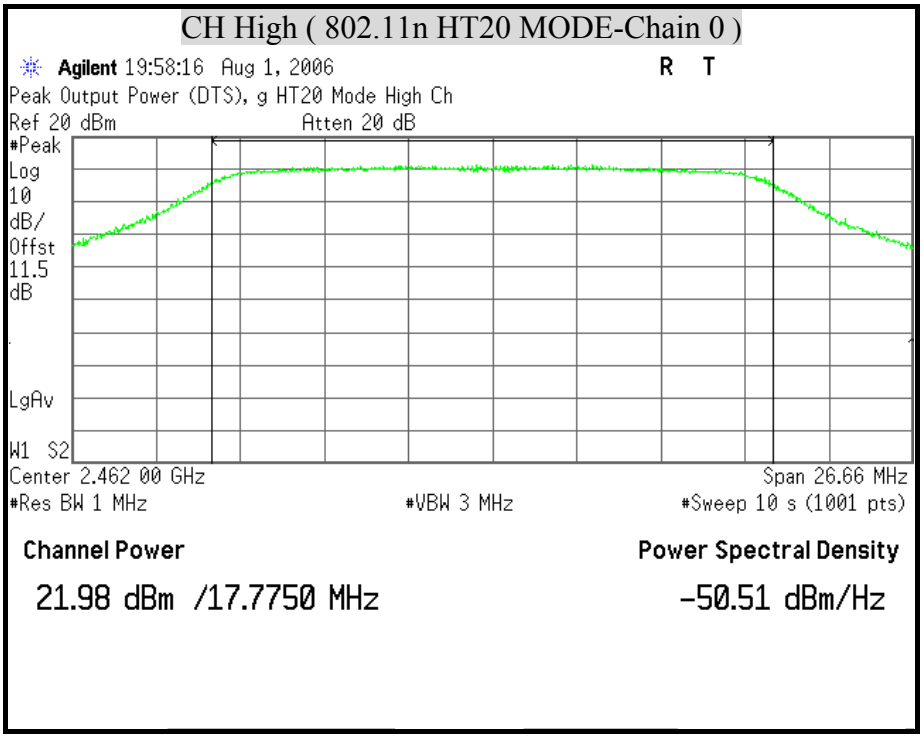
CH Low (802.11n HT20 MODE-Chain 0)



CH Mid (802.11n HT20 MODE-Chain 0)

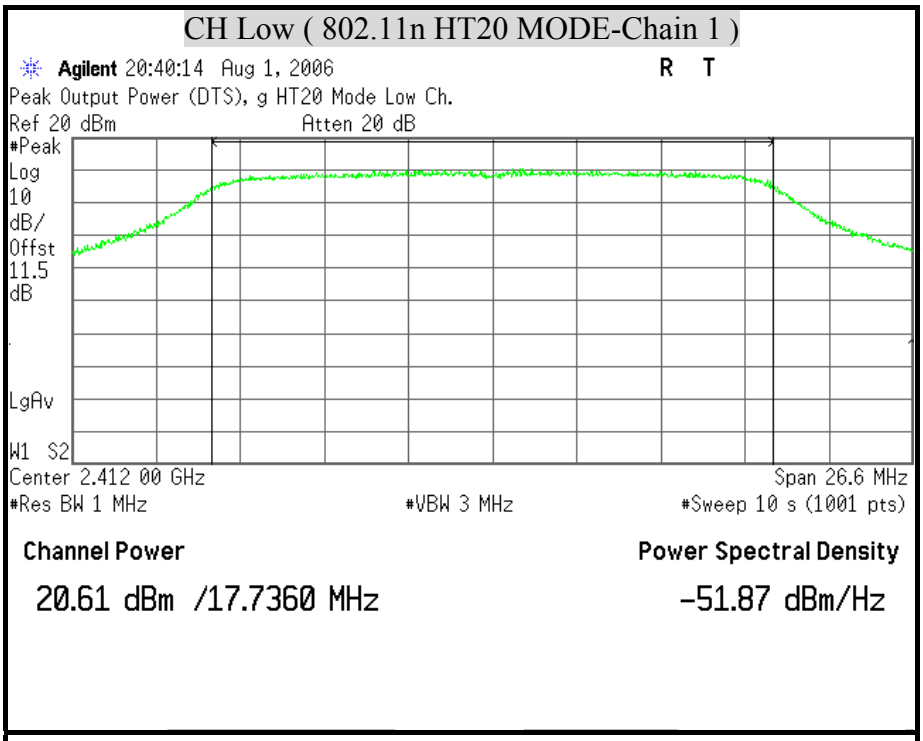


CH High (802.11n HT20 MODE-Chain 0)

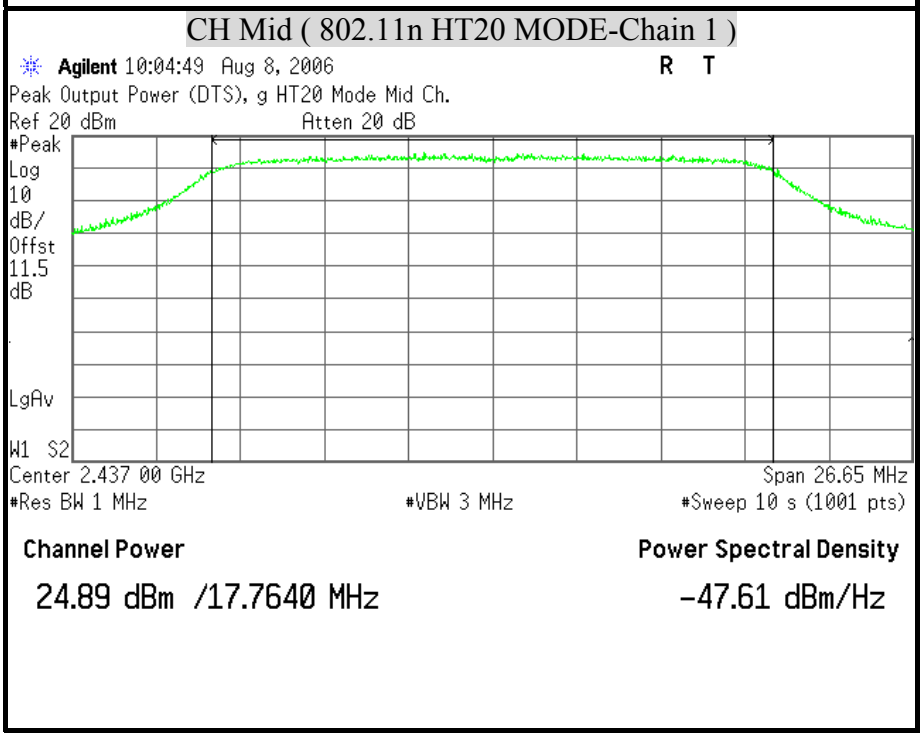


3dBi Antenna

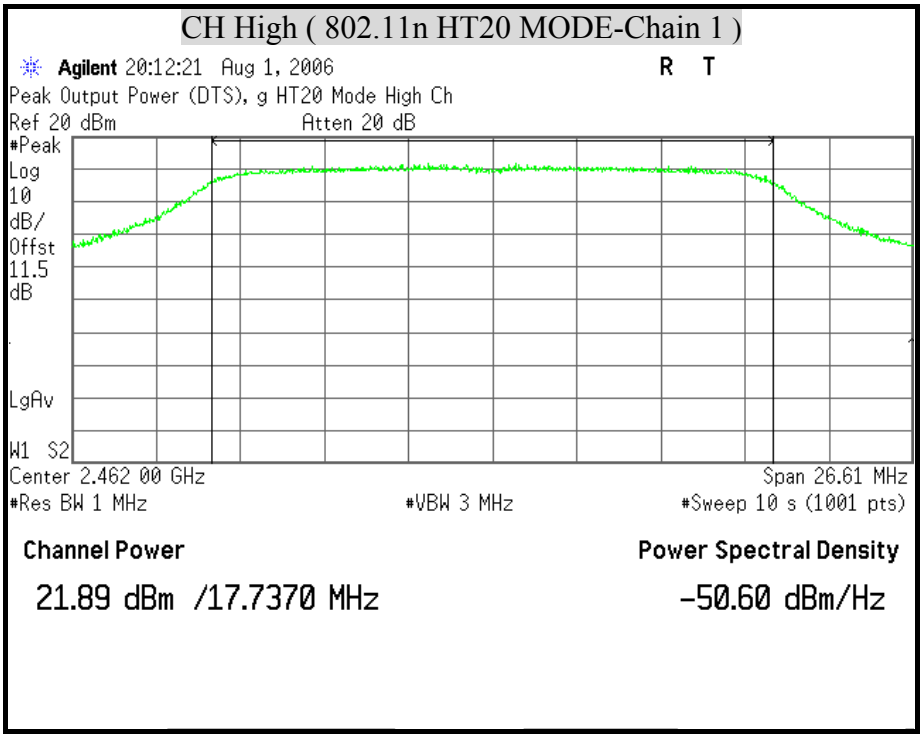
CH Low (802.11n HT20 MODE-Chain 1)



CH Mid (802.11n HT20 MODE-Chain 1)

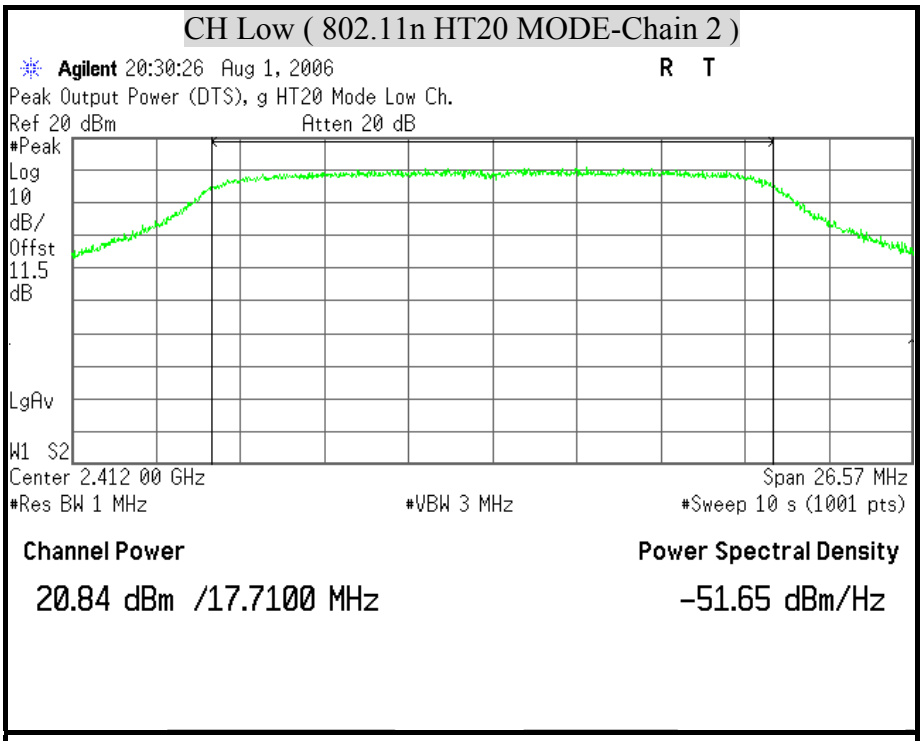


CH High (802.11n HT20 MODE-Chain 1)

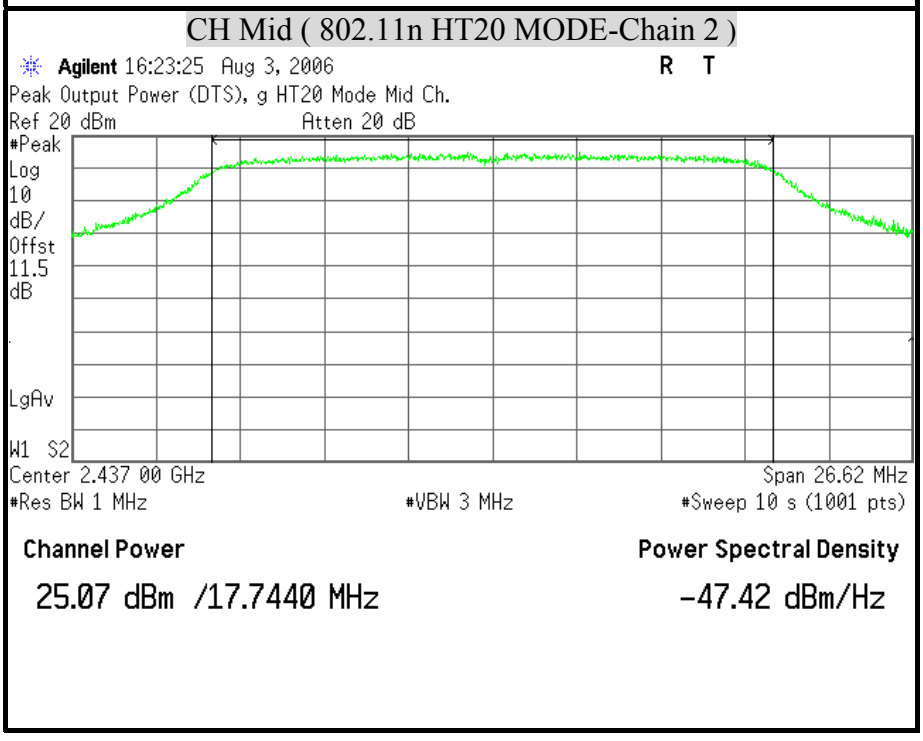


3dBi Antenna

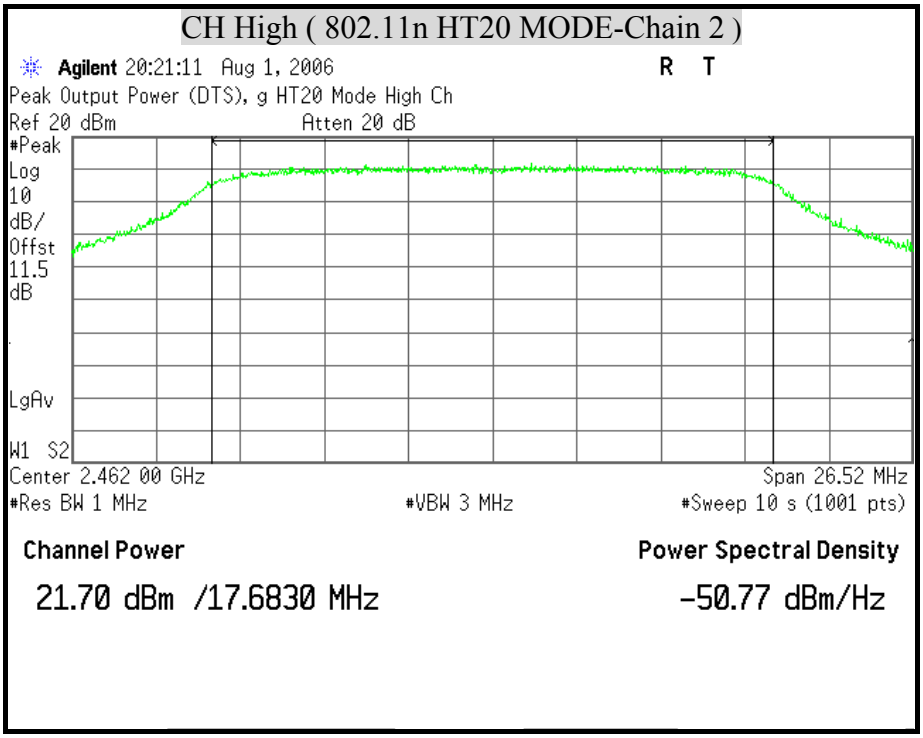
CH Low (802.11n HT20 MODE-Chain 2)



CH Mid (802.11n HT20 MODE-Chain 2)



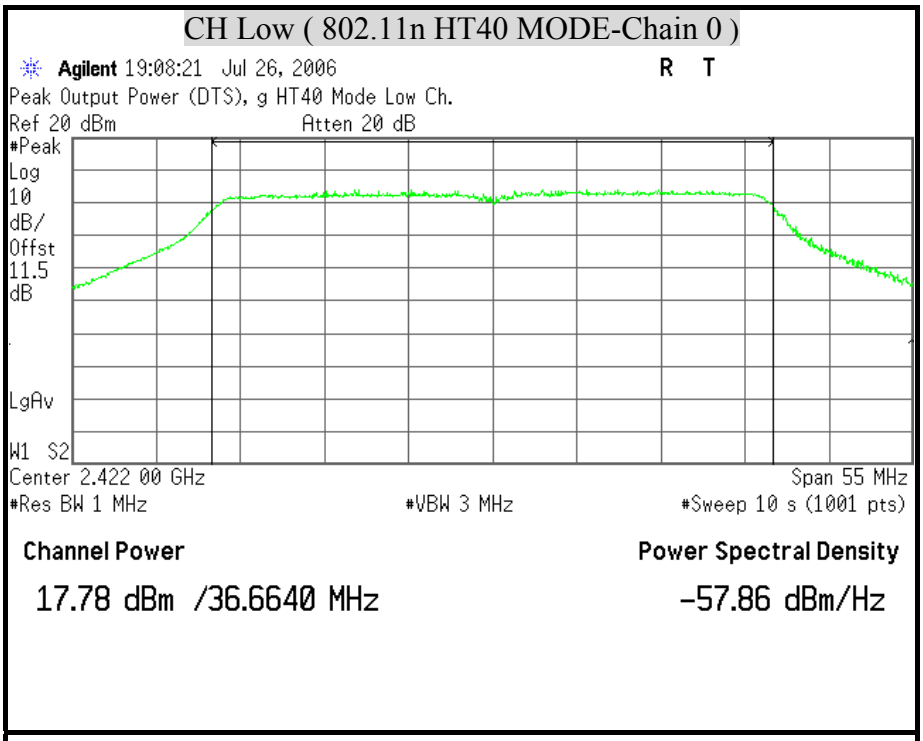
CH High (802.11n HT20 MODE-Chain 2)



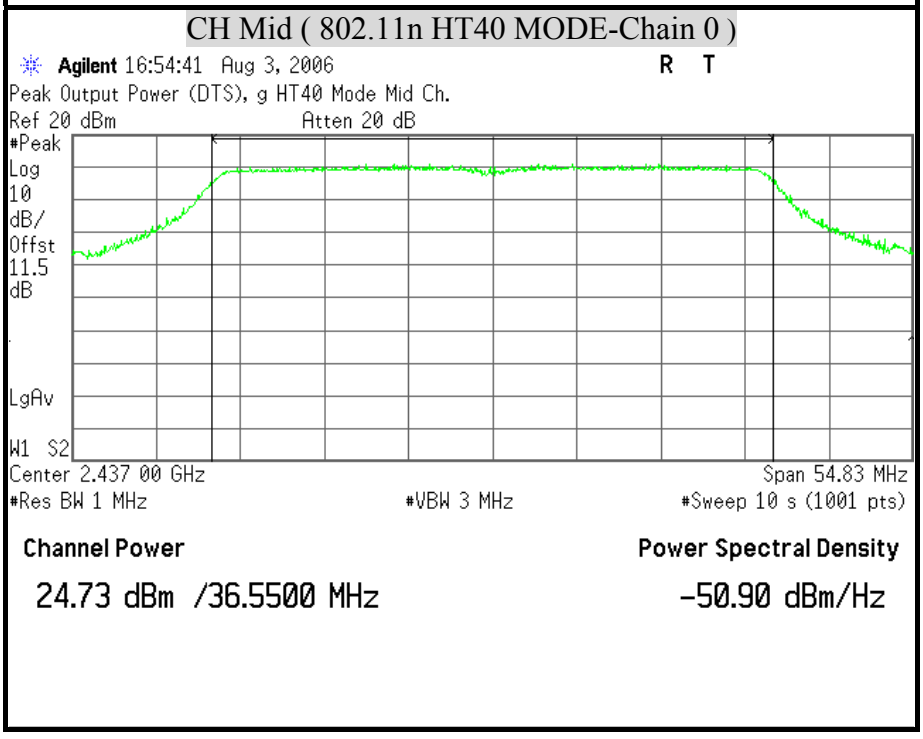
MAXIMUM PEAK OUTPUT POWER (802.11n HT40 MODE)

3dBi Antenna

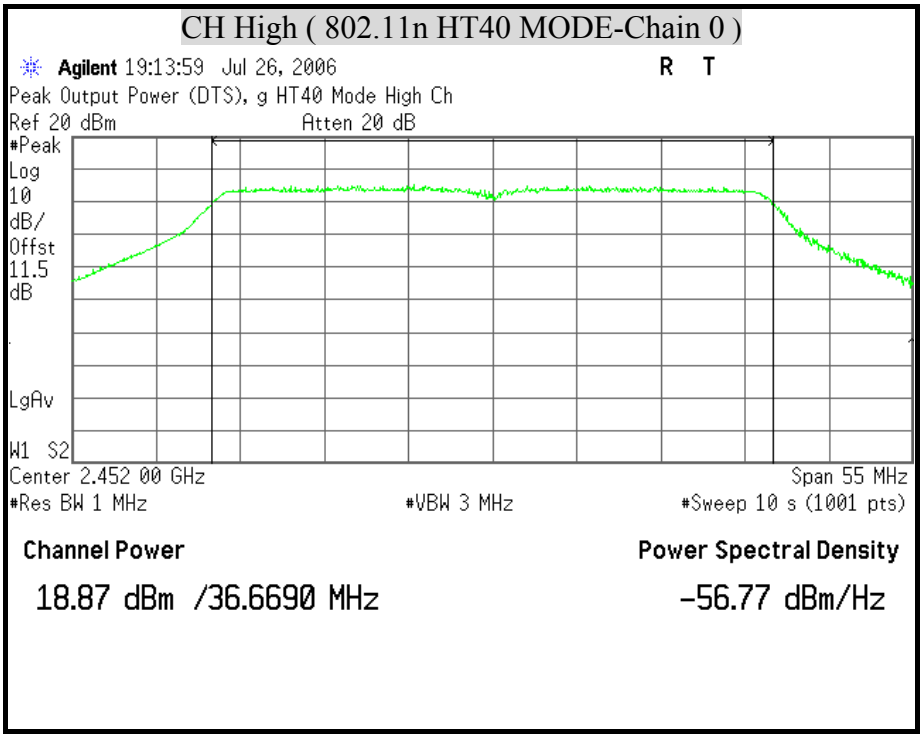
CH Low (802.11n HT40 MODE-Chain 0)



CH Mid (802.11n HT40 MODE-Chain 0)

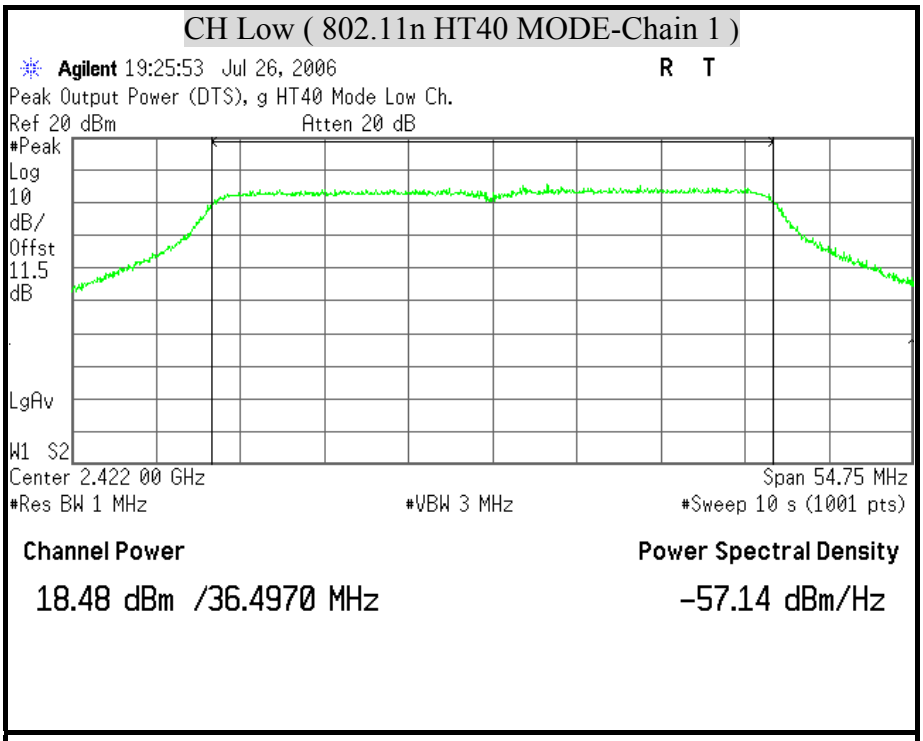


CH High (802.11n HT40 MODE-Chain 0)

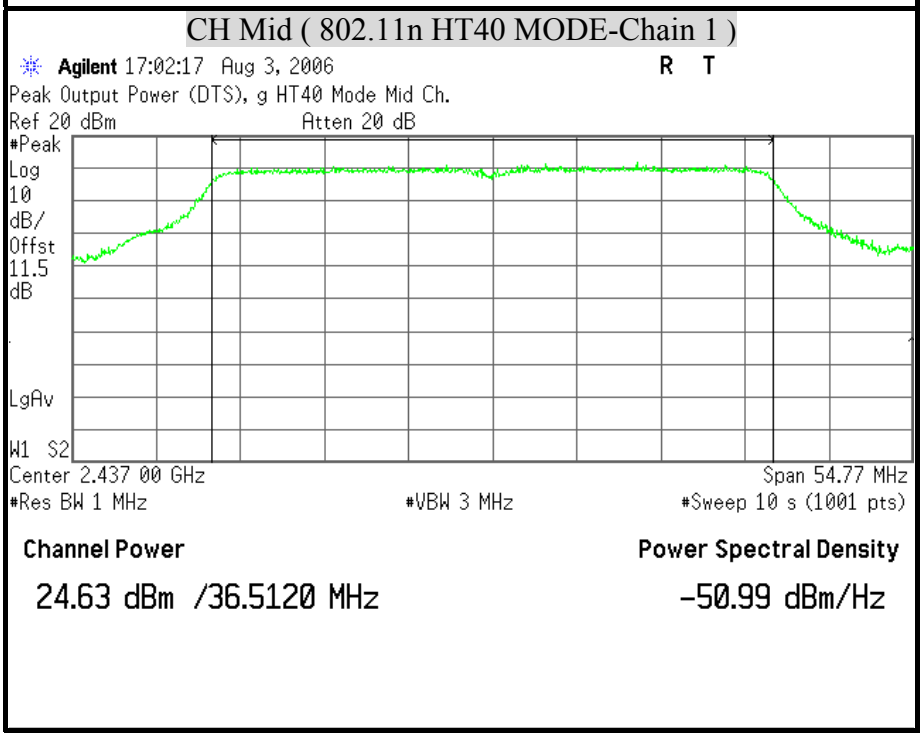


3dBi Antenna

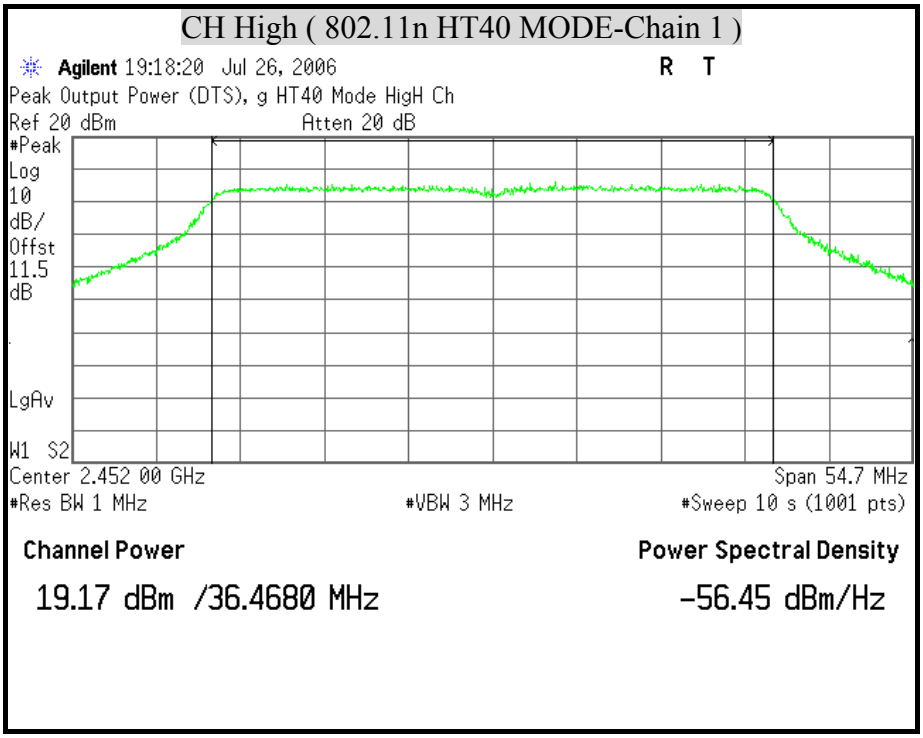
CH Low (802.11n HT40 MODE-Chain 1)



CH Mid (802.11n HT40 MODE-Chain 1)

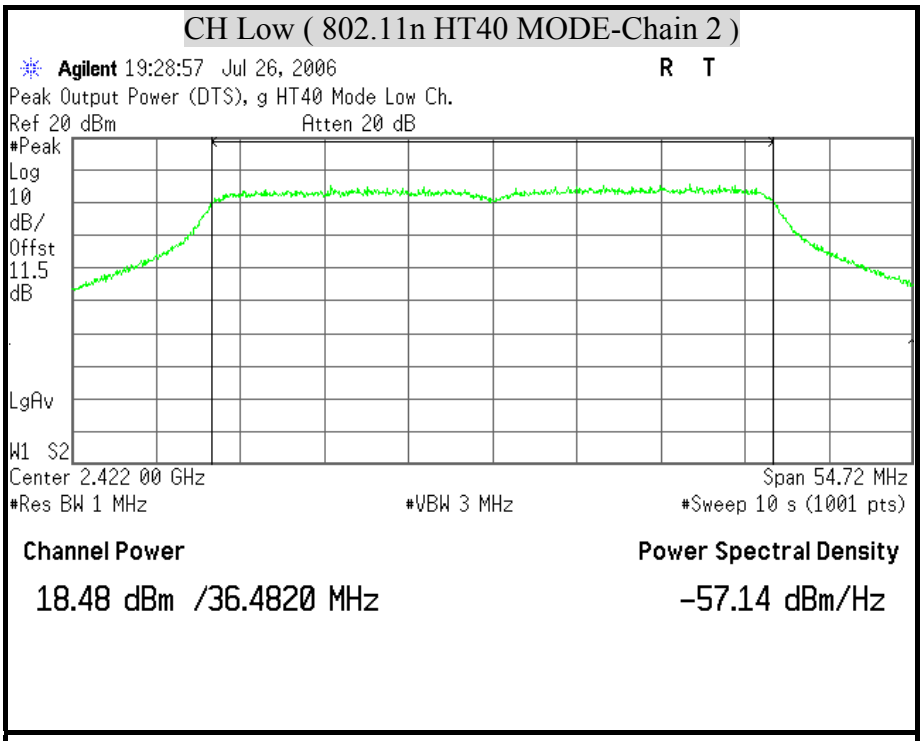


CH High (802.11n HT40 MODE-Chain 1)

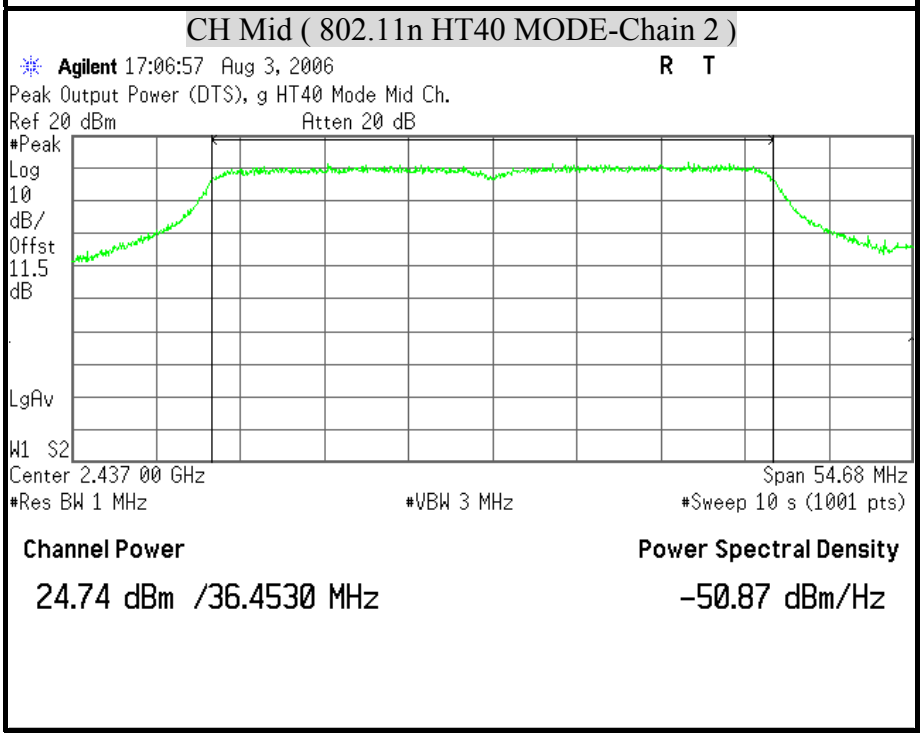


3dBi Antenna

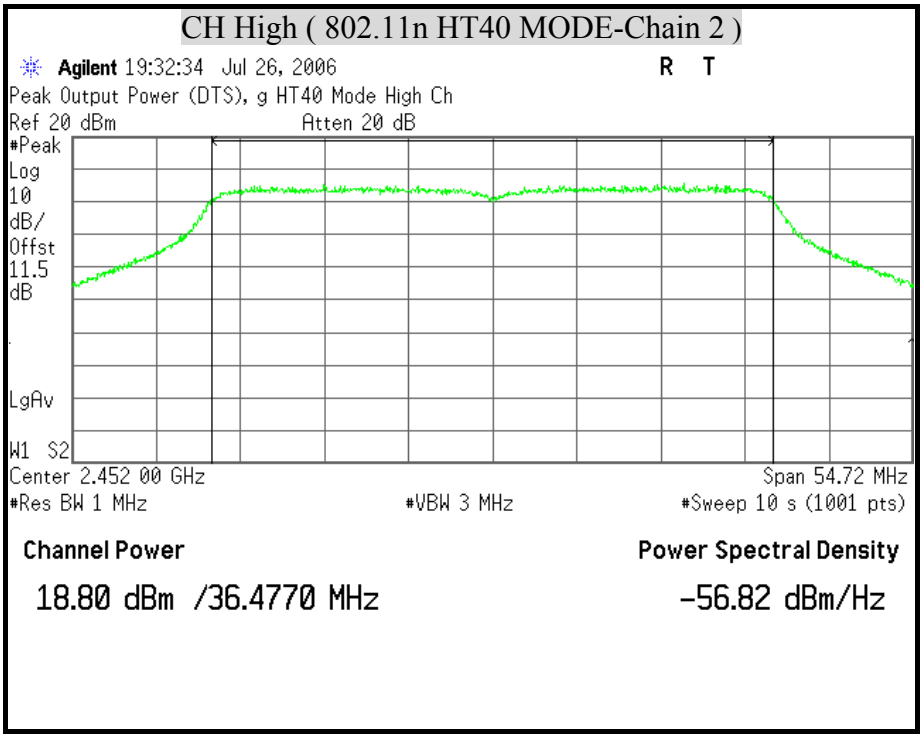
CH Low (802.11n HT40 MODE-Chain 2)



CH Mid (802.11n HT40 MODE-Chain 2)



CH High (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

For Dipole 2dBi Antenna (1):

Mode	Minimum separation distance (cm)	Output Power (dBm)	Antenna Gain (dBi)	Power Density Limit (mW/cm^2)	Power Density at 20cm (mW/cm^2)
IEEE 802.11b	20.0	28.22	2	1.00	0.209281
IEEE 802.11g	20.0	28.94	2	1.00	0.247019
IEEE 802.11n HT20	20.0	29.64	2	1.00	0.290222
IEEE 802.11n HT40	20.0	29.47	2	1.00	0.279081

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.*

For Dipole 3dBi Antenna (2):

Mode	Minimum separation distance (cm)	Output Power (dBm)	Antenna Gain (dBi)	Power Density Limit (mW/cm^2)	Power Density at 20cm (mW/cm^2)
IEEE 802.11b	20.0	28.22	3	1.00	0.263469
IEEE 802.11g	20.0	27.99	3	1.00	0.249879
IEEE 802.11n HT20	20.0	29.64	3	1.00	0.365368
IEEE 802.11n HT40	20.0	29.47	3	1.00	0.351342

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

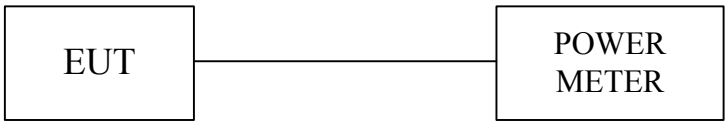
LIMIT

None; for reporting purposes only.

TEST EQUIPMENTS

Description & Manufacturer	Model No.	Serial No.	Date of Calibration
ANRITSU POWER METER	ML2487A MAL2491A	6K00001783 030982	March 08, 2006

TEST SETUP



TEST PROCEDURE

The transmitter output is connected to a power meter.

TEST RESULTS

Total peak power calculation formula:
10 log (10^ (Chain 0 Power / 10) + 10^ (Chain1 Power / 10) + 10^ (Chain 2 Power /10)).

No non-compliance noted

For Dipole 2dBi Antenna (1):

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	18.36	18.42	18.05	23.05
Middle	2437	18.74	18.49	18.63	23.39
High	2462	17.89	17.61	17.93	22.58

Note : 1.At finial test to get the worst-case emission at 11Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 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)	Average Power (dBm)			Average Power Total (dBm)
		Chain 0	Chain 1	Chain 2	
Low	2412	15.28	15.24	14.84	19.89
Middle	2437	15.27	15.57	15.04	20.06
High	2462	15.31	15.42	15.10	20.04

Note : 1.At finial test to get the worst-case emission at 6Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 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)	Average Power (dBm)			Average Power Total (dBm)
		Chain 0	Chain 1	Chain 2	
Low	2412	13.43	13.76	13.40	18.30
Middle	2437	16.27	16.39	16.11	21.03
High	2462	14.45	14.41	13.90	19.03

Note : 1.At finial test to get the worst-case emission at 6.5Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 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)	Average Power (dBm)			Average Power Total (dBm)
		Chain 0	Chain 1	Chain 2	
Low	2422	10.59	11.07	10.90	15.63
Middle	2437	16.16	15.91	15.71	20.70
High	2452	11.00	11.40	10.60	15.78

Note : 1.At finial test to get the worst-case emission at 13.5Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

For Dipole 3dBi Antenna (2):

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	17.61	17.72	17.53	22.39
Middle	2437	18.74	18.49	18.63	23.39
High	2462	17.89	17.61	17.93	22.58

Note : 1.At finial test to get the worst-case emission at 11Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 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)	Average Power (dBm)			Average Power Total (dBm)
		Chain 0	Chain 1	Chain 2	
Low	2412	13.89	14.26	13.99	18.82
Middle	2437	14.25	14.66	14.12	19.12
High	2462	14.70	14.51	14.11	19.21

Note : 1.At finial test to get the worst-case emission at 6Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 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)	Average Power (dBm)			Average Power Total (dBm)
		Chain 0	Chain 1	Chain 2	
Low	2412	11.74	12.08	11.89	16.68
Middle	2437	16.27	16.39	16.11	21.03
High	2462	13.64	13.40	12.86	18.08

Note : 1.At finial test to get the worst-case emission at 6.5Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 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)	Average Power (dBm)			Average Power Total (dBm)
		Chain 0	Chain 1	Chain 2	
Low	2422	9.13	9.76	9.37	14.20
Middle	2437	16.16	15.91	15.71	20.70
High	2452	10.35	10.51	9.70	14.97

Note : 1.At finial test to get the worst-case emission at 13.5Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

8.6 POWER SPECTRAL DENSITY

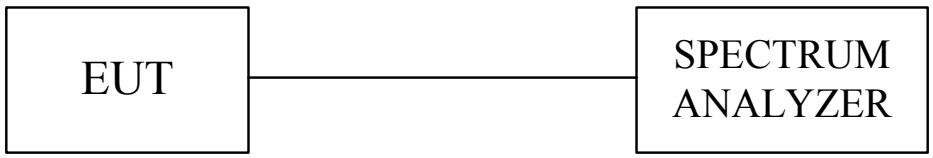
LIMIT

§ 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 EQUIPMENTS

Description & Manufacturer	Model No.	Serial No.	Date of Calibration
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	September 24, 2005
AGILENT SPECTRUM ANALYZER	E4446A	MY433601.32	March 22 , 2006

TEST SETUP



Combiner 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

Total peak power calculation formula:
10 log (10^ (Chain 0 PPSD / 10) + 10^ (Chain1 PPSD / 10) + 10^ (Chain 2 PPSD /10)).

No non-compliance noted

For Dipole 2dBi Antenna (1):

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	-4.39	-2.11	-4.21	1.33	8	PASS
Middle	2437	-3.17	-4.70	-6.97	0.09	8	PASS
High	2462	-5.82	-3.99	-2.59	0.83	8	PASS

Note : 1.At finial test to get the worst-case emission at 11Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 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	6.94	8	PASS
Middle	2437	7.24	8	PASS
High	2462	7.73	8	PASS

Note : 1.At finial test to get the worst-case emission at 11Mbps.
2. The cable assembly insertion loss of 21.1dB (including 10 dB pad and 11.1 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)	Final RF Power Level in 3KHz BW (dBm)			PPSD Total (dBm)	Maxmum Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2			
Low	2412	-9.60	-8.72	-7.82	-3.88	8	PASS
Middle	2437	-8.98	-8.63	-4.90	-2.31	8	PASS
High	2462	-8.77	-8.85	-9.49	-4.25	8	PASS

Note : 1.At finial test to get the worst-case emission at 6Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 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	3.47	8	PASS
Middle	2437	3.34	8	PASS
High	2462	4.13	8	PASS

Note : 1.At finial test to get the worst-case emission at 6Mbps.
2. The cable assembly insertion loss of 21.1dB (including 10 dB pad and 11.1 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)	Final RF Power Level in 3KHz BW (dBm)			PPSD Total (dBm)	Maxmum Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2			
Low	2412	-10.58	-9.75	-11.03	-5.65	8	PASS
Middle	2437	-7.95	-8.45	-8.14	-3.40	8	PASS
High	2462	-10.72	-9.83	-10.72	-5.63	8	PASS

Note : 1.At finial test to get the worst-case emission at 6.5Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 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	1.91	8	PASS
Middle	2437	5.58	8	PASS
High	2462	3.45	8	PASS

Note : 1.At finial test to get the worst-case emission at 6.5Mbps.
2. The cable assembly insertion loss of 21.1dB (including 10 dB pad and 11.1 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)	Final RF Power Level in 3KHz BW (dBm)			PPSD Total (dBm)	Maxmum Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2			
Low	2422	-17.21	-13.82	-17.25	-11.00	8	PASS
Middle	2437	-10.60	-9.50	-11.09	-5.57	8	PASS
High	2452	-14.26	-15.72	-15.70	-10.40	8	PASS

Note : 1.At finial test to get the worst-case emission at 13.5Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 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	-3.23	8	PASS
Middle	2437	2.65	8	PASS
High	2462	-3.40	8	PASS

Note : 1.At finial test to get the worst-case emission at 13.5Mbps.
2. The cable assembly insertion loss of 21.1dB (including 10 dB pad and 11.1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

For Dipole 3dBi Antenna (2):

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	-3.85	-5.24	-7.90	-0.58	8	PASS
Middle	2437	-3.17	-4.70	-6.97	0.09	8	PASS
High	2462	-5.82	-3.99	-2.59	0.83	8	PASS

Note : 1.At finial test to get the worst-case emission at 11Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 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	6.76	8	PASS
Middle	2437	7.24	8	PASS
High	2462	7.73	8	PASS

Note : 1.At finial test to get the worst-case emission at 11Mbps.
2. The cable assembly insertion loss of 21.1dB (including 10 dB pad and 11.1 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)	Final RF Power Level in 3KHz BW (dBm)			PPSD Total (dBm)	Maxmum Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2			
Low	2412	-10.82	-9.78	-9.57	-5.25	8	PASS
Middle	2437	-9.65	-6.75	-10.42	-3.86	8	PASS
High	2462	-9.79	-9.28	-10.39	-5.02	8	PASS

Note : 1.At finial test to get the worst-case emission at 6Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 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	3.03	8	PASS
Middle	2437	2.73	8	PASS
High	2462	3.31	8	PASS

Note : 1.At finial test to get the worst-case emission at 6Mbps.
2. The cable assembly insertion loss of 21.1dB (including 10 dB pad and 11.1 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)	Final RF Power Level in 3KHz BW (dBm)			PPSD Total (dBm)	Maxmum Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2			
Low	2412	-12.15	-11.69	-13.06	-7.49	8	PASS
Middle	2437	-7.95	-8.45	-8.14	-3.40	8	PASS
High	2462	-10.94	-11.98	-9.76	-6.03	8	PASS

Note : 1.At finial test to get the worst-case emission at 6.5Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 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	1.02	8	PASS
Middle	2437	5.58	8	PASS
High	2462	1.99	8	PASS

Note : 1.At finial test to get the worst-case emission at 6.5Mbps.
2. The cable assembly insertion loss of 21.1dB (including 10 dB pad and 11.1 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)	Final RF Power Level in 3KHz BW (dBm)			PPSD Total (dBm)	Maxmum Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2			
Low	2422	-18.08	-18.37	-18.46	-13.53	8	PASS
Middle	2437	-10.60	-9.50	-11.09	-5.57	8	PASS
High	2452	-17.54	-17.56	-17.67	-12.82	8	PASS

Note : 1.At finial test to get the worst-case emission at 13.5Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 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)

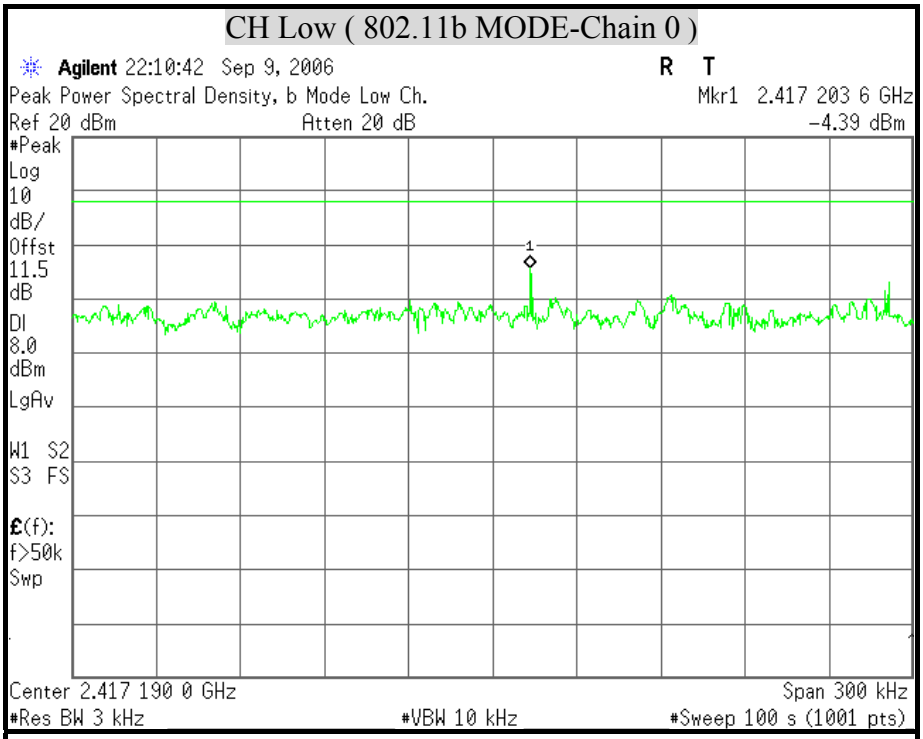
Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Maxmum Limit (dBm)	Pass / Fail
Low	2412	-6.28	8	PASS
Middle	2437	2.65	8	PASS
High	2462	-4.49	8	PASS

Note : 1.At finial test to get the worst-case emission at 13.5Mbps.
2. The cable assembly insertion loss of 21.1dB (including 10 dB pad and 11.1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

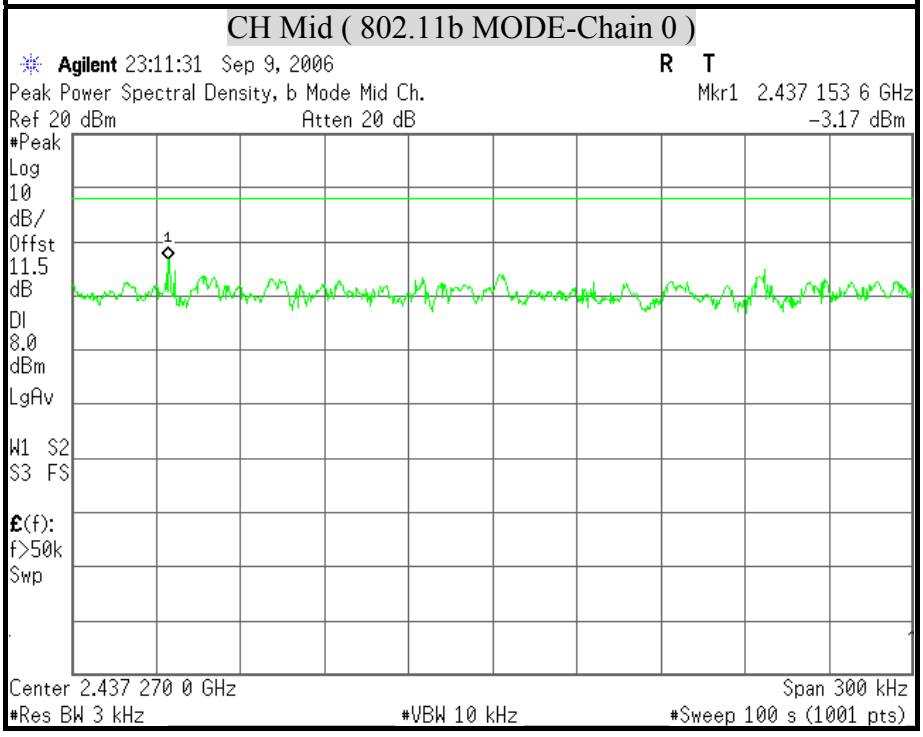
POWER SPECTRAL DENSITY (IEEE 802.11b MODE)

2dBi Antenna

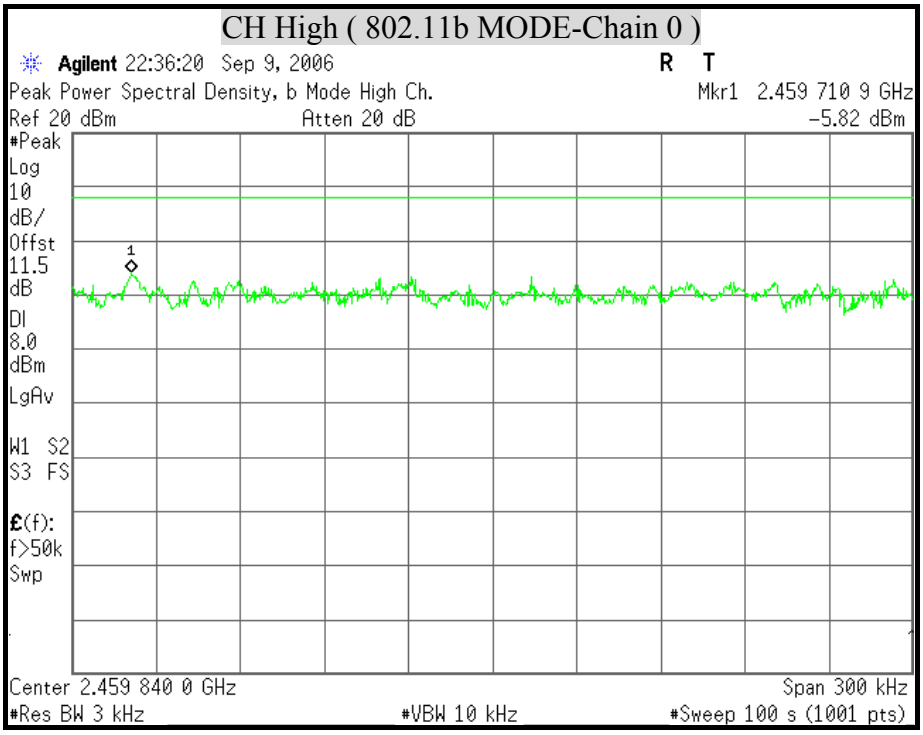
CH Low (802.11b MODE-Chain 0)



CH Mid (802.11b MODE-Chain 0)

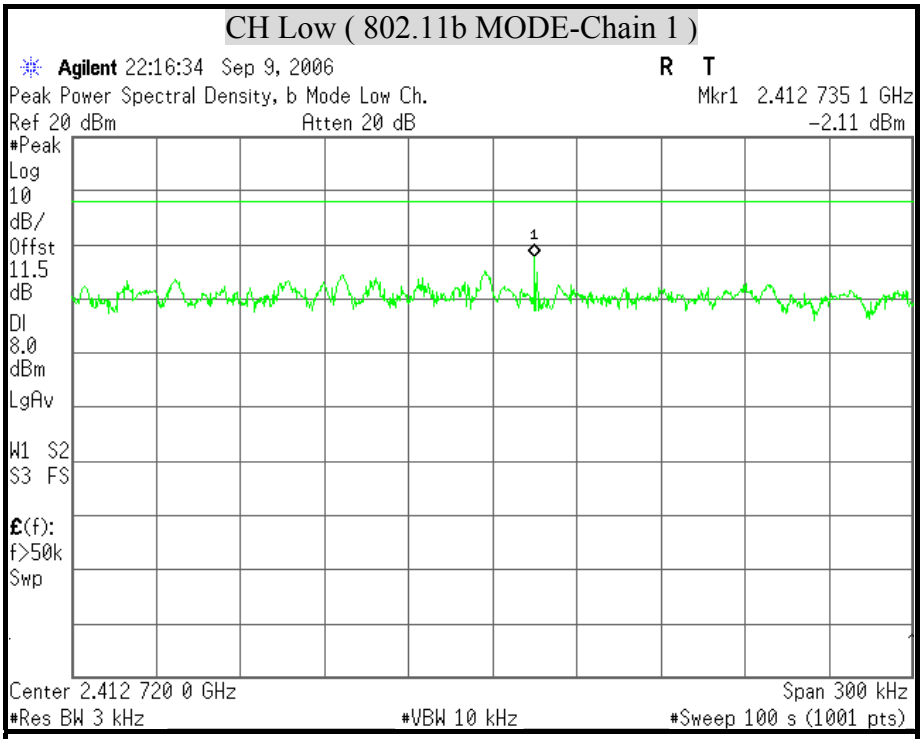


CH High (802.11b MODE-Chain 0)

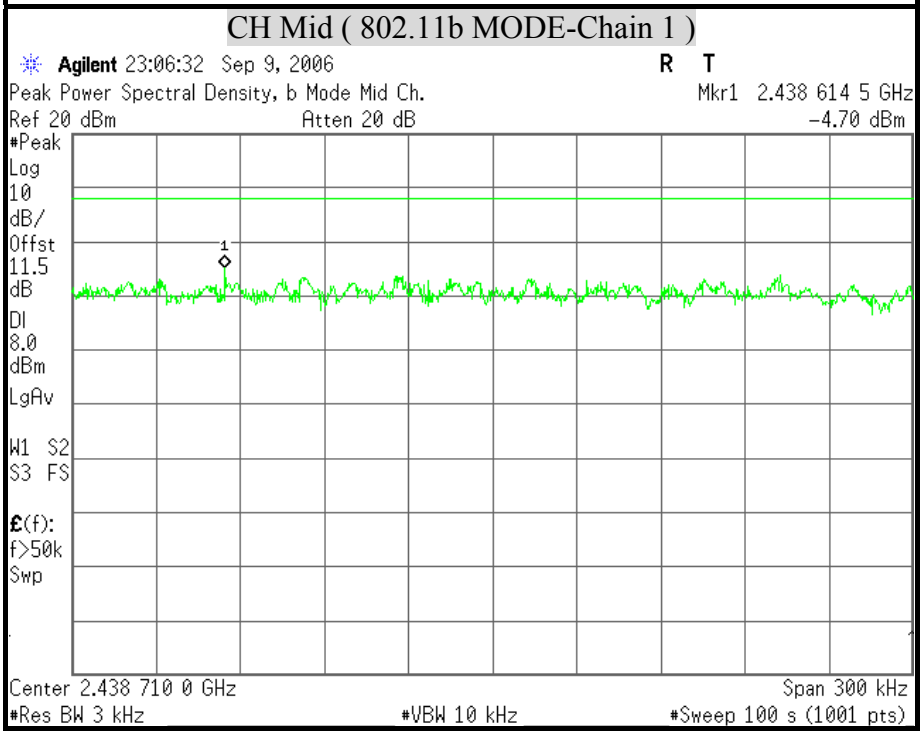


2dBi Antenna

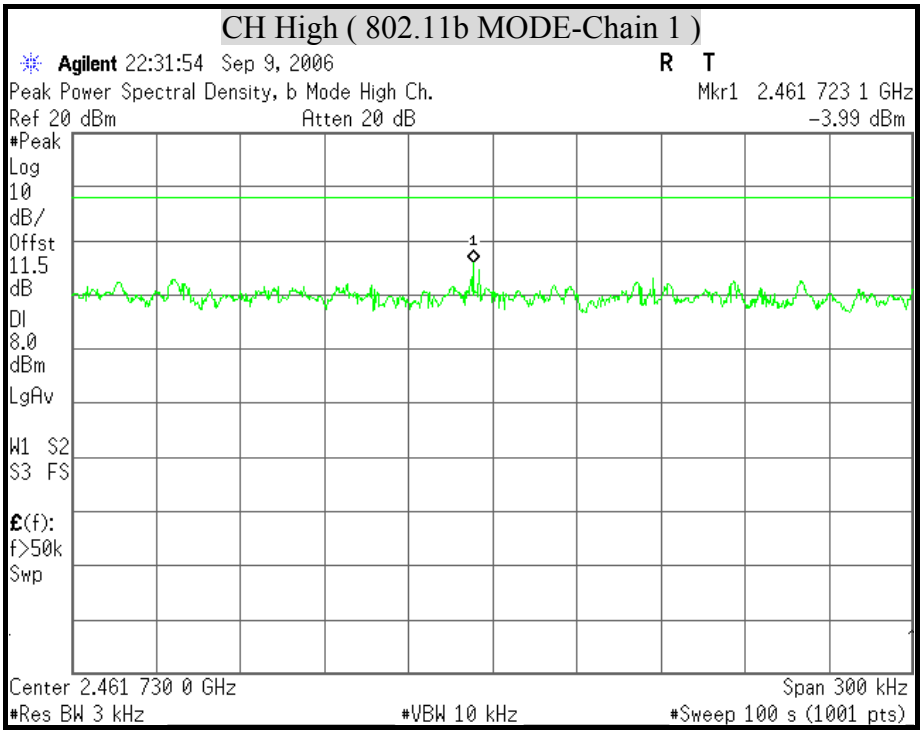
CH Low (802.11b MODE-Chain 1)



CH Mid (802.11b MODE-Chain 1)

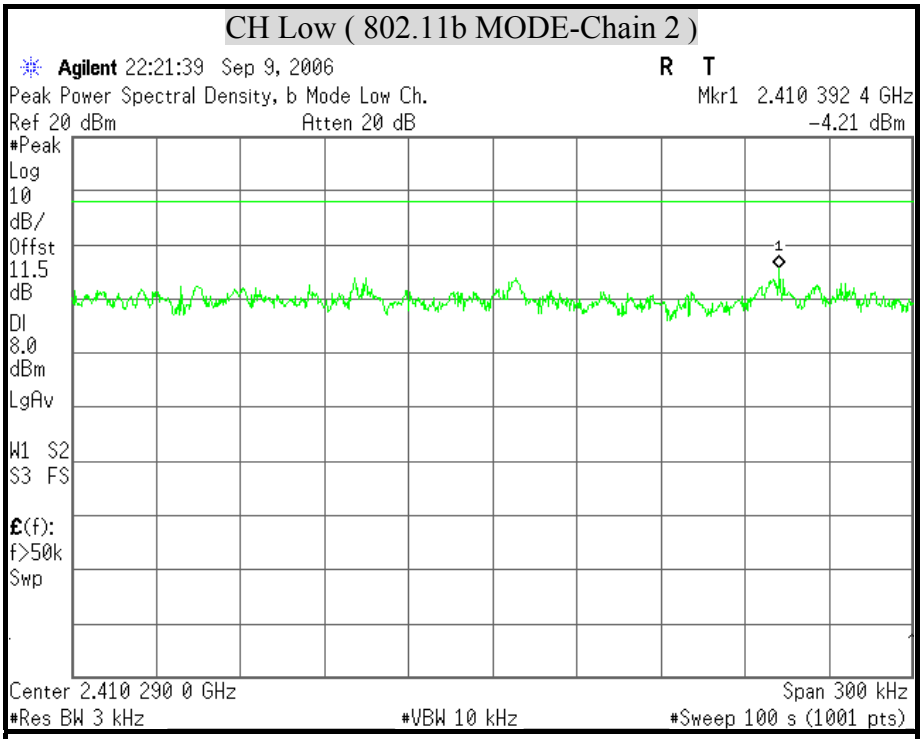


CH High (802.11b MODE-Chain 1)

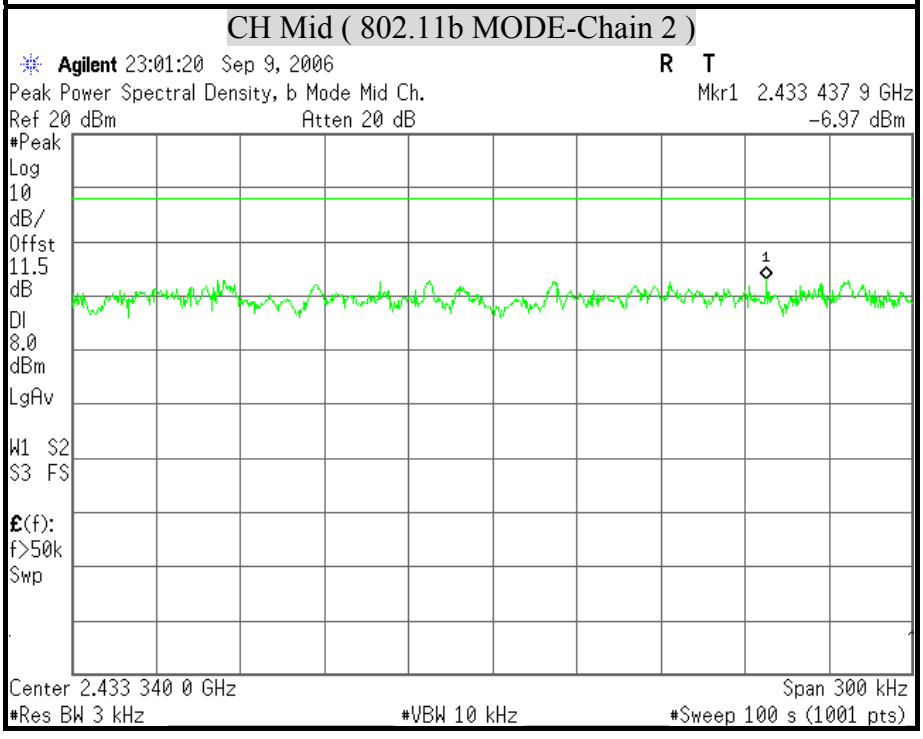


2dBi Antenna

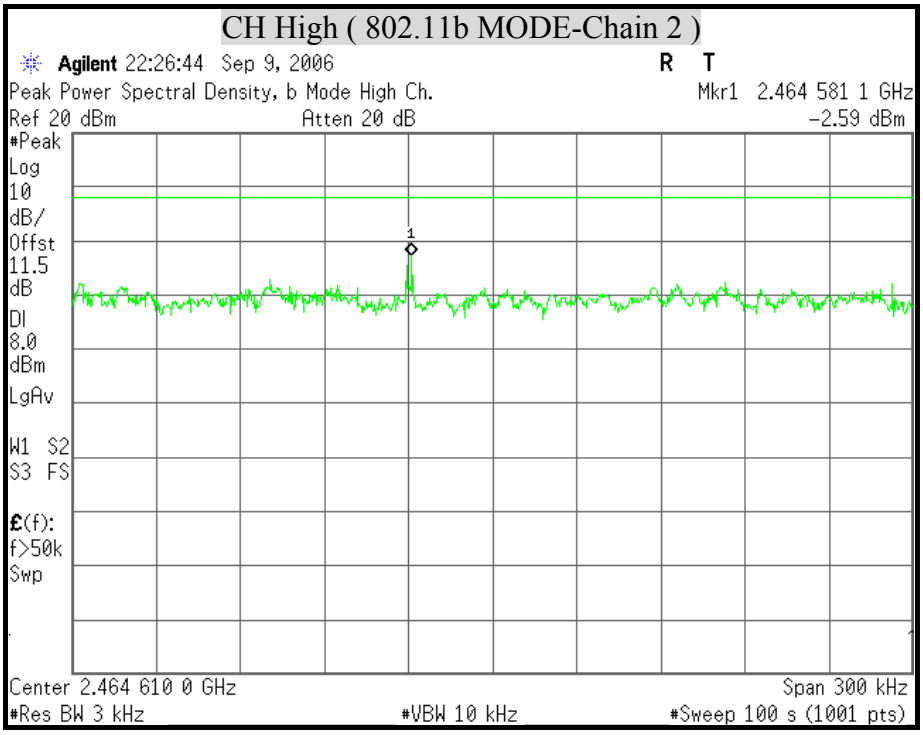
CH Low (802.11b MODE-Chain 2)



CH Mid (802.11b MODE-Chain 2)

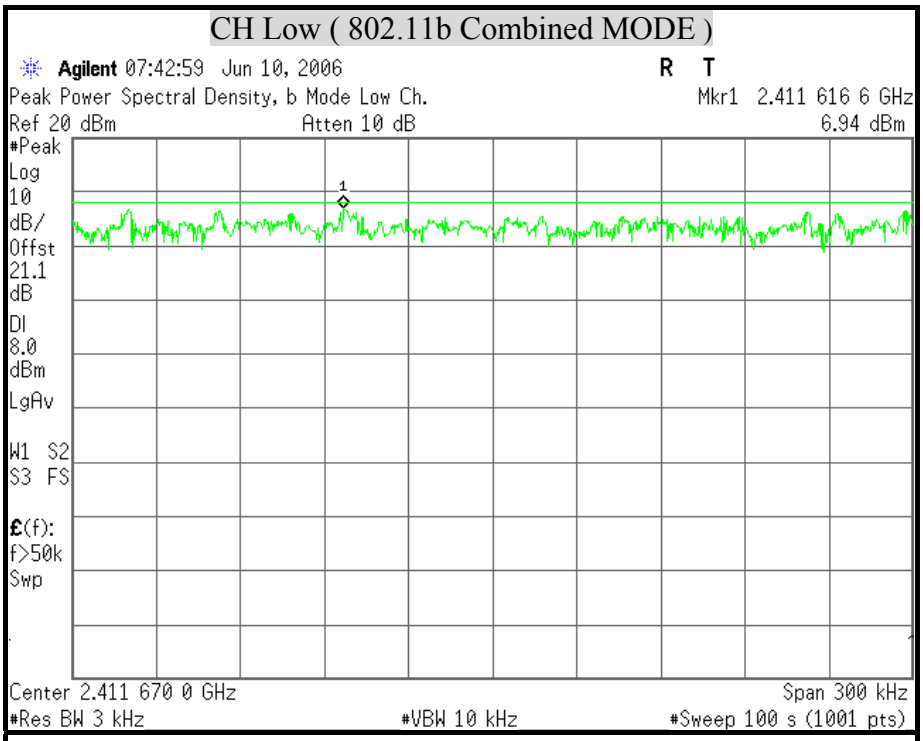


CH High (802.11b MODE-Chain 2)

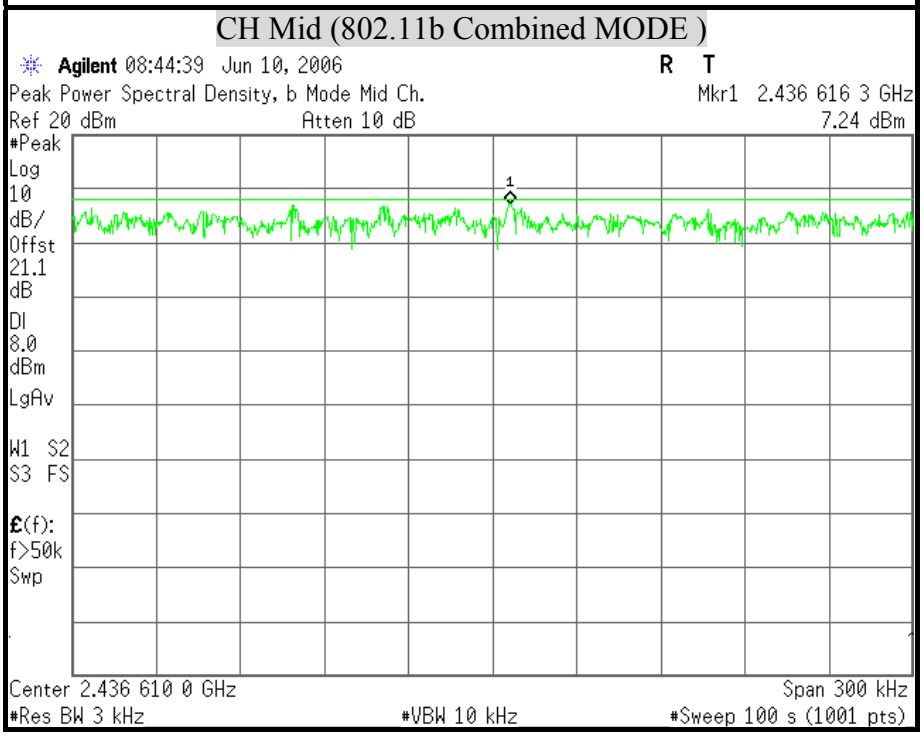


2dBi Antenna

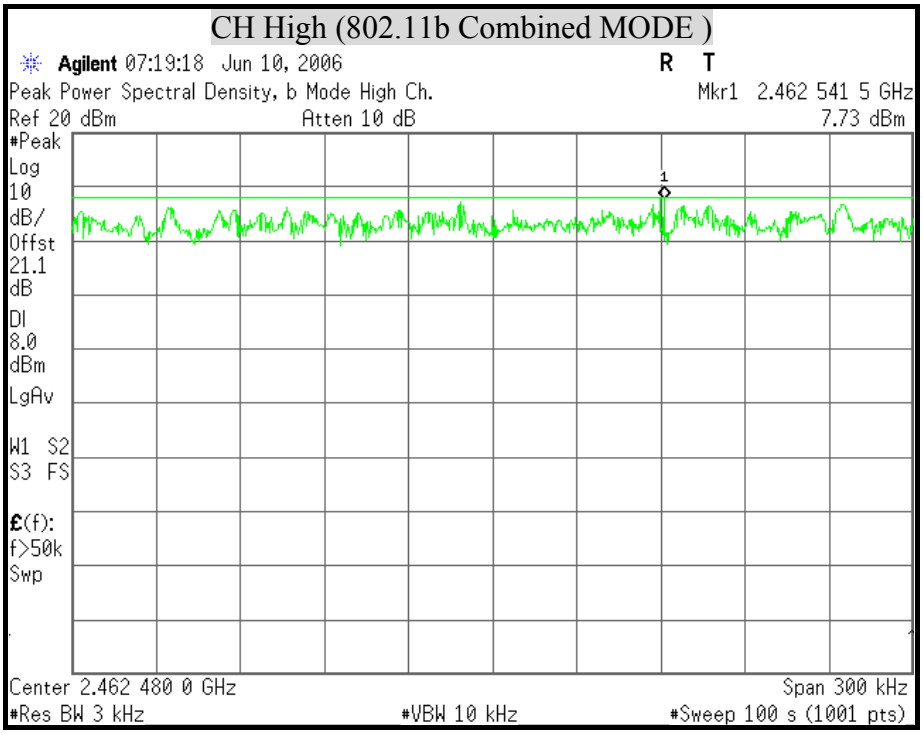
CH Low (802.11b Combined MODE)



CH Mid (802.11b Combined MODE)



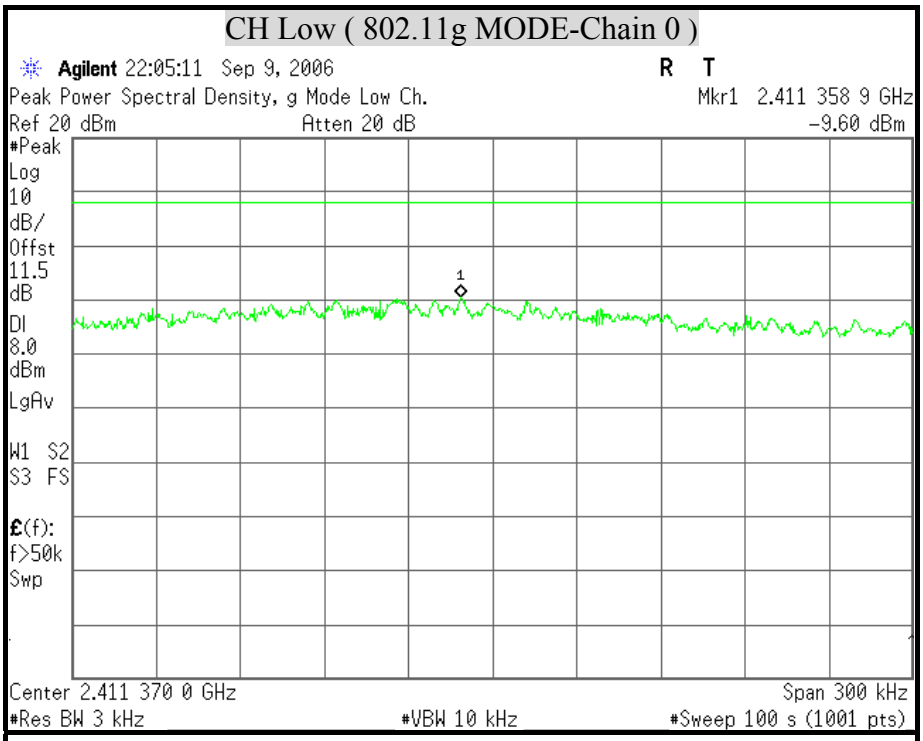
CH High (802.11b Combined MODE)



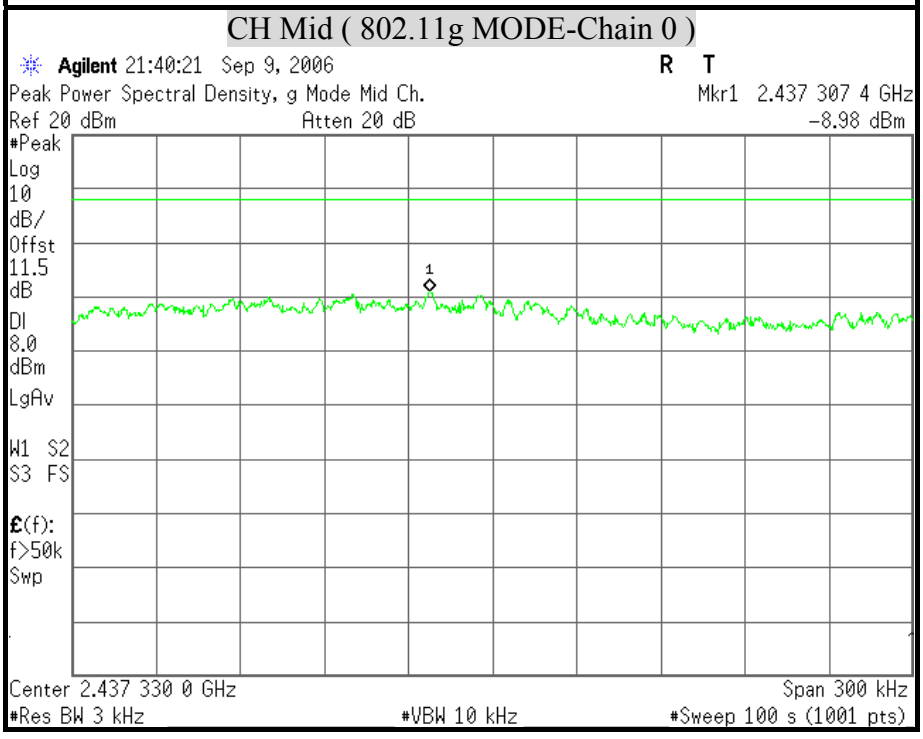
POWER SPECTRAL DENSITY (IEEE 802.11g MODE)

2dBi Antenna

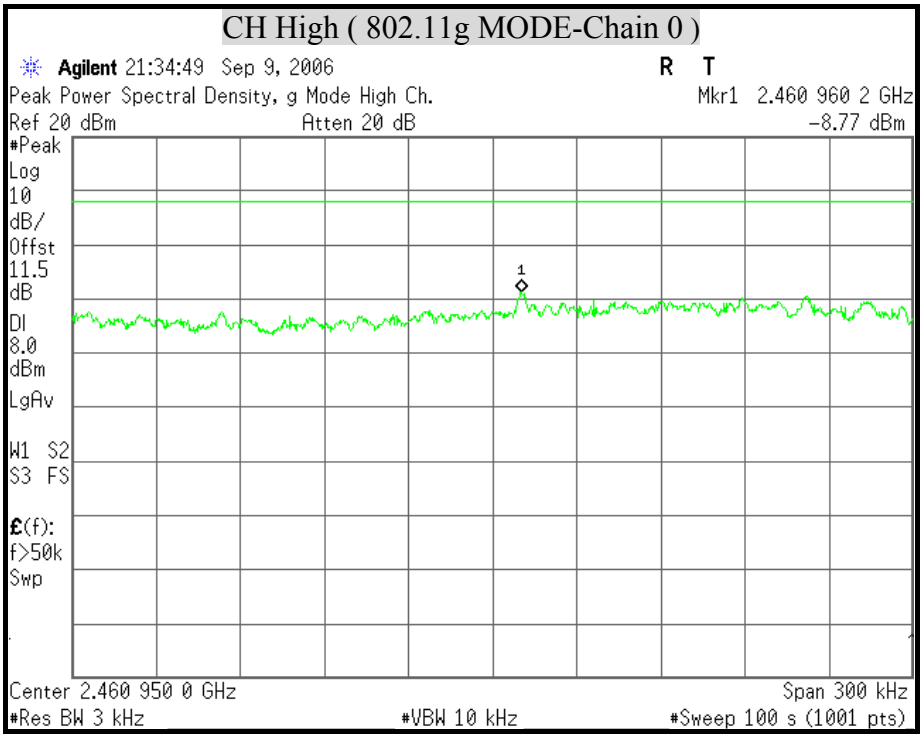
CH Low (802.11g MODE-Chain 0)



CH Mid (802.11g MODE-Chain 0)

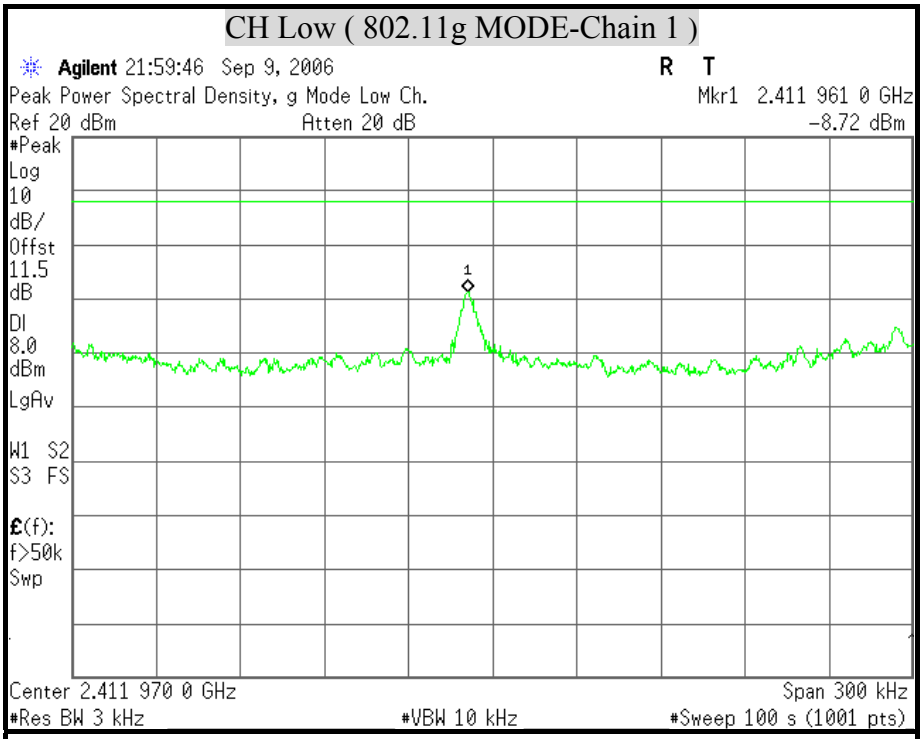


CH High (802.11g MODE-Chain 0)

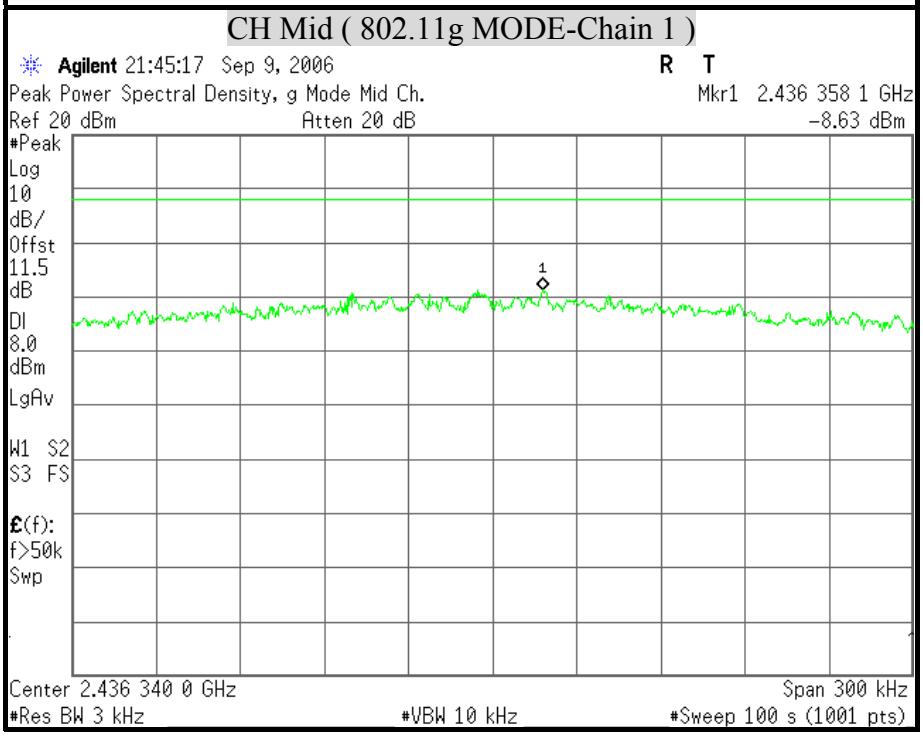


2dBi Antenna

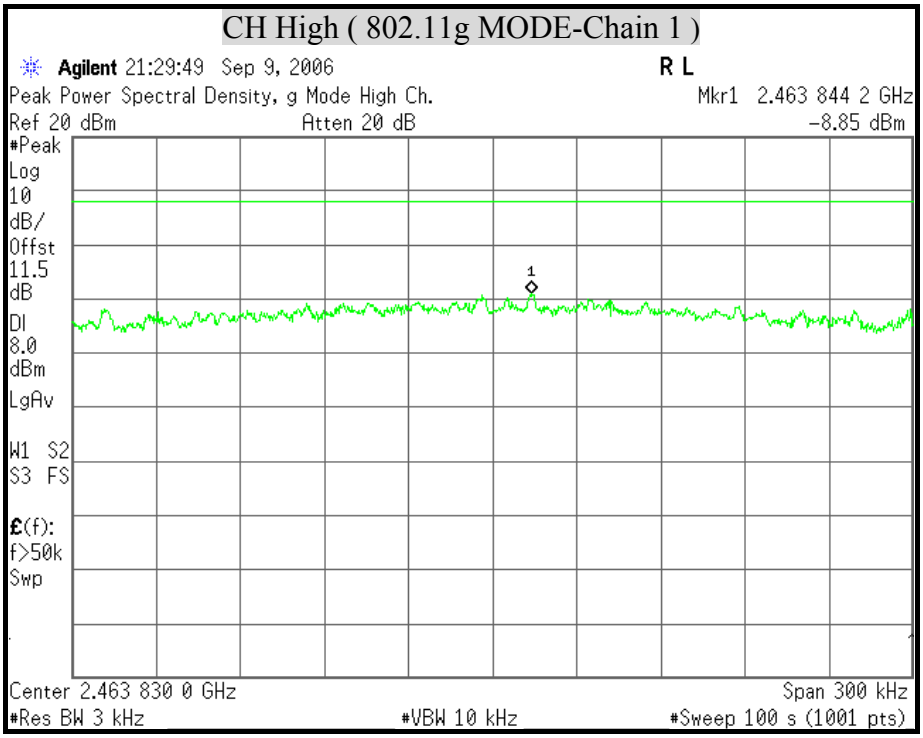
CH Low (802.11g MODE-Chain 1)



CH Mid (802.11g MODE-Chain 1)

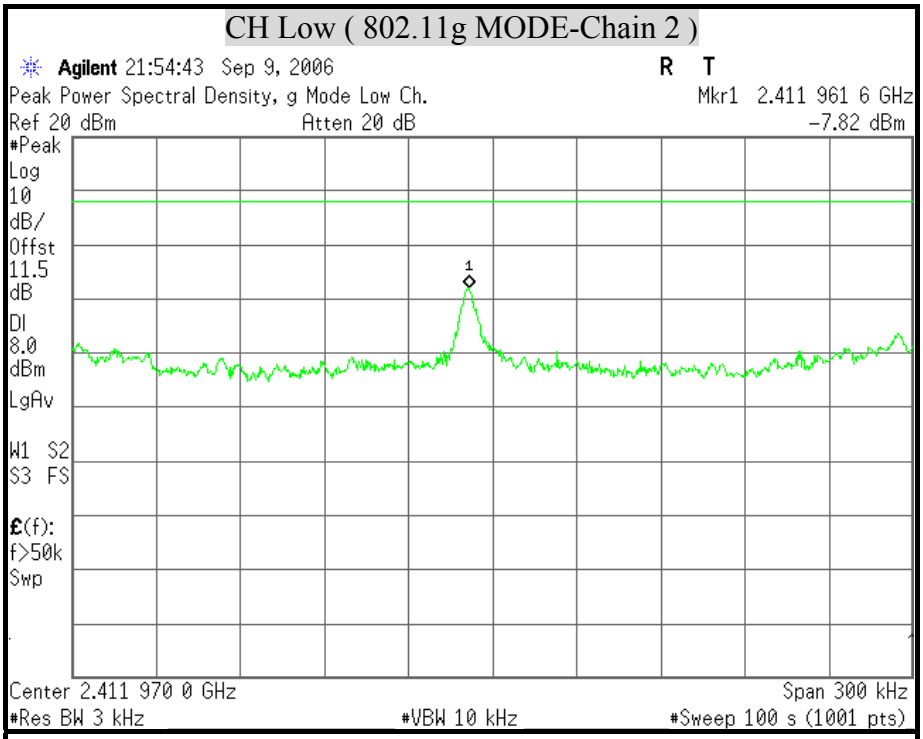


CH High (802.11g MODE-Chain 1)

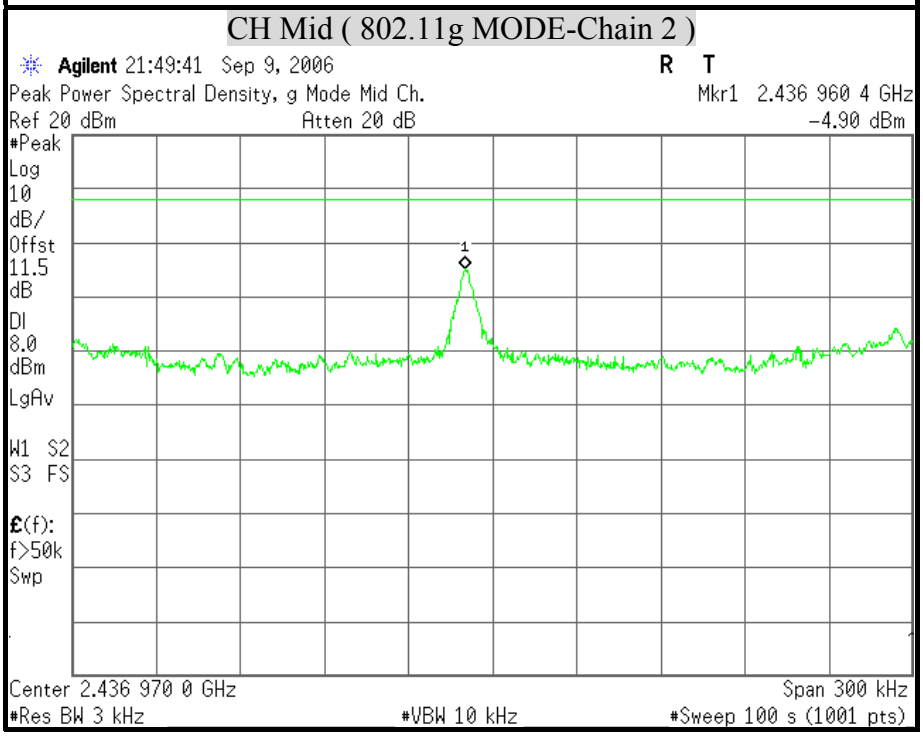


2dBi Antenna

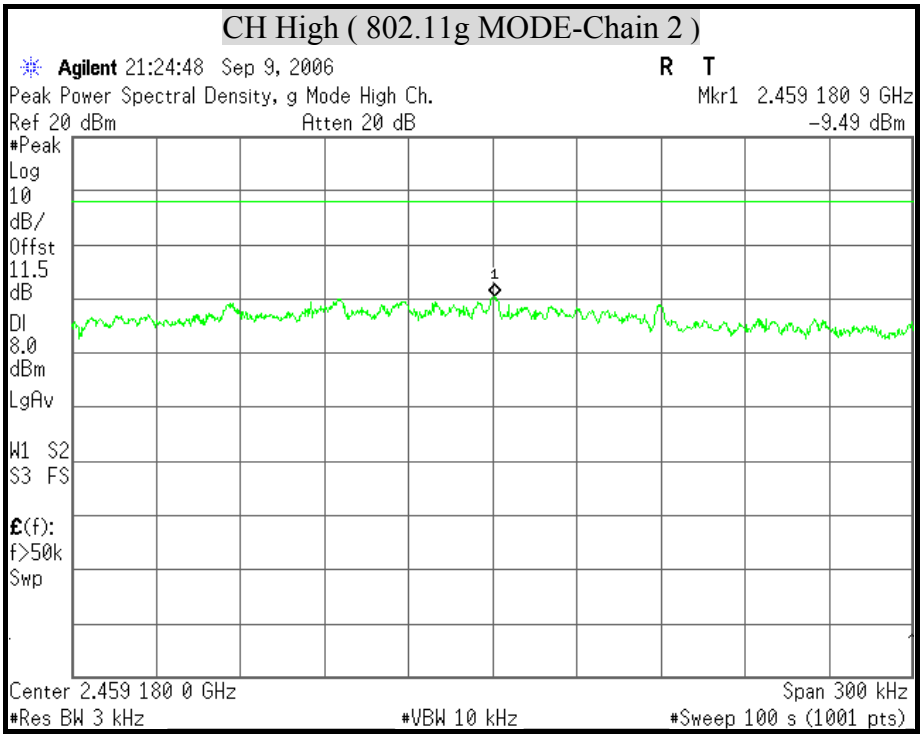
CH Low (802.11g MODE-Chain 2)



CH Mid (802.11g MODE-Chain 2)

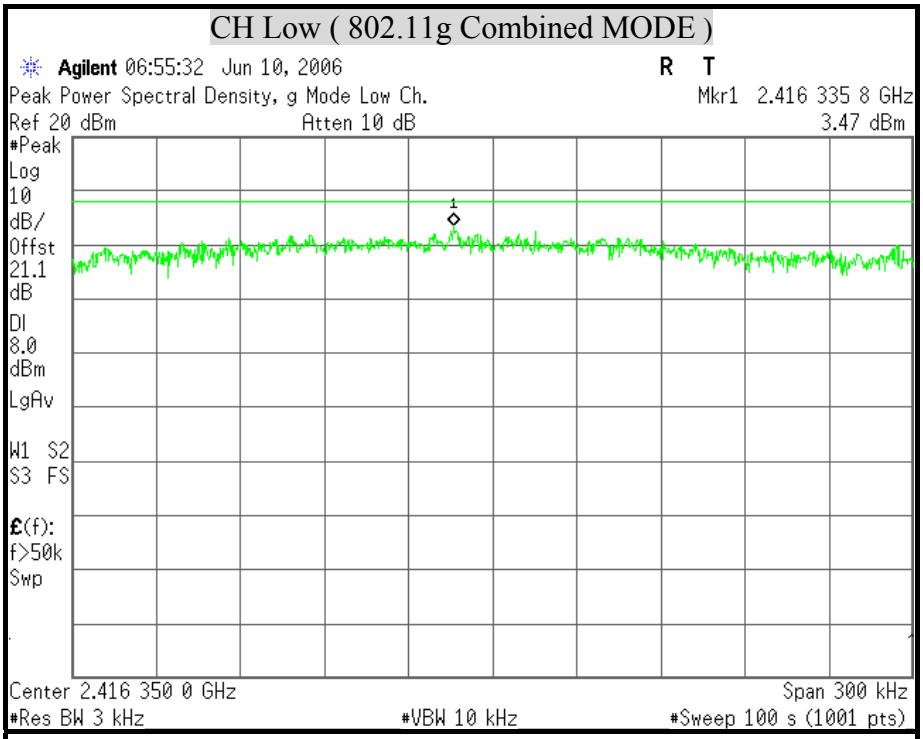


CH High (802.11g MODE-Chain 2)

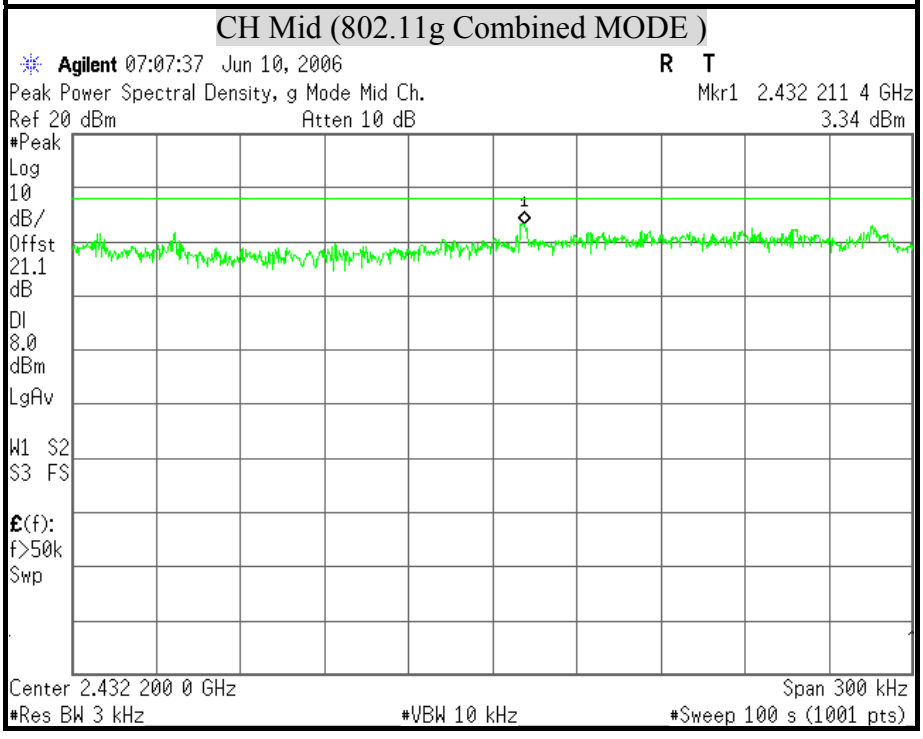


2dBi Antenna

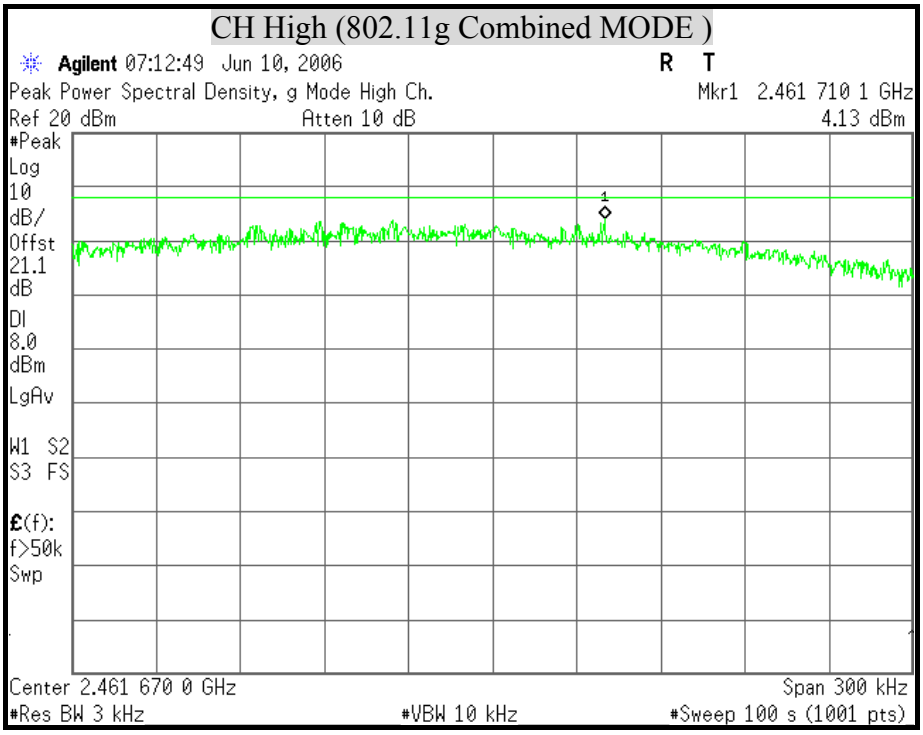
CH Low (802.11g Combined MODE)



CH Mid (802.11g Combined MODE)



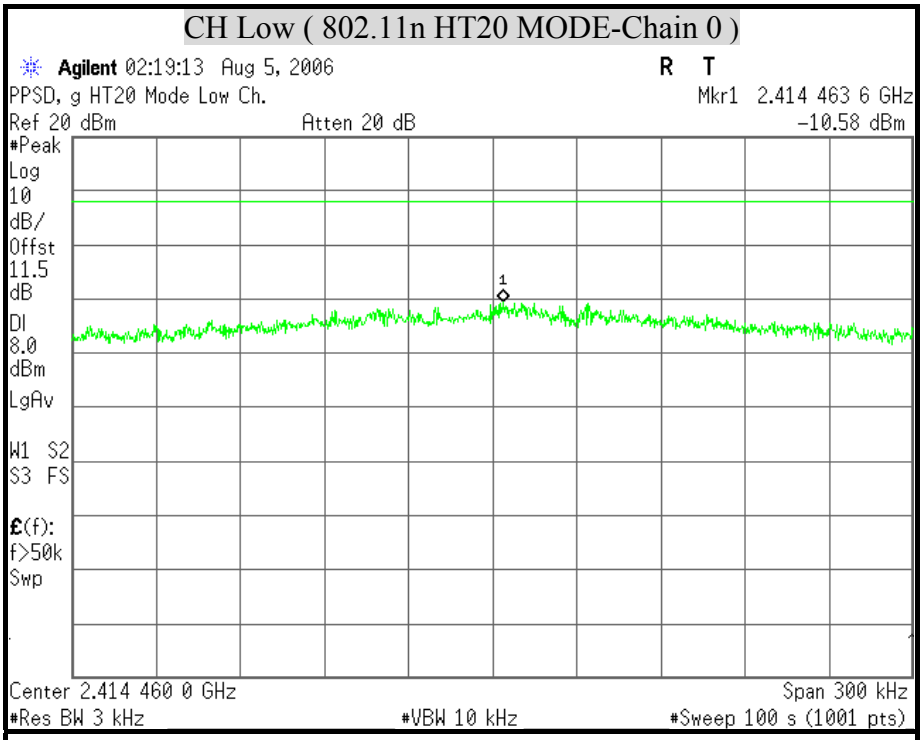
CH High (802.11g Combined MODE)



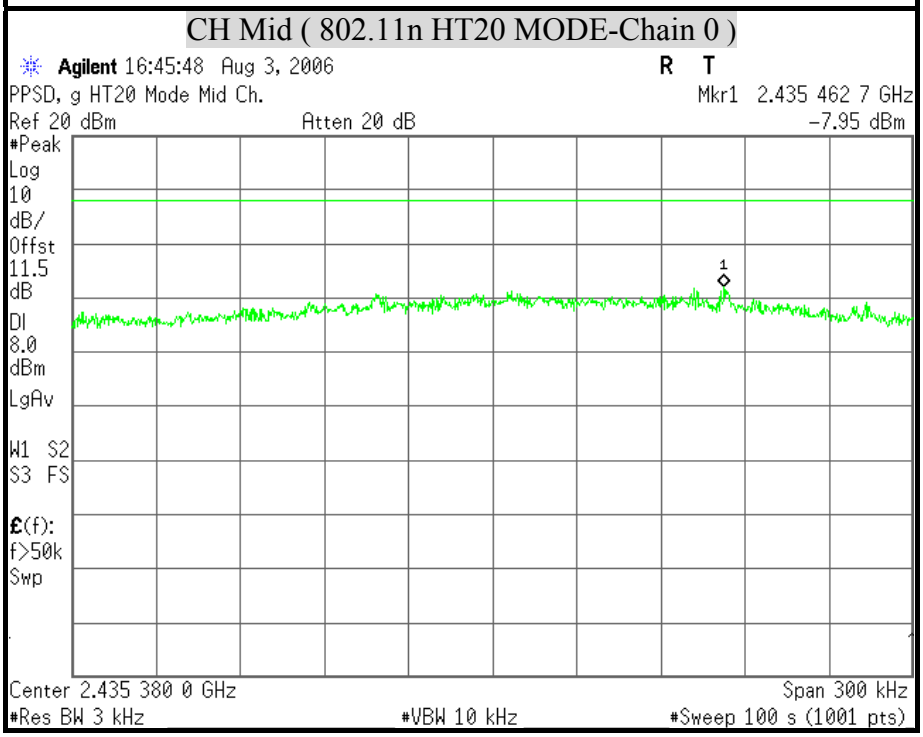
POWER SPECTRAL DENSITY (802.11n HT20 MODE)

2dBi Antenna

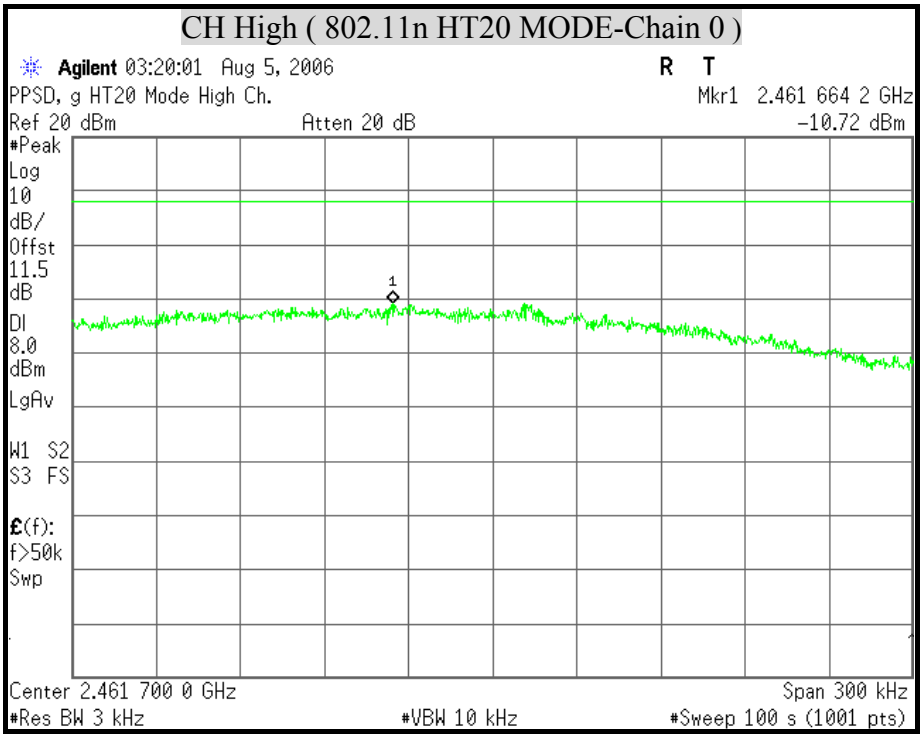
CH Low (802.11n HT20 MODE-Chain 0)



CH Mid (802.11n HT20 MODE-Chain 0)

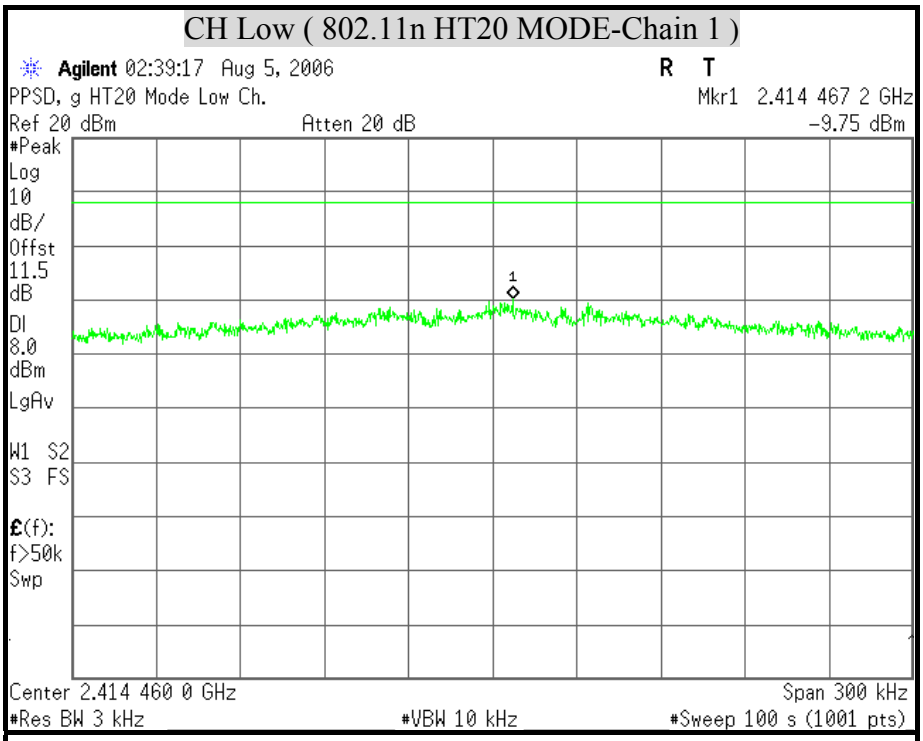


CH High (802.11n HT20 MODE-Chain 0)

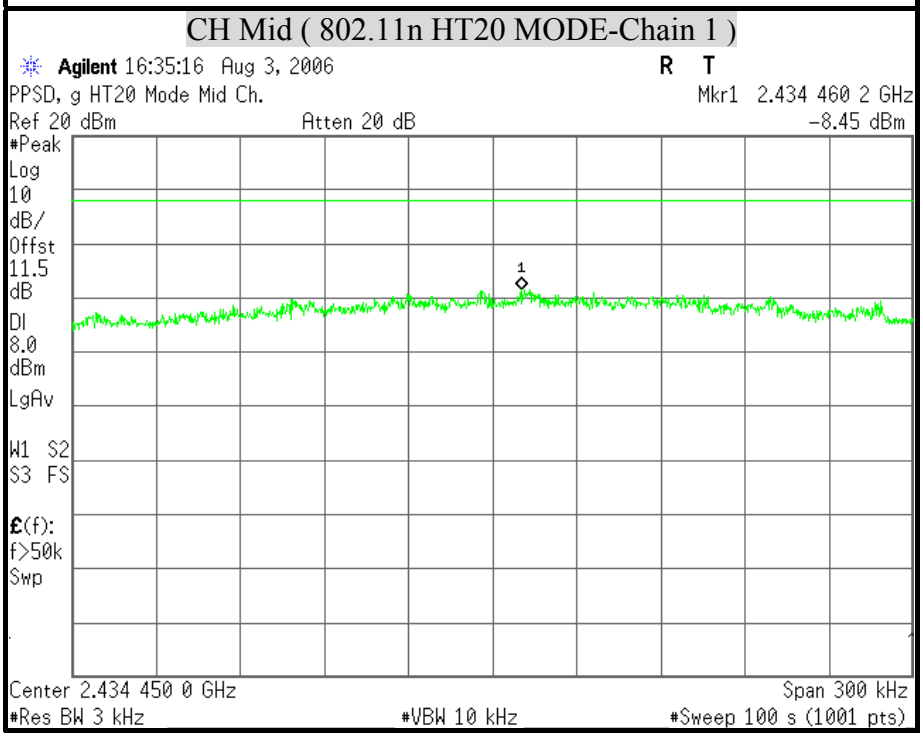


2dBi Antenna

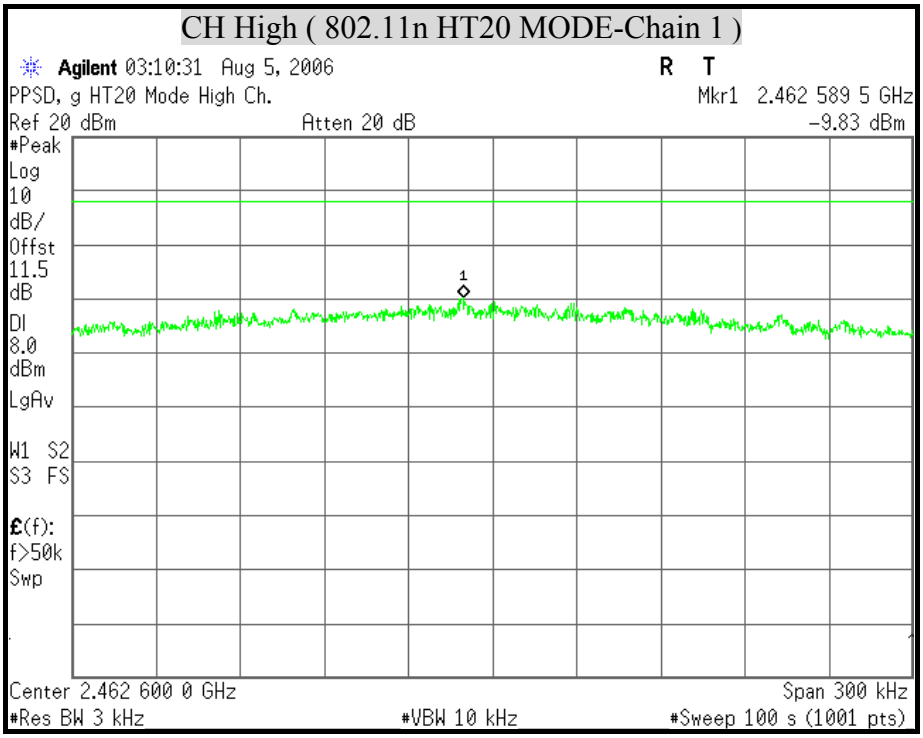
CH Low (802.11n HT20 MODE-Chain 1)



CH Mid (802.11n HT20 MODE-Chain 1)

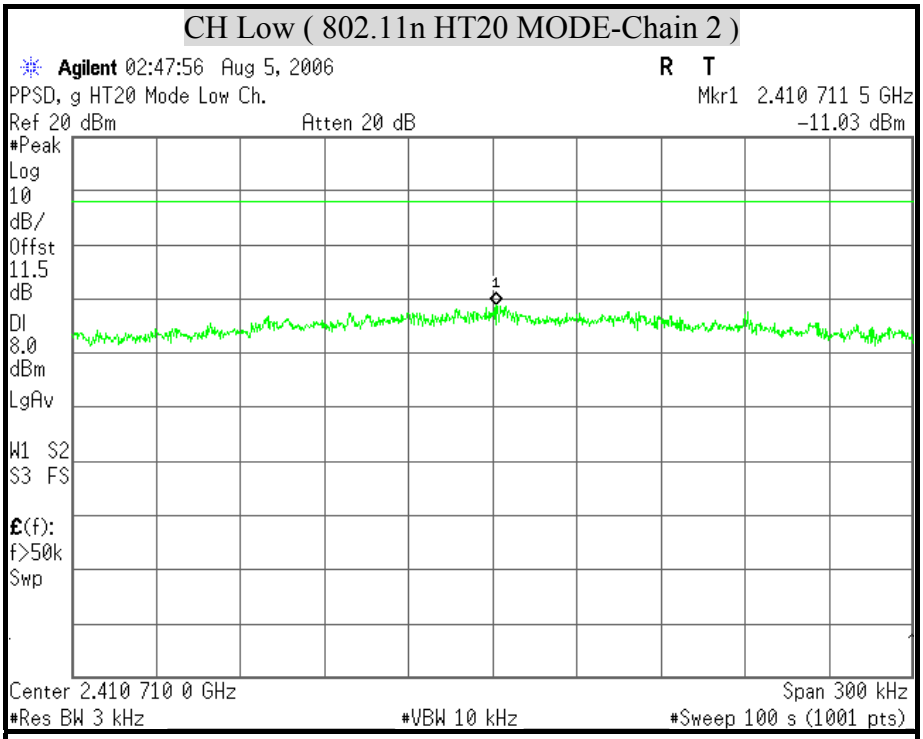


CH High (802.11n HT20 MODE-Chain 1)



2dBi Antenna

CH Low (802.11n HT20 MODE-Chain 2)



CH Mid (802.11n HT20 MODE-Chain 2)